Position Controller
PS312P

INSTRUCTION MANUAL

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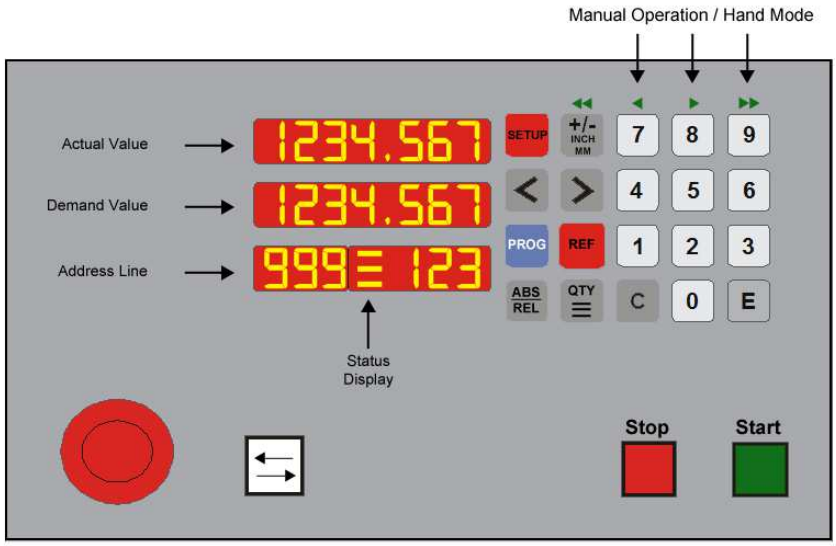
1. Functions of the Displays



• First display shows:	1.”1234.567” , Actual value (7 digits) 2.”EstoP”, when E-Stop button activated 3.Name of parameter level selected with “F” 4.Entered Parameter value
• Second display shows:	1.”1234.567” , Demand value (7 digits) 2.”EndS” for End limit switch activated 3.”hand” for “manual mode” activated 4.”tEACH” for stored Actual value as parking pos.
• Third display shows:	Address line or program number (left 3 digits)
• Fourth display shows:	Status / Mode display (1 digit in the center)
• Fifth display shows:	Quantity display (right 3 digits)

Function display 999 E 123 (Third, fourth and fifth display)

1. 999 This display shows Program Number in “Program select” mode or Address line in “Program running” or “Program entering” mode

2. E The Status display shows 3 different modes:

E Enter” Quantity is activated

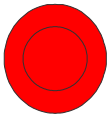
A Demand value is an absolute position (activated when Parameter P45=2/All)

r Demand value is an incremental position (only when P45=2/All)

3. 123 Quantity display shows actual quantity to be cut or number of incremental moves

2. Functions of the Keypads

Keypad	Function/Display
7 8 keypad [0] to [9]	To enter data
C Clear	To delete entered value Press & hold to clear a running program
E Enter	To enter and exit “Manual mode” To enter selected “Parameter level” To enter a selected program To store a value when programming
REF Reference (Set datum)	To enter datum value
QTY Quantity	To enter and exit quantity display
SETUP Setup	To enter and exit Parameter levels To activate “tool outputs” when programming
PROG Program mode	To enter and exit a running program. Press & hold for 2 sec to edit a program.
< Cursor left	To select previous program or address line or pa
> Cursor right	To select next program or address line or parameter
ABS REL Special Functions	1.To show actual address line in “Program running” mode 2.To show actual running program number in actual value display 3. Absolute / incremental switching to be activated in Parameter All/P45
+/- INCH MM Mode	To switch to (-) minus sign (P35=1) To select Mode in Function level To switch from inch to metric (P35=2) To search next available program or address line in “Program entering” mode To switch to encoder frequency measuring (P35=3) To activate editor for measuring error compensation (P35 = 5)
[Start]	To start positioning
[Stop]	To stop positioning
[Retract]	To extend and retract arm

 [Emergency Stop]	(optional) To stop carriage immediately. Actual value display shows “EstoP”

3. Set datum

☞ Measure the distance to be entered.

☞ Press REF button, Display shows:

	1	0	0.	0	0	0
		C	o	d	E	
						0

100.000 = *Actual value*

Code = *Security code*

0 = *Quantity*

Enter security code "**1 7 7 6**" (= default value, or code as entered in parameter P44/All → see parameter manual) and hit E button to enter "Set Datum" mode

☞ Press 0 to 9 buttons to enter measured datum value or length of measured piece (e.g. 24.500), display shows:

		2	4.	5	0	0
		r	E	F		
						0

24.500 = *New Datum value*

rEF = *Reference/Datum*

0 = *Quantity*

☞ Press C [**Clear**] button at any time to delete entered datum value

☞ Press REF button again to exit "Set datum" mode and to return to "Single Position Mode", display shows:

		2	4.	5	0	0
		8	0.	0	0	0
						0

220.500 = *New Actual value*

80.000 = *Last demand value*

0 = *Quantity*

☞ Controller is back in "Single Position Mode"

Press 

button before entering code to exit “Set datum” mode without changing value.

4. Manual Mode

In Manual Mode the operator can move the gauge in fast and slow speed in both directions by using the [+/- INCH MM], [7], [8] and [9] buttons:

Manual mode can only entered from “Single Position Mode” not when you are in “Program Mode” or “Parameter Mode”

☞ Press [E] button to enter Manual mode, display shows:

	7	**0**	**0.**	**0**	**0**	**0**
	H	**a**	**n**	**d**		
			A			**0**

700.000 = *Actual value*

Hand = *Manual Mode*

Display is not used

☞ Press [+/-], [7], [8] or [9] button to move gauge manually:

[+/- INCH MM] Fast speed in ← direction

[7] Slow speed in ← direction

[8] Slow speed in → direction

[9] Fast speed in → direction

☞ Press [E] at any time to exit Manual Mode and to return to “Single Position Mode”.

5. Positioning Modes and Demand Value options

You have 3 different positioning modes:

1. Single Position Mode without Quantity counter → see chapter 6
2. Single Position Mode with Quantity counter → see chapter 7
3. Program Mode → see chapter 8

For each positioning mode you have 3 different options for demand values to be entered:

4. (A) Absolute position
5. (r) Relative/incremental position in (+) direction → select relative mode with "ABS/REL" button
6. (r) Relative/incremental position in (-) direction → select (-) minus sign with "+/-" button

☞ Enter the required **absolute position** (e.g. 300.000) in demand value display:

	2	**2**	**0.**	**5**	**0**	**0**
	3	**0**	**0.**	**0**	**0**	**0**
			A			**0**

220.500 = *Actual value*

300.000 = *Demand value*

***A**=absolute position* ***0** = no Quantity entered*

or

☞ Enter the required **relative position** in **(+)** direction, e.g. 20.000 in demand value display by pressing the "ABS/REL" button:

	2	**2**	**0.**	**5**	**0**	**0**
		2	**0.**	**0**	**0**	**0**
			r			**0**

220.500 = *Actual value*

20.000 = *Demand value*

***0** = no Quantity entered*

***r**= relative/incremental position, press "ABS/REL" button to switch*

or

☞ Enter the required **relative position** in **(-)** direction, e.g. "- 5.000" in demand value display by pressing the "ABS/REL" and "+/-" button:

	2	**2**	**0.**	**5**	**0**	**0**
-			**5.**	**0**	**0**	**0**
			r			**0**

220.500 = *Actual value*

20.000 = *Demand value*

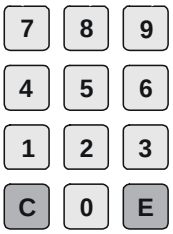
***0** = no Quantity entered*

***r**= relative/incremental position, press "ABS/REL" button to switch*

*Press **"+/-"** button to select (-) minus sign to move towards "0"*

6. Single Position Mode without Quantity counter

After turning power on, the controller will always start with “Single Position Mode”. Single position mode means you can enter one demand value and hit the “Start” button. Use the numeric keypad to enter your demand value



Press C [**Clear**] button at any time to delete entered value

☞ Enter the required **absolute position** (e.g. 300.000) in demand value display:

	2	**2**	**0.**	**5**	**0**	**0**
	3	**0**	**0.**	**0**	**0**	**0**
			A			**0**

220.500 = *Actual value*

300.000 = *Demand value*

***A**=absolute position* ***0** = no Quantity entered*

☞ Press [**Start**] button, carriage moves to entered position, display shows:

	3	**0**	**0.**	**0**	**0**	**0**
	3	**0**	**0.**	**0**	**0**	**0**
			A			**0**

300.000 = *New Actual value*

300.000 = *Last entered Demand value*

A=absolute position *0 = no Quantity entered*
r= relative/incremental position, press “ABS/REL” button to switch
*Press **“+/-”** button to select (-) minus sign to move towards “0”*

☞ Enter new position (e.g. 450.000) in demand value display and hit [Start] again

☞ Press E button to enter Manual mode → see chapter 4

☞ Press PROG button to enter Program mode → see chapter 8

☞ Press SETUP button to enter Parameter level → see separate parameter manual

☞ Press ABS REL button to switch from absolute to relative (incremental) (if P45 =2)

Note: Enter saw blade width before moving in incremental mode

Press “SETUP” + “+/- INCH MM” + “E” to enter saw blade (see chapter 18.)

