IFC 300

Technical Datasheet

Electromagnetic Flow Converter

- 3 x 100% diagnostics of application, accuracy and instrument
- Quick and easy to install and operate due to HMI
- One converter for all applications
- Exceeds requirements VDI / VDE/ WIB 2650 and NAMUR NE 107
- Integrated temperature and conductivity measurement
- Approval for Custody Transfer

KROHNE

The high-performance solution

IFC 300 is the only electromagnetic flow converter with 3 x diagnostics of instrument, application and accuracy. IFC 300 fits to all sensors and is suitable for all applications.

1. Same housing for Ex and non-Ex
2. Large grafic display with piezo-electric buttons
3. Available for AC and DC voltage operation

Highlights

- 3 x 100% diagnostics of application, accuracy and instrument
- Quick and easy to install and operate due to HMI
- Excellent long-term stability
- Optimal zero point stability independent from product properties
- One converter for all applications, and thus advantages with regard to procurement, engineering and stock-keeping
- Exceeds requirements VDI / VDE/ WIB 2650 and NAMUR NE 107
- Integrated temperature and conductivity measurement
- Approval for Custody Transfer
- Highest process safety

Industries

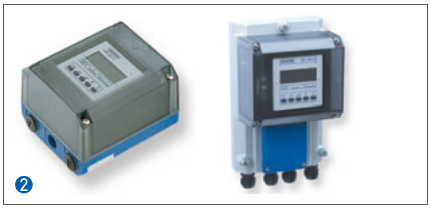
- Chemicals
- Food & Beverage
- Minerals & Mining
- Oil & Gas
- Pharmaceuticals
- Power Plants
- Pulp & Paper
- Water
- Wastewater
- Machinery

Applications

- Products with low conductivity, high solid contents or entrained air
- Inhomogeneous, abrasive and corrosive products
- Quick media changes
- Abrupt changes of pH value
- Pulsating or turbulent flows

Electromagnetic product range

OPTIFLUX converters: All converters fit to all sensors

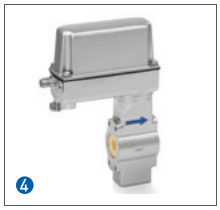


1 IFC 300 High-performance solution
2 IFC 010 Economical solution

OPTIFLUX sensors

1 OPTIFLUX 1000 Economical solution
2 OPTIFLUX 2000 Solution for the water and wastewater industry
3 OPTIFLUX 4000 Standard solution for the process industry
4 OPTIFLUX 5000 Solution with high-tech ceramics
5 OPTIFLUX 6000 Sanitary and hygienic solution

Special-purpose flowmeters



1 WATERFLUX 2070 Battery powered watermeter solution
2 OPTIFLUX 4040 C 2-wire solution
3 TIDALFLUX 4110 PF Solution for partially filled pipelines
4 BATCHFLUX 5015 C Solution for volumetric filling
5 OPTIFLUX 7300 C Electrode-free solution

Technical data

Model

C (compact)	IFC 300 C
F (field), W (wall), R (19" rack)	IFC 300 F, IFC 300 W, IFC 300 R

Performance

Maximum deviation (see accuracy curves)	±0.15% of MV ± 1 mm/s
Repeatability	±0.06% to OIML R117
Full-scale range (see flow table)	v = 0.3...12 m/s / 1...40 ft/s

Conductivity

Min. process liquid conductivity (non-water)	1 µS/cm (see flow sensor)
Min. process liquid conductivity (water)	20 µS/cm

Content of solids

Maximum percentage (by volume)	30%

Display

With local display (2 meas. pages: 1 status page, 1 graphical page)	Standard

Languages

English, French, German, Dutch, Polish, Portuguese, Danish	Standard

Combinations

OPTIFLUX 1000	DN10...150
OPTIFLUX 2000	DN25...3000
OPTIFLUX 4000	DN2.5...3000
OPTIFLUX 5000	DN2.5...250
OPTIFLUX 6000	DN2.5...150

