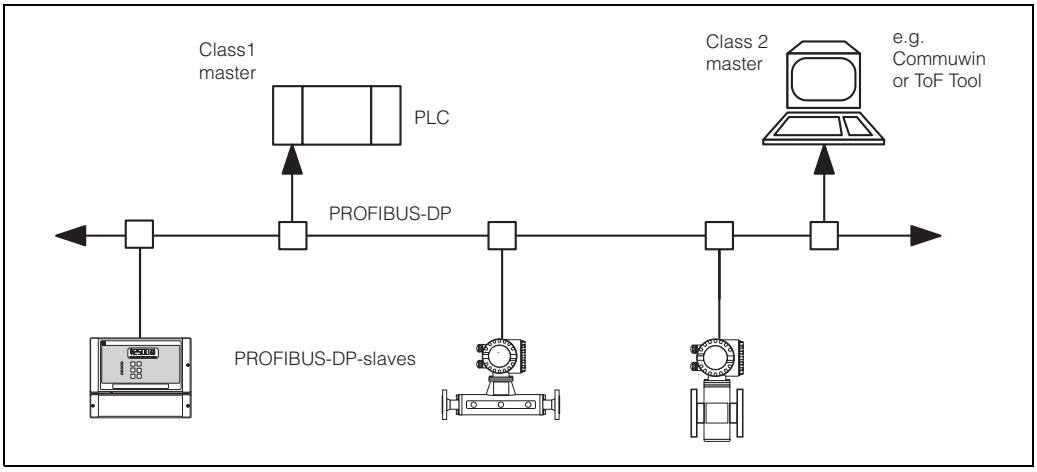
1 Synopsis



Application

PROFIBUS-DP is used primarily for factory automation. In PROFIBUS-PA systems for process automation, a PROFIBUS-DP system is used at the control level for quick transmission of the data. Here, a variant of PROFIBUS-DP, DPV1 is used. In addition to the cyclic exchange of data with a PLC, this allows the field devices to be configured via acyclic services. The principle technical data for DPV1 are listed in Table 2.1.

Standard	EN 50170, Parts 1 - 3, Version DPV1
Support	PROFIBUS User Organisation (PNO)
Physical layer	RS-485 and/or fibre optics
Max. length	1200 m (copper) or several kilometres (optics)
Participants	Max. 126, including max. 32 as master
Transmission rate	up to12 MBit/s
Bus access method	Token passing with master-slave

Tab. 2.1 Technical data PROFIBUS-DP

Participants

Depending upon the application at hand, the participants in a PROFIBUS-DP system might be frequency converters, remote I/Os, actuators, sensors, links, gateways etc. as well as the PLC or process control system.

2 Topology

PROFIBUS-DP is based on a linear topology. For lower data transmission rates, a tree structure is also possible.

Cable

EN 50 170 specifies two types of bus cable. For transmission rates up to 12Mbit/s, cable type A is recommended. The specification is given in Table 2.2

Terminator	135 Ω to 165 Ω at a measuring frequency of 3 MHz to 20 MHz
Cable capacitance	< 30pF per Meter
Core cross-section	>0.34 mm^2, corresponds to AWG 22
Cable type	twisted pairs, 1x 2, 2x 2 or 1x4 core
Loop resistance	110 Ω per km
Signal attenuation	max. 9 dB over the entire length of the segment
Screening	woven copper sheath or woven sheath and foil sheath

Tab. 2.2 Specification of Cable type A of the PROFIBUS-DP standard

Structure

The following points should be noted when the bus structure is being planned:
- The max. permissible cable length depends upon the transmission rate. For PROFIBUS RS-485 cable of type A (see table 2.2) the dependency is as follows:

Transmission rate(kBit/s)	9,6 - 93,75	187,5	500	1500	3000 – 12000
Cable length(m)	1200	1000	400	200	100

The maximum transmission rate is limited by the slowest instrument on the bus. The maximum rate of the Prosonic FMU is 3 Mbit/s. The FMU recognizes the rate present on the bus and adjusts its own rate automatically.

- A maximum of 32 participants per segment is allowed.
- A terminating resistance must be installed at both ends of every segment (ohmic load 220 Ω).
- The cable length and/or the number of participants can be increased by using repeaters.
- There must never be more than three repeaters between any two participants
- The total number of participants in the system is limited to 126 - (2x number of repeaters).

Spurs

A spur is the cable connecting the field device to the T-box. As a rule of thumb:
- For transmission rates up to 1500 kbits/s, the total length (sum) ot the spurs may not exceed 6.6 m.
- Spurs should not be used for transmission rates greater than 1500 kbits/s.

Examples

Figs. 2.2 and 2.3 show examples for a linear and tree bus structure.

Fig. 2.2. shows that three repeaters are necessary if the PROFIBUS-DP system is to be developed to the full. The maximum cable length corresponds to 4x the value quoted in the table above. Since three repeaters are used, the maximum number of participants is reduced to 120.

Fig. 2.3. shows how several repeaters can be used to create a tree structure. The number of participants allowable per segment is reduced by one per repeater: the total number of participants is limited to 126 - (2x number of repeaters).

