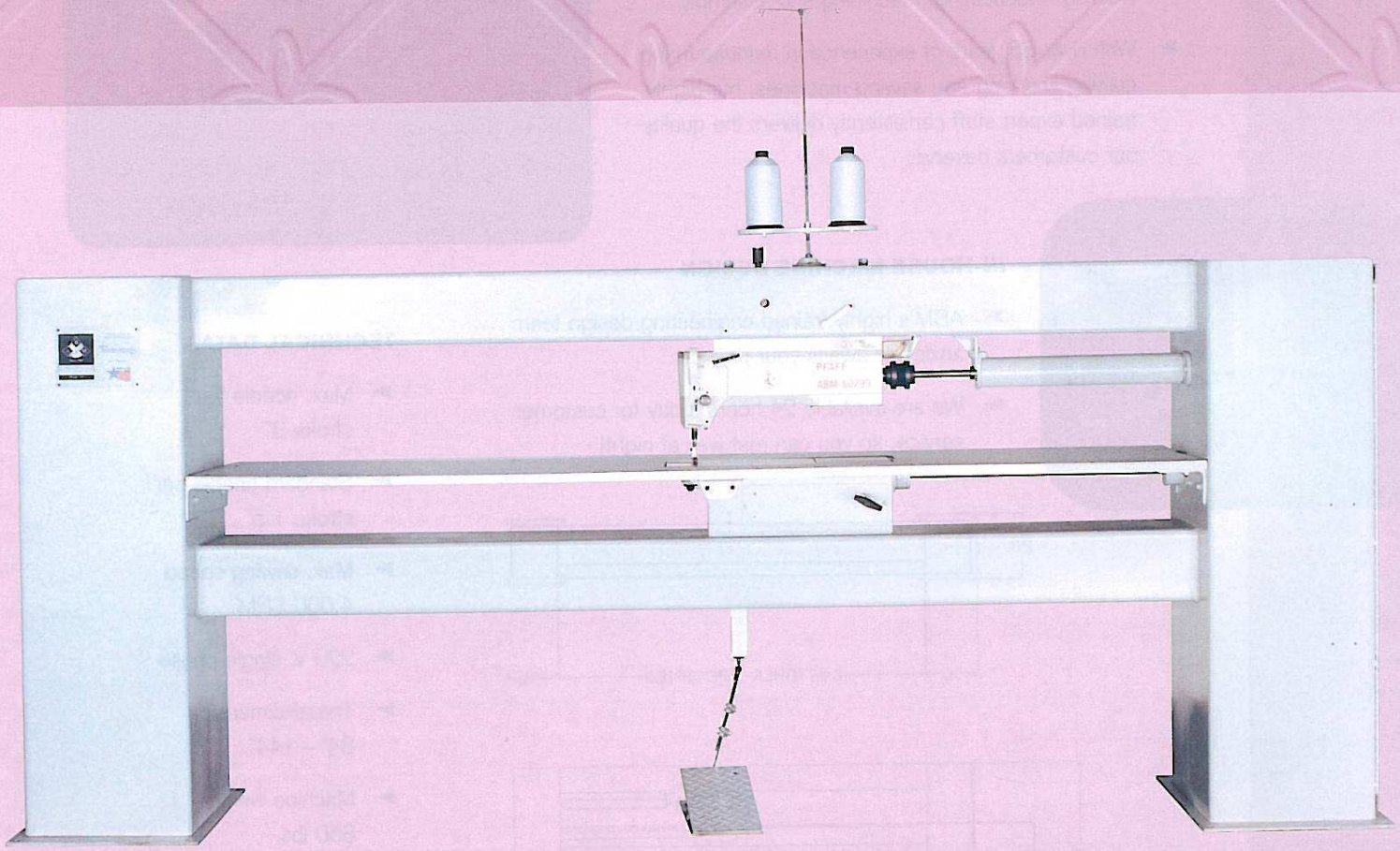
# LA-763
## LONG ARM SEWING MACHINE

SINCE 1947

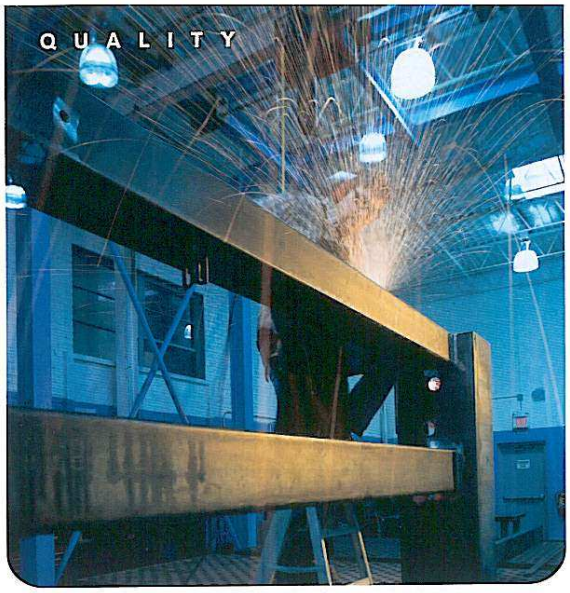


### OVERVIEW

ABM International, Inc. has spent many years perfecting the world's largest, most versatile Long Arm Sewing Machine. The LA-763 Long Arm Sewing Machine can be manufactured to specified lengths as desired by the end user. This extremely rigid bridge type design eliminates the problem of sagging and vibration harmonics allowing for much greater lengths than conventional cantilever C-throat machines. The LA-763 allows the sewing operator to easily handle larger products by eliminating the bunching of fabric under the throat of standard long arms available on the market today. Examples of these products are tents, awnings, fabric structures, parachutes, comforters, bedspreads, mattresses and much nore.

### FEATURES & BENEFITS

- Any desired width available, from 48˝ – 144˝.
- Many different models of sewheads available, such as Singer, Pfaff, Juki, etc.
- Ultrasonic welding, cutting and heat sealing.
- Backtacking, threadcutting.
- Adjustable product guides.

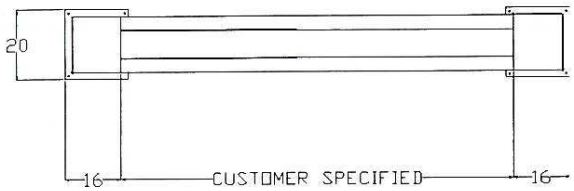


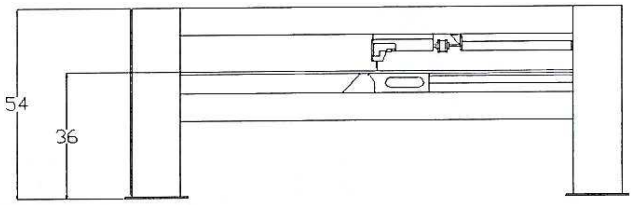

## QUALITY

- ABM International, Inc. is a vertically integrated manufacturer with in-house design, programming, welding / fabricating, machining and assembly.
- With over 55 years of experience in manufacturing quilting and long arm sewing machines, our highly trained expert staff consistently delivers the quality our customers deserve.

## IN-HOUSE MACHINE DESIGN

- ABM's highly trained engineering design team anxiously awaits your projects.
- We are available 24 hours a day for customer service, so you can rest well at night!




## TECHNICAL DATA

- Max. needle bar stroke 3″
- Standard needle bar stroke 1.5″
- Max. sewing speed 4,000 SPM
- 220 V. single phase
- Throat dimension 84″ – 144″
- Machine weight 850 lbs.
- Compound feed available

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SINCE 1947

ABM International, Inc., headquartered in Texas, has been serving the home furnishing market of the textile industry for over 60 years.

At ABM International, Inc. we are committed to manufacturing excellence and superior customer service. Let us provide you with the highest quality state-of-the-art machinery that will enhance your operations, improve your production, reduce your costs—and ensure your success!

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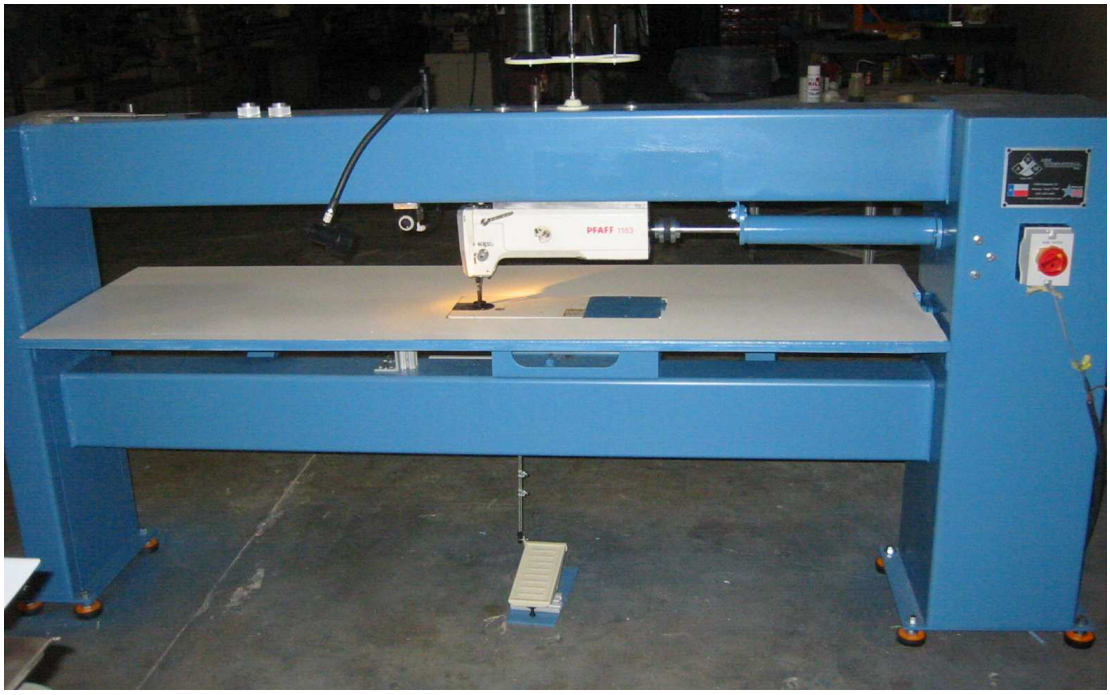


Figure 0.1 – LA-763

## Introduction

ABM International would like to thank you for the purchase of an LA-763 Long Arm Sewing Machine. ABM is confident that this machine will meet or exceed your expectations for cost, speed and durability.

If at anytime you experience problems with any of your ABM machines we ask that you contact us - 24 hours a day by calling our service department at (281) 443-4440. We can help you solve the problem quickly, and correctly. Your calls, questions, and comments will in turn help us to perfect the quality of our products and services in the future.

Once again, we thank you for your purchase.

ABM International, Inc.

Joe Podolski
Vice President
Engineering Department

## Section 1: Safety

### 1.0 Safety Introduction

As with the operation of all machinery, safe operation of the LA-763 is a major concern of ABM International, Inc. The purpose of this section is to inform personnel of the safe and prudent operation of an LA-763.

We have attempted to recommend the most effective methods and calculations to warn against actions that could result in personal injury, or make equipment unsafe. It is important to understand that ABM cannot anticipate, or list all conceivable safety methods and warn of all the possible hazards. In the interest of promoting safety, ABM advises that the operating personnel should always make sure that personal safety and the safe operation of the machine will not be adversely affected by their actions.

It is imperative that the operating personnel of the LA-763 read and understand the information in this manual before operating the machine.

### 1.1 Safety Policy Statement

The conservation of the assets of any company, which include the buildings, equipment, supplies and inventories as well as personnel, must be and is the responsibility of all levels of management. The purpose of a personnel and property conservation program is to insure that all phases of management recognize that personnel and property conservation are both inseparable parts of a company's objective…to produce quality products at the lowest possible cost.

Safety of personnel in every aspect must be of first consideration. The implementation of a conservation program will eliminate human suffering and effectively lower the direct and indirect costs resulting from employee injury. It will substantially reduce the exposure and probability of damage and / or loss of company's physical assets.

### 1.2 Safety Practices

The safety factors must be observed to ensure safe operation of the LA-763 .

1. Read and understand the operating instructions of the LA-763 before operating.
2. Use extreme caution when working around the LA-763 electrical controls.
3. Keep hands or other body parts away from the moving parts of the LA-763 .
4. Wear appropriate personal safety protection.
5. Stop the LA-763 immediately at any sign of malfunction or danger.
6. Do not crawl under or into the LA-763 for any reason during the operation of the machine.
7. Do not reach into the LA-763 at any time during the operation of the machine.
8. Do not climb, walk, or stand on the LA-763 at any time.
9. Do not tamper with factory installed guards and or safety devices.
10. Never operate machinery without all ABM installed guards and safety devices intact, and in working order.

11. Before starting the LA-763, ensure that no loose tools, bars or parts are lying in or on any part of the machine.
12. Proper fire fighting equipment should be kept in good operating condition and kept near in the event of fire.
13. Never attempt to service any of the pneumatic components until the unit is relieved of all air pressure.
14. Do not wear loose clothing or jewelry when operating the LA-763.
15. Always keep hair from coming in contact with moving parts.

## SECTION 2.0 – Machine Setup

The LA-763 ships fully tested ready to operate. As a result, this manual provides a section on machine setup so that you can install the machine. Please read this manual in its' entirety and follow all ABM instructions, especially the inspections. Total setup time, less power and air hook-up, should take approximately 1 hour.

### SETUP INSTRUCTIONS:

**INSPECTION #1:** Upon receipt of the machine, check to ensure that there is no visible damage. Figure 0.1 and the front cover of this manual are enough for this inspection. **Note: that some components may be in different locations depending on the version of the machine.**

Determine the location in your facility for the sewing machine. Attach the eight (8) machine legs supplied with the machine to the plates that were used to bolt the machine to its skid. Level and position the machine in the desired location. Though not required, ABM recommends that the machine be bolted to the floor. Place the foot pedal in front of the machine on the floor and connect it.

Run a 220VAC line (15AMP) to the machine location. Though the machine does not come equipped with a 220V plug, "ABM" does not recommend the use of any type of extension cord to power the machine. As with any machine, power should be run through approved conduit and ducting with proper termination. ABM does not supply a main power disconnect with the machine and recommends that the customer install one. You may connect the power to the machine at this time.

**INSPECTION #2:** Will confirm that the electronics of the LA-763 long arm sewing machine are functioning properly.

**WARNING: ELECTRICAL SHOCK HAZARD. THIS INSPECTION WILL REQUIRE POWER TO BE ON WHILE THE ELECTRONICS CABINET IS OPEN. IF A PROBLEM IS FOUND, YOU SHOULD NOT ATTEMPT TO REPAIR IT WITH THE POWER ON. DISCONNECT THE MACHINE PRIOR TO ADJUSTING ANY COMPONENTS WITHIN THE ELECTRICAL CABINET.**

Step one; open the electronics cabinet located on the right vertical end-stand of the steel bridge of the machine. The internals of the cabinet will look like Figure 1.0. From top to bottom the components are as follows: Lamp power supply, servo motor, servo motion controller .

Upon power up, the sewhead needles up.

Figure 2.0 – Electrical Panel.

**FINAL TEST:**

**WARNING – WHEN OPERATING THE MACHINE, YOU MUST ENSURE THAT THERE ARE NO LOOSE ITEMS SUCH AS TOOLS FOOD DRINKS ETC. ON THE MACHINE AND THAT ALL PESONNEL ARE CLEAR OF THE MACHINE.**


Figure 2.1 – LA-763 sewing head.

Inspect the front of the machine and ensure that the sewhead is free of obstructions.

Step 1: Depress the treddle forward and the sewhead will begin to run.

Step 2: Release the treddle and the needle will stay down to pivot your fabric.

Step 3: Depress the treddle backwards and the needle will raise to the upper position.

Setup and inspection is now complete.

## SECTION 3.0 – Machine Operation

This section will discuss how to properly use the LA763 to fulfill all of your sewing needs.