Communication

Current, pulse & status output, frequency output, limit switch	Standard
HART communication, control input, 3 counters	Standard
Ex-i	Option
Foundation Fieldbus	Option 1
Profibus PA	Option
Profibus DP	Option

Verification

Integrated verification, diagnostics:	Standard
- instrument / process / measurement	Standard
- empty pipe indication / stabilization	Standard

Custody transfer

Without	Standard
Cold potable water (OIML R-49, KIWA K618)	Option
Other than water (OIML R-117)	Option 1

Power supply

100...230 VAC (-15/+10%), 50/60 Hz	Standard
12...24 VDC / 9...31 VDC	Option
24 V AC/DC	Option
Power consumption	13 W

Approval

Non Ex	Standard
EEx - zone 1 / 2	Option ❷
FM - Class I DIV 1 / 2	Option ❷
CSA - GP / Class I DIV 1 / 2	Option ❷
SAA - Aus Ex zone 1 / 2 (pending)	Option ❷
TIIS - zone 1 / 2 (pending)	Option ❷

Protection category (according to IEC 529 / EN 60 529)

C (compact)	IP 66 / 67 (eq. to NEMA 6)
F (remote)	IP 66 / 67 (eq. to NEMA 6)
W (wall)	IP 65 (eq. to NEMA 4/4X)
R (19" rack)	IP 20 (eq. to NEMA 1)

Temperature

Process temperature	See flow sensor
Ambient temperature	-40...+65°C / -40...+149°F
Storage temperature	-50...+70°C / -58...+158°F

Signal cable

Separate - DS (dep. on conductivity)	5...600 m / 15...1800 ft
Separate - BTS (dep. on conductivity)	5...600 m / 15...1800 ft
Separate - LIYCY (Class 1 Div. 2 only) (dep. on conductivity)	5...100 m / 15...300 ft

Cable connection

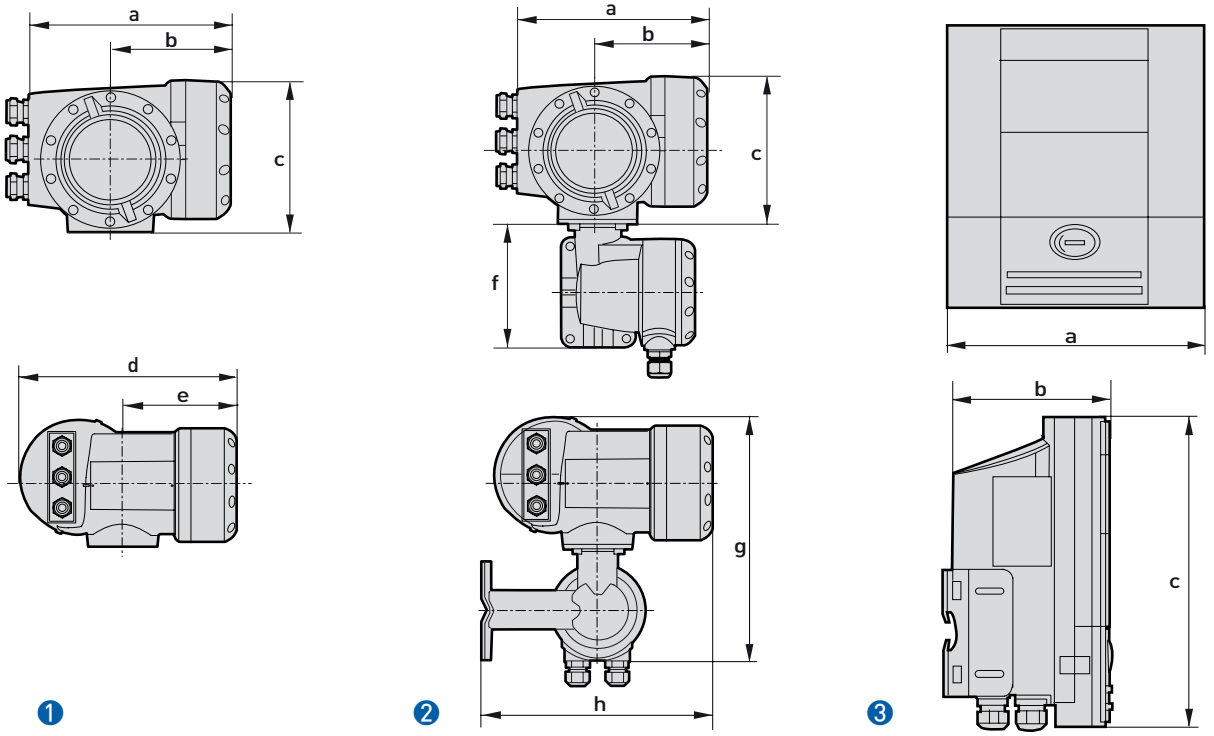
M20 x 1.5	Standard
½" NPT	Option
PF ½	Option

