OPTIBAR 5060 / 7060 SERIES

Supplementary instructions

Pressure transmitter OPTIBAR PC 5060 / PM 5060
Differential pressure transmitter OPTIBAR DP 7060

Description of Foundation Fieldbus interface
This document is only complete in conjunction with the operating manual of the device in question.

FOUNDATION

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1.1 Installation

If the OPTIBAR 5060 or 7060 device file has not yet been installed on the Host system, it must be installed manually via DD device installation. The necessary installation files are located at website (Downloadcenter), or you can request an installation CD from us at any time.

1.2 Scope of the document

These supplementary instructions apply to the following Foundation Fieldbus device versions:

- Hardware (HW) 1.0.0 and later
- Software (SW) 1.0.0 and later

Note: These supplementary instructions only cover the specific device features as regards Foundation Fieldbus. All other information regarding the intended use of the device can be found in the operating manual included.

1.3 Scope of delivery

A device for Foundation Fieldbus communication includes:
additional instructions for the Foundation Fieldbus interface (this document)

2.1 Software History

Created	Transmitter	
Month/ Year	Hardware	Firmware
01/14	Ident- Nr. 4000769602	V1.0.x

2.2 Technical data

Output variable

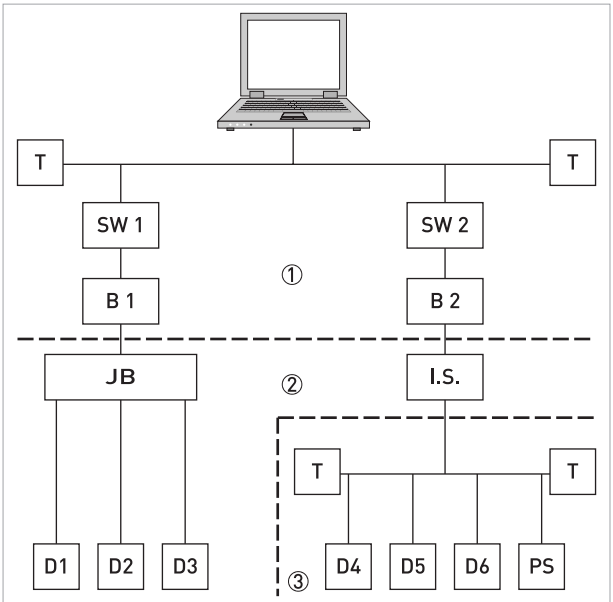
Output	Signal	digital output signal, Foundation Fieldbus
	Physical layer	acc. to IEC 61158-2
Damping (63% of input variable)	0...999 seconds, adjustable	
Channel numbers	Channel 1	Process Value
	Channel 8	Electronic temperature
	Channel 9	Count rate
Transmission rate	31.25 Kbits/s	
Current value	Non-Ex and Ex-ia devices	10 mA, ±0.5mA
	Ex-d-devices	16 mA, ±0.5mA
Resolution, digital	> 1mm / 0.039 inch	

Power supply

Operating voltage	Non-Ex devices	9...32 VDC
	Ex-ia devices - Supply FISCO model	9...17.5 VDC
	Ex-ia devices - Supply ENTITY model	9...24 VDC
	Ex-d-devices	14...32 VDC
Operating voltage U_B - illuminated display and adjustment module	Non-Ex device	13.5...32 V DC
	Ex-ia devices - Supply FISCO model	13.5...17.5 VDC
	Ex-ia devices - Supply ENTITY model	13.5...24 V DC
Power supply by/max. number of sensors	Fieldbus	max. 32 (max. 10 at Ex)

3.1 Topology of Foundation Fieldbus networks

An example for mixed topology of Foundation Fieldbus networks is shown in the following example. The connection is best made via short stubs and T-connectors. This type of connection enables the connection and disconnection of devices without interrupting the bus or the communication.



①	HSE network
②	H1-Bus
③	Intrinsically Safe, Hazardous area
B1+B2	Bridge = coupling element for H1 bus and HSE network
D1-D3	Device = field device, own power supply, for non hazardous area
D4-D6	Intrinsically safe field device = external power supply, for hazardous area
I.S.	Intrinsically safe barrier
JB	Junction box = field device distribution box
PS	Power supply
SW1 + SW2	Switch = connection of multiple HSE subnetworks
T	Terminator = bus termination

3.2 Single chamber housing

DANGER!
For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.