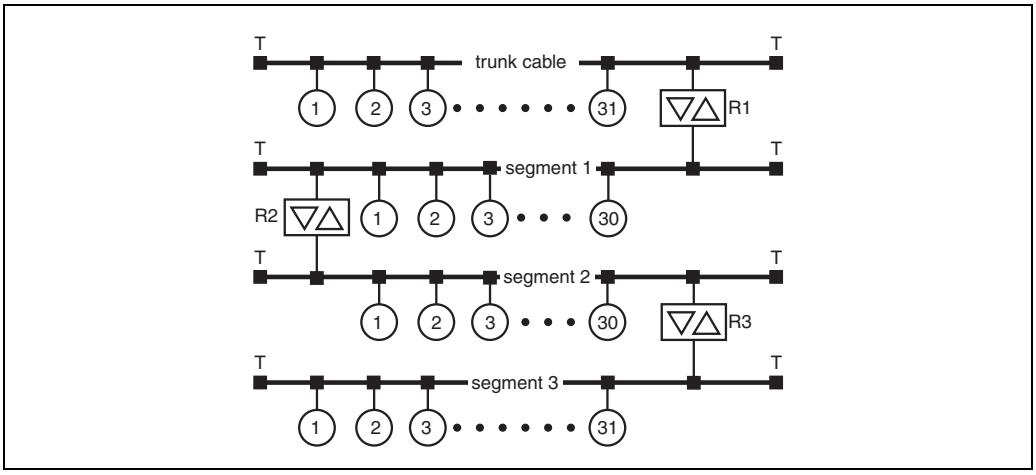


Abb. 2.2 PROFIBUS-DP system with linear structure
T = terminator
R = repeater
1...n = max. number of field devices on a segment

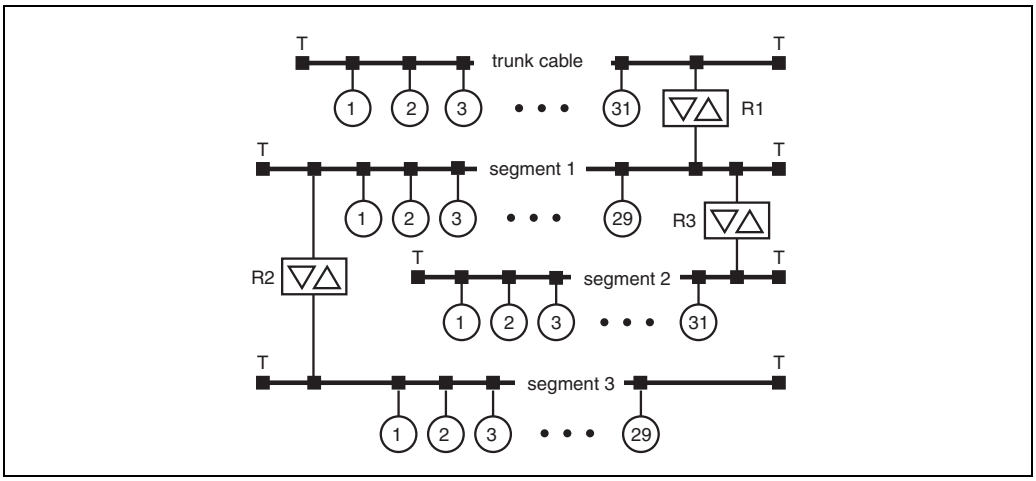


Abb. 2.3 PROFIBUS-DP system with tree structure
T = terminator
R = repeater
1...n = max. number of field devices on a segment

Optical network

If the PROFIBUS-DP system has to be routed over large distances or in a plant with heavy electromagnetic interference, then an optical or mixed optical/copper network can be used. Provided that all participants support them, very high transmission rates are possible. Fig. 2.4 shows a possible structure for an optical network, whereby the technical details can be taken from the PROFIBUS standard.

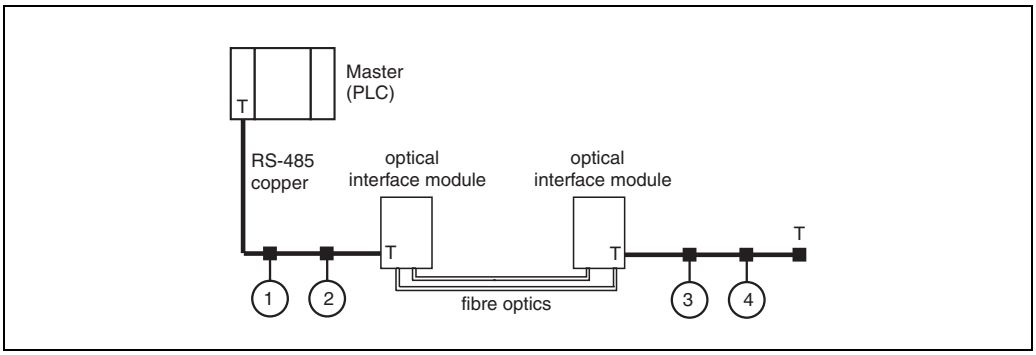


Abb. 2.4 Example for a mixed optical/RS-485 network
T = terminator
1...n = field devices(slaves)

