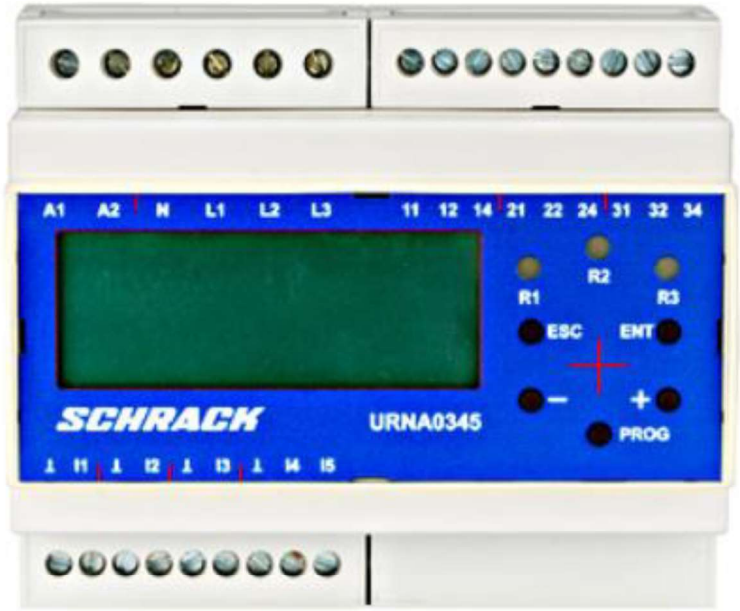
CONNECTING COMPETENCE. SCHRACK TECHNIK

Grid and System Protection Relay

URNA0345-B



USERS GUIDE

for SW: 01.10.01b

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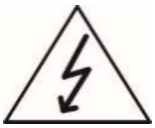
1 Safety



Caution! Never work when voltage is applied.
This poses a life-threatening risk! Never use the device if there is obvious damage! Use only by trained specialist personnel!

Professional product!
This product requires special expertise for the installation!

This device is subject to the Waste Electrical Equipment Regulation (WEEE) and may not be disposed of with normal domestic waste. The device is made of materials that can be recycled by specialized recycling companies. The device must be disposed of according to the national electronic scrap regulations.

1.1 Intended use

The URNA0345-B serves as grid and system protection for supplying cogeneration units, wind power stations, hydroelectric power plants, and photovoltaic systems.

In the event of a power failure or a fault in the grid of the energy supply company, private small power plants must immediately be isolated from the public grid to prevent accidental infeed. For one, maintenance personnel could be endangered without immediate grid separation, and secondly, consumers could be exposed to impermissible voltages and frequencies.

In case the grid operator requires threshold values that deviate from the standards, it is possible in part to set some of the threshold values outside of the standard defined range.

Outside of this range the device is no longer in compliance with standards and the corresponding certificates lose their validity. This status is shown on the display by the identifier "ncnf." Settings outside of this range are therefore within the operator's scope of responsibility and/or the acceptance authority of the system.

1.2 Safety advice

This device was built and tested under-recognized technical safety regulations. However, incorrect use can still result in danger for both persons and machines.

Only use this device as intended, in a technical safe condition, and compliance with the applicable rules and regulations for accident prevention valid at the usage location.

- Fix all faults that could impair the safety immediately.
- Do not make any unauthorized changes and only use spare parts and additional devices that are sold or expressly recommended by the manufacturer of the device.
- The device may no longer be used in case of obvious damage.
- Country-specific standards and guidelines are to be observed.
- The URNA0345-B can be protected against authorized changes after commissioning via password protection or sealing. One of the protection mechanisms named above must be applied if this is required in the respective country-specific standard or guidelines.

1.3 Qualified electrician

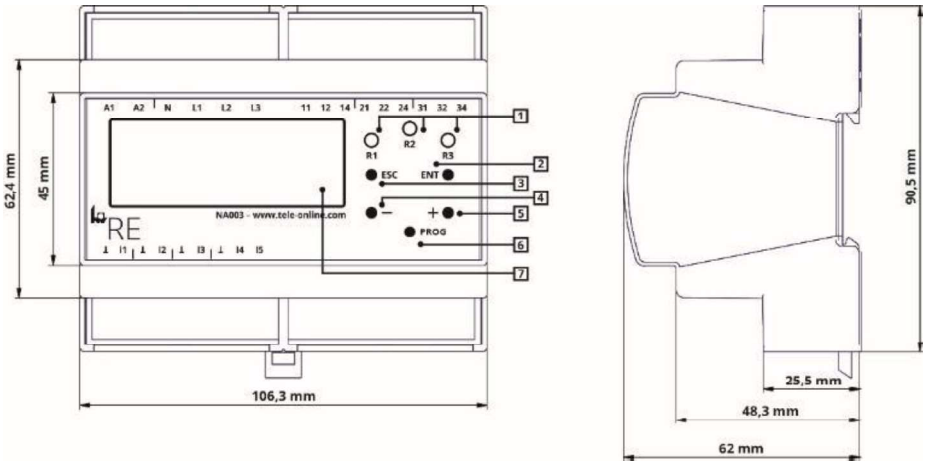
A qualified electrician can independently recognize and prevent dangers from electricity. Requirements for this are:

- Knowledge of electrical engineering
- Experience in electrical work
- Knowledge and work experience with the corresponding system or similar systems (system type)
- Knowledge of the hazards and countermeasures
- The ability to recognize whether safety is provided during the performance of work

Qualified electricians are specially trained and know the relevant standards and regulations for the work environment in which they are active. The regulations of the corresponding country apply.

2 Installation and connection

2.1 Dimensions and operating elements



Legend	Labeling	Type	Function
1	R1, R2, R3	LED (yellow)	Output relay status display
2	ENT	Button	ENTER, input confirmation, next level
3	ESC	Button	ESCAPE, input rejection, back a level, Test
4	-	Button	Parameter setting, display change
5	+	Button	Parameter setting, display change
6	PROG	Button (can be sealed)	PROGRAM, programming
7		LCD-display 4x20 characters	Display

2.2 Back-up fuse of the supply voltage

The supply and measuring voltages of all system components are to be secured with back-up fuses. The back-up fuses are to be dimensioned according to the conductor cross-section used.

We recommend securing the output relay against the danger of short-circuit with a 5A fast-acting fuse!

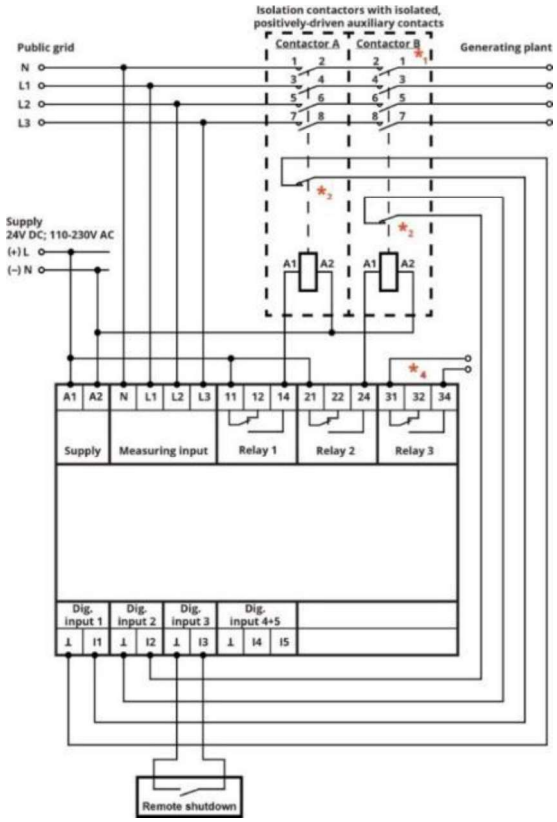
2.3 Terminal allocation

A1, A2	Supply circuit	DC: 24V AC: 110 - 230V A1: L (+) A2: N (-)
L1, L2, L3, N	Measuring circuit	U_N: 3x400V AC
11, 12, 14	Output relay channel A (changeover contact) Status display through yellow LED R1	Contact output (isolated) 11: Root 12: normally opened 14: normally closed
21, 22, 24	Output relay channel B (changeover contact) Status display through yellow LED R2	Contact output (isolated) 21: Root 22: normally opened 24: normally closed
31, 32, 34	Output relay channel D (changeover contact) Status display through yellow LED R3	Contact output (isolated) 31: Root 32: normally opened 34: normally closed
I1, ⊥	Digital input 1 (feedback contact of contactor A)	Contact input (24V/5mA) Input active: I1 and ⊥ connected
I2, ⊥	Digital input 2 (feedback contact of contactor B)	Contact input (24V/5mA) Input active: I2 and ⊥ connected Not applicable for all country-specific standards in which no functional safety is required!
I3, ⊥	Digital input 3 (remote shutdown)	Contact input (24V/5mA) Input active: I3 and ⊥ connected
I4, I5, ⊥	Digital input 4 and 5 (parameter switchover)	For CEI 0-21 Contact input (24V/5mA) Input active: I4 resp. I5 and ⊥ connected

2.4 Installation on top-hat rail according to EN 60715

Latch the mounting clip on the reverse of the device to the top-hat rail so that a safe and secure fit is ensured.

2.5 Circuit diagram 1 (general, without activities for FRT)



To be used for:

Actual standards

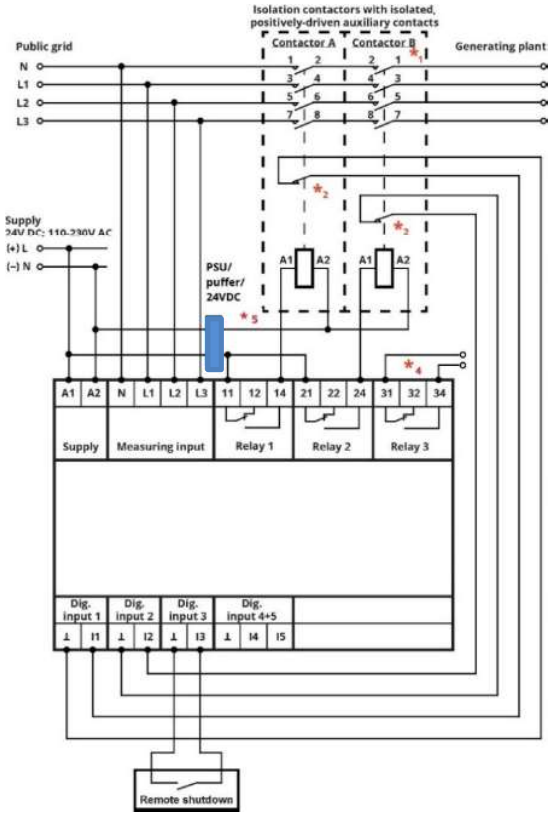
OVE TOR R25 NS SYNC, OOE TOR R25 NS SYNC	
OVE TOR R25 NS ASYNC, OOE TOR R25 NS ASYNC	
OVE TOR R25 MS SYNC, OOE TOR R25 MS SYNC	
OVE TOR R25 MS ASYNC, OOE TOR R25 MS ASYNC	
VDE-AR-N 4105:2018-11 (Pn ≤ 50 kW)	*1, *4, *5
VDE-AR-N 4105:2018-11 (Pn > 50 kW)	*1, *4, *5
VDE-AR-N 4105:2018-11 (Umrichter)	*4, *5
VDE-AR-N 4110:2018-11	*1
G99-1-3 LV:2018	*1
G99-1-3 HV:2018	*1
G98-1-2:2018	*1
C10-11:2019 LV-IP	*1, *4
C10-11:2019 LV-ASS	*1, *4
C10-11:2019 HV-IP	*1, *4
C10-11:2019 HV-ASS	*1, *4
EN50438:2013	
EN50438:2013 DK	*3
VDE 0126-1-1:2013	
NRS 097-2-1:2017	
AS/NZS 4777.2:2015	
OPEN SETUP	*3

Recertified standards

OVE E 8001-4-712 / E 8101-4-712	
VDE 0124-100:2013	
TR3 Rev23:2013	*1
G59/3/3:2015 LV	*1
G59/3/3:2015 MV	*1

*1 ... Contactor B not applicable for all country-specific standards in which no functional safety is required!
*2 ... Auxiliary contact as normally opened, normally closed, or can be configured "not monitored".
*3 ... 1- or 2-channel connection possible and can be configured.
*4 ... Evaluation, contact error for autogeneration plants only for VDE-AR-N 4105:2018-11 and C10-11:2019
*5 ... VDE-AR-N 4105:2018-11 FRT (fault ride through) behavior with buffered isolation contactors.

2.6 Circuit diagram 2 (general, with activities for FRT)



To be used for:

Standards as described in chapter 2.5

5 FRT (fault ride through) behavior with puffered isolation contactors

Power supply / buffer. Isolation contactors and coupling relays, if present, must be buffered for 3s/0.3s in the event of undervoltage (FRT).

Power generation devices into low-voltage networks must help to stabilize the network. Therefore, the isolating contactor must not drop out at a voltage just above U << (0.45 Un) or 0.3s in the event of a voltage interruption due to undervoltage. Only the URNA0345-B switches the contactor off after 3s (U <) or 0.3s (U <<). A power supply / buffer is required.

When using 2 isolating contactors, both must be supplied for 3 s. The URNA0345-B has an internal broadband power supply and therefore does not need a buffered control voltage.

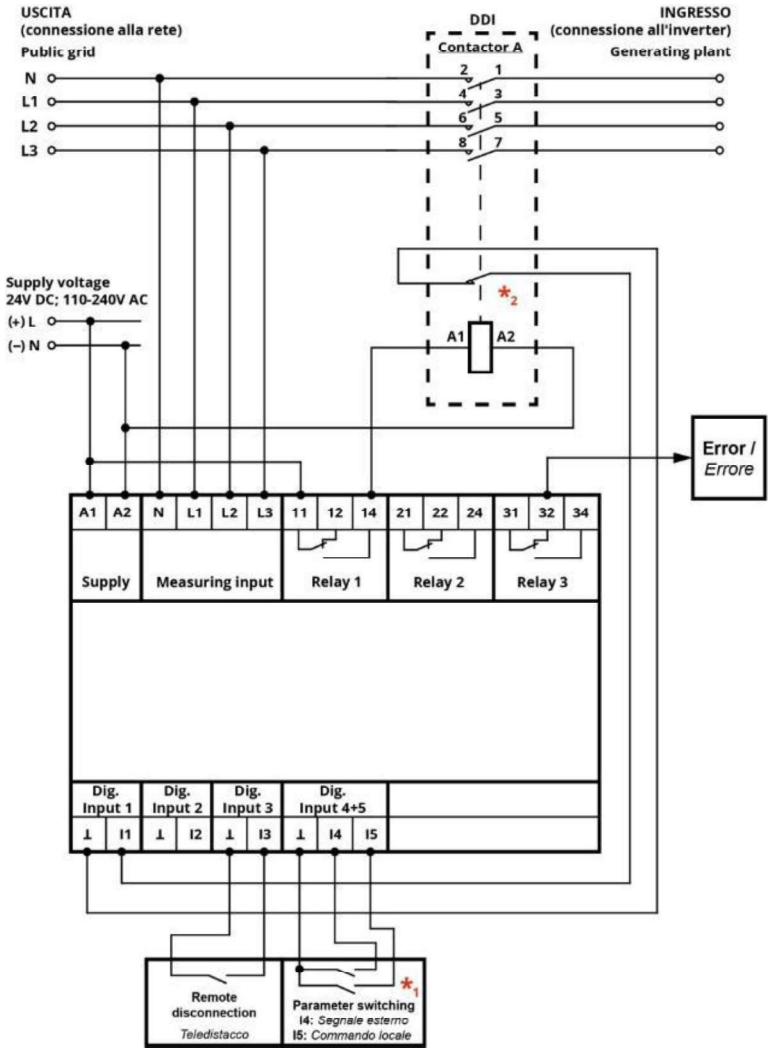
ATTENTION with signal sequence: Buffer - URNA0345-B - isolating contactor. The control signal must NOT be delayed!

*1 ... Contactor B not applicable for all country-specific standards in which no functional safety is required!
*2 ... Auxiliary contact as normally opened, normally closed, or can be configured "not monitored".
*3 ... 1- or 2-channel connection possible and can be configured.
*4 ... Evaluation, contact error for autogeneration plants only for VDE-AR-N 4105:2018-11 and C10-11:2019
*5 ... VDE-AR-N 4105:2018-11 FRT (fault ride through) behavior with buffered isolation contactors.

2.7 Circuit diagram 3 (CEI 0-21)

To be used for:

CEI 0-21:2019



*1 Parameter switching:

definitive mode (Operational mode 0):

I4 inactiv / contact open:	overfrequency 1, underfrequency 1
I4 activ / contact closed:	overfrequency 2, underfrequency 2

transitory mode (Operational mode 1):

I5 active / contact closed:	overfrequency 2, underfrequency 2
I5 inactive / contact open:	overfrequency 3, underfrequency 3

*2 Auxiliary contact as normally opened, normally closed, or can be configured "not monitored"

3 Function

3.1 Features

- Simple implementation through pre-defined setups for country-specific standards and guidelines with parameters that can be set within a wide range.
- Wide nominal voltage and nominal frequency range, configurable nominal voltage
- Additional "Open setup" for free, practically unlimited parametrization in the field
- Single-fault tolerance
- Cyclical self-test
- Monitoring of the connected section switch
- Remote shutdown
- Loss of mains detection (RoCoF, PShift, phase voltage)
- Test function with the determination of the turn-off time
- Monitoring of 1- and 3- phase grids for low and medium voltage grids
- Error memory with a timestamp (50 entries)
- Password protection and ability to seal
- Random turn-off thresholds and turn-on times for non-controllable energy producers (e.g. CHP)

3.2 Functional description

Depending on the configuration selected, the device can handle several monitoring functions at the same time.

After exceeding a threshold value, the device switches off after a turn-off delay that is defined especially for each threshold value. When the test function or the remote shutdown is activated, the device switches off immediately. Only once all monitored parameters are within the permissible limits and the remote shutdown deactivated does the device switch back on after a defined turn-on time.

If not specified otherwise, the nominal voltage is 230 V / 400 V and the nominal frequency 50 Hz.