Materials used

Die-cast aluminum (polyurethane coated); C and F version only	Standard
Polyamide - polycarbonate; W version only	Standard
Stainless steel 316 L (1.4404); C and F version only	Option
Custody transfer lead & sealing; C and F version only	Option

❶ pending
❷ only for C and F version

Dimensions and Weights



1 IFC 300 C
2 IFC 300 F
3 IFC 300 W

Dimensions and Weights in mm and kg

Version	Dimensions [mm]								Weights [kg]
	a	b	c	d	e	f	g	h	
IFC 300 C	202	120	155	260	137	-	-	-	4.2
IFC 300 F	202	120	155	-	-	140.5	295.8	277	5.7
IFC 300 W	198	138	299	-	-	-	-	-	2.4

Dimensions and Weights in inches and lbs

Version	Dimensions [inches]								Weights [lbs]
	a	b	c	d	e	f	g	h	
IFC 300 C	7.75	4.75	6.10	10.20	5.40	-	-	-	9.30
IFC 300 F	7.75	4.75	6.10	-	-	5.50	11.60	10.90	12.60
IFC 300 W	7.80	5.40	11.80	-	-	-	-	-	5.30

I/O Specifications

Overall functionality

Function	Continuous measurement of actual volume flow rate, flow velocity, conductivity, massflow (at const. density), coil temperature. Integrated batch controller
	Bidirectional flow measurement and totalisation
	Flow direction identified via status or current output
	Diagnostics: Accuracy, linearity, electrode contamination, noise, flow profile, field current, coil resistance and temperature, empty or non-full pipe + derived functions

Current output

Function	All operating data configurable; galvanically isolated; HART communication
Settings	Q = 0%: 0...15 mA
	Q = 100%: 10...22 mA
	Error identification: 0...22 mA
Connection	
Basic / Modular IO: Active	$I \leq 22$ mA / $R_L \leq 1$ kOhm
Ex-i: Active	$I \leq 22$ mA / $R_L \leq 470$ Ohm
	$U_0 = 21$ V / $I_0 = 90$ mA
	$P_0 = 0.5$ W
	$C_0 = 90$ nF / $L_0 = 2$ mH
Basic / Modular IO: Passive	$I \leq 22$ mA / $U \leq 32$ VDC
Ex-i: Passive	$I \leq 22$ mA
	$U_i = 30$ V / $I_i = 100$ mA
	$P_i = 1$ W
	$C_i = 10$ nF / $L_i \sim 0$ mH