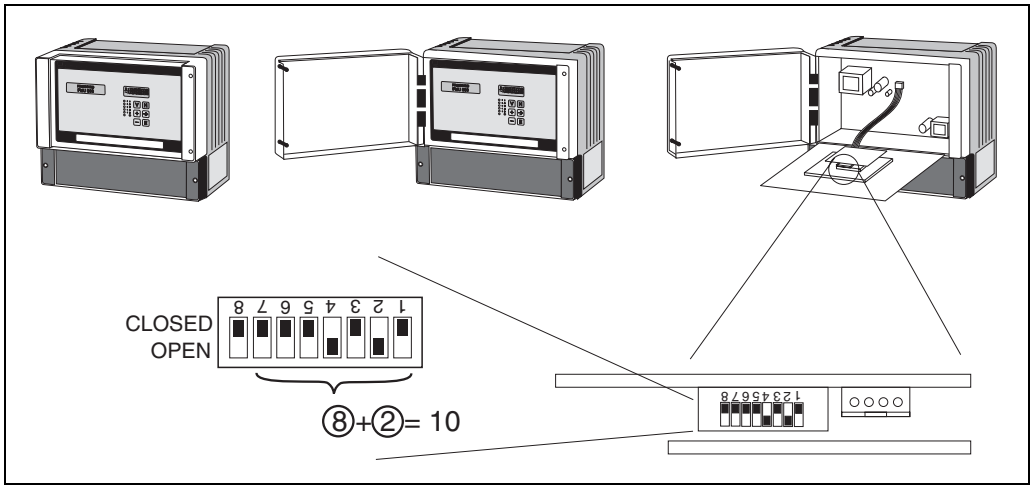
3 Address, Termination

Address

Selecting the device address

- Every PROFIBUS-DP device must be given an address. If the address is not set correctly, the device will not be recognised by the process control system.
- A device address may appear only once within a particular PROFIBUS-DP network, see BA 198F.
- Valid device addresses are in the range from 1 to 126.

Setting of the device address



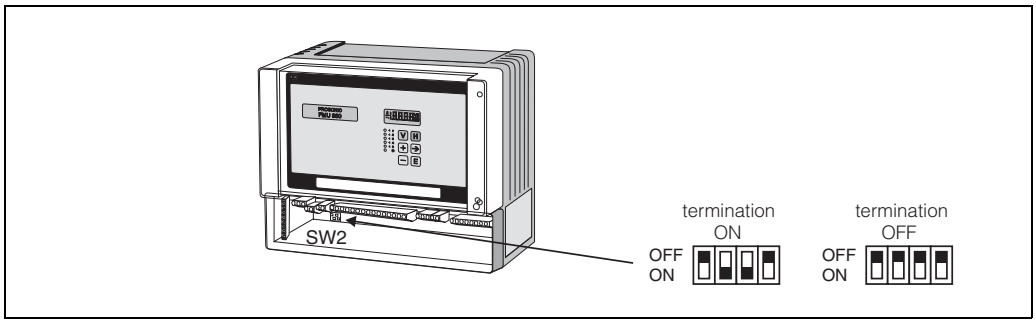
The address is determined by the position of the DIP-switches 1 to 7 according to the following table:

Switch No.	1	2	3	4	5	6	7
Value in position "CLOSED"	0	0	0	0	0	0	0
Value in position "OPEN	1	2	4	8	16	32	64

The new address becomes valid at a restart of the Prosonic (power on). For the Prosonic, DIP-switch 8 ist without function.

Termination

At the last instrument on the bus, a terminating resistance must be switched on at DIP-switch SW 2: OFF, ON, ON, OFF.
At the remaining instruments the terminating resistance must be switche off: OFF, OFF, OFF, OFF.



4 Device database and type files

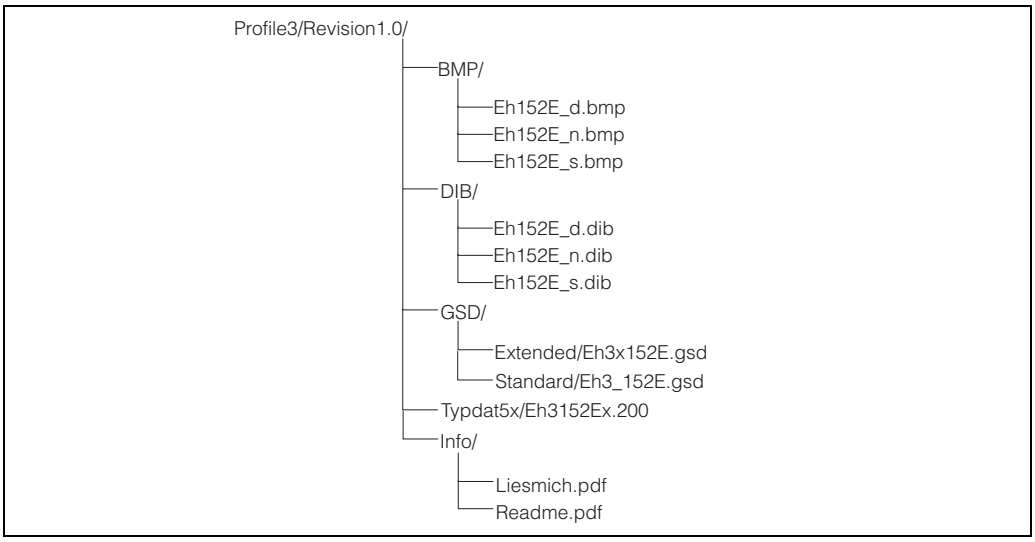
A device database file (*.gsd) contains a description of the properties of the PROFIBUS-DP device, e.g. the supported transmission rates and the type and format of the digital information that can be transfered to the PLC.
Additional bitmap files are required in order to represent the device by an icon in the network design software.
Every device is allocated an identity code by the PROFIBUS User Organisation (PNO). This appears in the device data base file name (.gsd). The Prosonic has the ID number 152E.

