WANDFLUH
Hydraulics + Electronics

OPERATING GUIDE

POSITION CONTROLLER PLUS SD1X4

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Operating guide to Position controller PLUS SD1X4

1 General information

This operating guide (OG) makes it possible to use the WANDFLUH Position controller PLUS SD1X4 (Position controller PLUS) safely and according to specification. The OG includes instructions which WANDFLUH as the manufacturer, or its resale organisations (WANDFLUH sister companies or distributors), provide to users within their duty to instruct.

For this purpose, the OG mainly includes:

- information about use according to specification, installation and commissioning of the Position controller PLUS card
- information about safety in dealing with control.

2 Product description

2.1 General

The Position controller PLUS is built in the Eurocard format, put in a housing for mounting on dome-rails, with a screw-on/plug-in connector strip.

2.2 Field of application

As an Eurocard, put in a housing for mounting on dome-rails, the field of application of the Position controller PLUS is situated above all in the industrial field.

2.3 Conformity

The Position controller PLUS has been developed and tested in accordance with the latest technical standards. Applied in particular was the EU Guideline 89/336/EEC (EMC Guideline).

2.4 Labelling of the product

The housing of the Position controller PLUS is provided with the following adhesive labels:

- with an adhesive type label
- with an adhesive serial number label (with the initials of the tester)

With the PC-Parameterizationsoftware PASO, the following information can be directly read-off the Position controller PLUS:

- Card type
- Software version
- Firmware version

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2.5 Type code

```
S D1 □ 4 2 D2 0 0 □□ # □
```

Snap-on module
Digital
Parameters to be set with:
Multi-function term. MTG02/TESO [1]
PC-Software [3]
Position controller PLUS
2-solenoid version
24VDC supply voltage
Preset value input selection
Actual value input selection
Hardware configuration
10-Bit resolution [A]
12-Bit resolution, without galvanic separation [B]
12-Bit resolution, with galvanic separation [C]
Hardware configuration
without bus [A]
with profibus DP [B]
with CAN-bus [C] (on request)
Design-Index (Subject to change)

2.6 Technical data

2.6.1 General specifications

Execution	snap-on module	housing made of alu
Dimensions	with housing	172.0 x 111.0 x 60.5 mm
	print plate	160.0 x 100.0 mm
Installations	with snap-on socket	for 35mm dome-rail to DIN 46277
Weight	10-Bit card with housing	450g
	12-Bit card with housing	480g
Connections	screw-on/plug-in connector strip	CAMDEN rising clamp, plug-in, max. cable size 4mm²
Ambient temperature		-20 ... +60° C

2.6.2 Electrical specifications

Supply voltage	24 VDC
Voltage range	21 ... 30 VDC
Ripple on supply voltage	+/-10 %
Fuse	Customer must integrate a slow fuse into his electrical system (A-value = no load power plus max solenoid current)
Temperature drift	< 1% with $\Delta T = 40°C$
No load power	1.2 W

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Analog inputs	1 differential input 10-Bit	0 ... 10 VDC
	1 differential input 10-Bit	0/4 ... 20 mA
	1 input 10-Bit	0 ... +/- 10 VDC
	1 input 10-Bit	0/4 ... 20 mA
	Option:	
	1 differential input 12-Bit for preset value	0 ... ±10VDC
		or 0/4 ... 20mA
	1 differential input 12-Bit for actual value	0 ... ±10VDC
		or 0/4 ... 20mA
Input resistance	Voltage input against ground	> 100kOhm
	Voltage differential input	> 27kOhm
	Burden for current input	= 250Ohm
Digital inputs	2 inputs acitve-low	
	6 input acitve-high	
	Switching threshold high	12 - 34VDC
	Switching threshold low	0 - 4VDC
Serial interface	1 interface D-SUB 9-pin socket (female) on the front plate according to RS232 C standard	
Stabilized output voltage	1 output	+ 15 VDC, max. Load 100 mA
	1 output	+ 10 VDC, max. Load 10 mA
Solenoid outputs	The solenoid outputs are short circuit proof and protected against negative voltage peaks by a suppression diode.	
Solenoid current	Minimum current Imin adjustable	0 ... 950 mA
	Default setting	150 mA
	Maximum current Imax adjustable	Imin ... 1800 mA
	Default setting	700 mA
Dither	Frequency adjustable	20 ... 250 Hz
	Default setting	100 Hz
	Level adjustable	0 ... 200 mA
	Default setting	100 mA
Digital outputs	2 outputs optically coupled.	
	Open collector connected to Digital ground	
	Umax	50 VDC
	Imax	15 mA
Free pins	4 pins AUX1 - AUX4 reserved for customer specific adaptations on the plug-in modules area	
Status indication by LED LED green LED yellow LED red	 Supply voltage Function Error	
EMC Immunity Emission	 EN 50082-2 EN 55022 Class B	

2.6.3 Environment

Storage	packing:	The card must be stored in the original packing
	Temperature range:	-25 ... +85° C
	Resistance to alkali and acid:	The card must be protected against alkalis and acids
In operation	Temperature range	-20 ... +60° C
	Resistance to alkali and acid:	The card must be protected against alkalis and acids

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2.7 Block diagram SD1 basic card

Pin	Signal
1	Earth
5	Supply voltage 24VDC
3	
15	Internale GND
19	Stabilizied output voltage +10VDC
27	Analogue input 1 Voltage signal
25	
31	Analogue input 2 Current signal
29	
33	Analogue input 3 Voltage signal
35	Analogue input 4 Current signal
23	Analogue ground
21	Analogue ground with cablebreak detection
2	Digital input 1 Start
4	Digital input 2 *Stop
6	Digital input 3 Enable control
8	Digital input 4 Controller Off
10	Digital input 5 Ramp Off
12	Digital input 6 Profile 1
14	Digital input 7 Profile 2
16	Digital input 8 Profile 4
18	Digital ground
J2-9	+5VDC
J2-2	RS 232C
J2-3	
J2-5	

Micro-controller

EPROM
RAM
EEPROM

Pin	Signal
17	Stabilizied output voltage +15VDC
	LED green
9	Solenoid A
7	I-mess
13	Solenoid B
11	I-mess
36	AUX5
34	AUX6/RS23C
32	AUX7/RS23C
24	AUX 1
26	AUX 2
28	AUX 3
30	AUX 4

Provision for plug-in modules

Pin	Signal
20	Digital output 1 Error
22	Digital output 2 Pres./flow reached
18	Digital ground

LED red Error

LED yellow Pres./flow reached

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2.8 Block diagram 12-Bit additional print

(mounted on the provision for plug-in modules)

2.9 Dimensions

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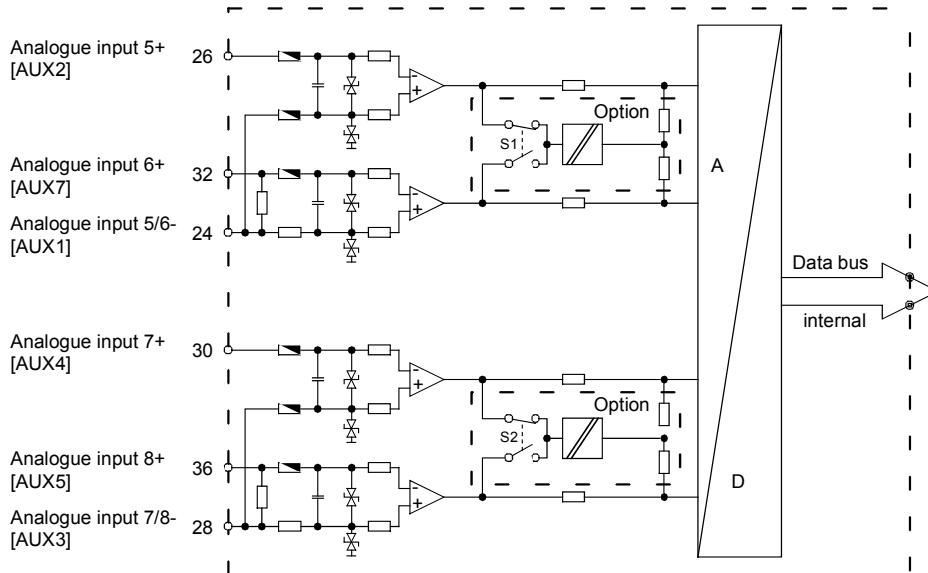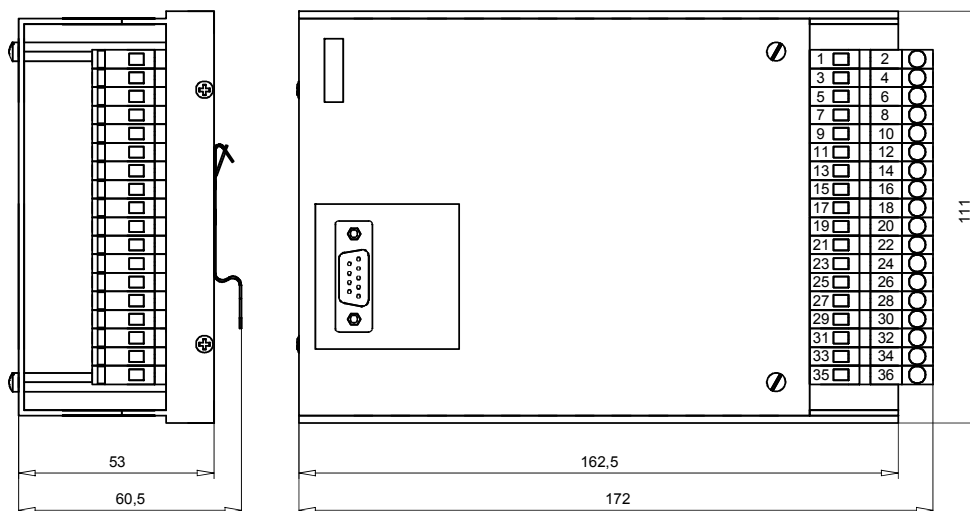
3 Safety rules

3.1 Installation / Commissioning / Parameterization

- These operating instructions has to be carefully studied beforehand and the instructions are to be complied with.
- Prior to the installation, all power supply voltages and any other energy sources have to be disconnected.
- During unpacking and when installing it, the card must only be gripped by the handle on the front plate. Any contact with soldering points, components and contact pins of the card should be avoided.
- Wrong manipulations by the personal cannot be prevented by the card.
- Before the switching on of the supply voltage, the fuse protection, the correct wiring and the conformity of the power supply voltage with the permissible supply voltage range have to be verified.

- **The control monitors the working conditions within the electronic and within the installation. Uncontrolled movements caused by unforeseen errors cannot be prevented.**

- **Danger for persons has to be avoided by installing an emergency stop device which cuts off the power to the system.**

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4 Construction and Function

Refer to the section "Block diagram SD1 " page 7

4.1 Introduction

- The Position controller PLUS is constructed as an **Eurocard**
- The Eurocard is built into a **housing made of alu**
- All inputs and outputs have to be contacted trough the **screw-on/plug-in connector strip**
- The **Version SD1122D200XA** has a RS232 (serial) interface, via which the parameterization and the diagnostics can be made by using the multi-function terminal (MTG02) or PC-Terminalsoftware TESO
- The **Version SD1322D200XA** has a RS232 (serial) interface, via which the parameterization and the diagnostics can be made by using the PC-Parameterization software PASO

4.2 Description of the Function

Integrated in the card are controller and amplifier to operate a 4/3-way proportional valve. The higher-level computer is used to input a position in the form of an analog preset value signal into the control system. The preset value may also be input in the form of a profile and selected digitally.

By linking multiple profiles a travel profile may be preset. Near it, it's possible to set a travel speed and a stop time (for waiting after reached the preset position) for each profile.
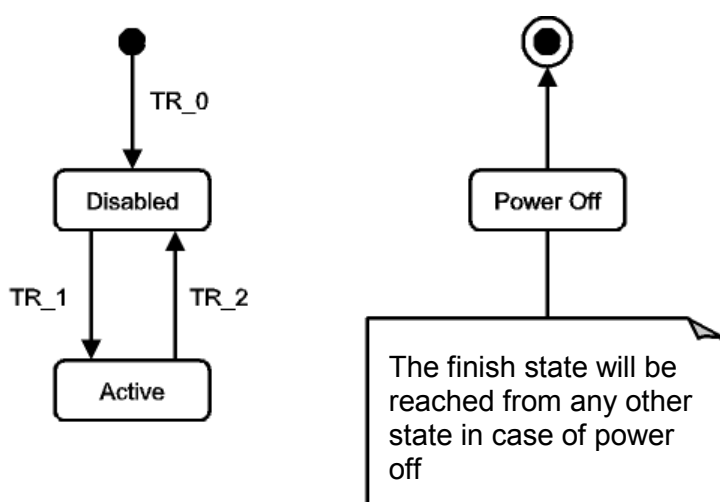
By scaling the preset and actual values, it's possible to make the following adjustments in e.g. inch.

The preselected preset values corresponds to a position the cylinder moves to by means of the Position controller PLUS. If the cylinder reaches the position, the controller outputs a digital signal. Start and stop of the cylinder may be smoothened by varying ramp time. The control characteristic can be adjusted to the respective control system by means of various parameters. It is also possible to switch off the control system completely for carrying out tests or setting procedures.

Amended parameters can be stored in a non volatile memory to have them available when the control system is switched on again.

4.3 Position controller PLUS State machine

In the following, with the help of a status diagram it is described, how the start-up of the Position controller PLUS takes place and which statuses are reached when and how.