3.2.1 Innovations concerning VDE-AR-N 4105

For the 3 new parameter sets of VDE-AR-N 4105 (3.3.3-5), the following applies for the commissioning:

When commissioning, make sure that only one coupling switch (on R1) is used. VDE-AR-N 4105 for inverters is an exception here - 2 coupling switches (on R1 and R2) must still be used.
Furthermore, the feedback contact(s) must be connected to the digital inputs I1(2)- ⊥ provided for this purpose.
Finally, parameter 3.099 determines whether the feedback contact(s) are normally closed (n.c.) or normally open (n.o.).
An Error C (Contact) appears on the display if this has not been taken into account. URNA0345-B must not switch on the output relays R1(2) for VDE-AR-N 4105 during error C as long as the feedback contacts are not correctly connected and parameterized.

Contact Error-Reset:

If U_N 3x400V AC is correctly connected, a reset can only be carried out by pressing the Esc (level 1.010) or Ent (level 1.050) key. The contact error is then cleared and the output relays R1/2) energize after the switch-on time has elapsed.
An existing contact error can also be reported to the generating system via R3.
In this context, we would like to refer to Chapter 3.7 Test function (Determination of the tripping time of the coupling switch).

A synchronization device or power switch allows the coupling contactor to be switched on with a defined delay after they have been released by the NA protective relay. Thus the signal from the feedback contact is delayed. The permissible delay is set with **parameter .110 T ConDelOn**. In the default setting, this time is parameterized with **100ms** and can be set up to a maximum of 300.000ms (5min). The conformity is guaranteed up to 10000ms.

Password protection:

Concerning VDE-AR-N 4105, the devices are supplied with fixed password protection. The password is "4105". The commissioning engineer is requested to change the password immediately for safety reasons (see 5.2.5).

3.3 Overview of the implemented configurations

3.3.1 OVE TOR R25 NS SYNC (Typ A/B low voltage for sync. generators)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 2 Overvoltage threshold - phase to neutral voltage
- 2 Undervoltage thresholds - phase to neutral voltage
- 10-minute average Overvoltage threshold
- 1 Over frequency threshold
- 1 Underfrequency threshold
- switch-on delay

3.3.2 OVE TOR R25 NS ASYNC (Typ A/B low voltage for async. generators)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 2 Overvoltage threshold - phase to neutral voltage
- 2 Undervoltage thresholds - phase to neutral voltage
- 10-minute average Overvoltage threshold
- 1 Over frequency threshold
- 1 Underfrequency threshold
- switch-on delay

3.3.3 OVE TOR R25 MS SYNC (Typ A/B medium voltage for sync. generators)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 2 Overvoltage threshold - phase to phase voltage
- 2 Undervoltage thresholds - phase to phase voltage
- 1 Over frequency threshold
- 1 Underfrequency threshold
- switch-on delay

3.3.4 OVE TOR R25 MS ASYNC (Typ A/B medium voltage for async. generators)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 2 Overvoltage threshold - phase to phase voltage
- 2 Undervoltage thresholds - phase to phase voltage
- 1 Over frequency threshold
- 1 Underfrequency threshold
- switch-on delay

3.3.5 OOE TOR R25 NS SYNC (Typ A/B low voltage for sync. generators)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 1 Overvoltage threshold - phase to neutral voltage
- 2 Undervoltage thresholds - phase to neutral voltage
- 10-minute average Overvoltage threshold
- 1 Over frequency threshold
- 1 Underfrequency threshold
- switch-on delay

3.3.6 OOE TOR R25 NS ASYNC (Typ A/B low voltage for async. generators)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 1 Overvoltage threshold - phase to neutral voltage
- 2 Undervoltage thresholds - phase to neutral voltage
- 10-minute average Overvoltage threshold
- 1 Over frequency threshold
- 1 Underfrequency threshold
- switch-on delay

3.3.7 OOE TOR R25 MS SYNC (Typ A/B medium voltage for sync. generators)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 2 Overvoltage threshold - phase to phase voltage
- 2 Undervoltage thresholds - phase to phase voltage
- 10-minute average Overvoltage threshold
- 1 Over frequency threshold
- 1 Underfrequency threshold
- switch-on delay

3.3.8 OOE TOR R25 MS ASYNC (Typ A/B medium voltage for async. generators)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 2 Overvoltage threshold - phase to phase voltage
- 2 Undervoltage thresholds - phase to phase voltage
- 10-minute average Overvoltage threshold
- 1 Over frequency threshold
- 1 Underfrequency threshold
- switch-on delay

3.3.9 VDE-AR-N 4105:2018-11 (Pn ≤ 50 kW)

- Selectable feedback contact (normally closed / normally open)
- Additional monitoring of the feedback contact when switching on
- 1 Overvoltage threshold - phase to phase voltage
- 1 Undervoltage threshold - phase to phase voltage
- 1 Overvoltage threshold - phase-to-neutral voltage
- 1 Undervoltage threshold - phase-to-neutral voltage
- 10-minute average Overvoltage threshold
- 1 Over frequency threshold
- 1 Underfrequency threshold
- 1 random over-frequency threshold (can be activated if required)
- switch-on delay
- random switch-on delay (can be activated if required)

3.3.10 VDE-AR-N 4105:2018-11 (Pn > 50 kW)

- Selectable feedback contact (normally closed / normally open)
- Additional monitoring of the feedback contact when switching on
- 1 Overvoltage threshold - phase to phase voltage
- 2 undervoltage thresholds - phase to phase voltage
- 1 Overvoltage threshold - phase-to-neutral voltage
- 2 undervoltage thresholds - phase-to-neutral voltage
- 10-minute average Overvoltage threshold
- 1 Over frequency threshold
- 1 Underfrequency threshold
- 1 random over-frequency threshold (can be activated if required)
- switch-on delay
- random switch-on delay (can be activated if required)

3.3.11 VDE-AR-N 4105:2018-11 (inverter)

- Selectable feedback contact (normally closed / normally open)
- Additional monitoring of the feedback contact when switching on
- 1 Overvoltage threshold - phase to phase voltage
- 2 undervoltage thresholds - phase to phase voltage
- 1 Overvoltage threshold - phase-to-neutral voltage
- 2 undervoltage thresholds - phase-to-neutral voltage
- 10-minute average Overvoltage threshold
- 1 Over frequency threshold
- 1 Underfrequency threshold
- 1 random over-frequency threshold (can be activated if required)
- switch-on delay
- random switch-on delay (can be activated if required)

3.3.12 VDE-AR-N 4110:2018-11 (tested according to TR3, evaluation report TR8)

- Selectable connection mode (1 phase, 3 phase)
- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 2 Overvoltage thresholds - phase to phase voltage (auto-selection depending on Connection Mode)
- 2 undervoltage thresholds - phase to phase voltage (auto-selection depending on Connection Mode)
- 2 Overvoltage thresholds - phase-to-neutral voltage (autom. selection depending on Connection Mode)
- 2 undervoltage thresholds - phase-to-neutral voltage (autom. selection depending on Connection Mode)
- 2 over-frequency thresholds
- 1 Underfrequency threshold
- switch-on delay

3.3.13 CEI 0-21:2019

- Selectable connection mode (1-phase, 3-phase)
- Selectable operational mode (transitory mode / definitive mode)
- Selectable feedback contact (normally opened/normally closed)
- 1 overvoltage threshold - phase to phase volt. (autom. selection depending on connection mode)
- 2 undervoltage thresholds - phase to phase volt. (autom. selection depending on connection mode)
- 1 overvoltage threshold - phase-to-neutral volt. (autom. selection depending on connection mode)
- 2 undervoltage threshold - phase-to-neutral volt. (autom. selection depending on connection mode)
- 10 minutes average overvoltage threshold
- 3 switchable over-frequency thresholds (switchover via operational mode and digital inputs)
- 3 switchable under-frequency thresholds (switchover via operational mode and digital inputs)
- 1 Frequency ramp threshold (RoCoF ... can be activated if required), RoCoF-Window changeable
- Turn-on delay

3.3.14 G99/1/3 LV:2018 (low voltage)

- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 2 overvoltage thresholds - phase-to-neutral voltage
- 1 Undervoltage threshold - phase-to-neutral voltage
- 1 Over frequency threshold
- 2 Under frequency thresholds
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 phase jump threshold (PShift ... can be deactivated if required)
- switch-on delay

3.3.15 G99/1/3 HV:2018 (medium/high voltage)

- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 2 overvoltage thresholds - phase to phase voltage
- 1 Undervoltage threshold - phase to phase voltage
- 1 Over frequency threshold
- 2 Under frequency thresholds
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 phase jump threshold (PShift ... can be deactivated if required)
- switch-on delay

3.3.16 G98/1/2:2018 (low voltage)

- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open)
- 2 overvoltage thresholds - phase-to-neutral voltage
- 1 Undervoltage threshold - phase-to-neutral voltage
- 1 Over frequency threshold
- 2 under-frequency thresholds
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 phase jump threshold (PShift ... can be deactivated if required)
- switch-on delay

3.3.17 C10-11 2019 LV-IP (Interface Protection / low voltage)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- Additional time monitoring of the feedback contact
- 2 Overvoltage threshold - phase-to-neutral voltage
- 2 Undervoltage thresholds - phase-to-neutral voltage
- 1 Over frequency threshold
- 1 Underfrequency threshold
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 Phase shift threshold (PShift ... can be deactivated if required)
- Turn-on delay

3.3.18 C10-11 2019 LV-ASS (Automatic Separation System / low voltage)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- Additional time monitoring of the feedback contact
- 1 Overvoltage threshold - phase-to-neutral voltage
- 1 Undervoltage thresholds - phase-to-neutral voltage
- 10 minutes average overvoltage threshold
- 1 Over frequency threshold
- 1 Under frequency threshold
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 Phase shift threshold (PShift ... can be deactivated if required)
- Turn-on delay

3.3.19 C10-11:2019 HV-IP (Interface Protection / high voltage)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- Additional time monitoring of the feedback contact
- 2 Overvoltage threshold - phase-to-neutral voltage
- 2 Undervoltage thresholds - phase to phase voltage
- 1 Over frequency threshold
- 1 Under frequency threshold
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 Phase shift threshold (PShift ... can be deactivated if required)
- Turn-on delay

3.3.20 C10-11:2019 HV-ASS (Automatic Separation System /high voltage)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- Additional time monitoring of the feedback contact
- 1 Overvoltage threshold - phase-to-neutral voltage
- 1 Undervoltage thresholds - phase to phase voltage
- 10 minutes average overvoltage threshold
- 1 Over frequency threshold
- 1 Under frequency threshold
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 Phase shift threshold (PShift ... can be deactivated if required)
- Turn-on delay

3.3.21 EN 50438:2013

- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- 1 Overvoltage threshold - phase-to-neutral voltage
- 1 Undervoltage threshold - phase-to-neutral voltage
- 10 minutes average overvoltage threshold
- 1 Over frequency threshold
- 1 Underfrequency threshold
- Turn-on delay

3.3.22 EN 50438:2013 (DK)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable safety mode (1 contactor or 2 contactors controlled and monitored)
- Selectable feedback contact (normally opened/normally closed)
- 2 Overvoltage thresholds - phase to phase voltage
- 1 Undervoltage threshold - phase to phase voltage
- 2 Overvoltage thresholds - phase-to-neutral voltage
- 1 Undervoltage threshold - phase-to-neutral voltage
- 1 Over frequency threshold
- 1 Under frequency threshold
- 1 frequency ramp threshold (RoCoF .. can be deactivated if required)
- Turn-on delay

3.3.23 VDE 0126-1-1:2013 (ERDF-NOI-RES_13E Frankreich)

- Selectable feedback contact (normally opened/normally closed)
- 1 Overvoltage threshold - phase to phase voltage
- 1 Undervoltage threshold - phase to phase voltage
- 1 Overvoltage threshold - phase-to-neutral voltage
- 1 Undervoltage threshold - phase-to-neutral voltage
- 10 minutes average overvoltage threshold
- 1 Over frequency threshold
- 1 Under frequency threshold
- 1 Random over-frequency threshold (can be activated if required)
- Turn-on delay
- Random turn-on delay (can be activated if required)

3.3.24 NRS 097-2-1: 2017

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- 2 overvoltage thresholds - phase to phase voltage (automatic selection depending on connection mode)
- 2 undervoltage thresholds - phase to phase voltage (autom. selection depending on connection mode)
- 2 overvoltage thresholds - phase-to-neutral voltage (autom. selection depending on connection mode)
- 2 undervoltage thresholds - phase-to-neutral voltage (autom. selection depending on connection mode)
- 1 Over frequency thresholds
- 1 Under frequency thresholds
- 1 Random over-frequency threshold (can be activated if required)
- 1 Frequency ramp threshold (RoCoF ... can be deactivated if required)
- 1 Phase shift threshold (PShift ... can be activated if required)
- Turn-on delay
- Random turn-on delay (can be activated if required)

3.3.25 AS/NZS 4777.2:2015 (low voltage)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally closed / normally open / none)
- 2 overvoltage thresholds - phase-to-neutral voltage
- 1 Undervoltage threshold - phase-to-neutral voltage
- 1 Over frequency threshold
- 1 Under frequency thresholds
- 1 Frequency ramp threshold (RoCoF ... can be deactivated if required)
- 1 phase jump threshold (PShift ... can be deactivated if required)
- switch-on delay

3.3.26 OPEN SETUP

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable safety mode (1 contactor or 2 contactors controlled and monitored)
- Selectable feedback contact (normally opened/normally closed)
- 2 Overvoltage thresholds - phase to phase voltage (automatic selection depending on connection mode, can be manually deactivated if required)
- 2 Undervoltage thresholds - phase to phase voltage (automatic selection depending on connection mode, can be manually deactivated if required)
- 2 Overvoltage thresholds - phase-to-neutral voltage (automatic selection depending on connection mode, can be manually deactivated if required)
- 2 Undervoltage thresholds - phase-to-neutral voltage (automatic selection depending on connection mode, can be manually deactivated if required)
- 10 minutes average overvoltage threshold (can be manually deactivated if required)
- 2 over-frequency thresholds (can be manually deactivated if required)
- 2 under-frequency thresholds (can be manually deactivated if required)
- 1 Random over-frequency threshold (can be activated if required)
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 phase shift threshold (PShift ... can be activated if required)
- Turn-on delay
- Random turn-on delay (can be activated if required)

3.3.27 E 8001/8101 (previous standard of OVE TOR R25)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- 2 Overvoltage thresholds - phase to phase voltage
- 2 Undervoltage thresholds - phase to phase voltage
- 2 Overvoltage thresholds - phase-to-neutral voltage
- 2 Undervoltage thresholds - phase-to-neutral voltage
- 10 minutes average overvoltage threshold
- 1 Overfrequency threshold
- 1 Underfrequency threshold
- Turn-on delay

3.3.28 VDE 0124-100:2013 (previous standard of VDE-AR-N 4105:2018-11)

- Selectable feedback contact (normally opened/normally closed)
- 1 Overvoltage threshold - phase to phase voltage
- 1 Undervoltage threshold - phase to phase voltage
- 1 Overvoltage threshold - phase-to-neutral voltage
- 1 Undervoltage threshold - phase-to-neutral voltage
- 10-minute average overvoltage threshold
- 1 Overfrequency threshold
- 1 Underfrequency threshold
- 1 Random overfrequency threshold (can be activated if required)
- Turn-on delay
- Random turn-on delay (can be activated if required)

3.3.29 TR3 Rev23:2013 (previous standard of VDE-AR-N 4110:2018-11)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- 1 overvoltage threshold - phase to phase voltage (autom. selection depending on connection mode)
- 2 undervoltage thresholds - phase to phase voltage (autom. selection depending on connection mode)
- 1 overvoltage threshold - phase-to-neutral voltage (autom. selection depending on connection mode)
- 2 undervoltage threshold - phase-to-neutral voltage (autom. selection depending on connection mode)
- 1 Over frequency threshold
- 1 Under frequency threshold
- Turn-on delay

3.3.30 G59/3/3:2015 LV (low voltage – the previous standard of G99/1/3 LV:2018)

- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- 2 Overvoltage thresholds - phase-to-neutral voltage
- 2 Undervoltage thresholds - phase-to-neutral voltage
- 2 Over frequency thresholds
- 2 Underfrequency thresholds
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 Phase shift threshold (PShift ... can be deactivated if required)
- Turn-on delay

3.3.31 G59/3/3:2015 MV (high voltage – the previous standard of G99/1/3 HV:2018)

- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- 2 Overvoltage thresholds - phase to phase voltage
- 2 Undervoltage thresholds - phase to phase voltage
- 2 Over frequency thresholds
- 2 Underfrequency thresholds
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 Phase shift threshold (PShift ... can be deactivated if required)
- Turn-on delay

3.3.32 G83/2:2012 (low voltage – the previous standard of G98/1/2:2018)

- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- 2 Overvoltage thresholds - phase-to-neutral voltage
- 2 Undervoltage thresholds - phase-to-neutral voltage
- 2 Over frequency thresholds
- 2 Underfrequency thresholds
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 Phase shift threshold (PShift ... can be deactivated if required)
- Turn-on delay

3.3.33 C10-11:2012 LV (low voltage – the previous standard of C10-11:2019)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- 1 Overvoltage threshold - phase-to-neutral voltage
- 2 Undervoltage thresholds - phase-to-neutral voltage
- 1 Over frequency threshold
- 1 Under frequency threshold
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 Phase shift threshold (PShift ... can be deactivated if required)
- Turn-on delay

3.3.34 C10-11:2012 MV (high voltage – the previous standard of C10-11:2019)

- Selectable connection mode (1-phase, 3-phase)
- Selectable nominal voltage
- Selectable feedback contact (normally opened/normally closed)
- 1 Overvoltage threshold - phase to phase voltage
- 2 Undervoltage thresholds - phase to phase voltage
- 1 Over frequency threshold
- 1 Under frequency threshold
- 1 Frequency ramp threshold (RoCoF ... can be activated if required)
- 1 Phase shift threshold (PShift ... can be deactivated if required)
- Turn-on delay

3.4 Comparators

Depending on the standard selected not all comparators can be processed.

