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18.10.2005

Installation and operating instructions

BATCHCONTROL 5014 C

Compact Electromagnetic Flowmeters with CANopen bus interface

Please note!

Do not open the housing of the BATCHCONTROL 5014C.

Danger of contamination with substances likely to destroy the moisture barrier of the electronic equipment (e.g. if CIP or SIP cleaned from the outside).

Therefore, please contact your KROHNE Service engineer before you open the housing.

Contents

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Therefore, please contact your KROHNE Service engineer before you open the housing.

System description

The BATCHCONTROL IFM 5014C compact electromagnetic flowmeter is a precision instrument designed for the linear flow measurement of liquid products and controlling the filling process.

The products need to be electrically conductive:
> 5 µS/cm (except for water)
> 20 µS/cm (for water)

The full-scale range $Q_{100\%}$ can be set as a function of the meter size:
DN 2.5 – 40 and $^{1}/_{10}$" – $1^{1}/_{2}$" $Q_{100\%}$ = 0.0015 - 15 l/s
This is equivalent to a flow velocity of 0.2 - 12 m/s.

Standards and approvals

- BATCHCONTROL IFM 5014C with the IFC014 signal converter meets the **EU-EMC Directives** and bears the **CE and 3A symbol.**
- The 3A approval covers only the meter without adapter.
- All factories and production sequences are ISO 9001 certified.

Product liability and warranty

The compact BATCHCONTROL IFM 5014C electromagnetic flowmeter is designed exclusively for measuring the volumetric flowrate of electrically conductive, liquid process products.

The compact flowmeter is not suitable for use in hazardous areas. Other flowmeter series are available for such applications.

Responsibility as to suitability and intended use of this compact electromagnetic flowmeter rests solely with the operator.

Improper installation and operation of the flowmeters (systems) may lead to loss of warranty.

In addition, the “General conditions of sale“ forming the basis of the purchase contract are applicable.

If BATCHCONTROL 5014C flowmeters need to be returned to KROHNE, please note the information given on the last-but-one page of these instructions. KROHNE regret that they cannot repair or check your flowmeter(s) unless these are accompanied by the completed form sheet.

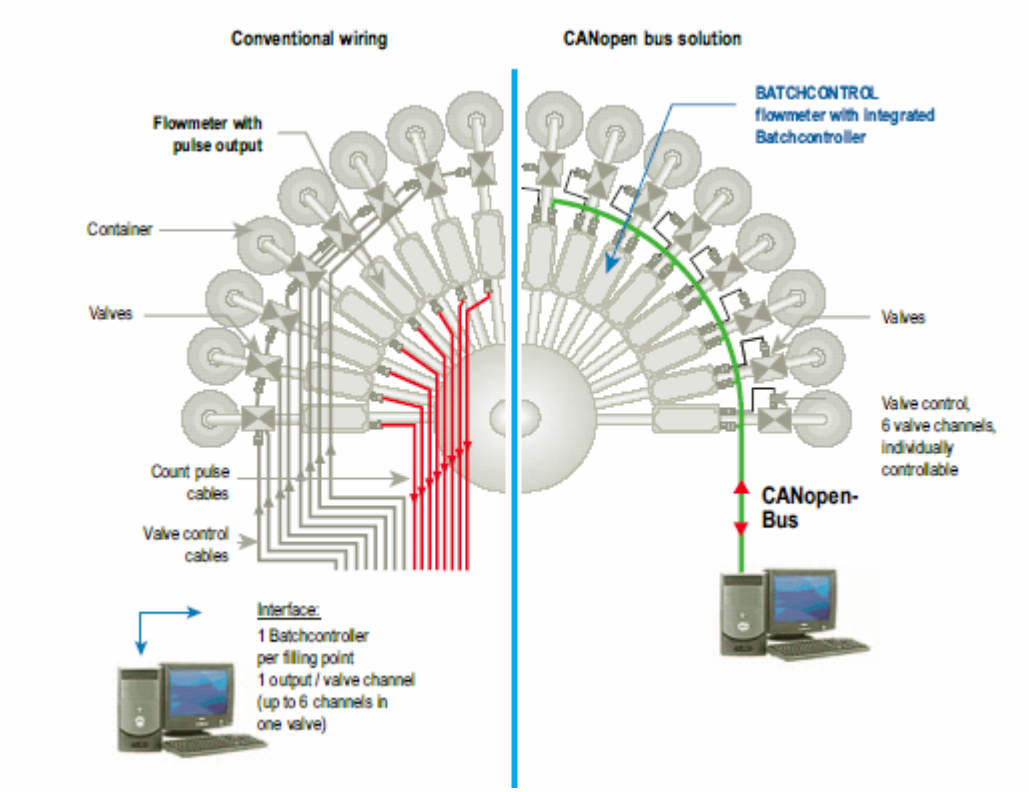
Functional description
BATCHCONTROL IFM 5014C

The volume to be filled into the container is measured “in line“ by means of the electromagnetic flowmetering system. The BATCHCONTROL closes the filling valve once the preset filling volume has been reached. It is always the preset target volume that is filled into the container.

The signal converter converts the measured flowrate signal into volume that are transfered to the integrated batch controller.

The influence of valve closing times and other dynamic factors can be corrected by the adaptive correction formalism of the BATCHCONTROL 5014C.

The use of state-of-the-art microprocessor electronics and the high-speed analog/digital converter also enables changes in the flowrate to be sensed precisely. This technology ensures high reproducibility and long-term stability.



Part A System installation and start-up

1 Installation in the pipeline

1.1 Important information

The following recommendations should be observed to ensure proper functioning of the flowmeter – PLEASE NOTE.

- **Measuring tube must be filled completely at all times.**
- **Direction of flow:** the blue arrow on the housing of the primary head must point in the direction of flow. If for structural reasons the flowmeter can only be installed invers to the direction of flow, the direction of flow measurement can be reprogrammed.
- **Stud bolts and nuts:** to fit, make sure there is sufficient room next to the pipe flanges.
- **Vibration:** support the pipeline on both sides of the flowmeter. Vibration level to IEC 068-2-34: below 2,2g in the 20 - 2000 Hz frequency range.
- **Radiant heat:** avoid e.g. from hot product tanks, insulate if necessary.
- **Avoid strong electromagnetic fields** in vicinity of flowmeter.
- **Straight Inlet run** ≥ 5 x DN and straight **outlet run** ≥ 2 x DN, measured from the electrode axis (DN = meter size).
- **Vortex or corkscrew flow:** increase length of inlet and outlet runs or install flow straighteners.
- **Mixing different process liquids:** install flowmeter upstream of mixing point or at an adequate distance downstream, minimum of 30 x DN (DN = meter size), otherwise display may be unsteady.
- **Plastic pipes and internally coated metal pipes:** grounding rings required, see “Grounding“, Section 1.3.3.
- **Heat-insulated pipelines:** do not insulate flowmeter.
- **Zero setting:** not required. For checking purpose, it should be possible to set “zero“ flow velocity in the completely filled measuring tube. Shutoff valves should therefore be provided either downstream or upstream and downstream of the flowmeter.
- **Ambient temperature**
  -25°C to +60°C
- **Process temperature**
  max. 140 °C
- **Transport and storage temperature**
  -25°C to +60°C

Limits imposed by the material used for the measuring tube for process temperature, thermal shock limit, pressure and vacuum, see Section D page 22.

Please note!

The ceramic measuring tube must not contact metal parts (flange, pipeline). This can destroy the flowmeter!

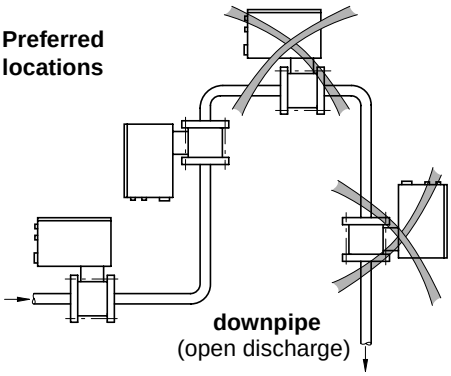
1.2 Suggestions for installation

To avoid measuring errors due to air inclusion and vacuum, please observe the following:

Highest point of pipe run

(Air bubbles collect in measuring tube - faulty measurements!)

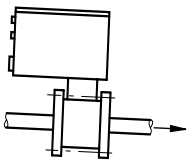
Preferred locations



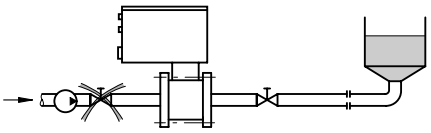
Avoid draining or partial filling of the measuring tube. Faulty measurements.

Horizontal pipe run

Install in slightly descending pipe section to prevent air from collecting, so avoiding faulty measurements and that meter can drain.

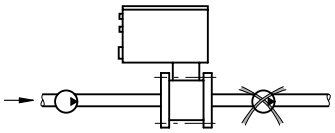


Control and shutoff valves: always install behind the flowmeter



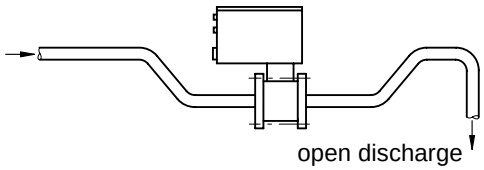
Pumps

Do not install flowmeter on pump suction side



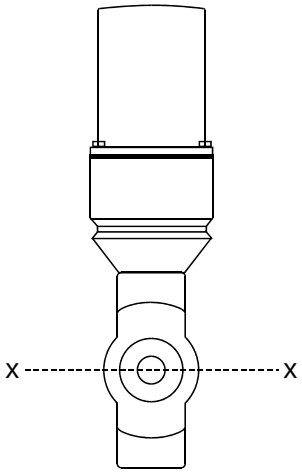
Open feed or discharge

Install meter in low section of pipe



Selecting the installation location

Location and position as required, but electrode axis **(X – – – – X** must be approximately horizontal in a horizontal pipe run.



Direction of flow The blue arrow on the primary head housing must point in the flow direction.

On **high-temperature pipes and where process temperatures exceed 100 °C,** provide facilities to compensate for longitudinal expansion on heat-up of the pipeline. Use flexible pipe elements (e.g. elbows).

1.3 Installation requirements

Items supplied with flowmeter

- BATCHCONTROL IFM 5014C compact flowmeter in the version as ordered
- Installation and operating instructions, as agreed
- Certificate of system calibration data (as agreed)

Excluding fitting accessories. Stud bolts, gaskets, etc., to be provided by customer.

All operating data and function values are factory set according to your order specifications.

Requirements

Use in the food industry

The IFM 5014C is specifically suitable for use in the food and beverage industry or similar sterile processes.

The IFM 5014C is steam-resistant.

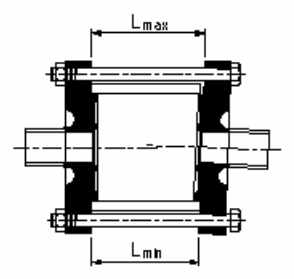
The measuring tube can be SIP or CIP cleaned when in installed condition. During the cleaning the meter(s) must be switched off to maintain the reliability of the unit(s).

- Operating pressure, type, and space between pipe flanges: see Table.
- Tighten stud bolts uniformly down to the metal stop in diagonally opposed sequence. See Table for type and number of stud bolts.
- Install meter vertically or in a slope due to its conical in/outlet.
  On DN 15 ($^1/_2$") and DN 32 ($1^1/_4$") a BATCHCONTROL with straight ceramic tube is avaible.

DIN 2501 and JIS	ANSI B 16.5	Space between pipe flanges	Bolts	Max torque		
				Nm	kpm	ft × lbf
DN 2.5	$^1/_{10}$"	51.8 mm (2.04")	4 x M12	10	1.0	7.2
DN 4	$^1/_8$"	51.8 mm (2.04")	4 x M12	10	1.0	7.2
DN 6	$^1/_4$"	51.8 mm (2.04")	4 x M12	10	1.0	7.2
DN 10	$^3/_8$"	51.8 mm (2.04")	4 x M12	10	1.0	7.2
DN 15	$^1/_2$"	51.8 mm (2.04")	4 x M12	10	1.0	7.2
DN 25	1"	58.0 mm (2.28")	4 x M12	10	1.0	7.2
DN 32	$1^1/_4$"	83.0 mm (3.27")	4 xM16	43	4.3	31.0
DN 40	$1^1/_2$"	83.0 mm (3.27")	4 x M16	43	4.3	31.0

1.3.1 Position of flanges

Install flowmeter in line with the pipe axis. Pipe flange faces must be parallel to each other, max. allowable deviation:
$L_{max} - L_{min} \leq 0.5$ mm ≤ 0.02"

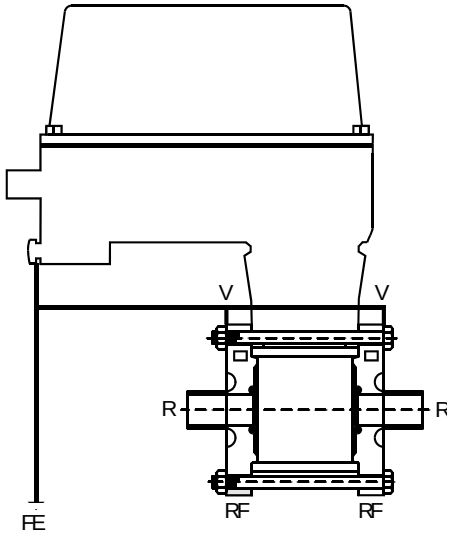


1.3.2 Example: centering and sealing the primary head

The primary head is centered between the pipe flanges with the aid of the precise geometric fitting (guide collar on primary head).

Detail drawings see Sect. 1.5.

