

### Model IMT30A Magnetic Flow Transmitter



The IMT30A magnetic flow transmitter can be used with 8400A, 8500A, 9500A, 9600A and 9700A magnetic flow tubes.

- ▶ For simple applications
- ▶ Multiple outputs, incl. active pulse output and RS485 Modbus
- ▶ Excellent price/performance ratio

*Equipment should be installed, operated, serviced, and maintained only by qualified personnel.*

*No responsibility is assumed by Schneider Electric for any consequences arising from the use of this material.*

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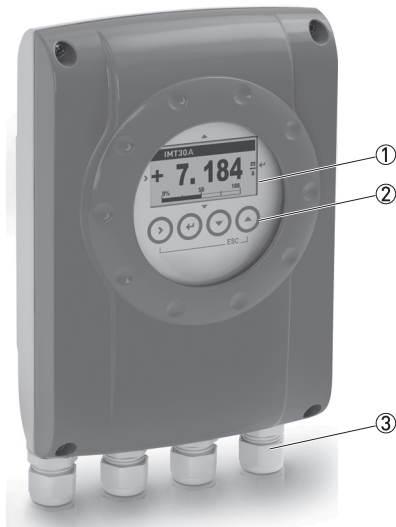
## 1.1 The standard for simple applications

The electromagnetic transmitter **IMT30A** is a perfect choice for measuring volumetric flow in various kinds of applications in the water industry but also in the food and beverage business.

The transmitter can be combined with the flow tubes 8400A, 8500A, 9500A, 9600A and 9700A. The output represents measured values for flow, mass and conductivity.

### This low-cost transmitter has some specific features:

- An active pulse output for a simple system, like driving an electro-mechanical counter
- RS485 Modbus communication with a data processing system
- Extra insulation of the electronic device and housing for high performance in areas with extreme humidity and chances for flooding
- Cost-effective flow measurement for a wide range of process conditions and still a very acceptable degree of accuracy



- ① Large graphic display with 4 magnet keys for operating the transmitter when the housing is closed
- ② 4 push buttons to operate the transmitter when the housing is open
- ③ Supply voltage: 100...230 VAC and 24 VDC

## Highlights

- Available outputs: current output (incl. HART®), active pulse/frequency output, status output and Modbus
- Intuitive operation with touch buttons
- Excellent price/performance ratio
- Modern robust housing design
- All versions with and without display are available
- Simple installation and start-up
- Bright graphic display
- A variety of operating languages integrated as standard
- Certified tests for humidity and vibration
- Extremely quick signal conversion

## Industries

- Water & Wastewater
- Food & Beverage
- Heating, Ventilation & Air Conditioning (HVAC)
- Agriculture
- Steel

## Applications

- Water and wastewater treatment
- Water distribution network
- Irrigation installation
- Water abstraction
- CIP cleaning stations

## 1.2 Options and variants

### Modular transmitter concept with display



The modular concept gives the opportunity to combine the IMT30A with the flow tubes 8400A, 8500A, 9500A, 9600A and 9700A.

With respect to the housing versions, both a compact and a remote design are available. The transmitter for the compact version is directly mounted under a 10° angle to the flow tube for easy reading of the display after rainfall or frost.

If the measuring point is difficult to access or if the ambient conditions like temperature effects and vibration prevent the use of the compact version, a remote transmitter with a wall housing is available.

### Remote version in wall housing with display



A signal cable is used to connect the flow tube to the transmitter for power supply and signal processing. The same electronic unit can be used in both (Compact + Wall) versions without configuration.

### Remote version in wall housing without display



A blind version is the perfect option in a situation where the display is not required and the menu will be approached once a time.

### 1.3 Measuring principle

An electrically conductive fluid flows inside an electrically insulated pipe through a magnetic field. This magnetic field is generated by a current, flowing through a pair of field coils.

Inside of the fluid, a voltage  $U$  is generated:

$$U = v * k * B * D$$

in which:

$v$  = mean flow velocity

$k$  = factor correcting for geometry

$B$  = magnetic field strength

$D$  = inner diameter of flowmeter

The signal voltage  $U$  is picked off by electrodes and is proportional to the mean flow velocity  $v$  and thus the flow rate  $Q$ . A signal transmitter is used to amplify the signal voltage, filter it and convert it into signals for totalizing, recording and output processing.

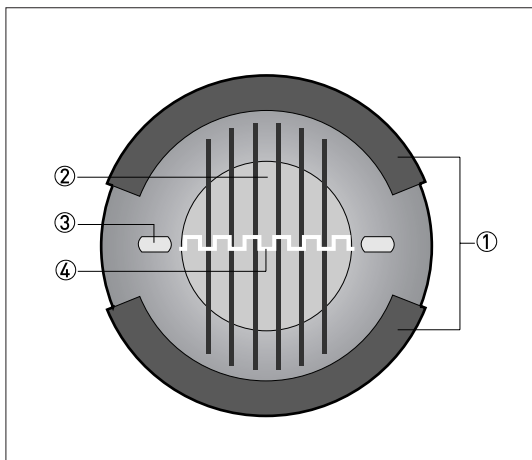


Figure 1-1: Measuring principle

- ① Field coils
- ② Magnetic field
- ③ Electrodes
- ④ Induced voltage (proportional to flow velocity)

