ELGO
ELECTRONIC

Operating Manual
SERIES *P40T-002*

Programmable Touch Screen Controller for Guillotine Shears

- TFT-Display with touch operation
- Manual inching, single and program mode
- Integrated program memory and auto-cutting machine
- Material depending calculation of gap, angle & pressure
- Sheet support and return to the front function
- Analog inputs and outputs
- Digital outputs up to 2 A

1   Contents

2 List of Figures

3   List of Tables

4   General, Safety, Transport and Storage

4.1   Information Operating Manual

This manual contains important information regarding the handling of the device. For your own safety and operational safety, please observe all safety warnings and instructions. Precondition for safe operation is the compliance with the specified safety and handling instructions. Moreover, the existing local accident prevention regulations and the general safety rules at the site of operation have to be observed.

Please read the operating manual carefully before starting to work with the device! It is part of the product and should be kept close to the device and accessible for the staff at any time. The illustrations in the manual are for better demonstration of the facts. They are not necessarily to scale and can slightly differ from the actual design.

4.2   Explanation of Symbols

Special notes in this manual are characterized by symbols. The notes are introduced by signal words which express the magnitude of danger. Please follow this advice and act carefully in order to avoid accidents, damage, and injuries.

Warning notes:

⚠️	**DANGER!** This symbol in connection with the signal word "Danger" indicates an immediate danger for the life and health of persons. Failure to heed these instructions can result in serious damage to health and even fatal injury.
⚠️	**WARNING!** This symbol in connection with the word „Warning" means a possibly impending danger for the life and health of persons. Failure to heed these instructions can result in serious damage to health and even fatal injury.
⚠️	**CAUTION!** This symbol in connection with the signal word "Caution" indicates a possibly dangerous situation. Failure to heed these instructions can lead to minor injuries or damage of property.

Special safety instructions:

⚡	**DANGER!** This symbol in connection with the signal word "Danger" indicates an immediate danger for the life and health of persons due to voltage. Failure to heed these instructions can result in serious damage to health and even fatal injury. The operations may only be carried out by a professional electrician.

Tips and recommendations:

ℹ️	**NOTE!** …points out useful tips and recommendations as well as information for an efficient and trouble-free operation.

Reference marks:
☞   Marks a reference to another chapter of this manual.
📖   Marks a reference to another chapter of another document.

4.3 Statement of Warranties

The producer guarantees the functional capability of the process engineering and the selected parameters.

4.4 Demounting and Disposal

Unless acceptance and disposal of returned goods are agreed upon, demount the device considering the safety instructions of this manual and dispose it with respect to the environment.

Before demounting, disconnect the power supply and secure against re-start. Then disconnect the supply lines physically and discharge remaining energy. Remove operational supplies and other material.

Disposal: Recycle the decomposed elements: Metal components in scrap metal, Electronic components in electronic scrap, Recycle plastic components, dispose the remaining components according to their material consistence.

⚠	CAUTION! Wrong disposal causes environmental damages! Electronic scrap, electronic components, lubricants and other auxiliary materials are subject to special refuse and can only be disposed by authorized specialists!

Local authorities and waste management facilities provide information about environmentally sound disposal.

Safety

⚠	CAUTION! Please read the operating manual carefully, before using the device! Observe the installation instructions! Only start up the device if you have understood the operating manual. The operating company is obliged to take appropriate safety measure. The initial operation may only be performed by qualified and trained staff. Selection and installation of the devices as well as their embedding into the controlling system require qualified knowledge of the applicable laws and normative requirements on the part of the machine manufacturer.

4.5 General Causes of Risk

This chapter gives an overview of all important safety aspects to guarantee an optimal protection of employees and a safe and trouble-free operation. Non-observance of the instructions mentioned in this operating manual can result in hazardous situations.

4.6 Personal Protective Equipment

Employees have to wear protective clothing during the installation of the device to minimize danger of health.

Therefore:
Change into protective clothing before performing the works and wear them throughout the process.
Additionally observe the labels regarding protective clothing in the operating area.

Protective clothing:

	PROTECTIVE CLOTHING … is close-fitting working clothing with light tear strength, tight sleeves and without distant parts. It serves preliminarily for protection against being gripped by flexible machine parts. Do not wear rings, necklaces or other jewelry.
	PROTECTIVE GLOVES …for protecting the hands against abrasion, wear and other injury of the skin.
	PROTECTIVE HELMET …for protection against injuries of the head.

4.7   Conventional Use

The device is only conceived for the conventional use described in this manual.
The ELGO device type P40T-002 serves exclusively for positioning and automatic cutting on guillotine shears.

> **CAUTION!**
> Danger through non-conventional use!
> Non-intended use and non-observance of this operating manual can lead to dangerous situations.
> Therefore:
>
> - Only use the device as described
> - Strictly follow the instructions of this manual
>
> Avoid in particular:
> - Remodeling, refitting or changing of the construction or single components with the intention to alter the functionality or scope of the device.

Claims resulting from damages due to non-conventional use are not possible.
Only the operator is liable for damages caused by non-conventional use.

4.8   Safety Instructions for Transport, Unpacking and Loading

> **CAUTION!**
> Transport the package (box, palette etc.) professionally.
> Do not throw, hit or fold it.

4.9   Handling of Packaging Material

Notes for proper disposal: ☞4.4

4.10   Inspection of Transport

Check the delivery immediately after the receipt for completeness and transport damage.
In case of externally recognizable transport damages:

- Do not accept the delivery or only accept under reserve.
- Note the extent of damages on the transportation documents or delivery note.
- File complaint immediately.

> **NOTE!**
> Claim any damage immediately after recognizing it.
> The claims for damage must be filed in the lawful reclaim periods.

4.11   Storage

Store the device only under the following conditions:

- Do not store outside
- Keep dry and dust-free
- Do not expose to aggressive media
- Protect from direct sun light
- Avoid mechanical shocks
- Storage temperature (☞6) needs to be observed
- Relative humidity (☞6) must not be exceeded
- Inspect packages regularly if stored for an extensive period of time (>3 months)

5 Product Features

P40T-002 is a compact, programmable multi-axis positioning controller with touchscreen panel, designed for axis positioning and cutting automation on guillotine shears.

Overview of features:

- 16 free programmable digital in-/outputs.
- Analog or digital outputs for 1 - 3 speed operation.
- Program memory (1000 blocks).
- Angle control / gap control / backgauge.
- Cut length and cut offset calculation by angle measurement system or time.
- Material list for angle, gap and pressure.
- Automatic cutting machine
- Sheet support
- Sheet return (RTO)
- Serial interface for data exchange with a PC

Figure 1: P40T - Touch Panel

Basic Operation Modes:

The P40T-002 controller consists of three general operation modes:

Manual: The manual Inching operation allows axis movements via touchscreen.

Single: A single data block can be worked off.

Program: Several data sets can be lined up or programmed individually in program mode. This series of program blocks is then processed sequentially.

6 Technical Data

6.1 Identification

The type label of the P40T-002 serves for the identification of the unit. It is located on the housing of the device and indicates the exact type designation (=order reference ☞ 15) with the corresponding part number. Furthermore, the type label contains a unique, traceable device number. When corresponding with ELGO please always indicate this data.

P40TW-002-024-xx-xx-CXXX ◄─── Device Desigantion

xxxxxxx ◄─── Conseautive Unit Number
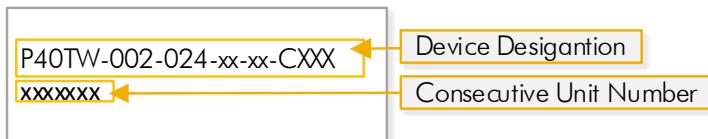
Figure 2: Type label

6.2 Dimensions

144

180

136

48

52

136

Installation depth incl. connectors = 83 mm
Panel cut-out = 138 x 138 mm
Front plate thickness = 4 mm
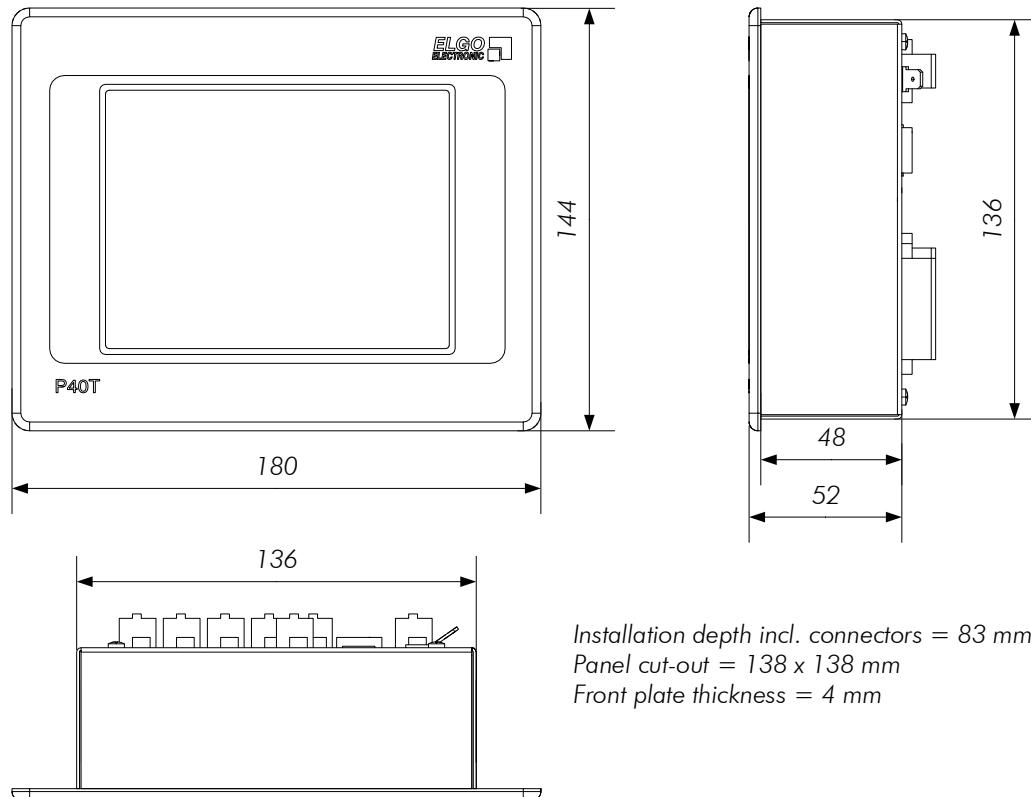
Figure 3: Dimensions P40T

6.3   Technical Data

P40T-002 (version for guillotine shears)

Mechanical Data

Housing	panel housing
Housing material	front plate: aluminium | housing: galvanized steel sheet
Front plate dimensions	W x H = 180 x 144 mm
Housing dimensions	W x H = 136 x 136 mm
Panel cut out	W x H = 138 x 138 mm
Keyboard	Touchscreen
Installation depth	48 mm (without connectors) | 83 mm (with connectors)

Electrical Data

Display	TFT touch screen monitor
Hardware	32 bit Microcontroller with 1 MByte Flash and 128 KByte RAM
Software	real time operating system: www.FreeRTOS.org
Program memory	up to 1.000 blocks (more on request)
System accuracy	± 1 increment
Power supply voltage	24 VDC +10/−20 %
Current consumption	24 VDC: max. 200 mA (unloaded); permitted total current (without outputs): 1 A
Encoder supply voltage	24 VDC or 5 VDC
Load by measuring system	max. 130 mA
Input signals (measuring system)	HTL, TTL, analog in (order information)
Signal channels	A, B, Z resp. A, A', B, B', Z, Z' or analog 0 ... 3.3 V (order information)
External inputs	16 digital PNP inputs, assignment and logic are freely programmable
Input current / pin	max. 10 mA
Min. pulse time for inputs	300 ms
Max. input frequency	100 kHz (higher on request)
Analog inputs (option)	1 ... 3 1 ... 3 analog inputs (12 bit) at 3.3 VDC measuring system supply
Output signals	16 digital PNP outputs with freely programmable assignment and switching logic (active HIGH / LOW)
Output current	max. 2 A per output / 8 A total current across all outputs; the outputs are durable short circuit proof (no multiple short circuits)
Freewheel clutch / outputs	for inductive loads integrated (clamping voltage at the output max. −36 V)
Analog outputs (option)	± 10 V PID (12 bit) or ± 10 V unregulated (11 bit)
Interfaces (option)	RS232
Connections	industry standard connectors (3.81 mm grid, lockable) and additional RJ45 sockets (depending on version)
Power down memory	E^{2}Prom (service life: 1.000.000, switching on / off cycles or 40 years)
Further options	8 = only 8 instead of 16 digital in- and outputs N = digital inputs as NPN version
Accessories	see ☞ 16

Environment Conditions

Operating temperature	0 ... +45° C
Storage temperature	−20 ... +50° C
Humidity	max. 80 %, non-condensing
Protection class	front: IP43 (installed state) | rear: IP00

7 Installation and First Start-Up

CAUTION
Please read the operating manual carefully before using the device! Strictly observe the Installation instructions!
In case of damage caused by failure to observe this operating manual, the warranty expires.

ELGO is not liable for any secondary damage and for damage to persons, property or assets.

The operator is obliged to take appropriate safety measures.

The first start-up may only be performed by qualified staff that has been trained and authorized by the operator.

7.1 Operating Area

WARNING!
Do not use the device in explosive or corrosive environments!
The device must not be installed close to sources of strong inductive or capacitive interference or strong electrostatic fields!

CAUTION!
The electrical connections must be made by suitably qualified personnel in accordance with local regulations.

The device may be designed for switchboard mounting. During work on the switchboard, all components must be de-energized if there is a danger of touching the energized parts!
(protection against contacts)

Wiring works may only be performed in the de-energized state!

Thin cable strands have to be equipped with end sleeves!

Before switching on the device, connections and plug connectors have to be checked!

The device must be mounted in a way that it is protected against harmful environmental influences such as splashing water, solvents, vibration, shock and severe pollution and the operating temperature must not be exceeded.

7.2 Mounting of the Controller

The P40T-002 controller is intended for installation into a 138 x 138 mm panel cut-out.
Required tools: 1 slotted screwdriver and 1 Phillips screwdriver.
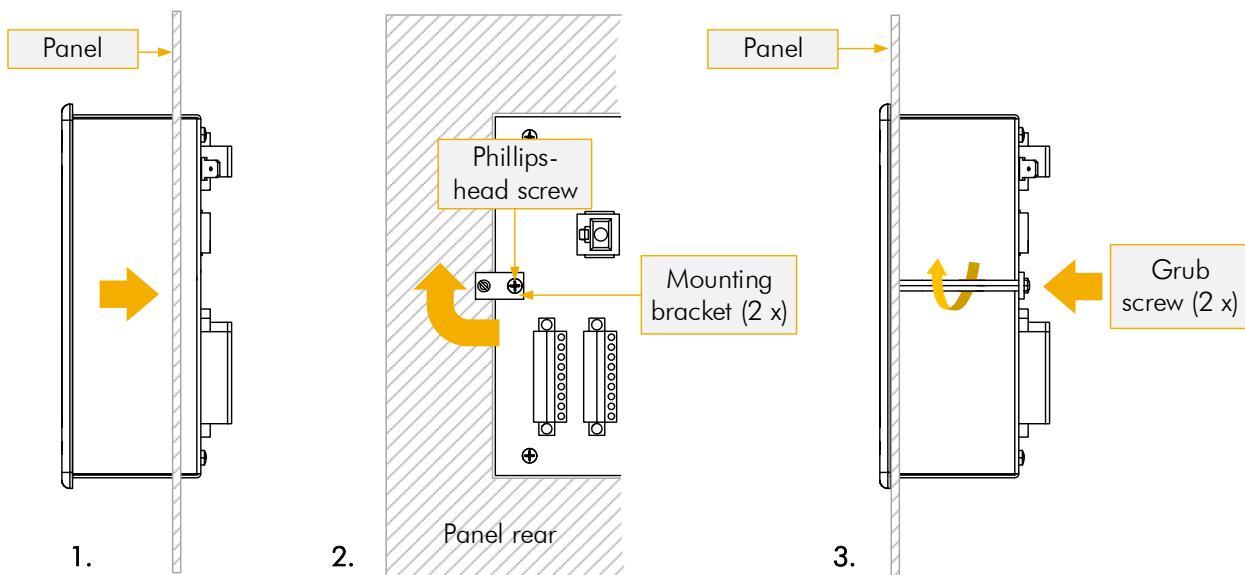
Figure 4: Mounting into panel cut-out

1. Insert the positioning control into a suitable panel cut-out.

2. Then loosen the two Phillips screws of the mounting brackets attached to the rear panel. Turn the two mounting brackets so that the free threaded holes point outwards and then retighten the Phillips screws.

3. Now insert the provided grub screws into the threaded holes of the mounting brackets and turn clockwise until the device is firmly seated in the cut-out.

7.3 Activation of the Device

After applying the 24 VDC power supply voltage (and automatic initialization), the device is ready for operation.

8 Design und Function

The device is operated via touch screen. The selection is made by touching the corresponding buttons.

8.1 Menu Structure
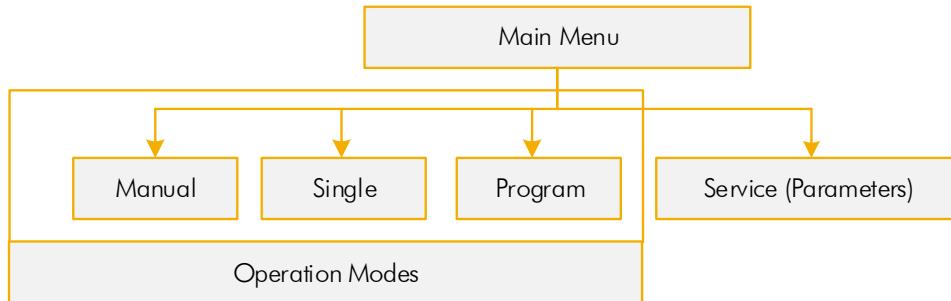
Figure 5: Menu Structure

8.1.1 Password

	NOTE!
ℹ	The service mode / parameter level is protected by password.
	After login the parameters can be set.
	PIN CODE → 250565

9 Main Menu

After switching on the positioning control, the main menu opens. This contains the selection for the operating modes, menu languages, parameter settings in service mode (password input required ☞ 8.1.1) and the cleaning function.
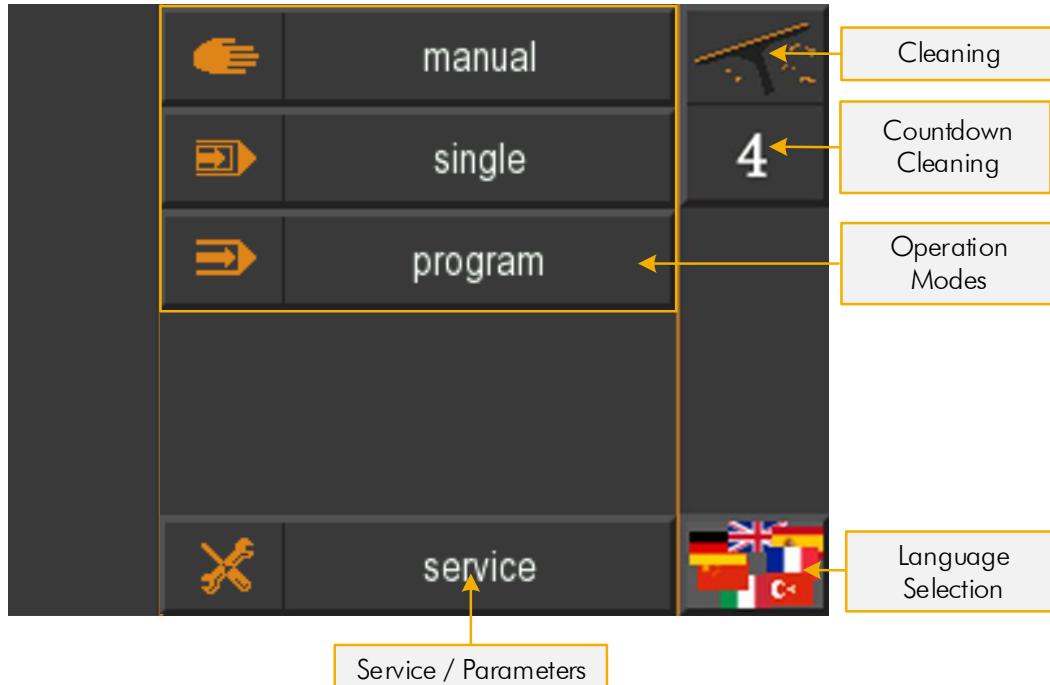
Figure 6: Start Screen / Main Menu

9.1 Language Selection

To select the language, click on the flag icons at the bottom right (see Figure 6 above). A mask appears where you can select the desired language by tapping on the corresponding flag symbol:

Figure 7: Language selection

10 Operation Modes

10.1 Single Mode

In single mode, a single block can be processed. Each entered target position must be confirmed with "OK".