1.3.3 Grounding



FE Functional ground, wire > 4 mm^2 Cu.
R Pipeline
RF Pipe flanges
V Interconnecting wires, bolted to the housing

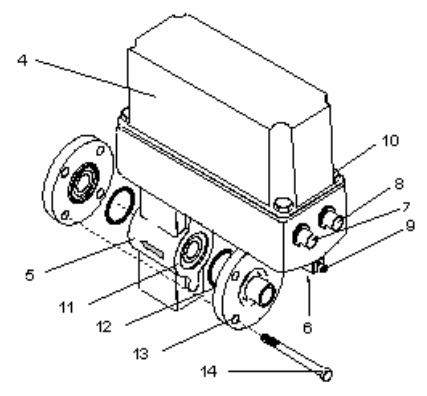
- All flowmeters **must** be properly grounded.
- The grounding wire should not transmit any interference voltage. Therefore do not ground any other electrical device simultaneously with this conductor.

Grounding is carried out via the **functional ground** that is connected to the U-clamp terminal (9). See also Section 2 “Electrical connection“.

When connected to functional extra-low voltages,
24V DC, protective separation (PELV) must be ensured (VDE 0100/VDE 0106 or IEC 364/IEC 536).

1.4 Installation of the primary head

1.4.1 Device description



- **BATCHCONTROL IFM 5014C**

4 Cover, signal converter
5 Primary head
7 Connector for the six in-/outputs
8 Connector for power and CAN Bus
9 U-clamp terminal for functional ground
10 Fastening screws for cover
11 Locating collar, primary head

- **Accessories from system manufacturer**

12 O-ring gasket
13 Special pipe flange
14 Stud bolt with lock washer, plain washer and nut

To facilitate servicing of the primary head, please note the following points:

- It must be possible to shut off the flow through the pipeline upsteam of the primary head (provide shutoff valve),
- Drain the pipe system before removing the primary head (provide drain valve),
- Support the pipeline on both sides of the flowmeter when located in a long, freely suspended section to facilitate removal of the primary head.

1.4.2 Installation of the IFM 5014C

- Position gaskets (12) in the pipe flanges.
- Type and location of gaskets as specified by the manufacturer of the filling machine (see Sect. 1.3.2 “Centering of the primary head”).
- Insert primary head (5) between the pipe flanges (13) in line with the pipe axis.
- For spacing and location of the pipe flanges, see Sect. 1.3 “Position of flanges”.
- Press pipe flanges against flowmeter.

Centering ring of pipe flanges must snap into place in the guide collar (11) of the primary head.

- Insert stud bolts (14) with washers into the holes in the pipe flanges. Fit nuts to stud bolts with lock washer.
- Tighten stud bolts and nuts down to the metal stop symmetrically. Check all bolts after starting up the pipe system, and retighten when any leaks show.
- Connect ground conductor to U-clamp terminal (9).
- Connect power supply, CAN bus and outputs to connector plugs (7, 8) on signal converter housing (4).

See Section 2.2 and 2.3 for details of electrical connection.

1.5 Size of connections

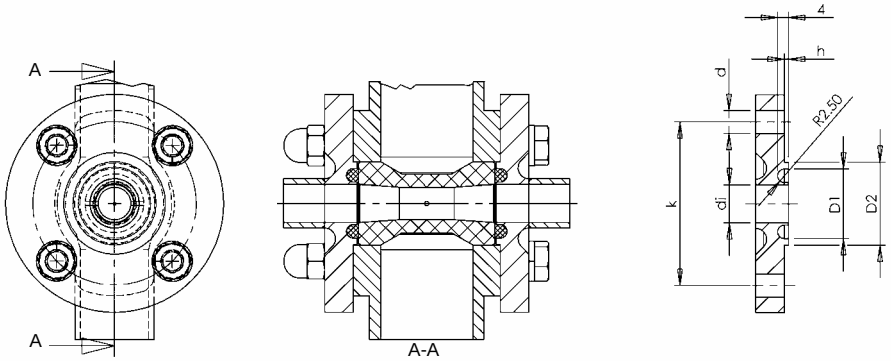
1.5.1 Fastening with tie bolts

All dimensions in mm (inches)

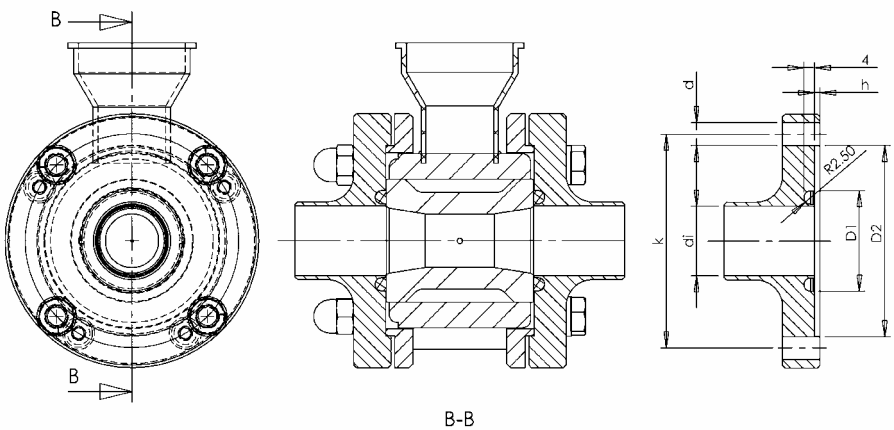
Flange-material: AISI 300 series
O-ring material: 3A standard 18-03

Meter size		Centering device, pipe connection				O-Ring	Dimensions	
DN	inches	d_i	D1	D2	h	75 Shore	k	d
2.5	$^1/_{10}$	6 (0.24)	25.5 (1.00)	30 $^{-0.05/-0.15}$ (1.18 $^{-0.002/-0.006}$)	1.5 $^{-0.05/-0.15}$ (0.06 $^{-0.002/-0.006}$)	on request on request	60 (2.36)	8.5 (0.33)
4	$^1/_8$	7 (0.28)	25.5 (1.00)	30 $^{-0.05/-0.15}$ (1.18 $^{-0.002/-0.006}$)	1.5 $^{-0.05/-0.15}$ (0.06 $^{-0.002/-0.006}$)	on request on request	60 (2.36)	8.5 (0.33)
6	$^1/_4$	9 (0.35)	25.5 (1.00)	30 $^{-0.05/-0.15}$ (1.18 $^{-0.002/-0.006}$)	1.5 $^{-0.05/-0.15}$ (0.06 $^{-0.002/-0.006}$)	on request on request	60 (2.36)	8.5 (0.33)
10	$^3/_8$	12 (0.47)	25.5 (1.00)	30 $^{-0.05/-0.15}$ (1.18 $^{-0.002/-0.006}$)	1.5 $^{-0.05/-0.15}$ (0.06 $^{-0.002/-0.006}$)	on request on request	60 (2.36)	8.5 (0.33)
15	$^1/_2$	14 (0.55)	25.5 (1.00)	30 $^{-0.05/-0.15}$ (1.18 $^{-0.002/-0.006}$)	1.5 $^{-0.05/-0.15}$ (0.06 $^{-0.002/-0.006}$)	Ø 16×5 (Ø 0.47×0.20)	60 (2.36)	8.5 (0.33)
25	1	26 (1.02)	37.5 (1.48)	71.3 $^{-0.1}$ (2.81 $^{-0.004}$)	2 $^{+0.1}$ (0.08 $^{+0.04}$)	Ø 28×5 (Ø 1.10×0.20)	80 (3.15)	8.5 (0.33)
32	$1\ ^1/_4$	on request						
40	$1^1/_2$	on request						

DN 2.5 - 15 / $^1/_{10}$“ - $^1/_2$“



DN 25 / 1“



DN 32-40 / $1^1/_4$“-$1^1/_2$“

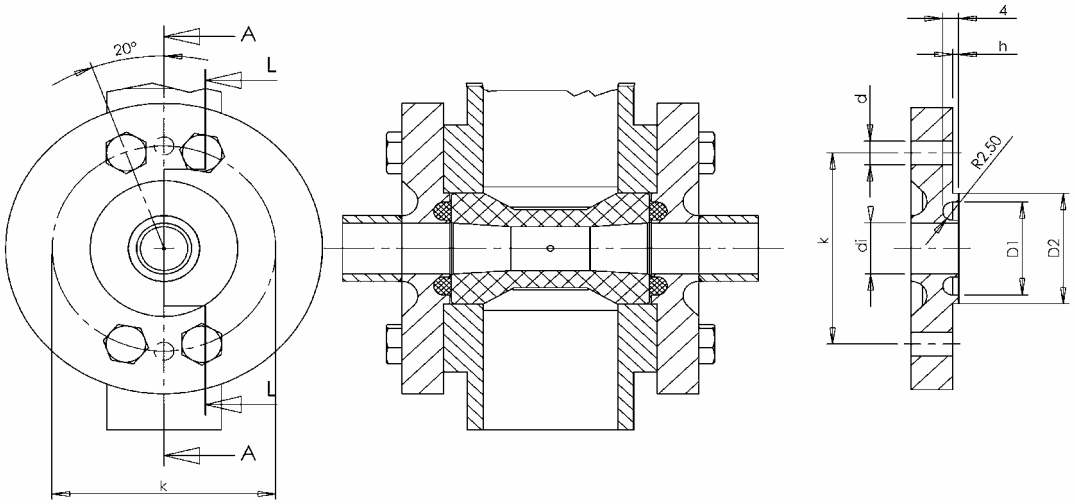
Dimensions on request

1.5.2 Fastening with bolts (option)

All dimensions in mm (inches)

***** Flange-material : AISI 300 series
O-ring material : 3A standard 18-03

Meter size		**Centering device, pipe connection**				**O-ring gaskets**	**Screw thread** (option)			
							2× M4		**4× M6**	
DN	inches	d_i	D1	D2	h	75 Shore	k	d	k	d
2.5	$^1/_{10}$	6	25.5	30 $^{-0.05/-0.15}$	1.5 $^{-0.05/-0.15}$	on request	60	8.5	56	6.4
		(0.24)	(1.00)	(1.18 $^{-0.002/-0.006}$)	(0.06 $^{-0.002/-0.006}$)	on request	(2.36)	(0.33)	(2.20)	(0.25)
4	$^1/_8$	7	25.5	30 $^{-0.05/-0.15}$	1.5 $^{-0.05/-0.15}$	on request	60	8.5	56	6.4
		(0.28)	(1.00)	(1.18 $^{-0.002/-0.006}$)	(0.06 $^{-0.002/-0.006}$)	on request	(2.36)	(0.33)	(2.20)	(0.25)
6	$^1/_4$	9	25.5	30 $^{-0.05/-0.15}$	1.5 $^{-0.05/-0.15}$	on request	60	8.5	56	6.4
		(0.35)	(1.00)	(1.18 $^{-0.002/-0.006}$)	(0.06 $^{-0.002/-0.006}$)	on request	(2.36)	(0.33)	(2.20)	(0.25)
10	$^3/_8$	12	25.5	30 $^{-0.05/-0.15}$	1.5 $^{-0.05/-0.15}$	on request	60	8.5	56	6.4
		(0.47)	(1.00)	(1.18 $^{-0.002/-0.006}$)	(0.06 $^{-0.002/-0.006}$)	on request	(2.36)	(0.33)	(2.20)	(0.25)
15	$^1/_2$	14	25.5	30 $^{-0.05/-0.15}$	1.5 $^{-0.05/-0.15}$	Ø 16×5 *****	60	8.5	56	6.4
		(0.55)	(1.00)	(1.18 $^{-0.002/-0.006}$)	(0.06 $^{-0.002/-0.006}$)	(Ø 0.47×0.20)*****	(2.36)	(0.33)	(2.20)	(0.25)



2 Electrical connection

2.1 Important information

Be sure to take note of the following information in order to ensure proper functioning of the signal converter.

Please note:

1) Overvoltage class:
   In conformity with VDE 0120, equivalent to IEC 664, the compact flowmeters are designed for overvoltage category III in the supply circuits and overvoltage category II in the output circuits.
2) Safety isolation:
   The compact flowmeters must be provided with an isolating facility.

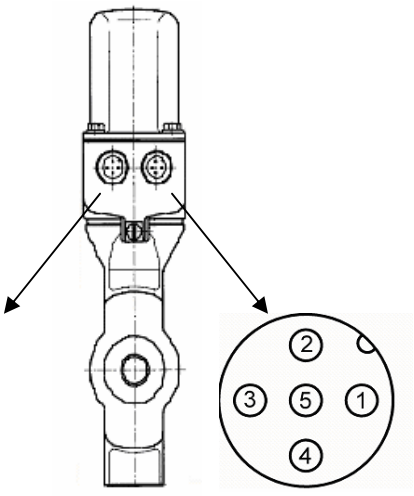
Electrical connection and repairs may only be carried out by qualified personnel.

- Protect the flowmeter from direct **radiant heat** (e.g. hot-product tanks), insulate if necessary.
- Do not expose flowmeter to intense **vibration.** If necessary, support the pipeline to the right and left of the flowmeter. Level of vibration in accordance with IEC 068-2-34: below 2.2g in the 20 - 2000 Hz frequency range.
- Note information given on the **instrument nameplate**, voltage.
- The **FE functional ground** for the supply power should for measurement reasons be connected to the separate U-clamp terminal on the signal converter housing.
- **When connected to a functional extra-low voltage of 24 V DC,** protective separation (PELV) must be ensured (VDE 0100 / VDE 0106 or IEC 364 / IEC 536 or equivalent national regulations)..

