**Instruction** **MI 019-039 en**

12 / 2020

# Model CFT34A Coriolis Flow Transmitter

Supplementary Instructions

Description of Foundation Fieldbus Interface

Schneider Electric

## 1.1 Scope of the document

These instructions are supplementary to the standard product documentation of the transmitter. The details depicted therein, in particular the safety information are valid and should be adhered to. The present supplementary instructions provide additional information for the devices when being operated and connected to a Foundation Fieldbus.

***NOTICE!***
*The present supplementary instruction for the transmitter with Foundation Fieldbus interface, plus the software with the DD and CCF files are included in our scope of supply, in addition to those items delivered for the standard device.*

## 1.2 Device description

The mass flowmeters are designed exclusively to directly measure mass flow rates, product density and temperature as well to indirectly measure parameters such as the total volume, concentration of dissolved substances and the volume flow rate.

Your measuring device is supplied ready for operation. The factory settings for the operating data have been made in accordance with your order specifications.

### The following versions are available:

- Compact version (the transmitter is mounted directly on the flow sensor)
- Remote version (electrical connection to the flow sensor via field current and signal cable)

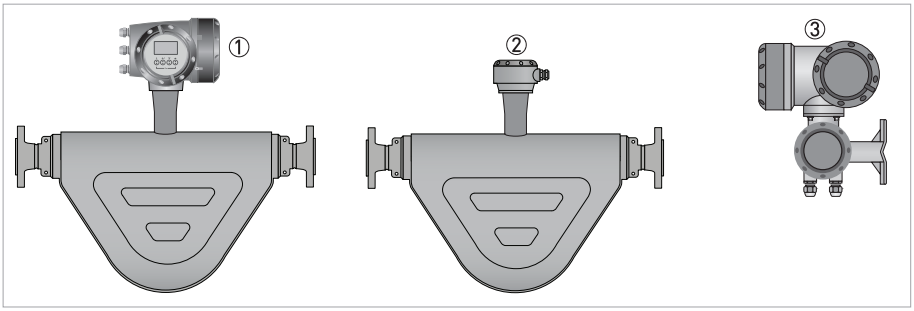



Figure 1-1: Versions with bent tube

① Compact version
② Flow sensor with connection box
③ Field housing

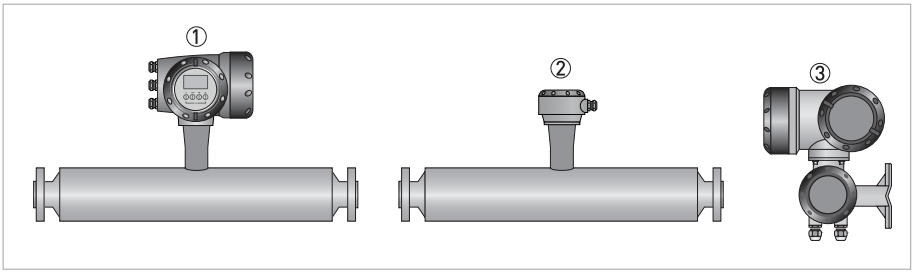



Figure 1-2: Versions with straight tube

① Compact version
② Flow sensor with connection box
③ Field housing

## 1.3 Software history

For all devices, the "Electronic Revision" (ER) is consulted to document the revision status of the electronics according to NE 53. It is easy to see from the ER whether any fault repairs or major changes to the electronic equipment have taken place and what effect they have had on compatibility.

| Electronic revision (ER) | DEV_REV | DD_REV | Fieldbus Software | Documentation |
|---|---|---|---|---|
| ER 2.0.2_ | 2 | 1 | 2.0.1_ 20200515 | Supplementary Instructions Foundation Fieldbus Edition 12/2020 |

Table 1-1: Software history

Description of the used abbreviations in alphabetical order.

| | |
|---|---|
| AI | Analog Input Block |
| AO | Analog Output Block |
| Auto | Automatic mode |
| BLK | Block mode |
| IT | Integrator Block |
| IV | Initial Value |
| MAN | Manual mode |
| OD | Object Directory |
| OOS | Out Of Service mode |
| PID | Proportional Integral Derivate Block |
| PV | Process Value (factory settings) |
| R | Read |
| RB | Resource Block |
| R/W | Read and Write |
| SP | Set Point |
| TB | Transducer Block |
| W | Write |

**Table 2-1: Description of used abbreviations**

## 3.1 Cable types

The cable types are specified according to IEC 61158-2. Shielded cables offer the advantage of malfunction-free operation with adequate protection against electromagnetic influences, and make it possible to employ the full performance of the Foundation Fieldbus system.

| | | | | |
|---|---|---|---|---|
| Core cross-section | 0.8 $mm^2$ or AWG 18 | 0.32 $mm^2$ or AWG 22 | 0.13 $mm^2$ or AWG 26 | 1.25 $mm^2$ or AWG 16 |
| Cable type | A | B | C | D |
| | twisted pair, individually shielded | individual or multiple twisted pairs with overall shield | multiple twisted pairs, without shielding | multiple non-twisted cables, without shielding |
| Max. length incl. branch line | 1900 m / 6200 ft | 1200 m / 3900 ft | 400 m / 1300 ft | 200 m / 650 ft |

**Table 3-1: Specification of cable types**

In non-hazardous locations, a maximum of 32 field devices can be connected to the network. For more data, refer to the table that follows.

| Number of devices | Cable lengths for number of devices per branch line | | | |
|---|---|---|---|---|
| | 1 device | 2 devices | 3 devices | 4 devices |
| 25...32 | 1 m / 3.3 ft | 1 m / 3.3 ft | 1 m / 3.3 ft | 1 m / 3.3 ft |
| 19...24 | 30 m / 100 ft | 1 m / 3.3 ft | 1 m / 3.3 ft | 1 m / 3.3 ft |
| 15...18 | 60 m / 200 ft | 30 m / 100 ft | 1 m / 3.3 ft | 1 m / 3.3 ft |
| 13...14 | 90 m / 300 ft | 60 m / 200 ft | 30 m / 100 ft | 1 m / 3.3 ft |
| 1..12 | 120 m / 400 ft | 90 m / 300 ft | 60 m / 200 ft | 30 m / 100 ft |

**Table 3-2: Cable lengths for number of devices per branch line**

All bus segments must be fitted with a terminator at both ends.

## 3.2 Shielding and grounding

- For optimum electromagnetic compatibility of systems it is extremely important that the system components, and particularly the bus cables connecting the components, are shielded and that such shields, if possible, form an unbroken cover.
- Hence, it follows that, for use in non-hazardous duty systems, the cable shield should be grounded as often as possible.
- In Ex systems an adequate equipotential bonding in the hazardous and non-hazardous location along the entire Fieldbus installation is strongly recommended. Multiple grounding of the shield is of advantage.
- In explosion-proof systems the shielding must at least be connected at one end of the cable.
- NAMUR NE 21 compliance is given, provided the above recommended cable types are used.

***NOTICE!***
*The use of twisted and shielded cables is strongly recommended, otherwise EMC protection of the transmitter cannot be assured.*

## 3.3 Electrical connection of Foundation Fieldbus

***NOTICE!***
*The wiring between the device and the Foundation Fieldbus cable is independent of polarity.*
*The transmitter Foundation Fieldbus interface will operate only if the additional power supply for the device is connected/available.*
*For a detailed description of the electrical connections please refer to the standard transmitter documentation.*

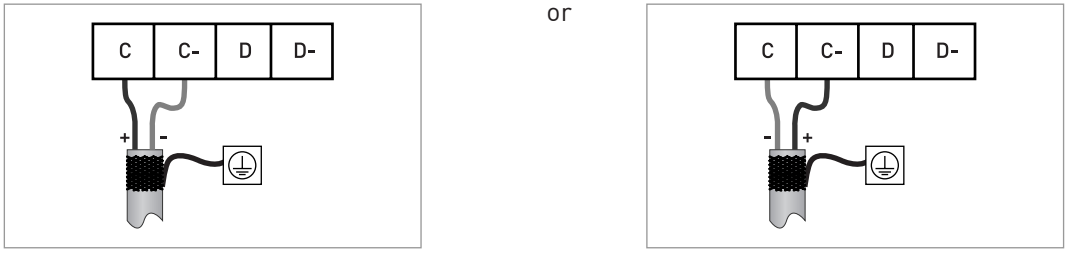



Table 3-3: Connection to a spur

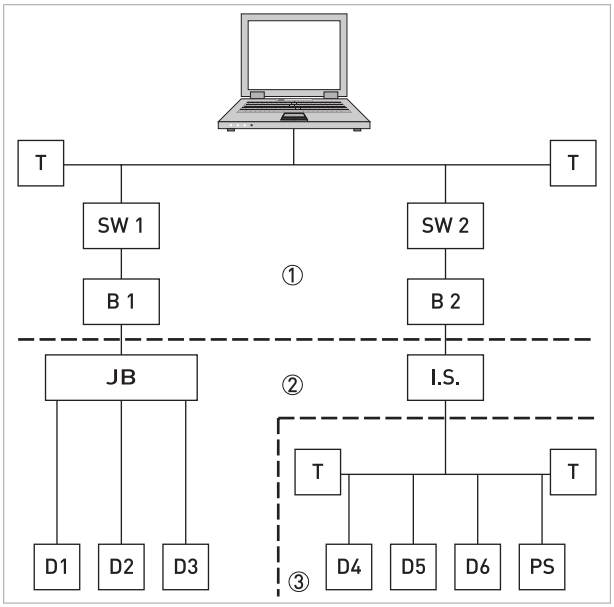

Table 3-4: Connection to a trunk

① e.g. incoming data lines
② e.g. outgoing data lines

## 3.4 Topology of FF networks

An example of mixed topology of FF networks is shown in the following example.

Connection is best made via short branch cables and T connectors. This connection type makes it possible to connect and disconnect the devices without interrupting the bus or the communication.




| | |
|---|---|
| ① | HSE network |
| ② | H1 bus |
| ③ | Intrinsically safe, explosive area |
| B1+B2 | Bridge = coupling element for H1 bus and HSE network |
| D1-D3 | Device = field devices, own power supply, for non potentially explosive areas |
| D4-D6 | Intrinsically safe devices, external power supply, for potentially explosive areas |
| I.S. | Intrinsically safe barrier |
| JB | Junction box for field devices |
| PS | Power supply |
| | Switch = connection of multiple HSE sub networks |
| T | Terminator |

Table 3-5: Topology of FF networks

# 4.1 Foundation Fieldbus data

## Description

| | |
|---|---|
| Type | Coriolis mass flowmeter |
| Physical layer | Foundation Fieldbus protocol that agrees with IEC 61158-2 Types 1 and Typer 2 and FISCO model; galvanically isolated |
| Communication standard | H1 |
| ITK version | 6.2.0 |
| NAMUR 107 | Supported within FF field diagnostics (FF-891) |

## Data blocks

| | |
|---|---|
| Function blocks | 1 x Enhanced Resource Block (RB) |
| | 1 x Customer Flow Transducer Block (FLOWTB) |
| | 1 x Customer Concentration Transducer Block (CONCTB) |
| | 1 x Customer Diagnostic Transducer Block (DIAGTB) |
| | 6 x Analog Input Block (AI) |
| | 2 x Integrator Block (IT) |
| | 1 x Proportional Integral Derivate Block (PID) |
| Execution time | Analog Input Block: 10 ms |
| | Integrator Block: 15 ms |
| | Proportional Integral Derivate Block: 25 ms |

## Electrical connections

| | |
|---|---|
| Device power supply | Not intrinsically safe: 9...32 VDC |
| | Intrinsically safe: 9...24 VDC |
| Basic current | 10.5 mA |
| Maximum error current | 16.5 mA (= basic current + error current = 10.5 mA + 6 mA) |
| Start current after 10 ms | 14 mA |
| Polarity sensitivity | No |
| Minimum cycle time | 200 ms |

**Table 4-1: Foundation Fieldbus data**

## 5.1 Settable functions

- For Foundation Fieldbus the totalizers of the transmitter are not available!
  Instead the integrator function blocks can be used to totalize mass, volume etc.
- The following table describes only the menus, functions and parameters that are different between the standard transmitter and the Foundation Fieldbus transmitter.
- For the electrical connections of the outputs, inputs and all settings of functions that are not listed in the following table refer to the standard product documentation.

| Displayed text | Description and settings |
|---|---|
| **A Quick Setup** | |
| A3.1 Tag | Identifier for the measurement in a plant, appears in the display header (maximum 8 digits). |
| | Note: Only read, not changeable! |
| **B Test** | |
| B5.3 Foundation fieldbus | Display information about Foundation fieldbus interface. |
| **C Setup** | |
| C3 Totalizer | Not available for Foundation Fieldbus devices! |
| C4 Foundation Field | - |
| C4.1 Simulate | Select: disabled / enabled |
| C5.7 2nd Meas. Page | In case of Foundation Fieldbus device, the second measurement page is meant to check the output values of the different function blocks. Only Foundation Fieldbus values can be selected here. The analogue inputs are shown with exactly the value, seen on the bus system. |
| C5.7.1 1st Line Variable | Select: AI1...6 analog inp. / PID / INT1..2 integrator |
| C5.7.2 1st Line Format | Fixed number of digits after the decimal point or automatic, where the number of digits is automatically adjusted to the available space. |
| C5.7.3 2nd Line Variable | Select: AI1...6 analog inp. / PID / INT1..2 integrator |
| C5.7.4 2nd Line Format | Fixed number of digits after the decimal point or automatic, where the number of digits is automatically adjusted to the available space. |
| C5.7.5 3rd Line Variable | Select: AI1...6 analog inp. / PID / INT1..2 integrator |
| C5.7.6 3rd Line Format | Fixed number of digits after the decimal point or automatic, where the number of digits is automatically adjusted to the available space. |
| C6.1 Tag | Identifier for the measurement in a plant, appears in the display header (maximum 8 digits). |
| | Note: Only read, not changeable! |
| C6.8.2 Information | Display information about hardware and software versions, the calibration and test date of this interface. |

Table 5-1: Menus for Foundation Fieldbus devices

## 5.2 Description of the Foundation Fieldbus block system

The Foundation Fieldbus is a Local Area Network (LAN) for connecting field devices like sensors and actuators. One of the main benefits of Foundation Fieldbus is line saving in comparison to the traditional 4...20 mA technology.

The different device functions are implemented in a block-based scheme within a user application. In this block scheme, a distinction is made between the Resource Block, Transducer Block and Function Block.

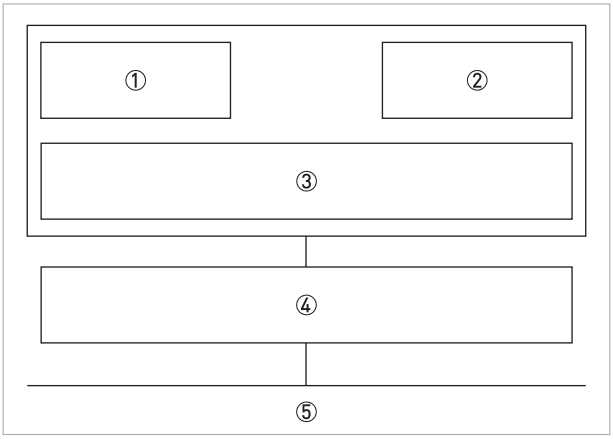



**Figure 5-1: Foundation Fieldbus block scheme**

① Resource Block (RB)
② Transducer Block (TB)
③ Function Block (FB)
④ Device FF communication
⑤ Foundation Fieldbus

## 5.3 Foundation Fieldbus block interface

### 5.3.1 Resource Block (RB)

The following table lists the Resource Block parameters in alphabetical order.

It describes characteristics of the Fieldbus device (e.g. device name, serial number, etc.) and is not included in the functional tasks of the transmitter for FF.

The following table contains short parameter descriptions, factory settings (Initial Value (IV)) and possible settings.

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **ALERT_KEY**<br>Alert Key | R/W | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. | 0 |
| | | Setting:<br>1...255 | |
| **BLOCK_ERR**<br>Block Error | R | This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. | OOS |
| | | Setting:<br>• Other: Non-specific error active<br>• Block Configuration: Error detected in block configuration<br>• Link Configuration: Error detected in link configuration<br>• Simulation Active: Simulation enabled in this block<br>• Local Override: Output tracking of faultstate active<br>• Device Fault State: Device faultstate set<br>• Device Maintenance: Device needs maintenance soon<br>• Sensor Failure: Sensor Failure detected by this block. Process variable has a status of Bad, Sensor Failure<br>• Output Failure: Failure detected in output hardware<br>• Memory Failure: Memory error detected<br>• Lost Static Data: Static parameters cannot be recovered<br>• Lost NV Data: Non-volatile parameters cannot be recovered<br>• Readback Check: Failure detected in READBACK<br>• Maintenance Needed: Device NEEDS maintenance NOW<br>• Power Up: Recovery from power failure<br>• Out Of Service: Block actual mode is out of service | |
| **MODE_BLK**<br>Block Mode | | The actual, target, permitted and normal modes of the block. | |
| TARGET<br>Target | R/W | This is the mode requested by the operator. Only one mode from those allowed by the permitted mode parameter may be requested. | OOS |
| | | Setting:<br>Auto / OOS | |
| ACTUAL<br>Actual | R | This is the current mode of the block, which may differ from the target based on operating conditions. Its value is calculated as part of block execution. | OOS |
| | | Setting:<br>Auto / OOS | |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| PERMITTED<br>Permitted | R/W | Defines the modes which are allowed for an instance of the block. The permitted mode is configured based on application requirement. | Auto<br>OOS |
| | | Setting:<br>Auto / OOS | |
| NORMAL<br>Normal | R/W | This is the mode which the block should be set to during normal operating conditions. | Auto |
| | | Setting:<br>Auto / OOS | |
| **ST_REV**<br>Static Revision | R | The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. | 0 |
| | | Setting:<br>0...65535 | |
| **STRATEGY**<br>Strategy | R/W | The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. | 0<br>(= Uninitialized) |
| | | Setting:<br>0...65535 | |
| **TAG_DESC**<br>Tag Description | R/W | The user description of the intended application of the block. | blanks |
| | | Setting:<br>≤32 digits | |
| **ACK_OPTION**<br>Acknowledge Option | R/W | Selection of whether alarms associated with the function block will be automatically acknowledged. | Uninitialized |
| | | Setting:<br>• Disc Alm Auto Ack: Discrete alarm auto acknowledged enabled<br>• Blk Alm Auto Ack: Block alarm auto acknowledged enabled<br>• Fail Alm Auto Ack: Fail alarm auto acknowledged enabled<br>• Off Spec Alm Auto Ack: Off spec alarm auto acknowledged enabled<br>• Maint Alm Auto Ack: Maintenance alarm auto acknowledged enabled<br>• Check Alm Auto Ack: Check alarm auto acknowledged enabled | |
| **ALARM_SUM**<br>Alarm Summary | | The current alert status, unacknowledged states, unreported states and disabled states of the alarms associated with the function block. | |
| CURRENT<br>Current | R | The active status of each alarm. | Uninitialized |
| | | Setting:<br>Discrete Alarm / Block Alarm / Fail Alarm / Off Spec Alarm / Maintenance Alarm / Check Alarm | |
| UNACKNOWLEDGED<br>Unacknowledged | R | The unacknowledged state of each alarm. | Uninitialized |
| | | Setting:<br>Disc Alm Unack / Block Alm Unack / Fail Alm Unack / Off Spec Alm Unack / Maint Alm Unack / Check Alm Unack | |
| UNREPORTED<br>Unreported | R | The unreported status of each alarm. | Uninitialized |
| | | Setting:<br>Disc Alm Unrep / Block Alm Unrep / Fail Alm Unrep / Off Spec Alm Unrep / Maint Alm Unrep / Check Alm Unrep | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| DISABLED<br>Disabled | R/W | The disabled state of each alarm. | Uninitialized |
| | | Setting:<br>Disc Alm Disabled / Block Alm Disabled / Fail Alm Disabled / Off Spec Alm Disabled / Maint Alm Disabled / Check Alm Disabled | |
| **BLOCK_ALM**<br>Block Alarm | | The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the "Active" status in the "Status" attribute. As soon as the "Unreported" status is cleared by the alert reporting task, another block alert may be reported without clearing the "Active" status, if the subcode has changed. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Other / Block Configuration / Link Configuration / Simulation Active / Local Override / Device Fault State / Device Maintenance / Input Failure / Output Failure / Memory Failure / Lost Static Data / Lost NV Data / Readback Check / Maintenance Needed / Power Up / Out Of Service | |
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected. | 0 |
| | | Setting:<br>0...255 | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **BLOCK_ERR_ DESC_1**<br>Block Error Description | R | This parameter is used by a device to report more specific details regarding persistent errors that are reported through BLOCK_ERR. | 0 |
| | | Setting:<br>• RB is OOS: RB: MODE_BLK.ACTUAL is OOS<br>• Memory Failure: Memory Failure<br>• Operating System: Operating System problem<br>• No GDC Communication: no GDC Communication<br>• Startup GDC error: Startup GDC, data invalid<br>• C-Number error: C-Number doesn't match to FF Software<br>• Data Base error: Data Base doesn't match to FF Software<br>• MODE_PERM not Auto: MODE_BLK.PERMITTED doesn't include Auto<br>• MODE OOS: MODE_BLK.TARGET is set OOS<br>• Write to RB/TB error: Write from GDC to RB/TB doesn't work | |
| **CLR_FSTATE**<br>Clear Fault State | R/W | Writing a "Clear" to this parameter will clear the device fault state if the field condition, if any, has cleared. | Off |
| | | Setting:<br>0x00 / Off / Clear | |
| **CONFIRM_TIME**<br>Confirm Time | R/W | The minimum time between retries of alert reports. | 640000 |
| | | Setting:<br>0...4294967295 in [1/32 ms] | |
| **CYCLE_SEL**<br>Cycle Selection | R/W | Used to select the block execution method for this resource. | 0x0000 |
| | | Setting:<br>Scheduled / Block Execution / Manuf Specific | |
| **CYCLE_TYPE**<br>Cycle Type | R | Identifies the block execution methods available for this resource. | Scheduled Block Execution |
| | | Setting:<br>Scheduled / Block Execution / Manuf Specific | |
| **DD_RESOURCE**<br>DD Resource | R | String identifying the tag of the resource which contains the Device Description for this resource. | blanks |
| | | Setting:<br>≤ 32 digits | |
| **DD_REV**<br>DD Revision | R | Revision of the DD associated with the resource - used by an interface device to locate the DD file for the resource. | Dependent on device version. |
| | | Setting:<br>Dependent on device version. | |
| **DEV_REV**<br>Device Revision | R | Manufacturer revision number associated with the resource - used by an interface device to locate the DD file for the resource. | Dependent on device version. |
| | | Setting:<br>Dependent on device version. | |
| **DEV_TYPE**<br>Device Type | R | Manufacturer's model number associated with the resource - used by interface devices to locate the DD file for the resource. | CFT34A |
| | | Setting:<br>CFT34A | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **FAULT_STATE**<br>Fault State | R | Condition set by loss of communication to an output block, failure promoted to an output block or a physical contact. When fault state condition is set, then output function blocks will perform their "FSTATE" actions. | Clear |
| | | Setting:<br>Uninitialized / Off / Clear | |
| **FD_CHECK_ACTIVE**<br>Check Active | R | This parameter reflects the error conditions that are being detected as active as selected for this category. It is a bit string, so that multiple conditions may be shown. | Uninitialized |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_CHECK_ALM**<br>Check Alarm | | This parameter is used primarily to broadcast a change in the associated active conditions, which are not masked, for this alarm category to a Host System. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear - reported / Clear - not reported /<br>Active - reported / Active - not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | A value specifying the cause of the alert to be reported. | Uninitialized |
| VALUE<br>Value | R | The index value of the diagnostic group causing the alert. Example: "0" would indicate that the alert was caused by group "(00) Check". | 0 |
| | | Setting:<br>0...255 | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **FD_CHECK_MAP**<br>Check Map | R/W | This parameter enables or disables conditions to be detected as active for this alarm category. | (8) |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_CHECK_MASK**<br>Check Mask | R/W | This parameter allows the user to suppress any single or multiple conditions that are active, in this category, from being broadcast to the host through the alarm parameter. | Uninitialized |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_CHECK_PRI**<br>Check Priority | R/W | This parameter allows the user to specify the priority of this alarm category. | 0 |
| | | Setting:<br>0...15 | |
| **FD_FAIL_ACTIVE**<br>Fail Active | R | This parameter reflects the error conditions that are being detected as active as selected for this category. It is a bit string, so that multiple conditions may be shown. | Uninitialized |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_FAIL_ALM**<br>Fail Diagnostic Alarm | | This parameter is used primarily to broadcast a change in the associated active conditions, which are not masked, for this alarm category to a Host System. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | |

| **Parameter**<br>**DD name** | Access | Description and settings | Initial Value |
|---|---|---|---|
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | A value specifying the cause of the alert to be reported. | Uninitialized |
| VALUE<br>Value | R | The index value of the diagnostic group causing the alert. Example: "0" would indicate that the alert was caused by group "(00) Check". | - |
| **FD_FAIL_MAP**<br>Fail Map | R/W | This parameter enables or disables conditions to be detected as active for this alarm category. | (25) (27) (28) (29) |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_FAIL_MASK**<br>Fail Mask | R/W | This parameter allows the user to suppress any single or multiple conditions that are active, in this category, from being broadcast to the host through the alarm parameter. | Uninitialized |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_FAIL_PRI**<br>Fail Priority | R/W | This parameter allows the user to specify the priority of this alarm category. | 0 |
| | | Setting:<br>0...15 | |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **FD_EXTENDED_ ACTIVE_1**<br>FD_EXTENDED_ ACTIVE_1 | R | An optional parameter to allow the user finer detail on conditions causing an active condition in the FD_*_ACTIVE parameter.<br>Setting:<br>(02) Optical Interf. Active<br>(02) Disp. 2 Overrange<br>(02) Disp. 1 Overrange<br>(02) RB is set to OOS<br>(02) Fieldbus No Connection<br>(02) Status Out B Active<br>(02) Status Out A Active<br>(02) Control In B Active<br>(02) Control In A Active<br>(02) Zero Calibr. Running<br>(03) Disp. 2 no measure values<br>(03) Disp. 1 no measure values<br>(03) IO D No Meas. Values<br>(03) IO D No Meas. Values<br>(03) IO B No Value for Current Output<br>(03) IO A No Value for Current Output<br>(05) System Control Active | Uninitialized |
| **FD_EXTENDED_ ACTIVE_2**<br>FD_EXTENDED_ ACTIVE_2 | R | An optional parameter to allow the user finer detail on conditions causing an active condition in the FD_*_ACTIVE parameter.<br>Setting:<br>(08) IO B Sim. Limit Sw./Current Out<br>(08) IO A Sim. Limit Sw./Current Out<br>(08) Fieldbus Sim. Active<br>(08) Sensor Starting up<br>(08) Sensor Simulation Active<br>(08) Sensor in Standby Mode<br>(08) Sensor in Stop Mode<br>(12) Backup 2 Data Faulty<br>(12) Backup 1 Data Faulty<br>(13) Backplane Difference<br>(13) Factory Data Faulty<br>(13) Backplane Data Faulty<br>(17) Sensor Signal Low<br>(18) 2 Phase Flow Detected<br>(19) IO B Connect. Control Input<br>(19) IO B Connect. Current In-/Output<br>(19) IO A Connect. Control Input<br>(19) IO A Connect. Current In-/Output | Uninitialized |
| **FD_EXTENDED_ ACTIVE_3**<br>FD_EXTENDED_ ACTIVE_3 | R | An optional parameter to allow the user finer detail on conditions causing an active condition in the FD_*_ACTIVE parameter.<br>Setting:<br>(20) Velocity Out of Range<br>(20) Prod.Density Out of Range<br>(20) Flow Out of Range<br>(20) Proc.Temp.Out of Range<br>(21) IO B Overrange Binary Output<br>(21) IO B Overrange Current Output<br>(21) IO B Overrange Current In-/Output<br>(21) IO A Overrange Binary Output/<br>(21) IO A Overrange Current Output<br>(21) IO A Overrange Current In-/Output<br>(22) Electr.Temp.Out of Spec<br>(23) Temp. Or Strain Res. Def.<br>(25) Sensor Signal Search | Uninitialized |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **FD_EXTENDED_ ACTIVE_4**<br>FD_EXTENDED_ ACTIVE_4 | R | An optional parameter to allow the user finer detail on conditions causing an active condition in the FD_*_ACTIVE parameter.<br>Setting:<br>(27) IO B Binary Output Config<br>(27) IO B Current In-/Output Config<br>(27) IO A Binary Output Config<br>(27) IO A Current In-/Output Config.<br>(27) IO2 Configuration<br>(27) IO1 Configuration<br>(27) Display Config.<br>(27) Fieldbus Config.<br>(27) Safe Config. Unverified (S)<br>(27) Density Calibration<br>(27) Process Input Conf. Invalid<br>(27) DM Configuration<br>(27) BM Configuration<br>(28) IO B Failure<br>(28) IO A Failure<br>(28) IO 2 Failure<br>(28) IO 1 Failure<br>(28) Fieldbus Failure<br>(28) Process Input Failure<br>(28) DM Failure<br>(28) BM Failure<br>(28) HW Combination Error<br>(28) Internal Comm. Error<br>(29) Sensor Error<br>(29) Sensor Containment Dam. | Uninitialized |
| **FD_EXTENDED_ MAP_1**<br>FD_EXTENDED_ MAP_1 | R/W | An optional parameter to allow the user finer control on enebling conditions contributing to the conditions in FD_*_ACTIVE parameter.<br>Setting:<br>(02) Optical Interf. Active<br>(02) Disp. 2 Overrange<br>(02) Disp. 1 Overrange<br>(02) RB is set to OOS<br>(02) Fieldbus No Connection<br>(02) Status Out B Active<br>(02) Status Out A Active<br>(02) Control In B Active<br>(02) Control In A Active<br>(02) Zero Calibr. Running<br>(03) Disp. 2 no measure values<br>(03) Disp. 1 no measure values<br>(03) IO D No Meas. Values<br>(03) IO D No Meas. Values<br>(03) IO B No Value for Current Output<br>(03) IO A No Value for Current Output<br>(05) System Control Active | Uninitialized |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **FD_EXTENDED_ MAP_2**<br>FD_EXTENDED_ MAP_2 | R/W | An optional parameter to allow the user finer control on enabling conditions contributing to the conditions in FD_*_ACTIVE parameter.<br><br>Setting:<br>(08) IO B Sim. Limit Sw./Current Out<br>(08) IO A Sim. Limit Sw./Current Out<br>(08) Fieldbus Sim. Active<br>(08) Sensor Starting up<br>(08) Sensor Simulation Active<br>(08) Sensor in Standby Mode<br>(08) Sensor in Stop Mode<br>(12) Backup 2 Data Faulty<br>(12) Backup 1 Data Faulty<br>(13) Backplane Difference<br>(13) Factory Data Faulty<br>(13) Backplane Data Faulty<br>(17) Sensor Signal Low<br>(18) 2 Phase Flow Detected<br>(19) IO B Connect. Control Input<br>(19) IO B Connect. Current In-/Output<br>(19) IO A Connect. Control Input<br>(19) IO A Connect. Current In-/Output | Uninitialized |
| **FD_EXTENDED_ MAP_3**<br>FD_EXTENDED_ MAP_3 | R/W | An optional parameter to allow the user finer control on enabling conditions contributing to the conditions in FD_*_ACTIVE parameter.<br><br>Setting:<br>(20) Velocity Out of Range<br>(20) Prod.Density Out of Range<br>(20) Flow Out of Range<br>(20) Proc.Temp.Out of Range<br>(21) IO B Overrange Binary Output<br>(21) IO B Overrange Current Output<br>(21) IO B Overrange Current In-/Output<br>(21) IO A Overrange Binary Output<br>(21) IO A Overrange Current Output<br>(21) IO A Overrange Current In-/Output<br>(22) Electr.Temp.Out of Spec<br>(23) Temp. Or Strain Res. Def.<br>(25) Sensor Signal Search | Uninitialized |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **FD_EXTENDED_MAP_4**<br>FD_EXTENDED_MAP_4 | R/W | An optional parameter to allow the user finer control on enabling conditions contributing to the conditions in FD_*_ACTIVE parameter. | Uninitialized |
| | | Setting:<br>(27) IO B Binary Output Config<br>(27) IO B Current In-/Output Config<br>(27) IO A Binary Output Config<br>(27) IO A Current In-/Output Config.<br>(27) IO2 Configuration<br>(27) IO1 Configuration<br>(27) Display Config.<br>(27) Fieldbus Config.<br>(27) Safe Config. Unverified (S)<br>(27) Density Calibration<br>(27) Process Input Conf. Invalid<br>(27) DM Configuration<br>(27) BM Configuration<br>(28) IO B Failure<br>(28) IO A Failure<br>(28) IO 2 Failure<br>(28) IO 1 Failure<br>(28) Fieldbus Failure<br>(28) Process Input Failure<br>(28) DM Failure<br>(28) BM Failure<br>(28) HW Combination Error<br>(28) Internal Comm. Error<br>(29) Sensor Error<br>(29) Sensor Containment Dam. | |
| **FD_MAINT_ACTIVE**<br>Maintenance Active | R | This parameter reflects the error conditions that are being detected as active as selected for this category. It is a bit string, so that multiple conditions may be shown. | Uninitialized |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_MAINT_ALM**<br>Fail Maintenance Alarm | | This parameter is used primarily to broadcast a change in the associated active conditions, which are not masked, for this alarm category to a Host System. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | A value specifying the cause of the alert to be reported. | - |
| VALUE<br>Value | R | The index value of the diagnostic group causing the alert. Example: "0" would indicate that the alert was caused by group "(00) Check". | - |
| **FD_MAINT_MAP**<br>Maintenance Map | R/W | This parameter enables or disables conditions to be detected as active for this alarm category. | (12) (13) |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_MAINT_MASK**<br>Maintenance Mask | R/W | This parameter allows the user to suppress any single or multiple conditions that are active, in this category, from being broadcast to the host through the alarm parameter. | Uninitialized |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_MAINT_PRI**<br>Maintenance Priority | R/W | This parameter allows the user to specify the priority of this alarm category. | 0 |
| | | Setting:<br>0...15 | |
| **FD_OFFSPEC_ACTIVE**<br>Offspec Active | R | This parameter reflects the error conditions that are being detected as active as selected for this category. It is a bit string, so that multiple conditions may be shown. | Uninitialized |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_OFFSPEC_ALM**<br>Offspec Alarm | | This parameter is used primarily to broadcast a change in the associated active conditions, which are not masked, for this alarm category to a Host System. | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | A value specifying the cause of the alert to be reported. | - |
| VALUE<br>Value | R | The index value of the diagnostic group causing the alert. Example: "0" would indicate that the alert was caused by group "(00) Check". | - |
| **FD_OFFSPEC_MAP**<br>Offspec Map | R/W | This parameter enables or disables conditions to be detected as active for this alarm category. | (17) (18) (19) (20) (21) (22) (23) |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_OFFSPEC_MASK**<br>Offspec Mask | R/W | This parameter allows the user to suppress any single or multiple conditions that are active, in this category, from being broadcast to the host through the alarm parameter. | Uninitilaized |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| **FD_OFFSPEC_PRI**<br>Offspec Priority | R/W | This parameter allows the user to specify the priority of this alarm category. | 0 |
| | | Setting:<br>0...15 | |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **FD_RECOMMEN_ACT**<br>Recommended Action | R | This parameter is a device enumerated summarization of the most severe condition or conditions detected. The DD help should describe by enumerated action, what should be done to alleviate the condition or conditions. | 0:Not Initialized |
| | | Setting:<br>0:Not Initialized<br>1:No Action Required<br>2:Check simulation settings.<br>10102:Keys can be used 60 sec. after removal of optical interface.<br>10103:Check configuration settings of display line 2.<br>10104:Check configuration settings of display line 1.<br>10105:Set MODE_BLK.TARGET at RB to AUTO<br>10106:Check Fieldbus terminal and connection.<br>10107-10111:No action required.<br>10113:Select another measurement for measure page 2.<br>10114:Select another measurement for measure page 1.<br>10115,10116:Sel. another measurement for terminal D or activate diagn. measurement.<br>10117:Sel. another measurement for terminal B or activate diagn. measurement.<br>10118:Sel. another measurement for terminal A or activate diagn. measurement.<br>10121:No action required.<br>10200,10201:Turn off simulation.<br>10202:Check Fieldbus configuration.<br>10203:No action required.<br>10204:Turn off simulation.<br>10205,10206:For normal operation change operation mode to measurement mode.<br>10211:Save settings to Backup 2.<br>10212:Save settings to Backup 1.<br>10214:Change one param. The status should disappear within 1 minute.<br>10215:Please contact company.<br>10216:Check if converter is correctly mounted and fixed into housing.<br>10221:Check for entrained gas or viscosity of product.<br>10223:Check process for entrained gas.<br>10225,10226:Check cable and connection at terminal B, reduce load.<br>10227,10228:Check cable and connection at terminal A, reduce load.<br>10300:Check process conditions or pipe diameter setting.<br>10301:Check process conditions and density calibration.<br>10302,10303:Check process conditions.<br>10305-10310:Check the range settings of the related output.<br>10312:Move electronics away from process influences and protect it against direct sunlight.<br>10314:Check cabling in case of remote device or replace sensor.<br>10317:Check process conditions. In case of remote sensor check cabling.<br>10400,10401:Check terminal B configuration or reset to factory configuration.<br>10402,10403:Check terminal A configuration or reset to factory configuration.<br>10404:Check IO2 configuration or reset to factory configuration.<br>10405:Check IO1 configuration or reset to factory configuration.<br>10406:Check display configuration or reset to factory configuration.<br>10407:Check fieldbus configuration or reset to factory configuration. | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| | | 10408:Set safety mode, perform safe config. according to safety manual.<br>10409-10412:Check config. of the related function. Reset config. to factory.<br>10414-10418:Perform power reset. If the status returns, contact the factory.<br>10419:Reset errors and perform power reset. If the status returns, contact the factory.<br>10420-10423:Perform power reset. If the status returns, contact the factory.<br>10425:Check cabling in case of remote device or replace sensor.<br>10426:Replace sensor. | |
| **FD_SIMULATE**<br>Field Diagnostic Simulate | | Used as the field diagnostic condition when the simulation is enabled. | |
| DIAGNOSTIC_<br>SIMULATE_VALUE<br>Diagnostic Simulate Value | R/W | Allows the conditions to be manually supplied when simulation is enabled. The simulate jumper is required for simulation to be enabled. | Uninitialized |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| DIAGNOSTIC_VALUE<br>Diagnostic Value | R | Current field diagnostic condition. | Uninitialized |
| | | Setting:<br>(00) Check / (02) Electr: Operation Info. /<br>(03) Config: No Meas.Value / (05) Proc: System Control /<br>(08) C Configuration / (12) M Configuration /<br>(13) M Electronics / (17) Proc: Signal Low /<br>(18) Proc: 2 Phase Flow / (19) Electr: IO Connection /<br>(20) S Process / (21) S Configuration / (22) S Electronics /<br>(23) S Sensor / (25) Proc: Signal Search /<br>(27) F Configuration / (28) F Electronics / (29) F Sensor | |
| ENABLE_DISABLE<br>Simulate En/Disable | R/W | Enable/disable simulation. | Disabled |
| | | Setting:<br>Uninitialized / Disabled / Active | |
| **FD_VER**<br>Revision | R | The major version of the Field Diagnostics specification used for the development of this device. | 1 |
| **FEATURES**<br>Features | R | Used to shows supported resource block options. | Reports<br>Faultstate<br>Soft W Lock<br>Multi-bit Alarm (Bit-Alarm) Support |
| | | Setting:<br>Reports / Faultstate / Soft W Lock /<br>Multi-bit Alarm (Bit-Alarm) Support | |
| **FEATURES_SEL**<br>Features Selection | R/W | Used to select resource block options. | Reports<br>Faultstate<br>Soft W Lock |
| | | Setting:<br>Reports / Faultstate / Soft W Lock /<br>Multi-bit Alarm (Bit-Alarm) Support | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **FREE_SPACE**<br>Free Space | R | Percent of the memory available for further configuration. Zero in a preconfigured resource. | 0.0 |
| | | Setting:<br>0.0…100.0 | |
| **FREE_TIME**<br>Free Time | R | Percent of the block processing time that is free to process additional blocks. | 0.0 |
| | | Setting:<br>0.0…100.0 | |
| **GRANT_DENY**<br>Grant Deny | | Options for controlling access of host computers and local control panels to operating, tuning and alarm parameters of the block. | |
| GRANT<br>Grant | R/W | Depending on the philosophy of the plant, the operator or a higher level device (HLD) or a local operator's panel (LOP) in the case of "Local", may turn on an item of the "Grant" attribute - "Program, Tune, Alarm or Local". | Uninitialized |
| | | Setting:<br>Program / Tune / Alarm / Local / Operate / Service / Diagnostic | |
| DENY<br>Deny | R/W | The Denied attribute is limited for use by a monitoring application in an interface device and may not be changed by an operator. | Uninitialized |
| | | Setting:<br>Program denied / Tune denied / Alarm denied / Local denied / Operate denied / Service denied / Diagnostic denied | |
| **HARD_TYPES**<br>Hardware Types | R | The types of hardware available as channel numbers. | Scalar Input |
| | | Setting:<br>Scalar Input / Scalar Output / Discrete Input / Discrete Output | |
| **ITK_VER**<br>ITK Version (Interoperatibility Test Kit) | R | Major revision number of the interoperability test case used to register this device. | 6 |
| **LIM_NOTIFY**<br>Limit Notify | R/W | Maximum number of unconfirmed alert notify messages allowed. | 20 |
| | | Setting:<br>0…255 | |
| **MANUFAC_ID**<br>Manufacturer ID | R | Manufacturer identification number - used by an interface device to locate the DD file for the resource. | Schneider Electric |
| | | Setting:<br>Schneider Electric | |
| **MAX_NOTIFY**<br>Maximum Notify | R | Maximum number of unconfirmed alert notify messages possible. | 20 |
| | | Setting:<br>0…255 | |
| **MEMORY_SIZE**<br>Memory Size | R | Available configuration memory in the empty resource. To be checked before attempting a download. | 0 |
| **MIN_CYCLE_T**<br>Minimium Cycle Time | R | Time duration of the shortest cycle interval of which the resource is capable (in [1/32 ms]). | 6400 |
| **NV_CYCLE_T**<br>Nonvolatile Cycle Time | R | Interval between writing copies of NV parameters to non-volatile memory. Zero means never (in [1/32 ms]). | 256000 |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **RESTART**<br>Restart | R/W | Allows a manual restart to be initiated. Several degrees of restart are possible. They are 1: Run, 2: Restart resource, 3: Restart with defaults, 4: Restart Processor, 6: PreConfig AI1, AI2 and AI3, 9: Transducer to Factory Zero Calibration, 10: Transducer to Factory Density Calibration. | Run |
| | | Setting:<br>Uninitialized / Run / Resource / Defaults / Processor / PreConfig AI Blocks / Transducer to Factory Zero Calibration / Transducer to Factory Density Calibration | |
| **RS_STATE**<br>Resource State | R | State of the function block application state machine. | Standby |
| | | Setting:<br>Uninitialized / Start_Restart / Initialization / Online Linking / Online / Standby / Failure | |
| **SET_FSTATE**<br>Set Fault State | R/W | Allows the fault state condition to be manually initiated by selecting "Set". | Off |
| | | Setting:<br>Off / Set | |
| **SHED_RCAS**<br>Shed Remote Cascade | R/W | Time duration at which to give up on computer writes to function block RCAS locations. | 640000 |
| | | Setting:<br>0...4294967295 in [1/32 ms] | |
| **SHED_ROUT**<br>Shed Remote Out | R/W | Time duration at which to give up on computer writes to function block ROUT locations. | 640000 |
| | | Setting:<br>0...4294967295 in [1/32 ms] | |
| **TEST_RW**<br>Test R Write | | Read/write test parameter - used only for conformance testing.<br>Note: Subelements "1..15" have no function! | - |
| **UPDATE_EVT**<br>Update Event | | This alert is generated by any change to the static data. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an update occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| UPDATE_STATE<br>Update State | R | A discrete enumeration which gives an indication of whether the alert has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Reported / Not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| STATIC_REVISION<br>Static Revision | R | The static revision of the block whose static parameter was changed and is being reported. It is possible for the present value of static revision to be greater than this because static can be changed at any time. | 0 |
| | | Setting:<br>0…65535 | |
| RELATIVE_INDEX<br>Relative Index | R | The OD index of the static parameter whose change caused this alert, minus the FB starting index. If the update event was caused by a write to multiple parameters at the same time, then this attribute will be zero. | 0 |
| | | Setting:<br>0…65535 | |
| **WRITE_ALM**<br>Write Alarm | | This alert is generated if the write lock parameter is cleared. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Other / Block Configuration / Link Configuration / Simulation Active / Local Override / Device Fault State / Device Maintenance / Input Failure / Output Failure / Memory Failure / Lost Static Data / Lost NV Data / Readback Check / Maintenance Needed / Power Up / Out Of Service | |
| VALUE<br>Discrete Value | R | The value of the associated parameter at the time the alert was detected. | State 0 |
| | | Setting:<br>Discrete State 0...16 | |
| **WRITE_LOCK**<br>Write Lock | R/W | If set, no writes from anywhere are allowed, except to clear WRITE_LOCK. Block inputs will continue to be updated. | Not locked |
| | | Setting:<br>Uninitialized / Not locked / Locked | |
| **WRITE_PRI**<br>Write Priority | R | Priority of the alarm generated by clearing the write lock. | 0 |
| | | Setting:<br>0...15 | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **FORMAT_2P_1L**<br>Form. 2.Page 1.Line | R/W | No. of decimal places for 1st line of 2nd page (C6.7.2). | X.X |
| | | Setting:<br>#X. / #X.X / #X.XX / #X.XXX / #X.XXXX / #X.XXXXX /<br>#X.XXXXXX / #X.XXXXXXX / #X.XXXXXXXX / automatic | |
| **FORMAT_2P_2L**<br>Form. 2.Page 2.Line | R/W | No. of decimal places for 2st line of 2nd page (C6.7.4). | X.X |
| | | Setting:<br>#X. / #X.X / #X.XX / #X.XXX / #X.XXXX / #X.XXXXX /<br>#X.XXXXXX / #X.XXXXXXX / #X.XXXXXXXX / automatic | |
| **FORMAT_2P_3L**<br>Form. 2.Page 3.Line | R/W | No. of decimal places for 3st line of 2nd page (C6.7.6). | X.X |
| | | Setting:<br>#X. / #X.X / #X.XX / #X.XXX / #X.XXXX / #X.XXXXX /<br>#X.XXXXXX / #X.XXXXXXX / #X.XXXXXXXX / automatic | |
| **IO_CONNECTION**<br>Status IO Connection | R/W | Defines the influence of the diagnostic ''Electronic: IO Connection'' to the TB measurements status (C6.6.7). | Information |
| | | Setting:<br>Information / Maintenance Required / Function Check / Out Of Specification / Failure | |
| **PASSWRD**<br>Password | R/W | Password to activate access rights to restricted parameters. | 0 |
| **PASSWRD_REF_ OPERATOR**<br>Operator Password | R/W | Set the Operator Password (C6.3.4). | 0000 |
| | | Setting:<br>0000...9999 | |
| **POWER_FAILURE**<br>Status Power Failure | R/W | Defines the influence of the diagnostic ''Electronic: Power Failure'' to the TB measurements status (C6.6.6). | Information |
| | | Setting:<br>Information / Maintenance Required / Function Check / Out Of Specification / Failure | |
| **PROTECT_INFO**<br>Access protection | R | Current protection level to restricted parameters. | Production / Service level |
| | | Setting:<br>Write Lock (simple) / Custody Transfer / Production / Service level / Operator / User / Local operation / Concentration / Write Lock Password set | |
| **SERIAL_NUMBER**<br>Serial Number | R | Device serial number, serial number of the system. | Current serial number |
| **SIGNAL_LOW**<br>Status Signal Low | R/W | Defines the influence of the diagnostic ''Process: Signal Low'' to the TB measurements status (C6.6.1). | Information |
| | | Setting:<br>Information / Maintenance Required / Function Check / Out Of Specification / Failure | |
| **SIGNAL_SEARCH**<br>Status Signal Search | R/W | Defines the influence of the diagnostic ''Process: Signal Search'' to the TB measurements status (C6.6.2). | Information |
| | | Setting:<br>Information / Maintenance Required / Function Check / Out Of Specification / Failure | |
| **SYSTEM_CONTROL**<br>Status System Control | R/W | Defines the influence of the diagnostic ''Process: Signal Search'' to the TB measurements status (C6.6.4). | Information |
| | | Setting:<br>Information / Maintenance Required / Function Check / Out Of Specification / Failure | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **SW_SIMULATE**<br>SW simulate | R/W | Enable/disable simulation like simulate Hardware jumper (C6.8.1). | Disable |
| | | Setting:<br>Disable / Active | |
| **TWO_PHASE_FLOW**<br>Status 2 Phase Flow | R/W | Defines the influence of the diagnostic ''Process: 2 Phase Flow'' to the TB measurements status (C6.6.3). | Information |
| | | Setting:<br>Information / Maintenance Required / Function Check / Out Of Specification / Failure | |
| **Variable_2P_1L**<br>Disp. 2.Page 1.Line | R/W | Select the Function Block output value to display at 2nd page 1st line (C6.7.1). | AI1 |
| | | Setting:<br>AI1 / AI2 / AI3 / AI4 / AI5 / AI6 / PID / IT1 / IT2 | |
| **Variable_2P_2L**<br>Disp. 2.Page 2.Line | R/W | Select the Function Block output value to display at 2nd page 2nd line (C6.7.3). | AI2 |
| | | Setting:<br>AI1 / AI2 / AI3 / AI4 / AI5 / AI6 / PID / IT1 / IT2 | |
| **Variable_2P_3L**<br>Disp. 2.Page 3.Line | R/W | Select the Function Block output value to display at 2nd page 3rd line (C6.7.5). | AI3 |
| | | Setting:<br>AI1 / AI2 / AI3 / AI4 / AI5 / AI6 / PID / IT1 / IT2 | |

Table 5-2: Description of Resource Block parameters

## 5.3.2 Analog Input Block (AI 1...6)

The following table lists the Analog Input Block parameters in alphabetical order.