## 2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website.*

### Measuring system

Measuring principle	Faraday's law of induction
Application range	Continuous measurement of current volume flow, flow velocity, conductivity, mass flow (at constant density), coil temperature of the flow tube

### Design

Modular construction	The measuring system consists of a flow tube and a transmitter.
<b>Flow tube</b>	
8400A	DN10...150 / 3/8...6"
8500A	DN2.5...100 / 1/10...4"
9500A	DN25...1200 / 1...48"
9600A	DN10...150 / 3/8...6"
9700A	DN10...1200 / 3/8...48"
<b>Transmitter</b>	
Compact (integral) version (C)	IMT30A 2 & IMT30A 4
Wall-mounted remote version (W)	IMT30A M & IMT30A N
<b>Options</b>	
Outputs	Current output (including HART®), pulse output, frequency output, status output and/or limit switch Note: It's not possible to use the pulse/frequency output with the status output at the same time!
Counter	2 internal counters with a max. of 10 counter places (e.g. for counting volume and/or mass units)
Verification	Integrated verification, diagnostic functions: measuring device, empty pipe detection, stabilisation
Communication interfaces	HART® Modbus

<b>Display and user interface</b>	
Graphic display	LC display, backlit white
	Size: 128 x 64 pixels, corresponds to 59 x 31 mm = 2.32" x 1.22"
	Ambient temperatures below -25°C / -13°F may affect the readability of the display.
Operating elements	4 push buttons for operating the transmitter when the housing is open.
	4 magnet keys for operating the transmitter when the housing is closed.
Remote control	Only generic and not device-specific DDs and DTMs available!
	PACTware™ (including Device Type Manager (DTM))
	HART® Communicator
	AMS®
	All DTMs and drivers are available free of charge from the manufacturer's website.
<b>Display functions</b>	
Operating menu	Setting the parameters using 2 measuring pages, 1 status page, 1 graphic page (measured values and graphics are freely adjustable)
Language display texts (as language package)	Standard: English, French, German, Dutch, Portuguese, Swedish, Spanish, Italian
	Eastern Europe: English, Slovenian, Czech, Hungarian
	Northern Europe: English, Danish, Polish, Finnish
	Southern Europe: English, Turkish
	China: English, German, Chinese (check <a href="http://www.BuyAutomation.com">www.BuyAutomation.com</a> for availability)
Russia: English, German, Russian	
Units	Metric, British and US units selectable as required from lists for volume / mass flow and counting, flow velocity, electrical conductivity, temperature

### Measuring accuracy

Max. measuring accuracy	<b>Standard:</b> ±0.5% of the measured value ± 1 mm/s
	<b>Option (optimised accuracy with extended calibration):</b> ±0.25% of the measured value ± 1.5 mm/s
	For detailed information and accuracy curves refer to <i>Measuring accuracy</i> on page 19.
	Special calibrations are available on request.
	Current output electronics: ±10 µA; ±100 ppm/°C (typically: ±30 ppm/°C)
Repeatability	±0.1%



## Operating conditions

<b>Temperature</b>	
Process temperature	Refer to technical data for the flow tube.
Ambient temperature	Depending on the version and combination of outputs.
	It is a good idea to protect the transmitter from external heat sources such as direct sunlight as higher temperatures reduce the life cycle of all electronic components.
	Ambient temperatures below -25°C / -13°F may affect the readability of the display.
Storage temperature	-40...+70°C / -40...+158°F
<b>Pressure</b>	
Medium	Refer to technical data for the flow tube.
Ambient pressure	Atmosphere
<b>Chemical properties</b>	
Electrical conductivity	All media except for water: $\geq 5 \mu\text{S}/\text{cm}$ (also refer to the technical data for the flow tube)
	Water: $\geq 20 \mu\text{S}/\text{cm}$
State of aggregation	Conductive, liquid media
Solid content (volume)	$\leq 10\%$
Gas content (volume)	$\leq 3\%$
Flow rate	For detailed information, refer to chapter "Flow tables".
<b>Other conditions</b>	
Ingress protection according to IEC 60529	IP66/67 (according to NEMA 4/4X)

## Installation conditions

Installation	For detailed information, refer to chapter "Installation".
Inlet / outlet sections	Refer to technical data for the flow tube.
Dimensions and weight	For detailed information refer to chapter "Dimensions and weight".

## Materials

Transmitter housing	Aluminum with a polyester topcoat
Flow tube	For housing materials, process connections, liners, grounding electrodes and gaskets, refer to technical data for the flow tube.