2.2 Attachment plugs

Manufacturer	Series and type	Description
Binder	Series 715	Moulded plug, straight or angle-entry form
	Series 763	Integrally extruded plug with cable in various lengths
Hirschmann	E-Series	
	ELKA 4012 and ELWIKA 4012	Moulded plug, straight or angle-entry form
	ELKA KV 4412 and ELWIKA KV 4412	Integrally extruded plug with cable in various lengths
Lumberg	RK-Series	
	RKC and RKCW	Moulded plug, straight or angle-entry form
	RKT and RKWG	Integrally extruded plug with cable in various lengths
Amphenol	Series C 164 P	Moulded plug, straight or angle-entry form
	Series C 164 P compact	Integrally extruded plug with cable in various lengths
Coninvers	Series BC	Moulded plug, straight form, especially suitable for high-interference environments (keyword: EMC)

Pin-assignment and alignment of cable entry body

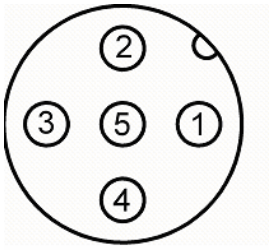


2.3 Power supply and CAN bus

5-pin connector M12x1 for 24V DC power supply and CAN bus

Pin	Description
1	ground CAN bus
2	+24 V power
3	ground
4	CAN high level
5	CAN low level

Pin assignment

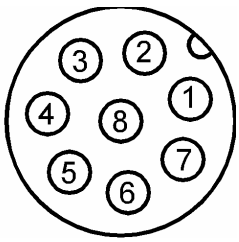


2.4 Input and output

8-pin connector M12x1 for 24V DC power supply and input / output signals

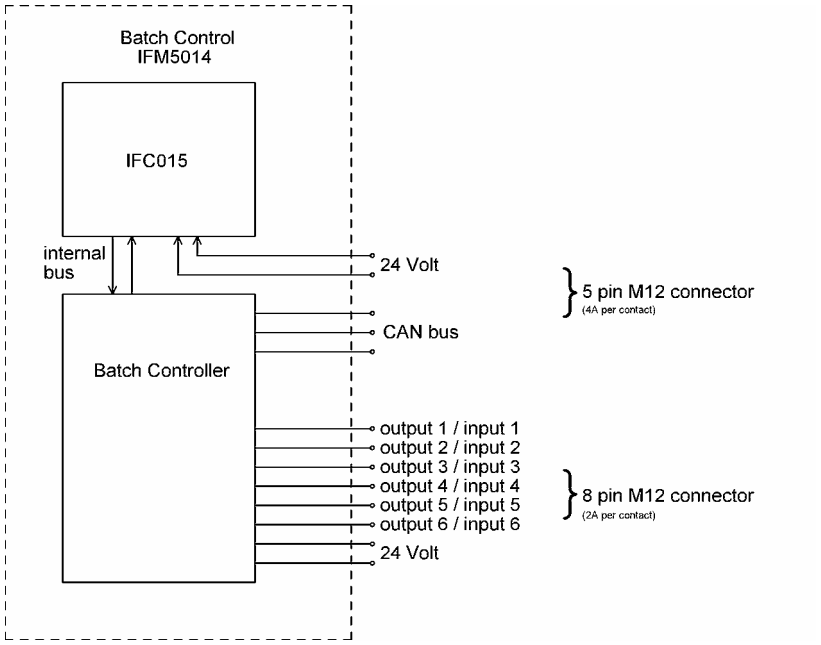
Pin	Description
1	input / output 1
2	input / output 2
3	input / output 3
4	input / output 4
5	input / output 5
6	input / output 6
7	+24 V power
8	ground

Pin assignment



2.5 Block circuit diagram

The following picture shows the block circuit diagram of the BATCHCONTROL 5014C:



The individual functions of inputs and outputs are described in detail in the following chapter.

3 Start-up

Before powering the system, check that it has been installed correctly according to Sections 1 and 2.
The compact flowmeter is delivered ready for operational use. All operating data have been factory set in accordance with your specifications.
Power the unit, and the flowmeter will start process flow measurement immediately.

3.1 Check for availability

Please note!

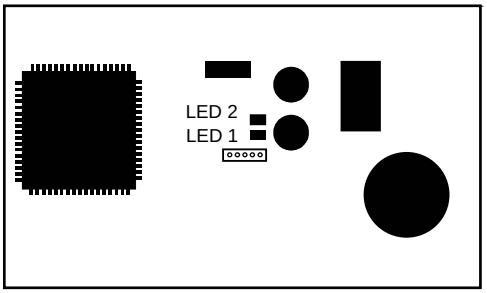
Do not open the housing of the BATCHCONTROL IFM 5014C.

Danger of contamination with substances likely to destroy the moisture barrier of the electronic equipment (e.g. if CIP or SIP cleaned from the outside).

Therefore, please contact your KROHNE Service engineer before you open the housing.

- The measurement status is signalled by the light-emitting diodes (LED) below the cover of the converter housing (see amplifier board on right).

LED 1	LED 2	Function
flashing	off	in order
flashing	flashing	overdriving
on	flashing	Fatal Error (defective operating parameter)
off	on	defective hardware
off	off	no supply voltage or hardware is defective



All operating data can be set and stored by means of a personal computer via the CAN bus interface. The digital CAN bus interface allows the complete filling procedure to be graphically represented on the PC, thus providing visualization of system and valve properties.

3.2 Factory settings

All operating data are factory-set according to your order specifications.

The table of standard factory settings is shown at the end of the manual.

Part B IFC 014 batch controller

4 Description of functions

Six contacts are available for the different functions. Every contact can be switched over as a switching output, switching input or analogous by software. In addition, the device has one CAN bus interface for communication, two internal temperature sensors and one flow sensor .

4.1 Contact outputs

Up to six power outputs (24V / I < 200mA), switch over to ground (low side driver) or to the 24V supply voltage (high side driver), can be programmed by software. The drivers communicate via the internal data bus with the logic and the other control and monitoring functions: undervoltage, overvoltage, overtemperature and failure detection. When commutating inductive loads, the dissipated power peak is be significantly reduced by the internal freewheeling diode. All power drivers are connected to the supply voltage. These are monitored by overvoltage and undervoltage comparators with hysteresis, so that the correct function can be checked in the application at any time. They are short-circuit resistant (I_{max} 2A). Overcharge is indicated by the bus interface. Consumer are controlled for disconnections (cable break) by the outputs, indication by the Bus interface.
All valve outputs are on equal basis. The following functions can be adjusted:

- Without use (off)
- Permanently on (breakdown identification)
- Binary output controlled by the bus
- Switch on after time or after reaching target volume or after reaching a defined volume flow
- Turn off after time or reaching target volume or after reaching a defined volume flow
- Automatically, regulation for target filling volume
- Customers specific programming

4.2 Voltage input

Up to six voltage inputs with common ground for 24V supply voltage are available. The voltage range is from 0 volts up to 11 volts with a resolution of 8 bits. The input impedance of the inputs ‘1’ and ‘2’ is 220kOhm, for the inputs ‘3’ up to ‘6’ is 22kOhm. The update rate is 8ms. For every input scaling factors and offsets can be defined. To use this functionality the corresponding output has to be switched off. Each voltage input can be programmed for the following functions:

- Without use (off)
- Voltage input for the bus
- Start of filling process
- Emergency off
- Customers specific programming

4.3 Contact inputs

Up to six inputs with common ground for 24V supply voltage. To use this functionality the corresponding output has to be switched off. Each control input can be programmed for the following functions:

- Without use (off)
- Binary input for the bus
- Starting of filling process
- Emergency off
- Customers specific programming

4.4 CAN bus and parameter

For the interface the CAN bus is used. Baud rates within the range 20k up to 1M Baud are possible. For the protocol CANopen is applied. The interface has a galvanic connection to the 24V supply! The possible functions are described in one of the following chapter.
Default Baud rate is 20k Baud.

The object dictionary for the parameters is subdivided into the following groups:

Object number range	Description
10xxH	CAN open parameter
300xH	Flow sensor parameter
301xH	Electronic temperature sensor
302xH	Liquid temperature sensor
303xH	Function block 1
304xH	Function block 2
305xH	Function block 3
306xH	Function block 4
307xH	Function block 5
308xH	Function block 6
309xH	Batching
30AxH	CAN parameter
32xxH	Customer specific 1 bit memory
33xxH	Customer specific 8 bit memory
34xxH	Customer specific 16 bit memory
35xxH	Customer specific 32 bit memory

The complete list of all parameters can be found at the end of the manual.

To be able to represent the variety of all possible messages on the bus, the CANopen definition hasn't been used at the definition of the TPDOs and RPDOs. If this function is programmed, then the device sends at every message in the first data byte a description and in the following bytes the data. This shall be explained at an example:

The user needs every flow measurement for the analysis of the valve. With the parameter 3002.02 the PDO is defined. After this parameter was stored in the BATCHCONTROL 5014C, it sends the actual volume flow every 20 ms. The Telegramm starts in the first byte with the descriptor (in this case 01H) followed by the measurement value in float format. Many parameters can use the same PDO. The distinction of the data is made by the first byte (called descriptor in the parameter list at the end of the manual).

This function shouldn't be used in CANopen nets.

4.5 Temperature sensors

Two temperature sensors are installed inside the BATCHCONTROL 5014C. The first one is mounted on the BATCHCONTROL print board. This one measures the electronic temperature. The information can be important during the CIP process or in hot filling application. If the temperature is higher then 70°C the life time of the electronic components are reduced. An upper and lower setpoint can be programmed. If one of this points are reached, an alarm message is send via the CAN bus. Alternativly this information can be programmed for an output, which is used as an alarm output.

The second sensor is mounted on the outside of the ceramic pipe. It has the same functionality as the electronic temperature sensor. Since the temperature sensor doesn't have direct contact to the liquid, the temperature measurement is delayed. The delay time depends on the temperature gradient and the temperature difference between outside housing and liquid. The delay time can be a few seconds.

Each sensor can be programmed for the following functions:

- Without use (off)
- Temperature value for the bus
- Temparature alarm for the bus
- Customers specific programming

4.6 Flow Sensor

The integrated flow sensor measures precisely the flow velocity. From this signal the device generates the information for the internal electronic volume counter. Furthermore the flow values and the counter are actualized every 20ms. It can be programmed for the following functions:

- Without use (off)
- Volume flow value for the bus
- Totalized Volume value for the bus

4.7 An example for a filling process

The function of the device shall be represented at the example of a two-stage filling device. The following order is used:

Output ‘1’ is for the low speed fluid valve. This valve is opened during the complete filling time. The target volume is 1000ml.

Output ‘2’ is for the high speed fluid valve. This valve switch off 50ml before the target

volume.

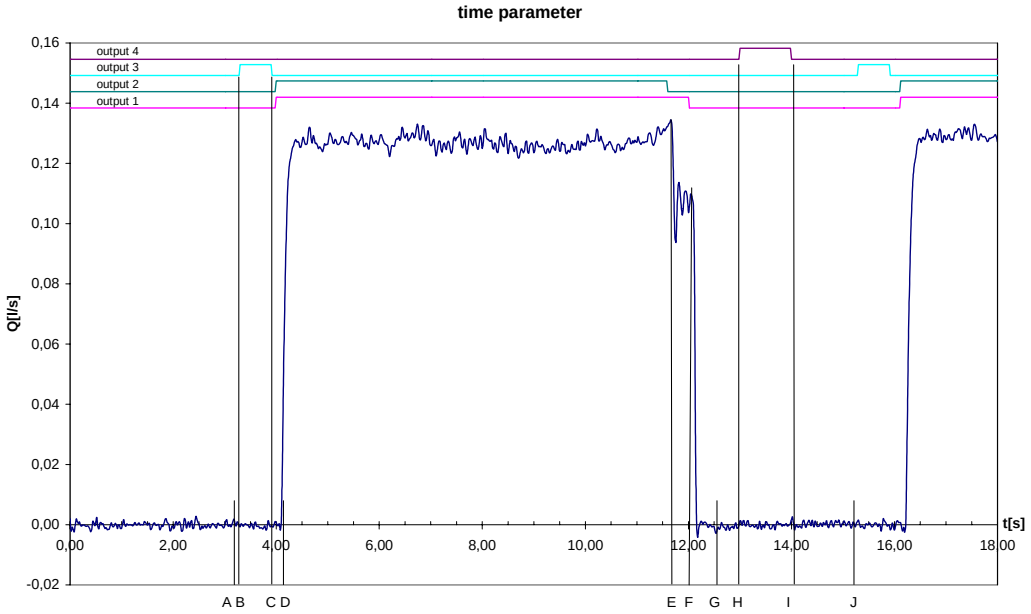
Output ‘3’ is used for the carbonizing of the bottle. This valve ist used at the beginning of the filling process. It opens for 0,6 second.

Output ‘4’ is used for unpreasurizing the bottle at the end of the filling process. It opens for 1 second.

Output ‘5’ an ‘6’ are not used.

CAN PARAMETER		
Letter	**Object No.**	**Description**
output 1	3031.01	Function of the block
	3034.01	Output hardware function
output 2	3041.01	Function of the block
	3044.01	Output hardware function
output 3	3051.01	Function of the block
	3054.01	Output hardware function
output 4	3061.01	Function of the block
	3064.01	Output hardware function
output 5	3071.01	Function of the block
output 6	3081.01	Function of the block

The following graphic shows the timing diagram of the filling process.



At the time of ‘A’ the filling starts. The bottle gets pressurized with CO2 (‘B’ – ‘C’). After this both product valves opens at the time of 'D'. The high speed valve is closed after 950ml (‘E’) is filled. The low speed valve is closed at the time of 'F' and the filling is completed to 'G'. The last step is to depressurize the bottle ('H' – ‘I’). The next filling starts after 'J'.

