OPERATING INSTRUCTIONS
DSV

PROFIBUS-DP Device-Profile
in accordance with
Fluid Power Technology

Version 2.0

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1 PROFIBUS-DP Technology

1.1   General

PROFIBUS-DP is a vendor-independent, open field bus standard for a wide range of applications in manufacturing and process automation. Vendor-independence and openness are ensured by the international standards EN 50170 and EN 50254.

PROFIBUS-DP offers functionally graduated communication protocols (Communication Profiles), WANDFLUH is using for the DSV Electronics the communication profile **DP** (**d**ecentralised **p**eriphery).

PROFIBUS-DP is optimised for fast, time critical data exchange on the field layer. The Fieldbus is used for cyclical and not cyclical data exchange between a Master and its slaves.

PROFIBUS-DP can be used for different device profiles. WANDFLUH is using for the DSV Electronics the device profile DSP-408 "Device Profile Fluid Power Technology".

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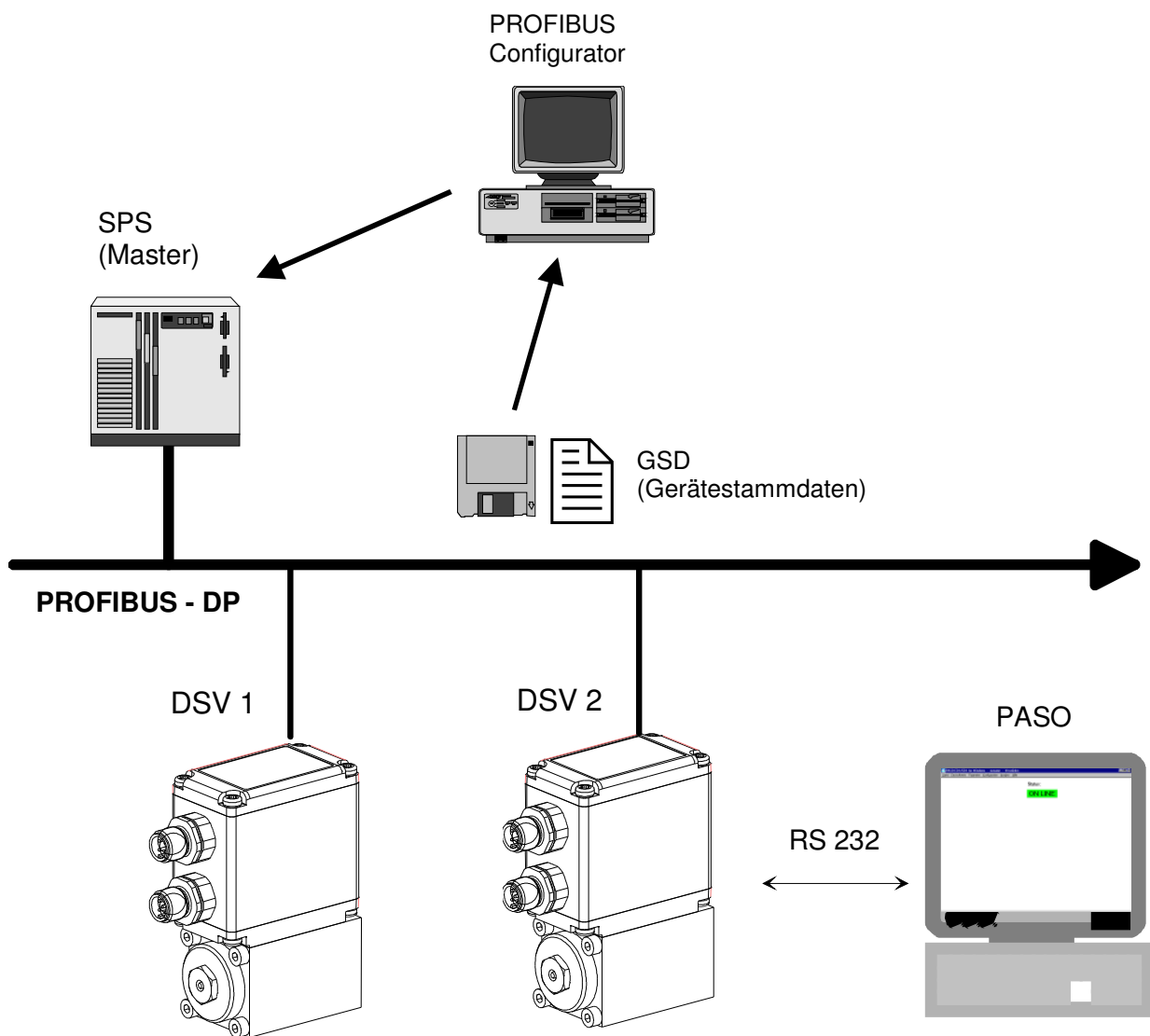
1.2 Master and Slaves

With -DP, once differs between Master- and Slave-Devices:

- **Master (active Fieldbus participants)**
  These devices determine the data exchange on the Fieldbus and are named therefore as active Fieldbus participant

- **Slaves (passive Fieldbus participants)**
  These devices can only receive messages and send data and messages to the Master only on a request.

  The WANDFLUH DSV Electronics are always slaves. In the further documentation, this slave will be named always DP-Slave controller card.

1.3 Data exchange

The data exchange is made through the Master - slave procedure, where the drives are always the slaves. This permits a very fast cyclical data exchange.

For the parameterisation, diagnostic and error handling during the current cyclical data exchange, also not cyclical communication functions are used in additional.
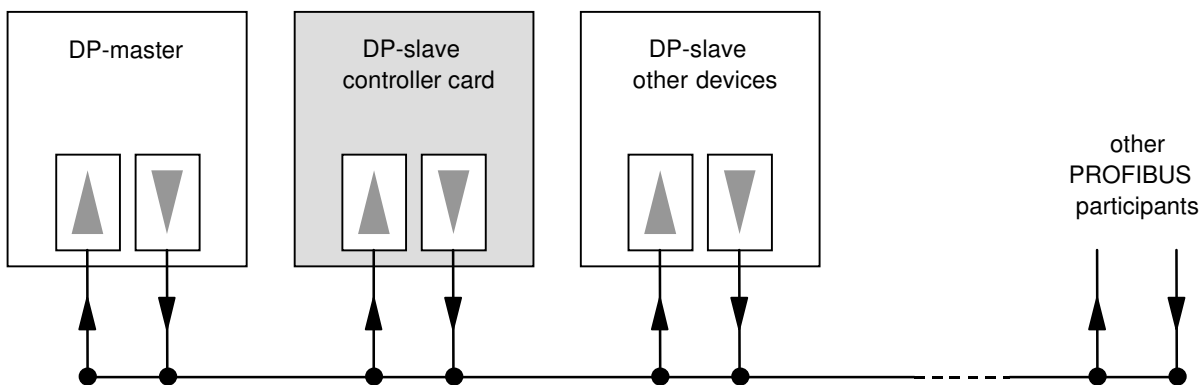
1.4 Communication from words and double words

All used size of words and double words are transmitted in the little endian format. Therefore, the low byte resp. the low word will be transmitted before the high byte resp. the high word (word = 16 bit, double word = 32 bit).

1.5 GSD Files

The characteristic communication features of a PROFIBUS-DP device are defined in the form of an electronic data sheet (Gerätestammdatei, GSD file). WANDFLUH makes available the corresponding GSD file for the DP-Slave controller card.

The GSD files expand the open communication right to the user level. All modern planning tools make it possible to read-in the GSD files during the configuration. As a result, the integration into the PROFIBUS-DP system becomes simple and user friendly.

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2 General of cyclical data exchange

2.1 Data structure

The data structure by the cyclical data communication is shared into 2 parts, which will be transmitted in each telegram:

- **Parameter data exchange (PKW, parameter channel)**
  This part of the telegram serves for read and/or write of parameters and for read of error messages.

- **Process data exchange (PZD, process data)**
  This part contains the control word, preset values resp. additional information and actual values. With the process data, the following data will be transmitted:

  - Control words and preset values (Master => Slave)
  - Status words and actual values (Slave => Master)

  During the boot up of the Fieldbus system, the Master determines the used telegram type. The selected telegram type will be send automatically to the DP-Slave controller card via the configuration telegram.

2.2 Telegram structure by the cyclical data communication

The telegrams by the cyclical data communication have the following structure:

Protocol frame (Header)	Data structure (telegram)		Protocol frame (Trailer)
	Parameter-Kennung-Wert (PKW)	**Prozessdaten (PZD)**	
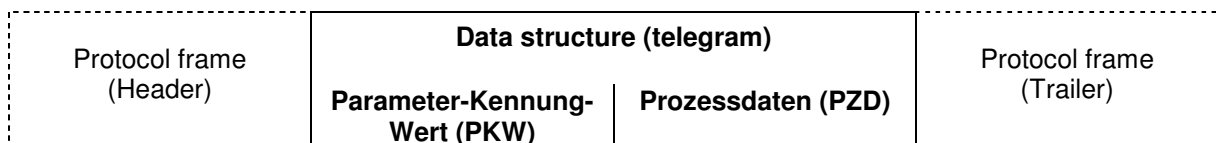
2.3 Available telegrams

For a description about all available telegram types refer to section "Telegram types" page 19.

2.4 General

- The selection between the different telegram types with different data length is depending on the performance of the device in the Fieldbus compound.

- For a detailed description about each parameter please refer to section "Parameter description" page 25.

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3 Product Description

3.1 General

The present operating instructions represent a PROFIBUS-DP specific extension of the DSV Electronics operating instructions.

Remark: Please read the operating instructions of the DSV Electronics beforehand.

3.2 Technical Data

The connection to the PROFIBUS-DP is made via the M12 plug connector on the housing. The pin occupation correspond to the standard.

PROFIBUS-DP Interface	M12 plug connector on the side plate, in accordance with RS485 galvanic separated
	• Pin 4 = RxD/TxD-P (receive-/transmit data-positive, B-line)
	• Pin 2 = RxD/TxD-N (receive-/transmit data -negative, A-line)
	• Pin 3 = DGND (data transmitting potential Ground to 5V)
	• Pin 1 = VP (power supply of the bus terminator-P P5V)

The DP-salve controller card is using the PROFIBUS-DP V0 specifications.

3.2.1 Transmission technology and baudrate

The DP-Slave controller card detects automatically the adjusted baudrate on the Fieldbus. The following baudrates are possible:

9.6kBaud / 19.2kBaud / 45.45kBaud / 93.75kBaud / 187.5kBaud / 500kBaud / 1.5MBaud / 3.0MBaud / 6.0Mbaud / 12Mbaud

During the setup of the fields system, the Master will set baudrate uniform for all devices on the bus.

3.3 Operating and Indicating elements

The DSV Electronics use a M12 female (B-coded) connector. Under the cover of the electronics housing, there is a RS232 (serial) interface, through which the parameterisation and the diagnostics can be made by using the PC-Parameterisation software PASO DSV/SD6

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3.4 Fieldbus Settings

The following settings can be made via the parameterisation software PASO:

- Bus Node Adress   (write and read)
- Baudrate   (read only)
- Telegram type   (write and read)

This settings can be made in the menu item "Fieldbus_Fieldbus-Info".
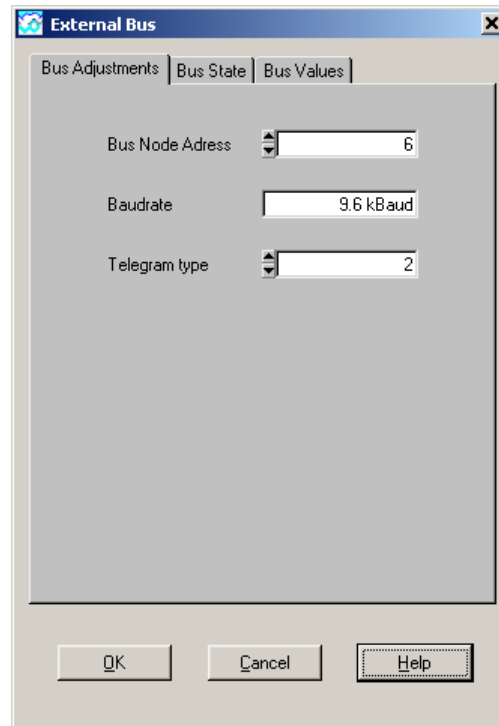
The following parameters can be set resp. will be displayed:

Field	Parameter description	Display
Bus Node Adress	With this parameter, the required node address for the DP-Slave controller card can be set. The value set is saved on the DP-Slave controller card in the non-volatile memory.	0 ... 126
Baudrate	The adjusted Baudrate will be displayed. During the setup of the fields system, the Master will set the Baudrate uniform for all devices on the bus.	9.6kBaud, 19.2kBaud, 45.45kBaud, 93.75kBaud, 187.5kBaud, 500kBaud, 1.5Mbaud, 3.0Mbaud, 6.0Mbaud, 12Mbaud
Telegram type	In the "Off Line"-mode, the required telegram type can be set. In the "On Line"-mode, the current telegram type will be displayed. For more information about the telegram type, please refer to section "Telegram types" page 19.	

