1 PROFIBUS-PA Interface

1.1 Synopsis

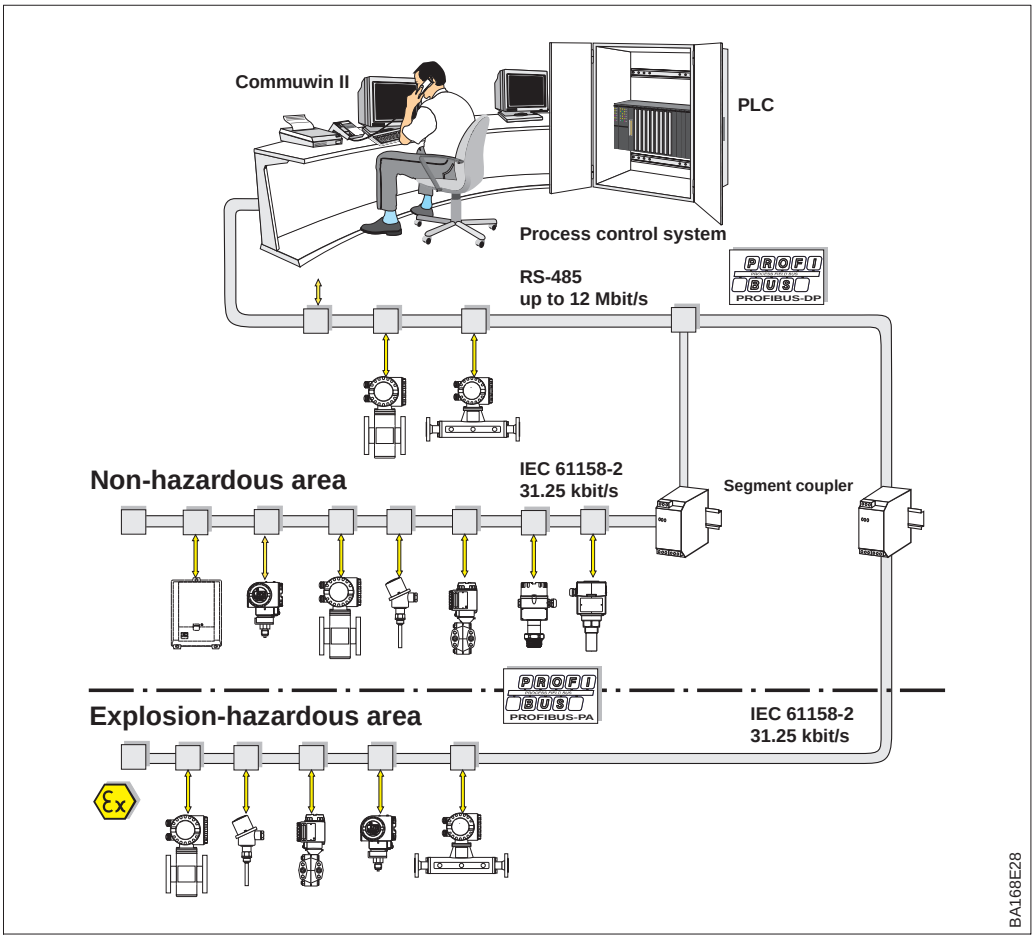


Figure 1.1
PROFIBUS-PA principle of operation

Note!
Additional planning information on the fieldbus PROFIBUS-PA can be found in the Operating Instructions BA 198F/00/en.

Note!

1.2 Setting the device address

Every PROFIBUS-PA device must be given an address. If the address is not set correctly, the device will not be recognised by the process control system.

- Valid device addresses are in the range 0 and 126. All devices are delivered from the factory with the software address 126.
- A device address may appear only once within a particular PROFIBUS-PA network, see Operating Instructions BA 198F.

The default address 126 can be used to check the function of the device and connect it to an operating PROFIBUS-PA system. Afterwards the address must be changed to allow other devices to be connected to the network.

There are two possibilities to set the address of the Cerabar S:

- via software using an operating program (DP Master Class 2, e.g. Commuwin II) or
- on-site via DIP switches. These are located on the electronic insert behind the display.