In single mode it is also possible to load the target position for the axis "Angle" and "Gap" from a material table. The fields "**Material selection**" and "**Material thickness**" are located on the left side of the menu.

After one of the two fields has been changed and the new value has been confirmed, the corresponding target positions for axis "Angle" and "Gap are displayed. It is also possible to assign a value each for the "Cut Length" and "Cut Offset".

The material properties can be changed via the material table. This is loaded by pressing the material selection key for longer than 5 seconds. After releasing the key, the material table opens. Either the password 2505 for the material table or the service password (250565) is required for access.
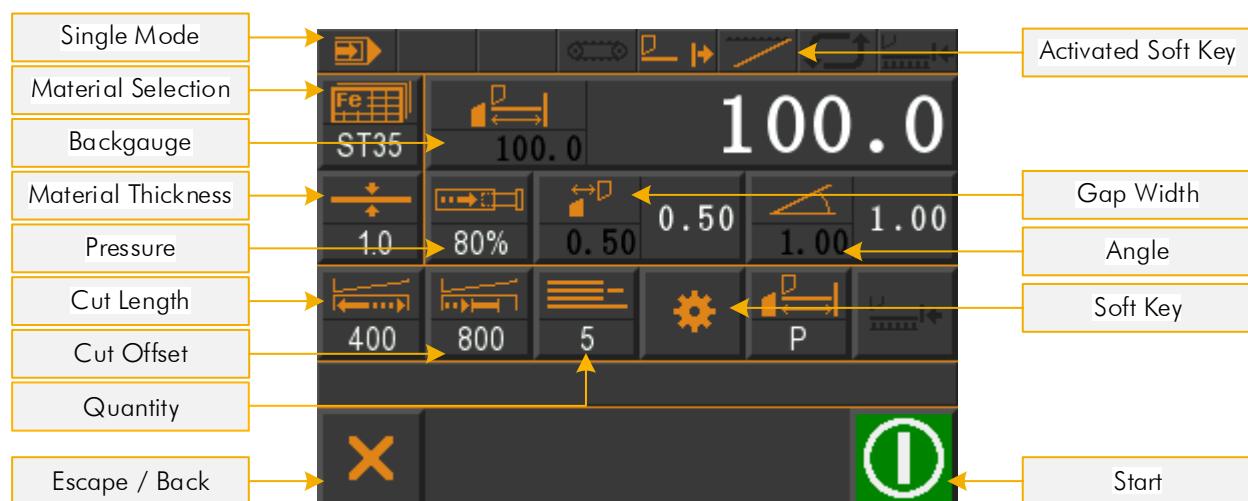
Figure 8: Single Mode

Figure 9: Numerical input fields of Axis Parameters

Consecutive material number

Short Name

Plain text field for material description

Scroll

Scroll

Exit list
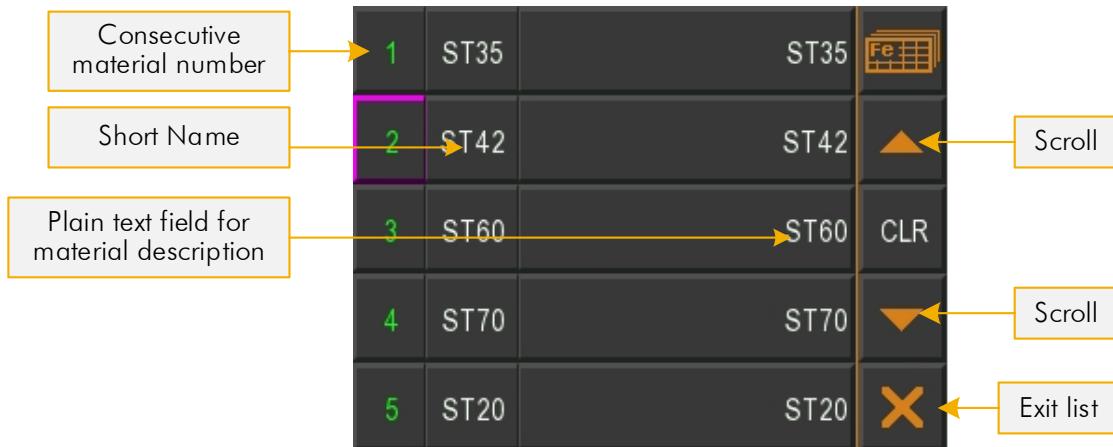
Figure 10: Select material from list

10.1.1 Piece Counter

The piece counter can be configured in 3 modes:

- Downwards counter
- Upwards counter
- Counter disabled

The active mode in each case is displayed in the "Single Mode" operating mask for the piece counter
(☞ 10.1.1.1, ☞ 10.1.1.2, ☞ 10.1.1.3)

The mode is set resp. selected in the piece pre-selection window.

Figure 11: Piece counter selection mask

When you exit the single mode or switch off the controller, the current quantity is stored in the single-block.

10.1.1.1 Downwards Piece Counter

The piece counter is decremented after each complete cut until the number 0 is reached.

Counts downwards
(negative sign)
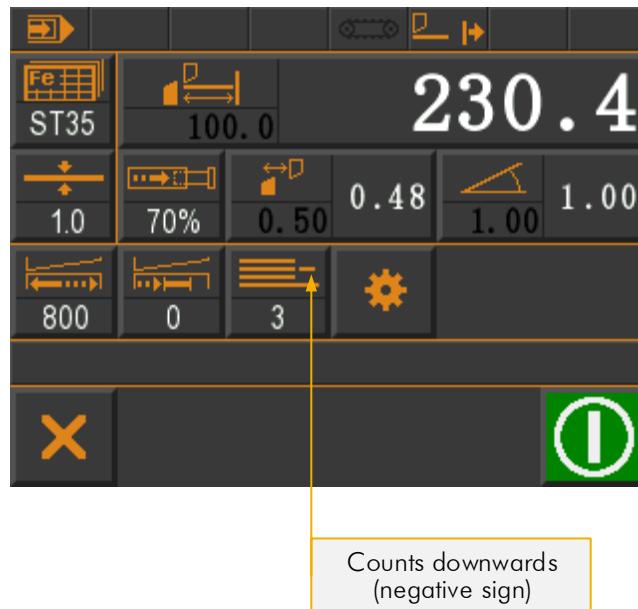
Figure 12: Downwards piece counter

10.1.1.2 Upwards Piece Counter

The piece counter is incremented after each complete cut. A value can be specified at which counting is started.

Counts upwards
(positive sign)
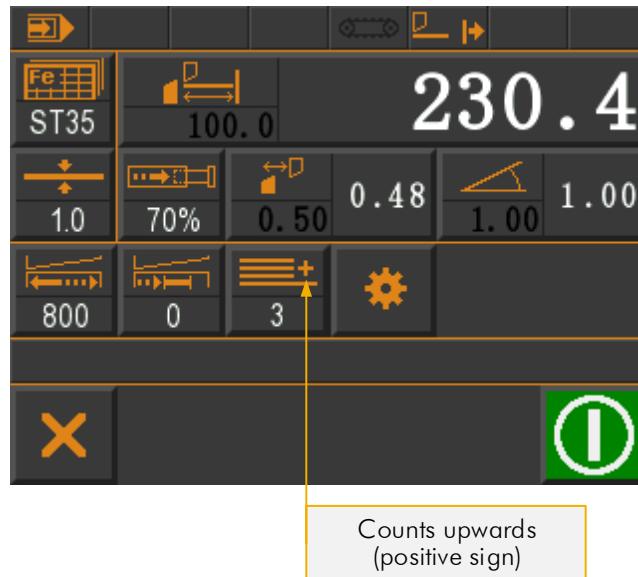
Figure 13: Upwards piece counter

10.1.1.3 Piece Counter disabled

The cuts are not counted when the piece counter is disabled.

Does not count
(empty field)

Figure 14: Piece counter disabled

10.2 Manual Mode

In the manual inching mode, the axes can be moved manually. Simply activate the corresponding axis and move to the demanded position by using the buttons "+" and "−". The active axis is highlighted in color.

Manual Mode

Back gauge

Gap 1 (left)

Gap 2 (right)

Angle

Move cutter bar

Cancel

Axis movement in negative direction

Axis movement in positive direction
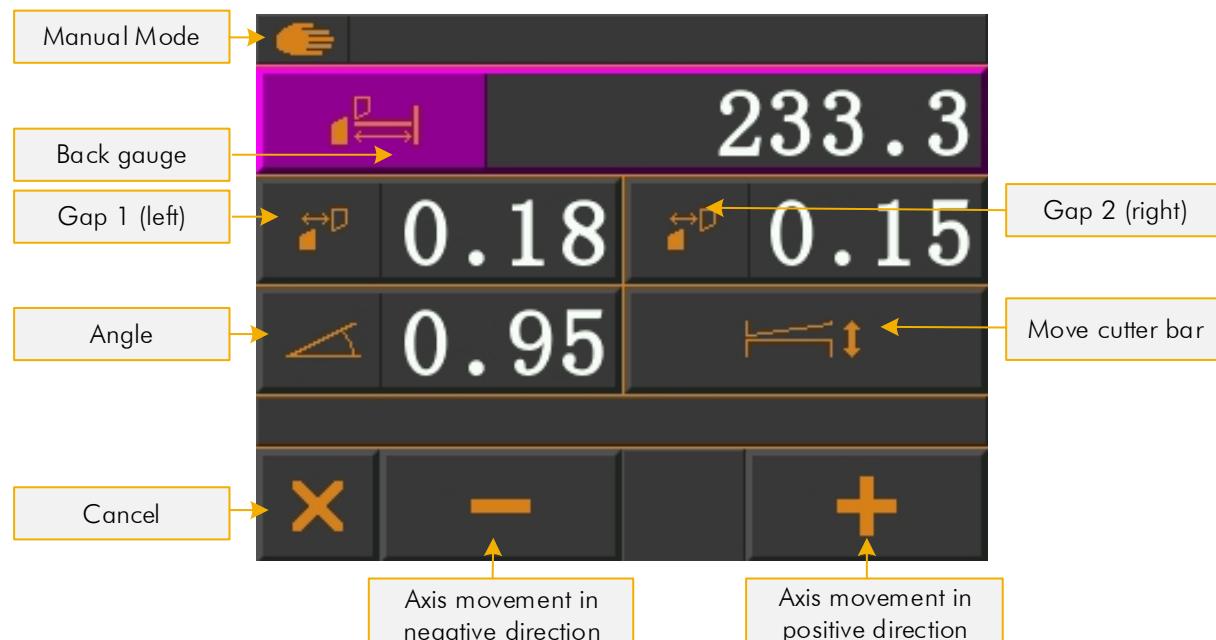
Figure 15: Manual inching mode

10.3 Program Mode

In program mode, programs can be created, saved and executed.

The material properties can be changed via the material table. This is loaded by pressing the material selection key for longer than 5 seconds. After releasing the key, the material table opens. Either the password 2505 for the material table or the service password (250565) is required for access.
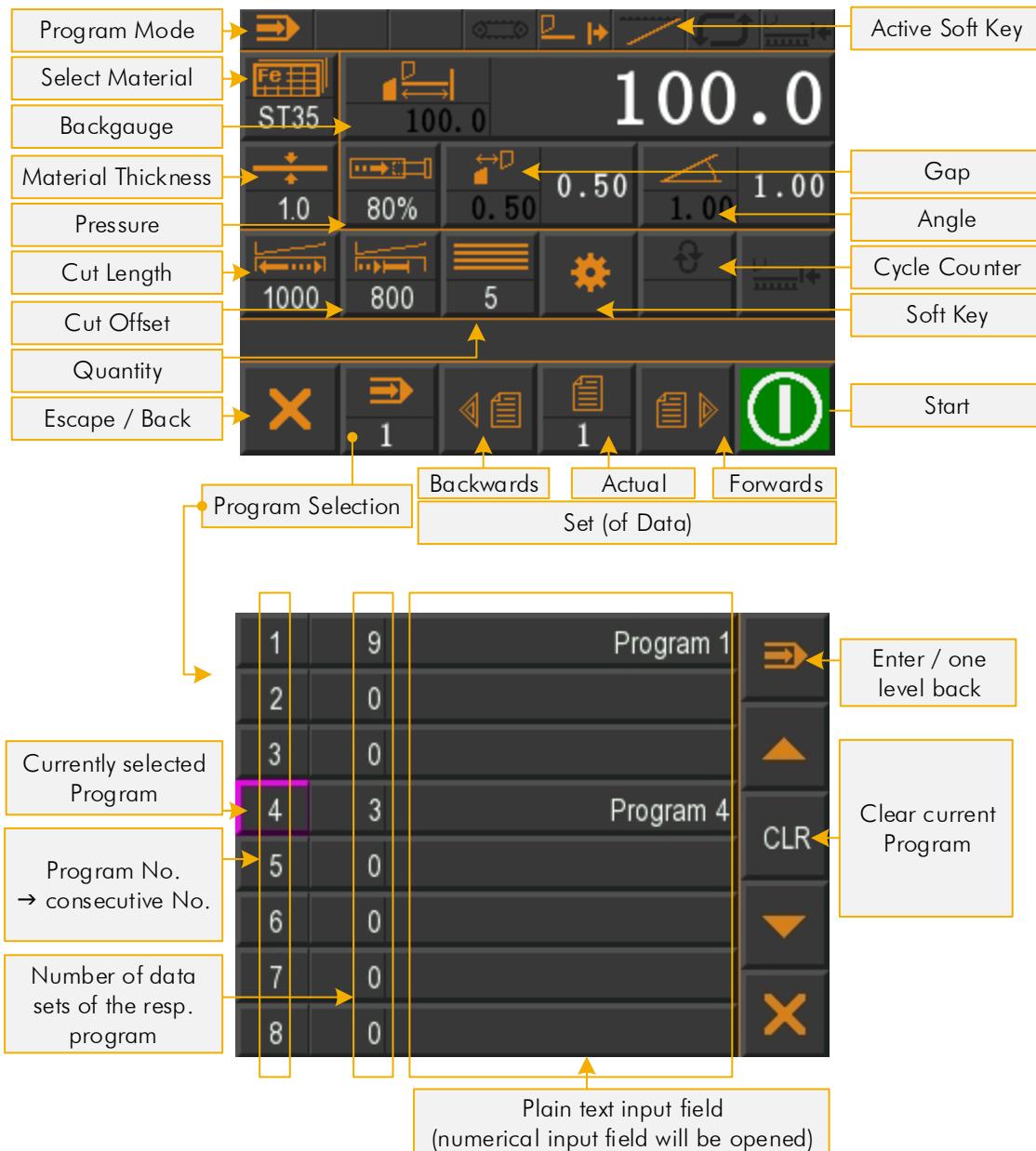
Figure 16: Program Mode and Program List
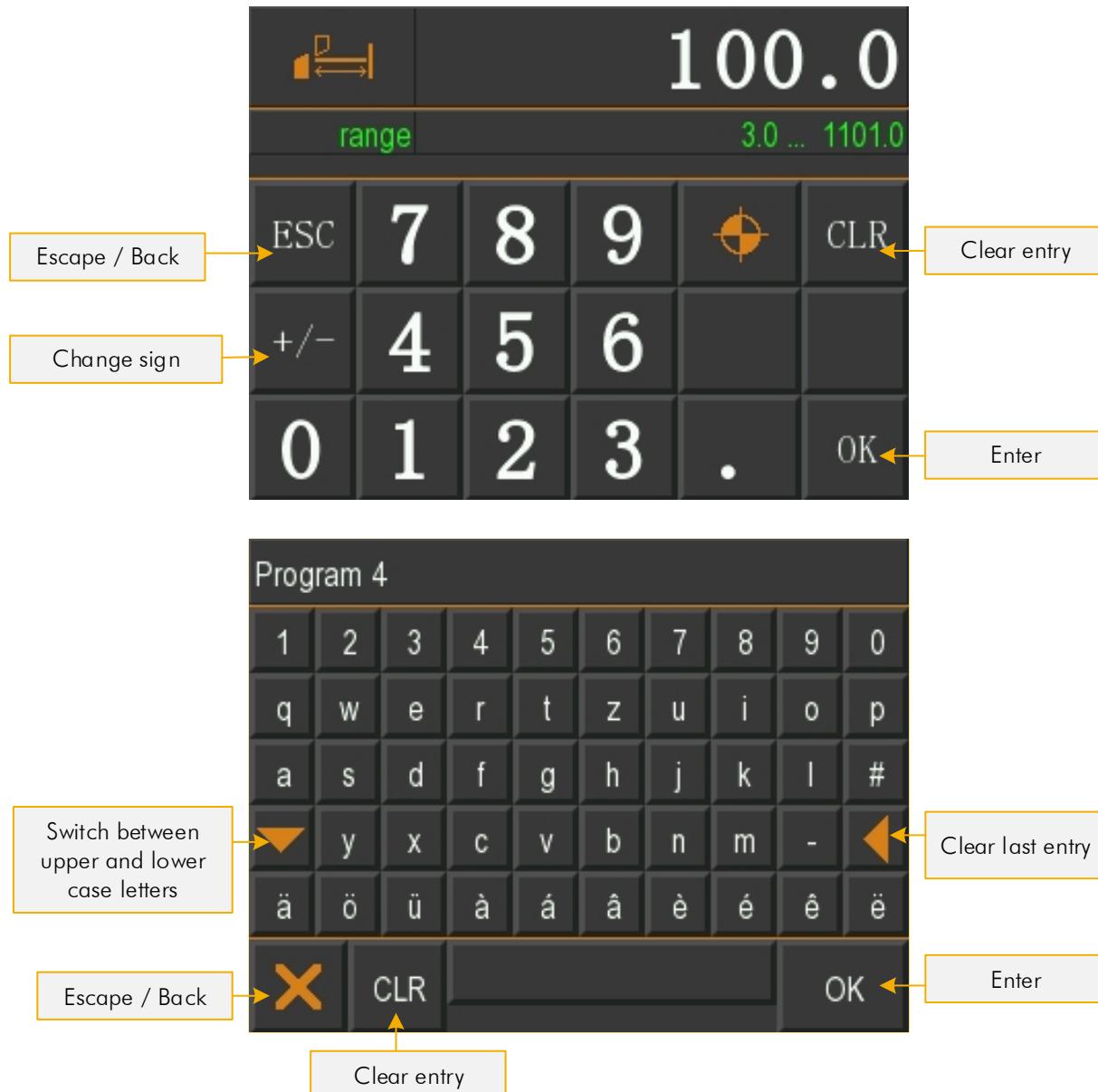
Figure 17: Numeric and alphanumeric input field

10.3.1 Cycle Counter in Program Mode

In program mode, the controller has a cycle counter with 3 different modes:
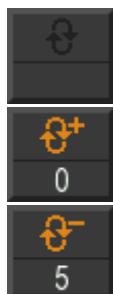
Cycle counter disabled

Upwards counter: If the program has been executed, it starts again from the beginning and the cycle counter is incremented.

Downwards counter: If the program has been executed, the cycle counter is decremented and the program jumps back to the beginning. If the cycle counter reaches the value 0, the controller is stopped. No further cut can be executed.

