Position Controller for 1 or 2 Axes
Manual, Single or Program operation
LCD display with 7 menu languages
16 freely configurable inputs & outputs
Optionally with 12 bit analog output
Useful functions like referencing, tool offset and batch counter
Simple and intuitive handling
Integrated diagnosis mode
Optional RS232 interface
Quick panel mounting
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# General, Safety, Transport and Storage

## 2.1 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.

## 2.2 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 Symbol] | **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 Symbol] | **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 Symbol] | **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 Symbol] | **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:

| ![Note Symbol] | **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.
2.3 Statement of Warranties

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

2.4 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 measures.
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.

2.5 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.

2.6 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. |
2.7 Conventional Use

The product described in this manual was developed to execute safety-related functions as a part of an entire assembly or machine. The ELGO position controller P40-000 only serves for positioning applications.

**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.

2.8 Safety Instructions for Transport, Unpacking and Loading

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

2.9 Handling of Packaging Material

Notes for proper disposal: ² 2.4

2.10 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.

2.11 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 (² 4) needs to be observed
- Relative humidity (² 4) must not be exceeded
- Inspect packages regularly if stored for an extensive period of time (>3 months)
3 Product Features

The position controller of the P40 series is used for simple positioning applications, e.g. with wood or sheet metal processing machines. The main advantage of this controller is the simple, easy and fast entry of required positions and quantities. The actual value, target value and quantity are displayed by a well legible LCD display in the control panel. After entering a target position value and a quantity, the positioning process can be started.

The P40 has an internal program memory for a maximum of 1,000 blocks. For the positioning procedure, three different versions of output signals are available:

1. Switch-off positioning with up to 3 speeds via digital outputs.
   The assignment and logic (active HIGH/LOW) can be parametrized.
2. Optionally (\( \varphi 18 \)) via unregulated 12 bit analog output (\( \pm 10 \) V).
3. Optionally (\( \varphi 18 \)) via regulated 12 bit PID analog output (\( \pm 10 \) V).

The P40 controller is with 24 VDC (\( \pm 10 / -20 \) %). For an alternative supply with AC-voltage, an external power pack is available (\( \varphi 19 \))

3.1 Essential P40 Features

- Available as Single or Dual Axis-Controller
- Analog output or digital outputs for 1 - 3 speed operation
- 16 free programmable digital in- & outputs (8 instead of 16 digital I/Os optionally, see \( \varphi 18 \))
- Program memory with up to 1000 program blocks

![Figure 1: P40-000 controller with panel housing](image)

3.2 Operating Modes

The P40 consists of three general operation modes:

- **Manual:** Inching operation moves the individual axes manually by operating the keypad.
- **Single:** A whole set can be processed.
- **Program:** In the program mode, data sets can be strung together or programmed. This program blocks are then processed sequentially. The program consists of several different data sets.
4 Technical Data

4.1 Identification

The type label serves for the identification of the unit. It is located on the housing of the sensor and gives the exact type designation ($\varnothing$ 18) with the corresponding part number. Furthermore, the type label contains a unique, traceable device number. When corresponding with ELGO please always indicate this data.

4.2 Dimensions

Figure 2: Dimensions of the P40 controller
### Technical Data Controller

**Technical Data P40-000 (standard version)**

#### Mechanical Data

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>panel housing</td>
</tr>
<tr>
<td>Housing material</td>
<td>front plate: aluminium</td>
</tr>
<tr>
<td></td>
<td>housing: galvanized steel sheet</td>
</tr>
<tr>
<td>Front plate dimensions</td>
<td>W × H = 144 x 144 mm</td>
</tr>
<tr>
<td>Panel cutout</td>
<td>W × H = 138 x 138 mm</td>
</tr>
<tr>
<td>Keyboard</td>
<td>membrane keyboard</td>
</tr>
<tr>
<td>Installation depth</td>
<td>37 mm (without connectors)</td>
</tr>
<tr>
<td></td>
<td>75 mm (with connectors)</td>
</tr>
</tbody>
</table>

#### Electrical Data

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>LCD dot matrix 120 x 80 pixels with white background lighting</td>
</tr>
<tr>
<td>Hardware</td>
<td>32 bit microcontroller with 1 MByte Flash and 56 KByte RAM</td>
</tr>
<tr>
<td>Program memory</td>
<td>up to 1.000 blocks (more on request)</td>
</tr>
<tr>
<td>System accuracy</td>
<td>± 1 increment</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>24 VDC ±10 / -20 %</td>
</tr>
<tr>
<td>Current consumption</td>
<td>24 VDC: max. 150 mA (unloaded); permitted tot. current incl. self-consumption: 1 A</td>
</tr>
<tr>
<td>Encoder supply voltage</td>
<td>24 VDC or 5 VDC (order designation ≠ 18)</td>
</tr>
<tr>
<td>Encoder load</td>
<td>max. 130 mA</td>
</tr>
<tr>
<td>Input signals (encoder)</td>
<td>HTL, TTL, analog (order designation ≠ 18)</td>
</tr>
<tr>
<td>External inputs</td>
<td>16 x digital PNP inputs with free programmable assignment and switching logic (active HIGH/LOW)</td>
</tr>
<tr>
<td>Input current / pin</td>
<td>max. 10 mA</td>
</tr>
<tr>
<td>Pulse time for inputs</td>
<td>min. 300 ms</td>
</tr>
<tr>
<td>Input frequency</td>
<td>max. 100 kHz (higher on request)</td>
</tr>
<tr>
<td>Analog inputs (option)</td>
<td>1 … 2 analog inputs (12 bit) at 3.3 V sensor supply (≠ 18)</td>
</tr>
<tr>
<td>Output signals</td>
<td>16 digital PNP outputs with freely programmable assignment and logic (active HIGH / LOW)</td>
</tr>
<tr>
<td>Output current</td>
<td>max. 150 mA per output / 500 mA total current across all outputs; the outputs are durable short circuit proof (no multiple short circuits)</td>
</tr>
<tr>
<td>Freewheel clutch / outputs</td>
<td>for inductive loads integrated (clamping voltage at the output max. −45 V)</td>
</tr>
<tr>
<td>Analog outputs (option)</td>
<td>optional: ± 10 V PID or ± 10 V unregulated (each 12 bit) (≠ 18)</td>
</tr>
<tr>
<td>Interfaces (option)</td>
<td>RS232 (≠ 18)</td>
</tr>
<tr>
<td>Connections</td>
<td>industry standard plug-in terminals (3.81 mm grid, lockable)</td>
</tr>
<tr>
<td></td>
<td>and additional RJ45 sockets (depending on version)</td>
</tr>
<tr>
<td>Power down memory</td>
<td>E²Prom (service life: 1.000.000 switching on/off cycles or 40 years)</td>
</tr>
<tr>
<td>Further options</td>
<td>8 = 8 instead of 16 digital inputs and outputs</td>
</tr>
<tr>
<td></td>
<td>C = screw terminals instead of plug-in terminals</td>
</tr>
</tbody>
</table>

#### Environmental Conditions

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>-20 ... +50° C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>0 ... +45° C</td>
</tr>
<tr>
<td>Humidity</td>
<td>max. 80 %, non-condensing</td>
</tr>
<tr>
<td>Protection class (front)</td>
<td>IP43 (installed state)</td>
</tr>
<tr>
<td>Protection class (rear)</td>
<td>IP00</td>
</tr>
</tbody>
</table>
5 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.

5.1 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.

5.2 Mounting / Installing

For the installation of the device, a panel section must be cut into the respective control panel. The cutout dimensions must correspond to the measurements defined in the technical data (⌀ 0).

The device is fastened into the panel cutout by using two studs with swiveling flaps which are already attached to the housing. For installation, only a screwdriver is necessary.

5.3 Activation of the Device

After connecting the power supply voltage, the device is switched on and ready for operation.
6 Design und Function

6.1 Key Functions

Figure 3: Key Functions

- Switch over between “Manual” and “Single” mode
- Operation mode “Program” (only if program mode is activated)
- To enter the parameter level (press for 3 seconds) and to exit the parameter level or a submenu (press shortly)
- Select or confirm (ENTER button)
- Cursor navigation “down”
- Cursor navigation “up”
- Functional keys (depending on menu level and operating mode)
- Delete or reset an entry
- Sign switchover
- Enter a target position or a parameter value
- Start positioning
- Stop positioning
6.2 Display Functions

Program number
Symbol operating mode
Absolute-/incremental position
Target position
Piece counter
Program counter
Program block number
Actual position
Options
Browse through data blocks

Figure 4: Display Functions

NOTE! The display elements can vary depending on operating mode and configuration.
7 Handling & Operating Modes

7.1 Operating Modes

Depending on the parameter setting, the screen display and assignment of the function keys can vary.

7.1.1 Manual Operation

In this mode the axes can be moved manually (manual inching). To do this, select the corresponding axis with the cursor and change the position by using the functional keys F1 / F3.

![Diagram of Manual Operation]

**Figure 5: Manual Operation**

1. Displays the actual position of the respective axis

2. F1 Moves the axis in negative direction

3. F3 Moves the axis in positive direction

4. F2 Referencing of the respective axis: Use the cursor to select the desired axis and press the F2 button longer than 2 seconds.

**Note:**

The parameter axis \( \rightarrow \) times (\( \approx 9.2 \)) \( \rightarrow \) “manual change” can be used to define a time. In case of manual operation, there is a change from creep speed to fast speed after the expiration of the time adjusted here.

See also table in section \( \approx 14.2 \) parameter axis \( \rightarrow \) times \( \rightarrow \) “manual change”

**Referencing:**

see chapters: \( \approx 7.2 \) “Referencing an Axis”, \( \approx 9.3 \) “Parameter Axis: “ and table in section \( \approx 14.1 \) “Parameter Axis: Distances”
7.1.2 Single Operation

This mode allows moving all active axes simultaneously after entering the desired target values and confirmation by the START key.