3.4.1 Voltage monitoring

Line to line	Overvoltage 1 Overvoltage 2	All 3 phase to phase voltages are monitored according to the set overvoltage thresholds! After exceeding the switching threshold, the device triggers after the set trigger delay t_{off}. It can be deactivated in 2-phase (L+N) as well as 4-phase (L1, L2, L3+N) coupling mode!
Line to line	Undervoltage 1 Undervoltage 2	All 3 phase to phase voltages are monitored according to the undervoltage thresholds set! After exceeding the switching threshold, the device triggers after the set trigger delay t_{off}. It can be deactivated in 2-phase (L+N) as well as 4-phase (L1, L2-L3+N) coupling mode!
Line to Neutral	Overvoltage 1 Overvoltage 2	All 3 phase-to-neutral voltages are monitored according to the overvoltage thresholds set! After exceeding the switching threshold, the device triggers after the set trigger delay toff. Exception: In 2-phase (L+N) coupling mode, only one overvoltage measurement takes place between L1 and N! It can be deactivated in 3-phase (L1, L2, L3) coupling mode!
Line to Neutral	Undervoltage 1 Undervoltage 2	All 3 phase-to-neutral voltages are monitored according to the undervoltage thresholds set! After exceeding the switching threshold, the device triggers after the set trigger delay toff. Exception: In 2-phase (L+N) coupling mode, only one overvoltage measurement takes place between L1 and N! It can be deactivated in 3-phase (L1, L2, L3) coupling mode!
Average	Overvoltage	The 10-minutes average generated is monitored according to the switching thresholds set for the slow voltage increase protection! After exceeding the switching threshold, the device triggers after the set trigger delay toff. In 2-phase coupling mode: L-N In 3-phase coupling mode: L1-L2-L3 In 4-phase coupling mode: L1-N; L2-N; L3-N

3.4.2 Frequency monitoring

Overfrequency 1 Overfrequency 2 Overfrequency 3 Overfrequency 4	The frequency of the 3 phase-to-neutral voltages is monitored according to the overvoltage thresholds set. Exception: in 2-wire mode only U L1-N
Underfrequency 1 Underfrequency 2 Underfrequency 3 Underfrequency 4	The frequencies of the 3 phase-to-neutral voltages are monitored according to the under-frequency thresholds set. Exception: in 2-wire mode only U L1-N
Random over frequency	The frequency of the 3 phase-to-neutral voltages is monitored according to the parameters set (random max. frequency). Exception: in 2-wire mode only U L1-N
Frequency monitoring undervoltage LL Frequency monitoring undervoltage LN	Depending on the mode (2-, 3-, 4-wire,) falling below the set threshold leads to the deactivation of the frequency comparators.
RoCoF	The frequency change rates of the 3 phase-to-neutral voltages are monitored according to the parameters set. Exception: in 2-wire mode only U L1-N

3.4.3 Phase shift monitoring

Phase Shift	The phase shift behavior of the 3 phase-to-neutral voltages is monitored according to the parameters set. Exception: in 2-wire mode only U L1-N

3.5 Settings of the implemented configurations

Definition for the following tables:
Lines highlighted in gray mean that the associated parameters can be edited. All other settings are fixed.

3.5.1 Connection Modes

2-wire	Only the voltage between L1 and N is evaluated
3-wire	Only the line to line voltages U_{L1-L2}, U_{L2-L3} and U_{L3-L1} are evaluated
4-wire (LN)	Only the phase-to-neutral voltages U_{L1-N}, $U_{L2-N,}$ and U_{L3-N} are evaluated
4-wire (LN+LL)	Both the phase-to-neutral voltages U_{L1-N}, $U_{L2-N,}$ and U_{L3-N} as well as the phase to phase voltages U_{L1-L2}, U_{L2-L3}, and U_{L3-L1} are evaluated

3.5.2 Units

%Unom	Percent of the nominal voltage (nominal voltage factor)

3.5.3 Functional safety

Errtol 2ch	2 separated contactors with 2 separated auxiliary contacts are connected
Errtol 1ch	1 external contactor with 1 auxiliary contact is connected

3.5.4 Operational mode

It is possible to switch between 2 different operating modes
It is currently only used for the CEI-021 ... see CEI-021 8.6.2.1.1

Mode 0:	transitory mode
Mode 1:	definitive mode

3.5.5 Thresholds

U_{THR} OFF	Voltage threshold for the turn-off
U_{THR} ON	Voltage threshold for turn-on
f_{THR} OFF	Frequency threshold for the turn-off
f_{THR} ON	Frequency threshold for turn-on
$RoCoF_{THR}$ OFF	Frequency change threshold for the turn-off
$RoCoF_{THR}$ ON	Frequency change threshold for turn-on
$PShift_{THR}$ OFF	Phase shift threshold for the turn-off
$PShift_{THR}$ ON	Phase shift threshold for turn-on

3.5.6 Times

Time OFF	Turn-off delay
T on delay	Turn-on delay

3.5.7 Auxiliary contact

Read back of the position of the actuated contactors (via positively-driven auxiliary contacts) is required for the necessary functional safety. The following can be selected for these auxiliary contacts:

Contact n.c. (normally closed)	Auxiliary contact is normally opened (recommended implementation)
Contact n.o. (normally opened)	Auxiliary contact is normally closed
Contact dis. (disabled)	Auxiliary contact is ignored (impermissible for standards that require functional safety)
Contact t	Setting the time-delay (for switching off) that could elapse before the auxiliary contact of the coupling relay must feedback to I1/2, otherwise display a contact error.
T ConDelOn	Setting the time-delay (for switching on) that could elapse before the auxiliary contact of the coupling relay must feedback to I1/2, otherwise display a contact error and switch off R1/2. R3 is also activated.

3.5.8 Ranges

Conformity range	Within this range, the device is configured in compliance with the selected standards. Outside of these ranges, the device is no longer compliant with standards and the corresponding certificates lose their validity. This status is shown on the display by the identifier "ncnf." Settings outside of this range are therefore within the operator's scope of responsibility and/or the acceptance authority of the system.
Possible range	Technically possible setting range

3.5.9 ÖVE TOR R25 NS SYNC [ID 802] Typ A/B low voltage sync. generators

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	57.5	230.0	28.8	241.4
		Unom Δ	V	400.0	100.0	400.0	50.0	420.0

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.018	Ueff >	Enable function		on	on / off		on /off	
.019	Ueff > off	U_{THR} OFF	%Unom	111	100	130	100	135
.020	Ueff > on	U_{THR} ON	%Unom	108	100	108	100	135
.021	T Ueff >	Time OFF	ms	60000	50	180000	50	180000
Comment:		Ueff > on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	Ueff < off	U_{THR} OFF	%Unom	80	10	100	10	100
.024	Ueff < on	U_{THR} ON	%Unom	90	86	100	10	100
.025	T Ueff <	Time OFF	ms	1000	50	180000	50	180000
Comment:		Ueff < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.034	Ueff>>	Enable function		on	on		on /off	
.035	Ueff>> off	U_{THR} OFF	%Unom	115	100	130	100	135
.036	Ueff>> on	U_{THR} ON	%Unom	108	100	108	100	135
.037	T Ueff>>	Time OFF	ms	100	50	180000	50	180000
Comment:		Ueff>> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.038	Ueff<<	Enable function		on	on		on /off	
.039	Ueff<< off	U_{THR} OFF	%Unom	30	10	100	10	100
.040	Ueff<< on	U_{THR} ON	%Unom	90	86	100	0	100
.041	T Ueff<<	Time OFF	ms	200	50	180000	50	180000
Comment:		Ueff<< on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.042	U10min	Enable function		on	on / off		on /off	
.043	U10min off	U_{THR} OFF	%Unom	111	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	50.00	55.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.05	50.00	50.05	50.00	55.00
.057	T f >	Time OFF	ms	50	50	50	50	180000
Comment:		f > on has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	45.00	50.00	45.00	50.00
.060	f < on	f_{THR} ON	Hz	49.50	47.55	50.00	45.00	50.00
.061	T f <	Time OFF	ms	50	50	50	50	180000
Comment:		f < on has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	300	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.10 ÖVE TOR R25 NS ASYNC [ID 803] Typ A/B low voltage async. generators

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	57.5	230.0	28.8	241.4
		Unom Δ	V	400.0	100.0	400.0	50.0	420.0

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.018	Ueff >	Enable function		on	on / off		on /off	
.019	Ueff > off	U_{THR} OFF	%Unom	111	100	130	100	135
.020	Ueff > on	U_{THR} ON	%Unom	108	100	108	100	135
.021	T Ueff >	Time OFF	ms	60000	50	180000	50	180000
Comment:		Ueff > on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	Ueff < off	U_{THR} OFF	%Unom	80	10	100	10	100
.024	Ueff < on	U_{THR} ON	%Unom	90	86	100	10	100
.025	T Ueff <	Time OFF	ms	1500	50	180000	50	180000
Comment:		Ueff < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.034	Ueff>>	Enable function		on	on		on /off	
.035	Ueff>> off	U_{THR} OFF	%Unom	115	100	130	100	135
.036	Ueff>> on	U_{THR} ON	%Unom	108	100	108	100	135
.037	T Ueff>>	Time OFF	ms	100	50	180000	50	180000
Comment:		Ueff>> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.038	Ueff<<	Enable function		on	on		on /off	
.039	Ueff<< off	U_{THR} OFF	%Unom	25	10	100	10	100
.040	Ueff<< on	U_{THR} ON	%Unom	90	86	100	0	100
.041	T Ueff<<	Time OFF	ms	500	50	180000	50	180000
Comment:		Ueff<< on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.042	U10min	Enable function		off	on / off		on /off	
.043	U10min off	U_{THR} OFF	%Unom	111	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	50.00	55.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.05	50.00	50.05	50.00	55.00
.057	T f >	Time OFF	ms	50	50	50	50	180000
Comment:		f > on has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	45.00	50.00	45.00	50.00
.060	f < on	f_{THR} ON	Hz	49.50	47.55	50.00	45.00	50.00
.061	T f <	Time OFF	ms	50	50	50	50	180000
Comment:		f < on has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Auxiliary Contact type				Conformity Range		Possible Range	
ID			Default	Min	Max	Min	Max
.099	Contact	Type	n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms			

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	300	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.11 ÖVE TOR R25 MS SYNC [ID 852] Typ A/B medium voltage sync. generators

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	3-wire	3-wire	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	60.4	57.5	230.0	28.8	241.4
		Unom Δ	V	105.0	100.0	400.0	50.0	420.0
Comment:		Default for Uc=21kV and 200:1 voltage transformer or Uc=31,7kV and 300:1						

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	U > off	U_{THR} OFF	%Unom	105	100	130	100	135
.012	U > on	U_{THR} ON	%Unom	104	100	108	100	135
.013	T U >	Time OFF	ms	60000	50	180000	50	180000
Comment:		U > on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	U < off	U_{THR} OFF	%Unom	70	10	100	10	100
.016	U < on	U_{THR} ON	%Unom	90	86	100	10	100
.017	T U <	Time OFF	ms	1000	50	180000	50	180000
Comment:		U < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.026	U >>	Enable function		on	on		on /off	
.027	U >> off	U_{THR} OFF	%Unom	110	100	130	100	135
.028	U >> on	U_{THR} ON	%Unom	104	100	108	100	135
.029	T U >>	Time OFF	ms	100	50	180000	50	180000
Comment:		U >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.030	U <<	Enable function		on	on		on /off	
.031	U << off	U_{THR} OFF	%Unom	30	10	100	10	100
.032	U << on	U_{THR} ON	%Unom	90	86	100	0	100
.033	T U <<	Time OFF	ms	200	50	180000	50	180000
Comment:		U << on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	50.00	55.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.05	50.00	50.05	50.00	55.00
.057	T f >	Time OFF	ms	50	50	50	50	180000
Comment:		f > on has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	45.00	50.00	45.00	50.00
.060	f < on	f_{THR} ON	Hz	49.50	47.55	50.00	45.00	50.00
.061	T f <	Time OFF	ms	50	50	50	50	180000
Comment:		f < on has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	300	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.12 ÖVE TOR R25 MS ASYNC [ID 853] Typ A/B medium voltage async. generators

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	3-wire	3-wire	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	60.4	57.5	230.0	28.8	241.4
		Unom Δ	V	105.0	100.0	400.0	50.0	420.0
Comment:		Default for Uc=21kV and 200:1 voltage transformer or Uc=31,7kV and 300:1						

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	U > off	U_{THR} OFF	%Unom	105	100	130	100	135
.012	U > on	U_{THR} ON	%Unom	104	100	108	100	135
.013	T U >	Time OFF	ms	60000	50	180000	50	180000
Comment:		U > on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	U < off	U_{THR} OFF	%Unom	80	10	100	10	100
.016	U < on	U_{THR} ON	%Unom	90	86	100	10	100
.017	T U <	Time OFF	ms	1500	50	180000	50	180000
Comment:		U < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.026	U >>	Enable function		on	on		on /off	
.027	U >> off	U_{THR} OFF	%Unom	110	100	130	100	135
.028	U >> on	U_{THR} ON	%Unom	104	100	108	100	135
.029	T U >>	Time OFF	ms	100	50	180000	50	180000
Comment:		U >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.030	U <<	Enable function		on	on		on /off	
.031	U << off	U_{THR} OFF	%Unom	30	10	100	10	100
.032	U << on	U_{THR} ON	%Unom	90	86	100	0	100
.033	T U <<	Time OFF	ms	400	50	180000	50	180000
Comment:		U << on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	50.00	55.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.05	50.00	50.05	50.00	55.00
.057	T f >	Time OFF	ms	50	50	50	50	180000
Comment:		f > on has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	45.00	50.00	45.00	50.00
.060	f < on	f_{THR} ON	Hz	49.50	47.55	50.00	45.00	50.00
.061	T f <	Time OFF	ms	50	50	50	50	180000
Comment:		f < on has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	300	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.13 Oberösterreich OOE TOR R25 NS SYNC [ID 822] Typ A/B low voltage synchr. generators

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	57.5	230.0	28.8	241.4
		Unom Δ	V	400.0	100.0	400.0	50.0	420.0

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	Ueff < off	U_{THR} OFF	%Unom	80	10	100	10	100
.024	Ueff < on	U_{THR} ON	%Unom	85	85	100	10	100
.025	T Ueff <	Time OFF	ms	200	50	180000	50	180000
Comment:		Ueff < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.034	Ueff>>	Enable function		on	on		on /off	
.035	Ueff>> off	U_{THR} OFF	%Unom	115	100	130	100	135
.036	Ueff>> on	U_{THR} ON	%Unom	109	100	109	100	135
.037	T Ueff>>	Time OFF	ms	100	50	180000	50	180000
Comment:		Ueff>> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.038	Ueff<<	Enable function		on	on		on /off	
.039	Ueff<< off	U_{THR} OFF	%Unom	30	10	100	10	100
.040	Ueff<< on	U_{THR} ON	%Unom	85	85	100	0	100
.041	T Ueff<<	Time OFF	ms	200	50	180000	50	180000
Comment:		Ueff<< on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.042	U10min	Enable function		on	on / off		on /off	
.043	U10min off	U_{THR} OFF	%Unom	111	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to a fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	50.00	55.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.1	50.00	50.1	50.00	55.00
.057	T f >	Time OFF	ms	50	50	50	50	180000
Comment:		f > on has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	45.00	50.00	45.00	50.00
.060	f < on	f_{THR} ON	Hz	47.50	47.50	50.00	45.00	50.00
.061	T f <	Time OFF	ms	50	50	50	50	180000
Comment:		f < on has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	300	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.14 Oberösterreich OOE TOR R25 NS ASYNC [ID 823] Typ A/B low voltage asynchr. generators

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	57.5	230.0	28.8	241.4
		Unom Δ	V	400.0	100.0	400.0	50.0	420.0

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	Ueff < off	U_{THR} OFF	%Unom	80	10	100	10	100
.024	Ueff < on	U_{THR} ON	%Unom	85	85	100	10	100
.025	T Ueff <	Time OFF	ms	1500	50	180000	50	180000
Comment:		Ueff < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.034	Ueff>>	Enable function		on	on		on /off	
.035	Ueff>> off	U_{THR} OFF	%Unom	115	100	130	100	135
.036	Ueff>> on	U_{THR} ON	%Unom	109	100	109	100	135
.037	T Ueff>>	Time OFF	ms	100	50	180000	50	180000
Comment:		Ueff>> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.038	Ueff<<	Enable function		on	on		on /off	
.039	Ueff<< off	U_{THR} OFF	%Unom	25	10	100	10	100
.040	Ueff<< on	U_{THR} ON	%Unom	85	85	100	0	100
.041	T Ueff<<	Time OFF	ms	500	50	180000	50	180000
Comment:		Ueff<< on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.042	U10min	Enable function		on	on / off		on /off	
.043	U10min off	U_{THR} OFF	%Unom	111	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to a fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	50.00	55.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.1	50.00	50.1	50.00	55.00
.057	T f >	Time OFF	ms	50	50	50	50	180000
Comment:		f > on has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	45.00	50.00	45.00	50.00
.060	f < on	f_{THR} ON	Hz	47.50	47.50	50.00	45.00	50.00
.061	T f <	Time OFF	ms	50	50	50	50	180000
Comment:		f < on has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	300	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.15 Oberösterreich OOE TOR R25 MS SYNC [ID 872] Typ A/B medium voltage synchr. generator

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	3-wire	3-wire	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	60.4	57.5	230.0	28.8	241.4
		Unom Δ	V	105.0	100.0	400.0	50.0	420.0
Comment:		Default for Uc=21kV and 200:1 voltage transformer or Uc=31,7kV and 300:1						

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	U > off	U_{THR} OFF	%Unom	104.5	100	130	100	135
.012	U > on	U_{THR} ON	%Unom	104.5	100	109	100	135
.013	T U >	Time OFF	ms	60000	50	180000	50	180000
Comment:		U > on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	U < off	U_{THR} OFF	%Unom	70	10	100	10	100
.016	U < on	U_{THR} ON	%Unom	85	85	100	10	100
.017	T U <	Time OFF	ms	200	50	180000	50	180000
Comment:		U < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.026	U >>	Enable function		on	on		on /off	
.027	U >> off	U_{THR} OFF	%Unom	108	100	130	100	135
.028	U >> on	U_{THR} ON	%Unom	104.5	100	109	100	135
.029	T U >>	Time OFF	ms	100	50	180000	50	180000
Comment:		U >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.030	U <<	Enable function		on	on		on /off	
.031	U << off	U_{THR} OFF	%Unom	30	10	100	10	100
.032	U << on	U_{THR} ON	%Unom	85	85	100	0	100
.033	T U <<	Time OFF	ms	200	50	180000	50	180000
Comment:		U << on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.042	U10min	Enable function		off	on / off		on /off	
.043	U10min off	U_{THR} OFF	%Unom	104.5	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to a fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	50.00	55.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.1	50.00	50.1	50.00	55.00
.057	T f >	Time OFF	ms	50	50	50	50	180000
Comment:		f > on has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	45.00	50.00	45.00	50.00
.060	f < on	f_{THR} ON	Hz	47.50	47.5	50.00	45.00	50.00
.061	T f <	Time OFF	ms	50	50	50	50	180000
Comment:		f < on has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Auxiliary Contact type				Conformity Range		Possible Range	
ID			Default	Min	Max	Min	Max
.099	Contact	Type	n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms			

