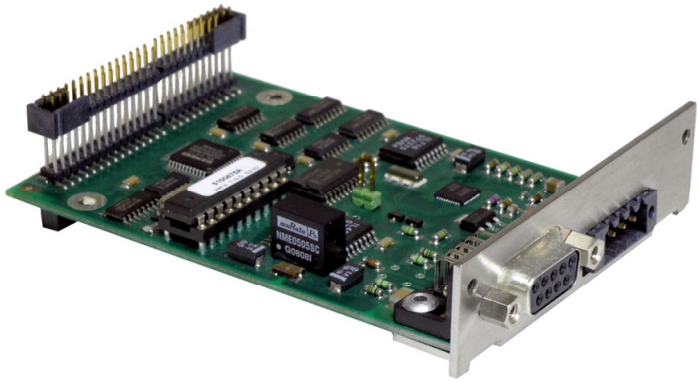
EasyLine Continuous Gas Analyzers

EL3000, EL3060
PROFIBUS DP/PA Interface

Software-Versions ≥ 3.3.2

Technical Information

30/24-415 EN Rev. 3



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Chapter 1 Description

Preface

This Technical Information describes the PROFIBUS interface in the EL3000 and EL3060 gas analyzers. Using this interface requires a general knowledge of PROFIBUS.

For information on the configuration of PROFIBUS networks see the brochure “PROFIBUS – Solutions from ABB” (Publication No. 30/FB-10 EN). Additional information can also be found with the PROFIBUS User Organization on the Internet at http://www.profibus.com.

Application

Via the PROFIBUS module the gas analyzer can be connected to the PROFIBUS network as a PROFIBUS slave. The PROFIBUS module provides one RS485 and one MBP interface (non-intrinsically safe).

Via the PROFIBUS, information from the gas analyzer is transferred to a PC, PLC or process control system, thus providing measured values, status signals as well as signals of the analog and digital inputs for further processing.

Compatibility

The PROFIBUS interface described in this revision of the Technical Information at hand can be used as from software version 3.3.2. Revision 1 of the Technical Information remains valid for former software versions.

Communication

The „Profile for Process Control Device Version V 3.01“, with Amendment 2 „Condensed Status und Diagnostic Messages V 1.0“ and Amendment 3 „Identification Maintenance Functions (I&M Function for PA) V 1.0“ are used.

The RS485- and MBP (non-intrinsically safe) transmission technology is supported.

The PROFIBUS specification differentiates between cyclic and acyclic services. With the cyclic services the process data (e.g. measured values, control commands and status information) is transferred between master and slaves, whereas the acyclic services provide online access to field instruments for parameter setting, operation, observation and alarm handling.

The PROFIBUS device profile is a device-specific supplement for data communication. In this device profile, parameters typical for the device family, as for instance measurement ranges or alarms have been specified as binding.

PROFIBUS DP/PA Module

The electronic module in the gas analyzer provides the possibility to insert a PROFIBUS module in slot –X20/–X21. The module can be ordered in 2 variants:

- PROFIBUS DP/PA module for direct cabling
- PROFIBUS DP for Ex (hazardous areas) with cabling via isolating relay for use in a central housing in category 2G.

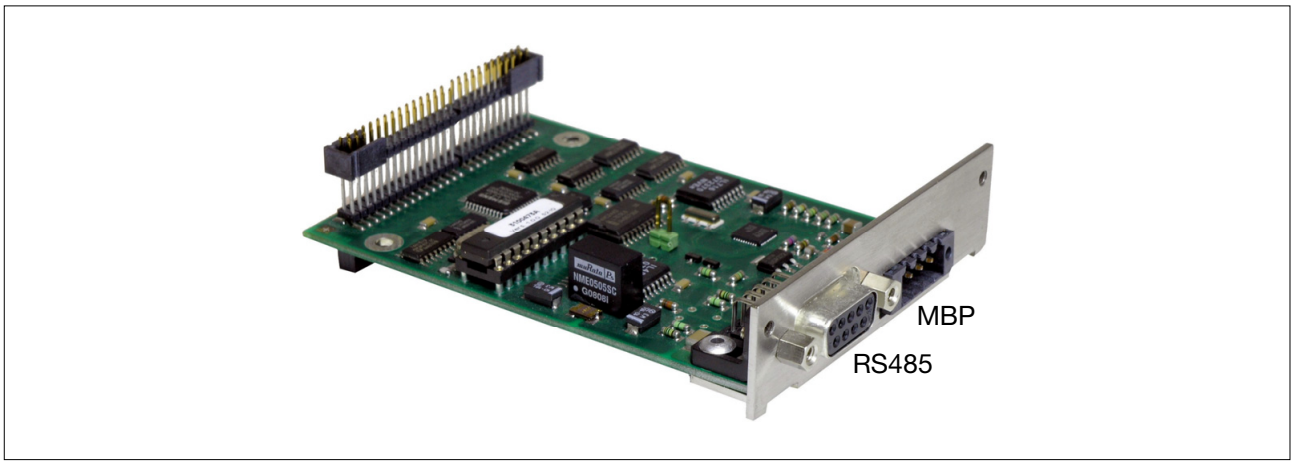


Figure 1 PROFIBUS Module

The PROFIBUS module provides two interfaces:

- RS485 interface
  Via the RS485 interface a gas analyzer can be integrated into a PROFIBUS DP network.
- MBP interface
  Via the MBP interface a gas analyzer can be integrated into a non-intrinsically safe PROFIBUS PA network.

Firmware

Current firmware version of the gas analyzer: V 3.4.0.

Integration into PROFIBUS Networks

The gas analyzer can be integrated into existing PROFIBUS DP or PROFIBUS PA networks by using the PROFIBUS DP/PA module. The PROFIBUS PA shown in the figure below is situated in a non-hazardous area.

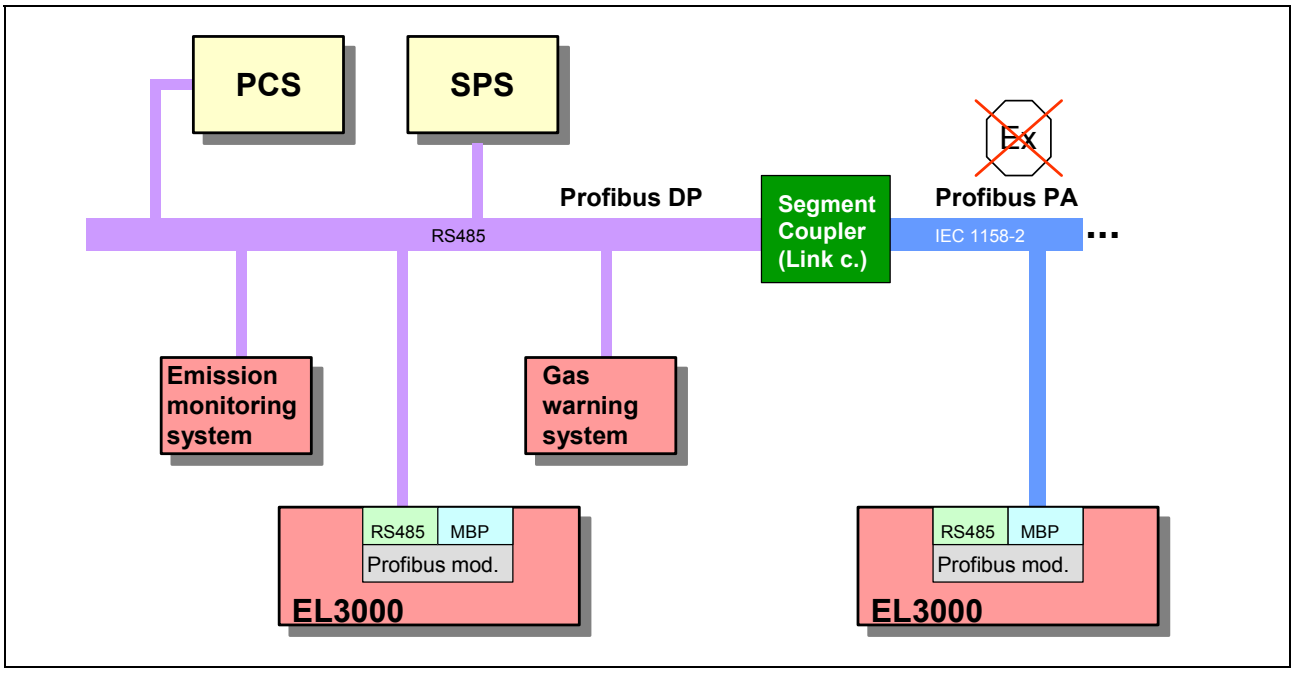


Figure 2 Gas analyzers coupled to a PROFIBUS DP and PA (non-intrinsically safe)

Chapter 2 Design Notes

Device-Specific Data File (GSD File)

Using the PROFIBUS PA profile not only makes devices interoperable – that is devices of different manufacturers can be physically connected to a single bus and are able to communicate with each other –, but also makes them interchangeable, which means devices of different manufacturers can be exchanged one for another without engineering effort to change the configuration in the process automation system.

In order to ensure this interchangeability ABB provides a GSD file (device-specific data file) for system integration. The manufacturer-specific GSD file “ABB_3400.gsd” (see page 24) is included on the CD-ROM “Software Tools and Technical Documentation” which is part of the scope of supply.

Setting the Bus Address

If there is no customer specification regarding the bus address, it is set to “126” at delivery. During commissioning of the gas analyzer the address must be set within the valid range (1–125). The set address must not be assigned more than once in the segment. The bus address is set using the “ECT” software tool.

PROFIBUS Map

The PROFIBUS map can be read-out using the “ECT” software tool (see page 37 for an example).

Device Type Manager (DTM)

A DTM for configuration and parameter setting via the PROFIBUS is presently not available.

Line Lengths

The admissible line length within the segment including all stub lines depends on the cable type and the set Baud rate.

More detailed instructions for planning and design can be found in the brochure “PROFIBUS – Solutions from ABB” (Publication No. 30/FB-10 EN).

