Device description for 1-axis positioning control PS711

Hardware version PS711_01

Software version PS711 V3.2

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content

1. Safety and security

These operating instructions contain instructions which should enable safe and proper installation and operation. Should difficulties arise which cannot be solved with the help of the operating instructions, further information should be obtained from the machine manufacturer or supplier.

HEJM Automatisierungstechnik GmbH is not liable for any personal injury or damage to property caused by improper commissioning, incorrect operation, misunderstandings or errors within this description or on the device.

HEJM Automatisierungstechnik GmbH reserves the right to make technical changes to the device or the operating instructions without prior notice. Therefore, deviations in the agreement between the device and the device description cannot be excluded.

Special attention must be paid to hazard warnings in these operating instructions.

This device description must be read carefully before initial operation.

The use of the operating instructions requires a corresponding qualification of the user.

1.1 Qualified personnel

Commissioning, installation and operation may only be carried out by suitably qualified personnel. The staff must have a qualification commensurate with their function and activity, e.g:

- Instruction and obligation to comply with all operational, regional and internal regulations and requirements.
- Training in the use and maintenance of appropriate safety and occupational safety equipment in accordance with safety engineering standards.
- Training in first aid, etc.

1.2 Intended Use

The device has been developed exclusively for use on industrial machines.

Any use beyond this is considered improper use. The manufacturer is not liable for any resulting damage. The risk is borne solely by the user.

1.3 Safety instructions

The following symbols for hazards and particularly important notes are used in the device description:

The **hazard** symbol warns of errors and dangers during commissioning and operation of the display. This warning signifies an imminent danger to the health of persons and contains special information and instructions as well as commandments and prohibitions for the prevention of personal injury or damage to property.

The **Attention** symbol indicates a potentially dangerous situation and contains special information and instructions as well as commandments and prohibitions for the prevention of injury and damage.

The **Note** symbol indicates important and useful information and application tips.

1.4 Safety precautions

The device is operated with 24V, respectively 24V and 48V power supply, and must be fused according to the applicable regulations.

1.5 Warranty and terms of delivery

Only the common conditions of supply for manufactures and services of the electrical industry are applied.

The warranty period is 2 years.

2. Technical data

power supply (electronics)	24 V DC +/-10%,
current consumption	
Display	4.3" TFT display
	widescreen
input signals	14 inputs
	0 – 5 V active low10 - 30 V active high
measurement system	2x incremental measuring system
	Tracks: A; B; Z Supply voltage 24V
	max. 100mA
	250Khz
	1x Incremental measuring system
	Tracks: A, B or digital inputs Power supply 24V,
	max. 100mA
	20Khz
output signals	**For version without output stage:**
	14x output driver 24V, 700 mA
	1x analog output +/-10V (option)
	For version with output stage:
	9x output driver 24V, 700 mA
Output stage (option)	1x full bridge for brushless/brushed DC motors
	Power supply 24-50V DC
	Maximum continuous current 6A
	Maximum peak current (8A)
Interface	2x RS232
(option)	1x CAN (Can Open DS301 Master/Slave)
	USB Host/Device

operating temperature	0-40°C
storage temperature	-20 – 70°C
air humidity	Max 90% non-condensing
mounting position	Any
degree of protection	IP40
Dimensions (mm)	125mmx155mmx80mm

3. Commissioning

Most equipment damage occurs due to faulty wiring and incorrect parameter values. Therefore, commissioning must only be carried out by trained and competent personnel.

3.1 Connection

The device is operated at 24V or 24 to 50V DC with optional output stage.

Before connection, it is essential to compare the nameplate on the back of the device with the desired supply voltage.

Electrical cables must be laid in accordance with the relevant local regulations (e.g. VDE). Measuring, signal and mains cables must be laid separately from each other.

It is recommended to use a shielded cable which should be connected with the ground of the device.

Ensure that no ground loops occur.

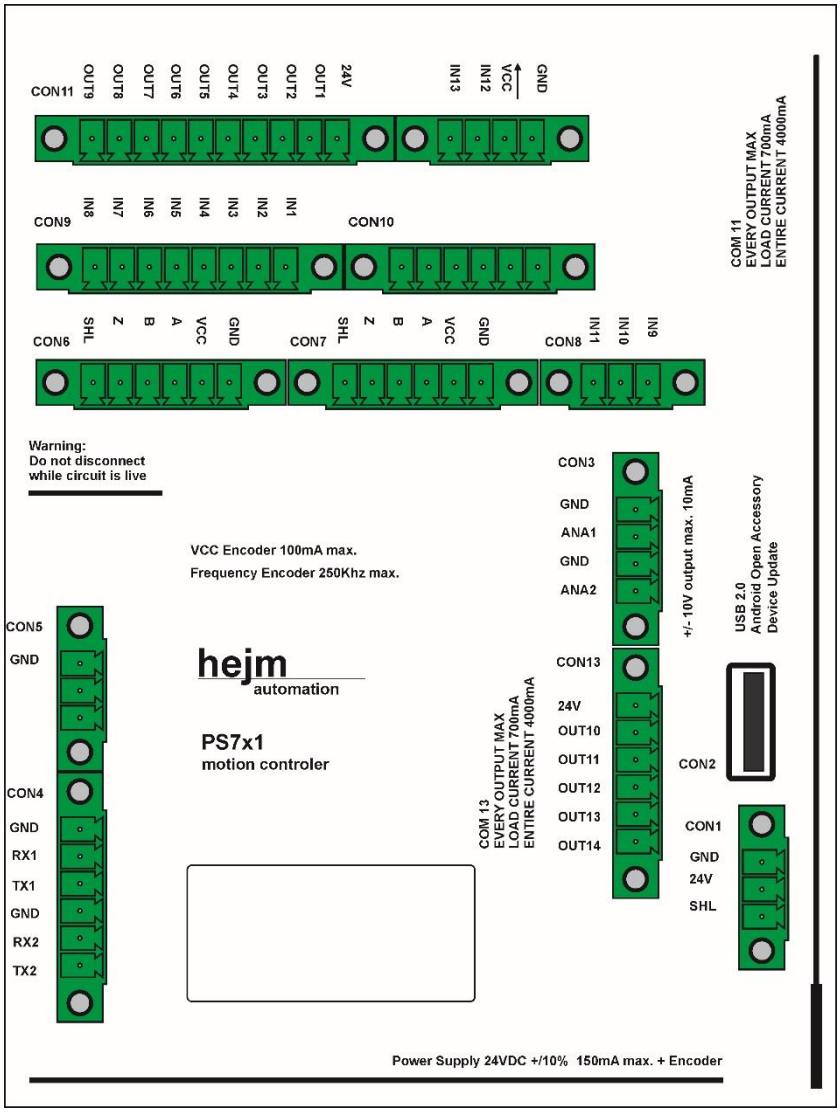


Fig. 1 Wiring diagram

Connector and pin assignment

Only connect the power supply according to the nameplate on the device!

CON1	Power supply (+24V)
	Terminal strip 3 pole
Pin 1	GND
Pin 2	+24V
Pin 3	GND

CON2	USB 2.0

CON3	analog output (Only for version without output stage)
	Terminal strip 4 poles
Pin 1	GND
Pin 2	Analog output 1
Pin 3	GND
Pin 4	Analog output 2, for axis 1

CON4	RS232
	Terminal strip 6 pole
Pin 1	GND
Pin 2	RxD, serial interface 1
Pin 3	TxD, serial interface 1
Pin 4	GND
Pin 5	RxD, serial interface 2
Pin 6	TxD, serial interface 2

CON5	RS485 or input 14
	Terminal strip 3 pole
Pin 1	GND
Pin 2	Data A, when using the RS485 interface, or 24V output when using input 14
Pin 3	Data B, when using the RS485 interface, or input 14 when using the switching input

CON6	Measuring system input axis 1
	Terminal strip 6 pole
Pin 1	GND
Pin 2	+24V Measuring system supply
Pin 3	Signal A
Pin 4	Signal B
Pin 5	Signal Z
Pin 6	Connection for shield (GND)

CON7	Measuring system input axis 2 resp. input 15,16,17
	Terminal strip 6-pole
Pin 1	GND
Pin 2	+24V Measuring system supply or auxiliary voltage for switching inputs
Pin 3	Signal A, when used as measuring system, or input 15 when used as switching input
Pin 4	Signal B, when used as measuring system, or input 16 when used as switching input
Pin 5	Signal Z, when used as measuring system, or input 17 when used as switching input
Pin 6	Connection for shield (GND)

CON8	Digital inputs
	Terminal strip 3 pole
Pin 1	Servo-, frequency inverter reports error
Pin 2	Positioning Release
Pin 3	Input 11, for extensions

CON9	Digital inputs
	Terminal strip 8 pole
Pin 1	Emergency stop (digital)
Pin 2	Quantity counter
Pin 3	Operating hours counter
Pin 4	Protective cover/door etc.
Pin 5	Start
Pin 6	Stop
Pin 7	Limit switch positive direction
Pin 8	Limit switch negative direction

CON10	CAN (option)
	Terminal strip 4 poles
Pin 1	GND
Pin 2	CANH
Pin 3	CANL
Pin 4	GND
Pin 5	CANH
Pin 6	CANL

CON11	Digital outputs
	Terminal strip 10 pole
Pin 1	Supply of the outputs (24V)
Pin 2	Clamping (output 1)
Pin 3	Controller enable (output 2)
Pin 4	Position Ok (output 3)
Pin 5	Quantity Ok (output 4)
Pin 6	Program Ok (output 5)
Pin 7	NC, not assigned (output 6)
Pin 8	Auxiliary output 1 (output 7)
Pin 9	Auxiliary output 2 (output 8)
Pin 10	Auxiliary output 3 (output 9)

CON12	Measuring system input axis 3 or input 12,13
	Terminal strip 4 poles
Pin 1	GND
Pin 2	+24V Measuring system supply or auxiliary voltage for switching inputs
Pin 3	Signal A, when used as measuring system, or input 12 when used as switching input
Pin 4	Signal B , when used as measuring system, or input 13 when used as switching input

CON13	Digital outputs (Only for version without output stage)
	Terminal strip 6 pole
Pin 1	Supply of the outputs (24V)
Pin 2	Auxiliary output 4 (output 10)
Pin 3	Auxiliary output 5 (output 11)
Pin 4	Auxiliary output 6 (output 12)
Pin 5	Auxiliary output 7 (output 13)
Pin 6	Auxiliary output 8 (output 14)

When the device is used as a switch- off positioning controller, Con 13, pin 3 to pin 6 are used as speed signals.
These can differ due to the settings made in parameter P77 (axis).
Please refer to chapter 7.2, switch-off positioning.

