



Actuator controls

AC(V) 01.2/AC(V)ExC 01.2

Profibus DP



Read operation instructions first.

- Observe safety instructions.

Purpose of the document:

This document contains information for the commissioning staff of the distributed control system and DCS software engineers. This document is intended to support the actuator integration into the DCS via fieldbus interface.

Reference documents:

- Operation instructions (Assembly and commissioning) for the actuator
- Manual (Operation and setting) AC 01.2 actuator controls Profibus DP

Reference documents can be downloaded from the Internet (www.auma.com) or ordered directly from AUMA (refer to <Addresses>).

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1. Safety instructions

1.1. Prerequisites for the safe handling of the product

Standards/directives The end user or the contractor must ensure that all legal requirements, directives, guidelines, national regulations and recommendations with respect to assembly, electrical connection, commissioning and operation are met at the place of installation.

They include among others:

- Standards and directives such as IEC 60079 "Explosive atmospheres":
 - Part 14: Electrical installations design, selection and erection.
 - Part 17: Electrical installations inspection and maintenance.
- Applicable configuration guidelines for fieldbus applications.

Safety instructions/warnings All personnel working with this device must be familiar with the safety and warning instructions in this manual and observe the instructions given. Safety instructions and warning signs on the device must be observed to avoid personal injury or property damage.

Qualification of staff Assembly, electrical connection, commissioning, operation, and maintenance must be carried out by suitably qualified personnel authorised by the end user or contractor of the plant only.

Prior to working on this product, the staff must have thoroughly read and understood these instructions and, furthermore, know and observe officially recognised rules regarding occupational health and safety.

Work performed in potentially explosive atmospheres is subject to special regulations which have to be observed. The end user or contractor of the plant is responsible for respect and control of these regulations, standards, and laws.

Electrostatic charging Highly efficient charge generating processes (processes more efficient than manual friction) on the device surface must be excluded at any time, since they will lead to propagating brush discharges and therefore to ignition of a potentially explosive atmosphere.

This also applies to fireproof coatings or covers available as an option.

Ignition dangers Gearboxes were subjected to an ignition hazard assessment in compliance with the currently applicable standard according to ISO 80079-36/ -37. Hot surfaces, mechanically generated sparks as well as static electricity and stray electric currents were identified and assessed as major potential ignition sources. Protective measures to prevent the likelihood that ignition sources arise were applied to the gearboxes. This includes in particular lubrication of the gearbox, the IP protection codes and the warnings and notes contained in these operation instructions.

Commissioning Prior to commissioning, imperatively check that all settings meet the requirements of the application. Incorrect settings might present a danger to the application, e.g. cause damage to the valve or the installation. The manufacturer will not be held liable for any consequential damage. Such risk lies entirely with the user.

Operation Prerequisites for safe and smooth operation:

- Correct transport, proper storage, mounting and installation, as well as careful commissioning.
- Only operate the device if it is in perfect condition while observing these instructions.
- Immediately report any faults and damage and allow for corrective measures.
- Observe recognised rules for occupational health and safety.
- Observe national regulations.
- During operation, the housing warms up and surface temperatures > 60 °C may occur. To prevent possible burns, we recommend checking the surface temperature prior to working on the device using an appropriate thermometer and wearing protective gloves.

Protective measures	The end user or the contractor are responsible for implementing required protective measures on site, such as enclosures, barriers, or personal protective equipment for the staff.
Maintenance	To ensure safe device operation, the maintenance instructions included in this manual must be observed. Any device modification requires prior written consent of the manufacturer.

1.2. Range of application

AUMA actuator controls are exclusively designed for the operation of AUMA actuators. Other applications require explicit (written) confirmation by the manufacturer. The following applications are not permitted, e.g.:

- motor control
- pump control

No liability can be assumed for inappropriate or unintended use.

Observance of these operation instructions is considered as part of the device's designated use.

1.3. Warnings and notes

The following warnings draw special attention to safety-relevant procedures in these operation instructions, each marked by the appropriate signal word (DANGER, WARNING, CAUTION, NOTICE).



Indicates an imminently hazardous situation with a high level of risk. Failure to observe this warning results in death or serious injury.



Indicates a potentially hazardous situation with a medium level of risk. Failure to observe this warning could result in death or serious injury.



Indicates a potentially hazardous situation with a low level of risk. Failure to observe this warning could result in minor or moderate injury. May also be used with property damage.



Potentially hazardous situation. Failure to observe this warning could result in property damage. Is not used for personal injury.

Safety alert symbol  warns of a potential personal injury hazard.

The signal word (here: DANGER) indicates the level of hazard.

1.4. References and symbols

The following references and symbols are used in these instructions:

Information The term **Information** preceding the text indicates important notes and information.

 Symbol for CLOSED (valve closed)

 Symbol for OPEN (valve open)

M ▶ **Via the menu to parameter**

Describes the menu path to the parameter. When using the push buttons of local controls, the required parameter can be quickly found on the display. Display texts are shaded in grey: **Display**.

➡ Result of a process step

Describes the result of a preceding process step.

Warning signs at the device

The following warning signs can be attached to the device.

**General warning sign**

General warning of a danger zone.

**Hot surface**

Warning of hot surfaces, e.g. possibly caused by high ambient temperatures or strong direct sunlight.

**Electrical voltage**

Hazardous voltage! Warning of electric shock. At some devices, the warning sign additionally includes a time interval, e.g. 30 s. Once power supply is switched off, you will have to wait for the indicated period. Only then may the device be opened.

2. General information about Profibus DP

For exchange of information among automation systems and between automation systems and the connected distributed field devices, the use of serial fieldbus systems for communication is state-of-the-art. Thousands of applications have proved impressively that, in comparison with conventional technology, cost savings of up to 40 % in wiring, commissioning, and maintenance are achieved by using fieldbus technology. While in the past the fieldbus systems used were often manufacturer specific and incompatible with other bus systems, the systems employed today are almost exclusively open and standardized. This means that the user does not depend on individual suppliers and can choose within a large product range the most suitable product at the most competitive price.

Profibus DP is the leading open fieldbus system in Europe and is also used successfully throughout the world. The application range includes automation in the areas of manufacturing, processing, and building. Profibus DP is an international, open fieldbus protocol which has been standardized in the fieldbus standards IEC 61158 and IEC 61784. This standardization ensures that the investments by manufacturers and users are protected to the best possible degree and the independence of the manufacturer is guaranteed.

2.1. Basic characteristics

Profibus DP defines the technical and functional features of a serial fieldbus system allowing interconnection of distributed, digital automation devices. Profibus DP distinguishes between master and slave devices.

Profibus DP is designed for fast data transmission on the field level. Here, central control devices, such as a PLC or PC, communicate via a fast serial connection with peripheral field devices such as input/output devices, valves, and actuators.

Data exchange among these field devices is based on cyclic communication. The respectively necessary communication functions are defined by the Profibus DP basic functions according to IEC 61158 and IEC 61784.

Master devices Master devices control data traffic on the bus. A master is allowed to send messages without an external request. Within the Profibus protocol, masters are also called 'active devices'.

Slave device Slave devices such as AUMA Profibus DP actuators are peripheral devices. Typical slave devices are input/output devices, valves, actuators, and measuring transducers. They do not have bus access rights, i.e. they may only acknowledge received messages or, at the request of a master, transmit messages to that master. Slaves are also called 'passive devices'.

2.2. Basic functions of Profibus DP

On a cyclic basis, the master reads the input information from the slaves and writes the output information to the slaves. In addition to this cyclic data transfer of the process representation, Profibus DP also provides powerful functions for diagnostics and commissioning. Data traffic is monitored through the monitoring functions on the master and slave side.

2.3. Transfer mode

- RS-485 twisted pair cable or fibre optic cable
- AUMA actuators support baud rates up to 1.5 Mbits/s.

2.4. Bus access

- Token-passing between the masters and polling between master and slave
- Mono-master or multi-master systems are possible.
- Master and slave devices: max. 126 devices at a bus

2.5. Functionality

- Peer-to-peer (process data exchange [DATA EX]) or Multicast (control commands to all slaves)

- Cyclic process data exchange between DP master and DP slaves.
- Additional acyclic data exchange between DP master and DP slaves for Profibus DP with V1 services.
- DP-V2 redundancy according to PNO guideline 2.212
- DP-V2 time stamp according to PNO guideline 2.192 or IEC 61158 / 64784
- Checking the configuration of the DP slaves
- Synchronisation of inputs and/or outputs

2.6. Protective functions

- All messages are transmitted with Hamming Distance HD=4.
- Watchdog timer at DP slaves
- Access protection for the inputs/outputs of DP slaves (Sync and Freeze)
- Process data exchange monitoring with configurable timer interval at the master
- Adjustable failure behaviour

2.7. Device types

- DP master class 2 (DPM2), e.g. programming/configuration tools
- DP master class 1 (DPM1), e.g. central controllers such as PLC, PC
- DP slave, e.g. AUMA Profibus DP devices. Devices with binary or analogue inputs/outputs, actuators, plug valves

3. Commissioning

3.1. Introduction

When commissioning a Profibus DP network, the devices on the Profibus DP must be parameterized and configured using the programming software at the controls (Profibus configurator).

The programming software first reads the GSD file (**GeneralStationData**) of the individual actuators. The GSD file contains information about the device properties needed by the master.

Afterwards, the user can configure and parameterize the device at the Profibus DP for the programming software of the process control system.

This information is then stored in the controls (DP master) and sent to the actuators (DP slaves) each time cyclic communication is started.

The process representation input and output bytes are used to control the actuator and to supply the feedback signals. If a configuration with consistent data is selected, certain PLCs require special functional elements for the control of the Profibus DP slaves.

Certification AUMA actuators with Profibus DP are certified by the Profibus user organisation (PNO).

ID number Each DP slave and each DP master have individual ID numbers. The ID number is required for the DP master to identify the type of device connected without signification protocol overhead. The master compares the ID numbers of the connected DP devices to the ID number in the specified configuration data. The process data transfer will only be started if the correct device types with the correct station addresses were connected to the bus. This ensures a high security against configuration errors.

The PNO manages the ID numbers together with the device master data (GSD).

AUMA actuators with actuator controls AC 01.2 are listed under the following ID numbers at the PNO:

- ID number of the standard version: **0x0C4F** with functions for:
 - Single channel Profibus DP interface (not redundant)
 - Redundant Profibus DP interface according to AUMA redundancy (I or II)
 - Optional Profibus DP V1 services
- ID number of the extended version: **0x0CBD** with functions for:
 - Redundant Profibus DP interface according to Profibus DP-V2 redundancy
 - Time stamp and alarms according to Profibus DP-V2
 - Optional Profibus DP V1 services

Device Master Data (GSD) For Profibus DP, the performance features of the devices are documented by the manufacturer and made available to the users as device data sheet and device master data. Structure, contents and coding of the device master data (GSD) are standardised. They enable comfortable configuration of any DP slaves with configuration devices by different manufacturers.

For AUMA actuators with AC 01.2 controls, the following GSD files are available:

- Standard version: **AUMA0C4F.GSD** with functions for:
 - Single channel Profibus DP interface (not redundant)
 - Redundant Profibus DP interface according to AUMA redundancy
 - Optional Profibus DP V1 services
- Optional version: **AUMA0CBD.GSD** with functions for:
 - Redundant Profibus DP interface according to Profibus DP-V2 redundancy
 - Time stamp and alarms according to Profibus DP-V2
 - Optional Profibus DP V1 services

Information GSD files can be downloaded from our website: www.auma.com.

3.2. Parameter setting

The parameter setting is partly defined in the Profibus standard, e.g. one bit for switching bus monitoring on and off (watchdog).

In addition, the Profibus DP interface can receive further user parameters thus enabling complete configuration of the process representation input. These parameters can be modified via the programming software of the controls. New programming software supports the parameter setting via text and a menu selection. For older versions, the parameters must be entered as hexadecimal numbers.

Table 1: Structure of the parameter telegram

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
1	Lock	Unlock	Sync	Freeze	WD_ON	0	0	0	
2									WD factor 1
3									WD factor 2
4									MinTSDR
5									ID no. high
6									ID no. low
7									Group ID
8	DPV1 Enable	0	0	0	0	WD_Base	0	0	DP-V1 status 1
9	PrmCmd	Enable Process Alarm	0	0	0	0	0	0	DP-V1 status 2
10	0	0	0	0	PrmStruct	Alarm Mode			DP-V1 status 3

Settings for basic functions of the Profibus:

- WD_Base** WD_Base = 0 (time base 10 ms)
WD_Base = 1 (time base 1 ms)
Connection monitoring time of the Profibus DP communication:
 $T_{WD} = (1 \text{ or } 10 \text{ ms, depending on WD_Base}) \times (\text{WD factor 1}) \times (\text{WD factor 2})$
- MinTSDR** Minimum response time of the actuator (in T_{Bit})
- ID no.** ID number of the actuator
- Group ID** Group assignment by the master

Settings for Profibus DP-V1 services (option):

- DPV1 Enable** Activates the DP-V1 services available as an option; must be set to 1 when using DP-V1 services.

Settings for Profibus DP-V2 functions (option):

- Enable Process Alarm** Enables the process alarm (required for time synchronisation with time stamp), must be set to 1.
- Alarm Mode** Number of supported alarms, must be set to 0 (i.e. one alarm of each type is supported).
- PrmStruct** Structured parameter setting possible, must be set to 1.
- PrmCmd** Parameter command activated, must be set to 1 for Profibus DP-V2 redundancy.

In the bytes following byte 10 of the parameter telegram the user parameters for adaptation of the process representation input to the DCS can among others be found (AUMA specific parameters).

The GSD file available on the website does not contain any user parameters for adapting the process representation input to DCS requirements. The actuator will

use the default process representation with this GSD file. For further information please refer to <Process representation input (default process representation)>.

3.3. Bus address (slave address)

Each participant at the bus is addressed via its specific bus address (slave address). The bus address may be assigned only once per fieldbus network.

The bus address is stored in a non-volatile memory.

On delivery, address 126 (default value) is set for all devices.

The bus address (slave address) can be set in the following ways:

- Locally via push buttons (indication in the display).
For details on setting refer to the operation instructions to the actuator or Manual (Operation and Setting) AUMATIC AC 01.1 Profibus DP.
- Using the AUMA CDT service software (via PC or laptop with Bluetooth).
The latest version of the AUMA CDT can be downloaded from our website: www.auma.com.
- Via fieldbus. Please note that only one device with the address 126 (default value) may be connected to Profibus DP. A new bus address may be assigned to the actuator using the SAP 55 (Service-Access-Point Set Slave Address).

For redundant version according to Profibus DP-V2 redundancy, only the address of the primary channel can be set; the address of the backup channel is derived from the primary.

For redundant version according to AUMA redundancy, the addresses of both channels can be set individually.

3.4. Configuring the Profibus DP interface

During configuration, the number of input and output bytes reserved for each device in the controls' memory is selected. Additionally, the method of data processing is defined: consistent or non-consistent.

Information

Only the number of bytes determined in the configuration is transferred between DP master and DP slave.

The following configurations are possible with AUMA Profibus DP actuators:

Number of input bytes	Number of output bytes
1	1
1	4
1	8
2	1
2	4
2	8
2	16
4	1
4	4
4	8
4	16
6	8
6	16
8	4
8	8
8	12
12	4
12	8
12	12

Number of input bytes	Number of output bytes
12	16
20	4
20	8
20	12
32	4
32	8
32	12
32	16
40	26

All these configurations (except 1 In, 1 Out) can be selected as consistent or non-consistent.

The number of input bytes indicates how many of the maximum 40 bytes are sent to the DP master by the DP slave.

The number of output bytes indicates how many of the maximum 26 bytes are sent to the DP slave by the DP master.

If, for example, a configuration with 8 input bytes is selected, only the first 8 bytes are sent by the DP slave to the DP master during data exchange. In this case, the master does not have access to bytes 9 to 40. This way, the DP master saves memory space since only 8 input bytes are reserved for the actuator.

Data issued by AUMA actuators shall be consistently processed by the DP master. This ensures that the value of a 2-byte variable (position transmitter, analogue customer input) does not change after reading out the first byte and, thus, does not distort the value. If a master does not offer the option of consistent configuration because of the DCS, configuration without consistency can be selected.

3.5. Communication start-up

When switching on the DP master, it first sends one parameter and one configuration telegram to each DP slave. If parameters and configuration are correct, the DP slave enters the 'Data Exchange' mode to exchange process data between controls and slave. Then, the DP master can control the DP slave and read its current state via the process representation.

If communication is interrupted (e.g. when switching the slave off or in the event of Profibus cable rupture), it is automatically resumed by the DP master once the cause of the fault is eliminated.

3.6. AUMA user parameters (AUMA specific parameters)

The process representation input can be updated by means of the user parameters. Default values and selection options are defined in a specific GSD file available on request.

Two GSD files are available for AUMATIC AC 01.2/ACExC 01.2. A standard version (AUMA04CF for ident-no. 0x0C4F) and an optional version with additional user parameters for setting time stamp and alarms according to Profibus DP-V2 (AUMA0CBD for ident no. 0x0CBD).

3.6.1. Process representation input arrangement (user parameters)

The process representation input data can be arranged in any order. Arrangement is defined by means of the user parameters in the GSD file, available on request. Users may assign a specific indication to each Profibus DP signal. The data volume of the transmitted data depends on the type of signals selected (u8, u16, i, individual signals).

3.6.2. Settable (user definable) signals

Table 2: Description of the parameter settings

Prm-Text-Def GSD file	Designation (process representation)	Description
(0) = "Bit: Reserved"	–	
(1) = "Bit: End p. CLOSED"	End position CLOSED	For limit seating: Limit switch operated in direction CLOSE For torque seating: Torque switch and limit switch operated in direction CLOSE
(2) = "Bit: End p. OPEN"	End position OPEN	For limit seating: Limit switch operated in direction OPEN For torque seating: Torque switch and limit switch operated in direction OPEN
(3) = "Bit: End p. CLOSED, blink"	End p. CLOSED, blink	End position CLOSED reached or intermediate position reached (die Zwischenstellungsanzeige erfolgt nur, wenn Parameter Signal interm. pos. M0167 = OPEN/CLOSED = On) Signal blinking: Actuator runs in direction CLOSE.
(4) = "Bit: End p. OPEN, blink"	End p. OPEN, blink	End position OPEN reached or intermediate position reached. (die Zwischenstellungsanzeige erfolgt nur, wenn Parameter Signal interm. pos. M0167 = OPEN/CLOSED = On) Signal blinking: Actuator runs in direction OPEN.
(5) = "Bit: Setpoint reached"	Setpoint pos.reached	The position setpoint is within max. error variable (outer dead band). Is only signalled if Profibus DP master has set the Fieldbus SETPOINT bit (process representation output).
(6) = "Bit: Running CLOSE"	Running CLOSE	Es wird ein Fahrbefehl über die Drucktaster der Ortssteuerstelle oder den Feldbus in Richtung ZU durchgeführt: Fieldbus CLOSE oder Fieldbus SETPOINT (Prozessabbild Ausgang). Dieses Bit bleibt auch bei Fahrpausen gesetzt (z.B. aufgrund der Totzeit oder der Reversiersperrzeit).
(7) = "Bit: Running OPEN"	Running OPEN	Es wird ein Fahrbefehl über die Drucktaster der Ortssteuerstelle oder den Feldbus in Richtung AUF durchgeführt: Fieldbus OPEN oder Fieldbus SETPOINT (Prozessabbild Ausgang). Dieses Bit bleibt auch bei Fahrpausen gesetzt (z.B. aufgrund der Totzeit oder der Reversiersperrzeit).
(8) = "Bit: Selector sw. LOCAL"	Selector sw. LOCAL	Selector switch is in position LOCAL.
(9) = "Bit: Sel. sw. REMOTE"	Selector sw. REMOTE	Selector switch is in position REMOTE.
(10) = "Bit: Sel. sw. OFF"	Selector sw. OFF	Selector switch is in position OFF.
(11) = "Bit: Limit sw. CLOSED"	Limit switch CLOSED	Limit switch operated in end position CLOSED
(12) = "Bit: Limit sw. OPEN"	Limit switch OPEN	Limit switch operated in end position OPEN
(13) = "Bit: Torque sw. CLOSE"	Torque sw. CLOSED	Torque switch operated in direction CLOSE
(14) = "Bit: Torque sw. OPEN"	Torque sw. OPEN	Torque switch operated in direction OPEN
(15) = "Bit: Device ok"	Device ok	Collective signal 05: The device is ready for remote control. No AUMA warnings, AUMA faults or signals according to NAMUR are present.
(16) = "Bit: Failure"	NAMUR failure	Collective signal 10: Indication according to NAMUR recommendation NE 107 Actuator function failure, output signals are invalid.
(17) = "Bit: Function check"	NAMUR funct. check	Collective signal 08: Indication according to NAMUR recommendation NE 107 The actuator is being worked on; output signals are temporarily invalid.
(18) = "Bit: Out of spec."	NAMUR out of spec.	Collective signal 07: Indication according to NAMUR recommendation NE 107 Actuator is operated outside the normal operation conditions.
(19) = "Bit: Maintenance requ."	NAMUR mainten. req.	Collective signal 09: Indication according to NAMUR recommendation NE 107 Recommendation to perform maintenance.