For additional information see ABB homepage at http://www.abb.com as well as the homepage of the PROFIBUS User Organization at http://www.profibus.com.

Chapter 3 Block Structure of the Device Profile Analyzer Devices

The PA device profile for the gas analyzer has been developed and implemented according to the block model, which describes the functionality of the device by means of “blocks”.

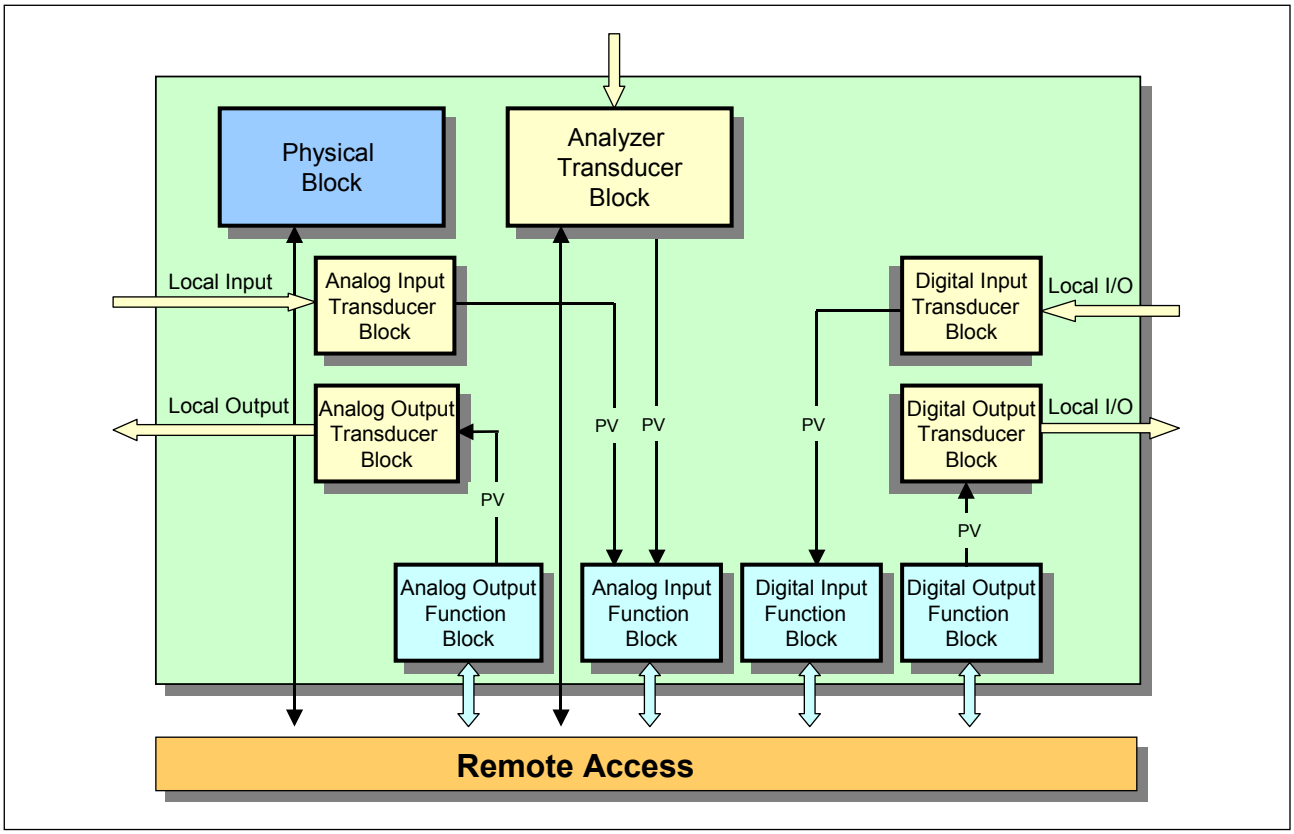


Figure 3 Block structure of the device profile analyzer devices

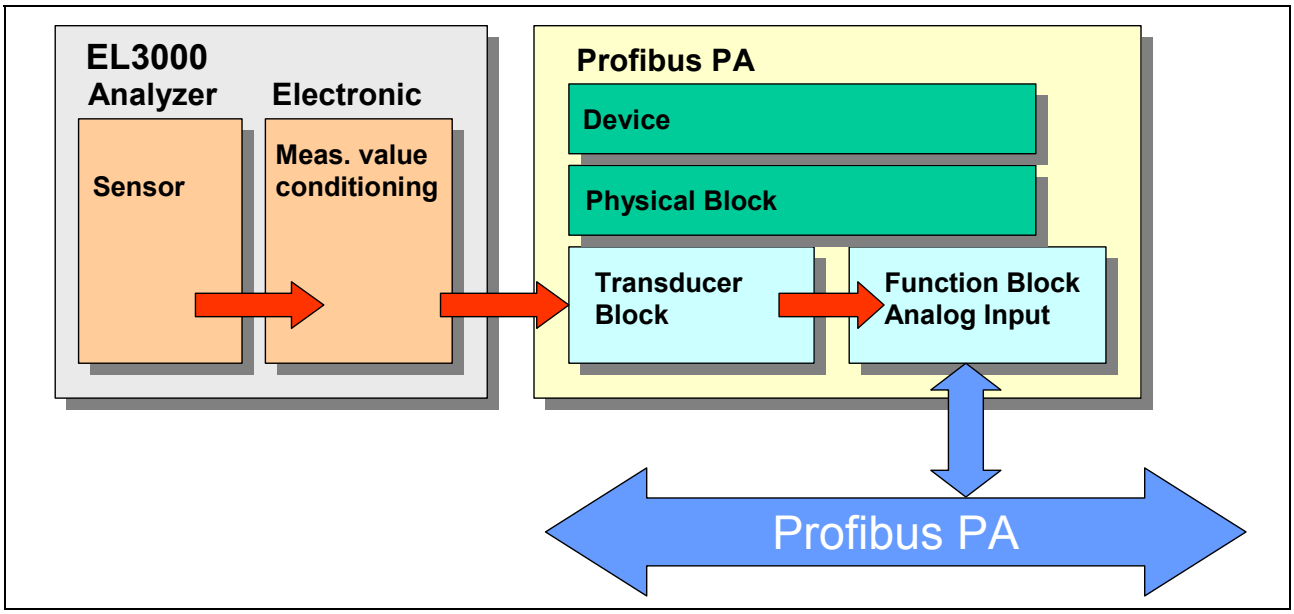


Figure 4 Block model in the gas analyzer

Description of the Blocks

Block type	Block contents	Note
Device block		
Physical Block (PB)	Description of the device (hardware) Measuring method, device configuration, device number, manufacturer's name, operating status (operation, maintenance, ...) global status, diagnosis information.	only one device block for each device
Transducer blocks (Parameters of the physical meas. variable)		
Transducer Block (ATB, DITB, AITB, DOTB)	Measuring method and its interpretation Variable (clear text and unit). Number of measurement ranges (MR), lower range and upper range values of MR, active MR. ON/OFF of the function Auto range. Measured value cycle time, measured value with time stamp and status	Analyzer TB, discrete input TB Manufacturer-specific: Analog input TB, Digital output TB
Function blocks (Functions seen from SPS, PLS, ...)		
Analog Input Function Block (AIFB)	Measured value Current measured value with status and scaling. Calculated meas. values and auxiliary variables via bus AO	Component measurement values, analog outputs of the gas analyzer
Discrete Input Function Block (DIFB)	Digital input	Status, autocal status, limit values, digital inputs and outputs of the gas analyzer
Discrete Output Function Block (DOFB)	Digital output	Automatic calibration, Bus DI of the gas analyzer, component switch-over

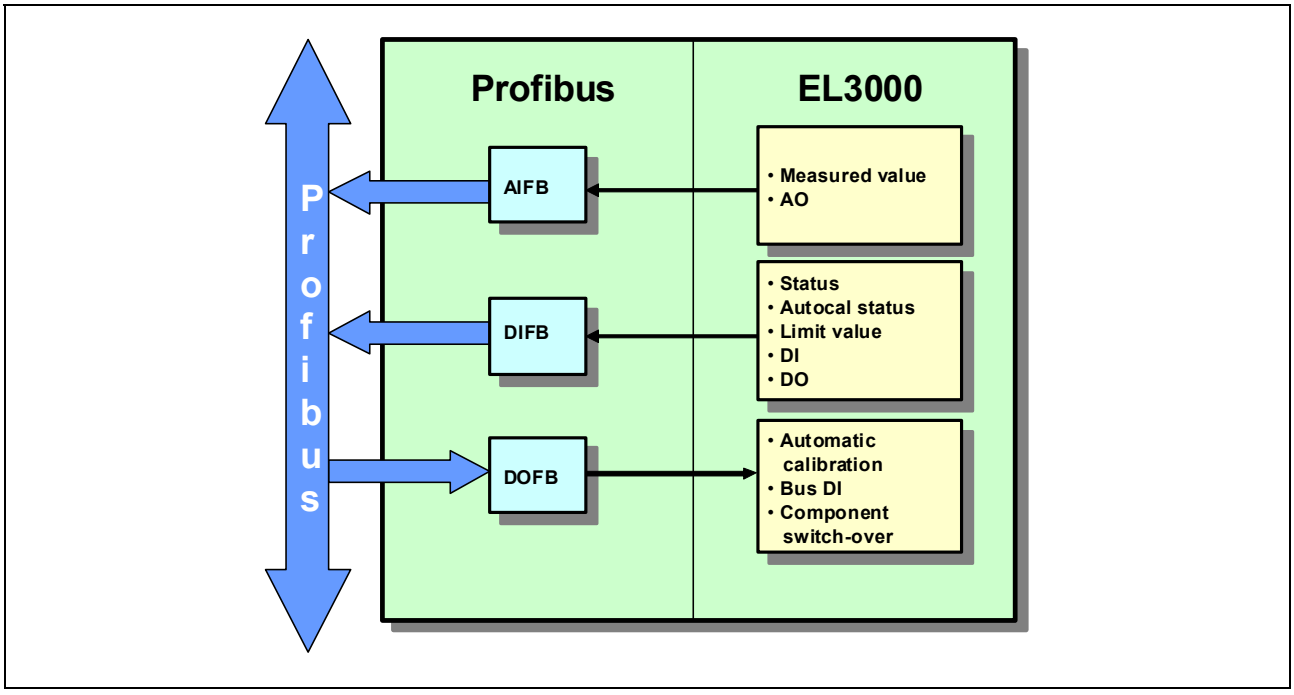


Figure 5 Mapping of the process values in the gas analyzer on the PROFIBUS

Configuration Menu

The PROFIBUS interface parameters are set via the “Profibus” dialog in the “ECT” software tool.

