Position Controller

PS312P

INSTRUCTION MANUAL

1. Introduction

The one axis position controller PS312P is a complete ready to plug in device including a 42V DC drive for brushed or brushless motors.

Up to 99 programs or over 32000 datasets comprising demand values and quantities can be stored in the unit.

The large, 0.55-inch-wide 7 segment display can be read easily at a distance out of different viewing angles.

The operating guide is available in English and German.

The device with maximum equipage has 12 inputs and 8 driver outputs for various functions.

2. Safety

This operating guide contains instructions for ensuring safe and proper installation and operation. If you have any difficulties which cannot be resolved by consulting this guide, please consult the machine manufacturer or vendor for additional information.

Kentucky Gauge is not liable for any personal injury or equipment damage resulting from improper commissioning, incorrect operation, misunderstandings, or errors contained in this guide or on the display.

Kentucky Gauge reserves the right to make technical changes to the equipment or operating guide without prior notice. This means that errors in agreement between the equipment and the guide cannot be precluded.

Pay attention to hazard notices in this operating guide.

This equipment description should be read carefully in full before commissioning.

Use of the operating guide presumes that the user is technically qualified.

2.1 Personnel Qualifications

Commissioning, installation, and operation are to be performed only by qualified personnel. The personnel must have qualifications which are appropriate to their function and activity.

- Instruction and obligation to observe all application-related, regional, and in-house regulations and requirements.
- Training in accordance with the standards of safety technology in the use and care of commensurate safety and work protection equipment.
- Courses in first aid, etc.

2.2 Proper use

This position controller has been developed solely for use on industrial machinery.

Any further use is considered improper. The manufacturer assumes no liability for damages resulting from such misuse. This risk is assumed solely by the user.

2.3 Safety Notes

In the description of the device, the following symbols are used to denote hazards and other important notes:

The **Hazard** symbol warns of errors and hazards in commissioning and operation of the controller. This warning notice signifies a directly threatening hazard to the health of persons and contains special specifications and instructions as well as imperatives and prohibitions to prevent personal injury and damage to equipment.

The **Attention** symbol denotes a possible hazardous situation and contains special specifications and instructions as well as imperatives and prohibitions to prevent personal injury and damage to equipment.

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

2.4 Safety Precautions

The device must be secured in accordance with the relevant regulations.

The device may not be opened or have any of the screws removed from the housing!

The device should be, wherever possible, mounted on a metal plate that is connected to PE.

2.5 Warranty and Delivery Terms

Hymark Ltd Co (henceforth Hymark), warrants this product for a period of twenty-four (24) months from the date of shipment. During the warranty period, under authorized return component parts to Hymark freight prepaid, the company will repair, or at its option, replace any part found to be defective in material or workmanship, without charge to the owner for parts, service labor, or associated customary shipping costs.

This same protection will extend to any subsequent owner during the warranty period. It does not apply to damage caused by accident, misuse, fire, flood or acts of God, or from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose, which are expressly included. The owner agrees that Hymark´s liability with respect to this product shall be set forth in this warranty, and incidental or consequential damages are expressly excluded.

3. Technical Data

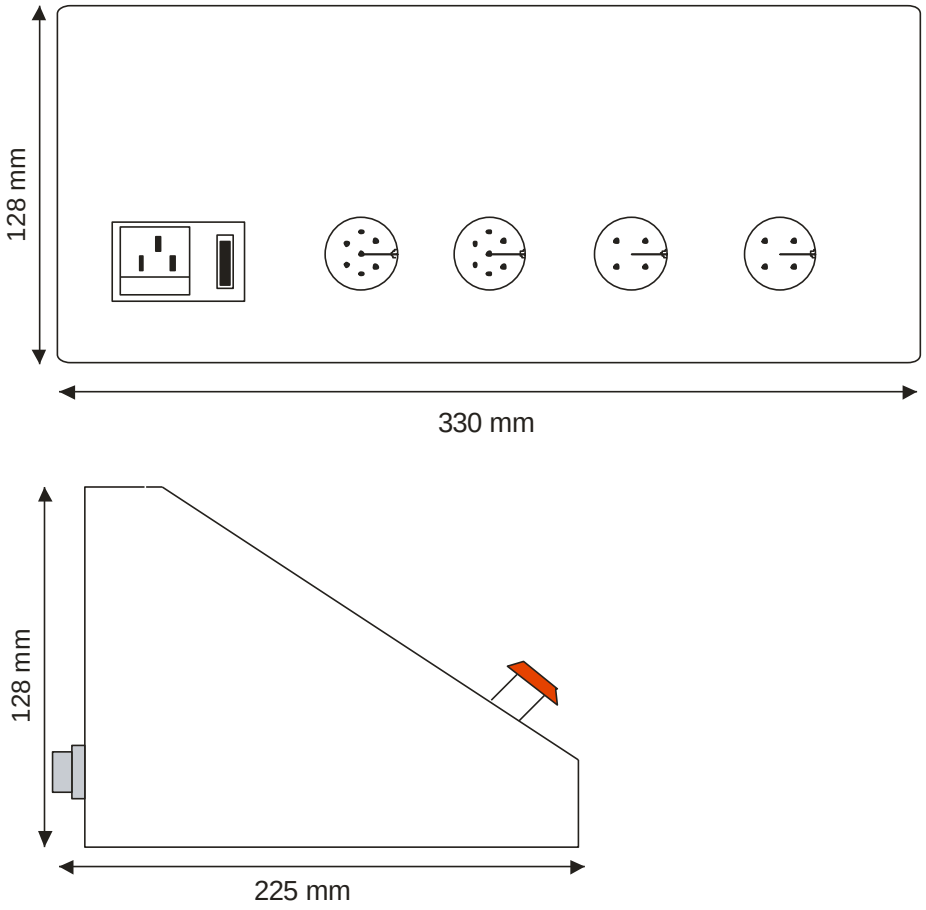


Fig. 1 Dimensions (illustration reduced)

Supply voltage	115 V AC ± 10 % dedicated line. Line filter highly suggested for avoiding power spikes/surges.
Current draw	Max. 200 mA without motor current and current consumption of measuring system.
Max. motor current	6 A using the 30V AC standard transformer Optional 8A on demand
Max. motor voltage	42V using a 30V AC transformer 34V using a 24V AC transformer
Display	3 x 7-decade LED display Digit height 14 mm
Input signals	0 – 5 V low active 10 - 30 V high active
Encoder	Incremental encoder A, B, Z. 24V DC supply (Max. 100 kHz, four edge counting)
Output Signals	8 output drivers 24V, 700 mA, PNP sourcing
Operating temperature	0 – 40 °C
Storage temperature	-20 - + 65 °C
Relative humidity	max. 90 %
Installation orientation	Any
Enclosure rating	IP 54, frontside
Dimensions	330 x 128 x 225 mm^3 (W x H x D) Installation depth excluding connector

4. Commissioning

Most common damage to the device is a result of faulty cabling and incorrect parameter values. Therefore, commissioning is to be performed by trained and expert personnel.

4.1 Installation

The device can be mounted on a mounting plate and fixed with two M4 screws.

The screws should not intrude more than 15 mm into the housing.

4.2 Connection

The device is operated with 115V or 230V.

With 115V or 230V AC voltage the relevant regulations for contact protection must be observed to prevent personal injury.

Before connecting, compare the part label on the back of the device with the desired connection voltage.

Electrical cables are to be routed in accordance with the respective national regulations. Route measuring, signal, and power cables separately.

We recommend using only shielded cable connected to GND on the device.

Ensure that no ground loops are created.

