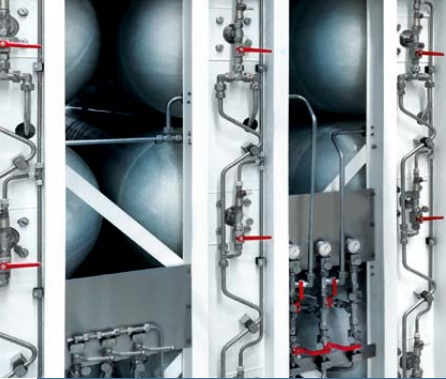


MHA ZENTGRAF
FlowControl Technology

CATALOG 2019 / 2020



Directory

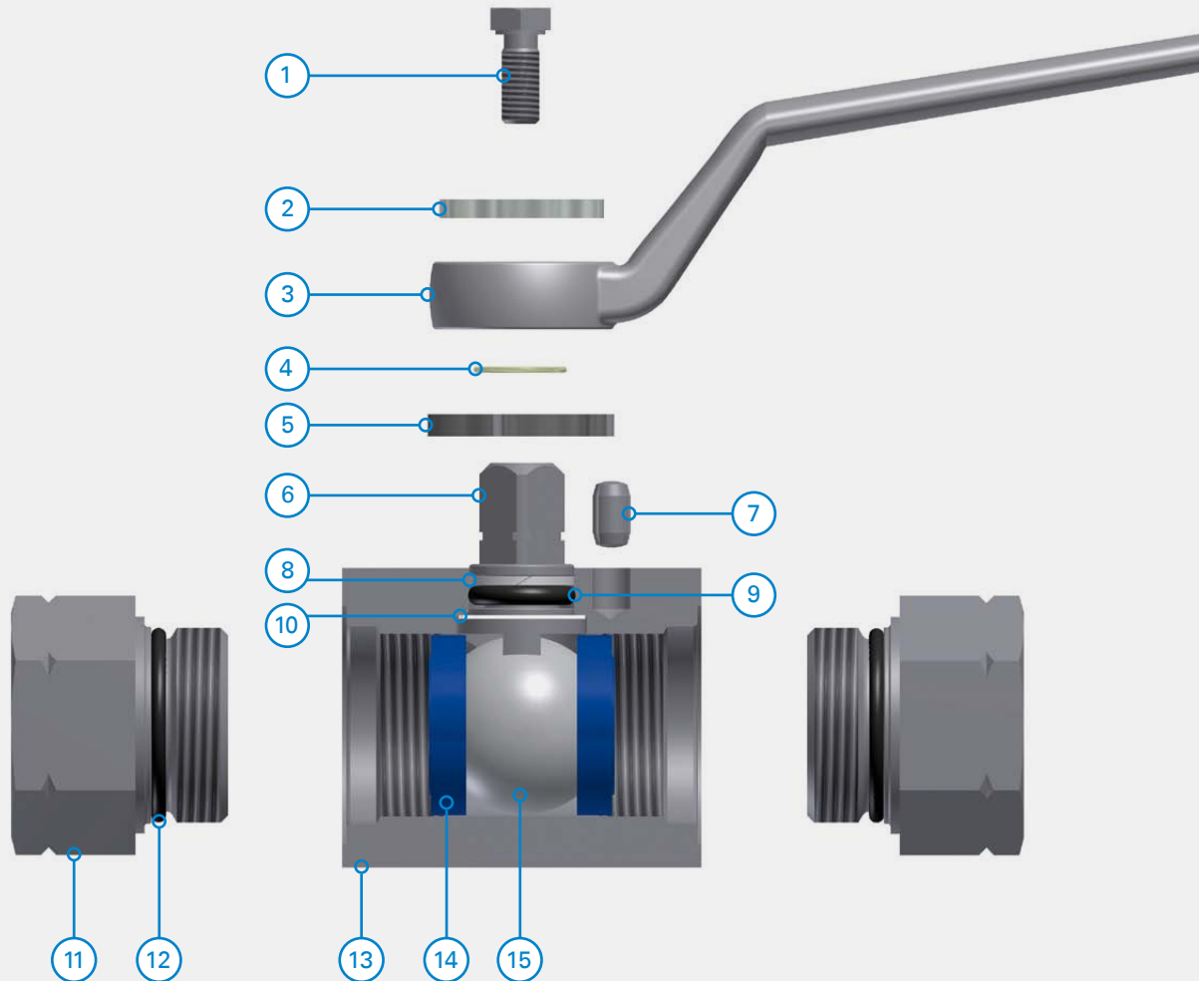
Introduction	4
Data sheets	14

Two-way ball valves	14	Two-way
Multiway ball valves	92	Multiway
Ball valves for manifold mounting	124	Manifold
Application-specific ball valves	140	Application-specific
Ball valve combinations	184	Combinations
Flow control valves	196	Flow control
Accessories	218	Accessories
Accumulator safety blocks	234	Accumulator safety blocks
Industry solutions	238	Industry solutions
Technical annex	250	

Ball valve components nomenclature

 Nomenklatur von Kugelhahnkomponenten
  Nomenclature des composants du robinet

 Nomenclatura delle componenti della valvola a sfera
  Nomenclatura de las componentes de la válvula de bola



Pos.	English	German	French	Italian	Spanish
1	fixing screw	Befestigungsschraube	vis de fixation	vite di fissaggio	tornillo de ajuste
2	flow indicator	Durchflussanzeige	indicateur de débit	indicatore di direzione del flusso	indicador de flujo
3	lever, handle	Handgriff	levier	leva	palanca
4	snap ring	Sprengring	circlip	anello elastico	anillo de retencion
5	stopping disk	Anschlagscheibe	rondelle de butée	rondella d'arresto	disco de cierre
6	stem	Schaltwelle	arbre	perno di manovra	vastago
7	stop pin	Anschlagstift	pion d'arrêt	perno d'arresto	perno de tope
8	back-up ring	Stützring	bague d'appui	rondella d'appoggio	anillo de refuerzo
9	O-ring	O-ring	joint torique	O-ring	O-ring
10	washer	Anlaufscheibe	rondelle de calage	disco d'appoggio	arandela
11	adapter	Anschluss	adaptateur	adattatore	conexion
12	O-ring	O-ring	joint torique	O-ring	O-ring
13	body	Gehäuse	corps	corpo	cuerpo
14	ball seat	Dichtelement	siège de boisseau	guarnizione della sfera	asiento de bola
15	ball	Kugel	boisseau	sfera	bola / esfera

Data sheet structure

Aufbau der Datenblätter
 Structure de la fiche technique
 Struttura di schede tecniche
 Estructura de Hojas de Datos

- EN available sizes
 - GER verfügbare Nenngrößen
 - F diamètres
 - I diametri disponibili
 - ES tamanos disponibles
-
- EN accessories on request
 - GER mögliches Zubehör
 - F accessoires
 - I accessori su richiesta
 - ES accesorios bajo pedido
-
- EN general dimensions
 - GER allgemeine Abmessungen
 - F dimensions
 - I dimensioni generali
 - ES accesorios bajo pedido
-
- EN connection type
 - GER Anschlussstyp
 - F raccordement
 - I tipo di connessione
 - ES tipo de conexion

2-way ball valve

Steel

BKH / BKHP500

AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, ISO 7/1 Rc Female thread, ISO 8434-3 ORFS Male thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 21
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	112B
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	PPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

Type	L	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BKH-DN4	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN6	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN8	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN10	43	32	52	38	12,5	11	9	115	-	86	Zn
BKH-DN13	48	35	54	40	19	11	9	115	-	89	Zn
BKH-DN16	48	38	63	46	19	13	12	160	-	106	Al
BKH-DN20	62	49	75	57	24,5	14	14	200	79	-	Zn
BKH-DN25	66	58	83	65	29,5	14	14	200	87	-	Zn
BKHP500-DN25	74	70	88	70	34,5	14	14	200	92	-	Zn
BKH-DN25/32	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/40	66	58	83	65	29,5	14	14	200	87	-	Zn

CONNECTION TYPE

DIN ISO 228 FEMALE THREAD

DIMENSIONS

Type	LW	L	l	d	Weight (Kg)
BKH-DN4-G1/8	5	69	10	G1/8	0,41
BKH-DN6-G1/4	6	69	14	G1/4	0,40
BKH-DN10-G3/8	10	72	14	G3/8	0,54
BKH-DN13-G1/2	13	83	16,3	G1/2	0,65
BKH-DN16-G5/8	15	83	16	G5/8	0,70
BKH-DN20-G3/4	20	95	18	G3/4	1,50
BKH-DN25-G1	25	113	20	G1	2,20
BKHP500-DN25-G1	25	113	20	G1	3,10
BKH-DN25/32-G1 1/4	25	120	22	G1 1/4	2,30
BKH-DN25/40-G1 1/2	25	130	24	G1 1/2	2,60

ORDER CODE PER MATERIAL COMBINATION

PN (bar)	112A	112B
500	20639*	34799*
500	17401*	17679*
500	17185*	19901*
500	17253*	17165*
420	21519*	25726*
420	17254*	17183*
315	17751*	30379*
420	43622	43835
315	17630*	19765*
315	25357*	29191*

- EN available connection types
 - GER verfügbare Anschlussstypen
 - F gammes de raccordement
 - I gamma di connessione
 - ES tipos de conexion disponibles
-
- EN material code description
 - GER Materialschlüssel
 - F description du code matière
 - I codice materiale
 - ES descripción código de material
-
- EN order code
 - GER Bestellnummer
 - F code de commande
 - I codice ordine
 - ES número de pedido

Ordering information

Please always provide the medium, pressure, temperature and specific use conditions with every order. Guarantee claims are invalid in the event that information is missing or insufficient and this results in unsuitable use of our products. The pressure levels given represent the maximum operating pressures for static loads including pressure peaks. Pressure reductions with regard to temperature and materials/area of use must be taken into account. Dynamic loads, e.g. from vibrations or pulsating pressure, require particular consideration during product selection.

Bestellinformationen

Bitte geben Sie bei Bestellungen unbedingt Medium, Druck, Temperatur und besondere Einsatzbedingungen an. Bei fehlenden oder unzureichenden Angaben und daraus resultierenden ungeeigneten Anwendungen unserer Produkte entfällt der Garantieanspruch. Die angegebenen Druckstufen stellen die maximalen Betriebsdrücke für ruhende Belastungen inklusive Druckspitzen dar. Druckabschläge hinsichtlich Temperatur und Werkstoffen/Einsatzbereich sind zu berücksichtigen. Dynamische Belastungen, z.B. durch Schwingungen oder pulsierende Drücke verlangen bei der Produktauswahl besondere Beachtung.

Données techniques pour la commande

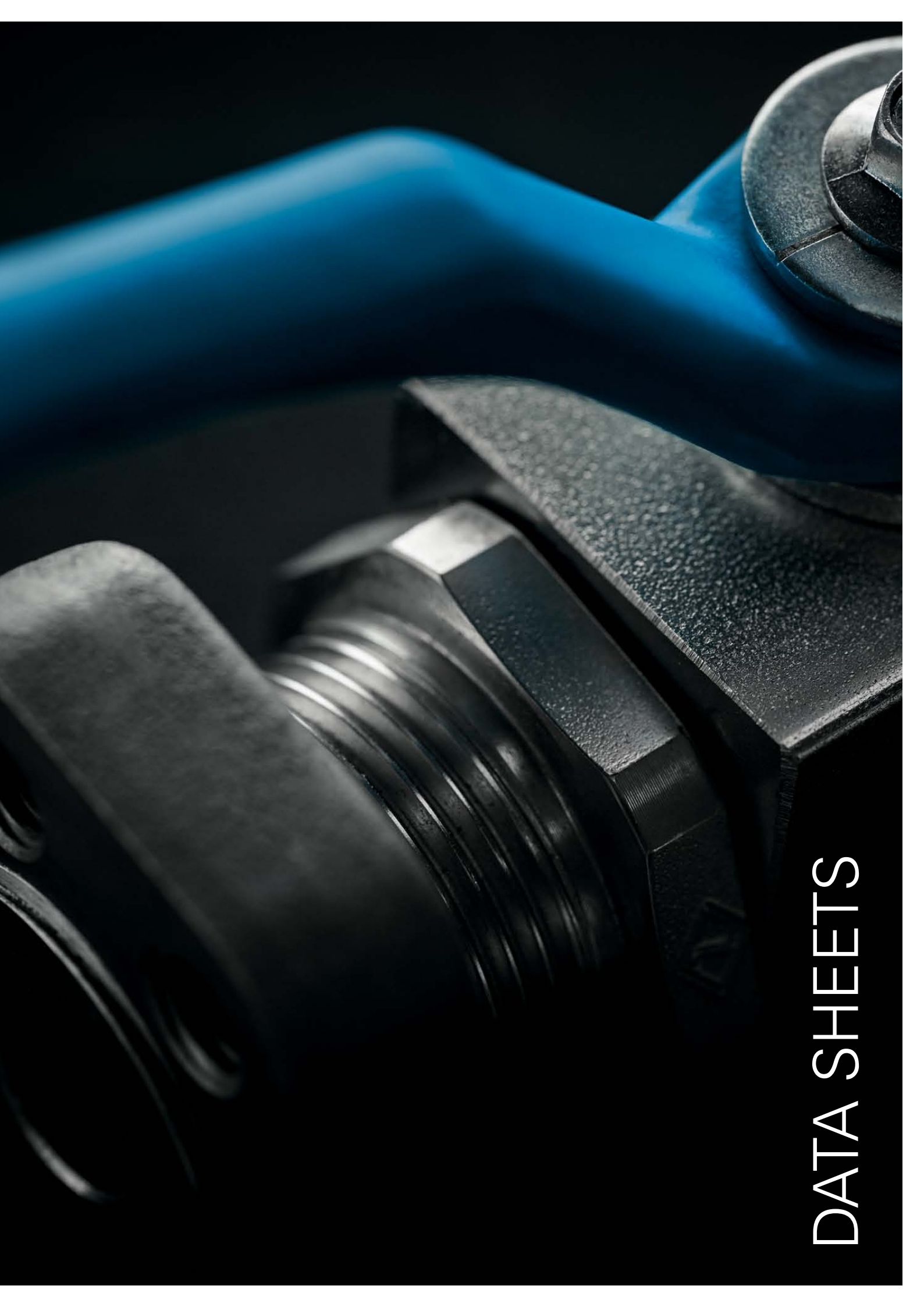
Lors de la commande, veuillez impérativement indiquer le fluide, la pression, la température et les éventuelles conditions d'exploitation particulières. En cas d'absence de ces données ou de données insuffisantes, le droit de garantie est annulé si cela conduit à une utilisation non-conforme de nos produits. Les niveaux de pression indiqués correspondent aux pressions de service maximales pour les charges statiques, y compris les pics de pression. Les réductions de pression liées à la température et aux matériaux/domaines d'application doivent être prises en compte. Les charges dynamiques, par ex. les vibrations ou les impulsions de pression, doivent être prises en compte spécifiquement lors du choix des produits.

Información sobre pedidos

Cuando realice los pedidos, es imprescindible que indique el fluido que se utiliza, la presión, la temperatura y cualquier posible condición de uso especial. Si se obtienen aplicaciones inadecuadas de nuestros productos porque no se proporcionaron los datos correctos o eran incompletos, se extingue todo derecho de garantía. Los niveles de presión indicados representan las presiones máximas operativas para cargas en reposo, picos de presión incluidos. Deben tenerse en cuenta las reducciones de presión en cuanto a temperatura y materiales/lugar de uso. Las cargas dinámicas, p. ej. con oscilaciones o presión pulsada, merecen especial atención a la hora de elegir el producto.

Informazioni per l'ordinazione

Al momento dell'ordine indicare necessariamente il fluido, la pressione, la temperatura e fare presente particolari condizioni di utilizzo. In caso di informazioni mancanti o insufficienti e di conseguenti applicazioni non idonee decade il diritto di garanzia per i nostri prodotti. Gli stadi di pressione indicati rappresentano le pressioni massime d'esercizio per i carichi statici comprensive dei picchi di pressione. Tenere presente i cali di pressione relativi a temperatura e a materiali/ambiti di applicazione. Nella scelta dei prodotti prestare particolare attenzione ai carichi dinamici, determinati ad es. da oscillazioni o pressioni intermittenti.

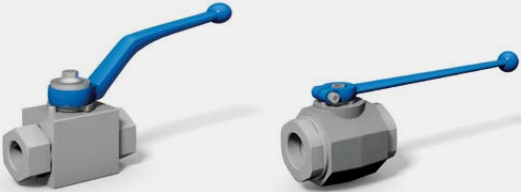


DATA SHEETS

2-way ball valves


2-way ball valves with threaded connections

page

	BKH / BKHP500	PN250-500 bar	DN4-25/40	14
	MKHP420	PN420 bar	DN32-50	22
steel / stainless steel				


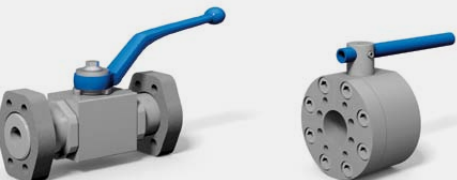
2-way low-pressure ball valves with threaded connections

page

	NKH	PN30-65 bar	DN8-100	30
	brass / stainless steel			

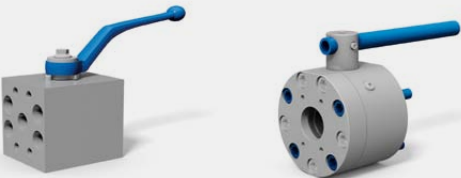
2-way ball valves with SAE connections

page

	BKH- / BKHP-SAEFS	PN315-420 bar	DN13-25	38
	MKHP-SAEFS	PN210-420 bar	DN32-50	42
steel / stainless steel				
	BKH-SAE / BKHP-SAE	PN315-420 bar	DN13-25	46
	MKHP-SAE	PN175-420 bar	DN32-50/65	50
	BKH/BKHP-SAE/SAEFS	PN315-420 bar	DN13-25	54
	MKHP-SAE/SAEFS	PN175-420 bar	DN32-50	58
	KH-SAE	PN35-420 bar	DN15-125	62
steel / stainless steel metric threads / UNC threads				


2-way ball valves flangeable with SAE connections

page

	KHZ-SAE	PN210-420 bar	DN13-50	68
	KH-SAE	PN35-420 bar	DN50-125	72
steel / stainless steel metric threads / UNC threads				

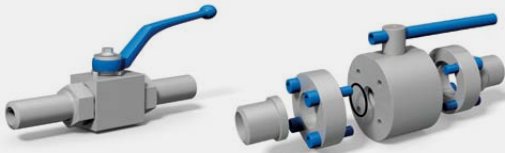
2-way ball valves with ISO connections / CETOP connections

page

	KH-ISO	PN100-400 bar	DN13-200	74
	KH-CETOP	PN100-250 bar	DN40-100	82
steel / stainless steel				

2-way ball valves with welding ends

page

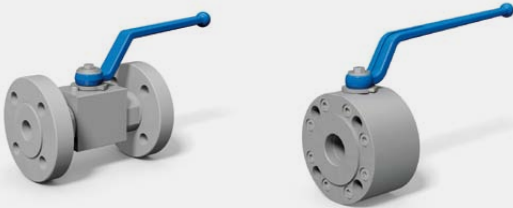


BKH-AS	PN160 bar	DN10-25/40	34
MKHP-AS	PN160 bar	DN32-50/65	35
BKH-ASK	PN160-500 bar	DN4-25/40	37
KH-AS	PN329-475 bar	DN65-125	84

steel / stainless steel

2-way ball valves with DIN connections

page



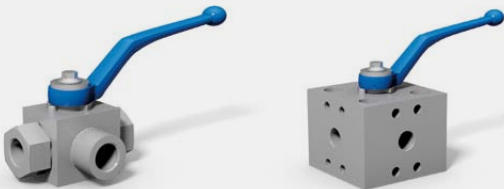
BKH-F	PN40-320 bar	DN15-25/32	86
MKHP-F	PN40-320 bar	DN32-50/65	88
KH-DIN	PN40-160 bar	DN40-150	90

steel

Multiway ball valves

3/2-way selector ball valves with threaded connections / SAE connections

page



BK3 / BK3-S	PN315-500 bar	DN4-50	92
BK3K-SAE	PN420 bar	DN13-50	103

steel / stainless steel

3/2-way low-pressure selector ball valves with threaded connections

page



NK3	PN35-63 bar	DN10-50	104
-----	-------------	---------	---------------------

brass / stainless steel

3-way and 4-way ball valves with threaded connections

page




3KH	PN250-500 bar	DN4-25/40	108
4KH	PN250-500 bar	DN4-25/40	116

steel / stainless steel

Ball valves for manifold mounting

Ball valves for manifold mounting



page

	PKH	PN420-500 bar	DN6-50	124
	PK3 / PK3-S	PN315-500 bar	DN6-50	128
	MPKH3 / MPKH4	PN420-500 bar	DN6-40	136
	steel / stainless steel			

Application-specific ball valves


2-way highest-pressure ball valves with threaded connections

page

	BKHP800	PN800 bar	DN4-25	140
	steel			
	MKHP800	PN800 bar	DN4-25	142
	stainless steel			


2-way ball valves for gas with threaded connections

  page

	BKH	PN250-500 bar	DN4-25/40	145
	MKHP	PN350 bar	DN32-50	152
steel / stainless steel				


2-way ball valves for paints and lacquers

 page

	BKH	PN175-500 bar	DN4-25/40	160
	steel / stainless steel			


2-way ball valves for isocyanate with threaded connections

 page

	BKH	PN250-500 bar	DN4-25/40	168
	MKHP420	PN420 bar	DN32-50	172
steel				

2-way ball valves with venting hole and with threaded connections


page


	BKH	PN250-500 bar	DN4-25/40	176
	steel			

2-way ball valves with fire-safe approval



page

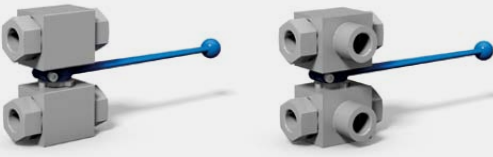
	BKH	PN315-420 bar	DN13-50	180
	stainless steel with threaded connections			

	KH-SAE	PN160-420 bar	DN25-125	182
	stainless steel with SAE connections			

Ball valve combinations

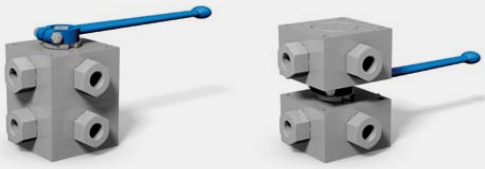
Ball valve combinations with threaded connections

page

	BKH / BKHP500	PN250-500 bar	DN4-25/40	184
	MKHP420	PN420 bar	DN32-50	188
	BK3	PN315-500 bar	DN4-25/32	190
	steel			

3-and 4-way ball valve combinations with threaded connections

page

	3KH/4KH lever on top	PN250-500 bar	DN4-25/40	192
	3KH/4KH lever central	PN250-500 bar	DN4-25/40	194
	steel			

Flow control

Needle valves for piping-system assembly with threaded connections / for manifold mounting / cartridge assembly

page



NDV
NDVP
NDVE

PN350 bar
PN350 bar
PN350 bar

DN6-40
DN6-30
DN8-16

196
198
206

steel / stainless steel

Flow control check valves for piping-system assembly with threaded connections / for manifold mounting

page



NDRV
NDRVP

PN350 bar
PN350 bar

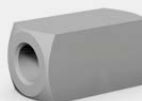
DN6-40
DN6-40

200
202

steel / stainless steel

Check valves for piping-system assembly / for manifold mounting

page



RV
RVP

PN350-500 bar
PN350 bar

DN6-40
DN6-40

210
212

steel / stainless steel

Check valve with SAE connection pattern

page



RVZ-SAE

PN 210-420 bar

DN15-50

214

steel / stainless steel

Accessories

Panel mounting kits

page



NDV/NDRV

DN 6-25

209

Ball valve operations

page



Levers
Actuators

218
220

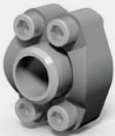
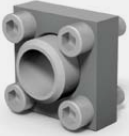
Mounting sets for ...

page

 	Locking devices	222
	Limit switches	228
	Proximity switches	229
 	Combinations	230
	Detent	231


Connection flanges

page

 	SAE connection flanges	232
	ISO connection flanges	233

Accumulator safety blocks

page

	ASB	DN10, 20, 32	234
	steel / stainless steel		
	manually or electrically operated		

Industry solutions

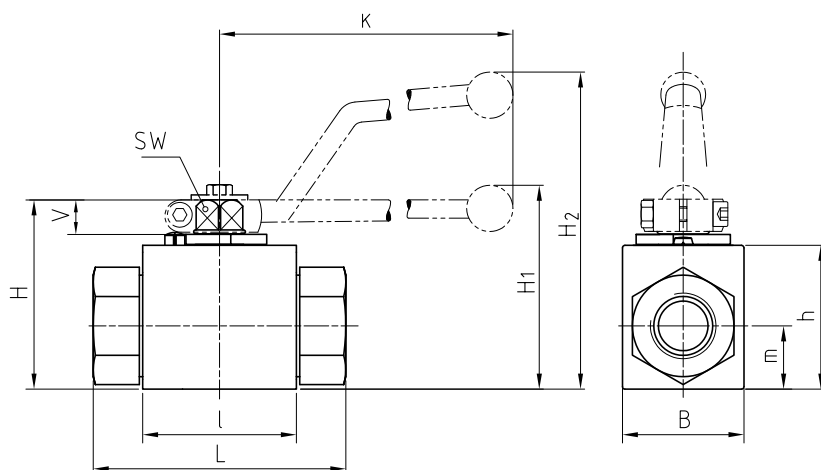
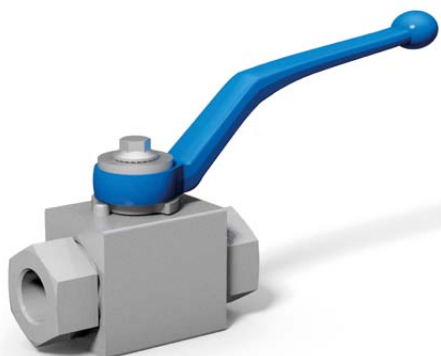
Solution examples for ...

page

<p>Marine & offshore</p> <p>Fire protection</p> <p>Energy and renewables</p> <p>Construction & agricultural</p> <p>Oil & gas</p> <p>Automotive</p> <p>Mining & boring</p> <p>Process industry</p>	   	238
	   	

2-way ball valve Steel

BKH / BKHP500



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, ISO 7/1 Rc Female thread, ISO 8434-3 ORFS Male thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

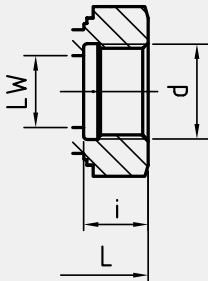
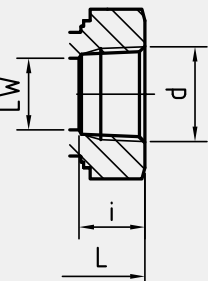
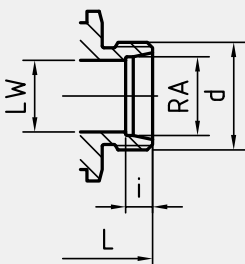
Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

Type	L	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BKH-DN4	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN6	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN8	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN10	43	32	52	38	17,5	11	9	115	-	86	Zn
BKH-DN13	48	35	54	40	19	11	9	115	-	89	Zn
BKH-DN16	48	38	63	46	19	13	12	160	-	106	Al
BKH-DN20	62	49	75	57	24,5	14	14	200	79	-	Zn
BKH-DN25	66	58	83	65	29,5	14	14	200	87	-	Zn
BKHP500-DN25	74	70	88	70	34,5	14	14	200	92	-	Zn
BKH-DN25/32	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/40	66	58	83	65	29,5	14	14	200	87	-	Zn
BKHR-DN25	70	55	78	60	26	14	14	171	-	129	Zn

2-way ball valve Steel

BKH / BKHP500

CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION			
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	112A	1128	
	BKH-DN4-G1/8	5	69	10	G1/8	0,41	500	20639*	34799*	
	BKH-DN6-G1/4	6	69	14	G1/4	0,40	500	17401*	17679*	
	BKH-DN10-G3/8	10	72	14	G3/8	0,54	500	17185*	19901*	
	BKH-DN13-G1/2	13	83	16,3	G1/2	0,65	500	17253*	17165*	
	BKH-DN16-G5/8	15	83	16	G5/8	0,70	420	21519*	25726*	
	BKH-DN20-G3/4	20	95	18	G3/4	1,50	420	17254*	17183*	
	BKH-DN25-G1	25	113	20	G1	2,20	350	17751*	30379*	
	BKHR-DN25-G1	24	115	20	G1	2,16	420	64417*	on request	
	BKHP500-DN25-G1	25	113	20	G1	3,10	500	43622	43835	
	BKH-DN25/32-G1 1/4	25	120	22	G1 1/4	2,30	350	17630*	19765*	
	BKH-DN25/40-G1 1/2	25	130	24	G1 1/2	2,60	350	25357*	29191*	
ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	112A	1128	
	BKH-DN4-1/8"NPT	5	69	10,5	1/8"NPT	0,30	500	02832*	25698*	
	BKH-DN6-1/4"NPT	6	69	13,7	1/4"NPT	0,40	500	17174*	24525*	
	BKH-DN10-3/8"NPT	10	72	13,5	3/8"NPT	0,55	500	17175*	25700*	
	BKH-DN13-1/2"NPT	13	83	17	1/2"NPT	0,75	500	17176*	24526*	
	BKH-DN20-3/4"NPT	20	95	18,3	3/4"NPT	1,63	420	17177*	25721*	
	BKH-DN25-1"NPT	25	113	21,6	1"NPT	2,30	350	17178*	25722*	
	BKHR-DN25-1"NPT	24	115	19	1"NPT	2,3	420	64419*	on request	
	BKHP500-DN25-1"NPT	25	113	21,6	1"NPT	3,16	500	43836	43837	
	BKH-DN25/32-1 1/4"NPT	25	120	22,1	1 1/4"NPT	2,51	350	17179*	25723*	
	BKH-DN25/40-1 1/2"NPT	25	130	22,1	1 1/2"NPT	2,70	250	32506*	32165*	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	112A	1128
	BKH-DN4-6L	5	6	67	7	M 12x1,5	0,36	500	17485*	25703*
	BKH-DN6-8L	6	8	67	7	M 14x1,5	0,37	500	17380*	25704*
	BKH-DN8-10L	8	10	74	7	M 16x1,5	0,38	500	17260*	17600*
	BKH-DN10-12L	10	12	74	7	M 18x1,5	0,50	500	17381*	25705*
	BKH-DN13-15L	13	15	82	7	M 22x1,5	0,61	500	17382*	25706*
	BKH-DN13-18L	13	18	82	7,5	M 26x1,5	0,60	500	18385*	25708*
	BKH-DN16-18L	15	18	82	7,5	M 26x1,5	0,75	420	17486*	25709*
	BKH-DN20-22L	20	22	101	7,5	M 30x2	1,49	420	18567*	25710*
	BKH-DN25-28L	25	28	108	7,5	M 36x2	2,00	350	17427*	25711*
	BKH-DN25/32-35L	25	35	112	10,5	M 45x2	2,12	350	18672*	02868*
	BKH-DN25/40-42L	25	42	112	11	M 52x2	2,27	350	20190*	33207*
	BKHR-DN25-28L	24	28	108	7,5	M 36x2	1,90	420	67851*	on request
	BKHR-DN25/32-35L	24	35,3	116	10,5	M 45x2	2,02	420	67169*	on request
	BKHR-DN25/40-42L	24	42,3	121	11	M 52x2	2,20	420	on request	on request

Please note the pressure ratings of the tube connections!

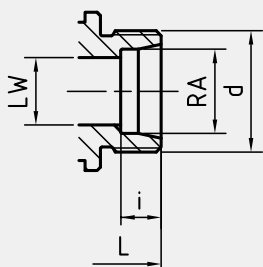
*Article usually in stock.

2-way ball valve Steel

BKH / BKHP500

CONNECTION TYPE

DIN 2353 / ISO 8434-1
HEAVY SERIES



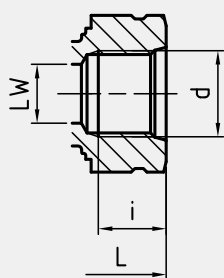
DIMENSIONS

Type	LW	RA	L	i	d	Weight [Kg]
BKH-DN4-8S	5	8	73	7	M 16x1,5	0,38
BKH-DN6-10S	6	10	73	7,5	M 18x1,5	0,39
BKH-DN8-12S	8	12	76	7,5	M 20x1,5	0,39
BKH-DN10-14S	10	14	80	8	M 22x1,5	0,50
BKH-DN13-16S	13	16	86	8,5	M 24x1,5	0,60
BKH-DN13-20S	13	20	90	10,5	M 30x2	0,60
BKH-DN16-20S	15	20	90	10,5	M 30x2	0,80
BKH-DN20-25S	20	25	109	12	M 36x2	1,55
BKH-DN25-30S	25	30	120	13,5	M 42x2	2,10
BKHR-DN25-30S	24	30	120	13,5	M 42x2	2,01
BKHP500-DN25-30S	25	30	130	13,5	M 42x2	3,06
BKH-DN25/32-38S	25	38	124	16	M 52x2	2,30
BKHR-DN25/32-38S	24	38,3	134	16	M 52x2	2,20

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	112A	1128
500	18168*	25713*
500	18386*	25714*
500	17255*	25715*
500	21515*	25716*
500	17384*	17984*
500	18169*	25718*
420	17371*	22625*
420	17624*	25719*
350	18673*	22864*
420	64853*	on request
500	44029	44030
350	21517*	25720*
420	64858	on request

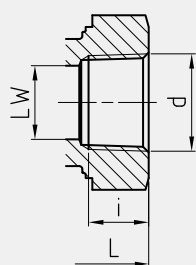
SAE J514/ISO/DIS11926-1
FEMALE THREAD



Type	LW	L	i	d	Weight [Kg]
BKH-DN6-7/16" UNF	5	69	12	7/16"-20 UNF	0,40
BKH-DN10-9/16" UNF	10	72	13	9/16"-18 UNF	0,50
BKH-DN13-3/4" UNF	13	83	15	3/4"-16 UNF	0,70
BKH-DN20-1 1/16" UN	20	95	20	1 1/16"-12 UN	1,55
BKH-DN25-1 5/16" UN	25	113	20	1 5/16"-12 UN	2,20
BKHP500-DN25-1 5/16" UN	25	121	20	1 5/16"-12 UN	3,06

PN [bar]	112A	1128
500	28609*	10046*
500	23885*	09793*
500	22842*	27701*
420	19202*	27122*
350	37159*	10048*
500	45667	45669

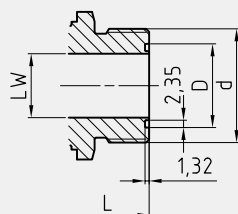
ISO 7/1 Rc
FEMALE THREAD



Type	LW	L	i	d	Weight [Kg]
BKH-DN4-Rc 1/8"	5	69	7,4	Rc 1/8"	0,40
BKH-DN6-Rc 1/4"	6	69	11	Rc 1/4"	0,39
BKH-DN10-Rc 3/8"	10	72	11,4	Rc 3/8"	0,55
BKH-DN13-Rc 1/2"	13	83	15	Rc 1/2"	0,64
BKH-DN20-Rc 3/4"	20	95	16,3	Rc 3/4"	1,59
BKH-DN25-Rc 1"	25	113	19	Rc 1"	2,30
BKHP500-DN25-Rc 1"	25	113	19	Rc 1"	3,20
BKH-DN25/32-Rc 1 1/4"	25	120	21,4	Rc 1 1/4"	2,37

PN [bar]	112A	1128
500	12050	59580
500	10105	14758
500	26165	16185
500	10106	35501
420	09384	24264
350	09800	51889
500	59578	59579
350	11752	59581

ISO 8434-3 ORFS
MALE THREAD



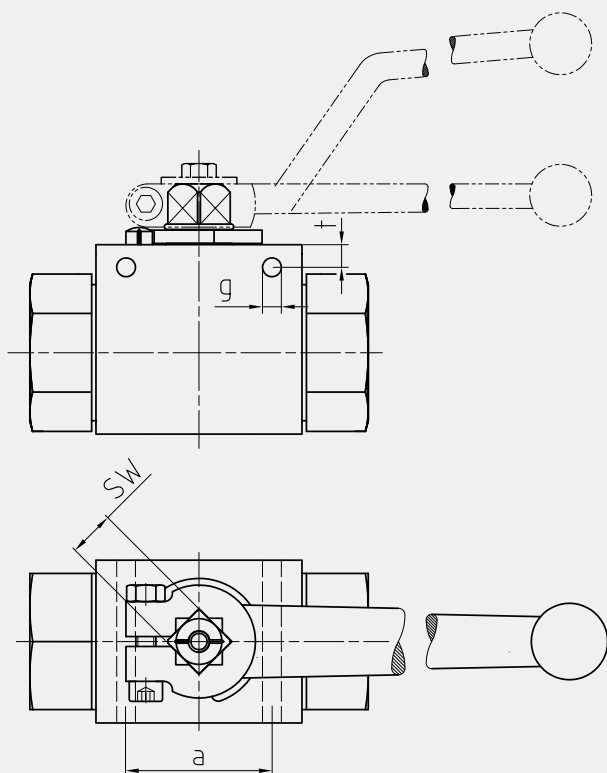
Type	LW	L	D	d	O-ring**	Weight [Kg]
BKH-DN6					on request	
BKH-DN8-11/16" UN ISO8434-3	6,5	73	12,6	11/16"-16 UN	9,25 x 1,78	0,40
BKH-DN10-13/16" UN ISO8434-3	9,5	80	15,77	13/16"-16 UN	12,42 x 1,78	0,50
BKH-DN13-1" UNS ISO8434-3	12,5	90	19	1-14" UNS	15,6 x 1,78	0,60
BKH-DN16-1 3/16" UN ISO8434-3	15	98	22,17	1 3/16"-12 UN	18,77 x 1,78	0,80
BKH-DN20-1 7/16" UN ISO8434-3	20	111	26,87	1 7/16"-12 UN	23,52 x 1,78	1,60
BKH-DN25-1 11/16" UN ISO8434-3	25	120	33,25	1 11/16"-12 UN	29,87 x 1,78	2,10

PN [bar]	112A	1128
500	on request	
500	on request	
500	on request	
420	on request	
420	on request	
250	on request	

Please note the pressure ratings of the tube connections!

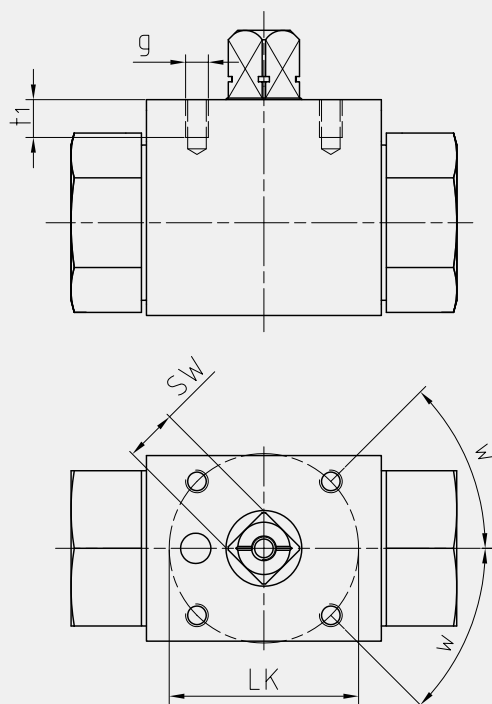
**O-ring included

*Article usually in stock.



ASSEMBLING HOLES

DN	SW	a	g	t
4	9	31	4,3	4,5
6	9	31	4,3	4,5
10	9	32	4,3	4
13	9	32	4,3	4
16	12	32	5,2	6
20	14	44	6,2	6
25	14	44	6,3	6
25/32	14	44	6,3	6
25/40	14	44	6,3	6



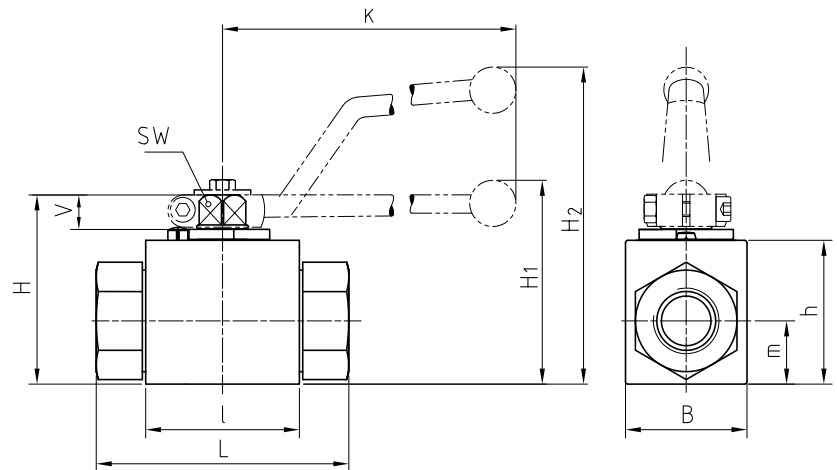
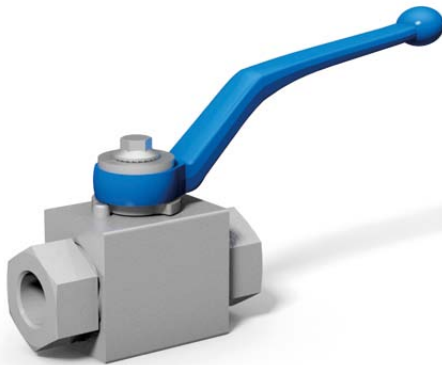
ASSEMBLING THREADS AS PER ISO 5211

DN	SW	LK	g	t ₁	w	ISO 5211
4	9	36	M5	6	30°*	(F03)*
6	9	36	M5	6	30°*	(F03)*
10	9	36	M5	7	45°	F03
13	9	36	M5	6	45°	F03
16	12	42	M5	8	45°	F04
20	14	50	M6	10	45°	F05
25	14	50	M6	10	45°	F05
25/32	14	50	M6	10	45°	F05
25/40	14	50	M6	10	45°	F05

*30° does not correspond to ISO 5211

2-way ball valve Stainless Steel

BKH / BKHP500



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, ISO 7/1 Rc Female thread, ISO 8434-3 ORFS Male thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 21
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

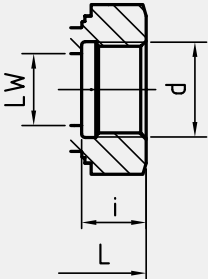
Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-30°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

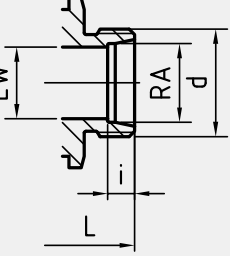
Type	L	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BKH-DN4	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN6	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN8	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN10	43	32	52	38	17,5	11	9	115	-	86	Zn
BKH-DN13	48	35	54	40	19	11	9	115	-	89	Zn
BKH-DN16	48	38	63	46	19	13	12	160	-	106	Al
BKH-DN20	62	49	75	57	24,5	14	14	200	79	-	Zn
BKHP500-DN20	82	58	83	65	32,5	14	14	200	87	-	Zn
BKH-DN25	66	58	83	65	29,5	14	14	200	87	-	Zn
BKHP500-DN25	84	70	88	70	34,5	14	14	200	92	-	Zn
BKH-DN25/32	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/40	66	58	83	65	29,5	14	14	200	87	-	Zn
BKHP-DN25	71	75	91	75	38	14	14	190	-	128	VA

2-way ball valve Stainless Steel

BKH / BKHP500

CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	442A	4428
	BKH-DN4-G1/8	5	69	10	G1/8	0,41	500	29754*	30422*
	BKH-DN6-G1/4	6	69	14	G1/4	0,40	500	27183*	26726*
	BKH-DN10-G3/8	10	72	14	G3/8	0,54	500	27261*	27180*
	BKH-DN13-G1/2	13	83	16,3	G1/2	0,65	500	27260*	27182*
	BKH-DN16-G5/8	15	83	16	G5/8	0,70	400	32270*	31558*
	BKH-DN20-G3/4	20	95	18	G3/4	1,50	350	27657*	27817*
	BKHP500-DN20-G3/4	20	107	18	G3/4	2,57	500	50143	53461
	BKH-DN25-G1	25	113	20	G1	2,20	350	27026*	27673*
	BKHP500-DN25-G1	25	131	20	G1	3,94	500	50144	53462
	BKH-DN25/32-G1 1/4	25	120	22	G1 1/4	2,30	350	27438*	34869*
	BKH-DN25/40-G1 1/2	25	130	24	G1 1/2	2,60	250	33223*	35476*
	BKHP500-DN25/40-G1 1/2	25	130	24	G1 1/2	2,60	250	33223*	35476*

ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	442A	4428
	BKH-DN4-1/8"NPT	5	69	10,5	1/8"NPT	0,30	500	37169*	37170*
	BKH-DN6-1/4"NPT	6	69	13,7	1/4"NPT	0,40	500	28387*	27369*
	BKH-DN10-3/8"NPT	10	72	13,5	3/8"NPT	0,55	500	28388*	28750*
	BKH-DN13-1/2"NPT	13	83	17	1/2"NPT	0,75	500	41318*	27803*
	BKH-DN20-3/4"NPT	20	95	18,3	3/4"NPT	1,63	350	29237*	27429*
	BKHP500-DN20-3/4"NPT	20	107	18,3	3/4"NPT	2,60	500	53463	53464
	BKH-DN25-1"NPT	25	113	21,6	1"NPT	2,30	350	26996*	28451*
	BKHP500-DN25-1"NPT	25	131	21,6	1"NPT	4,00	500	53465	53466
	BKH-DN25/32-1 1/4"NPT	25	120	22,1	1 1/4"NPT	2,51	350	37168*	37171*
	BKH-DN25/40-1 1/2"NPT	25	130	22,1	1 1/2"NPT	2,70	250	37767*	37768*
	BKHP500-DN25/40-1 1/2"NPT	25	130	22,1	1 1/2"NPT	2,70	250	37767*	37768*
	BKHP500-DN25/40-1 1/2"NPT	25	130	22,1	1 1/2"NPT	2,70	250	37767*	37768*

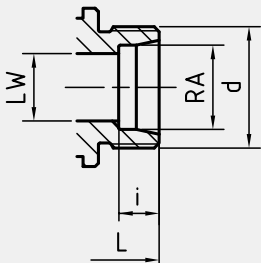
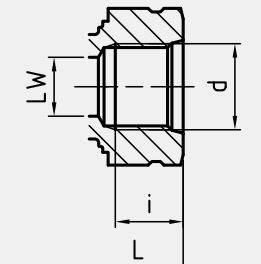
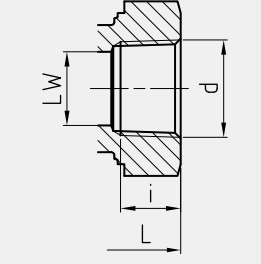
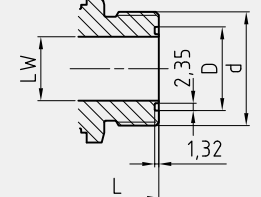
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	442A	4428
	BKH-DN4-6L	5	6	67	7	M 12x1,5	0,36	500	26268*	28589*
	BKH-DN6-8L	6	8	67	7	M 14x1,5	0,37	500	27342*	27381*
	BKH-DN8-10L	8	10	74	7	M 16x1,5	0,38	500	34754*	27380*
	BKH-DN10-12L	10	12	74	7	M 18x1,5	0,50	500	26263*	27388*
	BKH-DN13-15L	13	15	82	7	M 22x1,5	0,61	500	34673*	27658*
	BKH-DN13-18L	13	18	82	7,5	M 26x1,5	0,60	500	33220*	28732*
	BKH-DN16-18L	15	18	82	7,5	M 26x1,5	0,75	400	31293*	29097*
	BKH-DN20-22L	20	22	101	7,5	M 30x2	1,49	350	32346*	27965*
	BKH-DN25-28L	25	28	108	7,5	M 36x2	2,00	350	28322*	37164*
	BKH-DN25/32-35L	25	35	112	10,5	M 45x2	2,12	350	33221*	32289*
	BKH-DN25/40-42L	25	42	112	11	M 52x2	2,27	350	37765*	37766*
	BKHP500-DN25/40-42L	25	42	112	11	M 52x2	2,27	350	37765*	37766*

Please note the pressure ratings of the tube connections!

*Article usually in stock.

2-way ball valve Stainless Steel

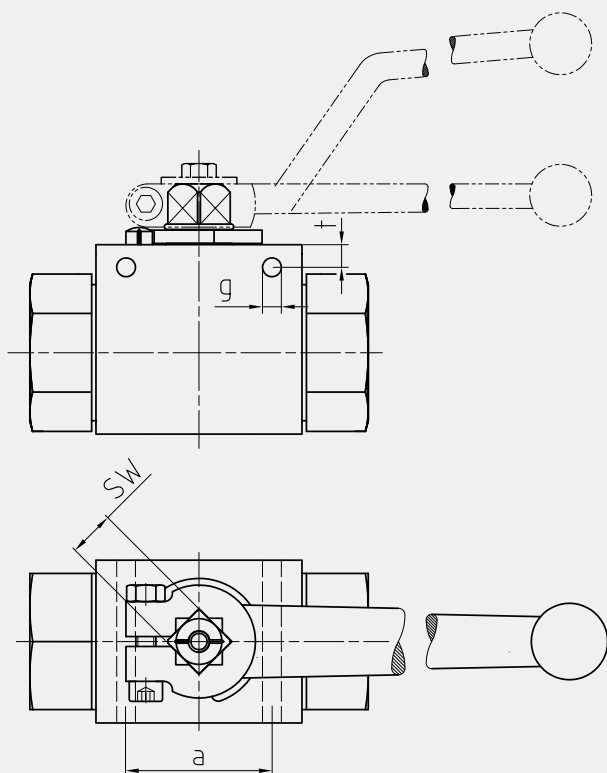
BKH / BKHP500

CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
<div>DIN 2353 / ISO 8434-1 HEAVY SERIES</div> 	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	442A	4428
	BKH-DN4-8S	5	8	73	7	M 16x1,5	0,38	500	28455*	27378*
	BKH-DN6-10S	6	10	73	7,5	M 18x1,5	0,39	500	32334*	32837*
	BKH-DN8-12S	8	12	76	7,5	M 20x1,5	0,39	500	27887*	29803*
	BKH-DN10-14S	10	14	80	8	M 22x1,5	0,50	500	28011*	30738*
	BKH-DN13-16S	13	16	86	8,5	M 24x1,5	0,60	500	27599*	28494*
	BKH-DN13-20S	13	20	90	10,5	M 30x2	0,60	500	27598*	28207*
	BKH-DN16-20S	15	20	90	10,5	M 30x2	0,80	400	29971*	29173*
	BKH-DN20-25S	20	25	109	12	M 36x2	1,55	350	27365*	28751*
	BKHP500-DN20-25S	20	25	129	12	M 36x2	2,52	500	53467	53468
	BKH-DN25-30S	25	30	120	13,5	M 42x2	2,10	350	27015*	35233*
	BKHR-DN25-30S	24	30	124	13,65	M 42x2	3,43	400	68606	on request
	BKHP500-DN25-30S	25	30	138	13,5	M 42x2	4,00	500	53469	53470
	BKH-DN25/32-38S	25	38	124	16	M 52x2	2,30	350	27178*	32570*
<div>SAE J514/ISO/DIS11926-1 FEMALE THREAD</div> 	Type	LW	L	i	d	Weight [Kg]	PN [bar]	442A	4428	
	BKH-DN6-7/16" UNF	5	69	12	7/16"-20 UNF	0,39	500	37174*	37179*	
	BKH-DN10-9/16" UNF	10	72	13	9/16"-18 UNF	0,50	500	37175*	37180*	
	BKH-DN13-3/4" UNF	13	83	15	3/4"-16 UNF	0,60	500	37176*	37181*	
	BKH-DN20-1 1/16" UN	20	95	20	1 1/16"-12 UN	1,55	350	37177*	37182*	
	BKHP500-DN20-1 1/16" UN	20	108	20	1 1/16"-12 UN	2,55	420	53471	53472	
	BKH-DN25-1 5/16" UN	25	113	20	1 5/16"-12 UN	2,10	350	37178*	37183*	
	BKHP500-DN25-1 5/16" UN	25	131	20	1 5/16"-12 UN	4,00	500	53473	53474	
<div>ISO 7/1 Rc FEMALE THREAD</div> 	Type	LW	L	i	d	Weight [Kg]	PN [bar]	442A	4428	
	BKH-DN4-Rc 1/8"	5	69	7,4	Rc 1/8"	0,40	500	59582	59583	
	BKH-DN6-Rc 1/4"	6	69	11	Rc 1/4"	0,39	500	29014	59584	
	BKH-DN10-Rc 3/8"	10	72	11,4	Rc 3/8"	0,55	500	29015	40400	
	BKH-DN13-Rc 1/2"	13	83	15	Rc 1/2"	0,64	500	29016	59585	
	BKH-DN20-Rc 3/4"	20	95	16,3	Rc 3/4"	1,59	350	29017	57551	
	BKHP500-DN20-Rc 3/4"	20	107	16,3	Rc 3/4"	2,57	420	59586	59587	
	BKH-DN25-Rc 1"	25	113	19	Rc 1"	2,20	350	29018	46686	
	BKHP500-DN25-Rc 1"	25	131	19	Rc 1"	3,94	500	59588	59589	
	BKH-DN25/32-Rc 1 1/4"	25	120	21,4	Rc 1 1/4"	2,30	350	29019	59590	
<div>ISO 8434-3 ORFS MALE THREAD</div> 	Type	LW	L	D	d	O-ring**	Weight [Kg]	PN [bar]	442A	4428
	BKH-DN6					on request				
	BKH-DN8-11/16" UN ISO8434-3	6,5	73	12,6	11/16"-16 UN	9,25 x 1,78	0,40	500	on request	
	BKH-DN10-13/16" UN ISO8434-3	9,5	80	15,77	13/16"-16 UN	12,42 x 1,78	0,50	500	on request	
	BKH-DN13-1" UNS ISO8434-3	12,5	90	19	1-14" UNS	15,6 x 1,78	0,60	500	on request	
	BKH-DN16-1 3/16" UN ISO8434-3	15	98	22,17	1 3/16"-12 UN	18,77 x 1,78	0,80	400	on request	
	BKH-DN20-1 7/16" UN ISO8434-3	20	111	26,87	1 7/16"-12 UN	23,52 x 1,78	1,60	350	on request	
	BKH-DN25-1 11/16" UN ISO8434-3	25	120	33,25	1 11/16"-12 UN	29,87 x 1,78	2,10	250	on request	

Please note the pressure ratings of the tube connections!

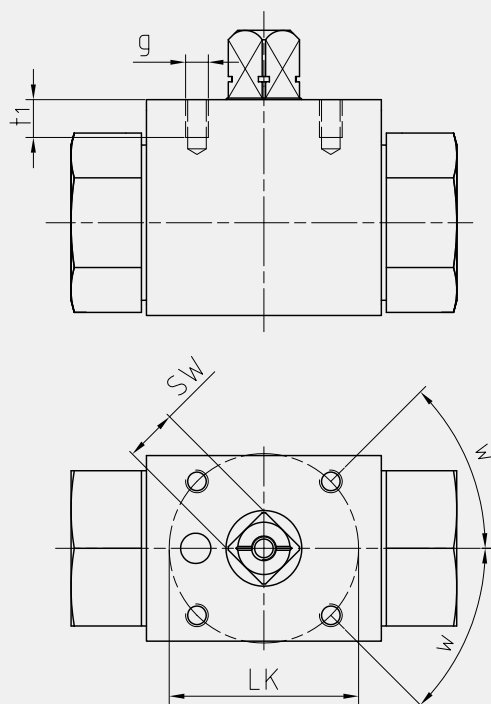
**O-ring included

*Article usually in stock.



ASSEMBLING HOLES

DN	SW	a	g	t
4	9	31	4,3	4,5
6	9	31	4,3	4,5
10	9	32	4,3	4
13	9	32	4,3	4
16	12	32	5,2	6
20	14	44	6,2	6
25	14	44	6,3	6
25	14	44	6,3	6
25/32	14	44	6,3	6
25/40	14	44	6,3	6



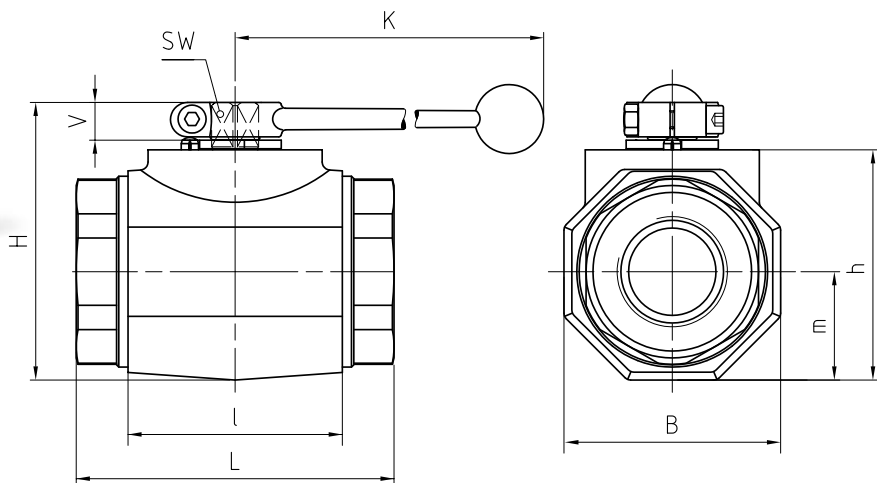
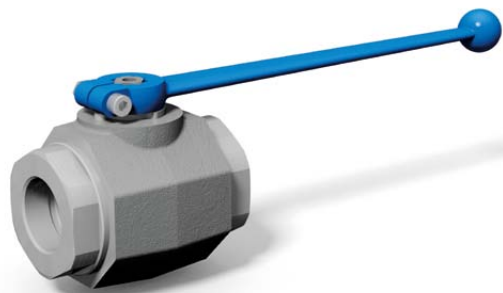
ASSEMBLING THREADS AS PER ISO 5211

DN	SW	LK	g	t ₁	w	ISO 5211
4	9	36	M5	6	30°*	(F03)*
6	9	36	M5	6	30°*	(F03)*
10	9	36	M5	7	45°	F03
13	9	36	M5	6	45°	F03
16	12	42	M5	8	45°	F04
20	14	50	M6	10	45°	F05
25	14	50	M6	10	45°	F05
25	14	50	M6	10	45°	F05
25/32	14	50	M6	10	45°	F05
25/40	14	50	M6	10	45°	F05

*30° does not correspond to ISO 5211

2-way ball valve Steel

MKHP420



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 24
- Position switches 228 - 229
- Combinations 188 - 189
- Detent on request

MATERIAL CODE DESCRIPTION

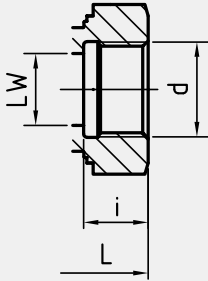
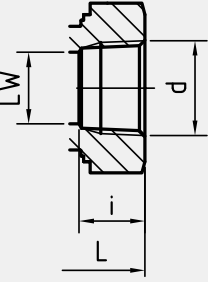
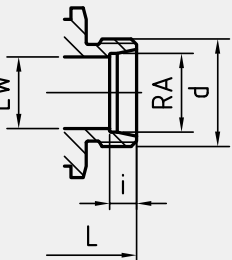
Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

Type	L	B 8Kt	H	h	m	V	SW	K	Lever
MKHP420-DN32	80	81	107	86	40,5	16,5	17	320	Al
MKHP420-DN40	85	100	124	103	50	16,5	17	320	Al
MKHP420-DN50	100	118	138	117	59	16,5	17	320	Al

2-way ball valve Steel

MKHP420

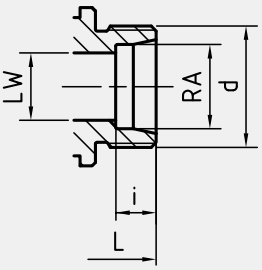
CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION			
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	112A	1128	
	MKHP420-DN32-G1 1/4	32	111	22	G1 1/4	3,47	420	43548*	43551*	
	MKHP420-DN40-G1 1/2	38	130	24	G1 1/2	5,67	420	43549*	43552*	
	MKHP420-DN50-G2	48	140	26	G2	8,14	420	43550*	43553*	
ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	112A	1128	
	MKHP420-DN32-1 1/4"NPT	32	120	22,1	1 1/4"NPT	3,52	420	43677*	43680*	
	MKHP420-DN40-1 1/2"NPT	38	130	22,1	1 1/2"NPT	5,69	420	43678*	43681*	
	MKHP420-DN50-2"NPT	48	140	30,3	2"NPT	8,14	420	43679*	43682*	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	112A	1128
	MKHP420-DN32-35L	32	35	136	10,5	M 45x2	3,58	420	43683*	43685*
	MKHP420-DN40-42L	38	42	147	11	M 52x2	5,54	420	43684*	43686*

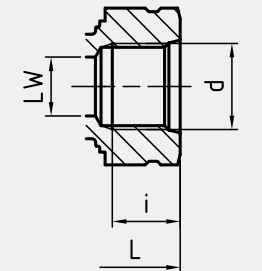
Please note the pressure ratings of the tube connections!

*Article usually in stock.

2-way ball valve Steel

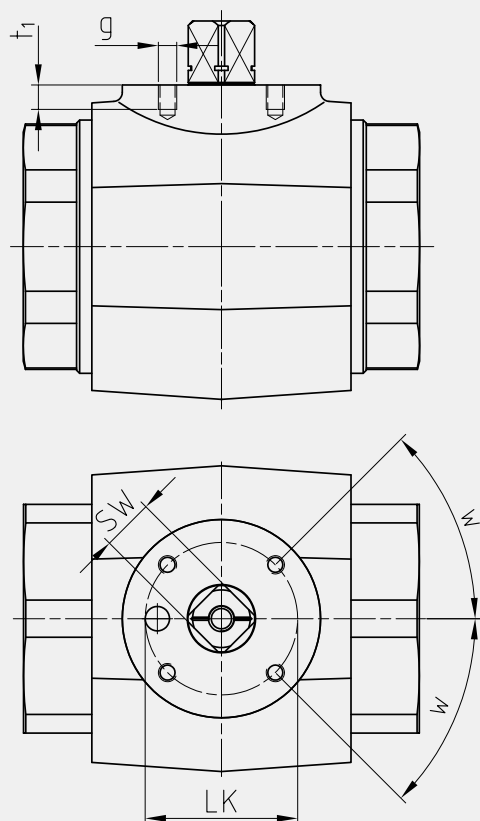
MKHP420

CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	112A	1128
	MKHP420-DN32-38S	32	38	148	16	M 52x2	3,77	420	43687*	43688*

SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	112A	1128
	MKHP420-DN32-1 5/8" UN	30	111	20	1 5/8" -12 UN	3,52	420	43689*	43692*
	MKHP420-DN40-1 7/8" UN	38	130	20	1 7/8" -12 UN	5,69	420	43690*	43693*
	MKHP420-DN50-2 1/2" UN	45	140	20	2 1/2" -12 UN	7,99	420	43691*	43694*

Please note the pressure ratings of the tube connections!

*Article usually in stock.

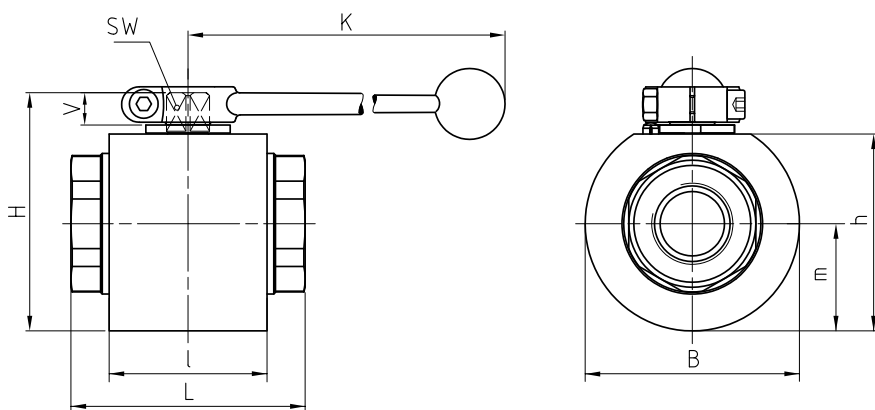
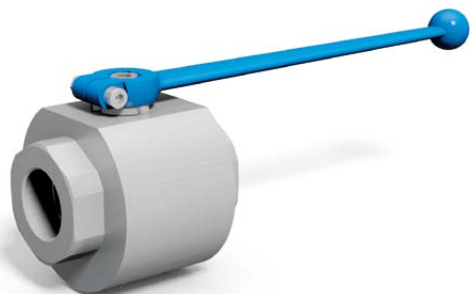


ASSEMBLING THREADS AS PER ISO 5211

DN	SW	LK	g	t ₁	w	ISO5211
32	17	50	M6	8	45°	F05
40	17	50	M6	8	45°	F05
50	17	50	M6	8	45°	F05

2-way ball valve Stainless Steel

MKHP420



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 28
- Position switches 228 - 229
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

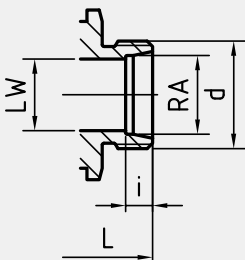
Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-30°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

Type	L	B	H	h	m	V	SW	K	Lever
MKHP420-DN32	80	109	121	100	54,5	16,5	17	320	Al
MKHP420-DN40	85	124	136	115	62	16,5	17	320	Al
MKHP420-DN50	101	132	145	124	66	16,5	17	320	Al

2-way ball valve Stainless Steel

MKHP420

CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION			
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	442A	4428	
	MKHP420-DN32-G1 1/4	32	111	22	G1 1/4	5,67	420	50006*	49265*	
	MKHP420-DN40-G1 1/2	38	130	24	G1 1/2	8,16	420	49271*	49102*	
	MKHP420-DN50-G2	48	140	26	G2	10,45	420	49764*	51637*	
ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	442A	4428	
	MKHP420-DN32-1 1/4"NPT	32	120	22,1	1 1/4"NPT	5,72	420	48751*	53257*	
	MKHP420-DN40-1 1/2"NPT	38	130	22,1	1 1/2"NPT	8,16	420	53256*	53258*	
	MKHP420-DN50-2"NPT	48	140	30,3	2"NPT	10,37	420	51994*	53259*	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	442A	4428
	MKHP420-DN32-35L	32	35	136	10,5	M 45x2	5,78	420	53260*	53261*
	MKHP420-DN40-42L	38	42	147	11	M 52x2	8,35	420	48766*	49335*
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	442A	4428
	MKHP420-DN32-38S	32	38	148	16	M 52x2	5,97	420	51699*	53262*

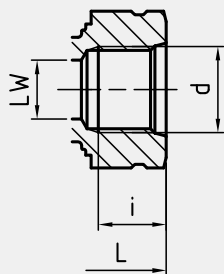
Two-way

2-way ball valve Stainless Steel

MKHP420

CONNECTION TYPE

SAE J514/ISO/DIS11926-1
FEMALE THREAD



DIMENSIONS

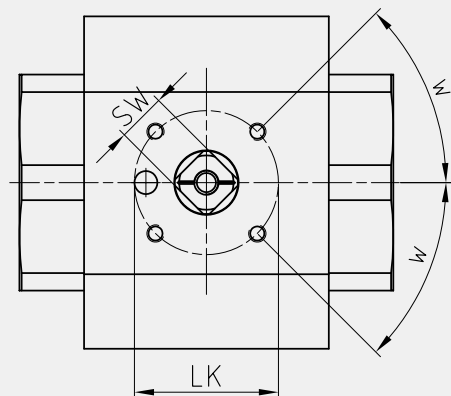
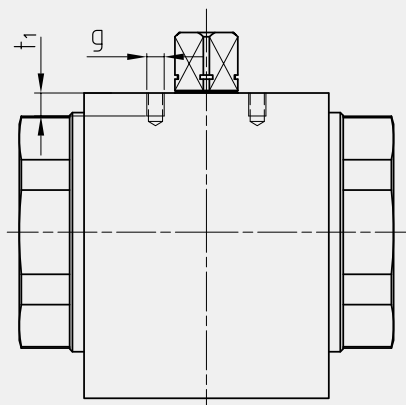
Type	LW	L	i	d	Weight [Kg]
MKHP420-DN32-1 5/8" UN	30	111	20	1 5/8"-12 UN	5,72
MKHP420-DN40-1 7/8" UN	38	130	20	1 7/8"-12 UN	8,16
MKHP420-DN50-2 1/2" UN	45	140	20	2 1/2"-12 UN	9,47

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	442A	4428
420	37187*	53263*
420	37188*	37191*
420	53264*	37192*

Please note the pressure ratings of the tube connections!

*Article usually in stock.

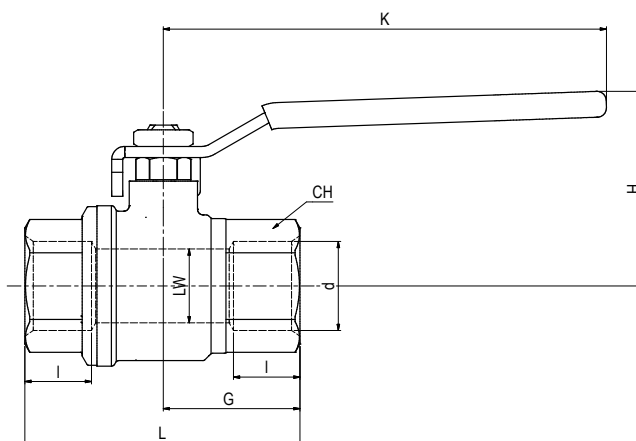


ASSEMBLING THREADS AS PER ISO 5211

DN	SW	LK	g	t ₁	w	ISO5211
32	17	50	M6	8	45°	F05
40	17	50	M6	8	45°	F05
50	17	50	M6	8	45°	F05

2-way low-pressure ball valve Brass

NKH



AVAILABLE SIZES

DN8 - DN100 (3/8" to 4")

CONNECTIONS

DIN ISO 228 Female thread

MATERIAL CODE DESCRIPTION

Materials	5574
Body	Brass
Ball	Brass
Stem	Brass
Ball seats	PTFE
O-rings	PTFE
Tmin /Tmax	-40°C / 170°C

ACCESSORIES ON REQUEST

- Butterfly handle on request
- Round handle on request

GENERAL DIMENSIONS

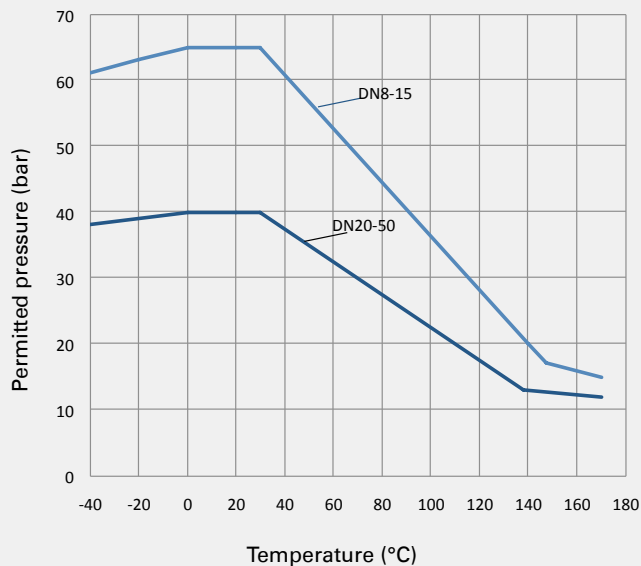
Type	LW	I	L	G	K	H	CH	Lever	Weight [Kg]
NKH-DN8/6	8	12,5	51	25,5	82	39,5	22	St	0,19
NKH-DN10	10	12,5	51	25,5	82	39,5	22	St	0,19
NKH-DN15	15	15,5	61	30,5	100	43	27	St	0,27
NKH-DN20	20	18	74,5	37	120	52,5	32	St	0,44
NKH-DN25	25	21	90,5	45,5	120	57	41	St	0,79
NKH-DN32	32	23	104	52	158	78	50	St	1,11
NKH-DN40	40	24,5	117	59	158	85	55	St	1,53
NKH-DN50	50	26,5	135	67,5	158	92	70	St	2,48
NKH-DN65	65	22	136	68	255	132	85	St	4,44
NKH-DN80	80	25	157	78,5	255	140	99	St	5,84
NKH-DN100	100	29	191	95,5	255	154	125	St	9,10

ORDER CODE PER MATERIAL COMBINATION

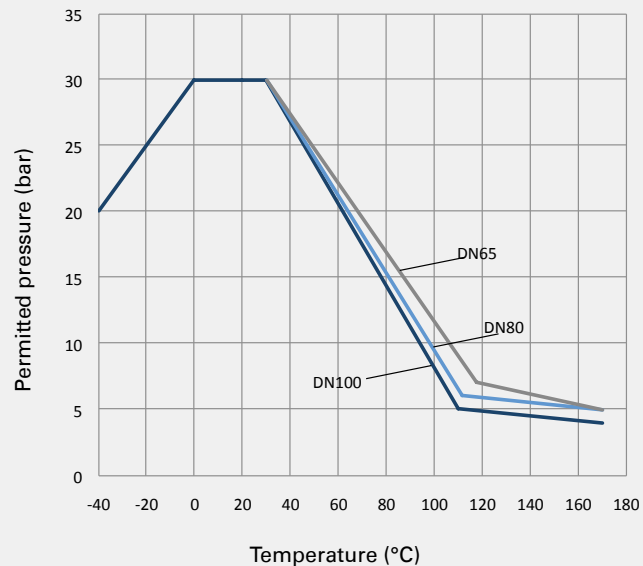
Type	d	PN [bar]	5574
NKH-DN8/6-G1/4	G1/4	65	58712
NKH-DN10-G3/8	G3/8	65	58713
NKH-DN15-G1/2	G1/2	65	58714
NKH-DN20-G3/4	G3/4	40	58715
NKH-DN25-G1	G1	40	58716
NKH-DN32-G1 1/4	G1 1/4	40	58717
NKH-DN40-G1 1/2	G1 1/2	40	58718
NKH-DN50-G2	G2	40	58719
NKH-DN65-G2 1/2	G2 1/2	30	58720
NKH-DN80-G3	G3	30	58721
NKH-DN100-G4	G4	30	58722

PRESSURE/TEMPERATURE RELATION

Pressure/Temperature curve
NKH DN8-50

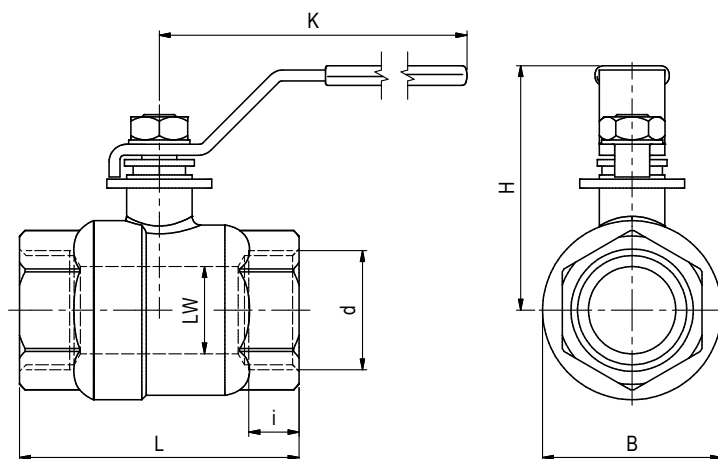
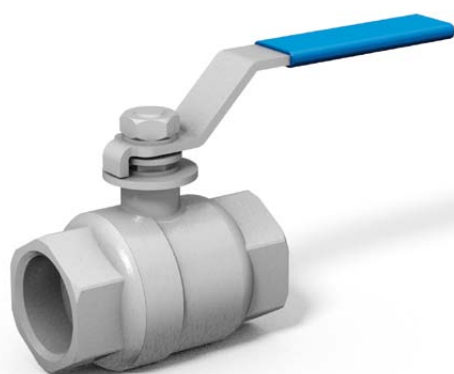


Pressure/Temperature curve
NKH DN65-100



2-way low-pressure ball valve Stainless Steel

NKH



AVAILABLE SIZES

DN6 - DN100 (1/4" to 4")

CONNECTIONS

DIN ISO 228 Female thread

MATERIAL CODE DESCRIPTION

Materials	4474
Body	CF8M (Stainless Steel)
Ball	Stainless Steel
Stem	Stainless Steel
Ball seats	PTFE
O-rings	PTFE
Tmin /Tmax	-30°C / 200°C

ACCESSORIES ON REQUEST

• Locking Device included

GENERAL DIMENSIONS

Type	LW	L	B	h	K	i	Lever	Weight [Kg]
NKH-DN8/6	10	50	29	45	100	12	SS	0,21
NKH-DN13/10	12,5	50	29	45	100	11	SS	0,21
NKH-DN15	15	59	34	50	100	13	SS	0,28
NKH-DN20	20	69	40,5	52	103	15,5	SS	0,40
NKH-DN25	25	79	49,2	70	150	15,5	SS	0,72
NKH-DN32	32	94	60,5	75	150	19,5	SS	1,57
NKH-DN40	38	103	71,3	85	183	21	SS	2,15
NKH-DN50	50	123	90,2	94	183	23	SS	2,78
NKH-DN65	65	160	116,5	135	243	29	SS	5,80
NKH-DN80	80	180	138	145	243	29	SS	8,80
NKH-DN100	100	230	170,5	165	328	29	SS	17,20

ORDER CODE PER MATERIAL COMBINATION

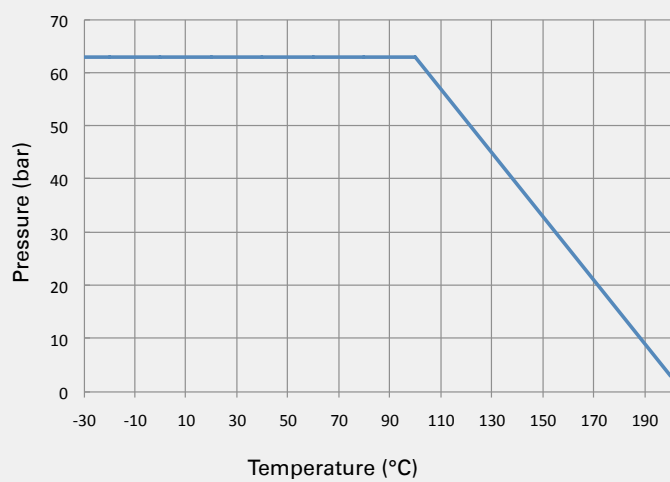
Type	PN [bar]	4474
NKH-DN8/6-G1/4	63	58723
NKH-DN13/10-G3/8	63	58724
NKH-DN15-G1/2	63	58725
NKH-DN20-G3/4	63	58726
NKH-DN25-G1	63	58727
NKH-DN32-G1 1/4	63	58728
NKH-DN40-G1 1/2	63	58729
NKH-DN50-G2	63	58730
NKH-DN65-G2 1/2	63	58731
NKH-DN80-G3	63	58732
NKH-DN100-G4	63	58733

2-way low-pressure ball valve Stainless Steel

NKH

PRESSURE/TEMPERATURE RELATION

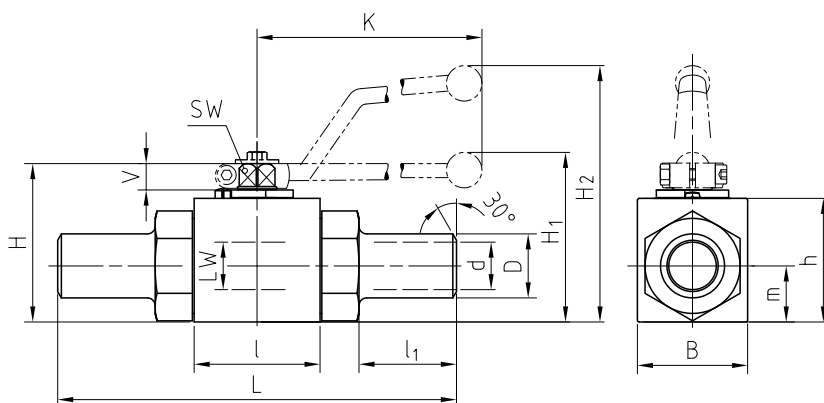
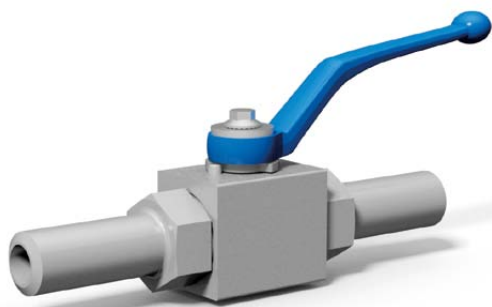
Pressure/Temperature curve
NKH Stainless Steel



Two-way

Ball valve with welding ends Steel / Stainless Steel

BKH-AS



AVAILABLE SIZES

DN10 - DN25 (3/8" to 1")

CONNECTIONS

AS160; other pipe dimensions and higher pressure ratings on request.

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128	442A	4428
Body	Steel	Steel	Stainless Steel	Stainless Steel
Ball	Steel	Steel	Stainless Steel	Stainless Steel
Stem	Steel	Steel	Stainless Steel	Stainless Steel
Ball seats	POM	POM	POM	POM
O-rings	NBR	FPM	NBR	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C	-30°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

Type	LW	L	I	B	H	h	m	V	SW	K	d	D	I ₁	H ₁	H ₂	Lever	Weight [Kg]
BKH-DN10	10	150	43	32	52	38	17,5	11	9	115	10	17,2	42	-	86	Zn	0,64
BKH-DN13	13	181	48	35	54	40	19	11	9	115	13	21,3	51	-	89	Zn	0,82
BKH-DN16	15	180	48	38	63	46	19	13	12	160	15	21,3	55	-	106	Al	0,84
BKH-DN20	20	200	62	49	75	57	24,5	14	14	200	20	26,9	48,5	79	-	Zn	1,85
BKH-DN20/25	20	200	62	49	75	57	24,5	14	14	200	25	33,7	48,5	79	-	Zn	1,95
BKH-DN25	25	210	66	58	83	65	29,5	14	14	200	25	33,7	51,25	87	-	Zn	2,60
BKH-DN25/32	25	210	66	58	83	65	29,5	14	14	200	32	42,4	51,25	87	-	Zn	2,80
BKH-DN25/40	25	248	66	58	83	65	29,5	14	14	200	39,3	48,3	70	87	-	Zn	4,25

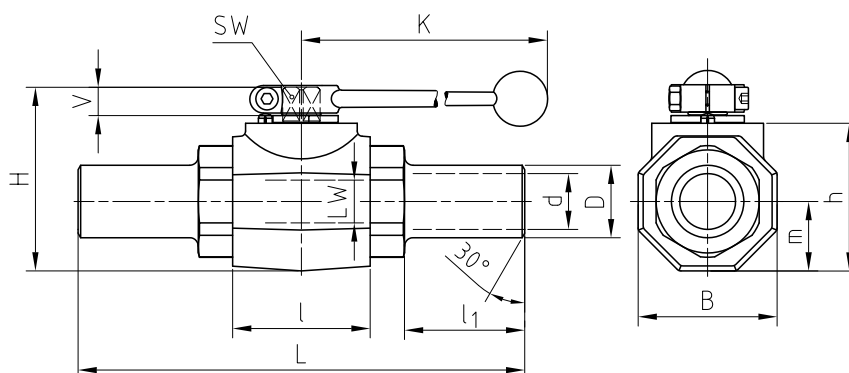
ORDER CODE PER MATERIAL COMBINATION

Type	PN	112A	1128	442A	4428
BKH-DN10-AS160	160	02389	38398	38414	38415
BKH-DN13-AS160	160	02390	02802	38416	38417
BKH-DN16-AS160	160	20442	38399	29230	38418
BKH-DN20-AS160	160	02684	38400	38419	38420

Type	PN	112A	1128	442A	4428
BKH-DN20/25-AS160	160	02686	38401	38421	38422
BKH-DN25-AS160	160	02685	20910	33263	38423
BKH-DN25/32-AS160	160	38402	38403	38424	38425
BKH-DN25/40-AS160	160	38404	38405	38426	38427

Ball valve with welding ends Steel

MKHP-AS



Two-way

AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

AS160; other pipe dimensions and higher pressure ratings on request. PN max 420 bar.

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 24
- Position switches 228 - 229
- Combinations 188 - 189
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

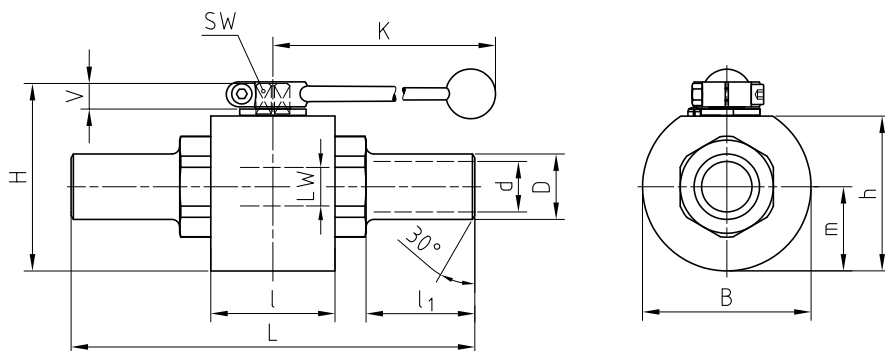
Type	LW	L	I	B 8Kt	H	h	m	V	SW	K	d	D	I ₁	Lever	Weight [Kg]
MKHP-DN32	32	260	80	81	107	86	40,5	16,5	17	320	32,5	42,2	70	Al	4,22
MKHP-DN32/40	32	260	80	81	107	86	40,5	16,5	17	320	38	51	70	Al	4,42
MKHP-DN40	38	270	85	100	124	103	50	16,5	17	320	39,3	48,3	72	Al	6,29
MKHP-DN40/50	38	270	85	100	124	103	50	16,5	17	320	50	60,3	72	Al	6,59
MKHP-DN50	48	300	100	118	138	117	59	16,5	17	320	50	60,3	72	Al	10,89
MKHP-DN50/65	48	300	100	118	138	117	59	16,5	17	320	63	76,1	72	Al	11,00

ORDER CODE PER MATERIAL COMBINATION

Type	PN	112A	1128
MKHP-DN32-AS160	160	02524	34168
MKHP-DN32/40-AS160	160	02525	38433
MKHP-DN40-AS160	160	02528	24356
MKHP-DN40/50-AS160	160	02530	38429
MKHP-DN50-AS160	160	02531	29151
MKHP-DN50/65-AS160	160	02532	38439

Ball valve with welding ends Stainless Steel

MKHP-AS



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

AS160; other pipe dimensions and higher pressure ratings on request. PN max 420 bar.

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 28
- Position switches 228 - 229
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-30°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

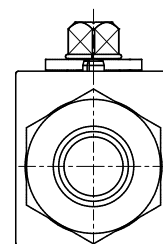
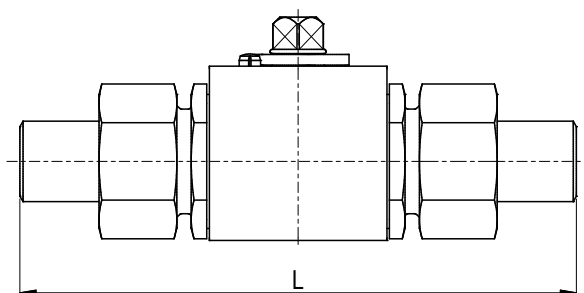
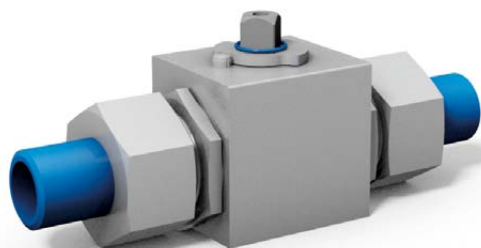
Type	LW	L	I	B	H	h	m	V	SW	K	d	D	I ₁	Lever	Weight [Kg]
MKHP-DN32	32	260	80	109	121	100	54,5	16,5	17	320	32,5	42,2	70	Al	6,42
MKHP-DN32/40	32	260	80	109	121	100	54,5	16,5	17	320	38	51	70	Al	6,62
MKHP-DN40	38	270	85	124	136	115	62	16,5	17	320	39,3	48,3	72	Al	8,76
MKHP-DN40/50	38	270	85	124	136	115	62	16,5	17	320	50	60,3	72	Al	9,06
MKHP-DN50	48	300	101	132	145	124	66	16,5	17	320	50	60,3	72	Al	12,37
MKHP-DN50/65	48	300	101	132	145	124	66	16,5	17	320	63	76,1	72	Al	12,47

ORDER CODE PER MATERIAL COMBINATION

Type	PN	442A	4428
MKHP-DN32-AS160	160	38432	16056
MKHP-DN32/40-AS160	160	38434	38435
MKHP-DN40-AS160	160	38436	16058
MKHP-DN40/50-AS160	160	38430	38431
MKHP-DN50-AS160	160	33262	09549
MKHP-DN50/65-AS160	160	38437	38438

Ball valve with welding nipples Steel / Stainless Steel

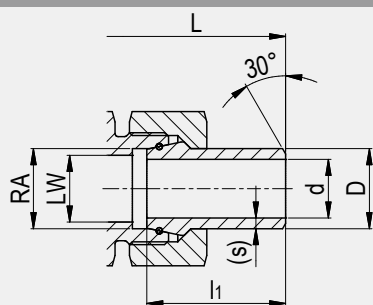
BKH-ASK



Two-way

CONNECTION TYPE

DIN 2353/ISO8434-1
LIGHT SERIES
WITH WELDING NIPPLE



DIMENSIONS

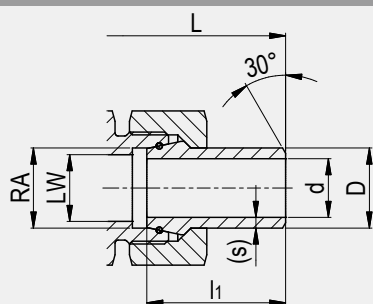
Type	LW	RA	L	d	D	S	I ₁
BKH-DN8-10L-ASK10x1	8	10	127	8	10	1	32,5
BKH-DN10-12L-ASK12x1,5	10	12	127	9	12	1,5	32,5
BKH-DN13-15L-ASK15x2	13	15	137	11	15	2	34
BKH-DN16-18L-ASK18x2,5	15	18	140	13	18	2,5	35,5
BKH-DN20-22L-ASK22x2,5	20	22	165	17	22	2,5	38,5
BKH-DN25-28L-ASK28x2,5	25	28	178	23	28	2,5	41,5
BKH-DN25/32-35L-ASK35x3,5	25	35	190	28	35	3,5	47,5
BKH-DN25/40-42L-ASK42x3	25	42	190	36	42	3	47,5

PN PER MATERIAL

Steel PN [bar]	Stainless Steel PN [bar]
249	242
305	297
315	315
315	315
160	160
160	160
160	160
160	160

CONNECTION TYPE

DIN 2353/ISO8434-1
HEAVY SERIES
WITH WELDING NIPPLE



DIMENSIONS

Type	LW	RA	L	d	D	S	I ₁
BKH-DN4-8S-ASK8x2	5	8	122	4	8	2	31
BKH-DN6-10S-ASK10x2	6	10	125	6	10	2	32,5
BKH-DN8-12S-ASK12x2	8	12	128	8	12	2	32,5
BKH-DN10-14S-ASK14x2	10	14	143	10	14	2	38,5
BKH-DN13-16S-ASK16x2	13	16	150	12	16	2	39
BKH-DN16-20S-ASK20x2	15	20	163	16	20	2	45
BKH-DN20-25S-ASK25x3	20	25	191	19	25	3	49,5
BKH-DN25-30S-ASK30x3	25	30	207	24	30	3	52
BKH-DN25/32-38S-ASK38x3	25	38	220	32	38	3	56,5

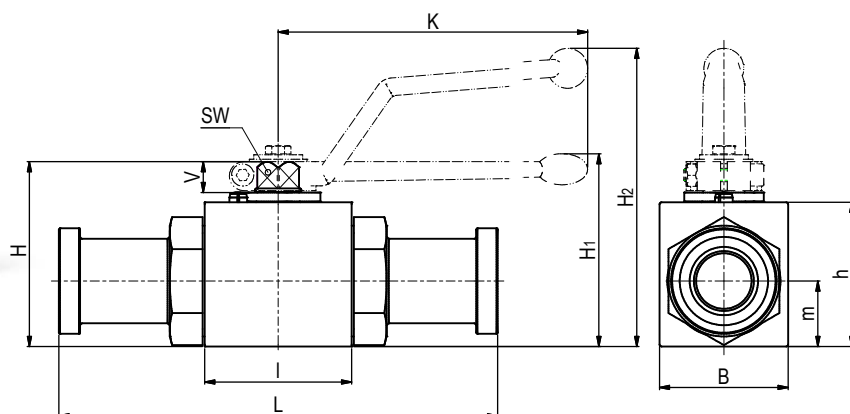
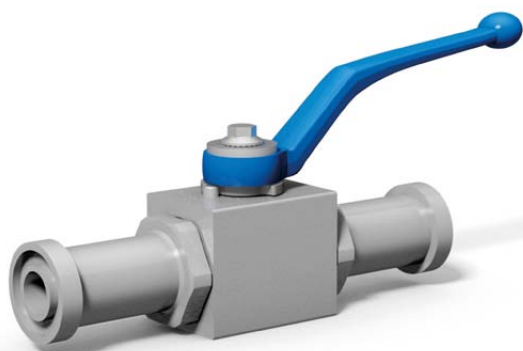
PN PER MATERIAL

Steel PN [bar]	Stainless Steel PN [bar]
500	500
460	447
393	383
343	334
305	297
249	242
294	286
249	242
200	195

Other pipe dimensions, pressure ratings and material combinations on request.
Article numbers on request.

Ball valve with SAE split flange adapter Steel

BKH / BKHP-SAEFS



AVAILABLE SIZES

DN13 - DN25 (1/2" to 1")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C

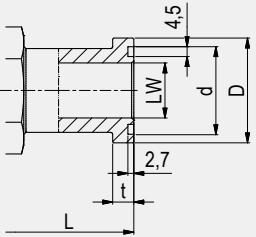
GENERAL DIMENSIONS

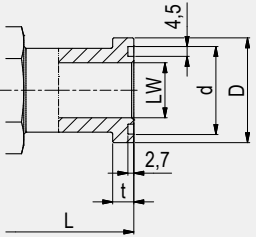
Type	I	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BKH-DN13	48	35	54	40	19	11	9	115	-	89	Zn
BKH-DN20	62	49	75	57	24,5	14	14	200	79	-	Zn
BKH-DN25	66	58	83	65	29,5	14	14	200	87	-	Zn
BKHP-DN25	74	70	88	70	34,5	14	14	200	92	-	Zn

Please note the pressure ratings of the connection flanges!

Ball valve with SAE split flange adapter Steel

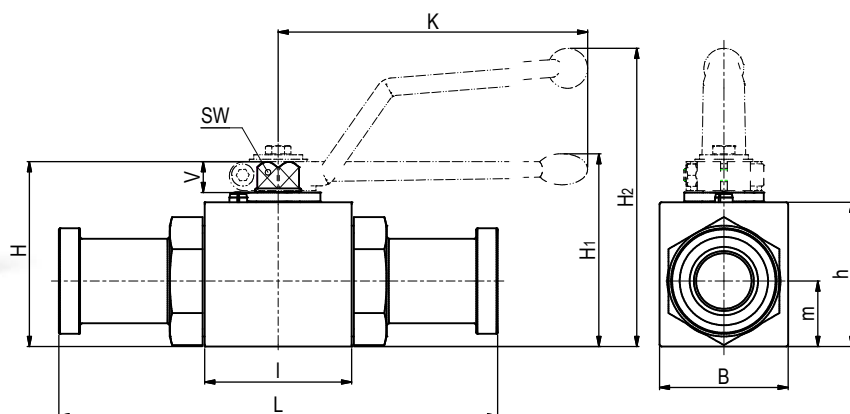
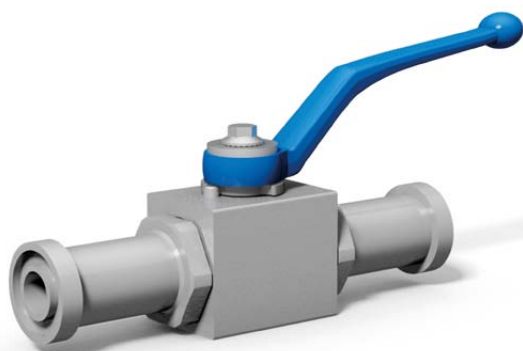
BKH / BKHP-SAEFS

CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1	Type	LW	L	d ^{+/-0,1}	D _{-0,2}	t _{-0,2}	Weight [Kg]	PN [bar]	112A	1128
	BKH-DN13-SAEFS210	13	151	25,5	30,2	6,8	0,85	350	30739	25937
	BKH-DN20-SAEFS210	19	162	31,9	38,1	6,8	1,87	350	20048	25938
	BKH-DN25-SAEFS210	25	178	39,8	44,4	8,1	2,70	350	30740	15737
	BKH-DN13-SAEFS210 Lu	13	170	25,5	30,2	6,8		350	on request	
	BKH-DN20-SAEFS210 Lu	19	200	31,9	38,1	6,8		350	on request	
	BKH-DN25-SAEFS210 Lu	25	215	39,8	44,4	8,1		350	on request	

CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-2	Type	LW	L	d ^{+/-0,1}	D _{-0,2}	t _{-0,2}	Weight [Kg]	PN [bar]	112A	1128
	BKH-DN13-SAEFS420	13	151	25,5	31,8	7,9	0,90	420	24818	25693
	BKH-DN20-SAEFS420	19	174	31,9	41,3	8,9	1,99	420	24819	25939
	BKH-DN25-SAEFS420	25	198	39,8	47,6	9,6	3,00	350	09913	15722
	BKHP-DN25-SAEFS420	25	206	39,8	47,6	9,6	3,66	420	43630	44031
	BKH-DN13-SAEFS420 Lu	13	180	25,5	31,8	7,9		420	on request	
	BKH-DN20-SAEFS420 Lu	19	200	31,9	41,3	8,9		420	on request	
	BKH-DN25-SAEFS420 Lu	25	250	39,8	47,6	9,6		350	on request	
	BKHP-DN25-SAEFS420 Lu	25	258	39,8	47,6	9,6		420	on request	

Ball valve with SAE split flange adapter Stainless Steel

BKH / BKHP-SAEFS



AVAILABLE SIZES

DN13 - DN25 (1/2" to 1")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-30°C / 100°C	-20°C / 100°C

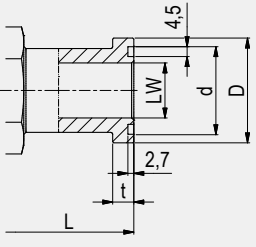
GENERAL DIMENSIONS

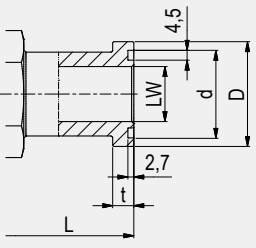
Type	I	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BKH-DN13	48	35	54	40	19	11	9	115	-	89	Zn
BKH-DN20	62	49	75	57	24,5	14	14	200	79	-	Zn
BKHP-DN20	82	58	83	65	32,5	14	14	200	87	-	Zn
BKH-DN25	66	58	83	65	29,5	14	14	200	87	-	Zn
BKHP-DN25	84	70	88	70	34,5	14	14	200	92	-	Zn

Please note the pressure ratings of the connection flanges!

Ball valve with SAE split flange adapter Stainless Steel

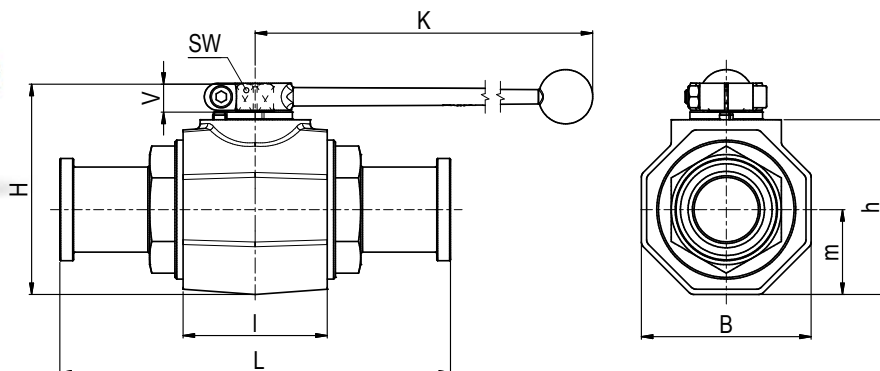
BKH / BKHP-SAEFS

CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1	Type	LW	L	d ^{+/-0,1}	D _{0,2}	t _{0,2}	Weight [Kg]	PN [bar]	442A	4428
	BKH-DN13-SAEFS210	13	151	25,5	30,2	6,8	0,85	350	37611	37614
	BKH-DN20-SAEFS210	19	162	31,9	38,1	6,8	1,87	350	37612	37615
	BKHP-DN20-SAEFS210	19	182	31,9	38,1	6,8		350	on request	
	BKH-DN25-SAEFS210	25	178	39,8	44,4	8,1	2,70	315	37613	37616
	BKH-DN13-SAEFS210 Lu	13	170	25,5	30,2	6,8		350	on request	
	BKH-DN20-SAEFS210 Lu	19	200	31,9	38,1	6,8		350	on request	
	BKHP-DN20-SAEFS210 Lu	19	220	31,9	38,1	6,8		350	on request	
	BKH-DN25-SAEFS210 Lu	25	215	39,8	44,4	8,1		350	on request	

CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-2	Type	LW	L	d ^{+/-0,1}	D _{0,2}	t _{0,2}	Weight [Kg]	PN [bar]	442A	4428
	BKH-DN13-SAEFS420	13	151	25,5	31,8	7,9	0,90	420	33255	37617
	BKH-DN20-SAEFS420	19	174	31,9	41,3	8,9	1,99	350	30510	37618
	BKHP-DN20-SAEFS420	19	194	31,9	41,3	8,9	2,85	420	53475	53476
	BKH-DN25-SAEFS420	25	198	39,8	47,6	9,6	3,00	350	31554	37619
	BKHP-DN25-SAEFS420	25	215	39,8	47,6	9,6	4,19	420	53477	53478
	BKH-DN13-SAEFS420 Lu	13	180	25,5	31,8	7,9		420	on request	
	BKH-DN20-SAEFS420 Lu	19	200	31,9	41,3	8,9		350	on request	
	BKHP-DN20-SAEFS420 Lu	19	220	31,9	41,3	8,9		420	on request	
	BKH-DN25-SAEFS420 Lu	25	250	39,8	47,6	9,6		350	on request	
	BKHP-DN25-SAEFS420 Lu	25	267	39,8	47,6	9,6		420	on request	

Ball valve with SAE-split flange adapter Steel

MKHP-SAEFS



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 24
- Position switches 228 - 229
- Combinations 188 - 189
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C

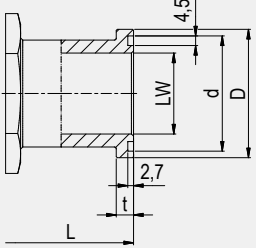
GENERAL DIMENSIONS

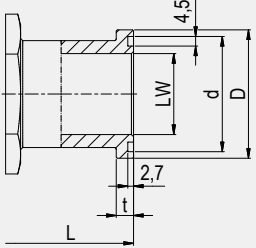
Type	L	B 8Kt	H	h	m	V	SW	K	Lever
MKHP-DN32	80	81	107	86	40,5	16,5	17	320	Al
MKHP-DN40	85	100	124	103	50	16,5	17	320	Al
MKHP-DN50	100	118	138	117	59	16,5	17	320	Al

Please note the pressure ratings of the connection flanges!

Ball valve with SAE split flange adapter Steel

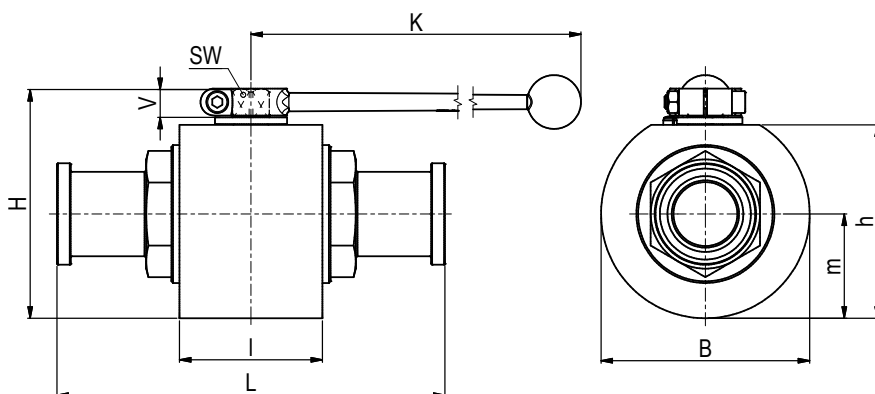
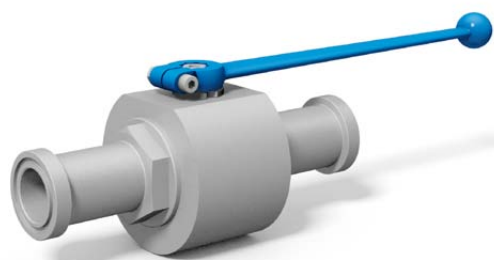
MKHP-SAEFS

CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1	Type	LW	L	$d^{+0,1}_{-0,1}$	$D_{-0,2}$	$t_{-0,2}$	Weight [Kg]	PN [bar]	112A	1128
	MKHP-DN32-SAEFS210	30	191	44,6	50,8	8,1	4,22	280	43725	43728
	MKHP-DN40-SAEFS210	38	231	54,1	60,3	8,1	6,54	210	43726	43729
	MKHP-DN50-SAEFS210	48	232	63,6	71,4	9,6	9,29	210	43727	43730
	MKHP-DN32-SAEFS210 Lu	30	275	44,6	50,8	8,1		280	on request	
	MKHP-DN40-SAEFS210 Lu	38	321	54,1	60,3	8,1		210	on request	
	MKHP-DN50-SAEFS210 Lu	48	323	63,6	71,4	9,6		210	on request	

CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-2	Type	LW	L	$d^{+0,1}_{-0,1}$	$D_{-0,2}$	$t_{-0,2}$	Weight [Kg]	PN [bar]	112A	1128
	MKHP-DN32-SAEFS420	30	223	44,6	54	10,4	4,72	420	43731	43734
	MKHP-DN40-SAEFS420	38	281	54,1	63,5	12,7	7,49	420	43732	43735
	MKHP-DN50-SAEFS420	48	316	63,6	79,4	12,7	11,39	420	43733	43736
	MKHP-DN32-SAEFS420 Lu	30	322	44,6	54	10,4		420	on request	
	MKHP-DN40-SAEFS420 Lu	38	380	54,1	63,5	12,7		420	on request	
	MKHP-DN50-SAEFS420 Lu	48	385	63,6	79,4	12,7		420	on request	

Ball valve with SAE split flange adapter Stainless Steel

MKHP-SAEFS



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 28
- Position switches 228 - 229
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-30°C / 100°C	-20°C / 100°C

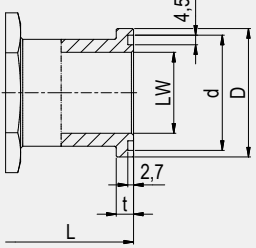
GENERAL DIMENSIONS

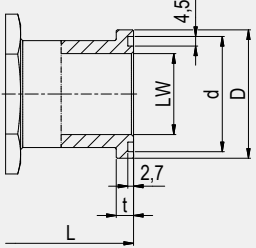
Type	L	B	H	h	m	V	SW	K	Lever
MKHP-DN32	80	109	121	100	54,5	16,5	17	320	Al
MKHP-DN40	85	124	136	115	62	16,5	17	320	Al
MKHP-DN50	101	132	145	124	66	16,5	17	320	Al

Please note the pressure ratings of the connection flanges!

Ball valve with SAE split flange adapter Stainless Steel

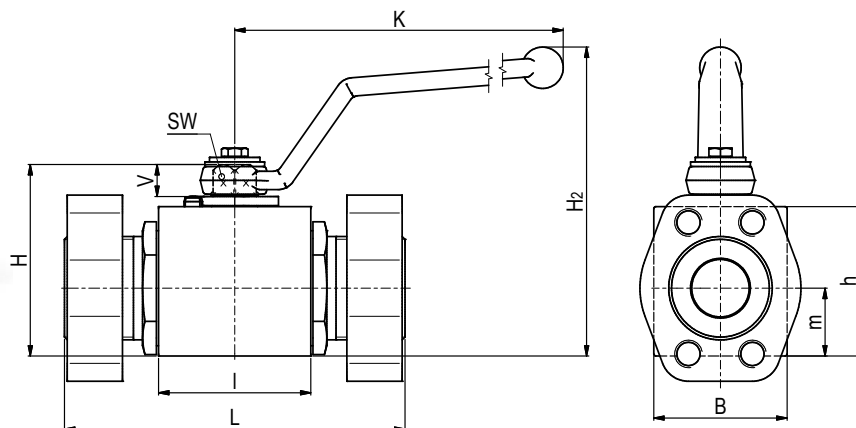
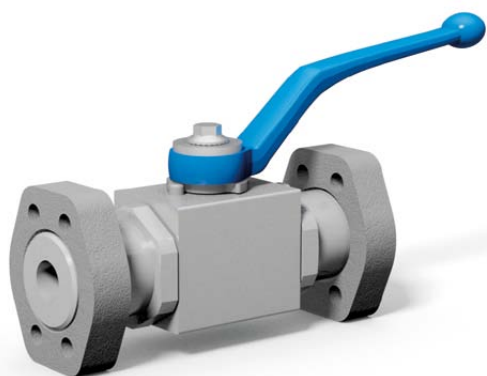
MKHP-SAEFS

CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1	Type	LW	L	$d^{+0,1}_{-0,1}$	$D_{-0,2}$	$t_{-0,2}$	Weight [Kg]	PN [bar]	442A	4428
	MKHP-DN32-SAEFS210	30	191	44,6	50,8	8,1	6,73	280	49031	37622
	MKHP-DN40-SAEFS210	38	231	54,1	60,3	8,1	9,01	210	37620	37623
	MKHP-DN50-SAEFS210	48	232	63,6	71,4	9,6	11,80	210	37621	49750
	MKHP-DN32-SAEFS210 Lu	30	275	44,6	50,8	8,1		280	on request	
	MKHP-DN40-SAEFS210 Lu	38	321	54,1	60,3	8,1		210	on request	
	MKHP-DN50-SAEFS210 Lu	48	323	63,6	71,4	9,6		210	on request	

CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-2	Type	LW	L	$d^{+0,1}_{-0,1}$	$D_{-0,2}$	$t_{-0,2}$	Weight [Kg]	PN [bar]	442A	4428
	MKHP-DN32-SAEFS420	30	223	44,6	54	10,4	7,00	420	49032	37625
	MKHP-DN40-SAEFS420	38	281	54,1	63,5	12,7	9,96	420	50358	37626
	MKHP-DN50-SAEFS420	48	316	63,6	79,4	12,7	13,39	420	50357	51879
	MKHP-DN32-SAEFS420 Lu	30	322	44,6	54	10,4		420	on request	
	MKHP-DN40-SAEFS420 Lu	38	380	54,1	63,5	12,7		420	on request	
	MKHP-DN50-SAEFS420 Lu	48	385	63,6	79,4	12,7		420	on request	

Ball valve with SAE adapter metric / UNC Steel

BKH / BKHP-SAE



AVAILABLE SIZES

DN13 - DN25 (1/2" to 1")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C

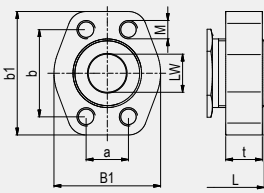
GENERAL DIMENSIONS

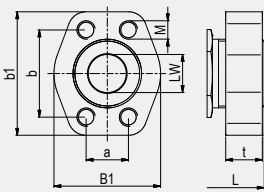
Type	L	B	H	h	m	V	SW	K	H ₂	Lever
BKH-DN13	48	35	54	40	19	11	9	115	89	Zn
BKH-DN20	62	49	75	57	24,5	14	14	171	127	St
BKH-DN25	66	58	83	65	29,5	14	14	171	135	St
BKHP-DN25	74	70	88	70	34,5	14	14	171	140	St

Please note the pressure ratings of the connection flanges!