Prm-Text-Def GSD file	Designation (process representation)	Description
(20) = "Bit: Fault"	Fault	Collective signal 03: Contains the result of a disjunction (OR operation) of all faults. The actuator cannot be operated.
(21) = "Bit: Warnings"	Warning	Collective signal 02: Contains the result of an OR disjunction of all warnings.
(22) = "Bit: Not ready REMOTE"	Not ready REMOTE	Collective signal 04: Contains the result of a disjunction (OR-operation) of the signals, forming the "Not ready REMOTE" group. The actuator cannot be operated from REMOTE.
(23) = "Bit: Op. pause active"	Operation pause active	The actuator is in off-time (e.g. stepping mode or reversing prevention time).
(24) = "Bit: Start step mode"	Start stepping mode	The actuator is within the set stepping range.
(25) = "Bit: Actuator running"	Actuator running	Actuator is running (output drive is moving) Hard wired collective signal consisting of signals: • (26) Running LOCAL • (27) Running REMOTE • (28) Handwheel oper.
(26) = "Bit: Running LOCAL"	Running LOCAL	Output drive rotates due to operation command from LOCAL.
(27) = "Bit: Running REMOTE"	Running REMOTE	Output drive rotates due to operation command from REMOTE.
(28) = "Bit: Running via handw."	Handwheel oper.	Output drive rotates without electric operation command (manual operation).
(29) = "Bit: In interm. position"	In intermediate pos.	The actuator is in an intermediate position e.g. neither in end position OPEN nor in end position CLOSED.
(30) = "Bit: Failure behav. active"	Failure behav. active	The failure behaviour is active.
(31) = "Bit: Intermediate pos. 1"	Intermediate pos. 1	Intermediate position 1 reached
(32) = "Bit: Intermediate pos. 2"	Intermediate pos. 2	Intermediate position 2 reached
(33) = "Bit: Intermediate pos. 3"	Intermediate pos. 3	Intermediate position 3 reached
(34) = "Bit: Intermediate pos. 4"	Intermediate pos. 4	Intermediate position 4 reached
(35) = "Bit: Intermediate pos. 5"	Intermediate pos. 5	Intermediate position 5 reached
(36) = "Bit: Intermediate pos. 6"	Intermediate pos. 6	Intermediate position 6 reached
(37) = "Bit: Intermediate pos. 7"	Intermediate pos. 7	Intermediate position 7 reached
(38) = "Bit: Intermediate pos. 8"	Intermediate pos. 8	Intermediate position 8 reached
(39) = "Bit: Input DIN 1"	Input DIN 1	A high signal (+24 V DC) is present at digital input 1.
(40) = "Bit: Input DIN 2"	Input DIN 2	A high signal (+24 V DC) is present at digital input 2.
(41) = "Bit: Input DIN 3"	Input DIN 3	A high signal (+24 V DC) is present at digital input 3.
(42) = "Bit: Input DIN 4"	Input DIN 4	A high signal (+24 V DC) is present at digital input 4.
(43) = "Bit: Input DIN 5"	Input DIN 5	A high signal (+24 V DC) is present at digital input 5.
(44) = "Bit: Input DIN 6"	Input DIN 6	A high signal (+24 V DC) is present at digital input 6.
(45) = "Bit: Input DIN 7"	Input DIN 7	Parameter not available
(46) = "Bit: Input DIN 8"	Input DIN 8	Parameter not available
(47) = "Bit: FailState fieldbus"	FailState fieldbus	No valid communication via fieldbus (despite available connection)
(48) = "Bit: I/O interface"	I/O interface	The actuator is controlled via the I/O interface (parallel).
(49) = "Bit: EMCY behav.act."	EMCY behav. active	Operation mode EMERGENCY is active (EMERGENCY signal was sent).
(50) = "Bit: EMCY stop active"	EMCY stop active	Operation mode EMERGENCY stop is active (EMERGENCY stop button pressed).
(51) = "Bit: Service active"	Service active	Operation mode Service (via Bluetooth) is active.
(52) = "Bit: Interlock active"	Interlock active	Actuator is interlocked.
(53) = "Bit: Sel. sw. not REMOTE"	Sel. sw. not REMOTE	Selector switch is in position Local control (LOCAL) or 0 (OFF).
(54) = "Bit: Handwheel active"	Handwheel active	Manual operation is active (handwheel is engaged); optional signal

Prm-Text-Def GSD file	Designation (process representation)	Description
(55) = "Bit: Wrong command"	Setpoint pos. disabled	Received setpoint cannot be performed as the positioner is not available.
(56) = "Bit: Thermal fault"	Thermal fault	Motor protection tripped.
(57) = "Bit: Phase fault"	Phase fault	- When connecting to a 3-ph AC system and with internal 24 V DC supply of the electronics: Phase 2 is missing. - When connecting to a 3-ph or 1-ph AC system and with external 24 V DC supply of the electronics: One of the phases L1, L2 or L3 is missing.
(58) = "Bit: Wrong phase sequence"	Incorrect phase seq	The phase conductors L1, L2 and L3 are connected in the wrong sequence.
(59) = "Bit: Mains quality"	Mains quality	Due to insufficient mains quality, the controls cannot detect the phase sequence (sequence of phase conductors L1, L2 and L3) within the pre-set time frame provided for monitoring.
(60) = "Bit: Torque fault CLOSE"	Torque fault CLOSE	Torque fault in direction CLOSE
(61) = "Bit: Torque fault OPEN"	Torque fault OPEN	Torque fault in direction OPEN
(62) = "Bit: Torque fault"	Torque fault	Torque fault in directions CLOSE or OPEN
(63) = "Bit: Operat. time warning"	Op. time warning	Warning: Max. permissible operating time for an operation (OPEN-CLOSE) exceeded
(64) = "Bit: On time warning"	Warning on time	Warning: Max. number of motor starts (starts) or max. running time/h exceeded
(65) = "Bit: 24 V AC, internal"	IE 24 V AC	The internal 24 V AC voltage supply of the controls has exceeded the power supply limits. The 24 V AC voltage supply is used to control the reversing contactors, to assess the thermoswitches, to supply the internal actuator heater and, as an option, to generate the 115 V AC supply for the customer.
(66) = "Bit: 24 V DC control volt."	24 V DC customer	The 24 V DC auxiliary voltage (e.g. for supply of the control outputs) is outside the supply voltage limits.
(67) = "Bit: 24 V DC, internal"	24 V DC internal	The internal 24 V DC supply voltage of the controls for supply of the electronic components is outside the supply voltage limits.
(68) = "Bit: 24 V DC, external"	24 V DC external	The external 24 V DC voltage supply of the controls has exceeded the power supply limits.
(69) = "Bit: Internal error"	Internal error	Collective signal 14: Internal error
(70) = "Bit: Internal warning"	Internal warning	Collective signal 15: Internal warning
(71) = "Bit: No reaction"	Wrn no reaction	No actuator reaction to operation commands within the set reaction time.
(72) = "Bit: Configuration error"	Configuration error	Incorrect configuration, i.e. the current setting is invalid.
(73) = "Bit: Temp. fault controls"	Temp. fault controls	Parameter not available
(74) = "Bit: Temp. fault motor"	Temp. fault motor	Parameter not available
(75) = "Bit: Temp.fault gearbox"	Temp. fault gearbox	Parameter not available
(76) = "Bit: Wrn heater"	Wrn heater	Heater failure at actuator (control unit)
(77) = "Bit: RTC not set"	Time not set	Real time clock has not yet been set.
(78) = "Bit: Wrn humidity"	Wrn humidity	Parameter not available
(79) = "Bit: WrnRefActPos"	Wrn ref.actual position	Warning: Position feedback of actuator was not yet referenced for limit end positions.
(80) = "Bit: WrnSigRgeActPos"	Wrn range act.pos.	Warning: Current position feedback signal range is outside the permissible range.
(81) = "Bit: WrnSigLossActPos"	Wrn sign.loss act.pos.	Warning: A signal loss has occurred for actuator position feedback.

Prm-Text-Def GSD file	Designation (process representation)	Description
(82) = "Bit: WrnActPosition"	Wrn actual position	Warning: Actual position of actuator Collective signal consisting of: (79) Wrn ref.actual position (80) Wrn range act.pos. (81) Wrn sign.loss act.pos.
(83) = "Bit: Wrn FO ring"	Wrn FOC	Warning: Optical receiving signal (channel 1) incorrect (no or insufficient Rx receive level) or RS-485 format error (incorrect bit(s))
(84) = "Bit: WrnOnTiRunning"	Wrn op.mode run time	Warning on time max. running time/h exceeded
(85) = "Bit: WrnOnTiStarts"	Wrn op.mode starts	Warning on time max. number of motor starts (starts) exceeded
(86) = "Bit: Wrn vibration"	Wrn op.mode run time	Parameter not available
(87) = "Bit: Wrn dew point"	Wrn op.mode starts	Parameter not available
(88) = "Bit: WrnControlsTemp"	Wrn controls temp.	Warning: Temperature within controls housing too high
(89) = "Bit: Wrn motor temp."	Wrn motor temp.	Parameter not available
(90) = "Bit: Wrn gearbox temp."	Wrn gearbox temp.	Parameter not available
(91) = "Bit: Wrn input AIN 1"	Wrn input AIN 1	Warning: Loss of signal analogue input 1
(92) = "Bit: Wrn input AIN 2"	Wrn input AIN 2	Warning: Loss of signal analogue input 2
(93) = "Bit: WrnActProcVal"	Wrn actual process value	Warning: Loss of signal actual process value
(94) = "Bit: WrnProcSetpoint"	Wrn process setpoint	Warning: Loss of signal process setpoint
(95) = "Bit: WrnSetpointPos"	Wrn setpoint position	Warning: Loss of signal of actuator setpoint position
(96) = "Bit: Fieldbus failure"	Fieldbus failure	Fieldbus failure
(97) = "Bit: Local Stop"	Local STOP	A local STOP is active. Push button STOP of local controls is operated.
(98) = "Bit: Wrong operation cmd"	Wrong oper. cmd	Wrong operation command Indicates that several operation commands were received simultaneously via Profibus DP (e.g. Remote OPEN and Remote CLOSE simultaneously or Remote CLOSE/Remote OPEN and Remote SETPOINT simultaneously) or that the max. value for a setpoint position has been exceeded (setpoint position > 1,000).
(99) = "Bit: Channel 1 active"	Channel 1 active	Channel 1 is the active operation command channel.
(100) = "Bit: Channel 2 active"	Channel 2 active	Channel 2 is the active operation command channel.
(101) = "Bit: Motor running Close"	Motor runs CLOSE	Motor runs in direction CLOSE.
(102) = "Bit: Motor running Open"	Motor runs OPEN	Motor runs in direction OPEN.
(103) = "Bit: Time Sync active"	DP TimeSync(SetPrm)	Time synchronisation is active.
(104) = "Bit: Interlock Remote"	Interlock Remote	The Interlock function prevents an operation in operation mode REMOTE.
(105) = "Bit: Interlock Local"	Interlock Local	The Interlock function prevents an operation in operation mode LOCAL.
(106) = "Bit: Interlock"	Interlock	The Interlock function prevents an operation in operation mode REMOTE or in operation mode LOCAL.
(107) = "Bit: Disabled"	Disabled	Operation mode disabled.
(108) = "Bit: Config. Warning"	Config. warning	Warning: Configuration setting is incorrect. The device can still be operated with restrictions.
(109) = "Bit: Pb DataEx Ch1"	Channel 1 DataEx	Channel 1 is in the data exchange state (DataEx).
(110) = "Bit: Pb DataEx Ch2"	Channel 2 DataEx	Channel 2 is in the data exchange state (DataEx).
(111) = "Bit: Wrn FOC budget"	Wrn FO cable budget	Warning: FO cable system reserve reached (critical or permissible Rx receive level)
(112) = "Bit: FieldbusFailsafeAct.1"	Ch.1 FailState Fieldb.	No valid fieldbus communication via channel 1 (application does not communicate with the DCS).
(113) = "Bit: FieldbusFailsafeAct.2"	Ch.2 FailState Fieldb.	No valid fieldbus communication via channel 2 (application does not communicate with the DCS).
(114) = "Bit: Chan1 BusComm"	Channel 1 activity	Bus communication available on channel 1.

Prm-Text-Def GSD file	Designation (process representation)	Description
(115) = "Bit: Chan2 BusComm"	Channel 2 activity	Bus communication available on channel 2.
(116) = "Bit: PVST active"	PVST active	Partial Valve Stroke Test (PVST) is active.
(117) = "Bit: PVST fault"	PVST fault	Partial Valve Stroke Test (PVST) could not be successfully completed.
(118) = "Bit: PVST abort"	PVST abort	Partial Valve Stroke Test (PVST) was aborted or could not be started. Remedy: Perform RESET or restart PVST.
(119) = "Bit: Interlock OPEN"	Interlock OPEN	Release signal OPEN not active: Operation commands in direction OPEN are disabled.
(120) = "Bit: Interlock CLOSE"	Interlock CLOSE	Release signal CLOSE not active: Operation commands in direction CLOSE are disabled.
(121) = "Bit: Bypass Interlock"	Interlock by-pass	Bypass of interlock function is active.
(122) = "Bit: Fault no reaction"	Fault no reaction	No reaction detected at actuator output drive.
(123) = "Bit: Config error remote"	Config. error REMOTE	Config. error of REMOTE interface active.
(124) = "Bit: Torque wrn OPEN"	Torque wrn OPEN	Warning: Limit value for torque warning in direction OPEN exceeded.
(125) = "Bit: Torque wrn CLOSE"	Torque wrn CLOSE	Warning: Limit value for torque warning in direction CLOSE exceeded.
(126) = "Bit: RTC button cell"	RTC voltage	Warning: Voltage of RTC button cell too low.
(127) = "Bit: Wrn FOC connection"	Wrn FOC connection	Warning: FO cable connection is not available.
(128) = "u16: Actual position"	Actual position	Actual actuator position (0 – 1,000 per mil)
(129) = "u16: Input AIN 1"	Input AIN 1	Analogue input 1
(130) = "u16: Input AIN 2"	Input AIN 2	Analogue input 2
(131) = "u16: Torque CLOSE %"	Torque CLOSE %	Torque in direction CLOSE, unit in %
(132) = "u16: Torque OPEN %"	Torque OPEN %	Torque in direction OPEN, unit in %
(133) = "u16: Torque CLOSE Nm"	Torque CLOSE Nm	Torque in direction CLOSE, unit in Nm
(134) = "u16: Torque OPEN Nm"	Torque OPEN Nm	Torque in direction OPEN, unit in Nm
(135) = "u16: torque CLOSE ft-lb"	Torque CLOSE ft-lb	Torque in direction CLOSE, unit in ft-lb
(136) = "u16: Torque OPEN ft-lb"	Torque OPEN ft-lb	Torque in direction OPEN, unit in ft-lb
(137) = "u16: Torque"	Torque	Actual torque value
(139) = "u16: Actual Position 0-100%"	Actual position 0-100 %	Actual actuator position (0 – 100 percent)
(160) = "i16: Actual position"		Parameter not available
(161) = "i16: Input AIN 1"		Parameter not available
(162) = "i16: Input AIN 2"		Parameter not available
(163) = "i16: Torque CLOSE %"		Parameter not available
(164) = "i16: Torque OPEN %"		Parameter not available
(192) = "float: Actual position"		Parameter not available
(193) = "float: Input AIN 1"		Parameter not available
(194) = "float: Input AIN 2"		Parameter not available
(195) = "float: T CLOSE %"		Parameter not available
(196) = "float: T OPEN %"		Parameter not available
(197) = "float: T CLOSE Nm"		Parameter not available
(198) = "float: T OPEN Nm"		Parameter not available
(199) = "float: T CLOSE lbs/ft."		Parameter not available
(200) = "float: T OPEN lbs/ft."		Parameter not available
(201) = "Cylinder printing max."	Cylinder pressure max.	Parameter not available
(202) = "Hydraulics fault"	Hydraulics fault	Parameter not available
(203) = "Hydraulics warning"	Hydraulics warning	Parameter not available
(204) = "Safe ESD"	Safe ESD¹⁾	Safe ESD function (Emergency Shut Down) is active.

Prm-Text-Def GSD file	Designation (process representation)	Description
(205) = "Safe Stop"	Safe Stop ¹⁾	Safe STOP function is active.
(206) = "SIL fault"	SIL fault ¹⁾	A SIL fault has occurred (collective signal).
(207) = "SIL function active"	SIL function active ¹⁾	A SIL function is active.
(208) = "PVST required"	PVST required	(PVST) Partial Valve Stroke Test should be executed
(209) = "Mechanic lifetime"	Mainten. mechanics	Mechanic maintenance requirement
(210) = "Seal lifetime"	Mainten. seals	Seal maintenance requirement
(211) = "Seal lifetime"	Mainten. lubricant	Lubricant maintenance requirement
(212) = "Contactor lifetime"	Mainten. contactors	Contactor maintenance requirement
(213) = "Maintenance interval"	Mainten. interval	The set maintenance interval has expired.
(214) = "Maintenance required"	Maintenance required	Maintenance required

- 1) The safety function indications via fieldbus are for information only and must not be used as part of a safety function. The I/O signals of the SIL module must be used for this purpose.

3.6.3. Additional (user-definable) parameters (option)

Parameter description of additional user parameters for setting the time stamp and alarms according to Profibus DP-V2, available with the optional version **AUMA0CBD.gsd**.

Table 3: Description of additional settings

Prm-Text GSD DateI ExtUserPrmData =	Setting	Description
1 "Setpoint valid bit"	—	No function
2 "Timestamp (TS)"	Text(0) = "disable"	DP-V2 time stamp deactivated.
	Text(1) = "enable"	DP-V2 time stamp activated.
3 "TS -> End Position Close"	Text(0) = "disable"	DP-V2 time stamp of End position CLOSED signal deactivated.
	Text(1) = "enable"	DP-V2 time stamp of End position CLOSED signal activated.
4 "TS -> End Position Open"	Text(0) = "disable"	DP-V2 time stamp of End position OPEN signal deactivated.
	Text(1) = "enable"	DP-V2 time stamp of End position OPEN signal activated.
5 "TS -> Torque Limit Switch Close"	Text(0) = "disable"	DP-V2 time stamp of Torque sw. CLOSED signal deactivated.
	Text(1) = "enable"	DP-V2 time stamp of Torque sw. CLOSED signal activated.
6 "TS -> Torque Limit Switch Open"	Text(0) = "disable"	DP-V2 time stamp of Torque sw. OPEN signal deactivated.
	Text(1) = "enable"	DP-V2 time stamp of Torque sw. OPEN signal activated.
7 "TS -> Ready and Remote"	Text(0) = "disable"	DP-V2 time stamp of Selector sw. REMOTE signal deactivated.
	Text(1) = "enable"	DP-V2 time stamp of Selector sw. REMOTE signal activated.
8 "TS -> Fault"	Text(0) = "disable"	DP-V2 time stamp of Fault signal deactivated.
	Text(1) = "enable"	DP-V2 time stamp of Fault signal activated.
9 "TS -> Power Supply Fault"	Text(0) = "disable"	DP-V2 time stamp of Phase fault signal deactivated.
	Text(1) = "enable"	DP-V2 time stamp of Phase fault signal activated.
10 "TS -> reserved"	—	Without function (reserved)
11 "reserved Byte"	—	Without function (reserved)

3.6.4. Further adaptation options

From firmware 04.05.xx, the actuator controls provide the option to adapt to the existing DCS configurations of the actuator type range AC 01.1/ACExC 01.1. Actuator controls of type range AC 01.2/ACExC 01.2 can be adapted as to support the default arrangement of the Profibus DP-V0 process representation input of AC 01.1/ACExC 01.1 without changing the Profibus configuration of the DCS.

Setting is performed using the following parameter: **Device configuration>Profibus>Connection type = AUMATIC .1**

- Information**
- Only the Profibus DP-V0 standard arrangement of the process representation input of AC 01.1/ACExC 01.1 is supported, deviating arrangements of the Profibus DP-V0 process data input require use/installation of AUMA04CF.gsd or AUMA0CBD.gsd file in the DCS.
 - With **connection type = AUMATIC.1** the AC 01.2/ACExC 01.2 does not provide any diagnostic NAMUR NE 107 information within the cyclic process data representation.
 - EDD or DTM of the AC 01.2/ACExC 01.2 must imperatively be used for acyclic communication via Profibus DP-V1 with AC 01.2/ACExC 01.2!
 - Factory setting: **Connection type = AUMATIC.2**

3.7. Communication monitoring

3.7.1. Connection monitoring of the Profibus DP communication

The connection monitoring within the master has to be activated to monitor both master and cable connection between master and actuator (parameter telegram byte 1, bit 3, WD_ON = 1).

Only if the connection monitoring is active can the actuator react in the even of loss of communication once the monitoring time also set in the master has elapsed.

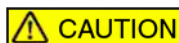
The reaction of the actuator also depends on the settings for failure behaviour or EMERGENCY BEHAVIOUR.

3.7.2. Fail Safe and Global Control Clear telegrams

Another possibility to set the slave to a safe state in the event of a fault are the fail safe telegrams (telegrams with data length = 0). If fails safe telegrams are received, the actuator remains in the DataExchange state; depending on the respective setting, the actuator may initiate the failure behaviour or the EMERGENCY behaviour. The actuator quits the Fail Safe state as soon as valid telegrams with the data length ≠ 0 are received.

Furthermore, the Global Control Clear (GC Clear) master telegrams can also be used to initiate the failure behaviour or the EMERGENCY behaviour. This state can be disabled using a Global Control Operate telegram (GC Operate).

For activated EMERGENCY behaviour:



The actuator can start its operation due to an EMERGENCY signal or a loss of communication.

Risk of personal injuries or damage to the valve.

- For commissioning and maintenance work: Set selector switch to position **0** (OFF). The motor operation can only be interrupted in this selector switch position.
- If the actuator starts its operation by accident: Set selector switch to position **0** (OFF).

3.8. I & M functions

The actuator controls support the I & M functions according to PNO guideline 3.502.

With the term **Identification & Maintenance (I & M) functions**, the Profibus user organisation e.V. (PNO) introduced a new functionality for all Profibus devices with acyclic communication channel that may prove very useful for plant operators. The I & M functions define how certain device-describing data (according to name plate) is to be uniformly stored in the Profibus devices. Engineering tools may then read and interpret the data according to a code which can be accessed on the PNO server. This provides uniform and powerful access to all important and current device data, one of the major requirements for asset management.

Part of the device-specific I & M information is the unambiguous asset identification using a manufacturer ID (MANUFACTURER_ID, for AUMA actuators = 319), the

order number (ORDER_ID) of the actuator as well as the individual serial number (SERIAL_NUMBER). Further data supplements the asset information.

Content	Size
Header	
Manufacturer specific	10 Octets
I & M Block	
MANUFACTURER_ID	2 Octets
ORDER_ID	20 Octets
SERIAL_NUMBER	16 Octets
HARDWARE_REVISION	2 Octets
SOFTWARE_REVISION	4 Octets
REVISION_COUNTER	2 Octets
PROFILE_ID	2 Octets
PROFILE_SPECIFIC_TYPE	2 Octets
IM_VERSION	2 Octets
IM_SUPPORTED	2 Octets

4. Description of the data interface

4.1. Input data (process representation input) – signals

The process representation input allows the master (controls) to read the state of the slave (actuator).

4.1.1. Process representation input (default process representation)

Grey bits are collective signals. They contain the results of a disjunction (OR operation) of other information.

Byte 1: Logic signals

	Fault
	Warnings
	Running CLOSE
	Running OPEN
	Not ready REMOTE
	Setpoint reached
	End p. CLOSED
	End p. OPEN
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 2: Actuator signals

	Torque sw. CLOSE
	Torque sw. OPEN
	Limit sw. CLOSED
	Limit sw. OPEN
	Selector sw. LOCAL
	Selector sw. REMOTE
	Phase failure
	Thermal fault
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 3: Actual position (H)

	Actual position high byte (positioner)
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 4: Actual position (L)

	Actual position low byte (positioner)
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 5: Device status

	Device ok
	Failure
	Function check
	Out of spec.
	Maintenance requ.
	Fault
	Warnings
	Not ready REMOATE
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 6: Operation status

	Running LOCAL
	Running REMOTE
	Handwheel oper.
	Actuator running
	MPV position reached
	Start step mode
	In intermed. position
	Op. pause active
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 7: Intermediate positions

	Intermed. pos. 8
	Intermed. pos. 7
	Intermed. pos. 6
	Intermed. pos. 5
	Intermed. pos. 4
	Intermed. pos. 3
	Intermed. pos. 2
	Intermed. pos. 1
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 8: Discrete inputs

	Bluetooth Connected
	-
	Input DIN 6
	Input DIN 5
	Input DIN 4
	Input DIN 3
	Input DIN 2
	Input DIN 1
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 9: Input AIN 1 (H)

	Input AIN 1
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 10: Input AIN 1 (L)

	Input AIN 1
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 11: Torque (H)

	Torque High byte
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 12: Torque (L)

	Torque Low byte
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 13: Not ready REMOTE 1

	I/O interface
	FailState fieldbus
	EMCY behav. active
	EMCY stop active
	Local STOP
	Interlock active
	Sel. sw. not REMOTE
	Wrong oper. cmd
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 14: Not ready REMOTE 2

	Handwheel active
	Service active
	PVST active
	Interlock by-pass
	Disabled
	SIL function active
	FQM fail safe active
	FQM fail safe init
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 15: Fault 1

	No reaction
	Internal fault
	Torque fault CLOSE
	Torque fault OPEN
	Phase failure
	Mains quality
	Configuration error
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 16: Fault 2

	Incorrect phase seq
	Config. error REMOTE
	Incorrect dir. rotation
	-
	-
	-
	-
	-
Bit 7	
Bit 6	
Bit 5	
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

Byte 17: Warnings 1

Wrn no reaction	SIL fault	Torque wrn OPEN	Torque wrn CLOSE	FQM fail safe fault	--	--	Maintenance Required
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 18: Warnings 2

Config. warning	Time not set	RTC voltage	--	24 V DC external	--	--	Wrn controls temp.
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 19: Warnings 3

Op. time warning	Wrn op mode run time	Wrn op mode starts	Internal warning	Wrn input AIN 1	Wrn input AIN 2	Wrn FOC	Wrn FO cable budget
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 20: Warnings 4

PVST fault	PVST abort	Failure behav. active	Wrn FOC connection	PVST required	Wrn setpoint position	--	--
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 21: Input AIN 2 (H)

Input AIN 2

Byte 22: Input AIN 2 (L)

Input AIN 2

Byte 23: Failure

Fault	--	--	--	--	--	--	--
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 24: Maintenance required

--	--	--	Maintenance interval	Maintenance contactors	Maintenance lubricant	Maintenance seals	Maintenance mechanics
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 25: Out of specification 1

Wrn no reaction	SIL fault	Torque wrn OPEN	Torque wrn CLOSE	FQM fail safe fault	--	--	--
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 26: Out of specification 2

Config. warning	Time not set	RTC voltage	--	24 V DC external	Wrn motor tmp.	Wrn gearbox temp.	Wrn controls temp.
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 27: Out of specification 3

Op. time warning	Wrn op mode run time	Wrn op mode starts	Internal warning	Wrn input AIN 1	Wrn input AIN 2	Wrn FOC	Wrn FO cable budget
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 28: Out of specification 4

PVST fault	PVST abort	Failure behav. active	Wrn FOC connection	PVST required	Wrn setpoint position	--	--
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 29: Function check 1

--	--	PVST active	EMCY stop active	Handwheel active	Service active	Sel. sw. not REMOTE	Local STOP
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 30: Function check 2

--	--	--	--	--	--	--	--
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 31: Fieldbus status

Channel 2 activity	Channel 1 activity	Channel 2 FailState fieldb.	Channel 1 FailState fieldb.	Channel 2 DataEx	Channel 1 DataEx	Channel 2 active	Channel 1 active
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 32: SIL signals

--	FQM fail safe fault	FQM fail safe init	FQM fail safe active	SIL function active	SIL fault	Safe Stop	Safe ESD
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 33: Reserve

--

Byte 34: Reserve

--

Byte 35: Reserve

--

Byte 36: Reserve

--

Byte 37: Reserve

--

Byte 38: Reserve

--

Byte 39: Reserve

--

Byte 40: Reserve

--

4.1.2. Description of the bytes in the process representation input

Byte 1: Logical signals

Bits 3, 6, and 7 are collective signals.