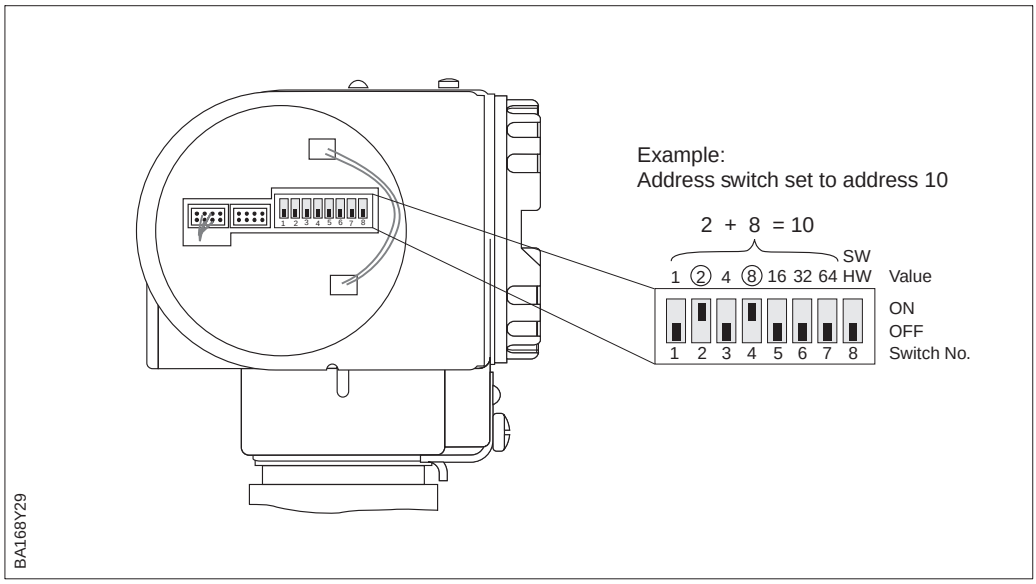


Figure 1.2
Setting the instrument address with the address switch.

Addressing mode

Set the addressing mode at Switch 8:

- ON= software addressing via the bus system (default setting) (SW)
- OFF= hardware addressing at the device via DIP switches 1 to 7 (HW)

Hardware address

Proceed as follows to set a hardware address:

1. Set Switch 8 to OFF = hardware addressing.
2. Set a unique hardware address at Switches 1 to 7 according to the table below.
3. The address becomes effective 10 s after the switches have been changed.

Switch No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Value in position "ON"	1	2	4	8	16	32	64
Value in position "OFF"	0	0	0	0	0	0	0

Software address

The procedure for changing a software address is described in Operating Instructions BA 198F, Chapter 5.7.

1.3 Device database and type files

A device database file (GSD) contains a description of the properties of the PROFIBUS-PA device, e.g. the supported transmission rates and the type and format of the digital information output to the PLC. The bitmap files also belong to the GSD files. These allow the measuring point to be represented by an icon. The device database file and corresponding bitmaps are required by the network design tool of the PROFIBUS-DP network.

Every device is allocated an identity code by the PROFIBUS User Organisation (PNO). This appears in the device data base file name (.gsd). For Endress+Hauser devices, the identity code is always 15xx, where xx is device dependent.

Name of device	ID No.:	GSD	Type file	Bitmaps
Cerabar S	1501 (hex)	EH3x1501.gsd	EH31501x.200	EH1501_d.bmp EH1501_n.bmp EH1501_s.bmp

The full set of device data base files for Endress+Hauser devices can be obtained as follows:

- INTERNET:
  Endress+Hauser → *ftp://194.196.152.203/pub/communic*
  then select the file "Cerabar_S.EXE"
  PNO→ http://www.PROFIBUS.com (GSD library)
- As diskette direct from Endress+Hauser: Order No. 943157-0000

Note!

- The PNO provides a general database file with the name PA_x9700.gsd for instruments with an Analog Output Block. This file supports the transmission of the main measured value. The transmission of a second measured value (2nd Cyclic Value) or a display value, is not supported. The universal profile must be selected in Commuwin II or the matrix field V6H0.

Note!

Working with GSD files

The GSD files must be loaded into a specific subdirectory in the PROFIBUS-DP network design software of your PLC.

- GSD files and bitmaps that are located in the directory "Extended" are required for a planning software, for example, STEP7 used by the Siemens S7-300/400 PLC family.
- x.200 files and bitmaps that are located in the directory "Typdat5x" are required for the planning software COM ET200 for the Siemens S5.
- The GSD files located in the directory "standard" are for PLCs that support the "identifier byte" (0x94) but not the "identifier format". These are for use e.g. with the Allen-Bradley PLC5.

More details about the directories used for storing the GSD files can be found in Chapter 6.4 of Operating Instructions BA 198F which describes the network design.