Source of supply

- Internet: www.endress.com
- CD-ROM with GSD files for all E+H devices. Order-Code: 50097200
- GSD library of the PROFIBUS User Organisation (PNO):http: //www.PROFIBUS.com

Directory structure

The files are oranized in the folowing strucutre:



- The GSD files in the directory "Extended" are needed for the network design software STEP 7 of the S7-300/400 PLC family.
- The GSD files in the directory "Standard" are used for PLCs, which do not support an identifier format but only an identifier byte (e.g. PLC5 of Allen-Bradley)
- For the network design tool COM ET200 with Siemens S5 instead of an GSD file the Type file "EH_1522x.200" and instead of the BMP files the DIB files have to be used.

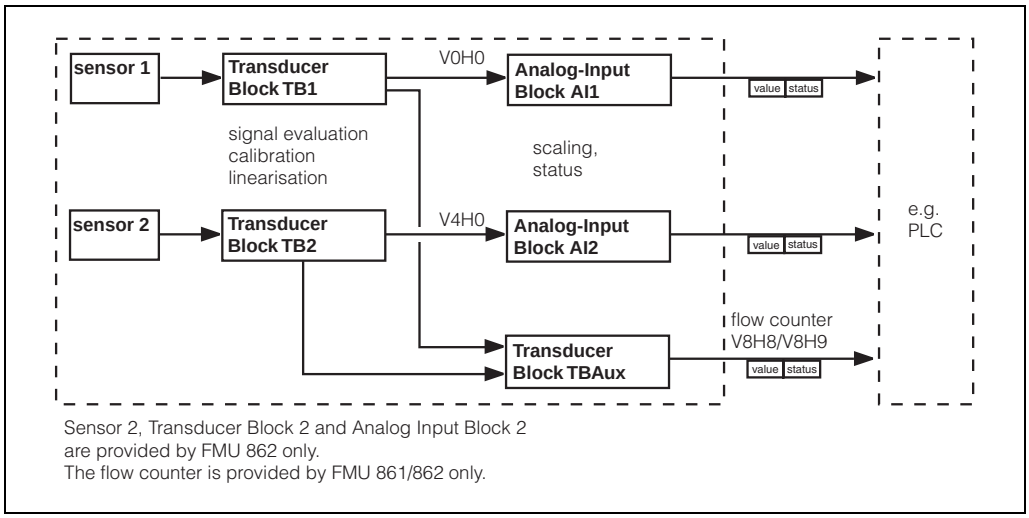
Universal Database File

The PNO also provides an universal database file with the designation PA139701.gsd for devices with two analogue input blocks. Should this be used instead of the Prosonic GSD, then only the two main values can be transmitted. The counter can not be transmitted.
If the universal profile is used, the option "profiles" must be selected in the Physical Block at the matrix position V0H4 (Ident number).

5 Cyclic data exchange

Block model of the Prosonic FMU 860/861/862

The block model shows, which data are exchanged continously (i.e. by cyclic data transfer) between the Prosonic and the PLC.



Modules for the cyclic data telegram

For the cyclic data telegram the Prosonic provides the following modules:

1. **Analog Input**
   Depending on the configuration (see below) this is main value 1 (V0H0) or main value 2 (V4H0). Before they are sent to the PLC these values may be scaled in the respective Analog Input Block.
2. **Counter**
   This flow counter is composed of the matrix fields V8H8 (counter high) and V8H9 (counter low).
3. **Empty**
   This module must be applied during configuration (see below), if main value 2 is not to appear in the data telegram.

Configuration of the cyclic data telegram

Use the configuration software of your PLC in order to compose the data telegram from these modules in one of the following ways:

1. **Main value 1**
   In order to transmit only main value 1, select the module **Analog Input**.
2. **Main value 1 and flow counter**
   In order to transmit main value 1 and the flow counter, select the modules in the following order: **Analog Input, Empty, Counter**.
3. **Main value 1 and main value 2**
   In order to transmit both main values , select **Analog Input** twice.
4. **Main value 1, main value 2 and flow counter**
   In order to transmit both main values and the flow counter, select the modules in the following order: **Analog Input, Analog Input, Counter**.