Ball valve with SAE adapter metric / UNC Steel

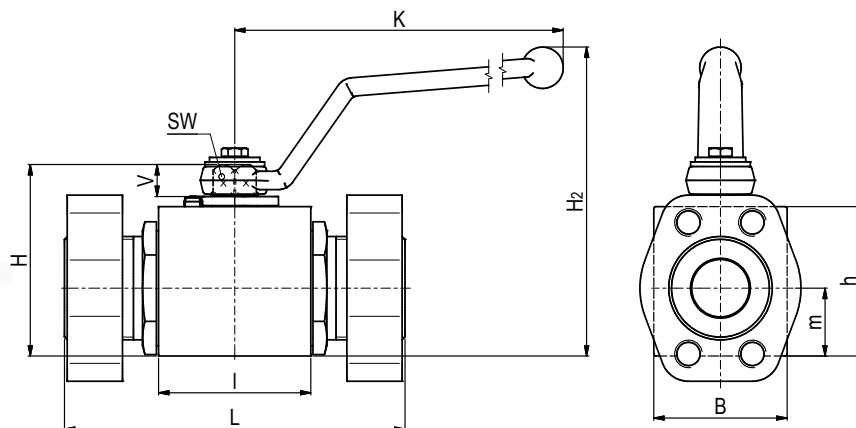
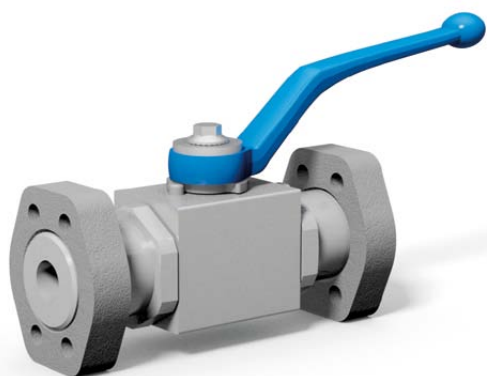
BKH / BKHP-SAE

CONNECTION TYPE	DIMENSIONS										ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1	Type	LW	L	B ₁	b ₁	t	a	b	M	Weight [Kg]	PN [bar]	112A	1128
	BKH-DN13-SAE210	13	120	48	56	13	17,5	38,1	M8	1,50	350	32986	30024
	BKH-DN20-SAE210	20	136	50	65	14	22,2	47,6	M10	3,00	350	30124	29967
	BKH-DN25-SAE210	25	148	60	70	16	26,2	52,4	M10	4,50	350	23290	30025
	BKH-DN13-SAE210	13	120	48	56	13	17,5	38,1	5/16" UNC	1,50	350	37789	37790
	BKH-DN20-SAE210	20	136	50	65	14	22,2	47,6	3/8" UNC	3,00	350	37791	37792
	BKH-DN25-SAE210	25	148	60	70	16	26,2	52,4	3/8" UNC	4,50	315350	37793	37794

CONNECTION TYPE	DIMENSIONS										ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-2	Type	LW	L	B ₁	b ₁	t	a	b	M	Weight [Kg]	PN [bar]	112A	1128
	BKH-DN13-SAE420	13	120	48	56	16	18,2	40,5	M8	1,50	420	32988	37584
	BKH-DN20-SAE420	20	136	60	71	19	23,8	50,8	M10	2,75	420	25407	37585
	BKH-DN25-SAE420	25	148	70	81	24	27,8	57,2	M12	3,80	350	25408	37586
	BKHP-DN25-SAE420	25	156	70	81	24	27,8	57,2	M12	4,50	420	49285	53456
	BKH-DN13-SAE420	13	120	48	56	16	18,2	40,5	5/16" UNC	1,50	420	37795	37796
	BKH-DN20-SAE420	20	136	60	71	19	23,8	50,8	3/8" UNC	2,75	420	37797	37798
	BKH-DN25-SAE420	25	148	70	81	24	27,8	57,2	7/16" UNC	3,80	350	37799	37800
	BKHP-DN25-SAE420	25	156	70	81	24	27,8	57,2	7/16" UNC	4,50	420	53457	53458

Ball valve with SAE adapter metric / UNC Stainless Steel

BKH / BKHP-SAE



AVAILABLE SIZES

DN13 - DN25 (1/2" to 1")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-30°C / 100°C	-20°C / 100°C

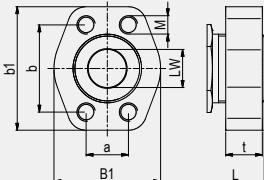
GENERAL DIMENSIONS

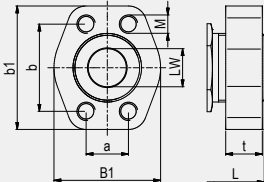
Type	L	B	H	h	m	V	SW	K	H ₂	Lever
BKH-DN13	48	35	54	40	19	11	9	115	89	Zn
BKH-DN20	62	49	75	57	24,5	14	14	171	127	St
BKHP-DN20	82	58	83	65	32,5	14	14	171	135	St
BKH-DN25	66	58	83	65	29,5	14	14	171	135	St
BKHP-DN25	84	70	88	70	34,5	14	14	171	140	St

Please note the pressure ratings of the connection flanges!

Ball valve with SAE adapter metric / UNC Stainless Steel

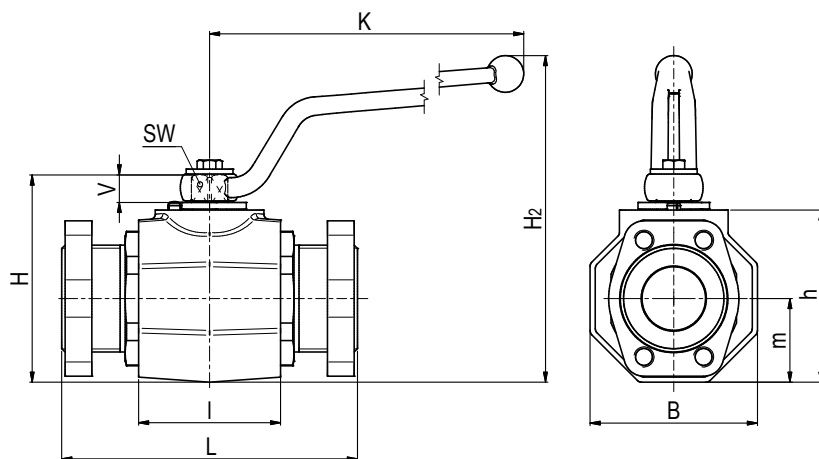
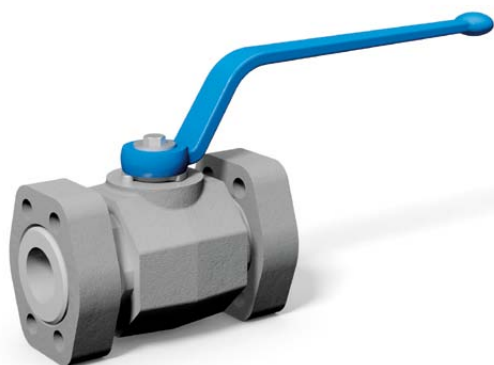
BKH / BKHP-SAE

CONNECTION TYPE	DIMENSIONS										ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1	Type	LW	L	B ₁	b ₁	t	a	b	M	Weight [Kg]	PN [bar]	442A	4428
	BKH-DN13-SAE210	13	120	48	56	13	17,5	38,1	M8	1,50	350	37587	33949
	BKH-DN20-SAE210	20	136	50	65	14	22,2	47,6	M10	3,00	350	32339	37588
	BKH-DN25-SAE210	25	148	60	70	16	26,2	52,4	M10	4,50	320	32340	37589
	BKH-DN13-SAE210	13	120	48	56	13	17,5	38,1	5/16" UNC	1,50	350	37801	37802
	BKH-DN20-SAE210	20	136	50	65	14	22,2	47,6	3/8" UNC	3,00	350	37803	37804
	BKHP-DN20-SAE210	20	156	50	65	14	22,2	47,6	3/8" UNC	-	350	on request	
	BKH-DN25-SAE210	25	148	60	70	16	26,2	52,4	3/8" UNC	4,50	320	37805	37806

CONNECTION TYPE	DIMENSIONS										ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-2	Type	LW	L	B ₁	b ₁	t	a	b	M	Weight [Kg]	PN [bar]	442A	4428
	BKH-DN13-SAE420	13	120	48	56	16	18,2	40,5	M8	1,50	420	37590	37591
	BKH-DN20-SAE420	20	136	60	71	19	23,8	50,8	M10	2,75	350	34367	33961
	BKHP-DN20-SAE420	20	156	60	71	19	23,8	50,8	M10	3,59	420	49048	53479
	BKH-DN25-SAE420	25	148	70	81	24	27,8	57,2	M12	3,80	350	35894	37592
	BKHP-DN25-SAE420	25	165	70	81	24	27,8	57,2	M12	5,03	420	49203	53480
	BKH-DN13-SAE420	13	120	48	56	16	18,2	40,5	5/16" UNC	1,50	420	37807	37808
	BKH-DN20-SAE420	20	136	60	71	19	23,8	50,8	3/8" UNC	2,75	350	37809	37810
	BKHP-DN20-SAE420	20	156	60	71	19	23,8	50,8	3/8" UNC	3,59	420	53481	53483
	BKH-DN25-SAE420	25	148	70	81	24	27,8	57,2	7/16" UNC	3,80	350	31772	37811
	BKHP-DN25-SAE420	25	165	70	81	24	27,8	57,2	7/16" UNC	5,03	420	53482	53484

Ball valve with SAE adapter metric / UNC Steel

MKHP-SAE



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 24
- Position switches 228 - 229
- Combinations 188 - 189
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C

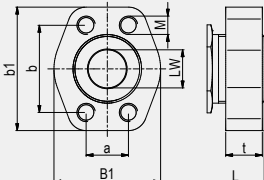
GENERAL DIMENSIONS

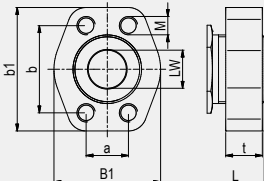
Type	L	B 8Kt	H	h	m	V	SW	K	H ₂	Lever
MKHP-DN32	80	81	107	86	40,5	16,5	17	306	180	St
MKHP-DN40	85	100	124	103	50	16,5	17	306	197	St
MKHP-DN50	100	118	138	117	59	16,5	17	306	211	St
MKHP-DN50/65	100	118	138	117	59	16,5	17	306	211	St

Please note the pressure ratings of the connection flanges!

Ball valve with SAE adapter metric / UNC Steel

MKHP-SAE

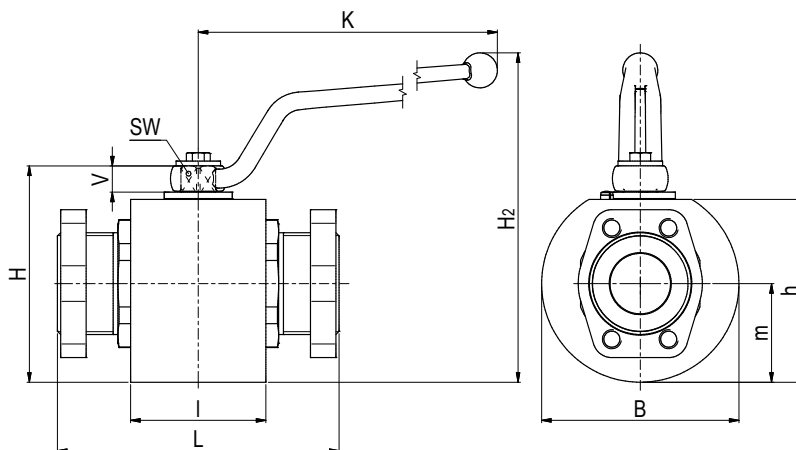
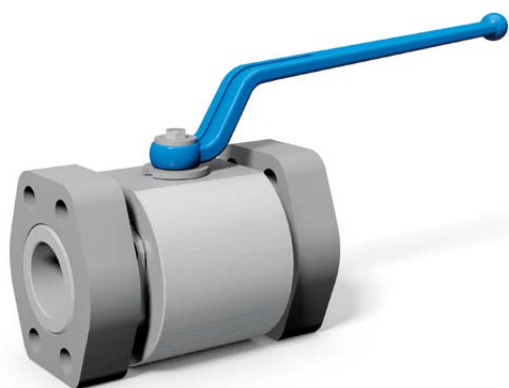
CONNECTION TYPE	DIMENSIONS										ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1	Type	LW	L	B ₁	b ₁	t	a	b	M	Weight [Kg]	PN [bar]	112A	1128
	MKHP-DN32-SAE210	32	172	68	79	16	30,2	58,7	M12 ⁽¹⁾	7,52	210	45947	45949
	MKHP-DN32-SAE210	32	172	68	79	16	30,2	58,7	M10	7,52	280	45948	41734
	MKHP-DN40-SAE210	38	177	78	93	16	35,7	69,9	M12	11,09	210	45110	45950
	MKHP-DN50-SAE210	48	196	90	102	16	42,9	77,8	M12	19,29	210	45309	45951
	MKHP-DN50/65-SAE210	48	196	105	114	19	50,8	88,9	M12	19,29	175	45772	45952
	MKHP-DN32-SAE210	32	172	68	79	16	30,2	58,7	7/16" UNC	7,52	280	38211	38214
	MKHP-DN40-SAE210	38	177	78	93	16	35,7	69,9	1/2" UNC	11,09	210	38212	38215
	MKHP-DN50-SAE210	48	196	90	102	16	42,9	77,8	1/2" UNC	19,29	210	46200	38216
	MKHP-DN50/65-SAE210	48	196	105	114	19	50,8	88,9	1/2" UNC	19,29	175	38213	38217

CONNECTION TYPE	DIMENSIONS										ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-2	Type	LW	L	B ₁	b ₁	t	a	b	M	Weight [Kg]	PN [bar]	112A	1128
	MKHP-DN32-SAE420	32	172	78	95	27	31,8	66,7	M14 ⁽¹⁾	7,52	420	45815	45953
	MKHP-DN32-SAE420	32	172	78	95	27	31,8	66,7	M12	7,52	420	45535	41738
	MKHP-DN40-SAE420	38	177	94	112	30	36,5	79,4	M16	11,09	420	45093	46198
	MKHP-DN50-SAE420	48	196	114	134	35	44,5	96,8	M20	19,29	420	45323	46199
	MKHP-DN32-SAE420	32	172	78	95	27	31,8	66,7	1/2" UNC	7,52	420	46201	38218
	MKHP-DN40-SAE420	38	177	94	112	30	36,5	79,4	5/8" UNC	11,09	420	46202	38219
	MKHP-DN50-SAE420	48	196	114	134	35	44,5	96,8	3/4" UNC	19,29	420	46203	38220

⁽¹⁾ This thread is not to be used for new designs.

Ball valve with SAE adapter metric / UNC Stainless Steel

MKHP-SAE



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 28
- Position switches 228 - 229
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-30°C / 100°C	-20°C / 100°C

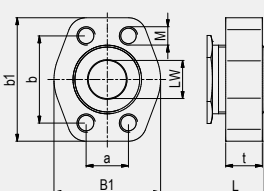
GENERAL DIMENSIONS

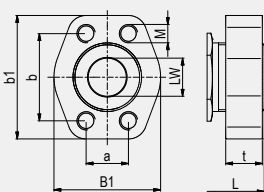
Type	L	B	H	h	m	V	SW	K	H ₂	Lever
MKHP-DN32	80	109	121	100	54,5	16,5	17	306	194	St
MKHP-DN40	85	124	136	115	62	16,5	17	306	209	St
MKHP-DN50	101	132	145	124	66	16,5	17	306	218	St
MKHP-DN50/65	101	132	145	124	66	16,5	17	306	218	St

Please note the pressure ratings of the connection flanges!

Ball valve with SAE adapter metric / UNC Stainless Steel

MKHP-SAE

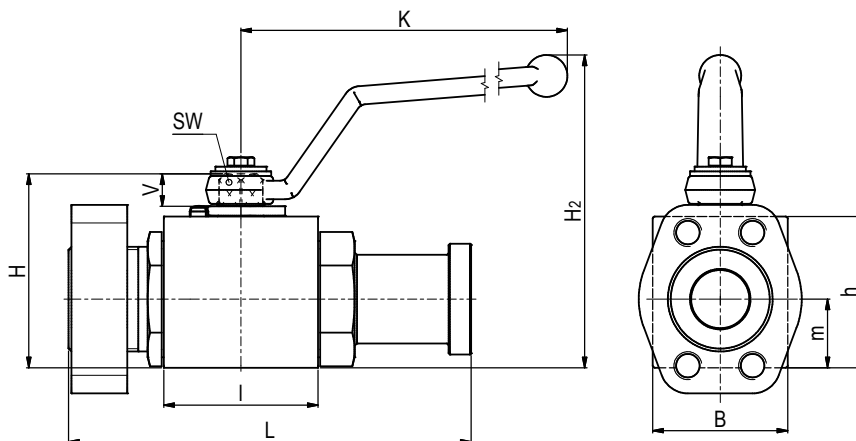
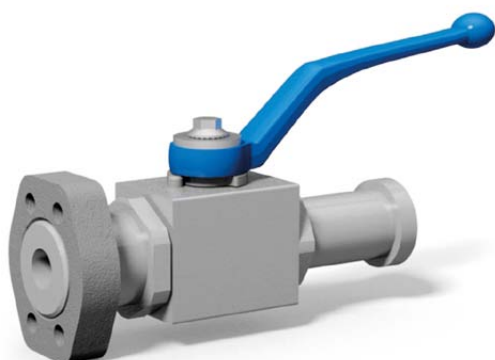
CONNECTION TYPE	DIMENSIONS											ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1	Type	LW	L	B ₁	b ₁	t	a	b	M	Weight [Kg]		PN [bar]	442A	4428
	MKHP-DN32-SAE210	32	172	68	79	16	30,2	58,7	M12 ⁽¹⁾	9,72		210	48988	37594
	MKHP-DN32-SAE210	32	172	68	79	16	30,2	58,7	M10	9,72		280	48483	48846
	MKHP-DN40-SAE210	38	177	78	93	16	35,7	69,9	M12	13,57		210	48812	48848
	MKHP-DN50-SAE210	48	196	90	102	16	42,9	77,8	M12	20,25		210	48843	48850
	MKHP-DN50/65-SAE210	48	196	105	114	19	50,8	88,9	M12	20,95		175	48845	48852
	MKHP-DN32-SAE210	32	172	68	79	16	30,2	58,7	7/16" UNC	9,72		280	48853	48855
	MKHP-DN40-SAE210	38	177	78	93	16	35,7	69,9	1/2" UNC	13,57		210	48857	48859
	MKHP-DN50-SAE210	48	196	90	102	16	42,9	77,8	1/2" UNC	20,25		210	48861	48864
	MKHP-DN50/65-SAE210	48	196	105	114	19	50,8	88,9	1/2" UNC	20,95		175	48862	48865

CONNECTION TYPE	DIMENSIONS											ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-2	Type	LW	L	B ₁	b ₁	t	a	b	M	Weight [Kg]		PN [bar]	442A	4428
	MKHP-DN32-SAE420	32	172	78	95	27	31,8	66,7	M14 ⁽¹⁾	9,72		420	49050	37598
	MKHP-DN32-SAE420	32	172	78	95	27	31,8	66,7	M12	9,72		420	48842	48847
	MKHP-DN40-SAE420	38	177	94	112	30	36,5	79,4	M16	13,57		420	48772	48849
	MKHP-DN50-SAE420	48	196	114	134	35	44,5	96,8	M20	20,25		420	48844	48851
	MKHP-DN32-SAE420	32	172	78	95	27	31,8	66,7	1/2" UNC	9,72		420	48854	48856
	MKHP-DN40-SAE420	38	177	94	112	30	36,5	79,4	5/8" UNC	13,57		420	48858	48860
	MKHP-DN50-SAE420	48	196	114	134	35	44,5	96,8	3/4" UNC	20,25		420	48863	48866

⁽¹⁾ This thread is not to be used for new designs.

Ball valve with SAE adapter / split flange adapter Steel

BKH/BKHP-SAE/SAEFS



AVAILABLE SIZES

DN13 - DN25 (1/2" to 1")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

Type	I	B	H	h	m	V	SW	K	H ₂	Lever
BKH-DN13	48	35	54	40	19	11	9	115	89	Zn
BKH-DN20	62	49	75	57	24,5	14	14	171	127	St
BKH-DN25	66	58	83	65	29,5	14	14	171	135	St
BKHP-DN25	74	70	88	70	34,5	14	14	171	140	St

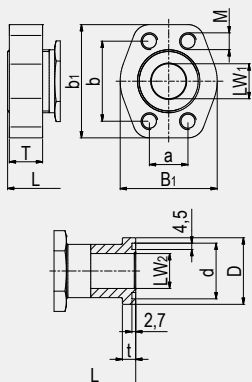
Please note the pressure ratings of the connection flanges!

Ball valve with SAE adapter / split flange adapter Steel

BKH/BKHP-SAE/SAEFS

CONNECTION TYPE

ISO 6162-1



DIMENSIONS

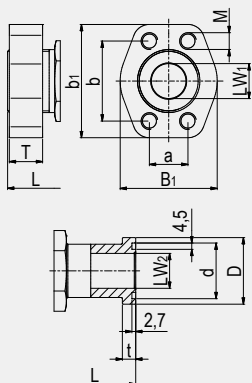
Type	LW ₁	LW ₂	L	B ₁	b ₁	T	a	b	M ⁽¹⁾	d	D	t	Weight [Kg]
BKH-DN13-SAE210/SAEFS210	13	13	136	48	56	13	17,5	38,1	M8	25,5	30,2	6,8	1,18
BKH-DN20-SAE210/SAEFS210	20	19	149	50	65	14	22,2	47,6	M10	31,9	38,1	6,8	2,15
BKH-DN25-SAE210/SAEFS210	25	25	163	60	70	16	26,2	52,4	M10	39,8	44,4	8,1	3,60

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	112A	1128
350	53942	on request
350	57332	on request
320	35339	on request

CONNECTION TYPE

ISO 6162-2



DIMENSIONS

Type	LW ₁	LW ₂	L	B ₁	b ₁	T	a	b	M ⁽¹⁾	d	D	t	Weight [Kg]
BKH-DN13-SAE420/SAEFS420	13	13	136	48	56	16	18,2	40,5	M8	25,5	31,8	7,9	1,20
BKH-DN20-SAE420/SAEFS420	20	19	155	60	71	19	23,8	50,8	M10	31,9	41,3	8,9	2,26
BKH-DN25-SAE420/SAEFS420	25	25	173	70	81	24	27,8	57,2	M12	39,8	47,6	9,6	3,75
BKHP-DN25-SAE420/SAEFS420	25	25	181	70	81	24	27,8	57,2	M12	39,8	47,6	9,6	-

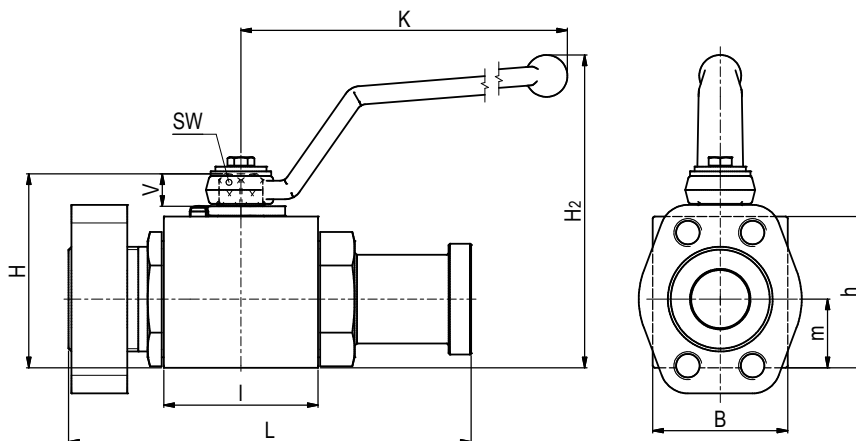
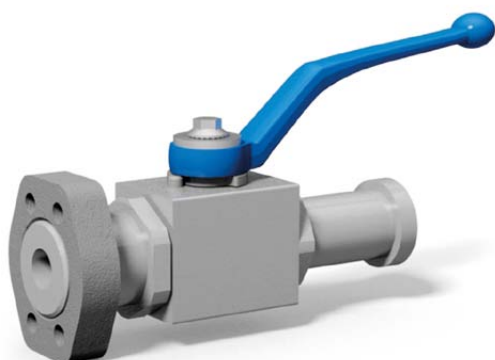
ORDER CODE PER MATERIAL COMBINATION

PN [bar]	112A	1128
420	50016	on request
420	47869	on request
320	47968	on request
420	on request	on request

⁽¹⁾ UNC threads on request.

Ball valve with SAE adapter / split flange adapter Stainless Steel

BKH/BKHP-SAE/SAEFS



AVAILABLE SIZES

DN13 - DN25 (1/2" to 1")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-30°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

Type	L	B	H	h	m	V	SW	K	H ₂	Lever
BKH-DN13	48	35	54	40	19	11	9	115	89	Zn
BKH-DN20	62	49	75	57	24,5	14	14	171	127	St
BKHP-DN20	82	58	83	65	32,5	14	14	171	135	St
BKH-DN25	66	58	83	65	29,5	14	14	171	135	St
BKHP-DN25	84	70	88	70	34,5	14	14	171	140	St

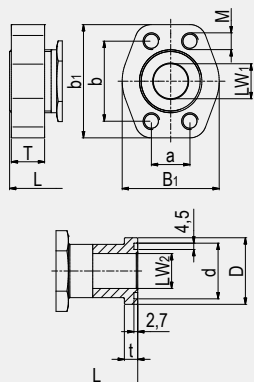
Please note the pressure ratings of the connection flanges!

Ball valve with SAE adapter / split flange adapter Stainless Steel

BKH/BKHP-SAE/SAEFS

CONNECTION TYPE

ISO 6162-1



DIMENSIONS

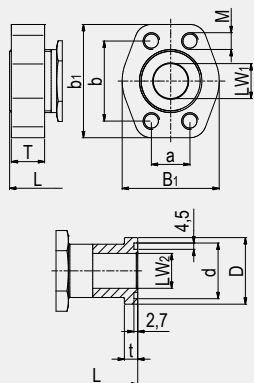
Type	LW ₁	LW ₂	L	B ₁	b ₁	T	a	b	M ⁽¹⁾	d	D	t	Weight [Kg]
BKH-DN13-SAE210/SAEFS210	13	13	136	48	56	13	17,5	38,1	M8	25,5	30,2	6,8	1,18
BKH-DN20-SAE210/SAEFS210	20	19	149	50	65	14	22,2	47,6	M10	31,9	38,1	6,8	2,15
BKH-DN25-SAE210/SAEFS210	25	25	163	60	70	16	26,2	52,4	M10	39,8	44,4	8,1	3,60

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	442A	4428
350	on request	
350	on request	
320	on request	

CONNECTION TYPE

ISO 6162-2



DIMENSIONS

Type	LW ₁	LW ₂	L	B ₁	b ₁	T	a	b	M ⁽¹⁾	d	D	t	Weight [Kg]
BKH-DN13-SAE420/SAEFS420	13	13	136	48	56	16	18,2	40,5	M8	25,5	31,8	7,9	1,20
BKH-DN20-SAE420/SAEFS420	20	19	155	60	71	19	23,8	50,8	M10	31,9	41,3	8,9	2,26
BKHP-DN20-SAE420/SAEFS420	20	19	175	60	71	19	23,8	50,8	M10	31,9	41,3	8,9	-
BKH-DN25-SAE420/SAEFS420	25	25	173	70	81	24	27,8	57,2	M12	39,8	47,6	9,6	3,75
BKHP-DN25-SAE420/SAEFS420	25	25	191	70	81	24	27,8	57,2	M12	39,8	47,6	9,6	-

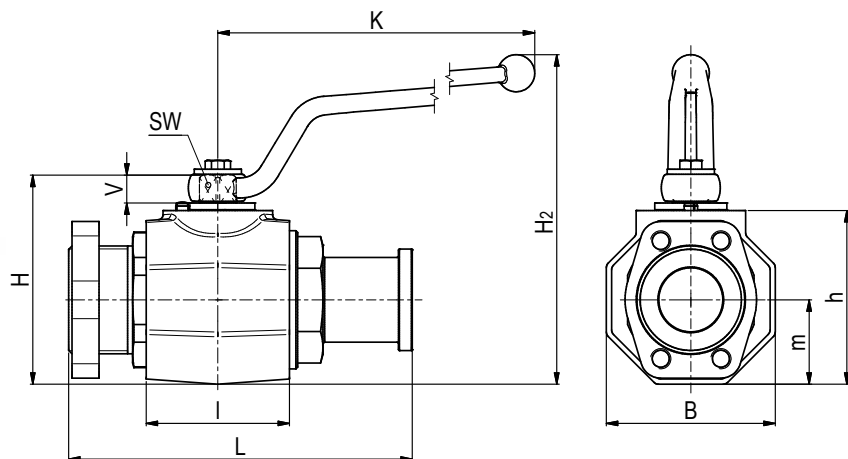
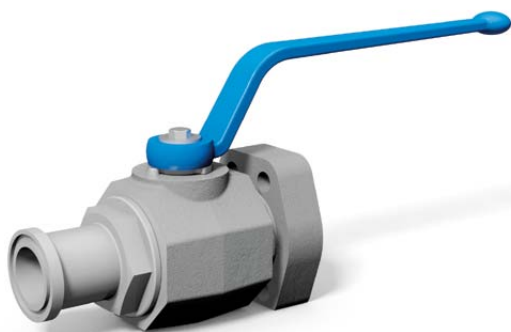
ORDER CODE PER MATERIAL COMBINATION

PN [bar]	442A	4428
420	on request	
315	on request	
420	on request	
320	on request	
420	on request	

⁽¹⁾ UNC threads on request.

Ball valve with SAE adapter / split flange adapter Steel

MKHP-SAE/SAEFS



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 24
- Position switches 228 - 229
- Combinations 188 - 189
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C

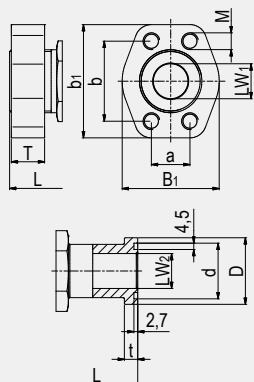
GENERAL DIMENSIONS

Type	L	B 8Kt	H	h	m	V	SW	K	H ₂	Lever
MKHP-DN32	80	81	107	86	40,5	16,5	17	306	180	St
MKHP-DN40	85	100	124	103	50	16,5	17	306	197	St
MKHP-DN50	100	118	138	117	59	16,5	17	306	211	St

Please note the pressure ratings of the connection flanges!

CONNECTION TYPE

ISO 6162-1



DIMENSIONS

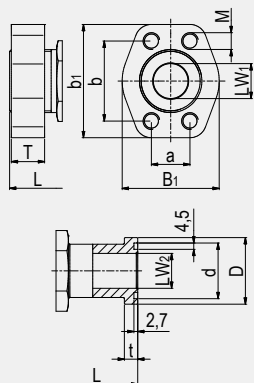
Type	LW ₁	LW ₂	L	B ₁	b ₁	T	a	b	M ⁽¹⁾	d	D	t	Weight [Kg]
MKHP-DN32-SAE210/SAEFS210	32	30	181	68	79	16	30,2	58,7	M10	44,6	50,8	8,1	5,87
MKHP-DN40-SAE210/SAEFS210	38	38	204	78	93	16	35,7	69,9	M12	54,1	60,3	8,1	8,82
MKHP-DN50-SAE210/SAEFS210	48	48	214	90	102	16	42,9	77,8	M12	63,6	71,4	9,6	14,30

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	112A	1128
280	on request	
210	on request	
210	on request	

CONNECTION TYPE

ISO 6162-2



DIMENSIONS

Type	LW ₁	LW ₂	L	B ₁	b ₁	T	a	b	M ⁽¹⁾	d	D	t	Weight [Kg]
MKHP-DN32-SAE420/SAEFS420	32	30	198	78	95	27	31,8	66,7	M12	44,6	54	10,4	6,12
MKHP-DN40-SAE420/SAEFS420	38	38	229	94	112	30	36,5	79,4	M16	54,1	63,5	12,7	9,29
MKHP-DN50-SAE420/SAEFS420	48	48	256	114	134	35	44,5	96,8	M20	63,6	79,4	12,7	15,34

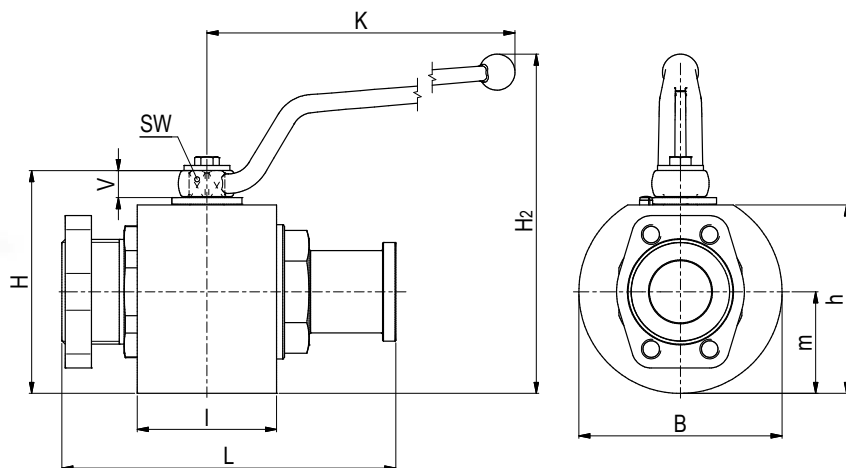
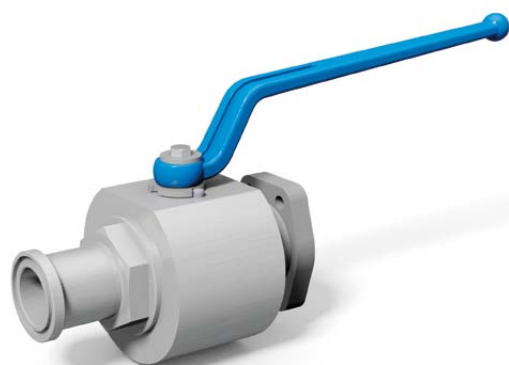
ORDER CODE PER MATERIAL COMBINATION

PN [bar]	112A	1128
420	on request	
420	on request	
420	on request	

⁽¹⁾ UNC threads on request.

Ball valve with SAE adapter / split flange adapter Stainless Steel

MKHP-SAE/SAEFS



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 28
- Position switches 228 - 229
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-30°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

Type	I	B	H	h	m	V	SW	K	H ₂	Lever
MKHP-DN32	80	109	121	100	54,5	16,5	17	306	194	St
MKHP-DN40	85	124	136	115	62	16,5	17	306	209	St
MKHP-DN50	101	132	145	124	66	16,5	17	306	218	St

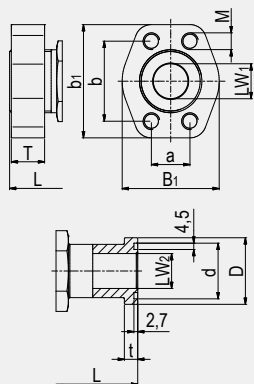
Please note the pressure ratings of the connection flanges!

Ball valve with SAE adapter / split flange adapter Stainless Steel

MKHP-SAE/SAEFS

CONNECTION TYPE

ISO 6162-1



DIMENSIONS

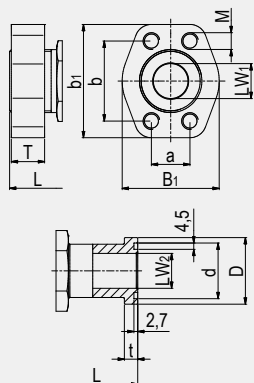
Type	LW ₁	LW ₂	L	B ₁	b ₁	T	a	b	M ⁽¹⁾	d	D	t	Weight [Kg]
MKHP-DN32-SAE210/SAEFS210	32	30	181	68	79	16	30,2	58,7	M10	44,6	50,8	8,1	7,86
MKHP-DN40-SAE210/SAEFS210	38	38	204	78	93	16	35,7	69,9	M12	54,1	60,3	8,1	11,43
MKHP-DN50-SAE210/SAEFS210	48	48	214	90	102	16	42,9	77,8	M12	63,6	71,4	9,6	15,85

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	442A	4428
280	on request	
210	on request	
210	on request	

CONNECTION TYPE

ISO 6162-2



DIMENSIONS

Type	LW ₁	LW ₂	L	B ₁	b ₁	T	a	b	M ⁽¹⁾	d	D	t	Weight [Kg]
MKHP-DN32-SAE420/SAEFS420	32	30	198	78	95	27	31,8	66,7	M12	44,6	54	10,4	8,51
MKHP-DN40-SAE420/SAEFS420	38	38	229	94	112	30	36,5	79,4	M16	54,1	63,5	12,7	11,95
MKHP-DN50-SAE420/SAEFS420	48	48	256	114	134	35	44,5	96,8	M20	63,6	79,4	12,7	12,32

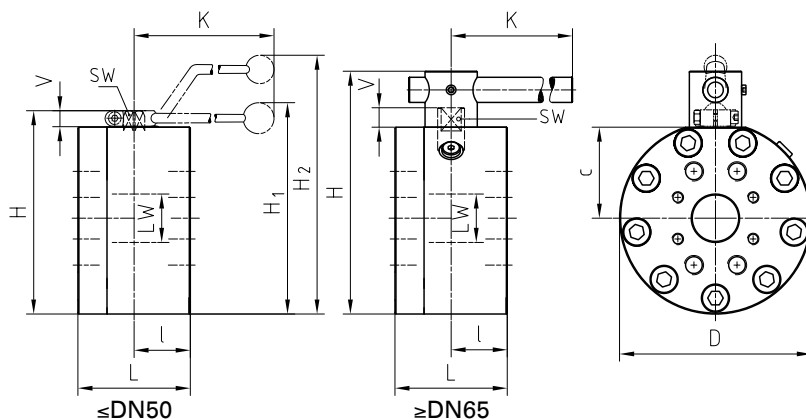
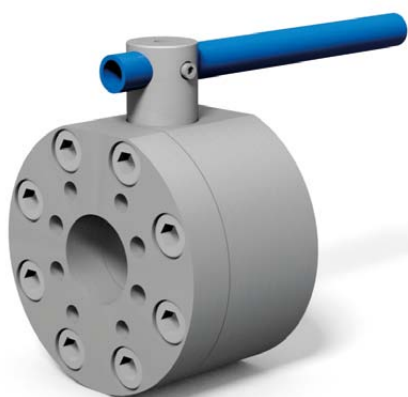
ORDER CODE PER MATERIAL COMBINATION

PN [bar]	442A	4428
420	on request	
420	on request	
420	on request	

⁽¹⁾ UNC threads on request.

Flange ball valve with SAE connection metric / UNC Steel

KH-SAE



AVAILABLE SIZES

DN15 - DN80 (5/8" to 3")

CONNECTIONS

ISO 6162-1 and -2 (double flange pattern)

ACCESSORIES ON REQUEST

- Locking devices page 222 - 226
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

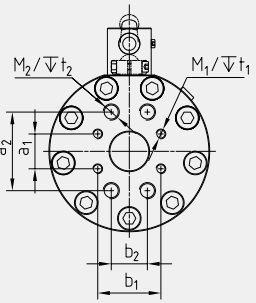
Materials	DN15-50 212A	DN15-50 2128	DN65-80 282A	DN65-80 2828
Body	Steel	Steel	Steel	Steel
Ball	Steel	Steel	Steel	Steel
Stem	Steel	Steel	Duplex	Duplex
Ball seats	POM	POM	POM	POM
O-rings	NBR	FPM	NBR	FPM
Tmin / Tmax	-10°C / 100°C	-10°C / 100°C	-10°C / 100°C	-10°C / 100°C

GENERAL DIMENSIONS

Type	LW	L	I	D	H	c	V	K	SW	H ₁	H ₂	Lever
KH-DN15	15	75	35	88	88	31	13	160	12	-	132	Al
KH-DN20	20	80	35	98	100	36,5	14	200	14	103	-	Zn
KH-DN25	25	88	38	118	113	39,5	14	200	14	116	-	Zn
KH-DN32	32	100	50	145	158	68	17	320	17	167	-	Al
KH-DN40	38	110	55	165	178	78	17	320	17	187	-	Al
KH-DN50	48	116	58	198	210	94	17	320	17	219	-	Al
KH-DN65	63	170	75	218	275	100	20	600	16	-	-	St ⁽¹⁾
KH-DN80 (PN100)	76	170	70	248	307	111	26	600	19	-	-	St ⁽¹⁾
KH-DN80 (PN160/420)	76	170	79	258	315	114,5	26	600	19	-	-	St ⁽¹⁾

Please note the pressure ratings of the connection flanges!

⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

CONNECTION TYPE	DIMENSIONS										ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1 and -2 (double flange pattern)	Type	a ₁	b ₁	M ₁	t ₁	a ₂	b ₂	M ₂	t ₂	Weight [Kg]	PN [bar]	212A (282A)	2128 (2828)
	KH-DN15-SAE210/420	17,5	38,1	M8	18	40,5	18,2	M8	18	2,96	350/420	44655*	45545*
	KH-DN20-SAE210/420	22,2	47,6	M10	18	50,8	23,8	M10	18	4,20	350/420	44804*	45546*
	KH-DN25-SAE210/420	27,8	57,2	M12	20	52,4	26,2	M10	20	6,00	320/420	44632*	45547*
	KH-DN32-SAE210/420 ⁽²⁾	30,2	58,7	M12	20	66,7	31,8	M14	22	11,65	210/420	45548*	45549*
	KH-DN32-SAE210/420	30,2	58,7	M10	20	66,7	31,8	M12	22	11,70	280/420	44826*	45550*
	KH-DN40-SAE210/420	35,7	69,9	M12	21	79,4	36,5	M16	27	17,10	210/420	45212*	45551*
	KH-DN50-SAE210/420	42,9	77,8	M12	20	96,8	44,5	M20	28	24,60	210/420	44710*	21845*
	KH-DN65-SAE210/420	58,7	123,8	M24	41	88,9	50,8	M12	19	44,40	175/420	41440	46204
	KH-DN80-SAE210/420	71,4	152,4	M30	47	106,4	61,9	M16	24	54,90	100	46376	46205
	KH-DN80-SAE210/420	71,4	152,4	M30	47	106,4	61,9	M16	24	60,40	160/420	58191	58107
	KH-DN15-SAE210/420	17,5	38,1	5/16"UNC	18	40,5	18,2	5/16"UNC	18	2,96	350/420	46206	25414
	KH-DN20-SAE210/420	22,2	47,6	3/8"UNC	18	50,8	23,8	3/8"UNC	18	4,20	350/420	46207	46212
	KH-DN25-SAE210/420	27,8	57,2	7/16"UNC	20	52,4	26,2	3/8"UNC	20	6,00	320/420	46208	46213
	KH-DN32-SAE210/420	30,2	58,7	7/16"UNC	22	66,7	31,8	1/2"UNC	22	11,70	280/420	46209	46214
	KH-DN40-SAE210/420	35,7	69,9	1/2"UNC	20	79,4	36,5	5/8"UNC	24	17,10	210/420	46210	46215
	KH-DN50-SAE210/420	42,9	77,8	1/2"UNC	20	96,8	44,5	3/4"UNC	28	24,60	210/420	46211	46216

⁽²⁾This version is not to be used for new designs.

*Article usually in stock.

! We stamp the valves with the flange pressure rating in accordance with ISO 6162-1/2 as stated above. Nevertheless the valve is suitable for usage up to 210/420 bar if higher-rated flanges are used.

BYPASS OPTION



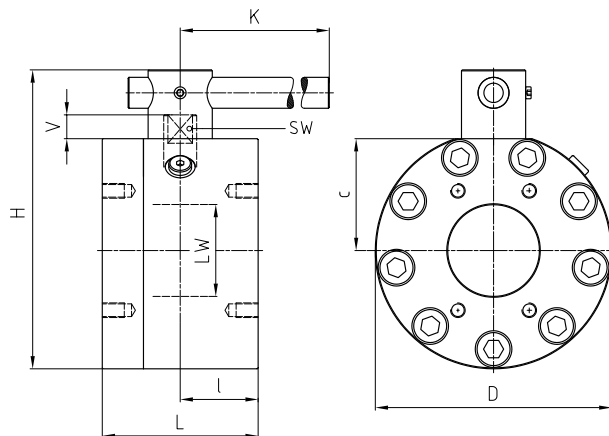
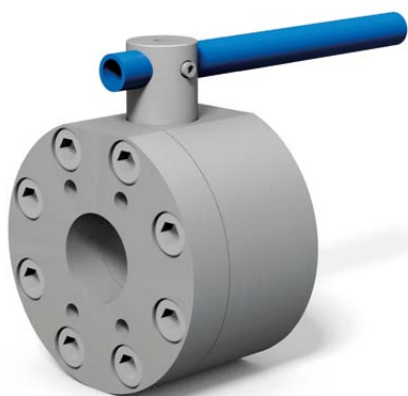
When larger ball valves have to be activated at full differential pressure, a smaller ball valve can be used before activation in order to equalize the pressure.

We combine the bypass within the flange valve body to provide less leakage points compared to a piped solution.

- Both main and bypass valve can be offered with locking device or any other accessory like limit switches or actuators.
- Bypass is a standard manifold mounting PKH valve which can be easily maintained or replaced
- Bypass manifold mounting valve provides bubble tight shut off.

Flange ball valve with SAE connection metric / UNC Steel

KH-SAE



AVAILABLE SIZES

DN65 - DN125 (2 1/2" to 5")

CONNECTIONS

ISO 6162-1 (single flange pattern)

ACCESSORIES ON REQUEST

- Locking devices page 226
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

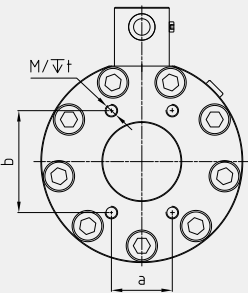
Materials	282A	2828
Body	Steel	Steel
Ball	Steel	Steel
Stem	Duplex	Duplex
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-10°C / 100°C	-10°C / 100°C

GENERAL DIMENSIONS

Type	LW	L	I	D	H	c	V	K	SW	Lever
KH-DN65	63	150	75	198	259	94	20	600	16	St ⁽¹⁾
KH-DN80 (PN100)	76	140	70	210	277	100	26	600	19	St ⁽¹⁾
KH-DN80 (PN160)	76	150	79	218	284	103,5	26	600	19	St ⁽¹⁾
KH-DN100	100	170	85	258	326	122	27	900	24	St ⁽¹⁾
KH-DN125	118	210	105	295	377	140	33	900	36	St ⁽¹⁾

Please note the pressure ratings of the connection flanges!

⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1 (single flange pattern)	Type	a	b	M	t	Weight [Kg]	PN [bar]	282A	2828
	KH-DN65-SAE210	50,8	88,9	M12	19	33,50	175	32104	25933
	KH-DN80-SAE210	61,9	106,4	M16	24	33,50	100	30721	25934
	KH-DN80-SAE210	61,9	106,4	M16	24	39,40	160	58097	58098
	KH-DN100-SAE210	77,8	130,2	M16	24	60,50	35	30722	25935
	KH-DN125-SAE210	92,1	152,4	M16	30	95,50	35	14830	25936
	KH-DN65-SAE210	50,8	88,9	1/2" UNC	19	33,50	175	21886	10702
	KH-DN80-SAE210	61,9	106,4	5/8" UNC	24	33,50	100	27427	10701
	KH-DN80-SAE210	61,9	106,4	5/8" UNC	24	39,40	160	58101	58102
	KH-DN100-SAE210	77,8	130,2	5/8" UNC	24	60,50	35	27428	10700
	KH-DN125-SAE210	92,1	152,4	5/8" UNC	30	95,50	35	37954	10699

! We stamp the valves with the flange pressure rating in accordance with ISO 6162-1 as stated above.
Nevertheless the valve is suitable for usage up to 210 bar if higher-rated flanges are used.

BYPASS OPTION



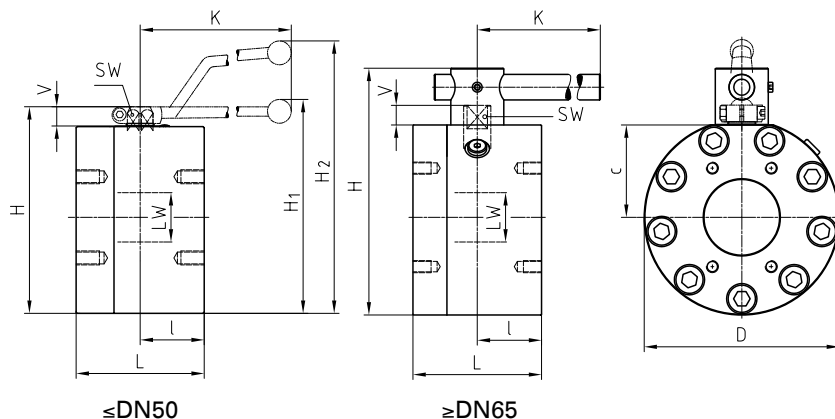
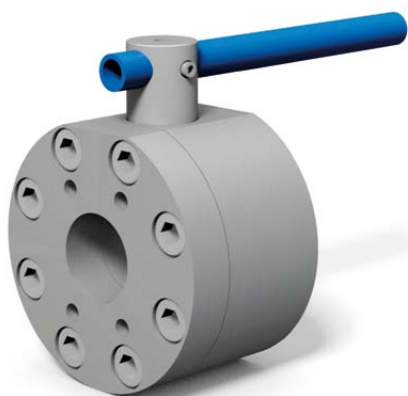
When larger ball valves have to be activated at full differential pressure, a smaller ball valve can be used before activation in order to equalize the pressure.

We combine the bypass within the flange valve body to provide less leakage points compared to a piped solution.

- Both main and bypass valve can be offered with locking device or any other accessory like limit switches or actuators.
- Bypass is a standard manifold mounting PKH valve which can be easily maintained or replaced
- Bypass manifold mounting valve provides bubble tight shut off.

Flange ball valve with SAE connection metric / UNC Stainless Steel

KH-SAE



AVAILABLE SIZES

DN15 - DN125 (5/8" to 5")

CONNECTIONS

ISO 6162-1, ISO 6162-2 (single flange pattern)

ACCESSORIES ON REQUEST

- Locking devices page 222 - 226
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-10°C / 100°C	-10°C / 100°C

GENERAL DIMENSIONS ISO 6162-1 (SAE210)

Type	LW	L	I	D	H	c	V	K	SW	H ₁	H ₂	Lever
KH-DN15	15	75	35	78	83	31	13	160	12	-	127	Al
KH-DN20	20	80	35	98	100	36,5	14	200	14	103	-	Zn
KH-DN25	25	88	38	118	113	39,5	14	200	14	116	-	Zn
KH-DN32	32	100	50	145	158	68	17	320	17	167	-	Al
KH-DN40	38	110	55	165	178	78	17	320	17	187	-	Al
KH-DN50	48	116	58	198	210	94	17	320	17	219	-	Al
KH-DN65	63	150	75	198	259	94	20	600	16	-	-	St ⁽¹⁾
KH-DN80 (PN100)	76	140	70	210	277	100	26	600	19	-	-	St ⁽¹⁾
KH-DN80 (PN160)	76	150	79	218	284	103,5	26	600	19	-	-	St ⁽¹⁾
KH-DN100	100	170	85	258	326	122	27	900	24	-	-	St ⁽¹⁾
KH-DN125	118	210	105	295	377	140	33	900	36	-	-	St ⁽¹⁾

GENERAL DIMENSIONS ISO 6162-2 (SAE420)

Type	LW	L	I	D	H	c	V	K	SW	H ₁	H ₂	Lever
KH-DN15	15	75	35	78	83	31	13	160	12	-	127	Al
KH-DN20	20	80	35	98	100	36,5	14	200	14	103	-	Zn
KH-DN25	25	88	38	118	113	39,5	14	200	14	116	-	Zn
KH-DN32	32	100	50	145	158	68	17	320	17	167	-	Al
KH-DN40	38	110	55	165	178	78	17	320	17	187	-	Al
KH-DN50	48	116	58	198	210	94	17	320	17	219	-	Al
KH-DN65	63	170	75	218	275	100	20	600	16	-	-	St ⁽¹⁾
KH-DN80 (PN100)	76	170	70	248	307	111	26	600	19	-	-	St ⁽¹⁾
KH-DN80 (PN420)	76	170	79	258	315	114,5	26	600	19	-	-	St ⁽¹⁾

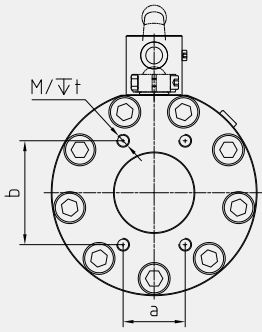
Please note the pressure ratings of the connection flanges!

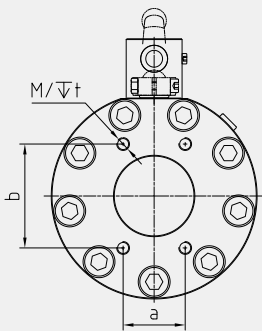
⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

! We stamp the valves with the flange pressure rating in accordance with ISO 6162-1 as stated above. Nevertheless the valve is suitable for usage up to 210 bar if higher-rated flanges are used.

Flange ball valve with SAE connection metric / UNC Stainless Steel

KH-SAE

CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1 (single flange pattern)	Type	a	b	M	t	Weight [Kg]	PN [bar]	442A	4428
	KH-DN15-SAE210	17,5	38,1	M8	18	2,50	350	17228	37557
	KH-DN20-SAE210	22,2	47,6	M10	18	4,15	350	19946	37558
	KH-DN25-SAE210	26,2	52,4	M10	20	6,27	320	17229	37559
	KH-DN32-SAE210	30,2	58,7	M12 ⁽²⁾	20	11,85	210	16115	37566
	KH-DN32-SAE210	30,2	58,7	M10	20	11,85	280	41727	41728
	KH-DN40-SAE210	35,7	69,9	M12	21	17,00	210	12818	13256
	KH-DN50-SAE210	42,9	77,8	M12	20	25,50	210	12819	13257
	KH-DN65-SAE210	50,8	88,9	M12	19	33,50	175	17592	13255
	KH-DN80-SAE210	61,9	106,4	M16	24	33,50	100	25309	13254
	KH-DN80-SAE210	61,9	106,4	M16	24	40,00	160	58099	58100
	KH-DN100-SAE210	77,8	130,2	M16	24	60,50	35	23662	32960
	KH-DN125-SAE210	92,1	152,4	M16	30	95,50	35	37567	37568
	KH-DN15-SAE210	17,5	38,1	5/16" UNC	18	2,50	350	24701	37813
	KH-DN20-SAE210	22,2	47,6	3/8" UNC	18	4,15	350	37815	37816
	KH-DN25-SAE210	26,2	52,4	3/8" UNC	20	6,27	320	37818	37941
	KH-DN32-SAE210	30,2	58,7	7/16" UNC	20	11,85	280	37943	37944
	KH-DN40-SAE210	35,7	69,9	1/2" UNC	20	17,00	210	37946	37947
	KH-DN50-SAE210	42,9	77,8	1/2" UNC	20	25,50	210	27350	37949
	KH-DN65-SAE210	50,8	88,9	1/2" UNC	19	33,50	175	37950	37951
	KH-DN80-SAE210	61,9	106,4	5/8" UNC	24	33,50	100	33274	37952
	KH-DN80-SAE210	61,9	106,4	5/8" UNC	24	40,00	160	58103	58104
	KH-DN100-SAE210	77,8	130,2	5/8" UNC	24	60,50	35	24717	37953
	KH-DN125-SAE210	92,1	152,4	5/8" UNC	30	95,50	35	37955	37956

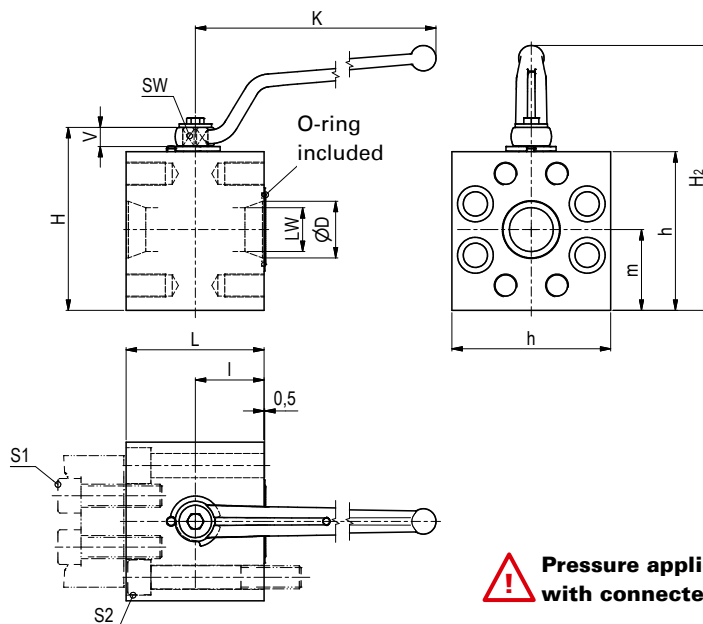
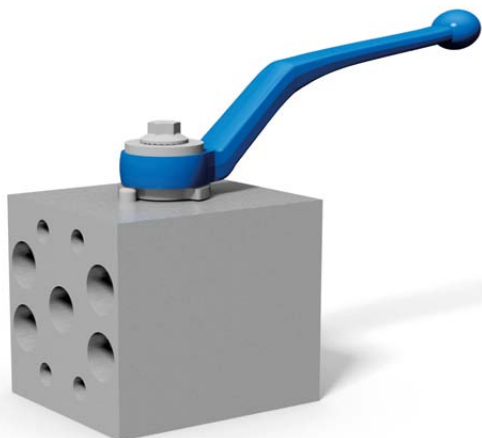
CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-2 (single flange pattern)	Type	a	b	M	t	Weight [Kg]	PN [bar]	442A	4428
	KH-DN15-SAE420	18,2	40,5	M8	18	2,50	420	26159	37571
	KH-DN20-SAE420	23,8	50,8	M10	18	4,25	420	16937	37572
	KH-DN25-SAE420	27,8	57,2	M12	20	6,30	420	37569	37570
	KH-DN32-SAE420	31,8	66,7	M14 ⁽²⁾	22	11,80	420	16114	37573
	KH-DN32-SAE420	31,8	66,7	M12	22	11,80	420	41731	41732
	KH-DN40-SAE420	36,5	79,4	M16	27	16,90	420	14401	16313
	KH-DN50-SAE420	44,5	96,8	M20	28	25,30	420	16113	37574
	KH-DN65-SAE420	123,8	58,7	M24	41	44,50	420	46354	46355
	KH-DN80-SAE420	152,4	71,4	M30	47	55,00	100	46356	46357
	KH-DN80-SAE420	152,4	71,4	M30	47	63,50	420	58105	58106
	KH-DN15-SAE420	18,2	40,5	5/16" UNC	18	2,50	420	37958	37959
	KH-DN20-SAE420	23,8	50,8	3/8" UNC	18	4,25	420	37961	37962
	KH-DN25-SAE420	27,8	57,2	7/16" UNC	20	6,30	420	37964	14241
	KH-DN32-SAE420	31,8	66,7	1/2" UNC	22	11,80	420	37966	18654
	KH-DN40-SAE420	36,5	79,4	5/8" UNC	24	16,90	420	27349	14242
	KH-DN50-SAE420	44,5	96,8	3/4" UNC	30	25,30	420	29020	14243

⁽²⁾This version is not to be used for new designs.

Intermediate ball valve with SAE connection metric / UNC Steel

KHZ

Two-way



AVAILABLE SIZES

DN13 - DN50 (1/2" to 2")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 225
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-10°C / 100°C	-10°C / 100°C

GENERAL DIMENSIONS

Type	LW	D	L	I	H	h	m	K	SW	V	H ₂	Lever	Weight [Kg]
KHZ-DN13	13	13	68	34	72	58	30	115	9	11	109	St	1,8
KHZ-DN20	20	20	70	35	93	75	37,5	171	14	14	146	St	2,8
KHZ-DN25	25	25	78	39	103	84,5	44	171	14	14	155	St	3,9
KHZ-DN32	25	32	90	45	119	100	50	171	14	14	171	St	6,5
KHZ-DN40	32	38	99	49,5	141	120	60	306	17	17	214	St	10,5
KHZ-DN50	38	49	120	60	158,5	137,5	70	306	17	17	232	St	16,5

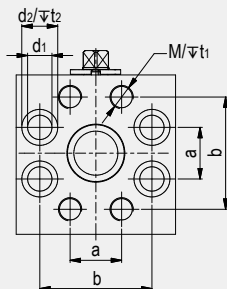
These intermediate ball valves have been designed with both bore patterns in accordance with ISO 6162-1 or ISO 6162-2. They can either be flanged on one side to a hydraulic block and connected on the other side with a hydraulic pipe, or they can be installed into a pipe system. Please note the pressure ratings of the connection flanges!

Intermediate ball valve with SAE connection metric / UNC Steel

KHZ

CONNECTION TYPE

ISO 6162-1

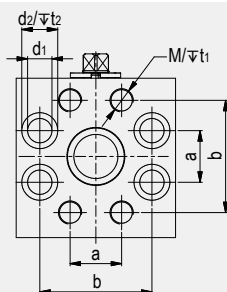


DIMENSIONS

Type	a	b	M	t ₁	d ₁	d ₂	t ₂	S1 ⁽¹⁾ Dimension of screws (min)	S2 ⁽¹⁾ Dimension of screws (min)	O-ring	PN [bar]	112A	1128
KHZ-DN13-SAE210	17,5	38,1	M8	15	8,5	13,5	9	M8x30 – 10.9	M8x70 – 10.9	18,64x3,53	350	47110	47122
KHZ-DN20-SAE210	22,2	47,6	M10	17	10,5	16,5	11	M10x30 – 10.9	M10x80 – 10.9	24,99x3,53	350	47111	41625
KHZ-DN25-SAE210	26,2	52,4	M10	17	10,5	16,5	11	M10x30 – 10.9	M10x80 – 10.9	32,92x3,53	320	47112	47141
KHZ-DN32-SAE210	30,2	58,7	M10	21	10,5	16,5	11	M10x30 – 10.9	M10x90 – 10.9	37,69x3,53	280	47113	41627
KHZ-DN40-SAE210	35,7	69,9	M12	21	13	19	13	M12x35 – 10.9	M12x100 – 10.9	47,22x3,53	210	47114	41628
KHZ-DN50-SAE210	42,9	77,8	M12	21	13	19	13	M12x35 – 10.9	M12x120 – 10.9	56,74x3,53	210	47115	47123
KHZ-DN13-SAE210	17,5	38,1	5/16"UNC	15	8,5	13,5	9	5/16"UNCx30 – 10.9	5/16"UNCx70 – 10.9	18,64x3,53	350	47129	47135
KHZ-DN20-SAE210	22,2	47,6	3/8"UNC	17	10,5	16,5	11	3/8"UNCx30 – 10.9	3/8"UNCx80 – 10.9	24,99x3,53	350	41637	41710
KHZ-DN25-SAE210	26,2	52,4	3/8"UNC	17	10,5	16,5	11	3/8"UNCx30 – 10.9	3/8"UNCx80 – 10.9	32,92x3,53	320	47144	47142
KHZ-DN32-SAE210	30,2	58,7	7/16"UNC	21	10,5	16,5	11	7/16"UNCx30 – 10.9	7/16"UNCx90 – 10.9	37,69x3,53	280	41639	41712
KHZ-DN40-SAE210	35,7	69,9	1/2"UNC	21	13	19	13	1/2"UNCx35 – 10.9	1/2"UNCx100 – 10.9	47,22x3,53	210	41640	41713
KHZ-DN50-SAE210	42,9	77,8	1/2"UNC	21	13	19	13	1/2"UNCx35 – 10.9	1/2"UNCx120 – 10.9	56,74x3,53	210	47130	47136

CONNECTION TYPE

ISO 6162-2



DIMENSIONS

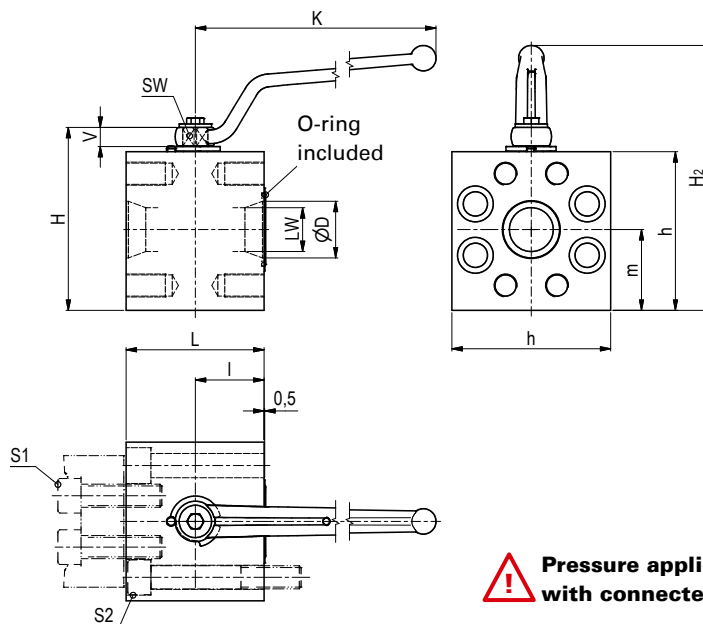
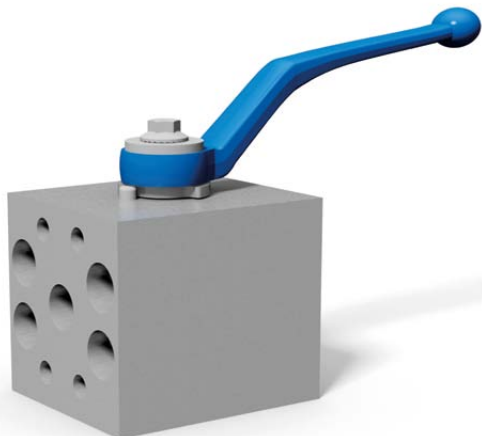
Type	a	b	M	t ₁	d ₁	d ₂	t ₂	S1 ⁽¹⁾ Dimension of screws (min)	S2 ⁽¹⁾ Dimension of screws (min)	O-ring	PN [bar]	112A	1128
KHZ-DN13-SAE420	18,2	40,5	M8	15	8,5	13,5	9	M8x30 – 10.9	M8x70 – 10.9	18,64x3,53	420	47116	47124
KHZ-DN20-SAE420	23,8	50,8	M10	17	10,5	16,5	11	M10x35 – 12.9	M10x80 – 12.9	24,99x3,53	420	47117	41631
KHZ-DN25-SAE420	27,8	57,2	M12	21	13	19	13	M12x45 – 10.9	M12x80 – 10.9	32,92x3,53	420	47118	47125
KHZ-DN32-SAE420	31,8	66,7	M12	20	13	19	13	M12x45 – 10.9	M12x90 – 10.9	37,69x3,53	420	47119	47126
KHZ-DN40-SAE420	36,5	79,4	M16	27	17	25	17,5	M16x55 – 10.9	M16x100 – 10.9	47,22x3,53	420	47120	47127
KHZ-DN50-SAE420	44,5	96,8	M20	34	21	31	21,5	M20x70 – 10.9	M20x130 – 10.9	56,74x3,53	420	47121	47128
KHZ-DN13-SAE420	18,2	40,5	5/16"UNC	15	8,5	13,5	9	5/16"UNCx30 – 10.9	5/16"UNCx70 – 10.9	18,64x3,53	420	47131	47137
KHZ-DN20-SAE420	23,8	50,8	3/8"UNC	17	10,5	16,5	11	3/8"UNCx35 – 12.9	3/8"UNCx80 – 12.9	24,99x3,53	420	41643	41716
KHZ-DN25-SAE420	27,8	57,2	7/16"UNC	21	13	19	13	7/16"UNCx45 – 10.9	7/16"UNCx80 – 10.9	32,92x3,53	420	47145	47143
KHZ-DN32-SAE420	31,8	66,7	1/2"UNC	20	13	19	13	1/2"UNCx45 – 10.9	1/2"UNCx90 – 10.9	37,69x3,53	420	47132	47138
KHZ-DN40-SAE420	36,5	79,4	5/8"UNC	26	17	25	17,5	5/8"UNCx55 – 10.9	5/8"UNCx100 – 10.9	47,22x3,53	420	47133	47139
KHZ-DN50-SAE420	44,5	96,8	3/4"UNC	34	21	31	21,5	3/4"UNCx70 – 10.9	3/4"UNCx130 – 10.9	56,74x3,53	420	47134	47140

⁽¹⁾ Screws and flanges not included

Intermediate ball valve with SAE connection metric / UNC Stainless Steel

KHZ

Two-way



AVAILABLE SIZES

DN13 - DN50 (1/2" to 2")

CONNECTIONS

ISO 6162-1, ISO 6162-2

ACCESSORIES ON REQUEST

- Locking devices page 225
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-10°C / 100°C	-10°C / 100°C

GENERAL DIMENSIONS

Type	LW	D	L	I	H	h	m	K	SW	V	H ₂	Lever	Weight [Kg]
KHZ-DN13	13	13	68	34	72	58	30	115	9	11	109	St	1,8
KHZ-DN20	20	20	70	35	93	75	37,5	171	14	14	146	St	2,8
KHZ-DN25	25	25	78	39	103	84,5	44	171	14	14	155	St	3,9
KHZ-DN32	25	32	90	45	119	100	50	171	14	14	171	St	6,5
KHZ-DN40	32	38	99	49,5	141	120	60	306	17	17	214	St	10,5
KHZ-DN50	38	49	120	60	158,5	137,5	70	306	17	17	232	St	16,5

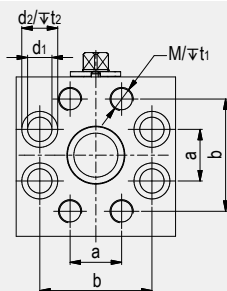
These intermediate ball valves have been designed with both bore patterns in accordance with ISO 6162-1 or ISO 6162-2. They can either be flanged on one side to a hydraulic block and connected on the other side with a hydraulic pipe, or they can be installed into a pipe system. Please note the pressure ratings of the connection flanges!

Intermediate ball valve with SAE connection metric / UNC Stainless Steel

KHZ

CONNECTION TYPE

ISO 6162-1

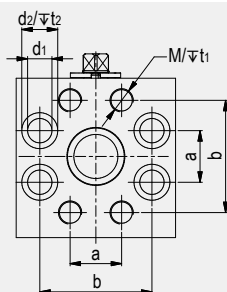


DIMENSIONS

Type	a	b	M	t ₁	d ₁	d ₂	t ₂	S1 ⁽¹⁾ Dimension of screws (min)	S2 ⁽¹⁾ Dimension of screws (min)	O-ring	PN [bar]	442A	4428
KHZ-DN13-SAE210	17,5	38,1	M8	15	8,5	13,5	9	M8x30*	M8x70*	18,64x3,53	350	49778	49790
KHZ-DN20-SAE210	22,2	47,6	M10	17	10,5	16,5	11	M10x30*	M10x80*	24,99x3,53	350	49779	49791
KHZ-DN25-SAE210	26,2	52,4	M10	17	10,5	16,5	11	M10x30*	M10x80*	32,92x3,53	320	49780	49792
KHZ-DN32-SAE210	30,2	58,7	M10	21	10,5	16,5	11	M10x30*	M10x90*	37,69x3,53	280	49781	49793
KHZ-DN40-SAE210	35,7	69,9	M12	21	13	19	13	M12x35*	M12x100*	47,22x3,53	210	49782	49794
KHZ-DN50-SAE210	42,9	77,8	M12	21	13	19	13	M12x35*	M12x120*	56,74x3,53	210	49783	49795
KHZ-DN13-SAE210	17,5	38,1	5/16" UNC	15	8,5	13,5	9	5/16" UNCx30*	5/16" UNCx70*	18,64x3,53	350	49802	49814
KHZ-DN20-SAE210	22,2	47,6	3/8" UNC	17	10,5	16,5	11	3/8" UNCx30*	3/8" UNCx80*	24,99x3,53	350	49803	49815
KHZ-DN25-SAE210	26,2	52,4	3/8" UNC	17	10,5	16,5	11	3/8" UNCx30*	3/8" UNCx80*	32,92x3,53	320	49804	49816
KHZ-DN32-SAE210	30,2	58,7	7/16" UNC	21	10,5	16,5	11	7/16" UNCx30*	7/16" UNCx90*	37,69x3,53	280	49805	49817
KHZ-DN40-SAE210	35,7	69,9	1/2" UNC	21	13	19	13	1/2" UNCx35*	1/2" UNCx100*	47,22x3,53	210	49806	49818
KHZ-DN50-SAE210	42,9	77,8	1/2" UNC	21	13	19	13	1/2" UNCx35*	1/2" UNCx120*	56,74x3,53	210	49807	49819

CONNECTION TYPE

ISO 6162-2



DIMENSIONS

Type	a	b	M	t ₁	d ₁	d ₂	t ₂	S1 ⁽¹⁾ Dimension of screws (min)	S2 ⁽¹⁾ Dimension of screws (min)	O-ring	PN [bar]	442A	4428
KHZ-DN13-SAE420	18,2	40,5	M8	15	8,5	13,5	9	M8x30*	M8x70*	18,64x3,53	420	49784	49796
KHZ-DN20-SAE420	23,8	50,8	M10	17	10,5	16,5	11	M10x35*	M10x80*	24,99x3,53	420	49785	49797
KHZ-DN25-SAE420	27,8	57,2	M12	21	13	19	13	M12x45*	M12x80*	32,92x3,53	420	49786	49798
KHZ-DN32-SAE420	31,8	66,7	M12	20	13	19	13	M12x45*	M12x90*	37,69x3,53	420	49787	49799
KHZ-DN40-SAE420	36,5	79,4	M16	27	17	25	17,5	M16x55*	M16x100*	47,22x3,53	420	49788	49800
KHZ-DN50-SAE420	44,5	96,8	M20	34	21	31	21,5	M20x70*	M20x130*	56,74x3,53	420	49789	49801
KHZ-DN13-SAE420	18,2	40,5	5/16" UNC	15	8,5	13,5	9	5/16" UNCx30*	5/16" UNCx70*	18,64x3,53	420	49808	49820
KHZ-DN20-SAE420	23,8	50,8	3/8" UNC	17	10,5	16,5	11	3/8" UNCx35*	3/8" UNCx80*	24,99x3,53	420	49809	49821
KHZ-DN25-SAE420	27,8	57,2	7/16" UNC	21	13	19	13	7/16" UNCx45*	7/16" UNCx80*	32,92x3,53	420	49810	49822
KHZ-DN32-SAE420	31,8	66,7	1/2" UNC	20	13	19	13	1/2" UNCx45*	1/2" UNCx90*	37,69x3,53	420	49811	49823
KHZ-DN40-SAE420	36,5	79,4	5/8" UNC	26	17	25	17,5	5/8" UNCx55*	5/8" UNCx100*	47,22x3,53	420	49812	49824
KHZ-DN50-SAE420	44,5	96,8	3/4" UNC	34	21	31	21,5	3/4" UNCx70*	3/4" UNCx130*	56,74x3,53	420	49813	49825

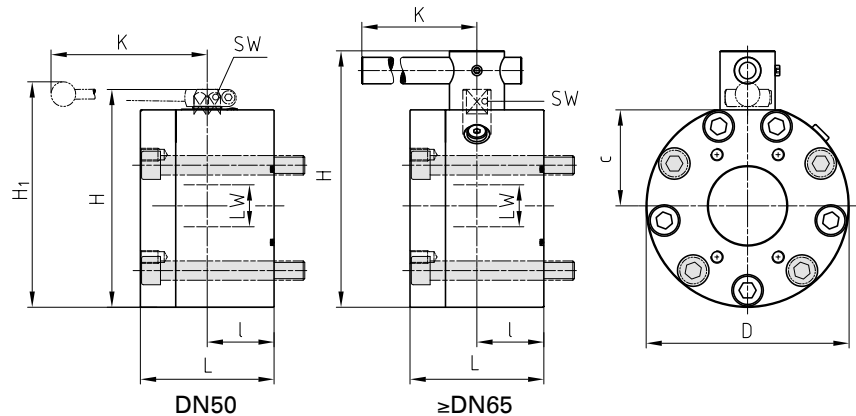
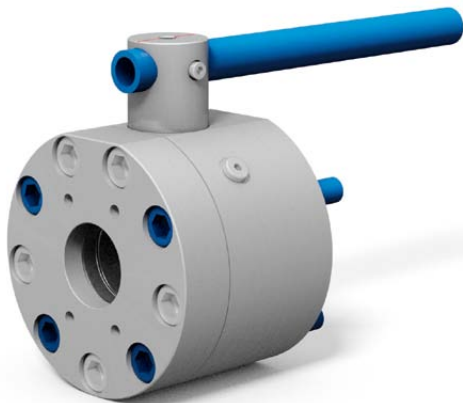
⁽¹⁾ Screws and flanges not included

* Rp 0,2 ≥ 900 N/mm²



Flange ball valve with SAE connection metric / UNC Steel

KH-SAE
flangeable



AVAILABLE SIZES

DN50 - DN125 (2" to 5")

CONNECTIONS

ISO6162-1 (single flange pattern), other connection types and sizes on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 226
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	DN50 212A	DN50 2128	DN65-125 282A	DN65-125 2828
Body	Steel	Steel	Steel	Steel
Ball	Steel	Steel	Steel	Steel
Stem	Steel	Steel	Duplex	Duplex
Ball seats	POM	POM	POM	POM
O-rings	NBR	FPM	NBR	FPM
Tmin / Tmax	-10°C / 100°C	-10°C / 100°C	-10°C / 100°C	-10°C / 100°C

GENERAL DIMENSIONS

Type	LW	L	I	D	H	c	K	SW	H ₁	Lever
KH-DN50	48	116	58	198	210	94	320	17	219	AI
KH-DN65	63	150	75	198	259	94	600	16	-	St ⁽¹⁾
KH-DN80 (PN100)	76	140	70	210	277	100	600	19	-	St ⁽¹⁾
KH-DN80 (PN160)	76	150	79	218	284	103,5	600	19	-	St ⁽¹⁾
KH-DN100	100	170	85	258	326	122	900	24	-	St ⁽¹⁾
KH-DN125	118	210	105	295	377	140	900	36	-	St ⁽¹⁾

Please note the pressure ratings of the connection flanges!

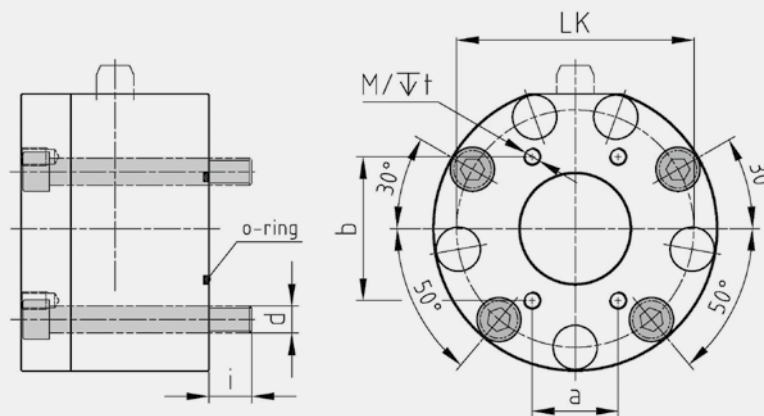
⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

Flange ball valve with SAE connection metric / UNC Steel

KH-SAE
flangeable

CONNECTION TYPE

ISO 6162-1



DIMENSIONS

Type	a	b	M	t	LK	d	i	Dimension of screws (min) ⁽¹⁾	O-ring ⁽²⁾	Weight [Kg]
KH-DN50-SAE210 see KHZ series valve										
KH-DN65-SAE210	50,8	88,9	M12	19	163	M20	32	4x M20x160	69,44x3,53	29,70
KH-DN80-SAE210	61,9	106,4	M16	24	175	M20	32	4x M20x150	85,32x3,53	34,00
KH-DN80-SAE210	61,9	106,4	M16	24	182	M20	32	4x M20x160	85,32x3,53	
KH-DN100-SAE210	77,8	130,2	M16	24	215	M24	26	4x M24x170	110,72x3,53	59,50
KH-DN125-SAE210	92,1	152,4	M16	30	248	M27	35	4x M27x215	136,12x3,53	96,50
KH-DN50-SAE210 see KHZ series valve										
KH-DN65-SAE210	50,8	88,9	1/2"UNC	19	163	3/4"UNC	31	4x 3/4"UNCx6 1/4"	69,44x3,53	27,90
KH-DN80-SAE210	61,9	106,4	5/8"UNC	24	175	3/4"UNC	28	4x 3/4"UNCx5 3/4"	85,32x3,53	32,30
KH-DN80-SAE210	61,9	106,4	5/8"UNC	24	182	3/4"UNC	31	4x 3/4"UNCx6 1/4"	85,32x3,53	
KH-DN100-SAE210	77,8	130,2	5/8"UNC	24	215	1"UNC	27,5	4x 1"UNCx6 3/4"	110,72x3,53	56,60
KH-DN125-SAE210	92,1	152,4	5/8"UNC	30	248	1 1/8"UNC	35	4x 1 1/8"UNCx8 1/2"	136,12x3,53	91,40

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	212A (282A)	2128 (2828)
175	40180	40188
100	40181	40189
160	59903	59904
35	40182	40190
35	40183	40191
175	40184	40192
100	40185	40193
160	59905	59906
35	40186	40194
35	40187	39344

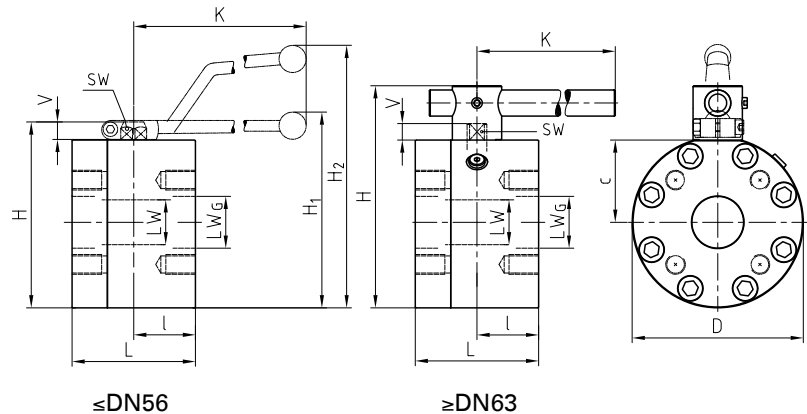
⁽¹⁾ Metric screws included, UNC screws not included

⁽²⁾ O-ring included

Also available with ISO6162-2 and ISO6164 connection.

Flange ball valve with ISO connection Steel

KH-ISO



AVAILABLE SIZES

DN13 - DN200 (1/2" to 8")

CONNECTIONS

ISO 6164-1 (ISO250), ISO 6164-2 (ISO400), ISO320 (not part of ISO 6164)

ACCESSORIES ON REQUEST

- Locking devices page 222 - 226
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	DN15-50 212A	DN15-50 2128	DN65-200 282A	DN65-200 2828
Body	Steel	Steel	Steel	Steel
Ball	Steel	Steel	Steel	Steel
Stem	Steel	Steel	Duplex	Duplex
Ball seats	POM	POM	POM	POM
O-rings	NBR	FPM	NBR	FPM
Tmin / Tmax	-10°C / 100°C	-10°C / 100°C	-10°C / 100°C	-10°C / 100°C

GENERAL DIMENSIONS ISO 6164-1 (ISO250)

Type	LW	LW _G	L	I	D	H	c	V	K	SW	H ₁	H ₂	Lever
KH-DN13	15	15	85	45	78	83	31	13	160	12	-	127	Al
KH-DN19	20	20	88	38	119	110	36,5	14	200	14	114	-	Zn
KH-DN25	25	25	88	38	126	117	39,5	14	200	14	120	-	Zn
KH-DN32	32	32	105	50	145	158	68	17	320	17	167	-	Al
KH-DN38	38	38	110	55	165	178	78	17	320	17	187	-	Al
KH-DN51	48	47	116	58	198	210	94	17	320	17	219	-	Al
KH-DN56	48	58	123	58	198	210	94	17	320	17	219	-	Al
KH-DN63	63	70	150	75	208	270	100	20	600	16	-	-	St ⁽¹⁾

GENERAL DIMENSIONS ISO 6164-2 (ISO400)

Type	LW	LW _G	L	I	D	H	c	V	K	SW	H ₁	H ₂	Lever
KH-DN13	15	14	85	45	78	83	31	13	160	12	-	127	Al
KH-DN19	20	18	88	38	119	110	36,5	14	200	14	114	-	Zn
KH-DN25	25	22	88	38	126	117	39,5	14	200	14	120	-	Zn
KH-DN32	32	29	105	50	145	158	68	17	320	17	167	-	Al
KH-DN38	38	35	110	55	165	178	78	17	320	17	187	-	Al
KH-DN51	48	43	123	58	198	210	94	17	320	17	219	-	Al
KH-DN56	48	53	123	58	198	210	94	17	320	17	219	-	Al
KH-DN63	65	58	150	75	224	286	108	20	600	16	-	-	St ⁽¹⁾
KH-DN70	65	63	150	75	224	286	108	20	600	16	-	-	St ⁽¹⁾
KH-DN80 (PN100)	76	74	140	70	228	293	107	26	600	19	-	-	St ⁽¹⁾
KH-DN80 (PN400)	76	76	170	78	258	315	114,5	26	600	19	-	-	St ⁽¹⁾

Please note the pressure ratings of the connection flanges!

⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

GENERAL DIMENSIONS ISO 320 (not part of ISO 6164)



Type	LW	LW _G	L	I	D	H	c	V	K	SW	H ₁	H ₂	Lever
KH-DN15													
							on request						
KH-DN20	20	20	88	38	119	110	36,5	14	200	14	114	-	Zn
KH-DN25	25	25	88	38	126	117	39,5	14	200	14	120	-	Zn
KH-DN32	32	32	105	50	145	158	68	17	320	17	167	-	Al
KH-DN40	38	38	110	55	165	178	78	17	320	17	187	-	Al
KH-DN50	48	48	122	58	198	210	94	17	320	17	219	-	Al
KH-DN65	65	63	150	75	208	270	100	20	600	16	-	-	St ⁽¹⁾
KH-DN80 (PN100)	76	76	140	70	215	279	100	26	600	19	-	-	St ⁽¹⁾
KH-DN80 (PN350)	76	76					refer to KH-DN80-ISO400 (PN400)						
KH-DN100	100	100	200	100	260	327	122	26	900	24	-	-	St ⁽¹⁾
KH-DN125	118	118	230	110	390	470	185	32	900	36	-	-	St ⁽¹⁾
KH-DN150	150	150	285	130	390	475	190	32	900	36	-	-	St ⁽¹⁾
KH-DN200	192	200	378	150	456	598	223	61	940	46	-	-	St ⁽¹⁾

Please note the pressure ratings of the connection flanges!

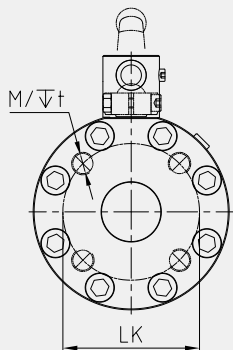
⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

Flange ball valve with ISO connection Steel

KH-ISO

CONNECTION TYPE

ISO 6164-1



DIMENSIONS

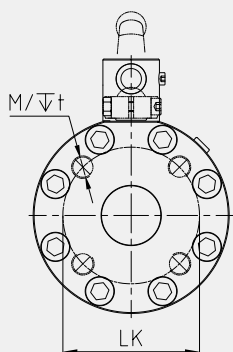
Type	LK	M	t	Weight [Kg]
KH-DN13-ISO250	42 ⁽¹⁾	4 x M8	16	2,90
KH-DN19-ISO250	50	4 x M8	15	6,80
KH-DN25-ISO250	62	4 x M10	20	7,20
KH-DN32-ISO250	73	4 x M12	21	12,50
KH-DN38-ISO250	85	4 x M16	24,5	16,60
KH-DN51-ISO250	98	4 x M16	25,5	24,90
KH-DN56-ISO250	118	4 x M20	33	26,60
KH-DN63-ISO250	145	4 x M20	33	36,90

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	212A (282A)	2128 (2828)
350	29452	37481
350	29453	37482
315	29455	37483
250	40654	37484
250	29538	37485
250	37839	37486
250	36011	37487
250	31638	37488

CONNECTION TYPE

ISO 6164-2



DIMENSIONS

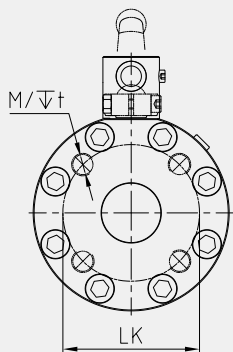
Type	LK	M	t	Weight [Kg]
KH-DN13-ISO400	42 ⁽¹⁾	4 x M8	16	2,90
KH-DN19-ISO400	50	4 x M8	15	6,80
KH-DN25-ISO400	62	4 x M10	20	7,20
KH-DN32-ISO400	73	4 x M12	21	12,50
KH-DN38-ISO400	85	4 x M16	24,5	16,60
KH-DN51-ISO400	98	4 x M16	25,5	24,90
KH-DN56-ISO400	118	4 x M20	31	26,60
KH-DN63-ISO400	145	4 x M24	37,5	42,53
KH-DN70-ISO400	160	4 x M24	37,5	43,00
KH-DN80-ISO400 (PN100)	175	4 x M30	35	51,00
KH-DN80-ISO400 (PN400)	175	4 x M30	35	63,00

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	212A (282A)	2128 (2828)
400	37842	37849
400	37843	37850
400	37844	37851
400	37845	37852
400	19556	37853
400	37846	37854
400	36010	37855
400	31493	15045
315	37847	37856
100	37848	37857
400	58109	58110

CONNECTION TYPE

ISO 320
(NOT PART OF ISO 6164)



DIMENSIONS

Type	LK	M	t	Weight [Kg]
KH-DN15-ISO320	54	4 x M10	on request	
KH-DN20-ISO320	64	4 x M12	22	6,80
KH-DN25-ISO320	72	4 x M12	20	7,20
KH-DN32-ISO320	80	4 x M16	24	12,50
KH-DN40-ISO320	98	4 x M16	25	16,60
KH-DN50-ISO320	118	4 x M20	28	24,90
KH-DN65-ISO320	145	4 x M24	36	36,00
KH-DN80-ISO320 (PN100)	175	4 x M30	35	34,26
KH-DN100-ISO320	200	8 x M24	36	70,00
KH-DN125-ISO320	245	8 x M30	45	209,00
KH-DN150-ISO320	245	8 x M30	46	225,00
KH-DN200-ISO320	315	8 x M36	55	395,00

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	212A (282A)	2128 (2828)
350	37827	37830
350	37459	37463
350	37828	37831
350	37460	37464
350	37461	37465
350	37462	37466
350	19987	37467
100	16635	32093
350	34178	37468
350	37829	37832
350	45938	41962
350	41393	41965

⁽¹⁾ rotated by 45°

BYPASS OPTION



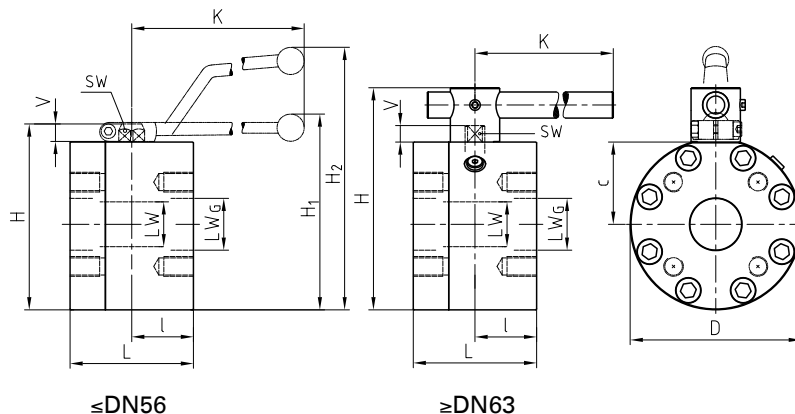
When larger ball valves have to be activated at full differential pressure, a smaller ball valve can be used before activation in order to equalize the pressure.

We combine the bypass within the flange valve body to provide less leakage points compared to a piped solution.

- Both main and bypass valve can be offered with locking device or any other accessory like limit switches or actuators.
- Bypass is a standard manifold mounting PKH valve which can be easily maintained or replaced
- Bypass manifold mounting valve provides bubble tight shut off.

Flange ball valve with ISO connection Stainless Steel

KH-ISO



AVAILABLE SIZES

DN13 - DN200 (1/2" to 8")

CONNECTIONS

ISO 6164-1 (ISO250), ISO 6164-2 (ISO400), ISO320 (not part of ISO 6164)

ACCESSORIES ON REQUEST

- Locking devices page 222 - 226
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-10°C / 100°C	-10°C / 100°C

GENERAL DIMENSIONS ISO 6164-1 (ISO250)

Type	LW	LW _G	L	I	D	H	c	V	K	SW	H ₁	H ₂	Lever
KH-DN13	15	15	85	45	78	83	31	13	160	12	-	127	Al
KH-DN19	20	20	88	38	119	110	36,5	14	200	14	114	-	Zn
KH-DN25	25	25	88	38	126	117	39,5	14	200	14	120	-	Zn
KH-DN32	32	32	105	50	145	158	68	17	320	17	167	-	Al
KH-DN38	38	38	110	55	165	178	78	17	320	17	187	-	Al
KH-DN51	48	47	116	58	198	210	94	17	320	17	219	-	Al
KH-DN56	48	58	123	58	198	210	94	17	320	17	219	-	Al
KH-DN63	63	70	150	75	208	270	100	20	600	16	-	-	St ⁽¹⁾

GENERAL DIMENSIONS ISO 6164-2 (ISO400)

Type	LW	LW _G	L	I	D	H	c	V	K	SW	H ₁	H ₂	Lever
KH-DN13	15	14	85	45	78	83	31	13	160	12	-	127	Al
KH-DN19	20	18	88	38	119	110	36,5	14	200	14	114	-	Zn
KH-DN25	25	22	88	38	126	117	39,5	14	200	14	120	-	Zn
KH-DN32	32	29	105	50	145	158	68	17	320	17	167	-	Al
KH-DN38	38	35	110	55	165	178	78	17	320	17	187	-	Al
KH-DN51	48	43	123	58	198	210	94	17	320	17	219	-	Al
KH-DN56	48	53	123	58	198	210	94	17	320	17	219	-	Al
KH-DN63	65	58	150	75	224	286	108	20	600	16	-	-	St ⁽¹⁾
KH-DN70	65	63	150	75	224	286	108	20	600	16	-	-	St ⁽¹⁾
KH-DN80 (PN100)	76	74	140	70	228	293	107	26	600	19	-	-	St ⁽¹⁾
KH-DN80 (PN400)	76	76	170	78	258	315	114,5	26	600	19	-	-	St ⁽¹⁾

Please note the pressure ratings of the connection flanges!

⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

Flange ball valve with ISO connection Stainless Steel

KH-ISO

GENERAL DIMENSIONS ISO 320 (not part of ISO 6164)



Type	LW	LW _G	L	I	D	H	c	V	K	SW	H ₁	H ₂	Lever
KH-DN15													
KH-DN20	20	20	88	38	119	110	36,5	14	200	14	114	-	Zn
KH-DN25	25	25	88	38	126	117	39,5	14	200	14	120	-	Zn
KH-DN32	32	32	105	50	145	158	68	17	320	17	167	-	Al
KH-DN40	38	38	110	55	165	178	78	17	320	17	187	-	Al
KH-DN50	48	48	122	58	198	210	94	17	320	17	219	-	Al
KH-DN65	65	63	150	75	208	270	100	20	600	16	-	-	St ⁽¹⁾
KH-DN80 (PN100)	76	76	140	70	215	279	100	26	600	19	-	-	St ⁽¹⁾
KH-DN80 (PN350)	76	76											
KH-DN100	100	100	200	100	260	327	122	26	900	24	-	-	St ⁽¹⁾
KH-DN125	118	118	230	110	390	470	185	32	900	36	-	-	St ⁽¹⁾
KH-DN150	150	150	285	130	390	475	190	32	900	36	-	-	St ⁽¹⁾
KH-DN200	192	200	378	150	456	598	223	61	940	46	-	-	St ⁽¹⁾

Please note the pressure ratings of the connection flanges!

⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

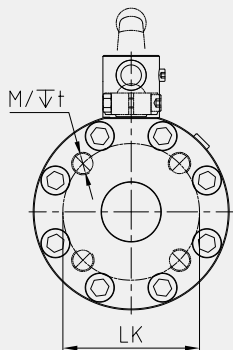
Two-way

Flange ball valve with ISO connection Stainless Steel

KH-ISO

CONNECTION TYPE

ISO 6164-1



DIMENSIONS

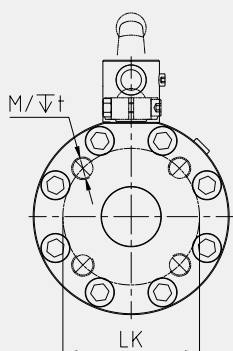
Type	LK	M	t	Weight [Kg]
KH-DN13-ISO250	42 ⁽¹⁾	4 x M8	16	2,90
KH-DN19-ISO250	50	4 x M8	15	6,80
KH-DN25-ISO250	62	4 x M10	20	7,20
KH-DN32-ISO250	73	4 x M12	21	12,50
KH-DN38-ISO250	85	4 x M16	24,5	16,60
KH-DN51-ISO250	98	4 x M16	25,5	24,90
KH-DN56-ISO250	118	4 x M20	33	26,60
KH-DN63-ISO250	145	4 x M20	33	36,90

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	442A	4428
350	37489	37494
350	37490	37495
315	37491	37496
250	37492	37497
250	37493	37498
250	37840	37499
250	37841	37500
250	35873	37501

CONNECTION TYPE

ISO 6164-2



DIMENSIONS

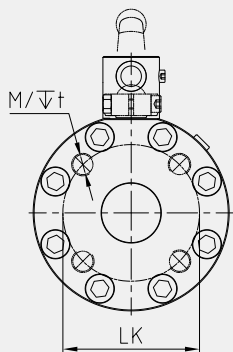
Type	LK	M	t	Weight [Kg]
KH-DN13-ISO400	42 ⁽¹⁾	4 x M8	16	2,90
KH-DN19-ISO400	50	4 x M8	15	6,80
KH-DN25-ISO400	62	4 x M10	20	7,20
KH-DN32-ISO400	73	4 x M12	21	12,50
KH-DN38-ISO400	85	4 x M16	24,5	16,60
KH-DN51-ISO400	98	4 x M16	25,5	24,90
KH-DN56-ISO400	118	4 x M20	31	26,60
KH-DN63-ISO400	145	4 x M24	37,5	42,53
KH-DN70-ISO400	160	4 x M24	37,5	43,00
KH-DN80-ISO400 (PN100)	175	4 x M30	35	51,00
KH-DN80-ISO400 (PN400)	175	4 x M30	35	63,00

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	442A	4428
400	37858	37868
400	37859	37869
400	37860	37870
400	37861	37871
400	37862	37872
400	37863	37873
400	37864	37874
400	37865	37875
315	37866	37876
100	37867	37877
400	58190	58111

CONNECTION TYPE

ISO 320
(NOT PART OF ISO 6164)



DIMENSIONS

Type	LK	M	t	Weight [Kg]
KH-DN15-ISO320	54	4 x M10	on request	
KH-DN20-ISO320	64	4 x M12	22	6,80
KH-DN25-ISO320	72	4 x M12	20	7,20
KH-DN32-ISO320	80	4 x M16	24	12,50
KH-DN40-ISO320	98	4 x M16	25	16,60
KH-DN50-ISO320	118	4 x M20	28	24,90
KH-DN65-ISO320	145	4 x M24	36	36,00
KH-DN80-ISO320 (PN100)	175	4 x M30	35	34,26
KH-DN100-ISO320	200	8 x M24	36	70,00
KH-DN125-ISO320	245	8 x M30	45	209,00
KH-DN150-ISO320	245	8 x M30	46	225,00
KH-DN200-ISO320	315	8 x M36	55	395,00

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	442A	4428
350	37833	37836
350	37469	37474
350	37834	37837
350	37470	37475
350	37471	37476
350	37472	37477
350	20043	37478
100	32608	31684
350	37473	37479
350	37835	37838
350	41963	41964
350	41966	41967

⁽¹⁾ rotated by 45°

BYPASS OPTION



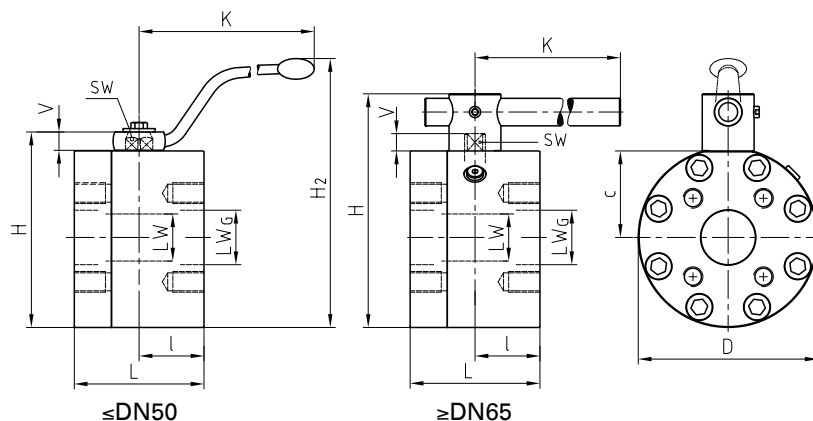
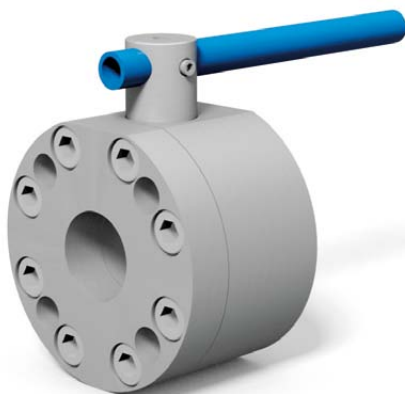
When larger ball valves have to be activated at full differential pressure, a smaller ball valve can be used before activation in order to equalize the pressure.

We combine the bypass within the flange valve body to provide less leakage points compared to a piped solution.

- Both main and bypass valve can be offered with locking device or any other accessory like limit switches or actuators.
- Bypass is a standard manifold mounting PKH valve which can be easily maintained or replaced
- Bypass manifold mounting valve provides bubble tight shut off.

Flange ball valve with CETOP connection Steel

KH-CET



AVAILABLE SIZES

DN40 - DN100 (1 1/2" to 4")

CONNECTIONS

CETOP 250 bar, CETOP 400 bar

ACCESSORIES ON REQUEST

- Locking devices page 222 - 226
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	DN15-50 212A	DN15-50 2128	DN65-100 282A	DN65-100 2828
Body	Steel	Steel	Steel	Steel
Ball	Steel	Steel	Steel	Steel
Stem	Steel	Steel	Duplex	Duplex
Ball seats	POM	POM	POM	POM
O-rings	NBR	FPM	NBR	FPM
Tmin / Tmax	-10°C / 100°C	-10°C / 100°C	-10°C / 100°C	-10°C / 100°C

GENERAL DIMENSIONS CETOP 250 BAR

Type	Flange size	LW	LW _G	L	I	D	H	c	V	K	SW	H ₂	Lever
KH-DN40	1 1/2"	38	38	110	55	165	178	78	17	306	17	250	St
KH-DN50	2"	48	47	123	58	198	210	94	17	306	17	283	St
KH-DN50	2 1/2"	48	58	123	58	198	210	94	17	306	17	283	St
KH-DN65	3"	63	70	150	75	208	270	100	20	600	19	-	St ⁽¹⁾
KH-DN80 (PN100)	3"	76	70	150	75	215	279	100	26	600	19	-	St ⁽¹⁾
KH-DN80 (PN250)	3"	76	70	170	78	258	315	114,5	26	600	19	-	St ⁽¹⁾
KH-DN100	4"	100	90	200	100	258	326	122	26	900	24	-	St ⁽¹⁾

GENERAL DIMENSIONS CETOP 400 BAR

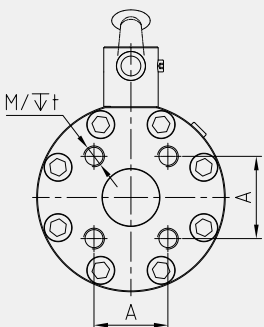
Type	Flange size	LW	LW _G	L	I	D	H	c	V	K	SW	H ₂	Lever
KH-DN40	1 1/2"	38	35	110	55	165	178	78	17	306	17	250	St
KH-DN50	2"	48	43	123	58	198	210	94	17	306	17	283	St
KH-DN50	2 1/2"	48	53	123	58	198	210	94	17	306	17	283	St
KH-DN65	3"	63	58	150	75	224	286	108	20	600	19	-	St ⁽¹⁾
KH-DN80 (PN100)	4"	76	74	150	70	228	293	107	26	600	19	-	St ⁽¹⁾
KH-DN80 (PN400)	4"	76	74	170	78	258	315	114,5	26	600	19	-	St ⁽¹⁾

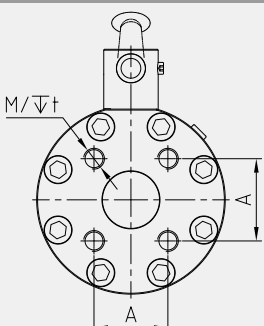
Please note the pressure ratings of the connection flanges!

⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

Flange ball valve with CETOP connection Steel

KH-CET

CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
CETOP 250 bar	Type	Flange size	A	M	t	Weight [Kg]	PN [bar]	212A (282A)	2128 (2828)
	KH-DN40-CET250	1 1/2"	60	M14	24	16,60	250	41915	41918
	KH-DN50-CET250	2"	69,4	M16	24,5	27,00	250	41916	41919
	KH-DN50-CET250	2 1/2"	83,4	M20	33	26,70	250	41798	41920
	KH-DN65-CET250	3"	102,5	M20	33	36,80	250	41799	40774
	KH-DN80-CET250 (PN100)	3"	102,5	M20	37	37,80	100	26710	55486
	KH-DN80-CET250 (PN250)	3"	102,5	M20	37	62,50	250	59301	59646
	KH-DN100-CET250	4"	113,2	M24	40	70,40	250	41917	35922

CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
CETOP 400 bar	Type	Flange size	A	M	t	Weight [Kg]	PN [bar]	212A (282A)	2128 (2828)
	KH-DN40-CET400	1 1/2"	60	M14	24	16,60	400	41921	41922
	KH-DN50-CET400	2"	69,4	M16	24,5	27,10	400	41923	41924
	KH-DN50-CET400	2 1/2"	83,4	M20	31	26,90	400	41925	41926
	KH-DN65-CET400	3"	102,5	M20	37,5	42,70	400	41927	41928
	KH-DN80-CET400 (PN100)	4"	113,2	M24	40	43,00	100	41929	41930
	KH-DN80-CET400 (PN400)	4"	113,2	M24	35	63,00	400	59307	59648

BYPASS OPTION



When larger ball valves have to be activated at full differential pressure, a smaller ball valve can be used before activation in order to equalize the pressure.

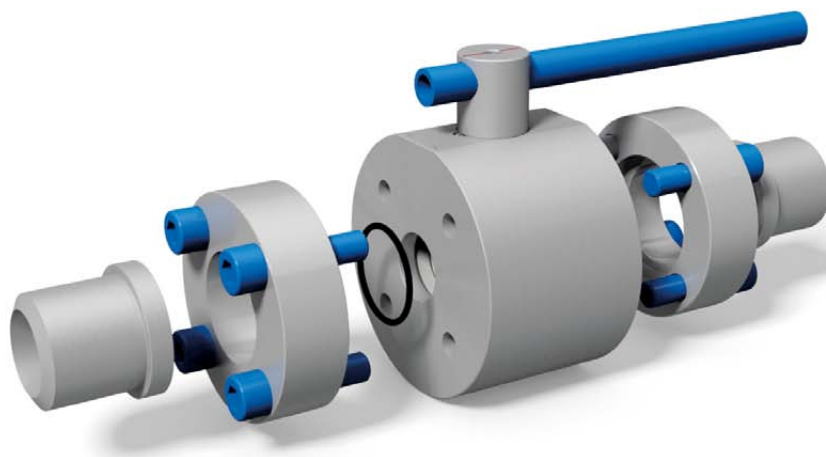
We combine the bypass within the flange valve body to provide less leakage points compared to a piped solution.

- Both main and bypass valve can be offered with locking device or any other accessory like limit switches or actuators.
- Bypass is a standard manifold mounting PKH valve which can be easily maintained or replaced
- Bypass manifold mounting valve provides bubble tight shut off.

Flange ball valve with welding ends Steel / Stainless Steel

KH-AS

Two-way



MHA ZENTGRAF offers flange ball valves including welding ends with pipe Schedule XXS, 160, 80 or special pipe sizes upon request. The flanges are manufactured by **MHA ZENTGRAF** with full material traceability through 3.1. mill certificates.

