ABB MEASUREMENT & ANALYTICS | INTERFACE DESCRIPTION

VortexMaster FSV400, SwirlMaster FSS400

Vortex and Swirl flowmeter

FOUNDATION Fieldbus protocol
Valid from software version 01.06.00

Measurement made easy

—
VortexMaster FSV430, FSV450
SwirlMaster FSS430, FSS450

Additional Information

Additional documentation on VortexMaster FSV400, SwirlMaster FSS400 is available for download free of charge at www.abb.com/flow.
Alternatively simply scan this code:

FSV430 FSV450 FSS430 FSS450

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1 Specification

Note
The FOUNDATION Fieldbus® protocol is not secure, therefore the intended application should be assessed to make sure that these protocols are suited before implementation.

FOUNDATION Fieldbus® Interface	
Terminals	BUS CONNECTION
Configuration	Via the FOUNDATION Fieldbus interface or the local operating interface in connection with Asset Vision Basic (DAT200) and a corresponding Device Type Manager (DTM)
Transmission	FOUNDATION Fieldbus H1 in accordance with IEC 61158-2
Baud rate	9.6 kbps, 19.2 kbps, 45.45 kbps, 93.75 kbps, 187.5 kbps, 500 kbps, 1.5 Mbps The baud rate is automatically detected and does not need to be configured manually
Interoperability test campaign no.	ITK 6.3.0
Manufacturer ID	0x000320
Device ID	0x12C
Bus address	Address range 0 to 126 Factory setting: 126

For commissioning purposes, you will need a device driver in the form of a DD (Device Description) or DTM (Device Type Manager) format, plus a CFF file (Common File Format).

You can download DD, DTM and CFF from www.abb.com/flow.

The files required for operation can also be downloaded from www.fieldbus.org.

2 Parameterization

Structure and design of the function blocks

Block structure	
Ordinal	**Block**
0	RESOURCE_2_FD
1	TB0: HMI
2	TB1: PCB
3	TB2: Standard
4	TB3: Advanced
5	AI1
6	AI2
7	AI3
8	AI4
9	AO1
10	AO2
11	AO3
12	DI
13	IT
14	EPID

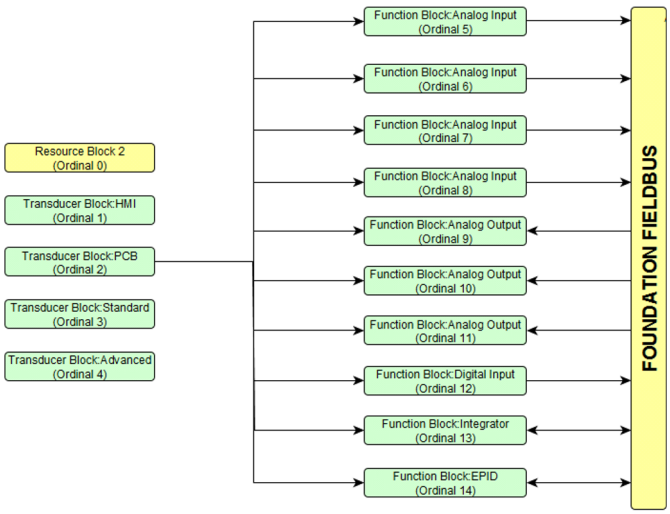

Figure 1: Design of the function blocks

FOUNDATION Fieldbus® Channel Assignment (Channel)	
AI Channel	**Process value**
1	Volume flow
2	Partial volume flow
3	Standard volume flow
4	Partial standard volume flow
5	Mass flow
6	Energy
7	Temperature
8	Volume flow counter
9	Partial volume flow counter
10	Standard volume flow counter
11	Partial standard volume flow counter
12	Mass flow counter
13	Energy counter
AO Channel	**Process value**
14	Temperature
15	Second temperature
16	Gauge pressure
17	Absolute pressure
18	Density
19	Gas content
DI Channel	
20	Switch output
21	Low flow cutoff

Note

For additional information on the FOUNDATION Fieldbus® interface, refer to the separate COM/FSV/FSS/430/450/FF interface description!

3 Block overview

Available units

For certain parameters it is possible to choose among the following units.
The **'Code'** column indicates which value the corresponding parameter must be set to.

Table 1: Units for the volume flow rate

Selection	Code	Description
m^3/s	1347	Cubic meter per second
m^3/min	1348	Cubic meter per minute
m^3/h	1349	Cubic meter per hour
m^3/d	1350	Cubic meter per day
ft^3/s	1356	Cubic feet per second
ft^3/min	1357	Cubic feet per minute
ft^3/h	1358	Cubic feet per hour
ft^3/d	1359	Cubic feet per day
kft^3/s	—	Cubic kilofeet per second
kft^3/min	—	Cubic kilofeet per minute
kft^3/h	—	Cubic kilofeet per hour
kft^3/d	—	Cubic kilofeet per day
l/s	1351	Liter per second
l/m	1352	Liter per minute
l/h	1353	Liter per hour
l/d	1354	Liter per day
kl/s	1517	Kilo liter per second
hl/s	1633	Hecto liter per second
hl/m	1634	Hecto liter per minute
hl/h	1635	Hecto liter per hour
hl/d	1636	Hecto liter per day
kl/m	1518	Kilo liter per minute
kl/h	1519	Kilo liter per hour
kl/d	1520	Kilo liter per day
usg/s	1362	Us gallon per second
usg/m	1363	Us gallon per minute
usg/h	1364	Us gallon per hour
usg/d	1365	Us gallon per day
igal/s	1367	Imperial gallon per second
igal/m	1368	Imperial gallon per minute
igal/h	1369	Imperial gallon per hour
igal/d	1370	Imperial gallon per day
bbl/s	1371	Barrel per second
bbl/m	1372	Barrel per minute
bbl/h	1373	Barrel per hour
bbl/d	1374	Barrel per day

Table 2: Units for mass flow

Selection	Code	Description
g/s	1318	Gram per second
g/min	1319	Gram per minute
g/h	1320	Gram per hour
g/d	1321	Gram per day
kg/s	1322	Kilogram per second
kg/min	1323	Kilogram per minute
kg/h	1324	Kilogram per hour
kg/d	1325	Kilogram per day
t/s	1326	Metric ton per second
t/min	1327	Metric ton per minute
t/h	1328	Metric ton per hour
t/d	1329	Metric ton per day
lb/s	1330	Pounds per second
lb/min	1331	Pounds per minute
lb/h	1332	Pounds per hour
lb/d	1333	Pounds per day
US t/s	1334	Short ton per second
US t/min	1335	Short ton per minute
US t/h	1336	Short ton per hour
US t/d	1337	Short ton per day

Table 3: Power units

Selection	Code	Description
W	1186	Watt
MW	1189	MegaWatt
KW	1190	KiloWatt
KJ/s	1438	Kilo Joule Per Second
KJ/min	1439	Kilo Joule Per minute
KJ/h	1440	Kilo Joule Per hour
KJ/d	1441	Kilo Joule Per day
MJ/h	1196	Mega Joule Per hour

Table 4: Density units

Selection	Code	Description
g/cm^3	1100	Gram per cubic centimeter
kg/m^3	1097	Kilogram per cubic meter
g/ml	1104	Gram per milliliter
g/l	1105	Gram per liter
kg/l	1103	Kilogram per liter
lb/ft^3	1107	Pounds per cubic feet
lb/ugal	1108	Pounds per us gallons

… 3 Block overview

… Available units

Table 5: Temperature units

Selection	Code	Description
K	1000	Kelvin
°C	1001	Celsius
°F	1002	Fahrenheit

Table 6: Pressure units

Selection	Code	Description
Pa	1610	Pascal
Mpa	1614	Mega pascal
Kpa	1616	Kilo pascal
hPa	1622	Hecto pascal
bar	1137	Bar
mbar	1138	Milli bar
psi	1141	Pound per square inch
kg/cm^2	1626	Kilo gram per square centimeter
mm H_2O	1149	Milli meter H_2O

Table 6: Units for the mass totalizer

Selection	Code	Description
kg	1088	Kilogram
g	1089	Gram
t	1092	Metric ton
Pound	1094	Pound

Table 7: Units for the volume totalizer

Selection	Code	Description
m^3	1034	Cubic meter
ft^3	1043	Cubic feet
ml	1040	Milliliter
l	1038	Liter
hl	1041	Hecto liter
ugal	1048	Us gallons
igal	1049	Imperial gallons
bbl	1051	Oil barrels
bls	1052	Brew barrels

Table 8: Concentration units

Selection	Code	Description
%	1342	% (percent)

… 3 Block overview

Resource Block 2 RESOURCE_2_FD – Ordinal / Slot 0

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
RESOURCE_BLOCK_2	0	16	Record	BLOCK	Cst	62	SRW	0	A named block consisting of contained parameters which provides an interface to common resource capabilities or information.
ST_REV	1	17	Simple	UNSIGNED16		2	SR	0	Revision counter for the static parameters. The counter is incremented each time the static parameter is changed.
TAG_DESC	2	18	Simple	OCTET_STRING		32	SRW	" "	The user description of the intended application of the block.
STRATEGY	3	19	Simple	UNSIGNED16		2	SRW	0	This parameter can be used to create a grouping of blocks by relating the same reference number to each block of a group. This parameter is not checked or processed by the block.
ALERT_KEY	4	20	Simple	UNSIGNED8		1	SRW	0	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
MODE_BLK	5	21	Record	MODE		4	RSW	Target: OOS Actual: OOS Permitted: Auto, OOS Normal: Auto	The actual, target, permitted and normal operation modes of the block.
BLOCK_ERR	6	22	Simple	BIT_STRING		2	R	0	This parameter contains a summary of the block alarms.
RS_STATE	7	23	Simple	UNSIGNED8		1	R	0	State of the function block state machine.
TEST_RW	8	24	Record	TEST		112	WR	0;0;0;0;0; 0;0;0.0;0	Read/write test parameter - used only for conformance testing.
DD_RESOURCE	9	25	Simple	VISIBLE_STRING		32	R	" "	A description of the device description.
MANUFAC_ID	10	26	Simple	UNSIGNED32		4	SR	0x000320 (ABB)	Manufacturer identification number.
DEV_TYPE	11	27	Simple	UNSIGNED16		2	SR	0x012C	Manufacturer's model name of the device.
DEV_REV	12	28	Simple	UNSIGNED8		1	SR	0x01	Device revision.
DD_REV	13	29	Simple	UNSIGNED8		1	SR	0x01	Revision of the DD file of the device.

… 3 Block overview

… Resource Block 2 RESOURCE_2_FD – Ordinal / Slot 0

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
GRANT_DENY	14	30	Record	ACCESS_PERM		2	RW	0	Options for the access from PLC and DCS systems to device parameters.
HARD_TYPES	15	31	Simple	BIT_STRING		2	SR	0xF000	The types of hardware available for the channels of the device.
RESTART	16	32	Simple	UNSIGNED8		1	RW	1	Several possibilities of restart are possible: 1: Run 2: Restart resource 3: Restart with defaults 4: Restart processor
FEATURES	17	33	Simple	BIT_STRING		2	SR	0x4000| 0x2000| 0x0800| 0x0400| 0x0020	Used to show resource block options. 0x4800 = Reports supported, Hard Write Lock supported.
FEATURE_SEL	18	34	Simple	BIT_STRING		2	SRW	0x0000	Used to select resource block options. 0x4800 = Reports supported, Hard Write Lock supported.
CYCLE_TYPE	19	35	Simple	BIT_STRING		2	R	0xC000	Describes the block execution methods. 0xC000 = Scheduled, Completion of block execution.
CYCLE_SEL	20	36	Simple	BIT_STRING		2	SRW	0xC000	Selection of the block execution method.0xC000 = Scheduled, Completion of block execution.
MIN_CYCLE_T	21	37	Simple	UNSIGNED32		4	SR	3200	Time duration of the shortest cycle time of the device in 1/32 ms.
MEMORY_SIZE	22	38	Simple	UNSIGNED16		2	R	0	Available memory in the device.
NV_CYCLE_T	23	39	Simple	UNSIGNED32		4	R	0	Interval between writing copies of NV parameters to non-volatile memory.Zero means never.
FREE_SPACE	24	40	Simple	FLOATING_POINT		4	R	0	Percent of memory available for additional configuration.
FREE_TIME	25	41	Simple	FLOATING_POINT		4	R	0	Percent of the block processing time that is free to process additional blocks.
SHED_RCAS	26	42	Simple	UNSIGNED32		4	SRW	640000	Timeout time for connections to PLC or DCS in operation mode Rcas.

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
SHED_ROUT	27	43	Simple	UNSIGNED32		4	SRW	640000	Timeout time for connections to PLC or DCS in operation mod Rout.
FAULT_STATE	28	44	Simple	UNSIGNED8		1	R	1	Behavior of output blocks if communication errors appears.
SET_FSTATE	29	45	Simple	UNSIGNED8		1	RW	1	Allows the Fault State condition to be manually initiated.
CLR_FSTATE	30	46	Simple	UNSIGNED8		1	RW	1	Allows deleting the fault state condition.
MAX_NOTIFY	31	47	Simple	UNSIGNED8		1	SR	20	Maximum number of unconfirmed notify messages possible.
LIM_NOTIFY	32	48	Simple	UNSIGNED8		1	SRW	20	Maximum number of unconfirmed notify messages allowed.
CONFIRM_TIME	33	49	Simple	UNSIGNED32		4	SRW	640000	The time the device will wait for confirmation of receipt of a report before trying to send again. Retry shall not happen when CONFIRM_TIME = 0.
WRITE_LOCK	34	50	Simple	UNSIGNED8		1	SRW	1	If set, no writing is allowed. Cannot be cleared by software. **Note** This parameter is dependent from the hardware switch Write_Lock.
UPDATE_EVT	35	51	Record	ALARM_EVENT		16	RW	0;0;0;0;0;0;9;0	This message is generated by any change to static data.
BLOCK_ALM	36	52	Record	ALARM_DISC		18	RW	0;0;0;0;0; 0;0;8;0;0	Indicates alarms which are related to the block.
ALARM_SUM | ALARM_SUM_RES2	37	53	Record	ALARM_SUMMARY		8	SRW	0;0;0;0	This parameter contains a summary of the block alarms.
ACK_OPTION | ACK_OPTION_RES2	38	54	Simple	BIT_STRING		2	SRW	0	Defines if block alarms are automatically acknowledged or not.
WRITE_PRI	39	55	Simple	UNSIGNED8		1	SRW	0	Priority of the alarm generated by clearing the WRITE_LOCK.
WRITE_ALM	40	56	Record	ALARM_DISC		18	RW	0;0;0;0;0; 0;0;10;0;0	This alert is generated if the write lock parameter is cleared.
ITK_VER	41	57	Simple	UNSIGNED16		2	NR	6	Version of the Interoperability Test Kit used to test the device.
SOFTWARE_REV	42	58	Simple	VISIBLE_STRING		32	RX	" "	Manufacturer software revision.
HARDWARE_REV	43	59	Simple	VISIBLE_STRING		32	RX	" "	Manufacturer hardware revision.