Pulse output and Status output

Function	Configurable as pulse output, identification for automatic range change, indicator of flow direction, overflow, errors, trip point or empty pipe indication
	Valve control, if batch control function is activated
Settings	Q = 100%: 0.0001...10000 pulses per second or pulses per unit volume
	Pulse width: 0.05...2000 ms or auto or sym.
	Status: On or Off
Connection	
Basic / Modular IO: Passive	$f \leq 10$ kHz: $I \leq 20$ mA
	$f \leq 10$ Hz: $I \leq 100$ mA
	$U \leq 32$ VDC / $I \leq 100$ mA
Passive	$U_i = 30$ V / $I_i = 100$ mA
	$P_i = 1$ W
	$C_i = 10$ nF / $L_i \sim 0$ mH
Active	U_{nom} 24 VDC / $I < 1$ mA
	$U_0 = 1.5$ V at 10 mA
Namur (acc. to EN 60947-5-6)	Passive

Control input

Function	Freeze output (e.g. during cleaning), forced return to zero, counter and error reset, ext. range selection. Start batching, if batch control function is activated
Settings	Freeze outputs, output zero, reset counter, reset error, start batch (in batch mode)
Connection	
Basic / Modular IO: Active	I_{nom} 16 mA / U_{nom} 24 VDC

Basic / Modular IO: Passive	U ≤ 32 VDC
	U_{on} > 19 VDC / U_{off} < 2.5 V DC
Namur (acc. to EN 60947-5-6)	Active

Low flow cut-off

On	0...±9,999 m/s; 0...20.0% 1
Off	0...±9,999 m/s; 0...19.0% 1

Time constant

Time constant	0...99.9 seconds (set in increments of 0.1)

1 of Q100%, adjustable in 0.1% increments for every mA and pulse output

I/O-module combination possibilities

Communication	Basic I/O	Ex-i I/O	Modular I/O
Current output			
Active / passive	■	■	■
HART	■	■	■
Pulse and status output			
Active			■
Passive	■	■	■
Namur (acc. to EN 60947-5-6)			■
Control input			
Active			■
Passive	■	■	■
Namur (acc. to EN 60947-5-6)			■
Foundation Fieldbus			
Foundation Fieldbus (pending)		■	■
Profibus			
Profibus PA		■	■
Profibus DP			■
Protection			
Ex-d / e	■	■	■

■ standard ■ optional □ on request

Note:

Ex-i I/O: up to 1 additional in-/output module possible (see I/O-module combinations)

Modular I/O: up to 2 additional in-/output module possible (see I/O-module combinations)

I/O modules

1	I/O	2	1st module	3	2nd module	
1	Basic	0	no module possible	0	no module possible	
2	Ex-i (Ia + Pp)	1	Ex-i (Ia + Pp/Cp)			
3	Ex-i (Ip + Pp)	2	Ex-i (Ip + Pp/Cp)			
4	Modular (Ia + Pa)	8	no module	8	no module	
6	Modular (Ia + Pp)	A	Ia	A	Ia	Ia = current output - active
7	Modular (Ia + Pn)	B	Ip	B	Ip	Ip = current output - passive
8	Modular (Ip + Pa)	C	Pa/Sa	C	Pa/Sa	Pa/Sa = pulse/status output - active, high current
B	Modular (Ip + Pp)	E	Pp/Sp	E	Pp/Sp	Pp/Sp = pulse/status output - passive, high current
C	Modular (Ip + Pn)	F	Pn/Sn	F	Pn/Sn	Pn/Sn = pulse/status output - passive, Namur
D	Profibus PA	G	Ca	G	Ca	Ca = control input - active, high current
E	Foundation Fieldbus (1)	H	Cn	H	Cn	Cn = control input - active, Namur
F	Profibus DP	K	Cp	K	Cp	Cp = control input - passive, high current

(1) in preparation

The **IFC 300 with standard basic I/O** covers almost all applications, having 4 I/Os:

- active/passive current output (+HART)
- passive pulse/status output
- passive status output
- passive status output / control input

The I/O-module combination is thus 1-0-0 (see above).