The mode can be selected and a value preselected by pressing the cycle counter button.
The mode is toggled by pressing the cycle counter mode button again:

(Disabled) → (Upwards) → (Downwards) → Disabled […]
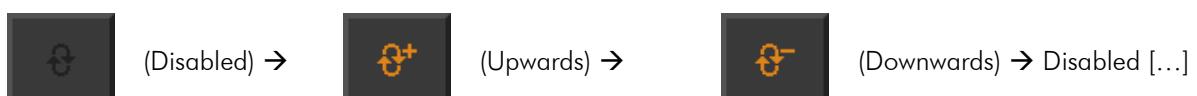
10.3.2 Create a Program

Following parameters and values are valid for the entire program (resp. are similar for all program blocks):

- Material type
- Material thickness
- Pressure
- Gap
- Angle

1. Select a free program from the program list (☞ 10.3 Program Mode) resp. delete an existing program. Now the current data set should be 1.
2. Define if necessary material type and thickness or pressure, gap and angle (applies to the entire program).
3. Define a position for backgauge and if necessary a value for cut length and cut offset.
4. Switch to next data set.
5. Repeat steps 3. and 4. until all desired data sets are defined.
6. Finally, the end of the program must be defined. To do this, open the "current data set" window and activate the "E" field for End. This marks the end of the program in the last data set as character "E".

Mark the last data set of the program with „E" (End).
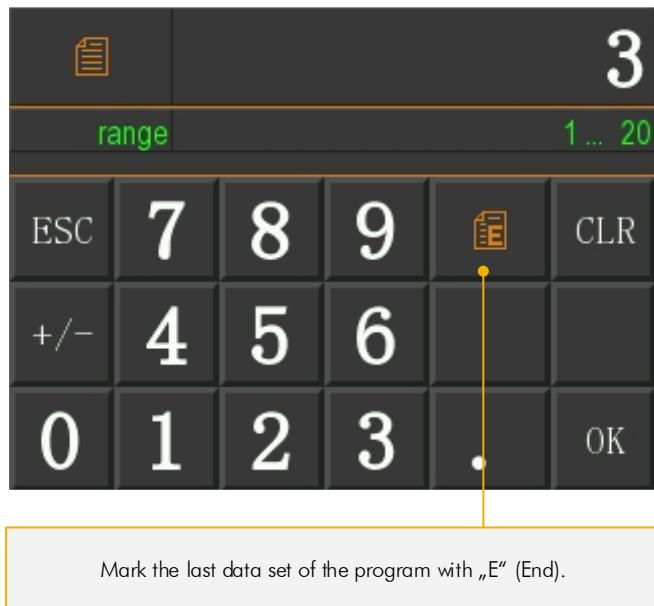
Figure 18: Define the "End of Program"

10.4 Reference an Axis

The following parameter settings can be selected in the menu
Sub Menu Axis -> General Axis General -> Mode reference (☞ 11.4.2 Reference Mode):

1. **MODE 1**(by parameters):
   If the external reference input is active or the button "Reference" will be pressed for more than
   3 seconds, the value stored in register *Sub Menu Axis → Distance Axis → Reference value* is taken
   as the current actual value for this axis.

2. **MODE 2** (by target value):
   If the external reference input is active or the button "Reference" will be pressed for more than
   3 seconds, the entered "target position value" is taken as the current actual value for this axis.

3. **MODE 3** (positive drive) to limit switch with index pulse.

10.4.1 Function of a Reference Run

The reference run will be started by touching the "Reference" button for more than 3 seconds.

The controller now moves the axis to be referenced depending on the parameter
Sub Menu Axis → Axis General → Mode reference (☞ 11.4.2 Reference Mode):

- The output "reference drive run" is set.

- If the appropriate input (limit switch positive or negative) is activated, the controller stops.

- After a dwell time the controller moves in the opposite direction.

- As soon as the corresponding input (limit switch) is deactivated, the "index pulse input" is enabled.

- With the next zero pulse, the control is stopped and the reference value stored in the register
  Axes → Reference is transferred to the actual value window.

11 Service Mode / Parameter Level

Parameters are set in the service mode.

An overview of all parameters can be found in ☞ 13 Parameter Tables.

11.1 Service Menu

The service menu can only be accessed after successful login (see ☞ 11.2 Password Login).
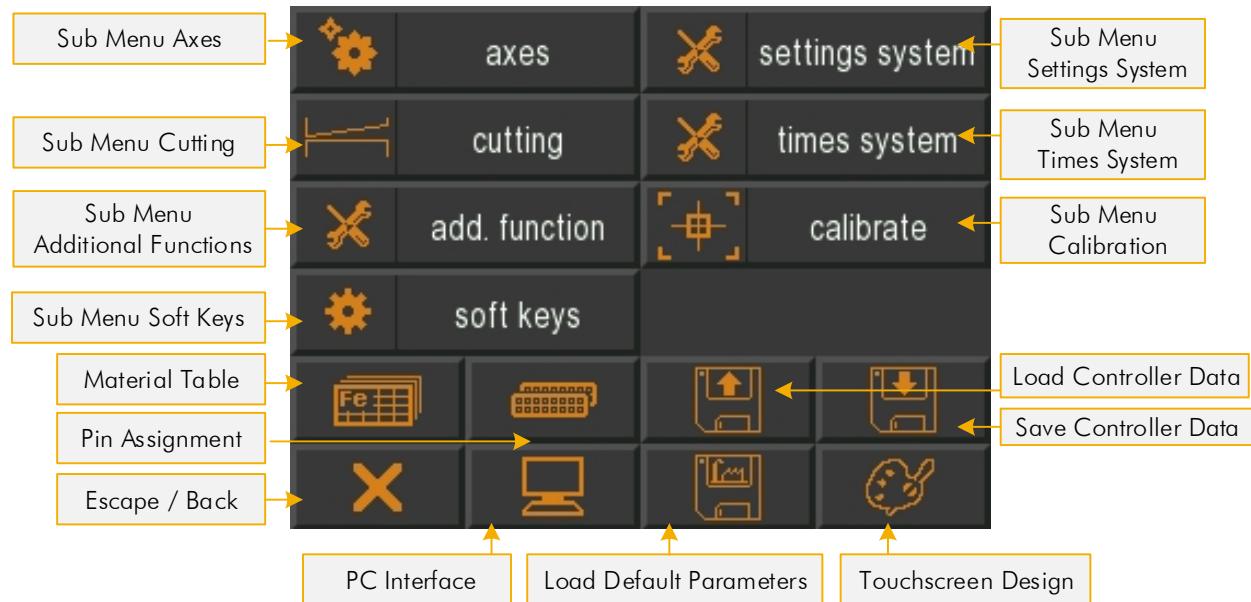
Figure 19: Main Page Service

11.2 Password Login

After touching the service field in the main menu, a numerical input field for the password login appears.
The password **250565** has been assigned as default pin code.
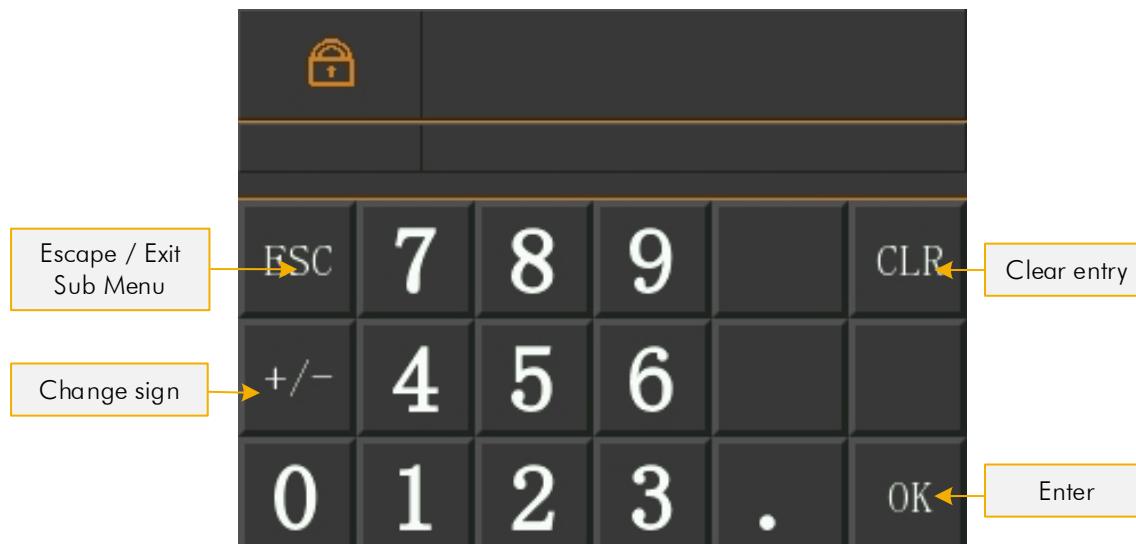
Figure 20: Password login

11.3 Sub Menu Axis

With this menu all axis parameters can be selected and edited in the corresponding sub level.

Figure 21: Sub Menu Axis

11.4 Settings Axis

With this menu the general axis parameter settings of the respective axis can be done.
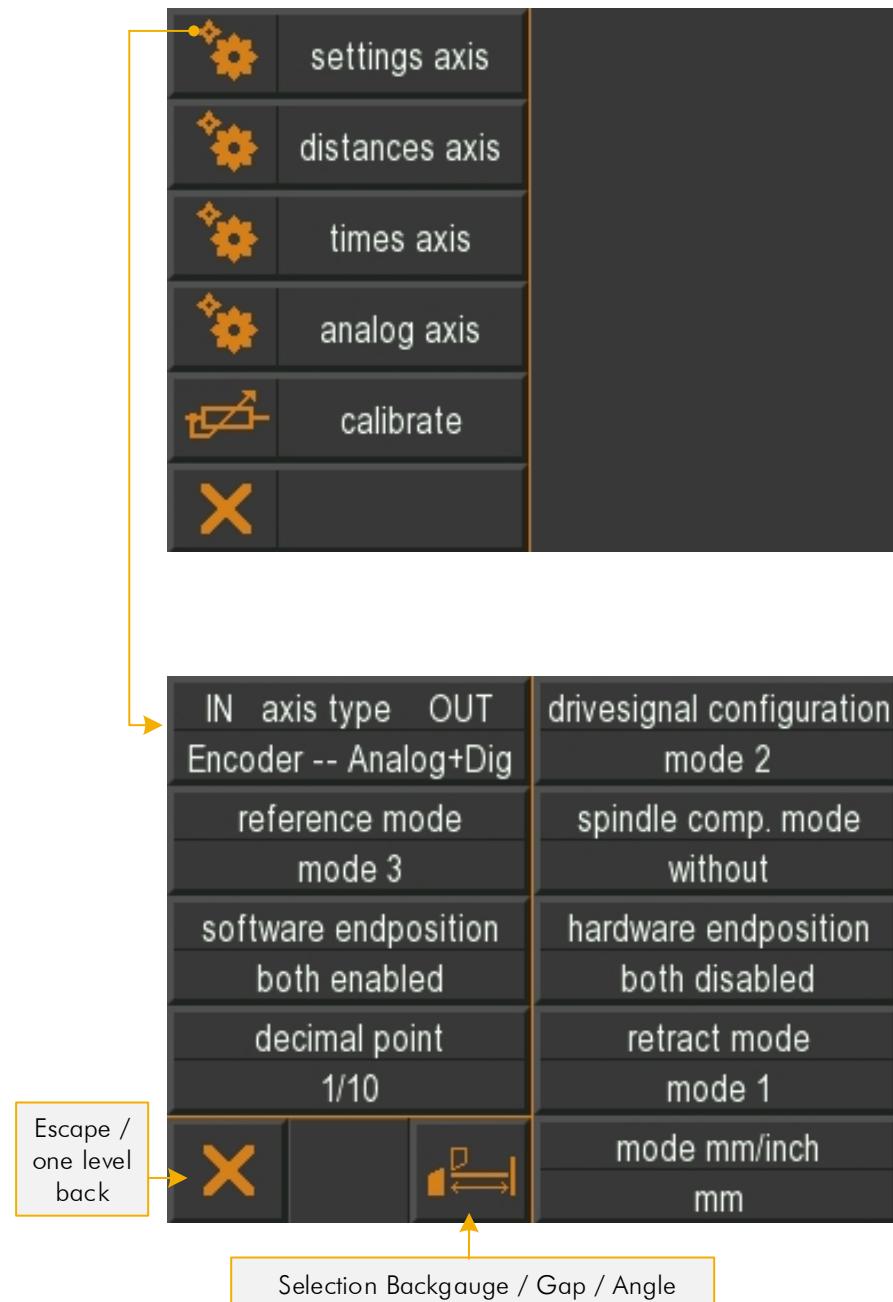
Figure 22: Settings Axis (general)

11.4.1   Axis Type IN / OUT

Table 1: Define Type of Axes

Backgauge Parameters	Gap and Angle Parameters
Encoder – Analog+Dig	Disabled
Analog – Analog+Dig	Encoder – Analog+Dig
Encoder – Digital	Analog – Analog+Dig
Encoder – PID+Digital	Encoder – Digital
Analog – Digital	Encoder – PID+Digital
	Analog – Digital

11.4.2   Reference Mode

The mode for axis referencing is defined in this register (see also ☞ 10.4 Reference an Axis):

- Mode 1 = referencing by parameter
- Mode 2 = referencing by target value
- Mode 3 = reference run positive with index impulse

11.4.3   Software Endposition

Software-end positions can be activated or deactivated with this parameter:

- both enabled
- negative disabled
- positive enabled
- both disabled

11.4.4   Decimal Point

- without
- 1/10
- 1/100
- 1/1000

11.4.5   Drive Signal Configuration

With configuration of the motor signals different starting combinations for the different speeds can be set.

- ▪ Drive Signals → Mode 1

  3 speeds
  Speed = output signals 1-3 ascending
  Output 4 sets direction backwards

Output signals	1	2	3	4
Creep speed forward	X			
Slow speed forward	X	X		
Fast speed forward	X	X	X	
Creep speed backward	X			X
Slow speed backward	X	X		X
Fast speed backward	X	X	X	X

- ▪ Drive signals → Mode 2

  2 speeds
  Independent outputs forwards and backwards
  Independent outputs fast and creep speed

Output signals	1	2	3	4
Creep speed forward	X	X		
Fast speed forward	X		X	
Creep speed backward		X		X
Fast speed backward			X	X

- ▪ Drive signals → Mode 3

  2 speeds
  Speed = output signals 2 + 3
  Output 4 set direction backwards

Output signals	1	2	3	4
Creep speed forward	X	X		
Fast speed forward	X		X	
Creep speed backward	X	X		X
Fast speed backward	X		X	X

- **Drive signals → Mode 4**

  2 speeds
  Independent outputs for direction and speed

Output signals	1	2	3	4
Creep speed forward	X			
Fast speed forward		X		
Creep speed backward			X	
Fast speed backward				X

- **Drive signals → Mode 5**

  3 speeds
  Speed forward = output signals 1-3 ascending
  Speed backward = always fast
  output 4 sets direction backwards

Output signals	1	2	3	4
Creep speed forward	X			
Slow speed forward	X	X		
Fast speed forward	X	X	X	
Creep speed backward	X	X	X	X
Slow speed backward	X	X	X	X
Fast speed backward	X	X	X	X

- **Drive signals → Mode 6**

  3 speeds
  Binary coded
  Output 1 = forward
  Output 4 = backward
  Outputs 2 + 3 = speed

Output signals	1	2	3	4
Creep speed forward	X	X		
Slow speed forward	X		X	
Fast speed forward	X	X	X	
Creep speed backward		X		X
Slow speed backward			X	X
Fast speed backward		X	X	X

- Drive signals → Mode 7

3 speed
Forward/backward separately

Output signals	1	2	3	4
Creep speed forward	X			
Slow speed forward	X	X		
Fast speed forward	X	X	X	
Creep speed backward				X
Slow speed backward		X		X
Fast speed backward		X	X	X

- Drive signals → Mode 8

2 speeds
Forward/backward separately

Output signals	1	2	3	4
Creep speed forward	X			
Fast speed forward	X		X	
Creep speed backward		X		
Fast speed backward		X		X

11.4.6 Spindle Compensation Mode

- Without = No spindle compensation
- With spindle − = negative spindle compensation
- With spindle + = positive spindle compensation
- Forced loop − = with backlash by positioning in negative direction
- Forced loop + = with backlash by positioning in positive direction

11.4.7 Hardware Endposition

- Both enabled
- Negative disabled
- Positive enabled
- Both disabled

11.4.8 Retract Function

- Mode 1 = Retract to actual value + adjusted value with return (see 11.5.7)
- Mode 2 = Retract to adjusted value with return (see 11.5.7)
- Mode 3 = Retract positive to actual value for the adjusted time period with return (see ☞ 11.6.9)
- Mode 4 = Retract to actual value + adjusted value without return (see 11.5.7)
- Mode 5 = Retract to adjusted value* without return (see 11.5.7)
- Mode 6 = Retract positive to actual value for the adjusted time period without return (see ☞ 11.6.9)
- Mode 7 = Retract to actual value – adjusted value with return (see 11.5.7)
- Mode 8 = Retract negative to actual value for the adjusted time period with return (see ☞ 11.6.9)

11.4.9 mm/ Inch Mode

Measurement unit: mm or inches

11.5 Distances Axis

Relevant distance parameters can be set in this menu for the selected axes.

Figure 23: Axis Distances

11.5.1   Creep Speed / Correction Stop

Creep speed (forward / backward) = slow speed

Distance to the target position at which the controller switches from slow speed to creep speed. The output slow speed will be switched off.

Correction Stop (forward) / Correction Stop (backward)

This parameter serves to compensate the overrun distance from the switch-off point of the motor to standstill.

Example: The target position is overrun by 0.2 mm constantly. The data entry has to be 2.
The stop command is thus moved forward by 0.2 mm.

During first start-up, the stop offset is set first to "0" in order to be able to calibrate the overrun accurately. For an exact positioning the stop offset should be as small as possible (0.0 ... 0.2 mm) i.e. the mechanical friction should be steady over the entire retract distance and the slow speed and/or creep speed must be accordingly small adjusted. The value in register slow speed must be larger than in creep speed.

ⓘ	**REMARK!** When positioning with PID, the correction stop serves as a tolerance window.

Example: Positioning with 1 speed

In principle, the following applies when setting the speeds:

Creep speed = Correction stop

Creep speed: 1.0 mm
Correction: 1.0 mm
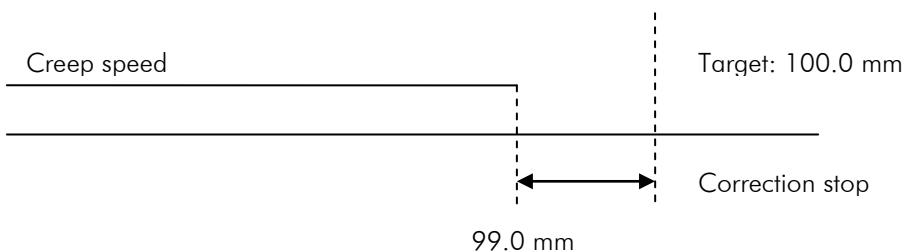
Figure 24: Creep speed (1 speed)

Example: Positioning with 2 speeds

In principle, the following applies when setting the speeds:

Creep speed > Correction stop

Creep speed   = 10.0
Correction   = 1.0
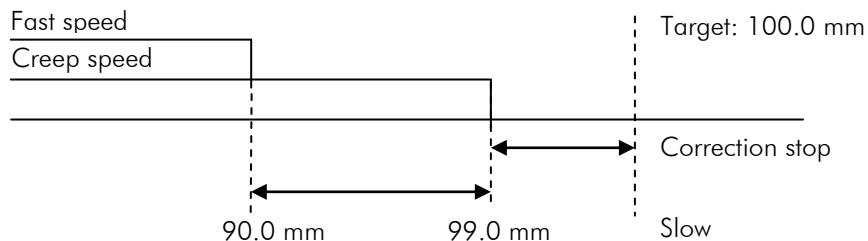
Figure 25: Creep speed (2 speeds)

Example: Positioning with 3 speeds

In principle, the following applies when setting the speeds:

Slow speed > Creep speed > Correction stop

Slow speed   = 20.0
Creep speed   = 10.0
Correction stop = 1.0
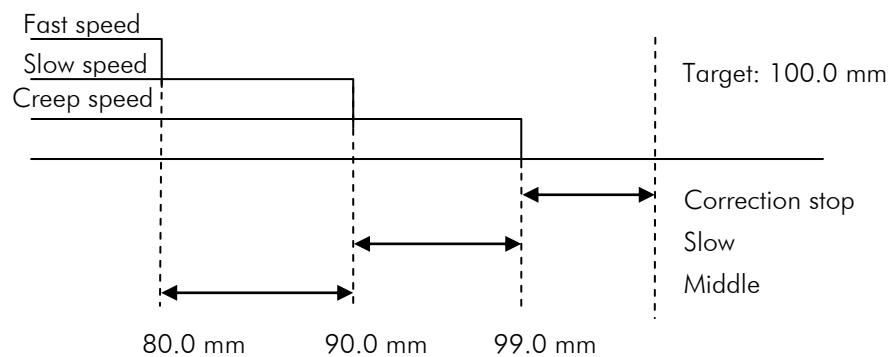
Figure 26: Creep and Slow speed (3 speeds)

11.5.2   Tolerance Window

The tolerance window is reached when the actual value is equal to the target value ± parameter "Tolerance Window". If an axis is within the tolerance window, it is not moved when a new start command is issued. The respective "Tolerance Zone" output of the axis is also set when the tolerance window is reached.

