# TRIO-WIRL V

# Vortex/Swirl Flowmeter
Model VT4000 / VR4000

# TRIO-WIRL S

# Vortex/Swirl Flowmeter
Model ST4000 / SR4000
Valid from Software Edition A10

Datalink Description
Foundation™ Fieldbus

D184B093U24 Rev. 01 / 03.2002

TRIO-WIRL VT

TRIO-WIRL ST

TRIO-WIRL VR

TRIO-WIRL SR

CE

We congratulate you on having acquired a high-quality flowmeter designed by ABB Automation Products and thank you for the trust shown in our company.

The on-hand instruction bulletin contains instructions relating to installation and mounting as well as technical data regarding the respective instrument design. ABB Automation Products reserves the right of modifying, without prior notice, the instruments' Hard and Software for the benefit of technical progress. Should any questions crop up which are not covered by information given in this manual, please contact ABB Automation Products / Site Göttingen: Tel 05 51 / 9 05 – 0.

**CONTENTS:**

## 1. Block-Overview

The TRIO-WIRL converter contains the following FF-Blocks:

1 x Resource Block

1 x Transducer Block

2 x Analog Input Block

The resource and analog input blocks are standard FF blocks. The entirely comply with the FF specification FF-891-1.4.

The transducer block is an enhanced block. The parameters up to the relevant index 29 correspond to the "Standard Flow with Calibration" block of the FF specification FF-903-3.0. The following parameters are instrument specific for TRIO-WIRL.

### 1.1 Block Table Legend

The below table treats the following attributes:

Rel.Index: Relative index of parameter within a block.

Data-Type: Data type of parameter. Some parameters are structures (DS-xx). These structures are specified in chapter 1.5.

Size: Size of the parameter in Bytes.

Storage Type:

- S = Static Parameter are store permanently (non-volatile). When writing a static parameter the Static Revision Counter ST_REV of the respective block (Index 1 in each block) will be incremented by one.
- N = Non-volatile parameters will be stored permanently. When writing „non-volatile parameters" ST_REV remains unchanged.
- D = Dynamic Parameter will be lost during powering off.

Read: R = Parameter can be read.

Write: Parameter can partially merely be written in certain operating modes (MODE_BLK, Index 5, sub parameter Target)

- OOS: Parameter can be written in Target-Mode „Out of Service"
- Man: Parameter can be written in Target-Mode „Manual".
- Auto: Parameter can be written in Target-Mode „Auto".

Default Value: Basic setting of the parameters.
The parameter RESTART (Index 16 within Resource Block), selection „Restart with defaults", allows resetting of the parameters to default values.

## 1.2 Resource Block

The resource block contains general information on the fieldbus instrument, such as manufacturer, instrument type, version no. etc.

### 1.2.1 Resource Block Parameter, sorted in accordance with index

| Relative Index | Parameter Name | Data Type | Size | Storage Type | Read | Write in Target-Mode | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| 1 | ST_REV | Unsigned 16 | 2 | S | R | - | 0 | Revision counter for the static parameters. The counter is incremented each time the static parameter is changed. |
| 2 | TAG_DESC | OctetString | 32 | S | R | OOS,Auto | space | The user description of the intended application of the block. |
| 3 | STRATEGY | Unsigned 16 | 2 | S | R | OOS,Auto | 0 | Thisparameter 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. |
| 4 | ALERT_KEY | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |
| 5 | MODE_BLK | DS-69 | 4 | N,D,S,S | R | OOS,Auto | Target : OOS<br>Actual : OOS<br>Permitted: Auto, OOS<br>Normal : Auto | The actual, target, permitted and normal operation modes of the block. |
| 6 | BLOCK_ERR | Bit String | 2 | D | R | - | 0 | This parameter contains a summary of the block alarms |
| 7 | RS_STATE | Unsigned 8 | 1 | D | R | - | 0 | State of the function block state machine. |
| 8 | TEST_RW | DS-85 | 112 | D | R | OOS,Auto | 0 | Read/write test parameter - used only for conformance testing. |
| 9 | DD_RESOURCE | OctetString | 32 | S | R | - | | A description of the device description for the device |
| 10 | MANUFAC_ID | Unsigned 32 | 4 | S | R | - | 0x320 = ABB | Manufacturer identification number |
| 11 | DEV_TYPE | Unsigned 16 | 2 | S | R | - | 0x15 = TRIO-WIRL | Manufacturer's model name of the device |
| 12 | DEV_REV | Unsigned 8 | 1 | S | R | - | 1 | Device revision |
| 13 | DD_REV | Unsigned 8 | 1 | S | R | - | 1 | Revision of the DD file of the device |
| 14 | GRANT_DENY | DS-70 | 2 | D | R | OOS,Auto | 0 | Options for the access from PLC and DCS systems to device parameters |
| 15 | HARD_TYPES | Bit String | 2 | S | R | - | 0x8000 | The types of hardware available for the channels of the device |
| 16 | RESTART | Unsigned 8 | 1 | D | R | OOS,Auto | 1 | Several possibilities of restart are possible:<br>1) Run<br>2) Restart resource<br>3) Restart with defaults<br>4) Restart processor |
| 17 | FEATURES | Bit String | 2 | S | R | - | 0x4800 | Used to show resource block options.<br>0x4800 = Reports supported, Hard Write Lock supported |
| 18 | FEATURE_SEL | Bit String | 2 | S | R | OOS,Auto | 0x4800 | Used to select resource block options.<br>0x4800 = Reports supported, Hard Write Lock supported |
| 19 | CYCLE_TYPE | Bit String | 2 | S | R | - | 0xC000 | Describes the block execution methods.<br>0xC000 = Scheduled, Completion of block execution |

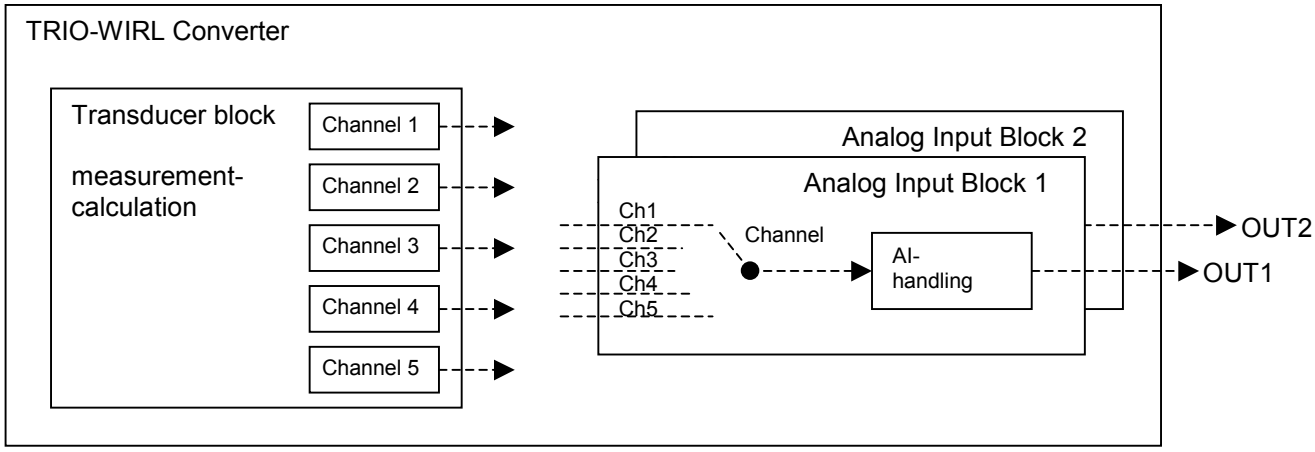
| Relative Index | Parameter Name | Data Type | Size | Storage Type | Read | Write in Target-Mode | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| 20 | CYCLE_SEL | Bit String | 2 | S | R | OOS,Auto | 0xC000 | Select ion of the block execution method.<br>0xC000 = Scheduled, Completion of block execution |
| 21 | MIN_CYCLE_T | Unsigned 32 | 4 | S | R | - | 1600 | Time duration of the shortest cycle time of the device in 1/32 ms |
| 22 | MEMORY_SIZE | Unsigned 16 | 2 | S | R | - | 0 | Available memory in the device |
| 23 | NV_CYCLE_T | Unsigned 32 | 4 | S | R | - | 0 | Interval between writing copies of NV parameters to non-volatile memory. Zero means never. |
| 24 | FREE_SPACE | Float | 4 | D | R | - | 0.0 | Percent of memory available for additional configuration. |
| 25 | FREE_TIME | Float | 4 | D | R | - | 0.0 | Percent of the block processing time that is free to process additional blocks. |
| 26 | SHED_RCAS | Unsigned 32 | 4 | S | R | OOS,Auto | 640000 | Timeout time for connections to PLC or DCS in operation mode Rcas |
| 27 | SHED_ROUT | Unsigned 32 | 4 | S | R | OOS,Auto | 640000 | Timeout time for connections to PLC or DCS in operation mod Rout |
| 28 | FAULT_STATE | Unsigned 8 | 1 | N | R | - | 1 | Behaviour of output blocks if communication errors appears |
| 29 | SET_FSTATE | Unsigned 8 | 1 | D | R | OOS,Auto | 1 | Allows the Fault State condition to be manually initiated |
| 30 | CLR_FSTATE | Unsigned 8 | 1 | D | R | OOS,Auto | 1 | Allows deleting the fault state condition |
| 31 | MAX_NOTIFY | Unsigned 8 | 1 | S | R | - | 8 | Maximum number of unconfirmed notify messages possible. |
| 32 | LIM_NOTIFY | Unsigned 8 | 1 | S | R | OOS,Auto | 8 | Maximum number of unconfirmed notify messages allowed. |
| 33 | CONFIRM_TIME | Unsigned 32 | 4 | S | R | OOS,Auto | 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. |
| 34 | WRITE_LOCK | Unsigned 8 | 1 | S | R | OOS,Auto | 1 | If set, no writing is allowed. Cannot be cleared by software.<br>Note:this parameter is dependent from the hardware switch Write_Lock<br>(see chapter 2) |
| 35 | UPDATE_EVT | DS-73 | 14 | D | R | - | 0;0;0;0;0;0;9;0 | This message is generated by any change to static data. |
| 36 | BLOCK_ALM | DS-72 | 13 | D | R | OOS,Auto | 0;0;0;0;0;0;0;8;0;0 | Indicates alarms which are related to the block |
| 37 | ALARM_SUM | DS-74 | 8 | D,D,D,S | R | OOS,Auto | 0;0;0;0 | This parameter contains a summary of the block alarms |
| 38 | ACK_OPTION | Bit String | 2 | S | R | OOS,Auto | 0 | Defines if block alarms are automatically acknowledged or not |
| 39 | WRITE_PRI | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | Priority of the alarm generated by clearing the WRITE_LOCK. |
| 40 | WRITE_ALM | DS-72 | 13 | D | R | OOS,Auto | | This alert is generated if the write lock parameter is cleared. |
| 41 | ITK_VER | Unsigned 16 | 2 | S | R | - | 4 | Version of the Interoperability Test Kit used to test the device. |

### 1.2.2 Resource Block Parameter, sorted according to names

| Parameter Name | Relative Index |
|---|---|
| ACK_OPTION | 38 |
| ALARM_SUM | 37 |
| ALERT_KEY | 4 |
| BLOCK_ALM | 36 |
| BLOCK_ERR | 6 |
| CLR_FSTATE | 30 |
| CONFIRM_TIME | 33 |
| CYCLE_SEL | 20 |
| CYCLE_TYPE | 19 |
| DD_RESOURCE | 9 |
| DD_REV | 13 |
| DEV_REV | 12 |
| DEV_TYPE | 11 |
| FAULT_STATE | 28 |
| FEATURE_SEL | 18 |
| FEATURES | 17 |
| FREE_SPACE | 24 |
| FREE_TIME | 25 |
| GRANT_DENY | 14 |
| HARD_TYPES | 15 |
| ITK_VER | 41 |
| LIM_NOTIFY | 32 |
| MANUFAC_ID | 10 |
| MAX_NOTIFY | 31 |
| MEMORY_SIZE | 22 |
| MIN_CYCLE_T | 21 |
| MODE_BLK | 5 |
| NV_CYCLE_T | 23 |
| RESTART | 16 |
| RS_STATE | 7 |
| SET_FSTATE | 29 |
| SHED_RCAS | 26 |
| SHED_ROUT | 27 |
| ST_REV | 1 |
| STRATEGY | 3 |
| TAG_DESC | 2 |
| TEST_RW | 8 |
| UPDATE_EVT | 35 |
| WRITE_ALM | 40 |
| WRITE_LOCK | 34 |
| WRITE_PRI | 39 |