The LA-763 is equipped with either a mechanical or pneumatic foot lifter to create clearance under the foot when inserting and removing your product to be sewn.

For the mechanical lifter:

Figure 3.0 – Foot Lifter Operation.

To raise the presser foot, pull down on the white presser foot lift lever at located at the back of the sewhead. To release the presser foot, pull the silver release bar located at the top of the back of the sewhead.

For the pneumatic lifter:

Figure 3.1 – Pneumatic foot lift Operation

Toggle switch mounted to the left of the sewing head will raise and lower the foot.

Operating the LA-763 is a simple task. Turn the main power on and allow the machine to energize (this may take 5 seconds). While the machine is powered on please make sure that the foot pedal is not being pressed or the machine will activate an electrical safety measure that will not allow the sewhead to work. To reset the safety, turn off the machine remove anything that may be activating the pedal and turn the machine on.

Figure 3.2 – Power Disconnect

The speed of sewing can be adjusted two ways. The first is via the foot pedal. Pressing the pedal further will cause the machine to speed up and releasing pressure will make the machine slow down.

Figure 3.3 – Foot pedal control

Speed can also be limited on the servo controller interface. Press the TE SPEED button until the menu with speed is shown. Press the four lower arrow keys to increase or decrease the desired maximum speed. When modification is complete, press TE SPEED to store the number in memory.


Figure 3.5 – Servo motor controller interface

## SECTION 4.0 – Troubleshooting guide

ABM has done its best to include as much information as possible. However, not all problems are listed, therefore ABM asks that whenever a problem occurs you contact a service technician at our home office. To reach service dial 281-443-4440 and ask for a service technician, they are on call 24 hours a day, seven days a week.

### Troubleshooting notes:

A few blank pages are provided so that you and your personnel can keep records and notes of machine problems. By using this section and keeping it attached to the manual, you will always have your own personalized quick reference repair section.

TROUBLESHOOTING NOTES:

| Date | Problem | Solution |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

TROUBLESHOOTING NOTES:

| Date | Problem | Solution |
|---|---|---|
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# LA-763M

Long Arm machine manual: Electric versions
www.abminternational.com

- Installation instructions
- Operational guide
- Troubleshooting guide
- Parts list

# Table of Contents

# EcoDrive

## QE3760/QE5540

# Instruction Manual

# Part 1

CE

QUICK-ROTAN Elektromotoren GmbH
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67655 Kaiserslautern
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Fax: 0631 / 200 38 62
E-Mail: tech.supp@quick-rotan.com
www.quick-rotan.com

**English 2004-03-10**

**The CE symbol confirms that the respective drive system meets the applicable safety requirements of the following EU directives:**

- **EC Maschine Directive 89/392/EWG**
- **EMV Directive 89/336/EWG**
- **Low Voltage Directive 73/23/EWG**

# Contents



**Technical updatings reserved !**

# 1. General Safety Information

This EcoDrive Sewing Drive System has been constructed and tested in compliance with the relevant regulations and safety standards and has left our factory in proper safety condition.

In order to maintain this condition and to ensure non-hazardous operation, the user is obliged to observe the information and warning notes contained in this Operating Instructions Manual.

The EcoDrive is not a ready-to-use machine, but is designed for installation into machines of the sewing-thread processing industry operating in clean and dry localities. It is not allowed to operate the EcoDrive in any machine unless the machine destined for receiving installation of this motor is specifically identified as being in compliance with the regulations of the EC Rule on machines.

Any application or use beyond the conditions stipulated above, such as outdoors, in moist or explosion hazardous environment, is not considered to be in compliance with specifications. Application in compliance with regulations and standards also includes close observation of the operating, maintenance and repair conditions stipulated by the manufacturer.

The EcoDrive can function safely and reliably only when used in compliance with this Operating Instructions Manual and in compliance with the use it is intended for.

Read this Operating Instructions Manual thoroughly before unpacking and commissioning the ECO-DRIVE. Please make yourself acquainted with all safety, installation. operating and maintenance instructions before starting operation of the EcoDrive, its accessories and attachments.

Any and all activities on and by means of the EcoDrive must be carried out exclusively under close observation of the general and specific safety instructions given in the ensuing sections of this Operating Instructions Manual!

All persons involved must be made thoroughly familiar with these safety instructions, requiring them to observe these closely. Non-observation of these safety instructions can cause injury to persons, damage to objects or malfunction of or damage to the drive system itself.

Any and all accident prevention regulations as well as the rules on work in compliance with proper practices and safety standards valid in the user country involved must be fully observed. This drive system is subject to installation and commissioning by properly trained personnel!

Installation and commissioning of the EcoDrive must be made with due care by qualified technicians so as to minimize the effects of any disturbing influences which are likely to constitute health hazards to personnel or any other perilous condition.

Doing any work on any parts or elements of the equipment being under live voltage is not permitted! Exceptions are subject to EN 50110.

Before removing any cover parts or installing any attachments or accessories - such as speed control unit, light barrier control etc. - switch the machine off, shut off physical connection with mains voltage, and wait for the machine to come to complete stop. Do not open the control box before ten minutes have elapsed!

In order to reduce any hazard of burns, fire, electrical shock, or injury, it is basically not permitted to make any structural modifications or other changes on the EcoDrive.

It is not allowed to operate the equipment with any cover or protection elements removed!

Before leaving the workplace, turn the ON/OFF switch into its OFF position. In case of prolonged pauses of operation, remove the mains plug from the wall oulet so as to safeguard the drive system against being inadvertantly switched on again.

Any equipment or auxiliary facilities additionally connected to the control system of the EcoDrive are only allowed to be operated on low voltage generated by a safety transformer!

Never use the drive system with its ventilation louvers clogged. Make sure that ventilation louvers are unobstructed by fibres, lint, dust etc.

Do not introduce or drop any objects, such as needles, into the ventilation louvers.

Keep your hands out of the area of moving parts!

Do not operate the EcoDrive when using aerosols (sprays) or oxygen!

This Operating Instructions Manual is an integral part of the EcoDrive and must be passed on with it in case of change of ownership.

The instructions given in the sections below are destined for your own safety as well as for that of other persons.

Warnings given in various section of this Operating Instructions Manual for the purpose of preventing specific hazards of injury to persons or damage to the equipment are identified by the symbol shown at left.

This symbol is a warning given on the EcoDrive, indicating dangerous voltage.

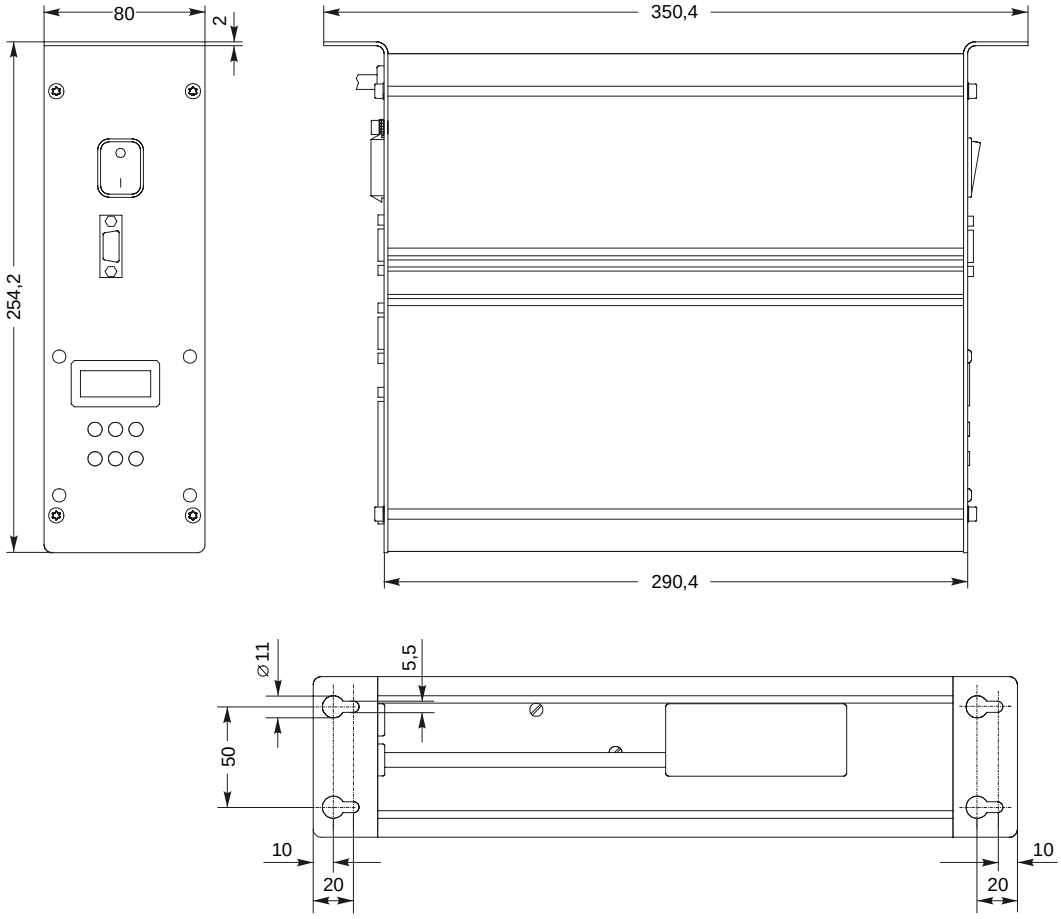
The EcoDrive is permitted to operate only in a properly functional protection earth system in compliance with all local rules and regulations.

# 2. Technical Specifications

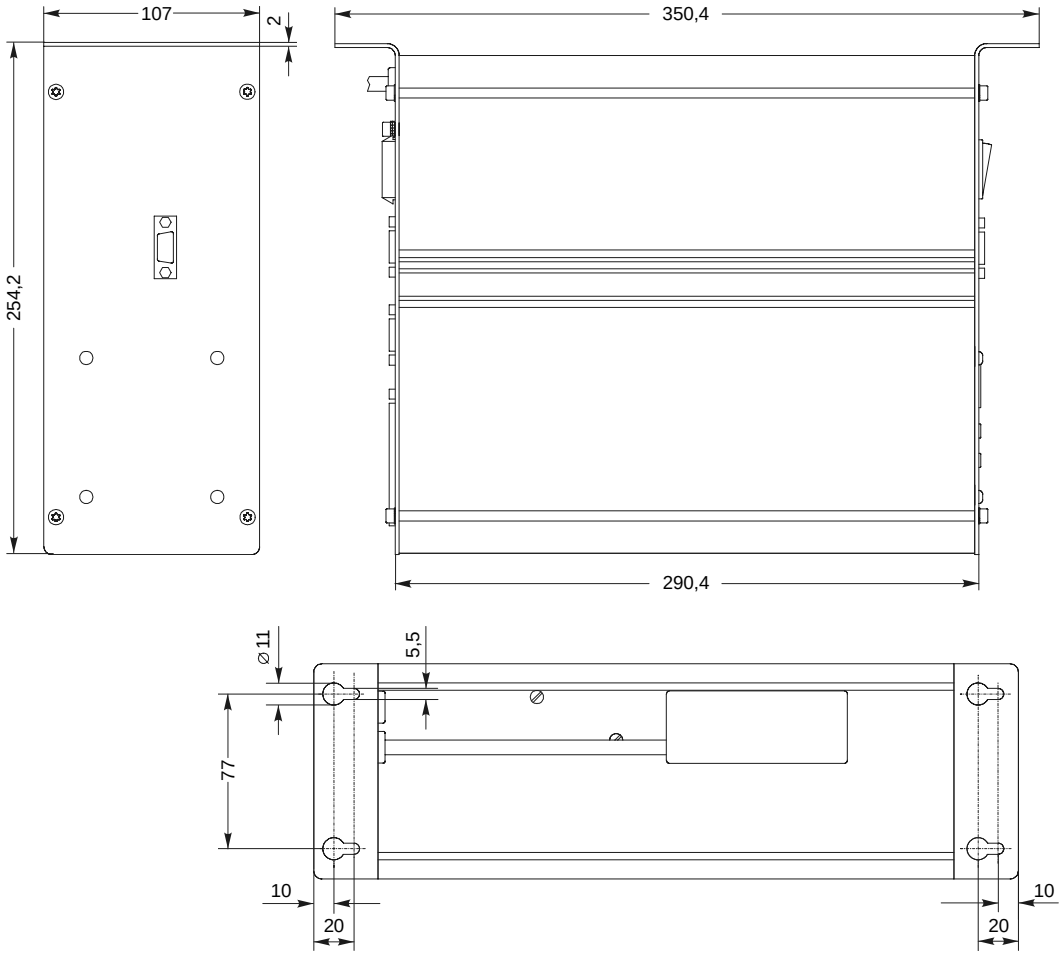
| **Rated Values:** | **ED QE3760** | **EDL QE5540** |
|---|---|---|
| Voltage ($U_{N)}$) [V] | 230, single phase AC | |
| Frequency ($f_{N)}$) [cps] | 50/60 | |
| Current (drive system) ($I_{N)}$) [A] | 3,5 | 5,0 |
| Current (control system) [A] | 0,6 | |
| Power (output) ($P_2$) [W] | 375 | 550 |
| Speed ($n_n$) [1/min] | 6000 | 4000 |
| Torque ($M_n$) [Nm] | 0,63 | 1,2 |
| Moment of motor inertia ($J_{mot}$) [kgcm²] (without belt pulley) | 0,5 | 1,0 |
| Operating mode | S5 (40 % duty cycle at ts = 2.5 s) Intermittent operation with electrical brake action, relative duty cycle 40 %, operating cycle time 2.5 s | |
| Protection type | IP40 | |
| Insulation class | E | |
| **Limit Values** | | |
| Range of voltage [V] | 190 - 240 +/- 10% single phase | |
| Speed ($n_{max}$) [1/min] | 9000 | 4500 |
| Torque (accelleration) ($M_{max}$, short-time) [Nm] | 3 | 7 |
| Power (short-time) ($P_{2max}$, short-time) [W] | 1000 | 1500 |
| Maximum permissible ($J_{masch}$) [kg cm²] sewing machine inertia, reduced to the motor shaft ($J_{mach}$) | 4,5 | 9,0 |
| **Conditions of Use** | | |
| Ambient temperature [℃] | + 5 bis 45 | |
| Ambient temperature (24 hour average) [℃] | < 35 | |
| Humidity (relative) | 85% bei 30 ℃ | |
| **Driving voltage of the Outputs** | | |
| Idling voltage [V] | 25 DC | |
| Voltage under load [V] | 24 DC at I = 4 amps (20 DC at I = 10 amps short-time) | |
| Power | 96 (200, short-time) | |
| Load current | 4 | |
| Maximum load current | 10, (short-time) | |

**Note: The accumulated load currents of all simultaneously operated outputs (solenoids, solenoid valves) are not *allowed to exceed 4 amps!***

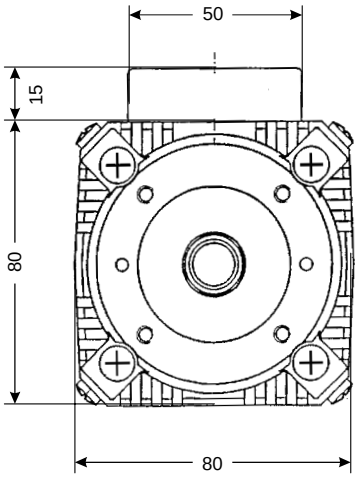
## Dimensions of the Control System (small version) ED

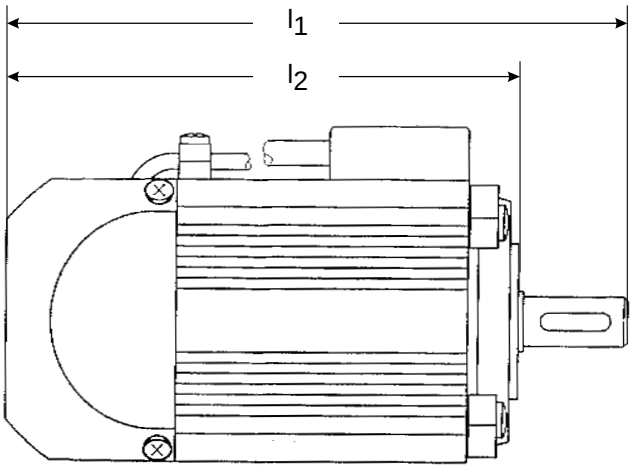



## Control System (broad version) EDx



## Motor




| | MS | MSL |
|---|---|---|
| $l_1$ = | 179 | 219 |
| $l_2$ = | 147,5 | 187,5 |

# 3. Range of Application

The **EcoDrive** is not a ready-to use machine, but is intended for installation into other machines, such as sewing units and sewing equipment used by the sewing thread processing industry.