Bits 5 and 4 of the logical signals (byte1) indicate a logical operation of the actuator, i.e. they are set when the actuator has received the command to perform an electrical operation (also active when e.g. the actuator is in a stepping pause during stepping mode or waiting for the end of the dead time).

Table 4: Byte 1: Logical signals

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	End position OPEN	(2) = "Bit: End p. OPEN"	1	For limit seating: Limit switch operated in direction OPEN For torque seating: Torque switch and limit switch operated in direction OPEN
			0	No signal
1	End position CLOSED	(1) = "Bit End p. CLOSED"	1	For limit seating: Limit switch operated in direction CLOSE For torque seating: Torque switch and limit switch operated in direction CLOSE
			0	No signal
2	Setpoint pos.reached	(5) = "Bit: Setpoint reached"	1	The setpoint is within max. error variable (outer dead band). Is only signalled if Profibus DP master has set the Fieldbus SETPOINT bit (process representation output).
			0	No signal
3	Not ready REMOTE	(22) = "Bit: Not ready REMOTE"	1	Collective signal 04: Contains the result of a disjunction (OR-operation) of all bits comprised in bytes 13 and 14 (Not ready REMOTE 1 and Not ready REMOTE 2). The actuator cannot be operated from REMOTE. The actuator can only be operated via the local controls.
			0	In bytes 13 and 14, no signals are active (all bits are set to 0).
4	Running OPEN	(7) = "Bit: Running OPEN"	1	An operation command via the local controls push buttons or via fieldbus in direction OPEN is performed: Fieldbus OPEN or Fieldbus SETPOINT (process representation output). This bit remains also set during operation pauses (e.g. due to the dead time or the reversing prevention time).
			0	Operation in direction OPEN via fieldbus is not executed.
5	Running CLOSE	(6) = "Bit: Running CLOSE"	1	An operation command via the local controls push buttons or via fieldbus in direction CLOSE is performed: Fieldbus CLOSE or Fieldbus SETPOINT (process representation output). This bit remains also set during operation pauses (e.g. due to the dead time or the reversing prevention time).
			0	Operation in direction CLOSE via fieldbus is not executed.
6	Warning	(21) = "Bit: Warnings"	1	Collective signal 02: Contains the result of a disjunction (OR-operation) of all bits of bytes 17 to 20 (Warning 1 to Warning 4).
			0	In bytes 17 and 20, no warnings are active (all bits are set to 0).
7	Fault	(20) = "Bit: Fault"	1	Collective signal 03: Contains the result of a disjunction (OR-operation) of all bits of bytes 15 and 16 (Fault 1 and Fault 2). The actuator cannot be operated.
			0	In bytes 15 and 16, no faults are active (all bits are set to 0).

Byte 2: Actuator signals

Table 5: Byte 2: Actuator signals

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Thermal fault	(56) = "Bit: Thermal fault"	1	Motor protection tripped
			0	No signal
1	Phase fault	(57) = "Bit: Phase fault"	1	- When connecting to a 3-ph AC system and with internal 24 V DC supply of the electronics: Phase 2 is missing. - When connecting to a 3-ph or 1-ph AC system and with external 24 V DC supply of the electronics: One of the phases L1, L2 or L3 is missing.
			0	All phases are available.
2	Selector sw. REMOTE	(9) = "Bit: Sel. sw. REMOTE"	1	Selector switch is in position REMOTE.
			0	Selector switch is not in position REMOTE.
3	Selector sw. LOCAL	(8) = "Bit: Selector sw. LOCAL"	1	Selector switch is in position LOCAL.
			0	Selector switch is not in position LOCAL.
4	Limit switch OPEN	(12) = "Bit: Limit sw. OPEN"	1	Limit switch operated in end position OPEN
			0	No signal
5	Limit switch CLOSED	(11) = "Bit: Limit sw. CLOSED"	1	Limit switch operated in end position CLOSED
			0	No signal
6	Torque sw. OPEN	(14) = "Bit: Torque sw. OPEN"	1	Torque switch operated in direction OPEN.
			0	No signal
7	Torque sw. CLOSED	(13) = "Bit: Torque sw. CLOSE"	1	Torque switch operated in direction CLOSE.
			0	No signal

Bytes 3 and 4: Actual position

Byte 3 = high byte, byte 4 = low byte.

If a position transmitter (potentiometer, RWG, EWG, or MWG) is installed in the actuator, bytes 3 and 4 are used to transmit the current actuator position. The value is transmitted in per mil (value: 0 – 1,000).

Byte 5: Device status

Table 6: Byte 5: Device status

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Not ready REMOTE	(22) = "Bit: Not ready REMOTE"	1	Collective signal 04: Contains the result of a disjunction (OR-operation) of all bits comprised in bytes 13 and 14 (Not ready REMOTE 1 and Not ready REMOTE 2). The actuator cannot be operated from REMOTE. The actuator can only be operated via the local controls.
			0	In bytes 13 and 14, no signals are active (all bits are set to 0).
1	Warning	(21) = "Bit: Warnings"	1	Collective signal 02: Contains the result of a disjunction (OR-operation) of all bits of bytes 17 to 20 (Warning 1 to Warning 4).
			0	In bytes 17 and 20, no warnings are active (all bits are set to 0).
2	Fault	(20) = "Bit: Fault"	1	Collective signal 03: Contains the result of a disjunction (OR-operation) of all bits of bytes 15 and 16 (Fault 1 and Fault 2). The actuator cannot be operated.
			0	In bytes 15 and 16, no faults are active (all bits are set to 0).

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
3	NAMUR mainten. req.	(19) = "Bit: Maintenance requ."	1	Collective signal 09: Indication according to NAMUR recommendation NE 107 Recommendation to perform maintenance. Contains the result of a disjunction (OR-operation) of all bits of byte 24 (Maintenance required).
			0	In all bits of byte 24, no signals are active (all bits are set to 0).
4	NAMUR out of spec.	(18) = "Bit: Out of spec."	1	Collective signal 07: Indication according to NAMUR recommendation NE 107 Actuator is operated outside the normal operation conditions. Contains the result of a disjunction (OR-operation) of all bits of bytes 25 to 28 (Out of specification 1 to 4).
			0	In bytes 25 and 28, no signals are active (all bits are set to 0).
5	NAMUR funct. check	(17) = "Bit: Function check"	1	Collective signal 08: Indication according to NAMUR recommendation NE 107 The actuator is being worked on; output signals are temporarily invalid. Contains the result of a disjunction (OR-operation) of all bits of bytes 29 and 30 (Function check 1 and 2).
			0	In bytes 29 and 30, no signals are active (all bits are set to 0).
6	NAMUR failure	(16) = "Bit: Failure"	1	Collective signal 10: Indication according to NAMUR recommendation NE 107 Actuator function failure, output signals are invalid. Contains the result of a disjunction (OR-operation) of all bits of byte 23 (Failure).
			0	In all bits of byte 23, no signals are active (all bits are set to 0).
7	Device ok	(15) = "Bit: Device ok"	1	Collective signal 05: The device is ready for remote control. No AUMA warnings, AUMA faults or signals according to NAMUR are present. Bit 7 is set if bits 0 to 6 are deleted.
			0	Contains the result of a disjunction (OR-operation) of bits 0 to 6 (device status).

Byte 6: Operation status

This byte stores information about actuator movement.

Table 7: Byte 6: Operation status

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Operation pause active	(23) = "Bit: Op. pause active"	1	The actuator is in off-time (e.g. reversing prevention time)
			0	No signal
1	In intermediate pos.	(29) = "Bit: In interm. position"	1	The actuator is in an intermediate position e.g. neither in end position OPEN nor in end position CLOSED.
			0	No signal
2	Start stepping mode	(24) = "Bit: Start step mode"	1	The actuator is within the set stepping range.
			0	The actuator is outside the set stepping range.
3	—	—		No signal (reserved)
4	Actuator running	(25) = "Bit: Actuator running"	1	Actuator is running (output drive is moving) Hard wired collective signal consisting of signals: (26) Running LOCAL (27) Running REMOTE (28) Handwheel oper.
			0	No signal

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
5	Handwheel oper.	(28) = "Bit: Running via handw."	1	Output drive rotates without electric operation command.
			0	No signal
6	Running REMOTE	(27) = "Bit: Running REMOTE"	1	Output drive rotates due to operation command from REMOTE.
			0	No signal
7	Running LOCAL	(26) = "Bit: Running LOCAL"	1	Output drive rotates due to operation command from LOCAL.
			0	No signal

Byte 7: Intermediate positions

Table 8: Byte 7: Intermediate positions

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Intermediate pos. 1	(31) = "Bit: Intermediate pos. 1"	1	Intermediate position 1 reached
			0	No signal
1	Intermediate pos. 2	(32) = "Bit: Intermediate pos. 2"	1	Intermediate position 2 reached
			0	No signal
2	Intermediate pos. 3	(33) = "Bit: Intermediate pos. 3"	1	Intermediate position 3 reached
			0	No signal
3	Intermediate pos. 4	(34) = "Bit: Intermediate pos. 4"	1	Intermediate position 4 reached
			0	No signal
4	Intermediate pos. 5	(35) = "Bit: Intermediate pos. 5"	1	Intermediate position 5 reached
			0	No signal
5	Intermediate pos. 6	(36) = "Bit: Intermediate pos. 6"	1	Intermediate position 6 reached
			0	No signal
6	Intermediate pos. 7	(37) = "Bit: Intermediate pos. 7"	1	Intermediate position 7 reached
			0	No signal
7	Intermediate pos. 8	(38) = "Bit: Intermediate pos. 8"	1	Intermediate position 8 reached
			0	No signal

Byte 8: Discrete inputs

Table 9: Byte 8: Discrete inputs

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Input DIN 1	(39) = "Bit: Input DIN 1"	1	A high signal (+24 V DC) is present at digital input 1.
			0	No signal
1	Input DIN 2	(40) = "Bit: Input DIN 2"	1	A high signal (+24 V DC) is present at digital input 2.
			0	No signal
2	Input DIN 3	(41) = "Bit: Input DIN 3"	1	A high signal (+24 V DC) is present at digital input 3.
			0	No signal
3	Input DIN 4	(42) = "Bit: Input DIN 4"	1	A high signal (+24 V DC) is present at digital input 4.
			0	No signal
4	Input DIN 5	(43) = "Bit: Input DIN 5"	1	A high signal (+24 V DC) is present at digital input 5.
			0	No signal
5	Input DIN 6	(44) = "Bit: Input DIN 6"	1	A high signal (+24 V DC) is present at digital input 6.
			0	No signal
6	—	—		No signal (reserved)
7	Bluetooth connected	(46) = "Bit: Input DIN 7"	1	The Bluetooth interface is connected.
			0	No signal

Byte 9 and byte 10: Input AIN 1

Byte 9 = high byte, byte 10 = low byte.

Bytes 9 and 10 transmit the value of the first additional free analogue current input of the Profibus DP interface. The start and end values can be set at the AC via push buttons and display. (For operation, please refer to the respective operation instructions for the actuator.)

If the measuring values are 0.3 mA below the initial value, a signal loss is indicated. The value is transmitted in per mil (value: 0 – 1,000).

Byte 11 and byte 12: Torque

Byte 11 = high byte, byte 12 = low byte.

Bytes 11 and 12 transmit the current torque of the actuator (only if an MWG is installed in the actuator).

The value transmitted is the current torque in percent or per mil of the nominal actuator torque.

The value is transmitted in per mil (value: 0 – 1,000).

- The value 1,000 corresponds to 127.0 % torque in direction OPEN.
- The value 500 is the torque zero point.
- The value 0 corresponds to 127.0 % torque in direction CLOSE.

Byte 13: Not ready REMOTE 1

Table 10: Byte 13: Not ready REMOTE 1

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Wrong oper. cmd	(98) = "Bit: Wrong operation cmd"	1	Wrong operation command Indicates the fact that several operation commands were received simultaneously via Profibus DP (e.g. Remote OPEN and Remote CLOSE simultaneously or Remote CLOSE/Remote OPEN and Remote SETPOINT simultaneously) or that the max. value for a setpoint position has been exceeded (setpoint position > 1,000).
			0	Operation commands are ok.
1	Sel. sw. not REMOTE	(53) = "Bit: Sel. sw. not REMOTE"	1	Selector switch is in position Local control (LOCAL) or 0 (OFF).
			0	Selector switch is in position Remote control (REMOTE).
2	Interlock active	(52) = "Bit: Interlock active"	1	Actuator is interlocked.
			0	No signal
3	Local STOP	(97) = "Bit: Local Stop"	1	Push button STOP of local controls is operated.
			0	No signal
4	EMCY stop active	(50) = "Bit: EMCY stop active"	1	Operation mode EMERGENCY stop is active (EMERGENCY stop button has been pressed).
			0	EMERGENCY stop button not pressed (normal operation).
5	EMCY behav. active	(49) = "Bit: EMCY behav.act."	1	Operation mode EMERGENCY behaviour is active (EMERGENCY signal was sent).
			0	No signal
6	FailState fieldbus	(47) = "Bit: FailState fieldbus"	1	No valid communication via fieldbus (despite available connection)
			0	Communication via fieldbus is ok.
7	I/O interface	(48) = "Bit: I/O interface"	1	The actuator is controlled via the I/O interface (parallel).
			0	The actuator is controlled via fieldbus.

Byte 14: Not ready REMOTE 2

Table 11: Byte 14: Not ready REMOTE 2

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	FQM fail safe ini.	—		No signal (reserved)
1	FQM fail safe act.	—		No signal (reserved)
2	SIL function active ¹⁾	(207) = "SIL function active"	1	The safety function of the SIL sub-assembly is active.
			0	No signal.
3	Disabled	(107) = "Bit: Disabled"	1	Actuator is in operation mode Disabled.
			0	No signal
4	Interlock by-pass	(121) = "Bit: Bypass Interlock"	1	By-pass of interlock function is active.
			0	No signal
5	PVST active	(116) = "Bit: PVST active"	1	Partial Valve Stroke Test (PVST) is active.
			0	No signal
6	Service active	(51) = "Bit: Service active"	1	Operation mode Service is active.
			0	No signal
7	Handwheel active	(54) = "Bit: Handwheel active"	1	Manual operation is active (handwheel is engaged); optional signal
			0	No signal

- 1) The safety function indications via fieldbus are for information only and must not be used as part of a safety function. The I/O signals of the SIL module must be used for this purpose.

Byte 15: Fault 1

The fault signals contain the causes why the actuator cannot be operated.

Table 12: Byte 15: Fault 1

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Configuration error	(72) = "Bit: Configuration error"	1	Incorrect configuration, i.e. the current setting of the actuator controls is invalid.
			0	Configuration is ok.
1	Mains quality	(59) = "Bit: Mains quality"	1	Due to insufficient mains quality, the controls cannot detect the phase sequence (sequence of phase conductors L1, L2 and L3) within the pre-set time frame provided for monitoring.
			0	No signal
2	Thermal fault	(56) = "Bit: Thermal fault"	1	Motor protection tripped
			0	No signal
3	Phase fault	(57) = "Bit: Phase fault"	1	- When connecting to a 3-ph AC system and with internal 24 V DC supply of the electronics: Phase 2 is missing. - When connecting to a 3-ph or 1-ph AC system and with external 24 V DC supply of the electronics: One of the phases L1, L2 or L3 is missing.
			0	No signal
4	Torque fault OPEN	(61) = "Bit: Torque fault OPEN"	1	Torque fault in direction OPEN
			0	No signal
5	Torque fault CLOSE	(60) = "Bit: Torque fault CLOSE"	1	Torque fault in direction CLOSE
			0	No signal
6	Internal error	(69) = "Bit: Internal fault"	1	Collective signal 14: Internal fault
			0	No internal fault
7	Wrn no reaction	(71) = "Bit: No reaction"	1	No actuator reaction to operation commands within the set reaction time.
			0	No signal

Byte 16: Fault 2

The fault signals contain the causes why the actuator cannot be operated.

Table 13: Byte 16: Fault 2

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	—	—		No signal (reserved)
1	—	—		No signal (reserved)
2	—	—		No signal (reserved)
3	—	—		No signal (reserved)
4	—	—		No signal (reserved)
5		—		No signal
6	Config. error REMOTE	(123) = "Bit: Config error remote"	1	Configuration error of REMOTE interface active.
			0	No signal.
7	Incorrect phase seq	(58) = "Bit: Wrong phase sequence"	1	The phase conductors L1, L2 and L3 are connected in the wrong sequence.
			0	Phase sequence is ok.

Byte 17: Warnings 1

The warning signals are for information only and do not interrupt or disable an operation (as opposed to faults).

Table 14: Byte 17: Warnings 1

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	—	—		No signal (reserved)
1	—	—		No signal (reserved)
2	—	—		No signal (reserved)
3	FQM fail safe flt	—		No signal
4	Torque wrn CLOSE	(125) = "Bit: Torque wrn CLOSE"	1	Warning: Limit value for Torque warning CLOSE exceeded
			0	No signal
5	Torque wrn OPEN	(124) = "Bit: Torque wrn OPEN"	1	Warning: Limit value for Torque warning OPEN exceeded
			0	No signal
6	SIL fault ¹⁾	(206) = "SIL fault"	1	Warning: A SIL fault of the SIL sub-assembly has occurred.
			0	No signal
7	Wrn no reaction	(71) = "Bit: No reaction"	1	Warning: No actuator reaction to operation commands within the set reaction time.
			0	No signal

- 1) The safety function indications via fieldbus are for information only and must not be used as part of a safety function. The I/O signals of the SIL module must be used for this purpose.

Byte 18: Warnings 2

Table 15: Byte 18: Warnings 2

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Wrn controls temp.	(88) = "Bit: WrnControl-sTemp"	1	Warning: Temperature within controls housing too high
			0	No signal
1	—	—		No signal (reserved)
2	—	—		No signal (reserved)
3	24 V DC external	(68) = "Bit: 24 V DC, external"	1	The external 24 V DC voltage supply of the controls has exceeded the power supply limits.
			0	No signal

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
4	—	—		No signal (reserved)
5	RTC voltage	(126) = "Bit: RTC button cell"	1	Warning: The voltage of the RTC button cell is too low.
			0	No signal
6	Time not set	(77) = "Bit: RTC not set"	1	The real time clock has not yet been set on the basis of valid values.
			0	No signal
7	Config. warning	(108) = "Bit: Config. Warning"	1	Warning: Configuration setting is incorrect. The device can still be operated with restrictions.
			0	No signal

Byte 19: Warnings 3

Table 16: Byte 19: Warnings 3

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Wrn FO cable budget	(111) = "Bit: Wrn FOC budget"	1	Warning: FO cable system reserve reached (critical or permissible Rx receive level)
			0	No signal
1	Wrn FOC	(83) = "Bit: Wrn FO loop"	1	Warning: Optical receiving signal (channel 1) incorrect (no or insufficient Rx receive level) or RS-485 format error (incorrect bit(s))
			0	No signal
2	Wrn input AIN 2	(92) = "Bit: Wrn input AIN 2"	1	Warning: Loss of signal analogue input 2
			0	No signal
3	Wrn input AIN 1	(91) = "Bit: Wrn input AIN 1"	1	Warning: Loss of signal analogue input 1
			0	No signal
4	Internal warning	(70) = "Bit: Internal warning"	1	Collective signal 15: Internal warning
			0	No internal warning
5	Wrn op.mode starts	(85) = "Bit: WrnOnTiStarts"	1	Warning: Max. number of motor starts (starts) exceeded
			0	No signal
6	Wrn op.mode run time	(84) = "Bit: WrnOnTiRunning"	1	Warning: Max. running time/h exceeded
			0	No signal
7	Op. time warning	(63) = "Bit: Operat. time warning"	1	Warning: Max. permissible operating time for an operation (OPEN-CLOSE) exceeded
			0	No signal

Byte 20: Warnings 4

Table 17: Byte 20: Warnings 4

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	—	—		No signal (reserved)
1	—	—		No signal (reserved)
2	Wrn setpoint position	(95) = "Bit: WrnSetpoint-Pos"	1	Warning: Loss of signal of actuator setpoint position
			0	No signal
3	PVST required	(208) = "PVST required"	1	Warning: A Partial Valve Stroke Test (PVST) should be performed.
			0	
4	Wrn FOC connection	(127) = "Bit: Wrn FOC connection"	1	Warning: FO cable connection not available.
			0	No signal
5	Failure behav. active	(30) = "Bit: Failure behav. active"	1	The failure behaviour is active.
			0	No signal

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
6	PVST abort	(118) = "Bit: PVST abort"	1	Partial Valve Stroke Test (PVST) was aborted or could not be started. Remedy: Perform RESET or restart PVST.
			0	No signal
7	PVST fault	(117) = "Bit: PVST fault"	1	Partial Valve Stroke Test (PVST) could not be successfully completed.
			0	No signal

Byte 21 and byte 22: Input AIN 2

Byte 21 = high byte, byte 22 = low byte.

Bytes 9 and 10 transmit the value of the second additional free analogue current input of the Profibus DP interface. The start and end values can be set at the AC via push buttons and display. (For operation, please refer to the respective operation instructions for the actuator.)

If the measuring values are 0.3 mA below the initial value, a signal loss is indicated. The value is transmitted in per mil (value: 0 – 1,000).

Byte 23: Failure

Causes of the Failure signal in accordance with NAMUR recommendation NE 107.

Table 18: Byte 23: Failure

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	—	—		No signal (reserved)
1	—	—		No signal (reserved)
2	—	—		No signal (reserved)
3	—	—		No signal (reserved)
4	—	—		No signal (reserved)
5	—	—		No signal (reserved)
6	—	—		No signal (reserved)
7	Fault	(20) = "Bit: Fault"	1	Collective signal 03: Contains the result of a disjunction (OR-operation) of all bits of bytes 15 and 16 (Fault 1 and Fault 2). The actuator cannot be operated.
			0	In bytes 15 and 16, no faults are active (all bits are set to 0).

Byte 24: Maintenance required

Causes of the Maintenance required signal in accordance with NAMUR recommendation NE 107.