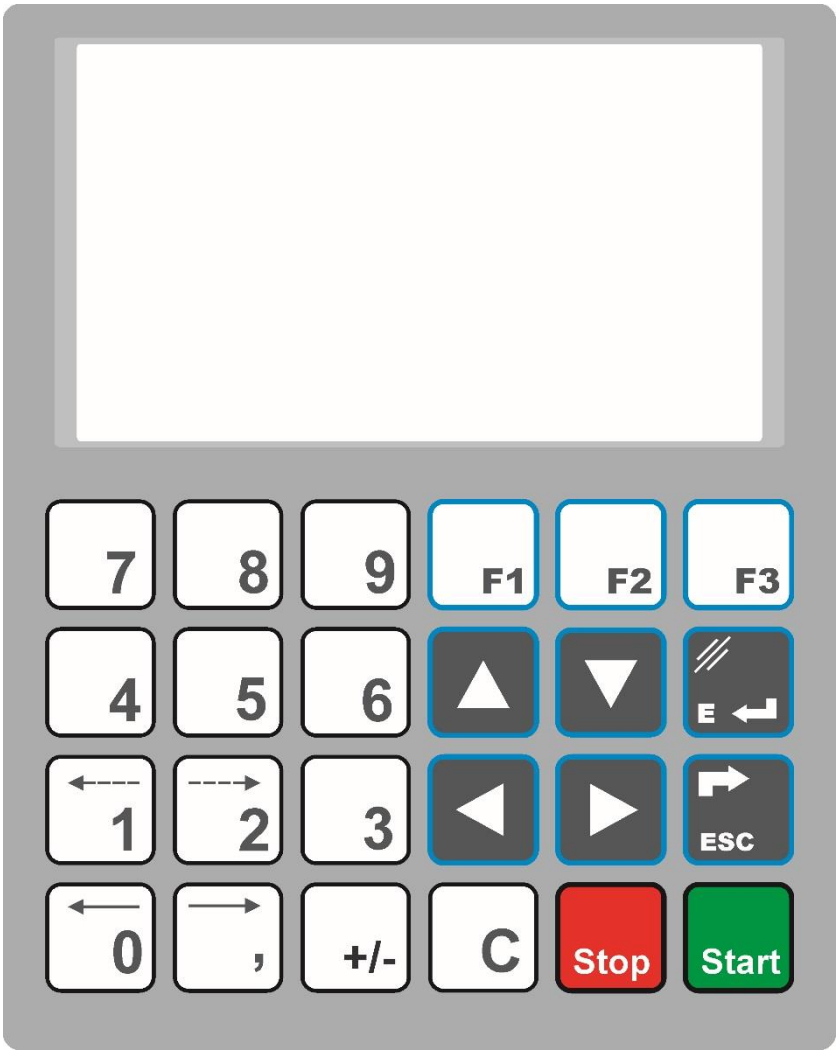
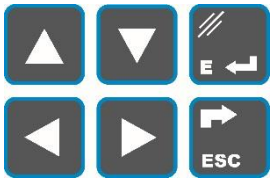


Fig. 2 Front panel PS711

4. Operation

4.1 Key functions

4.1.1 Navigation



Use the 

key to exit the display or the currently selected menu item.

Pressing the 

key always jumps back one menu level or cancels the currently active function.

In the menu level, the 

key is used to confirm the current menu item, which calls up the next menu level.

In the parameter level, the current parameter is loaded by pressing the key and can then be edited. 

After entering a parameter or calibration value, the 

key must always be pressed to confirm and save the edited value.

If a display field has been selected via the cursor, its function can be activated via the 

key.

4.2 Menu structure

The menu structure of the device is divided into several menu levels.

The  keys are used to select the individual menu items.

The selected menu item is called up by pressing the  key.

Exit again by pressing the  key.

Fig. 3 Start menu

Manual operation Single block Program Service

5. Service level

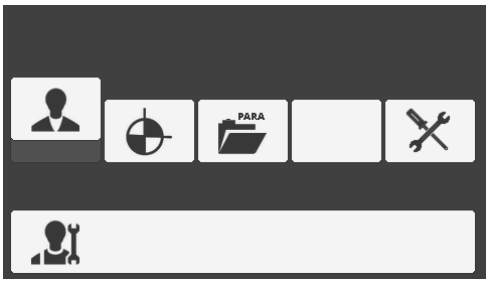


Fig. 4 Service level

In the service level, the menu items **Operator parameters**, **Referencing**, **Parameter level** and **Commissioning can** be selected.

After selecting the level with  confirm with  , the new level is selected.

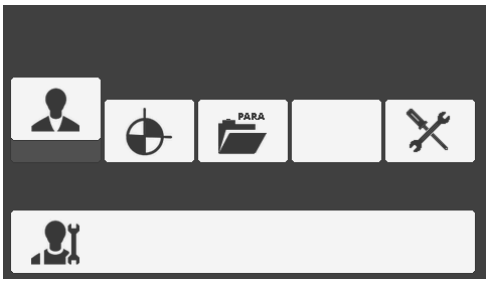
Fig. 5 Operator parameters

Fig. 6 Referencing

Fig. 7 Parameter level

Fig. 8 Commissioning

5.1 Operator parameters



The menu item **Operator parameters** does not have password protection. These parameters can be changed and set by the operator.

See Parameter level for operation

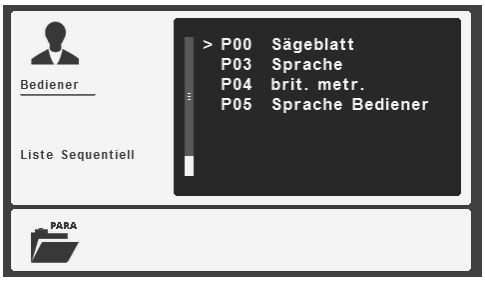


Fig. 9 Operator parameters

5.2 Reference

The axis can be referenced under the menu item **Reference.**

Fig. 10 Referencing

Enter the desired reference value with the numeric keyboard and reference  with .

5.3 Parameter level

The menu item **Parameter level** contains the selection for axis and device parameters.

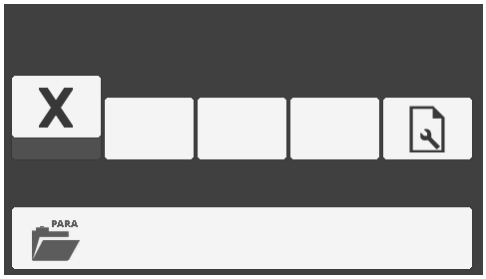


Fig. 11 Parameter level

Use the keys to select the parameter level and confirm with .

Fig. 12 Parameter list

The symbol at the top left indicates the current parameter level.

The existing parameters are displayed in the parameter list.

The cursor can be moved up and down using the keys to select a parameter.

Parameters that have already been changed or do not correspond to the factory setting are displayed with a blue background in the parameter list. Use to select the parameter.

There are two types of parameters.

1. parameter with decimal value input

Fig. 13 Parameter with decimal value input

Enter the value using the numeric keyboard. The decimal point is static. The value is shifted over the decimal point. Press  to save the value. Afterwards the  keys can be used to switch directly to the next parameter.

2. parameter with multiple choice selection

Fig. 14 Parameters with multiple choice selection

The desired setting can be selected with the  keys and saved with  .

Changes to the parameter settings can lead to malfunctions or to standstill or failure. Therefore, changes to the parameter settings must only be carried out by qualified personnel.

The parameters can be protected by a security code to prevent unintentional changes.

This can be selected by the machine manufacturer himself.

5.4 Commissioning

The menu item **Information** contains information about the device, the software and the operating hours.

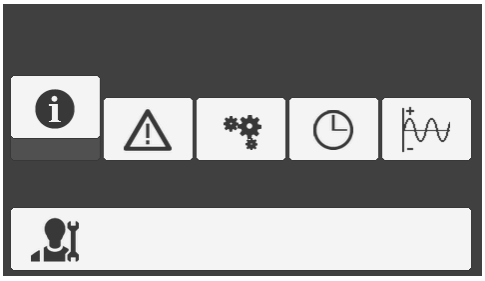


Fig. 15 Commissioning Selection

The menu items **Information**, **Error messages**, **Commissioning I/O, Operating hour counter** and **Analog calibration** can be selected in the commissioning level.

After selecting the level with  and confirming with  , the new level is selected.

Fig. 16 Information

Fig. 17 Error messages

Fig. 18 Commissioning EA

Fig. 19 Operating hour counter

Fig. 20 Analog calibration

5.4.1 Information

Various hardware and software information are displayed here.

Fig. 21 Device information

5.4.2 Error messages

Error messages are stored in a non-volatile memory.

The last 80 errors that occurred are stored in a list.

The current error is displayed in orange.

After pressing the key C and entering the security code, the messages are deleted.

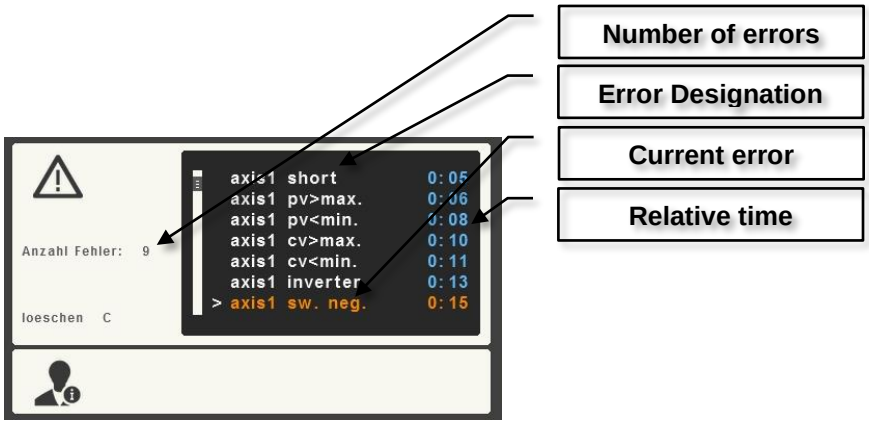


Fig. 22 Error messages

Number of errors = max. 80

Error Designation

- axis1 limit neg. End position direction negative values
- axis1 limit pos. End position direction positive values
- axis1 encoder Measuring system Error
- axis1 current Overcurrent
- axis1 short Output stage reports short circuit
- axis1 pv<min Motor voltage<24V
- axis1 pv> max Motor voltage>60V
- main cv<min Supply voltage<21V
- main cv> max Supply voltage>29V
- inverter External controller reports error

5.4.3 Commissioning I/O

The states of the digital and analog inputs and outputs are displayed here.

Select with

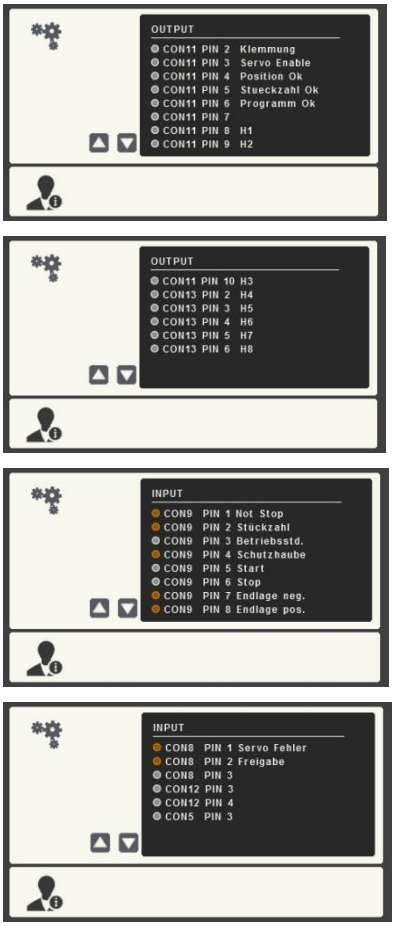


Fig. 23 Commissioning IOs

Display for analog and switch-off positioning

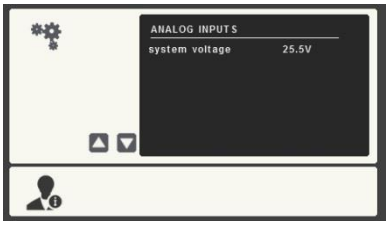


Fig. 24 Commissioning analogue

Display during operation with output stage

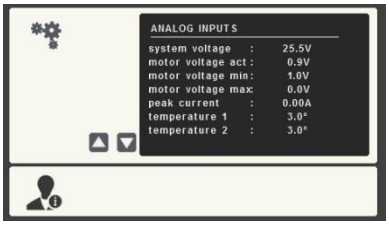


Fig. 25 Commissioning power stage

5.4.4 Operating hours counter

Fig. 26 Operating hour counter

The operating hours of the tool can be set to 0 with the key. C

5.4.5 Analog output calibration

Here the offset and the amplification of the respective analog output are set.

Fig. 27 Analog output selection

The keys ◀ ▶ can be used to toggle between analog output 1 and analog output 2.

The keys ▲ ▼ can be used to switch between the selection of the analog outputs and the respective values of the analog outputs. For each analog output there is an offset value and an amplification value.

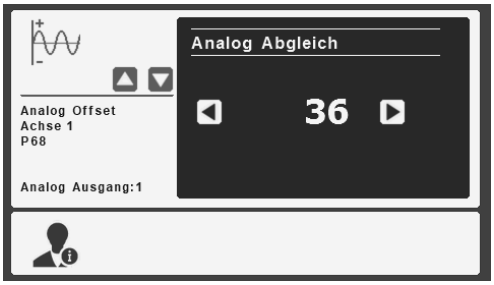


Fig. 28 Analog offset

Fig. 29 Analog gain

If the analog offset or the gain is set, the respective values can be incremented or decremented via the keys.