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For a description of the start-up procedure for a Position controller PLUS with fieldbus please refer to the document "Operating Instructions ED1/SD1 PROFIBUS DP Geräte-Profil Fluid Power Technology ".

The following table describes the possible statuses and what is done in these statuses:

Status	Description
Disabled	● The Position controller PLUS is disabled, no solenoid current will be active ● In this status, with the command "Local operation" resp. "PASO operation" (refer to the section "Commands_Local Operating / PASO Operating" page 38) the operating mode can be set.
Active	● The Position controller PLUS is enabled ● The Position controller PLUS can be operated with the selected operating mode ● Changing the operating mode is not possible

The following table describes the transitions from one status to the next one:

Transition	Description
TR_0	Switching-on the supply voltage
TR_1	Enable This is made in the operating mode "Local" through the digital input "Enable control" (refer to the section "Digital inputs" page 13) and in the operating mode "Remote PASO" through the command "Enable" (refer to the section "Commands_Disable / Enable" page 38).
TR_2	Disable This is made in the operating mode "Local" through the digital input "Enable control" (refer to the section "Digital inputs" page 13) and in the operating mode "Remote PASO" through the command "Enable" (refer to the section "Commands_Disable / Enable" page 38).

4.4   Operating mode

The Position controller PLUS has 3 operating modes. The following table describes, what can be done in the different operating modes and how they can be activated:

Operating mode	Activating with	Description
Local	Menu point "Commands_Local Operating" or via fieldbus-object "Device local"	Operating via analog and digital inputs on the Position controller PLUS
Remote PASO	Menu point "Commands_PASO Operating	Operating direct with the PASO
Remote	Via fieldbus-object "Device local"	Operating via the fieldbus

The current operating mode is displayed in the status line (refer to the section "Starting of PASO" page 48).

For more information about the operating mode "Local" and "Remote", please refer to the section "Commands_Local Operating / PASO Operating" page 38.

For more information about the possibilities for the Position controller PLUS with fieldbus, please refer to the document "Operating Instructions ED1/SD1 PROFIBUS DP Geräte-Profil Fluid Power Technology ".

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4.5 Analog inputs

- The applied analog signal is digitalized in the A/D converter as follows:
  - 10-Bit for the card SD1X22D200**A**A (only by 0 ... +10V and 0 ... 20mA)
  - 12-Bit for the card SD1X22D200**B**A (only by 0 ... +5V, 0 ... +10V and 0 ... 20mA)
  - **Attention:** By the input range 0 ... 8V, 0 ... 5V (only 10-Bit) or 4 ... 20mA, the resolution is < 10-Bit resp. < 12-Bit!
- **Differential inputs**
  Differential inputs must be used if the ground potential of the external preset value generator does not agree with the analog ground on the Position controller PLUS card.
  If the differential input is intended to use like an analog input against analog ground, the - (minus) connection of the differential input must be connected to the analog ground.
- **Galvanic separation of analog inputs (optional)**
  (only 12-Bit version)
  Two of the four 12-Bit analog inputs (selectable) can be separated or isolated galvanically on the controller card.
- **Analog input 1** (for differential voltage signal)
  (only 10-Bit version)
  Input voltage range: 0 ... +10V / 0 ... +8V / 0 ... +5V
- **Analog input 2** (for differential current signal)
  (only 10-Bit version)
  Input current range: 0 ... +20mA / 4 ... +20mA
- **Analog input 3** (for voltage signal against analog ground)
  (only 10-Bit version)
  Input voltage range: 0 ... ±10V / 0 ... ±8V / 0 ... ±5V
- **Analog input 4** (for current signal against analog ground)
  (only 10-Bit version)
  Input current range: 0 ... +20mA / 4 ... +20mA
- **Analog input 5 [AUX2]** (for differential voltage signal)
  (only 12-Bit version)
  Input voltage range: 0 ... +10V / 0 ... +8V / 0 ... +5V
- **Analog input 6 [AUX7]** (for differential current signal)
  (only 12-Bit version)
  Input current range: 0 ... +20mA / 4 ... +20mA
- **Analog input 7 [AUX4]** (for differential voltage signal)
  (only 12-Bit version)
  Input voltage range: 0 ... +10V / 0 ... +8V / 0 ... +5V
- **Analog input 8 [AUX5]** (for differential current signal)
  (only 12-Bit version)
  Input current range: 0 ... +20mA / 4 ... +20mA

4.6 Cablebreak detection

The analog inputs can be detected for a cablebreak. If a cablebreak is present, the corresponding solenoid outputs will be blocked and the red LED and the output "Error" will be active. The following conditions had to be performed:

- The input signal must be a current value 4 ... 20mA or a voltage value from a potentiometer.
- By a voltage signal with a potentiometer, the ground connection must be connected with the terminal "Analog ground with cablebreak fuse" (21).
- The parameter "Cablebreak" must be on "On" (refer to section "Configuration_Preset/Actual value signals" Page 35). By a voltage signal with a potentiometer, the card always had to be restarted after switching On the cablebreak detection.

Attention: Until a cablebreak will be detected, a time from about 100ms will passed. During this time, the cylinder can make unintentional movements.

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4.7 Digital inputs

- Digital inputs 1 and 2 are active-low (refer to section "Electrical specifications" page 5) and not galvanically separated.
- Digital inputs 3 to 8 are acitve-high (refer to section (refer to section "Electrical specifications" page 5) and galvanically separated via optical couplers.
  Attention: Connect common optical coupler ground (18)!
- **Digital input 1 (*Start, active-low)**
  If this input is set, the movement of the axis will be started. Dependent of the digital inputs 6 - 8, either the external preset value or a profile preset position will be acitve. If this input is not set, the current state will be stored.
  If each change on the digital inputs 6 - 8 should be read in immediately, the digital input 1 must be set fixed to active.
- **Digital input 2 (*Stop, active-low)**
  If this input is set, the movement of the axis is stopped. If this input is not set, the movement of the axis is enabled.
- **Digital input 3 (Enable control, active-high)**
  If this input is set, the Position controller PLUS is enabled. Without this enable, no movements can be made.
- **Digital input 4 (Controller Off, active-high)**
  The controller function can be temporarily switched off by setting this input. To do this, the parameter "Controller" must be on "external" (refer to section "Controller function" page 14).
- **Digital input 5 (Ramp Off, active-high)**
  The ramp can be temporarily switched off by setting this input. If the ramp is never required, this input needs not to be set since the ramp time is set to 0s.
- **Digital input 6 - 8 (Profile selection, active-high)**
  7 Profiles, selectable in binary form, are available. When a fixed preset value is selected via the digital inputs 6 - 8 and the digital input 1 "Start" is set, the external preset value is ineffective.
  The following inputs must be set to activate the corresponding profile:

Profile selection	Digital input 6	Digital input 7	Digital input 8
External preset value			
1	**1**		
2		**1**	
3	1	1	
4			**1**
5	1		1
6		1	1
7	1	1	1

Profiles 1, 2 and 4 can be selected directly, i.e. without coding.

If the Position controller has a fieldbus, the digital inputs 6 - 8 can not be used. Profiles can only be selected via the PC-Parameterization software PASO.

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4.8 Outputs

- **Proportional solenoid outputs A and B**
  The 2 solenoid outputs have a current output **p**ulse-**w**idth-**m**odulated at 1000Hz with superimposed dither. The polarity of the connected solenoids is irrelevant. The outputs are short circuit proof and may be loaded up to 1.8A.
- **Digital output 1 (Error)**
  This output becomes active, when an error is present.
- **Digital output 2 (In position)**
  This output becomes acitve, when the cylinder is in position.
- **Light emitting diodes LED green / yellow / red**
  LED green: Supply voltage is present
  LED yellow: Cylinder in position
  LED red: Indicates an error

4.9 Controller function

The following 3 controller functions are possible:

- **Controller On**
  In this mode, the control is working as a cylinder Position controller PLUS in a closed loop system. The preset value signal correspond to the desired position of the cylinder. The different controller settings can be made here.
- **Controller Off**
  In this mode, the control is working as a normal amplifier in a open loop system. A solenoid current corresponding to the preset value signal is output:
  0% ... 50% preset value = Imax ... Imin solenoid B
  50% ... 100% preset value = Imin ... Imax solenoid A
- **Controller Extern**
  In this mode, the external digital input 4 (Controller Off) decide, if the control is working as a Position controller PLUS (DI4 not active) or as a normal amplifier (DI4 active).

For more information about the controller parameters, please refer to section "Parameters_Controller" on page 32.

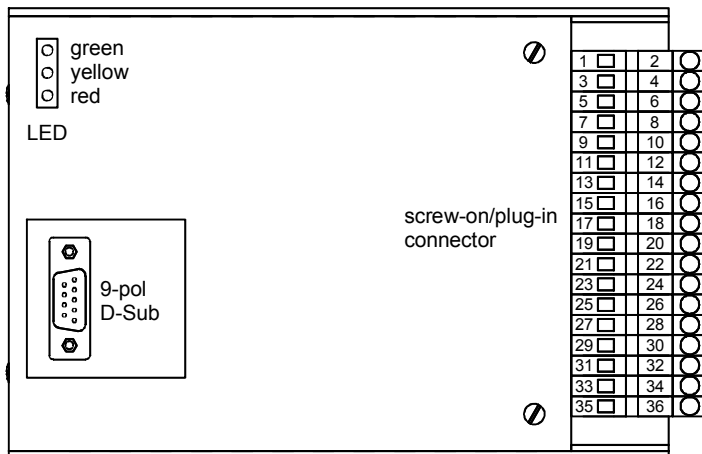|			
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5 Operating and Indicating elements

5.1 Introduction

The Position controller PLUS is available as standard with a front plate:

- The **Version SD1122D200XA** has a RS232 (serial) interface, via which the parameterization and the diagnostics can be made by using the multi-function terminal (MTG02) or PC-Terminalsoftware TESO
- The **Version SD1322D200XA** has a RS232 (serial) interface, via which the parameterization and the diagnostics can be made by using the PC-Parameterization software PASO

5.2 Front plate view

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6　Commissioning

Please refer to the section "Safety rules" on page 8.

6.1　Installation / Connection

The Position controller PLUS should preferably be installed in a 19" rack or in a closed housing.

For an **installation / connection appropriate for EMC**, the following points absolutely have to be observed:

- The surface (at least the surface on which the front plate of the Position controller PLUS rests) of the rack / housing has to be electrically conductive (not anodised)!
- The rack / housing has to be grounded on an electrically conducting sub-surface using a conductor strand with a large cross section.
- On the rack / housing side, a female connector strip in accordance with DIN 41612, type F48, have to be foreseen as the plug-in connector.
- The shielding connection (X1-32z) on the connector strip has to be connected with the rack resp. housing with an as short as possible conductor with a strand cross section >= 1,5 mm²·
- The screening of the cable on the rack resp. housing side must only be connected with the rack / housing using a large surface area and low Ohm connection (best by means of a clamp shackle).
- Solenoid- and signal cables must not be laid parallel to high voltage cables.

6.2　Connection instructions

The contact assignment of the following description refers to the section "Connection examples" page 20.

6.2.1　Supply voltage

- For the dimensioning of the 24VDC power supply, the maximum power demand of the solenoid has to be calculated (in case of directional valves, only the maximum power demand of one solenoid has to be considered). This power then has to be increased by the no load power from the Position controller PLUS (refer to the section "Electrical specifications" page 5).
- The limit values of the supply voltage and its residual ripple indispensably have to be complied with (refer to the section "Electrical specifications" page 5).
- The Position controller PLUS has to be protected with a slow acting fuse. The rating of this fuse should correspond to approx. 1.5 times the current calculated above.

6.2.2　Solenoid outputs

For the solenoid outputs, the polarity, with which the solenoids are connected, does not matter. The following, however, has to be observed:

- The conductor strand cross section has to be adapted to the solenoid current
- Screened cables have to be used; the screen must be grounded only on the rack resp. housing side.

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6.2.3 Digital inputs and outputs

- Digital inputs 1 and 2 are active-low and not galvanically separated.
- For activation, they have to be connected to 0V (ground)
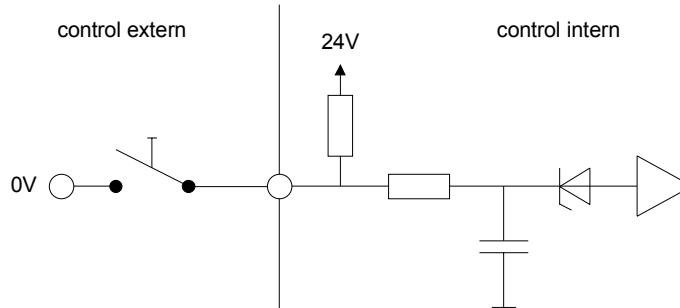
- Digital inputs 3 - 8 are acitve-high and galvanically separated via optical couplers.
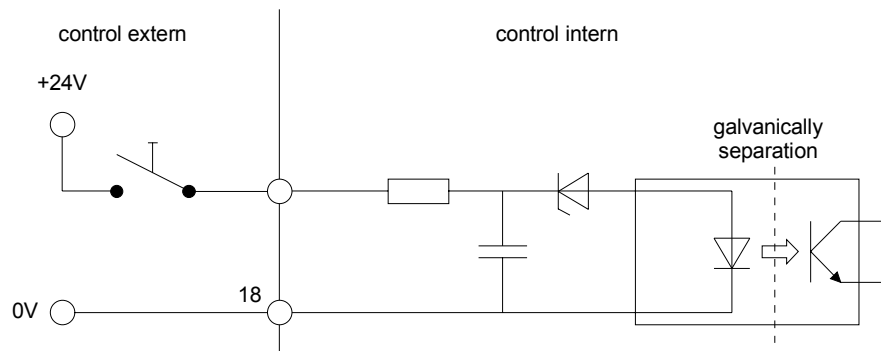- In order to use the galvanically separation, the connection "Digital ground" (14z) has to be connected to the ground of the external digital signal transmitter.
- If no galvanically separation is necessary, the "Digital ground" (14z) can be connected with the minus of the 24VDC power supply.
- For activation, they have to be connected to +24VDC.