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	300	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.16 Oberösterreich OOE TOR R25 MS ASYNC [ID 873] Typ A/B medium voltage asynchr. generat

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	3-wire	3-wire	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	60.4	57.5	230.0	28.8	241.4
		Unom Δ	V	105.0	100.0	400.0	50.0	420.0
Comment:		Default for Uc=21kV and 200:1 voltage transformer or Uc=31,7kV and 300:1						

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	U > off	U_{THR} OFF	%Unom	104.5	100	130	100	135
.012	U > on	U_{THR} ON	%Unom	104.5	100	109	100	135
.013	T U >	Time OFF	ms	60000	50	180000	50	180000
Comment:		U > on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	U < off	U_{THR} OFF	%Unom	80	10	100	10	100
.016	U < on	U_{THR} ON	%Unom	85	85	100	10	100
.017	T U <	Time OFF	ms	1000	50	180000	50	180000
Comment:		U < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.026	U >>	Enable function		on	on		on /off	
.027	U >> off	U_{THR} OFF	%Unom	108	100	130	100	135
.028	U >> on	U_{THR} ON	%Unom	104.5	100	109	100	135
.029	T U >>	Time OFF	ms	100	50	180000	50	180000
Comment:		U >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.030	U <<	Enable function		on	on		on /off	
.031	U << off	U_{THR} OFF	%Unom	30	10	100	10	100
.032	U << on	U_{THR} ON	%Unom	85	85	100	0	100
.033	T U <<	Time OFF	ms	500	50	180000	50	180000
Comment:		U << on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.042	U10min	Enable function		off	on / off		on /off	
.043	U10min off	U_{THR} OFF	%Unom	104.5	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to a fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	50.00	55.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.1	50.00	50.1	50.00	55.00
.057	T f >	Time OFF	ms	50	50	50	50	180000
Comment:		f > on has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	45.00	50.00	45.00	50.00
.060	f < on	f_{THR} ON	Hz	47.50	47.5	50.00	45.00	50.00
.061	T f <	Time OFF	ms	50	50	50	50	180000
Comment:		f < on has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 60% U_{NOM}						

Auxiliary Contact type				Conformity Range		Possible Range	
ID			Default	Min	Max	Min	Max
.099	Contact	Type	n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms			

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	300	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.17 VDE-AR-N 4105:2018 ≤50kW [ID 311]

Functional Safety			Conformity Range	Possible Range
ID		Default		
.007	Errtol	1ch	1ch	2ch, 1ch
Remark:		2ch means: 2 channel with functional safety and 2 auxiliary contacts necessary 1ch means: 1 channel without functional safety and 1 auxiliary contact1 necessary		

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	ULL >> off	U_{THR} OFF	%Unom	Fixed to 115% U_{NOM}				
.012	ULL >> on	U_{THR} ON	%Unom	110	110	110	100	110
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULL >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	ULL < off	U_{THR} OFF	%Unom	Fixed to 80% U_{NOM}				
.015	ULL < off	U_{THR} OFF	%Unom	80	80	85	80	85
.016	ULL < on	U_{THR} ON	%Unom	85	85	85	85	100
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULL < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	ULN >> off	U_{THR} OFF	%Unom	Fixed to 115% U_{NOM}				
.020	ULN >> on	U_{THR} ON	%Unom	110	110	110	100	110
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULN >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	ULN < off	U_{THR} OFF	%Unom	80	80	85	80	85
.024	ULN < on	U_{THR} ON	%Unom	85	85	85	85	100
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULN < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.043	U > off	U_{THR} OFF	%Unom	110	110	115	110	115
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	Fixed to 51.50Hz				
.056	f > on	f_{THR} ON	Hz	50.10	50.10	50.10	50.00	50.10
		Time OFF	ms	Fixed to the fastest possible disconnection				

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	Fixed to 47.50Hz				
.060	f < on	f_{THR} ON	Hz	47.50	47.50	47.50	47.50	50.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f < on has a fixed offset of 0.025 Hz added to the displayed value						

Random overfrequency					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.086	f > random	Enable function		off	on / off		on /off	
.087	f > random	f_{THR} OFF	Hz		50.20	51.50	50.20	51.50
		f_{THR} ON	Hz	Fixed reconnection frequency of 50.10Hz				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		The random f_{THR} OFF threshold is shown in .087 and cannot be edited						

Auxiliary Contact type					Conformity Range		Possible Range	
ID			Default		Min	Max	Min	Max
.099	Contact	Type	n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 100ms				
.110	T ConDelOn	Time ON	ms	100	100	10000	100	300000

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	1	600

Random Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.103	Ton random	Enable function		off	on / off		on / off	
.104	Ton random	Turn on time	s		60	600	60	600
Comment:		The random time value is shown in .104 and cannot be edited						

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	4	0	9
.107	PW2	2nd digit of Password	1	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	5	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.18 VDE-AR-N 4105:2018 >50kW [ID 312]

Functional Safety			Conformity Range	Possible Range
ID		Default		
.007	Errtol	1ch	1ch	2ch, 1ch
Remark:		2ch means: 2 channel with functional safety and 2 auxiliary contacts necessary 1ch means: 1 channel without functional safety and 1 auxiliary contact1 necessary		

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	ULL >> off	U_{THR} OFF	%Unom	Fixed to 125% U_{NOM}				
.012	ULL >> on	U_{THR} ON	%Unom	110	110	110	100	110
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULL >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	ULL < off	U_{THR} OFF	%Unom	Fixed to 80% U_{NOM}				
.016	ULL < on	U_{THR} ON	%Unom	85	85	85	85	100
.017	T ULL <	Time OFF	ms	1000	50	1000	50	10000
Comment:		ULL < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	ULN >> off	U_{THR} OFF	%Unom	Fixed to 125% U_{NOM}				
.020	ULN >> on	U_{THR} ON	%Unom	110	110	110	100	110
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULN >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	ULN < off	U_{THR} OFF	%Unom	Fixed to 80% U_{NOM}				
.024	ULN < on	U_{THR} ON	%Unom	85	85	85	85	100
.025	T ULN <	Time OFF	ms	1000	50	1000	50	10000
Comment:		ULN < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.031	ULL << off	U_{THR} OFF	%Unom	Fixed to 45% U_{NOM}				
.032	ULL << on	U_{THR} ON	%Unom	85	85	85	85	100
.033	T ULL <<	Time OFF	ms	300	50	300	50	10000
Comment:		ULL << on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	ULN << off	U_{THR} OFF	%Unom	Fixed to 45% U_{NOM}				
.040	ULN << on	U_{THR} ON	%Unom	85	85	85	85	100
.041	T ULN <<	Time OFF	ms	200	50	300000	50	300000
Comment:		ULN << on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.043	U > off	U_{THR} OFF	%Unom	110	110	115	110	115
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	Fixed to 51.50Hz				
.056	f > on	f_{THR} ON	Hz	50.10	50.10	50.10	50.00	50.10
		Time OFF	ms	Fixed to the fastest possible disconnection				

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	Fixed to 47.50Hz				
.060	f < on	f_{THR} ON	Hz	47.50	47.50	47.50	47.50	50.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:	f < on has a fixed offset of 0.025 Hz added to the displayed value							

Random overfrequency					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.086	f > random	Enable function		off	on / off		on /off	
.087	f > random	f_{THR} OFF	Hz		50.20	51.50	50.20	51.50
		f_{THR} ON	Hz	Fixed reconnection frequency of 50.10Hz				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:	The random f_{THR} OFF threshold is shown in .087 and cannot be edited							

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type	n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 100ms				
.110	T ConDelOn	Time ON	ms	100	100	10000	100	300000

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	1	600

Random Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.103	Ton random	Enable function		off	on / off		on / off	
.104	Ton random	Turn on time	s		60	600	60	600
Comment:	The random time value is shown in .104 and cannot be edited							

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	4	0	9
.107	PW2	2nd digit of Password	1	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	5	0	9
Remark:	If all 4 digits of the Password are 0 (default setting) the Password request is skipped				

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.19 VDE-AR-N 4105:2018 Umr [ID 313]

Functional Safety			Conformity Range	Possible Range
ID		Default		
.007	Errtol	2ch	2ch	2ch, 1ch
Remark:		2ch means: 2 channel with functional safety and 2 auxiliary contacts necessary 1ch means: 1 channel without functional safety and 1 auxiliary contact1 necessary		

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	ULL >> off	U_{THR} OFF	%Unom	Fixed to 125% U_{NOM}				
.012	ULL >> on	U_{THR} ON	%Unom	110	110	110	100	110
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULL >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	ULL < off	U_{THR} OFF	%Unom	Fixed to 80% U_{NOM}				
.016	ULL < on	U_{THR} ON	%Unom	85	85	85	85	100
		Time OFF	ms	Fixed to 3000ms				
Comment:		ULL < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	ULN >> off	U_{THR} OFF	%Unom	Fixed to 125% U_{NOM}				
.020	ULN >> on	U_{THR} ON	%Unom	110	110	110	100	110
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULN >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	ULN < off	U_{THR} OFF	%Unom	Fixed to 80% U_{NOM}				
.024	ULN < on	U_{THR} ON	%Unom	85	85	85	85	100
		Time OFF	ms	Fixed to 3000ms				
Comment:		ULN < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.031	ULL << off	U_{THR} OFF	%Unom	Fixed to 45% U_{NOM}				
.032	ULL << on	U_{THR} ON	%Unom	85	85	85	85	100
		Time OFF	ms	Fixed to 300ms				
Comment:		ULL << on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	ULN << off	U_{THR} OFF	%Unom	Fixed to 45% U_{NOM}				
.040	ULN << on	U_{THR} ON	%Unom	85	85	85	85	100
		Time OFF	ms	Fixed to 300ms				
Comment:		ULN << on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.043	U > off	U_{THR} OFF	%Unom	110	110	115	110	115
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	Fixed to 51.50Hz				
.056	f > on	f_{THR} ON	Hz	50.10	50.10	50.10	50.00	50.10
		Time OFF	ms	Fixed to the fastest possible disconnection				

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	Fixed to 47.50Hz				
.060	f < on	f_{THR} ON	Hz	47.50	47.50	47.50	47.50	50.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:	f < on has a fixed offset of 0.025 Hz added to the displayed value							

Random overfrequency					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.086	f > random	Enable function		off	on / off		on /off	
.087	f > random	f_{THR} OFF	Hz		50.20	51.50	50.20	51.50
		f_{THR} ON	Hz	Fixed reconnection frequency of 50.10Hz				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:	The random f_{THR} OFF threshold is shown in .087 and cannot be edited							

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type	n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 100ms				
.110	T ConDelOn	Time ON	ms	100	100	10000	100	300000

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	1	600

Random Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.103	Ton random	Enable function		off	on / off		on / off	
.104	Ton random	Turn on time	s		60	600	60	600
Comment:	The random time value is shown in .104 and cannot be edited							

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	4	0	9
.107	PW2	2nd digit of Password	1	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	5	0	9
Remark:	If all 4 digits of the Password are 0 (default setting) the Password request is skipped				

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.20 VDE-AR-N 4110:2018 TR3-25 [ID 706]

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	3-wire, 4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	57.5	230.0	28.8	241.4
		Unom Δ	V	400.0	100.0	400.0	50.0	420.0

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	ULL > off	U_{THR} OFF	%Unom	110	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
.013	T ULL >	Time OFF	ms	180000	100	180000	100	180000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	ULL < off	U_{THR} OFF	%Unom	80	10	100	10	100
.016	ULL < on	U_{THR} ON	%Unom	95	95	95	10	100
.017	T ULL <	Time OFF	ms	1500	1500	2400	50	60000
Comment:		ULL < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	ULN > off	U_{THR} OFF	%Unom	110	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
.021	T ULN >	Time OFF	ms	180000	100	180000	100	180000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	ULN < off	U_{THR} OFF	%Unom	80	10	100	10	100
.024	ULN < on	U_{THR} ON	%Unom	95	95	95	10	100
.025	T ULN <	Time OFF	ms	1500	1500	2400	50	60000
Comment:		ULN < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.027	ULL >> off	U_{THR} OFF	%Unom	125	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
.029	T ULL >>	Time OFF	ms	100	100	100	100	10000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.031	ULL << off	U_{THR} OFF	%Unom	30	10	100	10	100
.032	ULL << on	U_{THR} ON	%Unom	95	95	95	10	100
.033	T ULL <<	Time OFF	ms	800	800	800	50	60000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						
Comment:		ULL << on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.035	ULN >> off	U_{THR} OFF	%Unom	125	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
.037	T ULN >>	Time OFF	ms	100	100	100	100	10000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	ULN << off	U_{THR} OFF	%Unom	30	10	100	10	100
.040	ULN << on	U_{THR} ON	%Unom	95	95	95	10	100
.041	T ULN <<	Time OFF	ms	800	800	800	50	60000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						
Comment:		ULN << on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	50.00	55.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.10	50.10	50.10	50.00	55.00
.057	T f >	Time OFF	ms	5000	150	5000	150	10000
Comment:		f > on has a fixed offset of 0.01 Hz subtracted to the displayed value						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	45.00	50.00	45.00	50.00
.060	f < on	f_{THR} ON	Hz	49.90	49.90	49.90	45.00	50.00
.061	T f <	Time OFF	ms	50	50	70	50	10000
Comment:		f < off has a fixed offset of 0.01 Hz added to the displayed value f < on has a fixed offset of 0.01 Hz added to the displayed value						

Overfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.063	f >> off	f_{THR} OFF	Hz	52.50	50.00	55.00	50.00	55.00
.064	f >> on	f_{THR} ON	Hz	50.10	50.10	50.10	50.00	55.00
.065	T f >>	Time OFF	ms	50	50	70	50	10000
Comment:		f >> off has a fixed offset of 0.01 Hz subtracted to the displayed value						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	600	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.21 CEI 0-21:2019 [ID 102]

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	2-wire, 3-wire, 4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Operational Mode			Conformity Range	Possible Range
ID		Default		
.009	Mode	1 (transitory)	0 (definitive), 1 (transitory)	0 (definitive), 1 (transitory)

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	V 59.S2 LL	U_{THR} OFF	%Unom	115	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (4% U_{THR})				
.013	T 59.S2 LL	Time OFF	ms	200	50	1000	50	10000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	V 27.S1 LL	U_{THR} OFF	% Unom	85	20	100	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (4% U_{THR})				
.017	T 27.S1 LL	Time OFF	ms	1500	50	5000	50	10000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	V 59.S2 LN	U_{THR} OFF	%Unom	115	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (4% U_{THR})				
.021	T 59.S2 LN	Time OFF	ms	200	50	1000	50	10000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	V 27.S1 LN	U_{THR} OFF	%Unom	85	20	100	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (4% U_{THR})				
.025	T 27.S1 LN	Time OFF	ms	1500	50	5000	50	10000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.031	V 27.S2 LL	U_{THR} OFF	%Unom	15	5	100	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (4% U_{THR})				
.033	T 27.S2 LL	Time OFF	ms	200	50	5000	50	10000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	V 27.S2 LN	U_{THR} OFF	%Unom	15	5	100	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (4% U_{THR})				
.041	T 27.S2 LN	Time OFF	ms	200	50	5000	50	10000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.043	V 59.S1	U_{THR} OFF	%Unom	110	100	120	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (4% U_{THR})				
.045	T 59.S1	Time OFF	ms	0	0	0	0	10000

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	F 81>S2 ws	f_{THR} OFF	Hz	51.50	50.00	52.00	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.2% f_{THR})				
.057	T 81>S2 ws	Time OFF	ms	1000	50	5000	50	10000
Only active for:		Operational Mode 0 (definitive mode) when DigIn4 is inactive (contact open) Voltage > 20% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	F 81<S2 ws	f_{THR} OFF	Hz	47.50	47.00	50.00	45.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.2% f_{THR})				
.061	T 81<S2 ws	Time OFF	ms	4000	50	5000	50	10000
Only active for:		Operational Mode 0 (definitive mode) when DigIn4 is inactive (contact open) Voltage > 20% U_{NOM}						

Overfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.063	F 81>S1 nf	f_{THR} OFF	Hz	50.20	50.00	52.00	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.2% f_{THR})				
.065	T 81>S1 nf	Time OFF	ms	100	50	5000	50	10000
Only active for:		Operational Mode 0 (definitive mode) when DigIn4 is active (contact closed) Operational Mode 1 (transitory mode) when DigIn5 is active (contact closed) Voltage > 20% U_{NOM}						

Underfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.067	F 81<S1 nf	f_{THR} OFF	Hz	49.80	47.00	50.00	45.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.2% f_{THR})				
.069	T 81<S1 nf	Time OFF	ms	100	50	5000	50	10000
Only active for:		Operational Mode 0 (definitive mode) when DigIn4 is active (contact closed) Operational Mode 1 (transitory mode) when DigIn5 is active (contact closed) Voltage > 20% U_{NOM}						

Overfrequency3					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.071	F 81>S2 wf	f_{THR} OFF	Hz	51.50	50.00	52.00	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.2% f_{THR})				
.073	T 81>S2 wf	Time OFF	ms	100	50	5000	50	10000
Only active for:		Operational Mode 1 (transitory mode) when DigIn5 is inactive (contact open) Voltage > 20% U_{NOM}						

Underfrequency3					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.075	F 81<S2 wf	f_{THR} OFF	Hz	47.50	47.00	50.00	45.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.2% f_{THR})				
.077	T 81<S2 wf	Time OFF	ms	100	50	5000	50	10000
Only active for:		Operational Mode 1 (transitory mode) when DigIn5 is inactive (contact open) Voltage > 20% U_{NOM}						

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		off	on / off		on / off	
.091	RoCoF OFF	$RoCoF_{THR}$ OFF	mHz/s	2700	1000	4000	100	8000
.092	RoCoF ON	$RoCoF_{THR}$ ON	mHz/s	2300	1000	4000	100	8000
.093	T RoCoF	Time OFF	ms	0	0	1000	0	10000
.111	RoCoF Wnd	Window length	ms	100	100	1000	100	1000

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	5	0	300	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.22 G99/1/3:2018 LV [ID 410]

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	230.0	240.0	100.0	240.0
		Unom Δ	V	400.0	400.0	417.4	173.9	417.4

