Profibus PA

Data Link Description

COPA-XE / MAG-XE

D184B093U12 Rev. 01 / 06.2001

CE

ABB

1 Condensed Description

The 50XE4000 can be connected to the Profibus DPV1 in accordance with the EN 50170 (DPV1) Standard as a passive instrument (slave), including the PROFIBUS-PA Profile for Process Control Devices; Part 3-Device Data Sheet Transmitter; Conformance Class B. It consists 1 Physical, 1 Transducer and 2 Function blocks. Physical Layer is in accordance with the IEC1158.

2 Ident No.

The Ident No. has been assigned by the Profibus User Organization and is 6668_{hex} (26216_{dec})

3 Number of In- and Outputs

The number of inputs, relative to the Master, is 10 Bytes

4 Configuration for Cyclic Data Exchange

Only a single configuration is available. The configuration byte is 99_{hex} (153_{dec}). Any other configuration will not be accepted.

5 Parameter Entry

Parameters are entered as described in EN 50170 . User parameters are not available.

6 Diagnostics

The design of the diagnostic data corresponds to the descriptions in EN 50170 . User specific diagnostic data are not available.

7 Setting the Slave Address

The Slave adress will be set with the set_slave_adress service over the Bus as described in EN 50170. The default adress is 126.

8 Baudrates

The Baudrate supported are:

31.25 kBaud
45.45 kBaud
93.75 kBaud with segment coupler.

The baudrate is automatically recognized by the instrument.

9 GSD Files

The name of the GSD file is BFP6668.GSD and is included with the shipment.

10 Terminal Designations

+	B	PA +
-	A	PA -

11 Cyclic Parameters

11.1 Configuration Byte

The configuration byte for the cyclic data exchange is 99hex. That means 10 Byte Input and 0 Byte Output.

11.2 Analog Input Function Block Parameter

Parameter Name	Object Type	Data Type	Access
OUT	Record	DS-33	cyclic

Process Variable
The function block parameter OUT contains the value of the current process variable in a vendor specific or configuration adjusted engineering unit and the belonging state.

11.3 Flow Totalizer Function Block Parameter

Parameter Name	Object Type	Data Type	Access
OUT_TOTAL	Record	DS-33	cyclic

Process Variable in "Auto" Mode. The function block parameter OUT_TOTAL contains the value of the actual totalised value in a vendor specific or configuration adjusted engineering unit and its associated status.

12 Acyclic Parameters

You will get the Device description by read out the Device Management parameter. The acyclic functions can be used with the SAP 47. The detailed description of the Parameters is in:

PROFIBUS
Second Draft Profile
Profibus-PA
Profile for Process Control Devices
Part1-General Requirements
Part2-Mapping of the Profile to PROFIBUS-DP
Part3-Device Data Sheet Transmitter

12.1 Device Management parameter

The description is contained in the General Requirement document

12.1.1 Header

Slot 1 Index 0 Length 12

Dir_ID	Rev-Number	Num_Dir_Obj	Num_Dir_Entry	First_Comp_List_Dir_Entry	Num_Comp_List_Dir_Entry
0 Unsigned16	1 Unsigned16	1 Unsigned16	7 Unsigned16	1 Unsigned16	3 Unsigned16

12.1.2 Composite_List_Directory_Entries

Slot 1 Index 1 Length 28

Start_PB	Num_PB	Start_TB	Num_TB	Start_FB	Num_FB
Index/Offset		Index/Offset		Index/Offset	
1/4	1	1/5	1	1/6	2
High byte/ low byte	Unsigned 16	High byte/ low byte	Unsigned 16	High byte/ low byte	Unsigned 16

Pointer	PB	Number	Pointer	TB	Number	Pointer	FB	Number
Offset	0	of PB	Offset	1	of TB	Offset	2	of FB
Slot	Index	para- meters	Slot	Index	para- meters	Slot	Index	para- meters
1	14	254	2	0	24	3	0	35
High byte	Low byte	Unsigned16	High byte	Low byte	Unsigned16	High byte	Low byte	Unsigned16

Pointer	FB	Number
Offset	3	of FB
Slot	Index	para- meters
4	0	27
High byte	Low byte	Unsigned16