6. Parameter

When changing control and adjustment parameters, the effects on the overall system must be taken into account.

The parameters can be protected by a security code to prevent unintentional changes.

This can be selected by the machine manufacturer himself.

Changes to the parameter settings can lead to malfunctions up to standstill or failure. Therefore, changes to the parameter settings must only be carried out by qualified personnel.

6.1 Description

The parameters listed below are all according to the following pattern

Parameter number Designation [Unit/ minimum, maximum value]
Parameter description

Parameters in which P05 is entered as the unit refer to the unit defined in parameter P05.

6.2 General devices Parameters

P09 *Variable Icons [Enable/ Disable, Logo + Icons]*

discontinuation	function
Off	The icons or logo previously loaded via USB sticks are not displayed.
logo	Only the previously loaded logo is displayed.

P10 *Style [Display/ Default, User]*

discontinuation	function
Standard	The factory-set surfaces are displayed.
User	The user-defined interfaces are displayed.

P11 - P20 are described in chapter 8 Personalization.

P21 *Code Parameter [6 Decimal number/ 0-999999]*

The parameter values can be protected against overwriting by entering a code.

The input of parameter values is then only possible after this code has been entered

If 0 is entered, the lock is switched off.

General devices Parameters

P22 *Code Reference [6 Decimal number/ 0-999999]*

Referencing can be locked by entering a code.

The referencing is then only possible after this code has been entered.

If 0 is entered, the lock is switched off.

P23 *Code Program [6 Decimal number / 0-999999]*

The programs can be protected against overwriting by entering a code.

The input of programs is then only possible after this code has been entered.

If 0 is entered, the lock is switched off.

P36 *Time delay for new positioning [s/ 0.00, 10.00]*

With this parameter, the positioning process in automatic mode can be delayed by the set time.

General devices Parameters

P37 *Wipe time for position reached [s/ 0.00, 10.00]*

Here the wipe time of the position reached output can be set. If the parameter is set to 0, the output switches statically.

P38 *Wipe time for piece count reached [s/ 0.00, 10.. 0]*

The output Number of pieces reached is set for the time set here, if number of pieces 0 appears in the number of pieces window. If P38 is set to 0, the function is deactivated.

P39 *Wipe time for end of program [s/ 0.00, 10.00]*

The output Program end is active for the set time when the program has been executed. If P39 is set to 0, the function is deactivated.

P40 *Control function [Binary/ 0000 0000, 0001 1111]*

This control register is used to activate or deactivate additional functions.
A 1 means active, a 0 means inactive.
The settings can also be combined at will.

discontinuation	function
0000 0000	No additional function active
0000 0001	Absolute - incremental dimension change active
0000 0010	The auxiliary outputs described in P51 are activated in single-block mode.
0000 0100	The auxiliary outputs described in P52 can be activated via the F1 key.
0000 1000	The auxiliary outputs described in P53 can be activated by pressing the F2 key.
0001 0000	The auxiliary outputs described in P54 can be activated by pressing the F3 key.

General devices Parameters

P49 *Duration test [Off,On]*

If this parameter is set to "On", a processed program starts again from the beginning.

P51 *Single Function [Binary, 0000 0000, 1111 1111]*

As soon as the user changes to the single block, the output combination of the auxiliary outputs stored in parameter P51 becomes active and is deleted again when the user exits. This function must first be enabled in P40 of the device level.

Any combinations of the settings are also possible.

The pin assignment of the auxiliary outputs can be found in the chapter "Connection".

discontinuation	function
0000 0000	The auxiliary outputs are switched off
0000 0001	Auxiliary output 1 active
0000 0010	Auxiliary output 2 active
0000 0011	Auxiliary output 1 and 2 active
0000 0100	Auxiliary output 3 active
….. …..	……
1111 1111	Auxiliary output 1 to 8 active

General devices Parameters

P52 *F1 Function [Binary, 0000 0000, 1111 1111] F1 Function [Binary, 0000 0000, 1111 1111] F1 Function [Binary, 1111 1111]*

By pressing the F1 key, the auxiliary outputs 1 to 8 can be activated and deactivated again when pressed again.

This function must first be enabled in P40 of the device level.

Any combinations of the settings are also possible.

The pin assignment of the auxiliary outputs can be found in the chapter "Connection".

discontinuation	function
0000 0000	The auxiliary outputs are switched off
0000 0001	Auxiliary output 1 active
0000 0010	Auxiliary output 2 active
0000 0011	Auxiliary output 1 and 2 active
0000 0100	Auxiliary output 3 active
….. …..	……
1111 1111	Auxiliary output 1 to 8 active

P53 *F2 Function [binary, 0000 0000, 1111 1111] F2 Function [binary, 0000 0000, 1111 1111] F2 Function [binary, 1111 1111] F2 Function [binary, 0000 0000, 1111 1111]] F2 Function*

The functionality of this corresponds to that described in P52. The activation and deactivation, however, takes place via the F2 key.

P53 *F3 Function [binary, 0000 0000, 1111 1111] F3 Function [binary, 0000 0000, 1111 1111] F3 Function [binary, 1111 1111] F3 Function [1111*

The functionality of this corresponds to that described in P52. The activation and deactivation, however, is carried out via the F3 key.

General devices Parameters

P55- P64 *M- Functions [Binary, 0000 0000, 1111 1111]*

In a program, so-called M functions can be assigned to any data set. These activate or deactivate the auxiliary outputs stored in P55 to P64.

M functions from 10 to 19, and M functions M20 to M29 deactivate the outputs stored in P55 to P64. The M30 function disables all auxiliary outputs.

P55	Output combination M10/M20
P56	Output combination M11/M21
P57	Output combination M12/M22
P58	Output combination M13/M23
P59	Output combination M14/M24
P60	Output combination M15/M25
P61	Output combination M16/M26
P62	Output combination M17/M27
P63	Output combination M18/M28
P64	Output combination M19/M29

The assignment of the binary values to the auxiliary outputs can be seen in the following table.

Any combinations of the settings are also possible.

The pin assignment of the auxiliary outputs can be found in the chapter "Connection".

discontinuation	function
0000 0000	The auxiliary outputs are switched off
0000 0001	Auxiliary output 1 active
0000 0010	Auxiliary output 2 active
0000 0011	Auxiliary output 1 and 2 active
0000 0100	Auxiliary output 3 active
….. …..	……
1111 1111	Auxiliary output 1 to 8 active

General devices Parameters

P74 *Logic of the switching outputs 1-8 [Binary/00000000-111111]*

Here the logic of the switching outputs 1 to 8 can be inverted.

One 1 on the lowest decade (00000001) refers to output 1, one 1 on the highest decade (10000000) to output 8.

The pin assignment of outputs 1 to 8 can be found in the chapter "Connection".

P75 *Logic of the switching outputs 9-14 [Binary/0000000000-00111111]*

Here the logic of the switching outputs 9 to 14 can be inverted.

A 1 on the lowest decade (00000001) refers to output 9, a 1 on the highest decade (00100000) to output 14.

The pin assignment of outputs 9 to 14 can be found in the chapter "Connection".

P99 *Factory setting [Off,On]*

Sets the parameters to factory setting when parameter is set to "On". P99 is then automatically reset to "Off".

6.3 Axis Parameter

P03 *Software end position negative [P05/ -99999, 999999]*

Contains the minimum input value that the controller accepts as the setpoint.

P04 *Software limit position positive [P05/ / -99999, 999999]*

Contains the maximum input value that the controller accepts as the setpoint.

P05 *Travel distance for factor calculation [any unit of length/ 1, 999999]*

Contains any distance.

The axis controller requires two parameters so that it can be adjusted to different mechanical conditions such as gear, spindle stroke, etc.

1. any distance in the desired unit and resolution (P05).
2. the number of pulses transmitted from the measuring system to the controller when moving this path (P06).

Only if these specifications are entered in P05 and P06 without rounding errors will the controller be able to position error-free over the entire range. Therefore, a distance should always be selected to which an integer number of pulses is transmitted by the measuring system.

Axis Parameter

P06 *Factor Impulses / Distance [Resolution of the measuring system/ 1, 999999]*

Number of pulses per distance specified in P05 (the factor is automatically calculated from P05 and P06).

Example 1: The measuring system used sends 100 pulses to the controller over a distance of 1.00 mm. Setpoints, actual values etc. are to be transmitted in 1/100 mm. Therefore, each impulse received from the measuring system must be offset against the actual value. Consequently, P05 and P06 must be set to the same value (e.g. 1, 1 or 10,10 or 100, 100).

Example 2: The measuring system used here also has a resolution of 1/100 mm. However, setpoints and actual values should only resolve one digit after the decimal point, i.e. in 1/10 mm. This means that 10 pulses are now transmitted from the measuring system to the controller over a distance of 1 (0.1 mm). Consequently, P05 must be set smaller than P06 by a factor of 10 (e.g. 1, 10 or 10,100 or 100, 1000).

Example 3: A machine with spindle drive has the following key data: spindle pitch 5.0 mm / rotary encoder with a resolution of 20 pulses/revolution. Setpoints and actual values should be resolved here with one digit after the decimal point, i.e. in 1/10 mm. This means that 20 pulses are now transmitted from the measuring system to the controller over a distance of 50 (5.0 mm). Consequently, P05 should be set to 50 and P06 to 20.

P07 *Maximum continuous current [x.xx Ampere/ 0.00, 10.00]*

Contains the current that the motor may draw over the time set in P34 without the controller interrupting with an error message.

The measured current can deviate by ± 10% from the real value.

Axis Parameter

P08 *No. of start repetitions [piece/ 0, 10]*

If the actual value is outside the setpoint +/- tolerance window after completion of a positioning, the positioning to the same setpoint is started again. This is repeated until the actual value lies within the tolerance window, but not more than the value stored here.

P09 *Tolerance window [P05/ 0, 1000]*

If the actual value after positioning is in the range of Setpoint ± Tolerance window, then not the real actual value but the setpoint is displayed and the status bit "in position" is set.

P10 *Time Controller enable [x.xx sec/ 0.00, 100.00]*

In order to avoid unnecessary heating of the motor after completion of positioning, the motor control is switched off after the time entered here.

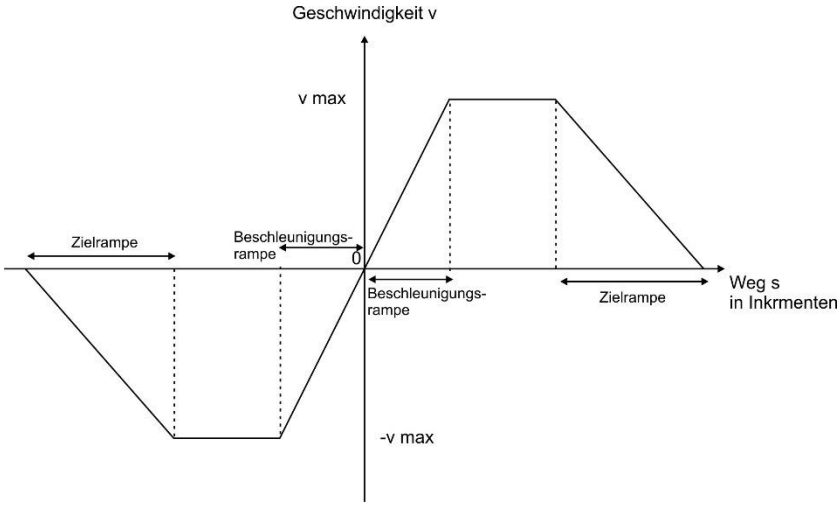
If this time is too short, the motor may not stay at its target point, but may exceed the target due to its inertia.
If set to 0.00, the output controller enable remains permanently at 1. This can be useful under certain circumstances when controlling servo drives or frequency inverters. However, this setting should always be avoided when controlling brushed DC motors.

Axis Parameter

P11 *Maximum ramp length for increasing ramp travel [pulses of the measuring system/ 1.999999]*

This parameter defines the number of ramp steps that the controller sweeps over its entire range.