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3.5 Fieldbus Diagnostics

A diagnosis of the Fieldbus is possible at any time via the parameterisation software PASO. This takes place through the menu point "Fieldbus-Fieldbus-Info".
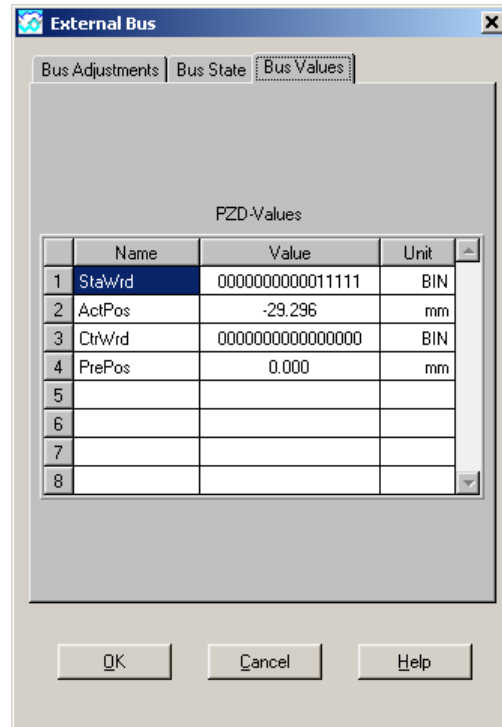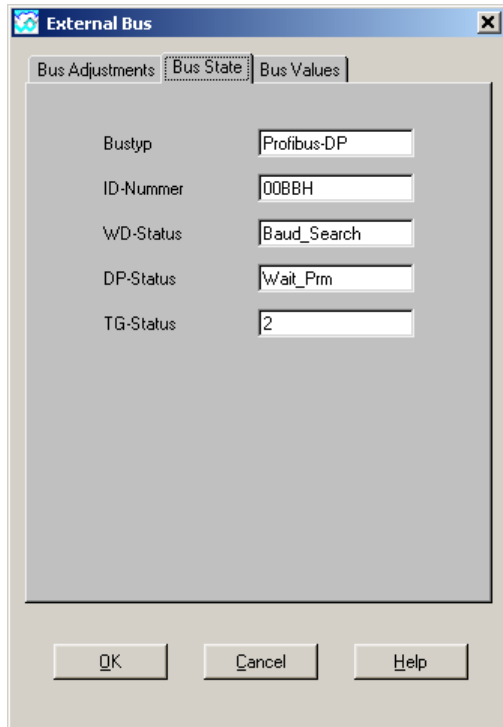
The following bus statuses are displayed:

Field	Parameter description	Display
Bus type	The type of the connected Fieldbus	PROFIBUS-DP
ID - number	The identification number of the DP-Slave controller card. This number is predefined fixed.	
WD-Status	The communication on the Fieldbus is supervised permanent through the Watchdog. The current state of the Watchdog is displayed here. **Baud_Search** The baudrate will be searched **Baud_Control** The found baudrate will be checked **DP_Control** The found baudrate is ok. The Watchdog for the Fieldbus is active.	Baud_Search Baud_Control DP_Control

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DP-Status	The DP-Slave controller card can be in different states. The current state will be displayed here.	
	Wait_Prm After the start-up, the DP-Slave controller card is waiting for a parameter telegram. All other telegram types will not be handled. No data exchange is possible.	Wait_Prm
	Wait_Cfg The DP-Slave controller card is waiting for a configuration telegram. All other telegram types will not be handled. No data exchange is possible.	Wait_Cfg
	Data_Exchange If the parameter telegram as well as the configuration telegram were ok, the data exchange via the Fieldbus is enable and possible.	Data_Exchange
TG-Status	The current telegram type will be displayed here	

The following bus values are displayed:

Field	Parameter description	Display
PZD-Values	In this table, the PZD-values will be displayed. The PZD-values are the real data on the bus. The displayed value depends on the selected telegram type.	

3.6   Connection Example

As a connection example, reference is made to the corresponding operating instructions of the DSV Electronics.

All relevant digital I/O information is transmitted via the Fieldbus. Therefore no digital inputs should be connected from external.

3.7   Parameterisation

The DP-Slave controller card can be parameterised either through the PROFIBUS-DP or through the parameterisation software PASO.

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4 Description of the Function of Device Profile DSP-408

The device profile explains the data and their format, which are exchanged between the PROFIBUS-DP Master and the DP-Slave controller card. The device profile is based on the specification of the profile „Fluid Power Technology" as defined by the VDMA (the German Engineering Federation). The device profile has been defined for hydraulic devices, such as: proportional valves, hydrostatic pumps and hydrostatic drives.

4.1 Device architecture

Fieldbus

Profibus DP	RS 232	analog

Interface control

signal dictionary	demand value

device control

fault monitoring

program control

valve controller → solenoid
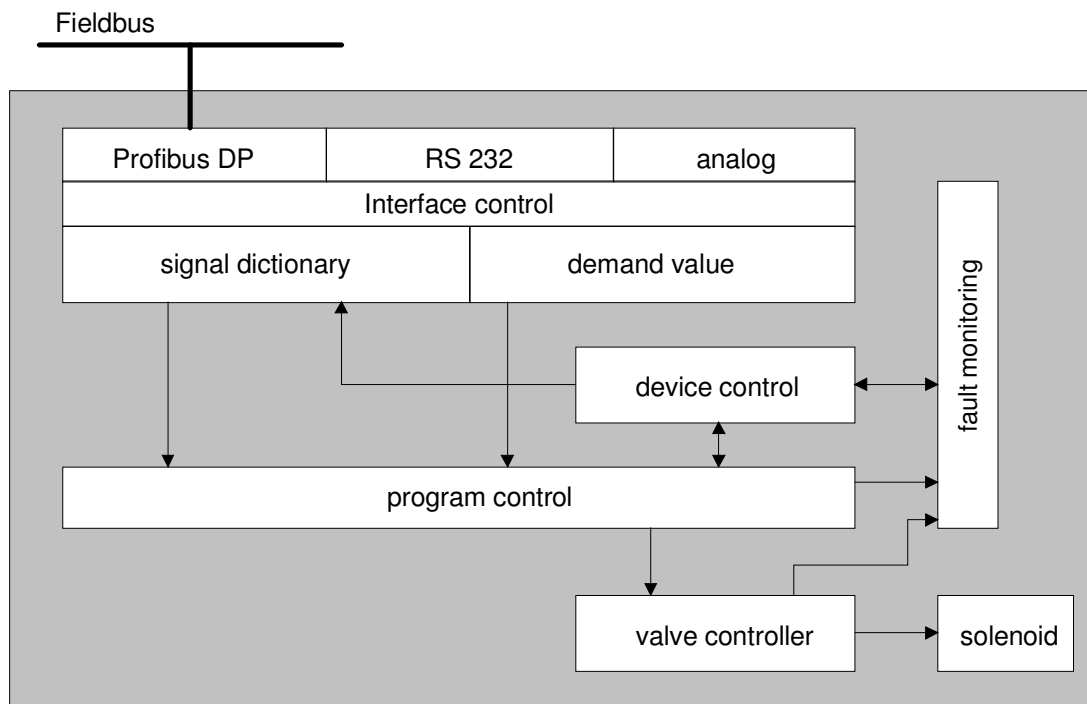
The DP-Slave controller card contains the complete Hardware of the DSV Electronics. This Hardware includes the interface for the Fieldbus and the interface for the parameterisation software PASO. Also included are 2 solenoid outputs for the cylinder.

The Fieldbus control is made through a higher level Fieldbus Master.

The local control can be made either via digital in- and outputs or via the parameterisation software PASO.

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4.2 Device Control

The following picture shows the principle function of the DP-Slave controller card.

4.2.1 Local control
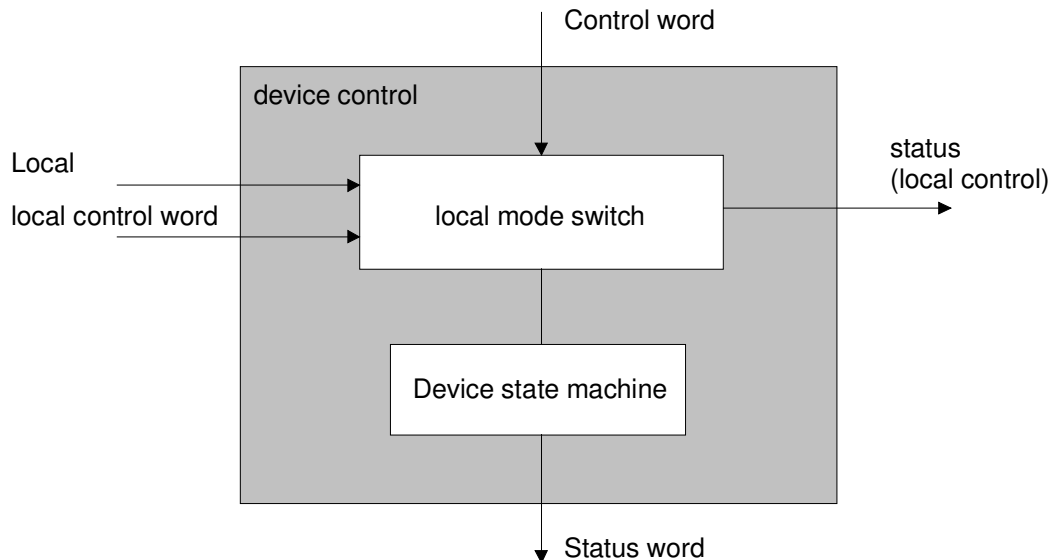
4.2.2 Operating mode

Local mode ("local")
In the local mode, the control commands and the current states will be set resp. displayed through the parameterisation software PASO. **Except of the parameter "Local", all values coming through the Fieldbus are ignored.** The local mode has 2 states: "Disabled" and "Enabled", switch over through the digital input.
To activate the local mode from the bus mode, the bus parameter "Device local=1" must be sent via the CAN-bus (condition: DSV-state "Init" or "Disabled").

PASO mode ("Remote PASO")
In the PASO mode, the control commands and the current states will be set resp. displayed through the parameterisation software PASO (equal to the local mode). The local mode has 2 states: "Disabled" and "Enabled", switch over through the PASO command "Enable" resp. "Disable".
To activate the PASO mode from the bus resp. local mode, the PASO command "PASO Control" must be activated (condition: DSV-state "Init" or "Disabled").

Bus mode ("Remote")
In the Bus mode, the control commands and the current states will be set resp. displayed through the Bus. The Bus mode has several states (refer to chapter "State machine" page 15), switch over through the Bus parameter "control word".
The DSV parameterisation is possible either through the Bus or through the PASO.
To activate the Bus mode from the PASO mode, the PASO command "Local Control" must be activated (condition: DSV-state "Init" or "Disabled").
To activate the Bus mode from the local mode, the bus parameter "Device local=0" must be sent via the Bus (condition: DSV-state "Init" or "Disabled").

The picture on the next page shows the different possibilities of switch over the different states.

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Bus Bedienung
"Remote"
Auswahl Betriebszustand
"Active"/"Disabled" über
Zustandsbefehle

Befehle PASO Bedienung

Busparameter
Bedienung Lokal = 0

Befehle Lokale Bedienung (1)

Bedienung Lokal = 1

PASO Bedienung
"Remote PASO"
Auswahl Betriebszustand
"Active"/"Disabled" über
Freigabe/Sperren

Befehle Lokale Bedienung (2)

Lokale Bedienung
"Local"
Auswahl Betriebszustand
"Active"/"Disabled" über
Digital-Eingang

Befehle PASO Bedienung

Verlassen eines Operationsmodus nur
wenn DSV-Zustand auf Init oder Disabled

(1) wenn Bedienung Lokal = 0
(2) wenn Bedienung Lokal = 1

Im Bedienungszustand 'PASO Disabled' ist das Senden des
Busparameters 'Bedienung Lokal' ebenfalls möglich

Operating mode

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4.2.3 State machine

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

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

Zustand	description
NOT_READY	• The supply voltage is present on the DSV • Self test is running • The device functions are disabled
INIT	• Device parameters can be set • Initialisation of device parameters with stored values • The device functions are disabled • It's possible to activate the "PASO remote" mode
DISABLED	• Device parameters can be set • The device functions are disabled • In this state "db_ControlMode" can be set. • It's possible to activate the "PASO remote" mode
HOLD	• Device parameters can be set • The last set-point value present is maintained active • The set-point value of the status DEVICE_MODE_ACTIVE is not active • Device modes setting is disabled
DEVICE_MODE_ACTIVE	• Geräte Parameter können gesetzt werden • Der mit dem Parameter "db_ControlMode" gewählte Betriebsmodus ist aktiv • Device parameters can be set • The operating mode selected with the parameter "db_ControlMode" is active
FAULT_HOLD	• Device parameters can be set • The actual value present is read or the set-point value of the HOLD status is active • To leave this state, the corresponding transitions in the table below have to be executed.
FAULT	• Device parameters can be set • The device functions are disabled • To leave this state, the corresponding transitions in the table below have to be executed
FAULT_REACTION	• This status is reached, if the device is not anymore ready for operation • Device parameters can be set • The device function can be disabled or enabled

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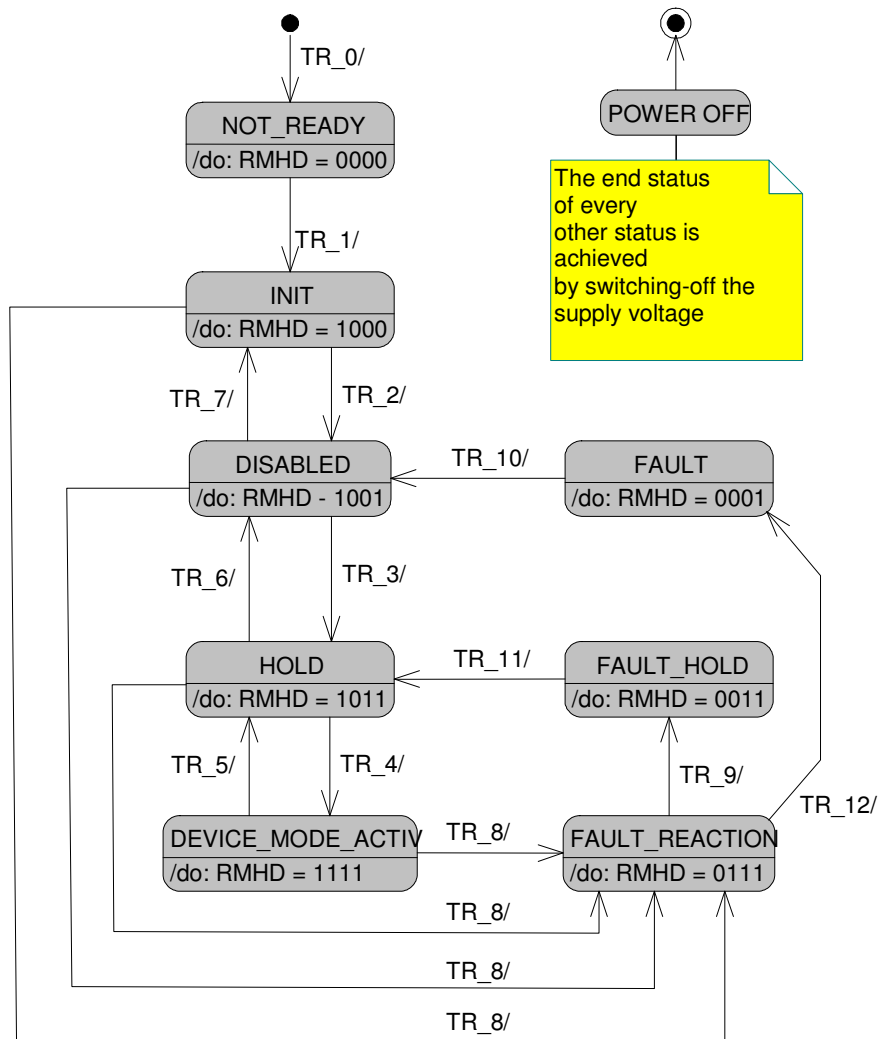
RMHD = R: Status word "Ready" (bit 3)
M: Status word "Device mode active enable" (bit 2)
H: Status word "Hold enable" (bit 1)
D: Status word "Disable" (bit 0)