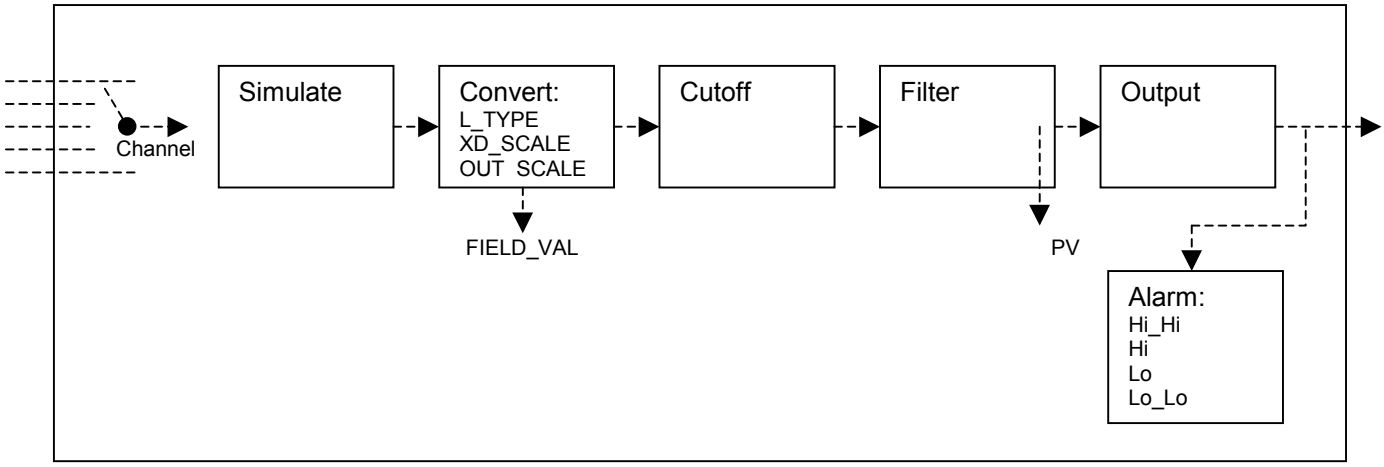
## 1.3 Analog Input Block

The measurement calculation takes place within the transducer block. The transducer block internally provides the measurement values via “Channels”. The cyclic output of the measurement values takes place via the analog input blocks (Al-block). The TRIO-WIRL converter disposes of two Al blocks.




An Al block fulfils different tasks, such as change of scaling, alarm handling, simulation etc. See the following description:

### 1.3.1 Analog Input Block Diagram




Channel: Using the channel parameter (index 15) you can choose the measured value to be transferred from the transducer block.

Simulate: The simulate parameter is a structure (see 1.5.9). You can activate a simulation by means of the sub-parameter “Simulate En/Disable”. The sub-parameter “Simulate-Value” indicates the simulation value which will be processed instead of the channel value.

Note: The simulation can solely be activated if the hardware switch “Simulation Enable” is set to “on”, see 2.

Convert: Converting is determined by the parameters L_TYPE, XD_SCALE and OUT_SCALE.

The scaling structures (see 1.5.2) dispose of the Sub-Parameters EU100%, EU0%, Unit and Decimal Point.

The channel value will be scaled to a percent value (FIELD_VAL) using the XD_SCALE according the following formula :

FIELD_VAL = 100 * (Channel-Value – EU0%) / (EU100%-EU0%)

L_TYPE can be of the following values:

**Direct:** With Direct the entry value will be directly transferred to PV (Primary Analog Value, index 7). There will be no change of scaling:

PV = Channel Value

Structures XD_SCALE and OUT_SCALE have to be adjusted identically.

**Indirect:** The percent value FIELD_VAL will be scaled to PV (Primary analog Value) using OUT_SCALE:

PV = (FIELD_VAL / 100) * (EU100% - EU0%) + EU0%

**Indirect Square Root**: Similar to direct. Additionally a roots function will be calculated

PV = sqrt(FIELD_VAL / 100) * (EU100% - EU0%) + EU0%

Cutoff: This function is equivalent to a low flow cut-off. It will be activated via a bit in IO_OPTS (index 13). If the PV value calculated undershoot the LOW_CUT value (index 17), PV will be set to 0.

Filter: Using the parameter PV_FTIME (index 18) you may set a damping time expressed in seconds.

Alarm: Four different alarms are available: Hi_Hi, Hi, Lo and Lo_Lo. For each of these alarms, the threshold …_LIM and the priority …_PRI can be set (index 25 to 32).
A detected will be entered into a structure …_ALM (index 33 to 36).

### 1.3.2 Analogue Input Block Parameter, sorted according to index

| Relative Index | Parameter Name | Data Type | Size | Storage Type | Read | Write in Target-Mode | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| 1 | ST_REV | Unsigned 16 | 2 | S | R | - | 0 | Revision counter for static variables. Every time a static variable changes the revision counter is incremented by one. |
| 2 | TAG_DESC | Octet String | 32 | S | R | OOS, Man,Auto | Leerzeichen | The user description of the application of the block. |
| 3 | STRATEGY | Unsigned 16 | 2 | S | R | OOS, Man,Auto | 0 | This parameter can be used to create groups of blocks by assigning the same reference number to each block of a group. This paramte is not verified and not processed |
| 4 | ALERT_KEY | Unsigned 8 | 1 | S | R | OOS, Man,Auto | 0 | This parametr is used as identification number for plant units. It can be used within DCS or PLC systems e.g. to sort alarms. |
| 5 | MODE_BLK | DS-69 | 4 | N,D,S,S | R | OOS, Man,Auto | Target : OOS<br>Actual : OOS<br>Permitted: Auto, Man, OOS<br>Normal : Auto | The actual, target, permitted, and normal operation modes of the block. |
| 6 | BLOCK_ERR | Bit String | 2 | D | R | - | 0 | Contains a summary of the block alarms |
| 7 | PV | DS-65 | 5 | D | R | - | 0.0 | This parameter is the primary measurement value for use in executing the block. |
| 8 | OUT | DS-65 | 5 | D | R | OOS, Man | 0.0 | Thi is out value of the block. OUT will have standard block alarms plus standard HI_HI, HI, LO, and LO_LO alarms applied to it. |
| 9 | SIMULATE | DS-82 | 11 | D | R | OOS, Man,Auto | | This is a structure. With the sub parameter Simulate Enable/disable a simulation can be switsched on and off. If a simulation is active the sub parametr simulate value is used as input value for the block. |
| 10 | XD_SCALE | DS-68 | 11 | S | R | OOS, Man | EU100%: 100.0<br>EU0% : 0.0<br>Unit : 0<br>DecPoint: 0 | Input scaling of the block. Using the100% and 0% values the channel value is scaled to percent(Field_Val). The channel unit must be in accordance with the channel unit. DecPoint indicates the number of digits after the decimal point for the display. |
| 11 | OUT_SCALE | DS-68 | 11 | S | R | OOS, Man | EU100%: 100.0<br>EU0% : 0.0<br>Unit : 0<br>DecPoint: 0 | OUTPUT scaling of the block. Using the 100% and the 0% values the percent value (Field_Val) is scaled to the OUT value. The unit is the OUT unit. DecPoint indicates the number of digits after the decimal point for the display |
| 12 | GRANT_DENY | DS-70 | 2 | D | R | OOS, Man,Auto | 0;0 | Options for the access of DCS and PLC systems to parameter of the device |
| 13 | IO_OPTS | Bit String | 2 | S | R | OOS | 0 | Options which the user may select to alter input and output block processing.<br>Bit 10: Enable Low_Cutoff |
| 14 | STATUS_OPTS | Bit String | 2 | S | R | OOS | 0 | Options which the user may select in the block processing of its status. |
| 15 | CHANNEL | Unsigned 16 | 2 | S | R | OOS | 0 | The number of the logical channel of the transducer block, which should be processed actually |
| 16 | L_TYPE | Unsigned 8 | 1 | S | R | OOS, Man | 0 | Processing the input value:<br>Direct: there is no scaling procedure the OUT isidentical to the INPUT<br>Indirect: the input value is scaled using XD_SCALE and OUT_SCALE<br>Square root: like indiret, however a mathematical square root is added. |
| 17 | LOW_CUT | Float | 4 | S | R | OOS, Man,Auto | 0.0 | Low flow cutoff : Values lower than LOW_CUT are set to 0 if the option (see IO_OPTS) |

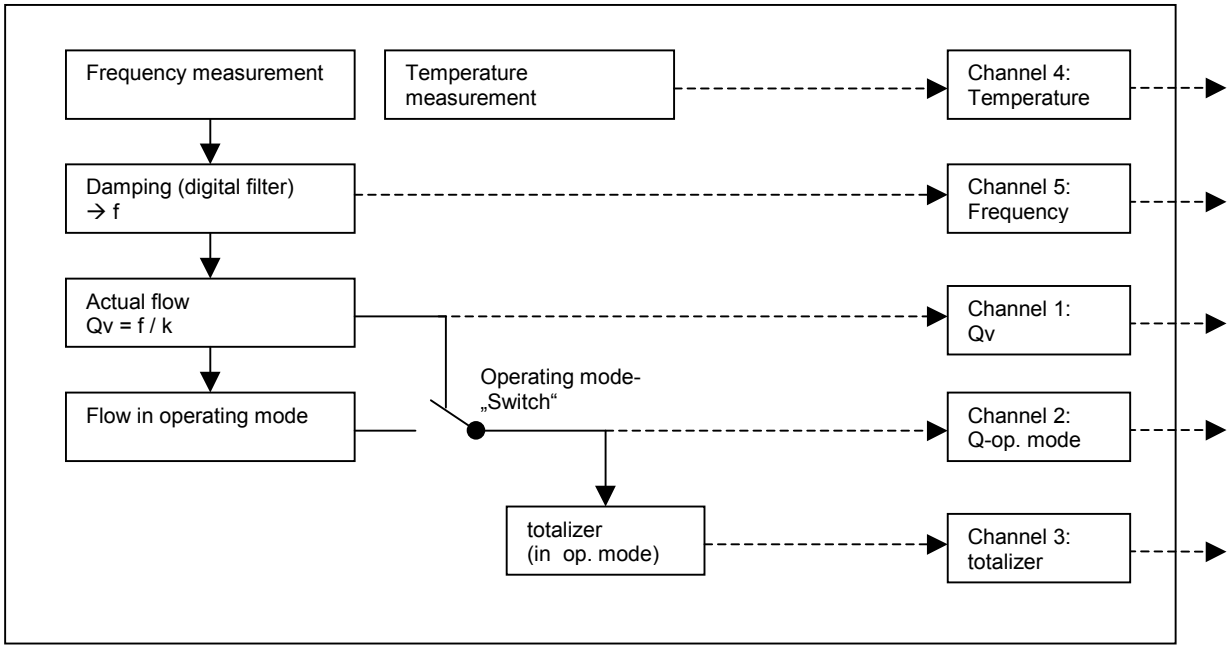
| Relative Index | Parameter Name | Data Type | Size | Storage Type | Read | Write in Target-Mode | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | is active |
| 18 | PV_FTIME | Float | 4 | S | R | OOS, Man,Auto | 0.0 | Time constant of a damping filter for process variable. Time constant is in seconds. |
| 19 | FIELD_VAL | DS-65 | 5 | D | R | - | 0x1C;0.0 | Input value in percent scaled by XD_SCALE |
| 20 | UPDATE_EVT | DS-73 | 14 | D | R | - | | This alert is generated by any change to the static data. |
| 21 | BLOCK_ALM | DS-72 | 13 | D | R | OOS, Man,Auto | | Indicates the alarms related to the block |
| 22 | ALARM_SUM | DS-74 | 8 | D | R | OOS, Man,Auto | | This parameter contains a summary of the alarms of the bock |
| 23 | ACK_OPTION | Bit String | 2 | S | R | OOS, Man,Auto | 0 | The selection of whether alarms associated with the block will be automatically acknowledged or not |
| 24 | ALARM_HYS | Float | 4 | S | R | OOS, Man,Auto | 0.5 | Alarm Hysteresis, expressed as a percent of the PV span . |
| 25 | HI_HI_PRI | Unsigned 8 | 1 | S | R | OOS, Man,Auto | 0 | Priority of the high high alarm. |
| 26 | HI_HI_LIM | Float | 4 | S | R | OOS, Man,Auto | +INV | The value for the high high alarm ilimit n engineering units. |
| 27 | HI_PRI | Unsigned 8 | 1 | S | R | OOS, Man,Auto | 0 | Priority of the high alarm. |
| 28 | HI_LIM | Float | 4 | S | R | OOS, Man,Auto | +INV | The value for the high alarm limit in engineering units. |
| 29 | LO_PRI | Unsigned 8 | 1 | S | R | OOS, Man,Auto | 0 | Priority of the low alarm. |
| 30 | LO_LIM | Float | 4 | S | R | OOS, Man,Auto | -INV | The value for the low alarm limit in engineering units. |
| 31 | LO_LO_PRI | Unsigned 8 | 1 | S | R | OOS, Man,Auto | 0 | Priority of the low low alarm. |
| 32 | LO_LO_LIM | Float | 4 | S | R | OOS, Man,Auto | -INV | The value for the low low alarm limit in engineering units. |
| 33 | HI_HI_ALM | DS-71 | 16 | D | R | OOS, Man,Auto | | The status for high high alarm and its associated time stamp. |
| 34 | HI_ALM | DS-71 | 16 | D | R | OOS, Man,Auto | | The status for high alarm and its associated time stamp. |
| 35 | LO_ALM | DS-71 | 16 | D | R | OOS, Man,Auto | | The status of the low alarm and its associated time stamp. |
| 36 | LO_LO_ALM | DS-71 | 16 | D | R | OOS, Man,Auto | | The status of the low low alarm and its associated time stamp. |

