

Operator's Manual
Teach-Program

version 1.35 and greater
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231760

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1 General

This operator's manual describes the program control using the teach terminal HT-2 or the front panel of the control group PA-CONTROL.

1.1 Activating the teach operation

You activate the teach operation through starting the program TEA_MAIN.PNC. In the program TEA_PARA.PNC you define whether a teach terminal HT-2 is used or not. Corresponding to that definition the HT-2 or the keypad of the control PA-CONTROL will be activated.

Following messages appear on the front panel of the control PA-CONTROL:

Teach operation through front panel

G:L	AXIS X	TEACH:0.000	IST:0.000
ENTER/ESC		SCROLL WITH CURSER KEY UP/DOWN	

Teach operation with teach terminal HT-2

***** TEACH-TERMINAL *****
ACTIVE

2 Presettings

2.1 Parameter file

In the program TEA_PARA.PNC you adjust the teach parameters corresponding to the control model PA-CONTROL and application.

The parameter file TEA_PARA.PNC displays as follows:

```

; SETTING THE SPECIFIC
; PARAMETER
;+++++
M182:=1           ;KEYBOARD EXISTS
M184:=1           ;MANUAL FUNCTIONS
M196:=0           ;ACCEPT KEY I3
M197:=1           ;ENTER MODE  0=SINGLE 1=ALL

N473:=1           ; 1. TEACH - REGISTER
N473:=N473-1
N474:=2           ; NUMBER OF AXIS
N484:=1           ; DEFAULT TEACH POINT
N485:=30          ; NUMBER OF TEACH POINTS
N483:=N485-0      ; FREE RANGE
N483:=N483+N473

N460:=0           ; DO NOT CHANGE!!
N461:=2           ; END OF STATION 1
N462:=4           ; END OF STATION 2
N463:=0           ; 3
N464:=0           ; 4
N465:=0           ; 5
N466:=0           ; 6
N467:=0           ; 7
N468:=0           ; 8
N469:=0           ; 9

N508:=2           ; 1=COM1 2=COM2
SUB TEA_LONG      ; LOADING AXIS PARAMETER
END

```

Used ranges for the entire teach program:

N- Register: N450 to N509
R- Register: R468 to R484
Marker: M170 to M216

2.2 Description of register

In the program TEA_PARA.PNC the different register and marker have following functions:

- M182 keyboard exists 0=No, 1=Yes
At M182:=1 and no teach terminal HT-2 the front panel is active
- M184 manual functions 0=No, 1=Yes
- M196 accept keys of teach terminal HT-2 activating 0=No, 1=Yes
- M197 Saving all axis positions with ENTER at the same time or only the chosen axis.
AT M197:=0 each axis position has to be single saved with ENTER.
- N473 Start of saving range for teach positions. 1.Register for position 1
- N474 Number of axis, dependent on control. e.g. PA-CONTROL Single N474:=1
- N484 Current position at the start of the teach program. N484:=4 is P4 current at the start
- N485 Number of teach positions is equal for each axis.
- N483 Free range of not described register.
At N483:=N485-5 the last 5 register are not used.
- N461 which manual functions are needed for station 1
- N461 which manual functions are needed for station 2
- N463 etc.
- N508 At which interface is the teach terminal HT-2 connected.

2.3 Example for a parameter file

```

; SETTING THE SPECIFIC
; PARAMETERS
;+++++
M182:=1                ;KEYBOARD EXISTS
M184:=1                ;MANUAL FUNCTIONS
M196:=0                ;ACCEPT KEY I3
M197:=1                ;ENTER MODE    0=SINGLE 1=ALL

N473:=1                ; 1. TEACH - REGISTER
N473:=N473-1
N474:=2                ; NUMBER OF AXIS
N484:=3                ; DEFAULT TEACH-POINT
N485:=30               ; NUMBER OF TEACH POINTS
N483:=N485-5           ; FREE RANGE
N483:=N483+N473

N460:=0                ; DO NOT CHANGE!!
N461:=2                ; END OF STATION 1
N462:=4                ; END OF STATION 2
N463:=10               ; END OF STATION 3
N464:=0                ; 4
N465:=0                ; 5
N466:=0                ; 6
N467:=0                ; 7
N468:=0                ; 8
N469:=0                ; 9

N508:=2                ; 1=COM1 2=COM2
SUB TEA_LONG           ; LOADING AXIS PARAMETER
END

