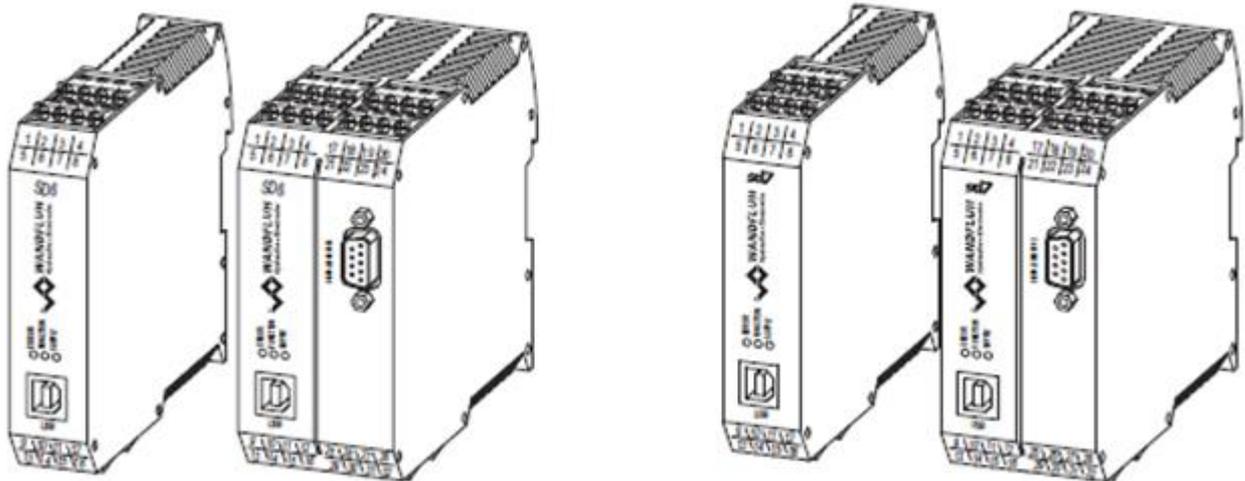


# DIFFERENCES

## SD6 - SD7



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## 1 General

The SD7 Electronics is a further development of the SD6 electronics. Thereby, the hardware has not changed, only functional enhancements have been made to the software (refer to section "[Functional differences](#)"<sup>[4]</sup>). Thus, a SD6 card can be replaced with a SD7 card without modifications to the wiring.

For parameterisation of the SD7 cards the new PASO SD7 must be used. This new PASO version is created in the new design with the signal flow directly in the main window (similar to PASO DSV and PASO MD2). Parameter files that were created with the PASO SD6 can be imported into PASO SD7 (refer to section "[Acquisition of existing SD6 parameter files](#)"<sup>[11]</sup>).

With the SD7 card the inputs and outputs are no more fixed linked to a function. They can be freely assigned. During importing a SD6 parameter file, they are assigned according to the specification from the SD6 card. The corresponding adjustments are shown in the section "[Differences digital inputs WAG standard to SD6](#)"<sup>[7]</sup>.

The scaling of the command value has been adapted for the SD7 amplifier card. Now, the parameter "Interface" and "Reference" are used (same principle as on the controller cards). During importing a SD6 parameter file, they are adapted automatically. The correlation of both types of scaling is shown in the section "[Differences command value scaling \(only Amplifier\)](#)"<sup>[6]</sup>.

