

Series 3730

Electropneumatic Positioner

Type 3730-4



Configuration and operation over PROFIBUS-PA



Fig. 1 · Configuration and operation over TROVIS-VIEW (Type 3730-4)

Configuration Manual

KH 8384-4 EN

Firmware version K 2.0x/R 1.5x

Edition May 2012

Note concerning this Configuration Manual

The rotary pushbutton on the positioner allows the Type 3730-4 Positioner to be operated and configured on site. In addition, the settings can be performed over the PROFIBUS-PA network or over the SAMSON SSP interface. The Mounting and Operating Instructions EB 8384-4 EN describe the mounting, start up and on-site operation.

This Manual (KH 8384-4 EN) describes the basic principles as well as parameters for operation and configuration over the PROFIBUS-PA network.

Note:

- *This Configuration Manual **KH 8384-4 EN** is valid for positioners with firmware versions **K 2.00 to K 2.09 and R 1.52 to R 1.59**.
The latest edition of this manual, detailing the firmware version and modifications compared to the previous version, is available on the Internet at <http://www.samson.de>.*
 - *Information on the **EXPERTplus** diagnostics is included in the Operating Instructions **EB 8389 EN**.*
-

Revisions of positioner firmware in comparison to previous versions	
Communication	
Firmware	Revisions
K 1.01	Internal modifications
K 1.10	The FEATURE_SELECT parameter allows you to set whether an active diagnostic function is to be reported by a GOOD_FUNCTION_CHECK or a BAD_FUNCTION_CHECK (see page 54).
K 1.11	<ul style="list-style-type: none"> – More trigger conditions in the data logger (see page 53) – More additional functions (FEATURE_SELECT) (see page 54) – The limits of the discrete valve position (POS_D_LIMIT_LOW, POS_D_LIMIT_UP) can now be defined as required (see page 7).
K 1.12	Resetting the identification parameters resets all the parameters saved in the controller. The parameters saved in the controller are, however, not reset when just the start-up parameters are reset (see page 42).
K 1.13	Internal modifications
K 1.15	Feature of ID number adaptation acc. to PROFIBUS PA Profile 3.02 added. It allows a Type 3785 Positioner (Profile 2.0 and Profile 3.0) to be directly replaced with a Type 3730-4 Positioner in the compatibility mode (see page 8).
K 1.16	<p>The function to suppress extended diagnostic messages allows messages for the PROFIBUS diagnosis protocol to be suppressed. The messages are still included in the condensed state according to their classification. The parameter to suppress the diagnostic messages exists in the following integrations:</p> <p>DD: 2.2.007</p> <p>TROVIS-VIEW: >3.60.005 (device module)</p> <p>DTM: 1.3.0.1</p>
K 1.17	The versions K 1.12 to K 1.16 do not save a reference variable received in acyclic data exchange as the valid value for the fail-safe action 'Last valid setpoint is used'. In the affected modules for data exchange, the polling for a valid reference variable has been changed to GOOD_NON_SPECIFIC.
K 2.00	Partial stroke test (PST) and full stroke test (FST) added

Contents	Page
1	PROFIBUS-PA communication 6
2	Profile 6
3	Cyclic data exchange 7
3.1	GSD files and automatic ID number adaptation 8
3.2	Data exchange 10
3.3	Integration for PCS7 control system 14
3.4	General instructions to start up the positioner 14
4	CHECKBACK – Device status 15
5	Measured value status and valve diagnostics 17
5.1	Extended valve diagnostics – EXPERTplus 17
5.2	Classification of the status alarms and the condensed state 18
5.3	Status alarm according to Profile 3.01 21
5.4	Status alarms according to Profile 3.01 Condensed Status. 25
5.5	Standard diagnostics with PROFIBUS-DP protocol. 29
6	Acyclic data exchange 36
7	Partial stroke testing over DP-V0 37
8	Parameter lists 38
8.1	Physical Block, Slot 0 · Profile-specific parameters. 39
8.1.1	Physical Block, Slot 0 · Manufacturer-specific parameters 47
8.1.2	AO Function Block, Slot 1 · Profile-specific parameters 63
8.2	AO Transducer Block, Slot 1 · Profile-specific parameters 68
8.3	AO Transducer Block, Slot 1 · Manufacturer-specific parameters 77
8.3.1	DI1/2 Function Block, Slot 2/3 · Profile-specific parameters 93
8.3.2	DI1/2 Transducer Block, Slot 2/3 · Profile-specific parameters 97

1 PROFIBUS-PA communication

The PROFIBUS-PA is a fieldbus version for process automation based on the widely used PROFIBUS-DP. The transmission technique conforms with the IEC 61158-2 standard and therefore fulfills the requirements for the type of protection, intrinsic safety.

PROFIBUS-DP defines two types of masters:

- ▶ **Class 1 master** exchanges the data with the configured slaves.
- ▶ **Class 2 master** is used for acyclic data exchange for commissioning and diagnostics purposes.

2 Profile

Basic device functions have been described in profiles by PNO (PROFIBUS user organization) to supplement the EN 50170 standard.

The scope of functions of the Type 3730-4 Positioner is consistent with Profile 3.01 for final control elements. However, it still fulfills all obligatory functions of Profile 3.02, e.g. the automatic implementation on replacing old device models and versions or concerning the condensed state according to the NAMUR Recommendation NE 107.

3 Cyclic data exchange

Cyclically transmitted parameters

The following parameters that are transmitted in cyclic data transfer are marked with an asterisk (*) in the parameter lists on page 38 onwards.

- ▶ **POS_D**
Current position of the valve (discrete)
0: Not initialized
1: Closed ($x < 0.5\%$)
2: Open ($x > 99.5\%$)
3: Intermediate position
- ▶ **RCAS_IN**
Setpoint with status: Reference variable w in RCAS mode
Provided by a supervisory host, e.g. PID Block or master class 1. Depending on the mode of the function block.
Range of values defined in PV_SCALE
- ▶ **RCAS_OUT**
Setpoint with status: Reference variable w in RCAS mode
Provided to a supervisory host, z. B. PID Block or master class 1. Depending on the mode of the function block.
Range of values defined in PV_SCALE
- ▶ **READBACK**
Current position of the valve and status
Controlled variable x in relation to travel range/angle of rotation (OUT_SCALE)
Range of values defined in PV_SCALE
- ▶ **SP**
The setpoint SP is transmitted to the positioner. Defines the position of the valve between the open and closed positions.
Range of values defined in PV_SCALE
- ▶ **DI_OUT**
Output of the DI Function Block

Status of the device and measured values

► Checkback

Refer to section 4 for device status.

► Status

Each process value is assigned a status according to the PROFIBUS-PA Profile.

Status of reference variable (hex):

0-3f	Bad
40-7f	Uncertain
80-bf	Good

Refer to section 5 for measured value status.

3.1 GSD files and automatic ID number adaptation

The General Station Description file (GSD file) is included in the scope of delivery for every PROFIBUS positioner and supplies all information required for the cyclic exchange of process data (setpoint, status, etc.) with the host system and for configuring the PROFIBUS network. Each positioner and its GSD file has a unique ID number (ident number) assigned to it. This allows the host to check the compatibility between the configuration in the system and the actual device.

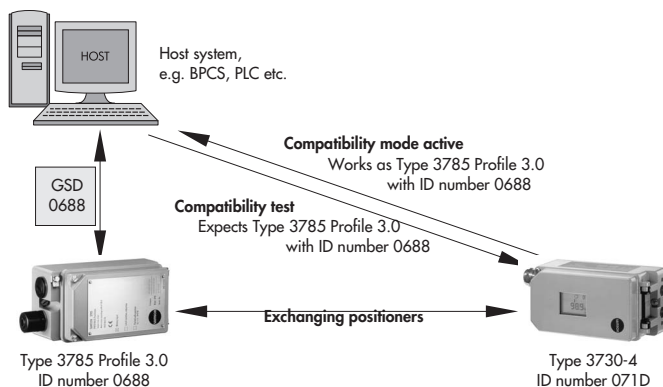


Fig. 2 · Replacing positioners with automatic adaptation of the ID number

The ID number (ident number) of the GSD file must be the same as the ID number of the device to ensure successful integration.

The Automatic Ident Number Adaption function allows a Type 3785 Positioner to be replaced by a Type 3730-4 Positioner without having to replace the GSD file in the host system: The configured GSD file/ID number of the positioner is checked by the host (compatibility test) during the transition to cyclic data exchange. If the positioner is in the compatibility mode, the GSD file/ID number of the Type 3785 Positioner (Profile 2.0 and Profile 3.0) is also accepted by the positioner. The positioner changes to cyclic data exchange.

The functions of the active positioner model (active ID number) are only supported by the process control system for communication.

Example: If the Type 3730-4 Positioner is operated in the compatibility mode for Type 3785 Profile 3.0, the diagnosis telegram then communicates as with Type 3785. Diagnosis bits, which were first introduced with Profile 3.01, are not set. Additionally, the DI Blocks of Type 3730-4 cannot be used as they are not available in Type 3785.

Proceed as follows to replace the Type 3785 Positioner with the Type 3730-4 Positioner:

NOTICE

- *The Type 3730-4 Positioner must be mounted and connected properly. Refer to EB 8384-4 EN.*
 - *Configuration over PROFIBUS must be performed with the associated EDD or DTM of Type 3730-4 as this is the only way to access the device parameters.*
-

1. Change the bus address of Type 3730-4 to the same bus address as Type 3785. This can be done over the PROFIBUS protocol (DEVICE_ADDRESS parameter), using the TROVIS-VIEW software or in Code 46 in the positioner.
 2. Start up the positioner (refer to EB 8384-4 EN).
-

Note: After initialization (in step 2), the positioner is in compatibility (adaptation) mode (IDENT_NUMBER_SELECTOR parameter in the Physical Block). Do not change this setting.

3.2 Data exchange

The relationship between output and input is based on the control system/master class 1.

SLOT 1

- **Version 1:** Module = SP
0x4A or 0x82, 0x84, 0x08, 0x05

Output

Byte 0	1	2	3	4
Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction
SP, value (floating point, IEEE)				Status

- **Version 2:** Module = RCAS_IN, RCAS_OUT
0xC4, 0x84, 0x84, 0x08, 0x05, 0x08, 0x05

Output

Byte 0	1	2	3	4
Octet 1 sign, exponent	Octet 2 Exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction
RCAS_IN, value (floating point, IEEE)				Status

Input

Byte 0	1	2	3	4
Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction
RCAS_OUT, value (floating point, IEEE)				Status

- **Version 3:** Module = SP, READBACK + POS_D
 0xC6, 0x84, 0x86, 0x08, 0x05, 0x08, 0x05, 0x05, 0x05

Output

Byte 0	1	2	3	4
Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction
SP, value (floating point, IEEE)				Status

Input

Byte 0	1	2	3	4	5	6
Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction	Octet 1	Octet 2
READBACK, value (floating point, IEEE)				Status	POS_D value	POS_D status

- **Version 4:** Module = SP, CHECKBACK
 0xC3, 0x84, 0x82, 0x08, 0x05, 0x0A

Output

Byte 0	1	2	3	4
Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction
SP, value (floating point, IEEE)				Status

Input

Byte 0	1	2
Octet 1	Octet 2	Octet 3
CHECK_ BACK[0]	CHECK_ BACK[1]	CHECK_ BACK[2]

- **Version 5:** Module = SP, READBACK + POS_D + CHECKBACK
 0xC7, 0x84, 0x89, 0x08, 0x05, 0x08, 0x05, 0x05, 0x05, 0x0A

Output

Byte 0	1	2	3	4
Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction
SP, value (floating point, IEEE)				Status

Input)

Byte 0	1	2	3	4	5	6	7	8	9
Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction	Octet 1	Octet 2	Octet 1	Octet 2	Octet 3
READBACK, value (floating point, IEEE)				Status	POS_D value	POS_D status	CHECK_ BACK[0]	CHECK_ BACK[1]	CHECK_ BACK[2]

- **Version 6:** Module = RCAS_IN, RCAS_OUT + CHECKBACK
 0xC5, 0x84, 0x87, 0x08, 0x05, 0x08, 0x05, 0x0A

Output)

Byte 0	1	2	3	4
Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction
RCAS_IN, value (floating point, IEEE)				Status

Input

Byte 0	1	2	3	4	5	6	7
Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction	Octet 1	Octet 2	Octet 3
RCAS_OUT, value (floating point, IEEE)				Status	CHECK_ BACK[0]	CHECK_ BACK[1]	CHECK_ BACK[2]

- **Version 7:** Module = SP + RCAS_IN, READBACK + RCAS_OUT + POS_D + CHECKBACK
 0xCB, 0x89, 0x8E, 0x08, 0x05, 0x08, 0x05, 0x08, 0x05, 0x08, 0x05, 0x05, 0x05, 0x0A

Output

Byte 0	1	2	3	4	5	6	7	8	9
Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction	Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction
SP, value (floating point, IEEE)				Status	RCAS_IN, value (floating point, IEEE)				Status

Input

Byte 0	1	2	3	4	5	6	7	8	9
Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction	Octet 1 sign, exponent	Octet 2 exponent fraction	Octet 3 fraction	Octet 4 fraction	Octet 5 fraction
READBACK, value (floating point, IEEE)				Status	RCAS_OUT, value (floating point, IEEE)				Status
Byte 10	11	12	13	14					
Octet 1	Octet 2	Octet 1	Octet 2	Octet 3					
POS_D value	POS_D status	CHECK_ BACK[0]	CHECK_ BACK[1]	CHECK_ BACK[2]					

SLOT 2, 3

- **Version 1:** Module = Discrete Input (DI)
 0x91

Input)

Byte 0	1
Octet 1 value	Octet 2 status
DI_OUT value	DI_OUT status

3.3 Integration for PCS7 control system

The following instructions must be observed on integrating the positioner into a Siemens Simatic S7 control system to ensure that the positioner functions properly:

1. The module in Slot 1 can be read out over the function component SFC 14 DPRD_DAT and, for example, assigned to a data module.
2. Existing modules in Slot 2 and/or Slot 3 need to be allocated over the MOVE command as the use of SFC 14 is not permissible in this case.

Note:

- *Data consistency is first provided from a data length of 3 bytes or 5 bytes.*
 - *Use the MOVE command for data types BYTE, WORD and DWORD.*
 - *If the SFC 14 is to be used over several slots, do not forget that the data length is always to be regarded separately for each slot!*
-

3.4 General instructions to start up the positioner

The positioner remains in the fail-safe position until it receives a valid setpoint from the process control system (status < 0x80). **S** blinks on the positioner display to indicate that the positioner is in the fail-safe position (see EB 8384-4 EN). First when a valid setpoint (status ≥ 0x80) is set, the positioner leaves the fail-safe position and follows the reference variable.

4 CHECKBACK – Device status

Each bit can be masked individually for cyclic communication by the class 2 master. This allows a targeted selection to be made from the active alarms.

Byte	Bit	Name	Description	
0	0	CB_FAIL_SAFE	Fail-safe position: The fail-safe position has been triggered. This may have been caused by the local operation, activation of the SET_FAIL_SAFE_POS option or due to a communication failure.	R
	1	CB_REQ_LOC_OP	Request for local operation: This is set when the initialization key of the local operation is activated.	A
	2	CB_LOCAL_OP	Local operation: <ul style="list-style-type: none"> The device has been switched to the MAN or SAFE mode by the local operation. The device is in the self-testing mode (initialization, zero point calibration or diagnostic function active). In this case, the CB_SELFTEST bit is also set. 	R
0	3	CB_OVERRIDE	Operating voltage for the optional integrated solenoid valve failed: The positioner cannot function and moves to the fail-safe position determined by the actuator, regardless of the reference variable.	R
	4...6	Not assigned		
	7	CB_TRAVE_TIME	Control loop error: The control valve no longer follows the controlled variable in the tolerable times (see error code 57 in EB 8384-4 EN). This alarm is reset after 10 seconds. The message CHECKBACK byte 1 bit 5 remains, in contrast, until it is confirmed.	A
1	0...1	Not assigned		
	2	CB_UPDATE_EVENT	Static data changed: This is set when the device data have been changed, allowing (unintended/unauthorized) changes from the originally set values to be monitored.	A
	3	CB_SIMULATE	Simulation mode active: This is set when the simulation mode of at least one Function Block is active. The simulation mode of the AO Function Block allows the controlled variable x to be simulated. The simulation mode of the DI Function Block allows the discrete output to be simulated.	R
	4	Not assigned		

Byte	Bit	Name	Description	
1	5	CB_CONTR_ERR	Control loop error: The control valve no longer follows the controlled variable in the tolerable times (see error code 57 in EB 8384-4 EN). The error must be reset manually.	R
	6	CB_CONTR_INACT	Positioner inactive: This is set when the device is in the OUT OF SERVICE mode or the output of the AO Function Block has a bad status.	R
	7	CB_SELFTEST	Device is in self-testing mode: This is set when the initialization routine, the zero point calibration or a diagnostic function of the extended EXPERTplus valve diagnostics is active.	R
2	0	CB_TOT_VALVE_TRAV	Limit value for total valve travel exceeded: The current value for the total valve travel is above the entered or pre-determined limit. Reset over SELF_CALIB_CMD = 10 (Reset "Total valve travel limit exceeded").	R
	1	CB_ADD_INPUT	Status of the second optional integrated binary input: The use of the second binary input must be configured correspondingly with CONFIG_BINARY_INPUT2.	
	2...7	Not assigned		
	7	CB_ZERO_POINT_ERROR	Zero point error (see error code 58 in EB 8384-4 EN)	R

R Static alarm remains active as long as the reason for the alarm still exists in the device

A Dynamic alarm is automatically reset after 10 seconds

5 Measured value status and valve diagnostics

5.1 Extended valve diagnostics – EXPERTplus

The Type 3730-4 Positioner includes integrated diagnostic functions. According to the Profibus Profile 3.01 and the 'Condensed status and diagnostic messages' extension, the generated alarms can be classified and summarized (see section 5.5, page 29).

The EXPERTplus extended diagnostics provides the following in-service monitoring and out-of-service tests to provide significant statements on the condition of the entire control valve.

Statistical information (in-service monitoring)

- ▶ Data logger
- ▶ Histograms
- ▶ Cycle counter
- ▶ Valve end position trend
- ▶ Drive signal diagram
- ▶ Hysteresis test

Tests (out-of-service tests)

- ▶ Drive signal diagram over the full range of the valve
- ▶ Hysteresis test diagram over the full range of the valve
- ▶ Static characteristic
- ▶ Partial stroke test

The diagnostic tests are completely integrated into the positioner. The PROFIBUS-PA protocol allows parameters to be entered and test results to be read. The graph readings depend on the process control system used.

Further status alarms are generated from the extensive information compiled during the diagnostic tests of EXPERTplus which provide the user with information covering the entire control valve.

The required reference graphs are automatically plotted after initialization and saved in the positioner if the plotting is activated with Code 48 - h0 in EXPERTplus.

5.2 Classification of the status alarms and the condensed state

Note: The following description only applies to positioners configured corresponding to the Profile 3.01 with the 'Condensed status and diagnostic messages' extension (set in the COND_STATUS_DIAG parameter of the Physical Block).

The alarms are classified in the positioner, i.e. when an alarm is issued, it is assigned a status. The classification of the states can be changed.

To provide a better overview, the positioner state is summarized in a condensed state. This condensed state is made up from a summary of all classified status alarms.

If an event is classified with "No message", this event has no influence on the condensed state. If the classification "No message" is assigned for a diagnostic alarm, this alarm is not included in the diagnostic parameter. To be able to read all diagnostic alarms regardless of which classification they have been assigned to, these are entered in DIAGNOSIS_EXT_1_RAW and DIAGNOSIS_EXT_2_RAW parameters.

The following states can be selected (refer to Fig. 3):

► **Maintenance alarm**

The positioner cannot perform its control task due to a functional fault in the device or in one of its peripherals or an initialization has not yet been successfully completed.

► **Maintenance required**

The positioner still performs its control task (with restrictions). A maintenance requirement or above average wear has been determined. The wear tolerance will soon be exhausted or is reducing at a faster rate than expected. Maintenance is necessary in the medium term.

► **Maintenance demanded**

The positioner still performs its control task (with restrictions). A maintenance demand or above average wear has been determined. The wear tolerance will soon be exhausted or is reducing at a faster rate than expected. Maintenance is necessary in the short term.

► **Process-related fault/Out of specification**








The current process conditions do not allow a valid calculation of values.

► **Function check**

Test or calibration procedures are being performed. The positioner is temporarily unable to perform its control task until this procedure is completed.

The condensed state is displayed in the engineering tool and on the positioner display (see table below).

Condensed state

Status alarm	Engineering tool/ TROVIS-VIEW (version 3.40 and higher)	Positioner display
No message, OK	 green	
Function check	 orange	<i>tEsting, tunE or tEst</i>
Maintenance required Maintenance demanded	 blue	
Process-related fault Out of specification	 yellow	
Maintenance alarm	 red	

Status modification

The classification of the status alarms can be assigned as required using the TROVIS-VIEW software connected to the local SSP interface of the positioner or over the PA parameters.

NOTICE

All extended alarms generated by the EXPERTplus diagnostics are assigned the "No message" status by default.

Logging and displaying diagnostic functions/alarms

The last 30 alarms are logged in the positioner. An alarm that is repeated is only logged once when it first occurs.

The alarms and the condensed state appear on the display as described in the code list (refer to EB 8384-4 EN). In addition, the diagnostic parameters are available over the communication interface of the positioner. The diagnostic functions can easily be displayed and configured using the TROVIS-VIEW software connected over the local interface (SSP) or over the PROFIBUS protocol.

The COND_STATUS_DIAG parameter in the Physical Block allows you to select whether the measured value status is to be set according to Profile 3.01 or according to the 'Condensed Status and diagnostic messages' profile extension.

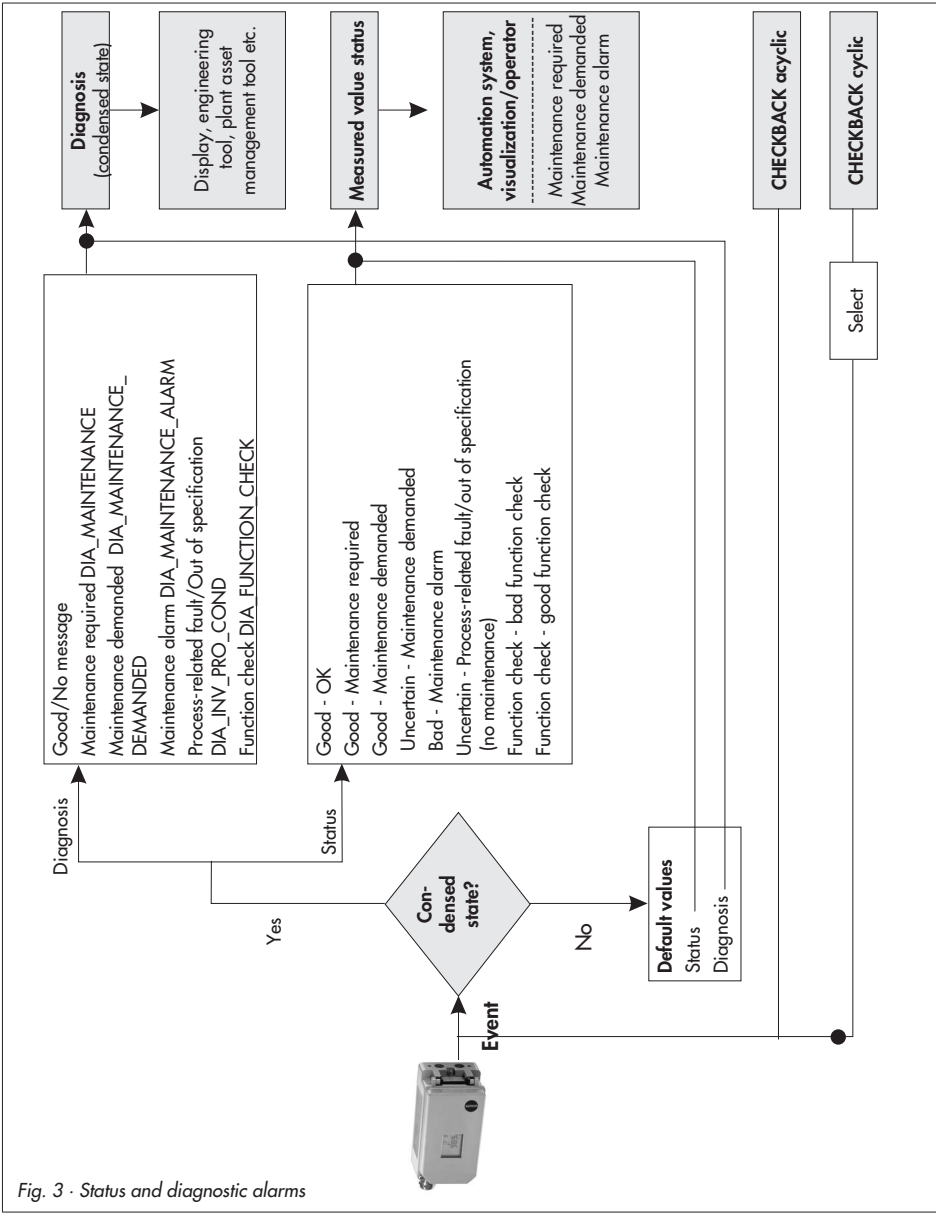


Fig. 3 · Status and diagnostic alarms

5.3 Status alarm according to Profile 3.01

Fault/diagnostic alarm	Value (hex)	Status alarm acc. to Profile 3.01
Operational errors		
Device not initialized	0x1C	BAD_OUT_OF_SERVICE
Solenoid valve active	0x80	GOOD_NON_SPECIFIC
Total travel exceeded	0xA4	GOOD_MAINT_REQ
Control loop error	0x4A	GOOD_MAINT_REQ
Zero point error	0xA4	GOOD_MAINT_REQ
Autocorrection	0x80	GOOD_NON_SPECIFIC
Fatal error	0x0C	BAD_DEVICE_FAILURE
No emergency mode	0xA4	GOOD_MAINT_REQ
Reference test aborted	0x80	GOOD_NON_SPECIFIC
Temperature < -40 °C	0x80	GOOD_NON_SPECIFIC
Temperature > 80 °C	0x80	GOOD_NON_SPECIFIC
Initialization errors		
x > range	0x80	GOOD_NON_SPECIFIC
Delta x < range	0x80	GOOD_NON_SPECIFIC
Incorrect attachment (mechanics/pneumatics)	0x80	GOOD_NON_SPECIFIC
Initialization time exceeded	0x80	GOOD_NON_SPECIFIC
Initialization/solenoid valve	0x80	GOOD_NON_SPECIFIC
Transit time too short	0x80	GOOD_NON_SPECIFIC
Pin position	0x80	GOOD_NON_SPECIFIC
Initialization running	0x80	GOOD_NON_SPECIFIC
Hardware errors		
x signal	0x0C	BAD_DEVICE_FAILURE
i/p converter	0x0C	BAD_DEVICE_FAILURE
Hardware	0x0C	BAD_DEVICE_FAILURE
Data memory	0xA4	GOOD_MAINT_REQ

Measured value status and valve diagnostics

Fault/diagnostic alarm	Value (hex)	Status alarm acc. to Profile 3.01
Test calculation	0x0C	BAD_DEVICE_FAILURE
Program loading error	0x0C	BAD_DEVICE_FAILURE
Data errors		
Control parameter	0xA4	GOOD_MAINT_REQ
Potentiometer parameter	0xA4	GOOD_MAINT_REQ
Calibration error	0xA4	GOOD_MAINT_REQ
Internal device error	0x0C	BAD_DEVICE_FAILURE
General parameters	0xA4	GOOD_MAINT_REQ
Options parameter	0xA4	GOOD_MAINT_REQ
Info parameter	0xA4	GOOD_MAINT_REQ
PA parameter	0xA4	GOOD_MAINT_REQ
Diagnostic parameter	0xA4	GOOD_MAINT_REQ
Extended diagnostics – EXPERTplus		
Air supply		
Perhaps modified (TEST)	0x80	GOOD_NON_SPECIFIC
Perhaps not enough (TEST)	0x80	GOOD_NON_SPECIFIC
Perhaps not enough	0x80	GOOD_NON_SPECIFIC
Working at full capacity	0x80	GOOD_NON_SPECIFIC
Working at full capacity (TEST)	0x80	GOOD_NON_SPECIFIC
Perhaps modified	0x80	GOOD_NON_SPECIFIC
Actuator springs		
Perhaps spring stiffness reduced (TEST)	0x80	GOOD_NON_SPECIFIC
Perhaps bias reduced (TEST)	0x80	GOOD_NON_SPECIFIC
Perhaps bias increased (TEST)	0x80	GOOD_NON_SPECIFIC
Working at full capacity	0x80	GOOD_NON_SPECIFIC
Working at full capacity (TEST)	0x80	GOOD_NON_SPECIFIC
Shifting working range		
Shifting working range close	0x80	GOOD_NON_SPECIFIC
Shifting working range open	0x80	GOOD_NON_SPECIFIC

Fault/diagnostic alarm	Value (hex)	Status alarm acc. to Profile 3.01
Friction		
Much higher over whole range	0x80	GOOD_NON_SPECIFIC
Much lower over whole range	0x80	GOOD_NON_SPECIFIC
Much higher over partial range	0x80	GOOD_NON_SPECIFIC
Much lower over partial range	0x80	GOOD_NON_SPECIFIC
Much higher over whole range (TEST)	0x80	GOOD_NON_SPECIFIC
Much lower over whole range (TEST)	0x80	GOOD_NON_SPECIFIC
Much higher over partial range (TEST)	0x80	GOOD_NON_SPECIFIC
Much lower over partial range (TEST)	0x80	GOOD_NON_SPECIFIC
Leakage in pneumatics		
Perhaps existing (TEST)	0x80	GOOD_NON_SPECIFIC
Perhaps existing	0x80	GOOD_NON_SPECIFIC
Perhaps too large (TEST)	0x80	GOOD_NON_SPECIFIC
Perhaps too large	0x80	GOOD_NON_SPECIFIC
Limit range		
Down	0x80	GOOD_NON_SPECIFIC
Up	0x80	GOOD_NON_SPECIFIC
Modification impossible	0x80	GOOD_NON_SPECIFIC
Dynamic stress factor		
Load factor > 90 %	0x80	GOOD_NON_SPECIFIC
Inner leakage (shut-off)		
Perhaps existing	0x80	GOOD_NON_SPECIFIC
Perhaps larger than in original state (TEST)	0x80	GOOD_NON_SPECIFIC
Perhaps larger than original state	0x80	GOOD_NON_SPECIFIC
External leakage		
Perhaps soon expected	0x80	GOOD_NON_SPECIFIC
Perhaps existing	0x80	GOOD_NON_SPECIFIC
Existing	0x80	GOOD_NON_SPECIFIC

Fault/diagnostic alarm	Value (hex)	Status alarm acc. to Profile 3.01
Observing end position		
Zero point shift monotonously downwards, average value above reference lines	0x80	GOOD_NON_SPECIFIC
Zero point shift monotonously upwards, average value above reference lines	0x80	GOOD_NON_SPECIFIC
Zero point alternating, average value above reference lines	0x80	GOOD_NON_SPECIFIC
Zero point shift monotonously downwards, average value below reference lines	0x80	GOOD_NON_SPECIFIC
Zero point shift monotonously upwards, average value below reference lines	0x80	GOOD_NON_SPECIFIC
Zero point alternating, average value below reference lines	0x80	GOOD_NON_SPECIFIC
Connection positioner/valve		
No optimal travel transmission (TEST)	0x80	GOOD_NON_SPECIFIC
Perhaps loose	0x80	GOOD_NON_SPECIFIC
Perhaps limit. range	0x80	GOOD_NON_SPECIFIC
Perhaps loose (TEST)	0x80	GOOD_NON_SPECIFIC
Range		
Mostly near closing position	0x80	GOOD_NON_SPECIFIC
Mostly near max. opening	0x80	GOOD_NON_SPECIFIC
Mostly closing position	0x80	GOOD_NON_SPECIFIC
Mostly max. opening	0x80	GOOD_NON_SPECIFIC
Temperature monitoring		
Lower limit exceeded	0x80	GOOD_NON_SPECIFIC
Higher limit exceeded	0x80	GOOD_NON_SPECIFIC
Reference run		
Reference test aborted	0x80	GOOD_NON_SPECIFIC
ESD		
Movement actuator possible -> Masking redundant	0x80	GOOD_NON_SPECIFIC
Movement actuator impossible	0x80	GOOD_NON_SPECIFIC
Solenoid valve error	0x80	GOOD_NON_SPECIFIC

Fault/diagnostic alarm	Value (hex)	Status alarm acc. to Profile 3.01
Function activated		
Initialization active	0x80	GOOD_NON_SPECIFIC
Diagnostic function activated	0x80	GOOD_NON_SPECIFIC

5.4 Status alarms according to Profile 3.01 Condensed Status

Fault/diagnostic alarm		Default setting acc. to Pro- file 3.01 Condensed Status	Classified		Diagnosis
			Yes	No	
Operational error					
Device not initialized	0x24	BAD_MAINT_ALARM		•	DIA_INIT_ERR
Solenoid valve active	0x80	GOOD_NON_SPECIFIC	•		–
Total valve travel exceeded	0xA4	GOOD_MAINT_REQ	•		DIA_MAINTENANCE
Control loop error	0xA4	GOOD_MAINT_REQ	•		DIA_MAINTENANCE
Zero point error	0xA4	GOOD_MAINT_REQ	•		DIA_ZERO_ERR
Autocorrection	0x80	GOOD_NON_SPECIFIC	•		DIA_MAINTENANCE DIA_MEM_CHECKSUM
Fatal error	0x24	BAD_MAINT_ALARM		•	DIA_HW_ELECTR
Extended diagnostics available	0x80	GOOD_NON_SPECIFIC		•	DIA_MAINTENANCE EXTENSION_AVAILABLE
No emergency mode	0xA4	GOOD_MAINT_REQ	•		DIA_MEM_CHECKSUM
Temperature < –40 °C	0x80	GOOD_NON_SPECIFIC	•		–
Temperature > 80 °C	0x80	GOOD_NON_SPECIFIC	•		–
Initialization error					
x > range	0xA4	GOOD_MAINT_REQ	•		DIA_INIT_ERR
Delta x < range	0xA4	GOOD_MAINT_REQ	•		DIA_INIT_ERR
Incorrect attachment (mechanics/pneumatics)	0xA4	GOOD_MAINT_REQ	•		DIA_INIT_ERR
Initialization time exceeded	0xA4	GOOD_MAINT_REQ	•		DIA_INIT_ERR
Solenoid valve initialization	0xA4	GOOD_MAINT_REQ	•		DIA_INIT_ERR
Transit time too short	0xA4	GOOD_MAINT_REQ	•		DIA_INIT_ERR
Pin position	0xA4	GOOD_MAINT_REQ	•		DIA_INIT_ERR

Measured value status and valve diagnostics

Fault/diagnostic alarm		Default setting acc. to Pro-file 3.01 Condensed Status	Classified		Diagnosis
			Yes	No	
Initialization running	0xA4	GOOD_MAINT_REQ	•		–
Hardware error					
x signal	0xA8	GOOD_MAIN_DEMANDED	•		DIA_MEASUREMENT
i/p converter	0x24	BAD_MAINT_ALARM		•	DIA_HW_ELECTR
Hardware	0x24	BAD_MAINT_ALARM		•	DIA_HW_ELECTR
Data memory	0xA4	GOOD_MAINT_REQ		•	DIA_MEM_CHECKSUM
Test calculation	0x24	BAD_MAINT_ALARM		•	DIA_MEM_CHECKSUM
Program loading error	0x24	BAD_MAINT_ALARM		•	DIA_MEM_CHECKSUM
Data error					
Control parameter	0xA4	GOOD_MAINT_REQ	•		DIA_MEM_CHECKSUM
Potentiometer parameter	0xA4	GOOD_MAINT_REQ	•		DIA_MEM_CHECKSUM
Calibration error	0xA4	GOOD_MAINT_REQ	•		DIA_MEM_CHECKSUM
Internal device error	0xA4	GOOD_MAINT_REQ	•		DIA_MEM_CHECKSUM
General parameters	0xA4	GOOD_MAINT_REQ	•		DIA_MEM_CHECKSUM
Options parameters	0xA4	GOOD_MAINT_REQ	•		DIA_MEM_CHECKSUM
Info parameter	0xA4	GOOD_MAINT_REQ	•		DIA_MEM_CHECKSUM
PA parameter	0xA4	GOOD_MAINT_REQ	•		DIA_MEM_CHECKSUM
Diagnostic parameter	0xA4	GOOD_MAINT_REQ	•		DIA_MEM_CHECKSUM
Extended diagnostics EXPERTplus					
Air supply					
Perhaps modified (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps not enough (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps not enough	0x80	GOOD_NON_SPECIFIC	•		–
Working at full capacity	0x80	GOOD_NON_SPECIFIC	•		–
Working at full capacity (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps modified	0x80	GOOD_NON_SPECIFIC	•		–
Actuator springs					
Perhaps spring stiffness reduced (TEST)		GOOD_NON_SPECIFIC	•		–

Fault/diagnostic alarm		Default setting acc. to Profile 3.01 Condensed Status	Classified		Diagnosis
			Yes	No	
Perhaps bias reduced (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps bias increased (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Working at full capacity	0x80	GOOD_NON_SPECIFIC	•		–
Working at full capacity (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Shifting working range					
Shifting working range close position	0x80	GOOD_NON_SPECIFIC	•		–
Shifting working range max. open	0x80	GOOD_NON_SPECIFIC	•		–
Friction					
Much higher over whole range	0x80	GOOD_NON_SPECIFIC	•		–
Much lower over whole range	0x80	GOOD_NON_SPECIFIC	•		–
Much higher over partial range	0x80	GOOD_NON_SPECIFIC	•		–
Much lower over partial range	0x80	GOOD_NON_SPECIFIC	•		–
Much higher over whole range (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Much lower over whole range (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Much higher over partial range (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Much lower over partial range (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Leakage pneumatics					
Perhaps existing (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps existing	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps too large (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps too large	0x80	GOOD_NON_SPECIFIC	•		–
Limit range					
Down	0x80	GOOD_NON_SPECIFIC	•		–
Up	0x80	GOOD_NON_SPECIFIC	•		–
Modification impossible	0x80	GOOD_NON_SPECIFIC	•		–
Dynamic stress factor					
Load factor > 90 %	0x80	GOOD_NON_SPECIFIC	•		–
Inner leakage (shut-off)					
Perhaps existing	0x80	GOOD_NON_SPECIFIC	•		–

Status alarms according to Profile 3.01 Condensed Status

Fault/diagnostic alarm		Default setting acc. to Profile 3.01 Condensed Status	Classified		Diagnosis
			Yes	No	
Perhaps larger than in original state (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps larger than original state	0x80	GOOD_NON_SPECIFIC	•		–
External leakage					
Perhaps soon expected	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps existing	0x80	GOOD_NON_SPECIFIC	•		–
Existing	0x80	GOOD_NON_SPECIFIC	•		–
Observing end position					
Zero point shift monotonously downwards, average value above reference lines	0x80	GOOD_NON_SPECIFIC	•		–
Zero point shift monotonously upwards, average value above reference lines	0x80	GOOD_NON_SPECIFIC	•		–
Zero point alternating, average value above reference lines	0x80	GOOD_NON_SPECIFIC	•		–
Zero point shift monotonously downwards, average value below reference lines	0x80	GOOD_NON_SPECIFIC	•		–
Zero point shift monotonously upwards, average value below reference lines	0x80	GOOD_NON_SPECIFIC	•		–
Zero point alternating, average value below reference lines	0x80	GOOD_NON_SPECIFIC	•		–
Connection positioner/valve					
No optimal travel transmission (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps loose	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps limit. range	0x80	GOOD_NON_SPECIFIC	•		–
Perhaps loose (TEST)	0x80	GOOD_NON_SPECIFIC	•		–
Range					
Mostly near closing position	0x80	GOOD_NON_SPECIFIC	•		–
Mostly near max. opening	0x80	GOOD_NON_SPECIFIC	•		–
Mostly closing position	0x80	GOOD_NON_SPECIFIC	•		–

Fault/diagnostic alarm		Default setting acc. to Profile 3.01 Condensed Status	Classified		Diagnosis
			Yes	No	
Mostly max. opening	0x80	GOOD_NON_SPECIFIC	•		–
Temperature monitoring					
Lower limit exceeded	0x80	GOOD_NON_SPECIFIC	•		–
Higher limit exceeded	0x80	GOOD_NON_SPECIFIC	•		–
Reference run					
Reference test aborted	0x80	GOOD_NON_SPECIFIC	•		–
ESD					
Movement actuator possible -> Masking redundant	0x80	GOOD_NON_SPECIFIC	•		–
Movement actuator impossible	0x80	GOOD_NON_SPECIFIC	•		–
Solenoid valve error	0x80	GOOD_NON_SPECIFIC	•		–
Function activated					
Initialization active	0xBC	GOOD_NON_SPECIFIC	• 1)		–
Diagnostic function active	0xBC	GOOD_NON_SPECIFIC	• 1)		–

¹⁾ Can be classified either as GOOD_FUNCTION_CHECK or BAD_FUNCTION_CHECK in firmware K 1.10 and higher. See FEATURE_SELECT parameter on page 54.

5.5 Standard diagnostics with PROFIBUS-DP protocol

Generated alarms are classified and summarized in the PROFIBUS Profile 3.01 and 'Condensed status and diagnostic messages' extension.

The diagnostic approach complying with PROFIBUS-DP includes the following types of diagnostic transfer:

- ▶ The DP master class 1 reads the diagnosis of the DP slave while the cyclic data exchange is being set up.
- ▶ In case of an active diagnostic alarm, the slave responds during the data exchange with a high-prioritized response telegram.
The master requests a diagnosis as a result to continue afterwards with the normal data exchange.

The diagnostic alarm is made up of the standard diagnosis according to PROFIBUS-DP protocol and the user-specific diagnosis. The first six octets of the diagnostic alarm are assigned to the standard diagnosis, essentially providing a statement about the state of the cyclic connection. Special attention is given to the DIAG.ext bit (octet 1). The slave uses this bit to indicate to the master that the output data are invalid. As a result, the master interrupts the cyclic data exchange to read out the diagnostic data. The master first returns to cyclic data exchange when the DIAG.ext bit is reset by the slave.

If, however, the DIAG.ext bit is set to 0, the existing data are treated as status information by the system. For the Type 3730-4 Positioner, this behavior can be determined by the FEATURE_SELECT parameter. By selecting the option "DIA_MAINTENANCE_ALARM sets DIAG_EXT bit", the DIAG_EXT bit is set when the DIA_MAINTENANCE_ALARM bit has been determined. Deactivate this option if all the data of the positioner should be used as status information.

On using the Profile 3.01 the DIAG_EXT bit can be set when the measured value status has been assigned to BAD_DEVICE_FAILURE. This only happens when the following errors, which lead to device failure, occur:

- ▶ Test calculation
- ▶ Fatal error
- ▶ Program loading error
- ▶ No production calibration
- ▶ Hardware
- ▶ i/p converter

On using the 'Condensed status and diagnostic messages' extension, the assignment can be selected as required.

The first four bytes of the manufacturer-specific diagnosis are used for diagnostic alarms according to Profile 3.01. On using the 'Condensed status and diagnostic messages' extension, these condensed diagnostic alarms are also included in these bytes. The manufacturer-specific diagnosis listed in the following table is transmitted in the eleventh byte and above. The contents of both parameters of the Physical Block, DIAGNOSIS and DIAGNOSIS_EXT, are sent.

Standard diagnosis according to PROFIBUS-DP protocol

Regardless of whether the positioner has been integrated according to Profile 3.01 or using manufacturer specifications, the diagnosis can be restricted to six bytes. For this purpose, the FEATURE_SELECT parameter provides the option "Use DP standard diagnosis (6 bytes)" (see page 54).

The default setting causes the positioner to provide a manufacturer-specific diagnosis of 26 bytes and a diagnosis of 14 bytes according to Profile 3.01.

Octet	Bit	Explanation	Note
1	0...7	Standard slave diagnostics	
2	0...7		
3	0...7		
4	0...7		
5	0...7		
6	0...7		
7	0...7	Definition of manufacturer-specific diagnostic alarms	
8	0...7		
9	0...7		
10	0...7		
11	0	DIA_HW_ELECTR (hardware fault in the electronics)	
	1	DIA_HW_MECH (hardware fault in the mechanics)	
	2	Not assigned	
	3	DIA_TEMP_ELECTR (temperature of electronics too high)	
	4	DIA_MEM_CHCKSUM (checksum error in data memory)	
	5	DIA_MEASUREMENT (error in measurement)	
	6	DIA_NOT_INIT (device not initialized/self-calibration not performed)	
	7	DIA_INIT_ERR (self-calibration faulty)	
12	0	DIA_ZERO_ERR (zero point error, final position)	
	1	–	
	2	DIA_CONF_INVALID (configuration invalid/invalid address)	
	3	DIA_WARMSTART (restart-up/warm start performed)	
	4	DIA_COLDSTART (new start-up/cold start performed)	
	5	DIA_MAINTENANCE (maintenance required)	1
	6	DIA_CHARACT (characteristic invalid)	
	7	IDENT_NUMBER_VIOLATION (selected ID no. has not been implemented by the device yet)	
13	0	DIA_MAINTENANCE_ALARM (device error exists)	1
	1	DIA_MAINTENANCE_DEMANDED (maintenance demanded)	1
	2	DIA_FUNCTION_CHECK (device in function check, in simulation or in MODE_LO)	1
	3	DIA_INV_PRO_COND (process-related fault/out of specification)	

Octet	Bit	Explanation	Note
13	4...7	Reserved in Profile 3.01	
14	0...6	Reserved in Profile 3.01	
	7	EXTENSION_AVAILABLE (further diagnostic information available)	
15 ³⁾	0	Device not initialized	
	1	Solenoid valve active	
	2	Total valve travel limit exceeded (see Code 24)	
	3	Control loop (see Code 57)	
	4	Zero point (see Code 58)	
	5	Autocorrection (see Code 59)	
	6	Fatal error (see Code 60)	
	7	Extended diagnostics (only available with EXPERT ⁺)	2
16 ³⁾	0	x > range (see Code 50)	
	1	Delta x < range (see Code 51)	
	2	Attachment (see Code 52)	
	3	Initialization time exceeded (see Code 53)	
	4	Initialization/solenoid valve (see Code 54)	
	5	Travel time too short (see Code 55)	
	6	Pin position (see Code 56)	
16 ³⁾	7	Test or calibration running	
17 ³⁾	0	x signal (see Code 62)	
	1	i/p converter (see Code 64)	
	2	Hardware (see Code 65)	
	3	Control parameter (see Code 68)	
	4	Potentiometer parameter (see Code 69)	
	5	Calibration parameter (see Code 70)	
	6	Internal device error 1 (see Code 73)	
	7	General parameter (see Code 71)	

Octet	Bit	Explanation	Note
18 ³⁾	0	No emergency mode (see Code 76)	
	1	Program load error (see Code 77)	
	2	Options parameter (see Code 78)	
	3	Info parameter (see Code 75)	
	4	Data memory (see Code 66)	
	5	Control calculation (see Code 67)	
	6	PA parameter (see Code 74)	
	7	Diagnostic parameter (see Code 80)	
19 ³⁾	0	Reset communication controller	
	1	Reset SPC4 (reset comm HW interface)	
	2	Binary input 2 deactivated	
	3	Reset closed-loop controller	
	4...7	Not assigned	
20 ³⁾	0	Air supply: Perhaps modified (TEST)	2
	1	Air supply: Perhaps not enough (TEST)	2
	2	Air supply: Perhaps not enough	2
	3	Air supply: At full capacity	2
	4	Air supply: At full capacity (TEST)	2
	5	Air supply: Perhaps modified	2
	6	Actuator spring: Stiffness reduced (TEST)	2
	7	Actuator spring: Pretensioning reduced (TEST)	2
21 ³⁾	0	Actuator spring: Perhaps pretensioning increased (TEST)	2
	1	Actuator spring: Working at full capacity	2
	2	Actuator spring: Working at full capacity (TEST)	2
	3	Shifting working range: Close	2
	4	Shifting working range: Open	2
	5	Friction: Higher over whole range	2
	6	Friction: Lower over whole range	2
	7	Friction: Higher over partial range	2

Octet	Bit	Explanation	Note
22 ³⁾	0	Friction: Lower over partial range	2
	1	Friction: Higher whole range (TEST)	2
	2	Friction: Lower whole range (TEST)	2
	3	Friction: Higher over partial range (TEST)	2
	4	Friction: Lower over partial range (TEST)	2
	5	Leakage in pneumatics: Perhaps existing (TEST)	2
	6	Leakage in pneumatics: Perhaps existing	2
	7	Leakage in pneumatics: Too large (TEST)	2
23 ³⁾	0	Leakage in pneumatics: Perhaps too large	2
	1	Limit range: Down	2
	2	Limit range: Up	2
	3	Limit range: Modification not possible	2
	4	Dynamic stress factor > than 90 %	2
	5	Inner leakage (shut-off): Perhaps larger than in original state	2
	6	Inner leakage (shut-off): Perhaps larger than original state (TEST)	2
	7	Inner leakage (shut-off): Perhaps present	2
24 ³⁾	0	External leakage: Perhaps soon to be expected	2
	1	External leakage: Perhaps existing	2
	2	External leakage: Existing	2
	3	Zero point shift monotonously downwards, average value above reference lines	2
	4	Zero point shift monotonously upwards, average value above reference lines	2
	5	Zero point shift alternating, average value above reference lines	2
24 ³⁾	6	Zero point shift monotonously downwards, average value below reference lines	2
	7	Zero point shift monotonously upwards, average value below reference lines	2

Octet	Bit	Explanation	Note
25 ³⁾	0	Zero point shift alternating, average value below reference lines	2
	1	Attachment between positioner and valve: Travel transmission not optimal (TEST)	2
	2	Attachment between positioner and valve: Perhaps loose	2
	3	Attachment between positioner and valve: Perhaps working range limited	2
	4	Attachment between positioner and valve: Perhaps loose (TEST)	2
	5	Working range: Mostly near closing position	2
	6	Working range: Mostly near max. opening	2
	7	Working range: Mostly closing position	2
26 ³⁾	0	Working range: Mostly max. opening	2
	1	Temperature below -40 °C	2
	2	Temperature above +80 °C	2
	3	Reference test aborted	2
	4	ESD: Movement actuator possible	2
	5	ESD: Movement actuator not possible	2
	6	ESD: Solenoid valve error	2
	7	Not assigned	2

- ¹⁾ Only on using the 'Condensed status und diagnostic messages' profile extension
The following diagnostic alarms indicate the condensed state (refer to section 5.2):

DIA_MAINTENANCE_ALARM: Maintenance alarm
DIA_MAINTENANCE_DEMAND: Maintenance demanded
DIA_MAINTENANCE: Maintenance required
DIA_FUNCTION_CHECK: Function check
DIA_INV_PRO_COND: Process-related fault/outside of specification

- ²⁾ Diagnostic alarm of the extended EXPERTplus diagnostics
³⁾ The default setting causes the positioner to provide a manufacturer-specific diagnosis of 26 bytes and a diagnosis of 14 bytes according to Profile 3.01

6 Acyclic data exchange

Note: All parameters in the parameter list on page 38 onwards, which are not marked, are included in the acyclic data exchange.

The acyclic data exchange complying to DP-V1 with a master class 2 (MS2) is mainly used for commissioning, parameter settings and for diagnostic purposes.

The DD (Device Description) file can be downloaded from the SAMSON Internet site (www.samson.de) to configure parameters in Type 3730-4 Positioner over Siemens PDM (Process Device Manager). Some parameters make it necessary to use the corresponding DD revision as specified in the table below.

Communication firmware	DD revision
K 1.00 to K 1.10	1
K 1.11 to K 1.17	2
K 2.00 and higher	3

7 Partial stroke testing over DP-V0

The partial stroke test (PST) can be started in the following ways:

Operating mode	Test mode PST	Start over binary input	Start with auto test time	Start over reference variable
AUTO	PST MAN	•	–	• ¹⁾
	PST AUTO	•	•	• ¹⁾
MAN	PST MAN	•	–	–
	PST AUTO	•	•	–

¹⁾ The partial stroke test is started by defining SP with status value (9C hexadecimal). This function must be enabled by the FEATURE_SELECT parameter.

The partial stroke test cannot be started when the fail-safe action (FSAFE_TYPE) is active.

The partial stroke test is analyzed by the DI Function Block (Discrete Input) of the positioner. In this case, one of the following alarms is assigned to the discrete data:

0: Test not performed successfully

1: Test OK

2: PST has not been performed

3: Test analysis not successful

For further analysis, the condensed state can be analyzed with the second DI Function Block (see section 5.2).

Note: Partial stroke testing is described in detail in the Operating Instructions EB 8389 EN on EXPERTplus valve diagnostics.

8 Parameter lists

Legend

The parameter index is written in parentheses after the parameter description in the following tables.

Class of memory:	S	Static parameter
	D	Dynamic parameter
	N	Non-volatile parameter

Read/write capability: (access)	r	Read capability
	w	Write capability

Supported modes:	O	O/S (out of service) mode
	M	MAN mode
	A	AUTO mode
	CAS	Cascade mode
	RCAS	Remote cascade mode
	ALL	O/M/A/CAS/RCAS

Note:

- Parameters marked with an asterisk (*) are included in the cyclic data exchange. All other parameters are included in the acyclic data exchange.
 - Values/settings in brackets [] are default settings.
 - More information on the parameters in the EXPERTplus diagnostics can be found in the Operating Instructions EB 8389 EN.
-

8.1 Physical Block, Slot 0 · Profile-specific parameters

ALERT_KEY (20)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Identification number of the plant section

ALM_SUM (23)

Storage class: – · Read capability (r)

Current state of process alarms in the Physical Block.

BLOCK_OBJ (16)

Storage class: – · Read capability (r)

COND_STATUS_DIAG (43)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Select whether the positioner is to be used

- according to Profile 3.01 or
- with condensed state

A change is not permissible in the DATA_EXCHANGE (cyclic) state.

DESCRIPTOR (36)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Any desired text to describe the application. The text is saved in the field device.

- Max. 32 characters, [no text]

DEVICE_CERTIFICATION (33)

Storage class: – · Read capability (r)

Certification · Specifies whether explosion protection certification is available for Type 3730-4.

DEVICE_ID (27)

Storage class: – · Read capability (r)

Positioner's model number

DEVICE_INSTAL_DATE (38)

Storage class: N · Read/write capability (r/w) · Supported modes: ALL

Date when the positioner was installed

DEVICE_MAN_ID (26)

Storage class: – · Read capability (r)

Manufacturer of the positioner

DEVICE_MESSAGE (37)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Any desired text. The text is saved in the field device.

- Max. 32 characters, [no text]

DEVICE_SER_NUM (28)

Storage class: – · Read capability (r)

Positioner's serial number: Enables the clear identification of the field device in combination with descriptions entered in DEVICE_MAN_ID and DEVICE_ID

DIAG_EVENT_SWITCH (44)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Classification of diagnostic and status alarms

DIAGNOSIS (29)

Storage class: – · Read capability (r)

Detailed information of the device, coded bitwise. More than one alarm possible at one time.
Alarms remain active as long as the event still exists (static alarms)

Bit: 0 = false · 1 = true

Byte	Bit	According to PA V3.01	Description
0	0	DIA_HW_ELECTR	Hardware error in the electronics
0	1	DIA_HW_MECH	Hardware error in the mechanics
0	2	–	
0	3	DIA_TEMP_ELECTR	Temperature in the electronics too high
0	4	DIA_MEM_CHKSUM	Checksum error in the data memory
0	5	DIA_MEASUREMENT	Error occurred in measurement
0	6	DIA_NOT_INIT	Device not initialized
0	7	DIA_INIT_ERR	Initialization incorrect
1	0	DIA_ZERO_ERR	Zero point error (end position)
1	1	–	
1	2	DIA_CONF_INVALID	Configuration invalid/invalid address
1	3	DIA_WARMSTART	Restart (warm start) performed
1	4	DIA_COLDSTART	New start-up (cold start) performed
1	5	DIA_MAINTENANCE	Maintenance required
1	6	DIA_CHARACTER	Invalid characteristic
1	7	IDENT_NUMBER_VIOLATION	The ID number selected could not yet be implemented by the device

Byte	Bit	According to PA V3.01	Description
2	0	DIA_MAINTENANCE_ALARM	Device error exists
2	1	DIA_MAINTENANCE_DEMANDED	Maintenance demanded
2	2	DIA_FUNCTION_CHECK	Device performing a function check or it is in simulation or in MODE_LO
2	3	DIA_INV_PRO_COND	The current process conditions do not allow a valid calculation of values
2	4...7	–	
3	0...7	–	
4	0...6	–	
4	7	EXTENSION_AVAILABLE	Further diagnostic data available see DIAGNOSIS_EXT/ DIAGNOSIS_EXTENSION_2

DIAGNOSIS_EXT (30)

Storage class: – · Read capability (r)

Byte	Bit	Description
0	0	Device not initialized
0	1	Solenoid valve active
0	2	LV total valve travel (Code 24)
0	3	Control loop error (Code 57)
0	4	Zero point error (Code 58)
0	5	Autocorrection (Code 59)
0	6	Fatal error (Code 60)
0	7	Extended diagnostics available · Only with EXPERTplus
1	0	x > range (Code 50)
1	1	Delta x < range (Code 51)
1	2	Attachment (Code 52)
1	3	Initialization time exceeded (Code 53)
1	4	Initialization solenoid valve (Code 54)
1	5	Transit time too short (Code 55)
1	6	Pin position (Code 56)
1	7	Test or calibration in progress
2	0	x signal (Code 62)
2	1	i/p converter (Code 64)
2	2	Hardware error (Code 65)
2	3	Control parameter error (Code 68)
2	4	Potentiometer parameter error (Code 69)
2	5	Calibration (Code 70)
2	6	No production calibration
2	7	General parameters (Code 71)

Byte	Bit	Description	
3	0	Emergency mode · No error	(Code 76)
3	1	Program loading error	(Code 77)
3	2	Options parameter	(Code 78)
3	3	Info parameter	(Code 75)
3	4	Data memory	(Code 66)
3	5	Test calculation	(Code 67)
3	6	PA parameters	(Code 74)
3	7	Diagnostic parameters	(Code 80)
4	0	Reset communication controller	
4	1	Reset comm HW interface (bus connection error alarm)	
4	2	Bin2 deactivated	
4	3	Reset closed-loop controller	
4	4...7	–	
5	0	Supply air: Perhaps modified (TEST)	
5	1	Supply air: Perhaps insufficient (TEST)	
5	2	Supply air: Perhaps insufficient	
5	3	Supply air: At full capacity	
5	4	Supply air: At full capacity (TEST)	
5	5	Supply air: Perhaps modified	
5	6	Actuator springs: Spring stiffness reduced (TEST)	
5	7	Actuator springs: Pre-tensioning reduced (TEST)	

DIAGNOSIS_MASK (31)

Storage class: – · Read capability (r)

Availability of the status bit in DIAGNOSIS parameter

- Bit = 0: Status not available
- Bit = 1: Status available

DIAGNOSIS_MASK_EXT (32)

Storage class: – · Read capability (r)

Availability of the status bit in DIAGNOSIS_EXT parameter

- Bit = 0: Status not available
- Bit = 1: Status available

FACTORY_RESET (35)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Command to reset the positioner to default settings

- 1 (0x0001) · Resets the start-up, identification and function block parameters as well as the status classification. After performing a reset, the positioner needs to be re-initialized!
- 2506 (0x09CA) · Warm start

- 2712 (0x0A98) · Resets the bus address to the default value of 126. The positioner restarts after the reset is performed. The bus address is not reset when the identification parameters are reset.
Note: *The bus address can only be reset using this command in firmware version K 1.11 and higher.*
- 32768 (0x8000) · Resets the identification parameters
- 32769 (0x8001) · Resets the start-up and function block parameters as well as the status classification. After performing a reset, the positioner needs to be re-initialized!
- 32770 (0x8002) · Resets the start-up parameters. After performing a reset, the positioner needs to be re-initialized!

Identification parameters (without bus address, valve and actuator data) include:

- Physical Block: CONFIG_BINARY_INPUT_2¹⁾, DEVICE_INSTAL_DATE, DEVICE_MESSAGE, DESCRIPTOR, IDENT_LIMIT_SWITCHES¹⁾, IDENT_NUMBER_SELECTOR, TAG_DESC, TEXT_INPUT 1...5¹⁾
- AO Function Block: TAG_DESC
- AO Transducer Block: ACTUATOR_MAN, ACTUATOR_SER_NUM, ADD_GEAR_ID, ADD_GEAR_INST_DATE, ADD_GEAR_MAN, ADD_GEAR_SER_NUM, DEVICE_CALIB_DATE, DEVICE_CHARACTER¹⁾, DEVICE_CONFIG_DATE, TAG_DESC VALVE_MAINT_DATE, VALVE_MAN, VALVE_SER_NUM, VALVE_TYPE
- DI1/2 Function Block: TAG_DESC
- DI1/2 Transducer Block: SENSOR_ID, SENSOR_MAN, SENSOR_SER_NUM, TAG_DESC

Start-up parameters (status classification, analysis of condensed state (Code 36) include:

- Physical Block: COND_STATUS_DIAG, DIAG_EVENT_SWITCH, DIAG_EVENT_SWITCH_2¹⁾, FEATURE

Function block parameters include:

- Physical Block: ALERT_KEY, FACTORY_RESET, FEATURE_SELECT, LOCAL_OP_ENA, ST_REV, STRATEGY, TARGET_MODE, WRITE_LOCKING
- AO Function Block: ALERT_KEY, BATCH, CHECK_BACK_OPT, FSAFE_TIME, FSAFE_TYPE, FSAFE_VALUE, IN_CHANNEL, INCREASE_CLOSE, OUT_CHANNEL, OUT_SCALE, PV_SCALE, SIMULATE, ST_REV, STRATEGY, TARGET_MODE
- AO Transducer Block: ACTUATOR_ACTION, ALERT_KEY, CHARACTER¹⁾, SELF_CALIB_CMD, SELF_CALIB_STATUS, ST_REV, STRATEGY, TARGET_MODE
- DI1/2 Function Block: ALERT_KEY, BATCH, CHANNEL, FSAFE_TYPE, FSAFE_VAL_D, INVERT, SIMULATE, ST_REV, STRATEGY, TARGET_MODE
- DI1/2 Transducer Block: ALERT_KEY, SENSOR_WIRE_CHECK, ST_REV, STRATEGY, TARGET_MODE

¹⁾ Manufacturer-specific parameter

FEATURE (42)

Storage class: – · Read capability (r)

Optional existence and state of the feature integrated into the device

Supported/enabled (**Note:** The structure for supported and enabled are identical!)

- 0 = Not supported/not enabled
- 1 = Supported/enabled

Byte	Bit	Element	[Default]	Description
0	0	CONDENSED_STATUS	[1]	Status and diagnosis complying with 'condensed status and diagnostic messages' extension Status and diagnostics acc. to Profile 3.01
0	1	EXPANDED_STATUS/DIAGNOSIS	[1]	
0	2...7	Reserved	[0]	
1	0...7	Reserved	[0]	
2	0...7	Reserved	[0]	
3	0...7	Reserved	[0]	

HARDWARE_REVISION (25)

Storage class: – · Read capability (r)

Hardware version (electronics/mechanics)

HW_WRITE_PROTECTION (41)

Storage class: – · Read capability (r)

Position of the write protection switch on the device

- 0 · Not write-protected
- 1 · Write-protected

IDENT_NUMBER_SELECTOR (40)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Used to select the ID number

- 0 · Profile-specific ID (0x9710), PA139710.GSD
- 1 · Manufacturer-specific ID (0x071D), SAMS071D.GSD

LOCAL_OP_ENA (39)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Local operation enabled

If communication fails for a time longer than 30 seconds, local operation will be enabled automatically

- 0 · Disabled
- 1 · Enabled

MODE_BLK (22)

Storage class: – · Read capability (r)

Current mode of the Physical Block

SOFTWARE_REVISION (24)

Storage class: – · Read capability (r)

Firmware version (communication → Code 48 F0 /control→ Code 43)

ST_REV (17)

Storage class: – · Read capability (r)

Revision level of static data

STRATEGY (19)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Grouping to allow faster processing of blocks

Blocks are grouped by entering the same value in the STRATEGY parameter of each block.

TAG_DESC (18)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Used to enter a user-selected text to identify and assign blocks

- Max. 32 characters, [no text]

TARGET_MODE (21)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Target mode

WRITE_LOCKING (34)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Software write protection

- 0 · Writing access locked
- 2457 · Writing access permitted

Index and parameter assignment: Physical Block, Slot 0 · Profile-specific parameters

Index	Parameter
16	BLOCK_OBJ
17	ST_REV
18	TAG_DESC
19	STRATEGY
20	ALERT_KEY
21	TARGET_MODE
22	MODE_BLK
23	ALM_SUM
24	SOFTWARE_REVISION
25	HARDWARE_REVISION
26	DEVICE_MAN_ID
27	DEVICE_ID
28	DEVICE_SER_NUM
29	DIAGNOSIS
30	DIAGNOSIS_EXT

Index	Parameter
31	DIAGNOSIS_MASK
32	DIAGNOSIS_MASK_EXT
33	DEVICE_CERTIFICATION
34	WRITE_LOCKING
35	FACTORY_RESET
36	DESCRIPTOR
37	DEVICE_MESSAGE
38	DEVICE_INSTAL_DATE
39	LOCAL_OP_ENA
40	IDENT_NUMBER_SELECTOR
41	HW_WRITE_PROTECTION
42	FEATURE
43	COND_STATUS_DIAG
44	DIAG_EVENT_SWITCH

8.1.1 Physical Block, Slot 0 · Manufacturer-specific parameters

ACTIVE_IDENT_NUMBER (137)

Storage class: – · Read capability (r)

GSD file used to run the positioner

If the positioner is in the compatibility mode, it can run using the following GSD files:

- 3785: 3785 Profile 2
- 071D: 3785 Profile 3
- 0688: 3730-4 Profile 3.01

CONDENSED_STATUS (133)

Storage class: – · Read capability (r)

Condensed state according to NAMUR

CONFIG_BINARY_INPUT_2 (59)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Configuration of the second binary input

- 0 · Floating contact – DI2 · The input is analyzed with the second DI Function Block.
- 1 · Actively open – Diagnosis leakage sensor – DI2 · A leakage sensor is operated at the input as actively open. This information is reported by the extended diagnostics as “External leakage may exist” and can be analyzed with Function Block DI2.
- 2 · Actively closed – Diagnosis leakage sensor – DI2 · A leakage sensor is operated at the input as actively closed. This information is reported by the extended diagnostics as “External leakage may exist” and can be analyzed with Function Block DI2.
- 3 · Solenoid valve – CB_FAIL_SAFE/DI2 · The internal solenoid valve is used and the information (solenoid valve wired same as 1) is analyzed with Function Block DI2. This information is also transmitted cyclically with CHECKBACK (CB_FAIL_SAFE). The input is not switched.
- 4 · Actively open – Diagnosis leakage sensor/CB_ADD_INPUT/Solenoid valve – DI2 · A leakage sensor is operated at the input as actively open. This information is also transmitted cyclically with CHECKBACK (CB_ADD_INPUT). Additionally, the state of the internal solenoid valve is switched to Function Block DI2.
- 5 · Actively closed – Diagnosis leakage sensor/CB_ADD_INPUT/Solenoid valve – DI2 · A leakage sensor is operated at the input as actively closed. This information is also transmitted cyclically with CHECKBACK (CB_ADD_INPUT). Additionally, the state of the internal solenoid valve is switched to Function Block DI2.
- 6 · Actively open – Diagnosis leakage sensor/CB_ADD_INPUT/Solenoid valve – DI2 · A leakage sensor is operated at the input as actively open. This information can be analyzed with Function Block DI2. Additionally, the state of the internal solenoid valve is also transmitted cyclically with CHECKBACK (CB_ADD_INPUT).

- 7 · Actively closed – Diagnosis leakage sensor/CB_ADD_INPUT Solenoid valve – DI2 · A leakage sensor is operated at the input as actively closed. This information can be analyzed with Function Block DI2. Additionally, the state of the internal solenoid valve is also transmitted cyclically with CHECKBACK (CB_ADD_INPUT).

CONFIG_DI_1 (157)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Information communicated cyclically over the discrete input DI1

- Status disk of input 1:
1 = Voltage signal applied
0 = De-energized
- Status of last PST:
0 = Error
1 = OK
2 = Not performed

CONFIG_DI_2 (158)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Information communicated cyclically over the discrete input DI2

- Status disk of input 2:
1 = Voltage signal applied
0 = De-energized
- Status of last PST:
0 = Error
1 = OK
2 = Not performed

DATALOGGER_DS_1 (111) to DATALOGGER_DS_14 (124)

Storage class: – · Read capability (r)

Test function: Data logger – Data set 1 to 14

Element	Parameter name
0	SOLLWERT_W_1 (reference variable w - data set 1)
1	ISTWERT_X_1 (valve position x - data set 1)
2	STELLSIGNAL_Y_1 (drive signal y - data set 1)
3	REGELABWEICH_E_1 (setpoint deviation e - data set 1)
4	ZEIT_T_1 (time t - data set 1)
...	
30	SOLLWERT_W_14 (reference variable w - data set 14)
31	ISTWERT_X_14 (valve position x - data set 14)
32	STELLSIGNAL_Y_14 (drive signal y - data set 14)
33	REGELABWEICH_E_14 (setpoint deviation e - data set 14)
34	ZEIT_T_14 (time t - data set 14)

DATALOGGER_DS_15 (125)

Storage class: – · Read capability (r)

Test function: Data logger – Data set 1 to 14

Element	Parameter name
---------	----------------

0	SOLLWERT_W_1 (reference variable w - data set 1)
1	ISTWERT_X_1 (valve position x - data set 1)
2	STELLSIGNAL_Y_1 (drive signal y - data set 1)
3	REGELABWEICH_E_1 (setpoint deviation e - data set 1)
4	ZEIT_T_1 (time t - data set 1)
5	SOLLWERT_W_2 (reference variable w - data set 2)
6	ISTWERT_X_2 (valve position x - data set 2)
7	STELLSIGNAL_Y_2 (drive signal y - data set 2)
8	REGELABWEICH_E_2 (setpoint deviation e - data set 2)
9	ZEIT_T_2 (time t - data set 2)

DEV_REVISION (135)

Storage class: – · Read capability (r)

Revision of the positioner

DEV_REVISION_COMP (134)

Storage class: – · Read capability (r)

Lowest positioner revision with which the device revision (DEV_REVISION) is compatible

DEVICE_DP_STATUS (126)

Storage class: – · Read capability (r)

Current status of the PROFIBUS-DP state machine

The state machine runs through the following states during the transition to cyclic data exchange:

- Wait prm: Parameterization telegram not yet received
- Wait cfg: Configuration telegram not yet received
- Data exchg: Cyclic data exchange taking place

This information serves to pinpoint problems.

DEVICE_PRODUCT_NUM (51)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Product number of the positioner.

DIAG_EVENT_SWITCH_2 (61)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

DIAGNOSIS_DATA_1 (131)

Storage class: – · Read capability (r)

Diagnostic alarms

- 0x01 Inconsistent data memory
- 0x02 Potentiometer parameter
- 0x04 Calibration parameter
- 0x08 General parameter
- 0x10 Internal device error
- 0x20 PA parameter
- 0x40 Info parameter
- 0x80 Options parameter

DIAGNOSIS_DATA_2 (132)

Storage class: – · Read capability (r)

Diagnostic alarms

- 0x01 Diagnostic parameters

DIAGNOSIS_EXT (60)

Storage class: – · Read capability (r)

Further detailed information of the device, coded bitwise. More than one alarm possible at one time.

Bit: 0 = false · 1 = true

Byte	Bit	Description
------	-----	-------------

0	0	Actuator springs: Perhaps spring stiffness increased (TEST)
0	1	Actuator springs: Working at full capacity
0	2	Actuator springs: Working at full capacity (TEST)
0	3	Shift of working range: Closed position
0	4	Shift of working range: Max. opening
0	5	Friction: Much higher over whole range
0	6	Friction: Much lower over whole range
0	7	Friction: Much higher over partial range
1	0	Friction: Much lower over partial range
1	1	Friction: Much higher over whole range (TEST)
1	2	Friction: Much lower over whole range (TEST)
1	3	Friction: Much higher over partial range (TEST)
1	4	Friction: Much lower over partial range (TEST)
1	5	Leakage in pneumatics: Perhaps existing (TEST)
1	6	Leakage in pneumatics: Perhaps existing
1	7	Leakage in pneumatics: Perhaps too large (TEST)

Byte	Bit	Description
2	0	Leakage in pneumatics: Perhaps too large
2	1	Restriction of working range: Downwards
2	2	Restriction of working range: Upwards
2	3	Restriction of working range: Modification impossible
2	4	Dynamic stress factor > 90 %
2	5	Inner leakage (shut-off): Perhaps existing
2	6	Inner leakage (shut-off): Perhaps larger than in original state (TEST)
2	7	Inner leakage (shut-off): Perhaps larger than original state
3	0	External leakage: Perhaps soon expected
3	1	External leakage: Perhaps existing
3	2	External leakage: Existing
3	3	Zero point: Shift monotonously downwards, average value above reference lines
3	4	Zero point: Shift monotonously upwards, average value above reference lines
3	5	Zero point: Alternating, average value above reference lines
3	6	Zero point: Shift monotonously downwards, average value below reference lines
3	7	Zero point: Shift monotonously upwards, average value below reference lines
4	0	Zero point: Alternating, average value below reference lines
4	1	Positioner/valve attachment: Travel transmission not optimal (TEST)
4	2	Positioner/valve attachment: Perhaps loose
4	3	Positioner/valve attachment: Perhaps restricted by working range
4	4	Positioner/valve attachment: Perhaps loose (TEST)
4	5	Working range: Mostly near closing position
4	6	Working range: Mostly near max. opening
4	7	Working range: Mostly closing position
5	0	Working range: Mostly max. opening
5	1	Working range: Temperature below -40 °C
5	2	Working range: Temperature above 80 °C
5	3	Working range: Reference test canceled
5	4	Working range: Actuator movement possible
5	5	Working range: Actuator movement not possible
5	6	Working range: Solenoid valve error
5	7	–

DIAGNOSIS_EXT_1_RAW (62) and DIAGNOSIS_EXT_2_RAW (63)

Storage class: – · Read capability (r)

Diagnostic alarms regardless of the selected classification

DIAGNOSIS_HW (130)

Storage class: – · Read capability (r)

Diagnostic alarms

- 0x01 x signal
- 0x02 i/p converter
- 0x04 Hardware error
- 0x08 Data memory
- 0x10 Test calculation
- 0x20 Program loading error

DIAGNOSIS_INIT_1 (128)

Storage class: – · Read capability (r)

Diagnostic alarms

- 0x01 x > range
- 0x02 Delta x < range
- 0x04 Attachment
- 0x08 Initialization time exceeded
- 0x10 Initialization/internal solenoid valve/forced venting
- 0x20 Transit time exceeded
- 0x40 Pin position
- 0x80 Test or calibration in progress

DIAGNOSIS_INIT_2 (129)

Storage class: – · Read capability (r)

Diagnostic alarms

- 0x01 No emergency mode

DIAGNOSIS_OPERATION (127)

Storage class: – · Read capability (r)

Diagnostic alarms

- 0x01 Device not initialized
- 0x02 Internal solenoid valve not active
- 0x04 LV total valve travel exceeded
- 0x08 Control loop error
- 0x10 Zero point error
- 0x20 Autocorrection
- 0x40 Fatal error
- 0x80 Extended diagnostics available

DL_TRIGGER_SELECT_BIN (136)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Binary input for triggering in data logger (can be selected with firmware version K 1.11 or higher)

- 0 · Binary input 1
- 1 · Binary input 2

ET_BSZ (78)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for end position trend – operating hours counter

Element	Parameter name
---------	----------------

0	Measured value 0
---	------------------

...	
-----	--

29	Measured value 29
----	-------------------

30	Reference value
----	-----------------

ET_ENDLAGE (79)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for end position trend – drive signal

Element	Parameter name
---------	----------------

0	Measured value 0
---	------------------

...	
-----	--

29	Measured value 29
----	-------------------

30	Reference value
----	-----------------

ET_VENTILSTELLUNG (77)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for end position trend – valve position x

Element	Parameter name
---------	----------------

0	Measured value 0
---	------------------

...	
-----	--

29	Measured value 29
----	-------------------

30	Reference value
----	-----------------

FEATURE_SELECT (64)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Coded bitwise, therefore more than one alarm possible at one time

Bit: 0 = false · 1 = true

Byte Bit Description

0	0	BAD_DEVICE_FAILURE sets DIAG_EXT-Bit · By using the 'Condensed status and diagnostic messages' profile extension, the DIAG.ext bit (Octet 1) is set when a fault or the corresponding diagnostic alarm DIA_MAINTENANCE_ALARM is detected by the positioner. According to Profile 3.01, the DIAG.ext bit is set when one of the following errors is detected by the positioner: Test calculation, fatal error, program loading error, no production calibration, hardware, i/p converter
0	1	Test function activated · The activation of this function allows errors to be simulated in TROVIS-VIEW (Positioner (AO, TRD) folder (> Simulation) (firmware version K 1.11 and higher)
0	2	LO and active diagnostic function activate GOOD_FUNCTION_CHECK · During a diagnostic test, a BAD_FUNCTION_CHECK would be activated according to the profile. This can be prevented by activating this additional function which activates GOOD_FUNCTION_CHECK (firmware version K 1.11 and higher)
0	3	Use DP standard diagnosis (6 bytes) · Select whether the positioner responds to a GET_DIAG telegram with the full diagnosis (14 using as Profile or 26 as manufacturer specification) or only with 6 bytes for DP standard diagnosis (firmware version K 1.11 or higher)

FST_E_1 (148) to FST_E_4 (151)

Storage class: – · Read capability (r)

Tests MAN: Full stroke test (FST) – Setpoint deviation data set 1 to 4

- FST_E_1: Data set 1 (measured points 1 to 25)
- FST_E_2: Data set 2 (measured points 26 to 50)
- FST_E_3: Data set 3 (measured points 51 to 75)
- FST_E_4: Data set 4 (measured points 76 to 100)

FST_SS_1 (146) and FST_SS_2 (147)

Storage class: – · Read capability (r)

Tests MAN: Full stroke test (FST) – Drive signal data set 1 and 2

- FST_SS_1: Data set 1 (measured points 1 to 50)
- FST_SS_2: Data set 2 (measured points 51 to 100)

FST_SW_1 (142) to FST_SW_4 (145)

Storage class: – · Read capability (r)

Tests MAN: Full stroke test (FST) – Reference variable data set 1 to 4

- FST_SW_1: Data set 1 (measured points 1 to 25)
- FST_SW_2: Data set 2 (measured points 26 to 50)
- FST_SW_3: Data set 3 (measured points 51 to 75)
- FST_SW_4: Data set 4 (measured points 76 to 100)

FST_VS_1 (138) to FST_VS_4 (141)

Storage class: – · Read capability (r)

Tests MAN: Full stroke test (FST) – Valve position data set 1 to 4

- FST_VS_1: Data set 1 (measured points 1 to 25)
- FST_VS_2: Data set 2 (measured points 26 to 50)
- FST_VS_3: Data set 3 (measured points 51 to 75)
- FST_VS_4: Data set 4 (measured points 76 to 100)

FST_ZEIT_1 (152) to FST_ZEIT_4 (155)

Storage class: – · Read capability (r)

Tests MAN: Full stroke test (FST) – Time data set 1 to 4

- FST_ZEIT_1: Data set 1 (measured points 1 to 25)
- FST_ZEIT_2: Data set 2 (measured points 26 to 50)
- FST_ZEIT_3: Data set 3 (measured points 51 to 75)
- FST_ZEIT_4: Data set 4 (measured points 76 to 100)

HISTOGRAMM_E_KURZ (70)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for short-term setpoint deviation histogram

Element	Parameter name
---------	----------------

0	E_INTERVAL_VALUE_0 (setpoint deviation interval 0)
...	
11	E_INTERVAL_VALUE_11 (setpoint deviation interval 11)
12	E_AVERAGE (average value e for short-term)

HISTOGRAMM_E_LANG (67)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for long-term setpoint deviation histogram

Element	Parameter name
0	E_INTERVAL_VALUE_0 (setpoint deviation interval 0)
...	
11	E_INTERVAL_VALUE_11 (setpoint deviation interval 11)
12	E_AVERAGE (average value e for long-term)
13	NUMBER_MESS_POINTS (number of measuring points)
14	DEVIATION_MIN (min. setpoint deviation)
15	DEVIATION_MAX (max. setpoint deviation)

HISTOGRAMM_X_KURZ (69)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for short-term travel histogram

Element	Parameter name
0	X_INTERVAL_VALUE_0 (valve position interval 0)
...	
21	X_INTERVAL_VALUE_21 (valve position interval 21)
22	X_AVERAGE (average value x for short-term)

HISTOGRAMM_X_LANG (66)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for long-term travel histogram

Element	Parameter name
0	X_INTERVAL_VALUE_0 (valve position interval 0)
...	
21	X_INTERVAL_VALUE_21 (valve position interval 21)
22	X_AVERAGE (average value x for long-term)
23	NUMBER_MESS_POINTS (number of measuring points)

HISTOGRAMM_X_LANG2 (156)

Storage class: – · Read capability (r)

HISTOGRAMM_Z_KURZ (71)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for short-term cycle counter histogram

Element	Parameter name
---------	----------------

0	Z_INTERVAL_VALUE_0 (cycle counter interval 0)
---	---

...	
-----	--

12	Z_INTERVAL_VALUE_12 (cycle counter interval 12)
----	---

13	Z_AVERAGE (average value z for short-term)
----	--

HISTOGRAMM_Z_LANG (68)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for long-term cycle counter histogram

Element	Parameter name
---------	----------------

0	Z_INTERVAL_VALUE_0 (cycle counter interval 0)
---	---

...	
-----	--

12	Z_INTERVAL_VALUE_11 (cycle counter interval 12)
----	---

13	Z_AVERAGE (average value z for long-term)
----	---

14	TOTAL_NUMBER (number of measuring points)
----	---

15	DYNAMIC_FAKTOR (dynamic stress factor)
----	--

HYS_STELLSIGNAL (83)

Storage class: – · Read capability (r)

Tests MAN: Drive signal diagram hysteresis

Element	Parameter name
---------	----------------

0	REFERENZZEITSTEMPEL (reference time stamp)
---	--

1	TESTINFO (test information)
---	-----------------------------

2	FORTSCHRITT (progress flag)
---	-----------------------------

3	REFERENZWERT_VS_0 (reference value for valve position 0)
---	--

4	REFERENZWERT_HYST_0 (reference value for hysteresis 0)
---	--

5	WIEDERHOLUNGSWERT_HYST_0 (repetition value for hysteresis 0)
---	--

...	
-----	--

36	REFERENZWERT_VS_11 (reference value for valve position 11)
----	--

37	REFERENZWERT_HYST_11 (reference value for hysteresis 11)
----	--

38	WIEDERHOLUNGSWERT_HYST_11 (repetition value for hysteresis 11)
----	--

HYSTERESE_KURZ (76)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for drive signal diagram hysteresis in short-term monitoring

Element	Parameter name
0	STELLSIGNAL_0 (drive signal 0)
0	VENTILSTELLUNG_0 (valve position 0)
...	
9	STELLSIGNAL_9 (drive signal 9)
9	VENTILSTELLUNG_9 (valve position 9)

HYSTERESE_LANG (75)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for drive signal diagram hysteresis in long-term monitoring

Element	Parameter name
0	MITTELWERT_0 (average value 0)
...	
18	MITTELWERT_18 (average value 18)

IDENT_LIMIT_SWITCHES (50)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Describes whether the optional inductive limit switch is installed. Not automatically recognized.

- 0 · Not installed
- 1 · Installed

IDENT_OPTIONS (49)

Storage class: – · Read capability (r)

Describes whether the optional solenoid valve and binary input 2 are installed.

- 0 · Not installed
- 1 · Binary input 2 installed
- 2 · Solenoid valve installed
- 3 · Inductive limit switch installed

PRODUCTION_ID (57)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Production ID number

PST_E_1 (103) to PST_E_4 (106)

Storage class: – · Read capability (r)

Tests MAN: Partial stroke test (PST) – Setpoint deviation data set 1 to 4

PST_SS_1 (101) and PST_SS_2 (102)

Storage class: – · Read capability (r)

Tests MAN: Partial stroke test (PST) – Drive signal data set 1 and 2

PST_SW_1 (97) to PST_SW_4 (100)

Storage class: – · Read capability (r)

Tests MAN: Partial stroke test (PST) – Reference variable data set 1 to 4

PST_VS_1 (93) to PST_VS_4 (96)

Storage class: – · Read capability (r)

Tests MAN: Partial stroke test (PST) – Valve position data set 1 to 4

PST_ZEIT_1 (107) to PST_ZEIT_4 (110)

Storage class: – · Read capability (r)

Tests MAN: Partial stroke test (PST) – Time data set 1 to 4

READING_DIRECTION (58)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Reading on the display is turned by 180°

STAT_AGAIN_VS (81)

Storage class: – · Read capability (r)

Tests MAN: Drive signal diagram steady-state – Repetition value of valve position

STAT_KENNLINIE_R (84)

Storage class: – · Read capability (r)

Tests MAN: Static characteristic

Element	Parameter
0	Testinfo (test information)
1	SPRUNGHOEHE (step height)
2	MIN_TOTE_ZONE (min. dead band)
3	DURCHSCHNITT_TOTE_ZONE (average dead band)
4	MAX_TOTE_ZONE (max. dead band)
5	FORTSCHRITTSANZEIGE (progress flag)

Element	Parameter
0	Testinfo (test information)
1	SPRUNGHOEHE (step height)
2	MIN_TOTE_ZONE (min. dead band)
3	DURCHSCHNITT_TOTE_ZONE (average dead band)
4	MAX_TOTE_ZONE (max. dead band)
5	FORTSCHRITTSANZEIGE (progress flag)

STAT_KENNLINIE_SW_1 (89) to STAT_KENNLINIE_SW_4 (92)

Storage class: – · Read capability (r)

Tests MAN: Static characteristic – Reference variable data set 1 to 4

STAT_KENNNLINIE_VS_1 (85) to STAT_KENNNLINIE_VS_4 (88)

Storage class: – · Read capability (r)

Tests MAN: Static characteristic – Valve position data set 1 to 4

- STAT_KENNNLINIE_VS_1: data set 1 (measuring points 1 to 25)
- STAT_KENNNLINIE_VS_2: data set 2 (measuring points 26 to 50)
- STAT_KENNNLINIE_VS_3: data set 3 (measuring points 51 to 25)
- STAT_KENNNLINIE_VS_4: data set 4 (measuring points 76 to 100)

STAT_REV_VS (80)

Storage class: – · Read capability (r)

Tests MAN: Drive signal diagram steady-state – Reference value (valve position)

STAT_STELLSIGNAL (82)

Storage class: – · Read capability (r)

Tests MAN: Drive signal diagram steady-state – Drive signal (reference and repetition values)

Element	Parameter
---------	-----------

0	REFERENZZEITSTEMPEL (reference time stamp)
1	TESTINFO (test information)
2	FORTSCHRITT (progress flag)
3	REFERENZSWERT_0 (reference value 0)
4	WIEDERHOLUNGSWERT_0 (repetition value 0)
...	
51	REFERENZSWERT_24 (reference value 24)
52	WIEDERHOLUNGSWERT_24 (repetition value 24)

STATIONAER_KURZ (73)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for drive signal diagram steady-state in short-term monitoring

Element	Parameter
---------	-----------

0	Mittelwert_0 (average value 0)
...	
21	Mittelwert_21 (average value 21)

STATIONAER_KURZ_RP (74)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for drive signal diagram steady-state in short-term monitoring.
Ring buffer values, containing drive signal and valve position

Element Parameter

0	STELLSIGNAL_0 (drive signal 0)
0	VENTILSTELLUNG_0 (valve position 0)
...	
9	STELLSIGNAL_9 (drive signal 9)
9	VENTILSTELLUNG_9 (valve position 9)

STATIONAER_LANG (72)

Storage class: – · Read capability (r)

Statistical information AUTO: Structure for drive signal diagram steady-state in long-term monitoring

Index and parameter assignment: Physical Block, Slot 0 · Manufacturer-specific parameters

Index	Parameter
49	IDENT_OPTIONS
50	IDENT_LIMIT_SWITCHES
51	DEVICE_PRODUCT_NUM
52	TEXT_INPUT_1
53	TEXT_INPUT_2
54	TEXT_INPUT_3
55	TEXT_INPUT_4
56	TEXT_INPUT_5
57	PRODUCTION_ID
58	READING_DIRECTION
59	CONFIG_BINARY_INPUT_2
60	DIAGNOSIS_EXT_2
61	DIAG_EVENT_SWITCH_2
62	DIAGNOSIS_EXT_1_RAW
63	DIAGNOSIS_EXT_2_RAW

Index	Parameter
64	FEATURE_SELECT
65	TEST_FUNCTION
66	HISTOGRAMM_X_LANG
67	HISTOGRAMM_E_LANG
68	HISTOGRAMM_Z_LANG
69	HISTOGRAMM_X_KURZ
70	HISTOGRAMM_E_KURZ
71	HISTOGRAMM_Z_KURZ
72	STATIONAER_LANG
73	STATIONAER_KURZ
74	STATIONAER_KURZ_RP
75	HYSTERESE_LANG
76	HYSTERESE_KURZ
77	ET_VENTILSTELLUNG
78	ET_BSZ

Index	Parameter
79	ET_ENDLAGE
80	STAT_REF_VS
81	STAT_AGAIN_VS
82	STAT_STELLSIGNAL
83	HYS_STELLSIGNAL
84	STAT_KENNLINIE_R
85	STAT_KENNLINIE_VS_1
86	STAT_KENNLINIE_VS_2
87	STAT_KENNLINIE_VS_3
88	STAT_KENNLINIE_VS_4
89	STAT_KENNLINIE_SW_1
90	STAT_KENNLINIE_SW_2
91	STAT_KENNLINIE_SW_3
92	STAT_KENNLINIE_SW_4
93	PST_VS_1
94	PST_VS_2
95	PST_VS_3
96	PST_VS_4
97	PST_SW_1
98	PST_SW_2
99	PST_SW_3
100	PST_SW_4
101	PST_SS_1
102	PST_SS_2
103	PST_E_1
104	PST_E_2
105	PST_E_3
106	PST_E_4
107	PST_ZEIT_1

Index	Parameter
108	PST_ZEIT_2
109	PST_ZEIT_3
110	PST_ZEIT_4
111	DATALOGGER_DS_1
112	DATALOGGER_DS_2
113	DATALOGGER_DS_3
114	DATALOGGER_DS_4
115	DATALOGGER_DS_5
116	DATALOGGER_DS_6
117	DATALOGGER_DS_7
118	DATALOGGER_DS_8
119	DATALOGGER_DS_9
120	DATALOGGER_DS_10
121	DATALOGGER_DS_11
122	DATALOGGER_DS_12
123	DATALOGGER_DS_13
124	DATALOGGER_DS_14
125	DATALOGGER_DS_15
126	DEVICE_DP_STATUS
127	DIAGNOSIS_OPERATION
128	DIAGNOSIS_INIT_1
129	DIAGNOSIS_INIT_2
130	DIAGNOSIS_HW
131	DIAGNOSIS_DATA_1
132	DIAGNOSIS_DATA_2
133	CONDENSED_STATUS
134	DEV_REVISION_COMP
135	DEV_REVISION
136	DL_TRIGGER_SELECT_BIN

Index	Parameter
137	ACTIVE_IDENT_NUMBER
138	FST_VS_1
139	FST_VS_2
140	FST_VS_3
141	FST_VS_4
142	FST_SW_1
143	FST_SW_2
144	FST_SW_3
145	FST_SW_4
146	FST_SS_1
147	FST_SS_2

Index	Parameter
148	FST_E_1
149	FST_E_2
150	FST_E_3
151	FST_E_4
152	FST_ZEIT_1
153	FST_ZEIT_2
154	FST_ZEIT_3
155	FST_ZEIT_4
156	HISTOGRAMM_X_LANG2
157	CONFIG_DI_1
158	CONFIG_DI_2

8.1.2 AO Function Block, Slot 1 · Profile-specific parameters

ALERT_KEY (20)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

ID number of the plant unit

ALM_SUM (23)

Storage class: – · Read capability (r)

Current states of the process alarms in the AO Function Block

BATCH (24)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Identification of the batch process

BLOCK_OBJ (16)

Storage class: – · Read capability (r)

CHECK_BACK* (49)

Storage class: – · Read capability (r)

Detailed information on the device, coded bitwise, refer to section 4

CHECK_BACK_MASK (50)

Storage class: – · Read capability (r)

Defines the supported status bits in CHECK_BACK

Bit = 0: Status not supported

Bit = 1: Status supported

CHECK_BACK_OPT (65)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

This alarm does not apply for acyclic access

Defines the support of the status bit in CHECK_BACK for cyclic data exchange

- [0x8F, 0xEC, 0x83]
- Bit = 0 · Status not supported
- Bit = 1 · Status supported

FSAFE_TIME (39)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Fail-safe time [s]

Time from detection of failure of the setpoint valid for the AO Function Block in the current mode until the fail-safe action is triggered

- [0]

Note: If the error still persists after the fail-safe time has elapsed, fail-safe action is triggered. The fail-safe action of the AO Function Block is determined by FSAFE_TYPE in this Block.

FSAFE_TYPE (40)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Fail-safe action

Defines the reaction to be taken when a communication failure is detected or after a warm start

- 0 · The default value FSAFE_VALUE is used
- 1 · The last valid setpoint is used/The last valid setpoint is saved
- 2 · Actuator moves to the fail-safe position defined by the actuator springs

FSAFE_VALUE (41)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Fail-safe value

Default value for setpoint (reference variable w) used when a communication failure is detected or after a warm start

IN_CHANNEL (37)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Assignment between the Transducer Block and the Function Block

- 0 · Not active
- 0x013A · Active (FEEDBACK_VALUE is written to READBACK)

INCREASE_CLOSE (52)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Determines the direction of action, i.e. how the reference variable is assigned to the controlled variable

- Increasing/increasing
- Increasing/decreasing

MODE_BLK (22)

Storage class: – · Read capability (r)

Current mode

OUT (53)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Output value

This output value is calculated by the Function Block from the SETPOINT for the Transducer Block in [mm], [degrees] or [%]

OUT_CHANNEL (38)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Assignment between the Transducer Block and the Function Block

- 0 · Not active
- 0x0139 · Active (OUT is written to POSITIONING_VALUE)

OUT_SCALE (54)

Storage class: S · Read/write capability (r/w) · Supported modes: O

Travel range or angle of rotation

Upper and lower values of the actual working range in [mm] or [degrees]. A non-linear characteristic is adapted to the reduced travel.

Maximum value for upper value = Rated travel

POS_D* (47)

Storage class: – · Read capability (r)

Current position of the valve (discrete)

- 0 · Not initialized
- 1 · Closed ($x < 0.5 \%$)
- 2 · Open ($x > 99.5 \%$)
- 3 · Intermediate position

PV_SCALE (27)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Range of the reference variable

RCAS_IN* (30)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Setpoint with status: Reference variable w in RCAS mode

Provided by a supervisory host, e.g. PID Block or Master Class 1. Depending on mode of the Function Block

Range defined in PV_SCALE

RCAS_OUT* (43)

Storage class: – · Read capability (r)

Setpoint with status: Reference variable w in RCAS mode

Provided to a supervisory host, e.g. PID Block or Master Class 1. Depending on mode of the Function Block

Range defined in PV_SCALE

READBACK (28)

Storage class: – · Read capability (r)

Controlled variable (valve position) x in relation to travel range/angle of rotation (PV_SCALE) and status of controlled variable

Range defined in PV_SCALE

SETP_DEVIATION (48)

Storage class: – · Read capability (r)

Setpoint deviation [%]

SIMULATE (51)

Storage class: – · Read/write capability (r/w) · Supported modes: ALL

Simulation

- Simulates a value/status of READBACK

SP (25)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Upper limit of the reference variable

- Value and range from PV_SCALE $\pm 10\%$, [100 %]

Note: This value must be adapted correspondingly if the scale end setting is changed in PV_SCALE parameter.

ST_REV (17)

Storage class: – · Read capability (r)

Revision level of static data

STRATEGY (19)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Grouping to allow faster processing of blocks

- [0]

Blocks are grouped by entering the same value in the STRATEGY parameter of each block.

Note: These data are neither checked nor processed by the AO Function Block.

TAG_DESC (18)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Used to enter a user-selected text to identify and assign blocks.

- Max. 32 characters, [no text]

TARGET_MODE (21)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Target mode of the positioner

- 8 · AUTO (automatic mode)
- 16 · MAN (manual mode)
- 128 · O/S (out of service)

Index and parameter assignment: AO Transducer Block, Slot 1 · Profile-specific parameters

Index	Parameter
16	BLOCK_OBJ
17	ST_REV
18	TAG_DESC
19	STRATEGY
20	ALERT_KEY
21	TARGET_MODE
22	MODE_BLK
23	ALM_SUM
24	BATCH
25	SP
27	PV_SCALE
28	READBACK
30	RCAS_IN
37	IN_CHANNEL
38	OUT_CHANNEL

Index	Parameter
39	FSAFE_TIME
40	FSAFE_TYPE
41	FSAFE_VALUE
43	RCAS_OUT
47	POS_D
48	SETP_DEVIATION
49	CHECK_BACK
50	CHECK_BACK_MASK
51	SIMULATE
52	INCREASE_CLOSE
53	OUT
54	OUT_SCALE
65	CHECK_BACK_OPT
66	POS_D_LIMITS

8.2 AO Transducer Block, Slot 1 · Profile-specific parameters

ACT_STROKE_TIME_DEC (89)

Storage class: – · Read capability (r)

Specifies the minimum transit time to reach CLOSED position [s] (Code 41)

The minimum transit time to reach CLOSED (0 % position) position is the actual time in seconds that the system (consisting of positioner, actuator and valve) needs to move through the rated travel range/angle of rotation to close the valve (measured during initialization).

- [1.0 s]

ACT_STROKE_TIME_INC (90)

Storage class: – · Read capability (r)

Specifies the minimum transit time to reach OPEN position [s] (Code 40)

The minimum transit time to reach OPEN (100 % position) position is the actual time in seconds that the system (consisting of positioner, actuator and valve) needs to move through the rated travel range/angle of rotation to open the valve (measured during initialization).

- [1.0 s]

ACTUATOR_ACTION (143)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Sets the fail-safe action to be performed by the actuator in case of a supply air failure, determined automatically during initialization.

- 0 · Not initialized
- 1 · Opening (towards 100 % position)
- 2 · Closing (towards 0 % position)
- 3 · None/saving (position remains kept)

ACTUATOR_MAN (140)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Manufacturer of the actuator mounted on the control valve

ACTUATOR_SER_NUM (145)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Serial number of the actuator used with the positioner.

ACTUATOR_TYPE (142)

Storage class: – · Read capability (r)

Type of actuator used

- 0 · Electropneumatic
- 1 · Electric
- 2 · Electrohydraulic
- 3 · Others

ADD_GEAR_ID (148)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Manufacturer ID of any additional components

ADD_GEAR_SER_NUM (146)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Serial number of any additional components

ALARM_SUM (87)

Storage class: – · Read capability (r)

Current state of process alarms in the AO Transducer Block

- [0]

ALARM_KEY (84)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

ID number of the plant unit

- [0]

BLOCK_OBJ (80)

Storage class: – · Read capability (r)

DEVICE_CALIB_DATE (103)

Storage class: S · Read/write capability (r/w) · Supported modes: ○

Date of the last calibration of the positioner [XX.XX.20XX]

DEVICE_CONFIG_DATE (104)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Date of the last configuration of the positioner [XX.XX.20XX]

FEADBACK_VALUE (138)

Storage class: – · Read capability (r)

Current valve position

Unit of OUT_SCALE

LIN_TYPE (105)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Type of characteristic (Code 20)

- 0 · Linear
- 1 · Equal percentage
- 2 · Equal percentage reverse
- 3 · User-defined (currently not supported)
- 4 · SAMSON control butterfly valve linear
- 5 · SAMSON control butterfly valve equal percentage
- 6 · Vetec rotary plug valve linear
- 7 · Vetec rotary plug valve equal percentage

MODE_BLK (86)

Storage class: – · Read capability (r)

Current mode of positioner

POSITIONING_VALUE (137)

Storage class: – · Read capability (r)

Current positioning value

Unit of OUT_SCALE

RATED_TRAVEL (112)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Specifies the rated travel [mm] or rotational angle [degrees] of the valve

- [15 mm]

SELF_CALIB_CMD (113)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Command to start the manufacturer-specific calibration routine in the field device:

- 0 · No test, normal operation
- 1 · –
- 2 · Start initialization
- 3 · Cancel initialization
- 4 · Start zero point calibration
- 5 · Cancel zero point calibration
- 6 · Search for device: "HERE I AM" on display
- 7 · Reset "Total valve travel exceeded"
- 8 to 22 · –
- 23 · Reset "Control loop"
- 24 · Reset "Zero point error"
- 25 · Reset "Autocorrection"
- 26 · Reset "Fatal error"
- 27 · No function
- 28 · Reset "x > range"
- 29 · Reset "Delta x < range"
- 30 · Reset "Attachment"
- 31 · Reset "Initialization time exceeded"
- 32 · Reset "Initialization/solenoid valve"
- 33 · Reset "Transit time too short"
- 34 · Reset "Pin position"

- 35 to 39 · –
- 40 · Reset “x signal”
- 41 · Reset “i/p converter”
- 42 · Reset “Hardware”
- 43 · Reset “Control parameter”
- 44 · Reset “Potentiometer parameter”
- 45 · Reset “Calibration”
- 46 · Reset “General parameters”
- 47 · Reset “Internal device error 1”
- 48 · Reset “No emergency mode”
- 49 · Reset “Program loading error”
- 50 · Reset “Option parameter”
- 51 · Reset “Info parameter”
- 52 · Reset “Data memory”
- 53 · Reset “Test calculation”
- 54 · No function
- 55 · Reset “Diagnostic parameter”
- 56 to 59 = –
- 60 · Reset “Device start up counter”
- 61 · Reset “Communication controller”
- 62 · Reset “Communication controller counter” → SW_W_DOG triggered
- 63 · Reset “Control parameter”
- 64 · Reset “Closed-loop controller counter”
- 65 · Reset “Error message for bus connection”
- 66 · Reset “Bus connection counter”

SELF_CALIB_STATUS (114)

Storage class: – · Read capability (r)

Manufacturer-specific status of the sequence started with SELF_CALIB_CMD parameter

Note: During the zero point key test, this parameter assumes the state of the zero point key.

- 0 · Undetermined
- 1 · In progress
- 2 · Canceled
- 3 · Range incorrect
- 4 · Error in mechanics/pneumatics
- 5 · Gain error
- 6 · Offset error

- 7 · Calibration sequence mixed up
- 8 to 10 · –
- 11 · Timeout
- 12 · Proportional range restricted too much
- 13 · Rated travel or transmission incorrectly selected
- 14 · Mechanics system stuck (during initialization)
- 15 · Pneumatics system leaks (during initialization)
- 16 · Action interrupted as a production test has not yet been performed successfully
- 17 · Initialization status: Mechanical stops determined
- 18 · Initialization status: Minimum control pulse determined
- 19 · Initialization status: Minimum transit times determined
- 20 · Initialization canceled by activation of the solenoid valve
- 21 to 29 · –
- 30 = Zero point error
- 31 to 253 · –
- 254 = Successful
- 255 = No valid data from the closed-loop control

SERVO_GAIN_1 (115)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

K_p step (Code 17)

- [7]

SERVO_RATE_1 (116)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

T_v step (Code 18)

- [2]

SETP_CUTOFF_DEC (118)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Final position $w <$ (Code 14)

If the reference variable falls below the entered value, the valve moves towards the final position which corresponds to 0 % reference variable.

Electropneumatic actuators are completely filled with air or vented (depending on the fail-safe position).

- [0.0 %]

SETP_CUTOFF_INC (119)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Final position $w >$ (Code 15)

If the reference variable exceeds the entered value, the valve moves towards the final position which corresponds to 100 % reference variable.

Electropneumatic actuators are completely filled with air or vented (depending on the fail-safe position).

- [125.0 %]

ST_REV (81)

Storage class: – · Read capability (r)

Revision level of static data

STRATEGY (83)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Grouping to allow faster processing of blocks

- [0]

Blocks are grouped by entering the same value in the STRATEGY parameter of each block.

TAG_DESC (82)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Used to enter a user-selected text to identify and assign blocks.

- Max. 32 characters, [no text]

TARGET_MODE (85)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Target mode

- [8] · AUTO (automatic mode)
- 16 · MAN (manual mode)
- 128 · O/S (out of service)

TOT_VALVE_TRAV_LIM (126)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Limit value for the total valve travel (Code 24)

- [1000000.0]

TOTAL_VALVE_TRAVEL (125)

Storage class: – · Read capability (r)

Total valve travel: Totaled double valve travel (Code 23)

TRAVEL_LIMIT_LOW (127)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Travel/angle lower limit [% of PV_SCALE] (Code 10)

Limitation of the travel/angle of rotation downwards to the entered value. The characteristic is not adapted.

- [0.0 %]

TRAVEL_LIMIT_UP (128)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Travel/angle upper limit [% of PV_SCALE] (Code 11)

Limitation of the travel/angle of rotation upwards to the entered value. The characteristic is not adapted.

- [100.0 %]

TRAVEL_RATE_DEC (129)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Required transit time CLOSED [s]

Minimum time required to move through the working range to 0 % position

- [0.0 s]

TRAVEL_RATE_INC (130)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Required transit time OPEN [s]

Minimum time required to move through the working range to 100 % position

- [0.0 s]

VALVE_MAINT_DATE (131)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Date of the last maintenance performed on the positioner [XX.XX.20XX]

VALVE_MAN (139)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Valve manufacturer

VALVE_SER_NUM (144)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Serial number of the valve

VALVE_TYPE (141)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Type of valve

- 0 · Valve with straight-moving plug
- 1 · Valve with rotary moving plug (part-turn)
- 2 · Valve with rotary moving plug (multi-turn)

Index and parameter assignment: AO Transducer Block, Slot 1 · Profile-specific parameters

Index	Parameter
80	BLOCK_OBJ
81	ST_REV
82	TAG_DESC
83	STRATEGY
84	ALERT_KEY
85	TARGET_MODE
86	MODE_BLK
87	ALARM_SUM
89	ACT_STROKE_TIME_DEC
90	ACT_STROKE_TIME_INC
103	DEVICE_CALIB_DATE
104	DEVICE_CONFIG_DATE
105	LIN_TYPE
112	RATED_TRAVEL
113	SELF_CALIB_CMD
114	SELF_CALIB_STATUS
115	SERVO_GAIN_1
116	SERVO_RATE_1
118	SETP_CUTOFF_DEC
119	SETP_CUTOFF_INC
125	TOTAL_VALVE_TRAVEL

Index	Parameter
126	TOT_VALVE_TRAV_LIM
127	TRAVEL_LIMIT_LOW
128	TRAVEL_LIMIT_UP
129	TRAVEL_RATE_DEC
130	TRAVEL_RATE_INC
131	VALVE_MAINT_DATE
137	POSITIONING_VALUE
138	FEEDBACK_VALUE
139	VALVE_MAN
140	ACTUATOR_MAN
141	VALVE_TYPE
142	ACTUATOR_TYPE
143	ACTUATOR_ACTION
144	VALVE_SER_NUM
145	ACTUATOR_SER_NUM
146	ADD_GEAR_SER_NUM
147	ADD_GEAR_MAN
148	ADD_GEAR_ID
149	ADD_GEAR_INST_DATE

8.3 AO Transducer Block, Slot 1 · Manufacturer-specific parameters

ACTIVE_IDENT_NUMBER (205)

Storage class: – · Read capability (r)

GSD file in the positioner

If the positioner is in the compatibility mode, it can run using the following GSD files:

- 3785: 3785 Profile 2
- 071D: 3785 Profile 3
- 0688: 3730-4 Profile 3.01

AUTOSTART_HYS (194)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Indicates the minimum interval between the hysteresis tests (EXPERTplus)

BLOCKING_POSITION (166)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

CHARACT_TYPE (173)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Type of characteristic.

- Max. 32 characters, [no text]

CLOSING_DIRECTION (165)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

COUNTER_INIT_START (198)

Storage class: – · Read capability (r)

Number of initialization cycles that have been performed since the last reset

CYCLE_COUNTER_LIMIT (210)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Max. cycle counter limit

DATALOGGER (185)

Storage class: – · Read capability (r)

Structure of read and write parameters of the data logger (EXPERTplus)

Element Parameter

0	DATALOGGER_SELECT (selection for data logger)
1	TRIGGER_SELECT (trigger status)
2	SAMPLE_RATE (scan rate)
3	START_VALUE (trigger value)
4	LOGGING_LIMIT
5	PRETRIGGER_TIME

DATALOGGER_2 (211)

Storage class: – · Read capability (r)

DATALOGGER_READ (186)

Storage class: – · Read capability (r)

Structure of read parameters of the data logger (EXPERTplus)

Element Parameter

0	TESTINFO (test information)
1	MAX_PRETRIGGERZEIT (max. pretrigger time)
2	FORTSCHRITT (progress flag)
3	ZÄHLER_TAGE (day counter)
4	ZÄHLER_STUNDEN (hour counter)
5	ZÄHLER_MINUTEN (minute counter)
6	ZÄHLER_SEKUNDEN (seconds counter)
7	ZÄHLER_100MS_TAKT (100 ms counter)

DATA_READ_2 (212)

Storage class: – · Read capability (r)

DELAY_TIME (181)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Delay time (reset criterion when closed-loop operation monitoring is in progress). If the entered DELAY_TIME is exceeded and the system deviation is outside the specified TOLERANCE_BAND, a control loop error is indicated. Determined from the minimum transit time during initialization.

- [30]

DEVICE_CHARACT (202) and DEVICE_CHARACT_2 (231)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Structure of the device properties

Element	Parameter
0	Actuator effective area
1	Type of actuator
2	Attachment
3	Lower signal pressure range
4	Upper signal pressure range
5	Supply pressure
6	Booster
7	Stem packing
8	Plug/seat facing (leakage class)
9	Pressure balancing
10	Flow characteristic
11	Direction of flow
12	Nominal size standard
13	Nominal size DN
14	K _{VS} unit
15	K _{VS} coefficient
16	Seat diameter of the valve

DEVICE_INIT_STATE (163)

Storage class: – · Read capability (r)

Indicates whether the device has been initialized.

DIAG_MONITORING (187)

Storage class: – · Read capability (r)

Temperature-specific parameter

Element	Parameter
0	CURRENT_TEMP (current temperature)
1	MAX_TEMP (max. temperature)
2	TIME_MAX_TEMP (time at which max. temperature occurred)
3	MIN_TEMP (min. temperature)
4	TIME_MIN_TEMP (time at which min. temperature occurred)
5	PERIOD_TIME_HIGH (period of time max. temperature lasted)
6	PERIOD_TIME_LOW (period of time min. temperature lasted)

DIAG_TESTINFO (201)

Storage class: – · Read capability (r)

Info parameter concerning an active diagnostic test running (EXPERTplus)

- 0 · d1 Drive signal diagram steady-state
- 2 · d2 Drive signal diagram hysteresis
- 4 · d3 Static characteristic
- 8 · d4 Partial stroke test
- 16 · d5 Drive signal diagram hysteresis (AUTO) – activated
- 32 · d5 Drive signal diagram hysteresis (AUTO) – running
- 64 · Permanent data logging
- 128 · Triggered data logging
- 256 · Reference test
- 516 · All tests started automatically in sequence

DIAGNOSE_LEVEL (195)

Storage class: – · Read capability (r)

Indicates the diagnostic level

- EXPERT
- EXPERTplus
- Emergency shutdown (ESD)

ELAPSED_HOURS_METERS (193)

Storage class: – · Read capability (r)

Operating hours counter

Element	Parameter
---------	-----------

- | | |
|---|--|
| 0 | ELAPSED_HOURS_METER (time since first initialization) |
| 1 | DEVICE_IN_CLOSED_LOOP (time in closed-loop control since first initialization) |
| 2 | POWER_ON_SINCE_INIT (device switched on since last initialization) |
| 3 | DEVICE_IN_CLOSED_LOOP_SINCE_LAST_INIT (t in closed-loop since last initialization) |

ENHANCED_DIAG_CMD (192)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Extended diagnostic tests

- 0 · No function
- 1 · Start data logging
- 2 · Stop data logging
- 3 · Start hysteresis online test
- 4 · Stop hysteresis online test

- 5 · Start partial stroke test
 - 6 · Stop partial stroke test
 - 7 · Start all tests automatically in sequence
 - 8 · Stop tests
 - 9 · Start drive signal test steady-state
 - 10 · Stop drive signal test steady-state
 - 11 · Start drive signal test hysteresis
 - 12 · Stop drive signal test hysteresis
 - 13 · Start static characteristic test
 - 14 · Stop static characteristic test
 - 15 · Start reference test
 - 16 · Stop reference test
 - 17 · Reset "Data logging"
 - 18 · Reset all diagnosis data
 - 19 · Reset "Operating hours counter"
 - 20 · Reset temperature data
 - 21 · Reset "Travel histogram – long-term monitoring"
 - 22 · Reset "Cycle counter histogram – long-term monitoring"
 - 23 · Reset "Setpoint deviation histogram – long-term monitoring"
 - 24 · Reset "Drive signal diagram steady-state – long-term monitoring"
 - 25 · Reset "Drive signal diagram steady-state – short-term monitoring"
 - 26 · Reset "Drive signal diagram – hysteresis – long-term monitoring"
 - 27 · Reset "End position trend"
 - 28 · Reset "End position – reference values"
 - 29 · Reset "Travel histogram – short-term monitoring"
 - 30 · Reset "Setpoint deviation histogram – short-term monitoring"
 - 31 · Reset "Cycle counter histogram – short-term monitoring"
 - 32 · Reset "Drive signal diagram – hysteresis – short-term monitoring"
 - 33 · Reset "Drive signal diagram steady-state – reference values"
 - 34 · Reset "Reference measurement - hysteresis"
 - 35 · Reset "Data logger"
 - 36 · Reset "Static characteristic"
 - 37 · Reset "Step response"
 - 38 · Reset "Drive signal diagram steady-state– measured data"
 - 39 · Reset "Drive signal diagram – hysteresis - measured data"
-

EVENT_LOGGING_1 (190) and EVENT_LOGGING_2 (191)

Storage class: – · Read capability (r)

Data sets 1/2 of the event logging (EXPERTplus)

Element Parameter

0	MESSAGES_0...15 (alarms 0...15)
1	ELAPSED_HOURS_METER_0...15 (time stamp of recorded alarms 0...15)
...	
29	MESSAGE_14...29 (alarms 14...29)
30	ELAPSED_HOURS_METER_14...29 (time stamp of recorded alarms 14...29)

FINAL_POSITION_VALUE (183)

Storage class: – · Read capability (r)

Current valve position in % in relation to the operating range FINAL_VALUE_RANGE

FINAL_VALUE (184)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Contains the output value received from the upstream Analog Output Function Block

FINAL_VALUE_RANGE (179)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Travel range/angle of rotation

- [0.0 to 100.0]
- EU_100 (Code 9)
- EU_0 (Code 8)
- UNIT_INDEX
- DECIMAL

FST_ANALYSIS_1 (222) to FST_ANALYSIS_3 (224)

Storage class: – · Read capability (r)

Settings for full stroke test (FST)

- FST_MEAS_DATA1...3_TIME_STAMP
- FST_MEAS_DATA1...3_BREAK_AWAY_TIME
- FST_MEAS_DATA1...3_OVERSHOOT_RISING
- FST_MEAS_DATA1...3_DEAD_TIME_RISING
- FST_MEAS_DATA1...3_T63_RISING
- FST_MEAS_DATA1...3_T98_RISING
- FST_MEAS_DATA1...3_RISE_TI_RISING
- FST_MEAS_DATA1...3_SETTL_TI_RISING
- FST_MEAS_DATA1...3_OVERSHOOT_FALL

- FST_MEAS_DATA1...3_DEAD_TI_FALL
- FST_MEAS_DATA1...3_T63_FALLING
- FST_MEAS_DATA1...3_T98_FALLING
- FST_MEAS_DATA1...3_RISE_TI_FALLING
- FST_MEAS_DATA1...3_SETTL_TI_FALLING

FST_CANCEL_CONDITIONS (226)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Cancellation conditions of the full stroke test (FST)

- FST_CANCEL_COND_MAX_TEST_DURA: Maximum test duration (user-defined)
- FST_CANCEL_COND_ACTIV_MAX_TIME: Activation 'Max. breakaway time'
- FST_CANCEL_COND_MAX_BREAK_TIME: Maximum breakaway time
- FST_CANCEL_COND_ACTIV_TIME_REACH: Activation 'Allowed time to reach full closed position'
- FST_CANCEL_COND_TIME_REACH: Allowed time to reach full closed position

FST_DISPLAY (227)

Storage class: – · Read capability (r)

Information on the full stroke test (FST)

- PROGRESS_FLAG
- STATUS_FST
- NUMBER_OF_TESTS
- RECOMMEND_SCAN_RATE
- DURATION_OF_TEST
- TEST_INFO

FST_SETTINGS (225)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Settings for full stroke test (FST)

- FST_SETTINGS_TOL_LIMIT_RESPONSE (tolerance limit of step response)
- FST_SETTINGS_ACTIV_RAMP_FUNC (activation of ramp function)
- FST_SETTINGS_RAMP_TIME_RISING (ramp time rising)
- FST_SETTINGS_RAMP_TIME_FALLING (ramp time falling)
- FST_SETTINGS_SETTL_BEFORE_START (settling time before test starts)
- FST_SETTINGS_DELAY_AFTER_STEP (delay time after step)
- FST_SETTINGS_SCAN_RATE (scan rate)

FST_TEST_STATUS_1 (228) to FST_TEST_STATUS_3 (230)

Storage class: – · Read capability (r)

Status of performed full stroke tests (FST)

HISTOGRAMM_E_ABTAstrate (200)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Scan rate for setpoint deviation histogram for short-term monitoring (EXPERTplus)

HISTOGRAMM_X_ABTAstrate (199)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Scan rate for travel histogram for short-term monitoring (EXPERTplus)

INIT_METHOD (161)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Type of initialization

- 0 · Maximum range
- 1 · Nominal range
- 2 · Manually selected range
- 3 · Substitute
- 4 · Zero point

MANUFAC_ACTUATOR_SIZE (209)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

MOVING_DIRECTION (164)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Direction of operation, i.e. how the reference variable w is assigned to the controlled variable x

NO_OF_ZERO_POINT_ADJ (196)

Storage class: – · Read capability (r)

Indicates the number of zero point calibrations since the last initialization

PIN_POSITION (160)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Pin position

The follower pin must be inserted into the right pin position depending on the valve travel/angle of rotation. The pin position needs to be entered for initialization in NOM or SUB initialization mode. Refer to EB 8384-4 EN.

PRESSURE_LIMIT (177)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Pressure limit (Code 16)

- 1 · Off
- 2 · 3.7 bar
- 3 · 2.4 bar
- 4 · 1.4 bar

PST_ANALYSIS_1 (213) to PST_ANALYSIS_3 (215)

Storage class: – · Read capability (r)

Settings for partial stroke test (PST)

- PST_MEAS_DATA1...3_TIME_STAMP (time stamp for this test)
- PST_MEAS_DATA1...3_BREAK_AWAY_TIME (determined breakaway time)
- PST_MEAS_DATA1...3_OVERSHOOT_RISING (overshoot, rising)
- PST_MEAS_DATA1...3_DEAD_TIME_RISING (dead time, rising)
- PST_MEAS_DATA1...3_T63_RISING (T63, rising)
- PST_MEAS_DATA1...3_T98_RISING (T98, rising)
- PST_MEAS_DATA1...3_RISE_TI_RISING (rise time, rising)
- PST_MEAS_DATA1...3_SETTL_TI_RISING (settling time, rising)
- PST_MEAS_DATA1...3_OVERSHOOT_FALL (overshoot, falling)
- PST_MEAS_DATA1...3_DEAD_TI_FALL (dead time falling)
- PST_MEAS_DATA1...3_T63_FALLING (T63, falling)
- PST_MEAS_DATA1...3_T98_FALLING (T98, falling)
- PST_MEAS_DATA1...3_RISE_TI_FALLING (rise time, falling)
- PST_MEAS_DATA1...3_SETTL_TI_FALLING (settling time, falling)
- PST_MEAS_DATA1...3_DELTA_Y (delta y monitoring value)

PST_CANCEL_CONDITIONS (217)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Cancellation conditions for partial stroke test (PST)

- PST_CANCEL_COND_ACT_X_CONTROL (activation x control)
- PST_CANCEL_COND_X_CONTROL_VALUE (x control value)
- PST_CANCEL_COND_ACT_DELTA_Y_MON (activation delta y monitoring)
- PST_CANCEL_COND_DELTA_Y_MON_VAL (delta y monitoring value)
- PST_CANCEL_COND_TOL_BAND_CONTR (activation tolerance band control)
- PST_CANCEL_COND_TOL_BAND (PST tolerance band)
- PST_CANCEL_COND_MAX_TEST_DURA (max. test duration)

- PST_CANCEL_COND_ACTIV_MAX_TIME (activation 'Max. breakaway time')
- PST_CANCEL_COND_MAX_BREAK_TIME (max. breakaway time)
- PST_CANCEL_COND_ACTIVE_TIME_REACH (activation 'Allowed time to reach PST target')
- PST_CANCEL_COND_TIME_REACH (allowed time to reach PST target)

PST_DISPLAY (218)

Storage class: – · Read capability (r)

Information on partial stroke test (PST)

- AUTOSTART_READ (auto test time)
- PROGRESS_FLAG (progress flag)
- DELTA_Y_MON_REF_VAL (delta y monitoring reference value)
- DELTA_Y_MON_REP_VAL (delta y monitoring repetition value)
- STATUS_PST (status of PST test)
- NUMBER_OF_TESTS (number of PST tests)
- RECOMMEND_SCAN_RATE (recommended scan rate)
- DURATION_OF_TEST (test duration)
- TESTMODE_ACTUAL (current test mode)
- TEST_INFO (test information)

PST_SETTINGS (216)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Settings for partial stroke test (PST)

- PST_SETTINGS_AUTOSTART (auto test time)
- PST_SETTINGS_STEP_START (step start)
- PST_SETTINGS_STEP_END (step end)
- PST_SETTINGS_LIMIT_STEP_RESPONSE (tolerance limit of step response)
- PST_SETTINGS_ACTIVATION_RAMP_FUN (activation of ramp function)
- PST_SETTINGS_RAMP_TIME_RISING (ramp time, rising)
- PST_SETTINGS_RAMP_FALLING (ramp time, falling)
- PST_SETTINGS_SETTLING_TIME (settling time before test starts)
- PST_SETTINGS_DELAY_TI_AFTER_STEP (delay time after step)
- PST_SETTINGS_SCAN_RATE (scan time)
- PST_SETTINGS_STEP_RESPONSE (number of step responses)

PST_TEST_STATUS_1 (219) to PST_TEST_STATUS_3 (221)

Storage class: – · Read capability (r)

Status of partial stroke tests (PST)

- PST_TEST_STAT1...3_TEST_START (test start)
- PST_TEST_STAT1...3_no_test_avail (no test available)
- PST_TEST_STAT1...3_X_CANCEL (x cancellation)
- PST_TEST_STAT1...3_Y_CANCEL (y cancellation)
- PST_TEST_STAT1...3_TOL_BAND_EXCEED (tolerance band exceeded)
- PST_TEST_STAT1...3_MAX_TIME_EXCEED (max. time exceeded)
- PST_TEST_STAT1...3_TEST_MAN_CANCEL (test manually cancelled)
- PST_TEST_STAT1...3_OUT_OF_MEMORY (measured data storage out of memory)
- PST_TEST_STAT1...3_ABO_INT_SOL_VAL (aborted by internal solenoid valve/forced venting)
- PST_TEST_STAT1...3_PRESSURE_FRIC (supply pressure/friction)
- PST_TEST_STAT1...3_W_STEP_TOO_HIGH (difference w - step start too high)
- PST_TEST_STAT1...3_ABORT_REF_CHANG (test aborted - reference variable was changed)
- PST_TEST_STAT1...3_MAX_BREAKTIME_EX (max. breakaway time exceeded)
- PST_TEST_STAT1...3_TIME_EXCEEDED (allowed time to reach PST target exceeded)

RESET_DIAG_FKT (206)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Reset functions

- 0 No function
- 1 Reset diagnosis
- 17 Reset 'Logger'
- 21 Reset 'Travel histogram x'
- 23 Reset 'Setpoint deviation histogram e'
- 22 Reset 'Cycle counter histogram'
- 24 Reset 'Drive signal diagram steady-state'
- 25 Reset 'Drive signal diagram steady-state - short-term monitoring'
- 26 Reset 'Drive signal diagram hysteresis'
- 27 Reset 'Lower end position'
- 28 Reset 'Lower end position - reference values'

- 29 Reset 'Travel histogram x - short-term monitoring'
- 30 Reset 'Setpoint deviation histogram e - short-term monitoring'
- 31 Reset 'Cycle counter histogram - short-term monitoring'
- 32 Reset 'Drive signal diagram hysteresis - short-term monitoring'
- 38 Reset 'Drive signal diagram steady-state - measured data'
- 39 Reset 'Drive signal diagram hysteresis - measured data'
- 60 Reset partial stroke test (PST)
- 61 Reset full stroke test (FST)

SELF_CALIB_STATUS_2 (233)

Storage class: – · Read capability (r)

SELF_CALIB_WARNING (167)

Storage class: – · Read capability (r)

Initialization error

SET_FAIL_SAFE_POS (178)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Fail-safe position of the valve

The positioner remains in AUTO mode. The fail-safe position is indicated on the positioner display by a blinking "S".

- 0 · Not active
- 1 · Set fail-safe position
- 2 · Reset fail-safe position

SETP_CUTOFF_DEC_ON (171)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Activate/deactivate setpoint cutoff decrease (final position w <)

SETP_CUTOFF_INC_ON (170)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Activate/deactivate setpoint cutoff increase (final position w >)

SIGNAL_PRESSURE_ACTION (176)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Position of the slide switch AIR TO OPEN/AIR TO CLOSE (for initialization)

It can only be changed by re-initializing the positioner.

STARTUP_PARA (207)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Start-up parameters

- TRANS1_INIT_METHOD (initialization method (MAX, NOM, MAN, SUB))
- TRANS1_MOVING_DIRECTION (direction of action)
- TRANS1_LIN_TYPE (type of characteristic)
- TRANS1_INIT_WITH_REF_TEST (initialization with reference test (yes/no))
- TRANS1_BLOCKING_POSITION (blocking position)

STAT_KENNLINIE_RW (204)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Structure of the static characteristic

Element	Parameter
0	START
1	ENDE (end)
2	WARTEZEIT_NACH_SPRUNG (delay time after step)
3	ANZAHL_BIS_UMKEHR (number of measurement values until turn back)

STAT_KENNLINIE_RW_2 (232)

Storage class: – · Read/write capability (r/w) · Supported modes: ALL

- START
- ENDE (end)
- WARTEZEIT_NACH_SPRUNG (delay time after step)
- ANZAHL_BIS_UMKEHR (number of measurement values until turn back)

STATUS_SOLENOID_VALVE (182)

Storage class: – · Read capability (r)

Status of solenoid valve (Code 45)

STEP_RESPONSE_R (188)

Storage class: – · Read capability (r)

Information parameter on step response (EXPERTplus)

Element	Parameter
0	OVERSHOOT_RISING
1	OVERSHOOT_FALLING
2	DEAD_TIME_RISING
3	DEAD_TIME_FALLING
4	TIME_63_RISING

5	TIME_63_FALLING
6	TIME_98_RISING
7	TIME_98_FALLING
8	STEP_PROGRESS
9	RISE_TIME_FALLING
10	SETTLING_TIME_FALLING
11	RISE_TIME_RISING
12	SETTLING_TIME_RISING
13	DURATION_OF_TEST
14	TESTINFO

STEP_RESPONSE_RW (189)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Parameters for step response (EXPERTplus)

Element	Parameter
---------	-----------

0	STEPSTART
1	STEPEND
2	STEP_SAMPLE_RATE
3	RAMPE_UP
5	RAMPE_DOWN
6	LATENCY_AFTER_STEP
7	STEP_SELECTION

SUB_MODE_INIT (162)

Storage class: – · Read capability (r)

Status of substitution mode (SUB)

TOLERANCE_BAND (180)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Tolerance band (Code 19)

TRANSDUCER_STATE (172)

Storage class: – · Read capability (r)

State of the Transducer Block

- [0] · See mode
- 1 · Solenoid valve active
- 2 · Lower travel limit reached (travel/angle lower limit, Code 10)
- 3 · Upper travel limit reached (travel/angle upper limit, Code 11)

- 4 · Tight-closing of the valve (final position $w <$, Code 14)
- 5 · Valve fully open (final position $w >$, Code 15)
- 7 · Fail-safe position active
- 255 · Normal operation

TRAVEL_LIMIT_LOW_ON (168)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Enable travel/angle lower limit

TRAVEL_LIMIT_UP_ON (169)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Enable travel/angle upper limit

USER_CHARACT (203)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

User-defined characteristic

Element	Parameter
0	X_0
1	Y_0
...	
20	X_10
21	Y_10

ZERO_POINT_LIMIT (197)

Storage class: S · Read/write capability (r/w) · Supported modes: O

Zero point limit

Index and parameter assignment: AO Transducer Block, Slot 1 · Manufacturer-specific parameters

Index	Parameter
160	PIN_POSITION
161	INIT_METHOD
162	SUB_MODE_INIT
163	DEVICE_INIT_STATE
164	MOVING_DIRECTION
165	CLOSING_DIRECTION
166	BLOCKING_POSITION
167	SELF_CALIB_WARNING
168	TRAVEL_LIMIT_LOW_ON
169	TRAVEL_LIMIT_UP_ON
170	SETP_CUTOFF_INC_ON
171	SETP_CUTOFF_DEC_ON
172	TRANSDUCER_STATE
173	CHARACT_TYPE
176	SIGNAL_PRESSURE_ACTION
177	PRESSURE_LIMIT
178	SET_FAIL_SAFE_POS
179	FINAL_VALUE_RANGE
180	TOLERANCE_BAND
181	DELAY_TIME
182	STATUS_SOLENOID_VALVE
183	FINAL_POSITION_VALUE
184	FINAL_VALUE
185	DATALOGGER
186	DATALOGGER_READ
187	DIAG_MONITORING
188	STEP_RESPONSE_R
189	STEP_RESPONSE_RW

Index	Parameter
190	EVENT_LOGGING_1
191	EVENT_LOGGING_2
192	ENHANCED_DIAG_CMD
193	ELAPSED_HOURS_METERS
194	AUTOSTART_HYS
195	DIAGNOSE_LEVEL
196	NO_OF_ZERO_POINT_ADJ
197	ZERO_POINT_LIMIT
198	COUNTER_INIT_START
199	HISTOGRAMM_X_ABTAstrate
200	HISTOGRAM_E_ABTAstrATRE
201	DIAG_TESTINFO
202	DEVICE_CHARACT
203	USER_CHARACT
204	STAT_KENNNLINIE_RW
205	ACTIVE_IDENT_NUMBER
206	RESET_DIAG_FKT
207	STARTUP_PARA
208	SETP_X_LIMIT_PARA
209	MANUFAC_ACTUATOR_SIZE
210	CYCLE_COUNTER_LIMIT
211	DATALOGGER_2
212	DATALOGGER_READ_2
213	PST_ANALYSIS_1
214	PST_ANALYSIS_2
215	PST_ANALYSIS_3
216	PST_SETTINGS
217	PST_CANCEL_CONDITIONS

Index	Parameter
218	PST_DISPLAY
219	PST_TEST_STATUS_1
220	PST_TEST_STATUS_2
221	PST_TEST_STATUS_3
222	FST_ANALYSIS_1
223	FST_ANALYSIS_2
224	FST_ANALYSIS_3
225	FST_SETTINGS

Index	Parameter
226	FST_CANCEL_CONDITIONS
227	FST_DISPLAY
228	FST_TEST_STATUS_1
229	FST_TEST_STATUS_2
230	FST_TEST_STATUS_3
231	DEVICE_CHARACT_2
232	STAT_KENNLINIE_RW_2
233	SELF_CALIB_STATUS_2

8.3.1 DI1/2 Function Block, Slot 2/3 · Profile-specific parameters

ALERT_KEY (20)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Identification number of the plant section

- [0]

ALM_SUM (23)

Storage class: – · Read capability (r)

Current states of the process alarms in DI Function Block

- [0]

BATCH (24)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Identification of the batch process

BLOCK_OBJECT (16)

Storage class: – · Read capability (r)

CHANNEL (30)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Connection of the Function Block with the Transducer Block

DI1: 0 · Not active

780 · Active

DI2: 0 · Not active

524 · Active

FSAFE_TYPE (36)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Fail-safe action

0 · FSAFE_VALUE is used as OUT_D

[1] · The last valid value of OUT_D is used

2 · OUT_D does not have a valid value

FSAFE_VAL_D (37)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Default value for OUT_D when the sensor/sensor electronics register an error

- [0]

INVERT (31)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Inversion of the input value PV_D (from DI Transducer Block) before it is saved in the OUT_D parameter

[0] · Not inverted

1 · Inverted

MODE_BLK (22)

Storage class: – · Read capability (r)

Current mode

OUT_D* (26)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Output of the Function Block (only in MAN mode)

SIMULATE (40)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Simulation of input value PV_D; the DI Transducer Block and DI Function Block are separated (test)

ST_REV (17)

Storage class: – · Read capability (r)

Revision level of static data

STRATEGY (19)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Grouping to allow faster processing of blocks

- [0]

Blocks are grouped by entering the same value in the STRATEGY parameter of each block.

Note: These data are neither checked nor processed by the DI Function Block.

TAG_DESC (18)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Assigns a unique description to each block for clear identification

- Max. 32 characters

TARGET_MODE (21)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Target mode

- 8 · AUTO
- 16 · MAN
- 128 · O/S

VIEW1 (240)

Storage class: – · Read capability (r)

A group of parameters can be read with a read command (VIEW1)

Index and parameter assignment: DI1/2 Function Block, Slot 2/3 · Profile-specific parameters

Index	Parameter
16	BLOCK_OBJECT
17	ST_REV
18	TAG_DESC
19	STRATEGY
20	ALERT_KEY
21	TARGET_MODE
22	MODE_BLK
23	ALM_SUM

Index	Parameter
24	BATCH
26	OUT_D
30	CHANNEL
31	INVERT
36	FSAFE_TYPE
37	FSAFE_VAL_D
40	SIMULATE

8.3.2 DI1/2 Transducer Block, Slot 2/3 · Profile-specific parameters

ALERT_KEY (64)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Identification number of the plant section

- [0]

ALM_SUM (67)

Storage class: – · Read capability (r)

Current states of the process alarms in DI Transducer Block

- [0]

BLOCK_OBJ (60)

Storage class: – · Read capability (r)

MODE_BLK (66)

Storage class: – · Read capability (r)

Current mode

PV_D (72)

Storage class: – · Read capability (r)

Process variable (forwarded to the Function Block including status)

SENSOR_ID (69)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Identification of sensor used (model type)

SENSOR_MAN (71)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Sensor manufacturer

SENSOR_SER_NUM (70)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Sensor's serial number

SENSOR_WIRE_CHECK (68)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

ST_REV (61)

Storage class: S · Read capability (r)

Revision level of static data

STRATEGY (63)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Grouping to allow faster processing of blocks

- [0]

Blocks are grouped by entering the same value in the STRATEGY parameter of each block.

TAG_DESC (62)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Assigns a unique description to each block for clear identification.

- Max. 32 characters

TARGET_MODE (65)

Storage class: S · Read/write capability (r/w) · Supported modes: ALL

Target mode

- 8 · AUTO
- 16 · MAN
- 128 · O/S

Index and parameter assignment: DI1/2 Transducer Block, Slot 2/3 · Profile-specific parameters

Index	Parameter
60	BLOCK_OBJ
61	ST_REV
62	TAG_DESC
63	STRATEGY
64	ALERT_KEY
65	TARGET_MODE

Index	Parameter
66	MODE_BLK
67	ALM_SUM
68	SENSOR_WIRE_CHECK
69	SENSOR_ID
70	SENSOR_MAN
71	PV_D



SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
Internet: <http://www.samson.de>

KH 8384-4 EN

2012-06