MINI-STOP

QE3760

CE

Type

PE40MS

Instruction Manual

Part 2

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7. Description of the MINI-STOP Drive System

The MINI-STOP Drive System is an electronically commutated, brushless DC motor.

The system is composed of the following subassemblies

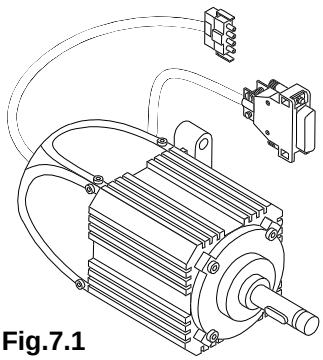


Fig.7.1

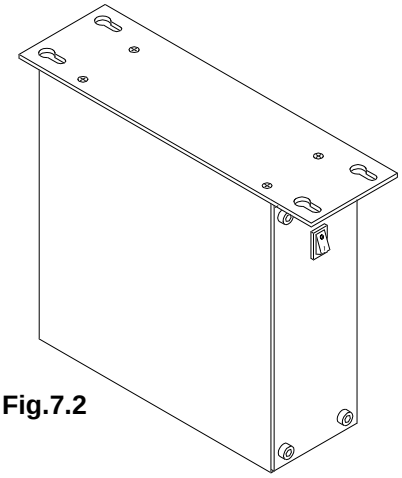


Fig.7.2

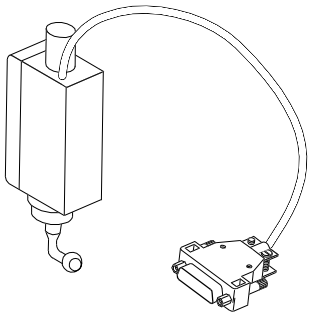


Fig.7.3

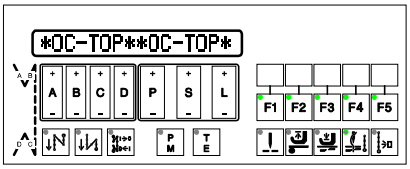


Fig.7.4

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

Control (**Fig.7.2**) with
- integrated mains switch
- 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

Speed control unit SWG2 (**Fig.7.3**)

Control panel OC-TOP (**Fig.7.4** - optional)

7.1 Motor QE3760

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 370 W in S5 mode. The rated speed of the motor is 6000 rpm, the maximum speed is 9000 rpm.

The motor has two mains leads:

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

7.2 Control system

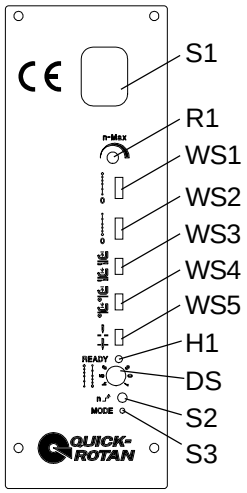


Fig. 7.5

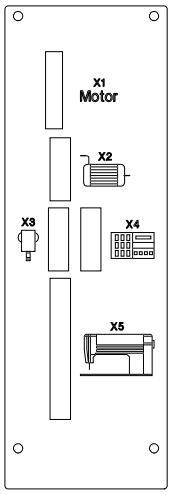


Fig 7.6

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. 7.5):

1 mains switch	**S1**	
5 selector switches	**WS1**	for front backtack (none, single, double)
	WS2	for end backtack (none, single, double)
	WS3	for presser foot position after seam end (down, up)
	WS4	for presser foot position at sewing stop (down, up)
	WS5	for needle position at sewing stop (down, up)
1 rotary switch	**DS**	for programming bartack stitching, needle positions and maximum speed
2 buttons	**S2**	(n ⌐↑) for setting the rotational speed
	S2	(MODE) for programming the needle position and maximum speed
1 LED	**H1**	(READY) for indicating readiness for operation

on the rear panel (Fig. 7.6):

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.

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.

Assignment of the machine functions to the inputs (Ex) and outputs (Ax) of the control dependent on the machine class is listed in Chapter 7.5 (operation of the drive).

Inputs (Ex)

E1:	Feed reverse (manual backtack)	
E2:	Needle position change-over	if <616> = I [1)]
	Needle up without trimming	if <616> = II
E3:	Single stitch	if <617> = I
	Backtack function changeover	if <617> = II
E4:	Stop/ start lock	if <624> = I
	Presser foot	if <624> = II

[1)] <616> = I means that parameter 616 (the parameter number 616) is set to „I“.
<616> = II means that parameter 616 (the parameter number 616) is set to „II“.

Outputs (Ax)

A1: Pneumatic thread trimmer
A3: Thread wiper
A4: Presser foot lift
A5: Feed reverse
A8: Thread tension release

7.3 Encoder SWG2

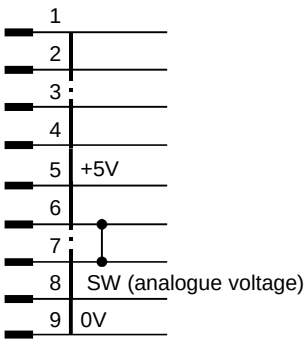
the SWG2 is attached under the table with the provided bracket and mechanically connected with the pedal of the machine with the provided linkage.

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).