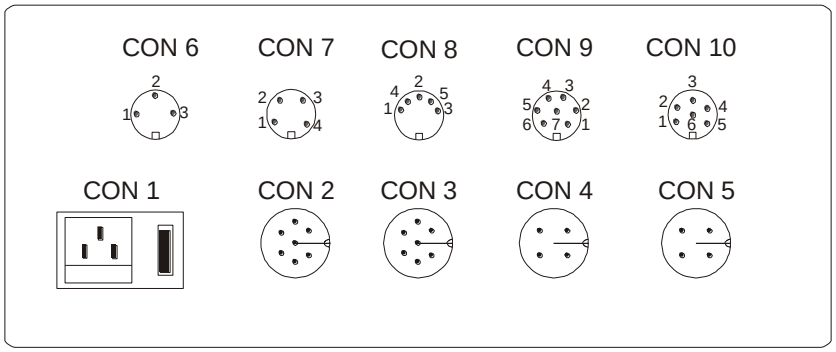


Fig. 2 Wiring diagram

Connector and pinouts

CON1	**Supply voltage**
	Cold-device plug with fuse
Pin 1	Line 115V AC, max. 100 mA (refer to type plate!)
Pin 2	Neutral
Pin 3	Shield

CON2	**Standard measuring system input (for RS422 signals refer to Con 9)**
	Connector female7 pin
Pin 1	GND
Pin 2	+ 24V encoder supply max. 150 mA
Pin 3	Signal A
Pin 4	Signal B
Pin 5	Signal Z
Pin 6	N/C
Pin 7	Shield

CON3	Quantity-, limit switch inputs
	Connector male 7 pin
Pin1	GND
Pin 2	+ 24V supply for switching inputs max. 50 mA
Pin 3	Limit switch plus When the limit switch is a normal open, the input must be left open or connected to GND to start the motor. When the limit switch is a normal closed, the input must be connected to 24V, to start the motor.
Pin 4	Limit switch minus When the limit switch is a normal open, the input must be left open or connected to GND to start the motor. When the limit switch is a normal closed, the input must be connected to 24V, to start the motor.
Pin 5	Quantity- and drive free input When the quantity switch is a normal open, the input must be connected to 24V to start the motor. When the quantity switch is a normal closed, the input must be left open or connected to GND to start the motor.
Pin 6	GND
Pin 7	Shield

CON4	Brake
	Connector male 4 pin
Pin 1	N/C
Pin 2	Brake open, closed Output source 24V when positioning is active
Pin 3	GND
Pin 4	Shield

CON5	Motor
	Connector female 4 pin
Pin 1	Motor +
Pin 2	Motor -
Pin 3	N/C
Pin 4	Shield

CON6	Outputs 1 (Option)
	Connector female 3 pin
Pin 1	Tool Output 4 (P06/ALL = 0)
	Pneumatic arm extend (P06/ALL = 1)
Pin 2	Tool Output 8 (P06/ALL = 0)
	Pneumatic arm retract (P06/ALL = 1)
Pin 3	GND

CON7	RS232 (Option)
	Connetcor female 4 pin
Pin 1	Shield
Pin 2	RxD
Pin 3	TxD
Pin 4	GND

CON8	Output 2 (Option)
	Connector female 5 pin
Pin 1	N/C
Pin 2	N/C
Pin 3	GND
Pin 4	Tool Output 1 (P06/ALL = 0)
	Pneumatic arm lift (P06/ALL = 1)
Pin 5	Tool Output 2 (P06/ALL = 0)
	Pneumatic arm lower (P06/ALL = 1)

CON9	Inputs (Option)
	Connector female 7 pin
Pin 1	Go to datum switch
Pin 2	Protection Hood, Offset 2
Pin 3	+24V
Pin 4	External E-Stop 1, connect to pin 7 to switch off the E-Stop. (When CON 7 isn`t used)
Pin 5	Offset activation or material sensor
Pin 6	GND
Pin 7	External E-Stop 2, connect to pin 4 to switch off the E-Stop. (When CON 7 isn`t used)

CON10	Outputs 3 (Option)
	Connector female 6 pin
Pin 1	Position reached Active when demand value = actual value.
Pin 2	N/C
Pin 3	N/C
Pin 4	End of program Active high when program is finished. Active low when program is running.
Pin 5	Quantity reached Active high when quantity is 0. Active low when quantity is not 0.
Pin 6	GND

4.3 Keypad and front panel

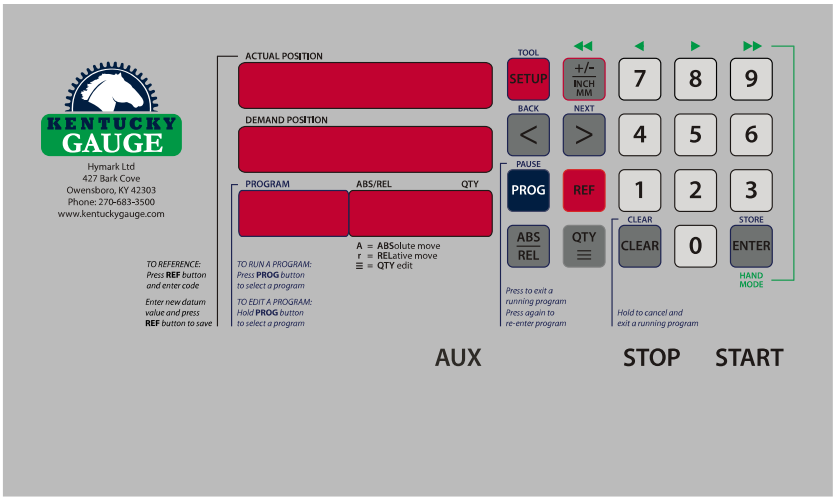


Fig. 3 Front panel

4.3.1 Displays

The upper display is used for visualizing the actual position.

The display in the middle is used for visualizing the demand value as well as the parameter number in the parameter levels.

The lower display is used for visualizing the Quantity, position modes and steps in program mode.

4.3.2 Key function

1. The keys **0 – 9** are used to change any kind of numerical values.
2. The ENTER opens a parameter level, completes the setting of a parameter value or demand value in the program editor. It is also used to acknowledge any fault and to switch between the automatic and manual adjustment of a motor.
3. The CLEAR key sets the input value to zero.
4. The QTY ≡ key activates and deactivates the quantity setting.
5. The REF opens and closes the datuming level.
6. The PROG opens and closes a program in the run and editor mode.
7. The < and > keys can be used to switch between parameters in the parameter levels, to select program numbers or to switch between the steps in program mode.

8. The +/- INCH MM key can be activated to change the sign of an input value, or to change between inch or mm display.
9. The SETUP key activates or deactivates the parameter levels.
10. The ABS REL can be activated to change between absolute and relative position mode.

4.4 Parameter and Function Levels

4.4.1 Entering parameters, changing the device functions

When changing control and calibration parameters, always consider the effects on the overall system:

The parameters may be protected against unintended changes by using a security code.

This may be selected by the machine manufacturer himself.

The device provides six levels

1. Datuming level
2. User level
3. Parameter level All
4. Parameter level Custom1
5. Parameter level Axis 1
6. Parameter level Special

The SETUP must be pressed to activate or deactivate the parameter levels.

< and > are used to select a parameter level.

ENTER opens a parameter level and stores any parameter changes.

Changes in the parameter setting can result in malfunction, stopping or failure. Changes to the parameter settings should therefore be made only by knowledgeable personnel.

Example:

Changing P 5 parameter level Motor 1 (axis parameter):

1. Press SETUP (Upper display shows dAtuM)
2. Press > 4 times. (Upper Display shows Motor 1)

3. Press ENTER (Display in the middle shows P 2)
4. Press ENTER several times until P 5 is shown in the middle.
5. Change the parameter value, using the numerical keys
6. Store the new value by pressing ENTER
7. Quit this parameter level, using SETUP (Upper Display shows Motor 1)
8. Quit all parameter levels by pressing SETUP again.

When the parameter level is locked by a code, then this code must be entered after step 2 and confirmed by pressing ENTER before the parameter can be changed.

4.4.2 Parameter functions

The parameters shown in the following are all performed according to the sample

Parameter number Name [unit, minimum/maximum value) Parameter description.

Parameters in which P05 is entered as the unit refer to the unit specified in parameter P05 (parameter level Axis 1).

Parameters which are filled with index ro (Read Only) can only be read.

Parameter level User:

P00 *Sawblade kerf thickness [P05/ 0,5000]*

The user can enter the width of a saw blade which will be automatically calculated when using incremental positioning.

P01 *Decrement value when quantity input is activated [quantity/ -20,20]*

The quantity counter is subtracted by the value set in this parameter, when the quantity input is activated.

P02 *Automatic retract function when quantity input is active [no, function/ 0, 2]*

Setting	Function
0	The automatic retract function is disabled.
1	The automatic retract function is activated.
2	The automatic retract function is activated in single mode only. It is disabled in program mode.

Parameter level User:

P03 *Move up to the first position, when a program is active [function/ 0,2]*

Setting	Function
0	The first position is drive up as programed in the first step.
1	Trim cut with external sensor The first programed step is ignored until the trim cut position is reached. The motor goes to the sensor position, stops for a short moment, calculates the outstanding distance between actual position and trim cut position and moves to the trim cut position. The trim cut position is the dedicated sensor position, plus the sensor position in parameter P04. When this setting is used, the first step must always be programed as a relative distance.
2	Good part with external sensor, without trim cut The motor goes to the sensor position, stops for a short moment, calculates the outstanding distance between actual position and the position programed in the first step and moves to that position. The position is the dedicated sensor position, plus the sensor position in parameter P04 and the value programed in the first step. When this setting is used, the first step must always be programed as a relative distance.

Parameter level User:

P04 *Distance between photo eye and saw blade [P05/ 0,100000]*

The distance between the photo eye sensor and the sawblade is set here. When the first cut should be a trim cut, add the length of the cut out to the distance.