Table 19: Byte 24: Maintenance required

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Mainten. mechanics	(209) = "Mechanic lifetime"	1	Mechanic maintenance requirement (AUMA service)
			0	No signal
1	Mainten. seals	(210) = "Seal lifetime"	1	Seal maintenance requirement (AUMA service)
			0	No signal
2	Mainten. lubricant	(211) = "Seal lifetime"	1	Lubricant maintenance requirement (AUMA service)
			0	No signal
3	Mainten. contactors	(212) = "Contactor lifetime"	1	Contactor maintenance requirement (AUMA service)
			0	No signal
4	Mainten. interval	(213) = "Maintenance interval"	1	The set maintenance interval has expired.
			0	No signal

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
5	—	—		No signal (reserved)
6	—	—		No signal (reserved)
7	—	—		No signal (reserved)

Byte 25: Out of specification 1

Causes of the Out of specification signal in accordance with NAMUR recommendation NE 107.

Table 20: Byte 25: Out of specification 1

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	—	—		No signal (reserved)
1	—	—		No signal (reserved)
2	—	—		No signal (reserved)
3	FQM fail safe flt	—		No signal
4	Torque wrn CLOSE	(125) = "Bit: Torque wrn CLOSE"	1	Warning: Limit value for Torque warning CLOSE exceeded
			0	No signal
5	Torque wrn OPEN	(124) = "Bit: Torque wrn OPEN"	1	Warning: Limit value for Torque warning OPEN exceeded
			0	No signal
6	SIL fault ¹⁾	(206) = "SIL fault"	1	Warning: A SIL fault of the SIL sub-assembly has occurred.
			0	No signal
7	Wrn no reaction	(71) = "Bit: No reaction"	1	Warning: No actuator reaction to operation commands within the set reaction time.
			0	No signal

- 1) The safety function indications via fieldbus are for information only and must not be used as part of a safety function. The I/O signals of the SIL module must be used for this purpose.

Byte 26: Out of specification 2

Table 21: Byte 26: Out of specification 2

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Wrn controls temp.	(88) = "Bit: WrnControl-sTemp"	1	Warning: Temperature within controls housing too high
			0	No signal
1	—	—		No signal (reserved)
2	—	—		No signal (reserved)
3	24 V DC external	(68) = "Bit: 24 V DC, external"	1	The external 24 V DC voltage supply of the controls has exceeded the power supply limits.
			0	No signal
4	—	—		No signal (reserved)
5	RTC voltage	(126) = "Bit: RTC button cell"	1	Warning: The voltage of the RTC button cell is too low.
			0	No signal
6	Time not set	(77) = "Bit: RTC not set"	1	The real time clock has not yet been set on the basis of valid values.
			0	No signal
7	Config. warning	(108) = "Bit: Config. Warning"	1	Warning: Configuration setting is incorrect. The device can still be operated with restrictions.
			0	No signal

Byte 27: Out of specification 3

Table 22: Byte 27: Out of specification 3

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Wrn FO cable budget	(111) = "Bit: Wrn FOC budget"	1	Warning: FO cable system reserve reached (critical or permissible Rx receive level)
			0	No signal
1	Wrn FOC	(83) = "Bit: Wrn FO loop"	1	Warning: Optical receiving signal (channel 1) incorrect (no or insufficient Rx receive level) or RS-485 format error (incorrect bit(s))
			0	No signal
2	Wrn input AIN 2	(92) = "Bit: Wrn input AIN 2"	1	Warning: Loss of signal analogue input 2
			0	No signal
3	Wrn input AIN 1	(91) = "Bit: Wrn input AIN 1"	1	Warning: Loss of signal analogue input 1
			0	No signal
4	Internal warning	(70) = "Bit: Internal warning"	1	Collective signal 15: Internal warning
			0	No internal warning
5	Wrn op.mode starts	(85) = "Bit: WrnOnTiStarts"	1	Warning: Max. number of motor starts (starts) exceeded
			0	No signal
6	Wrn op.mode run time	(84) = "Bit: WrnOnTiRunning"	1	Warning: Max. running time/h exceeded
			0	No signal
7	Op. time warning	(63) = "Bit: Operat. time warning"	1	Warning: Max. permissible operating time for an operation (OPEN-CLOSE) exceeded
			0	No signal

Byte 28: Out of specification 4

Table 23: Byte 28: Out of specification 4

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	—	—		No signal (reserved)
1	—	—		No signal (reserved)
2	Wrn setpoint position	(95) = "Bit: WrnSetpoint-Pos"	1	Warning: Loss of signal of actuator setpoint position
			0	No signal
3	PVST required	(208) = "PVST required"	1	Warning: A Partial Valve Stroke Test (PVST) should be performed.
			0	
4	Wrn FOC connection	(127) = "Bit: Wrn FOC connection"	1	Warning: FO cable connection not available.
			0	No signal
5	Failure behav. active	(30) = "Bit: Failure behav. active"	1	The failure behaviour is active.
			0	No signal
6	PVST abort	(118) = "Bit: PVST abort"	1	Partial Valve Stroke Test (PVST) was aborted or could not be started. Remedy: Perform RESET or restart PVST.
			0	No signal
7	PVST fault	(117) = "Bit: PVST fault"	1	Partial Valve Stroke Test (PVST) could not be successfully completed.
			0	No signal

Byte 29: Function check 1

Causes of the Function check signal in accordance with NAMUR recommendation NE 107.

Table 24: Byte 29: Function check 1

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Local STOP	(97) = "Bit: Local Stop"	1	Push button STOP of the local controls is operated.
			0	No signal
1	Sel. sw. not REMOTE	(53) = "Bit: Sel. sw. not REMOTE"	1	Selector switch is in position Local control (LOCAL) or 0 (OFF).
			0	Selector switch is in position Remote control (REMOTE).
2	Service active	(51) = "Bit: Service active"	1	Operation mode Service is active.
			0	No signal
3	Handwheel active	(54) = "Bit: Handwheel active"	1	Manual operation is active (handwheel is engaged); optional signal
			0	No signal
4	EMCY stop active	(50) = "Bit: EMCY stop active"	1	Operation mode EMERGENCY stop is active (EMERGENCY stop button has been pressed).
			0	EMERGENCY stop button not pressed (normal operation).
5	PVST active	(116) = "Bit: PVST active"	1	Partial Valve Stroke Test (PVST) is active.
			0	No signal
6	—	—		No signal (reserved)
7	—	—		No signal (reserved)

Byte 30: Function check 2

The contents are reserved for further Function check signals in accordance with NAMUR recommendation NE 107.

Byte 31: Status fieldbus

Information on the fieldbus status.

Table 25: Byte 31: Status fieldbus

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
0	Channel 1 active	(99) = "Fieldbus Channel 1 active"	1	Channel 1 is the active operation command channel.
			0	No signal
1	Channel 2 active	(100) = "Fieldbus Channel 2 active"	1	Channel 2 is the active operation command channel.
			0	No signal
2	Channel 1 DataEx	(109) = "Bit: Pb DataEx Ch1"	1	Channel 1 is in the data exchange state.
			0	No signal
3	Channel 2 DataEx	(110) = "Bit: Pb DataEx Ch2"	1	Channel 1 is in the data exchange state (DataEx).
			0	No signal
4	Ch.1 FailState Fieldb.	(112) = "Bit: Fieldbus-FailsafeAct.1"	1	No valid fieldbus communication via channel 1 (application does not communicate with the DCS).
			0	No signal
5	Ch.2 FailState Fieldb.	(113) = "Bit: Fieldbus-FailsafeAct.2"	1	No valid fieldbus communication via channel 2 (application does not communicate with the DCS).
			0	No signal
6	Channel 1 activity	(114) = "Bit: Chan1 BusComm"	1	Fieldbus communication on channel 1
			0	No signal
7	Channel 2 activity	(115) = "Bit: Chan2 BusComm"	1	Fieldbus communication on channel 2
			0	No signal

Byte 32: SIL indications

Causes of the Maintenance required signal in accordance with NAMUR recommendation NE 107.

Table 26: Byte 32: SIL indications

Bit	Designation (process representation)	Prm-Text-Def GSD file	Value	Description
1	Safe ESD ¹⁾	(204) = "Safe ESD"	1	Safe ESD (Emergency Shut Down) safety function of the SIL sub-assembly is active.
			0	No signal
2	Safe Stop ¹⁾	(205) = "Safe Stop"	1	Safe STOP safety function of the SIL sub-assembly is active.
			0	No signal
3	SIL fault ¹⁾	(206) = "SIL fault"	1	Collective signal Warning: A SIL fault of the SIL sub-assembly has occurred.
			0	No signal
4	SIL function active ¹⁾	(207) = "SIL function active"	1	A safety function of the SIL sub-assembly is active.
			0	No signal
4	—	—		No signal (reserved)
5	—	—		No signal (reserved)
6	—	—		No signal (reserved)
7	—	—		No signal (reserved)

- 1) The safety function indications via fieldbus are for information only and must not be used as part of a safety function. The I/O signals of the SIL module must be used for this purpose.

Byte 33 to byte 40: Reserve

The contents are reserved for future extensions.

4.2. Output data (process representation output)

The master (controls) can control the slave (actuator) via the process representation output.

4.2.1. Process representation output arrangement

Information To perform remote operations, the selector switch must be in position **Remote control** (REMOTE).

Byte 1: Commands

			Fieldbus STOP	Fieldbus RESET	Fieldbus SETPOINT	Fieldbus CLOSE	Fieldbus OPEN	
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

Byte 2: Speed - Setpoint

Fieldbus Speed - Setpoint

Byte 3: Position setpoint (H)

Fieldbus Setpoint position/ (Process setpoint) High byte

Byte 4: Setpoint position (L)

Fieldbus Setpoint position/ (Process setpoint) Low byte
--

Byte 5: Additional commands

	PVST	Fieldbus EMCY	Fieldbus channel 2	Fieldbus channel 1	Bluetooth activation	Fieldb. enable CLOSE	Fieldb. enable OPEN	Fieldb. enable LOCAL
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

Byte 6: Intermediate positions

	Fieldb. interm. pos 8	Fieldb. interm. pos 7	Fieldb. interm. pos 6	Fieldb. interm. pos 5	Fieldb. interm. pos 4	Fieldb. interm. pos 3	Fieldb. interm. pos 2	Fieldb. interm. pos 1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

Byte 7: Digital outputs 1

	-	-	-	-	reserved	reserved	reserved	reserved
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

Byte 8: Digital outputs 2

	reserved	reserved	Fieldbus DOUT 6	Fieldbus DOUT 5	Fieldbus DOUT 4	Fieldbus DOUT 3	Fieldbus DOUT 2	Fieldbus DOUT 1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

Byte 9: Actual process value (H)

Option (only for use with process controller)

Byte 10: Actual process value (L)

Option (only for use with process controller)

Byte 11: Output AOUT 1 (H)

Fieldbus Output AOUT 1 High byte
--

Byte 12: Output AOUT 1 (L)

Fieldbus Output AOUT 1 Low byte

Byte 13: Output AOUT 2 (H)

Fieldbus Output AOUT 2 High byte
--

Byte 14: Output AOUT 2 (L)

Fieldbus Output AOUT 2 Low byte

Byte 15: Reserve

Reserved for future extensions

Byte 16: Reserve

Reserved for future extensions

Byte 17: Reserve

Reserved for future extensions (Float 1)

Byte 18: Reserve

Reserved for future extensions (Float 1)

Byte 19: Reserve

Reserved for future extensions (Float 1))
--

Byte 20: Reserve

Reserved for future extensions (Float 1)

Byte 21: Reserve

Reserved for future extensions (Float 1)

Byte 22: Reserve

Reserved for future extensions (Float 2)

Byte 23: Reserve

Reserved for future extensions (Float 2)

Byte 24: Reserve

Reserved for future extensions (Float 2)

Byte 25: Reserve

Reserved for future extensions (Float 2)

Byte 26: Reserve

Reserved for future extensions (Float 2)

4.2.2. Description of the output data

Byte 1: Commands

Table 27: Byte 1: Commands

Bit	Designation (process representation)	Value	Description
0	Fieldbus OPEN	1	Operation command in direction OPEN
		0	No command
1	Fieldbus CLOSE	1	Operation command in direction CLOSE
		0	No command

Bit	Designation (process representation)	Value	Description
2	Fieldbus SETPOINT	1	Run to setpoint Setpoint is provided via bytes 3 and 4. In combination with a process controller, this bit is used to change-over between process controller mode and OPEN-CLOSE control.
		0	No command In combination with a process controller, this bit is used to select between process controller operation and OPEN - CLOSE operation.
3	Fieldbus RESET	1	Certain indications of the actuator controls can be reset via fieldbus while the selector switch is in position Remote control (REMOTE) via fieldbus (e.g. PTC tripping device and torque fault). The function of this bit corresponds to the push button RESET at the local controls.
		0	No command
4	Not used		Fieldbus STOP.
5	—		No command (reserved)
6	—		No command (reserved)
7	—		No command (reserved)

Bits 0, 1, 2 = operation commands

Bits 0 – 2 are used to transmit operation commands to the actuator. Only one of these bits may be set to 1 at any given time. If several bits are set, no operation is performed and the following signal is given: **Wrong oper. cmd**

For operation commands via bit 2 (**Fieldbus SETPOINT**):

- Condition: Position transmitter (potentiometer, RWG, EWG or MWG) installed in the actuator
- If the setpoint is 0 per mil, the actuators runs to the end position CLOSED; it runs to the end position OPEN for 1000 per mil.
- If the limit of 1,000 is exceeded, the actuator completely runs to end position OPEN.
- To avoid placing too much strain on the mechanics, the reversing of direction is delayed. The default setting in the factory for the reversing prevention time is 300 ms.

Bits 4, 5, 6, 7

Bits 4 through 7 are not used and must be set to 0.

Byte 2: Fieldbus speed setpoint

Byte 2 - Fieldbus speed setpoint in % (value range 0 – 100)

Bytes 3 and 4: Setpoint position I(process setpoint, option)

Byte 3 = high byte, byte 4 = low byte.

The setpoint position is transmitted via bytes 3 and 4 (value: 0 – 1,000), using the position controller.

- The value 1,000 corresponds to the maximum setpoint, i.e. end position OPEN.
- The value 0 corresponds to the minimum setpoint, i.e. end position CLOSED.

As an alternative, the process setpoint can be transmitted via bytes 3 and 4 (value 0...1,000), using a process controller (option). Value 1,000 corresponds to the maximum process setpoint, value 0 to the minimum process setpoint.

Byte 5: Additional commands

Table 28: Byte 5: Additional commands

Bit	Designation (process representation)	Value	Description
0	Fieldb. enable LOCAL	1	Actuator operation via local controls enabled
		0	Actuator operation via local controls disabled
1	Fieldb. enable OPEN	1	Enabling operation command in direction OPEN
		0	Operation command in direction OPEN disabled.
2	Fieldb. enable CLOSE	1	Enabling operation command in direction CLOSE
		0	Operation command in direction CLOSE disabled.
3	BluetoothActivDigIn	1	Activation of Bluetooth interface.
		0	Activation of Bluetooth interface disabled.
4	Fieldbus channel 1	1	Initiate change-over to channel 1
		0	No operation command
5	Fieldbus channel 2	1	Initiate change-over to channel 2
		0	No operation command
6	Fieldbus EMCY	1	EMERGENCY signal, triggers EMERGENCY behaviour.
		0	No command
7	PVST	1	Start Partial Valve Stroke Test (functional test)
		0	No operation command

Byte 6: Intermediate positions

Byte 6 is used for coding operation commands. Thus, 8 intermediate positions can be directly selected via fieldbus commands. Hereby, the selected intermediate position is approached directly, without stopping in another intermediate position.

In this case, the actuator continues running until the selected intermediate position has been reached. Example: Operation from position 5 to 7 without stopping at position 6.

Table 29: Byte 6: Operation commands for intermediate positions

Value	Behaviour
0x01	Position 1 is approached selecting the shortest path
0x02	Position 2 is approached selecting the shortest path
0x04	Position 3 is approached selecting the shortest path
0x08	Position 4 is approached selecting the shortest path
0x10	Position 5 is approached selecting the shortest path
0x20	Position 6 is approached selecting the shortest path
0x40	Position 7 is approached selecting the shortest path
0x80	Position 8 is approached selecting the shortest path

For further information, please refer to the Manual (Operation and setting) AC 01.2 actuator controls Profibus DP.

If the multiport valve function is active (option), the entire byte 6 is used for coding of multiport valve operation commands. Up to 12 positions can either be approached selecting the shortest travel, in clockwise direction (CW), or in counterclockwise direction (CCW). Furthermore, the actuator can also be operated without any position indications in clockwise or counterclockwise direction (CW or CCW).

Table 30: Operation commands via byte 6 for activated multiport valve function

Value	△ Operation direction/position	Behaviour
0x01	Position 1	Position 1 is approached selecting the shortest path
0x02	Position 2	Position 2 is approached selecting the shortest path
0x04	Position 3	Position 3 is approached selecting the shortest path
0x08	Position 4	Position 4 is approached selecting the shortest path
0x10	Position 5	Position 5 is approached selecting the shortest path
0x20	Position 6	Position 6 is approached selecting the shortest path
0x40	Position 7	Position 7 is approached selecting the shortest path
0x80	Position 8	Position 8 is approached selecting the shortest path
0x81	Position 9	Position 9 is approached selecting the shortest path
0x82	Position 10	Position 10 is approached selecting the shortest path
0x83	Position 11	Position 11 is approached selecting the shortest path
0x84	Position 12	Position 12 is approached selecting the shortest path
0x90	CW	Actuator operates in clockwise direction (without stop at any position)
0x91	CW Position 1	Position 1 is approached in clockwise direction (CW).
0x92	CW Position 2	Position 2 is approached in clockwise direction (CW).
0x93	CW Position 3	Position 3 is approached in clockwise direction (CW).
0x94	CW Position 4	Position 4 is approached in clockwise direction (CW).
0x95	CW Position 5	Position 5 is approached in clockwise direction (CW).
0x96	CW Position 6	Position 6 is approached in clockwise direction (CW).
0x97	CW Position 7	Position 7 is approached in clockwise direction (CW).
0x98	CW Position 8	Position 8 is approached in clockwise direction (CW).
0x99	CW Position 9	Position 9 is approached in clockwise direction (CW).
0x9A	CW Position 10	Position 10 is approached in clockwise direction (CW).
0x9B	CW Position 11	Position 11 is approached in clockwise direction (CW).
0x9C	CW Position 12	Position 12 is approached in clockwise direction (CW).
0xA0	CCW	Actuator operation in counterclockwise direction (without stop at any position)
0xA1	CCW Position 1	Position 1 is approached in counterclockwise direction (CCW).
0xA2	CCW Position 2	Position 2 is approached in counterclockwise direction (CCW).

Value	△ Operation direction/position	Behaviour
0xA3	CCW Position 3	Position 3 is approached in counterclockwise direction (CCW).
0xA4	CCW Position 4	Position 4 is approached in counterclockwise direction (CCW).
0xA5	CCW Position 5	Position 5 is approached in counterclockwise direction (CCW).
0xA6	CCW Position 6	Position 6 is approached in counterclockwise direction (CCW).
0xA7	CCW Position 7	Position 7 is approached in counterclockwise direction (CCW).
0xA8	CCW Position 8	Position 8 is approached in counterclockwise direction (CCW).
0xA9	CCW Position 9	Position 9 is approached in counterclockwise direction (CCW).
0xAA	CCW Position 10	Position 10 is approached in counterclockwise direction (CCW).
0xAB	CCW Position 11	Position 11 is approached in counterclockwise direction (CCW).
0xAC	CCW Position 12	Position 12 is approached in counterclockwise direction (CCW).

Byte 7: Digital outputs 1

The digital outputs Fieldbus DOUT 1 – DOUT 6 of the fieldbus interface can be used as commands for the output contacts. For this, the outputs of the output contacts have to be assigned with the signals **Fieldbus DOUT 1** – **Fieldbus DOUT 6**.

Table 31: Byte 7: Digital outputs 1

Bit	Designation (process representation)	Value	Description
0	—		No command (reserved)
1	—		No command (reserved)
2	—		No command (reserved)
3	—		No command (reserved)
4	—		No command (reserved)
5	—		No command (reserved)
6	—		No command (reserved)
7	—		No command (reserved)

Byte 8: Digital outputs 2

Table 32: Byte 8: Digital outputs 2

Bit	Designation (process representation)	Value	Description
0	Fieldbus DOUT 1	1	Digital output 1 is activated.
		0	Output is deactivated.
1	Fieldbus DOUT 2	1	Digital output 2 is activated.
		0	Output is deactivated.
2	Fieldbus DOUT 3	1	Digital output 3 is activated.
		0	Output is deactivated.
3	Fieldbus DOUT 4	1	Digital output 4 is activated.
		0	Output is deactivated.
4	Fieldbus DOUT 5	1	Digital output 5 is activated.
		0	Output is deactivated.

Bit	Designation (process representation)	Value	Description
5	Fieldbus DOUT 6	1	Digital output 6 is activated.
		0	Output is deactivated.
6	—		No command (reserved)
7	—		No command (reserved)

Bytes 9 and 10: Actual process value

Byte 9 = high byte, byte 10 = low byte.

Byte 9 and byte 10 in combination with a process controller (option) can be used to transmit the actual process value.

Bytes 11 and 12: Fieldbus output AOUT 1

Byte 11 = high byte, byte 12 = low byte.

Bytes 11 and 12 can be used to send an analogue value to the actuator.

The value is transmitted in per mil (value: 0 – 1,000).

The outputs "Fieldbus output AOUT 1" and "Fieldbus output AOUT 2" can be used as output values via the analogue outputs. For this, the outputs of the analogue outputs have to be assigned with the signals **Fieldbus AOUT 1** or **Fieldbus AOUT 2**.

Bytes 13 and 14: Fieldbus output AOUT 2

Byte 13 = high byte, byte 14 = low byte.

A second analogue value can be sent to the actuator using bytes 13 and 14.

The value is transmitted in per mil (value: 0 – 1,000).

Bytes 15 to 26: Reserve

The contents are reserved for future extensions.

4.3. Profibus DP V1 services

— Option —

Apart from the cyclic DP-V0 process data exchange, the Profibus DP-V1 services can establish an additional acyclic communication via the fieldbus.

Actuator controls with activated Profibus DP-V1 services grant access to the contents of the device ID, the operating data, and the most important parameters for setting and the maintenance information.

Access to the data of all actuators connected by the Profibus DP network is therefore enabled for preventive maintenance or uniform parameter setting.

Actuator controls support an acyclic DP-V1 connection with controls (DPM1 = master of class 1) and one acyclic DP-V1 connection with engineering stations (DPM2 = master of class 2).

The following DP-V1 fault indications are supported:

	Fault ind.	Error class	Error code	Cause
Read	Access.Invalid Slot	11	2	An invalid slot was accessed.
	Access.Invalid Index	11	0	An invalid index was accessed.
Write	Access.Invalid Slot	11	2	An invalid slot was accessed.
	Access.Invalid Index	11	0	An invalid index was accessed.
	Access.write length	11	1	The transmitted data length is invalid.
	Access.invalid parameter	11	8	Invalid parameter value
	Access.access denied	11	6	No write access permitted
	Application write error	10	1	Slot/index can only be read.

Depending on the DCS, either a DTM (Device Type Manager) or an EDD (Electronic Device Description) is required to integrate device-specific information, data and parameters, which can be accessed via Profibus DP-V1, into the engineering station.

The availability of the Profibus DP-V1 services is preset in the factory. For a description of the DP-V1 services, refer to the appendix.

4.4. Redundancy

— Option —

To increase the security of the installation, the actuator controls may be equipped with a redundant Profibus DP interface.