Position	**Meaning**
-2 (fully back)	End of seam, trim
-1 (back a little)	Raise presser foot
0 (neutral)	
+1 (forward a little)	Lower presser foot
+2 (forward)	Speed level 1
+3 to + 13 (fully forward)	maximum sewing speed (speed level 12)

contact connections of connection plug (X3) of the SWG2



7.4 External operator panel OC-TOP

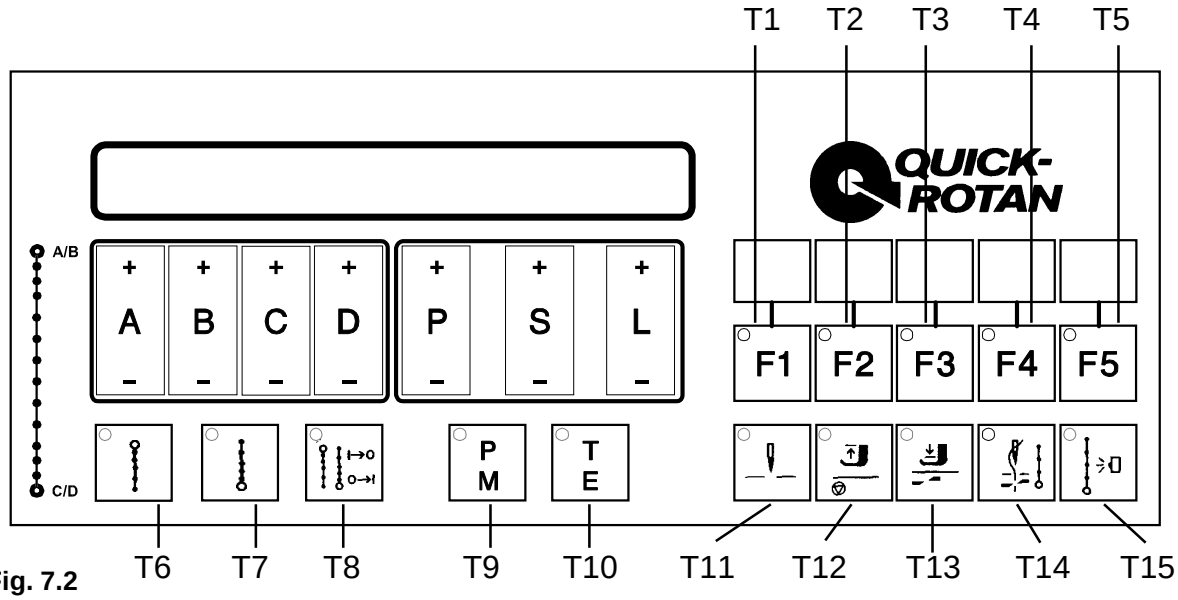


Fig. 7.2

The operator panel OC-TOP (Fig. 7.2) has the following components:

- a display: 16-digit LCD matrix

- 14 programming keys:
  A+ / A-, B+ / B-, C+ / C-, D+ / D-, P+ / P-, S+ / S-, L+ / L-

- 2 keys for operating mode selection:
  T9 (P/M) for change-over between programmed or manual sewing
  T10 (T/E) for change-over between programming or sewing

- 8 keys with specified functional contents:
  T6 for front backtack (on/off)
  T7 for end backtack (on/off)
  T8 for backtack inversion
  T11 for needle position at sewing stop (up/down)
  T12 for presser foot position at sewing stop (up/down)
  T13 for presser foot position after seam end (up/down)
  T14 for thread trimming (on/off)
  T15 for sewing with light barrier (on/off)

- 5 keys (T1 ... T5) with their functional signification being specified by the control program (control software)
  Meaning of keys T1 to T4 if key T5 is not pressed (dark):
  T1 (F1) for linking seam sections (with/without)
  T2 (F2) for speed control
  constant (automatic) or
  variable (treadle-controlled)
  T3 (F3) feed reverse for a seam section
  T4 (F4) seam section manual or stitchcounted
  Meaning of keys T1 to T4 if key T5 is pressed (bright):
  T1 currently no function
  T2 currently no function
  T3 single stitch
  T4 unit count in display

- outlet for two light barriers on the rear of the OC-TOP

The keys T1 ... T15 are provided with one signal lamp each (LED). Each LED provides optical feedback on the control position of the function assigned to each key. If the function is ON, the LED is bright; if the function is OFF, the LED is dark.

7.5 Range of Application

Drive type PE40MS can be used for different machine classes. Each machine class requires a specific control program.
Enabling of the machine-specific program is made by parameter <799> (for parameter programming please see Chapter 9.1.2.2).

Meanings:

<799> = 1 Machine class 1: Pegasus W500 / 600 / 700
<799> = 2 Machine class 2: Pegasus W562 - 82
<799> = 3 Machine class 3: Pegasus BL SSC - 100 (Backlatcher)

The machine functions are assigned to the inputs (Ex) and outputs (Ax) of the control depending on the machine class (<799>):

Ax: Ex:	MK1 (<799> = 1)	MK2 (<799> = 2)	MK3 (<799> = 3)
A1			Stacker-handing over 1
A2	Thread trimmer	Thread trimmer	Chain-cutter
A3	Thread wiper	Thread wiper	Vacuum 1
A4	Presser foot	Chaining-off finger	Presser foot
A5	Stitch condensation	Stitch condensation	Vacuum 2
A6			Stacker-handing over 2
A8	Motor runs	Motor runs	Stacker
A9	Thread tension release	Thread tension release	Thread tension release
A14	Needle up	Needle up	Blowing
A16	Count signal	Count signal	Count signal
E1	Stitch condensation	Stitch condensation	
E2	Needle positon change-over/ Needle up without thread trimming	Needle positon change-over/ Needle up without thread trimming	
E4	Presser foot	Chaining-off finger	
E6	STOP	STOP	
E12	Thread monitor		

8. Application

This MINI-STOP drive can be used either with or without an external operator's control panel (OCP).

The following external operator's control panels can be used:

- **OCP B2**
- **OCP OC-TOP**

Switching on
The on/off switch (mains switch) S1 is located at the front of the control unit. When activated and live, switch S1 is lit up.