P05 *Gauge speed from material sensor to first cut position [%/ 0,100]*

The gauge speed between the material sensor and the first cutting position can be set here.

P80 *Initialize the Bluetooth interface [no, yes / 0,1]*

When the device has an optional Bluetooth interface, this parameter is used to scan the surrounding for other Bluetooth devices.

P90 *LAN address setting MSB [Address / 0,255.255]*

Set the most significant bytes of the LAN address here in case a direct setting of the LAN interface is not possible.

P91 *LAN address setting LSB [Address / 0,255.255]*

Set the least significant bytes of the LAN address here in case a direct setting of the LAN interface is not possible.

P92 *LAN subnet mask [Mask / 0,4]*

Setting	Subnet mask
0	255.255.255.0
1	255.255.240.0
2	255.255.0.0
3	255.0.0.0
4	Restore factory setting

Parameters P90 to P92 are read once from the LAN box after power up. Therefore, changes on these parameters take effect only after power up.

Parameter level All:

P01 *Hardware version [Version/1,3]*

Hardware version of the device. **DO NOT CHANGE.**

P02 *Software version [read only/------.-------]*

Number of the software currently in use in the device.

P03 *Language for text messages [language/0,1]*

Setting	Language
0	German
1	English

P05 *Two hand mode [Mode/ 0,1]*

Setting	Mode
0	Standard
1	Two hand

P06 *Operation Mode [0/1]*

Setting	Machine type
0	Tool Output Active via CON6, Pin 1+2 CON8, Pin 4+5
1	Pneumatic retract and pneumatic lift/lower Via CON6 + CON8

P07 *CN number for special devices [ro/------,-------]*

Parameter level All:

P08 *Customer number for special devices [ro/------,-------]*

P21 *Security code for parameter level [7-decade number/ 0, 9999999]*

The parameters may be protected against unintended changes by

using a security code.

Data can only be entered in the parameter level All and Motor1 and Special after entering this code.

P22 *Security Code for calibrate level [7-decade number/ 0, 9999999]*

By entering a security code, the device can be protected from calibration.

Calibration to a new value is only possible after entering this code.

P23 *Code for parameter level customer [7-decade number/ 0, 9999999]*

The parameters in the parameter level Custom1 can be protected against unintended changes by using a security code.

Data can only be entered in the parameter level Custom 1 after entering this code.

P60 *Maximal number of programs [max. Programs/ 3, 99]*

The user can determine how many programs will be required in the future by means of this parameter.

The device can store over 32000 steps.

These steps are divided among the number of programs.

The maximal number of steps per program is 999.

Maximal Length = available steps/number of programs.

When this parameter is set to a value smaller than 33, a part of the memory will not be used.

Changes carried out to the parameter setting after some programs

have already been stored, causes a displacement in the existing

programs.

This may lead to the loss of stored programs.

Parameter level All:

P61 *Program sequence mode [Sequence/ 0, 15]*

Setting	Function
0	First address line always absolute position even if the device is equipped with an incremental function.
1	First address line as entered.
2	When the program cannot be finished with one workpiece, the motor goes to a park position where a new workpiece can be loaded. For example, when a tube is too short to cut out all programed parts.
3	Combination of 1 and 2
4	The keys < > on the keyboard are activated when a program is running, to switch between the steps.
5	Combination of 1 and 4
6	Combination of 2 and 4
7	Combination of 1,2 and 4
8	Automatic program restart when the last address line is reached.
9 -15	Combination of the former functions.

Parameter level All:

P70 Switching input logic 1 [binary code/ 0,255]

In engineering both normally open and normally closed devices are used as electrical switches.

To adapt the device quickly to suit any hardware, the

switching behavior of the inputs can be determined using this parameter.

The input is connected with a NO contact by pressing 1, and it is

connected with a NC contact by pressing 0.

Up to 256 various combinations are possible with the first 8 inputs.

The following table gives a more detailed description of the procedure.

Input	0	1	2	3	4	5	6	7
Switch	O/S	O/S	O/S	O/S	S	S	O/S	O/S
Binary value	1/0	1/0	1/0	1/0	0	0	1/0	1/0
Decimal value	1	2	4	8	16	32	64	128

S = NO normal open (Binary value 0)

O = NC normal closed (Binary value 1)

Parameter level All:

The following inputs are used in this software

Input 0 = not used – BCD Code1

Input 1 = Protective hood – BCD Code 2

Input 2 = Datuming switch – BCD Code 4

Input 3 = Quantity input – BCD Code 8

Input 4 = not used – BCD Code 16

Input 5 = not used – BCD Code 32

Input 6 = Limit switch min. – BCD Code 64

Input 7 = Limit switch max. – BCD Code 128

To calculate parameter value to be entered, determine if input 1 to 8 is needed as NO or NC. Then multiply the binary value with the decimal value for each input and add up the results of each input.

Example: Input 0, 1, 2, 4, 5, 6, 7 = NO.

Input	NC / NO	Binary	Decimal	Binary x Decimal	
0	NO	0	1	0	+
1	NO	0	2	0	+
2	NO	0	4	0	+
3	NC	1	8	8	+
4	NO	0	16	0	+
5	NO	0	32	0	+
6	NO	0	64	0	+
7	NO	0	128	0	=
			Total	8	

Enter “8” in parameter All/P70 to get required input configuration

Parameter level All:

P71 Switching input logic 2 [binary code/ 0,15]

Switching input logic of internal components is in accordance with the P70 parameter, but only for 4 inputs.

The following inputs are used in this software.

Input 0 = Not used– BCD Code1

Input 1 = Not used – BCD Code 2

Input 2 = Not used – BCD Code 4

Input 3 = Material detection sensor – BCD Code 8

Parameter level All:

P74 *Switching output logic 1 [*binary code/ 0,255]

The switching characteristic of the outputs 1 – 8 can be inverted with This parameter.

Example:

The following table gives a more detailed description of the procedure.

Output	0	1	2	3	4	5	6	7
Function	S	I	S	S	S	I	S	S
Binary value	0	1	0	0	0	1	0	0
Decimal value	1	2	4	8	16	32	64	128

S = Standard (Binary value 0)

I = Inverted (Binary value 1)

The following outputs are used in this software.

Output 0 = Brake – BCD Code1

Output 1 = Arm lift, or auxiliary output 1 – BCD Code 2

Output 2 = Arm lower or auxiliary output 2 – BCD Code 4

Output 3 = Arm forward or auxiliary output 3 – BCD Code 8

Output 4 = Arm backward or auxiliary output 4 – BCD Code 16

Output 5 = Position reached– BCD Code 32

Output 6 = Program finished – BCD Code 64

Output 7 = Quantity reached – BCD Code 128

To calculate parameter value to be entered, determine if output 1 to 8 is needed as a standard or inverted.

Then multiply the binary value with the decimal value for each input and add up the results of each output.

Parameter All:

In our example on the last side, the parameter must be set to 34 when the outputs 1 and 5 should switch inverted.

P81 *Baud rate for serial communication [Baud/ 4800/256000]*

When the device has a serial interface the baud rate for serial communication must be set here.

Setting	Baud rate
0	4800
1	9600
2	19200
3	38400
4	56000
5	115200
6	256000

P82 *Device address for serial communication [Address/11,99]*

The following addresses are not allowed in this protocol.
All addresses smaller than 11 and addresses with whole tenner decades as 20,30,40….
These are used as group addresses.

Parameter level All:

P90 *State of inputs [State/ 0/65535}*

This parameter shows the actual state of the digital inputs. When the input switches to an active state its bit will be shown as 1, otherwise as 0. This means that a normal closed switch will be shown as 1, when it is open. Please refer also to parameter P70 and P71 (parameter level All). When more than one input is active, their values are added.

Input	Decimal value	Hex value
Hood	2	0x02
Reference switch	4	0x04
Quantity	8	0x08
Limit switch -	64	0x40
Limit switch +	128	0x80
E Stop	32768	0x8000

All other inputs are not used at the moment.

Parameter level All:

P91 *State of outputs [State/ 0/255]*

This parameter shows the state of the outputs. When the output is active the bit will be shown as 1. When an output is switching off when it is active the respective bit will be shown as 1 and 0 when it is switched on.

Please refer also to P74 in parameter level 74.

Are more than one output active at the same time, their values were added.

Output	Decimal value	Hex value
Break	1	0x01
Arm lift, or auxiliary output 1	2	0x02
Arm lower, or auxiliary output 2	4	0x04
Arm forward or auxiliary output 3	8	0x08
Arm backward or auxiliary output 4	16	0x10
Position reached	32	0x20
Program finished	64	0x40
Quantity reached	128	0x80

P96 *Temperature offset [°C/ -20/+20]*

This parameter is used to compensate a temperature offset of the temperature sensor in the drive.