The following graphic shows a positioning process in positive and negative direction.



The ramp length determines how fast the controller is to adjust to its maximum speed.

Large values lead to long ramp paths, small values to short ramp paths.

A ramp length that is set too short can result in the target point being crossed, while a ramp that is set too long can result in a long positioning time.

P12 *Maximum ramp length for decreasing ramp travel [Impulses of the measuring system/ 1,250000]* ***Custom***

Same as parameter P11, but this refers to the target ramp.

This allows e.g. a fast start and gentle braking.

Parameter level axis 1

P13 *Fast positioning speed [percentage/ 0.0, 100.0]*

1.0% ... 100.0%: Value in percent of the maximum speed with automatic positioning, as well as fast manual adjustment.

P14 *Slow positioning speed [percentage/ 0.0, 100.0]*

0.0% ... 100.0%: Value in percent of the maximum speed with slow manual adjustment.

P15 *Stop ramp (with stop command) [x.xx sec/ 0.00,10.00]*

The time it takes for the motor to stop after stopping.

P17 *Dwell time with spindle compensation [x.xx sec/ 0.00,10.00]*

Time that the motor remains in the reversal point of the loop before the positioning to the target point is started.

If P17 is set to 0, the spindle compensation function is switched off.

P18 *Distance with spindle compensation [P05/-100.0,100.0]*

If the nominal value is exceeded by this distance during spindle compensation.

Axis Parameter

P19 *I-* component *1, integral* component *1 [value/ 1, 1000]*

If positioning distances greater than twice the length of the target ramp are driven, this integral component is used.
Small values lead to a soft control response large values lead to a hard control response.

P20 *I-* component *2, integral* component *2 [Controller intervention all/ 1, 1000]*

The setting corresponds to that in parameter P19.
However, this integral component is used when positioning distances smaller than twice the length of the target ramp are driven.

P21 *D* component*, differential component for target ramp [%/ 0, 100]*

The differential component only intervenes in the control during the falling ramp if the motor before target reduces its speed too much or stops.
This value can be set in % of the maximum modulation value.

P22 *Cycle time for position control [x.xxx sec/ 0.001, 1.000]*

Here you define how often the control parameters should intervene in the control during positioning.

P23 *S* component*, standstill monitoring [pulse/0, 1000]*

The device counts the incoming pulses during the cycle time stored in P22.

If the number of pulses stored in P23 is not reached during the cycle time stored in P22, the device interprets this as standstill and increases the integral component of the control section. In addition, the D component stored in P21 is controlled.

Axis Parameter

P24 *B component, braking amplification [increments/ 0, 1000]*

After termination of the start ramp, the built-up I-component, which is significantly responsible for the load behaviour of the drive, is negated and output to the drive via the I-component 1 or I-component 2 with the target ramp.

With the I component, this value is subtracted again via the controller cycle time.

Large values lead to a strong braking behaviour. If the brake gain = 0, the built-up I component is deleted.

P26 *Reversal of counting direction [direction/ 0, 1]*

Changing this value from 0 to 1 or vice versa reverses the counting direction of the controller.

0 = standard
1 = inverted

P27 *V Mode [State/ Off, On]*

This parameter is only active if the internal output stage is used. Mode for switching on the braking resistor. (effective from P97 voltage boost)

Off = 0
On = 1

From approx. 56V, a braking resistor is connected in parallel to the DC link, via which the excess energy is then dissipated.

P28 *Chain dimension Mode [Mode/ Setpoint, Actual]*

With different machines, different chain dimensions functions are useful. For example, a previously occurring inaccuracy in punching should be offset against the next positioning. (setpoint mode)

With saws this inaccuracy should be discarded. (actual value mode)

discontinuation	Calculation of the new target position
nominal value	Target position = current set point + new set point
actual value	Target position = current process value + new setpoint

Axis Parameter

P29 *Analogue output [%/ -100, 100]*

This parameter is only effective if positioning is not carried out via the analog output.

Sets the analog output to the corresponding value when switched on.

P31 *Time Encoder[x.xx sec/ 0.00 - 10.00]*

Within this time interval at least two pulses must be counted by the measuring system during positioning, otherwise the positioning is stopped with error message.
With setting "0" the monitoring is switched off.

P32 *Ramps current [x.xx Ampere/ 0.00, 10.00]*

This parameter is only used for controls with integrated output stage.

Contains the current that the motor may draw during ramp travel without the controller interrupting it with an error message.

If this current is exceeded for the time stored in P34, a current positioning is aborted with error message.

The measured current can deviate by ± 10% from the real value.

P33 *Reference value [P05/ -99999, 999999]*

Here the reference value can be set to which the controller is set after completion of the reference run.

P34 *Current monitoring time (x.xx s / 0.01, 10.00)*

With the overcurrent measurement, 8 measured values are determined over the time set here and their mean value is calculated.

The shorter the set measuring time, the faster the controller reacts to a detected overcurrent.

This measuring time must be set so that the motor cannot be damaged by overcurrent.

Axis Parameter

P35 *Switching threshold of the measuring system monitoring (% / 0, 100)*

In order to ensure error-free operation of the encoder monitoring even at low speeds, a switching threshold can be set in this parameter from which the encoder monitoring is active.

The setting is made in % of the maximum level at the controller.

If the measuring system fails during positioning or position control, the controller would accelerate the motor.

If the ramp height reaches the value specified here, the measuring system monitoring becomes active and switches the controller off.

P36 *Position control [status /off,on]*

The device has an integrated position controller, which should always hold the motor in the approached position.

discontinuation	state
0	Position controller switched off
1	Position controller switched on

The position controller may only be used in machines where there is no direct danger to man and machine from a constantly active control system, as the controller constantly works against mechanical influences such as pressure and tension.

It should be noted that the connected motor can heat up considerably if the control is constantly active.

Under certain circumstances, this can lead to faster aging, up to the failure of motors.

Axis Parameter

P37 *Position controller I component (gain / 0, 2.0000)*

The integral part of the position controller now works with a constant time.

The gain factor can now be used to adjust the "hardness" of the controller.

If a 1.0000 is entered here, this means that each differential increment of the measuring system is controlled 1:1 at the output stage.

P38 *Position controller window (increments / 0, 1000)*

If the actual value does not correspond to the setpoint ± position window in increments after positioning, the position controller becomes active.

Within this position window, the position controller is switched off.

P39 *Position controller Mode (Mode / 0, 3)*

The position controller can work in three different modes.

discontinuation	fashion
Mode 0	The position controller only becomes active after the positioning has been completed. (Position control only at setpoint)
Mode 1	The position controller is switched off after reaching the target position, provided that the time in P10 (axis1) has elapsed and the axis is in the position window of the position controller.
Mode 2	Same as mode 0, but the controller enable is only switched off after stop.

Axis Parameter

P40 *Position controller P component (gain / 0.0, 1000.0)*

The value set here is multiplied by the difference between setpoint and actual value (in increments of the measuring system) and output as ramp increments.

This means that with large ramp lengths in P11, P12 axis 1 this value can be set larger, with small ramp lengths it must be set smaller to prevent oscillation.

For the first tests, this value should not be greater than 1% of the ramp lengths set in P11, P12.

If there is no tendency to oscillate, the value can also be increased further.

P42 *Motor Direction (Direction of rotation / 0, 1)*

This parameter rotates the motor direction for forward and backward.

discontinuation	motor rotation direction
Standard	normal
Inverted	Inverted

P43 *Stop ramp limit (at end position) [x.xx sec/ 0.00,10.00]*

The time it takes for the motor to come to a standstill after stopping when the end position is reached.

P45 *Speed medium (% / 0.0, 100.0)*

Here the speed for the reference run is stored in %.

P46 *End positions [Condition/ off, on]*

This parameter can be used to activate or deactivate the hardware end positions.

discontinuation	function
Off	The hardware limit switches are not monitored.
To	The hardware limit switches are monitored.

Axis Parameter

P47 *Reference Mode [Mode / Keyboard, Method 6]*

The mode of the desired reference run is stored here.

The exact sequence of the different modes is described in chapter *9.8*

P48 *Time Encoder Direction [x.xx s / 0.00, 10.00]*

This parameter is used to monitor the counting direction of a connected measuring system. This could lead to collisions if the connection or measuring system is incorrect. Therefore, the counting direction of the measuring system with the positioning direction is checked here once after the start and expiry of the time stored here. If the counting direction does not match the positioning direction, the positioning is aborted with an error message.

P49 *Free ride Mode [Mode / Mode 1, Mode 2]*

discontinuation	function
Mode 1	With each negative edge of the piece count input, the system moves in the positive direction by the value stored in P53.
Mode 2	With each negative edge of the piece count input, the system moves in the positive direction by the value stored in P53. The positive edge of the input piece count returns to the starting position. This setting may only be selected if there is no danger to the operating personnel by returning to the starting position!

P50 *Brake time [(x.xx s / 0.00, 10.00]]*

If the axis is held in position with a mechanical clamp during standstill, it must first open safely when it is repositioned before the axis can reposition itself.

This time is deposited here.

Axis Parameter

P51 *Hand key (direction / standard, inverted)*

To ensure that the direction of the arrow corresponds to the actual direction of movement of the machine during manual operation, the function of the keys can be reversed here.

P53 *Free driving (route P05/ -9999.9, 999999)*

The distance to be moved by the drive when the piece count input is active is stored here.

If the distance stored here is 0, the override function is switched off.

P60 *Offset 1 [P05/ - 9999.9,99999.9]*

Reserved for future expansion.

P68 *Analog Calibration [Increments/ - 999,999]*

The calibration value of the analog adjustment is stored here.

The parameter is determined in the Analog adjustment menu.

P69 *Analog gain [increments/ 0, 2048]*

Analog gain of the analog adjustment is stored here.

The parameter is determined in the Analog adjustment menu.

P70 *Position OK [Function/ off, on]*

With this parameter the function of the position reached output can be enabled. This is required to realize a fully automatic process.

Axis Parameter

Parameters P72 to P77 are only relevant for controllers with switch-off positioning.

P72 *Slow speed negative [increments/ 0, 10000]*

For positioning to smaller actual values.

Here the distance to the target is stored in increments.

When this position is reached, the output “slowly” switches.

This must always be greater than or equal to P75.

P73 *Slow speed positive [increments/ 0, 10000]*

For positioning to larger actual values.

Here the distance to the target is stored in increments.

When this position is reached, the output “slowly” switches.

This must always be greater than or equal to P76.

P74 *Average speed [increments/ 0, 10000]*

For positioning to larger and smaller actual values.

Here the distance to the target is stored in increments.

When this position is reached, the output “medium” switches.

This must always be greater than or equal to P72 and P73.

P75 *Pre-stop negative [increments/ 0, 10000]*

For positioning to smaller actual values.

Here the distance to the target is stored in increments.

If this position is reached, all outputs are switched off.

P76 *Pre-stop positive [increments/ 0, 10000]*

For positioning to larger actual values.

Here the distance to the target is stored in increments.

If this position is reached, all outputs are switched off.

Axis Parameter

P77 *Speed signals [Mode/ Mode 1, Mode 3]*

Up to 3 different modes are available to the user for controlling contactors or frequency inverters.

A detailed explanation of the modes is described in chapter 7.2.

P90 *Decimal point [decade/ none, 0.000]*

The position of the decimal point is defined here. This parameter affects only the optics and not the resolution of the displayed value.

P97 *Max. Voltage in the DC link . [(xx.x volt / 24.0, 58.0] only with PWM output stage*

Voltage limit above which the braking resistor is switched on in order to reduce the voltage boost and to avoid destruction of the output stage.

P98 *Positioning Mode [Device / Counter, 0-10V]*

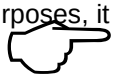
This parameter defines the functionality of the device.

discontinuation	function
Counter	The positioning functions are switched off. Only the actual value is displayed.
output stage	The optional integrated output stage is controlled.
+/- 10V	A -10v to +10V signal is output at the analog output-
0 – 10V	A 0 to 10V signal is controlled at the analog output. The direction is via a switching output.
Digital	The Outputs Con 13, pin 3 to pin 6 are used as switch-off positioning outputs. Please refer to chapter 7.2.