### 1.3.3 Analogue Input Block Parameter, sorted according to names

| Parameter Name | Relative Index |
|---|---|
| ACK_OPTION | 23 |
| ALARM_HYS | 24 |
| ALARM_SUM | 22 |
| ALERT_KEY | 4 |
| BLOCK_ALM | 21 |
| BLOCK_ERR | 6 |
| CHANNEL | 15 |
| FIELD_VAL | 19 |
| GRANT_DENY | 12 |
| HI_ALM | 34 |
| HI_HI_ALM | 33 |
| HI_HI_LIM | 26 |
| HI_HI_PRI | 25 |
| HI_LIM | 28 |
| HI_PRI | 27 |
| IO_OPTS | 13 |
| L_TYPE | 16 |
| LO_ALM | 35 |
| LO_LIM | 30 |
| LO_LO_ALM | 36 |
| LO_LO_LIM | 32 |
| LO_LO_PRI | 31 |
| LO_PRI | 29 |
| LOW_CUT | 17 |
| MODE_BLK | 5 |
| OUT | 8 |
| OUT_SCALE | 11 |
| PV | 7 |
| PV_FTIME | 18 |
| SIMULATE | 9 |
| ST_REV | 1 |
| STATUS_OPTS | 14 |
| STRATEGY | 3 |
| TAG_DESC | 2 |
| UPDATE_EVT | 20 |
| XD_SCALE | 10 |

## 1.4 Transducer Block

The Transducer Block contains all instrument specific parameters and functions needed for flow measurement and calculation. The following diagram shows the sequence of calculations:




The Primary (Vortex or Swirl flow meter) generates a frequency signal. Using the calibration factors (k-factors) and damping parameter the converter calculates the actual flow value Qv . In accordance to the operating mode a flow value is calculated (e.g. mass flow(Qm), normal flow (QN)) and is the input for the flow totalizer. Additionally the temperature oftheflow medium is measured, if this option is selected by ordering the device.

These calculated and measured values as is shown in the diagram can be taken from channel 1 to 5 from the transducer block output value.

Note: Cyclical readings of measured values can only be taken from the AI blocks. Using the channel parameter within the AI block the desired measurement value can be chosen. See picture in chapter 1.3.

### 1.4.1 Channels and Units

The transducer block within the TRIO-WIRL provides 5 measurements in so-called channels. Each AI block disposes of one channel parameter (index 15). This so-called channel parameter decides which channel will be transferred from the TB to the AI.

**Each channel disposes of one physical unit. This unit has to comply with the XD-scale-unit of the AI blocks. Should it fail to do so, the AI block cannot be set to auto-mode.**

Channel 1: Qv = actual flow

Unit: see TB-Parameter “Unit Qv” (Index 54)

Channel 2: Q Operating mode = flow in operating mode chosen

Unit: Depending on the respective operating mode (see TB index 42) this is a volume flow unit (see TB parameter “unit Qv” index 54) or a mass flow unit (see TB parameter “unit Qm” index 55)

Channel 3: Totalizer

Unit: depending on operating mode (see TB index 42) a volume flow unit (see TB parameter “unit Zv”, index 61) or a mass flow unit (see TB parameter “unit Zm”, index 62)

Channel 4: Temperature

Unit: see TB parameter “unit temp.” (index 48)

Channel 5: Frequency

unit: Hz

### 1.4.2 Transducer Block Parameter, sorted according to index

Parameter:
1 to 29 equal a standard flow with calibration block, as described in FF document FF- 903 PS3.
30 to 33 contain further measurement values; calculated within the transducer block
34 to 125 comprise setting parameters of the converter. These are also accessible via display and keyboard of the converter.
The description of the parameters can be taken from the converter instruction manual. In the following you can find a list of all entry values permitted.

| Relative Index | Parameter Name | Data type | Size | Storage Type | Read | Write | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| 1 | ST_REV | Unsigned 16 | 2 | S | R | - | 1 | Revision counter for statics variables. Each timea static variable is changed the counter is incremented by one. |
| 2 | TAG_DESC | OctetString | 32 | S | R | OOS,Auto | Space character | The user description of the intended application of the block. |
| 3 | STRATEGY | Unsigned 16 | 2 | S | R | OOS,Auto | 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 |
| 4 | ALERT_KEY | Unsigned 8 | 1 | S | R | OOS,Auto | 96 | The identification number of the plant unit. This information may be used in PLC or DCS systems for sorting alarms, etc. |
| 5 | MODE_BLK | DS-69 | 4 | N,D,S,S | R | OOS,Auto | Target : OOS<br>Actual : OOS<br>Permitted: Auto, OOS<br>Normal : Auto | The actual, target, permitted, and normal modes of the block.Actual and allowable operation modes of the block. |
| 6 | BLOCK_ERR | Bit String | 2 | D | 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.<br>Bit 0 = Other<br>Bit 1 = Block Configuration Error<br>Bit 2 = Link Configuration Error<br>Bit 3 = Simulate Active<br>Bit 4 = Local Override<br>Bit 5 = Device Fail Safe Set<br>Bit 6 = Device Needs Maintenance Soon<br>Bit 7 = Input Failure/ process variable has BAD status<br>Bit 8 = Output Failure<br>Bit 9 = Memory Failure<br>Bit 10 = Lost Static Data<br>Bit 11 = Lost NV Data<br>Bit 12 = Readback Check Failure<br>Bit 13 = Device needs maintenance Now<br>Bit 14 = Power-up<br>Bit 15 = Out-of-Service (MSB) |
| 7 | UPDATE_EVT | DS-73 | 14 | D | R | OOS,Auto | | This alert is generated by any change to the static data. |
| 8 | BLOCK_ALM | DS-72 | 13 | D | R | OOS,Auto | | The block alarm is used for all configuration, hardware, connection failure or |

| Relative Index | Parameter Name | Data type | Size | Storage Type | Read | Write | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | system problems in the block. |
| 9 | TRANSDUCER_DIRECTORY | Array of Unsigned 16 | 1 | C | R | - | 0 | The directory that specifies the number and starting indices of the transducers in the transducer block. |
| 10 | TRANSDUCER_TYPE | Unsigned 16 | 2 | C | R | - | | Identifies the transducer type that follows. |
| 11 | XD_ERROR | Unsigned 8 | 1 | D | R | - | | Error codes of the Block |
| 12 | COLLECTION_DIRECTORY | Array of Unsigned 32 | 1 | C | 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. |
| 13 | PRIMARY_VALUE_TYPE | Unsigned 16 | 2 | S | R | OOS,Auto | 101 | The type of measurement represented by the primary value. The table shown below describes this parameter.<br>101 : volumetric flow |
| 14 | PRIMARY_VALUE | DS-65 | 5 | D | R | - | | The measured value is the actual flow QV<br>Unit: see index 54, unit Qv |
| 15 | PRIMARY_VALUE_RANGE | DS-68 | 11 | N | R | - | | The High and Low range limit values, the engineering units code and the number of digits to the right of the decimal point to be used to display the Primary Value.<br>High limit value = QmaxDN, see Index 56<br>Low Limit Value = 0<br>Unit = unit Qv, see index 54<br>DecPoint = 2 |
| 16 | CAL_POINT_HI | Float | 4 | S | R | OOS,Auto | | The highest calibration point:<br>Equal to Index 56: QmaxDN<br>Writing to this index means changing index 56 too |
| 17 | CAL_POINT_LO | Float | 4 | S | R | OOS,Auto | | The lowest calibration point::<br>Equal to Index 58: Qmin<br>Writing to this index means changing index 58 too |
| 18 | CAL_MIN_SPAN | Float | 4 | C | R | - | 0.0 | The minimum calibration span value allowed. This value is not used and therefore is set to 0.0 |
| 19 | CAL_UNIT | Unsigned 16 | 2 | S | R | OOS,Auto | 1349 | The engineering units code index for the calibration values.<br>Equal to Index 54: Einheit Qv<br>Writing to this index means changing index 54 too |
| 20 | SENSOR_TYPE | Unsigned 16 | 2 | C | R | OOS,Auto | 112 | The type of the sensor defined below.<br>112 : Vortex<br>note: even if primary is SWIRL the number 112 is valid |
| 21 | SENSOR_RANGE | DS-68 | 11 | C | R | - | | The High and Low range measurement values, the engineering units code, and the number of digits to the right of the decimal point .<br>SENSOR_RANGE.100%: QmaxDN, see Index 56<br>SENSOR_RANGE.0% : Qmin , see Index 58<br>SENSOR_RANGE.Unit : UnitQv , see Index 54<br>SENSOR_RANGE.DecPt: 2 |
| 22 | SENSOR_SN | Visible String | 32 | C | R | - | | The sensor serial number (not implemented for TRIO-WIRL) |
| 23 | SENSOR_CAL_METHOD | Unsigned 8 | 1 | S | R | OOS,Auto | | The method of sensor calibration |
| 24 | SENSOR_CAL_LOC | Visible String | 32 | S | R | OOS,Auto | | The location of the last sensor calibration |
| 25 | SENSOR_CAL_DATE | Date | 7 | S | R | OOS,Auto | | The date of the last sensor calibration. |
| 26 | SENSOR_CAL_WHO | Visible String | 32 | S | R | OOS,Auto | | The name of the person who is responsible for the last sensor calibration. |

| Relative Index | Parameter Name | Data type | Size | Storage Type | Read | Write | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| 27 | LIN-TYPE | Unsigned 16 | 2 | C | R | OOS,Auto | | Contains the linearisation type used to describe the behavior of the sensor:<br>1 : Linear with input signal |
| 28 | SECONDARY_VALUE | DS-65 | 5 | D | R | - | | Secondary Value = flow in operating mode chosen<br>unit: see Index 54, UnitQv, or Index 55, Unit Qm,<br>depending on operating mode chosen (Index 42) |
| 29 | SECONDARY_VALUE_UNIT | Unsigned 16 | 2 | S | R | OOS,Auto | | Unit: see Index 54, UnitQv, or Index 55, UnitQm,<br>Depending on operating mode chosen (Index 42) |
| 30 | SECONDARY_VALUE_2 | Float | 4 | | R | - | | Third Value = Temperature<br>Unit: see Index 48, UnitTemp |
| 31 | SECONDARY_VALUE_2_UNIT | Unsigned 16 | 2 | | R | OOS,Auto | | Unit: see Index 48, UnitTemp |
| 32 | SECONDARY_VALUE_3 | Float | 4 | | R | - | | Fourth value = Frequency<br>Unit: Hz |
| 33 | SECONDARY_VALUE_3_UNIT | Unsigned 16 | 2 | | R | OOS,Auto | | Unit:: 1077 = Hz |
| 34 | Version | Visible String | 16 | N | R | - | D200F002U01 A.00 | Software version |
| 35 | Progr.level | Unsigned 8 | 1 | D | R | OOS,Auto | 0 | 0 : Locked<br>1 : Standard<br>2 : Specialist<br>3 : Service |
| 36 | Service code | Unsigned 16 | 2 | D | R | OOS,Auto | | Limits: none<br>Unit : none |
| 37 | language | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : German<br>1 : English |
| 38 | Primary | Unsigned 8 | 1 | S | R | OOS,Auto | 1 | 0 : Swirl ST/SR<br>1 : Vortex VT/VR |
| 39 | Meter size Swirl | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : 15 mm 1/2 in<br>1 : 20 mm 3/4 in<br>2 : 25 mm 1 in<br>3 : 32 mm 1-1/4 in<br>4 : 40 mm 1-1/2 in<br>5 : 50 mm 2 in<br>6 : 80 mm 3 in<br>7 : 100 mm 4 in<br>8 : 150 mm 6 in<br>9 : 200 mm 8 in<br>10: 300 mm 12 in<br>11: 400 mm 16 in |
| 40 | Meter size Vortex | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : DIN 15mm 0.5in<br>1 : DIN 25mm 1in<br>2 : DIN 40mm 1.5in<br>3 : DIN 50mm 2in<br>4 : DIN 80mm 3in<br>5 : DIN 100mm 4in<br>6 : DIN 150mm 6in<br>7 : DIN 200mm 8in |