7. Single Position Mode with Quantity

☞ Enter the required position in demand value display (e.g. 80.000):

	3	**0**	**0.**	**0**	**0**	**0**
		8	**0.**	**0**	**0**	**0**
			A			**0**

300.000 = *Actual value*

80.000 = *New Demand value*

***A**=absolute position* ***0** = no Quantity entered*
***r**= relative/incremental position, press "ABS/REL" button to switch*
*Press **"+/-"** button to select (-) minus sign to move towards "0"*

☞ Press QTY Quantity button, display shows:

	3	**0**	**0.**	**0**	**0**	**0**
		8	**0.**	**0**	**0**	**0**
			=			**0**

300.000 = *Actual value*

80.000 = *Demand value*

0 = *No Quantity*

☞ Enter desired quantity (1 to max. 999)

	3	**0**	**0.**	**0**	**0**	**0**
		8	**0.**	**0**	**0**	**0**
			=	**1**	**3**	**0**

300.000 = *New Actual value*

80.000 = *Demand value*

130 = *Entered Quantity*

☞ Press QTY button again, display shows:

	3	**0**	**0.**	**0**	**0**	**0**
		8	**0.**	**0**	**0**	**0**
			A	**1**	**3**	**0**

300.000 = *New Actual value*

80.000 = *Demand value*

***A**=absolute position* ***130** = entered Quantity*
***r**= relative/incremental position, press "ABS/REL" button to switch*
*Press **"+/-"** button to select (-) minus sign to move towards "0"*

☞ Press C [**Clear**] button at any time to delete entered value

☞ Press [**Start**] button, gauge moves to entered position

☞ After each working process Quantity counter decrements (129, 128,..., 0)

☞ When Quantity = 0, new demand position and quantity can be entered

☞ Press ABS REL button to switch from absolute to relative/incremental mode

☞ Press +/- INCH MM button to select (-) minus sign to move incrementally towards "0"

Note: Enter saw blade width before moving in incremental mode

Press "SETUP" + "+/- INCH MM" + "E" to enter saw blade (see chapter 18.)

8. Enter a new program

The PS312 has a total of 3,000 address lines with 99 programs max. The number of programs you require can be selected in Parameter P60 / Parameter level “ALL” (see separate parameter manual how to change this parameter)

Example: P60 = 20 means you have a total of 150 address lines available for each of the 20 programs (20x150=3,000 address lines)

☞ Press PROG button for 2 seconds to enter Program mode, display shows:

P		**1**				

= Display is blank

= Display is blank

P1 *= Program Number 1*

☞ Press < and > button to select next available program number where no address lines are entered yet (e.g. Program No “P12”). Display shows:

P	**1**	**2**				

= Display is blank

= Display is blank

P12 *= Program Number 12*

Program number is flashing to indicate a program without entered address lines.

☞ Press E button to enter selected program, display shows:

			0.	**0**	**0**	**0**
		1	**A**			**0**

= Display is blank

0.000 *= Demand value*

1 = Address line “1” *0 = Quantity “0”*

***A**=absolute position*

***r**= relative/incremental position, press “ABS/REL” button to switch*

*Press **“+/-”** button to select (-) minus sign to move towards “0”*

“Address line” and “Demand value” display are flashing to indicate a value to be entered

8. Enter a new program (cont.)

☞ Press **0** to **9** buttons to enter Demand value (e.g. 25.500), display shows:

		2	**5.**	**5**	**0**	**0**
		1	**A**			**0**

= Display is blank

25.500 = New Demand value

1 = Address line "1" 0 = Quantity "0"
***A**=absolute position*
***r**= relative/incremental position, press "ABS/REL" button to switch*
*Press **"+/-"** button to select (-) minus sign to move towards "0"*

☞ Press **E** button to store entered demand value, Quantity display is now activated. Enter Quantity required (at least a "1" must be entered for tool cycle), display shows:

		2	**5.**	**5**	**0**	**0**
		1	**A**			**1**

= Display is blank

25.500 = Demand value

1 = Address line "1" 1 = Quantity "1"
***A**=absolute position*
***r**= relative/incremental position, press "ABS/REL" button to switch*
*Press **"+/-"** button to select (-) minus sign to move towards "0"*

Note: Quantity = "0" can only be entered to the last address line to indicate a parking position for loading new material (no "in position" output will be activated to start machine and no quantity input is necessary to exit program. Additional offset for the parking position can be entered in Parameter Ach1/P47, see separate parameter list)

☞ Press **E** button again to store entered quantity. Controller automatically goes to address line "2", display shows:

☞

			0.	**0**	**0**	**0**
		2	**A**			**0**

= Display is blank

0.000 = Demand value

2 = Address line "2" 0 = Quantity "0"
***A**=absolute position*
***r**= relative/incremental position, press "ABS/REL" button to switch*
*Press **"+/-"** button to select (-) minus sign to move towards "0"*

"Address line" and "Demand value" display are flashing to indicate a value to be entered

☞ Repeat the last steps to enter all required address lines for this program

8. Enter a new program (cont.)

☞ Enter “0” to Qty display to indicate a parking position as the last step of a program (only absolute position), display shows:

Alternatively, the parking position/home position/loading position can be at the beginning of a program if desired.

		7	0.	0	0	0
	2	5	A			0

= Display is blank

70.000 *= Parking position*

25 = Address line “25” ***0 = Quantity “0” indicates parking position***

***A**= absolute position*

Press **E** button again after entering the last demand value and quantity of the program (**Demand value and Qty display must be zero to indicate end of program**):

			0.	0	0	0
	2	6	A			0

= Display is blank

0.000 ***= end of program***

26 = Address line “25” ***0 = end of program***

***A**= absolute position*

Press **PROG** button to store and exit the entered program.

Note:

Press **ABS REL** button any time to select relative move (incremental position)

Press **+/- INCH MM** button to select (-) minus sign to move incrementally towards “0” (machine)

You can only exit program mode after quantity has been entered and the E button has been pressed to start the next address line.

9. Tool output activation:

The position controller has a total of 15 different tool outputs. For each address line you can select one of these 15 tool outputs (Parameter All/P6 must be “0” to activate this feature).

Press SETUP button any time to activate and select a “tool output” with any address line. Display shows:

				P	**1**	**2**
			t	**o**	**o**	**L**
		1	**A**			**3**

= current program

tooL = tool output activation

1 = Address line “1”
***A**=absolute position*

3 = activated tool output “3” (display is flashing)

Press SETUP button again to return to address line “1’, display shows:

		2	**5.**	**5**	**0**	**0**
		1	**A**			**1**

= Display is blank

25.500 = Demand value

1 = Address line “1”
***A**=absolute position*

1 = Quantity “1”

***r**= relative/incremental position, press “ABS/REL” button to switch*
*Press **“+/-”** button to select (-) minus sign to move towards “0”*

Note:

→ Any entered Tool output will also be copied automatically to next address line. Delete copied Tool output of next address line if not required by entering a zero

→ Tool outputs are only available in Program mode, not in Single mode.

→ Tool outputs are only activated in Program Run Mode.

→ Static Tool output (Parameter All/P39 = 0.00) goes high when specific address line is showing up in the display and goes low when display is switching to next address line

→ At the end of program and when exiting a running program the Tool output will be deactivated automatically

→ Press “SETUP” in **Program Run Mode** to see activated tool output. Display shows:

		1	**0.**	**0**	**0**	**0**
		2	**5.**	**5**	**0**	**0**
		1	**A**	**t**		**3**

= current actual value

25.500 = Demand value

1 = Address line “1”
A=absolute position

t = tool output display
3 = activated tool output “3”

10. Run an existing program

☞ Press and release PROG button to enter Program mode, display shows first program no: **(Holding button for 2+ seconds will enter program mode)**

P		**1**				

= Display is blank

= Display is blank

P1 *= First Program Number*

☞ Press < or > buttons to step through all Program numbers, display shows selected program no (e.g. P28):

P	**2**	**8**				

= Display is blank

= Display is blank

P28 *= Selected Program Number 28*

☞ Press E button to enter selected program P28, display shows:

	1	**2**	**3.**	**1**	**2**	**5**
		1	**A**			**1**

= Display is blank

123.125 *= Demand value of Address line "1"*

1 = Address line "1" *1 = Quantity "1"*

☞ Press [**Start**] button, gauge moves to first position "123.125", display shows:

	1	**2**	**3.**	**1**	**2**	**5**
	1	**2**	**3.**	**1**	**2**	**5**
		1	**A**			**1**

= Actual value

123.125 *= Demand value of Address line "1"*

1 = Address line "1" *1 = Quantity "1"*

At the end of the working process at the machine Quantity will be decremented from "1" to "0" and display goes to address line no. 2

Note: Depending on the selected positioning mode in Parameter Ach1/P46 the controller starts automatically to demand position of address line no. 2

(Ach1/P46=1) or operator has to push the “Start” button any time to move to next position as entered in address line no. 2 (Ach1/P46=0)

10. Run an existing program (cont.)

☞ Press [**Start**] button again, gauge moves to second position “250.125”, display shows:

	2	**5**	**0.**	**1**	**2**	**5**
	2	**5**	**0.**	**1**	**2**	**5**
		2				**1**

= Actual value

250.125 = Demand value of Address line “2”

2 = Address line “2” *1 = Quantity “1”*

At the end of program (Quantity display of last address line = ”0”) display shows Program no “P28” again:

P	**2**	**8**				

= blank

= blank

P28 = Program number “28”

☞ Press **E** and [**Start**] button to run same program again (Controller moves to first position in address line no. 1)

or

☞ Press **<** or **>** buttons to select a different program

or

☞ Press **PROG** button to exit Program mode and to return to “Single Position Mode”

11. Exit a running program

	2	5	0.	1	2	5
	2	5	0.	1	2	5
		4	A			7

= Actual value

250.125 = Demand value of Address line "2"

4 = Address line "4" *7 = Quantity "7"*

☞ Press PROG button at any time to exit the running program and to return to "Single Position Mode". Display shows:

	2	5	0.	1	2	5
	2	5	0.	1	2	5
			A			0

250.125 = Actual value

250.125 = Last Demand value

0 = no Quantity entered

You can now enter a "Single position" outside the program and hit the [Start] button or use the manual mode to move the gauge.