- The digital outputs are "open collector" outputs.

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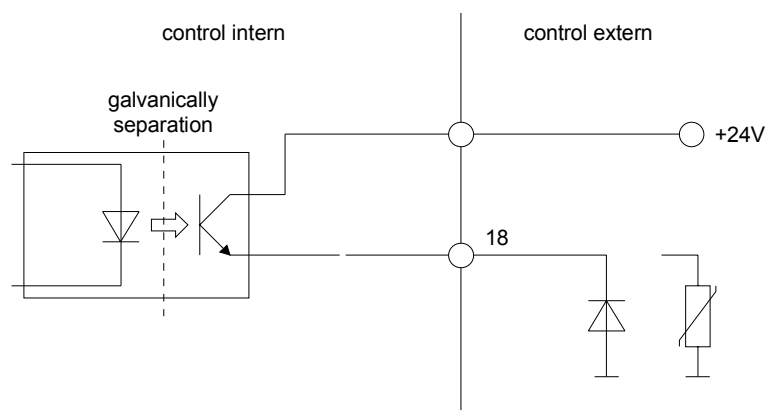
6.2.4   Analog inputs 10-Bit

- There are two voltage and two current inputs available.
- One of each is a differential input.
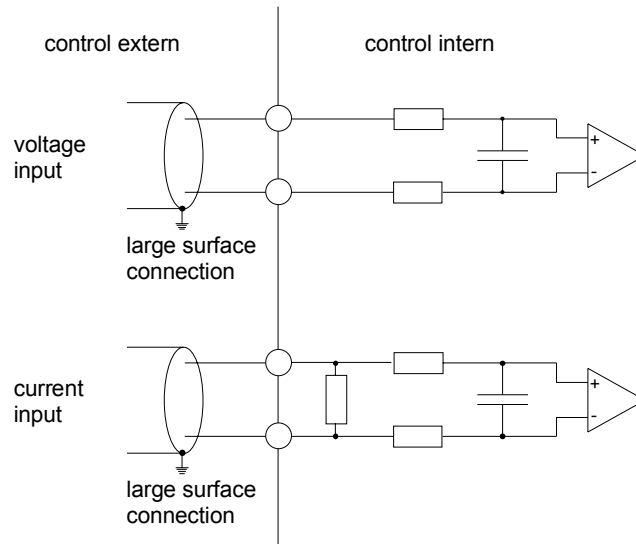
6.2.5   Analog inputs 12-Bit

- There are two voltage and two current inputs with a common feedback available.
- The inputs 5 and 7 are for voltage signals, inputs 6 and 8 for current signals

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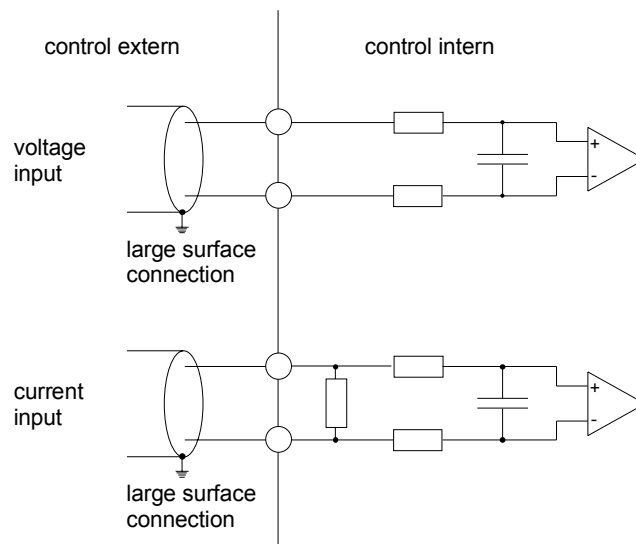
6.2.6 Configuration of the analog inputs 10-Bit

The analog inputs 10-Bit can be configured as follows:

Input signal	Connector strip assignment	Input range
Voltage input against analog ground	+ to 33 / ground to 23	0 ... +5/8/10V 0 ... ±5/8/10V
Voltage input against analog ground with cable break detection	+ to 33 / ground to 21	0 ... +5/8/10V
Voltage differential input	+ to 27 / - to 25	0 ... +5/8/10V
Current input against analog ground	+ to 35 / ground to 23	0 ... +20mA 4 ... +20mA
Current differential input	+ to 31 / - to 29	0 ... +20mA 4 ... +20mA

6.2.7 Configuration of the analog inputs 12-Bit

The analog inputs 12-Bit can be configured as follows:

Input signal	Connector strip assignment	Input range
Voltage differential input	+ to 26 / - to 24 + to 30 / - to 28	0 ... +5/8/10V
Current differential input	+ to 32 / - to 24 + to 36 / - to 28	0 ... +20mA 4 ... +20mA

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6.3 Connection examples

6.3.1 Position control with 10-Bit card

- +10VDC voltage preset value from external MPCS, PC or NC
- +10VDC voltage actual value with potentiometer on the cylinder
- digital inputs from external MPCS, PC or NC with galvanically separation
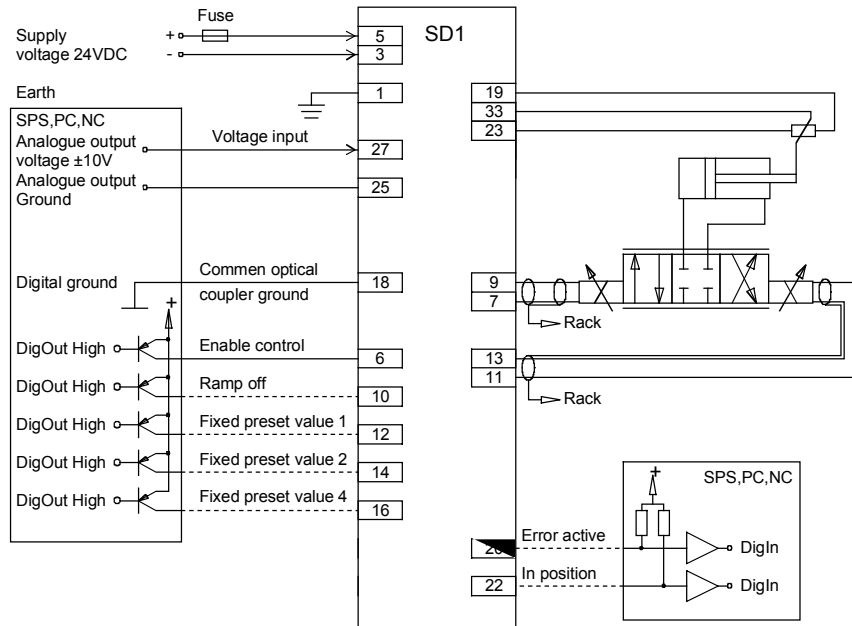
6.3.2 Position control with 12-Bit card

- +10VDC voltage preset value from external MPCS, PC or NC
- +10VDC voltage actual value with potentiometer on the cylinder
- digital inputs from external MPCS, PC or NC with galvanically separation

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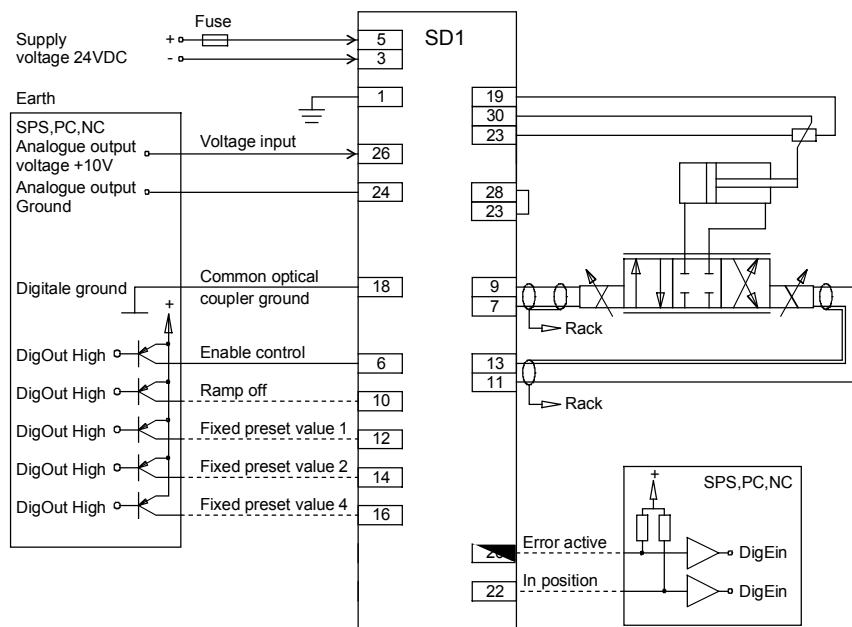
7 Settings

Please refer to the section "Safety rules" on page 8.

7.1 Introduction

- The system- and parameter settings can be made it depends on the card version either via the display/keys on the front plate or via the RS232 interface with the multi-function terminal MTG02 resp. the PC-Terminal software TESO or the PC-Parameterization software PASO.
- For information about the operation via the display/keys or the multi-function terminal MTG02 resp. PC-Terminalsoftware TESO please refer to section "Cyclic menu construction" page 44.
- For information about the operation via the PC-Parameterization software PASO please refer to section "PASO Installation and Operation" page 45.
- The following instructions refer to the Menu order of the PC-Parameterization software PASO. To look for the corresponding points in the version with display/keys or multi-function terminal MTG02 resp. PC-Terminal software TESO, the corresponding cyclic menu construction is also displayed.
- **Depending on the software version and connecting card type, certain settings may be blocked.**

7.2 General

In order for some of the menus resp. sub-menus listed below to be able to be selected, first a parameter set must be present int the memory or else a new one has to be established. To do this, one of the following commands has to be executed:

- File_New
- File_Open
- Start PASO with the connection to the Position controller PLUS (in this case, the data are loaded from the Position controller PLUS)

7.3 Parameter Inconstancy

The parameter settings can be made via the PC-Parameterisation software PASO DSV or via the fieldbus (only, if the Position controller PLUS has a fieldbus). In any case, the current parameter values will be displayed in the PASO

If a parameter value will be changed through the fieldbus, this new value does not correspond with the displayed value in the PASO. In this case, the following message appears:

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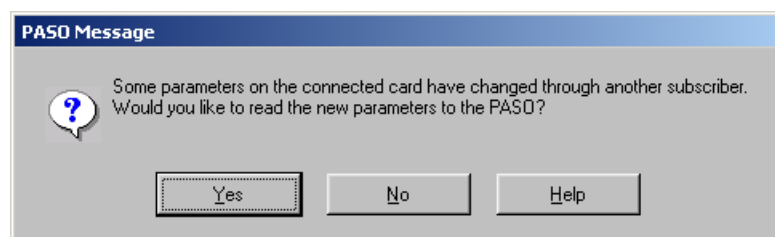
If the answer is "Yes", then the parameters will be read-in from the Position controller PLUS. Possible open parameter windows in the PASO will be closed automatically. If a parameter value will be changed through the fieldbus after the read-in of the new parameters, this message will appear again.

If the answer is "No", then the displayed parameter values in the PASO do not correspond to the current parameter value on the Position controller PLUS. This will be displayed in the status line in the field "parameter Inconsistancy" (refer to the section "Starting of PASO" page 48). If a parameter value will be changed through the fieldbus again, no further message will be appear in the PASO. But it's always possible to change also parameter values through the PASO.

7.4   Tips for the first commissioning

ATTENTION: During the first commissioning, the system can make uncontrolled movements. Please be sure that the working area of the system is really open!

1. Connect the power supply, leave the Position controller PLUS still switched off
2. Switch off the hydraulic drive (hydraulics switched off)
3. Carefully check the connections
4. Switch on the power supply
5. Establish communication with the PASO (connect PC and position controller PLUS with an RS 232 cable and start PASO).
6. Configure the position controller PLUS specific to the installation. Please pay attention to the following order:
    1. In the Menu "Configuration_Preset/Actual value signals": Set the corresponding values
    2. In the Menu "Parameters_General": Set the corresponding limits
7. Switch on the hydraulic system
8. For releasing the card, the digital input 3 "Enable control" must be active (refer to section "Digital inputs" page "13")
9. For reading in changes on the input signals, the digital input 1 "Start" must be active and the digital input 2 "Stop" must be not active (refer to section "Digital inputs" page "13")
10. The axis should now travel in the desired direction corresponding to the preset value.
    If the axis travels to the mechanical stop in one direction only, then the system control direction is probably wrong (change the menu point "Parameters_General").
    The preset value direction (e.g., potentiometer left / right) should correspond to the axis direction. Otherwise either the preset value direction or the actual value direction has to be reversed. If the actual value direction is reversed, then simultaneously the connections of the solenoid A and B also have to be reversed.
11. Set the drive currents of the valves in the menu "Parameter_Valves"
12. Set the control parameters in the menu "Parameter_Controller"

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7.5 Scaling

The position controller PLUS has the possibility to display the preset and actual value with a selectable unit (e.g. mm). For it, both signals must be scaled. This is made with the parameters "Resolution actual value", "Resolution preset value" and "Offset measuring system".