AVAILABLE SIZES

DN65 - DN125 (2 1/2" to 5")

CONNECTIONS

SchXXS, Sch160, Sch80, others on request

ACCESSORIES ON REQUEST

- Locking devices page 226
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request

MATERIAL CODE DESCRIPTION

Materials	282A	2828	442A	4428
Body	Steel	Steel	Stainless Steel	Stainless Steel
Ball	Steel	Steel	Stainless Steel	Stainless Steel
Stem	Duplex	Duplex	Duplex	Duplex
Ball seats	POM	POM	POM	POM
O-rings	NBR	FPM	NBR	FPM
Tmin / Tmax	-10°C / 100°C	-10°C / 100°C	-10°C / 100°C	-10°C / 100°C

ORDER CODE SchXXS

Type	Pipe size*
KH-AS-DN65-SchXXS	44,96 x 14,02
KH-AS-DN80-SchXXS	58,42 x 15,24
KH-AS-DN100-SchXXS	80,06 x 17,12
KH-AS-DN125-SchXXS	103,20 x 19,05

ORDER CODE Sch160

Type	Pipe size*
KH-AS-DN65-Sch160	53,94 x 9,53
KH-AS-DN80-Sch160	66,64 x 11,13
KH-AS-DN100-Sch160	87,32 x 13,49
KH-AS-DN125-Sch160	109,54 x 15,88

ORDER CODE Sch80

Type	Pipe size*
KH-AS-DN65-Sch80	58,98 x 7,01
KH-AS-DN80-Sch80	73,66 x 7,62
KH-AS-DN100-Sch80	97,18 x 8,56
KH-AS-DN125-Sch80	122,24 x 9,53

*inner diameter x wall thickness (mm)

BYPASS OPTION



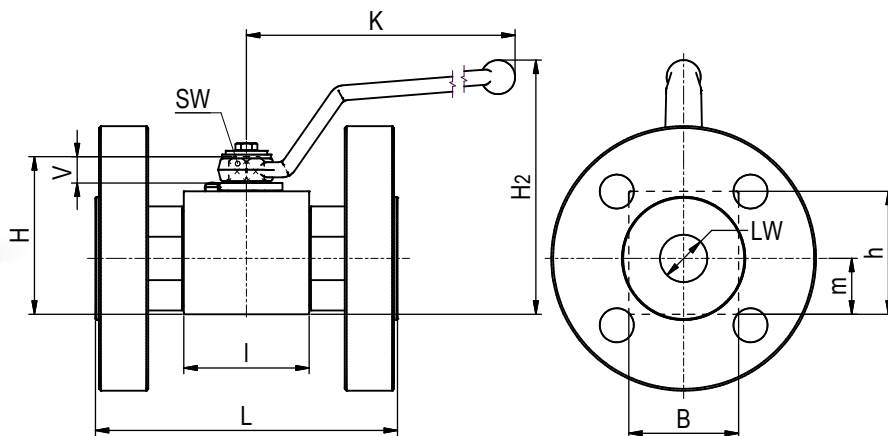
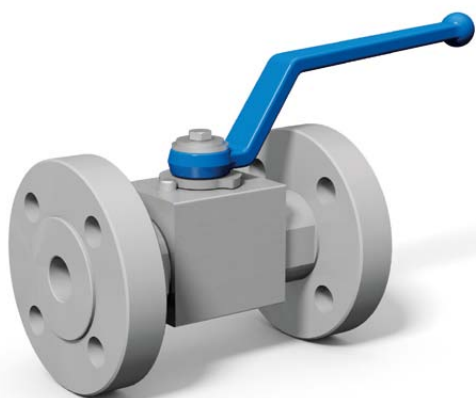
When larger ball valves have to be activated at full differential pressure, a smaller ball valve can be used before activation in order to equalize the pressure.

We combine the bypass within the flange valve body to provide less leakage points compared to a piped solution.

- Both main and bypass valve can be offered with locking device or any other accessory like limit switches or actuators.
- Bypass is a standard manifold mounting PKH valve which can be easily maintained or replaced
- Bypass manifold mounting valve provides bubble tight shut off.

Flange ball valve Steel

BKH-F



AVAILABLE SIZES

DN15 - DN25 (5/8" to 1")

CONNECTIONS

DIN EN 1092-1 (F10/40 bar, F63/160 bar, F250 bar, F320 bar)
Overall length in accordance with DIN EN 558 F1

ACCESSORIES ON REQUEST

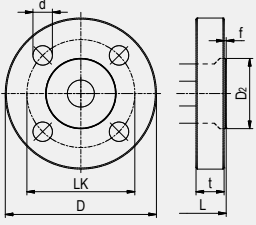
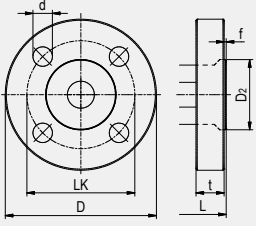
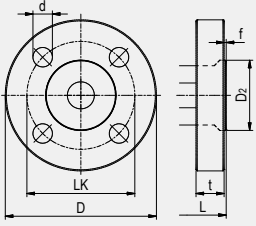
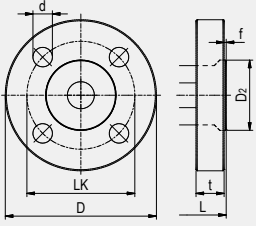
- Locking devices on request
- Actuators page 220 - 221
- Mounting holes 17
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

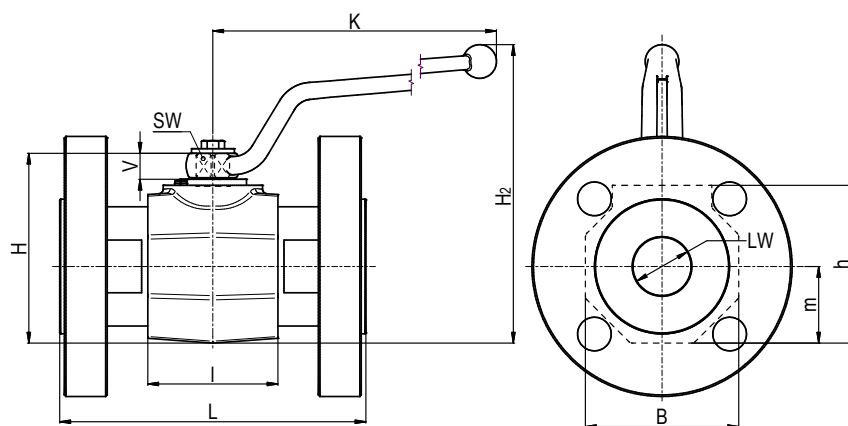
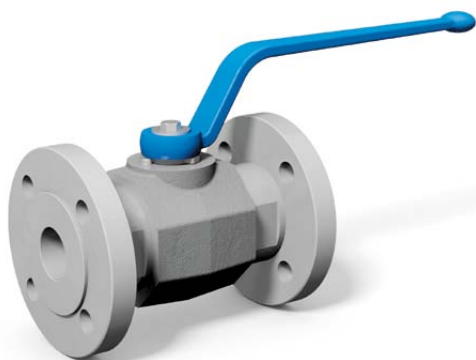
Type	LW	I	B	H	h	m	V	SW	K	H ₂	Lever
BKH-DN15	15	48	38	63	46	19	13	12	160	106	Al
BKH-DN20	20	62	49	75	57	24,5	14	14	171	127	St
BKH-DN25	25	66	58	83	65	29,5	14	14	171	135	St
BKH-DN25/32	25	66	58	83	65	29,5	14	14	171	135	St

CONNECTION TYPE	DIMENSIONS									ORDER CODE PER MATERIAL COMBINATION		
DIN EN 1092-1 F10/40	Type	L	D ₂	D	LK	d	t	f	Weight [Kg]	PN [bar]	112A	1128
	BKH-DN15-F10/40	130	45	95	65	4 x Ø14	18	2	2,70	40	06765	38837
	BKH-DN20-F10/40	150	55	105	75	4 x Ø14	20	2	4,20	40	15590	38838
	BKH-DN25-F10/40	160	65	115	85	4 x Ø14	20	2	5,60	40	15591	38839
	BKH-DN25/32-F10/40	180	75	140	100	4 x Ø18	20	2	8,20	40	38840	38841
DIN EN 1092-1 F63/160	Type	L	D ₂	D	LK	d	t	f	Weight [Kg]	PN [bar]	112A	1128
	BKH-DN15-F63/160	130	45	105	75	4 x Ø14	22	2	3,60	160	20238	38842
	BKH-DN20-F63/160	150	55	130	90	4 x Ø18	20	2	5,50	160	20239	38843
	BKH-DN25-F63/160	160	65	140	100	4 x Ø18	26	2	8,20	160	06772	38844
DIN EN 1092-1 F250	Type	L	D ₂	D	LK	d	t	f	Weight [Kg]	PN [bar]	112A	1128
	BKH-DN15-F250	130	45	130	90	4 x Ø18	28	2	3,60	250	27238	38845
	BKH-DN20-F250	150	55	135	95	4 x Ø18	28	2	5,50	250	20240	38846
	BKH-DN25-F250	160	65	150	105	4 x Ø22	30	2	9,60	250	06773	38847
DIN EN 1092-1 F320	Type	L	D ₂	D	LK	d	t	f	Weight [Kg]	PN [bar]	112A	1128
	BKH-DN15-F320	130	45	130	90	4 x Ø18	28	2	3,60	320	06767	38848
	BKH-DN20-F320	150	55	150	105	4 x Ø22	28	2	8,60	320	32472	38849
	BKH-DN25-F320	160	65	160	115	4 x Ø22	31	2	12,30	315	06774	38850

Flange ball valve Steel

MKHP-F

Two-way



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

DIN EN 1092-1 (F10/40 bar, F63 bar, F100/160 bar, F250 bar, F320 bar)
Overall length in accordance with DIN EN 558 F1

ACCESSORIES ON REQUEST

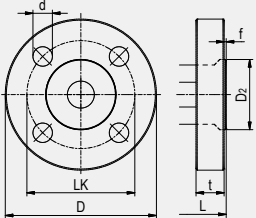
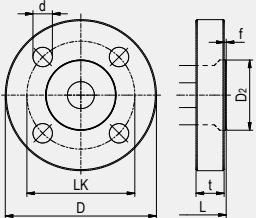
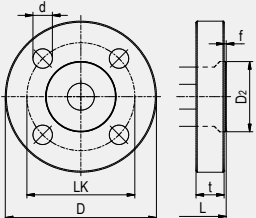
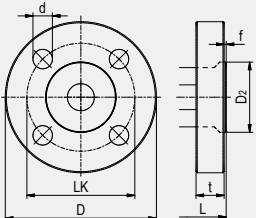
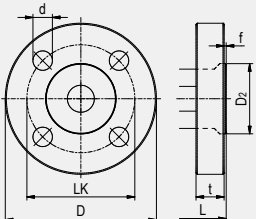
- Locking devices on request
- Actuators page 220 - 221
- Mounting holes 24
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C

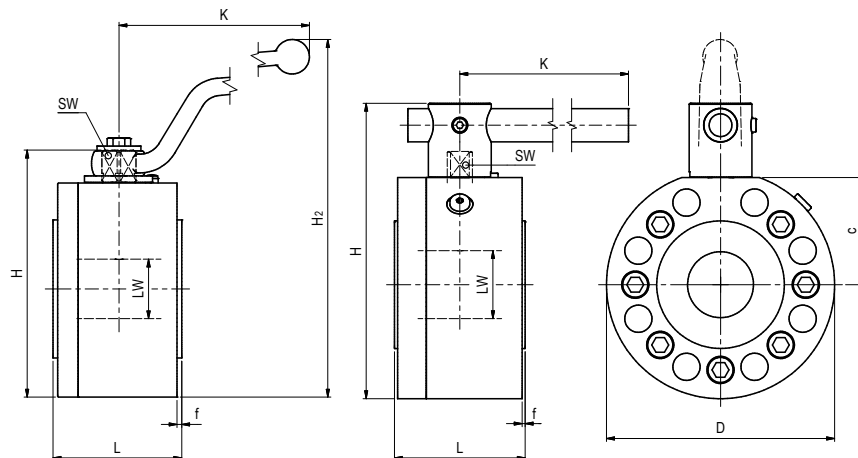
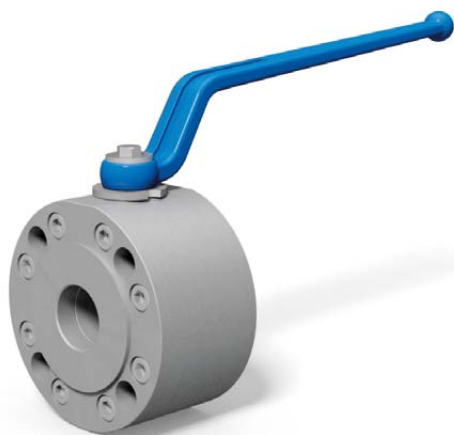
GENERAL DIMENSIONS

Type	LW	I	B 8Kt	H	h	m	V	SW	K	H ₂	Lever
MKHP-DN32	32	80	81	107	86	40,5	16,5	17	306	180	St
MKHP-DN40	38	85	100	124	103	50	16,5	17	306	197	St
MKHP-DN50	48	100	118	138	117	59	16,5	17	306	211	St

CONNECTION TYPE	DIMENSIONS									ORDER CODE PER MATERIAL COMBINATION		
DIN EN 1092-1 F10/40	Type	L	D ₂	D	LK	d	t	f	Weight [Kg]	PN [bar]	112A	1128
	MKHP-DN32-F10/40	180	78	140	100	4 x Ø18	16	2	8,82	40	20232	31140
	MKHP-DN40-F10/40	200	88	150	110	4 x Ø18	20	3	14,29	40	15099	29179
	MKHP-DN50-F10/40	230	102	165	125	4 x Ø18	20	3	16,19	40	16035	29581
DIN EN 1092-1 F63	Type	L	D ₂	D	LK	d	t	f	Weight [Kg]	PN [bar]	112A	1128
	MKHP-DN32-F63	180	78	155	110	4 x Ø22	26	2	11,12	63	20233	37554
	MKHP-DN40-F63	200	88	170	125	4 x Ø22	28	3	14,79	63	20234	37555
	MKHP-DN50-F63	230	102	180	135	4 x Ø22	26	3	18,49	63	15445	37556
DIN EN 1092-1 F100/160	Type	L	D ₂	D	LK	d	t	f	Weight [Kg]	PN [bar]	112A	1128
	MKHP-DN32-F100/160	180	78	155	110	4 x Ø22	26	2	11,12	160	20235	25398
	MKHP-DN40-F100/160	200	88	170	125	4 x Ø22	28	3	20,84	160	06790	32430
	MKHP-DN50-F100/160	230	102	195	145	4 x Ø26	30	3	21,89	160	17973	20798
DIN EN 1092-1 F250	Type	L	D ₂	D	LK	d	t	f	Weight [Kg]	PN [bar]	112A	1128
	MKHP-DN40-F250	200	88	185	135	4 x Ø26	34	3	18,79	250	15022	26261
	MKHP-DN50-F250	230	102	200	150	8 x Ø26	35	3	24,19	250	06832	31288
DIN EN 1092-1 F320	Type	L	D ₂	D	LK	d	t	f	Weight [Kg]	PN [bar]	112A	1128
	MKHP-DN40-F320	200	88	195	145	4 x Ø26	35	3	20,47	320	18260	27846
	MKHP-DN50-F320	230	102	210	160	8 x Ø26	40	3	26,80	320	20236	27758

Flange ball valve with DIN connection Steel

KH-DIN



AVAILABLE SIZES

DN40 - DN150 (1 1/2" to 6")

CONNECTIONS

DIN EN 1092-1 (10/40 bar, 100/160 bar)

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators page 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	212A	2128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-10°C / 100°C	-10°C / 100°C

GENERAL DIMENSIONS

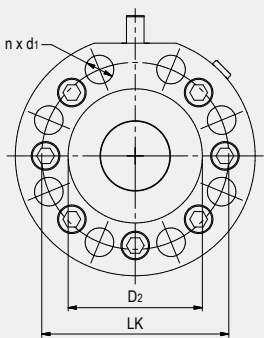
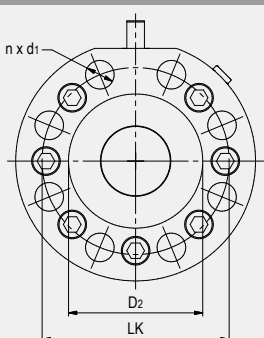
Type	LW	L	D	H	c	K	SW	Lever ⁽²⁾
KH-DN40-DIN10/40	38	82	138	157	67,5	306	17	St
KH-DN40-DIN100/160	38	87,5	158	174	74	306	17	St
KH-DN50-DIN10/40	48	83	158	172,5	72,5	306	17	St
KH-DN50-DIN100/160	48	92	178	190	80	306	17	St
KH-DN65-DIN10/40	63	125	178	244	84	600	16	St
KH-DN65-DIN100/160	63	125	218	282,5	102,5	600	16	St
KH-DN80-DIN10/40	76	122	198	265	95	600	16	St
KH-DN80-DIN100/160	76	140	228	300	109,5	600	19	St
KH-DN100-DIN10/40	100	160	228	298	107	600	19	St

⁽¹⁾ Please consider pressure reduction at higher temperatures.

⁽²⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

Flange ball valve with DIN connection Steel

KH-DIN

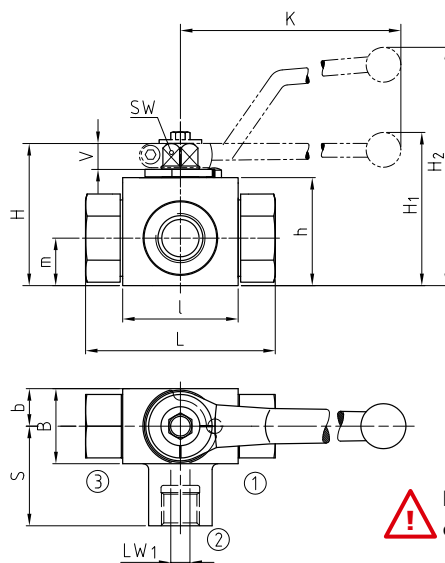
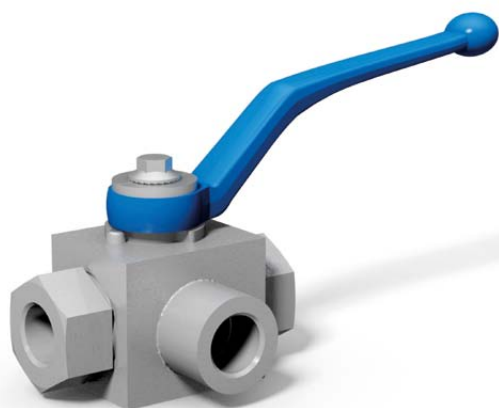
CONNECTION TYPE	DIMENSIONS										ORDER CODE PER MATERIAL COMBINATION		
DIN EN 1092-1 FF10/40	Type	LK	n*	d ₁	t ₁	t ₂	d ₂	D ₂	f	Weight [Kg]	PN [bar]	212A	2128
	KH-DN40-DIN10/40	110	4	-	-	-	18	88	3	12,00	40	68211	on request
	KH-DN50-DIN10/40	125	4	-	-	-	18	102	3	14,00	40	68212	on request
	KH-DN65-DIN10/40	145	8	-	-	-	18	122	3	21,50	40	68213	on request
	KH-DN80-DIN10/40	160	8	-	-	-	18	138	3	25,00	40	68214	on request
	KH-DN100-DIN40	190	8	-	-	-	22	162	3	59,50	40	68215	on request
	further sizes on request												
DIN EN 1092-1 FF100/160	Type	LK	n*	d ₁	t ₁	t ₂	d ₂	D ₂	f	Weight [Kg]	PN [bar]	212A	2128
	KH-DN40-DIN100/160	125	4	-	-	-	22	88	3	14,00	160	38854	on request
	KH-DN50-DIN100/160	145	4	-	-	-	26	102	3	19,00	160	20290	on request
	KH-DN65-DIN100/160	170	8	-	-	-	26	122	3	31,60	160	20292	on request
	KH-DN80-DIN100/160	180	8	-	-	-	26	138	3	37,30	160	20294	on request
	further sizes on request												

*n = number of holes / threads

Two-way

Selector ball valve Steel

BK3



! Pressure inlet only from center port (port 2)!

AVAILABLE SIZES

DN4 - DN50 (1/8" to 2")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

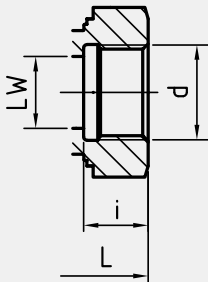
- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 190 - 191
- Detent on request

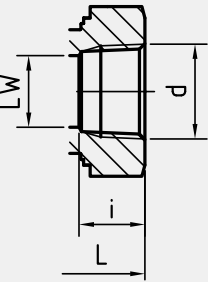
MATERIAL CODE DESCRIPTION

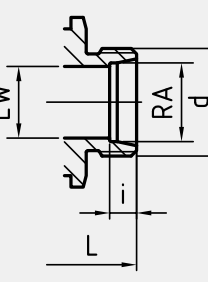
Materials	112A	112A	1128	1128
Body	Steel	Steel	Steel	Steel
Ball	Steel	Steel	Steel	Steel
Stem	Steel	Steel	Steel	Steel
Ball seats	POM	POM	POM	POM
O-rings	NBR	NBR	FPM	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C
Porting pattern	L=SB50	T=SB51	L=SB50	T=SB51

GENERAL DIMENSIONS

Type	L	b	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BK3-DN4	40	13	29	47	33	13,5	11	9	115	-	82	Zn
BK3-DN6	40	13	29	47	33	13,5	11	9	115	-	82	Zn
BK3-DN8	40	13	29	47	33	13,5	11	9	115	-	82	Zn
BK3-DN10	43	16	35	52	38	17,5	11	9	115	-	86	Zn
BK3-DN13	48	17,5	38	54	40	19	11	9	115	-	89	Zn
BK3-DN20	62	24,5	52	75	57	24,5	14	14	200	79	-	Zn
BK3-DN25	66	29	61	83	65	29,5	14	14	200	87	-	Zn
BK3-DN25/32	66	29	61	83	65	29,5	14	14	200	87	-	Zn
BK3-DN32	81	39	-	106	84,5	39	16,5	17	320	115	-	Al
BK3-DN40	104	53	-	127	106	53	16,5	17	320	136	-	Al
BK3-DN50	118	58	116	137	116	58	16,5	17	320	146	-	Al

CONNECTION TYPE	DIMENSIONS								ORDER CODE PER MATERIAL COMBINATION				
DIN ISO 228 FEMALE THREAD	Type	LW	L	S	LW ₁	i	d	Weight [Kg]	PN [bar]	112A L=SB50	112A T=SB51	1128 L=SB50	1128 T=SB51
	BK3-DN4-G1/8	5	69	34,5	4	10	G1/8	0,40	500	02347*	02401*	03236*	03247*
	BK3-DN6-G1/4	6	69	34,5	6	14	G1/4	0,46	500	02849*	02408*	03237*	03248*
	BK3-DN10-G3/8	10	72	36	10	14	G3/8	0,60	500	02398*	02413*	03238*	03249*
	BK3-DN13-G1/2	13	83	41,5	13	16,3	G1/2	0,70	500	02429*	02430*	03239*	03250*
	BK3-DN13-G5/8	13	83	41,5	13	16	G5/8	0,70	500	02850*	02851*	03240*	03251*
	BK3-DN20-G3/4	20	95	47,5	20	18	G3/4	1,80	315	02708*	02770*	03241*	03252*
	BK3-DN25-G1	25	113	56,5	25	20	G1	2,40	315	02711*	02773*	03242*	03253*
	BK3-DN25/32-G1 1/4	25	120	57	25	22	G1 1/4	2,64	315	02714*	02776*	03243*	03254*
	BK3-DN32-G1 1/4	30	111	55	30	22	G 1 1/4	4,80	350	32154*	32685*	33571*	38015*
	BK3-DN40-G1 1/2	38	130	65	38	24	G 1 1/2	8,90	350	31980*	32038*	36033*	38016*
BK3-DN50-G2	48	150	75	48	26	G2	12,40	350	38005*	38014*	36034*	38017*	

ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	S	LW ₁	i	d	Weight [Kg]	PN [bar]	112A L=SB50	112A T=SB51	1128 L=SB50	1128 T=SB51
	BK3-DN4-1/8" NPT	5	69	34,5	4	10,5	1/8" NPT	0,40	500	40221*	40222*	15710*	40223*
	BK3-DN6-1/4" NPT	6	69	34,5	6	13,7	1/4" NPT	0,46	500	13221*	38049*	11333*	25912*
	BK3-DN10-3/8" NPT	10	72	36	10	13,5	3/8" NPT	0,60	500	41291*	38050*	11607*	25913*
	BK3-DN13-1/2" NPT	13	83	41,5	13	17	1/2" NPT	0,70	500	41292*	17198*	11608*	25914*
	BK3-DN20-3/4" NPT	20	95	47,5	20	18,3	3/4" NPT	1,80	315	15425*	38051*	11609*	25915*
	BK3-DN25-1" NPT	25	113	56,5	25	21,6	1" NPT	2,40	315	15426*	22926*	11610*	25916*
	BK3-DN25/32-1 1/4" NPT	25	120	57,5	25	22,1	1 1/4" NPT	2,64	315	38030*	36499*	38032*	25917*
	BK3-DN32-1 1/4" NPT	30	120	60	30	22,1	1 1/4" NPT	5,24	350	35517*	38052*	36538*	38055*
	BK3-DN40-1 1/2" NPT	38	140	70	38	22,1	1 1/2" NPT	10,00	350	38031*	38053*	38033*	38056*
	BK3-DN50-2" NPT	48	150	75	48	30,2	2" NPT	12,20	350	35519*	38054*	38034*	38057*

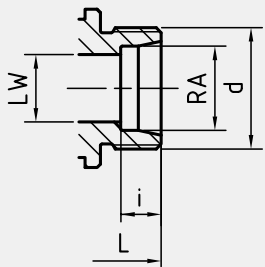
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	S	LW ₁	i	d	Weight [Kg]	PN [bar]	112A L=SB50	112A T=SB51	1128 L=SB50	1128 T=SB51
	BK3-DN4-6L	5	6	67	33,5	4	7	M 12x1,5	0,30	500	02349*	02403*	03214*	03225*
	BK3-DN6-8L	6	8	67	33,5	6	7	M 14x1,5	0,40	500	02348*	02402*	03215*	03226*
	BK3-DN8-10L	8	10	74	34,5	8	7	M 16x1,5	0,40	500	02396*	02409*	03216*	03227*
	BK3-DN10-12L	10	12	74	36,5	10	7	M 18x1,5	0,50	500	02416*	02417*	36116*	03228*
	BK3-DN13-15L	13	15	82	41	13	7	M 22x1,5	0,65	500	02425*	02426*	03218*	03229*
	BK3-DN13-18L	13	18	82	41,5	13	7,5	M 26x1,5	0,69	500	02847*	02848*	03219*	03230*
	BK3-DN20-22L	20	22	101	48	20	7,5	M 30x2	1,50	315	02706*	02768*	03220*	03231*
	BK3-DN25-28L	25	28	108	54	25	7,5	M 36x2	2,10	315	02709*	02771*	03221*	03232*
	BK3-DN25/32-35L	25	35	112	56	25	10,5	M 45x2	2,50	315	02712*	02774*	03222*	03233*

Please note the pressure ratings of the tube connections!

*Article usually in stock.

CONNECTION TYPE

DIN 2353 / ISO 8434-1
HEAVY SERIES



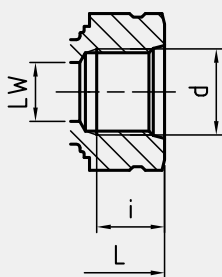
DIMENSIONS

Type	LW	RA	L	S	LW ₁	i	d	Weight [Kg]
BK3-DN4-8S	5	8	73	34,5	4	7	M 16x1,5	0,42
BK3-DN6-10S	6	10	73	34,5	6	7,5	M 18x1,5	0,43
BK3-DN8-12S	8	12	76	34,5	8	7,5	M 20x1,5	0,44
BK3-DN10-14S	10	14	80	36,5	10	8	M 22x1,5	0,50
BK3-DN13-16S	13	16	86	43	13	8,5	M 24x1,5	0,65
BK3-DN13-20S	13	20	90	43	15	10,5	M 30x2	0,70
BK3-DN20-25S	20	25	109	48	20	12	M 36x2	1,70
BK3-DN25-30S	25	30	120	57,5	25	13,5	M 42x2	2,40
BK3-DN25/32-38S	25	38	124	57,5	25	16	M 52x2	2,80

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	112A L=SB50	112A T=SB51	1128 L=SB50	1128 T=SB51
500	02350*	02404*	03194*	03204*
500	02351*	02406*	03195*	03205*
500	02397*	02410*	03196*	03206*
500	02414*	02415*	03197*	03207*
500	02427*	02428*	03198*	03208*
500	02845*	02846*	03199*	03209*
315	02707*	02769*	03200*	37995*
315	02710*	02772*	03201*	03211*
315	02713*	02775*	03202*	03212*

SAE J514/ISO/DIS11926-1
FEMALE THREAD



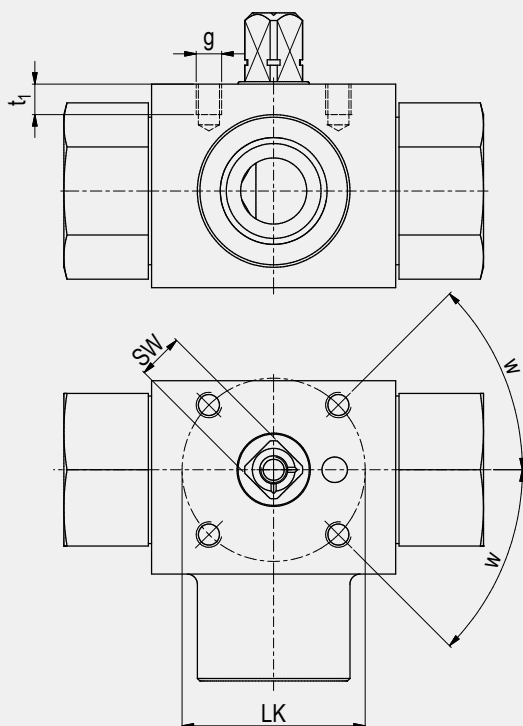
Type	LW	L	S	i	d	Weight [Kg]
BK3-DN6-7/16" UNF	5	69	34,5	12	7/16"-20 UNF	0,50
BK3-DN10-9/16" UNF	10	72	36	13	9/16"-18 UNF	0,60
BK3-DN13-3/4" UNF	13	83	41,5	15	3/4"-16 UNF	0,70
BK3-DN20-1 1/16" UN	20	95	47,5	20	1 1/16"-12 UN	1,80
BK3-DN25-1 5/16" UN	25	113	56,5	20	1 5/16"-12 UN	2,70
BK3-DN32-1 5/8" UN	30	111	60	20	1 5/8"-12 UN	5,20
BK3-DN40-1 7/8" UN	38	140	70	20	1 7/8"-12 UN	10,00
BK3-DN50-2 1/2" UN	48	150	75	20	2 1/2"-12 UN	12,20

PN [bar]	112A L=SB50	112A T=SB51	1128 L=SB50	1128 T=SB51
500	38076*	38094*	38081*	38099*
500	38077*	38095*	38082*	38100*
500	38078*	38096*	38083*	38101*
315	38079*	38097*	11027*	38102*
315	38080*	38098*	11026*	38103*
350	39214*	39215*	39216*	39217*
350	39218*	39219*	39220*	39221*
350	39222*	39223*	39224*	39225*

Please note the pressure ratings of the tube connections!

Due to material availability the material code of the steel valves may vary from 112A (resp. 1128). DN20-32=812A (8128), DN40-50=212A (2128). Material suitability for the application does not differ from 112A (1128).

*Article usually in stock.

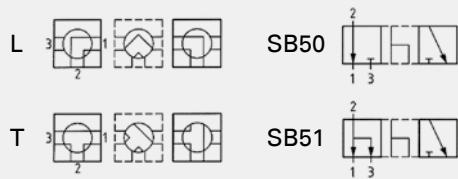


ASSEMBLING THREADS AS PER ISO 5211

DN	SW	LK	g	t ₁	w	ISO 5211
4	9	36	M5	6	30°*	(F03)*
6	9	36	M5	6	30°*	(F03)*
10	9	36	M5	7	45°	F03
13	9	36	M5	6	45°	F03
16	12	42	M5	8	45°	F04
20	14	50	M6	10	45°	F05
25	14	50	M6	10	45°	F05
25/32	14	50	M6	10	45°	F05
25/40	14	50	M6	10	45°	F05

*30° does not correspond to ISO 5211

PORTING PATTERNS

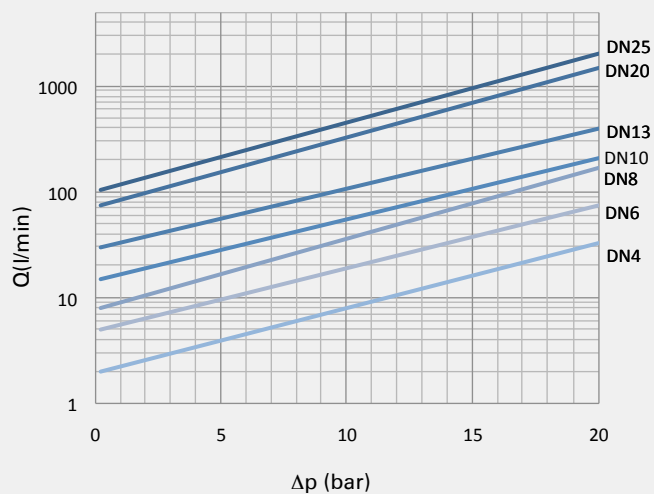


Pressure inlet only from center port (port 2)!

Further porting patterns page 262 to 267

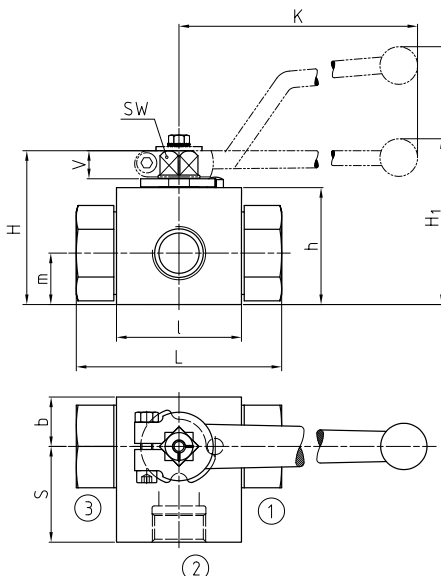
Please see type BK3-S or 3KH in case you need pressure inlet from all ports.

FLOW CHARACTERISTICS BK3-L/T



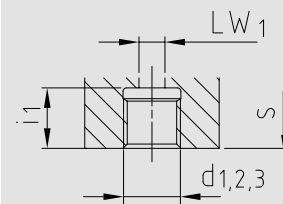
Selector ball valve Stainless Steel

BK3



CONNECTION TYPE (CONNECTION 2)

d₁ DIN ISO 228
d₂ ANSI B1.20.1
d₃ SAE J 514/ISO/DIS11926-1



! Pressure inlet only from center port (port 2)!

AVAILABLE SIZES

DN4 - DN50 (1/8" to 2")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes on request
- Position switches 228 - 229
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	442A	4428	4428
Body	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Ball seats	POM	POM	POM	POM
O-rings	NBR	NBR	FPM	FPM
Tmin / Tmax	-30°C / 100°C	-30°C / 100°C	-20°C / 100°C	-20°C / 100°C
Porting pattern	L=SB50	T=SB51	L=SB50	T=SB51

GENERAL DIMENSIONS

Type	L	H	h	m	V	SW	K	H ₁	H ₂	Lever
BK3-DN4	40	47	33	13,5	11	9	115	-	82	Zn
BK3-DN6	40	47	33	13,5	11	9	115	-	82	Zn
BK3-DN8	40	47	33	13,5	11	9	115	-	82	Zn
BK3-DN10	43	52	38	17,5	11	9	115	-	86	Zn
BK3-DN13	48	54	40	19	11	9	115	-	89	Zn
BK3-DN20	62	75	57	24,5	14	14	200	79	-	Zn
BK3-DN25	66	83	65	29,5	14	14	200	87	-	Zn
BK3-DN25/32	66	83	65	29,5	14	14	200	87	-	Zn
BK3-DN32	81	106	84,5	39	16,5	17	320	115	-	Al
BK3-DN40	104	127	106	53	16,5	17	320	136	-	Al
BK3-DN50	118	137	116	58	16,5	17	320	146	-	Al

Selector ball valve Stainless Steel

BK3

CONNECTION TYPE (CONNECTIONS 1 AND 3)		DIMENSIONS										ORDER CODE PER MATERIAL COMBINATION					
DIN ISO 228 FEMALE THREAD		Type	LW	L	b	S	i	d	i ₁	d ₁	LW ₁	Weight [Kg]	PN [bar]	442A L=SB50	442A T=SB51	4428 L=SB50	4428 T=SB51
	BK3-DN4-G1/8	5	69	13	34,5	10	G1/8	10	G1/8	4	0,55	500	40910*	41806*	41812*	41817*	
	BK3-DN6-G1/4	6	69	13	34,5	14	G1/4	14	G1/4	6	0,55	500	40911*	41807*	41813*	41818*	
	BK3-DN10-G3/8	10	72	16	36	14	G3/8	14	G3/8	10	0,77	500	40868*	41808*	41814*	41819	
	BK3-DN13-G1/2	13	83	17,5	39,5	16,3	G1/2	16,3	G1/2	13	0,90	500	40912*	41809*	40949*	41820*	
	BK3-DN13-G5/8	13	83	17,5	39,5	16	G5/8	16	G5/8	13	0,90	500	40913*	41810*	41815*	41821*	
	BK3-DN20-G3/4	20	95	24,5	47,5	18	G3/4	18	G3/4	20	1,95	315	40914*	41811*	41816*	41822*	
	BK3-DN25-G1	25	113	29	56,5	20	G1	20	G1	25	2,40	315	42177*	38282*	42180*	38283*	
	BK3-DN25/32-G1 1/4	25	120	29	57	22	G1 1/4	22	G1 1/4	25	2,64	315	42179*	38284*	38275*	38285*	
	BK3-DN32-G1 1/4	30	111	39	55	22	G1 1/4	22	G1 1/4	30	5,40	350	38286*	38288*	38287*	38289*	
	BK3-DN40-G1 1/2	38	130	53	65	24	G1 1/2	24	G1 1/2	38	9,40	350	38290*	38292*	38291*	38293*	
BK3-DN50-G2	48	150	58	75	26	G2	26	G2	48	13,00	350	20433*	38295*	38294*	38296*		

ANSI B1.20.1 NPT FEMALE THREAD		Type	LW	L	b	S	i	d	i ₁	d ₂	LW ₁	Weight [Kg]	PN [bar]	442A L=SB50	442A T=SB51	4428 L=SB50	4428 T=SB51
	BK3-DN4-1/8"NPT	5	69	13	34,5	10,5	1/8"NPT	10,5	1/8"NPT	4	0,55	500	41080*	41823*	41828*	41833*	
	BK3-DN6-1/4"NPT	6	69	13	34,5	13,7	1/4"NPT	13,7	1/4"NPT	6	0,55	500	41081*	41824*	41829*	41834*	
	BK3-DN10-3/8"NPT	10	72	16	36	13,5	3/8"NPT	13,5	3/8"NPT	10	0,77	500	41082*	41825*	41830*	41835*	
	BK3-DN13-1/2"NPT	13	83	17,5	39,5	17	1/2"NPT	17	1/2"NPT	13	0,90	500	41083*	41826*	41831*	41836*	
	BK3-DN20-3/4"NPT	20	95	24,5	47,5	18,3	3/4"NPT	18,3	3/4"NPT	20	1,95	315	41084*	41827*	41832*	41837*	
	BK3-DN25-1"NPT	25	113	29	56,5	21,6	1"NPT	21,6	1"NPT	25	2,40	315	38347	38349	38348	38350	
	BK3-DN25/32-1 1/4"NPT	25	120	29	57,5	22,1	1 1/4"NPT	22,1	1 1/4"NPT	25	2,65	315	38351	38353	38352	38354	
	BK3-DN32-1 1/4"NPT	30	120	39	60	22,1	1 1/4"NPT	22,1	1 1/4"NPT	30	5,40	350	38355	38357	38356	38358	
	BK3-DN40-1 1/2"NPT	38	140	53	70	22,1	1 1/2"NPT	22,1	1 1/2"NPT	38	9,40	350	38359	38361	38360	38362	
	BK3-DN50-2"NPT	48	150	58	75	30,3	2"NPT	30,3	2"NPT	48	13,00	350	38363	40284	40285	40286	

DIN 2353 / ISO 8434-1 LIGHT SERIES		Type	LW	RA	L	b	S	i	d	i ₁	d ₁ ⁽¹⁾	LW ₁	Weight [Kg]	PN [bar]	442A L=SB50	442A T=SB51	4428 L=SB50	4428 T=SB51
	BK3-DN4-6L	5	6	67	13	34,5	7	M 12x1,5	10	G1/8	4	0,50	500	41838*	41845*	41852*	41859*	
	BK3-DN6-8L	6	8	67	13	34,5	7	M 14x1,5	14	G1/4	6	0,52	500	41839*	41846*	41853*	41860*	
	BK3-DN8-10L	8	10	74	13	34,5	7	M 16x1,5	14	G1/4	6	0,54	500	41840*	41847*	41854*	41861*	
	BK3-DN10-12L	10	12	74	16	36	7	M 18x1,5	14	G3/8	10	0,73	500	41841*	41848*	41855*	41862*	
	BK3-DN13-15L	13	15	82	17,5	39,5	7	M 22x1,5	16,3	G1/2	13	0,85	500	41842*	41849*	41856*	41863*	
	BK3-DN13-18L	13	18	82	17,5	39,5	7,5	M 26x1,5	16	G5/8	13	0,89	500	41843*	41850*	41857*	41864*	
	BK3-DN20-22L	20	22	101	24,5	47,5	7,5	M 30x2	18	G3/4	20	1,87	315	41844*	41851*	41858*	41865*	
	BK3-DN25-28L	25	28	108	29	56,5	7,5	M 36x2	20	G1	25	2,45	315	42181*	42182*	42185*	42186*	
	BK3-DN25/32-35L	25	35	112	29	57	10,5	M 45x2	22	G1 1/4	25	2,90	315	42183*	42184*	42187*	42188*	

Please note the pressure ratings of the tube connections!
⁽¹⁾Transition adapters for light and heavy series on request.

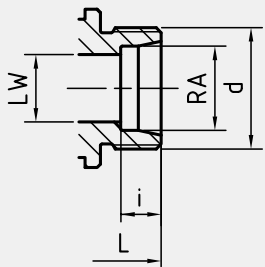
*Article usually in stock.

Selector ball valve Stainless Steel

BK3

CONNECTION TYPE (CONNECTIONS 1 AND 3)

DIN 2353 / ISO 8434-1
HEAVY SERIES



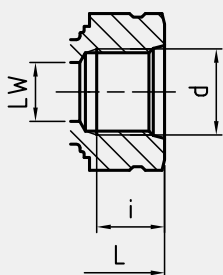
DIMENSIONS

Type	LW	RA	L	b	S	i	d	i ₁	d ₁ ⁽¹⁾	LW ₁	Weight [Kg]
BK3-DN4-8S	5	8	73	13	34,5	7	M 16x1,5	10	G1/8	4	0,52
BK3-DN6-10S	6	10	73	13	34,5	7,5	M 18x1,5	14	G1/4	6	0,54
BK3-DN8-12S	8	12	76	13	34,5	7,5	M 20x1,5	14	G1/4	6	0,56
BK3-DN10-14S	10	14	80	16	36	8	M 22x1,5	14	G3/8	10	0,73
BK3-DN13-16S	13	16	86	17,5	39,5	8,5	M 24x1,5	16,3	G1/2	13	0,86
BK3-DN13-20S	13	20	90	17,5	39,5	10,5	M 30x2	16	G5/8	13	0,94
BK3-DN20-25S	20	25	109	24,5	47,5	12	M 36x2	18	G3/4	20	1,95
BK3-DN25-30S	25	30	120	29	56,5	13,5	M 42x2	20	G1	25	2,65
BK3-DN25/32-38S	25	38	124	29	57	16	M 52x2	22	G1 1/4	25	3,10

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	442A L=SB50	442A T=SB51	4428 L=SB50	4428 T=SB51
500	41866*	41873*	41880*	41887*
500	41867*	41874*	41881*	41888*
500	41868*	41875*	41882*	41889*
500	41869*	41876*	41883*	41890*
500	41870*	41877*	41884*	41891*
500	41871*	41878*	41885*	41892*
315	41872*	41879*	41886*	41893*
315	42189*	42190*	42193*	42194*
315	42191*	42192*	42195*	42196*

SAE J514/ISO/DIS11926-1 FEMALE THREAD



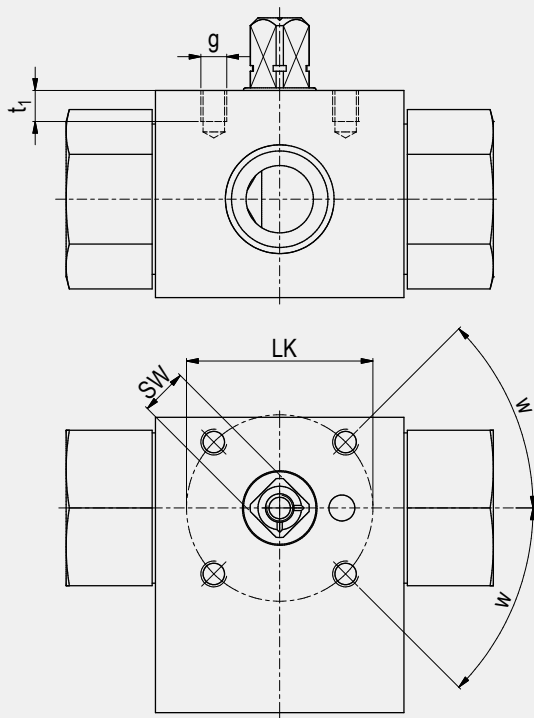
Type	LW	L	b	S	i	d	i ₁	d ₃	LW ₁	Weight [Kg]
BK3-DN6-7/16"UNF	5	69	13	34,5	12	7/16"-20 UNF	12	7/16"-20 UNF	6	0,55
BK3-DN10-9/16"UNF	10	72	16	36	13	9/16"-18 UNF	13	9/16"-18 UNF	7,5	0,77
BK3-DN13-3/4"UNF	13	83	17,5	39,5	15	3/4"-16 UNF	15	3/4"-16 UNF	13	0,90
BK3-DN20-1 1/16"UN	20	95	24,5	47,5	20	1 1/16"-12 UN	20	1 1/16"-12 UN	16	1,95
BK3-DN25-1 5/16"UN	25	113	29	56,5	20	1 5/16"-12 UN	20	1 5/16"-12 UN	21	2,80
BK3-DN32-1 5/8"UN	30	111	39	60	20	1 5/8"-12 UN	20	1 5/8"-12 UN	30	7,00
BK3-DN40-1 7/8"UN	38	140	53	70	20	1 7/8"-12 UN	20	1 7/8"-12 UN	38	10,50
BK3-DN50-2 1/2"UN	48	150	58	75	20	2 1/2"-12 UN	20	2 1/2"-12 UN	48	14,50

PN [bar]	442A L=SB50	442A T=SB51	4428 L=SB50	4428 T=SB51
500	41894*	41898*	41902*	41906*
500	41895*	41899*	41903*	41907*
500	41896*	41900*	41904*	41908*
315	41897*	41901*	41905*	41909*
315	38312	38314	38313	38315
350	38316	38318	38317	38319
350	38320	38322	38321	38323
350	38324	38326	38325	38327

Please note the pressure ratings of the tube connections!

⁽¹⁾Transition adapters for light and heavy series on request.

*Article usually in stock.

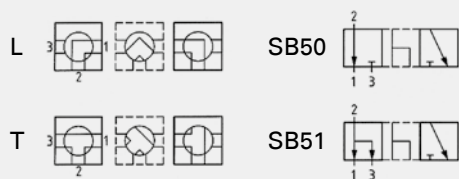


ASSEMBLING THREADS AS PER ISO 5211

DN	SW	LK	g	t ₁	w	ISO 5211
4	9	36	M5	6	30°*	(F03)*
6	9	36	M5	6	30°*	(F03)*
10	9	36	M5	7	45°	F03
13	9	36	M5	6	45°	F03
16	12	42	M5	8	45°	F04
20	14	50	M6	10	45°	F05
25	14	50	M6	10	45°	F05
25/32	14	50	M6	10	45°	F05
25/40	14	50	M6	10	45°	F05

*30° does not correspond to ISO 5211

PORTING PATTERNS

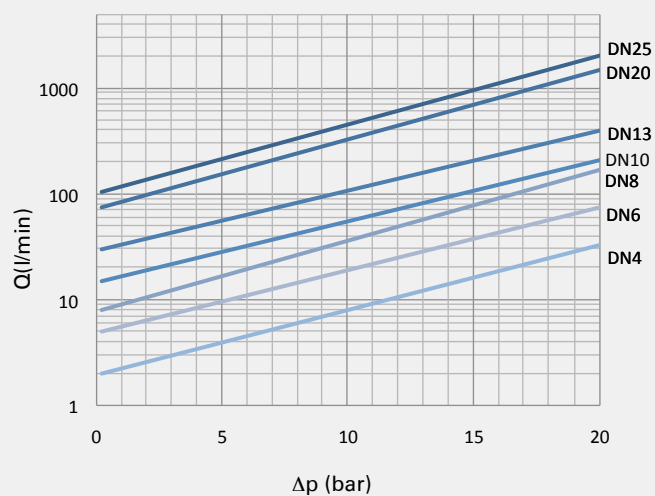


Pressure inlet only from center port (port 2)!

Further porting patterns page 262 to 267

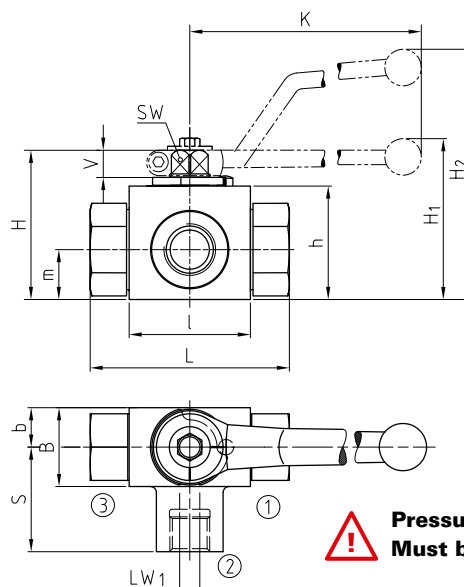
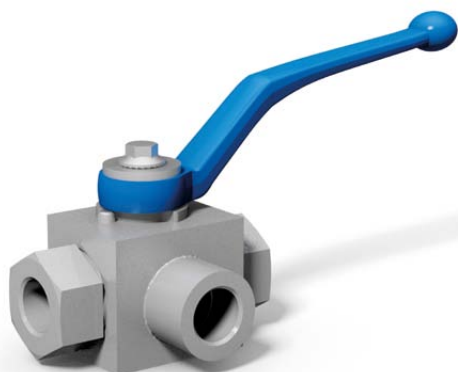
Please see type BK3-S or 3KH in case you need pressure inlet from all ports.

FLOW CHARACTERISTICS BK3-L/T



Selector ball valve Steel

BK3-S



**Pressure inlet possible from all ports!
Must be operated only at $\Delta P=0\text{bar}$!**

AVAILABLE SIZES

DN4 - DN50 (1/8" to 2")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 190 - 191
- Detent on request

MATERIAL CODE DESCRIPTION

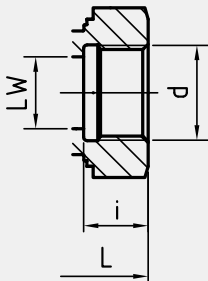
Materials	118A	118A	1188	1188
Body	Steel	Steel	Steel	Steel
Ball	Steel	Steel	Steel	Steel
Stem	Steel	Steel	Steel	Steel
Ball seats	POM	POM	POM	POM
O-rings	NBR	NBR	FPM	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C
Porting pattern	L=SB55	T=SB56	L=SB55	T=SB56

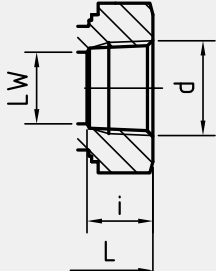
GENERAL DIMENSIONS

Type	L	b	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BK3-S-DN4	40	13	29	47	33	13,5	11	9	115	-	82	Zn
BK3-S-DN6	40	13	29	47	33	13,5	11	9	115	-	82	Zn
BK3-S-DN8	40	13	29	47	33	13,5	11	9	115	-	82	Zn
BK3-S-DN10	43	16	35	52	38	17,5	11	9	115	-	86	Zn
BK3-S-DN13	48	17,5	38	54	40	19	11	9	115	-	89	Zn
BK3-S-DN20	62	24,5	52	75	57	24,5	14	14	200	79	-	Zn
BK3-S-DN25	66	29	61	83	65	29,5	14	14	200	87	-	Zn
BK3-S-DN25/32	66	29	61	83	65	29,5	14	14	200	87	-	Zn
BK3-S-DN32	81	39	-	106	84,5	39	16,5	17	320	115	-	Al
BK3-S-DN40	104	53	-	127	106	53	16,5	17	320	136	-	Al
BK3-S-DN50	118	58	116	137	116	58	16,5	17	320	146	-	Al

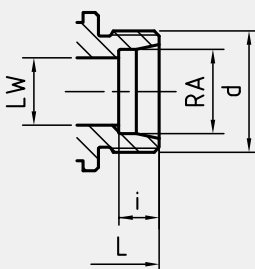
Selector ball valve Steel

BK3-S

CONNECTION TYPE	DIMENSIONS									ORDER CODE PER MATERIAL COMBINATION				
DIN ISO 228 FEMALE THREAD	Type	LW	L	S	LW ₁	i	d	Weight [Kg]		PN [bar]	118A L=SB55	118A T=SB56	1188 L=SB55	1188 T=SB56
	BK3-S-DN4-G1/8	5	69	34,5	4	10	G1/8	0,40		500	02543*	02569*	38007*	38022*
	BK3-S-DN6-G1/4	6	69	34,5	6	14	G1/4	0,46		500	20039*	02572*	04330*	38023*
	BK3-S-DN10-G3/8	10	72	36	10	14	G3/8	0,60		500	00902*	20119*	04102*	38024*
	BK3-S-DN13-G1/2	13	83	41,5	13	16,3	G1/2	0,70		315	02554*	02580*	27347*	28639*
	BK3-S-DN13-G5/8	13	83	41,5	13	16	G5/8	0,70		315	02557*	38018*	38008*	38025*
	BK3-S-DN20-G3/4	20	95	47,5	20	18	G3/4	1,80		315	02717*	02767*	19972*	09399*
	BK3-S-DN25-G1	25	113	56,5	25	20	G1	2,40		315	02720*	02779*	38009*	11954*
	BK3-S-DN25/32-G1 1/4	25	120	57	25	22	G1 1/4	2,64		315	02723*	02780*	38010*	38026*
	BK3-S-DN32-G1 1/4	30	111	55	30	22	G 1 1/4	4,80		350	38013*	38019*	33276*	38027*
	BK3-S-DN40-G1 1/2	38	130	65	38	24	G 1 1/2	8,90		350	30040*	38020*	38011*	38028*
	BK3-S-DN50-G2	48	150	75	48	26	G2	12,40		350	38006*	38021*	38012*	38029*

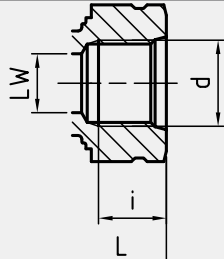
ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	S	LW ₁	i	d	Weight [Kg]		PN [bar]	118A L=SB55	118A T=SB56	1188 L=SB55	1188 T=SB56
	BK3-S-DN4-1/8" NPT	5	69	34,5	4	10,5	1/8" NPT	0,40		500	40224*	40225*	40226*	40227*
	BK3-S-DN6-1/4" NPT	6	69	34,5	6	13,7	1/4" NPT	0,46		500	34885*	38058*	38041*	38059*
	BK3-S-DN10-3/8" NPT	10	72	36	10	13,5	3/8" NPT	0,60		500	14368*	38060*	38042*	38061*
	BK3-S-DN13-1/2" NPT	13	83	41,5	13	17	1/2" NPT	0,70		315	28281*	38062*	38043*	38063*
	BK3-S-DN20-3/4" NPT	20	95	47,5	20	18,3	3/4" NPT	1,80		315	38035*	38064*	28242*	38065*
	BK3-S-DN25-1" NPT	25	113	56,5	25	21,6	1" NPT	2,40		315	38036*	38066*	38044*	38067*
	BK3-S-DN25/32-1 1/4" NPT	25	120	57,5	25	22,1	1 1/4" NPT	2,64		315	38037*	38068*	38045*	38069*
	BK3-S-DN32-1 1/4" NPT	30	120	60	30	22,1	1 1/4" NPT	5,24		350	38038*	38070*	38046*	38071*
	BK3-S-DN40-1 1/2" NPT	38	140	70	38	22,1	1 1/2" NPT	10,00		350	38039*	38072*	38047*	38073*
	BK3-S-DN50-2" NPT	48	150	75	48	30,2	2" NPT	12,20		350	38040*	38074*	38048*	38075*

DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	S	LW ₁	i	d	Weight [Kg]		PN [bar]	118A L=SB55	118A T=SB56	1188 L=SB55	1188 T=SB56
	BK3-S-DN4-6L	5	6	67	33,5	4	7	M 12x1,5	0,30		500	02541*	02567*	04271*	37979*
	BK3-S-DN6-8L	6	8	67	33,5	6	7	M 14x1,5	0,40		500	02544*	02570*	04251*	37980*
	BK3-S-DN8-10L	8	10	74	34,5	8	7	M 16x1,5	0,40		500	02548*	02574*	37973*	37981*
	BK3-S-DN10-12L	10	12	74	36,5	10	7	M 18x1,5	0,50		500	04801*	37977*	04803*	37982*
	BK3-S-DN13-15L	13	15	82	41	13	7	M 22x1,5	0,65		315	02552*	02578*	04116*	37983*
	BK3-S-DN13-18L	13	18	82	41,5	13	7,5	M 26x1,5	0,69		315	02555*	37978*	33246*	37984*
	BK3-S-DN20-22L	20	22	101	48	20	7,5	M 30x2	1,50		315	20287*	02765*	37974*	37985*
	BK3-S-DN25-28L	25	28	108	54	25	7,5	M 36x2	2,10		315	02718*	02777*	37975*	37986*
	BK3-S-DN25/32-35L	25	35	112	56	25	10,5	M 45x2	2,50		315	02721*	02782*	37976*	37987*

DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	S	LW ₁	i	d	Weight [Kg]		PN [bar]	118A L=SB55	118A T=SB56	1188 L=SB55	1188 T=SB56
	BK3-S-DN4-8S	5	8	73	34,5	4	7	M 16x1,5	0,42		500	02542*	02568*	37989*	37996*
	BK3-S-DN6-10S	6	10	73	34,5	6	7,5	M 18x1,5	0,43		500	02545*	02571*	37990*	37997*
	BK3-S-DN8-12S	8	12	76	34,5	8	7,5	M 20x1,5	0,44		500	02547*	02573*	37991*	37998*
	BK3-S-DN10-14S	10	14	80	36,5	10	8	M 22x1,5	0,50		500	04782*	02577*	37992*	37999*
	BK3-S-DN13-16S	13	16	86	43	13	8,5	M 24x1,5	0,65		315	02553*	02579*	37993*	38000*
	BK3-S-DN13-20S	13	20	90	43	15	10,5	M 30x2	0,70		315	20288*	36377*	29921*	38001*
	BK3-S-DN20-25S	20	25	109	48	20	12	M 36x2	1,70		315	10073*	02766*	04955*	38002*
	BK3-S-DN25-30S	25	30	120	57,5	25	13,5	M 42x2	2,40		315	02719*	02778*	37994*	38003*
	BK3-S-DN25/32-38S	25	38	124	57,5	25	16	M 52x2	2,80		315	02722*	02781*	32489*	38004*

Please note the pressure ratings of the tube connections!

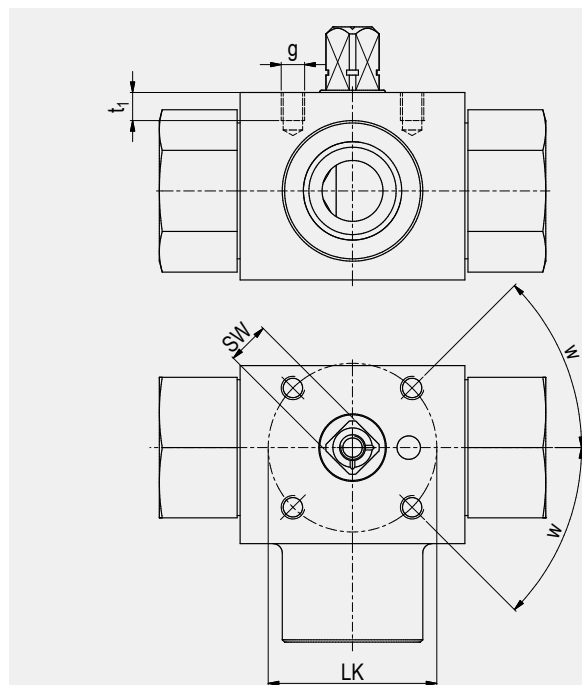
*Article usually in stock.

CONNECTION TYPE	DIMENSIONS								ORDER CODE PER MATERIAL COMBINATION				
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	LW	L	S	LW ₁	i	d	Weight [Kg]	PN [bar]	118A L=SB55	118A T=SB56	1188 L=SB55	1188 T=SB56
	BK3-S-DN6-7/16" UNF	5	69	34,5	6	12	7/16"-20 UNF	0,50	500	38084*	38104*	38089*	38109*
	BK3-S-DN10-9/16" UNF	10	72	36	7,5	13	9/16"-18 UNF	0,60	500	38085*	38105*	38090*	38110*
	BK3-S-DN13-3/4" UNF	13	83	41,5	13	15	3/4"-16 UNF	0,70	315	38086*	38106*	38091*	38111*
	BK3-S-DN20-1 1/16" UN	20	105	47,5	16	20	1 1/16"-12 UN	1,80	315	38087*	38107*	38092*	38112*
	BK3-S-DN25-1 5/16" UN	25	113	56,5	21	20	1 5/16"-12 UN	2,70	315	38088*	38108*	38093*	38113*
	BK3-S-DN32-1 5/8" UN	30	111	60	30	20	1 5/8"-12 UN	5,20	350	39226*	39227*	39228*	39229*
	BK3-S-DN40-1 7/8" UN	38	140	70	38	20	1 7/8"-12 UN	10,00	350	39230*	39231*	39232*	39233*
	BK3-S-DN50-2 1/2" UN	48	150	75	48	20	2 1/2"-12 UN	12,20	350	39234*	39235*	39236*	39237*

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Due to material availability the material code of the steel valves may vary from 118A (1188). DN20-32=818A (8188), DN40-50=218A (2188). Material suitability for the application does not differ from 118A (1188).



ASSEMBLING THREADS AS PER ISO 5211

DN	SW	LK	g	t ₁	w	ISO 5211
4	9	36	M5	6	30°*	(F03)*
6	9	36	M5	6	30°*	(F03)*
10	9	36	M5	7	45°	F03
13	9	36	M5	6	45°	F03
16	12	42	M5	8	45°	F04
20	14	50	M6	10	45°	F05
25	14	50	M6	10	45°	F05
25/32	14	50	M6	10	45°	F05
25/40	14	50	M6	10	45°	F05

*30° does not correspond to ISO 5211

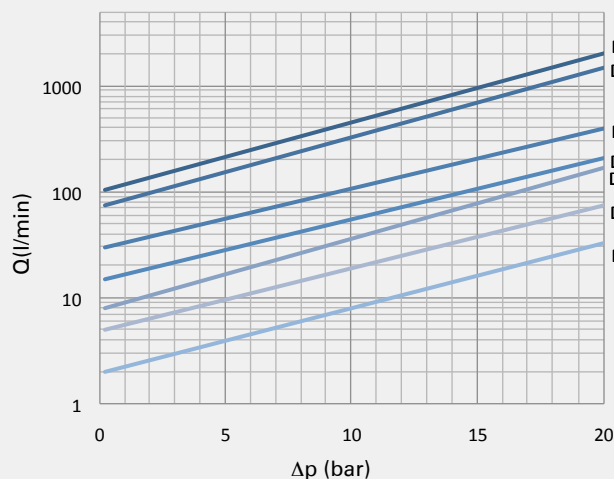
PORTING PATTERNS



Pressure inlet possible from all ports!
Must be operated only at $\Delta P=0$ bar!

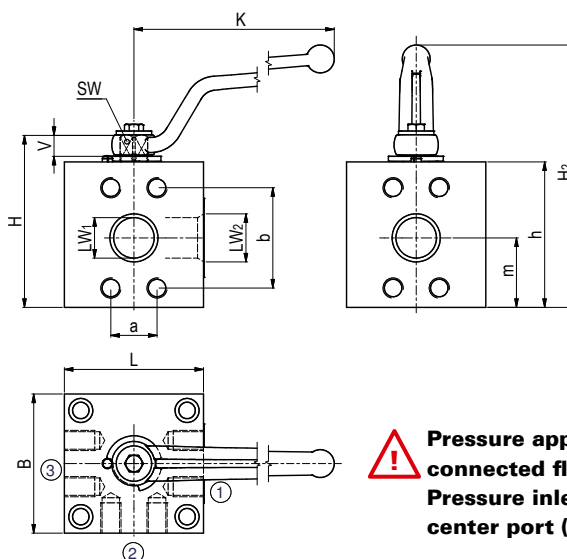
Further porting patterns page 262 to 267

FLOW CHARACTERISTICS BK3S-L/T



3-way compact ball valve with SAE connection metric Steel

BK3K-SAE



AVAILABLE SIZES

DN13 - DN50 (1/2" to 2")

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators page 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C
Porting pattern	L=SB50	L=SB50

CONNECTIONS

ISO 6162-2

PORTING PATTERNS

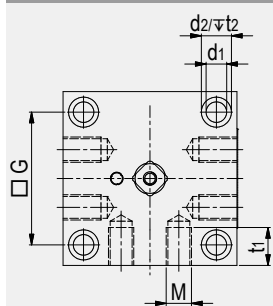


GENERAL DIMENSIONS

Type	LW ₁	LW ₂	L	B	H	h	m	V	SW	K	H ₂	Lever	Weight [Kg]
BK3K-DN13	13	13	70	70	70	56	28	11	9	115	108	St	1,90
BK3K-DN20	20	20	80	80	87	72	36	14	14	171	137	St	3,20
BK3K-DN25	25	25	94	94	96	81	42	14	14	171	147	St	4,85
BK3K-DN32	30	32	100	100	117	100	50,5	16,5	17	306	190	St	6,80
BK3K-DN32/40	30	38	110	110	136	115	55	16,5	17	306	209	St	9,55
BK3K-DN50	48	48	135	135	147	135	67,5	16,5	17	306	220	St	15,50

CONNECTION TYPE

ISO 6162-2



DIMENSIONS

Type	a	b	M ⁽¹⁾	t ₁	G	d ₁	d ₂	t ₂
BK3K-DN13-SAE420	18,2	40,5	M8	18	43	8,5	13,5	9
BK3K-DN20-SAE420	23,8	50,8	M10	20	60	10,5	16,5	11
BK3K-DN25-SAE420	27,8	57,2	M12	21	70	10,5	16,5	11
BK3K-DN32-SAE420	31,8	66,7	M14 ⁽²⁾	21	76	13	19	13
BK3K-DN32-SAE420	31,8	66,7	M12	22	76	13	19	13
BK3K-DN32/40-SAE420	36,5	79,4	M16	24	84	13	19	13
BK3K-DN50-SAE420	44,5	96,8	M20	28	108	13	19	13

- (1) Please advise thread dimension with order. UNC threads on request.
 (2) This thread is not to be used for new designs.

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	112A L=SB50	1128 L=SB50
420	39013	39019
420	39014	39020
420	39015	39021
400	39016	39022
420	41913	41914
420	53792	53202
420	39018	39024

Please note the pressure ratings of the tube connections!

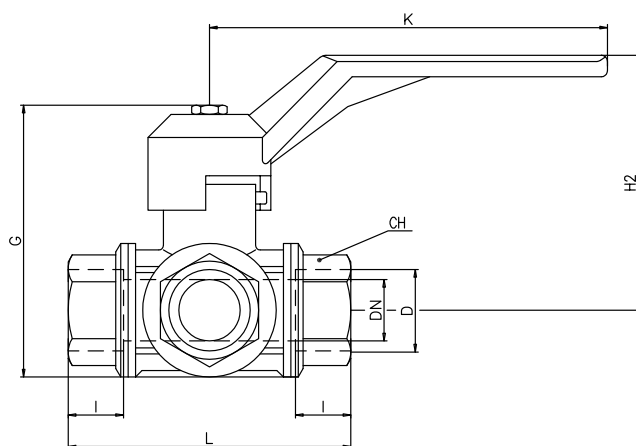
Please note the pressure ratings of the tube connections!

Due to material availability the material code of the steel valves may vary from 112A (or 1128).

DN40-50=812A (or 8128). Material suitability for the application does not differ from 112A (or 1128).

3-way low-pressure ball valve Brass

NK3



AVAILABLE SIZES

DN6 - DN50 (1/4" to 2")

CONNECTIONS

DIN ISO 228 Female thread

MATERIAL CODE DESCRIPTION

Materials	5574	5574
Body	Brass	Brass
Ball	Brass	Brass
Stem	Brass	Brass
Ball seats	PTFE	PTFE
O-rings	PTFE	PTFE
Tmin / Tmax	-10°C / 120°C	-10°C / 120°C
Porting pattern	L=SB50	T=SB51

GENERAL DIMENSIONS

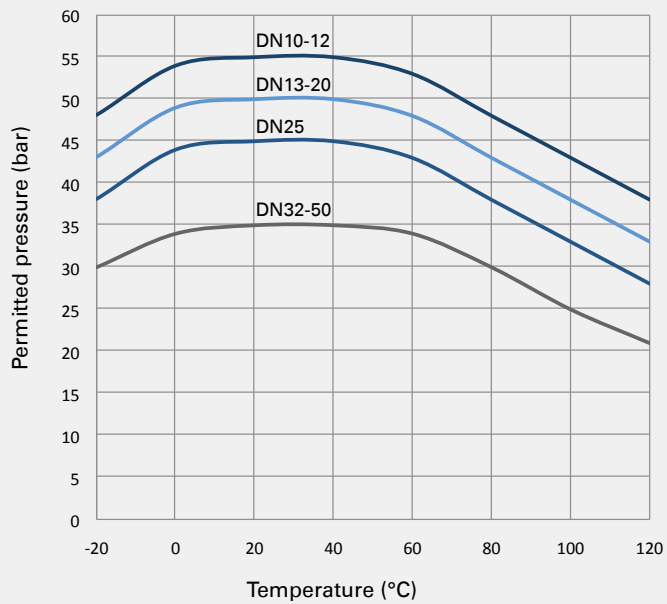
Type	LW	I	L	H	K	H2	CH	Lever	Weight [Kg]
NK3-DN10/6	10	19	77	75	125	65	22	Al	0,71
NK3-DN12/10	12	19	77	75	125	65	22	Al	0,67
NK3-DN13	14	19	77	75	125	65	27	Al	0,65
NK3-DN20	18	23	92	91	145	83	34	Al	1,09
NK3-DN25	23	25	104	105	170	96	41	Al	1,66
NK3-DN32	29	27	118	115	170	102	50	Al	2,22
NK3-DN40	36	31	138	128	170	109	57	Al	3,30
NK3-DN50	45	36	162	165	260	139	70	Al	5,40

ORDER CODE PER MATERIAL COMBINATION

Type	d	PN [bar]	5574 L=SB50	5574 T=SB51
NK3-DN10/6-G1/4	G1/4	55	58742	58734
NK3-DN12/10-G3/8	G3/8	55	58743	58735
NK3-DN13-G1/2	G1/2	50	58744	58736
NK3-DN20-G3/4	G3/4	50	58745	58737
NK3-DN25-G1	G1	45	58746	58738
NK3-DN32-G1 1/4	G1 1/4	35	58747	58739
NK3-DN40-G1 1/2	G1 1/2	35	58748	58740
NK3-DN50-G2	G2	35	58749	58741

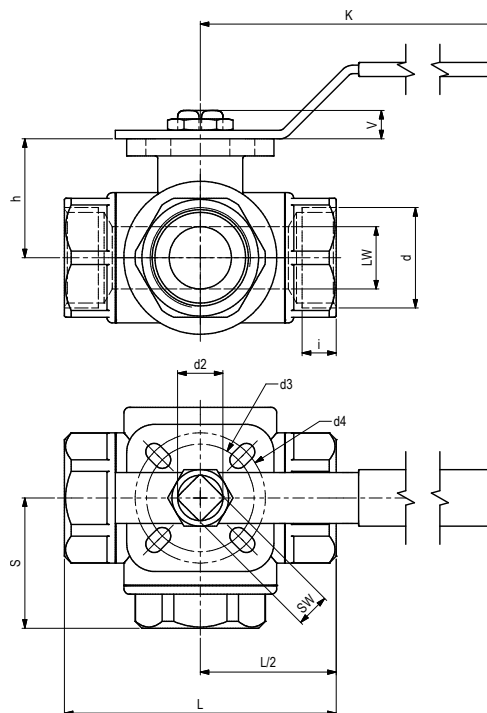
PRESSURE/TEMPERATURE RELATION

Pressure/Temperature curve
NK3 CN10-50 brass



3-way low-pressure ball valve Stainless Steel

NK3



AVAILABLE SIZES

DN6 - DN50 (1/4" to 2")

CONNECTIONS

DIN ISO 228 Female thread

MATERIAL CODE DESCRIPTION

Materials	4474
Body	CF8M (Stainless Steel)
Ball	Stainless Steel
Stem	Stainless Steel
Ball seats	PTFE
O-rings	PTFE
Tmin / Tmax	-30°C / 200°C
Porting pattern	L=SB50

ACCESSORIES ON REQUEST

• Locking devices included

GENERAL DIMENSIONS

Type	LW	L	h	K	V	d2	SW	S	ISO5211	d3	d4	Lever	i	Weight [Kg]
NK3-DN10/6	11	72	38	106	9	11	9	36	F03/F04	36	42	SS	13	0,68
NK3-DN10	11	72	38	106	9	11	9	36	F03/F04	36	42	SS	13	0,67
NK3-DN13	12,7	75	40	106	9	11	9	38	F03/F04	36	42	SS	14,9	0,67
NK3-DN20	16	86	43	133	9	11	9	42	F03/F04	36	42	SS	17,5	0,88
NK3-DN25	20	100	50	133	11	14	11	50	F04/F05	42	50	SS	16,3	1,55
NK3-DN32	25	115	56	133	11	14	11	58	F04/F05	42	50	SS	21	2,21
NK3-DN40	32	125	66	187	14	18	14	64	F05/F07	50	70	SS	21	3,41
NK3-DN50	38,1	150	74	187	14	18	14	76	F05/F07	50	70	SS	23	5,40

ORDER CODE PER MATERIAL COMBINATION

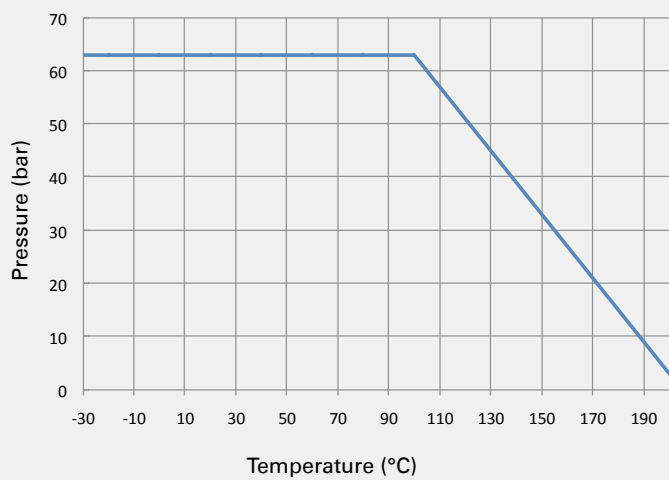
Type	d	PN [bar]	4474 L=SB50
NK3-DN10/6-G1/4	G1/4	63	58750
NK3-DN10-G3/8	G3/8	63	58751
NK3-DN13-G1/2	G1/2	63	58752
NK3-DN20-G3/4	G3/4	63	58753
NK3-DN25-G1	G1	63	58754
NK3-DN32-G1 1/4	G1 1/4	63	58755
NK3-DN40-G1 1/2	G1 1/2	63	58756
NK3-DN50-G2	G2	63	58757

3-way low-pressure ball valve Stainless Steel

NK3

PRESSURE/TEMPERATURE RELATION

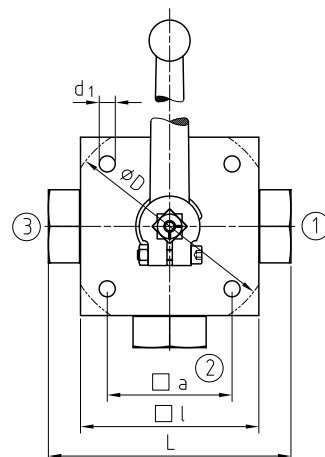
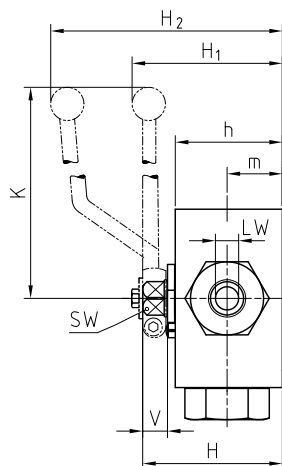
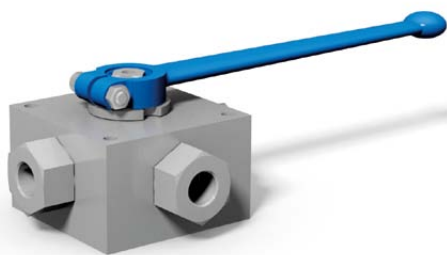
Pressure/Temperature curve
NK3 Stainless Steel



Multiway

Multiway ball valve Steel

3KH



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations 192 - 195
- Detent 231

MATERIAL CODE DESCRIPTION

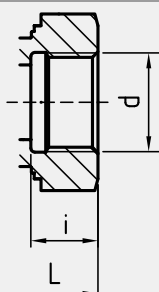
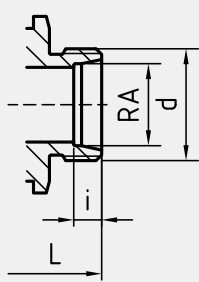
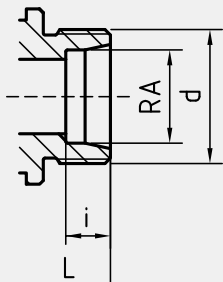
Materials	112A	112A	1128	1128
Body	Steel	Steel	Steel	Steel
Trunnion ball	Steel	Steel	Steel	Steel
Ball seats	POM	POM	POM	POM
O-rings	NBR	NBR	FPM	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C
Porting pattern	L=SB01	T=SB02	L=SB01	T=SB02

GENERAL DIMENSIONS

Type	LW _{LT}	D	a	l	d ₁	H	h	m	K	V	SW	H ₁	H ₂	Lever
3KH-DN4	5	-	55	70	6,5	58	40	22	160	14	12	-	101	Al
3KH-DN6	5	-	55	70	6,5	58	40	22	160	14	12	-	101	Al
3KH-DN8	8	-	65	80	6,5	68	50	27	200	14	14	72	-	Zn
3KH-DN10	8	-	65	80	6,5	68	50	27	200	14	14	72	-	Zn
3KH-DN13	13	-	80	100	9	78	60	31	200	14	14	82	-	Zn
3KH-DN16	13	-	80	100	9	78	60	31	200	14	14	82	-	Zn
3KH-DN20	18	138	85	113	8,5	88	67	36,5	320	16,5	17	96	-	Al
3KH-DN25	23	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al
3KH-DN25/32	23	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al
3KH-DN25/40	23	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al

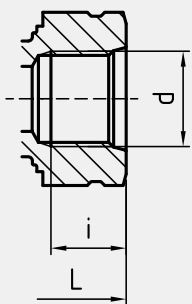
Multiway ball valve Steel

3KH

CONNECTION TYPE	DIMENSIONS					ORDER CODE PER MATERIAL COMBINATION					
DIN ISO 228 FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	112A L=SB01	112A T=SB02	1128 L=SB01	1128 T=SB02	
	3KH-DN4-G1/8	100	10	G1/8	1,60	500	02256*	02254	25762*	25867	
	3KH-DN6-G1/4	100	14	G1/4	1,60	500	20046*	22349	19767*	25868	
	3KH-DN10-G3/8	115	14	G3/8	2,70	500	19241*	20460	20502*	21512	
	3KH-DN13-G1/2	136	16,3	G1/2	4,90	400	19151*	20459	25763*	17220	
	3KH-DN16-G5/8	139	18	G5/8	4,90	400	02661*	02659	03162*	03171	
	3KH-DN20-G3/4	154	18	G3/4	6,70	315	19242*	20458	03163*	03172	
	3KH-DN25-G1	172	20	G1	8,30	315	19243*	20457	25765*	03173	
	3KH-DN25/32-G1 1/4	180	22	G1 1/4	8,50	315	27190	02203	25766	25871	
	3KH-DN25/40-G1 1/2	180	24	G1 1/2	8,50	250	30663	02209	25767	17304	
ANSI B1.20.1 NPT FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	112A L=SB01	112A T=SB02	1128 L=SB01	1128 T=SB02	
	3KH-DN4-1/8"NPT	100	10,5	1/8"NPT	1,60	500	33210	19444	25768	25872	
	3KH-DN6-1/4"NPT	100	13,7	1/4"NPT	1,60	500	14380	33212	15716	25873	
	3KH-DN10-3/8"NPT	115	13,5	3/8"NPT	2,80	500	04578	19446	25770	25874	
	3KH-DN13-1/2"NPT	160	17	1/2"NPT	5,20	400	16523	19447	25771	25875	
	3KH-DN20-3/4"NPT	164	18,3	3/4"NPT	6,80	315	17256	17314	15718	25876	
	3KH-DN25-1"NPT	186	21,6	1"NPT	8,50	315	19442	33213	25773	25877	
	3KH-DN25/32-1 1/4"NPT	186	22,1	1 1/4"NPT	8,80	315	19443	19449	16745	19455	
	3KH-DN25/40-1 1/2"NPT	186	22,1	1 1/2"NPT	8,80	250	33211	33214	25775	25879	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	RA	L	i	d	Weight [Kg]	PN [bar]	112A L=SB01	112A T=SB02	1128 L=SB01	1128 T=SB02
	3KH-DN4-6L	6	105	7	M 12x1,5	1,60	500	02217*	02215	25746*	25851
	3KH-DN6-8L	8	105	7	M 14x1,5	1,80	500	02223*	02221	25747*	25852
	3KH-DN8-10L	10	114	7	M 16x1,5	2,60	500	02600*	02598	25748*	25853
	3KH-DN10-12L	12	114	7	M 18x1,5	2,60	500	02612*	24278	25749*	25854
	3KH-DN13-15L	15	137	7	M 22x1,5	4,70	400	02630*	02628	25750*	25855
	3KH-DN16-18L	18	137	7,5	M 26x1,5	4,70	400	22027*	02647	25751*	25856
	3KH-DN20-22L	22	152	7,5	M 30x2	6,60	315	20370*	24007	25752*	25857
	3KH-DN25-28L	28	166	7,5	M 36x2	8,00	315	02319*	02317	25753*	25858
	3KH-DN25/32-35L	35	170	10,5	M 45x2	8,12	315	02856*	02857	03130*	03139
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	RA	L	i	d	Weight [Kg]	PN [bar]	112A L=SB01	112A T=SB02	1128 L=SB01	1128 T=SB02
	3KH-DN4-8S	8	105	7	M 16x1,5	1,60	500	02304*	02303	25754*	25859
	3KH-DN6-10S	10	105	7,5	M 18x1,5	1,60	500	02308*	02309	19002*	25860
	3KH-DN8-12S	12	116	7,5	M 20x1,5	2,60	500	22863*	02604	25756*	25861
	3KH-DN10-14S	14	120	8	M 22x1,5	2,60	500	02618*	02616	25757*	25862
	3KH-DN13-16S	16	141	8,5	M 24x1,5	4,70	400	23058*	02634	25758*	25863
	3KH-DN16-20S	20	145	10,5	M 30x2	4,70	400	23059*	02653	25759*	25864
	3KH-DN20-25S	25	160	12	M 36x2	6,60	315	02268*	29891	25760*	25865
	3KH-DN25-30S	30	176	13,5	M 42x2	8,00	315	02274*	02272	25761*	25866
	3KH-DN25/32-38S	38	180	16	M 52x2	8,30	315	02852*	02853	03094*	03103

Please note the pressure ratings of the tube connections!

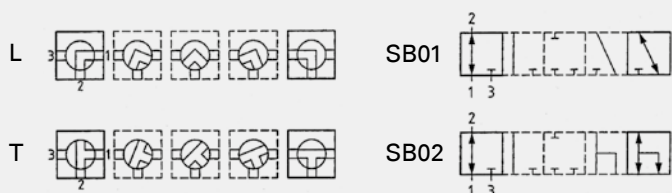
*Article usually in stock.

CONNECTION TYPE	DIMENSIONS					ORDER CODE PER MATERIAL COMBINATION				
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	112A L=SB01	112A T=SB02	1128 L=SB01	1128 T=SB02
	3KH-DN6-7/16" UNF	100	12	7/16"-20 UNF	1,60	500	37193	37364	31546	39103
	3KH-DN10-9/16" UNF	115	13	9/16"-18 UNF	2,80	500	37194	37365	25631	39104
	3KH-DN13-3/4" UNF	144	15	3/4"-16 UNF	5,20	400	37195	37366	37197	39105
	3KH-DN20-1 1/16" UN	164	20	1 1/16"-12 UN	6,80	315	37196	37367	37198	39106
	3KH-DN25-1 5/16" UN	180	20	1 5/16"-12 UN	8,50	315	32203	37368	22853	39107

Please note the pressure ratings of the tube connections!
Due to material availability the material code of the steel valves may vary from 112A (or 1128). DN20-25=812A (or 8128). Material suitability for the application does not differ from 112A (or 1128).

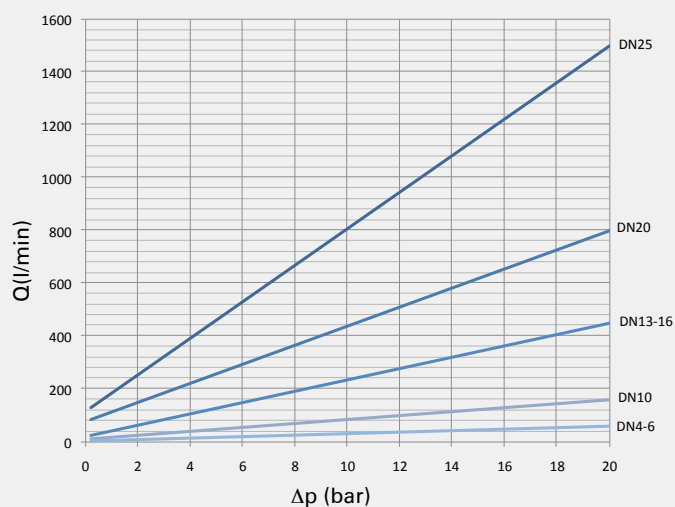
*Article usually in stock.

PORTING PATTERNS



Further porting patterns page 262 to 267

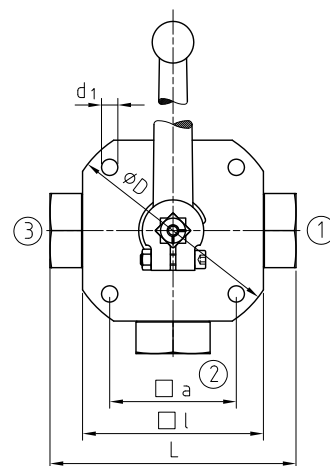
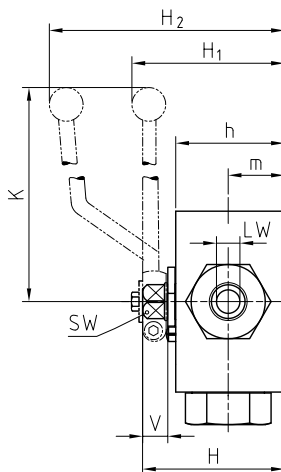
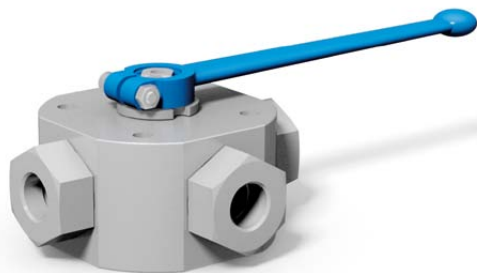
FLOW CHARACTERISTICS 3KH-L/T





Multiway ball valve Stainless Steel

3KH



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations 192 - 195
- Detent 231

MATERIAL CODE DESCRIPTION

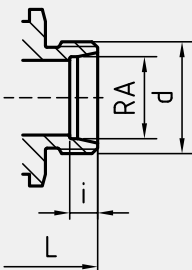
Materials	442A	442A	4428	4428
Body	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Trunnion ball	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Ball seats	POM	POM	POM	POM
O-rings	NBR	NBR	FPM	FPM
Tmin / Tmax	-30°C / 100°C	-30°C / 100°C	-20°C / 100°C	-20°C / 100°C
Porting pattern	L=SB01	T=SB02	L=SB01	T=SB02

GENERAL DIMENSIONS

Type	LW _{LT}	D	a	l	d ₁	H	h	m	K	V	SW	H ₁	H ₂	Lever
3KH-DN4	5	75	40	70	6,5	58	40	22	160	14	12	-	101	Al
3KH-DN6	5	75	40	70	6,5	58	40	22	160	14	12	-	101	Al
3KH-DN8	8	90	45	80	6,5	68	50	27	200	14	14	72	-	Zn
3KH-DN10	8	90	45	80	6,5	68	50	27	200	14	14	72	-	Zn
3KH-DN13	13	110	60	100	9	78	60	31	200	14	14	82	-	Zn
3KH-DN16	13	110	60	100	9	78	60	31	200	14	14	82	-	Zn
3KH-DN20	18	138	85	113	8,5	88	67	36,5	320	16,5	17	96	-	Al
3KH-DN25	23	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al
3KH-DN25/32	23	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al
3KH-DN25/40	23	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al

Multiway ball valve Stainless Steel

3KH

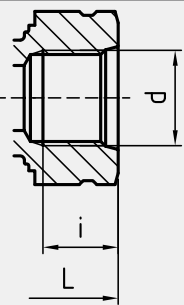
CONNECTION TYPE	DIMENSIONS					ORDER CODE PER MATERIAL COMBINATION					
DIN ISO 228 FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	442A L=SB01	442A T=SB02	4428 L=SB01	4428 T=SB02	
	3KH-DN4-G1/8	100	10	G1/8	1,60	500	37287	37347	37292	39088	
	3KH-DN6-G1/4	100	14	G1/4	1,60	500	12130	10548	32285	20675	
	3KH-DN10-G3/8	115	14	G3/8	2,70	500	10836	37348	37293	31637	
	3KH-DN13-G1/2	136	16,3	G1/2	4,90	400	14623	37349	36503	39089	
	3KH-DN16-G5/8	139	18	G5/8	4,90	400	37288	37350	37294	39090	
	3KH-DN20-G3/4	154	18	G3/4	6,70	315	37289	31516	37295	39091	
	3KH-DN25-G1	172	20	G1	8,30	315	29130	25433	37296	39092	
	3KH-DN25/32-G1 1/4	180	22	G1 1/4	8,50	315	37290	37351	37297	39093	
	3KH-DN25/40G1 1/2	180	24	G1 1/2	8,50	250	37291	37352	37298	39094	
ANSI B1.20.1 NPT FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	442A L=SB01	442A T=SB02	4428 L=SB01	4428 T=SB02	
	3KH-DN4-1/8"NPT	100	10,5	1/8"NPT	1,60	500	37299	37353	37305	39095	
	3KH-DN6-1/4"NPT	100	13,7	1/4"NPT	1,60	500	28248	37354	37306	39096	
	3KH-DN10-3/8"NPT	115	13,5	3/8"NPT	2,80	500	29181	37355	37307	39097	
	3KH-DN13-1/2"NPT	160	17	1/2"NPT	5,20	400	37300	37356	37308	39098	
	3KH-DN20-3/4"NPT	164	18,3	3/4"NPT	6,80	315	37301	29129	34995	39099	
	3KH-DN25-1"NPT	186	21,6	1"NPT	8,50	315	37302	37357	37309	39100	
	3KH-DN25/32-1 1/4"NPT	186	22,1	1 1/4"NPT	8,80	315	37303	37358	37310	39101	
	3KH-DN25/40-1 1/2"NPT	186	22,1	1 1/2"NPT	8,80	250	37304	32572	37311	39102	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	RA	L	i	d	Weight [Kg]	PN [bar]	442A L=SB01	442A T=SB02	4428 L=SB01	4428 T=SB02
	3KH-DN4-6L	6	105	7	M 12x1,5	1,60	500	37199	37328	37267	39072
	3KH-DN6-8L	8	105	7	M 14x1,5	1,80	500	37200	37329	37268	39073
	3KH-DN8-10L	10	114	7	M 16x1,5	2,60	500	37262	32511	37269	39074
	3KH-DN10-12L	12	114	7	M 18x1,5	2,60	500	34556	37330	37270	39075
	3KH-DN13-15L	15	137	7	M 22x1,5	4,70	400	37263	37331	37271	39076
	3KH-DN16-18L	18	137	7,5	M 26x1,5	4,70	400	37264	37332	37272	39077
	3KH-DN20-22L	22	152	7,5	M 30x2	6,60	315	37265	37333	37273	39078
	3KH-DN25-28L	28	166	7,5	M 36x2	8,00	315	37266	37334	37274	39079
	3KH-DN25/32-35L	35	170	10,5	M 45x2	8,12	315	41942	41943	41944	41945
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	RA	L	i	d	Weight [Kg]	PN [bar]	442A L=SB01	442A T=SB02	4428 L=SB01	4428 T=SB02
	3KH-DN4-8S	8	105	7	M 16x1,5	1,60	500	37275	37335	37279	39080
	3KH-DN6-10S	10	105	7,5	M 18x1,5	1,60	500	37276	37336	37280	39081
	3KH-DN8-12S	12	116	7,5	M 20x1,5	2,60	500	31678	37337	37281	39082
	3KH-DN10-14S	14	120	8	M 22x1,5	2,60	500	18678	37338	37282	39083
	3KH-DN13-16S	16	141	8,5	M 24x1,5	4,70	400	32300	37339	37283	39084
	3KH-DN16-20S	20	145	10,5	M 30x2	4,70	400	37277	37340	37284	39085
	3KH-DN20-25S	25	160	12	M 36x2	6,60	315	37278	37341	37285	39086
	3KH-DN25-30S	30	176	13,5	M 42x2	8,00	315	29468	15986	37286	39087
	3KH-DN25/32-38S	38	180	16	M 52x2	8,30	315	41946	41947	41948	41949

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Multiway ball valve Stainless Steel

3KH

CONNECTION TYPE	DIMENSIONS					ORDER CODE PER MATERIAL COMBINATION				
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	442A L=SB01	442A T=SB02	4428 L=SB01	4428 T=SB02
	3KH-DN6-7/16" UNF	100	12	7/16"-20 UNF	1,60	500	37312	37359	37317	39108
	3KH-DN10-9/16" UNF	115	13	9/16"-18 UNF	2,80	500	37313	37360	37318	39109
	3KH-DN13-3/4" UNF	144	15	3/4"-16 UNF	5,20	400	37314	37361	37319	39110
	3KH-DN20-1 1/16" UN	164	20	1 1/16"-12 UN	6,80	315	37315	37362	37320	39111
	3KH-DN25-1 5/16" UN	180	20	1 5/16"-12 UN	8,50	315	37316	37363	37321	39112

Please note the pressure ratings of the tube connections!

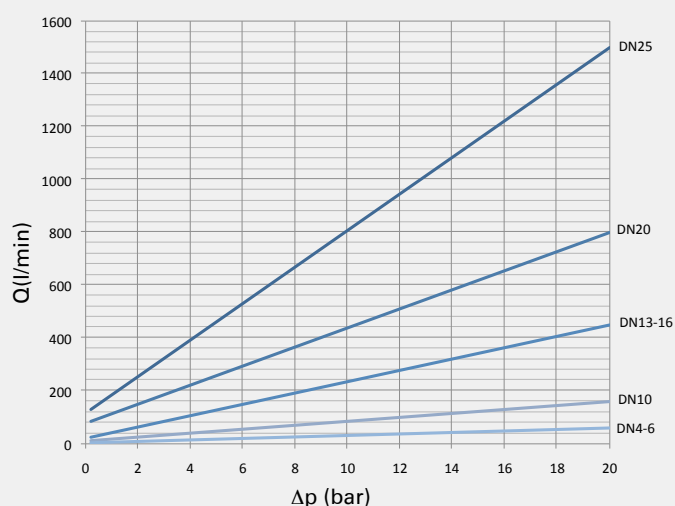
*Article usually in stock.

PORTING PATTERNS



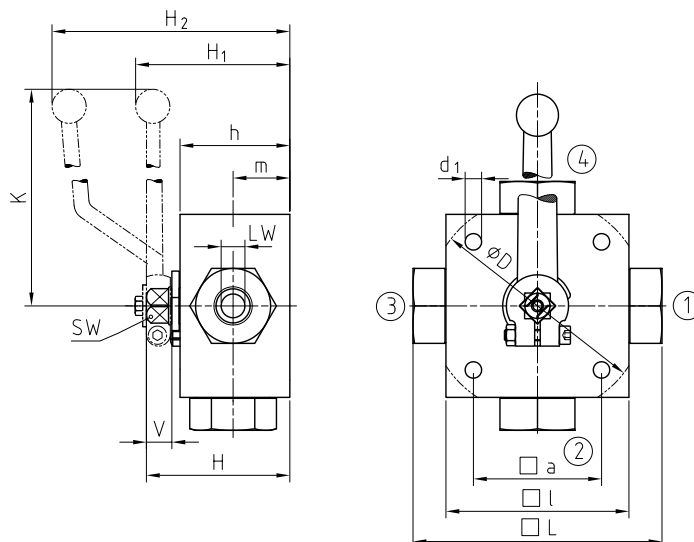
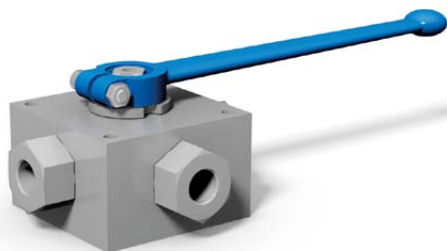
Further porting patterns page 262 to 267

FLOW CHARACTERISTICS 3KH-L/T



Multiway ball valve Steel

4KH



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations 192 - 195
- Detent 231

MATERIAL CODE DESCRIPTION

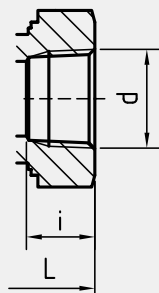
Materials	112A	112A	1128	1128
Body	Steel	Steel	Steel	Steel
Trunnion ball	Steel	Steel	Steel	Steel
Ball seats	POM	POM	POM	POM
O-rings	NBR	NBR	FPM	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C
Porting pattern	T=SB13	X=SB14	T=SB13	X=SB14

GENERAL DIMENSIONS

Type	LW _{LT}	LW _X	D	a	l	d ₁	H	h	m	K	V	SW	H ₁	H ₂	Lever
4KH-DN4	5	4	-	55	70	6,5	58	40	22	160	14	12	-	101	Al
4KH-DN6	5	4	-	55	70	6,5	58	40	22	160	14	12	-	101	Al
4KH-DN8	8	7	-	65	80	6,5	68	50	27	200	14	14	72	-	Zn
4KH-DN10	8	7	-	65	80	6,5	68	50	27	200	14	14	72	-	Zn
4KH-DN13	13	10	-	80	100	9	78	60	31	200	14	14	82	-	Zn
4KH-DN16	13	10	-	80	100	9	78	60	31	200	14	14	82	-	Zn
4KH-DN20	18	14	138	85	113	8,5	88	67	36,5	320	16,5	17	96	-	Al
4KH-DN25	23	17	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al
4KH-DN25/32	23	17	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al
4KH-DN25/40	23	17	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al

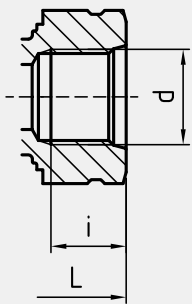
Multiway ball valve Steel

4KH

CONNECTION TYPE	DIMENSIONS					ORDER CODE PER MATERIAL COMBINATION					
DIN ISO 228 FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	112A T=SB13	112A X=SB14	1128 T=SB13	1128 X=SB14	
	4KH-DN4-G1/8	100	10	G1/8	1,60	500	02257	02258*	25896	25829*	
	4KH-DN6-G1/4	100	14	G1/4	1,60	500	20455	20445*	25897	25830*	
	4KH-DN10-G3/8	115	14	G3/8	2,80	500	20447	20448*	25898	25831*	
	4KH-DN13-G1/2	136	16,3	G1/2	4,90	400	20450	20451*	25899	25832*	
	4KH-DN16-G5/8	139	18	G5/8	4,90	400	02662	02663*	03180	03189	
	4KH-DN20-G3/4	154	18	G3/4	6,80	315	02233	23441*	25900	03190*	
	4KH-DN25-G1	172	20	G1	8,50	315	02200	20452*	25901	03191*	
	4KH-DN25/32-G1 1/4	180	22	G1 1/4	8,80	315	02206	30658	25902	03192	
	4KH-DN25/40-G1 1/2	180	24	G1 1/2	8,80	250	02212	02213	25903	25836	
ANSI B1.20.1 NPT FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	112A T=SB13	112A X=SB14	1128 T=SB13	1128 X=SB14	
	4KH-DN4-1/8"NPT	100	10,5	1/8"NPT	1,60	500	37525	33216	25904	25837	
	4KH-DN6-1/4"NPT	100	13,7	1/4"NPT	1,60	500	19327	17859	25905	15741	
	4KH-DN10-3/8"NPT	115	13,5	3/8"NPT	2,80	500	19525	19531	25906	25839	
	4KH-DN13-1/2"NPT	160	17	1/2"NPT	4,90	400	19526	19532	25907	25840	
	4KH-DN20-3/4"NPT	164	18,3	3/4"NPT	6,80	315	14024	13515	25908	25841	
	4KH-DN25-1"NPT	186	21,6	1"NPT	8,50	315	19528	19534	25909	25842	
	4KH-DN25/32-1 1/4"NPT	186	22,1	1 1/4"NPT	8,80	315	19529	19535	25910	25843	
	4KH-DN25/40-1 1/2"NPT	186	22,1	1 1/2"NPT	8,80	250	37533	33217	25911	25844	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	RA	L	i	d	Weight [Kg]	PN [bar]	112A T=SB13	112A X=SB14	1128 T=SB13	1128 X=SB14
	4KH-DN4-6L	6	105	7	M 12x1,5	1,60	500	02218	02219*	25880	25813*
	4KH-DN6-8L	8	105	7	M 14x1,5	1,80	500	37369	02336*	25881	25814*
	4KH-DN8-10L	10	114	7	M 16x1,5	2,60	500	19856	02602*	25882	25815*
	4KH-DN10-12L	12	114	7	M 18x1,5	2,60	500	02613	20385*	25883	25816*
	4KH-DN13-15L	15	137	7	M 22x1,5	4,70	400	02631	02632*	25884	25817*
	4KH-DN16-18L	18	137	7,5	M 26x1,5	4,70	400	02650	02651*	25885	25818*
	4KH-DN20-22L	22	152	7,5	M 30x2	6,60	315	02314	02315*	25886	25819
	4KH-DN25-28L	28	166	7,5	M 36x2	8,00	315	31967	02321*	25887	25820*
	4KH-DN25/32-35L	35	170	10,5	M 45x2	8,12	315	02858	02859*	03148	03157*
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	RA	L	i	d	Weight [Kg]	PN [bar]	112A T=SB13	112A X=SB14	1128 T=SB13	1128 X=SB14
	4KH-DN4-8S	8	105	7	M 16x1,5	1,60	500	02306	02305*	25888	25821*
	4KH-DN6-10S	10	105	7,5	M 18x1,5	1,60	500	37434	16410*	25889	25822*
	4KH-DN8-12S	12	116	7,5	M 20x1,5	2,60	500	23057	02608*	25890	25823*
	4KH-DN10-14S	14	120	8	M 22x1,5	2,60	500	02619	02620*	25891	25824*
	4KH-DN13-16S	16	141	8,5	M 24x1,5	4,70	400	02637	02638*	25892	36440*
	4KH-DN16-20S	20	145	10,5	M 30x2	4,70	400	02656	02657*	25893	25826*
	4KH-DN20-25S	25	160	12	M 36x2	6,60	315	02269	31966*	25894	25827*
	4KH-DN25-30S	30	176	13,5	M 42x2	8,20	315	02263	02264*	25895	25828*
	4KH-DN25/32-38S	38	180	16	M 52x2	8,30	315	02854	02855*	03112	03121*

Please note the pressure ratings of the tube connections!

*Article usually in stock.

CONNECTION TYPE	DIMENSIONS					ORDER CODE PER MATERIAL COMBINATION				
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	112A T=SB13	112A X=SB14	1128 T=SB13	1128 X=SB14
	4KH-DN6-7/16" UNF	100	12	7/16"-20 UNF	1,60	500	38189	38190	39171	39172
	4KH-DN10-9/16" UNF	115	13	9/16"-18 UNF	2,80	500	38191	38192	39173	39174
	4KH-DN13-3/4" UNF	144	15	3/4"-16 UNF	4,90	400	38193	38194	39175	22359
	4KH-DN20-1 1/16" UN	164	20	1 1/16"-12 UN	6,80	315	38195	38196	39176	30547
	4KH-DN25-1 5/16" UN	180	20	1 5/16"-12 UN	8,50	315	38197	38198	39177	22342

Please note the pressure ratings of the tube connections!
Due to material availability the material code of the steel valves may vary from 112A (or 1128). DN20-25=812A (or 8128). Material suitability for the application does not differ from 112A (or 1128).

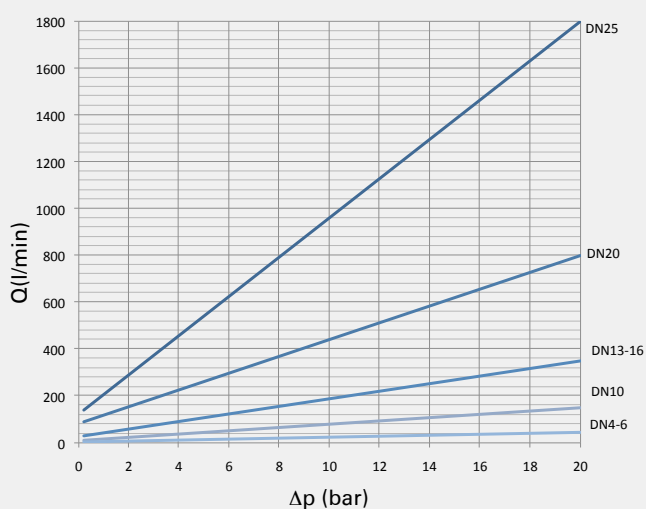
*Article usually in stock.

PORTING PATTERNS



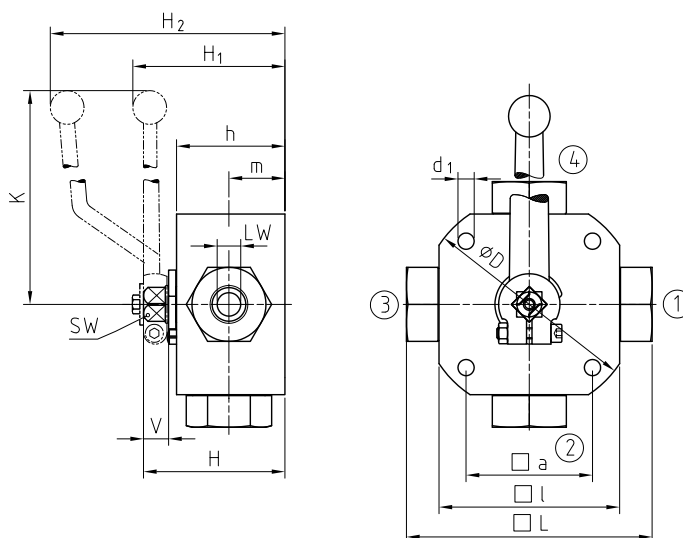
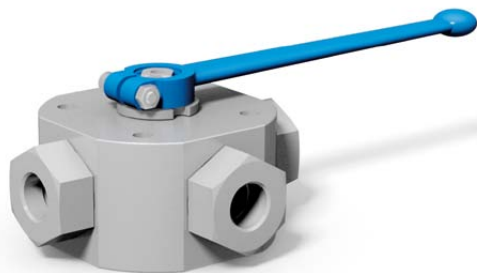
Further porting patterns page 262 to 267

FLOW CHARACTERISTICS 4KH-X/T



Multiway ball valve Stainless Steel

4KH



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations 192 - 195
- Detent 231

MATERIAL CODE DESCRIPTION

Materials	442A	442A	4428	4428
Body	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Trunnion ball	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Ball seats	POM	POM	POM	POM
O-rings	NBR	NBR	FPM	FPM
Tmin / Tmax	-30°C / 100°C	-30°C / 100°C	-20°C / 100°C	-20°C / 100°C
Porting pattern	T=SB13	X=SB14	T=SB13	X=SB14

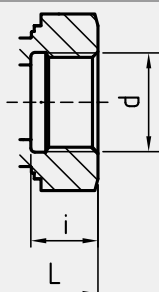
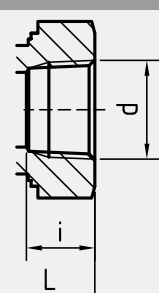
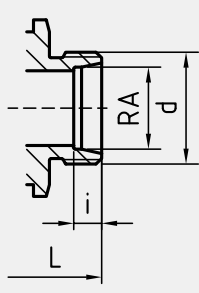
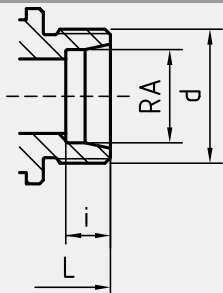
GENERAL DIMENSIONS

Type	LW _{LT}	LW _X	D	a	l	d ₁	H	h	m	K	V	SW	H ₁	H ₂	Lever
4KH-DN4	5	4	75	40	70	6,5	58	40	22	160	14	12	-	101	Al
4KH-DN6	5	4	75	40	70	6,5	58	40	22	160	14	12	-	101	Al
4KH-DN8	8	7	90	45	80	6,5	68	50	27	200	14	14	72	-	Zn
4KH-DN10	8	7	90	45	80	6,5	68	50	27	200	14	14	72	-	Zn
4KH-DN13	13	10	110	60	100	9	78	60	31	200	14	14	82	-	Zn
4KH-DN16	13	10	110	60	100	9	78	60	31	200	14	14	82	-	Zn
4KH-DN20	18	14	138	85	113	8,5	88	67	36,5	320	16,5	17	96	-	Al
4KH-DN25	23	17	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al
4KH-DN25/32	23	17	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al
4KH-DN25/40	23	17	138	85	119	8,5	103	82	47,5	320	16,5	17	112	-	Al

Multiway ball valve Stainless Steel

4KH

Multiway

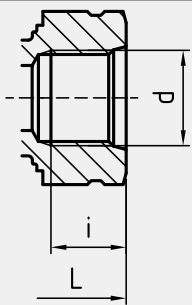
CONNECTION TYPE	DIMENSIONS					ORDER CODE PER MATERIAL COMBINATION					
DIN ISO 228 FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	442A T=SB13	442A X=SB14	4428 T=SB13	4428 X=SB14	
	4KH-DN4-G1/8	100	10	G1/8	1,60	500	37443	37444	39144	39145	
	4KH-DN6-G1/4	100	14	G1/4	1,60	500	37446	20172	39146	31150	
	4KH-DN10-G3/8	115	14	G3/8	2,80	500	37509	09823	39147	35755	
	4KH-DN13-G1/2	136	16,3	G1/2	4,90	400	36026	21366	39148	26611	
	4KH-DN16-G5/8	139	18	G5/8	4,90	400	37512	37513	39149	39151	
	4KH-DN20-G3/4	154	18	G3/4	6,80	315	37515	35477	39150	28850	
	4KH-DN25-G1	172	20	G1	8,50	315	10212	37521	39152	39153	
	4KH-DN25/32-G1 1/4	180	22	G1 1/4	8,80	315	37519	37522	39154	39155	
	4KH-DN25/40-G1 1/2	180	24	G1 1/2	8,80	250	37520	37523	39156	39157	
ANSI B1.20.1 NPT FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	442A T=SB13	442A X=SB14	4428 T=SB13	4428 X=SB14	
	4KH-DN4-1/8"NPT	100	10,5	1/8"NPT	1,60	500	38115	38116	39158	39159	
	4KH-DN6-1/4"NPT	100	13,7	1/4"NPT	1,60	500	38117	32668	39160	32428	
	4KH-DN10-3/8"NPT	115	13,5	3/8"NPT	2,80	500	38118	38119	39161	32499	
	4KH-DN13-1/2"NPT	160	17	1/2"NPT	4,90	400	38120	32185	39162	39163	
	4KH-DN20-3/4"NPT	164	18,3	3/4"NPT	6,80	315	38121	38122	39164	34083	
	4KH-DN25-1"NPT	186	21,6	1"NPT	8,50	315	38123	38126	39165	39166	
	4KH-DN25/32-1 1/4"NPT	186	22,1	1 1/4 "NPT	8,80	315	38124	32310	39167	39168	
	4KH-DN25/40-1 1/2"NPT	186	22,1	1 1/2"NPT	8,80	250	38125	38127	39169	39170	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	RA	L	i	d	Weight [Kg]	PN [bar]	442A T=SB13	442A X=SB14	4428 T=SB13	4428 X=SB14
	4KH-DN4-6L	6	105	7	M 12x1,5	1,60	500	37379	37380	39113	39114
	4KH-DN6-8L	8	105	7	M 14x1,5	1,80	500	37382	37383	39115	39116
	4KH-DN8-10L	10	114	7	M 16x1,5	2,60	500	37385	37386	39117	39118
	4KH-DN10-12L	12	114	7	M 18x1,5	2,60	500	37388	37389	39119	39120
	4KH-DN13-15L	15	137	7	M 22x1,5	4,70	400	37391	37392	39121	39122
	4KH-DN16-18L	18	137	7,5	M 26x1,5	4,70	400	37394	37395	39123	39124
	4KH-DN20-22L	22	152	7,5	M 30x2	6,60	315	37397	37398	39125	39126
	4KH-DN25-28L	28	166	7,5	M 36x2	8,00	315	37400	37401	39127	39128
	4KH-DN25/32-35L	35	170	10,5	M 45x2	8,12	315	41950	41951	41952	41953
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	RA	L	i	d	Weight [Kg]	PN [bar]	442A T=SB13	442A X=SB14	4428 T=SB13	4428 X=SB14
	4KH-DN4-8S	8	105	7	M 16x1,5	1,60	500	37414	37415	39129	39130
	4KH-DN6-10S	10	105	7,5	M 18x1,5	1,60	500	37417	37418	39131	39132
	4KH-DN8-12S	12	116	7,5	M 20x1,5	2,60	500	37420	19830	39133	39134
	4KH-DN10-14S	14	120	8	M 22x1,5	2,60	500	37422	37423	39135	39136
	4KH-DN13-16S	16	141	8,5	M 24x1,5	4,70	400	37425	37426	39137	26186
	4KH-DN16-20S	20	145	10,5	M 30x2	4,70	400	37428	22234	39138	39139
	4KH-DN20-25S	25	160	12	M 36x2	6,60	315	37430	37431	39140	39141
	4KH-DN25-30S	30	176	13,5	M 42x2	8,20	315	37433	37432	39142	39143
	4KH-DN25/32-38S	38	180	16	M 52x2	8,30	315	41954	41955	41956	41957

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Multiway ball valve Stainless Steel

4KH

CONNECTION TYPE	DIMENSIONS					ORDER CODE PER MATERIAL COMBINATION				
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	442A T=SB13	442A X=SB14	4428 T=SB13	4428 X=SB14
	4KH-DN6-7/16" UNF	100	12	7/16"-20 UNF	1,60	500	38199	38200	39178	39179
	4KH-DN10-9/16" UNF	115	13	9/16"-18 UNF	2,80	500	38201	38202	39180	39181
	4KH-DN13-3/4" UNF	144	15	3/4"-16 UNF	4,90	400	38203	38204	39182	39183
	4KH-DN20-1 1/16" UN	164	20	1 1/16"-12 UN	6,80	315	38205	38206	39184	39185
	4KH-DN25-1 5/16" UN	180	20	1 5/16"-12 UN	8,50	315	38207	38208	39186	39187

Please note the pressure ratings of the tube connections!