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

Übergang	description	Controlwort Bit							
		7	6	5	4	3 R	2 M	1 H	0 D
TR_0	Switching-on the supply voltage	Internal transition							
TR_1	Device initialisation successfully completed	Internal transition							
TR_2	Bit "Disable" active	x	x	x	x	x	x	x	1
TR_3	Bit "Hold enable" active	x	x	x	x	x	x	1	1
TR_4	Bit "Device mode active enable" active	x	x	x	x	x	1	1	1
TR_5	Bit "Device mode active enable " not active	x	x	x	x	x	0	x	x
TR_6	Bit "Hold enable" not active	x	x	x	x	x	0	0	x
TR_7	Bit "Disable" not active	x	x	x	x	x	0	0	0
TR_8	Error present	Internal transition							
TR_9	Error reaction successful (HOLD active)	Internal transition							
TR_10	Error reset (return to the status DISABLED). The "reset fault" bit in the control word imperatively has to change from 0 to 1	x	x	x	x	0	x	0	x
		→							
		x	x	x	x	1	x	0	x
TR_11	Error reset (return to status HOLD). The "reset fault" bit in the control word imperatively has to change from 0 to 1	x	x	x	x	0	x	1	x
		→							
		x	x	x	x	1	x	1	x
TR_12	Error reaction successful (DISABLED active)	Internal transition							

RMHD = R: Controlwort "Reset Fault" (Bit 3)
       M: Controlwort "Device mode active enable" (Bit 2)
       H: Controlwort "Hold enable" (Bit 1)
       D: Controlwort "Disable" (Bit 0)

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4.3   Program Control

The DSV through the fieldbus can be set to the following operating modes; in doing so, one differentiates between the Control mode and the Device mode:

Controle mode	Description
Local operating mode	The DSV is operated through the local possibilities such as e.g. the digital inputs and outputs or PASO.
Spool position control open loop vpoc (1)	A proportional spool valve is driven with a set-point value, the set-point value is proportional to the valve opening. The spool position is not recorded and controlled (open loop). **This control mode is only selectable with DSV amplifier.**
Pressure control valve open loop vprc (3)	A proportional pressure control valve is driven with a set-point value; the set-point value is proportional to the valve pressure. The pressure is not measured and controlled with a pressure sensor (open loop). **This control mode is selectable with DSV amplifier a. DSV controller.**
Pressure control valve closed loop vprc (4)	A proportional pressure control valve is driven with a set-point value; the set-point value is proportional to the valve pressure. The pressure is measured and controlled with a pressure sensor (closed loop). **This control mode is only selectable with DSV controller.**
Open loop movement dcol (6)	A proportional spool valve is driven with a set-point value; the set-point value is proportional to the position of the axis. The Position is not measured and controlled with a position sensor (open loop). **This control mode is only selectable with DSV controller.**
Velocity control axis dsc (7)	A proportional flow valve is driven with a set-point value; the set-point value is proportional to the valve flow. The flow is measured and controlled with a flow sensor (closed loop). **This control mode is only selectable with DSV controller.**
Position control axis dpc (9)	A proportional spool valve is driven with a set-point value; the set-point value is proportional to the position of the axis. The position is measured and controlled with a position sensor (closed loop). **This control mode is only selectable with DSV controller.**

Device mode	Description
Set-point value setting through the bus	The set-point-value setting for the DP-Slave takes place through the fieldbus. This corresponds to the standard device mode.
Set-point value setting locally	The set-point value setting for the DP-slave takes place locally. This device mode is only possible for certain types of DSV.

The DSV can be parameterized through the Profibus; correspondingly parameter objects are available for this purpose. Depending on the Device control mode only the appropriate objects (parameters) are accessible.

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4.4 Cyclical process data exchange (PZD)

The data exchange is made with consistence about the whole length of the input- and output data. The transmission correspond to the little endian format (refer to section "Data exchange" page 6).

4.4.1 Telegram types

The following telegram types are available on the DP-Slave controller card. They are shared into:

- Data exchange **with** parameter channel
  with 4 words for parameters and 3 words for data exchange   => telegram type 1

- Data exchange **without** parameter channel
  with 3 words for data exchange   => telegram type 2

- Data exchange **with** parameter channel
  with 4 words for parameters and 2 words for data exchange   => telegram type 3

- Data exchange **without** parameter channel
  with 2 words for data exchange   => telegram type 4

	Control Mode					
	1 (Spool position control open loop)	3 (Druck- / Mengenventil Steuerung)	4 (Druck- / Mengenventil Regelung)	6 (Open loop movement)	7 (Velocity control axis)	9 (Position control axis)
Telegram type	3 / 4	3 / 4	3 / 4	1 / 2	1 / 2	1 / 2
Profibus-Amplifier	selectable			not selectable		
Profibus-Controller	not selectable	selectable				

Standard telegram 1

The telegram type 1 is defined by the "PROFIBUS Profile Fluid Power Technology" (standard telegram) and is used for the DSV Electronics in control mode 6 (Open loop movement), 7 (Velocity control axis) and 9 (Position control axis).

	word 0	word 1		word 2	word 3
Parameter (PKW)	PKE	IND	RES	PWE	PWE

	word 4	word 5	word 6
PZD receive data	Control Word	Setpoint value	Setpoint value

	word 4	word 5	word 6
PZD transmit data	Status Word	Actual value	Actual value

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Standard telegram 2

The telegram type 2 is defined by the "PROFIBUS Profile Fluid Power Technology" (standard telegram) and is used for the DSV Electronik in control mode 6 (Open loop movement), 7 (Velocity control axis) and 9 (Position control axis).

	word 0	word 1	word 2
PZD receive data	Control Word	Setpoint value	Setpoint value

	word 0	word 1	word 2
PZD transmit data	Status Word	Actual value	Actual value

Standard telegram 3

The telegram type 3 is defined by the "PROFIBUS Profile Fluid Power Technology" (standard telegram) and is used for the DSV Electronics in control mode 1 (Spool position control open loop), 3 (Pressure control valve open loop) and 4 (Pressure control valve closed loop).

	word 0	word 1		word 2	word 3
Parameter (PKW)	PKE	IND	RES	PWE	PWE

	word 4	word 5
PZD receive data	Control Word	Setpoint value

	word 4	word 5
PZD transmit data	Status Word	Actual value

Standard telegram 4

The telegram type 4 is defined by the "PROFIBUS Profile Fluid Power Technology" (standard telegram) and is used for the DSV Electronics in control mode 1 (Spool position control open loop), 3 (Pressure control valve open loop) and 4 (Pressure control valve closed loop).

	word 0	word 1
PZD receive data	Control Word	Setpoint value

	word 0	word 1
PZD transmit data	Status Word	Actual value

4.4.2 Receive data (Master → Slave, set values)

Parameter	Length (word)	Signal number	Page
ControlWord	1	001	33
Setpoint value	Telegram type 1 / 2: 2 Telegram type 3 / 4: 1	012	38

4.4.3 Transmit data (Slave → Master, actual values)

Parameter	Length (word)	Signal number	Page
Status Word	1	002	34
Actual value	Telegram type 1 / 2: 2 Telegram type 3 / 4: 1	003	69

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4.5   Cyclical parameter data exchange (PKW)

The parameter data exchange is made via the PKW (parameter channel). With the PKW, parameter can be written (Master → Slave) or read (Slave → Master) through the Fieldbus. Exactly one parameter can be written resp. read in one telegram.

The below table shows the structure of the PKW:

PKW							
word 0		word 1		word 2		word 2	
byte 0	byte 1	byte 2	byte 3	byte 4	byte 5	byte 6	byte 7
PKE		IND	Res	PWE			

PKE: parameter signature value
IND: block number
Res: reserved
PWE: parameter value

The instructions and responses are coded in the parameter signature word PKE:

PKE															
bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
AK				Res				PNU							

AK: instruction / response signature
Res: reserved
PNU: parameter number

The below table shows the possible instruction / response signatures:

AK			
instruction signature	function	response signature	
		positive	negative
0	no instruction	0	
1	parameter value read	1, 2, 11	7
2	parameter value write (word)	1	7
3	parameter value write (double word)	2	7
4 - 9	reserved		
10	parameter value write (byte)	11	7

In case an instruction can not be processed, the slave responses with a negative response signature (negative = error code), in normal case with a positive response signature.

The parameter value is located to the PWE in the following bytes::

- with parameter length 'word' (instruction signature = 2):   byte 6 and byte 7
- with parameter length 'double word' (instruction signature = 3):   byte 4, byte 5, byte 6 and byte 7
- with parameter length 'byte' (instruction signature = 10)   byte 7

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In case the slave responses with an error (response signature = 7), an error message will be located in byte 6 and byte 7 of the PWE. The below table shows the possible error codes:

error code	semantic
0	undefined PNU
1	parameter not changeable
2	lower or upper value range limit overflow
3	undefined IND
5	data type error
18	other errors
201	Invalid parameter
202	The selected parameter can't be read
203	The solenoid choice contained in the value is except range
204	The array index contained in the value is except range
205	The array element cannot be read
206	The array element cannot be described
207	The characteristic optimisation cannot be switched on because of incorrect characteristic values

Remark:

An error message can occur, if a value assignment is not certified in the current control mode or status or in the current mode of operation. Further informations you will find in the associated parameter description.

The below table shows the connection between the data type and parameter length:

data type	parameter length
int8	byte (1 byte)
uint8	byte (1 byte)
int16	word (2 bytes)
uint16	word (2 bytes)
int32	double word (4 bytes)
uint32	double word (4 bytes)
float	double word (4 bytes)
vstring(n)	n bytes

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4.5.1 Description of the parameter transmission process

On each request from the Master, the slave will send a response.
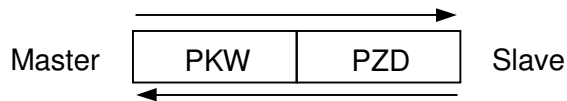
Example 1:

The parameter "Imin A" should be written with the value 450mA.

- data type = uint16 → parameter length = word → AK = 2h
- parameter number = 73 → PNU = 49h
- block number = 3 → IND = 03h
- value = 450 → PWE = 00h 00h 01h c2h

Instruction signature (Master → Slave):

PKW							
word 0			word 1		word 2		word 3
PKE			IND	RES	PWE		
AK	RES	PNU					
2h	0h	49h	03h	00h	00h	00h	01h	C2h

Response signature (Slave → Master):

PKW							
word 0			word 1		word 2		word 3
PKE			IND	RES	PWE		
AK	RES	PNU					
1h	0h	49h	03h	00h	00h	00h	01h	C2h

- AK = 1h → 1 = positive response signature for a parameter length = word

Example 2:

The parameter "Dither frequency" should be read.

- data type = uint8 → parameter length = byte → AK = 1h
- parameter number = 98 → PNU = 62h
- block number = 3 → IND = 03h

Instruction signature (Master → Slave):

PKW							
word 0			word 1		word 2		word 3
PKE			IND	RES	PWE		
AK	RES	PNU					
1h	0h	62h	03h	00h	00h	00h	00h	00h

Response signature (Slave → Master):

PKW							
word 0			word 1		word 2		word 3
PKE			IND	RES	PWE		
AK	RES	PNU					
Bh	0h	62h	03h	00h	00h	00h	00h	64h

- AK = Bh → 11 = positive response signature for a parameter length = byte
- PWE = 00h 00h 00h 64h → 100 = value of the parameter

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4.6 Scaling

By parameter with an unit (e.g. mm, psi, l/min, etc.), the adjusting range and the resolution depends on the control mode and the selected unit. The following table shows the connection:

Control Mode Druckventil mit Drucksensor vprc (4)

Unit:	bar	psi	kN	MPa
Range:	0...500	0...8000	0...1000	0...50
Resolution:	1/1000	1/1000	1/1000	1/1000
Input:	0...500000	0...8000000	0...1000000	0...50000

Control Mode Velocity control axis dsc (7)

Unit:	l/min	mm/s	inch/s	1/min	Grad/s
Range:	0...500	0...2000	0...10000	0...100	0...360
Resolution:	1/1000	1/1000	1/1000	1/1000	1/1000
Input:	0...500000	0...2000000	0...10000000	0...100000	0...360000

Control Mode Position control axis dpc (9)

Unit:	mm	Grad	Zoll
Range:	0...2000	0...360	0...100
Resolution:	1/1000	1/1000	1/1000
Input:	0...2000000	0...360000	0...100000

The DSV has also an internal resolution. This internal resolution determines the adjusting precision for the scaled parameters. The internal resolution depends on the adjusted reference- and interface values. The calculation is as follows::

$$\text{internal resolution} = \text{reference range [unit]} / \text{interface range}$$

Reference range = Max Reference [Einheit] - Min Reference [Einheit]
Interface range by voltage actual value = (Max Interface [V] - Min Interface [V]) x 1024 / 10 [V]
Interface range by current actual value = (Max Interface [mA] - Min Interface [mA]) x 1024 / 20 [mA]

Example:

Measuringsystem: 4 ... 20mA   Min. Interface actual value = 4mA (corresponds 204 Inc bei 10Bit-resolution)
Max. Interface actual value = 20mA (corresponds 1024 Inc bei 10Bit-resolution)

Measuring range: 0 ... 300mm   Min. Reference actual value = 0 mm/1000
Max. Reference actual value = 300000 mm/1000

$$Internal resolution = \frac{300000\frac{mm}{1000} - 0\frac{mm}{1000}}{1024 Inc - 204 Inc} = 365.854\frac{mm}{1000 Inc} = \underline{0.3659\frac{mm}{Inc}}$$

The current internal resolution can be read out also through the object 2050 (refer to section "Internal resolution" page 61).

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4.6.1 Internal bus resolution

In the Device Profile in accordance with CiA DSP 408, an internal resolution value is defined. This value is 0 ... 16384. It corresponds to the range of the "Signal type actual value" (refer to section "Signal type actual value" page 55).

Examples:

Signal type actual value = 0 ... 10V:	0	=	0	V
	8192	=	5	V
	16384	=	10	V
Signal type actual value = 0 ... 20mA	0	=	0	mA
	8192	=	10	mA
	16384	=	20	mA
Signal type actual value = 4 ... 20mA	3277	=	4	mA
	9831	=	12	mA
	16384	=	20	mA

4.7 Parameter description

In the following section, all parameters, which can be adjusted via PKW (refer to section "Cyclical parameter data exchange (PKW)" page 21) will be described.