… 3 Block overview

… Resource Block 2 RESOURCE_2_FD – Ordinal / Slot 0

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
CAPABILITY_LEV	44	60	Simple	UNSIGNED8		1	RX	0	This parameter included in a device to indicate the capability level supported by a device.
COMPATIBILITY_REV	45	61	Simple	UNSIGNED8		1	RX	1	This parameter is optionally used when replacing field devices.
FD_VER	46	62	Simple	UNSIGNED16		2	SR	1	The FD_VER parameter reflects the value of the major version of Field Diagnostics specification that the device was designed too. This allows hosts to distinguish between changes that may be necessary to be made in such a recent specification.
FD_FAIL_ACTIVE	47	63	Simple	BIT_STRING		4	R	0	This parameter reflects the error conditions that are being detected as active as selected for this category.
FD_OFFSPEC_ACTIVE	48	64	Simple	BIT_STRING		4	R	0	This parameter reflects the error conditions that are being detected as active as selected for this category.
FD_MAINT_ACTIVE	49	65	Simple	BIT_STRING		4	R	0	This parameter reflects the error conditions that are being detected as active as selected for this category.
FD_CHECK_ACTIVE	50	66	Simple	BIT_STRING		4	R	0	This parameter reflects the error conditions that are being detected as active as selected for this category.
FD_FAIL_MAP	51	67	Simple	BIT_STRING		4	SRW	0x00000000	This parameter maps conditions to be detected as active for this alarm category.
FD_OFFSPEC_MAP	52	68	Simple	BIT_STRING		4	SRW	0x00000000	This parameter maps conditions to be detected as active for this alarm category.
FD_MAINT_MAP	53	69	Simple	BIT_STRING		4	SRW	0x00000000	This parameter maps conditions to be detected as active for this alarm category.
FD_CHECK_MAP	54	70	Simple	BIT_STRING		4	SRW	0x80000000	This parameter maps conditions to be detected as active for this alarm category.
FD_FAIL_MASK	55	71	Simple	BIT_STRING		4	SRW	0x00000000	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.

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
FD_OFFSPEC_MASK	56	72	Simple	BIT_STRING		4	SRW	0x00000000	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.
FD_MAINT_MASK	57	73	Simple	BIT_STRING		4	SRW	0x00000000	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.
FD_CHECK_MASK	58	74	Simple	BIT_STRING		4	SRW	0x00000000	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.
FD_FAIL_ALM	59	75	Record	ALARM_FD_DIAG		20	RW	0;0;0;0;0; 0;0;15;0;0	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.
FD_OFFSPEC_ALM	60	76	Record	ALARM_FD_DIAG		20	RW	0;0;0;0;0; 0;0;16;0;0	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.
FD_MAINT_ALM	61	77	Record	ALARM_FD_DIAG		20	RW	0;0;0;0;0; 0;0;17;0;0	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.
FD_CHECK_ALM	62	78	Record	ALARM_FD_DIAG		20	RW	0;0;0;0;0; 0;0;18;0;0	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.
FD_FAIL_PRI	63	79	Simple	UNSIGNED8		1	SRW	0	This parameter allows the user to specify the priority of this alarm category.
FD_OFFSPEC_PRI	64	80	Simple	UNSIGNED8		1	SRW	0	This parameter allows the user to specify the priority of this alarm category.
FD_MAINT_PRI	65	81	Simple	UNSIGNED8		1	SRW	0	This parameter allows the user to specify the priority of this alarm category.
FD_CHECK_PRI	66	82	Simple	UNSIGNED8		1	SRW	0	This parameter allows the user to specify the priority of this alarm category.

... 3 Block overview

... Resource Block 2 RESOURCE_2_FD – Ordinal / Slot 0

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
FD_SIMULATE	67	83	Record	SIMULATE_FD		9	RW	0;0;1	This parameter allows the conditions to be manually supplied when simulation is enabled. When simulation is disabled both the diagnostic simulate value and the diagnostic value track the actual conditions. The simulate jumper is required for simulation to be enabled and while FD_SIMULATE is enabled the recommended action will show that simulation is active.
FD_RECOMMEN_ACT	68	84	Simple	UNSIGNED16		2	R	0	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 is defined as Not Initialized, 1 is defined as No Action Required, all others defined by manuf.
SPECIAL_RESTART	69	85	Simple	BIT_STRING		2	RWB	0	Special restart of device.
SPECIAL_OPERATION	70	86	Simple	UNSIGNED8		1	RWB	0	Special operation of device.
FD_HISTORY	71	87	Simple	BIT_STRING		4	AR	0	Field bus Diagnostic history.
FD_CONDITION_IDX	72	88	Simple	UNSIGNED8		1	XRW	4	Don't have this object in the fieldbus.
FD_CONDITION_DETAILS	73	89	Record	DIAG_DET_STRUCT		14	XRW	0;0;0	counter Of Alarm ConditionIndex.
MESSAGE	74	90	Simple	VISIBLE_STRING		32	RW	" "	
DESCRIPTOR	75	91	Simple	VISIBLE_STRING		32	RW	" "	
INSTALLATION_DATE	76	92	Simple	DATE		7	RW	0	
SERVICE_PASSWORD	77	93	Simple	VISIBLE_STRING		20	XRW	"Empty"	Hashed result of 5-digit alphanumeric Service password.
OBJECT_ADDRESS	78	94	Record	PRIVATE_OBJECT_ADDRESS		8	ABXRW	0;0;0;0;0	There is no objectAddress in the fieldbus subsystem.
OBJECT_DATA	79	95	Record	PRIVATE_DATA		33	ABXRW	0;" "	Don't have objectdata in the fieldbus.
MEMORY_ADDRESS	80	96	Record	PRIVATE_MEMORY_ADDRESS		7	ABXRW	0;0;0;0	Don't have this object in the fieldbus.
MEMORY_DATA	81	97	Record	PRIVATE_DATA		33	ABXRW	0;" "	Don't have this object in the fieldbus.
TEST_RESULT	82	98	Simple	UNSIGNED8		1	RWX	0	test Result of the device. 0: TEST_NOT_RUNNING 1: TEST_RUNNING 2: TEST_PASSED 3: TEST_FAILED 4: TEST_RESULT_NUMBER

Transducer Block TB0:HMI – Ordinal / Slot 1

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
HMITB	0	16	Record	BLOCK		62	SRW	0	Define the HMI interfaces on field devices.
ST_REV	1	17	Simple	UNSIGNED16		2	SR	0	Revision counter for statics variables. Each time a static variable is changed the counter is incremented by one.
TAG_DESC	2	18	Simple	OCTET_STRING		32	SRW	" "	The user description of the intended application of the block.
STRATEGY	3	19	Simple	UNSIGNED16		2	SRW	0	The strategy field can be used to create grouping of blocks by relating the same reference number to each block of a group. This data is not checked or processed by the block.
ALERT_KEY	4	20	Simple	UNSIGNED8		1	SRW	0	The identification number of the plant unit. This information may be used in PLC or DCS systems for sorting alarms, etc.
MODE_BLK	5	21	Record	MODE		4	RSW	0x01; 0x01; 0x11; 0x10	The actual, target, permitted, and normal modes of the block. Actual and allowable operation modes of the block.
BLOCK_ERR	6	22	Simple	BIT_STRING		2	R	0	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. Bit 0 Other Bit 1 Block Configuration Error Bit 2 Link Configuration Error Bit 3 Simulate Active Bit 4 Local Override Bit 5 Device Fail Safe Set Bit 6 Device Needs Maintenance Soon Bit 7 Input Failure/ process variable has BAD status Bit 8 Output Failure Bit 9 Memory Failure Bit 10 Lost Static Data Bit 11 Lost NV Data Bit 12 Readback Check Failure Bit 13 Device needs maintenance Now Bit 14 Power-up Bit 15 Out-of-Service (MSB)

… 3 Block overview

… Transducer Block TB0:HMI – Ordinal / Slot 1

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
UPDATE_EVT	7	23	Record	ALARM_EVENT		16	RW	0;0;0;0;0;0;9;0	This alert is generated by any change to the static data.
BLOCK_ALM	8	24	Record	ALARM_DISC		18	RW	0;0;0;0;0;0;0;8; 0;0	The block alarm is used for all configuration, hardware, connection failure or system problems in the block.
TRANSDUCER_ DIRECTORY	9	25	Array	UNSIGNED16		2	R	0	The directory that specifies the number and starting indices of the transducers in the transducer block.
TRANSDUCER_TYPE	10	26	Simple	UNSIGNED16		2	RS	65535	Identifies the transducer type that follows.
TRANSDUCER_ TYPE_VER	11	27	Simple	UNSIGNED16		2	RS	0	
XD_ERROR	12	28	Simple	UNSIGNED8		1	R	0	Error codes of the Block.
COLLECTION_ DIRECTORY	13	29	Array	UNSIGNED32		4	R	0	A directory that specifies the number, starting indices, and DD Item IDs of the data collections in each transducer within a transducer block.
CONTRAST	14	30	Simple	UNSIGNED8		1	VXRW	0	Display Contrast (0 to 100%)
LANGUAGE	15	31	Simple	UNSIGNED8		1	VXRW	0	0: German 1: English
DISPLAY_MODE	16	32	Simple	UNSIGNED8		1	VXRW	0	0: 1 big line, 1 small line 1: 4 small lines
HMI_FW_REVISION	17	33	Simple	UNSIGNED8		1	XR	0	HMI Firmware version.
HMI_LINE_1	18	34	Simple	UNSIGNED8		1	RWX	1	Signal to be displayed on 1st line of 1st operator page.
HMI_LINE_2	19	35	Simple	UNSIGNED8		1	RWX	3	Signal to be displayed on 2nd line of 1st operator page.
HMI_LINE_ BARGRAPH	20	36	Simple	UNSIGNED8		1	RWX	1	Signal to be displayed on bargraph of 1st operator page.
HMI_LINE_ SEQUENCE	21	37	Simple	UNSIGNED8		1	SRW	0	
HMI_LINE_ VARIABLE_1	22	38	Simple	UNSIGNED8		1	SRW	0	
HMI_LINE_ VARIABLE_2	23	39	Simple	UNSIGNED8		1	SRW	1	
HMI_LINE_ VARIABLE_3	24	40	Simple	UNSIGNED8		1	SRW	2	
HMI_LINE_ VARIABLE_4	25	41	Simple	UNSIGNED8		1	SRW	3	

Transducer Block TB1:PCB – Ordinal / Slot 2

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
PCBTB	0	16	Record	BLOCK		62	SRW	0	Manufacturers transducer blocks to support local interfaces on field devices.
ST_REV	1	17	Simple	UNSIGNED16		2	SR	0	Revision counter for statics variables. Each time a static variable is changed the counter is incremented by one.
TAG_DESC	2	18	Simple	OCTET_STRING		32	SRW	32	The user description of the intended application of the block.
STRATEGY	3	19	Simple	UNSIGNED16		2	SRW	0	The strategy field can be used to create grouping of blocks by relating the same reference number to each block of a group. This data is not checked or processed by the block.
ALERT_KEY	4	20	Simple	UNSIGNED8		1	SRW	0	The identification number of the plant unit. This information may be used in PLC or DCS systems for sorting alarms, etc.
MODE_BLK	5	21	Record	MODE		4	SRW	0x10;0x01; 0x11;0x10	The actual, target, permitted, and normal modes of the block. Actual and allowable operation modes of the block.
BLOCK_ERR	6	22	Simple	BIT_STRING		2	R	0	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. Bit 0 Other Bit 1 Block Configuration Error Bit 2 Link Configuration Error Bit 3 Simulate Active Bit 4 Local Override Bit 5 Device Fail Safe Set Bit 6 Device Needs Maintenance Soon Bit 7 Input Failure/ process variable has BAD status Bit 8 Output Failure Bit 9 Memory Failure Bit 10 Lost Static Data Bit 11 Lost NV Data Bit 12 Readback Check Failure Bit 13 Device needs maintenance Now Bit 14 Power-up Bit 15 Out-of-Service (MSB)

… 3 Block overview

… Transducer Block TB1:PCB – Ordinal / Slot 2

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
UPDATE_EVT	7	23	Record	ALARM_EVENT		16	RW	0;0;0	This alert is generated by any change to the static data.
BLOCK_ALM	8	24	Record	ALARM_DISC		18	RW	0;0;0	The block alarm is used for all configuration, hardware, connection failure or system problems in the block.
TRANSDUCER_DIRECTORY	9	25	Array	UNSIGNED16		2	R	0	The directory that specifies the number and starting indices of the transducers in the transducer block.
TRANSDUCER_TYPE	10	26	Simple	UNSIGNED16		2	RS	65535	Identifies the transducer type that follows.
TRANSDUCER_TYPE_VER	11	27	Simple	UNSIGNED16		2	RS	0	
XD_ERROR	12	28	Simple	UNSIGNED8		1	R	0	Error codes of the Block.
COLLECTION_DIRECTORY	13	29	Array	UNSIGNED32		4	R	0	A directory that specifies the number, starting indices, and DD Item ids of the data collections in each transducer within a transducer block.
QV	14	30	Record	FLOAT_S		5	RAX	0;0.0	Access Object of Volume flow.
QV_UNIT	15	31	Simple	UNSIGNED16		2	SRWB	1349	Volume flow unit. For details see **Table 1: Units for the volume flow rate** on page 5.
PARTIAL_QV	16	32	Record	FLOAT_S		5	RAX	0;0.0	An object to volume flow.
PARTIAL_QV_UNIT	16	32	Simple	UNSIGNED16		2	SRWB	1349	
QN	17	33	Record	FLOAT_S		5	RAX	0;0.0	An object to volume flow and the unit.
QN_UNIT	18	34	Simple	UNSIGNED16		2	SRWB	1349	Volume flow unit
PARTIAL_QN	19	35	Record	FLOAT_S		5	RAX	0;0.0	An object to volume flow.
PARTIAL_QN_UNIT	20	36	Simple	UNSIGNED16		2	SRWB	1349	
QM	20	36	Record	FLOAT_S		5	RAX	0;0.0	An object to mass flow.
QM_UNIT	21	37	Simple	UNSIGNED16		2	SRWB	1324	Mass flow Unit: For details see **Table 2: Units for mass flow** on page 5.
QP	22	38	Record	FLOAT_S		5	RAX	0;0.0	An object to power.
QP_UNIT	23	39	Simple	UNSIGNED16		2	SRWB	1190	Power unit For details see **Table 3: Power units** on page 5.

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
T	24	40	Record	FLOAT_S		5	RAX	0;0.0	An object to temperature.
T_UNIT	25	41	Simple	UNSIGNED16		2	SRWB	1001	Temperature unit For details see **Table 5: Temperature units** on page 6.
T_AO_IN	26	42	Record	FLOAT_S		5	RWABX	0;0.0	The dvinlettemperature is input from AO Block.
T_AO_IN_UNIT	27	43	Simple	UNSIGNED16		2	RWB	1001	
SECOND_T_AO_IN	27	43	Record	FLOAT_S		5	RWABX	0;0.0	The dvoutlettemperature is input from AO block.
SECOND_T_UNIT	28	44	Simple	UNSIGNED16		2	RWB	1001	
GAGE_P_AO_IN	28	44	Record	FLOAT_S		5	RWABX	0;0.0	The Gas Pressure is input from AO block.
ABS_P_AO_IN	29	45	Record	FLOAT_S		5	RWABX	0;0.0	Absolute Gas Pressure is input from AO block.
P_UNIT	30	46	Simple	UNSIGNED16		2	RWB	1133	Pressure Unit For details see **Table 6: Pressure units** on page 6.
ABS_P_UNIT	31	47	Simple	UNSIGNED16		2	RWB	1133	
GAS_CONTENT_AO_IN	31	47	Record	FLOAT_S		5	RWABX	0;0.0	Gas Content is input from AO block.
GAS_CONTENT_UNIT	32	48	Simple	UNSIGNED16		2	RWB	1342	Gas content unit.
DENSITY_AO_IN	33	49	Record	FLOAT_S		5	RWABX	0;0.0	Density is input from AO block.
DENSITY_UNIT	34	50	Simple	UNSIGNED16		2	RWB	1097	Density unit For details see **Table 4: Density units** on page 5.
TOT_QV	35	51	Record	FLOAT_S		5	RAX	0;0.0	Totalizer volume
TOT_QV_UNIT	36	52	Simple	UNSIGNED16		2	SRWB	1034	Totalizer Volume Units For details see **Table 7: Units for the volume totalizer** on page 6.
TOT_PQV	37	53	Record	FLOAT_S		5	RAX	0;0.0	Totalizer Bio-gas Volume
TOT_PQV_UNIT	38	54	Simple	UNSIGNED16		2	SRWB	1034	Totalizer standard volume
TOT_QN	38	54	Record	FLOAT_S		5	RAX	0;0.0	Totalizer standard volume
TOT_QN_UNIT	39	55	Simple	UNSIGNED16		2	SRWB	1034	Totalizer Standard Volume Units For details see **Table 7: Units for the volume totalizer** on page 6.

