

Model 8500A Magnetic Flowmeter wafer version



The 8500A magnetic flow tube can be used with IMT30A, IMT31A and IMT33A magnetic flow transmitter.

- ▶ Exceptional long-term stability and accuracy
- ▶ For highly aggressive and abrasive fluids
- ▶ Full vacuum-resistant with high-tech ceramic liners

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 Solution with high-tech ceramics

The **8500A** is one of the most accurate flowmeters available in the market today. This is the result of a special tube design with conical parts, optimizing the flow profile.



- ① Wafer design
- ② Ceramic liner
- ③ Cermet or Platinum electrodes

Highlights

- Excellent long-term stability and accuracy
- Unique flow tube
- Fused in-place Cermet or Platinum electrodes
- Custody transfer standard of international metrological authorities
- For highly aggressive and abrasive fluids
- Resistant to a full vacuum
- High-tech ceramic liners
- Insensitive against temperature shocks

Industries

- Chemical
- Paper & Pulp
- Water and wastewater
- Minerals & Mining
- Food & beverage
- Machinery

Applications

- Master transfer meter
- Precise volumetric dosing of additives
- Chemical injection
- For acids, alkaline, abrasive slurries and many other aggressive media

1.2 Options and variants



The 8500A wafer version is available in a diameter range of DN2.5 up to DN100 - 1/10" up to 4".

The flow tube is offered in a large range of pressure ratings and is configurable with the IMT30A, IMT31A and IMT33A signal transmitter.

Can be ordered in stainless steel version and is also optionally suitable in hazardous areas.

Grounding rings are available in high grade alloys.

The installation of the 8500A can be simplified by choosing the virtual reference option. Grounding rings can then be omitted. This option can only be combined with the IMT33A signal transmitter.

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.

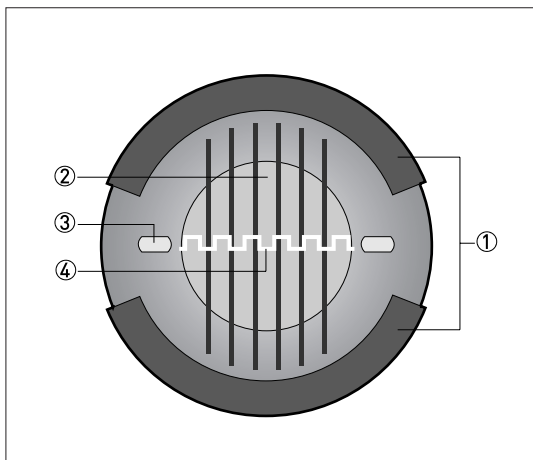


Figure 1-1: Measuring principle

- 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
Application range	Electrically conductive fluids
Measured value	
Primary measured value	Flow velocity
Secondary measured value	Volume flow, mass flow, electrical conductivity, coil temperature

Design

Features	Wafer version with optimized flow tube
Modular construction	The measurement system consists of a flow tube and a signal transmitter. It is available as compact and as separate version. More information about the signal transmitter can be found in the documentation of the signal transmitter.
Compact version	With IMT30A 4 signal transmitter
	With IMT31A 4 signal transmitter
	With IMT33A 4 signal transmitter DN2.5...15 / 1/10...1/2" is only available with aluminum signal transmitter housing
Remote version	In wall (W) mount version with IMT30A N signal transmitter
	In wall (W) mount version with IMT31A N signal transmitter
	In field (F) or wall (W) version with IMT33A H or IMT33A N signal transmitter
Nominal diameter	DN2.5...100 / 1/10...4"

Measuring accuracy

Maximum measuring error	IMT30A: down to 0.5% of the measured value ± 1 mm/s
	IMT31A: down to 0.3% of the measured value ± 1 mm/s
	IMT33A: down to 0.15% of the measured value ± 1 mm/s
	The maximum measuring error depends on the installation conditions.
	For detailed information refer to <i>Measuring accuracy</i> on page 12.
Repeatability	$\pm 0.1\%$ of MV, minimum 1 mm/s
Calibration	Standard: 2 point calibration by direct volume comparison.