```

1. M182: using the teach terminal the HT-2 is active, otherwise the front panel
2. M184: manual functions are set and needed
3. M196: the accept keys of the HT-2 are not considered in the program
4. M197: the positions of all axis are to be saved with ENTER
5. N473: the range for the positions start at R1
6. N474: two axis are being moved and edited in the teach program
7. N484: at the start of the teach program POS.3 is the current position
8. N485: for each axis 30 positions were set X-axis uses R1 to R30, Y-axis uses R31 to R60, those register are used in the main program
9. N483: the position 26 to 30 and 56 to 60 are locked and will not be recorded
10. N461: for station 1 manual function 1 and 2 are released
11. N461: for station 2 manual function 3 and 4 are released
12. N463: for station 3 the manual functions 5, 6, 7, 8, 9 and 10 are released
13. N508: the teach terminal HT-2 is connected to COM2

2.4 Transferring the programs

All necessary programs for the teach program are stored on the disk. Programs for maximum eight axis are stored. All programs on disk will be copied on to the control.

If the program development system registers a transfer failure within one of the following programs this failure will be passed over with the command *ignore*.

This failure can show up in the following program names:

TEA_X.PNC	axis X
TEA_Y.PNC	axis Y
TEA_Z.PNC	axis Z
TEA_U.PNC	axis U
TEA_V.PNC	axis V
TEA_W.PNC	axis W
TEA_Q.PNC	axis Q
TEA_P.PNC	axis P

3 Teach program

The teach software is operated either with the teach terminal HT-2 or with the front panel of the control PA-CONTROL.

Warning!

Before you start the teach program with the command `SUB TEA_MAIN` you have to conduct the reference move with the axis chosen in the teach program.

3.1 The keyboard functions in the teach program

The sub-menus in the teach program can be started through short cuts or selected through the cursor keys "UP/DOWN" and pressing ENTER. (Please see the description to each menu.)

->	Cursor key right: moves the chosen axis in positive direction (front panel)
<-	Cursor key left: moves the chosen axis in negative direction (front panel)
H	manual functions::: calls up the sub-menu manual function
Z	Target position: Target position input is user required
+	Relative position: relative change of positions in positive direction
-	Relative position: relative change of positions in negative direction
T	Teach position: teacher position will be target position
P	Position: new position is user required
G	Speed: Switch of speed between fast and slow
X+/X-	axis X to Z: switch and move axis with teach terminal HT-2
2nd	axis V to P: switch and move axis with teach terminal HT-2
F1	F1 to F4: special function keys on the teach terminal HT-2
SHIFT+1	SHIFT+1 to 4: special function equal to F1 to F4 (front panel)
ENTER	save axis position or click menu option if using the cursor keys up/down
ESC	exit sub-menu or teach program

3.2 The keyboard of the teach terminal HT-2

The key functions as shown below will be described in detail afterwards.