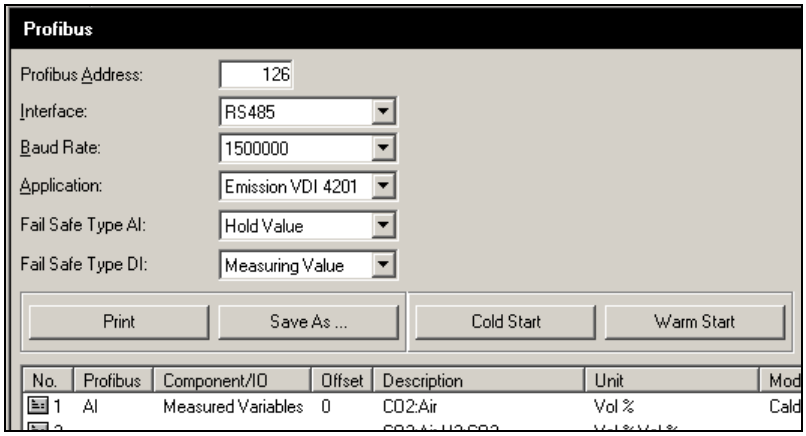


Figure 6 “Profibus” dialog in the “ECT” software tool

Parameter	**Value Range**	
Profibus Address	1–126	
Interface	RS485 Interface	(PROFIBUS DP)
	MBP Interface	(PROFIBUS PA, non-intrinsically safe)
Baud Rate	RS485 Interface:	automatically, 9600 Baud, 19200 Baud, 93750 Baud, 187.5 KBaud, 500 KBaud, 1.5 MBaud, 3 MBaud, 6 MBaud
	MBP Interface:	set to 31.25 KBaud
Application	Standard:	The Profibus-AI value is the physical measured value (indicated value) of the gas analyzer.
	Emission VDI 4201:	The physical measured values of the gas analyzer are scaled to the range –10000…0…+10000. 0 equals physically zero and 10000 corresponds to the end value of the indication range (according to VDI 4201; see section “Application of Reference Material via PROFIBUS to VDI 4201”, page 10).
Fail Safe Type of funktion blocks AI and DI [1)]	Measuring Value:	The Profibus function block value follows the function block output value of the gas analyzer.
	Hold Value:	The Profibus function block holds the last output value.

1) As from software version 3.4.0. For the Profibus DI’s Device Status and Autocal Status, in the transducer block always a “Good” status is delivered independent of the set fail safe type.

Function	**Action**
Print	Print the PROFIBUS image.
Save As …	Save the PROFIBUS image as txt file.
Cold Start	With Cold Start, all the parameters which are stored in the PROFIBUS stack as Store parameters are reset to the default value. These are e.g. all the parameters of the function blocks, the block header parameters of the transducer blocks, cancelling the blocking of the change of PROFIBUS address via the bus.
Warm Start	With Warm Start the PROFIBUS stack is reset, comparable with a Power off/on.

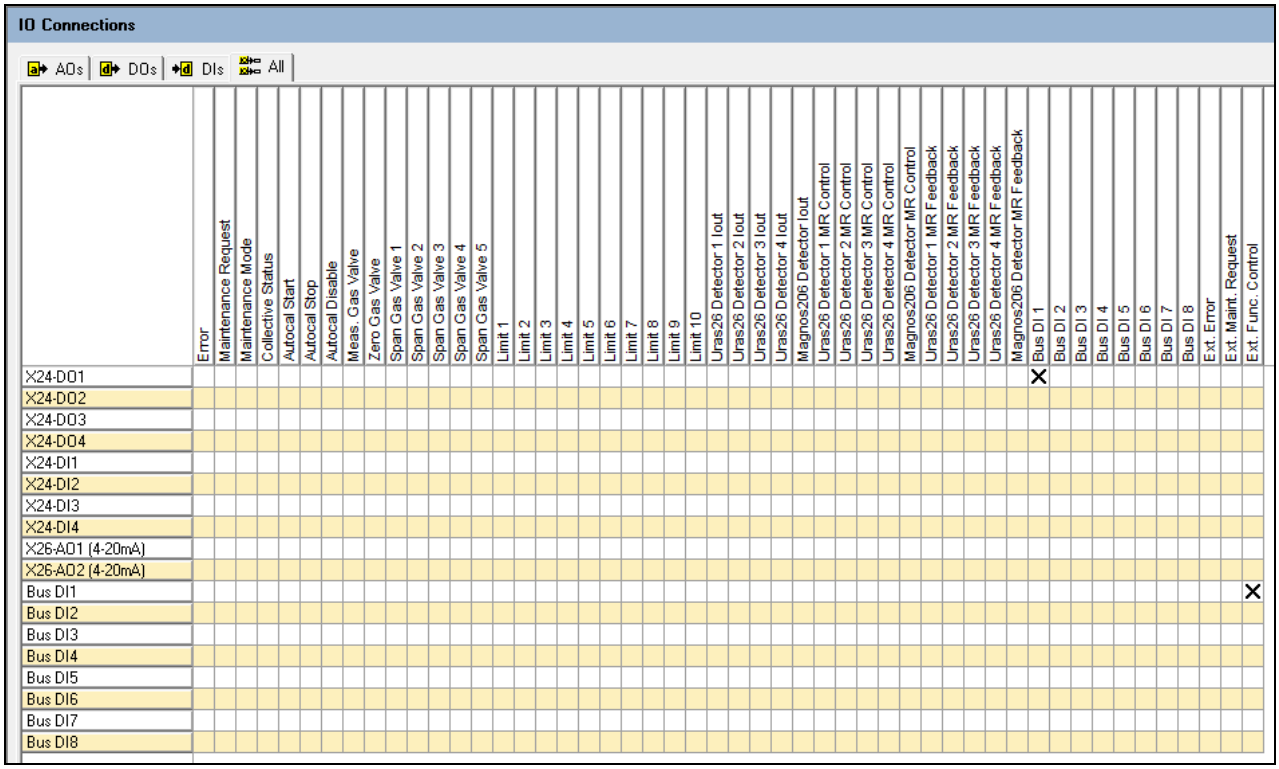
Application of Reference Material via PROFIBUS to VDI 4201

An evaluation computer equipped with a PROFIBUS interface to VDI 4201 is able to apply reference material to the connected gas analyzer.

In this regard, the application “Emission VDI 4201” must be set in the “Profibus” dialog of the “ECT” software tool (see Figure 6). Furthermore, connections between the bus digital inputs which are actuated via the PROFIBUS and the digital outputs, by means of which the solenoid valves are actuated, must be set up in the “IO Connections” dialog; at the same time, the bus digital inputs must set the status “External Function Control” (see the following example). The bus digital inputs in cyclic data traffic are shown in the Profibus map.

Example

The digital outputs X24-DO1 to X24-DO4 of the digital I/O module installed in slot –X24 are actuated via the bus digital inputs Bus DI1 to Bus DI4; at the same time, External Function Control is set for each activated bus digital input Bus DI1 to Bus DI4. For example, if the zero gas valve connected to digital output X24-DO1 is to be actuated by the evaluation computer via bus digital input Bus DI1 and the External Function Control set at the same time, a cross must be set in the X24-DO1 line in the Bus DI1 column and a cross in the Ext. Func. Control column in the Bus DI1 line (see the illustration below).



Mapping in Cyclic Data Communication

In cyclic data communication the measured values and I/Os are arranged automatically in the following sequence:

Analog inputs

1. Measured values 1–5
2. Current outputs 1–6

Digital inputs

3. Device status
4. Automatic calibration status
5. Limit values 1–10
6. Digital inputs 1–4 module 1
7. Digital inputs 1–4 module 2
8. Digital inputs 1–4 module 3
9. Digital outputs 1–4 module 1
10. Digital outputs 1–4 module 2
11. Digital outputs 1–4 module 3

Digital outputs

12. Start automatic calibration
13. Abort automatic calibration
14. Block automatic calibration
15. Bus digital inputs 1–8
16. Component switch-over (for each measured value detector)

In order to enter the cyclic data into a SPS or control system, the user needs the map of the cyclic data. Using the software tool “ECT” the map of the cyclic data can be read out from the gas analyzer. Subsequently these data can be printed and saved.

See example in Section “PROFIBUS Map”, page 37.

The PROFIBUS map is automatically modified if the configuration is changed (deletion or addition of DIO modules, AO modules or SSI modules).

Cyclic Data Transfer of Digital Inputs and Outputs

2 bytes are transferred for each digital value. (PROFIBUS PA profiles for Process Control Devices / General Requirements Data structure Numeric Identifier 102). The first byte represents the digital value. The second byte represents the status (see the following Section “Cyclic Data Transmission of Analog Inputs”).

Digital inputs

Status: The Namur status of the gas analyzer is mapped here (as in Modbus). Bit 0: Failure, Bit 1: Maintenance request, Bit 2: Maintenance mode, Bit 3: Collective status.
Autocal status: If the value is > 0, an autocalibration is executed in the device.
Alarm values: If the value is > 0, the alarm value is active.
Module DI, DO: If the value is > 0, the DI or DO is active.

Digital outputs

When writing to the DOs, it must be ensured that the status is set to a valid value (Good – OK = 0x80), otherwise the written value is not transferred to the system.
Autocal Start: The autocalibration is started by writing a value ≠ 0.
Autocal Cancel: An ongoing autocalibration is canceled by writing a value ≠ 0.
Autocal Disable: The start of an autocalibration is disabled by writing a value ≠ 0.
Bus DI: Writes the value to the value of Bus DI.
Component switch-over: The value which can be written here must be in the range $1 \leq x \leq$ number of components of the detector. A component switch-over is created for each detector of a measured variable, irrespective of whether one or more components have been set up.