| Relative Index | Parameter Name | Data type | Size | Storage Type | Read | Write | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 8 : DIN 250mm 10in<br>9 : DIN 300mm 12in<br>10: ANSI 15mm 0.5in<br>11 : ANSI 25mm 1in<br>12 : ANSI 40mm 1.5in<br>13 : ANSI 50mm 2in<br>14 : ANSI 80mm 3in<br>15 : ANSI 100mm 4in<br>16 : ANSI 150mm 6in<br>17 : ANSI 200mm 8in<br>18 : ANSI 250mm 10in<br>19 : ANSI 300mm 12in |
| 41 | Shedule Correct. | Unsigned 8 | 1 | S | R | OOS,Auto | 1 | 0 : Schedule40<br>1 : Schedule80 |
| 42 | Flow mode | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : Liquid Qv (1)<br>1 : Liquid Qm (D) (1)<br>2 : Liquid Qm (D,T) (2)<br>3 : Liquid Qm (V,T) (2)<br>4 : Gas Qv (3)<br>5 : Gas Norm Qn (pT) (4)<br>6 : Gas Stnd Qs (pT) (4)<br>7 : Gas Stnd Qs (Cmp) (3)<br>8 : Gas MassQm (pT) (4)<br>9 : Gas MassQm (D) (3)<br>10: Steam satu. Qm (4)<br>11: Steam satu. Qv (4)<br><br>Notes:<br>(1) can solely be chosen if "Enable K-Set" (Index 83) is set to 1 or 2<br>(2) can solely be chosen if "Enable K-Set" (Index 83) is set to 1 or 2 and PT100-Sensor (Index 82) is set to 1<br>(3) can solely be chosen if "Enable K-Set" (Index 83) is set to 0 or 2<br>(4) can solely be chosen if "Enable K-Set" (Index 83) is set to 0 or 2 and PT100-Sensor (Index 82) be set to 1 |
| 43 | Unit Density | Unsigned 16 | 2 | S | R | OOS,Auto | 1103 | 1104: g/ml<br>1100: g/cm3<br>1105: g/l<br>1103: kg/l<br>1097: kg/m3<br>1107: lb/ft3<br>1108: lb/ugl |
| 44 | Reference density | Float | 4 | S | R | OOS,Auto | 1.0 | Lower limit: 0.00001 kg/l<br>Upper limit :10 kg/l<br>or corresponding values expressed in different units<br>Unit : see Index 43, Unit density |

| Relative Index | Parameter Name | Data type | Size | Storage Type | Read | Write | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| 45 | Normal density | Float | 4 | S | R | OOS,Auto | 0.001293 | Lower limit: 0.0 kg/l<br>Upper limit :0.1 kg/l<br>Or corresponding values expressed in different units<br>Unit : see Index 43, Unit density |
| 46 | Norm factor | Float | 4 | S | R | OOS,Auto | 1.0 | Lower limit: 0.00001<br>Upper limit : 30.0<br>Unit : none |
| 47 | Normal condition | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : 1.0133bara °C<br>1 : 1.0133bara 20 °C<br>2 : 14.7psi-abs 60F<br>3 : 14.7psi-abs 70F |
| 48 | Unit temperature | Unsigned 16 | 2 | S | R | OOS,Auto | 1001 | 1001: °C<br>1002: F<br>1000: K |
| 49 | Reference temperature | Float | 4 | S | R | OOS,Auto | 20.0 | Lower limit: -200 °C<br>Upper limit : 450 °C<br>Or corresponding values expressed in different units<br>Unit : see Index 48, UnitTemp. |
| 50 | Unit pressure | Unsigned 16 | 2 | S | R | OOS,Auto | 1137 | 1137: bara<br>1142: PSIA<br>1132: MPA<br>1138: mbar |
| 51 | PressurePopr abs | Float | 4 | S | R | OOS,Auto | 1.0133 | Lower limit: 0 bar<br>Upper limit : 100 bar<br>Or corresponding values expressed in different units<br>Unit : see Index 50, Unit Pressure |
| 52 | Volume Extension | Float | 4 | S | R | OOS,Auto | 1.0 | Lower limit: 0<br>Upper limit : 10.0<br>Unit : none |
| 53 | Density Extension | Float | 4 | S | R | OOS,Auto | 1.0 | Lower limit: 0<br>Upper limit : 10.0<br>Unit : none |
| 54 | Unit Qvol | Unsigned 16 | 2 | S | R | OOS,Auto | 1349 | 1351: l/s<br>1352: l/m<br>1353: l/h<br>1347: m3/s<br>1348: m3/m<br>1349: m3/h<br>1350: m3/d<br>1356: ft3/s<br>1357: ft3/m<br>1358: ft3/h<br>1359: ft3/d<br>1362: usgps<br>1363: usgpm |

| Relative Index | Parameter Name | Data type | Size | Storage Type | Read | Write | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 1364: usgph<br>1365: usmgd<br>1367: igps<br>1368: igpm<br>1369: igph<br>1370: igpd<br>1371: bbl/s<br>1372: bbl/m<br>1373: bbl/h<br>1374: bbl/d |
| 55 | Unit Qm | Unsigned 16 | 2 | S | R | OOS,Auto | 1324 | 1318: g/s<br>1319: g/m<br>1320: g/h<br>1322: kg/s<br>1323: kg/m<br>1324: kg/h<br>1325: kg/d<br>1327: t/m<br>1328: t/h<br>1329: t/d<br>1330: lb/s<br>1331: lb/m<br>1332: lb/h<br>1333: lb/d |
| 56 | QmaxDN operation | Float | 4 | N | R | - | 1.67 | Unit: see Index 54, UnitQv |
| 57 | Qmax | Float | 4 | S | R | OOS,Auto | 1.67 | Limits: depending on different other parameters<br>Unit : see index 54, unitQv or index 55, unitQm, depending on operating mode chosen (index 42) |
| 58 | Qmin operat. | Float | 4 | S | R | OOS,Auto | 0.139 | Lower limit: 0<br>Upper limit : depending on other parameters<br>Unit: see index 54, UnitQv |
| 59 | Totalizer | Float | 4 | N | R | - | 0.0 | Unit: see index 61, unitZv, or Index 62, unitZm,<br>Depending on operating mode chosen (Index 42) |
| 60 | Overflow (totalizer) | Unsigned 16 | 2 | N | R | - | 0 | Unit: none |
| 61 | Unit totalizer<br>(Volume units) | Unsigned 16 | 2 | S | R | OOS,Auto | 1034 | 1038: l<br>1034: m3<br>1043: ft3<br>1048: ugl<br>1049: igl<br>1051: bbl |
| 62 | Unit totalizer<br>(Mass unit) | Unsigned 16 | 2 | S | R | OOS,Auto | 1088 | 1089: g<br>1088: kg<br>1092: t<br>1094: lb |
| 63 | Totalizer Reset | | 1 | D | R | OOS,Auto | 0 | 0 : no totalizer reset |

| Relative Index | Parameter Name | Data type | Size | Storage Type | Read | Write | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 1 : reset totalizer<br>Note: value will be automatically reset to 0 should a value other than zero be entered. |
| 64 | Damping | Float | 4 | S | R | OOS,Auto | 3.0 | Lower limit : 0.2<br>Upper limit : 100<br>Unit : Seconds |
| 65 | Hardware Config. | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : Off<br>1 : Puls_Bin<br>2 : Q_Alarm<br>3 : T_Alarm (1)<br>4 : S_Alarm<br><br>Note:<br>(1) can solely be chosen, should the parameter PT100Sensor (Index 82) be set to 1 |
| 66 | Minalarm flow | Float | 4 | S | R | OOS,Auto | 0.0 | Lower limit : 0<br>Upper limit : 100<br>unit : % |
| 67 | Maxalarm flow | Float | 4 | S | R | OOS,Auto | 100.0 | Lower limit : 0<br>Upper limit : 100<br>Unit : % |
| 68 | Minalarm Temp. | Float | 4 | S | R | OOS,Auto | -60.0 | Lower limit : -60.0 °C<br>Upper limit : 510.0 °C<br>Or corresponding values expressed in different units<br>Unit : see Index 48, UnitTemp |
| 69 | Maxalarm Temp. | Float | 4 | S | R | OOS,Auto | 510.0 | Lower limit : -60.0 °C<br>Upper limit : 510.0 °C<br>Or corresponding values expressed in different units<br>Unit : see Index 48, UnitTemp |
| 70 | Pulse factor | Float | 4 | S | R | OOS,Auto | 20.0 | Lower limit : 0.001<br>Upper limit :1000<br>Note: in some cases the input range may be less<br>Unit :1 / Unit Totalizer |
| 71 | Pulse width | Float | 4 | S | R | OOS,Auto | 5 | Lower limit : 1 msec<br>Upper limit : 256 msec or less. (limitation to max. 50% period length at pulse output)<br>Unit : msec |
| 72 | Display mode | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : 1 big line, 1 small line<br>1 : 4 small lines |
| 73 | Display line 1 | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : Q Operating mode<br>1 : Qv Operation<br>2 : Per cent<br>3 : Totalizer<br>4 : Temperature (1)<br>5 : Frequency<br>6 : AI1 Out<br>7 : AI1 Status<br>8 : AI2 Out<br>9 : AI2 Status<br><br>Note: |
| 74 | Display line 2 | Unsigned 8 | 1 | S | R | OOS,Auto | 3 | |
| 75 | Display line 3 | Unsigned 8 | 1 | S | R | OOS,Auto | 2 | |

| Relative Index | Parameter Name | Data type | Size | Storage Type | Read | Write | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| 76 | Display line 4 | Unsigned 8 | 1 | S | R | OOS,Auto | 5 | |
| 77 | Display contrast | Unsigned 8 | 1 | S | R | - | 144 | Range 136 (min. Contrast) – 159 (max. Contrast) |
| 78 | Error register | Unsigned 16 | 2 | N | R | - | 0 | Bit 0: Steam calculation<br>Bit 1: Front end<br>Bit 2: -<br>Bit 3: Flow > 115%<br>Bit 4: -<br>Bit 5: Main Data base<br>Bit 6: Totalizer incorrect<br>Bit 7: Temperature<br>Bit 8: -<br>Bit 9: Qv > 115% QmaxDN<br>Bit 10: -<br>Bit 11: Backup Data base<br>Bit 12: -<br>Bit 13: -<br>Bit 14: -<br>Bit 15: - |
| 79 | Mains failure | Unsigned 16 | 2 | N | R | - | 0 | |
| 80 | Instrument No. | Unsigned 16 | 2 | N | R | - | 0 | |
| 81 | Order-Number | Visible String | 16 | S | R | OOS,Auto | 00000000x000 | |
| 82 | PT100 Sensor | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : Off<br>1 : On |
| 83 | Enable K-Set | Unsigned 8 | 1 | S | R | OOS,Auto | 2 | 0 : Gas<br>1 : Liquid<br>2 : Liquid & Gas |
| 84 | k-Linearisation | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : mean value<br>1 : 5 points |
| 85 | Schedule-ShiftFct | Float | 4 | S | R | OOS,Auto | 0.0 | Lower limit : -10.0<br>Upper limit : 10.0<br>Unit : none |
| 86 | Calib.Schedule | Float | 4 | S | R | OOS,Auto | 1.0 | 0 : Schedule40<br>1 : Schedule80 |
| 87 | Liquid f1 | Float | 4 | S | R | OOS,Auto | 2500.0 | Lower limt : 1<br>Upper limit : Liquid f2<br>Unit : Hz |
| 88 | Liquid f2 | Float | 4 | S | R | OOS,Auto | 2500.0 | Lower limit : Liquid f1<br>Upper limit : Liquid f3<br>Unit : Hz |
| 89 | Liquid f3 | Float | 4 | S | R | OOS,Auto | 2500.0 | Lower limit : Liquid f2<br>Upper limit : Liquid f4<br>Unit : Hz |
| 90 | Liquid f4 | Float | 4 | S | R | OOS,Auto | 2500.0 | Lower limit : Liquid f3<br>Upper limit : Liquid f5 |