Press PROG button again to re-enter and continue the same program with same line and Quantity as left before. Display shows:

	3	4	5.	0	0	0
	2	5	0.	1	2	5
		4	A			7

= Latest Actual value

250.125 = Demand value of Address line "4"

4 = Address line "4" *7 = Quantity "7"*

☞ Press [**Start**] button to restart same program at same line again

Note: To exit a running program in order to select and run a different program number press and hold C button for 2 seconds.

12. Edit an existing program

☞ Press PROG button for 2 seconds to enter Program mode, display shows :

P		**1**				

= Display is blank

= Display is blank

P1 *= First Program Number*

☞ Use < or > buttons to select program to be edited, display shows selected program no (e.g. P28):

P	**2**	**8**				

= Display is blank

= Display is blank

P28 *= Selected Program Number 28*

☞ Press E button to enter selected program P28, display shows:

	1	**2**	**3.**	**1**	**2**	**5**
		1	**A**			**1**

= Display is blank

123.125 *= Demand value of Address line "1"*

1 = Address line "1" *1 = Quantity "1"*

☞ Press < or > buttons to step through all address lines, display shows selected Address line (e.g. "7"):

	1	**5**	**5.**	**1**	**0**	**0**
		7	**A**			**2**

= Display is blank

155.100 *= Demand value of Address line "7"*

7 = Address line "7" *2 = Quantity "2"*

12. Edit an existing program (cont.)

☞ Press **0** to **9** buttons to edit Demand value of Address line No “7”, e.g. “46.750”. Display shows:

		4	**6.**	**7**	**5**	**0**
		7	**A**			**2**

= Display is blank

46.750 = New edited Demand value

7 = Address line “7” 2 = Quantity “2”

☞ Press **E** button to store edited demand value, Quantity display is now activated. Edit Quantity if necessary (e.g.“1”), display shows:

		4	**6.**	**7**	**5**	**0**
		7	**A**			**1**

= Display is blank

46.750 = Demand value

7 = Address line “7” 1 = New edited Quantity “1”

☞ Press **E** button again to store edited quantity. Controller automatically goes to address line “8”, display shows:

	2	**0**	**0.**	**0**	**0**	**0**
		8	**A**			**1**

= Display is blank

200.000 = Demand value

8 = Address line “8” 1 = Quantity “1”

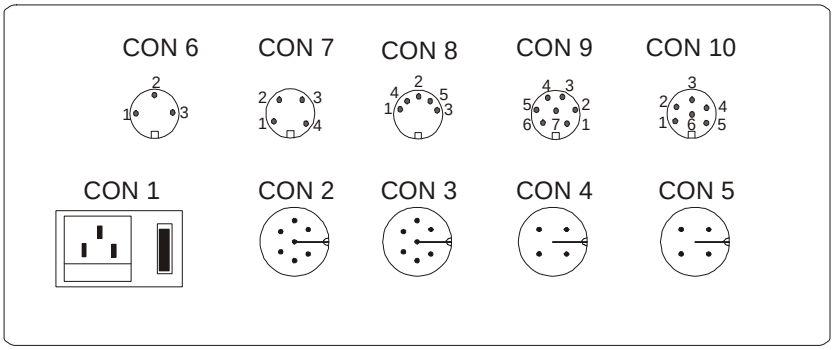
☞ Press **<** or **>** buttons to select another address line to be edited

or

☞ Press **PROG** button to exit “Program mode” and to return to “Single Position Mode”.

Note: You can only exit program mode after quantity has been entered and the E button has been pressed.

13. Connections



Rear view

CON1	Power supply
	Connector with fuse
Pin 1	L, 115V, max. 100 mA
Pin 2	N, 115V, max. 100 mA
Pin 3	PE

CON2	Encoder 5v A, /A, B, /B	Encoder 24v A, B, Z
	7 pin female connector	7 pin female connector
Pin 1	GND	GND
Pin 2	+ 5v max. 150mA	+ 24V max. 150 mA
Pin 3	A channel	A channel
Pin 4	B channel	B channel
Pin 5	/A channel	Z zero or index pulse
Pin 6	/B channel	NC
Pin 7	Shield	Shield

CON3	Inputs
	7 pin male connector
Pin1	GND
Pin 2	+ 24V max. 50 mA
Pin 3	Limit switch + direction
Pin 4	Limit switch - direction
Pin 5	Quantity
Pin 6	GND
Pin 7	Shield

13. Connections (cont.)

CON4	Brake
	4 pin male connector
Pin 1	No connection
Pin 2	Brake activated / deactivated
Pin 3	GND
Pin 4	Shield

CON5	Motor
	4 pin female connector
Pin 1	Motor +
Pin 2	Motor -
Pin 3	No connection
Pin 4	Shield

CON6	Outputs (1)
	3 pin female connector
Pin 1	Auxiliary output “3” (P06/ALL = 0) Pneumatic arm extend (P06/ALL = 1)
Pin 2	Auxiliary output “4” (P06/ALL = 0) Pneumatic arm retract (P06/ALL = 1)
Pin 3	GND

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

13. Connections (cont.)

CON8	Outputs (2)
	5 pin female connector
Pin 1	No connection
Pin 2	No connection
Pin 3	GND
Pin 4	Auxiliary output “1” (P06/ALL = 0) Pneumatic arm lift (P06/ALL = 1)
Pin 5	Auxiliary output “2” (P06/ALL = 0) Pneumatic arm lower (P06/ALL = 1)

CON9	E-stop option
	6 pin female connector
Pin 1	No connection
Pin 2	No connection
Pin 3	No connection
Pin 4	E-stop
Pin 5	No connection
Pin 6	No connection
Pin 7	E-stop

CON10	Outputs (Option)
	6 pin female connector
Pin 1	Position reached
Pin 2	Coded pin
Pin 3	No connection
Pin 4	End of program
Pin 5	Quantity reached
Pin 6	GND

14. Fault monitoring

Info	Display	Function
EStoP	Demand Value	**E-Stop button** activated. Pull E-Stop button to clear display
CurrEnt	Demand Value	**Motor current** consumption higher than P07 (Ach1) for 2 to 4 sec. Positioning stops automatically.
Ub S1	Actual Value + Demand Value	**Short circuit** with motor or drive. Check motor, motor cable/wiring. Turn power off and on to clear message. Controller has to be referenced after power on.
EncodEr	Demand Value	Controller didn't receive encoder Pulses. Check encoder, encoder Cable or encoder coupling
EndU	Demand Value	Mechanical limit switch in - direction is activated. Press "E"-button to enter manual mode to release limit switch
EndO	Demand Value	Mechanical limit switch in + direction is activated. Press "E"-button to enter manual mode to release limit switch
PdError	Demand Value	Actual value or parameters have not been saved properly on power down. Double check actual value and all parameters. Press "E" button twice to clear Message.

15. Measuring error compensation

To compensate mechanical measuring errors you can enter a list of up to 100 compensation values over your entire measuring length. The position controller automatically calculates linear error compensation between each entered compensation value. The compensation value is the value you want to read in your actual value display instead of the actual shown value.

Before activating the measuring error compensation prepare your list of actual and compensation values. You have to enter at least two data lines (min. and max. software limit)

Here is an example with 2 compensation values:

Min. software limit (Ach1/P3) = 5.000
Max. software limit (Ach1/P4) = 100.000

Actual value	Required compensation value
20.000	20.050
80.000	79.825

The following list needs to be entered into the controller:

Actual value	Required compensation value
5.000	5.000 (min. software limit)
20.000	20.050
80.000	79.825
100.000	100.000 (max. software limit)

Position controller is now making in operating mode two linear error compensations. First linear compensation is from 5.000 to 20.050, second linear compensation from 20.050 to 79.825.