Figure 6: Single Operation

1. Displays the actual position of the respective axis

Incremental positioning:
- \( \rightarrow \) target value is an absolute position
- \( \rightarrow \rightarrow \) target value is an incremental position +
- \( \leftarrow \leftarrow \) target value is an incremental position −

2. Displays the target value of the respective axis

3. Input field for quantity

4. Referencing of the respective axis: Use the cursor to select the desired axis and press the F2 button longer than 2 seconds.

NOTE!

Incremental Positioning:
Select corresponding axis with the cursor and change positioning mode by pressing the ENTER key (see chapter 9.3 “Parameter Axis: ”)

Referencing:
see chapters: 7.2 “Referencing an Axis”, 9.3 “Parameter Axis: ” and table in section 14.1 “Parameter Axis: Distances”
7.1.3 Program Operation

When using the program mode, the user has the possibility to summarize several program blocks into one program. Depending on the configuration, different program sequences are possible.

![Diagram of Program Operation](image)

Figure 7: Program Operation

1. Enter and confirm a program number

Incremental positioning:
- target value is an absolute position
- target value is an incremental position +
- target value is an incremental position –

2. Shows the actual program block and the program end (example: 3E = 3 last program block)

3. Displays the actual position of the respective axis

4. Displays the target value of the respective axis

5. Input field for quantity

6. Previous program block

7. Next program block

7.1.3.1 Create a Program

Press the program key to activate the program mode. Before a program can be created, a program number must be assigned and confirmed with the ENTER key. The corresponding data sets (blocks) then will be assigned to the defined program number. In order to navigate through the various program blocks, the keys F1 and F3 are used. It is also possible to select a program block directly, by entering the block number in the corresponding input field and confirming with ENTER.
After entering the required data sets, the program end has to be marked. For this, the F2 key must be pressed during the cursor is in the input field for the block number. The defined program end will then be marked with the letter “E” behind the block number.

### 7.1.3.2 Processing a Program

The program mode can be selected directly by using the PROGRAM key. First, choose a program by entering a program number and confirm it by using the ENTER key. The keys F1 and F3 can be used to scroll through all the program blocks. The positioning will start automatically when the START key is pressed. Now, all data sets will be processed in dependency of parameter settings until the end marker of the program is reached.

The positioning process can be interrupted by pressing the STOP key at any time. In this case, the program remains in the current block. To continue the program, press the START key again.

---

**NOTE!**

The end of program is necessarily needed for the automatic run. In case of missing end of program a warning is displayed.

Incremental Positioning:
Select corresponding axis with the cursor and change positioning mode by pressing the ENTER key.

- 9.3 “Parameter Axis: “

### 7.2 Referencing an Axis

The axes can be referenced in the manual mode and single mode. Depending on the setting in parameter axis \( \rightarrow \) X-/Y-axis \( \rightarrow \) settings \( \rightarrow \) reference mode the following applies:

- **Mode 1, 3, 5, 7:** The F2 key must be pressed for minimum 2 seconds.
  - With a dual-axis controller, the reference symbol of the corresponding axis has to be displayed
  - in the manual mode the corresponding axis needs to be selected,
  - in the single mode the target value of the corresponding axis needs to be selected.

- **Mode 2, 4, 6, 8:** for referencing, an external input must be activated

- **Mode 1 or 2:** the value deposited in parameter axis \( \rightarrow \) X-/Y-axis \( \rightarrow \) distances \( \rightarrow \) referenceval. will be taken as the current actual value for the respective axis

- **Mode 3 or 4:** the value entered for target position will be taken as current actual value

- **Mode 5 or 6:** referencing to the positive switch end-position with index pulse (see next section)

- **Mode 7 or 8:** referencing to the negative switch end-position with index pulse (see next section)

### 7.2.1 Functionality of Referencing

The controller moves the axis that needs to be referenced in dependence of the parameter setting in parameter axis \( \rightarrow \) X-/Y-axis \( \rightarrow \) settings \( \rightarrow \) reference mode. The output “reference drive run” is set. If the corresponding input (switch end-position positive or negative) is activated, the controller will stop. After a dwell time the controller moves in the opposite direction.

As soon the appropriate input (switch end-position) is disabled, the index pulse will be released. With the next zero pulse, the controller stops and the reference value stored in parameter axis \( \rightarrow \) X-/Y-axis \( \rightarrow \) distances \( \rightarrow \) referenceval. will be transferred into the actual value window.
8 Menu Structure and Parameter Levels

Operating modes
- manual mode
- single mode
- program mode

Service (press ESC for 3 seconds)
- parameter axis
  - X-axis
    - distances
    - times
    - analog (optionally)
    - measuring system (optionally)
    - settings
  - Y-axis
    - distances
    - times
    - analog (optionally)
    - measuring system (optionally)
    - settings
- system
  - setup
  - system-times
  - I/O-configuration
    - input function
    - input logic
    - output function
    - output logic
    - default parameter
- password
- diagnosis
  - inputs
  - outputs
  - keyboard
  - version
- contrast

NOTE!
The service mode with the parameter levels can be accessed by keeping the ESC key pressed for minimum 3 seconds. Most of the parameters - if not marked otherwise - can only be changed after entering the password resp. PIN code.

PIN CODE: 250565
9 Axis Menu

9.1 Parameter Axis: Distances

This menu is used to set relevant distances for the X- and Y-axis separately.

- Distances
  Access to parameters concerning distances e.g. speeds etc.

- Times
  Access to parameters concerning times e.g. position reached, zero speed monitoring, rotary encoder etc.

- Settings
  Access to the general axis parameters

  - Slow forward
  - Creep forward
  - Correction stop forward
  - Slow backward
  - Creep backward
  - Correction stop backward
  - Tolerance window
  - Manipulation
  - Spindle compensation
  - Forced loop
  - Reference value
  - Retract length
  - End position Min
  - End position Max
  - Factor
  - Displacement
  - Tool correction
  - Fix position

A detailed description of these parameters can be found on the next pages...
Slow forward / slow backward = middle speed

This parameter defines the distance at which the controller switches from high speed to slow speed before reaching the target position.

Creep forward / creep backward = slow speed

This parameter defines the distance at which the controller switches from slow speed to creep speed before reaching the target position.

Correction stop forward / correction stop backward

This parameter can be used to compensate a constant overrun.

Example: If the target position is overrun by 0.2 mm constantly, the parameter must be set to 0.2 mm. The stop command is then moved forward by 0.2 mm.

At first start-up the initial setting of the stop offset is ‘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 to 0.2 mm) i.e. the mechanical friction should be steady over the entire run distance and the slow speed and/or creep speed must be adjusted accordingly small.

NOTE!

When positioning with PID, the correction stop serves as tolerance window.

Example: Positioning with 2 speeds

For the parameter setting generally applies:

<table>
<thead>
<tr>
<th>Slow speed</th>
<th>Creep speed</th>
<th>Correction stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.0 mm</td>
<td>10.0 mm</td>
<td>1.0 mm</td>
</tr>
</tbody>
</table>

Slow speed = Creep speed > Correction stop

Figure 8: Correction stop with 2 speeds
Example: Positioning with 3 speeds

For the parameter setting generally applies:

<table>
<thead>
<tr>
<th>Slow speed &gt; Creep speed &gt; Correction stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow speed: 20.0 mm</td>
</tr>
<tr>
<td>Creep speed: 10.0 mm</td>
</tr>
<tr>
<td>Correction stop: 1.0 mm</td>
</tr>
</tbody>
</table>

Fast

<table>
<thead>
<tr>
<th>Slow speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creep speed</td>
</tr>
<tr>
<td>Position reached: 100.0 mm</td>
</tr>
</tbody>
</table>

| 80.0 mm | 90.0 mm | 99.0 mm | 100.0 mm |

Figure 9: Correction stop with 3 speeds

Tolerance window

If the current actual position of the target position corresponds +/− to the value of "tolerance window", the corresponding output "tolerance zone" (≈ 10.3.2) is set.

Manipulation

It is possible to adjust the indicator of the actual value of the corresponding axis to the target value within the entered tolerance window. The entered tolerance range is always active in the + and − range around the target value. The real actual value is saved in the microprocessor, i.e. no positioning errors will add up.

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

| Internal actual value | 99.8 mm |
| Displayed actual value | 100.0 mm |
| Target Value | 100.0 mm |

NOTE!

Before starting-up initially the tolerance window should be set to 0.

Spindle compensation

In order to adjust spindle or sprocket tolerances, the target position must always be approached from the same direction, i.e. in one direction the target position will be overrun by the entered value. After expiration of the time entered in parameter axis → X-/Y-axis → times → spindle compens., the axis will move to the defined target position again.
Forced loop

If the actual value is during an absolute positioning within the range target value +/- value of forced loop window, a forced loop is moved.

Reference value

This parameter is used to define reference value resp. reference position.

Retract length

When activating the external retract input, the axis moves depending on the retract mode setting (see 9.5 parameter axis → X-/Y-axis → settings → retract mode) around this value or to this value.

Software-end position minimum / maximum

These two values can be used if no mechanical switch end-positions are available or additionally to already existing mechanical switch end-positions.

End position min: This value should be set between the smallest length/position to be processed and zero (resp. shortly before the mechanical switch end-position).

End position max: This value should be set between the largest length/position to be processed and the maximum length (resp. shortly before the mechanical switch end-position).

Factor

The factor for analysis of the pulses is set here.

\[
\text{Factor} = \frac{\text{distance resp. angle}}{\text{amount of clock pulse edges A and B}}
\]

NOTE!