| Relative Index | Parameter Name | Data type | Size | Storage Type | Read | Write | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Unit : Hz |
| 91 | Liquid f5 | Float | 4 | S | R | OOS,Auto | 2500.0 | Lower limit : Liquid f4<br>Upper limit : 2500<br>Unit : Hz |
| 92 | Liquid k1 | Float | 4 | S | R | OOS,Auto | 60.0 | Lower limit : 1.0<br>Upper limit : 200000.0<br>Unit : 1/m3 |
| 93 | Liquid k2 | Float | 4 | S | R | OOS,Auto | 60.0 | Lower limit : 1.0<br>Upper limit : 200000.0<br>Unit : 1/m3 |
| 94 | Liquid k3 | Float | 4 | S | R | OOS,Auto | 60.0 | Lower limit : 1.0<br>Upper limit : 200000.0<br>Unit : 1/m3 |
| 95 | Liquid k4 | Float | 4 | S | R | OOS,Auto | 60.0 | Lower limit : 1.0<br>Upper limit : 200000.0<br>Unit : 1/m3 |
| 96 | Liquid k5 | Float | 4 | S | R | OOS,Auto | 60.0 | Lower limit : 1.0<br>Upper limit : 200000.0<br>Unit : 1/m3 |
| 97 | Liquid km | Float | 4 | S | R | OOS,Auto | 60.0 | Lower limit : 1.0<br>Upper limit : 200000.0<br>Unit : 1/m3 |
| 98 | Gas f1 | Float | 4 | S | R | OOS,Auto | 2500.0 | Lower limit : 1<br>Upper limit : Gas f2<br>Unit : Hz |
| 99 | Gas f2 | Float | 4 | S | R | OOS,Auto | 2500.0 | Lower limit : Gas f1<br>Upper limit : Gas f3<br>Unit : Hz |
| 100 | Gas f3 | Float | 4 | S | R | OOS,Auto | 2500.0 | Lower limit : Gas f2<br>Upper limit : Gas f4<br>Unit : Hz |
| 101 | Gas f4 | Float | 4 | S | R | OOS,Auto | 2500.0 | Lower limit : Gas f3<br>Upper limit : Gas f5<br>Unit : Hz |
| 102 | Gas f5 | Float | 4 | S | R | OOS,Auto | 2500.0 | Lower limit : Gas f4<br>Upper limit : 2500<br>Unit : Hz |
| 103 | Gas k1 | Float | 4 | S | R | OOS,Auto | 150.0 | Lower limit : 1.0<br>Upper limit : 200000.0<br>Unit : 1/m3 |
| 104 | Gas k2 | Float | 4 | S | R | OOS,Auto | 150.0 | Lower limit : 1.0<br>Upper limit : 200000.0<br>Unit : 1/m3 |
| 105 | Gas k3 | Float | 4 | S | R | OOS,Auto | 150.0 | Lower limit : 1.0 |

| Relative Index | Parameter Name | Data type | Size | Storage Type | Read | Write | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Upper limit : 200000.0<br>Unit : 1/m3 |
| 106 | Gas k4 | Float | 4 | S | R | OOS,Auto | 150.0 | Lower limit : 1.0<br>Upper limit : 200000.0<br>Unit : 1/m3 |
| 107 | Gas k5 | Float | 4 | S | R | OOS,Auto | 150.0 | Lower limit : 1.0<br>Upper limit : 200000.0<br>Unit : 1/m3 |
| 108 | Gas km | Float | 4 | S | R | OOS,Auto | 150.0 | Lower limit : 1.0<br>Upper limit : 200000.0<br>Unit : 1/m3 |
| 109 | DSP BootPage | Unsigned 8 | 1 | S | R | OOS,Auto | 1 | 0 : Page 0<br>1 : Page Standard<br>2 : Page Spectrum |
| 110 | Freq.Min | Unsigned 8 | 1 | S | R | OOS,Auto | 6 | 0 : 954Hz<br>1 : 477Hz<br>2 : 238Hz<br>3 : 119Hz<br>4 : 60Hz<br>5 : 30Hz<br>6 : 15Hz<br>7 : 8Hz<br>8 : 4Hz<br>9 : 2Hz<br>10: 1Hz |
| 111 | Freq.Max | Unsigned 8 | 1 | S | R | OOS,Auto | 1 | 0 : 2500Hz<br>1 : 954Hz<br>2 : 477Hz<br>3 : 238Hz<br>4 : 119Hz<br>5 : 60Hz<br>6 : 30Hz<br>7 : 15Hz<br>8 : 8Hz<br>9 : 4Hz<br>10 : 2Hz |
| 112 | Gain Max | Unsigned 16 | 2 | S | R | OOS,Auto | 0x06EA | Lower limit : 0x400<br>Upper limit : 0x07FF<br>Unit : none |
| 113 | BP-Aver Damp | Unsigned 8 | 1 | S | R | OOS,Auto | 1 | 0 : 1.0 Sec<br>1 : 2.0 Sec<br>2 : 5.0 Sec |
| 114 | FreqSpecBalance | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : Off<br>1 : 1<br>2 : 2 |

| Relative Index | Parameter Name | Data type | Size | Storage Type | Read | Write | Default Values | Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 3 : 3 |
| 115 | Input Minimum | Float | 4 | S | R | OOS,Auto | 0.03 | Lower limit : 0<br>Upper limit : 0.99<br>Unit : none |
| 116 | Gain VibTrigger | Unsigned 16 | 2 | S | R | OOS,Auto | 0x062C | Lower limit : 0x400<br>Upper limit : 0x07FF<br>Unit : none |
| 117 | Vib Qv Factor | Float | 4 | S | R | OOS,Auto | 0.9 | Lower limit : 0<br>Upper limit : 0.99<br>Unit : none |
| 118 | Input Select | Unsigned 8 | 1 | S | R | OOS,Auto | 0 | 0 : Qv<br>1 : Qv Comp |
| 119 | Low DisFrequen. | Float | 4 | S | R | OOS,Auto | 5000 | Lower limit : 0<br>Upper limit : 5000<br>Unit : none |
| 120 | High DisFrequen. | Float | 4 | S | R | OOS,Auto | 5000 | Lower limit : 0<br>Upper limit : 5000<br>Unit : none |
| 121 | Low DisGain | Unsigned 16 | 2 | S | R | OOS,Auto | 0x07FF | Lower limit : 0x0400<br>Upper limit :0x07FF<br>Unit : none |
| 122 | High DisGain | Unsigned 16 | 2 | S | R | OOS,Auto | 0x07FF | Lower limit : 0x0400<br>Upper limit : 0x07FF<br>Unit : none |
| 123 | Temp.Correct. | Float | 4 | S | R | OOS,Auto | 0.0 | Lower limit : -10.0<br>Upper limit :10.0<br>Unit : Celsius |
| 124 | Temp.Interval | Unsigned 16 | 2 | S | R | OOS,Auto | 32767 | Lower limit : 0<br>Upper limit : 32767<br>Unit : none |
| 125 | Service Display | Unsigned 8 | 1 | D | R | OOS,Auto | 0 | 0 : BP Range<br>1 : BP State<br>2 : Input Values<br>3 : Vib In Values<br>4 : Input Quality<br>5 : Gain Values<br>6 : Freq Values |

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| Shedule Correct. | 41 |
| Shedule-ShiftFct | 85 |
| ST_REV | 1 |
| STRATEGY | 3 |
| TAG_DESC | 2 |
| Temp.Correct. | 123 |
| Temp.Interval | 124 |
| Totalizer | 59 |
| Totalizer Reset | 63 |
| TRANSDUCER_DIRECTORY | 9 |
| TRANSDUCER_TYPE | 10 |
| Unit Density | 43 |
| Unit pressure | 50 |
| Unit Qm | 55 |
| Unit Qvol | 54 |
| Unit Temp. | 48 |
| Unit totalizer | 61 |
| Unit totalizer | 62 |
| UPDATE_EVT | 7 |
| Version | 34 |
| Vib Qv Factor | 117 |
| Volume Extension | 52 |
| XD_ERROR | 11 |

## 1.5 Data Structure

### 1.5.1 DS-65 – Value & Status – Floating Point Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Status | Unsigned8 | 1 |
| 2 | Value | Float | 4 |

### 1.5.2 DS-68 – Scaling Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | EU at 100% | Float | 4 |
| 2 | EU at 0% | Float | 4 |
| 3 | Units Index | Unsigned16 | 2 |
| 4 | Decimal Point | Integer8 | 1 |

### 1.5.3 DS-69 – Mode Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Target | Bitstring | 1 |
| 2 | Actual | Bitstring | 1 |
| 3 | Permitted | Bitstring | 1 |
| 4 | Normal | Bitstring | 1 |

### 1.5.4 DS-70 – Access Permissions

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Grant | Bitstring | 1 |
| 2 | Deny | Bitstring | 1 |

### 1.5.5 DS-71 – Alarm Float Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Unacknowledged | Unsigned8 | 1 |
| 2 | Alarm State | Unsigned8 | 1 |
| 3 | Time Stamp | Time Value | 8 |
| 4 | Subcode | Unsigned16 | 2 |
| 5 | Value | Float | 4 |

### 1.5.6 DS-72 – Alarm Discrete Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Unacknowledged | Unsigned8 | 1 |
| 2 | Alarm State | Unsigned8 | 1 |
| 3 | Time Stamp | Time Value | 8 |
| 4 | Subcode | Unsigned16 | 2 |
| 5 | Value | Unsigned8 | 1 |

### 1.5.7 DS-73 – Event Update Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Unacknowledged | Unsigned8 | 1 |
| 2 | Update State | Unsigned8 | 1 |
| 3 | Time Stamp | Time Value | 8 |
| 4 | Static Revision | Unsigned16 | 2 |
| 5 | Relative Index | Unsigned16 | 2 |

### 1.5.8 DS-74 – Alarm Summary Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Current | Bitstring | 2 |
| 2 | Unacknowledged | Bitstring | 2 |
| 3 | Unreported | Bitstring | 2 |
| 4 | Disabled | Bitstring | 2 |

### 1.5.9 DS-82 – Simulate – Floating Point Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Simulate Status | Unsigned8 | 1 |
| 2 | Simulate Value | Float | 4 |
| 3 | Transducer Status | Unsigned8 | 1 |
| 4 | Transdiúcer Value | Float | 4 |
| 5 | Simulate En/Disable | Unsigned8 | 1 |

### 1.5.10 DS-85 – Test Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Value 1 | Boolean | 1 |
| 2 | Value 2 | Integer8 | 1 |
| 3 | Value 3 | Integer16 | 2 |
| 4 | Value 4 | Integer32 | 4 |
| 5 | Value 5 | Unsigned8 | 1 |
| 6 | Value 6 | Unsigned16 | 2 |
| 7 | Value 7 | Unsigned32 | 4 |
| 8 | Value 8 | Float | 4 |
| 9 | Value 9 | Visible String | 32 |
| 10 | Value 10 | Octet String | 32 |
| 11 | Value 11 | Date | 7 |
| 12 | Value 12 | Time of Day | 6 |
| 13 | Value 13 | Time Difference | 6 |
| 14 | Value 14 | Bitstring | 2 |
| 15 | Value 15 | Time Value | 8 |

## 1.6 Status-Byte

Measuement values are usually transferred as data structure DS-65 – Value & Status in cyclic communication. This structure consists of a value as float number and a status information as byte. This status byte has the following 3 parts:

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|
| Quality | | Quality Substatus | | | | Limits | |

Quality
- 0: Bad
- 1: Uncertain
- 2: Good (Not Cascade)
- 3: Good (Cascade)

Substatus BAD
- 0: Non-specific
- 1: Configuration Error
- 2: Not Connected
- 3: Device Failure
- 4: Sensor Failure
- 5: No Communication (last usable value)
- 6: No Communication (no usable value)
- 7: Out of Service

Substatus UNCERTAIN
- 0: Non-specific
- 1: Last Usable Value
- 2: Substitute
- 3: Initial Value
- 4: Sensor Conversion not Accurate
- 5: Engineering Unit Range Violation
- 6: Sub-normal

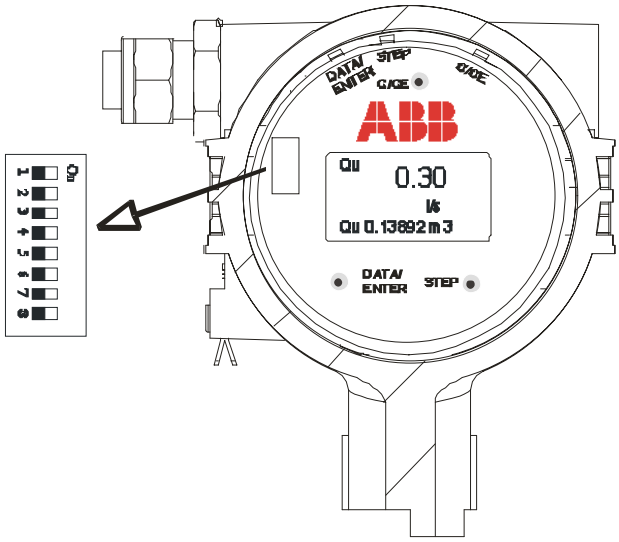
Substatus GOOD (Non-Cascade)
- 0: Non-specific
- 1: Active Block Alarm
- 2: Active Advisory Alarm (priority < 8)
- 3: Active Critical Alarm (priority > 8)
- 4: Unacknowledged Block Alarm
- 5: Unacknowledged Advisory Alarm
- 6: Unacknowledged Critical Alarm

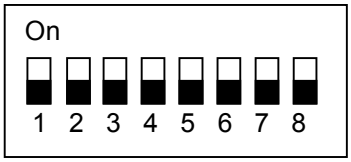
Substatus GOOD (Cascade)
- 0: Non-specific
- 1: Initialisation Acknowlegde
- 2: Initialisation Request
- 3: Not Invited
- 4: Not Selected
- 5: Local Override
- 6: -
- 7: Fault State Active
- 8: Initiate Fault State

Limits:
- 0: Not limited
- 1: Low limited
- 2: High limited
- 3: Constant

## 2. Hardware Switch

The switches can be found on the digital board (below the display). Should you desire to reach the switch, please unscrew the housing lid. The switch setting can be read out on the device display using the submenu function test, menu DIP-Switch.