… 3 Block overview

… Transducer Block TB1:PCB – Ordinal / Slot 2

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
TOT_PQN	40	56	Record	FLOAT_S		5	RAX	0;0.0	Totalizer Bio-gas Standard Volume
TOT_PQN_UNIT	41	57	Simple	UNSIGNED16		2	SRWB	1034	
TOT_QM	41	57	Record	FLOAT_S		5	RAX	0;0.0	Totalizer mass
TOT_QM_UNIT	42	58	Simple	UNSIGNED16		2	SRWB	1088	Totalizer Mass Units For details see **Table 6: Units for the mass totalizer** on page 6.
TOT_QP	43	59	Record	FLOAT_S		5	RAX	0;0.0	Energy flow
TOT_QP_UNIT	44	60	Simple	UNSIGNED16		2	SRWB	1179	Energy flow Units For details see **Table 3: Power units** on page 5.
DI_LOW_CUT_OFF	45	61	Record	DISC_S		2	RA	0;0	Low cut off.
DI_SWITCH_OUT	46	62	Record	DISC_S		2	RA	0;0	Switch out.
SIMULATION_MODE	47	63	Simple	UNSIGNED8		1	RWX	0	Simulation mode 0: simulation cb off 1: simulation cb qv value 2: simulation cb qm value 3: simulation cb medium temp 4: simulation cb do freq 5: simulation cb do logic 6: simulation cb do pulse 7: simulation fe sensor frequency
REF_TEMPERATURE	48	64	Simple	FLOATING_POINT		4	RWX	0	Reference temperature. Unit: Temperature unit Value: –200 to 500
TEMPERATURE_OFFSET_CORRECTION	49	65	Simple	FLOATING_POINT		4	RWX	0	Rtdsensoroffsetcorrectuserdisp. Value:–50 to 50
QV_MAXDN	50	66	Simple	FLOATING_POINT		4	RWX	0	Qvmaxdn. Unit: Volume Flow Unit. Value: 0.01f to 260000f
QV_MAX	51	67	Simple	FLOATING_POINT		4	RWX	0	Qv Range. Min. Value: qvmindn Max. Value: qvmaxdn
QV_SIMU_STATUS	52	68	Simple	UNSIGNED8		1	RWX	0	Qv simulation enable. 1: enable 0: disable
QV_SIMU_VALUE	53	69	Simple	FLOATING_POINT		4	RWX	0	Qv simulation.

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
PARTIAL_QV_MAX	54	70	Simple	FLOATING_POINT		4	RWX	0	Qv Partial Range. Min. Value: qmindn Max. Value: qnmaxdn
PARTIAL_QV_SIMU_STATUS	55	71	Simple	UNSIGNED8		1	RWX	0	Qv partial simulation enable. 1: enable 0: disable
PARTIAL_QV_SIMU_VALUE	56	72	Simple	FLOATING_POINT		4	RWX	0	Qv partial simulation.
QN_MAX	57	73	Simple	FLOATING_POINT		4	RWX	0	Qn Range. Min. Value: qmindn Max. Value: qnmaxdn
QN_SIMU_STATUS	58	74	Simple	UNSIGNED8		1	RWX	0	Qn simulation enable. 1: enable 0: disable
QN_SIMU_VALUE	59	75	Simple	FLOATING_POINT		4	RWX	0	Qn simulation.
PARTIAL_QN_MAX	60	76	Simple	FLOATING_POINT		4	RWX	0	Qn Partial Range Min. Value: qmindn Max. Value: qnpartialmaxdn
PARTIAL_QN_SIMU_STATUS	61	77	Simple	UNSIGNED8		1	RWX	0	Qn partial simulation enable. 1: enable 0: disable
PARTIAL_QN_SIMU_VALUE	62	78	Simple	FLOATING_POINT		4	RWX	0	Qn partial simulation.
QM_MAX	63	79	Simple	FLOATING_POINT		4	RWX	0	Qm range.
QM_SIMU_STATUS	64	80	Simple	UNSIGNED8		1	RWX	0	Qm simulation enable. 1: enable 0: disable
QM_SIMU_VALUE	65	81	Simple	FLOATING_POINT		4	RWX	0	Qm simulation.
POWER_MAX	66	82	Simple	FLOATING_POINT		4	RWX	0	Qp Range. Min. Value: qmindn Max. Value: Qp maxdn
POWER_SIMU_STATUS	67	83	Simple	UNSIGNED8		1	RWX	0	Qp simulation enable. 1: enable 0: disable
POWER_SIMU_VALUE	68	84	Simple	FLOATING_POINT		4	RWX	0	Qp simulation. Unit: power.

… 3 Block overview

… Transducer Block TB1:PCB – Ordinal / Slot 2

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
T_SIM_ENABLE	69	85	Simple	UNSIGNED8		1	RWABX	0	Dvinlett simulation enable. 0: simulation disable. 1: simulation enable.
T_SIMULATE	70	86	Simple	FLOATING_ POINT		4	RWABX	0	Dvinlett simulation.
T_HI_RANGE	71	87	Simple	FLOATING_ POINT		4	RWABX	0	Dvinlett High Range. Min. Value: dvinlettmindn Max. Value: dvinlettmaxdn
T_LO_RANGE	72	88	Simple	FLOATING_ POINT		4	RWABX	0	Dvinlett Low Range. Min. Value: dvinlettmindn Max. Value: dvinlettmaxdn
SECOND_T_SIM_ ENABLE	73	89	Simple	UNSIGNED8		1	RWABX	0	Dvoutlett simulation enable. 0: simulation disable. 1: simulation enable.
SECOND_T_ SIMULATE	74	90	Simple	FLOATING_ POINT		4	RWABX	0	Dvoutlett simulation. Value:–200 to 500
SECOND_T_HI_ RANGE	75	91	Simple	FLOATING_ POINT		4	RWABX	0	Dvoutlett High Range min Value: dvoutlett mindn Max. Value: dvoutlett maxdn
SECOND_T_LO_ RANGE	76	92	Simple	FLOATING_ POINT		4	RWABX	0	Dvoutlett Low Range min Value: dvoutlett mindn Max. Value: dvoutlett maxdn
SECOND_T	77	93	Simple	FLOATING_ POINT		4	RWX	0	Dvoutlett Value: –300.0f to 600.0f Unit: TEMPERATURE UNIT
ABS_P_SIM_ENABLE	78	94	Simple	UNSIGNED8		1	RWABX	0	Dvpressure simulation enable. 0: simu disable 1: simu enable
ABS_P_SIMULATE	79	95	Simple	FLOATING_ POINT		4	RWABX	0	Dvpressuresimulation.
ABS_P_HI_RANGE	80	96	Simple	FLOATING_ POINT		4	RWABX	0	Dvpressurerange. Max Value: dvpressuremaxdn min Value: dvpressuremindn
ABS_P_LO_RANGE	81	97	Simple	FLOATING_ POINT		4	RWABX	0	Dvpressure Low Range. Max Value: dvpressuremaxdn Min Value: dvpressuremindn
ABS_P	82	98	Simple	FLOATING_ POINT		4	RWX	0	Dvpressure. Value:0.0f to 40101.325f. Unit:Pressure Unit.

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
GAS_CONTENT_SIM_ ENABLE	83	99	Simple	UNSIGNED8		1	RWABX	0	Dv content simulation enable. 0: simulation disable 1: simulation enable
GAS_CONTENT_ SIMULATE	84	100	Simple	FLOATING_ POINT		4	RWABX	0	Dv Content Simulation. Value: 0.0f to 100.0f
GAS_CONTENT_HI_ RANGE	85	101	Simple	FLOATING_ POINT		4	RWABX	0	Dv content high range.
GAS_CONTENT_LO_ RANGE	86	102	Simple	FLOATING_ POINT		4	RWABX	0	Dv content low range.
GAS_CONTENT	87	103	Simple	FLOATING_ POINT		4	RWX	0	Dv Content. Value:0.0f to 100.0f
DENSITY_SIM_ ENABLE	88	104	Simple	UNSIGNED8		1	RWABX	0	Dvdensity Simulation Enable. 0: Simualation Disable. 1: Simualation enable.
DENSITY_SIMULATE	89	105	Simple	FLOATING_ POINT		4	RWABX	0	Dvdensitysimulation.
DENSITY_HI_RANGE	90	106	Simple	FLOATING_ POINT		4	RWABX	0	Dvdensity high range.
DENSITY_LO_RANGE	91	107	Simple	FLOATING_ POINT		4	RWABX	0	Dvdensity low range.
DENSITY	92	108	Simple	FLOATING_ POINT		4	RWX	0	Dvdensity Value: 0.01 to 3000. Unit: mass density unit.
STEAM_STATUS	93	109	Simple	UNSIGNED8		1	RAX	0	Steam status 0: water 1: saturated_steam 2: overheat_steam
DENSITY_REFERENCE	94	110	Simple	FLOATING_ POINT		4	RWABX	0	Densityref. Value: 0.01 to 3000 Unit: density unit.
DENSITY_STANDARD	95	111	Simple	FLOATING_ POINT		4	RWABX	0	Density Value: 0.01 to 3000 Unit: Density Unit.
GAS_CFG_FLAG	96	112	Simple	UNSIGNED8		1	RWABX	0	Gas confflag. 0: NONGONFIGED 1: GONFIGING 2: GONFIGED
CF_MATRIX_SIZE	97	113	Simple	UNSIGNED8		1	RWABX	0	Matrix Size. 0: SIZE3X3,three pressure and three temperature. 1: SIZE4X3,four pressure and three temperature. 2: SIZE9X7,nine pressure and seven temperature.

… 3 Block overview

… Transducer Block TB1:PCB – Ordinal / Slot 2

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
COMPRESSED_ FACTOR_0 to 62	98 to 160	114 to 176	Simple	FLOATING_ POINT		4	RWABX	0	9*7 [0…6],[7…13]…[56…62]
CF_TEMPERATURE_ 0 to 6	161 to 167	177 to 183	Simple	FLOATING_ POINT		4	RWABX	0	Cftemparray0 Value: −10.5f to 64.85f Unit: Temperature Unit.
CF_PRESSURE_ 0 to 8	168 to 176	184 to 192	Simple	FLOATING_ POINT		4	RWABX	0	Cfpressarray0 Value: 0 to 12000f. Unit: Pressure Unit.
CF_REFERENCE	177	193	Simple	FLOATING_ POINT		4	RAX	0	Compress Factor at operating Status. Default Value:1.0f
INLET_ENTHALPY	178	194	Simple	FLOATING_ POINT		4	RAX	0	Hw
OUTLET_ENTHALPY	179	195	Simple	FLOATING_ POINT		4	RAX	0	Hc
STEAM_POWER_TYPE	180	196	Simple	UNSIGNED8		1	RWABX	0	Steampwrrfr 0: Just measure forward flow. 1: measure forward and reverse flow.
SENSOR_FREQ	181	197	Simple	FLOATING_ POINT		4	RAX	0	Dv Frequency Damped. Min. Value: 0.7 Max. Value: 3000
SENSOR_FREQ_SIM_ ENABLE	182	198	Simple	UNSIGNED8		1	RWABX	0	Dv Frequency Simulation Enable. 0: simulation disable. 1: simulation enable.
SENSOR_FREQ_ SIMULATE	183	199	Simple	FLOATING_ POINT		4	RWABX	0	Dv Frequency Simulation. Min. Value: 0.7 Max. Value: 3000
SENSOR_FREQ_ DAMPING_TIME	184	200	Simple	FLOATING_ POINT		4	RWABX	0	Dv Frequency Damping Time. Min. Value: 0.0 Max. Value: 100
T_PRESET	185	201	Simple	FLOATING_ POINT		4	RWX	20	Preset temperature.
SECOND_T_PRESET	186	202	Simple	FLOATING_ POINT		4	RWX	15	Preset second temperature.
P_PRESET	187	203	Simple	FLOATING_ POINT		4	RWX	101,325	Preset pressure.
DENSITY_PRESET	188	204	Simple	FLOATING_ POINT		4	RWX	998	Preset unit density.
GAS_CONTENT_ PRESET	189	205	Simple	FLOATING_ POINT		4	RWX	45	Preset gas content.

Transducer Block TB2:Standard – Ordinal / Slot 3

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
STANDARDTB	0	16	Record	BLOCK		62	SRW	0	
ST_REV	1	17	Simple	UNSIGNED16		2	SR	0	Revision counter for static variables. If a variable changes, the revision counter is incremented each time by one.
TAG_DESC	2	18	Simple	OCTET_STRING		32	SRW	32	A textual description of the block. This has to be unique within a fieldbus.
STRATEGY	3	19	Simple	UNSIGNED16		2	SRW	0	This parameter can be used to build groups of blocks . Each block of a group gets the same reference number.
ALERT_KEY	4	20	Simple	UNSIGNED8		1	SRW	0	This parameter is used as identification number for a part of a plant.
MODE_BLK	5	21	Record	MODE		4	SRW	0x10;0x01; 0x11;0x10	This parameter includes the actual valid and normal operating modes of the block.
BLOCK_ERR	6	22	Simple	BIT_STRING		2	R	0	This parameter contains a summary of the block alarms.
UPDATE_EVT	7	23	Record	ALARM_EVENT		16	RW	0;0;0	State of the function block state machine.
BLOCK_ALM	8	24	Record	ALARM_DISC		18	RW	0;0;0	The block alarm is used for all configuration, hardware, connection failure or system problems in the block.
TRANSDUCER_DIRECTORY	9	25	Array	UNSIGNED16		2	R	0	The directory that specifies the number and starting indices of the transducers in the transducer block.
TRANSDUCER_TYPE	10	26	Simple	UNSIGNED16		2	RS	65535	Identifies the transducer type that follows.
TRANSDUCER_TYPE_VER	11	27	Simple	UNSIGNED16		2	RS	0	
XD_ERROR	12	28	Simple	UNSIGNED8		1	R	0	Error codes of the Block.
COLLECTION_DIRECTORY	13	29	Array	UNSIGNED32		4	R	0	A directory that specifies the number, starting indices, and DD Item ids of the data collections in each transducer within a transducer block.
SENSOR_TYPE_R	14	30	Simple	UNSIGNED8		1	RAX	0	Converter type. 0: swirl 1: vortex