### Electrical connection

General	Electrical connection is carried out in conformity with the VDE 0100 directive "Regulations for electrical power installations with line voltages up to 1000 V" or equivalent national specifications.
Power supply	100...230 VAC (-15% / +10%), 50/60 Hz; 240 VAC + 5% is included in the tolerance range.
	24 VDC (-30% / +30%)
Power consumption	AC: 15 VA
	DC: 5.6 W
Signal cable	Only necessary for remote versions.
	<b>DS 300 (type A)</b> Max. length: 600 m / 1968 ft (depending on electrical conductivity and flow tube version)
Cable entries	Standard: M20 x 1.5 (8...12 mm)
	Option: 1/2 NPT, PF 1/2

### Outputs

General	All outputs are electrically isolated from each other and from all other circuits.
	All operating data and output values can be adjusted.
Description of abbreviations	$U_{\text{ext}}$ = external voltage; $R_L$ = load + resistance; $U_o$ = terminal voltage; $I_{\text{nom}}$ = nominal current

<b>Current output</b>	
Output data	Flow
Settings	<b>Without HART®</b>
	Q = 0%: 0...20 mA; Q = 100%: 10...21.5 mA
	Error identification: 20...22 mA
	<b>With HART®</b>
	Q = 0%: 4...20 mA; Q = 100%: 10...21.5 mA
	Error identification: 3...22 mA
<b>Operating data</b>	<b>Basic I/Os</b>
Active	Observe connection polarity.
	$U_{int, nom} = 20 \text{ VDC}$
	$I \leq 22 \text{ mA}$
	$R_L \leq 750 \Omega$
	HART® at terminals A
Passive	Observe connection polarity.
	$U_{ext} \leq 32 \text{ VDC}$
	$I \leq 22 \text{ mA}$
	$U_0 \leq 2 \text{ V at } I = 22 \text{ mA}$
	$R_{L, max} = (U_{ext} - U_0) / I_{max}$
	HART® at terminals A
<b>HART®</b>	
Description	HART® protocol via active and passive current output
	HART® version: V5
	Universal Common Practice HART® parameter: completely supported
Load	$\geq 230 \Omega$ at HART® test point; Note maximum load for current output!
Multi-drop mode	Yes, current output = 4 mA
	Multi-drop address adjustable in operation menu 1...15

<b>Pulse or frequency output</b>	
Output data	Flow
Function	Can be set as a pulse output or frequency output
Pulse rate/frequency	0.01...10000 pulses/s or Hz
Settings	Pulses per volume or mass unit or max. frequency for 100% flow
	Pulse width: adjustable as automatic, symmetric or fixed (0.05...2000 ms)
<b>Operating data</b>	<b>Basic I/Os + Modbus</b>
Active	This output is intended to drive mechanical or electronic counters directly.
	$U_{int, nom} \leq 20 \text{ V}$ $R_V = 1 \text{ k}\Omega$ $C = 1000 \text{ }\mu\text{F}$
	<b>High current mechanical counter</b> $f_{max} \leq 1 \text{ Hz}$
	<b>Low current mechanical counter</b> $I \leq 20 \text{ mA}$ $R_L \leq 10 \text{ k}\Omega$ for $f \leq 1 \text{ kHz}$ $R_L \leq 1 \text{ k}\Omega$ for $f \leq 10 \text{ kHz}$ closed: $U_0 \geq 12.5 \text{ V}$ at $I = 10 \text{ mA}$ open: $I \leq 0.05 \text{ mA}$ at $U_{nom} = 20 \text{ V}$
Passive	Independent of connection polarity.
	$U_{ext} \leq 32 \text{ VDC}$
	$f_{max}$ in operating menu set to $f_{max} \leq 100 \text{ Hz}$ : $I \leq 100 \text{ mA}$ open: $I \leq 0.05 \text{ mA}$ at $U_{ext} = 32 \text{ VDC}$ closed: $U_{0, max} = 0.2 \text{ V}$ at $I \leq 10 \text{ mA}$ $U_{0, max} = 2 \text{ V}$ at $I \leq 100 \text{ mA}$
	$f_{max}$ in operating menu set to $100 \text{ Hz} < f_{max} \leq 10 \text{ kHz}$ : $I \leq 20 \text{ mA}$ open: $I \leq 0.05 \text{ mA}$ at $U_{ext} = 32 \text{ VDC}$ closed: $U_{0, max} = 1.5 \text{ V}$ at $I \leq 1 \text{ mA}$ $U_{0, max} = 2.5 \text{ V}$ at $I \leq 10 \text{ mA}$ $U_{0, max} = 5.0 \text{ V}$ at $I \leq 20 \text{ mA}$

<b>Low flow cut off</b>	
Function	Switching point and hysteresis separately adjustable for each output, counter and the display
Switching point	Set in increments of 0.1%.
	0...20% (current output, frequency output) or 0...±9.999 m/s (pulse output)
Hysteresis	Set in increments of 0.1%.
	0...5% (current output, frequency output) or 0...5 m/s (pulse output)
<b>Time constant</b>	
Function	The time constant corresponds to the elapsed time until 67% of the end value has been reached according to a step function.
Settings	Set in increments of 0.1 seconds.
	0...100 seconds
<b>Status output / limit switch</b>	
Function and settings	Adjustable as automatic measuring range conversion, display of flow direction, counter overflow, error, switching point or empty pipe detection
	Valve control with activated dosing function
	Status and/or control: ON or OFF
<b>Operating data</b>	
Passive	<b>Basic I/Os + Modbus</b>
	Independent of connection polarity. $U_{ext} \leq 32 \text{ VDC}$ $I \leq 100 \text{ mA}$ open: $I \leq 0.05 \text{ mA}$ at $U_{ext} = 32 \text{ VDC}$ closed: $U_0 = 0.2 \text{ V}$ at $I \leq 10 \text{ mA}$ $U_0 = 2 \text{ V}$ at $I \leq 100 \text{ mA}$
<b>Modbus</b>	
Description	Modbus RTU, Master / Slave, RS485
Address range	1...247
Broadcast	Supported with function code 16
Supported Baud rate	1200, 2400, 3600, 4800, 9600, 19200, 38400, 57600, 115200 Baud