## 2 Functional differences

SD6	SD7
Type code - SD6x0.. = Standard Amplifier - SD631.. = Standard Amplifier with Mode of operation 4 - SD632.. = Standard Amplifier with Command values fixed - SD633.. = Basic Controller - SD636.. = Enhanced Controller	Type code - <b>SD7x0.. = Basic Amplifier</b> - <b>SD735.. = Enhanced Amplifier</b> - SD733.. = Basic Controller - SD736.. = Enhanced Controller <b>On the amplifier, the mode of operation 4 and fixed command values are always available, the difference Basic / Enhanced is the number of inputs and outputs</b>
The inputs and outputs are fixed assigned. For example the digital input for the device enable is always digital input 1 (except on SD632.., there it is digital input 3)	<b>The assignment of the inputs and outputs can be freely assigned. For example, the user can choose itself, which digital input should be used for the device enable. PASO SD7 provides a WANDFLUH standard, which set the inputs and outputs according to the SD6 (with some small exceptions, which were not logical on the SD6)</b>
Parameter in the PASO are accessed and adjusted via menu items	<b>New design with the signal flow directly in the main window (similar to PASO DSV and PASO MD2)</b>
Communication is done via protocol V1. This protocol based on the specifications for the serial communications with the ED1 (individual bytes are transferred) and therefore is relatively slow.	<b>Communications is done via protocol V2. This protocol is created for the USB transfer and optimally used these advantages (complete blocks are transmitted).</b> <b>Comparative measurement activating ON-Line with SD6 and SD7 Enhanced Controller with the some parameter:</b> <b>SD6 = 14s</b> <b>SD7 = 7s</b>
Command value signal - Voltage - Current	Command value signal - Voltage - Current - <b>Digital</b> - <b>Frequency</b> - <b>PWM</b>
Feedback value signal (only Controller) - Voltage - Current - SSI - Start / Stop	Feedback value signal (only Controller) - Voltage - Current - <b>Frequency</b> - <b>PWM</b> - SSI <b>Start / Stop is no longer supported by the SD7 (possible on request)</b>
One possible input for command and feedback value	<b>Two possible inputs for command and feedback value</b> <b>Command value</b> - <b>command = command 1 + command 2</b> - <b>command = command 1 x command 2</b> - <b>command = optionally command 1 or command 2</b> - <b>command = command 1, speed = command 2</b> <b>Feedback value</b> - <b>feedback = feedback 1 - feedback 2 (e.g. differential pressure)</b>
Fixed command values only on the Amplifier with Command values fixed (SD632..)	<b>Fixed command values are always available (Amplifier and Controller). Because of the</b>

SD6	SD7
	<b>restriction of the digital inputs, there are three command values fixed on the Basic version (two DigInp) and seven command values fixed on the Enhanced version (three DigInp) available.</b>
Command value generator (only Controller) - speed pos / neg adjustable - speed 0.0 = max. speed - acceleration / deceleration pos / neg is fixed	Command value generator (only Controller) - speed pos / neg adjustable - <b>speed 0.0 = really 0.0</b> - <b>acceleration pos / neg adjustable</b> - <b>deceleration pos / neg adjustable</b>
Controller modes (only Controller) - Pressure/flow valve closed loop (1-sol) - Pressure control closed loop (2-sol) - Position closed loop (2-sol) - Speed control closed loop (2-sol)	Controller modes (only Controller) - Pressure/flow valve closed loop (1-sol) - Pressure control closed loop (2-sol) - Position closed loop (2-sol) - Speed control closed loop (2-sol) - <b>2-point controller (1-sol)</b> - <b>2-point controller (2-sol)</b> - <b>3-point controller (2-sol)</b>
The controller settings P, I and D refer always to the maximum possible control deviation. The maximum possible control deviation is the feedback value at 10V resp. 20mA.	<b>With the parameter "End reference" and "Control deviation for 100% control value" can be defined, at which control deviation the controller settings P, I and D should have the full effectiveness</b>
Solenoid outputs - for proportional solenoids with current measuring	Solenoid outputs - for proportional solenoids with current measuring - <b>for proportional solenoids without current measuring</b> - <b>for switching solenoids without current measuring</b>
Individual disable / enable of each solenoid only possible with Amplifier with command values fixes	<b>Individual disable / enable of each solenoid possible with all types</b>
	<b>Cablebreak detection for the solenoid outputs possible</b>
	<b>On / Off threshold for switching solenoids available</b>
	<b>Power reduction for switching solenoids available</b>
Each digital output is permanently assigned to a function	<b>For each function a separate digital output can be assigned</b>
Each error is automatically displayed on digital output 1	<b>For each error a separate digital output can be assigned</b>
An active error is displayed in the PASO with a red field "Error" in below right corner	An active error is displayed in the PASO - with a red field "Error" in below right corner - <b>with a red border around the box "Error evaluation"</b> - <b>with a red button "Diagnostics" in the "Error evaluation"</b>
Auto reset on a power error only possible with a special K-number	<b>Auto reset on a power error possible as standard</b>
	<b>Internal signals are included. For example, a digital output from a function can be connected directly to a digital input without an external wiring.</b>
Fieldbus - Profibus DP	Fieldbus - Profibus DP - <b>CANopen / J1939</b> - <b>HART</b>