It describes characteristics of the measurement values obtained from the Transducer Block and provides them as input to other function blocks. There are also some parameters in the Analog Input Block, that can be configured to get a measurement value quality as desired by the user.

The following table contains short parameter descriptions, factory settings (Initial Value (IV)) and possible settings.

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **ALERT_KEY**<br>Alert Key | R/W | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. | 0 |
| | | Setting:<br>1...255 | |
| **BLOCK_ERR**<br>Block Error | R | This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. | OOS |
| | | Setting:<br>• Other: Non-specific error active<br>• Block Configuration: Error detected in block configuration<br>• Link Configuration: Error detected in link configuration<br>• Simulation Active: Simulation enabled in this block<br>• Local Override: Output tracking of faultstate active<br>• Device Fault State: Device faultstate set<br>• Device Maintenance: Device needs maintenance soon<br>• Sensor Failure: Sensor Failure detected by this block. Process variable has a status of Bad, Sensor Failure<br>• Output Failure: Failure detected in output hardware<br>• Memory Failure: Memory error detected<br>• Lost Static Data: Static parameters cannot be recovered<br>• Lost NV Data: Non-volatile parameters cannot be recovered<br>• Readback Check: Failure detected in READBACK<br>• Maintenance Needed: Device NEEDS maintenance NOW<br>• Power Up: Recovery from power failure<br>• Out Of Service: Block actual mode is out of service | |
| **MODE_BLK**<br>Block Mode | | The actual, target, permitted and normal modes of the block. | |
| TARGET<br>Target | R/W | This is the mode requested by the operator. Only one mode from those allowed by the permitted mode parameter may be requested. | OOS |
| | | Setting:<br>Auto / Man / OOS | |
| ACTUAL<br>Actual | R | This is the current mode of the block, which may differ from the target based on operating conditions. Its value is calculated as part of block execution. | OOS |
| | | Setting:<br>Auto / Man / OOS | |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| PERMITTED<br>Permitted | R/W | Defines the modes which are allowed for an instance in the block. The permitted mode is configured based on application requirements. | Auto<br>Man<br>OOS |
| | | Setting:<br>Auto / Man / OOS | |
| NORMAL<br>Normal | R/W | This is the mode which the block should be set to during normal operating conditions. | Auto |
| | | Setting:<br>Auto / Man / OOS | |
| **ST_REV**<br>Static Revision | R | The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. | 0 |
| | | Setting:<br>0...65535 | |
| **STRATEGY**<br>Strategy | R/W | The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. | 0<br>(= Uninitialized) |
| | | Setting:<br>0...65535 | |
| **TAG_DESC**<br>Tag Description | R/W | This is the user description of the intended application of the block. | blanks |
| | | Setting:<br>≤32 digits | |
| **ACK_OPTION**<br>Acknowledge Option | R/W | Selection of whether alarms associated with the function block will be automatically acknowledged. | Uninitialized |
| | | Setting:<br>• HiHi Alm Auto Ack: HiHi alarm auto acknowledged enabled<br>• Hi Alm Auto Ack: Hi alarm auto acknowledged enabled<br>• LoLo Alm Auto Ack: LoLo alarm auto acknowledged enabled<br>• Lo Alm Auto Ack: Lo alarm auto acknowledged enabled<br>• DevHi Alm Auto Ack: Deviation high alarm auto acknowledged enabled<br>• DevLo Alm Auto Ack: Deviation low alarm auto acknowledged enabled<br>• Blk Alm Auto Ack: Block alarm auto acknowledged enabled<br>• Fail Alm Auto Ack: Fail alarm auto acknowledged enabled<br>• Off Spec Alm Auto Ack: Off spec alarm auto acknowledged enabled<br>• Maint Alm Auto Ack: Maintenance alarm auto acknowledged enabled<br>• Check Alm Auto Ack: Check alarm auto acknowledged enabled | |
| **ALARM_HYS**<br>Alarm Hysteresis | R/W | Amount the PV must return within the alarm limits before the alarm condition clears. Alarm hysteresis is expressed as a percent of the PV span. | 0.5 |
| | | Setting:<br>0...50% | |
| **ALARM_SUM**<br>Alarm Summary | | The current alert status, unacknowledged states, unreported states and disabled states of the alarms associated with the function block. | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| CURRENT<br>Current | R | The active status of each alarm. | Uninitialized |
| | | Setting:<br>HiHi Alarm / Hi Alarm / LoLo Alarm / Lo Alarm / Block Alarm | |
| UNACKNOWLEDGED<br>Unacknowledged | R | The unacknowledged state of each alarm. | Uninitialized |
| | | Setting:<br>HiHi Alarm Unack / Hi Alarm Unack / LoLo Alarm Unack / Lo Alarm Unack / Block Alarm Unack | |
| UNREPORTED<br>Unreported | R | The unreported states of each alarm. | Uninitialized |
| | | Setting:<br>HiHi Alarm Unrep / Hi Alarm Unrep / LoLo Alarm Unrep / Lo Alarm Unrep / Block Alarm Unrep | |
| DISABLED<br>Disabled | R | The disabled state of each alarm | Uninitialized |
| | | Setting:<br>HiHi Alarm Disabled / Hi Alarm Disabled / LoLo Alarm Disabled / Lo Alarm Disabled / Block Alarm Disabled | |
| **BLOCK_ALM**<br>Block Alarm | | The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the "Active" status in the "Status" attribute. As soon as the "Unreported" status is cleared by the alert reporting task, another block alert may be reported without clearing the "Active" status, if the subcode has changed. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Other / Block Configuration / Link Configuration / Simulation Active / Local Override / Device Fault State / Device Maintenance / Input Failure / Output Failure / Memory Failure / Lost Static Data / Lost NV Data / Readback Check / Maintenance Needed / Power Up / Out Of Service | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected.<br>Setting:<br>0...255 | 0 |
| **BLOCK_ERR_ DESC_1**<br>Block Error Description | R | This parameter is used by a device to report more specific details regarding persistent errors that are reported through BLOCK_ERR.<br>Setting:<br>• RB is OOS: RB: MODE_BLK.ACTUAL is OOS<br>• Memory Failure: Memory Failure<br>• No Schedule: No Schedule<br>• ExecTime small: Block Execution Time too small<br>• ExecTime large: Block Execution Time too large<br>• MODE OOS: MODE_BLK.TARGET is set OOS<br>• CHANNEL setting: CHANNEL is uninitialized<br>• XD UNIT setting: XD UNIT can't be converted from TB UNIT<br>• XD_SCALE small delta: XD_SCALE: range of EU_100 and EU_0 is too small<br>• OUT_SCALE small delta: OUT_SCALE: range of EU_100 and EU_0 is too small<br>• L_TYPE setting: L_TYPE is uninitialized<br>• XD_SCALE unequal to OUT_SCALE: L_TYPE is direct but scaling of XD_SCALE is unequal to OUT_SCALE<br>• IO_OPTS setting: no unit conversion at IO_OPTS but XD UNIT is unequal to TB UNIT | 0 |
| **BLOCK_WARN_ DESC**<br>Block Warning Description | R | Reason why OUT.status is not GOOD<br>Setting:<br>• MODE_PERM not Auto: MODE_BLK.PERMITTED doesn't include Auto<br>• MODE MAN: MODE_BLK.TARGET is set MAN<br>• MODE.ACTUAL MAN: MODE_BLK.ACTUAL is MAN<br>• Simulation active: Simulation is active<br>• sim value not good: SIMULATE_STATUS is not Good, Simulation is active<br>• sim value is limited: SIMULATE_STATUS limited, STATUS_OPTS is set, Simulation active<br>• TB is OOS: Transducer Block MODE_BLK.ACTUAL is OOS<br>• TB value is Bad: CHANNEL selected TB.prim_val.status is Bad<br>• TB value is limited: TB.prim_val.status is limited, STATUS_OPTS is set<br>• TB value is uncertain: CHANNEL selected TB.prim_val.status is Uncertain<br>• OUT exceeds OUT_SCALE: OUT.value exceeds OUT_SCALE<br>• unknown reason: unknown reason | 0 |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **CHANNEL**<br>Channel | R/W | The number of the logical hardware channel that is connected to this I/O block. This information defines the transducer to be used going to or from the physical world.<br>**Note:**<br>W = Writeable only by setting "OOS" in MODE_BLK | Uninitialized |
| | | Setting:<br>0: Uninitialized<br>1: Mass Flow<br>2: Density<br>3: Temperature<br>4: Flow Velocity<br>5: Volume Flow<br>21: Concentration 1<br>22: Concentration 2<br>23: Concentr. MassFlow 1<br>24: Concentr. MassFlow 2<br>25: Concentr. Vol.Flow 1<br>26: Concentr. Vol.Flow 2<br>41: Drive Level<br>42: Sensor Average<br>43: Sensor Deviation<br>44: 2 Phase Signal<br>45: Tube Frequency<br>46: Strain 1<br>47: Strain 2<br>48: Electronic Temperature | |
| **FIELD_VAL**<br>Field Value | | Raw value of the field device in percent of the PV range, with a status reflecting the transducer condition, before signal characterization (L_TYPE) or filtering (PV_FTIME). | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | Bad<br>NonSpecific<br>NotLimited |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | 0.0 |
| **GRANT_DENY**<br>Grant Deny | | Options for controlling access of host computers and local control panels to operating, tuning and alarm parameters of the block. | |
| GRANT<br>Grant | R/W | Depending on the philosophy of the plant, the operator or a higher level device (HLD) or a local operator's panel (LOP) in the case of "Local", may turn on an item of the "Grant" attribute - "Program, Tune, Alarm or Local". | Uninitialized |
| | | Setting:<br>Program / Tune / Alarm / Local / Operate / Service / Diagnostic | |
| DENY<br>Deny | R/W | The deny attribute is provided for use by a monitoring application in an interface device and may not be changed by an operator. | Uninitialized |
| | | Setting:<br>Program denied / Tune denied / Alarm denied / Local denied / Operate denied / Service Denied / Diagnostic Denied | |
| **HI_ALM**<br>High Alarm | | The status for High Alarm and its associated time stamp. Settings of 5 subelements see in the following part. | |
| **HI_HI_ALM**<br>High High Alarm | | The status for High High Alarm and its associated time stamp. Settings of 5 subelements see in the following part. | |

| **Parameter**<br>**DD name** | Access | Description and settings | Initial Value |
|---|---|---|---|
| Settings of 5 subelements for previous 2 parameters High Alarm and High High Alarm: | | | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | Uninitialized |
| ALARM_STATE<br>Alarm State | R | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | Uninitialized |
| TIME_STAMP<br>Time Stamp | R | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | Uninitialized |
| SUB_CODE<br>Subcode | R | Setting:<br>Other / Block Configuration / Link Configuration / Simulation Active / Local Override / Device Fault State / Device Maintenance / Input Failure / Output Failure / Memory Failure / Lost Static Data / Lost NV Data / Readback Check / Maintenance Needed / Power Up / Out Of Service | Other |
| VALUE<br>Float Value | R | A numerical quantity entered by a user or calculated by the algorithm. | 0.0 |
| **HI_HI_LIM**<br>High High Limit | R/W | The setting for High High Alarm in engineering units.<br>Setting range see in the following part. | +INF |
| **HI_HI_PRI**<br>High High Priority | R/W | Priority of the High High Alarm.<br>Setting see in the following part. | 0 |
| **HI_LIM**<br>High Limit | R/W | The setting for High Alarm in engineering units.<br>Setting range see in the following part. | +INF |
| **HI_PRI**<br>High Priority | R/W | Priority of the High Alarm.<br>Setting see in the following part. | 0 |
| Setting range for previous 2 parameters:<br>x_y_LIM<br>x_y_Limit | | -3.39 E38…+3.39 E38 / - INF (- infinite) / + INF (+ infinite) | |
| Setting for previous 2 parameters:<br>x_y_PRI<br>x_y_Priority | | 0: The associated alert may clear when the priority is changed to 0, but it will never occur.<br>1: The associated alert is not send as a notification. If the priority is above 1, then the alert must be reported.<br>2: Reserved for alerts that do not require the attention of a plant operator, e.g. diagnostic and system alerts. Block alarm, error alarm and update event have a fixed priority of 2.<br>3...7: Increasing higher priorities - advisory alarms.<br>8...15: Increasing higher priorities - critical alarms. | 0 |
| **IO_OPTS**<br>IO Options<br>(IO = Input/Output) | R/W | Options which the user may select to alter input and output block processing. For details refer to chapter "Appendix".<br>Setting:<br>• Low Cutoff: The AI low cutoff algorithm is enabled.<br>• Units Conversion: Device will perform unit conversion on the channel value so that it will match the units set in XD_SCALE. If the unit of XD_SCALE is set to a value that is not convertible from TB unit, then the block will remain in OOS after being configured. | 0 |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **L_TYPE**<br>Linearization Type | R/W | Determines if the values passed by the TB to the AI block may be used directly (Direct) or if the value is in different units and must be converted linearly (Indirect) or with square root (Ind Sqr Root), using the input range defined by the transducer and the associated output range.<br>W = Writeable only by setting "OOS" in MODE_BLK | Uninitialized |
| | | Setting:<br>• Uninitialized: The block will remain in OOS<br>• Direct: Use FIELD_VAL as output after filtering<br>• Indirect: Convert FIELD_VAL to output scale linearly<br>• Indirect Sq Root: Convert FIELD_VAL to output scale after taking square root | |
| **LO_ALM**<br>Low Alarm | | The status for Low Alarm and its associated time stamp.<br>Settings of 5 subelements see in the following part. | - |
| **LO_LO_ALM**<br>**Low Low Alarm** | | The status for Low Low Alarm and its associated time stamp.<br>Settings of 5 subelements see in the following part. | - |
| Settings of 5 subelements for previous 2 parameters Low Alarm and Low Low Alarm: | | | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | Uninitialized |
| ALARM_STATE<br>Alarm State | R | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | Uninitialized |
| TIME_STAMP<br>Time Stamp | R | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | Uninitialized |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Other / Block Configuration / Link Configuration / Simulation Active / Local Override / Device Fault State / Device Maintenance / Input Failure / Output Failure / Memory Failure / Lost Static Data / Lost NV Data / Readback Check / Maintenance Needed / Power Up / Out Of Service | |
| VALUE<br>Float Value | R | A numerical quantity entered by a user or calculated by the algorithm. | 0.0 |
| **LO_LIM**<br>Low Limit | R/W | The setting for Low Alarm in engineering units.<br>Setting range see in the following part. | -INF |
| **LO_LO_LIM**<br>Low Low Limit | R/W | The setting for Low Low Alarm in engineering units.<br>Setting range see in the following part. | -INF |
| **LO_PRI**<br>Low Priority | R/W | Priority of the Low Alarm.<br>Setting see in the following part. | 0 |
| **LO_LO_PRI**<br>Low Low Priority | R/W | Priority of the Low Low Alarm.<br>Setting see in the following part. | 0 |
| Setting range for previous 2 parameters:<br>x_y_LIM<br>x_y_Limit | | -3.39 E38…+3.39 E38 / - INF (- infinite) / + INF (+ infinite) | |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| Setting for previous 2 parameters:<br>x_y_PRI<br>x_y_Priority | | 0: The associated alert may clear when the priority is changed to 0, but it will never occur.<br>1: The associated alert is not send as a notification. If the priority is above 1, then the alert must be reported.<br>2: Reserved for alerts that do not require the attention of a plant operator, e.g. diagnostic and system alerts. Block alarm, error alarm and update event have a fixed priority of 2.<br>3...7: Increasing higher priorities - advisory alarms.<br>8...15: Increasing higher priorities - critical alarms. | 0 |
| **LOW_CUT**<br>Low Cutoff | R/W | A value of zero percent of scale is used in block processing if the transducer absolute value falls below this limit, in % of scale. This feature may be used to eliminate noise near zero for a flow sensor. | 0.0 |
| | | Setting:<br>≥0.0 | |
| **OUT**<br>Output | | The primary analogue discrete value calculated as a result of executing the function.<br>**Note:**<br>W = Writeable only by setting "OOS" in MODE_BLK | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R/W | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **OUT_SCALE**<br>Output Scale | | The high and low scale values, engineering units code and number of digits to the right of the decimal point to be used in displaying the OUT parameter and parameters which have the same scaling as OUT. | |
| EU_100<br>EU at 100% | R/W | The engineering unit value which represents the upper end of range of the associated block parameter. | 100.0 |
| EU_0<br>EU at 0% | R/W | The engineering unit value which represents the lower end of range of the associated block parameter. | 0.0 |
| UNITS_INDEX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. The value has no effect on the block calculation. | Uninitialized |
| | | Setting:<br>All units are possible. | |
| DECIMAL<br>Decimal | R/W | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 0 |
| **PV**<br>Process Value | | Either the primary analogue value for use in executing the function or a process value associated with it. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | Bad<br>NonSpecific<br>NotLimited |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | 0.0 |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **PV_FTIME**<br>PV F Time<br>(Process Value Filter Time) | R/W | Time constant of a single exponential filter for the PV, in seconds. | 0.0 |
| | | Setting:<br>0.0…60.0 | |
| **SIMULATE**<br>Simulate | | Allows the transducer analogue input or output to the block to be manually supplied when "Simulate" is enabled. When simulation is disabled, the simulate value and status track the actual value and status. | |
| SIMULATE_STATUS<br>Simulate Status | R/W | Used for the transducer status when simulation is enabled. | Bad<br>NonSpecific<br>NotLimited |
| SIMULATE_VALUE<br>Simulate Value | R/W | Used for the transducer value when simulation is enabled. | 0.0 |
| | | Setting:<br>-3.39 E38 … +3.39 E38, - INF, + INF | |
| TRANSDUCER_<br>STATUS<br>Transducer Status | R | Status of value supplied by transducer. | Bad<br>NonSpecific<br>NotLimited |
| TRANSDUCER_VALUE<br>Transducer Value | R | Current value supplied by transducer. | 0.0 |
| ENABLE_DISABLE<br>Simulate En/Disable | R/W | The parameter "SW_Simulated" in RB Block must be enabled. | Disabled |
| | | Setting:<br>Uninitialized / Disabled / Active | |
| **STATUS_OPTS**<br>Status Option | R/W | Options which the user may select in the block processing of status. | Uninitialized |
| | | Setting:<br>Propagate Fault Forward / Uncertain if limited / BAD if limited / Uncertain if Man. | |
| **UPDATE_EVT**<br>Update Event | | This alert is generated by any change to the static data. | |
| UNACKNOWLEDGED<br>Unacknowledged | RW | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| UPDATE_STATE<br>Update State | R | A discrete enumeration which gives an indication of whether the alert has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Reported / Not Reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. Time stamp records the time when parameter was updated. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |

| **Parameter**<br>**DD name** | Access | Description and settings | Initial Value |
|---|---|---|---|
| STATIC_REVISION<br>Static Revision | R | The static revision of the block whose static parameter was changed and is being reported. It is possible for the present value of static revision to be greater than this because static can be changed at any time. | 0 |
| RELATIVE_INDEX<br>Relative Index | R | The OD index of the static parameter whose change caused this alert, minus the FB starting index. If the update event was caused by a write to multiple parameters at the same time, then this attribute will be zero. | 0 |
| **XD_SCALE**<br>Transducer Scale | | The high and low scale values, engineering units code and number of digits to the right of the decimal point used with the value obtained from the transducer for a specified channel.<br>**Note:**<br>W = Writeable only by setting "OOS" in MODE_BLK | |
| EU_100<br>EU at 100% | R/W | The engineering unit value which represents the upper end of range of the associated block parameter. | 100 |
| EU_0<br>EU at 0% | R/W | The engineering unit value which represents the lower end of range of the associated block parameter. | 0.0 |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| UNITS_INDEX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. The value could effect a unit conversion. For details refer to chapter "Appendix". | Uninitialized |
| | | **Temperature units:**<br>1001:°C / 1002:°F / 1000:K | |
| | | **Mass flow units:**<br>1322:kg/s / 1323:kg/min / 1324:kg/h / 1325:kg/d / 1326:t/s / 1327:t/min / 1328:t/h / 1329:t/d / 1330:lb/s / 1331:lb/min / 1332:lb/h / 1333:lb/d / 1644:klb(US)/s / 1643:klb(US)/min / 1642:klb(US)/h / 1641:klb(US)/d / 1334:STon/s / 1335:STon/min / 1336:STon/h / 1337:STon/d / 1338:LTon/s / 1339:LTon/min / 1340:LTon/h / 1341:LTon/d | |
| | | **Density units:**<br>1097:kg/m³ / 1099:kg/dm³ / 1103:kg/L / 1101:g/m³ / 1105:g/L / 1100:g/cm³ / 1104:g/ml / 1098:Mg/m³ / 1102:t/m³ / 1106:lb/in³ / 1107:lb/ft³ / 1108:lb/gal / 1430:lb/ImpGal | |
| | | **Volume flow units:**<br>1347:m³/s / 1348:m³/min / 1349:m³/h / 1350:m³/d / 1351:L/s / 1352:L/min / 1353:L/h / 1354:L/d / 1619:kL/s / 1518:kL/min / 1519:kL/h / 1520:kL/d / 1356:CFS / 1357:CFM / 1358:CFH / 1359:ft³/d / 1623:kCFS / 1622:kCFM / 1621:kCFH / 1620:kft³/d / 1511:cm³/s / 1512:cm³/min / 1513:cm³/h / 1514:cm³/d / 1362:gal/s / 1363:GPM / 1364:gal/h / 1365:gal/d / 1450:kgal/s / 1454:kgal/min / 1458:kgal/h / 1462:kgal/d / 1371:bbl/s / 1372:bbl/min / 1373:bbl/h / 1374:bbl/d / 1367:ImpGal/s / 1368:ImpGal/min / 1369:ImpGal/h / 1370:ImpGal/d | |
| | | **Speed (velocity) units:**<br>1061:m/s / 1062:mm/s / 1063:m/h / 1064:km/h / 1067:ft/s / 1070:ft/min / 1073:ft/h / 1066:in/s / 1069:in/min / 1072:in/h / 1068:yd/s / 1071:yd/min / 1074:yd/h | |
| | | **Concentration units:**<br>1588: / 1342:% / 1113:degAPI / 1346:% plato / 1426:degBrix / 65520:Baume 144 / 65521:Baume 145 / 65522:% NaOH / 65523:% mass A / 65524:% mass B / 65527:% mass / 65525:% vol A / 65526:% vol B / 65528:% vol / 65518:% alc by mass / 65517:% alc by vol | |
| | | **Units for Drive Level, Sensor Average, Sensor Deviation, 2 Phase Signal:**<br>1342:% | |
| | | **Frequency units:**<br>1077:Hz | |
| | | **Strain units:**<br>1281:Ohm | |
| DECIMAL<br>Decimal | R/W | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 0 |

Table 5-3: Description of Analog Input Block parameters

### 5.3.3 Flow Transducer Block (FLOWTB)

The following table lists the Flow Transducer Block parameters in alphabetical order with short parameter descriptions, factory settings (Initial Value (IV)) and possible settings.