The following redundant operation modes are supported:

1. Redundant behaviour according to AUMA redundancy (AUMA redundancy I or AUMA redundancy II)
(use of AUMA 0C4F.GSD in combination with the ident. no. of the standard version: **0x0C4F**)
2. Redundant behaviour according to Profibus DP-V2 redundancy in accordance with PNO guideline 2.212 (system redundancy or flying redundancy)
(use of AUMA 0CBD.GSD in combination with the ident. no. of the standard version: **0x0CBD**)

The redundant behaviour is set using the following parameter: **Device configuration**
> **Profibus** > **Redundancy M0601**

4.4.1. Redundant behaviour according to AUMA redundancy

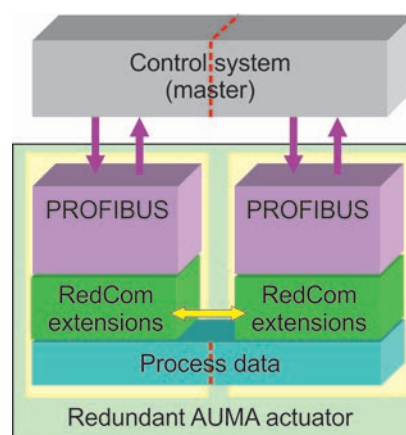
This redundancy type can be selected if the DCS does not support Profibus DP-V2 redundancy according to Profibus DP guideline 2.212 but a redundant structure is nevertheless required.

The physical structure of the redundant Profibus DP interfaces within the controls is based on two independent, galvanically isolated Profibus DP interfaces with an internal RedCom data channel for exchanging the communication status.

AUMA redundancy I

In general, the actuator decides autonomously which of the Profibus DP communication channels will be the active channel and therefore be able to operate the actuator and which channel will be the passive channel only providing feedback signals of the actuator. **The slave addresses can be individually assigned for both channels.**

Figure 1: Basic structure for AUMA redundancy I



The operation of both communication channels is logically, physically and chronologically separated.

The communication channel, which first exchanges process data with the controls (data exchange state), is the active channel, the second channel will automatically become the passive channel. The actuator can only be controlled via the active channel.

Controls (DPM1 = master of class 1) can only write and read acyclic data via the active channel. Engineering stations (DPM2 = master of class 2) can use both channels to read and write acyclic DP-V1 data (writing the same parameter via both communication channels simultaneously is, however, not possible).

Byte 31 Fieldbus status is used to signal the following communication states of the two channels to the DCS:

- Active or passive channel (Channel 1 active, Bit: Channel 2 active)
- Profibus DP Watchdog Status (Channel 1 DataEx, Bit: Channel 2 DataEx)
- Fault state (Ch.1 FailState Fieldb., Bit: Chan 2 FailState fieldbus)
- Available fieldbus communication (Channel 1 activity, Bit: Channel 2 activity), i.e. Profibus Watchdog Status $\neq$ Baud Search

The DCS may change over the active channel if both channels do not signal a fault state (neither Global Control Clear nor telegrams with the data length 0) and are in the DataEx state. Change-over is made during the logical 0–1 change of bits **Fieldbus channel 1** or **Fieldbus channel 2** in byte 5 of the output data (process representation output).

Change-over can be initiated both via the active and the passive channel.

Automatic change-over to another channel is performed if either the communication of the active channel fails or if Fail Safe telegrams (telegrams with the data length = 0) or Global Control Clear (GC Clear) telegrams are received via the active channel.

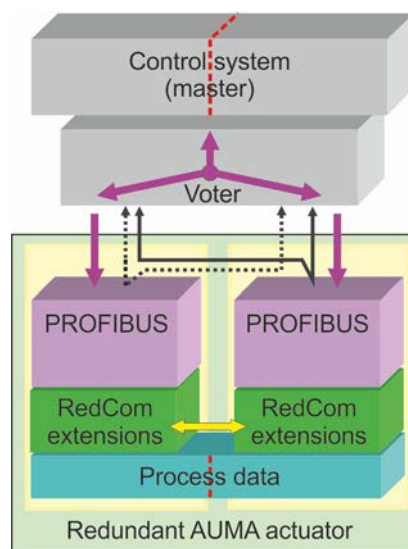
Changing channels does not result in a loss of data.

If neither of the channels exchange process data with the controls or if both channels receive Fail Safe telegrams (telegrams with the data length = 0) or Global Control Clear (GC Clear) telegrams, the set failure behaviour or EMERGENCY behaviour is started.

AUMA redundancy II

In general, the actuator decides autonomously which of the Profibus DP communication channels will be the active channel and therefore be able to operate the actuator and which channel will be the passive channel only providing feedback signals of the actuator. **Only one slave address can be assigned for both channels.**

Figure 2: Basic structure for AUMA redundancy II



→ Response path of the active channel

.....→ Response path after change-over

The operation of both communication channels is physically separated, however they are logically and chronologically synchronised.

The communication channel, which first exchanges process data with the controls (data exchange state), is the active channel, the second channel will automatically become the passive channel. The actuator can only be controlled via the active channel.

Controls (DPM1 = master of class 1) can only write and read acyclic data via the active channel. Engineering stations (DPM2 = master of class 2) can use both channels to read and write acyclic DP-V1 data (writing the same parameter via both communication channels simultaneously is, however, not possible).

Byte 31 Fieldbus status is used to signal the following communication states of the two channels to the DCS:

- Active or passive channel (Channel 1 active, Bit: Channel 2 active)
- Profibus DP Watchdog Status (Channel 1 DataEx, Bit: Channel 2 DataEx)
- Fault state (Ch.1 FailState Fieldb., Bit: Chan 2 FailState fieldbus)
- Available fieldbus communication (Channel 1 activity, Bit: Channel 2 activity), i.e. Profibus Watchdog Status ≠ Baud Search

The DCS may change-over the active channel if both channels do not signal a fault state (neither Global control clear nor telegrams with the data length 0) and are in the DataEx state. Change-over is made during the logical 0–1 change of bits **Fieldbus channel 1** or **Fieldbus channel 2** in byte 5 of the output data (process representation output).

Change-over can be initiated both via the active and the passive channel.

Changing channels does not result in a loss of data.

If neither of the channels exchange process data with the controls or if both channels receive Fail Safe telegrams (telegrams with the data length = 0) or Global Control Clear (GC Clear) telegrams, the set failure behaviour or EMERGENCY behaviour is started.

The special feature of AUMA redundancy II is its absolute, chronologically synchronised response of the Profibus telegrams via both communication channels with simultaneous monitoring of the passive channel on the basis of the received DataEx request telegrams. This redundancy behaviour is imperatively required in combination with DCS splitting a Profibus Stack to two redundant channels using a voter.

The **Behaviour Tx** parameter can be used to influence the transmission of response telegrams via the passive channel:

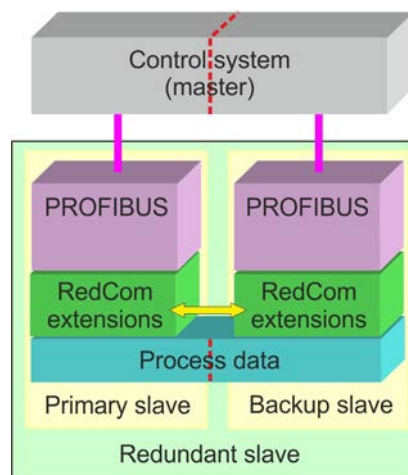
Tx active channel	Response telegrams are only sent via the active channel.
Tx both channels	Response telegrams are sent via both channels, the active and the passive channel.

4.4.2. Redundant behaviour according to Profibus DP-V2 redundancy (PNO guideline 2.212)

This redundancy type can be selected if the DCS supports Profibus DP-V2 redundancy according to Profibus DP guideline 2.212.

The physical structure of the redundant Profibus DP interfaces within the actuator corresponds to the structure for AUMA redundancy; two independent, galvanically isolated Profibus DP interfaces with an internal Redcom data channel for exchanging the communication status.

Figure 3: Structure for DP-V2 redundancy according to guideline 2.212



The master generally uses parameter telegrams to determine which Profibus DP communication channel is the primary channel and which is the backup channel. The primary channel is used to operate the actuator, the backup channel can also be used to establish a Profibus DP connection as an option; operation commands of the backup channel will, however, be ignored by the actuator.

Feedback signals on the communication status of the two Profibus DP interfaces and on received requests for changing the channels are performed by the extended diagnostic (Red_Status, 3 bytes); not all DCS support this extended diagnostic telegram.

Controls (DPM1 = master of class 1) can only write and read acyclic DP-V1 data via the primary channel. Engineering stations (DPM2 = master of class 2) can use both channels to read and write acyclic DP-V1 data (writing the same parameter via both communication channels simultaneously is, however, not possible).

Details for change-over and behaviour are stipulated in PNO guideline 2.212.

If neither of the channels exchange process data with the controls or if both channels receive Fail Safe telegrams (telegrams with the data length = 0) or Global Control Clear (GC Clear) telegrams, the set failure behaviour or EMERGENCY behaviour is started.

The redundant behaviour according to Profibus DP-V2 redundancy requires activation of the Profibus DP-V2 functions.

4.5. Profibus DP-V2 functions

— Option —

In addition to the cyclic Profibus DP-V0 process data exchange and in addition to the acyclic Profibus DP-V1 data exchange, the Profibus DP-V2 functions define further, more comprehensive functions:

- Isochronous mode
- Cross traffic between slaves
- Upload and download
- Redundancy
- Time synchronisation with time stamp

The actuator controls AUMATIC AC 01.2 supports the following functions:

- Redundancy
- Time synchronisation with time stamp

This means the two functions are only available combined. If only the time synchronisation with time stamp is exclusively required, the redundant channel can remain unconnected (connection with Profibus DP master not imperatively required.)

Profibus DP-V2 functions can be activated using the following parameter: **Device configuration** > **Application functions** > **Activation** > **Profibus DP-V2 M0587**

4.5.1. Profibus DP-V2 redundancy

The behaviour and the states of a redundant slave are defined in the "Specification Slave Redundancy 2.212" (also refer to <Redundant behaviour according to Profibus DP-V2 redundancy (PNO guideline 2.212)>). A distinction is made between a primary and a backup channel, with different effects on the properties of Profibus DP communication:

- Cyclic Profibus DP-V0 communication
 - Operation commands of the primary channel are processed and executed by the actuator; operation commands by the backup channel are ignored, the communication for the backup channel is only used for monitoring.
 - Feedback signals of the actuator can be sent via both channels.
 - Diagnostic feedback signals of the primary channel contain diagnostic status data of both the primary and the backup channel.
- Acyclic Profibus DP-V1 services of the controls (DPM1 = master class 1) are only supported by the primary channel.
- Acyclic Profibus DP-V1 services of the engineering stations (DPM2 = master class 2) are only supported by the primary channel.

Furthermore, a distinction is made between two configuration types within the Profibus DP-V2 redundancy:

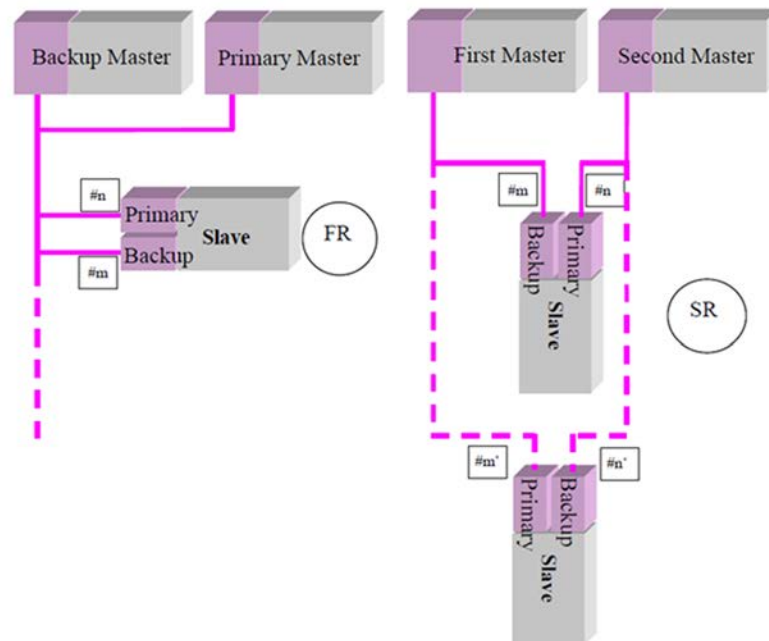
Flying redundancy (FR)

- The slave address of the primary channel is different from the address of the backup channel (slave address backup = slave address primary + 64, for this reason the slave address of the primary must be < 62).
- Only the slave address of the primary channel has to be set.
- The master never communicates via the backup channel with the slave.

System redundancy (SR)

- The slave address of the primary channel corresponds to the slave address of the backup channel.
- The master can configure both channels and can establish a cyclic DP-V0 connection via both channels.

Figure 4: Configuration type for Profibus DP-V2



Setting the bus address (slave address)

Each channel has its own address. After setting the primary address, the backup automatically accepts the address of the primary plus a configurable offset (either 0 or 64).

Startup behaviour

The channels automatically change between the startup_primary and startup_waiting states until the master starts the communication with the actuator. In the startup_primary state, the actuator waits with the primary slave address for the master to start the communication. The cycle starts with 2 s, this time is doubled after each cycle to max. 32 s.

Change over

The actuator does not decide autonomously on change-over. The master detects a loss of communication of the primary channel and may initiate change-over using a parameter telegram (parameter command PrmCmd). The former backup channel becomes the new primary channel.

Parameter command

Apart from the change-over commands, different parameters for the configuration of the Profibus DP-V2 redundancy are transmitted using the PrmCmd parameter command.

For Profibus DP-V2, the parameter command is part of the parameter telegram which is sent to the actuator on startup of the communication.

Table 33: Structure of the PrmCmd parameter command

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
1	0	0	0	0	1	0	0	0	Block length (= 0x08)
2	0	0	0	0	0	0	1	0	Structure type (= 0x02, PrmCmd parameter command for DP-V2 redundancy)
3	0	0	0	0	0	0	0	0	Slot
4	Sequence number					Reserved			Specifier
5	Res	Master State Clear	Res	Check Properties	Start MSAC1S	Stop MSAC1S	Primary Request	Res	Function
6	Reserved				Address Offset64	Address Change	Start/ Stop MSAC1S used	Primary Req_MS0_MS1 used	Properties
7									Output Hold Time high
8									Output Hold Time low

Output Hold Time

In the event of change-over, the outputs will not be changed during this time (time base = 10 ms)

Address Offset64/ Address Change

Change-over between flying redundancy and system redundancy

AddressOffset64 = 1 and AddressChange = 1, > Flying redundancy is selected

AddressOffset64 = 0 and AddressChange = 1, > System redundancy is selected

Extended diagnostic

For activated Profibus DP-V2 redundancy, the primary channel of the actuator sends a high priority response telegram; after that, the master reads the extended diagnostic data Red_Status (Status_Type = 0x9F) with the new states.

When transmitting the PrmCmd parameter command via the master, the actuator responds with Prm_Cmd_Ack (Status_Type = 0x9E).

With Red_Status/ Prm_Cmd_Ack, the actuator signals both the status of the primary and of the backup channel.

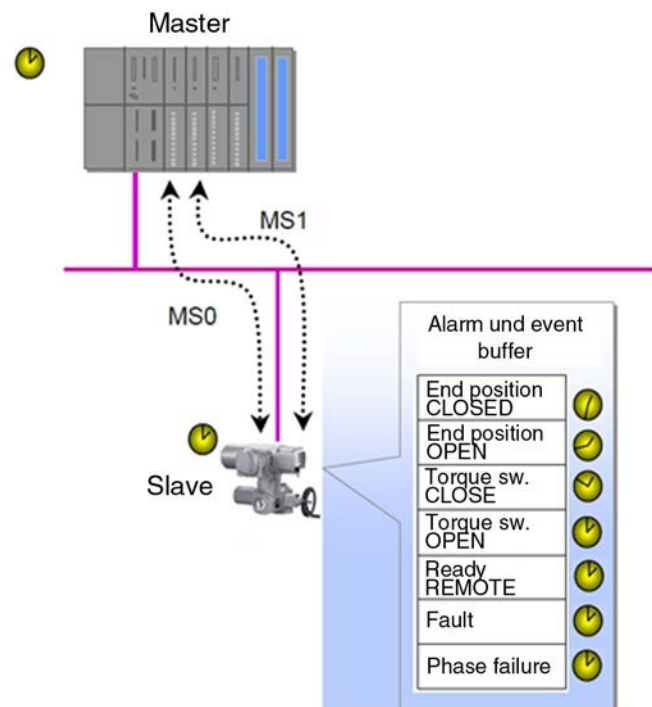
Table 34: Prm_Cmd_Ack/ Red_Status

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
1	0	0	0	0	1	0	0	0	Header (0x08)
2									Status_Type 0x9E = Prm_Cmd_Ack 0x9F = Red_Status
3	0	0	0	0	0	0	0	0	Slot
4	Sequence number					Reserved			Specifier
5	Res	Master State Clear	Res	Check Properties	Start MSAC1S	Stop MSAC1S	Primary Request	Res	Function
6	Res	Output Hold Time started	Baud rate found	Master State Clear	Data Exchange	Hardware defective	Primary	Backup	Red_State_1 (Primary status)
7	Res	Output Hold Time started	Baud rate found	Master State Clear	Data Exchange	Hardware defective	Primary	Backup	Red_State_2 (Backup status)
8	Not used								Red_State_3

4.5.2. Profibus DP-V2 time-synchronisation with time stamp

Certain events within the actuator can be marked with a time stamp. The event is sent to the master using an alarm signal; the master then reads the event with time stamp from the actuator.

Figure 5: Time synchronisation



To ensure that all events within an installation are recorded in the correct sequence, all Profibus DP-V2 field devices must have the same time information. For this purpose, the master cyclically sends the current time to all field devices.

Basic procedure during communication startup

1. During communication startup, a parameter telegram is sent from the master to the actuator. The parameter telegram contains parameters for configuring the time stamp and time synchronisation.
2. The master then cyclically sends Time_Event and Clock_Value telegrams to synchronise the time.

3. The actuator sends the startup data of the time stamp (current state of the signals to be stamped).

Procedure during operation:

1. The actuator detects an event, stamps the time and sends a high priority response telegram (in the DataExchange state).
2. The master reads the alarm information from the actuator using a diagnostic telegram.
3. The master acknowledges the alarm.
4. The master reads the indicated data record (event with time) from the actuator.

The following events are stamped by the actuator with a resolution of 10 ms

End position CLOSED

End position OPEN

Torque sw. CLOSED

Torque sw. OPEN

Selector sw. REMOTE

Fault

Phase fault

A time stamp is made for any change of state of these signals, for both rising and falling signal flank.

Configuration of the time stamp

The parameters of the time stamp are part of the AUMA user parameters transmitted to the actuator during communication startup.

The time stamp is activated via byte 2 of the parameters.

Table 35: Parameters of the time stamp

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
1	0	0	0	0	0	0	0	0	Reserved
2	0	0	0	0	0	0	0	X	Activate time stamp 0 = deactivated 1 = activated
3	Res	Phase fault	Fault	Selector sw. REMOTE	Torque sw. OPEN	Torque sw. CLOSED	End position OPEN	End position CLOSED	Enabling the individual indications 0 = not active 1 = active
4	Not used								Reserved

Configuration of the time synchronisation

This parameter block is part of the structured parameterisation transmitted to the actuator during communication startup.

Table 36: Time AR parameter

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
1	0	0	0	0	1	0	0	0	Block length (= 0x08)
2	0	0	0	0	1	0	0	0	Structure type (= 0x08, Time AR parameter command for time synchronisation)
3	0	0	0	0	0	0	0	0	Slot
4	0	0	0	0	0	0	0	0	Reserved

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
5	Default value 1000 (0x03F8, corresponds to 10 s)								Clock_Sync_Interval (time basis 10 ms)
6									
7	Seconds ($2^{31} \dots 0$)								Clock_Sync Delay Time
8									
9									
10									
11									
12	Split seconds ($2^{31} \dots 0$) unit: $1/2^{32}$ seconds								
13									
14									

Clock_Sync_Interval

The following time intervals are supported:

- 1 s
- 10 s
- 1 min.
- 10 min.

Transmission of time information

The time is transmitted in two steps:

- Master sends Time_Event telegram (layer 2 data telegram)
- Master sends Clock_Value telegram indicating the precise time when the time event was sent.

Table 37: Clock Value telegram

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
1	Seconds ($2^{31} \dots 0$) since 1.1.1900 0:00,00 or if value < 0x9DFF4400, since 7.2.2036 6:28,16								Clock_value of Time_Event (TE)
2									
3									
4									
5	Split seconds ($2^{31} \dots 0$) unit: $1/2^{32}$ seconds								
6									
7									
8									
9	Seconds ($2^{31} \dots 0$) since 1.1.1900 0:00,00 or if value < 0x9DFF4400 since 7.2.2036 6:28,16								Clock_value of the previousTime_Events (TE)
10									
11									
12									
13	Split seconds ($2^{31} \dots 0$) unit: $1/2^{32}$ seconds								
14									
15									
16									
17	C	CV					Reserved		Clock_Value_Status1
18	ANH	SWT	Res	CR		Reserved		SYF	Clock_Value_Status2

The information of Clock_Value_Status1 and Clock_Value_Status2 is used for the transmission of time corrections (C and CV), the synchronisation status (SYF), the daylight saving time information (ANH and SWT) and the accuracy (CR).

Process alarm

The diagnostic telegram is used to signal to the master that a time-stamped event has been recorded. The actuator only supports process alarms.

Table 38: Process alarm

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
1	0	0	0	0	1	0	0	0	Block length (= 0x08)
2	0	0	0	0	0	0	1	0	Alarm_Type 0x02 = Time Stamped Process Alarm
3	0	0	0	0	0	0	0	0	Slot
4	Sequence number					0	0	0	Specifier
5				Restarted			Buffer Overrun		Time stamp state Buffer Overrun = Internal buffer full, time stamp stopped Restarted = Time stamp started anew
6									Index of the data record (value range 100 to 115)
7									Number of indications within the data record (value range 1 -17)
8	0	0	0	0	1	1	0	1	Type of data record Permanently assigned to 0x0D: Delta_Trigger_Discrete

Read time-stamped data

The data record signalled via a process alarm (slot 0 index 100 to 115) can be read using the Profibus DP-V1 services once the alarm has been acknowledged.

A data record may contain up to 17 alarms, each data record consists of 14 bytes.

Table 39: Alarms

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
1	0	0	0	0	1	0	0	0	Type of signal 0x01 = Delta_Trigger_Discrete 0x02 = Time_Trigger_Discrete 0x80 = Start-up data 0x84 = End of time stamp 0x85 = Buffer overrun 0x86 = Channel change-over for redundancy 0x87 = Loss of information for redundancy
2	0	0	0	0	0	0	0	0	Slot
3									Signal 1 = End position CLOSED 2 = End position OPEN 3 = Torque sw. CLOSED 4 = Torque sw. OPEN 5 = Selector sw. REMOTE 6 = Fault 7 = Phase fault

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
4	Active								Status of the indication Active = 1: Indication active (rising signal flank) Active = 0: Indication not active (falling signal flank)
5									Not used
6									Not used
7	Seconds ($2^{31} \dots 0$) since 1.1.1900 0:00,00 or if value < 0x9DFF4400 since 7.2.2036 6:28,16								Time- stamp
8									
9									
10									
11									
12	Split seconds ($2^{31} \dots 0$) unit: $1/2^{32}$ seconds								
13									
14									

Time stamp and redundancy

Time-stamped data is only sent via the primary channel. During a channel change-over, the time-stamped indications are buffered and sent to the master after change-over. In case of a buffer overrun, the startup data is sent.

5. Description of the Profibus DP board

The Profibus DP boards is directly located below the local controls.

Figure 6: Profibus DP board



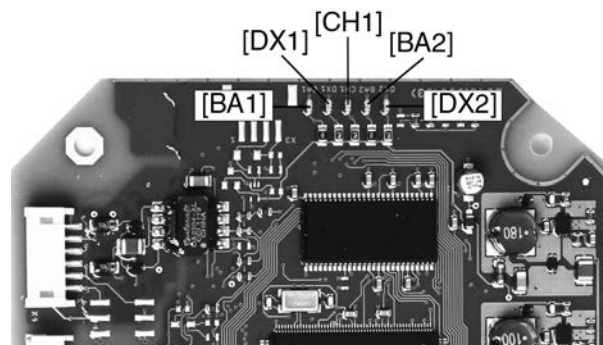
Hazardous voltage!