### 3 Differences command value scaling (only Amplifier)

SD6	SD7
<ul style="list-style-type: none"> <li>with the SD6 Amplifier, the scaling of the command value is done with the parameter "Scaling" and "Offset"</li> <li>the scaling relates always to 100% command value</li> <li>the calculation for the parameter "Scaling" is as follows: Scaling = 100% / signal range</li> </ul>	<ul style="list-style-type: none"> <li>with all SD7 card (Amplifiers and Controllers), the scaling is done with the parameter "min Interface", "max Interface", "min Reference" and "max Reference"</li> <li>no calculation is necessary, the input of tow points for the signal range and the command value is enough</li> </ul>
<ul style="list-style-type: none"> <li>Example 1: Signal range = 0 ... 10V for 0 ... 100% command value Scaling = 100% / 10V = 10%/V Offset = 0.0V</li> </ul>	<ul style="list-style-type: none"> <li>Example 1: Signal range = 0 ... 10V for 0 ... 100% command value min Interface = 0.0V max Interface = 10.0V min Reference = 0.0% max Reference = 100.0%</li> </ul>
<ul style="list-style-type: none"> <li>Example 2: Signal range = 0 ... 8V for 0 ... 100% command value Scaling = 100% / 8V = 12.5%/V Offset = 0.0V</li> </ul>	<ul style="list-style-type: none"> <li>Example 2: Signal range = 0 ... 8V for 0 ... 100% command value min Interface = 0.0V max Interface = 8.0V min Reference = 0.0% max Reference = 100.0%</li> </ul>
<ul style="list-style-type: none"> <li>Example 3: Signal range = 2 ... 8V for 0 ... 100% command value Scaling = 100% / 6V = 16.66%/V Offset = 2.0V</li> </ul>	<ul style="list-style-type: none"> <li>Example 3: Signal range = 2 ... 8V for 0 ... 100% command value min Interface = 2.0V max Interface = 8.0V min Reference = 0.0% max Reference = 100.0%</li> </ul>
<ul style="list-style-type: none"> <li>Example 4: Signal range = 10 ... 0V for 0 ... 100% command value Scaling = 100% / 10V = 10%/V Offset = 0.0V Inversion = yes</li> </ul>	<ul style="list-style-type: none"> <li>Example 4: Signal range = 10 ... 0V for 0 ... 100% command value min Interface = 10V max Interface = 0V min Reference = 0% max Reference = 100%</li> </ul>

## 4 Differences digital inputs WAG standard to SD6

### Basic Amplifier SD7 / standard Amplifier SD6

Input	WAG-standard	SD6	Settings on SD7, compatible therewith to SD6
DigInp 1	Enable channel 0 = disabled 1 = enabled	Enable 0 = disabled 1 = enabled	
DigInp 2	Selection solenoid B 0 = solenoid B not selected 1 = solenoid B selected	Selection solenoid B 0 = solenoid B not selected 1 = solenoid B selected	