… 3 Block overview

… Transducer Block TB2:Standard – Ordinal / Slot 3

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
METER_SIZE_VORTEX	15	31	Simple	UNSIGNED8		1	RWX	0	The diameter size of Meter when select the Sensor type is Vortex. It include the diameter size following: DIN 15 mm,DIN 25 mm,DIN 40 mm,DIN 50 mm,DIN 80 mm,DIN 100 mm,DIN 150 mm,DIN 200 mm,DIN 250 mm,DIN 300 mm,ANSI 15 mm,ANSI 25 mm,ANSI 40 mm,ANSI 50 mm,ANSI 80 mm,ANSI 100 mm,ANSI 150 mm,ANSI 200 mm,ANSI 250 mm,ANSI 300 mm.
METER_SIZE_SWIRL	16	32	Simple	UNSIGNED8		1	RWX	0	The diameter size of Meter when select the Sensor type is SWIRL. It include the diameter size following: 15 mm,20 mm,25 mm,32 mm,40 mm,50 mm,80 mm,100 mm,150 mm,200 mm,300 mm,400 mm.
SENSOR_ID	17	33	Simple	VISIBLE_STRING		8	RAX	"ABB"	The ID of Sensor. The default value is ‘ABB’.
SENSOR_SAP_NO	18	34	Simple	VISIBLE_STRING		20	RAX	0	The Serial Number of Sensor.
SENSOR_RUN_HOURS	19	35	Simple	UNSIGNED32		4	RAX	0	Sensor run hours.
SENSOR_CALI_DATE	20	36	Simple	VISIBLE_STRING		12	RAX	0	The calibration date of Sensor.
SENSOR_CALI_CERT_NO	21	37	Simple	VISIBLE_STRING		20	RAX	0	Calibration number.
SENSOR_CALI_LOCATION	22	38	Simple	VISIBLE_STRING		32	RAX	0	The location of Sensor Calibration.
TRANSMITTER_TYPE	23	39	Simple	VISIBLE_STRING		12	RAX	0	Transmitter type.
TRANSMITTER_ID	24	40	Simple	VISIBLE_STRING		8	RAX	0	Transmitter ID
TRANSMITTER_SAP	25	41	Simple	VISIBLE_STRING		20	RAX	0	Transmitter sap/erp no.
BOOTLOADER_VERSION	26	42	Simple	VISIBLE_STRING		8	RAX	0	Bootloader version.
TRANSMITTER_RUN_HOURS	27	43	Simple	UNSIGNED32		4	RAX	0	Transmitter run hours.
TRANSMITTER_CALI_DATE	28	44	Simple	VISIBLE_STRING		12	RAX	0	Transmitter calibration date.
TRANSMITTER_CALI_CERT_NO	29	45	Simple	VISIBLE_STRING		20	RAX	0	Transmitter calibration certification number.
TRANSMITTER_CALI_LOCATION	30	46	Simple	VISIBLE_STRING		32	RAX	0	Transmitter calibration location.
MANUFACTURER_NAME	31	47	Simple	VISIBLE_STRING		20	RAX	0	Manufacturer name
STREET	32	48	Simple	VISIBLE_STRING		20	RAX	0	The street of Manufacturer address.
CITY	33	49	Simple	VISIBLE_STRING		20	RAX	0	The city of Manufacturer address.
PHONE	34	50	Simple	VISIBLE_STRING		20	RAX	0	The phone of Manufacturer address.

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
SENSOR_LOCATION_TAG	35	51	Simple	VISIBLE_STRING		20	RAX	0	Sensor location tag.
SENSOR_TAG	36	52	Simple	VISIBLE_STRING		20	RAX	0	Sensor TAG.
QV_DAMPING_TIME	37	53	Simple	FLOATING_POINT		4	RWABX	0	Qv damping time.
PQV_DAMPING_TIME	38	54	Simple	FLOATING_POINT		4	RWABX	0	Qv partial damping time.
QN_DAMPING_TIME	39	55	Simple	FLOATING_POINT		4	RWABX	0	Qn damping time.
PQN_DAMPING_TIME	40	56	Simple	FLOATING_POINT		4	RWABX	0	Qn partial damping time.
QM_DAMPING_TIME	41	57	Simple	FLOATING_POINT		4	RWABX	0	Qm damping time.
QP_DAMPING_TIME	42	58	Simple	FLOATING_POINT		4	RWABX	0	Qp damping time.
T_DAMPING_TIME	43	59	Simple	FLOATING_POINT		4	RWABX	0	Dvinlet T Damping Time.
QV_LOW_CUT_OFF	44	60	Simple	FLOATING_POINT		4	RWABX	0	Qv Low cutoff.
LIQUID_MASS_CORRECTION	45	61	Simple	UNSIGNED8		1	RWABX	0	Liquid Correction. It include density correction, volume correction.
VOLUME_EXPANSION_COEFFICIENTS	46	62	Simple	FLOATING_POINT		4	RWABX	0	Volume Expand Beta1.
DENSITY_EXPANSION_COEFFICIENTS	47	63	Simple	FLOATING_POINT		4	RWABX	0	Density Expand Beta2.
SPECIFIC_HEAT_CAPACITY	48	64	Simple	FLOATING_POINT		4	RWABX	0	Heat Capacity.
GAS_DENSITY_SELECTION	49	65	Simple	UNSIGNED8		1	RWABX	0	Gas mass computation. It have two selection: 0: is the Standard Density 1: is Preset Density
GAS_REF_CONDITIONS	50	66	Simple	UNSIGNED8		1	RWABX	0	GAS_REF_CONDITIONS: 0: pressure is 14.7 psi,60 °F (15.4 °C) 1: pressure is 14.7 psi,70 °F (21.6 °C) 2: 1013.25 mbar,0 °C 3: 1013.25 mbar,20 °C
GAS_STD_MODE	51	67	Simple	UNSIGNED8		1	RWABX	0	GAS_COMPUTATION_TYPE: 0: Real gas equation 1: ISO12213_2/AGA8 2: ISO12213_3/GERG88

… 3 Block overview

… Transducer Block TB2:Standard – Ordinal / Slot 3

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
GAS_ENERGY_ DENSITY	52	68	Simple	FLOATING_ POINT		4	RWABX	0	Calorific energy.
WATER_STEAM_TYPE	53	69	Simple	UNSIGNED8		1	RWABX	0	Steam type: 0: steamtype overheat 1: steamtype saturated 2: steamtype water
STEAM_DENSITY_ SELECTION	54	70	Simple	UNSIGNED8		1	RWABX	0	Actual density selection. 0: ext. Density 1: calculation from P&T 2: calculation from T 3: calculation from p
ENERGY_CALC_ METHOD	55	71	Simple	UNSIGNED8		1	RWABX	0	Steampwrrfr 0: Just measure forward flow. 1: measure forward and reverse flow
DYNAMIC_VISCOSITY	56	72	Simple	FLOATING_ POINT		4	RWABX	0	Dynamic Viscosity Max. Value: 2.0E+12 Min. Value: 1.0E-12
AUTO_ZERO	57	73	Simple	UNSIGNED8		1	RWABX	0	Write autozero. This is an action.
LOW_FLOW_ THRESHOLD	58	74	Simple	INTEGER16		2	RWABX	0	Low Flow Thresh. Min. Value: 7 Max. Value: 2000
SENSOR_SELF_ CHECK	59	75	Simple	UNSIGNED8		1	RWABX	0	Autoself check Enable. 0: STATUS OFF 1: STATUS ON
MAINTENANCE_ CYCLE_TIME	60	76	Simple	UNSIGNED32		4	RWABX	0	Transmitter maintenace cycle. Min. Value: 0 Max. Value: 50000
REYNOLDS_NUMBER	61	77	Simple	FLOATING_ POINT		4	RAX	0	Reynolds Number. Default value: 10000.00f.
DO_LOGIC_STATE	62	78	Simple	UNSIGNED8		1	RAX	0	Hardware logic output. 0: Hardware logic output is low. 1: Hardware logic output is high.
DO_PULSE_NUM	63	79	Simple	UNSIGNED32		4	RAX	0	Pulse output value (the actual number of pulse output)
DO_FREQUENCY	64	80	Simple	FLOATING_ POINT		4	RAX	0	The actual frequency the do output.

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
DO_INPUT_CONFIG_FREQ	65	81	Simple	UNSIGNED8		1	RWX	0	Input Selection Freq 0: QV FREQ 1: PQV FREQ 2: QN FREQ 3: PQN FREQ 4: QM FREQ 5: QP FREQ 6: TEMPERATURE FREQ 255: OFF FREQ
DO_INPUT_CONFIG_PULSE	66	82	Simple	UNSIGNED8		1	RWX	0	Input Selection Pulse 0:QV PULSE 1: PQV PULSE 2: QN PULSE 3: PQN PULSE 4: QM PULSE 5: QP PULSE 255: OFF PULSE
DO_OUTPUTMODE	67	83	Simple	UNSIGNED8		1	RWX	0	Output mode of hardware output logic / freq / pulse / none 0 :Hardware output1 is disabled 1 :Hardware output1 logic signal 2 :Hardware output1 pulse signal 3 :Hardware output1 frequency signal
DO_LOGIC_SRC	68	84	Simple	UNSIGNED8		1	RWX	0	Logic signal source for hardware output. 0: No source selected for logic output 1: Dig out alarm signal selected for logic output
DO_SIMU_MODE	69	85	Simple	UNSIGNED8		1	RWX	0	Simulation hardware output1 mode. 0: hardware output1 is disabled. 1: hardware output1 logic signal. 2: hardware output1 pulse signal. 3: hardware output1 frequency signal. 4: toutputmode1formats numeric limit.
DO_LOGICSTATE_SIM	70	86	Simple	UNSIGNED8		1	RWABX	0	Logic simulation command for hardware (On-output/Off-close) 0: Simulate logic OFF. 1: Simulate logic ON.
DO_FREQ_SIM	71	87	Simple	FLOATING_POINT		4	RWABX	0	Simulation frequency for frequency outputs. The minimum full-scale frequency of real frequency is 0.25f. The maximum full-scale frequency of real frequency is 10500.0f.

… 3 Block overview

… Transducer Block TB2:Standard – Ordinal / Slot 3

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
DO_PULSE_SIM	72	88	Simple	INTEGER16		2	RWABX	0	Simulate pulse number. Min. Value: 0 max. Value: 10000
DO_PULSE_WIDTH	73	89	Simple	FLOATING_POINT		4	RWABX	0	Pulse Width. Min. Value: The minimum pulse width is 0.05ms. Max. Value: The maximum pulse width is 2000ms. Unit: millisecond.
DO_PULSE_FACTOR	74	90	Simple	FLOATING_POINT		4	RWABX	0	Pulse factor. Min. Value: The minimum pulse factor is 0.001 pulses/uot. Max. Value: The maximum pulse factor is 2000.0 pulses/uot.
DO_ALARM_LOW_CUTOFF	75	91	Simple	UNSIGNED8		1	RWABX	0	Enable/disable low flow cut off alarm for diagnosis. 0: alarm disable. 1: alarm enable.
DO_ALARM_GENERAL	76	92	Simple	UNSIGNED8		1	RWABX	0	Enable/disable general alarm for diagnosis. 0: alarm disable. 1: alarm enable.
DO_ALARM_ MINFLOWRATE	77	93	Simple	UNSIGNED8		1	RWABX	0	Enable/disable min flow rate alarm for diagnosis. 0: alarm disable. 1: alarm enable.
DO_ALARM_ MAXFLOWRATE	78	94	Simple	UNSIGNED8		1	RWABX	0	Enable/disable max flow rate alarm for diagnosis. 0: alarm disable. 1: alarm enable.
DO_ALARM_ MINTEMPERATURE	79	95	Simple	UNSIGNED8		1	RWABX	0	Enable/disable min Temperature Alarm for diagnosis. 0: ALARM DISABLE. 1: ALARM ENABLE.
DO_ALARM_ MAXTEMPERATURE	80	96	Simple	UNSIGNED8		1	RWABX	0	Enable/disable max Temperature Alarm for diagnosis. 0: ALARM DISABLE. 1: ALARM ENABLE.
DO_PULSE_UNIT_QV	81	97	Simple	UNSIGNED8		1	RWABX	0	DO Volume. For details see table **Table 7: Units for the volume totalizer** on page 6.

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
DO_PULSE_UNIT_QN	82	98	Simple	UNSIGNED8		1	RWABX	0	The linked object is pulseunit_Qv.it is not correct.
DO_PULSE_UNIT_QM	83	99	Simple	UNSIGNED8		1	RWABX	0	DO Mass. For details see table **Table 6: Units for the mass totalizer** on page 6.
DO_PULSE_UNIT_QP	84	100	Simple	UNSIGNED8		1	RWABX	0	DO Energy For details see table **Table 3: Power units** on page 5.
DO_MIN_FREQ	85	101	Simple	FLOATING_POINT		4	RWABX	0	Frequency minimum range. The minimum fullscale frequency of real frequency is 0.25f the maximum fullscale frequency of real frequency is 10500.0f.
DO_MAX_FREQ	86	102	Simple	FLOATING_POINT		4	RWABX	0	Frequency maximum range. The minimum fullscale frequency of real frequency is 0.25f the maximum fullscale frequency of real frequency is 10500.
DO_LOGIC_ACTIVE_SELECTION	87	103	Simple	UNSIGNED8		1	RWABX	0	Logic output NC/NO. 0: Logic output Active State is high 1: Logic output Active State is low
MEDIUM_TYPE	88	104	Simple	UNSIGNED8		1	RWABX	0	Medium Type. 0: MEDIUM TYPE is LIQUID 1: MEDIUM TYPE is GAS 2: MEDIUM TYPE is STEAM
START_ALL_TOTALIZERS	89	105	Simple	UNSIGNED8		1	WX	0	Start All of the Totalizers according to Operation Mode in VT5.
START_QV_TOTALIZER	90	106	Simple	UNSIGNED8		1	WX	0	Start qv totalizer.
START_QN_TOTALIZER	91	107	Simple	UNSIGNED8		1	WX	0	Start qn totalizer.
START_QM_TOTALIZER	92	108	Simple	UNSIGNED8		1	WX	0	Start qm totalizer.
START_QP_TOTALIZER	93	109	Simple	UNSIGNED8		1	WX	0	Start energy totalizer.
START_QVP_TOTALIZER	94	110	Simple	UNSIGNED8		1	WX	0	Start qvpartial Totalizer.
START_QNP_TOTALIZER	95	111	Simple	UNSIGNED8		1	WX	0	Start qnpartial Totalizer.