Switch 1 = Simulate Enable
off = Simulation Mode disabled
on = Simulation Mode enabled

The switch position will be displayed via the resource block within the parameter BLOCK_ERR.

Switch 2 = Write Protect (Schreibschutz)
off = Write Protect disabled (Schreibschutz inaktiv)
on = Write Protect enabled (Schreibschutz aktiv)

The switch position will be displayed via the resource block within the parameter WRITE_LOCK.

## 3. Start-Up

This manual is set out to provide a description of the TRIO-WIRL converter set-up using National Instruments Fieldbus Configuration System V2.3.

In addition to the instrument, you will require the following instrument-describing files for TRIO-WIRL (000320/0015):

0101.ffo

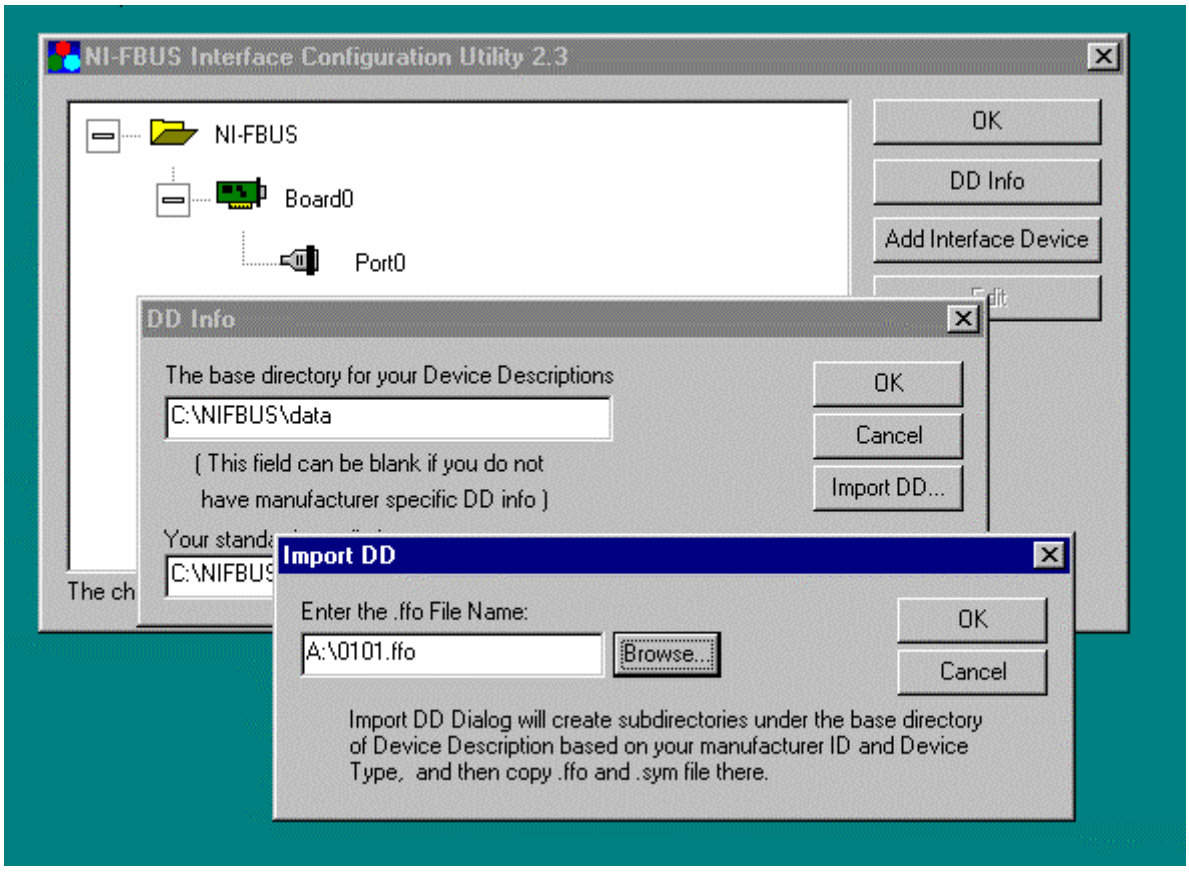
0101.sym

010101.cff (not required for NI-Configurator)

These files will be delivered along with the instrument on a CD-ROM which additionally includes this documentation. They can likewise be obtained via the Fieldbus Foundation Homepage www.fieldbus.org.

### 3.1 NI-Interface Config.

Initially, please, start the National Instruments© Program “Interface Config.”. Neither the NI-FBUS configurator nor the NIFB program may be activated. Click on “DD info” and subsequently on “Import DD”. Please enter the path to the ffo- (and sym-) file and press the “OK” button to import the files.

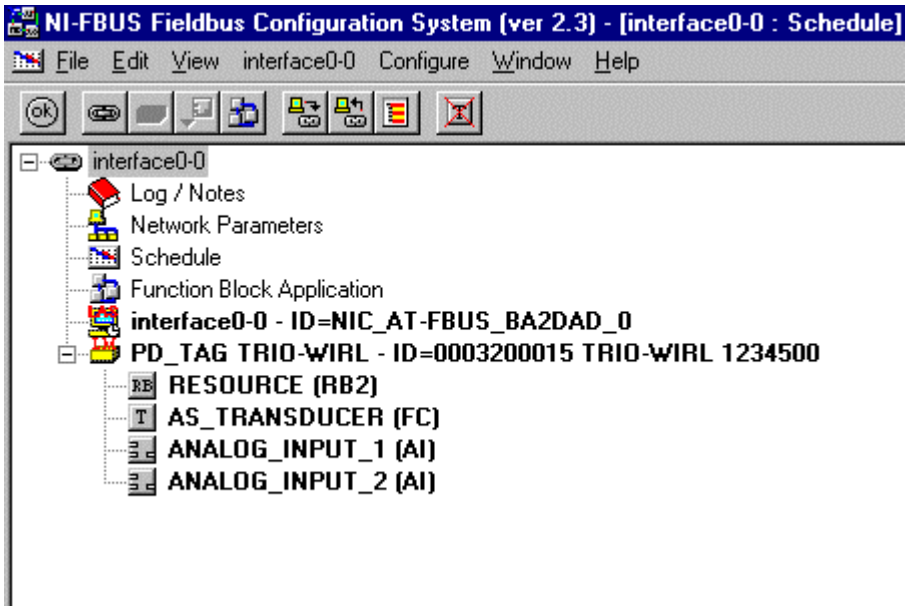


## 3.2 Verify Hardware switch

Please check on TRIO-WIRL, whether the hardware switches 1 and 3 are set to off (see chapter 2). Should this not be the case, please change the setting to off (also feasible during instrument operation).

## 3.3 Connection Establishment

Please start the National Instruments© NI-FBUS Configurator. Subsequent to the connection establishment, the following message should appear:




This is the identifier (ID) structure:

000320 = manufacturer code ABB, hex

0015 = Device Type Code TRIO-WIRL, hex

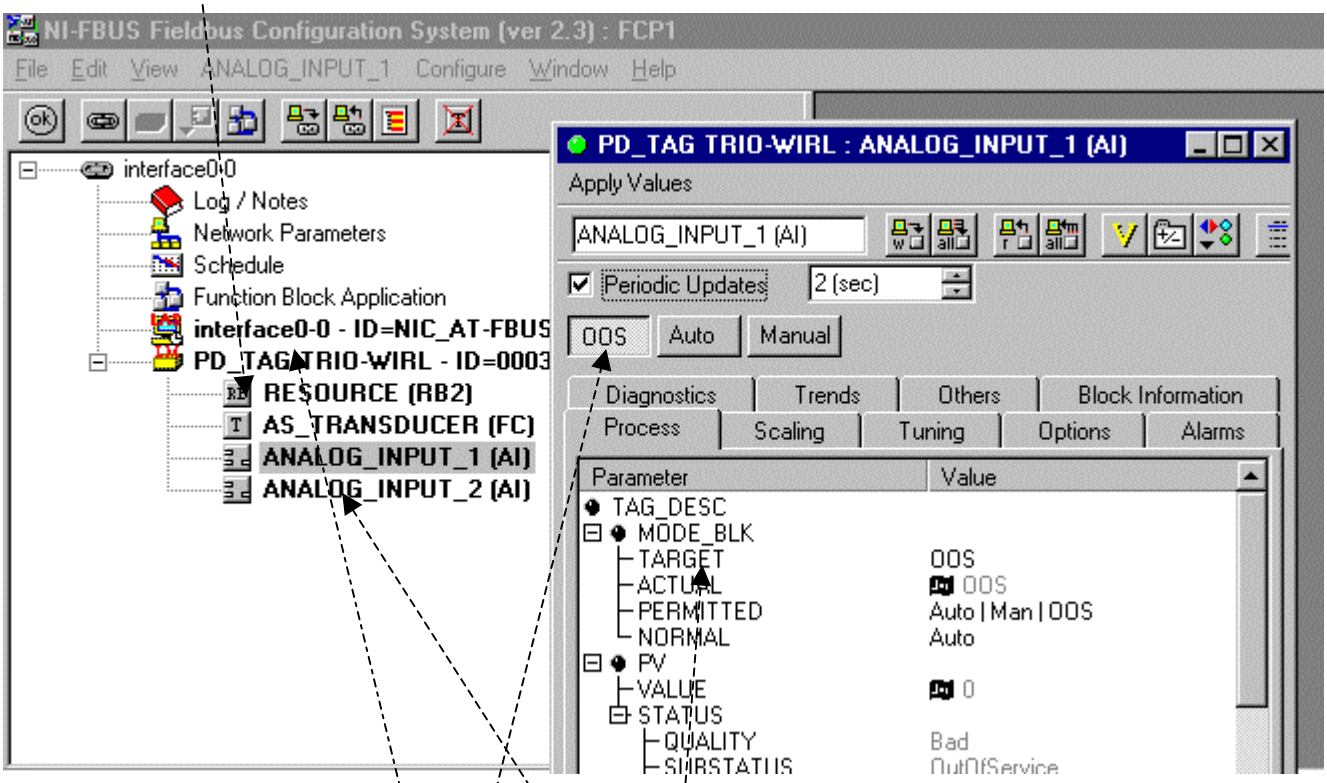
TRIO-WIRL = Device name

12345 = serial no. of instrument expressed as 5-digit decimal figure

00 = double-zero always added

## 3.4 Blocks Out of Service

Prior to configuring the instrument, please verify whether all blocks are "out of service" . Verification can be done by opening (doubleclick on the block entry ) the block display for each block:




If necessary, please set blocks to "out of service".

NOTE: Both Target Mode and Actual mode have to be set to "OOS"!

## 3.5 Instrument and Block Denominations

Please choose an instrument denomination.
To do so, please click on "PD_TAG TRIO-WIRL" using the right mouse button. Using SET TAG, please enter a denomination for the respective instrument.
Repeat this procedure to choose a denomination for the blocks (RB2, FC, AI1, AI2).

Should the error message "Write prohibited" appear, please verify once again, whether the "Write Protect" switch is set to off. (see 2).

As to Foundation Fieldbus, you have to imagine that the block be instrument-independent. Thus different denominations for the different devices are not sufficient. Even the blocks at the same bus have to dispose of different denominations.

## 3.6 Resource Block

In general, no settings have to be adjusted within the resource block. Set the block into the mode "Auto".

## 3.7 Transducer Block

The transducer block contains all instrument-specific parameters of the TRIO-WIRL converter.

The parameter can be set in accordance with the application desired value. Please use the instruction manual for getting information about the specific parameter usage. Then set the block mode to "Auto".

## 3.8 Analog input Block

Next you have to determine the unit handling. The measurements will be calculated within the transducer block and provided by the channels. Each channel disposes of different units (see 1.4.1). Within the AI block this value can merely be transferred (L_TYPE =direct) or the scale can be changed to another unit (L_TYPE =indirect) (see 1.3.1).

