

“Sensing the pulse of industry”

tekMag TM12 Series Insertion Magnetic Flow Sensors

The **tekMag** TM12 Insertion Series is part of **tekflo sensors** family of magnetic flow sensors, each refreshingly having the highest signal to media noise ratio, with fast response, low power consumption and attractive prices.

The **tekMag** TM12 may be inserted under pressure via a shut-off valve, or may have a fixed flanged construction external to the pipe. Each is custom calibrated, so that no traversing is necessary to determine the point of average velocity and no complex blockage factor compensation is required. **tekMag** TM12 sensors are supplied with Calibration Certificates in terms of volumetric flow for a specified pipe size and flow range, traceable to the USA National Institute of Standards and Technology (NIST) and other Internationally recognised standards.

tekMag TM12 prices are almost independent of pipe size. With installation costs ranging from half to more than 20 times less than non **tekflo sensors** in-line flow sensor, significant overall cost reductions are accomplished.

Production is strictly adhered and certified to ISO 9001 conditions. This assures consistent quality and guarantees to operate correctly to customized conditions straight from the packing crate.

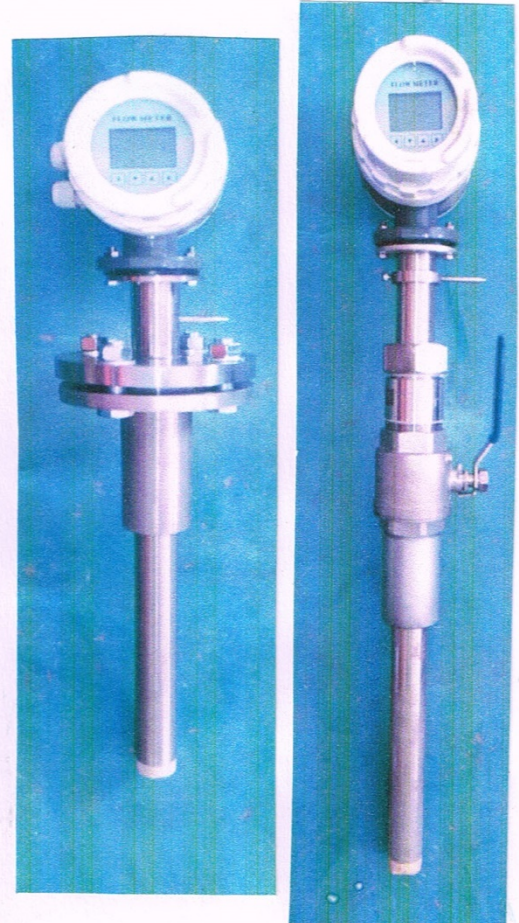
The pipe fittings supplied with **tekMag** TM12 are for welding to metal pipe sizes 100 – 4000mm (4” to 160”) diameters. They are suitable for drinking water, filtered raw sewage, pastes, slurries and similar.

This is no ordinary insertion mag meter. **tekMag’s** powerful magnetizing current, complete with adjustable high exciter frequencies, provides a clean signal with negligible media noise. Normal greasy sewage or calcium carbonate coatings have virtually no effect on accuracy. However, media with wrap-around objects, such as string or toilet paper must be filtered.

The **tekMag** TM12 operates with a compact TMC3A or remote TMC4A converter. With submersible **tekMag** TM12 sensors a remote TMC4A converter must be used.

Features:

- + **tekMag** technology offers the highest possible signal : media noise ratio
- + Accuracy unaffected by permanent coatings of sewage grease, calcium carbonate and similar
- + High accuracy < ± 1.5% of reading > 0.3 m/s (0.3 fps)
- + Repeatability < 0.1% of reading > 0.1m/s (0.3 fps)
- + No blockage factor correction, no traversing necessary
- + Resolution to 1000th of range
- + Calibration Certificates provided with traceability to USA NIST and other international standards
- + Installation and initial costs typically half to 20 times less than in-line flow sensors, size dependent
- + Quality Assurance to ISO 9001
- + Custom calibration guarantees operation to specification straight out of the packing crate
- + Range of metal pipe sizes 100 – 4000mm (4” – 160”)
- + Meets European EMC Conformity Standards EN 61326 – 1 for use in industrial locations
- + Meets European Pressure Equipment Directive – Sound Engineering Practice
- + Grounding rings not necessary when installed in non-isolated metal pipes
- + Bidirectional or unidirectional flow