The error code 0 (invalid PNU) can be sent back for different reasons:
* if the current hardware or software execution does not support the parameter
* if the selected control mode (refer to section "Control Mode" page 35) does not support the parameter
* if the selected mode of operation (refer to section "Mode of operation" page 37) does not support the parameter

The error code 1 (Selected parameter can't be changed) can be sent back for different reasons:
* the parameter can be only read
* the parameter can be only changed, if the DSV is blocked (status „INIT" or „DISABLED", refer to section "State machine" page 15)

Note: A detailed description about the function of each parameter you will find in the corresponding operating instructions of the DSV Electronics

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Operating Instructions for DSV Electronics
PROFIBUS-DP Device-Profile Fluid Power Technology

Function parameter:

Parameter	Control Mode 1 Spool position control open loop		Control Mode 3 Pressure control valve open loop		Control Mode 4 Pressure control valve closed loop		Control Mode 6 Open loop movement		Control Mode 7 Velocity control axis		Control Mode 9 Position control axis		Detail on page
	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	
Error Code	36	0	36	0	36	0	36	0	36	0	36	0	32
Control Word	37	0	37	0	37	0	37	0	37	0	37	0	33
Status Word	38	0	38	0	38	0	38	0	38	0	38	0	34
Control Mode	40	0	40	0	40	0	40	0	40	0	40	0	35
Device local	41	0	41	0	41	0	41	0	41	0	41	0	35
Capability	50	0	50	0	50	0	50	0	50	0	50	0	35
Store Parameter	51	0	51	0	51	0	51	0	51	0	51	0	36
Reset Default	52	0	52	0	52	0	52	0	52	0	52	0	36
Mode of operation	53	0	53	0	-	-	53	0	-	-	-	-	37
Error handling	54	0	54	0	54	0	54	0	54	0	54	0	37
Actual Temperature	55	0	55	0	55	0	55	0	55	0	55	0	38

Ramps:

Parameter	Control Mode 1 Spool position control open loop		Control Mode 3 Pressure control valve open loop		Control Mode 4 Pressure control valve closed loop		Control Mode 6 Open loop movement		Control Mode 7 Velocity control axis		Control Mode 9 Position control axis		Details auf Seite
	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	
Ramp type	43	21	43	22	-	-	42	11	-	-	-	-	44
Ramp A up	50	21	50	22	-	-	49	11	-	-	-	-	45
Ramp A down	59	21	59	22	-	-	58	11	-	-	-	-	45
Ramp B up	47	21	47	22	-	-	46	11	-	-	-	-	46
Ramp B down	56	21	56	22	-	-	55	11	-	-	-	-	47
Speed positive	-	-	-	-	62	22	-	-	61	13	61	12	47
Speed negative	-	-	-	-	231	22	-	-	231	13	231	12	48

Analog input preset values:

Parameter	Control Mode 1 Spool position control open loop		Control Mode 3 Pressure control valve open loop		Control Mode 4 Pressure control valve closed loop		Control Mode 6 Open loop movement		Control Mode 7 Velocity control axis		Control Mode 9 Position control axis		Detail on page
	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	
Signal type actual value	-	-	-	-	97	1	-	-	97	1	97	1	55
Used input actual value	-	-	-	-	20	1	-	-	20	1	20	1	55
Cablebreak actual value	-	-	-	-	96	1	-	-	96	1	96	1	55
Measuringsystem type	-	-	-	-	22	1	-	-	22	1	22	1	56
Displayed unit	-	-	-	-	84	1	-	-	84	1	84	1	56

Solenoid outputs:

Parameter	Control Mode 1 Spool position control open loop		Control Mode 3 Pressure control valve open loop		Control Mode 4 Pressure control valve closed		Control Mode 6 Open loop movement		Control Mode 7 Velocity control axis		Control Mode 9 Position control axis		Detail on page
	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	
Imin A	107	21	107	22	107	22	73	3	73	3	73	3	39
Imax A	251	21	251	22	251	22	129	3	129	3	129	3	40
Imin B	110	21	110	22	110	22	76	3	76	3	76	3	41
Imax B	252	21	252	22	252	22	130	3	130	3	130	3	41
Deadband compensation type	106	21	106	22	-	-	100	11	-	-	-	-	49
Deadband threshold A	113	21	113	22	-	-	101	11	-	-	-	-	49
Deadband threshold B	254	21	254	22	-	-	-	-	-	-	-	-	50
Dither type	187	21	187	22	187	22	97	3	97	3	97	3	51
Dither Frequency	191	21	191	22	191	22	98	3	98	3	98	3	51
Dither Amplitude	188	21	188	22	188	22	101	3	101	3	101	3	52

Scaling actual value:

Parameter	Control Mode 1 Spool position control open loop		Control Mode 3 Pressure control valve open loop		Control Mode 4 Pressure control valve closed		Control Mode 6 Open loop movement		Control Mode 7 Velocity control axis		Control Mode 9 Position control axis		Detail on page
	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	
Min Refernce	-	-	-	-	23	1	-	-	102	1	50	1	43
Max Refernce	-	-	-	-	26	1	-	-	103	1	53	1	43
Min Interface	-	-	-	-	35	1	-	-	100	1	59	1	42
Max Interface	-	-	-	-	38	1	-	-	101	1	62	1	42

General controller parameter:

Parameter	Control Mode 1 Spool position control open loop		Control Mode 3 Pressure control valve open loop		Control Mode 4 Pressure control valve closed		Control Mode 6 Open loop movement		Control Mode 7 Velocity control axis		Control Mode 9 Position control axis		Detail on page
	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	
System control	-	-	-	-	131	3	-	-	131	3	131	3	52
Output solenoid A	-	-	-	-	132	3	-	-	132	3	132	3	53
Output solenoid B	-	-	-	-	133	3	-	-	133	3	133	3	53
Imin always active	-	-	-	-	134	3	-	-	134	3	134	3	54
Solenoid 'In Position'	-	-	-	-	250	22	-	-	250	13	250	12	54

Controller specific windows parameter:

Parameter	Control Mode 1 Spool position control open loop		Control Mode 3 Pressure control valve open loop		Control Mode 4 Pressure control valve closed		Control Mode 6 Open loop movement		Control Mode 7 Velocity control axis		Control Mode 9 Position control axis		Detail on page
	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	
Target window type	-	-	-	-	203	22	-	-	149	13	177	12	57
Target window threshold	-	-	-	-	204	22	-	-	150	13	178	12	57
Target window delay time	-	-	-	-	232	22	-	-	232	13	232	12	58
Trailing window type	-	-	-	-	150	22	-	-	112	13	140	12	58
Trailing window threshold	-	-	-	-	160	22	-	-	122	13	150	12	59
Trailing window delay time	-	-	-	-	157	22	-	-	119	13	147	12	59
Solenoid off window threshold	-	-	-	-	233	22	-	-	233	13	233	12	60
Solenoid off window delay time	-	-	-	-	234	22	-	-	234	13	234	12	60
Internal resolution	-	-	-	-	254	22	-	-	254	13	254	12	61

Controller parameter:

Parameter	Control Mode 1 Spool position control open loop		Control Mode 3 Pressure control valve open loop		Control Mode 4 Pressure control valve closed loop		Control Mode 6 Open loop movement		Control Mode 7 Velocity control axis		Control Mode 9 Position control axis		Detail on page
	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	
Preset value offering	-	-	-	-	236	22	-	-	236	13	236	12	61
Speed offering	-	-	-	-	237	22	-	-	237	13	237	12	62
I-window outside	-	-	-	-	235	22	-	-	235	13	235	12	63
P-amplification positive	-	-	-	-	238	22	-	-	106	13	106	12	63
P-amplificaion negative	-	-	-	-	239	22	-	-	239	13	239	12	63
Integrator type	-	-	-	-	-	-	-	-	-	-	115	12	64
I-time positive	-	-	-	-	240	22	-	-	109	13	116	12	65
I-time negative	-	-	-	-	241	22	-	-	241	13	241	12	65
I-window outside positive	-	-	-	-	242	22	-	-	242	13	119	12	65
I-window outside negative	-	-	-	-	243	22	-	-	243	13	243	12	66
I-window inside positive	-	-	-	-	248	22	-	-	248	13	248	12	66
I-window inside negative	-	-	-	-	249	22	-	-	249	13	249	12	67
D-time positive	-	-	-	-	244	22	-	-	244	13	244	12	67
D-time negative	-	-	-	-	245	22	-	-	245	13	245	12	68
D-amplification positive	-	-	-	-	246	22	-	-	246	13	246	12	68
D-amplification negative	-	-	-	-	247	22	-	-	247	13	247	12	69

Signals:

Parameter	Control Mode 1 Spool position control open loop		Control Mode 3 Pressure control valve open loop		Control Mode 4 Pressure control valve closed loop		Control Mode 6 Open loop movement		Control Mode 7 Velocity control axis		Control Mode 9 Position control axis		Detail on page
	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	
Setpoint	21	21	21	22	21	22	21	11	21	13	21	12	38
Setpoint B	253	21	253	22	-	-	-	-	-	-	-	-	39
Actual value	-	-	-	-	144	22	-	-	100	13	100	12	69
Control deviation	-	-	-	-	147	22	-	-	103	13	103	12	70

Characteristic optimisation:

Parameter	Control Mode 1 Spool position control open loop		Control Mode 3 Pressure control valve open loop		Control Mode 4 Pressure control valve closed loop		Control Mode 6 Open loop movement		Control Mode 7 Velocity control axis		Control Mode 9 Position control axis		Detail on page
	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	PNU	Index	
Characteristic optimisation	20	64	20 [*)]	64 [*)]	-	-	-	-	-	-	-	-	71
X-axis	21	64	21 [*)]	64 [*)]	-	-	-	-	-	-	-	-	71
Y-axis	22	64	22 [*)]	64 [*)]	-	-	-	-	-	-	-	-	73
Stützpunkt	23	64	23 [*)]	64 [*)]	-	-	-	-	-	-	-	-	75
Magnetwahl	24	64	24 [*)]	64 [*)]	-	-	-	-	-	-	-	-	75

*) Only DSV amplifier

4.7.2   Error Code

Parameter description

Description	Error code
IND	0
PNU	36
PZD-number	--
Parameter name	db_ErrorCode
Data type	uint16
Parameter length (byte)	2
Access	r

Value description

Code (Hex)	Name	Description	Reaction
0000	No error	No error is present	
1000	General error	A general error is present	FAULT
3412	Power supply voltage too low	The supply voltage is too low	FAULT
3422	Control voltage too low	The preset value (analog signal) voltage is too low or there occurred a cable break	FAULT
5231	Transducer sensor 1	The actual value (analog signal) voltage is too low or there occurred a cable break	FAULT
5510	EPROM / EEPROM	Device parameter can not be stored or read in or from the non-volatile memory	FAULT
8100	Communication	Bus communication is interrupted	FAULT

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4.7.3 Control Word

Parameter description

Description	Control the device
IND	0
PNU	37
PZD-number	001
Parameter name	db_ControlWord
Data type	uint16
Parameter length (byte)	2
Access	r/w

Value description

The control word is bit coded, i.e., each individual bit has a certain control function. The table below lists the individual functions with the bit belonging to it.

MSB								LSB							
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
High - Byte								Low - Byte							

Bit	Name	description
0	Disable (D)	Set the DP-Slave controller card in the state "DISABLED"
1	Hold enable (H)	Set the DP-Slave controller card in the state "HOLD"
2	Device mode active (M)	Set the DP-Slave controller card in the state "DEVICE_MODE_ACTIVE"
3	Reset fault (R)	Reset an error
4	Reserved	
5	Reserved	
6	Reserved	
7	Reserved	
8	Reserved	
9	Reserved	
10	Reserved	
11	Reserved	
12	Reserved	
13	Release Solenoid A	Releases the solenoid output A, only for operating mode " Set-point value uni-bipolar (2-solenoid single) "
14	Release Solenoid B	Releases the solenoid output B, only for operating mode " Set-point value uni-bipolar (2-solenoid single) "
15	Manufacturer-specific	

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4.7.4   Status Word

Parameter description

Description	Control the device
IND	0
PNU	38
PZD-number	002
Parameter name	db_StatusWord
Data type	uint16
Parameter length (byte)	2
Access	r

Value description

The control word is bit coded, i.e., each individual bit has a certain control function. The table below lists the individual functions with the bit belonging to it.

MSB								LSB							
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
High - Byte								Low - Byte							

Bit	Parameter name	Description
0	Disable (D)	Set the DP-Slave controller card in the state "DISABLED".
1	Hold enable (H)	Set the DP-Slave controller card in the state "HOLD"
2	Device mode active (M)	Set the DP-Slave controller card in the state "DEVICE_MODE_ACTIVE".
3	Reset fault (R)	Reset an error
4	Local control	Is active, if the DSV is operated locally
5	Warning	
6		
7		
8		
9	Ramp running	The preset value ramp is active (only in device mode 1 and 3)
10		
11		
12	Window reached	The target window is rechead (only in device mode 4, 7 and 9)
13	Solenoid output A released	Solenoid output A is released, only for operating mode " Set-point value uni-bipolar (2-solenoid single) "
14	Solenoid output B released	Solenoid output B is released, only for operating mode " Set-point value uni-bipolar (2-solenoid single) "
15	Manufacturer-specific	

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4.7.5 Control Mode

Parameter description

Description	Control Mode
IND	0
PNU	40
PZD-number	-
Parameter name	db_ControlMode
Data type	Int8
Parameter length (byte)	1
Access	r/w

Value description

1	Spool position control open loop	Telegram type 3 or 4
3	Pressure control valve open loop	Telegram type 3 or 4
4	Pressure control valve closed	Telegram type 3 or 4
6	Open loop movement	Telegram type 1 or 2
7	Velocity control axis	Telegram type 1 or 2
9	Position control axis	Telegram type 1 or 2

Remark:

With the DSV amplifier the control mode 1 and 3 are selectable. With the DSV controller the control mode 3, 4, 6, 7 and 9 are selectable. Depending upon control mode, the master must support another DSV telegram (refer to section "Available telegrams" page 7). The telegram selection can be made only via PASO. To do this, the DSV electronics must be separate from the Profibus.