From software version 1.64 on, the decimal point (number of positions after decimal point) is calculated automatically. Basically, the controller triggers all four edges!

Displacement (no PIN necessary)

Here, positive or negative dimensions are programmed. The entered dimension is added to the actual position when activating an allocated input.

Tool correction (no PIN necessary)

In the incremental measurement mode this correction value is automatically added to the target value, i.e. the positioning process continues the movement by this value.

Fix Position

This register is used to determine a fixed position for each axis. When activating input "fixed position X" or "fixed position Y", the controller moves to this defined position.
9.2 Parameter Axis: Times

This menu is used to set relevant time parameters for the X- and Y-axis separately.

Distances
Access to parameters concerning distances e.g. speeds etc.

Times
Access to parameters concerning times e.g. position reached, zero speed monitoring, rotary encoder etc.

Settings
Access to the general axis parameters

- Position reached
- Spindle compensation
- Manual change
- Monitoring
- Delay Control enable
- Start delay
- Shutdown control
- Retract time
- Delay retract
- Reference time
- Quantity reached

A detailed description of these parameters can be found on the next pages...
Position reached

The output signal is statically if this time parameter is set to 0 or wiping if a time is defined here. The output will be active as soon the according axis has reached the target position.

Spindle compensation

In the peak of the loop drive the drive signals switch off. The controller returns to the target value when the parameterized time has expired (adjustment range 0.0 … 99.9 s). With a setting of “0” there is no waiting period at the peak.

Manual change

After expiration of this time, the manual mode switches from the low speed to the next higher speed.

Monitoring

Defines a time within a range of 0.0 ... 99.9 s to monitor the encoder resp. measuring system. If there are no encoder signals during the programmed period of time, the drive signals are switched off to stop the engine. With a setting of “0” the monitoring is deactivated.

Delay control enable

After the START command the output “control enable” is activated. After reaching the target position and only after the expiration of the programmed time (range 0.0 ... 99.9 s) in the parameter delay contr.enable the output is set back. With a setting of “0”, the output for the control enable is adjusted statically and remains active until the operation modes changes resp. until STOP key is pressed.

Start delay

At a START command the start of the positioning is delayed for the entered time.

Shutdown control

Here the time for shutdown after the position is reached is entered (range 0.0 ... 99.9 s).

Retract time

The dwell-time at the peak is entered here (range 0.0 ... 99.9 s). After this time has been expired, the position control is set back from the retract peak to the target value. In addition this value is also used for a retraction on time.

Delay retract

The retraction is delayed for the entered time.

Reference time

In the peak of the reference run the drive signals switch off. The controller will continue positioning after this time has been expired (range 0.1 ... 99.9 s).

Quantity reached

This parameter is used to set a time for the signal “quantity reached” (range 0.1 ... 99.9 s). With a setting of “0” the output “quantity reached” is statically set.
## 9.3 Parameter Axis: Settings

This menu is used to set general parameters for the X- and Y-axis separately.

<table>
<thead>
<tr>
<th>Distances</th>
<th>Access to parameters concerning distances e.g. speeds etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Times</td>
<td>Access to parameters concerning times e.g. position reached, zero speed monitoring, rotary encoder etc.</td>
</tr>
</tbody>
</table>

**Settings**
Access to the general axis parameters

<table>
<thead>
<tr>
<th>Axis type</th>
<th>Button manual mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive signal configuration</td>
<td>Reference mode</td>
</tr>
<tr>
<td>Spindle compensation mode</td>
<td>Software end-position</td>
</tr>
<tr>
<td>Hardware end-position</td>
<td>Retract mode</td>
</tr>
<tr>
<td>Error compensation</td>
<td>Piece counter</td>
</tr>
<tr>
<td>Incremental positioning</td>
<td>Decimal point</td>
</tr>
<tr>
<td>Display option manual</td>
<td>Unit</td>
</tr>
</tbody>
</table>

A detailed description of these parameters can be found on the next pages...
Axis type

This parameter is used to define the type of axis (for each axis separately).

- **IN:** „Encoder“ for usage with incremental encoder resp. measuring systems
- **IN:** „Analog“ for usage with analog measuring systems resp. sensors
- **OUT:** „Digital“ for positioning via digital drive signals
- **OUT:** „Analog+Dig“ for positioning via unregulated analog output
- **OUT:** „PID+Digital“ for positioning via regulated PID analog output

Button manual mode

The function of the keys in manual mode is defined in this parameter.

- off: The P40 controller buttons F1, F3 are deactivated for the corresponding axis (the respective axis can only be moved by the correspondingly assigned inputs)
- normal
- inverted

Drive signal configuration

With configuration of the drive signals different starting combinations for the corresponding speeds can be adjusted.

- Drive signals → Mode 1

**3 speeds**

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

<table>
<thead>
<tr>
<th>Output signals</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creep forward</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow forward</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast forward</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Creep backward</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Slow backward</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Fast backward</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

- Drive signals → Mode 2

**2 speeds (ELGO Standard)**

Independent outputs for forward and backward
Independent outputs for fast and slow

<table>
<thead>
<tr>
<th>Output signals</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creep forward</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow forward</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast forward</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creep backward</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Slow backward</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Fast backward</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

**Signal configuration:**

- Forward: Drive signal 1
- Creep: Drive signal 2
- Fast: Drive signal 3
- Backward: Drive signal 4
Drive signals → Mode 3

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

<table>
<thead>
<tr>
<th>Output signals</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creep forward</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow forward</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast forward</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Creep backward</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Slow backward</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Fast backward</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Drive signals = Mode 4

2 speeds
Independent outputs for direction and speed

<table>
<thead>
<tr>
<th>Output signals</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creep forward</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow forward</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Fast forward</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Creep backward</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow backward</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Fast backward</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Drive signals = Mode 5

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

<table>
<thead>
<tr>
<th>Output signals</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creep forward</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow forward</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast forward</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Creep backward</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Slow backward</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Fast backward</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Signal configuration:
- Forwards: Drive signal 1
- Forwards fast: Drive signal 2
- Backwards: Drive signal 3
- Backwards fast: Drive signal 4
Drive signals = Mode 6

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

<table>
<thead>
<tr>
<th>Output signals</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creep forward</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow forward</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast forward</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Creep backward</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Slow backward</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Fast backward</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Drive signals = Mode 7

3 speed
Forward/backward separately

<table>
<thead>
<tr>
<th>Output signals</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creep forward</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow forward</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast forward</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Creep backward</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Slow backward</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Fast backward</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Reference mode

Available modes:

- Mode 1 Reference via parameter with F2 button *
- Mode 2 Reference via parameter and external input *
- Mode 3 Reference via Target value and F2 button
- Mode 4 Reference via Target value and external input **
- Mode 5 Reference drive positive via parameter with F2 button **
- Mode 6 Reference drive positive via external input **
- Mode 7 Reference drive negative via F2 button **
- Mode 8 Reference drive negative via external input **

* see parameter axis → X-/Y-axis → distances → reference value
** see parameter axis → X-/Y-axis → time → reference time

Additionally when positioning via PID resp. analog output:
- parameter axis → X-/Y-axis → analog → v. ref. mode 1
- parameter axis → X-/Y-axis → analog → v. ref. mode 2

General:

1. Above the F2 button the reference symbol of the corresponding axis is displayed
2. An external input must be defined and allocated as “reference input”
3. See also chapter 7.2 “Referencing an Axis”
**Spindle compensation mode**

- without (no spindle compensation)
- negative spindle compensation –
- positive spindle compensation +
- with forced loop –
- with forced loop +

**Software end-position**

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

**Hardware end-position**

- both (defined inputs) enabled
- negative (defined input) disabled
- positive (defined input) disabled
- both disabled

**Retract mode**

- Mode 1  retract to actual value + adjusted retract length* with return
- Mode 2  retract to adjusted retract length* with return
- Mode 3  retract positive to actual value for the adjusted retract time** with return
- Mode 4  retract to actual value + adjusted retract length* without return
- Mode 5  retract to adjusted retract length* without return
- Mode 6  retract positive to actual value for the adjusted retract time** without return
- Mode 7  retract to actual value – retract length* with return
- Mode 8  retract negative to actual value for the adjusted retract time** with return
- Mode 9  retract to actual value – adjusted retract length* without return
- Mode10 retract negative to actual value for the adjusted retract time** without return

* see parameter axis ➔ X/Y-axis ➔ distances ➔ retract length
** see parameter axis ➔ X/Y-axis ➔ times ➔ retract time

**Error compensation**

The setting defines the acrivity of the error compensation at incremental measurement positioning.

- off
- on
Piece counter

This parameter is used to define the piece counter function for the Single Mode:

- without piece counter
- auto decrement *
- auto decrement + Stop *
- auto increment *
- auto decrement/ increment *
- decrement **
- decrement + Stop **
- increment **
- decrement/ increment **

- Setting “counter increment”: the piece counter counts up from the current actual value.
- Setting “counter decrement”: the piece counter counts towards zero.
- Setting “counter decrement/increment”: the piece counter is decrementing if a certain number of items have been assigned. When zero is reached, the “quantity reached” output is set wiping according to the time deposited in parameter parameter axis → X-/Y-axis → times → quantity reached. Then the piece counter is incrementing.

* When reaching the position the counter will be activated
** When activating the input “quantity” the counter will be activated

Incremental positioning

This parameter is used to activate the option “absolute / incremental positioning”.

- off no selection possible, always absolute positioning
- on selection via keypad possible
- extern selection via external inputs possible

If this function is activated, one of the following symbols will appear (see ≅ 6.2 “Display Functions”):

- target value is absolute position
- target value is incremental position +
- target value is incremental position –

If the function is deactivated, no symbol is shown the display and the positioning mode is generally absolute.