11.5.3   Manipulation

The manipulation window is used to adjust the actual value. If the actual value is within the target value ± parameter "Manipulation", the actual value is equated with the target value. The real target value remains stored in the background, because only the display is manipulated (thus no positioning errors will add up).

Example: Entered Value = 0.2 mm (i.e. Tolerance Window ± 0.2 mm)

Target value:	100,0 mm
Internal actual value:	99,8 mm
Displayed actual value:	100,0 mm

> **REMARK!**
>
> The tolerance window should be set to zero before starting to operate.

11.5.4   Spindle Compensation

To compensate for spindle tolerances, the target position must always be approached from the same direction, i.e. in one direction the target position is exceeded by the value set here. After expiration of the backlash dwell time that was entered in register *Menu → Times → Spindle Compensation*, the axis moves back to the target position.

11.5.5   Forced Loop

If during absolute positioning the target value is within the range ± value of the "forced loop" window, a forced loop is run.

11.5.6   Reference Value

A reference value resp. reference position can be specified here.

11.5.7   Retract Length

Depending on the selected retract mode, the axis is moved by the value "Retract Length".
The retract function is controlled by the internal automatic cutting machine.

11.5.8   End Position Min/ Max

These two values can be used if there are no mechanical limit switches available or in addition to existing mechanical limit switches.

The minimum software end position should be between the smallest length/position to be machined and 0 (or shortly before the mechanical limit switch).

The maximum software end position should be between the largest length/position to be machined and the maximum length (or shortly before the mechanical limit switch).

If one of these two values is reached, the positioning procedure is interrupted.

11.5.9 Factor

Here the pulse scaling factor (for mm as measuring unit) is set. The incoming encoder pulses are multiplied by this factor (range 0.00001 to 9.9999) to customize the display to the desired position values.

Beispiel:

$$\text{Encoder} = 1000 \; \frac{[\text{Pulses}]}{[\text{U}]}$$

$$\text{Spindle distance} = 100 \; \frac{[\text{mm}]}{[\text{U}]}$$

$$\text{Factor} = 100 \; \frac{\text{Spindle distance [mm]}}{\text{Pulses}} = \frac{100 \text{ mm}}{1000 \text{ [Pulses]}} = 0.1 \frac{[\text{mm}]}{[\text{Pulses}]}$$

11.6 Times Axis

Relevant time parameters for the respective axis can be set in this menu.
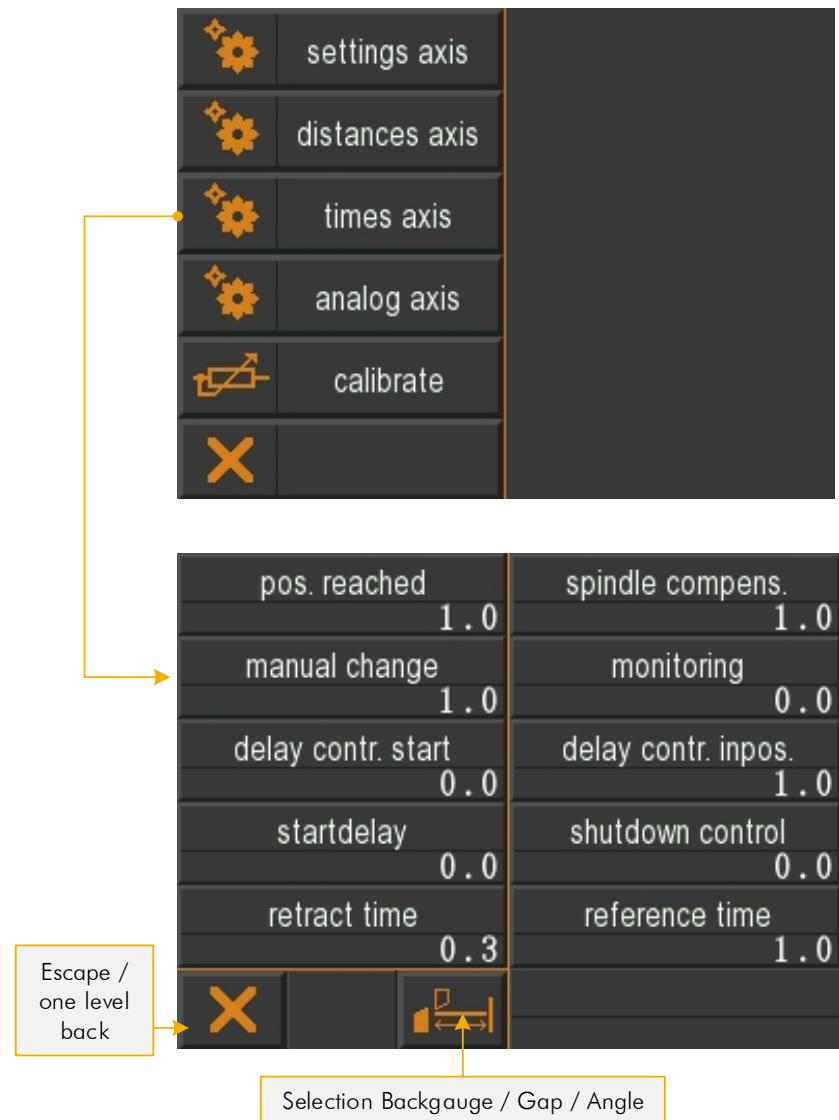
Figure 27: Axis Times

11.6.1 Position Reached

The output signal is wiping when a time is entered or static when zero is set.
It is set when the positioning of the corresponding axis is completed.

11.6.2 Spindle Compensation

At the peak of the loop run, the drive signals drop off. Only after this time has elapsed, the controller returns to the target value (adjustment range 0.1 sec … 99.9 sec).

11.6.3 Manual Change

After this time has elapsed, the system switches from a low speed to a higher speed in manual mode.

11.6.4 Monitoring

A time (0.1 … 99.9 sec.) for encoder monitoring can be set here. If no more encoder signals are detected for the duration of the time set here, the drive signals are switched off to stop the motor.

11.6.5 Delay Contr. Start

After the start of positioning, the movement of the axis is delayed by the time set here X.X seconds, although the controller enable has already been set via the corresponding output.

11.6.6 Delay Contr. Inpos.

After a position has been reached, the output signal for the controller enable is retained for the time set here in X.X seconds.

11.6.7 Start Delay

With a start command, the start of positioning is delayed by this time.

11.6.8 Shutdown Contr.

Here the time in X.X sec. is entered for shutdown after the position is reached.

11.6.9 Retract Time

Here the time in X.X sec. is entered, after which is positioned from the retract peak back to the target value.

11.6.10 Turning Back Reference Time

In the peak of the reference run, the drive signals drop off. The positioning is only continued after this time has elapsed (setting range 0.1 … 99.9 sec).

11.7 Analog Axis

Relevant analog parameters for the respective axis can be set here:
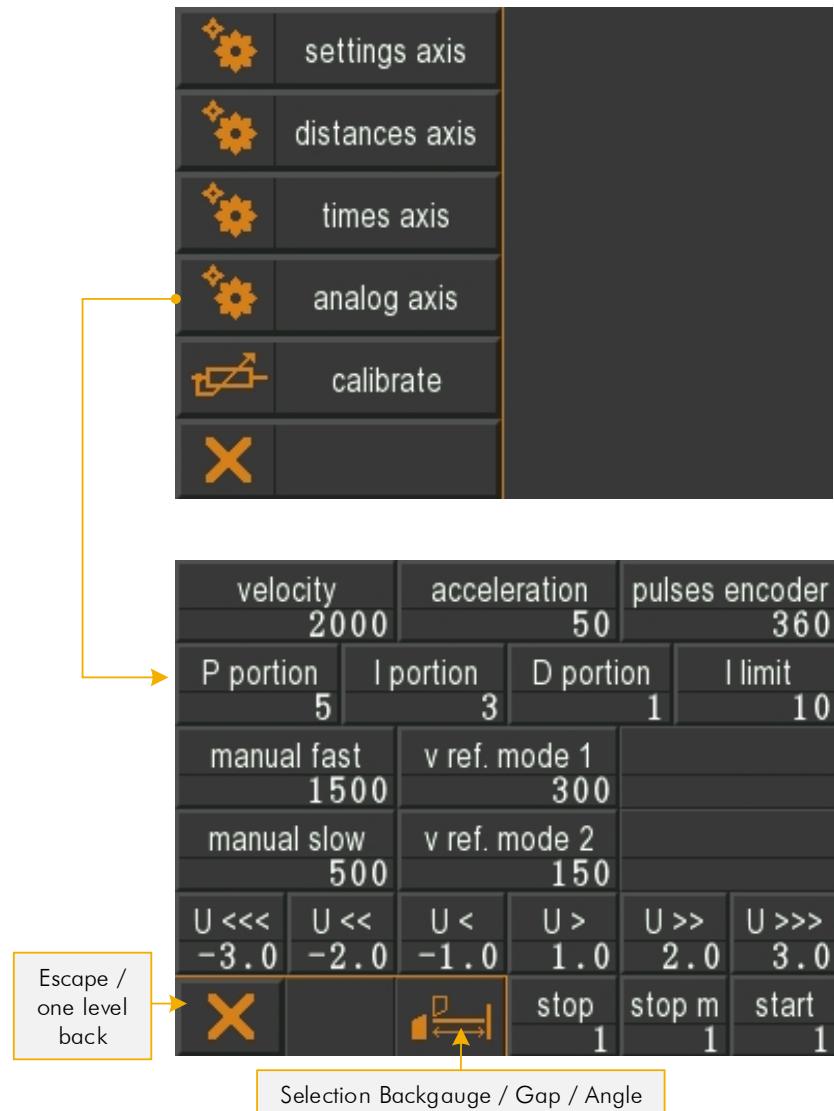
Figure 28: Axis Analog

11.7.1 Velocity

The maximum speed per minute for positioning is defined here. The speed is measured via the rotary encoder (0 … 10000 rpm). If there is a transmission between the motor and the rotary encoder (e.g. by a gear or a spindle), the transmission ratio must be taken into account for the number of revolutions.

ℹ	**EXAMPLE:** • Demanded motor speed rpm = 3000 • Gearing ratio i = 10 **V = UPM/i = 3000/10 = 300**

11.7.2 Acceleration

The acceleration during positioning in revolutions per second squared ($\frac{[U]}{[s^2]}$) is set in this parameter.

11.7.3 Pulse Encoder

The number of pulses of the measuring system per revolution of the motor is set here in order to be able to calculate the nominal speed (maximum 9999 pulses per revolution).

11.7.4 P-Portion

Proportional amplification: setting range 1 … 3000

General:

The P-element consists exclusively of a proportional part and thus has an amplifying property.
The P-component multiplies the input value by a constant factor.

P40T:

In case of control deviation, the difference between target and actual value is multiplied by the value set here and output as a voltage component. The higher the proportional amplification, the more sensitive (possibly also unstable) the control loop becomes.

11.7.5   I-Portion / I-Limit

Integral step: setting range 1 … 1000

General:

An I-controller (integrating controller) determines the output value by integrating the control deviation with weighting by the reset time. A continuous control deviation therefore leads to a further increase of the control output. The reset time determines how large this time influence is. The maximum reset value is limited by the I-limit. The step response of the I-component is a linear increase. This means that with a constant control deviation, the integral increases and thus this component increases.

P40T:

In case of control deviation, the analog control voltage is increased stepwise until the target/actual difference equals zero or until the I-limit set in the register is reached. The larger the I-component, the slower becomes the control loop.

11.7.6   D-Portion

Differential voltage: setting range 1 … 1000

General:

The D-controller (differential controller) determines the output value from the time derivative of the control deviation.

P40T:

In case of control deviation, a short voltage pulse proportional to the rate of change is output in order to compensate this quickly - without permanently endangering the control loop stability. The level of the voltage pulse is set (max. ± 10 V).

11.7.7   Manual Fast

Here the fast speed can be set for moving the axes in manual mode.

11.7.8   v Ref. Mode Part 1

Here the reference run speed of the back gauge until reaching the initiator is defined.

11.7.9   Manual Slow

Here the slow speed can be set for moving the axes in manual mode.

11.7.10   v Ref. Mode Part 2

Here the reference run speed of the back gauge until reaching the index pulse is defined.

11.7.11   U<<< / U>>>

This register is used to set the voltage during fast speed operation backwards / forwards.

11.7.12 U<< / U>>

This register is used to set the voltage during slow speed operation backwards / forwards.

11.7.13 U< / U>

This register is used to set the voltage during creep speed backwards / forwards.

11.7.14 Stop Mode

For the different possibilities to stop the system the P40T comes with this special register.

Stop Mode / Stop Mode manual mode:

0 = the voltage of the analog output is set to 0 V.
1 = the drive is set to a standstill with the greatest possible ramp slope.
2 = the drive is set to a standstill with the ramp slope according to the "**Acceleration**" parameter setting.

11.7.15 Start Mode

0 = if the axis is in the tolerance zone, it is not restarted.
1 = the start of the axis is forced in the tolerance zone.

11.8   Calibrate Axis

11.8.1   Calibration with Axis Angle

1. Input of the min. and max. value to be calibrated.
2. Activate axis.
3. Move axis accordingly (measure min/max manually).
4. Set Increment value (inc) by „**Teach**" field.
5. With deactivated axis the according inc values can be readjusted.

The following machine values are set directly:

A   Distance to measuring system
B   Distance to pivot point
C   Blade opening at pivot point
D   Blade length

Note: If double gap is deactivated, the right column does not appear in the calibration mask.
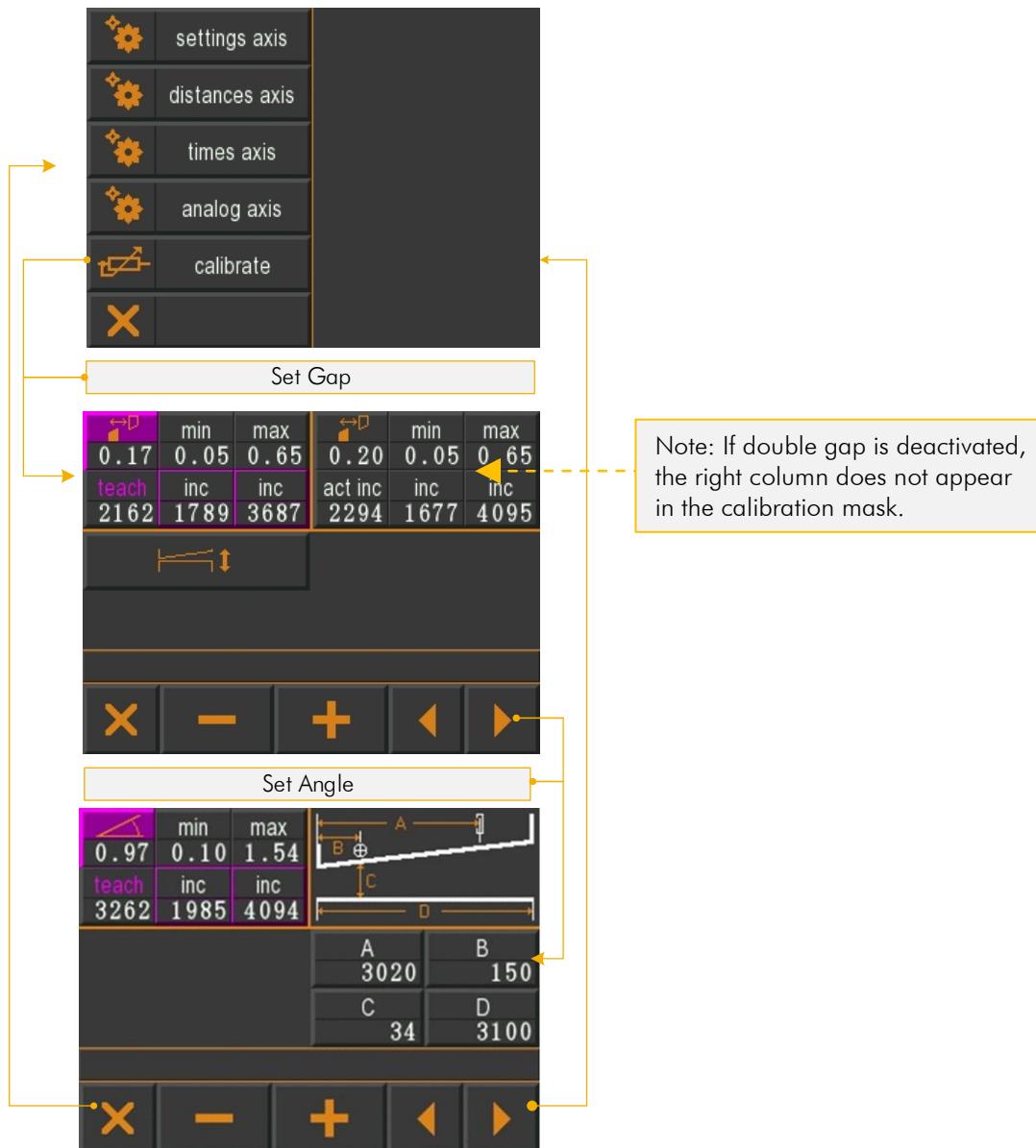
Figure 29: Axis calibration with axis angle

11.8.2 Calibration without Axis Angle

1. Input of min. and max. values to be calibrated.
2. Activate axis.
3. Move axis accordingly (measure min/max manually).
4. Set Increment value by the „**Teach**" field.
5. With deactivated axis the according inc values can be readjusted.