P99 *Factory setting [Reset/ Off, On]*

If this parameter is set to "On", all parameters are reset to factory settings.

6.3.1 parameter list

For service purposes, it is a 

It is advisable to document the parameters stored in the controller when the machine is delivered. The following table can be used for this purpose.

parameter	Specific machine setting	default
Parameter Operator		
P00 Saw blade thickness		0.0
P03 Language		German
P04 British Metric		metric
P05 Language Operator		German
Parameter Device	---	
P09 Variable Icons		Off
P10 Style		Standard
P11 H foreground		black
P12 H background		black
P13 H-line		black
P14 M foreground		black
P15 M background		black
P16 M line		black
P17 L foreground		black
P18 L-background		black
P19 L-Line		black
P20 Background		black
P21 Code Parameter		0
P22 Code Reference		0
P23 Code Program		0
P36 Time delay for renewed positioning		0.00
P37 Wipe time for position attained		0.00
P38 Wipe time for Quantity reached		0.00
P39 Wipe time program		0.00

end		
P40 Control function		0
P49 Endurance test		Off
P51 Single Function		0
P52 F1 Function		0
P53 F2 Function		0
P54 F3 Function		0
P55 Output combination M10/M20		0
P56 Output combination M11/M21		0
P57 Output combination M12/M22		0
P58 Output combination M13/M23		0
P59 Output combination M14/M24		0
P60 Output combination M15/M25		0
P61 Output combination M16/M26		0
P62 Output combination M17/M27		0
P63 Output combination M18/M28		0
P64 Output combination M19/M29		0
P74 Logic of the Switching outputs 1 - 8		0
P75 Logic of the Switching outputs 9 - 14		0
P99 Factory settings		Off
Axis parameter		
P03 Software end position negatively		-9999.9
P04 Software end position positively		99999.9
P05 Factor path		100.0
P06 Pulse factor		40000

P07 Maximum continuous current		4.00
P08 Number start repetitions		0
P09 Tolerance window		0.1
P10 Time controller enable		0.00
P11 Maximum ramps Length for ascending ramp ride		8000
P12 Maximum ramp Length for decreasing ramp ride		8000
P13 Fast positioning speed		100.0
P14 Slow positioning speed		50.0
P15 Stop ramp		0.10
P17 Dwell time after spindle compensation		0.50
P18 Travel for spindle compensation		1.5
P19 Integral component 1		1
P20 Integral component 2		1
P21 Differential component		0
P22 Cycle time position regulation		0.010
P23 S component		2
P24 B component		2
P26 Reversal of counting direction		Standard
P27 V-Mode		Off
P28 Chain dimension function		nominal value
P29 Analog output		0
P31 Time Encoder		0.10
P32 Ramps current		4.00
P33 Reference value		0.0
P34Current monitoring time		0.10
P35 Switching threshold of the measurement system monitoring		50

P36 Position control		Off
P37 Position controller I component		0.0010
P38 Position controller window		0
P39 Position controller Mode		Mode 0
P40 Position controller P component		0.0
P42 Motor Direction		Standard
P43 Stop ramp Limit		0.10
P45 Speed medium		1.0
P46 End positions		Off
P47 Reference Mode		keyboard
P48 Time Encoder Direction		0.50
P49 free ride fashion		Fashion 1
P50 Brake time		0.50
P51 Hand button		Standard
P53 Retract		0.0
P60 Offset 1		0.0
P68 Analog Calibration		0
P69 Analog gain		1830
P70 Position OK		Off
P72 Slow Negative speed		0
P73 Slow Speed positive		0
P74 Average Negative speed		0
P75 Pre-stop negative		0
P76 Pre-stop positive		0
P77 Travel signals		Fashion 1
P90 Decimal point		0.0
P97 Max. Voltage in DC link		24.0
P98 Position mode		counters
P99 Factory settings		Off

7. Controller Functions

7.1 General information

Either switching outputs (switch-off positioning), analog outputs or an integrated output stage can be used for positioning.

This must be stated when ordering.

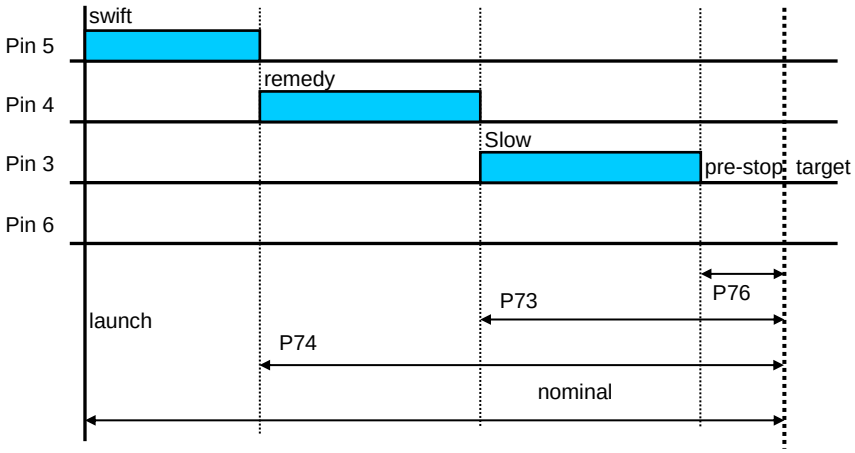
For switch-off positioning, the auxiliary functions are limited to 4 outputs.

A combination of the different positioning types is not possible.

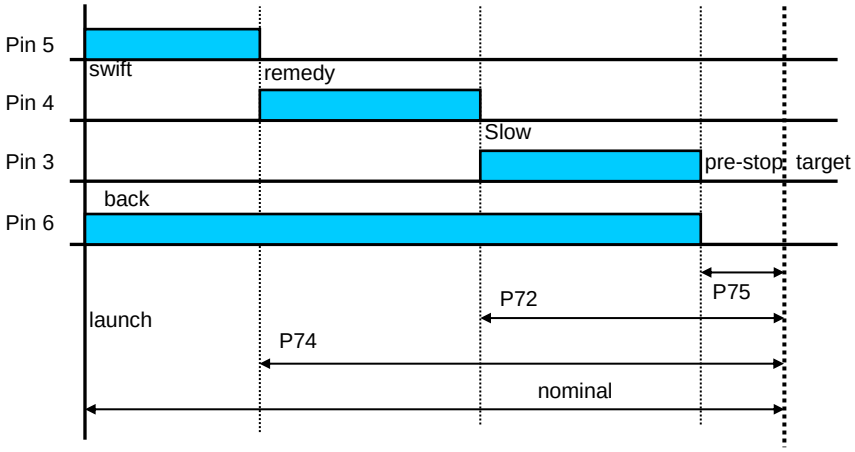
7.2 switch-off positioning

Mode 1: 3 speeds

Forward

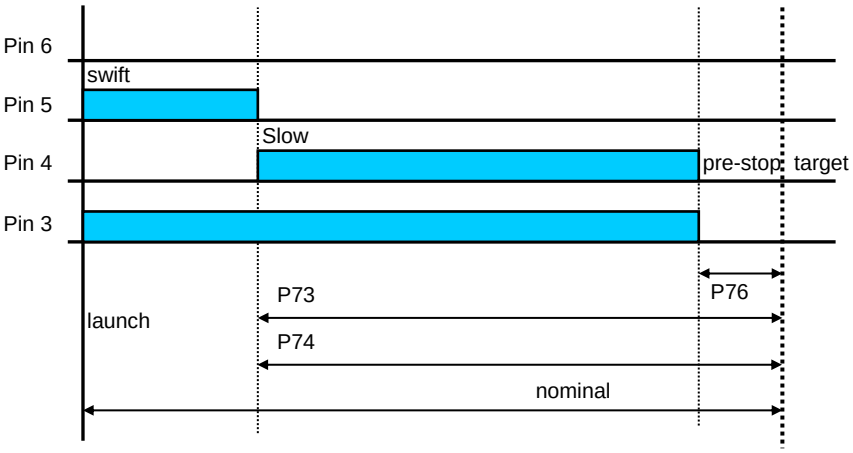


Reverse

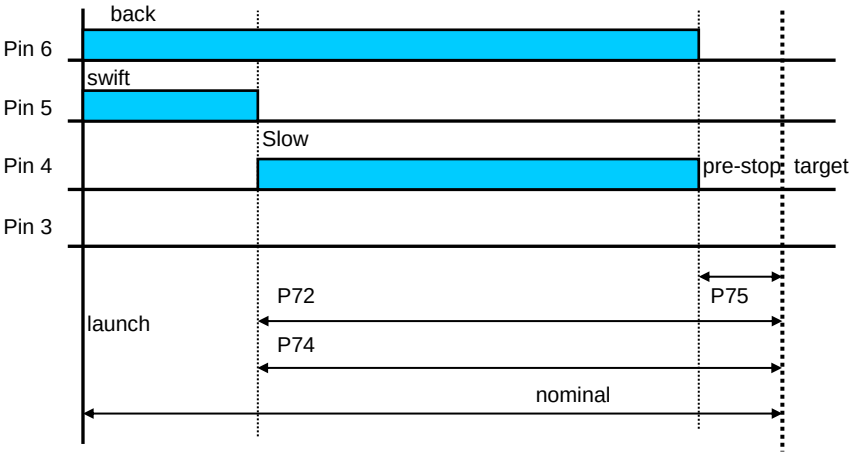


Mode2: 2 speeds

Forward

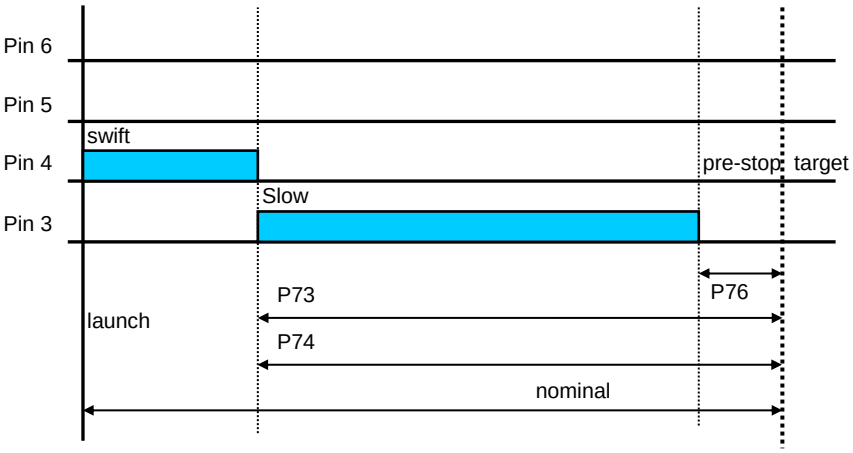


Reverse

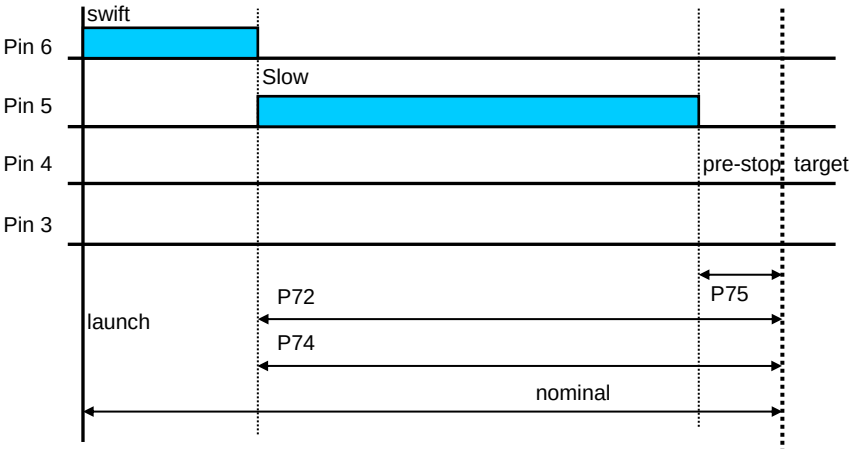


Mode3: 2 speeds

Forward



back



7.3 Controller with output stage and analog output

The positioning controller PS711 optionally has a 12 bit

+/- 10V analog output or two, respectively three pulse width modulated half bridges.