4.7.6 Device local

Parameter description

Description	Specifies the source for the control word
IND	0
PNU	41
PZD-number	-
Parameter name	db_Local
Data type	int8
Parameter length (byte)	1
Access	r/w

Value description

1	Preset value via bus
2	Preset value locally

4.7.7 Capability

Parameter description

Description	Device capability
IND	0
PNU	50
PZD-number	-
Parameter name	db_Capability
Data type	uint32
Parameter length (byte)	4
Access	r

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Value description

0x1B 0x17 0x80 0x00	Default value: depending on the valve [Read only]
	Value 0 = disabled / not supported
	Value 1 = enabled / supported
	Bit 0 – 15 = Specific information (manufacturer-specific 8000h-FFFFh)
	Bit 16 – 23 = Drive information (not used)
	Bit 24 = Hydraulic proportional valve
	Bit 25 = Spool position control open loop (without LVDT)
	Bit 26 = Spool position control closed loop (with LVDT)
	Bit 27 = Pressure control valve open loop (without feedback sensor)
	Bit 28 = Pressure control valve closed loop (with feedback sensor)
	Bit 29 = P/Q Valve
	Bit 30 = Reserved
	Bit 31 = Modular device (can have various functions)

4.7.8   Store Parameter

Parameter description

Description	Specifies the source for the control word
IND	0
PNU	51
PZD-number	-
Parameter name	db_StoreParameter
Data type	Int32
Parameter length (byte)	4
Access	w

Value description

0	Do nothing
0x73 0x61 0x76 0x65 (= 's' 'a' 'v' 'e')	Store all parameters into the non-volatile memory

4.7.9   Reset Default

Parameter description

Description	All device parameters will be set to default values
IND	0
PNU	52
PZD-number	-
Parameter name	db_ResetDefault
Data type	Int32
Parameter length (byte)	4
Access	w

Value description

0	
0x6C 0x6F 0x61 0x64 (= 'l' 'o' 'a' 'd')	

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4.7.10 Mode of operation

Parameter description

Description	Interface Nummer (= 'Betriebsart' in PASO) After a change of mode of operation 2 in 3 or in reverse, the characteristic optimisation parameters of the X axis (refer to section "Characteristict optimisation X-axis" page 71) are no longer valid. The parameters must be read or set again.
IND	0
PNU	Control Mode 1, 2, 6: 53 Control Mode 4, 7, 9: -
PZD-number	-
Parameter name	db_Operation_Moder
Data type	Int8
Parameter length (byte)	1
Access	r/w

Value description

0	Setpoint unipolar (1-Mag)
1	Setpoint unipolar (2-Mag)
2	Setpoint bipolar (2-Mag)
3	Setpoint unipolar (2-Mag einzeln, optional) Remark: With this mode of operation each solenoid must be released individually over the control Word (refer to section "Control Word" page 33)

4.7.11 Error handling

Parameter description

Description	Error handling (= 'Error handling' in PASO)
IND	0
PNU	54
PZD-number	-
Parameter name	db_Error_Handling
Data type	Int8
Parameter length (byte)	1
Access	r/w

Value description

0	In case of an error, switch solenoid A+B off
1	In case of an error, switch solenoid A on
2	In case of an error, switch solenoid B on
3	In case of an error, switch solenoid A+B on

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4.7.12 Actual Temperature

Parameter description

Description	Actual Temperature
IND	0
PNU	55
PZD-number	-
Parameter name	dav_ActualTemperature
Data type	Int16
Parameter length (byte)	2
Access	r

Value description

Unit	° Celsius

4.7.13 Setpoint

Description	Setpoint	
IND	Control Mode 1:	21
	Control Mode 3, 4:	22
	Control Mode 6:	11
	Control Mode 7:	13
	Control Mode 9:	12
PNU	21	
PZD-number	012	
Parameter name	Control Mode 1:	vpoc_Setpoint_AVal
	Control Mode 3:	vprc_Setpoint_AVal
	Control Mode 4:	vprc_Setpoint_Val
	Control Mode 6:	dcol_Setpoint_AVal
	Control Mode 7:	dsp_Setpoint_Val
	Control Mode 9:	dpc_Setpoint_Val
Data type	Control Mode 1, 3, 4:	uint16
	Control Mode 6, 7, 9:	uint 32
Parameter length (byte)	Control Mode 1, 3, 4:	2
	Control Mode 6, 7, 9:	4
Access	r/w	

Value description

Range	Control Mode 1, 3 (telegram type 3 and 4): -16384...16384 (refer to section "Internal bus resolution" page 25) Control Mode 4 (telegram type 3 and 4): 0...16384 (refer to section "Internal bus resolution" page 25) Control Mode 6 (telegram type 1 and 2): -100000...+100000 = ±100% Control Mode 7, 9 (telegram type 1 and 2): 0...maxReference (refer to section "Max. Reference transducer" page 43)

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Unit	Control Mode 1, 3 (telegram type 3 and 4):	Inc
	Control Mode 4 (telegram type 3 and 4):	Inc
	Control Mode 6 (telegram type 1 and 2):	%
	Control Mode 7, 9 (telegram type 1 and 2):	selected unit
Default Value	-	
Step	Control Mode 1, 3 (telegram type 3 and 4):	16 = 0.098%
	Control Mode 4 (telegram type 3 and 4):	16 = actual step
	Control Mode 6 (telegram type 1 and 2):	98 = 0.098%%
	Control Mode 7, 9 (telegram type 1 and 2):	actual step

4.7.14 Setpoint B

Description	Setpoint B is only used in control mode 1, 3 and 6 in the mode of operation "Setpoint bipolar (2-Mag)".
IND	Control Mode 1: 21
	Control Mode 3: 22
	Control Mode 4, 6, 7, 9: -
PNU	Control Mode 1, 3: 253
	Control Mode 4, 6, 7, 9: -
PZD-number	012
Parameter name	Control Mode 1: vpoc_Setpoint_BVal
	Control Mode 3: vprc_Setpoint_BVal
Data type	Control Mode 1, 3 (telegram type 3 and 4): uint16
Parameter length (byte)	Control Mode 1, 3 (telegram type 3 and 4): 2
Access	w

Value description

Range	Control Mode 1, 3 (telegram type 3 and 4): 0...16384 (refer to section "Internal bus resolution" page 25)
Unit	Control Mode 1, 3 (telegram type 3 and 4): Inc
Default Value	-
Step	Control Mode 1, 3 (telegram type 3 and 4): 16 = 0.098%

4.7.15 Imin A
Parameter description

Description	Minimum current solenoid A (= 'Imin A' in PASO)
IND	Control Mode 1: 21
	Control Mode 3, 4: 22
	Control Mode 6, 7, 9: 3
PNU	Control Mode 1, 3, 4: 107
	Control Mode 6, 7, 9: 73
PZD-number	-
Parameter name	Control Mode 1: vpoc_Deadband_AsideVal
	Control Mode 3: vprc_Deadband_AsideVal
	Control Mode 4: vprc_Deadband_AsideVal
	Control Mode 6: dop_drivePos_AsideVal
	Control Mode 7: dop_drivePos_AsideVal
	Control Mode 9: dop_drivePos_AsideVal
Data type	Control Mode 1, 3, 4: uint16
	Control Mode 6, 7, 9: uint32
Parameter length (byte)	Control Mode 1, 3, 4: 2
	Control Mode 6, 7, 9: 4
Access	r/w

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Value description

Range	0...16384 (24V version: corresponds 0 ... 1536 mA)
	(12V version: corresponds 0 ... 2560 mA)
	Upper limit = adjusted Imax A
Unit	mA
Default Value	Valve dependent
Step	16 (corresponds 1.5 mA, 24V version)
	(corresponds 2.5 mA, 12V version)

4.7.16 Imax A

Parameter description

Description	Maximum current solenoid A (= 'Imax A' in PASO)
IND	Control Mode 1: 21
	Control Mode 3, 4: 22
	Control Mode 6, 7, 9: 3
PNU	Control Mode 1, 3, 4: 251
	Control Mode 6, 7, 9: 129
PZD-number	-
Parameter name	Control Mode 1: vpoc_Imax_AsideVal
	Control Mode 3: vprc_Imax_AsideMaxVal
	Control Mode 4: vprc_Imax_AsideMaxVal
	Control Mode 6: dop_drivePos_AsideMaxVal
	Control Mode 7: dop_drivePos_AsideMaxVal
	Control Mode 9: dop_drivePos_AsideMaxVal
Data type	Control Mode 1, 3, 4: uint16
	Control Mode 6, 7, 9: uint32
Parameter length (byte)	Control Mode 1, 3, 4: 2
	Control Mode 6, 7, 9: 4
Access	r/w

Value description

Range	0...16384 (24V version: corresponds 0 ... 1536 mA)
	(12V version: corresponds 0 ... 2560 mA)
	Lower limit = adjusted Imin A
	Upper limit depends to the valve type
Unit	mA
Default Value	Valve dependent
Step	16 (corresponds 1.5 mA, 24V version)
	(corresponds 2.5 mA, 12V version)

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4.7.17 Imin B

Parameter description

Description	Minimum current solenoid B (= 'Imin B' in PASO), only with 2 solenoids
IND	Control Mode 1: 21 Control Mode 3, 4: 22 Control Mode 6, 7, 9: 3
PNU	Control Mode 1, 3, 4: 110 Control Mode 6, 7, 9: 76
PZD-number	-
Parameter name	Control Mode 1: vpoc_Deadband_BsideVal Control Mode 3: vprc_Deadband_BsideVal Control Mode 4: vprc_Deadband_BsideVal Control Mode 6: dop_drivePos_BsideVal Control Mode 7: dop_drivePos_BsideVal Control Mode 9: dop_drivePos_BsideVal
Data type	Control Mode 1, 3, 4: uint16 Control Mode 6, 7, 9: uint32
Parameter length (byte)	Control Mode 1, 3, 4: 2 Control Mode 6, 7, 9: 4
Access	r/w

Value description

Range	0...16384 (24V version: corresponds 0 ... 1536 mA) (12V version: corresponds 0 ... 2560 mA) Upper limit = adjusted Imax B
Unit	mA
Default Value	Valve dependent
Step	16 (corresponds 1.5 mA, 24V version) (corresponds 2.5 mA, 12V version)

4.7.18 Imax B

Parameter description

Description	Maximum current solenoid B (= 'Imax B' in PASO), only with 2 solenoids
IND	Control Mode 1: 21 Control Mode 3, 4: 22 Control Mode 6, 7, 9: 3
PNU	Control Mode 1, 3, 4: 252 Control Mode 6, 7, 9: 130
PZD-number	-
Parameter name	Control Mode 1: vpoc_Imax_BsideVal Control Mode 3: vprc_Imax_BsideMaxVal Control Mode 4: vprc_Imax_BsideMaxVal Control Mode 6: dop_drivePos_BsideMaxVal Control Mode 7: dop_drivePos_BsideMaxVal Control Mode 9: dop_drivePos_BsideMaxVal
Data type	Control Mode 1, 3, 4: uint16 Control Mode 6, 7, 9: uint32
Parameter length (byte)	Control Mode 1, 3, 4: 2 Control Mode 6, 7, 9: 4
Access	r/w

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Value description

Range	0...16384 (24V version: corresponds 0 ... 1536 mA)
	(12V version: corresponds 0 ... 2560 mA)
	Lower limit = adjusted Imin B
	Upper limit depends to the valve type
Unit	mA
Default Value	Valve dependent
Step	16 (corresponds 1.5 mA, 24V version)
	(corresponds 2.5 mA, 12V version)

4.7.19   Min. Interface transducer

Parameter description

Description	Min. Interface Istwert (= 'Min. Interface Istwert' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	1
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4:	35
	Control Mode 7:	100
	Control Mode 9:	59
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	dav_Min_Int_Transducer
Data type	uint16	
Parameter length (byte)	2	
Access	r/w	

Value description

Range	0...10000 = 0...10V by voltage actual value
	0...20000 = 0...20mA by current actual value
Unit	V resp. mA
Default Value	0
Step	0.001V resp. 0.001mA

4.7.20   Max. Interface transducer

Parameter description

Description	Max. Interface Istwert (= 'Max. Interface Istwert' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	1
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4:	38
	Control Mode 7:	101
	Control Mode 9:	62
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	dav_Max_Int_Transducer
Data type	uint16	
Parameter length (byte)	2	
Access	r/w	

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Value description

Range	0...10000 = 0...10V by voltage actual value
	0...20000 = 0...20mA by voltage actual value
Unit	1
Default Value	10000 resp. 20000
Step	0.001V resp. 0.001mA

4.7.21 Min. Reference transducer

Parameter description

Description	Min. Reference Istwert (= 'Min. Reference Istwert' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	1
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4:	23
	Control Mode 7:	102
	Control Mode 9:	50
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	dav_Min_Ref_Transducer
Data type	uint32	
Parameter length (byte)	4	
Access	r/w	

Value description

Range	Dependent on the control mode and unit (refer to section "Scaling" page 24)
Unit	Adjusted unit, refer to section "Displayed unit" page 56.
Default Value	0
Step	1

4.7.22 Max. Reference transducer

Parameter description

Description	Max. Reference Istwert (= 'Max. Reference Istwert' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	1
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4:	26
	Control Mode 7:	103
	Control Mode 9:	53
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	dav_Max_Ref_Transducer
Data type	uint32	
Parameter length (byte)	4	
Access	r/w	

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Value description

Range	Dependent on the control mode and unit (refer to section "Scaling" page 24)
Unit	Adjusted unit, refer to section "Displayed unit" auf page 56.
Default Value	10
Step	1

4.7.23 Ramp type

Parameter description

Description	Ramp type	
IND	Control Mode 1:	21
	Control Mode 3:	22
	Control Mode 6:	11
	Control Mode 4, 7, 9:	-
PNU	Control Mode 1, 3:	43
	Control Mode 6:	42
	Control Mode 4, 7, 9:	-
PZD-number	-	
Parameter name	Control Mode 1:	vpoc_ramp_Type
	Control Mode 3:	vprc_ramp_Type
	Control Mode 6:	dcol_ramp_Type
	Control Mode 4, 7, 9:	-
Data type	int8	
Parameter length (byte)	1	
Access	r/w	

Value description

0	no ramp
3	Linear ramp (2 separate parameters for acceleration positive and negative)

Rampentyp 3:

Beschleunigungszeit positiv

Verzögerungszeit positiv

+100%

-100%

t

Beschleunigungszeit negativ

Verzögerungszeit negativ

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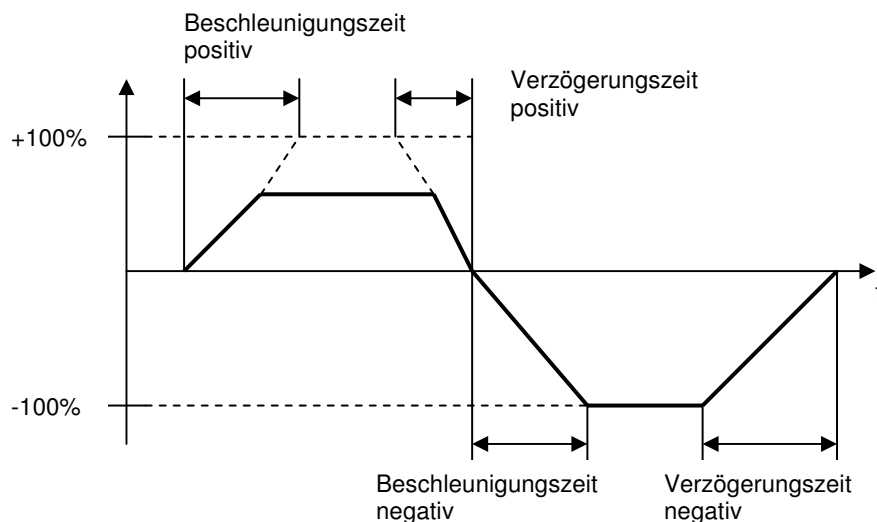
4.7.24 Ramp A up

Parameter description

Description	Start ramp positive (= 'Ramp A up' in PASO)	
IND	Control Mode 1:	21
	Control Mode 3:	22
	Control Mode 6:	11
	Control Mode 4, 7, 9:	-
PNU	Control Mode 1, 3:	50
	Control Mode 6:	49
	Control Mode 4, 7, 9:	-
PZD-number	-	
Parameter name	Control Mode 1:	vpoc_ramp_AccTimePosVal
	Control Mode 3:	vprc_ramp_AccTimePosVal
	Control Mode 4:	-
	Control Mode 6:	dcol_ramp_AccTimePosVal
	Control Mode 7:	-
	Control Mode 9:	-
Data type	Control Mode 1, 3:	uint16
	Control Mode 6:	uint32
Parameter length (byte)	Control Mode 1, 3:	2
	Control Mode 6:	4
Access	r/w	