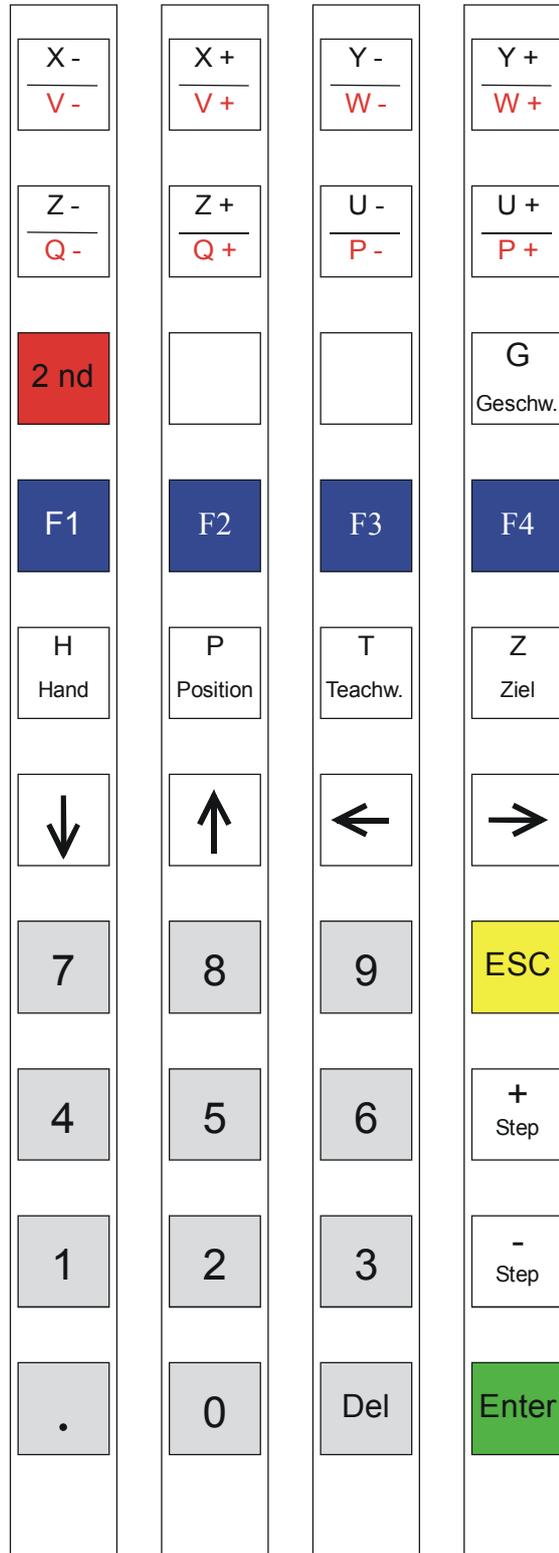


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3.3 Content of the displays

The front panel of control PA-CONTROL shows as follows:

G:L AXIS X	TEACH:0.000	IST:0.000
ENTER/ESC	SCROLL WITH CURSOR KEY UP/DOWN	

The display of the teach terminal HT-2 shows as follows:

10.000 A:X G:S
0.000 POS.:1

A or AXIS

- shows the chosen axis, in this case axis X = X- axis, Y = Y- axis, Z = Z- axis, ...

TEACH or decimal value left top hand on the HT-2

- shows the already saved position at the chosen axis and the corresponding position

IST or decimal value left bottom hand on the HT-2

- shows the current axis position of the chosen axis

POS.:1

- displays the current position to work on. Operating the front panel the key **P** has to be pushed.

ENTER

- places the current axis position as teach position

ESC

- with this key you leave a sub menu or the TEACH program and continue working with the teach value

Scroll with cursor key UP/DOWN

- With the cursor keys up and down all possible sub menu points show up. With ENTER you start the function shown on the display. With ESC you exit the menu.

Important!

<p>If choosing a sub menu through the cursor key UP/DOWN you have to confirm with ENTER, or leave the sub menu with ESC. You start the same operation through the corresponding short cut.</p>

H or H

STATION ?

The key H starts the manual functions. If several stations are connected in the TEA_PARA.PNC you first input the station number by pushing 1 through 9. Afterwards the following display appears:

KEYBOARD MANUAL FUNCTIONS: UP/DOWN <>ESC
MANUAL FUNCTION 3 1 ==== 0

With cursor keys left/right you set and reset the actuator. With cursor keys up/down you choose the manual function. You exit the manual function program with ESC. The text MANUAL FUNCTION 3 will be changed in the program HAND_TXT.PTX accordingly. The display 1 ==== 0 shows the setting of the end switch which is inquired in the main program. The display changes as follows as soon as the cylinder moves:

```
1 ==== 0
0 ==== 0
0 ==== 1
```

Program example for a manual program:

```
HAND_1.PNC
G21 M188.1 END
LD M185.1
OUT O9                            ; Exit for actuator
$END
LD I9.1                           ; Sensor reeled-in
OUT M186
LD I10.1                          ; Sensor reeled-in
OUT M187
END
```

Simply the inquiry LD I9.1 and the output OUT O9 will be changed accordingly to the input and output variable as set real. The manual program name has to be changed accordingly in the program H_MAIN.PNC.

STATION ?

Station number input.

MANUAL FUNCTION 3
1 ==== 0

Proceeding method as described above.