Following machine values are set directly:
- **A** (Left) blade opening at TDC (Top Dead Center).
- **B** (Right) blade opening at TDC.
- **C** Minimal blade opening (virtual TDC, relevant for using with cut offset)
- **D** If only the backgauge axis is active (gap and angle not active)…
  … and the value is 0 → the material thickness is considered as minimal blade opening.
  … and the value is not 0 → this value is the minimal blade opening.
- **E** If several axes are activated, this value is added to the material thickness.
- **F** Blade length
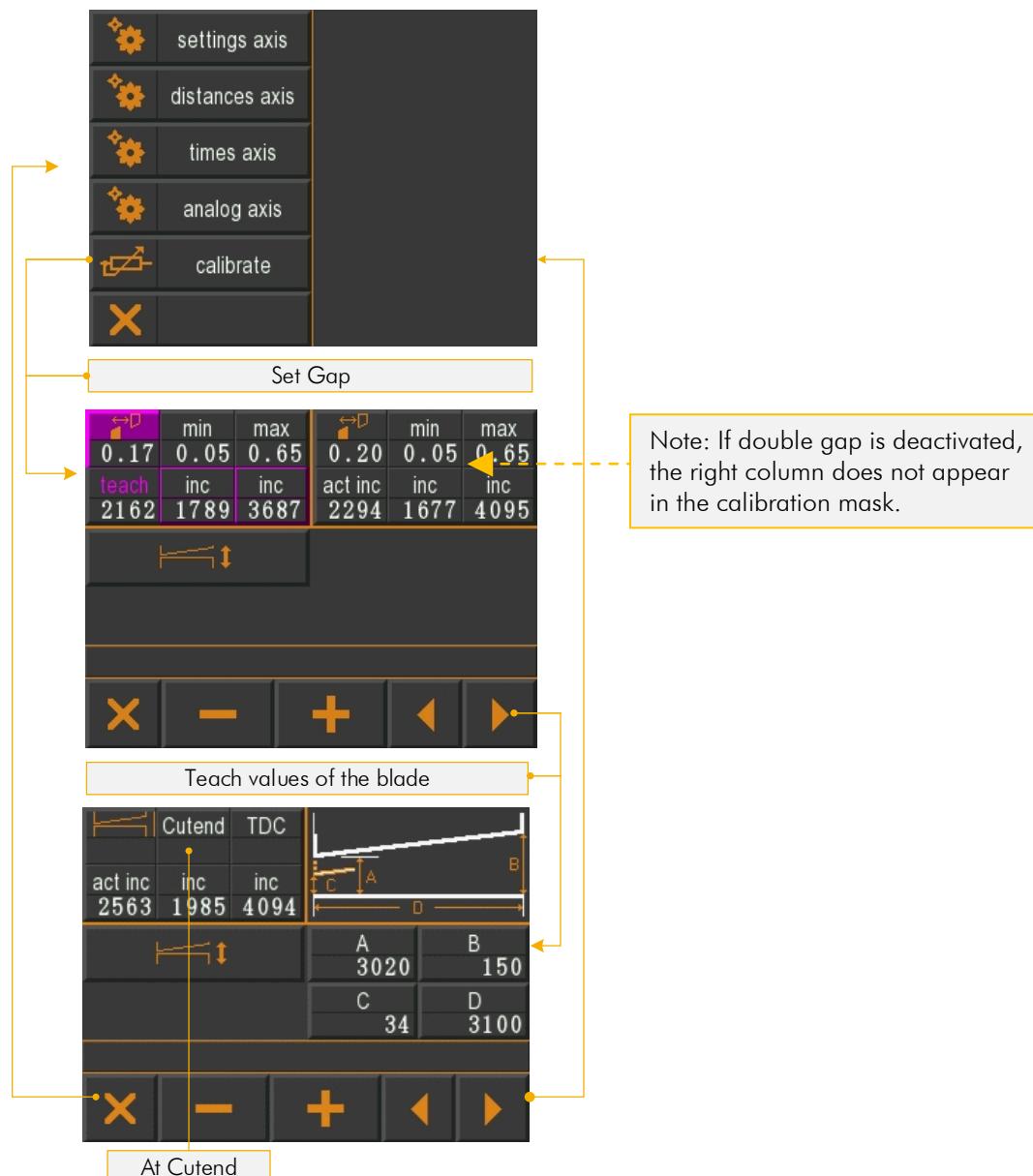
Figure 30: Calibration without axis angle

11.9 Sub Menu Cutting
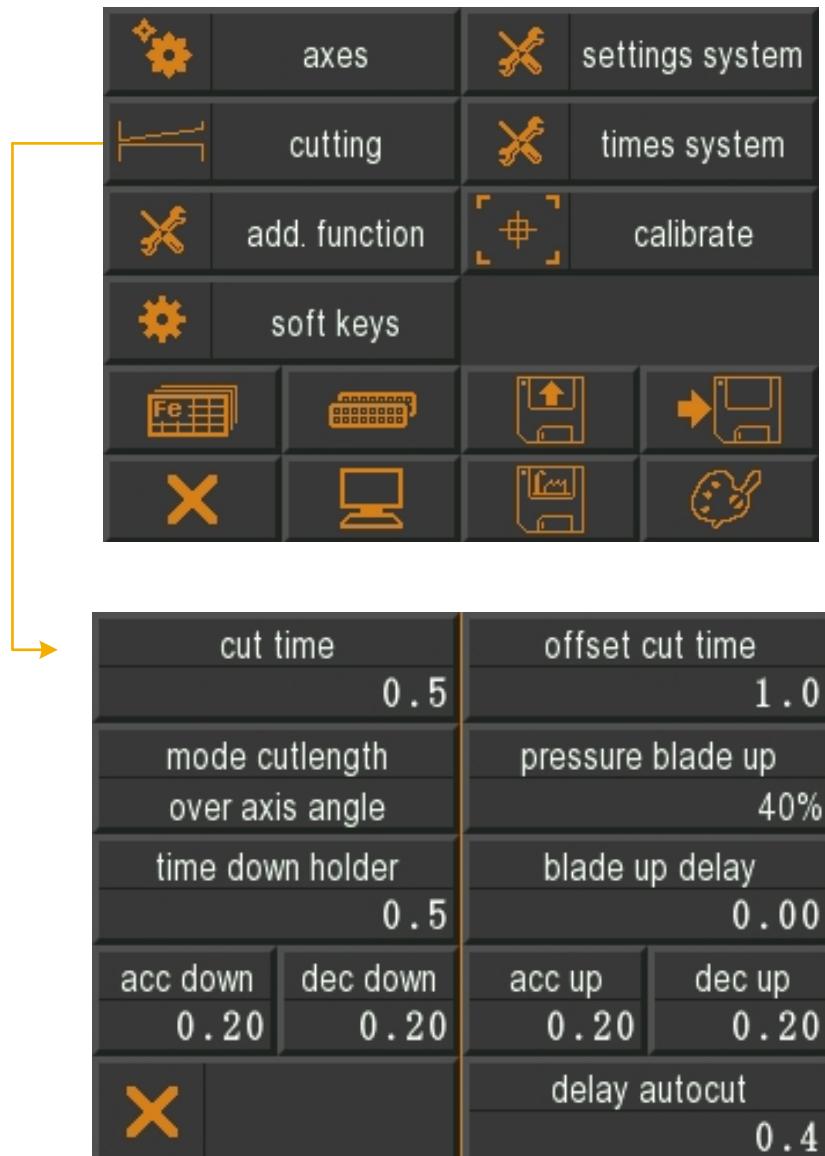
Figure 31: Sub Menu Cutting

11.9.1   Cut Time

This parameter defines the time from start of cutting until end of cutting.

11.9.2   Offset Cut Time

This parameter defines the time from the upper rest position to the start of the cut that the blade needs to lower.

11.9.3 Mode Cutlength

- OFF
- via axis angle (default setting)
- via time
- by foot pedal
  (the blade moves downwards until either the foot pedal is released,
  or the BDC switch is reached. The blade then moves upwards again).

11.9.4 Pressure Blade up

Defines the pressure in % at which the knife is lifted back to the upper rest position.

11.9.5 Time Down Holder

This parameter defines the time that elapses before the down holder take effect.

11.9.6 Blade Up Delay

This parameter defines the delay time after cutting until the knife is lifted back to its rest position.

11.9.7 Acc Down

This parameter defines the duration between opening the valve and switching ON the pressure when the blade is lowered.

11.9.8 Dec Down

This parameter defines the duration between switching OFF the pressure and closing the valve when the blade is lowered.

11.9.9 Acc Up

This parameter defines the duration between opening the valve and switching ON the pressure when the blade is lifted.

11.9.10 Dec Up

This parameter defines the duration between switching off the pressure and closing the valve when the knife is lifted.

11.9.11 Delay Autocut

This parameter defines the delay time that elapses until the next cut when "Autocut" is activated.

11.10 Sub Menu Setting System

In this sub menu system parameter can be set. By pressing the button "**pressure active for testing**" (see figure below) additionally the setting "U at 100 % pressure" can be activated for testing purposes.

Button „pressure active for testing"

Figure 32: System General

11.10.1 Pressure Control

- ON
- OFF

11.10.2 U at 100% press.

Here the analog output voltage at 100 % pressure can be set.

Service Mode / Parameter Level

11.10.3 Pressure Adjust Angle

This parameter defines the pressure in percent to adjust the angle.

11.10.4 Pressure Adjust Gap

This parameter defines the pressure in percent to adjust the gap.

11.10.5 Gap / Angle / Pressure

- locked
- unlocked
- hidden

11.10.6 Gap 2 (right)

- ON
- OFF

11.10.7 Next set stepping

For program operation, various settings can be made for processing the following data set (program block):

- without   → no next set stepping activated
- without start → when a set has been processed, the next set is loaded
- with start   → when a set has been processed, START must be pressed to load the next set

- 48 -

11.11 Sub Menu Times System
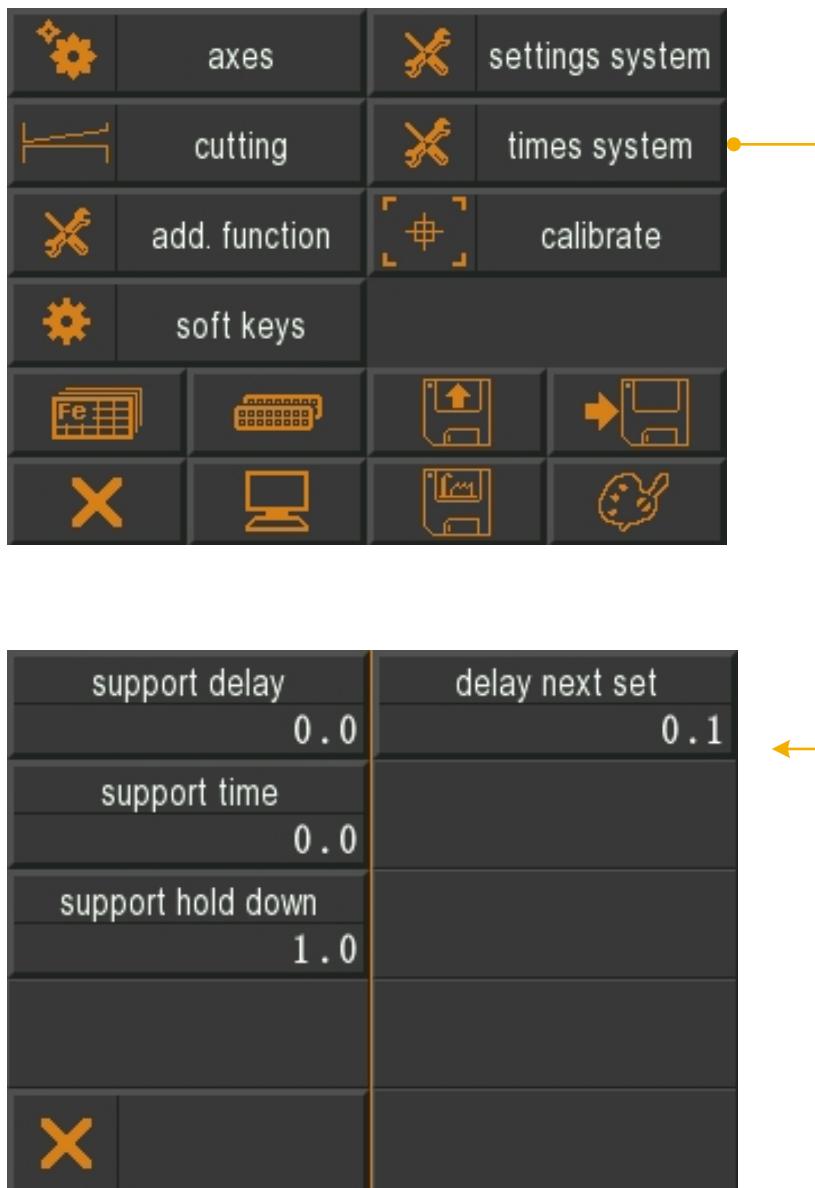
Figure 33: System Times

11.11.1 Preparations for Activation of the Sheet Support

1. Please check whether the software is V2.13 or higher has been installed
2. The inputs and outputs must be assigned
    (see also ☞ 11.17 Functional and Logical Assignment of Input-/Output Functions).

    <u>Inputs:</u>

    Sheet Support may have 2 or 3 positions:

    ▪ if you assign the Input "**support is up**" and "**support is down**", you define a 2-position-sheet-support
    ▪ if you assign in addition the Input "**support in middle**", you define a 3-position-sheet-support

    <u>Outputs:</u>

    Also the Outputs "**support up**" and "**support down**" must be assigned
3. To activate the sheet support in Single- and Program-Mode, the button "**Sheet Support**"
    (see ☞ 11.15 Soft Keys) must be used.
4. Define the time parameter "**support delay**" (☞ 11.11 Sub Menu Times System). This is the time that must elapse between the start of the cutting process and moving the sheet support. It should be long enough that the down holder just acts.
5. In addition you can define the time parameter "**support hold down**" (☞ 11.11 Sub Menu Times System). This is the time that must elapse (after the cutter bar has moved up again) before the sheet support is returned to its initial position.

11.11.2 Using Sheet Support in Single and Program Mode

1. Press button "**Soft Key**" (see also section ☞ 10.1 Single Mode)
2. Now you can:
        a. switch ON / OFF a 2-position-support
        b. use a 3-position-support with 2 (up/down) or 3 (up/middle/down) positions or switch off.
3. In order to bring the Sheet Support in position, press "**START**".
4. When all axes are in position, the P40T is ready to cut (with sheet support and if chosen with retract function).

11.11.3 Sheet Support Handling during Cutting Process

1. 2-position-support and 3-position-support with only 2 positions (up/down)
        a. after "**start cut**", time "**support delay**" runs
        b. after time "**support delay**" elapsed, output "**support down**" is set
        c. P40T waits for Input "support is down"
        d. output "**support down**" is cleared and time "**support hold down**" starts
        e. if blade is in TDC (Top-Dead-Center) and time "**support hold down**" has elapsed, the output "**support up**" is set
        f. P40T waits for Input "**support is up**"
        g. output "**support up**" is reset

2. 3-position-support with 3 positions (up/middle/down)
   a. after "**start cut**", time "**support delay**" runs
   b. after time "**support delay**" elapsed, output "**support down**" is set
   c. P40T waits for Input "**support in middle**"
   d. output "**support down**" is reset
   e. P40T waits until blade turns up
   f. output "**support down**" is set again
   g. P40T waits for Input "support is down"
   h. output "**support down**" is reset and time "**support hold down**" starts
   i. if blade is in TDC (Top-Dead-Center) and time "**support hold down**" has elapsed, the output "**support up**" is set
   j. P40T waits for Input "**support is up**"
   k. output "**support up**" is reset

11.11.4 Support Delay

Runtime until support is active.

11.11.5 Support Time

Runtime for total support

11.11.6 Support Holding Time

Time while support is active.

11.11.7 Delay Next Set

Time before the next step will be loaded and started.

11.12 Additional Functions
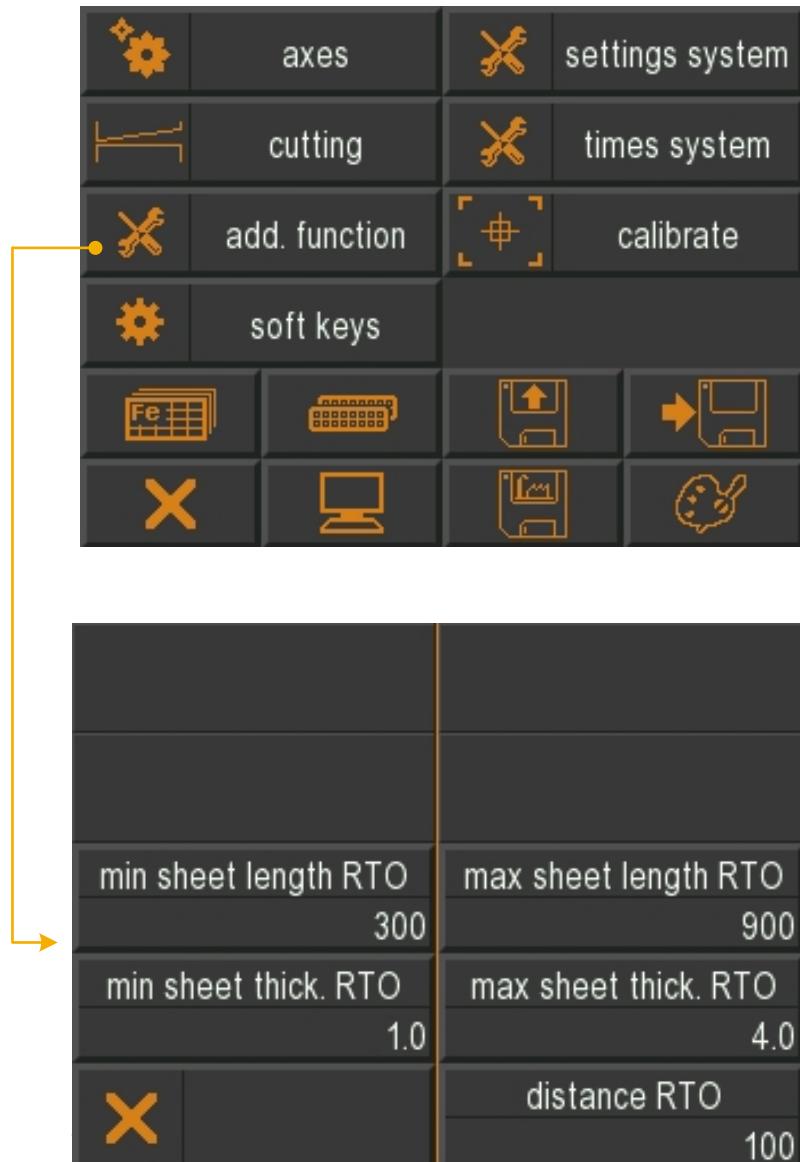
Figure 34: Additional Functions

11.12.1 Min Sheet Length RTO

Min sheet length for the RTO function ➔ push sheet to operator (Return To Operator).

11.12.2 Max Sheet Length RTO

Max sheet length for the RTO function ➔ push sheet to operator (Return To Operator).

11.12.3 Min Sheet Thickness RTO

Min sheet thickness for the RTO function ➔ push sheet to operator (Return To Operator).

11.12.4 Max Sheet Thickness RTO

Max sheet thickness for the RTO function ➔ push sheet to operator (Return To Operator).

11.13 Pump Control

With the P40T-002 it is possible to control a pump via a digital output. The pump control is activated by assigning the output "**Pump on**" to any output pin (☞ 11.17).