Decimal point

- This parameter is used to define a decimal place.

Display option manual

In this register the appearance of the manual button can be selected:

- left – right
- down – up
- forwards – backwards

Unit

The displayed measurement unit can be specified here: mm, inch or degree.

NOTE! The units of the parameters remain unchanged!
9.4 Parameter Axis: Analog - optional

This menu is used to set the optional analog parameters for the X- and Y-axis separately.

**Distances**
Access to parameters concerning distances e.g. speeds etc.

**Times**
Access to parameters concerning times e.g. position reached, zero speed monitoring, rotary encoder etc.

**Analog**
Access to the analog output parameters

**Settings**
Access to the general axis parameters

---

### Velocity

### Acceleration

### P-Portion

### I-Portion

### D-Position

### I-Limit

### Impulses encoder

### Start mode

### Stop mode

### Stop mode manual

### Manual fast

### Manual slow

### v Reference mode 1

### v Reference mode 2

### U fast forward

### U slow forward

### U creep forward

### U fast backward

### U slow backward

### U creep backward

---

**NOTE!**
The analog parameters are only relevant for devices equipped with an optional analog output (PID or unregulated). See also §18 “Type Designation”.

A detailed description of these parameters can be found on the next pages...
**Please note:** The optional analog parameters are only displayed in the menu “axis parameter” if an analog output has been previously assigned in the menu parameter axis → X-/Y-axis → settings → axis type to the corresponding axis. See figure 11 and section 14.2.

**Setting for a regulated PID analog output:**

<table>
<thead>
<tr>
<th>Y-axis system</th>
<th>1/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>axis type</td>
</tr>
<tr>
<td>Encoder</td>
<td></td>
</tr>
</tbody>
</table>

**Setting for an unregulated analog output:**

<table>
<thead>
<tr>
<th>Y-axis system</th>
<th>1/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>axis type</td>
</tr>
<tr>
<td>Encoder</td>
<td></td>
</tr>
</tbody>
</table>

Figure 10: Assigning an analog output to an axis

**Velocity**

The maximum speed is set in this parameter (unit: rpm). Should there be gearing between the motor and the measuring system, this has to be considered in the calculations (e.g. gear or spindle).

**Example**

Demanded (below the maximum possible!) motor speed rpm = 3000

Gearing ratio \( i = 10 \)

\[
V = (\text{rpm}) / i = (3000 \text{ rpm}) / 10 = 300 \text{ rpm}
\]

**Acceleration**

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

A possible gearing ratio must also be considered here.

**P-Portion**

Integral step: setting range 1 ... 99999

**General:** The P-controller exclusively consists of a proportional portion and has thereby its reinforcing characteristic. The P-term multiplies the input value by a constant coefficient.

**P40:** At offset, the difference between the target and actual value is multiplied with the entered value and shown as power-sharing. The bigger the proportional amplification the more sensitive the control loop will be (possibly even unstable).

**I-Anteil/I-Limit**

Integral step: setting range 1 ... 99999

**General:** An I-controller (integrating controller) determines the control value through timed integration of the offset taking the reset time into account. A continuing offset leads to further increase of the analog output. The reset time determines how big the temporal influence is. The maximum reset time is limited through I-limit. The step response of the I-portion is a linear increase. That means for a constant offset the integral will be increased and thus reinforces the I-portion.

**P40:** At offset the analogue control voltage will continue to increase step by step until there is zero difference between the target and actual position and the entered I-limit in this parameter is reached respectively. The greater the I-portion, the slower is the response.
D-portion

Differential voltage: setting 1 ... 1000

**General:** The D-controller (differential controller) determines the control value from the derivative with respect to time of the offset.

**P40:** At offset a short voltage pulse proportional to the rate of change will be put out to compensate quickly without sacrificing the stability of the control loop permanently. The value of the voltage pulse is entered (max. ±10 V).

**Pulses encoder** (resolution of the measuring system)

The number of pulses per revolution of the engine is entered in this parameter. This enables amongst others the calculation of speed to be effected (max. 9999 pulses per revolution).

**Startmodus**

<table>
<thead>
<tr>
<th>Value</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>If the axis is in the tolerance zone, the axis will not be restarted.</td>
</tr>
<tr>
<td>1</td>
<td>A start of the axis will be forced in the tolerance zone.</td>
</tr>
</tbody>
</table>

**Stoppmodus**

<table>
<thead>
<tr>
<th>Value</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>The voltage of the analog output is set to 0 V</td>
</tr>
<tr>
<td>1</td>
<td>The drive is set to shut down through the highest possible acceleration</td>
</tr>
<tr>
<td>2</td>
<td>The drive is set to shut down through an acceleration according to the adjusted parameter</td>
</tr>
</tbody>
</table>

**Manual fast**

Here the *fast* speed for moving the axis in manual mode can be defined.

**Manual slow**

Here the *slow* speed for moving the axis in manual mode can be defined.

**v Reference mode 1**

Here the reference run speed of the stopping point until reaching the initiator is defined.

**v Reference mode 2**

Here the reference run speed of stopping point until reaching the index pulse is defined.

**U fast / slow / creep speed forward**

Voltage during fast / slow / creep speed forward.

**U fast / slow / creep speed backward**

Voltage during fast / slow / creep speed backward.
9.5 Parameter Axis: Measuring System - optional

This menu is used to calibrate analog inputs. The submenu "measuring system" is only relevant for devices which are optionally equipped with an analog input (⇒ 18 Type Designation).

Please note:
The submenu “Measuring system” appears only under “Axis parameters”, if an analog measuring system has been assigned to the corresponding axis (parameter axis → X-/Y-axis → settings → axis type → IN).
See also figure 11 and table ⇒ 14.2.

<table>
<thead>
<tr>
<th>X-axis system 1/14</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN axis type OUT</td>
</tr>
<tr>
<td>Analog --- Digital</td>
</tr>
</tbody>
</table>

Figure 11: Assigning an analog input to an axis

Distances
Access to parameters concerning distances e.g. speeds etc.

Times
Access to parameters concerning times e.g. position reached, zero speed monitoring, rotary encoder etc.

Measuring system
To calibrate analog measuring systems

Settings
Access to the general axis parameters

9.5.1 Analog Input Calibration

A minimum and a maximum value for the lower voltage (offset) as well as the upper voltage (full scale) of the analog measuring system can be set during calibration.

The analogue input is designed for 0 ... 3.3 V, whereby 3.3 volts correspond to the full scale of 4095 increments (12 bits).

Example factory setting (see figure 12):
Min value: 0 V ≈ 0.0 mm
Max value: 3.3 V ≈ 90.0 mm

| Measuring system calibration |

Figure 12: Analog Input Calibration

With these two buttons, the minimum and maximum positions of the analog axis can be manually approached in the desired direction in order to calibrate them.

Used as a teach button: After approaching the “min” and “max” position, the incremental measured value is assigned to the position, written into the corresponding field and stored.

See also section ⇒ 14.1
10 System Menu

10.1 System: Setup

**Setup**
Access to the system parameters

**System-Times**
Access to system parameters concerning times

**I/O-configuration**
Here the inputs and outputs can be assigned

**Default parameter**
Reset the parameters to factory settings

- Language
- Axes active (only with two-axes-version)
- Piece Counter program
- Auxiliary Counter
- Number of programs
- Next set stepping
- Options
- Operating modes
- PIN before Parameters
- Sequence of axes (only with two-axes-version)
- System equip

**NOTE!**
Setting the default parameters:
In the two-axis version, the default parameters for the I/O configuration are set depending on the active axes.

<table>
<thead>
<tr>
<th>Only X-axis active:</th>
<th>I/O configuration of the single-axis-version</th>
</tr>
</thead>
<tbody>
<tr>
<td>X- and Y-axis active:</td>
<td>I/O configuration of the two-axes-version</td>
</tr>
</tbody>
</table>

A detailed description of these parameters can be found on the next pages...
Language

- German
- English
- French
- Spanish
- Italian
- Polish
- Chinese

Axes active (only with two-axes-version)

- X-axis
- X-axis and Y-axis

Piece counter program

This parameter is used to set the mode of the piece counter during "program" operation.

- without: no piece counter activated
- decrementing: when position reached, piece counting is activated
- incrementing: piece counting is activated via external input

If the piece counter reaches zero, the output is adjusted for a time corresponding to the time stored in parameter system → system-times → piece counter prog. In addition a next program step can be activated (this depends on further parameters).

Auxiliary counter

This parameter determines if an additional counter is available.

- without auxiliary counter
- program
- auto-program

If a program counter is activated, it is possible to specify in the "program mode" how many times a program is to be run through. If the program counter reaches zero, a new value entry is forced (even if zero was entered).

With the function “auto program” the next position will be automatically hit after a piece counting pulse ("piece counter program" has to be configured decrementing).

Number of program blocks

- 1 = 1000 blocks
- 2 = 500 blocks
- 5 = 200 blocks
- 10 = 100 blocks
- 20 = 50 blocks
- 25 = 40 blocks
- 40 = 25 blocks
- 50 = 20 blocks
Next set stepping

The following options can be selected for “next set stepping”:

- without no next step setting activated
- quantity reached after expiration of the piece counter of the current set, the next set will be loaded
- quantity, set 1 same as “quantity reached”, additionally set 1 will be loaded after program end

Options

- without no options selected
- auxiliary function auxiliary functions activated
- value retract retract value activated

Operating modes

This parameter determines which modes are possible:

- single set
- single set + manual
- single set + program
- single set + manual + program

Pin before parameter

This parameter determines if the service/parameter-level can be achieved with or without password:

- off can be looked at without password, but cannot be changed
- on parameters can only be changed by using the password 250565.