P or P

TEACHPOS.	PLEASE SELECT	(1...30)
TEACHPOS. [1]	IS TREATED	

With the key *P* a new position is chosen. The current position is shown in brackets []. The new value is entered through the numeric keypad and confirmed with ENTER. If the value is too high a message is displayed and new data input is required.

0.000	POS.
30	MAX.

With the key *P* a new position is chosen. The new value is entered through the numeric keypad and confirmed with ENTER. If the value is too high the value 0.000 again is displayed in the 1. line. The second line displays the range in which the input has to be.

T or T

G:L	AXIS X	TEACH:150.000	IST:185.600
ESC		ENTER <<	TARGET: 150.000

With the key *T* the chosen axis is moved from the current position to the saved position. Through pushing the key ENTER the axis is moved to the target 150 mm. If you don't use the key ENTER the axis stops. With the key ESC the request is ignored.

10.000	-> ENT.
0.000	POS.:1

With the key *T* the chosen axis is moved from the current position to the stored position.

The display comprises the following message:

Line 1: saved position value is 10mm; the axis is moved to the saved position value with the key ENTER

Line 2: current axis position value = 0mm; position 1 is to work on .

The axis only moves as long as the key ENTER is pushed. If the end position 10mm has not been reached yet and you release the key ENTER the axis stops. With the key ESC the request is ignored.

Z or Z

G:L	AXIS X	TEACH:150.000	IST:185.600
ENTER/ESC		TARGET INPUT [0]

With the key Z you can type in a new target position for the current axis as absolute value. You confirm the input with ENTER. You ignore the input with the key ESC.

G:L	AXIS X	TEACH:150.000	IST:185.600
ESC		ENTER << TARGET: 130.000	

The axis is moved afterwards to the new target with the key ENTER as described before.

0.000	TARGET
0.000	POS.:1

With the key Z you can enter a new target for the current axis and position as absolute value. The display comprises the following message:

Line 1: You enter the absolute value in mm through the numeric keypad. If the input value is too high the maximum value is displayed.

Line 2: current position value is 0mm and work on position 1.

After the input of 100mm following display appears:

100.000	-> ENT.
0.000	POS.:1

With the key ENTER the axis is moved to the end position 100mm. The axis only moves as long as the key ENTER is pushed.

+/- or +Step/-Step

G:L	AXIS X	TEACH:150.000	IST:185.600
ENTER/ESC		STEP +	INPUT [0]

With the key + or - you can enter a new target position for the current axis as incremental value. The operational sign is automatically considered through pushing + or -. You confirm the input with ENTER. You ignore the input with the key ESC.

G:L	AXIS X	TEACH:150.000	IST:185.600
ESC		ENTER << TARGET: 130.000	

The axis is moved afterwards to the new target with the key ENTER as described before.

0.000	STEP +
0.000	POS.:1

With the keys + *Step* and - *Step* the axis can be relative positioned regarding the current position.

After pushing the key + STEP the display contents the following message:

Line 1: chosen function STEP + value input through numeric keypad

Line 2: current position value is 0mm for position 1

After the input of 5.50mm following display appears:

5.500	-> ENT.
0.000	POS.:1

With the key ENTER the axis is moved to the end position 100mm.

The axis only moves as long as the key ENTER is pushed.

SHIFT+1 to 4 or F1 to F4

With the key combination SHIFT+1 to SHIFT+4 you can start special programs.

Those program names are TEA_F1.PNC to TEA_F4.PNC.

The program functions are user defined.

The same programs as above described can be started with *F1* to *F4*.

CURSER KEY UP AND DOWN

You can scroll through the menu with cursor key UP and DOWN.

Each function displays like TARGET or STEP +.

You activate the displayed menu option with **ENTER**. Further proceeding as described above. At the beginning you have to push the cursor key 2 times.

CURSOR KEY LEFT AND RIGHT

With the cursor keys **LEFT** and **RIGHT** you move the chosen axis. Pushing once the axis only moves step wise dependent on axis configuration, pushing longer the axis moves continuously.

With the cursor keys **LEFT** and **RIGHT** all positions display in ascending or descending sequence.

5 Ending the teach program

You end the teach program through pushing the key **ESC**.