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	O/V st 1	U_{THR} OFF	%Unom	114	114	114	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.021	T O/V st 1	Time OFF	ms	1000	1000	1000	50	300000

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.035	O/V st 2	U_{THR} OFF	%Unom	119	119	119	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.037	T O/V st 2	Time OFF	ms	500	500	500	50	300000

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	U/V	U_{THR} OFF	%Unom	80	80	80	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.041	T U/V	Time OFF	ms	2500	2500	2500	50	300000

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	U/F st 1	f_{THR} OFF	Hz	47.50	47.50	47.50	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.061	T U/F st 1	Time OFF	ms	20000	20000	20000	1000	300000

Overfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.063	O/F	f_{THR} OFF	Hz	52.00	52.00	52.00	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.065	T O/F	Time OFF	ms	500	500	500	50	300000

Underfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.067	U/F st 2	f_{THR} OFF	Hz	47.00	47.00	47.00	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.069	T U/F st 2	Time OFF	ms	500	500	500	50	300000

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		on	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	10	3000	10	3000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	950	10	3000	10	3000
.093	RoCoFDelay	Time OFF	ms	500	50	500	50	2000
Comment:		Fixed window length 225ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		off	on / off		on / off	
.095	PShift off	PShift $_{THR}$ OFF	°	12	--	--	3	15
.096	PShift on	PShift $_{THR}$ ON	°	9	--	--	3	15
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 200ms						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	20	20	20	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.23 G99/1/3:2018 HV [ID 460]

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	57.5	230.0	28.8	241.4
		Unom Δ	V	400.0	100.0	400	50.0	420.0

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	O/V st 1	U_{THR} OFF	%Unom	110	110	110	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.013	T O/V st 1	Time OFF	ms	1000	1000	1000	50	300000

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.027	O/V st 2	U_{THR} OFF	%Unom	113	113	113	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.029	T O/V st 2	Time OFF	ms	500	500	500	50	300000

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.031	U/V	U_{THR} OFF	%Unom	80	80	80	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.033	T U/V	Time OFF	ms	2500	2500	2500	50	300000

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	U/F st 1	f_{THR} OFF	Hz	47.50	47.50	47.50	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.061	T U/F st 1	Time OFF	ms	20000	20000	20000	1000	300000

Overfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.063	O/F	f_{THR} OFF	Hz	52.00	52.00	52.00	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.065	T O/F	Time OFF	ms	500	500	500	50	300000

Underfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.067	U/F st 2	f_{THR} OFF	Hz	47.00	47.00	47.00	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.069	T U/F st 2	Time OFF	ms	500	500	500	50	300000

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		on	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	10	3000	10	3000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	950	10	3000	10	3000
.093	RoCoFDelay	Time OFF	ms	500	50	500	50	2000
Comment:		Fixed window length 225ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		off	on / off		on / off	
.095	PShift off	PShift $_{THR}$ OFF	°	12	--	--	3	15
.096	PShift on	PShift $_{THR}$ ON	°	9	--	--	3	15
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 200ms						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	20	20	20	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.24 G98/1/2:2018 [ID 510]

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	230.0	240.0	100.0	240.0
		Unom Δ	V	400.0	400.0	417.4	173.9	417.4

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	O/V st 1	U_{THR} OFF	%Unom	114	114	114	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.021	T O/V st 1	Time OFF	ms	1000	1000	1000	50	10000

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.035	O/V st 2	U_{THR} OFF	%Unom	119	119	119	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.037	T O/V st 2	Time OFF	ms	500	500	500	50	10000

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	U/V	U_{THR} OFF	%Unom	80	80	80	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.041	T U/V	Time OFF	ms	2500	2500	2500	50	10000

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	U/F st 1	f_{THR} OFF	Hz	47.50	47.50	47.50	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.061	T U/F st 1	Time OFF	ms	20000	20000	20000	1000	120000

Overfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.063	O/F	f_{THR} OFF	Hz	52.00	52.00	52.00	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.065	T O/F	Time OFF	ms	500	500	500	50	10000

Underfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.067	U/F st 2	f_{THR} OFF	Hz	47.00	47.00	47.00	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.069	T U/F st 2	Time OFF	ms	500	500	500	50	10000

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		on	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	10	3000	10	3000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	950	10	3000	10	3000
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 535ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		off	on / off		on / off	
.095	PShift off	PShift $_{THR}$ OFF	°	12	--	--	3	15
.096	PShift on	PShift $_{THR}$ ON	°	9	--	--	3	15
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 200ms						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	20	20	20	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.25 C10-11:2019 LV-IP [ID 601] Interface Protection low voltage

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	230.0	240.0	100.0	240.0
		Unom Δ	V	400.0	400.0	417.4	173.9	417.4

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	U LN > off	U_{THR} OFF	%Unom	110	100	110	100	135
.020	U LN > on	U_{THR} ON	%Unom	109	100	120	100	135
.021	T U LN >	Time OFF	ms	1000	0	3000	0	10000
Comment:		U LN > off has a fixed offset of 0.25% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	U LN < off	U_{THR} OFF	%Unom	70	50	85	0	100
.024	U LN < on	U_{THR} ON	%Unom	85	50	100	0	100
.025	T U LN <	Time OFF	ms	1500	0	1500	0	10000
Comment:		U LN < off has a fixed offset of 0.25% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.035	U LN>> off	U_{THR} OFF	%Unom	115	100	130	100	135
.036	U LN>> on	U_{THR} ON	%Unom	114	100	120	100	135
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U LN > off has a fixed offset of 0.25% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	U LN<< off	U_{THR} OFF	%Unom	25	25	50	0	100
.040	U LN<< on	U_{THR} ON	%Unom	85	50	100	0	100
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U LN < off has a fixed offset of 0.25% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	51.50	51.50	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.10	50.00	52.00	50.00	55.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f > off has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 20% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	47.50	47.50	40.00	50.00
.060	f < on	f_{THR} ON	Hz	49.90	47.00	50.00	40.00	50.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f < off has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 20% U_{NOM}						

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		off	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	1000	1000	100	2000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	800	100	1000	100	1000
.093	RoCoF t	Time OFF	ms	0	0	0	0	1000
Comment:		Fixed window length 100ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		on	on / off		on / off	
.095	PShift off	$PShift_{THR}$ OFF	°	7	7	7	3	15
.096	PShift on	$PShift_{THR}$ ON	°	5	3	7	3	15
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 100ms PShift off has a fixed offset of 1° subtracted from the displayed value						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	Contact t	Time OFF	ms	300	100	300	10	5000

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.26 C10-11:2019 LV-ASS [ID 602] Automatic Separation System / Low Voltage

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	230.0	240.0	100.0	240.0
		Unom Δ	V	400.0	400.0	417.4	173.9	417.4

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	U LN > off	U_{THR} OFF	%Unom	115	100	120	100	135
.020	U LN > on	U_{THR} ON	%Unom	109	100	120	100	135
.021	T U LN >	Time OFF	ms	100	100	100000	100	100000
Comment:		U LN > off has a fixed offset of 0.25% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	U LN < off	U_{THR} OFF	%Unom	80	20	100	0	100
.024	U LN < on	U_{THR} ON	%Unom	85	50	100	0	100
.025	T U LN <	Time OFF	ms	100	100	100000	100	100000
Comment:		U LN < off has a fixed offset of 0.25% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.042	Uavg	Enable function		on	on		on /off	
.043	Uavg off	U_{THR} OFF	%Unom	110	100	115	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	50.00	52.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.10	50.00	52.00	50.00	55.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f > off has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 20% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	47.00	50.00	40.00	50.00
.060	f < on	f_{THR} ON	Hz	49.90	47.00	50.00	40.00	50.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f < off has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 20% U_{NOM}						

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		off	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	1000	1000	100	2000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	800	100	1000	100	1000
.093	RoCoF t	Time OFF	ms	0	0	0	0	1000
Comment:		Fixed window length 100ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		on	on / off		on / off	
.095	PShift off	$PShift_{THR}$ OFF	°	7	7	7	3	15
.096	PShift on	$PShift_{THR}$ ON	°	5	3	7	3	15
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 100ms PShift off has a fixed offset of 1° subtracted from the displayed value						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	Contact t	Time OFF	ms	300	100	300	10	5000

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.27 C10-11:2019 HV-IP [ID 651] Interface Protection / High Voltage

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	3-wire	3-wire	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	57.5	230.0	28.8	241.4
		Unom Δ	V	400.0	100.0	400.0	50.0	420.0

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	U LL > off	U_{THR} OFF	%Unom	110	100	110	100	135
.012	U LL > on	U_{THR} ON	%Unom	109	100	120	100	135
.013	T U LL >	Time OFF	ms	1000	0	3000	0	10000
Comment:		U LL > off has a fixed offset of 0.25% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	U LL < off	U_{THR} OFF	%Unom	70	50	85	0	100
.016	U LL < on	U_{THR} ON	%Unom	90	50	100	0	100
.017	T U LL <	Time OFF	ms	1500	0	1500	0	10000
Comment:		U LL < off has a fixed offset of 0.25% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.027	U LL>> off	U_{THR} OFF	%Unom	115	100	130	100	135
.028	U LL>> on	U_{THR} ON	%Unom	114	100	120	100	135
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U LL>> off has a fixed offset of 0.25% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.031	U LL<< off	U_{THR} OFF	%Unom	25	25	50	0	100
.032	U LL<< on	U_{THR} ON	%Unom	90	50	100	0	100
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U LL<< off has a fixed offset of 0.25% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	51.50	51.50	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.10	50.00	52.00	50.00	55.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f > off has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 20% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	47.50	47.50	40.00	50.00
.060	f < on	f_{THR} ON	Hz	49.90	47.00	50.00	40.00	50.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f < off has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 20% U_{NOM}						

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		off	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	1000	1000	100	2000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	800	100	1000	100	1000
.093	RoCoF t	Time OFF	ms	0	0	0	0	1000
Comment:		Fixed window length 100ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		on	on / off		on / off	
.095	PShift off	$PShift_{THR}$ OFF	°	7	7	7	3	15
.096	PShift on	$PShift_{THR}$ ON	°	5	3	7	3	15
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 100ms PShift off has a fixed offset of 1° subtracted from the displayed value						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	Contact t	Time OFF	ms	300	100	300	10	5000

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.28 C10-11:2019 HV-ASS [ID 652] Automatic Separation System / High Voltage

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	3-wire	3-wire	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	57.5	230.0	28.8	241.4
		Unom Δ	V	400.0	100.0	400.0	50.0	420.0

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	U LL > off	U_{THR} OFF	%Unom	115	100	120	100	135
.012	U LL > on	U_{THR} ON	%Unom	109	100	120	100	135
.013	T U LL >	Time OFF	ms	100	100	100000	100	100000
Comment:		U LL > off has a fixed offset of 0.25% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	U LL < off	U_{THR} OFF	%Unom	80	20	100	0	100
.016	U LL < on	U_{THR} ON	%Unom	90	50	100	0	100
.017	T U LL <	Time OFF	ms	100	100	100000	100	10000
Comment:		U LL < off has a fixed offset of 0.25% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.042	Uavg	Enable function		on	on		on /off	
.043	Uavg off	U_{THR} OFF	%Unom	110	100	115	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	50.00	52.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.10	50.00	52.00	50.00	55.00
.057	T f >	Time OFF	ms	100	100	100000	100	100000
Comment:		f > off has a fixed offset of 0.01 Hz subtracted to the displayed value						
Only active for:		Voltage > 20% U_{NOM}						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	47.00	50.00	40.00	50.00
.060	f < on	f_{THR} ON	Hz	49.90	47.00	50.00	40.00	50.00
.061	T f <	Time OFF	ms	100	100	100000	100	100000
Comment:		f < off has a fixed offset of 0.01 Hz added to the displayed value						
Only active for:		Voltage > 20% U_{NOM}						

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		off	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	1000	1000	100	2000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	800	100	1000	100	1000
.093	RoCoF t	Time OFF	ms	0	0	0	0	1000
Comment:		Fixed window length 100ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		on	on / off		on / off	
.095	PShift off	$PShift_{THR}$ OFF	°	7	7	7	3	15
.096	PShift on	$PShift_{THR}$ ON	°	5	3	7	3	15
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 100ms PShift off has a fixed offset of 1° subtracted from the displayed value						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	Contact t	Time OFF	ms	300	100	300	10	5000

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.29 EN50438:2013 [ID 900]

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	230.0	230.0	100.0	240.0
		Unom Δ	V	400.0	400.0	400.0	173.9	417.4

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	U > off	U_{THR} OFF	%Unom	115	115	115	100	135
.020	U > on	U_{THR} ON	%Unom	110	110	110	100	135
		Time OFF	ms	Fixed to 100ms				
Comment:		U > on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	U < off	U_{THR} OFF	%Unom	85	85	85	10	100
.024	U < on	U_{THR} ON	%Unom	85	85	85	10	100
.025	U < t	Time OFF	ms	1300	1300	1300	50	10000
Comment:		U < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.043	U avg off	U_{THR} OFF	%Unom	110	110	110	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	52.00	52.00	52.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.05	50.05	50.05	50.00	55.00
.057	f > t	Time OFF	ms	400	400	400	50	10000

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	47.50	47.50	45.00	50.00
.060	f < on	f_{THR} ON	Hz	47.50	47.50	47.50	45.00	50.00
.061	f < t	Time OFF	ms	400	400	400	50	10000
Comment:		f < on has a fixed offset of 0.025 Hz added to the displayed value						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.30 EN50438:2013 DK [ID 950]

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	3-wire, 4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y Unom Δ	V V	230.0 400.0	230.0 400.0	230.0 400.0	100.0 173.9	240.0 417.4

Functional Safety			Conformity Range	Possible Range
ID		Default		
.007	Errtol	2ch	2ch, 1ch	2ch, 1ch
Remark:		2ch means: 2 channel with functional safety and 2 auxiliary contacts necessary 1ch means: 1 channel without functional safety and 1 auxiliary contact1 necessary		

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	ULL max 1	U_{THR} OFF	%Unom	110	110	110	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
.013	ULL max 1t	Time OFF	ms	39500	39500	39500	50	60000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	ULL min	U_{THR} OFF	%Unom	90	90	90	10	100
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
.017	ULL min t	Time OFF	ms	9500	9500	9500	50	60000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	ULN max 1	U_{THR} OFF	%Unom	110	110	110	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
.021	ULN max 1t	Time OFF	ms	39500	39500	39500	50	60000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	ULN min	U_{THR} OFF	%Unom	90	90	90	10	100
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
.025	ULN min t	Time OFF	ms	9500	9500	9500	50	60000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.027	ULL max 2	U_{THR} OFF	%Unom	113	113	113	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
		Time OFF	ms	Fixed to 100ms				
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.035	ULN max 2	U_{THR} OFF	%Unom	113	113	113	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
		Time OFF	ms	Fixed to 100ms				
Only active for:	Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)							

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	52.00	52.00	52.00	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.05	50.05	50.05	50.00	55.00
		Time OFF	ms	Fixed to 150ms				

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	47.50	47.50	45.00	50.00
.060	f < on	f_{THR} ON	Hz	47.50	47.50	47.50	45.00	50.00
		Time OFF	ms	Fixed to 150ms				
Comment:	f < on has a fixed offset of 0.025 Hz added to the displayed value							

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		on	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	2500	2500	2500	100	3000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	2300	2300	2300	100	3000
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:	Fixed window length 200ms							

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:	If all 4 digits of the Password are 0 (default setting) the Password request is skipped				

Device Information		
ID		
.105	ID: xxxxxx	xxxxx = Device ID
	SW: aa.dd.ccb	dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.31 VDE 0126-1-1:2013 [ID 200]

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	ULLmax off	U_{THR} OFF	%Unom	115	115	115	100	135
.012	ULLmax on	U_{THR} ON	%Unom	110	110	110	100	135
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULLmax on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	ULLmin off	U_{THR} OFF	% Unom	80	80	80	10	100
.016	ULLmin on	U_{THR} ON	%Unom	85	85	85	10	100
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULLmin on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	U >> off	U_{THR} OFF	%Unom	115	115	115	100	135
.020	U >> on	U_{THR} ON	%Unom	110	110	110	100	135
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	U < off	U_{THR} OFF	%Unom	80	80	80	10	100
.024	U < on	U_{THR} ON	%Unom	85	85	85	10	100
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.043	U>	U_{THR} OFF	%Unom	110	110	115	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	51.50	51.50	50.00	55.00
.056	F > on	f_{THR} ON	Hz	50.05	50.05	50.05	50.00	55.00
		Time OFF	ms	Fixed to the fastest possible disconnection				

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	47.50	47.50	45.00	50.00
.060	f < on	f_{THR} ON	ms	47.50	47.50	47.50	45.00	50.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f < on has a fixed offset of 0.025 Hz added to the displayed value						

Random overfrequency					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.086	f> random	Enable function		off	on / off		on /off	
.087	f> random	f_{THR} OFF	Hz		50.20	51.50	50.20	51.50
		f_{THR} ON	Hz	Fixed reconnection frequency of 50.05Hz				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		The random f_{THR} OFF threshold is shown in .087 and cannot be edited						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	0	600

Random Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.103	Ton random	Enable function		off	on / off		on / off	
.104	Ton random	Turn on time	s		60	600	60	600
Comment:		The random time value is shown in .104 and cannot be edited						

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.32 NRS 097-2-1:2017 [ID 1000]

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y Unom Δ	V V	230.0 400.0	230.0 400.0	230.0 400.0	28.8 50.0	250.0 434.8