How to activate the measuring error compensation and entering compensation values:

1. Enter “5” in Parameter All/P35 to activate the editor for the measuring error compensation via +/- INCH MM button

2. Press +/- INCH MM button, display shows:

			0.	**0**	**0**	**0**
			0.	**0**	**0**	**0**
			M			**1**

= Actual value (flashing)

= Compensation value

M = Editor activated

1 = first data line

15. Measuring error compensation (cont.)

3. Enter min. software limit “5.000” and hit the “E” button, display shows:

			5.	**0**	**0**	**0**
			0.	**0**	**0**	**0**
			M			**1**

= min. software limit

= Compensation value (flashing)

M = Editor activated *1 = first data line*

4. Enter min. software limit “5.000” again as compensation value, display shows:

			5.	**0**	**0**	**0**
			5.	**0**	**0**	**0**
			M			**1**

= min. software limit

= Compensation value (flashing)

M = Editor activated *1 = first data line*

5. Press “E”, display shows second data line (M 2):

			0.	**0**	**0**	**0**
			0.	**0**	**0**	**0**
			M			**2**

= Actual value (flashing)

= Compensation value

M = Editor activated *2 = 2nd data line*

6. Enter actual value to be compensated (20.000) and hit the “E” button, display shows:

		2	**0.**	**0**	**0**	**0**
			0.	**0**	**0**	**0**
			M			**2**

= actual value to be compensated

= Compensation value (flashing)

M = Editor activated *2 = 2nd data line*

7. Enter compensation value (20.050), display shows:

		2	**0.**	**0**	**0**	**0**
		2	**0.**	**0**	**5**	**0**
			M			**2**

= min. software limit

= Compensation value (flashing)

M = Editor activated *2 = 2nd data line*

8. Press “E”, display shows third data line (M 3):

			0.	**0**	**0**	**0**
			0.	**0**	**0**	**0**
			M			**3**

= Actual value (flashing)

= Compensation value

M = Editor activated *3 = third data line*

15. Measuring error compensation (cont.)

9. Repeat steps 6 to 8 to enter all compensation values from your list. Last values to be entered are the max. software limit as actual value and compensation value

10. Press +/- INCH MM at the end to store entered data lines, display shows:

		s	t	o	r	E
			0.	0	0	0
			M			5

= min. software limit

= Compensation value (flashing)

M = Editor activated *1 = first data line*

When all compensation values are stored after a few seconds, controller will be back in single operation mode

11. Enter "1" in Parameter All/P41 to activate measuring error compensation

To double check or edit entered compensation value list press +/- INCH MM and use ">" button to switch from data line 1 to the next. Press +/- INCH MM again to store and exit measuring error compensation editor. Use "<" and ">" button to toggle between actual and compensation value display.

Note: When pushing the +/- INCH MM button controller stores all values again from the first data line (min software limit) to the data line where the +/- INCH MM button was pushed. Make sure that you hit the +/- INCH MM button ONLY at the end of your entered list otherwise you will lose all data from the end of your list.

16. Tool outputs / Auxiliary outputs

→ Parameter P06/ALL must be set to "0"
→ Tool outputs are binary coded (4 hardware transistor outputs = 15 binary coded outputs

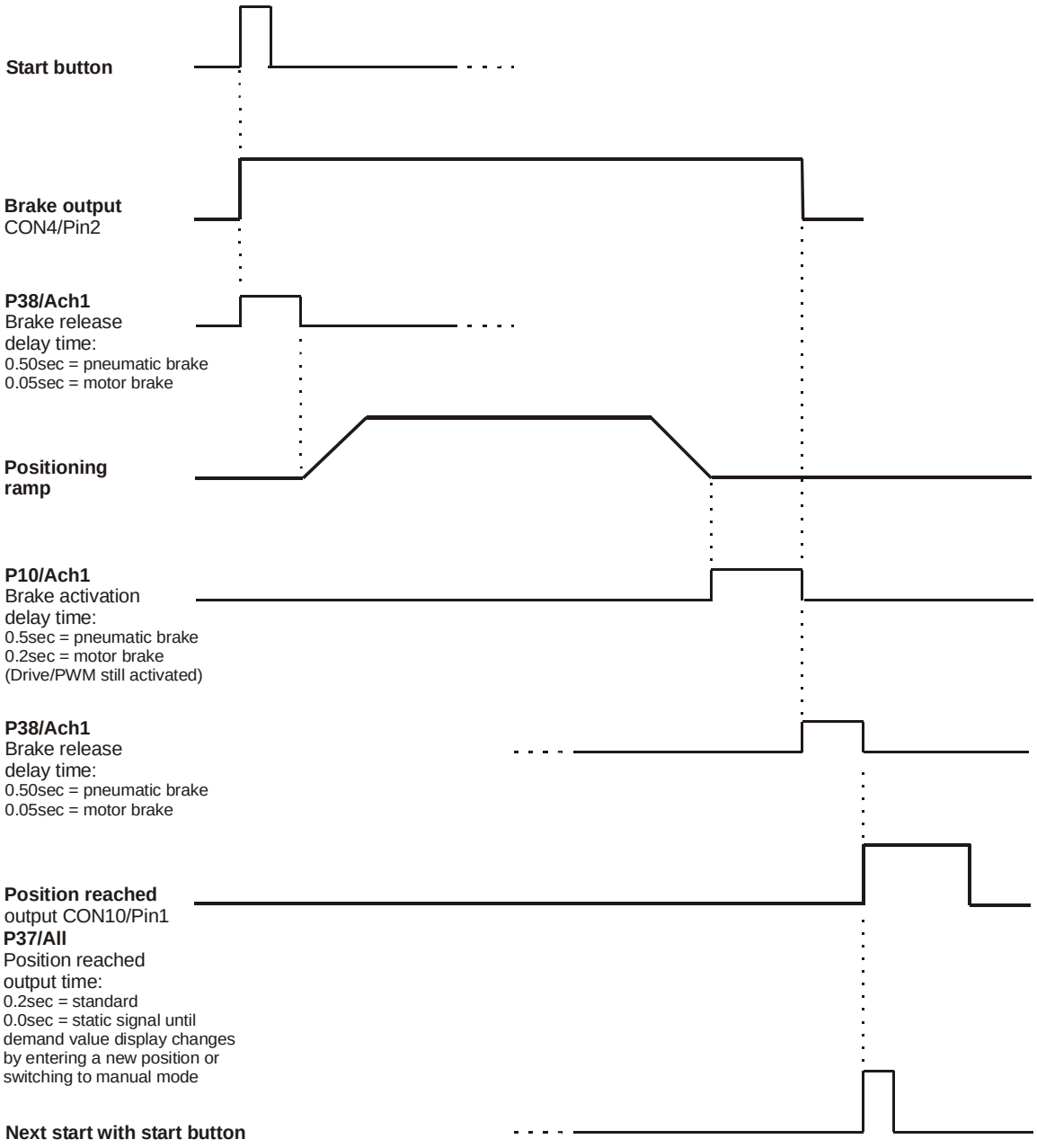
CON6	Outputs (1)
	3 pin female connector
Pin 1	Auxiliary output "3" (P06/ALL = 0)
Pin 2	Auxiliary output "4" (P06/ALL = 0)
Pin 3	GND

CON8	Outputs (2)
	5 pin female connector
Pin 1	NC
Pin 2	NC
Pin 3	GND
Pin 4	Auxiliary output "1" (P06/ALL = 0)
Pin 5	Auxiliary output "2" (P06/ALL = 0)

Setting	Activated pins
0	No output activated
1	Con 8, Pin4
2	Con 8, Pin5
3	Con 8, Pin4 + Pin5
4	Con 6, 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

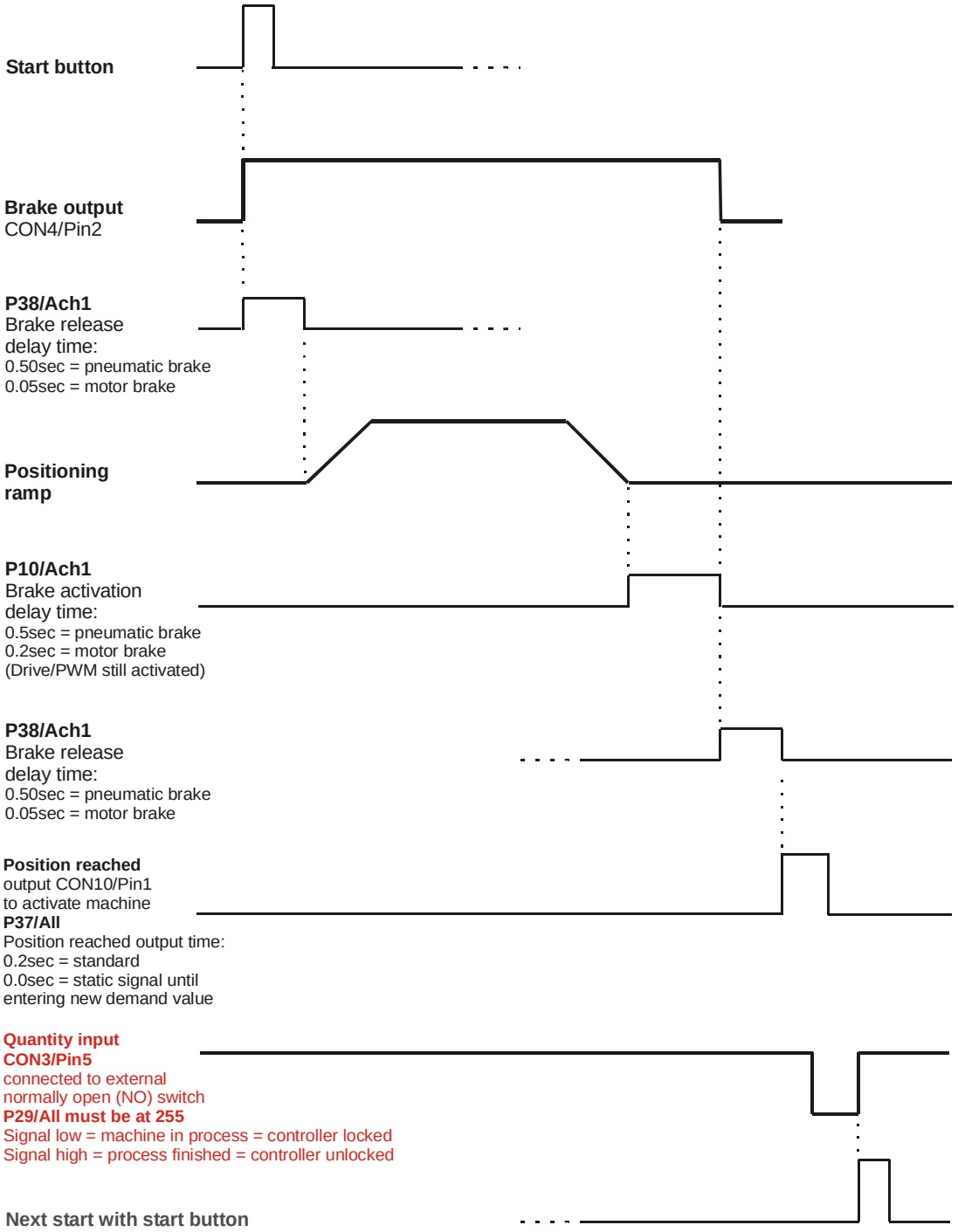
17. Timing diagrams

Single positioning, no Qty switch connected to Qty input CON3/Pin5 (P29/All = 247)