Sequence of axis (only with two-axes-version)

This parameter determines in which sequence the axes are going to move:

- X-axis, Y-axis (Y-axis drives after X-axis)
- Y-axis, X-axis (X-axis drives after X-axis)
- X-axis + Y-axis (axes drive at the same time)

System equip

- off diverse parameters are turned off
- on
10.2 System: System-Times

**Setup**
Access to the system parameters

**System-Times**
Access to system parameters concerning times

**I/O-configuration**
Here the inputs and outputs can be assigned

**Default parameter**
Reset the parameters to factory settings

---

**Next set stepping**
This is the time setting in seconds (0.0 … 9.9) how long the controller should wait in the program-mode, with auxiliary counter “auto-program” until the next set is positioned.

**Clamping off**
If the function „clamping off“ is assigned to an output (system → I/O-configuration → output function), the controller is waiting between setting the output and the start of positioning, as well as between resetting the output (after completion of positioning) and the release of the next action for the specified time (0.0 … 9.9 s). This function is used to release (activate) e. g. a clamping system or brake right before (after) positioning.

**Edit-mode timeout** (no PIN necessary)
This is the time until exiting the input mode (0.0 … 9.9 s, default setting: 2.0 s)

**Piece counter program**
Here the time is defined in seconds (0.0 … 9.9), which presents the signal “quantity reached” in the program mode. If the values = 0, the output “quantity reached is set statically.

**Clamp auxiliary function**
If the program mode „next program step“ has been chosen and the parameter system → setup → options → auxiliary function setting is „on“, the auxiliary function outputs are hold for the defined time (0.0 … 9.9 in seconds). After this it is switched to the next set.
10.3 System: I/O Configuration

**Setup**
Access to the system parameters

**System-Times**
Access to system parameters concerning times

**I/O-configuration**
Here the inputs and outputs can be assigned

**Default parameter**
Reset the parameters to factory settings

---

### 10.3.1 Input Functions

**NOTE!**
For safety reasons (fail-safe), the logic default setting of the inputs „extern enable“, „external stop“ and „switch endpos min/max“, is “LOW active.”

**External enable**
The extern enable input is monitored during the positioning. If the input is activated, no positioning is possible respectively it will be cancelled with an error message.

**External start**
This input corresponds to the function of the button

**External stop**
This input corresponds to the function of the button

**Setting the reference**
If the parameter axis → X-/Y-axis → settings → reference mode is set to 2, 4, 6 or 8, the actual value can be calibrated by activating this input:

- Mode 2: Reference via external input (parameter axis → X-/Y-axis → distances → referenceval.)
- Mode 4: Reference via target value + ext. input (Reference value: set target value)
- Mode 6: Reference positive via external input
- Mode 8: Reference negative via external input
Incremental positioning negative

If this input is active, the incremental positioning is in negative direction, if incremental positioning is externally configured (parameter axis \( \rightarrow \) X-/Y-axis \( \rightarrow \) settings \( \rightarrow \) incremental positioning \( \rightarrow \) external).

Incremental positioning positive

If this input is active, the incremental positioning is in negative direction, if incremental positioning is externally configured (parameter axis \( \rightarrow \) X-/Y-axis \( \rightarrow \) settings \( \rightarrow \) incremental positioning \( \rightarrow \) external).

Retract function

The retract function will be started if the input is activated.

Piece counter

With every pulse at this input, the current quantity is increased or decreased by one piece.
Settings: parameter axis \( \rightarrow \) X-/Y-axis \( \rightarrow \) settings \( \rightarrow \) piece counter

- decrement
- decrement + stop
- increment
- increment/decrement

Switch endposition min/max

- switch end-pos. min
- switch end-pos. max

The switch end-position inputs are monitored during the positioning. If a switch end-position input is activated, no positioning in the corresponding direction is possible respectively the positioning will be cancelled.

Key manual mode <Axis +/->

If an input is assigned here, the corresponding axis can be positioned in the corresponding direction via an external key in the manual mode (joystick-function).

Tool offset

As long as this input is activated, the parameter axis \( \rightarrow \) X-/Y-axis \( \rightarrow \) distances \( \rightarrow \) toolcorrection will be added to the actual value.

Fix position

If the input is activated the axis moves to the fix position which is defined in parameter axis \( \rightarrow \) X-/Y-axis \( \rightarrow \) distances \( \rightarrow \) fixposition

Enable axis

The input is monitored during the positioning. If the input is activated, no more positioning is possible resp. the positioning is canceled and an error message is set.
10.3.2 Output Functions

**Position reached** (wiping / statically)

If 0.0 s is entered in **parameter axis → X-/Y-axis → times → pos. reached**, the output switches statically i.e. the output is active, after the target value has been reached. If a wiping time between 0.1 ... 99.9 s is entered, the output will be active until the entered wiping time has expired.

**Drive Signal**

The drive signal outputs are individually configurable via **parameter axis → X-/Y-axis → settings → drivesignals** (☞ 9.3).

**Control enable**

Before a positioning the signal control enable is set. After reaching the target position and only after expiration of the time in **parameter axis → X-/Y-axis → times → delay contr.enable**, the signal control enable is reset.

**Quantity reached** (wiping / statically)

If 0.0 s is entered in **parameter axis → X-/Y-axis → times → quantity reached**, the output is set statically when the quantity is reached. When pressing START, the output is reset. If a wiping time between 0.1 ... 99.9 s is entered, the output will be active until the entered wiping time has expired.

**Tolerance window <Axis>**

If the current actual position corresponds to the target value +/- the value entered in **parameter axis → X-/Y-axis → distances → tolerancewindow**, this output is set.

**Reference drive**

This output is set during a reference drive.

**Tool enable**

**In manual mode:** the output is set when changing into the manual mode and is reset during a positioning.

**In single and program mode:** the output is reset when changing in one of these modes and is set after each positioning. The output can be reset via STOP button.

**Program - end**

The output is set, after the program block with end marker has been processed. If „program” resp. „auto-program” has been selected in **system → setup → auxiliary counter**, the number of program sequences has to be reached additionally.
Auxiliary function

In the single and program mode these outputs are set according to the defined time in parameter system → system-times → clamp aux function

Clamping

This output is set before a positioning and is reset after a positioning (e.g. for a clamping system or in order to activate resp. release the brake). The corresponding time can be defined in parameter system → system-times → clamping off

All axes on position (only two-axis version)

If both current actual values correspond to the according target positions +/- the value entered in parameter axis → X-/Y-axis → distances → tolerance window, this output is set.

Retract s1 axis

This output is active during retract.

10.3.3 Input and Output Configuration

The inputs and outputs with their associated logic can be configured freely.

10.3.3.1 Linking of Inputs with Functions

Chapter 15 I/O Configuration Notation Table contains an overview of all functions which can be assigned to the inputs. After selecting a function via parameter system → I/O-configuration → input function by using the navigation buttons. The desired input for this function can be selected by pressing the ENTER button.

If a previously used input needs to be reset, the button can be used, to set the input to the “not used” state. Further it is possible to press the ENTER key repeatedly until “not-used” appears in the display. A multiple use of inputs is not possible here. If an input is already used, only the next free input can be chosen automatically.

<table>
<thead>
<tr>
<th>IN assignment</th>
<th>1/26</th>
</tr>
</thead>
<tbody>
<tr>
<td>switch endpos X-min</td>
<td>ST4 (S14) - P03</td>
</tr>
<tr>
<td>switch endpos X-max</td>
<td>not used</td>
</tr>
<tr>
<td>switch endpos Y-min</td>
<td>not used</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IN logic</th>
<th>1/26</th>
</tr>
</thead>
<tbody>
<tr>
<td>switch endpos X-min</td>
<td>low active</td>
</tr>
<tr>
<td>switch endpos X-max</td>
<td>low active</td>
</tr>
<tr>
<td>switch endpos Y-min</td>
<td>low active</td>
</tr>
</tbody>
</table>

Figure 13: Input assignment

10.3.3.2 Input Logic Assignment

After the inputs of the controller have been assigned with functions, parameter system → I/O-configuration → input logic can be used to determine whether the corresponding input function should be triggered to a logic HIGH level or a logic LOW level. The logic is assigned by selecting the corresponding function and pressing the ENTER button.
10.3.3.3 Linking of Outputs with Functions

Chapter 15 I/O Configuration Notation Table contains an overview of all functions which can be assigned to the inputs. After selecting a function via parameter system → I/O-configuration → output function by using the navigation buttons. The desired output for this function can be selected by pressing the ENTER button.

If a previously used output needs to be reset, the button can be used, to set the output to the “not used” state. Further it is possible to press the ENTER key repeatedly until “not-used” appears in the display. A multiple use of outputs is not possible here. If an input is already used, only the next free output can be chosen automatically.

<table>
<thead>
<tr>
<th>OUT assignment</th>
<th>1/23</th>
</tr>
</thead>
<tbody>
<tr>
<td>drive signal 1 X-axis</td>
<td>P03</td>
</tr>
<tr>
<td>ST5 (S11)</td>
<td></td>
</tr>
<tr>
<td>drive signal 2 X-axis</td>
<td>P04</td>
</tr>
<tr>
<td>ST5 (S11)</td>
<td></td>
</tr>
<tr>
<td>drive signal 3 X-axis</td>
<td>P05</td>
</tr>
<tr>
<td>ST5 (S11)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 14: Output assignment

10.3.3.4 Output-Logic Assignment

The outputs can also be assigned with an active HIGH or LOW logic depending on the selected output function. The setting follows the same procedure as already described in section 10.3.3.2 Input Logic.