The exact way of performing the configuration depends on the configuration software of the PLC.

Data formats

Main value 1/2

Bytes	Data	Format
1, 2, 3, 4	main value	32 bit floating point number (IEEE-757, see below)
5	status code	see below "Stauts codes"

Flow counter

Bytes	Data	Format
1, 2, 3, 4	flow counter	LONG INTEGER (see below)
5	status code (identical to status of main value 1)	see below "Stautscodes"

IEEE-754 floating point number

The measured values are transmitted as IEEE 754 floating point numbers, whereby:

measured value = $(-1)^{VZ} \times 2^{(E-127)} \times (1+F)$

Byte 1								Byte 2							
Bit 7	Bit 6	Bit5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Sign	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}
	Exponent (E)							Mantissa (F)							

Byte 3								Byte 4							
Bit 7	Bit 6	Bit5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
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}
Mantissa (F)															

Example

40 F0 00 00 (hex) = 0**100 0000 1**111 0000 0000 0000 0000 0000 (bin)

$= (-1)^0 \times 2^{(129 - 127)} \times (1 + 2^{-1} + 2^{-2} + 2^{-3})$

$= 1 \times 2^2 \times (1 + 0.5 + 0.25 + 0.125)$

$= 1 \times 4 \times 1.875$

$= 7.5$

LONG INTEGER

The flow counter is transmitted as LONG INTEGER, whereby:

Byte 1								Byte 2							
Bit 7	Bit 6	Bit5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
2^{31}	2^{30}	2^{29}	2^{28}	2^{27}	2^{26}	2^{25}	2^{24}	2^{23}	2^{22}	2^{21}	2^{20}	2^{19}	2^{18}	2^{17}	2^{16}

Byte 3								Byte 4							
Bit 7	Bit 6	Bit5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

Status codes

The status codes comprise one byte and have got the following meaning:

Status-Code	Device status	Significance
00 Hex	BAD	non-specific
1F Hex	BAD	out-of-service (target mode)
40 Hex	UNCERTAIN	non-specific (simulation)
47 Hex	UNCERTAIN	last usable value (Fail-safe-Mode aktiv)
48 Hex	UNCERTAIN	Ersatzmenge (fail-Safe mode active)
4C Hex	UNCERTAIN	initial value (fail-Safe mode active)
5C Hex	UNCERTAIN	Configuration error (limits not set correctly)
80 Hex	GOOD	OK
84 Hex	GOOD	Active block alarm (static revision counter incremented)
89 Hex	GOOD	LOW_LIM (alarm active)
8A Hex	GOOD	HI_LIM (alarm active)
8D Hex	GOOD	LOW_LOW_LIM (alarm active)
8E Hex	GOOD	HI_HI_LIM (alarm active)

6 Acyclic data exchange

The device parameters in the physical block, transducer blocks and analog input blocks, as well as the device management can be accessed by a Class 2 PROFIBUS-DP master (e.g. Commuwin II) using the acyclic data services.

Slot/Index-Tabellen

The device parameters are listed in the following tables. The parameters are accessed via the slot and index number.
The Analog-Input and physical blocks contain standard parameters, block parameters and manufacturer-specific parameters. The transducer blocks are E+H specific.

Physical Block

Parameter	E+H Matrix (CW II)	Slot	Index	Size [bytes]	Type	Read	Write	Storage Class
Standardparameter								
Physikal Block block objekt		0	16	20	DS32*	x		C
PB Static revision		0	17	2	unsigned16	x		N
PB Device tag		0	18	32	Octet String(32)	x	x	S
PB Strategy		0	19	2	unsigned16	x	x	S
PB Alert key		0	20	1	unsigned8	x	x	S
PB Target mode		0	21	1	unsigned8	x	x	S
PB Mode block		0	22	3	DS37*	x		D
PB Alarm summary		0	23	8	DS42*	x		D
Blockparameter								C
PB Software revision		0	24	16	Visible String(16)	x		C
PB Hardware revision		0	25	16	Visible String(16)	x		C
PB Device manufacturer identity		0	26	2	unsigned16	x		C
PB Device identity		0	27	16	Visible String(16)	x		C
PB Device serial number		0	28	16	Visible String(16)	x		C
PB Diagnosis		0	29	4	Octet String(4)	x		D
PB Diagnosis extention		0	30	6	Octet String(6)	x		D
PB Diagnosis mask		0	31	4	Octet String(4)	x		C
PB Diagnosis extention mask		0	32	6	Octet String(6)	x		C
PB Security locking	V9H6	0	34	2	unsigned16	x	x	N
PB General reset	V9H5	0	35	2	unsigned16	x	x	S
PB Device message		0	37	32	Octet String(32)	x	x	S
PB Ident Number selector		0	40	1	unsigned8	x	x	S
PB Diagnostic code	V9H0	0	54	2	unsigned16	x		D
PB Last diagnostic code	V9H1	0	55	2	unsigned16	x	x	D
PB Device and software number	V9H3	0	60	2	unsigned16	x		C
PB Last but one diagnostic code	V9H2	0	61	2	unsigned16	x	x	D
PB View 1		0	70	13	OSTRING	x		D

Transducer Block TBAux

Transducer Block TBAux contains those device parameters which can not be assigned to one of the channels.