Readiness for operation
The green „READY" LED (H1) is located at the front of the control unit.
When this is continuously lit, the drive is ready for operation.
A flashing LED means that there is a malfunction (error) in the drive.
The malfunction is to be found under error messages 62 (see Sect. 8.4)
When the drive is switched off at the mains, the LED likewise starts to blink.
The LED goes off when the control unit is no longer live.

Maximum speed
The maximum speed can be adjusted:
either with control panel OC-TOP by means of parameter <607>
or without control panel by means of button S2 at the front of the control unit.
The maximum speed can be reduced by means of potentiometer „n-max" (R1) at the front of the control unit.

8.1 Sewing without an external operator's control panel

When working without an external operator's control panel the switches **WS1** to **WS5** and **DS** are used.

The following functions can be called up via these switches:

WS1: Initial backtack: without / single / double

WS2: End backtack: without / single / double.

WS3: Presser foot position (up/down) after seam end

WS4: Presser foot position (up/down) when stopping before seam end

WS5: Needle position (up/down) when stopping before seam end

DS: number of stitches for front backtack and end backtack

8.2 Sewing with the external operator's control panel B2

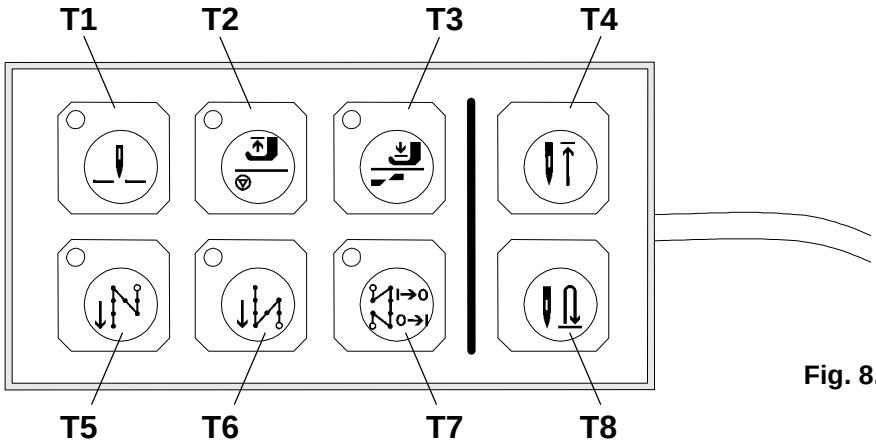


Fig. 8.1

If the MINI-STOP is used with the OCP B2, then only the manual sewing work option is available.

The following functions can be called up via the keys of the OCP B2:

T1: Needle position when the machine stopped before end of the seam
up: (LED switched on)
down: (LED switched off)

T2: Position of the presser foot when the machine is stopped before the end of the seam
up: (LED switched on)
down: (LED switched off)

T3: Position of the presser foot after the end of the seam
up: (LED switched on)
down: (LED switched off)

T4: Needle up without trimming

T5: Initial backtack
on:(LED switched on)
off:(LED switched off)

T6: End backtack
on:(LED switched on)
off:(LED switched off)

T7: Backtack inversion or elimination
If this key is pressed (LED switched on), before the start of the seam length, then from the start of the seam length the opposite function to what is indicated on key T5 will be effected.

If this key is pressed during sewing (LED switched on) then the opposite function to what is indicated on key T6 will be effected at the end of the seam length.

T8: Single stitch
When this key is pressed, the machine will perform one extra stitch.

The actual position of each function is indicated by the LEDs which are built into each key.

The type of backtack - single or double - will be chosen by the selector switches WS4 and WS5 at the front of the control box.

The other function selecting switches (WS1, WS2, WS3) at the front of the control box are without effect.

Indication of defective functions at the OCP B2:

Functions that are inoperative or defective in the drive or only in the control box will be indicated via the LEDs in the keys.

There are two signal positions which indicate these malfunctions :

a) The 3 upper LEDs and the 3 lower LEDs blink alternatively.
The malfunction is in the area of malfunction number < 63 (see section 8.4).

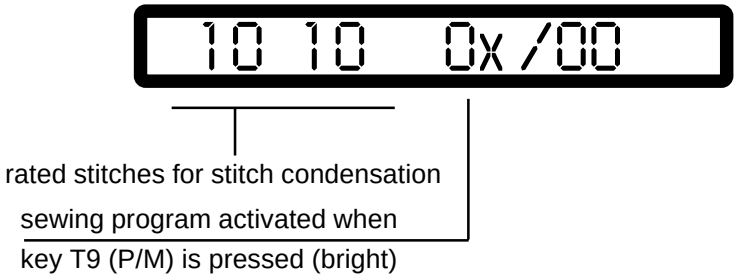
b) All 6 LEDs blink at the same time.
The malfunction is in the area of malfunction number > 64 (see section 8.4).