### Approvals and certificates

CE	This device fulfils the statutory requirements of the relevant EU directives. The manufacturer certifies successful testing of the product by applying the CE mark.
	For full information of the EU directives & standards and the approved certifications, please refer to the EU declaration or the manufacturer website.
<b>Other standards and approvals</b>	
Vibration resistance	Tested according to IEC 60068-2-64
NAMUR	NE 21, NE 43, NE 53

## 2.2 Dimensions and weight

### 2.2.1 Housing

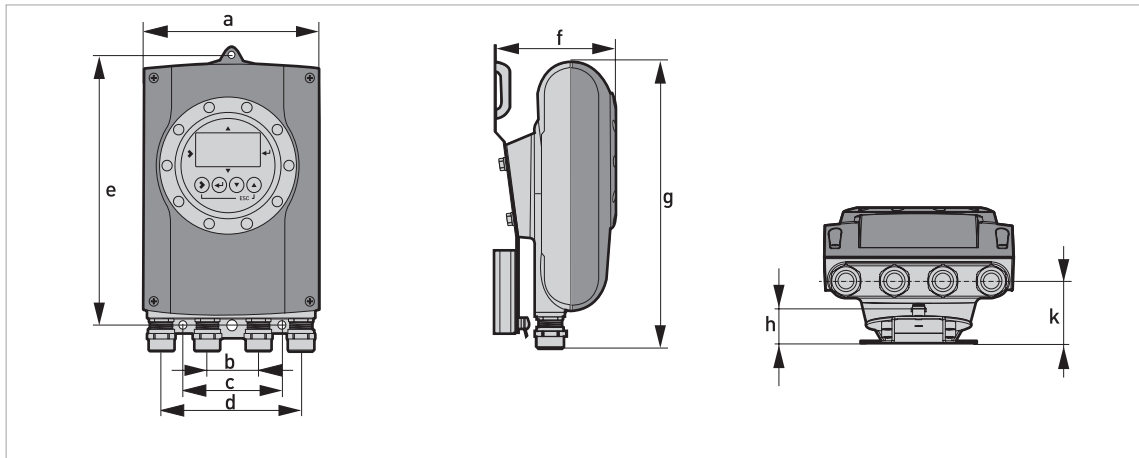


Figure 2-1: Dimensions of wall version

	Dimensions [mm]									Weight [kg]
	a	b	c	d	e	f	g	h	k	
Version with & without display	157	40	80	120	248	111.7	260	28.4	51.3	1.9

Table 2-1: Dimensions and weight in mm and kg

	Dimensions [inch]									Weight [lb]
	a	b	c	d	e	f	g	h	k	
Version with & without display	6.18	1.57	3.15	4.72	9.76	4.39	10.24	1.12	2.02	4.2

Table 2-2: Dimensions and weight in inch and lb

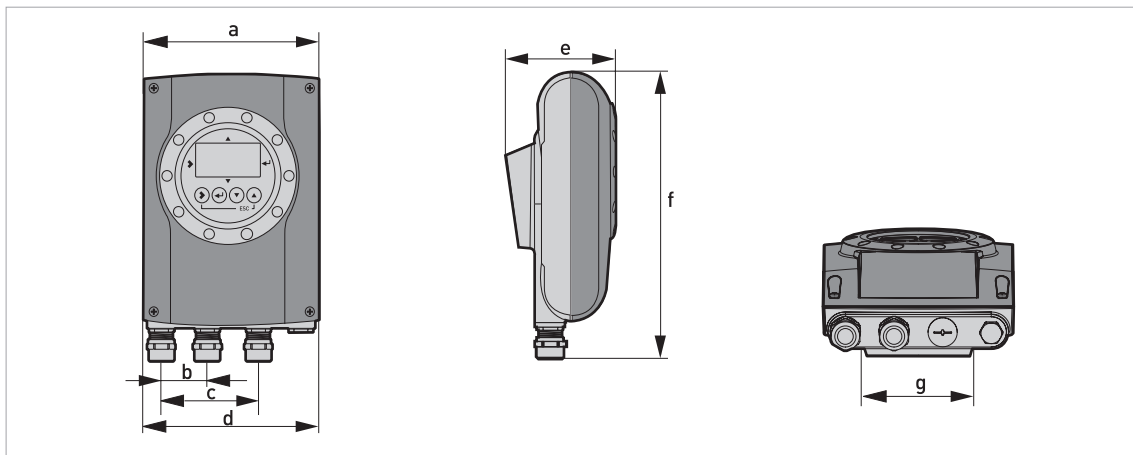


Figure 2-2: Dimensions of compact version

	Dimensions [mm]							Weight [kg]
	a	b	c	d	e	f	g	
Version with & without display	157	40	80	148.2	101	260	95.5	1.8

Table 2-3: Dimensions and weight in mm and kg

	Dimensions [inch]							Weight [lb]
	a	b	c	d	e	f	g	
Version with & without display	6.18	1.57	3.15	5.83	3.98	10.24	3.76	4.0

Table 2-4: Dimensions and weight in inch and lb

## 2.2.2 Mounting plate, wall version

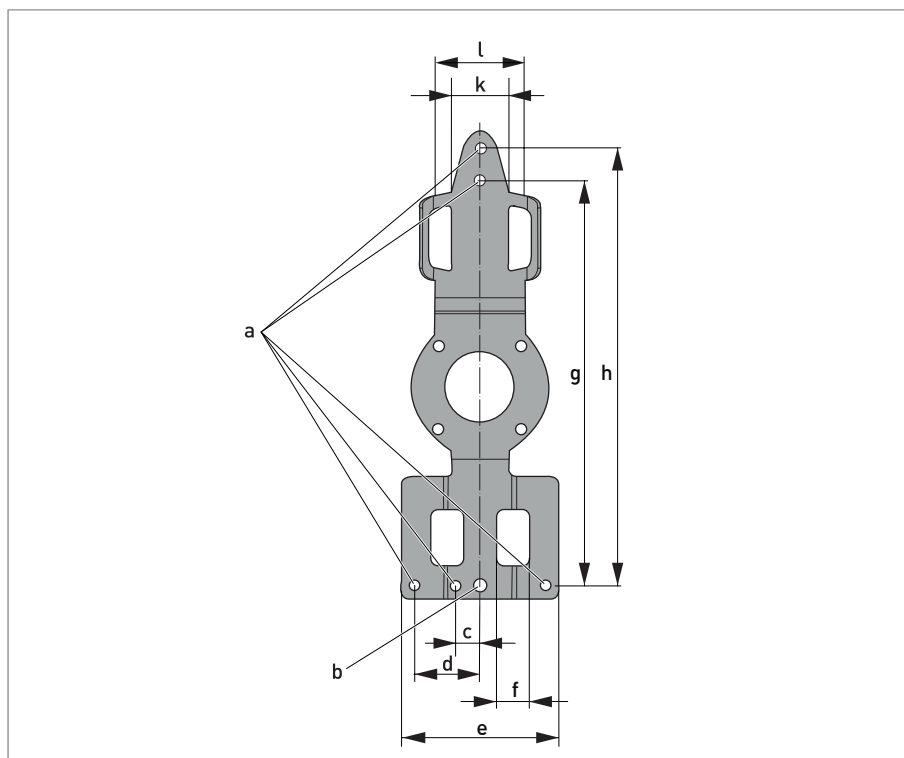


Figure 2-3: Dimensions of mounting plate, wall version

	[mm]	[inch]
a	Ø6.5	Ø0.26
b	Ø8.1	Ø0.3
c	15	0.6
d	40	1.6
e	96	3.8
f	20	0.8
g	248	9.8
h	268	10.5
k	35	1.4
l	55	2.2

Table 2-5: Dimensions in mm and inch



## 2.3 Flow tables

	Q <sub>100 %</sub> in m <sup>3</sup> /h			
v [m/s]	0.3	1	3	12
DN [mm]	Minimum flow	Nominal flow		Maximum flow
2.5	0.005	0.02	0.05	0.21
4	0.01	0.05	0.14	0.54
6	0.03	0.10	0.31	1.22
10	0.08	0.28	0.85	3.39
15	0.19	0.64	1.91	7.63
20	0.34	1.13	3.39	13.57
25	0.53	1.77	5.30	21.21
32	0.87	2.90	8.69	34.74
40	1.36	4.52	13.57	54.29
50	2.12	7.07	21.21	84.82
65	3.58	11.95	35.84	143.35
80	5.43	18.10	54.29	217.15
100	8.48	28.27	84.82	339.29
125	13.25	44.18	132.54	530.15
150	19.09	63.62	190.85	763.40
200	33.93	113.10	339.30	1357.20
250	53.01	176.71	530.13	2120.52
300	76.34	254.47	763.41	3053.64
350	103.91	346.36	1039.08	4156.32
400	135.72	452.39	1357.17	5428.68
450	171.77	572.51	1717.65	6870.60
500	212.06	706.86	2120.58	8482.32
600	305.37	1017.90	3053.70	12214.80
700	415.62	1385.40	4156.20	16624.80
800	542.88	1809.60	5428.80	21715.20
900	687.06	2290.20	6870.60	27482.40
1000	848.22	2827.40	8482.20	33928.80
1200	1221.45	3421.20	12214.50	48858.00

Table 2-6: Flow rate in m/s and m<sup>3</sup>/h

	Q <sub>100</sub> % in US gallons/min			
v [ft/s]	1	3.3	10	40
DN [inch]	Minimum flow	Nominal flow		Maximum flow
1/10	0.02	0.09	0.23	0.93
1/6	0.06	0.22	0.60	2.39
1/4	0.13	0.44	1.34	5.38
3/8	0.37	1.23	3.73	14.94
1/2	0.84	2.82	8.40	33.61
3/4	1.49	4.98	14.94	59.76
1	2.33	7.79	23.34	93.36
1.25	3.82	12.77	38.24	152.97
1.5	5.98	19.90	59.75	239.02
2	9.34	31.13	93.37	373.47
2.5	15.78	52.61	159.79	631.16
3	23.90	79.69	239.02	956.09
4	37.35	124.47	373.46	1493.84
5	58.35	194.48	583.24	2334.17
6	84.03	279.97	840.29	3361.17
8	149.39	497.92	1493.29	5975.57
10	233.41	777.96	2334.09	9336.37
12	336.12	1120.29	3361.19	13444.77
14	457.59	1525.15	4574.93	18299.73
16	597.54	1991.60	5975.44	23901.76
18	756.26	2520.61	7562.58	30250.34
20	933.86	3112.56	9336.63	37346.53
24	1344.50	4481.22	13445.04	53780.15
28	1829.92	6099.12	18299.20	73196.79
32	2390.23	7966.64	23902.29	95609.15
36	3025.03	10082.42	30250.34	121001.37
40	3734.50	12447.09	37346.00	149384.01
48	5377.88	17924.47	53778.83	215115.30

Table 2-7: Flow rate in ft/s and US gallons/min

## 2.4 Measuring accuracy

Every electromagnetic flowmeter is calibrated by direct volume comparison. The wet calibration validates the performance of the flowmeter under reference conditions against accuracy limits.

The accuracy limits of electromagnetic flowmeters are typically the result of the combined effect of linearity, zero point stability and calibration uncertainty.

### Reference conditions

- Medium: water
- Temperature: +5...+35°C / +41...+95°F
- Operating pressure: 0.1...5 barg / 1.5...72.5 psig
- Inlet section: ≥ 5 DN; outlet section: ≥ 2 DN

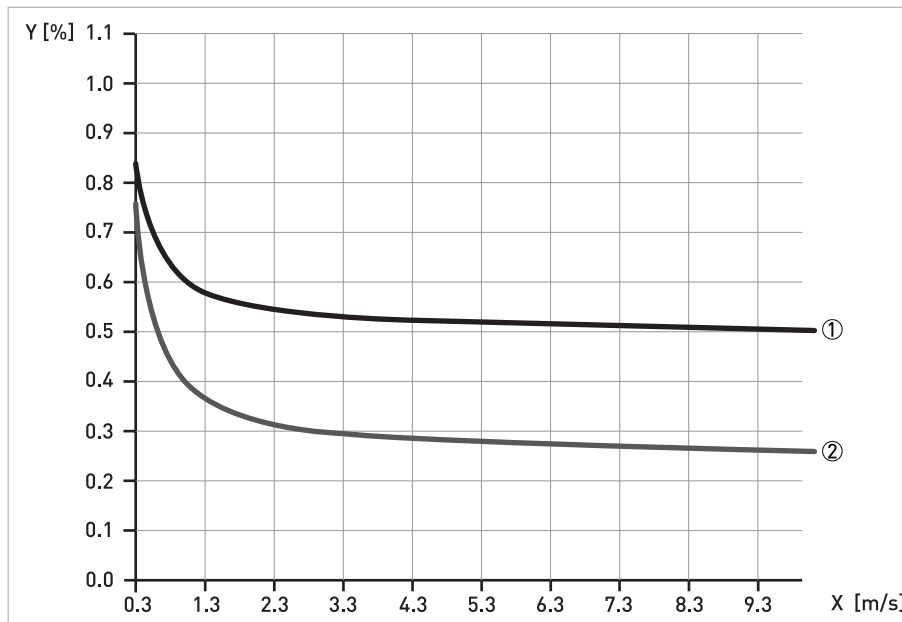


Figure 2-4: Measuring accuracy

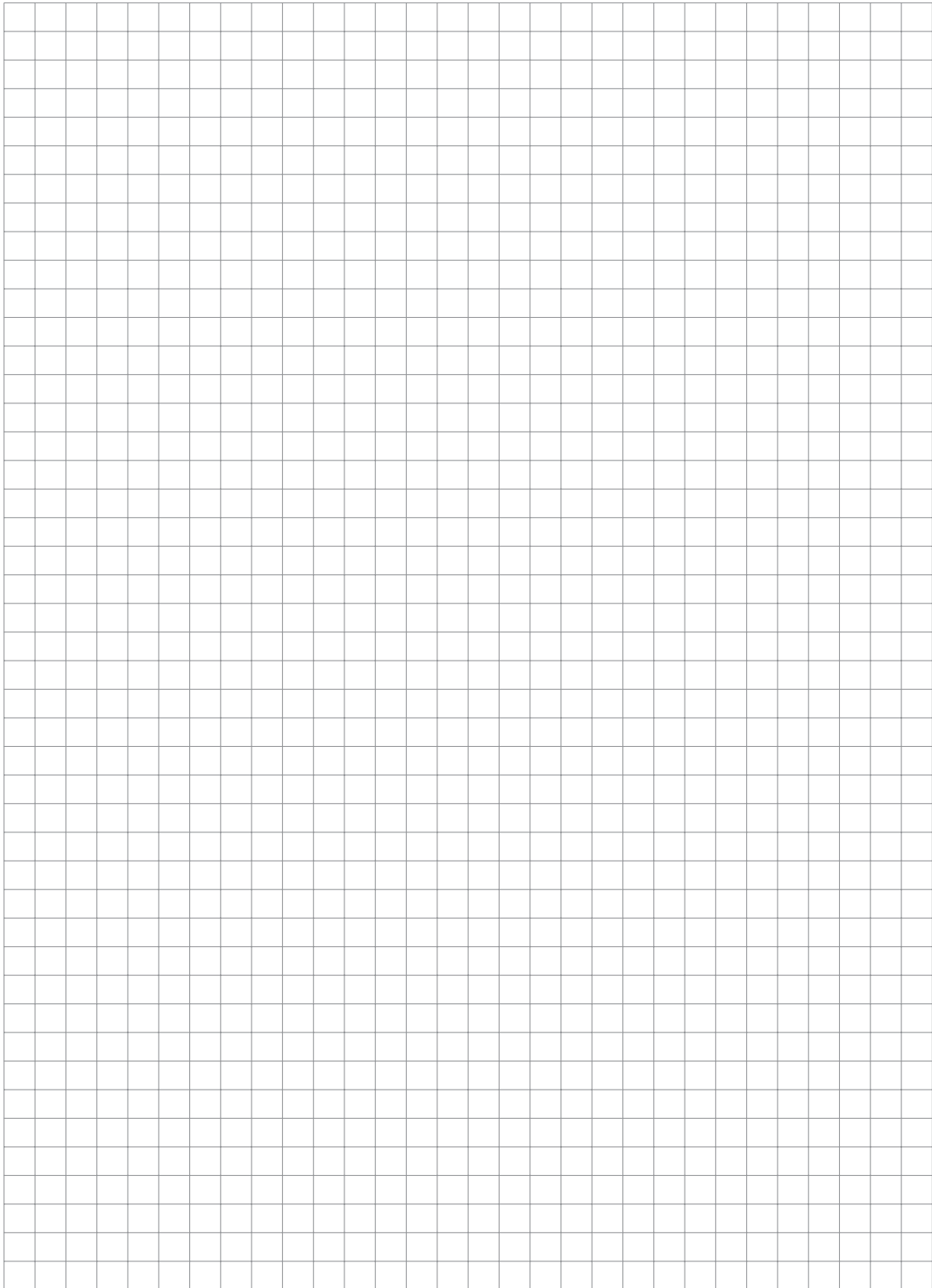
X [m/s]: flow velocity

Y [%]: accuracy of measured value (mv)

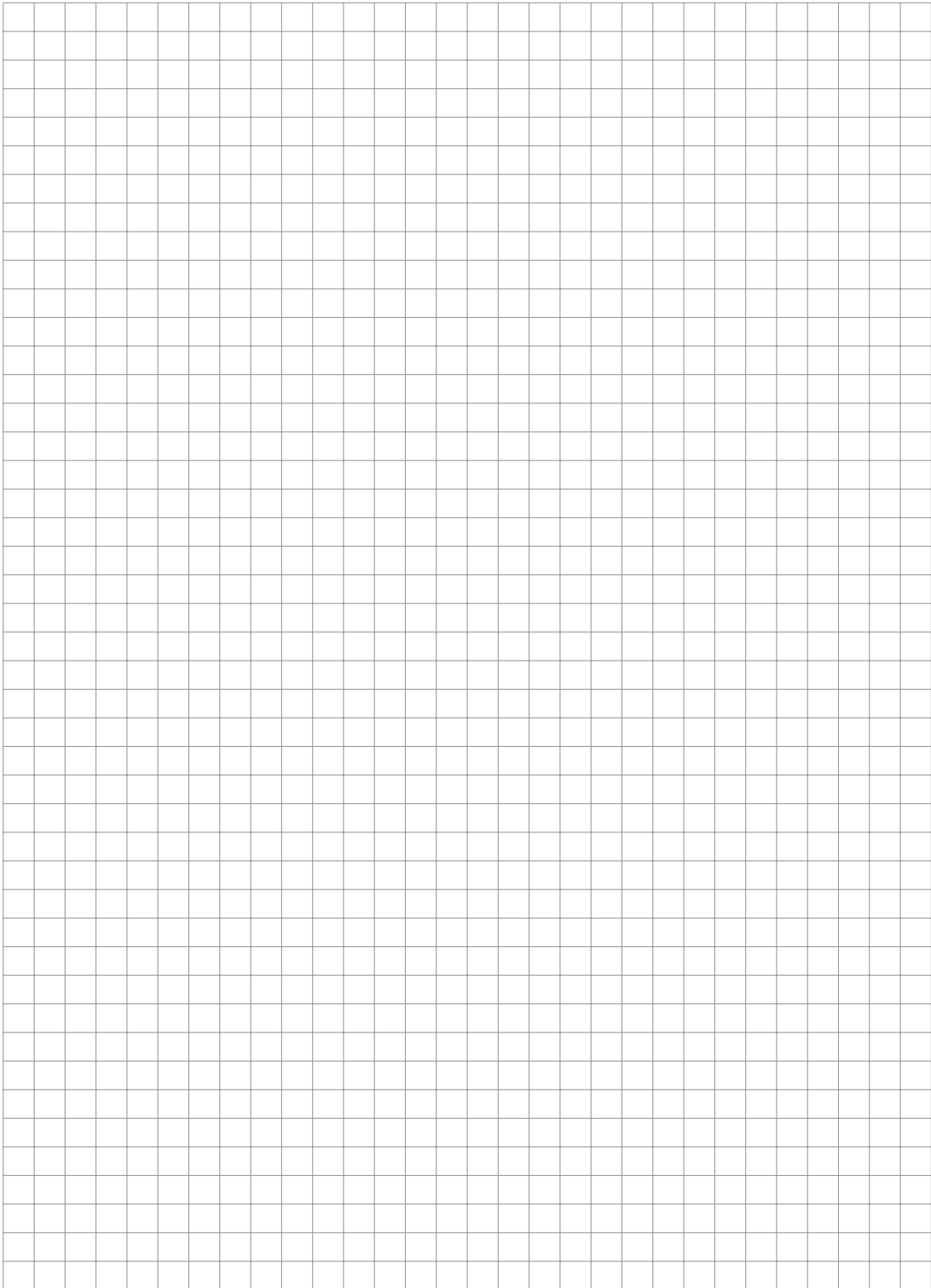
	DN [mm]	DN [inch]	Standard accuracy ①	Optimised accuracy ②
8400A	10...150	3/8...6	±0.5% of mv ± 1 mm/s	only 9500A / 9700A: ±0.25% of mv ± 1.5 mm/s  Extended calibration at 2 points
8500A	2.5...100	1/10...4		
9500A	25...1200	1...48		
9600A	10...150	3/8...6		
9700A	10...1200	3/8...48		

Table 2-8: Measuring accuracy

Model	Description
IMT30A	Magnetic flow transmitter for simple applications used with 8400A, 8500A, 9500A, 9600A and 9700A magnetic flow tubes.
2 4 M N	<b>Type</b> IMT30A (compact without display - Basic IO) IMT30A (compact with display - Basic IO) IMT30A (wall without display - Basic IO) IMT30A (wall with display - Basic IO)
1 A	<b>Power supply</b> 12-24 VDC 100-230 VAC (85-253 VAC, 50/60 Hz)
0	<b>Ex version</b> Without - non Ex
4 5 6	<b>Cable connection</b> 1/2 NPT PF 1/2 M20 x 1.5
5 6 7 8 A B C H K L M R X	<b>Operating manual / operating language</b> See manual selection below / German See manual selection below / English GB See manual selection below / French See manual selection below / Spanish See below / eastern Europe group (GB, CZ, HU, SI, SL, AL, BG & RO) See below / northern Europe group (GB, DK, FI, LT, NO, PL, EE & LV) See below / southern Europe group (GB, TR) See manual selection below / Italian See manual selection below / Portuguese See manual selection below / Dutch See manual selection below / Swedish See manual selection below / Chinese (check <a href="http://www.BuyAutomation.com">www.BuyAutomation.com</a> for availability) See manual selection below / Russian
0	<b>Custody transfer</b> Without
0	<b>Process diagnostics</b> Standard
1	<b>Transmitter housing</b> Standard
1 R	<b>Communication</b> Basic IO (4-20 mA / HART + pulse / frequency + status output) Basic IO + RS485 Modbus
0	<b>1st IO module</b> Without, no module possible
0	<b>2nd IO module</b> Without, no module possible
0	<b>Reference method</b> Standard
0 2 3	<b>Tag plate (Wall only)</b> Standard 316/1.4401 tag plate (120 x 46 mm) 316/1.4401 tag plate (67 x 25 mm)
1 3	<b>Manuals</b> German English







## ORDERING INSTRUCTIONS

1. Model Number.
2. Flow Data:
  - a. Maximum, minimum, and normal flow rate.
  - b. Fluid composition and viscosity at operating temperatures.
  - c. Fluid density or relative density (specific gravity).
  - d. Maximum, minimum and normal operating temperatures.
  - e. Maximum, minimum and normal operating pressures.
  - f. Mating pipe schedule.
  - g. Type and location (distance) of upstream disturbance.
3. Calibration Information (analog output only); maximum flow rate 20 mA output.
4. Electric Classification.
5. Optional Selections and Accessories.
6. Customer Tag Data.

## FLOWEXPERTPRO SIZING APPLICATION

Website  
[www.FlowExpertPro.com](http://www.FlowExpertPro.com)



App Store (Apple®)



Google Play™ Store  
(Android®)



## ADDITIONAL PRODUCTS

These product lines offer a broad range of measurement and instrument products, including solutions for pressure, flow, analytical, temperature, positioning, controlling and recording.

For a list of these offerings, visit our website at:

[www.se.com](http://www.se.com)

Schneider Electric Systems USA, Inc. Global Customer Support  
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