P97 *Shut down temperature of the drive [°C/ 0/95]*

The motor drive will be switched of, when it reaches the temperature set here to prevent it from overheating.

Parameter level Motor 1:

Some of the parameters listed here can be found in the parameter level Custom 1 too. These parameters can be changed in either level.

These parameters are marked with "**Custom"**.

P02 *Datum value [P05/ -999999,9999999]* ***Custom***

Value first shown when a unit should be datumed, manually or the value the motor position is set when the go to datum routine is active.

P03 *Software limit switch min. [P05/ -999999, 9999999]* ***Custom***

The minimum input value, the device should accept as a demand value.

P04 *Software limit switch min. [P05/ -999999, 9999999]* ***Custom***

The maximum input value, the device should accept as a demand value.

P05 *Distance for multiplication [any desired length unit/ 1, 10000]*

Custom

Contains any desired distance.
These two parameters are needed so that the counter can be set to

various mechanical conditions, such as drives, spindle stroke, etc.

1. Any desired distance in the desired unit and resolution

(P05).

2. The number of increments sent by the encoder to the

unit when travelling the distance in P05. (P06).

Only if these specifications are entered in P05 and P06 with no rounding

error, will the counter operate correctly over the entire range.

Therefore, the distance selected should always be one where a whole

number of pulses is sent by the encoder.

P06 *Pulse**/** distance [encoder resolution/1,100000]*

Custom

Number of pulses per travel distance entered in P05 (the factor is

automatically calculated from P05 and P06).

Parameter level Motor 1:

P07 *Maximum permanent motor current [x.xx Ampere/ 0.01, 20.00]*

When the motor current exceeds the current set here for more than one second the motor will be stopped, and an error message appears on the display.

The measured current may differ in a range of ± 10% of the real current.

P08 *Number of automatic restarts [piece / 0, 10]*

If the actual value lies outside the demand value +/- tolerance window

when positioning has been completed, then positioning to the same

demand value will be restarted. This process is repeated until the actual value lies within the tolerance window, but not more often than the value entered here.

P09 *Tolerance window [P05/ 0, 250]*

If the actual value is in the demand value ± tolerance window range after positioning, then the demand value is displayed instead of the real actual value (P00 = P01).

P10 *Brake activation delay time when position reached or stop*

[x.xx sec/ 0.00, 10.00]

To avoid the motor overheating unnecessarily when positioning has been completed, the drive free signal is switched off after the time entered here.

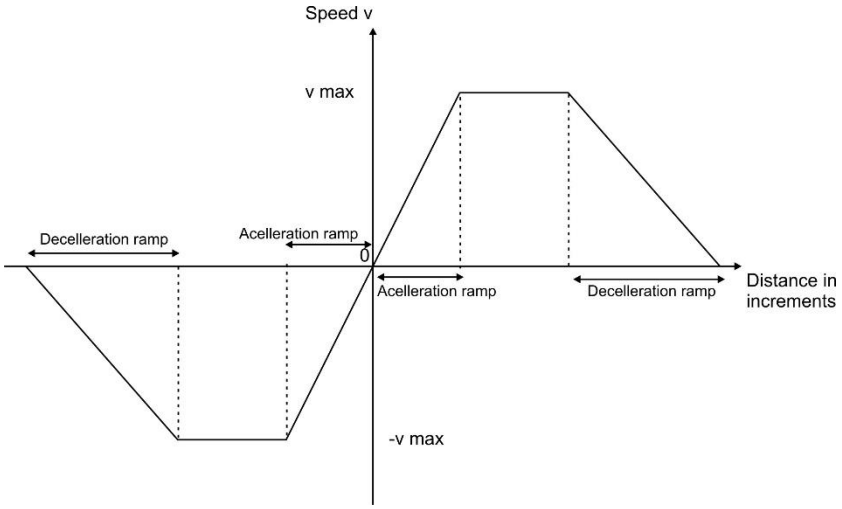
If the time selected is too short, the motor may not dwell at the target point but continue beyond it due to inertia.

Parameter level Motor 1:

P11 *Maximum ramp distance for acceleration ramp [encoder pulses / 1, 250000]* ***Custom***

This parameter determines the number of ramp steps the controller passes over in its complete range.

The negative and positive positioning process is presented in the following graph.



The ramp length determines how rapidly the controller should reach its maximum speed.

High values lead to long and low values lead to short ramp distances.

Parameter level Motor 1:

P12 *Maximum ramp distance for deceleration ramp [encoder pulses / 1, 250000]* ***Custom***

See P11 for more detailed information.

This parameter is used for the deceleration ramp.

If the ramp length is too short, it can cause the target to be overshot,

whereas if the ramp length is too long, it can lead to a long positioning

time.

P13 *Fast speed forwards and backwards [Percent 1, 100]*

1% ... 100%: percent of the maximum speed of automatic positioning and rapid manual operation.

P14 *Manual slow speed [Percent / 1, 100]*

1% ... 100%: percent of the maximum speed of automatic positioning or rapid manual operation.

P15 *Deceleration ramp after stop command [x.xx sec/ 1, 2000]*

The time interval the motor requires to reach standstill after a stop command.

P16 *Fast speed 2 [Percent 1, 100]*

This parameter is used for moves to smaller demand values when it is set to values unequal 0.

When it is set to 0, the parameter is enabled.

1% ... 100%: percent of the maximum speed of automatic positioning and rapid manual operation

P17 *Backlash compensation time [x.xx sec/ 0, 10.00]*

The time during which the motor pauses at the loop reversal point before moving towards the target.

If P17 is set to 0, the backlash compensation function is deactivated.

Parameter level Motor 1:

P18 *Backlash compensation distance [P05/-10000,10000] (Ballscrew Only)*

Exceed demand values on this distance during backlash compensation.

The backlash compensation is driven to lower demand values when in the negative range, to higher demand values when in the positive range.

P19 *Integral term [controller intervention all / 1, 9999]*

The integral term of the regulating algorithms determines, how often the I term should intervene in the closed loop control.

1 is equivalent with the time entered in P 22, 2 is equivalent with 2 x P22 etc.

1 = Max. gain (the controller intervenes in the positioning of all in the

P22 set time field) The consequence is rapid start and sharp braking

depending on the time set.

...

9999 = Min. reinforcement (the controller intervenes in the positioning of all 9999 in the P22 set time field.) The consequence is slow start and gentle braking depending on the time set.

P20 *Integral term 2 [controller intervention all / 1, 9999]*

See parameter P19, however only for restarting if specified in P08

P21 *Differential term for brake ramp [%/ 0, 100]*

The differential term only intervenes before the target during the declining ramp if the motor decelerates too much or comes to a standstill.

Setting = 0 deactivates the D term.

Setting = 100 sets the D term to its maximum

Parameter level Motor 1:

P22 *Feedback monitoring interval [sec/ 0.0001, 5.0000]*

Custom

Measurement period during which the internal demand values and actual values of the controller must agree before it intervenes.

P23 *Feedback acceleration ramp pulse no. [pulse/ 0, 200]*

The controller has a superimposed closed loop control to monitor

stopping. During the period P22 the encoder must send the pulse value written in P23 to the controller.

If this does not occur, the controller identifies this as a stop and the superimposed control is activated.

A higher value leads to an early closed loop intervention

P24 *Feedback deceleration ramp pulse no. [pulse/ 0, 200]*

The controller has a superimposed closed loop control to monitor

Stopping. During the period P22 the encoder must send the pulse value written in P24 to the controller.

If this does not occur, the controller identities this as a stop and the superimposed control is activated.

A higher value leads to an early closed loop intervention

P25 *Edge counting mode [Edge evaluation/ 4, 4]*

This must be set to 4 always.

Parameter level Motor 1:

P26 *Counting direction [direction/ 0, 1]* **Custom**

Altering this value from 0 to 1, or vice versa, reverses the counting direction of the unit.

0 = forwards
1 = backwards

P28 *Incremental move mode [Modes/ 0, 3]*

Different applications require different incremental functions.

1. The incremental value is added or subtracted to the actual or demand value.

2. The set increment is always added to or subtracted from the current

actual value (actual value mode), or after the first positioning, added

to or subtracted from the demand value (demand value mode)

The various settings can be found in the table below.

Setting	Incremental Mode
0	Actual Mode. This is normally used for saws, where former occurred inaccuracies cannot be compensated.
1	Demand Mode. This is normally used for punches, where former occurred inaccuracies should be compensated.
2	Actual Mode. The demand value will be automatically set to negative.
3	Demand Mode. The demand value will be automatically set to negative.

Parameter level Motor 1:

P29 *Retract distance [P05/ 0, 100000]*

The device can be applied for longitudinal stop with motor-driven and pneumatic retraction.

The distance the longitudinal stop moves with the motor-driven retraction can be entered here.