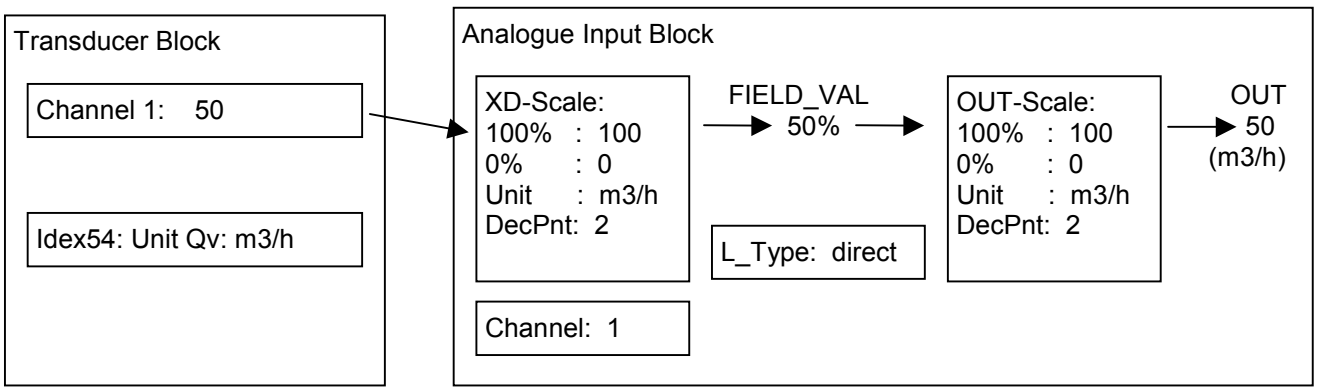
### 3.8.1 Unit with L_TYPE =Direct

Should within the AI block the L_TYPE (Index 16) be set to “Direct” will the structures XD_SCALE and OUT_SCALE need to be set up identically. The entry value will be directly and without transformation be transferred to OUT. The XD scale unit has to be identical with the channel unit.

Example:

The operating flow Qv shall be indicated in m3/h. Thus, please :

- Set the L_TYPE within the AI-Block to “Direct”
- Set the channel within the AI block to 1 in order to choose Qv (see 1.4.1)
- Within the transducer block (Index 54) set “Unit Qv” to m3/h. The channel 1 value then is displayed in this unit .
- Within the AI block, please set the units XD_SCALE and OUT_SCALE likewise to m3/h.
- Recommendation (not necessary): set 100%-value in XD-Scale and OUT-Scale to the QmaxDN value (Transducer-Block Index 56).
- All values in XD_SCALE and OUT_SCALE have to be adjusted identically.
- Set AI block to “Auto”.




Using automatic operation mode the channel 1 value (see above example: “50”) will automatically transferred through the AI block and then be displayed as OUT value “50”.

FIELD_VAL indicates the measurement value in input-(XD)-scaling expressed in percent, in this example “50.0%”.

Info: Both the 100% and the 0% values in the XD_SCALE and OUT _SCALE do not have to be identical with the real measuring ranges of the converter. Both values do in no way represent any limit. The AI block also tranfers measuring values differing from the indicated measuring range. E.g.: Taking the above example a measuring value of 200 (m3/h) will be processed without problems. FIELD_VAL would than amount to 200%.

Yet, it is recommended to adjust the AI scaling to the real measurement range. Thereto you have to either enter the QmaxDN (TB index 56) or Qmax (TB index 57) as 100% value to XD_SCALE and OUT_SCALE. The 0% value then is 0. In that case the FIELD_VAL will be indicated as a percentage of the real flow. This is important for the alarm hysteresis value(AI index 24). ALARM_HYS is a percent value related to OUT_SCALE.

NOTE: Should alarms be used, the scaling of XD_SCALE and OUT_SCALE has to comply with the real measurement range.

### 3.8.2 Unit with L_TYPE=Indirect

Should within the AI block the L_TYPE (index 16) be set to „indirect“, a change of scale as to the measurement value within the AI block will be effected (see 1.3.1). Using the XD_SCALE the channel value will be set to percent (= FIELD_VAL). Using the OUT_SCALE structure, the percent value will be scaled to OUT value. The XD_SCALE unit has to be identical with the channel unit.

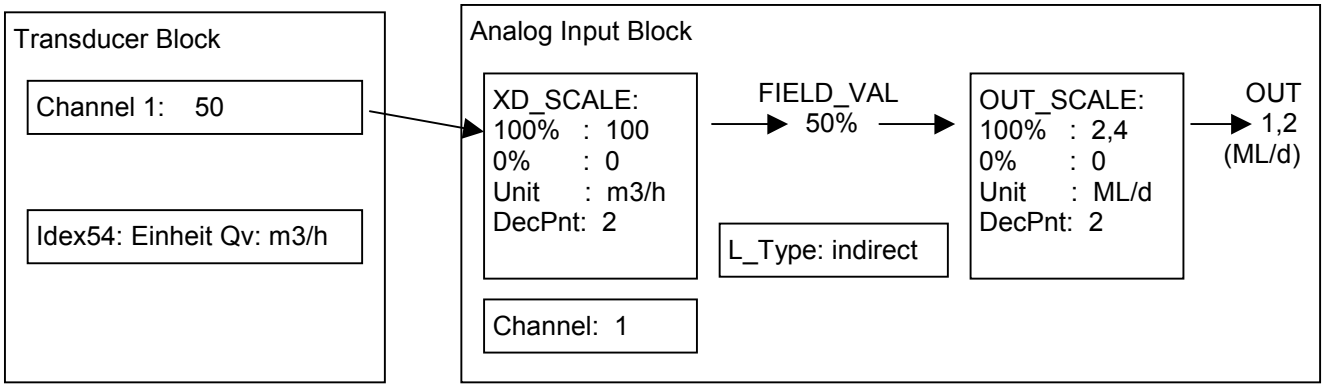
Thus a change of scaling to any suitable unit available with Foundation Fieldbus becomes feasible.

Example:

The operating flow Qv in ML/d (MegaLiter/Day) shall be displayed. For this purpose, the conversion factor has to be known: 100 m3/h = 2400 m3/d = 2,400,000 L/d = 2.4 ML/d

Settings:

- Set L_TYPE within AI block to indirect.
- Set Channel within AI block to 1 as to choose Qv (see 1.4.1)
- Set “Unit Qv” (index 54) within transducer block to m3/h. Thus the channel 1 value will be displayed in this unit.
- Set XD_SCALE within AI block to 0 to 100 m3/h. The unit has to comply with the channel unit
- Set OUT_SCALE within AI block to 0 to 2.4 ML/d.
- Set AI block to “auto"




Using the XD scaling, the channel 1 value („50“ in this example) will then be automatically set to 50(%).

This value is scaled to 1.20 (ML/d) using OUT_SCALE.

Info: As is the case with L_TYPE = „direct“ the range of scaling does not necessarily have to be identical with the measurement range of the instrument. You could also scale the instrument to, say, 0 - 1000 m3/h to 0 - 24 ML/d or even 0 - 1 m3/h to 0 - 0.024 ML/d. The percent value FIELD_VAL would then differ considerably, depending on the scaling chosen.

Should you want the percent value FIELD_VAL to be displayed as a percent value off the real flow, the scaling range has to correspond to the real measurement range, i.e. to the QmaxDN or Qmax value. Example:

QmaxDN = 6 m3/h = 6*0.024 ML/d = 0.144 ML/d

In this case you would have to enter 0 - 6 m3/h with XD_SCALE and 0 - 0.144 ML/d with OUT_SCALE. Then FIELD_VAL will show a percentage of QmaxDN, i.e. the real flow.

The alarm hysteresis ALARM_HYS (AI index 24) represents a percentage referring to OUT_SCALE.

Note: When using alarms OUT_SCALE has to correspond to the real measurement range.

**Warning:** **With L_TYPE „indirect“ the converter does NOT verifiy scaling and unit of OUT_SCALE**

It is feasible to choose any sensible or insensible unit. The above example could for example also be scaled at 0-100 m3/h to 0-100 kg/h, which, under certain circumstances could well be considered sensible. Yet, the scaling could also be set at 0-100 m3/h to 0-100 Celsius, which, of course, makes no sense at all.

There is, of course, always a risk of faulty scaling. You could, e.g., set a scaling from 0 – 100 m3/h to 0-100 ML/d, which would be incorrect.

This behaviour refers to the Foundation Fieldbus AI blocks. The operator takes the responsibility of correctly setting the scale.

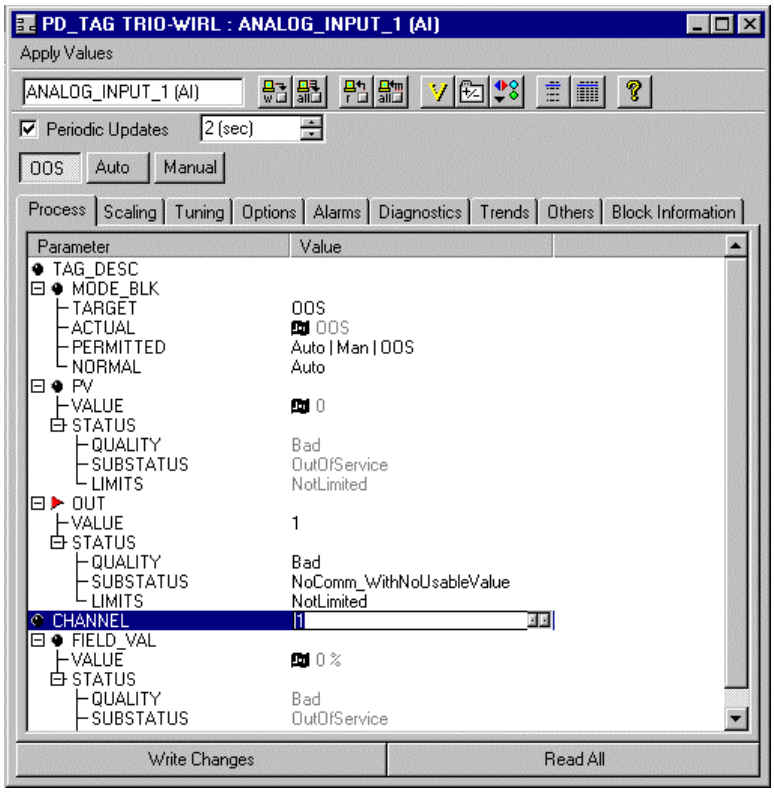
### 3.8.3 Summary AI block settings

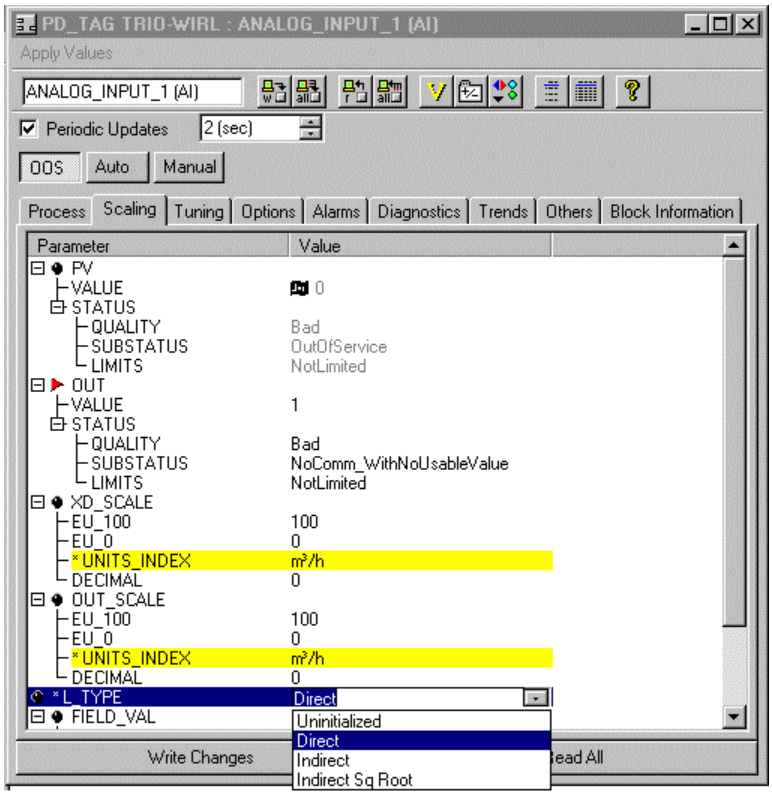
Minimum settings:

- Valid channel
- L_TYPE: direct or indirect
- XD_SCALE
- OUT_SCALE

It is recommended to work with L_TYPE direct in order to avoid errors during change of scaling.