tekMag TM12 Specification

Accuracy:	< $\pm 1.5\%$ of reading > 0.3 m/s (1 fps) to 10m/s (33 fps) < ± 0.0045 m/s (0.015 fps) for < 0.3 m/s (1 fps) This includes both converter types
Maximum mean velocity:	10 m/s (33fps)
Metal pipe sizes:	100 – 4000mm diameter (4" – 160")
Maximum pressures:	Fixed flange construction: 10 bar g maximum Manual under pressure: 2 bar g (30 psig)
Fixed flanged option:	AISI stainless steel supplied by manufacturer
Ball valve option:	Full port ball valve in AISI 304 stainless steel supplied for under pressure installation
European Pressure Equipment Directive:	tekMags conform to the European Pressure Directive PED97/23/EC, Article 3, Sound Engineering Practice (SEP), Table 7 Group 2, Table 8 Group 1, and Table 9, Group 2 up to the maximum specified pressures
Max media temperature:	-25° C to + 80° C (- 13° F to + 176° F)
Minimum conductivity:	5 micro Siemens/cm (5 micro mhos/cm)
Sensor material:	AISI 304 non-magnetic stainless steel insertion and grounding tube, PEEK sensor tip.
Other construction materials:	Epoxy coated carbon steel AISI 304 stainless steel Nitrile (Buna N) electrode seals Optional wet tap ball valve: AISI 304 stainless steel
Electrode materials	AISI 316L stainless steel, Hastelloy C
Sensor protection class:	IP65 / NEMA 4X weatherproof for compact TMC3A converters. Sensors with remote TMC4A converters: Optional IP 68 / NEMA 6P sensor only submersible to 5 m w.g. for long periods. Standard IP 65 / NEMA 4X weatherproof
Cable length:	10 m (30 feet) standard. Special max cable length: 15 m (50 feet)
European EMC Conformity:	Meets EN61326 – 1 Class A, Table 2 for industrial locations
tekMag Converters:	Compact type TMC3A. Remote type TMC4A
Bi-directional Outputs	$\pm 4 - 20$ mA into 500 Ohm max load Frequency $\pm 0 - 100$ Hz adjustable to $\pm 1 - 5000$ Hz, or scalable pulse output, Frequency and pulse output max current load 30mA \pm RS485 with optional HART communication High \pm alarms for connection to 24 Vdc, max 30mA Low \pm alarms for connection to 24 Vdc, max 30mA
Converter power supply:	85 – 265 V 50/60 Hz or external 24V dc
English language displays:	LCD b-directional, backlit displays of +ve, -ve or net totals and \pm flow rates
Non-full pipe and alarms:	LED indication. Non full pipe relay 36 Vdc, 30mA max
Programming:	Waterproof buttons
Converter protection:	IP 65 and NEMA 4X
Note: for submersible sensors a remote TMC4A converter must be used.	

tekMag TM12 Minimum Straight Pipe Runs

Upstream Obstruction	Min Straight Pipe Diameters Without Flow Straightener	Min Straight Pipe Diameters With Flow Straightener	Min Downstream Pipe Diameters
Bend Preceded by > 9D Straight	10 D	5 D	5 D
Min 8° Pipe Reducer	5 D	5 D	5 D
2 Bends in Plane Preceded by > 9D Straight	15 D	10 D	5 D
2 Bends Out of Plane	25 D	15 D	5 D
Upstream Tee	25 D	15 D	5 D
Fully Open Valve	10 D	10 D	5 D
Throttling Control Valve	30 D	13 D	5 D

Note: Control valves should be downstream, with a minimum 5 D pipe length

tekMag TM12 Recommended Flow Ranges and Approximate Weights

Note: Choose any range between min and max ranges below, expressed 0 – X m³/h or 0 – X gpm. It is suggested to round up to the nearest 10 whole units. For larger sizes see next page.