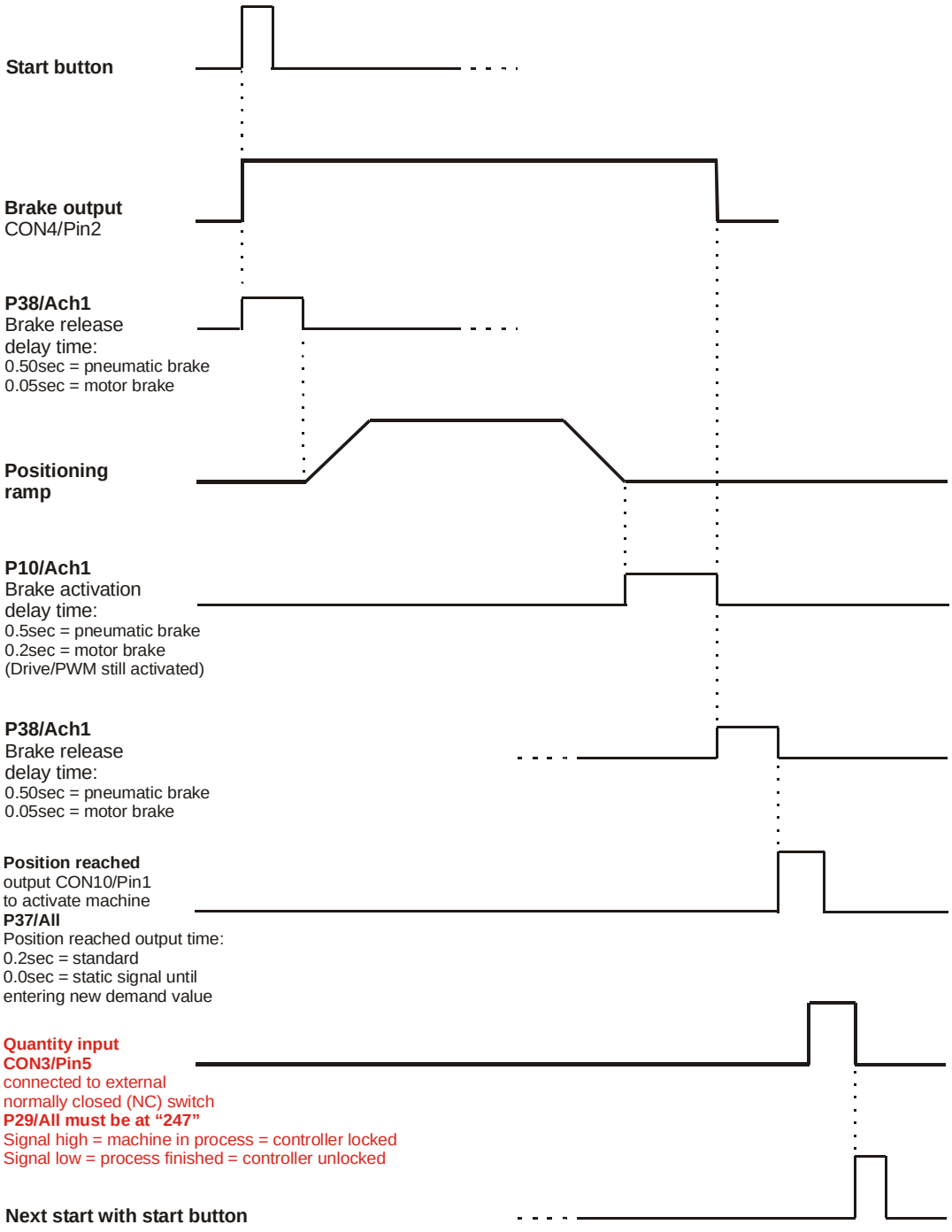
17. Timing diagrams (cont.)

Single positioning <u>with</u> Qty switch, Qty switch = normally open (NO), P29/All = 255



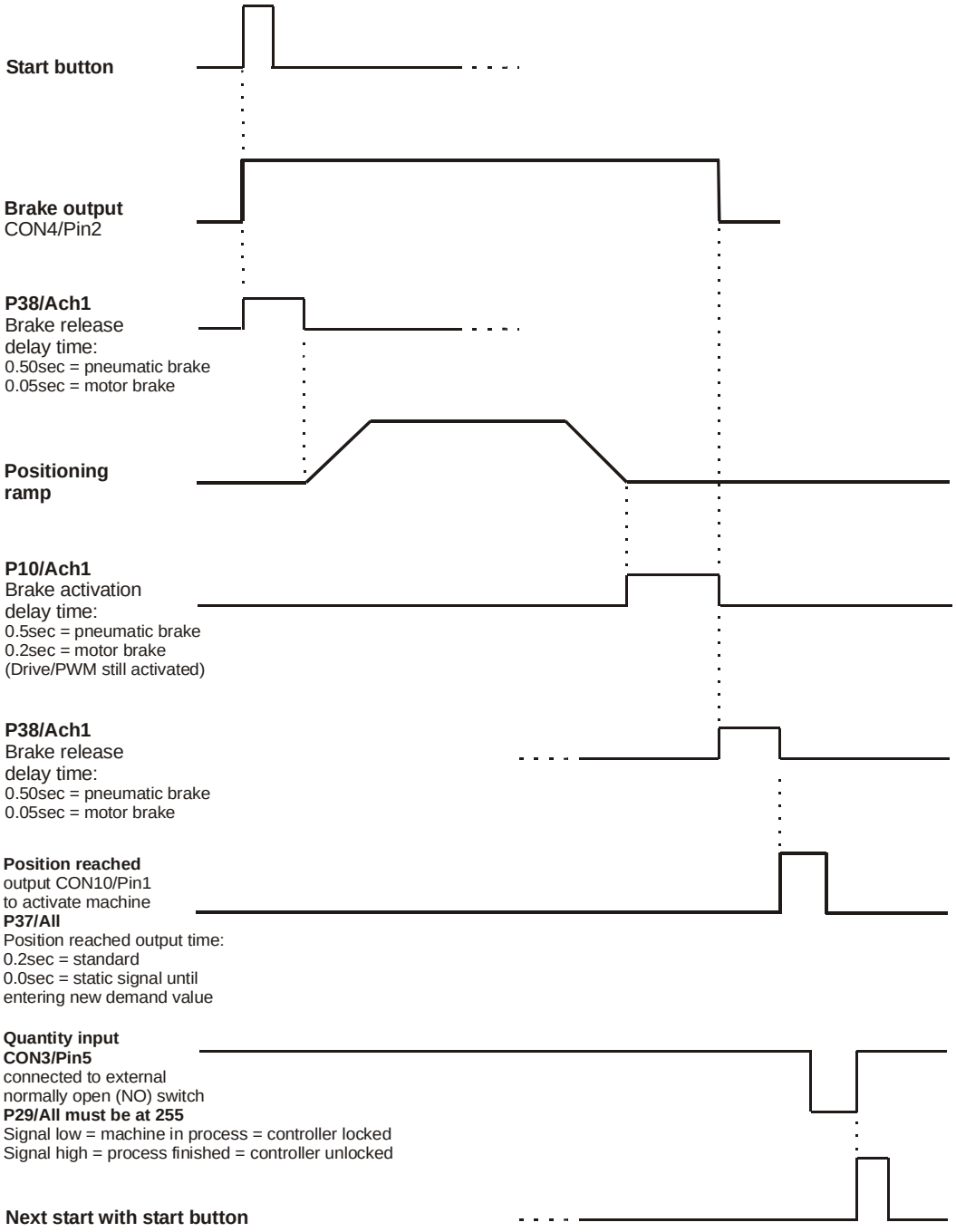
17. Timing diagrams (cont.)