The **IFC 300 with modular I/O** can be tailor-made to any application:

- Suppose you require a converter with passive pulse output and 3 passive current outputs. The I/O-module combination then becomes B-B-B.
- Suppose you require a converter with 2 active pulse/status outputs. The I/Omodule combination then becomes either 4-C-8 or 8-C-8 (depending on whether active or passive current output is required). The latter '8' indicates that 1 additional module can be added in the future.
- Suppose you require a converter with Profibus PA communication, 1 active current output and 1 passive control input. The I/O-module combination then becomes D-A-K.

For I/O-module combinations, not described in the overview on the right, please consult KROHNE.

Example for combination of I/O's

Basic I/O

1	2	3
1	0	0

Ex- I/O

1	2	3
2	0	0
	1	
	2	
3	0	0
	1	
	2	
D	0	0
	1	
	2	
E	0	0
	1	
	2	

Modular I/O

1	2	3
4	8	8
	A	B
		A
		C
		G
	C	8
		C
		G
	G	8
		G
6	8	8
	A	8
		A
		E
		K
	E	8
		E
		K
	K	8
		K
7	8	8
	A	8
		A
		F
		H
	F	8
		F
		H
	H	8
		H

1	2	3
8	8	8
	B	8
		B
		C
		G
	C	8
		C
		G
	G	8
		G
B	8	8
	B	8
		B
		E
		K
	E	8
		E
		K
	K	8
		K
C	8	8
	B	8
		B
		F
		H
	F	8
		F
		H
	H	8
		H

1	2	3
D	8	8
	A	8
		A
		C
		K
	C	8
		C
		K
	K	8
		K
E	8	8
	A	8
		A
		C
		K
	C	8
		C
		K
	K	8
		K
F	8	0
	A	
	B	
	C	
	D	
	E	
	F	
	G	
	H	
	K	