8.3 Sewing with External Operator's Control Panel OC-TOP

8.3.1 Sewing without Sewing Program (manual Sewing)

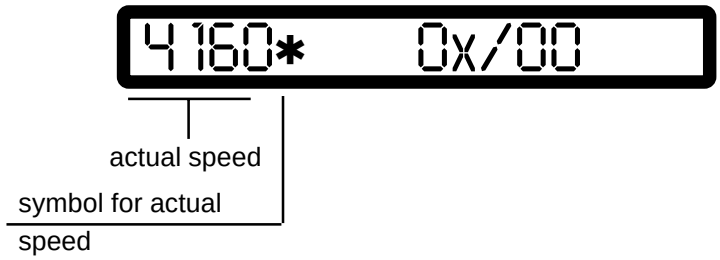
Condition: key T9 (P/M) is dark
key T10 (T/E) is dark

Display showing
- before start or after start, when <605> = II



Setting of rated stitches for stitch condensation is possible only with the machine at standstill
for front stitch condensation with key A+ or key B+
key A- or key B-
for end stitch condensation with key C+ or key D+
key C- or key D-

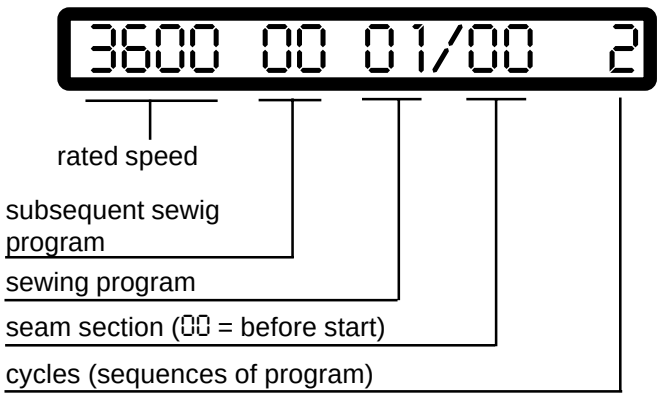
Display showing
- before start, when <605> = I



8.3.2 Sewing with Sewing Program

Condition: key T9 (P/M) is bright
key T10 (T/E) is dark

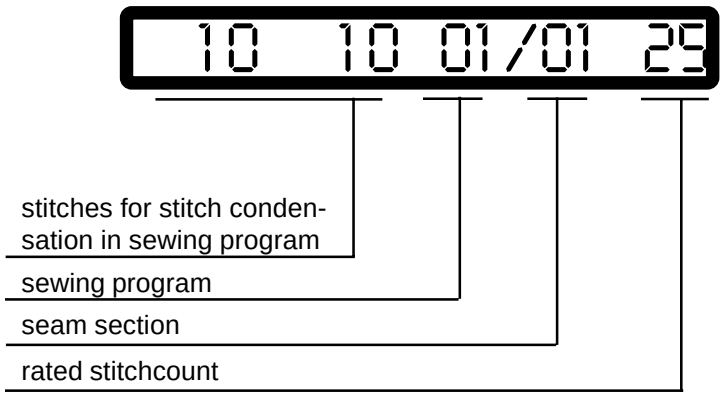
Display showing before start



When this is displayed, the following can be modified:

- program: by actuating key P+ or P-
- seam section: by actuating key S+ or S-
- cycles: by actuating key L+ or L-
- the subsequent sewing program via key D+ or D-
- rated speed for the program: by actuating key A+ or A-
  This speed is limited by parameter <221>

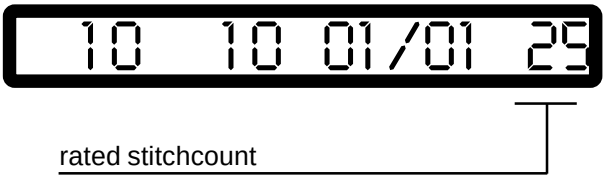
Display before start if a seam section has been activated



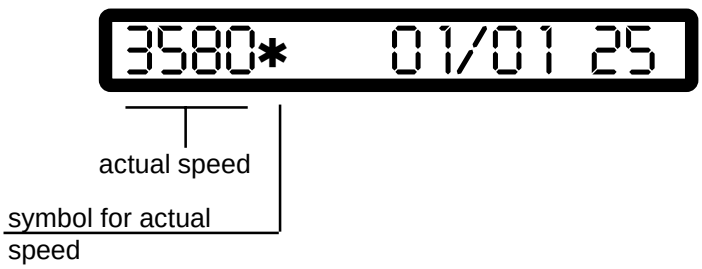
When this is displayed, the following can be modified:

- the rated stitches for stitch condensation for the program by actuating the keys located below the respective digits
- rated stitchcount of a seam section: by actuating key L+ or L-
- program: by actuating key P+ or P-
- seam section: by actuating key S+ or S-

Display showing after start, when <605> = II



Display showing after start, when <605> = I



Sewing programs

a) 5 sewing programs can be used

b) The sewing programs comprise up to 5 seam sections

c) Each seam section can comprise up to 99 stitches

d) The following functions can be assigned to each seam section:

front stitch condensation	via key T6
end stitch condensation	via key T7
needle position at sewing stop	via key T11
presser foot position at sewing stop	via key T12
presser foot position after completion of seam section	via key T13
thread trimming	via key T14
feed reverse (stitch condensation)	via key T3

e) Linking consecutive seam sections can be made via key T1

f) Sewing speed can be chosen to be either constant (automatic) or variable (treadle-controlled) via key T2.

g) The stitchcount of a seam section can be interrupted via treadle position -2. This condition is signalled by the letter n schown in the display. Manual sewing (without stitchcount) is now possible until the seam section is completed by renewed treadle position -2 and the program advancing to the subsequent seam section.

h) Seam sections can also be performed without stitchcount; stitchcount deactivation is made via key T4

i) In sewing with light barrier control, the rated stitchcounts stored for the seam section are light barrier compensation stitches.

j) It is possible to run several sewing programs consecutively.
During programming, the subsequent program is displayed by digits 6 and 7 and can be entered via key D+ and D-.
00 means that the current program will be performed exclusively; at its end return is made to its start.