The **EcoDrive** is destined for use in clean and dry localities.

Any application or use beyond the conditions stipulated above, such as outdoors, in moist or explosion-hazardous environment, is not considered to be in compliance with specifications.

Application in compliance with regulations and standards also includes close observation of the operating, maintenance and repair conditions stipulated by the manufacturer.

# 4. Scope of Supply

1x Synchronous motor QE3760 with commutation transmitter
or Synchronous motor QE5540 with commutation transmitter

1x Control system with mains power switch

1x Speed control unit SWG2 (Art.Nr.63.012) + accessories

1x Operating Instructions Manual

Optional:

1 Synchronizer (Art.Nr. 62.055)

1 Operator panel EcoTop

# 5. Transport and Storage

The EcoDrive has left our factory after thorough final inspection.

Please check the drive system for any transport damages.

If necessary, file claims with the carrier.

Complaints for missing parts will be accepted within 14 days from the date of purchase.

The EcoDrive and its accessories are shipped in a carton with polyurethane insert;
outside dimensions: L = 600 mm,
W = 405 mm
H = 280 mm

This packing material protects the EcoDrive against outside influences during transport and storage.

The EcoDrive is designed to withstand temperatures during transport and storage of between -25℃ and +55℃ and briefly, but not lon ger than 24 hours, up to +70℃.

Storage in the packing material must be in a dry environment.

**Handle the carton and its contents with care!**

# 6. Mounting Instructions

Before starting installation, please remove all parts from the packing material.
The carton holds the **EcoDrive**, accessories and Operating Instruction manual.
Check the content if complete.
If you have any questions with the installation, not clarified through the Instruction Manual, please contact us or one of our nearest Service Stations.
Assemble the **EcoDrive** in compliance with the instructions and illustrations.

## 6.1 Motor assembly

There are three different ways to assemble the motor to the machine.

1.Machine head mount (rear / external)

2.Under the table top mount

3.Machine head mount (direct drive, internal)

There are three different ways to transmit the motor drive:

· Timing belt and timing gears.
· “V” belt and pulley.
· Direct drive on main shaft.

### 6.1.1 Use of timing belt.

Transmitting torque through timing belt, slippage is avoided.
Transmission ratio between motor and machine is 1:1.
Being so, no reference signal from sewing machine is required.
Many transmission ratios in both directions are possible, on the available timing belt wheels.
In this case a reference position signal is needed by the machine.

### 6.1.2 Use of “V” belt

Transmitting torque through “V” belt, slippage is possible. Transmission ratio between motor and machine is variable. Reference signal from sewing machine is required.

### 6.1.3 Assembly of the motor to the machine head.

Following, list of parts required:
- Assembly bracket (machine type related)
- Motor timing gear
- Machine timing gear
- Timing belt
- Belt cover

### 6.1.4 Assembly of the motor under the table

Following list of parts required:
- Assembly bracket
- Motor pulley
- Machine pulley
- “V” belt
- Belt cover
- If necessary synchronizer PD3
- Y-adapter

## 6.2 Motor and machine adjustment

a) Adjust motor shaft to reference position (zero position)
- Terminal box at top (viewpoint)
- Motor shaft groove (-90°) quarter to twelve in re lation to terminal box equals zero position, rotate motor shaft.

b) Adjust machine reference position (zero position)
- Rotate machine pulley (sewing rotation) until needle point starts penetrating needle hole of throat plate (zero position)

c) Assembly of timing belt
- Slide belt to motor and machine timing gear maintain and guarantee positions described in a) and b).

## 6.3 Electrical Connection (to Mains Power)

All work on the electrical equipment (connection, maintenance, repair) is permitted to be performed only by or under the supervision of a properly qualified technician.

The EcoDrive is designed for connection to an earthed AC mains power system having a rated voltage between

**190 and 240 Volts, 50/60 cps**.

Before connecting the power supply line, make sure that your mains power voltage is within the rated voltage range specified on the nameplate of the EcoDrive.

Connection to mains power is permitted only by means of a multi-contact plug with protection earth contact. Fixed connection is not permitted.

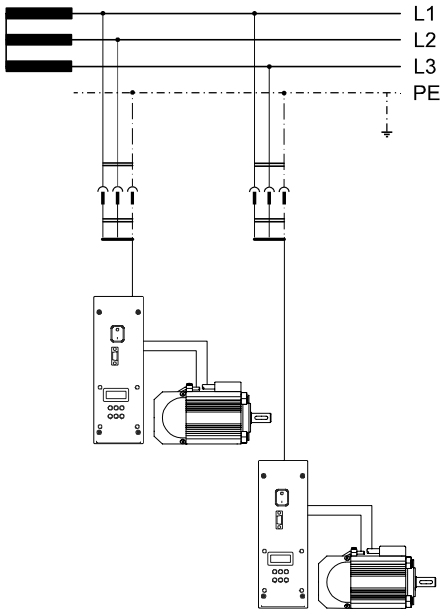
Connect the following potentials:

Phase (L1 or L2 or L3)
Neutral conductor (N)
Protection earth (PE)

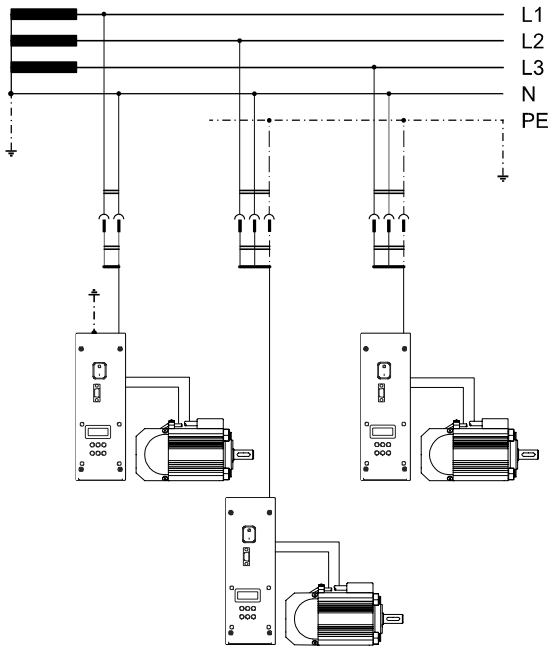
The EcoDrive is designed for connection to the following types of mains power systems:

- TN (system with a directly earthed point and with a protection earth conductor (PE) connected to this point)
- TT (system with a directly earthed point, the protection earth conductor (PE) not being connected to this point)
- IT (system not directly earthed)

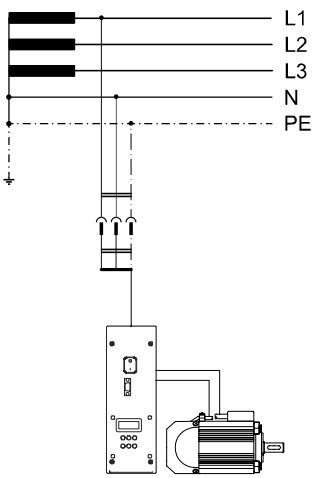
**IT-System**




**TT-System**




**TN-System**



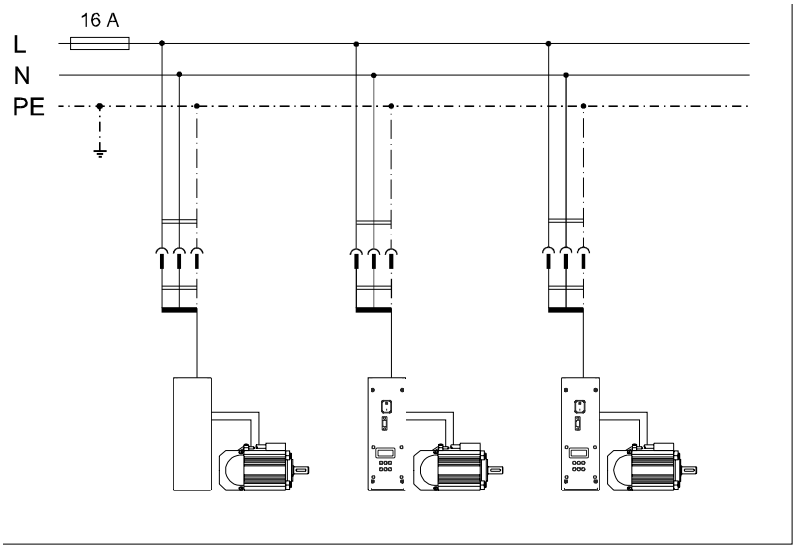
**The following applies to TT and IT systems:**

All elements protected by a common protective device must be connected to the same earthing via protection earth conductors.

All elements apt to be touched simultaneously must be connected to a common earthing.

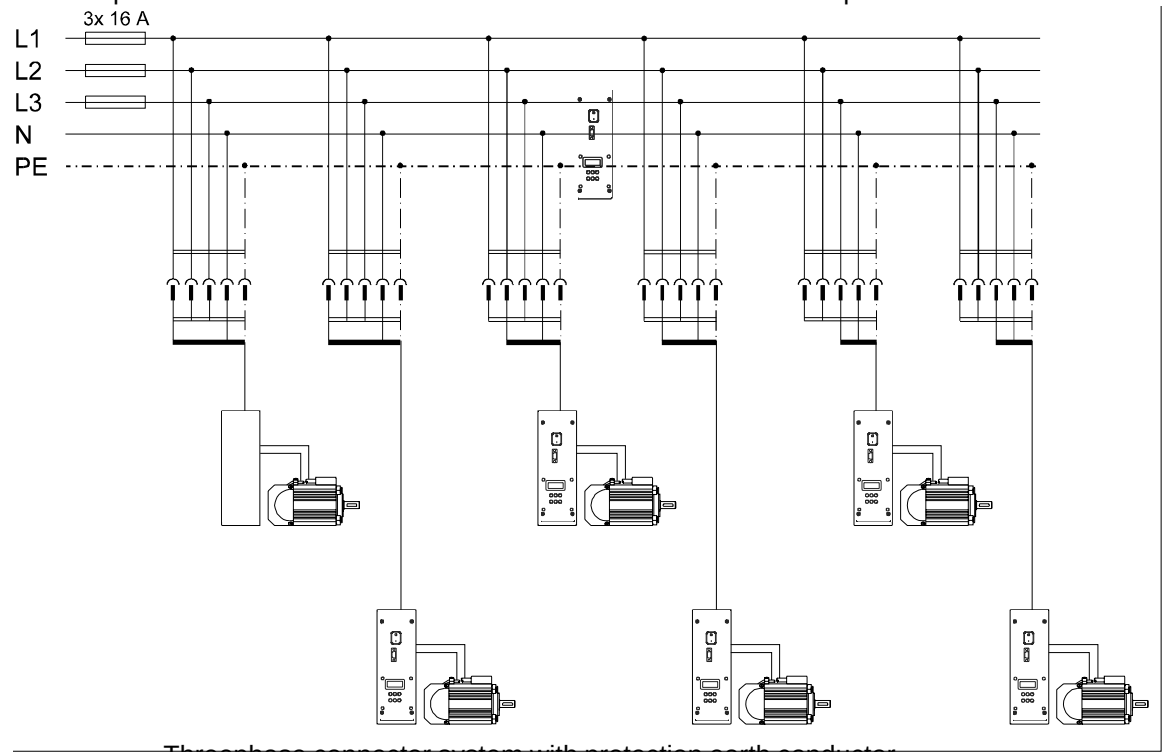
**The following applies additionally to IT systems:**

No active conductor within the installation is permitted to be earthed directly. All elements must be connected individually, in groups, or in total with a protection earthing conductor.




Single-phase connector system with protection earth conductor

Do not operate more than 5 EcoDrives on one circuit fused with 16 amps.




Threephase connector system with protection earth conductor

Make sure to distribute loads evenly in a threephase AC system!
Do not operate more than 3 EcoDrives on one face fused with 16 amps in order not to overload the N-conductor!

The EcoDrive is a protection class I device, i.e. for protection at indirect touching it comprises a protection earth connection.

The EcoDrive is permitted to operate only in a properly functional protection earth system in compliance with all local rules and regulations in order to avoid danger to persons by electric shock or fire hazards in case of malfunction.

It is not permitted to disable the protection system by using extension cables not equipped with a protection earth conductor.

**Caution:** Any interruption of the protection earth conductor within the EcoDrive or outside, or by disconnecting the protection earth connection, can result in making the equipment hazardous.
Any intentional interruption is inadmissible.

Fault Current Protection Devices
If any EcoDrives are to be monitored via fault current protection devices, then the latter must be shock puls proof, short pulse delayed as well as suited for alternating and pulsating constant fault currents.

For connections, use line types not lighter than plastic- insulated sheathed flexible cables H05 VV.
The minimum conductor cross section must be 1 $mm^2$, with the line length not in excess of 5 m.
The voltage drop in the protection earth conductor is not permitted to exceed 3.3 V at a measuring current of 10 amps.

Any lines installed must be properly protected against anticipated loads and must be properly fastened.

Place and attach lines so as to maintain a minimum distance of 25 mm relative to any moving parts.

Place lines, mains power leads and low voltage circuits at a proper distance from each other to achieve adequate separation.

For replacement make sure to use exclusively fuses of the type and current rating specified.

Any bridging-over of fuses is inadmissible and will create electrical or fire hazards.

If there is reason to presume that operation without hazards will not be possible, discontinue operation of the drive system and safeguard the equipment against inadvertant use.

Reasons to presume that operation without hazards will not be possible are as follows:

- if the drive system presents visible damage, for instance mains power connection cable,
- if the drive system fails to function,
- after lengthy storage at unfavourable conditions.

The control box may be opened only by properly qualified personnel and after having separated the drive system from mains power by pulling the plug out. (After switching the system off, wait at least 10 minutes.)

Insert and lock carefully the connectors on the control system after having checked the pin and socket configuration and the plug-in direction, to avoid malfunction.

The brake action will not be initiated when mains power supply is switched off or power failure occurs during operation of the EcoDrive.

When leaving the workplace or when doing maintenance work, separate the machine from mains power by pulling out the plug. For this, do not pull at the cable, but grip the plug and pull it out.

**Before separating the EcoDrive from mains power,
bring all control elements into „OFF“ or „0“ position.**

## 6.4 Electro-Magnetic Compatibility (EMC)

The EcoDrive is designed for installation/attachment to EMC sewing units and equipment, i.e. it complies with the relevant EMC regulations (CDV IEC 204-3-1 44 sec 169) for a cable length of 500 mm at each input or output connector. In accordance with experience, this is adequate for sewing units.

More complicated sewing equipment may require additional action due to longer cables, unfavourable cable placement, neighbouring strong interference fields etc.

The following action can be appropriate for reducing or eliminating interference:

- The use of appropriate filters, delay units, line material or line placement.

- Lines belonging to different circuits (such as mains power, low voltage) being placed at a proper distance from each other to minimize interference.

- Reference potential conductors for the circuits, or a common connection point:
  star-type wiring with one or more reference points earthed via insulated conductors having a large cross section.

- Electrically conductive parts of the sewing unit or equipment should be connected via potential compensation leads to the protection earth conductor on the EcoDrive control box. (Use leads suited for high frequencies: fine-gauge stranded leads with a cross section of at least 2.5 $mm^2$, or large-area copper bands.)
  When connecting potential compensation leads, make sure to achieve good contact, i.e. use toothed washers for connections to painted parts.