In the following section you will find a detailed description about these parameters. It is important to keep the pretended order (1. resolution actual value, 2. offset measuring system, 3. resolution preset value).

The declared calculation examples correspond to the following picture:
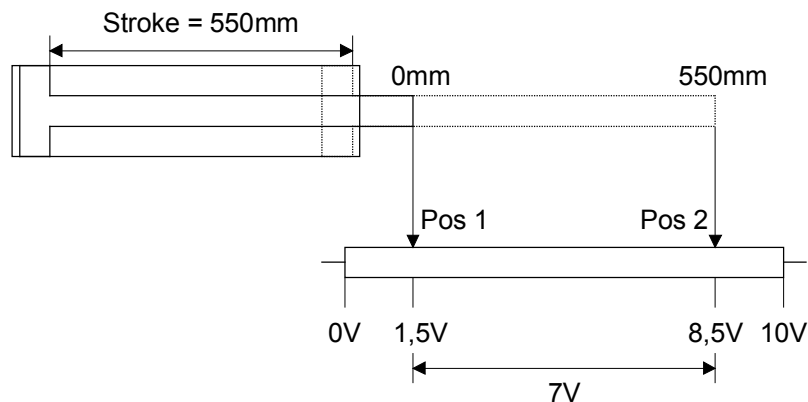
7.5.1 Determination of the resolution actual value

With the parameter "Resolution actual value" the actual value can be adjusted to the maximum working area. The value of the "Resolution actual value" results of the maximum working area divided with the maximum input signal range from the actual value.

The maximum working area correspond to the maximum cylinder stroke. It is important to calculate always with the maximum possible cylinder stroke, even only a part of this will be used.

The maximum input signal range correspond to the range between the minimum and maximum actual value signal.
Example: Actual value signal 0V ... 10V => maximum input signal range 10V (10V - 0V = 10V).
Actual value signal 1.5V ... 8.5V => maximum input signal range 7V (8.5V - 1.5V = 7V)

With a maximum cylinder stroke from 0 ... 550mm (= maximum working area from 550mm) and with an actual value signal from 1.5V ... 8.5V (= maximum input signal range from 7V), the "Resolution actual value" proves a value from 550mm / 7V = 78.57mm/V.

The value of the "Resolution actual value" can be also determined by moving the cylinder into two different positions. With the indicated position (Menu "Analysis_Values") and the real position, the existing value of the "Resolution actual value" et can be corrected.

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Example of a determination of the value "Resolution actual value" by moving the cylinder:

- Go to Pos. 1, e.g. left-hand stop
- Make a note of the measured and indicated position
- Go to Pos. 2, e.g. right-hand stop
- Make a note of the measured and indicated position
- Calculate the measured range ΔPos measured = Pos 2 measured - Pos 1 measured
- Calculate the indicated range ΔPos indicated = Pos 2 indicated - Pos 1 indicated
- Correction factor: K = ΔPos measured / ΔPos indicated
- New value of the "Resolution actual value" = current value "Resolution actual value" x correction factor K

Calculation example:

current resolution = 100mm/V (default setting)

Pos 1 measured	0mm	Pos 1 indicated	150mm	(1.5V x 100mm/V)
Pos 2 measured	550mm	Pos 2 indicated	850mm	(8.5V x 100mm/V)
	-----------		-----------	
ΔPos measured	550mm	ΔPos indicated	700mm	

correction factor K = ΔPos mes. / ΔPos ind. = 550mm / 700mm = 0.7857

new resolution = current resolution x K = 100mm/V x 0.7857 = **78.57mm/V**
                                                              =========

Control: 7V x 78.57mm/V = 550.00mm

7.5.2   Determination of the offset measuring system

With the parameter "Offset measuring system", the zero position of the actual value can be adjusted. The adjusted value will be subtracted from the actual value.

The parameter "Offset measuring system" correspond to the signal range from the actual value signal. The range of adjustment is ±50% from the selected signal type (e.g. ±5V with signal type 0 ... 10V). But the value of the "Offset measuring system" will be adjusted in the selected unit (e.g. mm). Therefore the displayed value will be multiplied with the parameter "Resolution actual value". Because of the relationship to the signal type and the resolution, the displayed value of the parameter "Offset measuring unit" will be changed, as soon as the parameter "Resolution actual value" or "Signal type" will be changed.

With a cylinder stroke from 0 ... 550mm, with an actual value signal from 1.5V ... 8.5V and with a adjusted parameter "Resolution actual value" from 78.57mm/V, the "Offset measuring system " proves a value from 1.5V x 78.57mm/V = 117.85mm.

The value of the "Offset measuring system" can be also determined by moving the cylinder into a position. With the indicated position (Menu "Analysis_Values") and the real position, the existing value of the "Offset measuring system" can be corrected.

Example of a determination of the value "Offset measuring system" by moving the cylinder:

- Go to Pos. 1, e.g. left-hand stop
- Make a note of the measured and indicated position
- Offset correction = Pos 1 indicated / Pos 1 measured
- New value of the "Offset measuring system" = current value "Offset measuring system" + offset correction

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7.5.3 Determination of the resolution preset value

With the parameter "Resolution preset value", the desired working range for the preset value can be adjusted. The value of the "Resolution preset value" results of the desired working range divided with the maximum input signal range from the preset value.

Examples:

Cylinder stroke = 0 ... 550mm, preset value signal = 0 ... 10V
Resolution preset value = 20mm/V   => working range 0 ... 200mm
Resolution preset value = 40mm/V   => working range 0 ... 400mm
Resolution preset value = 55mm/V   => working range 0 ... 550mm

7.5.4 Determination of the resolution and offset of the actual value automatic

By operating the button "Scaling help" in the menu "Configuration Preset/Actual value signals", the calculation of the parameters "Resolution actual value" and "Offset measuring system" will be done by the PC. The cylinder can be moved into the 2 positions either with an external preset value signal or with the direct operating of the solenoids (press button "Enable", adjust with the slide control "Current [%]" a solenoid current, select with the button "Direction" the moving direction and release with the button "Start" the movement of the cylinder). In both position, the measured position can be entered. the PC saves automatically the displayed position and calculates itself the new values of the parameters "Resolution actual value" and "Offset measuring system".

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7.6 File - Menu (only PASO - Version)

Contained in the File menu are the menu points, which concern the file handling and the printing of the parameters. In the "On Line Mode", some of these menu points are blocked..

7.6.1 File_New

This menu point is active only in the "Off Line Mode".
With this command, a new file can be opened. A selection window will be displayed. In this window, the desired function from the PASO can be selected. The selected function should correspond to the function of the connected digital card. All parameter values are set to standard values. The required values can now be entered.

7.6.2 File_Open...

This menu point is only active in the "Off Line Mode".
With this command, an existing file from a storage medium is opened. First the file selection window appears. In this window the required file can now be selected and opened with "OK". If the function of the selected file does not correspond to the current function of the PASO, a message will be displayed. A selection is now possible, if the event should be cancelled or if the current function from the PASO should change over to the new function of the selected file. The parameter values can now be edited and changed as required under the menu points "Configuration" or "Parameters".

7.6.3 File_Save

With this command, the parameters are saved on a data storage medium. All parameter values of all input windows are saved under the current file name. If no file name has been defined yet, then first the file selection window appears (refer to File_Save as...).

7.6.4 File_Save as...

With this command, the parameters are saved on a data storage medium. All parameter values of all input windows are saved under the file name entered.
First the file selection window appears (see File_Open). In this window the desired file name can now be entered. If the file name is entered without an extension, then the extension ".par" is automatically assigned to it. After actuating the key "Save", the file information window appears (see File_File-Info). In this window the required entries can now be made. With the key "Save", the file is then finally saved under the selected file name. With the key "Cancel", one changes back to the file window.

7.6.5 File_Print...

With this command, the current parameters are printed in ASCII text format. The File_Print window is opened. In this window one can now select, whether the printing process is to be to a printer or to a file.

If the output is to be to a printer, then the Windows printer selection window is opened.. **In this window, please do not select "Print to File".** If you do, a new program start might possibly be required and you could lose any data not yet saved.

If the output is to be to a file, then the file selection window appears. In this window the desired file name can now be entered. If the file name is entered without an extension, then automatically the extension ".txt" is assigned to it.

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7.6.6 File-Info

With this command, the file information of an existing file is displayed. The file information consists of the following parts:

Date, time   Date, time of saving.
File name: The file name, under which the file has been saved.
Card type: The type of digital control card at the moment of saving. If no card is connected, then this indication remains empty. In case of saving during "On Line Operation", this indication is updated.
Operator: The name of the originating person.
Remarks: Possibility to enter remarks concerning the file.

When the File_Info window appears during the execution of the command "File_Save", then the corresponding entries can be made in the various fields (with the exception of "Date", "Time", "File name" and "Card type", which cannot be edited). When the File_Info window appears during the execution of the command "File_File-Info", then the various fields cannot be edited.

7.6.7 File_Off Line (On Line)

Off Line
With this command, the connection with the Position controller PLUS is interrupted. All menu points, which call for a communication with the Position controller PLUS, are blocked. The PASO software now runs in the "Off Line Mode". The loading, saving and the editing of parameter files is possible in this mode.

On Line
With this command, the connection with the Position controller PLUS is established. The communication with the Position controller PLUS is briefly tested. If the connection works, then the user has the option of taking over the parameters from the Position controller PLUS or of transferring the parameters to the Position controller PLUS. During the transfer of the parameters, the user has the possibility of aborting the operation.

Before parameters are transferred to the Position controller PLUS, a verification is carried out as to whether the version of the Position controller PLUS supports the parameter values. If this is not the case, then a message is issued and a transfer to the controller is not possible.

If the parameters have been taken over by the Position controller PLUS, then they are briefly checked. If one or several of the parameters are outside the tolerance, standard values are assigned instead and a message is issued. If the transfer was successful and the verification check was also successful, then the software subsequently runs in the On Line Mode". The loading of parameter files is not possible in this mode.

7.6.8 File_Exit

With this command, the parameterization program PASO is terminated. If parameter data have been changed and have not yet been saved, then the question appears, as to whether these data should be saved. When terminating, the current data from the configuration window are also saved.

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7.7   Profiles - Menu

```
                        ┌─────────────────────┐
                        │ ED1x42D2  Ver. E     │◄─────────────┐
                        │           <MODE>     │◄──┐          │
                        └─────────────────────┘   │          │
     ┌────────────────────────────────────────────┘          │
     │                                                        │
  ┌──┴──────────────┐  ┌─────────────────┐  ┌─────────────────┐  ┌─────────────────┐
──►│ Profile    <M>  │─►│ Parameter  <M>  │─►│ Konfigurat. <M> │─►│ Analyse     <M> │
   │ Selekt     <E>  │  │ Selekt     <E>  │  │ Selekt      <E> │  │ Selekt      <E> │
   └─────────────────┘  └─────────────────┘  └─────────────────┘  └─────────────────┘
```
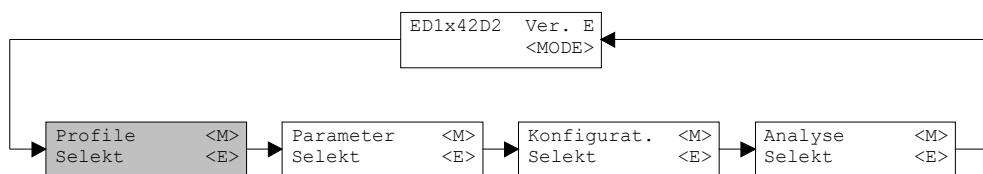
The position controller is able to move the cylinder in a preselected position with an also preselected speed. After an adjustable stop time, the position controller moves the cylinder automatically to the next preselected position.

If the Position controller has a fieldbus, the profiles can only be selected by the field "Direct control" (see below) or by the menu "Configuration_Digital I/O" (refer to page 36).

7.7.1   Generator

In this window, all adjustments according to the Profiles will be made.