6 Important information on the teach program

The teached values are stored in the corresponding registers as described in chapter 2.3.
The positioning of the axis is done using the corresponding registers so that the automatic program can use the teached positions.

WARNING!!!

**A value is stored when the value following TEACH: corresponds the value following IST:.
Analogue to this the value in line 1 has to correspond to the value in line 2.**

7 Wiring diagram for the teach terminal HT-2

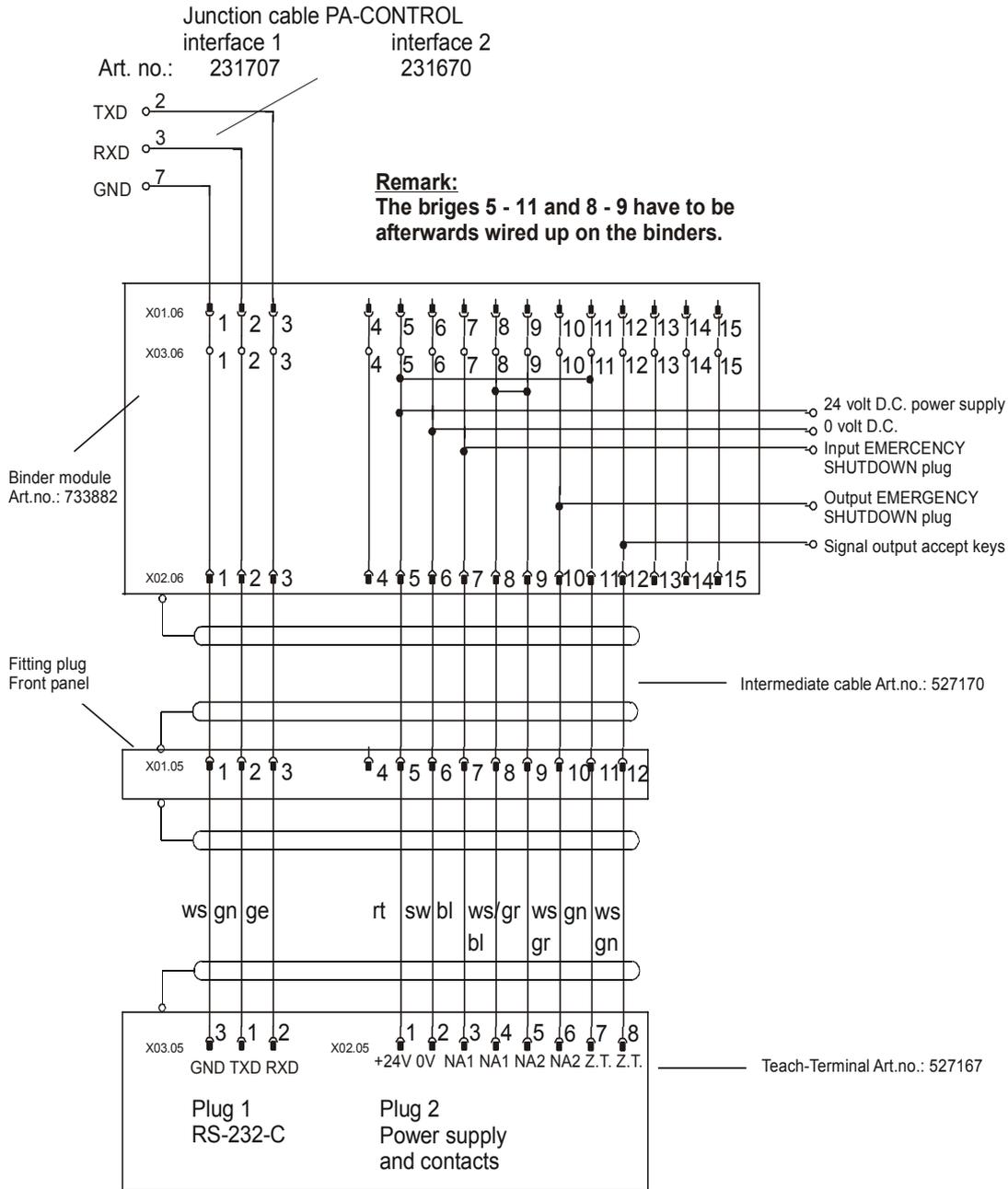


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