Nominal Dia mm Ins	Recommended 0 - Min. Range		Recommended 0 - Max. Range		Approx. Weight with Compact Converter		
	m ³ /h	gpm	m ³ /h	gpm	kg	lbs	
100	4"	30	130	300	1300	18	40
125	5"	45	200	450	2000	20	44
150	6"	65	300	650	3000	23	51
200	8"	110	500	1100	5000	25	55
250	10"	200	750	2000	7500	27	59
300	12"	300	1000	2500	10000	29	64
350	14"	350	1500	3500	15000	32	70
400	16"	450	2000	4500	20000	34	75
450	18"	600	2500	6000	25000	36	79
500	20"	700	3000	7000	30000	38	84
600	24"	1000	4500	10000	45000	42	92
700	28"	1400	6000	14000	60000	46	101
800	30/32"	1800	7000	18000	70000	48	106
900	36"	2300	10000	23000	100000	52	114
1000	40"	3000	12000	30000	120000	56	123
1200	48"	4000	17000	40000	170000	64	141
1400	56"	5500	23000	55000	230000	72	158
1600	60"	7500	27000	75000	270000	80	176
1800	72"	9000	40000	90000	400000	88	194
2000	80"	12000	47000	120000	470000	96	211

Note: 1) For overall weights with remote converter ADD 2 kg (4 lbs) to the weights with compact converter.
Additional weight for TM12 with ball valve ADD 3 kg (7 lbs)

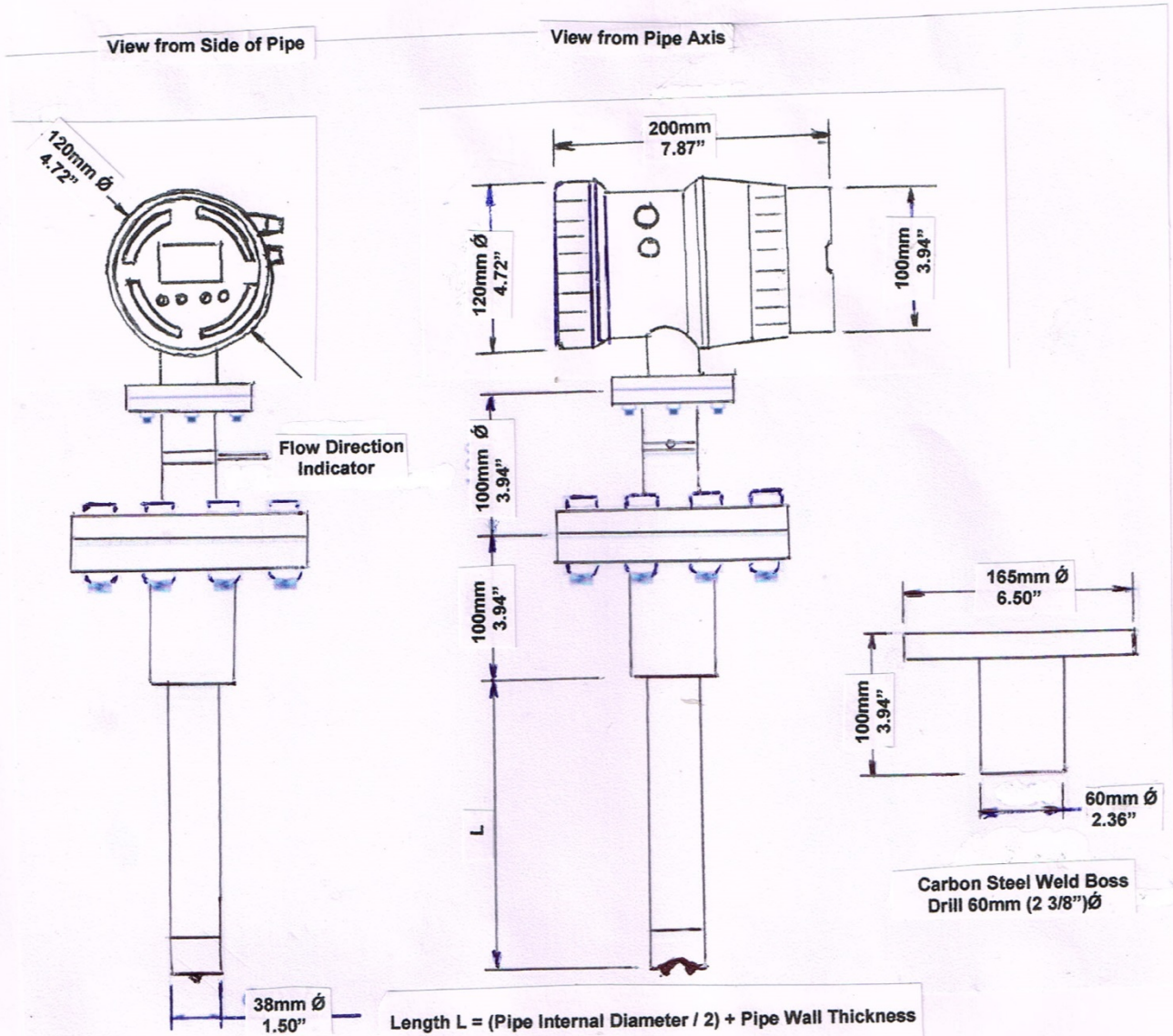
2) For larger size ranges see next page

Note: Take nearest nominal size to application size. Inch sizes are based on standard nominal AWWA sizes, except in red.

Nominal Dia		Recommended 0 - Min. Range		Recommended 0 - Max. Range		Approx. Weight with Compact Converter	
mm	Ins	m ³ /h	gpm	m ³ /h	gpm	kg	lbs
2100	84"	12400	57000	124000	570000	106	233
2200	90"	13600	66000	136000	660000	116	255
2400	96"	16200	75000	162000	750000	126	277
2500	100"	17500	81000	175000	810000	137	301
2600	102"	19000	85000	190000	850000	147	323
2700	108"	20000	94500	200000	945000	156	343
2900	114"	23500	105000	235000	1050000	164	361
3000	120"	25000	116000	250000	1160000	171	376
3200	126"	29000	130000	290000	1300000	181	398
3300	132"	30500	141000	305000	1410000	188	414
3500	138"	34500	155000	345000	1550000	196	431
3600	144"	36500	168000	365000	1680000	202	444
3700	145"	38500	170000	385000	1700000	213	469
3800	150"	40500	182000	405000	1820000	226	497
3900	154"	42500	192000	425000	1920000	241	530
4000	160"	45000	210000	450000	2100000	257	565

Note: For overall weights with remote converter ADD 2 kg (4 lbs) to the weights with compact converter.
Additional weight for TM12 with ball valve ADD 3 kg (7 lbs)

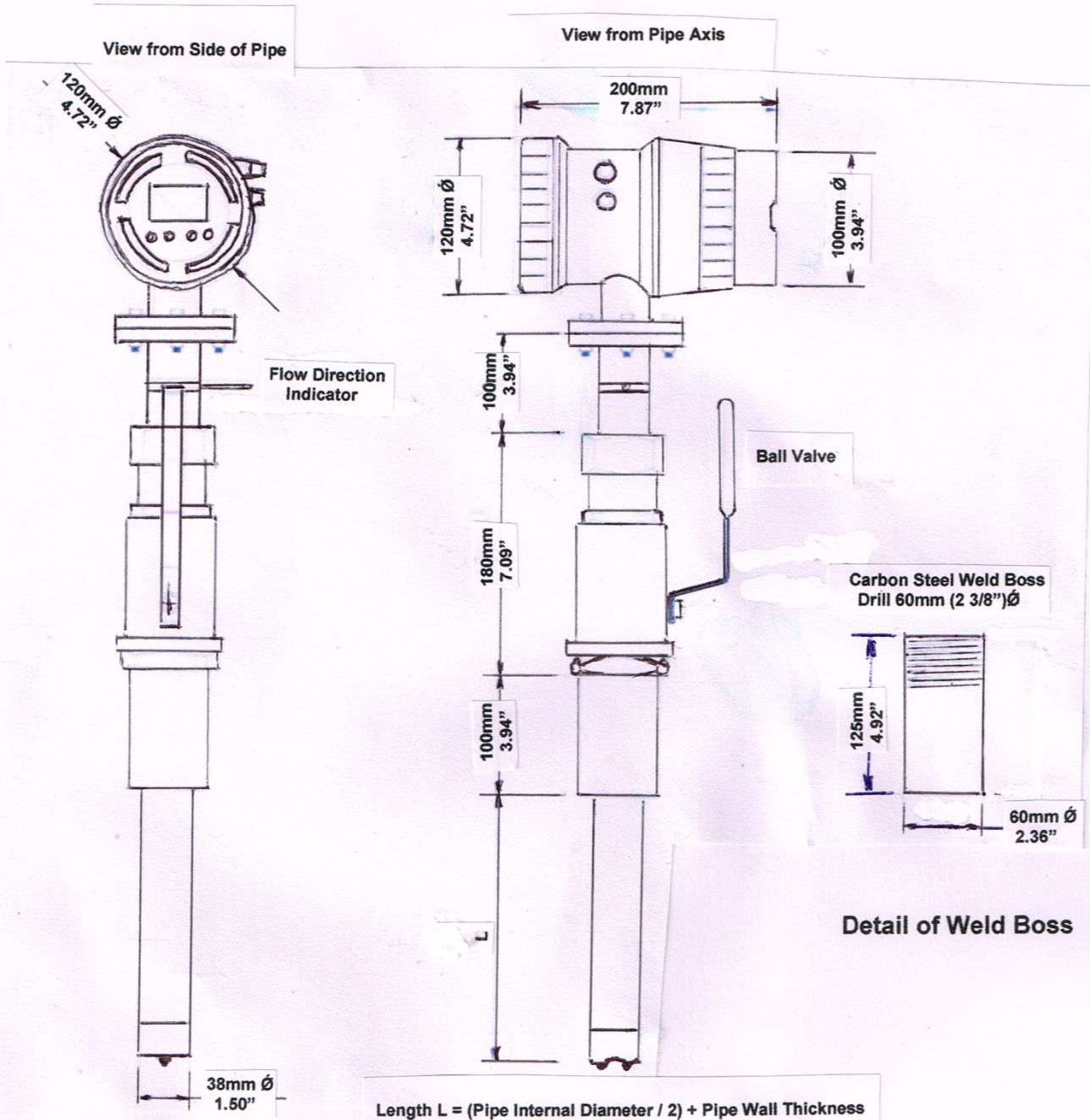
Shown With Compact Converter



TM12 Insertion Sensor with Weld Boss and Fixed Flange

Detail of Fixed Flange Weld Boss

Shown With Compact Converter

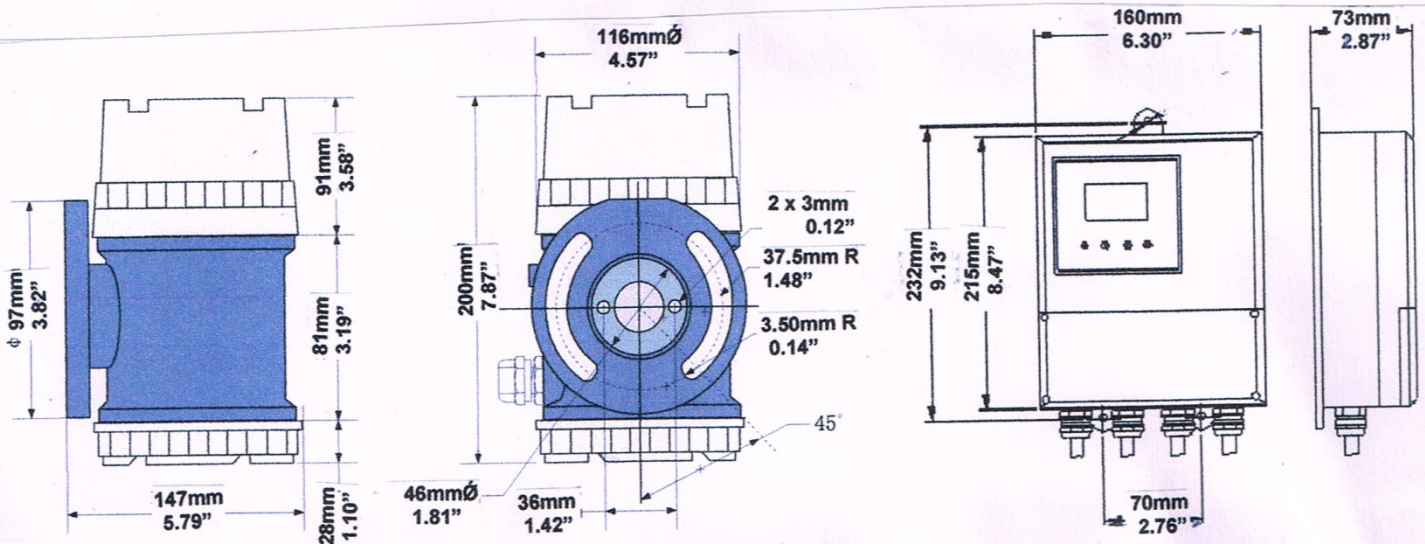


TM12 Insertion Sensor With Ball Valve

tekMag TMC3A Compact and TMC4A Remote Converter Dimensions and Separate Weights

Nominal Diameter		Compact Weight		Remote Weight	
mm	Ins	kg	lbs	kg	lbs
3 - 8	1/8" - 5/16"	7	16	9.0	20
10	0.5"	7.5	16.5	9.5	41.5
15	0.75"	7.7	17	9.7	21.5
20	0.75"	8	18	10	22
25	1"	9	20	11	24
32	1.25"	9.5	21	11.5	25
40	1.5"	12	27	14	31
50	2"	14	31	16	35
65	2.50"	16	35	18	40
80	3"	18	40	20	44
100	4"	22	49	24	53
125	5"	30	66	32	70
150	6"	35	77	37	81
200	8"	48	106	50	110
250	10"	68	150	70	154
300	12"	85	187	87	191
350	14"	127	279	129	284
400	16"	184	405	186	409
450	18"	195	429	197	433
500	20"	210	462	212	466
600	24"	303	667	305	671
700	28"	470	1034	472	1038
800	30"/32"	500	1100	502	1104
900	36"	700	1540	702	1544
1000	40"	921	2026	923	2031
1200	48"	1105	2431	1107	2435
1400	56"	1450	3190	1452	3195
1600	60"	1655	3641	1657	3646
1800	72"	2080	4576	2082	4581
2000	80"	2680	5896	2682	5901

Note: 1) The remote weights are the total weights of the TM03 sensor plus the weight of the integral junction box and remote TMC4A converter.
 2) Weight of remote TMC4A converter 1.85 kg (4.10 lb)



Compact TMC3A Converter Dimensions

Remote TMC4A Converter Dimensions

tekMag TM12 Insertion Magnetic Flow Sensor Ordering Code

Example: **tekMag TM12 - C2 - 19.25" - L - 1 - B - 1 - A - 5000gpm - U - 30feet**

Basic Type

tekMag Converter

TMC3A compact converter = C1

TMC4A remote converter = C2

Exact Internal Pipe Diameter mm or Ins.

50mm = 0050 2.5" = 002.5"

250mm = 0250 19.25" = 19.25"

2000mm = 2000 78.7" = 078.7"

Electrode Materials

(with standard nitrile rubber seal):

AISI 316L = L

Hastelloy C = C

Fixed Flange or Wet Tap Installation:

With wet tap ball valve in AISI 304 stainless steel = 1

Fixed flange assembly in 304 stainless steel = 2

Sensor Protection:

IP 65 (NEMA 4X) = A

IP68 (NEMA6P) with remote converter only = B

Outputs:

4-20mA with scaled pulse output = 1

4-20mA with scaled pulse output + RS485 = 2

4-20mA with scaled pulse output + HART = 3

Note: All converters have LCD display of rate, totals and alarms

Power Supply:

85 - 265 V, 50/60 Hz = A

24V dc = B

Flow Range:

Select between min and max ranges and **state units**, eg.

Eg. 5000 gpm = range 0 - 5000 gpm

Unidirectional or Bidirectional Flow:

Unidirectional flow = U

Bidirectional flow = B

Cable Length:

Maximum 10m (30 feet) standard length = 1

Compact converter - no cable length = 2

tekMag TM12 Enquiry Form

Customer's Name, Address and E-Mail:						
Quantity	Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Sensor 6
Media Type						
Special Details						
Typical Flow Rate With Units						
Min & Max Flow Rate With Units						
Cable Length 8m standard Max. 15m (50 feet)						
Bi-directional (B)/ Uni-directional (U)						
Pressure Range and Units						
Temperature Range and Units						
Liquid Viscosity and Units						
Explosive Atmosphere and Type Required						
Pipe Material – Must be metallic						
Pipe Schedule or ID / Wall Thickness Specify mm or inches						
Straight Pipe Runs Available						
Pipe Material Is Pipe Electrically Isolated (Yes/No)						
Is the flow sensor to be used in an area of magnetic fields? Yes / No						
Electronics Weatherproof (WP), Local (L), or Remote (R)						
Analog and Pulse Frequency						
Is Communication Network Required? If yes, specify which						
Complete Energy System (Yes/No)						

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Specifications are subject to change without notice