12.2 Standard Parameter

Slot	Index	Parameter Name	Object Type	Data Type	Access	Size
1	15	St_REV	Simple	Unsigned16	r	2
1	16	TAG_DESCRIPTION	Simple	OctetString	r,w	32
1	17	STRATEGY	Simple	Unsigned16	r,w	2
1	18	ALERT_KEY	Simple	Unsigned8	r,w	1
1	19	MODE_PER	Simple	Unsigned8	r	1
1	20	MODE_BLK	Record	DS-37	r,w	3
1	21	ALARM_SUM	Record	DS-42	r	8

12.3 Physical Block Parameter

Slot	Index	Parameter Name	Object Type	Data Type	Access	Size
1	22	Software_Revision	Simple	OctetString	r	16
1	23	Hardware_Revision	Simple	OctetString	r	16
1	24	Device_Man_ID	Simple	Unsigned16	r	2
1	25	Device_ID	Simple	VisibleString	r	16
1	26	Device_SER_Num	Simple	VisibleString	r	16
1	27	Diagnosis	Simple	Bitstring	r	4
1	28	Diagnosis_Mask	Simple	Bitstring	r	4
1	29	Device_Certificatio n	Simple	VisibleString	r,w	16
1	30	Security_Locking	Simple	Unsigned16	r,w	2
1	31	Factory_Reset	Simple	Unsigned16	r	2

12.3.1 Diagnosis

Bitstring of 32 bits (4x8Bits)

12.3.1.1 DIA_HW_ELECTR

Bit 0 of the bitstring means: Hardware failure of the electronic
For the XE4000: Error EEPROM
Error Totalizer

12.3.1.2 DIA_MEM_CHECKSUM

Bit 4 of the bitstring means: Memory checksum error
For the XE4000: Checksum Error EEPROM
Checksum Error Totalizer
Checksum Error calibration data

12.3.1.3 DIA_MEASUREMENT

Bit 5 of the bitstring means: Failure in measurement
For the XE4000: PV out of limits
negative Reference current
coil excitation
functiontest active
A/D overflow

12.3.2 Additional Physical Block Parameter

Slot	Index	Parameter Name	Object Type	Data Type	Access	Size
1	44	DESCRIPTOR	Simple	OctetString	r,w	32
1	45	DEVICE_MESSAGE	Simple	OctetString	r,w	32
1	46	DEVICE_INSTALL_DATE	Simple	OctetString	r,w	8

12.4 Analog Input Function Block Parameter

Slot	Index	Parameter Name	Object Type	Data Type	Access	Size
3	10	OUT	Record	DS-33	r	5
3	11	PV_SCALE	Record	DS-36	r,w	11
3	12	OUT_SCALE	Record	DS-36	r,w	11
3	14	Channel	Simple	Unsigned16	r,w	2
3	16	PV_FTIME	Simple	Float	r,w	4
3	19	ALARM_HYS	Simple	Float	r,w	4
3	21	HI_HI_LIM	Simple	Float	r,w	4
3	23	HI_LIM	Simple	Float	r,w	4
3	25	LO_LIM	Simple	Float	r,w	4
3	27	LO_LO_LIM	Simple	Float	r,w	4
3	30	HI_HI_ALM	Record	DS-39	r	14
3	31	HI_ALM	Record	DS-39	r	14
3	32	LO_ALM	Record	DS-39	r	14
3	33	LO_LO_ALM	Record	DS-39	r	14
3	34	SIMULATE	Record	DS-51	r,w	6

12.5 Flow Transducer Block Parameter

Slot	Index	Parameter Name	Object Type	Data Type	Access	Size
2	8	FLOWRATE	Simple	Float	r	4
2	9	NOMINAL_SIZE	Simple	Float	r,w	4
2	10	FILTER_TYPE	Simple	Unsigned8	r,w	1
2	11	DEVICE_MODE	Simple	Unsigned8	r,w	1
2	12	FLOWRATE_UNITS	Simple	Unsigned16	r,w	2
2	13	SELF_CHECKING	Simple	Unsigned8	r,w	1
2	14	CALIBRATION_FACTOR	Simple	Float	r,w	4
2	15	ZERO_POINT	Simple	Float	r,w	4