<table>
<thead>
<tr>
<th>OUT logic</th>
<th>1/23</th>
</tr>
</thead>
<tbody>
<tr>
<td>drive signal 1 X-axis</td>
<td>high active</td>
</tr>
<tr>
<td>ST5 (S11)</td>
<td>P03</td>
</tr>
<tr>
<td>drive signal 2 X-axis</td>
<td>high active</td>
</tr>
<tr>
<td>ST5 (S11)</td>
<td>P04</td>
</tr>
<tr>
<td>drive signal 3 X-axis</td>
<td>high active</td>
</tr>
<tr>
<td>ST5 (S11)</td>
<td>P05</td>
</tr>
</tbody>
</table>

10.4 System: Default Parameters

With this parameter, the device can be reset to its factory settings (default parameters).

Possible key functions are:

- **F3** Cancel the operation
- **F2** The factory parameters are loaded immediately and then effective. All values and configurations previously stored in the controller are deleted / overwritten!

**WARNING!**

By loading the factory parameters, all individually configured or customer-specific parameter settings as well as assignments of the inputs and outputs are lost.

It is recommended to note the original settings on a sheet of paper before the control is reset. You can also use our note table for your individual I / O configuration (see chapter 15).
11 Password Menu

The password for the PIN query is entered in the **Password** menu.

The entered password must be confirmed by pressing button ← or F2.

<table>
<thead>
<tr>
<th>NOTE!</th>
</tr>
</thead>
<tbody>
<tr>
<td>The parameter level is saved by a password.</td>
</tr>
</tbody>
</table>

Required PIN CODE: **250565**

After entering the password / PIN code, all parameters can be edited.

12 Contrast Menu

This menu is used to adjust the contrast of the display.

The following buttons are used:

- Increase contrast
- Decrease contrast

Press ESC or ← to exit
13 Diagnosis / Error Messages Menu

13.1 Diagnosis

This menu contains a function to test the hardware and to display the current installed hard- and software version.

- Inputs
- Outputs
- Keypad
- Version/Info

13.2 Error Messages and Error Handling

The following table shows possible errors and their handling.

Table 1: Error Messages and Error Handling

<table>
<thead>
<tr>
<th>Error No.</th>
<th>Meaning</th>
<th>Possible causes and remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Hardware end switch minimum axis X active!</td>
<td>Check the signals/wires of the corresponding input or deactivate the according input function (☞ 10.3.3.1 Linking of Inputs with Functions).</td>
</tr>
<tr>
<td>02</td>
<td>Hardware end switch minimum axis X active!</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Hardware end switch minimum axis Y active!</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Hardware end switch maximum axis X active!</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>External stop on error active!</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>No enable!</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Software end position minimum axis X fell below!</td>
<td>Check the corresponding parameter or deactivate the according software end position (☞ 9.3 Parameter Axis: Settings).</td>
</tr>
<tr>
<td>08</td>
<td>Software end position minimum axis Y fell below!</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Software end position maximum axis X fell above!</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Software end position maximum axis Y fell above!</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>No measuring system axis X!</td>
<td>Check the according measuring system resp. the encoder signals/wires</td>
</tr>
<tr>
<td>14</td>
<td>No measuring system axis Y!</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Power failure. Switch on control again and check the axis-position</td>
<td>If the voltage drops below approx. 18 V, all axes are stopped, all outputs are set to 0, an error message occurs and the controller remains in a waiting state. The device can only be reactivated by re-applying the supply voltage.</td>
</tr>
<tr>
<td>18</td>
<td>Access denied</td>
<td>You have no authorisation to process this function or you have not entered a password (PIN), respectively the wrong one (☞ 11).</td>
</tr>
<tr>
<td>24</td>
<td>GFI structure</td>
<td>Internal error (please contact the manufacturer)</td>
</tr>
</tbody>
</table>

After troubleshooting, the following measures must be taken:

- See section ☞ 17.2 Re-start after Fault Clearance
14 Parameter Lists

14.1 Parameter Axis: Distances

Table 2: Axis parameter list: Distances

<table>
<thead>
<tr>
<th>Function</th>
<th>Range</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow forward</td>
<td>0.0 ... 9999.9 *</td>
<td>15.0</td>
</tr>
<tr>
<td>Creep forward</td>
<td>0.0 ... 9999.9 *</td>
<td>15.0</td>
</tr>
<tr>
<td>Correction stop forward</td>
<td>0.0 ... 9999.9 *</td>
<td>0.0</td>
</tr>
<tr>
<td>Slow backward</td>
<td>0.0 ... 9999.9 *</td>
<td>15.0</td>
</tr>
<tr>
<td>Creep backward</td>
<td>0.0 ... 9999.9 *</td>
<td>15.0</td>
</tr>
<tr>
<td>Correction stop backward</td>
<td>0.0 ... 9999.9 *</td>
<td>0.0</td>
</tr>
<tr>
<td>Tolerance window</td>
<td>0.0 ... 9999.9 *</td>
<td>0.0</td>
</tr>
<tr>
<td>Manipulation</td>
<td>0.0 ... 9999.9 *</td>
<td>0.0</td>
</tr>
<tr>
<td>Spindle compensation</td>
<td>0.0 ... 9999.9 *</td>
<td>5.0</td>
</tr>
<tr>
<td>Forced loop</td>
<td>0.0 ... 9999.9 *</td>
<td>1.0</td>
</tr>
<tr>
<td>Reference value</td>
<td>−9999.9 ... 9999.9 *</td>
<td>0.0</td>
</tr>
<tr>
<td>Retract length</td>
<td>0.0 ... 9999.9 *</td>
<td>5.0</td>
</tr>
<tr>
<td>End position min.</td>
<td>−999999.9 ... +999999.9 *</td>
<td>−2000.0</td>
</tr>
<tr>
<td>End position max.</td>
<td>−999999.9 ... +999999.9 *</td>
<td>+2000.0</td>
</tr>
<tr>
<td>Factor</td>
<td>0.0 ... 9.999999</td>
<td>0.100000</td>
</tr>
<tr>
<td>Displacement</td>
<td>−9999.9 ... +9999.9 *</td>
<td>0.0</td>
</tr>
<tr>
<td>Tool correction</td>
<td>0.0 ... 9999.9 *</td>
<td>0.0</td>
</tr>
<tr>
<td>Fix position</td>
<td>−9999.9 ... +9999.9 *</td>
<td>0.0</td>
</tr>
</tbody>
</table>

* = dependent on decimal point setting (particulars with 1/10)

14.2 Parameter Axis: Times

Table 3: Axis parameter list: Times

<table>
<thead>
<tr>
<th>Function</th>
<th>Range</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position reached</td>
<td>0.0 ... 99.9 [s]</td>
<td>1.0</td>
</tr>
<tr>
<td>Spindle compensation</td>
<td>0.0 ... 99.9 [s]</td>
<td>1.0</td>
</tr>
<tr>
<td>Manual change</td>
<td>0.0 ... 99.9 [s]</td>
<td>1.0</td>
</tr>
<tr>
<td>Monitoring</td>
<td>0.0 ... 99.9 [s]</td>
<td>0.0</td>
</tr>
<tr>
<td>Delay Control enable</td>
<td>0.0 ... 99.9 [s]</td>
<td>1.0</td>
</tr>
<tr>
<td>Start delay</td>
<td>0.0 ... 99.9 [s]</td>
<td>0.0</td>
</tr>
<tr>
<td>Shutdown control</td>
<td>0.0 ... 99.9 [s]</td>
<td>0.0</td>
</tr>
<tr>
<td>Retract time</td>
<td>0.0 ... 99.9 [s]</td>
<td>1.0</td>
</tr>
<tr>
<td>Delay retract time</td>
<td>0.0 ... 99.9 [s]</td>
<td>0.0</td>
</tr>
<tr>
<td>Reference time</td>
<td>0.0 ... 99.9 [s]</td>
<td>1.0</td>
</tr>
<tr>
<td>Quantity reached</td>
<td>0.0 ... 99.9 [s]</td>
<td>0.0</td>
</tr>
</tbody>
</table>
14.3 Parameter Axis: Analog - optional

Please note: The optional analog parameters are only displayed in the menu “axis parameter” if an analog or PID output has been previously assigned in the menu parameter axis → X-/Y-axis → settings → axis type to the corresponding axis (see 9.4 Parameter Axis: Analog - optional).

Table 4: List of analog parameters

<table>
<thead>
<tr>
<th>Function</th>
<th>Range</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Velocity</td>
<td>0 ... 9999 [U/min]</td>
<td>3000</td>
</tr>
<tr>
<td>Acceleration</td>
<td>0 ... 9999 [U/s²]</td>
<td>50</td>
</tr>
<tr>
<td>P-Portion</td>
<td>0 ... 99999</td>
<td>5</td>
</tr>
<tr>
<td>I-Portion</td>
<td>0 ... 99999</td>
<td>3</td>
</tr>
<tr>
<td>D- Position</td>
<td>0 ... 99999</td>
<td>1</td>
</tr>
<tr>
<td>I-Limit</td>
<td>0 ... 99999</td>
<td>10</td>
</tr>
<tr>
<td>Impulses encoder</td>
<td>0 ... 9999</td>
<td>360</td>
</tr>
<tr>
<td>Start mode</td>
<td>0, 1</td>
<td>1</td>
</tr>
<tr>
<td>Stop mode</td>
<td>0, 1, 2</td>
<td>1</td>
</tr>
<tr>
<td>Stop mode manual</td>
<td>0, 1, 2</td>
<td>1</td>
</tr>
<tr>
<td>Manual fast</td>
<td>0 ... 9999 [U/min]</td>
<td>2000</td>
</tr>
<tr>
<td>Manual slow</td>
<td>0 ... 9999 [U/min]</td>
<td>1000</td>
</tr>
<tr>
<td>v Reference mode 1</td>
<td>0 ... 9999 [U/min]</td>
<td>500</td>
</tr>
<tr>
<td>v Reference mode 2</td>
<td>0 ... 9999 [U/min]</td>
<td>250</td>
</tr>
<tr>
<td>U fast forward</td>
<td>0 ... 9.9 [Volt]</td>
<td>3.0</td>
</tr>
<tr>
<td>U slow forward</td>
<td>0 ... 9.9 [Volt]</td>
<td>2.0</td>
</tr>
<tr>
<td>U creep forward</td>
<td>0 ... 9.9 [Volt]</td>
<td>1.0</td>
</tr>
<tr>
<td>U fast backward</td>
<td>0 ... 9.9 [Volt]</td>
<td>−3.0</td>
</tr>
<tr>
<td>U slow backward</td>
<td>0 ... 9.9 [Volt]</td>
<td>−2.0</td>
</tr>
<tr>
<td>U creep backward</td>
<td>0 ... 9.9 [Volt]</td>
<td>−1.0</td>
</tr>
</tbody>
</table>

14.1 Parameter Axis: Measuring System - optional

This menu is used to calibrate the analog inputs, when analog measurement systems or sensors are used.