Field	Parameter description	Range / Step
Profile No.	Number of the preset value	1 - 7
Actual position (only PASO-Version)	In the "On Line Mode", the actual position value of the cylinder will be displayed here.	
Preset position	The target position for the cylinder	dependent on the adjusted actual value resolution
Speed	Max. speed for the cylinder. This is a limitation of the solenoid current (the speed is not controlled).	0 ... 100% 1%
Stop time	Define the waiting time on the reached position before the cylinder moves to the next position. If the cylinder should change the direction, the a stop time should be adjusted so that he will reached really the position. This field is only active if the field "Profile end" is not active.	0 ... 10s 0.1s
Dig. output 'In position'	If this field is set, the output "In position" will be active when the cylinder reached the target position. If this filed is not set, the output "In position" will not be acitve when the cylinder reached the target position.	set not set
Solenoid 'In position'	If this field is on, the solenoids will not be blocked when the cylinder reached the target position. If this field is off, the solenoids will be blocked when the cylinder reached the target position.	on off
Profile end	If this field is active, the stop time will be endless, i.e. the cylinder stays in this position until a new fixed preset position will be selected	

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Direct control on/off	If the direct control is off, the adjustments in this window has no direct influence on the axis. If the direct control is on, the axis will be stopped until the button "Start" will be set. In the version with display/keys or multi-function terminal resp. PC-Terminalsoftware TESO, the axis will move to the current profil position immediately if the direct control is set to active. This item is only active, if the Position controller is in the "On Line Mode", in the operating mode "Remote PASO" (refer to section "Operating mode", page 11) and in the state "Active".	PASO-Version: on off Display/keys or MTG02 resp. TESO-Version: start stop
Direct control Start/Stop (only PASO-Version)	With activating the button "Start", the axis will move to the current profil position and the label of the button will change to "Stop". With activating the button "Stop", the axis will be stopped and the label of the button will change to "Start".	Start Stop

Travel profile with a stop time between each position
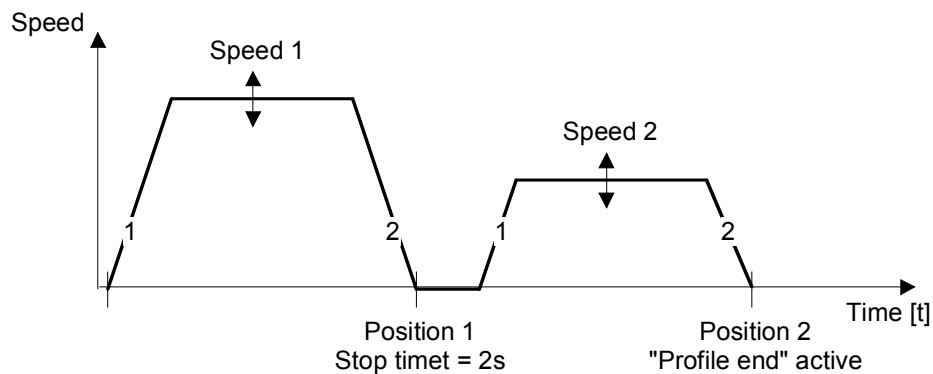
Speed

Speed 1

Speed 2

1　　　　　　　　　　2　1　　　　2

Time [t]

Position 1
Stop timet = 2s

Position 2
"Profile end" active

Travel profile without a stop time between each position

Speed

Speed 2

Speed 1　1　　　　　2

Speed 3

1

2

Time [t]

Position 1
Stop time = 0s

Position 2
Stop time = 0s

Position 3
"Profile ene"
active

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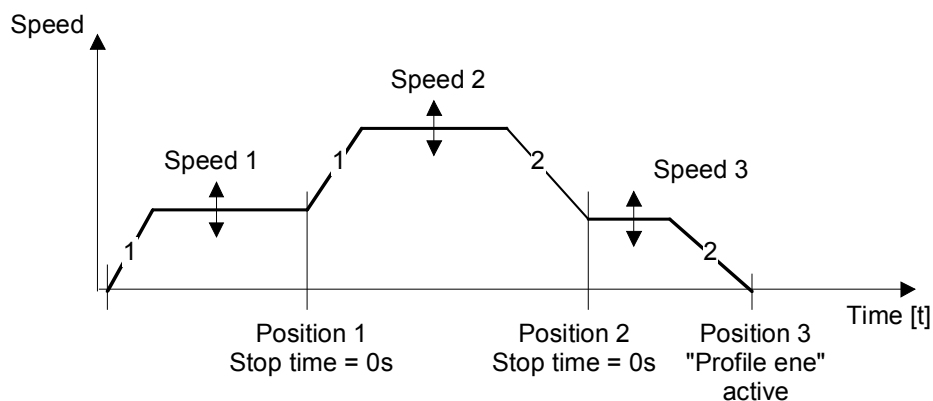
Travel profile without a stop time between each position. In this example, the controller parameters are adjusted for a very slow drive in the position => sometimes the speed can not be reached. Because of that, there is a immediately speed change at position 3.
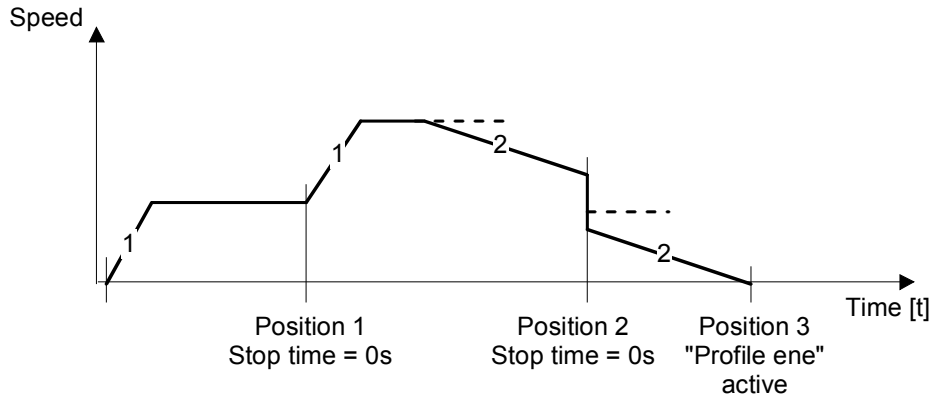
1 = dependent on the adjusted ramp parameters
2 = dependent on the adjusted controller parameters

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7.8 Parameters - Menu

```
                          ┌─────────────────────┐
                          │ ED1x42D2  Ver. E    │◄───────────────────┐
                          │            <MODE>   │                    │
                          └─────────────────────┘                    │
  ┌──────────────────────────────────────────────────────────────┐  │
  │  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐
  └─▶│ Profile  <M> │─▶│ Parameter <M>│─▶│ Konfigurat.<M>│─▶│ Analyse  <M> │
     │ Selekt   <E> │  │ Selekt    <E>│  │ Selekt    <E> │  │ Selekt   <E> │
     └──────────────┘  └──────────────┘  └──────────────┘  └──────────────┘
```
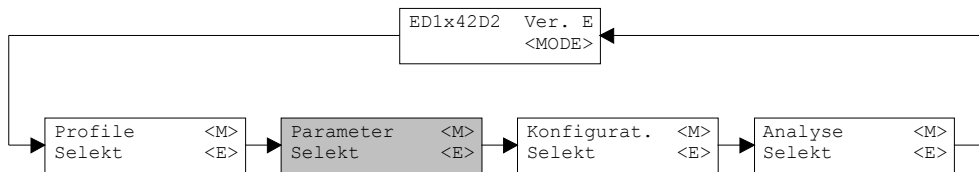
In this window, all parameter values of the Position controller PLUS will be made.

In the version with display/keys or multi-function terminal resp. PC-Terminalsoftware TESO, a password question appears. Input the value "9" in succession as the password.

7.8.1 Parameters_Valves

```
                          ┌─────────────────────┐
                          │ Parameter     <M>   │◄───────────────────┐
                          │ Selekt        <E>   │                    │
                          └─────────────────────┘                    │
  ┌──────────────────────────────────────────────────────────────┐  │
  │  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐
  └─▶│ Ventile  <M> │─▶│ Regler   <M> │─▶│ Allgemein <M>│─▶│ Speichern<M> │
     │ Selekt   <E> │  │ Selekt   <E> │  │ Selekt    <E>│  │ Selekt   <E> │
     └──────────────┘  └──────────────┘  └──────────────┘  └──────────────┘
```

In this window, all settings specific to the valves will be made.

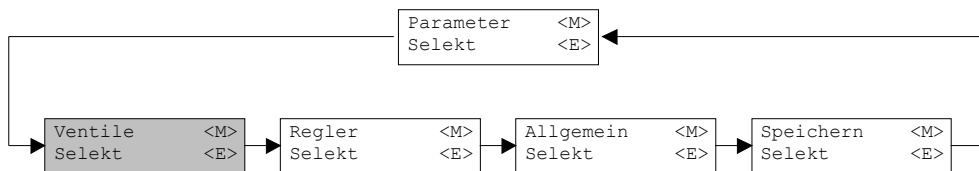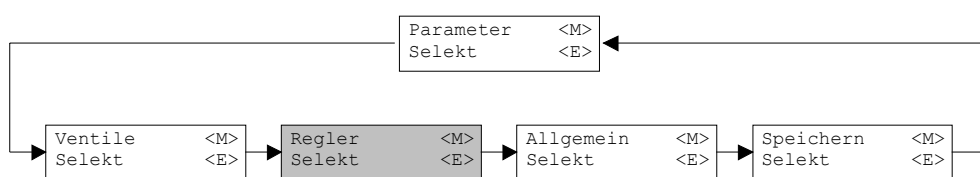| Field	Parameter description	Range / Step
Actual position (only PASO-Version)	In the "On Line Mode", the actual position value of the cylinder will be displayed here.	
Direct solenoid operation	If this switch is selected, an internal preset value from 0% resp. 100% will be active during the setting of the Imin resp. Imax. This item is only active, if the Position controller is in the "On Line Mode", in the operating mode "Remote PASO" (refer to section "Operating mode", page 11) and in the state "Active".	
Prop. Valve settings	The minimum and the maximum solenoid current can be set separately for each solenoid output, corresponding to 0% resp. 100% preset value. In the "Off Line Mode", the displayed current value is the theoretical preset current. This makes it possible to set the Imin/Imax values without a solenoid or a valve is connected to the Position controller PLUS (only PASO-Version). If the switch "Direct solenoid operation" is selected, if the Imin setting is active, a preset value of 0% resp. if the Imax setting is active, a preset value of 100% is automatically applied internally (with the PASO-Version only in the "On Line Mode"). As a result of the digitalisation, the numbers entered max be modified to less "rounded-off" number.	
Imin A	Set minimum solenoid current A. Preferenceable set the Imin in the way that the cylinder will move slightly.	0 ... 950mA 2mA
Imax A	Set maximum solenoid current A. Set the Imax in the way that the maximum desired travel speed will be achieved.	0 ... 1800mA 2mA

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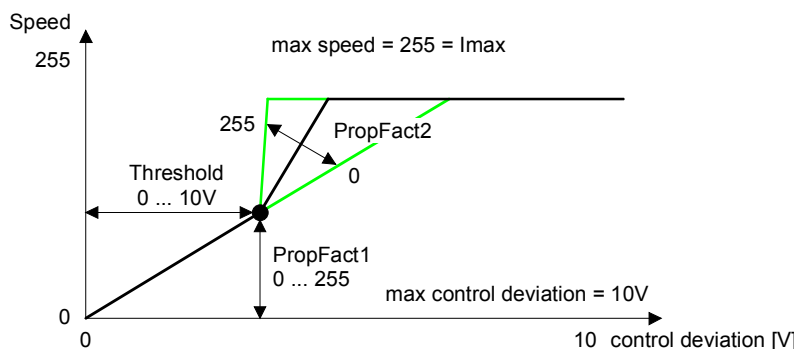
Imin B	Set minimum solenoid current B. Preferenceable set the Imin in the way that the cylinder will move slightly.	0 ... 950mA 2mA
Imax B	Set maximum solenoid current B. Set the Imax in the way that the maximum desired travel speed will be achieved.	0 ... 1800mA 2mA
Frequency	The dither frequency can be set in steps.	20, 40, 60, 70, 80, 90, 100, 110, 125, 140, 165, 200, 250Hz
Level	Level of the superimposed AC signal	0 ... 199mA 2mA

7.8.2   Parameters_Controller

```
                          Parameter    <M>
                          Selekt       <E>

   Ventile   <M>     Regler    <M>     Allgemein  <M>     Speichern  <M>
   Selekt    <E>     Selekt    <E>     Selekt     <E>     Selekt     <E>
```

In this window, all settings specific to the controller will be made.

Field	Parameter description	Range / Step
Positive	The controller characteristics for the positive side can be adjusted here. Positive side = positive control deviation	
Negative	The controller characteristics for the negative side can be adjusted here. Negative side = negative control deviation	
Threshold	Is the first value for defining the break point which switches between the two breaking speeds (see below picture)	0.0 ... 10.0V 0.1V
PropFact 1	Is the second value for defining the break point which switches between the two braking speeds (see below picture)	0 ... 255 1
PropFact 2	Correspond to the first breaking speed and is dependent on the adjustment from the parameter "Threshold " and "PropFact 1"	0 ... 255 1
I-Time	Reaction time of the integrator. If the time is set to 0s, the integrator is switched off	0 ... 10s 0.01s
I-Window	Inside this window, the integrator is switched on. Outside this window, the controller is working as a real P-controller.	dependent on the adjusted actual value resolution

7.8.3   Parameter_Ramps

```
                              Parameter    <M>
                              Selekt       <E>

  Ventile     <M>    Regler      <M>    Allgemein   <M>    Speichern   <M>
  Selekt      <E>    Selekt      <E>    Selekt      <E>    Selekt      <E>
```
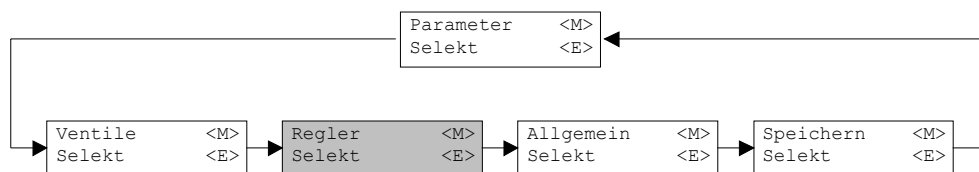
In this window, all adjustments according to the ramp function will be made.

Field	Parameter description	Range / Step
Ramp +	Ramptime for a positive control deviation	0 ... 51s 0.05s
Ramp -	Ramptime for a negative control deviation	0 ... 51s 0.05s

7.8.4   Parameter_General

```
                              Parameter    <M>
                              Selekt       <E>

  Ventile     <M>    Regler      <M>    Allgemein   <M>    Speichern   <M>
  Selekt      <E>    Selekt      <E>    Selekt      <E>    Selekt      <E>
```
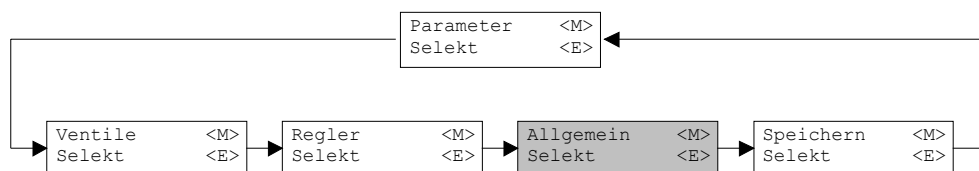
In this window, all general adjustments for the controller will be made.