If 0 is entered in this parameter, the motor-driven retract function is deactivated.

P30 *P-term at the end of the ramp [sec/0.00, 1000.00]*

This parameter can be used to speed up, or slow down the deceleration ramp, contingent on the heavy loads or changing supply voltage.

A positioning ramp that hits the target in a desired amount of time must be stored before. The controller compares the actual ramp with the stored ramp and changes the motor current as needed. The maximum ramp time for this function is 2 seconds.

Before storing a ramp, all parameters must be adjusted to get a deceleration ramp with the accuracy and time needed. P30 must be set to 0.00 and the motor must reach its maximum speed during the adjustment.

When the setting is found the  key must be pressed for about 2 seconds. The actual value will blink until the ramp is stored. Then P30 can be increased until the positioning is stable under all conditions.

If this parameter is set too high, the positioning will become erratic.

A setting of 1.00 means, that a difference of 1 increment between the actual and stored ramp will change 1/1000 of the maximum output current of the drive.

P31 *Timer encoder monitoring [sec/0, 5.000]*

During the time set in this parameter, the controller must get two pulses from the connected measuring system.

Otherwise, the controller stops the motor and shows an error message.

When this parameter is set to 0, the encoder monitoring is switched off.

Parameter level Motor 1:

P32 *Operating threshold for encoder monitoring (% / 0, 100)*

In some applications the connected motor must move very slowly to its target position.

Then the encoder frequency could fall below the frequency set in P31 and would cause an error message.

Setting the operating threshold in % of the maximum ramp value will prevent the system from faulty error messages.

Only when this threshold is exceeded, the encoder monitoring is active.

P33 *Automatic start function (Function / 0, 3)*

To support an automatic operation of a machine, the quantity input can trigger an automatic start. The condition for an automatic start can be set in this parameter.

Setting	Function
0	The automatic start is switched off.
1	The automatic start is enabled in program mode only.
2	The automatic start is enabled in single mode only.
3	The automatic start is enabled in single and automatic mode.

Parameter level Motor 1:

P36 *Closed loop controller [Mode/0,1]*

The controller has an integrated position control to ensure the motor stays at the defined point.

Setting	Function
0	Position control deactivated.
1	Position control activated.

Position control may only be used in machines which constitute no direct hazard to people or machines due to the continually active closed loop feature. This works constantly against mechanical influences such as pressure and tension.

Please note: the motor may overheat due to constant closed loop activity. In certain circumstances, this may lead to faster deterioration or even motor failure.

P37 *Closed loop gain factor (Gain factor / 0, 10.0000)*

The closed loop controller time is now constant.

This parameter set the force of the integral term of the controller.

A setting of 1.000 means, that an increment difference of the measuring system is sent 1:1 to the analog output of the unit.

P38 *Closed loop window (increments / 0, 1000)*

After positioning if the actual value does not correspond to the demand value ± position window in encoder increments, then the closed loop controller is activated automatically.

Within this position window the closed loop control is deactivated.

Parameter level Motor 1:

P39 *Closed loop mode (mode / 0, 3)*

The closed loop controller can function in four different modes.

Setting	Mode
0	The closed loop controller is only activated when positioning is complete. (Closed loop to demand values only).
1	The closed loop controller sets to actual value after switch-on or stop, but when positioning is complete, to the demand value.
2	The closed loop function is active until the time in P10 (Axis1) is reached and the axis is inside the closed loop window.
3	Same as mode 0, but the drive free output is only deactivated after stop.

In this mode, if the stop key is repeatedly pressed, the closed

loop controller is deactivated.

Parameter level Motor 1:

P40 *Closed loop P- term (amplification/ 0, 50000)*

The closed loop controller proportional term can be set in this parameter.

The value entered here is multiplied by the difference between the demand value and actual value (in encoder increments) and used as ramp increments.

This means that when there are long ramp lengths in P 11 Ach1, a higher value can be set. For shorter ramp lengths a lower value must be set to prevent oscillation.

This value should not be greater than1% of the ramp length entered in P12 axis1 when running the first trials.

If no oscillation occurs, the value can be increased.

P42 *Motor rotation direction (forwards, backwards / 0, 1)*

This parameter inverts the actual direction of the motor rotation.

If the motor is rotating in the wrong direction, this parameter must be altered or the cables connecting the motor must be changed.

P44 *Go to datum enabled (disabled, enabled / 0, 1)*

This parameter enables the automatic go to datum routines in the software. Only set the parameter to 1 when the machine is equipped for automatic datuming!

P45 *Go to datum speed (% / 0, 100)*

When the motor moves to the go to datum or limit switch this speed is used.

Parameter level Motor 1:

P46 *Go to datum mode (mode / 0, 7)*

Depending on the machine equipment the Go to datum process can be done in different modes.

Setting	Mode
0	The motor moves in positive direction, until it reaches the reference cam, connected to Con 9. The motor stops and changes direction to the negative limit, using the speed stored in P14 axis 1. When the index signal of the measuring system is reached, the actual value is set to P02 in axis 1.
1	The motor moves in negative direction, until it reaches the reference cam, connected to Con 9. The motor stops and changes direction to the positive limit, using the speed stored in P14 axis 1. When the index signal of the measuring system is reached, the actual value is set to P02 in axis 1.
2	Same as mode 0, But the positive limit switch is used instead of the reference cam.
3	Same as mode 1, But the negative limit switch is used instead of the reference cam.
4	Same as mode 0, but without index signal. The actual value is set to P02 when the switch is left.
5	Same as mode 1, but without index signal. The actual value is set to P02 when the switch is left.
6	Same as mode 2, but without index signal. The actual value is set to P02 when the switch is left.
7	Same as mode 3, but without index signal. The actual value is set to P02 when the switch is left.

Parameter level Motor 1:

P47 *Parking position after “go-to-datum” routine [P05/ / -999999, 9999999]*

After the “go-to-datum” routine, the positioning unit repositions to the

parking position entered in this parameter.

If the motor should stop after the “go-to-datum” routine, then the calibration value + offset should be entered here.

P48 *Go-to-datum offset (P05 / -999999, 9999999]*

If the index pulse is reached during “go-to-datum”, after the reference

cam is left, the new actual value is calculated from actual

value = calibration value + Offset

P50 *Brake release delay time [seconds/ 0.01,10.00]*

If the motor is held in position by a mechanical brake during still-stand, then, when repositioning takes place, it must be opened with respect to the break time needed to open this break before the motor can be repositioned.

The time can be entered in this parameter.

P51 *Motor direction for manual mode [standard, inverted/ 0, 1]*

Custom

The motor positioning direction can be reversed by using the manual key.

This is useful if the arrow key, which points to the left, would otherwise

position to the right from the user's point of view.

Parameter level Motor 1:

P58 *Error compensation step width [P05/ 0,60000]* ***Custom***

The error compensation can be used to compensate differences between displayed and mechanical positions.

The step width of the measuring points can be set here.

For more information about the error compensation refer to the corresponding chapter at the end of this manual.

P59 *Error compensation mode [mode/ 0,2]* ***Custom***

Setting	Function
0	The error compensation is disabled.
1	The editor for the error compensation values is activated.
2	The error compensation is running. The displayed values are calculated out of the stored compensation table.

For more information about the error compensation refer to the corresponding chapter at the end of this manual.

P70 *Deadman zone negative direction [P05/ -99999,9999999]*

For security reasons, some applications need a deadman zone.
When this parameter is set to a value not equal to 0, the operator must keep the start button pressed from the value set here, to the minimum software limit, when the motor moves in negative direction.
This function is monitored by software only. To reach a higher performance level, additional hardware must be added.

Parameter level Motor 1:

P71 *Deadman zone positive direction [P05/ -99999,9999999]*

For security reasons, some applications need a deadman zone.
When this parameter is set to a value not equal to 0, the operator must keep the start button pressed from the value set here, to the maximum software limit, when the motor moves in positive direction.
This function is monitored by software only. To reach a higher performance level, additional hardware must be added.

P86 *Distance reference switch to zero pulse (cam index)*

of the encoder [read only increments)/ -----.-------]

When auto datuming is used this parameter shows the difference in

increments between the reference switch and the first zero pulse of the encoder.

This parameter facilitates the adjustment of a rotary pulse encoder with

index pulse.

Set this difference to be as large as possible so that the controller can

always evaluate the same index pulse.

P90 *Decimal place [Decimal place 0, 5]*

This parameter is used to set the decimal place within the display.

0 = turn off decimal point

1 = one decimal place etc.

Setting the decimal place has no effect on the display resolution.

This is only done using parameters P05 and P06 in Ach1.

