

Series 3731 Type 3731-5 Electropneumatic Ex d Positioner



Configuration and operation over
FOUNDATION™ fieldbus and TROVIS-VIEW

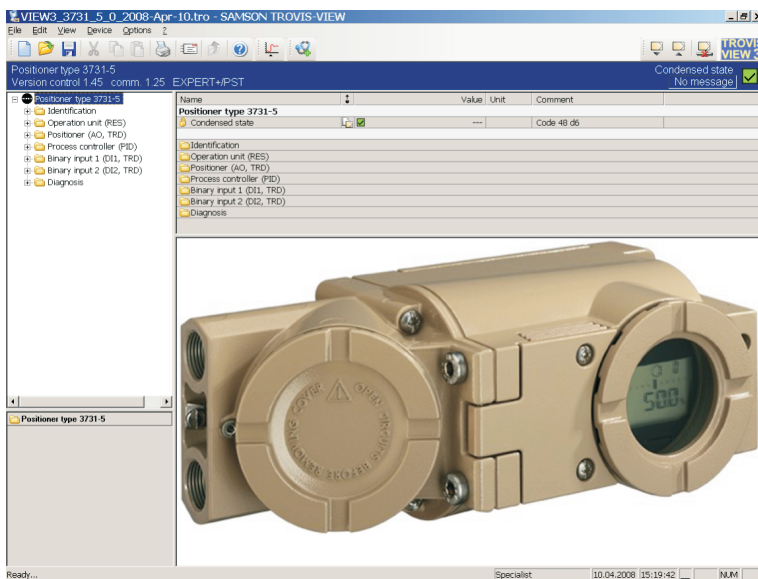


Fig. 1 · Configuration and operation over TROVIS-VIEW (Type 3731-5)



Configuration Manual

KH 8387-5 EN

Firmware version K 1.2x/R 1.4x

Edition April 2008

Note concerning this Configuration Manual

The rotary pushbutton on the positioner allows the Type 3731-5 Positioner to be operated and configured on site. In addition, the settings can be performed over the FOUNDATION fieldbus network or over the SAMSON SSP interface. The Mounting and Operating Instructions EB 8387-5 EN describe the mounting, start up and on-site operation.

This Manual (KH 8387-5 EN) describes the basic principles and parameters for operation and configuration using:

- ▶ FOUNDATION™ fieldbus (section 1)
and
- ▶ TROVIS-VIEW Configuration and Operator Interface (section 2) connected over the SAMSON SSP interface

Note: Information on the extended EXPERT⁺ diagnostics (including partial stroke testing) is included in the Operating Instructions EB 8388-5 EN.

Revisions of positioner firmware in comparison to previous versions	
Previous	New
Communication K 1.25	K 1.26
Bus connection	Supports bus connector SIM 1-2 (Siemens IEC MAU)

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1 Configuration and operation over FOUNDATION™ fieldbus

This section is based upon:

- ▶ Fieldbus FOUNDATION Specification "Function Block Application Process Part 1 – 3" Revision 1.5
- ▶ Fieldbus FOUNDATION Specification "Transducer Block Application Process Part 1 – 2" Revision PS 3.0

1.1 Device description files (DD)

To integrate the positioner into host systems, the following device description files are required:

- ▶ Device description files: < 0101.ffo >, < 0101.sym >
- ▶ Capabilities file: < 010101.cff >

These device description files are available on the supplied CD-ROM (CD 8387-5) or can be downloaded from the Internet at www.fieldbus.org or www.samson.de.

1.2 FOUNDATION™ fieldbus block model

FOUNDATION™ fieldbus assigns all the functions and data of a device to various types of blocks. Each type of block has a different range of tasks to fulfill in the block model.

The following types of blocks are implemented in the SAMSON Type 3731-5 Positioner:

- ▶ **One Resource Block**
The Resource Block contains all the specific characteristics associated with a device on the fieldbus, for example, device name, manufacturer number and serial number. A device can only have one Resource Block.
- ▶ **One AO Transducer Block**
Each AI or AO Function Block has a Transducer Block which contains all data and device-specific parameters to connect the device to the process value (sensor or actuator). The positioner output signal can be directly influenced over the AO Transducer Block.
- ▶ **Two DI Transducer Blocks**
The DI Transducer Blocks connect binary input signals for transmission and processing over the fieldbus.
- ▶ **One Analog Output Function Block**
Function blocks are responsible for the control behavior of a FOUNDATION™ fieldbus device. A FOUNDATION™ fieldbus application can be configured by connecting the inputs and outputs of function blocks.

The AO Function Block converts the output value from an upstream function block into a control value for the valve.

Execution time: 20 ms

▶ **Two Discrete Input Function Blocks**

The DI Function Blocks are used as inputs to control binary signals. They support the selection of binary switching states of various functions.

Execution time: 40 ms

▶ **One PID Function Block**

The PID controller has a flexible proportional-integral-differential control algorithm which can be configured as required to match the application.

Execution time: 60 ms

1.3 FF parameters

Several parameters can only be modified in certain modes (see Read/write capability in the parameter description). In this case, not the actual mode is decisive, but the target mode.

1.3.1 Resource Block

The Resource Block contains all the data that identify the device. It is similar to an electronic device tag. Resource Block parameters include device type, device name, manufacturer ID, serial number as well as parameters which affect the behavior of all other blocks of the device.

Refer to page 16 for the list of parameters.

Note: All time specifications in the Resource Block are specified in the unit of 1/32 ms according to the Fieldbus Specification Version 1.5.

In the Device Description Library supplied by Fieldbus FOUNDATION upon which the device description of Type 3731-5 is also based, these parameters are incorrectly specified as the unit of ms. The specified values supplied by the device are, however, always to be interpreted as the unit of 1/32 ms.

1.3.2 Analog Output Transducer Block

The Transducer Block allows the input and output variables of a function block to be influenced. In this way, process data can be used to calibrate measured and control data, linearize characteristics, or convert engineering units. Transducer Block parameters include information on the type of actuator, attachment, engineering units, commissioning, diagnostics as well as device-specific parameters.

The Standard Advanced Positioner Valve Transducer Block receives an output value from an upstream Analog Output Function Block. This value is used to position a control valve. The block contains parameters to adapt the positioner to the actuator and valve as well as for valve commissioning and diagnostics.

Refer to page 26 for the list of parameters.

1.3.3 Discrete Input Transducer Blocks

Transducer Blocks directly connect the physical inputs of the field device to the assigned function blocks.

The CHANNEL parameter is used to assign the Transducer Blocks to the function blocks.

The Type 3731-5 Positioner has an optional binary input which works either for DC voltage signals or as a floating contact. The state of the binary input is passed on to the DI Function Block over the DI1 Transducer Block.

The DI Transducer Blocks are implemented according to the FF Specification and do not contain any manufacturer-specific parameters.

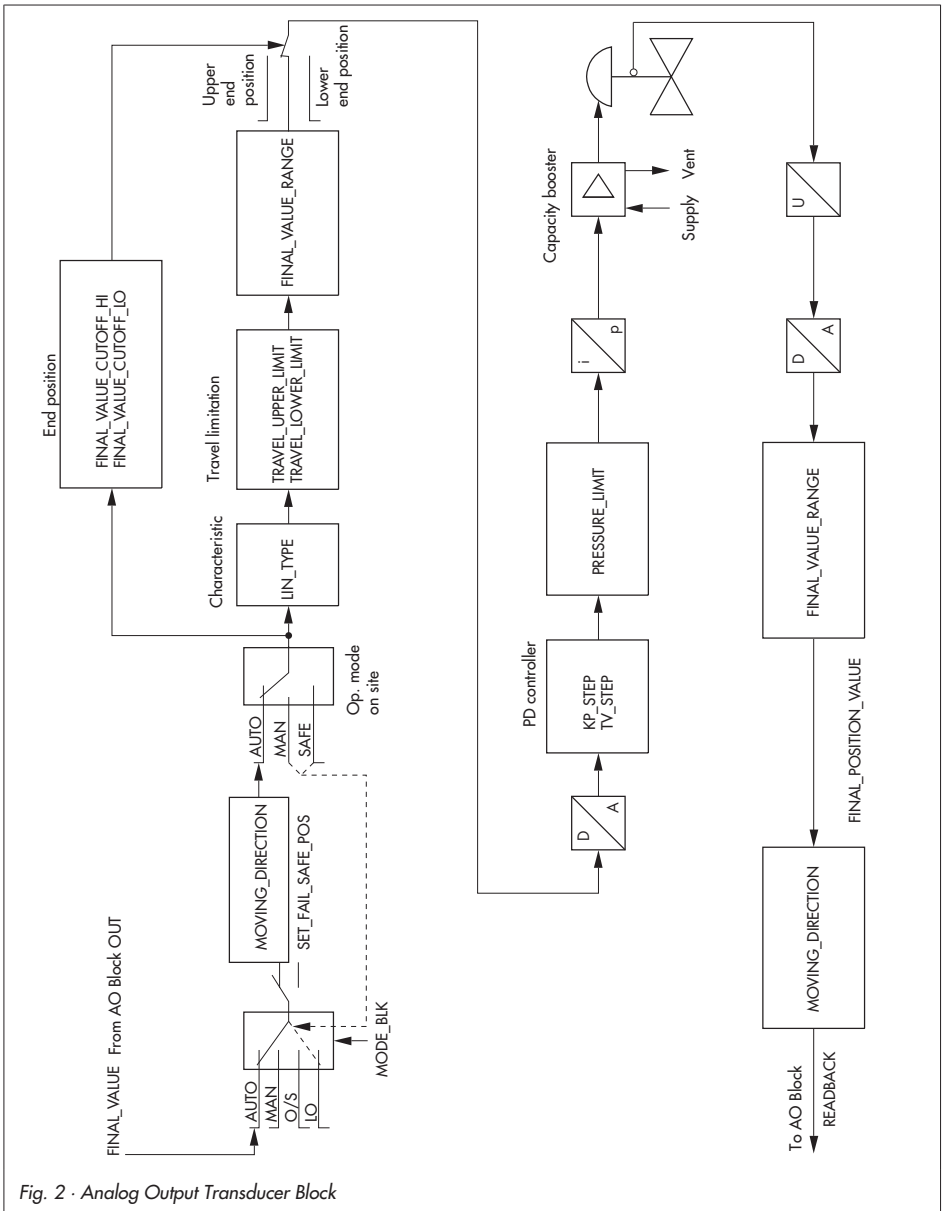


Fig. 2 - Analog Output Transducer Block

1.3.4 Analog Output Function Block

The Analog Output (AO) Function Block processes an analog signal from an upstream function block (e.g. PID Function Block) into an output value intended for the downstream Transducer Block (e.g. valve positioner). It contains scaling functions and ramp functions as well as other functions.

The AO Function Block receives its set point depending on the mode (MODE_BLK) from one of the input variables CAS_IN, RCAS_IN or SP. An internal working set point is created from it, taking into account the PV_SCALE, SP_HI_LIM and SP_LO_LIM, SP_RATE_UP and SP_RATE_DN.

Depending on the IO_OPTS and XD_SCALE parameters, an output value OUT is generated which is passed on to the downstream Transducer Block over the CHANNEL parameter.

A Fault State is included in the AO Function Block which is activated when a fault condition (of the valid set point) lasts longer than the time determined in FSTATE_TIME or when SET_FSTATE is activated in the Resource Block.

The Fault State is determined over FSTATE_TIME, FSTATE_VAL and IO_OPTS parameters.

In the Device Description Library supplied by Fieldbus FOUNDATION upon which the device description of Type 3731-5 is also based, "Fault state to value" is indicated as "Fault state type" in the IO_OPTS parameter of the AO Function Block.

Refer to page 53 for the list of parameters.

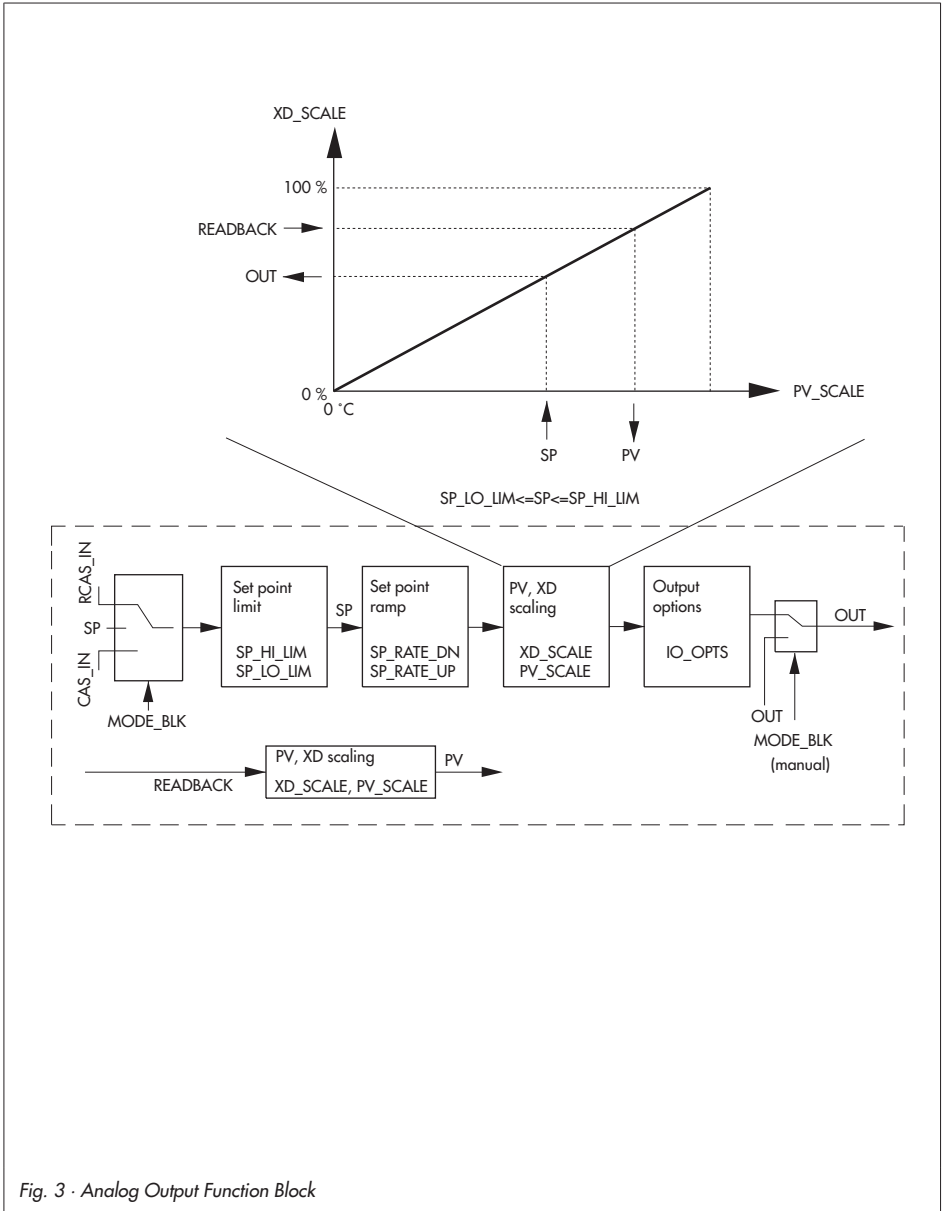


Fig. 3 - Analog Output Function Block

1.3.5 DI1 Function Block

The Type 3731-5 Positioner has an optional binary input. The DI Function Block is used to analyze the contact input (terminals A and B for a binary input with DC voltage signals or terminals B und C for a binary input with floating contact) and to integrate it into a FOUNDATION™ fieldbus application.

The connected hardware is assigned to the function block by CHANNEL = 1. The OUT_D parameter is used to link the state of the contact to other function blocks.

Alternatively, an optional forced venting function, a discrete valve position with three states POS_D as well as the Condensed State (NAMUR status) can be processed.

The binary signal to be linked can be selected over the SELECT_BINARY_INPUT_1 parameter in the Resource Block.

Refer to page 60 for the list of parameters.

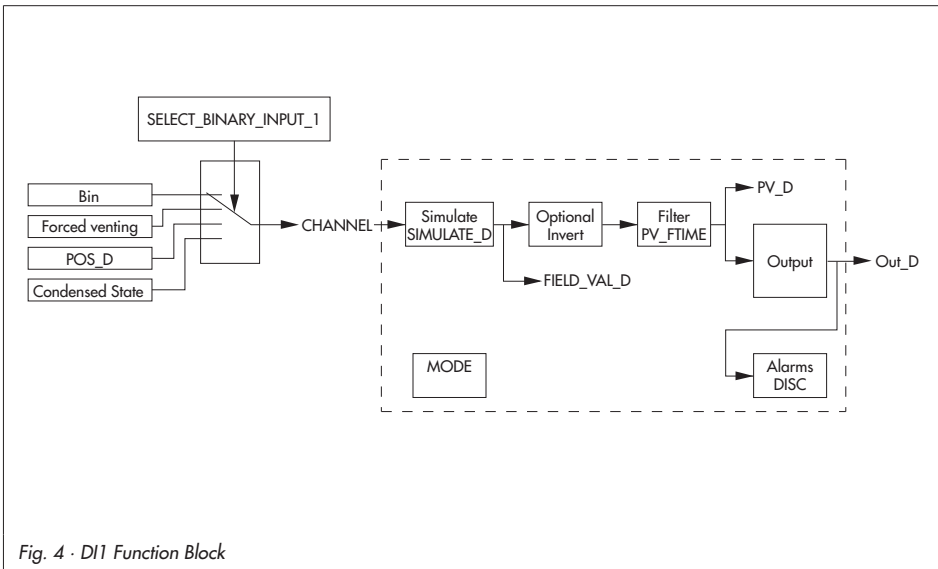


Fig. 4 · DI1 Function Block

1.3.6 DI2 Function Block

The forced venting function, a discrete valve position with three states POS_D or the Condensed State/PST (NAMUR status) are processed by the DI2 Function Block. The connected hardware is assigned to the function block by CHANNEL = 2.

The OUT_D parameter is used to link the state of the contact to other function blocks. The signal to be linked can be selected over the SELECT_BINARY_INPUT_2 parameter in the Resource Block.

When a pressure sensor (leakage sensor) is connected, its switching state can be issued as a diagnostic alarm in the XD_ERROR_EXT parameter of the AO Transducer Block and logged. In this case, the option LEAKAGE SENSOR must be activated in CONFIG_BINARY_INPUT2. Alternatively, the switching state of the binary input can be issued in the BINARY_INPUT2 parameter of the AO Transducer Block.

Parameters of the DI2 Function Block

The parameters of the DI2 Function Block are the same as the parameters of DI1 Function Block.

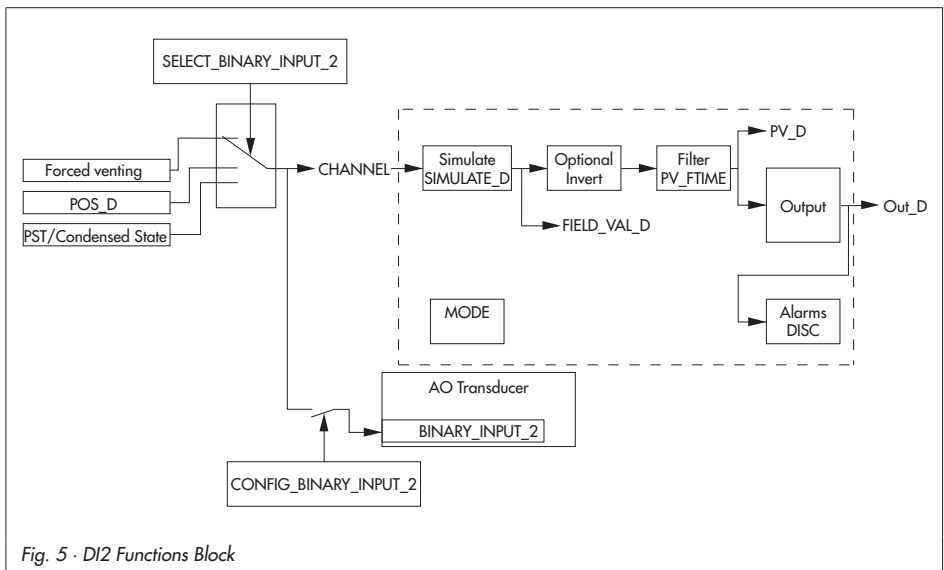


Fig. 5 · DI2 Functions Block

1.3.7 PID Function Block

A PID Function Block contains the input channel processing, the proportional-integral-derivative (PID) control loop and the analog output channel processing.

The configuration of the PID Block (PID controller) depends on the automation task.

Simple control loops, control loops with manipulate variable feedforwarding, cascade control and cascade controls with limitation in combination with another controller function block can be implemented.

The following options are available for processing the measured variable within the PID Function Block (PID controller): Signal scaling and limiting, mode control, feedforward control, limit control, alarm limit detection and signal status propagation.

The PID Function Block (PID controller) can be used for various automation strategies. The block has a flexible control algorithm that can be configured to match the application.

The PID Function Block receives its set point depending on the mode (MODE_BLK) from the input variables CAS_IN, RCAS_IN or SP. PV_SCALE, SP_HI_LIM, SP_LO_LIM, SP_RATE_UP and SP_RATE_DN are used to generate an internal operating set point.

The block receives the actual value over the IN input variable which is used to generate the process variable PV, taking into account the PV_SCALE and the filter of the first order PV_FTME.

These values are fed to the internal PID algorithm. This algorithm consists of a proportional, an integral and a derivative component. The manipulated variable is calculated from the set point value SP and the process variable PV (actual value) resulting from the system deviation.

The individual PID components are included in the calculation of the manipulated variable as follows:

▶ **Proportional component:**

The proportional component reacts immediately and directly when the set point SP or the process variable PV (actual value). The manipulated variable is changed by the proportional factor GAIN. This change corresponds to the system deviation multiplied by the gain factor. If a controller works only with a proportional component, the control loop has a permanent system deviation.

▶ **Integral component:**

The system deviation resulting from the calculation of the manipulated variable using the proportional component is integrated over the integral component of the controller until it is negligible. The integral function corrects the manipulated variable depending on the size and duration of the system deviation. If the value for the integration time RESET is set to zero, the controller works as a P or PD controller. The influence of the integral component on the control loop increases when the value of the integration time is reduced.

► Derivative component:

In controlled systems with long delay times, e.g. in temperature control loops, it is better to use the derivative component RATE of the controller. Using the derivative component RATE, the manipulated variable is calculated depending on the rate of change of the system deviation.

An output value OUT is formed from the calculated manipulated variable corresponding to the OUT_SCALE, OUT_HI_LIM and OUT_LO_LIM parameters. This output value can be passed on to a downstream connected function block.

The status of the output value OUT can be influenced by the STATUS_OPTS parameter depending on the status of the input variable of the PID Function Block. This allows, for example, the fault state of a downstream connected output block to be activated.

The BYPASS parameter allows the internal set point to be directly transferred to the correction value. Feedforward is possible over the FF_VAL input variable. TRK_IN_D and TRK_VAL allow the output value to be directly tracked.

Refer to page 66 for the list of parameters.

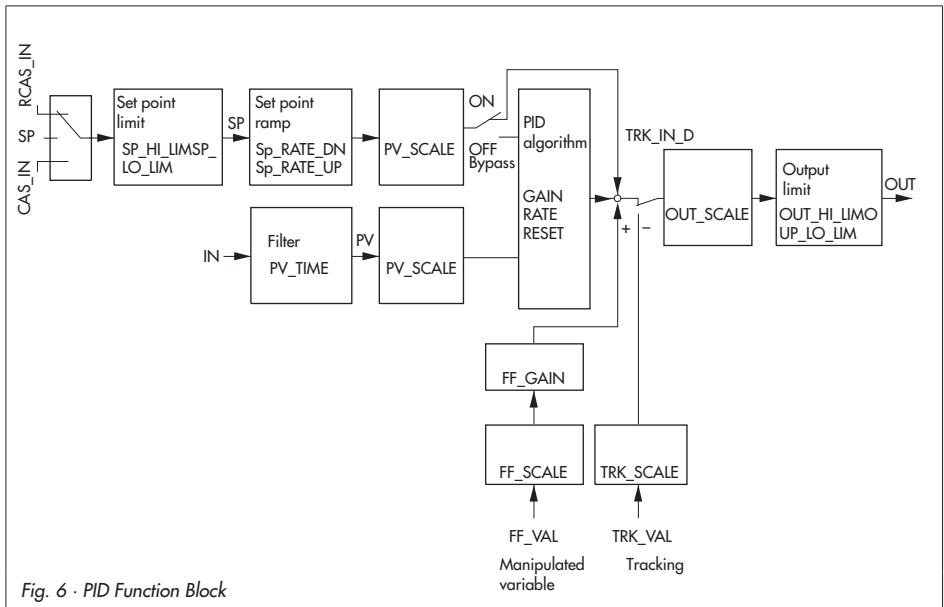


Fig. 6 · PID Function Block

1.3.8 Other parameters

Stale Counter

The Stale Counter serves to judge the “quality” of a process variable received over a configured cyclic connection (publisher/subscriber connection).

These connections are used to transfer the process variable linked amongst the various function blocks. For this purpose, the upstream block (publisher) sends the process variable over the bus at scheduled times. The downstream block(s) (subscriber) responds at the scheduled times. The blocks that are to receive data monitor whether a valid value exists at the scheduled time. A value is valid if it exists with the status “Good” at the scheduled time.

The Stale Counter defines how many “Bad” (stale) values can be accepted in sequence before the Fault State of the block is activated.

This monitoring function is deactivated by setting the Stale Counter to zero.

Link Objects

Link Objects are used to link the inputs and outputs of the function blocks (configurable cyclic connections).

A maximum of 22 Link Objects can be configured for each positioner.

LAS Functionality

The number of links and schedules that can be used is matched to the requirements of standard process control systems available on the market.

The positioner functioning as an LAS can support the following:

- ▶ 1 schedule
- ▶ 1 subschedule
- ▶ 25 sequences per subschedule
- ▶ 25 elements per sequence
- ▶ In the delivered state, the positioner is configured as a basic device.

1.4 Parameter lists

Legend

The parameter index is listed in parentheses following the parameter name in the following tables.

Storage class:	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
	NA	Not analyzed

Other modes:	LO	Local override mode
	ROUT	Remote output mode

Note:

- Values/setting in parentheses [] are the default settings
 - Refer to the Operating Instructions EB 8388-5 EN for further information on parameters which are available from the diagnostic level EXPERT⁺/PST and higher.
-

1.4.1 Resource Block

RES: ACK_OPTIONS (38)

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

Determines whether an alarm is to be automatically acknowledged in the Resource Block

- [UNDEFINED] · No selection
- DISC ALM · Write lock has been changed
- BLOCK ALM · Block alarm

Note: The alarm is broadcast to the fieldbus host system, but not acknowledged by it.

RES: ALARM_SUM (37)

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

Determines the current status of the process alarms in the Resource Block

- DISC ALM · Write lock has been changed
- BLOCK ALM · Block alarm

Note: The process alarms can also be deactivated in this parameter group.

RES: ALERT_KEY (4)

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

Used to specify the identification number of the plant section.

- 1 to 255, [0]

This information can be used by the fieldbus host system to group alerts and events.

Note: "0" is not a permissible value and will be rejected when transferring data to the device (error alarm).

RES: BLOCK_ALM (36)

Storage class: D · Read capability (r)

Indicates the current block state with details on all configuration, hardware or system problems in the block including details on the date and time of the alarm when the fault occurred.

RES: BLOCK_ERR (6)

Storage class: D · Read capability (r)

Active block error → Code 48 S2

- SIMULATE ACTIVE · Simulation jumper active, simulation possible
- OUT OF SERVICE · Block mode is out of service
- LOST STATIC DATA · Data in EEPROM lost
- DEVICE NEEDS MAINTENANCE SOON · Block alarm (BLOCK_ALM) in Resource Block is triggered.

- DEVICE NEEDS MAINTENANCE NOW · Block alarm (BLOCK_ALM) in Resource Block is triggered.

Note: The assignment of error or diagnostic alarms to the desired function block is determined using the ERROR_OPTION parameters in the Transducer Block.

RES: BUS_ADDRESS (55)

Storage class: D · Read capability (r)

Bus address → Code 46

- 0 to 255, [248]

RES: CLR_FSTATE (30)

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

Used to manually clear the Fault State of the AO Function Block.

RES: CONDENSED_STATE (59)

Storage class: D · Read capability (r)


Condensed state → Code 48 d6

- 0: OK
- 1: Maintenance required
- 2: Maintenance demanded
- 3: Maintenance alarm
- 7: Function check

Each possible event or error is assigned to a status in the positioner.

This assignment can be modified in the Transducer Block. The condensed state provides a summary of all classified status alarms.

The state is also indicated on the LCD of the positioner:

 for "Maintenance required" and "Maintenance demanded"

 for "Maintenance alarm"

*tES*ting for "Function check"

RES: CONFIRM_TIME (33)

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

Confirmation time for alert report

Specifies the time the device waits for confirmation that an alert report was received before trying again.

- [640000 1/32 ms]

RES: CYCLE_SEL (20)

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

Specifies the block execution method determined by the fieldbus host system.

- [SCHEDULED]
- COMPLETION OF BLOCK EXECUTION

Note: The block execution method is selected directly in the fieldbus host system.

RES: CYCLE_TYPE (19)

Storage class: S · Read capability (r)

Indicates the block execution method supported by the device.

- SCHEDULED
- COMPLETION OF BLOCK EXECUTION

RES: DD_RESOURCE (9)

Storage class: S · Read capability (r)

Specifies the resource that contains the Device Description file in the device.

Note: If the device contains no Device Description, "0" is indicated.

RES: DD_REV (13)

Storage class: S · Read capability (r)

Specifies the revision number of the Device Description file.

RES: DESCRIPTOR (46)

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

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

- Max. 32 characters, [no text]

RES: DEV_REV (12)

Storage class: S · Read capability (r)

Indicates the manufacturer's revision number for the device.

RES: DEV_TYPE (11)

Storage class: S · Read capability (r)

Indicates the manufacturer's model number for the device in decimal format.

- [2] for Type 3731-5

RES: DEVICE_CERTIFICATION (45)

Storage class: N · Read capability (r)

Specifies whether explosion protection certificates are available for Type 3731-5.

RES:	DEVICE_PRODUCT_NUM (48) Storage class: N · Read capability (r) Specifies the positioner's product number
RES:	DEVICE_SER_NUM (44) Storage class: N · Read capability (r) Specifies the positioner's serial number.
RES:	DEVICE_MESSAGE (47) Storage class: N · Read/write capability (r/w) · Supported modes: O/A Any desired text. The text is saved in the field device. • Max. 32 characters, [no text]
RES:	FAULT_STATE (28) Storage class: N · Read capability (r) Indicates the current Fault State of the Analog Output Function Block
RES:	FEATURES (17) Storage class: S · Read capability (r) Specifies the additionally supported Resource Block options, see FEATURES_SEL.
RES:	FEATURES_SEL (18) Storage class: S · Read/write capability (r/w) · Supported modes: O/A Enables selection of additionally supported Resource Block options. • REPORTS · Fieldbus host system needs to acknowledge receipt of an alert report. • HARD W LOCK · Write lock switch hardware is evaluated • FAULTSTATE · Fault State can be triggered (see SET_FSTATE /CLR_FSTATE). • OUT READBACK · Current valve position issued in the PV parameter of the Analog Function Block (otherwise in SP parameter). Note: If the AO Function Block should not move to the MAN mode when the forced venting function is activated, deactivate this option.
RES:	FREE_SPACE (24) · This parameter is not supported
RES:	FREE_TIME (25) · This parameter is not supported
RES:	GRANT_DENY (14) · This parameter is not supported

RES: HARD_TYPES (15)

Storage class: S · Read capability (r)

Indicates the types of output signal (hardware) available for the AO Function Block.

- [SCALAR OUTPUT] · Scalable analog output variable

RES: HW_REVISION (43)

Storage class: S · Read capability (r)

Specifies the hardware revision number of the electronic/mechanical components.

RES: ITK_VER (41)

Storage class: S

Specifies the version of the Interoperability Tester used on certifying the device as interoperable.

RES: LIM_NOTIFY (32)

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

Specifies the number of alert reports that the device can send without getting a confirmation.

- 0 to [8]

RES: LOCAL_OP_ENA (56)

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

Locks/enables local operation.

RES: MANUFAC_ID (10)

Storage class: S · Read capability (r)

Manufacturer's identification number.

- [0 x 00E099] · SAMSON AG

RES: MAX_NOTIFY (31)

Storage class: S · Read capability (r)

Specifies the maximum number of alert reports that the device can send without getting a confirmation.

- [8]

RES: MEMORY_SIZE (22) · This parameter is not supported**RES: MIN_CYCLE_T (21)**

Storage class: S · Read capability (r)

Indicates the shortest cycle interval that the device can perform.

- [640 ½ ms] · Corresponds to an execution time of AO Function Block: 20 ms

RES: MODE_BLK (5)

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

operating mode of the Resource Block:

- Target Mode → Code 48 S0
- Actual Mode (read only) → Code 48 S1
- Permitted Mode
- Normal Mode (read only)

- AUTO · The execution of the function blocks (AO and PID) is enabled.
- O/S · The execution of the function blocks (AO and PID) is stopped. These blocks go out of service (O/S mode).

RES: NV_CYCLE_T (23)

Storage class: S · Read capability (r)

Specifies the minimum time interval in which device data are stored to the non-volatile memory.

Note: Non-volatile data are saved immediately after transmission.

RES: READING_DIRECTION (54)

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

Reading direction → Code 2

Rotates the display contents by 180°.

RES: RESTART (16)

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

Enables the positioner to be reset in various ways:

- RUN · Normal operating state
- RESOURCE (**setting not supported!**)
- DEFAULTS · Device data and function block linkings are reset to the default settings listed in the FF Specification.
- PROCESSOR · Warm start of device, processor restarted.

RES: RS_STATE (7)

Storage class: D · Read capability (r)

Indicates the current operating state of the Resource Block.

- ONLINE · Standard operating state; the function block is in AUTO mode.
- STANDBY · The Resource Block is in O/S mode.
- ONLINE LINKING · The configured links between the function blocks have not been established yet.

RES: SELECT_BINARY_INPUT1 (57)

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

Used to select the data to be processed in DI1 Block (optional binary input)

- DI1 CONTACT · Switching state of the binary input
- DI1 INTERNAL SOLENOID VALVE · Switching state of the forced venting
- DI1 DISCRETE VALVE POSITION · Current valve position as discrete information
 - 1 Current valve position < x %
 - 2 Current valve position > x %
 - 3 Intermediate position

Note: The limits for < x % or > x % are set in FINAL_POSITION_VALUE_LIMITS [0.5; 99.5]

- DI1 CONDENSED STATE
 - 0 OK
 - 1 Maintenance required
 - 2 Maintenance demanded
 - 3 Maintenance alarm
 - 7 Function check

RES: SELECT_BINARY_INPUT2 (58)

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

Used to select the data to be processed in DI2 Block (optional binary input)

- DI2 CONTACT · No function
- DI2 INTERNAL SOLENOID VALVE · Switching state of the forced venting
- DI2 DISCRETE VALVE POSITION · Current valve position as discrete information, see SELECT_BINARY_INPUT1
- DI2 CONDENSED STATE · Condensed state/PST, see SELECT_BINARY_INPUT1

RES: SET_FSTATE (29)

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

Enables manual activation of the Fault State of the AO Function Block.

RES: SHED_RCAS (26)

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

Determines how long function blocks are to check that the connection between the fieldbus host system and the PID Function Block exists in RCAS mode.

When the time has elapsed, the PID Function Block switches from RCAS mode to the operating mode selected in the SHED_OPT parameter.

RES: SHED_ROUT (27)

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

Determines how long function blocks are to check that the connection between the fieldbus host system and the PID Function Block exists in ROUT mode.

When the time has elapsed, the PID Function Block switches from ROUT mode to the operating mode selected in the SHED_OPT parameter.

- [640000 ½ ms]

RES: ST_REV (1)

Storage class: N · Read capability (r)

Indicates the revision number of static data.

Note: The revision state is incremented by one each time a static parameter in the block is written.

RES: STRATEGY (3)

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

Permits strategic grouping and thus faster processing of blocks.

- [0]

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

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

RES: SW_REVISION (42)

Storage class: N · Read capability (r)

Indicates the firmware version (communication → Code 48 F0 /control → Code 43)

RES: TAG_DESC (2)

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

Assigns a unique description to each block for clear identification.

- Max. 32 characters, [no text]

RES: TEST_RW (8)

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

This parameter is required for conformity tests only and is not used in normal operation.

RES: TEXT_INPUT_1 (49) to TEXT_INPUT_5 (53)

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

Any text

- Max. 32 characters, [no text]

RES: UPDATE_EVT (35)

Storage class: D · Read capability (r)

Indicates that static data were changed, including date and time stamp.

RES: WRITE_ALM (40)

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

Indicates the state of the write-lock alarm.

Note: The alarm is triggered when the WRITE_LOCK parameter is unlocked.

RES: WRITE_LOCK (34)

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

Indicates the state of the write-lock alarm → Code 47

- LOCKED
- NOT LOCKED

Note: The write-lock can be activated by setting Code 47 to ON: device data can only be read over FF communication, but not overwritten.

The write-lock can be deactivated by setting Code 47 to OFF: device data can be overwritten over FF communication.

RES: WRITE_PRI (39)

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

Used to set the priority for the WRITE_ALM parameter.

- [0] · The write-lock alarm is not processed.
- 1 · The write-lock alarm is not broadcast to the fieldbus host system.
- 2 · Reserved for block alarms
- 3 to 7 · The write-lock alarm is issued to notify the operator with the corresponding priority: (3 = low, 7 = high)
- 8 to 15 · The write-lock alarm is issued as a critical alarm with the corresponding priority (8 = low, 15 = high).

Parameter index for Resource Block

Index	Parameter
0	–
1	ST_REV
2	TAG_DESC
3	STRATEGY
4	ALERT_KEY
5	MODE_BLK
6	BLOCK_ERR
7	RS_STATE
8	TEST_RW
9	DD_RESOURCE
10	MANUFAC_ID
11	DEV_TYPE
12	DEV_REV
13	DD_REV
14	GRANT_DENY
15	HARD_TYPES
16	RESTART
17	FEATURES
18	FEATURES_SEL
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20	CYCLE_SEL
21	MIN_CYCLE_T
22	MEMORY_SIZE
23	NV_CYCLE_T
24	FREE_SPACE
25	FREE_TIME
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Index	Parameter
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31	MAX_NOTIFY
32	LIM_NOTIFY
33	CONFIRM_TIME
34	WRITE_LOCK
35	UPDATE_EVT
36	BLOCK_ALM
37	ALARM_SUM
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40	WRITE_ALM
41	ITK_VER
42	SW_REVISION
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44	DEVICE_SER_NUM
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56	LOCAL_OP_ENA
57	SELECT_BINARY_INPUT1
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59	CONDENSED_STATE

1.4.2 Analog Output Transducer Block

AO TRD: ACT_FAIL_ACTION (21)

Storage class: D · Read capability (r)

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

- UNINITIALIZED · Undefined
- CLOSING · (in 0 % position)
- OPENING · (in 100 % position)
- INDETERMINATE · None

AO TRD: ACT_MAN_ID (22)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Specifies the actuator manufacturer's identification number.

Clearly identifies the manufacturer of the actuator used with the positioner.

AO TRD: ACT_MODEL_NUM (23)

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

Specifies the model number of the actuator used with the positioner.

AO TRD: ACT_SN (24)

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

Specifies the serial number of the actuator used with the positioner.

AO TRD: ACT_STROKE_TIME_DEC (67)

Storage class: D · Read capability (r)

Minimum transit time to reach CLOSED position → Code 41

Time in seconds that the system (consisting of positioner, actuator and valve) needs to move through the rated travel range/angle of rotation to reach CLOSED (0 % position).

ACT_STROKE_TIME_DEC is measured during initialization.

AO TRD: ACT_STROKE_TIME_INC (68)

Storage class: D · Read capability (r)

Minimum transit time to reach OPEN position → Code 40

Time in seconds that the system (consisting of positioner, actuator and valve) needs to move through the rated travel range/angle of rotation to reach OPEN (100 % position).

ACT_STROKE_TIME_INC is measured during initialization.

AO TRD: ADVANCED_PV_BASIC (0)

Storage class: D · Read capability (r)

Indicates block-specific and device-specific data.

- BLOCK_TAG · Name of block
- DD_MEMBER · 0 (0x0)
- DD_ITEM · Start index of AO Transducer Block
- DD_REVIS · Revision index of DD
- PROFILE · 33037 (0x810d)
- PROFILE_REVISION · 1 (0x1)
- EXECUTION_TIME · Execution time of block
- EXECUTION_PERIOD · Repetition interval
- NUM_OF_PARAMS · No. of block parameters
- NEXT_FB_TO_EXECUTE · Next function block to be executed
- VIEWS_INDEX · Initial address of View objects
- NUMBER_VIEW_3 · Number of View-3 objects
- NUMBER_VIEW_4 · Number of View-4 objects

AO TRD: ALERT_KEY (4)

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

Used to specify the identification number of the plant section.

- 1 to 255, [0]

This information can be used by the fieldbus host system to group alerts and events.

Note: "0" is not a permissible value and will be rejected when transferring data to the device (error alarm).

AO TRD: AUTOSTART (111)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Step response/partial stroke test: Auto test time → Code 49 A3

Indicates the interval at which the partial stroke test is repeated.

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: BINARY_INPUT2 (53)

Storage class: D · Read capability (r)

Indicates the state of DI2 Block

The value of the output depends on CONFIG_BINARY_INPUT2.

AO TRD: BLOCK_ALM (8)

Storage class: D · Read capability (r)

Indicates the current block state with details on all configuration, hardware or system problems in the block including details on the date and time of the alarm when the fault occurred.

AO TRD: BLOCK_ERR (6)

Storage class: D · Read capability (r)

Active block error → Code 48 t3

- OUT OF SERVICE
- DEVICE NEEDS MAINTENANCE NOW · Maintenance required immediately (error in the electronics)
- DEVICE NEEDS MAINTENANCE SOON · Maintenance required soon (zero error, positioner fault or total valve travel exceeded)
- LOCAL OVERRIDE · Output value set to “local operation” using TROVIS-VIEW, or forced venting function/zero calibration or initialization currently in process.
- INPUT FAILURE · Position feedback error or device not initialized
- OUTPUT FAILURE · Device not initialized
- MEMORY FAILURE · Memory error
- LOST STATIC DATA · Check sum error

AO TRD: BLOCKING_POSITION (76)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Blocking position → Code 35

Distance up to CLOSED position (0 % position)

Note: Only required for SUB initialization mode.

AO TRD: CLOSING_DIRECTION (66)

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

Closing direction → Code 34

Direction in which the lever for travel pick-up turns to allow the control valve to reach the CLOSED position (0 % position).

Note: Only required for SUB initialization mode.

AO TRD: COLLECTION_DIRECTORY (12) · This parameter is not supported

AO TRD: CONFIG_BINARY_INPUT2 (56)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Sets the logic state of DI2.

- [NOT EVALUATED]
- ACTIVELY OPEN
- ACTIVELY CLOSED
- ACTIVELY OPEN – LEAKAGE SENSOR
- ACTIVELY CLOSED – LEAKAGE SENSOR

Note: The parameter is processed by the BINARY_INPUT2 parameter. The parameter settings do not depend on DI2 Transducer Block.

AO TRD: COUNTER_INIT_START (85)

Storage class: D · Read capability (r)

Specifies the number of initialization cycles that have been performed since the last reset → Code 48 d4

AO TRD: DATALOGGER_PROGRESS (95)

Storage class: D · Read capability (r)

Indicates the state of the data logger.

- 1 Trigger select
- 2 Trigger not select
- 3 Trigger start by travel condition
- 4 Trigger start by solenoid condition (forced venting)
- 5 End measuring, memory full

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: DATALOGGER_SELECT (88)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Permits selection of data logger recording method.

- 1 Permanent · Permanent data logging
- 2 Trigger · Triggered data logging (data saved after an event is triggered)

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: DEAD_TIME_FALLING (115)

Storage class: D · Read capability (r)

Step response/partial stroke test: Dead time – Falling step

Specifies the time that elapses until a change in the valve position x occurs after a falling step change of the reference variable w (during diagnostic test).

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: DEAD_TIME_RISING (114)

Storage class: D · Read capability (r)

Step response/partial stroke test: Dead time – Rising step

Specifies the time that elapses until a change in the valve position x occurs after a rising step change of the reference variable w (during diagnostic test).

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: DELAY_TIME (46)

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

Specifies the delay time (reset criterion when control loop monitoring is in progress).

- 1 to 240 s, [10 s]

If the entered DELAY_TIME is exceeded and the system deviation is outside the specified TOLERANCE_BAND, a control loop error is issued.

Note: DELAY_TIME is determined from the minimum transit time during initialization.

AO TRD: DEVIATION_MAX (98)

Storage class: D · Read capability (r)

Specifies the positioner's maximum system deviation that has occurred.

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: DEVIATION_MIN (97)

Storage class: D · Read capability (r)

Specifies the positioner's minimum system deviation that has occurred.

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: DEVICE_CHARACTERISTICS (32)

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

- Reflects positioner-specific data.
- ACTUATOR_SIZE
- ACTUATOR_VERSION
- ATTACHMENT
- PRESSURE_RANGE_START
- PRESSURE_RANGE_END
- SUPPLY_PRESSURE
- BOOSTER
- STUFFING_BOX
- SEALING_EDGE · Plug/seat facing (leakage class)
- PRESSURE_BALANCING

- FLOW_CHARACTERISTIC
- FLOW_DIRECTION
- NOM_DIAMETER
- NOM_DIAMETER_DN
- KVS_UNIT
- KVS_VALUE
- SEAT_DIAM_VALVE

AO TRD: DEVICE_INIT_STATE (64)

Storage class: D · Read capability (r)

Indicates whether the device has been initialized.

AO TRD: DIAG_LEVEL (101)

Storage class: D · Read capability (r)

Indicates the currently installed version of diagnostics.

- EXPERT · Standard valve diagnostics
- EXPERT⁺/PST · Extended valve diagnostics including partial stroke test (PST)

AO TRD: ELAPSED_HOURS_METERS (82)

Storage class: D · Read capability (r)

Indicates the hours the device has been in operation.

- ELAPSED_HOURS_TOTAL · Total hours the device has been switched on
- ELAPSED_HOURS_IN_CLOSED_LOOP · Device in closed loop
- ELAPSED_HOURS_SWITCHED_ON_SINCE_INIT · Hours the device has been switched on since last initialization
- ELAPSED_HOURS_IN_CLOSED_LOOP_SINCE_INIT · Hours in closed loop control since last initialization

AO TRD: ENHANCED_DIAG_CMD (81)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Indicates an extended diagnostic test.

- 1 No function
- 2 Start data logger
- 3 Abort data logger
- 4 Hysteresis online test · Hysteresis test (d2)
- 5 Abort hysteresis online test · Hysteresis test (d2)
- 6 Start step response
- 7 Abort step response

- 8 Start tests in turn

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: **ERROR_OPTION_DATA_FAILURE (39)**

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

Indicates the masking of data errors.

- 1 Control parameter
- 2 Poti parameter
- 3 Adj. parameter
- 4 General parameter
- 5 Int. device error 1
- 6 Valve dim. parameter
- 7 Info parameter
- 8 Checksum program code

AO TRD: **ERROR_OPTION_ENH_DIAGNOSTIC_1 (40) to ERROR_OPTION_ENH_DIAGNOSTIC_5 (44)**

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

Specifies the masking of status or error alarms in the diagnostics.

AO TRD: **ERROR_OPTION_HW_FAILURE (38)**

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

Specifies the masking of hardware errors.

- 1 x signal
- 2 i/p converter
- 3 Hardware
- 4 Data memory
- 5 Control calculation
- 6 Program load error

AO TRD: **ERROR_OPTION_INIT_FAILURE (36)**

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

Specifies the masking of initialization errors.

- 1 x > range
- 2 Delta x < range
- 3 Mech./pneu. · Attachment
- 4 Init. time exceeded · Initialization time exceeded
- 5 Init./sol. valve · Initialization forced venting

- 6 Travel time too short
- 7 Pin position
- 8 No emergency mode

AO TRD: ERROR_OPTION_OPERATION_FAILURE (37)

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

Specifies the masking of operational errors.

- 1 Control loop
- 2 Zero point
- 3 Autocorrection
- 4 Fatal error
- 5 w too small
- 6 Total valve travel exceeded

AO TRD: ERRORBYTE (106)

Storage class: D · Read capability (r)

Step response/partial stroke test: Cancellation flag (criterion for cancellation)

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: EVENT_LOGGING_1 (86)

Storage class: D · Read capability (r)

Indicates the event logs 0 – 14 with the time they were recorded.

AO TRD: EVENT_LOGGING_2 (87)

Storage class: D · Read capability (r)

Indicates the event logs 15 – 29 with the time they were recorded.

AO TRD: FINAL_POSITION_VALUE (20)

Storage class: D · Read capability (r)

Specifies the current valve position in % in relation to the operating range (FINAL_VALUE_RANGE).

AO TRD: FINAL_POSITION_VALUE_DISC (52)

Storage class: D · Read/write capability (r/w)

Specifies FINAL_POSITION_VALUE_LIMITS, e.g. limit values reached or status.

AO TRD: FINAL_POSITION_VALUE_LIMITS (51)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Indicates the limit of valve position (FINAL_POSITION_VALUE)

- FINAL_POSITION_VALUE_LIMITS
- FINAL_POSITION_VALUE_HIGH_LIMIT
- FINAL_POSITION_VALUE_LOW_LIMIT

This actual value is sent to the AO Transducer Block directly from the valve.

AO TRD: FINAL_VALUE (13)

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

Output value TRD

FINAL_VALUE contains the output value received from the upstream AO Function Block.

- Scaling over FINAL_VALUE_RANGE

AO TRD: FINAL_VALUE_CUTOFF_HI (15)

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

Setpoint cutoff increase (final position $w >$) → Code 15

- -2.5 to 125.0 %, [99.0 %]

If the reference value exceeds the entered value, the valve is moved to the final position that corresponds to 100 % of the manipulated variable. This causes the actuator to either be vented completely or fully filled with air (depending on the fail-safe action).

Note: The function is deactivated by entering -2.5 %.

NOTICE

As this function causes the actuator to be fully vented or filled with air, the valve moves to its absolute final position. Restrictions set by the travel range or travel limitation functions do not apply. In the event that this creates excessive positioning forces, this function must be deactivated.

AO TRD: FINAL_VALUE_CUTOFF_HI_ON (75)

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

Enables setpoint cutoff increase → Code 15

AO TRD: FINAL_VALUE_CUTOFF_LO (16)

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

Setpoint cutoff decrease (final position $w <$) → Code 14

- -2.5 to 100.0 %, [1.0 %]

If the reference value falls below the entered value, the valve is moved to the final position that corresponds to 0 % of the manipulated variable. This causes the actuator to either be vented completely or fully filled with air (depending on the fail-safe action).

Note: The function is deactivated by entering -2.5 %.

NOTICE

As this function causes the actuator to be fully vented or filled with air, the valve moves to its absolute final position. Restrictions set by the travel range or travel limitation functions do not apply. In the event that this creates excessive positioning forces, this function must be deactivated.

AO TRD: FINAL_VALUE_CUTOFF_LO_ON (74)

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

Enables setpoint cutoff decrease → Code 14

AO TRD: FINAL_VALUE_RANGE (14)

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

Sets the travel range/angle of rotation.

- FINAL VALUE RANGE EU_100 · Travel/angle range end → Code 9
- FINAL VALUE RANGE EU_0 · Travel/angle range start → Code 8
- FINAL VALUE RANGE UNITS_INDEX · Unit
- FINAL VALUE RANGE DECIMAL · Decimal point

Note: FINAL_VALUE is sent to the AO Transducer Block directly from an upstream AO Function Block.

Note: The operating range FINAL_VALUE_RANGE is checked for the TRANSM_PIN_POS. If the TRANSM_PIN_POS is changed, the positioner checks whether the setting and unit matches the current operating range FINAL_VALUE_RANGE. If this is not the case, the operating range FINAL_VALUE_RANGE is set to 0 to 100 %.

AO TRD: HIS_TEMPERATURE (100)

Storage class: D · Read capability (r)

Indicates temperature-specific data.

- T_CURRENT_TEMPERATURE · Current operating temperature inside the positioner → Code 48 d0
- T_MAX_TEMPERATURE · Highest operating temperature that ever occurred above 20 °C → Code 48 d2
- HIS_T_ZEIT_MAX_TEMPERATUR · Duration of highest temperature
- T_MIN_TEMPERATURE · Lowest operating temperature that ever occurred below 20 °C → Code 48 d1
- HIS_T_ZEIT_MIN_TEMPERATUR · Duration of lowest temperature
- TEMP_PERIOD_TIME_HIGH · Duration of temperature above +80 °C
- TEMP_PERIOD_TIME_LOW · Duration of temperature below -40 °C

AO TRD: HISTOGRAMM_X (96)

Storage class: D · Read capability (r)

Reflects the valve position x.

The valve position histogram provides a static evaluation of the recorded travel positions. The histogram indicates, for example the travel range in which the valve has mainly been operating and whether a recent trend can be recognized, indicating a change of the main operating range.

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: HISTOGRAMM_Z (99)

Storage class: D · Read capability (r)

Cycle counter histogram

The cycle counter histogram provides a static evaluation of the cycle spans. The cycle counter records the number of spans and the associated heights of the spans, which are categorized in fixed intervals (classes). It provides data on the dynamic stress that a bellows and/or an installed packing are exposed to.

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: HYS_STELL_Y (102)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Drive signal diagram hysteresis: Specifies the minimum interval at which hysteresis tests are performed.

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: IDENT_LIMIT_SWITCHES (55) · This parameter is not supported

AO TRD: IDENT_OPTIONS (54)

Storage class: D · Read capability (r)

Indicates which optional components (additional equipment) are installed.

- 1 Not implemented
- 2 Binary input
- 3 Solenoid valve (forced venting)

AO TRD: INIT_METHOD (60)

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

Indicates the selected initialization mode → Code 6

- 0 Maximum range · MAX maximum range
- 1 Nominal range · NOM nominal range
- 2 Manual adjustment · MAN manually adjusted range

- 3 Substitute · SUB substitute calibration
- 4 Zero point · Zero calibration

AO TRD: KP_STEP (17)

Storage class: S · Read capability (r)

Specifies proportional gain factor KP (step) → Code 17

Note: This parameter can only be read over the FOUNDATION fieldbus network. The value is detected during initialization.

AO TRD: LATENCY_AFTER_STEP (109)

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

Step response/partial stroke test: Waiting time after step change → Code 49 d8

This parameter sets the waiting time required to jump back from the final value of the first step change to the initial value of the second step change (reverse step change).

- 0 to 120 s, [1 s]

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: LIN_TYPE (69)

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

Characteristic → Code 20

- 1 Linear
- 2 Equal percentage
- 3 Equal percentage reverse
- 4 SAMSON butterfly linear
- 5 SAMSON butterfly equal percentage
- 6 VETEC rotary linear
- 7 VETEC rotary equal percentage
- 8 Segmented ball valve linear
- 9 Segmented ball valve percentage
- 10 User defined

Definition over AO Transducer Block (USER_CHARACTERISTIC (33))

AO TRD: LOGGING_LIMIT (92)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Indicates the initial value of an event that triggers the data logger.

- 1 Lower limit
- 2 Upper limit



Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: MODE_BLK (5)

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

Operating mode:

- Target Mode → Code 48 t0
- Actual Mode (read only) → Code 48 t1
- Permitted Mode
- Normal Mode (read only)

- AUTO · In this operating mode, a positioning value is calculated from the output value from the AO Function Block and the control valve is positioned accordingly.
- O/S · In this operating mode, the output value from the AO Function Block is not used. The control valve is moved to its mechanical fail-safe position entered in ACT_FAIL_ACTION. The mode is also changed to O/S when the forced venting function is triggered.
- MAN · In this operating mode, the positioning value (FINAL_VALUE) can be entered manually (positioner display:  and )
- LO · If the device is locally set to the MAN mode, the AO Transducer Block is set to LO.

AO TRD: MOVING_DIRECTION (65)

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

Specifies the direction of action of the reference variable w in relation to the travel/angle x
→ Code 7

AO TRD: NO_OF_ZERO_POINT_ADJ (83)

Storage class: D · Read capability (r)

Specifies the number of zero calibrations performed since the last initialization
→ Code 48 d3

AO TRD: OVERSHOOT_FALLING (113)

Storage class: D · Read capability (r)

Step response/partial stroke test: Overshooting – falling step

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: OVERSHOOT_RISING (112)

Storage class: D · Read capability (r)

Step response/partial stroke test: Overshooting – rising step

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: PRESSURE_LIMIT (80)

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

Pressure limit → Code 16

- [OFF]
- 3.7 bar
- 2.4 bar
- 1.4 bar

AO TRD: PRESSURE_Y (50)

Storage class: D · Read capability (r)

Info y → Code 44

Indicates the control signal y in percent in relation to the travel range determined during initialization.

AO TRD: PRETRIGGER_TIME (93)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Data logger: Pretrigger time

The data logger can be triggered as soon as a certain event occurs. The pretrigger function can be used to display data recorded before this event. This is made possible by a ring buffer in which all events are saved continuously.

For example, if the pretrigger time is set to 1 s, all events that occurred in the second before the data logger was triggered are displayed.

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: RAMP_DOWN (108)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Step response/partial stroke test: Ramp time – Falling step → Code 49 d6

Indicates the time in which the reverse step change is expected to fall.

- [0]

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: RAMP_UP (107)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Step response/partial stroke test: Ramp time – Rising step → Code 49 d5

Indicates the time in which the reverse step change is expected to rise.

- [0]

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: RATED_TRAVEL (58)

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

Nominal range → Code 5

- 0 to 255.9 mm, [15.0 mm]

Note: The unit [mm] or [degrees] depends on the VALVE_TYPE parameter.

AO TRD: SAMPLE_RATE (90)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Data logger: Sampling rate [ms]

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: SELF_CALIB_CMD (61)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Starts the calibration sequences in the field device and the resetting of error alarms.

- 1 No test, normal operation
- 2 Start with default values
- 3 Start initialization
- 4 Abort initialization
- 5 Start zero point adjustment
- 6 Abort zero point adjustment (zero calibration)
- 7 Search device
- 8 Reset "Total valve travel" /*xd_error_ext_1*/
- 9 Reset "Solenoid valve active"
- 10 Reset "Total valve travel limit exceeded"
- 11 Reset "Control loop"
- 12 Reset "Zero point"
- 13 Reset "Autocorrection"
- 14 Reset "Fatal error"
- 15 Reset "Extended diagnosis"
- 16 Reset "x > range"
- 17 Reset "Delta x < range"
- 18 Reset "Attachment"
- 19 Reset "Initialization time exceeded"
- 20 Reset "Initialization/solenoid valve" (forced venting)
- 21 Reset "Travel time too short"
- 22 Reset "Pin position" /*xd_error_ext_2*/

- 23 Reset "x signal"
- 24 Reset "i/p converter"
- 25 Reset "Hardware"
- 26 Reset "Control parameter"
- 27 Reset "Poti parameter"
- 28 Reset "Adjustment Parameter"
- 29 Reset "General parameter"
- 30 Reset "Internal device error 1"
- 31 Reset "No emergency mode"
- 32 Reset „Program load error“
- 33 Reset "Options parameter"
- 34 Reset "Info parameter"
- 35 Reset "Data memory"
- 36 Reset "Control calculation"
- 37 Reference Test aborted

AO TRD: SELF_CALIB_STATUS (63)

Storage class: D · Read capability (r)

Indicates the state of the calibration sequence started with SELF_CALIB_CMD.

- 1 Not active
- 2 Running
- 3 Test aborted
- 4 Zero point adjustment (zero calibration)
- 5 Maximum point adjustment · Calibration of maximum opening position
- 6 Detection of mech. steps
- 7 Controller optimization
- 8 Fine adjustment
- 9 Step 1 (step response)
- 10 Step 2 (step response)
- 11 Terminated · Test ended

AO TRD: SERVO_RESET (18) · This parameter is not supported

AO TRD: SET_FAIL_SAFE_POS (57)

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

Sets the fail-safe position.

- NOT ACTIVE
- SET FAIL-SAFE POSITION
- CLEAR FAIL-SAFE POSITION

Note: The fail-safe position is indicated by "S" blinking on the display of the positioner.

AO TRD: SETP_DEVIATION (45)

Storage class: D · Read capability (r)

System deviation $e \rightarrow$ Code 39

AO TRD: SIGNAL_PRESSURE_ACTION (77)

Storage class: D · Read capability (r)

Indicates the position of the slide switch AIR TO OPEN/AIR TO CLOSE

This parameter is determined during initialization. The positioner needs to be re-initialized when the switch position is changed.

AO TRD: SOLENOID_SELECT (94)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Status of forced venting \rightarrow Code 45

Note: By selecting "1" (Close) the "DEVICE NEEDS MAINTENANCE NOW" alarm of the AO Transducer Block is entered in the AO Function Block as an "OUTPUT FAILURE" block error.

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: ST_REV (1)

Storage class: S · Read capability (r)

Revision state of static data

Note: The revision state is incremented by one each time a static parameter in the block is written.

AO TRD: START_VALUE (91)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Data logger: Start value (valve position in % for a start condition to trigger data logging)

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: STEP_PROGRESS (120)

Storage class: D · Read capability (r)

Step response/partial stroke test: Progress of test [%]

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: STEP_SAMPLE_RATE (105)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Step response/partial stroke test: Sampling rate → Code 49 d9

- [0.1] to 120.0 s

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: STEP_SELECTION (110)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Step response/partial stroke test: Number of steps

- 1 one step
- [2] two steps

The dynamic control behavior of the valve can be tested by recording the step responses. Either one or two steps of the reference variable are performed and the course of the valve position x and the manipulated variable y are plotted until they reach a steady state.

The first step starts at an initial value defined beforehand and finishes at the determined final value. After the entered waiting time, the second step is performed in reverse starting with the final value back to the initial value.

This parameter is used to select whether just one step is to be performed or whether also the reverse step is to be performed after the first step.

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: STEPEND (104)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Step response/partial stroke test: Step end → Code 49 d3

- 0 to [100 %]

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: STEPSTART (103)

Storage class: D · Read/write capability (r/w) · Supported modes: O/M/A

Step response/partial stroke test: Step start → Code 49 d2

- [0] to 100 %

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: STRATEGY (3)

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

Permits strategic grouping and thus faster processing of blocks

- [0]

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

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

AO TRD: SUB_MODE_INIT (62)

Storage class: D · Read capability (r)

Indicates whether an initialization has been performed in the SUB mode (substitute calibration)

AO TRD: TAG_DESC (2)

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

Assigns a unique description to each block for clear identification

- Max. 32 characters, [no text]

AO TRD: TIME_63_FALLING (117)

Storage class: D · Read capability (r)

Step response/partial stroke test: T63 for the falling step

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: TIME_63_RISING (116)

Storage class: D · Read capability (r)

Step response/partial stroke test: T63 for the rising step

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: TIME_98_FALLING (119)

Storage class: D · Read capability (r)

Step response/partial stroke test: T98 for the falling step

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: TIME_98_RISING (118)

Storage class: D · Read capability (r)

Step response/partial stroke test: T98 for the rising step

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: TOLERANCE_BAND (47)

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

Tolerance band in relation to the operating range → Code 19

- 0.1 to 10.0 %, [5.0 %]

AO TRD: TOT_VALVE_TRAV_LIM (49)

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

Limit of absolute total valve travel → Code 24

- 1 000 to 990 000 000, [1 000 000]

AO TRD: TOTAL_VALVE_TRAVEL (48)

Storage class: D · Read capability (r)

Absolute total valve travel: Sum of the nominal travel cycles (double strokes), total number of valve strokes → Code 23

AO TRD: TRANSDUCER_DIRECTORY (9) · This parameter is not supported

AO TRD: TRANSDUCER_STATE (34)

Storage class: D · Read capability (r)

State of the Transducer Block → Code 48 f2

- 1 See operating mode
- 2 Solenoid valve active · Forced venting active
- 3 Lower travel limit active
- 4 Upper travel limit active
- 5 End position < active · Tight-closing of valve
- 6 End position > active · Maximum open position of valve
- 7 Fail-safe position active
- 8 Normal operation

AO TRD: TRANSDUCER_TYPE (10)

Storage class: N · Read capability (r)

Indicates the type of transducer. "Standard Advanced Positioner Valve" in this case.

AO TRD: TRANSM_PIN_POS (59)

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

Pin position → Code 4

AO TRD: TRAVEL_LOWER_LIMIT (71)

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

Travel/angle lower limit → Code 10

Note: The characteristic is not adapted.

AO TRD: TRAVEL_LOWER_LIMIT_ON (70)

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

Enables travel/angle lower limit → Code 10

AO TRD: TRAVEL_RATE_DEC (79)

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

Required transit time CLOSED → Code 22

Indicates the time required by the valve to move through the operating range when the valve closes.

AO TRD: TRAVEL_RATE_INC (78)

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

Required transit time OPEN → Code 21

Indicates the time required by the valve to move through the operating range when the valve opens.

AO TRD: TRAVEL_UPPER_LIMIT (73)

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

Travel/angle upper limit → Code 11

Note: The characteristic is not adapted.

AO TRD: TRAVEL_UPPER_LIMIT_ON (72)

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

Enables travel/angle upper limit → Code 11

AO TRD: TRIGGER_SELECT (89)

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

The user can select which events are to trigger the data logger.

- 1 Valve position
- 2 Solenoid condition (forced venting)
- 3 Valve position or solenoid condition · Valve condition or forced venting

Note: Available in versions with EXPERT+/PST diagnostics and higher.

AO TRD: TV_STEP (19)

Storage class: S · Read capability (r)

Derivative-action time TV (step) → Code 18

Note: This parameter can only be read over FOUNDATION fieldbus. The value is recorded during initialization.

AO TRD: UPDATE_EVT (7)

Storage class: D · Read capability (r)

Indicates that static data were changed, including date and time stamp.

AO TRD: USER_CHARACTERISTIC (33)

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

Allows the user-defined characteristic to be entered.

The values for the valve position x must continually rise for the characteristic.

Note: The characteristic to be used is selected over the LIN_TYPE parameter (user-defined in this case).

AO TRD: VALVE_MAN_ID (25)

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

Clear identification of the manufacturer of the valve that the positioner is mounted on.

AO TRD: VALVE_MODEL_NUM (26)

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

Indicates the model number of the valve that the positioner is mounted on.

AO TRD: VALVE_SN (27)

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

Indicates the serial number of the valve that the positioner is mounted on.

AO TRD: VALVE_TYPE (28)

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

Type of valve

- UNINITIALIZED · Undefined (treated like a globe valve)
- [LINEAR] · (control valves with straight moving plug, e.g. globe valves)
- ROTARY · (control valves with rotating closure members)
- OTHER · (treated like a globe valve)
- OFF · The last setting is kept

Note: The Type 3731-5 differentiates merely between linear and rotary valves, "UNINITIALIZED" and "OTHER" are treated like a globe valve.

AO TRD: XD_CAL_DATE (30)

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

Indicates the time when the last calibration was performed.

AO TRD: XD_CAL_LOC (29)

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

Indicates the location where the last calibration was performed.

AO TRD: XD_CAL_WHO (31)

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

Indicates the person who performed the last calibration.

AO TRD: XD_ERROR (11)

Storage class: D · Read capability (r)

Errors listed in the Transducer Block

- NONE (0) · No error
- UNSPECIFIED ERROR · Unspecified (device not initialized, initialization or zero calibration in progress or total valve travel exceeded)
- GENERAL ERROR · General device error
- CALIBRATION ERROR · Zero point, internal control loop, or initialization error, reference test canceled (Code 81, only with EXPERT⁺/PST)
- CONFIGURATION ERROR · Parameter or characteristic faulty
- ELECTRONICS FAILURE · (i/p converter (Code 64), hardware (Code 65), bus connection)
- MECHANICAL FAILURE · Fault in the mechanics
- DATA INTEGRITY ERROR · Check sum error
- ALGORITHM ERROR · Dynamic values outside of the range

AO TRD: XD_ERROR_EXT (35)

Storage class: D · Read capability (r)

Extended errors listed in the Transducer Block

- 1 xd_error_ext_1: Device not initialized
 - Solenoid valve active · (forced venting active)
 - SET_FAIL_SAFE POS active · Fail-safe position active
 - Total valve travel limit exceeded ·
 - Control loop (Code 57)
 - Zero point (Code 58)
 - Autocorrection (Code 59)
 - Fatal error (Code 60)
 - Extended diagnosis (Code 79)
 - x > range (Code 50)
 - Delta x < range (Code 51)
 - Attachment (Code 52)
 - Initialization time exceeded (Code 53)
 - Initialization/solenoid valve (forced venting) (Code 54)
 - Travel time too short (Code 55)
 - Pin position (Code 56)
 - Test or calibration running

- 2 xd_error_ext_2: x signal (Code 62)
 - i/p converter (Code 64)
 - Hardware (Code 65)
 - Control parameter (Code 68)
 - Poti parameter (Code 69)
 - Adjustment parameter (Code 70)
 - General parameter (Code 71)
 - Internal device error 1 (Code 73)
 - No emergency mode (Code 76)
 - Program load error (Code 77)
 - Options parameters (Code 78)
 - Info parameters (Code 75)
 - Data memory (Code 66)
 - Control calculation (Code 67)
 - Reference test aborted (Code 81)
- 3 xd_error_txt_3 EXPERT+ functions
- 4 Air supply (EXPERT+ function)
- 5 Actuator spring (EXPERT+ function)
- 6 Shifting working range (EXPERT+ function)
- 7 Friction (EXPERT+ function)
- 8 Leakage pneumatic (EXPERT+ function)
- 9 Limit working range (EXPERT+ function)
- 10 Dynamic stress factor (EXPERT+ function)
- 11 Inner leakage (EXPERT+ function)
- 12 External leakage (EXPERT+ function)
- 13 Observing end position (EXPERT+ function)
- 14 Connection positioner valve (EXPERT+ function)
- 15 Working range (EXPERT+ function)
- 16 Partial stroke test PST (EXPERT+ function)
- 17 Temperature error (EXPERT+ function)

AO TRD: ZERO_POINT_LIMIT (84)

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

Zero point limit [%] → Code 48 d5

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1.4.3 AO Function Block

AO: ALERT_KEY (4)

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

Used to specify the identification number of the plant section.

- 1 to 255, [0]

This information can be used by the fieldbus host system to group alerts and events.

Note: "0" is not a permissible value and will be rejected when transferring data to the device (error alarm).

AO: BKCAL_OUT (25)

Storage class: D · Read capability (r)

Analog output value for upstream function block (value and status)

BKCAL_OUT is required by the BKCAL_IN parameter of the upstream function block for cascade control. This value provides windup protection in the upstream function block and a bumpless transfer on mode changes.

AO: BLOCK_ALM (30)

Storage class: D · Read capability (r)

Indicates the current block state with details on all configuration, hardware or system problems in the block including date and time stamp.

AO: BLOCK_ERR (6)

Storage class: D · Read capability (r)

Active block error → Code 48 A8

- OUT OF SERVICE
- CONFIGURATION_ERROR · A configuration error exists in the block.
- INPUT FAILURE PV · Position feedback has bad status, e.g. because the Transducer Block is in O/S mode.
- OUTPUT FAILURE · OUT cannot be issued, e.g. because the Transducer Block is not initialized or is in LO mode.

AO: CAS_IN (17)

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

Analog reference variable from an upstream function block (value and status)

→ Code 48 A2/A3

AO: CHANNEL (22)

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

Assignment between the output of the AO Function Block and the logical hardware channels (Transducer Block)

- [3]

Note: In order to be able to put the AO Function Block into operation, CHANNEL must be set to 3 as there are three Transducer Blocks (Standard Advanced Positioner Valve) in the Type 3731-5.

AO: FSTATE_TIME (23)

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

Fault state time [s]

The length of time that the AO Function Block will wait to set Fault State after the recognition of an error of the valid set point.

- [0]

Note: The Fault State is triggered when the fault still exists after the time interval has elapsed. The Fault State of the AO Function Block is set in the IO_OPTS parameter of this block.

AO: FSTATE_VAL (24)

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

Fault state value

Determines the value for the AO Function Block when the Fault State is triggered.

- Value and range of PV_SCALE $\pm 10\%$, [0]

Note: This value is used when the option "FAULT STATE TO VALUE" is set in the IO_OPTS parameter.

AO: GRANT_DENY (13) · This parameter is not supported

AO: IO_OPTS (14)

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

Used to select how the input/output is processed in the AO Function Block

- SP-PV TRACK IN MAN · SP tracks PV in MAN mode (Actual Mode)
- SP-PV TRACK IN LO · SP tracks PV in LO mode (Actual Mode)
- SP TRACK RETAINED TARGET · SP tracks RCAS_IN or CAS_IN depending on the set Target Mode in LO or MAN mode (Actual Mode). This option has priority over SP-PV TRACK IN MAN/LO.
- INCREASE TO CLOSE · The output value to the Transducer Block is inverted (same as moving direction).

- **FAULT STATE TO VALUE** · FSTATE_VAL is used as the set point when the Fault State is triggered (see FSTATE_VAL, FSTATE_TIME).
- **USE FAULT STATE VALUE ON RESTART** · FSTATE_VAL is used for the set point until there is a valid value on restarting the device.
- **TARGET TO MAN IF FAULT STATE ACTIVATED** · On triggering the Fault State, the Target Mode is set to MAN. The original target mode is lost as a result. After leaving the Fault State, the block remains in MAN and must be set to the required target mode by the user.
- **USE PV FOR BKCAL_OUT** · The process variable is used instead of the working set point in BKCAL_OUT. If OUT_READBACK is set in the FEATURES_SEL parameter in the Resource Block, the current valve position is reported back over BKCAL_OUT.

AO: MODE_BLK (5)

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

Type of mode

- Target Mode → Code 48 A0
- Actual Mode (read only) → Code 48 A1
- Permitted Mode
- Normal Mode (read only)

- **O/S** · The AO algorithm of the block is not processed. The last value is issued at OUT or the determined value when the Fault State is activated.
- **MAN** · The user can directly determine the output value of the AO Block.
- **AUTO** · The set point determined by the user is used over the SP parameter on implementation of the AO Block.
- **CAS** · The AO Function Block receives the reference variable directly from an upstream function block over the CAS_IN parameter to calculate the manipulated variable internally. The AO Block is implemented.
- **RCAS** · The AO Function Block receives the reference variable directly from the host system over the RCAS_IN parameter to calculate the manipulated variable internally. The AO Block is implemented.

AO: OUT (9)

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

Manipulated variable of the AO Function Block (value, limit and status) → Code 48 A6/7

- Range of OUT_SCALE ±10 %; unit from XD_SCALE parameter group

Note: The output value OUT can be set manually if the MAN mode is selected in MODE_BLK.

AO: PV (7)

Storage class: D · Read capability (r)

Process variable of the function block (value and status)

- Unit from XD_SCALE parameter group

Note: If OUT_READBACK is set in the FEATURES_SEL parameter in the Resource Block, PV contains the current valve position (same as FINAL_POSITION_VALUE).

AO: PV_SCALE (11)

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

Range of the process variable (PV) (start, end, unit and decimal point)

- 0 to 100 %

AO: RCAS_IN (26)

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

Analog reference variable for internal calculation of the manipulated variable (value and status)

RCAS_IN is provided by the fieldbus host system

Note: This parameter is only active in the RCAS mode.

AO: RCAS_OUT (28)

Storage class: D · Read capability (r)

Analog reference variable after ramping (value and status)

RCAS_OUT is provided by the fieldbus host system for back calculation to allow action to be taken under mode changes or limited signals.

Note: This parameter is only active in the RCAS mode.

AO: READBACK (16)

Storage class: D · Read capability (r)

Current valve position determined from FINAL_POSITION_VALUE parameter of the associated Transducer Block.

- Unit from XD_SCALE parameter group

AO: SHED_OPT (27)

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

Determines what action is to be taken when the monitoring time is exceeded (see SHED_RCAS parameter in the Resource Block)

The connection between the fieldbus host system and the AO Function Block in RCAS mode is checked: When the monitoring time has elapsed, the AO Function Block switches from RCAS mode to the mode selected in SHED_OPT.

The action to be taken after the Fault State ends is also determined.

- [UNINITIALIZED] · Not initialized
- NORMAL SHED_NORMAL RETURN · On failure of remote connection, change to next possible mode until RCAS mode is restored.
- NORMAL SHED_NO RETURN · On failure of remote connection, change to next possible mode. The block remains in this mode.
- SHED TO AUTO_NORMAL RETURN · On failure of remote connection, change to AUTO mode until RCAS mode is restored.
- SHED TO AUTO_NO RETURN · On failure of remote connection, change to AUTO mode. No attempt is made to restore the mode and the block remains in AUTO mode.
- SHED TO MANUAL_NORMAL RETURN · On failure of remote connection, change to MAN mode until RCAS mode is restored.
- SHED TO MANUAL_NO RETURN · On failure of remote connection, change to MAN mode. No attempt is made to restore the mode and the block remains in MAN mode.
- SHED TO RETAINED_TARGET_NORMAL RETURN · On failure of remote connection, the block attempts to attain the retained target mode until RCAS mode is restored.
- SHED TO RETAINED_TARGET_NO RETURN · On failure of remote connection, the block sets the target mode to the retained target mode.

Note: This parameter is only active in RCAS mode in the AO Function Block. The AO Function Block cannot be set to the RCAS mode when the value is set to Uninitialized.

AO: SIMULATE (10)

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

Simulation of process variable PV of the function block (value and status) → Code 48 F3

Note: During the simulation, the OUT value is not passed on to the Transducer Block. It keeps the last value valid prior to activating the simulation.

The simulation can only be activated if the Simulate Activate is set in the BLOCK_ERR parameter of the Resource Block.

AO: SP (8)

Storage class: N · Read/write capability (r/w) · Supported modes: O/M/A

Reference variable w in AUTO mode → Code 48 A4/5

- Value and range from PV_SCALE ±10 %; unit from PV_SCALE

AO: SP_HI_LIM (20)

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

Upper limit of the reference variable

- Value and range from PV_SCALE ±10 %, [100 %]

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

AO: SP_LO_LIM (21)

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

Lower limit of the reference variable

- Value and range from PV_SCALE ±10 %, [0 %]

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

AO: SP_RATE_DN (18)

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

Ramp rate for falling changes of the reference variable in AUTO mode.

- [3402823466 × 10³⁸]

Note: The reference variable is used immediately when the ramp rate is set to "0". The rate limit is active for output blocks in AUTO and CAS modes.

AO: SP_RATE_UP (19)

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

Ramp rate for rising changes of the reference variable in AUTO mode.

- [3402823466 × 10³⁸]

Note: The reference variable is used immediately when the ramp rate is set to "0". The rate limit is active for output blocks in AUTO and CAS modes.

AO: ST_REV (1)

Storage class: N · Read capability (r)

Revision state of static data (AO Function Block)

Note: The revision state is incremented by one each time a static parameter in the block is written.

AO: STATUS_OPTS (15)

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

Selection of status options available to determine the handling and processing of the status.

- [UNINITIALIZED] · Not initialized
- PROPAGATE FAULT BACKWARD · Status of the Transducer is passed on to the upstream block over the status of BKCAL_OUT.

AO: STRATEGY (3)

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 number in the STRATEGY parameter of each block.

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

AO: TAG_DESC (2)

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

Assigns a unique description to each block for clear identification.

- Max. 32 characters, [no text]

AO: UPDATE_EVT (29)

Storage class: D · Read capability (r)

Indicates that static data were changed, including date and time stamp.

AO: XD_SCALE (12)

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

Range of the manipulated variable OUT (start, end, unit and decimal point)

- 0.0 to 100.0 %; specified in [%], [mm] or [degrees]

Note: When [%] is used, the OUT value is based on a scale of 100 %. In case of [mm] (with globe valves) or [degrees] (with rotary valves), the OUT value corresponds to the value set in the RATED_TRAVEL parameter in the Transducer Block which is scaled as 100 %.

Parameter index: AO Function Block

Index	Parameter
0	–
1	ST_REV
2	TAG_DESC
3	STRATEGY
4	ALERT_KEYS
5	MODE_BLK
6	BLOCK_ERR
7	PV
8	SP
9	OUT
10	SIMULATE
11	PV_SCALE
12	XD_SCALE
13	GRANT_DENY
14	IO_OPTS
15	STATUS_OPTS

Index	Parameter
16	READBACK
17	CAS_IN
18	SP_RATE_DN
19	SP_RATE_UP
20	SP_HI_LIM
21	SP_LO_LIM
22	CHANNEL
23	FSTATE_TIME
24	FSTATE_VAL
25	BKCAL_OUT
26	RCAS_IN
27	SHED_OPT
28	RCAS_OUT
29	UPDATE_EVT
30	BLOCK_ALM

1.4.4 DI1 and DI2 Function Blocks

DI: ACK_OPTIONS (21)

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

Determines whether an alarm is to be automatically acknowledged, i.e. without intervention of the fieldbus host system.

- [UNDEFINED] · No selection
- BLOCK ALM · Block alarm
- DISC ALM · Write lock has been changed

Note: The alarm is broadcast to the fieldbus host system, but not acknowledged by it.

DI: ALARM_SUM (20)

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

Determines the current status of the process alarms in the DI Function Block

- BLOCK ALM · Block alarm
- DISC ALM · Write lock has been changed

Note: The process alarms can also be deactivated in this parameter group.

DI: ALERT_KEY (4)

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

Used to specify the identification number of the plant section.

- 1 to 255, [0]

This information can be used by the fieldbus host system to group alerts and events.

Note: "0" is not a permissible value and will be rejected when transferring data to the device (error alarm).

DI: BLOCK_ALM (19)

Storage class: D · Read capability (r)

Indicates the current block state with details on all configuration, hardware or system problems in the block including date and time stamp.

DI: BLOCK_ERR (6)

Storage class: D · Read capability (r)

Active block error → Code 48 I6 for DI1, Code 48 L6 for DI2

- OUT OF SERVICE
- CONFIGURATION_ERROR

DI: CHANNEL (15)

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

Determines which Transducer Block is assigned to the DI Function Block.

- 1 to [3]

DI: DISC_ALM (24)

Storage class: D · Read capability (r)

Indicates the status of the discrete alarm including details on the time of the alarm (time and date stamp) and on the value which triggered the alarm.

The value entered in DISC_LIM is exceeded.

Note: An active block alarm can also be acknowledged manually in this parameter group.

DI: DISC_LIM (23)

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

Limit for discrete alarm

- [0], 1

DI: DISC_PRI (22)

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

Determines the action to be taken when the value entered in DISC_LIM is reached.

- [0] · The limit violation is not processed.
- 1 · Alarm is not broadcast to fieldbus host system
- 2 · Reserved for block alarms
- 3 to 7 · Limit alarm is issued to notify the operator with the corresponding priority (3 = low, 7 = high).
- 8 to 15 · Limit alarm is issued as a critical alarm with the corresponding priority (8 = low, 15 = high).

DI: FIELD_VAL_D (17)

Storage class: N · Read capability (r)

Discrete input variable of the DI Function Block (value and status)

→ Code 48 I2/3 for DI1, Code 48 L2/3 for DI2

DI: GRANT_DENY (12) · This parameter is not supported**DI: IO_OPTS (13)**

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

Used to select how the input/output is processed in the DI Function Block.

- INVERT · Used to logically invert the value of FIELD_VAL_D before it is stored as OUT_D.

DI: MODE_BLK (5)

Storage class: N · Read/write capability (r/w) · Supported modes: O/M/A

Types of mode

- Target Mode → Code 48 t4 for DI1, Code 48 t7 for DI2
- Actual Mode (read only) → Code 48 t5 for DI1, Code 48 t8 for DI2
- Permitted Mode
- Normal Mode (read only)
- O/S · The DI algorithm of the block is not implemented. The last value is issued at OUT_D.
- MAN · The user can directly enter the output value of the Function Block over OUT_D.
- AUTO · The binary input value FIELD_VAL_D is processed by the Function Block and issued as OUT_D.

DI: OUT_D (8)

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

Discrete output variable (value and status) → Code 48 I4/5 for DI1, Code 48 L4/5 for DI2

DI: PV_D (7)

Storage class: D · Read capability (r)

Indicates the discrete state used for the function block with status.

Note: The PV_D parameter is identical to the OUT_D in AUTO mode.

DI: PV_FTME (16)

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

Used to enter the filter time constant (in seconds) of the digital filter until a binary state at the input of the function block is adopted in the PV_D parameter.

- [0]

DI: SIMULATE_D (9)

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

A discrete input value FIELD_VAL_D can be simulated with status.

Note: The simulation can only be activated when this has been enabled at the positioner (Code 48 F3) as well as in the Function Block.

DI: STATUS_OPTS (14)

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

Status options to determine the handling and processing of the status.

- [UNINITIALIZED] · Not initialized
- PROPAGATE FAIL FWD · Fault State is passed on to the downstream function block.

DI: STRATEGY (3)

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

Permits strategic grouping and thus faster processing of blocks.

- [0]

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

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

DI: ST_REV (1)

Storage class: N · Read capability (r)

Indicates the revision number of static data (DI).

Note: The revision state is incremented by one each time a static parameter in the block is written.

DI: TAG_DESC (2)

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

Assigns a unique description to each block for clear identification.

- Max. 32 characters, [no text]

DI: UPDATE_EVT (18)

Storage class: D · Read capability (r)

Indicates that static data were changed, including date and time stamp.

Parameter index: DI1 and DI2 Function Blocks

Index	Parameter
0	–
1	ST_REV
2	TAG_DESC
3	STRATEGY
4	ALERT_KEY
5	MODE_BLK
6	BLOCK_ERR
7	PV_D
8	OUT_D
9	SIMULATE_D
10	–
11	–
12	GRANT_DENY

Index	Parameter
13	IO_OPTS
14	STATUS_OPTS
15	CHANNEL
16	PV_FTIME
17	FIELD_VAL_D
18	UPDATE_EVT
19	BLOCK_ALM
20	ALARM_SUM
21	ACK_OPTIONS
22	DISC_PRI
23	DISC_LIM
24	DISC_ALM

1.4.5 PID Function Block

PID: ACK_OPTIONS (46)

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

Determines whether an alarm is to be automatically acknowledged in the PID Function Block

- [UNDEFINED] · No selection
- HI_HI_ALM · High high alarm
- HI_ALM · High alarm
- LO_LO_ALM · Low low alarm
- LO_ALM · Low alarm
- DV_HI_ALM · Deviation high alarm
- DV_LO_ALM · Deviation low alarm
- BLOCK ALM · Block alarm

Note: The alarm is broadcast to the fieldbus host system, but not acknowledged by it.

PID: ALARM_HYS (47)

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

Hysteresis for high and low alarms

- 0 to 50 %, [0.5 %]

The alarm conditions remain active until the measured value leaves the hysteresis. The hysteresis value affects the following alarms of the PID Function Block:

HI_HI_LIM; HI_LIM; LO_LO_LIM; LO_LIM; DV_HI_LIM; DV_LO_LIM

Note: The hysteresis value is based upon the percent of the range of the PV_SCALE parameter group in the PID Function Block.

PID: ALARM_SUM (45)

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

Determines the current status of the process alarms in the PID Function Block

- HI_HI_ALM · High high alarm
- HI_ALM · High alarm
- LO_LO_ALM · Low low alarm
- LO_ALM · Low low
- DV_HI_ALM · Deviation high alarm
- DV_LO_ALM · Deviation low alarm
- BLOCK ALM · Block alarm

Note: The process alarms can also be deactivated in this parameter group.

PID: ALERT_KEY (4)

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

Used to specify the identification number of the plant section.

- 1 to 255, [0]

This information can be used by the fieldbus host system to group alerts and events.

Note: "0" is not a permissible value and will be rejected when transferring data to the device (alarm).

PID: BAL_TIME (25)

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

Balance time of the integral term

Used to specify the time constant at which the integral term will move to obtain balance (calculated manipulated variable > OUT_HI_LIM or < OUT_LO_LIM)

- [0]

Note: Balance is immediately obtained when the value "0" is set.

PID: BKCAL_HYS (30)

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

Hysteresis value for manipulated variable range limits OUT_HI_LIM and OUT_LO_LIM

- 0 to 50 %, [0.5 %]

If the calculated manipulated variable violates the limits defined for the range, this limit violation is indicated in the OUT parameter and passed on to the following function blocks.

The limit violation status remains active until the value of the calculated manipulated variable does not exceed or fall below the hysteresis value.

PID: BKCAL_IN (27)

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

Analog input (value and status)

BKCAL_IN is used by the BKCAL_OUT parameter of a downstream function block for a cascade control. This value provides a bumpless transfer on mode changes by backward output tracking.

PID: BKCAL_OUT (31)

Storage class: D · Read capability (r)

Analog output (value and status)

BKCAL_OUT is used by the BKCAL_IN parameter of an upstream function block for a cascade control. This value provides windup protection in the upstream block and a bumpless transfer on mode changes.

PID: BLOCK_ALM (44)

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

Indicates the current block state with details on all configuration, hardware or system problems in the block including details on the date and time of the alarm when the fault occurred.

PID: BLOCK_ERR (6)

Storage class: D · Read capability (r)

Active block error → Code 48 P8

- OUT OF SERVICE · The block is in the O/S mode.
- CONFIGURATION ERROR · A configuration error exists in the block.

PID: BYPASS (17)

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

Used to activate or deactivate the calculation of the manipulated variable using the PID control algorithm.

- UNINITIALIZED · Same as ON
- [OFF] · Bypass deactivated: The manipulated variable determined using the PID control algorithm is issued over the OUT parameter.
- ON · BYPASS activated: The value of the reference variable SP is issued directly over the OUT parameter.

Note: When "UNINITIALIZED" is set, the block remains in O/S mode. To activate the bypass (set to ON), the bypass must be enabled in the options (CONTROL_OPTS parameters).

PID: CAS_IN (18)

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

Analog reference variable (value and status) → Code 48 P2/3

CAS_IN is passed on from the upstream function block.

PID: CONTROL_OPTS (13)

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

Allows selection of controller options available to determine the automation strategy.

- [NONE]
- BYPASS ENABLE · Enable BYPASS parameter
- DIRECT ACTING · Direct action
- TRACK ENABLE · Enable tracking
- TRACK IN MANUAL · Tracking in MAN mode
- PV FOR BKCAL_OUT · Value and status of PV parameter used for BKCAL_OUT parameter
- NO OUT LIMITS IN MANUAL · No output limits in MAN mode

PID: DV_HI_ALM (64)

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

Deviation high alarm (DV_HI_LIM) including details of time of alarm (date and time stamp) as well as the value that triggered the alarm.

Note: An active block alarm can also be acknowledged manually in this parameter group.

PID: DV_HI_LIM (57)

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

Limit for deviation high alarm

- $[3402823466 \times 10^{38}]$

If the controlled variable exceeds the reference variable by this value, the DV_HI_ALM is issued.

PID: DV_HI_PRI (56)

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

Determines the action to be taken when the value for the deviation high alarm is exceeded (DV_HI_LIM).

- [0] · The limit for deviation high alarm is not processed.
- 1 · Alarm is not broadcast to fieldbus host system.
- 2 · Reserved for block alarms
- 3 to 7 · Deviation high alarm is issued to notify the operator with the corresponding priority (3 = low, 7 = high).
- 8 to 15 · Deviation high alarm is issued as a critical alarm with the corresponding priority (8 = low, 15 = high).

PID: DV_LO_ALM (65)

Storage class: D · Read capability (r)

Deviation low alarm (DV_LO_LIM) including details of time of alarm (date and time stamp) as well as the value that triggered the alarm.

Note: An active block alarm can also be acknowledged manually in this parameter group.

PID: DV_LO_LIM (59)

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

Limit for deviation low alarm

- $[-3402823466 \times 10^{38}]$

If the controlled variable exceeds the reference variable by this value, the DV_LO_ALM is issued.

PID: DV_LO_PRI (58)

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

Determines the action to be taken when the value for the deviation low alarm is exceeded (DV_LO_LIM)

- [0] · The limit for deviation low alarm is not processed.
- 1 · Alarm is not broadcast to fieldbus host system.
- 2 · Reserved for block alarms
- 3 to 7 · Deviation low alarm is issued to notify the operator with the corresponding priority (3 = low, 7 = high).
- 8 to 15 · Deviation low alarm is issued as a critical alarm with the corresponding priority (8 = low, 15 = high).

PID: FF_GAIN (42)

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

Gain of the feedforward input

- [0]

Note: The gain is multiplied by the feedforward input (FF_VAL) before it is added to the OUT value.

PID: FF_SCALE (41)

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

Measuring range of feedforward input FF_VAL (upper and lower limits, unit and decimal point)

- [0 to 100 %]

PID: FF_VAL (40)

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

Feedforward input (value and status)

- Range and unit from FF_SCALE

Note: The feedforward input is multiplied by the gain (FF_GAIN) before it is added to the OUT value.

PID: GAIN (23)

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

Proportional gain (factor)

- [1.0]

Note: The parameter must be set to a value other than "0", otherwise a configuration error will be set in the BLOCK_ERR parameter and the block will go to O/S mode.

PID: GRANT_DENY (12) · This parameter is not supported

PID: HI_ALM (61)

Storage class: D · Read capability (r)

Indicates high alarm status (HI_LIM) including details of time of alarm (date and time stamp) as well as the value that triggered the alarm.

- Unit from PV_SCALE

PID: HI_HI_ALM (60)

Storage class: D · Read/write capability (r/w)

Indicates high high alarm status (HI_HI_LIM) including details of time of alarm (date and time stamp) as well as the value that triggered the alarm.

- Unit from PV_SCALE

Note: The active alarm can also be acknowledged manually in this parameter group.

PID: HI_HI_LIM (49)

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

Limit for high high alarm (HI_HI_ALM)

- Range and unit from PV_SCALE, $[3402823466 \times 10^{38}]$

If the PV value exceeds this limit, the HI_HI_ALM alarm is issued.

PID: HI_HI_PRI (48)

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

Determines the action to be taken when the value for the high high alarm is exceeded (HI_HI_LIM).

- [0] · The limit for high high alarm is not processed.
- 1 · Alarm is not broadcast to fieldbus host system.
- 2 · Reserved for block alarms
- 3 to 7 · High high alarm is issued to notify the operator with the corresponding priority (3 = low, 7 = high).
- 8 to 15 · High high alarm is issued as a critical alarm with the corresponding priority (8 = low, 15 = high).

PID: HI_LIM (51)

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

Limit for high alarm (HI_ALM)

- Range and unit from PV_SCALE, $[3402823466 \times 10^{38}]$

If the PV value exceeds this limit, the HI_ALM alarm is issued.

PID: HI_PRI (50)

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

Determines the action to be taken when the value for the high alarm is exceeded (HI_LIM).

- [0] · The limit for high alarm is not processed.
- 1 · Alarm is not broadcast to fieldbus host system.
- 2 · Reserved for block alarms
- 3 to 7 · High alarm is issued to notify the operator with the corresponding priority (3 = low, 7 = high).
- 8 to 15 · High alarm is issued as a critical alarm with the corresponding priority (8 = low, 15 = high).

PID: IN (15)

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

Analog controlled variable x (value and status)

PID: LO_ALM (62)

Storage class: D · Read capability (r)

Indicates low alarm status (LO_LIM) including details of time of alarm (date and time stamp) as well as the value that triggered the alarm.

- Unit from PV_SCALE

PID: LO_LIM (53)

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

Limit for low alarm (LO_ALM)

- Range and unit from PV_SCALE, $[-3402823466 \times 10^{38}]$

If the PV value exceeds this limit, the LO_ALM alarm is issued.

PID: LO_LO_ALM (63)

Storage class: D · Read capability (r)

Indicates low low alarm status (LO_LO_LIM) including details of time of alarm (date and time stamp) as well as the value that triggered the alarm.

- Unit from PV_SCALE

Note: The active alarm can also be acknowledged manually in this parameter group.

PID: LO_LO_LIM (55)

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

Limit for low low alarm (LO_LO_ALM)

- Range and unit from PV_SCALE, $[-3402823466 \times 10^{38}]$

If the PV value exceeds this limit, the LO_LO_ALM alarm is issued.

PID: LO_LO_PRI (54)

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

Determines the action to be taken when the value for the low low alarm is exceeded (LO_LO_LIM).

- [0] · The limit for low low alarm is not processed.
- 1 · Alarm is not broadcast to fieldbus host system.
- 2 · Reserved for block alarms
- 3 to 7 · Low low alarm is issued to notify the operator with the corresponding priority (3 = low, 7 = high).
- 8 to 15 · Low low alarm is issued as a critical alarm with the corresponding priority (8 = low, 15 = high).

PID: LO_PRI (52)

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

Determines the action to be taken when the value for the low alarm is exceeded (LO_LIM).

- [0] · The limit for low alarm is not processed.
- 1 · Alarm is not broadcast to fieldbus host system.
- 2 · Reserved for block alarms
- 3 to 7 · Low alarm is issued to notify the operator with the corresponding priority (3 = low, 7 = high).
- 8 to 15 · Low alarm is issued as a critical alarm with the corresponding priority (8 = low, 15 = high).

PID: MODE_BLK (5)

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

Type of mode

- Target Mode → Code 48 P0
- Actual Mode (read only) → Code 48 P1
- Permitted Mode
- Normal Mode (read only)

- O/S · The PID algorithm of the block is not implemented. The last value or the value determined when the Fault State is activated is issued at OUT parameter.
- MAN · The output value of the block can directly be entered by the user over the OUT parameter.
- AUTO · The set point determined by the user is used to implement the AO Function Block over the SP parameter.
- CAS · The AO Function Block receives the reference variable directly from an upstream function block over the CAS_IN parameter for internal calculation of the manipulated variable. The AO Block is implemented.

- RCAS · The AO Function Block receives the reference variable directly from the fieldbus host system for internal calculation of the manipulated variable. The AO Block is implemented.
- ROUT · The PID Function Block receives the manipulated variable directly from the fieldbus host system over the ROUT_IN parameter. The manipulated variable is issued again over OUT without the internal PID algorithm being implemented.

PID: OUT (9)

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

Manipulated variable of AO Function Block (value, limit and status) → Code 48 P6/7

- Range from OUT_SCALE ±10 %, unit from XD_SCALE

Note: If the MAN mode is selected in the MODE_BLK parameter, the output value OUT can be entered manually.

PID: OUT_HI_LIM (28)

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

Upper limit of the analog manipulated variable (OUT)

- Range from OUT_SCALE ±10 %, unit from OUT_SCALE, [100]

PID: OUT_LO_LIM (29)

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

Lower limit of the analog manipulated variable (OUT)

- Range from OUT_SCALE ±10 %, unit from OUT_SCALE, [0]

PID: OUT_SCALE (11)

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

Definition of the range for the manipulated variable (OUT) (start, end, unit and decimal point)

- [0 to 100 %]

PID: PV (7)

Storage class: D · Read capability (r)

Process variable to implement the block (value and status)

- Unit from PV_SCALE

PID: PV_FTME (16)

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

Used to enter the filter time constant (in seconds) of the first-order digital filter.

- [0]

This time is needed to allow a 63 % change of the controlled variable at the input IN to become effective in the value of PV.

PID: PV_SCALE (10)

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

Definition of the range for the process variable PV (start, end, unit and decimal point)

- [0 to 100 %]

PID: RATE (26)

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

Specifies the time constant (in seconds) for the differential function.

- [0]

PID: RCAS_IN (32)

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

Analog reference variable (value and status) provided by the fieldbus host system for internal calculation of the manipulated variable RCAS_IN.

Note: This parameter is only active in the RCAS mode.

PID: RCAS_OUT (35)

Storage class: D · Read capability (r)

Analog reference variable (value and status) after ramping.

This RCAS_OUT value is provided to the fieldbus host system for back calculation to allow action to be taken under mode changes or limited signals.

Note: This parameter is only active in the RCAS mode.

PID: RESET (24)

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

Specifies the time constant for the integral-action function.

- [$3402823466 \times 10^{38}$] (maximum value possible)

Note: The initial value or 0 deactivates the integral-action function.

PID: ROUT_IN (33)

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

Manipulated variable (value and status)

ROUT_IN is provided by the fieldbus host system.

Note: This parameter is only active in the ROUT mode.

PID: ROUT_OUT (36)

Storage class: D · Read capability (r)

Analog reference variable (value and status) that has been written by the ROUT_IN parameter.

ROUT_OUT is provided by the fieldbus host system to perform back calculation to allow action to be taken under mode changes or limited signals.

Note: This parameter is only active in the ROUT mode.

PID: SHED_OPT (34)

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

Determines what action is to be taken when the monitoring time is exceeded (see SHED_RCAS parameter in the Resource Block) while the connection between the fieldbus host system and the PID Function Block in RCAS or ROUT mode is being checked.

When the time has elapsed, the PID Function Block switches from RCAS or ROUT mode to the mode selected in SHED_OPT. The action to be taken after the Fault State ends is also determined.

- [UNINITIALIZED] · Not initialized
- NORMAL SHED_NORMAL RETURN · On failure of remote connection, change to next possible mode until RCAS or ROUT mode is restored.
- NORMAL SHED_NO RETURN · On failure of remote connection, change to next possible mode the block remains in this mode.
- SHED TO AUTO_NORMAL RETURN · On failure of remote connection, change to AUTO mode until RCAS or ROUT mode is restored.
- SHED TO AUTO_NO RETURN · On failure of remote connection, change to AUTO mode. No attempt is made to restore the mode and the block remains in AUTO mode.
- SHED TO MANUAL_NORMAL RETURN · On failure of remote connection, change to MAN mode until RCAS or ROUT mode is restored.
- SHED TO MANUAL_NO RETURN · On failure of remote connection, change to MAN mode. No attempt is made to restore the mode and the block remains in MAN mode.
- SHED TO RETAINED_TARGET_NORMAL RETURN · On failure of remote connection, the block attempts to attain the retained target mode until RCAS or ROUT mode is restored.
- SHED TO RETAINED_TARGET_NO RETURN · On failure of remote connection, the block sets the target mode to the retained target mode.

Note: This parameter is only active in RCAS or ROUT mode in the PID Function Block. The PID Block cannot be set to the RCAS or ROUT mode when the value is set to UNINITIALIZED.

PID: SP (8)

Storage class: N · Read/write capability (r/w) · Supported modes: O/M/A

Reference variable w in AUTO mode (value and status) → Code 48 P4/5

- Range and value from PV_SCALE ±10 %

PID: SP_HI_LIM (21)

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

Upper limit of the reference variable.

- Range and value from PV_SCALE $\pm 10\%$, [100]

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

PID: SP_LO_LIM (22)

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

Lower limit of the reference variable.

- Range and value from PV_SCALE $\pm 10\%$, [0]

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

PID: SP_RATE_DN (19)

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

Used to enter the ramp rate for downward changes of the reference variable in AUTO mode.

- $[3402823466 \times 10^{38}]$

Note: The set point is used immediately when the ramp rate is set to "0". The rate limit is active for output blocks in the AUTO mode.

PID: SP_RATE_UP (20)

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

Used to enter the ramp rate for upward changes of the reference variable in AUTO mode.

$[3402823466 \times 10^{38}]$

Note: The set point is used immediately when the ramp rate is set to "0". The rate limit is active for output blocks in the AUTO mode.

PID: ST_REV (1)

Storage class: S · Read capability (r)

Indicates the revision number of static data (PID)

Note: The revision state is incremented by one each time a static parameter in the block is written.

PID: STATUS_OPTS (14)

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

Status options available to determine the handling and processing of the status:

- [UNINITIALIZED] · Not initialized
- IFS IF BAD IN · Trigger IFS substate of downstream AO Function Block if the input value (IN) changes status to BAD.
- IFS IF BAD CAS_IN · Trigger IFS substate if the external reference variable (CAS_IN) changes status to BAD.

- USE UNCERTAIN AS GOOD · The status UNCERTAIN is used as GOOD.
- TARGET IN MANUAL IF BAD IN · Reverts to MAN mode if the input value changes status to BAD.

PID: STRATEGY (3)

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

Permits strategic grouping and thus faster processing of blocks.

- [0]

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

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

PID: TAG_DESC (2)

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

Assigns a unique description to each block for clear identification.

- Max. 32 characters, [no text]

PID: TRK_IN_D (38)

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

Discrete input (value and status) which activates the external output tracking.

On activating tracking, the block changes to LO mode. The manipulated variable at OUT adopts the value defined over the input TRK_VAL.

PID: TRK_SCALE (37)

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

Definition of range for external tracking value (TRK_VAL) (start, end, unit and decimal point)

- [0 to 100 %]

PID: TRK_VAL (39)

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

Analog input (value and status) for external tracking function

TRK_VAL is read from another function block.

PID: UPDATE_EVT (43)

Storage class: D · Read capability (r)

Indicates that static data were changed, including date and time stamp.

Parameter index: PID Function Block

Index	Parameter
0	–
1	ST_REV
2	TAG_DESC
3	STRATEGY
4	ALERT_KEY
5	MODE_BLK
6	BLOCK_ERR
7	PV
8	SP
9	OUT
10	PV_SCALE
11	OUT_SCALE
12	GRANT_DENY
13	CONTROL_OPTS
14	STATUS_OPTS
15	IN
16	PV_FTIME
17	BYPASS
18	CAS_IN
19	SP_RATE_DN
20	SP_RATE_UP
21	SP_HI_LIM
22	SP_LO_LIM
23	GAIN
24	RESET
25	BAL_TIME
26	RATE
27	BKCAL_IN

Index	Parameter
28	OUT_HI_LIM
29	OUT_LO_LIM
30	BKCAL_HYS
31	BKCAL_OUT
32	RCAS_IN
33	ROUT_IN
34	SHED_OPT
35	RCAS_OUT
36	ROUT_OUT
37	TRK_SCALE
38	TRK_IN_D
39	TRK_VAL
40	FF_VAL
41	FF_SCALE
42	FF_GAIN
43	UPDATE_EVT
44	BLOCK_ALM
45	ALARM_SUM
46	ACK_OPTION
47	ALARM_HYS
48	HI_HI_PRI
49	HI_HI_LIM
50	HI_PRI
51	HI_LIM
52	LO_PRI
53	LO_LIM
54	LO_LO_PRI
55	LO_LO_LIM

Index	Parameter
56	DV_HI_PRI
57	DV_HI_LIM
58	DV_LO_PRI
59	DV_LO_LIM
60	HI_HI_ALM
61	HI_ALM
62	LO_ALM
63	LO_LO_ALM
64	DV_HI_ALM
65	DV_LO_ALM

1.5 Status classification and condensed state

All status alarms are classified in the positioner, i.e. when an alarm is issued, it is assigned a status. Changes in the status classification can be made over the following FF parameters in the AO Transducer Block:

- ▶ ERROR_OPTION_INIT_FAILURE (36):
Masking of initialization error
- ▶ ERROR_OPTION_OPERATION_FAILURE (37):
Masking of operational error
- ▶ ERROR_OPTION_HW_FAILURE (38):
Masking of hardware error
- ▶ ERROR_OPTION_DATA_FAILURE (39):
Masking of data failure
- ▶ ERROR_OPTION_ENH_DIAGNOSTIC (40 to 44):
Masking of status and diagnostic alarms

To provide a better overview, the classified status alarms are summarized in a condensed state (CONDENSED_STATE (59) parameter of the Resource Block). In addition to the CONDENSED_STATE parameter, the condensed state can be issued to the discrete output OUT_D of the DI Function Blocks.

The possible states of the condensed state include:

0	OK	
1	Maintenance required	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 medium term.
2	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.
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.
7	Function check	Test or calibration procedures are being performed. The positioner is temporarily unable to perform its control task until this procedure is completed.

In addition to the condensed state, the alarms of the BLOCK_ERR parameter in the Resource Block and Transducer Block can also be assigned to events.

In this case, the individual alarms can be assigned a further status for the block error in the AO Transducer Block in the ERROR_OPTION_ parameters (Index 36 to 44). The following classifications are possible:

- ▶ No message
- ▶ Device needs maintenance soon
- ▶ Device needs maintenance now

The block error (BLOCK_ERR) is then created from the summary of the active classified alarms.

2 Settings in TROVIS-VIEW software

2.1 General

The TROVIS-VIEW software allows various smart SAMSON devices to be configured over a common operator interface. It consists of the operator interface, communication server, and the device-specific module. The software has a Windows® Explorer look and feel. The entire configuration of the positioner can be performed over the TROVIS-VIEW Configuration and Operator Interface. It is not possible to link function blocks of other devices with the TROVIS-VIEW software. The TROVIS-VIEW software containing online help and the database module for Type 3731-5 Positioner is delivered on a CD-ROM (order number 6661-1065).

Software updates are available in Internet (<http://www.samson.de>) in Products > Support and downloads.

Note: The following instructions include a description on the key functions of the TROVIS-VIEW software in conjunction with Type 3731-5 Positioner. Refer to the online help in the ? menu for a detailed description

2.1.1 System requirements

- | | |
|--------------------|---|
| Hardware | <ul style="list-style-type: none"> ▶ PC with Pentium II processor or equivalent (300 MHz or higher), 500 MHz recommended ▶ Serial interface or USB/RS-232 adapter ▶ Min. 96 MB RAM, 192 MB RAM recommended ▶ Min. 150 MB free hard disk space plus approx. 10 to 15 MB additional hard disk space per SAMSON module ▶ SVGA graphic card (min. 800 x 600) ▶ CD-ROM drive |
| Software | <ul style="list-style-type: none"> ▶ Operating system: Windows® 2000 (min. SP2), Windows® XP, Windows® Vista ▶ Microsoft .NET Framework Version 2.0 or higher (included on the installation CD-ROM) ▶ Internet browser: Microsoft Internet Explorer, version 6.0 or higher |
| Accessories | <ul style="list-style-type: none"> ▶ Serial interface adapter, order no. 1400-7700 (SAMSON SSP interface – RS-232 port of a computer) ▶ Isolated USB interface adapter, order no. 1400-9740 (SAMSON SSP interface – USB port of a computer) |

2.2 Installing TROVIS-VIEW software

A CD-ROM containing the TROVIS-VIEW software is provided by SAMSON.

1. Insert the installation CD-ROM to start the installation program.
Once inserted, the CD-ROM usually starts the installation program automatically, depending on the configuration of the operating system. If the program does not start automatically, double-click setup.exe in the root directory of the CD-ROM in order to install TROVIS-VIEW.
2. Follow the on-screen prompts and instructions of the installation program.

The TROVIS-VIEW Operator Interface can be used for different SAMSON devices. Note that the installation program also offers you the option of installing a demo module. To use the software without restrictions, the software needs to be activated by entering a CD key as follows:

3. After installation, a dialog box will appear, prompting you to enter the CD key, which you will find on the cover of the original CD-ROM. Once you have entered the correct CD key, an activation is necessary. The software can be activated automatically or manually. Internet access on the computer on which TROVIS-VIEW is installed is required for automatic activation.

Manual activation:

Once you have entered the correct CD key, a request code will be automatically generated and displayed which contains computer identification details.

- ▶ Enter request code in SAMSON's product activation server over the Internet. (http://support.samson-ag.com:8082/activate_eng.html)
An activation code is generated which allows TROVIS-VIEW to be used without any restrictions in the purchased scope.
- ▶ Enter this activation code in TROVIS-VIEW.
The TROVIS-VIEW software is now ready for use.

Automatic activation:

A request code containing the computer identification details is transferred to the SAMSON product activation server when an Internet connection is active and an activation code is automatically entered into TROVIS-VIEW.

The TROVIS-VIEW software is now ready for use.

Note: Refer to the readme.txt file in the root directory of the CD-ROM for further information on installation, software updates and current system requirements.

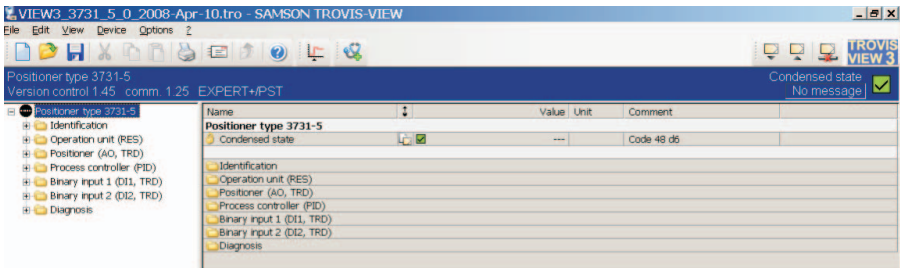
2.3 Starting TROVIS-VIEW and performing basic settings

You can perform the settings in TROVIS-VIEW either when the positioner is connected (on-line) to the computer or not connected (offline).

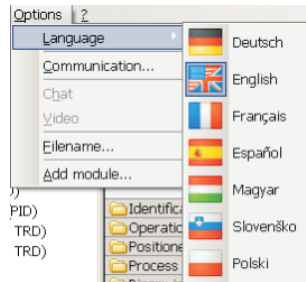
Note! When the positioner is not connected, the default settings appear on the operator interface or, alternatively, a stored TROVIS-VIEW file (*.tro) can be loaded and overwritten by selecting *Open* in the *File* menu.

1. Start TROVIS-VIEW.

The operator interface appears with menubar and toolbar as well as various folders.

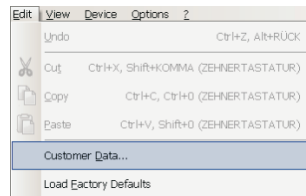


2. In *Options* menu, select *Language* to change the interface language.



3. Select *Customer data* in *Edit* menu to enter data relevant to the plant, e.g. project name, plant location, operator.

4. Select *Load Factory Defaults* in *Edit* menu if you want to load default settings onto the operator interface.



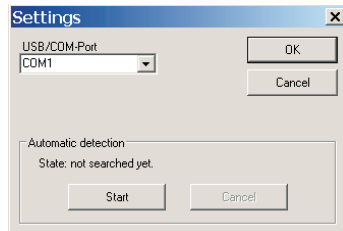
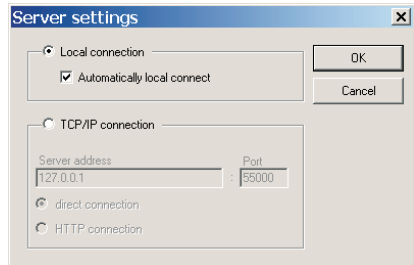
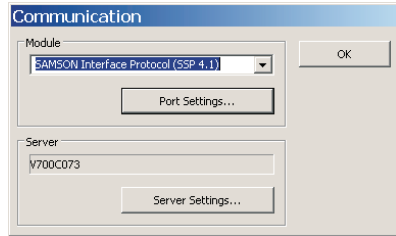
5. Set the communications port for data communication. Proceed as follows:
 - ▶ Connect the serial port of the computer (RS-232 or USB) using the adapter to the SAMSON SSP interface at the positioner.
 - ▶ Select *Communications* in *Options* menu to open the server settings window. Click *Server settings* button.
 - ▶ Check *Local connection* and *Automatically local connect* boxes and click OK button to confirm server settings.

The *Communication* window reappears.

 - ▶ Click *Port settings* button. The settings window opens and *State: not yet searched* appears in the *Automatic detection* field.
 - ▶ Click *Start* button.

TROVIS-VIEW has found the positioner when *State: Device found on COM* appears.

 - ▶ Click on OK button twice to confirm settings.



6. If required, add a new TROVIS-VIEW module by selecting *Add module* in *Options* menu. Enter the CD key (written on the installation CD-ROM) in the open window.
7. If required, enter the type, date and selectable parameters which are used to automatically create the TROVIS-VIEW file name. The file name created in this way appears on saving a TROVIS-VIEW file (e.g. VIEW3_3731_5.tro) and can be adopted or altered.

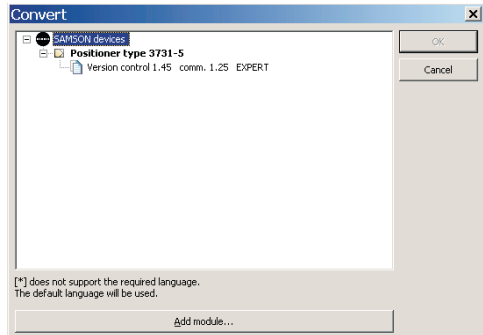
Converting the software version

The TROVIS-VIEW software version must match the firmware of the positioner.

On exchanging data between the positioner and TROVIS-VIEW, the software automatically checks whether the versions are compatible and, if necessary, converts the data.

If you want to adapt the firmware version without exchanging any data, proceed as follows:

1. Select *Convert* in *File* menu.
A window with a drop-down list of all the available firmware versions appears.
2. Select the corresponding version.
3. Click on OK button to confirm the selected version.







Note: The TROVIS-VIEW software version for communication with EXPERT⁺/PST applies for all positioners in which the extended valve diagnostics option has been activated.

The EXPERT⁺ extended valve diagnostics is an **optional** diagnostic software integrated into the positioner which allows predictive, status-oriented maintenance of pneumatic control valves. An activation code is required which needs to be ordered to activate this option.

2.4 Data transmission

Settings performed in the operator interface can be made both when the positioner is connected or not connected. When the positioner is connected, data uploaded from the positioner can be overwritten. The default setting appear on the operator interface when no positioner is connected. A stored TROVIS-VIEW file (*.tro) can be loaded and overwritten by selecting *Open* in the *File* menu.

Connection to the positioner can also be made by clicking the icons on the top right in the device toolbar:

-  Data from the positioner are uploaded and shown in the operator interface.
-  The complete set of data is downloaded to the positioner from the operator interface. To transfer individual parameters, open the corresponding context-sensitive menu. Select *Write* to just download the selected parameter, refer to section 2.4.3.
-  The positioner is in the online mode, indicated by the TROVIS-VIEW 3 logo at the top.
-  The positioner is in the offline mode.


The listed functions can be activated in the *Device* menu.



WARNING!

Perform the electrical connection as described in section 5.2 of EB 8387-5 EN first before downloading any data to the positioner.

2.4.1 Offline operation (indirect data transmission)


In offline mode, there is no constant data communication between the computer and positioner. Communication must first be established to upload data from the positioner and download data to the positioner.


- ▶ **Downloading data to the positioner:** Select *Download to the device* in *Device* menu to transfer data to the positioner. The control task is implemented after data are downloaded from TROVIS-VIEW
- ▶ **Uploading data from the positioner:** Select *Upload from device* in *Device* menu to transfer all the data from the positioner. Uploaded data are indicated in TROVIS-VIEW by the  icon.

Note: *Data transmission can also be performed by clicking the icons in the device toolbar: click  to download data from TROVIS-VIEW to the positioner and click  to upload data from the positioner and to display them in TROVIS-VIEW.*

2.4.2 Online operation (direct data transmission)

The positioner and TROVIS-VIEW are constantly connected in online operation. Current configuration and operating data are uploaded from the positioner cyclically and displayed in TROVIS-VIEW. Likewise, any settings performed in TROVIS-VIEW are directly transferred to the positioner.

- ▶ **Activate online operation:** Select *Online* in *Device* menu to activate online mode. In online mode,  on the device toolbar is animated.
- ▶ **Deactivate online operation:** Select *Online* in *Device* menu while the online mode is activated. The online mode is canceled.

Note: Alternatively, click  on the toolbar to activate and deactivate online operation.

Operational data graphs (Trend Viewer)








In online mode, process data (positioning value TRD, actual valve position and set point deviation [e]) are plotted in a graph over time. Select *Trend Viewer* in the *View* menu.

You can modify the graphs, for example, by adding data points that should be recorded, or even remove data points. Right-click on the graph to save the analysis in a file.




Note: Drag and drop other data points in the *Trend Viewer* to add them.


2.4.3 Setting parameters

Properties of data points are indicated by icons on clicking on a folder:

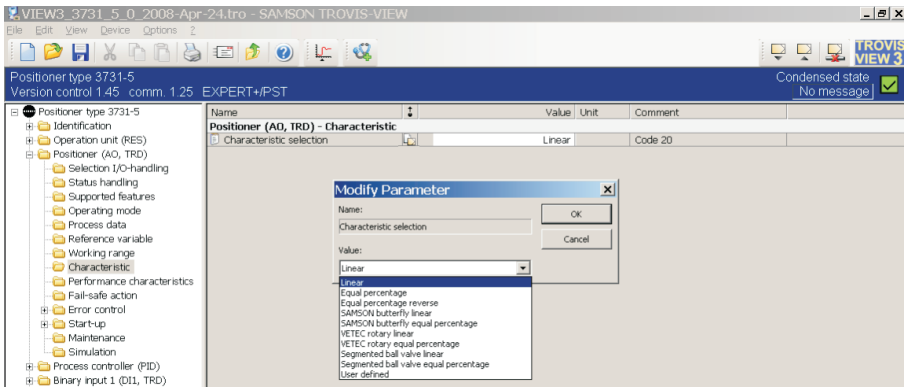
Icon	Meaning
	Data cannot be changed
	Data can be changed
	Data point can be executed
	Data point is user-defined
	Mark to indicate status/error
	Value has fallen below minimum limit
	Value has exceeded maximum limit

Source of data:

	Value has been modified manually
	Value has been uploaded from the positioner. In online mode, x in the icon indicates a value has been updated.
	Value originates from a stored file

Parameters are data points whose settings can be changed. They are marked by the  icon. Their settings can be made either in online or offline mode.

1. Click on one of the folders in the left tree directory to view the parameter settings on the right. Place the cursor over a data point to open a tool tip providing more information on the parameter.
2. Double-click the required parameter to open a pop-up window to modify parameter setting.



Right-click the required parameter to open pop-up window to modify parameter settings:

- [Modify] Opens pop-up window to modify parameter settings.
- [Read] Uploads parameter value from device.
- [Write] Downloads parameter value to device.
- [Default: ...] Resets parameter to default setting
(setting in gray to indicate that the parameter value is the same as the default setting)
- [Min ...] Set parameter to the displayed minimum value (not for all parameters)
- [Max ...] Set parameter to the displayed maximum value (not for all parameters)

Note: An explanatory text on the parameter appears underneath the tree directory (left) if you place the cursor on a parameter.
 Additional explanations can be found in the description of the FF parameters (section 1.4) or in the code list (section 10 of EB 8384-5 EN). In TROVIS-VIEW, the parameter and the code number belonging to the FF parameter are listed in the "Comment" column.

2.5 Initializing the positioner and performing an operational test

Initializing the positioner and performing an operational test are only possible in TROVIS-VIEW when the positioner has been mounted to the control valve and has been connected properly (see EB 8387-3 EN). The positioner must be connected to the computer over the serial interface adapter.

The positioner does not need to be connected to a FOUNDATION fieldbus segment. It just needs to be supplied over the bus terminals with an operating voltage (9 to 32 V DC).

Initialization

WARNING!

During the initialization, the control valve moves through its entire travel/angle of rotation range. Therefore, do not start initialization while a process is running, but only during start-up, when all shut-off valves are closed.

1. Change parameter settings in Start-up folder in Positioner (AO, TRD).

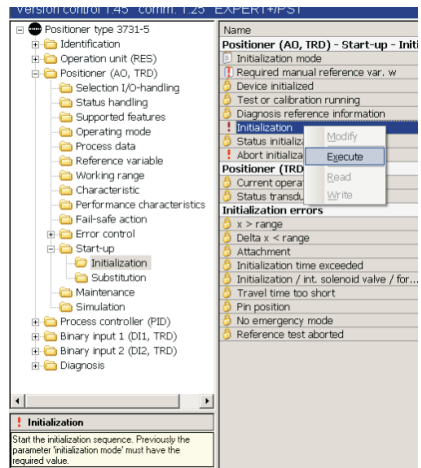
The screenshot shows the TROVIS-VIEW software interface. The left sidebar displays a tree view of the positioner configuration, with the 'Start-up' folder expanded. The main window shows a table of parameters for the 'Positioner (AO, TRD) - Start-up' folder. A 'Modify Parameter' dialog box is open over the 'Determined nominal position' parameter.

Name	Value	Unit	Comment
Positioner (AO, TRD) - Start-up			
Reading direction	Pneumatic connection right		Code 2
Pin position	Off		Code 4
Initialization mode	Maximum range		Code 6
Pressure limit	Off		Code 16
Determined nominal position	Off		Code 5
Minimum transit time			Code 40
Minimum transit time			Code 41
Fail-safe position			ACT_FAIL_ACTION
Date of last calibration			XD_CAL_DATE (day)
month			XD_CAL_DATE (month)
year	Off		XD_CAL_DATE (year)
hour	Off		XD_CAL_DATE (hour)
minute	17 mm	0 min	XD_CAL_DATE (minute)
Person of last calibration	25 mm	-/-	XD_CAL_WHO
Location of last calibration	20 mm	-/-	XD_CAL_LOC
70 mm			
100 mm			
200 mm			
20 °			


The 'Modify Parameter' dialog box shows the following details for 'Determined nominal position':

- Name: Determined nominal position
- Pin position: Off
- Value: Off

- Select the initialization type under *Initialization* (maximum range, nominal range, manual adjustment, substitute) in the *Positioner (AO, TRD)* folder in the *Start-up* subfolder.
- Start initialization by right-clicking *Initialization* and selecting *Execute*.
How long the initialization procedure lasts depends on the actuator transit time and may take a few minutes.



Operational test

- Start the test mode by clicking  icon.
If the positioner is not connected (online), TROVIS-VIEW establishes the connection automatically.
A warning appears that the operating mode will be changed into the manual mode (MAN).
- Confirm the warning message.
The *Modify Final Value* window appears.
- Enter required final value.
- Confirm the final value by clicking the *Write* button.
The final value is download onto the positioner and the valve is positioned using this new value.
The positioner exits the manual mode (MAN) and changes back to the operating mode originally selected.

2.6 Status classification

All alarms are classified in the positioner, i.e. when an alarm is issued, it is assigned a status. These states are "Maintenance alarm", "Maintenance required", "Maintenance demanded", "Function check" and "No message".

▶ **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 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 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.





▶ **Function check**

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

▶ **No message**


When this classification is active, it does not have any affect on the condensed status.

Changes in status classification can be made by selecting the *Positioner* folder (> Error control > Classification report).







Status classification of alarms	TROVIS-VIEW3/DTM
Maintenance alarm	 red
Maintenance required/ Maintenance demanded	 blue
Function check	 orange
No message	 white

To provide a better overview, the classified alarms are summarized in a condensed state.

The condensed state is indicated on the right-hand side of the infobar and in the *Diagnosis* folder (> Status messages). This folder shows which error caused the condensed state to be set.

Note: The condensed state and status alarms are marked with  until they have been read-out.

The condensed state is indicated as follows:

Condensed state	TROVIS-VIEW3/DTM	Positioner display
Maintenance alarm	 red	
Maintenance required/ Maintenance demanded	 blue	
Function check	 orange	Text: <i>tESing</i> , <i>tunE</i> or <i>tESf</i>
No message	 green	



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>

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