1.4 Cyclic data exchange (Data_Exchange)

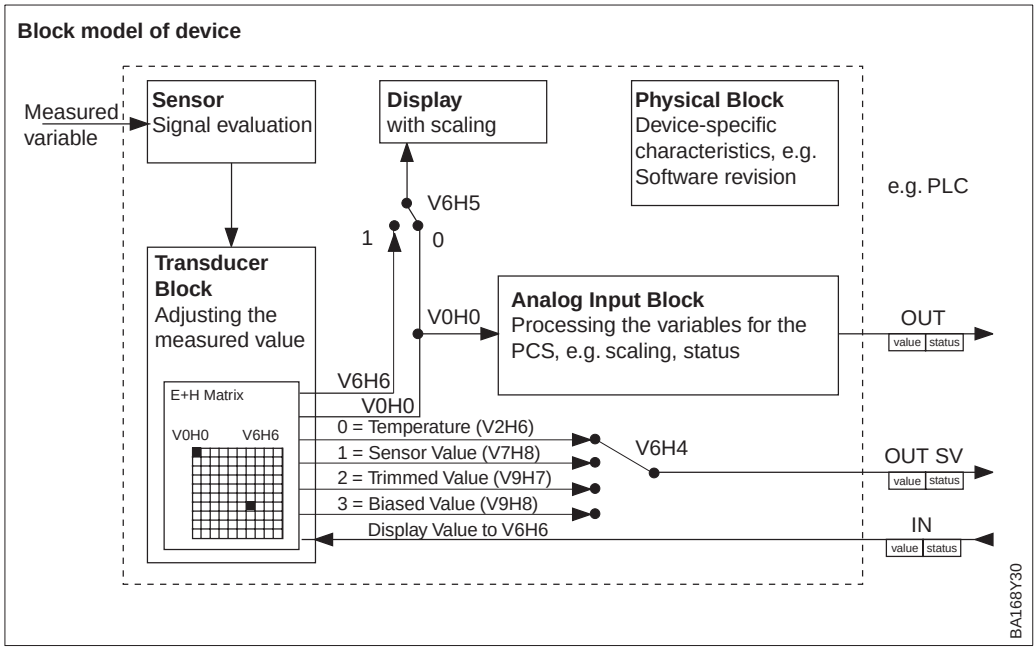


Figure 1.3
Block model of the Cerabar S with PROFIBUS-PA profile 3.0.

Fields in brackets apply to the matrix positions in Commuwin II.

Block model

Fig. 1.3 shows a block model of the Cerabar S. The primary value V0H0 is output by the transducer block and used as the process value for the analog input block. Here it is scaled, processed and rescaled before being output as cyclic data to the PLC as the variable OUT. This comprises a value and status.

The local display and the matrix field V0H0 normally show the same value. The local display can also be set to show a cyclical output value (Display Value) using a PLC. For this the matrix field V6H5 in Commuwin II is set to "read in value" (or 1). Example: Two Cerabar S transmitters measures the pressure drop across a filter. The differential pressure is registered in the PLC and then allocated to the matrix field V6H6.

A Cerabar S can still supply two other values to the PLC. The field V6H4 in Commuwin II allows one of four values to be selected.

Configuration

The data exchange is configured in the network design tool and Commuwin II.

1) Using the network design tool for your PLC, add the Cerabar S to the network, taking care that the address assigned corresponds to that set at the device.
2) Select the Cerabar S and call up the configuration tool: five options appear:
   – "Main Process Value", "2nd Cyclic Value", "3rd Cyclic Value", "Display Value", "FREE PLACE"
3) Select "Main Process Value".
   If no other values are required, close the configuration window, otherwise
4) Select "2nd Cyclic Value" or "FREE PLACE" (= function deactivated) *and* select "Display Value" or "FREE PLACE" (= function deactivated).
   Then close the configuration window.
5) Start Commuwin II and open the connection using the PA DPV1 server. Generate a live list, locate the device address and click on "Cerabar S".
6) Open the device menu and select the operating matrix.
7) If needed, select a second measured value via the matrix field V6H4:
   0 = Temperature, 1 = Sensor value, 2 = Trimmed value, 3 = Biased value
8) If a display value is to be shown at the device, set V6H5 = 1 (=display value).
9) The data exchange is now configured for the Cerabar S in question.

Cerabar S → SPS (input data)

A PLC can read the input data of Cerabar S from the response telegram of the Data_Exchange service. The cyclic data telegram has the following structure:

Index input data	Data	Access	Data format/remarks
0, 1, 2, 3	Primary value: pressure or level	read	32 bit floating point number (IEEE-754)
4	Status code for primary value	read	see status codes
5, 6, 7, 8	Secondary value: temperature, sensor value, trimmed value or biased value	read	32 bit floating point number (IEEE-754)
9	Status code for secondary value	read	see status codes
10, 11, 12, 13	Third value: Totalizer	read	32 bit floating point number (IEEE-754)
14	Status code for third value	read	see status codes

PLC → Cerabar S (output data)

The output data from the PLC for the local display are structured as follows:

Index output data	Data	Access	Data format/remarks
0, 1, 2, 3	Display value	write	32 bit floating point number (IEEE-754)
4	Status code	write	see status codes for secondary value

Status codes

The following status codes are supported by the Cerabar S for the primary and secondary values:

Status code	Device status	Significance	Primary value	Secondary value
0F Hex	BAD	Non-specific	x	x
1F Hex	BAD	Out of service (target mode)	x	
40 Hex	UNCERTAIN	Non-specific (simulation)	x	x
47 Hex	UNCERTAIN	Last usable value (fail-safe mode active)	x	
4B Hex	UNCERTAIN	Substitute set (fail-safe mode active)	x	
4F Hex	UNCERTAIN	Initial value (fail-safe mode active)	x	
5C Hex	UNCERTAIN	Configuration error (limits not set correctly)	x	
80 Hex	GOOD	OK	x	x
84 Hex	GOOD	Active block alarm (static revision counter incremented)	x	
89 Hex	GOOD	LOW_LIM (alarm active)	x	
8A Hex	GOOD	HI_LIM (alarm active)	x	
8D Hex	GOOD	LOW_LOW_LIM (alarm active)	x	
8E Hex	GOOD	HI_HI_LIM (alarm active)	x	

1.5 Acyclic data exchange

The device parameters in the physical block, transducer block and analog input block, see Fig. 1.3, as well as the device management can be accessed by a Class 2 PROFIBUS-DP master using the acyclic data services. Figs. 1.4 and 1.5 show block diagrams of the transducer and analog input blocks. A full description of the device management, standard parameters and the physical block is to be found in Chapter 7 of Operating Instructions BA 198F.