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **ALERT_KEY**<br>Alert Key | R/W | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. | 0 |
| | | Setting:<br>1...255 | |
| **BLOCK_ERR**<br>Block Error | R | This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. | Other |
| | | Setting:<br>• Other: Non-specific error active<br>• Block Configuration: Error detected in block configuration<br>• Link Configuration: Error detected in link configuration<br>• Simulation Active: Simulation enabled in this block<br>• Local Override: Output tracking of faultstate active<br>• Device Fault State: Device faultstate set<br>• Device Maintenance: Device needs maintenance soon<br>• Sensor Failure: Sensor Failure detected by this block. Process variable has a status of Bad, Sensor Failure<br>• Output Failure: Failure detected in output hardware<br>• Memory Failure: Memory error detected<br>• Lost Static Data: Static parameters cannot be recovered<br>• Lost NV Data: Non-volatile parameters cannot be recovered<br>• Readback Check: Failure detected in READBACK<br>• Maintenance Needed: Device NEEDS maintenance NOW<br>• Power Up: Recovery from power failure<br>• Out Of Service: Block actual mode is out of service | |
| **MODE_BLK**<br>Block Mode | | The actual, target, permitted and normal modes of the block. | |
| TARGET<br>Target | R/W | This is the mode requested by the operator. Only one mode from those allowed by the permitted mode parameter may be requested. | Auto |
| | | Setting:<br>Auto / OOS | |
| ACTUAL<br>Actual | R | This is the current mode of the block, which may differ from the target based on operating conditions. Its value is calculated as part of block execution. | Auto |
| | | Setting:<br>Auto / OOS | |
| PERMITTED<br>Permitted | R/W | Defines the modes which are allowed for an instance of the block. The permitted mode is configured based on application requirement. | Auto<br>OOS |
| | | Setting:<br>Auto / OOS | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| NORMAL<br>Normal | R/W | This is the mode which the block should be set to during normal operating conditions. | Auto |
| | | Setting:<br>Auto / OOS | |
| **ST_REV**<br>Static Revision | R | The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. | 0 |
| | | Setting:<br>0...65535 | |
| **STRATEGY**<br>Strategy | R/W | The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. | 0<br>(= Uninitialized) |
| | | Setting:<br>0...65535 | |
| **TAG_DESC**<br>Tag Description | R/W | The user description of the intended application of the block. | blanks |
| | | Setting:<br>≤32 digits | |
| **ACT_OPERATE_MODE**<br>Act. Operat. Mode | R | The current Operating Mode (B1.5). | 3: Measuring |
| | | Setting:<br>3: Measuring / 5: Standby / 1: Stop / 2: Startup / 6: Calibrate Zero | |
| **BLOCK_ALM**<br>Block Alarm | | The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the "Active" status in the "Status" attribute. As soon as the "Unreported" status is cleared by the alert reporting task, another block alert may be reported without clearing the "Active" status, if the subcode has changed. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Other / Block Configuration / Link Configuration / Simulation Active / Local Override / Device Fault State / Device Maintenance / Input Failure / Output Failure / Memory Failure / Lost Static Data / Lost NV Data / Readback Check / Maintenance Needed / Power Up / Out Of Service | |
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected. | 0 |
| | | Setting:<br>0...255 | |
| **BLOCK_ERR_ DESC_1**<br>Block Error Description | R | This parameter is used by a device to report more specific details regarding persistent errors that are reported through BLOCK_ERR. | 0 |
| | | Setting:<br>TB is OOS: TB: MODE_BLK.ACTUAL is OOS | |
| **CAL_ACTION**<br>Calibration | R/W | Selector to start a calibration. | no action |
| | | Setting:<br>no action / zero factory calibration / zero automatic calibration / zero manual calibration | |
| **CAL_LAST_ RESULT**<br>Calib. Result | R | Calibration result of latest action. | idle |
| | | Setting:<br>idle / Passed / Failed / Failed – not meas. / Failed – zero too high / Failed – points closed / Failed - plausibility / 0 % / 10 % / 20 % / 30 % / 40 % / 50 % / 60 % / 70 % / 80 % / 90 % / 100 % | |
| **CALIBRATION_ ZERO**<br>Zero Calibration % | R | Zero calibration value for manual zero calibration (A7, C1.1.1). | - |
| **COLLECTION_ DIRECTORY**<br>Collection Directory | | A directory that specifies the number, starting indices and DD Item IDs of the data collections in each transducer within a Transducer Block. | - |
| **DENSITY_CAL_ PROD**<br>Density Calib. Product | R/W | Product of the density calibration point (C1.2.1). | 3:Other |
| | | Setting:<br>1:Pure Water<br>2:Town Water<br>0:Empty<br>3:Other | |
| **DENSITY_ENABLE**<br>Density measurement | R | Setting:<br>0:Off / 1:On | 1:On |
| **DENSITY_MODE_ SEL**<br>Density Mode Sel. | R/W | Set Density Mode (C1.2.2). | 0:Process |
| | | 0:Process / 1:Fixed / 2:Referred / 3:Standard | |
| **DENSITY_VALUE**<br>Density | | The measured value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **DENSITY_RANGE**<br>Density Range | | Defines the ends of the SECONDARY_VALUE, the units of the SECONDARY_VALUE, and the decimal point position (number of significant digits to the right of the point). The engineering units must match the units selected in the parameter XD_SCALE of the Analog Input Block that reads the channel with this value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 5000 kg/m³ |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | 0.05 kg/m³ |
| UNIT_IDX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | kg/m³ |
| | | Setting:<br>1097:kg/m³ / 1099:kg/dm³ / 1103:kg/L / 1101:g/m³ / 1105:g/L / 1100:g/cm³ / 1104:g/ml / 1098:Mg/m³ / 1102:t/m³ / 1106:lb/in³ / 1107:lb/ft³ / 1108:lb/gal / 1430:lb/ImpGal | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 0 |
| **DENSITY_REF_TEMP**<br>Ref. Density Temp. | R/W | Set Reference Temperature for density (C1.2.4). | 20 °C |
| | | Setting:<br>-245.00…500.00 °C | |
| **FIXED_DENSITY**<br>Fixed Density | R/W | Set density value for Fixed Density (C1.2.1/C1.2.3). | 998.2 kg/m³ |
| | | Setting:<br>0.080 … 5000.0 kg/m³ | |
| **FLOW_CORRECTION**<br>Flow Correction | R/W | Sets additional correction for mass flow (C1.1.3). | 0.0% |
| | | Setting:<br>-100.0…100.0 % | |
| **FLOW_DIRECTION**<br>Flow Direction | R/W | Set the direction of flow in relation to the arrow on the flow sensor (C1.1.4). | Forwards |
| | | Setting:<br>Forwards / Backwards | |
| **FLOW_VELOCITY_VALUE**<br>Flow Velocity | | The measured value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **FLOW_VELOCITY_RANGE**<br>Flow Velocity Range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 500 |

| **Parameter**<br>**DD name** | Access | Description and settings | Initial Value |
|---|---|---|---|
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | -500 |
| UNIT_IDX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | m/s |
| | | Setting:<br>1061:m/s / 1062:mm/s / 1063:m/h / 1064:km/h / 1067:ft/s / 1070:ft/min / 1073:ft/h / 1066:in/s / 1069:in/min / 1072:in/h / 1068:yd/s / 1071:yd/min / 1074:yd/h | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 0 |
| **LOW_FLOW_ CUTOFF**<br>Low flow cutoff | R/W | Set the low flow cutoff in percent of nom. mass flow. It eliminates noise near zero flow (C1.1.6). | 0.2 % |
| | | Setting:<br>0.0…10.0 % | |
| **MASS_FLOW_ VALUE**<br>Mass Flow | | The measured mass flow value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **MASS_FLOW_ RANGE**<br>Mass Flow range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | - |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | - |
| UNIT_IDX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | kg/h |
| | | Setting:<br>1322:kg/s / 1323:kg/min / 1324:kg/h / 1325:kg/d / 1326:t/s / 1327:t/min / 1328:t/h / 1329:t/d / 1330:lb/s / 1331:lb/min / 1332:lb/h / 1333:lb/d / 1644:klb(US)/s / 1643:klb(US)/min / 1642:klb(US)/h / 1641:klb(US)/d / 1334:STon/s / 1335:STon/min / 1336:STon/h / 1337:STon/d / 1338:LTon/s / 1339:LTon/min / 1340:LTon/h / 1341:LTon/d | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | - |
| **PRESS_SUPP_ CUTOFF**<br>Press. Supp. Cutoff | R/W | Sets the additional cutoff used during pressure suppression (C1.1.7). | 0.0 % |
| | | Setting:<br>0.0…10.0 % | |
| **PRESS_SUPP_ TIME**<br>Press. Supp. Time | R/W | Sets the time that pressure suppression is active (C1.1.8). | 0.0 s |
| | | Setting:<br>0.0…20.0 s | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **PROCESS_NOISE_ DAMPING**<br>Process Noise Damping | R/W | Set process noise damping (C1.1.5).<br>Setting:<br>0.01...30.0 s | 1.0 s |
| **PROD_DENSITY_ VAL**<br>Product Density (manual value) | R/W | Manually entered density of the product for the calibration point (C1.2.1).<br>Setting:<br>-1000.00…5000.0 kg/m³ | 998.2 kg/m³ |
| **REF_DENSITY_ SLOPE**<br>Ref. Density Slope | R/W | Set density slope for referred density (C1.2.5).<br>Setting:<br>0.0…65.0 | 0.0 |
| **SENSOR_CAL_ DATE**<br>Sensor Calibration Date | R | The date of the last sensor calibration. | - |
| **SENSOR_CAL_ LOC**<br>Sensor Calibration Location | R/W | The last physical location at which the sensor was calibrated. (ex. Acme Labs) | Factory |
| **SENSOR_CAL_ WHO**<br>Sensor Calibration Who | R/W | The name of the person responsible for the last sensor calibration. | Factory |
| **SENSOR_TYPE**<br>Sensor Type | R | The type of sensor.<br>Setting:<br>Coriolis (Gyroscopic) | Coriolis (Gyroscopic) |
| **SET_OPERATE_ MODE**<br>Operation Mode | R/W | Sets the operating mode of the sensor (A8).<br>Setting:<br>1:Stop / 3:Measuring / 5:Standby | 3: Measuring |
| **STD_DENSITY_K0**<br>Standard Density k0 | R/W | Sets k0 value for standard density (C1.2.7).<br>Setting:<br>0.0...5000.00 | 346.4228 |
| **STD_DENSITY_K1**<br>Standard Density k1 | R/W | Sets k1 value for standard density (C1.2.8).<br>Setting:<br>-100.00…100.00 | 0.4388 |
| **STD_DENSITY_K2**<br>Standard Density k2 | R/W | Sets k2 value for standard density (C1.2.9).<br>Setting:<br>-10.00…10.00 | 0.0 |
| **STD_DENSITY_ TEMP**<br>Standard Density Temp. | R/W | Set Reference Temperature for density (C1.2.6).<br>Setting:<br>-245.0…500.0 °C | 20.0 °C |
| **TEMPERATURE_ VALUE**<br>Temperature | | The measured value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **TEMPERATURE_ RANGE**<br>Temperature range | | The High and Low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated block parameter. | 500.0 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | -200.0 |
| UNIT_IDX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | °C |
| | | Setting:<br>1001:°C / 1002:°F / 1000:K | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **TRANSDUCER_ DIRECTORY**<br>Transducer Directory Entry | R | A directory that specifies the number and starting indices of the data collections in the transducer block. | 0 |
| **TRANSDUCER_ TYPE**<br>Transducer Type | R | Identifies the transducer that follows. | |
| **TRANSDUCER_ TYPE_VER**<br>Transducer Type Version | R | Identifies the version of the transducer that follows. Format is XXYY where XX is the major spec revision and YY is the manufacturer revision. | 0x0101 |
| **TUBE_DIAMETER_ CONSTANT**<br>Pipe Diameter | R/W | Pipe diameter used to calculate flow velocity (C1.1.9). | 10.0 mm |
| | | Setting:<br>1.00..500.00 mm | |
| **UPDATE_EVT**<br>Update Event | | This alert is generated by any change to the static data. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| UPDATE_STATE<br>Update State | R | A discrete enumeration which gives an indication of whether the alert has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Update reported / Update not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. Time stamp records the time when parameter was updated. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| STATIC_REVISION<br>Static Revision | R | The static revision of the block whose static parameter was changed and is being reported. It is possible for the present value of static revision to be greater than this because static can be changed at any time. | 0 |
| | | Setting:<br>0…65535 | |
| RELATIVE_INDEX<br>Relative Index | R | The OD index of the static parameter whose change caused this alert, minus the FB starting index. If the update event was caused by a write to multiple parameters at the same time, then this attribute will be zero. | 0 |
| | | Setting:<br>0…65535 | |
| **VOLUME_FLOW_ VALUE**<br>Volume Flow | | The measured value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **VOLUME_FLOW_ RANGE**<br>Volume Flow Range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | - |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | - |
| UNIT_IDX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | m³/s |
| | | Setting:<br>1347:m³/s / 1348:m³/min / 1349:m³/h / 1350:m³/d / 1351:L/s / 1352:L/min / 1353:L/h / 1354:L/d / 1619:kL/s / 1518:kL/min / 1519:kL/h / 1520:kL/d / 1356:CFS / 1357:CFM / 1358:CFH / 1359:ft³/d / 1623:kCFS / 1622:kCFM / 1621:kCFH / 1620:kft³/d / 1511:cm³/s / 1512:cm³/min / 1513:cm³/h / 1514:cm³/d / 1362:gal/s / 1363:GPM / 1364:gal/h / 1365:gal/d / 1450:kgal/s / 1454:kgal/min / 1458:kgal/h / 1462:kgal/d / 1371:bbl/s / 1372:bbl/min / 1373:bbl/h / 1374:bbl/d / 1367:ImpGal/s / 1368:ImpGal/min / 1369:ImpGal/h / 1370:ImpGal/d | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 0 |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **XD_ERROR**<br>Transducer Error | R | One of the transducer error codes defined in the FF Transducer Specifications in section "4.7 Block Alarm Subcodes". | No errors |
| | | Setting:<br>• 0: No errors<br>• 16: Unspecified error<br>• 17: General error<br>• 18: Calibration error<br>• 19: Configuration error<br>• 20: Electronics Failure<br>• 21: Mechanical Failure<br>• 22: I/O Failure<br>• 23: Data Integrity Error<br>• 24: Software Error<br>• 25: Algorithm Error | |
| **ZERO_ADD_ OFFSET**<br>Zero Add. Offset | R/W | Set additional zero offset for mass flow (C1.1.2). | 0.0 kg/h |
| | | Setting:<br>-115200.0…1115200.0 kg/h | |

Table 5-4: Description of Flow Transducer Block parameters

### 5.3.4 Concentration Transducer Block (CONCTB)

The following table lists the Concentration Transducer Block parameters in alphabetical order with short parameter descriptions, factory settings (Initial Value (IV)) and possible settings.

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **ALERT_KEY**<br>Alert Key | R/W | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. | 0 |
| | | Setting:<br>1...255 | |
| **BLOCK_ERR**<br>Block Error | R | This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. | Other |
| | | Setting:<br>• Other: Non-specific error active<br>• Block Configuration: Error detected in block configuration<br>• Link Configuration: Error detected in link configuration<br>• Simulation Active: Simulation enabled in this block<br>• Local Override: Output tracking of faultstate active<br>• Device Fault State: Device faultstate set<br>• Device Maintenance: Device needs maintenance soon<br>• Sensor Failure: Sensor Failure detected by this block. Process variable has a status of Bad, Sensor Failure<br>• Output Failure: Failure detected in output hardware<br>• Memory Failure: Memory error detected<br>• Lost Static Data: Static parameters cannot be recovered<br>• Lost NV Data: Non-volatile parameters cannot be recovered<br>• Readback Check: Failure detected in READBACK<br>• Maintenance Needed: Device NEEDS maintenance NOW<br>• Power Up: Recovery from power failure<br>• Out Of Service: Block actual mode is out of service | |
| **MODE_BLK**<br>Block Mode | | The actual, target, permitted and normal modes of the block. | |
| TARGET<br>Target | R/W | This is the mode requested by the operator. Only one mode from those allowed by the permitted mode parameter may be requested. | Auto |
| | | Setting:<br>Auto / OOS | |
| ACTUAL<br>Actual | R | This is the current mode of the block, which may differ from the target based on operating conditions. Its value is calculated as part of block execution. | Auto |
| | | Setting:<br>Auto / OOS | |
| PERMITTED<br>Permitted | R/W | Defines the modes which are allowed for an instance of the block. The permitted mode is configured based on application requirement. | Auto<br>OOS |
| | | Setting:<br>Auto / OOS | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| NORMAL<br>Normal | R/W | This is the mode which the block should be set to during normal operating conditions. | Auto |
| | | Setting:<br>Auto / OOS | |
| **ST_REV**<br>Static Revision | R | The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. | 0 |
| | | Setting:<br>0...65535 | |
| **STRATEGY**<br>Strategy | R/W | The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. | 0<br>(= Uninitialized) |
| | | Setting:<br>0...65535 | |
| **TAG_DESC**<br>Tag Description | R/W | The user description of the intended application of the block. | blanks |
| | | Setting:<br>≤32 digits | |
| **BLOCK_ALM**<br>Block Alarm | | The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the "Active" status in the "Status" attribute. As soon as the "Unreported" status is cleared by the alert reporting task, another block alert may be reported without clearing the "Active" status, if the subcode has changed. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Other / Block Configuration / Link Configuration / Simulation Active / Local Override / Device Fault State / Device Maintenance / Input Failure / Output Failure / Memory Failure / Lost Static Data / Lost NV Data / Readback Check / Maintenance Needed / Power Up / Out Of Service | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected.<br>Setting:<br>0...255 | 0 |
| **COLLECTION_ DIRECTORY**<br>Collection Directory | | A directory that specifies the number, starting indices and DD Item IDs of the data collections in each transducer within a Transducer Block. | |
| **CONCENTR_1_ VALUE**<br>Concentration 1 | | The measured velocity of sound value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **CONCENTR_1_ RANGE**<br>Conc. 1 Range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 100.0 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | 0.0 |
| UNIT_IDX<br>Units Index | R | Device Description units code index for the engineering unit descriptor for the associated block value.<br>Setting:<br>**Concentration units:**<br>1588: / 1342:% / 1113:degAPI / 1346:% plato / 1426:degBrix / 65520:Baume 144 / 65521:Baume 145 / 65522:% NaOH / 65523:% mass A / 65524:% mass B / 65527:% mass / 65525:% vol A / 65526:% vol B / 65528:% vol / 65518:% alc by mass / 65517:% alc by vol | % |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **CONCENTR_2_ VALUE**<br>Concentration 2 | | The measured value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **CONCENTR_2_ RANGE**<br>Conc. 2 Range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 100.0 |

| **Parameter**<br>**DD name** | Access | Description and settings | Initial Value |
|---|---|---|---|
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | 0.0 |
| UNIT_IDX<br>Units Index | R | Device Description units code index for the engineering unit descriptor for the associated block value. | % |
| | | Setting:<br>**Concentration units:**<br>1588: / 1342:% / 1113:degAPI / 1346:% plato / 1426:degBrix / 65520:Baume 144 / 65521:Baume 145 / 65522:% NaOH / 65523:% mass A / 65524:% mass B / 65527:% mass / 65525:% vol A / 65526:% vol B / 65528:% vol / 65518:% alc by mass / 65517:% alc by vol | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **CONC_MASSFLOW_ 1_VALUE**<br>Concentr. MassFlow 1 | | The measured value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **CONC_MASSFLOW_ 1_RANGE**<br>Conc. MassFlow 1 range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 3.40e38 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | -3.40e38 |
| UNIT_IDX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | kg/h |
| | | Setting:<br>**Mass flow units:**<br>1322:kg/s / 1323:kg/min / 1324:kg/h / 1325:kg/d / 1326:t/s / 1327:t/min / 1328:t/h / 1329:t/d / 1330:lb/s / 1331:lb/min / 1332:lb/h / 1333:lb/d / 1644:klb(US)/s / 1643:klb(US)/min / 1642:klb(US)/h / 1641:klb(US)/d / 1334:STon/s / 1335:STon/min / 1336:STon/h / 1337:STon/d / 1338:LTon/s / 1339:LTon/min / 1340:LTon/h / 1341:LTon/d | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **CONC_MASSFLOW_ 2_VALUE**<br>Conc. MassFlow 2 | | The measured value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **CONC_MASSFLOW_2_RANGE**<br>Conc. MassFlow 2 range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 3.40e38 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | -3.40e38 |
| UNIT_IDX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | kg/h |
| | | Setting:<br>**Mass flow units:**<br>1322:kg/s / 1323:kg/min / 1324:kg/h / 1325:kg/d / 1326:t/s / 1327:t/min / 1328:t/h / 1329:t/d / 1330:lb/s / 1331:lb/min / 1332:lb/h / 1333:lb/d / 1644:klb(US)/s / 1643:klb(US)/min / 1642:klb(US)/h / 1641:klb(US)/d / 1334:STon/s / 1335:STon/min / 1336:STon/h / 1337:STon/d / 1338:LTon/s / 1339:LTon/min / 1340:LTon/h / 1341:LTon/d | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **CONC_VOLFLOW_1_VALUE**<br>Conc. Vol.Flow 1 | | The measured value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **CONC_VOLFLOW_1_RANGE**<br>Conc. Vol.Flow 1 range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 3.40e38 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | -3.40e38 |
| UNIT_IDX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | m³/h |
| | | Setting:<br>**Volume flow units:**<br>1347:m³/s / 1348:m³/min / 1349:m³/h / 1350:m³/d / 1351:L/s / 1352:L/min / 1353:L/h / 1354:L/d / 1619:kL/s / 1518:kL/min / 1519:kL/h / 1520:kL/d / 1356:CFS / 1357:CFM / 1358:CFH / 1359:ft³/d / 1623:kCFS / 1622:kCFM / 1621:kCFH / 1620:kft³/d / 1511:cm³/s / 1512:cm³/min / 1513:cm³/h / 1514:cm³/d / 1362:gal/s / 1363:GPM / 1364:gal/h / 1365:gal/d / 1450:kgal/s / 1454:kgal/min / 1458:kgal/h / 1462:kgal/d / 1371:bbl/s / 1372:bbl/min / 1373:bbl/h / 1374:bbl/d / 1367:ImpGal/s / 1368:ImpGal/min / 1369:ImpGal/h / 1370:ImpGal/d | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 0 |
| **CONC_VOLFLOW_ 2_VALUE**<br>Conc. Vol.Flow 2 | | The measured value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **CONC_VOLFLOW_ 2_RANGE**<br>Conc. Vol.Flow 2 range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 3.40e38 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | -3.40e38 |
| UNIT_IDX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | m³/h |
| | | Setting:<br>**Volume flow units:**<br>1347:m³/s / 1348:m³/min / 1349:m³/h / 1350:m³/d / 1351:L/s / 1352:L/min / 1353:L/h / 1354:L/d / 1619:kL/s / 1518:kL/min / 1519:kL/h / 1520:kL/d / 1356:CFS / 1357:CFM / 1358:CFH / 1359:ft³/d / 1623:kCFS / 1622:kCFM / 1621:kCFH / 1620:kft³/d / 1511:cm³/s / 1512:cm³/min / 1513:cm³/h / 1514:cm³/d / 1362:gal/s / 1363:GPM / 1364:gal/h / 1365:gal/d / 1450:kgal/s / 1454:kgal/min / 1458:kgal/h / 1462:kgal/d / 1371:bbl/s / 1372:bbl/min / 1373:bbl/h / 1374:bbl/d / 1367:ImpGal/s / 1368:ImpGal/min / 1369:ImpGal/h / 1370:ImpGal/d | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 0 |
| **CONC_CONC_ ENABLE**<br>Concentration | R | Concentration measurement enabled. | 0:Off |
| | | Setting:<br>0:Off / 1:On | |
| **CONC_DATA_SEL**<br>Conc. Data Sel. | R/W | Select the set of general concentration parameters are active (C1.3.1). | 0:Conc. Data 1 |
| | | Setting:<br>0:Conc. Data 1 / 1:Conc. Data 2 | |
| **CONC1_CCF01**<br>Conc.1 CCF01 | R/W | Selects type of concentration measurement (C1.3.4.1). | 0:Linear |
| | | Setting:<br>0:Linear / 1:Non Linear | |
| **CONC1_CCF02**<br>Conc.1 CCF02 | R/W | Set density of product A in g/cm³ (C1.3.4.2). | 0.0 g/cm³ |
| | | Setting:<br>-9.0E7…9.0E7 g/cm³ | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **CONC1_CCF03**<br>Conc.1 CCF03 | R/W | Set temperature coefficient for product A (C1.3.4.3). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC1_CCF04**<br>Conc.1 CCF04 | R/W | Set temperature coefficient squared for product A (C1.3.4.4). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC1_CCF05**<br>Conc.1 CCF05 | R/W | Set product B type (C1.3.4.5). | 0:Pure Water |
| | | Setting:<br>0:Pure Water / 1:Town Water / 2:Other | |
| **CONC1_CCF06**<br>Conc.1 CCF06 | R/W | Set density of product B in g/cm³. (C1.3.4.6). | 0.0 g/cm³ |
| | | Setting:<br>-9.0E7…9.0E7 g/cm³ | |
| **CONC1_CCF07**<br>Conc.1 CCF07 | R/W | Set temperature coefficient squared for product B (C1.3.4.7). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC1_CCF08**<br>Conc.1 CCF08 | R/W | Set parameters for non-linear equation (C1.3.4.8). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC1_CCF09**<br>Conc.1 CCF09 | R/W | Set parameters for non-linear equation (C1.3.4.9). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC1_CCF10**<br>Conc.1 CCF10 | R/W | Set parameters for non-linear equation (C1.3.4.10). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC1_CCF11**<br>Conc.1 CCF11 | R/W | Set parameters for non-linear equation (C1.3.4.11). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC1_CCF12**<br>Conc.1 CCF12 | R/W | Set parameters for non-linear equation (C1.3.4.12). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC1_FUNCTION**<br>Conc.1 Function | R/W | Select the function of the 1st concentration measurement (C1.3.2.1). | 1:Off |
| | | Setting:<br>1:Off / 2:Brix / 3:% Mass / 8:% Volume / 4:Baume 144 / 5:Baume 145 / 6:% NaOH / 7:Plato / 9:API / 10:% Alcohol by mass / 11:% Alcohol by volume | |
| **CONC1_OFFSET**<br>Conc.1 Offset | R/W | Set an additional offset for the 1st conc. measurement (C1.3.2.2). | 0.0 % |
| | | Setting:<br>-100.0…100.0 % | |
| **CONC1_PRODUCT**<br>Conc.1 Product | R/W | Set which 1st concentration product is displayed (C1.3.2.3). | 0:% Of Product A |
| | | Setting:<br>0:% Of Product A / 1:% Of Product B | |
| **CONC2_CCF01**<br>Conc.2 CCF01 | R/W | Selects type of concentration measurement (C1.3.5.1). | 0:Linear |
| | | Setting:<br>0:Linear / 1:Non Linear | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **CONC2_CCF02**<br>Conc.2 CCF02 | R/W | Set density of product A ing/cm³ (C1.3.5.2). | 0.0 g/cm³ |
| | | Setting:<br>-9.0E7…9.0E7 g/cm³ | |
| **CONC2_CCF03**<br>Conc.2 CCF03 | R/W | Set temperature coefficient for product A (C1.3.5.3). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC2_CCF04**<br>Conc.2 CCF04 | R/W | Set temperature coefficient squared for product A (C1.3.5.4). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC2_CCF05**<br>Conc.2 CCF05 | R/W | Set product B type (C1.3.5.5). | 0:Pure Water |
| | | Setting:<br>0:Pure Water / 1:Town Water / 2:Other | |
| **CONC2_CCF06**<br>Conc.2 CCF06 | R/W | Set density of product B in g/cm³ (C1.3.5.6). | 0.0 g/cm³ |
| | | Setting:<br>-9.0E7…9.0E7 g/cm³ | |
| **CONC2_CCF07**<br>Conc.2 CCF07 | R/W | Set temperature coefficient squared for product B (C1.3.5.7). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC2_CCF08**<br>Conc.2 CCF08 | R/W | Set parameters for non-linear equation (C1.3.5.8). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC2_CCF09**<br>Conc.2 CCF09 | R/W | Set parameters for non-linear equation (C1.3.5.9). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC2_CCF10**<br>Conc.2 CCF10 | R/W | Set parameters for non-linear equation (C1.3.5.10). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC2_CCF11**<br>Conc.2 CCF11 | R/W | Set parameters for non-linear equation (C1.3.5.11). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC2_CCF12**<br>Conc.2 CCF12 | R/W | Set parameters for non-linear equation (C1.3.5.12). | 0.0 |
| | | Setting:<br>-9.0E7…9.0E7 | |
| **CONC2_<br>FUNCTION**<br>Conc.2 Function | R/W | Select the function of the 2nd concentration measurement (C1.3.3.1). | 1:Off |
| | | Setting:<br>1:Off / 2:Brix / 3:% Mass / 8:% Volume / 4:Baume 144 / 5:Baume 145 / 6:% NaOH / 7:Plato / 9:API / 10:% Alcohol by mass / 11:% Alcohol by volume | |
| **CONC2_OFFSET**<br>Conc.2 Offset | R/W | Set an additional offset for the 2nd conc. measurement (C1.3.3.2). | 0.0 % |
| | | Setting:<br>-100.0…100.0 % | |
| **CONC2_PRODUCT**<br>Conc.2 Product | R/W | Set which 2nd concentration product is displayed (C1.3.3.3). | 0:% Of Product A |
| | | Setting:<br>0:% Of Product A / 1:% Of Product B | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **DEV_CONNECT_ STATE**<br>Device Connection State | R | | 0:Offline |
| | | Setting:<br>0:Offline / 129:Online | |
| **TRANSDUCER_ DIRECTORY**<br>Transducer Directory Entry | | A directory that specifies the number and starting indices of the data collections in the transducer block. | 0 |
| **TRANSDUCER_ TYPE**<br>Transducer Type | R | Identifies the transducer that follows. | Other |
| **UPDATE_EVT**<br>Update Event | | This alert is generated by any change to the static data. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| UPDATE_STATE<br>Update State | R | A discrete enumeration which gives an indication of whether the alert has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Update reported / Update not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. Time stamp records the time when parameter was updated. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| STATIC_REVISION<br>Static Revision | R | The static revision of the block whose static parameter was changed and is being reported. It is possible for the present value of static revision to be greater than this because static can be changed at any time. | 0 |
| | | Setting:<br>0…65535 | |
| RELATIVE_INDEX<br>Relative Index | R | The OD index of the static parameter whose change caused this alert, minus the FB starting index. If the update event was caused by a write to multiple parameters at the same time, then this attribute will be zero. | 0 |
| | | Setting:<br>0…65535 | |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **XD_ERROR**<br>Transducer Error | | One of the transducer error codes defined in the FF Transducer Specifications in section "4.7 Block Alarm Subcodes". | 0: No errors |
| | | Setting:<br>• 0: No errors<br>• 16: Unspecified error<br>• 17: General error<br>• 18: Calibration error<br>• 19: Configuration error<br>• 20: Electronics Failure<br>• 21: Mechanical Failure<br>• 22: I/O Failure<br>• 23: Data Integrity Error<br>• 24: Software Error<br>• 25: Algorithm Error | |