The following illustration applies to both the non-Ex as well as the Ex ia, the Ex d and the Ex d ia version.

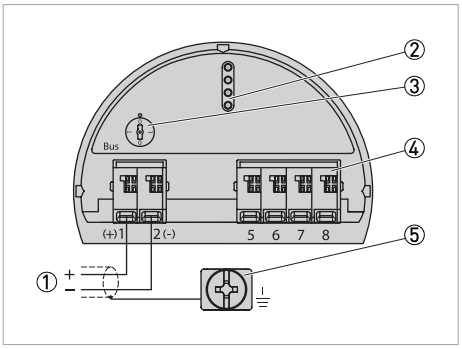


Figure 3-1: Electronics and terminal compartment, single chamber housing

① Power supply / signal output
② Contact pins for the display and adjustment module or interface adapter
③ Simulation switch ("1"= mode for simulation release)
④ For external display and adjustment unit
⑤ Ground terminal for connection of the cable shield

3.3 Double chamber housing

DANGER!
For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.

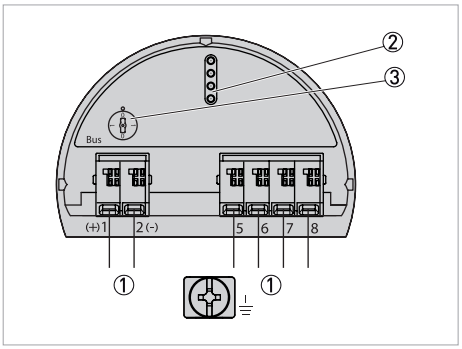


Figure 3-2: Electronic compartment double chamber housing

① Internal connection to terminal compartment
② Contact pins for the display and adjustment module or interface adapter
③ Simulation switch ("1"= mode for simulation release)

3.4 Start-up

The following menu items and settings have been added for converters with Foundation Fieldbus electronics:

Info - Device ID	In this menu item, the identification number of the device in a Foundation Fieldbus system is displayed.

4.1 Supplementary information Foundation Fieldbus

The following table gives you an overview of the device versions and the corresponding device descriptions, the electrical characteristics of the bus system as well as the applied function blocks.

Revisions Data	DD Revision	Rev_01
	CFF-File	010101.cff
	Device Revision	0101.ffo 0101.sym
	Cff-Revision	01 01 01
	Device-Software revision	>1.1.0
	ITK (Interoperability Test Kit) Number	6.1.0
Electrical Characteristics	Physical Layer Type	Low-power signaling, bus-powered, FISCO I.S.
	Input Impedance	> 3000 Ohms between 7.8 KHz - 39 KHz
	Unbalacend Capacitance	< 250 pF to ground from either input terminal
	Output Amplitude	0.8 V P-P
	Electrical Connection	2 Wire
	Polarity Insensitive	Yes
	Max. Current Load	10 mA
	Device minimum operating voltage	9 V
Transmitter Function Blocks	Resource Block (RB)	1
	Transducer Block (TB)	1
	Standard Block (AI)	3
	Execution Time	30 ms
Advanced Function Blocks	Discret Input (DI)	Yes
	PID Control	Yes
	Output Splitter (OS)	Yes
	Signal Characteriser (SC)	Yes
	Integrator	Yes
	Input Selector (IS)	Yes
	Arithmetic (AR)	Yes
Diagnostics	Standard	Yes
	Advanced	Yes
	Performance	No
	Fuction Blocks Instantiable	No
General Information	LAS (Link Active Scheduler)	Yes
	Master Capable	Yes
	Number of VCRs (Virtual Communication Relationships)	24

4.2 Function blocks

Transducer Block (TB)

The Transducer Block "Analogue Input (AI)" takes the original measured value (Secondary Value 2), carries out the min./max. adjustment (Secondary Value 1), carries out a linearisation (Primary Value) and makes the values on its output available for further function blocks.

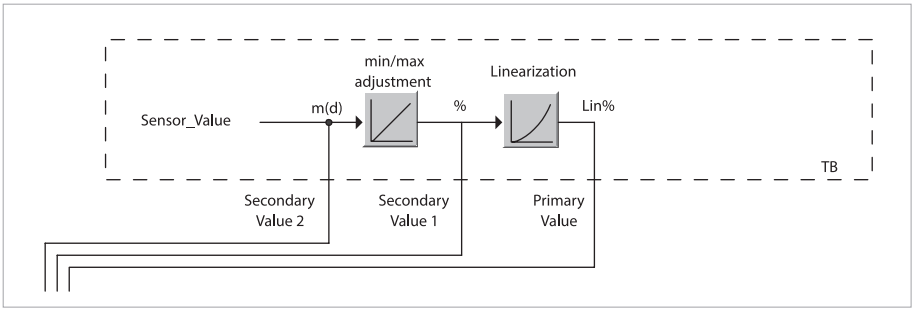


Figure 4-1: Diagram of Transducer Block (TB)

Funktionsblock Analog Input (AI)

The function block "Analogue Input (AI)" takes the original measured value selected by a Channel Number and makes it available to additional function blocks on its output.

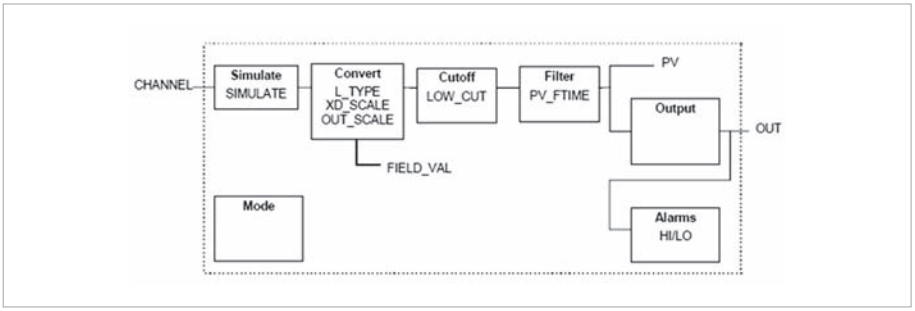


Figure 4-2: Diagram of function block Analogue Input (AI)

Funktionsblock Discret Input (DI)

The function block "Discrete Input (DI)" takes the original measured value selected by a Channel Number and makes it available to additional function blocks on its output.

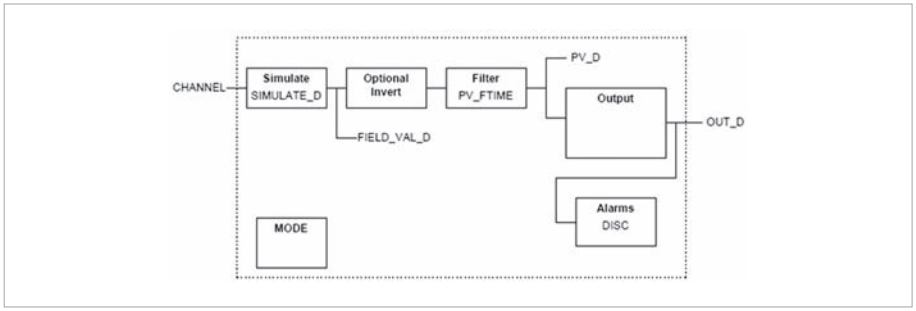


Figure 4-3: Diagram of function block Discret Input (AI)

Funktionsblock PID Control

The function block "PID Control " is a key component for various tasks in the process automation and is used universally. PID blocks can be cascaded if this is necessary or requested due to different time constants with the primary and secondary process measurement.

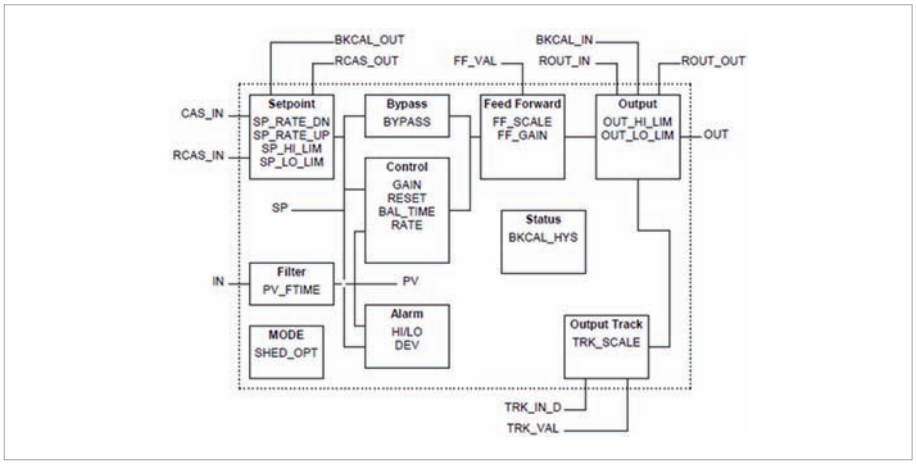


Figure 4-4: Diagram of function block PID Control

Funktionsblock Output Splitter

The function block "Output Splitter" generates two control outputs out of one input. Each output is a linear image of a part of the input. A retrograde calculation function is realised by using the linear imaging function inversely. A cascading of several Output Splitters is supported by an integrated decision table for the combinability of inputs and outputs.

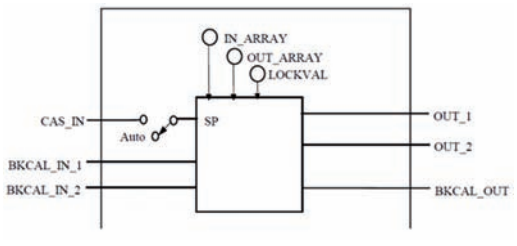


Figure 4-5: Diagram of function block Output Splitter

Funktionsblock Signal Characteriser

The function block "Signal Characteriser" has two channels the outputs of which are not in linear relation with the respective input. The non-linear relation is defined by a look-up table with individually selectable x/y-pairs. The respective input signal is imaged on the corresponding output, hence this function block can be used in a control loop or signal path. Optionally the function axis can be exchanged in channel 2 so that the block can be also used in a reverse control loop.

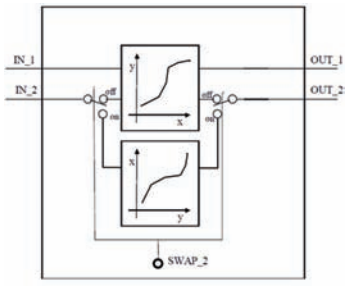


Figure 4-6: Diagram of function block Signal Characteriser

Funktionsblock Integrator

The function block "Integrator" integrates a continuous input signal over the time and sums the results of an impulse input block. It is used as a totaliser up to a reset or as a subtotaliser up to a reference point at which the integrated and accumulated value is compared with the default values. When these default values are reached, digital output signals will be outputted. The integration function is carried out upwardly starting with zero and downwards with a default value. Two flow values are also available so that the net flow volume can be calculated and integrated. This can be used for calculation of volume and mass changes in the vessel or for optimisation of flow controls.