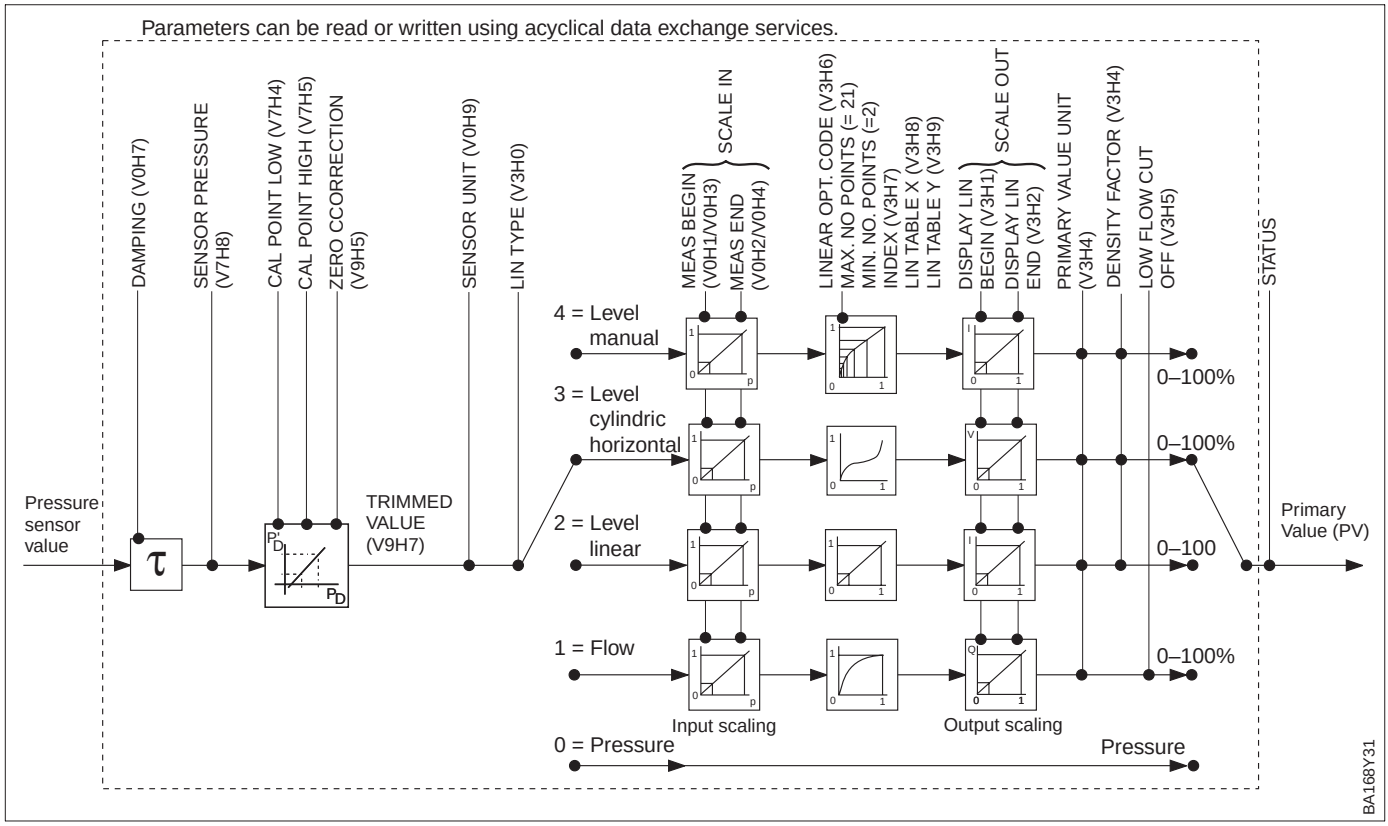


Figure 1.4
Schematic diagram of the Cerabar S transducer block.
Parameter designations correspond to those designations in the Slot/Index List. Parameters with data for a matrix field (in brackets) can be accessed by Commuwin II.