CAN PARAMETER		
Letter	**Object No.**	**Description**
A	3091.05	Controlling batching process
B	3054.02	Output 3 on function definition
	3054.03	On value (output 3)
C	3054.05	Output 3 off function definition
	3054.06	Off value (output 3)
D	3091.02	Forward run time
	3034.02	Output 1 on function definition
	3044.02	Output 2 on function definition
E	3044.05	Output 2 off function definition
	3044.06	Off value (output 2)
F	3034.05	Output 1 off function definition
G	3091.07	Function select ‘switch off calculation’
	3091.08	Function data 1
	3091.0A	Volume flow value for switch off
	3091.0B	Number of measurements
	3091.0C	Definition for shut-down

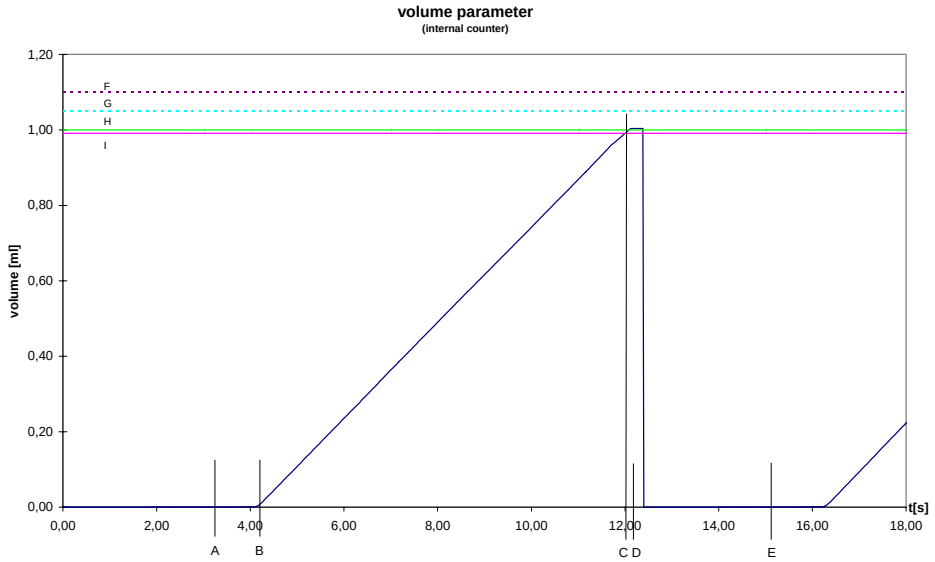
H	3064.02	Output 4 on function definition
	3064.03	On value (output 4)
I	3064.05	Output 4 off function definition
	3064.06	Off value (output 4)
G – J	3091.03	Time out

There are parameters similar as in the case of the time representation, for the supervision of the volume flow.

'A' is the full scale range of the flow meter. An overload of +50% is permitted. If the flow should get even bigger, then the value is limited to150%. The value 'B' is an emergency switch off value for the valve. The value 'C' corresponds to the maximum volume flow during the filling process.

CAN PARAMETER		
Letter	**Object No.**	**Description**
A	3001.01	Full scale range
B	3003.01	Maximum volume flow
C	3094.06	Maximum flow velocity

The internal volume counter adds up the measurement values. As in the case of the two previous representations the counter has own parameters.

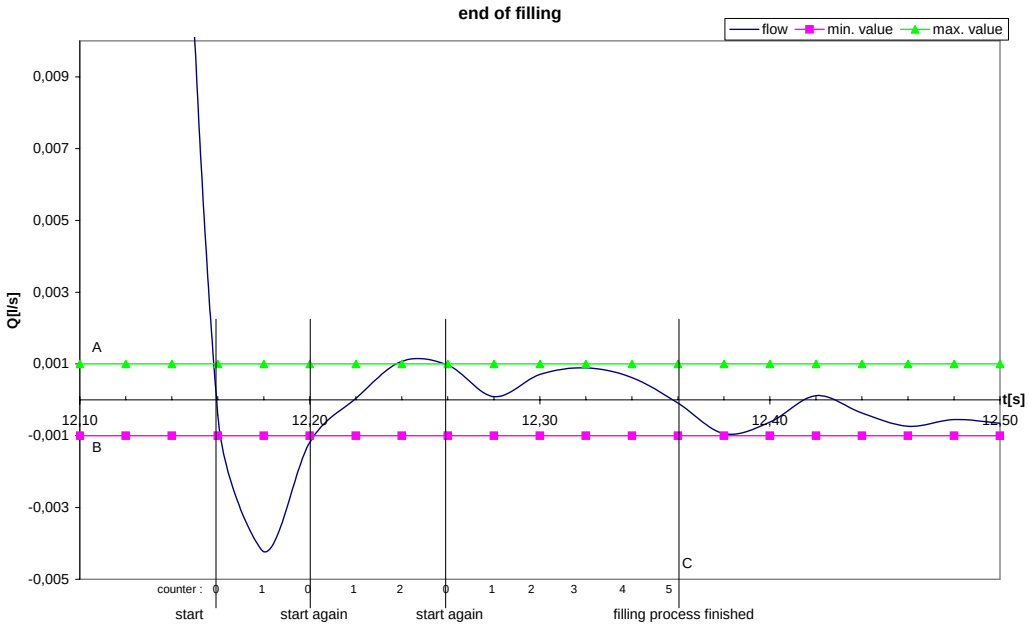


At the time of 'A' the filling starts. The bottle gets pressurized with CO2. After this both valves open for the product at the time of 'B'. The valve reduces the flow speed at the position of 'C' and the

filling is completed to 'D'. The parameter ‘I’ is the switch point for lower speed and ‘H’ is the target volume. ‘E’, ‘F’ and ‘G’ are alarm and emergency shutoff values.

CAN PARAMETER		
Letter	**Object No.**	**Description**
B	3091.02	Forward run time
E	3093.04	Maximum batching time
F	3003.05	Maximum volume
G	3093.01	Maximum tail volume
H	3091.01	Target volume
I	3044.06	Off value

As a rule, valves don't close directly and completely. It comes to vibrations if the liquid is suddenly stopped. The vibrating amount of liquid is measured. If the oscillation amplitude is in a programmable area for a predefined number of measuring, then the filling is regarded as ended. The following picture shows this process:



CAN PARAMETER		
Letter	**Object No.**	**Description**
A + B	3091.0A	Volume flow value for switch off
C	3091.0B	Number of measurements

In addition to the described functions alarm and emergency off functions can be programmed. The individual phases of the filling process, changes of state and the filling results can be sent by the device automatically. The Krohne configuration program represents a good summary of the possibilities for the BATCHCONTROL 5014C.
If the possibilities shouldn't suffice, then customer specific functions can be down loaded in the device.

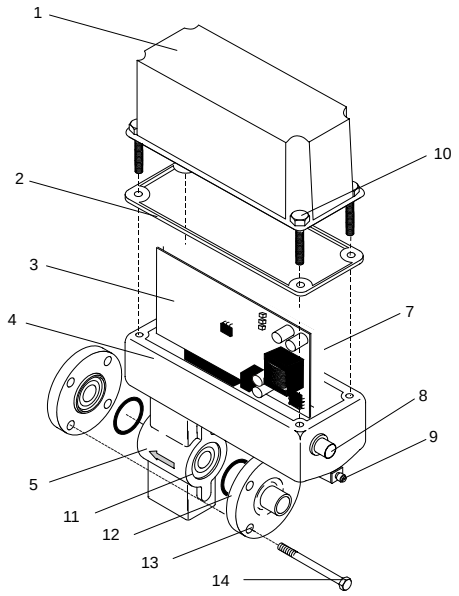
5 Illustration of printed circuit board

Please note!

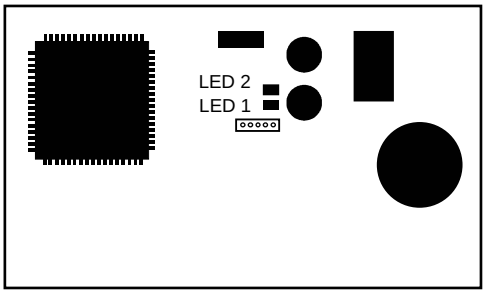
Do not open the housing of the BATCHCONTROL IFM 5014C.

Danger of contamination with substances likely to destroy the moisture barrier of the electronic equipment (e.g. if CIP or SIP cleaned from the outside).

Therefore, please contact your KROHNE Service engineer before you open the housing.



1 Cover, signal converter
2 Gasket
3 Electronic unit, signal converter
4 Housing, signal converter
5 Primary head
7 Printed circuit board
8 Plug connector power supply and pulse output
9 U-clamp terminal for functional ground
10 Fastening screws for cover
11 Guide collar, primary head
12 O-ring gasket
13 Special pipe flange
14 Stud bolt with lock washer, plain washer and nut



Part D Technical Data, block diagram and measuring principle

6 Technical data

6.1 Flow during filling, and fill volume

Meter size		Optimum flowrate **for filling**		Filling times > 1.5 s, **filling volume .....**	
DN mm	inches	ml/s	US Gal/min	ml	US Gal
2.5	$^1/_{10}$	3 - 10	0.048 - 0.159	≥ 10	≥ 0.003
4	$^1/_8$	10 - 30	0.159 - 0.476	≥ 20	≥ 0.005
6	$^1/_4$	20 - 60	0.317 - 0.951	≥ 40	≥ 0.011
10	$^3/_8$	60 - 200	0.951 - 3.170	≥ 100	≥ 0.026
15	$^1/_2$	150 - 500	2.378 - 7.925	≥ 200	≥ 0.053
25	1	400 - 1200	6.340 - 19.020	≥ 600	≥ 0.159
32	$1^1/_4$	650 - 2250	10.300 - 35.663	≥ 975	≥ 0.257
40	$1^1/_2$	1000 - 3000	15.850 - 47.551	≥ 1500	≥ 0.396

6.2 Flowmeter

Meter sizes		
with venturi measuring tube	DN 2.5, 4, 6, 10, 15, 25, 40 and $^1/_{10}$", $^1/_8$", $^1/_4$", $^3/_8$", $^1/_2$", 1",$1^1/_2$"	
with straight tube (option)	DN 15, 32 and $^1/_2$", $1^1/_4$"	
Connection	sandwich (flangeless) type with precisely defined sealing faces, centering devices and metallic stop face	
Electrical conductivity	≥ 5 µS/cm (≥ 20 µS/cm for demineralized cold water)	
Ambient temperature	**Process temperature**	
-25 to +40 °C / -13 to +104 °F	-60 to +140 °C / -76 to +284 °F	
-25 to +60 °C / -13 to +140 °F	-60 to + 60 °C / -76 to +140 °F (information on higher provided on request) steam cleaning up to +150 °C / +302 °F (max. 1 hour)	
Temperature shock resistance	Temperature rising	Temperature falling
sudden change Temperature gradient	ΔT = 120 °C = 216 °F 1 K/s = 1.8 °F/s	ΔT = 90 °C = 162 °F
Operating pressure	40 bar / 580 psig (10 bar / 145 psig for DN 15, 32 and $^1/_2$", $1^1/_4$" with straight measuring tube)	
Electrode design	fused-in-place electrodes	
Protection category (EN 60 529/IEC 529)	IP 67, equivalent to NEMA 6 (overall device, incl. signal converter)	
Materials of construction		
Housing	stainless steel 1.4408 or 1.4404	
Measuring tube	fine-grain-stabilized, high-density HiTec ceramics, purity 88 % Al_2O_3 + 12%ZrO_2, CIP- and SIP-proof	
Electrodes	Cermet	
Cover seal	EPDM	

6.3 Signal converter

Power supply	
Voltage	24 V DC, ± 20%
Power consumption	≤ 5 W excl. external loads
Electrical connection	two M12 plug-in connector
Operator control	All operating data factory-set to your specifications. Available as **option** for change of operating data: **- KROHNE software** for operator control via PC. Options connected to the CAN bus interface
6 Valve outputs	low or high side activ
Function	programmable to control valves, short and cable broken detect
Voltage	24 V DC, ± 20%
Load rating	I_{max} ≤ 200 mA
Load short	I_{short} ≤ 2 A
6 Analogue inputs	alternative to the outputs
Function	programmable for alarm messages, to control the filling process
Voltage	0 – 11 V DC, resolution of 8 bit
Impedance	input 1 and 2: 220 kOhm Input 3 to 6: 22 kOhm
Electronic temperature sensor	
Function	programmable for alarm messages
Range	-20°C … +100°C
Error	± 3 K
Fluid temperature sensor	
Function	programmable for alarm messages
Range	-20°C … +140°C
Error	± 3 K
CAN bus	
Baud rate	20k … 1M baud

6.4 Error limits at reference conditions

F = Error in % of MV
MV = measured value

Pulse output	**DN 2.5 – 6 / $^{1}/_{10}$“ – $^{1}/_{4}$“**	**DN 10 – 40 / $^{3}/_{8}$“ – $1^{1}/_{2}$“**
at flow velocity of ...		
v ≥ 1 m/s ≥ 3.3 ft/s	F < ± 0.5 % of MV	F < ± 0.3 % of MV
v < 1 m/s < 3.3 ft/s	F < ± 0.4 % of MV + 1 mm/s < ± 0.4 % of MV + 0.04 inch/s	F < ± 0.2 % of MV + 1 mm/s < ± 0.2 % of MV + 0.04 inch/s

Repeatability	**Filling time T_F**	**Standard deviation σ**
	1.5 s < T_F ≤ 3 s	≤ 0.4 %
	3.0 s < T_F ≤ 5 s	≤ 0.2 %
	5.0 s < T_F	≤ 0.1 %

Reference conditions (similar to EN 29 104)

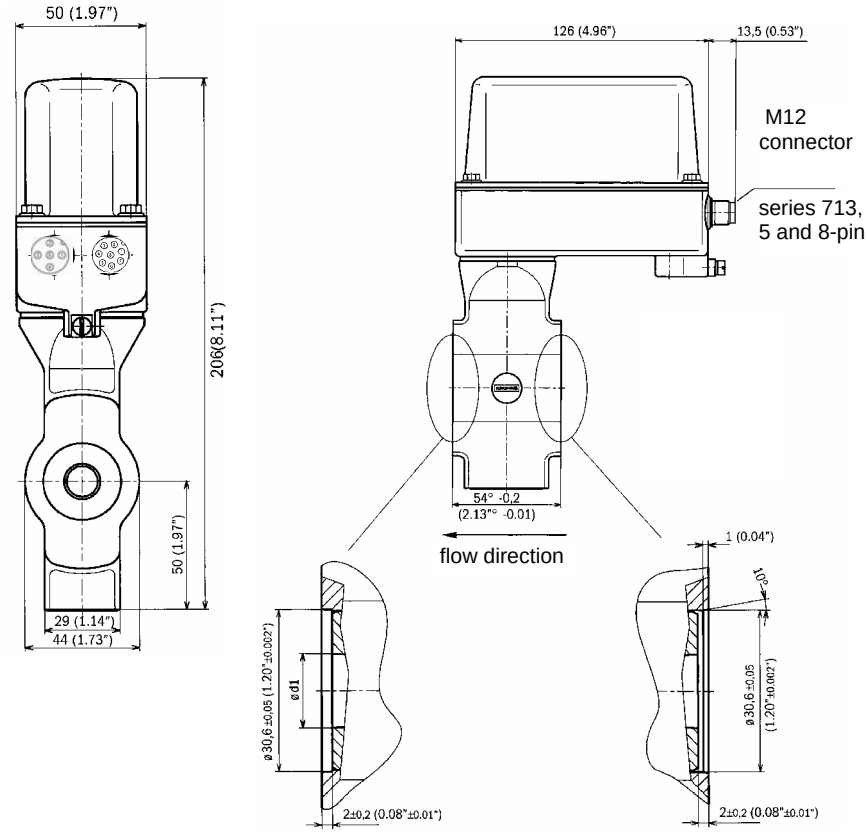
Liquid product	water +20 °C / +68 °F
Straight inlet/outlet runs	10× DN / 5 × DN (DN = meter size)
Valve closing time variation	< 1 ms
Flow velocity	1 m/s = 3.3 ft/s

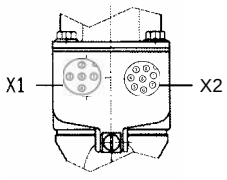
Volumetrically wet calibration on EN 17025 accredited calibration rigs.