… 3 Block overview

… Transducer Block TB2:Standard – Ordinal / Slot 3

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
STOP_ALL_ TOTALIZERS	96	112	Simple	UNSIGNED8		1	WX	0	Stop All of the Totalizers according to Operation Mode in VT5.
STOP_QV_ TOTALIZER	97	113	Simple	UNSIGNED8		1	WX	0	Stop qv totalizer.
STOP_QN_ TOTALIZER	98	114	Simple	UNSIGNED8		1	WX	0	Stop qn totalizer.
STOP_QM_ TOTALIZER	99	115	Simple	UNSIGNED8		1	WX	0	Stop qm totalizer.
STOP_QP_ TOTALIZER	100	116	Simple	UNSIGNED8		1	WX	0	Stop energy totalizer.
STOP_QVP_ TOTALIZER	101	117	Simple	UNSIGNED8		1	WX	0	Stopqvpartial Totalizer.
STOP_QNP_ TOTALIZER	102	118	Simple	UNSIGNED8		1	WX	0	Stop qnpartial Totalizer.
RESET_ALL_ TOTALIZERS	103	119	Simple	UNSIGNED8		1	WX	0	Reset All of the Totalizers according to Operation Mode in VT5.
RESET_QV_ TOTALIZER	104	120	Simple	UNSIGNED8		1	WX	0	Reset qv totalizer.
RESET_QN_ TOTALIZER	105	121	Simple	UNSIGNED8		1	WX	0	Reset qn totalizer.
RESET_QM_ TOTALIZER	106	122	Simple	UNSIGNED8		1	WX	0	Reset qm totalizer.
RESET_QP_ TOTALIZER	107	123	Simple	UNSIGNED8		1	WX	0	Reset energy totalzier.
RESET_QVP_ TOTALIZER	108	124	Simple	UNSIGNED8		1	WX	0	Reset qvpartial Totalizer.
RESET_QNP_ TOTALIZER	109	125	Simple	UNSIGNED8		1	WX	0	Reset qnpartial Totalizer.
QV_TOTALIZER_ PRESET	110	126	Simple	FLOATING_POINT		4	RWX	0	
QN_TOTALIZER_ PRESET	111	127	Simple	FLOATING_POINT		4	RWX	0	
QM_TOTALIZER_ PRESET	112	128	Simple	FLOATING_POINT		4	RWX	0	
QP_TOTALIZER_ PRESET	113	129	Simple	FLOATING_POINT		4	RWX	0	
QVP_TOTALIZER_ PRESET	114	130	Simple	FLOATING_POINT		4	RWX	0	
QNP_TOTALIZER_ PRESET	115	131	Simple	FLOATING_POINT		4	RWX	0	

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
SET_ALL_ TOTALIZERS_PRESET	116	132	Simple	UNSIGNED8		1	WX	0	Preset All of the Totalizers according to Operation Mode in VT5.
SET_QV_TOTALIZER_ PRESET	117	133	Simple	UNSIGNED8		1	WX	0	Preset qv totalizer.
SET_QN_TOTALIZER_ PRESET	118	134	Simple	UNSIGNED8		1	WX	0	Preset qn totalizer.
SET_QM_TOTALIZER_ PRESET	119	135	Simple	UNSIGNED8		1	WX	0	Preset qm totalizer.
SET_QP_TOTALIZER_ PRESET	120	136	Simple	UNSIGNED8		1	WX	0	Preset energy totalizer.
SET_QVP_ TOTALIZER_PRESET	121	137	Simple	UNSIGNED8		1	WX	0	Preset qvpartial Totalizer.
SET_QNP_ TOTALIZER_PRESET	122	138	Simple	UNSIGNED8		1	WX	0	Preset qnpartial Totalizer.
QV_TOTALIZER_ OVERFLOW_COUNTS	123	139	Simple	UNSIGNED32		4	RX	0	
QN_TOTALIZER_ OVERFLOW_COUNTS	124	140	Simple	UNSIGNED32		4	RX	0	
QM_TOTALIZER_ OVERFLOW_COUNTS	125	141	Simple	UNSIGNED32		4	RX	0	
QP_TOTALIZER_ OVERFLOW_COUNTS	126	142	Simple	UNSIGNED32		4	RX	0	
QVP_TOTALIZER_ OVERFLOW_COUNTS	127	143	Simple	UNSIGNED32		4	RX	0	
QNP_TOTALIZER_ OVERFLOW_COUNTS	128	144	Simple	UNSIGNED32		4	RX	0	
TOTALIZER_OVERFLOW_THRESHOLD	129	145	Simple	FLOATING_POINT		4	RX	0	
FE_SW_VERSION	130	146	Simple	VISIBLE_STRING		8	RAX	0	Frond end software version.
FE_HW_VERSION	131	147	Simple	VISIBLE_STRING		8	RAX	0	Frond end hardware version.
AUTO_ZERO_STATUS	132	148	Simple	UNSIGNED8		1	RAX	0	Autozero Status. 0: STATUS COMPLETED. 1: STATUS UNCOMPLETED. 2: STATUS FAIL. 3: STATUS NOT START.

… 3 Block overview

Transducer Block TB3:Advanced – Ordinal / Slot 4

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
ADVANCEDTB	0	16	Record	BLOCK		62	SRW	0	
ST_REV	1	17	Simple	UNSIGNED16		2	SR	0	Revision counter for static variables. If a variable changes, the revision counter is incremented each time by one.
TAG_DESC	2	18	Simple	OCTET_STRING		32	SRW	32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32	A textual description of the block. This has to be unique within a fieldbus.
STRATEGY	3	19	Simple	UNSIGNED16		2	SRW	0	This parameter can be used to build groups of blocks. Each block of a group gets the same reference number.
ALERT_KEY	4	20	Simple	UNSIGNED8		1	SRW	0	This parameter is used as identification number for a part of a plant.
MODE_BLK	5	21	Record	MODE		4	SRW	0x10;0x01; 0x11;0x10	This parameter includes the actual valid and normal operating modes of the block.
BLOCK_ERR	6	22	Simple	BIT_STRING		2	R	0	This parameter contains a summary of the block alarms.
UPDATE_EVT	7	23	Record	ALARM_EVENT		16	RWX	0;0;0,0;0; 0;9;0	State of the function block state machine.
BLOCK_ALM	8	24	Record	ALARM_DISC		18	RWX	0;0;0,0;0; 0;0;8;0;0	The block alarm is used for all configuration, hardware, connection failure or system problems in the block.
TRANSDUCER_DIRECTORY	9	25	Array	UNSIGNED16		2	R	0	The directory that specifies the number and starting indices of the transducers in the transducer block.
TRANSDUCER_TYPE	10	26	Simple	UNSIGNED16		2	RS	65535	Identifies the transducer type that follows.
TRANSDUCER_TYPE_VER	11	27	Simple	UNSIGNED16		2	RS	0	
XD_ERROR	12	28	Simple	UNSIGNED8		1	R	0	Error codes of the Block.
COLLECTION_DIRECTORY	13	29	Array	UNSIGNED32		4	R	0	A directory that specifies the number, starting indices, and DD Item ids of the data collections in each transducer within a transducer block.

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
RESET_RUN_HOUR_ TRANS	14	30	Simple	UNSIGNED8		1	RWX	0	Reset FE Run hour.
RUN_HOURS_ TRANSMITTER	15	31	Simple	UNSIGNED32		4	RX	0	Frontend operation hour.
MAINTENANCE_ CYCLE_TIME_TRANS	16	32	Simple	UNSIGNED32		4	RWX	17520	Frontend Maintenance Cycle time.
SENSOR_TYPE	17	33	Simple	UNSIGNED8		1	RWX	0	Sensor converter type. 0: swirl. 1: vortex.
METER_SIZE_VORTEX	18	34	Simple	UNSIGNED8		1	RWX	0	Vortex meter Size. 0: DIN 15 mm 10: ANSI 15 mm 1: DIN 25 mm 11: ANSI 25 mm 2: DIN 40 mm 12: ANSI 40 mm 3: DIN 50 mm 13: ANSI 50 mm 4: DIN 80 mm 14: ANSI 80 mm 5: DIN 100 mm 15: ANSI 100 mm 6: DIN 150 mm 16: ANSI 150 mm 7: DIN 200 mm 17: ANSI 200 mm 8: DIN 250 mm 18: ANSI 250 mm 9: DIN 300 mm 19: ANSI 300 mm
METER_SIZE_SWIRL	19	35	Simple	UNSIGNED8		1	RWX	0	Swirl meter Size 0: Swirl15mm 6: Swirl80mm 1: Swirl20mm 7: Swirl100mm 2: Swirl25mm 8: Swirl150mm 3: Swirl32mm 9: Swirl200mm 4: Swirl40mm 10: Swirl300mm 5: Swirl50mm 11: Swirl400mm
QV_MAX_DN	20	36	Simple	FLOATING_POINT		4	RWX	80	Access Object of the maximum measurable volume flow. Value: The maximum measurable volume flow. Unitcode: Reference volume flow units of sheet "Unit".
RTD_CONNECTION	21	37	Simple	UNSIGNED8		1	RWX	0	Temperature sensor type. 0: temp_pt100 1: temp_pt1000 2: temp_none.

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… Transducer Block TB3:Advanced – Ordinal / Slot 4

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
MAX_MEDIUM_TEMP	22	38	Simple	FLOATING_POINT		4	RWX	0	Max medium temperature. Value: −400 to 1000℃ Unit: 1: kelvin 2: celsius 3: fahrenheit
RESET_RUN_HOUR_SENSOR	23	39	Simple	UNSIGNED8		1	RWX	0	Reset FE Run hour.
RUN_HOURS_SENSOR	24	40	Simple	UNSIGNED32		4	RX	0	Frontend operation hour.
MAINTENANCE_CYCLE_TIME_SENSOR	25	41	Simple	UNSIGNED32		4	RWX	0	Frontend Maintenance Cycle time.
SNR	26	42	Simple	FLOATING_POINT		4	RX	0	The Ration of Signal /Noise
SNR_THRESHOLD	27	43	Simple	INTEGER16		2	RWX	−50	Sensor threshold.
AUTO_CHECK_EN	28	44	Simple	UNSIGNED8		1	RWX	0	Auto self check Enable. 0: STATUS OFF. 1: STATUS ON.
AUTO_CHECK_RANGE	29	45	Simple	INTEGER16		2	RWX	32767	Span upper range.
SIG_AMPLITUDE	30	46	Simple	UNSIGNED16		2	RX	0	Signal amplitude.
VBR_AMPLITUDE	31	47	Simple	UNSIGNED16		2	RX	0	Vibration amplitude.
FFT_MAGNITUDE	32	48	Simple	UNSIGNED16		2	RX	0	Signal magnitude.
CALIBRATION_STATUS	33	49	Simple	UNSIGNED8		1	RWX	0	Calibration status.
INT_RTD_PASSWORD	34	50	Simple	VISIBLE_STRING		6	RWX	"******"	Internal rtd password.
ENERGY_PASSWORD	35	51	Simple	VISIBLE_STRING		6	RWX	"******"	Energy flow password.
K_LINERISATION	36	52	Simple	UNSIGNED8		1	RWX	0	Enalbe k linearization. 0: average 1: 1pt 2: 2pt 3: 3pt 4: 4pt 5: 5pt 6: 6pt 7: 7pt 8: 8pt
K_SET	37	53	Simple	UNSIGNED8		1	RWX	0	Select gas kfactor or liquid factor. 0: kfactor gas 1: kfactor liquid
K_AVERAGE_LIQUID	38	54	Simple	FLOATING_POINT		4	RWX	7420	Average Liquid K Factor. Min. Value: 10.00f Max. Value: 800000.00f

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
K_LIQUID_1	39	55	Simple	FLOATING_POINT		4	RWX	0	Liquid kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_LIQUID_2	40	56	Simple	FLOATING_POINT		4	RWX	0	Liquid kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_LIQUID_3	41	57	Simple	FLOATING_POINT		4	RWX	0	Liquid kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_LIQUID_4	42	58	Simple	FLOATING_POINT		4	RWX	0	Liquid kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_LIQUID_5	43	59	Simple	FLOATING_POINT		4	RWX	0	Liquid kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_LIQUID_6	44	60	Simple	FLOATING_POINT		4	RWX	0	Liquid kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_LIQUID_7	45	61	Simple	FLOATING_POINT		4	RWX	0	Liquid kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_LIQUID_8	46	62	Simple	FLOATING_POINT		4	RWX	0	Liquid kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_LIQUID_FREQ_1	47	63	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Kfactor. Min. Value: 0.30f. Max. Value: 1000.00f.
K_LIQUID_FREQ_2	48	64	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Kfactor. Min. Value: 0.30f. Max. Value: 1000.00f.
K_LIQUID_FREQ_3	49	65	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Kfactor. Min. Value: 0.30f. Max. Value: 1000.00f.
K_LIQUID_FREQ_4	50	66	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Kfactor. Min. Value: 0.30f. Max. Value: 1000.00f.

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Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
K_LIQUID_FREQ_5	51	67	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Kfactor. Min. Value: 0.30f. Max. Value: 1000.00f.
K_LIQUID_FREQ_6	52	68	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Kfactor. Min. Value: 0.30f. Max. Value: 1000.00f.
K_LIQUID_FREQ_7	53	69	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Kfactor. Min. Value: 0.30f. Max. Value: 1000.00f.
K_LIQUID_FREQ_8	54	70	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Kfactor. Min. Value: 0.30f. Max. Value: 1000.00f.
K_AVERAGE_GAS	55	71	Simple	FLOATING_POINT		4	RWX	7420	Average gas k factor. Min. Value: 10.00f Max. Value: 800000.00f
K_GAS_1	56	72	Simple	FLOATING_POINT		4	RWX	0	Gas kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_GAS_2	57	73	Simple	FLOATING_POINT		4	RWX	0	Gas kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_GAS_3	58	74	Simple	FLOATING_POINT		4	RWX	0	Gas kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_GAS_4	59	75	Simple	FLOATING_POINT		4	RWX	0	Gas kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_GAS_5	60	76	Simple	FLOATING_POINT		4	RWX	0	Gas kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_GAS_6	61	77	Simple	FLOATING_POINT		4	RWX	0	Gas kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_GAS_7	62	78	Simple	FLOATING_POINT		4	RWX	0	Gas kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f
K_GAS_8	63	79	Simple	FLOATING_POINT		4	RWX	0	Gas kfactor of 5 Point. Min. Value: 10.00f Max. Value: 800000.00f

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
K_GAS_FREQ_1	64	80	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Gas K Factor. Min. Value: 2.00f. Max. Value: 3000.00f.
K_GAS_FREQ_2	65	81	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Gas K Factor. Min. Value: 2.00f. Max. Value: 3000.00f.
K_GAS_FREQ_3	66	82	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Gas K Factor. Min. Value: 2.00f. Max. Value: 3000.00f.
K_GAS_FREQ_4	67	83	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Gas K Factor. Min. Value: 2.00f. Max. Value: 3000.00f.
K_GAS_FREQ_5	68	84	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Gas K Factor. Min. Value: 2.00f. Max. Value: 3000.00f.
K_GAS_FREQ_6	69	85	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Gas K Factor. Min. Value: 2.00f. Max. Value: 3000.00f.
K_GAS_FREQ_7	70	86	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Gas K Factor. Min. Value: 2.00f. Max. Value: 3000.00f.
K_GAS_FREQ_8	71	87	Simple	FLOATING_POINT		4	RWX	0	5 Point Frequency relate to Gas K Factor. Min. Value: 2.00f. Max. Value: 3000.00f.
READ_PARAMETERS	72	88	Simple	UNSIGNED8		1	RWX	0	Read FE Parameters.
WRITE_PARAMETERS	73	89	Simple	UNSIGNED8		1	RWX	0	Write Parameters to FE.
SAVE_AS_ CUSTOMER_DEF	74	90	Simple	UNSIGNED8		1	RWX	0	Save Customer Default.
SAVE_AS_FACTORY_ DEF	75	91	Simple	UNSIGNED8		1	RWX	0	Save Factory Default.
RESET_TO_ CUSTOMER_DEF	76	92	Simple	UNSIGNED8		1	RWX	0	Reset Customer Default.
RESET_TO_ FACTORY_DEF	77	93	Simple	UNSIGNED8		1	RWX	0	Reset Factory Default.
VIB_CORRECTION_ON	78	94	Simple	UNSIGNED8		1	RWX	0	Vibration Correction On. 0: STATUS OFF. 1: STATUS ON.
VIB_FILTER_STEP	79	95	Simple	INTEGER16		2	RWX	33	Vibration filstep. Min. Value: 33. Max. Value: 1310.
VIB_NUM_OF_COEF	80	96	Simple	UNSIGNED8		1	RWX	15	Vibration filnumcoef. Min. Value: 10. Max. Value: 50.