The analog output can be connected to an external output stage, servocontroller or frequency inverter.

When used with an output stage, it is possible to directly control a brushed DC motor or a brushless 3-phase DC motor.

A half-bridge and a braking resistor can be used to reduce voltage peaks up to a certain value.

7.4 Position controller for output stage and analog output

7.4.1 General information

The position controller has the task of bringing the drive into the specified position.

The control algorithm was specially developed for cost-effective positioning systems with DC motors, without tachometer.

The controller thus receives information such as the position and speed of the motor only via the connected measuring system.

In order to ensure fast and clean control, the resolution of the measuring system should be as high as possible, taking into account the maximum cut-off frequency.

7.4.2 Setting the parameters

Relevant parameters

The controller is based on a system cycle time of 100µs.

P11	Ramp ascending
P12	Ramp descending
P19	I-share 1
P20	I-share 2
P21	D portion
P22	Cycle time for position control
P23	S-share
P24	B portion

After the direction of rotation of the motor and the counting direction of the measuring system have been set, the first positioning attempts

can be carried out. For this purpose, the positioning distance should be selected so large that the drive reaches its full speed. For the first attempts, the start ramp should be set equal to the target ramp. If the drive crosses the target position without slowing down noticeably, the target ramp must be extended. If the drive moves too early, before reaching the target at slow speed, the target ramp can be shortened.

With P22 and P23 the speed at which the drive moves to the target can be changed. These settings depend strongly on the resolution of the connected measuring system, since P22 and P23 are used to set the minimum frequency of the measuring system with which the drive moves to the target.

Frequency = P23 : P22.

When setting P22, it must be kept as small as possible in order to keep the dead time during positioning as short as possible.

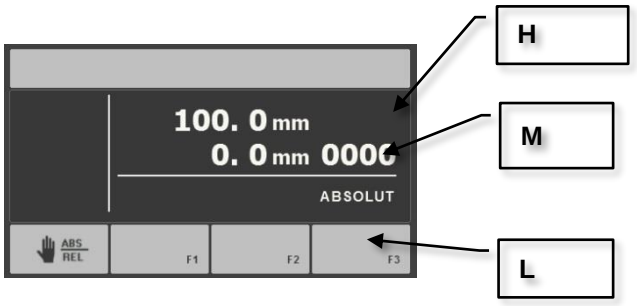
A position controller is available to keep the drive exactly in the target. In P39 3 different modes can be selected.

The setting options are described in P36 to P40 of the axis parameters.

8. Personalize

8.1 General information

The screen of the device is divided into three areas, for each of which the foreground, background and line colors can be selected.



There are the following colors:

Black
Brown
green
olive
navy
purple
blue-green
silver
grey
red
lime
Yellow
Blue
fuchsia
Water
White

8.2 style

Relevant parameters Device level

P10	style	
P11	H foreground	
P12	H background	
P13	H line	
P14	M Foreground	
P15	M background	
P16	M line	
P17	L foreground	
P18	L-background	
P19	L-line	
P20	background	

The parameters P11 to P19 can be used for the different foreground, background colors

P20 Background
This sets the background color independent of P10.

8.3 Logo

8.3.1 logo

A bitmap created with a standard bitmap editor can be loaded instead of the standard bitmap.

Size : 132x132 Pixel

Format : 32bpp

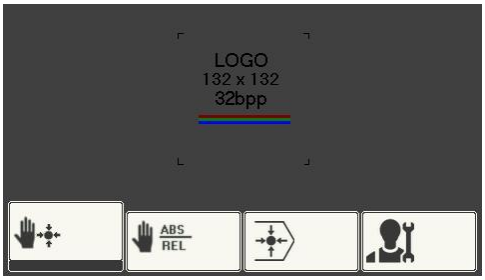


Fig. 30 Logo display

8.3.2 icons

The icons must have a size of 48 x 48 pixels.

9. Operating modes

Integrated menus

- manual operation
- single record
- Automatic Program

9.1 General information

The following inputs must be observed in order to be able to position.

- ✓ Limit switch active (24V) CON9, PIN7 and PIN8
- ✓ Emergency stop (24V) CON9 PIN1
- ✓ Protective cover (24V) CON9 PIN4
- ✓ Enable (24V) CON8 PIN 2
- ✓ Servo status (24V) CON8 PIN1
- ✓ Quantity (24V), CON 9 PIN 2

9.2 status messages

Status and error messages appear in manual, individual and program mode.

(here, for example, in single operation)

9.2.1 Emergency Off

CON9, PIN1

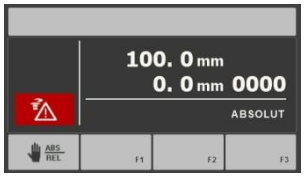


Fig. 31 Emergency stop

9.2.2 release

CON8, PIN2

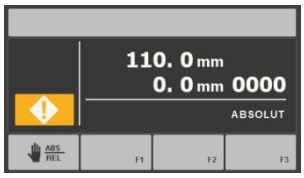


Fig. 32 Release / Quantity

9.2.3 protective cover

CON9, PIN4

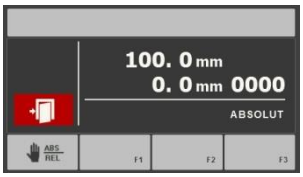


Fig. 33 Protective cover

9.2.4 limit switches

CON9, PIN7 and PIN8

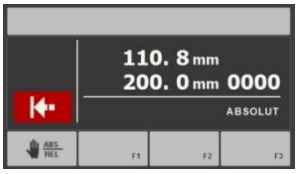


Fig. 34 Limit switch 1

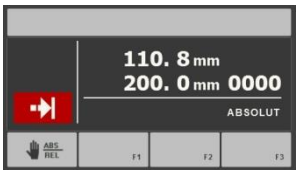


Fig. 35 Limit switch 2

9.2.5 General errors

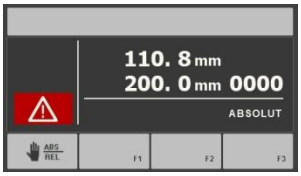


Fig. 36 General error

Error with error message in the service menu

9.2.6 Acknowledge error

Error messages are acknowledged with the stop key or with each start.

9.3 individual operation

In the Individual mode menu, you can move to an absolute position or a relative position from the current actual value.

The F3 key can be used to switch between absolute and relative mode if this has been activated in P40 control register.

In addition, a quantity can be stored, which is decremented with each activation of the quantity input.

To be able to start a positioning, the quantity contact must be occupied if the input has been defined as a normally open contact. Otherwise, the control would conclude that a machining tool is no longer in the home position and that collisions could occur.

See also Auxiliary Functions - Single Block

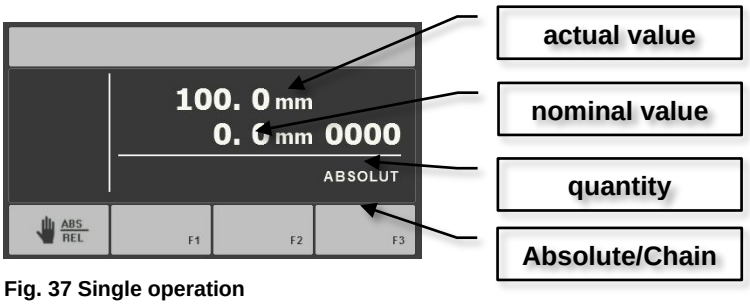


Fig. 37 Single operation

Fig. 38 Single operation Abs/Rel

With Selected Absolute/Relative Changeover

Selection of the setpoint/piece counter with the 10 key keyboard.

Use the arrow keys to ◀ ▶ toggle between setpoint and piece count.

9.4 manual operation

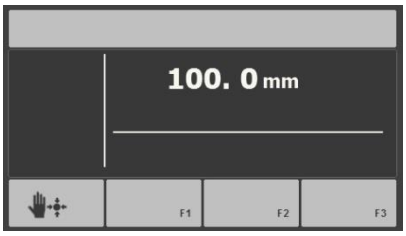
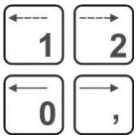


Fig. 39 Manual operation

The numeric keypad is inactive.

The hand buttons can be used to move manually.



9.5 Program operation

9.5.1 General information

The positioning controller PS711 has extensive functions to realize even complex program sequences. In a single-axis system, the program memory contains 399 programs of 99 blocks each. Programs can be entered via keyboard, USB interface (memory stick) or RS232. If the programs are read in via a memory stick/RS232, a program name, a block name and further information can be created.

9.5.2 Processing

After selecting the program, the sequence starts with the Start key (green). The program sequence can be stopped at any time with the stop button (red) to eliminate malfunctions etc.. The controller is able to continue working at the interrupted point at any time.

9.5.3 Error

If an error occurs during program execution, this must be acknowledged with the stop button (red). Afterwards you can continue working with the Start button (green).

9.5.4 Program Selection

The program name is displayed if the program was read in via a memory stick/RS232 and the name is stored there.

The program number can be entered directly via the keyboard or selected with the  keys. Press  to jump into the program.

The program input can be protected by a code.

Use the  key to switch between Edit program and Execute program. The currently active mode is highlighted in black.

Figure 40 Program Selection Edit

Press the  key to switch to the Execute mode.

Fig. 41 Program selection for execution

9.5.5 Delete program

Select the program and press the F1 key for one second. The program is completely deleted and "free" is displayed next to the program number.

The program input can be protected by a code.

9.5.6 Copy program

Select the program to be copied and press the F2 key. Now select the program into which you want to copy and press F2 again. The program is copied completely.

The program input can be protected by a code.

9.6 Creating a program manually

Program names and block information are displayed if the program was read in via a memory stick.

Use the keys to toggle ◀ ▶ between entering the setpoint or the piece count.

The keys are used to select the data records.

Use the F1 key to switch between absolute and relative dimensions.

This can be used to assign a special function to a data record. F3

These will be explained in detail later.

The F2 key deletes a previously assigned special function.

The program is terminated by pressing the F3 key. Program end appears in the selected data set. When you press F3 again, Program New appears.

If a program is terminated with program end, the first data set is jumped back to when the end is reached in processing mode. The Program selection menu appears for Program new.

9.6.1 Save program

After pressing the 

key, a selection menu appears showing how to proceed with the created program procedure.

- 

Save and exit
- 

Discard and quit
- 

discontinuance

9.6.2 Selection Functions

The Program function key 

is used to set Program End/ Program New and all other functions.

The program function key 

is used to delete the functions.

These functions are used to link individual program steps or entire sequences with switching outputs, to repeat program sequences, to define speeds, to insert waiting times, or to control additional analog outputs. Depending on the application, this can replace simple PLC functions. If these functions are not needed, they can simply be neglected.

9.7 Program Functions

9.7.1 MFunction

The MF function can be used to trigger special functions:

MFunction 000	Program Stop until Start key is pressed
MFunction 001	Next block without machining
MFunction 002	Free travel activated
MFunction 003	Free travel deactivated
MFunction 004	Next block set text Info1
MFunction 005	Next sentence set text Info2
MFunction 006	Next sentence set text Info3
MFunction 010	set outputs from P55
MFunction 011	set outputs from P56
MFunction 012	set outputs from P57
MFunction 013	set outputs from P58
MFunction 014	set outputs from P59
MFunction 015	set outputs from P60
MFunction 016	set outputs from P61
MFunction 017	set outputs from P62
MFunction 018	set outputs from P63
MFunction 019	set outputs from P64
MFunction 020	delete outputs from P55
MFunction 021	delete outputs from P56
MFunction 022	delete outputs from P57
MFunction 023	delete outputs from P58
MFunction 024	delete outputs from P59
MFunction 025	delete outputs from P60
MFunction 026	delete outputs from P61
MFunction 027	delete outputs from P62
MFunction 028	delete outputs from P63
MFunction 029	delete outputs from P64
MFunction 030	All outputs are deleted

MFunctions between 007 and 009 or greater than 030 are reserved for extensions and currently have no function.

9.7.2 Velocity in %

All the following positions are approached at the speed specified here

speed	XXX	Speed in percent

9.7.3 Sequential Start

The commands or setpoints lying between SeqStart XXX and SeqEnd are executed XXX times.