Cyclic Data Transfer of Analog Inputs

For each analog value 5 bytes are transmitted (PROFIBUS PA Profile for Process Control Devices / General Requirements Data Structure Numeric Identifier 101). The first 4 bytes represent the analog value, which is transmitted in the IEEE 754 format (see page 19) .The 5th byte represents the status.

Condensed Status

For each diagnostic event which occurs in the gas analyzer, a measured value status and a bit must be set in the device diagnosis. A measured value status and diagnostic information are stored for each status message.

Device Diagnosis

Each diagnostic event of the gas analyzer is assigned to one of the following diagnosis bits in the device diagnosis.

Abbr.	Diagnosis bit	Code		
DMR	DIA_MAINTENANCE	0x00200000	Maintenance required	Maintenance request: Maintenance in ≥ 7 days
DMA	DIA_MAINTENANCE_ALARM	0x00000100	Failure of the device	Failure: Maintenance is required immediately
DMD	DIA_MAINTENANCE_DEMANDED	0x00000200	Maintenance demanded	Maintenance request: Maintenance in ≥ 24h
DFC	DIA_FUNCTION_CHECK	0x00000400	Device is in function check mode or in simulation or under local control, e.g. maintenance	Function check: The device is under local control, in self-diagnosis, being calibrated
DIPC	DIA_INV_PRO_COND	0x00000800	The process conditions do not allow returning valid values. (Set if a value has the quality Uncertain – process related, no maintenance or Bad – process related, no maintenance)	Process-related fault

Other diagnosis bits used

Abbr.	Diagnosis bit	Code
DCS	DIA_COLDSTART	0x00100000
DWS	DIA_WARMSTART	0x00080000
INV	IDENT_NUMBER_VIOLATION	0x00800000

Measured Value Status

The following measured value statuses are defined by the profile:

Abbr.	Code	Description	Meaning	
GOK	0x80–0x8E	Good – OK		
GMR	0xA4	Good – maintenance required	Device has wearout message (1st level)	
GMD	0xA8	Good – maintenance demand	Device has wearout message (2nd level)	
GFC	0xBC	Good – internal function check	Self-diagnosis, calibration, without noticeable influence on measured value	
BFC	0x3C	Bad – function check / local override	Device is maintained, cleaned or calibrated. Measured value does not correspond to the process value	If one of these faults occurs at the inlet of the FB, this will be converted to the outlet status to the defined failsafe table (Chapter 3.3.1 of amendment 2).
BMA	0x24	Bad – maintenance alarm	Error in device	
BP	0x23	Bad – passivated	Device is not used in the process. Device may not report any kind of diagnosis or other status.	
BNM	0x2B	Bad – process related, no maintenance	Device fault-free but fault-free measurement not possible	
USS	0x4B	Uncertain – substitute set	Device supplies preset substitute value in the event of a fault	Set by the profile stack to the defined failsafe table (Chapter 3.3.1 of amendment 2)
UIV	0x4F	Uncertain – initial value	Activate initial value to	Set by the profile stack
UMD	0x68	Uncertain – maintenance demanded	Device has wearout message (2nd level) measured value if necessary, outside the specification	
USVS	0x73	Uncertain – simulated value, start	Start of a simulation e.g. loop test when commissioning	Set by the profile stack (Chapter 3.1 of amendment 2)
USVE	0x74	Uncertain – simulated value, end	End of the simulation	Set by the profile stack (Chapter 3.1 of amendment 2)
UPR	0x78	Uncertain – process related	Device fault-free but fault-free measurement not possible, e.g. measured value with reduced precision	

Legend for the Table "Status Messages"

Status signals		
A	Status "Error"	A status has occurred in the gas analyzer which requires the immediate intervention of the user. The measured value is invalid.
W	Status "Maintenance Request"	A status has occurred in the gas analyzer which will soon require the intervention of the user. The measured value is valid.
F	Status "Maintenance Mode"	A calibration is being carried out in the gas analyzer, or the maintenance switch has been set to "On". The measured value is not a process measured value and is to be discarded.
S	Overall Status	The overall status is always set in conjunction with the status "Error" and for individual messages in conjunction with the status "Maintenance request"; it is not set in conjunction with the status "Maintenance mode".

Status messages categories	
a	Active status messages not requiring acknowledgement
aQ	Active status messages requiring acknowledgement
aL	Active status messages requiring acknowledgement and troubleshooting
iQ	Inactive status message requiring acknowledgement

PROFIBUS diagnosis and status	
	The abbreviations for the diagnosis are to be taken from the table in the Section "Device diagnosis" (cf. Page 13)
	The abbreviations for the status are to be taken from the table in the Section "Measured value status" (cf. Page 14). The measured value status for the inlet of the FB is entered in this column. If the status is Bad, this will be converted in the FB on the basis of the failsafe table (Chapter 3.3.1 of amendment 2).
L	With this status message only the disturbed variable (Local) assumes the measured value status.
G	With this status message all the measurement variables (Global) assume the measured value status.
	Note: Status messages with no entry in the "Profibus" columns are not mapped via the Profibus.

Continued on next page

Gas Analyzer Status Messages, *continued*

No.	Status			Profibus			Message
				Status	L/G	Diagn.	
110	A	S	a				The instrument is booting.
116	A	S	a				The Profibus module is installed in the wrong slot! The interface is therefore not operative. Please install the Profibus module in slot X20/X21.
119	A	S	iQ				The configuration could not be loaded! This instrument is therefore currently not configured. Please load a configuration using TCT.
120	F		a	BFC	G	DFC	The maintenance switch is ON.
121			aL				The limit value has alarm status.
122	A	S	a	BMA	G	DMA	The IO module is defective.
123	A	S	a	BMA	G	DMA	Communication error while accessing the IO module.
124			iQ				The configuration data was corrupt! The configuration was restored using the backup data.
125			a				The limit monitor is in alarm-state.
126	W		a	GMD	L	DMD	The QAL3 history buffer is full. Please read out QAL3 data.
127	W		a	GMD	L	DMD	The calibration drift exceeds the QAL3 limits.
250	A	S	aQ	BMA	L	DMA	The analyzer could not be found!
251	A	S	aQ	BMA	L	DMA	The connection to the analyzer has been lost!
252	A	S	aL	BMA	L	DMA	The EEPROM data of the analyzer is defective!
253	A	S	aL	BMA	L	DMA	Communication with the analyzer is faulty!
254	A	S	a	BMA	L	DMA	The boot program of the analyzer is defective! Notify service!
255	A	S	a	BMA	L	DMA	The program of the analyzer is defective! Notify service!
300	A	S	aL	BMA	L	DMA	No new measured values from the analog/digital converter.
301	A	S	a	BMA	L	DMA	The measurement value exceeds the value range of the analog/digital converter.
302	W		aQ	GMR	L	DMR	The offset drift exceeds half the permissible range.
303	A	S	aQ	GMD	L	DMD	The offset drift exceeds the permissible range.
304	W		aQ	GMR	L	DMR	The amplification drift exceeds half the permissible range.
305	A	S	aQ	GMD	L	DMD	The amplification drift exceeds the permissible range.
306	W		aQ	GOK	L	DMD	The offset drift between two calibrations exceeds the permissible range.
307	W		aQ	GOK	L	DMD	The amplification drift between two calibrations exceeds the permissible range.
308	A	S	aQ	BMA	L	DMA	A computational error occurred during the calculation of the measured value.
309	W		a	BMA	L	DMA	The temperature regulator is defective.
310	W		a	UMD	L	DMR	The temperature correction has been turned off for this component because the measured temperature value is invalid.
312	W		a	UMD	L	DMR	The pressure correction has been turned off for this component because the measured pressure value is invalid.
313	W		a	UMD	L	DMD	Cross-sensitivity correction is not possible for this component because the correction value is invalid.
314	W		a	UMD	L	DMD	Carrier gas correction is not possible for this component because the correction value is invalid.

Continued on next page

Gas Analyzer Status Messages, *continued*

No.	Status			Profibus			Message
				Status	L/G	Diagn.	
321	A	S		BMA	L	DMA	The detector temperature is below the lowest permissible temperature.
322	A	S		BMA	L	DMA	The flame is out.
323	A	S		BMA	L	DMA	The analyzer is in the fail-safe state.
324	W		a	GMR		DMR	The temperature is above or below the upper or lower alarm value 1.
325	W		a	BMA		DMR	The temperature is above or below the upper or lower alarm value 2.
357	A	S		BMA	L	DMA	Limas motor optimization in progress.
358	W			GMR	L	DMR	Lamp intensity above or below middle of permissible range.
359	A	S		BMA	L	DMA	Lamp intensity above or below permissible range.
360	A	S		BMA	L	DMA	Filter wheel 1 cannot be initialized.
362	A	S		BMA	L	DMA	Filter wheel 2 cannot be initialized.
378	A	S	aL	BMA	L	DMA	The chopper wheel is blocked.
379	A	S	aL	BMA	L	DMA	Chopper wheel speed not OK.
380	A	S	aL	BMA	L	DMA	IR source element or electronics defective.
381	A	S	aL	BMA	L	DMA	High voltage in the preamplifier defective.
390	A	S	aL	BMA	G	DMA	Module-internal power supply failure.
397	A	S	a				The temperature regulator sensor is defective.
398	A	S	aL				No new measured values from the analog/digital converter.
399	A	S	a				The measurement value exceeds the value range of the analog/digital converter.
400	A	S	a				A computational error occurred during the calculation of the measured value.
401	W		a				The flow is above or below the upper or lower alarm value 1.
402	A	S	a				The flow is above or below the upper or lower alarm value 2.
403	A	S	a				The controller output value is out of range.
404	A	S	a				The temperature is above or below the upper or lower alarm value 2.
411	F	S		BFC	L	DFC	The analyzer is in standby condition. Enter menu Service/Test..Standby/Restart FID to restart the analyzer.
412	A	S		BMA	G	DMA	Ignition failed. The analyzer has to be restarted manually. Enter menu Service/Test..Standby/Restart FID to restart the analyzer.
413	A	S	aL	BMA	G	DMA	Power fail on analyzer hardware,
414	F	S		BFC	L	DFC	The control value of this controller exceeds the lower limit. (< 20%)
415	F	S		BFC	L	DFC	The control value of this controller exceeds the upper limit. (> 90%)
420	F	S		BFC	L	DFC	The first component used to calculate the result is not measured now.
421	F	S		BFC	L	DFC	The second component used to calculate the result is not measured now.
422	F	S		BFC	L	DFC	The first component used to calculate the result has an error.
423	F	S		BFC	L	DFC	The second component used to calculate the result has an error.