Field	Parameter description	Range / Step
Window	If the control deviation is inside this window, the output "In position" and the yellow LED will be set to active.	dependent on the adjusted actual value resolution
Window hysteresis	Is on the border of the window. Prevents a fast switch on/off on transition (swing).	dependent on the adjusted actual value resolution
max. system speed	Max. speed for the cylinder. This is a limitation of the solenoid current (the speed is not controlled).	0 ... 100% 1%
Solenoid 'In position'	If this field is on, the solenoids will not be blocked when the cylinder reached the target position. If this field is off, the solenoids will be blocked when the cylinder reached the target position.	on off
Dig. output 'In position'	If this field is set, the output "In position" will be active when the cylinder reached the target position. If this filed is not set, the output "In position" will not be acitve when the cylinder reached the target position.	set not set
Controller	Select the desired controller function	off on external
System control	The system control can be inverted. This correspond to the exchange from solenoid A and solenoid B.	invert not invert

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Window

Hysteresis   Hysteresis

Preset position

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7.9 Configuration - Menu

```
                              ED1x42D2  Ver. E
                                        <MODE>
 ┌──────────────────────────────────────────────────────────────────────┐
 │                                                                        │
 │  Profile    <M>    Parameter  <M>    Konfigurat. <M>    Analyse   <M>  │
 └► Selekt     <E> ►  Selekt     <E> ►  Selekt      <E> ►  Selekt   <E>   │
```

In this window, the settings of the function of the Position controller PLUS will be made.

In the version with display/keys or multi-function terminal resp. PC-Terminalsoftware TESO, a password question appears. Input the value "9" in succession as the password.
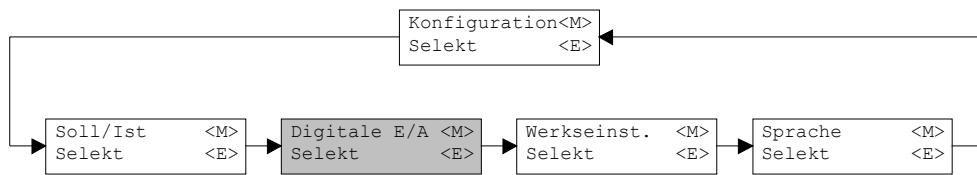
7.9.1 Configuration_Preset/Actual value signals

In this window, the signal types of the preset and actual value will be set and the cross reference of the analog inputs will be made..

Field	Parameter description	Range / Step
Controller	Select the desired controller function	off on external
Displacement displayed	In this ring menu, the travel distance unit can be selected. In all program windows, the travel distance will be indicated in accordance with this setting.	mm Deg Inch
Input Signal	Here the selection is possible, if the following settings should be for the analog input for the preset value or for the actual value.	Preset value Actual value
Signal type	Select the desired signal type.	0-5V 0-8V 0-10V 0-20mA 4-20mA
Used input	A selection can be made between voltage and current inputs. Only the corresponding inputs to the selected signal type are available.	AnaInp1 [V] AnaInp2 [mA] AnaInp3 [V] AnaInp4 [mA]
Inversion	The analog input value can be inverted.	no yes
Cablebreak	Switch on/off the cablebreak detection of the analog input signal	no yes
Offset measuring system	The zero position of the actual value can be adjusted here. The adjusted value will be subtracted from the actual value. (refer to section "Scaling" page 23)	±50% from the selected signal type
Resolution	Serves for the scaling of the preset and actual value. Maximum working range / actual value signal range = resolution actual value Desired working range / preset value signal range = resolution preset value (refer to section "Scaling" page 23)	0.001 ... 999.999 0.001
Scaling help	Start the automatic scaling help (refer to section "Scaling" page 23)	

With leaving the window with the key "OK", a check will be made, if for the preset value and the actual value the used input is different. If not, a message will be displayed and the window cannot be left.

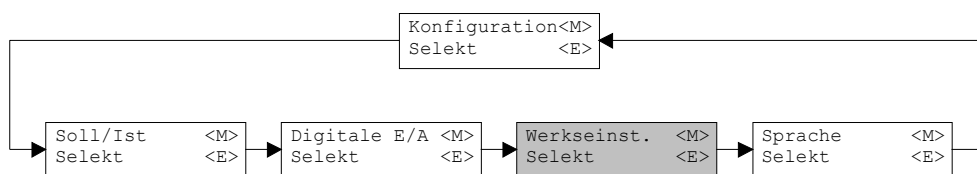|			
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7.9.2 Configuration_Digital I/O

```
                                  Konfiguration<M>
                                  Selekt        <E>

  Soll/Ist   <M>    Digitale E/A <M>    Werkseinst.  <M>    Sprache    <M>
  Selekt     <E>    Selekt       <E>    Selekt       <E>    Selekt     <E>
```

With this command, the digital inputs and outputs of the connected Position controller PLUS can be set to active, not active or released.

Field	Parameter description	Range / Step
Digital inputs	Set digital input with software	1
	Reset digital input with software	0
	Read in the external digital input	X
Digital outputs	Set digital output with software	1
	Reset digital output with software	0
	The digital output is driven by the running program	X

7.9.3 Configuration_Default setting

```
                                  Konfiguration<M>
                                  Selekt        <E>

  Soll/Ist   <M>    Digitale E/A <M>    Werkseinst.  <M>    Sprache    <M>
  Selekt     <E>    Selekt       <E>    Selekt       <E>    Selekt     <E>
```

With this command, the default settings in the EPROM on the connected Position controller PLUS will be loaded and read to the PC in the PASO-Version.

7.9.4 Configuration_Interface (only PASO-Version)

With this command, the serial output port for the communication with the connected control card can be selected. This setting is automatically saved in the file "konfig.kon" and taken over with a new start.

If the software is in the "On Line Mode", then the communication is broken off when the "OK" key is pushed.
If the software is in the "Off Line Mode", then a confirmation window appears with the question, as to whether the communication with the axis controller is to be tested. If the communication works, a corresponding message is issued and a connection with the axis controller can be established via the menu point File_On Line.

If no communication can be established (transmission interference or no axis controller card connected), then an error message appears. All menu points and keys, which contain an action in connection with the communication, are then blocked.

Field	Parameter description	Range / Step
Output port	The serial port of the PC can be selected.	COM1 - COM9

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7.9.5 Configuration_Language

```
                              ┌─────────────────────┐
                              │ Konfiguration<M>    │◄────────────────┐
                              │ Selekt        <E>   │                 │
                              └─────────────────────┘                 │
  ┌────────────────────────────────────────────────────────────────┐ │
  │                                                                 │ │
  ▼                                                                 │ │
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ Soll/Ist    <M>  │   │ Digitale E/A <M> │   │ Werkseinst.  <M> │   │ Sprache      <M> │
│ Selekt      <E>  │►  │ Selekt       <E> │►  │ Selekt       <E> │►  │ Selekt       <E> │
└──────────────────┘   └──────────────────┘   └──────────────────┘   └──────────────────┘
```
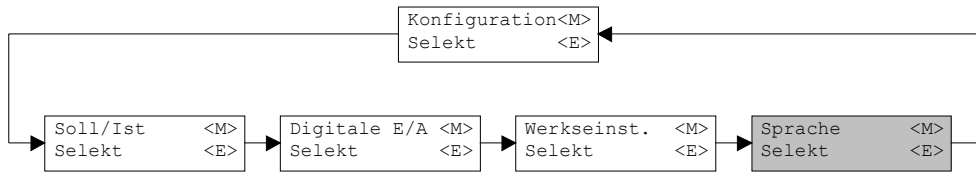
In this window, the language can be selected, with which the menu will be inscribed. In the version with display/keys or multi-function terminal MTG02 resp. PC-Terminalsoftware TESO, the menu language question appears after the card is switched on for the first time. During the execution, the language can be changed at any time in menu "System". In the PASO-Version, this setting is automatically saved in the file "konfig.kon" and taken over with a new start.

Field	Parameter description	Range / Step
Language	Field, from which the desired language can be selected.	deutsch english français

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7.10 Commands - Menu (only PASO-Version)

In the Commands menu, direct control commands can be transmitted to the Position controller PLUS.

7.10.1 Commands_Valve operation

This menu point is only active in the "On Line"-mode and if the operating mode is set to "Remote PASO" (refer to the section "Operating mode" page 11).

In this window, the valve can be directly actuated via the elements available in the window.

Field	Parameter description	Range / Step
Current	The solenoid current can be preset either with the slide control or in the numerical field.	0...100% (Imin...Imax)
Operation	Through this key, the current set can be switched to the solenoid or else the solenoid can be switched to be without current.	Start / Stop
Solenoid change	If a two solenoid valve is available, then with this switch one can changeover between solenoid A and - B.	A / B

7.10.2 Commands_Local Operating / PASO Operating

This menu point is only active in the "On Line"-mode and if the DSV-state is set to "Disabled" (refer to the section "Position controller PLUS State machine" page 10).

If the command "PASO operating" will be activated (only possible if the operating mode is set to "Local" or "Remote"), the DSV-Electronic can be operated direct through the PASO with the commands "Valve operation" and "Enable / Disable". There is no operation through the analog and digital inputs or through the fieldbus possible. The operating mode will be changed to "Remote PASO".

If the command "Local operating" will be activated (only possible if the operating mode is set to "Remote PASO"), the DSV-Electronic can be operated either through the analog and digital inputs or through the fieldbus. A direct valve operation (refer to section "Commands_Valve operation" page 38) is not possible. The operating mode will be changed to "Local".

7.10.3 Commands_Disable / Enable

This menu point is only active in the "On Line"-mode and if the operating mode is set to "Remote PASO" (refer to the section "Operating mode" page 11).

With the command "Enable", the Position controller PLUS will be set to the state "Active" (refer to the section "Position controller PLUS State machine" page 10) and it is generally enabled.

With the command "Disable", the Position controller PLUS will be set to the state "Disabled" (refer to the section "Position controller PLUS State machine" page 10) and it is generally disabled.

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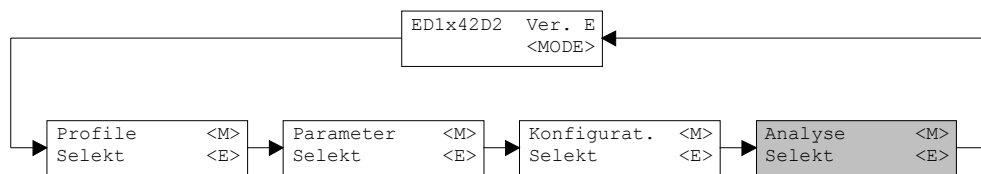
7.11　Fieldbus_Fieldbus Info (only PASO-Version)

If the Position controller PLUS has an fieldbus, with this menu point the necessary bus node adjustments can be made. Also bus states will be displayed here.

If the DSV-Electronic has no fieldbus, the message " The connected Position controller PLUS doesn't provide a external bus port" will appear.
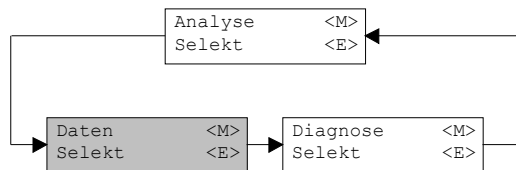
For more information about the possibilities for the Position controller PLUS with fieldbus, please refer to the document "Operating Instructions ED1/SD1 PROFIBUS DP Geräte-Profil Fluid Power Technology ".

7.12　Analysis - Menu

```
                        ┌────────────────────┐
                        │ ED1x42D2  Ver. E    │◄────────────┐
                        │            <MODE>   │             │
                        └────────────────────┘             │
┌────────┐  ┌──────────────────┐  ┌──────────────────┐  ┌──────────────────┐  ┌──────────────────┐
│        │  │ Profile     <M>  │  │ Parameter   <M>  │  │ Konfigurat. <M>  │  │ Analyse     <M>  │
└───────►│  │ Selekt      <E>  ├─►│ Selekt      <E>  ├─►│ Selekt      <E>  ├─►│ Selekt      <E>  │
            └──────────────────┘  └──────────────────┘  └──────────────────┘  └──────────────────┘
```

In the Analysis menu, measured values can be displayed on-line and various process signals can be recorded and correspondingly displayed.

7.12.1　Analysis_Values

```
                    ┌──────────────────┐
                    │ Analyse     <M>  │◄────────────┐
                    │ Selekt      <E>  │             │
                    └──────────────────┘             │
┌──────────────────┐  ┌──────────────────┐
│ Daten       <M>  │  │ Diagnose    <M>  │
│ Selekt      <E>  ├─►│ Selekt      <E>  │
└──────────────────┘  └──────────────────┘
```

This menu point is active only in the "On Line Mode".
With this command, all relevant data of the connected axis controller are read-in and displayed. The values are continually updated (on-line).