Please note: This menu contains optional parameters, which are only accessable if an analog measuring system has been assigned to the corresponding axis in parameter axis → X-/Y-axis → settings → axis type → IN (see 9.5 Parameter Axis: Measuring System - option).

Table 5: Calibration of analog Inputs

<table>
<thead>
<tr>
<th>Function</th>
<th>Range</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimum</td>
<td>angle, distance</td>
<td>−99999,9 ... +99999,9 [°, mm]</td>
</tr>
<tr>
<td>complies</td>
<td>transformer increment</td>
<td>0 ... 4095</td>
</tr>
<tr>
<td>maximum</td>
<td>angle, distance</td>
<td>−99999,9 ... +99999,9 [°, mm]</td>
</tr>
<tr>
<td>complies</td>
<td>transformer increment</td>
<td>0 ... 4095</td>
</tr>
</tbody>
</table>

- 48 -
## 14.2 Parameter Axis: Settings

<table>
<thead>
<tr>
<th>Function</th>
<th>Range</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axis type</td>
<td>Measuring system - - - drive outputs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Encoder - - - Digital</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Encoder - - - PID + Digital</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Analog - - - Digital</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Encoder - - - Analog+ Digital</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Analog - - - Analog + Digital</td>
<td></td>
</tr>
<tr>
<td>Button manual mode</td>
<td>normal, inverted, off</td>
<td>normal</td>
</tr>
<tr>
<td>Drive signal configuration</td>
<td>Mode 1, 2, 3, 4, 5, 6, 7, 8</td>
<td>Mode 2</td>
</tr>
<tr>
<td>Reference mode</td>
<td>Mode 1, 2, 3, 4, 5, 6, 7, 8</td>
<td>Mode 1</td>
</tr>
<tr>
<td>Spindle compensation mode</td>
<td>without</td>
<td>without</td>
</tr>
<tr>
<td></td>
<td>with spindle +/-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>forced loop +/-</td>
<td></td>
</tr>
<tr>
<td>Software end-position</td>
<td>both enabled</td>
<td>both enabled</td>
</tr>
<tr>
<td></td>
<td>negative disabled</td>
<td></td>
</tr>
<tr>
<td></td>
<td>positive disabled</td>
<td></td>
</tr>
<tr>
<td></td>
<td>both disabled</td>
<td></td>
</tr>
<tr>
<td>Hardware end-position</td>
<td>both enabled</td>
<td>both enabled</td>
</tr>
<tr>
<td></td>
<td>negative disabled</td>
<td></td>
</tr>
<tr>
<td></td>
<td>positive disabled</td>
<td></td>
</tr>
<tr>
<td></td>
<td>both disabled</td>
<td></td>
</tr>
<tr>
<td>Retract mode</td>
<td>Mode 1, 2, 3, 4, 5, 6, 7, 8, 9, 10</td>
<td>Modus 1</td>
</tr>
<tr>
<td>Error compensation</td>
<td>off/on</td>
<td>off</td>
</tr>
<tr>
<td>Piece counter</td>
<td>without</td>
<td>auto decrement</td>
</tr>
<tr>
<td></td>
<td>auto decrement + stop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>auto increment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>auto decrement / increment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>decrement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>decrement + stop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>increment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>decrement / increment</td>
<td></td>
</tr>
<tr>
<td>Incremental positioning</td>
<td>off/on</td>
<td>on</td>
</tr>
<tr>
<td>Decimal point</td>
<td>without, 1/10, 1/100, 1/1000</td>
<td>1/10</td>
</tr>
<tr>
<td>Display option manual</td>
<td>left-right</td>
<td>left-right</td>
</tr>
<tr>
<td></td>
<td>down-up</td>
<td></td>
</tr>
<tr>
<td></td>
<td>forward-backward</td>
<td></td>
</tr>
<tr>
<td>Unit</td>
<td>mm / inch / degree</td>
<td>mm</td>
</tr>
</tbody>
</table>
### 14.3 System: Setup

Table 7: List of system parameters: setup

<table>
<thead>
<tr>
<th>Function</th>
<th>Range</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>English / Francais / Castellano / Italiano / Polski / Chinese / Deutsch</td>
<td>English</td>
</tr>
<tr>
<td>Axes active (only with two-axes-version)</td>
<td>X-axis</td>
<td>X-axis + Y-axis</td>
</tr>
<tr>
<td></td>
<td>X-axis + Y-axis</td>
<td></td>
</tr>
<tr>
<td>Piece Counter program</td>
<td>decrement</td>
<td>auto decrement</td>
</tr>
<tr>
<td></td>
<td>without</td>
<td></td>
</tr>
<tr>
<td></td>
<td>auto decrement</td>
<td></td>
</tr>
<tr>
<td>Auxiliary Counter</td>
<td>without program</td>
<td>without</td>
</tr>
<tr>
<td></td>
<td>auto-program</td>
<td></td>
</tr>
<tr>
<td>Number of programs</td>
<td>1, 2, 5, 10, 20, 25, 40, 50</td>
<td>50</td>
</tr>
<tr>
<td>Next set stepping</td>
<td>without</td>
<td>quantity reaches</td>
</tr>
<tr>
<td></td>
<td>quantity reaches + set 1</td>
<td></td>
</tr>
<tr>
<td>Options</td>
<td>without / auxiliary function / value retract</td>
<td>without</td>
</tr>
<tr>
<td>Operating modes</td>
<td>single</td>
<td>single + manual + program</td>
</tr>
<tr>
<td></td>
<td>single + manual</td>
<td></td>
</tr>
<tr>
<td></td>
<td>single + program</td>
<td></td>
</tr>
<tr>
<td></td>
<td>single + manual + program</td>
<td></td>
</tr>
<tr>
<td>PIN before Parameter</td>
<td>off/on</td>
<td>off</td>
</tr>
<tr>
<td>Sequence of axis (only two-axis version)</td>
<td>X-axis, Y-axis</td>
<td>X-axis, Y-axis</td>
</tr>
<tr>
<td></td>
<td>Y-axis, X-axis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X-axis + Y-axis</td>
<td></td>
</tr>
<tr>
<td>System equip</td>
<td>off/on</td>
<td>on</td>
</tr>
</tbody>
</table>

### 14.4 System: Times

Table 8: List of system parameters: times

<table>
<thead>
<tr>
<th>Function</th>
<th>Range</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next set stepping</td>
<td>0.0 … 9.9 [s]</td>
<td>0.0</td>
</tr>
<tr>
<td>Clamping off</td>
<td>0.0 … 9.9 [s]</td>
<td>0.0</td>
</tr>
<tr>
<td>Edit-mode timeout</td>
<td>0.0 … 9.9 [s]</td>
<td>2.0</td>
</tr>
<tr>
<td>Piece counter program</td>
<td>0.0 … 9.9 [s]</td>
<td>0.0</td>
</tr>
<tr>
<td>Clamp auxiliary function</td>
<td>0.0 … 9.9 [s]</td>
<td>0.0</td>
</tr>
</tbody>
</table>
15 I/O Configuration Notation Tables

The following tables are used to note an individual input and output configuration:

Table 9: Notation table for input configurations

<table>
<thead>
<tr>
<th>Function</th>
<th>ST3</th>
<th>ST4 (with option 16 I/O configurable)</th>
<th>Logik</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Switch endpos X-min</td>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch endpos X-max</td>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch endpos Y-min</td>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch endpos Y-max</td>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retract X-axis</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retract Y-axis</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference X-axis</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference Y-axis</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extern enable</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extern Start</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extern Stop</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piece counter X</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displacement X</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displacement Y</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Button manual X+</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Button manual X-</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Button manual Y+</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Button manual Y-</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fix position X</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fix position Y</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start X-axis</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start Y-axis</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enable X-axis</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enable Y-axis</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch endpos X-min</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch endpos X-max</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch endpos Y-min</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch endpos Y-max</td>
<td>H</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

"L" corresponds to input "LOW active", "H" corresponds to input "HIGH active"
Table 10: Notation table for output configurations