Parameter	E+H Matrix (CW II)	Slot	Index	Size [bytes]	Type	Read	Write	Storage Class
Standardparameter								
Transducer block Aux block objekt		0	120	20	DS32*	x		C
TBAux Static revision		0	121	2	unsigned16	x		N
TBAux Device tag		0	122	32	Octet String(32)	x	x	S
TBAux Strategy		0	123	2	unsigned16	x	x	S
TBAux Alert key		0	124	1	unsigned8	x	x	S
TBAux Target mode		0	125	1	unsigned8	x	x	S
TBAux Mode block		0	126	3	DS37*	x		D
TBAux Alarm summary		0	127	8	DS42*	x		D

Parameter	E+H Matrix (CW II)	Slot	Index	Size [bytes]	Type	Read	Write	Storage Class
E+H-Parameter								
TBAux Relay selection	V1H0	0	128	1	unsigned8	x	x	S
TBAux Relay funktion	V1H1	0	129	1	unsigned8	x	x	S
TBAux Switch-on point	V1H2	0	130	4	floating point	x	x	S
TBAux Switch-off point	V1H3	0	131	4	floating point	x	x	S
TBAux Alternating pump control	V1H4	0	132	1	unsigned8	x	x	S
TBAux Count factor C1	V1H5	0	133	4	floating point	x	x	S
TBAux Count factor C2	V1H6	0	134	4	floating point	x	x	S
TBAux Count factor C3	V1H7	0	135	4	floating point	x	x	S
TBAux Internal time	V1H8	0	136	2	unsigned16	x	x	S
TBAux Switch delay	V1H9	0	137	1	unsigned8	x	x	S
TBAux Operating mode	V8H0	0	138	1	unsigned8	x	x	S
TBAux Select current	V8H1	0	139	1	unsigned8	x	x	S
TBAux 4 mA threshold	V8H2	0	140	1	unsigned8	x	x	S
TBAux Select distance unit	V8H3	0	141	1	unsigned8	x	x	S
TBAux Flow unit	V8H4	0	142	1	unsigned8	x	x	S
TBAux Counter unit	V8H5	0	143	1	unsigned8	x	x	S
TBAux Limit switch	V8H6	0	144	1	unsigned8	x	x	S
TBAux External temperatur sensor	V8H7	0	145	1	unsigned8	x	x	S
TBAux Internal counter high	V8H8	0	146	2	unsigned16	x		S
TBAux Internal counter low	V8H9	0	147	2	unsigned16	x		S
TBAux Reset counter	V9H4	0	148	2	unsigned16	x	x	D
TBAux Simulation level	V9H7	0	149	4	floating point	x	x	S
TBAux Simulation volume	V9H8	0	150	4	floating point	x	x	S
TBAux Simulation current	V9H9	0	151	4	floating point	x	x	S
TBAux View1		0	152	13	OSTRING	x		D

Device management

Parameter	E+H Matrix (CW II)	Slot	Index	Size [bytes]	Type	Read	Write	Storage Class
Directory objekt header		1	0	12	OSTRING	x		C
Composite list directory entries		1	1	24	OSTRING	x		C

Analog Input Block AI1

Analog Input Block 1 transmits the measured value of channel 1. It is connected to the Transducer Block TB 1 and contains the following parameters:

Parameter	E+H Matrix (CW II)	Slot	Index	Size [bytes]	Type	Read	Write	Storage Class
Standardparameter								
Analog input block 1 block objekt		1	16	20	DS32*	x		C
AI1 Static revision		1	17	2	unsigned16	x		N
AI1 Device tag		1	18	32	Octet String(32)	x	x	S
AI1 Strategy		1	19	2	unsigned16	x	x	S
AI1 Alert key		1	20	1	unsigned8	x	x	S
AI1 Target Mode		1	21	1	unsigned8	x	x	S
AI1 Mode block		1	22	3	DS37*	x		D
AI1 Alarm summary		1	23	8	DS42*	x		D
Blockparameter								
AI1 OUT		1	26	5	DS33*	x		D
AI1 PV_SCALE		1	27	8	floating point(2)	x	x	S
AI1 OUT_SCALE		1	28	11	DS36*	x	x	S
AI1 LIN_TYPE		1	29	1	unsigned8	x	x	S
AI1 CHANNEL		1	30	2	unsigned16	x	x	S
AI1 PV_FTIME		1	32	4	floating point	x	x	S
AI1 ALARM_HYSTERESIS		1	35	4	floating point	x	x	S
AI1 HI_HI_LIMIT		1	37	4	floating point	x	x	S
AI1 HI_LIMIT		1	39	4	floating point	x	x	S
AI1 LO_LIMIT		1	41	4	floating point	x	x	S
AI1 LO_LO_LIMIT		1	42	4	floating point	x	x	S
AI1 HI_HI_ALM		1	46	16	DS39*	x		D
AI1 HI_ALM		1	47	16	DS39*	x		D
AI1 LO_ALM		1	48	16	DS39*	x		D
AI1 LO_LO_ALM		1	49	16	DS39*	x		D
AI1 SIMULATE		1	50	6	DS50*	x	x	S
AI1 OUT_UNIT_TEXT		1	51	16	Octet String(16)	x	x	S
AI1 View1		1	61	13	OSTRING	x		D

Transducer Block TB1

Transducer Block TB 1 contains the device parameters for channel 1.