Include the following parts in potential compensation:
- sewing machine head
- sewing machine stand
- treadle
- housings of solenoids or solenoid valves
- holding brackets for push-button switches
- stands for stackers, band feeders etc.

- Mass Connections
  Lead mass connection lines from each equipment element to a common point.
  Use large cross section braided leads between moving parts and casings while keeping mass connection as short as possible.

- Signal Transmission
  Use electrostatic and magnetic screening, twisted conductors and appropriate line placement to ensure that transmission of interference voltages from control or mains power lines to signal lines is prevented.
  (Right-angle line crossings are better than any lower angles; by all means avoid parallel placement.)

- Separation of Equipment Parts
  Equipment parts that are susceptible to interference parts (pulse-processing and/or low-level subassemblies) should be mounted separately from and/or be screened against switching devices such as electromagnetic relays, thyristors etc.

- Although being largely insusceptible to interference, the EcoDrive should not be operated in the immediate vicinity of HF welding devices or similar equipment to avoid malfunction.

- The EcoDrive is capable of complying with EMC regulations only when the control box front is provided with its cover!

- The covers of the control box must remain closed during operation in order to avoid malfunction due to EMC causes as well as pollution by dust penetration.

Whenever trouble should occur, please contact the manufacturer.

## 6.5 Mounting of the Speed Control Unit (SWG)

- Attach the speed control unit by means of the mounting bracket under the machine table.
- Connect the push/pull bar of the SWG with the machine treadle by means of a pitman rod.
- Install the mounting bracket for the SWG in such a way that the pitman rod and the push/pull bar of the speed control unit (SWG) line up to the treadle.
  This guarantees a optimal force transmission from treadle to SWG.
- The pitman rod and the treadle should form an angle as close to 90 degrees as possible.
- The speed control unit can be swivelled on the control box within a range of 40 degrees.
- Make sure that the treadle can move with ease!

# EcoDrive

## QE3760/QE5540

CE

# Type

# P40ED

## Instruction Manual

## Part 2

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**Englisch 2004-03-08**

# List of Contents Part 2

# 7. Description of the EcoDrive Drive System

The EcoDrive Drive System is an electronically commutated, brushless DC motor.

The system is composed of the following subassemblies

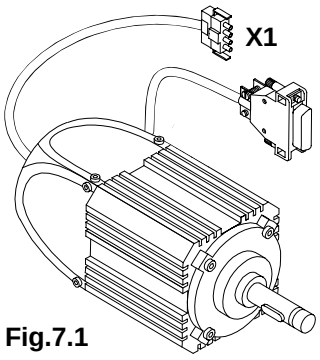



Fig.7.1

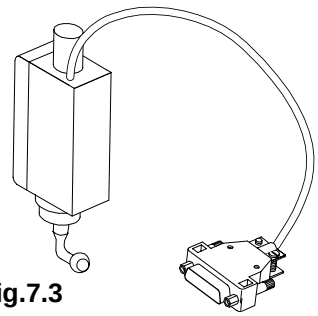


Fig.7.3

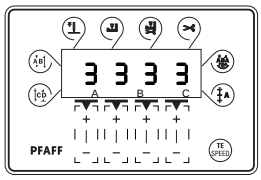



Fig.7.4

Fig.7.

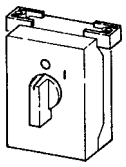


Fig.7.5

**Motor** QE3760 / QE5540 (**Fig.7.1**) with integrated optoelectronic incremental encoder for commutation and positioning.

**Control** (**Fig.7.2**) with
- mains connection with interference rejection circuit
- electronically controlled combinational circuit
- intermediate DC circuit
- motor-driven current inverter
- electronic control for motor control and machine specific functions
- connection for a sewing light

**Speed control unit** SWG2 (**Fig.7.3**)
**Control panel S1** (**Fig.7.4**)
**Mains switch** located under the desktop table (**Fig.7.5**)

## 7.1 Motor QE3760/QE5540

The motor is a synchronous motor. It has a permanent-magnetic rotor, a stator with three-phase winding and an optoelectronic increment encoder for commutation and positioning.
The rated capacity of the motor (shaft capacity) is 375W (QE3760), 550W (QE5540) in S5 mode.
The rated speed of the motor is 6000 rpm (QE3760), 4000 rpm (QE5540),
the maximum speed is 9000 rpm (QE3760), 4500 rpm (QE5540).

The motor has two mains leads:

a) four-wire with special quadripolar AMP plug (X1 Fig.7.1) for connecting the stator coil to the control system
b) six-wire shielded with nine-pole D-sub plug (X2 Fig.7.2) for connecting the increment encoder to the control system.

## 7.2 Control system

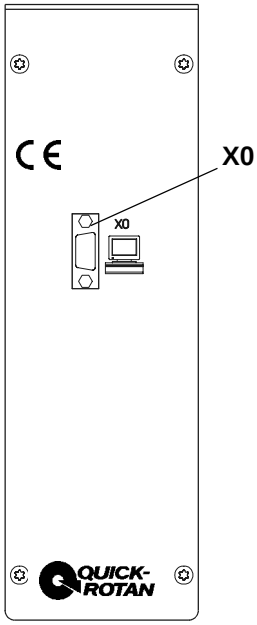



Fig. 7.6

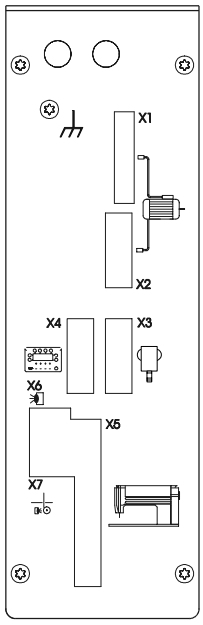



Fig 7.7

The control box is attached to the underside of the machine table by means of the four enclosed screws.

The mains connection is single-phase, using the three-wire cord protruding from the rear and a standard safety plug.

**The control system has peripheral functions:**

**on the front panel** (Fig. 7.6):

**X0** nine-pole D-sub jack for data transfer

**on the rear panel** (Fig. 7.7):

sockets or connector plugs

**X1** quadripole socket for connecting the motor's stator coil

**X2** nine-pole D-sub jack for connecting the motor's increment encoder

**X3** nine-pole D-sub plug for connecting set point adjuster SWG2 (Art. No. 63.012)

**X4** nine-pole D-sub plug for connecting the control panel OC-TOP/AP (Art. No. 64.175)

**X5** 37-pole D-sub jack for connecting the process control system (keys, switches, solenoids, solenoid valves) on the machine.

**X6** six-pole RJ45 western jack for connecting from a light barrier

**X7** six-pole RJ45 western jack for connecting from a bobbin thread supply monitor

In function, the control is connected with the sewing machine/sewing unit via:

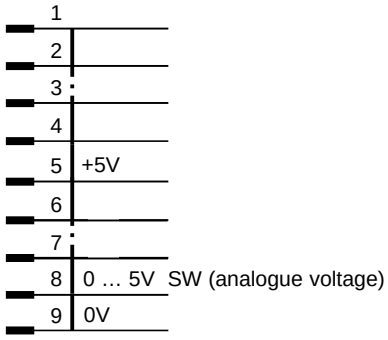
**Inputs (Ex)**, e.g. for push-buttons, switches, proximity switches, detectors, and
**Outputs (Ax)**, e.g. for solenoids, solenoid valves, signal indicators.

# 7.3 Encoder SWG2

the SWG2 is attached under the table with the provided bracket and mechanically connected with the pedal of the machine with the provided linkage.
Electrical connection of the SWG2 is made with the nin-pin coupling on plug X3 on the rear side of the control.
The SWG2 is an analog mechanical-electrical converter that converts the pedal stroke into voltage. This analog output voltage of the SWG2 is digitised in the control so that the pedal stroke is divided into 16 steps (positions).

| Level | Position | Voltage [V] | Meaning |
|---|---|---|---|
| 0 | -2 | 0,00 - 0,50 | Seam end, thread trimming |
| 1 | -1 | 0,50 - 0,94 | Presserfoot up |
| 2 | 0 | 0,94 - 1,76 | Treadle position 0 |
| 3 | +1 | 1,76 - 2,21 | Presserfoot down |
| 4 | +1 D | 2,21 - 2,43 | Speed n1 |
| 5 | +2 D | 2,43 - 2,66 | Speed n2 |
| 6 | +3 D | 2,66 - 2,90 | Speed n3 |
| 7 | +4 D | 2,90 - 3,13 | Speed n4 |
| 8 | +5 D | 3,13 - 3,37 | Speed n5 |
| 9 | +6 D | 3,37 - 3,60 | Speed n6 |
| 10 | +7 D | 3,60 - 3,84 | Speed n7 |
| 11 | +8 D | 3,84 - 4,07 | Speed n8 |
| 12 | +9 D | 4,07 - 4,31 | Speed n9 |
| 13 | +10 D | 4,31 - 4,54 | Speed n10 |
| 14 | +11 D | 4,54 - 4,78 | Speed n11 |
| 15 | +12 D | 4,78 - 5,00 | Speed n12 |

**contact connections of connection plug (X3) of the SWG2**



# 7.4 Control panel

The control panel (**Fig. 7.8**) consists of **display 1** and the function keys described below. The display 1 consists of a single-line, 7 segment LCD display with 8 symbols. The **texts 2**, located above and next to the LCD display, show the respective status of the function keys and the operating status of the machine. The control panel switches on all LCD-segments and the horn automatically for a short time during the power-on phase, after which the lettering PFAFF appears on the display, until the higher-ranking control unit sends commands to the control panel.
The function keys are located around the display 1. They are foil-packed without permanent marking and without contact signal. Fixed functions are allocated to the keys, see Chapter 7.4.2 Fuction keys.

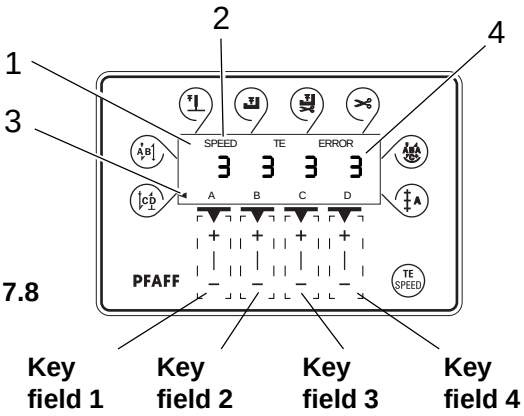



**Fig. 7.8**

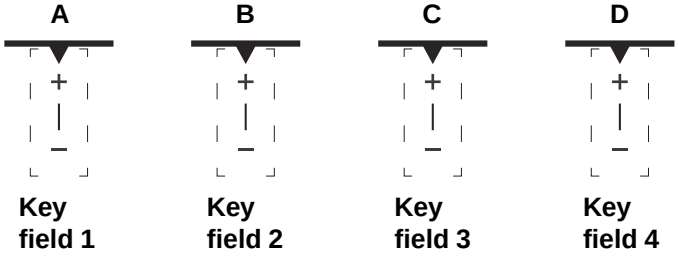
## 7.4.1 Screen displays

Activated functions are displayed with a triangular **marking 3** below or next to the respective function key.
In the sewing mode all relevant sewing data is displayed and can be changed directly, depending on the status of the machine, see also Chapter 8.2 Sewing.
During the parameter input the selected parameter number with the corresponding value is displayed.

## 7.4.2 Function keys

The function keys (**Fig.7.8**) described below are used basically to switch machine functions on and off. Each time a key is pressed, this must be confirmed by at least one beep tone. Irrespective of the machine mode a double beep signal is given if invalid keys are pressed or maximum values reached. If a corresponding value has to be set for the activated function, this is carried out with the corresponding +/- key. By pressing and holding the corresponding +/- key, the relevant numerical **value 4** is changed slowly to begin with. If the corresponding +/- key is held down longer, the values change more quickly.

**see Fig. 7.8**



**Start backtacks**

If this key  is pressed, the backtacks at the beginning of the seam (start backtacks) are switched on or off. The number of forward stitches (A) or reverse stitches (B) for the start backtacks can be changed by pressing the +/- key underneath. To convert from double backtack to single backtack set the number of stitches for the corresponding seam section at zero.

**End backtacks**

If this key  is pressed, the backtacks at the end of the seam (end backtacks) are switched on or off. The number of reverse stitches (C) or forward stitches (D) can be changed by pressing the +/- key underneath. To convert from double backtack to single backtack set the number of stitches for the corresponding seam section at zero.

**Needle position**

If this key  is pressed the „needle raised after sewing stop“ function is switched on or off.

When the function is switched on, the needle positions at t.d.c. after sewing stops.

**Foot position after stop**

If this key  is pressed the „foot raised after sewing stop“ function is switched on or off.

When the function is switched on, the presser foot is raised after sewing stops.

**Foot position after trimming**

If this key  is pressed the „foot raised after thread trimming“ function is switched on or off.

When the function is switched on, the presser foot is raised after thread trimming.

**Thread trimmer**

If this key  is pressed the thread trimming function is switched on or off.

**Darning program**

If this key  is pressed the darning program function is switched on or off.

The counted seam function is switched off automatically.

**Counted seam**

If this key  is pressed the counted seam function is switched on or off.

The darning program function is switched off automatically.

**TE/Speed**

If this key  is pressed once the speed limit for the sewing mode is activated.

If this key  is pressed twice (within 5 seconds) the machine changes from sewing to input mode.

# 8. Application

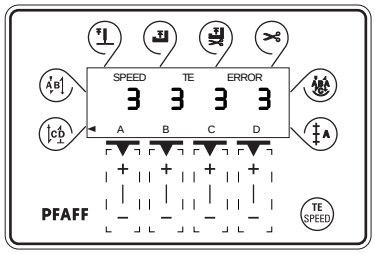
This **EcoDrive drive** can be used **with the external operator's control panel S1**.

**Switching on**
The on/off switch (mains switch) is located under the sewing machine table. When activated and live, an control lamp at the switch lit up.

**Maximum speed**
The maximum speed can be adjusted with the control panel S1.
Press the TE/Speed key once to call up the speed input mode.

## 8.1 Entering the start and end backtacks

Switch on the machine.




If necessary switch off the "darning seam" or "counted seam" function, see Chapter 8.3 Darning pro gram or Chapter 8.4 Counted seam.

By pressing the corresponding +/- key ("A") select the desired value for the number of forward stitches (A) of the start backtack.

By pressing the corresponding +/- key ("B") select the desired value for the number of reverse stitches (B) of the start backtack.

By pressing the corresponding +/- key ("C") select the desired value for the number of reverse stitches (C) of the end backtack.

By pressing the corresponding +/- key ("D") select the desired value for the number of forward stitches (D) of the end backtack.

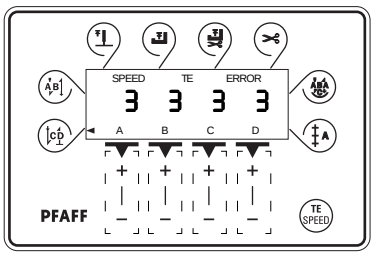
By pressing the keys start backtack and/or end backtack, activate the corresponding function (arrow appears next to the corresponding function key).

## 8.2 Sewing

In the sewing mode all relevant settings for the sewing operation are displayed. Functions can be switched on or off by pressing a key. Values for start and end backtacks or stitch placement can be changed directly.

**When the machine is switched on, the sewing mode is always activated.**

Switch on the machine.




If necessary switch off the function "darning seam" or "counted seam", see Chapter 8.3 Darning program or Chapter 8.4 Counted seam.

Functions in manual sewing, also see Chapter 7.4.2 Function keys:

Start backtacks on/off

End backtacks on/off

Needle position raised on/off

Presser foot raised on/off

Presser foot raised at end of seam on/off

Thread trimming on/off

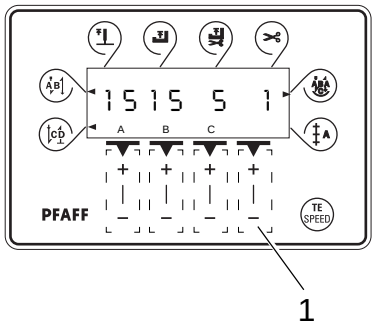
Darning program on/off

Counted seam on/off

Sewing is carried out with the pedal functions.