When pump control is activated, a button for switching the pump control output on and off is displayed in the main menu:

Pump is OFF

The pump output is activated by pressing the green button for approx. 2 seconds.
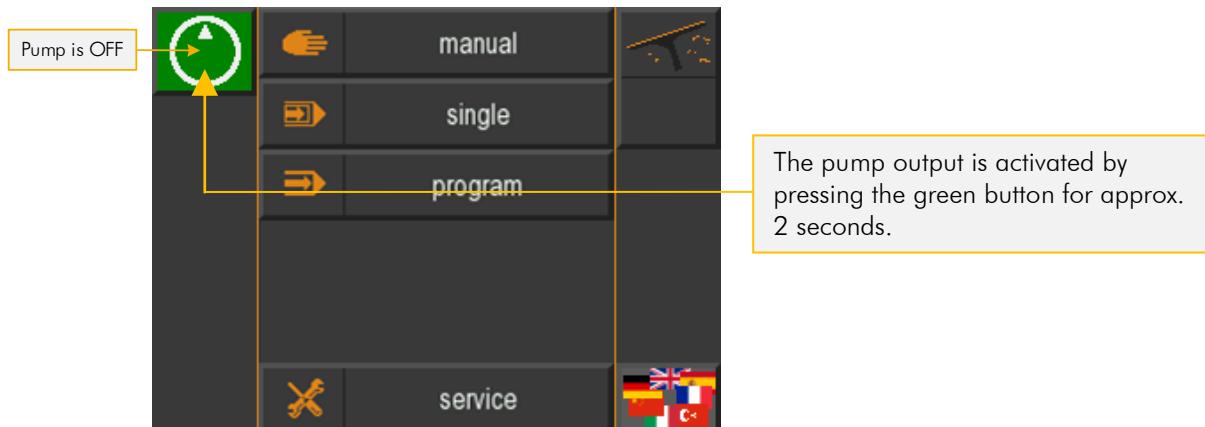
Figure 35: Main Menu - pump is OFF

The button changes its color to red to indicate that the pump is running:

Pump is ON

To switch off the pump the button must be pressed again. Switching off takes place immediately, without waiting time.
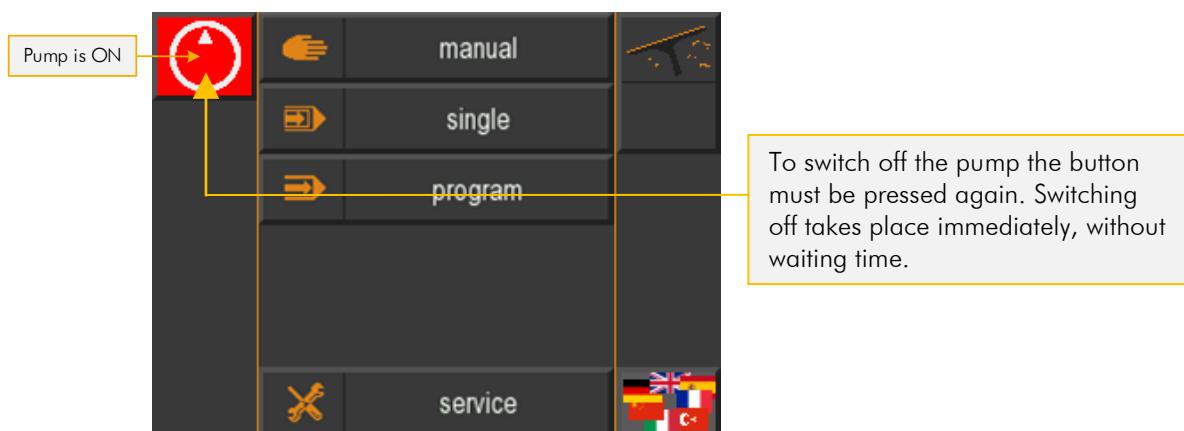
Figure 36: Main Menu - pump is ON

In manual, single or program mode, the status of the pump is displayed in the info line (above):

Pumpe ist AN
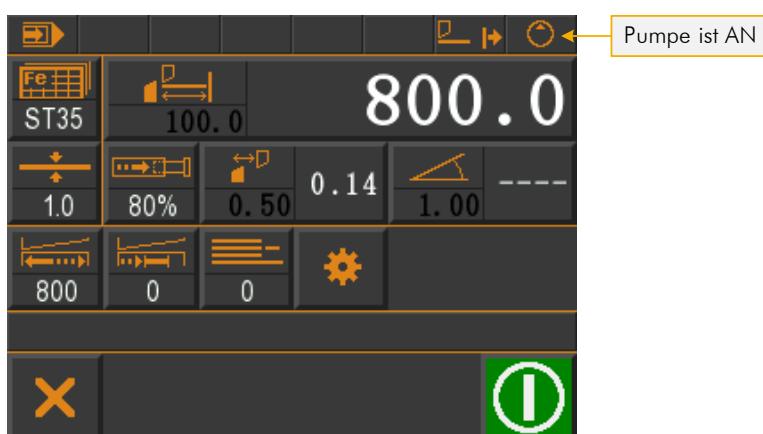
Figure 37: Example Singe Mode - pump status in the info line

When the pump is switched off, the symbol is displayed in black:

11.14 Calibrate (Touch Screen)

In this menu the touch screen can be calibrated:
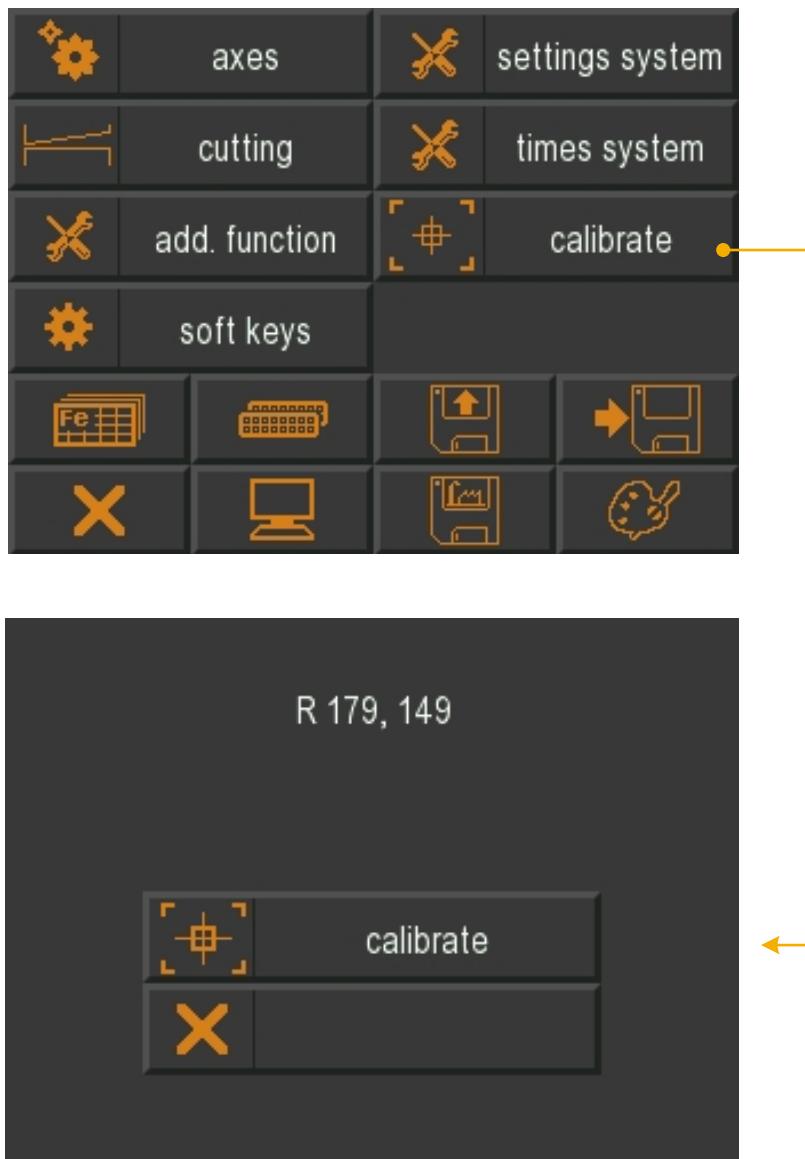
Figure 38: Calibration Touch Screen

1. Activate the calibration field.
2. Follow the displayed instructions "**Touch Corner and Hold**" in the respective corner.
3. Finish the calibration process by leaving the mask.

11.15 Soft Keys

This menu can be used to make the settings for the soft keys. The table below shows the corresponding options.

> A maximum of 5 soft key options can be activated simultaneously.
> If a further option is activated, an error message appears.

Figure 39: Soft-Keys

Table 2: Soft Keys

ON = active / OFF = not active		Input Field	
1	Conveyor belt		
2	Autocut (function for operation with foot pedal)		
3	Backgauge park position	3.1	Enter the park position value for the backgauge
4	Scrap shaft		
5	Support		
6	RTO (Return to Operator)		

11.15.1 Conveyor Belt

Function:

The output "conveyor belt" is set if:

1. The function is activated by soft key in single or program mode
2. The cutter bar is in the Top Dead Center

Since the state is not saved, the conveyor belt function must be reactivated each time the single or program mode is selected.

11.15.2 Autocut

Function in Single Mode:

If the Autocut function is activated and the "Start cut" input is set continuously (e.g. by a foot pedal), a new cut is triggered after the cut has been completed until either the defined quantity is reached or the "Start cut" input is reset.

Function in Program Mode:

In program mode, the cut must be retriggered for each data set. A data set is processed in the same way as in single mode. When the end of the program is reached, the shear also stops.

The time between two cuts can be set in both operating modes via the parameter "Delay Autocut" in the menu *Service-→ Cutting*.

11.15.3 Backgauge Park Position

Function: When this function is activated, the backgauge is moved to the parking position.
The corresponding position is entered in the menu *Service → Soft-Keys → parkposition*.

The activated function is displayed in color at the soft key. Pressing START deactivates the "Backgauge park position" function and moves the back gauge to the specified target position.

11.15.4 Support (Sheet Support)

Activates the soft key "Sheet Support". Refer to ☞ 11.11.1 / ☞ 11.11.2 / ☞ 11.11.3 for respective functions.

11.15.5 RTO

Activation of the "RTO" soft key. Only with activated "Sheet Support" possible.

Function of the soft key in single or program mode:

- Soft key RTO activated
- A cut is made
- Support above
- Sheet thickness and length within the specified range
- Button RTO activated
- As long as the button is pressed, the sheet is pushed forward with the back gauge,
  but maximum over the length entered in the parameters.

11.15.6 Position Value Park Position

Position to which the stop is moved if the function „Backgauge park position" is activated (☞ 11.15.3).

11.15.7 Scrap Shaft

If the Scrap Shaft option is activated, the scrap shaft can be activated in single and program mode. The corresponding output is simply switched ON or OFF.

11.16 Material Table

In this table the material-specific empirical values regarding cutting angle, cutting gap and cutting pressure can be entered. When processing one or more blocks, only the material type (material No.) and the sheet thickness must be entered.

Input of values:

- Switch to material list.
- Designation of material (input designation, clear text)
- Switch to material table.
- Set values by touching and input of data.

If "0" is entered in the sheet thickness column, this is recognized as the end of the table and subsequent entries are ignored.

Figure 40: Material table / list

11.16.1   Explanation of the Interpolation Procedure

Since only a limited number of values in 0.1mm steps can be stored in this table, the values in between are interpolated. The calculation of the intermediate steps is based on a linear behavior of the values for angle and gap between two successive material thicknesses.

Example:

The values marked in red are fixed in the material table. Now a value for the material thickness of 2.5 mm is to be loaded. For a better overview, only the calculation for the gap value is illustrated in this example. The intermediate steps for the angle are calculated according to the same principle.

Table 3: Interpolation Procedure

Thickness	Gap	Angle
0.5	0.10	0.75
2.0	0.20	1.00
3.0	0.30	1.25
4.0	0.40	1.50
6.0	0.50	1.75
…	…	…
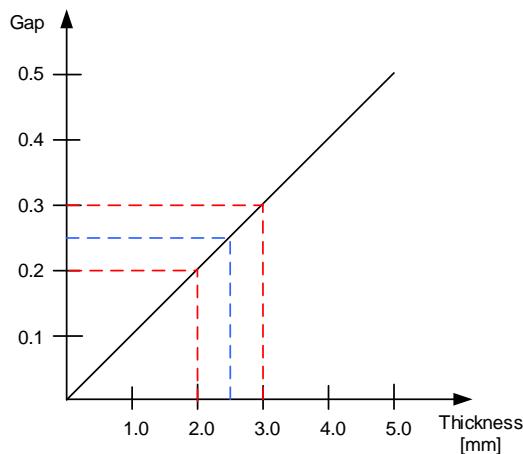
As you can see from the blue line in the right diagram, the intermediate step 0.25 is now calculated for the gap.

11.17 Functional and Logical Assignment of Input-/Output Functions

The input and outputs of the controller are set with functions (see chapter ☞ 12 Connections).

In this menu item you can define whether the corresponding input/output function is to be triggered at a logical HIGH level or at a logical LOW level. The logic is assigned by selecting the desired connector (ST) and touching the corresponding HIGH / LOW field.

In addition, an output test can be performed (see buttons "Output test activate/deactivate"). With regard to the output functions, it is also possible to activate the pressure and switch the individual outputs ON for test purposes by touching them. Repeated touching changes the status to OFF again.

Figure 41: Logic assignment of Input / Output functions

11.18 Load and Save OEM Data

The loading/storing of the OEM parameters must be confirmed by entering the password (see ☞ 8.1.1) again.
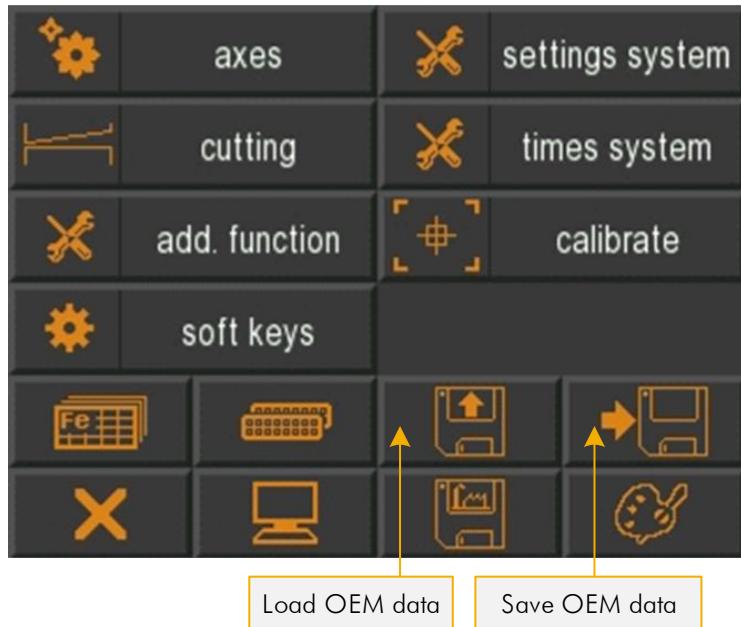
Figure 42: Load and save OEM data

11.19 Reset to Factory Defaults

A reset to the default parameters must be confirmed by entering the password (see ☞ 8.1.1) again.
While the data is being loaded, the respective button is highlighted in color.
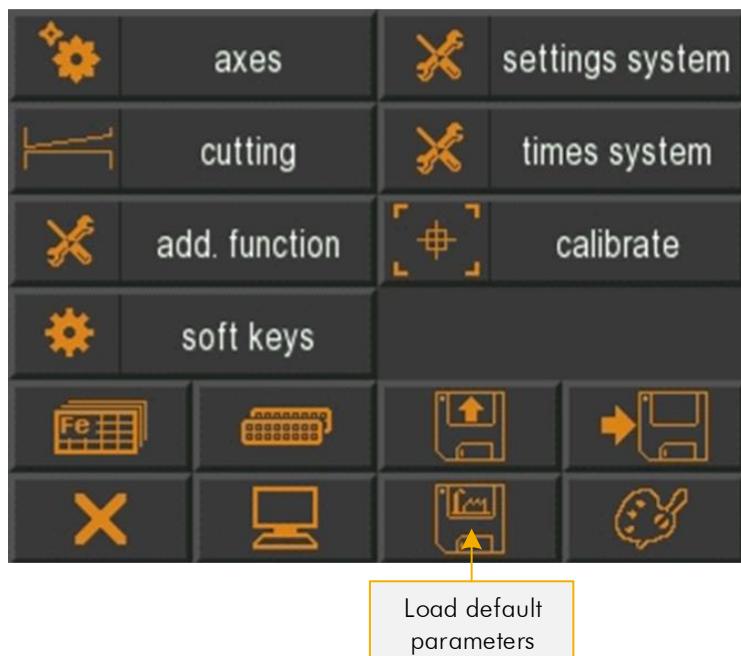
Figure 43: Load default parameters

11.20 Touchscreen Design / Program Version / Backup ID

This menu allows customizing the color design of the background, fields (icons), text foreground and text background. In addition, the program version and backup ID are displayed (important when backing/loading via the PC software "Backup Tool").

Customize
touchscreen design

Figure 44: Touchscreen Design

11.21 PC Interface

Activate
PC interface

Figure 45: Activate PC interface

12 Connections

The following sections provide detailed information on the connections:

12.1   Connector Arrangement - 16 IO Version
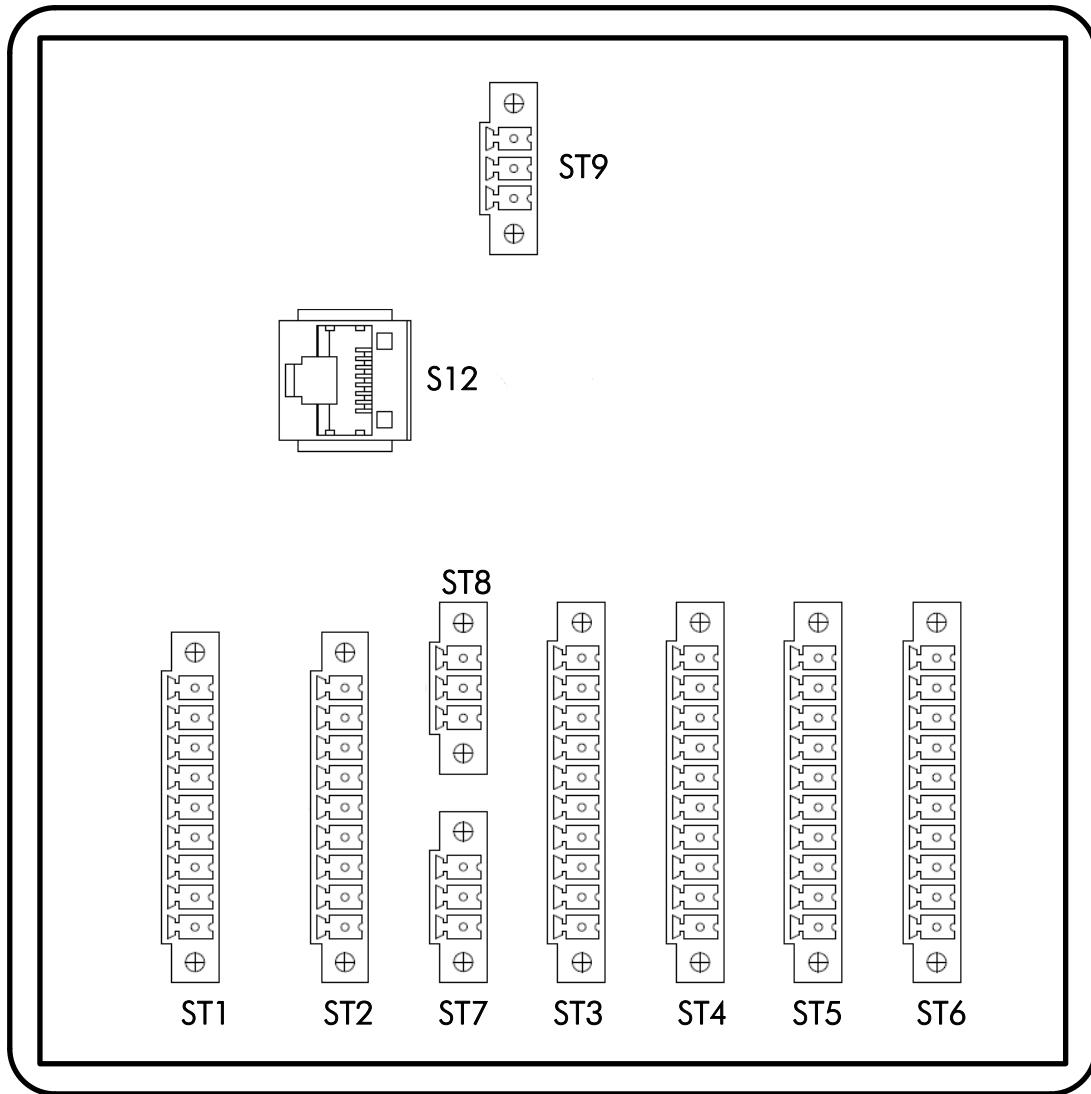
Figure 46: Connector arrangement - 16 IO

Connector No.	Function
ST1	Measuring system connections (encoder inputs)
ST2	Measuring system connections (analog inputs)
ST3/ST4	Digital inputs
ST5/ST6	Digital outputs
ST7	Analog output 1 (PID)
ST8	Analog output 2 (pressure control)
ST9	24 VDC power supply voltage
S12	PC interface (adapter cable see ☞ 15.1 Accessories)

Note: For example connection diagrams, refer to chapter ☞ 16 Appendix.