The following pictures show the settings at the National Instruments© NI-FBUS Configurator:



## 3.9 PERIOD_OF_EXECUTION

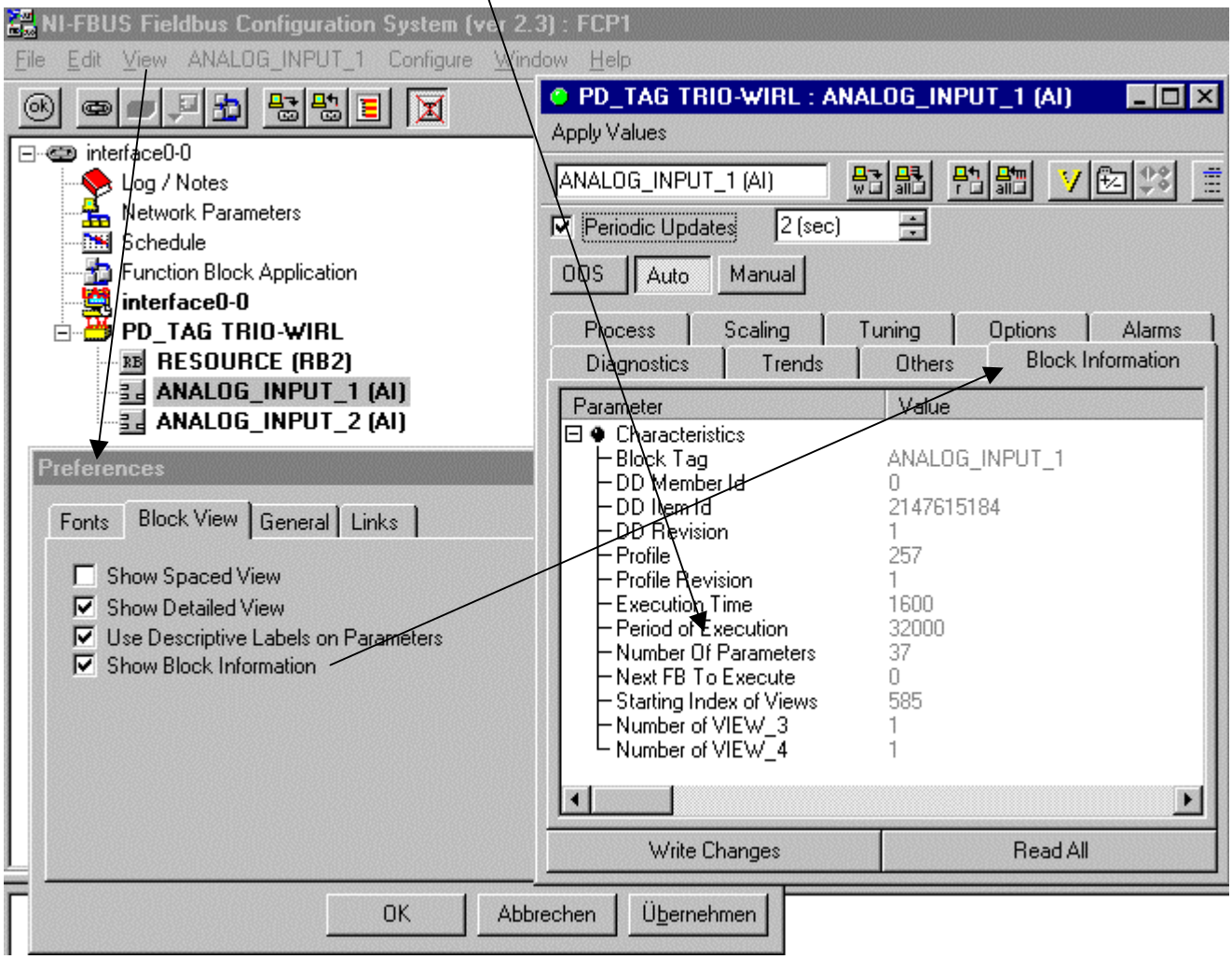
Within the AI block view choose the tab „Block Information". Should this tab not be visible, close the block view window and choose from the menu bar of the main window:

View→ Preferences→ Block View

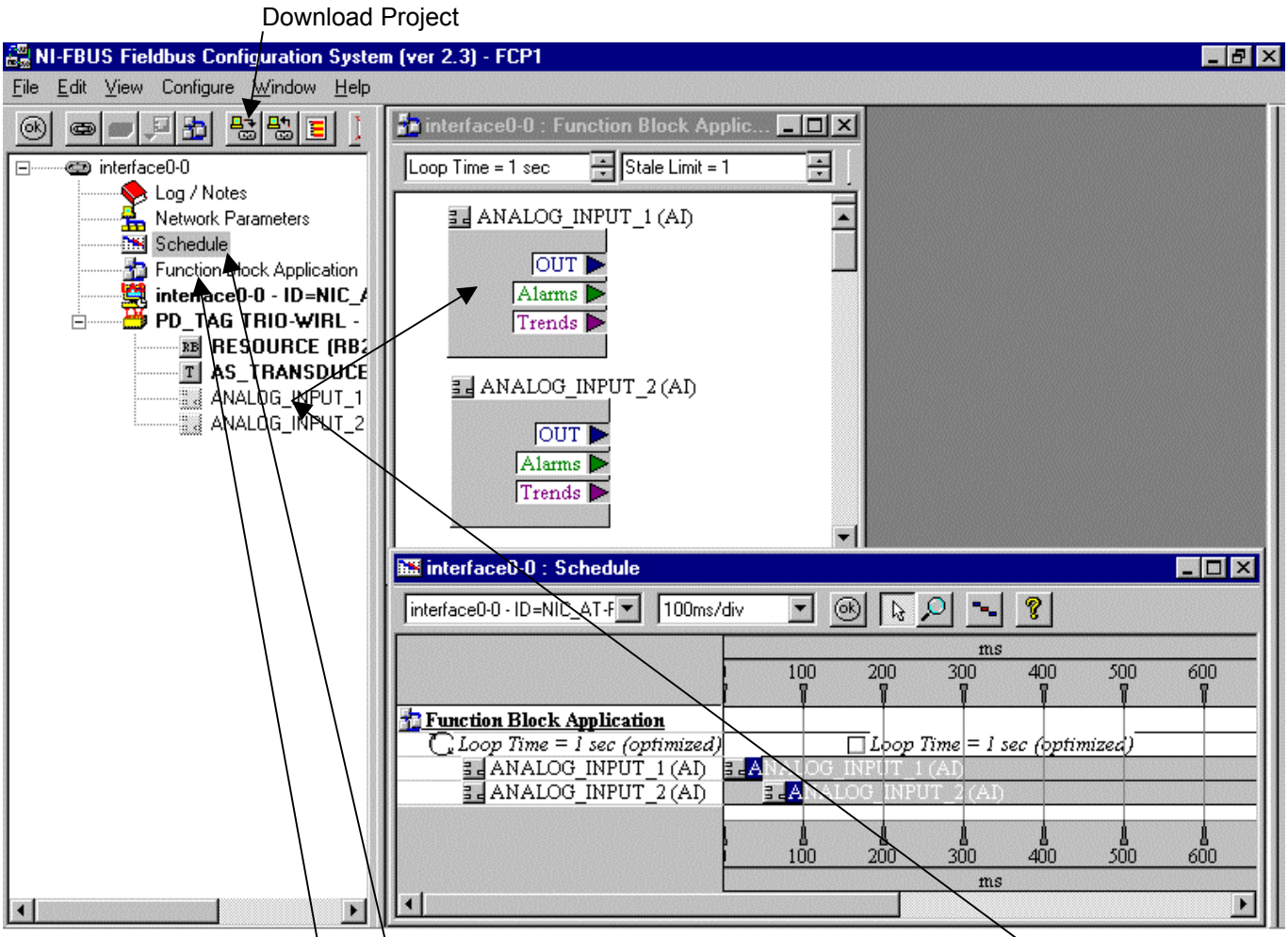
And then activate "Show Block Information". Open the AI block view again and look into the tab "Block Information". The parameter PERIOD_OF_EXECUTION indicates in which intervals the function block should be processed. The time basis is 1/32 msec.

An PERIOD_OF_EXECUTION other than 0 (e.g. 32000 corresponds to 1sec) means that the block is already being processed regularly. In this case, the block can be set to "auto".

Should the PERIOD_OF_EXECUTION be set to 0 it means that the block has not yet been included in the temporal processing. In this case it will not be feasible to set the block to auto mode prior to creating a schedule for block processing.



## 3.10 Scheduling




Please double-click on „Function Block Application“ to open this window. Then click on “Analog_Input_1” using the left mouse button. Keep the mouse button down. Drag the AI 1 symbol in the “Function Block Application” window. Should you want to make likewise use of AI2, repeat the above-mentioned procedure.

For information, please open the schedule window. The loop time within the “Function Block Application” window is set to a default value of 1 sec. From the schedule window it can be seen which blocks are to be processed in this loop and in which order of processing. In this example it would merely be the block AI1 and AI2. The execution time of the AI blocks amounts to 50msec. This information will be displayed in the block information within the AI window: 1600 (/32msec) = 50msec.

At least the OUT parameter coming from the AI blocks would in general be connected with other block inputs. For this reason you would have to enter further blocks from other instruments at the bus into the “Function Block Application” and connect the in and outputs of the blocks. For testing purposes of a single device , however, there is no need for such a connection (see above picture).

Click on “Download Project” to download this configuration into your instrument. Choosing “Automatic Mode Handling” within the download window guarantees that the target mode of resource and AI block will, during the downloading process, be first set to “Out of Service” and then to “Auto”. Should “Automatic Mode Handling” not have been activated you are forced to manually acknowledge the change of mode. If, at the very end of the download, the target mode is not set to “normal mode” (=Auto), please make up for it for the resource and the AI blocks after completion of download. The “Actual Mode” of these blocks should likewise change to “Auto”.

## 3.11 Device Display

Der TRIO-WIRL is equiped with a four line LCD. In the submenu „Display“ the content of the display is set (see auf rel. index 73 upto 76 in transducer block). The following selections are possible:

6 : AI1 Out
7 : AI1 Status
8 : AI2 Out
9 : AI2 Status

### 3.11.1 AI1 Out and AI2 Out

The out value of the choosen AI blockis displayed (AI1 or AI2). The number of digits right to decimal point are set by the value in Decimal-Point in the OUT_SCALE structure. The diplayed value is UNIT_INDEX of the OUT_SCALE structure:

```
AI1  123.45  l/s
```

### 3.11.2 AI1 Status and AI2 Status

The actual mode of thechoosen block and the status of OUT is displayed:

```
AI1  AUTO GOOD
```

Right to the status the substatius if available is diplayed as number.
Example :
BAD 4 means status is BAD, Substatus 4 = Sensor failure (Substatus codes see chapter 1.6).

## 3.12 Error Detection

### 3.12.1 Write parameters

The following error messages can appear while writing parameters using NI configurator:

Write is prohibited (Error code 40)

1. Check whether the write protect switch is deactivated (see 2). This can be checked at the instrument (switch position) or checking the the WRITE_LOCK parameter (to be found within the NI configurator in the resource block window below the tab “options”). This parameter indicates the status of the wirte protector switch and supplies the message “Locked” or “Not Locked”.

2. The respective parameter can (with current configuration) not be written. See description of respective parameter.

Wrong Mode for Request (Error code 39)

Each block disposes of a mode structure. This is composed of four single parameters:

- Target desired operating mode, e.g. Auto
- Actual current operating mode. Should the target be set to auto and a configuration error is detected, will the actual mode be remain to “Out of Service”.
- Permitted Includes all possible operating modes. I.e. with an AI block:Out of service, Man, Auto
- Normal normal operating mode, with AI block: Auto

Some parameters can merely be written if the target is set to „Out of Service“. Other parameters can also be written in “Man” and still others can be written in each of the target modes. For more detailed information, see block description

Exceed Limit (Error code 38)

It was attempted to write a value exceeding the permitted limits of a parameter. Refer to the parameter description to learn which limits and values respectively are permitted.

### 3.12.2 AI-Block cannot be set to auto

The Auto mode of an AI block requires the following conditions :

1. The resource block has to be set to auto. No other pre-conditions.
2. Within the AI block a valid channel has to be entered (1-5).
3. L_Type has to be set to direct or indirect (indirect square root is likewise possible)
4. XD-SCALE unit has to be idential with channel unit (see also 1.4.1).
5. With L_Type „Direct the XD_SCALE and OUT_SCALE structures have to be identical
6. The PERIOD_OF_EXECUTION of the AI block has to be of a value other than 0

Should these conditions be met and the target mode of the AI block be set to auto, will the actual mode and thus the block itself be set to auto.

Whether these conditions are met or not can be taken from the parameter BLOCK_ERR (within the NI configurator in the AI window below the tab diagnostics). Should the Block Configuration Error appear, please check which of the above mentioned conditions 1-6 has not been met.

If the PD_Tag of the device is changed or the Tag of the Resource- or Analog Input Block behind downloading of a schedule, it may be not possible to switch the AI-blocks to auto although the conditions are met. In this case create a new schedule with the “new” Blocks (=new Tags= new designations) and download the new schedule into the device.

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