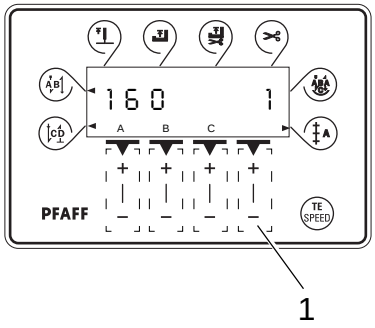
The "Darning program" and "Counted seam" functions are explained in more detail in Chapter 8.3 Darning program or Chapter 8.4 Counted seam.

## 8.3 Darning program




The corresponding function can be switched on or off directly with the Darning program key. The "counted seam" function is switched off automatically. Several darning programs with different seam sections A and B can be selected. The number of required darning programs can be selected by operating the +/- key 1. The number of stitches for the individual seam sections A and/or B can be selected by operating the corresponding +/- key. By operating the corresponding +/- key it is possible to select a repeating factor "C" for the selected darning program.
If the backtack functions are also activated, only the status backtack on or backtack off is displayed. The individual backtack parameters can be altered after the "darning program" function has been switched off, see Chapter 8.1 Entering start and end backtacks.

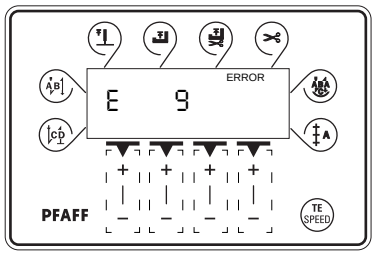
## 8.4 Counted seam




The corresponding function can be switched on or off directly with the Counted seam key. The "darning program" function is switched off automatically. Several counted seam sections can be selected. The number of required seam sections can be selected by operating the +/- key 1. The required number of stitches"A" of the selected seam section can be selected by operating the corresponding +/- key.
If the backtack functions are also activated, only the status backtack on or backtack off is displayed. The individual backtack parameters can be altered after the "counted seam" function has been switched off, see Chapter 8.1 Entering start and end backtacks.

## 8.5 Error messages

If a fault occurs, the text "ERROR" appears on the display, together with an error code and short instructions. An error message is caused by incorrect settings, faulty elements or seam programs as well as by overload conditions.
For an explanation of the error codes see Chapter 9.




TE SPEED

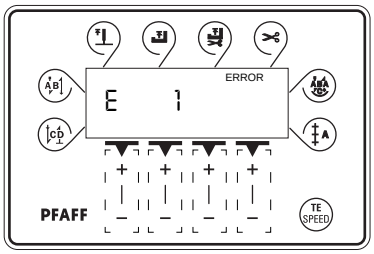
Correct the error.

Acknowledge error correction by pressing the TE/Speed key.

# 9 Error Codes (Malfunction Diagnostics)

The control system of the drive cyclically tests its own functional condition and the functional condition of the complete drive system.

Malfunctions are signalled via the display of the external control panel, for instance:




## Summary of the malfunctions:

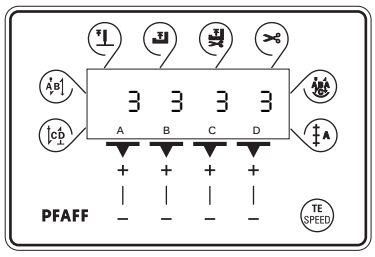
| Malfunction-No. | Reason | Remedy |
|---|---|---|
| 1 | Treadle not in zero position when mains power is turned ON. | Bring treadle in zero position, check the treadle, connect the Speed control unit. |
| 9 | Start lock is active. | Eliminate cause. |
| 10 | Machine class (<799>) was changed. | Turn mains power switch OFF and ON again. |
| 62 | Short circuit on 24 V (32 V) DC. | Find short circuit and eliminate it<br>Turn mains power switch OFF and ON again. |
| 63 | Overload on 24 V (32 V) DC, load current > 4 amps. | Turn mains power switch OFF and ON again search component (magnet), what was the reason why. Adjust new the magnet or change it. |
| 64 | voltage too low (90 V - 150 V) ( U < 150V ). | let check the voltage from a specialist. |
| 65 | Power electronics not operational after mains power ON, mains power < 130V. | Turn mains power switch OFF and ON again, if the malfunction still happens, then change the control box. |
| 66 | Earth short (motor or motor supply line has earth short in one or more phases). | Change the control box or the motor. |
| 67 | Internal malfunction | Change the control box. |

| Malfunction-No. | Reason | Remedy |
|---|---|---|
| 68 | Power electronics shut-off<br>when motor runs why:<br>a) Overcurrent, short circuit in motor or supply line<br>b) Overvoltage, mains voltage too high (>300 V), motor overloaded while decelerating<br>c) Undervoltage | Eliminate cause. |
| 70 | Machine blocked, no increment from synchronizer at max. motor torque. | Eliminate cause. |
| 71 | Commutation transmitter plug not inserted | Insert commutation transmitter plug |
| 73 | Motor overloaded. | Eliminate cause. |
| 75 | Internal malfunction: governor blocked. | Change control box. |
| 92 | Start lock while motor running. | Eliminate the causing input signal and turn mains power switch OFF and ON again. |
| 93 | Wrong EEPROM. | Change EEPROM. |
| 100 ... 111 | Internal malfunction. | Change control box. |
| 173 | Governor disturbance:<br>Startangle within control time not reached. | Turn hand wheel into needle position 2 (link take-up up), turn mains power switch OFF and ON again, start new.<br>Raise value for parameter <880> |

# 9.1 Parameter settings

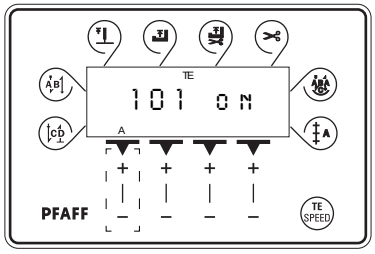
## 9.1.1 Selecting the user level

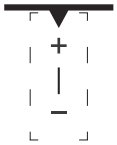
Switch on the machine.

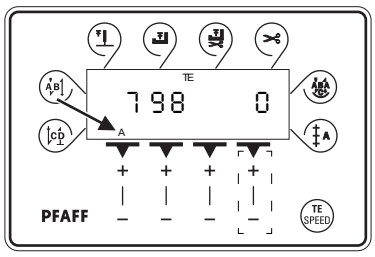



Press the TE/Speed key  twice to call up the input mode.






By pressing the corresponding +/- key  select the parameter group "798".




By pressing the corresponding +/- key select the desired user level:

"0" = operator level A
"1" = technician level B
"11" = service level C

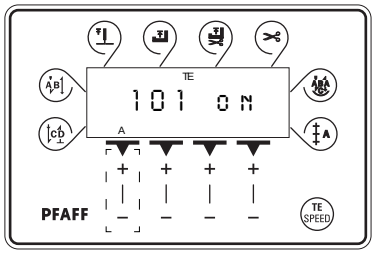
The selected user level is displayed on the screen. (see arrow).

### 9.1.2 Example of a parameter input

Switch on the machine.

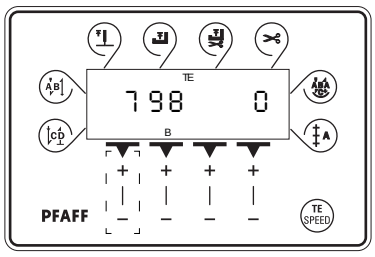
Press the TE/Speed key 

twice to select the input mode.

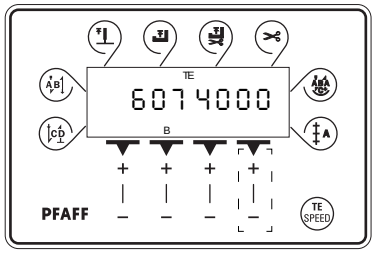



By pressing the corresponding +/- key 
select parameter "798" and the user level "B",

see Chapter 9.1.1 Selecting the user level.




Select parameter "607" by pressing the corresponding +/- key 



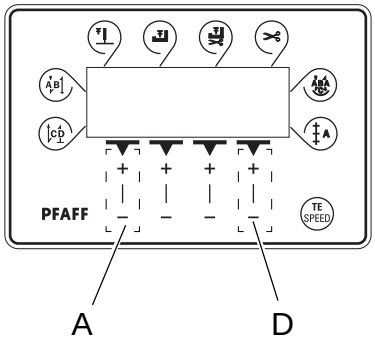

Select the required value for the maximum speed by pressing the corresponding +/- key.

By pressing the TE/Speed key 

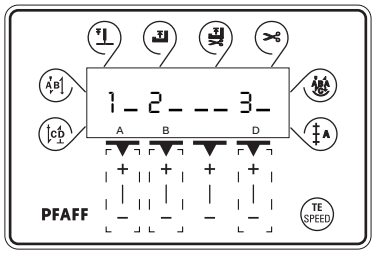
the selected value is taken over and the machine switches to the sewing mode.

## 9.2 Reset / Cold start

After selecting the reset menu, by pressing the corresponding key it is possible to reset seam parameters, reset seam programs and to execute a cold start.




Press and hold "+" on keys A and D and switch on the machine!





Resetting the seam parameters
Press "+"on key "A".
All parameters are deleted, the display "—rE—" appears for a short time on the screen.


Resetting the seam programs
Press "+"on key "B".
All seam programs are deleted, the display "—rE—nA" appears for a short time on the screen.


Cold start
Press "+" on key "D".
With the exception of the value for the machine class, the values of the machine control unit are set back to their basic values, the display "—COLd—" appears for a short time on the screen.

After the cold start all programmed values are set back to their status at the time of delivery. For this reason after a cold start it is necessary to re-enter first the parameter "799" and then the parameter "700".

# 10. Start of operation

If the **EcoDrive** has been stored at a temperature of <+5℃, then a working temperature of between +5℃ and +40℃ must first be obtained.
The equipment must be dry.

Before work with the machine can be started, make sure to perform the following:

a) Control the direction of rotation and the reference position of the needle bar

b) Control the needle positions

c) Control the maximum speed

## 10.1 Control of the direction of rotation and of the reference position from the needle bar (needle position NPO)

a) Activate programming level „**b**“ (technician level) (see section 9.1.1 „Selecting the user level „**b**“)

b) Set parameter 700

c) Actuate treadle briefly forward:
Reaction: The machine performs a full revolution and then positions in a random position.

d) Is the direction of rotation correct?
When yes, then proceed to adjust the reference position, proceed with e) below
If no, then activate parameter 800 and change the value <800> (on → off or off → on)
than proceed as b)

e) Turn the handwheel of the machine in the direction of rotation until the **point of the needle coming from up** to down touches the level of the throat plate (= reference position).

f) Actuate the treadle briefly forward:
Reaction: The machine performs one revolution and positions in the same position that had been previously obtained by hand.

g) As soon as new parameter numbers are activated, or the programming level „**b**“ is negated, then the parameter value <700> is memorized and the reference position adjustment is completed.

## 10.2 Control of the needle positions NP1 / NP2

NP1 - needle down position (<702>)
NP2 - thread take up lever in the up position (<703>)

a) Activate programming level „**b**“ (technician level)
(see section 9.1.1 „Selecting the user level „b“)

b) Activate parameter 702

c) Actuate the treadle briefly forward
Reaction: The machine performs a revolution and then positions at the programmed <702>

d) Is the needle position correct?
When yes, then proceed as with g) below.
When no, then the position must be changed
by turning the hand wheel or
via key field 3 +/- or field 4 +/- (see section 7.4.2) at the **control panael** S1

e) Actuate the treadle briefly forward
Reaction: The machine performs a revolution and positions in the same position

f) The position can again be corrected.
When no further correction is needed, then proceed as with g) below.

g) As soon as another parameter number is called up, e.g. example 703, the previously programmed value of <702> is memorized.

h) With parameter 703 correction is obtained as described above for parameter 702.

i) Deactivate programming level „**b**“
(see section 9.1.1 and 9.1.2 „Selecting the user level „**b**“).

## 10.3 Control of the maximum speed

a) Activate programming level „**b**“
(see section 9.1.1 "Selecting the user level „**b**“)

b) Set to parameter 607

c) Check the parameter value <607> and make correction if necessary via key field 3 +/- or key field 4 +/- at the **control panel S1**

d) Deactivate programming level „**b**“
(see section 9.1.1 and 9.1.2 "„Selecting the user level „**b**“).

## 10.4 Hardware Test

Hardware Test is a check routine permitting to use the control panel **S1**
for testing various components of the drive system
(control system) and of the machine installation.

**Activation of the „HARDWARE TEST“ = „HW-Test“ routine**

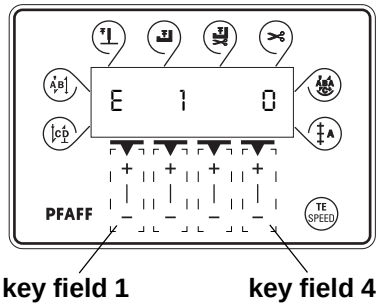
a) push key TE-SPEED two times
b) to activate programming level „**c**“ set parameter <798> to 11
(see section 9.1.1 and 9.1.2 „programming level „**b**“).
c) at programming level „**c**“, call up parameter 797
d) Set <797> from **OFF** to **ON** with **key field 4**

After that, the display shows the first test block: Inputs.

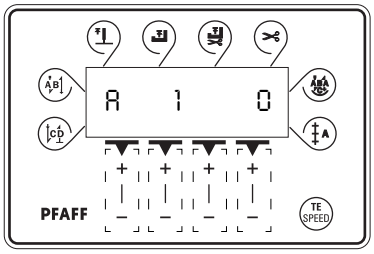
Response: The display shows:

Survey of test blocks:

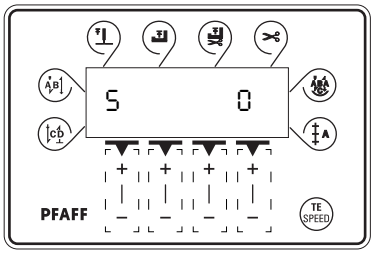
1 Inputs



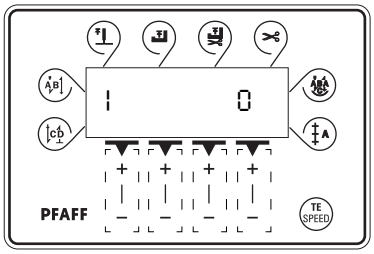

2 Outputs




3 Speed controlunit




4 Synchronizer



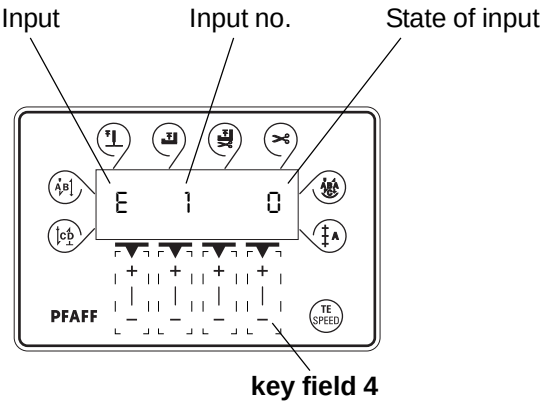

To call up the test blocks (advancing from test block to test block),

use **key field 1**

**Hint**: further indications on the display are for optional functions!

To call up various functional elements within a test block such as advancing from an Input to the next, use **key field 2 +/-** on the control panel **S1**.
To activate functional elements selected, use **key field 4 +/-** on the **control panel** S1.