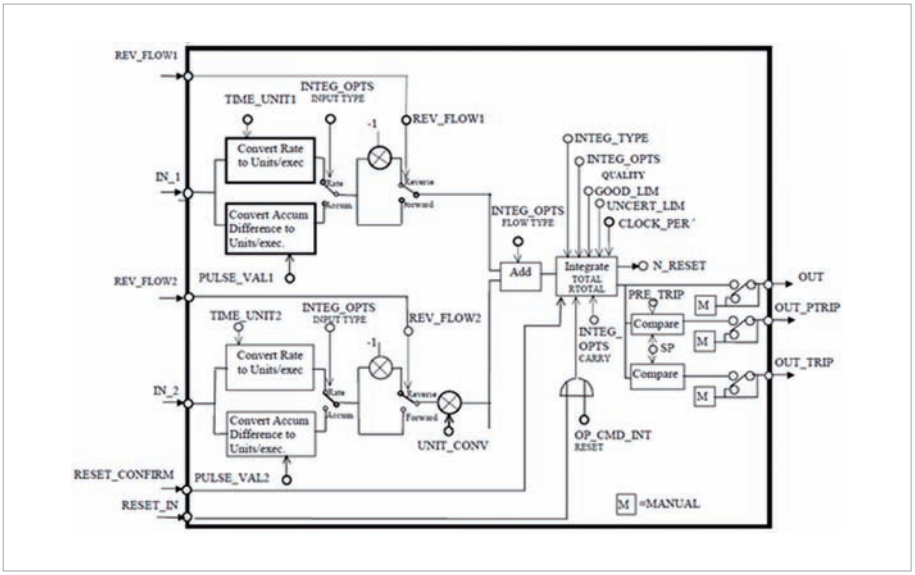


Figure 4-7: Diagram of function block Integrator

Funktionsblock Input Selector

The function block "Input Selector" offers selection possibilities for up to four inputs and generates an output signal according to the selection criteria. Typical input signals are AI blocks. Selection possibilities are maximum, minimum, mean value, average value and first useful signal. Through parameter combination, the block can be used as rotary switch or as pre-selection switch for the first useful value. Switch information can be received by other input blocks or the user. Mean value selection is also supported.

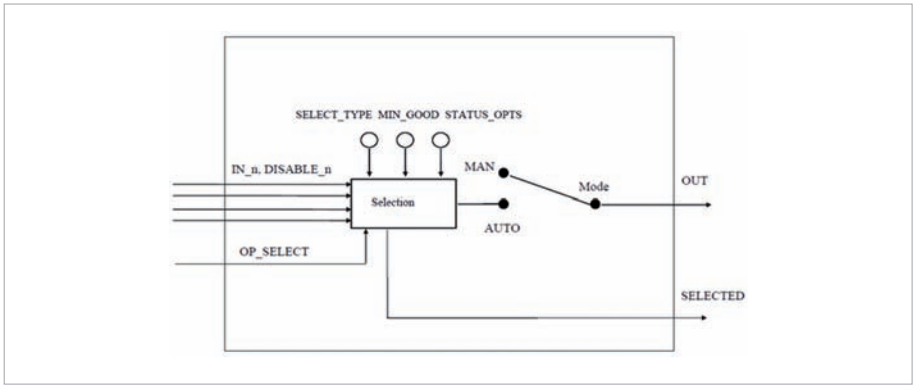


Figure 4-8: Diagram of function block Input Selector

Funktionsblock Arithmetic

The function block "Arithmetic" allows the simple integration of usual metrological calculation functions. The user can select the requested algorithm according to the name without knowing the formula.

The following algorithms are available:

- Flow compensation, linear
- Flow compensation, square root
- Flow compensation, approximate
- BTU flow
- Traditional Multiply Divide
- Average
- Traditional Summer
- Fourth order polynomial
- Simple HTG compensated level
- Fourth order Polynomial Based on PV

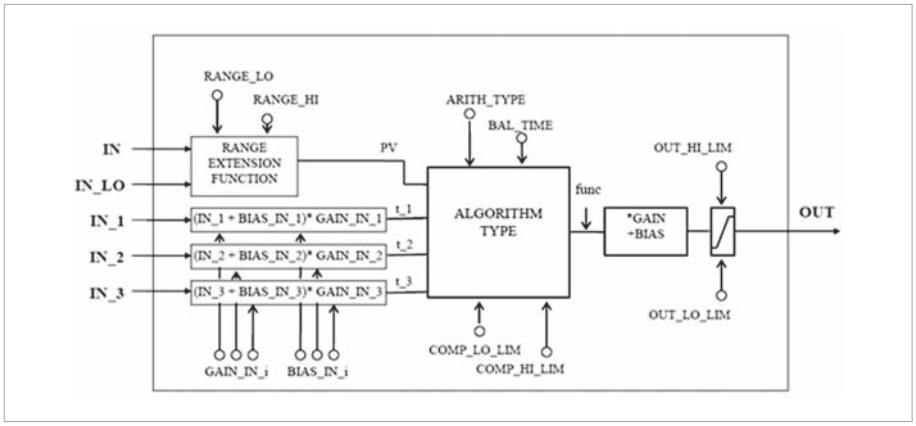


Figure 4-9: Diagram of function block Arithmetic

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