12.2 Pin Assignment - 16 IO Version

ST1	Inkremental Encoder
1	0 V / GND out
2	+ 24 VDC out (optionally 5 VDC)
3	Channel A
4	Channel B
5	PE / Earth
6	Channel A'
7	Channel B'
8	Channel Z (Indeximpuls)
9	Channel Z' (Indeximpuls)

ST2	Analog Measuring System
1	0 V / GND out
2	3.3 VDC out (reference voltage)
3	Analog input "Gap 1"
4	*do not connect*
5	PE / Earth
6	*do not connect*
7	*do not connect*
8	Analog input "Gap 2"
9	Analog input "Angle"

ST3	Inputs
1	In-/(Out)put IO-GND (0 V)*
2	In-/(Out)put IO-24 VDC**
3	End switch "gauge-min"
4	End switch "gauge-max"
5	NC
6	Reference start "gauge"
7	NC
8	NC
9	External START
10	External STOP

ST4	Inputs
1	In-/(Out)put IO-GND (0 V)*
2	In-/(Out)put IO-24 VDC**
3	Piece counter
4	NC
5	Top Dead Center
6	Bottom Dead Center
7	Support is up
8	Support is down
9	Start cut (foot pedal)
10	NC

ST5	Outputs
1	In-/(Out)put IO-GND (0 V)*
2	In-/(Out)put IO-24 VDC**
3	Drive signal 1 "gauge - forward"
4	Drive signal 4 "gauge - backward"
5	Drive signal 3 "gauge - fast"
6	Enable control "gauge"
7	Support up
8	Support down
9	NC
10	Conveyor

ST6	Outputs
1	In-/(Out)put IO-GND (0 V)*
2	In-/(Out)put IO-24 VDC**
3	Drive signal 1 "gap1 - increase"
4	Drive signal 2 "gap1 - reduce"
5	Drive signal 1 "angle - increase"
6	Drive signal 2 "angle - reduce"
7	Drive signal 1 "gap2 - increase"
8	Drive signal 2 "gap2 - reduce"
9	Lift blade
10	Lower blade

ST7	Analog Output (optionally PID)
1	0 V / GND
2	± 10 VDC
3	PE / Earth

ST9	Power Supply Voltage
1	0 V / GND
2	+24 VDC (+10/−20 %)
3	PE / Earth

ST8	Analog Output (Pressure Control)
1	0 V / GND
2	± 10 VDC
3	PE / Earth

ST12	PC Interface
1	GND
2	RS232 RX
3	RS232 TX

NOTE!

*) Pin 1 of ST3, ST4, ST5 and ST6 are internally connected to each other and must be externally connected to GND. It is sufficient to connect only one pin to GND (see connection examples ☞ 16).

**) Pin 2 of ST3, ST4, ST5 and ST6 are internally connected to each other and must be externally connected to 24 VDC. It is sufficient to connect only one pin to 24 VDC (see connection examples ☞ 16).

The external ground (IO-GND) and power supply (IO-24VDC) of ST3, ST4, ST5 and ST6 are not directly connected to the supply voltage of ST9, but there is no real galvanic isolation.

12.3 Connector Arrangement - 8 IO Version
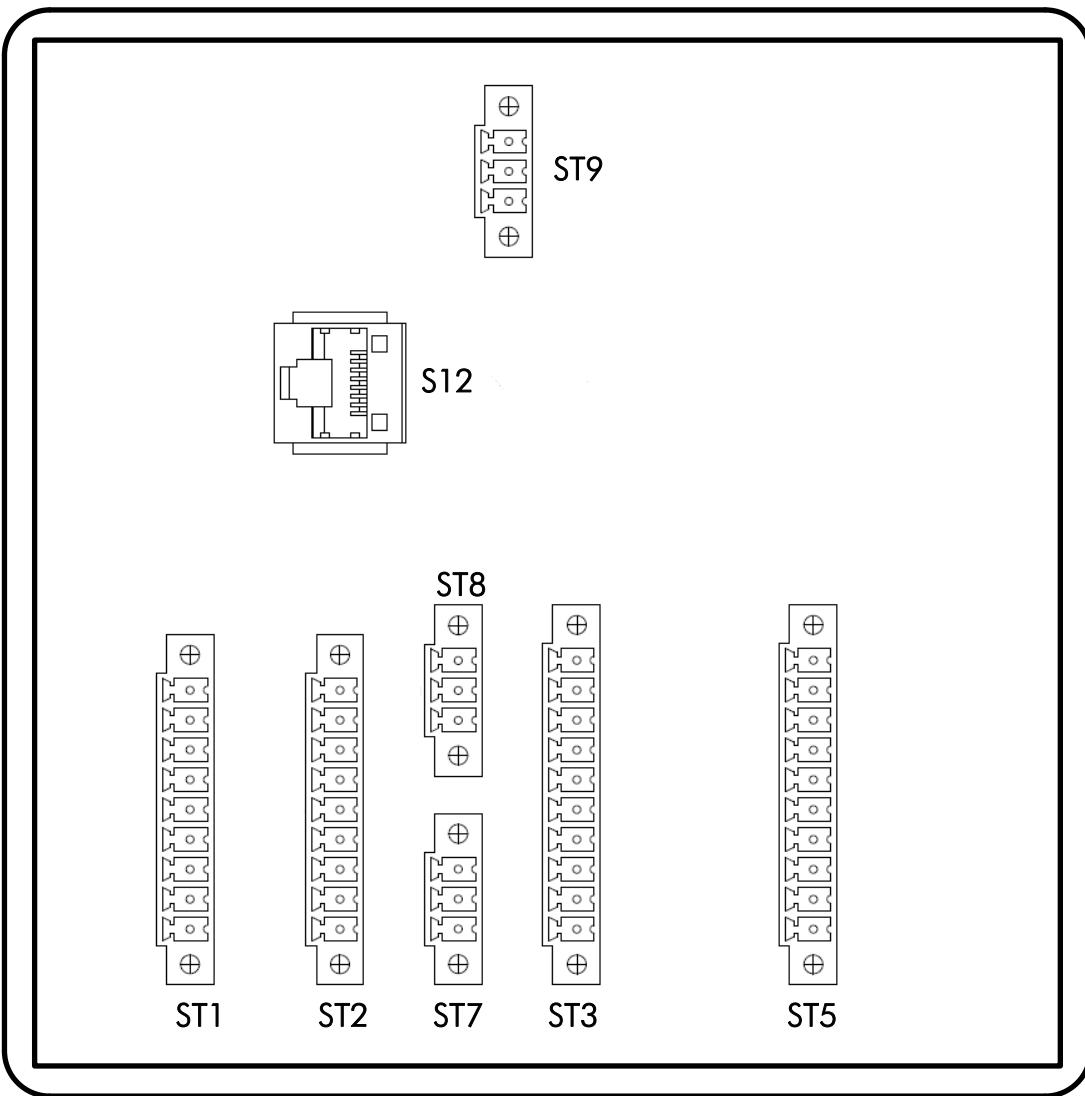
Figure 47: Connector arrangement - 8 IO

Connector No.	Function
ST1	Measuring system connections (encoder inputs)
ST2	Measuring system connections (analog inputs)
ST3	Digital inputs
ST5	Digital outputs
ST7	Analog output 1 (PID)
ST8	Analog output 2 (pressure control)
ST9	24 VDC power supply voltage
S12	PC interface (adapter cable see ☞ 15.1 Accessories)

Note: For example connection diagrams, refer to chapter ☞ 16 Appendix.

12.4 Pin Assignment - 8 IO Version

ST1	Inkremental Encoder
1	0 V / GND out
2	+ 24 VDC out (optionally 5 VDC)
3	Channel A
4	Channel B
5	PE / Earth
6	Channel A'
7	Channel B'
8	Channel Z (Indeximpuls)
9	Channel Z' (Indeximpuls)

ST2	Analog Measuring System
1	0 V / GND out
2	3,3 VDC out (reference voltage)
3	Analog input "Gap1"
4	*do not connect*
5	PE / Earth
6	*do not connect*
7	*do not connect*
8	*do not connect*
9	Analog input "Angle"

ST3	Inputs
1	In-/(Out)put IO-GND (0 V)*
2	In-/(Out)put IO-24 VDC**
3	End switch "gauge-min"
4	End switch "gauge-max"
5	Start cut (foot pedal)
6	Top Dead Center
7	Bottom Dead Center
8	Piece counter
9	Support is up
10	Support is down

ST5	Outputs
1	In-/(Out)put IO-GND (0 V)*
2	In-/(Out)put IO-24 VDC**
3	Drive signal 1 "gauge - forward"
4	Drive signal 4 "gauge - backward"
5	Drive signal 1 "gap1 - increase"
6	Drive signal 2 "gap1 - reduce"
7	Support up
8	Support down
9	Lift blade
10	Lower blade

ST7	Analog Output (optionally PID)
1	0 V / GND
2	± 10 VDC
3	PE / Earth

ST9	Power Supply Voltage
1	0 V / GND
2	+24 VDC (+10/−20 %)
3	PE / Earth

ST8	Analog Output (Pressure Control)
1	0 V / GND
2	± 10 VDC
3	PE / Earth

ST12	PC Interface
1	GND
2	RS232 RX
3	RS232 TX

NOTE!

*) Pin 1 of ST3 and ST5 are internally connected to each other and must be externally connected to GND. It is sufficient to connect only one pin to GND (see connection examples ☞ 16).

**) Pin 2 of ST3 and ST5 are internally connected to each other and must be externally connected to 24 VDC. It is sufficient to connect only one pin to 24 VDC (see connection examples ☞ 16).

The external ground (IO-GND) and power supply (IO-24VDC) of ST3 and ST5 are not directly connected to the supply voltage of ST9, but there is no real galvanic isolation.

13 Parameter Tables

13.1 Parameter Setting System

Table 4: Parameter list - Setting System

Function	Setting Range	Factory Setting	Customer Setting
Pressure Control	on / off	off	
U at 100% pressure	0 – 10	9 V	
Pressure adjust angle	0 – 100	40 %	
Pressure adjust gap	0 – 100	70 %	
Gap / Angle/ Pressure	hidden locked unlocked	unlocked	
Gap 2 (right)	on / off	off	
Next set stepping	without start with start without	without start	

13.2 Parameter Times System

Table 5: Parameter list - Time System

Function	Setting Range	Factory Setting	Customer Setting
Support Delay	0 - 10	10	
Support time	0 - 10	10	
Support hold down	0 - 10	1.0	
Delay next set	0 - 10	0.1	

13.3 Parameter Sub Menu Axes

Table 6: Parameter list - Axis Backgauge

Function	Setting Range	Factory Setting	Customer Setting
Axis Type IN / OUT	Encoder - Digital Encoder - PID+Digital Analog - Digital Encoder - Analog+Digital Encoder - Analog+Digital	Encoder - Digital	
Reference mode	Mode 1 / Mode 2 / Mode 3	Mode 3	
Software end position	both enabled negative disabled positive disabled both disabled	both enabled	
Hardware end position	both enabled negative disabled positive disabled both disabled	both disabled	
Decimal point	1/10; 1/100; 1/1000; without	1/10	
Drive signal configuration	Mode 1 … 8	Mode 2	
Spindle com. Mode	without with spindle − with spindle + forced loop − forced loop +	without	
Retract Mode	Mode 1 … 8	Mode 1	
Mm/Inch Mode	mm/Inch	mm	

Table 7: Parameter list - Axis Gap

Function	Setting Range	Factory Setting	Customer Setting
Axis Type IN / OUT	Encoder - Digital Encoder - PID+Digital Analog - Digital Encoder - Analog+Digital Encoder - Analog+Digital	disabled	
Reference mode	Mode 1 / Mode 2 / Mode 3	Mode 1	
Software end position	both enabled negative disabled positive disabled both disabled	both enabled	
Hardware end position	both enabled negative disabled positive disabled both disabled	both enabled	
Drive signal configuration	Mode 1 … 8	Mode 8	
Spindle com. Mode	without with spindle − with spindle + forced loop − forced loop +	without	
Retract Mode	Mode 1 … 8	Mode 1	

Table 8: Parameter list - Setting Angle

Function	Setting Range	Factory Setting	Customer Setting
Axis Type IN / OUT	Encoder - Digital Encoder - PID+Digital Analog - Digital Encoder - Analog+Digital Encoder - Analog+Digital	disabled	
Reference mode	Mode 1 / Mode 2 / Mode 3	Mode 1	
Software end position	both enabled negative disabled positive disabled both disabled	both enabled	
Hardware end position	both enabled negative disabled positive disabled both disabled	both enabled	
Drive signal configuration	Mode 1 … 8	Mode 8	
Spindle com. Mode	without with spindle − with spindle + forced loop − forced loop +	without	
Retract Mode	Mode 1 … 8	Mode 1	

Table 9: Parameter list - Distance Axis Backgauge

Function	Setting Range	Factory Setting	Customer Setting
Creep speed	0.0 … 1000.0	10.0	
Tolerance window	0.0 … 100.0	0.1	
Spindle compensation	0.0 … 1000.0	5.0	
Reference value	-10000.0 … 100000.0	30.0	
End position min	0.5 … 99999.0	3.0	
End position max	0.5 … 99999.0	1101.0	
Correction stop forwards	0.0 … 1000.0	0.1	
Manipulation	0.0 … 100.0	0.1	
Forced loop	0.0 … 1000.0	1.0	
Factor	0.000001 … 1.000000	0.002500	
Retract length	0.0…1000.0	1.0	

Table 10: Parameter list - Distance Axis Gap

Function	Setting Range	Factory Setting	Customer Setting
Creep speed	0.0 … 1000.0	5.00	
Tolerance window	0.0 … 100.0	0.02	
Spindle compensation	0.0 … 1000.0	0.10	
Reference value	-10000.0 … 100000.0	00.0	
End position min	0.05 … 99999.0	0.05	
End position max	0.05 … 99999.0	5.00	
Correction stop forwards	0.0 …1000.0	0.02	
Manipulation	0.0 … 100.0	0.02	
Forced loop	0.0 … 1000.0	0.10	
Factor	0.000001 … 1.000000	1.000000	
Retract length	0.0 … 1000.0	0.00	

Table 11: Parameter list - Distance Axis Angle

Function	Setting range	Factory setting	Customer setting
Creep speed	0.0 … 1000.0	3.00	
Tolerance window	0.0 … 100.0	0.02	
Spindle compensation	0.0 … 1000.0	0.10	
Reference value	-10000.0 … 100000.0	00.0	
End position min	0.05 … 99999.0	0.5	
End position max	0.05 … 99999.0	1.50	
Correction stop forwards	0.0 … 1000.0	0.02	
Manipulation	0.0 … 100.0	0.00	
Forced loop	0.0 … 1000.0	0.00	
Factor	0.000001 … 1.000000	0.001000	
Retract length	0.0 … 1000.0	0.00	

Table 12: Parameter list - Time axis backgauge

Function	Setting range	Factory setting	Customer setting
Position reached	0.0 … 10.0	1.0	
Manual change	0.0 … 10.0	1.0	
Delay contr. Start	0.0 … 10.0	0.0	
Delay contr. Inpos.	0.0 … 10.0	1.0	
Start delay	0.0 … 10.0	0.0	
Retract time	0.0 … 10.0	0.3	
Spindle compensation	0.0 … 10.0	1.0	
Monitoring	0.0 … 10.0	0.0	
Shutdown control	0.0 … 10.0	0.0	
Reference time	0.0 … 10.0	1.0	

Table 13: Parameter list - Time axis gap

Function	Setting Range	Factory Setting	Customer Setting
Position reached	0.0 … 10.0	1.0	
Manual change	0.0 … 10.0	1.0	
Delay contr. Start	0.0 … 10.0	0.0	
Delay contr. Inpos.	0.0 … 10.0	1.0	
Start delay	0.0 … 10.0	0.0	
Retract time	0.0 … 10.0	0.0	
Spindle compensation	0.0 … 10.0	1.0	
Monitoring	0.0 … 10.0	0.0	
Shutdown control	0.0 … 10.0	0.0	
Reference time	0.0 … 10.0	0.0	

Table 14: Parameter list - Time axis angle

Function	Setting Range	Factory Setting	Customer Setting
Position reached	0.0 … 10.0	1.0	
Manual change	0.0 … 10.0	1.0	
Delay contr. Start	0.0 … 10.0	0.0	
Delay contr. Inpos.	0.0 … 10.0	1.0	
Start delay	0.0 … 10.0	0.0	
Retract time	0.0 … 10.0	0.0	
Spindle compensation	0.0 … 10.0	1.0	
Monitoring	0.0 … 10.0	0.0	
Shutdown control	0.0 … 10.0	0.0	
Reference time	0.0 … 10.0	0.0	

Table 15: Parameter list - Analog axis

Function	Setting Range	Factory Setting	Customer Setting
Velocity	0 … 10000	2000	
Acceleration	0 … 1000	50	
Pulses encoder	0 … 10000	360	
P portion	0 … 100	5	
I portion	0 … 100	3	
D portion I	0 … 100	1	
I Limit	0 … 100	10	
Manual fast	0 … 10000	1500	
Manual slow	0 … 10000	500	
Velocity reference mode 1	0.0 … 10.0	300	
Velocity reference mode 2	0.0 … 10.0	150	
U<<< (U quick motion backwards)	0.0 … 10.0	9.7	
U>>> (U quick motion forwards)	0.0 … 10.0	9.7	
U<< (U slow speed backwards)	0.0 … 10.0	5.0	
U>> (U slow speed forwards)	0.0 … 10.0	5.0	
U< (U creep speed backwards)	0.0 … 10.0	1.0	
U> (U creep speed)	0.0 … 10.0	1.0	
Stop mode general	0 / 1 / 2	1	
Stop mode manual	0 / 1 / 2	1	
Stop mode	0 / 1	1	

13.4 Parameter Sub Menu Cutting

Table 16: Parameter list - Sub Menu cutting

Function	Setting Range	Factory Setting	Customer Setting
Cut time	0.0 … 10.0	0.5	
Offset cut time	0.0 … 10.0	1..0	
Mode cut length	over axis angle over time off	off	
Pressure blade up	0 … 100	40%	
Time down holder	0.0 … 10.0	0.5	
Blade up delay	0.0 … 0.50	0.00	
Acceleration down	0.0 … 0.50	0.20	
Deceleration down	0.0 … 0.50	0.20	
Acceleration up	0.0 … 0.50	0.20	
Deceleration up	0.0 … 0.50	0.20	
Delay autocut	0.0 … 10.0	0.4	

13.5 Parameter Sub Menu Additional Functions

Table 17: Parameter list - Sub Menu Additional Functions

Function	Setting Range	Factory Setting	Customer Setting
Min sheet length RTO	3.0 … backgauge-distance → end-position max	300.0	
Max sheet length RTO	3.0 … backgauge-distance → end-position max	900.0	
Min sheet thickness RTO	0.1 … 30.0	1.0	
Max sheet thickness RTO	0.1 … 30.0	4.0	
Distance RTO	3.0 … backgauge-distance → end-position max	100.0	

13.6 Parameter Sub Menu Soft Keys

Table 18: Parameter list - Sub Menu Soft Keys

Function	Setting Range	Factory Setting	Customer Setting
Conveyor belt	on / off	on	
Autocut	on / off	off	
Park position (backgauge)	on / off	off	
Park position (backgauge)	3.0 … backgauge-distance → end-position max	1101.0	
Return to Operator	on / off	off	
Support	on / off	off	
Scrap shaft	on / off	off	