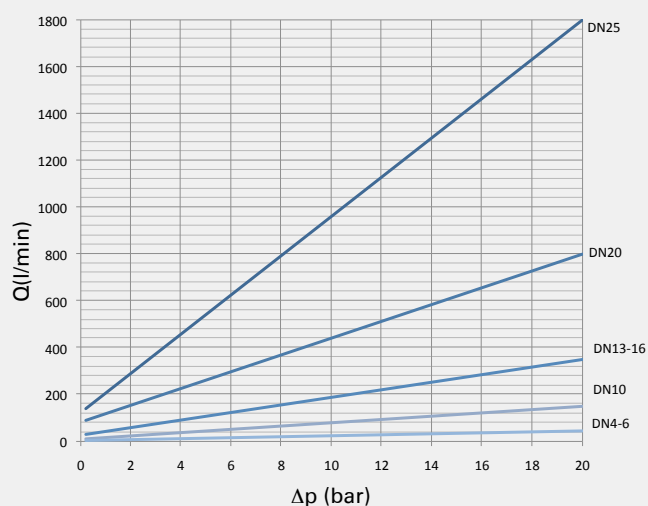
*Article usually in stock.

PORTING PATTERNS



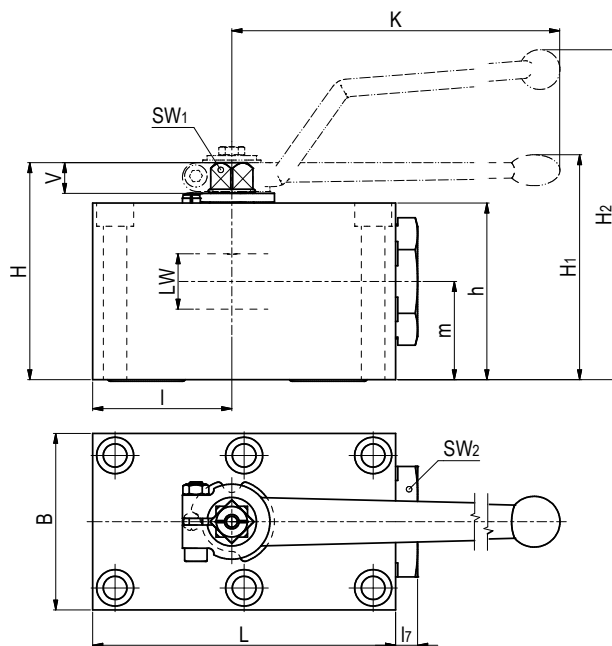
Further porting patterns page 262 to 267

FLOW CHARACTERISTICS 4KH-X/T



Ball valve for manifold mounting Steel

PKH



AVAILABLE SIZES

DN6 - DN50 (1/4" to 2")

ACCESSORIES ON REQUEST



- Locking devices page 225
- Actuators 220 - 221
- Position switches on request
- Detent on request

MATERIAL CODE DESCRIPTION



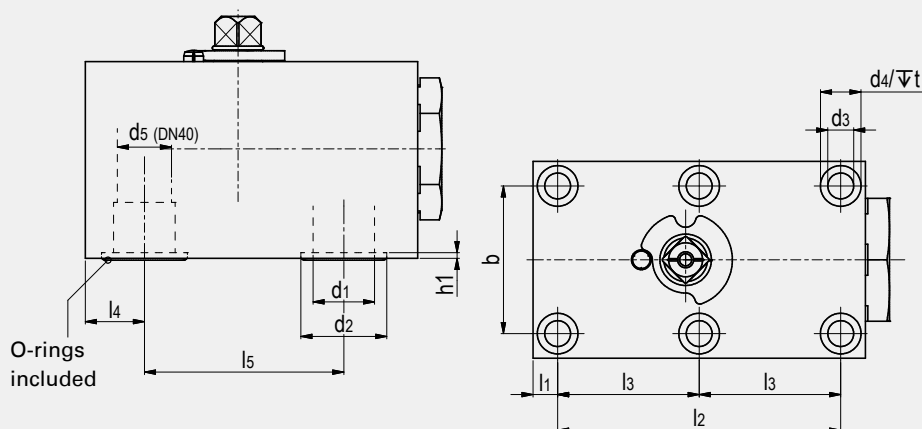
Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS



Type	I	L	I ₇	B	H	h	m	V	SW ₁	SW ₂	K	LW	H ₁	H ₂	Lever	Weight [Kg]
PKH-DN6	26	57	6	40	43	35	19,5	6	7	19	80	6	-	67	Zn	0,60
PKH-DN10	29	70	10	55	59	45	24,5	11	9	30	115	10	-	93	Zn	1,30
PKH-DN13	42,5	98	10	60	69	55	34	11	9	32	115	13	-	104	Zn	2,30
PKH-DN16	44	100	9,5	60	72,3	55	28	14	12	36	160	16	-	115	Al	3,75
PKH-DN20	51	117	10	70	88	70	37,5	14	14	46	200	20	92	-	Zn	3,92
PKH-DN25	62	135	10	80	98	80	44,5	14	14	50	200	25	102	-	Zn	5,68
PKH-DN32	75	165	11	100	121	100	54,5	17	17	70	320	32	130	-	Al	11,00
PKH-DN40	84,5	200	17	130	131	110	57	17	17	80	320	38	140	-	Al	18,78
PKH-DN50	106	240	15	150	150	129	71	17	17	90	320	48	159	-	Al	29,70

CONNECTION



CONNECTION DIMENSIONS

Type	l_1	l_2	l_3	l_4	l_5	b	d_1	d_2	h_1	d_3	d_4	t	d_5	Dimension of screws (min) ⁽¹⁾	Torque of screws in Nm ⁽¹⁾	O-ring	ORDER CODE PER MATERIAL COMBINATION		
																	PN [bar]	112A	1128
PKH-DN6	8,5	35	-	8,5	35	27	6	11,8	1,9	6,5	10,5	6,8	-	4 x M6x40 - 12.9	14	7x2,5	500	22661*	28416*
PKH-DN10	7,5	55	-	10	44	40	9,5	14,9	1,9	8,4	13,5	8,5	-	4 x M8x50 - 12.9	35	10x2,5	500	28687*	15727*
PKH-DN13	7,5	83	41,5	16	58	45	13	24,9	1,9	8,4	13,5	7	-	6 x M8x60 - 12.9	35	20x2,5	420	29571*	29226*
PKH-DN16	8,5	83	41,5	16	58	45	16	24,9	1,9	8,4	13,5	9	-	6 x M8x60 - 12.9	35	20x2,5	400	on request	
PKH-DN20	10	97	48,5	20	69	51	20	29	2	10,5	16,5	10,5	-	6 x M10x80 - 12.9	70	23,47x2,62	420	29296*	29292*
PKH-DN25	10	115	57,5	24	81	60	25	34,9	2,3	10,5	16,5	10,5	-	6 x M10x90 - 12.9	70	29x3	420	28953*	26334*
PKH-DN32	12	136	68	29	96	78	32	40	2	13	19	12	-	6 x M12x110 - 12.9	110	34,59 x 2,62	420	59599	59600
PKH-DN40	28,5	112	56	28,5	112	95	38	47,7	2,3	16,5	25	19	36	6 x M16x120 - 12.9	300	42x3	420	28331*	31261*
PKH-DN50	38	136	68	38	136	112	48	59,8	2,3	21	31	21,5	-	6 x M20x140 - 12.9	600	54x3	420	28338*	32267*

*Article usually in stock.

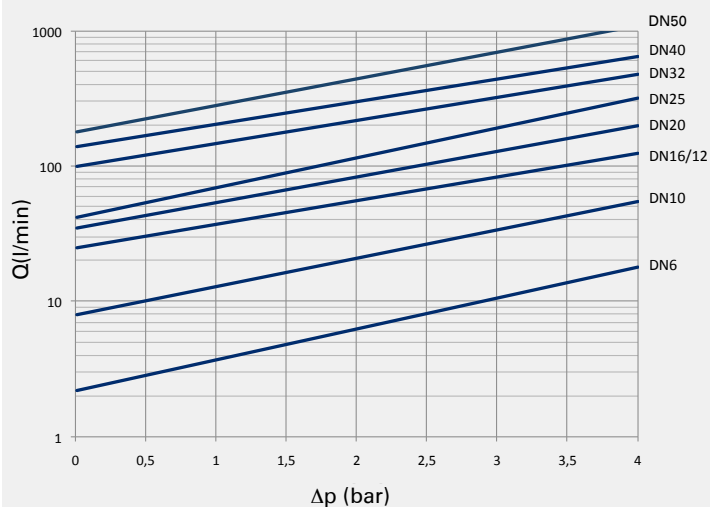
⁽¹⁾ Fixing screws not included.

We recommend screws as per ISO4762 (DIN 912).

The indicated property classes and torques represent our recommended guidelines at a friction coefficient of 14%.

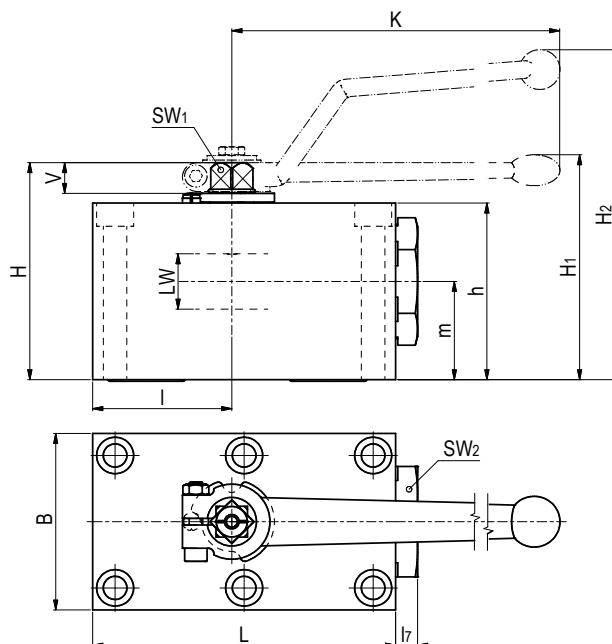
Due to material availability the material code of the steel valves may vary from 112A (or 1128). DN6=1123 (or 1125), DN32=212A (or 2128), DN40-50=812A (or 8128). Material suitability for the application does not differ from 112A (or 1128).

FLOW CHARACTERISTICS PKH



Ball valve for manifold mounting Stainless Steel

PKH



AVAILABLE SIZES

DN6 - DN50 (1/4" to 2")

ACCESSORIES ON REQUEST

- Locking devices page 225
- Actuators 220 - 221
- Position switches on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-30°C / 100°C	-20°C / 100°C

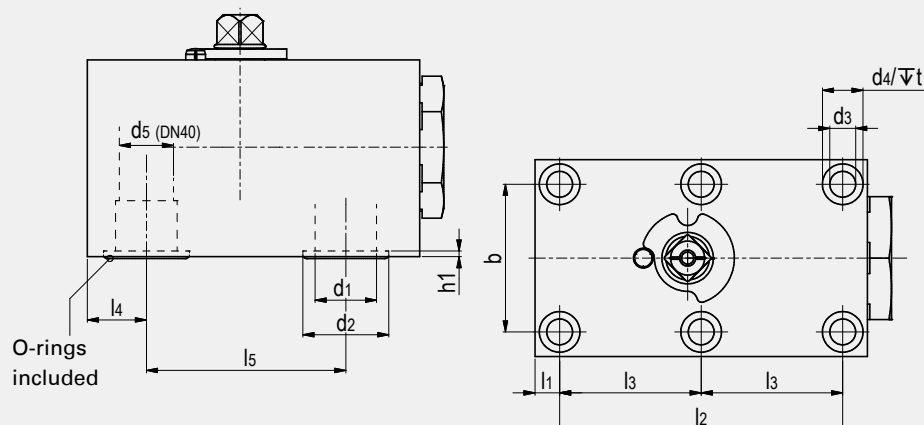
GENERAL DIMENSIONS

Type	I	L	L ₇	B	H	h	m	V	SW ₁	SW ₂	K	LW	H ₁	H ₂	Lever	Weight [Kg]
PKH-DN6	26	57	6	40	43	35	19,5	6	7	19	80	6	-	67	Zn	0,60
PKH-DN10	29	70	10	55	59	45	24,5	11	9	30	115	10	-	93	Zn	1,30
PKH-DN13	42,5	98	10	60	69	55	34	11	9	32	115	13	-	104	Zn	2,32
PKH-DN20	51	117	10	70	88	70	37,5	14	14	46	200	20	92	-	Zn	4,02
PKH-DN25	62	135	10	80	98	80	44,5	14	14	50	200	25	102	-	Zn	5,70
PKH-DN32	75	165	11	100	121	100	54,5	17	17	70	320	32	130	-	Al	11,00
PKH-DN40	84,5	200	17	130	131	110	57	17	17	80	320	38	140	-	Al	18,78
PKH-DN50	106	240	15	150	150	129	71	17	17	90	320	48	159	-	Al	29,55

Ball valve for manifold mounting Stainless Steel

PKH

CONNECTION



CONNECTION DIMENSIONS

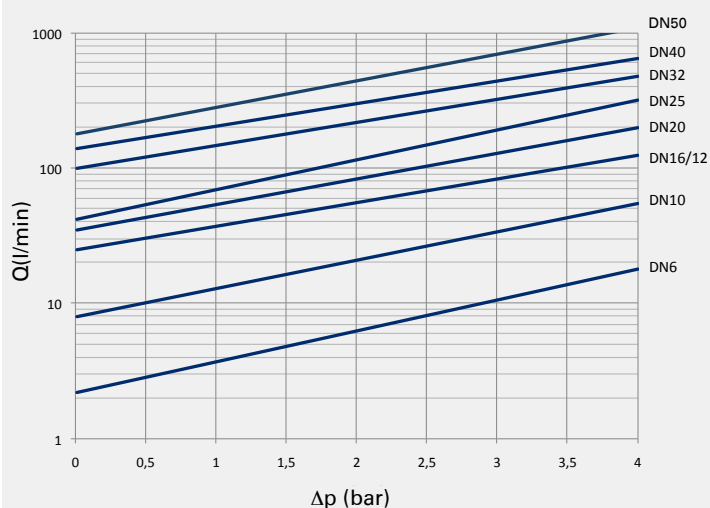
Type	l_1	l_2	l_3	l_4	l_5	b	d_1	d_2	h_1	d_3	d_4	t	d_5	Dimension of screws (min) ⁽¹⁾	Torque of screws in Nm ⁽¹⁾	O-ring	ORDER CODE PER MATERIAL COMBINATION		
																	PN [bar]	442A	4428
PKH-DN6	8,5	35	-	8,5	35	27	6	11,8	1,9	6,5	10,5	6,8	-	4 x M6x40 - 12.9	14	7x2,5	500	21337	28244
PKH-DN10	7,5	55	-	10	44	40	9,5	14,9	1,9	8,4	13,5	8,5	-	4 x M8x50 - 12.9	35	10x2,5	500	10053	29747
PKH-DN13	7,5	83	41,5	16	58	45	13	24,9	1,9	8,4	13,5	7	-	6 x M8x60 - 12.9	35	20x2,5	420	25439	18041
PKH-DN20	10	97	48,5	20	69	51	20	29	2	10,5	16,5	10,5	-	6 x M10x80 - 12.9	70	23,47x2,62	420	28598	38365
PKH-DN25	10	115	57,5	24	81	60	25	34,9	2,3	10,5	16,5	10,5	-	6 x M10x90 - 12.9	70	29x3	420	33708	32060
PKH-DN32	12	136	68	29	96	78	32	40	2	13	19	12	-	6 x M12x110 - 12.9	110	34,59 x 2,62	420	59601	59602
PKH-DN40	28,5	112	56	28,5	112	95	38	47,7	2,3	16,5	25	19	36	6 x M16x120 - 12.9	300	42x3	420	36117	38367
PKH-DN50	38	136	68	38	136	112	48	59,8	2,3	21	31	21,5	-	6 x M20x140 - 12.9	600	54x3	420	38368	38369

⁽¹⁾ Fixing screws not included.

We recommend screws as per ISO4762 (DIN 912).

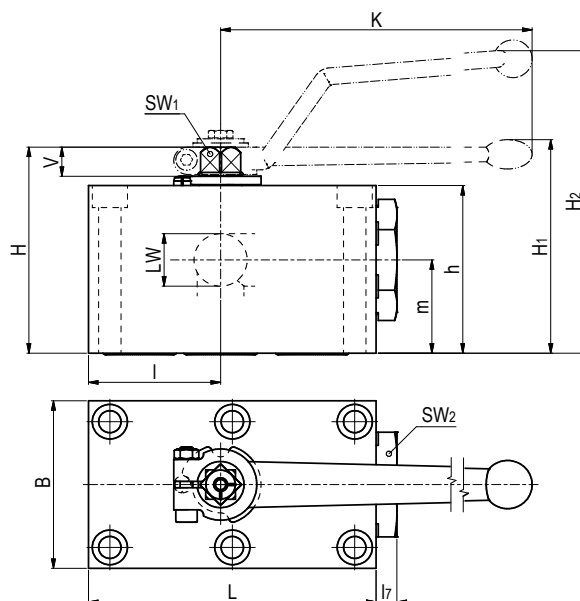
The indicated property classes and torques represent our recommended guidelines at a friction coefficient of 14%.

FLOW CHARACTERISTICS PKH



Selector ball valve for manifold mounting Steel

PK3



AVAILABLE SIZES

DN6 - DN50 (1/4" to 2")

ACCESSORIES ON REQUEST

- Locking devices page 225
- Actuators 220 - 221
- Position switches on request
- Detent on request



Pressure inlet only from center port (port 2)!

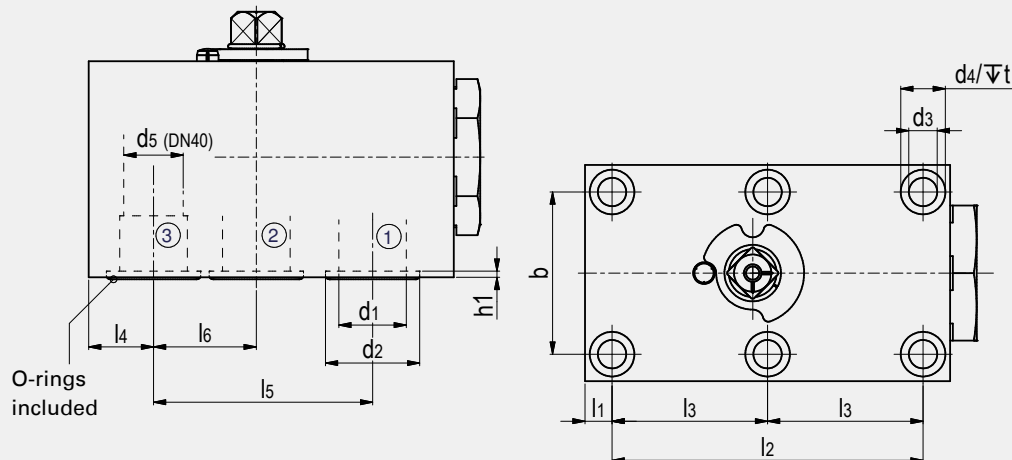
MATERIAL CODE DESCRIPTION

Materials	112A	1128
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C
Porting pattern	L=SB58	L=SB58

GENERAL DIMENSIONS

Type	L	L	L ₇	B	H	h	m	V	SW ₁	SW ₂	K	LW	H ₁	H ₂	Lever	Weight [Kg]
PK3-DN6	26	57	6	40	43	35	19,5	6	7	19	80	5	-	67	Zn	0,60
PK3-DN10	29	70	10	55	59	45	24,5	11	9	30	115	10	-	93	Zn	1,30
PK3-DN13	42,5	98	10	60	69	55	34	11	9	32	115	13	-	104	Zn	2,30
PK3-DN20	51	117	10	70	88	70	37,5	14	14	46	200	20	92	-	Zn	3,90
PK3-DN25	62	135	10	80	98	80	44,5	14	14	50	200	25	102	-	Zn	5,70
PK3-DN32	75	165	11	100	121	100	54,5	16,5	17	70	320	30	130	-	Al	11,00
PK3-DN40	84,5	200	17	130	131	110	57	16,5	17	80	320	38	140	-	Al	18,70
PK3-DN50	106	240	15	150	150	129	71	16,5	17	90	320	48	159	-	Al	28,80

CONNECTION



CONNECTION DIMENSIONS

Type	l_1	l_2	l_3	l_4	l_5	l_6	b	d_1	d_2	h_1	d_3	d_4	t	d_5	Dimension of screws (min) ⁽¹⁾	Torque of screws in Nm ⁽¹⁾	O-ring	PN [bar]	112A L=SB58	1128 L=SB58
PK3-DN6	8,5	35	-	8,5	35	17,5	27	6	11,8	1,9	6,5	10,5	6,8	-	4 x M6x40 - 12.9	14	7x2,5	500	25361	31404
PK3-DN10	7,5	55	-	10	44	19	40	9,5	14,9	1,9	8,4	13,5	8,5	-	4 x M8x50 - 12.9	35	10x2,5	500	26190	26727
PK3-DN13	7,5	83	41,5	16	58	26,5	45	13	24,9	1,9	8,4	13,5	7	-	6 x M8x60 - 12.9	35	20x2,5	420	23772	37544
PK3-DN20	10	97	48,5	20	69	31	51	20	29	2	10,5	16,5	10,5	-	6 x M10x80 - 12.9	70	23,47x2,62	420	29291	34743
PK3-DN25	10	115	57,5	24	81	38	60	25	34,9	2,3	10,5	16,5	10,5	-	6 x M10x90 - 12.9	70	29x3	420	28233	28970
PK3-DN32	12	136	68	29	96	46	78	32	40	2	13	19	12	-	6 x M12x110 - 12.9	110	34,59x2,62	420	59603	59604
PK3-DN40	28,5	112	56	28,5	112	56	95	38	47,7	2,3	16,5	25	19	36	6 x M16x120 - 12.9	300	42x3	420	33205	37546
PK3-DN50	38	136	68	38	136	68	112	48	59,8	2,3	21	31	21,5	-	6 x M20x140 - 12.9	600	54x3	420	28334	37547

⁽¹⁾ Fixing screws not included.

We recommend screws as per ISO4762 (DIN 912).

The indicated property classes and torques represent our recommended guidelines at a friction coefficient of 14%.

Due to material availability the material code of the steel valves may vary from 112A (or 1128). DN6=1123 (or 1125), DN32=212A (or 2128), DN40-50=812A (or 8128). Material suitability for the application does not differ from 112A (or 1128).

PORTING PATTERNS

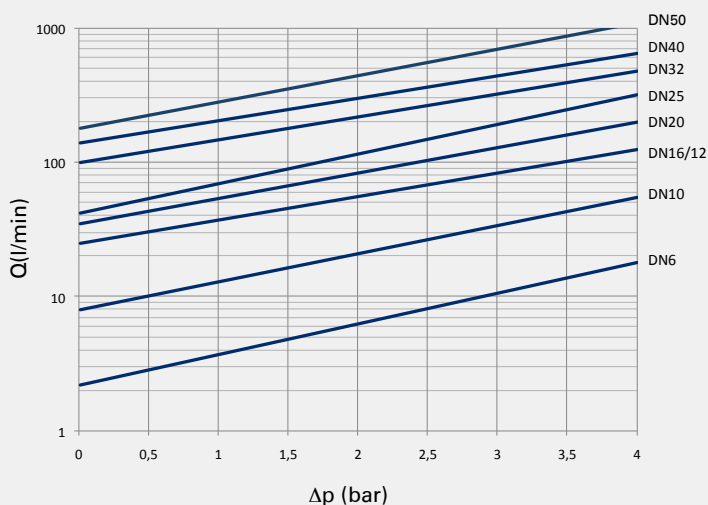


Pressure inlet only from center port (port2)!

PK3 with cross-over flow
Operation 90°
L-bore

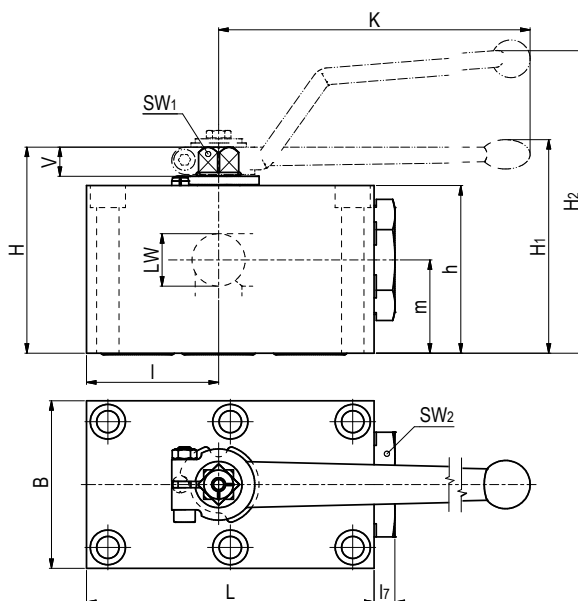
Further porting patterns
page 262 to 267

FLOW CHARACTERISTICS PK3



Selector ball valve for manifold mounting Stainless Steel

PK3



AVAILABLE SIZES

DN6 - DN50 (1/4" to 2")

ACCESSORIES ON REQUEST

- Locking devices page 225
- Actuators 220 - 221
- Position switches on request
- Detent on request



Pressure inlet only from center port (port 2)!

MATERIAL CODE DESCRIPTION

Materials	442A	4428
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-30°C / 100°C	-20°C / 100°C
Porting pattern	L=SB58	L=SB58

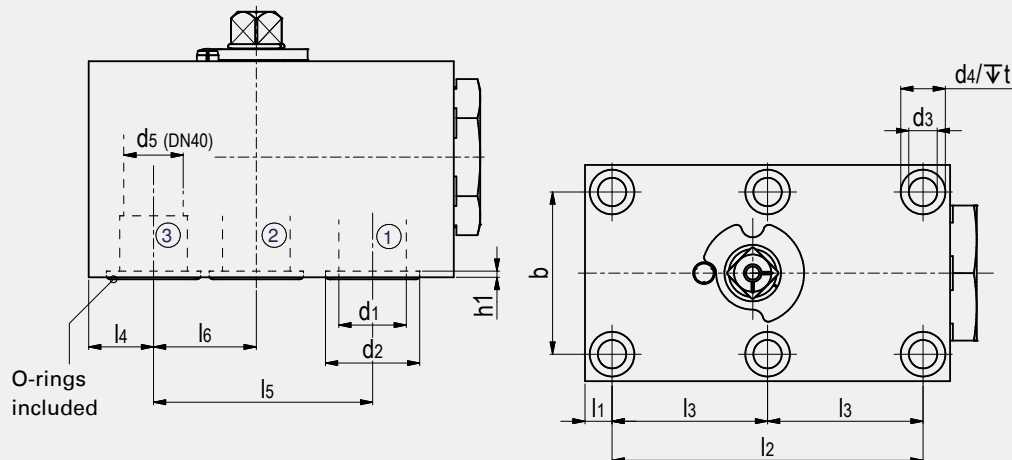
GENERAL DIMENSIONS

Type	I	L	I ₇	B	H	h	m	V	SW ₁	SW ₂	K	LW	H ₁	H ₂	Lever	Weight [Kg]
PK3-DN6	26	57	6	40	43	35	19,5	6	7	19	80	5	-	67	Zn	0,60
PK3-DN10	29	70	10	55	59	45	24,5	11	9	30	115	10	-	93	Zn	1,30
PK3-DN13	42,5	98	10	60	69	55	34	11	9	32	115	13	-	104	Zn	2,30
PK3-DN20	51	117	10	70	88	70	37,5	14	14	46	200	20	92	-	Zn	3,90
PK3-DN25	62	135	10	80	98	80	44,5	14	14	50	200	25	102	-	Zn	5,70
PK3-DN32	75	165	11	100	121	100	54,5	16,5	17	70	320	30	130	-	Al	11,00
PK3-DN40	84,5	200	17	130	131	110	57	16,5	17	80	320	38	140	-	Al	18,70
PK3-DN50	106	240	15	150	150	129	71	16,5	17	90	320	48	159	-	Al	28,80

Selector ball valve for manifold mounting Stainless Steel

PK3

CONNECTION



CONNECTION DIMENSIONS

Type	l_1	l_2	l_3	l_4	l_5	l_6	b	d_1	d_2	h_1	d_3	d_4	t	d_5	Dimension of screws (min) ⁽¹⁾	Torque of screws in Nm ⁽¹⁾	O-ring	PN [bar]	442A L=SB58	4428 L=SB58
PK3-DN6	8,5	35	-	8,5	35	17,5	27	6	11,8	1,9	6,5	10,5	6,8	-	4 x M6x40 - 12.9	14	7x2,5	500	31909	38376
PK3-DN10	7,5	55	-	10	44	19	40	9,5	14,9	1,9	8,4	13,5	8,5	-	4 x M8x50 - 12.9	35	10x2,5	500	31914	38377
PK3-DN13	7,5	83	41,5	16	58	26,5	45	13	24,9	1,9	8,4	13,5	7	-	6 x M8x60 - 12.9	35	20x2,5	420	38370	38378
PK3-DN20	10	97	48,5	20	69	31	51	20	29	2	10,5	16,5	10,5	-	6 x M10x80 - 12.9	70	23,47x2,62	420	38371	38379
PK3-DN25	10	115	57,5	24	81	38	60	25	34,9	2,3	10,5	16,5	10,5	-	6 x M10x90 - 12.9	70	29x3	420	38372	38380
PK3-DN32	12	136	68	29	96	46	78	32	40	2	13	19	12	-	6 x M12x110 - 12.9	110	34,59x2,62	420	59605	59606
PK3-DN40	28,5	112	56	28,5	112	56	95	38	47,7	2,3	16,5	25	19	36	6 x M16x120 - 12.9	300	42x3	420	38374	38382
PK3-DN50	38	136	68	38	136	68	112	48	59,8	2,3	21	31	21,5	-	6 x M20x140 - 12.9	600	54x3	420	38375	38383

⁽¹⁾ Fixing screws not included.

We recommend screws as per ISO4762 (DIN 912).

The indicated property classes and torques represent our recommended guidelines at a friction coefficient of 14%.

PORTING PATTERNS

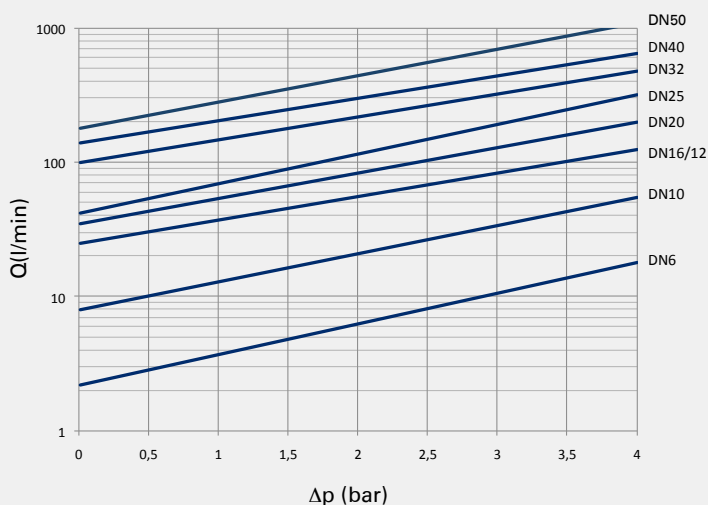


Pressure inlet only from center port (port2)!

PK3 with cross-over flow
Operation 90°
L-bore

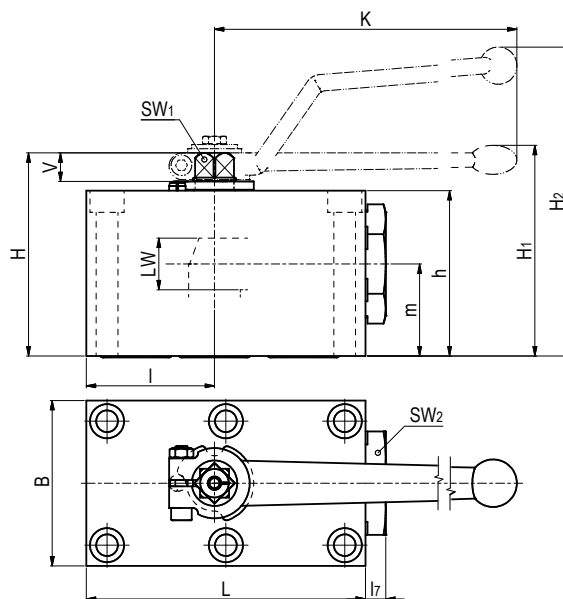
Further porting patterns
page 262 to 267

FLOW CHARACTERISTICS PK3



Selector ball valve for manifold mounting Steel

PK3-S



AVAILABLE SIZES

DN6 - DN50 (1/4" to 2")

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators page 220 - 221
- Position switches on request
- Detent on request



Pressure inlet possible from all ports! Must be operated only at $\Delta P=0\text{bar}$!

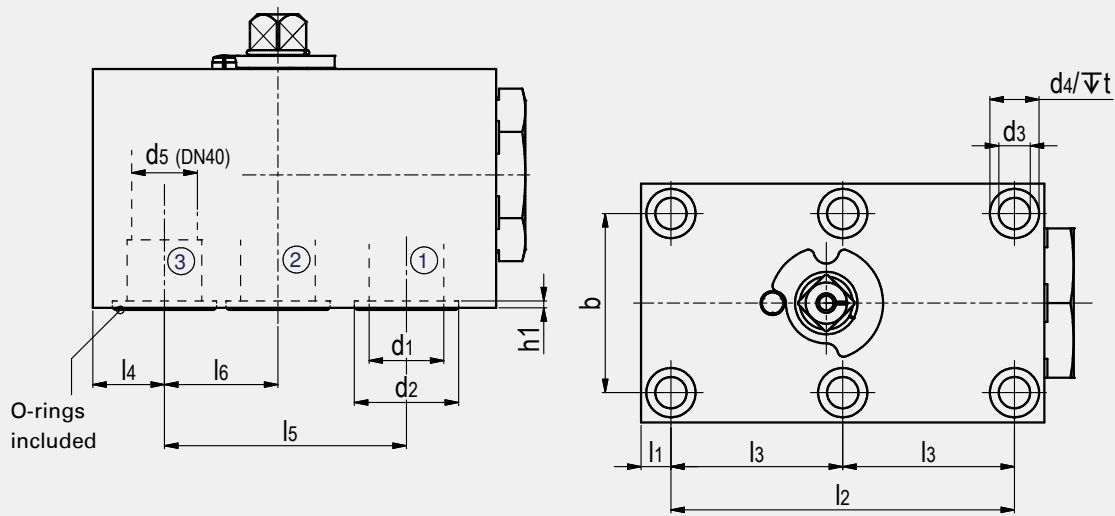
MATERIAL CODE DESCRIPTION

Materials	118A	1188
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C
Porting pattern	L=SB57	L=SB57

GENERAL DIMENSIONS

Type	I	L	L ₇	B	H	h	m	V	SW ₁	SW ₂	K	LW	H ₁	H ₂	Lever	Weight [Kg]
PK3-S-DN6	26	57	6	40	43	35	19,5	6	7	19	80	5	-	67	Zn	0,60
PK3-S-DN10	34	75	10	55	59	45	24,5	11	9	30	115	10	-	93	Zn	1,40
PK3-S-DN13	42,5	98	10	60	69	55	34	11	9	32	115	13	-	104	Zn	2,30
PK3-S-DN20	51	117	10	70	88	70	37,5	14	14	46	200	20	92	-	Zn	3,90
PK3-S-DN25	62	135	10	80	98	80	44,5	14	14	50	200	25	102	-	Zn	5,65
PK3-S-DN32	75	165	11	100	121	100	54,5	16,5	17	70	320	30	130	-	Al	11,00
PK3-S-DN40	84,5	200	17	130	131	110	57	16,5	17	80	320	38	140	-	Al	18,70
PK3-S-DN50	106	240	15	150	150	129	71	16,5	17	90	320	48	159	-	Al	28,80

CONNECTION



CONNECTION DIMENSIONS

Type	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	b	d ₁	d ₂	h ₁	d ₃	d ₄	t	d ₅	Dimension of screws (min) ⁽¹⁾	Torque of screws in Nm ⁽¹⁾	O-ring	PN [bar]	118A L=SB57	1188 L=SB57
PK3-S-DN6	8,5	35	-	8,5	35	17,5	27	6	11,8	1,9	6,5	10,5	6,8	-	4 x M6x40 - 12.9	14	7x2,5	250	26008	37548
PK3-S-DN10	12,5	55	-	15	44	19	40	9,5	14,9	1,9	8,4	13,5	8,5	-	4 x M8x50 - 12.9	35	10x2,5	500	26409	37549
PK3-S-DN13	7,5	83	41,5	16	58	26,5	45	13	24,9	1,9	8,4	13,5	7	-	6 x M8x60 - 12.9	35	20x2,5	400	36240	32019
PK3-S-DN20	10	97	48,5	20	69	31	51	20	29	2	10,5	16,5	10,5	-	6 x M10x80 - 12.9	70	23,47x2,62	315	33206	29760
PK3-S-DN25	10	115	57,5	24	81	38	60	25	34,9	2,3	10,5	16,5	10,5	-	6 x M10x90 - 12.9	70	29x3	315	26011	37553
PK3-S-DN32	12	136	68	29	96	46	78	32	40	2	13	19	12	-	6 x M12x110 - 12.9	110	34,59x2,62	420	58469	58470
PK3-S-DN40	28,5	112	56	28,5	112	56	95	38	47,7	2,3	16,5	25	19	36	6 x M16x120 - 12.9	300	42x3	420	29281	37551
PK3-S-DN50	38	136	68	38	136	68	112	48	59,8	2,3	21	31	21,5	-	6 x M20x140 - 12.9	600	54x3	420	26007	37552

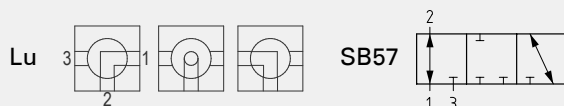
⁽¹⁾ Fixing screws not included.

We recommend screws as per ISO4762 (DIN 912).

The indicated property classes and torques represent our recommended guidelines at a friction coefficient of 14%.

Due to material availability the material code of the steel valves may vary from 118A (or 1188). DN6=1183 (or 1185), DN32-50=818A (or 8188). Material suitability for the application does not differ from 118A (or 1188).

PORTING PATTERNS

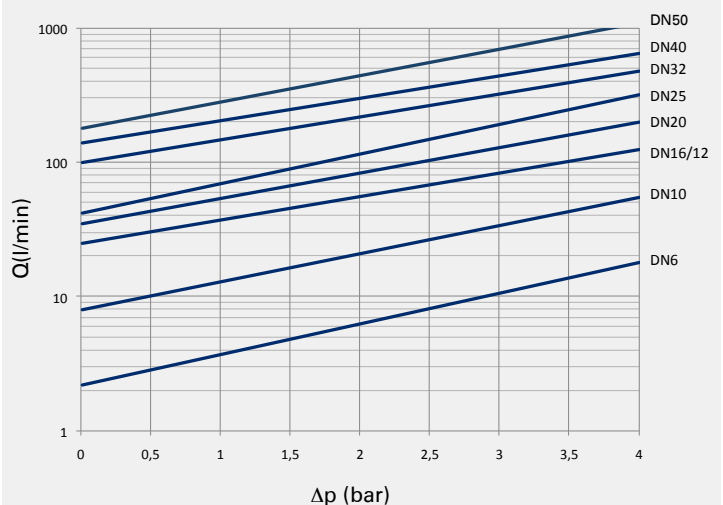


Pressure inlet possible from all ports!
Must be operated only at $\Delta P=0\text{bar}$!

PK3-S with positive overlap
Operation 180°
L-bore

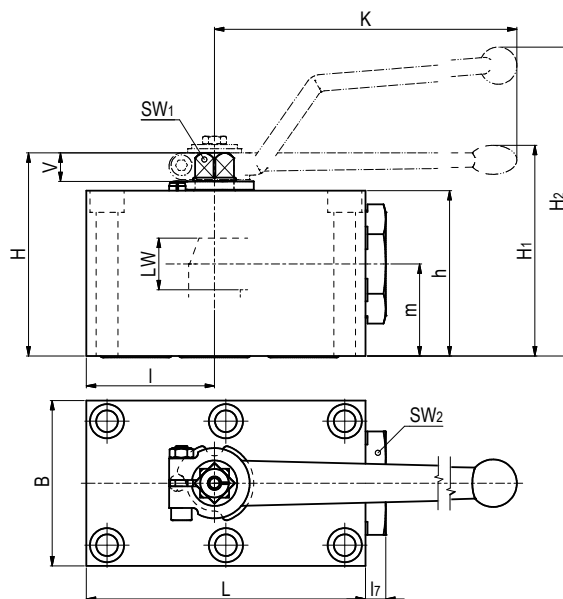
Further porting patterns
page 262 to 267

FLOW CHARACTERISTICS PK3-S



Selector ball valve for manifold mounting Stainless Steel

PK3-S



AVAILABLE SIZES

DN6 - DN50 (1/4" to 2")

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators page 220 - 221
- Position switches on request
- Detent on request



Pressure inlet possible from all ports! Must be operated only at $\Delta P=0\text{bar}$!

MATERIAL CODE DESCRIPTION

Materials	448A	4488
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-30°C / 100°C	-20°C / 100°C
Porting pattern	L=SB57	L=SB57

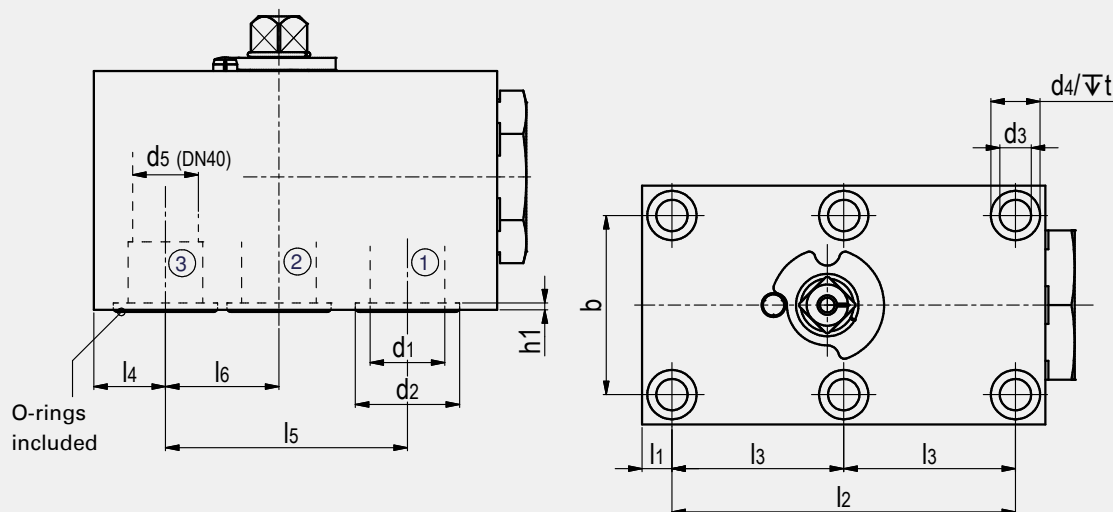
GENERAL DIMENSIONS

Type	L	L	L ₇	B	H	h	m	V	SW ₁	SW ₂	K	LW	H ₁	H ₂	Lever	Weight [Kg]
PK3-S-DN6	26	57	6	40	43	35	19,5	6	7	19	80	5	-	67	Zn	0,60
PK3-S-DN10	34	75	10	55	59	45	24,5	11	9	30	115	10	-	93	Zn	1,40
PK3-S-DN13	42,5	98	10	60	69	55	34	11	9	32	115	13	-	104	Zn	2,30
PK3-S-DN20	51	117	10	70	88	70	37,5	14	14	46	200	20	92	-	Zn	4,00
PK3-S-DN25	62	135	10	80	98	80	44,5	14	14	50	200	25	102	-	Zn	5,65
PK3-S-DN32	75	165	11	100	121	100	54,5	16,5	17	70	320	30	130	-	Al	11,00
PK3-S-DN40	84,5	200	17	130	131	110	57	16,5	17	80	320	38	140	-	Al	18,70
PK3-S-DN50	106	240	15	150	150	129	71	16,5	17	90	320	48	159	-	Al	28,80

Selector ball valve for manifold mounting Stainless Steel

PK3-S

CONNECTION



CONNECTION DIMENSIONS

Type	l_1	l_2	l_3	l_4	l_5	l_6	b	d_1	d_2	h_1	d_3	d_4	t	d_5	Dimension of screws (min) ⁽¹⁾	Torque of screws in Nm ⁽¹⁾	O-ring
PK3-S-DN6	8,5	35	-	8,5	35	17,5	27	6	11,8	1,9	6,5	10,5	6,8	-	4 x M6x40 - 12.9	14	7x2,5
PK3-S-DN10	12,5	55	-	15	44	19	40	9,5	14,9	1,9	8,4	13,5	8,5	-	4 x M8x50 - 12.9	35	10x2,5
PK3-S-DN13	7,5	83	41,5	16	58	26,5	45	13	24,9	1,9	8,4	13,5	7	-	6 x M8x60 - 12.9	35	20x2,5
PK3-S-DN20	10	97	48,5	20	69	31	51	20	29	2	10,5	16,5	10,5	-	6 x M10x80 - 12.9	70	23,47x2,62
PK3-S-DN25	10	115	57,5	24	81	38	60	25	34,9	2,3	10,5	16,5	10,5	-	6 x M10x90 - 12.9	70	29x3
PK3-S-DN32	12	136	68	29	96	46	78	32	40	2	13	19	12	-	6 x M12x110 - 12.9	110	34,59x2,62
PK3-S-DN40	28,5	112	56	28,5	112	56	95	38	47,7	2,3	16,5	25	19	36	6 x M16x120 - 12.9	300	42x3
PK3-S-DN50	38	136	68	38	136	68	112	48	59,8	2,3	21	31	21,5	-	6 x M20x140 - 12.9	600	54x3

ORDER CODE PER MATERIAL COMBINATION

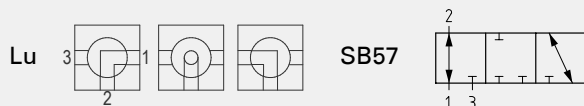
PN [bar]	448A L=SB57	4488 L=SB57
250	38384	38385
500	29414	38386
400	31544	38387
315	38388	38389
315	38390	38391
420	58473	58474
420	38394	38395
420	38396	38397

⁽¹⁾ Fixing screws not included.

We recommend screws as per ISO4762 (DIN 912).

The indicated property classes and torques represent our recommended guidelines at a friction coefficient of 14%.

PORTING PATTERNS

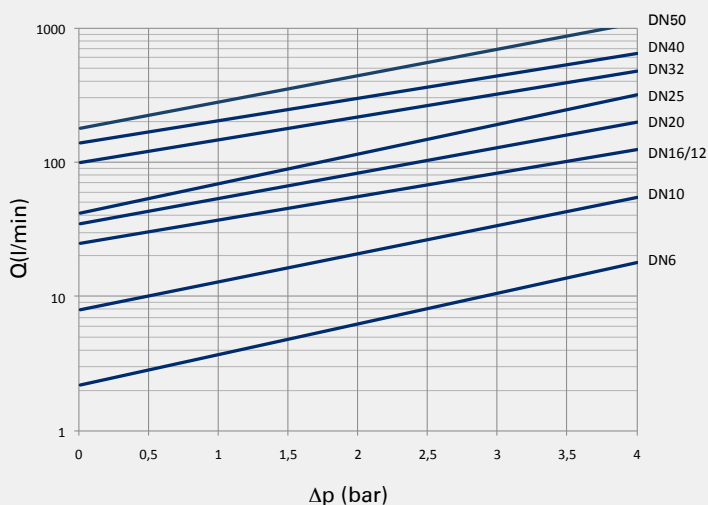


Pressure inlet possible from all ports!
Must be operated only at $\Delta P=0$ bar!

PK3-S with positive overlap
Operation 180°
L-bore

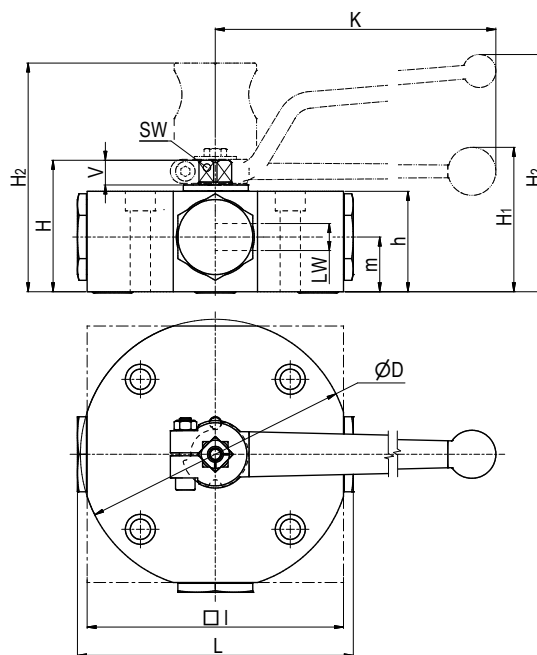
Further porting patterns
page 262 to 267

FLOW CHARACTERISTICS PK3-S



Multiway ball valve for manifold mounting Steel

MPKH3



AVAILABLE SIZES

DN6 - DN40 (1/4" to 1 1/2")

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators page 220 - 221
- Position switches on request

MATERIAL CODE DESCRIPTION

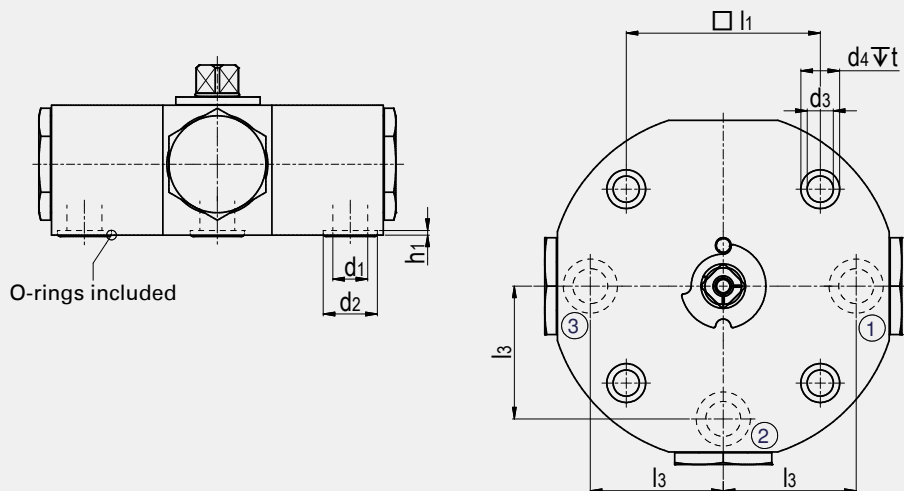
Materials	112A	112A	1128	1128
Body	Steel	Steel	Steel	Steel
Trunnion ball	Steel	Steel	Steel	Steel
Ball seats	POM	POM	POM	POM
O-rings	NBR	NBR	FPM	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C
Porting pattern	L=SB01	T=SB02	L=SB01	T=SB02

GENERAL DIMENSIONS

Type	LW _{LT}	I	L	D	H	h	m	V	SW	K	H ₁	H ₂	Lever	Weight [Kg]
MPKH3-DN6	5	90	102	-	58	40	22	13	12	160	-	101	Al	2,50
MPKH3-DN10	8	100	111	-	68	50	27	14	14	200	72	-	Zn	3,80
MPKH3-DN13	13	140	154	150	78	60	31	14	14	200	82	-	Zn	7,50
MPKH3-DN20	18	171	184	180	88	67	36,5	16,5	17	320	97	-	Al	12,50
MPKH3-DN25	23	205	225	215	96	75	40,5	16,5	17	320	106	-	Al	18,80
MPKH3-DN32	32	260	288	275	147	115	62	26	22	600	-	193	St ⁽¹⁾	49,60
MPKH3-DN40	38	301	332	315	156	125	65	25	22	600	-	204	St ⁽¹⁾	60,00

⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

CONNECTION



CONNECTION DIMENSIONS

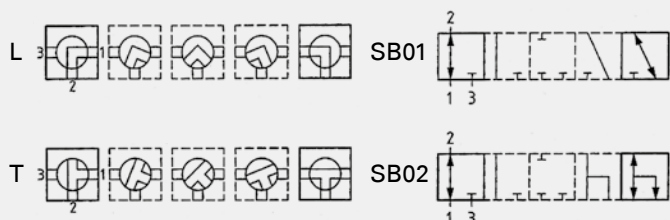
Type	l_1	l_3	d_1	d_2	h_1	O-ring	d_3	d_4	t	Dimension of screws (min)	Torque of screws in Nm
MPKH3-DN6	70	34,3	6	14	2	9x2,5	11	18	11	4 x M10 - 10.9	60
MPKH3-DN10	80	40,5	8	14,3	2	9,5x2,5	11	18	11	4 x M10 - 10.9	60
MPKH3-DN13	90	57,7	13	19,8	2	15x2,5	13,5	20	13	4 x M12 - 10.9	100
MPKH3-DN20	100	68,5	18	27,9	2,3	22x3	13,5	20	13	4 x M12 - 12.9	110
MPKH3-DN25	115	81	23	31,9	2,3	26x3	18	26	18	4 x M16 - 12.9	300
MPKH3-DN32	148,5	90	32	39,9	2,3	34x3	22	33	21,5	4 x M20 - 12.9	600
MPKH3-DN40	155,5	103	38	55,9	2,3	50x3	26	40	25,5	4 x M24 - 12.9	1000

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	112A L=SB01	112A T=SB02	1128 L=SB01	1128 T=SB02
400	02342	31340	38458	38460
315	20302	20799	38459	38461
315	18160	38453	19044	38462
250	20305	38454	19045	38463
250	20307	38455	19048	38464
250	12632	38456	19049	38465
250	12633	38457	19076	38466

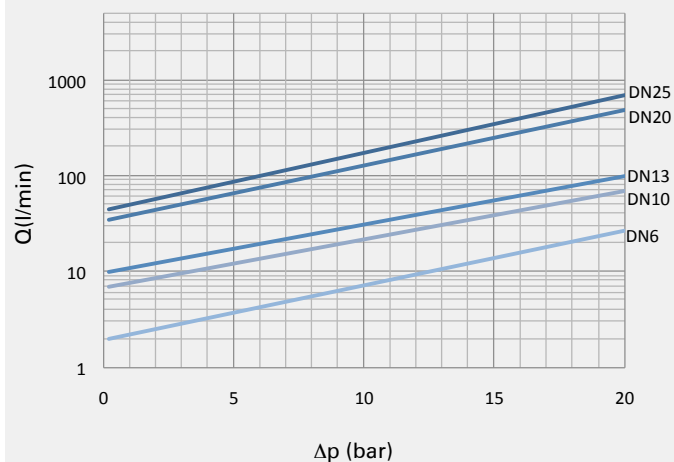
Due to material availability the material code of the steel valves may vary from 112A (or 1128). DN13-40=812A (or 8128). Material suitability for the application does not differ from 112A (or 1128).

PORTING PATTERNS



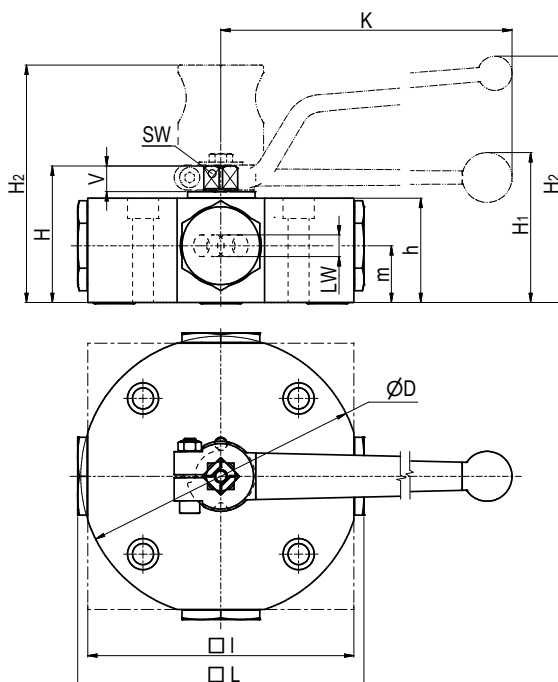
Further porting patterns page 262 to 267

FLOW CHARACTERISTICS MPKH-L



Multiway ball valve for manifold mounting Steel

MPKH4



AVAILABLE SIZES

DN6 - DN40 (1/4" to 1 1/2")

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators page 220 - 221
- Position switches on request

MATERIAL CODE DESCRIPTION

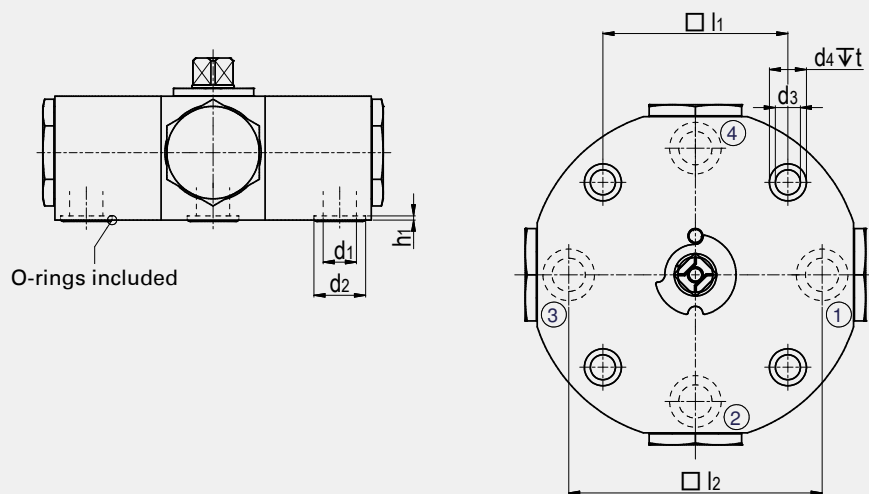
Materials	112A	112A	1128	1128
Body	Steel	Steel	Steel	Steel
Trunnion ball	Steel	Steel	Steel	Steel
Ball seats	POM	POM	POM	POM
O-rings	NBR	NBR	FPM	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C	-20°C / 100°C
Porting pattern	T=SB13	X=SB14	T=SB13	X=SB14

GENERAL DIMENSIONS

Type	LW _T	LW _x	I	L	D	H	h	m	V	SW	K	H ₁	H ₂	Lever	Weight [Kg]
MPKH4-DN6	5	4	90	102	-	58	40	22	13	12	160	-	101	Al	2,40
MPKH4-DN10	8	7	100	111	-	68	50	27	14	14	200	72	-	Zn	3,70
MPKH4-DN13	13	10	140	154	150	78	60	31	14	14	200	82	-	Zn	7,50
MPKH4-DN20	18	14	171	184	180	88	67	36,5	16,5	17	320	97	-	Al	12,00
MPKH4-DN25	23	16	205	225	215	96	75	40,5	16,5	17	320	106	-	Al	19,00
MPKH4-DN32	32	25	260	288	275	147	115	62	26	22	600	-	193	St ⁽¹⁾	56,60
MPKH4-DN40	38	32	301	332	315	156	125	65	25	22	600	-	204	St ⁽¹⁾	60,70

⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

CONNECTION



CONNECTION DIMENSIONS

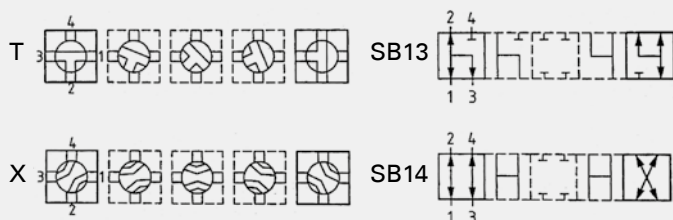
Type	l_1	l_2	d_1	d_2	h_1	O-ring	d_3	d_4	t	Dimension of screws (min)	Torque of screws in Nm
MPKH4-DN6	70	68,6	6	14	2	9x2,5	11	18	11	4 x M10 - 10.9	60
MPKH4-DN10	80	81	8	14,3	2	9,5x2,5	11	18	11	4 x M10 - 10.9	60
MPKH4-DN13	90	115,4	13	19,8	2	15x2,5	13,5	20	13	4 x M12 - 10.9	100
MPKH4-DN20	100	137	18	27,9	2,3	22x3	13,5	20	13	4 x M12 - 12.9	110
MPKH4-DN25	115	162	23	31,9	2,3	26x3	18	26	18	4 x M16 - 12.9	300
MPKH4-DN32	148,5	180	32	39,9	2,3	34x3	22	33	21,5	4 x M20 - 12.9	600
MPKH4-DN40	155,5	206	38	55,9	2,3	50x3	26	40	25,5	4 x M24 - 12.9	1000

ORDER CODE PER MATERIAL COMBINATION

PN [bar]	112A T=SB13	112A X=SB14	1128 T=SB13	1128 X=SB14
400	30629	29141	38475	35624
315	38467	29140	38476	19172
315	22200	26983	38477	38482
250	38468	38471	38478	31163
250	11603	38472	38479	38483
250	38469	38473	38480	38484
250	38470	38474	38481	38485

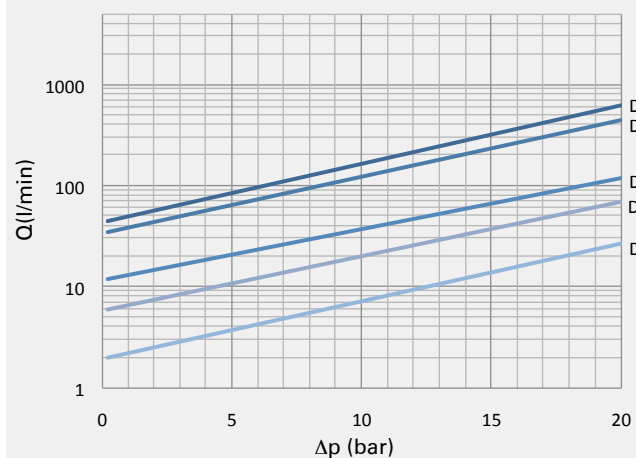
Due to material availability the material code of the steel valves may vary from 112A (or 1128). DN13-40=812A (or 8128). Material suitability for the application does not differ from 112A (or 1128).

PORTING PATTERNS



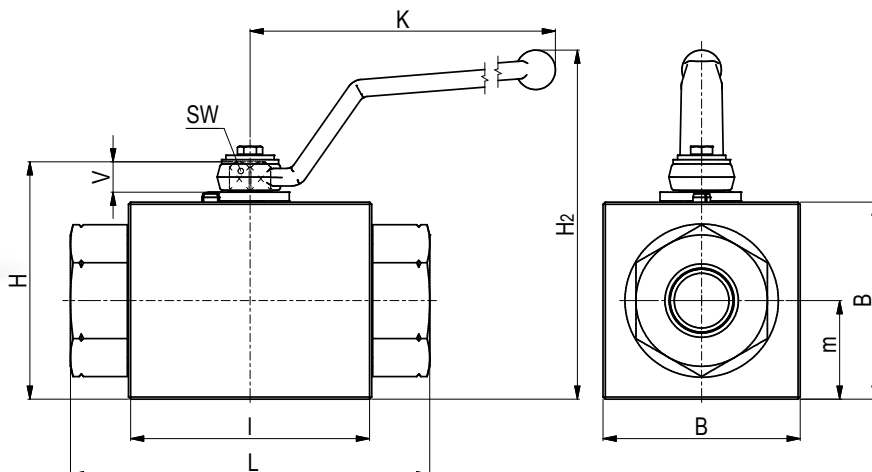
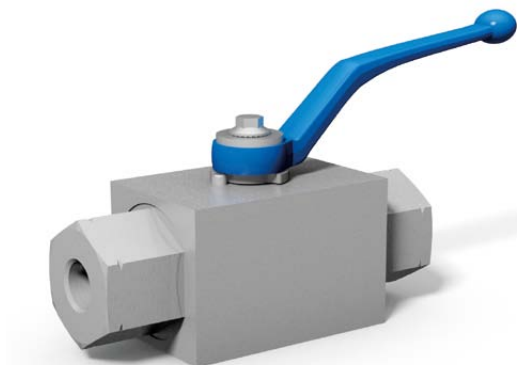
Further porting patterns page 262 to 267

FLOW CHARACTERISTICS MPKH-X/T



Highest-pressure ball valve Steel

BKHP800



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN 2353/ISO 8434-1 Heavy series, ANSI B1.20.1 NPT Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	81bA	81b8
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

Type	I	B	H	m	V	SW	K	H ₂	Lever
BKHP800-DN4	76	50	64	25	11	9	115	101	St
BKHP800-DN6	76	50	64	25	11	9	115	101	St
BKHP800-DN8	76	50	64	25	11	9	115	101	St
BKHP800-DN10	76	50	64	25	11	9	115	101	St
BKHP800-DN13	76	50	64	25	11	9	115	101	St
BKHP800-DN20	111	90	108	45	14	14	171	159	St
BKHP800-DN25	111	90	108	45	14	14	171	159	St

Highest-pressure ball valve Steel

BKHP800



CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
DIN 2353/ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	81bA	81b8
	BKHP800-DN4-8S	5	8	110	7	M 16x1,5	1,60	800	59607	59613
	BKHP800-DN6-10S	6	10	114	7,5	M 18x1,5	1,60	800	59608	59614
	BKHP800-DN8-12S	8	12	114	7,5	M 20x1,5	1,64	800	59609	59615
	BKHP800-DN10-14S	13	14	114	8	M 22x1,5	1,56	800	59610	59616
	BKHP800-DN13-16S	13	16	114	8,5	M 24x1,5	1,58	800	59611	59617
	BKHP800-DN13-20S	13	20	118	10,5	M 30x2	1,63	800	59612	59618
	BKHP800-DN20-25S	20	25	162	12	M 36x2	7,31	800	27019	59619
	BKHP800-DN25-30S	25	30	166	13,5	M 42x2	7,40	800	54861	51182

ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	81bA	81b8
	BKHP800-DN6-1/4"NPT	6	130	13,7	1/4" NPT	1,92	800	59620	59623
	BKHP800-DN10-3/8"NPT	13	130	13,5	3/8" NPT	1,85	800	59621	59624
	BKHP800-DN13-1/2"NPT	13	130	17	1/2" NPT	1,79	800	59622	59625
	BKHP800-DN20-3/4"NPT	20	161	18,3	3/4" NPT	7,83	800	48989	51181
	BKHP800-DN25-1"NPT	25	164	21,6	1" NPT	7,68	800	30785	30164

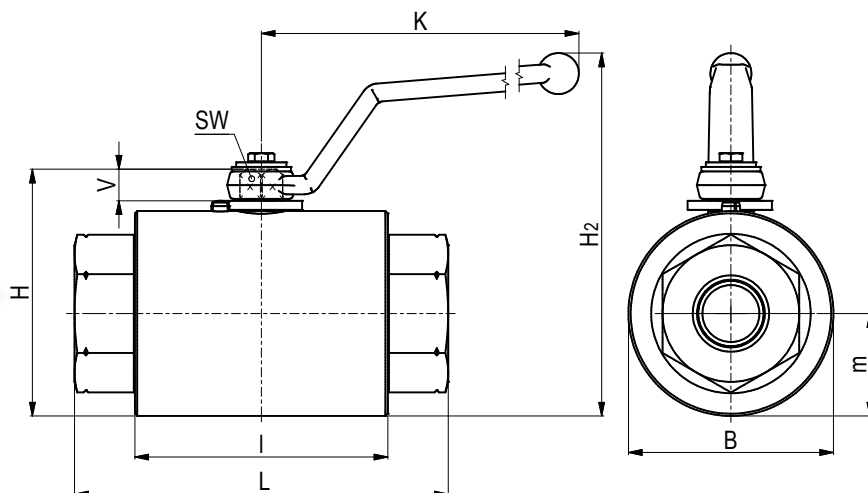
Please note the pressure ratings of the tube connections!

Available up to 2000 bar!

MHA ZENTGRAF can offer high pressure valves up to 2.000 bar (30.000 psi). Equipped with special high pressure connectors these valves are suitable for the most demanding applications.

Highest-pressure ball valve Stainless Steel

MKHP800



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN 2353/ISO 8434-1 Heavy series, ANSI B1.20.1 NPT Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Position switches on request
- Combinations on request

MATERIAL CODE DESCRIPTION

Materials	44bA	44b8
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin /Tmax	-30°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

Type	L	B	H	m	V	SW	K	H ₂	Lever
MKHP800-DN4	76	50	64	25	11	9	115	101	St
MKHP800-DN6	76	50	64	25	11	9	115	101	St
MKHP800-DN8	76	50	64	25	11	9	115	101	St
MKHP800-DN10	76	50	64	25	11	9	115	101	St
MKHP800-DN13	76	50	64	25	11	9	115	101	St
MKHP800-DN20	111	90	108	45	14	14	171	159	St
MKHP800-DN25	111	90	108	45	14	14	171	159	St

Highest-pressure ball valve Stainless Steel

MKHP800

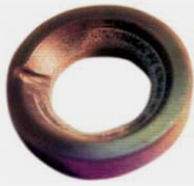


CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
DIN 2353/ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	44bA	44b8
	MKHP800-DN4-8S	5	8	110	7	M 16x1,5	1,23	800	59626	59627
	MKHP800-DN6-10S	6	10	114	7,5	M 18x1,5	1,34	800	59628	59629
	MKHP800-DN8-12S	8	12	114	7,5	M 20x1,5	1,35	800	59630	59631
	MKHP800-DN10-14S	13	14	114	8	M 22x1,5	1,28	800	59632	59633
	MKHP800-DN13-16S	13	16	114	8,5	M 24x1,5	1,27	800	59634	59636
	MKHP800-DN13-20S	13	20	118	10,5	M 30x2	1,30	800	59635	59637
	MKHP800-DN20-25S	20	25	162	12	M 36x2	5,80	800	59638	59639
	MKHP800-DN25-30S	25	30	166	13,5	M 42x2	5,80	800	59640	59641

ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	44bA	44b8
	MKHP800-DN6-1/4"NPT	6	130	13,7	1/4" NPT	1,71	800	42144	59643
	MKHP800-DN10-3/8"NPT	13	130	13,5	3/8" NPT	1,55	800	59644	59645
	MKHP800-DN13-1/2"NPT	13	130	17	1/2" NPT	1,48	800	42143	59647
	MKHP800-DN20-3/4"NPT	20	161	18,3	3/4" NPT	6,42	800	54714	59649
	MKHP800-DN25-1"NPT	25	164	21,6	1" NPT	6,40	800	28804	59650

Please note the pressure ratings of the tube connections!

Application-specific

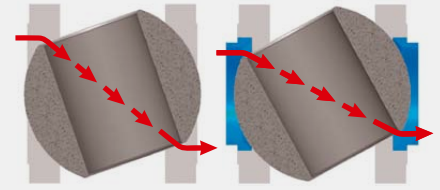


eroded ball seat

Ball seat design for gas applications

During opening gas can cause significant damage to standard ball seats through increased flow rates.

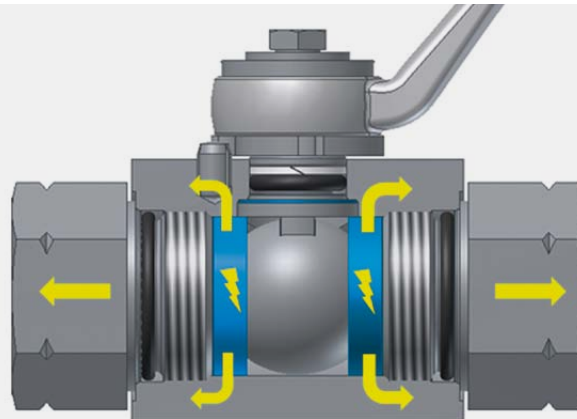
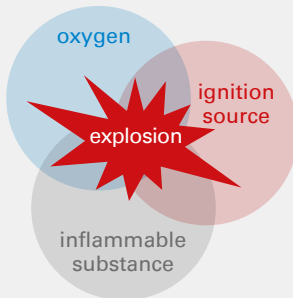
The **MHA ZENTGRAF** seat design with an inner metal ring protects the ball seat from erosion and increases the lifetime of the ball valve significantly.



standard seat design

MHA ZENTGRAF gas seat design

ATEX ball valves



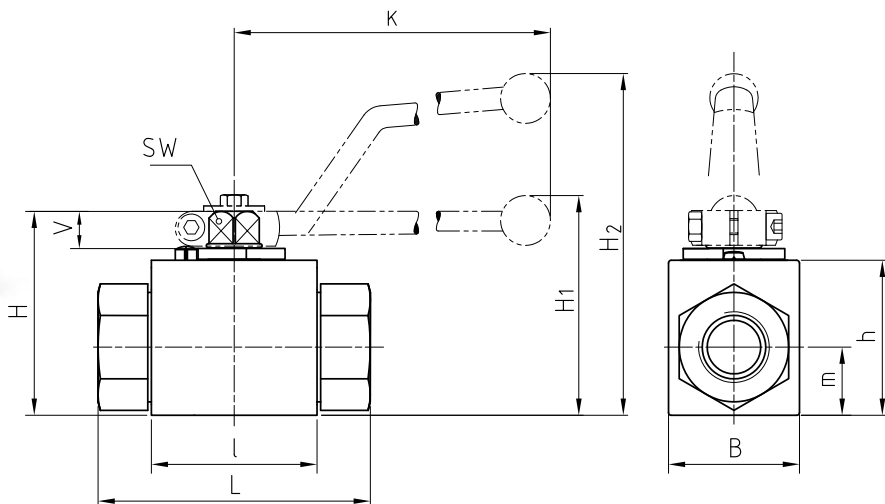
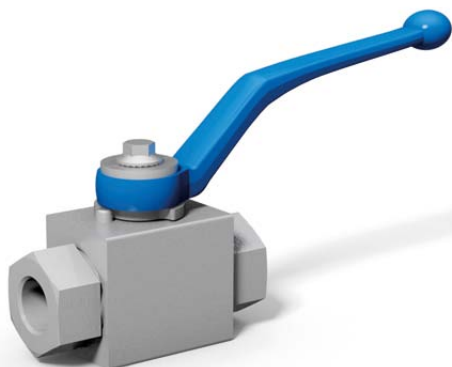
Explosions can cause loss of life and serious injuries as well as significant damage. The aim of the ATEX directive is both to apply a single level for health and safety requirements and to overcome trade barriers.

The main purpose of the ATEX directive is to minimize or completely eliminate the risk of ignition in explosive areas and to limit the harmful effects in case of an explosion. Explosive atmospheres (Ex areas) can be found where a mixture of air, flammable gases, vapors, mists or dusts are being produced, transformed or stored in the presence of oxygen. This may, for example, be the case in power plants, refineries, chemical facilities, paint facilities, air- and seaport storage tanks.

The new ATEX directive 2014/34/EU specifies some changes regarding ball valves classification.

According to that regulation ball valves are not allowed to be marked with the Ex-Symbol as they are not classified as "fast acting/shifting valves". Therefore they are said not to be affected by the ATEX directive.

Nevertheless **MHA ZENTGRAF** did a risk analysis in the past and found out that there is a risk of electrical current emerging inside the valve. Therefore **MHA ZENTGRAF** highly recommends special electrically discharging ball seats to be used for potentially explosive areas.



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	24HA	24aA
Body	Steel	Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM*	PEEK-ATEX*
O-rings	NBR	NBR
Tmin / Tmax	-30°C / 100°C	-30°C / 100°C


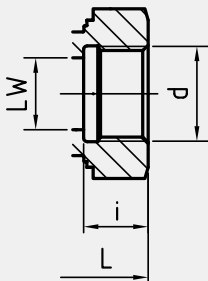

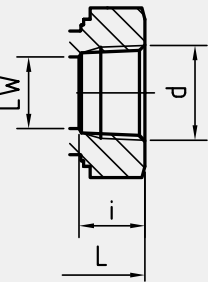

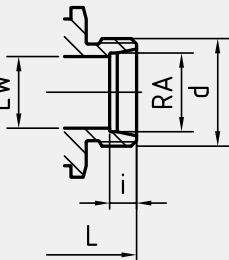
*with inner protection ring

GENERAL DIMENSIONS

Type	L	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BKH-DN4	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN6	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN8	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN10	43	32	52	38	17,5	11	9	115	-	86	Zn
BKH-DN13	48	35	54	40	19	11	9	115	-	89	Zn
BKH-DN16	48	38	63	46	19	13	12	160	-	106	Al
BKH-DN20	62	49	75	57	24,5	14	14	200	79	-	Zn
BKH-DN25	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/32	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/40	66	58	83	65	29,5	14	14	200	87	-	Zn

ATEX rating EX II 2G c


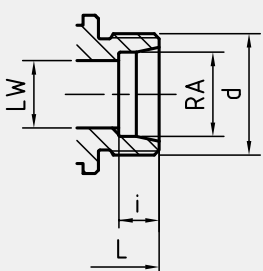



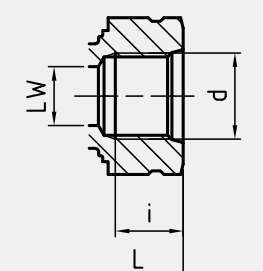
CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION			
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	24HA	24aA 	
	BKH-DN4-G1/8	5	69	10	G1/8	0,41	500	39736*	39747	
	BKH-DN6-G1/4	6	69	14	G1/4	0,40	500	31410*	39748	
	BKH-DN10-G3/8	10	72	14	G3/8	0,54	500	32446*	39749	
	BKH-DN13-G1/2	13	83	16,3	G1/2	0,65	500	30191*	39750	
	BKH-DN16-G5/8	15	83	16	G5/8	0,70	400	39742*	39753	
	BKH-DN20-G3/4	20	95	18	G3/4	1,50	350	32493*	39754	
	BKH-DN25-G1	25	113	20	G1	2,20	350	32328*	39755	
	BKH-DN25/32-G1 1/4	25	120	22	G1 1/4	2,30	350	39745*	39756	
	BKH-DN25/40-G1 1/2	25	130	24	G1 1/2	2,60	350	39746*	39757	
ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	24HA	24aA 	
	BKH-DN4-1/8"NPT	5	69	10,5	1/8"NPT	0,30	500	39774*	39782	
	BKH-DN6-1/4"NPT	6	69	13,7	1/4"NPT	0,40	500	32161*	39783	
	BKH-DN10-3/8"NPT	10	72	13,5	3/8"NPT	0,55	500	39776*	39784	
	BKH-DN13-1/2"NPT	13	83	17	1/2"NPT	0,75	500	33235*	39785	
	BKH-DN20-3/4"NPT	20	95	18,3	3/4"NPT	1,63	350	39778*	39786	
	BKH-DN25-1"NPT	25	113	21,6	1"NPT	2,30	350	34052*	39787	
	BKH-DN25/32-1 1/4"NPT	25	120	22,1	1 1/4"NPT	2,51	350	39780*	39788	
	BKH-DN25/40-1 1/2"NPT	25	130	22,1	1 1/2"NPT	2,70	250	39781*	39789	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	24HA	24aA 
	BKH-DN4-6L	5	6	67	7	M 12x1,5	0,36	500	32290*	39413
	BKH-DN6-8L	6	8	67	7	M 14x1,5	0,37	500	39402*	39414
	BKH-DN8-10L	8	10	74	7	M 16x1,5	0,38	500	33257*	39415
	BKH-DN10-12L	10	12	74	7	M 18x1,5	0,50	500	31729*	39416
	BKH-DN13-15L	13	15	82	7	M 22x1,5	0,61	500	39405*	39417
	BKH-DN13-18L	13	18	82	7,5	M 26x1,5	0,60	500	39407*	39419
	BKH-DN16-18L	15	18	82	7,5	M 26x1,5	0,75	400	39408*	39420
	BKH-DN20-22L	20	22	101	7,5	M 30x2	1,49	350	31746*	39421
	BKH-DN25-28L	25	28	108	7,5	M 36x2	2,00	350	39410*	39422
	BKH-DN25/32-35L	25	35	112	10,5	M 45x2	2,12	350	39411*	39423
	BKH-DN25/40-42L	25	42	112	11	M 52x2	2,27	315	39412*	39424

Please note the pressure ratings of the tube connections!

*Article usually in stock.



CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	24HA	24aA 
	BKH-DN4-8S	5	8	73	7	M 16x1,5	0,38	500	32201*	39703
	BKH-DN6-10S	6	10	73	7,5	M 18x1,5	0,39	500	39693*	39704
	BKH-DN8-12S	8	12	76	7,5	M 20x1,5	0,39	500	27199*	39705
	BKH-DN10-14S	10	14	80	8	M 22x1,5	0,50	500	39695*	39706
	BKH-DN13-16S	13	16	86	8,5	M 24x1,5	0,60	500	39696*	39707
	BKH-DN13-20S	13	20	90	10,5	M 30x2	0,60	500	39698*	39709
	BKH-DN16-20S	15	20	90	10,5	M 30x2	0,80	400	28960*	39710
	BKH-DN20-25S	20	25	109	12	M 36x2	1,55	350	39700*	39711
	BKH-DN25-30S	25	30	120	13,5	M 42x2	2,10	350	39701*	39712
BKH-DN25/32-38S	25	38	124	16	M 52x2	2,30	315	39702*	39713	

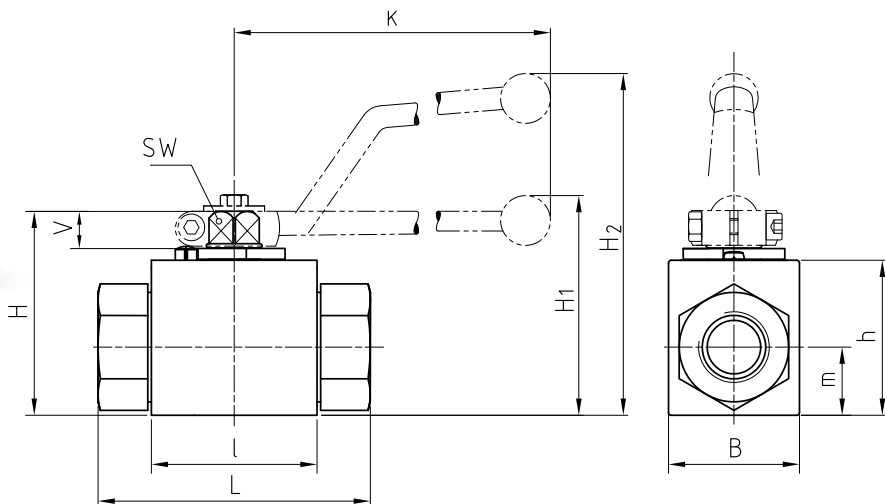
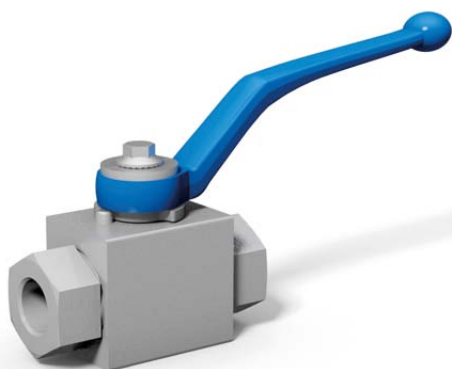
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	24HA	24aA 
	BKH-DN6-7/16" UNF	5	69	12	7/16"-20 UNF	0,39	500	39800*	39805
	BKH-DN10-9/16" UNF	10	72	13	9/16"-18 UNF	0,54	500	39801*	39806
	BKH-DN13-3/4" UNF	13	83	15	3/4"-16 UNF	0,82	500	39802*	39807
	BKH-DN20-1 1/16" UN	20	95	20	1 1/16"-12 UN	1,57	350	39803*	39808
	BKH-DN25-1 5/16" UN	25	113	20	1 5/16"-12 UN	2,30	350	39804*	39809

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Ball valve for gas Stainless Steel

BKH



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 21
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	44HA	44aA
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM*	PEEK-ATEX*
O-rings	NBR	NBR
Tmin / Tmax	-30°C / 100°C	-30°C / 100°C

*with inner protection ring

GENERAL DIMENSIONS


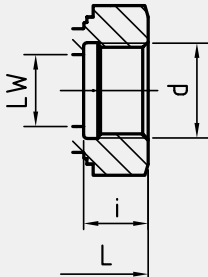

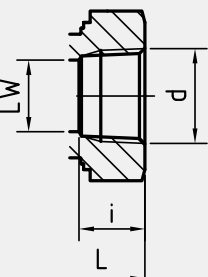

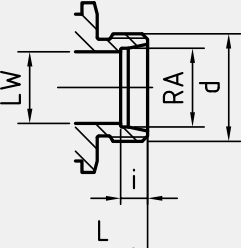
Type	L	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BKH-DN4	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN6	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN8	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN10	43	32	52	38	17,5	11	9	115	-	86	Zn
BKH-DN13	48	35	54	40	19	11	9	115	-	89	Zn
BKH-DN16	48	38	63	46	19	13	12	160	-	106	Al
BKH-DN20	62	49	75	57	24,5	14	14	200	79	-	Zn
BKHP500-DN20	82	58	83	65	32,5	14	14	200	87	-	Zn
BKH-DN25	66	58	83	65	29,5	14	14	200	87	-	Zn
BKHP500-DN25	84	70	88	70	34,5	14	14	200	92	-	Zn
BKH-DN25/32	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/40	66	58	83	65	29,5	14	14	200	87	-	Zn

ATEX rating EX II 2G c

Ball valve for gas Stainless Steel

BKH



CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION			
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	44HA	44aA 	
	BKH-DN4-G1/8	5	69	10	G1/8	0,41	500	39856*	39867	
	BKH-DN6-G1/4	6	69	14	G1/4	0,40	500	27721*	39868	
	BKH-DN10-G3/8	10	72	14	G3/8	0,56	500	35106*	39869	
	BKH-DN13-G1/2	13	83	16,3	G1/2	0,67	500	32198*	39870	
	BKH-DN16-G5/8	15	83	16	G5/8	0,83	400	39862*	39873	
	BKH-DN20-G3/4	20	95	18	G3/4	1,64	350	33236*	39874	
	BKHP500-DN20-G3/4	20	107	18	G3/4	2,60	500	56104	56105	
	BKH-DN25-G1	25	113	20	G1	2,37	350	31416*	39875	
	BKHP500-DN25-G1	25	131	20	G1	3,94	500	56107	56108	
	BKH-DN25/32-G1 1/4	25	120	22	G1 1/4	2,30	350	39865*	39876	
BKH-DN25/40-G1 1/2	25	130	24	G1 1/2	2,65	250	39866*	39877		
ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	44HA	44aA 	
	BKH-DN4-1/8"NPT	5	69	10,5	1/8"NPT	0,30	500	39878*	39886	
	BKH-DN6-1/4"NPT	6	69	13,7	1/4"NPT	0,41	500	33226*	39887	
	BKH-DN10-3/8"NPT	10	72	13,5	3/8"NPT	0,56	500	39880*	39888	
	BKH-DN13-1/2"NPT	13	83	17	1/2"NPT	0,68	500	34057*	39889	
	BKH-DN20-3/4"NPT	20	95	18,3	3/4"NPT	1,68	350	30533*	39890	
	BKHP500-DN20-3/4"NPT	20	107	18,3	3/4"NPT	2,58	500	56110	56111	
	BKH-DN25-1"NPT	25	113	21,6	1"NPT	2,37	350	39883*	39891	
	BKHP500-DN25-1"NPT	25	131	21,6	1"NPT	3,95	500	56113	56114	
	BKH-DN25/32-1 1/4"NPT	25	120	22,1	1 1/4"NPT	2,51	350	39884*	39892	
	BKH-DN25/40-1 1/2"NPT	25	130	22,1	1 1/2"NPT	2,70	250	39885*	39893	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	44HA	44aA 
	BKH-DN4-6L	5	6	67	7	M 12x1,5	0,36	500	39810*	39822
	BKH-DN6-8L	6	8	67	7	M 14x1,5	0,38	500	31028*	39823
	BKH-DN8-10L	8	10	74	7	M 16x1,5	0,38	500	36728*	39824
	BKH-DN10-12L	10	12	74	7	M 18x1,5	0,51	500	39813*	39825
	BKH-DN13-15L	13	15	82	7	M 22x1,5	0,61	500	39814*	39826
	BKH-DN13-18L	13	18	82	7,5	M 26x1,5	0,60	500	39816*	39828
	BKH-DN16-18L	15	18	82	7,5	M 26x1,5	0,75	400	39817*	39829
	BKH-DN20-22L	20	22	101	7,5	M 30x2	1,41	350	39818*	39830
	BKH-DN25-28L	25	28	108	7,5	M 36x2	2,00	350	39819*	39831
	BKH-DN25/32-35L	25	35	112	10,5	M 45x2	2,12	350	39820*	39832
	BKH-DN25/40-42L	25	42	112	11	M 52x2	2,27	350	39821*	39833

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Application-specific

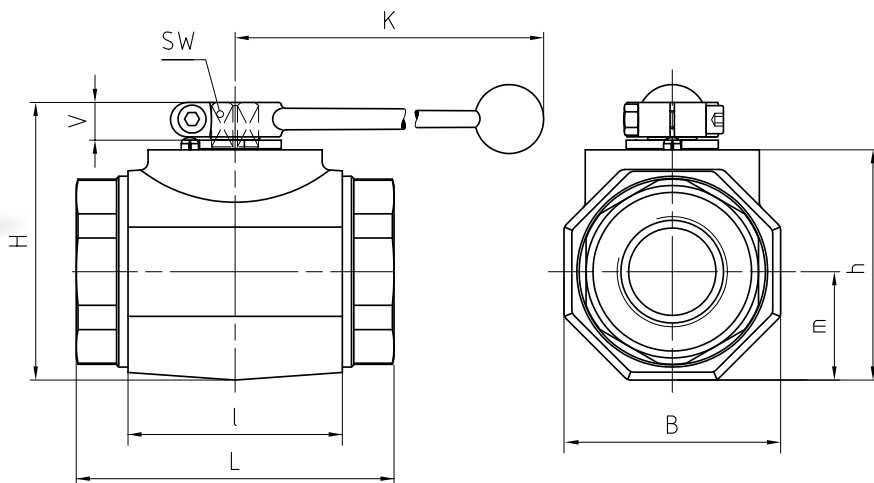
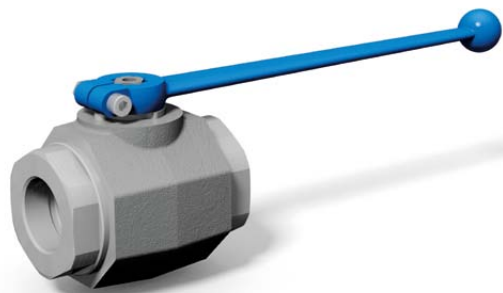


CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	44HA	44aA
	BKH-DN4-8S	5	8	73	7	M 16x1,5	0,39	500	33224*	39845
	BKH-DN6-10S	6	10	73	7,5	M 18x1,5	0,39	500	39835*	39846
	BKH-DN8-12S	8	12	76	7,5	M 20x1,5	0,39	500	32496*	39847
	BKH-DN10-14S	10	14	80	8	M 22x1,5	0,50	500	39837*	39848
	BKH-DN13-16S	13	16	86	8,5	M 24x1,5	0,63	500	29154*	39849
	BKH-DN13-20S	13	20	90	10,5	M 30x2	0,60	500	39840*	39851
	BKH-DN16-20S	15	20	90	10,5	M 30x2	0,80	400	29155*	39852
	BKH-DN20-25S	20	25	109	12	M 36x2	1,59	350	39842*	39853
	BKHP500-DN20-25S	20	25	129	12	M 36x2	2,53	500	56116	56117
	BKH-DN25-30S	25	30	120	13,5	M 42x2	2,22	350	39843*	39854
	BKHP500-DN25-30S	25	30	138	13,5	M 42x2	4,10	500	56119	56120
	BKH-DN25/32-38S	25	38	124	16	M 52x2	2,30	350	39844*	39855

SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	44HA	44aA
	BKH-DN6-7/16"UNF	5	69	12	7/16"-20 UNF	0,39	500	39894*	39899
	BKH-DN10-9/16"UNF	10	72	13	9/16"-18 UNF	0,54	500	31925*	39900
	BKH-DN13-3/4"UNF	13	83	15	3/4"-16 UNF	0,82	500	39896*	39901
	BKH-DN20-1 1/16"UN	20	95	20	1 1/16"-12 UN	1,57	350	39897*	39902
	BKHP500-DN20-1 1/16"UN	20	108	20	1 1/16"-12 UN	2,60	500	56122	56123
	BKH-DN25-1 5/16"UN	25	113	20	1 5/16"-12 UN	2,30	350	39898*	39903
	BKHP500-DN25-1 5/16"UN	25	131	20	1 5/16"-12 UN	4,10	500	56125	56127

Please note the pressure ratings of the tube connections!

*Article usually in stock.



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 24
- Position switches 228 - 229
- Combinations 188 - 189
- Detent on request

MATERIAL CODE DESCRIPTION


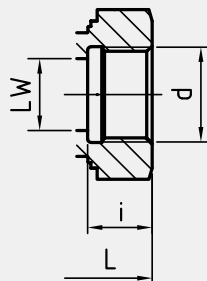
Materials	24HA	24aA	*with inner protection ring
Body	Steel	Steel	
Ball	Stainless Steel	Stainless Steel	
Stem	Stainless Steel	Stainless Steel	
Ball seats	POM*	PEEK-ATEX*	
O-rings	NBR	NBR	
Tmin / Tmax	-30°C / 100°C	-30°C / 100°C	


GENERAL DIMENSIONS


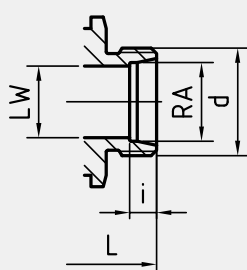
Type	L	B 8Kt	H	h	m	V	SW	K	Lever
MKHP-DN32	80	81	107	86	40,5	16,5	17	320	Al
MKHP-DN40	85	100	124	103	50	16,5	17	320	Al
MKHP-DN50	100	118	138	117	59	16,5	17	320	Al

ATEX rating EX II 2G c




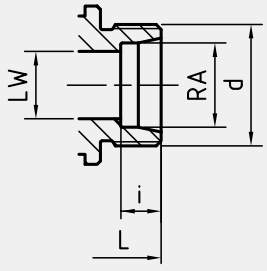

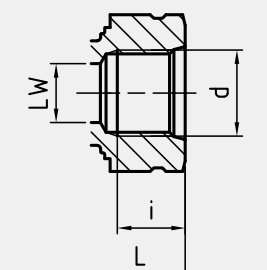
CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	24HA	24aA 
	MKHP-DN32-G1 1/4	32	111	22	G1 1/4	3,47	350	46219	39916
	MKHP-DN40-G1 1/2	38	130	24	G1 1/2	5,67	350	46220	39917
	MKHP-DN50-G2	48	140	26	G2	8,14	350	46221	39918

ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	24HA	24aA 
	MKHP-DN32-1 1/4"NPT	32	120	22,1	1 1/4"NPT	3,52	350	39924	39927
	MKHP-DN40-1 1/2"NPT	38	130	22,1	1 1/2"NPT	5,69	350	39925	39928
	MKHP-DN50-2"NPT	48	150	30,3	2"NPT	8,14	350	39926	39929

DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	24HA	24aA 
	MKHP-DN32-35L	32	35	136	10,5	M 45x2	3,58	350	39904	39906
	MKHP-DN40-42L	38	42	147	11	M 52x2	5,54	350	39905	39907

Please note the pressure ratings of the tube connections!



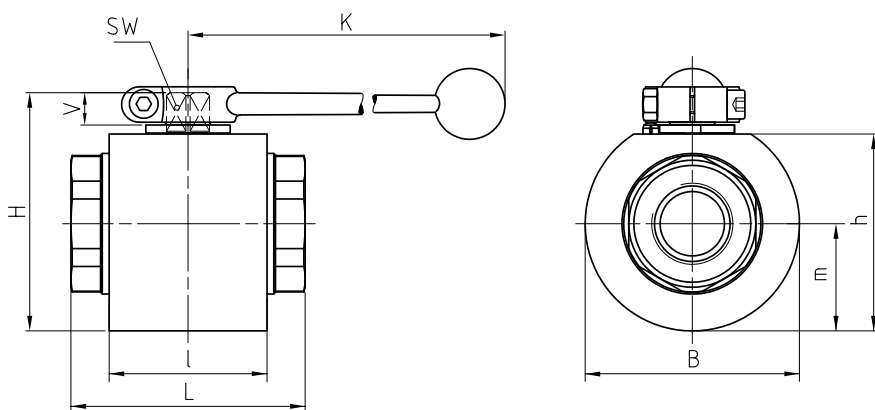
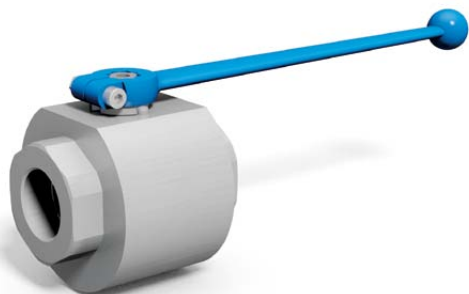
CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	24HA	24aA 
	MKHP-DN32-38S	32	38	148	16	M 52x2	3,77	350	46222	39913
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]		PN [bar]	24HA	24aA 
	MKHP-DN32-1 5/8" UN	30	111	20	1 5/8"-12 UN	3,52		350	39936	39939
	MKHP-DN40-1 7/8" UN	38	130	20	1 7/8"-12 UN	5,69		350	39937	39940
	MKHP-DN50-2-1/2" UN	45	140	20	2 1/2"-12 UN	7,99		350	39938	39941

Please note the pressure ratings of the tube connections!



Ball valve for gas Stainless Steel

MKHP



AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 28
- Position switches 228 - 229
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	44HA	44aA
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Ball seats	POM*	PEEK-ATEX*
O-rings	NBR	NBR
Tmin / Tmax	-30°C / 100°C	-30°C / 100°C

*with inner protection ring

GENERAL DIMENSIONS


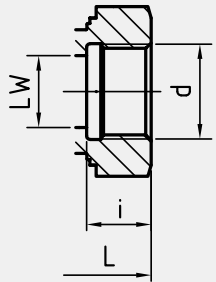
Type	I	B	H	h	m	V	SW	K	Lever
MKHP-DN32	80	109	121	100	54,5	16,5	17	320	Al
MKHP-DN40	85	124	136	115	62	16,5	17	320	Al
MKHP-DN50	101	132	145	124	66	16,5	17	320	Al


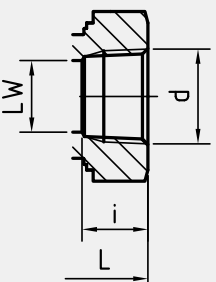
ATEX rating EX II 2G c


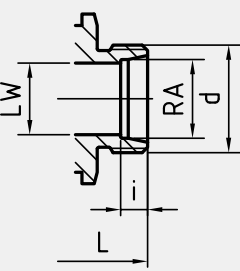
Ball valve for gas Stainless Steel

MKHP




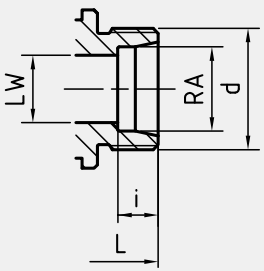

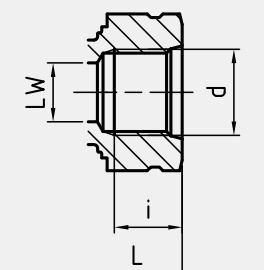
CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	44HA	44aA 
	MKHP-DN32-G1 1/4	32	111	22	G1 1/4	5,92	350	39919	39922
	MKHP-DN40-G1 1/2	38	130	24	G1 1/2	8,21	350	36150	39923
	MKHP-DN50- G2	48	140	26	G2	10,50	350	39920	39921

ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	44HA	44aA 
	MKHP-DN32-1 1/4"NPT	32	120	22,1	1 1/4"NPT	5,94	350	39930	39933
	MKHP-DN40-1 1/2"NPT	38	130	22,1	1 1/2"NPT	8,25	350	39931	39934
	MKHP-DN50-2"NPT	48	150	30,3	2"NPT	10,37	350	39932	39935

DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	44HA	44aA 
	MKHP-DN32-35L	32	35	136	10,5	M 45x2	5,82	350	39908	39910
	MKHP-DN40-42L	38	42	147	11	M 52x2	8,40	350	39909	39911

Application-specific



CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	44HA	44aA 
	MKHP-DN32-38S	32	38	148	16	M 52x2	6,13	350	39914	39915
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	LW	L	i	d		Weight [Kg]	PN [bar]	44HA	44aA 
	MKHP-DN32-1 5/8" UN	30	111	20	1 5/8"-12 UN		5,72	350	39942	39945
	MKHP-DN40-1 7/8" UN	38	130	20	1 7/8"-12 UN		8,17	350	39943	39946
	MKHP-DN50-2 1/2" UN	45	140	20	2 1/2"-12 UN		9,47	350	39944	39947

Please note the pressure ratings of the tube connections!

Ball valves for the automotive industry (paints, lacquers, isocyanate ...)



Sealing, Gluing

e.g. sheet metal overlapping for corrosion protection, windscreen, ceiling

Typical media:

- Polyurethane
- Thermoplastics (PVC, PA, PET)
- PVC, rubber

Painting

Typical requirement:

LABS-free (the valves can be specially cleaned to remove paint wetting disruptive substances)

Protection / damping

e.g. noise protection, protective undercoating

Typical media:

- Polyurethane
- Platisol
- Mastic (protective undercoating)

PUR-processing

e.g. seat padding

Typical media:

- Isocyanate (MDI, TDI)

Application-specific

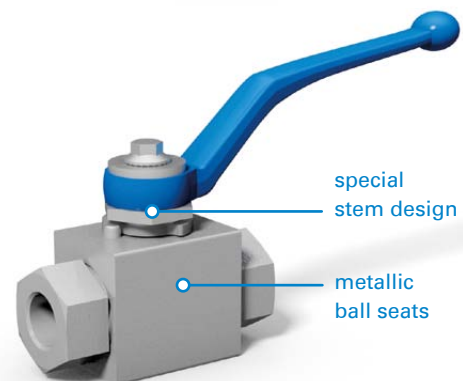
MHA ZENTGRAF offers a wide range of suitable valve setups for different automotive industry processes. In many cases highly viscous or abrasive fluids are used which provide major challenges for valve seat materials. For those media **MHA ZENTGRAF** uses metallic ball seats with a specially hardened ball to ensure a long lifetime in the process.

MHA ZENTGRAF ball valves are also available with heating devices and temperature sensors in order to keep the temperature regulated during the manufacturing process. On request the valves can be specially cleaned to remove paint wetting disruptive substances (LABS-free). Equipped with actuators and limit switches our ball valves can be integrated into any automatization concept.

Ball valves for isocyanates and abrasive media

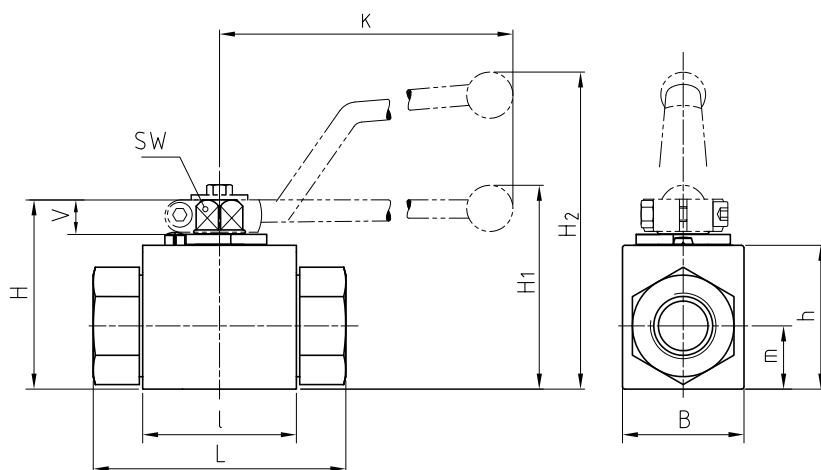
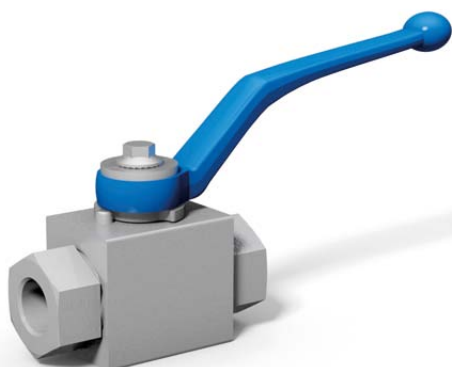
Isocyanates require a special seat setup as they react with humidity and develop crystalline particles. To prevent the fluid from coming into contact with environmental humidity, the ball valves have to be leakproof. This is ensured through a special stem setup.

Furthermore, some isocyanate types would damage standard plastic ball seats. That's why metallic ball seats are used for this application to increase the lifetime of the ball valves.