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	ULL>1 OFF	U_{THR} OFF	%Unom	111	111	111	100	135
.012	ULL>1 ON	U_{THR} ON	%Unom	109	100	109	100	135
.013	ULL>1 T	Time OFF	ms	2000	200	2000	200	60000
Comment:		ULL>1 OFF has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	ULL<1 OFF	U_{THR} OFF	%Unom	84	84	84	10	100
.016	ULL<1 ON	U_{THR} ON	%Unom	86	86	100	10	100
.017	ULL<1 T	Time OFF	ms	10000	600	10000	200	60000
Comment:		ULL<1 OFF has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	ULN>1 OFF	U_{THR} OFF	%Unom	111	111	111	100	135
.020	ULN>1 ON	U_{THR} ON	%Unom	109	100	109	100	135
.021	ULN>1 T	Time OFF	ms	2000	200	2000	200	60000
Comment:		ULN>1 OFF has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	ULN<1 OFF	U_{THR} OFF	%Unom	84	84	84	10	100
.024	ULN<1 ON	U_{THR} ON	%Unom	86	86	100	10	100
.025	ULN<1 T	Time OFF	ms	10000	600	10000	200	60000
Comment:		ULN<1 OFF has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.027	ULL>2 OFF	U_{THR} OFF	%Unom	121	121	121	100	135
.028	ULL>2 ON	U_{THR} ON	%Unom	119	100	119	100	135
.029	ULL>2 T	Time OFF	ms	160	110	160	110	60000
Comment:		ULL>2 OFF has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.031	ULL<2 OFF	U_{THR} OFF	%Unom	49	49	49	10	100
.032	ULL<2 ON	U_{THR} ON	%Unom	51	51	100	10	100
.033	ULL<2 T	Time OFF	ms	200	150	200	150	60000
Comment:		ULL<2 OFF has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.035	ULN>2 OFF	U_{THR} OFF	%Unom	121	121	121	100	135
.036	ULN>2 ON	U_{THR} ON	%Unom	119	100	119	100	135
.037	ULN>2 T	Time OFF	ms	160	110	160	110	60000
Comment:		ULN>2 OFF has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	ULN<2 OFF	U_{THR} OFF	%Unom	49	49	49	10	100
.040	ULN<2 ON	U_{THR} ON	%Unom	51	51	100	10	100
.041	ULN<2 T	Time OFF	ms	200	150	200	150	60000
Comment:		ULN<2 OFF has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f>1 OFF	f_{THR} OFF	Hz	52.00	52.00	52.00	50.00	60.00
.056	f>1 ON	f_{THR} ON	Hz	50.50	50.00	50.50	50.00	60.00
.057	f>1 T	Time OFF	ms	4000	4000	4000	200	60000

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f<1 OFF	f_{THR} OFF	Hz	47.00	47.00	47.00	40.00	50.00
.060	f<1 ON	f_{THR} ON	Hz	47.10	47.10	50.00	40.00	50.00
.061	f<1 T	Time OFF	ms	200	200	200	200	60000

Random overfrequency					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.086	f>RND	Enable function		off	on / off		on /off	
.087	f>RND OFF	f_{THR} OFF	Hz		50.50	52.00	50.50	52.00
.088	f>RND ON	f_{THR} ON	Hz	50.10	50.00	50.49	50.00	50.49
.089	f>RND T	Time OFF	ms	4000	4000	4000	50	60000
Comment:		The random f_{THR} OFF threshold is shown in .087 and cannot be edited						

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		off	on / off		on / off	
.091	RoCoF OFF	$RoCoF_{THR}$ OFF	mHz/s	1000	10	9990	10	9990
.092	RoCoF ON	$RoCoF_{THR}$ ON	mHz/s	950	10	9990	100	9990
.093	RoCoFDelay	Time OFF	ms	500	50	60000	50	60000
Comment:		Fixed window length 225ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		off	on / off		on / off	
.095	PShift OFF	PShift $_{THR}$ OFF	°	7	2	20	2	20
.096	PShift ON	PShift $_{THR}$ ON	°	5	2	20	2	20
.097	PShift T	Time OFF	ms	0	0	60000	0	60000
Comment:		Fixed window length 200ms						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	600	0	600

Random Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.103	Ton random	Enable function		off	on / off		on / off	
.104	Ton random	Turn on time	s		60	600	60	600
Comment:		The random time value is shown in .104 and cannot be edited						

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.33 AS/NZS 4777.2:2015 [ID 1100]

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	230.0	240.0	100.0	240.0
		Unom Δ	V	400.0	400.0	417.4	173.9	417.4

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	V> off	U_{THR} OFF	%Unom	113	113	113	100	135
.020	V> on	U_{THR} ON	%Unom	111	100	112	100	135
.021	T V>	Time OFF	ms	2000	1100	2000	100	300000

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	V< off	U_{THR} OFF	%Unom	78	78	78	0	100
.024	V< on	U_{THR} ON	%Unom	80	79	100	0	100
.025	T V<	Time OFF	ms	2000	1100	2000	100	300000

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.034	V>>	Enable function		off	on /off		on /off	
.035	V>> off	U_{THR} OFF	%Unom	115	115	115	100	135
.036	V>> on	U_{THR} ON	%Unom	111	100	112	100	135
.037	T V>>	Time OFF	ms	200	100	200	100	300000

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.042	Uavg	Enable function		on	on / off		on /off	
.043	Uavg off	U_{THR} OFF	%Unom	112	112	112	100	135
.044	Uavg on	U_{THR} ON	%Unom	111	100	111	100	135
		Time OFF	ms	Fixed to a fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	F> off	f_{THR} OFF	Hz	52.00	52.00	52.00	50.00	55.00
.056	F> on	f_{THR} ON	Hz	51.90	50.00	51.90	50.00	55.00
.057	T F>	Time OFF	ms	2000	100	2000	100	300000

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	F< off	f_{THR} OFF	Hz	47.00	45.00	47.00	40.00	50.00
.060	F< on	f_{THR} ON	Hz	47.50	45.50	50.00	40.00	50.00
.061	T F<	Time OFF	ms	2000	1100	2000	1000	300000

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		on	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	10	3000	10	3000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	950	10	3000	10	3000
.093	RoCoFDelay	Time OFF	ms	500	50	500	50	2000
Comment:		Fixed window length 225ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		on	on / off		on / off	
.095	PShift off	$PShift_{THR}$ OFF	°	8	0	8	3	15
.096	PShift on	$PShift_{THR}$ ON	°	6	0	8	3	15
		Time OFF	ms	Fixed to a fastest possible disconnection				
Comment:		Fixed window length 200ms						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	60	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.34 OPEN SETUP [ID 9004]

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y Unom Δ	V V	230.0 400.0	28.8 50.0	250.0 434.8	28.8 50.0	250.0 434.8

Functional Safety			Conformity Range	Possible Range
ID		Default		
.007	Errtol	2ch	2ch, 1ch	2ch, 1ch
Remark:		2ch means: 2 channel with functional safety and 2 auxiliary contacts necessary 1ch means: 1 channel without functional safety and 1 auxiliary contact1 necessary		

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.010	ULL>1	Enable function		on	on / off		on /off	
.011	ULL>1 OFF	U_{THR} OFF	%Unom	110	0	180	0	180
.012	ULL>1 ON	U_{THR} ON	%Unom	109	0	180	0	180
.013	ULL>1 T	Time OFF	ms	200	50	300000	50	300000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.014	ULL<1	Enable function		on	on / off		on /off	
.015	ULL<1 OFF	U_{THR} OFF	%Unom	90	0	180	0	180
.016	ULL<1 ON	U_{THR} ON	%Unom	91	0	180	0	180
.017	ULL<1 T	Time OFF	ms	200	50	300000	50	300000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.018	ULN>1	Enable function		on	on / off		on /off	
.019	ULN>1 OFF	U_{THR} OFF	%Unom	110	0	180	0	180
.020	ULN>1 ON	U_{THR} ON	%Unom	109	0	180	0	180
.021	ULN>1 T	Time OFF	ms	200	50	300000	50	300000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.022	ULN<1	Enable function		on	on / off		on /off	
.023	ULN<1 OFF	U_{THR} OFF	%Unom	90	0	180	0	180
.024	ULN<1 ON	U_{THR} ON	%Unom	91	0	180	0	180
.025	ULN<1 T	Time OFF	ms	200	50	300000	50	300000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.026	ULL>2	Enable function		on	on / off		on /off	
.027	ULL>2 OFF	U_{THR} OFF	%Unom	120	0	180	0	180
.028	ULL>2 ON	U_{THR} ON	%Unom	119	0	180	0	180
.029	ULL>2 T	Time OFF	ms	100	50	300000	50	300000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.030	ULL<2	Enable function		on	on / off		on /off	
.031	ULL<2 OFF	U_{THR} OFF	%Unom	80	0	180	0	180
.032	ULL<2 ON	U_{THR} ON	%Unom	81	0	180	0	180
.033	ULL<2 T	Time OFF	ms	100	50	300000	50	300000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.034	ULN>2	Enable function		on	on / off		on /off	
.035	ULN>2 OFF	U_{THR} OFF	%Unom	120	0	180	0	180
.036	ULN>2 ON	U_{THR} ON	%Unom	119	0	180	0	180
.037	ULN>2 T	Time OFF	ms	100	50	300000	50	300000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.038	ULN<2	Enable function		on	on / off		on /off	
.039	ULN<2 OFF	U_{THR} OFF	%Unom	80	0	180	0	180
.040	ULN<2 ON	U_{THR} ON	%Unom	81	0	180	0	180
.041	ULN<2 T	Time OFF	ms	100	50	300000	50	300000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.042	UAVG>	Enable function		on	on / off		on /off	
.043	UAVG> OFF	U_{THR} OFF	%Unom	110	0	180	0	180
.044	UAVG> ON	U_{THR} ON	%Unom	109	0	180	0	180
.045	UAVG> T	Time OFF	ms	0	0	300000	0	300000

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.054	f>1	Enable function		on	on / off		on /off	
.055	f>1 OFF	f_{THR} OFF	Hz	51.00	40.00	65.00	40.00	65.00
.056	f>1 ON	f_{THR} ON	Hz	50.90	40.00	65.00	40.00	65.00
.057	f>1 T	Time OFF	ms	200	75	300000	75	300000

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.058	f<1	Enable function		on	on / off		on /off	
.059	f<1 OFF	f_{THR} OFF	Hz	49.00	40.00	65.00	40.00	65.00
.060	f<1 ON	f_{THR} ON	Hz	49.10	40.00	65.00	40.00	65.00
.061	f<1 T	Time OFF	ms	200	75	300000	75	300000

Overfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.062	f>2	Enable function		on	on / off		on /off	
.063	f>2 OFF	f_{THR} OFF	Hz	52.00	40.00	65.00	40.00	65.00
.064	f>2 ON	f_{THR} ON	Hz	51.90	40.00	65.00	40.00	65.00
.065	f>1 T	Time OFF	ms	100	75	300000	75	300000

Underfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.066	f<2	Enable function		on	on / off		on /off	
.067	f<2 OFF	f_{THR} OFF	Hz	48.00	40.00	65.00	40.00	65.00
.068	f<2 ON	f_{THR} ON	Hz	48.10	40.00	65.00	40.00	65.00
.069	f<2 T	Time OFF	ms	100	75	300000	75	300000

Random overfrequency					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.086	f>RND	Enable function		off	on / off		on /off	
.087	f>RND OFF	f_{THR} OFF	Hz		50.20	51.50	50.20	51.50
.088	f>RND ON	f_{THR} ON	Hz	50.05	50.00	50.19	50.00	50.19
.089	f>RND T	Time OFF	ms	100	50	300000	50	300000
Comment:		The random f_{THR} OFF threshold is shown in .087 and cannot be edited						

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		off	on / off		on / off	
.091	RoCoF OFF	$RoCoF_{THR}$ OFF	mHz/s	1000	10	9990	10	9990
.092	RoCoF ON	$RoCoF_{THR}$ ON	mHz/s	950	10	9990	10	9990
.093	RoCoFDelay	Time OFF	ms	500	50	300000	50	300000
.111	RoCoF Wnd	Window length	ms	225	100	1000	100	1000

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		off	on / off		on / off	
.095	PShift OFF	$PShift_{THR}$ OFF	°	7	2	20	2	20
.096	PShift ON	$PShift_{THR}$ ON	°	5	2	20	2	20
.097	PShift T	Time OFF	ms	0	0	300000	0	300000
Comment:		Fixed window length 200ms						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	600	0	600

Random Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.103	Ton random	Enable function		off	on / off		on / off	
.104	Ton random	Turn on time	s		60	600	60	600
Comment:		The random time value is shown in .104 and cannot be edited						

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.35 OVE E8001/8101:2014 [ID 801] renewed standard

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y Unom Δ	V V	230.0 400.0	230.0 400.0	230.0 400.0	28.8 50.0	241.4 420.0

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	ULLmax1off	U_{THR} OFF	%Unom	115	115	115	100	135
.012	ULLmax1on	U_{THR} ON	%Unom	110	110	110	100	135
.013	T ULL max1	Time OFF	ms	50	50	180000	50	180000
Comment:		ULLmax1on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	ULLmin1off	U_{THR} OFF	%Unom	80	80	80	10	100
.016	ULLmin1on	U_{THR} ON	%Unom	90	90	90	10	100
.017	T ULL min1	Time OFF	ms	50	50	180000	50	180000
Comment:		ULLmin1on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	ULNmax1off	U_{THR} OFF	%Unom	115	115	115	100	135
.020	ULNmax1on	U_{THR} ON	%Unom	110	110	110	100	135
.021	T ULN max1	Time OFF	ms	50	50	180000	50	180000
Comment:		ULNmax1on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	ULNmin1off	U_{THR} OFF	%Unom	80	80	80	10	100
.024	ULNmin1on	U_{THR} ON	%Unom	90	90	90	10	100
.025	T ULN min1	Time OFF	ms	50	50	180000	50	180000
Comment:		ULNmin1on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.026	ULL max 2	Enable function		off	on / off		on /off	
.027	ULLmax2off	U_{THR} OFF	%Unom	105	100	135	100	135
.028	ULLmax2on	U_{THR} ON	%Unom	110	110	110	100	135
.029	T ULL max2	Time OFF	ms	60000	50	180000	50	180000
Comment:		ULLmax2on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.030	ULL min 2	Enable function		off	on / off		on /off	
.031	ULLmin2off	U_{THR} OFF	%Unom	30	10	100	10	100
.032	ULLmin2on	U_{THR} ON	%Unom	90	90	90	0	100
.033	T ULL min2	Time OFF	ms	50	50	180000	50	180000
Comment:		ULLmin2on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.034	ULN max 2	Enable function		off	on / off		on /off	
.035	ULNmax2off	U_{THR} OFF	%Unom	105	100	135	100	135
.036	ULNmax2on	U_{THR} ON	%Unom	110	110	110	100	135
.037	T ULN max2	Time OFF	ms	60000	50	180000	50	180000
Comment:		ULNmax2on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.038	ULN min 2	Enable function		off	on / off		on /off	
.039	ULNmin2off	U_{THR} OFF	%Unom	30	10	100	10	100
.040	ULNmin2on	U_{THR} ON	%Unom	90	90	90	0	100
.041	T ULN min2	Time OFF	ms	50	50	180000	50	180000
Comment:		ULNmin2on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.042	U avg	Enable function		on	on		on /off	
.043	U avg off	U_{THR} OFF	%Unom	112	110	115	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	51.50	51.50	50.00	55.00
		f_{THR} ON	Hz	Fixed reconnection frequency of 50.05Hz				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	47.50	47.50	45.00	50.00
.060	f < on	f_{THR} ON	Hz	47.50	47.50	47.50	45.00	50.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f < on has a fixed offset of 0.01 Hz added to the displayed value						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	500	Fixed and cannot be edited			

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	30	30	30	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.36 VDE 0124-100:2013 [ID 300] renewed standard

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	ULLmax off	U_{THR} OFF	%Unom	115	115	115	100	135
.012	ULLmax on	U_{THR} ON	%Unom	110	110	110	100	135
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULLmax on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	ULLmin off	U_{THR} OFF	%Unom	80	80	80	10	100
.016	ULLmin on	U_{THR} ON	%Unom	85	85	85	10	100
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		ULLmin on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	U >> off	U_{THR} OFF	%Unom	115	115	115	100	135
.020	U >> on	U_{THR} ON	%Unom	110	110	110	100	135
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U >> on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	U < off	U_{THR} OFF	%Unom	80	80	80	10	100
.024	U < on	U_{THR} ON	%Unom	85	85	85	10	100
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						

10 minutes average overvoltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.043	U>	U_{THR} OFF	%Unom	110	110	115	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.9% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f > off	f_{THR} OFF	Hz	51.50	51.50	51.50	50.00	55.00
.056	f > on	f_{THR} ON	Hz	50.05	50.05	50.05	50.00	55.00
		Time OFF	ms	Fixed to the fastest possible disconnection				

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	47.50	47.50	45.00	50.00
.060	f < on	f_{THR} ON	ms	47.50	47.50	47.50	45.00	50.00
		f_{THR} ON	Hz	Fixed reconnection frequency of 50.05Hz				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f < on has a fixed offset of 0.025 Hz added to the displayed value						

Random overfrequency					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.086	f> random	Enable function		off	on / off		on /off	
.087	f> random	f_{THR} OFF	Hz		50.20	51.50	50.20	51.50
		f_{THR} ON	Hz	Fixed reconnection frequency of 50.05Hz				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		The random f_{THR} OFF threshold is shown in .087 and cannot be edited						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		n.c. (normally closed)	n.o. (normally opened) n.c. (normally closed)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	0	600

Random Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.103	Ton random	Enable function		off	on / off		on / off	
.104	Ton random	Turn on time	s		60	600	60	600
Comment:		The random time value is shown in .104 and cannot be edited						

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.37 TR3 Rev23:2013 [ID 700] renewed standard

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	3-wire, 4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	57.5	230.0	28.8	241.4
		Unom Δ	V	400.0	100.0	400.0	50.0	420.0

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	ULL>> Off	U_{THR} OFF	%Unom	120	100	130	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (1% U_{NOM})				
.013	T ULL>>	Time OFF	ms	50	50	50	50	10000
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	ULL< Off	U_{THR} OFF	%Unom	80	10	100	10	100
.016	ULL< On	U_{THR} ON	%Unom	95	95	95	10	100
.017	T ULL<	Time OFF	ms	1500	1500	2400	50	10000
Comment:		ULL< On has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	ULN>> Off	U_{THR} OFF	%Unom	120	100	130	100	135
		U_{THR} ON		Fixed Hysteresis (1% U_{NOM})				
.021	T ULN>>	Time OFF	ms	50	50	50	50	10000
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	ULN< Off	U_{THR} OFF	%Unom	80	10	100	10	100
.024	ULN< On	U_{THR} ON	%Unom	95	95	95	10	100
.025	T ULN<	Time OFF	ms	1500	1500	2400	50	10000
Comment:		ULN< On has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.031	ULL<< Off	U_{THR} OFF	%Unom	45	10	100	0	100
.032	ULL<< On	U_{THR} ON	%Unom	95	95	95	10	100
.033	T ULL<<	Time OFF	ms	300	300	300	50	10000
Comment:		ULL<< On has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	ULN<< Off	U_{THR} OFF	%Unom	45	10	100	0	100
.040	ULN<< On	U_{THR} ON	%Unom	95	95	95	10	100
.041	T ULN<<	Time OFF	ms	300	300	300	50	10000
Comment:		ULN<< On has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f> Off	f_{THR} OFF	Hz	51.50	50.00	52.00	50.00	55.00
.056	f> On	f_{THR} ON	Hz	50.05	50.05	50.05	50.00	55.00
.057	T f>	Time OFF	ms	50	50	50	50	10000