Value description

Range	0 ... 51000
Unit	ms
Default Value	0
Step	1

4.7.25 Ramp A down

Parameter description

Description	Start ramp A negative (= 'Ramp A down' in PASO)	
IND	Control Mode 1:	21
	Control Mode 3:	22
	Control Mode 6:	11
	Control Mode 4, 7, 9:	-
PNU	Control Mode 1, 3:	59
	Control Mode 6:	58
	Control Mode 4, 7, 9:	-
PZD-number	-	
Parameter name	Control Mode 1:	vpoc_ramp_DecTimePosVal
	Control Mode 3:	vprc_ramp_DecTimePosVal
	Control Mode 6:	dcol_ramp_DecTimePosVal
	Control Mode 4, 7, 9:	-
Data type	Control Mode 1, 3:	uint16
	Control Mode 6:	uint32
Parameter length (byte)	Control Mode 1, 3:	2
	Control Mode 6:	4
Access	r/w	

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Value description

Range	0 ... 51000
Unit	ms
Default Value	0
Step	1

4.7.26   Ramp B up

Parameter description

Description	Stop ramp negative (= 'Ramp B up' in PASO) , only with 2 solenoids	
IND	Control Mode 1:	21
	Control Mode 3:	22
	Control Mode 6:	11
	Control Mode 4, 7, 9:	-
PNU	Control Mode 1, 3:	47
	Control Mode 6:	46
	Control Mode 4, 7, 9:	-
PZD-number	-	
Parameter name	Control Mode 1:	vpoc_ramp_AccTimeNegVal
	Control Mode 3:	vprc_ramp_AccTimeNegVal
	Control Mode 6:	dcol_ramp_AccTimeNegVal
	Control Mode 4, 7, 9:	-
Data type	Control Mode 1, 3:	uint16
	Control Mode 6:	uint32
Parameter length (byte)	Control Mode 1, 3:	2
	Control Mode 6:	4
Access	r/w	

Value description

Range	0 ... 51000
Unit	ms
Default Value	0
Step	1

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4.7.27 Ramp B down
Parameter description

Description	Stop ramp positive (= 'Ramp B down' in PASO) , only with 2 solenoids
IND	Control Mode 1: 21 Control Mode 3: 22 Control Mode 6: 11 Control Mode 4, 7, 9: -
PNU	Control Mode 1, 3: 56 Control Mode 6: 55 Control Mode 4, 7, 9: -
PZD-number	-
Parameter name	Control Mode 1: vpoc_ramp_DecTimeNegVal Control Mode 3: vprc_ramp_DecTimeNegVal Control Mode 6: dcol_ramp_DecTimeNegVal Control Mode 4, 7, 9: -
Data type	Control Mode 1, 3: uint16 Control Mode 6: uint32
Parameter length (byte)	Control Mode 1, 3: 2 Control Mode 6: 4
Access	r/w

Value description

Range	0 ... 51000
Unit	ms
Default Value	0
Step	1

4.7.28 Speed positive
Parameter description

Description	Speed positive (= 'Speed +' in PASO)
IND	Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12 Control Mode 1, 3, 6: -
PNU	Control Mode 4: 62 Control Mode 7, 9: 61 Control Mode 1, 3, 6: -
PZD-number	-
Parameter name	Control Mode 1: - Control Mode 3: - Control Mode 4: vprc_Ramp_Vel Control Mode 6: - Control Mode 7: dsp_Ramp_Vel Control Mode 9: dpc_Ramp_Vel
Data type	uint32
Parameter length (byte)	4
Access	r/w

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Value description

Range	Internal step...2000000
Unit	Einheit/s
Default Value	100000
Step	Internal step

4.7.29 Speed negative

Parameter description

Description	Speed negative (= 'Speed -' in PASO)	
IND	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
	Control Mode 1, 3, 6:	-
PNU	Control Mode 4, 7, 9:	231
	Control Mode 1, 3, 6:	-
PZD-number	-	
Parameter name	Control Mode 1:	-
	Control Mode 3:	-
	Control Mode 4:	vprc_Ramp_VelNeg
	Control Mode 6:	-
	Control Mode 7:	dsp_Ramp_VelNeg
	Control Mode 9:	dpc_Ramp_VelNeg
Data type	uint32	
Parameter length (byte)	4	
Access	r/w	

Value description

Range	Internal step...2000000
Unit	Einheit/s
Default Value	100000
Step	Internal step

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4.7.30 Deadband compensation type
Parameter description

Description	Deadband compensation type After a change of mode this parameter, the characteristic optimisation parameters of the X axis (refer to section "Characteristict optimisation X-axis" page 71) are no longer valid. The parameters must be read or set again.	
IND	Control Mode 1: 21 Control Mode 3: 22 Control Mode 6: 11 Control Mode 4, 7, 9: -	
PNU	Control Mode 1, 3: 106 Control Mode 6: 100 Control Mode 4, 7, 9: -	
PZD-number	-	
Parameter name	Control Mode 1: vpoc_Deadband_Type Control Mode 3: vprc_Deadband_Type Control Mode 4: - Control Mode 6: dcol_Deadband_Type Control Mode 7: - Control Mode 9: -	
Data type	int8	
Parameter length (byte)	1	
Access	r/w	

Value description

0	Deadband off
1	Deadband on

4.7.31 Deadband threshold A
Parameter description

Description	Deadband threshold A (= 'Deadband A' in PASO) After a change of mode this parameter, the characteristic optimisation parameters of the X axis (refer to section "Characteristict optimisation X-axis" page 71) are no longer valid. The parameters must be read or set again.	
IND	Control Mode 1: 21 Control Mode 3: 22 Control Mode 6: 11 Control Mode 4, 7, 9: -	
PNU	Control Mode 1, 3: 113 Control Mode 6: 101 Control Mode 4, 7, 9: -	
PZD-number	-	
Parameter name	Control Mode 1: vpoc_Deadband_ThresholdVal Control Mode 3: vprc_Deadband_ThresholdVal Control Mode 4: - Control Mode 6: dcol_Deadband_ThresholdVal Control Mode 7: - Control Mode 9: -	
Data type	Control Mode 1, 3: uint16 Control Mode 6: uint32	
Parameter length (byte)	Control Mode 1, 3: 2 Control Mode 6: 4	
Access	r/w	

Value Description

Range	0...16384 (corresponds 0 … 50%)
Unit	Increment
Default Value	0
Step	32 (corresponds 0.1%)

4.7.32 Deadband threshold B

Parameter description

Description	Deadband threshold B (= 'Deadband B' in PASO) (only with 2 solenoids. After a change of mode this parameter, the characteristic optimisation parameters of the Y axis (refer to section "Characteristic optimisation Y-axis" page 73) are no longer valid. The parameters must be read or set again.
IND	Control Mode 1: 21 Control Mode 3: 22 Control Mode 6: 11 Control Mode 4, 7, 9: -
PNU	Control Mode 1, 3: 254 Control Mode 6: 102 Control Mode 4, 7, 9: -
PZD-number	-
Parameter name	Control Mode 1: vpoc_Deadband_Threshold_BsideVal Control Mode 3: vprc_Deadband_Threshold_BsideVal Control Mode 4: - Control Mode 6: dcol_Deadband_Threshold_BsideVal Control Mode 7: - Control Mode 9: -
Data type	Control Mode 1, 3: uint16 Control Mode 6: uint32
Parameter length (byte)	Control Mode 1, 3: 2 Control Mode 6: 4
Access	r/w

Value description

Range	0...16384 (corresponds 0 … 50%)
Unit	Increment
Default Value	0
Step	32 (corresponds 0.1%)

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4.7.33 Dither type

Parameter description

Description	Dither type	
IND	Control Mode 1:	21
	Control Mode 3, 4:	22
	Control Mode 6, 7, 9:	3
PNU	Control Mode 1, 3, 4:	187
	Control Mode 6, 7, 9:	97
PZD-number	-	
Parameter name	Control Mode 1:	vpoc_dither_Type
	Control Mode 3:	vprc_dither_Type
	Control Mode 4:	vprc_dither_Type
	Control Mode 6:	dop_dither_Type
	Control Mode 7:	dop_dither_Type
	Control Mode 9:	dop_dither_Type
Data type	int8	
Parameter length (byte)	1	
Access	r/w	

Value description

0	Dither off
1	Dither on with square function

4.7.34 Dither Frequency

Parameter description

Description	Dither Frequency (= 'Dither Frequency' in PASO)	
IND	Control Mode 1:	21
	Control Mode 3, 4:	22
	Control Mode 6, 7, 9:	3
PNU	Control Mode 1, 3, 4:	191
	Control Mode 6, 7, 9:	98
PZD-number	-	
Parameter name	Control Mode 1:	vpoc_dither_FreqVal
	Control Mode 3:	vprc_dither_FreqVal
	Control Mode 4:	vprc_dither_FreqVal
	Control Mode 6:	dop_dither_FreqVal
	Control Mode 7:	dop_dither_FreqVal
	Control Mode 9:	dop_dither_FreqVal
Data type	Control Mode 1, 3, 4:	uint16
	Control Mode 6, 7, 9:	uint32
Parameter length (byte)	Control Mode 1, 3, 4:	2
	Control Mode 6, 7, 9:	4
Access	r/w	

Value description

Range	20 ... 500 = 20 ... 500Hz
Unit	Hz
Default Value	100 = 100Hz
Step	Only the following values are possible:
	20, 25, 30, 35, 40, 45, 50, 55, 60, 70, 80, 100, 125, 165, 250, 500
	The input will be rounded to a valid value

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4.7.35 Dither Amplitude

Parameter description

Description	Dither Amplitude (= 'Dither Level' in PASO)	
IND	Control Mode 1:	21
	Control Mode 3, 4:	22
	Control Mode 6, 7, 9:	3
PNU	Control Mode 1, 3, 4:	188
	Control Mode 6, 7, 9:	101
PZD-number	-	
Parameter name	Control Mode 1:	vpoc_dither_AmplVal
	Control Mode 3:	vprc_dither_AmplVal
	Control Mode 4:	vprc_dither_AmplVal
	Control Mode 6:	dop_dither_AmplVal
	Control Mode 7:	dop_dither_AmplVal
	Control Mode 9:	dop_dither_AmplVal
Data type	Control Mode 1, 3, 4:	uint16
	Control Mode 6, 7, 9:	uint32
Parameter length (byte)	Control Mode 1, 3, 4:	2
	Control Mode 6, 7, 9:	4
Access	r/w	

Value description

Range	0...4266 (24V version: corresponds 400 mA)
	0...2560 (12V version: corresponds 400 mA)
Unit	mA
Default Value	1072　(24V version: corresponds 100 mA)
	640　(12V version: corresponds 100 mA)
Step	32　(24V version: corresponds 3.0 mA)
	(12V version: corresponds 5.0 mA)

4.7.36 System control

Parameter description

Description	System control (= 'System control' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	3
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	131
PZD-number	-	
Parameter name	Control Mode 1,3,6:	-
	Control Mode 4,7,9:	dop_drivePos_SystemInvert
Data type	uint8	
Parameter length (byte)	1	
Access	r/w	

Value description

Range	0:	System control not inverted
	1:	System control inverted

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4.7.37 Output Solenoid A

Parameter description

Description	Output solenoid A (= 'Output solenoid A' in PASO)
IND	Control Mode 1, 3, 6, 9: - Control Mode 4, 7: 3
PNU	Control Mode 1, 3, 6, 9: - Control Mode 4, 7: 132
PZD-number	-
Parameter name	Control Mode 1,3,6,9: - Control Mode 4,7: dop_Invert_MagA
Data type	uint8
Parameter length (byte)	1
Access	r/w

Value description

Range	0: Solenoid A not inverted 1: Solenoid A inverted

4.7.38 Output Solenoid B

Parameter description

Description	Output Solenoid B (= 'Output solenoid B' in PASO) , only with 2 solenoids
IND	Control Mode 1, 3, 6, 9: - Control Mode 4, 7: 3
PNU	Control Mode 1, 3, 6, 9: - Control Mode 4, 7: 133
PZD-number	-
Parameter name	Control Mode 1,3,6,9: - Control Mode 4,7: dop_Invert_MagB
Data type	uint8
Parameter length (byte)	1
Access	r/w

Value description

Range	0: Solenoid B not inverted 1: Solenoid B inverted

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4.7.39 Imin always active

Parameter description

Description	Imin always active (= 'Imin always active' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 3
PNU	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 134
PZD-number	-
Parameter name	Control Mode 1,3,6: - Control Mode 4,7,9: dop_imin_Active
Data type	uint8
Parameter length (byte)	1
Access	r/w

Value description

Range	0: no 1: yes

4.7.40 Solenoid 'In Position'

Parameter description

Description	Solenoid 'In Position' (= 'Solenoid 'In Position'' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 250
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_window_solenoidInPos Control Mode 7: dsp_window_solenoidInPos Control Mode 9: dpc_window_solenoidInPos
Data type	uint8
Parameter length (byte)	1
Access	r/w

Value description

Range	0: Solenoids are not active inside the solenoid off window 1: Solenoids are also active inside the solenoid off window

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4.7.41 Signal type actual value

Parameter description

Description	Signal type actual valuet (= 'Signal type actual value' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 3
PNU	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 131
PZD-number	-
Parameter name	Control Mode 1,3,6: - Control Mode 4,7,9: dav_InterfaceType
Data type	uint8
Parameter length (byte)	1
Access	r/w

Value description

Range	Voltage input: 0: 0…10V Current input: 2: 0…20mA 3: 4…20mA

4.7.42 Used input actual value

Parameter description

Description	Used input actual value (= 'Used input actual value' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 1
PNU	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 20
PZD-number	-
Parameter name	dav_InterfaceNo
Data type	uint8
Parameter length (byte)	1
Access	r/w

Value description

Range	2: Analog input 3

4.7.43 Cablebreak actual value

Parameter description

Description	Cablebreak actual value (= 'Cablebreak actual value' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 1
PNU	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 96
PZD-number	-
Parameter name	dav_Cablebreak
Data type	uint8
Parameter length (byte)	1
Access	r/w

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Value description

Range	0:	Cablebreak detection off
	1:	Cablebreak detecion on (only Signal type actual value = 3)

4.7.44 Measuringsystem type

Parameter description

Description	Measuringsystem type actual value (This parameter is not visible in the PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	1
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	22
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	dav_transducer_Type
Data type	int8	
Parameter length (byte)	1	
Access	r/w	

Value description

-1	Speed Transducer
2	Pressure Transducer
67	Position Transducer Analog

4.7.45 Displayed unit

Parameter description

Description	Displayed unit (= 'Displayed unit' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	1
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	84
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	dav_ActualValUnit
Data type	uint8	
Parameter length (byte)	1	
Access	r/w	