Full-scale flowrates

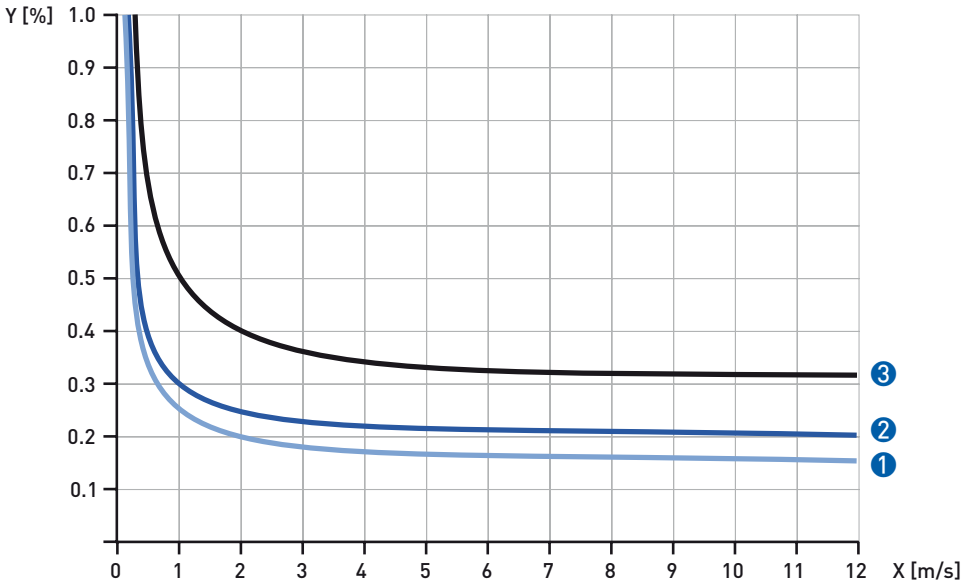
Flowrates in m/s and m^3/h

	$Q_{100\%}$ in m^3/h		
v [m/s]	0.3	3	12
DN [mm]	minimum	nominal	maximum
2.5	0.01	0.05	0.21
4	0.01	0.14	0.54
6	0.03	0.31	1.22
10	0.08	0.85	3.39
15	0.19	1.91	7.63
20	0.34	3.39	13.57
25	0.53	5.30	21.21
32	0.87	8.69	34.74
40	1.36	13.57	54.29
50	2.12	21.21	84.82
65	3.58	35.84	143.35
80	5.43	54.29	217.15
100	8.48	84.82	339.29
125	13.25	132.54	530.15
150	19.09	190.85	763.40
200	33.93	339.30	1357.20
250	53.01	530.13	2120.52
300	76.34	763.41	3053.64
350	103.91	1039.08	4156.32
400	135.72	1357.17	5428.68
450	171.77	1717.65	6870.60
500	212.06	2120.58	8482.32
600	305.37	3053.70	12214.80
700	415.62	4156.20	16624.80
800	542.88	5428.80	21715.20
900	687.06	6870.60	27482.40
1000	848.22	8482.20	33928.80
1200	1221.45	12214.50	48858.00
1400	1433.52	14335.20	57340.80
1600	2171.46	21714.60	86858.40
1800	2748.27	27482.70	109930.80
2000	3393.00	33930.00	135720.00
2200	4105.50	41055.00	164220.00
2400	4885.80	48858.00	195432.00
2600	5733.90	57339.00	229356.00
2800	6650.10	66501.00	266004.00
3000	7634.10	76341.00	305364.00

Flowrates in ft/s and gallons/min

	$Q_{100\%}$ in US gallons/min		
v [ft/s]	1	10	40
DN [inch]	minimum	nominal	maximum
1/10	0.02	0.23	0.93
1/8	0.06	0.60	2.39
1/4	0.13	1.34	5.38
3/8	0.37	3.73	14.94
1/2	0.84	8.40	33.61
3/4	1.49	14.94	59.76
1	2.33	23.34	93.36
1.25	3.82	38.24	152.97
1.5	5.98	59.75	239.02
2	9.34	93.37	373.47
2.5	15.78	159.79	631.16
3	23.90	239.02	956.09
4	37.35	373.46	1493.84
5	58.35	583.24	2334.17
6	84.03	840.29	3361.17
8	149.39	1493.29	5975.57
10	233.41	2334.09	9336.37
12	336.12	3361.19	13444.77
14	457.59	4574.93	18299.73
16	597.54	5975.44	23901.76
18	756.26	7562.58	30250.34
20	933.86	9336.63	37346.53
24	1344.50	13445.04	53780.15
28	1829.92	18299.20	73196.79
32	2390.23	23902.29	95609.15
36	3025.03	30250.34	121001.37
40	3734.50	37346.00	149384.01
48	5377.88	53778.83	215115.30
56	6311.60	63115.99	252463.94
64	9560.65	95606.51	382426.03
72	12100.27	121002.69	484010.75
80	14938.92	149389.29	597557.18
88	18075.97	180759.73	723038.90
96	21511.53	215115.30	860461.20
104	25245.60	252456.02	1009824.08
112	29279.51	292795.09	1171180.37
120	33611.93	336119.31	1344477.23

Accuracy



Y [%]: Deviation of actual measurement value
X [m/s]: Flow velocity

Reference conditions

Medium: Water

Temperature: 20°C / 68°F

Pressure: 1 bar / 14.5 psi

Inlet: ≥ 5DN

OPTIFLUX version	DN [mm]	DN [inches]	Accuracy	Curve
5300	10....100	3/8...10	0.15% of MV + 1 mm/s	❶
2300 / 4300 / 6300	10....1600	3/8...80	0.2% of MV + 1 mm/s	❷
1300	10...150	3/8...6	0.3% of MV + 2 mm/s	❸
2300 / 4300	>1600	>64	0.3% of MV + 2 mm/s	❸
4300 / 5300 / 6300	<10	<3/8	0.3% of MV + 2 mm/s	❸

KROHNE Overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Mass flowmeters
- Ultrasonic flowmeters
- Vortex flowmeters
- Flow controllers
- Level measuring instruments
- Pressure gauges
- Temperature measuring instruments
- Water solutions & analysis
- Oil and gas turnkey solutions

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