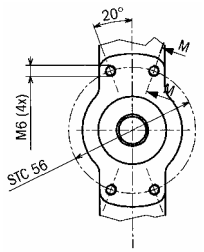
6.5 Dimensions and weights

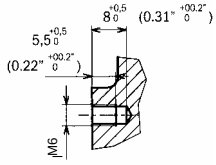
in mm (inches)

DN 2.5 –15 / $^{1}/_{10}$“ – ½“





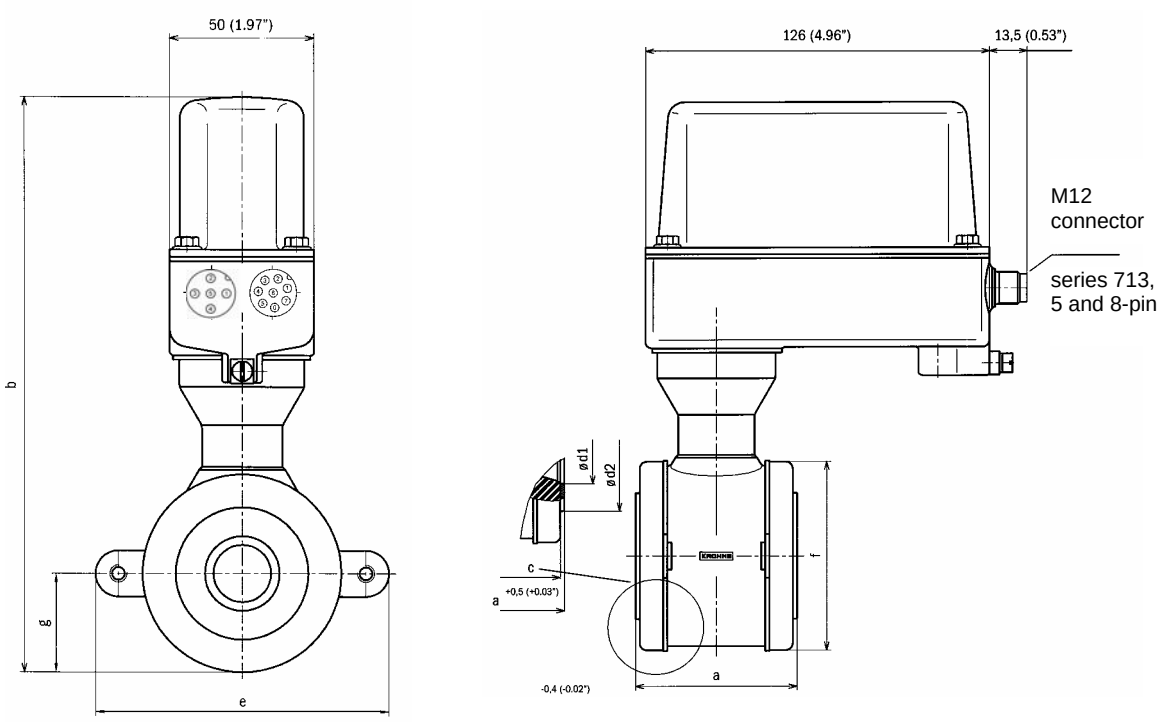




option: 4 x M6 bolt hole on both sides
(section M-M)

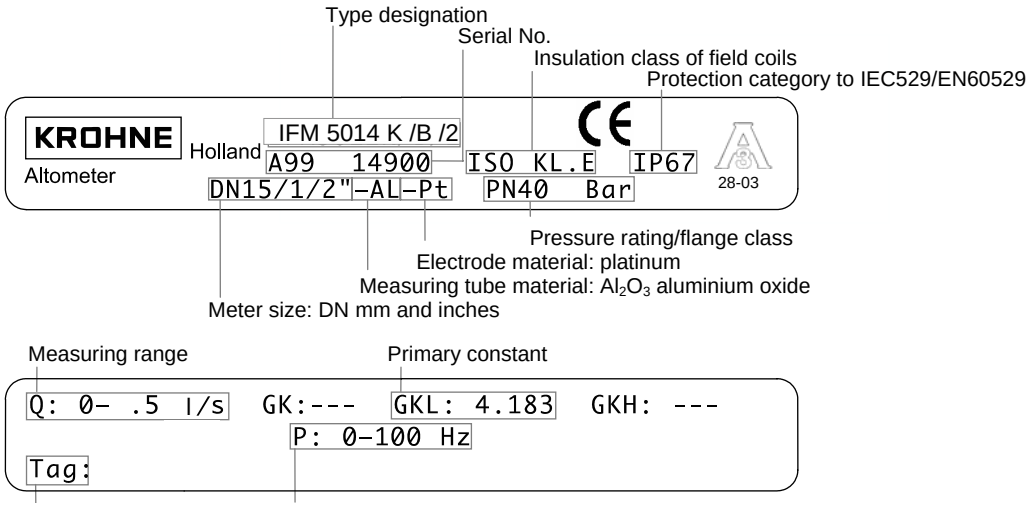
Meter size		Diameter d_1		Weight	
DN	**inches**	**mm**	**(inches)**	**kg**	**lb**
2.5	$^{1}/_{10}$	6	(0.24)	1.6	(3.6)
4	$^{1}/_{6}$	7	(0.28)	1.6	(3.6)
6	$^{1}/_{4}$	9	(0.35)	1.6	(3.6)
10	$^{3}/_{8}$	12	(0.47)	1.6	(3.6)
15	$^{1}/_{2}$	14.3	(0.56)	1.6	(3.6)

DN 25 – 40 / 1“ – 1½“



Meter size		Dimensions in mm (inches)								Weight	
DN	inches	a		b		f		g		kg	(lb)
25	1	58	(2.28)	200	(7.87)	66	(2.68)	34	(1.34)	1.6	(3.6)
32	1 1/4	83	(3.27)	215	(8.46)	81	(3.19)	42	(1.65)	2.3	(5.1)
40	1 1/2	83	(3.27)	215	(8.46)	81	(3.19)	42	(1.65)	2.3	(5.1)

6.6 Instrument nameplates



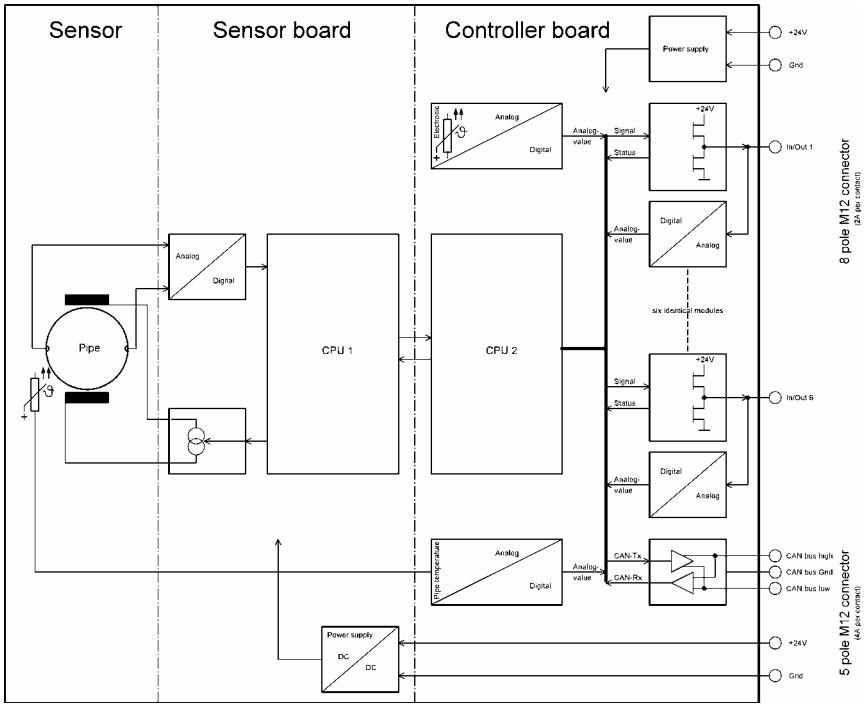
7 Block diagram

The IFC 014 signal converter consists of 2 functional groups.

Functional group 1 contains an input amplifier, and a high-resolution analog/digital converter that is controlled and monitored by microprocessor CPU 1. It controlled also the direct current for the field coils of the primary head.

Functional group 2 is the batch controller board. It is supdevided in the six IO-function blocks, the CAN bus interface and the temperature sensors. All functions are controlled by the CPU 2.

Block diagram IFC 014

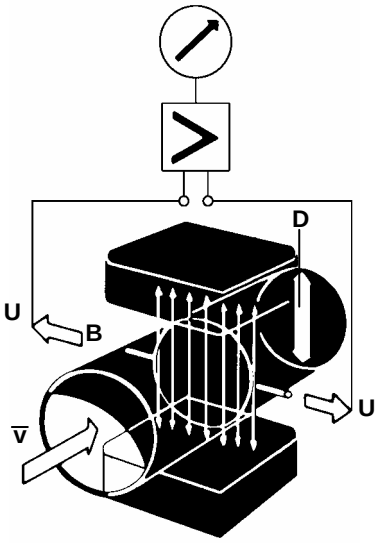


8 Measuring principle

Flowmeter for electrically conductive liquids.
Measurement is based on Faraday's law of induction, according to which a voltage is induced in an electrically conductive body passing through a magnetic field.

The following expression applies:
$U = K \times B \times \overline{v} \times D$

K an instrument constant
B magnetic field strength
v mean velocity
$\overline{D}$ tube diameter



Thus, the induced voltage is proportional to the mean flow velocity, when the field strength is constant. Inside the electromagnetic flowmeter, the liquid passes through a magnetic field applied perpendicular to the direction of flow.

An electric voltage is induced by the movement of the liquid (which must have a minimum electrical conductivity), which is proportional to the mean flow velocity and thus to the volume of flow.

The induced voltage signal is picked up by two electrodes that are in conductive contact with the liquid, and transmitted to a signal converter for a standardized output signal.

Part E Annex

E 2 CAN parameter

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description	
10xxH	**CANopen parameter**											
1000H	00H		Device type	without	long	0		r	-	-	0x00000014 (const. value)	
1008H	00H		Manufacturer Device Name	without	string	-	-	r	-	-	“IFC “	
1009H	00H		Manufacturer Hardware Version	without	string	-	-	r	-	-	“014 “	
1010H	**Parameter save**											
1010H	00H	1	Number of entries	without	byte	-	-	r	-	-		
1010H	01H		Save all parameters in EEPROM	without	long	-	-	r/w	-	d	Save databytes: 65H 76H 61H 73H Read: 00H 00H 00H 01H	
1011H	**Parameter recall**											
1011H	00H	1	Number of entries	without	byte	-	-	r	-	-		
1011H	01H	1	Recall all parameters from EEPROM to RAM	without	long	-	-	r/w	-	d	Recall databytes: 64H 61H 6FH 6CH Read: 00H 00H 00H 01H	
1017H	00H	250	Consumer heartbeat time	ms	word	0	65535	r/w	-	d		
1018H	**Identity Object**											
1018H	00H	4	Number of entries	without	byte	-	-	r	-	-		
1018H	01H		Vendor Id	without	long	-	-	r	-	-		
1018H	02H		Product code	without	long	-	-	r	-	-		
1018H	03H		Revisionsnumber	without	long	-	-	r	-	-		
1018H	04H		Serialnumber	without	long	-	-	r	-	-		
300xH	**Flow sensor parameter**											
3001H	**Sensor parameter**											
3001H	00H	7	Number of entries	without	byte	-	-	r	-	-		
3001H	01H	1	Full scale range	l/s	float	0,0015	15,1	r/w	-	d	Full scale value, basis for values given as percentage values	
3001H	02H	1	Time constant	S	float	0,1	99	r/w	-	as	Time constant for output value, of no significance for BATCHCONTROL	
3001H	03H	15	Meter size	mm	float	2,5	40	r/w	-	as	Meter size of tube	
3001H	04H	3,3	Sensor constant	without	float	0,5	9,9	r/w	-	as	Calibration constant of Sensor	
3001H	05H	0	Zero point	l/s	float	-1,0	+1,0	r/w	-	as	Zero point of Sensor	
3001H	06H	0	Flow direction	without	byte	0	1	r/w	-	as		0 = as printed on instrument
												1 = contrary to imprint
3001H	07H	0	Auto zero function	-	byte	0	1	r/w	-	d	Zero point calculation	
											Bit 0: Activation of function	
												1 = function active
												0 = function switched off
3002H	**Measurement values and PDO definition**											
3002H	00H	6	Number of entries	without	byte	-	-	r	-	-		
3002H	01H	0,0	Volume flow without time constant	l/s	float	-15,1	15,1	r	01H	-	Actual measurement flow value without time constant	
3002H	02H	4	Sending function for Index 01H	without	byte	0	4	r/w	-	d	Sending function measurement value without time constant	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: Activation of function	