Table 5-5: Description of Concentration Transducer Block parameters

### 5.3.5 Diagnostic Transducer Block (DIAGTB)

The following table lists the Diagnostic Transducer Block parameters in alphabetical order with short parameter descriptions, factory settings (Initial Value (IV)) and possible settings.

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **ALERT_KEY**<br>Alert Key | R/W | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. | 0 |
| | | Setting:<br>1...255 | |
| **BLOCK_ERR**<br>Block Error | R | This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. | Other |
| | | Setting:<br>• Other: Non-specific error active<br>• Block Configuration: Error detected in block configuration<br>• Link Configuration: Error detected in link configuration<br>• Simulation Active: Simulation enabled in this block<br>• Local Override: Output tracking of faultstate active<br>• Device Fault State: Device faultstate set<br>• Device Maintenance: Device needs maintenance soon<br>• Sensor Failure: Sensor Failure detected by this block. Process variable has a status of Bad, Sensor Failure<br>• Output Failure: Failure detected in output hardware<br>• Memory Failure: Memory error detected<br>• Lost Static Data: Static parameters cannot be recovered<br>• Lost NV Data: Non-volatile parameters cannot be recovered<br>• Readback Check: Failure detected in READBACK<br>• Maintenance Needed: Device NEEDS maintenance NOW<br>• Power Up: Recovery from power failure<br>• Out Of Service: Block actual mode is out of service | |
| **MODE_BLK**<br>Block Mode | | The actual, target, permitted and normal modes of the block. | |
| TARGET<br>Target | R/W | This is the mode requested by the operator. Only one mode from those allowed by the permitted mode parameter may be requested. | Auto |
| | | Setting:<br>Auto / OOS | |
| ACTUAL<br>Actual | R | This is the current mode of the block, which may differ from the target based on operating conditions. Its value is calculated as part of block execution. | Auto |
| | | Setting:<br>Auto / OOS | |
| PERMITTED<br>Permitted | R/W | Defines the modes which are allowed for an instance of the block. The permitted mode is configured based on application requirement. | Auto<br>OOS |
| | | Setting:<br>Auto / OOS | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| NORMAL<br>Normal | R/W | This is the mode which the block should be set to during normal operating conditions. | Auto |
| | | Setting:<br>Auto / OOS | |
| **ST_REV**<br>Static Revision | R | The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. | 0 |
| | | Setting:<br>0...65535 | |
| **STRATEGY**<br>Strategy | R/W | The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. | 0<br>(= Uninitialized) |
| | | Setting:<br>0...65535 | |
| **TAG_DESC**<br>Tag Description | R/W | The user description of the intended application of the block. | blanks |
| | | Setting:<br>≤32 digits | |
| **BLOCK_ALM**<br>Block Alarm | | The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the "Active" status in the "Status" attribute. As soon as the "Unreported" status is cleared by the alert reporting task, another block alert may be reported without clearing the "Active" status, if the subcode has changed. | - |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Other / Block Configuration / Link Configuration / Simulation Active / Local Override / Device Fault State / Device Maintenance / Input Failure / Output Failure / Memory Failure / Lost Static Data / Lost NV Data / Readback Check / Maintenance Needed / Power Up / Out Of Service | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected. | 0 |
| | | Setting:<br>0...255 | |
| **ACT_OPERATE_ MODE**<br>Act. Operat. Mode | R | The current operating mode (B1.5). | 3: Measuring |
| | | Setting:<br>1:Stop / 2:Startup / 3:Measuring / 5:Standby / 6:Calibrate Zero | |
| **CAL_DATE**<br>Calibration Date | R | Displays the date of calibration of the flow sensor (B4.11). | current calibration date |
| **CF1**<br>CF1 | R | B4.12.1 | 1.0 |
| **CF2**<br>CF2 | R | B4.12.2 | 16.0 |
| **CF3**<br>CF3 | R | B4.12.3 | 0.0 |
| **CF4**<br>CF4 | R | B4.12.4 | 255.0 |
| **CF5**<br>CF5 | R | B4.12.5 | 255.0 |
| **CF6**<br>CF6 | R | B4.12.6 | 20.0 |
| **CF7**<br>CF7 | R | B4.12.7 | 750.0 |
| **CF8**<br>CF8 | R | B4.12.8 | 300.0 |
| **CF11**<br>CF11 | R | B4.12.9 | 0.0 |
| **CF12**<br>CF12 | R | B4.12.10 | 1.0 |
| **CF13**<br>CF13 | R | B4.12.11 | 0.0 |
| **CF14**<br>CF14 | R | B4.12.12 | 0.0 |
| **CF15**<br>CF15 | R | B4.12.13 | 0.0 |
| **CF16**<br>CF16 | R | B4.12.14 | 0.0 |
| **CF17**<br>CF17 | R | B4.12.15 | 0.0 |
| **CF18**<br>CF18 | R | B4.12.16 | 0.0 |
| **CF19**<br>CF19 | R | B4.12.17 | 0.0 |
| **CF20**<br>CF20 | R | B4.12.18 | 0.0 |
| **CF21**<br>CF21 | R | B4.12.19 | 0.0 |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **CF22**<br>CF22 | R | B4.12.20 | 0.0 |
| **CF23**<br>CF23 | R | B4.12.21 | 0.0 |
| **CF24**<br>CF24 | R | B4.12.22 | 0.0 |
| **CF25**<br>CF25 | R | B4.12.23 | 0 |
| **CF26**<br>CF26 | R | B4.12.24 | 0.0 |
| **CF27**<br>CF27 | R | B4.12.25 | 0.0 |
| **C_NUM_ DETECTED**<br>C-Number Device | R | Current C-Number of this Device (D2.3.1). | - |
| **C_NUM_ PRODUCTION**<br>C-Number Production | R | C-Number of Production; this number identifies the type of electronics, can be found on the transmitter assembly sticker as well (B5.1). | - |
| **COLLECTION_ DIRECTORY**<br>Collection Directory | | A directory that specifies the number, starting indices and DD Item IDs of the data collections in each transducer within a Transducer Block. | |
| **DCF1**<br>DCF1 | R | B4.13.1 | 0 |
| **DCF2**<br>DCF2 | R | B4.13.2 | 0.0 |
| **DCF3**<br>DCF3 | R | B4.13.3 | 0.0 |
| **DCF4**<br>DCF4 | R | B4.13.4 | 0.0 |
| **DCF5**<br>DCF5 | R | B4.13.5 | 0.0 |
| **DCF6**<br>DCF6 | R | B4.13.6 | 2 |
| **DCF7**<br>DCF7 | R | B4.13.7 | 998.2 |
| **DCF8**<br>DCF8 | R | B4.13.8 | 1.0 |
| **DEVICE_SN**<br>Sensor Serial No. | R | Display of serial number of the flow sensor (B4.3). | current serial number |
| **DIAGNOSIS**<br>Diagnosis | | Detailed diagnosis of the device. | |
| MEMORY_SUMMARY<br>Memory summary | R | Summary of self diagnosis. | - |
| FRAM_DIAG<br>FRAM diagnosis | R | Result of FRAM self diagnosis. | - |
| work_LOAD<br>Work load | R | Work load of the processor. | - |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **DIAGNOSIS_1**<br>Diagnosis 1 | R/W | Select diagnostics measurement which is available at output (C1.5.2). | 255:Disabled |
| | | Setting:<br>255:Disabled / 31:Sensor Average / 32:Sensor Deviation / 14:Drive Level / 9:Tube Frequency / 10:Strain 1 / 11:Strain 2 / 25:2 Phase Signal | |
| **DIAGNOSIS_2**<br>Diagnosis 2 | R/W | Select diagnostics measurement which is available at output (C1.5.3). | 255:Disabled |
| | | Setting:<br>255:Disabled / 31:Sensor Average / 32:Sensor Deviation / 14:Drive Level / 9:Tube Frequency / 10:Strain 1 / 11:Strain 2 / 25:2 Phase Signal | |
| **DRIVE_LEVEL_ VALUE**<br>Drive Level | | The measured drive level value and status of available to the Function Block (B2.11). | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **DRIVE_LEVEL_ RANGE**<br>drive level range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 100.0 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | 0.0 |
| UNIT_IDX<br>Units Index | R | Device Description units code index for the engineering unit descriptor for the associated block value. | % |
| | | Setting:<br>**Drive Level units:**<br>1342:% | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **ELECTRONIC_ INFO**<br>Electronic Revision | | Displays information of the Electronics Revision. Displays the Electronics Revision of the electronics (B5.5). | |
| IDENT_NUMBER<br>Ident. number | R | Identification number | - |
| SOFTWARE_VER<br>Electronic Revision | R | Electronic Revision | - |
| PRODUCTION_ DATE<br>Production date | R | Production date | - |
| **ELECTRONIC_TEMP_ VALUE**<br>Electronic Temperature | | The measured value and status available to the Function Block. | |

| **Parameter**<br>**DD name** | Access | Description and settings | Initial Value |
|---|---|---|---|
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **ELECTRONIC_TEMP_ RANGE**<br>electronic temp. range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 115.0 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | -50.0 |
| UNIT_IDX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value.<br>Setting:<br>**Temperature units:**<br>1001:°C / 1002:°F / 1000:K | °C |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **FIELDBUS_INFO**<br>Foundation Fieldb | | Displays information of the Foundation Fieldbus interface (B5.3). | |
| IDENT_NUMBER<br>Ident. number | R | Identification number | - |
| SOFTWARE_VER<br>Electronic Revision | R | Electronic Revision | - |
| PRODUCTION_ DATE<br>Production date | R | Production date | - |
| **MAX_ALLOWED_ TEMP**<br>Max. Allowed Temp. | R | The maximum allowed temperature for the flow sensor (B4.7). | 300 °C |
| **MAX_REC_TEMP**<br>Max. Rec. Temp. | R | The maximum recorded sensor temperature whilst powered (B4.9). | 0.0 °C |
| **MIN_ALLOWED_ TEMP**<br>Min. Allowed Temp. | R | The minimum allowed temperature for the flow sensor (B4.8). | -40 °C |
| **MIN_REC_TEMP**<br>Min. Rec. Temp. | R | The minimum recorded sensor temperature whilst powered (B4.10). | 0.0 °C |
| **NOM_MASS_ FLOW**<br>Nominal Mass Flow | R | The nominal mass flow of the flow sensor (B4.6). | 3600.0 kg/h |
| **OPERATING_ HOURS**<br>Operating Hours | R | Operating hours since first power up (B2.1). | - |
| **SENSOR_AVERAGE_ VALUE**<br>Sensor Average | | The measured value and status available to the Function Block. | |

| **Parameter**<br>**DD name** | Access | Description and settings | Initial Value |
|---|---|---|---|
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **SENSOR_AVERAGE_ RANGE**<br>Sensor Average Range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 100.0 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | -100.0 |
| UNIT_IDX<br>Units Index | R | Device Description units code index for the engineering unit descriptor for the associated block value. | % |
| | | Setting:<br>**Sensor Average units:**<br>1342:% | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **SENSOR_DEVIATION_ VALUE**<br>Sensor Deviation | | The measured value and status available to the Function Block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **SENSOR_DEVIATION_ RANGE**<br>Sensor Deviation Range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 100.0 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | -100.0 |
| UNIT_IDX<br>Units Index | R | Device Description units code index for the engineering unit descriptor for the associated block value. | % |
| | | Setting:<br>**Sensor Deviation units:**<br>1342:% | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **SENSOR_ID**<br>Sensor ID | R | (B4.2) | - |
| **SENSOR_INFO**<br>Sensor Info | | (B5.2) | |

| **Parameter**<br>**DD name** | Access | Description and settings | Initial Value |
|---|---|---|---|
| IDENT_NUMBER<br>Ident. number | R | Identification number | - |
| SOFTWARE_VER<br>Electronic Revision | R | Electronic Revision | - |
| PRODUCTION_<br>DATE<br>Production date | R | Production date | - |
| **SENSOR_NAME**<br>Sensor Type | R | (B4.1) | - |
| **SENSOR_**<br>**REVISION**<br>Sensor Revision | R | (B4.5) | - |
| **STRAIN_1_VALUE**<br>Strain 1 | | The measured value and status available to the Function Block (B2.8). | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **STRAIN_1_RANGE**<br>strain 1 range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 2200.0 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | 0.0 |
| UNIT_IDX<br>Units Index | R | Device Description units code index for the engineering unit descriptor for the associated block value. | Ohm |
| | | Setting:<br>**Strain units:**<br>1281:Ohm | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **STRAIN_2_VALUE**<br>Strain 2 | | The measured value and status available to the Function Block (B2.9). | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **STRAIN_2_RANGE**<br>strain 2 range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 2200.0 |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | 0.0 |
| UNIT_IDX<br>Units Index | R | Device Description units code index for the engineering unit descriptor for the associated block value. | Ohm |
| | | Setting:<br>**Strain units:**<br>1281:Ohm | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **TRANSDUCER_ DIRECTORY**<br>Transducer Directory Entry | R | A directory that specifies the number and starting indices of the data collections in the transducer block. | 0 |
| **TRANSDUCER_ TYPE**<br>Transducer Type | R | Identifies the transducer that follows. | Diagnosis |
| **TUBE_FREQUENCY_ VALUE**<br>Tube Frequency | | The measured value and status available to the Function Block (B2.10). | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |
| **TUBE_FREQUENCY_ RANGE**<br>tube frequency range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 1000.0 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | 50.0 |
| UNIT_IDX<br>Units Index | R | Device Description units code index for the engineering unit descriptor for the associated block value. | Hz |
| | | Setting:<br>**Frequency units:**<br>1077:Hz | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **TWO_PHASE_ SIGNAL_VALUE**<br>2 Phase Signal | | The measured value and status available to the Function Block (B2.14). | |
| STATUS<br>Status | R | Digital transducers, unlike their analogue versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | - |
| VALUE<br>Value | R | A numerical quantity entered by a user or calculated by the algorithm. | - |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **TWO_PHASE_ SIGNAL_RANGE**<br>2 Phase Signal range | | The high and low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value. | |
| EU_100<br>max value | R | The engineering unit value which represents the upper end of range of the associated Block Parameter. | 1000.0 |
| EU_0<br>min value | R | The engineering unit value which represents the lower end of range of the associated Block Parameter. | -200.0 |
| UNIT_IDX<br>Units Index | R | Device Description units code index for the engineering unit descriptor for the associated block value. | % |
| | | Setting:<br>**2 Phase Signal units:**<br>1342:% | |
| DECIMAL<br>Decimal | R | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 2 |
| **TWO_PH_ THRESHOLD**<br>2 Phase Threshold | R/W | Set the threshold for activation of 2-phase signal status message (C1.5.1). | 0.0 |
| | | Setting:<br>0.0...1000.0 | |
| **UPDATE_EVT**<br>Update Event | | This alert is generated by any change to the static data. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| UPDATE_STATE<br>Update State | R | A discrete enumeration which gives an indication of whether the alert has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Reported / Not Reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. Time stamp records the time when parameter was updated. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| STATIC_REVISION<br>Static Revision | R | The static revision of the block whose static parameter was changed and is being reported. It is possible for the present value of static revision to be greater than this because static can be changed at any time. | 0 |
| | | Setting:<br>0…65535 | |
| RELATIVE_INDEX<br>Relative Index | R | The OD index of the static parameter whose change caused this alert, minus the FB starting index. If the update event was caused by a write to multiple parameters at the same time, then this attribute will be zero. | 0 |
| | | Setting:<br>0…65535 | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **USER_INTERFACE**<br>UI SW Version | | Display of data model version of device (D2.3.4). | |
| IDENT_NUMBER<br>Ident. number | R | Identification number | - |
| SOFTWARE_VER<br>Electronic Revision | R | Electronic Revision | - |
| PRODUCTION_<br>DATE<br>Production date | R | Production date | - |
| **V_NO_**<br>**CONVERTER**<br>V No. Converter | R | Display of V-number of transmitter (B5.4). | - |
| **V_NO_SENSOR**<br>V No. SENSOR | R | Display of the V-number of the flow sensor (B4.4). | - |
| **XD_ERROR**<br>Transducer Error | | One of the transducer error codes defined in the FF Transducer Specifications in section "4.7 Block Alarm Subcodes". | 0: No errors |
| | | Setting:<br>• 0: No errors<br>• 16: Unspecified error<br>• 17: General error<br>• 18: Calibration error<br>• 19: Configuration error<br>• 20: Electronics Failure<br>• 21: Mechanical Failure<br>• 22: I/O Failure<br>• 23: Data Integrity Error<br>• 24: Software Error<br>• 25: Algorithm Error | |

Table 5-6: Description of Diagnostic Transducer Block parameters

### 5.3.6 Integrator Block (IT 1, IT 2)

The following table lists the 2 Integrator Block parameters in alphabetical order.

The Integrator Function Block integrates a variable as a function of the time or accumulates the counts from a Pulse Input block. The block may be used as a totalizer that counts up until reset or as a batch totalizer that has a setpoint, where the integrated or accumulated value is compared to pre-trip and trip settings, generating discrete signals when these settings are reached. The integrated value may go up, starting from zero, or down, starting from the trip value. The block has two flow inputs so that it can calculate and integrate net flow.

The following table contains short parameter descriptions, factory settings (Initial Value (IV)) and possible settings.