Parameter level Special:

P01 *Offset mode [mode / 0,4]*

Setting	Mode
0	The offset mode for actual value is disabled.
1	Offset mode using the < > keys. When the < key is pressed the value set in P02 is subtracted from the actual value shown in the display. The offset symbol „|-„ is shown in the display on the lower left to show that the offset is activated. When the > key is pressed, and the offset is active, the value set in P02 is added to the actual value shown in the display. The offset symbol is switched off. Note: The offset symbol is only shown in single mode, because in program mode the window is used for other purposes.
2	Offset mode using an external switch. **This function is only active, when P03 in level Special is set to 0.** When using this function, the device must be connected to a switch that is activated by a hardware added to the machine.
3	Same as mode 1, but the offset value will also be subtracted from the lower limit switch. Then it can be possible to get closer to a tool, saw blade, when a lengthening is added.
4	Same as mode 2, but the offset value will also be subtracted from the lower limit switch. Then it can be possible to get closer to a tool, saw blade, when a lengthening is added.

Parameter level Special:

P02 *Offset value [P05/ -999999,9999999]*

The value of the offset is set here.

P03 *Offset value 2 [P05/ -999999,9999999]*

The value of the offset activated by the protection hood input (Con 9, Pin 2) is set here.

P04 *Delay time for auto retract function **[**sec/ 0.00,50.00]*

The auto retract function can be delayed for a time entered here.

P05 *Program key "P" lock **[**off, on/ 0,1]*

Setting	Function
0	The program Key is unlocked
1	The program key is locked

P06 *Datuming mode **[**mode/ 0,1]*

Setting	Function
0	The actual value is set by pressing the E key.
1	The actual value is set by pressing the R key.

Parameter level Special:

P07 *Automatic forward retract function [mode/ 0,1]*

Setting	Function
0	The function is switched off.
1	The axis will go to retract position when the quantity input is deactivated and will return to the front position when the quantity input is activated again. If the motor retract function is set, the automatic start must be activated to enable this function. The automatic start P33 in Parameter level axis must be activated.

P31 *Protection hood input function [Function/ 0,2]*

Setting	Function
0	The input is used to connect a protection hood. When active, Stop is shown in the display.
1	The input is used to activate the offset value2. This is added to the actual value.
2	The offset value 2 is added to the negative software limit. This makes it possible to change the limit variable.

P32 *Enhanced E-Stop function [Function/ 0,1]*

Setting	Function
0	An active E-Stop signal stops the motor only and prevents a new start.
1	An active E-Stop signal stops the motor, prevents a new start and disables all switching outputs.

Parameter level Special:

P33 *Quantity reached output function [Function/ 0,2]*

Setting	Function
0	The output is activated when quantity reaches 0.
1	The output is activated when program mode is active.
2	The output is activated when program is running.

P36 *Start delay in program mode [Seconds/ 0.00,60.00]*

When a connected peripheral needs some delay time in program mode, a next automatic start can be delayed here.

P46 *Meaning of value in P47 [Meaning/ 0,1]*

When the park position should be used in a program, the meaning of parameter P47 can be set here.

Setting	Meaning of P47
0	The value set in P47 is an offset for the park position. The park position is calculated as: Park position = Trim cut position + Offset (P47)
1	P47 is the absolute value of the park position.

P47 *Park position [P05/ -999999,9999999]*

Set the value for the park position here.

Parameter level Special:

P48 *ABS/REL key locked in program mode [off, on/ 0, 1]*

To avoid incorrect entries while a program is edit, the F1 key can be disabled in all steps except the first one.

Setting	Function
0	F1 key always active
1	F1 key locked

P49 *External Start Stop function enabled [off, on/ 0, 1]*

Setting	Function
0	External Start, Stop disabled
1	External Start, Stop enabled

P65 *Position reached signal at trim cut, or good part position [P05/ -999999,9999999]*

For some applications it is not allowed to start a tool automatically in trim cut mode or a good part position.

In this software version this parameter is activated for all device types, even when the trim cut or good part function is deactivated.

Setting	Function
0	The tool must be started manually in trim cut, or good part position.
1	The position reached output is activated at any position. No manual tool start is needed.

P67 *Switching forward/backward and lift/lower keys [no, yes. /0,1]*

The function of the forward/backward and lift/lower keys will be switched when this parameter is set to 1.

Parameter level Special:

P68 *Dwell time for program end output [Sec./0.00, 100.00]*

When this parameter is set to 0.00 the output is static. Otherwise, it is switched on for the time set here.

P69 *Parameter base for the inch/mm key [base/ 0, 1]*

When the inch/mm key is pressed, several parameters in the different parameter levels will be changed from inch to mm or vice versa.

When the user opens a parameter level, the parameters should be shown in the unit of length programmed the first time.

Therefore, the controller must know the unit of length.

When all the parameters are set in inch, this parameter must be set to” inch”.

Setting	Length unit
0	The parameters are stored in mm
1	The parameters are stored in inch

P70 Function of the 

key [Function/0, 2)

Setting	Function
0	Out of the parameter levels, the key is switched off.
1	The key changes the sign of the demand value.
2	The key changes the length unit from mm to inch or vice versa.

Parameter level Special:

P71 *Function of the*  key *[Function/0, 1]*

Setting	Function
0	The key is switched off.
1	The position mode is switched from absolute to relative or vice versa.

P72 *Enable the position reached output [Function/0, 5]*

Setting	Function
0	The position reached output is disabled in manual mode. In program mode, the position reached output is active high, when the demand value = actual value.
1	Also, in manual mode, the position reached output is active high, when the demand value = actual value.
2	The position reached output is disabled in manual mode. In program mode, the position reached output is active high, when the demand value = actual value, if the quantity input is opened. P73 must be set to 0, when using this function.
3	Also, in manual mode, the position reached output is active high, when the demand value = actual value, if the quantity input is opened. P73 must be set to 0, when using this function.
4	The position reached output is disabled in manual mode. In program mode, the position reached output triggers the quantity input. The dwell time P73 must be set to a value not equal 0.
5	Also, in manual mode, the position reached output triggers the quantity input. The dwell time P73 must be set to a value not equal 0.

Parameter level Special:

P73 *Dwell time for position reached output [Sec./0.00, 100.00]*

When this parameter is set to 0.00 the output is static. Otherwise, it is switched on for the time set here.

P74 *Quantity **a**uto decrement function, of a pneumatic length stop [off, on./0, 1]*

Setting	Function
0	The function is disabled.
1	When the pneumatic length stop moves to its home position after a pneumatic retract, depending on the setting, the quantity is decremented, or incremented.

P75 *Retract function [Function. /0, 1]*

Setting	Function
0	The motor is used for the retract function.
1	A pneumatic arm is used for the retract function.

P76 *Dwell time for pneumatic retract output [Sec./0.00, 10.00]*

The dwell time for the pneumatic forward and retract output can be set here. When this parameter is set to 0.00, the outputs are static.

P77 *Dwell time for pneumatic lift lower function [Sec./0.00, 10.00]*

The dwell time for the pneumatic lift and lower output can be set here. When this parameter is set to 0.00, the outputs are static.

Parameter level Special:

P78 *Lift and lower operation [operation. /0, 3]*

Setting	Operation
0	The lift and lower function are activated by a single operation of the key.
1	The lift and lower functions work in dead man mode. The arm moves only if the key is pressed.
2	The motor can move from the maximum limit switch to the value set in P79 while the arm is in upper position.
3	Combination of functions 1 and 2.

P79 *Minimal software limit switch with arm in upper position [P05. /-999999, 9999999]*

Insert the minimal position, where the motor can move with the arm in upper position here. When it is not allowed to move the motor when the arm is in upper position, this value must be set >= the maximum software limit switch.

Parameter level Special:

P80 Setting of Bluetooth interface *[Setting. /0, 1]*

Setting	Function
0	The optional Bluetooth interface is missing.
1	The optional Bluetooth interface is assembled.

P81 *Scanner mode [Mode./0, 3]*

Setting	Function
0	Only the demand value is sent by the scanner.
1	The demand value and quantity are sent by the scanner.
2	The decimal point is sent with the demand value.
3	The quantity and decimal point are sent with the demand value.

Parameter level Factory:

For staff off Kentucky Gauge only.

4.4.3 Parameter list

For service purpose it could be helpful to document the parameter setting of the device before the machine is shipped.

Therefore, the following table can be used.

Parameter	Default	User Settings
Parameter User		
P00 Sawblade thickness	0.000	0.000
P01 Decrement value when quantity input is activated	1	1
P02 Automatic retract function when quantity input is active	0	0
P03 Photo Eye Function	0	0
P04 Distance between photo eye and saw blade	0.000	0.000
P05 Gauge speed up to photo eye for trim cut	0-100	100
P80 Initialize the Bluetooth interface	0	0
P90 *LAN address setting MSB*	192168	192168
P91 *LAN address setting LSB*	1180	1180
P92 LAN subnet mask	0	0
Parameter All		
P01 Hardware Version	Do Not Change	Do Not Change
P02 Software Version	Read Only	75
P03 Language for text messages	0 = German 1 = English	1

P05 Two Hand Mode	0	0
P06 Operation Mode	0 = Tool Outputs 1 = Lift Arm	0
P07 CN number for special devices	0	0
P08 Customer number for special devices	0	0
P21 Security code for parameter level	0	0
P22 Security code for calibrate level	0	1776
P23 Security code for parameter level customer	0	1492
P60 Maximal number of programs	99	99
P61 Program sequence mode	Setting Function 0 First address line always absolute 1 First address line as entered. 2 Program goes to Park Position. 3 Combined 1 + 2 4 < and > buttons enabled in a program 5 Combined 1 + 4 6 Combined 2 + 4 7 Combined 1+2+ 4 8 Automatic program restart. 9 -15 Combination of former functions.	1
P70 Switching input logic 1	0 (QTY=NC) 8 (QTY=NO)	8
P71 Switching input logic 2	0	0
P74 Switching output logic 1	0	0
P81 Baud rate for serial communication	0=4800 1=9600 2=19200 3=38400	1
P82 Serial Address	11	11
P90 State Of Inputs		

P91 State Of Outputs		
P96 Temperature offset	7	7
P97 Shut-down temperature of drive	95	95
Parameter Motor 1		
P02 Datum value	10.000	10.000
P03 Software limit switch min	0.000	0.000
P04 Software limit switch max	999.999	999.999
P05 Distance for multiplication	1.000	1.000
P06 Pulse/distance	7200	5080
P07 Maximum permanent motor current	6.00	4.00
P08 Number of automatic restarts	0	1
P09 Tolerance window	0.000	0.006
P10 Delay time after position reached	0 – 2.50 seconds	0.20
P11 Maximum ramp distance for acceleration ramp	1 - 250,000	15000
P12 Maximum ramp distance for deceleration ramp	1 – 250,000	18500
P13 Fast speed forwards, backwards	100	100
P14 Manual slow speed	20	20
P15 Deceleration ramp after stop command	0.10	0.15
P16 Fast Speed 2	0-100%	0
P17 Backlash compensation time	Reserved for ball screw control	0.00
P18 Backlash compensation distance	Reserved for ball screw control	0.0
P19 Integral term 1	1	1
P20 Integral term 2	1	1
P21Differential term for brake ramp	0	0

P22 Feedback monitoring interval	0.0100	0.0100
P23 Feedback acceleration ramp pulse no.	1	1
P24 Feedback deceleration ramp pulse no.	1	1
P25 Edge counting mode	4	4
P26 Counting direction	0 or 1	0
P28 incremental move mode	0	0
P29 Retract distance	0.000	0.000
P30 P-term at the end of the ramp	0.00	0.00
P31 Timer encoder monitoring	0.00	0.00
P32 Operating threshold for encoder monitoring	50	50
P33 Automatic start function	0 Off 1 Program mode only. 2 Single mode only. 3 Single and automatic mode.	1
P36 Closed loop controller	0	0
P37 Closed loop gain factor	0.0100	0.0100
P38 Closed loop window	0	0
P39 Closed loop mode	0	0
P40 Closed loop P-term	10	10
P42 Motor rotation direction	0 = forwards 1 = backwards	0
P44 Go to datum enabled	0	0
P45 Go to datum speed	25	25
P46 Go to datum mode	0	0
P47 Park position after go to datum routine	0.000	0.000
P48 Go to datum offset	0.000	0.000

P50 Brake release delay time	0 – 2.50 seconds	0.20
P51 Motor direction for manual mode	0 or 1	0
P58 Error compensation step width	1.000	1.000
P59 Error compensation mode	0	0
P70 Deadman zone negative direction	0.000	0.000
P71 Deadman zone positive direction	0.000	0.000
P86 Distance reference switch to zero pulse	Read Only	Read Only
P90 Decimal place	1	3
Parameter Special		
P01 Offset mode	0	0
P02 Offset value	0.000	0.000
P03 Offset value 2	0.000	0.000
P04 Delay time for auto retract function	0.00 – 2.50 seconds	0.00
P05 Program key P locked	0 or 1	0
P06 Datuming mode	0 or 1	1
P07 Auto Forward Retract	0	0
P31 Protection hood input function	0, 1, or 2	0
P32 Enhanced E-Stop function	0 or 1	1
P33 Quantity Reached Output	0	0
P36 Start delay in program mode	0-60 seconds	0.20
P46 Meaning of value in P47	0 or 1	0
P47 Park position	0.000	0.000
P48 ABS/REL key locked in program mode	0=Active 1=Locked	0

P49 External Start/Stop	0=Disable 1=Enable	0
P65 Position reached signal enabled first line	0=Disable 1=Enable	1
P67 Switching forward/backward and lift/lower keys	0 or 1	0
P68 Dwell time for program end output	0-100 seconds	0.20
P69 Parameter base for the inch/mm key	0=mm 1=inch	1
P70 Function of the inch/mm key	0, 1, or 2	1
P71 Function of ABS/REL key	0=Disable 1=Enable	1
P72 Enable the position reached output	0 - 5	0
P73 Dwell time for position reached output	0.00 - 100.00 seconds 0.00 = static	0.20
P74 Quantity auto decrement function of pneumatic length stop	0=Disable 1=Enable	0
P75 Retract function	0 or 1	0
P76 Dwell time for pneumatic retract output	0 – 10.00 seconds 0.00=Static	0.00
P77 Dwell time for pneumatic lift/lower	0 – 10.00 seconds 0.00=Static	0.00
P78 Lift and lower operation	0 - 3	0
P79 Minimal software limit switch with arm in upper position	0.000	0.000
P80 Setting of Bluetooth interface	0 or 1	0
P81 Scanner mode	0 - 3	0

5. Handling

5.1 Display and key functions

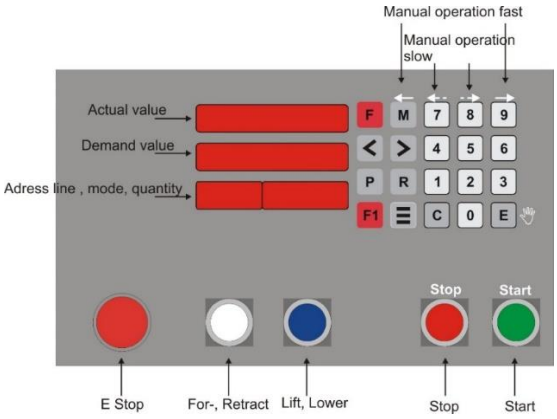


Fig. 4 Key functions, display

5.2 Key functions

5.2.1 QTY Quantity input

The quantity input is activated by pressing the QTY key. The quantity symbol appears in the mode display. After the quantity is entered another keystroke will leave the quantity input.

5.2.2 ABS REL Special functions

This key can activate different functions that can be activated in parameter P71 in the Special parameter level.

5.2.3 REF Reference, set datum

By pressing REF the actual value can be set to any value in the range of the software limits set in Motor1 P03 and P04.

Press REF and enter the code 1 7 7 6 and press ENTER then use the numeric keypad to enter the datum value and press the ENTER or REF determined by P06 in Special.

5.2.4 PROG Program key

A short actuation of the PROG key opens the program run mode if there are any saved programs.

Holding the PROG key (approx. 2 seconds) will switch to the program editor mode.

Further information can be found in a subsequent chapter.

5.2.5 < > Select keys

These keys are used to select the parameter levels, or to switch between the different parameters, without saving them to ram.

5.2.6 +/- INCH MM +/- or Inch/MM key

The key changes the sign of a parameter or relative value from positive to negative.

Parameter P70 in the parameter level Special can allow this key to be used for other functions.

5.2.7 SETUP Setup key

An actuation of this key switches to the parameter editor or back to normal mode (single mode).

5.2.8 ENTER Enter key

In Single mode, this key switches from automatic to manual mode and vice versa. When manual mode is active, “Hand” appears on the display.

An error message can also be confirmed.

The Enter key opens a parameter level or stores a parameter value to ram.

5.2.9 7 8 9 / 4 5 6 / 1 2 3 / C 0 E Numeric keypad

The numerical keypad is used to enter demand values, quantities, and different values when the program editor is active.

5.2.10  Start Button

Pressing the start button will start a program that is selected or move to a single demand position.

When the motor is inside the dead man zone this key must be held until the target is reached.

5.2.11  Stop Button

The motor is stopped after the current cycle is finished.

5.2.12  Forward, Retract key (Option)

Starts and ends a movement to the retract position,

or activates the forward and retract outputs alternately.

5.2.13  Lift, Lower key (Option)

The lift and lower outputs are activated or deactivated.

