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OPTIMASS

Communications Handbook for the MFC 300

Communication options for:

- MFC 300 PROFIBUS DP (RS485 device with PA profile)
- MFC 300 PROFIBUS PA (MBP device with PA profile)



KROHNE

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Explanation of Symbols Used

The following is a guide to the meaning of the symbols used in this handbook. The symbols fall into two types. The rectangular symbols with blue background draw the reader's attention to general points of information. The triangular symbols with yellow background draw the reader's attention to hazards or hazardous situations.

	General Information	Information is important to the installation/operation of the meter.
	General Warning	Risk of damage to the meter or installation.
	EX - Hazardous Area Warning	Instruction MUST be observed in order to comply with Hazardous Areas Certification.
	High Voltage	Risk of electric shock.
	General Hazard	Non specific hazard that could result in injury.
	Hot Surface or High Temperature	Risk of burning.
	Heavy Item	Risk of injury.

- Do not install, operate or maintain this device without reading, understanding and following the factory-supplied handbook. Failure to do so, may result in injury or damage.
- Read these instructions carefully before starting installation and save them for future reference.
- Observe all warnings and instructions marked on the device.
- You **MUST** only use a power supply that has a protective earth.
- Do not use the device with covers removed!
- You **MUST** follow the installation instructions in the handbook, paying particular attention to
 - Handling
 - Lifting
 - Supporting and fixing the meter
 - Cabling and connections.
- If the product does not operate normally, refer to the handbook or consult a qualified KROHNE service engineer. There are no operator-serviceable parts inside the product.



These terms may appear in this manual or on the instrument:

Warning statement: Identify conditions or practice that could result in injury or loss of life.
or

Caution statement: Identify conditions or practice that could result in damage to the instrument or other property.

Disclaimer:

- This document contains important information on the device. KROHNE attempts to be as accurate and up-to-date as possible but assumes no responsibility for errors or omissions. Nor does KROHNE make any commitment to update the information contained herein. This manual and all other documents are subject to change without prior notice.
- KROHNE will not be liable for any damage of any kind by using this device, including, but not limited to: direct; indirect; incidental; punitive and consequential damages.
- Any device purchased from KROHNE is warranted in accordance with the relevant product documentation and our Terms and Conditions of Sale.
- KROHNE reserves the right to alter the content of its documents, including this disclaimer in any way, at any time, for any reason, without prior notification and will not be liable in any way for possible consequences of such changes.

Product liability and Warranty

- Responsibility for suitability and intended use of this device rests solely with the user. Improper installation and operation of the device may lead to loss of warranty.
- In addition, the Terms and Conditions of Sale are applicable and are the basis for the purchase contract.
- If a device needs to be returned to KROHNE, please note the information given at the back of the Handbook. KROHNE regrets that they cannot repair or service a device unless accompanied by the completed form

This instrument has been developed and manufactured by:

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For information, maintenance or service, please contact your nearest local KROHNE representative.

See www.krohne.com

WARNING

No changes may be made to the devices. Unauthorized changes might affect the explosion safety of the devices. Be sure to follow these instructions!



IMPORTANT

- The prescriptions, regulations and electrical data described in the EC type examination certificate MUST be obeyed.
- In addition to the general regulations for low-voltage installations (e.g. HD384) the regulations laid down in the standard for electrical installations in gas hazardous areas (e.g. EN 60079-14) or dust hazardous areas (e.g. EN 50 281-1-2) MUST be complied with.
- Installation, commissioning, utilization and maintenance must be carried out only by personnel trained in explosion safety.
- This manual must be read in conjunction with the OPTIMASS / OPTIGAS Handbooks.



1.1 General

These Instructions are supplementary to the "MFC300 (OPTIMASS) Handbook". You must follow that handbook in particular the Safety Information. These Supplementary Instructions provide additional information for device operation and connection to a PROFIBUS fieldbus.

1.2 Items included with supply

In addition to the standard scope of supply, these Supplementary Instructions for the MFC300 PROFIBUS RS-485 Interface will be included.

1.3 Special Notes

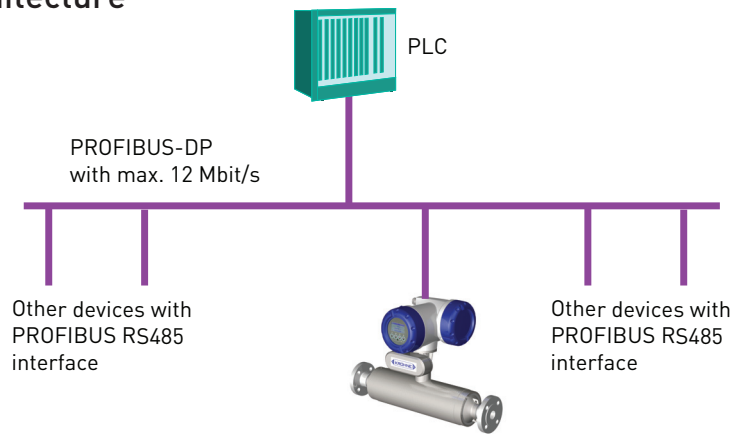


- Don't switch off (power off) the MFC300 immediately after manual change of parameter values:
 - Please wait approx. 10 seconds before you switch off the MFC300 after you have done both a parameter download via PROFIBUS or a manual change of a parameter value via the local display.
 - Please wait approx. 15 sec before you switch off the MFC300 after you have carried out a "Factory Reset" (PROFIBUS "Coldstart") via PROFIBUS or local display.
- "Deactivation of the Service Parameter Lock" of the MFC300 via PROFIBUS:
 - After writing down the service password (via PROFIBUS) the "Deactivation of the Service Parameter Lock" will last at least 10 min. if the internal password timer of the MFC300 won't be retriggered by writing this password again. The "Deactivation of the Service Parameter Lock" will be terminated at once by a PROFIBUS Cold-/Warm-Start or if the internal password timer of the MFC300 elapsed.

2.1 Software history

Issued	Signal Converter		Application Program		System Integration		
	Hardware	Firmware	Hardware	Software	Driver	Version	Model Name as used in the GSD:
11/06	MFC300 Signal Converter with RS485 Interface and PA Profile 3.01 ("Profibus DP device")	V2.2.1 / 061117	<ul style="list-style-type: none"> • Simatic PCS7 • Others 	<ul style="list-style-type: none"> • HW Config • others 	GSD (Manufacturer specific, for standard DP/PA segment coupler)	KR014510.GSD	"MFC300 (RS-485) Rev. 1"
					GSD (Profile specific, for standard DP/PA segment coupler)	PA039742.GSD	"Flow,dens,temp 3AI, 1TOT (PhyL 0)"
			Laptop/ PC	PDM > 6.0	DD	4510 0300 01	
			Laptop/ PC	Pactware	DTM (generic Flow DTM)	0300_1030001_FDT12.exe	

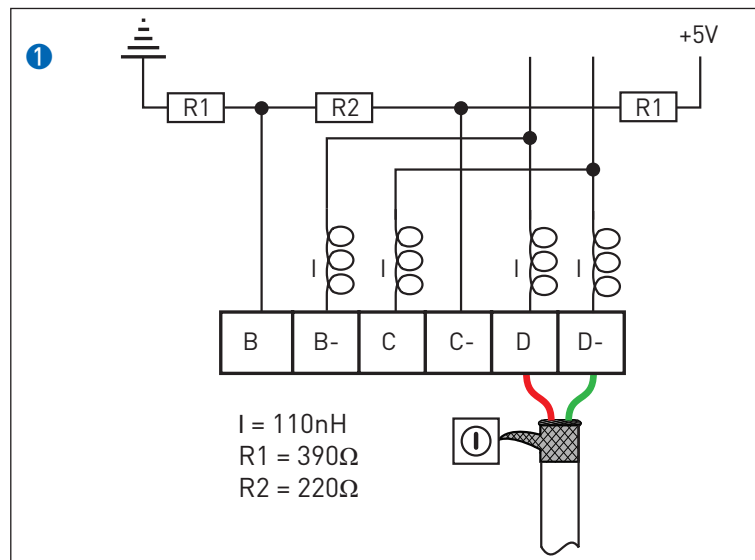
2.2 System Architecture

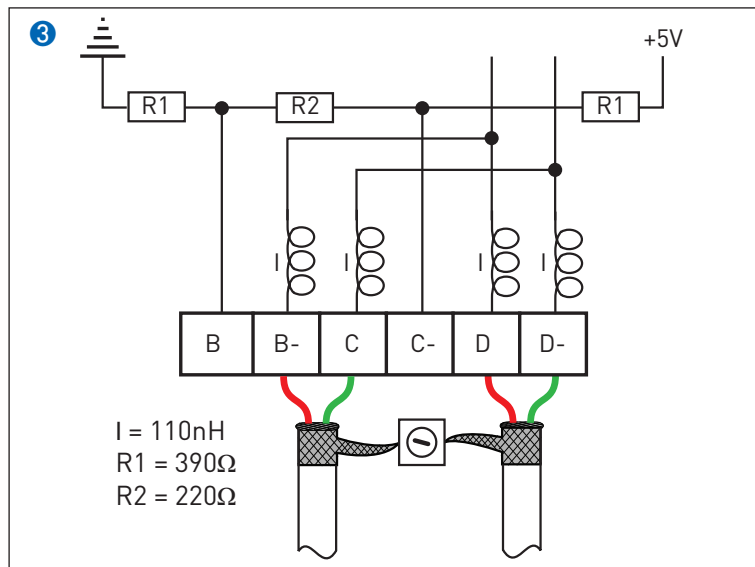
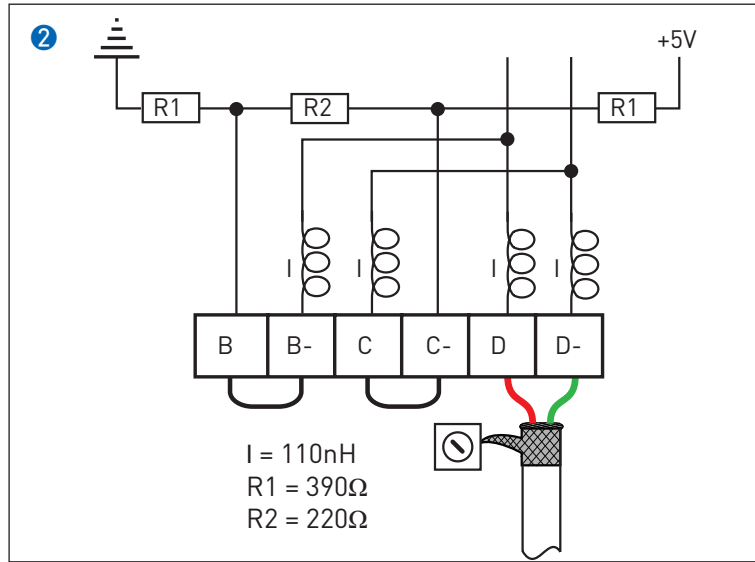


The illustration above shows a typical instrumentation with PROFIBUS devices with RS-485 interface in non-hazardous locations. The PROFIBUS devices with RS-485 interface do not need any segment coupler. They can be connected directly to the PROFIBUS DP Network.

2.3 Bus Connection Profibus DP Device

For a detailed description of the electrical connections of the MFC300 please refer to the OPTIMASS Handbok.





- ❶ External connection PROFIBUS DP device at low datarates connected with spur. (Spurs are only allowed at low data rates)
- ❷ External connection PROFIBUS DP last device, internal bus termination is active.
- ❸ External connections PROFIBUS DP device in trunk.

MFC Terminals	B	B-	C	C-	D	D-
PROFIBUS Designations	T	+B	-A	-T	+B	-A
	Termination positive	TxD+/RxD+ second connection	TxD-/RxD- Second connection	Termination negative	TxD+/RxD+ first connection	TxD-/RxD- first connection

Please also refer to publication: "Installation Guidelines for PROFIBUS DP/FMS" (PNO Order Number 2.112/2.111)

2.4 GSD Files

Supported baud rates are listed in the GSD file (see below). After power-on or PROFIBUS time-out a baud rate search is active to detect the current transfer speed on the bus. It is not necessary to set the baud rate manually.

If the transfer speed is changed during operation the baud rate search will not be started by the device. A new power-up or a manual interruption of the PROFIBUS communication is required to activate the baud rate search in this case.

A "PROFIBUS GSD ZIP" file (e.g. GSD-31777815.zip) including both all KROHNE GSD files and additional data files can be downloaded from the KROHNE homepage <http://www.krohne.com> or contact "KROHNE Marketing". The GSD file contains information that will be needed for project planning of the PROFIBUS DP communication network. The relevant data files (e.g. MFC300_n.bmp; MFC300_n.dib) must be loaded into the bus configuration system/master system before start-up of the bus system.

The MFC300 PROFIBUS RS-485 Interface is according to the PROFIBUS PA Profile V 3.01. The device supports two Ident-No:

- Ident-No. "4510hex" belongs to the GSD file KR014510.GSD and includes the complete functionality concerning the cyclic data exchange of the coriolis mass flow meter MFC300.
- The application of the manufacturer independent Ident-No. "9742hex" (GSD file "PA039742.GSD") provides interchangeability of devices, i.e. an exchange of coriolis mass flow meters of different vendors.

Please follow the instructions in the manual of the host supplier when installing the GSD File you need and the additional files (MFC300_n.bmp and MFC300_n.dib) into the PLC. If separated by the bus configuration system the device entry of the MFC300 PROFIBUS RS-485 Interface with PA Profile 3.01 will be located within the slave family PROFIBUS PA.

2.4.1 Manufacturer specific GSD file: KR014510.GSD

KROHNE delivers the GSD files with the entire device functionality, as follows:

Block Number	Standard-Configuration function block output: value + status]	KR014510.GSD Ident-No. 4510	Default unit:
1	Mass Flow	AI-FB	kg/s
2	Density	AI-FB	kg/m ³
3	Medium Temperature	AI-FB	K
4	Mass Totaliser	Totaliser-FB	kg
5	Volume Totaliser	Totaliser-FB	m ³
6	Mass Totaliser	Totaliser-FB	kg
7	Volume Flow	AI-FB	m ³ /h
8	Concentration 1	AI-FB	%
9	Concentration 2	AI-FB	%
10	Concentration Mass Flow 1	AI-FB	kg/s
11	Concentration Mass Flow 2	AI-FB	kg/s

AI = Analog Input Function Block

FB = Function Block

There are separate settings to select the units for local display and PROFIBUS. Modifications of the units of the display will have no effect on the data transferred via PROFIBUS. A master class 2 tool is required to modify the units for PROFIBUS transfer.

During network configuration the user has to define which function block outputs of the MFC300-DP should be transferred cyclically to the master. This is done by a bus configuration tool (e.g. for PC-S7 from Siemens this will be done with the tool "HW- Config"). This tool offers the functions described as follows:

1. It is possible to configure an "Empty" block (the code of an "Empty" block is defined as 0x00) on each block number. This means, that for this block no data is transmitted in the cyclic data telegram.
2. There is NO "Totaliser (TOT)" function block allowed on block position 1, 2, 3, 7, 8, 9, 10 and 11! An "Analog Input (AI)" function block or an "Empty" block is allowed here only!

Note: All codes supported of "Analog Input (AI)" - and "Totaliser (TOT)" - function blocks will be found in the corresponding GSD files.

3. There is NO "Analog Input (AI)" function block allowed on block position 4, 5 and 6! A "Totaliser (TOT)" function block or an "Empty" block is allowed here only!
4. There is a choice of 7 different totaliser functions, which can be allocated to the blocks 4, 5 and / or 6. The 7 functions are defined as follows:

"Total"	cyclic transfer of the totaliser value with status to the master
"SetTot + Total"	cyclic transfer of the totaliser value with status to the master + cyclic control data from master to the device via the parameter SetTot
"ModeTot + Total"	cyclic transfer of the totaliser value with status to the master + cyclic control data from master to the device via the parameter ModeTot
"SetTot+ModeTot+Total"	cyclic transfer of the totaliser value with status to the master + cyclic control data from master to the device via the parameters SetTot and ModeTot (in the given order)
"SetTot"	cyclic control data from master to the device via the parameter SetTot
"ModeTot"	cyclic control data from master to the device via the parameter ModeTot
"SetTot + ModeTot"	cyclic control data from master to the device via the parameters SetTot and ModeTot (in the given order)



The Byte SetTot and ModeTot are being sent cyclically from the Master to the device if these bytes are inserted as output data via the PLC configurator. The meaning of these control bytes are as follows:

SetTot:	
SetTot =0:	Totaliser is totalising.
SetTot =1:	Totaliser will be reset to 0 and stays at 0 until SetTot is switched back again to 0. If the value of SetTot changes from "1" to "0" the totaliser starts counting from 0.
SetTot =2:	Totaliser is set to the value defined by PresetTot. PresetTot can be written via a acyclic master (totaliser in block 4 = Slot 4 Index 32; totaliser in block 5 = Slot 5 Index 32; totaliser in block 6 = Slot 6 Index 32). If the value of SetTot changes from "2" to "0" the totaliser starts counting from the current value defined by PresetTot.
SetTot ? 2:	not allowed. Value is ignored; totaliser remains in its last valid setting.
ModeTot:	
ModeTot = 0	totaliser totalises positive and negative values.
ModeTot = 1	totalises only positive values.
ModeTot = 2	totalises only negative values.
ModeTot = 3	totaliser is stopped, no totalization will be done.
ModeTot = 248	totalises all values as positive (negative values will be multiplied with "-1.0")
ModeTot = 249	totalises all values as negative (positive values will be multiplied with "-1.0")

All other values of ModeTot are not allowed. Value is ignored; totaliser remains in its last valid setting.

The standard block configuration may be changed by the customer but using the default settings is highly recommended. If the standard block configuration should be changed by the customer an acyclic master tool must be used to change the "channel parameter" value of the block which should be connected to another transducer output value.

2.4.2 Profile specific GSD file: PA039742. GSD

The functionality of the profile specific GSD file is limited. This GSD file includes only four blocks:

Block Number	Standard-Configuration (function block output value)	PA039742. GSD Ident-No. 9742	Default unit:
1	Mass Flow	AI-FB	kg/s
2	Density	AI-FB	kg/m3
3	Medium Temperature	AI-FB	K
4	Mass Totaliser	Totaliser-FB	kg

The device has to be switched from "Manufacturer Specific" (full functionality) to "Profile Specific" (interchangeable basic configuration) by using a master class 2 tool (IDENT_NUMBER_SELECTOR: Slot 0, Index 40 change byte value to 0). After this the device has to be projected by using the PA039742.GSD file.

2.4.3 Cyclic data exchange

During network configuration the user has to define which function block outputs of the MFC300 PROFIBUS RS-485 should be transferred cyclically to the master. Network configuration will be done using one of the GSD files described above. The order of transmission of a function block always remains the same even if a function block is defined as an "Empty" block (in this case, no function block output data will be sent to the master and all function block outputs following the "Empty" block will move up one position).

2.5 Profiles

The MFC300 PROFIBUS RS-485 Interface supports the PROFIBUS PA Profile Version 3.01.

The MFC300 PROFIBUS RS-485 Interface with PA Profile 3.01 supports the following blocks:

- One physical block.

This block contains the parameters defined in PA Profile 3.01.

- One transducer block for coriolis mass flow devices.

This block provides the parameters and functions defined in PA Profile 3.01.

- Eight "Analog Input (AI)" function blocks: as default "Mass Flow", "Density", "Medium Temperature", "Volume Flow", "Concentration 1", "Concentration 2", "Concentration Mass Flow 1" and "Concentration Mass Flow 2".
- Three "Totaliser (TOT)" function blocks: as default the first and the third totaliser will totalise "Mass" and second one will totalise "Volume"

2.6 Data Structure of Function Block Output Values

The data structure of function block outputs consists of 5 bytes: a 4 byte float value (Float Format according IEEE Standard 754 Short Real Number) followed by a 1 byte status value. If all 11 function block outputs have been projected (see above), 55 byte will be transmitted.

Float Value

The following table gives an example of the float format

Byte n								Byte n+1								Byte n+2								Byte n+3							
Bit7	Bit6							Bit7	Bit6							Bit7								Bit7							
VZ	2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	2 ⁻¹	2 ⁻²	2 ⁻³	2 ⁻⁴	2 ⁻⁵	2 ⁻⁶	2 ⁻⁷	2 ⁻⁸	2 ⁻⁹	2 ⁻¹⁰	2 ⁻¹¹	2 ⁻¹²	2 ⁻¹³	2 ⁻¹⁴	2 ⁻¹⁵	2 ⁻¹⁶	2 ⁻¹⁷	2 ⁻¹⁸	2 ⁻¹⁹	2 ⁻²⁰	2 ⁻²¹	2 ⁻²²	2 ⁻²³
Exponent								Mantissa								Mantissa								Mantissa							

Example: 40 F0 00 00 (hex) = 0100 0000 1111 0000 0000 0000 0000 0000 (binary)

$$\begin{aligned} \text{Formula: Value} &= (-1)^{\text{VZ}} * 2^{(\text{Exponent} - 127)} * (1 + \text{Mantissa}) \\ \text{Value} &= (-1)^0 * 2^{(129 - 127)} * (1 + 2^{-1} + 2^{-2} + 2^{-3}) \\ \text{Value} &= 1 * 4 * (1 + 0,5 + 0,25 + 0,125) \\ \text{Value} &= 7,5 \end{aligned}$$

Status Value

The meanings of the status byte (unsigned integer) are given in the following tables

Quality		Quality-Substatus				Limits	
Gr	Gr	QS	QS	QS	QS	Qu	Qu
2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰

0	0							= bad
0	1							= uncertain
1	0							= good (Non Cascade)
1	1							= good (Cascade) - not supported

Status = bad								
0	0	0	0	0	0			= non-specific
0	0	0	0	0	1			= configuration error
0	0	0	0	1	0			= not connected
0	0	0	0	1	1			= device failure
0	0	0	1	0	0			= sensor failure
0	0	0	1	0	1			= no communication (last usable value)
0	0	0	1	1	0			= no communication (no usable value)
0	0	0	1	1	1			= out of service

Status = uncertain										
0	1	0	0	0	0					= non-specific
0	1	0	0	0	1					= last usable value
0	1	0	0	1	0					= substitute-set
0	1	0	0	1	1					= initial value
0	1	0	1	0	0					= sensor conversion not accurate
0	1	0	1	0	1					= engineering unit violation (unit not in the valid set)
0	1	0	1	1	0					= sub-normal
0	1	0	1	1	1					= configuration error
0	1	1	0	0	0					= simulated value
0	1	1	0	0	1					= sensor calibration

Status = good (Non-Cascade)										
1	0	0	0	0	0					= ok
1	0	0	0	0	1					= update event
1	0	0	0	1	0					= active advisory alarm (priority < 8)
1	0	0	0	1	1					= active critical alarm (priority > 8)
1	0	0	1	0	0					= unacknowledged update event
1	0	0	1	0	1					= unacknowledged advisory alarm
1	0	0	1	1	0					= unacknowledged critical alarm
1	0	1	0	0	0					= initiate fail safe
1	0	1	0	0	1					= maintenance required

Status = Limits										
						0	0			= ok
						0	1			= low limited
						1	0			= high limited
						1	1			= constant

Check the first two quality bits in order to get the quality information of the measurement value:

Good (non Cascade) function block output value is ok and can be used without restrictions

Good (Cascade) will not be supported, because it is not applicable for the device

Uncertain function block output value can be used but the accuracy can not be guaranteed (e.g. function block outputs value has been frozen or A/D converter is saturated or out of range)

Bad function block output value is bad - don't use it for process control!

The „Quality-Substatus“- and „Limit“-Bits will be used for further diagnostics or limit checking.

Attention: The status should be monitored because a number will be transmitted even if the status of the measurement value is bad or uncertain. This is the only way to check the quality of the transmitted measurement values.

2.7 Diagnosis

If the device internal diagnostic functions detect an error additional information will be sent to the Master (for further information have a look at the UNIT_DIAG_BIT(i) definitions of the corresponding GSD-file).

2.8 Display Parameters (PROFIBUS)

(MFC300 PROFIBUS RS-485 Interface with PA Profile 3.01)

For a detailed description please see "MFC 300 (OPTIMASS) Handbook". Some special settings concerning the PROFIBUS features easily operated via the local menu are described in the following tables.

A Quick Setup		
Ref	Display	Description & Settings
A3	Reset	<p>A3.1 Reset Errors</p> <p>This menu function can be used to reset all errors that are not removed automatically (power fail, counter overflow) step 1: reset? No: Exit the function Yes: Resets the errors and exits the function.</p>
		<p>The following reset menus for the counters (totaliser) are only available, if the quick access has been activated in the menu setup > device > quick setup. Each counter (totaliser) can be activated for quick access independently.</p>
		<p>A3.2 > FB4 Totaliser 1</p> <p>(for PROFIBUS Devices) the counter can be reset to zero in this menu step 1: reset counter? no: exits the function without reset yes: resets the counter and exits the function</p>
		<p>A3.3 > FB5 Totaliser 2</p> <p>for PROFIBUS Devices the counter can be reset to zero in this menu step 1: reset counter? No exits the function without reset Yes resets the counter and exits the function</p>
		<p>A3.4 > FB6 Totaliser 3 (where fitted)</p> <p>(for PROFIBUS Devices) the counter can be reset to zero in this menu step 1: reset counter? No exits the function without reset Yes resets the counter and exits the function</p>
A4	Station Address	<p>(only for PROFIBUS devices) A4 -> Station Address selects the address of the device at the PROFIBUS DP interface. Note: The PROFIBUS address can also be changed using the PROFIBUS service "set_slave_add". The input range is 0...125 according to the PROFIBUS specification. Address 126 is the default address and cannot be set via the PROFIBUS service "set_slave_add" - use menu instead to reset to default address.</p>

B Test level		
B3	Information	
B3.5	PROFIBUS	<p>available if there is a PROFIBUS interface in existence; displays the below mentioned information about the PROFIBUS interface: KROHNE Ident No. Software Revision of the PROFIBUS software Date of Production</p>

C Setup			
C4 I/O Totaliser			
C 4.y	Totaliser 1, 2 or 3	Allows you to control the three PROFIBUS counters The three menus are identical so they are grouped together and their functions are described in one go.	
C 4.y.1	Function of Totaliser	Incremental Total	Totalises only positive values
		Decremental Total	Totalises only negative values
		Absolute Total	Totalises positive and negative values
		Stop Totaliser	Totaliser is stopped.
		All As Positive	neg. input values will be multiplied with "-1.0"
		All As Negative	pos. input values will be multiplied with "-1.0"
C 4.y.2	Measurement	<ul style="list-style-type: none"> • Volume flow • Voncentration total1 • Conc volume flow 1 	<ul style="list-style-type: none"> • Mass flow • Concentration total2 • Conc volume flow 2
C 4.y.3	Preset Value	(predefines a "threshold" using the High Limit value and the Low Limit value of the totaliser affected; the "THRESHOLD" bit will be set in the long status information bytes of the PROFIBUS interface if the actual value of the totaliser is outside these limits. This can be also used as a status output choosing the function "preset counter X"	
C 4.y.4	Reset Totaliser	(The current value of the totaliser can be set to zero) Step 1: reset totaliser? no: exits the function without reset yes: resets the totaliser to zero and exits the function; totaliser will restart counting at once	
C 4.y.5	Error behaviour	(defines the behaviour of this function block in case of errors)	
		hold meas. value	totalization is continued based on the last incoming value with good status before the first occurrence of bad status
		ignore error:	totalization is continued using the input values despite the bad status. The status is ignored
		stop totaliser	totalization is stopped during occurrence of bad status of incoming values
C 4.y.6	information	(The KROHNE Ident. No. of the circuit board, the software version number and the production date of the circuit board will be displayed)	
		Note: If you choose "y" = 1 all settings will effect FB 4 (Totaliser 1) if you choose "y" = 2 all settings will effect FB 5 (Totaliser 2) if you choose "y" = 3 all settings will effect FB 6 (Totaliser 3)	

Ref	Display	Description & Settings	
C5 I/O PROFIBUS (This feature is available for PROFIBUS devices only.)			
Using the menu functions mentioned below you will be able to control basically the eight analogue input blocks of this PROFIBUS device. These eight menus are identical so they are grouped together and their functions are described in one go.			
C5.y.1	Measurement	Selects the measurement (channel) for the analogue input block for the PROFIBUS interface	
		Mass flow: Density: Concentration 2: Concentration mass flow 1: Concentration volume flow 2 Sensor average: Tube frequency: Inner cylinder strain: Flow velocity Supply** * This is the electronic temperature ** This is internal supply voltage for the PROFIBUS	Temperature Concentration 1: Concentration mass flow 2 Concentration volume flow 1 Sensor deviation: Drive energy Tube strain Electronics temperature * Volume flow
C5.y.2	Time Constant	Time constant for this function block	
C5.y.3	Error Behaviour	Defines the behaviour of this function block in case of errors	
		Hold Value:	last valid OUT value stored will be used as OUT value
		Ignore Error:	OUT has the wrong calculated value and status Bad as calculated
		Replace Value:	"replacement value" will be used as OUT value
		Note: If you choose "y" = 1 all settings will effect FB 1 (Analog Inp.1) if you choose "y" = 2 all settings will effect FB 2 (Analog Inp.2) if you choose "y" = 3 all settings will effect FB 3 (Analog Inp.3) if you choose "y" = 4 all settings will effect FB 7 (Analog Inp.4) if you choose "y" = 5 all settings will effect FB 8 (Analog Inp.5) if you choose "y" = 6 all settings will effect FB 9 (Analog Inp.6) if you choose "y" = 7 all settings will effect FB 10 (Analog Inp.7) if you choose "y" = 8 all settings will effect FB 11 (Analog Inp.8)	
C6 -> Device			
In this menu all functions are grouped that have no effect on the measurement or any output directly.			
C6.3.1	Function	One line	Display shows one line of measurement on this page
		Two lines	Display shows two lines of measurement on this page
		Three lines	Display shows three lines of measurement on this page

Ref	Display	Description & Settings	
C6 Device ctd...			
C6.3.2	Measurement 1.line	Mass flow: Density: Concentration flow 1 Diagnosis 2: Flow Velocity:	Temperature Concentration 1 Diagnosis 1 Diagnosis 3 VolumeFlow
C6.3.8	Measurement 2.line (Only available if this line is activated)	Bargraph* Volume Flow: Temperature: Concentration 1: Diagnosis 1: Diagnosis 3: FB5 totaliser 2: Operating Hours	Flow Velocity Mass Flow Density Concentration Flow 1 Diagnosis 2 FB4 Totaliser 1 FB6 Totaliser 3
		* Analogue display of the value selected for the first line	
C6.3.10	Measurement 3.line (Only available if this line is activated)	Flow Velocity Mass Flow Density Concentration Flow 1 Diagnosis 2 FB4 Totaliser 1 FB6 Totaliser 3	Volume Flow: Temperature: Concentration 1: Diagnosis 1: Diagnosis 3: FB5 totaliser 2: Operating Hours
C6.4 -> 2. Meas. page			
In case of a PROFIBUS device the second measurement page is meant to check the output values of the different function blocks. Only PROFIBUS values can be selected here. The analogue inputs are shown with exactly the value, as seen on the PROFIBUS.			
C6.4.1	Measurement 1.line	FB1 Analog inp. 1 FB3 Analog inp. 3 FB5 Totaliser 2 FB7 Analog inp. 4: FB9 Analog inp. 6: FB11 Analog inp. 8	FB2 Analog inp. 2 FB4 Totaliser 1 FB6 Totaliser 3 FB8 Analog inp. 5 FB10 Analog inp. 7
C6.4.2	Format 1.line	Fixed number of digits after the decimal point or automatic, where the number of digits is automatically adjusted to the available space.	
C6.4.3	Measurement 2.line	FB1 Analog inp. 1 FB3 Analog inp. 3 FB5 Totaliser 2 FB7 Analog inp. 4: FB9 Analog inp. 6: FB11 Analog inp. 8	FB2 Analog inp. 2 FB4 Totaliser 1 FB6 Totaliser 3 FB8 Analog inp. 5 FB10 Analog inp. 7
C6.4.4	Format 2.line	Fixed number of digits after the decimal point or automatic, where the number of digits is automatically adjusted to the available space.	
C6.4.5	Measurement 3.line	FB1 Analog inp. 1 FB3 Analog inp. 3 FB5 TOTALISER 2 FB7 Analog inp. 4: FB9 Analog inp. 6: FB11 Analog inp. 8	FB2 Analog inp. 2 FB4 Totaliser 1 FB6 Totaliser 3 FB8 Analog inp. 5 FB10 Analog inp. 7
C6.4.6	Format 3.line	Fixed number of digits after the decimal point or automatic, where the number of digits is automatically adjusted to the available space.	

Ref	Display	Description & Settings
C6 Device ctd...		
C6.8.2	Information	Gives information about the hardware version, software version and the calibration/test date of this interface
C6.8.3	Diag. extension	Gives a representation of the status information, that is also available on the PROFIBUS interface. The status is displayed in hexadecimal format.
C6.8.4	Diag. extension 2	
C6.8.5	Diag. extension i. (intern)	
C6.9	quick setup	
In this menu some settings in the Quick Setup can be activated. In the default configuration the settings in the Quick Setup are activated.		
C6.9.1	reset totaliser 1	The reset can be activated in the Quick Setup to get a quick access of the function Yes quick access activated No quick access not activated
C6.9.2	reset totaliser 2	The reset can be activated in the Quick Setup to get a quick access of the function Yes quick access activated No quick access not activated
C6.9.3	reset totaliser 3	The reset can be activated in the Quick Setup to get a quick access of the function Yes quick access activated No quick access not activated
D	Service	
This menu is protected. You will need to use the service password to gain access.		
D2	System	In this menu all functions related to different data sets can be found.
D2.2	Service Parameters	
D2.2.1	Cold start	Resetting of the MFC300 can be done here but all changes up to this point are automatically stored and cannot be discarded.
		step 1 reset? No terminates the function yes performs the reset and leaves the programming mode
D2.2.2	Save Factory Data	Copies the actual data into the factory setting, this overwrites the factory settings done during calibration)
		Step 1 Save Settings? break exits the menu without saving factory settings factory settings saves the settings as factory settings
		Step 2 go on with copy? (there is no possibility to undo this command) No exit menu without saving Yes copy the actual settings to the selected storage place.

Ref	Display	Description & Settings	
D2 System ctd...			
D2.2.4	Identification No	Sets a different device modus for the cyclic communication of the PROFIBUS interface	
		MFC300	complete functionality concerning the cyclic data exchange of the coriolis mass flow meter MFC300 is supported (including manufacturer specific extensions)
		Profile	only the profile defined functions concerning the cyclic data exchange are supported - no extras
D2.2.5	PB Cold Start	Reset?	No terminates the function Yes PROFIBUS cold start will be carried out at once. The programming mode is terminated
		Note: During a PROFIBUS cold start nearly all parameter values of the whole device will be set to their default values (e.g. the PROFIBUS address will not be changed) without disconnecting an already established connection to a PROFIBUS Master system	

Current Device Revision

Use the display of the "MFC300 with PROFIBUS RS-485 Interface" to open the path:

"test\information\Profibus" (== menu B3.5)

This menu will provide the following information:

KROHNE Ident No.

Software Revision of the PROFIBUS software

Date of Production

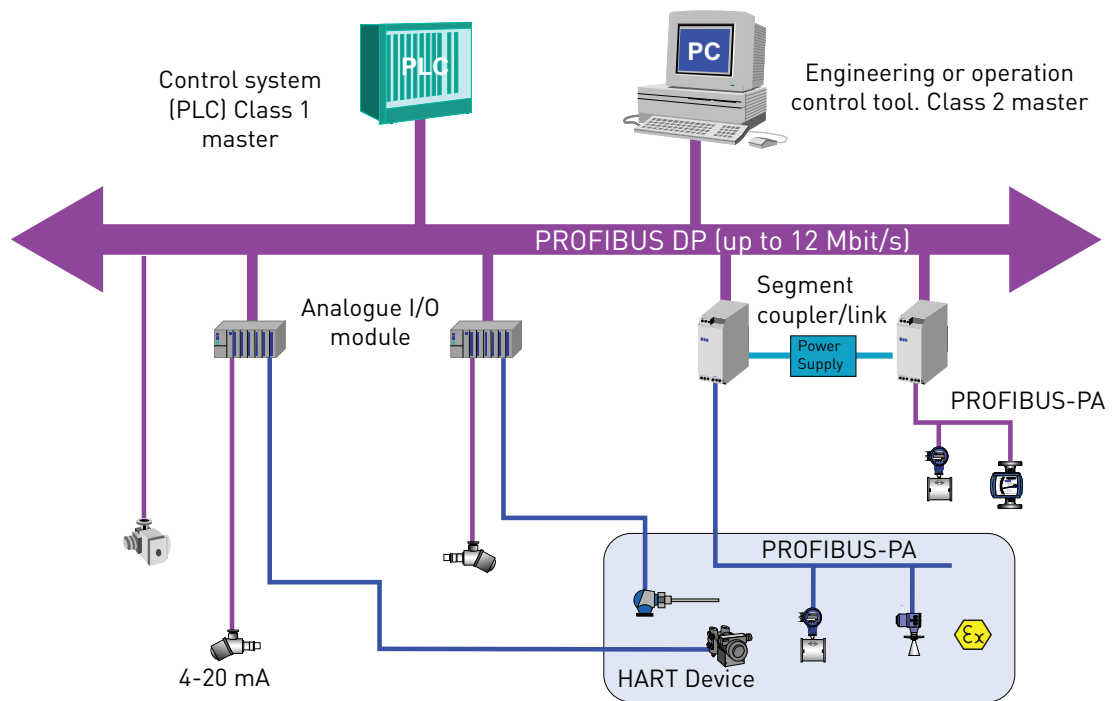
2.9 Technical Data

	Hardware		Software
Physical	PROFIBUS RS-485 Interface according to IEC 61158	GSD	GSD file can be downloaded from the KROHNE Homepage http://www.krohne.com
Connection	dependent of polarity	Device profile	PA Profile compact class B, V3.01
		Address range	0...126; default 126 0 to 125 via "set_slave_add" 0 to 126 via "Local Display" 126 via "FACTORY_RESET = 2712"
		Local control	local display and operator interface at device.
		SAPs	2 MS1 SAPs - acyclic interface to PLC 3 MS2 SAPs - the number of MS2 Service Access Points is typically equal to the maximum number of master class 2 tools
		Function Blocks	1 PB 1 TB 8 AI 3 TOT

3.1 Software history

Issued	Signal Converter		Application Program		System Integration		
	Hardware	Firm-ware	Hardware	Software	Driver	Version	Model Name as used in the GSD:
11/06	'MFC300 Signal Converter with MBP Interface and PA Profile 3.01 ("Profibus PA Device")	V2.2.1/061117	<ul style="list-style-type: none"> • Simatic PCS7 • Others 	<ul style="list-style-type: none"> • HW Config • Others 	GSD (Manufacturer specific, for standard DP/PA segment coupler)	KR014511.GSD	"MFC300 (MBP) Rev. 1"
					GSD (Manufacturer specific, for segment coupler SK2/SK3 of P&F)	YP014511.GSD	"YP0 MFC300 (MBP) Rev.1"
					GSD (Profile specific, for standard DP/PA segment coupler)	PA139742.GSD	"Flow,dens,temp 3AI, 1TOT (PhyL 1)"
			Laptop/ PC	PDM ≥ 6.0	DD	4511 0300 01	
			Laptop/ PC	Pactware	DTM (generic Flow DTM)	0300_1030001_FDT12.exe	

3.2 PROFIBUS PA System Architecture



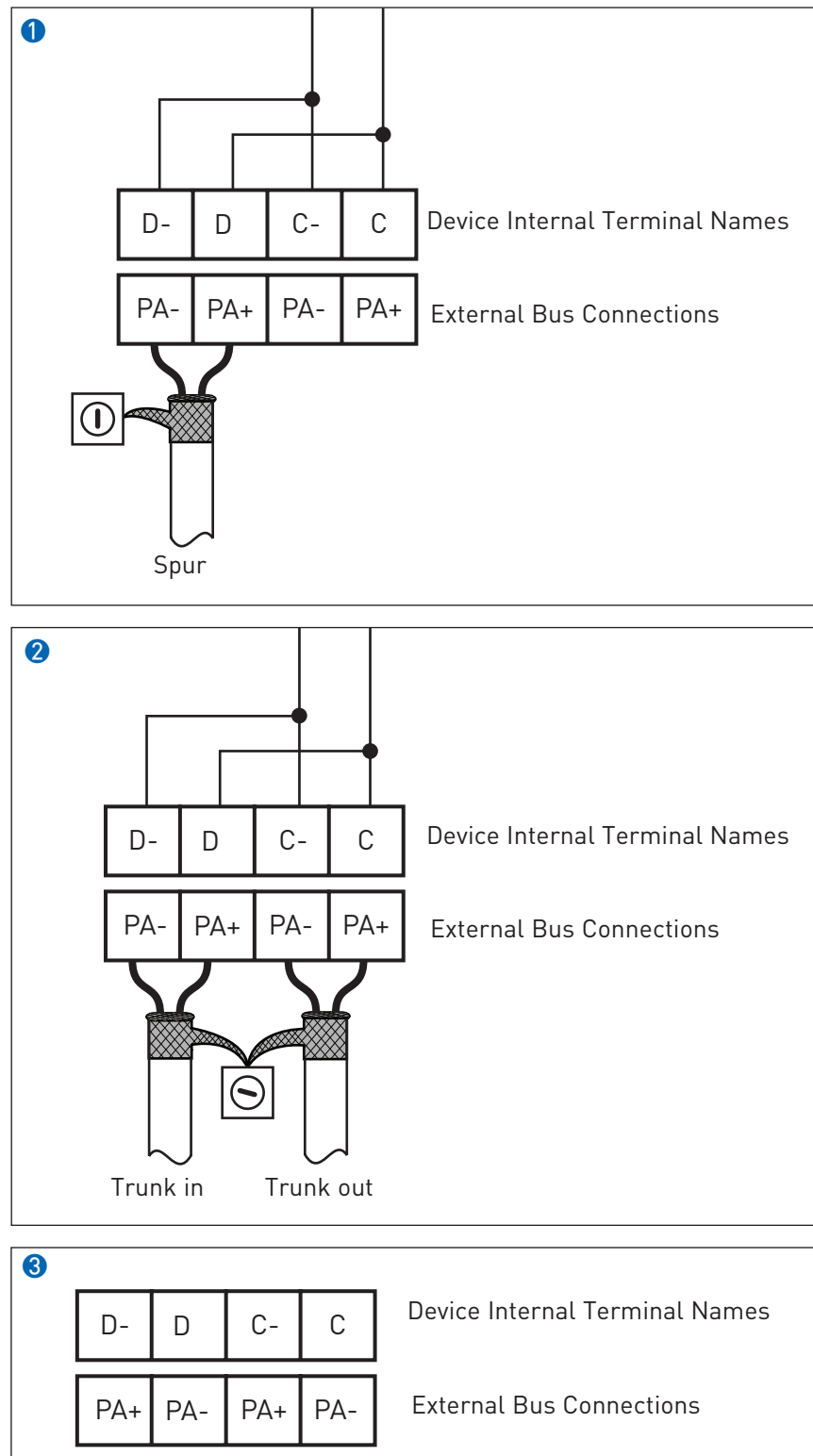
The diagram above shows a typical instrumentation with PROFIBUS PA devices with MBP interface in hazardous and non-hazardous locations, including connections of conventional devices (e.g. with 4-20mA signals) in a PROFIBUS network.

The PROFIBUS PA is normally connected to a segment coupler which, among other things, carries out the conversion to the PROFIBUS DP.

Further information on the planning and operation of PROFIBUS PA networks can be found in the KROHNE brochure "Fundamentals PROFIBUS" which can be downloaded from the KROHNE homepage <http://www.krohne.com> or contact "KROHNE Marketing".

3.3 Bus Connection - PROFIBUS PA Device

For a detailed description of the electrical connections of the MFC300 please refer to the OPTI-MASS Handbook.



① Single Spur

② Trunk In/Out

③ Alternative wiring because the current linkage between the device and the PROFIBUS PA cable is not polarised.

Note: Although the PROFIBUS MBP technology supports power supply via the PROFIBUS line the "MFC300 PROFIBUS MBP interface" will operate only if the additional power supply for the device is connected / available.

3.4 GSD Files

A "PROFIBUS GSD ZIP" file (e.g. GSD-31777815.zip) including both all KROHNE GSD files and additional data files can be downloaded from the KROHNE homepage <http://www.krohne.com> or contact "KROHNE Marketing". The GSD file contains information that will be needed for project planning of the PROFIBUS communication network. The relevant data files (e.g. MFC300_n.bmp; MFC300_n.dib) must be loaded into the bus configuration system/master system before start-up of the bus system.

The MFC300 PROFIBUS MBP Interface is according to the PROFIBUS PA Profile V 3.01. The device supports two Ident-No.:

- Ident-No. "4511hex" belongs to the KR014511.GSD / YP014511.GSD and includes the complete functionality concerning the cyclic data exchange of the coriolis mass flow meter MFC300.
- The application of the manufacturer independent Ident-No. "9742hex" (GSD file "PA139742.GSD") provides interchange ability of devices, i.e. an exchange of coriolis mass flow meters of different vendors.

Please follow the instructions in the manual of the host supplier when installing the GSD File you need and the additional files (MFC300_n.bmp and MFC300_n.dib) into the PLC. If separated by the bus configuration system the device entry of the MFC300 PROFIBUS MBP Interface with PA Profile 3.01 will be located within the slave family PROFIBUS PA.

3.4.1 Manufacturer specific GSD files: KR014511.GSD & YP014511 GSD

The KR014511.GSD file is for use with the standard DP/PA coupler and the YP014511.GSD file is for use with the transparent DP/PA coupler SK2/SK3 of Pepperl & Fuchs (up to 12 MBaud on the DP segment)

Note: For devices with MBP interface there are always two types of GSD files in our GSD compilation:

- One standard GSD file for a standard DP/PA segment coupler: file name: "KR....GSD"
- One special GSD file specific for the segment coupler SK2/SK3 of Pepperl & Fuchs file name: "YP....GSD"

It should be noted that both GSD files support device functionality as described below:

Block Number	Standard-Configuration function block output: value + status)	KR014511.GSD YP014511.GSD Ident-No. 4511	Default unit:
1	Mass Flow	AI-FB	kg/s
2	Density	AI-FB	kg/m ³
3	Medium Temperature	AI-FB	K
4	Mass Totalizer	Totalizer-FB	kg
5	Volume Totalizer	Totalizer-FB	m ³
6	Mass Totalizer	Totalizer-FB	kg
7	Volume Flow	AI-FB	m ³ /h
8	Concentration 1	AI-FB	%
9	Concentration 2	AI-FB	%
10	Concentration Mass Flow 1	AI-FB	kg/s
11	Concentration Mass Flow 2	AI-FB	kg/s

AI = Analog Input Function Block

FB = Function Block

There are separate settings to select the units for local display and PROFIBUS. Modifications of the units of the display will have no effect on the data transferred via PROFIBUS. A master class 2 tool is required to modify the units for PROFIBUS transfer.

Important Notes:

During network configuration the user has to define which function block outputs of the "MFC300 PROFIBUS MBP interface" should be transferred cyclically to the master. This is done by a bus configuration tool (e.g. for PC-S7 from Siemens this will be done with the tool "HW- Config"). This tool offers the functions described as follows:

1. It is possible to configure an "Empty" block (the code of an "Empty" block is defined as 0x00) on each block number. This means, that for this block no data is transmitted in the cyclic data telegram.
2. There is NO "Totalizer (TOT)" function block allowed on block position 1, 2, 3, 7, 8, 9, 10 and 11! An "Analog Input (AI)" function block or an "Empty" block is allowed here only!

Note: All codes supported of "Analog Input (AI)" - and "Totalizer (TOT)" - function blocks will be found in the corresponding GSD files.

3. There is NO "Analog Input (AI)" function block allowed on block position 4, 5 and 6! A "Totalizer (TOT)" function block or an "Empty" block is allowed here only!
4. There is a choice of 7 different totalizer functions, which can be allocated to the blocks 4, 5 and / or 6. The 7 functions are defined as follows:

"Total"	cyclic transfer of the totaliser value with status to the master
"SetTot + Total"	cyclic transfer of the totaliser value with status to the master + cyclic control data from master to the device via the parameter SetTot
"ModeTot + Total"	cyclic transfer of the totaliser value with status to the master + cyclic control data from master to the device via the parameter ModeTot
"SetTot+ModeTot+Total"	cyclic transfer of the totaliser value with status to the master + cyclic control data from master to the device via the parameters SetTot and ModeTot (in the given order)
"SetTot"	cyclic control data from master to the device via the parameter SetTot
"ModeTot"	cyclic control data from master to the device via the parameter ModeTot
"SetTot + ModeTot"	cyclic control data from master to the device via the parameters SetTot and ModeTot (in the given order)

Both, the Byte SetTot and ModeTot are being sent cyclically from the Master to the device if these bytes are inserted as output data via the PLC configurator. The meaning of these control bytes are as follows:

SetTot:	
SetTot =0:	Totaliser is totalising.
SetTot =1:	Totaliser will be reset to 0 and stays at 0 until SetTot is switched back again to 0. If the value of SetTot changes from "1" to "0" the totaliser starts counting from 0.
SetTot =2:	Totaliser is set to the value defined by PresetTot. PresetTot can be written via a acyclic master (totaliser in block 4 = Slot 4 Index 32; totaliser in block 5 = Slot 5 Index 32; totaliser in block 6 = Slot 6 Index 32). If the value of SetTot changes from "2" to "0" the totaliser starts counting from the current value defined by PresetTot.
SetTot ? 2:	not allowed. Value is ignored; totaliser remains in its last valid setting.
ModeTot:	
ModeTot = 0	totaliser totalises positive and negative values.
ModeTot = 1	totalises only positive values.
ModeTot = 2	totalises only negative values.
ModeTot = 3	totaliser is stopped, no totalization will be done.
ModeTot = 248	totalises all values as positive (negative values will be multiplied with "-1.0")
ModeTot = 249	totalises all values as negative (positive values will be multiplied with "-1.0")

All other values of ModeTot are not allowed. Value is ignored; totalizer remains in its last valid setting.

- The standard block configuration may be changed by the customer but using the default settings is highly recommended. If the standard block configuration should be changed by the customer an acyclic master tool must be used to change the "channel parameter" value of the block which should be connected to another transducer output value.

3.4.2 Profile specific GSD file: PA139742. GSD

The functionality of the profile specific GSD file is limited. This GSD file includes only four blocks:

Block Number	Standard-Configuration (function block output value)	PA139742. GSD Ident-No. 9742	Default unit:
1	Mass Flow	AI-FB	kg/s
2	Density	AI-FB	kg/m3
3	Medium Temperature	AI-FB	K
4	Mass Totaliser	Totaliser-FB	kg

The device has to be switched from "Manufacturer Specific" (full functionality) to "Profile Specific" (interchangeable basic configuration) by using a master class 2 tool (IDENT_NUMBER_SELECTOR: Slot 0, Index 40 change byte value to 0). After this the device has to be projected by using the PA139742.GSD file.

3.4.3 Cyclic data exchange

During network configuration the user has to define which function block outputs of the MFC300 PROFIBUS MBP Interface should be transferred cyclically to the master. Network configuration will be done using one of the GSD files described above. The order of transmission of the function blocks always remains the same even if a function block is defined as an "Empty" block (if so no function block output data will be sent to the master and all function block outputs following the "Empty" block will move up one position).

3.5 Profile

The MFC300 PROFIBUS MBP Interface is based on PROFIBUS PA Profile Version 3.01 and supports the following blocks:

- One Physical Block.

This block contains the parameters defined in PA Profile 3.01.

- One Transducer Block for coriolis mass flow devices.

This block provides the parameters and functions defined in PA Profile 3.01.

- Eight "Analog Input (AI)" function blocks: as default "Mass Flow", "Density", "Medium Temperature", "Volume Flow", "Concentration 1", "Concentration 2", "Concentration Mass Flow 1" and "Concentration Mass Flow 2".
- Three "Totalizer (TOT)" function blocks: as default the first and the third totalizers will totalize "Mass" and second one will totalize "Volume".

3.6 Data Structure of Function Block Output Values

The data structure of function block outputs consists of 5 bytes: a 4 byte float value (Float Format according IEEE Standard 754 Short Real Number) followed by a 1 byte status value. If all 11 function block outputs have been projected (see above), 55 byte will be transmitted.

Float Value

First an example of the float format

Byte n								Byte n+1							Byte n+2							Byte n+3									
Bit7	Bit6							Bit7	Bit6						Bit7							Bit7									
VZ	2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	2 ⁻¹	2 ⁻²	2 ⁻³	2 ⁻⁴	2 ⁻⁵	2 ⁻⁶	2 ⁻⁷	2 ⁻⁸	2 ⁻⁹	2 ⁻¹⁰	2 ⁻¹¹	2 ⁻¹²	2 ⁻¹³	2 ⁻¹⁴	2 ⁻¹⁵	2 ⁻¹⁶	2 ⁻¹⁷	2 ⁻¹⁸	2 ⁻¹⁹	2 ⁻²⁰	2 ⁻²¹	2 ⁻²²	2 ⁻²³
Exponent								Mantissa							Mantissa							Mantissa									

Example: 40 F0 00 00 (hex) = 0100 0000 1111 0000 0000 0000 0000 0000 (binary)

Formula: Value = (-1)VZ * 2 (Exponent - 127) * (1 + Mantissa)
 Value = (-1)0 * 2 (129 - 127) * (1 + 2⁻¹ + 2⁻² + 2⁻³)
 Value = 1 * 4 * (1 + 0,5 + 0,25 + 0,125)
 Value = 7,5

Status Value

The meanings of the status byte (unsigned integer) are described in the following tables

Quality		Quality-Substatus				Limits	
Gr	Gr	QS	QS	QS	QS	Qu	Qu
2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰

0	0							= bad
0	1							= uncertain
1	0							= good (Non Cascade)
1	1							= good (Cascade) - not supported

Status = bad								
0	0	0	0	0	0			
0	0	0	0	0	0			= non-specific
0	0	0	0	0	1			= configuration error
0	0	0	0	1	0			= not connected
0	0	0	0	1	1			= device failure
0	0	0	1	0	0			= sensor failure
0	0	0	1	0	1			= no communication (last usable value)
0	0	0	1	1	0			= no communication (no usable value)
0	0	0	1	1	1			= out of service

Status = uncertain							
0	1	0	0	0	0		= non-specific
0	1	0	0	0	1		= last usable value
0	1	0	0	1	0		= substitute-set
0	1	0	0	1	1		= initial value
0	1	0	1	0	0		= sensor conversion not accurate
0	1	0	1	0	1		= engineering unit violation (unit not in the valid set)
0	1	0	1	1	0		= sub-normal
0	1	0	1	1	1		= configuration error
0	1	1	0	0	0		= simulated value
0	1	1	0	0	1		= sensor calibration

Status = good (Non-Cascade)							
1	0	0	0	0	0		= ok
1	0	0	0	0	1		= update event
1	0	0	0	1	0		= active advisory alarm (priority < 8)
1	0	0	0	1	1		= active critical alarm (priority > 8)
1	0	0	1	0	0		= unacknowledged update event
1	0	0	1	0	1		= unacknowledged advisory alarm
1	0	0	1	1	0		= unacknowledged critical alarm
1	0	1	0	0	0		= initiate fail safe
1	0	1	0	0	1		= maintenance required

Status = Limits								
						0	0	= ok
						0	1	= low limited
						1	0	= high limited
						1	1	= constant

Check the first two quality bits in order to get the quality information of the measurement value:

Good (non Cascade) function block output value is ok and can be used without restrictions

Good (Cascade) will not be supported, because it is not applicable for the device

Uncertain function block output value can be used but the accuracy can not be guaranteed (e.g. function block outputs value has been frozen or A/D converter is saturated or out of range)

Bad function block output value is bad - don't use it for process control!

The „Quality-Substatus“- and „Limit“-Bits will be used for further diagnostics or limit checking.

Attention: The status should be monitored because a number will be transmitted even if the status of the measurement value is bad or uncertain. This is the only way to check the quality of the transmitted measurement values.

3.7 Diagnosis

If the device internal diagnostic functions detect an error additional information will be sent to the Master (for further information have a look at the UNIT_DIAG_BIT(i) definitions of the corresponding GSD-file).

3.8 Display Parameters (PROFIBUS)

(MFC300 PROFIBUS MBP Interface with PA Profile 3.01)

For a detailed description please see "MFC 300 (OPTIMASS) Handbook". Some special settings concerning the PROFIBUS features are easily operated via the local menu. Please see the following tables.

A Quick Setup		
Ref	Display	Description & Settings
A3	Reset	<p>A3.1 Reset Errors</p> <p>This menu function can be used to reset all errors that are not removed automatically (power fail, counter overflow)</p> <p>step 1: reset?</p> <p>No: Exit the function</p> <p>Yes Resets the errors and exits the function.</p>
		<p>The following reset menus for the counters (totaliser) are only available, if the quick access has been activated in the menu setup > device > quick setup. Each counter (totaliser) can be activated for quick access independently.</p>
		<p>A3.2 > FB4 Totaliser 1</p> <p>(for PROFIBUS Devices) the counter can be reset to zero in this menu</p> <p>step 1: reset counter?</p> <p>no: exits the function without reset</p> <p>yes: resets the counter and exits the function</p>
		<p>A3.3 > FB5 Totaliser 2</p> <p>(for PROFIBUS Devices) the counter can be reset to zero in this menu</p> <p>step 1: reset counter?</p> <p>No exits the function without reset</p> <p>Yes resets the counter and exits the function</p>
		<p>A3.4 > FB6 Totaliser 3</p> <p>(for PROFIBUS Devices) the counter can be reset to zero in this menu</p> <p>step 1: reset counter?</p> <p>No exits the function without reset</p> <p>Yes resets the counter and exits the function</p>
A4	Station Address	<p>(only for PROFIBUS devices)</p> <p>A4 -> Station Address selects the address of the device at the PROFIBUS DP interface.</p> <p>Note:</p> <p>The PROFIBUS address can also be changed using the PROFIBUS service "set_slave_add". The input range is 0...125 according to the PROFIBUS specification. Address 126 is the default address and cannot be set via the PROFIBUS service "set_slave_add" - use menu instead to reset to default address.</p>

B Test level		
B3	Information	
B3.5	PROFIBUS	<p>available if there is a PROFIBUS interface in existence; displays the below mentioned information about the PROFIBUS interface:</p> <p>KROHNE Ident No.</p> <p>Software Revision of the PROFIBUS software</p> <p>Date of Production</p>

C Setup			
C4 I/O Totaliser			
C 4.y	Totaliser 1, 2 or 3	Allows you to control the three PROFIBUS counters The three menus are identical so they are grouped together and their functions are described in one go.	
C 4.y.1	Function of Totaliser	Incremental Total	Totalises only positive values
		Decremental Total	Totalises only negative values
		Absolute Total	Totalises positive and negative values
		Stop Totaliser	Totaliser is stopped.
		All As Positive	neg. input values will be multiplied with "-1.0"
		All As Negative	pos. input values will be multiplied with "-1.0"
C 4.y.2	Measurement	<ul style="list-style-type: none"> • Volume flow • Voncentration total1 • Conc volume flow 1 	<ul style="list-style-type: none"> • Mass flow • Concentration total2 • Conc volume flow 2
C 4.y.3	Preset Value	[predefines a "threshold" using the High Limit value and the Low Limit value of the totaliser affected; the "THRESHOLD" bit will be set in the long status information bytes of the PROFIBUS interface if the actual value of the totaliser is outside these limits. This can be also used as a status output choosing the function "preset counter X"]	
C 4.y.4	Reset Totaliser	[The current value of the totaliser can be set to zero] Step 1: reset totaliser? no: exits the function without reset yes: resets the totaliser to zero and exits the function; totaliser will restart counting at once	
C 4.y.5	Error behaviour	[defines the behaviour of this function block in case of errors]	
		hold meas. value	totalization is continued based on the last incoming value with good status before the first occurrence of bad status
		ignore error:	totalization is continued using the input values despite the bad status. The status is ignored
		stop totaliser	totalization is stopped during occurrence of bad status of incoming values
C 4.y.6	information	[The KROHNE Ident. No. of the circuit board, the software version number and the production date of the circuit board will be displayed]	
		Note: If you choose "y" = 1 all settings will effect FB 4 (Totaliser 1) if you choose "y" = 2 all settings will effect FB 5 (Totaliser 2) if you choose "y" = 3 all settings will effect FB 6 (Totaliser 3)	

Ref	Display	Description & Settings	
C5 I/O PROFIBUS (This feature is available for PROFIBUS devices only.)			
Using the menu functions mentioned below you will be able to control basically the eight analogue input blocks of this PROFIBUS device. These eight menus are identical so they are grouped together and their functions are described in one go.			
C5.y.1	Measurement	Selects the measurement (channel) for the analogue input block for the PROFIBUS interface	
		Mass flow: Density: Concentration 2: Concentration mass flow 1: Concentration volume flow 2 Sensor average: Tube frequency: Inner cylinder strain: Flow velocity Supply** * This is the electronic temperature ** This is internal supply voltage for the PROFIBUS	Temperature Concentration 1: Concentration mass flow 2 Concentration volume flow 1 Sensor deviation: Drive energy Tube strain Electronics temperature * Volume flow
C5.y.2	Time Constant	Time constant for this function block	
C5.y.3	Error Behaviour	Defines the behaviour of this function block in case of errors	
		Hold Value:	last valid OUT value stored will be used as OUT value
		Ignore Error:	OUT has the wrong calculated value and status Bad as calculated
		Replace Value:	"replacement value" will be used as OUT value
		Note: If you choose "y" = 1 all settings will effect FB 1 (Analog Inp.1) if you choose "y" = 2 all settings will effect FB 2 (Analog Inp.2) if you choose "y" = 3 all settings will effect FB 3 (Analog Inp.3) if you choose "y" = 4 all settings will effect FB 7 (Analog Inp.4) if you choose "y" = 5 all settings will effect FB 8 (Analog Inp.5) if you choose "y" = 6 all settings will effect FB 9 (Analog Inp.6) if you choose "y" = 7 all settings will effect FB 10 (Analog Inp.7) if you choose "y" = 8 all settings will effect FB 11 (Analog Inp.8)	
C6 -> Device			
In this menu all functions are grouped that have no effect on the measurement or any output directly.			
C6.3.1	Function	One line	Display shows one line of measurement on this page
		Two lines	Display shows two lines of measurement on this page
		Three lines	Display shows three lines of measurement on this page

Ref	Display	Description & Settings	
C6 Device ctd...			
C6.3.2	Measurement 1.line	Mass flow: Density: Concentration flow 1 Diagnosis 2: Flow Velocity:	Temperature Concentration 1 Diagnosis 1 Diagnosis 3 VolumeFlow
C6.3.8	Measurement 2.line (Only available if this line is activated)	Bargraph* Volume Flow: Temperature: Concentration 1: Diagnosis 1: Diagnosis 3: FB5 totaliser 2: Operating Hours	Flow Velocity Mass Flow Density Concentration Flow 1 Diagnosis 2 FB4 Totaliser 1 FB6 Totaliser 3
* Analogue display of the value selected for the first line			
C6.3.10	Measurement 3.line (Only available if this line is activated)	Flow Velocity Mass Flow Density Concentration Flow 1 Diagnosis 2 FB4 Totaliser 1 FB6 Totaliser 3	Volume Flow: Temperature: Concentration 1: Diagnosis 1: Diagnosis 3: FB5 totaliser 2: Operating Hours
C6.4 -> 2. Meas. page			
In case of a PROFIBUS device the second measurement page is meant to check the output values of the different function blocks. Only PROFIBUS values can be selected here. The analogue inputs are shown with exactly the value, as seen on the PROFIBUS.			
C6.4.1	Measurement 1.line	FB1 Analog inp. 1 FB3 Analog inp. 3 FB5 Totaliser 2 FB7 Analog inp. 4: FB9 Analog inp. 6: FB11 Analog inp. 8	FB2 Analog inp. 2 FB4 Totaliser 1 FB6 Totaliser 3 FB8 Analog inp. 5 FB10 Analog inp. 7
C6.4.2	Format 1.line	Fixed number of digits after the decimal point or automatic, where the number of digits is automatically adjusted to the available space.	
C6.4.3	Measurement 2.line	FB1 Analog inp. 1 FB3 Analog inp. 3 FB5 Totaliser 2 FB7 Analog inp. 4: FB9 Analog inp. 6: FB11 Analog inp. 8	FB2 Analog inp. 2 FB4 Totaliser 1 FB6 Totaliser 3 FB8 Analog inp. 5 FB10 Analog inp. 7
C6.4.4	Format 2.line	Fixed number of digits after the decimal point or automatic, where the number of digits is automatically adjusted to the available space.	
C6.4.5	Measurement 3.line	FB1 Analog inp. 1 FB3 Analog inp. 3 FB5 TOTALISER 2 FB7 Analog inp. 4: FB9 Analog inp. 6: FB11 Analog inp. 8	FB2 Analog inp. 2 FB4 Totaliser 1 FB6 Totaliser 3 FB8 Analog inp. 5 FB10 Analog inp. 7
C6.4.6	Format 3.line	Fixed number of digits after the decimal point or automatic, where the number of digits is automatically adjusted to the available space.	

Ref	Display	Description & Settings
C6 Device ctd...		
C6.8.2	Information	Gives information about the hardware version, software version and the calibration/test date of this interface
C6.8.3	Diag. extension	Gives a representation of the status information, that is also available on the PROFIBUS interface. The status is displayed in hexadecimal format.
C6.8.4	Diag. extension 2	
C6.8.5	Diag. extension i. (intern)	
C6.9	quick setup	
In this menu some settings in the Quick Setup can be activated. In the default configuration the settings in the Quick Setup are activated.		
C6.9.1	reset totaliser 1	The reset can be activated in the Quick Setup to get a quick access of the function Yes quick access activated No quick access not activated
C6.9.2	reset totaliser 2	The reset can be activated in the Quick Setup to get a quick access of the function Yes quick access activated No quick access not activated
C6.9.3	reset totaliser 3	The reset can be activated in the Quick Setup to get a quick access of the function Yes quick access activated No quick access not activated
D	Service	
This menu is protected. You will need to use the service password to gain access.		
D2	System	In this menu all functions related to different data sets can be found.
D2.2	Service Parameters	
D2.2.1	Cold start	Resetting of the MFC300 can be done here but all changes up to this point are automatically stored and cannot be discarded.
		step 1 reset? No terminates the function yes performs the reset and leaves the programming mode
D2.2.2	Save Factory Data	Copies the actual data into the factory setting, this overwrites the factory settings done during calibration)
		Step 1 Save Settings? break exits the menu without saving factory settings saves the settings as factory settings
		Step 2 go on with copy? (there is no possibility to undo this command) No exit menu without saving Yes copy the actual settings to the selected storage place.

Ref	Display	Description & Settings	
D2 System ctd...			
D2.2.4	Identification No	Sets a different device modus for the cyclic communication of the PROFIBUS interface	
		MFC300	complete functionality concerning the cyclic data exchange of the coriolis mass flow meter MFC300 is supported (including manufacturer specific extensions)
		Profile	only the profile defined functions concerning the cyclic data exchange are supported - no extras
D2.2.5	PB Cold Start	Reset?	No terminates the function Yes PROFIBUS cold start will be carried out at once. The programming mode is terminated
		Note: During a PROFIBUS cold start nearly all parameter values of the whole device will be set to their default values (e.g. the PROFIBUS address will not be changed) without disconnecting an already established connection to a PROFIBUS Master system	

Current Device Revision

Use the display of the "MFC300 with PROFIBUS MBP Interface" to open the path:

"test\information\Profibus" (== menu B3.5)

This menu will provide the following information:

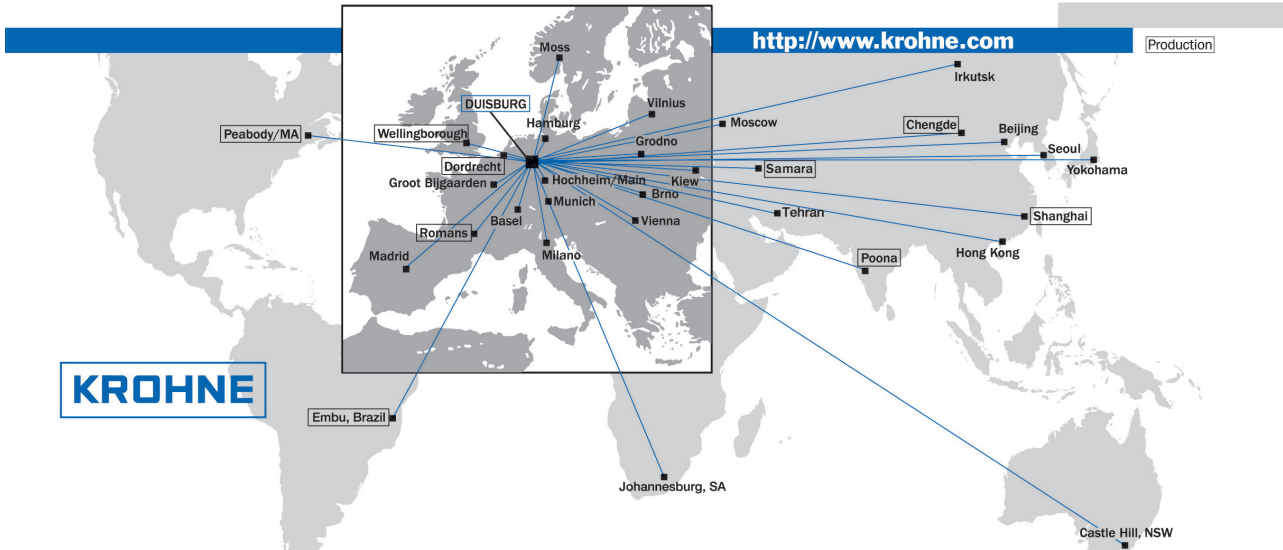
KROHNE Ident No.

Software Revision of the PROFIBUS software

Date of Production

3.9 Technical Data

Hardware		Software	
Physical	PROFIBUS MBP Interface according to IEC 61158	GSD	GSD file can be downloaded from the KROHNE Homepage http://www.krohne.com
Connection	Independent of polarity	Device profile	PA Profile compact class B, V3.01
Base current	10,5 mA	Address range	0...126; default 126 0 to 125 via "set_slave_add" 0 to 126 via "Local Display" 126 via "FACTORY_RESET = 2712"
FDE	yes: separate fault disconnection electronics provided	Local control	local display and operator interface at device.
Fault current	6 mA; (fault current = max. continuous current – base current).	SAPs	2 MS1 SAPs - acyclic interface to PLC 3 MS2 SAPs - the number of MS2 Service Access Points is typically equal to the maximum number of master class 2 tools
Starting current	< 12mA	Function Blocks	1 PB 1 TB 8 AI 3 TOT
"Ex" approval	EEx ia IIC or EEx ib IIC/IIB, FISCO device (for details see "MFC 300 (OPTIMASS) Handbook")		



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