Risk of electric shock.

→ When connected to the mains, the local controls may only be removed by suitably qualified personnel (electricians).

5.1. Indications (indication and diagnostic LEDs)

Figure 7: Indication and diagnostic LEDs



[BA2] Profibus channel 2 active (green)

[DX1] Data Exchange channel 1 (yellow)

[BA1] Profibus channel 1 active (green)

[CH1] Communication via channels 1/2 (yellow)

[DX2] Data Exchange channel 2 (yellow)

[BA2] Option for redundancy

Illuminated in green if Profibus channel 2 is active.

[DX1] If the LED is illuminated in yellow, the Profibus DP interface has entered the 'Data Exchange' state on channel 1. Controlling the actuator by the Profibus DP master and reading the actuator status can be performed in this state only.

[BA1] Illuminated in green if Profibus channel 1 is active.

[CH1] Option for redundancy

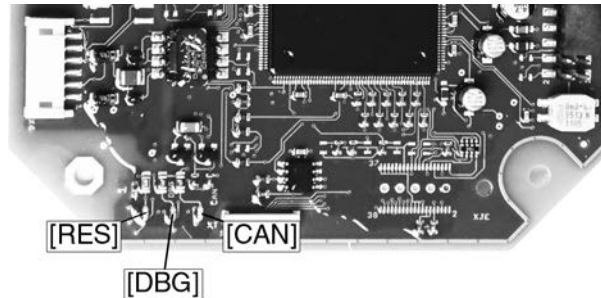
ON (illuminated in yellow): Communication via channel 1

OFF: Communication via channel 2

[DX2] Option for redundancy

If the LED is illuminated in yellow, the Profibus DP interface has entered the 'Data Exchange' state on channel 2. Controlling the actuator by the Profibus DP master and reading the actuator status can be performed in this state only.

Figure 8: Status LEDs



[RES] RESET (green)

[DBG] DEBUG (green)

[CAN] CAN (red)

[RES] Illuminated in green after Reset phase: 3.3 V voltage supply is ok.

[DBG] Blinking in green after Reset phase: 5 V voltage supply is ok

Blinking at 1 Hz: PCB test

Blinking at 2 Hz: Application is ok.

[CAN] Illuminated in red: Communication to logic is faulty.

Not illuminated: Communication with logic is ok.

6. Corrective action

6.1. Troubleshooting

In case of problems with Profibus DP communication, AUMATIC provides important information on troubleshooting via the display (menu **DiagnosticsM0022**).

The indication and diagnostic LEDs on the Profibus DP board can also be used as support.

Table 40: Troubleshooting table

			Causes and remedies
1	Can the actuator be controlled via Profibus DP?	Yes	No fault
		No	→ Continue with 2
2	Select menu: Diagnostics M0022		→ Continue with 3
3	Select menu: for channel 1: Profibus DP1 M0240 for channel 2 (option): Profibus DP2 M0549		→ Continue with 4
4	Select menu: for channel 1: DP1 Profibus status for channel 2 (option): DP2 Profibus status	Data Ex or LEDs on Profibus DP board: [DX1] is illuminated: Channel 1 [DX2] is illuminated: Channel 2	Profibus DP communication is ok. → Continue with 5
		Wait Prm	No communication between slave and master Possible causes and remedies: - Parameter data incorrect→ Correct parameter data in master. - Parameters not yet sent→ Send parameters - Incorrect GSD file was possibly used→ Check GSD file - Cable connection may either be interrupted or connected with the wrong polarity.→ Check cable connection
		Wait Cfg	No communication between slave and master Possible causes and remedies: - Configuration data incorrect → Correct configuration in master. - Configuration data not yet sent → Send configuration data.
5	Select menu: for channel 1: DP1 GC clear M0556 for channel 2 (option): DP2 GC clear	GC Clear active	Slave is in the Fail Safe state. Possible remedies: → Check all other implemented slaves at the Profibus. → Deactivate Autoclear function in the master, if required. → Send GC OPERATE telegram.
		GC Clear inactive	→ Continue with 6
6	Select menu: for channel 1: DP1 data length 0 for channel 2 (option): DP2 data length 0	Data length 0 active	Slave is in the Fail Safe state. Possible remedies: → Check all other implemented slaves at the Profibus. → Deactivate Autoclear function in the master, if required. → Send GC OPERATE telegram.
		Data length 0 inactive	→ Continue with 7
7	Operation via the push button of the local controls possible?	Yes	Possible causes and remedies: - Master does not send an operation command. - Master sends wrong operation command. → Check program of the controls.
		No	Possible causes and remedies: Faults such as torque fault, thermal fault or internal fault → Check logic board, motor control and motor. → continue with 8

			Causes and remedies
8	LED [RES] on Profibus DP board is illuminated in green.	Yes	3.3 V power supply is ok.
		No	3.3 V power supply not available
9	LED [DBG] on Profibus DP board	is blinking in green.	5 V power supply is ok.
		is not illuminated	5 V power supply not available Possible causes and remedies: → Check power supply of the AUMATIC (check fuses). → Check Profibus DP board.

6.2. Diagnostics

Menu **DiagnosticsM0022** can be used to check the different states of the Profibus DP interface.

The <Information on Profibus DP 1> tables shows the menus for the 1st DP interface. In case a second, redundant DP interface is installed, this table may be used as well. In the menu, **DP2** is displayed instead of **DP1**.

Table 41: Information on Profibus DP 1

Indication in display	Value and description	
DP1 slave address M0547	Bus address (slave address)	
DP1 baud rate M0099	Baud rate	
DP1 watchdog status M0411	Watchdog status	
	Baud search	The Profibus DP interface searches a baud rate. If no baud rate was found: • Connect bus cables. • Check bus cables. • Switch on DP master.
	Baud control	The detected baud rate is monitored. The DP watchdog within the master is not activated. In this case, the failure function is not available.
	DP control	The DP communication is monitored, the DP watchdog within the master is activated. Therefore, the failure function is also available.
DP1 Profibus status M0554	Profibus status	
	Wait Pm	The Profibus DP interface is waiting for correct parameter data.
	Wait Cfg	The Profibus DP interface is waiting for correct configuration data.
	Data Ex	The Profibus DP interface is currently exchanging data with the master.
DP1 GC clear M0556	Global Control Clear Status	
	GC Clear inactive	
	GC Clear active	The Profibus DP interface has received the Global Control Clear telegram and is waiting for the Global Control Operate telegram. In this mode, DP communication works perfectly, however the actuator cannot be operated via PLC. If the safety function is activated it will be initiated.
DP1 data length 0 M0557	Data length 0 status	
	Data length 0 inactive	
	Data length 0 active	The Profibus DP interface receives data telegrams of the length 0. In this mode, DP communication works perfectly, however the actuator cannot be operated via PLC. If the safety function is activated it will be initiated.
DP1 GC freeze M0558	Global Control Freeze Status	
	GC Freeze inactive	With Unfreeze Global Control telegram the Freeze state is deactivated again.
	GC Freeze active	The Freeze Global Control telegram can be used to freeze the Profibus DP inputs (feedback signals).
DP1 GC sync M059	Global Control Sync Status	
	GC Sync inactive	With the Unsync Global Control telegram the Sync state is deactivated again.
	GC Sync active	The Sync Global Control telegram can be used to freeze the Profibus DP outputs (operation commands).
DP1 config. data M1195	Configuration data (number of input and output bytes) set by the master.	

Table 42: Profibus details

Indication in display	Value and description	
DP-V1 control	In this state, the actuator can only be operated by means of the acyclic Profibus DP-V1 services (only possible if there is no cyclic DP-V0 connection available).	
DP-V1 active	At least one acyclic Profibus DP-V1 connection is active.	
Channel 1 active	Profibus interface of channel 1 is used.	
Channel 2 active	Profibus interface of channel 2 is used.	
Primary	Profibus DP2 (Profibus DP, channel 1)	
	None	No channel is used as primary channel.
	Channel 1	Channel 1 is used as primary channel.
	Channel 2	Channel 2 is used as primary channel.
Backup	Profibus DP2 (Profibus DP, channel 2)	
	None	No channel is used as backup channel.
	Channel 1	Channel 1 is used as backup channel.
	Channel 2	Channel 2 is used as backup channel.
Profibus Ident no.	The actuator controls are assigned different ident numbers depending on the function.	
	0x0C4F	For Profibus DP-V0 and DP-V1
	0x0CBD	for Profibus DP-V0 and DP-V1 including the DP-V2 functions Redundancy with time synchronisation, time stamp and alarms.
Redundancy	Redundancy	
	None	No redundancy available.
	DP-V2 (SR)	Redundancy activated according to Profibus DP-V2 (SR).
	DP-V2 (FR)	Redundancy activated according to Profibus DP-V2 (FR).
	AUMA redundancy I	General Profibus DP redundancy (AUMA redundancy I)
DP-V1 (SetPrm)	DP-V1 function in the parameter telegram (SetPrm)	
	Deactivated	The DP-V1 services were deactivated using the parameters in the parameter telegram (SetPrm).
	Activated	The DP-V1 services were activated using the parameters in the parameter telegram (SetPrm).
Alarms (SetPrm)	Signalling alarms in the parameter telegram (SetPrm)	
	Deactivated	The alarms were deactivated using the parameters in the parameter telegram (SetPrm).
	Activated	The alarms were activated using the parameters in the parameter telegram (SetPrm).
Redundancy (SetPrm)	Redundancy function in the parameter telegram (SetPrm)	
	Deactivated	The redundancy function according to Profibus DP-V2 was deactivated using the parameters in the parameter telegram (SetPrm).
	Activated	The redundancy function according to Profibus DP-V2 was activated using the parameters in the parameter telegram (SetPrm).
Behaviour Tx	Response behaviour (response) for AUMA redundancy II	
	Tx active channel	Profibus DP response telegrams are exclusively sent via the active channel
	Tx both channels	Profibus DP response telegrams are sent via both channels.

7. Technical data

Information The following tables include standard and optional features. For detailed information on the customer-specific version, refer to the order-related data sheet. The technical data sheet can be downloaded from the Internet in both German and English at <http://www.auma.com> (please state the order number).

7.1. Profibus DP interface

Settings/programming the Profibus DP interface

Baud rate setting	Automatic baud rate recognition
Setting the fieldbus address	The Profibus DP address is set via the actuator controls display.
Configurable process representation via GSD file	For an optimum adaptation to the process control system, the process representation input (feedback signals) can be configured as desired.

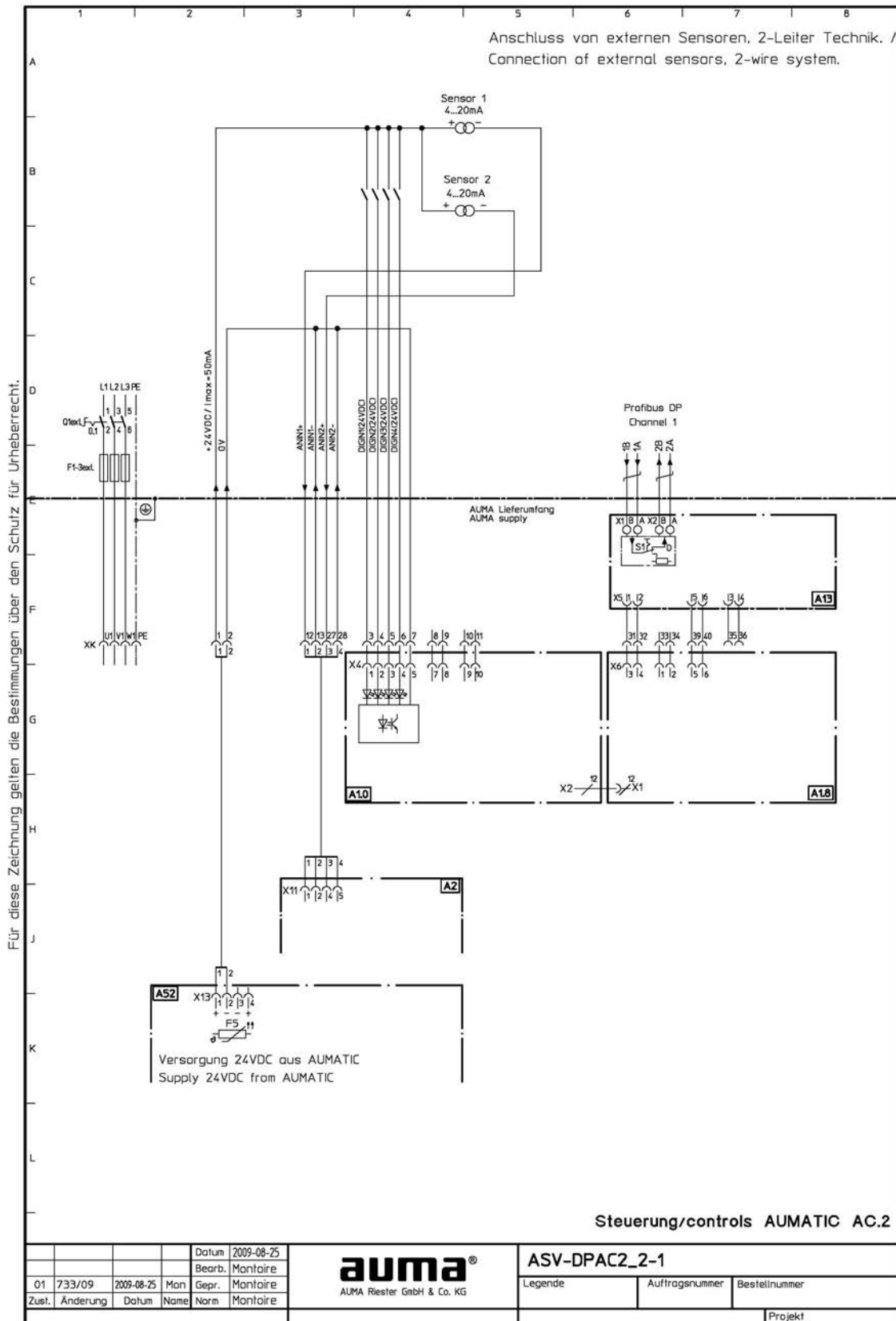
General Profibus DP interface data

Communication protocol	Profibus DP according to IEC 61158 and IEC 61784		
Network topology	Line (fieldbus) structure. When using repeaters, tree structures can also be implemented. Coupling and uncoupling of devices during operation without affecting other devices is possible.		
Transmission medium	Twisted, screened copper cable according to IEC 61158		
Profibus DP interface	EIA-485 (RS-485)		
Transmission rate/cable length	Baud rate (kbit/s)	Max. cable length (segment length) without repeater	Possible cable length with repeater (total network cable length):
	9.6 – 93.75	1,200 m	approx. 10 km
	187.5	1,000 m	approx. 10 km
	500	400 m	approx. 4 km
	1,500	200 m	approx. 2 km
Device types	DP master class 1, e.g. central controllers such as PLC, PC, ... DP master class 2, e.g. programming/configuration tools DP slave, e.g. devices with digital and/or analogue inputs/outputs such as actuators, sensors		
Number of devices	32 devices without repeater, with repeater expandable to 126		
Fieldbus access	Token-passing between masters and polling for slaves. Mono-master or multi-master systems are possible.		
Supported Profibus DP functions	Cyclic data exchange, sync mode, freeze mode, fail safe mode		
Profibus DP ident no.	0x0C4F:	Standard applications with Profibus DP-V0 and DP-V1	
	0x0CBD:	Applications with Profibus DP-V2	

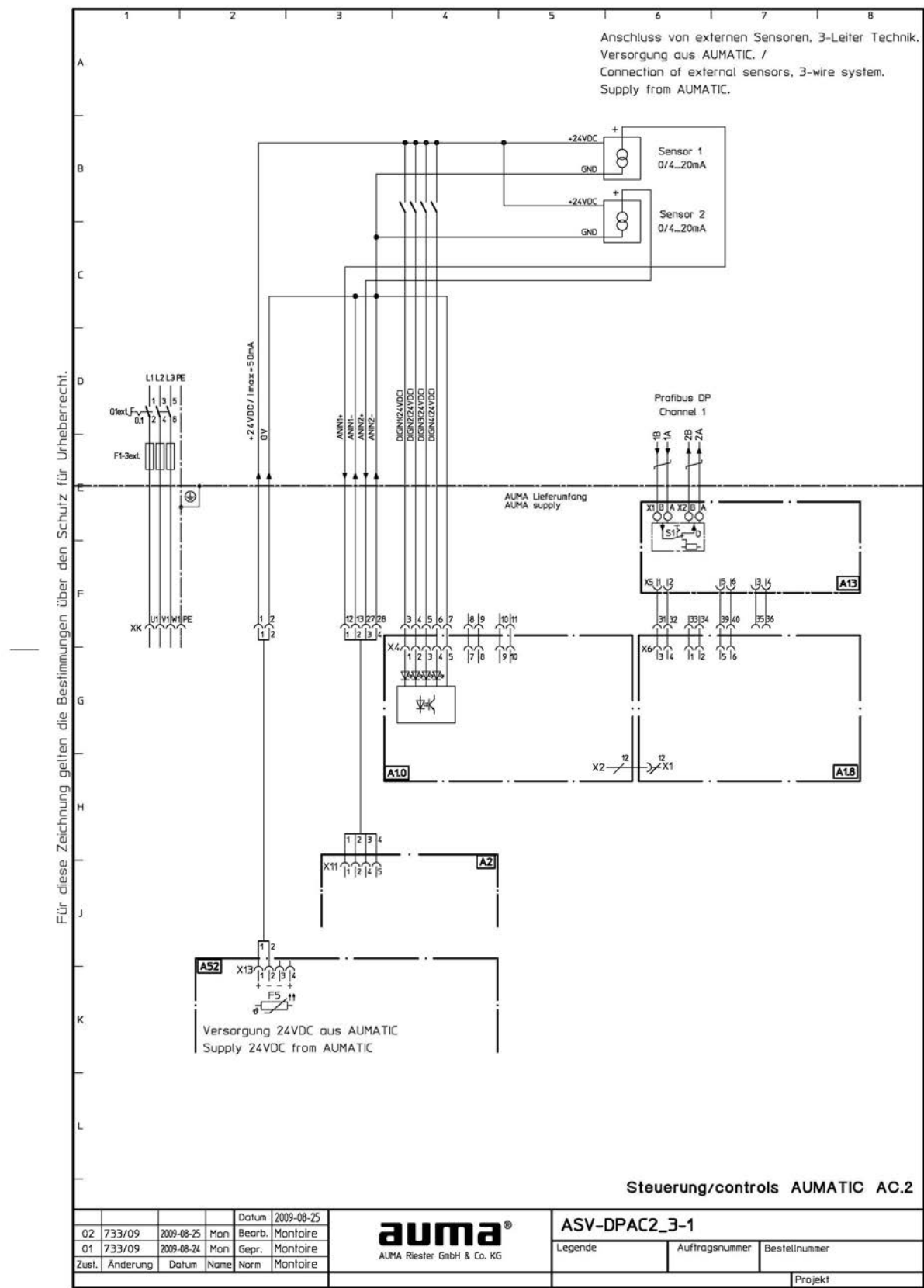
Commands and signals of the Profibus DP interface	
Process representation output (command signals)	OPEN, STOP, CLOSE, position setpoint, RESET, EMERGENCY operation command, enable local controls, Interlock OPEN/CLOSE OPEN, STOP, CLOSE, speed, position setpoint, RESET, EMERGENCY operation command, enable local controls, Interlock OPEN/CLOSE
Process representation input (feedback signals)	• End positions OPEN, CLOSED • Actual position value • Actual torque value, requires MWG in actuator • Selector switch in position LOCAL/REMOTE • Running indication (directional) • Torque switches OPEN, CLOSED • Limit switches OPEN, CLOSED • Manual operation by handwheel or via local controls • Analogue (2) and digital (4) customer inputs
Process representation input (fault signals)	• Motor protection tripped • Torque switch tripped in mid-travel • One phase missing • Failure of analogue customer inputs
Behaviour on loss of communication	The behaviour of the actuator is programmable: • Stop in current position • Travel to end position OPEN or CLOSED • Travel to any intermediate position • Execute last received operation command

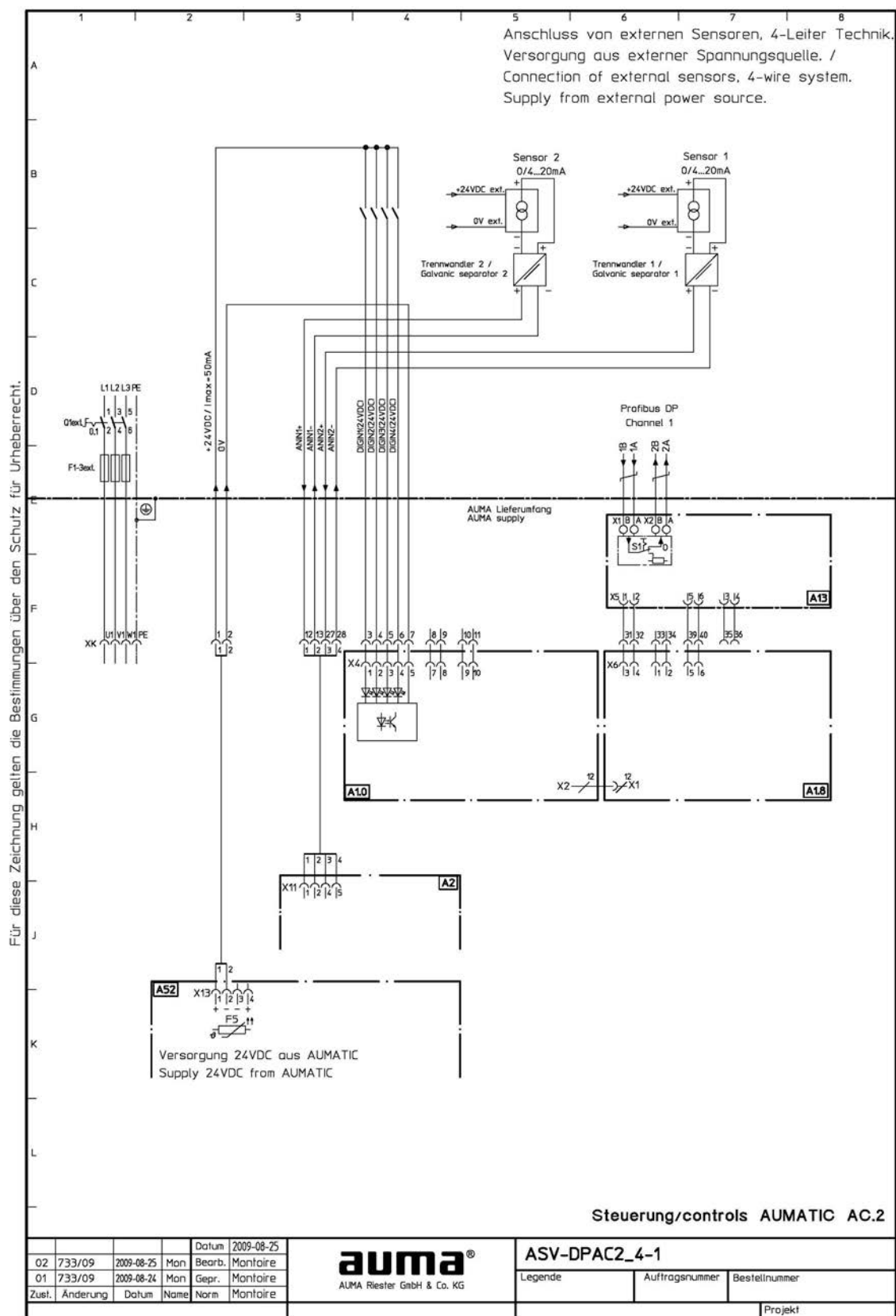
8. Appendix

8.1. Proposed wiring diagram for external sensors, 2-wire technology



8.2. Proposed wiring diagram for external sensors, 3-wire technology



8.3. Proposed wiring diagram for external sensors, 4-wire technology

8.4. Parameters

The present appendix contains notes on the parametrisation of actuator controls via Profibus DP-V1 as a table (with read/write access codes).