SeqStart1	XXX	Sequencer XXX=Number of sequences
SeqStart 2	XXX	Sequencer XXX=Number of sequences
SeqStart 3	XXX	Sequencer XXX=Number of sequences
SeqStart 4	XXX	Sequencer XXX=Number of sequences
SeqEnd 1		Label for sequencer return jump
SeqEnd 2		Label for sequencer return jump
SeqEnd 3		Label for sequencer return jump
SeqEnd 4		Label for sequencer return jump

9.7.4 timer

If this position is reached in the program, a waiting time in seconds is executed.

Timer sec.	XXX	Waiting time in seconds

9.7.5 Program End/New

At the end of the program, the program jumps back to the first block. With Program New it is switched to the program selection.

9.7.6 Analog

An analog value is controlled at analog output 1, CON3 PIN2.

Value 0-100% corresponding to 0-10V

9.8 reference run

Selecting the mode with P47

The axis can be referenced under the menu item **Reference.**

9.8.1 By keyboard

Fig. 42 Referencing

Enter the value with the numeric keypad and reference with  .

9.8.2 By reference Drive

Relevant parameters

P47	Selection Method
P14	Speed Direction Reference switch
P45	Speed Direction Index pulse

Reference run Start:

Open the reference menu and then press the Start key.

Six different modes are supported:

Method 1 : Drive with negative direction to the negative one. Limit switch with index pulse.

Method 2 : Drive with positive direction to the positive one. Limit switch with index pulse.

Method 3/4: Move with positive direction to the reference switch with index pulse.

Method 5/6: Move with negative direction to the reference switch with index pulse.

9.8.2.1 Mode 1

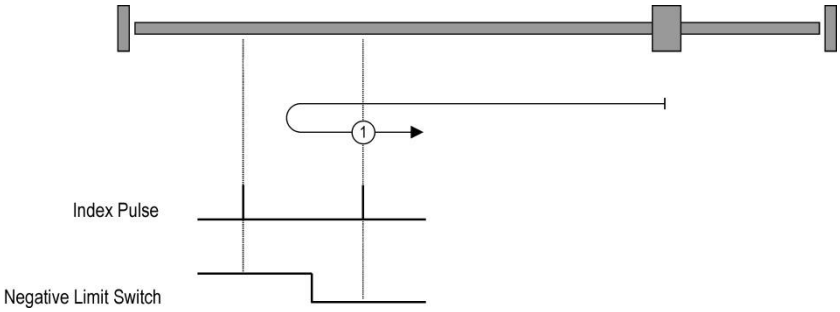


Fig. 43 Referencing Mode 1

Start in negative direction with the speed stored in P14. As soon as the negative end position has been reached, the direction of travel is reversed and the speed stored in parameter P45 is used to move in the positive direction. The reference value is written to the actual value when the index pulse is reached and the reference run is stopped.

9.8.2.2 Mode 2

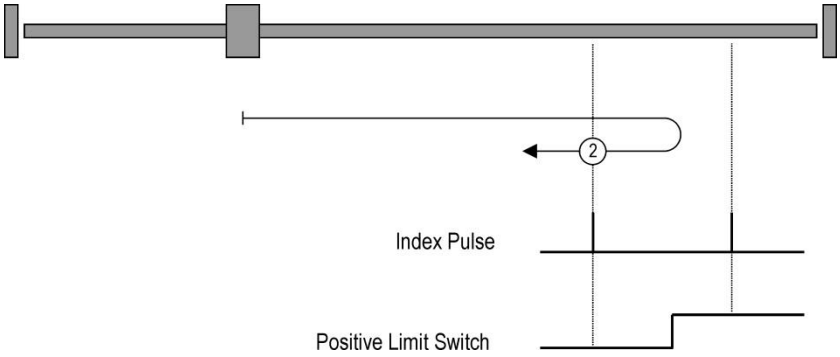


Fig. 44 Referencing Mode 2

Start in positive direction with the speed stored in P14. As soon as the positive end position has been reached, the direction of travel is reversed and the speed stored in parameter P45 is used to move in the negative direction. The reference value is written to the actual value when the index pulse is reached and the reference run is stopped.

9.8.2.3 Mode 3/4

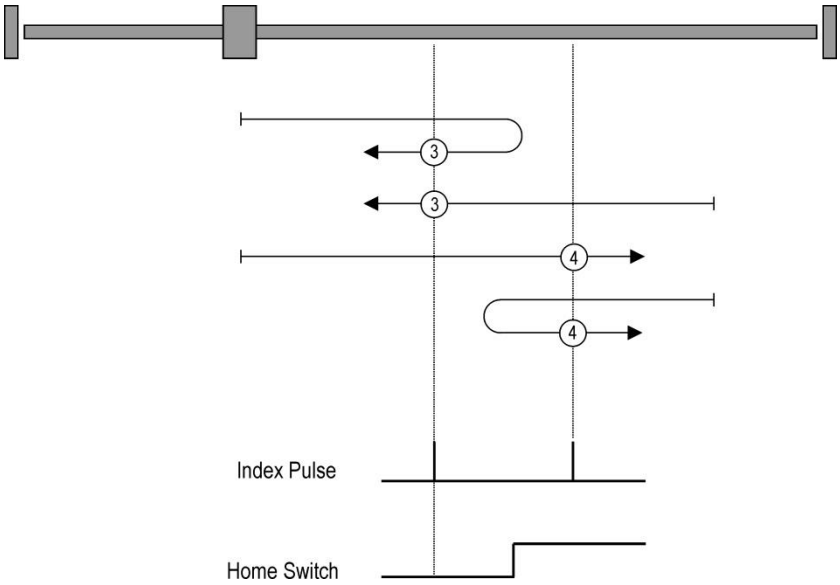


Fig. 45 Referencing Mode 3/4

Method 3: Reference for index + reference switch 0V

Method 4: Reference for index + reference switch 24V

Start in positive direction with the speed stored in P14. As soon as the reference switch is reached, the direction of travel is reversed and moved in the opposite direction at the speed stored in parameter P45. The reference value is written to the actual value when the index pulse is reached and the reference run is stopped.

9.8.2.4 Mode 5/6

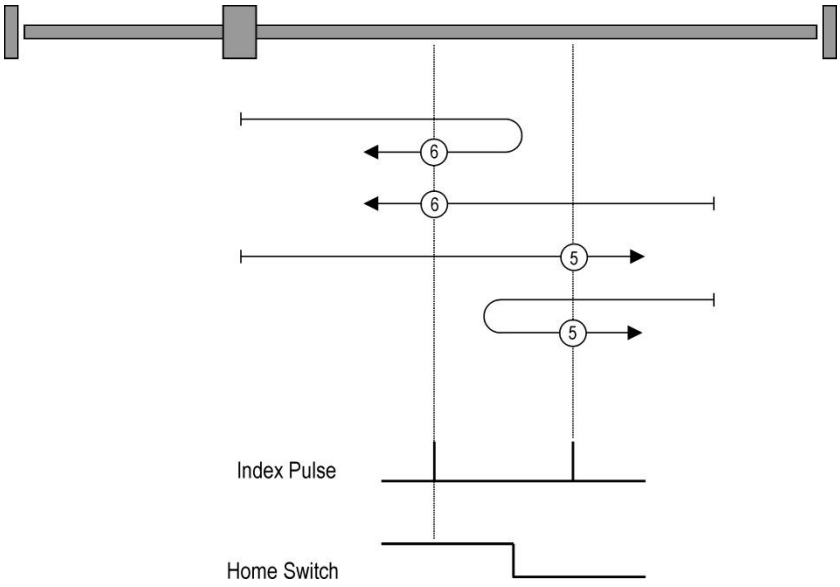


Fig. 46 Referencing Mode 5/6

Method 5: Reference for index + reference switch 0V

Method 6: Reference for index + reference switch 24V

Start in negative direction with the speed stored in P14. As soon as the reference switch is reached, the direction of travel is reversed and moved in the opposite direction at the speed stored in parameter P45. The reference value is written to the actual value when the index pulse is reached and the reference run is stopped.

9.9 Program with USB memory Input

Programs can be created and entered as .CSV files.

As soon as a USB memory stick is inserted, the File Navigator is called up. Now the file can be selected and loaded.

Only one program per file can be entered at a time.

The file must not be located behind subdirectories (always at the top level).

10. Sequence control

Relevant parameters

Device level

P36	Automatic time delay	
P37	Duration Position OK Signal	
P38	Duration Quantity OK Signal	
P39	Duration Program OK Signal	

10.1 General information

The program sequence is usually controlled by only two signals. With the position reached signal of the PS711 control the processing is triggered. The quantity input reports back to the control that processing has been completed.

10.2 Position reached

P37	Duration Position reached Signal	device level

The 'Position reached' signal informs the machine that the axis is in position and that the next machining operation can be carried out.

In program mode, the MFunction = 1 can be used to suppress the position reached signal and thus suspend machining in the next block.

In individual operation, this function must be enabled with P10 of the axis parameters.

If the value in P37 = 0, the signal is static.

10.3 Quantity reached

P38	Duration Quantity OK Signal	device level

The 'Number of pieces reached' signal indicates that all the machining steps of a block have been executed.

If the value in P38 = 0, the function is deactivated.

10.4 Program ok

P39	Duration Program OK Signal	device level

The 'Program ok' signal indicates that all machining steps have been executed.

If the value in P39 = 0, the function is deactivated.

10.5 Delay Automatic

P36	Automatic time delay	device level

With this parameter, the positioning process in automatic mode can be delayed by the set time. This time is effective before each positioning start.

11. Configuration of the operator level

In order to make certain axis and device parameters accessible to the operator, even if the parameters are locked via a code, they can be written to the operator level. Parameters at the operator level are not affected by the security codes and can be changed at any time.

11.1 Writing parameters to the operator level

The axis and device parameters can be written to the operator level via the parameter lists of the USB update.

When reading and writing the parameter lists via the USB update, a "Show" value is also transferred for each parameter. This value indicates whether the respective parameter is displayed at the operator level or not. A "0" of the show value means the parameter is not displayed at the operator level. A "1" activates the respective parameter at the operator level.

To write parameters to the operator level, the parameter list of the device must be read out via the USB update. The read-out parameter file is saved in . csv format and can be edited using any spreadsheet program.

Enter a "1" in the table column "show" for the parameters to be displayed in the operator level and then save the file.

If the edited parameter list is now written to the device via the USB update, the respective parameters are now displayed in the operator level.

Parameters which by default are not displayed at the operator level are indicated in the parameter list by an additional symbol which describes the standard parameter list of the respective parameter.

parameter list	add-on
Axis 1	A1
Axis 2	A2
Axis 3	A3
appliance	D

For a description of how to transfer the parameter lists via the USB update, see*12.4Update/Parameters/Diagnosis*.

11.2 Variable texts

It is possible to store a third, variable language for the axis and device parameters displayed at the operator level.

First of all, the texts of the operator level must be read out via the USB update. The parameter texts are stored in a . csv file. This file can be edited using any spreadsheet program.

In the column "user text" you can enter your desired text. Please note that only permitted characters are used and that the text for each parameter may contain a maximum of 20 characters. The permitted characters for the texts are stored in the read . csv file is displayed.

Furthermore, it should be noted that due to the pixel width of the individual characters, the entered texts can also be too long for the display of the parameter list with less than 20 characters. (Example: an "m" consumes more space than an "i")

After editing, the saved file can be written to the device via the USB update. The operator texts are stored in the memory. The operator texts can be displayed via the operator parameter P05 "Operator language".

For a description of how to transfer operator texts via the USB update, see *12.6Operator level Texts Configuration.*

12. USB Functions

12.1 General information

Except for reading programs, all USB functions are controlled by a script file.

The script file and the corresponding files must be located in the top level of the USB memory. Files in subdirectories are not allowed.

The script file can have any name with the extension ".upd".

Example: "Name.upd"

As soon as a USB memory has been plugged in, a simple file management opens. Press to  select the file. And with the  file is executed.

All commands in a script file are executed.

The [FLASH] function should only be available at the end, since this function updates the software and subsequent functions are no longer executed.