<table>
<thead>
<tr>
<th>Function</th>
<th>Output</th>
<th>ST5</th>
<th>ST6 (with option 16 I/O configurable)</th>
<th>Logic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive signal 1 X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Drive signal 2 X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Drive signal 3 X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Drive signal 4 X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Drive signal 1 Y-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Drive signal 2 Y-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Drive signal 3 Y-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Drive signal 4 Y-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Control enable X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Control enable Y-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Position reached X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Position reached Y-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Tolerance zone X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Tolerance zone Y-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Reference drive X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Reference drive Y-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Quantity reached</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>All axis in position</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Tool enable</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Program-end</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Clamping</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Retract s1 X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Retract s1 Y-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Drive signal 1 X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Drive signal 2 X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Drive signal 3 X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Drive signal 4 X-axis</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
</tbody>
</table>

"L" corresponds to input "LOW active", "H" corresponds to input "HIGH active"
16 Connections

16.1 Plug Arrangement

Figure 15: Plug arrangement

<table>
<thead>
<tr>
<th>Plug No.</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST1</td>
<td>Measuring system connection</td>
</tr>
<tr>
<td>ST2</td>
<td>Measuring system connection (only at 2-axes-version)</td>
</tr>
<tr>
<td>ST3/ST4</td>
<td>Digital inputs</td>
</tr>
<tr>
<td>ST5/ST6</td>
<td>Digital outputs</td>
</tr>
<tr>
<td>ST7</td>
<td>Analog output (PID)</td>
</tr>
<tr>
<td>ST8</td>
<td>Analog output 2 (PID) (only at 2-axes-version)</td>
</tr>
<tr>
<td>ST9</td>
<td>Voltage supply</td>
</tr>
<tr>
<td>MCC1</td>
<td>Control signal 1 (PID)*</td>
</tr>
<tr>
<td>MCC2</td>
<td>Control signal 2 (PID)* (only 2-axis version)</td>
</tr>
<tr>
<td>S12</td>
<td>PC interface (RS232)</td>
</tr>
</tbody>
</table>

*) e.g. combined with Motor Drive Controller P100 MCC

NOTE!
The analog output is only available if this option has been ordered.
See section ⇒ 18 Type Designation ⇒ Option “Analog output 1 or 2”.

The End
16.2 Pin Assignment

(default assignment – factory settings)

Table 11: Measuring system connections

<table>
<thead>
<tr>
<th>ST1</th>
<th>Incremental Measuring System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 V / GND</td>
</tr>
<tr>
<td>2</td>
<td>+ 24 VDC out (optionally 5 VDC)</td>
</tr>
<tr>
<td>3</td>
<td>Channel A</td>
</tr>
<tr>
<td>4</td>
<td>Channel B</td>
</tr>
<tr>
<td>5</td>
<td>PE</td>
</tr>
<tr>
<td>6</td>
<td>Channel A’</td>
</tr>
<tr>
<td>7</td>
<td>Channel B’</td>
</tr>
<tr>
<td>8</td>
<td>Channel Z (index pulse)</td>
</tr>
<tr>
<td>9</td>
<td>Channel Z’ (index pulse)</td>
</tr>
</tbody>
</table>

Table 12: Input connections

<table>
<thead>
<tr>
<th>ST3</th>
<th>Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 V / GND</td>
</tr>
<tr>
<td>2</td>
<td>+ 24 VDC out</td>
</tr>
<tr>
<td>3</td>
<td>Start</td>
</tr>
<tr>
<td>4</td>
<td>Stop</td>
</tr>
<tr>
<td>5</td>
<td>Reference</td>
</tr>
<tr>
<td>6</td>
<td>Piece counter</td>
</tr>
<tr>
<td>7</td>
<td>Retract</td>
</tr>
<tr>
<td>8</td>
<td>End min</td>
</tr>
<tr>
<td>9</td>
<td>End max</td>
</tr>
<tr>
<td>10</td>
<td>Displacement</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ST4</th>
<th>Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 V / GND</td>
</tr>
<tr>
<td>2</td>
<td>+ 24 VDC out</td>
</tr>
<tr>
<td>3</td>
<td>NC</td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
</tr>
<tr>
<td>5</td>
<td>Reference Y</td>
</tr>
<tr>
<td>6</td>
<td>NC</td>
</tr>
<tr>
<td>7</td>
<td>Retract Y</td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
</tr>
<tr>
<td>9</td>
<td>End max Y</td>
</tr>
<tr>
<td>10</td>
<td>NC</td>
</tr>
</tbody>
</table>

Table 13: Output connections

<table>
<thead>
<tr>
<th>ST5</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 V / GND</td>
</tr>
<tr>
<td>2</td>
<td>+ 24 VDC out</td>
</tr>
<tr>
<td>3</td>
<td>Drive signal 1 X</td>
</tr>
<tr>
<td>4</td>
<td>Drive signal 2 X</td>
</tr>
<tr>
<td>5</td>
<td>Drive signal 3 X</td>
</tr>
<tr>
<td>6</td>
<td>Drive signal 4 X</td>
</tr>
<tr>
<td>7</td>
<td>Position reached X</td>
</tr>
<tr>
<td>8</td>
<td>Quantity reached X</td>
</tr>
<tr>
<td>9</td>
<td>Control enable X</td>
</tr>
<tr>
<td>10</td>
<td>Tolerance window X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ST6</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 V / GND</td>
</tr>
<tr>
<td>2</td>
<td>+ 24 VDC out</td>
</tr>
<tr>
<td>3</td>
<td>Auxiliary function 1 Drive signal 1 Y</td>
</tr>
<tr>
<td>4</td>
<td>Auxiliary function 2 Drive signal 2 Y</td>
</tr>
<tr>
<td>5</td>
<td>Auxiliary function 3 Drive signal 3 Y</td>
</tr>
<tr>
<td>6</td>
<td>Auxiliary function 4 Drive signal 4 Y</td>
</tr>
<tr>
<td>7</td>
<td>Reference runs Position reached Y</td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
</tr>
<tr>
<td>9</td>
<td>NC</td>
</tr>
<tr>
<td>10</td>
<td>NC</td>
</tr>
</tbody>
</table>
### Table 14: Analog / PID output connections

<table>
<thead>
<tr>
<th>ST7/8</th>
<th>Analog output / PID output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 V / GND</td>
</tr>
<tr>
<td>2</td>
<td>Analog out</td>
</tr>
<tr>
<td>3</td>
<td>PE</td>
</tr>
</tbody>
</table>

### Table 15: Power supply connections

<table>
<thead>
<tr>
<th>ST9</th>
<th>Power Supply input</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 V / GND</td>
</tr>
<tr>
<td>2</td>
<td>+ 24 VDC</td>
</tr>
<tr>
<td>3</td>
<td>PE</td>
</tr>
</tbody>
</table>

### Table 16: Analog output / motor drive controller MCC

<table>
<thead>
<tr>
<th>MCC1</th>
<th>Analog out / Motor Drive Controller MCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control enable or CAN L (J1)</td>
</tr>
<tr>
<td>2</td>
<td>NC or CAN H (R1)</td>
</tr>
<tr>
<td>3</td>
<td>Encoder A</td>
</tr>
<tr>
<td>4</td>
<td>Encoder B</td>
</tr>
<tr>
<td>5</td>
<td>Encoder A’</td>
</tr>
<tr>
<td>6</td>
<td>Encoder B’</td>
</tr>
<tr>
<td>7</td>
<td>Target value analog</td>
</tr>
<tr>
<td>8</td>
<td>0 V / GND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MCC2</th>
<th>Analog out / Motor Drive Controller MCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control enable or CAN L (J2)</td>
</tr>
<tr>
<td>2</td>
<td>NC or CAN H (R2)</td>
</tr>
<tr>
<td>3</td>
<td>Encoder A</td>
</tr>
<tr>
<td>4</td>
<td>Encoder B</td>
</tr>
<tr>
<td>5</td>
<td>Encoder A’</td>
</tr>
<tr>
<td>6</td>
<td>Encoder B’</td>
</tr>
<tr>
<td>7</td>
<td>Target value analog</td>
</tr>
<tr>
<td>8</td>
<td>0 V / GND</td>
</tr>
</tbody>
</table>

**NOTE!**

At the RJ45 socket ST12 (serial RS232 PC interface) no wiring is required. A suitable interface cable is available as accessorial part (see Accessories).
16.3 Connection Example Diagram

![Connection Example Diagram](image)

Figure 16: Connection example diagram
17 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 17.1. 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).

17.1 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 through 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. Do not connect protective earth and ground
5. Connect a mains filter ahead of the external power pack

17.2 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 5.

**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
17.3 Maintenance
The device is maintenance-free.

WARNING!
Danger through non-conventional maintenance!

Non-conventional maintenance can lead to severe injuries and damage of property.

Therefore:
Maintenance works may only be completed by staff that has been authorized and trained by the operator.

17.4 Cleaning

WARNING!
The device can only be cleaned with a damp cloth, do not use aggressive cleanser!
18 Type Designation

Device Designation:  
P40 = Position Controller for 1 or 2 axes

Version:  
000 = standard version  
001 = first special version  
002 = second special version (etc.)

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 / HTL, 100 kHz²  
+ 1 analog input 3.3 V supply / 0 ... (customer specified)

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 outputs⁵

Restrictions:  
¹ for special applications (e. g. as auxiliary axis)  
² for special applications, analog inputs only for and on plug 2. Axis  
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 “-“.

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

The following table shows the available accessories as well as the respective order designation:

<table>
<thead>
<tr>
<th>Order designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG 13.0</td>
<td>Power pack for AC-supply (primary: 115/230 VAC, secondary: 24 VDC/600 mA)</td>
</tr>
<tr>
<td>RP8K</td>
<td>Relay card with 4 shutter relays and 4 changeover relays (28 VDC/250 VAC / 12 A)</td>
</tr>
<tr>
<td>P40 Interface Cable</td>
<td>Interface cable for PC connection (with RJ45 connector and female 9-pin SUB-D)</td>
</tr>
</tbody>
</table>
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