2	16	FLOW_DIRECTION	Simple	Unsigned8	r,w	1
2	17	UPPER_SENSOR_LIMIT	Simple	Float	r	4
2	18	LOWER_SENSOR_LIMIT	Simple	Float	r	4
2	19	SAMPLE_RATE	Simple	Float	r,w	4
2	20	EPD_THRESHOLD	Simple	Float	r,w	4
2	21	LOW_FLOW_CUTOFF	Simple	Float	r,w	4
2	22	MASS_FLOWRATE	Simple	Float	r	4
2	23	MASS_FLOWRATE_UNITS	Simple	Unsigned16	r,w	2
2	24	ZERO_POINT_ADJUST	Simple	Unsigned8	r,w	1

12.5.1 NOMINAL_SIZE, Description

Value	Nominal Size	
0	3 mm	1/10 in
1	4 mm	5/32 in
2	5 mm	3/16 in
3	6 mm	1/4 in
4	8 mm	5/16 in
5	10 mm	3/8 in
6	15 mm	1/2 in
7	20 mm	3/4 in
8	25 mm	1 in
9	32 mm	1-1/4 in
10	40 mm	1-1/2 in
11	50 mm	2 in
12	65 mm	2-1/2 in
13	80 mm	3 in
14	100 mm	4 in
15	125 mm	5 in
16	150 mm	6 in
17	200 mm	8 in
18	250 mm	10 in
19	300 mm	12 in
20	350 mm	14 in
21	400 mm	16 in
22	450 mm	18 in
23	500 mm	20 in
24	600 mm	24 in

12.5.2 FILTER_TYPE, Description

0 OFF
1 ON
(1=LOW,2=MEDIUM,3=HIGH is not supported)

12.5.3 DEVICE_MODE, Description

0 unidirectional
1 bidirectional

12.5.4 FLOWRATE_UNITS, Description

Value	Flowrate Unit
24	l/s
17	l/min
138	l/h
28	m3/s
131	m3/min
19	m3/h
29	m3/d
137	igps
18	igpm
30	igph
31	igpd
23	mgd
16	gpm
136	gph
132	bbl/s
133	bbl/min
134	bbl/h
135	bbl/d
73	kg/s
74	kg/min
75	kg/h
76	kg/d
77	t/min
78	t/h
79	t/d
70	g/s
71	g/min
72	g/h
80	lbs/s
81	lbs/min
82	lbs/h
240	programable unit /s
241	programable unit /min
242	programable unit /h
243	programable unit /d

12.5.5 SELF_CHECKING, Description

0 OFF
1 ON
(2 SMART not supported)

12.5.6 CALIBRATION_FACTOR, Description

Span Cs for 6.25 Hz
Unit % = 57
Minimum = 15 % ; -15 %
Maximum = 200 % ; -200%

12.5.7 ZERO_POINT, Description

Unit Hz = 38
Minimum = -50 Hz
Maximum = 50 Hz

12.5.8 FLOW_DIRECTION, Description

0 NORMAL
1 INVERS

12.5.9 SAMPLE_RATE, Description

Value	Sample Rate
0	6.25 Hz AC/DC
1	7.5 Hz AC/DC
2	12.5 Hz AC/DC
3	15 Hz AC/DC
4	25 Hz AC/DC
5	30 Hz AC/DC
6	6.25 Hz DC
7	7.5 Hz DC
8	12.5 Hz DC
9	15 Hz DC
10	25 Hz DC
11	30 Hz DC
12	negativ
13	positiv

12.5.10 EPD_THRESHOLD, Description

Unit Hz = 38
Minimum = 0 Hz
Maximum = 3000 Hz

12.5.11 LOW_FLOW_CUTOFF, Description

Unit % = 57
Minimum = 0 %
Maximum = 10 %

12.5.12 MASS_FLOWRATE, Description

A MASS_FLOWRATE_UNIT must be selected.