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description	
												1 = no message output
												0 = activation of message output
3002H	03H	0,0	Volume flow with time constant	l/s	float	-15,1	15,1	r	02H	-	actual measurement flow value with time constant	
3002H	04H	4	Sending function for Index 03H	without	byte	0	4	r/w	-	d	Sending function Measurement value with time constant	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												1 = no message output
												0 = activation of message output
3002H	05H	0,0	Currently measured volume	l	float	-1000	1000	r	03H	d	Currently totalized volume	
3002H	06H	4	Sending function for Index 05H	without	byte	0	4	r/w	-	d	Bit 2-0: Sending function volume counter	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												1 = no message output
												0 = activation of message output
3003H	**Alarm values and PDO definition**											
3003H	00H	8	Number of entries	without	byte	-	-	r	-	-		
3003H	01H	1	Maximum volume flow	l/s	float	0,0001	15,1	r/w	-	d	Limit value for volume flow (without time constant) with emergency shut-down	
3003H	02H	0	Definition for shut-down	without	byte	0	63	r/w	-	d	Bit 0: 1 = output 1 switch off if volume flow is to high, 0 = no influencing of the output	
											Bit 1: 1 = output 2 switch off if volume flow is to high, 0 = no influencing of the output	
											Bit 2: 1 = output 3 switch off if volume flow is to high, 0 = no influencing of the output	
											Bit 3: 1 = output 4 switch off if volume flow is to high, 0 = no influencing of the output	
											Bit 4: 1 = output 5 switch off if volume flow is to high, 0 = no influencing of the output	
											Bit 5: 1 = output 6 switch off if volume flow is to high, 0 = no influencing of the output	
3003H	03H	-	Actual status	without	byte	0	1	r	04H	-	Bit 0: 1 = Limit value exceeded, 0 = okay	
3003H	04H	4	Sending function for Index 03H	without	byte	0	4	r/w	-	d	Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												1 = no message output
												0 = activation of message output
3003H	05H	1,0	Maximum volume	l	float	0,0001	100,0	r/w	-	d	Limit value for counted volume with emergency shut-down	
3003H	06H	0	Definition for shut-down	without	byte	0	63	r/w	-	d	Bit 0: 1 = output 1 switch off if	

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description	
											volume is to high, 0 = no influencing of the output	
											Bit 1: 1 = output 2 switch off if volume is to high, 0 = no influencing of the output	
											Bit 2: 1 = output 3 switch off if volume is to high, 0 = no influencing of the output	
											Bit 3: 1 = output 4 switch off if volume is to high, 0 = no influencing of the output	
											Bit 4: 1 = output 5 switch off if volume is to high, 0 = no influencing of the output	
											Bit 5: 1 = output 6 switch off if volume is to high, 0 = no influencing of the output	
3003H	07H	-	Actual status	without	byte	0	1	r	05H	-	Bit 0: 1 = Limit value exceeded, 0 = okay	
3003H	08H	4	Sending function for Index 07H	without	byte	0	4	r/w	-	d	Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												1 = no message output
												0 = activation of message output
301xH	**Electronic temperature sensor**											
3011H	**Sensor parameter**											
3011H	00H	2	Number of entries	without	byte	-	-	r	-	-		
3011H	01H	1.0	Factor for scaling	without	float	0,001	1000,0	r/w	-	d		
3011H	02H	0.0	Offset for scaling	°C	float	-100,0	100,0	r/w	-	d		
3012H	**Measurement values and PDO definition**											
3012H	00H	3	Number of entries	without	byte	-	-	r	-	-		
3012H	01H	0,0	Measuring value	°C	float	-10	+100	r	11H	-	actual measured temperature	
3012H	02H	4	Sending function for index 01H	without	byte	0	4	r/w	-	d	Sending function of temperature output (repeat time depends on index 3)	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												1 = no message output
												0 = activation of message output
3012H	03H	250	Repeat time	ms	word	50	5000	r/w	-	d	Repeat time for the value	
3013H	**Alarm values and PDO definition**											
3013H	00H	4	Number of entries	without	byte	-	-	r	-	-		
3013H	01H	20	Lower limit value	°C	float	-10	+80	r/w	-	d	Warning message when value remains below limit	
3013H	02H	70	Upper limit value	°C	float	0	+100	r/w	-	d	Warning message when value exceeds limit	
3013H	03H	0	Status of measuring input	without	byte	0	15	r	12H	-	Bit 0: 1 = lower limit value is exceeded	
											Bit 1: 1 = upper limit value is exceeded	
											Bit 2: 1 = sensor cable break	
											Bit 3: 1 = sensor short circuit	
3013H	04H	4	Sending function for index 03H	without	byte	0	4	r/w	-	d	Sending function change of status	

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												0 = activation of message output
												1 = no message output
302xH	**Liquid temperature sensor**											
3021H	**Sensor parameter**											
3021H	00H	2	Number of entries	without	byte	-	-	r	-	-		
3021H	01H	1.0	Factor for scaling	without	float	0,001	1000	r/w	-	d		
3021H	02H	0.0	Offset for scaling	°C	float	-100,0	100,0	r/w	-	d		
3022H	**Measurement values and PDO definition**											
3022H	00H	3	Number of entries	without	byte	-	-	r	-	-		
3022H	01H	0,0	Measuring value	°C	float	-10	+150	r	21H	-	actual measured temperature	
3022H	02H	4	Sending function for index 01H	without	byte	0	4	r/w	-	d	Sending function of temperature output (repeat time depends on index 3)	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												1 = no message output
												0 = activation of message output
3022H	03H	250	Repeat time	ms	word	50	5000	r/w	-	d	Repeat time for the value	
3023H	**Alarm values and PDO definition**											
3023H	00H	4	Number of entries	without	byte	-	-	r	-	-		
3023H	01H	20	Lower limit value	°C	float	-10	+140	r/w	-	d	Warning message when value remains below limit	
3023H	02H	70	Upper limit value	°C	float	0	+150	r/w	-	d	Warning message when value exceeds limit	
3023H	03H	0	Status of measuring input	without	byte	0	15	r	22H	-	Bit 0: 1 = lower limit value is exceeded	
											Bit 1: 1 = upper limit value is exceeded	
											Bit 2: 1 = sensor cable break	
											Bit 3: 1 = sensor short circuit	
3023H	04H	4	Sending function for index 03H	without	byte	0	4	r/w	-	d	Sending function change of status	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												0 = activation of message output
												1 = no message output
30yxH	**Function blocks (3 <= y <= 8)**											
30y1H	**Function block definition**											
30y1H	00H	1	Number of entries	without	byte	-	-	r	-	-		
30y1H	01H	0	Function of the block	without	byte	0	5	r/w	-	D	Bit 3 - 0: function definition	

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description	
												0000 = off
												0001 = binary input
												0010 = analogue input
												0011 = binary output
												0100 = pulse width modulated output
												0101 = customer program
30y2H	**Binary input parameter and PDO definition (only valid if 30y1.1 = 01H)**											
30y2H	00H	4	Number of entries	without	byte	-	-	r	-	-		
30y2H	01H	0	Function of Input	without	byte	0	20	r/w	-	D	Bit 3 - 0: Function of Input	
												0000 = without function (off)
												0001 = Start of batching
												0010 = Stop of batching (emergency shut-down)
												0011 = Input for Bus
												0100 = customer program
											Bit 4: Polarity of Input	
												0 = high active
												1 = low active
30y2H	02H	0	Definition for shut-down	without	byte	0	63	r/w	-	d	Bit 0: 1 = output 1 switch off if input is high, 0 = no influencing of the output	
											Bit 1: 1 = output 2 switch off if input is high, 0 = no influencing of the output	
											Bit 2: 1 = output 3 switch off if input is high, 0 = no influencing of the output	
											Bit 3: 1 = output 4 switch off if input is high, 0 = no influencing of the output	
											Bit 4: 1 = output 5 switch off if input is high, 0 = no influencing of the output	
											Bit 5: 1 = output 6 switch off if input is high, 0 = no influencing of the output	
30y2H	03H	0	Status of Input	without	byte	0	1	r	y1H	-	Bit 0: actual status of Input	
												0 = Input is off
												1 = Input is on
30y2H	04H	4	Sending function for Index 03H	without	byte	0	4	r/w	-	d	Bit 3-0: Sending function change of status	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												1 = no message output
												0 = activation of message output
30y3H	**Analogue input and PDO definition (only valid if 30y1.1 = 02H)**											
30y3H	00H	10	Number of entries	without	byte	-	-	r	-	-		
30y3H	01H	0	Function of Input	without	byte	0	20	r/w	-	d	Bit 3 - 0: Function of Input	
												0000 = without function (off)
												0001 = input for bus

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description
											0010 = start of batching
											0011 = stop of batching (emergency shut-down)
											0100 = customer program
											Bit 4: Calculation function
											0 = input > parameter
											1 = input < parameter
30y3H	02H	1,0	Scaling factor for analogue input	without	float	0,0001	1000	r/w	-	as	The measured analogue voltage [V] is multiplied with this factor
30y3H	03H	0,0	Scaling offset for analogue input	V	float	-1000	1000	r/w	-	as	The offset is added to the measured analogue voltage [V] (voltage = offset + factor*real voltage)
30y3H	04H	0,0	Measured voltage (with scaling)	V	float	0,0	1000	r	y2H	-	actual measured voltage
30y3H	05H	4	Sending function for Index 04H	without	byte	0	4	r/w	-	d	Sending function of analogue value (repeat time depends on index 6)
											Bit 1-0: Priority
											00 = PDO 0
											01 = PDO 1
											10 = PDO 2
											11 = PDO 3
											Bit 2: activation of function
											1 = no message output
											0 = activation of message output
30y3H	06H	250	Repeat time	ms	word	50	5000	r/w	-	d	Repeat time for the value
30y3H	07H	10	Maximum voltage	V	float	0,0001	12,0	r/w	-	d	Limit value for voltage with emergency shut-down
30y3H	08H	0	Definition for shut-down	without	byte	0	63	r/w	-	d	Bit 0: 1 = output 1 switch off if voltage is to high, 0 = no influencing of the output
											Bit 1: 1 = output 2 switch off if voltage is to high, 0 = no influencing of the output
											Bit 2: 1 = output 3 switch off if voltage is to high, 0 = no influencing of the output
											Bit 3: 1 = output 4 switch off if voltage is to high, 0 = no influencing of the output
											Bit 4: 1 = output 5 switch off if voltage is to high, 0 = no influencing of the output
											Bit 5: 1 = output 6 switch off if voltage is to high, 0 = no influencing of the output
30y3H	09H	0	Actual status	without	byte	0	1	r	y3H	-	Bit 0: 1 = Limit value exceeded, 0 = okay
30y3H	0AH	4	Sending function for Index 09H	without	byte	0	4	r/w	-	d	Bit 1-0: Priority
											00 = PDO 0
											01 = PDO 1
											10 = PDO 2
											11 = PDO 3
											Bit 2: activation of function
											1 = no message output
											0 = activation of message output
30y4H	**Binary output parameter and PDO definition (only valid if 30y1.1 = 03H)**										
30y4H	00H	9	Number of entries	without	byte	-	-	r	-	-	
30y4H	01H	0	Output hardware function	without	byte	0	3	r/w	-	d	Bit 0: definition for high or low side driver
											0 = output switching to

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description	
												ground
												1 = output switching to +24V
											Bit1: output polarity	
												0 = high active
												1 = low active
30y4H	02H	0	Output on function definition	without	byte	0	11	r/w	-	d	Bit 0-3: definition for switching the output on	
												0000 = without function (off)
												0001 = switch on by input
												0010 = switch on by bus
												0011 = switch on by time
												0100 = switch on by volume
												0101 = switch on by volume flow
												0110 = switch on by fluid temperature
												0111 = switch on by electronic temperature
												1000 = switch on by analogue voltage
												1001 = switch on by batch program
												1010 = switch on by error detected
												1011 = switch on by customer program
30y4H	03H	0,001 s	On value	l or s or V or °C	float	0s 0l 0l/s 0V -20°C	100s 100l 15l/s 11V 120°C	r/w	-	d	According to selected function: on time or volume or volume flow or temperature or voltage	
30y4H	04H	0	Input channel for on signal	without	byte	0	31	r/w	-	d	Bit 0-3: input channel for output on function	
												0000 = function 1
												0001 = function 2
												0010 = function 3
												0011 = function 4
												0100 = function 5
												0101 = function 6
											Bit 4: Calculation function	
												0 = input > parameter
												1 = input < parameter
30y4H	05H	0	Output off function definition	without	byte	0	11	r/w	-	d	Bit 0-3: definition for switching the output off	
												0000 = without function (off)
												0001 = switch off by input
												0010 = switch off by bus
												0011 = switch off by time
												0100 = switch off by volume
												0101 = switch off by volume flow
												0110 = switch off by fluid temperature
												0111 = switch off by electronic temperature