Continued on next page

No.	Status			Profibus			Message
				Status	L/G	Diagn.	
500			iQ				An internal calibration error has occurred.
501			iQ				The requested functional capability is not available in the instrument.
502			iQ				A calibration error has occurred in the instrument.
503	W	S	iQ	GMD	L	DMD	The sensitivity is too low! The calibration was aborted.
508			iQ				Unknown calibration error. Check the configuration.
511			iQ				Autocalibration aborted.
512	F		a	BFC	G	DFC	Autocalibration in progress.
513			iQ				An internal calibration error has occurred.
517	F		a	BFC	G	DFC	Instrument is in operation.
518			iQ				The calibration could not be carried out because the measured value is unstable.
519			iQ				The calibration could not be carried out because the preamplifier is overranging.
529	W	S	iQ	GMD	L	DMD	The calibration was aborted because no raw measured values can be recorded.
801	A	S	a	BMA	G	DMA	An external failure occurred.
802	W		a	GMR	G	DMR	An external maintenance request occurred.
803	W			BFC	G	DFC	An external maintenance mode occurred.

IEEE 754 Format

Designation	Number of bits	Meaning
S	1	Sign bit; indicated sign (0 = positive, 1 = negative)
E	8	2nd complement representation. The actual value is the exponent minus 127.
M	23	The “most significant bit” of the normalized mantissa ahead of the decimal point is implicitly 1 but not stored. The value range is thus between 1.0 (included) and 2.0.

Example
The number –12.5 is stored as hexadecimal value 0xC1480000. The following table shows the memory allocation:

Address	+0	+1	+2	+3
Format	SEEEEEEE	EMMMMMMM	MMMMMMMM	MMMMMMMM
Binary	11000001	01001000	00000000	00000000
Hexadecimal	C1	48	00	00

Explanation:
- The sign is 1, i.e. the value is negative.
- The exponent is binary 10000010; this is equivalent to the decimal value 130. The exponent value is thus 130–127=3.
- The stored mantissa has a binary value of 10010000000000000000000. Adding the (unstored) leading 1 ahead of the decimal point results in the value 1 . 10010000000000000000000.
- After fitting the mantissa to the exponents (shifting three places) the result is 1100 . 10000000000000000000. This binary value corresponds to the decimal value 12.5.
  With the sign the value is –12.5.

Chapter 5 Mapping of the “Transducer/Function Blocks”

The following components can be accessed acyclically via the PROFIBUS.

Physical Block (PB)

The PB contains a global device description with the following information:

- Software version
- Manufacturer identification (ABB PROFIBUS identification = “26”)
- Serial number of the device
- Diagnosis (status of the device)
- Device configuration (description of the device modules with function units)
- Device status (run, standby, power down, maintenance)
- Global status (see below)
- …

Global status

The “global status” of a PROFIBUS PA device is a 16-bit variable. Each bit represents one status class. The status classes are divided into 3 NAMUR status signals (error, maintenance request and maintenance mode), limit value monitoring and manufacturer-specific status information. The “global status” is shown as follows:

Bit 1	Error
Bit 2	Maintenance request
Bit 3	Maintenance mode
Bit 4	Limit value monitoring (not supported)
Bit 5–16	manufacturer-specific

The “global status” is formed from the OR sum of the status classes. The status classes are described in the Transducer Alarm Block (TAB). As the TAB is not to be implemented, the 3 NAMUR status signals error, maintenance request and maintenance mode are mapped.

PROFIBUS “Analog Input Function Blocks”

Component measurement values

In the profile one Analyzer Transducer Block (ATB) is created for each measurement component. The cyclic data exchange of measurement components is made via “Analog Input Function Blocks” (AIFB). To each AIFB is assigned one ATB. This assignment is made via the AIFB channel. If a detector measures more than one component, these components will share one AIFB (e.g. Caldos27).

Switching of components is implemented via the "Component switch-over" DO (see page 22). With switching components the AIFB channel is shifted to the active ATB. The channel is not permitted to write via the PROFIBUS.

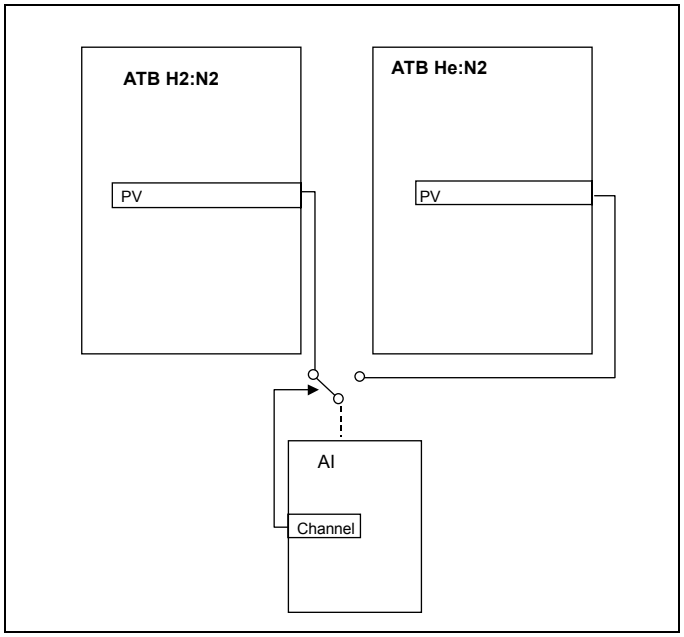


Figure 7 Switching components between AIFB and two ATBs

Analog output (Hardware analog outputs of the gas analyzer)

One PROFIBUS AIFB is assigned to each configured analog output and a manufacturer-specific AITB is assigned to the AIFB.

PROFIBUS “Digital Input Function Blocks”

Status

One PROFIBUS DIFB is assigned to the status (Namur status, Autocal status). A manufacturer-specific DITB is allocated to the DIFB.

Alarm values

One PROFIBUS DIFB is assigned to each alarm value. A manufacturer-specific DITB is allocated to the DIFB.

Digital input/output (Hardware digital inputs/outputs of the gas analyzer)

One PROFIBUS DIFB is assigned to each digital input/output and a manufacturer-specific DITB is allocated to the DIFB.

PROFIBUS “Digital Output Function Blocks”

Control of the calibration

One PROFIBUS DOFB is assigned to each logic control function of the automatic calibration (Start, Cancel, Disable). A manufacturer-specific “Digital Output Transducer Block” (DOTB) is allocated to the DOFB.

Bus digital input

One PROFIBUS DOFB is assigned to each configured bus digital input and a manufacturer-specific “Digital Output Transducer Block” (DOTB) is allocated to the DOFB.

Component switch-over

One PROFIBUS DOFB is assigned to each component switch-over. A manufacturer-specific “Digital Output Transducer Block” (DOTB) is allocated to the DOFB. A component switch-over is created for each detector of a measured variable, irrespective of whether one or more components have been set up.

Analyzer Transducer Block (ATB)

The ATB describes the measurement components and provides the following information:
- Component name
- Unit
- Active measurement range
- Autorange off/on
- Number of measurement ranges
- Lower-range value and upper-range value
- Measurement value with status and time stamp
- Measurement value cycle time

In addition, the ATB contains the following manufacturer-specific information:
- lowest and highest values, within which the measurement range can be set and
- the smallest measurement range span

Discrete Input Transducer Block (DITB)

The DITB describes the hardware digital inputs and outputs of the gas analyzer. Each DITB is assigned to one DIFB and provides the process value for the DIFB.

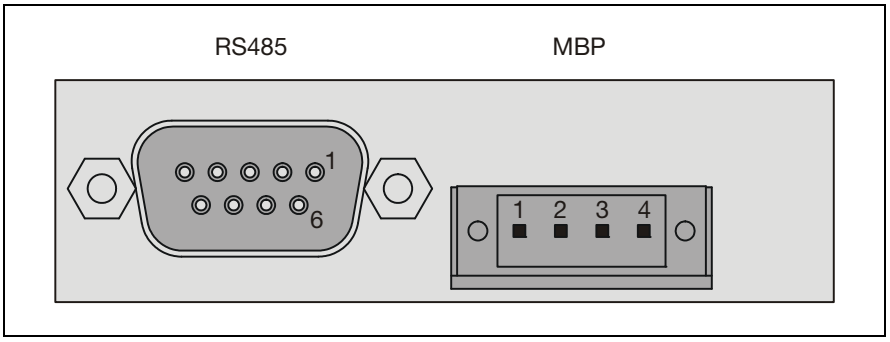
Analog Input Transducer Block (AITB)

The AITB is a manufacturer-specific transducer block. The AITB describes the hardware analog outputs of the gas analyzer. Each AITB is assigned to one AIFB and provides the process value for the AIFB.

Digital Output Transducer Block (DOTB)

The DOTB is a manufacturer-specific transducer block. The DOTB describes the bus digital inputs and the calibration control and the component switch-over of the gas analyzer. Each DOTB is assigned to one DOFB and provides the process value for the bus digital input.