8.4 Error Messages (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 operator panel, for instance:

- and/or by flashing of the green LED "READY"
  a) Flashing with low frequency: same as error code 1
  b) Flashing with high frequency: same as error code from 8 … 117

List of possible error codes:

1	Treadle not in zero position when mains power is turned ON
8	Thread monitor
9	Start lock
10	Machine class, <799> was changed; remedy: turn mains power switch OFF and ON again
62	Short circuit on 24 V (32 V) DC
63	Overload on 24 V (32 V) DC, load current > 4 amps
64	Power supply monitor: voltage too low (90 V - 150 V)
65	Power electronics not operational after mains power ON, mains power < 130 V
66	Earth short (motor or motor supply line has earth short in one or more phases)
67	Internal malfunction
68	Power electronics shut-off a) Overcurrent, short circuit in motor or supply line b) Overvoltage, mains voltage too high (>300 V), motor overloaded while decelerating c) Undervoltage
69	Synchronizer not furnishing increments a) Synchronizer plug not inserted b) Belt not in place or belt tension insufficient
70	Machine blocked, no increment from synchronizer at max. motor torque
71	Commutation transmitter plug not inserted
72	Synchronizer plugged into commutation transmitter connector
73	Motor overloaded
75	Internal malfunction
90	EEPROM does not exist
91	EEPROM not programmable
92	Start lock while motor running
93	Wrong EEPROM
100-117	Internal malfunction

In case of error messages ≥ 62, the motor will stop in undefined positions.

Control system reset possible only by mains power OFF/ON.

9. Programming by the user

Enables machine functions and parameters to be switched on or set up.

The **MINI-STOP is** user-programmed by means of the external control panel **OC-TOP**

Without the **OC-TOP** external control panel, user-programming is possible for only a few selected functions.

The user programming of the **MINI-STOP** is possible by means of an external operator's control panel via:

- direct programming (only with drives from function level 40) and/or
- programming parameters.

The programming of parameters is possible via three levels of program:

- Programming on level A (operator level)
- Programming on level B (technician’s level)
- Programming on level C (special level)

9.1 User programming with operator panel OC-TOP

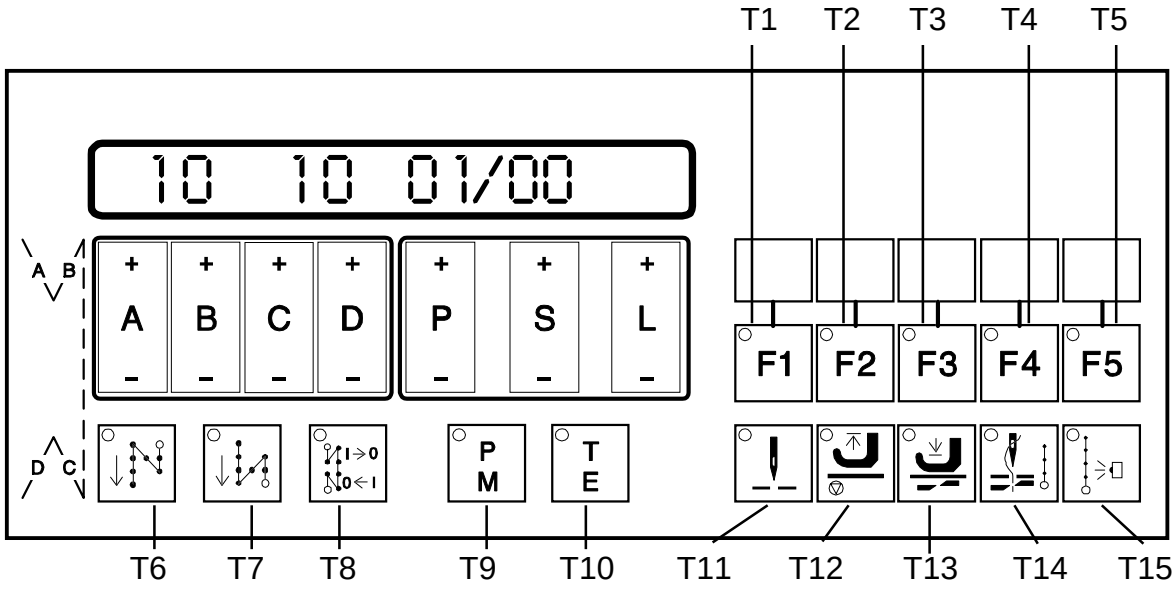


Fig. 9.1

9.1.1 Direct Programming

Attention! All values modified within direct programming are stored only when
a) the drive system is started or
b) key T9 (P/M) are pressed.
If the drive system is switched off via the mains power switch immediately after any values were modified, the values set before modification will be retained!

Regardless of the programming levels, certain values can be programmed without calling up parameter numbers - i.e. directly.

The following values can be modified by direct programming:

Stitches for front stitch condensation
Stitches for end stitch condensation
Stitchcounts for seam sections
Speeds for seam sections
Functions for seam sections

a) Modification of backtack stitchcounts

Display shown when "manual sewing" is ON (T9 (P/M) and T10 (T/E) not luminous)

Display shown when "programmed sewing" is ON (T9 (P/M) luminous, T10 (T/E) not luminous)

The symbolic seam pictogram on the lefthand side of the operator panel shows the stitch condensation sections

A / B: stitch condensation at seam start
C / D: stitch condensation at seam end

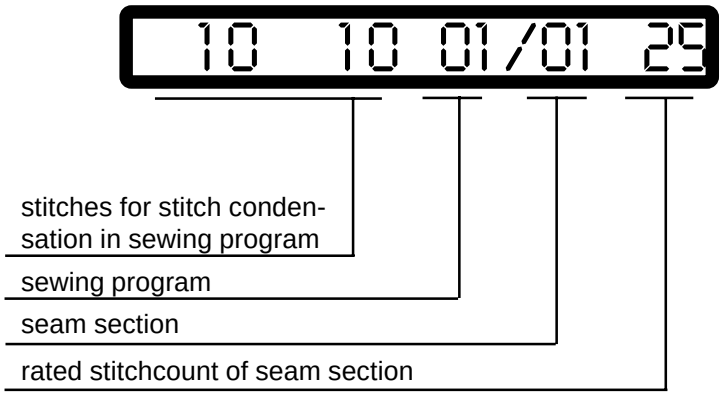
Immediatedly below the display, there are keys
A+ / A- / B+ / B- for stitch condensation at seam start
C+ / C- / D+ / D- for stitch condensation at seam end