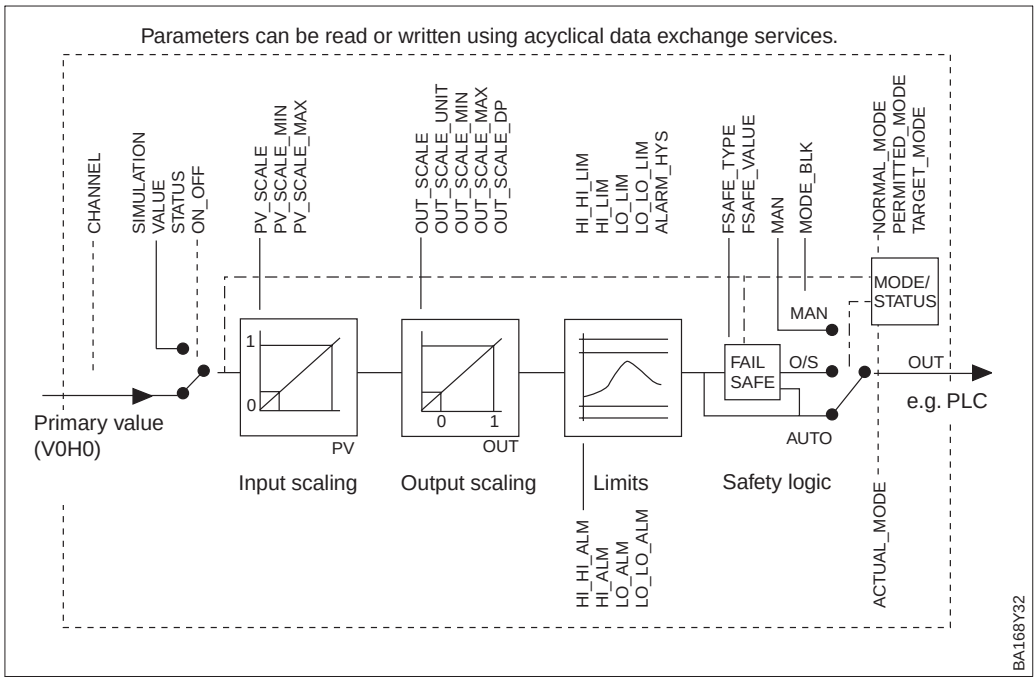


Figure 1.5
Schematic diagram of the Cerabar S analog input block

Slot/index tables

The device parameters are listed in the following tables. The parameters are accessed via the slot and index number. The analog output, transducer and physical blocks contain standard parameters, block parameters and manufacturer-specific parameters.

If Commuwin II is the operating programm used, then the matrix and the graphical operation are available as the user interface. If the standard operating parameters are to be found in any of the device blocks, then any changes made to them are automatically mapped to the block parameters. The dependencies are indicated in the column "E+H matrix". See also Figs. 1.4 and 1.5.

Device management

Parameters	E+H matrix	Slot	Index	Size (bytes)	Type	Read	Write	Storage class
Directory object header		1	0	12	Array of UNSIGNED16	X		C
Composite list directory entries		1	1	24	Array of UNSIGNED16	X		C
GAP directory continuous		1	2-8					
GAP reserved		1	9-15					

Analog input block

Parameters	E+H matrix	Slot	Index	Size (bytes)	Type	Read	Write	Storage class
Standard parameters								
AI Block data		1	16	20	DS-32*	X		C
Static revision		1	17	2	UNSIGNED16	X		N
Device tag	VAH0	1	18	32	OSTRING	X	X	S
Strategy		1	19	2	UNSIGNED16	X	X	S
Alert key		1	20	1	UNSIGNED8	X	X	S
AI Target mode		1	21	1	UNSIGNED8	X	X	S
AI Mode block		1	22	3	DS-37*	X		D/N/C
AI Alarm summary		1	23	8	DS-42*	X		D
Batch		1	24	10	DS-67*	X	X	S
Gap		1	25					
Block parameters								
OUT	V6H2/3	1	26	5	DS-33*	X		D
PV scale		1	27	8	Array of FLOAT	X	X	S
OUT scale		1	28	11	DS-36*	X	X	S
Linearisation type		1	29	1	UNSIGNED8	X	X	S
Channel		1	30	2	UNSIGNED16	X	X	S
Gap		1	31					
PV FTIME		1	32	4	FLOAT	X	X	S
Fail safe type		1	33	1	UNSIGNED8	X	X	S
Fail safe value		1	34	4	FLOAT	X	X	S
Alarm Hysteresis		1	35	4	FLOAT	X	X	S
Gap		1	36					
HI HI Limit		1	37	4	FLOAT	X	X	S
Gap		1	38					
HI Limit		1	39	4	FLOAT	X	X	S
Gap		1	40					
LO Limit		1	41	4	FLOAT	X	X	S
Gap		1	42					
LO LO Limit		1	43	4	FLOAT	X	X	S
Gap		1	44-45					
HI HI Alarm		1	46	16	DS-39*	X		D
HI Alarm		1	47	16	DS-39*	X		D
LO Alarm		1	48	16	DS-39*	X		D
LO LO Alarm		1	49	16	DS-39*	X		D
Simulate		1	50	6	DS-50*	X	X	S
OUT unit text		1	51		OSTRING	X	X	S
Gap reserved		1	52-60					
Gap		1	61-65					

*See Chapter 1.6, section “data strings” or PROFIBUS-PA specification part 1.
C = constant, N = non-volatile (remains stored), S = static (is counted), D = dynamic