**Test block 1**: Inputs
Display:



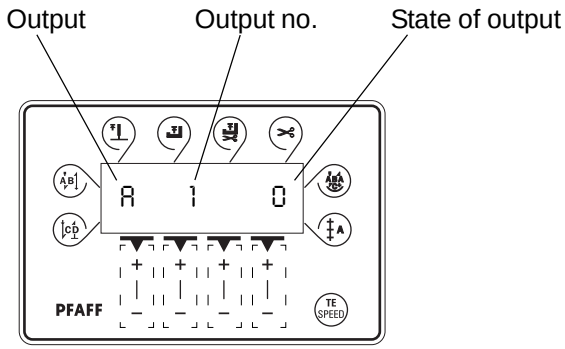

The function assigned to the input displayed can be seen from chapter 12 „Connections Diagram for Connectors“.

The designations E (for input) are located on the lefthand side of the connectors shown.
The keys or selectors assigned to the inputs are designated S in the connections diagram and have the same numbers as the associated inputs, i.e.
key S1 is connected to input E1
key S2 is connected to input E2
key Sx is connected to input Ex.

The operating state of the input is signalled in the 7th digit of the display.
Key/switch open → display: 0
Key/switch closed → display: 1

In the righthand part of the display, the connecting plug and the pin number to which the displayed input is connected are shown for the purpose of reference.

**Test block 2**: Outputs
Display:



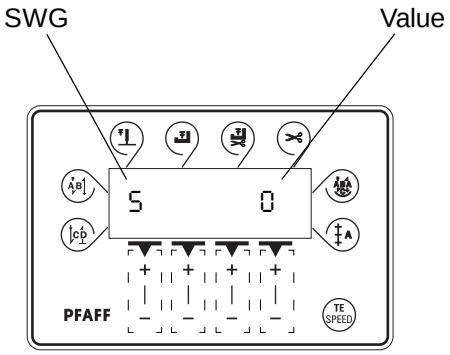

The function assigned to the ouput displayed can be seen from chapter 12 „Connections Diagram for Connectors“.

The designations A (for output) are located on the lefthand side of the connectors shown.
The solenoids/solenoid valves assigned to the outputs are designated Y in the connections diagram and have the same numbers as the associated outputs, i.e.
solenoid Y2 is connected to output A2
solenoid Y3 is connected to output A3
solenoid Yx is connected to output Ax

The operating state of the output displayed is signalled in the 7th digit of the display.
Output not activated → display: 0
Output activated → display: 1

To activate an output, use key field 4 +/-.

**Test block 3**: Speed control unit (SWG)
Display:

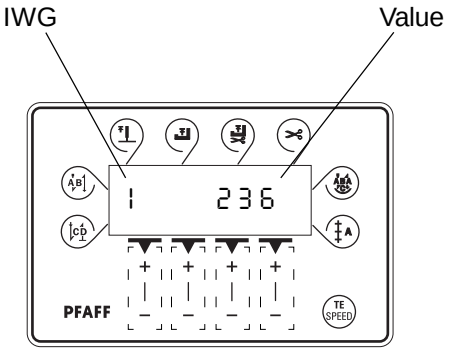



The treadle can be actuated to operate consecutively all 16 steps of the speed control unit.

The following is displayed in digits 6, 7 and 8

-2 / -1 / 0 / +1 / 10 / 20 / … / 120, when the speed control unit is in proper condition.

**Test block 4**: Synchronizer (IWG)
Display:




This test block permits to check the synchronizer (increment encoder). For this purpose, the shaft of the motor must be rotated manually.

The increments (pulses) of the synchronizer are counted and shown in display digits 4, 5 and 6. This display runs from 0 through 255 when the synchronizer is in proper condition.

**To deactivate the test routine**,
turn the mains power switch OFF, or press the TE/Speed key (TE SPEED) twice.

# EcoDrive

## QE3760/QE5540

CE

# Type

# P40ED

## Instruction Manual

## Part 3

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**Englisch 2005-10-25**

# List of Contents Part 3



**Technical updatings reserved!**

# 11. Survey and List of Parameters

## 11.1 Explanation of Parameter Survey

The parameter survey is designed as an aid for finding parameters quickly. It is a summary of references for the parameter list. Listed behind each reference are all parameters which exert an influence on the function described by the reference.

The parameter survey is divided into five columns:
Column 1 shows the references (functions) to which parameters are assigned.
Column 2 shows the abbreviations of the respective functions.
Column 3 shows all parameters (setting numbers) belonging to the respective reference.
Column 4 shows, for each function (reference) which controls inputs or outputs, the applicable indications such as Ex or Ax which can also be found on the connections diagram.
Column 5 shows, for each function (control inputs (Ex) or control outputs (Ax)), the respective plugs with the number of contacts (see connections diagram).

Example for searching a parameter:
Keyword (function): inverse rotation
The parameter survey shows in column 3 the parameter numbers 618, 801.

Suppose that the inverse rotation function is to be enabled. The parameter list shows this function under parameter number 618.

## 11.2 Explanation of Parameter List

The parameter list is divided into 5 columns. These comprise, in
column 1: the parameter number,
column 2: is the explanation (meaning) of the parameters and the coding system of row 1 of the keys of the mini operator's panel, used when the parameter concerned can be programmed with the mini operator's panel,
column 3: the programming level (A, B, C) on which the parameter in question can be accessed,
column 4: the range of values within which the parameter in question can be set,
column 5: the value of the parameter in question is set on delivery ex factory.

Parameters having "either/or" validity (software switches) can merely be set to value I or II. In the case of such parameters, column 4 is empty.
Parameter numbers in acute brackets; e.g. <105>, mean the value (content) set for the parameter in question.

Example:
**107** Speed for front backtack when <106> = I
I limited by <105>
II limited by <607>

Explanation:
Parameter 107 is valid only the the value (content) of parameter <106> = I.
If parameter 107 is set to I (<107> = I), then the speed for the front backtack is limited by parameter 105, e.g. <105> = 1500. If parameter 107 is set to II (<107> = II), then the speed for the front backtack is limited by the value of parameter 607, e.g. <607> = 4000.

## 11.3 Parameter survey P40ED 1_040_10 (PARAM.ENO)

| Function | Abbrev'n | Parameter | Input Output | Connection Socket/Contacts |
|---|---|---|---|---|
| Accelerate | DRZAN | 722 | | |
| Backtack | RIE | 105/107/110 364/391/523 584/585 | | |
| Backtack inversion | RIV | 748 | | |
| Backtack suppression | RIUNT | 748 | | |
| Blower | BLA | 668 | | |
| Brake | DRZAB | 723 | | |
| Catcher | FANG | 707 | | |
| Chopper | MESSER | 105/110 | | |
| Control | REG | 880/884/885 886/887/889 890/900 | | |
| Decorative backtack | ZRIE | 391/522/523 530/775 | | |
| Defect search | HWT | 797 | | |
| Delay | VERZ | 623/642/643 730/761/770 939 | | |
| Direction of rotation | DRR | 800 | | |
| Display | ANZ | 605/933 | | |
| Edge trimmer | KS | 356/387/776 | | |
| End backtack | ER | 110 | | |
| Engine | MOT | 897 | | |
| Feed reverse | TUM | 301/364/643 721/757/939 | | |
| Front backtack | AR | 105/106/107 | | |
| Hardware test | HWT | 797 | | |
| Inverse rotation | RDR | 618/623/801 | | |
| Machine class | MAKL | 799 | | |
| Machine run | ML | 387 | | |
| Needle position | NAPO | 522/700/702 703/705/706 707/710/746 748 | | |

| | | |
|---|---|---|
| Needle position change-over | NPW | 446/748 |
| Needle up without trimming | NHOS | 446/710/748 |
| Number of stitches | STZA | 111/112/470<br>760 |
| ON period | EINZ | 528/715/889 |
| Operator panel | BDF | 101 |
| Photocell | LS | 111/112/113<br>163/199/615 |
| Presser foot | PF | 356/636/642<br>651/719/729<br>730/770 |
| Program | PR | 203/206/311<br>313 |
| Programming level C | EBC | 798 |
| Residual brake | STBR | 718 |
| Seam end | NE | 110/206 |
| Seam start | NA | 105 |
| Single stitch | EST | 392/446/748 |
| Soft start | SANL | 116/117 |
| Speed | DRZ | 105/106/107<br>110/117/199<br>203/530/585<br>605/606/607<br>608/609/901 |
| Speed decrease | DRZAB | 723 |
| Speed increase | DRZAN | 722 |
| Speed limitation | DB | 585 |
| Stacker | STAP | 528/776 |
| Start | START | 113 |
| Start delay | STVERZ | 729 |
| Stitch condensation | STVD | 105/106/107<br>110/364 |
| Stitchcounter | STZ | 760 |
| Stop | STOP | 206 |
| Stop time | STOPZ | 775 |
| Target stitch | PEIPO | 653/789 |
| Thread clamp | FK | 470 |

| | | |
|---|---|---|
| Thread monitor | FW | 382/660/760 |
| Thread puller | FZ | 761 |
| Thread tension release | FSL | 393/538/636<br>707/761 |
| Thread trimming | SN | 311/609/646<br>705/706/734<br>901 |
| Thread wiper | WI | 668/715 |
| Time needed to switch on | EINZ | 528/715/889 |
| Timing output | TA | 538/642/643<br>705/719/721<br>734 |
| Vacuum | SAUG | 105/110/356 |
| Zigzag machine | ZZ | 746 |

## 11.4 List of Parameters P40ED 1_040_10 (PARAM.EN)

| No. | Function (Meaning) | Level | Range of Values | Value | Standard |
|---|---|---|---|---|---|
| 101 | (BDF) Audible signal of the control panel pushbutton<br>1 = on<br>0 = off | A,B,C | | 1 | Kl. 1, 2, 3, 4 |
| 105 | (AR/RIE/DRZ/MESSER/NA/SAUG/STVD) Speed for front backtack/ stitch condensation | B,C | 0300 - 2000<br>0300 - 2000 | 1200<br>700 | Kl. 1, 3, 4<br>Kl. 2 |
| 106 | (AR/DRZ/STVD) Speed for front backtack/stitch condensation<br>1 variable (treadle-controlled)<br>0 constant (corresponding to <105>) | B,C | | 0 | Kl. 1, 2, 3, 4 |
| 107 | (AR/RIE/DRZ/STVD) Speed for front backtack/stitch condensation when <106> = I<br>1 limited by <105><br>0 limited by <607> | B,C | | 0 | Kl. 1, 2, 3, 4 |
| 110 | (ER/RIE/DRZ/MESSER/NE/SAUG/STVD) Speed for end backtack/ stitch condensation | B,C | 0300 - 2000<br>0300 - 2000 | 1200<br>700 | Kl. 1, 3, 4<br>Kl. 2 |
| 111 | (LS/STZA) Light barrier compensation stitches 1 (stitches from light barrier clear to seam end) | A,B,C | 0001 - 0030 | 8 | Kl. 1, 2, 3, 4 |
| 112 | (LS/STZA) Number of stitches for light barrier fade-out on knit fabrics (according to stitch size) | A,B,C | 0000 - 0100 | 0 | Kl. 1, 2, 3, 4 |
| 113 | (LS/START) Start with light barrier<br>1 when light barrier is dark only<br>0 also when light barrier is clear | B,C | | 0 | Kl. 1, 2, 3, 4 |
| 116 | (SANL) Soft start stitches | A,B,C | 0000 - 0030 | 0 | Kl. 1, 2, 3, 4 |
| 117 | (SANL/DRZ) Speed for soft start stitches | B,C | 0030 - 0640 | 400 | Kl. 1, 2, 3, 4 |
| 163 | (LS) Sewing with photocell<br>1 yes<br>0 no | B,C | | 0 | Kl. 1, 2, 3, 4 |
| 199 | (DRZ/LS) Speed for light barrier compensation stitches | B,C | 0300 - 2000 | 1200 | Kl. 1, 2, 3, 4 |
| 203 | (PR/DRZ) Speed for seam program<br>1 variable (treadle-controlled)<br>0 constant (corresponding to <221> or <222>) | B,C | | 1 | Kl. 1, 2, 3, 4 |
| 206 | (NE/PR/STOP) Interrupt/discontinue seam sections at speed = constant (<203> = II)<br>1 with treadle -2<br>0 with treadle 0 | B,C | | 0 | Kl. 1, 2, 3, 4 |
| 301 | (TUM) Switch-on voltage of the magnet for transport change-over<br>1 24V<br>0 32V | C | | 0 | Kl. 1, 2, 3, 4 |
| 311 | (PR/SN) Cancellation of stitch count<br>1 with thread cutting<br>0 without thread cutting | B,C | | 1 | Kl. 1, 2, 3, 4 |
| 313 | (PR) Programs are backtack programs (darning programs)<br>1 yes<br>0 no | A,B,C | | 0 | Kl. 1, 2, 3, 4 |
| 356 | (PF/SAUG/KS) Input E4 is at<br>1 Presser foot<br>0 Vacuuming | B,C | | 1 | Kl. 1, 2, 3, 4 |
| 364 | (RIE/STVD/TUM) Transport change-over means for<br>1 Back-tack<br>0 Stitch condensation | B,C | | 1 | Kl. 1, 2, 3, 4 |
| 382 | (FW) Switching threshold of the analogue input for the thread monitor | B,C | 0000 - 0100 | 15 | Kl. 1, 2, 3, 4 |
| 387 | (ML/KS) Output Ax (motor run) is active<br>1 With Pedal = 1D (Motor running)<br>0 With Pedal = 1 (Lower presser foot) | B,C | | 1 | Kl. 1, 2, 3, 4 |