Single positioning <u>with</u> Qty switch, Qty switch = normally closed (NC), P29/All = 247



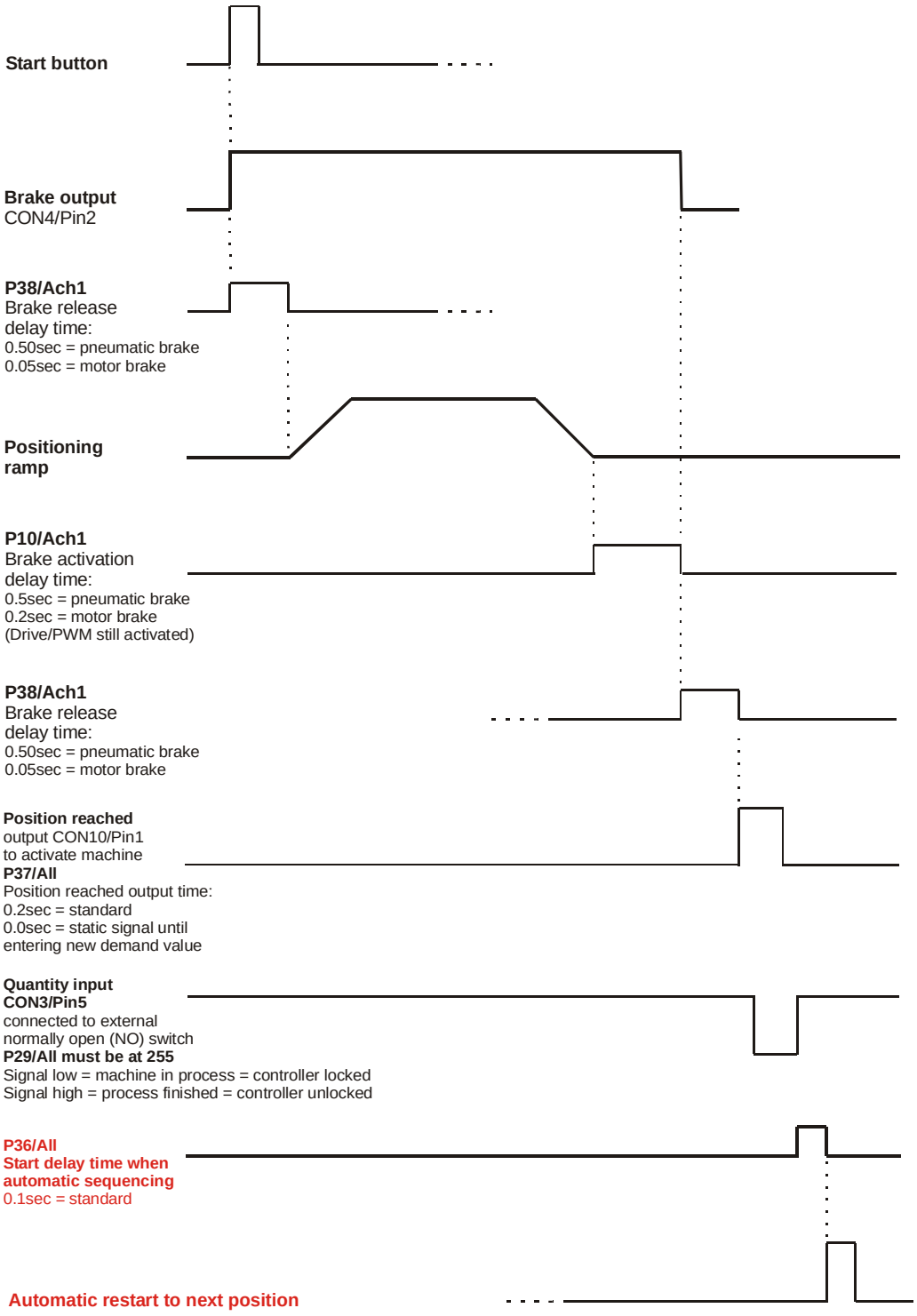
17. Timing diagrams (cont.)

<u>Manual</u> Sequencing in Program Mode, Qty switch = normally open (NO), P29/All = 255
P46/Ach1 = 0 = automatic sequencing deactivated



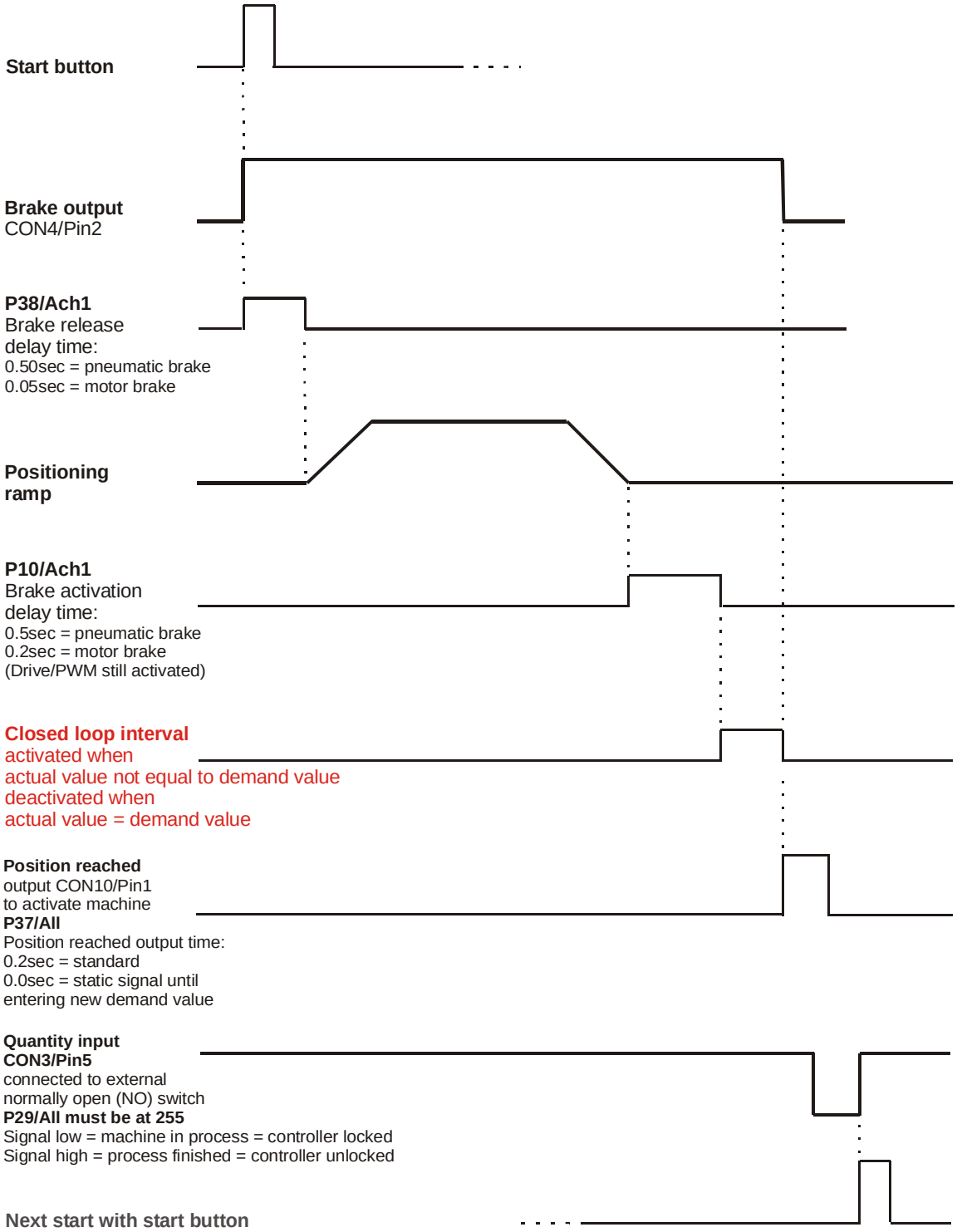
17. Timing diagrams (cont.)

<u>Automatic</u> Sequencing in Program Mode, Qty switch = normally open (NO), P29/All = 255
P46/Ach1 = 1 = automatic restart after Qty input signal



17. Timing diagrams (cont.)

Closed loop positioning (Parameter P48/Ach1 = 1)



18. Setting of Parameters

There are 7 different Parameter levels:

“rEF”	To store a datuming position
“bLAdE”	To enter saw blade width when positioning in incremental mode
“ALL”	**General parameters**
“ACH1”	**Axis related parameters**
“FACto”	Factory settings
“tESt”	Hardware test parameters

Note: Only the parameter levels “ALL” and “ACH1” are relevant for customizing

☞ Press SETUP button to enter Parameter level mode, display shows:

		r	**E**	**F**		

☞ Press +/- INCH MM + +/- INCH MM to switch to first Parameter level “ALL“, display shows

		A	**L**	**L**		

All *= General parameter level*

☞ Press **E** button to enter Parameter level “ALL“, display shows:

						1
			P			**0**

1 *= Value of Parameter 0*

P 0 *= Parameter 0*

18. Setting of Parameters (cont.)

Continue pressing the **E** button to select Parameter to be changed (e.g. P35):

						1
			P		**3**	**5**

1 =Original Value of Parameter 35

P 35 = Parameter 35

☞ Press **0** to change parameter value to “0”, display shows:

						0
			P		**3**	**5**

0 = New value of Parameter 35

P 35 = Parameter 35

☞ Press **E** button to save entered value and to switch to next parameter

☞ Repeat the last two steps to check or change parameters

☞ Press **SETUP** at any time to exit selected Parameter Mode, display shows:

		A	**L**	**L**		

All = General parameter level

☞ Press **+/- INCH MM** button twice to select Parameter level “ACH1”:

		A	**c**	**h**	**1**	

Ach1 = Parameter level for axis 1

Or

☞ Press **SETUP** again to exit to “single position” operating mode, display shows