Several parameters (View Objects) are read or written for each DP-V1 request. The data lengths indicated in the tables have to be considered accordingly.

View Objects

View Objects group several parameters enabling easy write access to the grouped parameters. The bus load is reduced as the parameters do no longer have to be read out individually.

Explanations to the table:

No. View Object number (corresponds to Profibus DP-V1 index). Profibus DP-V1 slot is always 254.

Type

Data type	Description	Data length
BOOL	Logical value	4 bytes
BS8/16/32/64	Bit string	2/4/6/8 bytes
DRVCM4	Process data	4 bytes
enum	Value from the value list	2 bytes
I8/16/32	Integer values	1/2/4 bytes
MMSS01	Time information	2 bytes
OS4/8/16/32/48/64	Octet string	4/8/16/32/48/64 bytes
S10/20/30/40	Character string	10/20/30/40 bytes
U8/16/32	Unsigned value	1/2/4 bytes (8/16/32 bits)

Parameters Parameter name. Is indicated in the display of actuator controls.

Access Read and write access

R = Read

W = Write

Default Default value

Setting value Permissible, settable value or setting range. Depending on the data type, scale factor and unit are also indicated in square brackets. Example:

Min = 0 [0.1 s]

Max = 50 [0.1 s]

Corresponds to a setting range between 0.1 and 5.0 seconds

Table 43: Display...

No.	Type	Parameters	Access	Default	Setting value
Data length = 14 bytes					
1-1	enum	Language	R/W	1	1: Deutsch
					2: English
					3: Français
					4: Español
					5: Italiano
					6: Русский
					7: Polski
					8: Português
					9: Türkçe
					10: Magyar
					11: 中国
					12: Nederlands
					13: Čeština
					14: Română
					15: 日本語
					16: Български
					17: Dansk
					18: Ελληνικά
					19: Suomi
					20: 한국어
					21: Svenska
					22: Tiếng Việt
					23: عربي
					24: Eesti keel
					25: Hrvatski
					26: Lietuvių
					27: Latviešu
					28: Norsk
					29: Slovenčina
					30: Slovenščina
					31: Srpski
					32: ไทย
					33: Bahasa Indonesia
					34: Bahasa Indonesia
					35: فارسی
1-2	enum	Date format	R/W	1	0: MM/DD/YYYY
					1: DD.MM.YYYY
					2: YYYY-MM-DD
1-3	enum	Time format	R/W	1	0: 12h
					1: 24h
1-4	enum	Number format	R/W	0	0: xx.x
					1: xx,x
1-5	enum	Torque unit	R/W	0	0: Nm
					1: ft-lb
					2: %

No.	Type	Parameters	Access	Default	Setting value
1-6	enum	Temperature unit	R/W	0	0: °C
					1: °F
1-7	enum	Diagnostic classific.	R/W	0	0: AUMA
					1: NAMUR

Table 44: Identifications

No.	Type	Parameters	Access	Default
Data length = 60 bytes				
2-1	S20	Device designation	R	AC 01.2
2-2	S20	Device tag	R/W	_DEVICE-TAG_
2-3	S20	Project name	R/W	_PROJECT_

Table 45: Controls

No.	Type	Parameters	Access	Default
Data length = 80 bytes				
3-1	S20	Order no. controls	R	_ORDER NO. CONTROLS _
3-2	S20	Serial no. controls	R	_SERIAL NO. CONTROLS _
3-3	S20	Wiring diagram	R	TPC
3-4	S20	Date of manufacture	R	_DATE_PRODUCTION_

Table 46: Actuator

No.	Type	Parameters	Access	Default
Data length = 60 bytes				
4-1	S20	Order no. actuator	R	_ORDER NO. ACTUATOR _
4-2	S20	Serial no. actuator	R	_SERIAL NO. ACTUATOR _
4-3	S20	Wiring diag. actuator	R	TPA

Table 47: Version

No.	Type	Parameters	Access	Default
Data length = 40 bytes				
5-1	S20	Firmware	R	Vxx.xx.xx
5-2	S20	Language	R	Vxxx

Table 48: Firmware details

No.	Type	Parameters	Access	Default
Data length = 160 bytes				
6-1	S20	LC	R	0
6-2	S20	LC (Bootloader)	R	0
6-3	S20	Logic	R	0
6-4	S20	Logic (Bootloader)	R	0
6-5	S20	Fieldbus	R	0
6-6	S20	Fieldbus (Bootloader)	R	0
6-7	S20	MWG	R	0
6-8	S20	MWG (Bootloader)	R	0
PRM_489	S20	FW version MWG	R	0
PRM_506	S20	Version FQM	R	0
PRM_507	S20	Version FQM-Btl	R	0
PRM_510	S20	Version Motor Ctrl	R	0
PRM_511	S20	Version Motor Ctrl Btl	R	0

Table 49: Hardware article no.

No.	Type	Parameters	Access	Default
Data length = 140 bytes				
7-1	S20	ArtNo LC	R	_ ARTNR LC _
7-2	S20	ArtNo logic	R	_ ARTNR LOGIC _
7-3	S20	ArtNo MCM	R	_ ARTNR MCM _
7-4	S20	ArtNo PSO	R	_ ARTNR_OPT _
7-5	S20	ArtNo I/O interface	R	_ ARTNR INTF _
7-6	S20	ArtNo fieldbus	R	_ ARTNR PBD _
7-7	S20	ArtNo MWG	R	_ ARTNR MWG _
PRM_503	S20	Art. no. FQM Ctrl	R	_ ARTNR FQM _
PRM_504	S20	ArtNo motor ctrl	R	_ ARTNR MCTRL_

Table 50: Type of seating

No.	Type	Parameters	Access	Default	Setting value
Data length = 4 bytes					
9-1	enum	End position CLOSED	R/W	0	0: Limit
					1: Torque
9-2	enum	End position OPEN	R/W	0	0: Limit
					1: Torque

Table 51: Torque switching

No.	Type	Parameters	Access	Default	Setting value
Data length = 12 bytes					
10-1	enum	Torque by-pass	R/W	1	0: Function not active
					1: Function active
10-2	U16	Torque by-pass [s]	R/W	0	Min = 0 [0.1 s]
					Max = 50 [0.1 s]
PRM_5161	enum	Torque limitation	R/W	1	0: Function not active
					1: Function active
PRM_5162	I16	Torque peak [%]	R/W	0	Min = 100 [%]
					Max = 150 [%]
10-3	U16	Trip torque CLO [Nm]	R/W	20	Min = 0 [Nm]
					Max = 65535 [Nm]
10-4	U16	Trip torque OPEN [Nm]	R/W	20	Min = 0 [Nm]
					Max = 65535 [Nm]
10-5	I16	Wrn torque CLOSE	R/W	80	Min = 20 [%]
					Max = 100 [%]
10-6	I16	Wrn torque OPEN	R/W	80	Min = 20 [%]
					Max = 100 [%]

Table 52: Local controls

No.	Type	Parameters	Access	Default	Setting value
Data length = 10 bytes					
11-1	enum	Self-retaining Local	R/W	3	0: Off (push-to-run op.)
					1: OPEN
					2: CLOSE
					3: OPEN and CLOSE
					4: OPEN & CL w/o STOP
11-2	enum	Local STOP	R/W	0	0: Off
					1: Sel.sw.Local + Remote

No.	Type	Parameters	Access	Default	Setting value
11-3	enum	Enable LOCAL	R/W	0	0: Sel. sw. Local 1: Sel. sw. Local + Off
11-4	enum	Priority REMOTE	R/W	0	0: Selector switch Local 1: Sel. sw. Local + Off
11-5	enum	Fieldbus auto enable	R/W	1	0: Off 1: On

Table 53: I/O interface

No.	Type	Parameters	Access	Default	Setting value
Data length = 4 bytes					
12-1	enum	Self-retaining Remote	R/W	3	0: Off (push-to-run op.) 1: OPEN 2: CLOSE 3: OPEN and CLOSE 4: OPEN & CL w/o STOP
PRM 4821	enum	Self-retaining	R/W	3	0: DIR_AUTO 1: DIR_CW 2: CW 3: CW and CCW 4: CW & CCW w/o STOP
12-2	enum	Self-retaining Remote II	R/W	0	0: Off (push-to-run op.) 1: OPEN 2: CLOSE 3: OPEN and CLOSE 4: OPEN & CL w/o STOP

Table 54: Profibus DP

No.	Type	Parameters	Access	Default	Setting value
Data length = 4 bytes					
13-1	U16	DP1 slave address	R/W	126	Min = 0 Max = 126
13-2	U16	DP2 slave address	R/W	126	Min = 0 Max = 126

Table 55: Positioner

No.	Type	Parameters	Access	Default	Setting value
Data length = 30 bytes					
14-1	enum	Adaptive behaviour	R/W	0	0: Off 1: Adaptive I
14-2	U16	Dead time	R/W	5	Min = 2 [0.1 s] Max = 600 [0.1 s]
14-3	U16	Dead band OPEN	R/W	5	Min = 0 [0.1 %] Max = 100 [0.1 %]
14-4	U16	Dead band CLOSE	R/W	5	Min = 0 [0.1 %] Max = 100 [0.1 %]
14-5	U16	Posit. hyst. OPEN	R/W	5	Min = 0 [0.1 %] Max = 50 [0.1 %]
14-6	U16	Posit. hyst. CLOSE	R/W	5	Min = 0 [0.1 %] Max = 50 [0.1 %]

No.	Type	Parameters	Access	Default	Setting value
PRM_5316	U16	Dead band min. (ad.2)	R/W	2	Min = 2 [0.1 %] Max = 50 [0.1 %]
PRM_5317	U16	Dead band max. (ad.2)	R/W	25	Min = 2 [0.1 %] Max = 50 [0.1 %]
14-7	I32	Tolerance CLOSE	R/W	0	Min = 0 [0.1 %] Max = 50 [0.1 %]
14-8	I32	Tolerance OPEN	R/W	1000	Min = 950 [0.1 %] Max = 1000 [0.1 %]
14-10	U16	Outer dead band	R/W	10	Min = 1 [0.1 %] Max = 100 [0.1 %]
14-11	enum	Limit setting range	R/W	0	0: Function not active 1: Function active
14-12	U16	Limit OPEN	R/W	1000	Min = 0 [0.1 %] Max = 1000 [0.1 %]
14-13	U16	Limit CLOSE	R/W	0	Min = 0 [0.1 %] Max = 1000 [0.1 %]
PRM_4076	enum	Speed red.prior setp.	R/W	1	0: Function not active 1: Function active
PRM_4070	U16	Speed red. range	R/W	0	Min = 2.0 [%] Max = 20.0 [%]
PRM_5116	U16	Target speed at setp.	R/W	10	Min = 6 [rpm] Max = 240 [rpm]
PRM_5139	U16	Target op. time at setp.	R/W	5.6	Min = 4.0 [s] Max = 268.0 [s]
PRM_4957	U16	Low limit target value	R/W	0.0	Min = 0.0 [mA] Max = 20.0 [mA]
PRM_4958	U16	High limit target value	R/W	20.0	Min = 0.0 [mA] Max = 20.0 [mA]

Table 56: Process controller

No.	Type	Parameters	Access	Default	Setting value
Data length = 26 bytes					
67-1	enum	Setpoint source	R/W	0	0: I/O interface 1: Fieldbus interface 2: Internal setpoint
67-2	enum	Beh. setpoint failure	R/W	0	0: Internal setpoint 1 1: Internal setpoint 2 2: Failure behaviour
67-3	enum	Inverse operation	R/W	0	0: Function not active 1: Function active
67-4	U16	Internal setpoint 1	R/W	500	Min = 0 [0.1 %] Max = 1000 [0.1 %]
67-5	U16	Internal setpoint 2	R/W	500	Min = 0 [0.1 %] Max = 1000 [0.1 %]
67-6	U16	Proport. gain Kp	R/W	10	Min = 1 [0.1] Max = 100 [0.1]
67-7	U16	Reset time Ti	R/W	1000	Min = 1 [s] Max = 1000 [s]

No.	Type	Parameters	Access	Default	Setting value
67-8	U16	Rate time Td	R/W	0	Min = 0 [s] Max = 100 [s]
67-12	enum	Actual value source	R/W	0	0: I/O interface 1: Fieldbus interface
67-13	enum	Modulating behaviour	R/W	0	0: P controller 1: PI controller 2: PID controller
PRM_5278	enum	Speed source PID	R/W	1	Internal 1 Internal 2 Internal 3 Internal 4 2 DigIn: "Internal (1-4)" Analogue input Fieldbus

Table 57: Failure behaviour

No.	Type	Parameters	Access	Default	Setting value
Data length = 12 bytes					
15-1	enum	Signal loss beh.	R/W	1	0: Good signal first 1: Immediately active
15-2	enum	Failure operation	R/W	0	0: STOP 1: CLOSE 2: OPEN 3: Approach position 4: Execute last CMD
15-3	enum	Source	R/W	4	1: Fieldbus interface 2: I/O interface 4: Active interface
15-4	Mmss01	Delay time	R/W	30	Min = 0 [0.1 s] Max = 1800 [0.1 s]
15-5	U16	Fail.pos.OPEN CLOSE	R/W	500	Min = 0 [0.1 %] Max = 1000 [0.1 %]
15-6	U16	Failure position MPV	R/W	500	Min = 0 [0.1 %] Max = 1000 [0.1 %]
PRM_5126	U16	Failure speed OPEN	R/W	45	Min = 6 [rpm] Max = 240 [rpm.]
PRM_5122	U16	Time speed red.	R/W	45	Min = 6 [rpm] Max = 240 [rpm.]
PRM_5132	U16	Op. time failure OPEN	R/W	11.0	Min = 4.0 [s] Max = 268.0 [s]
PRM_5134	U16	Oper. time rem. max.	R/W	11.0	Min = 4.0 [s] Max = 268.0 [s]

Table 58: EMERGENCY behaviour

No.	Type	Parameters	Access	Default	Setting value
Data length = 26 bytes					
16-1	enum	EMCY fail.reac.	R/W	1	1: Good signal first 2: Immediately active
16-2	enum	EMCY operation mode	R/W	0	0: Remote only 1: Remote and local
16-3	enum	EMCY source	R/W	3	1: I/O interface 2: Fieldbus interface 3: I/O or fieldbus 4: Active interface
16-4	enum	EMCY operation	R/W	0	0: STOP 1: CLOSE 2: OPEN 3: Approach EMCY pos.
16-5	U16	EMCY position	R/W	0	Min = 0 [0.1 %] Max = 1000 [0.1 %]
16-6	enum	By-pass torque	R/W	0	0: Off 1: On
16-7	enum	Thermal by-pass	R/W	0	0: Off 1: On
16-8	enum	By-pass timer	R/W	0	0: Off 1: On
16-9	enum	By-pass operat.profile	R/W	0	0: Off 1: On
16-10	enum	By-pass Interlock	R/W	0	0: Off 1: On
16-11	enum	By-pass Local STOP	R/W	0	0: Off 1: On
16-12	Mmss01	Delay time	R	10	Min = 0 [0.1 s] Max = 1800 [0.1 s]
16-13	U16	EMCY position MPV	R/W	10	Min = 0 [0.1 s] Max = 1800 [0.1 s]
PRM_5125	U16	Speed EMCY OPEN	R/W	45	Min = 6 [rpm] Max = 240 [rpm.]
PRM_5321	U16	Speed EMCY CLOSE	R/W	11	Min = 4.0 [s] Max = 268.0 [s]
PRM_5323	U16	Op. time EMCY CLOSE	R/W	11	Min = 4.0 [s] Max = 268.0 [s]

Table 59: Timer function

No.	Type	Parameters	Access	Default	Setting value
Data length = 20 bytes					
17-1	enum	Step mode CLOSE	R/W	0	0: Off 1: Remote 2: Local 3: Remote and local
17-2	Mmss01	On time CLOSE	R/W	50	Min = 10 [0.1 s] Max = 1800 [0.1 s]

No.	Type	Parameters	Access	Default	Setting value
17-3	Mmss01	Off time CLOSE	R/W	50	Min = 10 [0.1 s] Max = 1800 [0.1 s]
17-4	U16	Start stepping CLOSE	R/W	1000	Min = 1 [0.1 %] Max = 1000 [0.1 %]
17-5	U16	End stepping CLOSE	R/W	0	Min = 0 [0.1 %] Max = 999 [0.1 %]
17-6	enum	Step mode OPEN	R/W	0	0: Off 1: Remote 2: Local 3: Remote and local
17-7	Mmss01	On time OPEN	R/W	50	Min = 10 [0.1 s] Max = 1000 [0.1 s]
17-8	Mmss01	Off time OPEN	R/W	50	Min = 10 [0.1 s] Max = 1000 [0.1 s]
17-9	U16	Start stepping OPEN	R/W	0	Min = 0 [0.1 %] Max = 999 [0.1 %]
17-10	U16	End stepping OPEN	R/W	1000	Min = 1 [0.1 %] Max = 1000 [0.1 %]

Table 60: Operation mode monitoring

No.	Type	Parameters	Access	Default	Setting value
Data length = 6 bytes					
23-1	enum	Duty type monitoring	R/W	0	0: Function not active 1: Function active
23-2	U16	Perm. run time	R/W	15	Min = 10 [min] Max = 60 [min]
23-3	U16	Permissible starts	R/W	1200	Min = 1 Max = 1800

Table 61: Motion detector

No.	Type	Parameters	Access	Default	Setting value
Data length = 12 bytes					
24-1	enum	Motion detector	R/W	1	0: Function not active 1: Function active
24-2	Mmss01	Detect. time dt	R/W	50	Min = 10 [0.1 s] Max = 1800 [0.1 s]
24-3	U16	Travel diff. dx	R/W	10	Min = 10 [0.1 %] Max = 100 [0.1 %]
24-6	U16	Delay time	R/W	6000	Min = 1 [0.001 s] Max = 65535 [0.001 s]

Table 62: Operating time monitoring

No.	Type	Parameters	Access	Default	Setting value
Data length = 4 bytes					
25-1	enum	Operation mode	R/W	0	0: Off 1: Manual
25-2	Mmss01	Perm.op. time, manual	R/W	9000	Min = 0 [0.1 s] Max = 36000 [0.1 s]

Table 63: Reaction monitoring

No.	Type	Parameters	Access	Default	Setting value
Data length = 4 bytes					
26-1	enum	Actuator behaviour	R/W	0	0: No cut-off 1: Cut-off
26-2	U16	Reaction time	R/W	150	Min = 50 [0.1 s] Max = 3000 [0.1 s]

Table 64: Interlock

No.	Type	Parameters	Access	Default	Setting value
Data length = 8 bytes					
27-1	enum	Oper. mode Interlock	R/W	3	1: Remote 2: Local 3: Remote and Local
27-2	enum	Running dir. Interlock	R/W	3	1: OPEN 2: CLOSE 3: OPEN and CLOSE
27-4	enum	Interlock source	R/W	3	1 : Interface 2 : Fieldbus 3 : Active comm. source

Table 65: PVST

No.	Type	Parameters	Access	Default	Setting value
Data length = 18 bytes					
66-1	enum	PVST operation mode	R/W	0	0: Stroke 1: End position test
66-2	enum	PVST behaviour	R/W	1	0: OPEN 1: CLOSE
66-3	U16	PVST stroke	R/W	100	Min = 0 [0.1 %] Max = 1000 [0.1 %]
66-4	Mmss01	PVST monitoring	R/W	600	Min = 10 [0.1 s] Max = 3000 [0.1 s]
66-5	Mmss01	PVST operating time	R/W	20	Min = 1 [0.1 s] Max = 600 [0.1 s]
66-6	Mmss01	PVST reversing time	R/W	20	Min = 1 [0.1 s] Max = 600 [0.1 s]
66-7	enum	PVST reminder	R/W	0	0: Function not active 1: Function active
66-8	U16	PVST reminder period	R/W	0	Min = 0 Max = 65535
66-9	enum	PVST source	R/W	0	0: Active interface 1: I/O interface 2: Fieldbus interface

Table 66: Local controls

No.	Type	Parameters	Access	Default	Setting value
Data length = 22 bytes					
28-1	enum	Indication light 1 (left)	R/W	370	
28-2	enum	Indication light 2	R/W	269	
28-3	enum	Indication light 3	R/W	270	
28-4	enum	Indication light 4	R/W	268	

No.	Type	Parameters	Access	Default	Setting value
28-5	enum	Indicat. light 5 (right)	R/W	369	
Setting values for parameter no.: 28-1/-2/-3/-4/-5					
					372: Not used
					259: End position CLOSED
					258: End position OPEN
					370: End p. CLOSED, blink
					369: End p. OPEN, blink
					401: Setpoint pos.reached
					265: Running CLOSE
					264: Running OPEN
					113: Selector sw. LOCAL
					115: Selector sw. REMOTE
					116: Selector sw. OFF
					376: Limit switch CLOSED
					375: Limit switch OPEN
					460: Torque sw. CLOSED
					459: Torque sw. OPEN
					86: NAMUR failure
					84: NAMUR funct. check
					83: NAMUR out of spec.
					85: NAMUR mainten. req.
					79: Fault
					78: Warning
					80: Not ready REMOTE
					554: Operation pause active
					560: Start stepping mode
					603: Actuator running
					539: Running LOCAL
					540: Running REMOTE
					541: Handwheel oper.
					549: In intermediate pos.
					392: Intermediate pos. 1
					399: Intermediate pos. 2
					398: Intermediate pos. 3
					397: Intermediate pos. 4
					396: Intermediate pos. 5
					395: Intermediate pos. 6
					394: Intermediate pos. 7
					393: Intermediate pos. 8
					500: Input DIN 1
					501: Input DIN 2
					505: Input DIN 3
					504: Input DIN 4
					503: Input DIN 5
					502: Input DIN 6
					285: EMCY stop active
					269: Torque fault CLOSE
					Torque fault OPEN

No.	Type	Parameters	Access	Default	Setting value
					Torque fault
					Thermal fault
					Phase fault
					Fieldbus DOUT 1
					Fieldbus DOUT 2
					Fieldbus DOUT 3
					Fieldbus DOUT 4
					Fieldbus DOUT 5
					Fieldbus DOUT 6
					Fieldbus DOUT 7
					Fieldbus DOUT 8
					Fieldbus DOUT 9
					Fieldbus DOUT 10
					Fieldbus DOUT 11
					Fieldbus DOUT 12
					FailState fieldbus
					Handwheel active
					PVST active
					PVST fault
					PVST abort

Table 67: Profibus

No.	Type	Parameters	Access	Default	Setting value
Data length = 4 bytes					
35-1	enum	Redundancy	R/W	0	0: None 1: DP-V2 (SR) 4: DP-V2 (FR) 2: AUMA redundancy I 3: AUMA redundancy II
35-2	enum	Behaviour Tx	R/W	0	0: Tx active channel 1: Tx both channels

Table 68: FO connection

No.	Type	Parameters	Access	Default	Setting value
Data length = 6 bytes					
68-1	enum	FO cable monitoring	R/W	0	0: On (not final device) 1: Off (final device)
68-2	enum	FO cable topology	R	1	0: Ring 1: Star/line

No.	Type	Parameters	Access	Default	Setting value
68-3	enum	FO cable baud rate	R	0	0: Auto
					1: 9.6 kbit/s
					2: 19.2 kbit/s
					3: 38.4 kbit/s
					4: 45.45 kbit/s
					5: 57.6 kbit/s
					6: 93.75 kbit/s
					7: 115.2 kbit/s
					8: 187.5 kbit/s
					9: 500 kbit/s
					10: 1500 kbit/s
					11: 3000 kbit/s
					12: 6000 kbit/s
					13: 12000 kbit/s