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description	
												1000 = switch off by analogue voltage
												1001 = switch off by batch program
												1010 = switch off by error detected
												1011 = switch off by customer program
30y4H	06H	0,001 s	Off value	l or s or l/s or V or °C	float	0s 0l 0l/s 0V -20°C	100s 100l 15l/s 11V 120°C	r/w	-	d	According to selected function: off time or volume or volume flow or temperature or voltage	
30y4H	07H	0	Input channel for off signal	without	byte	0	21	r/w	-	d	Bit 0-3: input channel for output off function	
												0000 = function 1
												0001 = function 2
												0010 = function 3
												0011 = function 4
												0100 = function 5
												0101 = function 6
											Bit 4: Calculation function	
												0 = input > parameter
												1 = input < parameter
30y4H	08H	0	Status of output	without	byte	0	7	r/w	y4H	-	Bit 0: actual status of output	
												0 = output is off
												1 = output is on
											Bit 2-1: error status of output	
												00 = no error
												01 = short circuit (only detected if output is on)
												10 = interruption (only detected if output is on)
												11 = chip temperature to high
30y4H	09H	4	Sending function for Index 08H	without	byte	0	4	r/w	-	d	Bit 3-0: Sending function change of status	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												1 = no message output
												0 = activation of message output
309xH	**Batching**											
3091H	**Filling parameter**											
3091H	00H	15	Number of entries	without	byte	-	-	r	-	d		
3091H	01H	0,5	Target volume	l	float	0,0001	200	r/w	-	d	Automatic output controls on this parameter	
3091H	02H	0,02	Forward run time	s	float	0.01	10	r/w	-	d	Time after starting, before opening of valve	
3091H	03H	0,5	Time out	s	float	0.01	10	r/w	-	d	Time after filling, before a new run instruction is accepted	
3091H	04H	1	Counter control	without	byte	0	3	w	-	d	Counter control (only active on manual control output))	
											Bit 0: Start/Stop Counter	
												0 = stop counter

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description	
												1 = counter operates
											Bit 1: Counter reset	
												0 = no function
												1 = reset the counter
3091H	05H	0	Controlling batching process	without	byte	0	3	w	-	d		
											Bit 0: 1 = Start filling through bus, only at batching process = CAN Bus (0 = without function)	
											Bit 1: 1 = Stop filling through bus, independent from other inputs (0 = without function)	
3091H	06H	0	Learning function	-	byte	0	3	r/w	-	d	Self learning function	
											Bit 1-0: Activation of function	
												0 = function off
												1 = not allowed
												2 = function on, no other action
												3 = function on and the next filling starts the self learning cycle
3091H	07H	0	Function select for 'switch off calculation'	-	byte	0	1	r/w	-	d	Programm select for switch off calculation 0 = switch off point depends from the last 1 to 5 tail volumes 1 = switch off point depends from the actual flow and the last 1 to 5 tail volumes	
3091H	08H	0	Function data 1	-	byte	0	5	r/w	-	d	First data for the function 'switch off calculation' Fct = 0: number of tail volumes for switch off calculation (1 to 5) Fct = 1: number of tail volumes for switch off calculation (1 to 5)	
3091H	09H	0	Function data 2	-	byte	0	255	r/w	-	d	Second data for the function 'switch off calculation' (for future use)	
3091H	0AH	0,001	Volume flow value for switch off	l/s	float	0	15,1	r/w	-	d	If the volume flow is lower then this value, the filling will stop after number of measurements	
3091H	0BH	10	Number of measurements		byte	1	100	r/w	-	d	Parameter for the function 3091.10	
3091H	0CH	0	Definition for shut-down	without	byte	0	63	r/w	-	d	Bit 0: 1 = output 1 switch off if 3091_05 Bit 1 = 1 , 0 = no influencing of the output	
											Bit 1: 1 = output 2 switch off if 3091_05 Bit 1 = 1, 0 = no influencing of the output	
											Bit 2: 1 = output 3 switch off if 3091_05 Bit 1 = 1 , 0 = no influencing of the output	
											Bit 3: 1 = output 4 switch off if 3091_05 Bit 1 = 1, 0 = no influencing of the output	
											Bit 4: 1 = output 5 switch off if 3091_05 Bit 1 = 1, 0 = no influencing of the output	
											Bit 5: 1 = output 6 switch off if 3091_05 Bit 1 = 1, 0 = no influencing of the output	
3091H	0DH	100	Fixed tail volume 1	ml	byte	0	255	r/w	-	d	this tail volume is used for the next filling (if the bit 4 is set in RPDO1) and after power on	
3091H	0EH	100	Fixed tail volume 2	ml	byte	0	255	r/w	-	d	this tail volume is used for the next filling (if the bit 5 is set in RPDO1)	
3091H	0FH	10	Percentage of target volume	%	byte	0	50	r/w	-	d	this tail volume is used for the next filling (if the bit 6 is set in RPDO1)	
3092H	**Status values and PDO definition**											
3092H	00H	2	Number of entries	without	byte	-	-	r	-	d		
3092H	01H	0	Actual status of batching	without	byte	0	5	r	91H	-		
											Bit 0-3: actual status of batching	
												0 = stop

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description	
												1 = wait
												2 = fill
												3 = tail
												4 = pause
												5 = break
											Bit 4 - 7: not used	
3092H	02H	4	Sending function for Index 01H	without	byte	0	4	r/w	-	D	Sending function at change of status	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: Activation of function	
												1 = no message output
												0 = activation of message output
3093H	**Alarm values and PDO definition**											
3093H	00H	20	Number of entries	without				r				
3093H	01H	0,05	Maximum tail volume	l	float	0,0001	1,0	r/w	-	d	Limit value tail volume, status info only	
3093H	02H	0	Actual status	without	byte	0	1	r	92H	-	Bit 0: 1 = Limit value overstepped, 0 = okay	
3093H	03H	4	Sending function for Index 02H	without	byte	0	4	r/w	-	d	Sending function at change of status	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: Activation of function	
												1 = no message output
												0 = activation of message output
3093H	04H	10	Maximum batching time	s	float	0,01	100	r/w	-	d	Limit value for batching time with emergency shut-down	
3093H	05H	0	Definition for shut-down	without	byte	0	63	r/w	-	d	Bit 0: 1 = output 1 switch off if batching time is to high, 0 = no influencing of the output	
											Bit 1: 1 = output 2 switch off if batching time is to high, 0 = no influencing of the output	
											Bit 2: 1 = output 3 switch off if batching time is to high, 0 = no influencing of the output	
											Bit 3: 1 = output 4 switch off if batching time is to high, 0 = no influencing of the output	
											Bit 4: 1 = output 5 switch off if batching time is to high, 0 = no influencing of the output	
											Bit 5: 1 = output 6 switch off if batching time is to high, 0 = no influencing of the output	
3093H	06H	0	Actual status	without	byte	0	1	r	93H	-	Bit 0: 1 = Limit value overstepped, 0 = okay	
3093H	07H	4	Sending function for Index 06H	without	byte	0	4	r/w	-	d	Sending function at change of status	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: Activation of function	
												1 = no message

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description	
												output
												0 = activation of message output
3093H	08H	0,3	Maximum tail time	s	float	0,005	10	r/w	-	d	Limit value for the tail time, status info only	
3093H	09H	0	Actual status	without	byte	0	1	r	94H	-	Bit 0: 1 = Limit value overstepped, 0 = okay	
3093H	0AH	4	Sending function for Index 09H	without	byte	0	4	r/w	-	d	Sending function at change of status	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: Activation of function	
												1 = no message output
												0 = activation of message output
3093H	0BH	0,01	Maximum leakage volume	l	float	0,001	0,1	r/w	-	d	Leakage volume between two batches, status info only	
3093H	0CH	0	Actual status	without	byte	0	1	r	95H	-	Bit 0: 1 = limit value overstepped, 0 = okay	
3093H	0DH	4	Sending function for Index 0CH	without	byte	0	4	r/w	-	d	Sending function at change of status	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: Activation of function	
												1 = no message output
												0 = activation of message output
3093H	0EH	0.002	Lower limit for volume flow	l/s	float	-100	+100	r/w	-	d	lower deviation of the set point	
3093H	0FH	0	Actual status	without	byte	0	1	r	A0H	-	Bit 0: 1 = limit value understepped, 0 = okay	
3093H	10H	4	Sending function for Index 0FH	without	byte	0	4	r/w	-	d	Sending function at change of status	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												1 = no message output
												0 = activation of message output
3093H	11H	0.002	Upper limit for volume flow	l/s	float	-100	+100	r/w	-	d	upper deviation of the set point	
3093H	12H	0	Actual status	without	byte	0	1	r	A1H	-	Bit 0: 1 = limit value overstepped, 0 = okay	
3093H	13H	4	Sending function for Index 12H	without	byte	0	4	r/w	-	d	Sending function at change of status	
											Bit 1-0: Priority	
												00 = PDO 0
												01 = PDO 1
												10 = PDO 2
												11 = PDO 3
											Bit 2: activation of function	
												1 = no message output
												0 = activation of message output
3093H	14H	0	Reset emergency shut off	without	byte	0	1	w	-	d	0 = no action	

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description
											1 = all emergency flags will be reset
3094H	**Result of last batching and PDO definition**										
3094H	00H	15	Number of entries	without	byte	-	-	r	-	-	
3094H	01H	4	Sending function	without	byte	0	4	r/w	-	d	Sending function batching results
											Bit 1-0: Priority
											00 = PDO 0
											01 = PDO 1
											10 = PDO 2
											11 = PDO 3
											Bit 2: activation of function
											1 = no message output
											0 = activation of message output
3094H	02H	0	Batching time	s	float	0	100	r	96H	-	Time for complete batch process
3094H	03H	0	Tail time	s	float	0	10	r	97H	-	Closure time of valve
3094H	04H	0	Batching volume	l	float	0	100	r	98H	-	Volume filled
3094H	05H	0	Tail volume	l	float	0	1	r	99H	-	Volume during closure time
3094H	06H	0	Max. flow velocity	l/s	float	0	15,1	r	9AH	-	Highest volume flow during filling
3094H	07H	0	Leakage volume	l	float	0	0,1	r	9BH	-	Volume between two fillings
3094H	08H	0.002	Lower limit for filling	l	float	0	10	r/w	-	d	lower deviation of the set point
3094H	09H	0	Actual status	without	byte	0	1	r	9CH	-	Bit 0: 1 = limit value understepped, 0 = okay
3094H	0AH	4	Sending function for Index 09H	without	byte	0	4	r/w	-	d	Sending function at change of status
											Bit 1-0: Priority
											00 = PDO 0
											01 = PDO 1
											10 = PDO 2
											11 = PDO 3
											Bit 2: activation of function
											1 = no message output
											0 = activation of message output
3094H	0BH	0.002	Upper limit for filling	l	float	0	10	r/w	-	d	upper deviation of the set point
3094H	0CH	0	Actual status	without	byte	0	1	r	9DH	-	Bit 0: 1 = limit value overstepped, 0 = okay
3094H	0DH	4	Sending function for Index 0CH	without	byte	0	4	r/w	-	d	Sending function at change of status
											Bit 1-0: Priority
											00 = PDO 0
											01 = PDO 1
											10 = PDO 2
											11 = PDO 3
											Bit 2: activation of function
											1 = no message output
											0 = activation of message output
3094H	0EH	0	Actual status	without	byte	0	1	r	9EH	-	Bit 0: 1 = filling finished
3094H	0FH	4	Sending function for index 0EH	without	byte	0	4	r/w	-	d	Sending function at change of status
											Bit 1-0: Priority
											00 = PDO 0
											01 = PDO 1
											10 = PDO 2
											11 = PDO 3
											Bit 2: activation of function
											1 = no message output

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description	
												0 = activation of message output
3095H	**Statistic**											
3095H	00H	15	Number of entries	without	byte	-	-	r	-	-		
3095H	01H	-3000	Range 1	µl	Word	-32700	32700	r/w	-	d	First limit	
3095H	02H	-1500	Range 2	µl	Word	-32700	32700	r/w	-	d	Second limit	
3095H	03H	-500	Range 3	µl	Word	-32700	32700	r/w	-	d	Third limit	
3095H	04H	+500	Range 4	µl	Word	-32700	32700	r/w	-	d	Fourth limit	
3095H	05H	+1500	Range 5	µl	Word	-32700	32700	r/w	-	d	Fifth limit	
3095H	06H	+3000	Range 6	µl	word	-32700	32700	r/w	-	d	Sixth limit	
3095H	07H	0	Total number of fillings	without	word	0	65535	r/w	-	d	Total number of fillings since the last reset	
3095H	08H	0	Number of fillings 1	without	word	0	65535	r/w	-	d	Number of fillings with a volume lower than range 1	
3095H	09H	0	Number of fillings 2	without	word	0	65535	r/w	-	d	Number of fillings with a volume between range 1 and range 2	
3095H	0AH	0	Number of fillings 3	without	word	0	65535	r/w	-	d	Number of fillings with a volume between range 2 and range 3	
3095H	0BH	0	Number of fillings 4	without	word	0	65535	r/w	-	d	Number of fillings with a volume between range 3 and range 4	
3095H	0CH	0	Number of fillings 5	without	word	0	65535	r/w	-	d	Number of fillings with a volume between range 4 and range 5	
3095H	0DH	0	Number of fillings 6	without	word	0	65535	r/w	-	d	Number of fillings with a volume between range 5 and range 6	
3095H	0EH	0	Number of fillings 7	without	word	0	65535	r/w	-	d	Number of fillings with a volume higher than range 6	
3095H	0FH	0	Reset statistic	without	byte	0	1	r	-	d	Bit 0: 1 = reset all statistic results	
30AxH	**CAN parameter**											
30A1H	00H	7	Baudrate	without	byte	0	7	r/w	-	as	Bit 0 – 3:	
												0000 = 1MBaud
												0001 = 800kBaud
												0010 = 500kBaud
												0011 = 250kBaud
												0100 = 125kBaud
												0101 = 100kBaud
												0110 = 50kBaud
												0111 = 20kBaud
30A2H	00H	127	Node ID	without	byte	1	127	r/w	-	as		
30A3H	00H	0	Customer TPDO activation	without	byte	0	15	r/w	-	d	Bit 0: 1 = customer TPDO1 activ (description see below)	
											Bit 1: 1 = customer TPDO2 activ (description see below)	
											Bit 2: 1 = customer TPDO3 activ (description see below)	
											Bit 3: 1 = customer TPDO4 activ (description see below)	
30A4H	00H	0	Customer RPDO activation	without	byte	0	15	r/w	-	d	Bit 0: 1 = customer RPDO1 activ (description see below)	
											Bit 1: 1 = customer RPDO2 activ (description see below)	
											Bit 2: 1 = customer RPDO3 activ (description see below)	
											Bit 3: 1 = customer RPDO4 activ (description see below)	
32yxH	**Customer specific 1 bit memory (3 <= y <= 8)**											
32y1H	00H	8	Number of entries	without	byte	-	-	r	-	-		
32y1H	01H	0	Bit no 1	without	byte	0	1	r/w	-	d	1. bit variable (this parameter use the same memory cell as 30y2.04)	
32y1H	02H	0	Bit no 2	without	byte	0	1	r/w	-	d	2. bit variable (this parameter use the same memory cell as 30y2.04)	
32y1H	03H	0	Bit no 3	without	byte	0	1	r/w	-	d	3. bit variable (this parameter use the same memory cell as 30y2.04)	
32y1H	04H	0	Bit no 4	without	byte	0	1	r/w	-	d	4. bit variable (this parameter use the same memory cell as 30y2.04)	
32y1H	05H	0	Bit no 5	without	byte	0	1	r/w	-	d	5. bit variable (this parameter use the same memory cell as 30y2.04)	