Connecting PROFIBUS



RS485 interface:

1	–	not used
2	M24	24 V Output Ground
3	RxD/TxD-P	Receive/Transmit Data Plus, B-Line
4	–	not used
5	DGND	Data Transmission Potential (Ref. Pot. for VP)
6	VP	Supply Voltage Plus (5 V)
7	P24	24 V Output Voltage Plus, max. 0.2 A
8	RxD/TxD-N	Receive/Transmit Data N, A-Line
9	–	not used

Design: 9-pin Sub-D female connector

MBP interface (non-intrinsically safe):

1	+
2	Shield
3	–
4	Not used

Design: 4-pin terminal strip for braided or solid conductors with a maximum section of 1 mm^2 (17 AWG)

The Profibus module must always be inserted into slot -X20/-X21 of the electronic module.

The scope of supply does not include cables or connectors. PROFIBUS accessories can be acquired from ABB (see also Data Sheet 70/63).

GSD File

```
;-------------------------------------------------------------------
; PROFIBUS GSD for ABB Continuous Gas Analyzer EL3000 Series
; 22. Jan. 2008 WK  V 1.0.0     Release
;
;-------------------------------------------------------------------

#PROFIBUS_DP
GSD_Revision            = 5
Vendor_Name             = "ABB"
Model_Name              = "EL3000 Series"
Info_Text               = "EL3000 Series, Continuous Gas Analyzer EL3000 Series"
Revision                = "1.0.0"
Ident_Number            = 0x3400
Protocol_Ident          = 0
Station_Type            = 0
FMS_supp                = 0

Hardware_Release        = "-"
Software_Release        = "3.2.8"
Implementation_Type     = "SPC4"

Bitmap_Device           = "EL3000_R"
Bitmap_Diag             = "EL3000_D"
Bitmap_SF               = "EL3000_S"

9.6_supp                = 1
19.2_supp               = 1
31.25_supp              = 1
45.45_supp              = 1
93.75_supp              = 1
187.5_supp              = 1
500_supp                = 1
1.5M_supp               = 1
3M_supp                 = 1
6M_supp                 = 1

MaxTsdr_9.6             = 60
MaxTsdr_19.2            = 60
MaxTsdr_31.25           = 60
MaxTsdr_45.45           = 250
MaxTsdr_93.75           = 60
MaxTsdr_187.5           = 60
MaxTsdr_500             = 100
MaxTsdr_1.5M            = 150
MaxTsdr_3M              = 250
MaxTsdr_6M              = 450

Auto_Baud_supp          = 1
```

Continued on next page

```
Redundancy              = 0
Repeater_Ctrl_Sig       = 0
24V_Pins                = 2
Freeze_Mode_supp        = 0
Sync_Mode_supp          = 0
Set_Slave_Add_supp      = 1

Min_Slave_Intervall     = 6
Modular_Station         = 1

Max_Module              = 60
Max_Input_Len           = 240                   ; maximum Input Length
Max_Output_Len          = 240                   ; maximum Output Length
Max_Data_Len            = 300                   ; maximum In-Output Length

Slave_Family            = 12

Max_Diag_Data_Len       = 14
Max_User_Prm_Data_Len   = 8

PrmText                 = 1
Text(0)                 = "Disabled"
Text(1)                 = "Enabled"
EndPrmText

Ident_Maintenance_supp  =  1

ExtUserPrmData          = 1 "Condensed Status"
Bit(0) 1 0-1
Prm_Text_Ref            = 1
EndExtUserPrmData

Ext_User_Prm_Data_Const(0)  = 0x00, 0x00, 0x00
Ext_User_Prm_Data_Const(3)  = 0x05,0x41,0x00,0x00,0x01  ;default Values
                                                        ;Structure_Length = 5
                                                        ;Structur_Type = 65
(profile specific
                                                        ;Slot_Number = 0
                                                        ;reserved = 0
                                                        ;PRM_COND = 1 (enable)

Ext_User_Prm_Data_Ref(7)    = 1         ;reference to condensed status bit
PRM_COND
Prm_Block_Structure_supp    = 1         ;enables the block structure of extended
parametrization

;----------- Description of extended DP features: ---------------------
;
DPV1_Slave                  = 1
C2_Read_Write_supp          = 1
C2_Max_Data_Len             = 130
C2_Read_Write_required      = 1
C2_Max_Count_Channels       = 1
Max_Initiate_PDU_Length     = 52
C2_Response_Timeout         = 4000
DPV1_Data_Types             = 0
```

Continued on next page

```
;---- Description of physical interface for asynchronous transmission: ----
; RS485 Standard Copper can be selected without additional restrictions.

;----------- Description of device related diagnosis: --------------------
;
Unit_Diag_Bit(16)    = "Error appears"
Unit_Diag_Bit(17)    = "Error disappears"
Unit_Diag_Bit(35)    = "Restart"
Unit_Diag_Bit(36)    = "Coldstart"
Unit_Diag_Bit(37)    = "Maintenance Required"
Unit_Diag_Bit(39)    = "Ident_Number violation"
Unit_Diag_Bit(40)    = "Maintenance Alarm"
Unit_Diag_Bit(41)    = "Maintenance Demanded"
Unit_Diag_Bit(42)    = "Function Check"
Unit_Diag_Bit(43)    = "Inv Pro Cond"
Unit_Diag_Bit(55)    = "Extension Available"
;------------------------------------------------------------------------
;Modules for Analog Input
Module = "Analog Input (AI)"        0x42,0x84,0x81,0x81
1
EndModule

;Modules for Discrete Input
Module = "Discrete Input (DI)"      0x42,0x81,0x83,0x81
2
EndModule

;Modules for Discrete Output
Module = "Discrete Output (DO)"     0x82,0x81,0x84,0x82
3
EndModule
```

Acyclic Parameters – Physical Block

Relative index	Variable	Object type	Data type	Store	Size	Access	Parameter usage/Type of transport	Default values	Mandatory/ Optional
0	BLOCK OBJECT	Record	DS-32	C	20	r	C/a	-	m
1	ST_REV	Simple	Unsigned16	N	2	r	C/a	0	m
2	TAG_DESC	Simple	OctetString *	S	32	r,w	C/a	‘ ‘	m
3	STRATEGY	Simple	Unsigned16	S	2	r,w	C/a	0	m
4	ALERT_KEY	Simple	Unsigned8	S	1	r,w	C/a	0	m
5	TARGET_MODE	Simple	Unsigned8	S	1	r,w	C/a	-	m
6	MODE_BLK actual permitted normal	Record	DS-37	D	3	r	C/a	block-specific	m
7	ALARM_SUM	Record	DS-42	D	8	r	C/a	0,0,0,0	m
8	SOFTWARE_REVISION	Simple	VisibleString	Cst	16	r	C/a	Version 3.0.2	m
9	HARDWARE_REVISION	Simple	VisibleString	Cst	16	r	C/a	-	m
10	DEVICE_MAN_ID	Simple	Unsigned16	Cst	2	r	C/a	26 (ABB)	m
11	DEVICE_ID	Simple	VisibleString	Cst	16	r	C/a	-	m
12	DEVICE_SER_Num	Simple	VisibleString	Cst	16	r	C/a	MAC Address	m
13	DIAGNOSIS	Simple	OctetString byte4,MSB=1 more diag available	D	4	r	C/a	-	m
14	DIAGNOSIS_EXTENSION	Simple	OctetString	D	6	r	C/a	-	o
15	DIAGNOSIS_MASK	Simple	OctetString	Cst	4	r	C/a	-	m
16	DIAGNOSIS_MASK_EXTENSION	Simple	OctetString	Cst	6	r	C/a	-	o
17	DEVICE_CERTIFICATION	Simple	VisibleString	Cst	32	r	C/a	-	o
18	WRITE_LOCKING	Simple	Unsigned16	N	2	r,w	C/a	-	o
19	FACTORY_RESET	Simple	Unsigned16	S	2	r,w	C/a	-	o
20	DESCRIPTOR	Simple	OctetString	S	32	r,w	C/a	-	o
21	DEVICE_MESSAGE	Simple	OctetString	S	32	r,w	C/a	-	o
22	DEVICE_INSTAL_DATE	Simple	OctetString	S	16	r,w	C/a	-	o
23	LOCAL_OP_ENA	Simple	Unsigned8	N	1	r,w	C/a	1	o
24	IDENT_NUMBER_SELECTOR	Simple	Unsigned8	S	1	r,w	C/a	-	m (B)
25	HW_WRITE_PROTECTTION	Simple	Unsigned8	D	1	r	C/a	-	o
26	FEATURE	Record	DS-68	N	8	r	C/a		M
27	COND_STATUS_DIAG	Simple	Unsigend8	S	1	r/w	C/a		M
28	DIAG_EVENT_SWITCH	Record	Diag_Event_Switch	S	50	r/w	C/a		o

Continued on next page

Relative index	Variable	Object type	Data type	Store	Size	Access	Parameter usage/Type of transport	Default values	Mandatory/ Optional
29–32	Reserved by PNO								
33–35	Reserved by PNO								
36	DEVICE_CONFIGURATION	Simple	VisibleString	N	32	r	C/a	-	m
37	INIT_STATE	Simple	Unsigned8	S	1	r,w	C/a	-	m
38	DEVICE_STATE	Simple	Unsigned8	D	1	r,w	C/a	-	m
39	GLOBAL_STATUS	Simple	Unsigned16	D	2	r	C/a	0	m
40–47	Reserved by PNO								m
48	First manufacturer-specific parameter								o

Physical Block Bit Strings DIAGNOSIS Parameter Structure

		DIAGNOSIS		
Octet	**Bit**	**Mnemonic**	**Description**	**Indication Class**
1	0		reserved by PNO, fixed to 0	R
	1		reserved by PNO, fixed to 0	R
	2		reserved by PNO, fixed to 0	R
	3		reserved by PNO, fixed to 0	R
	4		reserved by PNO, fixed to 0	R
	5		reserved by PNO, fixed to 0	R
	6		reserved by PNO, fixed to 0	R
	7		reserved by PNO, fixed to 0	R
2	0		reserved by PNO, fixed to 0	R
	1		reserved by PNO, fixed to 0	R
	2		reserved by PNO, fixed to 0	R
	3	DIA_WARMSTART	New-start-up (warm start up) carried out.	A
	4	DIA_COLDSTART	Re-start-up (cold start up) carried out.	A
	5	DIA_MAINTAINANCE	Maintenance required	R
	6		reserved by PNO, fixed to 0	R
	7	IDENT_NUMBER_Violation	Set to 1 (one), if the Ident_Number of the running cyclic data transfer and the value of Physical Block IDENT_NUMBER_SELECTOR parameter are different.	R

Continued on next page

		DIAGNOSIS		
Octet	**Bit**	**Mnemonic**	**Description**	**Indication Class**
3	0	DIA_MAINTENANCE_ ALARM	Failure of the device	
	1	DIA_MAINTENANCE_ DEMANDED	Maintenance demanded	
	2	DIA_FUNCTION_CHECK	Device is in function check mode or in simulation or under local control e.g. maintenance	
	3	DIA_INV_PRO_COND	The process conditions don´t allow to return valid values. (set if a value has the quality Uncertain-Process related, no maintenance or Bad-Process related, no maintenance	
	4 ... 7	reserved	Reserved for use within the PNO	
4	0 ... 6	reserved	Reserved for use within the PNO	
4	7	EXTENSION_AVAILABLE	More diagnosis information is available	

Values of the DIAGNOSIS bit: 0 = not set, 1 = set

R Indication, remains active as long as the reason for the message exists.
A Indication, will be automatically reset after 10 s.