Physical block

Parameters	E+H matrix	Slot	Index	Size (bytes)	Type	Read	Write	Storage class
Standard parameters								
PB Block data		1	66	20	DS-32*	X		C
Static revision		1	67	2	UNSIGNED16	X		N
Device tag	VAH0	1	68	32	OSTRING	X	X	S
Strategy		1	69	2	UNSIGNED16	X	X	S
Alert key		1	70	1	UNSIGNED8	X	X	S
PB Target mode		1	71	1	UNSIGNED8	X	X	S
PB Mode block		1	72	3	DS-37*	X		D/N/C
PB Alarm summary		1	73	8	DS-42*	X		D
Block parameters								
Software revision		1	74	16	OSTRING	X		C
Hardware revision		1	75	16	OSTRING	X		C
Device manufacturer identity		1	76	2	UNSIGNED16	X		C
Device identity		1	77	16	OSTRING	X		C
Device serial number	VAH2	1	78	16	OSTRING	X		C
Diagnosis		1	79	4	OSTRING	X		D
Diagnosis extension		1	80	6	OSTRING	X		D
Diagnosis mask		1	81	4	OSTRING	X		C
Diagnosis mask extension		1	82	6	OSTRING	X		C
Device certification		1	83	16	OSTRING	X		N
Security locking	V9H9	1	84	2	UNSIGNED16	X	X	N
Factory reset	V2H9	1	85	2	UNSIGNED16		X	S
Descriptor		1	86	32	OSTRING	X	X	S
Device message	VAH1	1	87	32	OSTRING	X	X	S
Device installation date		1	88	16	OSTRING	X	X	S
reserved		1	89					
Identification number	V6H0	1	90	1	UNSIGNED 8	x	x	S
HW write protection		1	91	1	UNSIGNED 8	x		D
Gap reserved		1	92...98					
Gap		1	99...103					
Matrix error code	V2H0	1	104	2	UNSIGNED16	X		D
Matrix last error code	V2H1	1	105	2	UNSIGNED16	X	X	D
UpDown features supported		1	106	1	OSTRING	X		C
UpDown control		1	107	1	UNSIGNED8		X	D
UpDown data		1	108	20	OSTRING	X	X	D
Bus address		1	109	1	UNSIGNED8	X		D
Matrix device software number	V2H2	1	110	2	UNSIGNED16	X		C
PA set unit to bus	V6H1	1	111	1	UNSIGNED 8	x	x	S
PA input value	V6H6	1	112	6	FLOAT+U8+U8	x		D
PA select V0H0	V6H5	1	113	1	UNSIGNED8	x	x	S
PA profile revision	V6H7	1	114	16	OSTRING	x		C
Gap		1	115-119					
PA select second cyclic value	V6H4	1	120	1	UNSIGNED8	x		S
PA identity number		1	121	2	UNSIGNED16	x	x	D
PA identity string		1	122	32	OSTRING	x	x	C
PA DP status		1	123	1	UNSIGNED8	x		D
Gap		1	124-128					

*See Chapter 1.6, section “data strings” or PROFIBUS-PA specification part 1.
C = constant, N = non-volatile (remains stored), S = static (is counted), D = dynamic

View_1 parameters

Parameters	E+H matrix	Slot	Index	Size (bytes)	Type	Read	Write	Storage class
View 1 Physical block		1	216	17	OSTRING	X		D/N/C
Gap reserved		1	217-221					
View 1 Transducer block		1	222	22	OSTRING	X		D/N/C
Gap reserved		1	223-227					
View 1 Analog Input block		1	228	18	OSTRING	X		D/N/C
Gap reserved		1	229-233					

Transducer block

Parameters	E+H matrix	Slot	Index	Size (bytes)	Type	Read	Write	Storage class
Standard parameters								
TB Block data		1	129	20	DS-32*	X		C
Static revision		1	130	2	UNSIGNED16	X		N
Device tag	VAH0	1	131	32	OSTRING	X	X	S
Strategy		1	132	2	UNSIGNED16	X	X	S
Alert key		1	133	1	UNSIGNED8	X	X	S
TB Target mode		1	134	1	UNSIGNED8	X	X	S
TB Mode		1	135	3	DS-37*	X		D/N/C
TB Alarm summary		1	136	8	DS-42*	X		D
Block parameters								
Sensor value	V7H8	1	137	4	FLOAT	X		D
Sensor high limit	V7H7	1	138	4	FLOAT	X		N
Sensor low limit	V7H6	1	139	4	FLOAT	X		N
Calibration point high	V7H5	1	140	4	FLOAT	X	X	S
Calibration point low	V7H4	1	141	4	FLOAT	X	X	S
Calibration minimum span		1	142	4	FLOAT	X	X	N
Sensor unit	V0H9	1	143	2	UNSIGNED16	X	X	N
Trimmed value	V9H7	1	144	5	DS-33*	X		D
Sensor type		1	145	2	UNSIGNED16	X		N
Sensor serial number	VAH3	1	146	4	UNSIGNED32	X		N
Primary value	V0H0	1	147	5	DS-33*	X		D
Primary value unit	V3H3	1	148	2	UNSIGNED16	X	X	S
Primary value type		1	149	2	UNSIGNED16	X	X	S
Sensor diaphragm material	VAH7	1	150	1	UNSIGNED16	X	X	S
Sensor fill fluid	VAH8	1	151	1	UNSIGNED16	X	X	S
Gap		1	152					
Sensor O-ring material	VAH6	1	153	2	UNSIGNED16	X	X	S
Process connection type		1	154		UNSIGNED16	X	X	S
Process connection material	VAH4	1	155	2	UNSIGNED16	X	X	S
Temperature	V2H6	1	156	5	DS-33*	X		D
Temperature unit	V7H9	1	157	2	UNSIGNED16	X	X	S
Secondary value 1		1	158	5	DS-33*	X		D
Secondary value 1 unit	V0H9	1	159	2	UNSIGNED16	X	X	S
Secondary value 2		1	160	5	DS-33*	X		D
Secondary value 2 unit	V0H9	1	161	2	UNSIGNED16			
Linearisation type	V3H0	1	162	1	UNSIGNED8	X	X	S
Scale in	V0H1/2	1	163	2*4	Array of FLOAT	X	X	S
Scale out	V3H1/2	1	164	2*4	Array of FLOAT	X	X	S
Low flow cut off	V3H5	1	165	4	FLOAT	X	X	S
Flow linear sqrt point		1	166	4	FLOAT	X		S
Table actual number (linearisation)		1	167	1	UNSIGNED8	X	X	S
Table index (linearisation)	V3H7	1	168	1	UNSIGNED8	X	X	S
Table max. no. of points		1	169	1	UNSIGNED8	X	X	S
Table min. no. of points		1	170	1	UNSIGNED8	X	X	S
Table option code (linearisation)	V3H6	1	171	1	UNSIGNED8	X	X	S
Table status		1	172	1	UNSIGNED8	X	X	S
Table XY value		1	173	2*4	Array of Float	X	X	S
Max. sensor value	V2H4	1	174	4	FLOAT	X	X	S
Min. sensor value	V2H3	1	175	4	FLOAT	X	X	S
Max temperature	V2H8	1	176	4	FLOAT	X	X	S
Min temperature	V2H7	1	177	4	FLOAT	X	X	S
Gap reserved		1	178-187					