Operating conditions

Temperature	
Process temperature	Compact version: -40...+140°C / -40... +284°F Size DN2.5...15 / 1/10...½": -20...+120°C / -4... +248°F
	Remote version: -40...+180°C / -40...+356°F Size DN2.5...15 / 1/10...½": -20...+180°C / -4... +356°F
	For Ex versions different temperature ranges are applicable. Please see the relevant Ex documentation for details.
Maximum temperature change (shock)	DN2.5...25 / 1/10...1": < 3 K/s DN40...100 / 1½...4": < 0.2 K/s
Ambient temperature	-40...+65°C / -40...+149°F
	For Ex versions different temperature ranges are applicable. Please see the relevant Ex documentation for details.
Storage temperature	-50...+70°C / -58...+158°F
Measurement range	-12...+12 m/s / -40...+40 ft/s
Pressure	
Ambient	Atmospheric
Nominal flange pressure	
EN 1092-1	Standard:
	DN100: PN 16
	DN2.5...80: PN 40
	Option:
DN100: PN 25	
ASME B16.5	Standard:
	1/10...4": 150 lb
	Option:
1/10...4": 300 lb	
Vacuum load	0 mbar / 0 psi
Pressure ranges for secondary containment	Pressure resistant up to 40 bar / 580 psi
	Burst pressure up to ± 160 bar / 2320 psi
Chemical properties	
Physical condition	Liquids
Electrical conductivity	Non water:
	DN25...100 / 1...4": ≥ 1 μS/cm
	DN4...15 / 3/8...½": ≥ 5 μS/cm
	DN2.5 / 1/10": ≥ 10 μS/cm
	Demineralised cold water:
DN2.5...100 / 1/10...4": ≥ 20 μS/cm	
Permissible gas content (volume)	≤ 5%

Permissible solid content (volume)	IMT30A: ≤ 10%
	IMT31A: ≤ 10%
	IMT33A: ≤ 70%

Installation conditions

Installation	Take care that the flow tube is always fully filled.
	For detailed information refer to the manual of the flow tube and signal transmitter.
Flow direction	Forward and reverse.
	Arrow on the flow tube indicates positive flow direction.
Inlet run	≥ 5 DN (without disturbing flow, after a single 90° bend)
	≥ 10 DN (after a double bend = 2 x 90°)
Outlet run	≥ 2 DN
Dimensions and weights	For detailed information refer to <i>Dimensions and weights</i> on page 14.

Materials

Flow tube housing	DN2.5...15 / 1/10...1/2": stainless steel 1.4408 / 316
	DN25...100 / 1...4": stainless steel 1.4306 / 304L
Flow tube	Ceramic
Connection box (remote versions only)	Standard:
	Polyurethane coated die-cast aluminum
	Option:
	Stainless steel
Grounding rings	Standard:
	Stainless steel
	Option:
	Hastelloy® C, titanium, tantalum
	Grounding rings can be omitted with virtual reference option for the IMT33A signal transmitter.
Mounting materials	Standard: rubber centering sleeves
	Option: stud bolts and nuts in stainless steel or galvanized steel
Gaskets	DN2.5...15 / 1/10...1/2"; O-rings: FKM, EPDM, FFKM DN25...100 / 1...4"; flat gaskets: filled PTFE, Graphite, PTFE / PF-29
Measuring electrodes	DN2.5...25 / 1/10...1": Cermet
	DN40...100 / 1 1/2...4": Platinum

Process connections

EN 1092-1	Standard:
	DN100: PN 16
	DN2.5...80: PN 40
	Option:
	DN100: PN 25
ASME	Standard:
	1/10...4": 150 lb
	Option:
	1/10...4": 300 lb
JIS	DN2.5...100: 10...20 K

Electrical connections

For more details; see the relevant documentation of the signal transmitter	
Signal cable (remote versions only)	
Type A (DS)	In combination with the IMT31A and IMT33A signal transmitter Standard cable, double shielded. Max. length: 600 m / 1950 ft (depends on electrical conductivity and flow tube).
Type B (BTS)	Only in combination with the IMT33A signal transmitter Optional cable, triple shielded. Max. length: 600 m / 1950 ft (depends on electrical conductivity and flow tube).
I/O	For more details of I/O options, including data streams and protocols, see technical datasheet of the relevant signal transmitter.