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **ALERT_KEY**<br>Alert Key | R/W | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.<br>Setting:<br>0...255 | 0 |
| **BLOCK_ERR**<br>Block Error | R | This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.<br>Setting:<br>• Other: Non-specific error active<br>• Block Configuration: Error detected in block configuration<br>• Simulation Active: Simulation enabled in this block<br>• Local Override: Output tracking of faultstate active<br>• Device Fault State: Device faultstate set<br>• Device Maintenance: Device needs maintenance soon<br>• Sensor Failure: Sensor Failure detected by this block. Process variable has a status of Bad, Sensor Failure<br>• Output Failure: Failure detected in output hardware<br>• Memory Failure: Memory error detected<br>• Lost Static Data: Static parameters cannot be recovered<br>• Lost NV Data: Non-volatile parameters cannot be recovered<br>• Readback Check: Failure detected in READBACK<br>• Maintenance Needed: Device NEEDS maintenance NOW<br>• Power Up: Recovery from power failure<br>• Out Of Service: Block actual mode is out of service | Actual measured value |
| **MODE_BLK**<br>Block Mode | | The actual, target, permitted and normal modes of the block. | |
| TARGET<br>Target | R/W | By setting this parameter to an allowed value (one of the value from permitted modes) user can change the block execution mode. Changing of modes is required to change the access permissions available to various parameters.<br>Setting:<br>Auto / Man / OOS | OOS |
| ACTUAL<br>Actual | R | This is the current mode of the block, which may differ from the target based on operating conditions. Its value is calculated as part of block execution. | Factory Settings |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| PERMITTED<br>Permitted | R/W | This parameter defines allowed modes for this function block and can be set by user. | Auto<br>Man<br>OOS |
| | | Setting:<br>Auto / Man / OOS | |
| NORMAL<br>Normal | R/W | This is the mode which the block should be set to during normal operating conditions. | Auto |
| | | Setting:<br>Auto / Man / OOS | |
| **ST_REV**<br>Static Revision | R | The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. | 0 |
| | | Setting:<br>0...65535 | |
| **STRATEGY**<br>Strategy | R/W | The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. | 0<br>(= Uninitialized) |
| | | Setting:<br>0...65535 | |
| **TAG_DESC**<br>Tag Description | R/W | This is the user description of the block useful for documentation purpose. Not being updated frequently as it is not being accessed by application. | spaces |
| | | Setting:<br>≤32 digits | |
| **BLOCK_ALM**<br>Block Alarm | | The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the "Active" status in the "Status" attribute. As soon as the "Unreported" status is cleared by the alert reporting task, another block alert may be reported without clearing the "Active" status, if the subcode has changed. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear - reported / Clear - not reported / Active - reported / Active - not reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Other / Block Configuration / Link Configuration / Simulation Active / Local Override / Device Fault State / Device Maintenance / Input Failure / Output Failure / Memory Failure / Lost Static Data / Lost NV Data / Readback Check / Maintenance Needed / Power Up / Out Of Service | |
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected. | 0 |
| | | Setting:<br>0...255 | |
| **BLOCK_ERR_ DESC_1**<br>Block Error Description | R | This parameter is used by a device to report more specific details regarding persistent errors that are reported through BLOCK_ERR. | 0 |
| | | Setting:<br>• RB is OOS: RB: MODE_BLK.ACTUAL is OOS<br>• Memory Failure: Memory Failure<br>• No Schedule: No Schedule<br>• ExecTime small: Block Execution Time too small<br>• ExecTime large: Block Execution Time too large<br>• MODE OOS: MODE_BLK.TARGET is set OOS<br>• INTEG_TYPE setting: INTEG_TYPE is uninitialized<br>• CLOCK_PER setting: CLOCK_PER <= period of execution<br>• TIME_UNIT1 setting: TIME_UNIT1 is uninitialized<br>• TIME_UNIT2 setting: TIME_UNIT2 is uninitialized | |
| **BLOCK_WARN_ DESC**<br>Block Warning Description | R | Reason why OUT.status is not GOOD | 0 |
| | | Setting:<br>• MODE_PERM not Auto: MODE_BLK.PERMITTED doesn't include Auto<br>• MODE MAN: MODE_BLK.TARGET is set MAN<br>• MODE.ACTUAL MAN: MODE_BLK.ACTUAL is MAN<br>• IN_x not connected: IN_1 and IN_2 are not connected<br>• IN_1 is Bad: IN_1.status is Bad<br>• IN_2 is Bad: IN_2.status is Bad<br>• IN_1.value: IN_1.value is NaN or INF<br>• IN_2.value: IN_2.value is NaN or INF<br>• PCT_INCL < UNCERT_LIM: PCT_INCL < UNCERT_LIM<br>• PCT_INCL < GOOD_LIM: PCT_INCL < GOOD_LIM<br>• PULSE_VALx setting: PULSE_VAL1 and PULSE_VAL2 are 0<br>• TOTAL_SP setting: TOTAL_SP is 0: cyclic reset<br>• unknown reason: unknown reason | |
| **CLOCK_PER**<br>Clock Period | R/W | Establishes the period for periodic reset, in seconds. | 0.0 |
| | | Setting:<br>Positive or 0 | |
| **GOOD_LIM**<br>Good Limit | R/W | Sets the limit for PCT_INCL. Below this limit OUT receives the status good. | 0.0 |
| | | Setting:<br>0...100% | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **GRANT_DENY**<br>Grant Deny | | Options for controlling access of host computers and local control panels to operating, tuning and alarm parameters of the block. | |
| GRANT<br>Grant | R/W | Depending on the philosophy of the plant, the operator or a higher level device (HLD), or a local operator's panel (LOP) in the case of Local, may turn on an item of the Grant attribute - Program, Tune, Alarm or Local. | Uninitialized |
| | | Setting:<br>Program / Tune / Alarm / Local / Operate / Service / Diagnostic | |
| DENY<br>Deny | R/W | The denied attribute is provided for use by a monitoring application in an interface device and may not be changed by an operator. | Uninitialized |
| | | Setting:<br>Program denied / Tune denied / Alarm denied / Local denied / Operate Denied / Service Denied / Diagnostic Denied | |
| **IN_1**<br>Input 1 | | Input 1 of the Integrator Block. | |
| STATUS<br>Status | R/W | Digital transducers, unlike their analog versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | Bad<br>NotConnected<br>NotLimited |
| VALUE<br>Value | R/W | A numerical quantity received by the block parameter from another block parameter to which this block is linked. Or a default or user entered value if the parameter has not been linked. | 0.0 |
| **IN_2**<br>Input 2 | | Input 2 of the Integrator Block. | |
| STATUS<br>Status | R/W | Digital transducers, unlike their analog versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | Bad<br>NotConnected<br>NotLimited |
| VALUE<br>Value | R/W | A numerical quantity received by the block parameter from another block parameter to which this block is linked. Or a default or user entered value if the parameter has not been linked. | 0.0 |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **INTEG_OPTS**<br>Integration Options | R/W | INTEG_OPTS is to be used to specify several integration options as type of input used in each input, flow direction to be considered in the totalization, status to be considered in the totalization and if the totalization residue shall be used in the next batch after a reset. | Uninitialized |
| | | The following INTEG_OPTS are possible (see also INTEG_TYPE):<br>• Input 1 accumulate: IN_1 is used as pulse (otherwise as rate)<br>• Input 2 accumulate: IN_2 is used as pulse (otherwise as rate)<br>• Flow forward: only positive net flow will be taken into account for totalization<br>• Flow reverse: only negative net flow will be taken into account for totalization<br>• Use Uncertain: IN_1 and IN_2 input will be taken into account even if their states are "Uncertain" (otherwise the value with the last "Good" status will be taken)<br>• Use BAD Input: IN_1 or IN_2 with "Bad" status will be interpreted as "Good" (Note: only the status is interpreted as "Good", the value isn't used for totalization, but the good one, i.e. RTOTAL isn't affected with this setting.<br>• Carry: integration after a reset starts with the init value, but with the residual after the trip value.<br>• Add zero if Bad: if one of the input (IN_1 or IN_2) statuses are "Bad", not the last "Good" value is used for totalization, but zero (0).<br>• Confirm reset: after a manual reset of totalization, the next manual reset must be preceded by a reset confirmation by the control system. | |
| **N_RESET**<br>Number of Reset | R | Counts the number of resets. It can not be written nor reset. | 0 |
| **OP_CMD_INT**<br>Operator Command Integration | R/W | Operator command. "Reset" resets the totalizer. | 0: Off |
| | | Setting:<br>0: Off / 1: Reset | |
| **OUT**<br>Output | | The primary analog value calculated as a result of executing the function. The display scaling for the corresponding output. It has no effect on the block. | |
| STATUS<br>Status | R | Digital transducers, unlike their analog versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | Bad<br>OutOfService<br>NotLimited |
| VALUE<br>Value | R/W | A numerical quantity entered by a user or calculated by the algorithm. | 0.0 |
| **OUT_PTRIP**<br>Output Pre Trip | | The second discrete output. | |
| STATUS<br>Status | R/W | Digital transducers, unlike their analog versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | Bad<br>OutOfService<br>NotLimited |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| VALUE<br>Value | R/W | A numerical quantity entered by a user or calculated by the algorithm. | 0: Off |
| | | Setting:<br>0: Off / 1: On | |
| **OUT_RANGE**<br>Output Range | | This is the display scaling for the output. It has no effect on the block. | |
| EU_100<br>Engineering Unit 100 | R/W | The engineering unit value which represents the upper end of range of the associated block parameter. | 100.0 |
| EU_0<br>Engineering Unit 0 | R/W | The engineering unit value which represents the lower end of range of the associated block parameter. | 0.0 |
| UNITS_INDEX<br>Units Index | R/W | Setting:<br>All units are possible. | 0<br>(= Uninitialized) |
| DECIMAL<br>Decimal | R/W | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 0 |
| **OUT_TRIP**<br>Output Trip | | The first discrete output. | |
| STATUS<br>Status | R/W | Digital transducers, unlike their analog versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | Bad<br>OutOfService<br>NotLimited |
| VALUE<br>Value | R/W | A numerical quantity entered by a user or calculated by the algorithm. | 0: Off |
| | | Setting:<br>0: Off / 1: On | |
| **OUTAGE_LIM**<br>Outage Limit | R/W | The maximum tolerated duration for power failure. | 0.0 |
| | | Setting:<br>Positive or 0 | |
| **PCT_INCL**<br>Percentage Included | R | Indicates the percentage of inputs with good status compared to the ones with bad or uncertain and bad status. | 0.0 |
| **PRE_TRIP**<br>Pre Trip | R/W | Adjusts the amount of mass, volume or energy that should set OUT_PTRIP when the integration reaches (TOTAL_SP - PRE_TRIP) when counting up or PRE_TRIP when counting down. | 0.0 |
| | | Setting:<br>Positive or 0 | |
| **PULSE_VAL1**<br>Pulse Val1 | R/W | Determines the mass, volume or energy per pulse. | 0.0 |
| | | Setting:<br>Positive or 0 | |
| **PULSE_VAL2**<br>Pulse Val2 | R/W | Determines the mass, volume or energy per pulse. | 0.0 |
| | | Setting:<br>Positive or 0 | |
| **RESET_CONFIRM**<br>Reset Confirm | | Momentary discrete value which can be written by a host to enable further resets, if the option confirm reset in INTEG_OPTS is chosen. | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| STATUS<br>Status | R/W | Digital transducers, unlike their analog versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | Bad<br>NotConnected<br>NotLimited |
| VALUE<br>Value | R/W | A numerical quantity received by the block parameter from another block parameter to which this block is linked. Or a default or user entered value if the parameter has not been linked. | 0: Off |
| | | Setting:<br>0: Off / 1: On | |
| **RESET_IN**<br>Reset Input | | Reset the totalizers. | |
| STATUS<br>Status | R/W | Setting:<br>Good Non Cascade / Good Cascade / Uncertain / Bad Not Connected / Bad / Bad No Comm with Last Useable Value (LUV) | Bad<br>NotConnected |
| VALUE<br>Value | R/W | Setting:<br>0: Off / 1: On | 0: Off |
| **REV_FLOW1**<br>Reverse Flow 1 | | Indicates reverse flow when true. | |
| STATUS<br>Status | R/W | Digital transducers, unlike their analog versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | Bad<br>NotConnected<br>NotLimited |
| VALUE<br>Value | R/W | Setting:<br>0: Forward / 1: Reverse | 0: Forward |
| **REV_FLOW2**<br>Reverse Flow 2 | | Indicates reverse flow when true. | |
| STATUS<br>Status | R/W | Digital transducers, unlike their analog versions, can detect faults that make the measurement bad or prevent the actuator from responding. This additional, valuable information will be passed along with each transmission of a data value in the form of a status attribute. | Bad<br>NotConnected<br>NotLimited |
| VALUE<br>Value | R/W | Setting:<br>0: Forward / 1: Reverse | 0: Forward |
| **RTOTAL**<br>Rejected Total | R/W | Indicates the Totalization of BAD or BAD + UNCERTAIN Inputs, according to INTEG_OPTS. | 0.0 |
| **SRTOTAL**<br>Snapshot of Rejected Total | R | The snapshot of RTOTAL, just before a reset. | 0.0 |
| **SSP**<br>Snapshot of Setpoint | R | The snapshot of TOTAL_SP. | 0.0 |
| **STATUS_OPTS**<br>Status Option | R/W | Options which the user may select in the block processing of status. | Uninitialized |
| | | Setting:<br>Uncertain if Man | |
| **STOTAL**<br>Snapshot of Total | R | Indicates the Snapshot of OUT just before a reset. | 0.0 |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **TIME_UNIT1**<br>Time Unit 1 | R/W | Converts the rate time units in seconds. | Uninitialized |
| | | Setting:<br>1: seconds / 2: minutes / 3: hour / 4: days | |
| **TIME_UNIT2**<br>Time Unit 2 | R/W | Converts the rate time units in seconds. | Uninitialized |
| | | Setting:<br>1: seconds / 2: minutes / 3: hour / 4: days | |
| **TOTAL_SP**<br>Total Setpoint | R/W | The SP for a batch totalization. Not just SP because SP has PV units and other special properties not used in this application. | 0.0 |
| | | Setting:<br>Positive or 0 | |
| **UNIT_CONV**<br>Unit Conversion | R/W | Factor to convert the engineering units of input 2 into the engineering units of input 1. | 1.0 |
| | | Setting:<br>Positive and not 0 | |
| **UPDATE_EVT**<br>Update Event | | This alert is generated by any change to the static data. | |
| UNACKNOWLEDGED<br>Unacknowledged | R | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| UPDATE_STATE<br>Update State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. Time stamp records the time when parameter was updated. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| STATIC_REVISION<br>Static Revision | R | The static revision of the block whose static parameter was changed and is being reported. It is possible for the present value of static revision to be greater than this because static can be changed at any time. | 0 |
| RELATIVE_INDEX<br>Relative Index | R | The OD index of the static parameter whose change caused this alert, minus the FB starting index. If the update event was caused by a write to multiple parameters at the same time, then this attribute will be zero. | 0 |

Table 5-7: Description of Integrator Block parameters

## 5.3.7 Proportional Integral Derivative Block (PID)

The following table lists the Proportional Integral Derivative Block Block parameters in alphabetical order with short parameter descriptions, factory settings (Initial Value (IV)) and possible settings.

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **ALERT_KEY**<br>Alert Key | R/W | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. | 1 |
| | | Setting:<br>1...255 | |
| **BLOCK_ERR**<br>Block Error | R | This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. | Current Block Error |
| | | Setting:<br>• Other: Non-specific error active<br>• Block Configuration: Error detected in block configuration<br>• Simulation Active: Simulation enabled in this block<br>• Local Override: Output tracking of faultstate active<br>• Device Fault State: Device faultstate set<br>• Device Maintenance: Device needs maintenance soon<br>• Sensor Failure: Sensor Failure detected by this block. Process variable has a status of Bad, Sensor Failure<br>• Output Failure: Failure detected in output hardware<br>• Memory Failure: Memory error detected<br>• Lost Static Data: Static parameters cannot be recovered<br>• Lost NV Data: Non-volatile parameters cannot be recovered<br>• Readback Check: Failure detected in READBACK<br>• Maintenance Needed: Device NEEDS maintenance NOW<br>• Power Up: Recovery from power failure<br>• Out Of Service: Block actual mode is out of service | |
| **MODE_BLK**<br>Block Mode | | The actual, target, permitted and normal modes of the block. | |
| TARGET<br>Target | R/W | This is the mode requested by the operator. Only one mode from those allowed by the permitted mode parameter may be requested. | OOS |
| | | Setting:<br>ROut / RCas / Cas / Auto / Man / OOS | |
| ACTUAL<br>Actual | R | This is the current mode of the block, which may differ from the target based on operating conditions. Its value is calculated as part of block execution. | OOS |
| | | Setting:<br>ROut / RCas / Cas / Auto / Man / OOS | |
| PERMITTED<br>Permitted | R/W | Defines the modes which are allowed for an instance of the block. The permitted mode is configured based on application requirement. | ROut<br>RCas<br>Cas<br>Auto<br>Man<br>OOS |
| | | Setting:<br>ROut / RCas / Cas / Auto / Man / OOS | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| NORMAL<br>Normal | R/W | This is the mode the block should be set to during normal operating conditions. | Auto |
| | | Setting:<br>Auto | |
| **ST_REV**<br>Static Revision | R | The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. | 0 |
| | | Setting:<br>0...65535 | |
| **STRATEGY**<br>Strategy | R/W | This parameter can be used to create groups of blocks by control system. This data is not checked or processed by the block. | 0 (= Uninitialized) |
| | | Setting:<br>0...65535 | |
| **TAG_DESC**<br>Tag Description | R/W | The user description of the intended application of the block. | spaces |
| | | Setting:<br>≤32 digits | |
| **ACK_OPTION**<br>Acknowledge Option | R/W | Selection of whether alarms associated with the function block will be automatically acknowledged. | Uninitialized |
| | | Setting:<br>• HiHi Alm Auto Ack: HiHi alarm auto acknowledged enabled<br>• Hi Alm Auto Ack: Hi alarm auto acknowledged enabled<br>• LoLo Alm Auto Ack: LoLo alarm auto acknowledged enabled<br>• Lo Alm Auto Ack: Lo alarm auto acknowledged enabled<br>• DevHi Alm Auto Ack: Deviation high alarm auto acknowledged enabled<br>• DevLo Alm Auto Ack: Deviation low alarm auto acknowledged enabled<br>• Blk Alm Auto Ack: Block alarm auto acknowledged enabled<br>• Fail Alm Auto Ack: Fail alarm auto acknowledged enabled<br>• Off Spec Alm Auto Ack: Off spec alarm auto acknowledged enabled<br>• Maint Alm Auto Ack: Maintenance alarm auto acknowledged enabled<br>• Check Alm Auto Ack: Check alarm auto acknowledged enabled | |
| **ALARM_HYS**<br>Alarm Hysteresis | R/W | Amount the PV must return within the alarm limits before the alarm condition clears. Alarm hysteresis expressed as a percent of the span of the PV. | 0.5 |
| | | Setting:<br>0.0...50.0% | |
| **ALARM_SUM**<br>Alarm Summary | | The current alert status, unacknowledged states, unreported states and disabled states of the alarms associated with the function block. | |
| CURRENT<br>Current | R | Setting:<br>HiHi Alm Active / Hi Alm Active / LoLo Alm Active / Lo Alm Active / DevHi Alarm Active / DevLo Alm Active / Block Alm Active | Uninitialized |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| UNACKNOWLEDGED<br>Unacknowledged | R | Setting:<br>HiHi Alm Unack / Hi Alm Unack / LoLo Alm Unack / Lo Alm Unack / DevHi Alarm Unack / DevLo Alm Unack / Block Alm Unack | Uninitialized |
| UNREPORTED<br>Unreported | R | Setting:<br>HiHi Alm Unrep / Hi Alm Unrep / LoLo Alm Unrep / Lo Alm Unrep / DevHi Alarm Unrep / DevLo Alm Unrep / Block Alm Unrep | Uninitialized |
| DISABLED<br>Disabled | R | Setting:<br>HiHi Alm Disabled / Hi Alm Disabled / LoLo Alm Disabled / Lo Alm Disabled / DevHi Alarm Disabled / DevLo Alm Disabled / Block Alm Disabled | Uninitialized |
| **BAL_TIME**<br>Balance Time | R/W | This specifies the time for the internal working value of bias or ratio to return to the operator set bias or ratio, in seconds. In the PID block, it may be used to specify the time constant at which the integral term will move to obtain balance when the output is limited and the mode is Auto, Cas or RCas.<br>Setting:<br>0.0 s | 0 |
| **BKCAL_HYS**<br>Back Calculation Hysteresis | R/W | Limits the minimum output value for modes other than "Manual". The limit status is turned off, expressed as a percent of the span of the output.<br>Setting:<br>0.0...50.0% | 0.5 |
| **BKCAL_IN**<br>Back Calculation Input | | The value and status used for backwards tracking of the output, provided by a link to the back calculation output parameter of a downstream block. | |
| STATUS<br>Status | R/W | Status of BKCAL_IN | Bad<br>NonConnected<br>NotLimited |
| VALUE<br>Value | R/W | Value of BKCAL_IN | - |
| **BKCAL_OUT**<br>Back Calculation Output | | The output value and status provided to an upstream block for output tracking when the loop is broken or limited, as determined by the status bits. This information is used to provide bumpless transfer to closed loop control and to prevent windup under limited conditions when that becomes possible. | |
| STATUS<br>Status | R | Status of BKCAL_OUT | Bad<br>NonSpecific<br>Notlimited |
| VALUE<br>Value | R | Value of BKCAL_OUT | - |
| **BLOCK_ALM**<br>Block Alarm | | The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the "Active" status in the "Status" attribute. As soon as the "Unreported" status is cleared by the alert reporting task, another block alert may be reported without clearing the "Active" status, if the subcode has changed. | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear-Reported / Clear-Not Reported / Active-Reported / Active-Not Reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>• Other: Non-specific error active<br>• Block Configuration: Error detected in block configuration<br>• Link Configuration: Error detected in link configuration<br>• Simulation Active: Simulation enabled in this block<br>• Local Override: Output tracking or faultstate active<br>• Device Fault State: DeviceFaultState<br>• Device Maintenance: Device needs maintenance soon<br>• Sensor Failure: Sensor Failure detected by this block. Process variable has a status of Bad, Sensor Failure<br>• Output Failure: Failure detected in output hardware<br>• Memory Failure: Memory error detected<br>• Lost Static Data: Static parameters cannot be recovered<br>• Lost NV Data: Non-Volatile parameters cannot be recovered<br>• Readback Check: Failure detected in READBACK<br>• Maintenance Needed: Device NEEDS maintenance NOW<br>• PowerUp: Recovery from power failure<br>• Out Of Service: Block actual mode is Out of Service | |
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected. | 0 |
| | | Setting:<br>0...255 | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **BLOCK_ERR_ DESC_1**<br>Block Error Description | R | This parameter is used by a device to report more specific details regarding persistent errors that are reported through BLOCK_ERR. | 0 |
| | | Setting:<br>• RB is OOS: RB: MODE_BLK.ACTUAL is OOS<br>• Memory Failure: Memory Failure<br>• No Schedule: No Schedule<br>• ExecTime small: Block Execution Time too small<br>• ExecTime large: Block Execution Time too large<br>• MODE OOS: MODE_BLK.TARGET is set OOS<br>• BYPASS Setting: BYPASS is uninitialized<br>• SHED_OPT Setting: SHED_OPT is uninitialized<br>• PV_SCALE Setting: PV_SCALE: EU_100 <= EU_0<br>• OUT_SCALE Setting: OUT_SCALE: EU_100 <= EU_0<br>• TRK_SCALE Setting: TRK_SCALE: EU_100 <= EU_0<br>• FF_SCALE Setting: FF_SCALE: EU_100 <= EU_0<br>• SP_LIM Setting: SP_HI_LIM < SP_LO_LIM<br>• OUT_LIM Setting: OUT_HI_LIM < OUT_LO_LIM | |
| **BLOCK_WARN_ DESC**<br>Block Warning Description | R | Reason why OUT.status is not GOOD | 0 |
| | | Setting:<br>• MODE_PERM restricted: MODE_BLK.PERMITTED doesn't include CAS, RCAS, etc.<br>• MODE MAN: MODE_BLK.TARGET is set MAN<br>• MODE.ACTUAL MAN: MODE_BLK.ACTUAL is MAN<br>• xCAS_IN not connected: CAS_IN or RCAS_IN are not connected<br>• CAS_IN is Bad: CAS_IN.status is Bad<br>• RCAS_IN is Bad: RCAS_IN.status is Bad<br>• CAS_IN.value: CAS_IN.value is NaN or INF<br>• RCAS_IN.value: RCAS_IN.value is NaN or INF<br>• unknown reason: unknown reason | |
| **BYPASS**<br>Bypass | R/W | The normal control algorithm may be bypassed through this parameter. When bypass is set, the setpoint value (in percent) will be directly transferred to the output. To prevent a bump on transfer to/from bypass, the setpoint will automatically be initialized to the output value or process variable, respectively, and the path broken flag will be set for one execution. | Uninitialized |
| | | Setting:<br>• ON: normal control algorithm bypassed, output based on setpoint<br>• OFF: normal control | |
| **CAS_IN**<br>Cascade Input | | This parameter is the remote setpoint value, which must come from another Fieldbus block or a DCS block through a defined link. | |
| STATUS<br>Status | R/W | Status of CAS_IN | Bad<br>NotConnected<br>NotLimited |
| VALUE<br>Value | R/W | Value of CAS_IN | - |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **CONTROL_OPTS**<br>Control Options | R/W | Options which the user may select to alter the calculations done in a control block. | Uninitialized |
| | | Setting:<br>• Bypass Enable: This parameter, if true, allows BYPASS to be set. Some control algorithms cannot provide closed loop control if bypassed.<br>• SP-PV Track Man: Permits the setpoint to track the process variable when the block mode is "Man".<br>• SP-PV Track ROut: Permits the setpoint to track the process variable when the block mode is "ROut".<br>• SP-PV Track LO-IMan: Permits the setpoint to track the process variable when the block mode is "LO or IMan".<br>• SP Track retain: Permits the setpoint to track the RCas or Cas parameter based on the retained target mode when the actual mode of the block is "Man, LO, Man, or Rout".<br>• Direct acting: Defines the relationship between changes in PV and changes to output - when direct is selected, an increase in PV results in an increase in the output.<br>• Track enable: This enables the external tracking function – when TRK_ENA is 1, the preset value in TRK_VAL is output if TRK_IN_D becomes true.<br>• Track in manual: This is used only if TRK_ENA is YES (1) - when the block mode is Man, TRK_IN_D will be acted on only if the TRK_OVMAN control option is set.<br>• PV for BKCal_Out: The BKCAL_OUT value may be selected as the working SP or the PV - normally, BKCAL_OUT is the working SP.<br>• Restrict SP to limits in Cas and RCas: If this option is selected, the setpoint will be restricted to the setpoint absolute and rate limits in Cas and Rcas modes.<br>• No output limits in Man: Do not apply OUT_HI_LIM or OUT_LO_LIM when target and actual modes are "Man". | |
| **DV_HI_ALM**<br>Deviation High Alarm | | The status and time stamp associated with the high deviation alarm. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear-Reported / Clear-Not Reported / Active-Reported / Active-Not Reported | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Settings see above parameter "BLOCK_ALM", subelement "Subcode". | |
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected. | 0 |
| | | Setting:<br>0...255 | |
| **DV_HI_LIM**<br>Deviation High Limit | R/W | The setting of the high deviation alarm limit in engineering units. | +INF |
| **DV_HI_PRI**<br>Deviation High Priority | R/W | Priority of the high deviation alarm. | 0 |
| | | Setting:<br>0...15 | |
| **DV_LO_ALM**<br>Deviation Low Alarm | | The status and time stamp associated with the low deviation alarm. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear-Reported / Clear-Not Reported / Active-Reported / Active-Not Reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Settings see above parameter "BLOCK_ALM", subelement "Subcode". | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected. | 0 |
| | | Setting:<br>0...255 | |
| **DV_LO_LIM**<br>Deviation Low Limit | R/W | The setting of the low deviation alarm limit in engineering units. | -INF |
| **DV_LO_PRI**<br>Deviation Low Priority | R/W | Priority of the low deviation alarm. | 0 |
| | | Setting:<br>0...15 | |
| **FF_GAIN**<br>Feed Forward Gain | R/W | The gain that the feed forward input is multiplied by before it is added to the calculated control output. | 0 |
| **FF_SCALE**<br>Feed Forward Scale | | The feed forward input high and low scale values, engineering units code and number of digits to the right of the decimal point. | |
| EU_100<br>EU at 100% | R/W | The engineering unit value which represents the upper end of range of the associated block parameter. | 100.0 |
| EU_0<br>EU at 0% | R/W | The engineering unit value which represents the lower end of range of the associated block parameter. | 0.0 |
| UNITS_INDEX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | Uninitialized |
| | | Setting:<br>All units are possible. | |
| **FF_VAL**<br>Feed Forward Value | | The feed forward value and status. | |
| STATUS<br>Status | R | Status of FF_VAL | Bad<br>NotConnected<br>NotLimited |
| VALUE<br>Value | R | Value of FF_VAL | - |
| **GAIN**<br>Gain | R/W | Dimensionless value used by the block algorithm in calculating the block output. | 0 |
| **GRANT_DENY**<br>Grant Deny | | Options for controlling access of host computers and local control panels to operating, tuning and alarm parameters of the block. | |
| GRANT<br>Grant | R/W | Depending on the philosophy of the plant, the operator or a higher level device (HLD), or a local operator's panel (LOP) in the case of Local, may turn on an item of the Grant attribute - Program, Tuning, Alarm or Local. | Uninitialized |
| | | Setting:<br>Program / Tune / Alarm / Local / Operate / Service / Diagnostic | |
| DENY<br>Deny | R/W | The "Denied" attribute is provided for use by a monitoring application in an interface device and may not be changed by an operator. | Uninitialized |
| | | Setting:<br>Program Denied / Tune Denied / Alarm Denied / Local Denied / Operate Denied / Service Denied / Diagnostic Denied | |
| **HI_ALM**<br>High Alarm | | The status for High Alarm and its associated time stamp. | |