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f< Off	f_{THR} OFF	Hz	47.50	47.50	50.00	45.00	50.00
.060	f< On	f_{THR} ON	Hz	47.50	47.50	47.50	45.00	50.00
.061	T f<	Time OFF	ms	50	50	50	50	10000
Comment:	f< On has a fixed offset of 0.025 Hz added to the displayed value							

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	0	60	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:	If all 4 digits of the Password are 0 (default setting) the Password request is skipped				

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.38 G59/3/3:2015 LV [ID 405] renewed standard

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	230.0	240.0	100.0	240.0
		Unom Δ	V	400.0	400.0	417.4	173.9	417.4

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	O/V st 1	U_{THR} OFF	%Unom	114	114	114	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.021	T O/V st 1	Time OFF	ms	1000	1000	1000	50	300000

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	U/V st 1	U_{THR} OFF	%Unom	87	87	87	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.025	T U/V st 1	Time OFF	ms	2500	2500	2500	50	300000

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.035	O/V st 2	U_{THR} OFF	%Unom	119	119	119	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.037	T O/V st 2	Time OFF	ms	500	500	500	50	300000

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	U/V st 2	U_{THR} OFF	%Unom	80	80	80	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.041	T U/V st 2	Time OFF	ms	500	500	500	50	300000

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	O/F st 1	f_{THR} OFF	Hz	51.50	51.50	51.50	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.057	T O/F st 1	Time OFF	ms	90000	90000	90000	1000	300000

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	U/F st 1	f_{THR} OFF	Hz	47.50	47.50	47.50	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.061	T U/F st 1	Time OFF	ms	20000	20000	20000	1000	300000

Overfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.063	O/F st 2	f_{THR} OFF	Hz	52.00	52.00	52.00	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.065	T O/F st 2	Time OFF	ms	500	500	500	50	300000

Underfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.067	U/F st 2	f_{THR} OFF	Hz	47.00	47.00	47.00	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.069	T U/F st 2	Time OFF	ms	500	500	500	50	300000

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		on	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	10	3000	10	3000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	950	10	3000	10	3000
.093	RoCoFDelay	Time OFF	ms	500	50	2000	50	2000
Comment:		Fixed window length 225ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		off	on / off		on / off	
.095	PShift off	$PShift_{THR}$ OFF	°	12	6	12	3	15
.096	PShift on	$PShift_{THR}$ ON	°	9	5	11	3	15
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 200ms						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	20	20	20	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.39 G59/3/3:2015 MV [ID 455] renewed standard

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	57.5	230.0	28.8	241.4
		Unom Δ	V	400.0	100.0	400.0	50.0	420.0

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	O/V st 1	U_{THR} OFF	%Unom	110	110	110	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.013	T O/V st 1	Time OFF	ms	1000	1000	1000	50	300000

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	U/V st 1	U_{THR} OFF	%Unom	87	87	87	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.017	T U/V st 1	Time OFF	ms	2500	2500	2500	50	300000

Overvoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.027	O/V st 2	U_{THR} OFF	%Unom	113	113	113	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.029	T O/V st 2	Time OFF	ms	500	500	500	50	300000

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.031	U/V st 2	U_{THR} OFF	%Unom	80	80	80	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.033	T U/V st 2	Time OFF	ms	500	500	500	50	300000

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	O/F st 1	f_{THR} OFF	Hz	51.50	51.50	51.50	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.057	T O/F st 1	Time OFF	ms	90000	90000	90000	1000	300000

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	U/F st 1	f_{THR} OFF	Hz	47.50	47.50	47.50	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.061	T U/F st 1	Time OFF	ms	20000	20000	20000	1000	300000

Overfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.063	O/F st 2	f_{THR} OFF	Hz	52.00	52.00	52.00	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.065	T O/F st 2	Time OFF	ms	500	500	500	50	300000

Underfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.067	U/F st 2	f_{THR} OFF	Hz	47.00	47.00	47.00	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.069	T U/F st 2	Time OFF	ms	500	500	500	50	300000

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		on	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	10	3000	10	3000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	950	10	3000	10	3000
.093	RoCoFDelay	Time OFF	ms	500	50	2000	50	2000
Comment:		Fixed window length 225ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		off	on / off		on / off	
.095	PShift off	$PShift_{THR}$ OFF	°	12	6	12	3	15
.096	PShift on	$PShift_{THR}$ ON	°	9	5	11	3	15
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 200ms PShift off has a fixed offset of 0.2° subtracted from the displayed value						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	20	20	20	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx	xxxxx = Device ID
	SW: aa.dd.ccb	dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.40 G83/2:2012 [ID 500] renewed standard

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	230.0	240.0	100.0	240.0
		Unom Δ	V	400.0	400.0	417.4	173.9	417.4

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	O/V st 1	U_{THR} OFF	%Unom	114	114	114	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.021	T O/V st 1	Time OFF	ms	1000	1000	1000	50	10000

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	U/V st 1	U_{THR} OFF	%Unom	87	87	87	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.025	T U/V st 1	Time OFF	ms	2500	2500	2500	50	10000

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.035	O/V st 2	U_{THR} OFF	%Unom	119	119	119	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.037	T O/V st 2	Time OFF	ms	500	500	500	50	10000

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	U/V st 2	U_{THR} OFF	%Unom	80	80	80	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.75% U_{NOM})				
.041	T U/V st 2	Time OFF	ms	500	500	500	50	10000

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	O/F st 1	f_{THR} OFF	Hz	51.50	51.50	51.50	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.057	T O/F st 1	Time OFF	ms	90000	90000	90000	1000	120000

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	U/F st 1	f_{THR} OFF	Hz	47.50	47.50	47.50	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.061	T U/F st 1	Time OFF	ms	20000	20000	20000	1000	120000

Overfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.063	O/F st 2	f_{THR} OFF	Hz	52.00	52.00	52.00	50.00	55.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.065	T O/F st 2	Time OFF	ms	500	500	500	50	10000

Underfrequency2					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.067	U/F st 2	f_{THR} OFF	Hz	47.00	47.00	47.00	40.00	50.00
		f_{THR} ON	Hz	Fixed Hysteresis (0.05 Hz)				
.069	T U/F st 2	Time OFF	ms	500	500	500	50	10000

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		off	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	200	190	210	100	1000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	190	180	210	100	1000
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 535ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		on	on / off		on / off	
.095	PShift off	$PShift_{THR}$ OFF	°	12.0	11.0	13.0	3.0	15.0
.096	PShift on	$PShift_{THR}$ ON	°	10.5	9.5	13.0	3.0	15.0
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 200ms						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	20	20	20	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.41 C10-11:2013 LV [ID 600] renewed standard

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	230.0	230.0	100.0	240.0
		Unom Δ	V	400.0	400.0	400.0	173.9	417.4

Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.019	U LN >	U_{THR} OFF	%Unom	110	100	110	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.5% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U LN > has a fixed offset of 0.25% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	U LN <	U_{THR} OFF	%Unom	85	50	85	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.5% U_{NOM})				
.025	T U LN <	Time OFF	ms	1500	100	1500	100	10000
Comment:		U LN < has a fixed offset of 0.25% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Undervoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.039	U LN <<	U_{THR} OFF	%Unom	50	25	50	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.5% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U LN << has a fixed offset of 0.25% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f >	f_{THR} OFF	Hz	51.50	50.00	51.50	50.00	55.00
		f_{THR} ON	Hz	Fixed reconnection frequency of 50.05Hz				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f > has a fixed offset of 0.01 Hz subtracted from the displayed value						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	47.50	50.00	40.00	50.00
.060	f < on	f_{THR} ON	Hz	47.50	47.50	47.50	40.00	50.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f < on has a fixed offset of 0.02 Hz added to the displayed value						

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		off	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	1000	1000	100	2000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	800	100	1000	100	1000
.093	RoCoF T	Time OFF	ms	0	0	100	0	1000
Comment:		Fixed window length 100ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		on	on / off		on / off	
.095	PShift off	$PShift_{THR}$ OFF	°	7	7	7	3	15
.096	PShift on	$PShift_{THR}$ ON	°	5	3	7	3	15
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 100ms PShift off has a fixed offset of 1° subtracted from the displayed value						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 500ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.5.42 C10-11:2013 MV [ID 650] renewed standard

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	3-wire	3-wire	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	230.0	230.0	28.8	241.4
		Unom Δ	V	400.0	400.0	400.0	50.0	420.0

Overvoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.011	U LL >	U_{THR} OFF	%Unom	110	100	110	100	135
		U_{THR} ON	%Unom	Fixed Hysteresis (0.5% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U LL > has a fixed offset of 0.25% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage1 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.015	U LL <	U_{THR} OFF	%Unom	85	50	85	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.5% U_{NOM})				
.017	T ULL <	Time OFF	ms	1500	100	1500	100	10000
Comment:		U LL < has a fixed offset of 0.25% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Undervoltage2 Line to Line					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.031	U LL <<	U_{THR} OFF	%Unom	50	25	50	0	100
		U_{THR} ON	%Unom	Fixed Hysteresis (0.5% U_{NOM})				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		U LL << has a fixed offset of 0.25% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 3-wire, 4-wire (LN+LL)						

Overfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.055	f >	f_{THR} OFF	Hz	51.50	50.00	51.50	50.00	55.00
		f_{THR} ON	Hz	Fixed reconnection frequency of 50.05Hz				
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f > has a fixed offset of 0.01 Hz subtracted from the displayed value						

Underfrequency1					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.059	f < off	f_{THR} OFF	Hz	47.50	47.50	50.00	40.00	50.00
.060	f < on	f_{THR} ON	Hz	47.50	47.50	47.50	40.00	50.00
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		f < on has a fixed offset of 0.02 Hz added to the displayed value						

Rate of Change of Frequency (RoCoF)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.090	RoCoF	Enable Function		off	on / off		on / off	
.091	RoCoF off	$RoCoF_{THR}$ OFF	mHz/s	1000	1000	1000	100	2000
.092	RoCoF on	$RoCoF_{THR}$ ON	mHz/s	800	100	1000	100	1000
.093	RoCoF T	Time OFF	ms	0	0	100	0	1000
Comment:		Fixed window length 100ms						

Phase Shift (PShift)					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.094	PShift	Enable Function		on	on / off		on / off	
.095	PShift off	$PShift_{THR}$ OFF	°	7	7	7	3	15
.096	PShift on	$PShift_{THR}$ ON	°	5	3	7	3	15
		Time OFF	ms	Fixed to the fastest possible disconnection				
Comment:		Fixed window length 100ms PShift off has a fixed offset of 1° subtracted from the displayed value						

Auxiliary Contact type					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.099	Contact	Type		dis. (disabled)	n.o. (normally opened) n.c. (normally closed) dis. (disabled)		n.o. (normally opened) n.c. (normally closed) dis. (disabled)	
.100	T Contact	Time OFF	ms	Fixed to 270ms				

Turn-on delay					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.102	Ton delay	Turn on time	s	60	60	60	0	600

Password					
ID			Default	Min	Max
.106	PW1	1st digit of Password	0	0	9
.107	PW2	2nd digit of Password	0	0	9
.108	PW3	3rd digit of Password	0	0	9
.109	PW4	4th digit of Password	0	0	9
Remark:		If all 4 digits of the Password are 0 (default setting) the Password request is skipped			

Device Information		
ID		
.105	ID: xxxxxx SW: aa.dd.ccb	xxxxx = Device ID dd: Software version of Display Software aa: Software version of Measuring Software cc: Index of the Configuration set b: Version of the Configuration set

3.6 Loss Of Mains detection

3.6.1 Loss Of Mains detection via voltage measurement

In this procedure, a stand-alone grid is detected with the help of 3-phase voltage monitoring.

3.6.2 Loss Of Mains detection via RoCoF

In this procedure, a stand-alone grid is detected with the help of a rate-of-change of frequency. This measurement is based on frequency measurements and triggers in the event of lasting frequency changes over multiple periods. The df/dt limit value is given and set in Hz/s.

3.6.3 Loss Of Mains detection via vector shift

In this procedure, a phase or vector shift is detected through time measurements of the half-waves and the comparison with previous measurements. A vector shift can occur during a sudden load change. The threshold value is given and set in degrees.

3.7 Test function

The test function can be activated in two different ways:

- Pressing the ESC key in any window of menu level 1
- Pressing the ENT key in screen 1.050

Both output-relays 1 and 2 are switched off at activation of the test function and the turn-on time begins to run.

As with every turn-off, the turn-off time is determined. The last turn-off time can be read on-screen 1.40 (Toff).

3.8 Digital inputs

Digital inputs 1 and 2 serve as feedback contacts of both isolating contactors A and B. They are driven via the auxiliary contact of the isolation contactor. Here, the auxiliary contact can be connected as normally opened or normally closed and the digital inputs configured accordingly in the device.

Digital input 3 serves for the remote shutdown.

Both digital inputs 4 and 5 are used for parameter switching for Italian standard CEI 0-21.

3.9 Output contacts

Both output relays R1 and R2 control the isolation contactors/section switch.
Output relay R3 switches on in case of error (if configured accordingly).

3.10 Error

Current errors are displayed in level "1.060 Error," the display of the error memory is located in level 2. The 2 error types below are differentiated.

3.10.1 Measurement error

```
1.060   Error
M: UΔ UY Ū f Δf ΔΦ C
S: T0123456789ABCDEF
              ENT ->
```

Only the current present error is shown here!
Error types:

UΔ	Phase to phase voltage error (under or overvoltage)
UY	Phase-to-neutral voltage error (under or overvoltage)
Ū	10 minute average voltage error
f	Frequency error (under or over frequency)
Δf	Frequency ramp error (RoCoF)
ΔΦ	Phase shift error (PShift)
C	Feedback contact error

3.10.2 System error

```
1.060   Error
M: UΔ UY Ū f Δf ΔΦ C
S: T0123456789ABCDEF
              ENT ->
```

Error types:

T	Remote shutdown active
0-9, A-F	If this error appears permanently, please contact our technical support.

System error entries are found in the error memory when the unit is delivered. These occur during the final testing of the device, in which these errors are induced on purpose. As the error memory cannot be deleted, these entries do not represent a device error and can simply be ignored.

3.10.3 Error memory (LOG)

The error memory (for max. 50 LOGs) is displayed in level 2.
In the error memory, the occurrence, as well as the disappearance of each error, is saved with a time stamp. Entry without an error code is therefore not a malfunction.

```
2.0nn   Error
M: UΔ UY Ū f Δf ΔΦ C
S: T0123456789ABCDEF
t: 9999d 15h 03m 01s
```

nn ... The number of the entry in the error memory
t ... Timestamp: duration since occurrence in days/hours/minutes/seconds

4 Technical data

4.1 Supply circuit

Terminals	A1 (L or +); A2 (N or -)
Supply voltage	DC: 24V AC: 110 - 230V
Tolerance of the supply voltage	DC: ± 10% AC: ± 30%
Nominal consumption	max. 1,25W / 4VA @ 230V AC
Nominal frequency	50 / 60Hz
Tolerance of the nominal frequency	48 - 63Hz
Duration of operation	100%
Recovery time	6 seconds + set turn-on delay
Drop-out voltage	7V
Overvoltage category	III
Rated surge voltage	6 kV
Internal fusing	250V / 500mA slow blow (soldered)

To ensure the device's functionality during a power failure, the device is to be supplied via an external UPS system!

4.2 Measuring circuit

Terminals	L1-L2-L3-N
Measuring input	3x 400V AC
Input impedance	1MΩ
Measured quantities	Phase to phase voltage, phase-to-neutral voltage, 10 minutes voltage average, frequency, frequency change (RoCoF), Phase shift (PShift)

4.3 Measuring ranges

Phase voltage	0 - 560VAC
Phase-to-neutral voltage	0 - 325VAC
Frequency	40 - 65Hz (measured between L1/N)
RoCoF	100mHz/s - 2.000mHz/s
PShift	1 - 15°
Overload capacity	Permanent 1,4 x U_{Nom} Impulse 1,6 x U_{Nom} (1 second)
Overvoltage category	III
Rated surge voltage	4 kV

4.4 Digital inputs

Terminals	I1 and ⊥ ; I2 and ⊥ ; I3 and ⊥ ; I4 resp. I5 and ⊥
Contact type	potential-free
Switching capacity	24V DC / 5mA

4.5 Output circuit

Terminals	11-12-14; 21-22-24; 31-32-34
Number and type of contacts	3 changeover contacts
Contact material	AgNi
Switching capacity	5A / 250V AC
Electrical switching frequency (AC1-)	100 x 10^3 switching cycles
Mechanical switching frequency	15 x 10^6 switching cycles
Continuous current value	5A
Short time value (1s)	5A
Withstanding voltage across open contacts	Relay contacts: $1000V_{rms}$ Terminals: $450V_{rms}$
Overvoltage category	III
Rated surge voltage	4 kV
Fusing	5A fast acting

4.6 Accuracy

Voltage measurement:	
Base accuracy	< 0,5% @ +25°C
Temperature effect	< 0,01%/°C
Resolution	10mV
Frequency measurement:	
Base accuracy	< 0,01Hz @ +25°C
Temperature effect	< 0,0002Hz/°C
Resolution	1mHz
Start-up Ton delay	0...600s ± 0,6%
Time OFF delay, $t_{UTHR\ OFF}$	0...300s ± 0,6%
Reset(Release) delay, $t_{UTHR\ ON\_total}$	130ms ± 45%
Operating time at overvoltage t_{over}	95ms ± 50%
Operating time at undervoltage t_{under}	95ms ± 40%
Response time, $t_{off\_total\_over/under}$	$t_{off\_total\_over} = t_{over} + t_{UTHR\ OFF}$ $t_{off\_total\_under} = t_{under} + t_{UTHR\ OFF}$
Overshoot time	40ms

4.7 Insulation data

Rated insulation voltage	400V
Insulation	
Supply circuit/measuring circuit	Safe isolation
Supply circuit/output circuit	Safe isolation
Supply circuit / digital inputs	Safe isolation
Output circuit/measuring circuit	Base isolation
Output circuit / digital inputs	Base isolation

4.8 Environmental conditions

Ambient temperature operation	-25 up to +55°C
Ambient temperature storage	-40 up to +70°C
Display capability	-15 up to +55°C
Relative air humidity	5 up to 95%
Degree of contamination	2
Weight	300g

4.9 Electrical connection

Connection cross-section	max. 2,5mm^2
Stripping length	max. 8mm
Electrical capacity of the clamps: Relay outputs / digital inputs Measuring inputs	 max. 450V/16A max. 750V/16A
Tightening torque	max. 0,5Nm
Screw	M3, screwdriver for slotted screws 0,6 x 3,5mm
Digital input circuits and output relays	No limitation for simultaneous operation of inputs and/or outputs within the specified limits

4.10 Sealing wire

Wire diameter	Ø max. 0,8mm

4.11 Protection class

Terminals	IP 20
Housing	IP 20

5 Operation and commissioning

5.1 Initial commissioning

The device is delivered without a pre-configured standard. During initial commissioning, the device will prompt to select a parameter set (level 5 - menu point 5.001). Here, the corresponding configuration/standard must be selected via +/- and confirmed with ENTER.