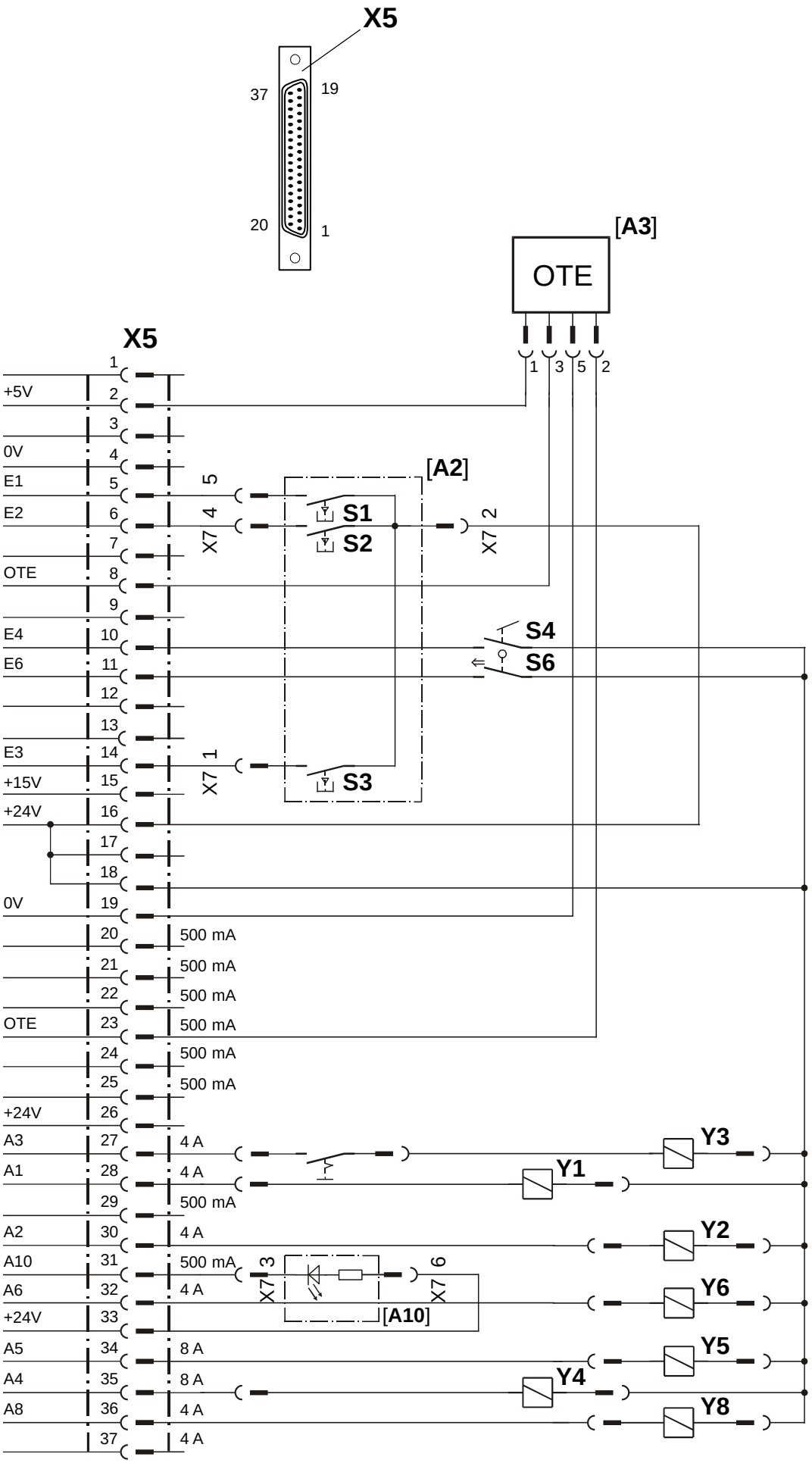
| | | | | | |
|---|---|---|---|---|---|
| 391 | (ZRIE/RIE) single stitch-decorative backtack | B,C | 0200 - 0700 | 450 | Kl. 4 |
| | 1 = on | | | - | Kl. 1, 2, 3 |
| | 0 = off | | | | |
| 392 | (EST) Change-over to sinle stitch via treadle | B,C | | 0 | Kl. 4 |
| | 1 = on | | | - | Kl. 1, 2, 3 |
| | 0 = off | | | | |
| 393 | (FSL) Thread tension release after seam end | B,C | | 1 | Kl. 1, 2, 3 |
| | 1 = on | | | 0 | Kl. 4 |
| | 0 = off | | | | |
| 407 | Kein Kommentar vorhanden | B,C | | 1 | Kl. 1, 2, 3, 4 |
| 446 | (NHOS/NPW/EST) Input E2 is | B,C | 0001 - 0007 | 1 | Kl. 1, 2, 3, 4 |
| | 1 = needle up without trimming | | | | |
| | 2 = needle position change-over | | | | |
| | 3 = single stitch | | | | |
| | 4 = single stitch with reduced length | | | | |
| | 5 = backtack inversion | | | | |
| | 6 = backtack suppression | | | | |
| | 7 = change-over position | | | | |
| | 8 = puller lift switched off | | | | |
| 470 | (STK/FK/STZA) number of stitches for disabling | A,B,C | 0000 - 0020 | 3 | Kl. 4 |
| | thread gripper | | | - | Kl. 1, 2, 3 |
| 522 | (NAPO/ZRIE) Needle position when stop occurs | B,C | | 0 | Kl. 1, 2, 3, 4 |
| | during decorative backtack (stitch in stitch) | | | | |
| | 1 position 2 (up) | | | | |
| | 0 position 1 (down) | | | | |
| 523 | (RIE/ZRIE) Backtack | A,B,C | | 0 | Kl. 1, 3, 4 |
| | 1 decorative backtack (stitch in stitch) | | | | Kl. 2 |
| | 0 standard backtack | | | | |
| 528 | (EINZ/STAP) Duration (ms) of stacker function | B,C | 0000 - 2500 | 120 | Kl. 1, 2, 3, 4 |
| 530 | (DRZ/ZRIE) Speed (max.) for decorative backtack | B,C | 0300 - 2000 | 1000 | Kl. 1, 3, 4 |
| | | | 0300 - 2000 | 600 | Kl. 2 |
| 538 | (FSL/TA) Timing of output Ax (thread tension release) | B,C | 0010 - 0090 | 40 | Kl. 1, 2, 3 |
| | (0 = 100%) | | 0010 - 0090 | 80 | Kl. 4 |
| 584 | (RIE) Backtack | B,C | | 0 | Kl. 1, 2, 3, 4 |
| | 1 four times | | | | |
| | 0 double | | | | |
| 585 | (DRZ/DB/RIE) Speed limitation | B,C | 0300 - 4800 | 1000 | Kl. 1, 2, 3, 4 |
| 605 | (DRZ/ANZ) Actual speed in display | B,C | | 0 | Kl. 1, 2, 3, 4 |
| | 1 yes | | | | |
| | 0 no | | | | |
| 606 | (DRZ) Speed: level 1 (min.) | B,C | 0030 - 0300 | 180 | Kl. 1, 2, 3, 4 |
| 607 | (DRZ) Speed: level 12 (max.) | B,C | 0300 - 6000 | 4000 | Kl. 1, 3 |
| | | | 0300 - 3200 | 3000 | Kl. 2 |
| | | | 0300 - 5500 | 1000 | Kl. 4 |
| 608 | (DRZ) Speed level curve (treadle characteristic) | B,C | | 1 | Kl. 1, 3, 4 |
| | 1 linear | | | 0 | Kl. 2 |
| | 0 not linear | | | | |
| 609 | (SN/DRZ) Trimming speed 1 | B,C | 0060 - 0300 | 180 | Kl. 1, 2, 3 |
| | | | 0060 - 0300 | 160 | Kl. 4 |
| 615 | (LS) End recognition when photocell goes | B,C | | 0 | Kl. 1, 2, 3, 4 |
| | 1 from light to dark | | | | |
| | 0 from dark to light | | | | |
| 618 | (RDR) Inverse rotation after seam end | B,C | | 0 | Kl. 1, 2, 3, 4 |
| | 1 yes | | | | |
| | 0 no | | | | |
| 623 | (RDR/VERZ) Delay in start-up time (ms) for inverse | B,C | 0000 - 2000 | 30 | Kl. 1, 2, 3, 4 |
| | rotation | | | | |
| 631 | Kein Kommentar vorhanden | B,C | | 0 | Kl. 4 |
| | | | | - | Kl. 1, 2, 3 |
| 636 | (FSL/PF) thread tension release in conjunction | B,C | | 0 | Kl. 1, 2, 3 |
| | with presser foot | | | - | Kl. 4 |
| | 1 yes | | | | |
| | 0 no | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 642 | (PF/VERZ/TA) preser foot time from switch-on to voltage reduction (cycling) | B,C | 0010 - 0150 | 100 | Kl. 1, 2, 3, 4 |
| 643 | (TUM/VERZ/TA) feed reverse time from switch-on to voltage reduction (cycling) | B,C | 0010 - 0150 | 100 | Kl. 1, 2, 3, 4 |
| 646 | (SN) Without thread trimmer magnet at seam end<br>1 on<br>0 off | B,C | | 0 | Kl. 1, 2, 3, 4 |
| 651 | (PF) Presser foot with automatic descent on machine stop<br>1 yes<br>0 no | B,C | | 1 | Kl. 1, 2, 3, 4 |
| 653 | (PEIPO) Target stitch before sewing<br>1 yes<br>0 no | B,C | | 0 | Kl. 1, 2, 3, 4 |
| 660 | (FW) Bobbin thread monitoring<br>0 without (= *II*)<br>1 via a sensor (= **I*)<br>2 by a stitch count | A,B,C | 0000 - 0002 | 0 | Kl. 1, 2, 3, 4 |
| 668 | (BLA/WI) Thread wiper/thread clearer<br>1 yes<br>0 no | B,C | | 0 | Kl. 1, 2, 3, 4 |
| 694 | Kein Kommentar vorhanden | B,C | 0300 - 0800 | 500 | Kl. 4 |
| | | | | - | Kl. 1, 2, 3 |
| 700 | (NAPO) Needle position 0<br>(reference position of the needle) | B,C | 0000 - 0255 | 0 | Kl. 1, 2, 3, 4 * |
| 702 | (NAPO) Needle position 1 (needle down) | B,C | 0000 - 0255 | 90 | Kl. 1 |
| | | | 0000 - 0255 | 15 | Kl. 2 |
| | | | 0000 - 0255 | 80 | Kl. 3, 4 |
| 703 | (NAPO) Needle position 2 (thread take-up lever up) | B,C | 0000 - 0255 | 236 | Kl. 1, 3 |
| | | | 0000 - 0255 | 230 | Kl. 2 |
| | | | 0000 - 0255 | 226 | Kl. 4 |
| 705 | (NAPO/SN/TA) Needle position 5 (end of trimming signal 1 (magnetic thread trimmer)/clock pulses start of the trimming signal 1) | B,C | 0000 - 0255 | 200 | Kl. 1, 2 |
| | | | 0000 - 0255 | 140 | Kl. 3 |
| | | | 0000 - 0255 | 100 | Kl. 4 |
| 706 | (NAPO/SN) Needle position 6 (start trimming signal 2 (pneumatic thread trimmer)) | B,C | 0000 - 0255 | 136 | Kl. 1 |
| | | | 0000 - 0255 | 15 | Kl. 2 |
| | | | 0000 - 0255 | 100 | Kl. 3 |
| | | | 0000 - 0255 | 80 | Kl. 4 |
| 707 | (NAPO/FSL/FANG) Needle position 9<br>(thread tension release or thread catcher start) | B,C | 0000 - 0255 | 164 | Kl. 1, 3, 4 |
| | | | 0000 - 0255 | 195 | Kl. 2 |
| 710 | (NAPO/NHOS) Needle position 3 (needle up) | B,C | 0000 - 0255 | 184 | Kl. 1, 2 |
| | | | 0000 - 0255 | 206 | Kl. 3 |
| | | | 0000 - 0255 | 212 | Kl. 4 |
| 715 | (EINZ/WI) Duration (ms) of thread wiper | B,C | 0000 - 2000 | 60 | Kl. 1, 2, 3, 4 |
| 718 | (STBR) Timing of residual brake<br>(0 = brake off) | B,C | 0000 - 0100 | 0 | Kl. 1, 2, 3 |
| | | | 0000 - 0100 | 7 | Kl. 4 |
| 719 | (PF/TA) Timing output A4 (lifting presser foot)<br>(0 = 100% switched on) | B,C | 0010 - 0060 | 40 | Kl. 1, 2, 3 |
| | | | | - | Kl. 4 |
| 721 | (TUM/TA) Timing output A5 (feed reverse)<br>(0 = 100% switched on) | B,C | 0010 - 0090 | 40 | Kl. 1, 2, 3, 4 |
| 722 | (DRZAN) Acceleration ramp<br>1 gradual<br>50 steep | B,C | 0001 - 0060 | 50 | Kl. 1, 2, 3 |
| | | | 0001 - 0060 | 30 | Kl. 4 |
| 723 | (DRZAB) Brake ramp<br>1 gradual<br>50 steep | B,C | 0001 - 0060 | 40 | Kl. 1, 2, 3 |
| | | | 0001 - 0060 | 27 | Kl. 4 |
| 729 | (STVERZ/PF) Start delay after lowering presser foot | B,C | 0010 - 2000 | 120 | Kl. 1, 2, 3, 4 |
| 730 | (PF/VERZ) Lift delay for presser foot after seam end | B,C | 0000 - 2000 | 50 | Kl. 1, 2, 3, 4 |
| 734 | (SN/TA) Timing output A2 (thread trimmer)<br>(0=100% switched on) | B,C | 0010 - 0090 | 10 | Kl. 1, 4 |
| | | | 0010 - 0090 | 40 | Kl. 2 |
| | | | 0010 - 0090 | 80 | Kl. 3 |
| 746 | (NAPO/ZZ) Needle position for change-over, zick-zack or three-fold-stitch | B,C | 0000 - 0255 | 90 | Kl. 1 |
| | | | 0000 - 0255 | 20 | Kl. 2 |
| | | | 0000 - 0255 | 80 | Kl. 3, 4 |

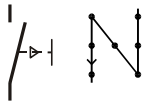
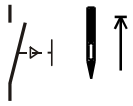
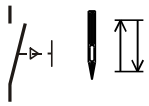
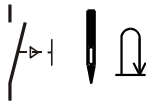
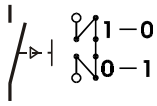
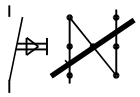
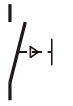
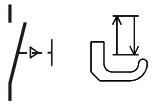
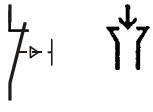
| | | | | | |
|---|---|---|---|---|---|
| 748 | (NHOS/NPW/EST/RIV/RIUNT/NAPO) Input E3 is<br>1 = needle up without trimming<br>2 = needle position change-over<br>3 = single stitch<br>4 = single stitch with reduced length<br>5 = backtack inversion<br>6 = backtack suppression<br>7 = change-over position<br>8 = puller lift switched off | B,C | 0001 - 0007 | 5 | Kl. 1, 2, 3, 4 |
| 757 | (TUM) Feed reverse speed of reaction (40, 50, 60 ms) | B,C | 0000 - 0255 | 25<br>- | Kl. 2<br>Kl. 1, 3, 4 |
| 760 | (FW/SPFW/STZ/STZA)<br>- Stitch count for the remnant thread after the bobbin thread monitor responds with direct bobbin thread monitoring<br>- Multiplicator for the fixed value (200) for determining the start value of the stitch counter with indirect bobbin thread monitoring | A,B,C | 0000 - 0250 | 5 | Kl. 1, 2, 3, 4 |
| 761 | (FSL/FZ/VERZ) Prolongation Thread tension release/ Thread puller | B,C | 0000 - 0080 | 0 | Kl. 1, 2, 3, 4 |
| 762 | Kein Kommentar vorhanden | B,C | 0000 - 0255 | 196<br>- | Kl. 4<br>Kl. 1, 2, 3 |
| 763 | Kein Kommentar vorhanden | B,C | 0000 - 0255 | 1<br>- | Kl. 4<br>Kl. 1, 2, 3 |
| 770 | (PF/VERZ) Lifting delay of presser foot at threadle-position „-1“ | B,C | 0010 - 0250 | 80 | Kl. 1, 2, 3, 4 |
| 775 | (ZRIE/STOPZ) Stop time (ms) with stitch in stitch backtack (decorative backtack) | B,C | 0010 - 1000<br>0010 - 1000 | 100<br>150 | Kl. 1, 3, 4<br>Kl. 2 |
| 789 | (PEIPO) Needle position 10 (target stitch) | B,C | 0000 - 0255 | 248 | Kl. 1, 2, 3, 4 |
| 797 | (HWT) Hardware test<br>1 yes<br>0 no | C | | 0 | Kl. 1, 2, 3, 4 |
| 798 | (EBC) Programming level C<br>1 yes<br>0 no | A,B,C | 0000 - 0020 | 1 | Kl. 1, 2, 3, 4 |
| 799 | (MAKL) Machine class which has been selected | C | 0001 - 0004<br>0001 - 0004<br>0001 - 0004<br>0001 - 0004 | 1<br>2<br>3<br>4 | Kl. 1 *<br>Kl. 2<br>Kl. 3<br>Kl. 4 |
| 800 | (DRR) Direction of motor rotation viewed from belt pulley<br>1 left-hand rotation<br>0 right-hand rotation | C | 0000 - 0001<br>0000 - 0001 | 0<br>1 | Kl. 1 *<br>Kl. 2, 3, 4 |
| 801 | (RDR) Reverse rotation angle after seam end | B,C | 0010 - 0212 | 32 | Kl. 1, 2, 3, 4 |
| 880 | (REG) Starting current max. [A] | C | 0001 - 0010<br>0001 - 0010 | 5<br>8 | Kl. 1, 2, 3<br>Kl. 4 |
| 884 | (REG) Proportional amplification of the speed control (in general) | B,C | 0003 - 0024<br>0003 - 0030<br>0003 - 0024<br>0003 - 0024 | 9<br>16<br>10<br>6 | Kl. 1<br>Kl. 2<br>Kl. 3<br>Kl. 4 |
| 885 | (REG) Integral amplification of the speed control | C | 0010 - 0080<br>0010 - 0080 | 50<br>23 | Kl. 1, 2, 3<br>Kl. 4 |
| 886 | (REG) Proportional amplification of the order controllers | C | 0001 - 0015 | 8 | Kl. 1, 2, 3, 4 |
| 887 | (REG) Differential amplification of the order controllers | C | 0001 - 0015 | 8 | Kl. 1, 2, 3, 4 |
| 889 | (EINZ/REG) Time required for order controlling (0 = always) | C | 0000 - 2500 | 200 | Kl. 1, 2, 3, 4 |
| 890 | (REG) Proportional amplification of the superior order controllers for the residual brake | C | 0001 - 0025<br>0001 - 0025 | 15<br>22 | Kl. 1, 2, 3<br>Kl. 4 |
| 897 | (MOT) MINI motor version<br>1 long<br>0 short | C | 0000 - 0001<br>0000 - 0001 | 0<br>1 | Kl. 1, 3, 4 *<br>Kl. 2 |

| | | | | | |
|---|---|---|---|---|---|
| 900 | (REG) Additional P-Amplification of the speed control | B,C | 0001 - 0024<br>0001 - 0030<br>0001 - 0024 | 10<br>16<br>6 | Kl. 1<br>Kl. 2, 3<br>Kl. 4 |
| 901 | (DRZ/SN) Trimming release speed | B,C | 0030 - 0500 | 300 | Kl. 1, 2, 3, 4 |
| 933 | (ANZ) Display change-over<br>1 diagnosis<br>0 normal display | C | | 0 | Kl. 1, 2, 3, 4 |
| 939 | (VERZ/TUM) Rate time (premature change-over) for the transport changer | B,C | 0010 - 0200 | 30 | Kl. 1, 2, 3, 4 |