Parameter	E+H Matrix (CW II)	Slot	Index	Size [bytes]	Type	Read	Write	Storage Class
Standardparameter								
Transducer block 1 block object		1	120	20	DS32*	x		C
TB1 Static revision		1	121	2	unsigned16	x		N
TB1 Device tag		1	122	32	Octet String(32)	x	x	S
TB1 Strategy		1	123	2	unsigned16	x	x	S
TB1 Alert key		1	124	1	unsigned8	x	x	S
TB1 Target mode		1	125	1	unsigned8	x	x	S
TB1 Mode block		1	126	3	DS37*	x		D
TB1 Alarm summary		1	127	8	DS42*	x		D
E+H-Parameter								
TB1 Measured value Channel 1	V0H0	1	128	4	floating point	x		D
TB1 Empty calibration Channel 1	V0H1	1	129	4	floating point	x	x	S
TB1 Full calibration Channel 1	V0H2	1	130	4	floating point	x	x	S
TB1 Application Channel 1	V0H3	1	131	1	unsigned8	x	x	S
TB1 Type of sensor Channel 1	V0H4	1	132	1	unsigned8	x	x	S
TB1 Value for 0/4mA Channel 1	V0H5	1	133	4	floating point	x	x	S
TB1 Value for 20mA Channel 1	V0H6	1	134	4	floating point	x	x	S
TB1 Output damping Channel 1	V0H7	1	135	4	floating point	x	x	S
TB1 Measured distance Channel 1	V0H8	1	136	4	floating point	x		D
TB1 Measured level Channel 1	V0H9	1	137	4	floating point	x		D
TB1 Linearization Channel 1	V2H0	1	138	1	unsigned8	x	x	S
TB1 Actual level Channel 1	V2H1	1	139	4	floating point	x	x	S
TB1 Q/h curve Channel 1	V2H2	1	140	1	unsigned8	x	x	S
TB1 Input level Channel 1	V2H3	1	141	4	floating point	x	x	D
TB1 Input volume Channel 1	V2H4	1	142	4	floating point	x	x	D
TB1 Line number Channel 1	V2H5	1	143	1	unsigned8	x	x	D
TB1 Diameter of vessel Channel 1	V2H6	1	144	4	floating point	x	x	S
TB1 Vmax / Qmax Channel 1	V2H7	1	145	4	floating point	x	x	S
TB1 Low flow cut off Channel 1	V2H8	1	146	4	floating point	x	x	S
TB1 Crest length Channel 1	V2H9	1	147	4	floating point	x	x	S
TB1 Range for auto. suppression Channel 1	V3H0	1	148	4	floating point	x	x	S
TB1 Echo attenuation Channel 1	V3H1	1	149	2	integer16	x		S
TB1 Signal / noise ratio Channel 1	V3H2	1	150	1	unsigned8	x		S
TB1 If no echo Channel 1	V3H3	1	151	1	unsigned8	x	x	D
TB1 Safety alarm Channel 1	V3H4	1	152	1	unsigned8	x	x	D
TB1 Envelope curve statistics Channel 1	V3H5	1	153	1	unsigned8	x	x	S
TB1 FAC threshold Channel 1	V3H6	1	154	1	unsigned8	x	x	S
TB1 FAC rise Channel 1	V3H7	1	155	1	unsigned8	x	x	S
TB1 Device tag Channel 1	VAH0	1	156	16	Octet String(16)	x	x	S
TB1 Unit Channel 1	VAH3	1	157	1	unsigned8	x	x	S
TB1 Text Channel 1	VAH7	1	158	1	unsigned8	x	x	S
TB1 View1		1	159	13	OSTRING	x		D

Analog Input Block AI2

Analog Input Block 2 transmits the measured value of channel 2. It is connected to Transducer Block TB 2 and contains the following parameters:

Parameter	E+H Matrix (CW II)	Slot	Index	Size [bytes]	Type	Read	Write	Storage Class
Standardparameter								
Analog input block 2 block objekt		2	16		DS32*	x		C
AI2 Static revision		2	17	2	unsigned16	x		N
AI2 Device tag		2	18	32	Octet String(32)	x	x	S
AI2 Strategy		2	19	2	unsigned16	x	x	S
AI2 Alert key		2	20	1	unsigned8	x	x	S
AI2 Target Mode		2	21	1	unsigned8	x	x	S
AI2 Mode block		2	22	3	DS37*	x		D
AI2 Alarm summary		2	23	8	DS42*	x		D