These keys permit to increase or decrease the number of stitches for stitch condensation.

b) Programming of the Stitchcount for a Seam Section

Condition: Operation mode „programmed sewing“ is on, i.e. key T9 (P/M) is bright and key T10 (T/E) is dark, machine not sewing

Display showing



Activation of a sewing program is made via keys P+ or P-

Activation of a seam section is made via keys S+ or S-

Programming of the stitchcount for the seam section is made via key L+ (value increased) or L- (value decreased)

c) Programming of Seam Sections by „Teach-in“ (Performing Work)

Condition: Key T9 (P/M) is bright
Key T10 (T/E) is bright

The machine must have performed at least one stitch before.

Activate the desired program in the display via keys P+ or P- and the seam section to be programmed via keys S+ or S-.

Cycle:

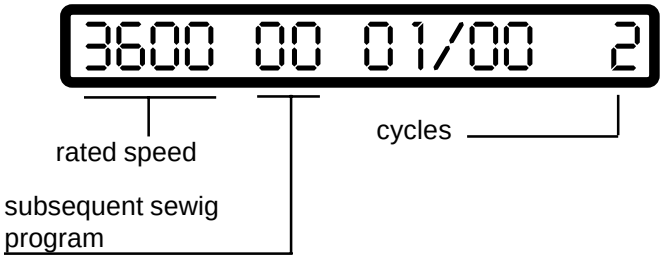
a) Treadle forward
   Reaction: the stitchcount which has been registered up to now will be eliminated
b) Treadle returns to zero position
c) Treadle forward
   Reaction: machine sews, the sewed stitches will be added in, shown in the display and registered

Correction of the value shown in the display is possible via key L+ or L-.

d) Programming of Cycles (Number of Sequences of Program), of Program Speed and of the subsequent Program

Condition: Operation mode „programmed sewing“ is on, i.e. key T9 (P/M) is bright and key T10 (T/E) is dark, machine not sewing

Display showing



Cycle programming is made via the keys L+ (number increased) or L- (number decreased)

Programming of the speed for the program is made via key A+ (value increased) or A- (value decreased)
This speed is limited by parameter <221>

Programming of the subsequent sewing program is made via keys D+ or D-.

e) Programming of Functions

Functions for the seam sections are controlled via the functional keys

T6	Front backtack or start stitch condensation (with/without)
T7	End backtack or end stitch condensation (with/without)
T11	Needle position at sewing stop and at the end of a seam section (up/down)
T12	Presser foot position at sewing stop (up/down)
T13	Presser foot position at the end of a seam section (up/down)
T14	Thread trimming at the end of a seam section (with/without)
T15	Sewing with light barrier (with/without)
T1	Linking of seam section (with/without), if T5 is dark
T2	Speed control, if T5 is dark variable (treadle-controlled, T2 is dark) or constant (automatic, T2 is bright)
T3	Transport reverse or stitch condensation of a seam section, if T5 is dark
T4	Seam section manual or stitchcounted, if T5 is dark

9.1.2 Parameter Programming

9.1.2.1 Programming Level A (Operator Level)

This level is used for programming control parameters which immediately affect the operation sequence.

These are the parameters for the following functions:

- Light barrier compensation stitches <111>
- Light barrier fade-out <112>
- Softstart <116>
- Number of stitches at seam end <145>
- Chain close-off at seam end <425>

a) Activation of Programming Level A

Conditions
Mains power switch ON
Drive system not running
Operating mode: manual sewing must be ON (key T9 (P/M) dark)

Press key T10 (T/E)

Response:
Key T10 (T/E) becomes bright, the display shows in its righthand half the first parameter (parameter no. and parameter value) associated with programming level A.
Sewing is not possible

- Programming
  The parameter number is set by using keys P+ or P- (hundreds of parameter no.) and keys S+ or S- (tens and units of parameter no.). The parameter value is programmed by using key L+ or L-

b) Deactivation of the Programming Level A

Press key T10 (T/E)

Response:
Key T10 (T/E) goes dark, the display returns to initial condition.
Sewing is possible.

9.1.2.2 Programming Level B (Technician Level)

This level is used for programming the control parameters which have to be modified or adapted very rarely or only for starting operation of the system.

a) Preparation for activation of the programming level B

Turn mains power switch OFF
Press and hold keys T9 (P/M) and T10 (T/E) simultaneously
Turn mains power switch ON
Release keys

Response:
The display shows a „✱“ between program and seam section.
Sewing is possible.

b) Activation of programming level B

Press key T9 (P/M) (not becoming bright) and press key T10 (T/E) (becoming bright)

Response:
In the righthand half of the display are shown: a parameter number (at first 104, then the number selected last) and the associated value.
Sewing is not possible.

Modification of parameter number:
for hundreds of parameter numbers use key P+ or P-
for tens and units of parameter numbers use key S+ or S-

Modification of parameter value: via key L+ or L-

c) Deactivation of programming level B

Press key T10 (T/E) (not becoming bright)

Response:
Parameters shown disappear from the display, the display returns to initial condition
Sewing is possible.

9.1.2.3 Programming Level C (Special Level)

Attention!

At this level, control parameters are stored the values of which have to be modified in exceptional cases only. Correction of these parameters should therefore be made only after consultation of the manufacturer.