### Enhanced Amplifier SD7 / Amplifier with command values fixed SD6

Input	WAG-standard	SD6	Settings on SD7, compatible therewith to SD6
DigInp 1	Enable channel 0 = disabled 1 = enabled	Disable solenoid A 0 = solenoid enabled 1 = solenoid disabled	Solenoid driver 1 - Enable = external inverted Solenoid driver 1 - Dig. Input = DigInp1
DigInp 2	Selection solenoid B 0 = solenoid B not selected 1 = solenoid B selected	Disable solenoid B 0 = solenoid enabled 1 = solenoid disabled	Solenoid driver 2 - Enable = external inverted Solenoid driver 2 - Dig. Input = DigInp2
DigInp 3	Enable solenoid 1 0 = solenoid disabled 1 = solenoid enabled	Enable 0 = disabled 1 = enabled	Channel Enable - Dig. Input = DigInp3
DigInp 4	Enable solenoid 2 0 = solenoid disabled 1 = solenoid enabled	Selection solenoid B 0 = solenoid B not selected 1 = solenoid B selected	Valve type - Solenoid 2 = DigInp4
DigInp 5	not used	Ramp off 0 = Ramp active 1 = Ramp not active	Command value generator - Enable = external inverted Command value generator - Dig. Input = DigInp5
DigInp 6 - 8	Selection fixed command value 1 - 7 0 = not selected 1 = selected	Selection fixed command value 1 - 7 0 = not selected 1 = selected	

**Basic Controller SD7 / Basic Controller SD6**

Input	WAG-standard	SD6	Settings on SD7, compatible therewith to SD6
DigInp 1	Enable channel 0 = disabled 1 = enabled	Enable 0 = disabled 1 = enabled	
DigInp 2	Selection solenoid B 0 = solenoid B not selected 1 = solenoid B selected	Selection solenoid B 0 = solenoid B not selected 1 = solenoid B selected	

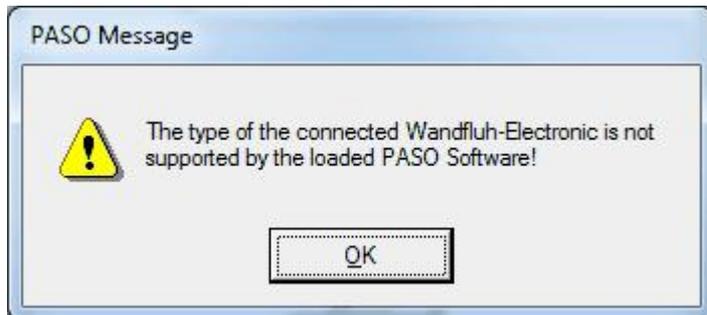
**Enhanced Controller SD7 / Enhanced Controller SD6**

Input	WAG-standard	SD6	Settings on SD7, compatible therewith to SD6
DigInp 1	Enable channel 0 = disabled 1 = enabled	Enable 0 = disabled 1 = enabled	
DigInp 2	Enable Manual mode 0 = Manual mode not active 1 = Manual mode active	Manual mode / Automatic 0 = Manual mode active 1 = Automatic mode active	Manual mode - Enable = external inverted
DigInp 3	Manual mode forward 0 = forward not active 1 = forward active Selection Profile/Sequence 0 = Profile 1 = Sequence	Manual mode forward 0 = forward not active 1 = forward active Selection Profile/Sequence 0 = Sequence 1 = Profile	Command value fixed - Enable Profile/Sequence = external inverted
DigInp 4	Manual mode backward 0 = backward not active 1 = backward active Profile Start 0 = Start not active 1 = Start active	Manual mode backward 0 = backward not active 1 = backward active Profile Start 0 = Start not active 1 = Start active	
DigInp 5	Manual mode fast speed 0 = Slow speed 1 = Fast speed Profile Stop 0 = Stop not active 1 = Stop active	Manual mode fast/slow speed 0 = Slow speed 1 = Fast speed Profile Stop 0 = Stop not active 1 = Stop active	Command value fixed - Enable Stop = external inverted
DigInp 6 - 8	Selection fixed command value/Profile 1 - 7 0 = not selected 1 = selected	Selection Profile 1 - 7 0 = not selected 1 = selected	