	2	**2**	**0.**	**5**	**0**	**0**
	3	**0**	**0.**	**0**	**0**	**0**
						0

220.500 = Actual value

300.000 = Last Demand value

0 = no Quantity entered

19. Parameter List

"ALL" General Parameters	Default	User Settings
P 0 Number of axis	1	1
P 1 Serial No	0.312	0.312
P 2 Software No	Installed software version	0.032
P 3 Customer No	0.000	0.000
P 4 Distance reference switch to '0' pulse of the encoder	0.000	0.000
P 5 Automatic "go-to datum" Routine activation	0 = deactivated 1 = activated	0
P 6 Operation mode	0 = with auxiliary outputs for tool activation via connector CON6, Pin 1+2 and CON8, Pin 4+5 1 = with pneumatic retract and pneumatic arm lift/lower via connector CON6 + CON8	1
P7 Accuracy Multiplier	0	0
P29 Function input configuration (see example at the end of the parameter list)	247 (Qty=NC) (without or with NC Qty switch) 255 (Qty=NO) (with NO Qty switch)	247
P30	0	0
P32 E-stop button function	0 = Only motor is stopped 1 = Motor and outputs are stopped	0
P33 Encoder signal input	0 = GND 1 = +24v	0
P34 Function input level	0 = GND 1 = +24v	1
P35 Function of the "M" button	1 = +/- sign 2 = inch/mm conversion 3 = frequency measuring 5 = editor for error compensation	1
P36 Positioning start delay time when automatic sequencing	1.00	0.20
P37 In Position output time	1.00 0.00= static	0.20
P38 Qty reached output time	1.00	0.20
P39 Auxiliary output time	0.00 = static 0.20 to 2.50 sec = pulse length	0.00
P40 Retract function ("1" and "2" only when P29 = 255, qty input = NO	0 = by push button only 1 = automatic retract when qty input deactivated, extend only with button 2 = automatic retract when qty input deactivated, automatic extend when qty input activated again 4 = automatic qty decrement	0

	when pushing the “arm extend” button	
P41 Measuring error Compensation	0 (=Not activated)	0
P42 Security Code for level ALL, BUS and Ach1	0	0
P43 Security Code “Measuring Error compensation”	1492	1492
P44 Security Code for level rEF + “R“ button	1776	1776
P45 Function of “ABS/REL”	0 = disabled 1 = abs/inc switching	1
P46 Function of “In Position “ output	0 = always activated 4 = only active in program mode	4
P48 Quantity counter function	0 = decrementing only with external Qty switch via Qty input CON3/Pin5 1 = automatically decrementing when “position reached” output is activated	0
P49 Arm lift disable position	0.000	0.000
P50 Position reached output in Retract mode	0 = Never activated after retract 1 = Activated after retract	1
P58 Program lock code	Enter program lock code	--
P59 Program lock code Activation	0 = Deactivated 1 = Activated	0
P60 Number of programs (1-99)	99	99
P61 Program sequence mode	0 = first address line always absolute position 1 = first address line as entered 2 = Automatic program restart at end of progr am 3 = combined features (2+1) 4 = < and > buttons are activated in “program running” mode to select different address line 5 = combined features (4+1) 6 = combined features (4+2) 7 = combined features (4+2+1)	1
P62 Actual program number	read only	--
P63 Demand value status	read only (0=abs / 1=inc)	--
P64 Software limit monitoring when pushing the “P” button to exit the program	0 = deactivated 1 = activated when entering incremental positions. After pushing the “P” button controller will jump to the address line that violates the software limit (Ach1 P3+4)	0

P65 Position Reached Output enable for first program position	0 = position reached signal disabled for the first line of the program 1 = position reached signal enabled for all program positions	1
P66 Tolerance window mode	0 = tolerance window calculation only within brake release delay time (Ach1/P38) 1 = tolerance window calculation always activated 2 = Pushing “Start” again within tolerance window activates “In Position” output again when positioning in absolute mode (combined with tolerance window mode “0”) Note: “In position output time (All/P37) must be greater than zero (zero = static) 3 = Pushing “Start” again within tolerance window activates “In Position” output again when positioning in absolute mode (combined with tolerance window mode “1” Note: “In position output time (All/P37) must be greater than zero (zero = static)	1
P67 Brake activation mode	0 = after Ach1/P10 delay time (for pneumatic brake) 1 = immediately after position is reached (motor brake only)	0
P68 Start Button enable in program mode	0 = Start button enabled in program mode 1 = Start button disabled in program mode (only quantity input will advance program)	0
P90 Serial address	11	11
P91 Baud rate	0 = 4800, 1 = 9600 2 = 19200, 3 = 38400	1
P92 Serial Protocol	0 = RS232/TS312 download 1 = Barcode scanner	0
P93 Scanner Set-point	0 = Set-point written to target 1 = Current record is written to target	0
P94 Serial output activation	0	0
P95 Serial output configuration	0	0
P98 “P” button activation	0 = “P” button enabled (with program)	0

	1 = “P” button disabled (without program)	
P99 Automatic demo mode	0 = deactivated 1 = activated	0

"ACH1" Axis Parameters	Default	User settings
P 0 Actual value for RS232	Read only	Read only
P 1 Demand value for RS232	Read only	Read only
P 2 Datum value for RS232	Read only	Read only
P 3 Software limit -	0.000	0.000
P 4 Software limit +	999.000	120.000
P 5 Distance for Multiplication	3.937=inch 7.874=inch (TSR70B / 8:1) 1.000=mm or linear encoder	1.000
P 6 Number of increments (max. 30,000)	7200 (PD40P) + up to 11/2003 10000 (PDxx) 20000 (TSR80) 29091 (TSR70B / 8:1) 27273 (TSR70B / 15:1) 5080 (5micron linear)	5080
P 7 Max. Permanent current in Amps (+/- 10% measuring tolerance)	4.00 = PD50, PD100, PD100Q, PDE, TSR70B 6.00 = TSR80S, PD100P, PDE-P PD1000 7.00 = PD1000P	4.00
P 8 No. of automatic restarts (Must be "0" when closed loop feature activated, Ach1/P48=1)	1 = PDxx 0 = PDxx, no gripper but pusher 0 = TSR70B + TSR80S	1
P 9 Tolerance window	6 = TSR70B 4 = TSR80S 6 = PDxx	6
P10 Brake activation delay time when position reached and All/P67=0, and Automatic restart delay time (P8>0) to avoid motor over-heating	0.50 = PDxx with pneumatic brake 0.20 = PDxx no brake/motor brake 0.20 = TSRxx	0.20
P11 Max. Ramp distance (P70 = 0, just for stop applications)	15000 = PD50 (30v) 8000 = PD100 10000 = PD100P 45000 = PD100Q (30v) 16000 = PDE 15000 = TSR80S	--
P11* Max. Ramp distance (*when using time controlled drive / P70=1 for pusher applications, enter here: "P61xP71" = ramp distance	37500 (TSR70B) (TSR80S) 40850 (PD40P) 56000 (PD40 / 15:1) (PD100 / 15:1) 52000 (PD100-Q / 8:1/80% speed) 45000 (PD100-P / 15:1/180lbs) (PDE / 8:1) 84000 (PDE-P / 8:1/220lbs) 45000 (PDE-P / 15:1/440lbs) (PDE-P old / 21:1/440lbs) (PD1000 / 8:1)	56000

		(PD1000-P/23.2:1/2,000lbs)	
P12	Drive mode after position reached	0 = drive is turned off after position is reached (motor can easily be moved out of position when no brake is activated; generated overvoltage can harm the motor) 1 = Motor pins are automatically connected to ground when position is reached (transistor short circuit bridge to avoid overvoltage. Motor cannot be moved out of position anymore)	1
P13	Fast speed Forward + backwards (Percentage of max speed)	100 80 = PD100Q	100
P14	Manual slow speed (Percentage of max speed)	20	20
P15	Deceleration ramp Time interval (msec)	0.200	0.200
P16	Fast speed backwards only	0 = as entered in P13	0
P17	Backlash compensation Dwell time	0.00 (= deactivated) 0.02 (TSR70B)	0.00
P18	Backlash compensation Distance (**P18 > P9**)	0.002 0.015 (TSR70B motor at far end) -0.015 (TSR70B motor next to machine)	0.002
P19	Integral term 1	1 (= max. ramp)	1
P20	Integral term 2 at automatic restart (P8>0)	1	1
P21	Differential term	0	0
P22	Feedback monitoring Interval (msec) 1/P22 x P23/P24 = max. drive frequency in kHz (P74 Integral term monitoring time interval)	PDxx = 0.20 TSR70B = 0.10 TSR80S = 0.10	0.20
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	1
P27	Counting mode while positioning	0 = Counts while debugging 1 = standard counting mode	1
P30	Retract time delay	0-10.00 seconds	0.000

In seconds		
P34 Brake amplification	0	0
P35 Deadman zone -	0.000	0.000
P36 Deadman zone +	0.000	0.000
P37 Counting direction for Manual mode	0 or 1	1
P38 Brake release delay time (tolerance window calculation time, P66=0)	0.20 (PDxx) 0.05 (TSR70B + TSR80S)	0.20
P39 Retract distance	0.000 (=pneumatic)	0.000
P40 Decimal place	3	3
P41 Display brightness	15	15
P42 Positioning mode	0 = absolute 1 = incremental	0
P43 Incremental move mode 0 = without incremental error compensation for saw and cutting applications 1 = with incremental error compensation for punching and drilling applications	0 = no incremental error compensation 1 = with incremental error compensation 2 = same as 0 and relative moves are always toward zero 3 = same as 1 and relative moves are always toward zero	0
P44 Saw blade width (to be entered with selected incremental mode for saws)	0.000 *Special Note: Software Versions 26 and higher have "BLADE" WIDTH at PARAMETER LEVEL; ENTRY CODE = 1492*	0.000
P45 Parking position (teach) only with Pusher software	0 = not activated	0
P46 Automatic Program sequence	0 = not activated 1 = automatic restart after Qty input)	1
P47 Offset parking position (Parking position = last address line of a program with Qty = 0)	0	0.000
P48 Closed loop feature (Ach1/P8, automatic restart must be "0" when closed loop feature activated (=1)	0 = deactivated (Stop with brake) 1 = activated (Stop without brake or Pusher with brake)	0
P49 Closed loop response time in msec	1 = fastest response time	1