Activation of programming level C

a) Activate programming level B (see 9.1.2.2)

b) Call up parameter 798

c) Set parameter value <798> to I

d) Deactivate programming level B

e) Turn mains power switch OFF, wait for >2 secs. to elapse

f) Turn mains power switch back ON

g) Press key T10 (T/E) (becoming bright)

Response:
In the righthand half of the display appears the first parameter of programming level C.

Calling up further parameter numbers and correcting the parameter values can be made in the same way as described for programming levels A and B.

Deactivation of programming level C:

- Press key T10 (T/E) (not becoming bright)
- Turn mains power switch OFF

9.1.3 Reset

All parameter values having been modified from the ex-factory condition (standard value) are reset to their standard values by this procedure.

Exceptions: parameters 700, 799 and 800
For these parameters, the values programmed by the user are retained even after -Reset- has been performed.

-Reset- procedure:

- turn mains power switch OFF
- press treadle fully forward and hold in that position
- press and hold keys P- or P+, S- or S+ and L- or L+ simultaneously

- turn mains power switch ON
- release the three keys and the treadle

Response: Display showing

Now -Reset- can be performed.
Located below the display Y (yes) there is key P+. Press this key P+ to start the reset. The display briefly shows:

After that the display shows the power-on display for approx. 2 secs.

and then shows the display corresponding to the operating mode selected

If it is not desired to start the -Reset-, press key L+ located below the display saying N (no).

9.2 User Programming without OC-TOP

For this purpose you find on the front of the control box
- rotary switch S7
- push button S2
- push button "MODE" S3

9.2.1 Conditions for Programming

- Drive system must be ON, means green LED "READY" is light
- Motor must be at standstill
- After switching ON motor has to make one revolution
- The external operator's panel should not be plugged in

9.2.2 Enabling the Programming Mode

Press button S3 "MODE" longer than 1 second, than LED "READY" flashes.

By means of rotary switch S7 can be programmed:

Position	Parameter	Meaning
"2"	<702>	Needle position down
"3"	<703>	Thread take up lever in position up
"9"	<607>	Maximum speed

The procedure of adjusting positions <702> and <703> is the same as described in chapter 10.

Adjusting maximum speed: following 9.2.2 rotary switch S7 at position "9"
- Press treadle fully down, maximum speed is now 500 rpm.
- Keep treadle pressed fully down and touch button S2; each touch increases the speed by 100 rpm.
- Release treadle into 0-position and the last value is stored.

9.2.3 End of Programming

Keep pressed button S3 "MODE" until green LED "READY" is ON.

10. Start of Operation

If the SERVO-TOP has been stored at a temperature of <+5°C, then a working temperature of between +5°C and +40°C 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
b) Control the needle positions
c) Control the maximum speed

10.1 Start of the Operation with the External Operator's Control Panel OC-TOP

10.1.1 Procedure for Checking the Direction of Rotation

a) Activate programming level B (technician level) (see section 9.1.2.2 „programming level B“)

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

c) 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> (I → II or II → I) than proceed as b)

10.1.2 Control of the Needle Positions (NP1 / NP2)

It is not necessary to set a reference position. The reference or zero position is given by the disk of the optical encoder and is located as follows:
View to the shaft end of the motor, cable outlets are on the top of the motor; when shaft key shows 90° to the left. This is zero position of the optical encoder.

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

a) Activate programming level B (technician level) (see section 9.1.2.2 „programming 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 (when <701> = I) or
via key L+ or L- (when <701> = II)

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 9.1.2.2 „programming level B“).

10.1.3 Procedure for Checking Maximum Speed

a) Activate programming level B (see section 9.1.2.2 "programming level B")

b) Set to parameter 607

c) Check the parameter value <607> and make correction if necessary via keys L+ or L–

d) Deactivate programming level B (see section 9.1.2.2 "programming level B")

10.2 Start of Operation without Operator's Panel OC-TOP

Procedure:
- Mains switch S1 is ON
- LED "READY" is light
  OC-TOP is not plugged in. Let motor make minimum one revolution by pressing treadle shortly down.
- Press button S3 "MODE" by means of an suitable tool (cartridge of ballpen) longer than 1 second until LED flashes.

By means of rotary switch DS can be adjusted / controlled:

Position of DS	**Meaning**
"2"	Needle position down <702>
"3"	Thread take-up lever up <703>
"9"	Maximum speed <607>

10.2.1 Procedure for Checking the Needle Positions (NP1 / NP2)

NP1 - needle down <702>
NP2 - thread takeup lever up <703>

a) Select the code number on rotary switch DS for
   parameter 702 - "2"
   703 - "3"

b) Actuate the treadle briefly forward:
   Response: The machine starts running and then positions
   Programming (position correction) is possible

c) Was the needle position correct?
   If yes, proceed under g)
   If no, correct the position by turning the handwheel

d) Actuate the treadle briefly forward:
   Response: The machine performs a full revolution and then positions in the same position

e) The position can be corrected again

f) If no further correction is required, store the position
   Press button S3 longer than 1 second
   Response: LED "READY" is permanent light

The selected position has been stored.

10.2.2 Procedure for Checking Maximum Speed

a) Select the code number on rotary switch DS for parameter 607 - "9"

b) Activate programming mode by pressing button S3 "MODE" longer than 1 second until LED flashes

c) Press treadle fully down, maximum speed is now 500 rpm

d) Keep treadle pressed fully down and press S2 shortly down. Maximum speed is increased by 100 rpm. Press S2 as often down as desired maximum speed is adjusted

e) Release treadle and keep S3 pressed until LED is permanently light. Value of maximum speed is stored.