Ball valve for paints and lacquers Steel

BKH



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	11H8	12f8	1178
Body	Steel	Steel	Steel
Ball	Steel	Stainless Steel	Steel
Stem	Steel	Steel	Steel
Ball seats	POM	Cast iron	PTFE Teflon ⁽¹⁾
O-rings	FPM	FPM	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C	-20°C / 120°C

GENERAL DIMENSIONS

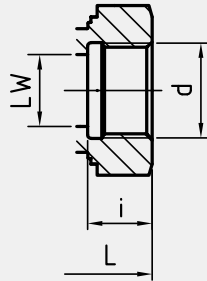
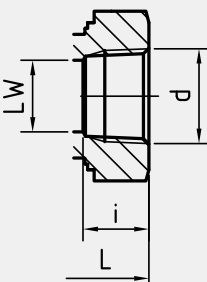
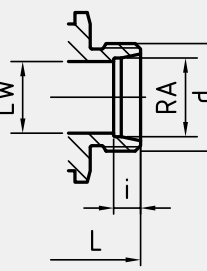
Type	L	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BKH-DN4	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN6	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN8	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN10	43	32	52	38	17,5	11	9	115	-	86	Zn
BKH-DN13	48	35	54	40	19	11	9	115	-	89	Zn
BKH-DN16	48	38	63	46	19	13	12	160	-	106	Al
BKH-DN20	62	49	75	57	24,5	14	14	200	79	-	Zn
BKH-DN25	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/32	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/40	66	58	83	65	29,5	14	14	200	87	-	Zn

⁽¹⁾ Please consider pressure reduction at higher temperatures (see technical annex page 255)

Ball valve for paints and lacquers Steel

BKH



CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION					
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	11H8	12f8	PN [bar]	1178	
	BKH-DN4-G1/8	5	69	10	G1/8	0,41	500	39863*	39987	315	39981*	
	BKH-DN6-G1/4	6	69	14	G1/4	0,40	500	30437*	39988	315	33986*	
	BKH-DN10-G3/8	10	72	14	G3/8	0,54	500	39864*	13338	315	32917*	
	BKH-DN13-G1/2	13	83	16,3	G1/2	0,65	500	39879*	15799	250	29580*	
	BKH-DN16-G5/8	15	83	16	G5/8	0,70	400	39895*	39991	175	39984*	
	BKH-DN20-G3/4	20	95	18	G3/4	1,50	350	39978*	29260	175	21585*	
	BKH-DN25-G1	25	113	20	G1	2,20	350	39979*	35557	175	22765*	
	BKH-DN25/32-G1 1/4	25	120	22	G1 1/4	2,30	350	39980*	39992	175	39985*	
	BKH-DN25/40-G1 1/2	25	130	24	G1 1/2	2,60	350	31323*	39993	175	39986*	
ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	11H8	12f8	PN [bar]	1178	
	BKH-DN4-1/8"NPT	5	69	10,5	1/8"NPT	0,30	500	39994*	40007	315	40002*	
	BKH-DN6-1/4"NPT	6	69	13,7	1/4"NPT	0,40	500	39995*	23028	315	24676*	
	BKH-DN10-3/8"NPT	10	72	13,5	3/8"NPT	0,55	500	39996*	18879	315	40003*	
	BKH-DN13-1/2"NPT	13	83	17	1/2"NPT	0,75	500	39997*	40008	250	24677*	
	BKH-DN20-3/4"NPT	20	95	18,3	3/4"NPT	1,63	350	39998*	17876	175	40004*	
	BKH-DN25-1"NPT	25	113	21,6	1"NPT	2,30	350	39999*	17877	175	27977*	
	BKH-DN25/32-1 1/4"NPT	25	120	22,1	1 1/4"NPT	2,51	350	40000*	40009	175	40005*	
	BKH-DN25/40-1 1/2"NPT	25	130	22,1	1 1/2"NPT	2,70	250	40001*	40010	175	40006*	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	11H8	12f8	PN [bar]	1178
	BKH-DN4-6L	5	6	67	7	M 12x1,5	0,36	500	39951*	39968	315	39948*
	BKH-DN6-8L	6	8	67	7	M 14x1,5	0,37	500	39952*	39969	315	39949*
	BKH-DN8-10L	8	10	74	7	M 16x1,5	0,38	500	39953*	12727	315	39950*
	BKH-DN10-12L	10	12	74	7	M 18x1,5	0,50	500	39954*	39970	315	39963*
	BKH-DN13-15L	13	15	82	7	M 22x1,5	0,61	500	39955*	12728	250	39964*
	BKH-DN13-18L	13	18	82	7,5	M 26x1,5	0,60	500	39957*	39972	250	39966*
	BKH-DN16-18L	15	18	82	7,5	M 26x1,5	0,75	400	39958*	39973	175	34383*
	BKH-DN20-22L	20	22	101	7,5	M 30x2	1,49	350	39959*	39974	175	34384*
	BKH-DN25-28L	25	28	108	7,5	M 36x2	2,00	350	39960*	39975	175	34588*
	BKH-DN25/32-35L	25	35	112	10,5	M 45x2	2,12	350	39961*	39976	175	34382*
	BKH-DN25/40-42L	25	42	112	11	M 52x2	2,27	315	39962*	39977	175	39967*

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Application-
specific

Ball valve for paints and lacquers Steel

BKH



CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION				
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	11H8	12f8	PN [bar]	1178
	BKH-DN4-8S	5	8	73	7	M 16x1,5	0,38	500	39401*	39836	315	39739*
	BKH-DN6-10S	6	10	73	7,5	M 18x1,5	0,39	500	29057*	39838	315	39740*
	BKH-DN8-12S	8	12	76	7,5	M 20x1,5	0,39	500	39403*	12730	315	24678*
	BKH-DN10-14S	10	14	80	8	M 22x1,5	0,50	500	39404*	39841	315	39743*
	BKH-DN13-16S	13	16	86	8,5	M 24x1,5	0,60	500	39409*	12729	250	39744*
	BKH-DN13-20S	13	20	90	10,5	M 30x2	0,60	500	39694*	30714	250	39777*
	BKH-DN16-20S	15	20	90	10,5	M 30x2	0,80	400	39697*	39858	175	39779*
	BKH-DN20-25S	20	25	109	12	M 36x2	1,55	350	39699*	21498	175	39811*
	BKH-DN25-30S	25	30	120	13,5	M 42x2	2,10	350	39737*	12731	175	39812*
	BKH-DN25/32-38S	25	38	124	16	M 52x2	2,30	350	39738*	39859	175	39834*

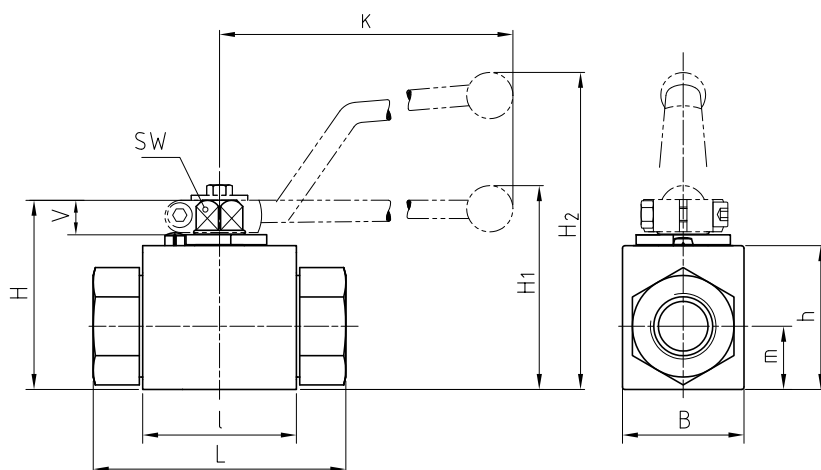
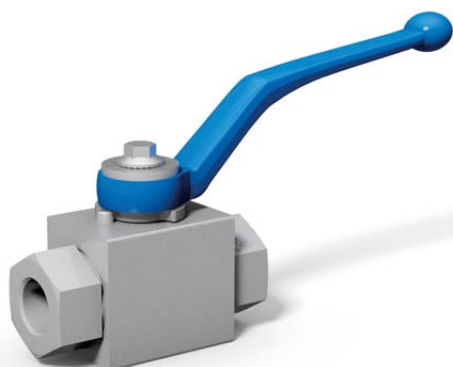
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	11H8	12f8	PN [bar]	1178
	BKH-DN6-7/16" UNF	5	69	12	7/16"-20 UNF	0,39	500	40011*	40021	315	40016*
	BKH-DN10-9/16" UNF	10	72	13	9/16"-18 UNF	0,54	500	40012*	40022	315	40017*
	BKH-DN13-3/4" UNF	13	83	15	3/4"-16 UNF	0,82	500	40013*	40023	250	40018*
	BKH-DN20-1 1/16" UN	20	95	20	1 1/16"-12 UN	1,57	350	40014*	40024	175	40019*
	BKH-DN25-1 5/16" UN	25	113	20	1 5/16"-12 UN	2,30	350	40015*	40025	175	40020*

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Ball valve for paints and lacquers Stainless Steel

BKH



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 21
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	44H8	44F8	4478
Body	Stainless Steel	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel	Stainless Steel
Ball seats	POM	Stainless Steel	PTFE Teflon ⁽¹⁾
O-rings	FPM	FPM	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C	-20°C / 200°C

GENERAL DIMENSIONS

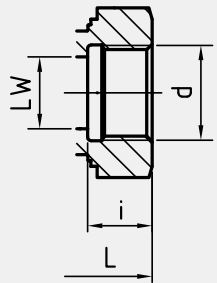
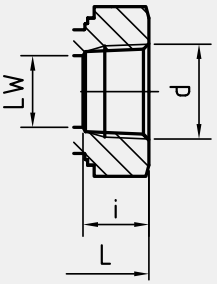
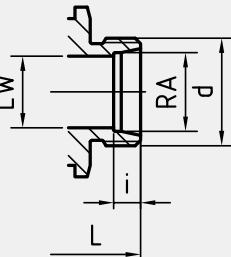
Type	L	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BKH-DN4	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN6	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN8	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN10	43	32	52	38	17,5	11	9	115	-	86	Zn
BKH-DN13	48	35	54	40	19	11	9	115	-	89	Zn
BKH-DN16	48	38	63	46	19	13	12	160	-	106	Al
BKH-DN20	62	49	75	57	24,5	14	14	200	79	-	Zn
BKH-DN25	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/32	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/40	66	58	83	65	29,5	14	14	200	87	-	Zn

⁽¹⁾ Please consider pressure reduction at higher temperatures (see technical annex page 255)

Ball valve for paints and lacquers Stainless Steel

BKH



CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION					
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	44H8	44F8	PN [bar]	4478	
	BKH-DN4-G1/8	5	69	10	G1/8	0,41	500	40088*	40106	315	32447*	
	BKH-DN6-G1/4	6	69	14	G1/4	0,40	500	40089*	40107	315	30667*	
	BKH-DN10-G3/8	10	72	14	G3/8	0,54	500	40090*	40108	315	40098*	
	BKH-DN13-G1/2	13	83	16,3	G1/2	0,65	500	32184*	34400	250	30783*	
	BKH-DN16-G5/8	15	83	16	G5/8	0,70	400	40093*	40111	175	40101*	
	BKH-DN20-G3/4	20	95	18	G3/4	1,50	350	40094*	40112	175	40102*	
	BKH-DN25-G1	25	113	20	G1	2,20	350	40095*	40113	175	40103*	
	BKH-DN25/32-G1 1/4	25	120	22	G1 1/4	2,30	350	40096*	40114	175	40104*	
	BKH-DN25/40-G1 1/2	25	130	24	G1 1/2	2,60	350	40097*	40115	175	40105*	
ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	44H8	44F8	PN [bar]	4478	
	BKH-DN4-1/8"NPT	5	69	10,5	1/8"NPT	0,30	500	40116*	40126	315	40121*	
	BKH-DN6-1/4"NPT	6	69	13,7	1/4"NPT	0,40	500	40117*	40127	315	34359*	
	BKH-DN10-3/8"NPT	10	72	13,5	3/8"NPT	0,55	500	32454*	40128	315	40122*	
	BKH-DN13-1/2"NPT	13	83	17	1/2"NPT	0,75	500	32453*	40129	250	34360*	
	BKH-DN20-3/4"NPT	20	95	18,3	3/4"NPT	1,63	350	40118*	40130	175	33958*	
	BKH-DN25-1"NPT	25	113	21,6	1"NPT	2,30	350	32455*	40131	175	40123*	
	BKH-DN25/32-1 1/4"NPT	25	120	22,1	1 1/4"NPT	2,51	350	40119*	40132	175	40124*	
	BKH-DN25/40-1 1/2"NPT	25	130	22,1	1 1/2"NPT	2,70	250	40120*	40133	175	40125*	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	44H8	44F8	PN [bar]	4478
	BKH-DN4-6L	5	6	67	7	M 12x1,5	0,36	500	40026*	40048	315	40038*
	BKH-DN6-8L	6	8	67	7	M 14x1,5	0,37	500	40027*	40049	315	40039*
	BKH-DN8-10L	8	10	74	7	M 16x1,5	0,38	500	40028*	40050	315	35926*
	BKH-DN10-12L	10	12	74	7	M 18x1,5	0,50	500	40029*	40051	315	40040*
	BKH-DN13-15L	13	15	82	7	M 22x1,5	0,61	500	40030*	40052	250	40041*
	BKH-DN13-18L	13	18	82	7,5	M 26x1,5	0,60	500	40032*	40054	250	40043*
	BKH-DN16-18L	15	18	82	7,5	M 26x1,5	0,75	400	40033*	40055	175	35925*
	BKH-DN20-22L	20	22	101	7,5	M 30x2	1,49	350	40034*	40056	175	40044*
	BKH-DN25-28L	25	28	108	7,5	M 36x2	2,00	350	40035*	40057	175	40045*
	BKH-DN25/32-35L	25	35	112	10,5	M 45x2	2,12	350	40036*	40058	175	40046*
	BKH-DN25/40-42L	25	42	112	11	M 52x2	2,27	350	40037*	40059	175	40047*

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Ball valve for paints and lacquers Stainless Steel

BKH

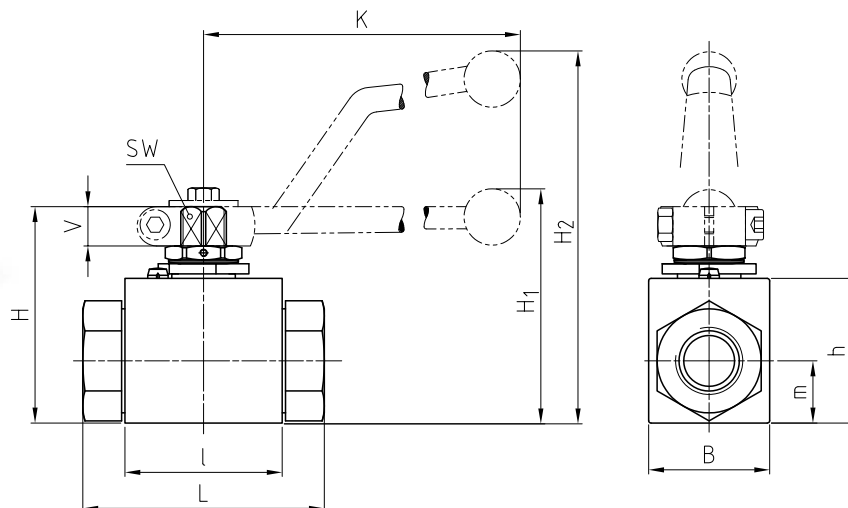
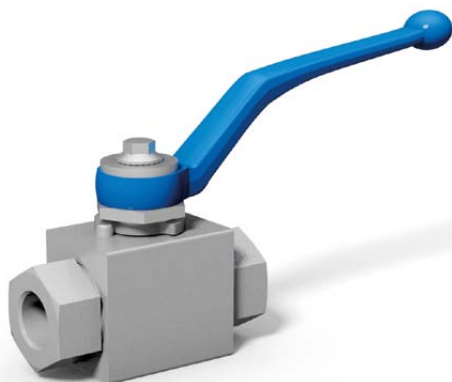


CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION				
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	44H8	44F8	PN [bar]	4478
	BKH-DN4-8S	5	8	73	7	M 16x1,5	0,38	500	40060*	40078	315	40068*
	BKH-DN6-10S	6	10	73	7,5	M 18x1,5	0,39	500	28982*	40079	315	40069*
	BKH-DN8-12S	8	12	76	7,5	M 20x1,5	0,39	500	40061*	40080	315	31258*
	BKH-DN10-14S	10	14	80	8	M 22x1,5	0,50	500	40062*	40081	315	40070*
	BKH-DN13-16S	13	16	86	8,5	M 24x1,5	0,60	500	29056*	31643	250	40071*
	BKH-DN13-20S	13	20	90	10,5	M 30x2	0,60	500	40064*	40083	250	40073*
	BKH-DN16-20S	15	20	90	10,5	M 30x2	0,80	400	33361*	40084	175	40074*
	BKH-DN20-25S	20	25	109	12	M 36x2	1,55	350	40065*	40085	175	40075*
	BKH-DN25-30S	25	30	120	13,5	M 42x2	2,10	350	40066*	40086	175	40076*
	BKH-DN25/32-38S	25	38	124	16	M 52x2	2,30	350	40067*	40087	175	40077*

SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	44H8	44F8	PN [bar]	4478
	BKH-DN6-7/16" UNF	5	69	12	7/16"-20 UNF	0,39	500	40134*	40144	315	40139*
	BKH-DN10-9/16" UNF	10	72	13	9/16"-18 UNF	0,54	500	40135*	40145	315	40140*
	BKH-DN13-3/4" UNF	13	83	15	3/4"-16 UNF	0,82	500	40136*	40146	250	40141*
	BKH-DN20-1 1/16" UN	20	95	20	1 1/16"-12 UN	1,57	350	40137*	40147	175	40142*
	BKH-DN25-1 5/16" UN	25	113	20	1 5/16"-12 UN	2,30	350	40138*	40148	175	40143*

Please note the pressure ratings of the tube connections!

*Article usually in stock.



This ball valve is equipped with a special stem sealing.
Due to this seal form a long service life can be guaranteed.

AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators page 220 - 221
- Mounting holes 17
- Position switches on request
- Combinations on request
- Detent on request

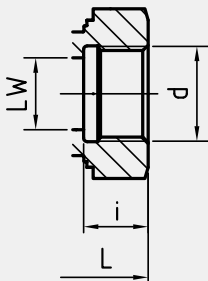
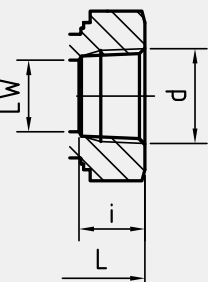
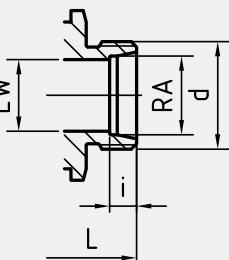
MATERIAL CODE DESCRIPTION

Materials	12f0
Body	Steel
Ball	Stainless Steel
Stem	Steel
Ball seats	Cast iron
O-rings	FPM
Tmin / Tmax	-20°C / 100°C

GENERAL DIMENSIONS

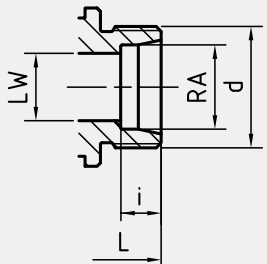
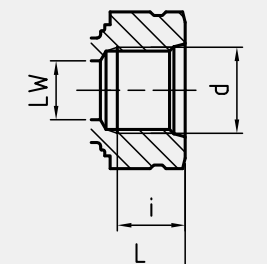
Type	L	B	H	h	m	V _{min}	SW	K	H ₁	H ₂	Lever
BKH-DN4	48	45	61	45	20,5	6,4	9	115	-	100	Zn
BKH-DN6	48	45	61	45	20,5	6,4	9	115	-	100	Zn
BKH-DN8	48	45	61	45	20,5	6,4	9	115	-	100	Zn
BKH-DN10	48	45	61	45	20,5	6,4	9	115	-	100	Zn
BKH-DN13	48	35	59	40	19	8	9	115	-	96	Zn
BKH-DN16	48	38	67	46	19	8,8	12	160	-	113	Al
BKH-DN20	62	49	85	57	24,5	15,5	14	200	86	-	Zn
BKH-DN25	66	58	93	65	29,5	15,5	14	200	94	-	Zn
BKH-DN25/32	66	58	93	65	29,5	15,5	14	200	94	-	Zn
BKH-DN25/40	66	58	93	65	29,5	15,5	14	200	94	-	Zn



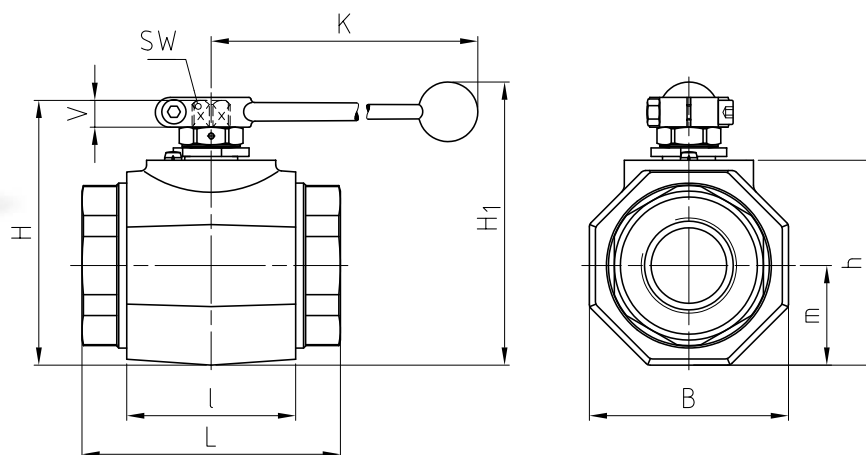
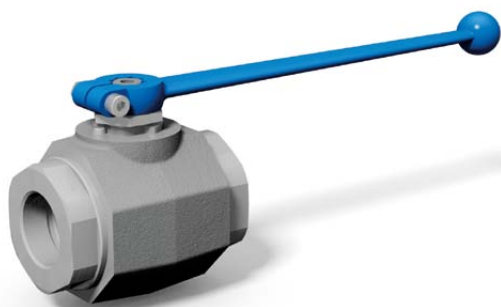
CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	12f0	
	BKH-DN4-G1/8	5	77	10	G1/8	0,41	500	39042	
	BKH-DN6-G1/4	6	77	14	G1/4	0,40	500	39043	
	BKH-DN10-G3/8	10	77	14	G3/8	0,55	500	39044	
	BKH-DN13-G1/2	13	83	16,3	G1/2	0,65	500	19173	
	BKH-DN16-G5/8	15	83	16,3	G5/8	0,70	420	39045	
	BKH-DN20-G3/4	20	95	18	G3/4	1,50	420	12265	
	BKH-DN25-G1	25	113	20	G1	2,20	350	12222	
	BKH-DN25/32-G1 1/4	25	120	22	G1 1/4	2,30	350	12266	
	BKH-DN25/40-G1 1/2	25	130	24	G1 1/2	2,60	350	39046	
ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	12f0	
	BKH-DN4-1/8"NPT	5	77	10,5	1/8"NPT	0,30	500	39047	
	BKH-DN6-1/4"NPT	6	77	13,7	1/4"NPT	0,40	500	39048	
	BKH-DN10-3/8"NPT	10	72	13,5	3/8"NPT	0,55	500	39049	
	BKH-DN13-1/2"NPT	13	83	17	1/2"NPT	0,75	500	39050	
	BKH-DN20-3/4"NPT	20	95	18,3	3/4"NPT	1,63	420	39051	
	BKH-DN25-1"NPT	25	113	21,6	1"NPT	2,30	350	39052	
	BKH-DN25/32-1 1/4"NPT	25	120	22,1	1 1/4"NPT	2,51	350	39053	
	BKH-DN25/40-1 1/2"NPT	25	130	22,1	1 1/2"NPT	2,70	250	39054	
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	12f0
	BKH-DN4-6L	5	6	75	7	M 12x1,5	0,36	500	39025
	BKH-DN6-8L	6	8	75	7	M 14x1,5	0,37	500	39026
	BKH-DN8-10L	8	10	82	7	M 16x1,5	0,38	500	39027
	BKH-DN10-12L	10	12	79	7	M 18x1,5	0,50	500	39028
	BKH-DN13-15L	13	15	82	7	M 22x1,5	0,61	500	39029
	BKH-DN16-18L	15	18	82	7,5	M 26x1,5	0,70	420	39030
	BKH-DN20-22L	20	22	101	7,5	M 30x2	1,49	420	39031
	BKH-DN25-28L	25	28	108	7,5	M 36x2	2,00	350	39032
	BKH-DN25/32-35L	25	35	112	10,5	M 45x2	2,12	350	39033
	BKH-DN25/40-42L	25	42	112	11	M 52x2	2,27	350	39034

Please note the pressure ratings of the tube connections!



CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION	
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	12f0
	BKH-DN4-8S	5	8	81	7	M 16x1,5	0,38	500	39035
	BKH-DN6-10S	6	10	81	7,5	M 18x1,5	0,39	500	39036
	BKH-DN8-12S	8	12	84	7,5	M 20x1,5	0,39	500	39037
	BKH-DN10-14S	10	14	85	8	M 22x1,5	0,50	500	39038
	BKH-DN13-16S	13	16	86	8,5	M 24x1,5	0,60	500	39039
	BKH-DN16-20S	15	20	90	10,5	M 30x2	0,80	420	39040
	BKH-DN20-25S	20	25	109	12	M 36x2	1,55	420	12220
	BKH-DN25-30S	25	30	120	13,5	M 42x2	2,10	350	12556
	BKH-DN25/32-38S	25	38	124	16	M 52x2	2,30	350	39041
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]		PN [bar]	12f0
	BKH-DN6-7/16" UNF	5	77	12	7/16"-20 UNF	0,39		500	39055
	BKH-DN10-9/16" UNF	10	77	13	9/16"-18 UNF	0,50		500	39056
	BKH-DN13-3/4" UNF	13	83	15	3/4"-16 UNF	0,60		500	39057
	BKH-DN20-1 1/16" UN	20	95	20	1 1/16"-12 UN	1,55		420	39058
	BKH-DN25-1 5/16" UN	25	113	20	1 5/16"-12 UN	2,10		350	39059

Please note the pressure ratings of the tube connections!



This ball valve is equipped with a special stem sealing.
Due to this seal form a long service life can be guaranteed.

AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators page 220 - 221
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

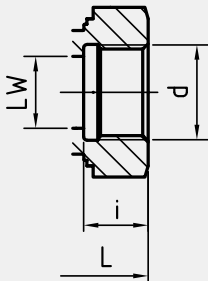
MATERIAL CODE DESCRIPTION

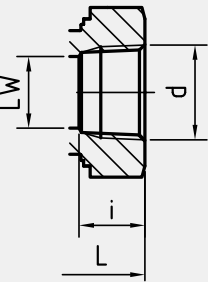
Materials	12f0
Body	Steel
Ball	Stainless Steel
Stem	Steel
Ball seats	Cast iron
O-rings	FPM
Tmin /Tmax	-20°C / 100°C

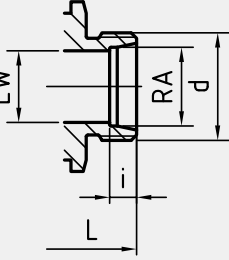
GENERAL DIMENSIONS

Type	L	B 8Kt	H	h	m	V _{min}	SW	K	H ₁	Lever
MKHP420-DN32	80	81	119	86	40,5	14,4	17	320	128	Al
MKHP420-DN40	85	100	136	103	50	14,4	17	320	145	Al
MKHP420-DN50	100	118	150	117	59	14,4	17	320	159	Al



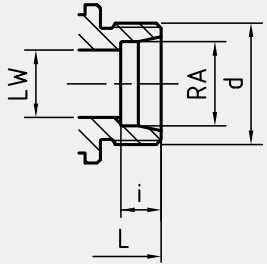
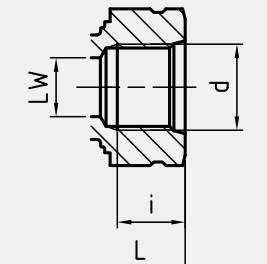
CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION	
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	12f0
	MKHP420-DN32-G1 1/4	32	111	22	G1 1/4	3,42	420	39063
	MKHP420-DN40-G1 1/2	38	130	24	G1 1/2	5,59	420	39064
	MKHP420-DN50-G2	48	140	26	G2	8,00	420	39065

ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	12f0
	MKHP420-DN32-1 1/4"NPT	32	120	22,1	1 1/4"NPT	3,52	420	39066
	MKHP420-DN40-1 1/2"NPT	38	136	22,1	1 1/2"NPT	5,69	420	39067
	MKHP420-DN50-2"NPT	48	148	30,3	2"NPT	8,00	420	39068

DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	12f0
	MKHP420-DN32-35L	32	35	136	10,5	M 45x2	3,62	420	39060
	MKHP420-DN40-42L	38	42	147	11	M 52x2	5,59	420	39061

Please note the pressure ratings of the tube connections!

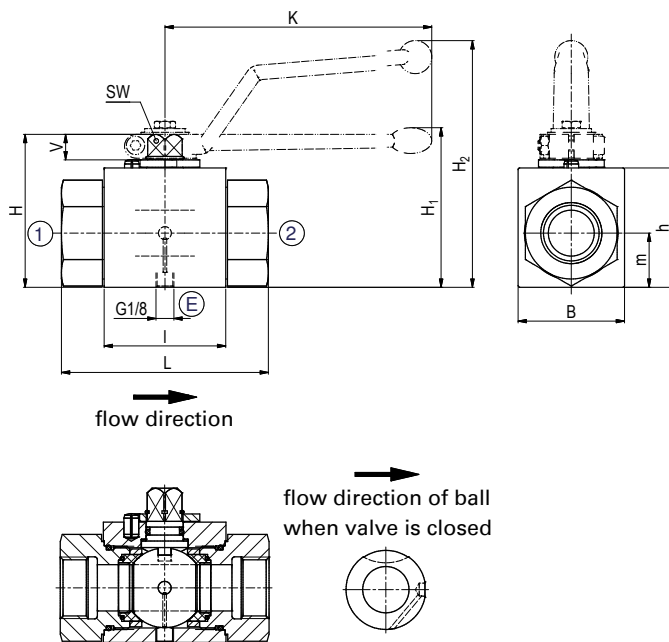
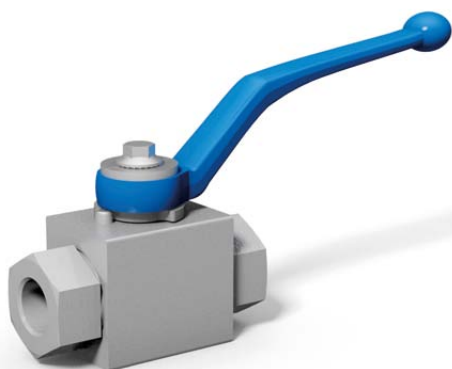


CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION	
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	12f0
	MKHP420-DN32-38S	32	38	148	16	M 52x2	3,62	420	39062
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]		PN [bar]	12f0
	MKHP420-DN32-1 5/8" UN	30	111	20	1 5/8"-12 UN	3,52		420	39069
	MKHP420-DN40-1 7/8" UN	38	130	20	1 7/8"-12 UN	5,69		420	39070
	MKHP420-DN50-1 1/2" UN	45	140	20	2 1/2"-12 UN	8,00		420	39071

Please note the pressure ratings of the tube connections!

Ball valve with venting hole Steel

BKH



AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request.

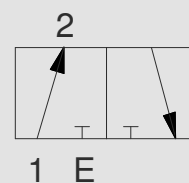
ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes 17
- Position switches 228 - 229
- Combinations 184 - 186
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	118A	1188
Body	Steel	Steel
Ball	Steel	Steel
Stem	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C

PORTING PATTERN

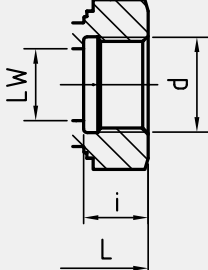


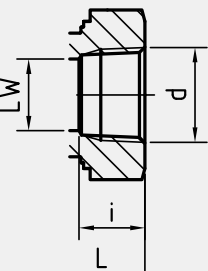
GENERAL DIMENSIONS

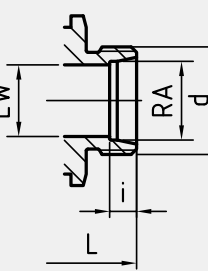
Type	L	B	H	h	m	V	SW	K	H ₁	H ₂	Lever
BKH-DN4	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN6	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN8	40	26	47	33	13,5	11	9	115	-	82	Zn
BKH-DN10	43	32	52	38	17,5	11	9	115	-	86	Zn
BKH-DN13	48	35	54	40	19	11	9	115	-	89	Zn
BKH-DN20	62	49	75	57	24,5	14	14	200	79	-	Zn
BKH-DN25	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/32	66	58	83	65	29,5	14	14	200	87	-	Zn
BKH-DN25/40	66	58	83	65	29,5	14	14	200	87	-	Zn

Ball valve with venting hole Steel

BKH

CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	118A	1188
	BKH-DN4-G1/8	5	69	10	G1/8	0,42	500	38974	38982
	BKH-DN6-G1/4	6	69	14	G1/4	0,42	500	38975	38983
	BKH-DN10-G3/8	10	72	14	G3/8	0,55	500	38976	38984
	BKH-DN13-G1/2	13	83	16,3	G1/2	0,66	500	38977	30389
	BKH-DN20-G3/4	20	95	18	G3/4	1,51	420	38978	30449
	BKH-DN25-G1	25	113	20	G1	2,21	315	38979	35266
	BKH-DN25/32-G1 1/4	25	120	22	G1 1/4	2,31	315	38980	38985
	BKH-DN25/40-G1 1/2	25	130	24	G1 1/2	2,61	315	38981	38986

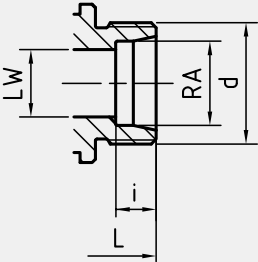
ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	118A	1188
	BKH-DN4-1/8" NPT	5	69	10,5	1/8" NPT	0,31	500	38987	38995
	BKH-DN6-1/4" NPT	6	69	13,7	1/4" NPT	0,41	500	38988	38996
	BKH-DN10-3/8" NPT	10	72	13,5	3/8" NPT	0,56	500	38989	38997
	BKH-DN13-1/2" NPT	13	83	17	1/2" NPT	0,76	500	38990	38998
	BKH-DN20-3/4" NPT	20	95	18,3	3/4" NPT	1,64	420	38991	38999
	BKH-DN25-1" NPT	25	113	21,6	1" NPT	2,31	315	38992	39000
	BKH-DN25/32-1 1/4" NPT	25	120	22,1	1 1/4" NPT	2,52	315	38993	39001
	BKH-DN25/40-1 1/2" NPT	25	130	22,1	1 1/2" NPT	2,66	250	38994	39002

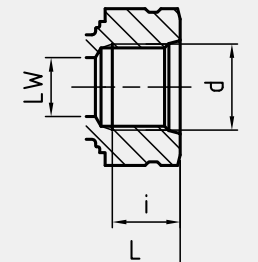
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	118A	1188
	BKH-DN4-6L	5	6	67	7	M12x1,5	0,37	500	38940	38949
	BKH-DN6-8L	6	8	67	7	M14x1,5	0,38	500	38941	38950
	BKH-DN8-10L	8	10	74	7	M16x1,5	0,39	500	38942	38951
	BKH-DN10-12L	10	12	74	7	M18x1,5	0,51	500	38943	38952
	BKH-DN13-15L	13	15	82	7	M22x1,5	0,62	500	38944	38953
	BKH-DN20-22L	20	22	101	7,5	M30x2	1,50	420	38945	38954
	BKH-DN25-28L	25	28	108	7,5	M36x2	2,10	315	38946	38955
	BKH-DN25/32-35L	25	35	112	10,5	M45x2	2,13	315	38947	38956
	BKH-DN25/40-42L	25	42	112	11	M52x2	2,28	315	38948	38957

Please note the pressure ratings of the tube connections!

Ball valve with venting hole Steel

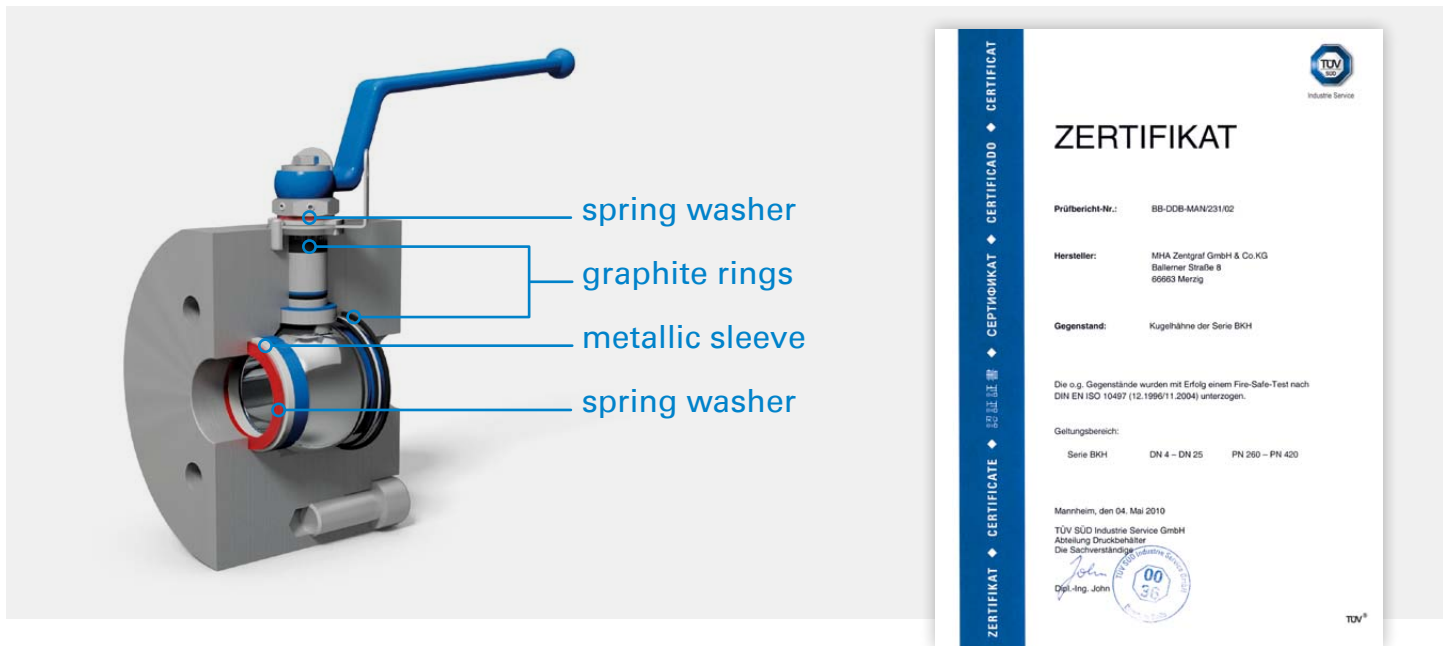
BKH

CONNECTION TYPE	DIMENSIONS							ORDER CODE PER MATERIAL COMBINATION		
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	LW	RA	L	i	d	Weight [Kg]	PN [bar]	118A	1188
	BKH-DN4-8S	5	8	73	7	M16x1,5	0,39	500	38958	38966
	BKH-DN6-10S	6	10	73	7,5	M18x1,5	0,40	500	38959	38967
	BKH-DN8-12S	8	12	76	7,5	M20x1,5	0,40	500	38960	38968
	BKH-DN10-14S	10	14	80	8	M22x1,5	0,51	500	38961	38969
	BKH-DN13-16S	13	16	86	8,5	M24x1,5	0,61	500	38962	38970
	BKH-DN20-25S	20	25	109	12	M36x2	1,56	420	38963	38971
	BKH-DN25-30S	25	30	120	13,5	M42x2	2,11	315	38964	38972
	BKH-DN25/32-38S	25	38	124	16	M52x2	2,31	315	38965	38973

SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	118A	1188
	BKH-DN6-7/16"UNF	5	69	12	7/16"-20 UNF	0,40	500	39003	39008
	BKH-DN10-9/16"UNF	10	72	13	9/16"-18 UNF	0,55	500	39004	39009
	BKH-DN13-3/4"UNF	13	83	15	3/4"-16 UNF	0,66	500	39005	39010
	BKH-DN20-1 1/16"UN	20	95	20	1 1/16"-12 UN	1,58	420	39006	39011
	BKH-DN25-1 5/16"UN	25	113	20	1 5/16"-12 UN	2,30	315	39007	39012

Please note the pressure ratings of the tube connections!

Ball valves with firesafe approval



When handling flammable liquids, safety must be a prime consideration. Great importance is therefore attributed to the design of “firesafe” shut-off valves utilized in many industrial environments including:

- Chemical and petrochemical plants
- Oil drilling and refineries
- On- /offshore installations

When fire does break out, it is important that it does not spread through failures in pipe-work systems. Even under the most extreme conditions shut-off valves must provide:

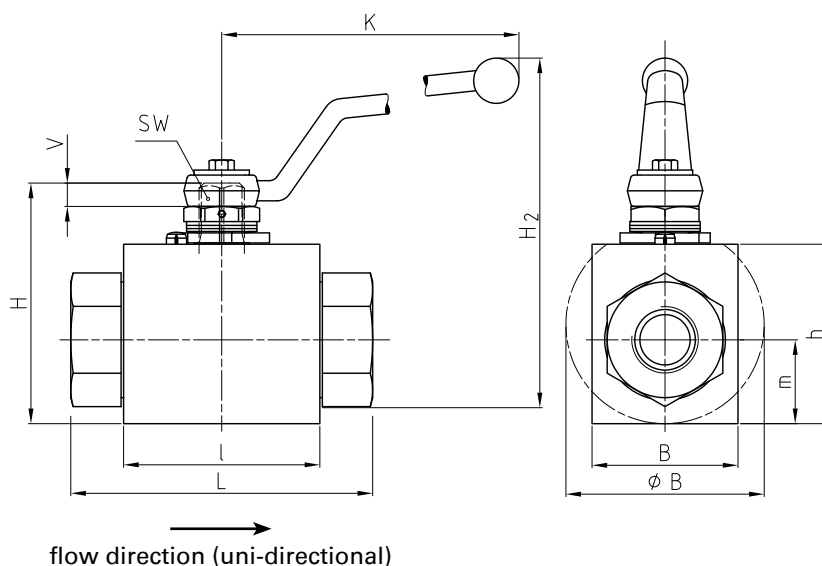
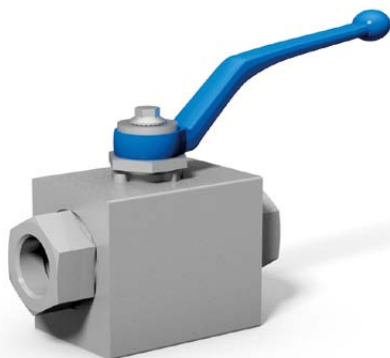
- Secure operation
- Reliable sealing in shut-off position
- Reliable sealing from ambient atmosphere

Due to their quarter turn shut-off design, our ball valves provide a solution to meet these demands. Metal seat edges at the ball seats guarantee the sealing function during and after contact with fire, even if the seals are burnt. In addition, both housings and shafts are sealed with heat-resistant seats, ensuring their continued operation.

MHA ZENTGRAF ball valves of the BKH- and KH-series have been tested successfully in accordance with firesafe standard ISO 10497. Currently **MHA ZENTGRAF** is certified for the BKH series with nominal sizes from DN 4 to DN 50 and the KH series with nominal sizes from DN 25 to DN 125, within a nominal pressure range up to PN 420 bar.

Block ball valve with fire-safe approval Stainless Steel

BKH



AVAILABLE SIZES

DN13 - DN50 (1/2" to 2")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators on request
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	44m8	44bA
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Primary ball seats	PEEK	POM
Secondary ball seats	Stainless Steel	Stainless Steel
Primary body and stem sealing	FPM	NBR
Secondary body and stem sealing	Graphite	Graphite
Tmin / Tmax	-20°C / 200°C	-30°C / 100°C

GENERAL DIMENSIONS

Type	I	B	H	h	m	V _{min}	SW	K	H ₂	Lever
< DN13 on request										
BKH-DN13	74,5	49	72	57	31,3	8	9	133	99	SS
BKH-DN20	78	70	94	70	32	9,5	14	161	127	SS
BKH-DN25	78	70	94	70	29,5	9,3	14	161	127	SS
BKH-DN32	102	Ø112	132	101,5	56	14	17	227	208	SS
BKH-DN40	97	Ø110	133	102	49	14	17	227	209	SS
BKH-DN50	101	Ø132	140	109,5	51,5	14,6	17	227	230	SS

Fire-safe approval as per BS 6755T.2, API 6 FA, ISO 10497

Block ball valve with fire-safe approval Stainless Steel

BKH



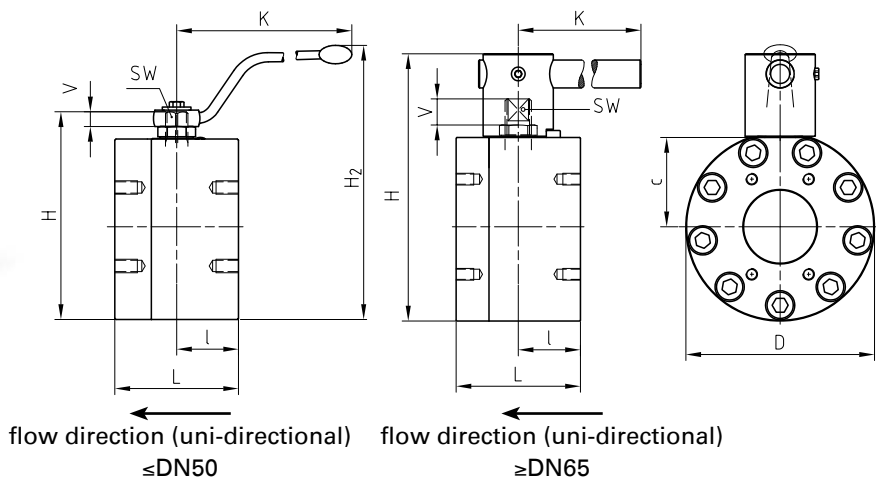
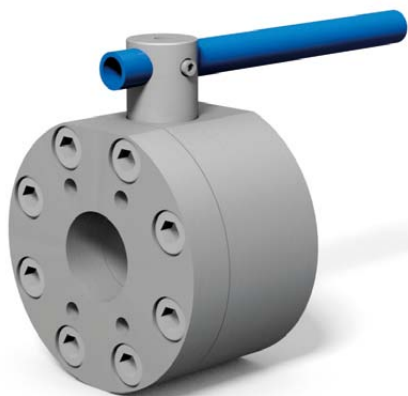
CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
DIN ISO 228 FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	44m8	44bA
	BKH-DN13-G 1/2	13	105	16,3	G 1/2	1,90	420	on request	on request
	BKH-DN20-G 3/4	20	120	18	G 3/4	3,41	420	53165	on request
	BKH-DN25-G 1	25	125	20	G 1	3,41	420	53163	on request
	BKH-DN32-G 1 1/4	32	138	22	G 1 1/4	8,00	315	53431	50921
	BKH-DN40-G 1 1/2	38	150	24	G 1 1/2	7,80	315	53455	-
	BKH-DN50-G 2	48	160	26	G 2	9,00	315	53432	53447
ANSI B1.20.1 NPT FEMALE THREAD	Type	LW	L	i	d	Weight [Kg]	PN [bar]	44m8	44bA
	BKH-DN13-1/2" NPT	13	105	17	1/2" NPT	1,90	420	on request	on request
	BKH-DN20-3/4" NPT	20	120	18,3	3/4" NPT	3,41	420	54291	on request
	BKH-DN25-1" NPT	25	125	21,6	1" NPT	3,41	420	54292	33864
	BKH-DN32-1 1/4" NPT	32	138	22,1	1 1/4" NPT	8,10	315	53434	48457
	BKH-DN40-1 1/2" NPT	38	150	22,1	1 1/2" NPT	7,90	315	53435	-
	BKH-DN50-2" NPT	48	160	30,3	2" NPT	9,10	315	53436	53448

Please note the pressure ratings of the tube connections!

Application-specific

Flange ball valve with fire-safe approval Stainless Steel

KH-SAE



AVAILABLE SIZES

DN25 - DN125 (1" to 5")

CONNECTIONS

ISO 6162-1, ISO 6162-2 (single flange pattern), others on request

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators on request
- Mounting holes on request
- Position switches on request
- Combinations on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	44m8	44bA
Body	Stainless Steel	Stainless Steel
Ball	Stainless Steel	Stainless Steel
Stem	Stainless Steel	Stainless Steel
Primary all seats	PEEK	POM
Secondary ball seats	Stainless Steel	Stainless Steel
Primary body and stem sealing	FPM	NBR
Secondary body and stem sealing	Graphite	Graphite
Tmin / Tmax	-20°C / 200°C	-30°C / 100°C

GENERAL DIMENSIONS

Type	LW	L	I	D	H	c	V _{min}	SW	K	H ₂	Lever
KH-DN25	25	115	49	120	133	50	11	14	160	170	SS
KH-DN32	32	120	54	148	174	68	14	17	227	248	SS
KH-DN40	38	130	55	175	197	79	14,4	17	227	273	SS
KH-DN50	48	140	65	198	220	94	10,1	17	227	299	SS
KH-DN65	64	187	85	224	318	108	16,5	22	600	-	SS ⁽¹⁾
KH-DN80	76/72	200	98	280	365	129	19,1	22	600	-	SS ⁽¹⁾
KH-DN100	on request										SS ⁽¹⁾
KH-DN125	on request										SS ⁽¹⁾

Fire-safe approval as per BS 6755T.2, API 6 FA, ISO 10497

⁽¹⁾ Lever must be fixed centrally during operation. In case of vibration the handle may otherwise operate the valve by itself.

Flange ball valve with fire-safe approval Stainless Steel

KH-SAE

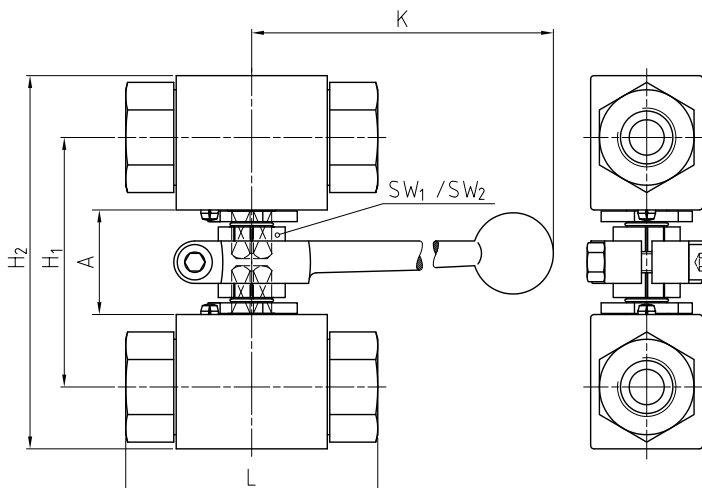
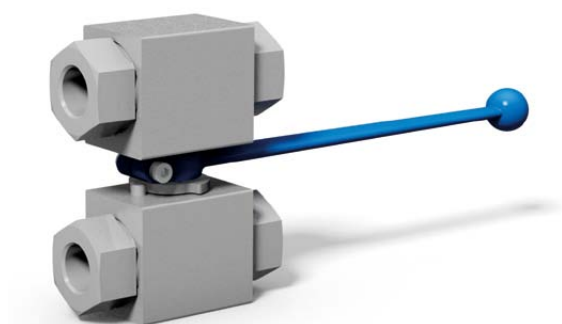


CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1 (single flange pattern)	Type	a	b	M	t	Weight [Kg]	PN [bar]	44m8	44bA
	KH-DN25-SAE210	52,4	26,2	M10	20	9,60	320	53437	53449
	KH-DN32-SAE210	30,2	58,7	M10	21	16,00	280	53439	53162
	KH-DN40-SAE210	35,7	69,9	M12	21	23,00	210	53441	-
	KH-DN50-SAE210	42,9	77,8	M12	21	31,10	210	53443	53451
	KH-DN65-SAE210	50,8	88,9	M12	23	57,00	175	53445	53453
	KH-DN80-SAE210	61,9	106,4	M16	24	93,00	160	53446	53454
	KH-DN100-SAE210	on request					on request		
	KH-DN125-SAE210	on request					on request		

CONNECTION TYPE	DIMENSIONS						ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-2 (single flange pattern)	Type	a	b	M	t	Weight [Kg]	PN [bar]	44m8	44bA
	KH-DN25-SAE420	27,8	57,2	M12	20	9,60	420	53438	53450
	KH-DN32-SAE420	31,8	66,7	M12	21	16,00	420	53440	53151
	KH-DN40-SAE420	36,5	79,4	M16	27	23,00	420	53442	-
	KH-DN50-SAE420	44,5	96,8	M20	28	31,10	420	53444	53452

Application-specific

Please note the pressure ratings of the connection flanges!



Detailed dimensions:
Catalog page 14 to 16

SW₁: Wrench size of stem
SW₂: Wrench size of lever

AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators on request
- Mounting holes on request
- Position switches on request

MATERIAL CODE DESCRIPTION

Materials	112A
Body	Steel
Ball	Steel
Stem	Steel
Ball seats	POM
O-rings	NBR
Tmin /Tmax	-20°C / 100°C

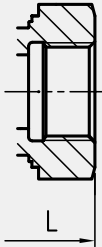
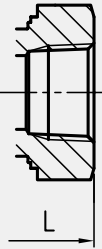

GENERAL DIMENSIONS

Type	SW ₁	SW ₂	A	H ₁	H ₂	K	Lever
BKH-DN4	9	14	30	69	96	200	Zn
BKH-DN6	9	14	30	69	96	200	Zn
BKH-DN8	9	14	30	69	96	200	Zn
BKH-DN10	9	14	30	71	106	200	Zn
BKH-DN13	9	14	30	72	110	200	Zn
BKH-DN16	12	17	35	89	127	320	Al
BKH-DN20	14	17	39	104	153	320	Al
BKH-DN25	14	17	39	110	169	320	Al
BKHP500-DN25	14	17	39	110	179	320	Al
BKH-DN25/32	14	17	39	110	169	320	Al
BKH-DN25/40	14	17	39	110	169	320	Al

Ball valve combinations

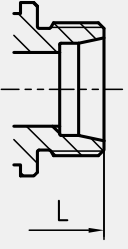
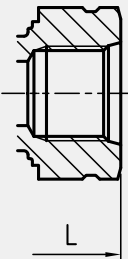
Steel

BKH / BKHP500

CONNECTION TYPE	DIMENSIONS			ORDER CODE PER MATERIAL COMBINATION	
DIN ISO 228 FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	112A
	BKH-DN4-G1/8	69	0,80	500	38806*
	BKH-DN6-G1/4	69	0,78	500	38807*
	BKH-DN10-G3/8	72	1,10	500	38808*
	BKH-DN13-G1/2	83	1,35	500	38809*
	BKH-DN16-G5/8	83	1,45	420	39240*
	BKH-DN20-G3/4	95	3,20	420	38810*
	BKH-DN25-G1	113	4,50	315	38811*
	BKHP500-DN25-G1	113	6,30	500	53493*
	BKH-DN25/32-G1 1/4	120	4,80	315	38812*
	BKH-DN25/40-G1 1/2	130	5,40	315	39241*
ANSI B1.20.1 NPT FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	112A
	BKH-DN4-1/8"NPT	69	0,65	500	38813*
	BKH-DN6-1/4"NPT	69	0,80	500	38814*
	BKH-DN10-3/8"NPT	72	1,20	500	38815*
	BKH-DN13-1/2"NPT	83	1,52	500	38816*
	BKH-DN20-3/4"NPT	95	3,35	420	38817*
	BKH-DN25-1"NPT	113	4,80	315	38818*
	BKHP500-DN25-1"NPT	113	6,40	500	53494*
	BKH-DN25/32-1 1/4"NPT	120	5,10	315	38819*
	BKH-DN25/40-1 1/2"NPT	130	5,50	250	39242*
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	L	Weight [Kg]	PN [bar]	112A
	BKH-DN4-6L	67	0,70	500	38790*
	BKH-DN6-8L	67	0,72	500	38791*
	BKH-DN8-10L	74	0,80	500	38792*
	BKH-DN10-12L	74	1,10	500	38793*
	BKH-DN13-15L	82	1,28	500	38794*
	BKH-DN13-18L	82	1,25	500	39244*
	BKH-DN16-18L	82	1,52	420	39245*
	BKH-DN20-22L	101	3,00	420	38795*
	BKH-DN25-28L	108	4,20	315	38796*
	BKH-DN25/32-35L	112	4,40	315	38797*
	BKH-DN25/40-42L	112	4,70	315	39246*

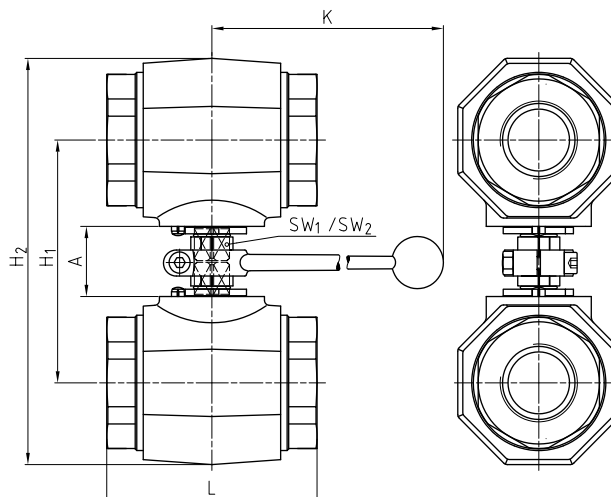
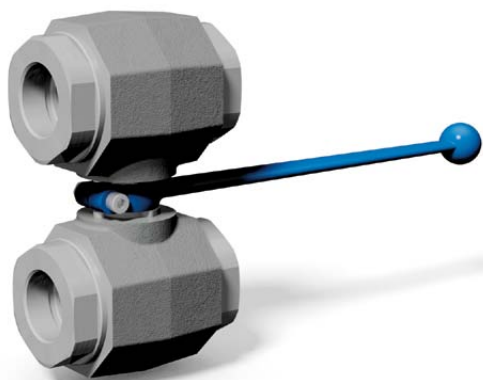
Please note the pressure ratings of the tube connections!

*Article usually in stock.

CONNECTION TYPE	DIMENSIONS			ORDER CODE PER MATERIAL COMBINATION	
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	L	Weight [Kg]	PN [bar]	112A
	BKH-DN4-8S	73	0,72	500	38798*
	BKH-DN6-10S	73	0,76	500	38799*
	BKH-DN8-12S	76	0,76	500	38800*
	BKH-DN10-14S	80	1,10	500	38801*
	BKH-DN13-16S	86	1,25	500	38802*
	BKH-DN13-20S	90	1,25	500	39248*
	BKH-DN16-20S	90	1,68	420	39249*
	BKH-DN20-25S	109	3,20	420	38803*
	BKH-DN25-30S	120	4,30	315	38804*
	BKHP500-DN25-30S	130	6,22	500	53495*
	BKH-DN25/32-38S	124	4,70	315	38805*
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	112A
	BKH-DN6-7/16"UNF	69	0,78	500	38820*
	BKH-DN10-9/16"UNF	72	0,96	500	38821*
	BKH-DN13-3/4"UNF	83	1,42	500	38822*
	BKH-DN20-1 1/16"UN	95	3,20	420	38823*
	BKH-DN25-1 5/16"UN	113	4,60	315	38824*
	BKHP500-DN25-1 5/16"UN	121	6,32	500	53496*

Please note the pressure ratings of the tube connections!

*Article usually in stock.



Detailed dimensions:
Catalog page 22 to 24

SW₁: Wrench size of stem
SW₂: Wrench size of lever

AVAILABLE SIZES

DN32 - DN50 (1 1/4" to 2")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators on request
- Mounting holes on request
- Position switches on request

MATERIAL CODE DESCRIPTION

Materials	112A
Body	Steel
Ball	Steel
Stem	Steel
Ball seats	POM
O-rings	NBR
Tmin /Tmax	-20°C / 100°C

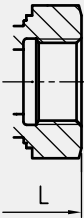




GENERAL DIMENSIONS

Type	SW ₁	SW ₂	A	H ₁	H ₂	K	Lever
MKHP420-DN32	17	19	43	134	215	320	Al
MKHP420-DN40	17	19	43	149	249	320	Al
MKHP420-DN50	17	19	43	159	277	320	Al

Ball valve combinations

Steel

MKHP420

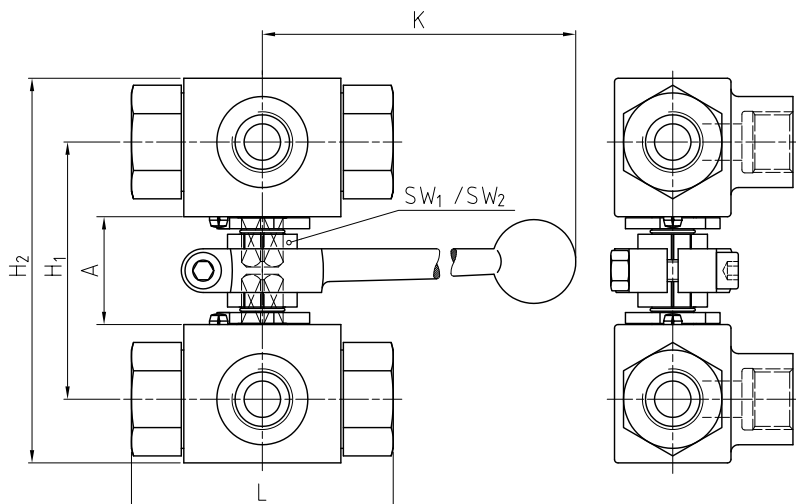
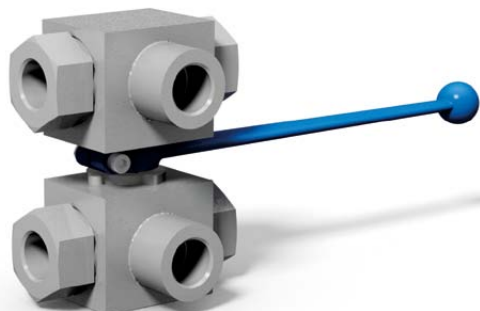
CONNECTION TYPE	DIMENSIONS			ORDER CODE PER MATERIAL COMBINATION	
DIN ISO 228 FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	112A
	MKHP420-DN32-G1 1/4	111	6,84	420	46217*
	MKHP420-DN40-G1 1/2	130	11,18	420	38829*
	MKHP420-DN50-G2	140	15,98	420	38830*
ANSI B1.20.1 NPT FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	112A
	MKHP420-DN32-1 1/4"NPT	120	7,04	420	38831*
	MKHP420-DN40-1 1/2"NPT	130	11,38	420	38832*
	MKHP420-DN50-2"NPT	140	15,98	420	38833*
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	L	Weight [Kg]	PN [bar]	112A
	MKHP420-DN32-35L	136	7,24	420	38825*
	MKHP420-DN40-42L	147	11,08	420	38826*
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	L	Weight [Kg]	PN [bar]	112A
	MKHP420-DN32-38S	148	7,54	420	38827*
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	112A
	MKHP420-DN32-1 5/8"UN	111	7,04	420	38834*
	MKHP420-DN40-1 7/8"UN	130	11,38	420	38835*
	MKHP420-DN50-2 1/2"UN	140	15,98	420	38836*

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Selector ball valve combinations Steel

BK3



Detailed dimensions:
Catalog page 92 to 95

SW₁: Wrench size of stem
SW₂: Wrench size of lever

**Pressure inlet only
from center port!**

AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators on request
- Mounting holes on request
- Position switches on request

MATERIAL CODE DESCRIPTION

Materials	112A
Body	Steel
Ball	Steel
Stem	Steel
Ball seats	POM
O-rings	NBR
Tmin /Tmax	-20°C / 100°C
Porting pattern	L=SB50

PORTING PATTERNS








Further porting patterns page 262 to 267

GENERAL DIMENSIONS

Type	SW ₁	SW ₂	A	H ₁	H ₂	K	Lever
BK3-DN4	9	14	30	69	96	200	Zn
BK3-DN6	9	14	30	69	96	200	Zn
BK3-DN8	9	14	30	69	96	200	Zn
BK3-DN10	9	14	30	71	106	200	Zn
BK3-DN13	9	14	30	72	110	200	Zn
BK3-DN20	14	17	39	104	153	320	Al
BK3-DN25	14	17	39	110	169	320	Al
BK3-DN25/32	14	17	39	110	169	320	Al

Selector ball valve combinations Steel

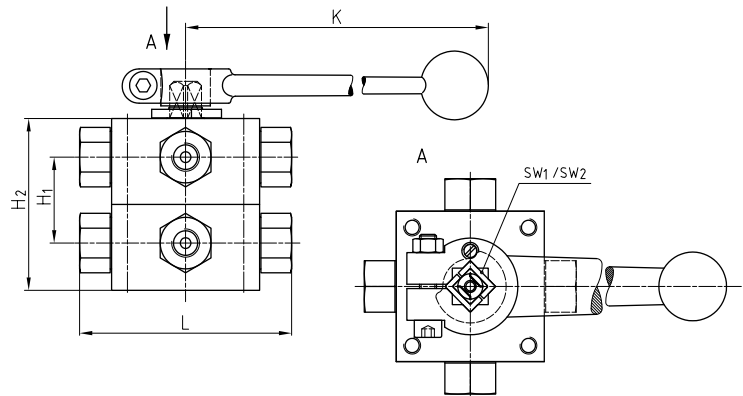
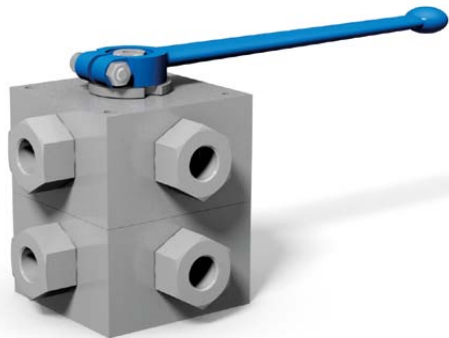
BK3

CONNECTION TYPE	DIMENSIONS			ORDER CODE PER MATERIAL COMBINATION	
DIN ISO 228 FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	112A L=SB50
	BK3-DN4-G1/8	69	0,78	500	38501*
	BK3-DN6-G1/4	69	0,90	500	38502*
	BK3-DN10-G3/8	72	1,25	500	20593*
	BK3-DN13-G1/2	83	1,45	500	38503*
	BK3-DN20-G3/4	95	3,68	315	33719*
	BK3-DN25-G1	113	4,90	315	38504*
	BK3-DN25/32-G1 1/4	120	5,38	315	38505*
ANSI B1.20.1 NPT FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	112A L=SB50
	BK3-DN4-1/8"NPT	69	0,78	500	38511*
	BK3-DN6-1/4"NPT	69	0,90	500	38512*
	BK3-DN10-3/8"NPT	72	1,20	500	38513*
	BK3-DN13-1/2"NPT	83	1,40	500	38514*
	BK3-DN20-3/4"NPT	95	3,65	315	38515*
	BK3-DN25-1"NPT	113	4,90	315	38516*
	BK3-DN25/32-1 1/4"NPT	120	5,38	315	38517*
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	L	Weight [Kg]	PN [bar]	112A L=SB50
	BK3-DN4-6L	67	0,58	500	38486*
	BK3-DN6-8L	67	0,78	500	38487*
	BK3-DN8-10L	74	0,78	500	23786*
	BK3-DN10-12L	74	0,98	500	38488*
	BK3-DN13-15L	82	1,31	500	38489*
	BK3-DN20-22L	101	3,10	315	38490*
	BK3-DN25-28L	108	4,30	315	38491*
	BK3-DN25/32-35L	112	5,20	315	38492*
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	L	Weight [Kg]	PN [bar]	112A L=SB50
	BK3-DN4-8S	73	0,80	500	38493*
	BK3-DN6-10S	73	0,84	500	38494*
	BK3-DN8-12S	76	0,86	500	38495*
	BK3-DN10-14S	80	0,98	500	38496*
	BK3-DN13-16S	86	1,41	500	38497*
	BK3-DN20-25S	109	3,30	315	38498*
	BK3-DN25-30S	120	4,90	315	38499*
	BK3-DN25/32-38S	124	5,70	315	38500*
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	112A L=SB50
	BK3-DN6-7/16"UNF	69	0,98	500	38506*
	BK3-DN10-9/16"UNF	72	1,18	500	38507*
	BK3-DN13-3/4"UNF	83	1,41	500	38508*
	BK3-DN20-1 1/16"UN	95	3,70	315	38509*
	BK3-DN25-1 5/16"UN	113	5,50	315	38510*

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Multiway ball valve combinations 3KH, 4KH Steel



Detailed dimensions:
Catalog page 108 to 110 and 116 to 118

SW₁: Wrench size of trunnion ball
SW₂: Wrench size of lever

AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices page 222 - 225
- Actuators 220 - 221
- Mounting holes on request
- Position switches on request
- Detent 231

MATERIAL CODE DESCRIPTION

Materials	112A	112A
Body	Steel	Steel
Trunnion ball	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	NBR
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C
Porting pattern	L=SB01	T=SB13
Type	3KH	4KH

GENERAL DIMENSIONS

Type	SW ₁	SW ₂	H ₁	H ₂	K	Lever
3/4KH-DN4	12	17	40	80	320	Al
3/4KH-DN6	12	17	40	80	320	Al
3/4KH-DN8	14	17	50	100	320	Al
3/4KH-DN10	14	17	50	100	320	Al
3/4KH-DN13	14	17	60	120	320	Al
3/4KH-DN16	14	17	60	120	320	Al
3/4KH-DN20	17	17	67	134	320	Al
3/4KH-DN25	17	17	82	164	320	Al
3/4KH-DN25/32	17	17	82	164	320	Al
3/4KH-DN25/40	17	17	82	164	320	Al

PORTING PATTERNS

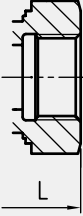
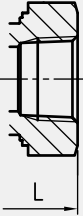

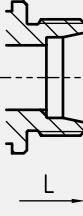



Further porting patterns page 262 to 267

Multiway ball valve combinations

Steel

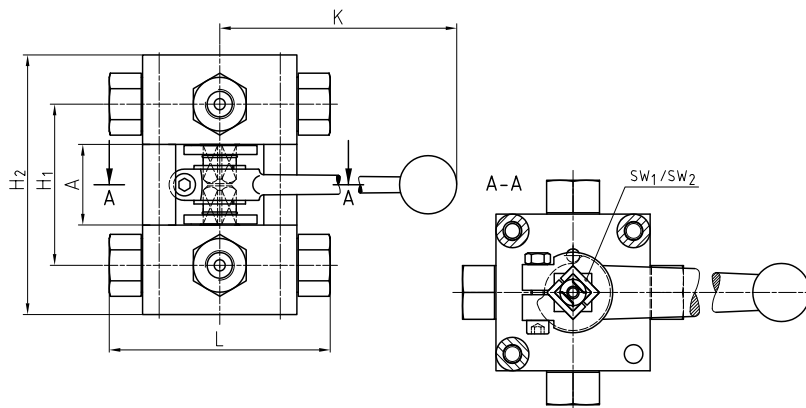
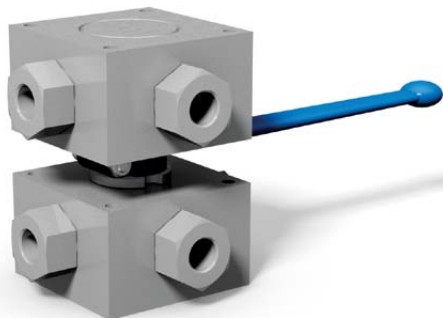
3KH, 4KH

CONNECTION TYPE	DIMENSIONS			ORDER CODE PER MATERIAL COMBINATION		
DIN ISO 228 FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	3KH 112A L=SB01	4KH 112A T=SB13
	3/4KH-DN4-G1/8	100	3,20	500	38550	38551
	3/4KH-DN6-G1/4	100	3,20	500	19945	38552
	3/4KH-DN10-G3/8	115	5,40	500	38553	38554
	3/4KH-DN13-G1/2	136	9,80	400	19221	38555
	3/4KH-DN16-G5/8	139	9,80	400	38556	38557
	3/4KH-DN20-G3/4	154	13,40	315	38558	38559
	3/4KH-DN25-G1	172	16,60	315	38683	38684
	3/4KH-DN25/32-G1 1/4	180	17,00	315	38685	38686
	3/4KH-DN25/40-G1 1/2	180	17,00	250	38687	38688
ANSI B1.20.1 NPT FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	3KH 112A L=SB01	4KH 112A T=SB13
	3/4KH-DN4-1/8"NPT	100	3,20	500	38689	38690
	3/4KH-DN6-1/4"NPT	100	3,20	500	38691	38692
	3/4KH-DN10-3/8"NPT	115	5,60	500	38693	38694
	3/4KH-DN13-1/2"NPT	160	10,40	400	38695	38696
	3/4KH-DN20-3/4"NPT	164	13,60	315	30805	38697
	3/4KH-DN25-1"NPT	186	17,00	315	38698	38699
	3/4KH-DN25/32-1 1/4"NPT	186	17,60	315	38700	38701
	3/4KH-DN25/40-1 1/2"NPT	186	17,60	250	38702	38703
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	L	Weight [Kg]	PN [bar]	3KH 112A L=SB01	4KH 112A T=SB13
	3/4KH-DN4-6L	105	3,20	500	38518	38519
	3/4KH-DN6-8L	105	3,20	500	38520	38521
	3/4KH-DN8-10L	114	5,20	500	38522	38523
	3/4KH-DN10-12L	114	5,20	500	38524	38525
	3/4KH-DN13-15L	137	9,40	400	38526	38527
	3/4KH-DN16-18L	137	9,40	400	38528	38529
	3/4KH-DN20-22L	152	13,20	315	38530	38531
	3/4KH-DN25-28L	166	16,00	315	38532	38533
	3/4KH-DN25/32-35L	170	16,10	315	59591	59593
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	L	Weight [Kg]	PN [bar]	3KH 112A L=SB01	4KH 112A T=SB13
	3/4KH-DN4-8S	105	3,20	500	38534	38535
	3/4KH-DN6-10S	105	3,20	500	38536	38537
	3/4KH-DN8-12S	116	5,20	500	38538	38539
	3/4KH-DN10-14S	120	5,20	500	38540	38541
	3/4KH-DN13-16S	141	9,40	400	38542	38543
	3/4KH-DN16-20S	145	9,40	400	38544	38545
	3/4KH-DN20-25S	160	13,20	315	38546	38547
	3/4KH-DN25-30S	176	16,40	315	38548	38549
	3/4KH-DN25/32-38S	180	16,50	315	59595	59597
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	3KH 112A L=SB01	4KH 112A T=SB13
	3/4KH-DN6-7/16"UNF	100	3,20	500	38704	38705
	3/4KH-DN10-9/16"UNF	115	5,60	500	38706	38707
	3/4KH-DN13-3/4"UNF	144	9,80	400	38708	38709
	3/4KH-DN20-1 1/16"UN	164	13,60	315	38710	38711
	3/4KH-DN25-1 5/16"UN	180	17,00	315	38712	38713

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Multiway ball valve combinations 3KH, 4KH Steel



Detailed dimensions:
Catalog page 108 to 110 and 116 to 118

SW₁: Wrench size of trunnion ball
SW₂: Wrench size of lever

AVAILABLE SIZES

DN4 - DN25 (1/8" to 1")

CONNECTIONS

DIN ISO 228 Female thread, ANSI B1.20.1 NPT Female thread, DIN 2353/ISO 8434-1 Light / Heavy series, SAE J 514/ISO/DIS11926-1 Female thread, others on request

ACCESSORIES ON REQUEST

- Locking devices on request
- Actuators on request
- Mounting holes on request
- Position switches on request
- Detent on request

MATERIAL CODE DESCRIPTION

Materials	112A	112A
Body	Steel	Steel
Trunnion ball	Steel	Steel
Ball seats	POM	POM
O-rings	NBR	NBR
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C
Porting pattern	L=SB01	T=SB13
Type	3KH	4KH

GENERAL DIMENSIONS

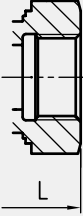


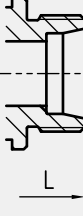

Type	SW ₁	SW ₂	A	H ₁	H ₂	K	Lever
3/4KH-DN4	12	17	36	72	116	240	Al
3/4KH-DN6	12	17	36	72	116	240	Al
3/4KH-DN8	14	17	38	84	138	320	Al
3/4KH-DN10	14	17	38	84	138	320	Al
3/4KH-DN13	14	17	38	96	158	320	Al
3/4KH-DN16	14	17	38	96	158	320	Al
3/4KH-DN20	17	19	46	107	180	320	Al
3/4KH-DN25	17	19	46	115	210	320	Al
3/4KH-DN25/32	17	19	46	115	210	320	Al
3/4KH-DN25/40	17	19	46	115	210	320	Al

PORTING PATTERNS



Further porting patterns page 262 to 267

Multiway ball valve combinations 3KH, 4KH Steel

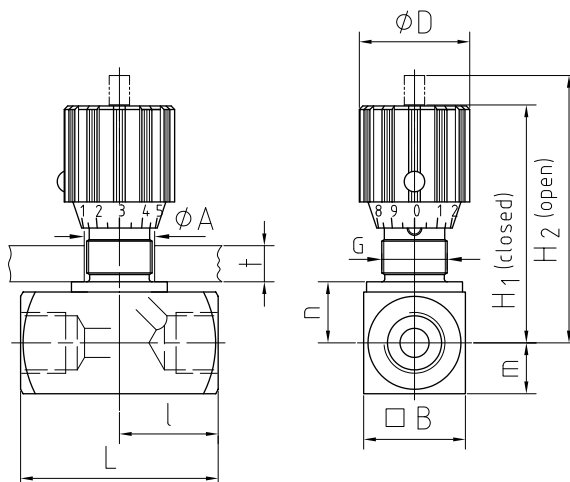
CONNECTION TYPE	DIMENSIONS			ORDER CODE PER MATERIAL COMBINATION		
DIN ISO 228 FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	3KH 112A L=SB01	4KH 112A T=SB13
	3/4KH-DN4-G1/8	100	3,50	500	38746	38747
	3/4KH-DN6-G1/4	100	3,50	500	38748	38749
	3/4KH-DN10-G3/8	115	6,00	500	38750	38751
	3/4KH-DN13-G1/2	136	10,20	400	38752	38753
	3/4KH-DN16-G5/8	139	10,20	400	38754	38755
	3/4KH-DN20-G3/4	154	14,00	315	38756	38757
	3/4KH-DN25-G1	172	17,50	315	38758	38759
	3/4KH-DN25/32-G1 1/4	180	18,00	315	38760	38761
	3/4KH-DN25/40-G1 1/2	180	18,00	250	38762	38763
ANSI B1.20.1 NPT FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	3KH 112A L=SB01	4KH 112A T=SB13
	3/4KH-DN4-1/8"NPT	100	3,50	500	38764	38765
	3/4KH-DN6-1/4"NPT	100	3,50	500	38766	38767
	3/4KH-DN10-3/8"NPT	115	6,00	500	38768	38769
	3/4KH-DN13-1/2"NPT	160	10,20	400	38770	38771
	3/4KH-DN20-3/4"NPT	164	14,00	315	38772	38773
	3/4KH-DN25-1"NPT	186	17,50	315	38774	38775
	3/4KH-DN25/32-1 1/4"NPT	186	18,00	315	38776	38777
	3/4KH-DN25/40-1 1/2"NPT	186	18,00	250	38778	38779
DIN 2353 / ISO 8434-1 LIGHT SERIES	Type	L	Weight [Kg]	PN [bar]	3KH 112A L=SB01	4KH 112A T=SB13
	3/4KH-DN4-6L	105	3,50	500	38714	38715
	3/4KH-DN6-8L	105	3,50	500	38716	38717
	3/4KH-DN8-10L	114	6,00	500	38718	38719
	3/4KH-DN10-12L	114	6,00	500	38720	38721
	3/4KH-DN13-15L	137	9,80	400	38722	38723
	3/4KH-DN16-18L	137	9,80	400	38724	38725
	3/4KH-DN20-22L	152	13,80	315	38726	38727
	3/4KH-DN25-28L	166	16,50	315	38728	38729
	3/4KH-DN25/32-35L	170	16,60	315	59592	59594
DIN 2353 / ISO 8434-1 HEAVY SERIES	Type	L	Weight [Kg]	PN [bar]	3KH 112A L=SB01	4KH 112A T=SB13
	3/4KH-DN4-8S	105	3,50	500	38730	38731
	3/4KH-DN6-10S	105	3,50	500	38732	38733
	3/4KH-DN8-12S	116	6,00	500	38734	38735
	3/4KH-DN10-14S	120	6,00	500	38736	38737
	3/4KH-DN13-16S	141	9,80	400	38738	38739
	3/4KH-DN16-20S	145	9,80	400	38740	38741
	3/4KH-DN20-25S	160	13,80	315	38742	38743
	3/4KH-DN25-30S	176	16,50	315	38744	38745
	3/4KH-DN25/32-38S	180	16,60	315	59596	59598
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	L	Weight [Kg]	PN [bar]	3KH 112A L=SB01	4KH 112A T=SB13
	3/4KH-DN6-7/16"UNF	100	3,50	500	38780	38781
	3/4KH-DN10-9/16"UNF	115	6,00	500	38782	38783
	3/4KH-DN13-3/4"UNF	144	10,40	400	38784	38785
	3/4KH-DN20-1 1/16"UN	164	14,00	315	38786	38787
	3/4KH-DN25-1 5/16"UN	180	17,50	315	38788	38789

Please note the pressure ratings of the tube connections!

*Article usually in stock.

Flow control valve for piping-system assembly Steel / Stainless Steel

NDV



AVAILABLE SIZES

DN6 - DN40 (1/8" to 2")

CONNECTIONS

DIN ISO 228 Female thread,
ANSI B1.20.1 NPT Female thread,
SAE J 514 ISO/DIS 11926-1 Female thread

PORTING PATTERN



ACCESSORIES ON REQUEST

• Panel mounting kit page 213

MATERIAL CODE DESCRIPTION

Materials	1A	18	4A	48
Body	Steel	Steel	Stainless Steel	Stainless Steel
O-rings	NBR	FPM	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C	-30°C / 100°C	-20°C / 100°C

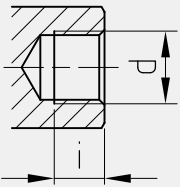
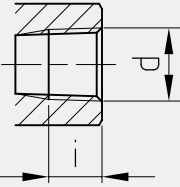
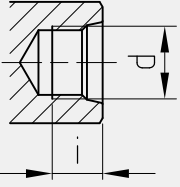
GENERAL DIMENSIONS

Type	H ₁	H ₂	m	n	B	l	L	D	A	G	t _{max}
NDV-DN6	51	56	8	10	16	19	38	24	13	Pg7	4
NDV-DN8	65	71	12,5	14,5	25	24	48	29	19	Pg11	7
NDV-DN10	68	75	15	17	30	29	58	29	19	Pg11	7
NDV-DN12	82	92	17,5	21	35	34	68	38	23	Pg16	7
NDV-DN16	96	106	22,5	26	45	39	78	38	23	Pg16	7
NDV-DN20	121	134	25	30	50	54	108	49	38	Pg29	10
NDV-DN25	126	139	30	35	60	54	108	49	38	Pg29	10
NDV-DN30	131	144	35	40	70	54	108	49	38	Pg29	10
NDV-DN40	141	154	45	50	90	60	120	49	38	Pg29	10

Flow control valve for piping-system assembly

Steel / Stainless Steel

NDV

CONNECTION TYPE	DIMENSIONS				ORDER CODE PER MATERIAL COMBINATION				
DIN ISO 228 FEMALE THREAD	Type	i	d	Weight [Kg]	PN [bar]	1A	18	4A	48
	NDV-DN6-G1/8	9	G1/8	0,12	350	26866*	30689*	33225	30108
	NDV-DN8-G1/4	12	G1/4	0,25	350	23791*	30655*	22084	09952
	NDV-DN10-G3/8	13,5	G3/8	0,40	350	18259*	11673*	20828	20476
	NDV-DN12-G1/2	14,5	G1/2	0,60	350	22827*	09792*	16243	22428
	NDV-DN16-G3/4	17,5	G3/4	1,10	350	28849*	30426*	16244	33051
	NDV-DN20-G1	19,5	G1	2,40	350	30726*	28618*	31240	37628
	NDV-DN25-G1 1/4	21,5	G1 1/4	2,80	350	30853*	31513*	32424	37629
	NDV-DN30-G1 1/2	23,5	G1 1/2	3,50	350	29461*	31639*	29724	37630
	NDV-DN40-G2	25,5	G2	6,24	350	41931*	40822*	41934	41935
ANSI B1.20.1 NPT FEMALE THREAD	Type	i	d	Weight [Kg]	PN [bar]	1A	18	4A	48
	NDV-DN6-1/8"NPT	9	1/8" NPT	0,12	350	30856*	37631*	37636	37643
	NDV-DN8-1/4"NPT	12	1/4" NPT	0,25	350	21346*	30744*	37637	37644
	NDV-DN10-3/8"NPT	12	3/8" NPT	0,40	350	21347*	37632*	37638	32407
	NDV-DN12-1/2"NPT	14	1/2" NPT	0,60	350	21348*	37633*	29585	37645
	NDV-DN16-3/4"NPT	14	3/4" NPT	1,10	350	30861*	14585*	37639	30677
	NDV-DN20-1"NPT	19,5	1" NPT	2,40	350	30863	37634	37640	32390
	NDV-DN25-1 1/4"NPT	21	1 1/4" NPT	2,80	350	30865	28835	37641	37646
	NDV-DN30-1 1/2"NPT	24	1 1/2" NPT	3,50	350	30866	37635	37642	37647
	NDV-DN40-2"NPT	19,9	2" NPT	6,30	350	41932	41938	41936	41937
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	i	d	Weight [Kg]	PN [bar]	1A	18	4A	48
	NDV-DN8-7/16"UNF	13	7/16"-20 UNF	0,28	350	36257	37672	37673	37674
	NDV-DN10-9/16"UNF	13,5	9/16"-18 UNF	0,42	350	37648	37649	37650	37651
	NDV-DN12-3/4"UNF	14	3/4"-16 UNF	0,69	350	37652	37653	37654	37655
	NDV-DN16-1 1/16"UN	20	1 1/16"-12 UN	1,14	350	37656	37657	37658	37659
	NDV-DN20-1 5/16"UN	20	1 5/16"-12 UN	2,19	350	37660	37661	37662	37663
	NDV-DN25-1 5/8"UN	20	1 5/8"-12 UN	2,89	350	37664	37665	37666	37667
	NDV-DN30-1 7/8"UN	20	1 7/8"-12 UN	3,70	350	37668	37669	37670	37671
	NDV-DN40-2 1/2"UN	20	2 1/2"-12 UN	6,30	350	41933	41939	41940	41941

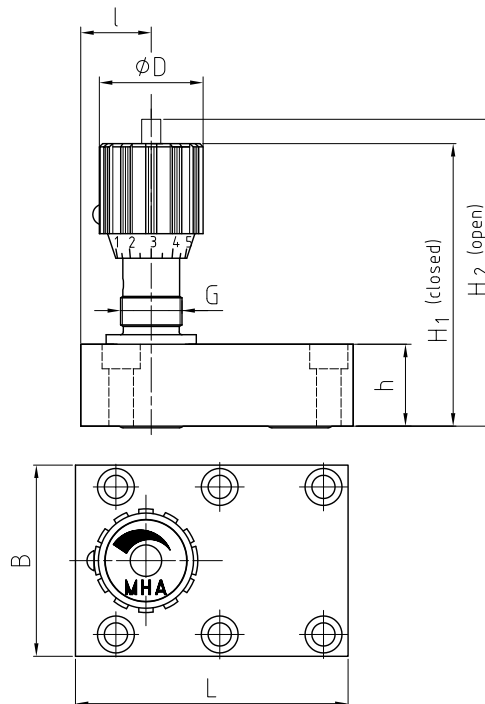
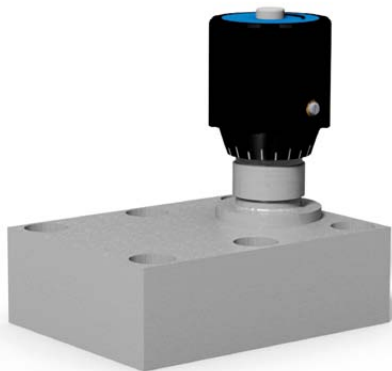
Please note the pressure ratings of the tube connections!

*Article usually in stock.

⚠ Flow control valves should not be used as shut-off device. Small leakage rates may occur in fully closed position. (DIN EN 12266 – leakage rate A-B – test medium water)

Flow control valve for manifold mounting Steel

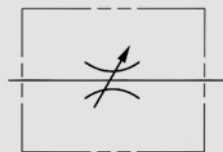
NDVP



AVAILABLE SIZES

DN6 - DN30 (1/4" to 1 1/4")

PORTING PATTERN



ACCESSORIES ON REQUEST

• Panel mounting kit page 209

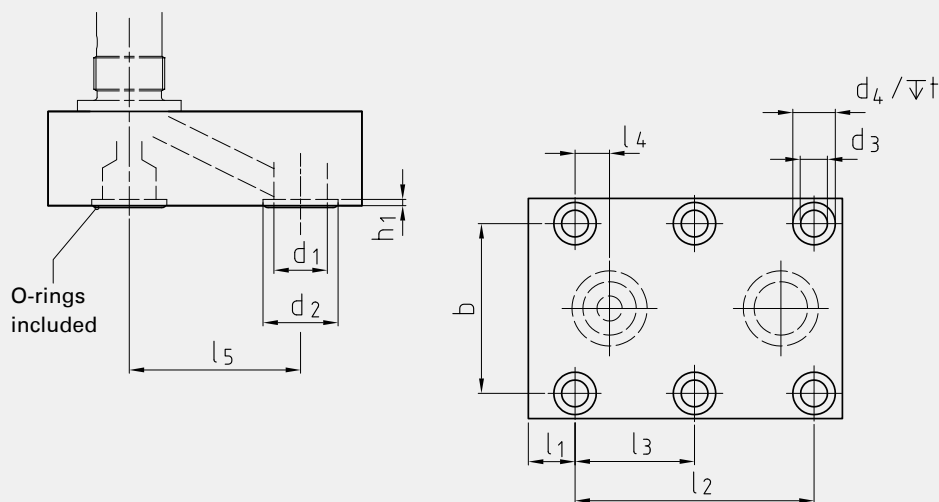
MATERIAL CODE DESCRIPTION

Materials	1A	18
Body	Steel	Steel
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C

GENERAL DIMENSIONS

Type	H ₁	H ₂	h	B	I	L	D	G	Weight [kg]
NDVP-DN6	59	64	16	41,5	9,5	35	24	Pg 7	0,20
NDVP-DN8	72	79	20	46	12	47,5	29	Pg 11	0,40
NDVP-DN10	78	84	25	51	14	51	29	Pg 11	0,60
NDVP-DN12	89	100	25	57,5	22,5	75	38	Pg 16	1,00
NDVP-DN16	103	113	30	70	19,5	93,5	38	Pg 16	1,50
NDVP-DN20	142	154	45	76,5	31,5	111	49	Pg 29	3,40
NDVP-DN25	142	154	45	100	49	143	49	Pg 29	5,15
NDVP-DN30	147	159	50	115	39	171	49	Pg 29	7,50

ASSEMBLY DIMENSIONS



ASSEMBLY DIMENSIONS																ORDER CODE PER MATERIAL COMBINATION		
Type	b	l_1	l_2	l_3	l_4	l_5	d_1	d_2	h_1	d_3	d_4	t	Dimension of screws (min) ⁽¹⁾	Torque of screws in Nm ⁽¹⁾	O-ring	PN [bar]	1A	18
NDVP-DN6	28,5	8	19	-	1,5	16	5	9,8	1,2	6,5	10,5	6,8	4 x M6x20 - 8.8	9	6,35x1,78	350	33580*	37734*
NDVP-DN8	33,5	6,5	35	-	4,5	25,5	7	12,4	1,5	6,5	10,5	6,8	4 x M6x25 - 8.8	9	8,5x2	350	13850*	37735*
NDVP-DN10	38	8,5	33,5	-	4,2	25,5	10	15,7	1,4	6,5	10,5	6,8	4 x M6x30 - 10.9	12	12x2	350	20313*	37736*
NDVP-DN12	44,5	18,5	38	-	4	30	13	18,7	1,4	6,5	10,5	6,8	4 x M6x30 - 12.9	14	15x2	350	16776*	37737*
NDVP-DN16	54	8,5	76	38	11	54,5	17	23,9	2	8,5	13,5	9	6 x M8x35 - 10.9	30	19x2,5	350	13852*	37738*
NDVP-DN20	60	8	95	47,5	19	57	22	30,5	2,2	8,5	13,5	9	6 x M8x50 - 12.9	35	25x3	350	33218*	22728*
NDVP-DN25	76	11	120,5	60	21	79,5	28,5	37,5	2,2	10,5	16,5	11	6 x M10x50 - 12.9	70	32x3	350	31132*	37739*
NDVP-DN30	92	15	143	71,5	24	95	35	43,5	2,2	13	19	13	6 x M12x60 - 10.9	100	38x3	350	32561*	37740*

⁽¹⁾ Fixing screws not included.

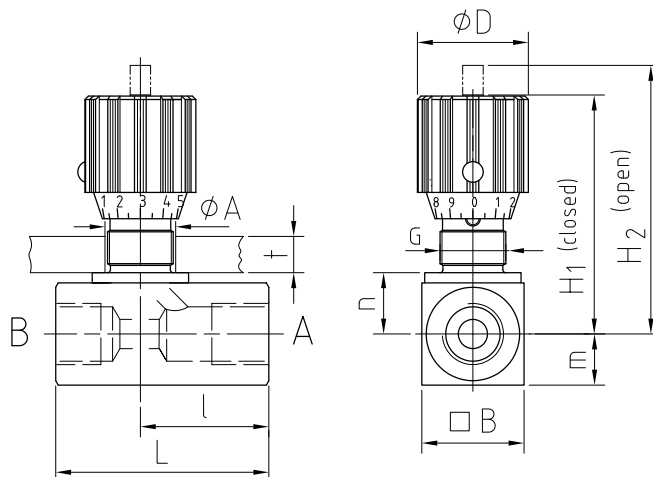
We recommend screws as per ISO4762 (DIN 912). The indicated property classes and torques represent our recommended guidelines at a friction coefficient of 14%.

*Article usually in stock.

⚠ Flow control valves should not be used as shut-off device. Small leakage rates may occur in fully closed position. (DIN EN 12266 – leakage rate A-B – test medium water)

Flow control check valve for piping-system assembly Steel / Stainless Steel

NDRV



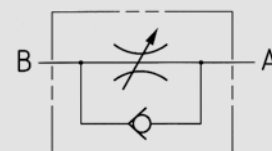
AVAILABLE SIZES

DN6 - DN40 (1/8" to 2")

CONNECTIONS

DIN ISO 228 Female thread,
ANSI B1.20.1 NPT Female thread,
SAE J 514 ISO/DIS 11926-1 Female thread

PORTING PATTERN



ACCESSORIES ON REQUEST

• Panel mounting kit page 209

MATERIAL CODE DESCRIPTION

Materials	1A	18	4A	48
Body	Steel	Steel	Stainless Steel	Stainless Steel
O-rings	NBR	FPM	NBR	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C	-30°C / 100°C	-20°C / 100°C
Cracking pressure	0,5 bar*	0,5 bar*	0,5 bar*	0,5 bar*

*Option: Cracking pressure PÖ 4,5 bar

GENERAL DIMENSIONS

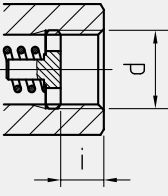
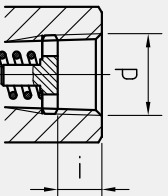
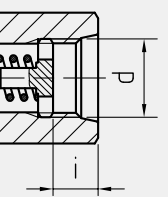
Type	H ₁	H ₂	m	n	B	l	L	D	A	G	t _{max}
NDRV-DN6	51	56	8	10	16	26	45	24	13	Pg 7	4
NDRV-DN8	65	71	12,5	14,5	25	33,5	55	29	19	Pg 11	7
NDRV-DN10	68	75	15	17	30	41	65	29	19	Pg 11	7
NDRV-DN12	82	92	17,5	21	35	44	73	38	23	Pg 16	7
NDRV-DN16	96	106	22,5	26	45	57	88	38	23	Pg 16	7
NDRV-DN20	121	134	25	30	50	77	127	49	38	Pg 29	10
NDRV-DN25	126	139	30	35	60	93	143	49	38	Pg 29	10
NDRV-DN30	131	144	35	40	70	91	143	49	38	Pg 29	10
NDRV-DN40	141	154	45	50	90	111	165	49	38	Pg 29	10

**! Due to spring and manufacturing tolerances
cracking pressures may deviate by ±30%.**

Flow control check valve for piping-system assembly

Steel / Stainless Steel

NDRV

CONNECTION TYPE	DIMENSIONS				ORDER CODE PER MATERIAL COMBINATION				
DIN ISO 228 FEMALE THREAD	Type	i	d	Weight [Kg]	PN [bar]	1A	18	4A	48
	NDRV-DN6-G1/8	9,5	G1/8	0,10	350	26868*	30690*	37675	37676
	NDRV-DN8-G1/4	13,5	G1/4	0,30	350	19562*	30652*	10298	09934
	NDRV-DN10-G3/8	13,5	G3/8	0,45	350	21359*	30653*	18568	37677
	NDRV-DN12-G1/2	15,5	G1/2	0,70	350	22829*	30654*	30145	25847
	NDRV-DN16-G3/4	17,5	G3/4	1,26	350	28978*	21586*	15776	31353
	NDRV-DN20-G1	19,5	G1	2,60	350	28977*	29227*	32425	34418
	NDRV-DN25-G1 1/4	21,5	G1 1/4	3,70	350	30086*	30346*	15777	37678
	NDRV-DN30-G1 1/2	23,5	G1 1/2	4,76	350	29494*	31338*	37679	37680
	NDRV-DN40-G2	25,5	G2	8,52	350	30867*	32226*	37681	37682
ANSI B1.20.1 NPT FEMALE THREAD	Type	i	d	Weight [Kg]	PN [bar]	1A	18	4A	48
	NDRV-DN6-1/8"NPT	9,5	1/8"NPT	0,10	350	30993*	37683*	37684	37685
	NDRV-DN8-1/4"NPT	13,5	1/4"NPT	0,30	350	28480*	30558*	37686	26257
	NDRV-DN10-3/8"NPT	13,5	3/8"NPT	0,45	350	24251*	37687*	37688	37689
	NDRV-DN12-1/2"NPT	15,5	1/2"NPT	0,70	350	24519*	37690*	33600	28789
	NDRV-DN16-3/4"NPT	17,5	3/4"NPT	1,26	350	30997*	37691*	30786	32525
	NDRV-DN20-1"NPT	19,5	1"NPT	2,60	350	30998*	37692*	37693	37694
	NDRV-DN25-1 1/4"NPT	21,5	1 1/4"NPT	3,70	350	31000*	37695*	37696	37697
	NDRV-DN30-1 1/2"NPT	23,5	1 1/2"NPT	4,76	350	31001*	37698*	37699	37700
	NDRV-DN40-2"NPT	25,5	2"NPT	8,52	350	31003*	37701*	37702	37703
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	i	d	Weight [Kg]	PN [bar]	1A	18	4A	48
	NDRV-DN8-7/16"UNF	13	7/16"-20 UNF	0,30	350	36102*	36486*	37706	37707
	NDRV-DN10-9/16"UNF	13,5	9/16"-18 UNF	0,46	350	37708*	37709*	37710	37711
	NDRV-DN12-3/4"UNF	15,5	3/4"-16 UNF	0,72	350	37712*	34898*	37713	37714
	NDRV-DN16-1 1/16"UN	20	1 1/16"-12 UN	1,37	350	36068*	37715*	37716	37717
	NDRV-DN20-1 5/16"UN	20	1 5/16"-12 UN	2,66	350	37718	37719	37720	37721
	NDRV-DN25-1 5/8"UN	20	1 5/8"-12 UN	2,86	350	37722	37723	37724	37725
	NDRV-DN30-1 7/8"UN	20	1 7/8"-12 UN	4,45	350	37726	37727	37728	37729
	NDRV-DN40-2 1/2"UN	25,5	2 1/2"-12 UN	8,03	350	37730	37731	37732	37733

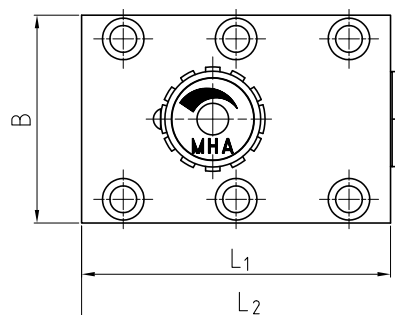
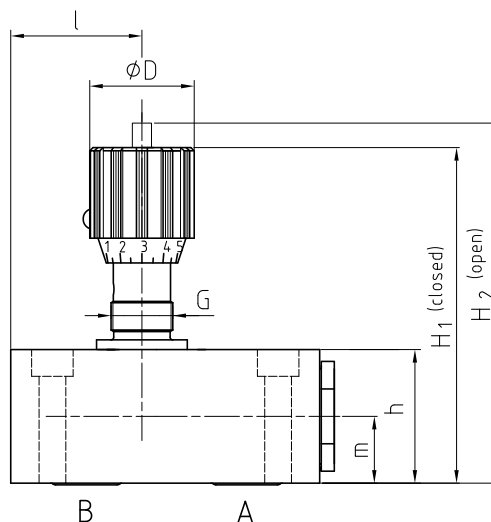
Please note the pressure ratings of the tube connections!

*Article usually in stock.

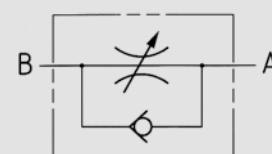
 **Flow control valves should not be used as shut-off device. Small leakage rates may occur in fully closed position. (DIN EN 12266 – leakage rate A-B – test medium water)**

Flow control check valve for manifold mounting Steel

NDRVP



PORTING PATTERN



AVAILABLE SIZES

DN6 - DN40 (1/4" to 1 1/2")

ACCESSORIES ON REQUEST



- Panel mounting kit page 209

MATERIAL CODE DESCRIPTION



Materials	8A	88
Body	Steel	Steel
O-rings	NBR	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C
Cracking pressure	0,5 bar*	0,5 bar*
*Option: Cracking pressure PÖ 4,5 bar		

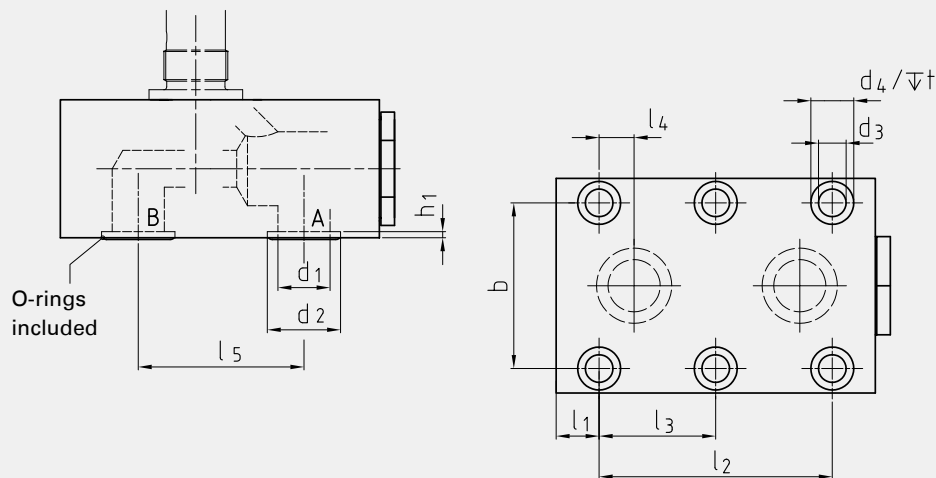
GENERAL DIMENSIONS

Type	H ₁	H ₂	m	h	B	l	L ₁	L ₂	D	G	Weight [kg]
NDRVP-DN6	59	64	8	16	41,5	13,5	41,5	47	24	Pg 7	0,26
NDRVP-DN8	72	79	10	20	46	31	63,5	70	29	Pg 11	0,50
NDRVP-DN10	78	84	12,5	25	51	29,5	70	75	29	Pg 11	0,80
NDRVP-DN12	96	107	16	32	57,5	36,5	80	86	38	Pg 16	1,20
NDRVP-DN16	118	128	22,5	45	70	49	104	110	38	Pg 16	2,50
NDRVP-DN20	147	159	25	50	76,5	49	127	133	49	Pg 29	3,90
NDRVP-DN25	152	164	27,5	55	100	77	165,5	171	49	Pg 29	6,70
NDRVP-DN30	172	184	37,5	75	115	85	186	192	49	Pg 29	11,00
NDRVP-DN40	197	209	50	100	140	64	192,5	206	49	Pg 29	18,80



Due to spring and manufacturing tolerances cracking pressures may deviate by ±30%.

ASSEMBLY DIMENSIONS



ASSEMBLY DIMENSIONS																ORDER CODE PER MATERIAL COMBINATION		
Type	b	l ₁	l ₂	l ₃	l ₄	l ₅	d ₁	d ₂	h ₁	d ₃	d ₄	t	Dimension of screws (min) ⁽¹⁾	Torque of screws in Nm ⁽¹⁾	O-ring	PN [bar]	8A	88
NDRVP-DN6	28,5	6,4	19	-	1,6	16	5	9,8	1,2	6,5	10,5	6,8	4x M6x20 - 8.8	9	6,35x1,78	350	31919*	17467*
NDRVP-DN8	33,5	14,2	35	-	4,5	25,5	7	12,4	1,4	6,5	10,5	6,8	4x M6x25 - 8.8	9	8,5x2	350	20318*	35034*
NDRVP-DN10	38	18	33,5	-	4	25,5	10	15,7	1,4	6,5	10,5	6,8	4x M6x30 - 10.9	12	12x2	350	18958*	19205*
NDRVP-DN12	44,5	21	38	-	4	30	13	18,7	1,4	6,5	10,5	6,8	4x M6x35 - 12.9	14	15x2	350	18959*	35035*
NDRVP-DN16	54	14	76	38	11,4	54	17	23,9	1,9	8,5	13,5	9	6x M8x50 - 10.9	30	19x2,5	350	19717*	35036*
NDRVP-DN20	60	16	95	47,5	19	57	22	30,5	2,2	8,5	13,5	9	6x M8x55 - 12.9	35	25x3	350	32987*	30945*
NDRVP-DN25	76	15	120	60	20,6	79,5	28,5	37,5	2,2	10,5	16,5	11	6x M10x60 - 12.9	70	32x3	350	31920*	35037*
NDRVP-DN30	92	15	143	71,5	23,8	95	35	43,5	2,2	13	19	13	6x M12x85 - 10.9	100	38x3	350	32563*	35038*
NDRVP-DN40	111	16	133,5	67	25,5	89	47,5	57,5	2,2	13	19	13	6x M12x110 - 12.9	130	52x3	350	34147*	35039*

⁽¹⁾ Fixing screws not included.

*Article usually in stock.

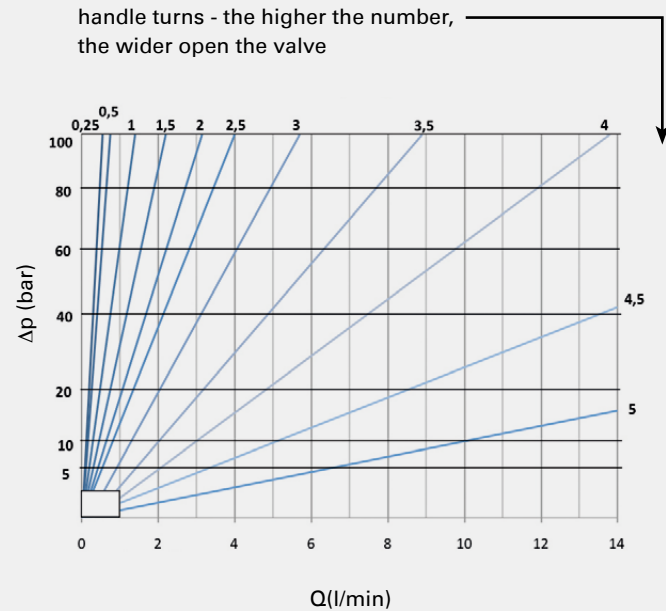
We recommend screws as per ISO4762 (DIN 912). The indicated property classes and torques represent our recommended guidelines at a friction coefficient of 14%.



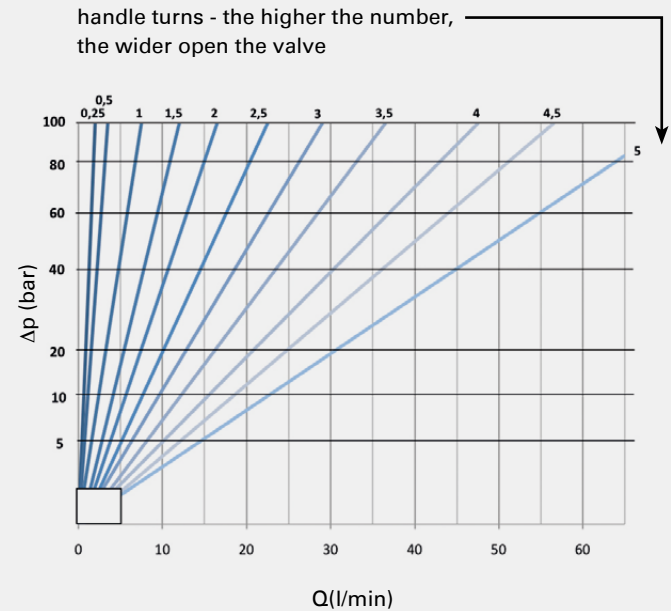
Flow control valves should not be used as shut-off device. Small leakage rates may occur in fully closed position. (DIN EN 12266 – leakage rate A-B – test medium water)
Leakage rate of check valve – DIN EN 12266 – leakage rate C-D

The flow values are valid for hydraulic oil (spissitude 880 kg/m³) and the kinematic viscosity ν of 35 mm²/s.

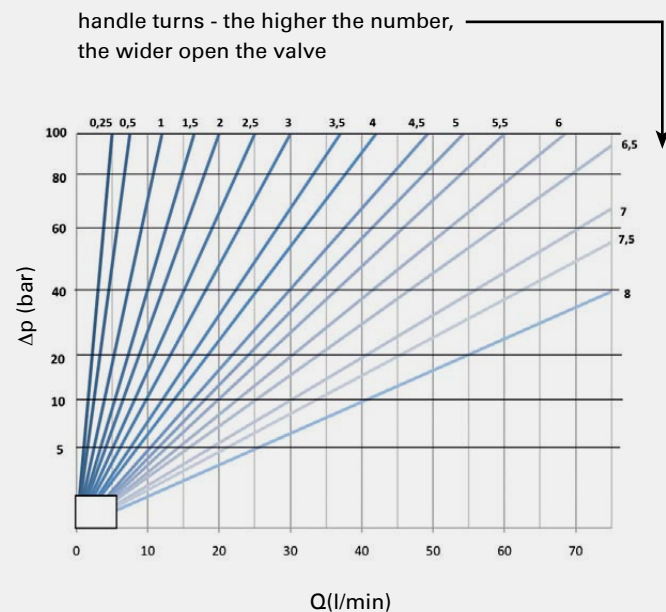
NDV/NDRV/NDVP/NDRVP-DN6



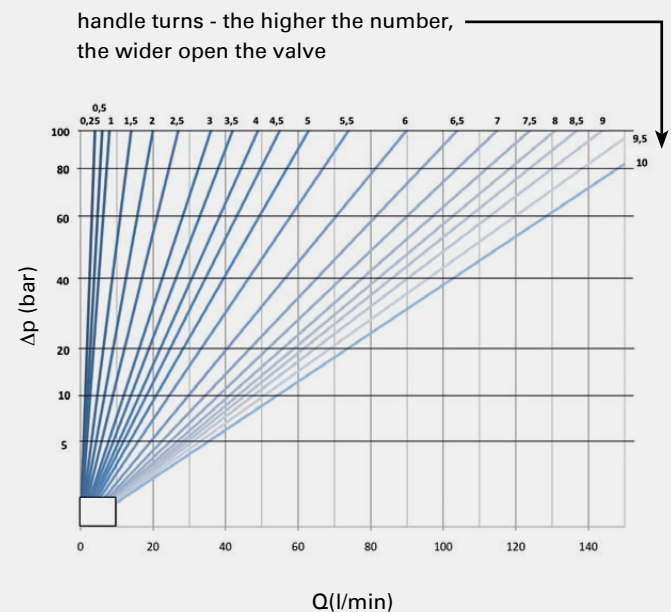
NDV/NDRV/NDVP/NDRVP-DN8



NDV/NDRV/NDVP/NDRVP-DN10



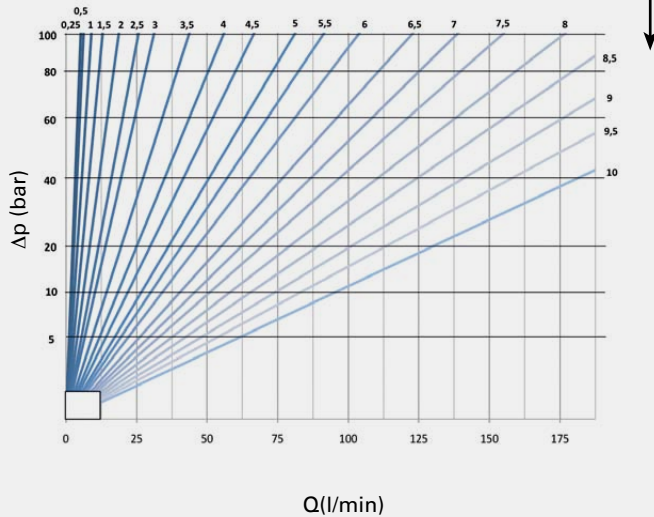
NDV/NDRV/NDVP/NDRVP-DN12



The flow values are valid for hydraulic oil (spissitude 880 kg/m³) and the kinematic viscosity ν of 35 mm²/s.