| **Parameter**<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear-Reported / Clear-Not Reported / Active-Reported / Active-Not Reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Settings see above parameter "BLOCK_ALM", subelement "Subcode". | |
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected. | 0 |
| **HI_HI_ALM**<br>High High Alarm | | The status for High High Alarm and its associated time stamp. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear-Reported / Clear-Not Reported / Active-Reported / Active-Not Reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Settings see above parameter "BLOCK_ALM", subelement "Subcode". | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected. | 0 |
| **HI_HI_LIM**<br>High High Limit | R/W | The setting for High High Alarm in engineering units. | +INF |
| **HI_HI_PRI**<br>High High Priority | R/W | Priority of the High High Alarm. | 0 |
| | | Setting:<br>0...15 | |
| **HI_LIM**<br>High Limit | R/W | The High Limit imposed on the PV compensation term. | +INF |
| **HI_PRI**<br>High Priority | R/W | Priority of the High Alarm. | 0 |
| | | Setting:<br>0...15 | |
| **IN**<br>Input | | Primary input value of the block, required for blocks that filter the input to get the PV. | |
| STATUS<br>Status | R/W | Status of IN | Bad<br>NotConnected<br>NotLimited |
| VALUE<br>Value | R/W | Value of IN | 0.0 |
| **LO_ALM**<br>Low Alarm | | The status for Low Alarm and its associated time stamp. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear-Reported / Clear-Not Reported / Active-Reported / Active-Not Reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Settings see above parameter "BLOCK_ALM", subelement "Subcode". | |
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected. | 0 |
| **LO_LIM**<br>Low Limit | R/W | The setting for Low Alarm in engineering units. | -INF |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **LO_LO_ALM**<br>Low Low Alarm | | The status of the Low Low Alarm and its associated time stamp. | |
| UNACKNOWLEDGED<br>Unacknowledged | R/W | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| ALARM_STATE<br>Alarm State | R | A discrete enumeration which gives an indication of whether the alert is active and whether it has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Clear-Reported / Clear-Not Reported / Active-Reported / Active-Not Reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| SUB_CODE<br>Subcode | R | An enumeration specifying the cause of the alert to be reported. | Other |
| | | Setting:<br>Settings see above parameter "BLOCK_ALM", subelement "Subcode". | |
| VALUE<br>Value | R | The value of the associated parameter at the time the alert was detected. | 0 |
| **LO_LO_LIM**<br>Low Low Limit | R/W | The setting for Low Low Alarm in engineering units. | -INF |
| **LO_LO_PRI**<br>Low Low Priority | R/W | Priority of the Low Low Alarm. | 0 |
| | | Setting:<br>0...15 | |
| **LO_PRI**<br>Low Priority | R/W | Priority of the Low Alarm. | 1 |
| | | Setting:<br>Max. 15 | |
| **OUT**<br>Output | | The primary analog value calculated as a result of executing the function block. | |
| STATUS<br>Status | R/W | Status of OUT | Bad<br>OutOfService<br>NotLimited |
| VALUE<br>Value | R/W | Value of OUT | 0.0 |
| **OUT_HI_LIM**<br>Output High Limit | R/W | Limits the maximum output value for modes other than "Manual". | 100.0 |
| **OUT_LO_LIM**<br>Output Low Limit | R/W | Limits the minimum output value for modes other than "Manual". | 0.0 |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **OUT_SCALE**<br>Output Scale | | The high and low scale values, engineering units code and number of digits to the right of the decimal point to be used in displaying the OUT parameter and parameters which have the same scaling as OUT. | |
| EU_100<br>EU at 100% | R/W | The engineering unit value which represents the upper end of range of the associated block parameter. | 100.0 |
| EU_0<br>EU at 0% | R/W | The engineering unit value which represents the lower end of range of the associated block parameter. | 0.0 |
| UNITS_INDEX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | Uninitialized |
| | | Setting:<br>All units are possible. | |
| DECIMAL<br>Decimal | R/W | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 0 |
| **PV**<br>**Process Value** | | This alert is generated by any change to the static data. | |
| STATUS<br>Status | R | Status of PV | Bad<br>OutOfService<br>NotLimited |
| VALUE<br>Value | R | Value of PV | 0.0 |
| **PV_FTIME**<br>Process Value Filter Time | R/W | Time constant of a single exponential filter for the PV, in seconds. | 0.0 |
| | | Setting:<br>0.0…60.0 | |
| **PV_SCALE**<br>Process Value Scale | | The high and low scale values, engineering units code and number of digits to the right of the decimal point to be used in displaying the PV parameter and parameters which have the same scaling as PV. | |
| EU_100<br>EU at 100% | R/W | The engineering unit value which represents the upper end of range of the associated block parameter. | 100.0 |
| EU_0<br>EU at 0% | R/W | The engineering unit value which represents the lower end of range of the associated block parameter. | 0.0 |
| UNITS_INDEX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | Uninitialized |
| | | Setting:<br>All units are possible. | |
| DECIMAL<br>Decimal | R/W | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 0 |
| **RATE**<br>Rate | R/W | Defines the derivative time constant, in seconds. | 0 |
| **RCAS_IN**<br>Remote Cascade Input | | Target setpoint and status provided by a supervisory host to a analog control or output block. | |
| STATUS<br>Status | R | Status of RCAS_IN | Bad<br>OutOfService<br>NotLimited |
| VALUE<br>Value | R | Value of RCAS_IN | 0.0 |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| **RCAS_OUT**<br>Remote Cascade Output | | Block setpoint and status after ramping - provided to a supervisory host for back calculation and to allow action to be taken under limiting conditions or mode change. | |
| STATUS<br>Status | R | Status of RCAS_OUT | Bad<br>OutOfService<br>NotLimited |
| VALUE<br>Value | R | Value of RCAS_OUT | 0.0 |
| **RESET**<br>Reset | R/W | The integral time constant, in seconds per repeat. | +INF |
| **ROUT_IN**<br>Remote Out Input | | Target output and status provided by a host to the control block for use as the output (ROut mode). | |
| STATUS<br>Status | R | Status of ROUT_IN | Bad<br>OutOfService<br>NotLimited |
| VALUE<br>Value | R | Value of ROUT_IN | 0.0 |
| **ROUT_OUT**<br>Remote Out Output | | Block output and status - provided to a host for back calculation in ROut mode and to allow action to be taken under limited conditions or mode change. | |
| STATUS<br>Status | R | Status of ROUT_OUT | Bad<br>OutOfService<br>NotLimited |
| VALUE<br>Value | R | Value of ROUT_OUT | 0.0 |
| **SHED_OPT**<br>Shed Options | R/W | Defines action to be taken on remote control device timeout.<br>Setting:<br>• Uninitialized<br>• NormalShed_NormalReturn: Actual mode changes to next lowest priority non-remote mode permitted, but returns to target remote mode after communications are re-established<br>• NormalShed_NoReturn: Target mode changes to next lowest priority non-remote mode permitted<br>• ShedToAuto_NormalReturn: Actual mode changes to "Auto", but returns to target remote mode after communications are re-established<br>• ShedToAuto_NoReturn: Target mode changes to "Auto"<br>• ShedToManual_NormalReturn: Actual mode changes to "Manual", but returns to target remote mode after communications are re-established<br>• NormalShed_NoReturn: Target mode changes to next lowest priority non-remote mode permitted<br>• ShedToRetainedTarget_NormalReturn: Shed to previous target mode and return target remote mode after communications are re-established<br>• ShedToRetainedTarget_NoReturn: Target mode changes to target retained mode | Uninitialized |
| **SP**<br>Setpoint | | Setpoint | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| STATUS<br>Status | R | Status of SP | |
| VALUE<br>Value | R | Value of SP | 0.0 |
| **SP_HI_LIM**<br>Setpoint High Limit | R/W | The setpoint high limit is the highest setpoint operator entry that can be used for the block. | 100.0 |
| **SP_LO_LIM**<br>Setpoint Low Limit | R/W | The setpoint low limit is the highest setpoint operator entry that can be used for the block. | 0.0 |
| **SP_RATE_DN**<br>Setpoint Rate Down | R/W | Ramp rate at which downward setpoint changes are acted on in "Auto" mode, in PV units per second. If the ramp rate is set to zero or the block is in a mode other than "Auto", then the setpoint will be used immediately.<br>Setting:<br>0.0...+INF | +INF |
| **SP_RATE_UP**<br>Setpoint Rate Up | R/W | Ramp rate at which upward setpoint changes are acted on in "Auto" mode, in PV units per second. If the ramp rate is set to zero or the block is in a mode other than "Auto", then the setpoint will be used immediately.<br>Setting:<br>0.0...+INF | +INF |
| **STATUS_OPTS**<br>Status Options | R/W | Options which the user may select in the block processing of status.<br>Setting:<br>• IFS if Bad IN: Set Initiate Fault State status in OUT if the status of IN is "Bad".<br>• IFS if Bad CAS_IN: Set Initiate Fault State status in OUT if the status of CAS_IN is "Bad".<br>• Use Uncertain as Good: If the status of IN is "Uncertain", treat it as "Good" otherwise treat it as "Bad".<br>• Target to Man if Bad IN: Set the target mode to "Man" if the status of the IN parameter is "Bad". This latches a PID block into the "Man" state of the input ever goes "Bad".<br>• Target to next permitted mode if BAD CAS_IN<br>• Target to Man if BAD TRK_IN_D: Set the target to Man if the current target mode is not Out-of-Service and Man mode is permitted. This latches a control block into Man if the status goes bad.<br>• IFS if BAD TRK_IN_D: Set Initiate Fault State Status in the OUT parameter if the status of the TRK_IN_D parameter is BAD. | Uninitialized |
| **TRK_IN_D**<br>Tracking Input Discrete | | This discrete input is used to initiate external tracking of the block output to the value specified by TRL_VAL. | |
| STATUS<br>Status | R/W | Status of TRK_IN_D | Bad<br>NotConnected<br>NotLimited |
| VALUE<br>Value | R/W | Value of TRK_IN_D | Off |
| **TRK_SCALE**<br>Tracking Scale | | The high and low scale values, engineering units code and number of digits to the right of the decimal point associated with TRK_VAL. | |

| Parameter<br>DD name | Access | Description and settings | Initial Value |
|---|---|---|---|
| EU_100<br>EU at 100% | R/W | The engineering unit value which represents the upper end of range of the associated block parameter. | 100.0 |
| EU_0<br>EU at 0% | R/W | The engineering unit value which represents the lower end of range of the associated block parameter. | 0.0 |
| UNITS_INDEX<br>Units Index | R/W | Device Description units code index for the engineering unit descriptor for the associated block value. | Uninitialized |
| | | Setting:<br>All units are possible. | |
| DECIMAL<br>Decimal | R/W | The number of digits to the right of the decimal point which should be used by an interface device in displaying the specified parameter. | 0 |
| **TRK_VALUE**<br>Tracking Value | | This input is used as the track value when external tracking is enabled by TRK_IN_D. | |
| STATUS<br>Status | R/W | Status of TRK_VAL | Bad<br>NotConnected<br>NotLimited |
| VALUE<br>Value | R/W | Value of TRK_VAL | 0.0 |
| **UPDATE_EVT**<br>Update Event | | This alert is generated by any change to the static data. | |
| UNACKNOWLEDGED<br>Unacknowledged | R | A discrete enumeration which is set to "Unacknowledged" when an alarm occurs, and set to "Acknowledged" by a write from a human interface device or other entity which can acknowledge that the alarm/event has been noticed. | Uninitialized |
| | | Setting:<br>Uninitialized / Acknowledged / Unacknowledged | |
| UPDATE_STATE<br>Update State | R | A discrete enumeration which gives an indication of whether the alert has been reported. | Uninitialized |
| | | Setting:<br>Uninitialized / Reported / Not Reported | |
| TIME_STAMP<br>Time Stamp | R | The time when evaluation of the block was started and a change in alarm/event state was detected that is unreported. The time stamp value will be maintained constant until alert confirmation has been received - even if another change of state occurs. | Uninitialized |
| | | Setting:<br>MM / DD / YY (Month / Day / Year)<br>HH:MM:SS (Hour:Minute:Second) | |
| STATIC_REVISION<br>Static Revision | R | The static revision of the block whose static parameter was changed and is being reported. It is possible for the present value of static revision to be greater than this because static can be changed at any time. | 0 |
| RELATIVE_INDEX<br>Relative Index | R | The OD index of the static parameter whose change caused this alert, minus the FB starting index. If the update event was caused by a write to multiple parameters at the same time, then this attribute will be zero. | 0 |

Table 5-8: Description of Proportional Integral Derivative Block Block parameters

## 5.4 Diagnostic features

### 5.4.1 Field diagnostic concept

For the purpose of general device diagnosis the device implements four field diagnostic (FD) alarms as defined by FF specification FF-891 FS 1.10 (5.5.8). The definitions made in FF-891 are compliant with NAMUR recommendation NE 107:

| Alarm category | Symbol | Status signal | Description |
|---|---|---|---|
| FAIL |  | Failure | The device is malfunctioning. |
| OFFSPEC |  | Out of specification | The device is being operated out of the valid conditions specified for the device. |
| MAINT |  | Maintenance required | The device is yet working properly but requires maintenance soon. |
| CHECK |  | Function check | One or more output signals are invalid due to on-going work on the device. |

**Table 5-9: Decription of alarm categories**

The specified alarms and the FD_... parameters associated with them are part of the FF Resource Block implementation. Their general context is illustrated in the figure at the end of this section. All atomic/single events that can be reported by the device are organized in M (1≤M≤32) virtual event groups. Whenever a single event is detected the corresponding bit in the respective 32-bit bitstring parameter FD_EXTENDED_ACTIVE_<n> is set.

Depending on the appropriate bit setting in the associated 32-bit bitstring parameter FD_EXTENDED_MAP_<n> the detected event contributes to its group‘s status (if bit set to 1) or not (if bit set to 0). If the event is configured to be forwarded a so called 'condition' (= group event) is triggered. Conditions can be mapped to one of the above mentioned four NAMUR categories via the four 32-bit bitstring FD_...._MAP parameters with one parameter reserved for each category. All of these FD_..._MAP parameters have the same bit definition whereby each condition is represented by exactly one bit. A set bit implies the corresponding condition to be mapped to the alarm category associated with the mapping parameter. Due to this mapping mechanism it is generally possible to map any condition to several alarm categories.

Alarm indication is realised by the four 32-bit bitstring FD_..._ACTIVE parameters which comprise the same bitstring definition as the FD_...MAP parameters. If a condition is active and it is mapped to an alarm category the corresponding bit of the respective FD_..._ACTIVE parameter is set. To enable alert broadcasting for an alarm category two more requirements must be fulfilled:

1. The condition bits for the conditions to be broadcasted have to be cleared(!) in the FD_..._MASK associated with the alarm if this is not yet the case. By default all conditions in all FD_..._MASKs are cleared.

2. The alarm priority (FD_..._PRI) must be set. The default value is 0.

Reports on broadcasted alarms are available via the structured FD_..._ALM parameters. In this context the VALUE subparameter displays the ID of the event group/condition which triggered the respective alarm.

An FD feature not considered in the following figure is the display of recommended actions via the 16-bit enumerated parameter FD_RECOMMEN_ACT. For each single event that can be reported by the device one recommended action to solve the related problem is defined. Due to the definition of FD_RECOMMEN_ACT only one action string can be displayed at a time. Thus only the recommended action for the mapped single event of highest actual priority is displayed. The event of highest actual priority is determined as the one which fulfills the following conditions[1]:

- The event is mapped to the alarm category of highest priority currently active.
- The condition/group bit triggered by the event is the highest of all conditions being indicated as active in the respective FD_..._ACTIVE bit string.
- The event bit in the corresponding FD_EXTENDED_ACTIVE_<n> bitstring is the highest one active and mapped in its event group.

***NOTICE!***
*The alarm priority order for alarm categories is FAIL (Highest), OFFSPEC, MAINT, CHECK (Lowest).*

[1]: Exception: If the FF simulation is enabled (via jumper or SW_SIMULATE parameter) the respective event is handled with highest priority and the corresponding action string is being displayed at the FD_RECOMMEN_ACT parameter.

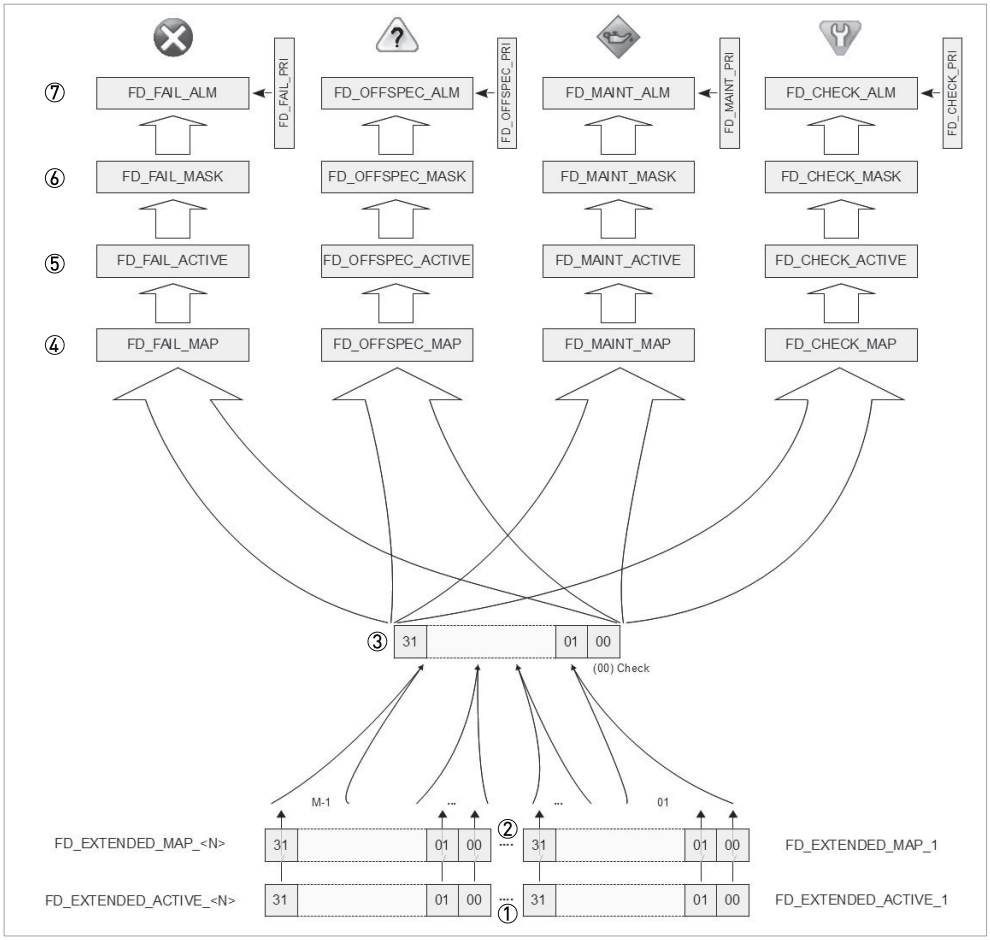



Figure 5-2: Field diagnostic concept

① Single Event Indication
② Single Event Enable
③ Conditions
④ Alarm Mapping
⑤ Alarm Indication
⑥ Alarm Broadcast Disable
⑦ Alarm Broadcast Report

## 5.4.2 Field diagnostic menu

If a DTM or a host system supporting EDDL menus is used for device maintenance the field diagnostic can be accessed by a dedicated menu. For further information refer to *Diagnostics root menu* on page 106.

### 5.4.3 Field diagnostic default mapping

The following table illustrates the FD default mapping for the device. It is recommended not to change these settings unless changes are demanded by the application.

| Single event | | | Group/Condition | | Alarm category | |
|---|---|---|---|---|---|---|
| MAP/ ACTIVE Parameter | Name | Mapped | ID | Name | FD_xxx_MAP | Categ. |
| - | Transducer Block is OOS | √ | 00 | Check | - | - |
| FD_EXTENDED_ACTIVE_1<br>FD_EXTENDED_MAP_1 | Optical Interf. Active | √ | 02 | Electr: Operation Info. | | |
| | Disp. 2 Overrange | √ | | | | |
| | Disp. 1 Overrange | √ | | | | |
| | RB is set to OOS | - | | | | |
| | Fieldbus No Connection | - | | | | |
| | Status Out B Active | √ | | | | |
| | Status Out A Active | √ | | | | |
| | Control In B Active | √ | | | | |
| | Control In A Active | √ | | | | |
| | Zero Calibr. Running | √ | | | | |
| | Disp. 2 no measure values | √ | 03 | Config: No Meas. Value | | |
| | Disp. 1 no measure values | √ | | | | |
| | IO D No Meas. Values | √ | | | | |
| | IO B No Value for Current Output | √ | | | | |
| | IO A No Value for Current Output | √ | | | | |
| | System Control Active | √ | 05 | Proc: System Control | | |

| Single event | | | Group/Condition | | Alarm category | |
|---|---|---|---|---|---|---|
| MAP/ ACTIVE Parameter | Name | Mapped | ID | Name | FD_xxx_MAP | Categ. |
| FD_EXTENDED_ACTIVE_2 FD_EXTENDED_MAP_2 | IO B Sim. Limit Sw./Current Out | √ | 08 | C Configuration | FD_CHECK_MAP |  |
| | IO A Sim. Limit Sw./Current Out | √ | | | | |
| | Fieldbus Sim. Active | √ | | | | |
| | Sensor Starting up | √ | | | | |
| | Sensor Simulation Active | √ | | | | |
| | Sensor in Standby Mode | √ | | | | |
| | Sensor in Stop Mode | √ | | | | |
| | Backup 2 Data Faulty | √ | 12 | M Configuration | FD_MAINT_MAP |  |
| | Backup 1 Data Faulty | √ | | | | |
| | Backplane Difference | √ | 13 | M Electronics | | |
| | Factory Data Faulty | √ | | | | |
| | Backplane Data Faulty | √ | | | | |
| | Sensor Signal Low | √ | 17 | Proc: Signal Low | FD_OFFSPEC_MAP |  |
| | 2 Phase Flow Detected | √ | 18 | Proc: 2 Phase Flow | | |
| | IO B Connect. Control Input | √ | 19 | Electr: IO_Connection | | |
| | IO B Connect. Current In-/ Output | √ | | | | |
| | IO A Connect. Control Input | √ | | | | |
| | IO A Connect. Current In-/ Output | √ | | | | |

| Single event | | | Group/Condition | | Alarm category | |
|---|---|---|---|---|---|---|
| MAP/ ACTIVE Parameter | Name | Mapped | ID | Name | FD_xxx_MAP | Categ. |
| FD_EXTENDED_ACTIVE_3<br>FD_EXTENDED_MAP_3 | Velocity Out of Range | √ | 20 | S Process | FD_OFFSPEC_MAP |  |
| | Prod.Density Out of Range | √ | | | | |
| | Flow Out of Range | √ | | | | |
| | Proc.Temp.Out of Range | √ | | | | |
| | IO B Overrange Binary Output | √ | 21 | S Configuration | | |
| | IO B Overrange Current Output | √ | | | | |
| | IO B Overrange Current In-/ Output | √ | | | | |
| | IO A Overrange Binary Output | √ | | | | |
| | IO A Overrange Current Output | √ | | | | |
| | IO A Overrange Current In-/ Output | √ | | | | |
| | Electr.Temp.Out of Spec | √ | 22 | S Electronics | | |
| | Temp. Or Strain Res. Def. | √ | 23 | S Sensor | | |
| | Sensor Signal Search | √ | 25 | Proc: Signal Search | FD_FAIL_MAP |  |

| Single event | | | Group/Condition | | Alarm category | |
|---|---|---|---|---|---|---|
| MAP/ ACTIVE Parameter | Name | Mapped | ID | Name | FD_xxx_MAP | Categ. |
| FD_EXTENDED_ACTIVE_4<br>FD_EXTENDED_MAP_4 | IO B Binary Output Config | √ | 27 | F Configuration | FD_FAIL_MAP | ⊗ |
| | IO B Current In-/Output Config | √ | | | | |
| | IO A Binary Output Config | √ | | | | |
| | IO A Current In-/Output Config. | √ | | | | |
| | IO2 Configuration | √ | | | | |
| | IO1 Configuration | √ | | | | |
| | Display Config. | √ | | | | |
| | Fieldbus Config. | √ | | | | |
| | Safe Config. Unverified (S) | √ | | | | |
| | Density Calibration | √ | | | | |
| | Process Input Conf. Invalid | √ | | | | |
| | DM Configuration | √ | | | | |
| | BM Configuration | √ | | | | |
| | IO B Failure | √ | 28 | F Electronics | | |
| | IO A Failure | √ | | | | |
| | IO 2 Failure | √ | | | | |
| | IO 1 Failure | √ | | | | |
| | Fieldbus Failure | √ | | | | |
| | Process Input Failure | √ | | | | |
| | DM Failure | √ | | | | |
| | BM Failure | √ | | | | |
| | HW Combination Error | √ | | | | |
| | Internal Comm. Error | √ | | | | |
| | Sensor Error | √ | 29 | F Sensor | | |
| | Sensor Containment Dam. | √ | | | | |

**Table 5-10: Description of the FD default mapping**

### 5.4.4 Block alarms

The device supports block diagnostic via block specific alarms with one block alarm defined for each existing FF Resource, Transducer and Function Block. Block alarms are triggered by single events related to the respective block. Examples for such block related events are the transition of the block mode to OOS, the occurrence of a block configuration error or a sensor failure (in case of Transducer Blocks).