Table 69: Actuator

No.	Type	Parameters	Access	Default	Setting value
Data length = 12 bytes					
36-1	enum	Motor prot. mode	R/W	0	0: Auto
					1: Reset
36-2	enum	Closing rotation	R	0	0: Clockwise rotation
					1: Counterclockwise rot.
36-3	enum	Handwheel switch	R	0	0: Without
					1: NC
					2: NO
36-4	enum	Heater monitor	R	0	0: Function not active
					1: Function active
36-5	U32	Heating sys. mon. time	R	3000	Min = 600 [0.1 s]
					Max = 36000 [0.1 s]

Table 70: MWG

No.	Type	Parameters	Access	Default	Setting value
Data length = 44 bytes					
37-1	U16	Nom. torque CLOSE	R	100	Min = 0 [Nm]
					Max = 65535 [Nm]
37-2	U16	Nom. torque OPEN	R	100	Min = 0 [Nm]
					Max = 65535 [Nm]
37-3	U16	CLOSE min. angle	R	120	Min = 65
					Max = 125
37-4	U16	CLOSE min. torque	R	50	Min = 20 [%]
					Max = 80 [%]
37-5	U16	CLOSE max. angle	R	105	Min = 8
					Max = 122
37-6	U16	CLOSE max. torque	R	100	Min = 80 [%]
					Max = 125 [%]
37-7	U16	OPEN min. angle	R	134	Min = 129
					Max = 189
37-8	U16	OPEN min. torque	R	50	Min = 20 [%]
					Max = 80 [%]

No.	Type	Parameters	Access	Default	Setting value
37-9	U16	OPEN max. angle	R	149	Min = 132 Max = 247
37-10	U16	OPEN max. torque	R	100	Min = 80 [%] Max = 125 [%]
37-11	U16	Correction CLOSE	R	100	Min = 80 Max = 120
37-12	U16	Correction OPEN	R	100	Min = 80 Max = 120
37-13	U16	Hysteresis torque	R	5	Min = 0 Max = 20
37-14	U16	Dead band torque	R	2	Min = 2 Max = 20
37-15	I32	Hysteresis limit	R	3	Min = 0 Max = 100
37-16	I32	Torque adjust 0 point	R	0	Min = 20 Max = 20
37-17	U16	Low limit T CLOSE	R	20	Min = 0 [Nm] Max = 65535 [Nm]
37-18	U16	High limit T CLOSE	R	100	Min = 0 [Nm] Max = 65535 [Nm]
37-19	U16	Low limit T OPEN	R	20	Min = 0 [Nm] Max = 65535 [Nm]
37-20	U16	High limit T OPEN	R	100	Min = 0 [Nm] Max = 65535 [Nm]
PRM_5057	U16	Speed EMCY OPEN	R/W	150	Min = 100 [%] Max = 200 [%]

Table 71: Potentiometer

No.	Type	Parameters	Access	Default	Setting value
Data length = 8 bytes					
38-1	U16	Low limit Uref	R	450	Min = 0 Max = 1023
38-2	U16	Low limit Upoti	R	77	Min = 0 Max = 1023
38-3	U16	Low limit Uspan	R/W	610	Min = 0 Max = 1023
38-4	U16	Hysteresis	R	2	Min = 0 Max = 10

Table 72: Phase failure monitoring

No.	Type	Parameters	Access	Default	Setting value
Data length = 4 bytes					
39-1	enum	Adapt rotary dir.	R	1	0: Function not active 1: Function active
39-2	U16	Tripping time	R/W	100	Min = 20 [0.1 s] Max = 3000 [0.1 s]

Table 73: Switchgear

No.	Type	Parameters	Access	Default	Setting value
Data length = 2 bytes					
40-1	U16	Revers. prevent. time	R	3	Min = 1 [0.1 s] Max = 300 [0.1 s]
PRM_1329	U16	Frequency limit	R	50	Min = 31 [Hz] Max = 70 [Hz]
PRM_1343	U16	Frequency limit	R	20	Min = 5 [Hz] Max = 30 [Hz]

Table 74: Monitoring functions

No.	Type	Parameters	Access	Default	Setting value
Data length = 18 bytes					
41-1	enum	Monitor heat. system	R	0	0: Function not active 1: Function active
PRM_3991	U16	Heating sys. mon. time	R	3000	Min = 600 [0.1 s] Max = 36000 [0.1 s]
PRM_3172	U16	Heater monitor	R	0	0: Function not active 1: Function active
41-2	enum	Monitor 24 V DC ext.	R	0	0: Function not active 1: Function active
41-3	enum	Monitor 24 V DC cust.	R/W	1	0: Function not active 1: Function active
41-4	enum	Monitor 24 V AC	R	1	0: Function not active 1: Function active
41-5	enum	Monitor 24 V DC intern	R	1	0: Function not active 1: Function active
41-6	enum	PTC trip. monit.	R	0	0: Function not active 1: Function active
41-7	enum	RTC battery test	R	1	0: Function not active 1: Function active
PRM_3517	U16	Vibration alarm level	R	1000	Min = 500 [0.001 g] Max = 4000 [0.001 g]
41-8	U32	Heating sys. mon. time	R	3000	Min = 600 [0.1 s] Max = 36000 [0.1 s]

Table 75: Service interface

No.	Type	Parameters	Access	Default	Setting value
Data length = 22 bytes					
42-1	S20	Device tag	R/W	_DEVICE-TAG_	
42-2	enum	Service op. mode	R/W	0	0: Control: LOCAL 1: Control: LOC+REM

Table 76: Service functions

No.	Type	Parameters	Access	Default	Setting value
Data length = 4 bytes					
45-1	I16	Create factory settings	R	-1	Min = 32768 Max = 32767
45-2	I16	Reset factory settings	R/W	-1	Min = 32768 Max = 32767

Table 77: General information

No.	Type	Parameters	Access	Default	Setting value
Data length = 48 bytes					
44-1	BOOL	Torque fault OPEN	R		Min = 0 Max = 1
44-2	BOOL	Torque fault CLOSE	R		Min = 0 Max = 1
44-3	enum	Selector switch	R		1: Local 2: Off 3: Remote
44-4	U16	Actual position	R		Min = 0 [0.1 %] Max = 1000 [0.1 %]
44-5	U16	Torque	R		Min = 0 [0.1 %] Max = 1000 [0.1 %]
44-6	enum	Operation mode	R		0: Power Off 1: EMCY stop 2: Off 3: Service 4: Local 5: Interlock 6: EMERGENCY 7: Remote 8: Remote II 9: Fieldbus 10: Disabled
44-7	DrvCmd4	Operation command	R		Min = 0 Max = 0xFFFFFFFF
44-8	BOOL	Running OPEN	R		Min = 0 Max = 1
44-9	BOOL	Running CLOSE	R		Min = 0 Max = 1
44-10	BOOL	Setpoint pos.reached	R		Min = 0 Max = 1
44-11	BOOL	Limit switch OPEN	R		Min = 0 Max = 1
44-12	BOOL	Limit switch CLOSED	R		Min = 0 Max = 1
44-13	BOOL	Torque sw. OPEN	R		Min = 0 Max = 1
44-14	BOOL	Torque sw. CLOSED	R		Min = 0 Max = 1

Table 78: Positioner

No.	Type	Parameters	Access	Default	Setting value
Data length = 26 bytes					
52-1	enum	Adaptive behaviour	R/W	0	0: Off 1: Adaptive I
52-2	U16	Setpoint	R		Min = 0 [0.1 %] Max = 1000 [0.1 %]
52-3	U16	Actual position	R/W		Min = 0 [0.1 %] Max = 1000 [0.1 %]
52-4	U32	Outer dead band	R		Min = 0 [0.1 %] Max = 1000 [0.1 %]
52-5	U32	Outer dead b. OPEN	R		Min = 0 [0.1 %] Max = 1000 [0.1 %]
52-6	U32	Outer dead b. CLOSE	R		Min = 0 [0.1 %] Max = 1000 [0.1 %]
52-7	U32	Inner dead b. OPEN	R		Min = 0 [0.1 %] Max = 1000 [0.1 %]
52-8	U32	Inner dead b. CLOSE	R		Min = 0 [0.1 %] Max = 1000 [0.1 %]

Table 79: Operation mode

No.	Type	Parameters	Access	Default	Setting value
Data length = 8 bytes					
53-1	U32	On time	R		Min = 0 Max = 3600
53-2	U32	No. mot. starts/h	R		Min = 0 Max = 3600
PRM_5241	BOOL	Incorrect dir. rotation	R		Min = 0 Max = 1

Table 80: Process controller

No.	Type	Parameters	Access	Default	Setting value
Data length = 8 bytes					
73-1	U16	Process setpoint	R		0 [0.0 %] 1000 [0.0 %]
73-2	U16	Actual process value	R		0 [0.0 %] 1000 [0.0 %]
73-3	U32	Op. com. PID contr.	R		0 0

Table 81: Bluetooth

No.	Type	Parameters	Access	Default	Setting value
Data length = 62 bytes					
54-1	S20	Device tag	R/W	_DEVICE-TAG_	
54-2	S20	Bluetooth address	R	XXXXXXXXXX	
54-4	enum	Bluetooth	R/W	1	0: Function not active 1: Function active

Table 82: Position transmitter potentiometer

No.	Type	Parameters	Access	Default	Setting value
Data length = 10 bytes					
69-1	U16	Low limit Uspan	R/W	610	Min = 0 Max = 1023
69-2	U16	Volt.level diff. potent.	R		Min = 0 Max = 1023
69-3	U16	Raw val. pos. OPEN	R		0 65535
69-4	U16	Raw val. pos. CLOSED	R		0 65535
69-5	U16	Potent. raw value /mV	R		0 5000 [mV]

Table 83: Profibus DP1

No.	Type	Parameters	Access	Default	Setting value
Data length = 15 bytes					
56-1	U8	DP1 slave address	R		Min = 0 Max = 126
56-2	enum	DP1 baud rate	R		0: 12 Mbit/s 1: 6 Mbit/s 2: 3 Mbit/s 3: 1.5 Mbit/s 4: 500 kbit/s 5: 187.5 kbit/s 6: 93.75 kbit/s 7: 45.45 kbit/s 8: 19.20 kbit/s 9: 9.6 kbit/s 15: Not available
55-3	enum	DP1 watchdog status	R		0: Baud search 1: Baud control 2: DP control
55-4	enum	DP1 Profibus status	R		0: Wait Prm 1: Wait Cfg 2: Data Ex
55-5	enum	DP1 GC clear	R		0: GC Clear inactive 1: GC Clear active
55-6	enum	DP1 data length 0	R		0: Data length 0 inactive 1: Data length 0 active
55-7	enum	DP1 GC freeze	R		0: GC Freeze inactive 1: GC Freeze active
55-8	enum	DP1 GC sync	R		0: GC Sync inactive 1: GC Sync active

Table 84: Profibus DP2

No.	Type	Parameters	Access	Default	Setting value
Data length = 15 bytes					
56-1	U8	DP2 slave address	R		Min = 0 Max = 126
56-2	enum	DP2 baud rate	R		0: 12 Mbit/s 1: 6 Mbit/s 2: 3 Mbit/s 3: 1.5 Mbit/s 4: 500 kbit/s 5: 187.5 kbit/s 6: 93.75 kbit/s 7: 45.45 kbit/s 8: 19.20 kbit/s 9: 9.6 kbit/s 15: Not available
56-3	enum	DP2 watchdog status	R		0: Baud search 1: Baud control 2: DP control
56-4	enum	DP2 Profibus status	R		0: Wait Prm 1: Wait Cfg 2: Data Ex
56-5	enum	DP2 GC clear	R		0: GC Clear inactive 1: GC Clear active
56-6	enum	DP2 data length 0	R		0: Data length 0 inactive 1: Data length 0 active
56-7	enum	DP2 GC freeze	R		0: GC Freeze inactive 1: GC Freeze active
56-8	enum	DP2 GC sync	R		0: GC Sync inactive 1: GC Sync active

Table 85: Profibus details

No.	Type	Parameters	Access	Default	Setting value
Data length = 36 bytes					
57-1	BOOL	DP-V1 control	R		Min = 0 Max = 1
57-2	BOOL	DP-V1 active	R		Min = 0 Max = 1
57-3	BOOL	Channel 1 active	R		Min = 0 Max = 1
57-4	BOOL	Channel 2 active	R		Min = 0 Max = 1
57-5	enum	Primary	R		0: None 1: Channel 1 2: Channel 2
57-6	enum	Backup	R		0: None 1: Channel 1 2: Channel 2

No.	Type	Parameters	Access	Default	Setting value
57-7	enum	Profibus Ident no.	R	3151	3151: 0x0C4F
					3261: 0x0CBD
					3191: 0x0C77
57-8	enum	Redundancy	R/W	0	0: None
					1: DP-V2 (SR)
					4: DP-V2 (FR)
					2: AUMA redundancy I
					3: AUMA redundancy II
57-9	enum	DP-V1 (SetPrm)	R		0: Deactivated
					1: Activated
57-10	enum	Alarms (SetPrm)	R		0: Deactivated
					1: Activated
57-11	enum	Redundancy (SetPrm)	R		0: Deactivated
					1: Activated
57-12	enum	Behaviour Tx	R	0	0: Tx active channel
					1: Tx both channels

Table 86: FO

No.	Type	Parameters	Access	Default	Setting value
Data length = 28 bytes					
58-1	enum	FOC level channel 1	R		0: Chanel deactivated
					1: Level bad!
					2: Level critical, no Rx
					3: Level critical, Rx
					4: Level good, no Rx
					5: Level good, Rx
58-2	enum	FOC level channel 2	R		0: Chanel deactivated
					1: Level bad!
					2: Level critical, no Rx
					3: Level critical, Rx
					4: Level good, no Rx
					5: Level good, Rx
58-3	U16	FOC RS-485 error	R		Min = 0
					Max = 1

No.	Type	Parameters	Access	Default	Setting value
58-4	enum	FO cable baud rate	R		0: Invalid
					1: 9.6 kbit/s
					2: 19.2 kbit/s
					3: 38.4 kbit/s
					4: 45.45 kbit/s
					5: 57.6 kbit/s
					6: 93.75 kbit/s
					7: 115.2 kbit/s
					8: 187.5 kbit/s
					9: 500.0 kbit/s
					10: 1500 kbit/s
					11: 3000 kbit/s
					12: 6000 kbit/s
					13: 12000 kbit/s
58-5	S20	FOC FPGA version	R	0	

Table 87: Operational info total

No.	Type	Parameters	Access	Default	Setting value
Data length = 80 bytes					
59-1	MMSS01	Motor running time	R		Min = 0 [s]
					Max = 4294967295 [s]
PRM_527	MMSS01	Max. running time /h	R		Min = 0 [s]
					Max = 4294967295 [s]
PRM_508	MMSS01	Operating hours	R		Min = 0 [s]
					Max = 4294967295 [s]
59-2	U32	Motor starts	R		Min = 0 [s]
					Max = 4294967295 [s]
PRM_526	U32	Max. starts/h	R		Min = 0
					Max = 4294967295
PRM_523	U32	Mean torque value	R		Min = 0 [%]
					Max = 4294967295 [%]
59-3	U32	No. thermal faults	R		Min = 0
					Max = 4294967295
59-4	U32	Torque fault CLOSE	R		Min = 0
					Max = 4294967295
59-5	U32	Torque fault OPEN	R		Min = 0 [s]
					Max = 4294967295 [s]
59-6	U32	Limit trip CLOSE	R		Min = 0
					Max = 4294967295
59-7	U32	Limit trip OPEN	R		Min = 0
					Max = 4294967295
59-8	U32	Torque trip CLOSE	R		Min = 0
					Max = 4294967295
59-9	U32	Torque trip OPEN	R		Min = 0
					Max = 4294967295
59-10	U32	On time warning 1	R		Min = 0 [s]
					Max = 4294967295 [s]

No.	Type	Parameters	Access	Default	Setting value
59-11	U32	On time warning 2	R		Min = 0 [s] Max = 4294967295 [s]
59-12	U32	No. system starts	R		Min = 0 Max = 4294967295
59-13	I32	Max. temp. controls	R		Min = -100 [°C] Max = +150 [°C]
59-14	I32	Min. temp. controls	R		Min = -100 [°C] Max = +150 [°C]
59-19	I32	Max. temp. MWG	R		Min = -100 [°C] Max = +150 [°C]
59-20	I32	Min. temp. MWG	R		Min = -100 [°C] Max = +150 [°C]
PRM_502	U32	Max. vibration	R		Min = 0 [g] Max = 4294967295 [g]

Table 88: Operational info

No.	Type	Parameters	Access	Default	Setting value
Data length = 82 bytes					
60-1	U32	Motor running time	R		Min = 0 [s] Max = 4294967295 [s]
PRM_525	U32	Max. running time /h	R		Min = 0 [s] Max = 4294967295 [s]
PRM_507	U32	Operating hours	R		Min = 0 [s] Max = 4294967295 [s]
60-2	U32	Motor starts	R		Min = 0 [s] Max = 4294967295 [s]
PRM_524	U32	Max. starts/h	R		Min = 0 Max = 4294967295
PRM_512	U32	Mean torque value	R		Min = 0 [%] Max = 4294967295 [%]
60-3	U32	No. thermal faults	R		Min = 0 [s] Max = 4294967295 [s]
60-4	U32	Torque fault CLOSE	R		Min = 0 [s] Max = 4294967295 [s]
60-5	U32	Torque fault OPEN	R		Min = 0 [s] Max = 4294967295 [s]
60-6	U32	Limit trip CLOSED	R		Min = 0 [s] Max = 4294967295 [s]
60-7	U32	Limit trip OPEN	R		Min = 0 [s] Max = 4294967295 [s]
60-8	U32	Torque trip CLOSE	R		Min = 0 [s] Max = 4294967295 [s]
60-9	U32	Torque trip OPEN	R		Min = 0 [s] Max = 4294967295 [s]
60-10	U32	On time warning 1	R		Min = 0 [s] Max = 4294967295 [s]
60-11	U32	On time warning 2	R		Min = 0 [s] Max = 4294967295 [s]

No.	Type	Parameters	Access	Default	Setting value
60-12	U32	No. system starts	R		Min = 0 [s]
					Max = 4294967295 [s]
60-13	I32	Max. temp. controls	R		Min = -100 [°C]
					Max = +150 [°C]
60-14	I32	Min. temp. controls	R		Min = -100 [°C]
					Max = +150 [°C]
60-19	I32	Max. temp. MWG	R		Min = -100 [°C]
					Max = +150 [°C]
60-20	I32	Min. temp. MWG	R		Min = -100 [°C]
					Max = +150 [°C]
PRM 5061	I32	Max. vibration	R		Min = -100 [°C]
					Max = +150 [°C]
60-21	I16	Reset operating data	R/W		

Table 89: Event report

No.	Type	Parameters	Access	Default	Setting value
Data length = 10 bytes					
61-1	U16	File size event. rep.	R	548	Min = 0
					Max = 1024
61-2	U16	Save interval	R	50000	Min = 1000
					Max = 65535
61-3	U16	Buffer size	R	50	Min = 10
					Max = 100
61-4	enum	System event filter	R	31	0: Commands
					1: Parameterization
					2: Enable processes
					3: System events
					4: Simulation

No.	Type	Parameters	Access	Default	Setting value
61-5	enum	Event filter for Events	R	93223	0: ER signals
					1: Warnings
					2: Fault
					3: Not ready REMOTE
					4: ER device status
					5: Configuration warning
					6: Out of specification
					7: Function check
					8: Maintenance required
					9: Failure
					10: Configuration error
					11: Hydraulics error
					12: Wrong oper. command
					13: Internal error
					14: Internal warning
					15: Fieldbus status
					16: Hydraulics warning
					17: Failure (Cfg)
					18: Fault (Cfg)
					19: Warnings (Cfg)
					20: Not ready REMOTE (Cfg)
					21: Config. error REMOTE
					22: Collective signal 23
					23: SIL status
					24: Collective signal 25
					25: Collective signal 26
					26: Collective signal 27
					27: Collective signal 28
					28: FOC status
					29: ER service 1
					30: ER service 2
					31: ER service 3
PRM_486	BOOL	Long-term recording	R	0	0: Function not active
					1: Function active

Table 90: Characteristics

No.	Type	Parameters	Access	Default	Setting value
Data length = 62 bytes					
65-1	S20	Tag torque-position 1	R/W	_ REF 1 _	
65-2	S20	Tag torque-position 2	R/W	_ REF 2 _	
65-3	S20	Tag torque-position 3	R/W	_ REF 3 _	
PRM_522	S20	No.TorqueCurvesOpen	R/W	0	Min = 0 Max = 65535
PRM_523	S20	No.TorqueCurvesClose	R/W	0	Min = 0 Max = 65535
65-4	U16	Interval position-time	R/W	10	Min = 1 [s] Max = 3600 [s]

Table 91: Device temperatures

No.	Type	Parameters	Access	Default	Setting value
Data length = 8 bytes					
62-1	I16	Temp. controls	R		Min = -60 [C°] Max = 150 [C°]
PRM_5171	I16	Temp mean value logic	R		Min = -100 C° Max = 150 [C°]
62-2	I16	Temp. control unit	R		Min = -60 [C°] Max = 150 [C°]
PRM_5174	I16	Temp mean value MWG	R		Min = -100 [C°] Max = 150 [C°]

Table 92: Controls version

No.	Type	Parameters	Access	Default	Setting value
Data length = 6 bytes					
63-1	enum	Ex version	R	0	0: Off 1: On
63-2	enum	Hydraulic version	R	0	0: Schuck 1: Ledeen
63-3	enum	SIL version	R	0	0: Off 1: On

Table 93: Hardware equipment

No.	Type	Parameters	Access	Default	Setting value
Data length = 46 bytes					
64-1	enum	LC (target)	R	1	0: Not available 1: Available
64-2	enum	LC	R	0	0: Not available 1: Available
64-3	enum	Logic (target)	R	1	0: Not available 1: Available
64-4	enum	Logic	R	0	0: Not available 1: Available
64-5	enum	Pos. transm. (target)	R	1	0: None 1: Potentiometer 2: RWG 4: MWG
64-6	enum	Position transmitter	R	0	0: None 1: Potentiometer 2: RWG 4: MWG
64-7	enum	MCM (target)	R	1	0: Not available 1: Available
64-8	enum	MCM	R	0	0: Not available 1: Available
64-9	enum	PSO (target)	R	0	0: Not available 1: Available
64-10	enum	PSO	R	0	0: Not available 1: Available

No.	Type	Parameters	Access	Default	Setting value
64-11	enum	I/O interface (target)	R	1	0: Not available
					1: Available
64-12	enum	I/O interface	R	0	0: Not available
					1: Available
64-13	enum	I/O interface 2 (target)	R	0	0: Not available
					1: Available
64-14	enum	I/O interface 2	R	0	0: Not available
					1: Available
64-15	enum	Fieldbus (target)	R	0	0: No fieldbus
					1: Profibus
					2: Modbus
					3: Foundation Fieldbus
					4: HART
					5: Profinet
PRM_600	enum	Fieldbus	R	0	0: No fieldbus
					1: Profibus
					2: Modbus
					3: Foundation Fieldbus
					4: HART
					5: Profinet
64-20	enum	Redundancy (target)	R	0	0: Not available
					1: Red. for line and loop
					2: Red. for line and loop
64-21	enum	Redundancy	R	0	0: Not available
					1: Red. for line and loop
					2: Red. for line and loop
64-17	enum	MWG (target)	R	0	0: Not available
					1: Available
64-18	enum	MWG	R	0	0: Not available
					1: Available
64-19	enum	FO cables (target)	R	0	0: Not available
					1: Available
64-22	enum	FO cables	R	0	0: Not available
					1: Available
64-23	enum	FOC Ex (target)	R	0	0 : Without FOC Ex
					1 : FOC Ex for line/star
					2 : FOC Ex for ring
PRM_5080	enum	Target_FQM_available	R	0	0 : Not available
					1 : Available
PRM_5081	enum	Target_FQM_available	R	0	0 : Not available
					1 : Available
PRM_5091	enum	Target_MotorCtrl_avail.	R	0	0 : Not available
					1 : Available
PRM_5092	enum	Actual_MotorCtrl_avail.	R	0	0 : Not available
					1 : Available

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