Approvals and certifications

CE	
This device fulfills the statutory requirements of the 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 of Conformity or the manufacturer website.
Hazardous areas	
Non-Ex	Standard
ATEX	KEMA 04 ATEX 2126 X
	ATEX II 2 GD EEx me ia IIC T6...T3
	ATEX II 2 GD EEx de ia IIC T6...T3
	For more details, see Ex documentation of flow tube and signaltransmitter.
FM	Class I, Div 2, groups A, B, C and D
	Class II, Div 2, groups F and G
	Class III, Div 2, groups F and G
CSA	Class I, Div 2, groups A, B, C and D
	Class II, Div 2, groups F and G
IECEX	Pending
NEPSI	GYJ15.1313X
	Ex e ia mb IIC T6...T3 and Ex d e ia IIC T6...T3
Other approvals and standards	
Custody transfer	Standard:
	Without verification
	Option:
	Cold water: MI-001 type examination for DN25...100 / 1...4"
	Liquids other than water: MI-005 type examination for DN25...100 / 1...4"
Only in combination with the IMT33A signal transmitter.	
Protection category acc. to IEC 60529	Standard:
	IP66/67, NEMA 4/4X/6
	Option:
	IP68, NEMA 6P
	IP68 is only available for remote designs and with a stainless steel connection box.
IP67/69 with (stainless steel) signal transmitter	
Hygiene	FDA approved materials.
Shock test	IEC 60068-2-27
	30 g for 18 ms
Vibration test	IEC 60068-2-64
	f = 20...2000 Hz, rms = 4.5 g, t = 30 min.

2.2 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

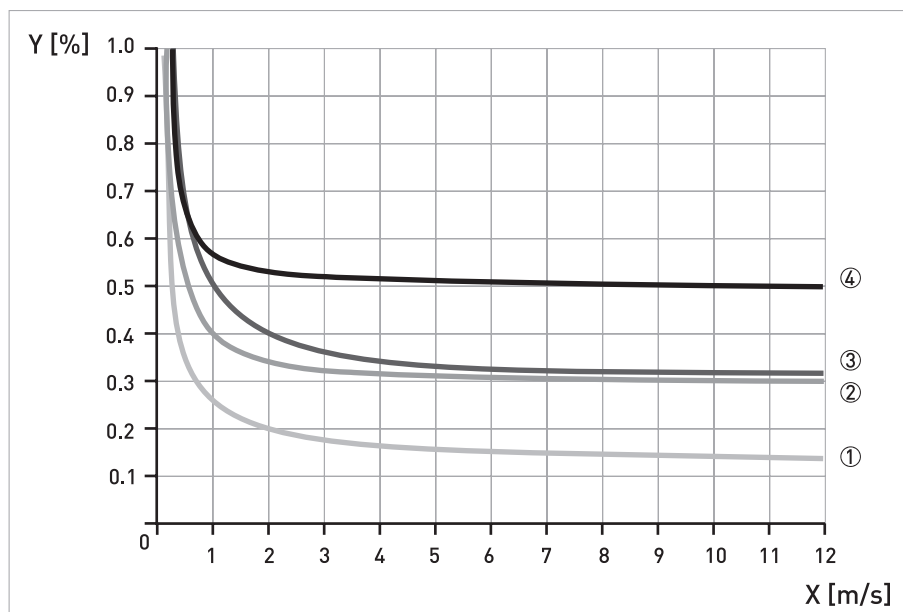


Figure 2-1:
X [m/s]: flow velocity
Y [%]: deviation from the actual measured value (mv)

In combination with the IMT33A

	Accuracy	Curve
DN2.5...6 / 1/10...1/4"	0.3% of mv + 2 mm/s	③
DN10...100 / 3/8... 4"	0.15% of mv + 1 mm/s	①

In combination with the IMT31A

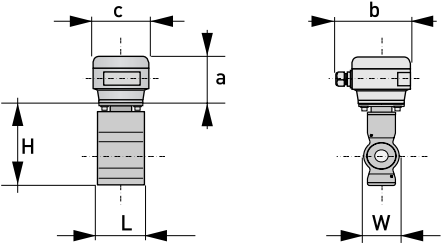
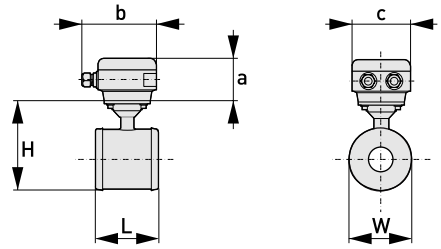
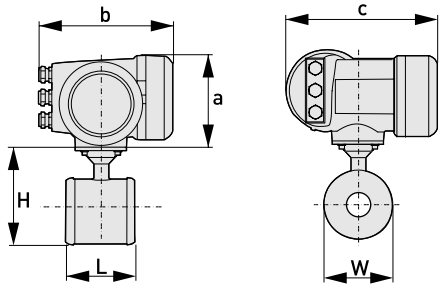
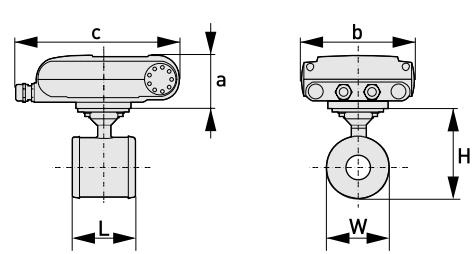
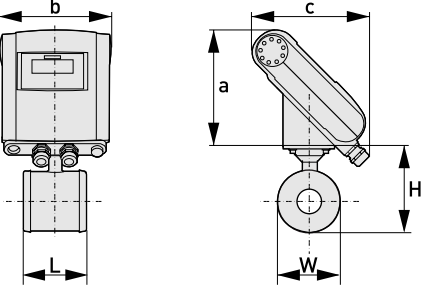
	Accuracy	Curve
DN2.5...6 / 1/10...1/4"	0.4% of mv + 1 mm/s	As ② + 0.1%
DN10...100 / 3/8...4"	0.3% of mv + 1 mm/s	②

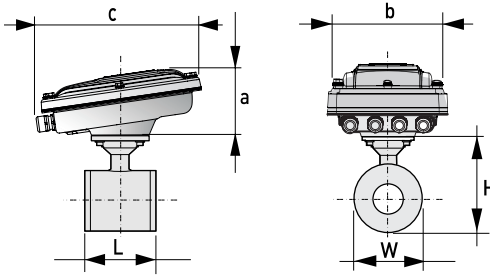
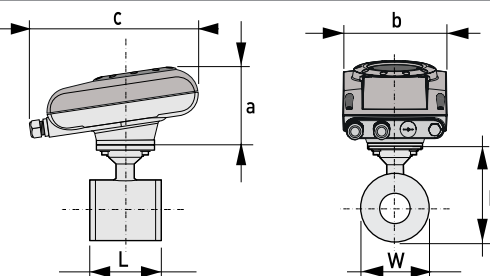
In combination with the IMT30A

	Accuracy	Curve
DN2.5...6 / 1/10...1/4"	0.5% of mv + 1 mm/s	④
DN10...100 / 3/8...4"	0.5% of mv + 1 mm/s	

*Optionally for IMT30A and IMT31A; extended calibration at 2 points for optimised accuracy.
For more details on optimised accuracy, see the concerning signal transmitter documentation.*

2.3 Dimensions and weights

<p>Remote version: DN2.5...15 / 1/10...1/2"</p>		<p>a = 88 mm / 3.5"</p> <p>b = 139 mm / 5.5" ①</p> <p>c = 106 mm / 4.2"</p> <p>Total height = H + a</p>
<p>Remote version: DN25...100 / 1...4"</p>		<p>a = 88 mm / 3.5"</p> <p>b = 139 mm / 5.5" ①</p> <p>c = 106 mm / 4.2"</p> <p>Total height = H + a</p>
<p>Compact version with IMT33A</p>		<p>a = 155 mm / 6.1"</p> <p>b = 230 mm / 9.1" ①</p> <p>c = 260 mm / 10.2"</p> <p>Total height = H + a</p>
<p>Compact version with IMT31A (0°)</p>		<p>a = 82 mm / 3.2"</p> <p>b = 161 mm / 6.3"</p> <p>c = 257 mm / 10.1" ①</p> <p>Total height = H + a</p>
<p>Compact version with IMT31A (45°)</p>		<p>a = 186 mm / 7.3"</p> <p>b = 161 mm / 6.3"</p> <p>c = 184 mm / 7.3" ①</p> <p>Total height = H + a</p>

Compact stainless steel version with IMT31A (10°)		a = 100 mm / 4" b = 187 mm / 7.36" ① c = 270 mm / 10.63" Total height = H + a
Compact version with IMT30A (10°)		a = 100mm / 4" b = 157 mm / 6.18" ① c = 260 mm / 10.24" Total height = H + a

① The value may vary depending on the used cable glands.

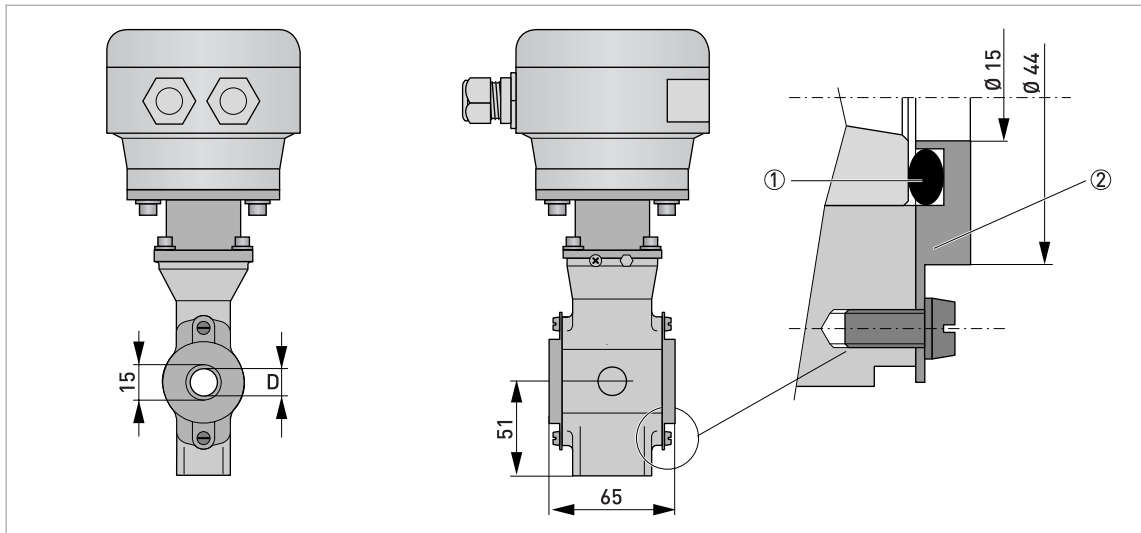


Figure 2-2: Construction details DN2.5...15 / 1/10...1/2"

- ① O-ring
- ② Grounding ring

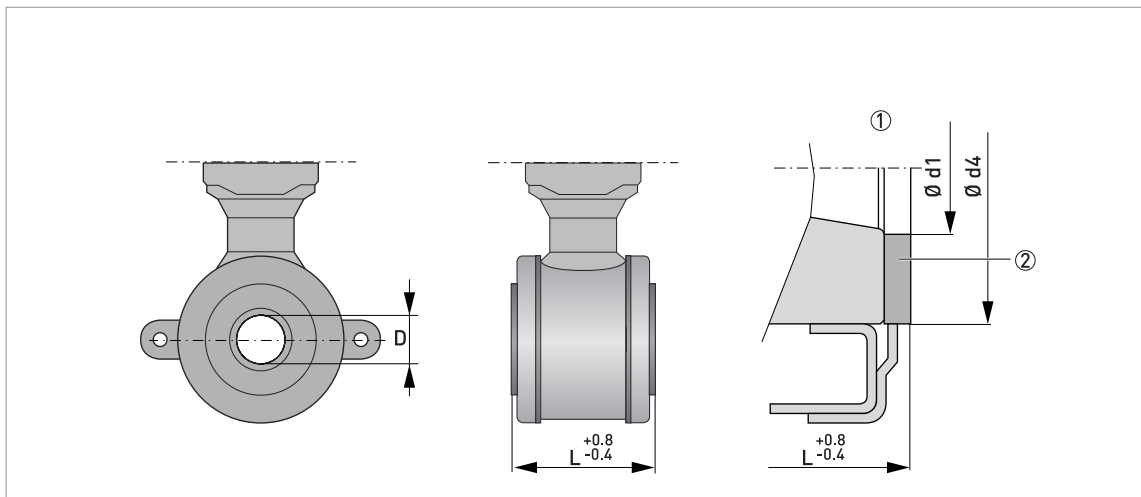


Figure 2-3: Construction details DN25...100 / 1...4"

- ① Situation without grounding rings
- ② Gasket

- All data given in the following tables are based on standard versions of the flow tube only.
- Especially for smaller nominal sizes of the flow tube, the signal transmitter can be bigger than the tube.
- Note that for other pressure ratings than mentioned, the dimensions may be different.
- For full information on signal transmitter dimensions see relevant documentation.

Nominal size	Dimensions [mm]						Approx. weight [kg]	
	DN	L	H	W	D	Ød1		Ød4
2.5	65 ①	123	44			-	-	1.6
4	65 ①	123	44			-	-	1.6
6	65 ①	123	44			-	-	1.6
10	65 ①	123	44			-	-	1.6
15	65 ①	123	44			-	-	1.6
25	58 ②	116	68	20	26	46		1.6
40	83 ②	131	83	30	39	62		2.4
50	103 ②	149	101	40	51	74		2.9
80	153 ②	181	133	60	80	106		6.4
100	203 ②	206	158	80	101	133		8.8

① Total fitting length of flowmeter with integrated rings: dimension L + 2 x gasket thickness.

② Total fitting length of flowmeter without rings: dimension L only.

Nominal size	Dimensions [inches]						Approx. weight [lb]	
	ASME	L	H	W	D	Ød1		Ød4
1/10"	2.56 ①	4.84	1.73			-	-	3.53
1/6"	2.56 ①	4.84	1.73			-	-	3.53
1/4"	2.56 ①	4.84	1.73			-	-	3.53
3/8"	2.56 ①	4.84	1.73			-	-	3.53
1/2"	2.56 ①	4.84	1.73			-	-	3.53
1"	2.28 ②	4.57	2.68	0.79	1.02	1.81		3.53
1½"	3.27 ②	5.16	3.27	1.18	1.54	2.44		5.29
2"	4.06 ②	5.87	3.98	1.57	2.01	2.91		6.39
3"	6.02 ②	7.13	5.24	2.36	3.15	4.17		14.11
4"	7.99 ②	8.11	6.22	3.15	3.98	5.24		19.40

① Total fitting length of flowmeter with integrated rings: dimension L + 2 x gasket thickness.

② Total fitting length of flowmeter without rings: dimension L only.

Model	Description, check www.BuyAutomation.com for availability
	Schneider Electric™ Model 8500A Magnetic Flow Tube
850TA 850SA 850QA 853EA 85HAA 8501A 851HA 8502A 8503A 8504A	Nominal diameter and liner DN2.5...1/10" - Ceramic - Mounts between DN15 / 1/2" flanges DN4...1/6" - Ceramic - Mounts between DN15 / 1/2" flanges DN6... 1/4" - Ceramic - Mounts between DN15 / 1/2" flanges DN10...3/8" - Ceramic - Mounts between DN15 / 1/2" flanges DN15...1/2" - Ceramic DN25...1 - Ceramic DN40...1 1/2" - Ceramic DN50...2" - Ceramic DN80...3" - Ceramic DN100...4" - Ceramic
3 4 5 A B M N	Nominal pressure (centering for) PN 16 EN 1092-1 (DN 100) PN 25 EN 1092-1 (DN 100) PN 40 EN 1092-1 (DN 100) 150 lbs RF ASME B 16.5 (1/10"...4") 300 lbs RF ASME B 16.5 (1/10"...4") JIS 20 K (DN 2,5 ...100) JIS 10 K (DN 50...100)
0 1 3 5 A C D	Approval Non Ex Ex Zone 1 (for IMT33A compact and field & IMT31A wall only) Ex Zone 2 (for IMT33A compact and field only) FM Class I DIV 2 (for IMT33A compact ad field only) cCSAus OL (IMT33A compact and field & IMT31A compact and wall only) CSA Class I DIV 2 (for IMT33A compact and field) NEPSI Zone 1 (for IMT33A compact and field only)
1 2 4 5 6 A B C	System design - Cable connection Compact/Integral design with aluminum transmitter housing/cable connection at the transmitter Compact/Integral design with stainless steel transmitter housing/cable connection at the transmitter Separate design with aluminum connection box/ 1/2" NPT cable connection Separate design with aluminum connection box/ PF 1/2" cable connection Separate design with aluminum connection box/ M20 x 1.5 cable connection Separate design with stainless steel connection box/ 1/2" NPT cable connection Separate design with stainless steel connection box/ PF 1/2" cable connection Separate design with stainless steel connection box/ M20 x 1.5 cable connection
0 3 4 C D K L	Transmitter model Without IMT31A (Compact/Integral design) IMT31A (Wall mount version) IMT33A (Compact/Integral design) IMT33A (Field mount version) IMT30A (Compact/Integral design) IMT30A (Wall mount version)

Model	Description, check www.BuyAutomation.com for availability
1 2 3	Mounting Material Steel, galvanized / Rubber sleeves Stainless Steel A2 / Rubber sleeves Rubber sleeves
3 T 6 7 8 B C D E F* H G R P S	Grounding ring material & Sealing St. steel DIN 1.4404 316 - O-ring FPM FKM (DN2,5...15 1/10"...½") St. steel DIN 1.4404 316 - O-ring EPDM (DN2,5...15 1/10"...½") Titanium - O-ring EPDM (DN2,5...15 - 1/10"...½") Hastelloy C22 - O-ring EPDM (DN2,5...15 - 1/10"...½") Hastelloy C22 - O-ring FPM FKM (DN2,5...15 - 1/10"...½") Titanium - O-ring PFFM FFKM (DN2,5...15 - 1/10"...½") Tantalum - Seal PTFE / PF 29 (DN2,5...15 - 1/10"...½") Hastelloy C22 - O-ring PFFM FFKM (DN2,5...15 - 1/10"...½") Without - Gasket graphite (DN25...100 / 1"...4") Without - Gasket filled PTFE (DN25...100 / 1"...4") Hastelloy C22 - Gasket filled PTFE (DN25...100 / 1"...4") St. steel DIN 1.4571 316 Ti - Gasket filled PTFE (DN25...100 / 1"...4") St. steel DIN 1.4571 316 Ti - Gasket graphite (DN25...100 / 1"...4") Tantalum - Seal PTFE / PF 29 (DN25...100 / 1"...4") Note ① Hastelloy C22 - Gasket graphite (DN25...100 / 1"...4")
0 7	Electrodes Standard, Platinum Cermet - Platinum
0* 1 2	Protection class / dimension (face-to-face) IP66 67 & Standard dimension IP68 Field & Standard dimension (with stainless steel connection box) IP68 Factory & Standard dimension (with stainless steel connection box)
0 1 2 Y	Cable Compact (none) - Separate (remote) DS Separate BTS Separate LIYCY (only for FM / CSA Class 1 DIV 2 with IP68 and IMT33A) Without
0 1 2 3 4 5 6 7 8 Y	Cable length Compact - None - Separate - 5 m - 15 ft 10 m - 30 ft 15 m - 45 ft 20 m - 60 ft 25 m - 75 ft 30 m - 90 ft 40 m - 120 ft 50 m - 150 ft 100 m - 300 ft Without
0 2 3	Calibration Standard calibration Standard calibration + 316 / 1.4401 Tag plate (120 x 46 mm) Standard calibration + 316 / 1.4401 Tag plate (67 x 25 mm)
0	Special Standard
H	Version Standard
0	Construction requirements Standard

Model	Description, check www.BuyAutomation.com for availability
0	QA / QC requirements Standard
0	Ratio of CT-calibration Standard, R=80
0	Warranty Standard
0	Instruction language Standard

① Please note that for Tantalum grounding rings, the mounting length changes. Dimensions resp. mounting length please refer to 8500A PSS.







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

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ADDITIONAL PRODUCTS

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