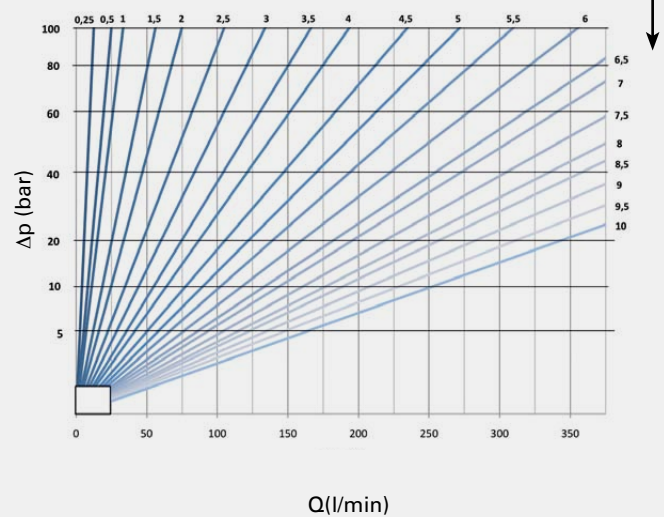
NDV/NDRV/NDVP/NDRVP-DN16

handle turns - the higher the number, the wider open the valve



NDV/NDRV/NDVP/NDRVP-DN20/25/30/40

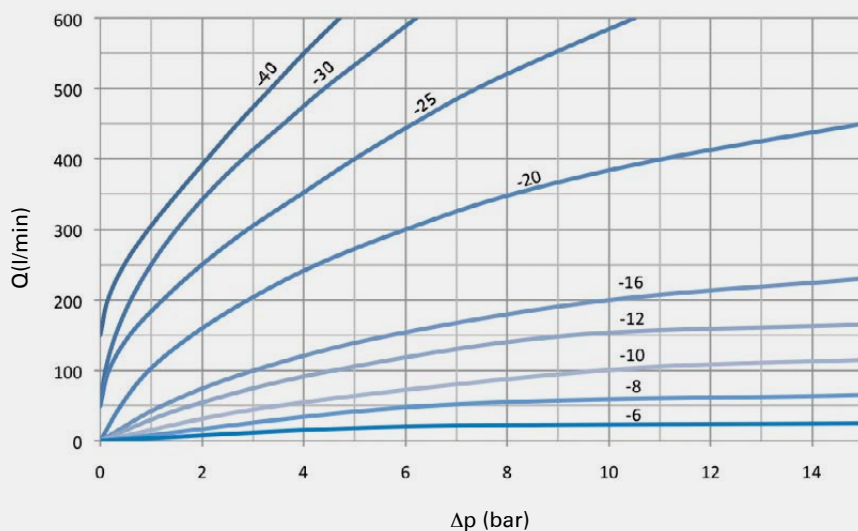
handle turns - the higher the number, the wider open the valve



NDRV/NDRVP-DN6 - DN40

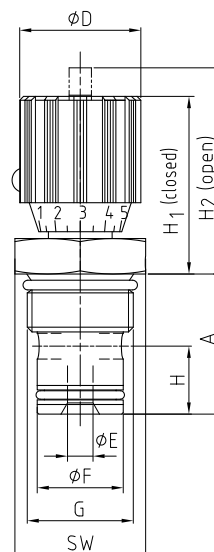
Flow direction: B-A

Δp characteristic line free flow through check valve



Flow control valve for cartridge assembly Steel / Stainless steel

NDVE



AVAILABLE SIZES

DN8 - DN16 (3/8" to 5/8")

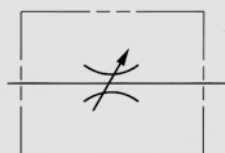
MATERIAL CODE DESCRIPTION

Materials	1A	18	4A	48
Body	Steel	Steel	Stainless Steel	Stainless Steel
O-rings	NBR	FPM	NBR	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C	-30°C / 100°C	-20°C / 100°C

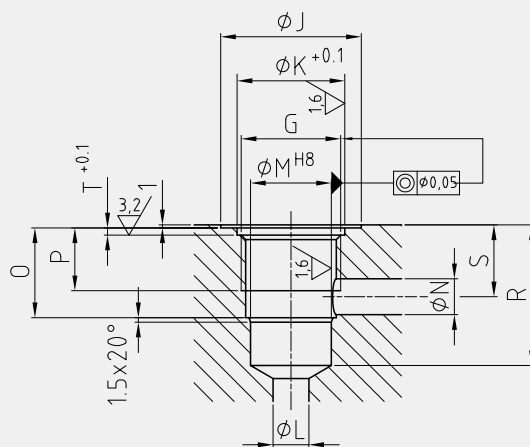
GENERAL DIMENSIONS

Type	H ₁	H ₂	H	A	E	F	SW	D	Weight [kg]
NDVE-DN8	41	47	12	27,5	5	14	27	29	0,15
NDVE-DN10	54	64	14,5	30,7	6	16	27	38	0,25
NDVE-DN12	55	65	17,5	40	8	19	32	38	0,50
NDVE-DN16	55	65	21,1	43,5	8	27	41	38	0,70

PORTING PATTERN



ASSEMBLY DIMENSIONS



ASSEMBLY DIMENSIONS												ORDER CODE PER MATERIAL COMBINATION				
Type	G ⁽¹⁾	J	K	L	M	N	O	P	R	S	T	PN [bar]	1A	18	4A	48
NDVE-DN8	G1/2	32	24	5	14	5	17,5	14	29	15	1,9	350	17280*	36703*	37741	20531
NDVE-DN10	G1/2	32	24	8	16	8	20,5	14	33	17	1,9	350	15132*	34216*	29470	30968
NDVE-DN12	G3/4	37	30	10	19	10	29	21	43	24	1,9	350	17266*	35285*	22599	11946
NDVE-DN16	G1	47	36	12	27	12	30	21	47	24	2,4	350	20312*	37742*	29471	12069

⁽¹⁾ As per DIN ISO228

*Article usually in stock.

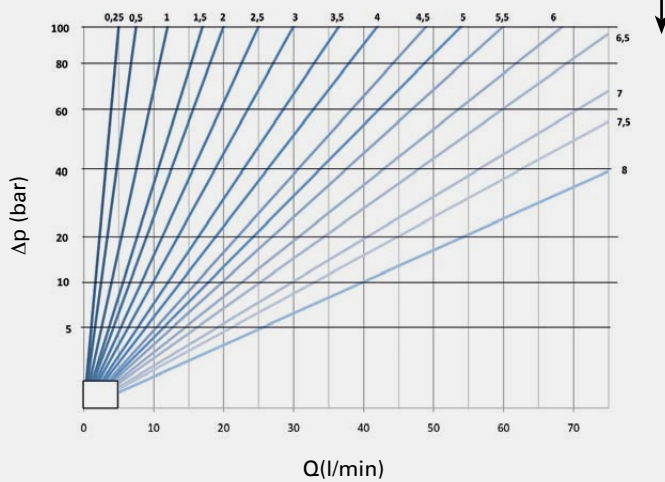


Flow control valves should not be used as shut-off device. Small leakage rates may occur in fully closed position. (DIN EN 12266 – leakage rate A-B – test medium water)

The flow values are valid for hydraulic oil (spissitude 880 kg/m³) and the kinematic viscosity ν of 35 mm²/s.

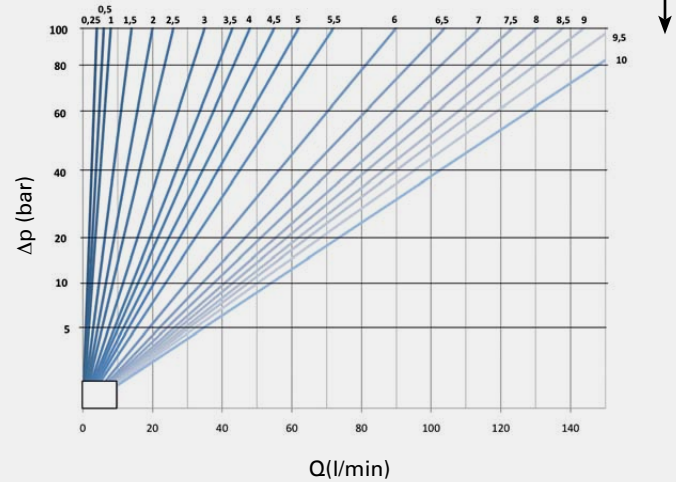
NDVE-DN8

handle turns - the higher the number,
the wider open the valve



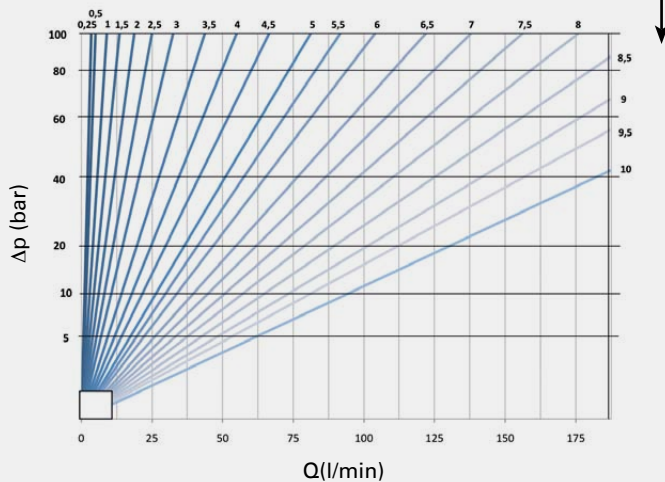
NDVE-DN10

handle turns - the higher the number,
the wider open the valve

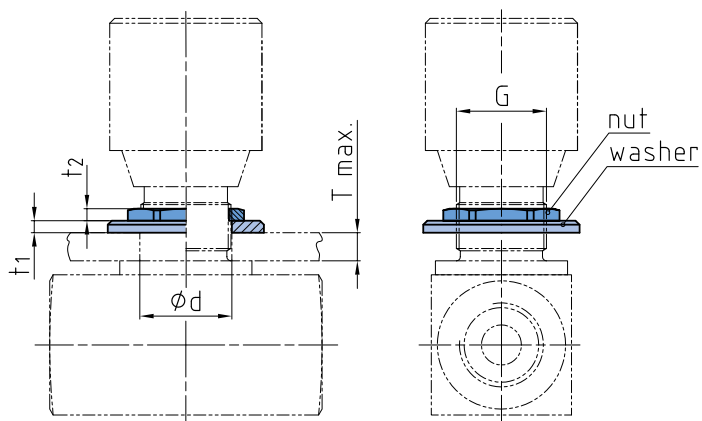


NDVE-DN12 - DN16

handle turns - the higher the number,
the wider open the valve



Panel mounting kits



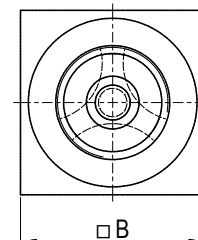
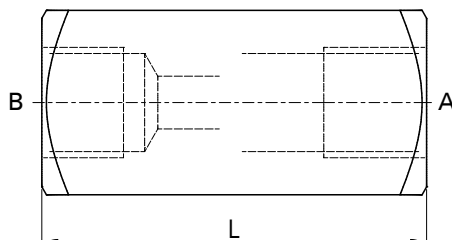
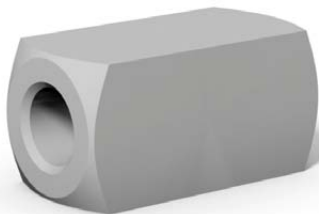
Detailed valve dimensions: page 196 to 203

DIMENSIONS							ORDER CODE
Type	T _{max}	d	t ₁	t ₂	G*	Weight [kg]	
NDV/NDRV-DN6	4	13	2,5	2,8	PG7	0,01	28286
NDV/NDRV-DN8-10	7	19	3	3	PG11	0,02	10095
NDV/NDRV-DN12-16	7	23	3	3	PG16	0,02	10096
NDV/NDRV-DN20-25	10	38	5	4	PG29	0,09	10097

*PG thread as per DIN 40430

Check valve for piping-system assembly Steel / Stainless steel

RV



AVAILABLE SIZES

DN6 - DN40 (1/8" to 2")

CONNECTIONS

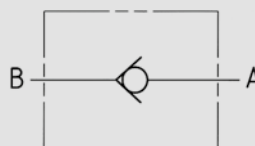
DIN ISO 228 Female thread,
ANSI B1.20.1 NPT Female thread,
SAE J 514 ISO/DIS 11926-1 Female thread

MATERIAL CODE DESCRIPTION

Materials	1	4
Body	Steel	Stainless Steel
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C
Cracking pressure	0,5 bar*	0,5 bar*

*Option: Cracking pressure PÖ 4,5 bar

PORTING PATTERN



GENERAL DIMENSIONS

Type	B
RV-DN6	16
RV-DN8	25
RV-DN10	30
RV-DN12	35
RV-DN16	45
RV-DN20	50
RV-DN25	60
RV-DN30	70
RV-DN40	90

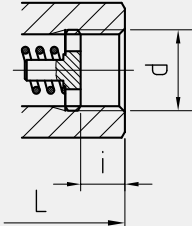
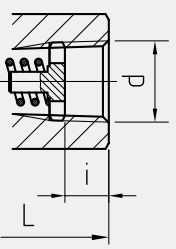
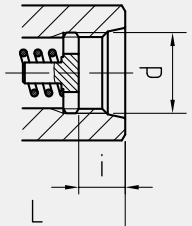


**Due to spring and manufacturing tolerances
cracking pressures may deviate by $\pm 30\%$.**

Check valve for piping-system assembly

Steel / Stainless steel

RV

CONNECTION TYPE	DIMENSIONS					ORDER CODE PER MATERIAL COMBINATION			
DIN ISO 228 FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	1	PN [bar]	4
	RV-DN6-G1/8	45	9,5	G1/8	0,10	500	18680*	350	35030
	RV-DN8-G1/4	55	13,5	G1/4	0,20	500	18646*	350	33963
	RV-DN10-G3/8	65	13,5	G3/8	0,40	500	18681*	350	33962
	RV-DN12-G1/2	73	15,5	G1/2	0,70	500	18682*	350	24828
	RV-DN16-G3/4	88	17,5	G3/4	1,20	500	18683*	350	18321
	RV-DN20-G1	127	19,5	G1	2,00	500	18684*	350	28592
	RV-DN25-G1 1/4	143	21,5	G1 1/4	3,30	400	18685*	350	25355
	RV-DN30-G1 1/2	143	23,5	G1 1/2	4,20	350	18687*	350	20786
	RV-DN40-G2	165	25,5	G2	7,20	350	18689*	350	31615
ANSI B1.20.1 NPT FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	1	PN [bar]	4
	RV-DN6-1/8"NPT	45	9,5	1/8"NPT	0,10	500	31006*	350	37753
	RV-DN8-1/4"NPT	55	13,5	1/4"NPT	0,20	500	26450*	350	29423
	RV-DN10-3/8"NPT	65	13,5	3/8"NPT	0,40	500	24442*	350	37754
	RV-DN12-1/2"NPT	73	15,5	1/2"NPT	0,60	500	30367*	350	31407
	RV-DN16-3/4"NPT	88	17,5	3/4"NPT	1,20	500	30640*	350	31408
	RV-DN20-1"NPT	127	19,5	1"NPT	2,00	500	26489	350	29909
	RV-DN25-1 1/4"NPT	143	21,5	1 1/4"NPT	3,00	400	26520	350	37755
	RV-DN30-1 1/2"NPT	143	23,5	1 1/2"NPT	4,20	350	26540	350	29524
	RV-DN40-2"NPT	165	25,5	2"NPT	8,00	350	25554	350	37756
SAE J514/ISO/DIS11926-1 FEMALE THREAD	Type	L	i	d	Weight [Kg]	PN [bar]	1	PN [bar]	4
	RV-DN8-7/16"UNF	54,5	13	7/16"-20 UNF	0,20	500	26451	350	37757
	RV-DN10-9/16"UNF	65	13,5	9/16"-18 UNF	0,40	500	26459	350	37758
	RV-DN12-3/4"UNF	73	15,5	3/4"-16 UNF	0,60	500	26465	350	37759
	RV-DN16-1 1/16"UNF	97,5	20	1 1/16"-12 UN	1,20	500	26479	350	37760
	RV-DN20-1 5/16"UN	127,5	20	1 5/16"-12 UN	1,90	500	26490	350	37761
	RV-DN25-1 5/8"UN	141,5	20	1 5/8"-12 UN	3,00	400	26522	350	37762
	RV-DN30-1 7/8"UN	139,5	20	1 7/8"-12 UN	3,90	350	26541	350	37763
	RV-DN40-2 1/2"UN	165	21	2 1/2"-12 UN	7,60	350	31793	350	37764

Please note the pressure ratings of the tube connections!

*Article usually in stock.

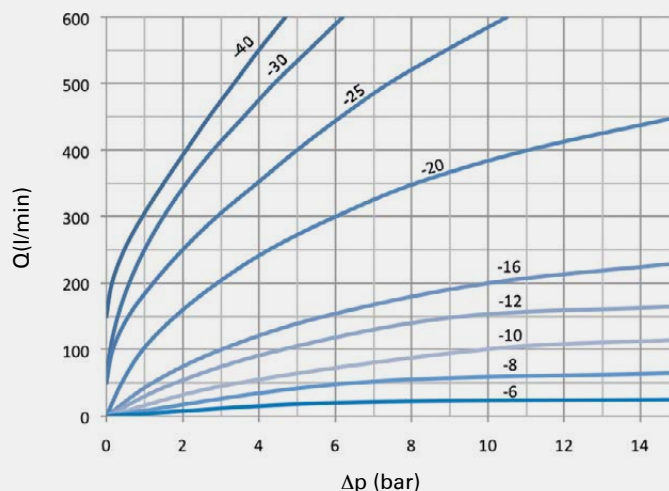
FLOW CHARACTERISTICS

The flow values are valid for hydraulic oil (spissitude 880 kg/m³) and the kinematic viscosity ν of 35 mm²/s.

Flow direction: B-A

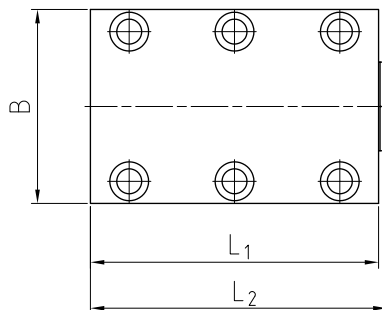
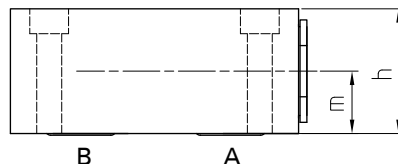
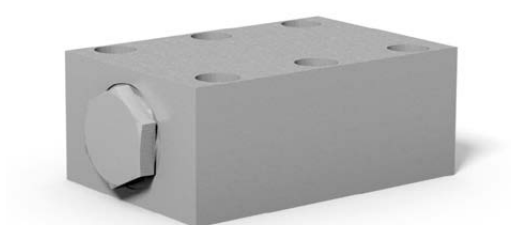
Δp characteristic line free flow through check valve

 **Leakage rate of check valve**
DIN EN 12266 – leakage rate C-D (test medium water)



Check valve for manifold mounting Steel

RVP



AVAILABLE SIZES

DN6 - DN40 (1/4" to 1 1/2")

MATERIAL CODE DESCRIPTION

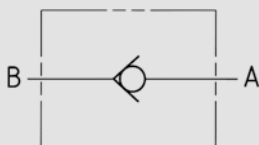
Materials	83	85
Body	Steel	Steel
O-rings	NBR	FPM
Tmin /Tmax	-20°C / 100°C	-20°C / 100°C
Cracking pressure	0,5 bar*	0,5 bar*

*Option: Cracking pressure PÖ 4,5 bar

GENERAL DIMENSIONS

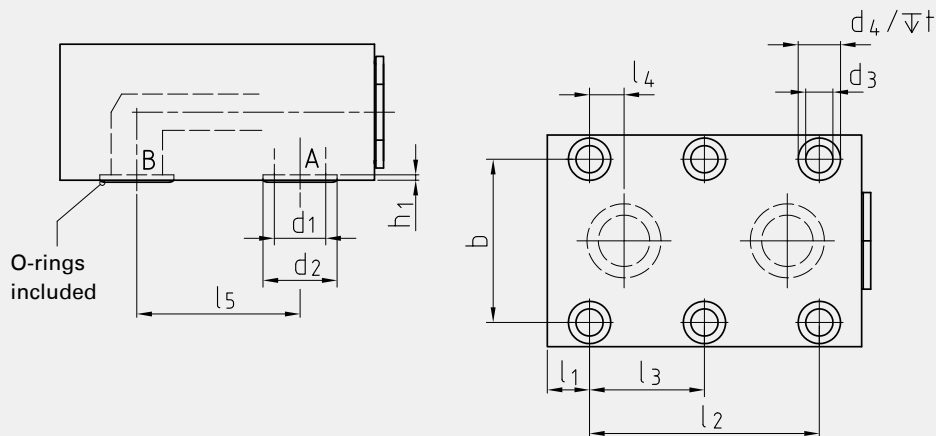
Type	m	h	B	L ₁	L ₂	Weight [kg]
RVP-DN6	8	16	41,5	41,5	47	0,20
RVP-DN8	10	20	46	63,5	70	0,40
RVP-DN10	12,5	25	51	70	75	0,63
RVP-DN12	16	32	57,5	80	86	1,06
RVP-DN16	22,5	45	70	104	110	2,23
RVP-DN20	25	50	76,5	127	133	3,33
RVP-DN25	27,5	55	100	165	171	5,80
RVP-DN30	37,5	75	115	186	192	10,89
RVP-DN40	50	100	140	192	206	18,20

PORTING PATTERN



Due to spring and manufacturing tolerances cracking pressures may deviate by ±30%.

ASSEMBLY DIMENSIONS



ASSEMBLY DIMENSIONS																ORDER CODE PER MATERIAL COMBINATION		
Type	b	l ₁	l ₂	l ₃	l ₄	l ₅	d ₁	d ₂	h ₁	d ₃	d ₄	t	Dimension of screws (min) ⁽¹⁾	Torque of screws in Nm ⁽¹⁾	O-ring	PN [bar]	83	85
RVP-DN6	28,5	6,4	19	-	1,6	16	5	9,8	1,2	6,5	10,5	6,8	4x M6x20 - 8.8	9	6,35x1,78	350	20321	37743
RVP-DN8	33,5	14,2	35	-	4,5	25,5	7	12,4	1,4	6,5	10,5	6,8	4x M6x25 - 8.8	9	8,5x2	350	20322	37744
RVP-DN10	38	18	33,5	-	4	25,5	10	15,7	1,4	6,5	10,5	6,8	4x M6x30 - 10.9	12	12x2	350	20323	37745
RVP-DN12	44,5	21	38	-	4	30	13	18,7	1,4	6,5	10,5	6,8	4x M6x35 - 12.9	14	15x2	350	20324	37746
RVP-DN16	54	14	76	38	11,4	54	17	23,9	1,9	8,5	13,5	9	6x M8x50 - 10.9	30	19x2,5	350	20325	37747
RVP-DN20	60	16	95	47,5	19	57	22	30,5	2,2	8,5	13,5	9	6x M8x55 - 12.9	35	25x3	350	20326	37748
RVP-DN25	76	15	120	60	20,6	79,5	28,5	37,5	2,2	10,5	16,5	11	6x M10x60 - 12.9	70	32x3	350	20327	37749
RVP-DN30	92	15	143	71,5	23,8	95	35	43,5	2,2	13	19	13	6x M12x85 - 10.9	100	38x3	350	20328	37750
RVP-DN40	111	16	133,5	67	25,5	89	47,5	57,5	2,2	13	19	13	6x M12x110 - 12.9	130	52x3	350	20329	37751

⁽¹⁾ Fixing screws not included.

We recommend screws as per ISO4762 (DIN 912). The indicated property classes and torques represent our recommended guidelines at a friction coefficient of 14%.

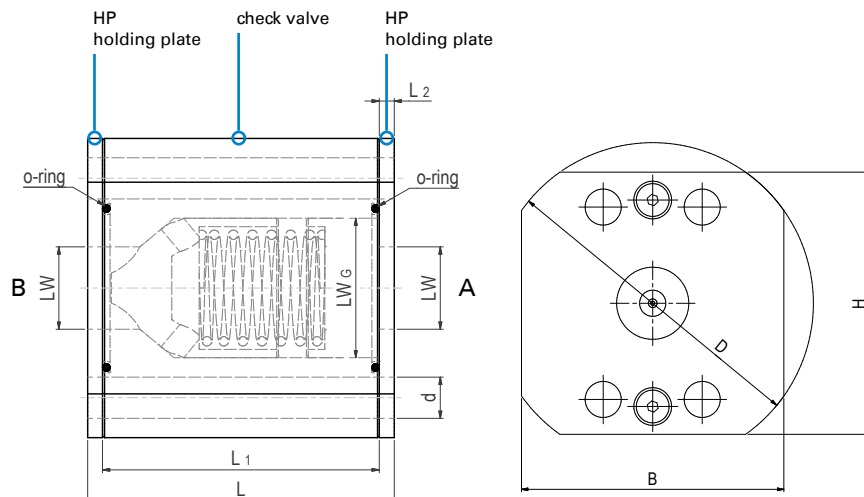


Leakage rate of check valve

DIN EN 12266 – leakage rate C-D (test medium water)

Check valve with SAE adapter Steel / Stainless Steel

RVZ-SAE



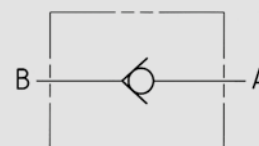
AVAILABLE SIZES

DN15 - DN50 (5/8" to 2")

CONNECTIONS

ISO 6162-1, ISO 6162-2

PORTING PATTERN



ACCESSORIES ON REQUEST

- Double flange pattern adapter plate

page 216

MATERIAL CODE DESCRIPTION

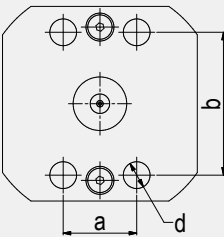
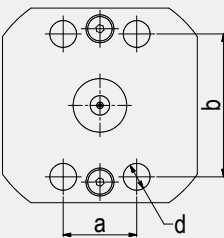
Materials	28p8	44p8
Body	Steel	Stainless Steel
Poppet	Steel	Stainless Steel
Seat	Polyurethane	Polyurethane
O-rings	FPM	FPM
Tmin / Tmax	-20°C / 100°C	-20°C / 100°C
Cracking pressure	2 bar	2 bar

GENERAL DIMENSIONS

Type	LW	LW _G	L	L ₁	D	B	H	PÖ [bar]
RVZ-DN15-SAE210	11	17,5	46	38	70	45	60	2
RVZ-DN20-SAE210	14,5	23	54	46	82	55	70	2
RVZ-DN25-SAE210	17	28	61	53	97	70	80	2
RVZ-DN32-SAE210	22	37,3	82	74	98	80	80	2
RVZ-DN40-SAE210	28	43	89	81	118	90	95	2
RVZ-DN50-SAE210	37	55	105	97	137	100	110	2
RVZ-DN15-SAE420	11	17,5	46	38	73	50	60	2
RVZ-DN20-SAE420	14,5	23	54	46	87	60	70	2
RVZ-DN25-SAE420	17	28	61	53	98	70	80	2
RVZ-DN32-SAE420	22	37,3	84	74	115	80	95	2
RVZ-DN40-SAE420	28	43	91	81	136	95	115	2
RVZ-DN50-SAE420	37	55	109	97	165	115	135	2

Check valve with SAE adapter Steel / Stainless Steel

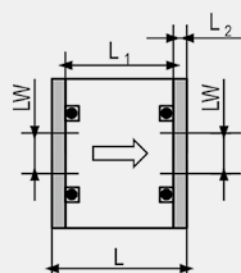
RVZ-SAE

CONNECTION TYPE	DIMENSIONS					ORDER CODE PER MATERIAL COMBINATION		
ISO 6162-1	Type	a	b	d	Weight [Kg]	PN [bar]	28p8	44p8
	RVZ-DN15-SAE210	17,5	38,1	9	1,10	210	55424	on request
	RVZ-DN20-SAE210	22,2	47,6	11	1,50	210	55425	on request
	RVZ-DN25-SAE210	26,2	52,4	11	2,30	210	55394	on request
	RVZ-DN32-SAE210	30,2	58,7	11	3,45	210	55395	on request
	RVZ-DN40-SAE210	35,7	69,9	13	4,85	210	54350	on request
	RVZ-DN50-SAE210	42,9	77,8	13	7,80	210	55426	on request
ISO 6162-2	Type	a	b	d	Weight [Kg]	PN [bar]	28p8	44p8
	RVZ-DN15-SAE420	18,2	40,5	9	1,10	420	55732	on request
	RVZ-DN20-SAE420	23,8	50,8	11	1,50	420	55731	on request
	RVZ-DN25-SAE420	27,8	57,2	13	2,30	420	55721	on request
	RVZ-DN32-SAE420	31,8	66,7	13	3,45	420	55716	on request
	RVZ-DN40-SAE420	36,5	79,4	17	4,85	420	55022	on request
	RVZ-DN50-SAE420	44,5	96,8	22	7,80	420	55726	on request

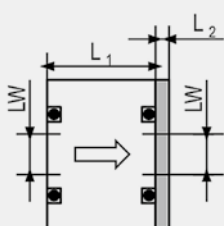
Scope of delivery

- Check valve + 2 O-rings + 2 holding plates
- Adapter plate has to be ordered separately (see next page)
- Standard cracking pressure 2 bar, further cracking pressures on request

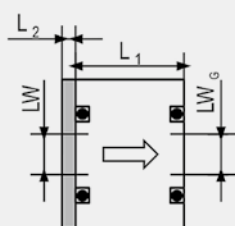
OPTIONS THAT CAN BE REALIZED WITH SCOPE OF DELIVERY



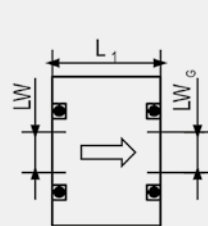
Option A
without seals



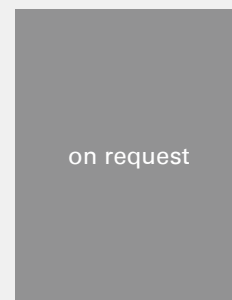
Option B
inlet side sealed



Option C
outlet side sealed



Option D
seals on both sides



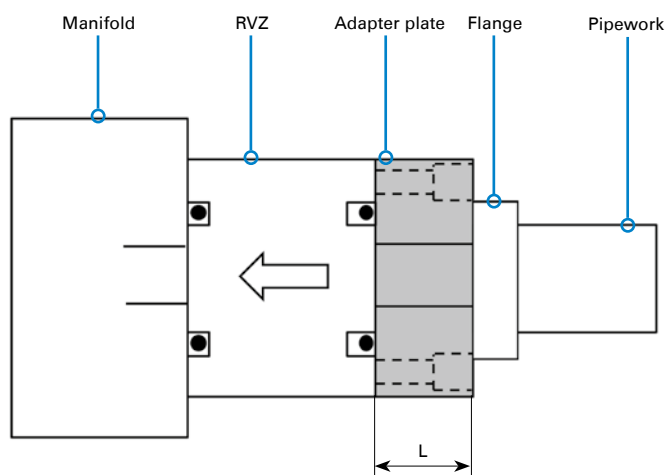
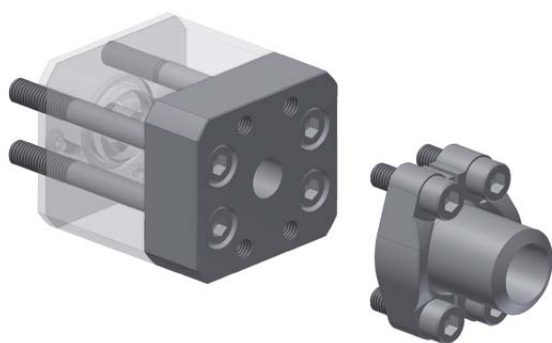
Option E
with threaded holes

! Due to spring and manufacturing tolerances cracking pressures may deviate by $\pm 30\%$.

! Leakage rate of check valve
DIN EN 12266 leakage rate A - no visually noticeable leakage during the duration of the test with fluid or air.

RVZ double flange pattern adapter plate Steel / Stainless Steel

RVZ-SAE



MATERIAL CODE DESCRIPTION

Materials	1	4
Body	Steel	Stainless Steel (on request)

The adapter plate expands the functional range of the RVZ with additional threaded connections. Through that it is (for example) possible to remove a connected pipe from the RVZ without removing the RVZ from the manifold it is attached to.

DIMENSIONS ISO 6162-1/SAE210

Connection	DN	L	PN (bar)	1	4
SAE210	15	on request	210	on request	on request
SAE210	20	29	210	55443	on request
SAE210	25	29	210	55444	on request
SAE210	32	33	210	55445	on request
SAE210	40	33	210	55446	on request
SAE210	50	33	210	55447	on request

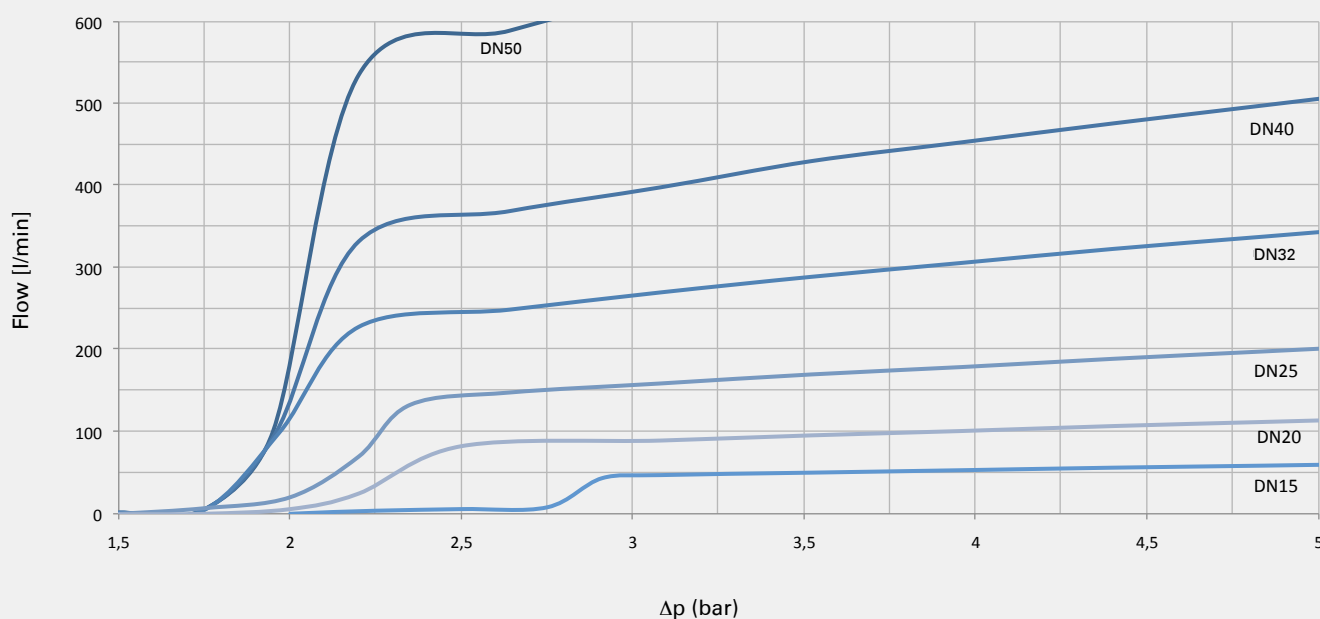
ORDER CODE PER MATERIAL

DIMENSIONS ISO 6162-2/SAE420

Connection	DN	L	PN (bar)	1	4
SAE420	15	on request	420	on request	on request
SAE420	20	on request	420	on request	on request
SAE420	25	on request	420	on request	on request
SAE420	32	on request	420	on request	on request
SAE420	40	on request	420	on request	on request
SAE420	50	on request	420	on request	on request

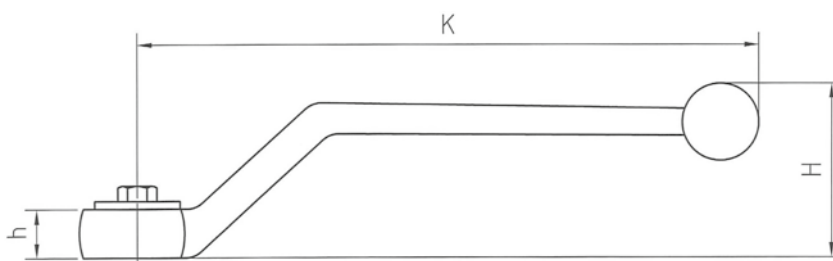
ORDER CODE PER MATERIAL

FLOW CHARACTERISTICS



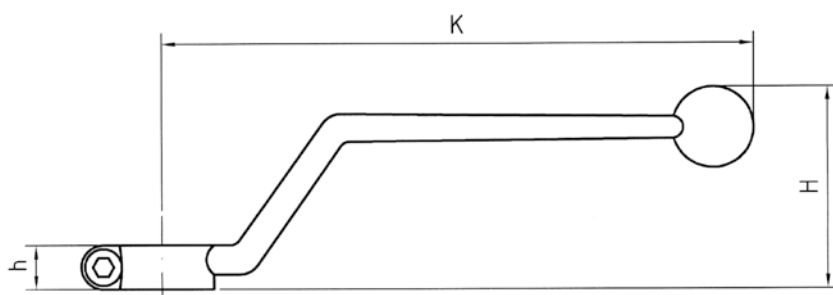
Bent levers

Steel / Stainless Steel / Zinc / Aluminum



DIMENSIONS				ORDER CODE PER MATERIAL					
SW	K	h	H	Weight [Kg]	Steel	Weight [Kg]	Stainless Steel	Weight [Kg]	Zinc
7	80	6,5	30	0,05	013 00196*			0,03	013 12603*
7	60	6,5	22			0,04	013 26305*		
9	115	8,7	45					0,09	013 15533*(1)
9	115	9	47	0,10	013 00063*(1)	0,10	013 14689*(1)		
14	171	12	64	0,25	013 08618*(1)				
14	160	12	48			0,20	013 49334*(1)		
17	306	16	89	0,70	013 14083*				
17	227,5	15	90			0,40	013 32962*		

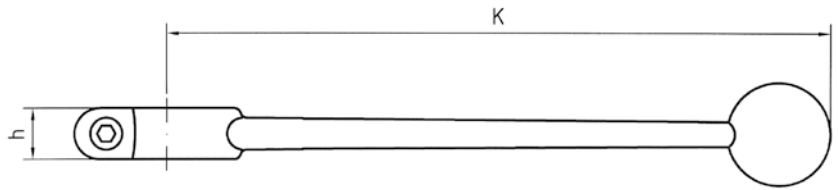
⁽¹⁾ Article numbers include flow indicator for 2-way valves.
Article numbers for multiway valves on request



DIMENSIONS				ORDER CODE PER MATERIAL	
SW	K	h	H	Weight [Kg]	Aluminum
12	160	12	55	0,07	013 01741*

*Article usually in stock.

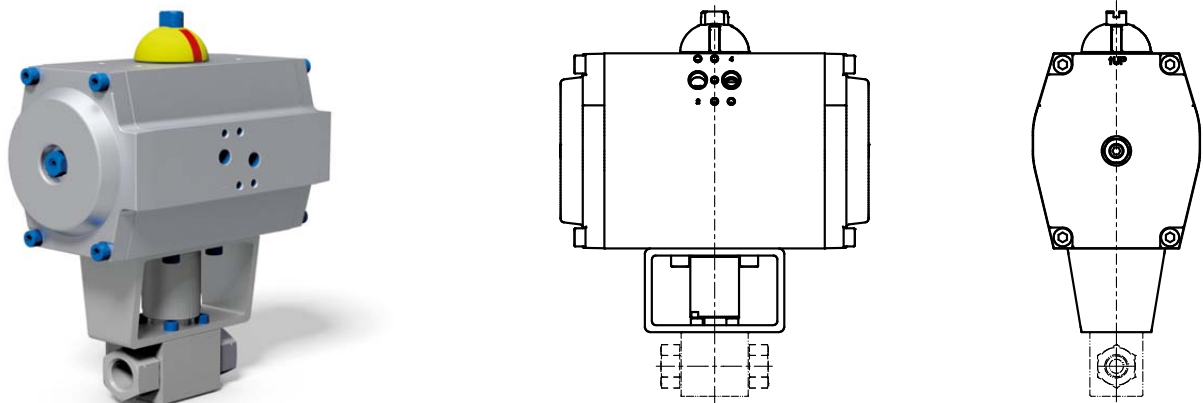
Straight levers Aluminum / Zinc



DIMENSIONS			ORDER CODE PER MATERIAL			
SW	K	h	Weight [Kg]	Aluminum	Weight [Kg]	Zinc
9	155	10			0,09	013 03722*
9	150	11	0,06	013 00052*		
14	200	12	0,11	013 06745*		
14	200	13			0,22	013 02729*
17	320	16	0,26	013 01799*		

*Article usually in stock.

Ball valves with pneumatic actuator

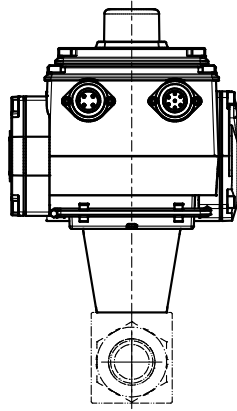
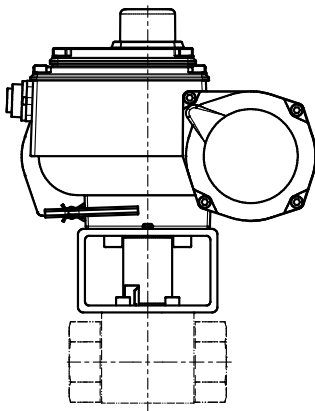


The dimensioning of the actuators is based on the extensive experience of MHA ZENTGRAF. When making a request, it is absolutely necessary to specify the working pressure, service medium and operating temperature, to enable us to configure the actuators for your application. Furthermore the following product code defines all used components for the actuator configuration:

ORDER EXAMPLE

order text (ball valve design: see data sheets)	article no.	mode of operation	control pressure [bar]	limit switch box	solenoid valve	version
BKH - DN4 - G1/8 - 112A	20639	PA				
		<div>DWdouble acting</div> <div>EWsingle acting</div>		<div>Mmechanical</div> <div>Iinductive</div> <div>Owithout</div>	<div>DC24V DC</div> <div>AC230V AC</div> <div>Owithout</div>	<div>STstandard</div> <div>EXEx-version: please specify required EX-zone (EX-level)</div>

Ball valves with electric actuator

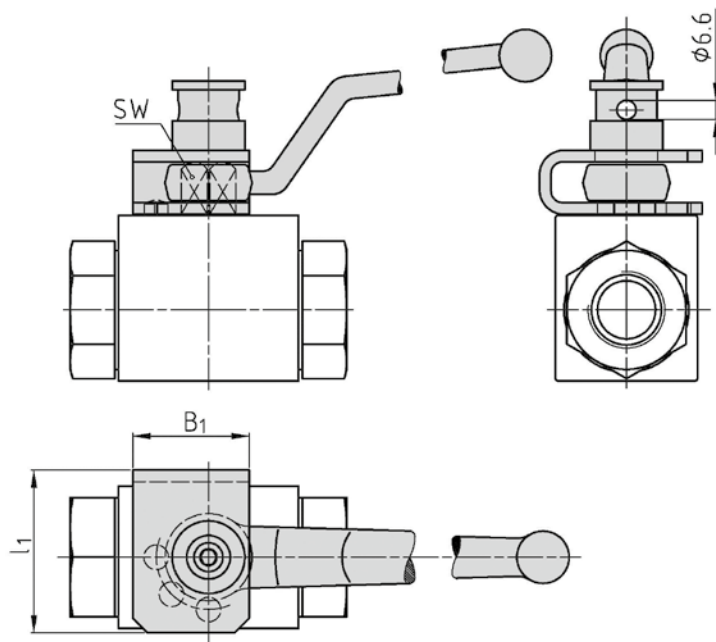
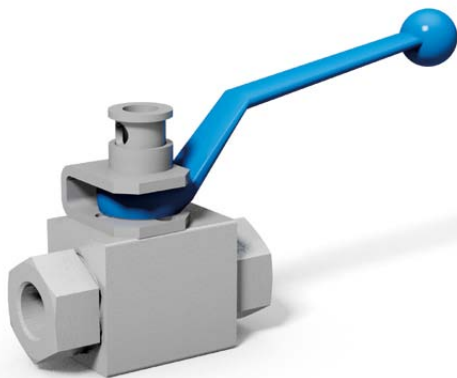


The dimensioning of the actuators is based on the extensive experience of MHA ZENTGRAF. When making a request, it is absolutely necessary to specify the working pressure, service medium and operating temperature, to enable us to configure the actuators for your application. Furthermore the following product code defines all used components for the actuator configuration:

ORDER EXAMPLE

order text (ball valve design: see data sheets)	article no.		voltage	version
BKH - DN4 - G1/8 - 112A	- 20639	- EA -		
			<div>24V DC</div> <div>230V AC</div> <div>S special: please specify separately with the inquiry</div>	<div>ST standard</div> <div>EX ⚠-version: please specify required EX-zone (EX-level)</div>

Locking device type 1 Steel



- Universal locking device
- Suitable as retrofit
- Cannot be dismantled when locked
- High security against tampering disassembly
- Bent handle is part of delivery

DIMENSIONS				ORDER CODE PER MATERIAL**		
DN	SW	B ₁	I ₁	Steel	Stainless Steel	*Article usually in stock.
4-13	9	25	33	052 18230*	on request	**Valid for flow through ball valves
16	12	40	50	052 18231*	on request	
20-25	14	40	56	052 18232*	on request	
32-50	17	50	64	052 18233*	on request	

ORDER EXAMPLE

Mounting set consisting of shackle, sliding sleeve, link with screw and steel lever:

order text	article no.
Locking device type 1 for ball valve DN 4-13	052 18230

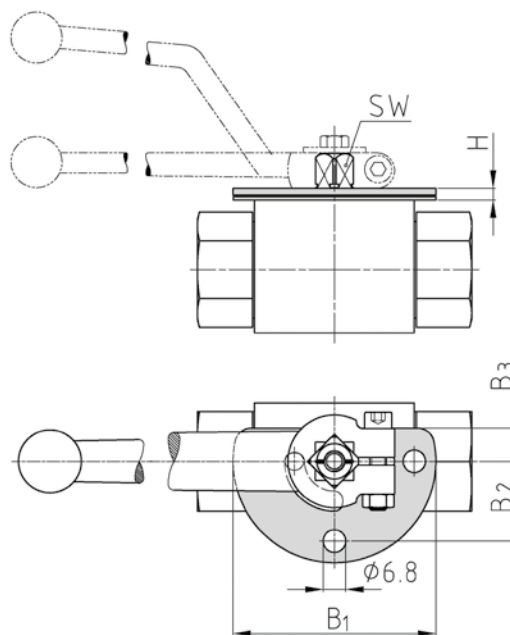
Assembled with ball valves:

ball valve type (ball valve design: see data sheets)	article no.	description
BKH - DN13 - G1/2 - 112A	17253	with locking device type 1

MOUNTING SETS ARE VALID FOR

Type	BKH / BKHP500	MKHP420 Steel	BKH-AS	MKHP-AS Steel	BKH / BKHP-SAEFS	MKHP-SAEFS Steel	BKH / BKHP-SAE	MKHP-SAE Steel	BK3 / BK3-S	3KH	PKH	BKHP800	MKHP800
Page	14 - 21	22 - 24	34	35	38 - 41	42 - 43	46 - 49	50 - 51	92 - 102	108 - 114	124 - 127	140 - 141	142 - 143

Locking device type 2 Steel



- Suitable as retrofit
- Economical solution
- Can be dismantled after disassembly of lever

DIMENSIONS						ORDER CODE PER MATERIAL		
DN	SW	H	B ₁	B ₂	B ₃	Steel	Stainless Steel	*Article usually in stock.
4-8	9	3,5	61	24	10	052 35082*	on request	
10-13	9	3,5	61	24	10	052 30594*	on request	
16	12	4,5	64	25,5	12	052 30595*	on request	
20-25	14	4,5	84	35,5	14	052 30596*	on request	
32-50	17	4,5	136	61,5	15	052 30597*	on request	

ORDER EXAMPLE

Mounting set consisting of locking plate, stopping disk and ring:

order text

Locking device type 2 for ball valve DN 4-8

article no.

052 35082

Assembled with ball valves:

ball valve type
(ball valve design: see data sheets)

article no.

BKH - DN13 - G1/2 - 112A

-

17253

-

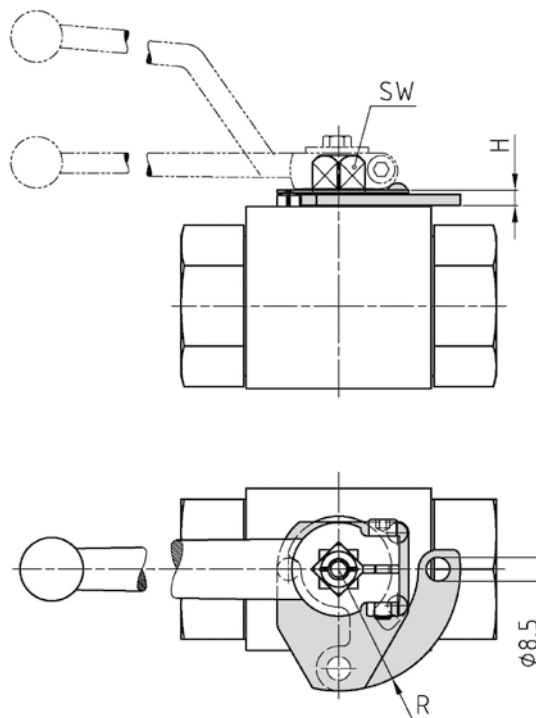
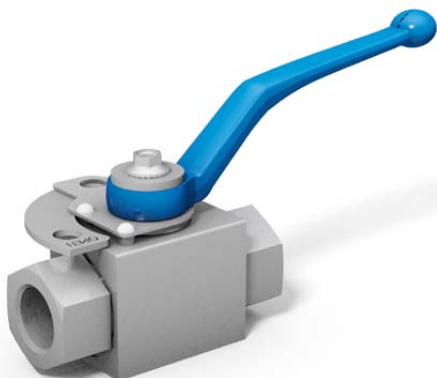
description

with locking device type 2

MOUNTING SETS ARE VALID FOR

Type	BKH	BKH-AS	MKHP420 Steel	MKHP-AS Steel	BKH / BKH-SAE	MKHP-SAE Steel	BKH / BKH- SAEFS	MKHP-SAEFS Steel	BK3 ≤ DN25
Page	14 - 21	34	22 - 24	35	46 - 49	50 - 51	38 - 41	42 - 43	92 - 95

Locking device type 3 Stainless steel



- Not suitable as retrofit
- Economical solution
- Cannot be dismantled
- High security against tampering disassembly

DIMENSIONS				ORDER CODE PER MATERIAL	
DN	SW	H	R	Stainless Steel	
4-13	9	4	37	052 34095	
16	12	4,3	40	052 34279	
20-25	14	5,5	43,5	052 33499	
32-50	17	6	69,5	052 33506	

ORDER EXAMPLE

Available only mounted with ball valve:

ball valve type
(ball valve design: see data sheets)

article no.

description

BKH - DN13 - G1/2 - 112A

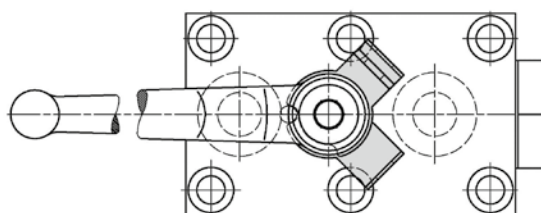
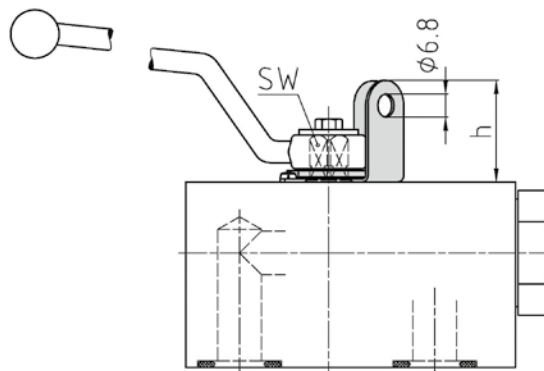
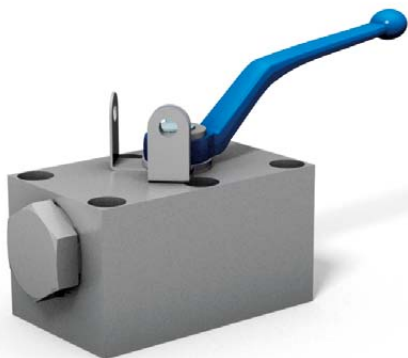
- on request

- with locking device type 3

MOUNTING SETS ARE VALID FOR

Type	BKH	BKH-AS	MKHP420 Steel	MKHP-AS Steel	BK3 ≤ DN25
Page	14 - 21	34	22 - 24	35	92 - 95

Locking device type 4 Stainless steel



- Universal locking device
- Only suitable as retrofit for ball valves with bent lever
- Economical solution
- Can be dismantled after disassembly of lever
- Bent handle is part of delivery

DIMENSIONS		ORDER CODE PER MATERIAL	
SW	h	Stainless Steel	
7	24	052 40570	
9	28	052 36682	
12	34,5	052 52896	
14	34,5	052 36683	
17	44	052 36684	

ORDER EXAMPLE

Mounting set consisting of locking plate, stopping disk and ring:

order text	article no.
Locking device type 4 for ball valve DN 10-13	052 36682

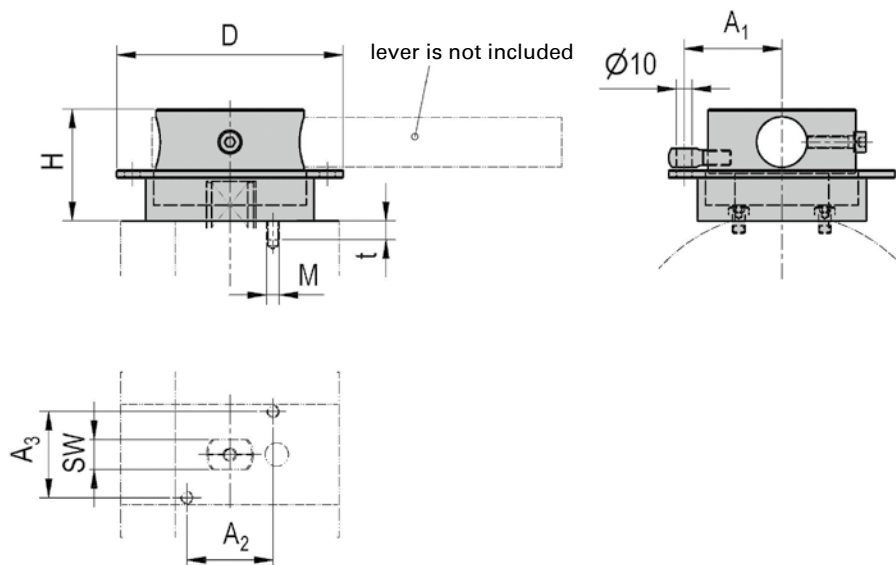
Assembled with ball valves:

ball valve type (ball valve design: see data sheets)	article no.	description
PKH - DN13 - 112A	- 29571	- with locking device type 4

MOUNTING SETS ARE VALID FOR

Type	BKH / BKHP500	MKHP420 Steel	MKHP- SAEFS	MKHP-SAE	KHZ-SAE	BK3 / BK3-S	3KH	4KH	PKH	PK3	MPKH3/4
Page	14 - 21	22 - 24	42 - 45 58 - 61	50 - 53	68 - 71	92 - 102	108 - 114	116 - 122	124 - 127	128 - 131	136 - 139

Locking device for KH series \geq DN65 Steel



- Attention: Locking device requires modification at valve body
- Not suitable as retrofit

DIMENSIONS									ORDER CODE PER MATERIAL	
Type	SW	D	H	A ₁	A ₂	A ₃	M	t	Steel	
KH-DN65	16	145	71,5	62,5	55,15	55,15	M6	10	29509	
KH-DN80	19	145	71,5	62,5	55,15	55,15	M8	12	14590	
KH-DN100	24	155	74,5	67,5	62,23	62,23	M8	12	17665	
KH-DN125	36	165	104,5	72,5	69,3	69,3	M8	12	54677	

ORDER EXAMPLE

Mounting set consisting of adapter, bushing, fixing screws and eye bolt:

order text

article no.

Locking device for ball valve DN 65

29509

Assembled with ball valves:

ball valve type
(ball valve design: see data sheets)

article no.

description

KH-DN65-SAE210-282A

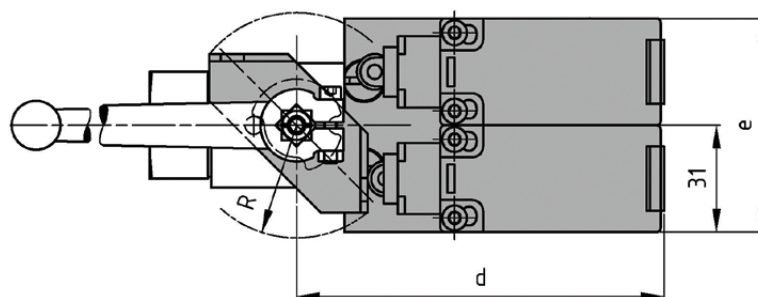
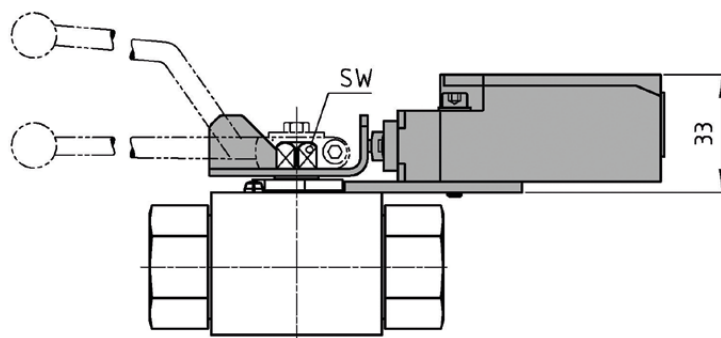
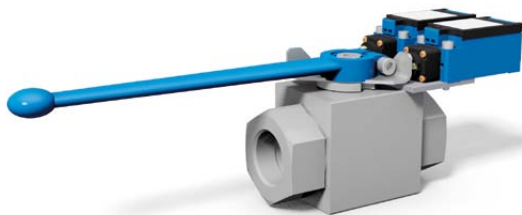
- 32104 -

with locking device

MOUNTING SETS ARE VALID FOR

Type	KH-SAE	KH-ISO	KH-CETOP	KH-AS
Page	62 - 67	74 - 81	82 - 83	84 - 85

Assembling set with mechanical limit switches



Mechanical limit switch properties

- Body material: thermoplastic, glass fiber reinforced
- Protection type: IP65 as per VDE 470T1
- NC/NO contact
- Utilization category AC-15, Ue /Ie 240V/3A
(DC usage also possible)
- Cable entry: 1 x M20x1,5
- Ambient air temp.: -30°C / +80°C

DIMENSIONS

DN	SW	d	e	R
4-8	9	102	60	32
10	9	102	60	32
13	9	102	60	32
16	12	108	73	40
20	14	106	70	37,5
25	14	106	70	37,5
32-50	17	114	85	49

ORDER CODE PER MATERIAL

Steel
048 21648
048 21649
048 21650
048 21651
048 21652
048 21653
048 21654

ORDER EXAMPLE

Mounting set consisting of switch cam, fixing plate with screws and limit switch(es) with screws and washers:

order text	article no.
Limit switch assembling set for ball valve DN 4-8	048 21648

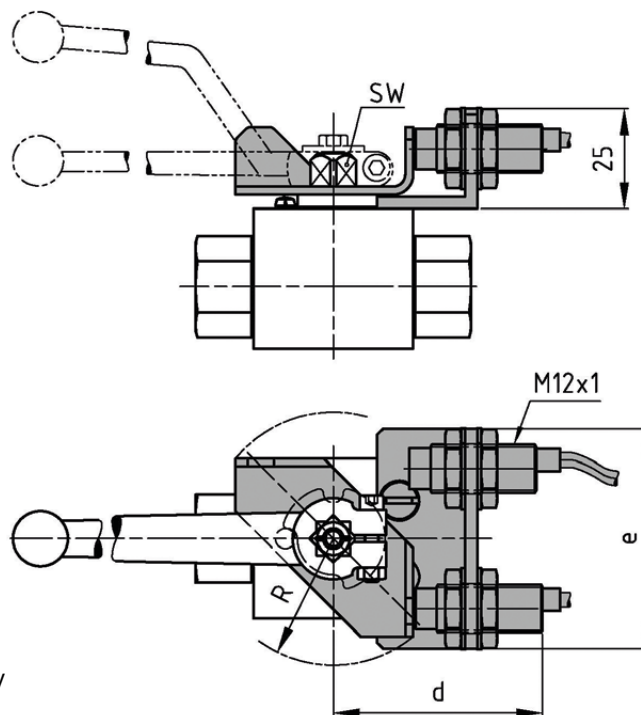
Assembled with ball valves:

ball valve type (ball valve design: see data sheets)	article no.	description
BKH - DN13 - G1/2 - 112A	17253	with limit switch assembling set

MOUNTING SETS ARE VALID FOR

Type	BKH / BKHP 420	BKH-AS	MKHP420	MKHP-AS	BK3 / BK3-S
Page	14 - 21	34	22 - 28	35	92 - 102

Assembling set with inductive proximity switches



Proximity switch properties

- Body material: brass, nickel-plated
- Active surface material: PA 6.6
- Mounting: non-flush
- Proximity sensor as per NAMUR (DIN EN 60947-5-6)
- Rated operation distance: 4mm
(switching point 1,5 mA @ $U_n = 8\text{ V}$ and $R_i = 1\text{ k}\Omega$)
- Protection type: IP67
- Rated voltage: DC 8 V / Rated operational voltage: DC 5 ... 25 V
- Ambient air temp.: -25°C / +70°C

DIMENSIONS					ORDER CODE PER MATERIAL	
DN	SW	d	e	R	Steel	
4-8	9	54	55	32	048 21921	
10	9	54	55	32	048 21922	
13	9	54	55	32	048 21923	
16	12	60	68	40	048 21924	
20	14	58	64	37,5	048 21925	
25	14	58	64	37,5	048 21926	
32-50	17	66	80	49	048 21927	

ORDER EXAMPLE

Mounting set consisting of switch cam, shackle with screws and limit switch(es):

order text	article no.
Proximity switch assembling set for ball valve DN 4-8	048 21921

Assembled with ball valves:

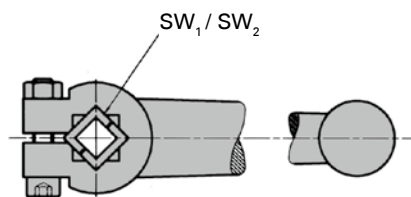
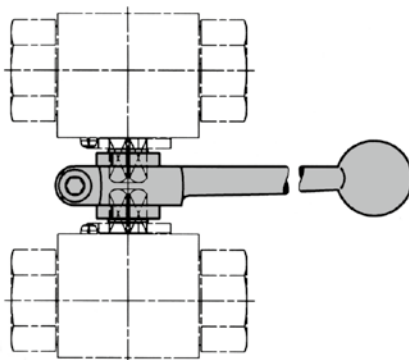
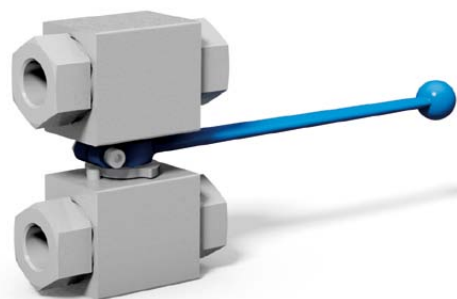
ball valve type (ball valve design: see data sheets)	article no.	description
BKH - DN13 - G1/2 - 112A	17253	with proximity switch assembling set

MOUNTING SETS ARE VALID FOR

Type	BKH / BKHP 420	BKH-AS	MKHP420	MKHP-AS	BK3 / BK3-S
Page	14 - 21	34	22 - 28	35	92 - 102

Assembling sets for ball valve combinations

Steel / Stainless Steel



MATERIAL CODE DESCRIPTION



SW₁: Wrench size of stem
SW₂: Wrench size of lever

Materials	1	4
Square coupling	Steel	Stainless Steel

DIMENSIONS



ORDER CODE PER MATERIAL

Type	SW ₁	SW ₂	Lever
SW9/14	9	14	Zn
SW12/17	12	17	Al
SW14/17	14	17	Al
SW17/19	17	19	Al

1	4
032 39250*	032 39251*
032 39252*	032 39253*
032 39254*	032 39255*
032 39256*	032 39257*

*Article usually in stock.

ORDER EXAMPLE

Mounting set consisting of lever and square coupling:

order text

article no.

Assembling set for ball valve combination SW 9/14-Steel

032 39250

Assembled with ball valves:

ball valve type
(ball valve design: see data sheets)

article no.

description

BKH - DN13 - G1/2 - 112A

-

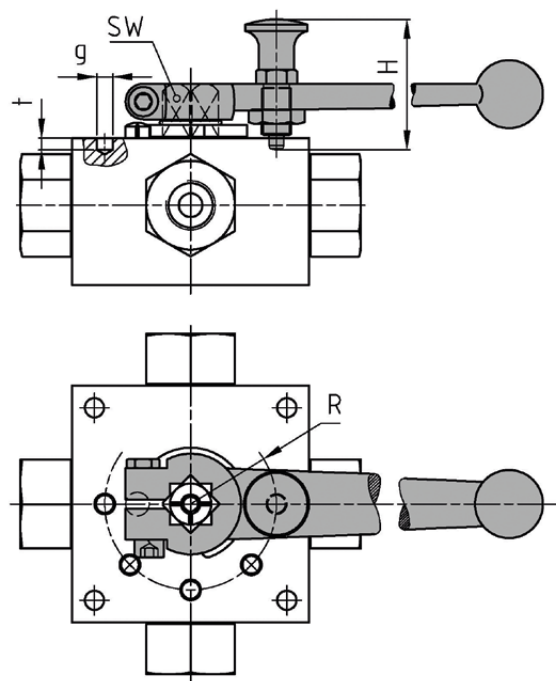
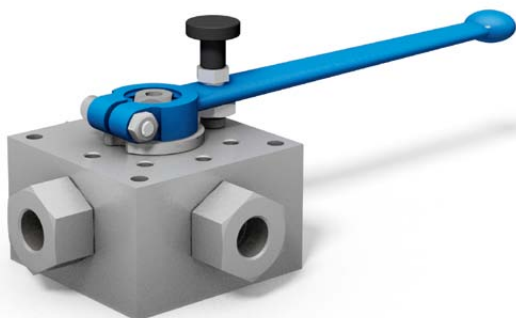
17253

-

with assembling set for ball valve combination

MOUNTING SETS ARE VALID FOR

Type	BKH / BKHP500	MKHP420	BKH-AS	MKHP-AS	BK3 / BK3-S	BKH / BKHP-SAEFS	MKHP-SAEFS	BKH / BKHP-SAE	MKHP-SAE	BKH-F	MKHP-F
Page	14 - 21	22 - 28	34	35	92 - 102	38 - 41	42 - 45	46 - 49	50 - 53	86 - 87	88 - 89



DIMENSIONS



Type	DN	SW	K	H	R	g	t
3/4KH	4-6	12	175	45	20	6	7
3/4KH	8-10	14	200	45	29	6	4
3/4KH	13-16	14	200	45	29	6	4
3/4KH	20	17	240	45	28	6	4
3/4KH	25	17	240	45	28	6	4

ORDER CODE PER MATERIAL

on request
on request
on request
on request
on request

ORDER EXAMPLE

Mounting set consisting of lever and detent bolt:

order text

article no.

Assembling set for ball valve with detent for 4KH-DN13-16-SW14

on request

Assembled with ball valves:

ball valve type
(ball valve design: see data sheets)

article no.

description

4KH - DN13 - G1/2 - 112A - SB13

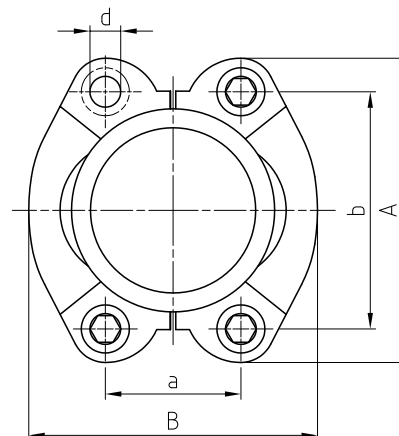
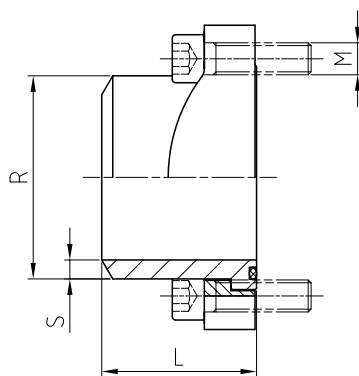
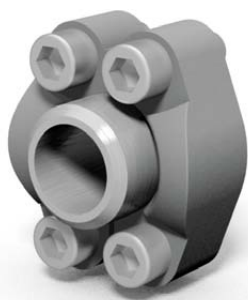
20450

with detent bolt

MOUNTING SETS ARE VALID FOR

Type	3KH	4KH
Page	108 - 114	116 - 122

Connection flanges ISO6162 (SAE) - metric



ISO 6162-1 (SAE210)

Design size	Tube dimensions ⁽¹⁾ R x S			a	b	d	L	A	B	Screws ⁽²⁾	Pressure [bar] ⁽⁴⁾ Screws property class		Weight [kg]
											8.8	10.9	
1/2"	16,0x2,0 21,3x3,8	20,0x2,5 21,3x4,7	21,3x2,9	17,5	38,1	8,5	41	54	45,6	M8x25	350	350	0,08
3/4"	25,0x3,0	26,9x3,6	26,9x3,9	22,2	47,6	10,5	50	65	51,8	M10x30	350	350	0,16
1"	25,0x3,0 30,0x4,0 38,0x5,0	28,0x3,0 33,7x4,5	30,0x3,0 38,0x4,0	26,2	52,4	10,5	50	70	58,4	M10x30	250	315	0,23
1 1/4"	25,0x3,0 38,0x4,0 42,4x4,5	30,0x3,0 38,0x5,0 42,4x6,3	38,0x3,0 42,4x3,6	30,2	58,7	12,5 11	55	79	72,6	M12x40 ⁽³⁾ M10x30	200	250	0,30
1 1/2"	38,0x4,0 45,0x5,0 48,3x5,0 50,0x6,0	42,0x3,0 48,3x2,6 48,3x6,3	42,0x5,0 48,3x3,6 48,3x7,1	35,7	69,9	13,5	57	94	82,2	M12x35	200	200	0,40
2"	48,3x5,0 60,3x3,9 60,3x8,0	55,0x5,0 60,3x5,5	60,3x2,9 60,3x6,3	42,9	77,8	13,5	57	102	96,4	M12x35	160	200	0,50
2 1/2"	65,0x6,0 76,1x7,1	70,0x7,5	88,9x3,9	50,8	88,9	13,5	58	114	108,2	M12x40	100	160	0,80
3"	80,0x6,0 88,9x7	88,9x3,2 88,9x8	88,9x3,9	61,9	106,4	16,75	58	135	130,6	M16x45	100	160	1,10
3 1/2"	100,0x6,0	88,9x3,6	88,9x8,0	69,9	120,7	17	60	152	139	M16x45	35	35	1,40
4"	110,0x6,0 114,3x8,8	114,3x3,6	114,3x6,02	77,8	130,2	17	60	162	152	M16x50	35	35	1,75
5"	133,0x6,5	139,7x4	139,7x10,0	92,1	152,4	17	60	184	180	M16x50	35	35	2,62

ISO 6162-2 (SAE420)

Design size	Tube dimensions ⁽¹⁾ R x S			a	b	d	L	A	B	Screws ⁽²⁾	Pressure [bar] ⁽⁴⁾ Screws property class		Weight [kg]
											8.8	10.9	
1/2"	16,0x2,0	20,0x2,5	21,3x4,5	18,2	40,5	8,5	34	56	47,2	M8x30	350	400	0,08
3/4"	16,0x2,0 25,0x3,5	20,0x2,5 25,0x4,0	25,0x3,0 26,9x5,6	23,8	50,8	10,5	38	71	60	M10x35	350	400	0,17
1"	25,0x3,0 33,7x6,3 38,0x5,0	30,0x3,0 33,7x7,1	30,0x4,0 38,0x4,0	27,8	57,2	13,5	40	81	69,6	M12x45	350	400	0,25
1 1/4"	25,0x3,0 38,0x5,0	30,0x4,0 38,0x5,5	38,0x4,0 42,4x6,3	31,8	66,7	14,5 13	45	95	77,2	M14x50 ⁽³⁾ M12x45	350	400	0,30
1 1/2"	38,0x5,0 48,3x6,3 48,3x8,8	45,0x6,5 48,3x7,1 50,0x6,0	48,3x5,0 48,3x8,0	36,5	79,4	16,75	50	113	95	M16x55	350	400	0,53
2"	48,3x6,3 60,3x8,0 60,3x13,4	60,3x6,3 60,3x8,75	60,3x7,5 60,3x10,0	44,5	96,8	21	58	133	113,8	M20x65	350	400	0,90
2 1/2"	76,1x8,0 88,9x11,1	76,1x10,0 88,9x14,2	88,9x10,0	58,8	123,8	26	75	180	150,2	M24x75	350	400	2,40
3"	88,9x10,0 114,3x11,0	88,9x11,1 114,3x17,5	88,9x14,2	71,6	152,4	31	80	215	198,2	M30x90	350	400	3,60

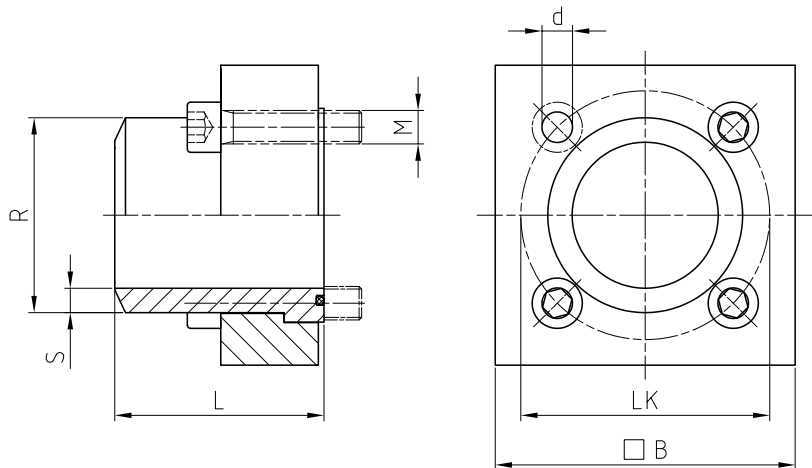
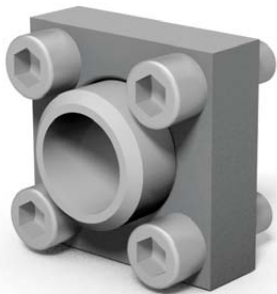
⁽¹⁾ Other tube dimensions on request.

⁽²⁾ Please advise thread dimension with order. UNC screws on request.

⁽³⁾ This thread is not to be used for new designs.

⁽⁴⁾ The max. recommended working pressure is based on the flange. The working pressure of the system is determined by the thickness and the material of the tube.

Connection flanges ISO6164 - metric



ISO 6164-1

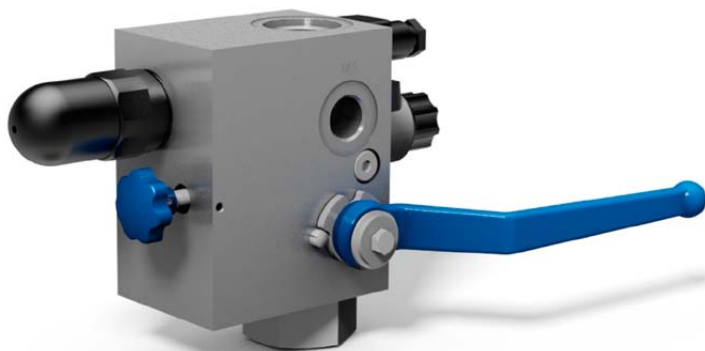
DN	Tube dimensions ⁽¹⁾ RxS	LK	d	L	B	Screws ⁽¹⁾ Property class 8,8	Pressure ⁽²⁾ [bar]	Weight [kg]
13	21,6x4,3	42	9	50	45	M8x35	350	0,22
19	27,2x4,1	50	9	60	50	M8x35	350	0,32
25	34,5x4,75	62	11	70	65	M10x40	315	0,63
32	43,0x6,0	73	13,5	80	75	M12x50	250	0,92
38	48,6x5,3	85	17,5	90	90	M16x60	250	1,34
51	61,0x5,5	98	17,5	100	100	M16x70	250	2,30
56	76,6x6,8	118	22	110	120	M20x80	250	4,00
63	89,0x9,5	145	22	120	140	M20x90	250	6,03

ISO 6164-2

DN	Tube dimensions ⁽¹⁾ RxS	LK	d	L	B	Screws ⁽¹⁾ Property class 8,8	Pressure ⁽²⁾ [bar]	Weight [kg]
13	21,6x4,3	42	9	50	45	M8x35	400	0,31
19	27,2x4,6	50	9	60	50	M8x35	400	0,45
25	34,5x6,25	62	11	70	65	M10x40	400	0,83
32	43,0x7,5	73	13,5	90	75	M12x50	400	1,19
38	48,6x8,3	85	17,5	90	90	M16x60	400	1,80
51	61,0x10,0	98	17,5	100	100	M16x70	400	3,08
56	76,6x13,3	118	22	110	120	M20x80	400	5,14
63	89,0x15,5	145	26	120	150	M24x90	400	7,34
70	102,0x19,5	160	26	130	160	M24x100	315	8,09
80	114,0x20,0	175	33	140	180	M30x120	315	12,75

⁽¹⁾ UNC screws on request.

⁽²⁾ The max. recommended working pressure is based on the flange. The working pressure of the system is determined by the thickness and the material of the tube.



AVAILABLE SIZES

DN10-G1/2
DN20-G1
DN32-G1 1/2

DESCRIPTION

The block is intended for protection, isolation and depressurization of hydraulic accumulators. It can be manually relieved or on request prepared and equipped with solenoid-operated relief valves.

Maximum working pressure

- Manual operation: 400 bar
- Manual and solenoid operation: 350 bar

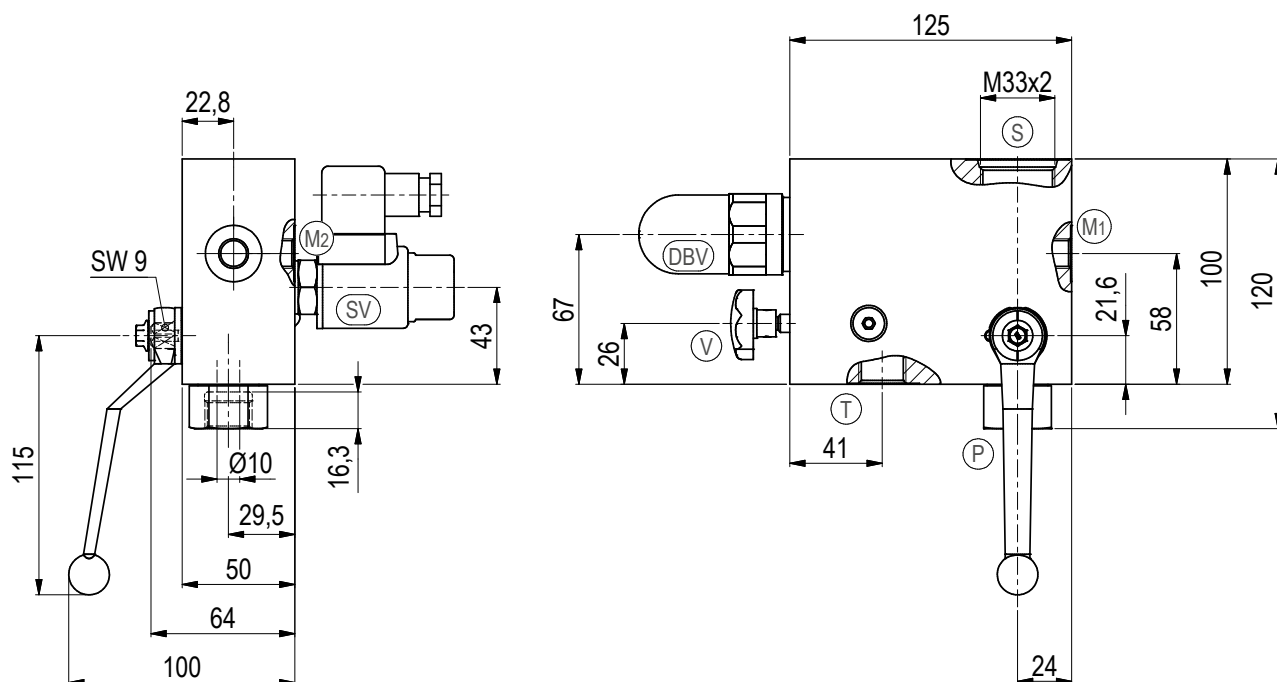
ACCESSORIES ON REQUEST



- Locking devices on request
- Adapters on request

ORDER EXAMPLE

ASB	size	pump connector	relief type		MATERIALS				pressure setting DBV (bar)	Approval DBV	
	DN10	G1/2	M		body	stem and ball	ball seat	O-ring	330	C	
	DN10	G	M	manual	1 carbon steel	1 carbon steel	2 POM	A NBR	leave blank if not required	C	CE
	DN20	NPT	EO	manual and solenoid operation normally open	1 carbon steel	1 carbon steel	g PEEK	8 Viton		N	none
	DN32		EC	manual and solenoid operation normally closed				B EPDM			

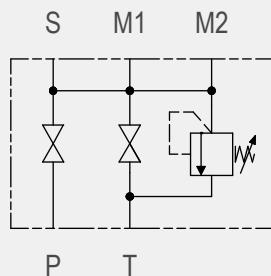


PORT DESCRIPTION

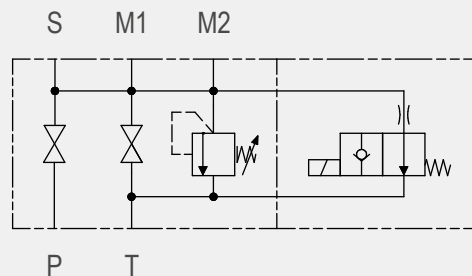
P	Pump connector G1/2 (DIN EN ISO 228-1) M-version 400 bar E-version 350 bar
T	Tank connector G1/2 (DIN EN ISO 228-1)
S	Accumulator connector
M1	Test gage connector G1/4 (DIN EN ISO 228-1)
M2	Test gage connector G1/4 (DIN EN ISO 228-1)
DBV	Pressure relief valve cavity thread M35x1.5
SV	2/2 solenoid valve cavity thread M22x1.5
V	Manual relief valve

CIRCUIT DIAGRAM

MANUAL OPERATED

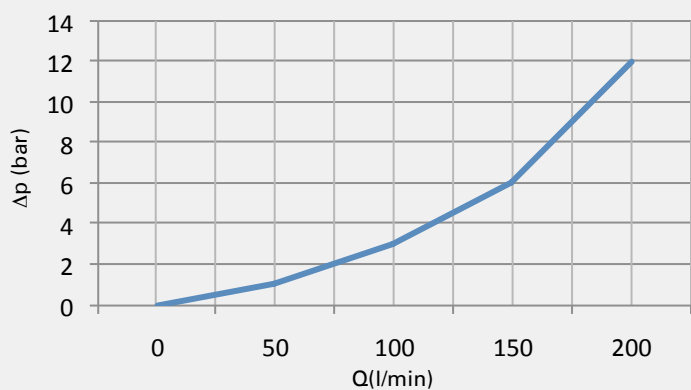


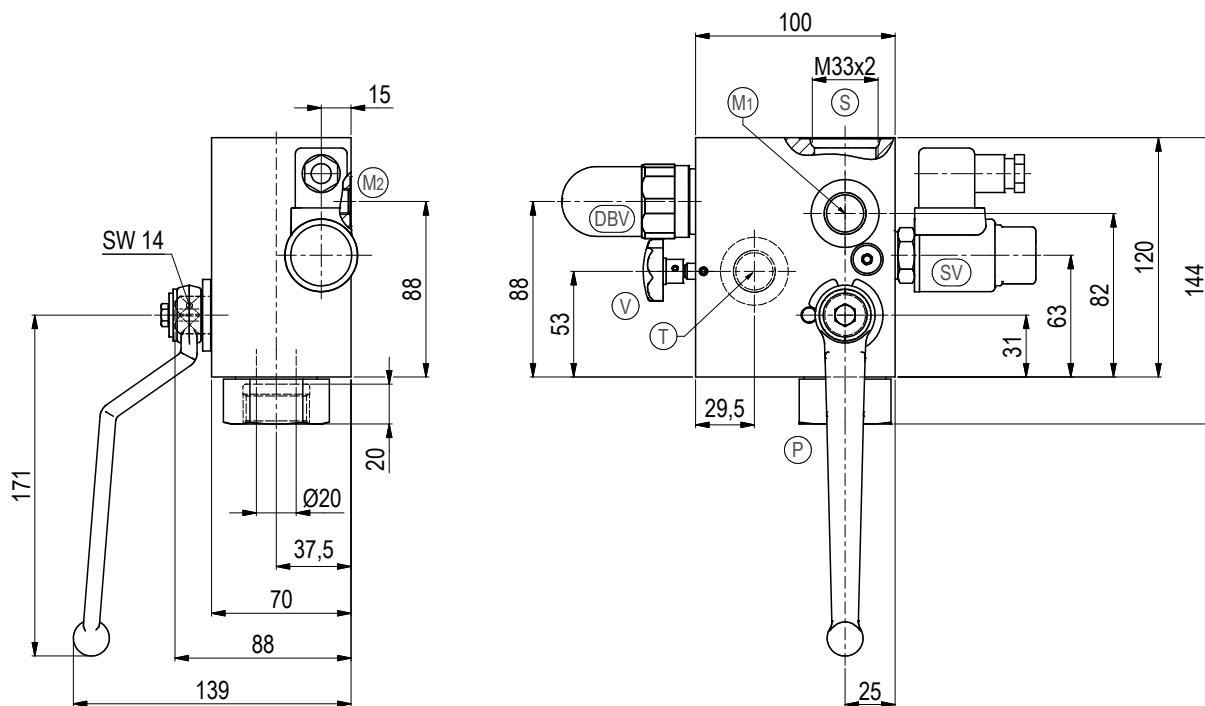
MANUAL AND SOLENOID OPERATED



FLOW CHARACTERISTICS

Flow direction: P-S



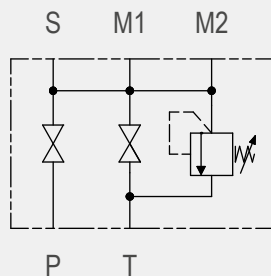


PORT DESCRIPTION

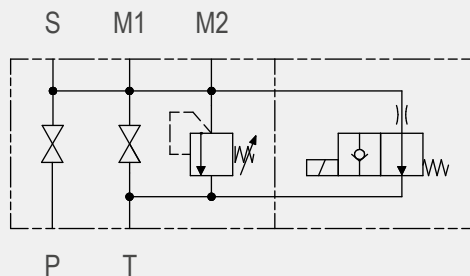
P	Pump connector G1 (DIN EN ISO 228-1) M-version 400 bar E-version 350 bar
T	Tank connector G1/2 (DIN EN ISO 228-1)
S	Accumulator connector
M1	Test gage connector G1/2 (DIN EN ISO 228-1)
M2	Test gage connector G1/4 (DIN EN ISO 228-1)
DBV	Pressure relief valve cavity thread M35x1.5
SV	2/2 solenoid valve cavity thread M22x1.5
V	Manual relief valve

CIRCUIT DIAGRAM

MANUAL OPERATED

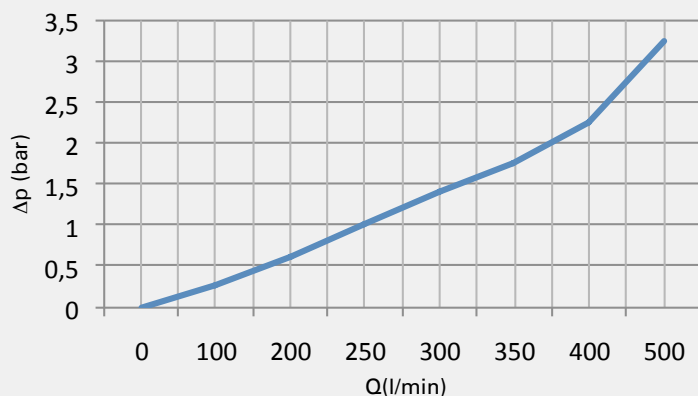


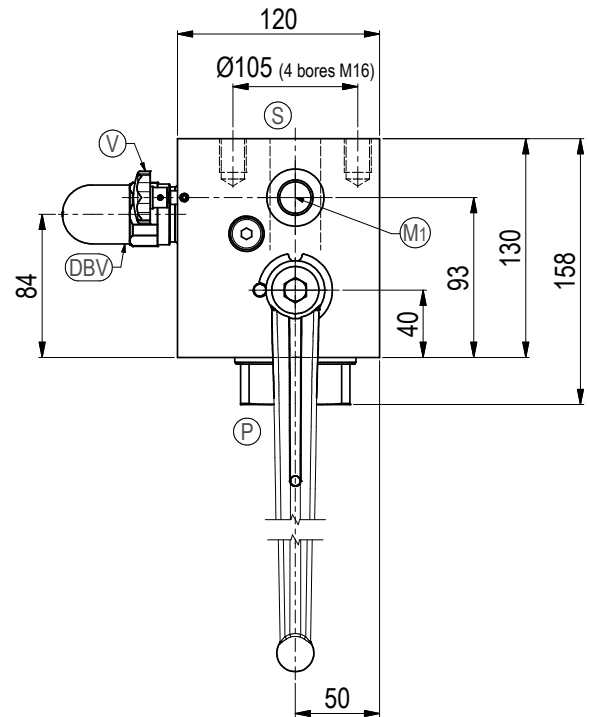
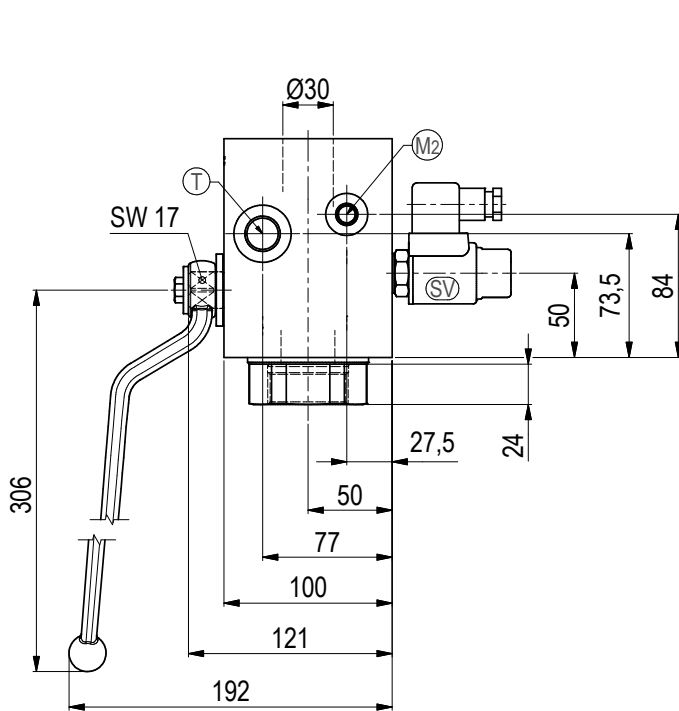
MANUAL AND SOLENOID OPERATED



FLOW CHARACTERISTICS

Flow direction: P-S



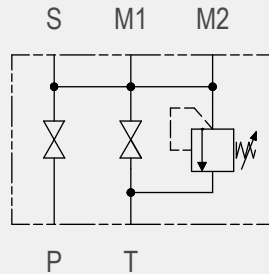


PORT DESCRIPTION

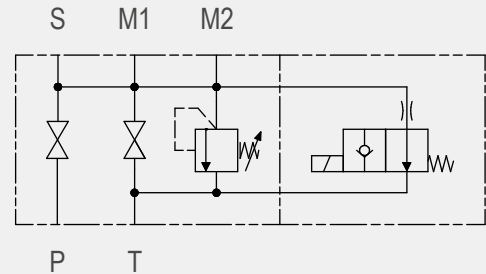
P	Pump connector G1 1/2 (DIN EN ISO 228-1) M-version 400 bar E-version 350 bar
T	Tank connector G1/2 (DIN EN ISO 228-1)
S	Accumulator connector
M1	Test gage connector G1/2 (DIN EN ISO 228-1)
M2	Test gage connector G1/4 (DIN EN ISO 228-1)
DBV	Pressure relief valve cavity thread M35x1.5
SV	2/2 solenoid valve cavity thread M22x1.5
V	Manual relief valve

CIRCUIT DIAGRAM

MANUAL OPERATED

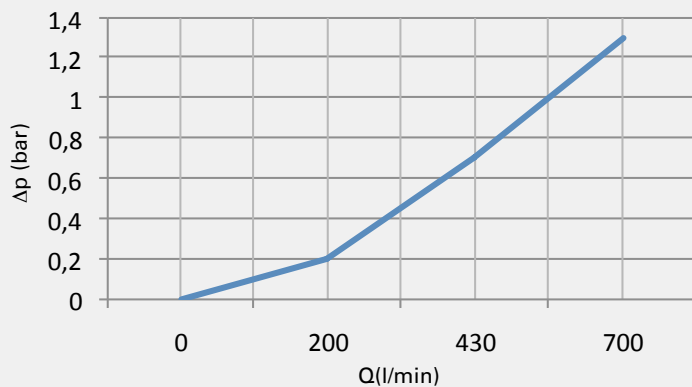


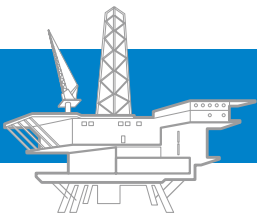
MANUAL AND SOLENOID OPERATED



FLOW CHARACTERISTICS

Flow direction: P-S





Double safety & bleed (DSB) valve



MHA Double Safety and Bleed valves combine various valve functions in one block. This solution is more space saving and contains much less potential leakage points compared to a multiple piped valve solution.

Possible options for MHA DSB valves are

Fig. 1: MHA Double Safety and Bleed valves ensures a two stage isolation with an integrated bleed valve at high security work areas. When maintenance service is conducted both valves are closed. Through the bleed valve the isolation of the valve can be proven. Through integrated test points the fluid conditions can constantly be monitored.

Fig. 2: MHA DSB valves allow to carry out maintenance service at components without shutting the HPU down:
Main valve A is closed. Through opening valve C fluid from maintenance component is bled. After closing valve B maintenance can be conducted with double isolation safety level.

Available options

- Double Safety & Bleed
- Double Safety & Bleed + Bypass
- Double Safety & Bypass

Available connections

- ISO 6162-1/2
- ISO 6164
- ANSI RF

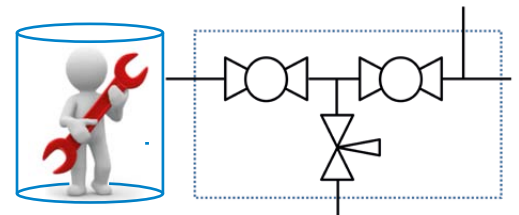


Fig. 1: Double safety & bleed option

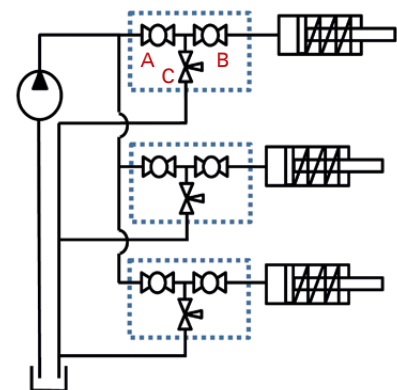
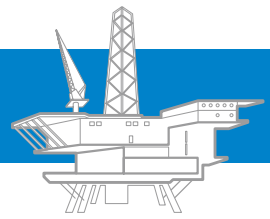
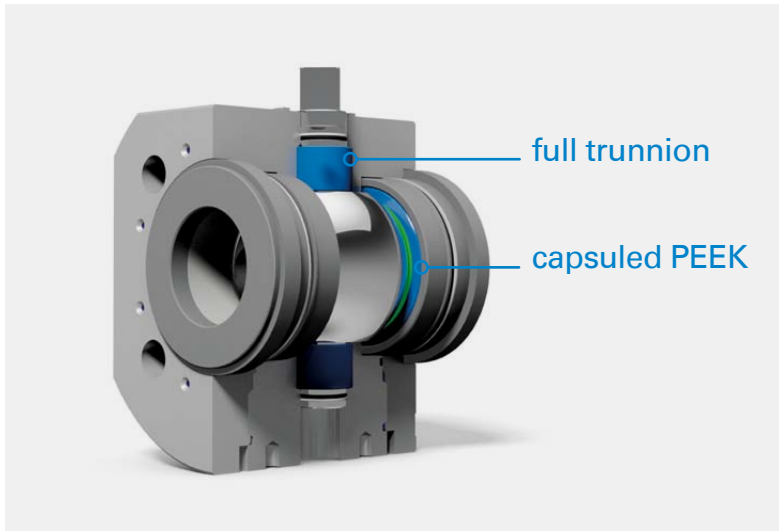


Fig. 2: System maintenance optimisation

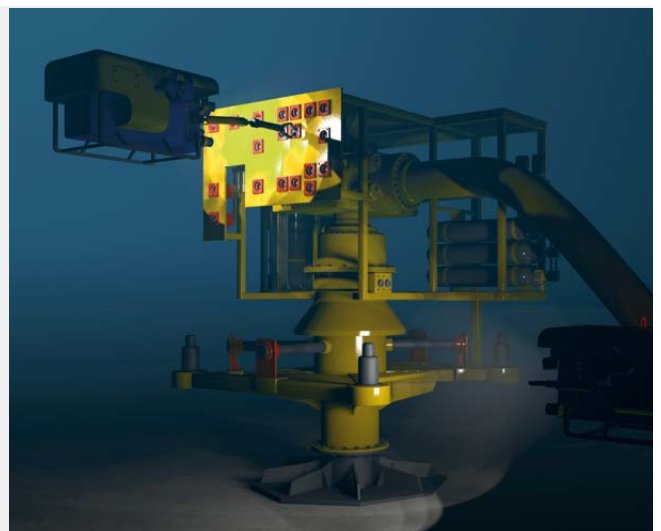


Full trunnion gas valve



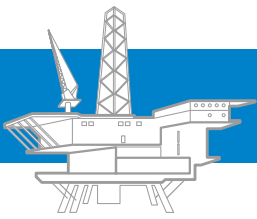
- 5.000 psi (350 bar) full ΔP
- Carbon or stainless steel up to 8" (DN200)
- Full trunnion design with capsuled PEEK seats
- VDS tested
- LRS or other classification society approvals

Subsea ball valves

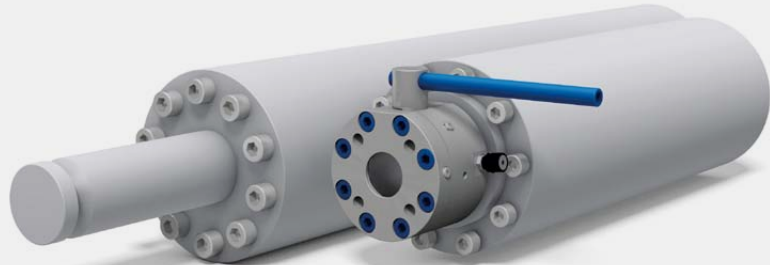
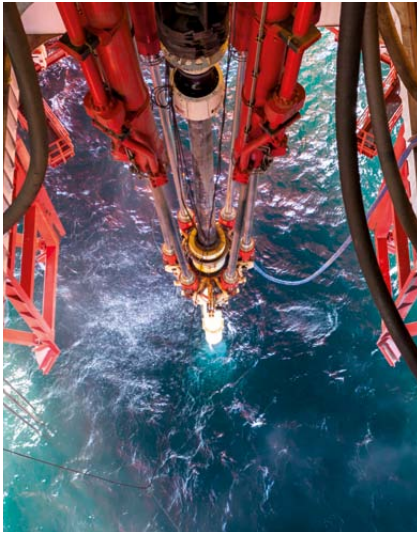


Ball valves for subsea control panels

- Trunnion design
- max depth 3.500 m below sea level
- Pressure rating 10.000 psi (690 bar)
- Sizes up to 1"



Riser tensioner system



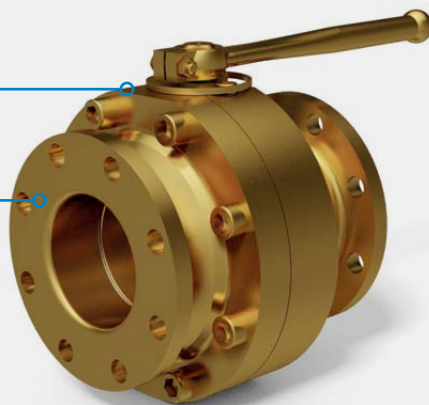
Flangeable cylinder valves

- Sizes from 5/8" to 8" (DN15 to 200)
- Pressure up to 10.000 psi (690 bar)
- Steel, stainless steel or duplex
- Bypass option

Application example: special marine valve

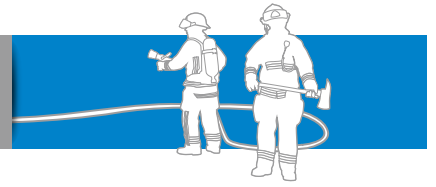
CuAl10Ni —

EN 1092
connection —



Highly corrosion-resistant valves

- All metal parts made of nickel-aluminum-bronze
- 3" (DN 80)
- 700 psi (50 bar)
- Flange connection EN 1092 (others on request)



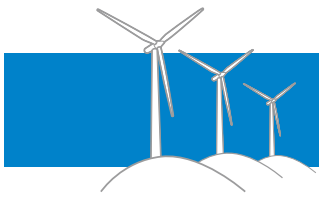
Fire protection application examples for railway, tunnel, buildings and marine



Product range for fire extinguishing systems

- Nominal diameter: 4 - 200 mm
- 15.000 section valves per year
- Steel, stainless steel
- Manually operated or actuated (pneumatic, electric, hydraulic)

Valves can be used with typical fire extinguishing media like water mist, argonite, nitrogen, CO₂ and others.



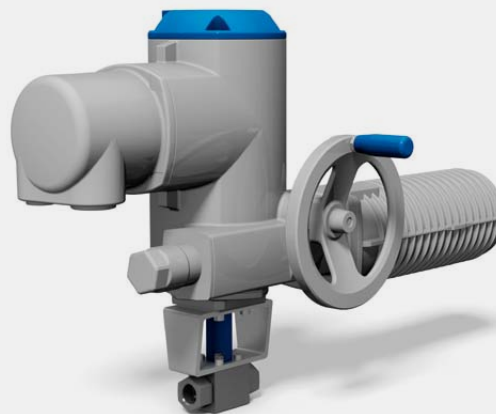
Maintenance ball valves for pitch systems in windpower plants



Block-type ball valve with integrated functions

- Position feedback with sensor
- Mechanism against unintentional actuation
- Optical display of position
- Also available for offshore or low-temperature applications

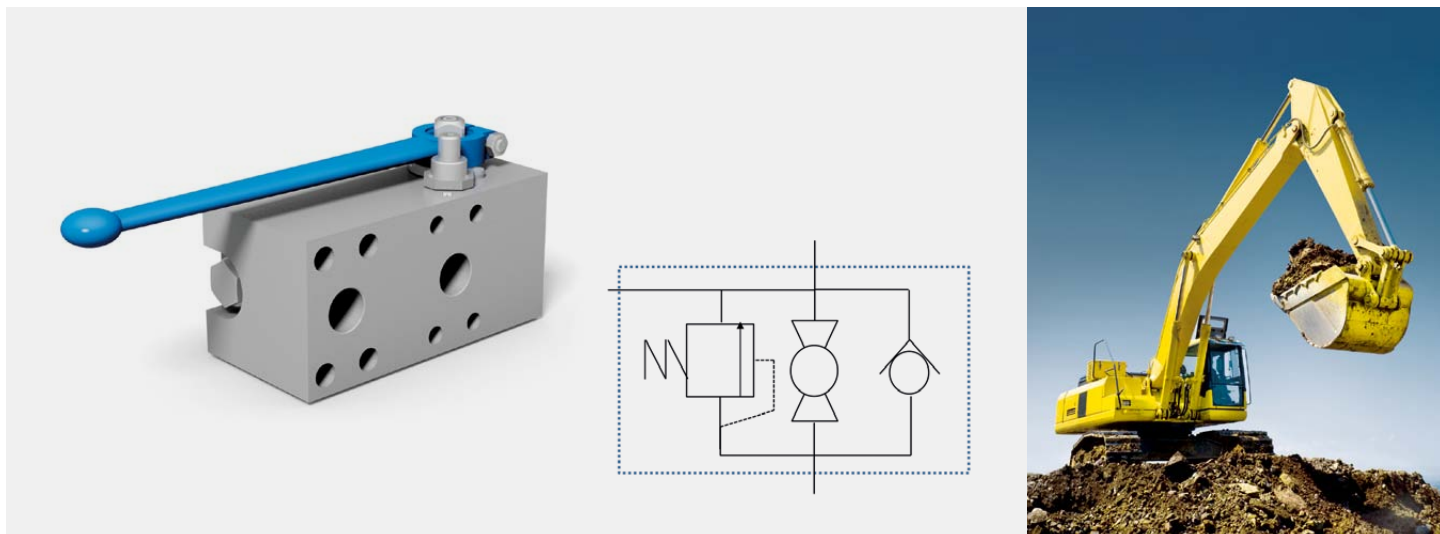
Electrically-operated ball valves for power plant hydraulics



- Electrical actuator in accordance with customer specifications
- ATEX certified
- Emergency manual override

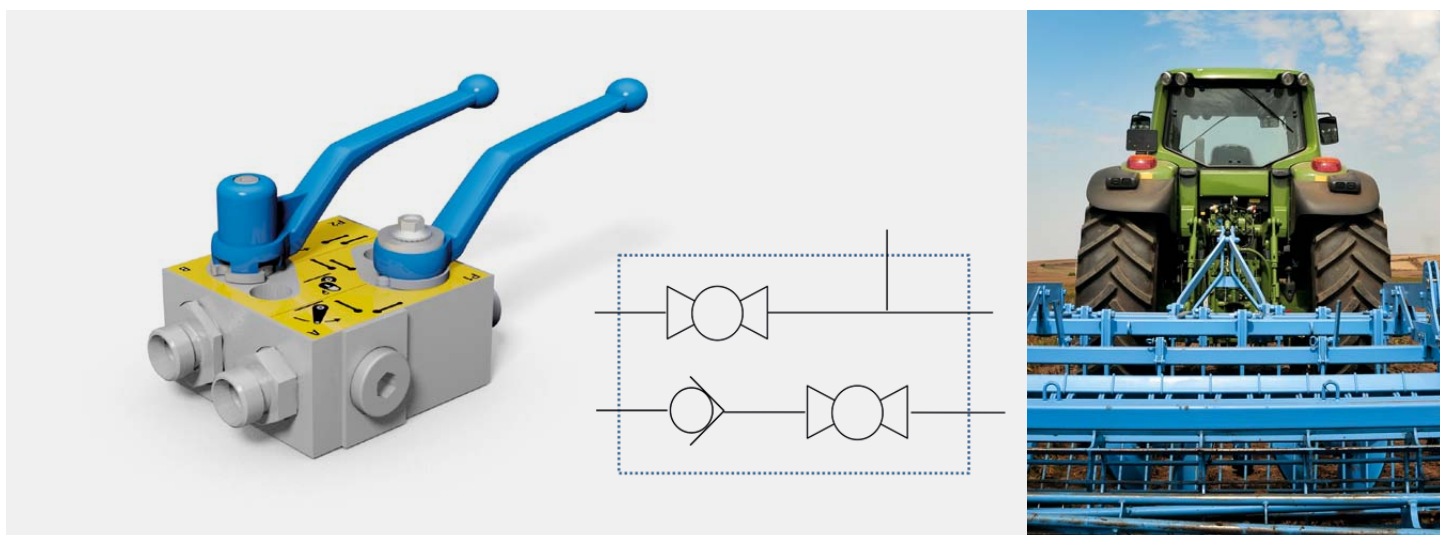


Excavator grab tooling valve



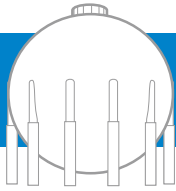
This valve combination is used in excavators for special tooling. Integrated safety function against overload pressure, combining ball valve, check valve and pressure relief valve in one valve block. Robust and space optimized design with fewer potential leakage points than piped solution.

Examples of multi-functional valve modules

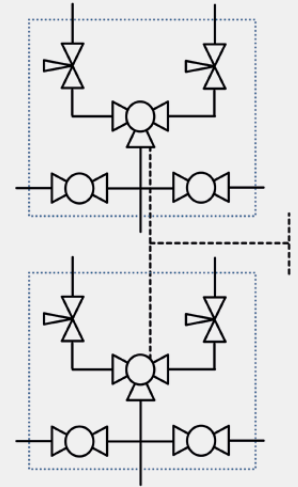
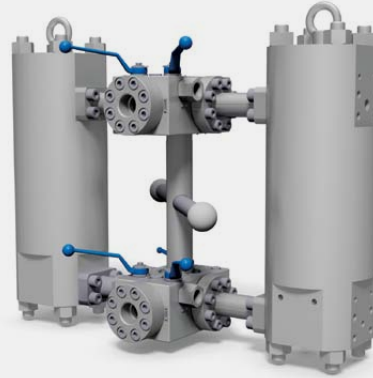


Changeover block for front linkage

This changeover block is mainly used in agricultural equipment. Allows for manual override of equipment movement functions. Space-saving valve block design, combining two ball valves and one check valve. The valve can be directly panel-mounted and is protected against unintentional operation.