You can find more information in the menu structure.

5.2 Menu navigation

The display unit consists of a 4-line text display with 20 characters per line.
The display has 5 levels. The different displays of the levels can be navigated via + and -.

5.2.1 Level 0

Start screen (display for 5 seconds at power-up)
Basic information is displayed here. This display appears after power-up and remains visible for 5 s. Then the display jumps to the first window in level 1.

5.2.2 Level 1

Measurements (screen 1.010-1.032)
Display of the current measurements.

Additionally, it will also be displayed here if the parameter set corresponds to the default configuration (dflt - default = base or factory setting), was edited within the normative permissible limit values (edit – edited), or is set outside the normative permissible limit values (ncnf – non conform = does not comply with the selected regulation or the selected standard).

If required, display of time-lapse "reconnection timer" (turn-on time) in seconds.

Navigation +/-. From this screen, you can access level 3 via ENT

Digital inputs and turn-off time (screen 1.040)
Display of the last turn-off time (Toff) of the connected contactors (the larger value for two-channel systems).

Additionally, it will also be displayed here if the parameter set corresponds to the default configuration (dflt - default = base or factory setting), was edited within the normative permissible limit values (edit – edited), or is set outside the normative permissible limit values (ncnf – non conform = does not comply with the selected regulation or the selected standard).

If required, display of time-lapse "reconnection timer" (turn-on time) in seconds.
Status display of the 5 digital inputs.

Navigation +/-. From this screen, you can access level 3 via ENT.

Test/Reset (1.050)
A relay test is triggered by pressing the ENT key. In this test, relays A and B turn off and the "reconnection-timer" (turn-on time) begins to run.
Also, a reset event can be carried out with the test/rest function, which allows relay 1/2 to be switched on again after a contact error (C) (required for the three-parameter sets VDE-AR-N 4105). The test/reset event can also be performed by pressing the ESC key in level 1.

Error (1.060)
Display of current error:

M	Measurement error
S	System error

Navigation +/-. You can access level 2 by pressing the ENT key.

5.2.3 Level 2

Error memory
This is where the latest errors are displayed with a timestamp (time since occurrence).
Both positive, as well as negative error flanks, are saved and displayed.

Navigation +/-. From this screen, you can access level 1 via ESC.

5.2.4 Level 3

Parameter display
Here, the parameters that have been visibly switched for the corresponding configuration are displayed.
Navigation +/-. From this screen, you can access level 1 via ESC.
You can access the editing mode of the selected parameter via PROG (can be lead-sealed).

The password query is skipped if the password is "0000" and you will end up directly in editing mode in level 5.
If a valid password has been entered in the last 60 seconds, the password query is skipped and you will end up directly in level 5.
If a password other than "0000" has been defined, you will be asked for the password in level 4.

5.2.5 Level 4

Password input
The currently active digit of the password can be incremented/decremented (0...9) via +/-.
ENT jumps to the next digit of the password entry.
The entered password is checked after pressing ENT in the 4th position.
ESC jumps back to the previous digit of the password entry.
The program goes back to Level 3 when you press ESC at the first digit of the password.

If you have forgotten the password, please contact our technical support and let them know the device ID. You will receive a master password only relevant to your device.

5.2.6 Level 5

Parameter editing
In this level, the parameter previously selected in level 3 can be changed with +/-.
Confirm with ENT or use ESC to discard the change. In both cases, the display jumps to the corresponding parameter in level 3.

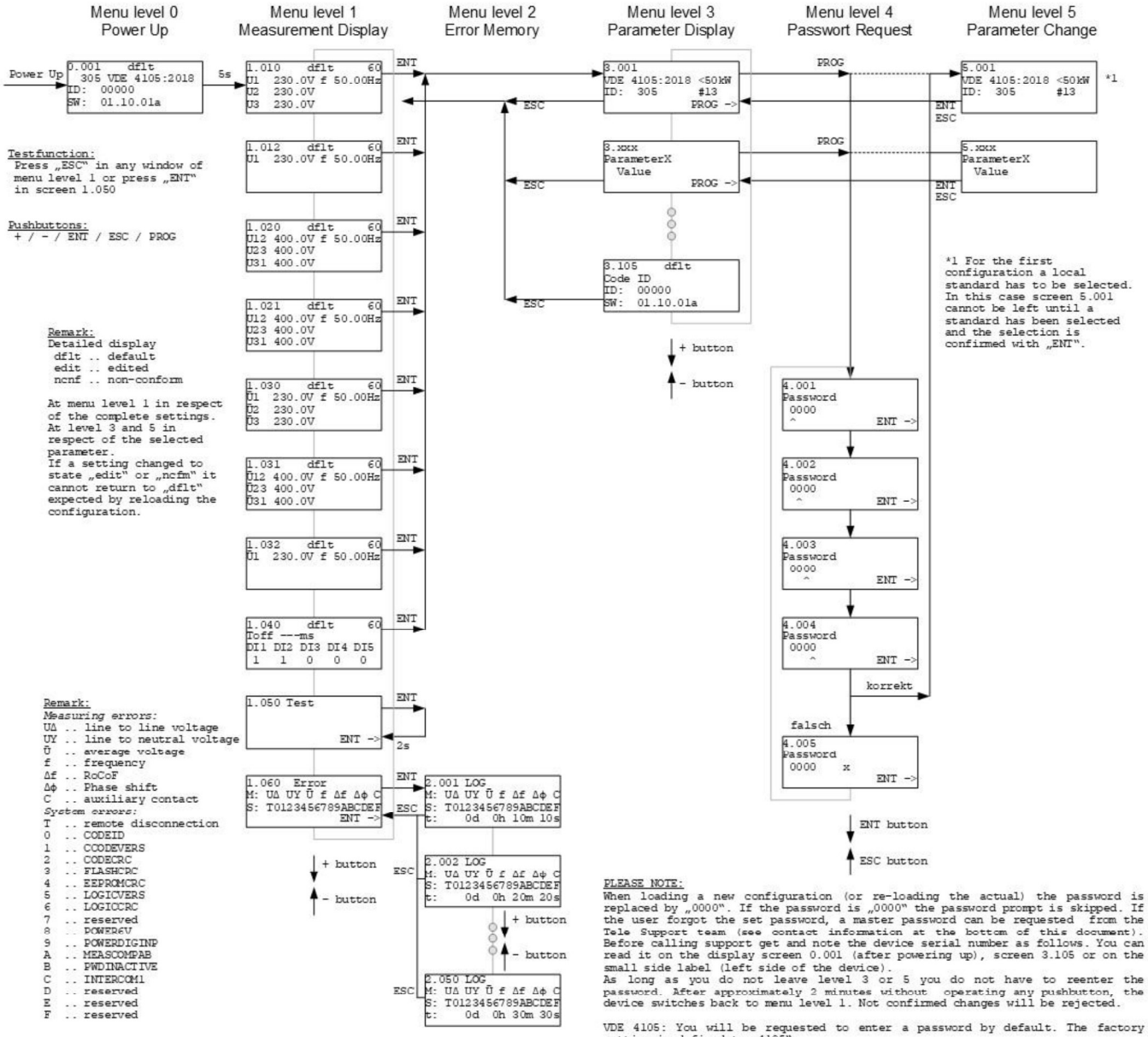
Additionally, it will also be displayed here whether the value that was just edited corresponds to the default configuration (dflt - default = base or factory setting) if it was edited within the normative permissible limit values (edit – edited) or is set outside the normative permissible limit values (ncnf – non conform = does not comply with the selected regulation or the selected standard).

Alongside thresholds, times, and modes, the 4 digits of the password also have 1 parameter each.

The current standard is a parameter too. This means that a newly selected standard will be activated by changing this parameter. Therefore all previous changes will be discarded.

If the already set standard is selected, the standard will be reset to default.

5.3 Operating menu structure



5.4 Applicable rules and standards

				Amount of channels		
Slot	**ID**	**Norm/Standard**	**Regions**	**1**	**2** Funct. safety	**1** or **2** select able
#00	802	OVE TOR R25 NS SYNC	Austria (low voltage)		**X**	
#01	803	OVE TOR R25 NS ASYNC	Austria (low voltage)		**X**	
#02	852	OVE TOR R25 MS SYNC	Austria (medium voltage)		**X**	
#03	853	OVE TOR R25 MS ASYNC	Austria (medium voltage)		**X**	
#04	822	OOE TOR R25 NS SYNC	Upper Austria Oberösterreich (low voltage)		**X**	
#05	823	OOE TOR R25 NS ASYNC	Upper Austria Oberösterreich (low voltage)		**X**	
#06	872	OOE TOR R25 MS SYNC	Upper Austria Oberösterreich (medium voltage)		**X**	
#07	873	OOE TOR R25 MS ASYNC	Upper Austria Oberösterreich (medium voltage)		**X**	
#13	311	VDE-AR-N 4105: 2018 (Pn ≤ 50kW)	Germany (low voltage)	**X**		
#14	312	VDE-AR-N 4105: 2018 (Pn > 50kW)	Germany (low voltage)	**X**		
#15	313	VDE-AR-N 4105: 2018 (converter)	Germany (low voltage)		**X**	
#17	706	VDE-AR-N 4110: 2018 (Pn > 135kW)	Germany (medium voltage)	**X**		
#21	102	CEI 0-21: 2019	Italy	**X**		
#25	410	G99/1/3: 2018 LV	Great Britain (low voltage)	**X**		
#26	460	G99/1/3: 2018 HV	Great Britain (medium/high voltage)	**X**		
#28	510	G98/1/2: 2018	Great Britain (low voltage)	**X**		
#32	601	C10-11: 2019 LV-IP	Belgium (low voltage) interface protection	**X**		

#33	602	C10-11: 2019 LV-ASS	Belgium (low voltage) automatic separation system	**X**		
#35	651	C10-11: 2019 HV-IP	Belgium (medium/high voltage) interface protection	**X**		
#36	652	C10-11: 2019 HV-ASS	Belgium (medium/high voltage) automatic separation system	**X**		
#40	900	EN 50438:2013	Europe		**X**	
#41	950	EN 50438: 2013 DK	Denmark			**X**
#44	200	VDE V 0126-1-1:2013	France, Turkey, Belgium, Greece, ...		**X**	
#48	1000	NRS 097-2-1: 2017	South Africa		**X**	
#49	1100	AS/NZS 4777.2:2015	Australia / Victoria (New Zealand)		**X**	
#51	9004	OPEN SETUP	Freely configurable setup			**X**
Renewed Standards						
#53	801	OVE E 8001/8101:2014	Austria		**X**	
#54	300	VDE-AR-N 4105 tested according to VDE 0124-100:2013	Germany (low voltage)		**X**	
#55	700	TR3 Rev23:2013 certified according to BDEW 2008	Germany (medium voltage)	**X**		
#57	405	G59/3/3: 2015 LV	Great Britain (low voltage)	**X**		
#58	455	G59/3/3: 2015 MV	Great Britain (high voltage)	**X**		
#59	500	G83/2: 2012	Great Britain (low voltage)	**X**		
#60	600	C10-11: 2012 LV	Belgium (low voltage)	**X**		
#61	650	C10-11: 2012 MV	Belgium medium voltage	**X**		

5.5 Lead seal

After commissioning, the device is to be secured against unauthorized changes of the protection-relevant setting parameters via a configurable password! If password protection is not used or if the country-specific regulations or standards demand it, the device is to be lead-sealed!

5.6 Use cases

5.6.1 Use of voltage transformers in medium voltage networks (OVE TOR R25, OOE TOR R25)

Using Austria as an example, in medium voltage networks a distinction is made between two basic voltage levels: 21kV and [31.7kV for special cases e.g. wind farms] phase to phase voltage.

Use of a 200:1 voltage converter at Uc = 21kV:

1. Select the parameter set **852** (OVE/OOE TOR R25 MS SYNC) for synchronous or **853** (OVE/OOE TOR R25 NS ASYNC) for non-synchronous generating systems (converter).

2. Parameter .005 (setting the nominal voltage ULN/LL nom) to **60.4/105.0V**.
   Mathematically, the value results from 21kV/200 = 105V (the 60.4V stand for the phase to neutral voltages, which are not relevant for medium-voltage applications). The setting options are possible as described with **60.4/105.0V**.

Use of a 200:1 voltage converter at Uc = 31,7kV (e.g. wind farms):

1. Select the parameter set **852** (OVE/OOE TOR R25 MS SYNC) for synchronous or **853** (OVE/OOE TOR R25 NS ASYNC) for non-synchronous generating systems (converter).

2. Parameter .005 (setting the nominal voltage ULN/LL nom) to **91.0/158.1V**.
   Mathematically, the value results from 31.7kV / 200 = 158.5V (the 91.0V stand for the phase to neutral voltages, which are not relevant for medium-voltage applications). The setting options are possible as described with **91.0/158.1V**.

Use of a 300:1 voltage converter at Uc = 31,7kV (e.g. wind farms):

1. Select the parameter set **852** (OVE/OOE TOR R25 MS SYNC) for synchronous or **853** (OVE/OOE TOR R25 NS ASYNC) for non-synchronous generating systems (converter).

2. Parameter .005 (setting the nominal voltage ULN/LL nom) to **60.4/105.0V**.
   Mathematically, the value results from 31.7kV/300 = 105.6V (the 60.4V stand for the phase to neutral voltages, which are not relevant for medium-voltage applications). The setting options are possible as described with **60.4/105.0V**.

In any case, the following applies: All protective functions U>>, U>, U<<, U< automatically adjust to the newly set voltage levels, this means changes only need to be made if they do not meet the requirements of the network operator.

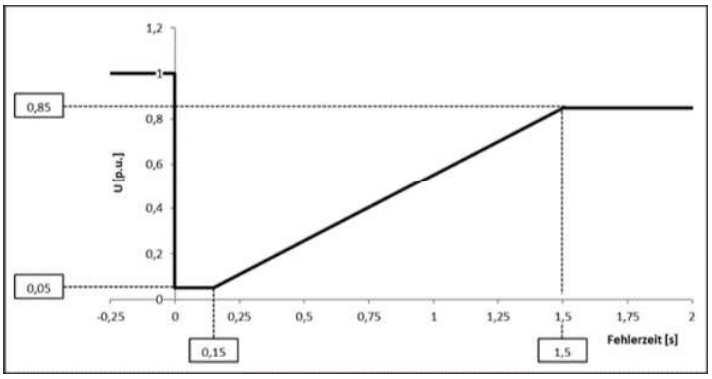
Changing the protective function U> and U>> according to the specifications of the network operator:

In the delivery state (default), these thresholds for U>off are 1.06xUc (106%) and for U>>off 1.1xUc (110%). If the network operator requests settings for U> off for example 1.04xUc (104%) and U>>off for example 1.15xUc (115%), both parameters .011 and .027 must be adjusted. If there are also different specifications for the undervoltage thresholds, parameters .015 (U<off) and .031 (U<< off) must also be adjusted.

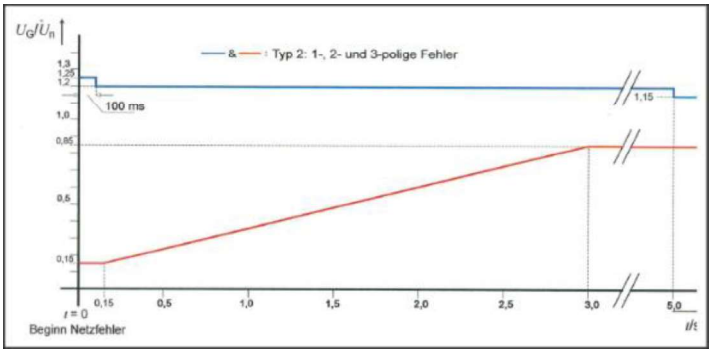
Note: In low-voltage networks, the nominal voltage is designated Un and in medium voltage networks Uc.

5.6.2 FRT (Fault Ride Through) capability of generators:

The FRT capability must be considered separately for the different components of power generation equipment. The FRT capability of isolating contactors is described in chapter 2.6. The installer of the power generation system must ensure that sufficient buffering is available for the isolating contactors.
The installer of the power generation plant must also ensure that the requirements from the FRT (different requirements between countries) and the protection settings for undervoltage (U</U<< and Time OFF) do not affect each other.
If the URNA0345-B (A1/A2) is supplied by the measuring circuit (not supplied separately from the measuring circuit), it can be guaranteed that the following FRT requirements from TOR 1.1 and VDE-AR-N 4105: 2018 can be run through without any problems (even at short intervals) while the output relays R1/R2 do not switch off erroneously due to the internal power supply unit.



(FRT-profile of asynchronous generators at middle voltage according to TOR 1.1 2019; the most difficult FRT behavior was chosen)



(FRT-profile according to VDE-AR-N 4105:2018 type 2- asynchronous generators; selected because it is more difficult for the internal power supply of the NA protection relay than type 1)

This FRT behavior applies to the entire AC supply range 110-230VAC. For a supply with 24VDC, the FRT behavior (no dropout of the output relays R1/R2) is not guaranteed. In this case, the power plant installer must ensure that the 24VDC is adequately buffered (device consumption 1.25W / 4VA).

In case of a total power loss for example L1 goes offline, and A1 & A2 are connected to L1 and N the internal PSU bridges the gap. The NA protection relay does not reset and the relais R1 & R2 do not switch off.

Buffer times are defined as follows:
230VAC <580ms
110VAC <200ms
24VDC < 70ms (NA protection supplied externally)

5.6.3 Self retention for remote shutdown with manual reset

For special applications, the network operator may require a manual reset after a remote shutdown. This is currently possible through the implementation of a self-retaining circuit: