



KH 8390-5 EN

Translation of original instructions



Type 3738-50 Electronic Limit Switch **Communication: FOUNDATION™ fieldbus**

Firmware version 1.01

Edition December 2013



The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at www.samson.de > **Service & Support** > **Downloads** > **Documentation**.

i Note

Refer to the Mounting and Operating Instructions EB 8390-5 for details on mounting, start-up and local operation of the electronic limit switch.

Definition of signal words

⚠ DANGER

Hazardous situations which, if not avoided, will result in death or serious injury

⚠ WARNING

Hazardous situations which, if not avoided, could result in death or serious injury

ⓘ NOTICE

Property damage message or malfunction

i Note

Additional information

💡 Tip

Recommended action

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1 Introduction

This section is based upon:

- Fieldbus FOUNDATION™ Specification “Function Block Application Process Part 1 – 3” Revision 1.7 (FF-890 to FF-892)
- Fieldbus FOUNDATION™ Specification “Positioner Transducer Block” Revision 3.0 (FF-906)

Type 3738-50 Electronic Limit Switch

The Type 3738-50 Electronic Limit Switch allows on/off valves to be actuated by an integrated or external solenoid valve as well as their discrete end positions to be read out by a FOUNDATION™ fieldbus network according to IEC 61158-2.

Special features:

- Link Master Capability
- Power supplied by FOUNDATION™ fieldbus (solenoid valve with low energy consumption of 6 V DC)
- Simple discrete actuation of on/off valves over a FOUNDATION™ fieldbus network
- Easy to attach to commonly available linear actuators (NAMUR attachment) as well as rotary actuators according to VDI/VDE 3845
- Non-contact sensing of the rotation angle by a magnetoresistive sensor system
- Simple one-knob, menu-driven operation
- Automatic start-up
- LCD easy to read in any mounting position due to selectable reading direction
- Integrated diagnostics with partial stroke testing (PST)
- Classified status alarms acc. to NAMUR Recommendation NE 107
- Parameters can be changed online
- Permanent storage of all parameters in non-volatile EEPROM (protection against power failure)
- Version with integrated solenoid valve or for external solenoid valve

2 Principle of operation

The electronic limit switch is designed for attachment to pneumatic actuators. The current valve position is measured without contact using a magnet (on a screw) positioned centrally on the actuator shaft. The screw with magnet does not need to be adjusted. The AMR (anisotropic magnetoresistive) sensor located in the device together with the measuring electronics (1) can detect the directional change of the applied magnetic field and, as a result, sense the movement of the actuator.

The pneumatic actuator is operated by a solenoid valve (6, 8) which converts the signal issued by the control system into a binary pressure signal.

2.1 Versions

Version with integrated solenoid valve (Type 3738-50-xxx4x00x1x00x0)

The solenoid valve is integrated into the housing of the electronic limit switch. The electronic limit switch and the solenoid valve are powered by the connected FOUNDATION™ fieldbus two-wire cable according to IEC 61158-2.

Version for external solenoid valve (Type 3738-50-xxx0x00x1x00x0)

The electronic limit switch and the external solenoid valve are powered by the connected FOUNDATION™ fieldbus two-wire cable according to IEC 61158-2.

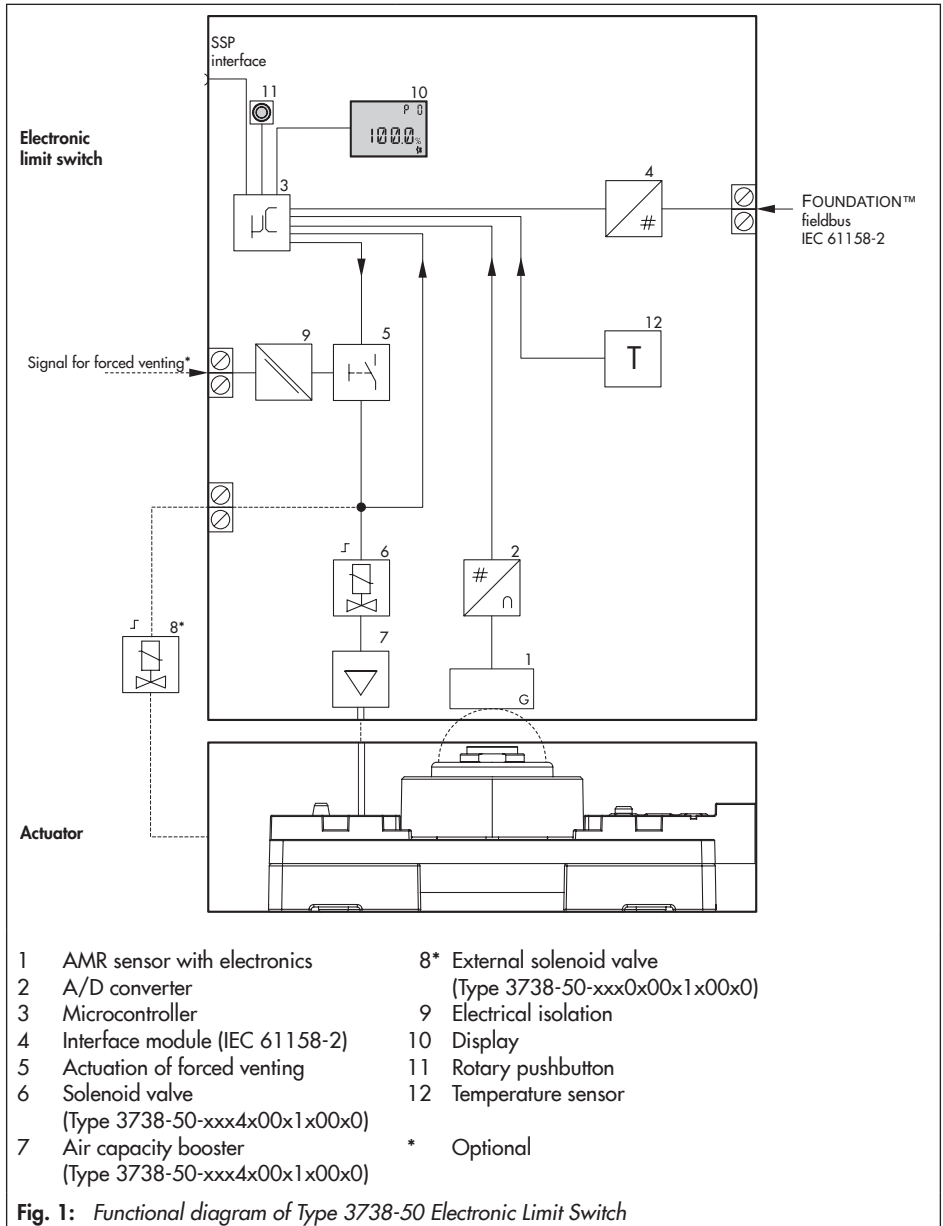
2.1.1 Forced venting

The electronic limit switch can optionally be fitted with a **forced venting** function. This function is activated when the solenoid valve is de-energized after the power supply is interrupted, causing the actuator to move the control valve to its fail-safe position.

2.2 Operating/configuration mode

The electronic limit switch has two modes: the operating mode (**RUN**) and the configuration mode (**SET**). Switchover between the two modes is performed in the **Operating mode** parameter ► page 40.

- **RUN**: Operating mode: configuration for start-up and partial stroke testing (PST) **not** possible
- **SET**: Configuration mode: (no operation), configuration for start-up and partial stroke testing (PST)



3 Configuration using TROVIS-VIEW software

The electronic limit switch can be configured using the TROVIS-VIEW Configuration and Operator Interface software.

The electronic limit switch is equipped with an additional digital serial interface to connect the RS-232 or USB port of the computer to the electronic limit switch over an adapter cable.

The TROVIS-VIEW software enables the user to easily set parameters in the electronic limit switch and view process parameters online.

3.1 Configuration using the NI-BUS™ Configurator

The NI-FBUS™ Configurator from National Instruments can also be used to configure the electronic limit switch. An FF interface card is required for connection to FOUNDATION™ fieldbus.

The integrated function blocks can be linked using the NI-FBUS™ Configurator.

3.2 Communication

The electronic limit switch is completely controlled over the digital signal transmission implemented according to FOUNDATION™ fieldbus specification.

Data are transmitted over the bus using digital, bit-synchronous Manchester coding at a baud rate of 31.25 kbit/s over twisted-pair wires according to IEC 61158-2.

i Note

If complex functions are started in the electronic limit switch, which require a long calculation time or lead to a large quantity of data being saved in the volatile memory of the electronic limit switch, the alert 'busy' is issued over FOUNDATION™ fieldbus. This alert is not an error message and can be simply confirmed.

4 FOUNDATION™ fieldbus block model

FOUNDATION™ fieldbus assigns all the functions and data of a device to different 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 3738-50 Electronic Limit Switch:

Resource Block (RES)

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.

Function Blocks (FB)

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 following function blocks are implemented in the Type 3738-50:

- 5x Discrete Input Function Blocks (DI FB); execution time 20 ms
- 5x Discrete Output Function Blocks (DO FB); execution time 30 ms
- 1x Analog Input Function Block (AI FB)
 - analog position feedback; execution time 20 ms

Transducer Blocks (TRD)

Each AI or AO Function Block has a Transducer Block which contains all data and device-specific parameters to link the device to the process value (sensor or final control element).

The following Transducer Blocks (corresponding to the Function Blocks) are implemented:

- 1x Limit Switch Transducer Block (LS TRD)
- 5x Discrete Input Transducer Blocks (DI TRD)
- 5x Discrete Output Transducer Blocks (DO TRD)
- 1x Analog Input Transducer Block (AI TRD)

5 Write protection

The **Local operation** parameter ► page 28 allows the local operation (access using TROVIS-VIEW and on-site operation) of the electronic limit switch to be locked. An active locking is indicated by σ on the display.

i Note

*Operation over the FOUNDATION™ fieldbus network can be locked by the local operation (Code **P18**). When this locking function is active, device data can only be read over the FOUNDATION™ fieldbus network, but data in the device cannot be overwritten.*

6 End position calibration in the device

When the zero point or end positions are incorrect, it may be necessary to recalibrate them. Always perform an end position calibration for the fail-safe position and for the operating position. The end position calibration can be started by the **START_ABORT_CMD** parameter of the LS Transducer Block. Status information can be read in the **Status of end position calibration** parameter ► page 38.

The end position calibration is automatically canceled if an error occurs. The error can be read in the **ACTUAL_DEVICE_ERROR (70)** parameter of the LS Transducer Block.

7 Resetting the device

Resetting start-up data

Reset the start-up data in the P21 parameter (local operation).

Resetting identification data and the block configuration

Reset the identification data for the electronic limit switch, valve and actuator by selecting '3' in the **RESET_CMD (63)** parameter of the LS Transducer Block. Additionally, the settings of the function blocks are reset to their default settings. The start-up data and loggings remain saved.

Resetting the logging of partial stroke testing (PST), valve movement and status

Reset the logged partial stroke testing data, valve movement and logged status messages by selecting '12' in the **RESET_CMD (63)** parameter of the LS Transducer Block. The device configuration remains saved.

8 Status classification and condensed state

All status messages are classified in the electronic limit switch to report an error that has occurred. The status classification can be changed over the DD or in the TROVIS-VIEW software (see Fig. 3).

To provide a better overview, the classified messages are summarized in a condensed state (▶ page 49). In addition to the parameter, the condensed state can be issued to the discrete output OUT_D of the Discrete Input Function Blocks (DI1 FB to DI5 FB).

Possible condensed states include:

0	OK	
1	Maintenance required	The device still performs its control task (with restrictions). A maintenance requirement or above average wear has been determined. The wear tolerance will soon be exhausted or is reducing at a faster rate than expected. Maintenance is necessary in the medium term.
2	Maintenance demanded	The device still performs its control task (with restrictions). A maintenance requirement or above average wear has been determined. The wear tolerance will soon be exhausted or is reducing at a faster rate than expected. Maintenance is necessary in the short term.
3	Failure	The device 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.
4	Out of specification	The device is running outside the specified operating conditions.
7	Function check	Test or calibration procedures are being performed. The device is temporarily unable to perform its control task until this procedure is completed.

In addition to the condensed state, the block error messages (▶ page 41) from the Resource Block and the Transducer Blocks can also be assigned to events.

The block error is formed from active classified messages.

Status classification and condensed state

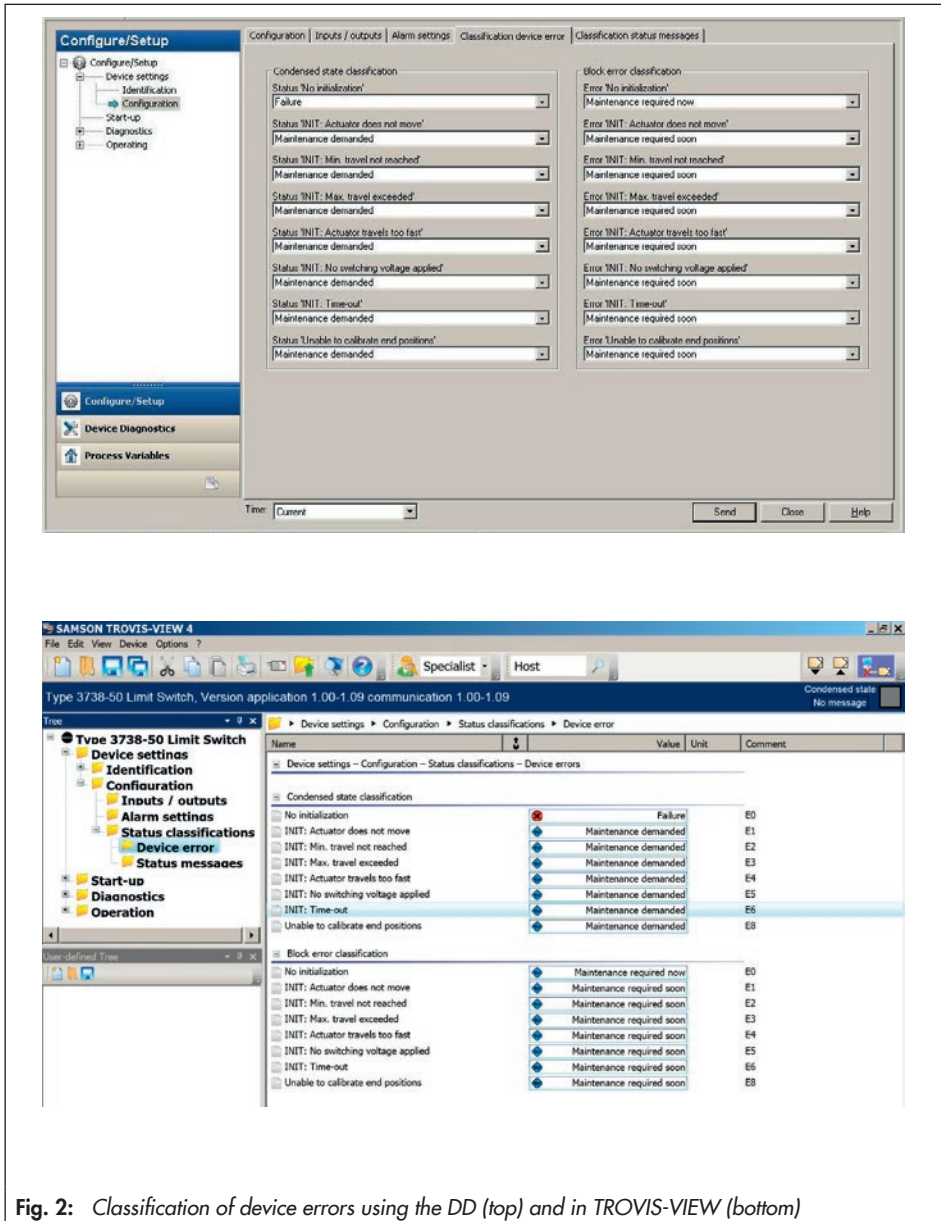


Fig. 2: Classification of device errors using the DD (top) and in TROVIS-VIEW (bottom)

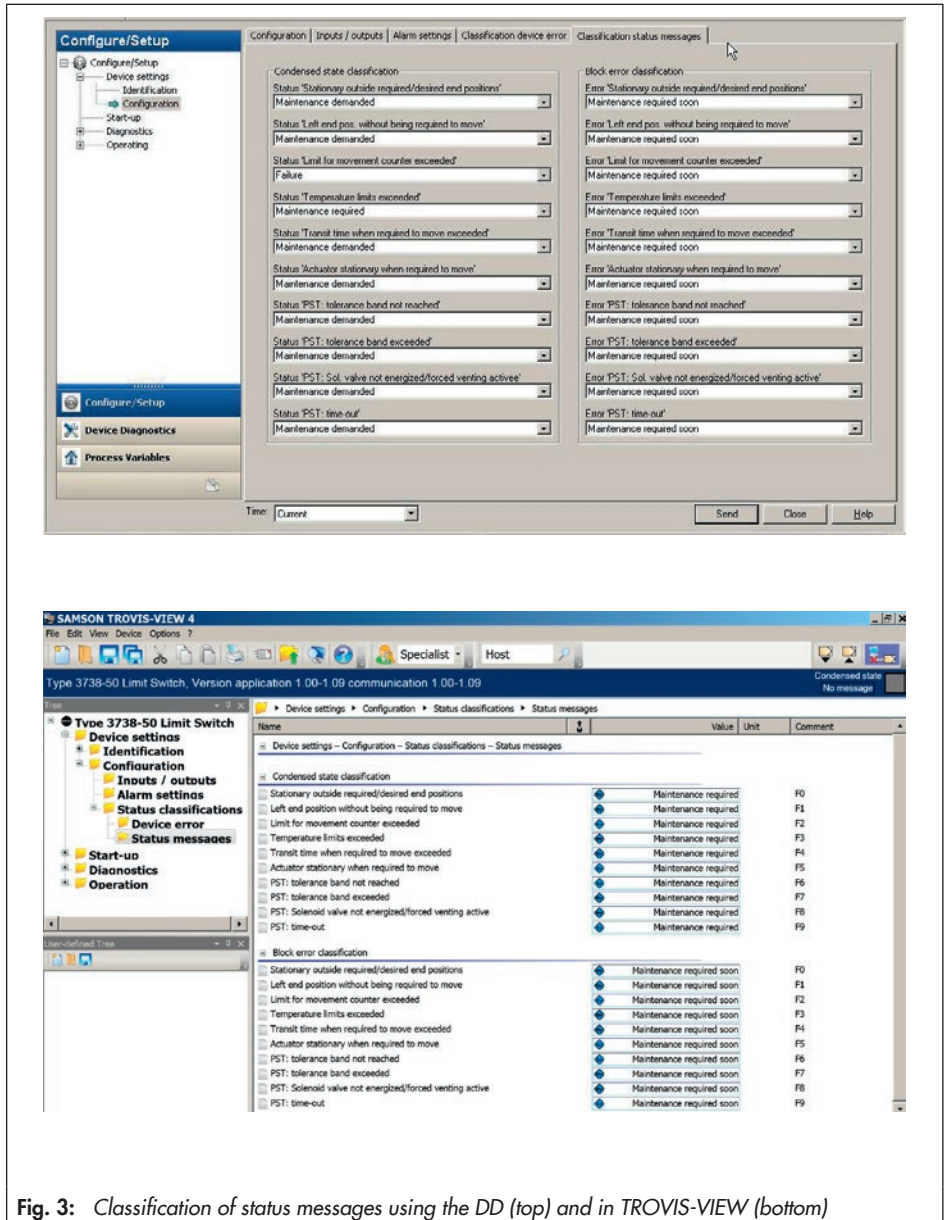


Fig. 3: Classification of status messages using the DD (top) and in TROVIS-VIEW (bottom)

9 Block model

Some parameters can only be changed in certain modes (see section 10). In this case, the target mode is decisive and not the actual mode.

9.1 Resource Block (RES)

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 that affect the behavior of all other blocks of the device.

i Note

All time specifications in the Resource Block are specified in the unit of 1/32 ms according to the FOUNDATION™ fieldbus Specification Version 1.7. In the Device Description Library supplied by Fieldbus FOUNDATION upon which the device description of Type 3738-50 is also based, these parameters are incorrectly specified with the unit of ms. The specified values supplied by the device are, however, always to be interpreted as the unit of 1/32 ms.

9.2 Function Blocks

9.2.1 Discrete Input Function Block (DI1 FB to DI5 FB)

The Discrete Input Function Block processes single discrete signals and makes them available to other function blocks over the discrete output (OUT_D). The electronic limit switch has five Discrete Input Function Blocks which provide the application options described below. The type of application is set over **Select discrete input 1 to 5** parameter ► page 29.

– **End position** (default assignment: DI1 FB)

The end position (current discrete valve position) is provided by the discrete output.

- 0 Valve closed
- 1 Valve open
- 2 Valve in intermediate position

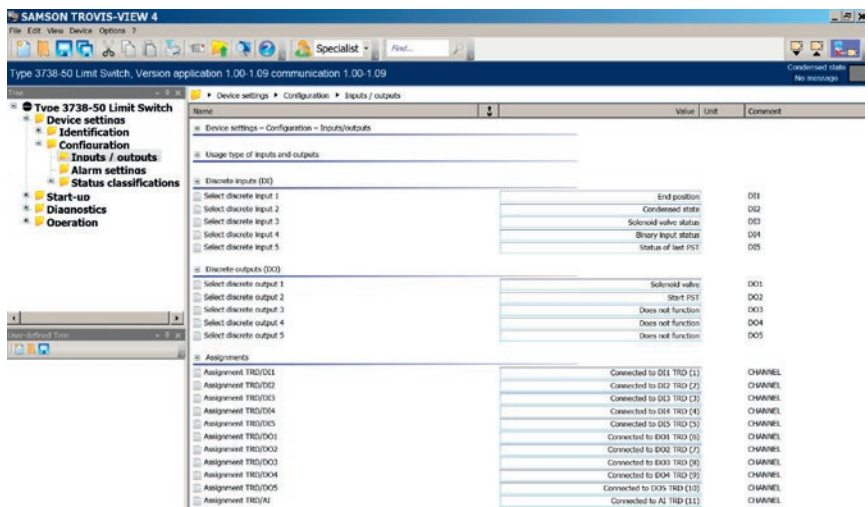
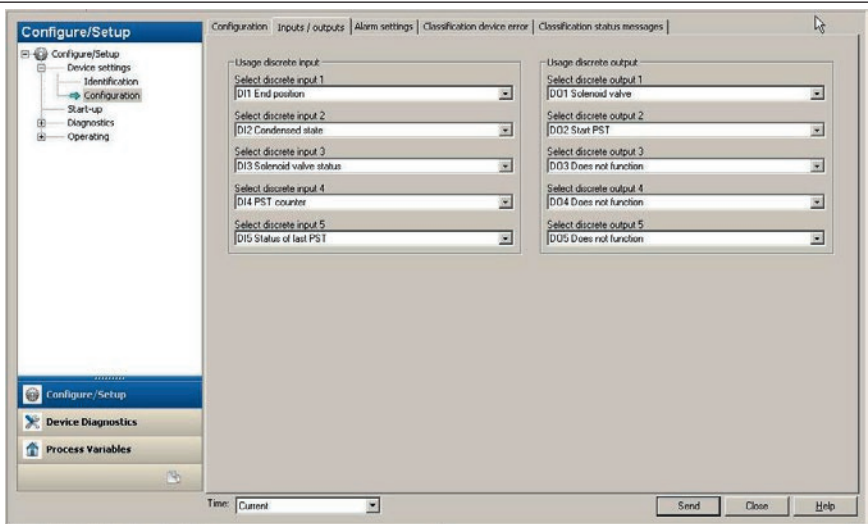


Fig. 4: Default assignment of Function Blocks DI1 FB to DI5 FB and DO1 FB to DO5 FB using the DD (top) and in TROVIS-VIEW (bottom)

Block model

- **Condensed state** (default assignment: DI2 FB)
The current condensed state according to NAMUR Recommendation NE 107 is provided by the discrete output.
 - 0 No message
 - 1 Maintenance required
 - 2 Maintenance demanded
 - 3 Failure
 - 4 Out of specification
 - 7 Function check
- **Solenoid valve status** (default assignment: DI3 FB)
The current status of the solenoid valve is provided by the discrete output.
 - 0 Not active
 - 1 Active
- **Status of last PST** (default assignment: DI5 FB)
The status of the last partial stroke test (PST) is provided by the discrete output.
 - 0 No test available
 - 1 Successful
 - 2 Not successful
- **PST counter** (no default assignment)
The number of partial stroke tests (PST) performed is provided by the discrete output.

9.2.2 Discrete Output Function Block (DO1 FB to DO5 FB)

The Discrete Output Function Block processes a discrete signal and makes it available as a discrete output (OUT_D) at the preset CHANNEL.

The five Discrete Output Function Blocks can be assigned to various applications over the **Select discrete output 1 to 5** parameter ► page 29. The following applications are supported:

- **Solenoid valve** (default assignment: DO1 FB)
Starts solenoid valve test
 - 0 De-energize solenoid valve
 - 1 Energize solenoid valve

- **Start the PST** (default assignment: DO2 FB)
Starts a partial stroke test (PST): the change to a positive edge at the DO output starts the partial stroke test (PST).
0 → 1 Start partial stroke test (PST)

9.2.3 Analog Input Function Block (AI FB)

The Analog Input Function Block provides an analog measured variable of the electronic limit switch at its output for other analog function blocks. It is not possible to assign the measured variables. The output is always the valve position.

9.3 Transducer Blocks

Transducer blocks link the function blocks to the input and output variables of a field device. For example, the Discrete Input Function Blocks are linked to the physical binary inputs, an internal solenoid valve, the current valve position or the condensed state of the device. This link to the various transducer blocks is made over the CHANNEL parameter of the individual function blocks. The table below shows how CHANNEL is assigned to the function blocks:

CHANNEL	Function block
1	DI1
2	DI2
3	DI3
4	DI4
5	DI5
6	DO1
7	DO2
8	DO3
9	DO4
10	DO5
11	AI

The Transducer Blocks DI TRD, DO TRD and AI TRD are implemented according to the FOUNDATION™ fieldbus specification and do not contain any manufacturer-specific parameters.

9.3.1 Limit Switch Transducer Block (LS TRD)

The Limit Switch Transducer Block is not linked to any function blocks. It serves as a container for device-specific parameters. Furthermore, the data of the diagnostic tests are saved here and can be transferred to other transducer blocks.

10 Parameters

Explanation to the following tables

The parameters of the electronic limit switch are arranged in the tables according to the following topics:

- ▶ Identification
- ▶ Configuration
- ▶ Start-up
- ▶ Diagnostics – Status messages
- ▶ Diagnostics – Monitoring functions
- ▶ Diagnostics – Test functions
- ▶ Process data
- ▶ Operating mode

The default settings for parameters with write protection are written in parentheses [].

Supported modes:

- O O/S (out of service) mode
- M MAN mode
- A AUTO mode

Read/write capability:

- R Read capability
- W Write capability

Identification

Actuator			
Actuator manufacturer ID			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: ACT_MAN_ID
Any desired text <ul style="list-style-type: none"> String with max. 32 characters 			
Actuator model number			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: ACT_MODEL_NUM
Any desired text <ul style="list-style-type: none"> String with max. 32 characters, [-/-] 			
Actuator serial number			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: ACT_SN
Any desired text <ul style="list-style-type: none"> String with max. 32 characters, [no text] 			
Attachment			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: ATTACHMENT
<ul style="list-style-type: none"> SAMSON integral attachment IEC 60534-6/NAMUR VDI/VDE 3847, sheet 1 VDI/VDE 3845 VDI/VDE 3847, sheet 2 Other [-/-] 			
Booster			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: BOOSTER
<ul style="list-style-type: none"> Not available Available Other [-/-] 			

Parameters

Design			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: MODEL
<ul style="list-style-type: none"> • Single-acting • Double-acting • Other • [-/-] 			
Effective actuator area			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: ACTUATOR_SIZE
<ul style="list-style-type: none"> • 0 to 3000 cm² 			
Lower signal pressure range value			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: SIGNAL_PRES- SURE_LOWER_VALUE
<ul style="list-style-type: none"> • [0.0] to 10.0 bar 			
Pressure unit			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: PRESSURE_UNIT
<ul style="list-style-type: none"> • [bar] • psi 			
Supply pressure			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: SUPPLY_PRES- SURE
<ul style="list-style-type: none"> → 0.0 to 12.0 bar 			
Upper signal pressure range value			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: SIGNAL_PRES- SURE_UPPER_VALUE
<ul style="list-style-type: none"> • [0.0] to 10.0 bar 			

Inputs/outputs			
Tag description			
Block: AI_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: TAG_DESC
Any desired text to assign a unique description to the analog input block (AI, TRD) for clear identification.			
<ul style="list-style-type: none"> • String with max. 32 characters, [no text] 			
Tag description			
Block: DI..._TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: TAG_DESC
Any desired text to assign a unique description to the discrete inputs (DI1, TRD to DI5, TRD) for clear identification.			
<ul style="list-style-type: none"> • String with max. 32 characters, [no text] 			
Tag description			
Block: DO..._TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: TAG_DESC
Any desired text to assign a unique description to the discrete outputs (DO1, TRD to DO5, TRD) for clear identification.			
<ul style="list-style-type: none"> • String with max. 32 characters, [no text] 			
Limit switch			
Article code			
Block: RES	Read/write capability: R	Supported modes: –	DD: DEVICE_PROD- UCT_NUM
Bus address			
Block: RES	Read/write capability: R	Supported modes: –	DD: BUS_ADDRESS
→ Local operation: Code P28			

Parameters

Certification			
Block: RES	Read/write capability: R	Supported modes: –	DD: DEVICE_CERTIFICATION
DD resource			
Block: RES	Read/write capability: R	Supported modes:	DD: DD_RESOURCE
DD revision			
Block: RES	Read/write capability: R	Supported modes:	DD: DD_REVISION
Description			
Block: RES	Read/write capability: R/W	Supported modes: O/M/A	DD: DESCRIPTOR
Any desired text			
<ul style="list-style-type: none"> • String with max. 32 characters, [SAMSON Type 3738-50] 			
Device revision			
Block: RES	Read/write capability: R	Supported modes: –	DD: DEVICE_REVISION
Device type			
Block: RES	Read/write capability: R	Supported modes: –	DD: DEVICE_TYPE
<ul style="list-style-type: none"> • Undefined • 3738-50 			
Firmware versions			
Block: RES	Read/write capability: R	Supported modes: –	DD: FIRMWARE_REVISION
<ul style="list-style-type: none"> • K Communication • A Application <p>→ Local operation: Code P29/P30</p>			
ITK version			
Block: RES	Read/write capability: R	Supported modes: –	DD: ITK_VER
Version of interoperability testing system			

Manufacturer			
Block: RES	Read/write capability: R	Supported modes: –	DD: MANUFAC_ID
Message			
Block: RES	Read/write capability: R/W	Supported modes: O/A	DD: DEVICE_MESSAGE
Any desired text <ul style="list-style-type: none"> String with max. 32 characters, [no text] 			
Serial number of the device			
Block: RES	Read/write capability: R	Supported modes: –	DD: DEVICE_SER_NUM
Static revision number			
Block: LS TRD	Read/write capability: R	Supported modes: –	DD: ST_REV
The revision number is incremented each time a static parameter changes.			
Tag description			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: TAG_DESC
Any desired text to assign a unique description to the limit switch (LS, TRD) for clear identification. <ul style="list-style-type: none"> Max. 32 characters, [no text] 			
Tag description			
Block: RES	Read/write capability: R/W	Supported modes: O/A	DD: TAG_DESC
Any desired text to assign a unique description to the operating unit (RES) for clear identification. <ul style="list-style-type: none"> Max. 32 characters, [no text] 			
Text field 1–5			
Block: RES	Read/write capability: R/W	Supported modes: O/A	DD: TEXT_INPUT_1 to TEXT_INPUT_5
Any desired text <ul style="list-style-type: none"> String with max. 32 characters, [no text] 			

Parameters

Valve			
Facing (leakage class)			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: SEALING_EDGE
<ul style="list-style-type: none"> • Metal-to-metal • Lapped-in • Soft seal • Nickel seat • Other • [-/-] 			
Flow direction			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: FLOW_DIRECTION
<ul style="list-style-type: none"> • FTO (flow-to-open) • FTC (flow-to-close) • Alternating • Other • [-/-] 			
Kvs			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: KVS_VALUE
<ul style="list-style-type: none"> • 0.0000 to 100.0000 			
Kvs unit			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: KVS_UNIT
<ul style="list-style-type: none"> • Kv • Cv • Other • [-/-] 			
Length unit			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: LENGTH_UNITS Length unit
<ul style="list-style-type: none"> • [mm] • in 			

Pressure balancing			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: PRESSURE_ BALANCING
<ul style="list-style-type: none"> • Without • With (PTFE) • With (graphite) • Other • [-/-] 			
Seat diameter			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: SEAT_DIAM_ VALVE
<ul style="list-style-type: none"> • [0.0] to 100.0 mm 			
Stem seal			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: STUFFING_BOX
<ul style="list-style-type: none"> • Live-loaded • Adjustable • Bellows seal • Other • [-/-] 			
Valve characteristic			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: FLOW_ CHARACTERISTIC
<ul style="list-style-type: none"> • Linear 30:1 • Equal percentage 30:1 • Linear 50:1 • Equal percentage 50:1 • VETEC 200:1 • Other • [-/-] 			
Valve manufacturer ID			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: VALVE_MAN_ID
Any desired text <ul style="list-style-type: none"> • String with max. 32 characters 			

Parameters

Valve serial number			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: VALVE_SN
Any desired text			
<ul style="list-style-type: none"> String with max. 32 characters, [no text] 			
Valve size			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: NOM_DIAMETER_DN
<ul style="list-style-type: none"> 0.00 to 100.00 			
Valve standard			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: NOM_DIAMETER
<ul style="list-style-type: none"> [DIN [mm]] [ANSI [in]] [IG [mm]] [JIS [mm]] [BS [in]] [Other [mm]] [Other [in]] [-/-] 			
Valve type			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: VALVE_MODEL_NUM
Any desired text			
<ul style="list-style-type: none"> String with max. 32 characters, [no text] 			

Configuration

Alarm settings			
Actuator transit time limit			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: LSTB_STR_ U32_2
<ul style="list-style-type: none"> • 0.0 to 180.0 s; 0 = OFF → Local operation: Code P13			
Issue status PST target range			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: PST_ACTI- VATE_STATUS
<ul style="list-style-type: none"> • Yes • [No] → Local operation: Code P12			
Limit for movement counter			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: LIMIT_ MOVEMENT_ COUNTER
<ul style="list-style-type: none"> • 0 to 99000000; 0 = OFF → Local operation: Code P26			
Status indication actuator transit time			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: ACTIVATE_ RUNTIME_ MESSAGE
<ul style="list-style-type: none"> • Yes • [No] → Local operation: Code P13			

Parameters

Device settings			
Actuator type			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: LSTB_STR_ U16_2
<ul style="list-style-type: none"> • [Rotary actuator] • Linear actuator <p>→ Local operation: Code P4</p>			
Actuator's direction of action			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: POWER_ DIRECTION
<ul style="list-style-type: none"> • [Power-to-open (PTO)] • Power-to-close (PTC) <p>→ Local operation: Code P5</p>			
Local operation			
Block: RES	Read/write capability: R/W	Supported modes: O/A	DD: LOCAL_OP_ ENA
Lock access over TROVIS-VIEW and local operation <ul style="list-style-type: none"> • Locked • Enabled 			
Select additional functions supported			
Block: RES	Read/write capability: R/W	Supported modes: –	DD: FEATURE_SEL
<ul style="list-style-type: none"> • Host needs to confirm event report: [Yes]/No • Fail-safe action permitted: [Yes]/No • Assessing hardware write protection: [Yes]/No • Current valve position issued in PV_D (DO): [Yes]/No 			
Switching contact, lower end position			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: THRESHOLD_ LOWER_END_POS
<ul style="list-style-type: none"> • 0.5 to 96.0 %, [2.0 %] <p>→ Local operation: Code P7</p>			

Switching contact, upper end position			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: THRESHOLD_ UPPER_END_POS
<ul style="list-style-type: none"> • 4.0 to 99.5 %, [98.0 %] <p>→ Local operation: Code P8</p>			
Write lock			
Block: RES	Read/write capability: R	Supported modes: –	DD: WRITE_LOCK
<ul style="list-style-type: none"> • Inactive • Active <p>→ Local operation: Code P18</p>			
Inputs/outputs			
Select discrete input ...			
Block: RES	Read/write capability: R/W	Supported modes: O/A	DD: SELECT_DI_1 to SELECT_DI_5
<ul style="list-style-type: none"> • No function • End position • Condensed state • Solenoid valve status • Binary input status • Status of the last PST • PST counter 			
Select discrete output ...			
Block: RES	Read/write capability: R/W	Supported modes: O/A	DD: SELECT_DO_1 to SELECT_DO_5
<ul style="list-style-type: none"> • No function • Solenoid valve • Start PST 			

Parameters

Status classification			
Error 'Actuator stationary when required to move'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F5_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'INIT: actuator does not move'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E1_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'INIT: actuator travels too fast'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E4_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'INIT: max travel exceeded'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E3_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'INIT: min travel not reached'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E2_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			

Error 'INIT: no switching voltage applied'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E5_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'INIT: time-out'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E6_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'Left end pos. without being req. to move'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F1_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'Limit for movement counter exceeded'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F2_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'No initialization'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E0_ERROR
<ul style="list-style-type: none"> • No message • Maintenance required soon • [Maintenance required now] 			

Parameters

Error 'PST: sol. valve inactive/forced venting active'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F8_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'PST: time-out'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F9_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'PST: tolerance band exceeded'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F7_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'PST: tolerance band not reached'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F6_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'Stationary outside demanded/desired end position'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F0_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			

Error 'Temperature limits exceeded'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F3_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'Transit time when required to move changed'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F4_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Error 'Unable to calibrate end positions'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E7_ERROR
<ul style="list-style-type: none"> • No message • [Maintenance required soon] • Maintenance required now 			
Status 'Actuator stationary when required to move'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F5_STATUS
<ul style="list-style-type: none"> • No message • [Maintenance required] • Maintenance demanded • Failure • Out of specification 			
Status 'INIT: actuator does not move'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E1_STATUS
<ul style="list-style-type: none"> • No message • Maintenance required • [Maintenance demanded] • Failure • Out of specification 			

Parameters

Status 'INIT: actuator travels too fast'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E4_STATUS
<ul style="list-style-type: none"> • No message • Maintenance required • [Maintenance demanded] • Failure • Out of specification 			
Status 'INIT: max travel exceeded'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E3_STATUS
<ul style="list-style-type: none"> • No message • Maintenance required • [Maintenance demanded] • Failure • Out of specification 			
Status 'INIT: min travel not reached'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E2_STATUS
<ul style="list-style-type: none"> • No message • Maintenance required • [Maintenance demanded] • Failure • Out of specification 			
Status 'INIT: no switching voltage applied'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E5_STATUS
<ul style="list-style-type: none"> • No message • Maintenance required • [Maintenance demanded] • Failure • Out of specification 			

Status 'INIT: time-out'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E6_STATUS
<ul style="list-style-type: none"> • No message • Maintenance required • [Maintenance demanded] • Failure • Out of specification 			
Status 'Left end pos. without being required'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F1_STATUS
<ul style="list-style-type: none"> • No message • [Maintenance required] • Maintenance demanded • Failure • Out of specification 			
Status 'Limit for movement counter exceeded'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F2_STATUS
<ul style="list-style-type: none"> • No message • [Maintenance required] • Maintenance demanded • Failure • Out of specification 			
Status 'No initialization'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E0_STATUS
<ul style="list-style-type: none"> • No message • Maintenance required • Maintenance demanded • [Failure] • Out of specification 			

Parameters

Status 'PST: sol. valve not energized/forced venting active'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F8_STATUS
<ul style="list-style-type: none"> • No message • [Maintenance required] • Maintenance demanded • Failure • Out of specification 			
Status 'PST: tolerance band exceeded'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F7_STATUS
<ul style="list-style-type: none"> • No message • [Maintenance required] • Maintenance demanded • Failure • Out of specification 			
Status 'PST: tolerance band not reached'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F6_STATUS
<ul style="list-style-type: none"> • No message • [Maintenance required] • Maintenance demanded • Failure • Out of specification 			
Status 'PST: time-out'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F9_STATUS
<ul style="list-style-type: none"> • No message • [Maintenance required] • Maintenance demanded • Failure • Out of specification 			

Status 'Stationary outside required/desired end positions'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F0_STATUS
<ul style="list-style-type: none"> • No message • [Maintenance required] • Maintenance demanded • Failure • Out of specification 			
Status 'Temperature limits exceeded'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F3_STATUS
<ul style="list-style-type: none"> • No message • [Maintenance required] • Maintenance demanded • Failure • Out of specification 			
Status 'Transit time when required to move exceeded'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_F4_STATUS
<ul style="list-style-type: none"> • No message • [Maintenance required] • Maintenance demanded • Failure • Out of specification 			
Status 'Unable to calibrate end positions'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: CLASSIFICATION_E7_STATUS
<ul style="list-style-type: none"> • No message • Maintenance required • [Maintenance demanded] • Failure • Out of specification 			

Start-up

Calibration				
Transducer calibration date				
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: XD_CAL_DATE	
Date of last calibration				
Transducer calibration location				
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: XD_CAL_LOC	
Location of last calibration				
Transducer calibration who				
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: XD_CAL_WHO	
Person who performed the last calibration				
End position calibration				
Offset in end position calibration				
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: CORRECTION_ VALUE	
Specified in degrees °				
Status of end position calibration				
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: ZERO_POINT_ STATUS_ENUM	
<ul style="list-style-type: none"> • Not successful • Successful 				
Time stamp, adaption end pos. cal.				
Block: LS_TRD	Read/write capability: R	Supported modes:	DD: ZERO_TIME_ STAMP_STRING	
Reading in d.h:min:sec				

Time stamp end position calibration			
Block: LS_TRD	Read/write capability: R	Supported modes:	DD: ZERO_PRIM_TIME_STAMP_STRING
Reading in d.h:min:sec			
Initialization			
Dead time decreasing			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: DEADTIME_OFF
Reading in sec			
Dead time increasing			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: DEADTIME_ON
Reading in sec			
Initialization span			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: RANGE
Specified in degrees °			
Initialization status			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: INIT_STATUS
<ul style="list-style-type: none"> • Not successful • Automatic initialization • Manual initialization • Active 			
Time stamp initialization			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: INIT_PRIM_TIME_STAMP_SECONDS
Reading in d.h:min:sec			
Transit time decreasing			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: RUNTIME_OFF
<ul style="list-style-type: none"> • [0.00] to 100.00 			

Parameters

Transit time increasing			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: RUNTIME_ON
→ Local operation: Code P23			
Operating mode			
Current operating mode			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: CURRENT_OPERATING_MODE
<ul style="list-style-type: none"> • RUN (operating mode) • SET (configuration mode) 			
Reading direction			
Block: RES	Read/write capability: R/W	Supported modes: O/A	DD: READING_DIRECTION
<ul style="list-style-type: none"> • [0° (normal)] • Turned by 180° 			
→ Local operation: Code P1			
Set operating mode			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: SET_OPERATING_MODE
<ul style="list-style-type: none"> • SET (operating mode) • RUN (configuration mode) 			
→ Local operation: Code P2			
Simulation			
Enable 'Simulation of status and error messages'			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: SIMULATE_STATUS_ERROR_ENABLE

Simulation of status and error messages			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: SIMULATE_STA- TUS_ERROR
<ul style="list-style-type: none"> • No simulation • E0: No initialization • ; • E10: Collective error HW maintenance required • F0: Stationary outside required/desired end position • ; • F11: Forced venting active 			

Diagnostics – Status messages

Block errors			
Block error			
Block: DI..._TRD	Read/write capability: R	Supported modes: –	DD: BLOCK_ERR
Block error of the discrete inputs (DI1, TRD ... DI5, TRD)			
<ul style="list-style-type: none"> • Configuration error • Input error/PV status = BAD • Block mode: out of service 			
Block error			
Block: DO..._TRD	Read/write capability: R	Supported modes: –	DD: BLOCK_ERR
Block error of the discrete outputs (DO1, TRD ... DO5, TRD)			
<ul style="list-style-type: none"> • Configuration error • Local override active • Input error/PV status = BAD • Output error • Block mode: out of service 			

Parameters

Block error			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: BLOCK_ERR
Block error of the limit switch (LS, TRD) <ul style="list-style-type: none"> • Local override active • Maintenance required soon • Input error/PV status = BAD • Output error • Memory error • Data loss in EEPROM • Maintenance required now • Block mode: out of service 			
Block error			
Block: RES	Read/write capability: R	Supported modes: –	DD: BLOCK_ERR
Block error of the operating unit (RES, TRD) <ul style="list-style-type: none"> • Unlock simulation P19 active • Maintenance required soon • Data loss in EEPROM • Maintenance required now • Block mode: out of service 			
Device error details			
Current device error			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: ACTUAL_DEVICE_ERROR
<ul style="list-style-type: none"> • E0 Device not initialized • E1 INIT: actuator does not move • E2 INIT: min. travel not reached • E3 INIT: max. travel exceeded • E4 INIT: actuator travels too fast • E5 INIT: forced venting active • E6 INIT: time-out • E7 Internal error • E8 Unable to calibrate end positions • E9 Collective error HW failure • E10 Collective error HW maintenance required 			

Operating hours since first init (t – ...)			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: ERROR..._TIME-STAMP_STRING
General			
Max. temperature			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: MAX_TEMP
Reading in °C			
Min. temperature			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: MIN_TEMP
Reading in °C			
Movement counter			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: STROKE_COUNTER
<ul style="list-style-type: none"> • 0 to [10000]; (0 = OFF) 			
→ Local operation: Code P26			
Operating hours counter			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: ELAPSED_HOUR_METER_STRING
→ Local operation: Code P25			
Status solenoid valve			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: STATUS_MGV
<ul style="list-style-type: none"> • Not active internally • Active • Active (cannot be deactivated internally) • Not active 			
Temperature			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: CURRENT_TEMP
Reading in °C			
→ Local operation: Code P24			

Parameters

Time stamp, LCD verification			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: TIME_STAMP_LCD_VERIFICATION
Reading in d.h:min:sec			
Time stamp 'Max. temperature'			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: MAX_TEMP_TIME_STAMP_TRINGS
Reading in d.h:min:sec			
Time stamp 'Min. temperature'			
Block: LS_TRD	Read/write capability: R	Supported modes:	DD: MIN_TEMP_TIME_STAMP_STRING
Reading in d.h:min:sec			
Transducer error			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: XD_ERROR
Error message of LS TRD			
Status messages details			
First occurrence F...			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: F..._FIRST_APPEARANCE_STRING
First time when status messages F0 to F10 occurred			
First reset F...			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: F..._FIRST_RESET_STRING
First time when status messages F0 to F10 were reset			
Last occurrence F...			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: F..._LAST_APPEARANCE_STRING
Last time when status messages F0 to F10 occurred			

Last reset F...			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: F..._LAST_RESET_STRING
Last time when status messages F0 to F10 were reset			
Qty. F...			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: F..._NUMBER
Number of status messages F0 to F10			
Status messages			
Block:	Read/write capability: R	Supported modes:	DD: ACTUAL_DEVICE_STATUS
<ul style="list-style-type: none"> • F0 Stationary outside required/desired end position • F1 Left end position without being required to move • F2 Limit for movement counter (P26) exceeded • F3 Temperature limits exceeded • F4 Transit time when required to move exceeded • F5 Actuator stationary when required to move • F6 PST tolerance band not reached • F7 PST tolerance band exceeded • F8 PST: solenoid valve not energized/forced venting active • F9 PST: time-out • F10 Error E0 to E10 exists • F11 Forced venting active 			

Diagnostics – Monitoring functions

Travel vs time diagram			
Recording duration travel vs time diagram			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: STB_STR_U16_4
Reading in sec			

Parameters

Status of travel vs time diagram			
Block:	Read/write capability: R	Supported modes: –	DD: LSTB_STR_U16_3
<ul style="list-style-type: none"> • Invalid • In progress • Solenoid valve off • Partial stroke test • Solenoid valve on 			
Valve movement			
Valve movement (...) beginning			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: START_...
Logging of the last ten valve movements – Reading in %			
Valve movement (...) dead time			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: DEADTIME_...
Logging of the last ten valve movements – Reading in sec			
Valve movement (...) end			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: END_...
Logging of the last ten valve movements – Reading in %			
Valve movement (...) status			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: STATUS_...
Logging of the last ten valve movements			
Valve movement (...) time stamp			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: TIME_STAMP_... TIME_STAMP_STR_...
Logging of the last ten valve movements			
Valve movement (...) transit time			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: RUNTIME_...
Logging of the last ten valve movements – Reading in sec			

Diagnostics – Test functions

Configuration of partial stroke test (PST)			
Interval for PST			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: PST_TIME_INTERVAL
<ul style="list-style-type: none"> • 0 to 999 days → Local operation: Code P16			
PST command			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: PST_CMD
→ Local operation: Code P17			
PST step end			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: PST_TARGET_MIN_VALUE
<ul style="list-style-type: none"> • 4.0 to 96.0 %, [90.0 %] → Local operation: Code P14			
PST tolerance band			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: PST_TARGET_MAX_VALUE
<ul style="list-style-type: none"> • 4.0 to 96.0 %, [10.0 %] → Local operation: Code P14			
Partial stroke test (PST) logging			
No. of PSTs performed			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: NUMBER_PST

Parameters

PST dead time (...)			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: PST_DEADTIME_...
Reading in sec			
PST hold time (...)			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: PST_DELAY_...
Reading in sec			
PST pulse length (...)			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: PST_PULSE_LENGTH_...
Reading in sec			
PST status (...)			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: PST_PULSE_LENGTH_9 (0) PST_DEADTIME_9 (1) PST_RUN_TIME_DOWN_9 (2) PST_DELAY_9 (3) PST_RUN_TIME_UP_9 (4) PST_PULSE_LENGTH_10 (5) PST_DEADTIME_10 (6) PST_RUN_TIME_DOWN_10 (7) PST_DELAY_10 (8) PST_RUN_TIME_UP_10 (9)
<ul style="list-style-type: none"> • No test available • OK • PST: time-out • Function canceled • AMR sensor error • PST: solenoid valve not energized/forced venting active • PST: tolerance band not reached • PST: tolerance band exceeded • End position error • Active • Test canceled manually 			
PST time stamp (...)			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: PST_TIME_STAMP_..._STRING
Reading in d.h:min:sec			

PST transit time SV Off (...)			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: PST_RUN_TIME_OFF_...
Reading in sec			
PST transit time SV On (...)			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: PST_RUN_TIME_ON_...
Reading in sec			
PST valve position reached (...)			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: PST_STROKE_...
Reading in %			

Process data

Condensed state			
Block: RES	Read/write capability: R	Supported modes: –	DD: CONDENSED_STATE
<ul style="list-style-type: none"> • No message • Maintenance required • Maintenance demanded • Failure • Out of specification 			
Valve position			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: VALVE_POSITION_IN_DEGREE/ VALVE_POSITION_IN_PERCENT
Reading in %			

Operating mode

Analog Input (AI, TRD)			
Actual mode			
Block: AI_TRD	Read/write capability: R	Supported modes: –	DD: MODE_BLK (ACTUAL)
<ul style="list-style-type: none"> • Automatic (AUTO) • Manual (MAN) • O/S mode • Cascade (CAS) • External cascade (RCAS) • Local override (positioning value) 			
Normal mode			
Block: AI_TRD	Read/write capability: R	Supported modes: –	DD: MODE_BLK (NORMAL)
<ul style="list-style-type: none"> • Automatic (AUTO): Yes/No • O/S mode: Yes/No 			
Permitted mode			
Block: AI_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: MODE_BLK (PERMITTED)
<ul style="list-style-type: none"> • Automatic (AUTO): [Yes]/No • Manual (MAN): [Yes]/No • O/S mode: [Yes]/No 			
Target mode			
Block: AI_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: MODE_BLK (TARGET)
<ul style="list-style-type: none"> • Automatic (AUTO) • Manual (MAN) • O/S mode 			

Discrete input 1 to 5 (DI..., TRD)			
Actual mode			
Block: DI..._TRD	Read/write capability: R	Supported modes: –	DD: MODE_BLK (ACTUAL)
<ul style="list-style-type: none"> • Automatic (AUTO) • Manual (MAN) • O/S mode • Cascade (CAS) • External cascade (RCAS) • Local override (positioning value) 			
Normal mode			
Block: DI..._TRD	Read/write capability: R	Supported modes: –	DD: MODE_BLK (NORMAL)
<ul style="list-style-type: none"> • Automatic (AUTO): Yes/No • Manual (MAN): Yes/No • O/S mode: Yes/No 			
Permitted mode			
Block: DI..._TRD	Read/write capability: R/W	Supported modes: –	DD: MODE_BLK (PERMITTED)
<ul style="list-style-type: none"> • Automatic (AUTO): [Yes]/No • Manual (MAN): [Yes]/No • O/S mode: [Yes]/No 			
Target mode			
Block: DI..._TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: MODE_BLK (TARGET)
<ul style="list-style-type: none"> • Automatic (AUTO) • Manual (MAN) • O/S mode 			

Parameters

Discrete output DO 1 to 5 (DO..., TRD)

Actual mode			
Block: DO..._TRD	Read/write capability: R	Supported modes: –	DD: MODE_BLK (ACTUAL)
<ul style="list-style-type: none"> • Automatic (AUTO) • Manual (MAN) • O/S mode • Cascade (CAS) • External cascade (RCAS) • Local override (positioning value) 			
Normal mode			
Block: DO..._TRD	Read/write capability: R	Supported modes: –	DD: MODE_BLK (NORMAL)
<ul style="list-style-type: none"> • Automatic (AUTO): Yes/No • Manual (MAN): Yes/No • O/S mode: Yes/No • Cascade: Yes/No • External cascade: Yes/No 			
Permitted mode			
Block: DO..._TRD	Read/write capability: R/W	Supported modes: –	DD: MODE_BLK (PERMITTED)
<ul style="list-style-type: none"> • Automatic (AUTO): [Yes]/No • Manual (MAN): [Yes]/No • O/S mode: [Yes]/No • Cascade (CAS): [Yes]/No • External cascade (RCAS): [Yes]/No 			
Target mode			
Block: DO..._TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: MODE_BLK (TARGET)
<ul style="list-style-type: none"> • Automatic (AUTO) • Manual (MAN) • O/S mode • Cascade (CAS) • External cascade (RCAS) 			

Limit switch (LS, TRD)			
Actual mode			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: MODE_BLK (ACTUAL)
<ul style="list-style-type: none"> • Automatic (AUTO) • Manual (MAN) • O/S mode • Cascade (CAS) • External cascade (RCAS) • Local override (positioning value) 			
Normal mode			
Block: LS_TRD	Read/write capability: R	Supported modes: –	DD: MODE_BLK (NORMAL)
<ul style="list-style-type: none"> • Automatic (AUTO): Yes/No • O/S mode: Yes/No 			
Permitted mode			
Block: LS_TRD	Read/write capability: R/W	Supported modes: –	DD: MODE_BLK (PERMITTED)
<ul style="list-style-type: none"> • Automatic (AUTO): [Yes]/No • Manual (MAN): [Yes]/No • O/S mode: [Yes]/No 			
Target mode			
Block: LS_TRD	Read/write capability: R/W	Supported modes: O/M/A	DD: MODE_BLK (TARGET)
<ul style="list-style-type: none"> • Automatic (AUTO) • Manual (MAN) • O/S mode 			

Operating unit (RES)

Actual mode			
Block: RES	Read/write capability: R	Supported modes: –	DD: MODE_BLK (ACTUAL)
<ul style="list-style-type: none"> • Automatic (AUTO) • O/S mode · All function blocks change to O/S. 			
Normal mode			
Block: RES	Read/write capability: R	Supported modes: –	DD: MODE_BLK (NORMAL)
<ul style="list-style-type: none"> • Automatic (AUTO): Yes/No • O/S mode: Yes/No 			
Permitted mode			
Block: RES	Read/write capability: R/W	Supported modes: –	DD: MODE_BLK (PERMITTED)
<ul style="list-style-type: none"> • Automatic (AUTO): [Yes]/No • O/S mode: [Yes]/No 			
Target mode			
Block: RES	Read/write capability: R/W	Supported modes: O/A	DD: MODE_BLK (TARGET)
<ul style="list-style-type: none"> • Automatic (AUTO) • O/S mode 			

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