Value description

Value	Control Mode		
	4 (Druck-Regelung)	7 (v-Regelung)	9 (Lage-Regelung)
0	bar	l/min	mm
1	psi	m/s	Grad
2	kN	Inch/s	Zoll
3	-	1/min	-
4	MPa	Grad/s	-

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4.7.46 Target window type

Parameter description

Description	Target window type (This parameter is not visible in the PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4: 203 Control Mode 7: 149 Control Mode 9: 177
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_window_Type Control Mode 7: dsp_window_Type Control Mode 9: dpc_window_Type
Data type	int8
Parameter length (byte)	1
Access	r/w

Value description

0	Window monitoring off
2	Window monitoring on

4.7.47 Target window threshold

Parameter description

Description	Target window threshold (= 'Target window threshold' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4: 204 Control Mode 7: 150 Control Mode 9: 178
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_window_ThresholdVal Control Mode 7: dsp_window_ThresholdVal Control Mode 9: dpc_window_ThresholdVal
Data type	int16
Parameter length (byte)	2
Access	r/w

Value description

Range	0 … max. range (refer to section "Scaling" page 24)
Unit	Adjusted unit, refer to section "Displayed unit" page 56.
Default Value	10
Step	Dependent on the resolution of actual value

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4.7.48 Target window delay time

Parameter description

Description	Target window delay time (= 'Target window delay time' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	232
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_window_Delay
	Control Mode 7:	dsp_window_Delay
	Control Mode 9:	dpc_window_Delay
Data type	int16	
Parameter length (byte)	2	
Access	r/w	

Value description

Range	0 ... 100
Unit	ms
Default Value	50
Step	1

4.7.49 Trailing window type

Parameter description

Description	Trailing window type (This parameter is not visible in the PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4:	150
	Control Mode 7:	112
	Control Mode 9:	140
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_Contr-Mon_Type
	Control Mode 7:	dsp_Contr-Mon_Type
	Control Mode 9:	dpc_Contr-Mon_Type
Data type	int8	
Parameter length (byte)	1	
Access	r/w	

Value description

0	Target window monitoring off
2	Target window monitoring on

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4.7.50 Trailing window threshold

Parameter description

Description	Trailing window threshold (= 'Trailing window threshold' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4: 160 Control Mode 7: 122 Control Mode 9: 150
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_Contr_Mon_Val Control Mode 7: dsp_Contr_Mon_Val Control Mode 9: dpc_Contr_Mon_Val
Data type	int16
Parameter length (byte)	2
Access	r/w

Value description

Range	0 … max. range (refer to section "Scaling" page 24)
Unit	Adjusted unit, refer to section "Displayed unit" page 56.
Default Value	10
Step	Dependent on the resolution of actual value

4.7.51 Trailing window delay time

Parameter description

Description	Trailing window delay time (= 'Trailing window delay time' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4: 157 Control Mode 7: 119 Control Mode 9: 147
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_Contr_Mon_Delay Control Mode 7: dsp_Contr_Mon_Delay Control Mode 9: dpc_Contr_Mon_Delay
Data type	int16
Parameter length (byte)	2
Access	r/w

Value description

Range	0 ... 100
Unit	ms
Default Value	50
Step	1

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4.7.52 Solenoid off window threshold

Parameter description

Description	Solenoid off window threshold (= 'Solenoid off window threshold' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 233
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_Magn_Aus_Val Control Mode 7: dsp_Magn_Aus_Val Control Mode 9: dpc_Magn_Aus_Val
Data type	int16
Parameter length (byte)	2
Access	r/w

Value description

Range	0 … max. range (refer to section "Scaling" page 24)
Unit	Adjusted unit, refer to section "Displayed unit" page 56.
Default Value	10
Step	Dependent on the resolution of actual value

4.7.53 Solenoid off window delay time

Parameter description

Description	Solenoid off window delay time (= 'Solenoid off window delay time' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 234
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_Magn_Aus_Delay Control Mode 7: dsp_Magn_Aus_Delay Control Mode 9: dpc_Magn_Aus_Delay
Data type	int16
Parameter length (byte)	2
Access	r/w

Value description

Range	0 ... 100
Unit	ms
Default Value	50
Step	1

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4.7.54 Internal resolution

Parameter description

Description	Current internal resolution (= 'Adjusting precision' for scaled parameter)
IND	Control Mode 1, 3, 6: -
	Control Mode 4: 22
	Control Mode 7: 13
	Control Mode 9: 12
PNU	Control Mode 1, 3, 6: -
	Control Mode 4, 7, 9: 254
PZD-number	-
Parameter name	Control Mode 1, 3, 6: -
	Control Mode 4: vprc_DeviceResolution
	Control Mode 7: dsp_DeviceResolution
	Control Mode 9: dpc_DeviceResolution
Data type	Control Mode 4 (Telegram type 3 and 4): int16
	Control Mode 7, 9 (Telegram type 1 and 2): int32
Parameter length (byte)	2, 4
Access	r

Value description

Range	0...maxReference (refer to section "Min. Reference transducer" page 43)
Unit	-
Default Value	1000 (corresponds factor 1.000)
Step	Dependent on the unit (refer to section "Scaling" page 24)

4.7.55 Preset value offering

Parameter description

Description	Preset value offering (= 'Preset value offering' in PASO)
IND	Control Mode 1, 3, 6: -
	Control Mode 4: 22
	Control Mode 7: 13
	Control Mode 9: 12
PNU	Control Mode 1, 3, 6: -
	Control Mode 4, 7, 9: 236
PZD-number	-
Parameter name	Control Mode 1, 3, 6: -
	Control Mode 4: vprc_SollwertAufschaltung
	Control Mode 7: dsp_SollwertAufschaltung
	Control Mode 9: dpc_SollwertAufschaltung
Data type	int16
Parameter length (byte)	2
Access	r/w

Value description

Range	0 ... 10000 (corresponds factor 0.000 … 10.000)
Unit	-
Default Value	1000 (corresponds factor 1.000)
Step	100

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4.7.56 Speed offering

Parameter description

Description	Speed offering (= 'Speed offering' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	237
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_GeschwAufschaltung
	Control Mode 7:	dsp_GeschwAufschaltung
	Control Mode 9:	dpc_GeschwAufschaltung
Data type	int16	
Parameter length (byte)	2	
Access	r/w	

Value description

Range	0 ... 10000 (corresponds factor 0.000 … 10.000)
Unit	-
Default Value	1000 (corresponds factor 1.000)
Step	100

4.7.57 I-part outside I-window

Parameter description

Description	I-part outside I-window (= 'I-part, if control difference > I-window outside' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	235
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_I_AnteilUnveraendert
	Control Mode 7:	dsp_I_AnteilUnveraendert
	Control Mode 9:	dpcI_AnteilUnveraendert
Data type	int8	
Parameter length (byte)	1	
Access	r/w	

Value description

0	Set the I-part to 0
1	Leave the I-part unchanged

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4.7.58   P-amplification positive

Parameter description

Description	P-amplification positive (= 'P-amplf. positive' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4:	238
	Control Mode 7, 9:	106
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_PVal
	Control Mode 7:	dsp_PVal
	Control Mode 9:	dpc_PVal
Data type	int16	
Parameter length (byte)	2	
Access	r/w	

Value description

Range	0 ... 25000 (corresponds factor 0.0 … 25.0)
Unit	-
Default Value	5000 (corresponds factor 5.0)
Step	100

4.7.59   P-amplification negative

Parameter description

Description	P-amplification negative (= 'P-amplft. negative' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	239
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_PValNeg
	Control Mode 7:	dsp_PValNeg
	Control Mode 9:	dpc_PValNeg
Data type	int16	
Parameter length (byte)	2	
Access	r/w	

Value description

Range	0 ... 25000 (corresponds factor 0.0 … 25.0)
Unit	-
Default Value	5000 (corresponds factor 5.0)
Step	100

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4.7.60   Integrator type

Parameter description

Description	Integrator type (This parameter is not visible in the PASO)
IND	Control Mode 1, 3, 4, 6, 7: - Control Mode 9: 12
PNU	Control Mode 1, 3, 4, 6, 7: - Control Mode 9: 115
PZD-number	-
Parameter name	Control Mode 1, 3, 4, 6, 7: - Control Mode 9: dpc_integrator_Type
Data type	int8
Parameter length (byte)	1
Access	r/w

Value description

0	Switched integrator off
1	Standard switched integrator on

4.7.61   I-time positive

Parameter description

Description	I-time positive (= 'I-time positive' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4: 240 Control Mode 7: 109 Control Mode 9: 116
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_integrator_TiVal Control Mode 7: dsp_integrator_TiVal Control Mode 9: dpc_integrator_TiVal
Data type	int16
Parameter length (byte)	2
Access	r/w

Value description

Range	0 ... 10000
Unit	ms
Default Value	1000
Step	1

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4.7.62 I-time negative

Parameter description

Description	I-time negative (= 'I-time negative' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 241
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_integrator_TiValNeg Control Mode 7: dsp_integrator_TiValNeg Control Mode 9: dpc_integrator_TiValNeg
Data type	int16
Parameter length (byte)	2
Access	r/w

Value description

Range	0 ... 10000
Unit	ms
Default Value	1000
Step	1

4.7.63 I-window outside positive

Parameter description

Description	I-window outside positive (= 'I-window outside positive' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4, 7: 242 Control Mode 9: 119
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_integrator_DXVal Control Mode 7: dsp_integrator_DXVal Control Mode 9: dpc_integrator_DXVal
Data type	int16
Parameter length (byte)	2
Access	r/w

Value description

Range	0 … max. range (refer to section "Scaling" page 24)
Unit	Adjusted unit, refer to section "Displayed unit" page 56.
Default Value	5
Step	Dependent on the resolution of actual value

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4.7.64 I-window outside negative

Parameter description

Description	I-window outside negative (= 'I-window outside negative' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 243
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_integrator_DXValNeg Control Mode 7: dsp_integrator_DXValNeg Control Mode 9: dpc_integrator_DXValNeg
Data type	int16
Parameter length (byte)	2
Access	r/w

Value description

Range	0 … max. range (refer to section "Scaling" page 24)
Unit	Adjusted unit, refer to section "Displayed unit" page 56.
Default Value	5
Step	Dependent on the resolution of actual value

4.7.65 I-window inside positive

Parameter description

Description	I-window inside positive (= 'I-window inside positive' in PASO)
IND	Control Mode 1, 3, 6: - Control Mode 4: 22 Control Mode 7: 13 Control Mode 9: 12
PNU	Control Mode 1, 3, 6: - Control Mode 4, 7, 9: 248
PZD-number	-
Parameter name	Control Mode 1, 3, 6: - Control Mode 4: vprc_I_Fenster_Innen_Pos Control Mode 7: dsp_I_Fenster_Innen_Pos Control Mode 9: dpc_I_Fenster_Innen_Pos
Data type	int16
Parameter length (byte)	2
Access	r/w

Value description

Range	0 … max. range (refer to section "Scaling" page 24)
Unit	Adjusted unit, refer to section "Displayed unit" page 56.
Default Value	0
Step	Dependent on the resolution of actual value

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4.7.66 I-window inside negative

Parameter description

Description	I-windiw inside negative (= 'I-window inside negative' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	249
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_I_Fenster_Innen_Neg
	Control Mode 7:	dsp_I_Fenster_Innen_Neg
	Control Mode 9:	dpc_I_Fenster_Innen_Neg
Data type	int16	
Parameter length (byte)	2	
Access	r/w	

Value description

Range	0 … max. range (refer to section "Scaling" page 24)
Unit	Adjusted unit, refer to section "Displayed unit" page 56.
Default Value	0
Step	Dependent on the resolution of actual value

4.7.67 D-time positive

Parameter description

Description	D-time positive (= 'D-time positive' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	244
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_DTimeVal
	Control Mode 7:	dsp_DTimeVal
	Control Mode 9:	dpc_DTimeVal
Data type	int16	
Parameter length (byte)	2	
Access	r/w	

Value description

Range	0 ... 10000
Unit	ms
Default Value	1000
Step	1

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4.7.68 D-time negative

Parameter description

Description	D-time negative (= 'D-time negative' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	245
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_DTimeValNeg
	Control Mode 7:	dsp_DTimeValNeg
	Control Mode 9:	dpc_DTimeValNeg
Data type	int16	
Parameter length (byte)	2	
Access	r/w	

Value description

Range	0 ... 10000
Unit	ms
Default Value	1000
Step	1

4.7.69 D-amplification positive

Parameter description

Description	D-amplification positive (= 'D-amplf. positive' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	246
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_DVal
	Control Mode 7:	dsp_DVal
	Control Mode 9:	dpc_DVal
Data type	int16	
Parameter length (byte)	2	
Access	r/w	

Value description

Range	0 ... 10000 (corresponds factor 0.0 … 10.0)
Unit	-
Default Value	5000 (corresponds factor 5.0)
Step	100

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4.7.70 D-amplification negative

Parameter description

Description	D-amplification negative (= 'D-amplf. negative' in PASO)	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4, 7, 9:	247
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_DValNeg
	Control Mode 7:	dsp_DValNeg
	Control Mode 9:	dpc_DValNeg
Data type	int16	
Parameter length (byte)	2	
Access	r/w	

Value description

Range	0 ... 10000 (corresponds factor 0.0 … 10.0)
Unit	-
Default Value	5000 (corresponds factor 5.0)
Step	100

4.7.71 Actual value

Parameter description

Description	Actual value	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4:	144
	Control Mode 7, 9:	100
PZD-number	003	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_ActualVal
	Control Mode 7:	dsp_ActualVal
	Control Mode 9:	dpc_ActualVal
Data type	Control Mode 4 (Telegram type 3 and 4):	int16
	Control Mode 7, 9 (Telegram type 1 and 2):	int32
Parameter length (byte)	2, 4	
Access	r	

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Value description

Range	Control Mode 1, 3, 6: -
	Control Mode 4 (Telegram type 3 and 4): 0 … +16384 (refer to section "Internal bus resolution" page 25)
	Control Mode 7, 9 (Telegram type 1 and 2): 0...maxReferenz (refer to section "Max. Reference transducer" page 43)
Unit	Adjusted unit

4.7.72   Control deviation

Parameter description

Description	Control deviation	
IND	Control Mode 1, 3, 6:	-
	Control Mode 4:	22
	Control Mode 7:	13
	Control Mode 9:	12
PNU	Control Mode 1, 3, 6:	-
	Control Mode 4:	147
	Control Mode 7, 9:	103
PZD-number	-	
Parameter name	Control Mode 1, 3, 6:	-
	Control Mode 4:	vprc_CtrlDeviationVal
	Control Mode 7:	dsp_CtrlDeviationVal
	Control Mode 9:	dpc_CtrlDeviationVal
Data type	Control Mode 4 (Telegram type 3 and 4):	int16
	Control Mode 7,9 (Telegram type 1 and 2):	int32
Parameter length (byte)	2, 4	
Access	r	