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… Transducer Block TB3:Advanced – Ordinal / Slot 4

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
LOCK_MIN_ INTEGRATION_ PERIOD	81	97	Simple	UNSIGNED8		1	RWX	1	Lockminintperiod. Min. Value: 1. Max. Value: 4.
LOCK_MAX_ INTEGRATION_ PERIOD	82	98	Simple	UNSIGNED8		1	RWX	4	Lockmaxintperiod. Min. Value: 4 Max. Value: 8
LOCK_ESTI_ ERROR_MARGIN	83	99	Simple	UNSIGNED8		1	RWX	10	Lockestimation. Min. Value: 10 Max. Value: 30
LOCK_ACCURACY_ IN_HIGH_SAMP	84	100	Simple	UNSIGNED8		1	RWX	1	Accuracyhigh. Min. Value: 1 Max. Value: 4
LOCK_ACCURACY_ IN_MID_SAMP	85	101	Simple	UNSIGNED8		1	RWX	1	Accuracymiddle. Min. Value: 1 Max. Value: 4
LOCK_ACCURACY_ IN_LOW_SAMP	86	102	Simple	UNSIGNED8		1	RWX	1	Accuracylow. Min. Value: 1 Max. Value: 4
ANALOGUE_GAIN	87	103	Simple	UNSIGNED8		1	RWX	0	Analog Gain control times. 1: GAIN_CONTROL_1TIMES. 2: GAIN_CONTROL_2TIMES. 4: GAIN_CONTROL_4TIMES. 8: GAIN_CONTROL_8TIMES.
GAIN_CTRL_ON	88	104	Simple	UNSIGNED8		1	RWX	0	Gain Control. 0: STATUS OFF. 1: STATUS ON.
GAIN_LOW_THLD	89	105	Simple	INTEGER16		2	RWX	2048	Gain Low Thresh. Min. Value: 2048 Max. Value: 10240
GAIN_HIGH_THLD	90	106	Simple	INTEGER16		2	RWX	20480	Gain High Thresh. Min. Value: 20480 Max. Value: 30720
GAIN_MARGIN_IN_ FREQ	91	107	Simple	INTEGER16		2	RWX	660	Gain Margin Freq. Min. Value: 660. Max. Value: 4096.
GAIN_MAX_SHIFT	92	108	Simple	UNSIGNED8		1	RWX	0	Gain Max Shift. Min. Value: 0 Max. Value: 2

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
LOW_FLOW_ THLD_ON	93	109	Simple	UNSIGNED8		1	RWX	0	Low Flow threshold 0: STATUS OFF. 1: STATUS ON.
LOW_FLOW_THLD	94	110	Simple	INTEGER16		2	RWX	7	Low Flow Thresh. Min. Value: 7 Max. Value: 2000
LOW_FLOAT_THLD_ COEFFICIENT	95	111	Simple	INTEGER16		2	RWX	5	Lowflow Thresh Coef. Min. Value: −10 Max. Value: 10
NOISE_SAMP_SIZE	96	112	Simple	UNSIGNED8		1	RWX	4	Noisesampsize. Min. Value: 4 Max. Value: 8
STATIC_ DECIMATION_BITS	97	113	Simple	UNSIGNED8		1	RWX	0	Static Decimation. Min. Value: 0 Max. Value: 5
MIDDLE_ DECIMATION_BITS	98	114	Simple	UNSIGNED8		1	RWX	1	Middle Buf Decimation. Min. Value: 1 Max. Value: 6
MAX_FREQ	99	115	Simple	FLOATING_POINT		4	RWX	3000	Max Flow Freq. Min. Value: 19.0f Max. Value: 3000.0f
MIN_FREQ	100	116	Simple	FLOATING_POINT		4	RWX	0	Min Flow Freq. Min. Value: 0.0f Max. Value: 1000.0f
MIN_MARGIN	101	117	Simple	UNSIGNED8		1	RWX	0	Frequency Min Margin Per. Min. Value: 0 Max. Value: 30
MAX_MARGIN	102	118	Simple	UNSIGNED8		1	RWX	0	Freq Max Margin Per. Min. Value: 0 Max. Value: 30
SAVE_ALL_AS_ DEFAULT	103	119	Simple	UNSIGNED8		1	RWX	0	Save All As Default.
RESET_ALL_TO_ DEFAULT	104	120	Simple	UNSIGNED8		1	RWX	0	Reset All To Default.
FORCE_REPLACE	105	121	Simple	UNSIGNED8		1	RWX	0	Force Replace. 0: NV replace is not enabled. 1: NV replace from FE to CB for common data. 2: NV replace from FE to CB for all data. 3: NV replace from CB to FE for all data.
FORMAT_CB_NV	106	122	Simple	UNSIGNED8		1	RWX	0	Initialize Nv.
FORMAT_FE_NV	107	123	Simple	UNSIGNED8		1	RWX	0	Format FE NV.

… 3 Block overview

Analog Input Block AI1, 2, 3, 4 – Ordinal / Slot 5, 6, 7, 8

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
ANALOG_INPUT_ BLOCK	0	16	Record	BLOCK		62	SRW	0	The AI block takes the manufacturer's input data, selected by channel number, and makes it available to other function blocks at its output.
ST_REV	1	17	Simple	UNSIGNED16		2	SR	0	Revision counter for static variables. If a variable changes, the revision counter is incremented each time by one.
TAG_DESC	2	18	Simple	OCTET_STRING		32	SRW	" "	A textual description of the block. This has to be unique within a fieldbus.
STRATEGY	3	19	Simple	UNSIGNED16		2	SRW	0	This parameter can be used to build groups of blocks. Each block of a group gets the same reference number.
ALERT_KEY	4	20	Simple	UNSIGNED8		1	SRW	0	This parameter is used as identification number for a part of a plant.
MODE_BLK	5	21	Record	MODE		4	SRW	0x01;0x01; 0x19;0x10	This parameter includes the actual valid and normal operating modes of the block.
BLOCK_ERR	6	22	Simple	BIT_STRING		2	R	0	This parameter contains a summary of the block alarms.
PV	7	23	Record	FLOAT_S		5	R	0x1C;0.0	Either the primary analog value for use in executing the function, or a process value associated with it.
OUT	8	24	Record	FLOAT_S		5	NRWO	0x1C;0.0	The primary analog value calculated as a result of executing the function.
SIMULATE	9	25	Record	SIM_FLOAT		11	RW	0; 0.0; 0; 0.0; 1	Allows the transducer analog 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.
XD_SCALE	10	26	Record	SCALE		11	SRW	100.0; 0.0; 1342; 2	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.
OUT_SCALE	11	27	Record	SCALE		11	SRW	100.0; 0.0; 1342; 2	Index to the text describing the states of a discrete output.
GRANT_DENY	12	28	Record	ACCESS_PERM		2	RW	0;0	Options for controlling access of host computer and local control panels to operating, tuning and alarm parameters of the block.

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
IO_OPTS | IO_OPTS_AI	13	29	Simple	BIT_STRING		2	SRW	0x0008	Options which the user may select to alter input and output block processing.
STATUS_OPTS | STATUS_OPTS_AI	14	30	Simple	BIT_STRING		2	SRW	0	Options which the user may select in the block processing of status.
CHANNEL | AI_CHANNEL	15	31	Simple	UNSIGNED16		2	SRW	0	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.
L_TYPE	16	32	Simple	UNSIGNED8		1	SRW	0	Determines if the values passed by the transducer block 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.
LOW_CUT	17	33	Simple	FLOATING_ POINT		4	SRW	0	Limit used in square root processing. A value of zero percent of scale is used in block processing if the transducer value falls below this limit, This feature may be used to eliminate noise near zero for a flow sensor.
PV_FTIME	18	34	Simple	FLOATING_ POINT		4	SRW	0	Time constant of a single exponential filter for the PV, in seconds.
FIELD_VAL	19	35	Record	FLOAT_S		5	R	0;0.0	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).
UPDATE_EVT	20	36	Record	ALARM_EVENT		16	RW	0;0;0,0;0;0;9;0	This alert is generated by any change to the static data.
BLOCK_ALM	21	37	Record	ALARM_DISC		18	RW	0;0;0,0;0; 0;0;8;0;0	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.

… 3 Block overview

… Analog Input Block AI1, 2, 3, 4 – Ordinal / Slot 5, 6, 7, 8

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
ALARM_SUM | ALARM_SUM_AI	22	38	Record	ALARM_ SUMMARY		8	SRW	0;0;0;0	The current alert status, unacknowledged states, unreported states, and disabled states of the alarms associated with the function block.
ACK_OPTION | ACK_OPTION_AI	23	39	Simple	BIT_STRING		2	SRW	0	Selection of whether alarms associated with the block will be automatically acknowledged.
ALARM_HYS	24	40	Simple	FLOATING_ POINT		4	SRW	0,5	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 .
HI_HI_PRI	25	41	Simple	UNSIGNED8		1	SRW	0	Priority of the high high alarm.
HI_HI_LIM	26	42	Simple	FLOATING_ POINT		4	SRW	0	The setting for high high alarm in engineering units.
HI_PRI	27	43	Simple	UNSIGNED8		1	SRW	0	Priority of the high alarm.
HI_LIM	28	44	Simple	FLOATING_ POINT		4	SRW	0	Value for upper limit of warnings in physical units like OUT.
LO_PRI	29	45	Simple	UNSIGNED8		1	SRW	0	Priority of the low alarm.
LO_LIM	30	46	Simple	FLOATING_ POINT		4	SRW	0	Value for lower limit of warnings in physical units like OUT.
LO_LO_PRI	31	47	Simple	UNSIGNED8		1	SRW	0	Priority of the low low alarm.
LO_LO_LIM	32	48	Simple	FLOATING_ POINT		4	SRW	0	Value for the lower limit of alarms in physical units like OUT.
HI_HI_ALM	33	49	Record	ALARM_FLOAT		21	RW	0;0;0,0;0; 0.0;0;4;0;0	State of the upper limit of alarms.
HI_ALM	34	50	Record	ALARM_FLOAT		21	RW	0;0;0,0;0; 0.0;0;2;0;0	State of the upper limit of warnings.
LO_ALM	35	51	Record	ALARM_FLOAT		21	RW	0;0;0,0;0; 0.0;0;1;0;0	State of the lower limit of warnings.
LO_LO_ALM	36	52	Record	ALARM_FLOAT		21	RW	0;0;0,0;0; 0.0;0;3;0;0	State of the lower limit of alarms.
BLOCK_ERR_DESC_1	37	53	Simple	BIT_STRING		4	R	0	this parameter is used by a device to report more specific details regarding persistent errors that are reported through BLOCK_ERR.

Analog Output Block AO1, 2, 3 – Ordinal / Slot 9, 10, 11

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
ANALOG_OUTPUT_BLOCK	0	16	Record	BLOCK		62	SRW	0	The AO block converts the value in SP to something useful for the hardware found at the CHANNEL selection.
ST_REV	1	17	Simple	UNSIGNED16		2	SR	0	Revision counter for static variables. If a variable changes, the revision counter is incremented each time by one.
TAG_DESC	2	18	Simple	OCTET_STRING		32	SRW	32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32	A textual description of the block. This has to be unique within a fieldbus.
STRATEGY	3	19	Simple	UNSIGNED16		2	SRW	0	This parameter can be used to build groups of blocks. Each block of a group gets the same reference number.
ALERT_KEY	4	20	Simple	UNSIGNED8		1	SRW	0	This parameter is used as identification number for a part of a plant.
MODE_BLK	5	21	Record	MODE		4	SRW	0x01;0x01;0x79;0x30	This parameter includes the actual valid and normal operating modes of the block.
BLOCK_ERR	6	22	Simple	BIT_STRING		2	R	0	This parameter contains a summary of the block alarms.
PV	7	23	Record	FLOAT_S		5	R	0;0.0	Either the primary analog value for use in executing the function, or a process value associated with it.
SP	8	24	Record	FLOAT_S		5	NRW	0xC0;0.0	The analog setpoint of this block.
OUT	9	25	Record	FLOAT_S		5	NRWO	0x1C;0.0	The primary analog value calculated as a result of executing the function.
SIMULATE	10	26	Record	SIM_FLOAT		11	RW	0;0.0;0;0.0;1	Allows the transducer analog 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.
PV_SCALE	11	27	Record	SCALE		11	SRW	100.0;0.0;0;0	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.

… 3 Block overview

… Analog Output Block AO1, 2, 3 – Ordinal / Slot 9, 10, 11

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
XD_SCALE	12	28	Record	SCALE		11	SRW	100.0;0.0;0;0	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.
GRANT_DENY	13	29	Record	ACCESS_PERM		2	SRW	0	Options for controlling access of host computer and local control panels to operating, tuning and alarm parameters of the block.
IO_OPTS | IO_OPTS_AO	14	30	Simple	BIT_STRING		2	SRW	0	Options which the user may select to alter input and output block processing.
STATUS_OPTS | STATUS_OPTS_AO	15	31	Simple	BIT_STRING		2	SRW	0	Options which the user may select in the block processing of status.
READBACK	16	32	Record	FLOAT_S		5	R	0;0.0	This indicates the readback of the actual continuous valve or other actuator position, in transducer units.
CAS_IN	17	33	Record	FLOAT_S		5	RWI	0x08;0.0	This parameter is the remote setpoint value, which must come from another Fieldbus block, or a DCS block through a defined link.
SP_RATE_DN	18	34	Simple	FLOATING_POINT		4	SRW	0	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, then the setpoint will be used immediately. For control blocks, rate limiting will apply only in Auto. For output blocks, rate limiting will apply in Auto, Cas, and RCas modes.
SP_RATE_UP	19	35	Simple	FLOATING_POINT		4	SRW	0	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, then the setpoint will be used immediately. For control blocks, rate limiting will apply only in Auto. For output blocks,rate limiting will apply in Auto, Cas, and RCas modes.
SP_HI_LIM	20	36	Simple	FLOATING_POINT		4	SRW	100	The setpoint high limit is the highest setpoint operator entry that can be used for the block.
SP_LO_LIM	21	37	Simple	FLOATING_POINT		4	SRW	0	The setpoint low limit is the lowest setpoint operator entry that can be used for the block.
CHANNEL | AO_CHANNEL	22	38	Simple	UNSIGNED16		2	SRW	0	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.

Parameter Name	Rel. Idx	Slot Idx	Obj. Type	Data Type	Store	Bytes	Access	Default value	Description
FSTATE_TIME	23	39	Simple	FLOATING_POINT		4	SRW	0	The delay time, in seconds, from detection of a condition which can initiate fault state action within an output block until the actual initiation of such output action of the block output if the condition continuously, as sampled by the output block, exists during this time interval.
FSTATE_VAL	24	40	Simple	FLOATING_POINT		4	SRW	0	The preset analog working setpoint value to use when fault occurs. This value will be used if the I/O option Fault State to value is selected.
BKCAL_OUT	25	41	Record	FLOAT_S		5	RO	0;0.0	The value and status required by an upper block's BKCAL_IN so that the upper block may prevent reset windup and provide bumpless transfer to closed loop control.
RCAS_IN	26	42	Record	FLOAT_S		5	RW	0x1C;0.0	Target setpoint and status provided by a supervisory Host to a analog control or output block.
SHED_OPT	27	43	Simple	UNSIGNED8		1	SRW	0	Defines action to be taken on remote control device timeout.
RCAS_OUT	28	44	Record	FLOAT_S		5	R	0;0.0	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.
UPDATE_EVT	29	45	Record	ALARM_EVENT		16	RW	0;0;0,0;0; 0;9;0	This alert is generated by any change to the static data.
BLOCK_ALM	30	46	Record	ALARM_DISC		18	RW	0;0;0,0;0; 0;0;8;0;0	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.
BLOCK_ERR_DESC_1	31	47	Simple	BIT_STRING		4	R	0	This parameter is used by a device to report more specific details regarding persistent errors that are reported through BLOCK_ERR.