10.3 Hardware Test

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

Hardware testing is made via test blocks. These are called up consecutively via key A+ or A-.

Activation of the „hardware test“ routine

a) Activate programming level „B“ and call up parameter 797

b) Set <797> to I

c) Deactivate programming level „B“

d) Turn mains power switch OFF

e) Wait for approx. 2 secs. to elapse, and turn mains power switch back ON

Response: The display shows „HARDWARE TEST“ for approx. 2 secs.

After that, the display shows the first test block: Inputs.
All OC-TOP keys equipped with LEDs become bright

Survey of test blocks:

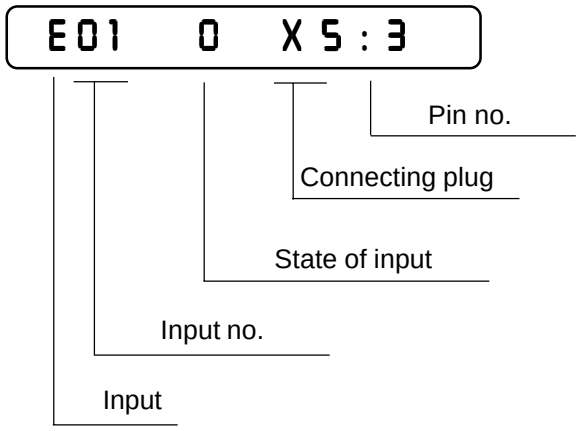
Test Block	Check	Display
1	Inputs	E01 0 X5:3
2	Outputs	A02 0 X5: 1
3	Speed control unit	SWG 0
4	Synchronizer	IWG 0 0
5	Potentiometer	R1 xxx%
6	Selectors	WS1-5 00000
7	Miniature Programming Field	MPF H1 0
8	Photocell	LS1 0 LS2 0

To call up the test blocks (advancing from test block to test block), use keys A+ and A-.

To call up various functional elements within a test block (advancing from functional element to functional element), use keys B+ and B-.

To activate functional elements selected, use key D+

Test block 1: Inputs
Display:



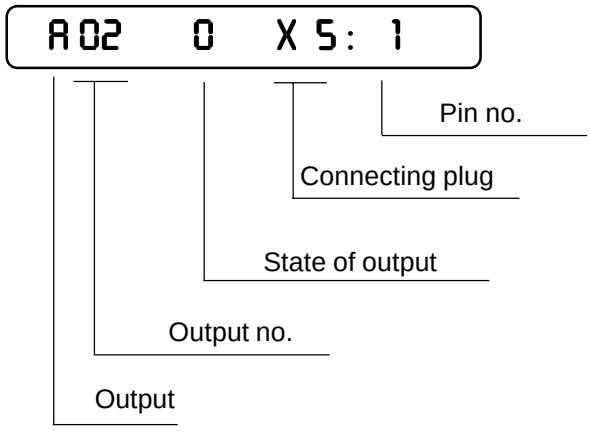
The function assigned to the input displayed can be seen from chapter 12 „Connections Diagram for Connectors“.

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.

Th 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“.

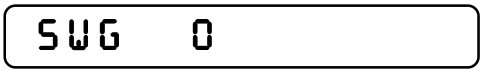
The designations A (for output) are located on the lefthand side of the connectors shown.
The solenoids/solenoid valves assigned to the outputs are designated Y in the connections diagram and have the same numbers as the associated outputs, i.e.
solenoid Y2 is connected to output A2
solenoid Y3 is connected 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 D+. Deactivation is made automatically after approx. 2.5 secs have elapsed or can be caused by using key D-.

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

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

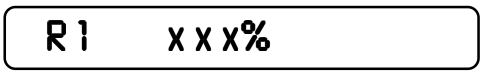
-2 / -1 / 0 / +1 / 10 / 20 / … / 120, when the speed control unit is in proper condition.

Test block 4: Synchronizer (IWG)
Display:

This test block permits to check the synchronizer (position control unit). For this purpose, the shaft of motor or handwheel is rotated manually

This display runs from 0 through 127 when the encoder / synchronizer is in proper condition.

Test block 5: Potentiometer R1
Display



This test block permits to check potentiometer R1 on the control box.
The display is in a proportion (%) of total resistance.
Turning the potentiometer axle causes the display to vary from 0 through 100.

Test block 6: Selectors
Display

This test block permits to check the 5 selectors (WS1 ... WS5) on the control box.
The operating state is shown in digits 8 to 12 of the display. Each switch has a display digit assigned to it.
The operating state is signalled by 0 and 1 for WS3, WS4 and WS5 and
by 0, 1 and 2 for WS1 and WS2.

Test block 7: Miniature Programming Field (MPF)
Display:

a) 

b) 

c) 

d) 

e) 

This test block permits to check the components of the miniature programming field (MPF). To advance from display to display (a) → b) → c) ...) use key B+ or B-.

a) LED "READY"
activate via key D+, H1 being bright; digit 8 in display shows 1

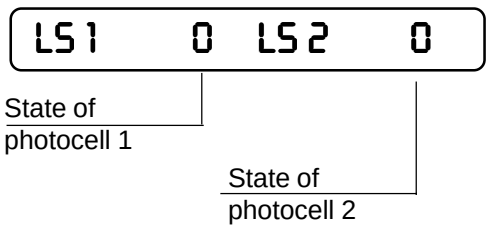
b) S2
press button S2, digit 8 in display shows 1

c) Press button S3 ("MODE"), digit 8 in display shows 1

d) Turn rotary switch S7 and digit 8 in display shows 0 … 9 acc. to position of switch

e) not yet available

Test block 8: Photocell
Display:



State of display 0: photocell is clear
1: photocell is dark

To deactivate the test routine, turn the mains power switch OFF.