*See Chapter 1.6, section “data strings” or PROFIBUS-PA specification part 1.
C = constant,
N = non-volatile (remains stored),
S = static (is counted),
D = dynamic

Transducer block (continued)

Parameters	E+H matrix	Slot	Index	Size (bytes)	Type	Read	Write	Storage class
Endress+Hauser Parameters								
Measure begin	V0H1	1	188	4	FLOAT	X	X	S
Measure end	V0H2	1	189	4	FLOAT	X	X	S
Automatically measure begin	V0H3	1	190	1	UNSIGNED8	X	X	S
Automatically measure end	V0H4	1	191	1	UNSIGNED8	X	X	S
Bias pressure	V0H5	1	192	4	FLOAT	X	X	S
Automatically bias pressure	V0H6	1	193	1	UNSIGNED8	X	X	S
Damping	V0H7	1	194	4	FLOAT	X	X	S
Max. pressure event counter	V2H5	1	195	1	UNSIGNED8	X	X	S
Display linearisation begin	V3H1	1	196	4	FLOAT	X	X	S
Display linearisation end	V3H2	1	197	4	FLOAT	X	X	S
Density	V3H4	1	198	4	FLOAT	X	X	S
Linearisation table edit mode	V3H6	1	199	1	UNSIGNED8	X	X	S
Linearisation table x (level)	V3H8	1	200	4	FLOAT	X	X	S
Linearisation table y (volume)	V3H9	1	201	4	FLOAT	X	X	S
Totalizer value	V5H0	1	202	4	FLOAT	X		D
Totalizer display select	V5H1	1	203	1	UNSIGNED8	X	X	S
Totalizer operation mode	V5H2	1	204	1	UNSIGNED8	X	X	S
Totalizer convention factor	V5H3	1	205	4	FLOAT	X	X	S
Totalizer unit	V5H4	1	206	2	UNSIGNED16	X	X	S
Sensor Trim off	V9H5	1	207	4	FLOAT	X		S
Sensor Trim off value	V9H6	1	208	4	FLOAT	X		S
Biased pressure	V9H8	1	209	4	FLOAT	X		D
Process connection material	VAH5	1	210	2	UNSIGNED16	X	X	S
Gap reserved		1	211-215					

*See Chapter 1.6, section “data strings” or PROFIBUS-PA specification part 1.
C = constant,
N = non-volatile (remains stored),
S = static (is counted),
D = dynamic

1.6 Data formats

IEEE 754 float

The measured value is transmitted as a IEEE 754 floating point number, whereby

$$\text{Measured value} = (-1)^{\text{Sign}} \times 2^{(E-127)} \times (1 + F)$$

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Sign	Exponent (E)								Fraction (F)						
	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	2^{-6}	2^{-7}
Fraction (F)															
2^{-8}	2^{-9}	2^{-10}	2^{-11}	2^{-12}	2^{-13}	2^{-14}	2^{-15}	2^{-16}	2^{-17}	2^{-18}	2^{-19}	2^{-20}	2^{-21}	2^{-22}	2^{-23}

Figure 1.6
IEEE-754floating point number

Example

40 F0 00 00 hex = 0**100 0000 1**111 0000 0000 0000 0000 0000 binary

$$\text{Value} = (-1)^0 \times 2^{(\mathbf{129}-127)} \times (1 + 2^{-1} + 2^{-2} + 2^{-3})$$
$$= 1 \times 2^2 \times (1 + 0.5 + 0.25 + 0.125)$$
$$= 1 \times 4 \times 1.875$$
$$= 7.5$$

Note!
- Not all PLCs support the IEEE 754 format. For this reason a conversion module must often be used or written.
- Depending on how the data are stored in the PLC (MSB or LSB), it might be necessary to use a byte swapping routine in the PLC.

Note!