… 3 Block overview

Integrator Block IT – Ordinal / Slot 12

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
INTEGRATOR	0	16	Record	BLOCK		62	SRW	0	Integrator Function Block integrates a variable as a function of the time or accumulates the counts from a Pulse Input block.
ST_REV	1	17	Simple	UNSIGNED16		2	SR	0	Revision counter for static variables. If a variable changes, the revision counter is incremented each time by one.
TAG_DESC	2	18	Simple	OCTET_STRING		32	SRW	" "	A textual description of the block. This has to be unique within a fieldbus.
STRATEGY	3	19	Simple	UNSIGNED16		2	SRW	0	This parameter can be used to build groups of blocks. Each block of a group gets the same reference number.
ALERT_KEY	4	20	Simple	UNSIGNED8		1	SRW	0	This parameter is used as identification number for a part of a plant.
MODE_BLK	5	21	Record	MODE		4	SRW	0x01;0x01; 0x19;0x10	This parameter includes the actual valid and normal operating modes of the block.
BLOCK_ERR	6	22	Simple	BIT_STRING		2	R	0	This parameter contains a summary of the block alarms.
TOTAL_SP	7	23	Simple	FLOATING_ POINT		4	NRW	0	The SP for a batch totalization. Not just SP because SP has PV units and other special properties not used in this application.
OUT	8	24	Record	FLOAT_S		5	NRWO	0x1C;0.0	Discrete output.
OUT_RANGE	9	25	Record	SCALE		11	SRW	100.0;0.0; 1342;2	This is the display scaling for the output. It has no effect on the block. It is used by many blocks.
GRANT_DENY	10	26	Record	ACCESS_PERM		2	SRW	0	Options for controlling access of host computer and local control panels to operating, tuning and alarm parameters of the block.
STATUS_OPTS | STATUS_OPTS_IT	11	27	Simple	BIT_STRING		2	SRW	0	Options which the user may select in the block processing of status.
IN_1	12	28	Record	FLOAT_S		5	NRWI	0x08;0.0	Auxiliary input value to the block, used for other values than the PV.
IN_2	13	29	Record	FLOAT_S		5	NRWI	0x08;0.0	Input required by the characterizer.
OUT_TRIP	14	30	Record	DISC_S		2	NRWO	0x1C;0.0	The first discrete output.
OUT_PTRIP	15	31	Record	DISC_S		2	NRWO	0x1C;0.0	The second discrete output.
TIME_UNIT1	16	32	Simple	UNSIGNED8		1	SRW	0	Converts the rate time units in seconds.
TIME_UNIT2	17	33	Simple	UNSIGNED8		1	SRW	0	Converts the rate time units in seconds.
UNIT_CONV	18	34	Simple	FLOATING_ POINT		4	SRW	1	Factor to convert the engineering units of input 2 into the engineering units of input 1.

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
PULSE_VAL1	19	35	Simple	FLOATING_POINT		4	SRW	0	Determines the mass, volume or energy per pulse.
PULSE_VAL2	20	36	Simple	FLOATING_POINT		4	SRW	0	Determines the mass, volume or energy per pulse.
REV_FLOW1	21	37	Record	DISC_S		2	NRWI	0x08;0.0	Indicates reverse flow when true.
REV_FLOW2	22	38	Record	DISC_S		2	NRWI	0x08;0.0	Indicates reverse flow when true.
RESET_IN	23	39	Record	DISC_S		2	NRWI	0x08;0.0	Resets the totalizers.
STOTAL	24	40	Simple	FLOATING_POINT		4	NR	0	Indicates the snapshot of OUT just before a reset.
RTOTAL	25	41	Simple	FLOATING_POINT		4	NRW	0	Indicates the totalization of bad or bad and uncertain inputs.
SRTOTAL	26	42	Simple	FLOATING_POINT		4	NR	0	The snapshot of RTOTAL just before a reset.
SSP	27	43	Simple	FLOATING_POINT		4	NR	0	The snapshot of TOTAL_SP.
INTEG_TYPE	28	44	Simple	UNSIGNED8		1	SRW	0	Defines the type of counting (up or down) and the type of resetting (demand or periodic).
INTEG_OPTS	29	45	Simple	BIT_STRING		2	SRW	0	A bit string to configure the type of input (rate or accum.) used in each input, the flow direction to be considered in the totalization, the status to be considered in TOTAL and if the totalization residue shall be used in the next batch (only when INTEG_TYPE= UP_AUTO or DN_AUTO).
CLOCK_PER	30	46	Simple	FLOATING_POINT		4	SRW	0	Establishes the period for periodic reset, in seconds.
PRE_TRIP	31	47	Simple	FLOATING_POINT		4	SRW	0	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.
N_RESET	32	48	Simple	FLOATING_POINT		4	NR	0	Counts the number of resets. It cannot be written nor reset.
PCT_INCL	33	49	Simple	FLOATING_POINT		4	R	0	Indicates the percentage of inputs with good status compared to the ones with bad or uncertain and bad status.

… 3 Block overview

… Integrator Block IT – Ordinal / Slot 12

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
GOOD_LIM	34	50	Simple	FLOATING_POINT		4	SRW	0	Sets the limit for PCT_INCL. Below this limit OUT receives the status good.
UNCERT_LIM	35	51	Simple	FLOATING_POINT		4	SRW	0	Sets the limit for PCT_INCL. Below this limit OUT receives the status uncertain.
OP_CMD_INT	36	52	Simple	UNSIGNED8		1	RW	0	Operator command. RESET. Resets the totalizer.
OUTAGE_LIM	37	53	Simple	FLOATING_POINT		4	SRW	0	The maximum tolerated duration for power failure.
RESET_CONFIRM	38	54	Record	DISC_S		2	NRWI	0x08;0.0	Momentary discrete value which can be written by a host to enable further resets, if the option Confirm reset in INTEG_OPTS is chosen.
UPDATE_EVT	39	55	Record	ALARM_EVENT		16	RW	0;0;0,0;0;0;9;0	This alert is generated by any change to the static data.
BLOCK_ALM	40	56	Record	ALARM_DISC		18	RW	0;0;0,0;0; 0;0;8;0;0	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.

PID Block EPID – Ordinal / Slot 13

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
PID_BLOCK	0	16	Record	BLOCK		62	SRW	0	PID blocks take the input values and convert them to percent of span values using the PV_SCALE span.
ST_REV	1	17	Simple	UNSIGNED16		2	SR	0	Revision counter for static variables. If a variable changes, the revision counter is incremented each time by one.
TAG_DESC	2	18	Simple	OCTET_STRING		32	SRW	" "	A textual description of the block. This has to be unique within a fieldbus.
STRATEGY	3	19	Simple	UNSIGNED16		2	SRW	0	This parameter can be used to build groups of blocks. Each block of a group gets the same reference number.
ALERT_KEY	4	20	Simple	UNSIGNED8		1	SRW	0	This parameter is used as identification number for a part of a plant.
MODE_BLK	5	21	Record	MODE		4	SRW	0x01;0x01;0xF9;0x10	This parameter includes the actual valid and normal operating modes of the block.
BLOCK_ERR	6	22	Simple	BIT_STRING		2	R	0	This parameter contains a summary of the block alarms.
PV	7	23	Record	FLOAT_S		5	R	0x1C;0.0	Either the primary analog value for use in executing the function, or a process value associated with it.
SP	8	24	Record	FLOAT_S		5	NRW	0x1C;0.0	The analog setpoint of this block.
OUT	9	25	Record	FLOAT_S		5	NRWO	0x1C;0.0	The primary analog value calculated as a result of executing the function.
PV_SCALE	10	26	Record	SCALE		11	SRW	100.0;0.0;1342;2	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.
OUT_SCALE	11	27	Record	SCALE		11	SRW	100.0;0.0;1342;2	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.
GRANT_DENY	12	28	Record	ACCESS_PERM		2	SRW	0;0	Options for controlling access of host computer and local control panels to operating, tuning and alarm parameters of the block.

… 3 Block overview

… PID Block EPID – Ordinal / Slot 13

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
CONTROL_OPTS | CONTROL_OPTS_PID	13	29	Simple	BIT_STRING		2	SRW	0	Options which the user may select to alter the calculations done in a control block.
STATUS_OPTS | STATUS_OPTS_PID	14	30	Simple	BIT_STRING		2	SRW	0	Options which the user may select in the block processing of status.
IN	15	31	Record	FLOAT_S		5	NRWI	0x08;0.0	The primary input value of the block, required for blocks that filter the input to get the PV.
PV_FTIME	16	32	Simple	FLOATING_ POINT		4	SRW	0	Time constant of a single exponential filter for the PV, in seconds.
BYPASS	17	33	Simple	UNSIGNED8		1	SRW	0	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.
CAS_IN	18	34	Record	FLOAT_S		5	NRWI	0x08;0.0	This parameter is the remote setpoint value, which must come from another Fieldbus block, or a DCS block through a defined link.
SP_RATE_DN	19	35	Simple	FLOATING_ POINT		4	SRW	0	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, then the setpoint will be used immediately. For control blocks, rate limiting will apply only in Auto. For output blocks,rate limiting will apply in Auto, Cas, and RCas modes.
SP_RATE_UP	20	36	Simple	FLOATING_ POINT		4	SRW	0	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, then the setpoint will be used immediately. For control blocks, rate limiting will apply only in Auto. For output blocks,rate limiting will apply in Auto, Cas, and RCas modes.

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
SP_HI_LIM	21	37	Simple	FLOATING_POINT		4	SRW	100	The setpoint high limit is the highest setpoint operator entry that can be used for the block.
SP_LO_LIM	22	38	Simple	FLOATING_POINT		4	SRW	0	The setpoint low limit is the lowest setpoint operator entry that can be used for the block.
GAIN	23	39	Simple	FLOATING_POINT		4	SRW	0	Dimensionless value used by the block algorithm in calculating the block output.
RESET	24	40	Simple	FLOATING_POINT		4	SRW	0	The integral time constant, in seconds per repeat.
BAL_TIME	25	41	Simple	FLOATING_POINT		4	SRW	0	The difference value used in the block calculation for bumpless transfer should ramp in a linear manner to zero in the time specified by BAL_TIME.
RATE	26	42	Simple	FLOATING_POINT		4	SRW	0	Defines the derivative time constant, in seconds.
BKCAL_IN	27	43	Record	FLOAT_S		5	NRWI	0x08;0.0	The value and status from a lower block's BKCAL_OUT that is used to prevent reset windup and to initialize the control loop.
OUT_HI_LIM	28	44	Simple	FLOATING_POINT		4	SRW	100	Limits the maximum output value.
OUT_LO_LIM	29	45	Simple	FLOATING_POINT		4	SRW	0	Limits the minimum output value.
BKCAL_HYS	30	46	Simple	FLOATING_POINT		4	SRW	0,5	The amount that the output must change away from its output limit before the limit status is turned off, expressed as a percent of the span of the output.
BKCAL_OUT	31	47	Record	FLOAT_S		5	RO	0x1C;0.0	The value and status required by an upper block’s BKCAL_IN so that the upper block may prevent reset windup and provide bumpless transfer to closed loop control.
RCAS_IN	32	48	Record	FLOAT_S		5	NRW	0x1C;0.0	The value and status from a lower block's BKCAL_OUT that is used to prevent reset windup and to initialize the control loop.
ROUT_IN	33	49	Record	FLOAT_S		5	NRW	0x1C;0.0	Target output and status provided by a Host to the control block for use as the output (ROut mode).
SHED_OPT	34	50	Simple	UNSIGNED8		1	SRW	0	Defines action to be taken on remote control device timeout.

… 3 Block overview

… PID Block EPID – Ordinal / Slot 13

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
RCAS_OUT	35	51	Record	FLOAT_S		5	R	#0x1C;0.0	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.
ROUT_OUT	36	52	Record	FLOAT_S		5	R	#0x1C;0.0	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.
TRK_SCALE	37	53	Record	SCALE		11	SRW	#100.0;0.0; 1342;2	The high and low scale values, engineering units code,and number of digits to the right of the decimal point, associated with TRK_VAL.
TRK_IN_D	38	54	Record	DISC_S		2	NRWI	#0x08;0	This discrete input is used to initiate external tracking of the block output to the value specified by TRK_VAL.
TRK_VAL	39	55	Record	FLOAT_S		5	NRWI	#0x08;0.0	This input is used as the track value when external tracking is enabled by TRK_IN_D.
FF_VAL	40	56	Record	FLOAT_S		5	NRWI	#0x08;0.0	The feed forward value and status.
FF_SCALE	41	57	Record	SCALE		11	SRW	#100.0;0.0; 1342;2	The feedforward input high and low scale values, engineering units code, and number of digits to the right of the decimal point.
FF_GAIN	42	58	Simple	FLOATING_ POINT		4	SRW	0	The gain that the feed forward input is multiplied by before it is added to the calculated control output.
UPDATE_EVT	43	59	Record	ALARM_EVENT		16	RW	#0;0;0,0;0; 0;9;0	This alert is generated by any change to the static data.
BLOCK_ALM	44	60	Record	ALARM_DISC		18	RW	#0;0;0,0;0; 0;0;8;0;0	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 Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
ALARM_SUM | ALARM_SUM_PID	45	61	Record	ALARM_ SUMMARY		8	SRW	#0;0;0;0	The current alert status, unacknowledged states, unreported states, and disabled states of the alarms associated with the function block.
ACK_OPTION | ACK_OPTION_PID	46	62	Simple	BIT_STRING		2	SRW	0	Selection of whether alarms associated with the block will be automatically acknowledged.
ALARM_HYS	47	63	Simple	FLOATING_ POINT		4	SRW	0,5	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 .
HI_HI_PRI	48	64	Simple	UNSIGNED8		1	SRW	0	Priority of the high alarm.
HI_HI_LIM	49	65	Simple	FLOATING_ POINT		4	SRW	0	The setting for high alarm in engineering units.
HI_PRI	50	66	Simple	UNSIGNED8		1	SRW	0	Priority of the high alarm.
HI_LIM	51	67	Simple	FLOATING_ POINT		4	SRW	0	The setting for high alarm in engineering units.
LO_PRI	52	68	Simple	UNSIGNED8		1	SRW	0	Priority of the low alarm.
LO_LIM	53	69	Simple	FLOATING_ POINT		4	SRW	0	The setting for the low alarm in engineering units.
LO_LO_PRI	54	70	Simple	UNSIGNED8		1	SRW	0	Priority of the low alarm.
LO_LO_LIM	55	71	Simple	FLOATING_ POINT		4	SRW	0	The setting of the low alarm in engineering units.
DV_HI_PRI	56	72	Simple	UNSIGNED8		1	SRW	0	Priority of the high deviation alarm.
DV_HI_LIM	57	73	Simple	FLOATING_ POINT		4	SRW	0	The setting of the high deviation alarm limit in engineering units.
DV_LO_PRI	58	74	Simple	UNSIGNED8		1	SRW	0	Priority of the low deviation alarm.
DV_LO_LIM	59	75	Simple	FLOATING_ POINT		4	SRW	0	The setting of the low deviation alarm limit in engineering units.
HI_HI_ALM	60	76	Record	ALARM_FLOAT		21	RW	#0;0;0,0;0;0.0; 0;4;0;0	The status for high alarm and its associated time stamp.
HI_ALM	61	77	Record	ALARM_FLOAT		21	RW	#0;0;0,0;0;0.0; 0;2;0;0	The status for high alarm and its associated time stamp.
LO_ALM	62	78	Record	ALARM_FLOAT		21	RW	#0;0;0,0;0;0.0; 0;1;0;0	The status of the low alarm and its associated time stamp.
LO_LO_ALM	63	79	Record	ALARM_FLOAT		21	RW	#0;0;0,0;0;0.0; 0;3;0;0	The status of the low alarm and its associated time stamp.

… 3 Block overview

… PID Block EPID – Ordinal / Slot 13

Parameter Name	Rel. Idx	Slot Idx	Obj.Type	Data Type	Store	Bytes	Access	Default value	Description
DV_HI_ALM	64	80	Record	ALARM_FLOAT		21	RW	#0;0;0,0;0;0.0; 0;6;0;0	The status and time stamp associated with the high deviation alarm.
DV_LO_ALM	65	81	Record	ALARM_FLOAT		21	RW	#0;0;0,0;0;0.0; 0;5;0;0	The status and time stamp associated with the low deviation alarm.
T1_RATE	66	82	Simple	FLOATING_ POINT		4	SRW	0	
BETA	67	83	Simple	FLOATING_ POINT		4	SRW	1	
GAMMA	68	84	Simple	FLOATING_ POINT		4	SRW	0	

Function blocks details including channel relations

Slot Nr.	Function Block Description	Execute time [ms]	Channel Selection / Relation to Transducer				
			TB Slot Nr.	TB Description	Parameter Name	Ch. Idx	Default
1	Analog Input	800	13 (TB1)	PCB	QV	1	x
			13 (TB1)	PCB	PARTIAL_QV	2	
			13 (TB1)	PCB	QN	3	
			13 (TB1)	PCB	PARTIAL_QN	4	
			13 (TB1)	PCB	QM	5	
			13 (TB1)	PCB	QP	6	
			13 (TB1)	PCB	T	7	
			13 (TB1)	PCB	TOT_QV	8	
			13 (TB1)	PCB	TOT_PQV	9	
			13 (TB1)	PCB	TOT_QN	10	
			13 (TB1)	PCB	TOT_PQN	11	
			13 (TB1)	PCB	TOT_QM	12	
			13 (TB1)	PCB	TOT_QP	13	
2	Analog Input	800	13 (TB1)	PCB	QV	1	
			13 (TB1)	PCB	PARTIAL_QV	2	x
			13 (TB1)	PCB	QN	3	
			13 (TB1)	PCB	PARTIAL_QN	4	
			13 (TB1)	PCB	QM	5	
			13 (TB1)	PCB	QP	6	
			13 (TB1)	PCB	T	7	
			13 (TB1)	PCB	TOT_QV	8	
			13 (TB1)	PCB	TOT_PQV	9	
			13 (TB1)	PCB	TOT_QN	10	
			13 (TB1)	PCB	TOT_PQN	11	
			13 (TB1)	PCB	TOT_QM	12	
			13 (TB1)	PCB	TOT_QP	13	
3	Analog Input	800	13 (TB1)	PCB	QV	1	
			13 (TB1)	PCB	PARTIAL_QV	2	
			13 (TB1)	PCB	QN	3	x
			13 (TB1)	PCB	PARTIAL_QN	4	
			13 (TB1)	PCB	QM	5	
			13 (TB1)	PCB	QP	6	
			13 (TB1)	PCB	T	7	
			13 (TB1)	PCB	TOT_QV	8	
			13 (TB1)	PCB	TOT_PQV	9	
			13 (TB1)	PCB	TOT_QN	10	
			13 (TB1)	PCB	TOT_PQN	11	
			13 (TB1)	PCB	TOT_QM	12	
			13 (TB1)	PCB	TOT_QP	13	

… 3 Block overview

… Function blocks details including channel relations

Slot Nr.	Function Block Description	Execute time [ms]	Channel Selection / Relation to Transducer				
			TB Slot Nr.	TB Description	Parameter Name	Ch. Idx	Default
4	Analog Input	800	13 (TB1)	PCB	QV	1	
			13 (TB1)	PCB	PARTIAL_QV	2	
			13 (TB1)	PCB	QN	3	
			13 (TB1)	PCB	PARTIAL_QN	4	x
			13 (TB1)	PCB	QM	5	
			13 (TB1)	PCB	QP	6	
			13 (TB1)	PCB	T	7	
			13 (TB1)	PCB	TOT_QV	8	
			13 (TB1)	PCB	TOT_PQV	9	
			13 (TB1)	PCB	TOT_QN	10	
			13 (TB1)	PCB	TOT_PQN	11	
			13 (TB1)	PCB	TOT_QM	12	
			13 (TB1)	PCB	TOT_QP	13	
5	Analog Output	800	13(TB1)	PCB	T_AO_IN	14	x
			13(TB1)	PCB	SECOND_T_AO_IN	15	
			13(TB1)	PCB	GAGE_P_AO_IN	16	
			13(TB1)	PCB	ABS_P_AO_IN	17	
			13(TB1)	PCB	GAS_CONTENT_AO_IN	18	
			13(TB1)	PCB	DENSITY_AO_IN	19	
6	Analog Output	800	13(TB1)	PCB	T_AO_IN	14	
			13(TB1)	PCB	SECOND_T_AO_IN	15	x
			13(TB1)	PCB	GAGE_P_AO_IN	16	
			13(TB1)	PCB	ABS_P_AO_IN	17	
			13(TB1)	PCB	GAS_CONTENT_AO_IN	18	
			13(TB1)	PCB	DENSITY_AO_IN	19	
7	Analog Output	800	13(TB1)	PCB	T_AO_IN	14	
			13(TB1)	PCB	SECOND_T_AO_IN	15	
			13(TB1)	PCB	GAGE_P_AO_IN	16	x
			13(TB1)	PCB	ABS_P_AO_IN	17	
			13(TB1)	PCB	GAS_CONTENT_AO_IN	18	
			13(TB1)	PCB	DENSITY_AO_IN	19	

4 Diagnosis / error messages

Field diagnostic definition – Process variable status

Part 1 – QV / TOT_QV / PARTIAL_QV / TOT_PQV / QN / TOT_QN / PARTIAL_QN / TOT_QN

FD Diagnosis bit definition	Group (According to NE107)	Description	Process variable status			
			QV / TOT_QV	PARTIAL_QV / TOT_PQV	QN / TOT_QN	PARTIAL_QN / TOT_QN
0x00000001	Failed	FE Board Communication Error	Bad-device failure (0x0C)	Bad-device failure (0x0C)	Bad-device failure (0x0C)	Bad-device failure (0x0C)
0x00000002	Failed	FE Synchronous Signal Missing	Bad-device failure (0x0C)	Bad-device failure (0x0C)	Bad-device failure (0x0C)	Bad-device failure (0x0C)
0x00000004	Failed	Vortex Sensor Failure	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)
0x00000008	Failed	Temperature Sensor Failure	Good-Active Critical alarm (0x8C)	Good-Active Critical alarm (0x8C)	Good-Active Critical alarm (0x8C)	Good-Active Critical alarm (0x8C)
0x00000010	Failed	Vibration Sensor Failure	Uncertain-Sensor Conversion not Accurate (0x50)	Uncertain-Sensor Conversion not Accurate (0x50)	Uncertain-Sensor Conversion not Accurate (0x50)	Uncertain-Sensor Conversion not Accurate (0x50)
0x00000020	Failed	Signal Noise Ratio Error	Uncertain-Sensor Conversion not Accurate (0x50)	Uncertain-Sensor Conversion not Accurate (0x50)	Uncertain-Sensor Conversion not Accurate (0x50)	Uncertain-Sensor Conversion not Accurate (0x50)
0x00000040	Failed	FE NV Failure	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)
0x00000080	Failed	CB NV Failure	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)
0x00000100	Check Function	AO input inactive	Good-Active advisory alarm	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)
0x00000200	Check Function	Alarm Simulated	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)
0x00000400	Check Function	Parameter Simulated	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)
0x00000800	Off Specification	Flowrate reach max limit	Good-Active advisory alarm, high limit (0x8A)	Good-Active advisory alarm, high limit (0x8A)	Good-Active advisory alarm, high limit (0x8A)	Good-Active advisory alarm, high limit (0x8A)
0x00001000	Off Specification	Flowrate reach min limit	Good-Active advisory alarm, low limit(0x89)	Good-Active advisory alarm, low limit(0x89)	Good-Active advisory alarm, low limit(0x89)	Good-Active advisory alarm, low limit(0x89)
0x00002000	Off Specification	Temperature reach max limit	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)

… 4 Diagnosis / error messages

… Field diagnostic definition – Process variable status

Part 1 – QV / TOT_QV / PARTIAL_QV / TOT_PQV / QN / TOT_QN / PARTIAL_QN / TOT_QN

FD Diagnosis bit definition	Group (According to NE107)	Description	Process variable status			
			QV/ TOT_QV	PARTIAL_QV/ TOT_PQV	QN/TOT_QN	PARTIAL_QN/ TOT_QN
0x00004000	Off Specification	Temperature reach min limit	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)
0x00008000	Off Specification	Low flow cut-off	Uncertain-low limit (0x41)	Uncertain-low limit (0x41)	Uncertain-low limit (0x41)	Uncertain-low limit (0x41)
0x00010000	Off Specification	Reynolds out of Range	Bad-Configuration Error(0x04)	Bad-Configuration Error(0x04)	Bad-Configuration Error(0x04)	Bad-Configuration Error(0x04)
0x00020000	Off Specification	Digital out cut-off	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)
0x00040000	Maintenance	NV replace warning	Good-Active Critical alarm (0x8C)	Good-Active Critical alarm (0x8C)	Good-Active Critical alarm (0x8C)	Good-Active Critical alarm (0x8C)
0x00080000	Maintenance	Maintenance warning	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)
0x00100000	Maintenance	Sensor uncalibrated	Uncertain-Sensor Conversion not Accurate (0x50)	Uncertain-Sensor Conversion not Accurate (0x50)	Uncertain-Sensor Conversion not Accurate (0x50)	Uncertain-Sensor Conversion not Accurate (0x50)
0x00200000	Off Specification	Steam type mismatch	Bad-Configuration Error (0x04)	Bad-Configuration Error (0x04)	Bad-Configuration Error(0x04)	Bad-Configuration Error (0x04)
0x00400000	Check Function	Check Function	Good-Active advisory alarm	Good-Active advisory alarm	Good-Active advisory alarm	Good-Active advisory alarm
0x00800000	Check Function	Totalizer stopped	Good-Active advisory alarm	Good-Active advisory alarm	Good-Active advisory alarm	Good-Active advisory alarm
0x01000000	Reserved	Reserved				
0x02000000	Reserved	Reserved				
0x04000000	Reserved	Reserved				
0x08000000	Reserved	Reserved				
0x10000000	Reserved	Reserved				
0x20000000	Reserved	Reserved				
0x40000000	Reserved	Reserved				
0x80000000	Reserved	Reserved				

Part 2 – QM / TOT_QM / QP / TOT_QP / T

FD Diagnosis bit definition	Group (According to NE107)	Description	Process variable status		
			QM / TOT_QM	QP / TOT_QP	T
0x00000001	Failed	FE Board Communication Error	Bad-device failure (0x0C)	Bad-device failure (0x0C)	Bad-device failure (0x0C)
0x00000002	Failed	FE Synchronous Signal Missing	Bad-device failure (0x0C)	Bad-device failure (0x0C)	Bad-device failure (0x0C)
0x00000004	Failed	Vortex Sensor Failure	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)	Good-active critical alarm (0x8C)
0x00000008	Failed	Temperature Sensor Failure	Good-Active Critiacal alarm (0x8C)	Good-Active Critiacal alarm (0x8C)	Bad-sensor failure (0x10)
0x00000010	Failed	Vibration Sensor Failure	Uncertain- Sensor Conversion not Accurate (0x50)	Uncertain- Sensor Conversion not Accurate (0x50)	Good-active critical alarm (0x8C)
0x00000020	Failed	Signal Noise Ratio Error	Uncertain- Sensor Conversion not Accurate (0x50)	Uncertain- Sensor Conversion not Accurate (0x50)	Good-active critical alarm (0x8C)
0x00000040	Failed	FE NV Failure	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)
0x00000080	Failed	CB NV Failure	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)	Bad-sensor failure (0x10)
0x00000100	Check Function	AO input inactive	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)
0x00000200	Check Function	Alarm Simulated	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)
0x00000400	Check Function	Parameter Simulated	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)	Uncertain-non specific (0x40)
0x00000800	Off Specification	Flowrate reach max limit	Good-Active advisory alarm, high limit (0x8A)	Good-Active advisory alarm, high limit (0x8A)	Good-Active advisory alarm (0x88)
0x00001000	Off Specification	Flowrate reach min limit	Good-Active advisory alarm, low limit (0x89)	Good-Active advisory alarm, low limit (0x89)	Good-Active advisory alarm (0x88)
0x00002000	Off Specification	Temperature reach max limit	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, high limit (0x8A)

… 4 Diagnosis / error messages

… Field diagnostic definition – Process variable status

Part 1 – QV / TOT_QV / PARTIAL_QV / TOT_PQV / QN / TOT_QN / PARTIAL_QN / TOT_QN

FD Diagnosis bit definition	Group (According to NE107)	Description	Process variable status		
			QM / TOT_QM	QP / TOT_QP	T
0x00004000	Off Specification	Temperature reach min limit	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, low limit (0x89)
0x00008000	Off Specification	Low flow cut-off	Uncertain-low limit (0x41)	Uncertain-low limit (0x41)	Good-Active advisory alarm (0x88)
0x00010000	Off Specification	Reynolds out of Range	Bad-Configuration Error (0x04)	Bad-Configuration Error (0x04)	Good-active critical alarm (0x8C)
0x00020000	Off Specification	Digital out cut-off	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)
0x00040000	Maintenance	NV replace warning	Good-active critical alarm (0x8C)	Good-active critical alarm (0x8C)	Good-active critical alarm (0x8C)
0x00080000	Maintenance	Maintenance warning	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)	Good-Active advisory alarm, (0x88)
0x00100000	Maintenance	Sensor uncalibrated	Uncertain- Sensor Conversion not Accurate (0x50)	Uncertain- Sensor Conversion not Accurate (0x50)	Uncertain- Sensor Conversion not Accurate (0x50)
0x00200000	Off Specification	Steam type mismatch	Bad-Configuration Error (0x04)	Bad-Configuration Error (0x04)	Good-active critical alarm (0x8C)
0x00400000	Check Function	Check Function	Good-Active advisory alarm	Good-Active advisory alarm	Good-Active advisory alarm
0x00800000	Check Function	Totalizer stopped	Good-Active advisory alarm	Good-Active advisory alarm	Good-Active advisory alarm
0x01000000	Reserved	Reserved			
0x02000000	Reserved	Reserved			
0x04000000	Reserved	Reserved			
0x08000000	Reserved	Reserved			
0x10000000	Reserved	Reserved			
0x20000000	Reserved	Reserved			
0x40000000	Reserved	Reserved			
0x80000000	Reserved	Reserved			

5 Revision history

Revision	Date	Changes
A	12.2018	First edition

Trademarks

FOUNDATION Fieldbus is a registered trademark of FieldComm Group, Austin, Texas, USA.

Notes

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