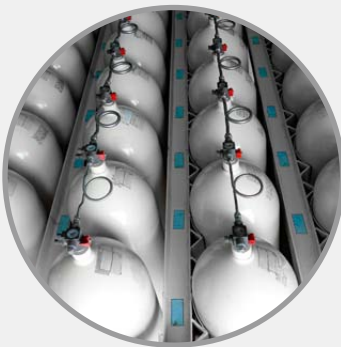


Distributor block for gas filtration stations



- Several integrated functions and ball valves in one block
- Mutual activation of two blocks
- Material suitability in accordance with NACE MR0175
- O-rings against explosive decompression and suitable for temperatures down to -46°C

Components for all CNG processing steps



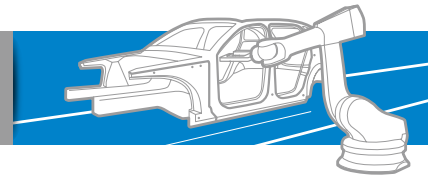
Storage / compression



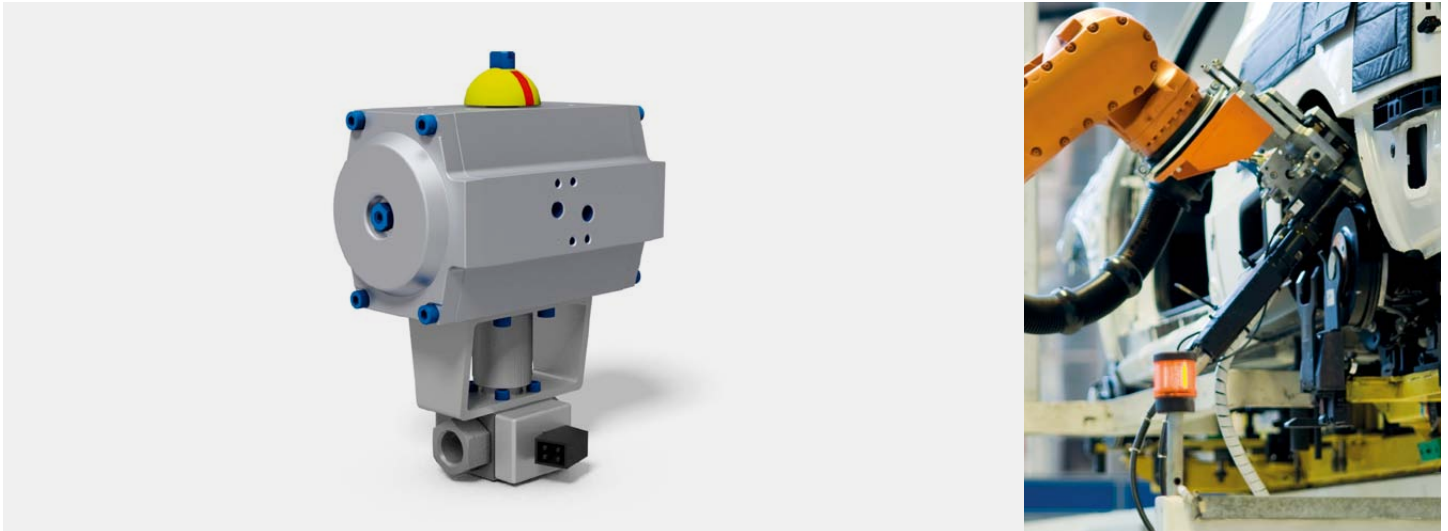
Transportation



Gas station



Ball valves for highly viscous media like glue or paint

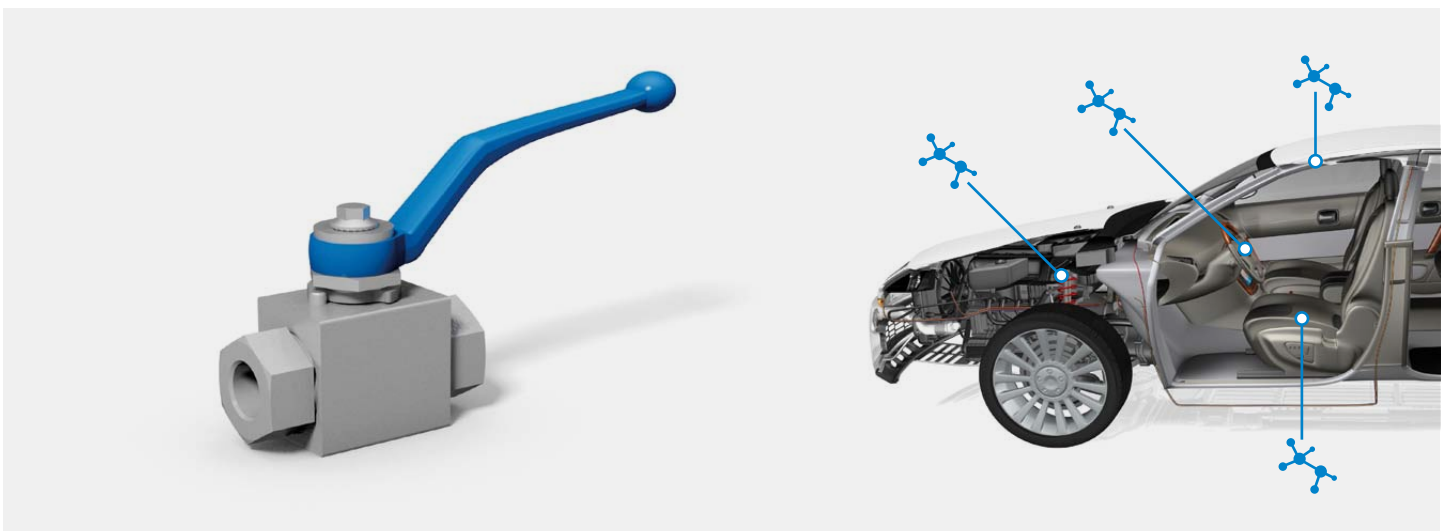


Ball valves for highly viscous / abrasive media such as underbody protection or adhesives. A heating jacket protects the media from hardening. On request the valves can be specially cleaned to remove paint wetting disruptive substances (LABS-free).

Characteristics

- Metallic sealings
- Various heating options: electric, hydraulic

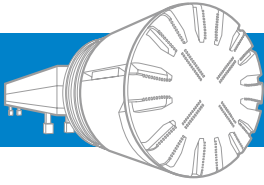
Ball valves for isocyanate or other humidity-sensitive media



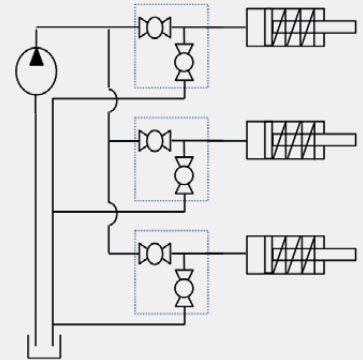
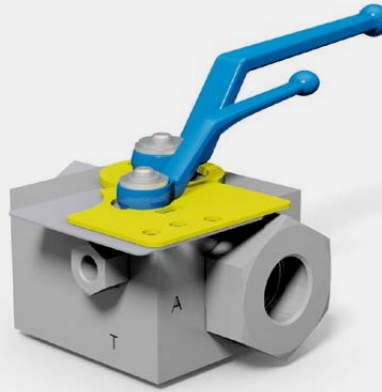
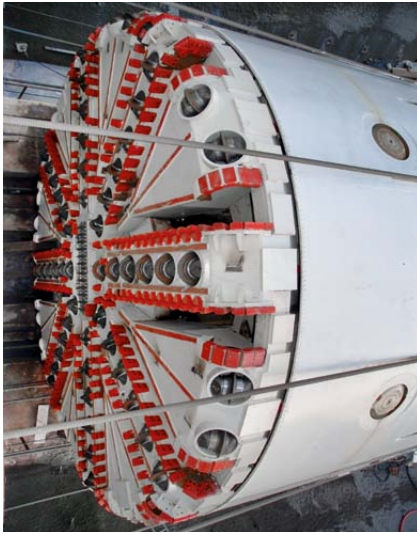
Ball valves for isocyanate have a selector shaft design which prevents any contact between the medium and the surrounding air. Contact with the surrounding humidity would cause the medium to crystallize.

Characteristics

- Metallic sealings
- Special selector shaft design

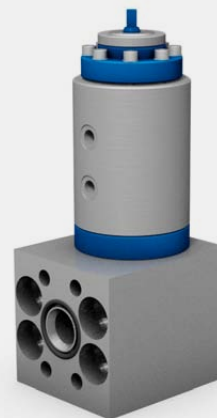


Machine service valve



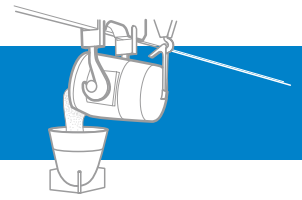
Maintenance valve used for example in tunnel boring machines, allowing for service of cylinders without shutting down the hydraulic system. Separated shut off and bleed valve guarantees safe isolation of media in accordance with DIN EN 982 with locking device for up to 3 padlocks and integrated on/off label.

Hydraulic feed of mining machine

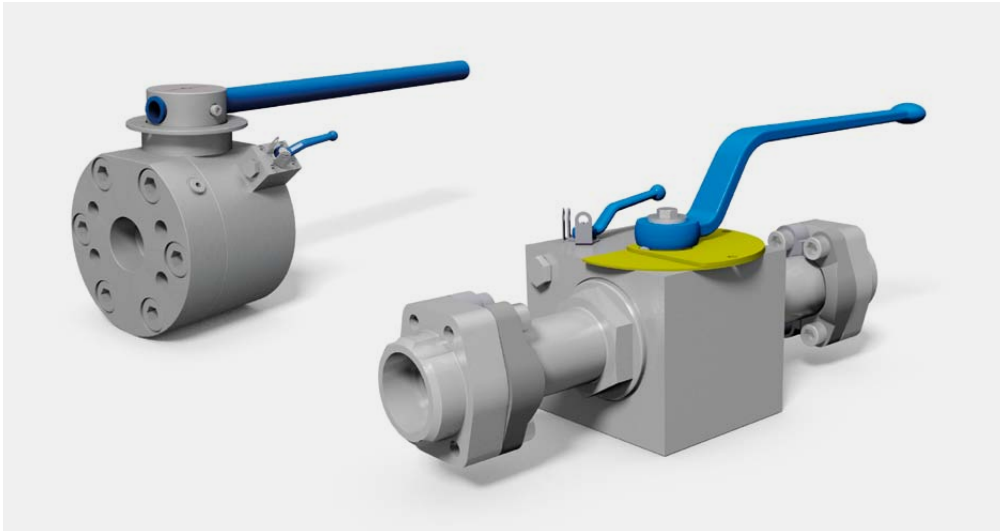


Various valve options for hydraulic feed system for mining machines.

- Directly mountable to hydraulic blocks or cylinders with ISO6162 flange connection
- Manual or actuated option
- Special pressure ratings up to 690 bar (10.000 psi)



Bypass ball valve with flange connection



When larger ball valves have to be activated at full differential pressure, a smaller ball valve is used before activation in order to equalize the pressure. MHA combines the bypass and main activation in one block in order to prevent leakage points (as compared to a solution using pipes).

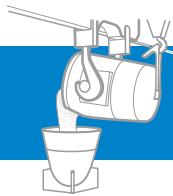
Benefits

- Designed for use in harsh conditions
- Locking device to prevent unintentional activation

CO₂ extraction trunnion ball valve



- Pneumatically operated
- Full trunnion ball
- ANSI flange connection (others on request)



Chemical industry ball valves

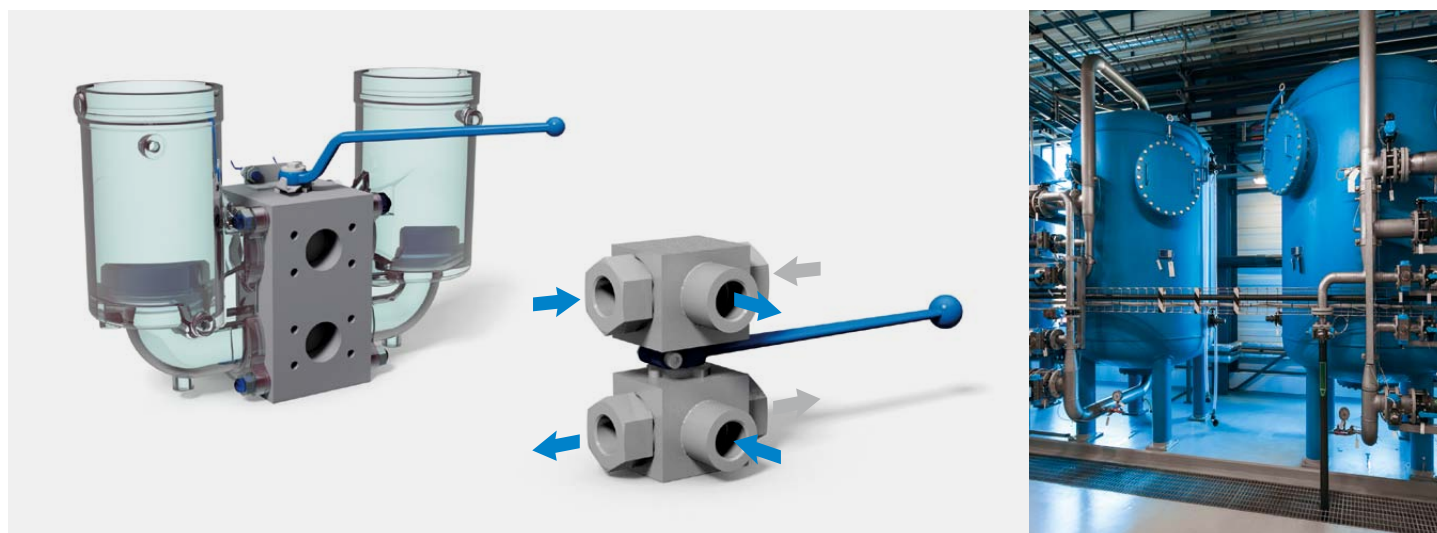


Extreme conditions such as hot sulfuric acid service require special coatings and superior corrosion resistance of all components used within the system.

MHA ZENTGRAF can supply a large variety of valve body materials (e.g. Inconel, Hastelloy, Superduplex) as well as special coatings such as tantalum coating. Such coatings provide extreme corrosion resistance on an economic price level compared to valves made of complete bar stocks.

Furthermore special services such as valve cleanliness certificates or helium leakage rate test protocols can be provided.

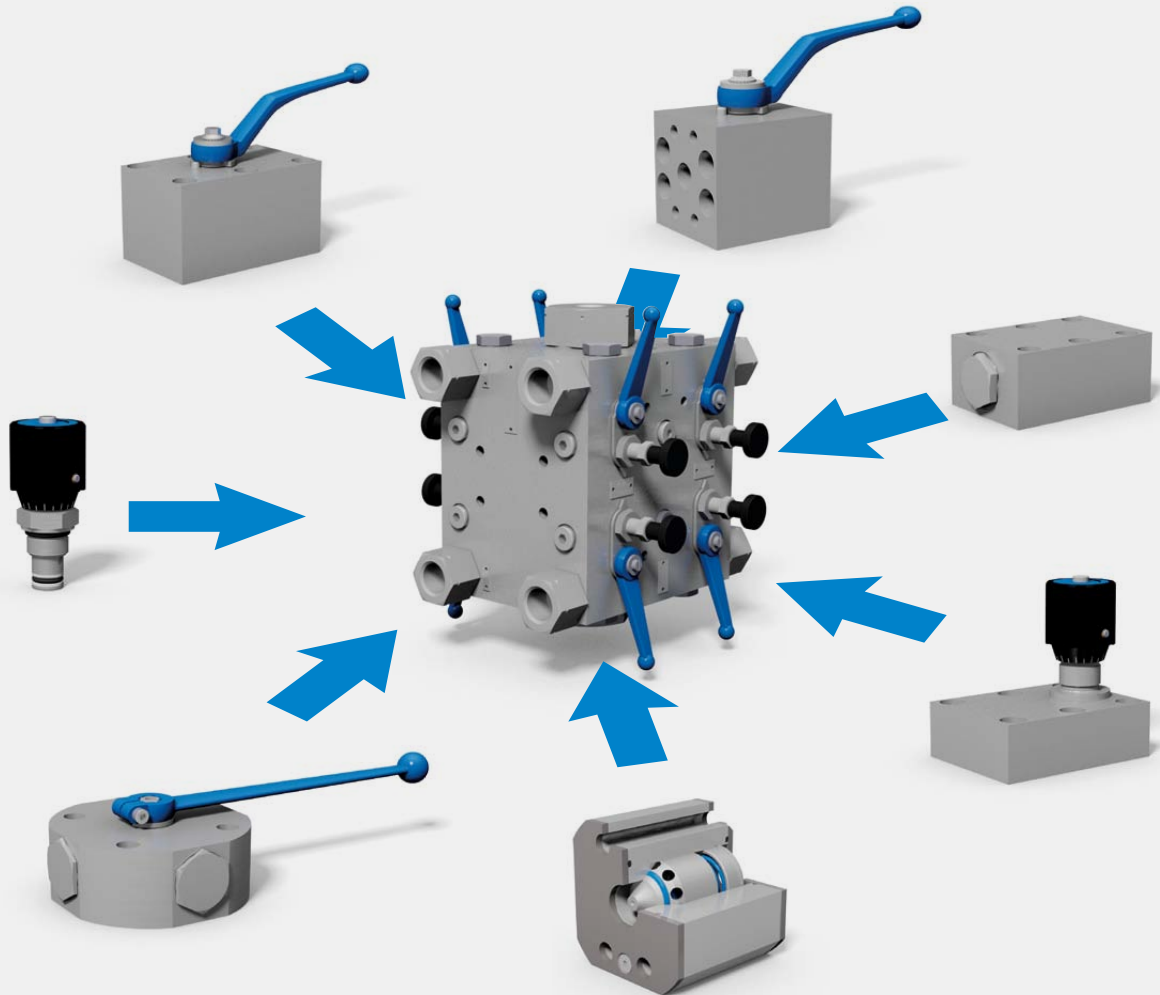
Filtration applications



- Core design of most filtration applications is a combination of two 3/2-way ball valves actuated with one handle
- Sizes from 1/4" to 3"
- Threaded or flanged connection
- Pressure rating up to 420 bar (6.000 psi)

Your manifold - Our solution

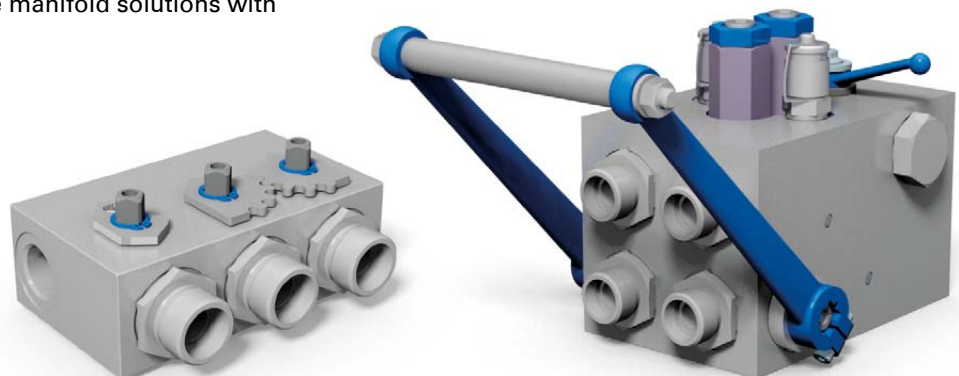
MHA ZENTGRAF offers a variety of product solutions for your manifold project. A variety of block mounting ball valves as well as flow control valves are available.



Looking for a ready-to-install solution?

We are able to supply complete manifold solutions with integrated valve components.

- Space saving
- Less potential leakage points



TECHNICAL ANNEX



Directory

Nomenclature

Terminology for nominal width, pressure, key to symbols 252

Materials

List of standard materials 253

General material combinations of MHA products 254

Pressure / Temperature curves

Admissible working pressure of MHA ball valves 255

Surfaces

Surface coating of MHA products 256

Inspection possibilities

Technical approvals, tests and certificates 257

Resistance list

258

Determining nominal diameter

260

Porting patterns for multiway ball valves

262

Sealing forms

MHA ball valve sealing variations 268

Operating manuals for ball valves

270

Assembly instructions

Assembly instructions for seal kit BKH 280

Assembly instructions for seal kit MKHP 281

Assembly instructions for seal kit 3/4 KH 282

General terms of sale and delivery

284

Certificates

294

Nomenclature

Nominal pressure PN

The nominal pressure indicates the pressure rate of a hydraulic component at continuous dynamic application. The number is rounded up in order to comply with the internationally specified terms.

These nominal pressure values are internationally recognized and assist in determining common component dimensions. A design and test pressure of $1.5 \times PN$ applies to all ball valves in accordance with DIN EN 12266-1 for body. $1.1 \times PN$ applies to ball seats.

The nominal pressure specifies the admissible working pressure at 20°C . Please consider the pressure reduction at higher temperature.

Maximum working pressure P max.

P max. is the maximum working pressure of a component including pressure peaks for limited duration of dynamic application or, as the case may be, the maximum working pressure which considers temperature reduction ratings.

Burst pressure P burst

The safety factor for burst pressure tests is a minimum of 2.4 times the nominal pressure.

$$P_{\text{Burst}} = 2.4 \times PN$$

Nominal diameter DN

The nominal diameter is a numeric dimension of mating parts without indication of outer tube diameter or thread size, for example flanges.

The nominal diameters match approximately the clear diameter of the ball valves in mm.

Reduced diameters are marked by MHA with for example DN25/32. That corresponds to the ball valve being DN 25 and the adapter being DN 32.

Leakage rate

Ball valves with synthetic ball seats:

DIN EN 12266 leakage rate A -

No visually noticeable leakage during the duration of the test with fluid or air.

Ball valves with metallic seats:

$1.0 \times DN \text{ mm}^3/\text{sec}$ – test medium water.

(leakage rate F acc. DIN EN 12266)

Flow control valves:

$\max 0.01 \times DN \text{ mm}^3/\text{sec}$ – test medium water

(leakage rate A-B acc. DIN EN 12266)

Check valves with metallic seats:

$0.1 \times DN \text{ mm}^3/\text{sec}$ – test medium water.

(leakage rate C-D acc. DIN EN 12266)

Check valves with synthetic seats (RVZ series):

DIN EN 12266 leakage rate A -

No visually noticeable leakage during the duration of the test with fluid or air.

Symbol	Designation	Unit	Conversion factor	Conversion factor
B, H, L	Dimensions	mm	1 Inch = 25,4 mm	
P	Pressure	bar	1 bar = 14,503 psi	1 bar = 0,1 MPa
T	Temperature	°C	1 °F = $9/5 \times ^\circ\text{C} + 32$	°K = °C + 273
M	Torque	Nm	1 lb inch = 0,115 Nm	
ΔP	Differential pressure	bar	1 bar = 0,1 MPa	1 psi = 0,007 MPa
Q	Flow	l/min	1 US gall/min = 3,785 l/min	1 UK gall/min = 4,546 l/min
W	Weight	Kg	1 lb = 0,4536 kg	
$L^{\pm 2}$	Dimension of tolerance of overall length	$\pm 2 \text{ mm}$ according to DIN 3202		

List of standard materials (other materials on request)

Body, adapters, stem and ball materials

	Pressure reduction in % of permissible operating temperature TB in °C													
Material	-60°	-50°	-40°	-30°	-20°	-10°	0°	+20°	+80°	+100°	+120°	+130°	+150°	+200°
Free-Cutting Steel (11SMn30, 1.0715), not suitable for gas applications!					0%									
Low-Alloy Steel (S355J2+N, 1.0570)	25%					0%						15%		
Stainless Steel 1.4571 (AISI 316Ti), 1.4404 (AISI 316L), 1.4401 (AISI 316)	0%									11%				
Duplex Steel (1.4462)			0%							20%				

Ball seat material

	Pressure reduction in % of permissible operating temperature TB in °C													
Material	-60°	-50°	-40°	-30°	-20°	-10°	0°	+20°	+80°	+100°	+120°	+130°	+150°	+200°
POM (Delrin, Polyacetal)			0%											
Polyetheretherketone PEEK natural (unfilled)	Please see separate diagram on page 255													
Polyetheretherketone PEEK (graphite-filled, ATEX-approved)				Please see separate diagram on page 255										
Cast Iron GG25			0%											
PTFE (Teflon, Fluon)	Please see separate diagram on page 255													

Stem and adapter sealing materials

	Pressure reduction in % of permissible operating temperature TB in °C													
Material	-60°	-50°	-40°	-30°	-20°	-10°	0°	+20°	+80°	+100°	+120°	+130°	+150°	+200°
Acrylonitrile-butadiene-rubber (NBR, Buna N)					0%									
Low-temp NBR Compound	0%													
Fluor Rubber (FPM, Viton)					0%									
Low-temp Viton Compound			0%											
Ethylene-Propylene-Diene Momomer Rubber (EPDM)		0%												
PTFE (Teflon, Fluon)	Please see separate diagram on page 255													

permitted operating temperature temperature not permitted

Calculation example

BKH-DN13-G1/2"-44g8

PN=500bar

Body: 1.4571

Ball seat: PEEK (graphite-filled)

O-ring: FPM

Application temperature: max. +180°C

Pressure reduction body: 11% (500 bar - 11% = 445 bar)

Pressure ball seat: 95 bar

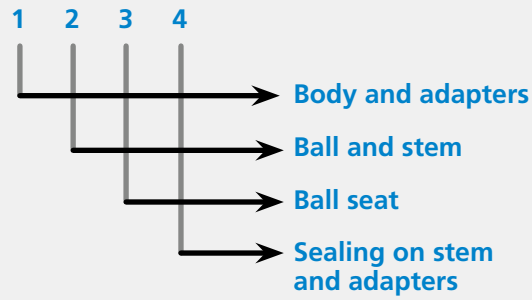
Pressure reduction O-ring: 0%



Result:

P_{max} (180°C) = 95 bar

General material combinations of MHA products



Digit 1 - Body and adapters

1	Body and adapters	Free-Cutting Steel
2	Body and adapters	Low-Alloy steel
4	Body and adapters	Stainless Steel
6	Body and adapters	Aluminum
8	Body	Low-Alloy Steel
	Adapters	Free-Cutting Steel
H	Body and adapters	Hastelloy

Digit 2 - Ball and stem

1	Ball and stem	Free-Cutting Steel
2	Ball	Stainless Steel
	Stem	Free-Cutting Steel
4	Ball and stem	Stainless Steel
	Stem	Free-Cutting Steel
H	Ball and stem	Hastelloy

Digit 3 - Ball seat

2	POM
4	PTFE
7	PTFE-(fiber-glass reinforced)-encased
8	POM front side sealing
9	PTFE front side sealing
a	PEEK with ATEX-certification
b	POM-encased
f	Steel, Cast Iron
g	PEEK
m	PEEK with protection ring against erosion
E	PTFE-fiber-glass reinforced with O-ring arranged behind
F	Stainless Steel
H	POM with protection ring against erosion

Digit 4 - Sealing on stem and adapters

0	Sealing on stem	Isocyanate sealing
	Sealing on adapters	FPM
4	Sealing on stem	PTFE sealing
	Sealing on adapters	FPM
8	Sealing on stem and adapters	FPM
d	Sealing on stem and adapters	Pure graphite
k	Sealing on stem and adapters	FFKM
m	Sealing on stem and adapters	FEPM
A	Sealing on stem and adapters	NBR
B	Sealing on stem and adapters	EPDM

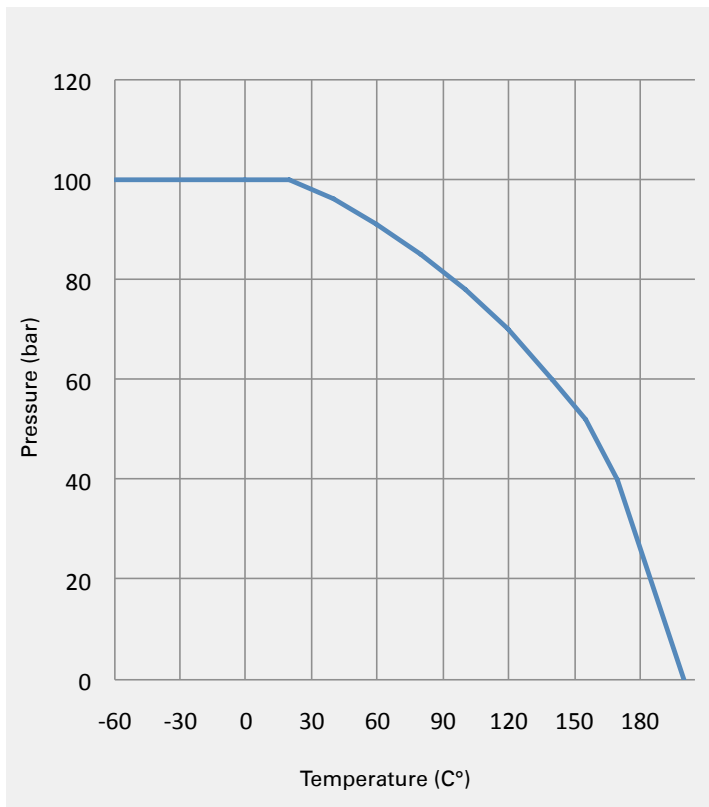


Other materials on request.

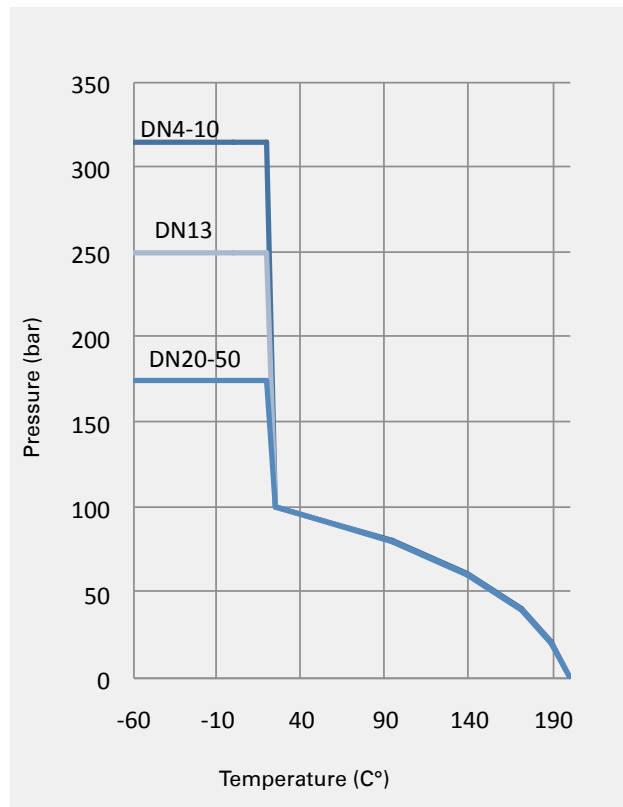
Pressure / Temperature curves

Admissible working pressure of MHA ball valves

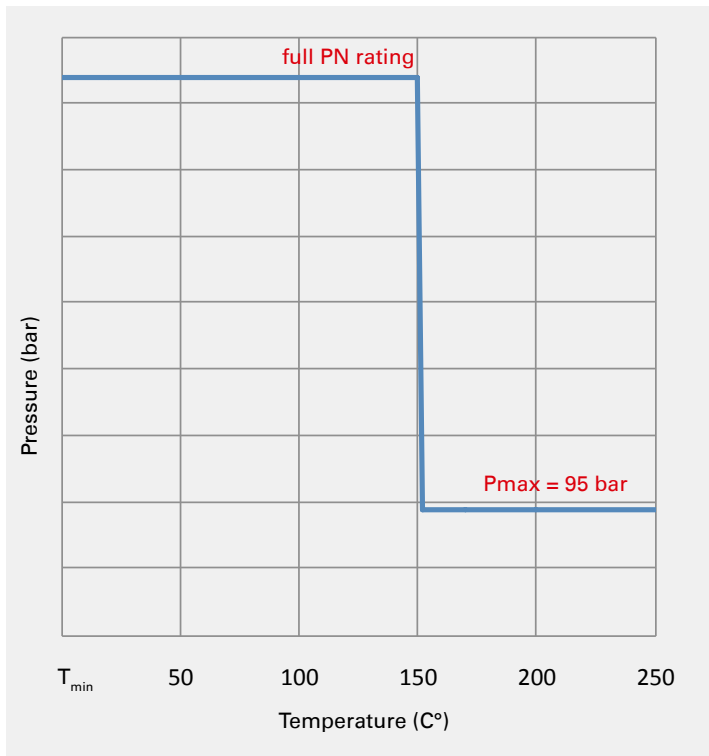
Pure PTFE ball seat



Teflon-fiber-glass-reinforced ball seat



PEEK ball seat



Surface coating of MHA products

MHA can supply the following surface coatings or surface treatments for the body materials:

Steel

- MHA Protect-Cr(VI)-free = standard
- chemically nickel-plated
- ZnNi coating

Stainless Steel

- machining quality = standard
- glass bead blasted
- electro-polished
- ceramic finished

Aluminum

- anodized
- hard anodized

MHA steel products are supplied as standard with a high-quality surface coating. MHA-Protect-Cr(VI)-free is a galvanically plated surface protection which complies with all the requirements of the current European regulations of the automobile industry and with the RoHS guidelines.

This surface protection also has a visual effect and MHA Protect can be varnished to suit any product design if required. The corrosion protection achieved is excellent and more effective than the protection of yellow chrome-plating. The cathodic remote protective action prevents early corrosion due to handling or assembly damage. As opposed to yellow plated surfaces containing Cr(VI), the MHA Protect surfaces do not lose on corrosion protection with increasing thermal load from 80 - 90°C. On the contrary, temperatures of approximately 100°C increase the corrosion protection.

Appearance

Silver-colored, or light yellow, depending on passivation

With this coating MHA conforms to the specifications of valid EU regulations

- EU Directive 2000/53/EG (end of life vehicles directive ELV)
- RoHS (**R**estriction **o**f the use of certain **H**azardous **S**ubstances in electrical and electronic equipment)
- WEEE (**W**aste from **E**lectrical and **E**lectronic **E**quipment)

Corrosion Resistance Level as per DIN 50021

Zn/Fe coating (standard):

Resistance to white rust: approx. 96 hours
Resistance to red rust: approx. 300 hours

Zn/Ni coating:

Resistance to red rust: 720 hours

Corrosion resistance level of valve accessories like handles or locking devices can vary from the above mentioned values.

Technical approvals, tests and certificates

MHA has the following test facilities:

Test mediums: air, nitrogen, helium, water, hydraulic oil
Test pressures: 0.1 bar to 4500 bar water

6 bar air
 200 bar nitrogen
 helium leak test

Test temperatures: 20°C to 500°C

Pressure, leak and functioning test in accordance with:

EN 12266-T1 and T2

DIN 3230-T5 and T6

API 6D

as well as tests specified by the customer.

MHA holds the following certification:

- AD-Directive HP 0
- DIN EN ISO 9001:2015
- PED/DGRL 2014/68/EU (Pressure Equipment Directive) modules D, H, H1
- ATEX 2014/34/EU Declaration, EX II 2G c
- Fire-safe approval in accordance with BS6755T.2, API6 FA and ISO10497, for type BKH and KH

MHA can carry out the following technical approval and issue the following certificates:

Test certificates in accordance with DIN EN 10204 for ball valves

- 3.1
- 2.2

Material certificates according to DIN EN 10204

- 3.1
- 3.2
- 2.2

Approval by the previous officially authorized inspection representative (formerly 3.1A) or, as the case may be, free inspection by the buyer's authorized representative (formerly 3.1C) is covered by the inspection certificate 3.2.

The current inspection certificate 3.1 conforms to the former inspection certificate 3.1B.

Test certifications by the manufacturer or by the manufacturer and the independent representative have to be authorized.

The following approval authorities can be assigned by MHA:

- TÜV Technischer Überwachungsverein
- ABS American Bureau of Shipping
- BV Bureau Veritas
- China Classification
- DNV Det Norske Veritas
- GL Germ. Lloyd
- LRS Lloyds Register of Shipping
- US Coast Guard
- others on request

Compulsory test of ball valves:

On request MHA valves can be provided with test certificate.

The test of ball valves are based on DIN EN 12266 -1

Standard tests are according to the methods P10, P11, P12

P10 = strength test of the body with 1.5 x PN with ball in half-opened position

P11 = leak test of the body and stem with max. 6 bar air.

The test is carried out randomly

P12 also includes the leak test of the ball seats with 1,1 x PN or 6 bar air

(P11 is not conducted at flow control valves)

Special tests of ball valves to be agreed up-front:

All tests in accordance with DIN EN 12266-1 can be agreed and carried out. The size of the inspection lot (up to 100%) also has to be defined.

Certificates: the result of the tests can be proven by the following certificates:

- DIN EN 10204 – 3.1 issued by MHA
- DIN EN 10204 – 3.2 issued by independent authorities

Type of test certificate	Content of certificate	Confirmation of certificate by
2.2 test report	confirmation of accordance with the order stating the results of nonspecific tests	the manufacturer
3.1 inspection certificate 3.1	confirmation of accordance with the order stating the results of specific tests	manufacturer's authorized inspection representative (independent from the production division)
3.2 inspection certificate 3.1	confirmation of accordance with the order stating the results of specific tests	manufacturer's authorized inspection representative (independent from the production division) and the buyer's authorized inspection representative or the inspection representative who is authorized by official regulation

Resistance list

Flow medium	Body, ball, stem and adapter materials		Seal materials				
	Steel	Acidproof Steel	NBR (Nuna-N)	EPDM (Buna AP)	FPM (Viton)	PTFE (Teflon)	POM (Delrin)
A							
Acetic acid, concentration 50%	B	A	C	A	C	A	C
Acetic acid, concentration 80%	B	A	C	-	C	A	C
Acetone	A	A	C	A	C	A	C
Acetylene	A	A	B	A	B	A	B
Acrylonitrile	A	A	C	C	C	A	C
Air	A	A	A	A	A	A	A
Aluminum oxide, max. +100°C	A	A	A	-	A	B	B
Ammonia, gaseous NH ₃ and liquid NH ₄ OH, max. +100°C	A	A	C	C	C	A	C
Ammonium chloride, max. +20°C	C	B	B	C	B	A	B
Anthracene oil	A	A	C	C	A	A	C
Argon, max. +100°C	A	A	A	-	A	A	A
Argon, max. +200°C	A	A	C	-	A	A	C
Asphaltic bitumen, +220°C	A	A	C	C	C	A	C
ATE brake fluid	A	A	C	A	B	A	A
B							
Benzene	A	A	C	C	B	A	A
Bitumen, max. +220°C	A	A	C	C	C	A	C
Borax	B	A	A	-	A	A	A
Bromine	C	C	C	C	B	A	-
Brown coal tar	A	A	C	C	C	A	C
Butadiene	A	A	C	-	A	A	A
Butane	A	A	A	C	A	A	A
Butyric fat	C	A	A	C	B	A	A
C							
Cadmium chloride, max. +100°C	C	A	A	-	B	A	B
Cadmium chloride, max. +200°C	C	A	C	-	B	A	C
Cadmium sulphate, +75°C	A	A	A	-	A	A	A
Calcareous water	A	A	A	A	A	A	A
Calcium carbonate	A	A	A	-	A	A	B
Calcium hydroxide	A	A	A	-	A	A	B
Capacitor oil	A	A	C	-	A	A	A
Carbonic acid, gaseous and liquid	A	A	C	C	C	A	C
Cellolube 220	A	A	C	-	A	A	A
Cellulose/pulp wood	C	A	A	-	-	A	A
Chlorine gaseous dry, max. +100°C	A	A	C	-	A	A	A
Chlorine gaseous dry, over +100°C	C	A	C	-	A	A	C
Chlorine liquid dry, max. +100°C	A	A	C	-	A	A	A
Chlorine liquid dry, over +100°C	C	A	C	-	A	A	C
Chlorine, phosphoric acid +20°C / 75%	C	A	C	-	A	A	C
Chloroform dry	A	A	C	C	B	A	A
Citric acid	C	A	C	C	C	A	C
Clophen A30, max. +100°C	A	A	C	-	A	A	B
Cocoa	B	A	A	-	C	A	A
Coconut oil	C	A	B	-	C	A	B
Cold water	A	A	A	A	A	A	A
Crude oil (sour)	A	A	A	-	A	A	B
Crude oil (sweet)	A	A	A	-	A	A	B
Cutting water (emulsion)	A	A	A	C	A	A	A
D							
Desmophen	A	A	C	-	C	A	B
Diesel oil	A	A	A	C	A	A	A

Flow medium	Body, ball, stem and adapter materials		Seal materials				
	Steel	Acidproof Steel	NBR (Nuna-N)	EPDM (Buna AP)	FPM (Viton)	PTFE (Teflon)	POM (Delrin)
E							
Engine oil	A	A	A	C	A	A	A
Ethane	A	A	A	-	A	A	A
Ether	A	A	B	-	B	A	B
Explosive (Anex 1)	A	A	A	-	-	B	B
F							
Faeces	A	A	A	-	A	A	A
Fatty acid, +100°C	C	A	B	-	C	A	A
Fatty acid, +200°C	C	A	C	-	C	A	C
Ferrous chloride	C	C	A	-	A	A	A
Ferrous sulphate	C	A	A	-	A	A	A
Fire-extinguishing substance (Foamite)	A	A	A	C	B	A	B
Formic acid	C	A	C	C	C	A	C
Fruit juices	C	A	A	-	B	A	A
Fuel oil heavy, max. +80°C	A	A	C	-	C	A	C
Fuel oil heavy, max +200°C	A	A	C	-	C	A	C
Fuel oil light, max. +80°C	A	A	A	C	A	A	A
Furane	A	A	C	C	C	A	C
G							
Gas (inert gas), +100°C	A	A	A	C	A	A	A
Gas (inert gas), +200°C	A	A	C	C	A	A	C
Gas oil	A	A	A	-	A	A	A
Gear oil	A	A	A	-	A	A	A
Glucose	A	A	A	-	A	A	A
Glycerine (glycerine-water mixture) sodium chloride	B	A	C	C	C	A	C
Glycol	B	A	A	-	A	A	B
H							
Heavy oil	A	A	C	C	C	A	C
Hot water, max. +80°C	A	A	A	A	A	A	A
Hot water, max. +180°C	A	A	C	A	C	A	C
Hydraulic fluid (glycol basis)	A	A	C	A	C	A	C
Hydraulic fluid (mineral oil basis)	A	A	A	C	B	A	A
Hydraulic fluid (phosphor-ester basis)	A	A	C	A	A	A	A
Hydraulic oil as per spec MIL-H-5606 a)	A	A	A	C	A	A	A
Hydrogene bromide	C	C	C	C	-	A	-
I							
Ink	C	A	A	-	A	A	A
Isopropyl alcohol	A	A	C	C	C	A	C
J							
Jet propulsion fuel JP-4	A	A	B	C	B	A	A

A resistant

B conditionally resistant in many cases (please enquire)

C not recommended

- not yet known

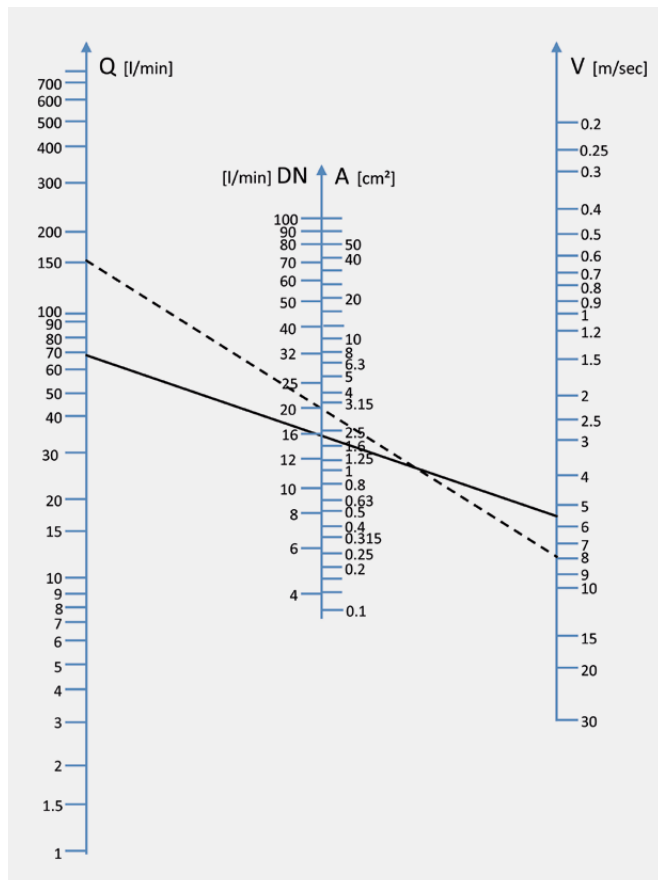
Resistance list

Flow medium	Body, ball, stem and adapter materials		Seal materials					
			Steel	Acidproof Steel	NBR (Nuna-N)	EPDM (Buna AP)	FPM (Viton)	PTFE (Teflon)
K								
Kerosene	A	A	C	C	A	A	A	
Ketone	C	A	C	C	C	A	C	
L								
Lacquers	B	A	C	C	C	A	A	
Latex	B	A	C	C	C	A	A	
Linseed oil	A	A	A	-	A	A	A	
Lubricating oil	A	A	A	C	A	A	A	
Lyes (alkaline)	B	A	A	-	B	A	A	
M								
Magnesium hydroxide	A	A	A	-	A	A	A	
Magnesium sulphate	A	A	A	-	A	A	A	
Malt (from barley)	C	A	C	C	C	A	-	
Margarine	C	A	A	-	C	A	A	
Mercury	A	A	A	-	B	A	A	
Methane	A	A	A	-	A	A	A	
Methanol, over +64°C	B	A	C	-	-	A	-	
Methanol, up to +64°C	B	A	A	-	-	A	-	
Milk of lime	A	A	A	-	C	A	A	
Mine gas	A	A	A	-	C	A	A	
Mineral oil, +100°C	A	A	A	C	A	A	A	
Mineral oil, +200°C	A	A	C	C	A	A	C	
Mining sewage	A	A	A	-	A	A	A	
Molasses (crude)	A	A	A	-	A	A	A	
Molasses (edible)	C	A	A	-	C	A	A	
N								
Naphtha	A	A	A	-	A	A	A	
Naphthalene	A	A	C	C	B	A	A	
Natural gas, +100°C	A	A	A	C	A	A	A	
Nitro dilution	A	A	C	C	C	A	-	
Nitrogen	A	A	A	-	A	A	A	
O								
Oil-water emulsion	A	A	A	-	A	A	A	
Olive oil	A	A	A	C	A	A	A	
Oxygen gas, +60°C (oxygen)	A	A	A	-	A	A	A	
Oxygen, max. +60°C	A	A	A	-	A	A	A	
P								
P3E-special	B	A	A	C	B	A	B	
Palatal	A	A	C	C	C	A	C	
Paraffin oil	A	A	A	C	A	A	A	
Paraffin oil and jet propulsion fuel = JP-4	A	A	B	C	B	A	A	
Perchloroethylene	A	A	C	C	C	A	C	
Petrol (pure)	A	A	B	C	A	A	A	
Petroleum	A	A	B	C	A	A	B	
Potassium sulphate	C	A	A	-	A	A	A	
Propane	A	A	A	-	A	A	A	
Propylene	A	A	A	C	B	A	A	
Pydraul 60, up to max. +50°C	A	A	C	A	C	A	B	
Pydraul F9	A	A	C	-	A	A	A	

Flow medium	Body, ball, stem and adapter materials		Seal materials				
	Steel	Acidproof Steel	NBR (Nuna-N)	EPDM (Buna AP)	FPM (Viton)	PTFE (Teflon)	POM (Delrin)
S							
Salad oil	B	A	A	C	C	A	B
Soda lye	B	A	A	-	B	A	B
Sodium aluminate solutions	B	A	A	-	A	A	A
Sodium arsenate + Sodium arsenite	A	A	A	-	A	A	A
Sodium arsenate + Sodium arsenite, +200°C	A	A	C	-	A	A	C
Sodium bisulphate, +20°C/10%	C	A	A	-	A	A	A
Sodium bisulphite, +20°C / 50%	C	A	C	C	C	A	C
Sodium carbonate, +20°C	C	A	A	-	A	A	A
Sodium chloride, +20°C	C	A	A	-	A	A	A
Sodium hydroxide, -20°C / 20%	A	A	A	-	B	A	C
Sodium monofluoro-phosphate, +20°C	C	A	B	-	B	A	-
Sodium nitrate, +20°C	B	A	C	C	B	A	A
Solvents	A	A	C	C	C	A	B
Spirit	A	A	C	C	C	A	C
Steam, max. +180°C	A	A	C	A	C	A	C
Sugar-beet juice	B	A	A	-	C	A	A
T							
Tannic acid (weak)	C	A	A	-	A	A	A
Tar	A	A	C	C	C	A	C
Tar oil (pit coal)	A	A	C	C	C	A	C
Tetrachloroethylene	A	A	C	C	C	A	C
Toluol/Toluene, +20°C	A	A	C	C	C	A	C
Town gas	A	A	A	-	A	A	A
Trichlor-acetic, max. +60°C	C	A	C	C	C	A	C
Trichlorethylene (tri)	A	A	C	C	B	A	-
Turbine oil (Aero-Shell) 750 Nato Symbol O-149	A	A	C	C	A	A	B
Turpentine oil	A	A	A	-	A	A	A
U							
Ucon-Hydrolube	A	A	C	C	B	A	A
V							
Vinegar	C	A	C	-	C	A	-
Vinyl chloride	C	A	C	C	C	A	C
Viscose	A	A	A	-	B	A	A
W							
Water, +80°C	A	A	A	A	A	A	A
Water, +180°C	A	A	C	A	C	A	C
Waxes	A	A	A	-	A	A	A
Wine	C	A	A	-	B	A	A
X							
Xylene	A	A	C	C	C	A	A

Determining nominal diameter

Nomogram for determination of nominal diameter



We recommend using the following oil rate as a guideline

Suction pipes: 0,5 ... 0,8 m/sec
 Return pipes: 2 ... 4 m/sec
 Pressure pipes up to 100 bar: 2 ... 4 m/sec
 Pressure pipes up to 500 bar: 3 ... 12 m/sec

This nomogram provides a guide for the determination of the nominal diameter (DN).

Example 1 - - - - -

A velocity $v = 8$ m/sec and a flow rate of $Q = 150$ l/min have been selected.

The straight line linking these two values on the outer scales intersects the nominal diameter DN 20 on the middle scale.

Example 2 _____

A velocity $v = 5,5$ m/sec and a flow rate of $Q = 66$ l/min have been selected.

The straight line linking these two values on the other scales intersects the nominal diameter DN 16 on the middle scale. No allowance is made for the resistance of the pipes, elbows and valves, viscosity, the effect of temperature on viscosity or other factors.

Nominal flow rate list

The indicated flow rates have been determined for ball valves in open position with water at a temperature of +15°C.

Nominal diameter		Kv [m³/h]	Cv [gal/min]	l/min
[mm]	[inch]			
15	1/2"	19,4	22,6	85
20	3/4"	45,6	53,0	200,3
25	1"	71,5	83,1	314,1
32	1 1/4"	105	122,1	461,5
40	1 1/2"	170	197,7	747,3
50	2"	275	319,8	1209
65	2 1/2"	507	589,5	2228
80	3"	905	1052,3	3978
100	4"	1414	1644,2	6215
125	5"	2362	2746,5	10382
150	6"	3694	4295,3	16236

The nominal flow rate coefficient Kv as per VDI/VDE 2173 indicates the quantity of water in cubic meters per hour, at $\Delta p = 1$ bar and 35 °C at 5 up to 30°C.

The Cv value which is still common practice in the USA specifies how many US gal/min of water at 60°F flow through the valve at $\Delta p = 1$ psi.



Porting patterns for multiway ball valves

BK3

Symbol	Porting pattern	SB no.	Stop of end position	Operating angle	Overlap
L		50 BK3 / BK3-A		90°	negative
T		51 BK3 / BK3-A		90°	negative
L		55 BK3-S*		90°	negative
T		56 BK3-S*		90°	negative
Not allowed:					
T		99		90°	

* Pressure inlet possible from all ports!
Must be operated only at $\Delta P=0\text{bar}$!

PK3

Symbol	Porting pattern	SB no.	Stop of end position	Operating angle	Overlap
LLu		58 PK3		90°	negative
Lu		57 PK3-S*		180°	positive

* Pressure inlet possible from all ports!
Must be operated only at $\Delta P=0\text{bar}$!

BEKH3

Symbol	Porting pattern	SB no.	Stop of end position	Operating angle	Overlap
Lu		52 BEKH3		180°	positive

Porting patterns for multiway ball valves

3KH with stop of end position


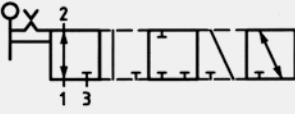

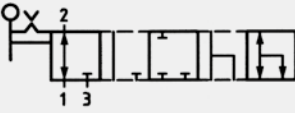

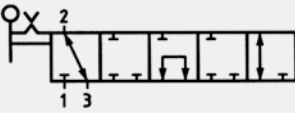

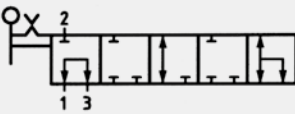

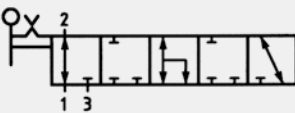






Symbol	Porting Pattern	SB no.	Stop of end position	Operating angle	Overlap
L		01		90°	positive
T		02		90°	positive
LL		03		45°	negative
TL		04		45°	negative
LI		06		90°	negative
TL		08		90°	negative
TI		09		90°	negative
T		99		90°	positive

3KH with detent bolt in all permitted positions

L		05		2x45°	positive
T		07		2x45°	positive
T		10		4x45°	positive
T		11		4x45°	positive
T		12		4x45°	positive
LI		28		2x45°	negative
TL		29		2x45°	negative
TI		30		2x45°	negative

Porting patterns for multiway ball valves

3KH with optical indicator in all permitted positions

Symbol	Porting pattern	SB no.	Stop of end position	Operating angle	Overlap
L		05.1		2x45°	positive
T		07.1		2x45°	positive
T		10.1		4x45°	positive
T		11.1		4x45°	positive
T		12.1		4x45°	positive
LI		28.1		2x45°	negative
TL		29.1		2x45°	negative
TI		30.1		2x45°	negative

Porting patterns for multiway ball valves

4KH with stop of end position

Symbol	Porting pattern	SB no.	Stop of end position	Operating angle	Overlap
T		13		90°	positive
X		14		90°	negative with closed position
X		15		45°	negative
XI		16		45°	negative
XI		17		90°	negative
LI		18		90°	negative
XT		19		90°	negative
TL		21		90°	negative
XL		22		90°	negative
XL		23		90°	negative
L		27		180°	negative






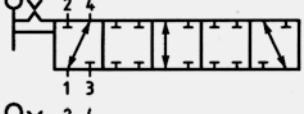
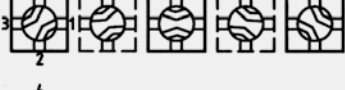







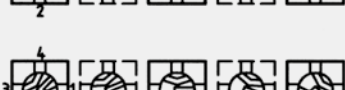

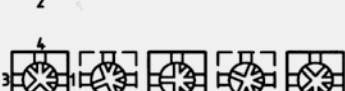


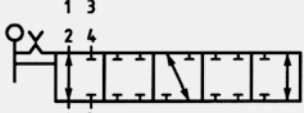

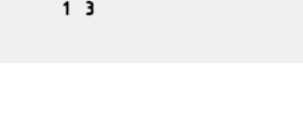
Porting patterns for multiway ball valves

4KH with detent bolt in all permitted positions

Symbol	Porting pattern	SB no.	Stop of end position	Operating angle	Overlap
T		20		2x45°	positive
T		24		4x45°	positive
L		25		4x45°	positive
X		26		2x45°	negative with closed position
XI		31		2x45°	negative
LI		32		2x45°	negative
XT		33		2x45°	negative
TL		34		2x45°	negative
XL		35		2x45°	negative
XL		36		2x45°	negative
L		37		4x45°	positive

Porting patterns for multiway ball valves

4KH with optical indicator in all permitted positions

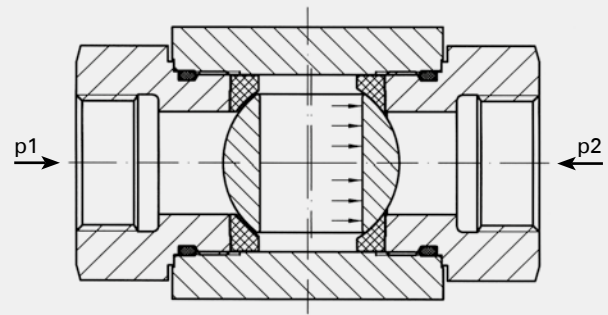
Symbol	Porting pattern	SB no.	Stop of end position	Operating angle	Overlap
T		20.1		2x45°	positive
T		24.1		4x45°	positive
L		25.1		4x45°	positive
X		26.1		2x45°	negative with closed position
XI		31.1		2x45°	negative
LI		32.1		2x45°	negative
XT		33.1		2x45°	negative
TL		34.1		2x45°	negative
XL		35.1		2x45°	negative
XL		36.1		2x45°	negative
L		37.1		4x45°	positive

MHA ball valve sealing variations

2-way ball valve

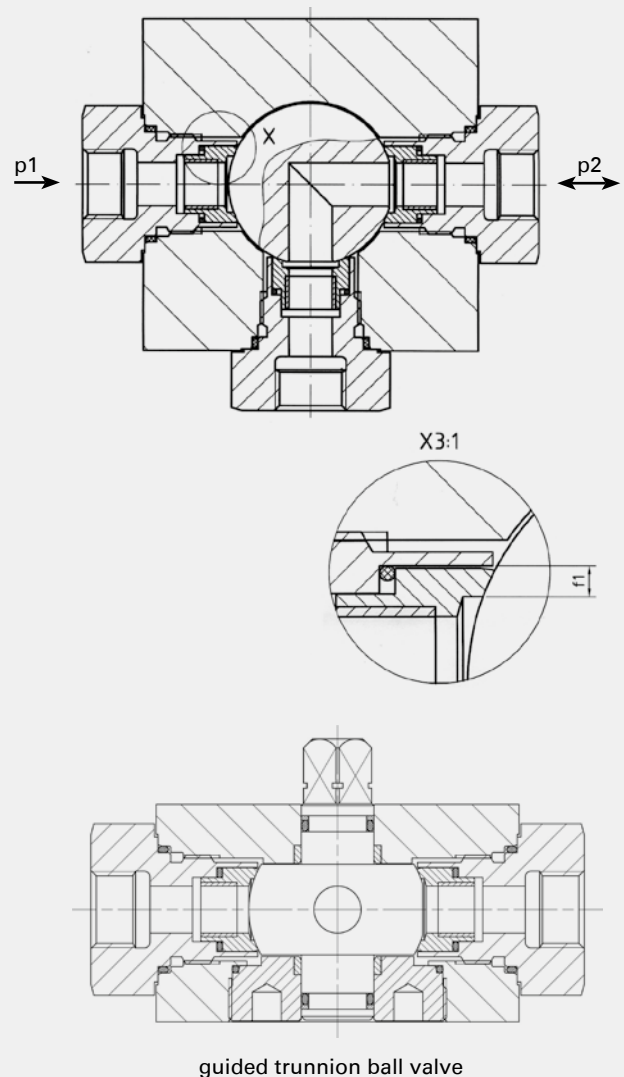
This valve has a floating ball.
The ball seats act as bearing seats for the ball.
Sealing is achieved by the ball being pushed against the downstream seal due to the pressure at p_1 .

Without pressure sealing is guaranteed by the preloading of the sealing elements.



Multiway ball valve (example 3KH)

This valve has a trunnion ball.
The sealing element seals from the upstream side. Sealing is guaranteed under all pressure conditions. It is achieved by the sealing element being forced against the ball.



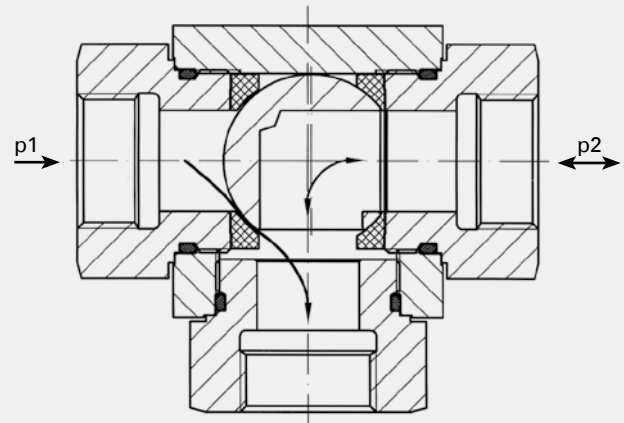
MHA ball valve sealing variations

3-way selector ball valve, type BK3

The selector ball valve has 2 seats and a floating ball.
If the shut-off port is pressurized and p_1 is higher than p_2 , the ball is being forced against the opposite sealing element. A gap forms and the ball valve is leaking.



Pressure inlet only from center port!

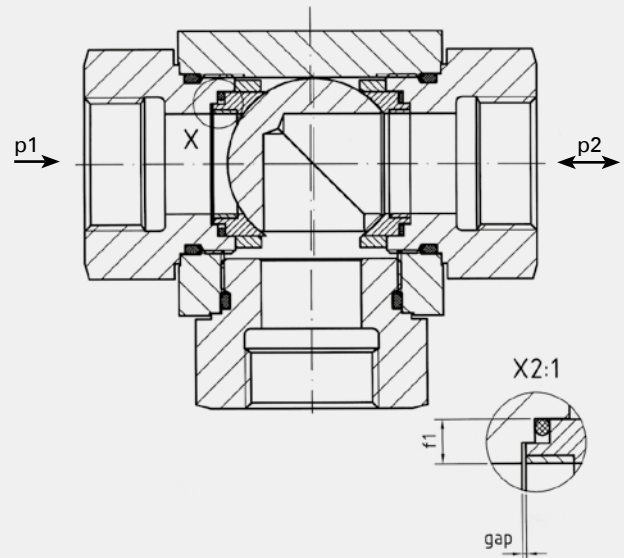


3-way selector ball valve, type BK3-S

The selector ball valve has 2 front side sealing seats and a floating ball.

$p_1 > p_2$

Due to the forming of the ring surface f_1' and the pressure ($p_1 - p_2$) the left sealing element will be forced against the ball and consequently the sealing is achieved. The 'floating' ball moves against the right sealing surface - the ball valve remains sealed.

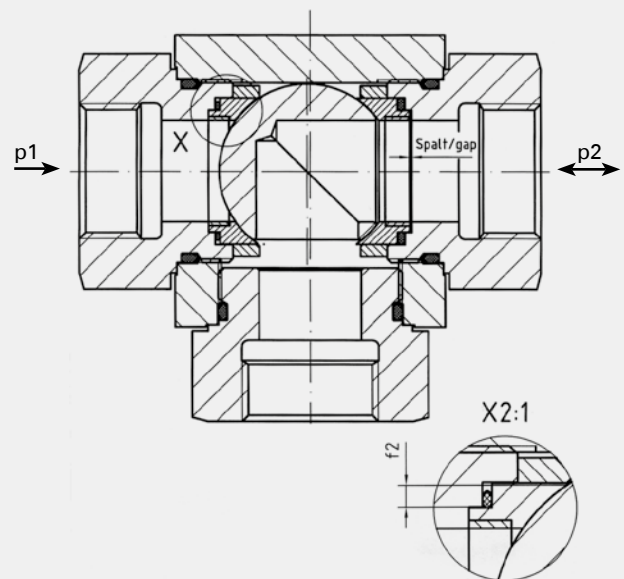


$p_1 < p_2$

Due to the ring surface f_2' and the pressure ($p_2 - p_1$) the right sealing element will also be forced against the ball and consequently the sealing is achieved. The 'floating' ball moves against the left sealing surface - the ball valve remains sealed.



**Pressure inlet possible from all ports!
Must be operated only at $\Delta P = 0 \text{ bar}$!**



Operating manual for ball valves

In accordance with Directive 97/23/EC



1. Labeling of ball valves and valves

The application of the PED (Pressure Equipment Directive) has been mandatory since 29.5.2002.

MHA ZENTGRAF GmbH & Co KG holds certification that includes compliance with DIN EN ISO 9001 and correspondence with Directive 97/23/EG, including Module H1.

Valves that are destined for use within the European Economic Area are classified in categories I to III in accordance with increasing potential hazard.

The nominal diameter, pressure and fluid group 1 + 2 (hazardous or non-hazardous fluids) are taken into account for the classification.

Fluid group 1 includes hazardous fluids in accordance with Article 3 of Directive 97/23/EG.

- Potentially explosive
- Extremely flammable
- Highly flammable
- Flammable (if the max. permitted temperature is above the flash point)
- Toxic
- Oxidizing

Fluid group 2 includes all fluids that do not have any of the characteristics in fluid group 1.

Ball valves with a nominal diameter of more than DN25 for fluid group 1 must be labeled as CE1637. Ball valves for fluids in fluid group 2 are not labeled with a CE mark. The buyer is obliged to inform the manufacturer/supplier if ball valves are destined for application in fluid group 1. If no information is provided on the medium for use it is assumed that fluids from fluid group 2 will be used.

The ball valve and seal materials are selected by the manufacturer in accordance with customer information such as medium, pressure, temperature and other use-specific requirements. If the conditions of use vary from the information provided then the lifespan of the ball valve may be reduced or the ball valve may malfunction. The material combinations and conditions for use that are specified based on the design can be found in the following labeling on the ball valve.

1st Line: Germany x-y	country of manufacture, x = calendar week, y = year
2nd Line: MHA	manufacturer
3rd Line: BKH-DN13-G1/2	valve type, nominal diameter, connection type, size
4th Line: PN500 - 1123	nominal pressure, MHA material combination

(For more information on MHA material combinations, please see p. 253/254.)

2. General

Ball valves are pressurized for the transportation, shutting off or redirection of media flow. Hazards are presented by fittings in the high-pressure area if there is a case of improper or incorrect use or if the safety notes in these operating instructions are not observed.

The customer must take the operating pressures (pressure surges/impulse pressures) into account during the planning and design of ball valves. Pressure information in the catalog refers to static loads. The corresponding pressure reductions must be taken into account for pulsating or changing loads.

Ball valves are only suitable for installation in piping systems with connections at the same pressure load and corresponding connections or between flanges of the same pressure load and the same flange connection. Two-way ball valves open and close by turning the selector shaft by 90°.

A flow display shows the position the ball valve is switched to. The ball valve can be switched using a hand lever or drive. The design of the drive must be suited to the conditions of use of the ball valve.

The operating instructions of the corresponding manufacturer are valid for drive parts, e.g. for drives and position switches. Please observe machinery directive 2006/42/EG for fittings and drives.

3. Installation notes

Prior to installation checks must be carried out to test whether the ball valve design corresponds to the required design and is suitable for the intended use. The installation of ball valves may only be carried out by qualified personnel and while the ball valve and pipe system are unpressurized. The pipelines must be introduced to the fittings without tension. The valve valves must be inspected for damage and contamination before installation. Damaged ball valves must not be installed.

All the pipelines must be rinsed before the ball valves are installed.

Residue in the pipelines can damage internal parts and this can result in malfunction or complete failure of the ball valve.

Please ensure during installation of the ball valves that no external tensions or vibrations are transferred to the ball valve.

When the piping is screwed in the screw on the ball valve must be held with a suitable tool. The ball valve connections must not be subjected to any additional torsional moment that would change their installation position and thus prevent provision of function.

Overheating of the seals must be prevented on ball valves with welded ends by using suitable measures. When welding is carried out it must also be ensured that no welding particles enter the internal space. Welding residue must be removed.

Ball valves with flange connections must be centered by screwing the counterflange before all the screws on the flange connection are tightened crosswise. An undamaged seal must be used between the flanges as prescribed in the norm. The spacer bolts or connecting screws must be selected in accordance with the flange types. With thread holes it must be ensured that the maximum screwing depth is not exceeded.

Switching must be carried out as a function test after the ball valve has been installed. No parts of the ball valve (e.g. cover, connecting piece) may be released or screwed down. In the case of media that are hazardous to health, flammable or explosive it must be ensured that the pipe system and ball valve are completely emptied.

Watch out for any residue flowing through. Appropriate protective clothing must be worn. The fitting may need to be placed in the piping using lifting gear.

Please observe the switch position of the ball valve according to the piping plan. Pressure stage, connection and construction length of the piping system must correspond to the ball valve. The operating instructions of the relevant manufacturer must be taken into account with regard to system parts.

4. Initial operation

All operating instructions must be read and observed prior to initial operation and assembly work must be inspected. Initial operation of a system may only be carried out by qualified personnel. The piping system must be bled prior to initial operation. Air bubbles in the piping system can cause explosions in the event of a sudden increase of pressure. This is why the operating pressure should be increased in stages.

If the ball valve is stored for a long period, or if it is at a standstill for a longer period in one switch position, then the torsional moment for the first switching process is substantially above the actual torsional moment (pull-off moment).

If ball valves are installed in the piping system as end fittings, there is particular risk of death from parts sheering off. Professional execution is absolutely essential in this case.



5. Maintenance / Inspection

When the piping system is drained the ball valves must be drained via a switch position of 45°. Ball valves may only be dismantled and maintained by trained, specialist personnel. No makeshift seals of any kind are permitted. Ball valves must be inspected at regular intervals for leaks, malfunction and damage. The maintenance intervals depend on the conditions of use of the fitting.

In order to retain functionality the ball valve must be switched at least every six months in the event of longer standstill periods. If discrepancies to the desired status are discovered during this maintenance work, measures must be undertaken immediately to ensure safe operating conditions (exchange or repair).

6. Removal notes

The removal of ball valves may only be carried out by qualified personnel and while the ball valve and piping are not under pressure. The ball valve must be set to a semi-open position in order to prevent pressure from being trapped.

If media are used that are hazardous to health, flammable or explosive, the piping and the ball valve must be completely drained. Watch out for any residues flowing through. Appropriate protective clothing must be worn.

7. Warning notes

Please take note of these operating instructions. The manufacturer of the ball valves does not accept any liability if these operating instructions are not heeded.

Ball valves must only be used for the purpose stated by the manufacturer. The manufacturer will also not accept liability in the event of damage caused by the incorrect installation and use of ball valves or by incorrect use by unqualified personnel.

Ball valves must always be switched fully in principle. They may only be used in the switch positions fully closed or fully open.

Ball valves are not suitable for the restriction or regulation of flow quantities and are not approved for this use. Indifferent switching positions lead to damage to the seals in the ball area, which result in leaks or altered torsional moments that can be accompanied by temperature rises at the surface.

Tools (e.g. pliers, hammers, open-end wrenches, extensions etc.) may not be used to switch the ball valves. The use of such tools can lead to damage to switching elements and casings. Ball valves may not be switched by force.

Particular usage or environmental conditions (moisture, vibrations, switching frequency, electromagnetic field, potentially explosive area or anti-statics etc.) must be clearly defined when the ball valves are ordered in order to ensure functional design. Ball valves may only be used for suitable media.

No viscous or hardenable media may be used.

Contamination is to be avoided. Contaminated media lead to damage to sealing elements. This creates leaks that lead to the failure of the ball valve. The temperature limits that are provided for the fitting must be upheld in order to prevent early failure of the ball valve.

Ball valves must be stored in a dry and clean condition as delivered. Protective caps must only be removed just before actual installation.

Unpacked ball valves must be protected from direct UV and/or sunlight. In potentially explosive areas the switches on the ball valves must be limited to a maximum of 10 per minute in order to avoid self-warming. Exceeding the operating pressure quoted or operating at temperatures outside the quoted range may lead to leaks or destruction of the ball valve.

Caution: Danger to human life!

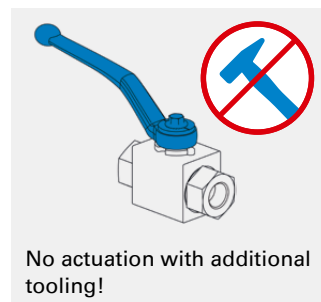
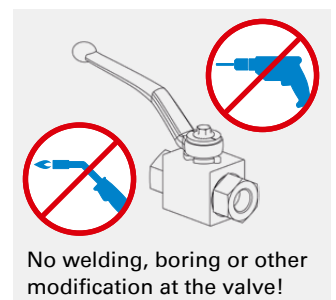
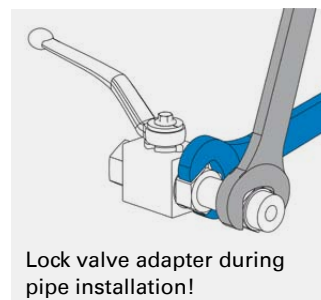
Specific warning notes, e.g. regarding the wearing of gloves for switching, must be heeded (the ball valves take on the temperature of the medium). Any structural modification to the ball valve, particularly the addition of drill holes and the welding on of objects (plates, mounts etc.) is strictly prohibited.

In the event of malfunctions the ball valve must be exchanged by qualified personnel with the pipe system in an unpressurized and drained condition. Systems must be switched off before the ball valve is dismantled.

Only the manufacturer is permitted to carry out repairs. If the ball valve is dismantled without permission and by unqualified personnel this will render any warranty or damage claim made against the manufacturer null and void. National regulations on accident prevention and the local safety regulations of the operator are not replaced by these operating instructions and must always be regarded as overriding.

The following must be ensured before any repair work:

- On automated fittings the power supply to the drives must be suspended prior to repair and maintenance work.
- It must be ensured that no third party can start up the system.
- The pipelines must be drained and pressure cushions relieved.
- Information must be collected regarding possible hazards that could be caused by residue operating material and protective gloves, goggles etc. must be worn if necessary.
- Leave fittings to cool. Do not exceed limits with regard to pressure, temperature or media.





1. Kennzeichnung von Kugelhähnen und Ventilen

Die Anwendung der DGRL (Druckgeräte-Richtlinie) ist seit dem 29.05.2002 verbindlich. **MHA ZENTGRAF GmbH & Co KG** ist zertifiziert u.a. nach DIN EN ISO 9001 und gem. Richtlinie 97/23/EG einschl. Modul H1.

Ventile, die für den Einsatz im europäischen Wirtschaftsraum bestimmt sind, werden nach zunehmendem Gefahrenpotential in die Kategorie I bis III eingestuft.

Für die Einstufung werden Nennweite, Druck und Fluidgruppe 1+2 (gefährliche oder nicht gefährliche Fluide) herangezogen.

Fluidgruppe 1 umfasst gefährliche Fluide gem. Art. 3 der Richtlinie 97/23/EG.

- Explosionsgefährlich
- Hochentzündlich
- Leichtentzündlich
- Entzündlich (wenn die maximal zulässige Temperatur über dem Flammpunkt liegt)
- Giftig
- Brandfördernd

Kugelhähne mit einer Nennweite von mehr als DN25 für die Fluidgruppe 1 müssen mit CE1637 gekennzeichnet werden. Kugelhähne für Flüssigkeiten der Fluidgruppe 2 erhalten keine CE-Kennzeichnung.

Der Besteller ist verpflichtet, dem Hersteller/Lieferant mitzuteilen, wenn Kugelhähne für die Anwendung der Fluidgruppe 1 bestimmt sind. Werden in der Bestellung keine Angaben zum Einsatzmedium gemacht, wird davon ausgegangen, dass Flüssigkeiten der Fluidgruppe 2 zum Einsatz kommen.

Die Kugelhahn- und Dichtungswerkstoffe werden durch den Hersteller des Kugelhahnes entsprechend den Kundenangaben wie Medium, Druck, Temperatur und weiteren einsatzspezifischen Anforderungen ausgewählt. Bei abweichenden Einsatzbedingungen kann es zu einer Verkürzung der Lebensdauer bzw. zum Ausfall des Kugelhahnes kommen. Die aufgrund der Auslegung spezifizierten Materialkombinationen und Einsatzbedingungen sind der Kennzeichnung auf dem Kugelhahn wie folgt zu entnehmen.

1. Zeile:	Germany x-y	Herstellerland, x = Kalenderwoche, y = Jahr
2. Zeile:	MHA	Hersteller
3. Zeile:	BKH-DN13-G1/2	Ventiltyp, Nennweite, Anschlussart, Größe
4. Zeile:	PN500 - 1123	Nenndruck, MHA Werkstoffkombination

(Weitere Informationen zu MHA Werkstoffkombinationen finden Sie auf Seite 253/254.)

2. Allgemeines

Kugelhähne werden zum Durchfluss bzw. Absperren oder Umlenken von Medienströmen unter Druck eingesetzt. Von Armaturen im Hochdruckbereich können Gefahren ausgehen, sofern eine unsachgemäße oder nicht bestimmungsgemäße Verwendung vorliegt oder die Sicherheitshinweise dieser Betriebsanleitung nicht beachtet werden.

Bei der Planung und Auslegung von Kugelhähnen muss der Kunde die auftretenden Arbeitsdrücke (Druckschläge/ Impulsdrücke) mit einbeziehen. Druckangaben im Katalog beziehen sich auf statische Belastungen. Für schwellige oder wechselnde Belastungen sind entsprechende Druckabschläge mit einzubeziehen.

Kugelhähne sind ausschließlich für den Einbau in Rohrleitungssysteme mit Anschlüssen gleicher Druckstufe und entsprechendem Anschluss oder

zwischen Flanschen gleicher Druckstufe und gleichem Flanschanschluss bestimmt.

2-Wege-Kugelhähne öffnen und schließen bei Drehung der Schaltwelle um 90°. Eine Durchflussanzeige zeigt die Schaltstellung des Kugelhahnes an. Der Kugelhahn kann mittels Handhebel oder Antrieb geschaltet werden. Die Auslegung des Antriebes muss auf die Einsatzbedingungen des Kugelhahns abgestimmt sein.

Für Anbauteile, wie z.B. Antriebe und Positionsschalter, ist die Betriebsanleitung der jeweiligen Hersteller gültig. Bei Armaturen mit Antrieb ist die Maschinenrichtlinie 2006/42/EG zu beachten!

3. Einbauhinweise

Vor dem Einbau ist zu überprüfen, ob die Kugelhahnausführung der geforderten Ausführung entspricht und für den vorgesehenen Einsatz geeignet ist. Der Einbau von Kugelhähnen darf nur von qualifiziertem Personal und im drucklosen Zustand des Kugelhahnes und des Rohrleitungssystems durchgeführt werden. Die Rohrleitungen sind spannungsfrei an die einzubauende Armatur heranzuführen! Die Kugelhähne sind vor dem Einbau auf Schäden und Kontamination zu prüfen. Beschädigte Kugelhähne dürfen nicht eingebaut werden.

Vor dem Einbau der Kugelhähne sind alle Rohrleitungen durchzuspülen. Rückstände in Rohrleitungen können Innenteile beschädigen, woraus Funktionsstörungen oder ein Komplettausfall des Kugelhahns resultieren können.

Beim Einbauen der Kugelventile ist darauf zu achten, dass keine externen Spannungen und Schwingungen auf den Kugelhahn übertragen werden. Beim Einschrauben von Rohrleitungen muss die Verschraubung des Kugelhahnes mit einem geeigneten Werkzeug gegengehalten werden. Die Kugelhahnanschlüsse dürfen beim Einbau keinen zusätzlichen Drehmomenten unterliegen, wodurch sich ihre Einbauposition ändert und somit die Funktion nicht gewährleistet werden kann. Bei Kugelventilen mit Anschweißenden ist ein Überhitzen der Dichtungen durch geeignete Maßnahmen zu verhindern. Beim Schweißen ist ebenfalls darauf zu achten, dass keine Schweißpartikel in den Innenraum gelangen. Schweißrückstände sind unbedingt zu entfernen. Kugelhähne mit Flanschanschluss müssen durch die Schrauben der Gegenflansche zentriert sein, bevor alle Schrauben der Flanschverbindung kreuzweise angezogen werden. Zwischen den Flanschen ist eine lt. Norm vorgeschriebene, unbeschädigte Dichtung zu verwenden. Die Stehbolzen oder Verbindungsschrauben müssen den Flanschtypen entsprechend ausgewählt werden. Bei Sackgewinden ist darauf zu achten, dass die maximale Einschraubtiefe nicht überschritten wird.

Nach dem Einbau des Kugelhahnes ist als Funktionsprobe eine Schaltung durchzuführen. Es dürfen keine Teile des Kugelhahnes (z.B. Deckel, Anschlussstutzen) gelöst oder heruntergeschraubt werden. Bei gesundheitsschädlichen, brennbaren und explosiven Medien ist auf vollständige Entleerung des Rohrleitungssystems und des Kugelhahnes zu achten!

Vor evtl. nachfließenden Rückständen wird gewarnt! Entsprechende Schutzkleidung ist zu tragen! Die Armatur ist gegebenenfalls mittels Hebezug zwischen die Rohrleitung zu setzen.

Die Schaltstellung des Kugelhahnes nach Rohrleitungsplan ist zu beachten. Druckstufe, Anschluss und Baulänge des Rohrleitungssystems müssen mit dem Kugelhahn übereinstimmen. Für Anbauteile sind die Betriebsanleitungen der jeweiligen Hersteller unbedingt zu beachten.

4. Inbetriebnahme

Vor der ersten Inbetriebnahme sind alle Betriebshinweise zu lesen und zu beachten, sowie die Montagearbeiten zu überprüfen. Die Inbetriebnahme einer Anlage darf nur von qualifiziertem Personal durchgeführt werden. Das Rohrleitungssystem muss vor der Inbetriebnahme entlüftet werden. Luftblasen im Rohrleitungssystem können bei schlagartigem Druckaufbau zu Explosionen führen. Der Betriebsdruck sollte daher in Stufen aufgebaut werden.



Bei längerer Lagerung des Kugelhahnes oder längerer Stillstandzeit in einer Schaltstellung liegt das Drehmoment beim ersten Schaltvorgang deutlich über dem tatsächlichen Drehmoment (Losreißmoment).

Sind Kugelhähne als Endarmaturen im Rohrleitungssystem eingebaut besteht besondere Lebensgefahr durch ausreißende Teile. Hierbei ist eine fachmännische Ausführung zwingend erforderlich.

5. Wartung / Inspektion

Bei Entleerung des Rohrleitungssystems müssen Kugelhähne über eine 45°-Schaltstellung entleert werden. Kugelhähne dürfen nur von geschultem Fachpersonal demontiert und gewartet werden. Notdürftige Abdichtungen jeglicher Art sind verboten. Kugelhähne müssen in regelmäßigen Abständen auf Dichtheit, Funktion und Beschädigungen überprüft werden. Die Wartungsintervalle richten sich nach den Einsatzbedingungen der Armatur.

Zur Erhaltung der Funktionstüchtigkeit ist es bei längerer Stillstandzeit erforderlich, den Kugelhahn mindestens halbjährlich zu schalten. Werden bei Wartungsarbeiten Abweichungen zum Sollzustand festgestellt, so müssen unverzüglich Maßnahmen ergriffen werden, die einen sicheren Betriebszustand gewährleisten (Austausch oder Instandsetzung).

6. Ausbauhinweise

Der Ausbau von Kugelhähnen darf nur von qualifiziertem Personal und im drucklosen Zustand des Kugelhahnes und des Rohrleitungssystems durchgeführt werden. Hierbei ist der Kugelhahn in halb-offene Stellung zu bringen, um eingeschlossene Drücke zu verhindern.

Bei gesundheitsschädlichen, brennbaren und explosiven Medien ist auf vollständige Entleerung des Rohrleitungssystems und des Kugelhahnes zu achten! Vor evtl. nachfließenden Rückständen wird gewarnt! Entsprechende Schutzkleidung ist zu tragen!

7. Warnhinweise

Diese Betriebsanleitung ist zur Kenntnis zu nehmen. Bei Nichtbeachtung der Betriebsanleitung übernimmt der Hersteller der Kugelhähne keine Haftung!

Kugelhähne sind nur für den vom Hersteller angegebenen Verwendungszweck zu benutzen!

Bei Schäden durch fehlerhaften Einbau und Anwendung von Kugelhähnen, sowie falscher Benutzung durch unqualifiziertes Personal übernimmt der Hersteller der Kugelhähne ebenfalls keine Haftung.

Kugelhähne sind grundsätzlich bis zum Anschlag durchzuschalten. Sie dürfen nur in den Schaltstellungen vollständig geschlossen oder vollständig geöffnet benutzt werden!

Zur Drosselung und Regulierung von Durchflussmengen sind Kugelhähne nicht geeignet und somit auch nicht zugelassen! Indifferente Schaltstellungen führen zu Beschädigung der Dichtungen im Kugelbereich, wodurch Undichtigkeiten oder veränderte Drehmomente resultieren, die eventuell mit Temperaturerhöhungen an der Oberfläche einhergehen.

Werkzeuge (z.B. Zangen, Hammer, Gabelschlüssel, Verlängerungen usw.) dürfen zum Umschalten der Kugelhähne nicht verwendet werden. Die Verwendung solcher Werkzeuge kann zu Beschädigungen an Schaltelementen und Gehäusen führen. Kugelhähne dürfen nicht mit Gewalt geschaltet werden.

Besondere Einsatz- oder Umgebungsbedingungen (Feuchtigkeit, Vibrationen, Schalthäufigkeit, elektromagnetisches Feld, explosionsgefährdeter Bereich und Antistatik, etc.) müssen bei der Bestellung von Kugelhähnen klar definiert sein, um eine funktionsgerechte Auslegung zu gewährleisten! Kugelhähne sind nur für geeignete Medien zu benutzen!

Zähflüssige oder aushärtbare Medien dürfen nicht verwendet werden. Verschmutzungen sind zu vermeiden. Verschmutzte Medien führen zu Beschädigungen der Dichtelemente. Dadurch entstehen Undichtigkeiten, die

zum Ausfall des Kugelhahnes führen. Die für die Armatur angegebenen Temperaturgrenzen sind einzuhalten, um einen frühzeitigen Ausfall des Kugelhahns zu vermeiden.

Kugelhähne sind im Anlieferungszustand trocken und schmutzfrei zu lagern. Schutzkappen sind erst vor dem eigentlichen Einbau zu entfernen.

Unverpackte Kugelhähne sind vor direkter UV- und/oder Sonneneinstrahlung zu schützen.

Im explosionsgefährdeten Bereich sind die Schaltungen der Kugelhähne zur Vermeidung von Eigenerwärmung auf max. 10 x je Minute zu begrenzen. Überschreitung des angegebenen Betriebsdruckes bzw. Über- und Unterschreitung der Betriebstemperatur führt zur Undichtheit und Zerstörung des Kugelhahnes!

Achtung: Gefährdung von Menschenleben!

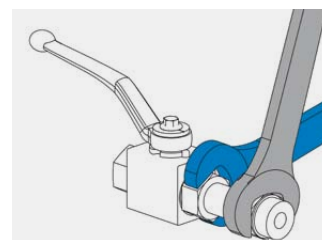
Speziellen Warnhinweisen, z.B. dem Tragen von Handschuhen beim Schalten, ist Folge zu leisten (Kugelhahn nimmt die Temperatur des Mediums an). Jede bauliche Veränderung des Kugelhahnes, insbesondere das Anbringen von Bohrungen und das Anschweißen von Gegenständen (Platten, Halterungen usw.) ist strengstens untersagt.

Bei Funktionsstörungen ist der Kugelhahn durch qualifiziertes Personal im drucklosen und entleerten Zustand des Rohrleitungssystems auszutauschen. Anlagen sind vor der Demontage des Kugelhahns abzuschalten.

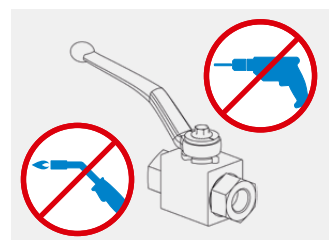
Eine Reparatur ist nur durch den Hersteller zulässig! Bei unzulässiger Demontage des Kugelhahnes durch unqualifiziertes Personal erlischt jeder Gewährleistungs- und Schadensanspruch an den Hersteller! Nationale Vorschriften zur Unfallverhütung sowie ortsgebundene Sicherheitsvorschriften des Betreibers werden durch diese Betriebsanleitung nicht ersetzt und sind in jedem Falle als vorrangig zu betrachten.

Vor sämtlichen Instandsetzungsarbeiten ist sicherzustellen bzw. zu beachten:

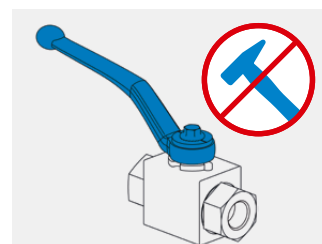
- Bei automatisierten Armaturen ist grundsätzlich vor Reparatur- und Wartungsarbeiten die Energieversorgung zu den Antrieben zu unterbrechen.
- Inbetriebnahme der Anlage durch Dritte ausschließen.
- Entleerung der Rohrleitung sowie Druckpolster abbauen.
- Sich über mögliche Gefahren, welche durch Rückstände des Betriebsmediums entstehen können, zu informieren, gegebenenfalls Sicherheitshandschuhe, Schutzbrille etc. tragen.
- Armaturen abkühlen lassen. Grenzwerte hinsichtlich Druck-, Temperatur- und Medium nicht überschreiten



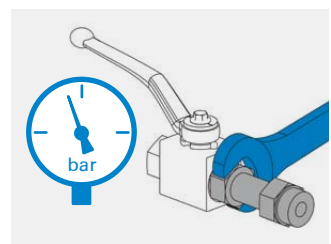
Gegenhalten der Kugelhahn-Verschraubung bei Montage!



Kein Schweißen, Bohren oder andere Modifikationen am Ventil!



Nicht mit Werkzeug schalten!



Nicht unter Druck demontieren!

Notice technique pour vannes à bille Selon la directive 97/23/CE



1. Marquage des vannes à bille et soupapes

La directive sur les équipements sous pression est en vigueur depuis le 29.05.2002.

MHA ZENTGRAF GmbH & Co KG est certifié entre autres selon DIN EN ISO 9001 et selon la directive 97/23/CE, y compris le module H1.

Les soupapes destinées à une utilisation dans l'espace économique européen sont classées en catégorie I à III en fonction des risques croissants. Pour les besoins de cette classification sont pris en considération la dimension nominale, la pression et le groupe de fluide 1+2 (fluides dangereux ou inoffensifs).

Le groupe de fluide 1 comprend les fluides dangereux conformément à l'art. 3 de la directive 97/23/CE.

- Explosifs
- Extrêmement inflammables
- Facilement inflammables
- Inflammables (lorsque la température maximale admissible est à une température supérieure au point d'éclair)
- Toxique
- Comburant

Le groupe de fluides 2 comprend tous les autres fluides qui n'ont pas les caractéristiques du groupe de fluide 1.

Les vannes à bille ayant une dimension nominale supérieure à DN25 dans le groupe de fluide 1 doivent être marquées CE1637. Les vannes à bille pour des liquides du groupe de fluide 2 n'ont pas de marquage CE. L'acheteur est tenu d'informer le fabricant/fournisseur lorsque les vannes à bille sont destinées à une utilisation avec le groupe de fluide 1. En cas d'absence d'informations sur le fluide utilisé dans la commande, il sera supposé qu'il s'agit de liquides du groupe de fluide 2.

Les matériaux des vannes à bille et d'étanchéité sont choisis par le fabricant de la vanne à bille en fonction des informations fournies par le client concernant le fluide, la pression, la température et d'autres exigences relatives à l'exploitation. Des divergences au niveau des conditions d'exploitation peuvent entraîner un raccourcissement de la durée de vie ou la défaillance de la vanne à bille. Le marquage sur la vanne à bille indique comme suit les combinaisons de matériaux et conditions d'exploitation spécifiques.

1. Ligne:	Germany x-y	pays de fabrication, x = semaine calendaire, y = année
2. Ligne:	MHA	fabricant
3. Ligne:	BKH-DN13-G1/2	type de soupape, dimension nominale, type de raccord, taille
4. Ligne:	PN500 - 1123	pression nominale combinaison de matériaux MHA

(Pour de plus amples renseignements concernant nos codes matière, veuillez consulter la page 253/254 de notre catalogue.)

2. Généralités

Les vannes à bille sont utilisées pour le passage ou le blocage ou la déviation de flux de fluides sous pression.

Les vannes à haute pression peuvent présenter des risques si elles sont utilisées de manière incorrecte ou non-conforme ou si les consignes de sécurité de la présente notice technique ne sont pas respectées.

Les pressions d'exploitation (coups de bélier / pressions d'impulsion) doivent être prises en compte par le client lors de la planification et la conception des vannes à bille. Les pressions indiquées dans le catalogue correspondent aux charges statiques. Des ratios correspondants doivent être pris en compte en cas de charge dynamique ou changeante.

Les vannes à bille sont exclusivement destinées au montage dans des

systèmes de tuyauteries avec des raccords du même niveau de pression et un raccord adapté ou entre brides du même niveau de pression et un même raccord à bride.

Les vannes à bille à 2 voies s'ouvrent et se ferment en tournant l'arbre de commande de 90°. Un affichage du débit indique la position de la vanne à bille. La vanne à bille peut être commandée par levier manuel ou par servomoteur. La construction du servomoteur doit répondre aux conditions d'exploitation de la vanne à bille.

La notice technique du fabricant respectif s'applique aux éléments de montage, tels que les servomoteurs et commutateurs de position. La directive sur les machines 2006/42/CE s'applique aux vannes à servomoteur!

3. Consignes de montage

Il faut vérifier avant le montage si la construction de la vanne à bille correspond à la construction demandée et convient à l'exploitation prévue. Le montage des vannes à bille ne doit être réalisé que par du personnel qualifié et uniquement lorsque la vanne à bille et le système de tuyauteries sont sans pression. Les tuyauteries doivent être cheminées aux vannes sans contrainte ! Il faut vérifier l'absence de dommages et de contamination des vannes à bille avant le montage. Il est interdit d'installer une vanne à bille endommagée.

Les tuyauteries doivent être rincées avant d'installer les vannes à bille. Les éventuels résidus dans les tuyauteries peuvent endommager les pièces internes et provoquer des dysfonctionnements ou la défaillance de la vanne à bille.

Lors du montage de la vanne à bille, il faut veiller à ce qu'aucune contrainte et vibration externe ne soit transmise à la vanne à bille.

Il faut maintenir le raccord vissé de la vanne à bille à l'aide d'un outil approprié lorsque les conduites sont vissées. Les raccords des vannes à bille ne doivent pas être soumis lors du montage à des couples de serrage supplémentaires car cela risque de modifier leur positionnement et d'entraver le bon fonctionnement.

Concernant les vannes à bille à souder, il faut protéger les joints de la chaleur au moyen de mesures appropriées. Pendant la soudure, il faut également veiller à ce qu'il n'y ait pas de particules de soudure qui accèdent à l'intérieur. Tout résidu de soudure est impérativement à enlever.

Les vannes à bille avec raccord à bride doivent être centrées avec les vis de la contre-bride avant de serrer toutes les vis du raccord à bride de manière croisée. La norme prévoit la mise en place d'un joint déterminé, non endommagé entre les brides. Le boulon vertical et les vis de fixation doivent être choisis en fonction du type de bride. En cas de taraudage borgne, il faut veiller à ne pas dépasser la profondeur de vissage maximale.

Une fois la vanne à bille montée, il faut effectuer une commutation à titre d'essai fonctionnel. Aucune pièce de la vanne à bille (p. ex. capot, manchon de raccordement) ne doit être desserrée ou dévissée. En cas de fluides nocifs pour la santé, combustibles et explosifs, il faut vérifier que le système de tuyauterie et la vanne à bille ont été complètement vidangés !

Attention aux éventuels écoulements de résidus ! Porter les vêtements de protection adaptés ! La vanne peut éventuellement être placée entre la tuyauterie à l'aide d'un moyen de levage.

Il faut respecter la position de commutation de la vanne à bille conformément au plan de cheminement des conduites. Le niveau de pression, les raccords et la longueur de construction du système de tuyauterie doivent correspondre à la vanne à bille. Les notices techniques des fabricants respectifs sont impérativement à respecter pour les éléments de montage.

4. Mise en service

L'ensemble des consignes d'utilisation doivent être lues et appliquées avant la première mise en service et les travaux de montage doivent être vérifiés. Seul le personnel qualifié est autorisé à mettre l'installation en service. Le système de tuyauterie doit être purgé avant la mise en service. Des bulles d'air dans le système de tuyauterie peuvent provoquer des explosions en cas de montée instantanée de la pression. Il est conseillé de

Notice technique pour vannes à bille

Selon la directive 97/23/CE



monter la pression d'exploitation de façon progressive.

En cas de stockage prolongé de la vanne à bille ou d'arrêt prolongé dans une position de commutation, le couple de serrage à la première commutation est nettement supérieur au couple de serrage réel (couple d'arrachement).

Les vannes à bille installées à l'extrémité du système de tuyauterie présentent tout particulièrement un danger de mort lié aux pièces arrachées. Une réalisation professionnelle est impérative dans ces cas.

5. Entretien / inspection

Lors de la vidange du système de tuyauterie, les vannes à bille doivent être vidangées en position à 45°. Seul le personnel formé est autorisé aux opérations de démontage et d'entretien des vannes à bille. Des mesures d'étanchéité provisoires de tout type sont interdites. L'étanchéité, le fonctionnement et l'absence de dommages des vannes à bille doivent être régulièrement vérifiés. Les intervalles d'entretien varient selon les conditions d'exploitation des vannes.

Pour maintenir un bon fonctionnement pendant des arrêts prolongés, il est nécessaire de commuter la vanne à bille au moins une fois tous les six mois. Si des écarts avec l'état visé sont constatés lors des travaux d'entretien, il faut immédiatement prendre des mesures pour garantir un fonctionnement en toute sécurité (remplacement ou remise en état).

6. Consignes de démontage

Le démontage des vannes à bille ne doit être réalisé que par du personnel qualifié et uniquement lorsque la vanne à bille et le système de tuyauteries sont sans pression. Pour cela, la vanne à bille doit être mise en position semi-ouverte pour éviter les pressions emprisonnées.

En cas de fluides nocifs pour la santé, combustibles et explosifs, il faut vérifier que le système de tuyauterie et la vanne à bille ont été complètement vidangés ! Attention aux éventuels écoulements de résidus ! Porter les vêtements de protection adaptés !

7. Mises en garde

Il faut lire la présente notice technique. Le fabricant des vannes à bille décline toute responsabilité en cas de non respect de la notice technique ! Les vannes à bille doivent être uniquement utilisées pour l'usage prévu par le fabricant !

Le fabricant décline également toute responsabilité pour tous les dommages liés à un montage et une utilisation non-conformes des vannes à bille, ainsi qu'à une utilisation incorrecte par du personnel non qualifié. Les vannes à bille doivent en principe être commutées jusqu'en butée. Elles ne doivent être utilisées qu'en position complètement fermée ou complètement ouverte !

Les vannes à bille ne conviennent pas à la régulation et à la réduction du débit et ne sont pas homologuées pour cet usage ! Des positions de commutation indifférentes entraînent des dommages au niveau des joints à proximité de la bille ce qui provoque des défauts d'étanchéité ou des modifications du couple de serrage conduisant éventuellement à des augmentations de température en surface.

Il est interdit d'utiliser des outils (p. ex. pinces, marteau, clé à fourche, extensions, etc.) pour commander les vannes à bille. L'utilisation de tels outils peut endommager les éléments de commandes et les boîtiers. Les vannes à bille ne doivent pas être commandées avec force.

Toute condition d'utilisation ou d'environnement exceptionnelle (humidité, vibrations, commutations fréquentes, champ électromagnétique, zone potentiellement explosive et antistatique, etc.) doit être clairement définie à la commande des vannes à bille pour assurer une construction adaptée. Les vannes à bille doivent être utilisées uniquement avec les fluides pour lesquels elles sont prévues !

Il ne faut pas utiliser des fluides visqueux ou durcissables.

Il faut éviter les pollutions. Les fluides pollués endommagent les éléments d'étanchéité. Cela provoque des défauts d'étanchéité conduisant à la défaillance de la vanne à bille. Il faut respecter les seuils de température indiqués pour les vannes afin de prévenir toute défaillance précoce de la vanne à bille.

Les vannes à bille doivent être stockées dans leur état de livraison dans un endroit sec et propre. Les bouchons de protection ne doivent être enlevés qu'avant le montage.

Les vannes non emballées doivent être protégées de l'exposition directe aux UV et/ou au soleil.

Dans des zones potentiellement explosives, il convient de limiter le nombre de commutations des vannes à bille à un maximum de 10 par minute pour éviter l'échauffement. Le dépassement de la pression d'exploitation indiquée ou le dépassement par le bas ou le haut de la température d'exploitation entraîne des défauts d'étanchéité et la destruction de la vanne à bille !

Attention: Danger de mort!

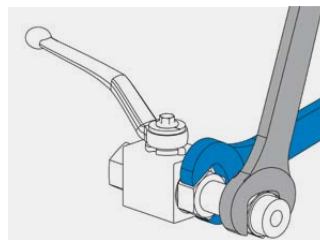
Les mises en garde particulières, p. ex. port de gants obligatoire pour la commande, doivent être impérativement appliquées (la vanne à bille est à la même température que le fluide). Toute modification de la construction de la vanne à bille, notamment des perçages et la soudure d'objets (plaques, fixations, etc.) est strictement interdite.

En cas de dysfonctionnements, seul le personnel qualifié est autorisé à remplacer la vanne à bille lorsque le système de tuyauterie est vidangé et sans pression. L'installation doit être mise hors tension avant le démontage de la vanne à bille.

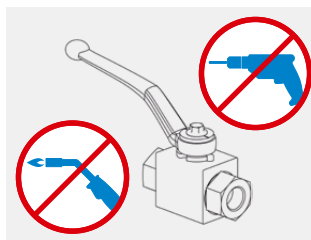
Seules les réparations par le fabricant sont admises ! En cas de démontage inadmissible de la vanne à bille par du personnel non qualifié, toute garantie et réclamation vis-à-vis du fabricant sera caduque ! La présente notice technique ne remplace pas les réglementations nationales relatives à la prévention des accidents ainsi que les consignes de sécurité locales de l'exploitant qui doivent dans tous les cas être considérées comme étant prioritaires.

Points à vérifier ou à respecter avant tous les travaux de maintenance:

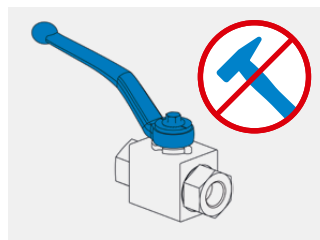
- En cas de vannes automatisées, il faut toujours couper l'alimentation énergétique des commandes avant de réaliser les réparations et l'entretien.
- Exclure toute remise en service de l'installation par des tiers.
- Vidanger les tuyauteries et éliminer la pression tampon.
- S'informer sur les dangers potentiels liés aux résidus du fluide d'exploitation, porter le cas échéant des gants de protection, des lunettes de protection, etc.
- Laisser refroidir les vannes. Ne pas dépasser les valeurs limites concernant la pression, la température et le fluide.



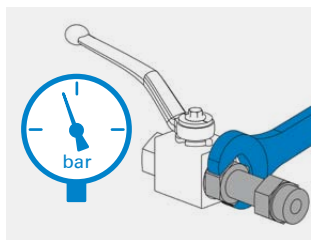
Maintenir l'adaptateur lors de l'installation!



Soudures, perçages ou autres modifications ne sont pas autorisées!



Ne pas manœuvrer la vanne avec des outils!



Ne pas démonter la vanne sous pression!



1. Identificación de las válvulas y las válvulas esféricas

La directiva de equipos a presión es de obligado cumplimiento desde el 29/05/2002.

MHA ZENTGRAF GmbH & Co KG tiene, entre otras, las certificaciones DIN EN ISO 9001 y de la directiva 97/23/CE, módulo H1 incluido.

Las válvulas fabricadas para emplearse en el espacio económico europeo se clasifican en las categorías I a III, progresivamente según su potencial de riesgo.

En la clasificación, se han utilizado el diámetro nominal, la presión y el grupo de fluidos 1+2 (fluidos peligrosos o no peligrosos).

El grupo 1 incluye a los fluidos peligrosos según el artículo 3 de la directiva 97/23/CE.

- Explosivo
- Extremadamente inflamable
- Fácilmente inflamable
- Inflamable (si la temperatura máxima permitida es superior al punto de ignición)
- Tóxico
- Comburente

El grupo 2 incluye a todos los fluidos que no corresponden a ninguna de las características del grupo 1.

Las válvulas esféricas con diámetro nominal superior a DN25 para el grupo 1 deben marcarse como CE1637. Las válvulas esféricas para líquidos del grupo de fluidos 2 no tienen distintivo CE. El cliente está obligado a comunicar al fabricante/distribuidor si las válvulas esféricas se van a utilizar para el grupo de fluidos 1. Si en el pedido no se especifican los datos de uso, se asumirá que las válvulas van a emplearse con líquidos del grupo de fluidos 2.

El fabricante selecciona los materiales de las válvulas esféricas y de sellado según los datos proporcionados por el cliente, por ejemplo, líquido, presión, temperatura y otros requisitos específicos de la aplicación. Si las condiciones de uso fueran distintas a estos datos, podría acortarse la vida útil de la válvula o causar averías en la misma. Las combinaciones de material y las condiciones de uso especificadas conforme a la configuración se identifican en la válvula esférica como:

1. Línea:	Germany x-y	País de fabricación, x = Semana, y = Año
2. Línea:	MHA	Fabricante
3. Línea:	BKH-DN13-G1/2	Tipo de válvula, diámetro nominal, tipo de conexión, tamaño
4. Línea:	PN500 - 1123	Presión nominal, combinación de materiales de MHA

(En el catálogo de MHA en la página 253/254, puede consultar información más detallada sobre las combinaciones de materiales de MHA.)

2. Información general

Las válvulas esféricas se utilizan para controlar el caudal con presión, es decir para cortar o desviar el caudal con presión.

Los dispositivos de valvulería en sistemas de alta presión pueden resultar peligrosos si no se usan de forma adecuada o convencional o si no se siguen las indicaciones de seguridad de este manual de instrucciones.

Para el diseño y configuración de las válvulas esféricas, el cliente debe indicar siempre las presiones operativas que se alcanzan. Los datos de presión del catálogo se refieren a cargas estáticas. En caso de cargas oscilantes o variables, es imprescindible incluir los baremos de presión.

Las válvulas esféricas están diseñadas exclusivamente para montarse en sistemas de tuberías con conexiones de igual presión y orificio apropiado o entre bridas con presión y orificio para bridas idénticos.

Las válvulas esféricas dobles se abren y cierran girando 90° el árbol. El indicador de caudal muestra la posición de conmutación de la válvula esférica. La válvula esférica se puede accionar con la palanca manual o el mecanismo de accionamiento. La configuración del mecanismo de accionamiento debe corresponder con las condiciones de uso de la válvula esférica.

Para los accesorios, como el mecanismo de accionamiento o el conmutador de posición, consulte el manual de instrucciones del fabricante. Las valvulerías con mecanismo de accionamiento deben cumplir la directiva de maquinaria 2006/42/CE.

3. Instalación

Antes de instalar la válvula, compruebe si la versión es compatible con la máquina y si está diseñada para ese uso. Las válvulas esféricas debe instalarlas únicamente personal cualificado y es imprescindible que tanto la válvula como el sistema de tuberías no tengan presión. Las tuberías deben conectarse sin tensión en la valvulería. Antes de instalar las válvulas esféricas, revíselas por si presentaran daños o contaminación. No monte las válvulas esféricas si están dañadas.

Antes de montar las válvulas esféricas, limpie con agua todas las tuberías. Si hubiera restos en las tuberías, las piezas internas podrían resultar dañadas, lo que causaría averías parciales o totales de la válvula esférica.

Al montar las válvulas esféricas, asegúrese de que no se pueden transmitir tensiones ni oscilaciones externas a la válvula.

Al atornillar las tuberías, es necesario sujetar la atornilladura de la válvula esférica con una herramienta apropiada. En la instalación, asegúrese de que las conexiones de la válvula no están expuestas a pares de rotación adicionales. De lo contrario, podría alterarse la posición de la válvula, con lo que no se podría garantizar su correcto funcionamiento.

En las válvulas esféricas con extremo de soldadura, tome las medidas necesarias para que no se sobrecalienten las juntas. Al soldar, asegúrese de que no caen partículas de soldadura en el interior. Retire de inmediato cualquier resto de soldadura.

Las válvulas esféricas con orificio para bridas deben centrarse atornillando la contrabrida, antes de que se aprieten todos los tornillos de la unión por bridas en cruz. Entre las bridas debe usarse una junta intacta conforme a la norma. Los prisioneros cónicos o los tornillos de unión deben seleccionarse según el tipo de brida. Si se trata de rosca ciega, asegúrese de que no se sobrepasa la profundidad máxima de atornilladura.

Después de instalar la válvula esférica, acciÓnela para comprobar el funcionamiento. No debe haber piezas de la válvula (p. ej. tapa, racores de empalme) sueltas ni desatornilladas. ¡Si se trabaja con fluidos perjudiciales para la salud, inflamables o explosivos, asegúrese de que se vacían por completo el sistema de tuberías y la válvula esférica!

¡Cuidado con los residuos que puedan retroceder! ¡Use el equipamiento de protección correspondiente! Para colocar la valvulería entre las tuberías, dado el caso emplear un equipo de elevación.

Tenga en cuenta la posición de conmutación de la válvula según el diagrama de las tuberías. Los niveles de presión, las conexiones y la longitud del sistema de tuberías deben coincidir con las especificaciones de la válvula esférica. En cuanto a los accesorios, consulte el manual de instrucciones del fabricante.

4. Puesta en marcha

Antes de poner en marcha el sistema por primera vez, es imprescindible que lea atentamente todas las indicaciones de manejo y que compruebe el montaje. La puesta en marcha debe realizarla únicamente personal cualificado. El sistema de tuberías debe desairearse antes de la puesta en marcha. Si hubiera burbujas en el sistema de tuberías y se acumulara la presión rápidamente, podrían producirse explosiones. Por ese motivo, la presión debe aumentarse de forma escalonada.

Si se va a guardar la válvula esférica o a mantenerla parada en una posición de conmutación durante un tiempo prolongado, la primera vez que se accione, el par de rotación será sensiblemente superior al par real (par de separación).



Si las válvulas esféricas están montadas en el sistema de tuberías como válvulas finales, aumenta el riesgo de lesiones mortales por desprendimiento de piezas. Por ese motivo, es obligatorio que la configuración sea profesional.

5. Mantenimiento/Inspección

Al vaciar el sistema de tuberías, las válvulas esféricas deben vaciarse en una posición de conmutación de 45°. El desmontaje y mantenimiento de las válvulas esféricas debe realizarlos únicamente personal cualificado. Queda terminantemente prohibido montar juntas provisionales de cualquier tipo. Es obligatorio revisar periódicamente la estanquidad, el funcionamiento y los posibles daños de las válvulas esféricas. Los intervalos de mantenimiento dependerán de las condiciones de uso.

Para conseguir que funcione correctamente, si se va a mantener parada durante mucho tiempo, hay que accionar la válvula esférica al menos cada medio año. Si durante las labores de mantenimiento se detectan desviaciones respecto al estado nominal, han de tomarse de inmediato las medidas necesarias para garantizar un funcionamiento seguro (cambios o reparaciones).

6. Desinstalación

Las válvulas esféricas debe desinstalarlas únicamente personal cualificado y es imprescindible que tanto la válvula como el sistema de tuberías no tengan presión. Para ello, coloque la válvula esférica en la posición entreabierta para evitar que haya presión atrapada.

¡Si se trabaja con fluidos perjudiciales para la salud, inflamables o explosivos, asegúrese de que se vacían por completo el sistema de tuberías y la válvula esférica! ¡Cuidado con los residuos que puedan retroceder! ¡Use el equipamiento de protección correspondiente!

7. Advertencias

Tenga siempre en cuenta las indicaciones de este manual de instrucciones. El fabricante de las válvulas esféricas no asume ninguna responsabilidad si no se cumplen las indicaciones de este manual de instrucciones. Las válvulas esféricas sólo deben usarse con la finalidad indicada por el fabricante.

El fabricante de las válvulas esféricas tampoco asume ninguna responsabilidad en caso de daños por un montaje o uso inadecuado de las válvulas esféricas, o por un uso inapropiado a cargo de personal no cualificado. Las válvulas esféricas deben accionarse básicamente hasta el tope. ¡Tan sólo deben usarse totalmente abiertas o cerradas en las posiciones de conmutación!

Las válvulas esféricas no están indicadas para limitar y regular caudales; por lo que queda prohibido usarlas con dichas finalidades. Si se usan posiciones de conmutación inadecuadas, se producirán daños en las juntas de la bola, lo que a su vez provoca fugas o pares de giro alterados que pueden ir acompañados de aumentos de temperatura en la superficie.

No se deben usar herramientas (p. ej. pinzas, martillos, llaves abiertas, alargadores, etc.) para accionar las válvulas esféricas. Usar esas herramientas puede provocar daños en los elementos de conmutación y las carcassas. Las válvulas esféricas no deben accionarse por la fuerza.