Octet 1				Octet 2				Octet 3				Octet 4			
Bit 7	...	...	Bit 0	Bit 7	...	...	Bit 0	Bit 7	...	...	Bit 0	Bit 7	..	..	Bit 0

Analog Input Function Block

Relative index	Variable	Object type	Data type	Store	Size	Access	Parameter usage/Type of transport	Default values	Mandatory/ Optional
0	BLOCK OBJECT	Record	DS-32	C	20	r	C/a	-	m
1	ST_REV	Simple	Unsigned16	N	2	r	C/a	0	m
2	TAG_DESC	Simple	OctetString	S	32	r,w	C/a	‘ ‘	m
3	STRATEGY	Simple	Unsigned16	S	2	r,w	C/a	0	m
4	ALERT_KEY	Simple	Unsigned8	S	1	r,w	C/a	0	m
5	TARGET_MODE	Simple	Unsigned8	S	1	r,w	C/a	-	m
6	MODE_BLK actual permitted normal	Record	DS-37	D	3	r	C/a	block-specific	m
7	ALARM_SUM	Record	DS-42	D	8	r	C/a	0,0,0,0	m
8	BATCH	Structure	DS-67	S	10	r,w	C/a	0,0,0,0	m
10	OUT	Record	DS-33	D	5	r	O/cyc		m (A,B)
11	PV_SCALE	Array	Float (*)	S	8	r,w	C/a	100, 0	m (A,B)
12	OUT_SCALE	Record	DS-36	S	11	r,w	C/a	100,0,-,-	m (B)
13	LIN_TYPE	Simple	Unsigned8	S	1	r,w	C/a	0	m (B)
14	CHANNEL	Simple	Unsigned16	S	2	r,w	C/a	-	m (B)
16	PV_FTIME	Simple	Float	S	4	r,w	C/a	0	m (A,B)
17	FSAFE_ TYPE (***)	Simple	Unsigned8	S	1	r,w	C/a	1 Last usable value (0 Failsafe value) (2 Wrong calculated value)	o (B)
18	FSAFE_VALUE	Simple	Float	S	4	r,w	C/a	-	o (B)
19	ALARM_HYS	Simple	Float	S	4	r,w	C/a	0.5 % of range	m (A,B)
21	HI_HI_LIM	Simple	Float	S	4	r,w	C/a	max value	m (A,B)
23	HI_LIM	Simple	Float	S	4	r,w	C/a	max value	m (A,B)
25	LO_LIM	Simple	Float	S	4	r,w	C/a	min value	m (A,B)
27	LO_LO_LIM	Simple	Float	S	4	r,w	C/a	min value	m (A,B)
30	HI_HI_ALM	Record	DS-39	D	16	r	C/a	0	o (A,B)
31	HI_ALM	Record	DS-39	D	16	r	C/a	0	o (A,B)
32	LO_ALM	Record	DS-39	D	16	r	C/a	0	o (A,B)
33	LO_LO_ALM	Record	DS-39	D	16	r	C/a	0	o (A,B)
34	SIMULATE	Record	DS-50	S	6	r,w	C/a	disable	m (B)
35	OUT_UNIT_TEXT	Simple	OctetString	S	16	r,w	C/a	-	o (A,B)
36-44	reserved by PNO								m (A,B)
45	first manufacturer-specific parameter								o (A,B)

Continued on next page

Digital Input Function Block

Relative index	Variable	Object type	Data type	Store	Size	Access	Parameter usage / Type of transport	Default values	Mandatory / Optional
0	BLOCK OBJECT	Record	DS-32	C	20	r	C/a	-	m
1	ST_REV	Simple	Unsigned16	N	2	r	C/a	0	m
2	TAG_DESC	Simple	OctetString	S	32	r,w	C/a	‘ ‘	m
3	STRATEGY	Simple	Unsigned16	S	2	r,w	C/a	0	m
4	ALERT_KEY	Simple	Unsigned8	S	1	r,w	C/a	0	m
5	TARGET_MODE	Simple	Unsigned8	S	1	r,w	C/a	-	m
6	MODE_BLK actual permitted normal	Record	DS-37	D	3	r	C/a	block-specific	m
7	ALARM_SUM	Record	DS-42	D	8	r	C/a	0,0,0,0	m
8	BATCH	Structure	DS-67	S	10	r,w	C/a	0,0,0,0	m
10	OUT_D	Record	DS-34	D	2	r,w	O/cyc		M (A,B)
14	CHANNEL	Simple	Unsigned16	S	2	r,w	C/a	-	O(A) M(B)
15	INVERT	Simple	Unsigned 8	S	1	r,w	C/a	0	M (A,B)
20	FSAFE_TYPE	Simple	Unsigned 8	S	1	r,w	C/a	1 Last usable value (0 Failsafe value) (2 Wrong calculated value)	O(A) M(B)
21	FSAFE_VAL_D	Simple	Unsigned 8	S	1	r,w	C/a	0	M(A,B)
24	SIMULATE	Record	DS-51	S	3	r,w	C/a	disable	O(A) M(B)
25-34	reserved by PNO								M (A, B)
35	first manufacturer-specific parameter								O

Continued on next page

Digital Output Function Block

Relative index	Variable	Object type	Data type	Store	Size	Access	Parameter usage / Type of transport	Default values	Mandatory / Optional
0	BLOCK OBJECT	Record	DS-32	C	20	r	C/a	-	m
1	ST_REV	Simple	Unsigned16	N	2	r	C/a	0	m
2	TAG_DESC	Simple	OctetString	S	32	r,w	C/a	‘ ‘	m
3	STRATEGY	Simple	Unsigned16	S	2	r,w	C/a	0	m
4	ALERT_KEY	Simple	Unsigned8	S	1	r,w	C/a	0	m
5	TARGET_MODE	Simple	Unsigned8	S	1	r,w	C/a	-	m
6	MODE_BLK actual permitted normal	Record	DS-37	D	3	r	C/a	block-specific	m
7	ALARM_SUM	Record	DS-42	D	8	r	C/a	0,0,0,0	m
8	BATCH	Structure	DS-67	S	10	r,w	C/a	0,0,0,0	m
9	SP_D	Record	DS-34	D	2	r,w	I/a, cyc	-	M(A,B)
10	OUT_D	Record	DS-34	D	2	r,w	C/a	-	O(A) M(B)
12	READBACK_D	Record	DS-34	D	2	r	O/a, cyc	-	O cyc optional
14	RCAS_IN_D	Record	DS-34	D	2	r,w	I/a, cyc	-	O(A) M(B) cyc optional
17	CHANNEL	Simple	Unsigned16	S	2	r,w	C/a	-	O(A) M(B)
18	INVERT	Simple	Unsigned 8	S	1	r,w	C/a	0	M(A,B)
19	FSAVE_TIME	Simple	Float	S	4	r,w	C/a	0	O(A) M(B)
20	FSAVE_TYPE	Simple	Unsigned 8	S	1	r,w	C/a	2	O(A) M(B)
21	FSAVE_VAL_D	Simple	Unsigned 8	S	1	r,w	C/a	0	O(A) M(B)
22	RCAS_OUT_D	Record	DS-34	D	2	r	O/a, cyc	-	O(A) M(B) cyc optional
24	SIMULATE	Record	DS-51	S	3	r,w	C/a	disable	O(A) M(B)
33	CHECK_BACK	Simple	OctetString	D	3	r	C/a, cyc	-	M cyc optional
34	CHECK_BACK_MASK	Simple	OctetString	Cst	3	r	C/a	-	M
35–44	reserved by PNO								M (A,B)
45	first manufacturer-specific parameter								O (A,B)

Analyzer Transducer Block

Relative index	Variable	Object type	Data type	Store	Size	Access	Parameter usage / Type of transport	Default values	Mandatory / Optional
0	BLOCK OBJECT	Record	DS-32	C	20	r	C/a	-	m
1	ST_REV	Simple	Unsigned16	N	2	r	C/a	0	m
2	TAG_DESC	Simple	OctetString	S	32	r,w	C/a	‘ ‘	m
3	STRATEGY	Simple	Unsigned16	S	2	r,w	C/a	0	m
4	ALERT_KEY	Simple	Unsigned8	S	1	r,w	C/a	0	m
5	TARGET_MODE	Simple	Unsigned8	S	1	r,w	C/a	-	m
6	MODE_BLK actual permitted normal	Record	DS-37	D	3	r	C/a	block-specific	m
7	ALARM_SUM	Record	DS-42	D	8	r	C/a	0,0,0,0	m
8	COMPONENT_NAME	Simple	OctetString	S	32	r,w	C/a	-	m
9	PV	Record	DS-60	D	12	r	C/a	-	m
10	PV_UNIT	Simple	Unsigned16	S	2	r,w	C/a	-	m
11	PV_UNIT_TEXT*	Simple	OctetString	S	8	r,w	C/a	-	m
12	ACTIVE_RANGE	Simple	Unsigned8	S	1	r,w	C/a	-	m
13	AUTORANGE_ON	Simple	Boolean	S	1	r,w	C/a	-	m
14	SAMPLING_RATE	Simple	Time_difference	S	4	r,w	C/a	-	m
15–24	Reserved by PNO								m
25	NUMBER_OF_RANGES	Simple	Unsigned8	N	1	r	C/a	-	m
26	RANGE_1	Record	DS-61	N	8	r,w	C/a	-	m
...									
25+n	RANGE_n	Record	DS-61	N	8	r,w	C/a	-	o
25+n+1	First manufacturer-specific parameter								o
55+n	RANGE_LIMIT_1	Array	Floating-Point		12	R	C/a		o