Field	Description	Unit
Supply voltage	Power supply voltage of the card	V
Bus preset value (only cards with fieldbus)	Preset value via fieldbus	Inc
Analog preset value	Voltage- resp. current preset value from the analog input	V or mA
Preset position	Scaled preset value	mm / Deg / Inch
Actual position	Scaled actual position	mm / Deg / Inch
Control deviation	current control deviation	mm / Deg / Inch
Control voltage A	Control signal before solenoid output A	V
Solenoid current A	Solenoid current of solenoid A	mA
Control voltage B	Control signal before solenoid output B	V
Solenoid current B	Solenoid current of solenoid B	mA
Digital inputs 1 - 8	Logical conditions of the digital inputs When the inputs are set When the inputs are not set	 1 0
Digital outputs 1 - 2	Logical conditions of the digital outputs When the outputs are set When the outputs are not set	 1 0

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7.12.2   Analysis_Signal Recording (only PASO-Version)

In the menu "Analysis_Signal Recording" different signals of the connected card can be recorded and analyzed. Not all card types do support Signal Recording. In "On Line Mode" the availability also is dependent on the card software version. If Signal Recording is not supported, the menu "Analysis_Signal Recording" is dimmed.

Configuration and performance of the connected card determine which signals can be recorded. The selection is made in the menu "Signal Assignment", which can be activated by clicking on the key "Signal Assignment" (see below).
In "Off-Line Mode" signal recording is not possible, however the recording parameters can still be set ("Signal Assignment").

For each measuring channel (maximum 4 channels) up to 250 measuring values will be recorded. The sampling rate consequently is determining the maximum recording time: sampling rate times number of measuring values. Some card types may have a different distribution of channels and total number of values. The minimal sample time is 5 ms. As first measuring value is sampled on time zero (start), the last measuring value is sampled one sample time before end of measuring span.

The recording parameters, signal type, sampling rate, etc., are saved on the card together with the parameters, as well as on hard disk, when saving into file.
The recorded measuring values will **not** be saved with the parameters, however there exists an export possibility (Key "Export").

The time cursors allows you to show the measurement values for each recording sample.

The recorded measuring values will be lost by changing "Off-Line" / "On-Line" mode, or by leaving PASO.

Field	Description	Range
Signal graph	Switching on the controls makes visible the recorded plots of the corresponding channels	
Time cursor	Positioning the time cursor using the input control Time [s] or by moving the slide control below the graphics	0 up to measuring span (see description in text)
Signal Assignment	Opens the menu " Signal Assignment" (see below)	
New	Possible recording data will be lost and the connected card is standby for a new recording	
Start/Stop	**Start** A new recording will be started. On trigger event the signal recording is active (showing the field "Recording" blinking) and the measuring data are transmitted If there are already measuring data in memory, recording will continue from this point. If the maximum number of measuring values is recorded, eventually remaining data will be transmitted (plots will continue actualizing). During transmission the plots can already been analyzed ("Signal graph", "Auto Scaling"). **Stop** Stops the data transmission and signal recording. At this point recording can be continued by actuating the "Start" key. If the maximum number of measuring values is read, or in case of "Off-Line" operation the "Start" key is dimmed.	Start / Stop

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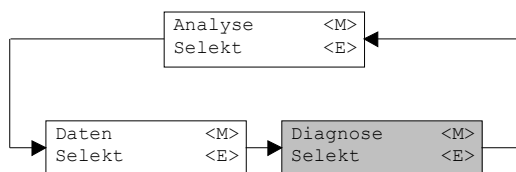| Export	By actuating this key recording data will be saved on hard disk. The used format is a text format with tabs as separators to enable an easy import into another program (e.g. Excel) The numbers decimal sign is chooseable: point or comma.	
Autoscaling	By means of this key data plots in the signal graph will be showed in optimized presentation. Optimizing is only executed on the visible plots. "Scaling" and "Offset" of the corresponding channels (see "Signal Assignment") will be modified automatically. Autoscaling is also possible during signal recording.	
Close	By actuating this key the signal recording menu will be left. Eventual signal recording data will be retrieved and can be made visible by opening the menu again.	

Menu Signal Assignment

In this submenu, which can be opened by actuating the "Signal Assignment" key, you make a choice of the signals you want to record.

13. Up to 4 channels are provided, which can be made active for signal recording.
14. Under "Signal" you choose for each channel the signal type to be recorded.
15. Under "Supplementary" you can specify the desired signal, if necessary.
16. Under "Trigger" you can indicate the desired trigger channel, as well as trigger slope and level.
17. Under "Sample Time" you can select the recording sample time (range 0.005..60 s, as a multiple of 5 ms).
18. Signal plot representation is controlled by the inputs in "Scale/div" and "Offset".
19. Leaving the menu with OK
    If there has been modifications under 1-5, eventual recording data will be deleted (as well as the graph plots).
20. Leaving the menu with Cancel
    Eventual changes will be discarded.

The plot parameters "Scale/div" and "Offset" are saved on connected card together with the parameters.

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7.12.3 Analysis_Diagnostic

```
          ┌──────────────────────┐
          │  Analyse      <M>    │◄──────────┐
          │  Selekt       <E>    │           │
          │                      │           │
  ┌───────┘                      └───────┐   │
  │   Daten       <M>    Diagnose    <M> │   │
  │   Selekt      <E>    Selekt      <E> │───┘
  └──────────────────────────────────────┘
```

With this command, possibly present errors on the connected Position controller PLUS are indicated. The error is read in once. In the version with display/keys or multi-function terminal MTG02 resp. PC-Terminalsoftware TESO, only the text in the column "Diagnostics" will be displayed. For making an exact analysis of the error, this operating guide has to be contacted. In the PASO-Version, a complete description of the error will be displayed.

Diagnostics:	Error	Error remedy
Power supply fault	If the supplied voltage < 18VDC. the solenoid outputs are blocked.	Disable and reenable the control
Cable break supply	This error is only detected, if the parameter "cablebreak" is set to "yes". The power supply and/or the ground of the preset generator is interrupted. The solenoid outputs are blocked.	Disable and reenable the control
Cable break input X	This error is only detected, if the parameter "cablebreak" is set to "yes". The preset value signal to the controller is interrupted. The corresponding solenoid output is blocked.	Disable and reenable the control
Memory: XX	Error in verifying EEPROM-RAM data. The solenoid outputs are blocked.	Switch off and on the control or resave the parameters

7.13 Help - Menu (only PASO-Version)

The PASO-Help based on the standard Windows-Help construction.

7.13.1 Help_Description of the function

A general information about the function of the Position controller PLUS will be displayed.

7.13.2 Help_Contents

The list of contents of the PASO-Help will be displayed.

7.13.3 Help_Index

The list of index of the PASO-Help will be displayed.

7.13.4 Help_Card Identification

This menu point is only active in the "On Line Mode".
Here the current version of the hardware and the software from the connected Position controller PLUS will be read and displayed.

7.13.5 Help_Info

Information about PASO and its version.

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8 The system does not work

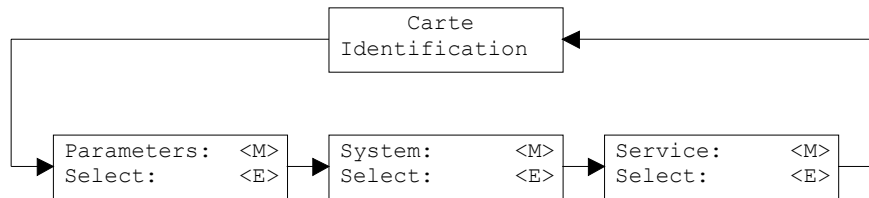In this section, the generally possible errors and the procedures for eliminating them are listed and explained.

8.1 Procedure

The following check list can be used to help, if a problem is arised.

Question:	Action:	Possible errors and causes
Green LED off	Analysis_Values	● The 24VDC supply is not switched on ● The 24VDC supply is wrongly or not connected ● If the supply voltage value is between 21VDC and 30VDC, the supply is correct
Red LED on	Analysis_Values Power supply error	● The supplied voltage is under 18VDC. The error is also displayed if a supplied voltage interruption occurred (t > 250ms). ● Is the supplied power enough? ● Is the AC voltage too high (refer to section "Electrical specifications" page 5) ● When the error is cleared, disable the controller for a short period and re-enable (DigInp 3)
	Analysis_Diagnostic Cablebreak supply	● If the preset value encoder is a potentiometer, the supply is absent ● The ground connection of the potentiometer is not connected to the connector strip. ● Check connections to the potentiometer ● If the cablebreak detection is not desired, switch off the cablebreak function in the menu "Configuration". ● When the error is cleared, disable the controller for a short period and re-enable (DigInp 3)
	Analysis_Diagnostic Cable break input X	● The cable break detection functions only with potentiometer or 4 ... 20mA preset value. ● The preset value signal is absent or is smaller than 4mA. ● Check the preset value signal connections between the preset value encoder and card. ● If the cablebreak detection is not desired, switch off the cablebreak function in the menu "Configuration". ● When the error is cleared, disable the controller for a short period and re-enable (DigInp 3).
	Analysis_Diagnostic Memory XX	● Error in verifying EPROM-RAM data. ● Error has occurred while writing to or reading from the EPROM. ● If fault occurred while storing, store again, then switch card off and on. ● If fault occurred when card was switched on, store parameter, then switch card off and on.

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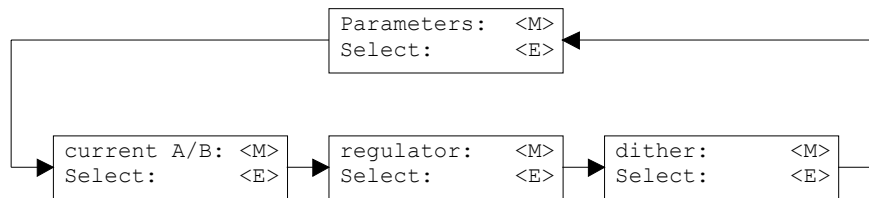*CH-3714 Frutigen*   *sd1x4bae.doc*

9 Cyclic menu construction

The operation via the display/keys or the multi-function terminal MTG02 resp. the PC-Terminalsoftware TESO is in the form of a cyclic menu structure.

```
                          ┌─────────────────┐
                          │      Carte       │◄──────────┐
                      ┌──►│  Identification   │           │
                      │   └─────────────────┘           │
                      │                                   │
          ┌───────────────────┐  ┌───────────────────┐  ┌───────────────────┐
       └─►│ Parameters:   <M> │─►│ System:       <M> │─►│ Service:      <M> │
          │ Select:       <E> │  │ Select:       <E> │  │ Select:       <E> │
          └───────────────────┘  └───────────────────┘  └───────────────────┘
```
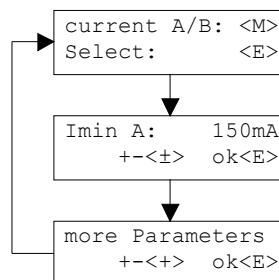
To move through the cyclic menu, press the key "MODE". All existing menu items are listed in the section "Settings" page 21 with the number 7.x.
To enter a program branch, press the key "ENTER":

```
                          ┌───────────────────┐
                          │ Parameters:   <M> │◄──────────┐
                      ┌──►│ Select:       <E> │           │
                      │   └───────────────────┘           │
                      │                                   │
          ┌───────────────────┐  ┌───────────────────┐  ┌───────────────────┐
       └─►│ current A/B:  <M> │─►│ regulator:    <M> │─►│ dither:       <M> │
          │ Select:       <E> │  │ Select:       <E> │  │ Select:       <E> │
          └───────────────────┘  └───────────────────┘  └───────────────────┘
```

to move through the sub cycle menu, press the key "MODE". All existing menu items are listed in the section "Settings" page 21 with the number 7.x.x.
To enter a parameter branch, press the key "ENTER":

```
              ┌───────────────────┐
          ┌──►│ current A/B:  <M> │
          │   │ Select:       <E> │
          │   └───────────────────┘
          │             │
          │             ▼
          │   ┌───────────────────┐
          │   │ Imin A:    150mA  │
          │   │    +-<±>   ok<E>  │
          │   └───────────────────┘
          │             │
          │             ▼
          │   ┌───────────────────┐
          └───│ more Parameters   │
              │    +-<+>   ok<E>  │
              └───────────────────┘
```

With the keys "+" and "-", the desired value can be adjusted. With the key "ENTER", the next parameter value will be displayed. All existing parameters are listed in the section "Settings" page 21 with the column "Field".

The detailed description of all commands and parameters is located in the section "Settings" page 21 of this operating guides.

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10 PASO Installation and Operation

The parameterisation software PASO serves for the parameterising and diagnosing of digital control cards of the WANDFLUH AG company. The software provides a user interface, through which by means of a keyboard or a mouse all adjustments and settings can easily be carried out. The communication with the digital control card takes place through a serial RS 232 interface.

The parameterisation software PASO can only be utilised in connection with a digital control card of the WANDFLUH AG company. It is necessary to carefully study the operating instructions of the connected digital control card beforehand.

10.1 PASO system requirements

A description of the different PASO versions is located in the file "history.pdf". This file is located in the directory where the PASO will be installed.

In order to be able to correctly utilise the PASO, an IBM-compatible PC with the following requirements has to be available:

- Processor 486 or higher, min. 33MHz, min. 8MB RAM
  Recommended: 80586 66MHz or higher, 16 MB RAM or more
- Free harddisk storage space of minimum 4MB, plus storage space for program files
- Operating system MS-WINDOWS 95/98, NT 4.0 or higher
- Standard VGA or higher graphics card, recommended resolution 800x600
- At least one serial RS 232 interface (with Laptops resp. Notebooks without a serial interface, this can be realised with a PCMCIA-card)
- Serial RS232 cable 1:1 (RxD and TxD not crossed)

10.2 PASO installation

The PASO software can be downloaded via the Internet free of charge (www.wandfluh.com/Download => PASO ED1/SD1 => Download Program files) or on request delivered on an installation-CD.