The script file starts with [UPDATE] and ends with [END].
Lines beginning with // are interpreted as comments.

Each command must be followed by a corresponding filename with the correct extension. These files must also be on the USB memory. These files cannot be created with the PS700.

The following functions are supported:

[BITMAP]	Read Bitmap (Logo)
[RPARAM]	Reading the parameters
[IPARAM]	Read the parameters with Info
[WPARAM]	Writing the parameters
[RUSER]	Reading the parameter texts of the operator parameters
[WUSER]	Writing the parameter texts of the operator parameters
[INTERP]	Reading the interpolation file
[IDEVIC]	Reading the error list
[FLASH]	software update

Example

Installing a new firmware

```
//!
//! Update PS711
//!
//! 04.12.2017
//!

[UPDATE]

[FLASH]        PS711 V13.bin

[END]
```

Example

Reading the parameters

```
//!
//! Read parameters
//!
//! 04.12.2017
//!

[UPDATE]

[RPARAM]     PS711 READ.csv

[END]
```

Example

Load bitmap into controller

```
//!
//! Load Bitmap (Logo)
//!
//!
//!

[UPDATE]

//!@ load bitmap logo
[BITMAP]                    bmpLOGO.bmp

[END]
```

Example

1. ***Write bitmap to controller***
2. ***Writing parameters to the controller***
3. ***Writing the interpolation list to the controller***
4. ***Load new firmware***

```
//!
//! Update File PS712
//!
//! 4.12.2017
//!

[UPDATE]

//!@ write bitmap logo
[BITMAP]                bmpLOGO.bmp

//!@ write all axis parameters
[WPARAM]                PS700 WRITE.csv

//!@ write interpolation
[INTERP]                interpol14m.txt

//!@ flash update
[FLASH]                 PS700 V10.bin


[END]
```

12.2 Reading programs

As soon as a USB memory has been plugged in, a simple file management opens. With these the file can   be selected. The  key executes the selected file.

Programs are read in . csv format-

Only one program with a maximum of 99 blocks can be selected at a time.

The program structure must be strictly adhered to, as a review of this structure is not carried out and this can lead to unexpected program runs.

12.2.1 Program head

The program starts with the keyword PROGRAM and ends with the keyword END or NEW.

In the column to the right of PROGRAM is the program number in which the program is to be written.

This is followed by a string that is to be displayed in the program selection or in the program itself.

A text can be stored in the following 3 lines. These texts can be displayed using M functions and should not exceed 10 characters. (see MFunctions)

12.2.2 sentence structure

A text can be stored for each program block, which is displayed when the block is executed. The text may consist of a maximum of 16 characters, but should ideally not exceed 13 characters.

order	function
SET	Blocks that begin with SET contain a nominal position value and a piece count.
FUNC	Blocks beginning with FUNC contain a function The function number (see *9.7.1MFunction*) is entered instead of the quantity for the block.
SPEED	Blocks starting with SPEED contain the function to set the speed. The speed is specified instead of the number of pieces for the set. All subsequent positions are approached at the speed specified here.
SEQ1	Blocks starting with SEQ1 define the start of sequence 1. This command may only be used once per program and must be terminated with RPT1. Instead of the number of pieces, the number of passes for sequence 1 is specified.
SEQ2	Blocks starting with SEQ2 define the start of sequence 2. This command may only be used once per program and must be terminated with RPT2. Instead of the number of pieces, the number of passes for sequence 2 is specified.
SEQ3	Blocks starting with SEQ3 define the start of sequence 3. This command may only be used once per program and must be terminated with RPT3. Instead of the number of pieces, the number of passes for sequence 3 is specified.
SEQ4	Blocks starting with SEQ4 define the start of sequence 4. This command may only be used once per program and must be terminated with RPT4. Instead of the number of pieces, the number of

	passes for sequence 4 is specified.
RPT1	Blocks starting with RPT1 define the end of sequence 1. This command may only be used once per program and only has a function in conjunction with the SEQ1 command.
RPT2	Blocks starting with RPT2 define the end of sequence 2. This command may only be used once per program and only has a function in conjunction with the SEQ2 command.
RPT3	Blocks starting with RPT3 define the end of sequence 3. This command may only be used once per program and only has a function in conjunction with the SEQ3 command.
RPT4	Blocks starting with RPT4 define the end of sequence 4. This command may only be used once per program and only has a function in conjunction with the SEQ4 command.
DELAY	Sentences starting with DELAY contain a time in seconds which is given instead of the number of pieces.
ANALOG	Blocks starting with ANALOG control the analog output 1 at CON3 Pin2 with the percentage value entered instead of the piece count.
END	Blocks starting with END define the end of the program.
NEW	Blocks beginning with NEW define the end of the program.

fashion	Record number	axis	nominal value	Quantity	Absolute/ Chain	text

absolute measure

SET	1	0	10000	0	ABS	Load material

Example: Decimal point = 0.0mm

- fashion target value specification
- leap 1
- nominal value 1000,0mm
- Quantity0
- Abs/Chain Absolute
- sentence text Load material

chain dimension

SET	2	0	1234	10	REL	boring

Example: Decimal point = 0.0mm

- fashion target value specification
- leap 2
- nominal value 123,4mm
- quantity 10
- Abs/Chain chain dimension
- sentence text 'Drilling'

Program stop" function

Example: Program stop in block 3 Start with start key

FUNC	3	0		0		Tool change

- fashion MFunction
- leap 3
- setpoint
- QuantityNumber of the MFunction
- Abs/chain
- Block text 'Tool change

Without machining" function

Example: The next block is executed without processing (no Pos. Ok signal).

FUNC	**4**	**0**		**1**		

-
- fashion MFunction
- leap 4
- setpoint
- QuantityNumber of the MFunction
- Abs/chain
- sentence-text

Program end

for sentence 8

Jumps to block 1

END	**8**					

Program end

for sentence 8

with change to the program selection menu

NEW	**8**					

12.2.3 Example Program CSV

PROGRAM	4	test				
Info Text 1						
Info Text 2						
Info Text 3						
fashion	set	axis	demand	Qty/Func.	Abs./Rel.	text
SET	1	0	1000	0	ABS	Load
FUNC	2	0	0	4	ABS	
SET	3	0	-100	5	REL	
SET	4	0	0	0	ABS	Drive on 0
END	5	0	0	0	ABS	

In the first line, the file is marked as a program file with the keyword "PROGRAM". In the same line the program number and the program name are additionally indicated.

Information texts for the MFunctions can be stored in the following 3 lines.

Lines 5-7 are reserved for future extensions.

Line 8 contains information on the table structure of the program file.

The actual program is entered from line 10 of the program file.

12.3 Writing programs to USB

To load a program onto the USB stick, open Program mode and select the program to be transferred. Then press the F2 key to copy the program and insert the USB stick into the device.

So that a program can be loaded onto a USB stick, there must be a . csv file on this stick in which the program can be written.

As soon as a USB memory has been plugged in, a simple file management opens. With these the file can   be selected. The key  writes the previously copied program to the selected file.

12.4 Update/Parameters/Diagnosis

The following functions are implemented on the USB 2.0 interface:

- Firmware Update
- Load/Save parameters in CSV format
- Parameter Info in CSV format
- Error list in TXT format
- Load bitmaps in BMP format
- Diagnostics and commissioning with Android App
- Automatic switching memory stick/android device

With a simple script file, one or more actions can be performed via USB.

The naming of the file is freely selectable except for the extension.

The files must be located in the uppermost directory.

Files are not created by the device itself, they must be copied onto the stick.

Description of the commands

comment	//
At the beginning of the file there is always	[UPDATE]
In between, the commands are specified with the corresponding file.	
At the end of the file there is always	[END]
Read parameters (into the stick)	[RPARAM]
Read parameter info (into the stick)	[IPARAM]
Write parameters (from stick)	[WPARAM]
Read error list (into the stick)	[IDEVICE]
Read texts of the operator parameters	[RUSER]
Write texts of the operator parameters	[WUSER]
Read bitmap (from stick)	[BITMAP]
Firmware Update	[FLASH]

The command must be followed by the file with which the command is to be executed.

12.4.1 Read parameters

[RPARAM] PS700 READ.csv

Parameter files must have the extension xxxx.csv.
Any name can be assigned.
Length 10 Character.

Example:

```
//!
//! Update File for PS712
//!
//! 24.05.2016
//!

[UPDATE]


//!@ read all axis parameters
//[RPARAM]                    PS700 READ.csv


[END]
```

The csv file then says:

HEJM GmbH			
Parameter File			
Version :	V1-0		
Device:	PS712		
Version :	1.0		
axis	number	value	show
AXIS1	1	2000	0
AXIS1	2	0	0
AXIS1	3	0	0
AXIS1	4	50000	0

etc.

12.4.2 Write parameters

[WPARAM] PS700 READ.csv

A previously read parameter file can be loaded into the controller.

Parameter files must have the extension xxxx.csv.
Any name can be assigned.
Length 10 Character.

Example:

```
//!
//! Update File for PS712
//!
//! 24.05.2016
//!

[UPDATE]


//!@ read all axis parameters
//[WPARAM]                    PS700 READ.csv


[END]
```

12.4.3 Read parameter with info

[IPARAM] PS700 READ.csv

Parameter files must have the extension xxxx.csv.
Any name can be assigned.
Length 10 Character.

Example:

```
//!
//! Update File for PS712
//!
//! 24.05.2016
//!

[UPDATE]


//!@ read all axis parameters
//[IPARAM]                    PS700 INFO.csv


[END]
```

The csv file contains the read parameters with all info

12.5 Software Update

File content

```
//!
//! Update file for PS712
//!
//! 24.05.2016
//!

[UPDATE]

[FLASH]                    PS712 V11.bin

[END]
```

Follow the instructions on the screen.

12.5.1 Read error list

```
//!
//!
//!
//!
//!

[UPDATE]

[IDEVIC]                   PS711 Error.csv

[END]
```

The file contains as info the

File Version

- version

Device Information

- version
- device
- client
- CN number

states

- ***Voltage Main*** (operating voltage)
- ***Voltage Motor act.*** (Current supply voltage of the output stage)
- ***Voltage motor max.*** (maximum voltage at the output stage)
- ***Current Motor max.*** (Maximum motor current occurred)
- ***Temperature*** 1 (Temperature output stage)
- ***Temperature 2*** (Temperature output stage)

Example

HEJM GmbH
Device Info File

Version :	V1-0
Device:	PS712
Version :	V1-1
Customer :	STANDARD
CN number:	1007173701
Voltage Main :	25.1V
Voltage Motor act:	32.8V
Voltage Motor max:	32.8V
Current Motor max:	0.00A
Temperature 1:	27.5°
Temperature 2:	27.6°

error buffer

errors :	78	
axis	1	ready
axis	1	encoder
axis	1	current
axis	1	short
axis	1	pv>max.
axis	1	pv<min.
axis	1	cv>max.
axis	1	cv<min.
axis	1	inverter
axis	1	sw. neg.

12.6 Operator level Texts Configuration

12.6.1 Read operator texts

[RUSER] MC530 text. csv

Operator text files must have the extension xxxx.csv.

Any name can be assigned.

Length 10 Character.

Example:

//! Update File MC530

//! 04.03.2019

[UPDATE]

//!@ read all axis parameters

[RUSER] MC530 text.csv

[END]

The csv file then says:

hejm automation GmbH			
User Text file			
Version :	V1-0		
Device:	Device 530		
Version :	V2.4		
Allowed characters for user text:			
ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghiklmnopqrstuvwxyz -0123456789			
axis	number	default text	user text
AXIS1	11	tolerance window	
AXIS1	12	Tolerance Specification	
AXIS1	13	Tol. length	
AXIS1	14	Tol. percentage	

etc.

12.6.2 Writing operator texts

[WUSER] MC530 text.csv

A previously read operator text file can be loaded into the display.

Operator text files must have the extension xxxx.csv.

Any name can be assigned.

Length 10 Character.

Example:

```
//! Update File MC530
//! 04.03.2019
[UPDATE]
//!@ write all axis parameters
[WUSER] MC530 text.csv
[END]
```

13. list of figures