Value description

Range	Control Mode 1, 3, 6: -
	Control Mode 4 (Telegram type 3 and 4): 0 … +16384 (refer to section "Internal bus resolution" page 25)
	Control Mode 7, 9 (Telegram type 1 and 2): 0...maxReferenz (refer to section "Max. Reference transducer" page 43)
Unit	Adjusted unit

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4.7.73 Characteristict optimisation
Parameter description

Description	Characteristic optimisation (= "characteristic optimisation" in PASO) switch on or switch off. Can be switched on only if the characteristic optimisation possesses valid values (refer to section "Characteristict optimisation X-axis" page 71 and "Characteristic optimisation Y-axis" page 73).
IND	Control Mode 1: 64 Control Mode 3: 64 (only DSV amplifier) Control Mode 4, 6, 7, 9: -
PNU	Control Mode 1: 20 Control Mode 3: 20 (only DSV amplifier) Control Mode 4, 6, 7, 9: -
PZD-number	-
Parameter name	
Data type	int8
Parameter length (byte)	1
Access	r/w

Value description

Characteristic optimisation switched off	0
Characteristic optimisation switched on	1

4.7.74 Characteristict optimisation X-axis
Parameter description

Description	Characteristic optimisation X axis (= 'Characterisitc opetimisation preset value' in PASO)
IND	Control Mode 1: 64 Control Mode 3: 64 (only DSV amplifier) Control Mode 4, 6, 7, 9: -
PNU	Control Mode 1: 21 Control Mode 3: 21 (only DSV amplifier) Control Mode 4, 6, 7, 9: -
PZD-number	-
Parameter name	
Data type	int32
Parameter length (byte)	4

Access	Stützpunkt
	    1: – (fixed value, refer to 'Range')
	   11: r (fixed 100)
	 2 ... 10: r/w

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Value description

Range	**Deadband type = 1**
	Mode of operation 0, 1, 2:
	Deadband A ... 100
	Mode of operationt 3 (2-Magnet einzeln):
	if solenoid choice A --> Totband A ... 100
	if solenoid choice B --> Totband B ... 100
	Deadband type = 0
	0 ... 100
	Condition:
	Values not sinkin
	Value [Base = 2] >= Value [Base = 1]
	Value [Baset = 3] >= Value [Base = 2]
	usw.
Unit	%
Default Value	0
Step	1

The value consists of 4 bytes. It contains the solenoid choice, base and parameter values.

Byte 3	Byte 2	Byte 1	Byte 0
Solenoid A / B[1]	base	empty	Parameter value

Example

1) **The base 4 of the solenoid B with the value 50 is to be described***:**

Byte 3	Byte 2	Byte 1	Byte 0
1 (Solenoid B)	4	empty	50

Hex.   01   04   00   32

Value = 01 04 00 32 H

or

Dez. $1 * 2^{24}$ + $4 * 2^{16}$ + $0 * 2^{8}$ +   50

       ↑   ↑   ↑

Shift 24 Bit   Shift 16 Bit   Shift 8 Bit
to the left   to the left   to the left

Value = 17039410 D

---

[1] Soelnoid B only with 2 solenoids

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2) **The base 3 of the solenoid A is to be read:**

Byte 3	Byte 2	Byte 1	Byte 0
0 (Solenoid A)	3	empty	0

Hex.   00   03   00   00

Value = 00 03 00 00 H

or

Dez. $0 * 2^{24}$ + $3 * 2^{16}$ + $0 * 2^8$ +   0

          ↑   ↑   ↑

Value = 196608 D

Answer of the DSV Electronics

Byte 3	Byte 2	Byte 1	Byte 0
0 (Solenoid A)	3	empty	Parameter value

After a change of the parameter "Deadband threshold A", the characteristic optimisation parameters of the X axis are no longer valid. The parameters must be read or set again.

4.7.75   Characteristic optimisation Y-axis

Parameter description

Description	Characteristic optimisation Y-axis (= 'Characteristic-solenoid current' in PASO)
IND	Control Mode 1: 64 Control Mode 3: 64 (only DSV amplifier) Control Mode 4, 6, 7, 9: -
PNU	Control Mode 1: 22 Control Mode 3: 22 (only DSV amplifier) Control Mode 4, 6, 7, 9: -
PZD-number	-
Parameter name	
Data type	int32
Parameter length (byte)	4

Access	Base
	          1: r (fest 0)
	          11: r (fest 1000)
	      2 ... 10: r/w

Value description

Range	Base
	          1: 0 (corresponds Imin)
	          11: 1000 (corresponds Imax)
	      2 ... 10: 0 ... 1000 (corresponds Imin ... Imax)

Unit	1/10 %
Default Value	0
Step	1

The value consists of 4 bytes. It contains the solenoid choice, base and parameter values.

Byte 3	Byte 2	Byte 1	Byte 0
Solenoid A / B[2]	Base	Parameter value	

Example

[2] Magnet B nur wenn 2-Magnete

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1) the base 8 of the solenoid A with the value 700 is to be described:

Byte 3	Byte 2	Byte 1	Byte 0
0 (Solenoid A)	8	700	

Hex.	00	08	02	BC

Value = 00 08 02 BC H

or

Dez. $0 * 2^{24}$ + $8 * 2^{16}$ +   700

↑ Shift 24 Bit to the left   ↑ Shift 16 Bit to the left

Value = 524988 D

2) The base 7 of the solenoid B is to be read:

Byte 3	Byte 2	Byte 1	Byte 0
1 (Solenoid B)	7	0	

Hex.	01	07	00	00

Value = 01 07 00 00 H
Or

Dez. $1 * 2^{24}$ + $7 * 2^{16}$ + $0 * 2^8$ +   0

↑ Shift 24 Bit to the left   ↑ Shift 16 Bit to the left   ↑ Shift 8 Bit to the left

Value = 17235968 D

Answer of the DSV Electronic

Byte 3	Byte 2	Byte 1	Byte 0
1 (Solenoid B)	7	Parameter value	

After a change of the parameter "Deadband threshold B", the characteristic optimisation parameters of the Y axis are no longer valid. The parameters must be read or set again.

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4.7.76 Characteristic optimisation of solenoid choice [3]

Parameter description

Description	Characteristict optimisation of solenoid choice
IND	Control Mode 1: 64 Control Mode 3: 64 (only DSV amplifier) Control Mode 4, 6, 7, 9: -
PNU	Control Mode 1: 24 Control Mode 3: 24 (only DSV amplifier) Control Mode 4, 6, 7, 9: -
PZD-number	-
Parameter name	
Data type	int8
Parameter length (byte)	1
Access	r/w

Value description

0	Solenoid A
1	Solenoid B

[3] The value is maintained, until it is overwritten with a new value or the DSV electronics is switched off.

4.7.77 Characteristict optimisation of base [4]

Parameter description

Description	Characteristict optimisation of base
IND	Control Mode 1: 64 Control Mode 3: 64 (only DSV amplifier) Control Mode 4, 6, 7, 9: -
PNU	Control Mode 1: 23 Control Mode 3: 23 (only DSV amplifier) Control Mode 4, 6, 7, 9: -
PZD-number	-
Parameter name	
Data type	int8
Parameter length (byte)	1
Access	r/w

Value description

Range	1…11 (corresponds base 1…11)

[4] The value is maintained, until it is overwritten with a new value or the DSV electronics is switched off .

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5 Commissioning

For a support during the commissioning of a DP-Slave controller card, the parameterisation software PASO can be connected to the DP-Slave controller card. PASO offers the possibility to display some process value like preset value, solenoid current, device state (state machine) etc. Also the setting of the node adress and a PROFIBUS-DP diagnostic can be made via the PASO (refer to section "Fieldbus Settings" page 9).

5.1 Step by step instructions for the first commissioning

For the first commissioning, the following steps should be observed:

5.1.1 Test the hydraulic system

1. Switch off the hydraulic system
2. Switch off the fieldbus master
3. Switch on the DSV
4. In the PASO window "Fieldbus_Fieldbus-Info" in the section "Bus State" the following statement will be displayed: WD-Status = Baud_Search and DP-status = Wait_Prm (refer to section "Fieldbus Settings" page 9)
5. In the PASO status line, the statements "Local" and "Init" will be displayed
6. Switch on the hydraulic system
7. Set the control of the device to PASO with the PASO Menu "Commands_PASO Control". In the PASO status line, the statements "Remote PASO" and "Init" will be displayed
8. Enable the device with the PASO Menu "Commands_Enable". In the PASO status line, the statements "Remote PASO" and "Active" will be displayed
9. Über den PASO Menubefehl "Befehle_Ventilbetätigung" kann nun direkt ein Magnetstrom vorgegeben werden.

   IMPORTANT: **The hydraulic moves in an open loop system! Be sure, that the hydraulic system can move free.**
10. In the PASO window "Parameters_Valves", the parameters for the minimum (Imin) and maximum (Imax) current and the dither signal (frequency and level) can be set
11. Disable the device with the PASO Menu "Commands_Disable". In the PASO status line, the statements "Remote PASO" and "Disabled" will be displayed
12. Set the control of the device to Local with the PASO Menu "Commands_Local Control". In the PASO status line, the statements "Remote" and "Init" will be displayed

5.1.2 Connect the measuring system (only DSV controller)

1. Connect the measuring system to the corresponding input of the DSV
2. In the PASO window "Configuration_Control mode", the adjustments for the desired control mode can be made
3. In the PASO window "Configuration_Signal scaling", the adjustments for the actual value signal can be made

5.1.3 Adjust the mode of operation (only DSV amplifier)

1. In the PASO window "Configuration_Mode of operation", the adjustments for the desired mode of operation can be made

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5.1.4 Test the fieldbus

2. Load the GSD-Datei in the filedbus master and select the desired telegram type (refer to section „Presupposition and information for the Fieldbus master" page 78)

3. Adjust the node adress and the telegram type (refer to section "Presupposition for the DP-Slave controller card" page 78)

4. Switch on the fieldbus master

5. In the PASO window „fieldbus_Fieldbus-Info" in the section „Bus State" the following statement will be displayed: WD-Status = DP_Control and DP-Status = Data-Exchange (refer to section "Fieldbus Diagnostics" page 10)

5.1.5 Test the control via the fieldbus

1. Set the following parameter in the declared order with the PKW-services (refer to section "Cyclical parameter data exchange (PKW) " page 21)

2. Set the parameter "Device local" to "Control operation via BUS (0)" (refer to section "Device local" page 35)

3. With the parameter "Control Mode" the desired device control mode can be selected (refer to section "Control Mode" page 35).

4. For the release of the DSV, the 3 bits "Disable (D)", "Hold enable (H)" and "Device mode active (M)" from the control word (refer to section "Control Word" page 33) must be set to logical 1. The DP-Slave controller is now in the state "ACTIVE".

5. With the PKW-services (refer to section "Cyclical parameter data exchange (PKW) " page 21) resp. the PZD-services (refer to section "Cyclical process data exchange (PZD) " page 19) a preset value can now be set via the fieldbus.

5.2 Presupposition for the DP-Slave controller card

For the commissioning of a DP-Slave controller card, the following presupposition must be cleared:

- **What is the node adresse from the DP-Slave controller card?**
  The node address can be set via the parameterisation software PASO in the menu item "Fieldbus_Fieldbus-Info" (refer to section "Fieldbus Settings" page 9).

- **What is the device control mode for the DP-Slave controller card?**
  The device control mode can be set via the parameter "". This selection is important for the for the function range of the DP-Slave controller card.

  IMPORTANT: This parameter can only be changed if the DSV is in the state "INIT" or "DISABLE" (refer to section "State machine" page 15)

- **Telegram**
  If the mode of operation is selected, the corresponding telegram must be selected. This adjustment can only be made if the DSV electronic is separated from the Profibus.

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5.3 Presupposition and information for the Fieldbus master

For the commissioning of a Fieldbus master, the following presupposition must be cleared:

- **Node adress**
  What is the node address from the DP-Slave?

- **Telegram**
  The master must be adjusted to the same type of telegram as the DSV Electronics.

- **GSD-file**
  The GSD-file "WAG400BB.gsd" must be present on the Master side. If not, this file must be copied into the project tool of the Master.

- **Data exchange (consistent / inconsistent)**
  For the programing of the data exchange (consistent / inconsistent) in the appliation program of the master, the following rules are valid:

  - PKW-part
    → consistent data transfer (consistent for the whole length)

  - PZD-part
    → consistent data transfer (consistent for the whole length)

5.4 Delivery state

The DSV is delivered with the following basic configuration:

- Adress 6
- Telegram type 3

5.5 Parameterisation

The parameters of the DP-Slave controller card can be read or changed trough the PROFIBUS-DP or through PASO.

After switch-on the DP-Slave controller card, it can be parameterised by sending parameter via PKW (refer to section "Cyclical parameter data exchange (PKW) " page 21). If the changed parameters should be also present after a switch-Off and switch-on, they must be stored before the switch-Off. This can be made with the parameter "Store Parameter" (refer to section "Store Parameter" page 36).

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5.6 Setting the preset value via Fieldbus

After each power on, the following commissioning sequence is necessary:

1. The DP-Slave controller card is now in the state "INIT"
2. In this state, the device control mode can be set with the parameter "db_ControlMode" and the device mode can be set with the parameter "db_DeviceMode"
3. For the release of the DP-Slave controller card, the 3 bits D, H and M from the control word (refer to section "State machine" page 15) must be set to logical 1. The DP-Slave controller card is now in the state "ACTIVE". Now, a preset value can be set.
   Note: If the DP-Slave controller card is used locally (refer to section "Local control" page 13), the start signal (digital input 1) must be set additionally

5.7 Start after an error

- If the device detects an error, the release will be take away internal and the bit "Ready" from the status word will be set to 0. Via the parameter "Error Code" or via the menu item "Diagnostic" in the PASO, an error description can be displayed.
- For restarting the DP-Slave controller card, the bit "Reset Fault" in the control word must be set once to logical 1. Therefore, the error will be reset.
- If the error is reset, the bit "Ready" from status word will be set to 1.
- For the release of the DP-Slave controller card, the 3 bit D, H and M from the control word must be set again to logical 1

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6 Diagnostic and error detection

6.1   Diagnostic about the Fieldbus

A diagnostic about the Fieldbus is always possible via the parameterisation software PASO. This will be made via the menu item "Fieldbus_Fieldbus-Info". The following values will be displayed:

- Node adress
- Baudrate
- Telegram type
- Bus type
- ID-number
- WD-state
- DP-state
- TG-state
- PDZ-values

A detailed description of the diagnostic function you will find in the section "Fieldbus Diagnostics" page 10.

7 Version index

In the following table, an index about the different versions of the " OPERATING INSTRUCTIONS ED1/SD1 PROFIBUS-DP Device-Profile in accordance with Fluid Power Technology" will be listed. The current version is always the version listed at last.

Version	Bezeichnung	Datum der Freigabe
0.1	Start Version	08.09.04
1.0	Ergänzt mit Parameterbeschreibung	29.11.04
2.0	Auf Geräte-Profil FPT umgeschrieben	30.07.07

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