5.2.14  Emergency-Stop

The e-stop stops the motor and disconnects the drive from the motor by an internal relay.

When the security stop is active, “EStoP” appears in the display.

5.2.15 SETUP ABS REL Set the EEProm to default

Make sure you have a list of your machine specific parameters before attempting this.

If the controller does not start during power up caused by corrupted parameters in the EEProm.

In this unlikely case it is possible to set the EEProm to its factory value.

To set the EEProm to its default value, switch off the device, keep SETUP and ABS REL pressed and switch the power on again.

When the display shows “ErASE EEProM” the keys can be released.

5.2.16 < PROG Erasing the whole program memory

Pressing the keys < PROG while the device is switched on will erase the whole program memory. P1 and the actual program address is shown during the erase cycle. Make sure you have a written copy of all programs stored on the controller before attempting this.

5.3 Displays

5.3.1 [redacted] Actual value display

The actual value display shows the actual value of the motor position in Single mode.

When selecting or editing a parameter level the display shows the name of the parameter level.

In program mode the display shows the actual value, or the actual program number in editor mode.

5.3.2 [redacted] Demand value display

In single or program mode, the demand value display shows the demand value. This display also shows various messages like,

1. EStOP
2. LiMit M for negative limit switch active
3. LiMit P for positive limit switch active
4. hand for manual mode active

When a parameter level is active, this display shows the parameter number.

5.3.3  Special function display

When a parameter level is active the parameter value is shown here.

In all other cases the display line shows different functions and states.

5.3.3.1  Address line display

The address line display shows the step number during program mode.

In single mode it can also show the offset sign when the offset is active.

5.3.3.2  Mode display

In the mode display 5 different symbols can appear

 quantity input active

 the displayed values are absolute values

 the displayed values are relative values

 the motor moves to a park position

 the motor moves to a trim cut, or good part position

5.3.3.3  Quantity display

Shows the actual quantity.

5.4 Program mode

In program mode it is possible to store a sequence of steps and run the controller step by step.

5.4.1 Editor mode

Start the editor mode by holding the PROG button until “Edit” appears in the second line. This is about 2 seconds.

5.4.1.1 Creating a new program

In the upper line the program number of the last active program appears.

When the program number is flashing, the program is still empty.

A new program can be selected by pressing the < > keys or searched by pressing the +/- INCH MM key.

It is also possible to insert a program number using the numerical keypad as well.

When a program is selected it must be opened by pressing the ENTER button.

The upper line shows the program number.

In the address line display the actual step is shown.

The demand value is flashing and now ready for entering a value.

When a new demand value is entered it must be confirmed by the ENTER key and it will be switched to the quantity window automatically.

When the ABS REL key is enabled to switch between absolute and relative positions it is possible to change this at every time.

The quantity value must be confirmed with the ENTER key and it will be switched to the next step in the program.

When all steps are stored in the program, it is possible to add a park position at the end.

To enter a park position, set the quantity in this step to 0.

When all steps are entered, the editor mode can be left by pressing the PROG key.

This can only be done when the demand value is flashing.

A step with demand and quantity value set to 0 shows the end of a program.

When a sensor is used to detect the beginning of the material, the first step must be programed always as a relative demand position.

Then the park position at the end of the program is created automatically.

5.4.1.2 Editing an existing program

Start the editor mode by pressing PROG permanent until “Edit” appears in the second line and P1 appears in the upper line.

The desired program number can be entered or selected by the select keys. ENTER will open the program.

Select the step that should be changed by the select keys.

The values can now be changed and must be confirmed by pressing ENTER.

When additional steps are needed at the end of the old program, a last step with demand value and quantity set to 0 must be added at the end.

Exit the editor mode by pressing PROG .

5.4.1.3 Erasing an existing program

Start the editor mode by pressing PROG permanent until “Edit” appears in the second line.

The desired program number can be entered or selected by the select keys.

A permanent keystroke of CLEAR erases a program.

When the program is erased, the program number is flashing.

5.4.2 Programming the Tool Outputs

The tool outputs can be assigned to every step when P06 in ALL is set to 0.

The outputs are binary coded, and the value can be set in a range of 0 to 15. The four outputs are connected to Con 6, pin 1 and 2 and Con 8, pin 4 and 5. 16 different combinations are possible

Setting	Active outputs
0	No output
1	**Con 8, Pin4**
2	**Con 8, Pin5**
3	**Con 8, Pin4 + Pin5**
4	**Con6, Pin1**
5	**Con 6, Pin1**
	Con 8, Pin4
6	**Con 6, Pin1**
	Con 8, Pin5
7	**Con 6, Pin1**
	Con 8, Pin4 + Pin5
8	**Con 6, Pin2**
9	**Con 6, Pin2**
	Con 8, Pin4
10	**Con 6, Pin2**
	Con 8, Pin5
11	**Con 6, Pin1**
	Con 8, Pin4 + Pin5
12	**Con 6, Pin1 + Pin2**
13	**Con 6, Pin1 + Pin2**
	Con 8, Pin4
14	**Con 6, Pin1 + Pin2**
	Con 8, Pin5
15	**Con 6, Pin1 + Pin2**
	Con 8, Pin4 + Pin5

When the program run mode is active, the tool outputs stay active, if the assigned step is active.

To assign a tool output press the SETUP button in the specific step.

In the demand line “Tool” appears and in the quantity window the value of the tool output.

Change the value and press the SETUP button again.

The outputs are now assigned to the step.

5.4.3 Run mode

To enter the program run mode press the PROG button but do not hold the button down or the controller will go into edit mode.

The program number appears in the upper line and “run” is shown in the second.

The desired program number can be entered or selected by the

< > buttons.

Pressing the ENTER button will open the program.

The program can now be started by pressing the start button.

When a program has finished the program number will appear on the display again.

When a program is interrupted by pressing the PROG button the program will be set to the beginning again.

6. Error compensation

The error compensation can be used to compensate mechanical tolerances of the machine.

The error compensation can only be used for positive values in this software version.

Up to 126 tolerance steps can be set. The first and the last step will be set automatically.

Before the error compensation can be executed, a comparison measurement must be done with a system accuracy ten times higher than the accuracy of the PS312.

When the comparison measurement system is connected to the machine, parameter P59 in the parameter level Motor 1 must be set to 1. Set the step width of the compensation values in P58.

When the step width should be 100mm for example enter 100.0.

Then the motor must be moved to the minimal software limit switch. Measure this position as exact as possible and datum the device at this position.

Then press ABS REL to start the compensation measuring function.

All parameters related to a length are now automatically multiplied with 10 to show the same accuracy as the comparison system.

This means, if the accuracy was set to 1/10mm it now will show 1/100mm. Additionally some parameters like tolerance window, automatic restart, or closed loop controller are switched off.

The address line shows “Comp” and in the quantity window the number of the actual compensation value is shown.

When the first compensation value is active the vales in the actual and demand line should be identical after the system was datumed.

We recommend storing the measured value somewhere. Then the values can be restored should the device become damaged.

Confirm all compensation values with the ENTER button. The compensation value number is incremented and the value set to P58 will be added to the demand value.

After the start key is pressed, the motor moves to the next demand position.

The demand value must now be replaced by the value of the comparison system and confirmed with ENTER .

This step must be repeated as often as needed until the end of the measuring section is reached.

When ABS REL is pressed one value higher than the positive limit switch is added to the list and stored to the EEProm.

With the < > keys the compensation list can be scrolled forward and backward.

Now that the editor mode is activated it is possible to control or change both values shown in the display. The address shows “Edit” and the value ready for editing is flashing.

With this function it is also possible to measure out all steps and enter these values into the device afterwards.

When start is pressed again the device switches back to the compensation measuring function and “Comp” will be shown again.

To activate the compensation in the production process, P59 in parameter level Motor 1 must be set to 2.

The accuracy of the display switches back to the former one.

But internally the device is still calculating with the higher accuracy and

all the parameter values in the parameter level related to a length are still shown in the higher accuracy.

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7. Closed loop adjustement

The closed loop function is used to hold the motor in position after a positioning is finished for a certain time, or until the brake is activated.

(Refer to P39 in parameter level Motor1)

The closed loop function should not be activated until all other control parameters are finally set.

First set parameter P09 and P37 in level Motor1 to 0.

Afterwards set P38 in Motor1 to the desired accuracy. When the value is set too small this could cause a long delay until the drive will report that the target is reached.

Then increase P40 until the target is hit, or nearly hit. When the parameter is set too high, the motor may swing around the target position. Then decrease this value again.

Then increase P37 until the target is hit consistently in the desired amount of time.

Finally set P09 in level Motor1 to the desired value again.

8. RS232 for PS3xx controllers

The RS232 communication protocol for these controllers can be requested separately at Kentucky Gauge.