## 5 Behaviour during activating On Line

### PASO SD6 (<= Version 1.5.1.5) with card SD7

- there is no communication possible
- because the SD7 card is unknown for the PASO SD6, no specific message can be displayed
- Error message:



### PASO SD6 (>= Version 1.5.1.6) with card SD7

- there is no communication possible
- the PASO SD6 recognizes the SD7 card and will therefore display a specific message
- Message:



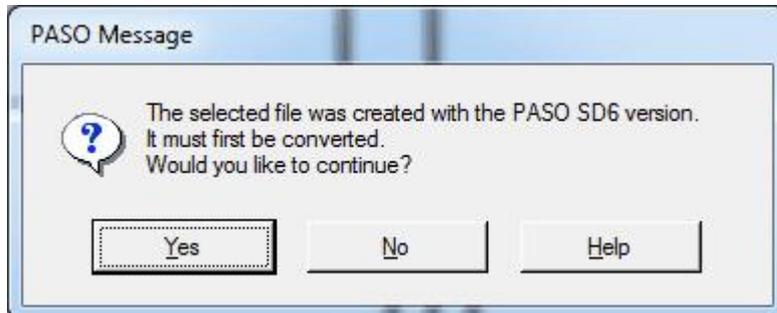
**PASO SD7 with card SD6**

- there is no communication possible
- the PASO SD7 recognizes the SD6 card and will therefore display a specific message
- Message:

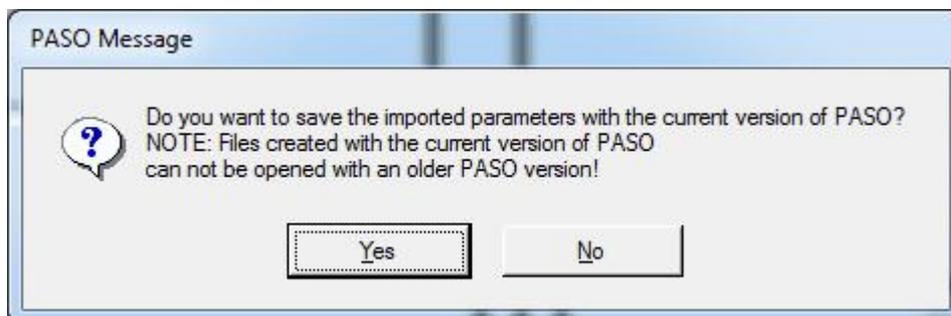


## 6 Acquisition of existing SD6 parameter files

- Parameter files that were created with the PASO SD6 can be imported into PASO SD7
- when opening a SD6 file, PASO SD7 automatically recognizes that it is a SD6 file



- click to "Yes" will start the import process
  - all parameters which are identical for SD7 and SD6, will be transferred 1:1
  - all parameters which are different for SD7 and SD6, will be transferred in the case, that they have the same effect  
(e.g. SD6 scaling "Offset" and "Scaling" => SD7 "min/max Interface" and "min/max Reference")
  - all parameters which are new on the SD7 will be set to default value
- thus the imported parameters can be used in the future directly with the PASO SD7, the following message appears:



- with click to "Yes", the imported parameters will be stored in a PASO SD7 parameter file
- the original SD6 parameter file is not changed
- **with PASO SD7 created parameter files can not be opened with the PASO SD6!**

### Procedure to adapt the function of a SD7 card to the function of a SD6 card

- read in the parameter from the SD6 card into the PASO SD6 (Menu "File - Activate On Line" with "Accept Parameters")
- save the read-in parameters in a parameter file (Menu "File - Save as")
- open the saved parameter file with the PASO SD7 (Menu "File - Open")
- reply to each PASO messages with "Yes"
- write the imported parameters to the SD7 card (Menu "File - Activate On Line - Download Parameter")