P50	Closed loop window (automatic feedback when outside this window) < than P09 with separate encoder	5 = PDxx 3 = TSR80S 9 = TSR70B	3
P51	Closed loop mode	0 = only activated after each positioning (closed loop to demand value only) 1 = also activated after hitting Stop button or when turning power on (closed loop to actual value) 2 = for pusher with brake. Closed loop mode also activated during P10 delay time after position is reached (to avoid carriage moving out of position by material gravity while brake is not activated yet.	0
P52	Proportional action Coefficient for closed loop	Should not exceed 1% of P11 in ACH1	50
P53	“Go-to-datum” direction	0 = in (-) direction 1 = in (+) direction	1
P54	Zero pulse edge trigger	0 = falling edge 1 = rising edge	1
P55	“Go-to-datum” offset New actual value (P00) = Datum value (P2) + P55	0	0.000
P56	Parking position after “Go-To-datum” routine	0	0.000
P57	Encoder monitoring interval in 0.000 sec	0=not activated	0.000
P58	Ramp threshold to activate Encoder monitoring interval	30%	30%
P59	“Go-to-datum” speed (%) Percentage of max speed	100%	100%
P60	Motor rotation direction	0 or 1	1

P61 Max. encoder counting Frequency at 100% max. Speed (P13=100). To be measured when time Controlled drive required (P70=1) → via "M" button (All/P35=3/see installation guide)	150000 (TSR70B) (TSR80S) 40850 (PD40P / 15:1) 56000 (PD40 / 15:1) (PD100 / 15:1) 52000 (PD100-Q / 8:1/80% speed) 45000 (PD100-P / 15:1/180lbs) (PDE / 8:1) 84000 (PDE-P / 8:1/220lbs) 45000 (PDE-P / 15:1/440lbs) (PDE-P old / 21:1/440lbs) (PD1000 / 8:1) (PD1000-P/23.2:1/2,000lbs)	111928
P62 Encoder pulse time interval to be compared with P61	0 = P61/62 deactivated	0.0000
P70 Time controlled PI drive activation (measure counting frequency P61 first)	0 = standard drive (via P11) 1 = P71 to P76 activated	1
P71 Ramp time	(0 to max speed, don't enter values less than min motor ramp time)	0.6000
P72 Proportional Gain 1	(Acceleration ramp) Increase value in 0.0050 increments when stopping with max. material weight before reaching demand position when using as a pusher	0.150
P73 Proportional Gain 2	(Deceleration ramp) Increase value in 0.0050 increments when over-shooting with max. material weight when using as a pusher	0.1500
P74 Integral term	To ensure: a) smooth positioning for the last ¼ to ½ inch of deceleration ramp) b) precise positioning for very short (< 1inch) distances	0.0040
P75 Differential gain (0-100%)	0 = not activated	0
P76 Automatic Proportional Gain limitation	0 = deactivated 1 = activated	1
P77 Ramp adjustment factor	1.00 (ideal, high dynamic motor) (>1.00 when overshooting <1.00 when not reaching position)	1.00
P78 Stop arm offset mode (when additional arm extension is required to get closer to the tool)	0 = not activated 1 = via "**<**" button offset value as entered in P64 will be subtracted from actual value ("**I-**" will be shown in demand value display) "**>**" button deactivates offset	0

	(offset value P64 will be added again to actual value 2 = offset activation via external proxy switch to recognize mounted arm extension (optional connector CON9 with offset input required)	
P79 Offset value for stop arm extension	0.000 (=length of arm extension)	0.000
P80 Controller status Only activated with RS232	0 = not ready 1 = ready to operate 2 = controller is positioning 4 = controller in position 8 = go-to-datum routine active 16 = over-current 32 = short-circuit 64 = encoder error 128 = software limit reached 256 = program run mode activated	read only

BLADE Parameters	Default	User settings
Passcode for Entry	1492 (P43 in All)	1492
P 0 Saw Blade Width	0.0	0.0
P 2 Photo-Eye Recognition	0 = Off, 1 = On	0
P 3 Distance From Photo Eye to Blade / Punch (for trim cut or initial punch)	0.000	0.000
P 4 Procedure Sequence Automatic default: 1st line of program (post photo eye)	0 = Off, 1 = On	0

20. Description of All/P29 -Input configuration

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

NO = Normally Open (binary value = 1)
NC = Normally closed (binary value = 0)
Parameter All/P34 must be at "1" (Input level = 24v, 24v activates input)

Input	Function	Decimal
0	Start	1
1	Stop	2
2	Zero/Index pulse enable	4
3	Quantity	8
4	Arm lift/lower	16
5	Arm retract/extend	32
6	Limit switch (-)	64
7	Limit switch (+)	128

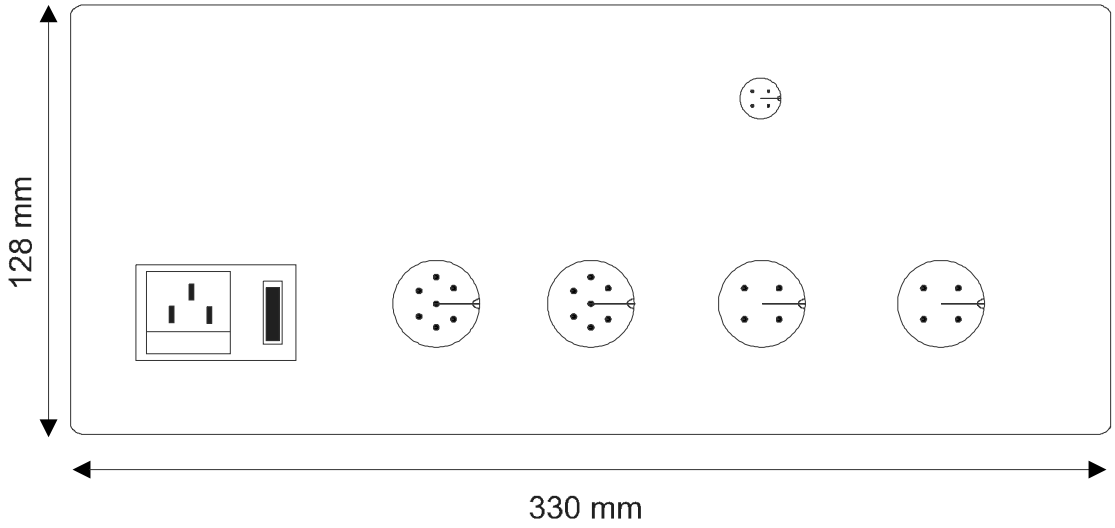
To get parameter value to be entered determine if input 3, 4, 6 and 7 is needed as NO or NC. Then multiply the binary value with the decimal value for each input and add up the results of each input.

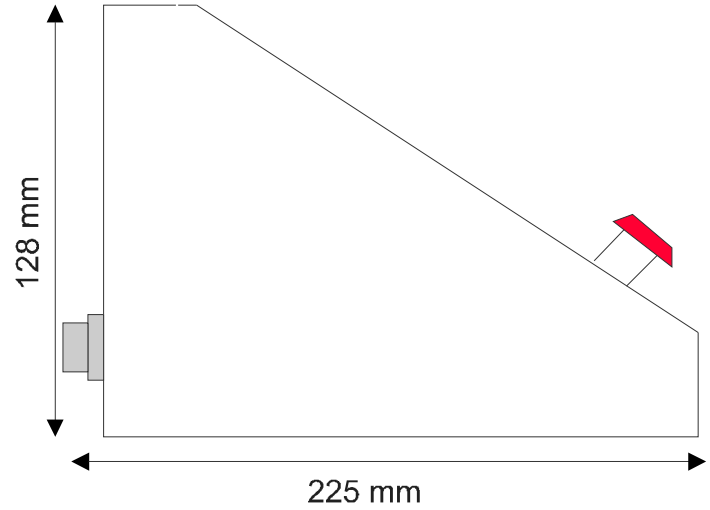
Example: Input 3 and 4 = NO, Input 6 and 7 = NC

Input	NC / NO	Binary	Decimal	Binary x Decimal	
0	NO	1	1	1	+
1	NO	1	2	2	+
2	NC	0	4	0	+
3	**NO**	**1**	**8**	**8**	**+**
4	**NO**	**1**	**16**	**16**	**+**
5	NO	1	32	32	+
6	**NC**	**0**	**64**	**0**	**+**
7	**NC**	**0**	**128**	**0**	**=**
			Total	**59**	

Enter "59" in parameter All/P29 to get required input configuration

21. Dimensions





22. Specifications

Power supply	115vac ± 10%
Consumption	Max. 200mA without encoder and motor current
Max. permanent motor current	6 amps, intermittent current 20 amps
Encoder signal	A, B, at 24v level
Counting frequency	100kHz (4 edge counting mode) 250kHz (1/2 edge counting mode)
Display	3 x 7 digits red, 14mm high
Operating temperature	0° to 40°C (32° to 104°F)
Condensation	Max. 90 %
Outputs	Max. 8 transistor outputs 0.7A / 30vdc
Function Inputs	4
Protection	IP 54

23. Warranty

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.