Parameter	E+H Matrix (CW II)	Slot	Index	Size [bytes]	Type	Read	Write	Storage Class
Blockparameter								
AI2 OUT		2	26	5	DS33*	x		D
AI2 PV_SCALE		2	27	8	floating point(2)	x	x	S
AI2 OUT_SCALE		2	28	11	DS36*	x	x	S
AI2 LIN_TYPE		2	29	1	unsigned8	x	x	S
AI2 CHANNEL		2	30	2	unsigned16	x	x	S
AI2 PV_FTIME		2	32	4	floating point	x	x	S
AI2 ALARM_HYSTERESIS		2	35	4	floating point	x	x	S
AI2 HI_HI_LIMIT		2	37	4	floating point	x	x	S
AI2 HI_LIMIT		2	39	4	floating point	x	x	S
AI2 LO_LIMIT		2	41	4	floating point	x	x	S
AI2 LO_LO_LIMIT		2	43	4	floating point	x	x	S
AI2 HI_HI_ALM		2	46	16	DS39*	x		D
AI2 HI_ALM		2	47	16	DS39*	x		D
AI2 LO_ALM		2	48	16	DS39*	x		D
AI2 LO_LO_ALM		2	49	16	DS39*	x		D
AI2 SIMULATE		2	50	6	DS50*	x	x	S
AI2 OUT_UNIT_TEXT		2	51	16	Octet String(16)	x	x	S
AI2 View1		2	61	13	OSTRING	x		D

Transducerblock TB2

Transducer Block TB 2 contains the device parameters for channel 2.

Parameter	E+H Matrix (CW II)	Slot	Index	Size [bytes]	Type	Read	Write	Storage Class
Standardparameter								
Transducer block 2 block object		2	120	20	DS32*	x		C
TB2 Static revision		2	121	2	unsigned16	x		N
TB2 Device tag		2	122	32	Octet String(32)	x	x	S
TB2 Strategy		2	123	2	unsigned16	x	x	S
TB2 Alert key		2	124	1	unsigned8	x	x	S
TB2 Target mode		2	125	1	unsigned8	x	x	S
TB2 Mode block		2	126	3	DS37*	x		D
TB2 Alarm summary		2	127	8	DS42*	x		D
E+H-Parameter								
TB2 Measured value Channel 2	V4H0	2	128	4	floating point	x		D
TB2 Empty calibration Channel 2	V4H1	2	129	4	floating point	x	x	S
TB2 Full calibration Channel 2	V4H2	2	130	4	floating point	x	x	S
TB2 Application Channel 2	V4H3	2	131	1	unsigned8	x	x	S
TB2 Type of sensor Channel 2	V4H4	2	132	1	unsigned8	x	x	S
TB2 Value for 0/4mA Channel 2	V4H5	2	133	4	floating point	x	x	S
TB2 Value for 20mA Channel 2	V4H6	2	134	4	floating point	x	x	S
TB2 Output damping Channel 2	V4H7	2	135	4	floating point	x	x	S
TB2 Measured distance Channel 2	V4H8	2	136	4	floating point	x		D
TB2 Measured level Channel 2	V4H9	2	137	4	floating point	x		D
TB2 Linearization Channel 2	V5H0	2	138	1	unsigned8	x	x	S
TB2 Actual level Channel 2	V5H1	2	139	4	floating point	x	x	S
TB2 Input level Channel 2	V5H3	2	140	4	floating point	x	x	D
TB2 Input volume Channel 2	V5H4	2	141	4	floating point	x	x	D
TB2 Line number Channel 2	V5H5	2	142	1	unsigned8	x	x	D
TB2 Diameter of vessel Channel 2	V5H6	2	143	4	floating point	x	x	S
TB2 Vmax / Qmax Channel 2	V5H7	2	144	4	floating point	x	x	S
TB2 Limit back water alarm Channel 2	V5H8	2	145	1	unsigned8	x	x	S
TB2 Range for auto. suppression Channel 2	V6H0	2	146	4	floating point	x	x	S
TB2 Echo attenuation Channel 2	V6H1	2	147	2	integer16	x		D
TB2 Signal / noise ratio Channel 2	V6H2	2	148	1	unsigned8	x		D
TB2 If no echo Channel 2	V6H3	2	149	1	unsigned8	x	x	S
TB2 Safety alarm Channel 2	V6H4	2	150	1	unsigned8	x	x	S
TB2 Envelope curve statistics Channel 2	V6H5	2	151	1	unsigned8	x	x	S
TB2 FAC threshold Channel 2	V6H6	2	152	1	unsigned8	x	x	S
TB2 FAC rise Channel 2	V6H7	2	153	1	unsigned8	x	x	S
TB2 Device tag Channel 2	VAH1	2	154	16	Octet String(16)	x	x	S
TB2 Unit Channel 2	VAH5	2	155	1	unsigned8	x	x	S
TB2 Text Channel 2	VAH9	2	156	1	unsigned8	x	x	S
TB2 View1		2	157	13	OSTRING	x		D