Al realizar el pedido de las válvulas esféricas es imprescindible especificar claramente si hay condiciones ambientales o de uso especiales (humedad, vibraciones, frecuencia de conmutación, campo electromagnético, entorno explosivo y antiestático, etc.) para garantizar una configuración que permita su correcto funcionamiento. ¡Las válvulas esféricas sólo deben usarse con los fluidos apropiados!

No se deben usar fluidos viscosos ni templables.

Es necesario evitar que se ensucien. Los fluidos sucios causan daños en las juntas. Esto genera fugas que, a su vez, provocan averías en la válvula esférica. Es obligatorio respetar los límites de temperatura indicados para la valvulería, con el fin de evitar averías precoces de la válvula esférica.

Las válvulas esféricas deben guardarse secas y limpias en el mismo estado de entrega. No retire los tapones hasta que no se hayan instalado definitivamente.

Si las válvulas esféricas están desembaladas, consérvelas protegidas de la radiación UV o solar directa.

En los entornos explosivos, las válvulas esféricas no se accionarán más de 10 veces por minuto con el fin de evitar su calentamiento. Tanto superar la presión operativa indicada como sobrepasar o no alcanzar la temperatura operativa causa fugas y deterioros en la válvula esférica.

Atención: ¡Peligro mortal!

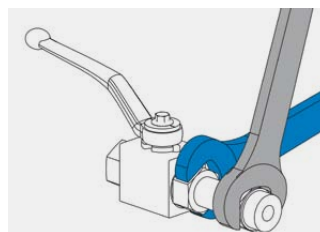
Es obligatorio cumplir las indicaciones especiales de advertencia, por ejemplo, usar guantes para accionar la válvula (la válvula esférica alcanza la misma temperatura que el fluido). Queda terminantemente prohibido realizar cambios estructurales en la válvula esférica, en especial realizar orificios o soldar objetos (placas, soportes, etc.).

En caso de avería, la válvula esférica deberá cambiarla personal cualificado con el sistema de tuberías sin presión y vacío. Antes de desmontar la válvula esférica, es necesario desconectar todos los sistemas.

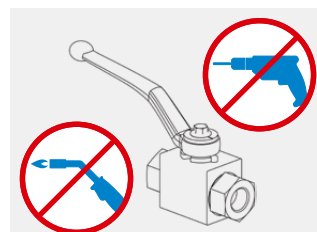
¡Las reparaciones debe autorizarlas previamente el fabricante! Si personal no cualificado desmonta la válvula esférica sin autorización, se anularán todos los derechos de garantía y reclamación que ofrece el fabricante. Este manual de instrucciones no reemplaza de ningún modo a la normativa nacional sobre prevención de accidentes ni a las normas locales de seguridad a las que está sujeto el titular y que son de obligado cumplimiento en todo momento.

Antes de realizar labores generales de mantenimiento, asegúrese de lo siguiente:

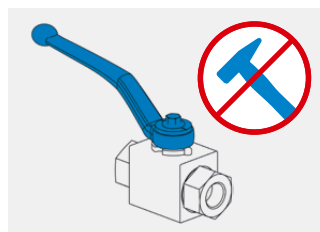
- Si la valvulería está automatizada, antes de realizar las labores de mantenimiento o reparación debe desconectarse la alimentación de los mecanismos de accionamiento.
- Nadie puede poner en marcha el sistema.
- Vacíe las tuberías y desmonte la bolsa de presión acumulada.
- Infórmese sobre los posibles riesgos que pueden causar los restos del fluido operativo y use los guantes, las gafas de seguridad, etc. que sean necesarios.
- Deje que se enfríe la valvulería. No deben superarse los valores umbral de presión, temperatura y fluido.



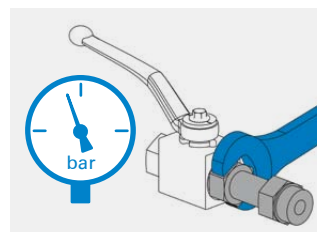
Fijar el adaptador de la válvula durante la instalación del tubo.



No soldar, taladrar u otro tipo de modificación sobre la válvula.



No operar la válvula con herramientas adicionales.



No desmontar si hay presión en el circuito.

Manuale operativo per rubinetti a sfera

Ai sensi della direttiva 97/23/CE



1. Marcatura per rubinetti a sfera e valvole

Dal 29.05.2002 è obbligatoria l'applicazione della DGRL (Direttiva sulle attrezzature a pressione).

MHA ZENTGRAF GmbH & Co KG è un'azienda certificata ai sensi della norma DIN EN ISO 9001 e della direttiva 97/23/CE incl. Modulo H1.

Le valvole destinate ad essere utilizzate nell'area economica europea sono classificate in tre categorie secondo criteri di pericolo crescente.

Per la classificazione vengono presi in considerazione la dimensione nominale, la pressione e il gruppo di fluidi 1+2 (fluidi pericolosi e fluidi non pericolosi).

Il gruppo di fluidi 1 comprende i fluidi pericolosi ai sensi dell'art. 3 della direttiva 97/23/CE.

- Esplosivo
- Altamente infiammatorio
- Leggermente infiammatorio
- Infiammatorio (se la temperatura massima ammissibile è superiore al punto di infiammabilità)
- Tossico
- Comburente

Il gruppo di fluidi 2 comprende tutti i fluidi che non presentano nessuna delle proprietà del gruppo di fluidi 1.

I rubinetti a sfera con dimensione nominale superiore a DN25 per il gruppo di fluidi 1 devono essere contrassegnati con la marcatura CE1637. I rubinetti a sfera per i liquidi del gruppo di fluidi 2 sono privi di marcatura CE. Il committente è tenuto a comunicare al produttore/fornitore i casi in cui rubinetti a sfera sono destinati all'utilizzo del gruppo di fluidi 1. Se nell'ordine non vengono incluse informazioni sul liquido da utilizzare, si presume che vengano utilizzati fluidi appartenenti al gruppo di fluidi 2.

I materiali utilizzati per la realizzazione dei rubinetti a sfera e delle guarnizioni vengono selezionati dal produttore del rubinetto a sfera in base alle informazioni fornite dal cliente, come liquido, pressione, temperatura ed altri requisiti. Condizioni di utilizzo differenti potrebbero ridurre la durata o causare un guasto del rubinetto a sfera. Le combinazioni di materiali e le condizioni di utilizzo specificate in base alla progettazione sono desumibili dalla marcatura riportata sul rubinetto a sfera, nel modo seguente:

1. Riga:	Germany x-y	Paese di produzione, x = Settimana, y = Anno
2. Riga:	MHA	Produttore
3. Riga:	BKH-DN13-G1/2	Tipo di valvola, dimensione nominale, tipo di attacco, dimensione
4. Riga:	PN500 - 1123	Pressione nominale, combinazione di materiali di MHA

(Ulteriori informazioni sulle combinazioni di materiali di MHA sono contenute nel catalogo sulla pagina 253/254.)

2. Informazioni generali

I rubinetti a sfera vengono utilizzati per far passare, bloccare o invertire i flussi di liquidi sotto pressione.

Il valvolame posto in settori di alta pressione può essere pericoloso in caso di utilizzo scorretto o non conforme alla destinazione o in caso di mancata osservanza delle avvertenze di sicurezza contenute in questo manuale operativo.

Nella progettazione e nel dimensionamento dei rubinetti a sfera, il cliente deve tener conto delle pressioni di esercizio presenti (colpi di pressione / pressioni di impulso). Le informazioni sulla pressione contenute nel catalogo si riferiscono a carichi statici. In caso di carichi dinamici o variabili considerare le riduzioni di pressione adeguate.

I rubinetti a sfera sono indicati esclusivamente per essere montati nei sistemi di tubature con attacchi dello stesso stadio di pressione e con attacco adatto a tra flange dello stesso stadio di pressione e uguale raccordo flangiato.

Aprire e chiudere i rubinetti a sfera a 2 vie ruotando l'albero di commutazione di 90°. Un'indicazione della portata indica la posizione di commutazione del rubinetto a sfera. Il rubinetto a sfera può essere attivato con una leva manuale o con un'unità di azionamento. Il dimensionamento dell'unità di azionamento deve essere determinato in base alle condizioni di utilizzo del rubinetto a sfera.

Per i componenti esterni, come ad es. unità di azionamento e interruttori di posizione, consultare il manuale d'uso del relativo produttore. Per il valvolame con unità di azionamento osservare la direttiva macchine 2006/42/CE.

3. Istruzioni di montaggio

Prima dell'installazione controllare che il modello del rubinetto a sfera corrisponda al modello richiesto e che sia indicato per l'utilizzo previsto. L'installazione di rubinetti a sfera può essere effettuata solo da personale qualificato e con il rubinetto a sfera e il sistema di tubature depressurizzati. Le tubature devono essere condotte prive di tensione al valvolame che deve essere installato. Prima dell'installazione, controllare che i rubinetti a sfera non siano danneggiati e contaminati. Non installare rubinetti a sfera danneggiati.

Lavare a fondo tutte le tubature, prima di installare i rubinetti a sfera. Eventuali residui presenti nelle tubature possono danneggiare le parti interne e causare malfunzionamenti o un guasto completo del rubinetto a sfera.

Quando si installano le valvole sferiche assicurarsi che non ci siano sollecitazioni e vibrazioni esterne sul rubinetto a sfera.

Quando si avvitano le tubature, bloccare il collegamento a vite del rubinetto a sfera utilizzando un attrezzo adatto. Durante l'installazione non sottoporre gli attacchi del rubinetto a sfera a coppie di serraggio aggiuntive che potrebbero modificare la sua posizione di installazione compromettendone il funzionamento.

In caso di valvole sferiche con estremità saldate, adottare misure adeguate per evitare un surriscaldamento delle guarnizioni. Durante la saldatura accertarsi che non penetrino all'interno particelle derivanti dalla saldatura. È importante rimuovere tutti i residui della saldatura.

I rubinetti a sfera con attacco flangiato devono essere centrati avvitando le controflange prima di serrare tutte le viti del collegamento a flangia. Tra le flange deve essere utilizzata una guarnizione non danneggiata come da normativa. I bulloni passanti o le viti di connessione devono essere scelti in base al tipo di flangia. In presenza di filettature cieche assicurarsi di non superare la profondità massima di avvitamento.

Dopo aver installato il rubinetto a sfera, eseguire una commutazione come prova di funzionamento. Non allentare né abbassare avvitando i pezzi del rubinetto a sfera (ad es. coperchio, attacchi). In caso di liquidi nocivi per la salute, infiammabili ed esplosivi, accertarsi che il sistema di tubature e il rubinetto a sfera siano stati completamente svuotati!

Fare attenzione ai residui che fuoriescono successivamente! Indossare vestiti di protezione adeguati! All'occorrenza, il valvolame deve essere collocato tra la tubatura tramite un dispositivo di sollevamento.

Osservare la posizione di commutazione in base al progetto delle tubature. Stadio di pressione, attacco e lunghezza di ingombro del sistema di tubature devono corrispondere al rubinetto a sfera. Per i componenti esterni attenersi al manuale operativo del relativo produttore.

4. Messa in funzione

Prima di procedere alla prima messa in funzione, leggere e osservare tutte le istruzioni per l'uso e controllare i lavori di montaggio. La messa in funzione di un impianto deve essere eseguita solo da personale qualificato. Il sistema di tubature deve essere deaerato prima della messa in funzione. Le bolle d'aria nel sistema di tubature possono causare delle esplosioni

Manuale operativo per rubinetti a sfera

Ai sensi della direttiva 97/23/CE



in caso di pressurizzazione improvvisa. Pertanto la pressione di esercizio deve essere generata gradualmente.

In caso di una conservazione prolungata del rubinetto a sfera o in caso di un periodo di inattività prolungato in una determinata posizione di commutazione, alla prima commutazione la coppia di serraggio si trova notevolmente al di sopra della coppia di serraggio reale (momento di distacco).

Se i rubinetti a sfera sono installati come valvole finali del sistema di tubature, sussiste un pericolo di morte per via delle parti che si staccano. In questi casi è necessaria un'esecuzione professionale.

5. Manutenzione / Ispezione

In fase di svuotamento del sistema di tubature, è necessario svuotare i rubinetti a sfera con una posizione di commutazione di 45°. I rubinetti a sfera possono essere smontati e sottoposti a manutenzione solo da personale specializzato addestrato. Non utilizzare guarnizioni di fortuna di qualsiasi tipo. Controllare a intervalli regolari la tenuta, il funzionamento ed eventuali danni dei rubinetti a sfera. Gli intervalli di manutenzione dipendono dalle condizioni di utilizzo del valvolame.

Ai fini della funzionalità è necessario azionare il rubinetto a sfera almeno ogni sei mesi, in caso di periodi di fermo prolungati. Nel caso in cui, durante i lavori di manutenzione, vengano rilevati degli scostamenti dallo stato desiderato, è necessario adottare immediatamente delle misure volte a garantire le condizioni di funzionamento sicure (sostituzione o riparazione).

6. Istruzioni di smontaggio

Lo smontaggio dei rubinetti a sfera può essere effettuato solo da personale qualificato e con il rubinetto a sfera e il sistema di tubature in stato depressurizzato. Per questa operazione portare il rubinetto a sfera nella posizione mezza aperta per evitare la formazione di pressione che non può fuoriuscire.

In caso di liquidi nocivi per la salute, infiammabili ed esplosivi, accertarsi che il sistema di tubature e il rubinetto a sfera siano stati completamente svuotati. Fare attenzione ai residui che fuoriescono successivamente! Indossare vestiti di protezione adeguati!

7. Avvertenze

Familiarizzare con il presente manuale operativo. Il produttore non si assume alcuna responsabilità in caso di mancata osservanza di questo manuale d'uso.

Utilizzare i rubinetti a sfera esclusivamente per gli usi previsti dal produttore!

Il produttore non si assume alcuna responsabilità in caso di installazione e utilizzo scorretti dei rubinetti a sfera o di utilizzo errato da parte di personale non qualificato.

In linea di massima, i rubinetti a sfera devono essere collegati fino alla battuta. Possono essere utilizzati solo se si trovano nella posizione di commutazione completamente chiusa o completamente aperta!

I rubinetti a sfera non sono adatti per la riduzione e la regolazione delle portate, pertanto non sono ammessi! Posizioni di commutazione indifferenti provocano danni alle guarnizioni vicino alla sfera causando difetti di tenuta o variazioni delle coppie di serraggio che potrebbero accompagnarsi a innalzamenti della temperatura sulla superficie.

Non utilizzare utensili (ad es. pinze, martelli, chiavi fisse, prolunghe, ecc.) per commutare i rubinetti a sfera. L'utilizzo di questo tipo di utensili può causare danni agli elementi di commutazione e agli alloggiamenti. Non esercitare forza per azionare i rubinetti a sfera.

Particolari condizioni di utilizzo o particolari condizioni ambientali (umidità, vibrazioni, frequenza di commutazioni, campi elettromagnetici, aree a rischio di esplosione e materiale antistatico, ecc.) devono essere definite con chiarezza al momento dell'ordine, per garantire un dimensionamen-

to funzionale. I rubinetti a sfera devono essere utilizzati solo per liquidi idonei!

Non utilizzare liquidi viscosi o termoisolanti.

Evitare la formazione di impurità. I liquidi sporchi danneggiano gli elementi di tenuta causando difetti di tenuta che comportano il guasto del rubinetto a sfera. Rispettare i limiti di temperatura indicati per il valvolame per evitare un guasto prematuro del rubinetto a sfera.

Conservare i rubinetti a sfera nelle condizioni di fornitura, in un luogo asciutto e pulito. I cappucci di protezione devono essere rimossi soltanto prima dell'effettiva installazione.

Proteggere i rubinetti a sfera non confezionati da raggi diretti UV e/o da raggi solari.

Nelle aree a rischio di esplosione limitare le commutazioni dei rubinetti a sfera a max. 10 al minuto per evitare un autoriscaldamento. Il superamento della pressione di esercizio stabilita e/o temperature più basse e più alte determinano annerimento e rottura del rubinetto a sfera!

Attenzione: pericolo di morte!

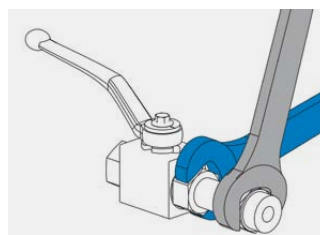
Osservare le avvertenze speciali, ad es. indossare guanti al momento dell'accensione (il rubinetto a sfera assorbe la temperatura del liquido). È severamente vietato apportare modifiche strutturali al rubinetto a sfera, in particolare la realizzazione di fori e l'applicazione di oggetti mediante saldatura (piastre, supporti, ecc.).

In caso di malfunzionamenti, far sostituire il rubinetto a sfera solo da personale qualificato tenendo il sistema di tubature in stato depressurizzato e svuotato. Spegnerne gli impianti prima di smontare il rubinetto a sfera.

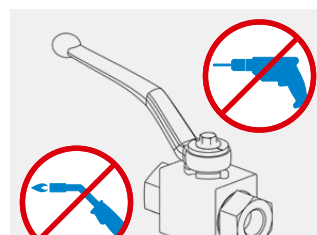
Le riparazioni devono essere eseguite solo dal produttore! Lo smontaggio non consentito del rubinetto a sfera da parte di personale non qualificato determina la decadenza di ogni garanzia e richiesta di rimborso. Le norme nazionali per la prevenzione degli infortuni e le norme di sicurezza locali del gestore non sono sostituite da questo manuale operativo e sono da ritenersi in ogni caso prioritarie.

Prima di eseguire interventi di manutenzione assicurarsi e/o osservare quanto segue:

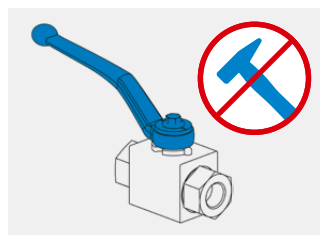
- In caso di valvolame automatizzato interrompere l'alimentazione energetica alle unità di azionamento prima di eseguire degli interventi di riparazione e manutenzione.
- Non far eseguire da terzi la messa in funzione dell'impianto.
- Svuotare la tubatura e ridurre la pressione accumulata.
- Informarsi sui possibili pericoli causati dai residui del liquido di esercizio e, se del caso, indossare guanti, occhiali di protezione, ecc.
- Far raffreddare il valvolame. Non superare i valori limite relativi a pressione, temperatura e liquido.



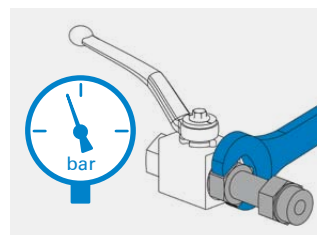
Tenere fermi i raccordi terminali della valvola durante il montaggio!



Non saldare, forare o fare altre modifiche sulla valvola!

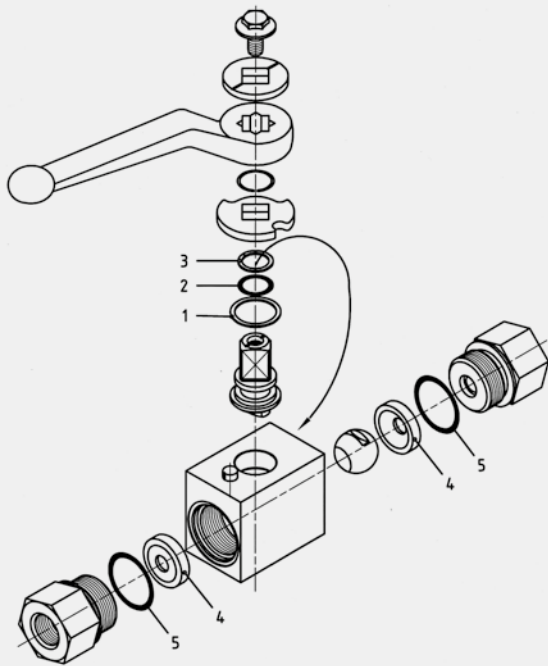


Non azionare con attrezzi!



Non smontare con pressione!

Assembly instructions for seal kit BKH



- Pos.1 1 x Thrust washer
- Pos.2 1 x O-ring for stem
- Pos.3 1 x Back-up ring for stem
- Pos.4 2 x Ball seat for ball
- Pos.5 2 x O-ring for adapter

Notice

The change of seals should only be undertaken by experienced and qualified experts. We recommend that seals are only replaced at **MHA ZENTGRAF** or by one of our authorized distributors, so that the quality of repair can be guaranteed.

1. Dismantling

Release any remaining fluid from the valve by first placing the ball in the HALF OPEN position and then in the OPEN position. Unscrew both adapters (anti-clockwise). Remove seals (note order and direction that these are in). The ball can only be removed when the valve is in the CLOSED position. Disassemble the stem by pressing it into the body of the valve. Remove all O-rings from the stem with suitable tools (e.g. small screwdriver). Remove the thrust washer (on the stem collar) from the stem.

2. Preparation

Prior to replacing seals ensure that all components are clean and free of any contamination. All seal elements and O-rings as well as the areas of the valves that will be in contact with the seals have to be greased slightly with Vaseline.

3. Pre-Assembly

Mount the thrust washer (Pos.1) on the stem collar. Replace O-rings (Pos.2+5) (using suitable tools) on the stem and onto each adapter. Ensure that O-rings are not damaged on keen edges or overstretched, (e.g. by covering screw threads or the shaft square by using suitable tools, alternatively by using a thin and soft foil).

Back-up rings (Pos.3) are located above the stem O-ring (Pos.2), i.e. on the unpressurized side. Ensure that the back-up ring sits tight and aligned without overlap in the groove to avoid any damage when assembling the stem to the body.

4. Assembly

Reassemble the stem to the body by pressing and turning at the same time, and then align the body axially to the stem ridge. Then insert the ball in and center it. Turn the shaft 90° (CLOSED position) in order to retain the ball within the body. Place the new seals in the body ensuring that the concave areas face the ball. Gently screw the adapters into the body and make sure that the O-ring is not damaged.

Tighten to the prescribed torque settings as indicated below:

DN4-6: 48 Nm

DN10: 90 Nm

DN13: 110 Nm

DN16: 110 Nm

DN20: 220 Nm

DN25: 250 Nm

Warning: Using higher torque values may cause significant damage to the valve body adapter.

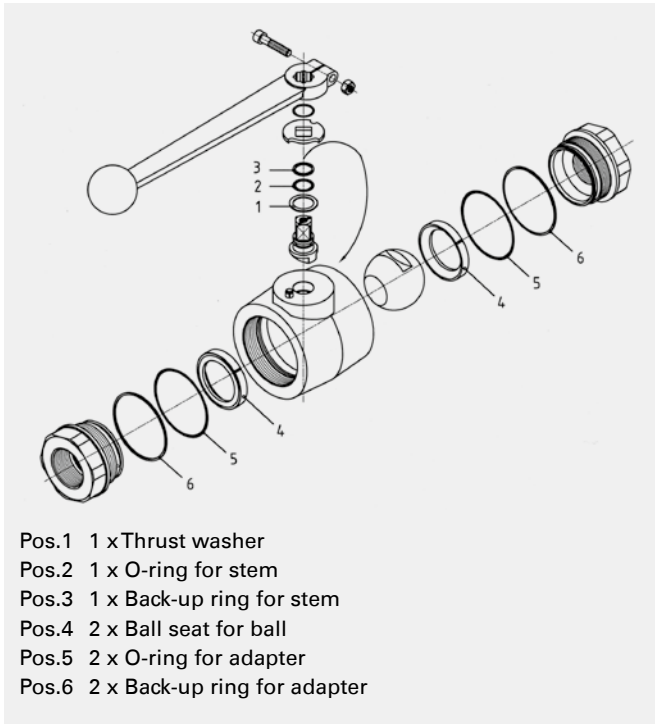
Place stop disk over the stem square ensuring that the valve closes when turned to the right, and secure it with a snap ring. Then assemble handle or actuator.

5. Test

Test to ensure that the valve can be opened and closed easily. We recommend that the valve is tested with air at 0,6 MPa and under working pressure with a compatible liquid, max. 1,1 x PN in closed position of the ball. If water is used for testing ensure after the test procedure has been carried out that all water is removed from the valve. This is best achieved by blowing through the valve with air whilst the valve is in a half-open position. Treat with an anti-corrosion liquid.

Store the valve in the OPEN position.

Assembly instructions for seal kit MKHP



Notice

The change of seals should only be undertaken by experienced and qualified experts. We recommend that seals are only replaced at **MHA ZENTGRAF** or by one of our authorized distributors, so that the quality of repair can be guaranteed.

1. Dismantling

Release any remaining fluid from the valve by first placing the ball in the HALF OPEN and then in the OPEN position. Unscrew both adapters (anti-clockwise). Remove seals (note the order and direction that these are in). The ball can only be removed when the valve is in CLOSED position. Disassemble the stem by pressing it into the body of the valve. Remove all O-rings from the stem with suitable tools (e.g. small screwdriver). Remove the thrust washer (on the stem collar) from the stem.

2. Preparation

Prior to replacing seals ensure that all components are clean and free of any contamination. Slightly grease all seals and O-rings as well as the areas of the valves that will be in contact with the seals with Vaseline.

3. Pre-Assembly

Mount the thrust washer (Pos.1) onto the stem collar. Mount O-ring (Pos.2) and back-up ring (Pos.3) carefully onto the stem using suitable tools and avoid damages through sharp edges or overstretching (e.g. by covering screw threads resp. of the shaft square by using suitable tools, alternatively by using a thin and soft foil). Mount the stem back-up ring (Pos.3) on top of the stem O-ring (Pos.2), i.e. on the pressure less side. Ensure that the back-up ring is located in the groove to avoid any damage when assembling the stem to the body. Mounting of the endless back-up ring to the adapter.

Mount the back-up ring (Pos.6) carefully onto the adapter by using a rounded tool (no sharp edges), be sure to stretch it as

little and constantly as possible. After a short time (approx. 30 to 60 sec.) the back-up ring returns to its original form and size. Push the back-up ring towards the thread side of the groove and mount the O-ring (Pos.5).

4. Assembly

Reassemble the stem to the body by pressing and turning at the same time, and then align the ball operating claw axially to the body. Insert the ball and center it. Turn the shaft 90° (CLOSED position) in order to retain the ball within the body. Place the new seals in the body ensuring that the concave areas face the ball. Gently screw the adapters into the body and make sure that the O-ring will not be damaged.

Tighten to the prescribed torque settings as indicated below:

DN32 Steel:	700 Nm
DN40 - 50 Steel:	800 Nm
DN32 - 50 Stainless steel:	700 Nm

Warning: Using higher torque values may cause significant damage to the valve body adapter.

Place stop disk over the stem square ensuring that the valve closes when turned to the right and secure with the snap ring. Assemble handle or actuator.

5. Test

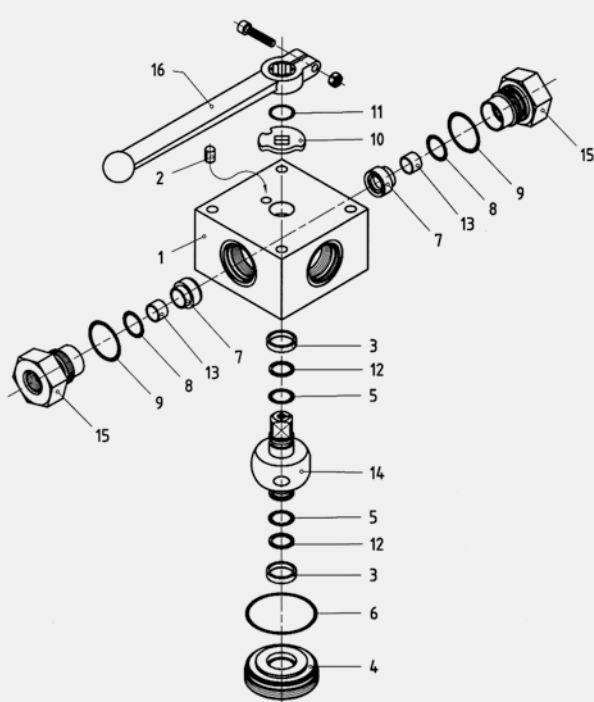
Check that the valve can be opened and closed easily. We recommend that the valve is tested with air at 0,6 MPa and under working pressure with a compatible liquid (e.g. water), max. 1,1 x PN in closed position of the ball. Afterwards all the fluid has to be removed again from the valve. This can be achieved by blowing air through the valve, whilst in HALF OPEN position. Let completely dry and treat with an anti-corrosive agent, if necessary.

Store the valve in the OPEN position.

Order number for recommended assembling tool for back-up ring assembly on adapter:

DN 32: 40218
DN 40: 40219
DN 50: 40220

Assembly instructions for seal kit 3/4 KH



Pos.3	2 x	Bearing
Pos.5	2 x	O-ring for trunnion
Pos.12	2 x	Back-up ring for O-ring on trunnion
Pos.7	4(3) x	Ball seats
Pos.13	4(3) x	Mounting tube for ball seat
Pos.8	4(3) x	O-ring for ball seat
Pos.9	4(3) x	O-ring for adapter
Pos.6	1 x	O-ring for cap

Notice

The change of seals should only be undertaken by experienced and qualified experts. We recommend that seals are only replaced at **MHA ZENTGRAF** or by one of our authorized distributors, so that the quality of repair can be guaranteed.

1. Dismantling

In order to release the remaining pressure, carry out 1x reciprocating movement.

Disassemble the shaft handle (Pos.16). Unscrew all adapters (Pos.15) anti-clockwise. Remove seals (Pos.7). Unscrew cap (Pos.4) at body bottom with suitable tools anti-clockwise. Remove trunnions (Pos.14) and bearing shells (Pos.3). Remove all O-rings and back-up rings from trunnion and adapters and cap with suitable tools (for example with a small screwdriver).

2. Preparation

Prior to replacing seals ensure that all components are clean and free of any contamination. Grease slightly with Vaseline all sealing elements and O-rings as well as the areas of the valves that will be in contact with the seals.

3. Pre-Assembly

Assemble O-rings (Pos.5) and back-up rings (Pos.12) in the grooves of the trunnion, back-up rings towards the unpressurized side.

Mount O-rings carefully on the (Pos.9) adapters (Pos.15) using suitable tools (at DN20 & DN25).

Attention: Ensure that O-rings are not damaged on keen edges or overstretched, (for example by covering screw threads or the shaft square by using suitable tools, alternatively by using a thin, soft foil).

For DN4 to DN16: Place mounting tubes (Pos.13) in the bore of the seal elements (Pos.7), or at DN20 and DN25: place seal element in sleeve (no description in this figure), spherical side facing to the exterior.

Mount O-ring for sealing element (Pos.8) on sealing element (Pos.7), (or at DN20 and DN25 mount on sleeve) and place together in adapter.

Pre-assemble O-ring (Pos.6) on cap (Pos.4). (Note: ensure that no damage can occur!).

4. Assembly

First assemble the bearing shells (bushing) (=Pos.3) in the body (Pos.1) and cap (Pos.4) so that the bevel faces the ball valve center and thus it can be used as chamfer for the O-ring (and back-up ring) of the trunnion.

Note: Ensure that the back-up rings lie in the groove fully closed to prevent damage during assembly.

Assemble the shaft end of the trunnion (shaft faces towards exterior) to the cap (Pos.4) by pressing and turning at the same time.

DN4 to DN16: place O-ring for cap (Pos.6) in the body.

Push trunnion (together with cap) into body until the cap thread touches the body thread, then screw in the cap and tighten to the prescribed torque (see table).

Gently screw the pre-assembled adapters into the body and ensure that the O-ring is not damaged. Tighten the adapters to the prescribed torque.

Replace stop disk (Pos.10) over shaft square so that the desired operation function is achieved, secure with snap ring (Pos.11). Assemble the handle (Pos.16) or the actuator (after it has been tested).

5. Test

Test to ensure that the valve can be opened and closed easily. We recommend that the valve be tested with 6 bar air and under working pressure with a compatible liquid, max. 1,1 x PN. If water is used for testing ensure after the test procedure has been carried out that all water is removed from the valve. This is best achieved by blowing air through the valve whilst the valve is in a half-open position. Treat with anti-corrosive.

Store the valve in the „OPEN“ or „CLOSED“ position, or end position.

Note: We recommend professional assembly tools especially for the cap. Please contact us for further information.

Instructions in other languages can be found at www.mha-zentgraf.com

Assembly instructions for seal kit 3/4 KH

Tightening torques of adapter and cap

Size	Adapter		Cap	
	Tightening torque in Nm	Thread	Tightening torque in Nm	Torque
DN 4-6	40	M18x1,5	120-140	M38x1,5
DN 8-10	70	M22x1,5	140-160	M45x1,5
DN 13-16	110	M30x1,5	320-350	M60x1,5
DN 20	180	M38x1,5	550-600	M80x2
DN 25 (-32, -40)	250	M45x1,5	650-700	M92x3



Warning: Using higher torque values may cause significant damage to the valve body adapter.



1. Scope

1.1 The following Terms apply for all deliveries and services offered by **MHA ZENTGRAF**.

1.2 Deviating or additional terms of the client do not apply.

1.3 In the context of an ongoing business relationship, these Terms apply in their respective version without explicit reference to their inclusion with all future deliveries and services by **MHA ZENTGRAF**.

2. Object of the contract and prices

2.1 Regarding special designs, **MHA ZENTGRAF** shall examine the client's guidelines on their correctness. **MHA ZENTGRAF** shall inform the client if they do not consider guidelines as plausible.

2.2 Services by **MHA ZENTGRAF**, which exceed the duties for a seller, such as consultancy, planning, installation and maintenance services, are to be fixed separately in writing.

2.3 All prices are net and apply ex works; VAT at their current applicable rates, packaging, transport, installation and insurance costs shall be payable additionally.

2.4 The prices according to the respective current price list of **MHA ZENTGRAF** at the moment of order are applicable. With a period of more than 4 months between conclusion of the contract and agreed delivery date, **MHA ZENTGRAF** shall be entitled to adapt the prices, if suppliers of **MHA ZENTGRAF** have changed their prices taking effect on the order. The client is to be immediately informed.

2.5 The minimum order value is set at EUR 300,--. If the order falls below this limit, the client shall pay an appropriate supplement to the list prices.

3. Offer and conclusion of contract

3.1 Offers of **MHA ZENTGRAF** are not binding. Cost estimates for special designs shall be unbinding and payable.

3.2 The contract shall be entered into when the client's order is confirmed in writing or if the performance has started or if the Products were delivered. Verbal ancillary agreements and confirmations are invalid without **MHA ZENTGRAF**'s written approval.

3.3 **MHA ZENTGRAF** is entitled to withdraw from the contract without observing a notice period, if the client's financial situation persistently deteriorates or if the opening of insolvency proceedings on his assets have been demanded.

3.4 If a right to withdraw has been granted to the client and if the client uses such right, he shall then pay to **MHA ZENTGRAF** cancellation costs of 50% of the order value.

4. Delivery, transfer of risk and delay

4.1 Delivery and service deadlines are only binding with the written confirmation of **MHA ZENTGRAF**. The delivery period begins at the moment of dispatch of the order confirmation, however not before additional documents, confirmations, releases or materials of the client are complete, as well as before receipt of an agreed deposit.

4.2 With service or delivery delays, which **MHA ZENTGRAF** is not liable for, such as force majeure, strike, import and export limitations, interruption of operations or disruption of traffic routes, the delivery period shall be prolonged – also within a delay – accordingly. The same applies if such conditions occur at the suppliers' or sub-suppliers' of **MHA ZENTGRAF**. **MHA ZENTGRAF** shall immediately inform the client of such delays and their probable duration.

4.3 If **MHA ZENTGRAF** is liable for the delay, the client shall be entitled to rescind the contract after an appropriate extension period, which was fixed in writing.

4.4 Should there be a default of acceptance on the client's side, **MHA ZENTGRAF** shall then be entitled to claim the costs actually resulting from storage, starting one month after notification of readiness to dispatch, or of 0,5% of the invoice amount for each begun month, unless the client can prove a lesser damage to **MHA ZENTGRAF**. At the end of an appropriate period, **MHA ZENTGRAF** shall be entitled to rescind the contract. The risk of an accidental deterioration and of an accidental loss is transferred to the client at the moment of default of acceptance.

4.5 Deliveries are ex works (EXW INCOTERMS 2010) Merzig. The delivery period is met when **MHA ZENTGRAF** has issued its readiness to deliver the Products before its expiration. The transfer of risks occurs at the moment of the notification of readiness to dispatch.

4.6 Safety devices are only provided if agreed on in writing.

4.7 **MHA ZENTGRAF** is entitled to partial deliveries to a reasonable degree. The client is obligated to pay for such partial deliveries.

5. Receivables, payment and default of payment

5.1 Payments shall be made without deduction within 30 days after the invoice date.

5.2 The right to withhold payments or to set them off against counterclaims is only granted to the client insofar that his claims are undisputed or finally recognized by declaratory judgment.

5.3 **MHA ZENTGRAF** reserves the right to transfer entitlements to its accounts receivable from customers to third parties.

5.4 If a customer is in default of payment, all outstanding accounts receivable from that customer shall become due with immediate effect.

5.5 Customers are to bear all fees, costs and outgoings associated with any successful legal proceeding that is launched against them by **MHA ZENTGRAF** outside Germany.

6. Intellectual property and property rights

6.1 **MHA ZENTGRAF** reserves all property rights and rights of use for all offer documentations, drawings, descriptions, samples and cost estimates. They shall not be transferred, published, copied or otherwise made accessible to third parties without **MHA ZENTGRAF**'s prior written consent.

6.2 The client shall ensure that the construction of Products according to his guidelines does not infringe the industrial property rights of a third party. The client shall hold harmless **MHA ZENTGRAF** from all claims due to violation of such property rights.

6.3 If common developments between **MHA ZENTGRAF** and the client result from special designs, the contractual partners shall conclude a separate agreement on the distribution of the intellectual property rights.

7. Retention of title

7.1 **MHA ZENTGRAF** reserves the title of ownership on the Products until their payment is completed. With Products, which are provided to the Client in the context of an ongoing business relationship, **MHA ZENTGRAF** reserves the title of ownership until all claims resulting from such relationship are settled. Client shall maintain the Products supplied in an orderly condition for the period of the retention of title and shall execute all required maintenance works or have them executed by a third party.

7.2 Client is entitled to the processing or combination of the products Zentgraf still has title on in the context of his proper business operations. **MHA ZENTGRAF** acquires co-ownership of the resulting Products, which the Client transfers already now. The amount of the co-ownership share of **MHA ZENTGRAF** is calculated according to the relation of the supplied Products' value and the other products. Client shall in these cases store the Products owned or co-owned by **MHA ZENTGRAF** free of charge.

7.3 Client shall be entitled to resell the Products Zentgraf still has title on in the proper business operations against payment or under reservation



of title. Claims arising from this resale or any other legal basis (insurance, unlawful acts) are already now transferred from Client to **MHA ZENTGRAF** with all subsidiary rights together with all ancillary rights. **MHA ZENTGRAF** accepts this transfer. If the resold supplied Products are co-owned by **MHA ZENTGRAF**, the transfer includes all claims from the amount corresponding to **MHA ZENTGRAF**'s share value to the co-ownership.

7.4 **MHA ZENTGRAF** authorizes Client irrevocably to collect the claims transferred to **MHA ZENTGRAF** for their invoice in their own name. This authorization to collect can be revoked if Client does not meet his payment duties. Revenues that **MHA ZENTGRAF** is entitled to from the transfer are payable immediately after their receipt. On request, Client shall notify his clients of this transfer and provide **MHA ZENTGRAF** with the names of the debtors of the transferred claim, in order for **MHA ZENTGRAF** to be able to perform the collection of transferred claims and/or their disclosure.

7.5 Client shall not be authorized to pledge or assign by way of security the products Zentgraf still has title on. If a third party accesses such Products and/or claims transferred to **MHA ZENTGRAF**, the Client shall then be obligated to notify **MHA ZENTGRAF** accordingly without delay. Costs arising for **MHA ZENTGRAF** from such access shall be borne by Client, as far as a substitution cannot be obtained by a third party.

7.6 If the value of the security becomes excessive by more than 20%, **MHA ZENTGRAF** shall be entitled to release collateral of their choice to the extent of the excess.

8. Warranty

8.1 Client shall examine the delivered Products or services immediately after receipt on their kind and quantity. Apparent defects and those recognizable after proper examination shall be immediately, but not later than 5 days following receipt of the product, reported in writing, stating the detailed description of the defect. Defects that cannot be detected within this period in spite of a careful examination are to be notified in writing immediately when detected. If the client fails to notify, the goods shall be deemed approved.

8.2 All claims arising from a defect shall lapse 12 months after delivery. The period of limitations begins on acceptance for work performance contractually agreed. Compensational claims are valid only to the extent of the regulations stated in point 9.

8.3 Client shall immediately stop the use of defective Products, particularly their resale or processing.

8.4 **MHA ZENTGRAF** shall not be held liable for defects caused by natural wear and tear, contamination, improper transport, treatment, storage, use, installation of the Products or defects caused by the Client or a third Party. A damage resulting from specialties in operating conditions, which cannot be foreseen by **MHA ZENTGRAF** (such as risk of contamination), do not represent a defect in terms of the warranty.

8.5 Specifications of the Products or other information on the subject of the agreement serve only as a description and include no guarantee on their condition. Deviations from these specifications are not considered as defects as long as they remain within the frame of the state-of-the-art permitted and as long as their functionality is not considerably affected. This does not apply if **MHA ZENTGRAF** has expressly guaranteed in writing these specifications upon conclusion of the contract.

8.6 Client shall not be authorized to repair defects on his own or have a third party do so, unless **MHA ZENTGRAF** is unduly delayed with the supplementary performance or if the client is forced to repair the defect due to urgent operational requirements or danger ahead. If the Client fails to comply, **MHA ZENTGRAF**'s duty to warranty for the affected Products is cancelled.

8.7 For the fulfillment of their duties to warranty, **MHA ZENTGRAF** is entitled to a supplementary performance of their own choice by repairing the defects or delivering defect-free Products. If the costs for such supplementary performance are disproportionate, **MHA ZENTGRAF** shall be entitled to refuse such performance. Replaced parts become property of **MHA ZENTGRAF**.

8.8 If a supplementary performance is not done within a set time period or

cannot be met on a second try, the client is entitled to claim a discount or to rescind the contract.

9. Liability

9.1 **MHA ZENTGRAF** shall be liable for damages caused by them intentionally, by gross negligence or while violating essential contractual duties with slight negligence. Compensation for the violation of essential contractual duties in cases of slight negligence is limited to the contractually typically foreseeable damages, at the maximum the purchase price. 9.2 The regulations of point 9.1 do not apply for compensational claims according to the product liability statute and claims arising from the injury to life, body and health.

9.3 As far as these regulations exclude or limit the liability, this also applies for the liability for officers of **MHA ZENTGRAF** as well as for the liability of employees and coworkers, performing and vicarious agents.

9.4 All liability claims lapse after twelve months. With intentional breach of duties or gross negligence, injury to life, health and body as well as with claims according to the product liability laws, the statutory periods apply.

10. Duty to co-operate of the client

10.1 As far as necessary for the execution of the contract, the client shall provide **MHA ZENTGRAF** with all information, documentation and other means in due time.

10.2 If Client realizes that his own information is incorrect, incomplete, ambiguous or impossible to execute, he shall notify **MHA ZENTGRAF** immediately.

10.3 If Client does not comply with his duty to co-operate and this results in delays or additional expenses, he shall compensate **MHA ZENTGRAF** for those suffered damages.

11. Place of performance, place of jurisdiction and applicable law

11.1 Place of performance and jurisdiction is Merzig. **MHA ZENTGRAF** is entitled to sue the supplier at his registered office.

11.2 All legal relationships between **MHA ZENTGRAF** and the supplier are subject to the law of the Federal Republic of Germany with the exception of UN Purchase Law and International Private Law.

1. Geltungsbereich

1.1 Die nachstehenden Bedingungen gelten für sämtliche Lieferungen und Leistungen von **MHA ZENTGRAF**.

1.2. Davon abweichende oder ergänzende Bedingungen des Kunden gelten nicht.

1.3 Im Rahmen einer laufenden Geschäftsbeziehung gelten diese Bedingungen in ihrer jeweiligen Fassung auch ohne ausdrücklichen Hinweis auf ihre Einbeziehung für alle zukünftigen Lieferungen und Leistungen.

2. Vertragsgegenstand und Preise

2.1 Bei Sonderanfertigungen ist **MHA ZENTGRAF** nicht verpflichtet, die Vorgaben des Kunden auf Richtigkeit zu überprüfen. **MHA ZENTGRAF** wird den Kunden jedoch darauf hinweisen, wenn es Vorgaben nicht für plausibel hält.

2.2 Dienstleistungen von **MHA ZENTGRAF**, die über die Verkäuferpflichten hinausgehen, wie z.B. Beratungs-, Planungs-, Einbauleistungen oder Wartungsarbeiten, bedürfen einer schriftlichen Vereinbarung.

2.3 Alle Preise sind netto und gelten ab Werk; Umsatzsteuer zum jeweils gültigen Satz, Verpackungs-, Transport-, Montage- und Versicherungskosten sind zusätzlich zu bezahlen.

2.4 Es gelten die Preise gemäß der aktuell gültigen Preisliste von **MHA ZENTGRAF** zum Zeitpunkt der Bestellung. Liegen zwischen Vertragsschluss und vereinbartem Liefertermin mehr als vier Monate, darf **MHA ZENTGRAF** den Preis anpassen, wenn Lieferanten von **MHA ZENTGRAF** ihre Preise geändert haben und dies Auswirkungen auf die Bestellung hat. Über Änderungen wird der Kunde umgehend informiert.

2.5 Der Mindestbestellwert beträgt netto EUR 300,-. Bei Unterschreiten dieser Grenze hat der Kunde einen angemessenen Zuschlag zu den Listenpreisen zu zahlen.

3. Angebot und Vertragsschluss

3.1 Angebote von **MHA ZENTGRAF** sind freibleibend. Kostenvoranschläge für Sonderanfertigungen sind unverbindlich und zu vergüten.

3.2 Der Vertrag kommt zustande, wenn die Bestellung des Kunden von **MHA ZENTGRAF** schriftlich bestätigt wurde oder mit der Ausführung der Leistung begonnen wurde oder die Ware geliefert wurde. Mündliche Nebenabreden und Zusagen sind ohne schriftliche Bestätigung von **MHA ZENTGRAF** unwirksam.

3.3 **MHA ZENTGRAF** ist berechtigt, vom Vertrag ohne Einhaltung einer Frist zurückzutreten, wenn sich das Vermögen des Kunden nachhaltig verschlechtert hat oder über dessen Vermögen die Durchführung des Insolvenzverfahrens beantragt wurde.

3.4 Wird dem Kunden ein Rücktrittsrecht eingeräumt und nimmt der Kunde es in Anspruch, hat er an **MHA ZENTGRAF** Stornokosten in Höhe von 50% des Auftragswerts zu zahlen.

4. Lieferung, Gefahrübergang und Verzug

4.1 Liefer- und Leistungsfristen sind nur verbindlich, wenn **MHA ZENTGRAF** sie schriftlich bestätigt hat. Die Lieferfrist beginnt mit der Absendung der Auftragsbestätigung durch **MHA ZENTGRAF**, jedoch nicht vor vollständiger Beibringung von eventuell vom Kunden zu beschaffenden Unterlagen, Genehmigungen, Freigaben oder Materialien sowie vor Eingang einer vereinbarten Anzahlung.

4.2 Bei Liefer- oder Leistungsverzögerungen, die von **MHA ZENTGRAF** nicht zu vertreten sind, z.B. bei höherer Gewalt, Streik, Einfuhr- und Ausfuhrbeschränkungen, Betriebsstörungen oder Störung der Verkehrswege, verlängert sich die Lieferfrist – auch innerhalb eines Verzuges – entsprechend. Dasselbe gilt, wenn diese Umstände bei Lieferanten von **MHA ZENTGRAF** oder deren Unterlieferanten eintreten. **MHA ZENTGRAF** wird

den Kunden umgehend über solche Hindernisse und die voraussichtliche Dauer informieren.

4.3 Hat **MHA ZENTGRAF** die Verzögerung verschuldet, kann der Kunde nach Ablauf einer schriftlich gesetzten, angemessenen Nachfrist vom Vertrag zurücktreten.

4.4 Kommt der Kunde in Annahmeverzug, ist **MHA ZENTGRAF** berechtigt, beginnend einen Monat nach Anzeige der Versandbereitschaft, die durch die Lagerung tatsächlich entstandenen Kosten oder 0,5% des Rechnungsbetrages für jeden angefangenen Monat zu verlangen, es sei denn der Kunde kann **MHA ZENTGRAF** einen geringeren Schaden nachweisen. Nach Ablauf einer angemessenen Frist kann **MHA ZENTGRAF** vom Vertrag zurücktreten. Mit Eintritt des Annahmeverzugs geht die Gefahr der zufälligen Verschlechterung und des zufälligen Untergangs auf den Kunden über.

4.5 Lieferungen erfolgen ab Werk (EXW INCOTERMS 2010) Merzig. Die Lieferfrist ist ein-gehalten, wenn **MHA ZENTGRAF** dem Kunden die Versandbereitschaft der Ware bis zu ihrem Ablauf angezeigt hat. Der Gefahrübergang erfolgt mit Anzeige der Versandbereitschaft.

4.6 Schutzvorrichtungen werden nur mitgeliefert, wenn dies schriftlich vereinbart ist.

4.7 **MHA ZENTGRAF** ist zu Teillieferungen in zumutbarem Umfang berechtigt. Der Kunde ist zur Bezahlung der gelieferten Teilmengen verpflichtet.

5. Forderungen, Zahlung und Zahlungsverzug

5.1 Die Zahlung hat ohne Abzug innerhalb von 30 Tagen ab Rechnungsdatum zu erfolgen.

5.2 Das Recht, Zahlungen zurückzuhalten oder mit Gegenforderungen aufzurechnen, steht dem Kunden nur insoweit zu, als seine Forderungen unbestritten oder rechtskräftig festgestellt sind.

5.3 **MHA ZENTGRAF** hat das Recht, seine Forderungen gegen den Kunden an Dritte abzutreten.

5.4 Ist der Kunde in Zahlungsverzug mit einer Forderung, so können alle übrigen Forderungen gegen den Kunden fällig gestellt werden.

5.5 Der Kunde hat alle Gebühren, Kosten und Auslagen zu tragen, die im Zusammenhang mit jeder gegen ihn rechtlich erfolgreichen Rechtsverfolgung außerhalb Deutschlands anfallen.

6. Geistiges Eigentum, Schutzrechte

6.1 An sämtlichen Angebotsunterlagen, Zeichnungen, Beschreibungen, Muster und Kostenvoranschlägen behält sich **MHA ZENTGRAF** die Eigentums- und Nutzungsrechte vor. Sie dürfen ohne Genehmigung von **MHA ZENTGRAF** weder weitergegeben, veröffentlicht, vervielfältigt noch anderweitig Dritten zugänglich gemacht werden.

6.2 Der Kunde hat dafür zu sorgen, dass durch die Konstruktion der nach seinen Vorgaben gefertigten Waren keine gewerblichen Schutzrechte Dritter verletzt werden. Der Kunde hat **MHA ZENTGRAF** von allen Ansprüchen wegen Verletzung solcher Schutzrechte freizustellen.

6.3 Kommt es im Rahmen von Sonderanfertigungen zu gemeinsamen Entwicklungen zwischen **MHA ZENTGRAF** und dem Kunden, schließen die Vertragspartner über die Verteilung der Schutzrechte eine gesonderte Vereinbarung.

7. Eigentumsvorbehalt

7.1 **MHA ZENTGRAF** behält sich das Eigentum an der Ware bis zu deren vollständigen Bezahlung vor. Bei Waren, die der Kunde im Rahmen einer laufenden Geschäftsbeziehung erhält, behält sich **MHA ZENTGRAF** das Eigentum vor, bis sämtliche Forderungen aus dieser beglichen sind. Der Kunde ist verpflichtet, die Vorbehaltsware während der Dauer des Eigentumsvorbehalts in ordnungsgemäßem Zustand zu halten und alle erforderlichen Wartungsarbeiten und Instandsetzungen durchzuführen

oder von Dritten durchführen zu lassen.

7.2 Der Kunde ist zur Verarbeitung oder Verbindung der Vorbehaltsware im Rahmen seines ordnungsgemäßen Geschäftsbetriebs berechtigt. **MHA ZENTGRAF** erwirbt an den dadurch entstehenden Gegenständen Miteigentum, das der Kunde bereits jetzt überträgt. Die Höhe des Miteigentumsanteils von **MHA ZENTGRAF** bestimmt sich nach dem Verhältnis des Wertes der Vorbehaltsware zu den anderen Erzeugnissen. Der Kunde hat in diesen Fällen, die im Eigentum oder Miteigentum von **MHA ZENTGRAF** stehende Sache unentgeltlich zu verwahren.

7.3 Der Kunde darf die Vorbehaltsware im ordnungsgemäßen Geschäftsverkehr gegen Zahlung oder unter Eigentumsvorbehalt weiterveräußern. Die aus dem Weiterverkauf oder einem sonstigen Rechtsgrund (Versicherung, unerlaubte Handlung) entstehende Forderung tritt der Kunde bereits jetzt mit allen Nebenrechten sicherungshalber in vollem Umfang an **MHA ZENTGRAF** ab. **MHA ZENTGRAF** nimmt diese Abtretung an. Wenn die weiterveräußerte Vorbehaltsware im Miteigentum von **MHA ZENTGRAF** steht, erstreckt sich die Abtretung der Forderungen auf den Betrag, der dem Anteilswert von **MHA ZENTGRAF** am Miteigentum entspricht.

7.4 **MHA ZENTGRAF** ermächtigt den Kunden widerruflich, die an **MHA ZENTGRAF** abgetretenen Forderungen für dessen Rechnung im eigenen Namen einzuziehen. Diese Einziehungsermächtigung kann widerrufen werden, wenn der Kunde seinen Zahlungsverpflichtungen nicht nachkommt. Die aus der Abtretung zustehenden Erlöse sind **MHA ZENTGRAF** sofort nach Eingang weiterzuleiten. Auf Verlangen hat der Kunde seine Abnehmer von der Abtretung zu informieren und **MHA ZENTGRAF** die Namen der Schuldner der abgetretenen Forderungen mitzuteilen, damit **MHA ZENTGRAF** eine Offenlegung der Abtretung und/oder Einziehung der abgetretenen Forderungen selbst vornehmen kann.

7.5 Der Kunde darf Vorbehaltsware weder verpfänden noch zur Sicherung übereignen. Greifen Dritte auf Vorbehaltsware und/oder an **MHA ZENTGRAF** abgetretene Forderungen zu, ist der Kunde verpflichtet, **MHA ZENTGRAF** sofort zu unterrichten. Kosten, die **MHA ZENTGRAF** durch einen solchen Zugriff entstehen, trägt der Kunde, sofern der Ersatz nicht von Dritten zu erlangen ist.

7.6 Bei Übersicherung von mehr als 20% ist **MHA ZENTGRAF** zur Freigabe der diesen Prozentsatz wertmäßig übersteigenden Sicherheiten nach seiner Wahl verpflichtet.

8. Gewährleistung

8.1 Der Kunde ist verpflichtet, die gelieferte Ware oder Leistung unverzüglich nach Erhalt auf Menge und Beschaffenheit zu untersuchen. Offensichtliche und bei ordnungsgemäßer Untersuchung erkennbare Mängel sind unverzüglich, spätestens jedoch innerhalb von 5 Werktagen nach Erhalt der Ware, schriftlich unter genauer Angabe des Mangels anzuzeigen. Mängel, die auch bei sorgfältiger Prüfung innerhalb dieser Frist nicht entdeckt werden können, sind unverzüglich nach Entdeckung schriftlich zu rügen. Unterlässt der Kunde die unverzügliche Anzeige, gilt die Ware als genehmigt.

8.2 Mängelansprüche verjähren mit Ablauf von 12 Monaten ab Ablieferung. Bei Werkleistungen von **MHA ZENTGRAF** beginnt die Verjährungsfrist mit Abnahme der vertraglich vereinbarten Leistung. Schadensersatzansprüche bestehen nur in dem in Ziffer 9 dieser Bedingungen geregelten Umfang.

8.3 Der Kunde ist verpflichtet, bei erkannten Mängeln die Verwendung der mangelhaften Ware, insbesondere deren Verarbeitung oder Weiterverkauf, unverzüglich einzustellen.

8.4 **MHA ZENTGRAF** haftet nicht für Schäden, die durch natürliche Abnutzung, Verschmutzung, unsachgemäßen Transport, Behandlung, Lagerung, Verwendung, Nutzung, Montage der Ware oder durch sonstige vom Kunden oder von Dritten zu verantwortende Umständen entstehen. Ein Schaden, der auf spezielle, für **MHA ZENTGRAF** nicht konkret vorhersehbare Einsatzbedingungen der Ware (z.B. Verschmutzungsgefahr) zurückzuführen ist, stellt keinen Mangel im Sinne der Gewährleistung dar.

8.5 Spezifikationen der Ware oder sonstige Angaben über den Vertragsgegenstand dienen lediglich der Beschreibung und enthalten keine Zusicherung für die Beschaffenheit. Abweichungen von diesen Spezifikationen und Angaben sind keine Mängel, wenn sich diese Abweichungen im Rahmen des gesetzlichen oder nach dem Stand der Technik Zulässigen

halten und die Funktionsfähigkeit nicht wesentlich beeinträchtigt wird. Dies gilt nicht, wenn **MHA ZENTGRAF** dem Kunden die Spezifikation bei Vertragsabschluss ausdrücklich als solche schriftlich zugesichert hat.

8.6 Der Kunde ist nicht berechtigt, Mängel selbst zu beseitigen oder von Dritten beseitigen zu lassen, es sei denn **MHA ZENTGRAF** befindet sich mit der Nacherfüllung in Verzug oder der Kunde ist durch dringende betriebliche Erfordernisse oder Gefahr im Verzug zur Mängelbeseitigung gezwungen. Handelt der Kunde dem zuwider, entfällt die Gewährleistungspflicht von **MHA ZENTGRAF** für die betroffene Ware.

8.7 Zur Erfüllung von Gewährleistungspflichten darf **MHA ZENTGRAF** nach seiner Wahl Nacherfüllung durch Beseitigung des Mangels oder durch Lieferung einer mangelfreien Sache leisten. Sind die Nacherfüllungskosten unverhältnismäßig, ist **MHA ZENTGRAF** berechtigt, die Nacherfüllung zu verweigern. Ersetzte Teile werden Eigentum von **MHA ZENTGRAF**.

8.8 Wird nicht innerhalb angemessener Frist nacherfüllt oder misslingt dies auch im zweiten Versuch, darf der Kunde nach seiner Wahl Minderung verlangen oder vom Vertrag zurücktreten.

9. Haftung

9.1 **MHA ZENTGRAF** haftet nur für Schäden, die von **MHA ZENTGRAF** vorsätzlich, grob fahrlässig oder in Verletzung wesentlicher Vertragspflichten leicht fahrlässig verursacht wurden. Der Schadensersatz für die Verletzung wesentlicher Vertragspflichten ist in Fällen leichter Fahrlässigkeit auf den vertragstypischen und vorhersehbaren Schaden, höchstens auf den Kaufpreis, begrenzt.

9.2 Die Regelungen in Ziffer 9.1 gelten nicht für Schadensersatzansprüche nach dem Produkthaftungsgesetz und wegen der Verletzung von Leben, Körper oder Gesundheit.

9.3 Soweit nach diesen Bedingungen die Haftung ausgeschlossen oder beschränkt ist, gilt dies auch für die Haftung der Organe von **MHA ZENTGRAF** sowie für die Haftung von Mitarbeitern und Angestellten, Erfüllungs- und Verrichtungsgehilfen.

9.4 Sämtliche Haftungsansprüche verjähren in zwölf Monaten. Bei vorsätzlicher oder grob fahrlässiger Pflichtverletzung, bei arglistigem Verhalten, bei Verletzung von Leben, Körper oder Gesundheit sowie bei Ansprüchen nach dem Produkthaftungsgesetz gelten die gesetzlichen Fristen.

10. Mitwirkungspflichten des Kunden

10.1 Soweit es für die Vertragsdurchführung erforderlich ist, wird der Kunde **MHA ZENTGRAF** alle Informationen, Unterlagen und sonstigen Mittel vollständig und rechtzeitig zur Verfügung stellen.

10.2 Erkennt der Kunde, dass eigene Angaben fehlerhaft, unvollständig, nicht eindeutig oder nicht durchführbar sind, hat er dies **MHA ZENTGRAF** unverzüglich mitzuteilen.

10.3 Kommt der Kunde seinen Mitwirkungspflichten nicht nach und entstehen dadurch Verzögerungen oder Mehraufwand, hat er **MHA ZENTGRAF** daraus entstehende Schäden zu ersetzen.

11. Erfüllungsort, Gerichtsstand und anwendbares Recht

11.1 Erfüllungsort und Gerichtsstand ist Merzig. **MHA ZENTGRAF** ist berechtigt, den Kunden auch an seinem Sitz zu verklagen.

11.2 Für alle Rechtsbeziehungen zwischen **MHA ZENTGRAF** und dem Kunden gilt das Recht der Bundesrepublik Deutschland unter Ausschluss des UN-Kaufrechts und des Internationalen Privatrechts.

1. Domaine d'application

1.1 Les conditions suivantes s'appliquent sur toute les livraisons et services de **MHA ZENTGRAF**.

1.2 Des conditions déviantes ou additionnelles du client ne s'appliquent pas.

1.3 Dans le cadre d'une relation commerciale, ces conditions sont valables dans leur version actuelle respective, sans indication formelle sur leur intégration pour toute future livraison ou service.

2. Objet du contrat et prix

2.1 Concernant les fabrications spéciales, **MHA ZENTGRAF** n'est pas obligé de contrôler la justesse des indications du client. **MHA ZENTGRAF** signalera toutefois au client, si les indications ne semblent non-plausibles.

2.2 Les services de **MHA ZENTGRAF** dépassant les obligations de vendeur, par exemple les services de consultation, planification, installation ou de maintien, nécessitent un accord écrit.

2.3 Tous les prix sont des prix net et sont valable ex usine; la TVA applicable respective, les frais de transport, installation, d'emballage et d'assurance sont payables séparément.

2.4 Les prix sont valables selon la liste de prix actuelle respective de **MHA ZENTGRAF** au moment de la commande. Dans le cas d'une période supérieure à 4 mois entre la conclusion du contrat et la livraison, **MHA ZENTGRAF** est autorisé d'adapter les prix suite aux changements de prix de leurs propres fournisseurs et si ceci a des conséquences sur la commande. **MHA ZENTGRAF** en informera le client immédiatement.

2.5 La valeur minimale de commande est de EUR 300,-- net. Si la commande est inférieure à cette limitation, le client s'engage à payer un supplément raisonnable au prix catalogue.

3. Offre et conclusion de contrat

3.1 Les offres de **MHA ZENTGRAF** sont sans engagement. Les devis pour fabrication spéciale sont payables à titre indicatif.

3.2 Le contrat est réalisé une fois que la commande du client est confirmée par écrit par **MHA ZENTGRAF**, l'exécution du service est débutée ou que les produits ont été livrés. Les conditions orales annexes ne sont pas valables sans la confirmation écrite de **MHA ZENTGRAF**.

3.3 **MHA ZENTGRAF** est autorisé de résilier le contrat sans délai, si une détérioration durable du patrimoine du client peut être constatée, ou si une procédure d'insolvabilité relative au patrimoine du client a été ouverte.

3.4 Si un droit de résiliation a été offert au client et si ce dernier en fait usage, il s'engage de payer à **MHA ZENTGRAF** des frais d'annulation de 50% de la valeur de commande.

4. Livraison, Transfert du danger et Retard

4.1 Les délais de livraison et service sont uniquement obligatoires s'ils sont confirmés par écrit par **MHA ZENTGRAF**. Le délai de livraison commence au moment de l'envoi de la confirmation de commande par **MHA ZENTGRAF**, toutefois pas avant la production complète éventuelle nécessaire de documents, autorisations, libérations ou matériaux par le client ou avant réception d'un acompte convenu.

4.2 Lors d'un retard de livraison ou service, qui ne tombe pas dans la responsabilité de **MHA ZENTGRAF**, par exemple force majeure, grève, restrictions à l'importation et exportation, perturbations de service ou du chemin de circulation, le délai de livraison se prolonge en conséquence – également endéans un retard. Ceci est également valable si ces conditions se produisent auprès d'un fournisseur de **MHA ZENTGRAF** ou l'un de ses sous-traitants. **MHA ZENTGRAF** informera immédiatement le client sur ces obstacles et leur durée probable.

4.3 Si **MHA ZENTGRAF** est responsable du délai, le client est autorisé de résilier le contrat à la fin d'un délai supplémentaire raisonnable convenu par écrit.

4.4 Si le client est en retard de prendre la livraison, **MHA ZENTGRAF** est autorisé de réclamer des frais pour le stockage ou bien 0,5 % du montant de la facture pour chaque mois commencé, et ce à partir du mois suivant la date à laquelle la marchandise est prête à être expédiée, sauf si le client est capable de prouver un dommage inférieur à **MHA ZENTGRAF**. A la fin d'un délai raisonnable, **MHA ZENTGRAF** peut résilier le contrat. Au moment du retard de prendre la livraison du client, le risque de perte ou d'une détérioration de la marchandise est transféré au client.

4.5 Les livraisons sont faites ex usine (EXW INCOTERMS 2010) Merzig. Le délai de livraison est respecté si **MHA ZENTGRAF** a indiqué d'être prêt de livrer pour toute la durée du délai. Le transfert de danger s'effectue au moment de l'avis d'expédition.

4.6 Des dispositifs de sécurité sont livrés uniquement sur demande écrite.

4.7 **MHA ZENTGRAF** a le droit de faire des livraisons partielles de manière raisonnable. Le client s'engage à payer ces livraisons partielles.

5. Créances, paiement et défaut de paiement

5.1 Le paiement doit être effectué sans déduction endéans 30 jours à compter de la date de facturation.

5.2 Le client peut seulement retenir des paiements ou les décompter avec une créance en contrepartie, si sa propre créance est fondée et incontestée.

5.3 **MHA ZENTGRAF** est en droit de céder à des tiers les créances envers ses clients.

5.4 Si le client est en retard de paiement, toutes les autres créances envers ce client peuvent être considérées comme échues.

5.5 L'ensemble des frais, coûts et dépenses liées à une procédure judiciaire à son encontre et décidée en notre faveur dans un pays autre que l'Allemagne sont à la charge du client.

6. Propriété intellectuelle, droits de protection

6.1 **MHA ZENTGRAF** se réserve le droit de propriété et d'usufruit à toute documentation d'offre, dessin, description, échantillon et devis. Ils ne peuvent être publiés, copiés ou transmis à un tiers sans l'autorisation de **MHA ZENTGRAF**.

6.2 Le client s'engage à veiller que la construction des produits fabriqués selon ses indications n'enfreint pas les droits de protection de tiers. Le client s'engage à libérer **MHA ZENTGRAF** de toute réclamation pour infraction de droit de propriété.

6.3 Dans le cas de développements commun entre **MHA ZENTGRAF** et le client dans le cadre de fabrications spéciales, les parties contractantes conviennent d'un règlement séparé pour la distribution des droits de propriété.

7. Réserve de propriété

7.1 **MHA ZENTGRAF** se réserve la propriété de la marchandise jusqu'à leur paiement complet. Concernant les produits reçus par le client dans le cadre d'une relation d'affaire courante, **MHA ZENTGRAF** se réserve la propriété jusqu'à ce que toutes les réclamations résultantes de cette relation soient réglées. Le client s'engage de maintenir les produits sous réserve en bon état pour toute la durée de la réserve de propriété et d'effectuer tous travaux et mesures de maintien lui-même ou par un tiers.

7.2 Le client est autorisé au traitement ou la conjonction des produits sous réserve dans le contexte de ses activités commerciales régulières. **MHA ZENTGRAF** gagne la copropriété, que le client lui transmet déjà maintenant, des produits fabriqués de cette manière. La valeur de la partie de copropriété se mesure en relation de la valeur des produits sous réserve

avec les autres produits. Dans ces cas, le client s'engage de stocker les produits possédés ou copossédés par **MHA ZENTGRAF** sans charge.

7.3 Le client est autorisé de revendre les produits sous réserve contre rémunération ou contre réserve de propriété dans le contexte de ses activités commerciales régulières. Pour des mesures de sécurité, le client transmet déjà maintenant les créances entières résultantes de cette revente ou d'une autre raison juridique (assurance, acte illicite) à **MHA ZENTGRAF**. **MHA ZENTGRAF** accepte ce transfert. Si **MHA ZENTGRAF** est copropriétaire de ces produits sous réserve revendus, le transfert de créances porte sur le montant correspondant à la partie relative de **MHA ZENTGRAF** à cette copropriété.

7.4 **MHA ZENTGRAF** autorise le client de manière révocable, d'encaisser les créances transmises à **MHA ZENTGRAF** pour leur compte en leur propre nom. Cette autorisation peut être révoquée si le client ne remplit pas son obligation de paiement. Les revenus gagnés du transfert doivent être transmis à **MHA ZENTGRAF** immédiatement après leur réception. Le client doit informer ses clients sur demande de ce transfert et de donner à **MHA ZENTGRAF** les noms des débiteurs pour que **MHA ZENTGRAF** puisse s'occuper de ses réclamations elle-même.

7.5 Le client n'est pas autorisé à donner les produits sous réserve en gage, ni à en transférer la propriété à titre de garantie. Si un tiers accède aux produits sous réserve et/ou des créances transmises à **MHA ZENTGRAF**, le client s'engage d'en informer **MHA ZENTGRAF** sans délai. Les frais provenant de tel accès sont à la charge du client, sauf si leur indemnisation n'est à demander de tiers.

7.6 Lors d'une surprotection de plus de 20 %, **MHA ZENTGRAF** est obligé de libérer les sécurités excédants ce pourcentage à son propre choix.

8. Garantie des défauts de la chose vendue

8.1 Le client est obligé de contrôler les produits ou services livrés concernant leur nature et quantité. Des défauts apparents et reconnaissables lors de cet examen doivent être indiqués sans délai, mais au plus tard endéans 5 jours ouvrables à partir de la réception de la marchandise, et ceci par écrit et en détail. Les défauts qui ne sont pas reconnus dans ce délai après le contrôle doivent immédiatement être réprimandés. Si le client omet cette indication, les produits sont vus comme acceptés.

8.2 Toutes réclamation se prescrivent à la fin de maximum 12 mois après livraison. Les délais de prescription débutent lors de la confection de l'ouvrage de **MHA ZENTGRAF** avec la réception du service contractuellement convenu. Les droits d'indemnisation sont valables uniquement selon les dispositions du chiffre 9 des présentes conditions.

8.3 Le client est obligé de cesser l'utilisation de la marchandise fautive, particulièrement leur traitement et revente, au moment de la détection des défauts.

8.4 **MHA ZENTGRAF** décline toute responsabilité pour les défauts résultants d'usure naturelle, salissure, transport, traitement, stockage, utilisation ou assemblage incorrect des produits ou d'autres conditions tombants sous la responsabilité du client. Un défaut résultant de conditions d'application spéciales des produits, qui ne peuvent pas être planifiées par **MHA ZENTGRAF** (par risque danger de salissure), ne représente pas un défaut au sens de la garantie.

8.5 Les spécifications des produits ou autres indications concernant l'objet du contrat sont seulement à titre indicatif et ne comprennent pas de garantie sur leur nature. Les déviations de ces spécifications ne représentent pas de défaut, si ces déviations restent dans le cadre de l'admissible juridique ou technique et que la fonctionnalité n'a pas été perturbée de manière significative. Ceci n'est pas valable si **MHA ZENTGRAF** a garanti de telles spécifications au client au moment de la conclusion du contrat.

8.6 Le client n'est pas autorisé de réparer les défauts lui-même ou de les faire réparer par un tiers, sauf si **MHA ZENTGRAF** est en retard avec l'exécution postérieure ou si le client s'y voit obligé dû à un risque imminent ou autre nécessité urgente liée à l'exploitation. Si le client ne convient pas à ces indications, **MHA ZENTGRAF** ne sera plus soumis à l'obligation de garantie pour le produit concerné.

8.7 Pour remplir son obligation de garantie, **MHA ZENTGRAF** est libre de choisir entre l'exécution postérieure en réparant le défaut ou la livraison d'un objet libre de défaut. Si les frais pour l'exécution postérieure sont disproportionnés, **MHA ZENTGRAF** peut refuser celle-ci. Les pièces remplacées deviennent propriété de **MHA ZENTGRAF**.

8.8 Si une exécution postérieure n'est pas effectuée endéans un délai acceptable ou si elle est insatisfaisante, le client peut résilier au contrat ou demander une réduction.

9. Responsabilité

9.1 **MHA ZENTGRAF** est uniquement responsable pour les défauts dus à une violation intentionnelle des obligations contractuelles ou à une négligence grave. Le montant de l'indemnisation pour violation d'obligations essentielles du contrat dans les cas d'une négligence mineure se limite au maximum au prix d'achat.

9.2 Les indications du chiffre 9.1 ne sont pas valables pour les droits d'indemnisation selon la loi relative à la responsabilité du fait des produits défectueux ou pour des dommages issus d'une atteinte à la vie, l'intégrité physique et la santé.

9.3 Dans la mesure où la responsabilité est exclue ou limitée selon ces conditions, ceci est également valable pour la responsabilité des organes de **MHA ZENTGRAF** ainsi que pour la responsabilité de ses employés, agents d'exécution et préposés.

9.4 Les droits à l'indemnisation se prescrivent après 12 mois. Les délais légaux sont valables dans les cas de violation d'obligation intentionnelle ou de négligence grave, d'une conduite frauduleuse, dans le cas d'une atteinte à la vie, l'intégrité physique et la santé ou lors de droits selon la loi relative à la responsabilité du fait des produits défectueux.

10. Obligations de participation du client

10.1 Si nécessaire pour l'exécution du contrat, le client mettra à la disposition de **MHA ZENTGRAF** toute information, documentation et autre moyen de manière complète et à temps.

10.2 Se le client reconnaît que ses informations sont fautives, incomplètes, non-claires ou pas réalisables, il doit immédiatement en informer **MHA ZENTGRAF**.

10.3 Si le client ne remplit pas son obligation de participation et que ceci cause des retards ou frais supplémentaires, il doit alors rembourser **MHA ZENTGRAF** les dommages causés.

11. Lieu d'exécution, for juridique et droit applicable

11.1 Lieu d'exécution et for juridique est Merzig. **MHA ZENTGRAF** a le droit d'intenter une action contre le client également au lieu de son siège.

11.2 Toute relation d'affaire est soumise aux lois de la République Fédérale d'Allemagne à l'exclusion des normes de renvoi du droit international privé et à l'exclusion des Conventions des Nations Unies sur l'achat international des marchandises.

1. Ámbito de aplicación

- 1.1 Las siguientes condiciones serán aplicables a todas las entregas y servicios de **MHA ZENTGRAF**.
- 1.2 Carecerán de validez las condiciones de los clientes que se desvíen de las presentes o que las enmienden.
- 1.3 Las presentes condiciones serán aplicables a las relaciones comerciales ya existentes en su correspondiente versión, incluso a falta de referencia explícita a su aplicación a todas las entregas y servicios futuros.

2. Objeto del contrato y precios

- 2.1 En la producción de modelos especiales, **MHA ZENTGRAF** no estará obligada a comprobar la corrección de las especificaciones realizadas por el cliente. Sin embargo, **MHA ZENTGRAF** informará al cliente cuando no considere plausibles dichas especificaciones.
- 2.2 Los servicios prestados por **MHA ZENTGRAF** que excedan sus obligaciones como vendedor, por ejemplo, servicios de asesoramiento, planificación, instalación o mantenimiento, requerirán acuerdo por escrito.
- 2.3 Los precios se entenderán netos y franco fábrica; el IVA aplicable, los gastos de embalaje, transporte y montaje, y la prima del seguro se abonarán adicionalmente.
- 2.4 Serán aplicables los precios consignados en la lista de precios de **MHA ZENTGRAF** vigente al realizar el pedido. Si entre la firma del contrato y la fecha de entrega pactada mediaran más de cuatro meses, **MHA ZENTGRAF** podrá modificar el precio cuando sus proveedores también lo hubieran modificado y ello afectara al pedido. El cliente será informado inmediatamente de dichos cambios.
- 2.5 El pedido mínimo es de 300 € netos. Si el pedido fuera inferior a esa suma, el cliente abonará un suplemento adicional a lo consignado en la lista de precios.

3. Oferta y firma del contrato

- 3.1 Las ofertas de **MHA ZENTGRAF** están sujetas a confirmación. El cálculo de los costes por modelos especiales no es vinculante y deberá ser remunerado.
- 3.2 El contrato se perfecciona cuando el pedido del cliente haya sido confirmado por escrito por **MHA ZENTGRAF**, cuando se haya iniciado el servicio o cuando la mercancía haya sido entregada. Los pactos verbales y las promesas solo serán válidos si son confirmados por escrito por **MHA ZENTGRAF**.
- 3.3 **MHA ZENTGRAF** tendrá derecho a rescindir unilateralmente el contrato sin sujeción a un plazo de preaviso, cuando el cliente haya ido perdiendo patrimonio o cuando se haya solicitado la insolvencia de dicho patrimonio.
- 3.4 Si se le reconoce al cliente el derecho a rescindir unilateralmente el contrato y este hace uso de tal derecho, el cliente abonará a **MHA ZENTGRAF** el 50% del valor del pedido en concepto de gastos de cancelación.

4. Entrega, cesión del riesgo y demora

- 4.1 Los plazos de entrega y de prestación del servicio solo serán vinculantes cuando **MHA ZENTGRAF** los haya confirmado por escrito. El plazo de entrega se inicia cuando **MHA ZENTGRAF** haya enviado la confirmación del pedido, no antes, sin embargo, de que el cliente haya aportado toda la documentación, permisos, liberalizaciones o materiales debidos ni antes de que se haya liquidado un pago acordado.
- 4.2 Cuando **MHA ZENTGRAF** no sea responsable del retraso en la entrega o prestación de servicios, por ejemplo, en casos de fuerza mayor, huelga, barreras a la importación o exportación, interrupción de la producción o de las vías de comunicación, el plazo de entrega se prorrogará respectivamente, incluso aunque ya se hubiera incurrido en demora. Lo anterior será también aplicable cuando las situaciones descritas se les presenten a los proveedores o subproveedores de **MHA ZENTGRAF**.

MHA ZENTGRAF informará inmediatamente al cliente sobre tales circunstancias y sobre la duración prevista.

- 4.3 Si el retraso se debiera a **MHA ZENTGRAF**, el cliente podrá rescindir unilateralmente el contrato una vez transcurrida la prórroga conveniente fijada por escrito.
- 4.4 En caso de mora en la aceptación de la mercancía, **MHA ZENTGRAF** podrá reclamar el reembolso de los gastos de almacenamiento ocasionados o del 0,5% del importe de la factura por cada mes iniciado a contar un mes después del anuncio de que se puede proceder al envío, salvo que el cliente demuestre a **MHA ZENTGRAF** que el daño fue menor. Transcurrido un plazo conveniente **MHA ZENTGRAF** podrá rescindir unilateralmente el contrato. En caso de mora en la recepción, el riesgo por pérdida de valor o pérdida fortuita regresará al cliente.
- 4.5 Las entregas se realizarán franco fábrica (EXW INCOTERMS 2010) Merzig. El plazo de entrega se considerará cumplido cuando **MHA ZENTGRAF** haya notificado al cliente hasta el vencimiento que ya puede entregar la mercancía. La cesión del riesgo se produce con la notificación de la posibilidad de entrega.
- 4.6 Los dispositivos de seguridad solo se entregarán junto con la mercancía cuando así se haya pactado por escrito.
- 4.7 **MHA ZENTGRAF** tiene derecho a realizar entregas parciales dentro de límites razonables. El cliente está obligado a pagar las entregas parciales.

5. Cuentas por cobrar, pago y falta de pago

- 5.1 El pago se deberá realizar sin descuentos en el plazo de 30 días desde la fecha de la factura.
- 5.2 El cliente solo tendrá derecho a retener el pago o a compensarlo con contraprestaciones en la medida en que sus pretensiones sean válidas y no sean objeto de controversia.
- 5.3 **MHA ZENTGRAF** tiene derecho a ceder a terceros las reclamaciones de pago frente al cliente.
- 5.4 Ante la demora del pago de una factura por parte del cliente, se cobrarán inmediatamente todas las facturas pendientes.
- 5.5 El cliente asumirá el pago de todos los honorarios, costes y gastos incurridos en relación con cualquier acción legal exitosa contra el cliente fuera de Alemania.

6. Propiedad intelectual y derechos de protección

- 6.1 **MHA ZENTGRAF** se reserva todos los derechos de propiedad y de uso sobre toda la documentación referente a la oferta, dibujos, descripciones, muestras y estimaciones de costes. La documentación anterior no se podrá ceder a terceros, ni publicar o reproducir, ni se podrá permitir de ningún otro modo que terceros accedan a ella sin la autorización de **MHA ZENTGRAF**.
- 6.2 El cliente deberá procurar que la construcción del producto de conformidad con sus especificaciones no conculque los derechos de propiedad industrial de terceros. El cliente exonerará a **MHA ZENTGRAF** de todas las pretensiones de terceros resultantes de la violación de derechos de propiedad intelectual.
- 6.3 Si de la colaboración entre **MHA ZENTGRAF** y su cliente para la producción de modelos específicos resultaran nuevos avances, las partes celebrarán un acuerdo aparte para repartir los derechos de propiedad intelectual.

7. Reserva de dominio

- 7.1 **MHA ZENTGRAF** se reserva la propiedad de la mercancía hasta que se haya completado el pago. En el caso de mercancías recibidas por el cliente en el marco de relaciones comerciales en curso, **MHA ZENTGRAF** se reserva la propiedad hasta que todas las deudas hayan sido saldadas. El cliente tiene la obligación de conservar la mercancía en buen estado durante toda la duración de la reserva de dominio y de realizar o encargar a terceros todas las medidas de mantenimiento y de saneamiento necesarias.

7.2 El cliente tiene derecho a procesar o incorporar la mercancía sujeta a la reserva de dominio a su actividad comercial reglamentaria. **MHA ZENTGRAF** será copropietaria de los objetos que resulten de lo anterior; dichos derechos de copropiedad se considerarán cedidos por las presentes condiciones. Los derechos de copropiedad de **MHA ZENTGRAF** serán proporcionales al valor de la mercancía objeto de reserva de dominio respecto de los demás productos. El cliente deberá en tales casos conservar gratuitamente el objeto de propiedad o copropiedad de **MHA ZENTGRAF**.

7.3 El cliente podrá revender la mercancía objeto de reserva de dominio en el tráfico comercial reglamentario a cambio de dinero o bajo reserva de dominio. Por las presentes condiciones, el cliente cede íntegramente a **MHA ZENTGRAF** todas las pretensiones emanadas de la reventa o de cualquier otra causa jurídica (seguro, acto ilícito), incluidos todos los derechos accesorios. **MHA ZENTGRAF** acepta dicha cesión. Si **MHA ZENTGRAF** es copropietaria de la mercancía revendida, la cesión de las pretensiones se extenderá al importe correspondiente a la parte proporcional copropiedad de **MHA ZENTGRAF**.

7.4 **MHA ZENTGRAF** autoriza al cliente con carácter revocable a cobrar las deudas cedidas a **MHA ZENTGRAF** a cargo de ella y en su nombre. Dicha autorización para el cobro podrá ser revocada cuando el cliente no cumpla sus obligaciones de pago. Los ingresos obtenidos por dicha cesión deberán ser regresados inmediatamente a **MHA ZENTGRAF** una vez recibidos. A requerimiento el cliente deberá informar a su intermediario de la cesión y a **MHA ZENTGRAF** del nombre del deudor para que **MHA ZENTGRAF** pueda efectuar por sí misma la publicación de la cesión y/o inclusión de las deudas cedidas.

7.5 El cliente no podrá empeñar la mercancía sujeta al derecho de dominio ni traspasarla en concepto de fianza. Si terceros accedieran a la mercancía objeto de reserva de dominio y/o a las deudas cedidas a **MHA ZENTGRAF**, el cliente estará obligado a notificarlo inmediatamente a **MHA ZENTGRAF**. Los desembolsos ocasionados por ello a **MHA ZENTGRAF** correrán de cuenta del cliente, siempre y cuando no se pueda exigir indemnización a terceros.

7.6 Por un exceso de garantía de más del 20% **MHA ZENTGRAF** está obligada a la liberación de las garantías de su elección cuyo valor supere tal porcentaje.

8. Saneamiento por vicios

8.1 El cliente está obligado a verificar la cuantía y la naturaleza de la mercancía entregada o el servicio prestado inmediatamente tras su recepción. Los vicios manifiestos o reconocibles en inspección reglamentaria deberán ser notificados inmediatamente por escrito, a más tardar en el plazo de 5 días laborables tras la recepción de la mercancía, junto con una descripción detallada del vicio. Los vicios que no puedan ser descubiertos dentro de dicho plazo al examinar rigurosamente la mercancía, deberán ser reclamados por escrito inmediatamente después de haber sido detectados. Si el cliente se abstuviera de notificar la existencia de vicios, se considerará que la mercancía ha sido aprobada.

8.2 Las reclamaciones por vicios prescriben a los 12 meses de la entrega. El plazo de prescripción de las prestaciones de obra realizadas por **MHA ZENTGRAF** comienza con la recepción del servicio pactado. Las indemnizaciones por daños y perjuicios tendrán solo el alcance previsto en la cláusula 9 de las presentes condiciones.

8.3 Al descubrir un vicio, el cliente está obligado a suspender inmediatamente el uso de la mercancía defectuosa, en especial su procesamiento o reventa.

8.4 **MHA ZENTGRAF** no responderá por daños causados por el deterioro natural de la mercancía, o por contaminación, o cuando haya sido transportada, manipulada, almacenada, utilizada, aprovechada o montada inadecuadamente, o por cualquier otra circunstancia atribuible al cliente o a un tercero. No se considerará vicio a efectos de saneamiento el daño originado cuando la mercancía se destine a un uso especial, no concretamente previsible por **MHA ZENTGRAF** (por ejemplo, riesgos de contaminación).

8.5 Las especificaciones de la mercancía o cualquier otra indicación sobre el objeto del contrato persiguen únicamente fines descriptivos y no contienen ninguna promesa o garantía sobre su naturaleza. Las discrepancias respecto a dichas especificaciones o indicaciones no constituyen un vicio cuando dichas diferencias se mantengan dentro de los límites legales o

técnicos permitidos y cuando la capacidad de funcionamiento no se vea considerablemente mermada. Lo anterior no se aplicará cuando a la firma del contrato **MHA ZENTGRAF** haya garantizado al cliente expresamente y por escrito dicha especificación como tal.

8.6 El cliente no tendrá derecho a subsanar por sí mismo los vicios o a encargar su subsanación a terceros, salvo que **MHA ZENTGRAF** haya incurrido en mora en el saneamiento o el cliente se vea obligado a subsanar los vicios por exigencias urgentes de la producción o porque se avecina un riesgo. Si el cliente contraviene el deber anterior, cesará la obligación de saneamiento de **MHA ZENTGRAF** para dicha mercancía.

8.7 En el cumplimiento de su obligación de saneamiento **MHA ZENTGRAF** podrá elegir entre subsanar el vicio o entregar la mercancía libre de defectos. Si los gastos de saneamiento fueran desproporcionados, **MHA ZENTGRAF** tendrá derecho a negarse al saneamiento. Las piezas reemplazadas son propiedad de **MHA ZENTGRAF**.

8.8 Si el saneamiento no se produce en un plazo razonable o resulta de nuevo fallido, el cliente podrá optar entre exigir una reducción del precio o rescindir unilateralmente el contrato.

9. Responsabilidad

9.1 **MHA ZENTGRAF** responde solo de los daños ocasionados por **MHA ZENTGRAF** con dolo, culpa grave o culpa leve que infrinja una obligación contractual esencial. La indemnización por daños originados por el incumplimiento de obligaciones contractuales esenciales estará limitada en caso de culpa leve a los daños contractuales típicos y previsibles, sin superar el monto del precio de venta.

9.2 Lo dispuesto en la cláusula 9.1 no será de aplicación a las reclamaciones por daños según la Ley alemana de Responsabilidad por Productos Defectuosos (Produkthaftungsgesetz, en adelante ProdHaftG) y en caso de muerte, lesiones físicas o menoscabo de la salud.

9.3 La exoneración o limitación de la responsabilidad según estas condiciones se aplicará también a los órganos, empleados, auxiliares ejecutivos y auxiliares de **MHA ZENTGRAF**.

9.4 Los derechos emanados de la responsabilidad prescriben a los 12 meses. En caso de incumplimiento doloso o con culpa grave de las obligaciones, de mala fe, de muerte, lesiones físicas o menoscabo de la salud así como en las reclamaciones basadas en la ProdHaftG se aplicarán los plazos de prescripción legales.

10. Deber de cooperación del cliente

10.1 Cuando la ejecución del contrato así lo requiera, el cliente pondrá a disposición de **MHA ZENTGRAF** con la debida antelación toda la información, documentación y demás medios necesarios.

10.2 Si el cliente detectara que algunos datos son incorrectos, incompletos, poco claros o irrealizables, deberá comunicárselo inmediatamente a **MHA ZENTGRAF**.

10.3 Si a resultas del incumplimiento del deber de cooperación se produjeran retrasos o gastos adicionales, el cliente indemnizará a **MHA ZENTGRAF** los perjuicios causados.

11. Lugar de cumplimiento del contrato, tribunales competentes y derecho aplicable

11.1 El lugar de cumplimiento del contrato es Merzig. Serán competentes los tribunales de Merzig. **MHA ZENTGRAF** tiene derecho también a demandar al cliente en el lugar donde este tenga su sede.

11.2 Se aplicará el derecho alemán a todas las relaciones jurídicas entre **MHA ZENTGRAF** y el cliente con exclusión de la legislación de derecho internacional privado y de lo previsto en la Convención de las Naciones Unidas sobre los Contratos de Compraventa Internacional de Mercaderías.

1. Ambito di applicazione

1.1 Le seguenti condizioni si applicano a tutte le forniture e le prestazioni di **MHA ZENTGRAF**.

1.2 Condizioni del cliente che siano difformi o integrative rispetto ad esse non trovano applicazione.

1.3 Nell'ambito di un rapporto commerciale continuativo, le presenti condizioni si applicano, nella loro versione di volta in volta vigente, a tutte le forniture e prestazioni future, anche in mancanza di espresso riferimento alla loro inclusione.

2. Oggetto del contratto e prezzi

2.1 Nel caso di prodotti speciali **MHA ZENTGRAF** non è obbligata a verificare l'esattezza delle prescrizioni del cliente. **MHA ZENTGRAF** informerà tuttavia i clienti qualora ritenga le prescrizioni non plausibili.

2.2 Prestazioni da parte di **MHA ZENTGRAF** che vadano oltre le obbligazioni del venditore, come ad es. prestazioni di consulenza, progettazione, installazione o lavori di manutenzione, devono essere concordate per iscritto.

2.3 Tutti i prezzi sono al netto e si intendono franco fabbrica; l'IVA nell'aliquota rispettivamente vigente, i costi di imballaggio, trasporto, montaggio e assicurazione devono essere pagati in aggiunta.

2.4 I prezzi si applicano secondo i listini prezzi di **MHA ZENTGRAF** rispettivamente in vigore al momento dell'ordinazione. Qualora tra la conclusione del contratto e il termine di consegna concordato intercorrano più di quattro mesi, **MHA ZENTGRAF** può adeguare il prezzo, se i fornitori di **MHA ZENTGRAF** hanno modificato i loro prezzi e ciò ha effetti sull'ordinazione. Il cliente verrà informato immediatamente delle variazioni.

2.5 Il valore minimo dell'ordinazione è di EUR 300,-- al netto. In caso di mancato superamento di tale limite il cliente deve pagare una adeguata maggiorazione rispetto ai prezzi di listino.

3. Offerta e conclusione del contratto

3.1 Le offerte di **MHA ZENTGRAF** sono senza impegno. I preventivi per prodotti speciali non sono vincolanti e devono essere pagati.

3.2 Il contratto viene in essere quando l'ordinazione del cliente è stata confermata per iscritto da **MHA ZENTGRAF** o è stata iniziata l'esecuzione della prestazione oppure la merce è stata consegnata. Pattuizioni orali aggiuntive sono inefficaci in assenza di conferma scritta da parte di **MHA ZENTGRAF**.

3.3 **MHA ZENTGRAF** è legittimata a recedere dal contratto senza preavviso qualora il patrimonio del cliente abbia subito modifiche durevoli in senso peggiorativo oppure venga richiesta l'apertura di una procedura concorsuale sul patrimonio di quest'ultimo.

3.4 Nel caso in cui venga concesso al cliente un diritto di recesso e il cliente se ne avvalga, esso deve corrispondere a **MHA ZENTGRAF** le spese di storno nella misura del 50% del valore dell'ordine.

4. Consegna, passaggio del rischio e ritardo

4.1 I termini di consegna e di esecuzione delle prestazioni sono vincolanti solamente qualora siano stati confermati per iscritto da **MHA ZENTGRAF**. Il termine di consegna inizia a decorrere con l'invio della conferma d'ordine da parte di **MHA ZENTGRAF**, tuttavia non prima dell'integrale consegna di documenti, autorizzazioni, liberatorie o materiali che debbano essere forniti dal cliente e non prima del ricevimento di un acconto eventualmente concordato.

4.2 Nel caso di ritardi nella consegna o nell'esecuzione delle prestazioni di cui **MHA ZENTGRAF** non sia responsabile, ad es. per forza maggiore, sciopero, restrizioni all'importazione e all'esportazione, interruzioni del lavoro o impedimenti alle vie di comunicazione, il termine di consegna – anche laddove il ritardo sia già in corso – viene corrispondentemente

prorogato. Lo stesso vale se tali circostanze si verificano presso i fornitori di **MHA ZENTGRAF** o i loro subfornitori. **MHA ZENTGRAF** informerà immediatamente i clienti di tali impedimenti e della loro prevedibile durata.

4.3 Nel caso in cui **MHA ZENTGRAF** debba rispondere del ritardo, il cliente, una volta trascorso un ragionevole termine successivo fissato per iscritto, può recedere dal contratto.

4.4 Qualora il cliente sia in mora nell'accettazione, **MHA ZENTGRAF** è legittimata a pretendere, con decorrenza da un mese dopo la comunicazione di pronta spedizione, i costi effettivi sostenuti per il deposito oppure lo 0,5% dell'importo della fattura per ciascun mese iniziato, salvo che il cliente possa dar prova a **MHA ZENTGRAF** di un danno inferiore. Dopo la scadenza di un termine ragionevole, **MHA ZENTGRAF** può recedere dal contratto. Dal momento in cui è iniziata la mora nell'accettazione il rischio di deterioramento accidentale e del perimento fortuito passa a carico del cliente.

4.5 Le consegne avvengono franco fabbrica (EXW INCOTERMS 2010) a Merzig. Il termine di consegna è rispettato quando **MHA ZENTGRAF** ha comunicato al cliente la pronta spedizione della merce fino alla sua scadenza. Il passaggio del rischio avviene con la comunicazione di pronta spedizione.

4.6 I dispositivi di protezione vengono consegnati assieme soltanto se ciò è stato concordato per iscritto.

4.7 **MHA ZENTGRAF** è legittimata a effettuare consegne parziali nei limiti di quanto ragionevole. Il cliente è tenuto al pagamento dei quantitativi parziali consegnati.

5. Crediti, pagamento e mancato pagamento

5.1 Il pagamento deve avvenire senza detrazioni entro 30 giorni dalla data della fattura.

5.2 Al cliente spetta il diritto di sospendere i pagamenti o di effettuare la compensazione con controcrediti solamente nella misura in cui i suoi crediti siano non contestati o siano stati accertati giudizialmente in via definitiva.

5.3 **MHA ZENTGRAF** ha il diritto di cedere i suoi crediti nei confronti del cliente a terzi.

5.4 Se il cliente è in ritardo con il pagamento del credito, tutti i crediti restanti potranno diventare esigibili dal cliente.

5.5 Il cliente è tenuto a farsi carico di tutte le imposte, costi e spese derivanti da qualsiasi azione legale, al di fuori della Germania.

6. Proprietà intellettuale, diritti protetti

6.1 **MHA ZENTGRAF** si riserva la proprietà e i diritti di utilizzazione di tutti i documenti relativi all'offerta, i disegni, le descrizioni, i campioni e i preventivi. Essi non possono essere trasmessi, pubblicati, riprodotti né resi in altro modo accessibili a terzi senza autorizzazione scritta di **MHA ZENTGRAF**.

6.2 Il cliente deve fare in modo che mediante la realizzazione delle merci prodotte secondo le sue prescrizioni non vengano violati diritti di proprietà industriale protetti di terzi. Il cliente deve sollevare **MHA ZENTGRAF** da ogni pretesa dovuta alla violazione di tali diritti protetti.

6.3 Qualora in relazione a prodotti speciali si proceda allo sviluppo comune tra **MHA ZENTGRAF** e il cliente, i contraenti stipulano un separato accordo sulla ripartizione dei diritti protetti.

7. Riserva di proprietà

7.1 **MHA ZENTGRAF** si riserva la proprietà sulla merce fino al suo integrale pagamento. Nel caso di merci che il cliente riceva nell'ambito di un rapporto commerciale continuativo, **MHA ZENTGRAF** si riserva la proprietà fino a quando tutti i crediti da esso derivanti siano soddisfatti. Il cliente è tenuto a mantenere le merci oggetto di riserva di proprietà in condizioni

adeguate per tutta la durata della riserva di proprietà e a eseguire o far eseguire a terzi tutti i lavori di manutenzione e di riparazione necessari.

7.2 Il cliente è autorizzato a lavorare o incorporare le merci oggetto di riserva di proprietà nell'ambito della sua normale attività commerciale. **MHA ZENTGRAF** acquista la comproprietà degli oggetti da ciò risultanti, la quale viene sin d'ora trasferita da parte del cliente. La misura della quota di comproprietà di **MHA ZENTGRAF** si determina secondo il rapporto del valore della merce oggetto di riserva di proprietà rispetto agli altri prodotti. Il cliente deve in tali casi custodire a titolo gratuito le cose che si trovano in proprietà o in comproprietà di **MHA ZENTGRAF**.

7.3 Il cliente è autorizzato ad alienare a sua volta le merci oggetto di riserva di proprietà nell'ambito delle normali transazioni commerciali a fronte del pagamento oppure con riserva di proprietà. I crediti derivanti dalla rivendita o da altro titolo giuridico (assicurazione, atto illecito) vengono sin d'ora ceduti integralmente dal cliente a **MHA ZENTGRAF** a scopo di garanzia assieme a tutti i diritti accessori. **MHA ZENTGRAF** accetta tale cessione. Qualora le merci rivendute oggetto di riserva di proprietà siano in comproprietà di **MHA ZENTGRAF**, la cessione dei crediti si estende all'importo corrispondente al valore della quota di comproprietà di **MHA ZENTGRAF**.

7.4 **MHA ZENTGRAF** autorizza il cliente, in maniera revocabile, ad incassare per conto di **MHA ZENTGRAF** i crediti ceduti a quest'ultima. L'autorizzazione all'incasso può essere revocata nel caso in cui il cliente non adempia le sue obbligazioni di pagamento. I ricavi spettanti in conseguenza della cessione devono essere trasferiti a **MHA ZENTGRAF** immediatamente dopo essere stati percepiti. Ove richiesto, il cliente deve informare della cessione i suoi aventi causa e comunicare a **MHA ZENTGRAF** i nominativi dei debitori dei crediti ceduti, affinché **MHA ZENTGRAF** possa essa stessa procedere a rendere nota la cessione dei crediti ceduti e/o alla loro riscossione.

7.5 Il cliente non può dare in pegno né cedere in garanzia la merce oggetto di riserva di proprietà. Qualora terzi agiscano contro le merci oggetto di riserva di proprietà e/o i crediti ceduti a **MHA ZENTGRAF** il cliente è tenuto a informarne subito **MHA ZENTGRAF**. I costi subiti da **MHA ZENTGRAF** per tale azione sono a carico del cliente, salvo che non debbano essere rimborsati da terzi.

7.6 In caso eccesso di garanzia in misura superiore al 20%, **MHA ZENTGRAF** è tenuta a svincolare a propria scelta le garanzie eccedenti per valore tale percentuale.

8. Garanzia

8.1 Il cliente è tenuto ad esaminare immediatamente la merce consegnata o la prestazione eseguita riguardo a quantità e qualità. I vizi palesi e quelli riconoscibili mediante una normale verifica devono essere comunicati senza ritardo per iscritto, tuttavia al più tardi entro 5 giorni lavorativi dopo il ricevimento della merce, mediante precisa indicazione del vizio. I vizi che non possono essere scoperti nemmeno attraverso un'attenta verifica entro tale termine, devono essere denunciati per iscritto immediatamente dopo la scoperta. Laddove il cliente ometta una denuncia tempestiva, la merce s'intende come accettata.

8.2 I diritti derivanti dai vizi si prescrivono con il decorso di 12 mesi dalla consegna. Nel caso di prestazioni d'opera da parte di **MHA ZENTGRAF** il termine di prescrizione decorre dall'accettazione della prestazione concordata contrattualmente. I diritti al risarcimento dei danni sussistono solo in relazione a quanto disciplinato al punto 9 delle presenti condizioni.

8.3 Il cliente, nel caso di vizi riconosciuti, è tenuto a sospendere immediatamente l'utilizzo della merce difettosa, in particolare la sua lavorazione o rivendita.

8.4 **MHA ZENTGRAF** non è responsabile per danni che siano dovuti a usura, inquinamento, trasporto, manipolazione, stoccaggio, utilizzazione, impiego, montaggio inappropriati della merce o a circostanze addebitabili al cliente o a terzi. Un danno che sia riconducibile a particolari condizioni di impiego della merce, non concretamente prevedibili per **MHA ZENTGRAF** (ad es. pericolo di inquinamento), non rappresenta un vizio ai sensi della garanzia.

8.5 Le specifiche della merce o altre indicazioni riguardo all'oggetto del contratto servono solamente a fini descrittivi e non implicano alcuna

garanzia sulla qualità. Difficoltà rispetto a tali specifiche e indicazioni non costituiscono vizi laddove tali difficoltà rientrino nell'ambito di quanto ammesso dalla legge o secondo lo stato della tecnica e non pregiudichino in modo rilevante la funzionalità. Ciò non vale nel caso in cui **MHA ZENTGRAF** abbia espressamente garantito per iscritto al cliente la specifica come tale al momento della conclusione del contratto.

8.6 Il cliente non è autorizzato a eliminare da sé i vizi o a farli eliminare da terzi, salvo che **MHA ZENTGRAF** non sia in mora nell'adempimento successivo oppure il cliente sia costretto all'eliminazione dei vizi a causa di esigenze aziendali urgenti o del pericolo nel ritardo. Laddove il cliente non rispetti tali prescrizioni, l'obbligo di garanzia di **MHA ZENTGRAF** per la merce in questione decade.

8.7 Ai fini dell'adempimento degli obblighi di garanzia **MHA ZENTGRAF** può, a sua scelta, effettuare l'adempimento successivo mediante l'eliminazione del vizio o attraverso la fornitura di una cosa esente da vizi. Qualora i costi per l'adempimento successivo siano sproporzionati, **MHA ZENTGRAF** è legittimata a rifiutare l'adempimento successivo. Le parti sostituite diventano di proprietà di **MHA ZENTGRAF**.

8.8 Qualora l'adempimento successivo non intervenga entro un termine ragionevole oppure esso abbia esito negativo anche dopo il secondo tentativo, il cliente può, a sua scelta, pretendere la riduzione del prezzo o risolvere il contratto.

9. Responsabilità

9.1 **MHA ZENTGRAF** è responsabile solamente per i danni che **MHA ZENTGRAF** abbia causato con dolo, colpa grave o, se in violazione di obbligazioni contrattuali essenziali, con colpa lieve. Il risarcimento del danno per la violazione di obbligazioni contrattuali essenziali, nei casi di colpa lieve, è limitato ai danni contrattuali tipici e prevedibili, nei limiti del prezzo della compravendita.

9.2 Le disposizioni di cui al punto 9.1 non trovano applicazione riguardo a diritti al risarcimento del danno derivanti dalla legge sulla responsabilità del produttore e da lesioni della vita, del corpo o della salute.

9.3 Nella misura in cui, secondo le presenti condizioni, la responsabilità venga esclusa o limitata, ciò vale anche per la responsabilità degli organi di **MHA ZENTGRAF** nonché per la responsabilità di collaboratori e dipendenti, ausiliari e commessi.

9.4 Tutti i diritti derivanti da responsabilità si prescrivono in dodici mesi. In caso di violazioni intenzionali o dovute a colpa grave, in caso di comportamento doloso, di lesioni della vita, del corpo o della salute nonché di diritti previsti dalla legge sulla responsabilità del produttore valgono i termini di legge.

10. Obblighi di collaborazione del cliente

10.1 Laddove sia necessario per l'esecuzione contratto, il cliente metterà a disposizione di **MHA ZENTGRAF**, in maniera esaustiva e tempestiva, ogni informazione, documentazione e mezzo simile.

10.2 Nel caso in cui il cliente riconosca che alcune delle proprie indicazioni sono errate, incomplete, non univoche o non eseguibili, deve darne immediatamente comunicazione a **MHA ZENTGRAF**.

10.3 Qualora il cliente non osservi i suoi obblighi di collaborazione e da ciò ne derivino ritardi o maggiori costi, esso deve risarcire **MHA ZENTGRAF** per i danni a ciò conseguenti.

11. Luogo di esecuzione, foro competente e diritto applicabile

11.1 Luogo di esecuzione e foro competente è Merzig. **MHA ZENTGRAF** è legittimata a convenire il cliente anche presso la sua sede.

11.2 Per tutti i rapporti giuridici tra **MHA ZENTGRAF** e il cliente si applica il diritto della Repubblica federale tedesca con esclusione della Convenzione di Vienna sulla vendita internazionale e del diritto internazionale privato.



Certificates

MHA ZENTGRAF is certified according to the relevant pressure equipment directive CE and DIN EN ISO 9001 as well as the environmental standard DIN EN ISO 14001 and carries out acceptance procedures under the supervision of all notable classification societies such as ABS the American Bureau of Shipping, BV Bureau Veritas, CC China Classification, DNV Det Norske Veritas, GL Germanischer Lloyd, NK Nippon Kaiji Kyokai, TÜV Technischer Überwachungsverein.

If desired, acceptance test certificates according to DIN EN 10204 3.1 and 3.2 can be issued.

MHA ZENTGRAF fulfills the requirements under code of practice AD-Merkblatt HP 0. Fire-safe ball valves are supplied in compliance with BS 6758:2 API 6 FA and ISO 10497.

COMPANY CERTIFICATES

ISO 9001:2015	de	en	fr	it
ISO 14001:2015	de	en	fr	it
PED/DGRL 2014/68/EU	de	en	fr	it
AD2000 HP-0	de	en	fr	
VdS approved manufacturer	de	en		

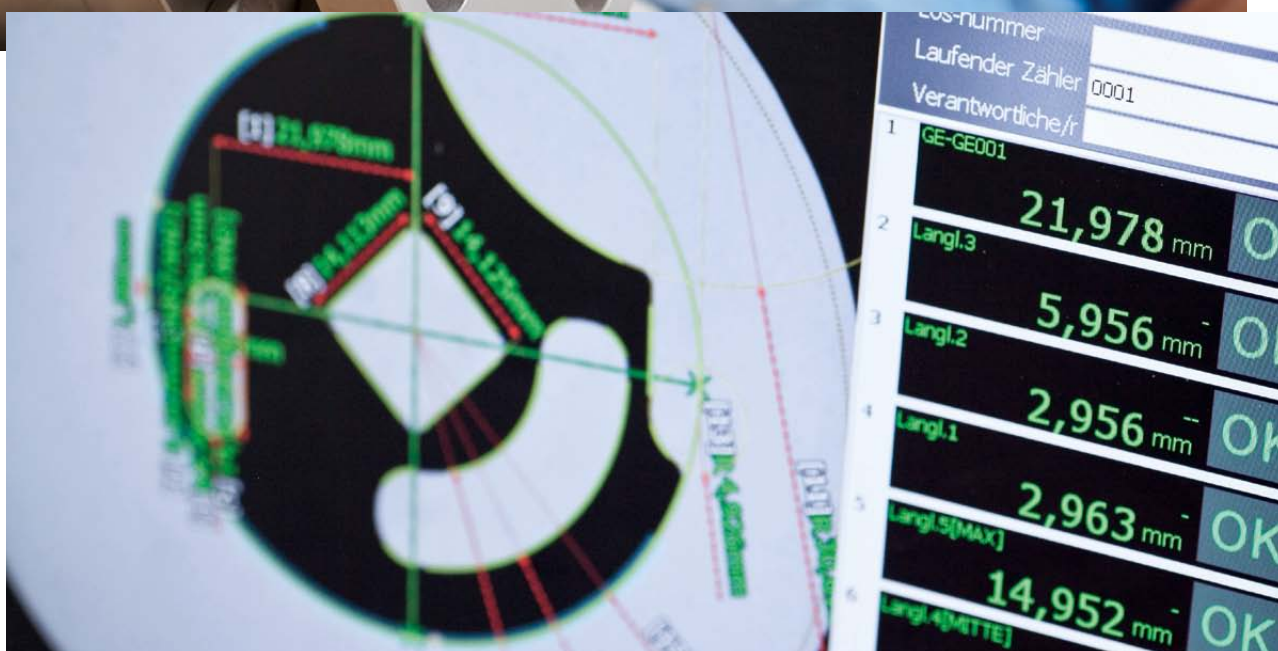
PRODUCT CERTIFICATES

ATEX 2014/34/EU Declaration	de	en
Fire-Safe	de	en
DNV Approval		en
ABS Design Approval		en

OTHER CERTIFICATES

EAC		ru
UKRSEPRO		ukr

Download: www.mha-zentgraf.com



MHA ZENTGRAF GmbH & Co. KG
 Ballerner Strasse 8
 66663 Merzig
 Germany
 Phone +49 6861 / 7000 - 0
 Fax +49 6861 / 7000 - 77
 info@mha-zentgraf.com
 www.mha-zentgraf.com

MHA ZENTGRAF Flow Control Technology
 (Shanghai) Co., Ltd.
 T52-1 South, No. 1510, Chuan Qiao Road
 Pudong, Shanghai, P.R.C. 201206
 Phone +86 21 / 5899 2090
 Fax +86 21 / 5899 6758
 sales@mha-zentgraf.com.cn
 www.mha-zentgraf.com.cn

MHA ZENTGRAF GmbH & Co. KG
 RK Plaza, Survey No 206/3, Plot No. 17
 Viman Nagar, Pune-411014
 India
 Phone +91 8007 9997 96
 info@mha-zentgraf.com
 www.mha-zentgraf.com



MHA ZENTGRAF
 Flow Control Technology

Basic Valve Program

2-way threaded
DN 4 to DN 50



2-way SAEFS
DN 4 to DN 50



2-way flanged
DN 15 to DN 200



3- and 4-way
DN 6 to DN 40



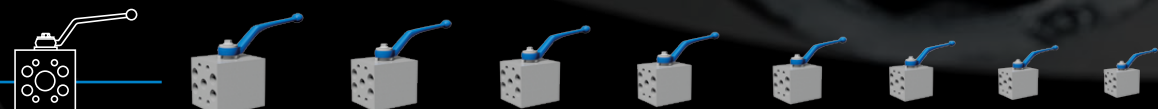
3-way selector
DN 6 to DN 50



Combinations
DN 6 to DN 50



Intermediate
DN 13 to DN 50



Manifold
DN 6 to DN 50



Flow control
DN 6 to DN 50



After a custom solution?
- Speak with us now!



info@mha-zentgraf.com www.mha-zentgraf.com