Data strings

The data types marked with an asterisk in the slot/index table. e.g. DS-36, are data strings that are structured according to the PROFIBUS-PA specification Part 1, Version 3.0. They comprise several elements that can be addressed via the slot, index and subindices, as shown in the following two examples:

Parameter type	Slot	Index	Element	Sub-index	Type	Size
DS-33	1	26	Out_Value	1	FLOAT	4
			OUT status	5	UNSIGNED8	1

Parameter type	Slot	Index	Element	Sub-index	Type	Size
DS-36		27	OUT Scale Max.	1	FLOAT	4
			OUT Scale Min	5	FLOAT	4
			OUT Scale Unit.	9	UNSIGNED16	2
			OUT Scale DP (decimal point).	11	INTEGER8	1

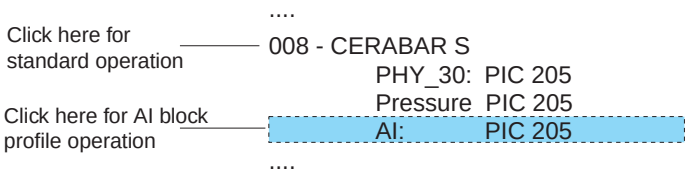
1.7 Configuration of profile parameters

The block parameters can be accessed by a PROFIBUS-DP Class 2 master, for example, Commuwin II. Commuwin II runs on an IBM-compatible computer or laptop. The computer must be equipped with a PROFIBUS interface, i.e. PROFIBOARD for PCs and PROFICARD for laptops. During the system integration, the computer is registered as a Class 2 master.

Operation

The PA-DPV1 server must be installed. The connection to Commuwin II is opened from the PA-DPV1 server.

- Generate a live list with "Tags"



- E+H operation is selected by clicking on the device name, e.g. Cerabar S.
- Profile operation is selected by clicking on the appropriate tag, e.g. AI: PIC 205 = Analog input block Cerabar S, or by selecting the appropriate device profile in the graphic template.
- The settings are entered in the device menu.

Device menu

The device menu allows matrix or graphical operation to be selected.

- In the case of matrix operation, the device or profile parameters are displayed in a matrix. A parameter can be changed when the corresponding matrix field is selected.
- In the case of graphical operation, the operating sequence is shown in a series of templates with parameters. For profile operation, the pictures *Diagnosis, Scaling, Simulation and Block* are of interest.

Output scaling

The Cerabar S display and the digital output operate completely independently of each other. The output value in the operation mode "Pressure" the output value is transmitted in the units stated on the nameplate. In the operating mode "Level", the output value (Out_Value) usually supplies a value based on the pressure between 0 and 100 % (V0H1/V0H2). To ensure that the display and output supply the same value, the values for the upper and lower limits of the PV_Scale and OUT_Scale must be set to the same in the Analog Input Block, or else the Parameter "Set Unit Out" confirmed as described in Operating Instructions BA 168P, Chapter 5.2, Section "Selecting pressure units". The output value (Out_Value) can also be scaled in the graphic mode, see Fig. 1.7.

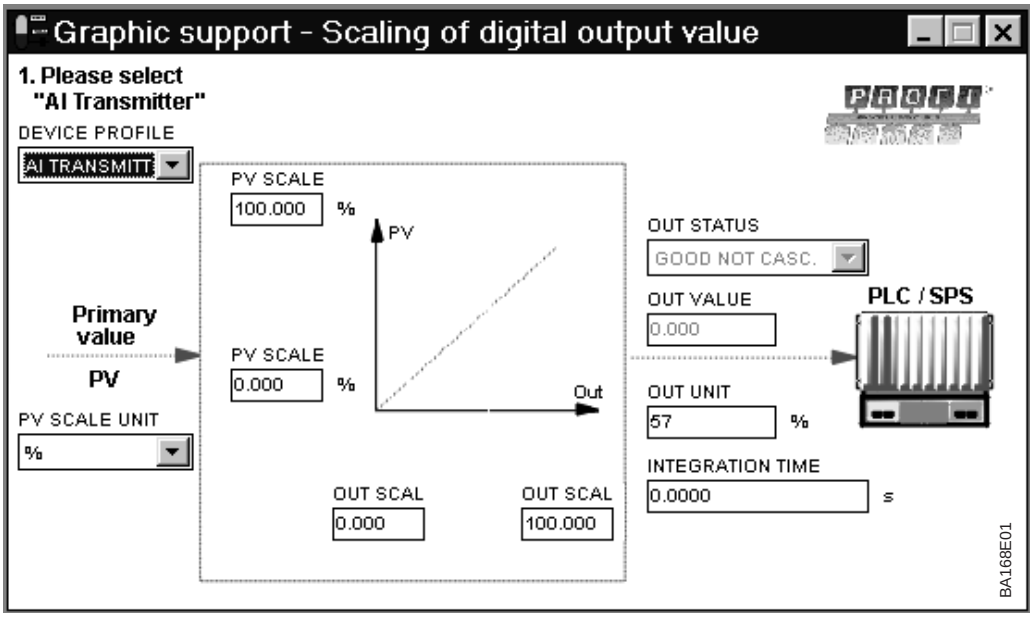


Figure 1.7
Scaling of the Out_Value via graphic support in Commuwin II