For each block a 32-bit bitstring parameter BLOCK_ERR is defined which displays the event(s) triggering the block alarm. Furthermore to allow for better analysis of the underlying issue each block comprises another 32-bit bitstring parameter BLOCK_ERR_DESC_1 which may indicate a more detailed description for the respective event(s). If however this information does not help to solve the problem it is generally recommended to turn to the field diagnostic parameters of the Resource Block for further investigation (for details refer to *Field diagnostic concept* on page 98).

## 5.5 DD/DTM menu description

If a DTM or a host system supporting EDDL menus is used for device maintenance a device specific menu structure is available which is intended to facilitate access to frequently used parameters and features.

On top level the menu structure is divided into three root menus, a configuration, a diagnostics and a process variables root menu (the menu description primarily refers to the EDDL menu structure. Though the DTM menu structure is largely identical.). The latter gives an overview over the process variables provided by the device including process values, their status and valid ranges. The configuration and diagnostics root menu are described in the following two subsections.

### 5.5.1 Configuration root menu

The configuration root menu provides access to parameters/features required for basic and advanced device configuration:

| Submenu | Description |
|---|---|
| Block modes | Quick access to the RB and TB block mode settings. Block modes can be switched using dedicated buttons. |
| Process & Transducer | Comprises the most relevant process and transducer related settings. Amongst others unit settings for the different measurements can be adjusted here. |
| Alarm Config. | Alarm related settings. Alarms can be enabled by setting the appropriate alarm priorities. Furthermore the menu provides quick access to the field diagnostic submenu. |
| Options | Selection of special options like write lock and simulation. Certain device features may be disabled/enabled. |
| Advanced | Access to all available RB and Transducer Block parameters via a "classic" block view. |

Table 5-11: Description of configuration root menu

### 5.5.2 Diagnostics root menu

The diagnostics root menu is the main entry point for accessing diagnostic and identification information:

| Submenu | Description |
|---|---|
| Block Status | RB and TB block status information. Block modes can be switched here. |
| Field Diag. | Field diagnostic status summary and configuration. For more information refer to *Diagnostic features* on page 98. |
| Measurement | Measurement values and status separated according to transducer blocks. |
| Identification | Device and software identification information like serial number and electronic revision. |

Table 5-12: Description of diagnostics root menu

The Field Diag. menu comprises visual enhancements to present the current device status.

At the "Summary" menu page the field diagnostics alarm status is provided. If any of the four alarm categories is being indicated as active by the corresponding RB FD_..._ACTIVE parameter, the respective status icon is highlighted on the summary page, assuming that the alarm category has the highest priority of all active categories. At the same time all other icons are greyed out and the recommended action to solve the status is being displayed.

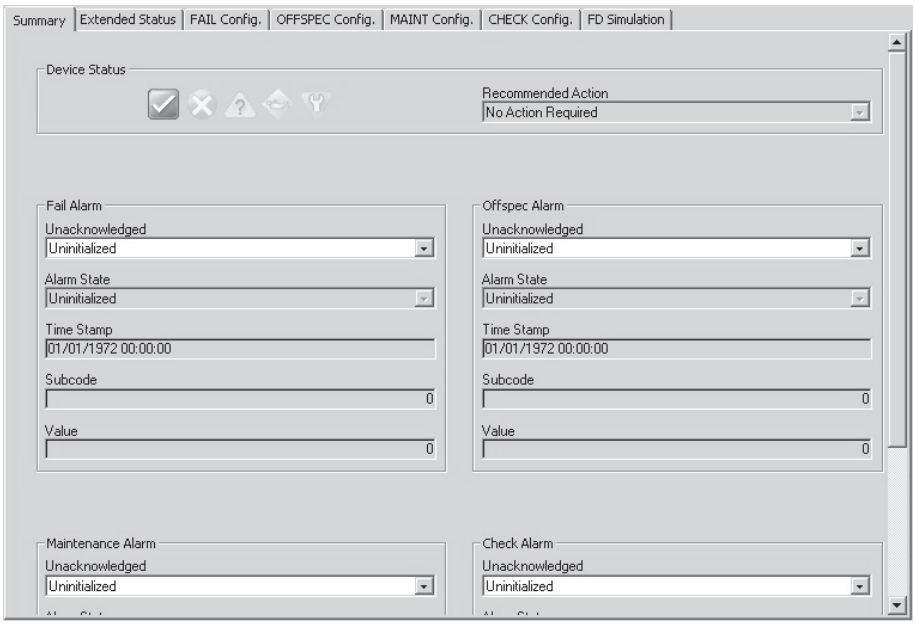



Figure 5-3: Menu page "Summary"

If none of the alarm categories is active a green "check mark" icon is highlighted. Note that this does not necessarily mean that the device is in a correct operational state: the icon will also be highlighted if solely error events not mapped to any of the four alarm categories are active! Furthermore it may occur that due to the device configuration the field diagnostics indication is not reliable, e.g. if the field diagnostics simulation is active. In this case all of the status icons are greyed out.

If the information available via the summary menu page is insufficient to solve the status the "Extended Status" menu page can be examined:

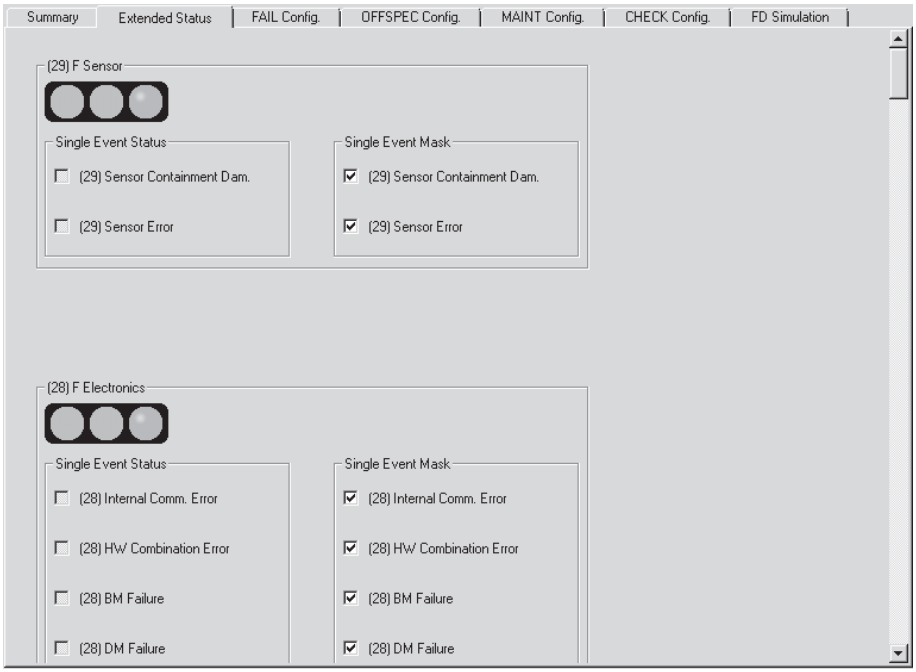



Figure 5-4: Menu page "Extended Status"

The menu provides the status and enable state of all single events with the events grouped in their respective event groups. Each group features a "traffic light" quick indicator summarizing the group status:

| Traffic light status | Description |
|---|---|
|  (red) | One or more events contained in the event group is/are active and enabled. |
|  (yellow) | One or more events contained in the event group is/are active but NOT enabled. |
|  (green) | None of the events of the event group is active. |

Table 5-13: Description of indication of group status

## 6.1 Appendix A - Troubleshooting

- **I would like to set the "Units Conversion" option at the IO_OPTS parameter of an AI block but I can't find it.**
  This is a problem of some (older) host systems which do not display this option. Only an update of the system might fix it. If this solution is not applicable the unit settings at the AI XD_SCALE parameter and the transducer block must match for the selected channel.
- **I want to use a "Concentration" measurement but the appropriate unit (e.g. Baume 144, %NaOH, % mass A) cannot be selected at the XD_RANGE parameter of the AI block.**
  Some host systems may not offer manufacturer specific units like [%NaOH]. In this special case the AI block will accept [%] as unit selection for "Concentration" as a fall-back solution. In this case the AI XD_RANGE unit selection and transducer block unit selection do not need to be identical.
- **I have changed the unit settings in the device display but the transducer block units do not seem to change accordingly.**
  Changes of the unit settings in the device display have generally no influence on the transducer block unit settings and vice versa.
- **I am using the DD5 file set of the device (*.sy5, *.ff5, *.cff) and the menu structure looks very strange.**
  If you are facing serious problems accessing device features due to presentation issues with the DD5 files, using the DD4 files (*.sym, *.ffo, *.cff) instead may help. The DD4 files provide a "classic" block view and do not make use of enhanced DD features.
- **I have a problem not described here which I am unable to solve. Whom shall I contact?**
  Please send a description of the problem to our support. Note that a detailed and complete description can help to speed up the handling of your request dramatically. As a minimum of information the serial number of the device should be provided.

## 6.2 Appendix B - Basic AI block configuration

The following description specifies the recommended procedure for putting an AI function block of the device into a correct operational state for the output of internal measurements:

1. **Configure the AI block:**
   a) Set the block target mode to OOS.
   b) At the CHANNEL parameter select the appropriate internal channel.
   c) Adjust scaling (XD_SCALE, OUT_SCALE).
      Note: By default the unit conversion option at the IO_OPTS parameter is not enabled. If this setting is not adapted the unit selection at the XD_SCALE parameter must generally be identical to the unit set for the channel at the respective transducer block!
   d) Select a linearization type (L_TYPE).
   e) If required adjust further block settings (filtering, alarms etc.).
   f) Set the block target mode to Auto.
2. **Set the Resource Block target mode to Auto**
3. **Create a network schedule:**
   The schedule must involve the configured AI block. Though (e.g. for testing purposes) it is permissible to have the AI block not linked to any other function block.

The AI block actual mode should be checked after these steps. If it does not switch to its target mode please turn to the BLOCK_ERR and BLOCK_ERR_DESC_1 parameter of the AI block for troubleshooting.

## 6.3 Appendix C - Relationship between TB and AI Block

**Transducer Block (TB) measurement values:**
There are various measurement values nnn_VALUE offered by the Transducer Blocks. A corresponding nnn_RANGE (e.g. MASS_FLOW_RANGE, DENSITY_RANGE) exists for each measurement value nnn_VALUE (MASS_FLOW_VALUE, DENSITY_VALUE). nnn_RANGE includes the high and low limits of the value and the engineering unit code.

**AI Block channel selection:**
The CHANNEL parameter of the AI block selects the TB measurement value the AI block should process and forward. At the CHANNEL a valid measurement must be selected, otherwise the AI Block will stay in OOS mode.

**Engineering unit conversion:**
The AI Block checks the unit code of XD_SCALE against the unit code of the TB measurement value range nnn_RANGE which is selected by CHANNEL. Three cases are possible:

1. The unit codes are equal: The AI Block can be executed without error. The value from TB nnn_VALUE is the input of the AI scaling defined by XD_SCALE and OUT_SCALE.
2. The unit codes are unequal and belong to a different physical unit family (e.g. m³/h and kg/L): The unit codes do not match and cannot be converted. The AI Block will stay in OOS mode; at BLOCK_ERR the bit "Block Configuration" is set.
3. The unit codes are unequal but belonging to the same physical unit family (e.g. m³/h and L/s): The behavior depends on the AI parameter IO_OPTS:
   a) The bit "Unit Conversion" is NOT set: The behavior is the same as at case 2.
   b) The bit "Unit Conversion" is set: The nnn_VALUE from the TB is converted to the unit code of XD_SCALE (e.g. 18.9 m³/h will be 5.250 L/s) and this value is the input of the AI scaling XD_SCALE and OUT_SCALE.

**AI Block scaling:**
The AI Block linearization type (L_TYPE) parameter defines how scaling in the AI Block is being performed. Two cases are possible:

1. L_TYPE is "Direct":
   The AI scaling is switched off. The scaling of XD_SCALE and OUT_SCALE does not influence the OUT value. Though it is recommended to set XD_SCALE and OUT_SCALE with correct values to prevent confusion.
2. L_TYPE is set "Indirect" or "Indirect Sq Root": The AI scaling is switched on. A unit conversion can be realized by XD_SCALE and OUT_SCALE. Example for lin. type "Indirect":
   XD_SCALE: EU_0 = -20.0; EU_100 = +20.0; UNITS_INDEX = m³/h;
   OUT_SCALE: EU_0 = -5.556; EU_100 = +5.556; UNITS_INDEX = L/s;
   TB VOLUME_FLOW_VALUE = 18.9 m³/h -> AI OUT is 5.250 L/s.

**Abstract:**
There are three ways of unit conversion. All are independent and can be combined.

- Selection of a unit at TB nnn_RANGE.
- Selection of a unit at AI XD_SCALE and setting of "Units Conversion" at IO_OPTS.
- Free user conversion at AI with XD_SCALE and OUT_SCALE.

## 6.4 Appendix D - Write Lock

There are two software options to protect against parameter change. A hardware protection (jumper) does not exist:

### 1. Protection without password:

- Characteristics: If write protection is enabled, write access via FOUNDATION Fieldbus is rejected. Only RB WRITE_LOCK could be changed. Access via display is still possible.
- Enabling: Set RB WRITE_LOCK to "Locked".
- Disabling: Set RB WRITE_LOCK to "Not Locked".
- Signalling: At RB PROTECT_INFO the bit "Write Lock (simple)" is set.

### 2. Protection with password:

- Characteristics: If write protection is enabled, write access via FOUNDATION Fieldbus is rejected. Only RB PASSWRD can be written. If a password exists, a write access via display is possible by entering the password.
- Enabling: Write a password number of 0001..9999 to RB PASSWRD_REF_OPERATOR. After writing the read back value will be 0.
- Disabling: Write the value 0 to RB PASSWRD_REF_OPERATOR.
  Note: Before disabling the password the correct password must be entered at RB PASSWRD first.
- Unlock: Write the correct password to RB PASSWRD. At RB PROTECT_INFO the bit "Operator" is cleared. 20 minutes after writing the correct password the access will be locked automatically again.
- Terminate Unlock: Write a number of 10000 to RB PASSWRD or wait max. 20 minutes.
- Change Password: Write the correct password number to RB PASSWRD, than the RB PASSWRD_REF_OPERATOR can be changed.
- Signalling: At RB PROTECT_INFO the bit "Write Lock Password set" is set if a password exists. Locking is active if additional the bit "Operator" is set.

## 6.5 Appendix E - Zero and Density Calibration

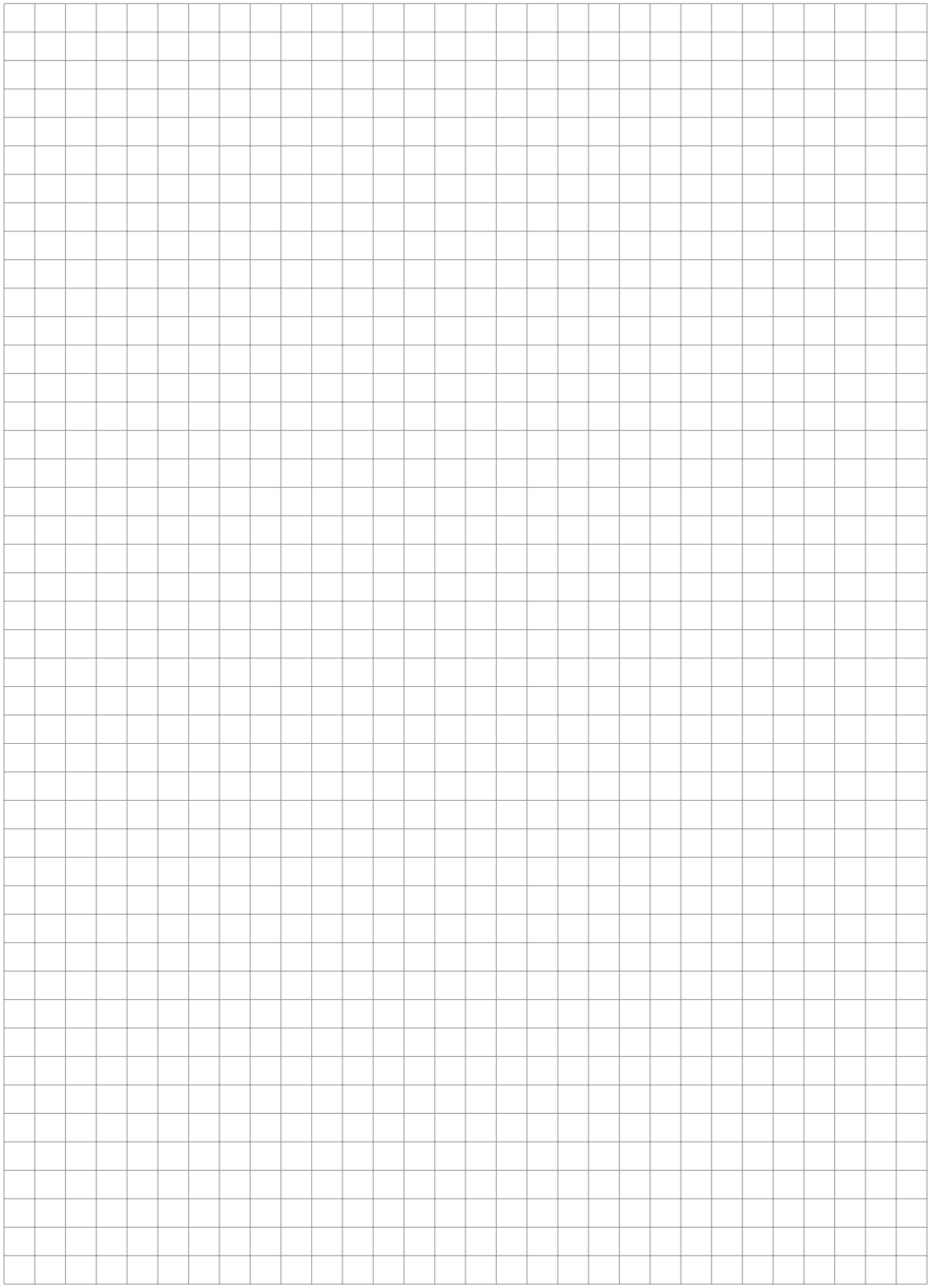
The transmitter features zero and density calibration options which can be accessed via the FF DD or DTM. For each of these two calibration types a calibration assistant exists which guides through the steps of the calibration procedure:

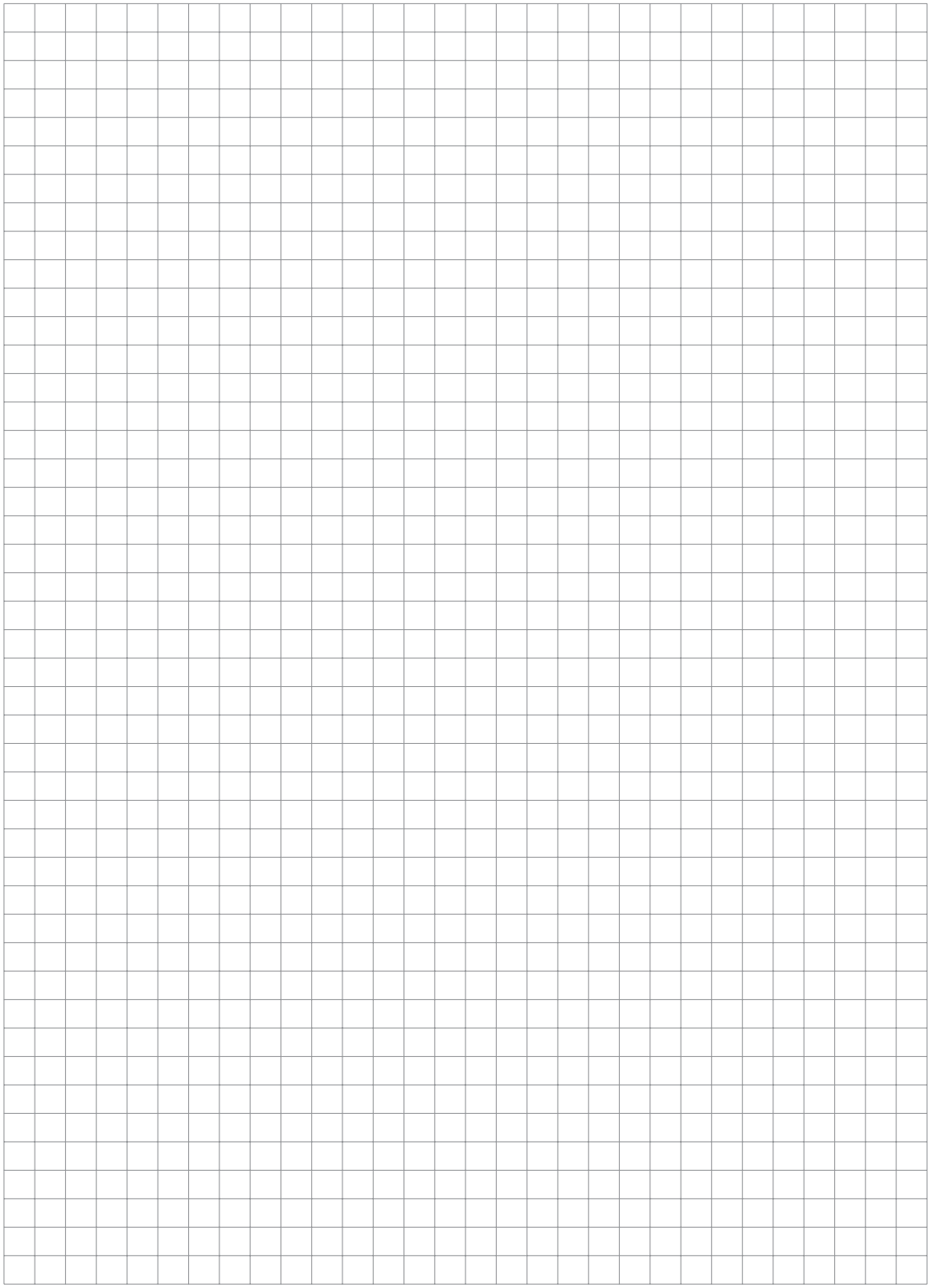
- **Zero calibration**
  Options: "Manual", "Automatic", "Factory defaults"
- **Density calibration**
  Options: "1 Point", "2nd Point", "Factory defaults"

For more details on the two calibration types and their preconditions please refer to the standard manual.

### Notes:

1. If the "Factory defaults" calibration option is selected the respective original calibration data from factory calibration will be restored.
2. In case of the "Automatic" or "1 Point" / "2nd Point" calibration option new calibration data will not be stored unless explicitly confirmed at the end of the calibration procedure.





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