13.7 Parameter Material Table

Table 19: Parameter list - Material Table

Function	Setting Range	Factory Setting	Customer Setting
Sheet thickness	0.0 … 40.0		
Gap	gap-distance → end-position min … gap-distance → end-position max	See chapter ☞ 11.16 (Material Table)	
Angle	angle-distance → end-position min … angle-distance → end-position max		
Pressure	1 … 100		

13.8 Parameter Digitale In-/Output

Table 20: Parameter list - Digital Inputs at ST3

Function	Setting Range	Factory Setting	Customer Setting
P3 End switch "Gauge-min"	HIGH / LOW	LOW	
P4 End switch "Gauge-max"	HIGH / LOW	LOW	
P5 NC	HIGH / LOW	LOW	
P6 Reference start gauge	HIGH / LOW	LOW	
P7 NC	HIGH / LOW	LOW	
P8 NC	HIGH / LOW	LOW	
P9 external START	HIGH / LOW	HIGH	
P10 external STOP	HIGH / LOW	LOW	

Table 21: Parameter list - Digital Inputs at ST4

Function	Setting Range	Factory Setting	Customer Setting
P3 Piece counter	HIGH / LOW	HIGH	
P4 NC	HIGH / LOW	LOW	
P5 Top Dead Center	HIGH / LOW	HIGH	
P6 Bottom Dead Center	HIGH / LOW	HIGH	
P7 Support is up	HIGH / LOW	HIGH	
P8 Support is down	HIGH / LOW	HIGH	
P9 Start cut	HIGH / LOW	HIGH	
P10 NC	HIGH / LOW	LOW	

Table 22: Parameter list - Digital Output at ST5

Function	Setting Range	Factory Setting	Customer Setting
P3 Drive signal 1 gauge	HIGH / LOW	HIGH	
P4 Drive signal 4 gauge	HIGH / LOW	HIGH	
P5 F Drive signal 3 gauge	HIGH / LOW	HIGH	
P6 Control enable gauge	HIGH / LOW	HIGH	
P7 Support up	HIGH / LOW	HIGH	
P8 Support down	HIGH / LOW	HIGH	
P9 NC	HIGH / LOW	HIGH	
P10 Conveyor belt	HIGH / LOW	HIGH	

Table 23: Parameter list - Digital Outputs ST6

Function	Setting Range	Factory Setting	Customer Setting
P3 Drive signal 1 gap 1	HIGH / LOW	HIGH	
P4 Drive signal 2 gap 1	HIGH / LOW	HIGH	
P5 Drive signal 1 angle	HIGH / LOW	HIGH	
P6 Drive signal 2 angle	HIGH / LOW	HIGH	
P7 Drive signal 1 gap 2	HIGH / LOW	HIGH	
P8 Drive signal 2 gap 2	HIGH / LOW	HIGH	
P9 Blade up	HIGH / LOW	HIGH	
P10 Blade down	HIGH / LOW	HIGH	

14 Disturbances, Maintenance, Cleaning

This chapter describes possible causes for disturbances and measures for their removal. In case of increased disturbances, please follow the measures for fault clearance in chapter 14.1. In case of disturbances that cannot be eliminated by following the advice and the fault clearance measures given here, please contact the manufacturer (see second page).

14.1 Fault Clearance

⚠	**CAUTION!** The device, the connection line and the signal cable must not be installed next to sources of interference that emit strong inductive or capacitive interference or strong electrostatic fields. External perturbations can be avoided thorough suitable cable routing.

⚡	The screen of the signal output cable should only be connected to the following circuit on one side. The screens should not be grounded on both sides. Signal cables always have to be routed separately from the load power line. A safety distance of at least 0.5 m has to be kept from inductive and capacitive sources of interference such as contactors, relays, motors, switching power supplies, clocked controllers etc.! If interferences occur in spite of all the items stated above being observed, please proceed as follows: 1. Installation of RC-circuits via contactor coils of AC-contactors (e.g. 0.1 μF / 100 Ω) 2. Installation of recovery diodes via DC-inductors 3. Installation of RC-circuits via the different motor phases (in the terminal box of the motor) 4. <u>Do not</u> connect protective earth and ground 5. Connect a mains filter ahead of the external power pack

14.2 Possible Errors and their Clearance

Table 24: Possible Errors and their Clearance

Message	Required Action
Hardware end switch minimum gauge active!	check signal/connection of input / deactivate function if necessary
Hardware end switch minimum gap1 active!	check signal/connection of input / deactivate function if necessary
Hardware end switch minimum angle active!	check signal/connection of input / deactivate function if necessary
Hardware end switch minimum gap2 active!	check signal/connection of input / deactivate function if necessary
Hardware end switch maximum gauge active!	check signal/connection of input / deactivate function if necessary
Hardware end switch maximum gap1 active!	check signal/connection of input / deactivate function if necessary
Hardware end switch maximum angle active!	check signal/connection of input / deactivate function if necessary
Hardware end switch maximum gap2 active!	check signal/connection of input / deactivate function if necessary
Software end position minimum gauge fell below!	check parameter or deactivate the corresponding software end position if necessary
Software end position minimum gap1 fell below!	check parameter or deactivate the corresponding software end position if necessary
Software end position minimum angle fell below!	check parameter or deactivate the corresponding software end position if necessary
Software end position minimum gap2 fell below!	check parameter or deactivate the corresponding software end position if necessary
Software end position maximum gauge exceeded!	check parameter or deactivate the corresponding software end position if necessary
Software end position maximum gap1 exceeded!	check parameter or deactivate the corresponding software end position if necessary
Software end position maximum angle exceeded!	check parameter or deactivate the corresponding software end position if necessary
Software end position maximum gap2 exceeded!	check parameter or deactivate the corresponding software end position if necessary
No measuring system gauge!	check measuring system respectively the signals/connections.
No measuring system gap1!	check measuring system respectively the signals/connections.
No measuring system angle!	check measuring system respectively the signals/connections.
No measuring system gap2!	check measuring system respectively the signals/connections.
Error PID gauge!	
Error PID gap1!	
Error PID angle!	
Error PID gap2!	
Error position gauge!	
Error position gap1!	
Error position angle!	
Error position gap2!	
External stop active!	check signal/connection of input / deactivate function if necessary
Material thickness outside look-up table	
Blade position detection error	
Support error	
Reposit axes!	
Quantity reached	

14.3 Re-start after Fault Clearance

After the fault clearance:
1. Reset the emergency stop mechanism if necessary
2. Reset the error report at the super-ordinate system if necessary.
3. Ensure that there are no persons in the danger area.
4. Follow the instructions from chapter 7.

⚠	**WARNING!** **Danger of injury through non-conventional fault clearance!** Non-conventional fault clearance can lead to severe injuries and damage of property. Therefore: ▪ Any work to clear the faults may only be performed by sufficiently qualified staff ▪ Arrange enough space before starting the works ▪ Make sure that the mounting area is clean and tidy. Loose components and tools are sources of accidents. If components need to be replaced: ▪ Pay attention to a correct installation of the spare parts. ▪ Reinstall all the fixing elements properly ▪ Before turning on the device, ensure that all covers and safety equipment is installed correctly and functions properly

14.4 Maintenance

The device operates maintenance-free.

14.5 Cleaning

⚠	**WARNING!** The device can only be cleaned with a damp cloth, do not use aggressive cleanser!

15 Type Designation

P40T - 000 - 024 - XX - XX - XXXX

Type Designation:
P40T = Touchscreen Position Controller
        (for 1 or 2 axes)

Version:
002 = Version for guillotine shears

Power Supply Voltage:
024 = 24 VDC (+10 / -20 %)

Encoder Inputs (per Axis):
X   =   Input is not available
1   =   A, B, Z (PNP)   24 V supply / HTL, 100 kHz
2   =   A, A', B, B', Z, Z'   24 V supply / TTL 100 kHz
3   =   A, A', B, B', Z, Z'   5 V supply / TTL 100 kHz
4   =   1 analog inputs   3.3 V supply / 0 ... 3.3 V (12 bit)[1]
5   =   2 analog inputs   3.3 V supply / 0 ... 3.3 V (12 bit)[2]
6   =   A, B, Z (PNP)   24 V supply / 0 ... customer spec., max. 24 V
7   =   3 analog inputs   3.3 V supply / 0 ... 3.3 V (12 Bit)[2]

Analog Output (per Axis):
X   =   no analog output (switch-off positioning)
1   =   12 bit analog output ±10 V (PID regulated)[4]
2   =   12 bit analog output ±10 V (unregulated)

Options:
X   =   no further options
C   =   screw terminals
8   =   8 digital inputs / 8 digital outputs[5]
S   =   serial RS232 interface
N   =   digital inputs in NPN version

Note: Digital switching outputs (transistor, PNP) are generally available for each axis in terms of software and hardware.

Restrictions:

[1] for special applications (e. g. as auxiliary axis)
[2] for special applications, analog inputs only for and on two axes
[3] for special applications and only possible for 2. Axis
[4] not possible with "Encoder Inputs = 4 or 5"
[5] not possible for two axes and not possible with analog output

NOTE
When ordering, please use the here described ordering code (Type Designation).
Options that are not required are filled in with „-".

15.1 Accessories

Table 25: Accessories

Order Designation	Description
NG 24.0	Power supply unit for supply with AC-voltage: - 115/230 VAC in / 24 VDC out (max. 600 mA) - with screw terminals for 2 x 2.5 mm^2 wires - Dimensions W x H x D = 75 x 73 x 114 mm
P40(T) Interface Cable Art. No. **820137012**	Adapter cable for connecting a P40T to a PC via the RS232 interface. Can be used to update the P40T software and to exchange data with the "backup tool" software.
RP8K	Relay card with 4 shutter relays and 4 changeover relays (28 VDC / 250 VAC - 12 A)

16 Appendix

Connection examples:

Frequency converter

U
V3
W3
M 3~

U
V
W
PE

GND
backward
forward

Power Supply

GND (0V)
24 VDC

P40T-002-024-15-22-C8XX

*Diodes if necessary (see operation manual)

ST5 — Outputs
- Input EA GND (0V)
- Input EA 24VDC (0V)
- Drive signal 1 „gauge-forward"
- Drive signal 4 „gauge-backwards"
- Drive signal 1 „angle – enlarge"
- Drive signal 2 „angle – shrink"
- Support up
- Support down
- Blade up
- Blade down

ST9
- GND (0V)
- 24 VDC
- Earth

ST3 — Inputs
- I/O EA GND (0V)
- I/O EA-24VDC
- Switch endposition „gab-min."
- Switch endposition „gab-max."
- Start cut (food pedal)
- Top dead center
- Bottom dead center
- Piece counter
- Support is up
- Support is down

ST1 — Measuring System Inputs
- GND (0V)
- Output 24 VDC (optional 5VDC)
- A-Channel
- B-Channel
- Earth
- (/A-Channel)
- (/B-Channel)
- Z-Channel(Index pulse)
- /Z-Channel(Index pulse)

Backgauge encoder
E

ST2
- GND (OV)
- Output 3,3 VDC Vref
- Analog Input „gap 1"
- Do not connect
- Earth
- Do not connect
- Do not connect
- Do not connect
- Analog Input „angle"

Cut length

Gap

ST7 — Analog Outputs
- GND (0V)
- +/-10VDC
- Earth

ST8
- GND (0V)
- 0...10VDC
- Earth

analoge Pressure control

PC Interface
1 GND
2 RS232 RX
3 RS232 TX

ELGO ELECTRONIC

Frequency converter

Power Supply

P40T-002-024-15-22-C8XX

U
V3
W3
M 3~

U
V
W
PE

GND
backward
forward

GND (0V)
24 VDC

*Diodes if necessary (see operation manual)

Input EA GND (0V)
Input EA 24VDC (0V)
Drive signal 1 „gauge-forward"
Drive signal 4 „gauge-backwards"
Drive signal 1 „angle – enlarge"
Drive signal 2 „angle – shrink"
Support up
Support down
Blade up
Blade down

ST5

Outputs

*
*
*
*

GND (0V)
24 VDC
Earth

I/O EA GND (0V)
I/O EA-24VDC
Switch endposition „gab-min."
Switch endposition „gab-max."
Start cut (food pedal)
Top dead center
Bottom dead center
Piece counter
Support is up
Support is down

ST9
ST3

Inputs

Backgauge encoder

E

GND (0V)
Output 24 VDC (optional 5VDC)
A-Channel
B-Channel
Earth
(/A-Channel)
(/B-Channel)
Z-Channel(Index pulse)
/Z-Channel(Index pulse)

ST1

Measuring System Inputs

Angle measurement

GND (0V)
Output 3,3 VDC Vref
Analog Input „gap 1"
Do not connect
Earth
Do not connect
Do not connect
Do not connect
Analog Input „angle"

ST2

GND (0V)
+/-10VDC
Earth

GND (0V)
0...10VDC
Earth

ST7

Analog Outputs

ST8

analoge
Pressure control

1 GND
2 RS232 RX
3 RS232 TX

PC Interface

Power Supply
GND (0V)
24 VDC

P40T-002-024-17-12-CXXX

Outputs ST5
- Input EA GND (0V)
- Input EA 24VDC (0V)
- Drive signal 1 „gauge-forward"
- Drive signal 2 „gauge-backwards"
- Drive signal 3 „gauge-fast"
- Controller enable „gap"
- Support up
- Support down
- Conveyor belt

Outputs ST6
- Input EA GND (0V)
- Input EA 24VDC (0V)
- Drive signal 1 „gap1 – enlarge"
- Drive signal 2 „gap1 – shrink"
- Drive signal 1 „angle – enlarge"
- Drive signal 2 „angle – shrink"
- Drive signal 1 „gap2 – enlarge"
- Drive signal 2 „gap2 – shrink"
- Blade up
- Blade down

Measuring System Inputs ST1
- GND (0V)
- Output 24 VDC (optional 5VDC)
- A-Channel
- B-Channel
- Earth
- (/A-Channel)
- (/B-Channel)
- Z-Channel(Index pulse)
- /Z-Channel(Index pulse)

Measuring System Inputs ST2
- GND (0V)
- Output 3,3 VDC Vref
- Analog Input „gap 1"
- Do not connect
- Earth
- Do not connect
- Do not connect
- Analog Input „gap 2"
- Analog Input „angle"

Inputs ST9
- GND (0V)
- 24 VDC
- Earth

Inputs ST3
- I/O EA GND (0V)
- I/O EA-24VDC
- Switch endposition „gab-min."
- Switch endposition „gab-max."
- NC
- Reference start „Gauge"
- NC
- NC

Inputs ST4
- Start extern
- Stop extern
- I/O EA GND (0V)
- I/O EA-24VDC
- Piece counter
- NC
- Top dead center
- Bottom dead center
- Support is up
- Support is down
- Start cup (foot pedal)
- NC

Analog Outputs ST7
- GND (0V)
- +/-10VDC
- Earth

Analog Outputs ST8
- GND (0V)
- 0...10VDC
- Earth

PC Interface
1 GND
2 RS232 RX
3 RS232 TX

*Diodes if necessary (see operation manual)

Controller enable gap

Backgauge encoder

Angle measurement

Gap1

Gap2

analoge Pressure control

Gauge Servo drive
GND (0V)
+/-10 C
Input voltage +/-10 VDC
FG

Frequency converter

Power Supply

P40T-002-024-17-22-CXXX

*Diodes if necessary (see operation manual)

Outputs ST5
- Input EA GND (0V)
- Input EA 24VDC (0V)
- Drive signal 1 „gauge-forward"
- Drive signal 2 „gauge-backwards"
- Drive signal 3 „gauge-fast"
- Controller enable „gap"
- Support up
- Support down
- Conveyor belt

Outputs ST6
- Input EA GND (0V)
- Input EA 24VDC (0V)
- Drive signal 1 „gap1 – enlarge"
- Drive signal 2 „gap1 – shrink"
- Drive signal 1 „angle – enlarge"
- Drive signal 2 „angle – shrink"
- Drive signal 1 „gap2 – enlarge"
- Drive signal 2 „gap2 – shrink"
- Blade up
- Blade down

Measuring System Inputs ST1
- GND (0V)
- Output 24 VDC (optional 5VDC)
- A-Channel
- B-Channel
- Earth
- (/A-Channel)
- (/B-Channel)
- Z-Channel(Index pulse)
- /Z-Channel(Index pulse)

ST2
- GND (OV)
- Output 3,3 VDC Vref
- Analog Input „gap 1"
- Do not connect
- Earth
- Do not connect
- Do not connect
- Analog Input „gap 2"
- Analog Input „angle"

Inputs ST9
- GND (0V)
- 24 VDC
- Earth

ST3
- I/O EA GND (0V)
- I/O EA-24VDC
- Switch endposition „gab-min."
- Switch endposition „gab-max."
- NC
- Reference start „Gauge"
- NC
- NC
- Start extern
- Stop extern

ST4
- I/O EA GND (0V)
- I/O EA-24VDC
- Piece counter
- NC
- Top dead center
- Bottom dead center
- Support is up
- Support is down
- Start cup (foot pedal)
- NC

Analog Outputs ST7
- GND (0V)
- +/-10VDC
- Earth

ST8
- GND (0V)
- 0...10VDC
- Earth

PC Interface
1 GND
2 RS232 RX
3 RS232 TX

analoge
Pressure control

Backgauge encoder

Angle measurement

Gap1

ELGO ELECTRONIC

Frequenzumrichter

P40T-002-024-17-22-CXXX

M 3~

U / V3 / W3

U / V / W / PE

GND schnell rück. vor.

Spannungs-versorgung

GND (0V)
24 VDC

0...10V
0V-GND
Schild

ST7

*Dioden falls erforderlich (siehe Betriebsanleitung)

ST5 Ausgänge
Eingang EA GND (0V)
Eingang EA 24VDC (0V)
Fahrtsignal 1 „Anschlag – vorwärts"
Fahrtsignal 2 „Anschlag – rückwärts"
Fahrtsignal 3 „Anschlag-schnell"
Reglerfreigabe „Anschlag"
Support heben
Support senken

Förderband

ST6 Ausgänge
Eingang EA GND (0V)
Eingang EA 24VDC (0V)
Fahrtsignal 1 „Spal1-vergrößern"
Fahrtsignal 2 „Spalt1-verkleinern"
Fahrtsignal 1 „Winkel – vergrößern"
Fahrtsignal 2 „Winkel – verkleinern"
Fahrtsignal 1 „Spalt2 – vergrößern"
Fahrtsignal 2 „Spalt2 – verkleinern"
Messer heben
Messer senken

ST1 Messsystem Eingänge
GND (0V)
Ausgang 24 VDC (optional 5VDC)
A-Kanal
B-Kanal
Earth
(/A-Kanal)
(/B-Kanal)
Z-Kanal (Indeximpuls)
/Z-Kanal (Indeximpuls)

ST2 Messsystem Eingänge
GND (0V)
Ausgang 3,3 VDC Referenzspannung
Analogeingang „Spalt 1"
nicht anschließen
Earth
nicht anschließen
nicht anschließen
Analogeingang „Spalt 2"
Analogeingang Winkel

Encoder Hinteranschlag
E

Winkel Messung

Spalt1

ST9 Eingänge
GND (0V)
24 VDC
Earth

ST3 Eingänge
Ein/(Aus)gang EA GND (0V)
Ein/(Aus)gang EA-24VDC
Endschalter „Anschlag-min."
Endschalter „Anschlag-max."
NC
Referenz Start „Referenz"
NC
NC
Start extern
Stop extern

ST4 Eingänge
Ein/(Aus)gang EA GND (0V)
Ein/(Aus)gang EA-24VDC
Stückzähler
NC
Oberer Totpunkt
Unterer Totpunkt
Support ist oben
Support ist unten
Schitt starten Fußbedal
NC

ST7 Analog Ausgänge
GND (0V)
+/-10VDC
Earth

ST8 Analog Ausgänge
GND (0V)
0...10VDC
Earth

FU

analoge Drucksteuerung

PC Schnittstelle
1 GND
2 RS232 RX
3 RS232 TX

Notes:

Notes:

Notes:

17 Index