The installation of the PASO is then carried out by executing the file "setupPasoEd1vxxxx.exe", where "xxxx" means the current version (e.g. setupPasoEd1v3000.exe, see also version index). An installation program takes over the complete installation of PASO. To them, the Windows Installer must be installed. This is normally a part of the Windows Environment. If not, please download it from the Microsoft Website.

If there is already a version of the PASO software installed on the PC, one can select if the existing version should be overwritten or removed.

For all standard cards (Amplifier, Position controller, Position controller PLUS and Position controller PLUS), the helpfiles are included in the setup and are installed automatically. For the special cards ED1AE, ED1AF, ED1AG, ED1AP, SD1AY and SD1BA the helpfiles can be downloaded separate via the internet (www.wandfluh.com/Download => PASO ED1/SD1 => Download Helpfiles for Special types)

10.3 PASO connection to the digital card

The connection between the PC, on which the parameterisation software PASO is installed and the axis controller takes place through the serial RS 232 interface. To do this, a 1:1 cable (RxD and TxD not crossed) has to be connected with the desired output port on the PC and with the RS 232 socket on the axis controller.

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The parameterisation software PASO runs in one of two modes:

- In the "Off Line"-mode, the processing of the parameter files is possible. The communication with the axis controller is not active. A connection is not necessary.
- In the "On Line"-mode, there is active communication with the axis controller card. Every change becomes immediately effective in the axis controller. In this mode, the loading and processing of files is not possible. Solely the saving of the currently active parameters into a file is possible.

The change between the two modes takes place through the menu point "File_On Line / Off Line". In case of an interference in the communication, the controlling of the axis controller is not assured anymore. An error message follows and the PASO software automatically changes over to the "Off Line"-mode.

When the parameterisation software PASO is started up, a check takes place, as to whether a communication with the axis controller is possible. If no communication can be established, an error message appears. The reason for this message is either a not connected - or a not switched on axis controller, or else on the PASO side not the same interface has been selected as the one used for the connection cable to the axis controller. In the latter case, one must reply with "No" and after the PASO start has taken place one changes the interface port setting in the menu "Configuration_Interface (only PASO-Version)" page 36.

If one replies with "No", then an additional message appears. The PASO software is set to the "Off Line"-mode. All menu points and keys, which involve an action in connection with the communication, are then blocked. All other functions of the parameterisation software PASO, such as the processing of parameter files, can be utilised without any limitation.
If one replies with "Yes", then it is once again checked, whether now a communication with the digital controller card is possible.

If the interruption of the communication occurs during the operation of the parameterisation software PASO, then an error message appears and the PASO software is set to the "Off Line"-mode. All menu points and keys, which involve an action in connection with the communication, are now blocked.
In order to re-establish a communication, the menu point "File_Activate On Line" has to be selected.

If a communication with the connected card is possible, a check will be made, if the current function from the PASO correspond to the function of the connected card type. If yes, the parameters will be transfered. If no, in case of "Take over", a question will be displayed if the current function from the PASO should be changed or not. In case of "Reprogram", an error message will be displayed and the parameters can not be transfered.

10.4 PASO program description

In the following section, you will find a detailed description of the function from the parameterisation software PASO.

10.4.1 Description of the keys

TAB	Transfer to the next input element
SHIFT-TAB	Transfer to the previous input element
ENTER	Execution of the active input element or conclusion of an input.
ESC	Abort, undoing of an action. In many cases corresponds to the key "Cancel".
F1	Activation the key "Help"

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10.4.2   Input elements

Key	A key executes the action, with which it is inscribed. Actuation of a key through the keyboard: ● Push the key TAB, until the key becomes active. ● Push the key ENTER. The action is now carried out. ● Push the key ALT and the underlined letter of the key inscription: The action is carried out immediately. Actuation of a key with the mouse: ● Click on the corresponding key. The action is now carried out.
Switch	By means of a switch, a selection between two possibilities is possible. A switch is either switched on or - off. Actuation of a switch through the keyboard: ● Push the keys UP or HOME to switch on the switch. ● Push the keys DOWN or END to switch off the switch. ● Push the SPACE key for changing over (switching over). Actuation of a switch with the mouse: ● Click on the switch for changing over (switching over).
Input field	The input fields enable the entering of numbers or text. All applicable keys of the keyboard are allowed, including the keys HOME, END, LEFT, RIGHT. In certain cases when taking it over, the input is checked and if necessary an error message is issued. Actuation of an input field through the keyboard: ● Push the key ENTER or TAB to finish with the input field. ● In the case of input fields with ARROW keys UP and DOWN: Actuation of the UP-/DOWN - keys for the step by step changing of the values. Actuation of an input field with the mouse: ● Click within the input field, in order to position the cursor in it. ● In the case of input fields with ARROW keys UP and DOWN: Click on the corresponding arrow for the step by step changing of the values.
Selection field	The selection fields enable the selection from various possibilities. Actuation of a selection field through the keyboard: ● Push the SPACE key to open all selection possibilities. With the help of the keys UP, DOWN, HOME, END, make the required selection. Subsequently push the ENTER key to confirm the required selection, or else the ESC key to undo the selection. ● Push the key UP to cyclically select the previous selection. ● Push the key DOWN to cyclically select the next selection. ● Push the key HOME to select the first item of the selection list. ● Push the key END to select the last item of the selection list. Actuation of a selection field with the mouse: ● Click inside the selection field so that all selection possibilities are displayed and then click on the required selection.

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10.4.3 Starting of PASO

Following the successful installation, the parameterisation software PASO can be started by double-clicking on the PASO - icon. Certain settings of the PASO software, e.g., the selected interface port, are saved in the file "konfig.kon". When PASO is started for the first time, the configuration values int this file are set to standard values. During the course of running the program, these values can be corrected.

After the start-up, the Start window appears:

During the start-up, the parameterisation software PASO checks, whether a digital controller card is connected. If no communication can be established (communication interference or no axis controller connected), an error message appears. All menu points and keys, which involve an action in connection with the communication, are then blocked. All other functions of the parameterisation software PASO can be utilised without any limitation.

If the communication works without any interference, the software PASO checks, if the current function of the PASO correspond with the function of the connected digital controller card. If no, a question will be displayed if the current function from the PASO should be changed or not.

If the function is ok or will be changed, the parameters are loaded from the card and subsequently a verification of the axis controller values takes place. If one or several parameters are outside the corresponding tolerance, they are replaced with standard values and a message is issued (refer to section "Limiting value error" page 50). In this case the communication is set to the "Off Line"-mode. The user now has the possibility to check the parameters and if necessary to correct them. The communication is resumed again via the menu point "File_On Line". Subsequently one has to select the option "Re-program the axis controller", in order for the corrected values to be made active on the axis controller.

The menu points in the menu line can be selected in the following manner:

* by clicking on them with the mouse
* by actuating the key "ALT" and the underlined letter of the required menu point
* if a menu point has been selected, then by means of the keys "Arrow left" and "Arrow right" one can change to the next menu point and with the keys "Arrow up" and "Arrow down" one can change to the next sub-menu point within the menu selection field.

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In the header line of the window, the name of the current file is always displayed. If no existing file has been loaded or if the data have not been saved to a file, then this line reads "noname". Also the current function of the PASO is displayed.

The following states will be displayed in the status line:

PASO status:
- 1. field: Selected RS232 interface
- 2. field: Current mode (On line or Off Line)
- 4. field: Parameter Inconstancy (only with Position controller PLUS with fieldbus,
refer to the section "Parameter Inconstancy" page 21)

ED1 status:
- 1. Feld: Wait: Controller card is waiting on the start signal
Go: Start signal was set and the controller card is reading in the current preset value
Stop: Stop signal was set and the axis stops
(refer to the section "Digital inputs" Seite 13)
- 2. field: State of the preset value (Preset Bus or Preset Local,
only with Position controller PLUS with fieldbus)
- 3. field: Operating mode (Remote PASO, Remote or Local, refer to section "Operating mode" page 11)
- 4. field: Warning (only with Position controller PLUS with fieldbus,
refer to the section "Parameter Inconstancy" page 21)
- 5. field: Position controller PLUS state (Disabled or Active,
refer to the section "Position controller PLUS State machine" page 10)
- 6. field: Error state (Ready or Error, refer to the section "Analysis_Diagnostic" page 42)

10.4.4   Store parameter on the controller card

Each new input value is immediately transferred to the connected controller card after the completion of the input field (either by pushing the key ENTER or by activating another input field).

If the window is closed with the key "OK", the values are stored in the connected controller card so that they are available after the controller card is switched on again (non-volatile memory).

If the window is closed with the key "Cancel", the previous current values are active again. All inputs made in the current window are cancelled.

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10.4.5 Limiting value error

Each incoming parameter (either transferred via the serial interface or loaded from a file) is checked against the limiting value. If a parameter is smaller or bigger than its limiting value (= limiting value error), it is set automatically to the default value and the following window appears:

Limiting error

The following parameters are set to default value:

	Parameter	Current Value	Min. Value	Max. Value	Default value
1	Digital input 5	8	0	2	2 [X]
2					
3					
4					
5					
6					
7					
8					

OK   Help
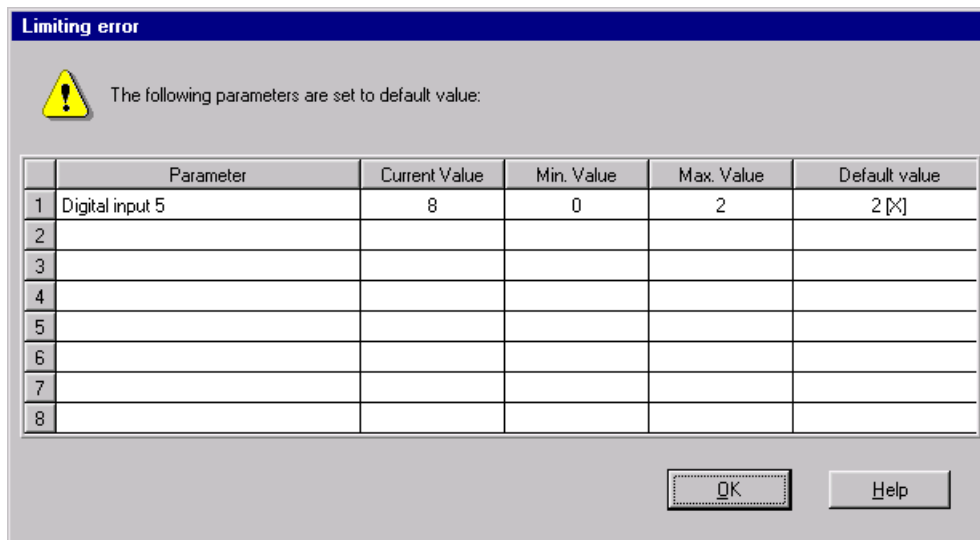
Parameter:	Name of the parameter with the limiting value error
Current value:	Current value of the parameter
Min. value:	Minimum allowed value of the parameter
Max. value:	Maximum allowed value of the parameter
Default value:	Default value of the parameter

After pressing the key "OK", the current value is overwritten by the default value.

Normally, a limiting value error does not happen. However, in the following cases it can happen:

- loading a file, in which parameter values have been changed from outside
- reading parameter values from a connected controller card with another configuration than the current configuration in the PASO (only if the controller card was changed while in the "On Line"-mode)
- if the transmission of the parameter values is wrong

10.5 Description of Commands

The description of the individual commands and parameters is contained in section "Settings" page 21.

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11 Disposal

- The electronics card has to be disposed of in accordance with the generally applicable regulations of that country, in which it is being used.
- Electronics cards are recycled by companies specialised in this field.

12 Additional information

You can find additional information in the following WANDFLUH documentations:

WANDFLUH-Electronics general	Documentation A	Register	1.13
Accessories	Documentation A	Register	1.13
Proportional directional control valves	Documentation A	Register	1.10
Proportional pressure control valves	Documentation A	Register	2.3
Proportional flow control valves	Documentation A	Register	2.6

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A1   Parameter Setting

Parameters	Default setting	Customer settings 1	Customer setting 2
Profile position 1 - 7	0mm		
Speed 1 - 7	100%		
Stop time	0s		
Output 'In position'	set		
Solenoid 'In position'	off		
Imin solenoid A	150mA		
Imax solenoid A	700mA		
Imin solenoid B	150mA		
Imax solenoid B	700mA		
Frequency	100Hz		
Level	100mA		
Threshold positive	0.1V		
PropFact 1 positive	20		
PropFact 2 positive	100		
I-Time positive	0.00s		
I-Window positive	0.00mm		
Threshold negative	0.1V		
PropFact 1 negative	20		
PropFact 2 negative	100		
I-Time negative	0.00s		
I-Window negative	0.00mm		
Ramp +	0.00s		
Ramp -	0.00s		
Window	1mm		
Window hysteresis	1mm		
max. system speed	100%		
Solenoid 'In position'	off		
Output 'In position'	set		
Controller	external		
System control	not invert		
Displacement displayed	mm		
Signal type preset value	0 ... 10VDC		
Used input preset value	AnaInp1 [V]		
Inversion preset value	no		
Cablebreak preset value	no		
Signal type actual value	0 ... 10VDC		
Used input actual value	AnaInp3 [V]		
Inversion actual value	no		
Cablebreak actual value	no		
Offset measuring system	0mm		
Resolution	100mm/V		
Digital input 1	X		
Digital input 2	X		
Digital input 3	X		
Digital input 4	X		
Digital input 5	X		
Digital input 6	X		
Digital input 7	X		
Digital input 8	X		
Digital output 1	X		
Digital output 2	X		

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