The Range Limit is an array of three floating-point variables. These three variables show the lower and upper range limit as well as the minimum adjustable span of the measurement range (in % of the measurement range)

Continued on next page

Digital Input Transducer Block

Relative index	Variable	Object type	Data type	Store	Size	Access	Parameter usage/Type of transport	Default values	Mandatory/ Optional
0	BLOCK OBJECT	Record	DS-32	C	20	r	C/a	-	m
1	ST_REV	Simple	Unsigned16	N	2	r	C/a	0	m
2	TAG_DESC	Simple	OctetString	S	32	r,w	C/a	‘ ‘	m
3	STRATEGY	Simple	Unsigned16	S	2	r,w	C/a	0	m
4	ALERT_KEY	Simple	Unsigned8	S	1	r,w	C/a	0	m
5	TARGET_MODE	Simple	Unsigned8	S	1	r,w	C/a	-	m
6	MODE_BLK actual permitted normal	Record	DS-37	D	3	r	C/a	block-specific	m
7	ALARM_SUM	Record	DS-42	D	8	r	C/a	0,0,0,0	m
12	PV_D	Record	DS-34	D	2	R	C/a	-	M(B)
23	first manufacturer-specific parameter								O (A,B)
23	NAME	Simple	OctetString	S	32	R	C/a		O (A,B)

Digital Output Transducer Block (manufacturer-specific)

Relative index	Variable	Object type	Data type	Store	Size	Access	Parameter usage/Type of transport	Default values	Mandatory/ Optional
0	BLOCK OBJECT	Record	DS-32	C	20	r	C/a	-	m
1	ST_REV	Simple	Unsigned16	N	2	r	C/a	0	m
2	TAG_DESC	Simple	OctetString	S	32	r,w	C/a	‘ ‘	m
3	STRATEGY	Simple	Unsigned16	S	2	r,w	C/a	0	m
4	ALLERT_KEY	Simple	Unsigned8	S	1	r,w	C/a	0	m
5	TARGET_MODE	Simple	Unsigned8	S	1	r,w	C/a	-	m
6	MODE_BLK actual permitted normal	Record	DS-37	D	3	r	C/a	block-specific	m
7	ALARM_SUM	Record	DS-42	D	8	r	C/a	0,0,0,0	m
9	PV_D	Record	DS-34	D	2	R	C/a	-	o
10	NAME	Simple	OctetString	S	32	R	C/a		o

Continued on next page

Analog Input Transducer Block (manufacturer-specific)

Relative index	Variable	Object type	Data type	Store	Size	Access	Parameter usage / Type of transport	Default values	Mandatory / Optional
0	BLOCK OBJECT	Record	DS-32	C	20	r	C/a	-	m
1	ST_REV	Simple	Unsigned16	N	2	r	C/a	0	m
2	TAG_DESC	Simple	OctetString	S	32	r,w	C/a	‘ ‘	m
3	STRATEGY	Simple	Unsigned16	S	2	r,w	C/a	0	m
4	ALERT_KEY	Simple	Unsigned8	S	1	r,w	C/a	0	m
5	TARGET_MODE	Simple	Unsigned8	S	1	r,w	C/a	-	m
6	MODE_BLK actual permitted normal	Record	DS-37	D	3	r	C/a	block-specific	m
7	ALARM_SUM	Record	DS-42	D	8	r	C/a	0,0,0,0	m
9	PV	Record	DS-60	D	12	R	C/a	-	o
10	NAME	Simple	OctetString	S	32	R	C/a		o
11	PV_UNIT	Simple	Unsigned16	S	2	r,w	C/a	-	o
12	PV_UNIT_TEXT*	Simple	OctetString	S	8	r,w	C/a	-	o
13	RANGE	Record	DS-61	N	8	r,w	C/a	-	o

Continued on next page

Limit Transducer Block

Relative index	Variable	Object type	Data type	Store	Size	Access	Parameter usage / Type of transport	Default values	Mandatory / Optional
0	BLOCK OBJECT	Record	DS-32	C	20	r	C/a	-	m
1	ST_REV	Simple	Unsigned16	N	2	r	C/a	0	m
2	TAG_DESC	Simple	OctetString *	S	32	r,w	C/a	‘ ‘	m
3	STRATEGY	Simple	Unsigned16	S	2	r,w	C/a	0	m
4	ALERT_KEY	Simple	Unsigned8	S	1	r,w	C/a	0	m
5	TARGET_MODE	Simple	Unsigned8	S	1	r,w	C/a	-	m
6	MODE_BLK actual permitted normal	Record	DS-37	D	3	r	C/a	block-specific	m
7	ALARM_SUM	Record	DS-42	D	8	r	C/a	0,0,0,0	m
9	CHANNEL	Simple	Unsigned16	S	2	r/w	C/a	.	m
10	THRESHOLD	Simple	Float	S	4	r/w	C/a		
11	HYSTERESIS	Simple	Float	S	4	r/w	C/a		
12	DIRECTION	Simple	Unsigned8	S	1	r/w	C/a		
13	ON_DELAY	Simple	Time_Difference	S	4	r/w	C/a		
14	OFF_DELAY	Simple	Time_Difference	S	4	r/w	C/a		
15	RESET	Simple	Unsigned8	S	1	r/w	C/a		
16	CONFIRMATION	Simple	Unsigned8	S	1	r/w	C/a		
17	LIMIT_STATUS	Simple	102	S	2	r	C/a		

PROFIBUS Map

Example of a PROFIBUS map from EL3000

noname ECT for EL3000 (V3.3.2.0) DHCP Device Name: EL3K010CCE Date: 11/29/2012 - 11:30:51 AM

Profibus

No.	Profibus	Component/IO	Offset	Description	Unit	Module Tex
1	AI	Measured Variables	0	Air:CO2	Vol %	Caldos 27 1
2	.....	.....		Air:CO2,CO2:Air	Vol %,Vol %	.....
3	.....	.....		Air:CO2,CO2:Air,Stdg N2	Vol %,Vol %,rTC	.....
4	AI	Current Outputs	5	X24-AO1	mA	Caldos27 D
5	.....	.....	10	X24-AO2	mA	Caldos27 D
6	DI	Collective Status	15	X22-DO1	.....	.....
7	DI	Autocal Status	17	Bus DO1	.....	.....
8	DI	Limit Values	19	Limit Values 1 : X22-DO2	.....	
9	.....	.....	21	Limit Values 2 : X22-DO3	.....	
10	.....	.....	23	Limit Values 3 :	.....	
11	.....	.....	25	Limit Values 4 :	.....	
12	.....	.....	27	Limit Values 5 :	.....	
13	.....	.....	29	Limit Values 6 :	.....	
14	.....	.....	31	Limit Values 7 :	.....	
15	.....	.....	33	Limit Values 8 :	.....	
16	.....	.....	35	Limit Values 9 :	.....	
17	.....	.....	37	Limit Values 10 :	.....	
18	DI	Digital Inputs	39	X22-DI1	.....	IO Module 1
19	.....	.....	41	X22-DI2	.....	IO Module 1
20	.....	.....	43	X22-DI3	.....	IO Module 1
21	.....	.....	45	X22-DI4	.....	IO Module 1
22	DI	Digital Outputs	47	X22-DO1	.....	IO Module 1
23	.....	.....	49	X22-DO2	.....	IO Module 1
24	.....	.....	51	X22-DO3	.....	IO Module 1
25	.....	.....	53	X22-DO4	.....	IO Module 1
26	DO	Autocal	0	Start: X22-DI1	.....	Bus DI1
27	.....	.....	2	Stop:	.....	Bus DI2
28	.....	.....	4	Disable: X22-DI2	.....	Bus DI3
29	DO	Bus Digital Inputs	6	Bus DI1	.....	.....
30	.....	.....	8	Bus DI2	.....	.....
31	.....	.....	10	Bus DI3	.....	.....
32	.....	.....	12	Bus DI4	.....	.....
33	.....	.....	14	Bus DI5	.....	.....
34	.....	.....	16	Bus DI6	.....	.....
35	.....	.....	18	Bus DI7	.....	.....
36	.....	.....	20	Bus DI8	.....	.....
37	DO	Comp. Switch-over	22	Air:CO2,CO2:Air,Stdg N2	.....	Caldos 27 1

Legend

AIFB	PROFIBUS Analog Input Function Block
AITB	Analog Input Transducer Block
AOFB	PROFIBUS Analog Output Function Block
AOTB	Analog Output Transducer Block
ATB	Analyzer Transducer Block
BM	Binary Message
CTB	Control Transducer Block
DIFB	PROFIBUS Digital Input Function Block
DITB	Discrete Input Transducer Block
DOFB	PROFIBUS Digital Output Function Block
DOTB	Discrete Output Transducer Block
DP	PROFIBUS protocol type for decentralized peripherals
DTM	Device Type Manager
FDT	Field Device Tool
GSD	Device-specific data file
H1	FF protocol type for process automation
LFB	Logging Function Block
MBP	Manchester Coded, Bus Powered
PA	PROFIBUS protocol type for process automation
PB	Physical Block
PKV-30	External protocol converter Modbus/PROFIBUS DP
TAB	Transducer Alarm Block
TLB	Transducer Limit Block
TTB	Transfer Transducer Block

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