12.5.13 MASS_FLOWRATE_UNITS, Description

☞FLOWRATE_UNITS, Description☜

12.5.14 ZERO_POINT_ADJUST, Description

(0 CANCEL not supported)
1 EXEC (read or write)

12.6 Flow Totalizer Function Block Parameter

Slot	Index	Parameter Name	Object Type	Data Type	Access	Size
4	10	OUT_TOTAL	Record	DS-33	r	5

4	12	TOT_UNITS	Index	Unsigned16	r,w	2
4	14	CHANNEL	Simple	Unsigned16	r,w	2
4	15	RESET_TOT	Simple	Unsigned8	w	1
4	16	MODE_TOT	Simple	Unsigned8	r,w	1
4	22	ALARM_HYS	Simple	Float	r,w	4
4	23	HI_HI_LIM	Simple	Float	r,w	4
4	24	HI_LIM	Simple	Float	r,w	4
4	25	HI_HI_ALARM	Record	DS-39	r	14
4	26	HI_ALARM	Record	DS-39	r	14

12.6.1 TOT_UNITS, Description

Value	Totalizer Units
41	l
43	m3
42	igal
40	gal
46	bbl
61	kg
62	t
60	g
63	lbs
244	programable unit

12.6.2 RESET_TOT, Description

0 CANCEL
1 EXEC (read or write)

12.6.3 MODE_TOT, Description

0 UP
1 Difference POS/NEG

13 Data Types

13.1 DS-33

Element No.	Element name	Data Type	Size
1	Value	Float	4
1	Status	Unsigned8	1

Coding of status

Limits **Quality** **Substatus** **Quality**

Gr	Gr	QS	QS	QS	QS	Q u	Qu	
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
0	0							= bad
0	1							= uncertain
1	0							= good (Not Cascade)
1	1							= good (Cascade)

Meaning at **= bad**

0	0	0	0	0	0			= non-specific
0	0	0	0	0	1			= configuration error, (value not accepted)
0	0	0	0	1	0			= not connected
0	0	0	0	1	1			= device failure
0	0	0	1	0	0			= sensor failure
0	0	0	1	0	1			= no communication (last usable value)
0	0	0	1	1	0			= no communication (no usable value)
0	0	0	1	1	1			= out of service
0	0	1	0	0	0			= configuration error, variable not supported

Meaning at **= uncertain**

0	1	0	0	0	0			= non-specific
0	1	0	0	0	1			= last usable value
0	1	0	0	1	0			= substitute-set
0	1	0	0	1	1			= initial value
0	1	0	1	0	0			= sensor conversion not accurate
0	1	0	1	0	1			= engineering unit range violation
0	1	0	1	1	0			= sub-normal
0	1	0	1	1	1			= configuration error, value adapted

Meaning at **= good (Non-Cascade)**

1	0	0	0	0	0			= ok
1	0	0	0	0	1			= active block alarm
1	0	0	0	1	0			= active advisory alarm (priority < 8)
1	0	0	0	1	1			= active critical alarm (priority > 8)
1	0	0	1	0	0			= unacknowledged block alarm
1	0	0	1	0	1			= unacknowledged advisory alarm
1	0	0	1	1	0			= unacknowledged critical alarm
1	0	1	0	0	0			= initiate fail safe

Meaning at **= good (Cascade)**

1	1	0	0	0	0			= ok
1	1	0	0	0	1			= initialisation acknowlegded
1	1	0	0	1	0			= initialisation request
1	1	0	0	1	1			= not invited
1	1	0	1	0	0			= not selected
1	1	0	1	0	1			= do not select
1	1	0	1	1	0			= local override
1	1	0	1	1	1			= fail safe active
1	1	1	0	0	0			= initiate fail safe

Meaning of the bits 'Limits'

						0	0	= ok
						0	1	= low limited *)
						1	0	= high limited *)
						1	1	= constant

13.2 DS-36

Element No.	Element name	Data Type	Size
1	EU at 100%	Float	4
2	EU at 0%	Float	4
3	Units Index	Unsigned16	2
4	Decimal Point	Unsigned8	1

13.3 DS-37

Element No.	Element name	Data Type	Size
1	Actual	Unsigned8	1
2	Permitted	Unsigned8	1
3	Normal	Unsigned8	1

13.4 DS-39

Element No.	Element name	Data Type	Size
1	Status/Priority	Unsigned8	1
2	Subcode	Unsigned16	2
3	Value	Float	4
4	Time Stamp	Time Value	8

13.5 DS-42

Element No.	Element name	Data Type	Size
1	Current	OctetString	2
2	Unacknowledged	OctetString	2
3	Unreported	OctetString	2

4	Disabled	OctetString	2

13.6 DS-51

Element No.	Element name	Data Type	Size
1	Simulate Status	Unsigned8	1
2	Simulate Value	Float	4
3	Simulate En/Disable	Unsigned8	1

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