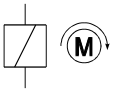
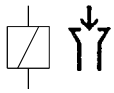
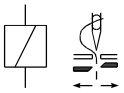
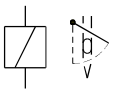
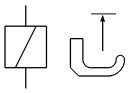
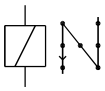
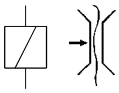
# 12. Electrical Connections Diagram X5 P40ED



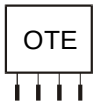
Bedeutung der Magnete bzw. Magnetventile, Taster / Meaning of magnets and/or solenoids and keys
Signification des aimants resp. solenoides et touches / Significação dos imaõs e/ou as solenoidas e teclas
Significato dei magneti, delle valvole magnetiche e dei tasti / Significación de los imanes y/o los solenoides
y pulsadores / Betekenis van de magneten resp. magneetkleppen, toetsen

| | |
|---|---|
| **S1**  | Transportumstellung von Hand / manual feed reverse / renversement de marche manuel / mudança do transporte manual / commutazione trasporto a mano / inversión de transporte manual / handmatige transportomschakeling |
| **S2**<br>**S3**  <br>S2 <446> = 1<br>S3 <748> = 1 | Nadel hoch ohne Schneiden / needle up without thread trimming / aiguille en haut sans coupe / agulha para cima sem corte de linhas / ago su senza taglio / aguja arriba sin corte / naald omhoog zonder snijden |
| **S2**<br>**S3**  <br>S2 <446> = 2<br>S3 <748> = 2 | Nadelpositionswechsel / needle position change-over / changement de position d´aiguille / troça de posição da agulha / cambio di posizione dell´ago / cambio de posición de aguja / naaldpositie-verwisseling |
| **S2**<br>**S3**  <br>S2 <446> = 3<br>S3 <748> = 3 | Einzelstich / single stitch / point unique / ponto individual / punto singolo / puntada individual / enkele steek |
| **S2**<br>**S3**  <br>S2 <446> = 5<br>S3 <748> = 5 | Nachfolgende Riegelfunktion invertieren / invert subsequent backtack function / inverser la prochaine fonction de bridage / inverter o próximo remate / invertire la funzione d'affr. successiva / invertir la próxima función de remate / inverteren op elkaar volgende hechtfunctie |
| **S2**<br>**S3**  <br>S2 <446> = 6<br>S3 <748> = 6 | Riegelunterdrückung / backtack suppression / suppression de bridage / supressão do remate / soppressione dell'afrancatura / supresion del remate / onderdrukking van het strookje |
| **S2**<br>**S3**  <br>S2 <446> = 7<br>S3 <748> = 7 | Umschaltposition / Change-over position / position le commutation / posição de mudança / posizione di commutazione / posición de cambio / omschakeling position |
| **S4**  <br><356> = I | Presserfuß / presser foot / pied presseur / calcador / alzapiedino / prensatelas / drukvoet |
| **S4**  <br><356> = II | Saugen / vacuuming / aspiration / aspirar / aspirare / aspirar / zuigen |

Bedeutung der Magnete bzw. Magnetventile, Taster / Meaning of magnets and/or solenoids and keys
Signification des aimants resp. solenoides et touches / Significação dos imaõs e/ou as solenoidas e teclas
Significato dei magneti, delle valvole magnetiche e dei tasti / Significación de los imanes y/o los solenoides y pulsadores / Betekenis van de magneten resp. magneetkleppen, toetsen

| | |
|---|---|
| **S6**  | STOP/Anlaufsperre / STOP/Safety switch no run /<br>STOP/Verrouillage de remise en marche / STOP/Bloqueio de arranque /<br>STOP/Blocco avviamento / STOP/Bloqueo de repuesta en marcha /<br>STOP/Startblokkering |
| **Y1**<br>I max<br>4 A ✱<br><356> = I  | Motorlauf / motor runs / moteur en marche /<br>motor em movimento / motore in moto / motor en marcha /<br>loop van de machine |
| **Y1**<br>I max<br>4 A ✱<br><356> = II  | Absaugung / vacuum /<br>aspiration / aspirar /<br>aspirazione / aspiración / zuigen |
| **Y2**<br>I max<br>4 A ✱  | Fadenschneiden / thread trimmer /<br>coupe-fil / corte de linhas /<br>rasafilo / cortahilos /<br>draadsnijder |
| **Y3**<br>I max<br>4 A ✱  | Fadenwischer / thread wiper / écarteur de fil /<br>retira-linhas / scartafilo / retirahilos /<br>draadwisser |
| **Y4**<br>I max<br>8 A ✱  | Presserfuß heben / lifting presser foot / relevage du pied presseur /<br>levantar do calcador / sollevamento del alzapiedino /<br>elevación de prensatelas /<br>drukvoet optillen |
| **Y5**<br>I max<br>8 A ✱  | Transportumsteller / feed reverse /<br>renversement de marche / mudança do transporte / commutazione trasporto /<br>inversión de transporte / transportomschakeling |
| **Y6**<br>I max<br>4 A ✱<br><776> = 1  | Kantenschneider / edge trimmer<br>coupe de bord / corte cantos<br>rasa bordi / corta bordes<br>zoomsnijder |
| **Y6**<br>I max<br>4 A ✱<br><776> = 2  | Stapler / stacker /<br>empileur / empilhadeira /<br>impilatore / apiladora / hefapparaat |
| **Y8**<br>I max<br>4 A ✱  | Fadenspannungslösen / thread tension release / détendeur de fil /<br>soltar tensão da linha / sbloccaggio tendifilo / detensión del hilo /<br>verbreken van de draadspanning |
| **A10**  | Signal Unterfadenwächter / signal bobbin thread sensor |
| **[A2]** | Tastergehäuse an der Nähmaschine / key case at the sewing machine |

Bedeutung der Magnete bzw. Magnetventile, Taster / Meaning of magnets and/or solenoids and keys
Signification des aimants resp. solenoides et touches / Significação dos imaõs e/ou as solenoidas e teclas
Significato dei magneti, delle valvole magnetiche e dei tasti / Significación de los imanes y/o los solenoides
y pulsadores / Betekenis van de magneten resp. magneetkleppen, toetsen

| | |
|---|---|
| **[A3]**   | Oberteilerkennung / sewing machine identify unit |

- ✱ Die Summe der Lastströme aller gleichzeitig eingeschalteten Stellglieder (Magnete, Magnetventile) darf den Wert von 4A nicht überschreiten (siehe hierzu Kapitel 2. Technische Daten).
- ✱ The total of load currents of all servos activated simultaneously (solenoids, solenoid valves) is not allowed to exceed 4 amps (see also section 2. Technical Specifications).
- ✱ Le total des courants de charge de tous les vérins (aimants, électro-vannes) activés simultanément ne doit pas dépasser 4 A (voir aussi le chapitre 2. "caractéristiques techniques").
- ✱ A soma das correntes sob carga de todos os actuadores ligados ao mesmo tempo (ímans, solenóides) não pode ultrapassar o valor de 4A (ver também capítulo 2. Dados Técnicos).
- ✱ La somma delle correnti di carico di tutti gli attuatori inseriti contemporaneamente (magneti, elettrovalvole) non deve essere superiore a 4 A (vedere il capitolo 2. Dati Tecnici).
- ✱ La suma de las corrientes bajo carga de todos los elementos de todos los componentes de regulación conectados simultáneamente (imanes, válvula magnética) no podrá sobrepasar el valor de 4A (véase también el capítulo 2. de datos técnicos).
- ✱ De belastingsstroom van alle tegelijkertijd ingeschakelde bedieningsschakels (magneten, magneetventielen) mag in totaal niet meer dan 4 A bedragen (zie hiervoor hoofdstuk 2. Technische gegevens).

# Important Notice!

Your newly purchased **EcoDrive** control system is designed to be connected to a sewing machine/system via connector X5. This connector X5 is a 37 pole sub-d jack as shown in the wiring diagram.

> *The connections/wiring of X5* ***is not identical nor compatible*** *with the connections of the same type of jack X5 of the* ***Ministop control box****, nor with the same type of 37 pole sub-d jack of a* ***Servo control box****!*

In order to avoid damage to the control box, you may only connect the **EcoDrive** to machines wired according to VDMA Regulations

**EN 60204-31**

If you wish to replace a Ministop or Servotop control box with an EcoDrive, you must either use the appropriate adapter cable or rewire your machine!

We offer following adapter cables:

| | | |
|---|---|---|
| Replacement for Q40MS: | Q40ED with adapter | Art.-No. 55.591 |
| Replacement for P40/51/52/47 MS | P40ED with adapter | Art.-No. 55.592 |
| Replacement for PE40MS | PE40ED with adapter | Art.-No. 55.580 |
| Y-Adapter for synchronizer (position control unit) | | Art.-No. 55.570 |
| Extension cable for synchronizer (position control unit) 1,5m | | Art.-No. 55.506 |
| Extension cable for speed control unit 1,5m | | Art.-No. 55.507 |
| Extension cable for operator panel EcoTop 5m | | Art.-No. 55.573 |
| Serial data cable for Q-Prog | | Art.-No. 55.577 |

## SECTION A

(1) 5140906 Upper face plate cover screw (long)
(2) 5106309 Face plate cover complete with guard
(3) 5106353 Face plate cover thread take-up lever guard
(4) 5106354 Face plate cover screw spacer
(7) 5131 Face plate cover lower screw (short)
(21) 5227 Thread take-up lever guard attachment screws

## SECTION B

(6) 5106302 Rear arm cover
(5) 5127 Arm cover screws

## SECTION C

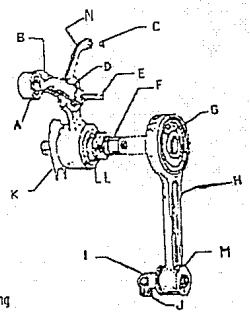
(4) 51350435 Pressure bar -pressure regulating screw with extended knob for bridge
(11) 5106336 Pressure bar spring- long black
(12) 5106394 Pressure bar spring locating pin.
(13) 5276025 Pressure bar tracking ball
(14) 5190 Slack thread regulator attachment screw
(15) 5106342 Slack thread regulator
(16) 5106335 Pressure bar position guide with screw (5158)
(17) 5158 Pressure bar position guide screw
*(18) 5276028 Pressure bar lifting lever bracket (optional only on manual quilters)*
*(23) 51350442 Pressure bar lifter hinge screw (optional only on manual quilters)*
*(24) 5276117 pressure bar lifter finger (optional only on manual quilters)*
(25) 5276536 Pressure bar bushing
(26) 5276241 Pressure bar with screw and ball
(27) 5176 Pressure bar screw
(28) 200039 Small pressure cup
*200070 Large pressure cup (option not shown)*

## SECTION D

(1) 5435 Thread take-up lever link hinge stud set screw
(5) 5106357 Thread take-up lever link hinge stud (with oil wick)
(6) 5106368A Thread take-up lever assembly complete
Individual parts:

Part # 5106368A

(A) Hinge stud bronze bushing #5106368A-1
(B) Side Link #5106368A-2
(C) Thread eylet #5106368A-3
(D) Take-up finger ball bearing #5106368A-4
(E) side link support pin #5106368A-5
(F) Counter weight main stud #5106368A-6
(G) Main link ball bearing #5106368A-7
(H) Main link #5106368A-8
(I) Needle bar stud #5106368A-9
(J) Needle bar stud screw #5140706
(L) Main stud needle bearing #5106368A-10
(M) Needle bar stud Needle bearing #5106368A-11
(N) Take-up Finger #5106368-12
(K) kit containing plastic thrust washers, oil plug, snap ring #5106368A-0




(7) 5106397 Upper oil felt
(8) 5106325 Upper needle bar bushing (older quilters only) **NO oil groove**
5106325-1 Upper needle bar bushing
( All XL quilters and newer manual quilters) **Oil groove**
(9) 200030 Lower oil felt
(10) 5106424-1 Lower needle bar bushing (all quilting machines) with retaining ring
5106424-2 Retaining ring can be used for both upper and lower bushings
(11) 598923 Lower needle bar bushing wire thread guide
(12) 200032 Needle bar with screw
(13) 200032-1 Needle bar set screw
(17) 200033-? Needles
(please check with the factory for application recommendation)
(18) 5106346 Thread eylet and guide
(19) 5106346-1 Thread eylet attachment screw

## SECTION E

(1) 5140609 Thread take-up clamping screw (hex head)
(2) 51036 Thread take-up flat alignment set screw (slotted)
(3) 5106304 Main arm shaft front bearing
010002 Rear bearing (not shown)
260001 Adapter bushing for above bearing (not shown)
080001 Flexible coupling for main arm shaft with 260001 and 010002 installed
(4) 5106303 Main counter-weight shaft with 5106303-1 and 5106304
5106303-1 Black counter-weight only

## SECTION F

(2) 51654 3-hole thread guide lock nut
(3) 516377 3-hole thread guide
(30) 5448 Tension assembly locking set screw
(31) 5140610 Acess hole plug
(29) 5106374 Tension assembly Rotary disc style
5106374-1 Tension assembly squeeze discs style
5106374-2 Rotary disc for 5106374
5106374-3 Check spring for either tension assembly
5106374-5 Tension assembly- Air Operated for XL quilters with thread cutter

## SECTION G

(5) 5106306 Timing pulley upper shaft 5/8"
(6) 5106303-3 Set screws for timing pulleys (upper or lower)
(7) 5106305 Rubber timing belt
(13) 5106307 Timing belt separator

## Sewing Head Lower Assembly

(1) 200053 Bobbin case L style
200053-1 Bobbin case - large capacity M style
(3) 200050-1 Screw for bobbin case holder finger
(4) 200050 Bobbin case holder finger
(5) 200043 Hook- plain chrome L style
200043-1 Hook- black teflon coated basket L style
200043-2 Hook- large capacity- M style
(7) 5272229 Hook pump- complete
(8) 5200346 Hook pump holding set screw
(9) 200046 Bed slide
(10) 200041 Ring gear - inside oil resovoir drives hook pump
(12) 200048 Gasket for oil resovoir
(13) 5276246 Oil resovoir cover
(14) 5200346 Set screw to hold ring gear drive shaft bushing in oil reso
(15) 5276244 Resovoir oil drain plug
(16) 200040 Ring gear drive shaft
(17) 010001 Ring gear drive shaft rear bearing
(18) 5114063 Lower timing pulley set screws

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## Sewing Head Upper Assembly
### A,B,C,D,E,F,G