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description
32y1H	06H	0	Bit no 6	without	byte	0	1	r/w	-	d	6. bit variable (this parameter use the same memory cell as 30y2.04)
32y1H	07H	0	Bit no 7	without	byte	0	1	r/w	-	d	7. bit variable (this parameter use the same memory cell as 30y2.04)
32y1H	08H	0	Bit no 8	without	byte	0	1	r/w	-	d	8. bit variable (this parameter use the same memory cell as 30y2.04)
32y2H	00H	8	Number of entries	without	byte	-	-	r	-	-	
32y2H	01H	0	Bit no 9	without	byte	0	1	r/w	-	d	9. bit variable (this parameter use the same memory cell as 30y3.01)
32y2H	02H	0	Bit no 10	without	byte	0	1	r/w	-	d	10. bit variable (this parameter use the same memory cell as 30y3.01)
32y2H	03H	0	Bit no 11	without	byte	0	1	r/w	-	d	11. bit variable (this parameter use the same memory cell as 30y3.01)
32y2H	04H	0	Bit no 12	without	byte	0	1	r/w	-	d	12. bit variable (this parameter use the same memory cell as 30y3.01)
32y2H	05H	0	Bit no 13	without	byte	0	1	r/w	-	d	13. bit variable (this parameter use the same memory cell as 30y3.01)
32y2H	06H	0	Bit no 14	without	byte	0	1	r/w	-	d	14. bit variable (this parameter use the same memory cell as 30y3.01)
32y2H	07H	0	Bit no 15	without	byte	0	1	r/w	-	d	15. bit variable (this parameter use the same memory cell as 30y3.01)
32y2H	08H	0	Bit no 16	without	byte	0	1	r/w	-	d	16. bit variable (this parameter use the same memory cell as 30y3.01)
33yxH	**Customer specific 8 bit memory (3 <= y <= 8)**										
33y1H	00h	9	Number of entries	without	byte	-	-	r	-	-	
33y1H	01H	0	Data format	without	byte	0	255	r	-	-	descriptor for data format bit n = 0: byte n = signed char, bit n = 1: byte n = unsigned char
33y1H	02H	0	Byte no 1	without	byte	-128 0	+127 255	r/w	-	-	1. byte (33y1.01) bit 0 = 0: signed char (this parameter use the same memory cell as 30y3.05) (33y1.01) bit 0 = 1: unsigned char
33y1H	03H	0	Byte no 2	without	byte	-128 0	+127 255	r/w	-	-	2. byte (33y1.01) bit 1 = 0: signed char (this parameter use the same memory cell as 30y3.08) (33y1.01) bit 1 = 1: unsigned char
33y1H	04H	0	Byte no 3	without	byte	-128 0	+127 255	r/w	-	-	3. byte (33y1.01) bit 2 = 0: signed char (this parameter use the same memory cell as 30y3.0A) (33y1.01) bit 2 = 1: unsigned char
33y1H	05H	0	Byte no 4	without	byte	-128 0	+127 255	r/w	-	-	4. byte (33y1.01) bit 3 = 0: signed char (this parameter use the same memory cell as 30y4.01) (33y1.01) bit 3 = 1: unsigned char
33y1H	06H	0	Byte no 5	without	byte	-128 0	+127 255	r/w	-	-	5. byte (33y1.01) bit 4 = 0: signed char (this parameter use the same memory cell as 30y4.02) (33y1.01) bit 4 = 1: unsigned char
33y1H	07H	0	Byte no 6	without	byte	-128 0	+127 255	r/w	-	-	6. byte (33y1.01) bit 5 = 0: signed char (this parameter use the same memory cell as 30y4.04) (33y1.01) bit 5 = 1: unsigned char
33y1H	08H	0	Byte no 7	without	byte	-128 0	+127 255	r/w	-	-	7. byte (33y1.01) bit 6 = 0: signed char (this parameter use the same memory cell as 30y4.05) (33y1.01) bit 6 = 1: unsigned char
33y1H	09H	0	Byte no 8	without	byte	-128 0	+127 255	r/w	-	-	8. byte (33y1.01) bit 7 = 0: signed char (this parameter use the same memory cell as 30y4.07) (33y1.01) bit 7 = 1: unsigned char
33y2H	00h	9	Number of entries	without	byte	-	-	r	-	-	
33y2H	01H	0	Data format	without	byte	0	255	r	-	-	descriptor for data format bit n = 0: byte n = signed char, bit n = 1: byte n = unsigned char
33y2H	02H	0	Byte no 9	without	byte	-128 0	+127 255	r/w	-	-	9. byte (33y2.01) bit 0 = 0: signed char (this parameter use the same memory cell as 30y4.09) (33y2.01) bit 0 = 1: unsigned char

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description
33y2H	03H	0	Byte no 10	without	byte	-128 0	+127 255	r/w	-	-	10. byte (33y2.01) bit 1 = 0: signed char (this parameter use the same memory cell as 30y5.01) (33y2.01) bit 1 = 1: unsigned char
33y2H	04H	0	Byte no 11	without	byte	-128 0	+127 255	r/w	-	-	11. byte (33y2.01) bit 2 = 0: signed char (this parameter use the same memory cell as 30y5.02) (33y2.01) bit 2 = 1: unsigned char
33y2H	05H	0	Byte no 12	without	byte	-128 0	+127 255	r/w	-	-	12. byte (33y2.01) bit 3 = 0: signed char (this parameter use the same memory cell as 30y5.03) (33y2.01) bit 3 = 1: unsigned char
33y2H	06H	0	Byte no 13	without	byte	-128 0	+127 255	r/w	-	-	13. byte (33y2.01) bit 4 = 0: signed char (this parameter use the same memory cell as 30y5.04) (33y2.01) bit 4 = 1: unsigned char
33y2H	07H	0	Byte no 14	without	byte	-128 0	+127 255	r/w	-	-	14. byte (33y2.01) bit 5 = 0: signed char (33y2.01) bit 5 = 1: unsigned char
33y2H	08H	0	Byte no 15	without	byte	-128 0	+127 255	r/w	-	-	15. byte (33y2.01) bit 6 = 0: signed char (33y2.01) bit 6 = 1: unsigned char
33y2H	09H	0	Byte no 16	without	byte	-127 0	+127 255	r/w	-	-	16. byte (33y2.01) bit 7 = 0: signed char (33y2.01) bit 7 = 1: unsigned char
34yxH	**Customer specific 16 bit memory (3 <= y <= 8)**										
34y1H	00h	9	Number of entries	without	byte	-	-	r	-	-	
34y1H	01H	0	Data format	without	byte	0	255	r	-	-	descriptor for data format bit n = 0: byte n = signed int, bit n = 1: byte n = unsigned int
34y1H	02H	0	Word no 1	without	word	-32768 0	32767 65535	r/w	-	-	1. word (34y1.01) bit 0 = 0: signed int (this parameter use the same memory cell as 30y3.06) (34y1.01) bit 0 = 1: unsigned int
34y1H	03H	0	Word no 2	without	word	-32768 0	32767 65535	r/w	-	-	2. word (34y1.01) bit 1 = 0: signed int (this parameter use the same memory cell as 30y5.05) (34y1.01) bit 1 = 1: unsigned int
34y1H	04H	0	Word no 3	without	word	-32768 0	32767 65535	r/w	-	-	3. word (34y1.01) bit 2 = 0: signed int (this parameter use the same memory cell as 30y3.02) (34y1.01) bit 2 = 1: unsigned int
34y1H	05H	0	Word no 4	without	word	-32768 0	32767 65535	r/w	-	-	4. word (34y1.01) bit 3 = 0: signed int (this parameter use the same memory cell as 30y3.02) (34y1.01) bit 3 = 1: unsigned int
34y1H	06H	0	Word no 5	without	word	-32768 0	32767 65535	r/w	-	-	5. word (34y1.01) bit 4 = 0: signed int (this parameter use the same memory cell as 30y3.03) (34y1.01) bit 4 = 1: unsigned int
34y1H	07H	0	Word no 6	without	word	-32768 0	32767 65535	r/w	-	-	6. word (34y1.01) bit 5 = 0: signed int (this parameter use the same memory cell as 30y3.03) (34y1.01) bit 5 = 1: unsigned int
34y1H	08H	0	Word no 7	without	word	-32768 0	32767 65535	r/w	-	-	7. word (34y1.01) bit 6 = 0: signed int (this parameter use the same memory cell as 30y3.07) (34y1.01) bit 6 = 1: unsigned int
34y1H	09H	0	Word no 8	without	word	-32768 0	32767 65535	r/w	-	-	8. word (34y1.01) bit 7 = 0: signed int (this parameter use the same memory cell as 30y3.07) (34y1.01) bit 7 = 1: unsigned int

Object No	Index	Value (default)	Description	Dimension	Format	min	max	access	Descriptor	transfer	Description
35yxH	**Customer specific 32 bit memory (3 <= y <= 8)**										
35y1H	00h	6	Number of entries	without	byte	-	-	r	-	-	
35y1H	01H	0	Data format	without	byte	0	255	r	-	-	descriptor for data format bit n = 0: byte n = long, bit n = 1: byte n = float
35y1H	02H	0	Long no 1	without	long	-2.1e9 -3.4e38	2.1e9 3.4e38	r/w	-	-	1. long (35y1.01) bit 0 = 0: long (this parameter use the same memory cell as 30y4.03) (35y1.01) bit 0 = 1: float
35y1H	03H	0	Long no 2	without	long	-2.1e9 -3.4e38	2.1e9 3.4e38	r/w	-	-	2. long (35y1.01) bit 1 = 0: long (this parameter use the same memory cell as 30y4.06) (35y1.01) bit 1 = 1: float
35y1H	04H	0	Long no 3	without	long	-2.1e9 -3.4e38	2.1e9 3.4e38	r/w	-	-	3. long (35y1.01) bit 2 = 0: long (35y1.01) bit 2 = 1: float
35y1H	05H	0	Long no 4	without	long	-2.1e9 -3.4e38	2.1e9 3.4e38	r/w	-	-	4. long (35y1.01) bit 3 = 0: long (35y1.01) bit 3 = 1: float
35y1H	06H	0	Long no 5	without	long	-2.1e9 -3.4e38	2.1e9 3.4e38	r/w	-	-	5. long (35y1.01) bit 4 = 0: long (35y1.01) bit 4 = 1: float
3900H	**Software download**										
3900H	00H	1	Number of entries	without	byte	-	-	r	-	-	
3900H	01H	0	Software download	without	-	-	-	w	-	-	Firmware download (only in preoperation mode) Download time (128kbyte): 20 kBaud: 149s 100 kBaud: 65.2s 250 kBaud: 47.0s 500 kBaud: 47.0s 1 Mbaud: 47.0s

E 3 Form to accompany returned device

If you need to return flowmeters for testing or repair to KROHNE

Your electromagnetic flowmeter

- has been carefully manufactured and tested
- and volumetrically calibrated in one of the world's most accurate test rigs.

If installed and operated in accordance with these operating instructions, your flowmeter will rarely present any problems.

Should you nevertheless need to return a flowmeter for checkout or repair, please pay strict attention to the following points:

Due to statutory regulations concerning protection of the environment and safeguarding the health and safety of our personnel, Krohne may only handle, test and repair returned flowmeters that have been in contact with liquids if it is possible to do so without risk to personnel and environment.

This means that KROHNE can only service your flowmeter if it is accompanied by a certificate in line with the following model confirming that the flowmeter is safe to handle.

If the flowmeter has been operated with toxic, caustic, flammable or water-endangering liquids, you are kindly requested

- to check and ensure, if necessary by rinsing or neutralizing, that all cavities in the flowmeter are free from such dangerous substances.
  (Directions on how you can find out whether the primary head has to be opened and flushed out or neutralized are obtainable from KROHNE on request.)
- to enclose a certificate with the flowmeter confirming that the flowmeter is safe to handle and stating the liquid used.

KROHNE regret that they cannot service your flowmeter unless it is accompanied by such a certificate.

Printed Form sheet (suitable for copying)

Company: ..... Address: .....

Department: ..... Name:.....

Tel. No.: .....

The enclosed electromagnetic flowmeter

Type: ..... KROHNE Order No. or Series No.: .....

has been operated with the following process liquid .....

Because this process liquid is

water-endangering * / toxic * / caustic * / flammable *

we have

– checked that all cavities in the flowmeter are free from such substances *
– flushed out and neutralized all cavities in the flowmeter *

(* delete where not applicable)

We confirm that there is **no** risk to man or environment through any residual liquid contained in the flowmeter.

Date: ..... Signature: .....
Company stamp: