MAGX2 / MAGB1

Build your own flowmeter

USB

RS232

RS485

BLUETOOTH

TCP/IP

GPRS

4-20 mA CURRENT LOOP

VOLTAGE 0-10 V

PULSE

90-250 VAC POWER SUPPLY

24 VDC POWER SUPPLY

12 VDC POWER SUPPLY

BATTERY POWERED

MODULAR DESIGN

arkon flow systems

Arkon Flow Systems
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MAGX2

Advantages

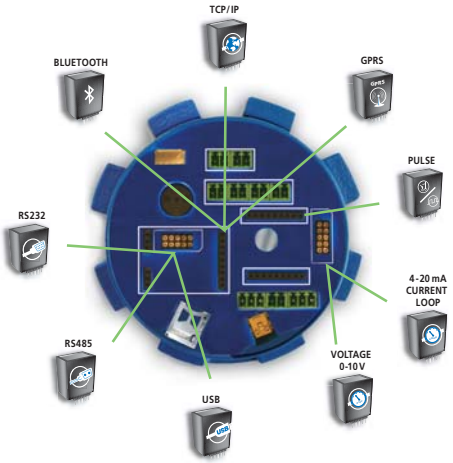
The MAGX2 has an innovative modular design „Plug & Play"; it is a fit-all, flexible, low-cost flow meter all at the same time. The transmitter consists of the low-cost basic unit plus optional modules according to the end-user's requirements. Each module is in fact a small electronic board, the size of a large stamp, which can be freely installed and removed from the main board in seconds.

You do not pay for options you do not want or need.
You can build a flowmeter exactly as per your requirements.
You can upgrade your flow meter at anytime in the future.

„Built in design" for upgrades

STANDARD

Transmitter
Power supply modules (12VDC/24VDC/90-250VAC)
Sensor communication module
CD + free Software
Sensor



UPGRADES

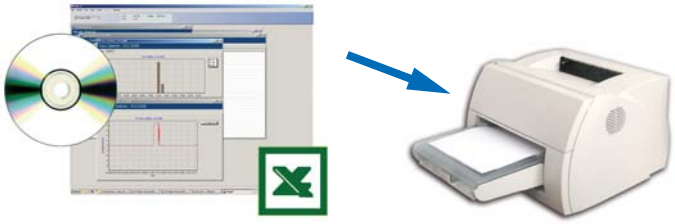
Choose your communication
Choose your outputs
Choose your memory modules

- **Accuracy** – ± 0.2% (0.5 - 10 m/s) of actual value
- **Temperature sensor** – to measure temperature of the measured medium
- **Communication protocol** – all communications via MODBUS RTU
- **Autocleaning** – automatic electrodes cleaning
- **Unique design** – any upgrade, extra features inside of the flowmeter, extra protection - „Built-in design"
- **Graphic display** – multi-language menu. Higher protection via lock-out system for touch buttons and 3 levels of passwords – User, Service, Factory settings.
- **Intelligent sensor design** – digital communication allows communication between the transmitter and the sensor up to 500 m. Calibration data are stored in the sensor communication module. If the transmitter is changed for whatever reason, all the calibration data will be taken from the sensor directly. No calibration download mistakes.

Datalogger

The MAGX2 uses, for data-logging purposes a standard micro Secure Digital card. This allows you to select for each application, the most suitable Secure Digital card from the market, according to your needs and requirements. It can be installed and removed easily from MAGX2 built-in socket. Data is stored in *.csv format. Record intervals are selectable from 1 minute to 24 hours.

+ **software free of charge**



MAG X2

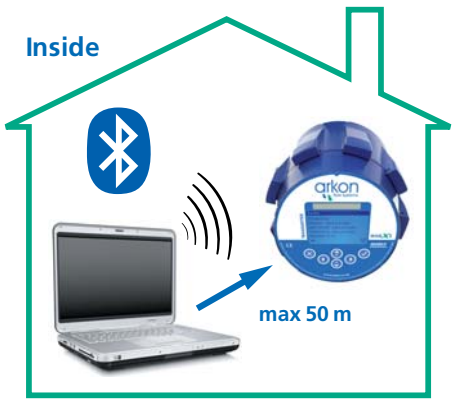
Choose your communication

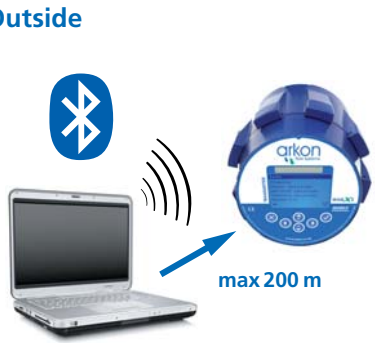
Modbus RTU can be used with all communication modules.

MODBUS

BLUETOOTH

Cables are not required to check your flowmeter, within a 200 meter range.
A mobile network is not required.





RS232 or USB

„Old vs new computer standard“

GPRS

Wireless communication system,
which is performed by the GPRS protocol.

- The measurements can be evaluated from anywhere in the world
- You will always have your flowmeter under control
- Another communication module is required for setting up the GPRS module

Anywhere in the WHOLE WORLD

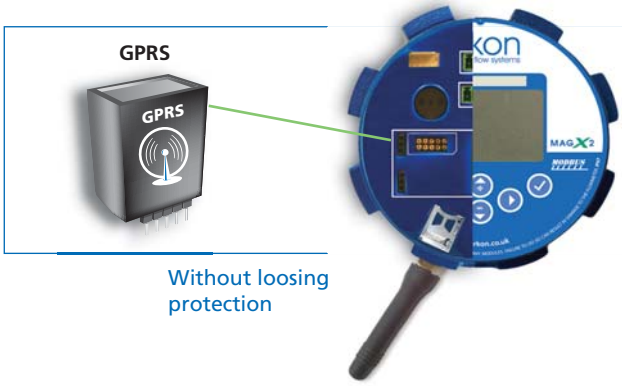
Standard solution for GPRS

vs

Flowmeter plus communication cable plus mounting devide for GPRS plus extra power supply.

Our solution for GPRS

3 step installation: open, plug in, close



Without loosing protection

MAGX2

Transmitter specifications MAGX2

Measurable media	Conductive fluids
Min. media electrical conductivity	≥5 µS/cm ≥20 µS/cm for demineralised water
Flow range	0.1 to 10 m/s; 0.015 - 10000 l/s
Displayed values	Actual flow (m^3/h l/s, l/m, US.gal/min, UK.gal/min), volume (m^3, l, US.Gal, UK.gal), positive, negative, total volume and auxiliary (clearable) volume, sensor temperature
Accuracy	±0.2% (0.5 - 10 m/s) of actual value
Power supply options	90-250 VAC 50/60 Hz or 24 VDC or 12 VDC
Power consumption	Max. 15VA
Communication protocol	Modbus RTU can be used with all the communication modules i.e. RS232, RS485, USB, BLUETOOTH, TCP/IP, GPRS
Flow direction	Bi-directional measurement
Ambient temperature	-20°C to 60°C (-4°F to 140°F)
Display	LCD 128 x 64 px graphical, contrast setup
Controls	6 touch-buttons + communication modules (optional)
Low flow cut-off	OFF, 0.5%, 1%, 2%, 5%, 10% of Flow Qn
Adjustable filter constant	0 - 120 samples; default value is 15 samples
Max. electronics weight (including housing)	2 kg
Housing material	Aluminium+powder coating
Housing dimensions	Ø 134 - 132 mm
Cable terminal	3+1xM16x1,5 IP68 cable glands
Electronics protection	Standard IP67 / NEMA 5
Other features	Auto-diagnostics Multi-language options (English and Spanish standard; other languages possible) Indicative temperature measurement up to 150°C (1% max. Error) Test of excitation coils Empty pipe detection Zero flow adjusting Flow simulator
Excitation frequency	3.125 Hz or 6.25 Hz
Real time	Clock function for datalogging
Analogue outputs	Optionals: Current 4-20 mA, Voltage 0-10 V, Pulse
Digital outputs (communication)	Optionals: USB, RS232, RS485, BLUETOOTH, GPRS, TCP/IP
Datalogger	Micro SD card

Sensor specifications MAGX2

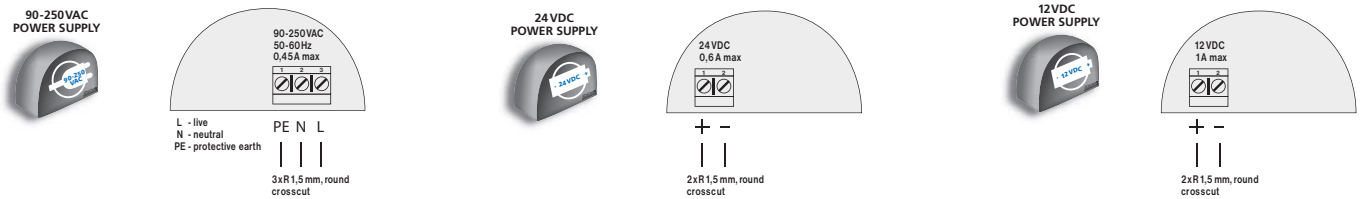
Connection types	DIN, ANSI, JIS flanged. Other types on request
Flange	Steel 1.0036 or higher, Dimensions according to DIN EN 1092-1, ASME B 16.5, JIS B 2239
Nominal size	10-1000 mm (1/2" - 40")
Maximum nominal pressure	PN 40/300 psi
Max.media temperature	70°C (158°F) for Hard Rubber liner, 130° (266°F) for PTFE liner in remote version
Ambient temperature	- 20 to 60°C (-4 to 140°F)
Sensor protection	Remote IP68 (NEMA 6), Compact IP67 (NEMA 5)
Liner	Hard Rubber, PTFE other material on request
Electrodes	CrNi austenitic steel 1.4305 DIN 1013, other material on request
Measuring tube	Stainless steel 1.4301 dimensions acording to DIN 17457
Outer casing	Carbon steel (1.0036) as standard
External coating	Lacquered finish (anticorrosive)
Accessories options	Earthing rings for plastic and lined pipes
Coils resistance	80 / 100 Ω
Other features	Earthing through 3rd electrode Automatic electrode cleaning

Technical Specification

Optional power supply modules

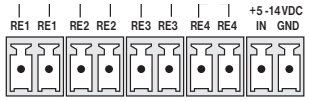
Weight PS 12 V, 24 V, 140 g
PS 230 V, 310 g

90-250 VAC 50/60 Hz	All power supply modules have an automatic electronic fuse. Max. 15 VA
24 VDC	
12 VDC	



Sensor to transmitter connection cable

Optional analogue output modules

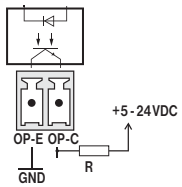


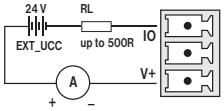
PULSE

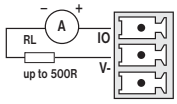
Current Loop output module	4-20 mA, with programmable flowrate and function
Voltage output module	0-10 V, with programmable flowrate and function
Pulse output module	4 output relays with programmable flowrate and function (max. 100 VDC/0.5 A), Input signal for batching purposes (5-14 V), Frequency output 2 – 1000 Hz with adjustable duty cycle

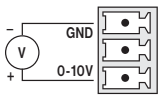
VDC	R1
5V	1k8
12V	3k3
24V	6k8

External power supply
External resistor R



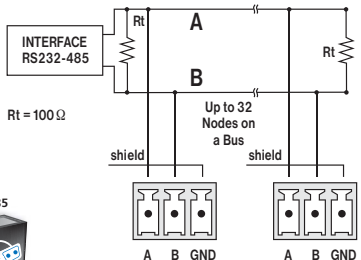






Optional digital outputs / communication modules

Only one of the following modules can be used / installed at the same time



RS232	Including RS232 cable
RS485	Terminators may be needed
USB	Including USB cable
BLUETOOTH	Outside up to 200 m / Inside up to 50 m
TCP/IP	TCP/IP internet communication, amplifiers may be needed
GPRS	GSM850, GSM900, DCS1800, PCS1900

MODBUS

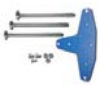
Modbus RTU can be used with all communication modules

Remote mounting system

Wall

DIN Rail

Panel



„Meeting your specific requirements“

Remote connection cable	UNITRONIC LiYCY (TP) 0035 830, 2x2x0.5
Wall mounting	
DIN Rail mounting	
Panel mounting	Max. Panel thickness; 5 mm
Sensor junction box	30x40x40 mm

MAGB1

Advantages

New Arkon MAGB1 battery powered flowmeter:
Now is possible to install a reliable flowmeter virtually anywhere without sacrificing accuracy or performance. Accuracy is ±0.5% of actual value. No mains power required. Suitable for irrigation, remote applications any other application where power supply lines are difficult or expensive to install.

Features

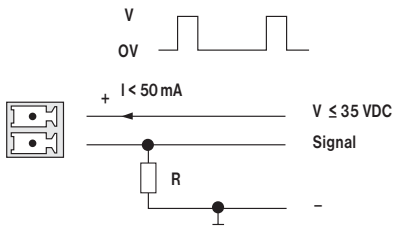
- Battery powered electromagnetic flowmeter
- Accuracy: ±0.5% of actual value
- Empty pipe detection, automatically turns off the excitation to prolong battery life
- Graphic display and keypad for simple operation and instant access to information about 4 totalizers: total +, total -, total, aux.
- Modbus RTU communication protocol via USB
- Standard USB interface for configuration and data collection using MAGB1 software
- Easy access to data on-site
- Isolated binary output (pulse per liters or alarm or flowrate functions)
- Error detection
- Datalogger - 1820 records, selectable interval of logging (5 min - 24 h)

Battery

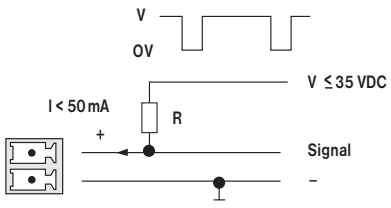
- Unit powered by 2 x 3.6 V batteries placed inside the transmitter (see drawing)
- Battery life up to 5 years
- Battery conservation when the pipe is empty
- Adjustable filter constant 1 – 30 samples
- Minimized inlet and outlet installation requirements
- Maintenance free
- CE certification
- Two built-in earthing electrodes
- No moving parts in measuring tube
- All units include a calibration certificate issued by an independent calibration rig, traceable to international standards, and calibration data is stored inside the instrument.

Binary output

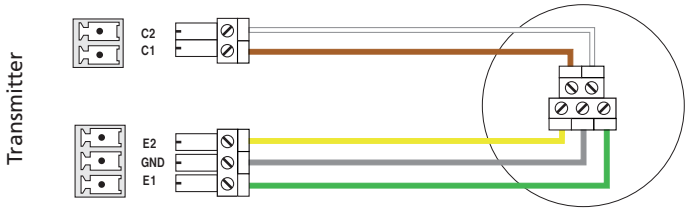
Positive Pulse



Negative Pulse



Sensor to transmitter connection cable



C1 - Coil1
C2 - Coil2
GND - Ground
Electrode - 1
Electrode - 2

MAGB1

Transmitter specifications MAGB1

Measurable media	Conductive fluids
Min. media electrical conductivity	≥5µS/cm ≥20µS/cm for demineralised water
Flow range	0.1 to 10 m/s
Displayed values	Actual flow (m^3/h l/s, l/m, US.gal/min, UK.gal/min), volume (m^3, l, US.Gal, UK.gal), positive, negative, total volume and auxiliary (clearable) volume
Accuracy	±0.5% (0.5 to 10 m/s) of actual value
Power supply	3.6 V internal lithium battery - 38000 mAh
Communication	Modbus RTU over USB
Flow direction	Bi-directional measurement
Ambient temperature	- 20 to 60°C (-4 to 140°F)
Display	LCD 128 x 64 px graphical, contrast setup, sleep mode
Control	1 touch button + USB
Low flow cut-off	OFF, 0.5%, 1%, 2%, 5%, 10% of Flow Qn
Electronics weight (including housing)	1.5 kg
Housing material	Aluminium + powder coating
Housing dimensions	Ø 134 - 132 mm
Cable terminals	1+1xM16x1.5 IP68 cable glands
Electronics protection	Standard IP67 / NEMA 5
Other features	Test of excitation coils Empty pipe detection Zero flow adjusting Flow simulator
Excitation frequency	1/60 Hz, 1/30 Hz, 1/15 Hz, 1/5 Hz, 1.5625 Hz, 3.125 Hz, 6.25 Hz
Real time	Clock function for datalogging
Outputs	Pulse output with programmable volume function and pulse width
Adjustable filter constant	1 - 30 samples
Error logger	Logging last 10 errors
Datalogger	1820 records, selectable interval of logging (5 min - 24 h)

Sensor specifications MAGB1

Connection types	DIN & ANSI Flanged. Other types on request
Flange	Steel 1.0036 or higher, Dimensions according to DIN EN 1092-1, ASME B 16.5, JIS B 2239
Nominal size	20-150 mm, other sizes on request
Maximum nominal pressure	PN 40/300 psi
Max.media temperature	70°C (158°F) for Hard Rubber liner, 130° (266°F) for PTFE liner in remote version
Ambient temperature	-20 to 60°C (-4 to 140°F)
Sensor protection	Remote IP68 (NEMA 6), Compact IP67 (NEMA 5)
Liner	Hard Rubber, PTFE other material on request
Electrodes	CrNi austenitic steel 1.4305 DIN 1013, other material on request
Measuring tube	Stainless steel 1.4301 dimensions acording to DIN 17457
Outer casing	Carbon steel (1.0036) as standard
External coating	Lacquered finish (anticorrosive)
Accessories options	Earthing rings for plastic and lined pipes
Coils resistance	100 Ω
Other features	Earthing through 3rd and 4th electrodes

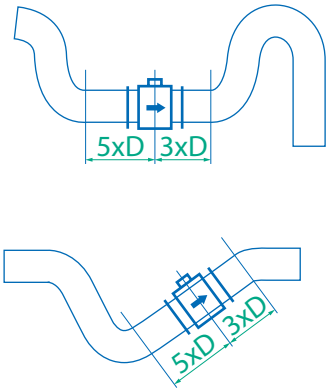
Recommended position for sensor installation

Sensor installation requirements

Proper installation is extremely important in order for your flowmeter to work correctly. There are minimum sensor installation requirements that need to be respected at all times. Please note that Arkon cannot warranty any installation which does not comply with these requirements:

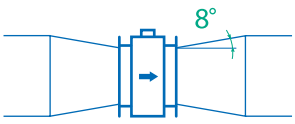
Horizontal standard mounting

The sensor tube must always remain full. The best way to achieve this is to locate the sensor in a low section of pipe, see the following picture.
It is mandatory to install the sensor in a section of straight pipe with at least 5 times the pipe diameter before sensor and 3 times after sensor.



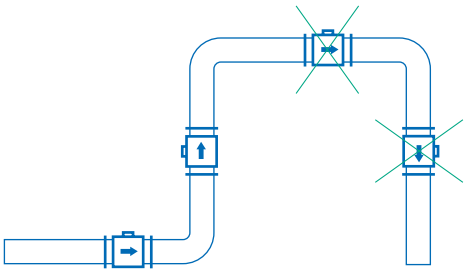
Pipe reducers

If the pipe diameter is not the same as the diameter of sensor, then pipe reducers can be used. So as not to lose accuracy of the measurement, the slope of reducers should not exceed 8°.



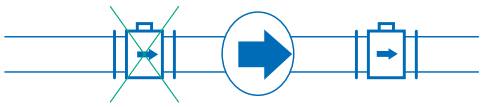
Vertical mounting

When the sensor is mounted on a vertical section of pipe, the flow direction must be upwards. In the case of a downward flow direction, air bubbles can collect in the sensor and the measurement could be unstable and inaccurate.



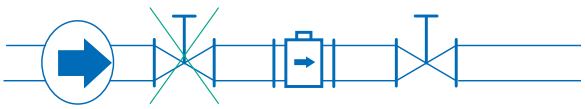
Pumps

Never install the sensor on the suction side of a pump or on a section of pipe where a vacuum is possible.



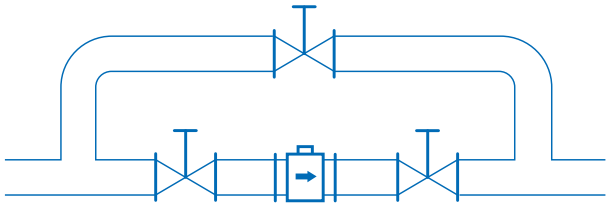
Valves

Suitable location of a shutoff valve is downstream of a sensor.



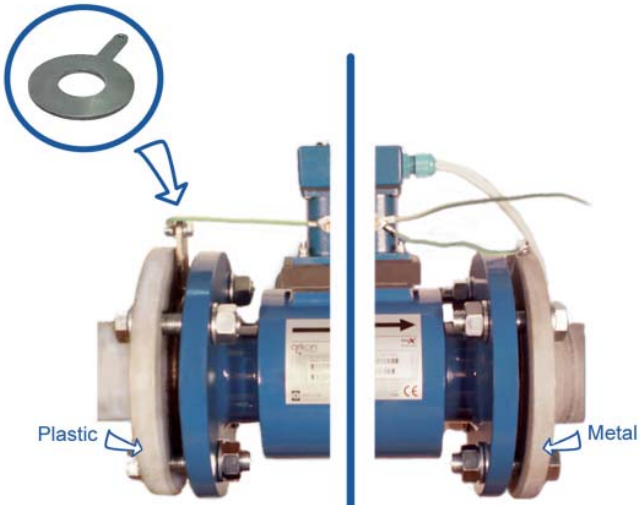
Removal during maintenance

If the application requires removal of the sensor for periodic maintenance, it is recommended to install a bypass section as the drawing below.



Earthing

All flowmeters must be earthed. Maximum resistance of the sensor to earth is <1 ohm. All the components in the loop, including flowmeter, pumps (especially submersible) valves, pipework, tanks and medium, should all be at the same earth potential. Problems can occur when different potentials are present which can happen, especially with submersible pumps. On applications with metal pipes and tanks it is enough to earth the flowmeter to the pipe's flanges. On applications where pipes and tanks are manufactured from plastic it is necessary that earthing rings are also installed to ensure the flowmeter works correctly.



MAGX2 ordering specification codes

Model	Ordering code							Description
MAGX2 Trans.	1	2	3	4	5	6	7	
	T							MAGX2 main board, display, touch buttons control unit,Version V.7
								Power supply module
		230						Power supply module 90-250VAC - Version 4.
		24						Power supply module 24VDC - Version 4.
		12						Power supply module 12VDC - Version 4.
			CM					Sensor to transmitter communication module - Version 8
								Remote monting kit
				N				None
				W				WALL mounting kit (including 6 m cable)
				P				PANEL mounting kit (including 6 m cable)
				D				DIN-Rail mounting kit (including 6 m cable)
								Output 1
					N			None
					C			4-20 mA current output signal module
					V			0-10 V voltage output module
								Output 2
						N		None
						P		Pulse output module
								Communication
							N	None
							232	RS232 communication module, including 1,8 m cable
							USB	USB communication module, including 1,8 m cable
							BTO	Bluetooth communication module
							GPR	GPRS*
							485	RS485 communication module, distance up to 1 km
							TCP	TCP/IP communication module, amplifiers might be necessary

Example

MAGX2 Trans.	T	230	CM	N	C	N	USB

* Please note you need another communication module for setup the GPRS module

Model	Ordering code					Description	
MAGX2 Sensor	1	2	3	4	5		
	T					Connection	
	D					DIN	
	A					ANSI	
	DS					DIN Flange St. St.	
	DSS					DIN St. St. body	
	AS					ANSI Flange St. St.	
	ASS					ANSI St. St. body	
	S					DIN 11851	
	SSS					DIN 11851 St. St. body	
	J					JIS	
	E					Table E	
	TD					Table D	
	T					Tri-clamp	
	W					Wafer	
						Size	
		10 / 1/2 150 / 6				10 mm / 1/2"	150 mm / 6"
		15 / 2/3 200 / 8				15 mm / 2/3"	200 mm / 8"
		20 / 3/4 250 / 10				20 mm / 3/4"	250 mm / 10"
		25 / 1 300 / 12				25 mm / 1"	300 mm / 12"
		32 / 1.1/4 350 / 14				32 mm / 1.1/4"	350 mm / 14"
		40 / 1.1/2 400 / 16				40 mm / 1.1/2"	400 mm / 16"
		50 / 2 450 / 18				50 mm / 2"	450 mm / 18"
		65 / 2.1/2 500 / 20				65 mm / 2.1/2"	500 mm / 20"
		80 / 3 600 / 24				80 mm / 3"	600 mm / 24"
		100 / 4 700 / 28				100 mm / 4"	700 mm / 28"
		125 / 5 800 / 32				125 mm / 5"	800 mm / 32"
						Liner	
			HR			HARD RUBBER	
			PT			PTFE	
			SR			SOFT RUBBER	
			NR			HYGIENIC RUBBER	
			CR			CERAMIC	
			CT			E-CTFE	
						Pressure	
				150		150 psi	
				300		300 psi	
				10		PN10	
				16		PN16	
				25		PN25	
				40		PN40	
						Electrodes	
					SS	Stainless Steel	
					HA	Hastelloy C	
					TA	Tantalum	
					TI	Titanium	
					PL	Platinum	

Example

MAGX2 Sensor	D	100	HR	16	SS

MAGB1

MAGB1 ordering specification codes

Model	Ordering code						Description
MAGB1	1	2	3	4	5	6	
							Version
	C						Compact
	W						Remote: WALL mounting kit (including 6 m cable)
	P						Remote: PANEL mounting kit (including 6 m cable)
	R						Remote: DIN-Rail mounting kit (including 6 m cable)
							Connection type
		D					DIN
		A					ANSI
							Size
			20 / 3/4				20 mm / 3/4"
			25 / 1				25 mm / 1"
			32 / 1.1/4				32 mm / 1.1/4"
			40 / 1.1/2				40 mm / 1.1/2"
			50 / 2				50 mm / 2"
			65 / 2.1/2				65 mm / 2.1/2"
			80 / 3				80 mm / 3"
			100 / 4				100 mm / 4"
			125 / 5				125 mm / 5"
			150 / 6				150 mm / 6"
							Liner material
				HR			HARD RUBBER
				SR			SOFT RUBBER
				PT			PTFE
							Pressure
					150		150 psi
					300		300 psi
					10		PN10
					16		PN16
					25		PN25
					40		PN40
							Electrodes
						SS	Stainless Steel
						HA	Hastelloy C
						TA	Tantalum
						TI	Titanium
						PL	Platinum
Example							
MAGB1	C	D	100	HR	16	SS	

Please note that any order placed without details regarding required flow-range (for example: 0-50 m^3/hr or 0 -100 l/s) and Pulse Output (for example pulse/m^3 or 1 pulse/litre) will be processed with standard settings.

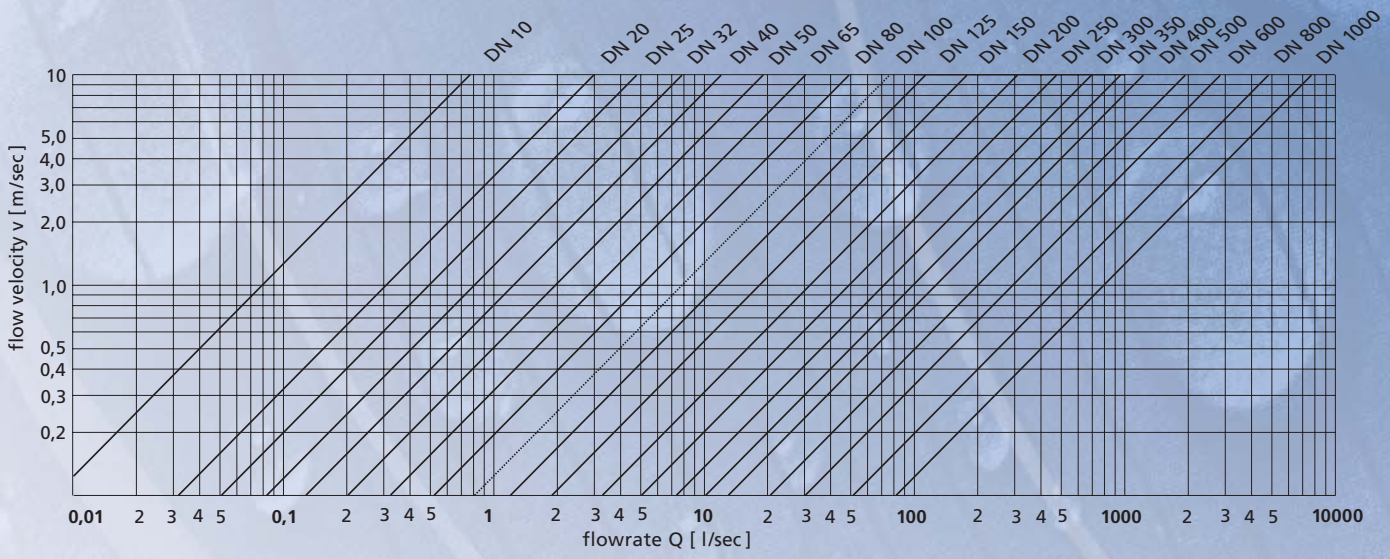
Please note for applications where all pipes and tanks are manufactured from plastic, earthing rings are recommended to ensure the accuracy of the measurements.

When placing orders where the application may difficult, such as aggressive and corrosive liquids. Arkon will expect you to advise us about the specifics of the installation on your enquiry form or order, to enable Arkon staff to consider if the requested products are indeed suitable.

MAGX2 MAGB1

arkon flow systems

Flow velocity



Flow rate

Flow rates [l/s]

DN	Q 1%	Q 5%	QN	QN 50%	QN 100%	Q MAX
10	0,01	0,04	0,2	0,39	0,79	0,98
15	0,02	0,09	0,5	0,88	1,77	2,21
20	0,03	0,16	0,9	1,57	3,14	3,93
25	0,05	0,25	1,4	2,45	4,91	6,14
32	0,08	0,4	2,2	4,02	8,04	10,05
40	0,1	0,6	4	6,3	12,6	15,7
50	0,2	1	6	9,8	19,6	24,5
65	0,3	1,7	9	16,6	33,2	41,5
80	0,5	2,5	14	25,1	50,3	62,8
100	0,8	3,9	20	39,3	78,5	98,2
125	1	6	30	61	123	153
150	2	9	50	88	177	221
200	3	16	100	157	314	393
250	5	25	150	245	491	614
300	7	35	200	353	707	884
350	10	48	300	481	962	1203
400	13	63	400	628	1257	1571
500	20	98	600	982	1963	2454
600	28	141	800	1414	2827	3534
700	38	192	1000	1924	3848	4811
800	50	251	1200	2513	5027	6283
900	64	318	1500	3181	6362	7952
1000	79	393	2000	3927	7854	9817

Flow rates [m³/h]

QN 1%	QN 5%	QN	QN 50%	QN 100%	Q MAX
0,03	0,14	0,8	1,41	2,83	3,53
0,06	0,32	2	3,18	6,36	7,95
0,11	0,57	3,2	5,65	11,31	14,14
0,18	0,88	5	8,84	17,67	22,09
0,3	1,5	8	14,5	29	36,2
0,5	2,3	13	22,6	45,2	56,6
0,7	3,5	20	35,3	70,7	88,4
1,2	6	35	59,7	119,5	149,3
1,8	9	50	90,5	181	226,2
3	14	80	141	283	353
4	22	150	221	442	552
6	32	200	318	636	795
1	57	300	565	1131	1414
18	88	500	884	1767	2209
25	127	800	1272	2545	3181
35	173	1000	1732	3464	4330
45	226	1300	2262	4524	5655
61	353	2000	3534	7069	8836
102	509	3000	5089	10179	12723
139	693	4000	6927	13854	17318
181	905	5000	9048	18096	22620
229	1145	6000	11451	22902	28630
283	1414	8000	14137	28274	35340

Q1% - Minimun applicable flowrate (with guaranteed accuracy) / Q5%- recommended minimum flowrate (minimum flowrate with best accuracy)
QN recommended nominal flowrate (expected working flowrate) / Q50% recommended maximum flowrate (maximum flowrate for industrial use)
Q100% maximum applicable flowrate (maximum flowrate with guaranteed accuracy) / QMAX maximum applicable overload (Q125%) (flowmeter is still measuring)

Certification

CE Conformity requirements MAGX2	EN 61010-1:2003
	EN 61326:1998 + Al.1:1999, cor. 1:1999 + A2:2002 + A3:2005, Table A.1
	EN 61326:1998 + Al.1:1999, cor. 1:1999 + A2:2002 + A3:2005, Class A
CE Conformity requirements MAGB1	EN 61326-1:2006 + rev. 1:2007
	EN 55011 ed.2:2007, group 1, class B

ISO 9001 BUREAU VERITAS Certification