

## Technical Information

# VersaFlow TWM 1000 Electromagnetic Flow Converter Specifications

## 34-VF-03-24 March 2022



### The More Than Economical Solution

The TWM1000 offers a broad range of performance with an outstanding price/performance ratio.

The TWM1000 has been developed for applications requiring an economical solution for the measuring task at a high technological level.

### Highlights

- Complete Diagnostics of the application and instrument.
- Optional Zero point stability independent from process properties.
- Extended calibration option for higher measuring accuracy down to 0.2% of the measuring value.
- One converter for all applications, helps facilitate procurement, engineering and inventory management.
- Quick and easy to install and operate.
- Large, illuminated graphic display with intuitive operation.
- Maintenance free.
- Outstanding price/performance ratio.

### Industries

- Machinery
- Power Plants
- Water & Wastewater
- Chemicals
- Oil and Gas
- Pharmaceuticals
- Minerals and Mining



**Figure 1 – TWM1000 Electromagnetic Flow Converter**

Large, illuminated graphic display with intuitive operation with Four push buttons for operator control.

### Applications

- Measuring homogeneous media.
- Water distribution networks and spray-irrigation systems.
- Water treatment.
- Environmental technology.
- Sanitary applications and (HoCIP, SIP) liquid food & beverages.

## Options and Variants



Figure 2

## Modular Converter Concept

Despite its somewhat different appearance, the TWM1000 has many of the same functions as its "big brother", the TWM9000.

The diagnostics function, conductivity measurement and simple menu navigation, to mention just a few.

This latest member of the transformer family also has a large number of fully-developed functions:

- various auxiliary power supply versions (AC, DC, AC/DC)
- HART as standard
- optional Ex version available



Figure 3

## Compact design in various versions

The TWM1000C in the 0° version is ideal for installation in vertical pipes.

The 45° version, on the other hand, allows draining of liquids when it is installed in horizontal pipes. The angled design also improves the readability of the display.

The backlit display provides excellent readability from long distances.

The 4 softkeys enable easy operation, start-up and parametrization.

Both housing versions can be rotated in 90° increments, allowing customer-specific installation positions.



### Signal converter in wall version

With the TWM1000W, remote installation is possible in the case of temperature effects, vibration or difficult-to-reach locations.

A signal cable is used to connect the sensor and the converter for the purposes of power supply and signal processing.

The electronics can be used in all housing versions without parametrization.

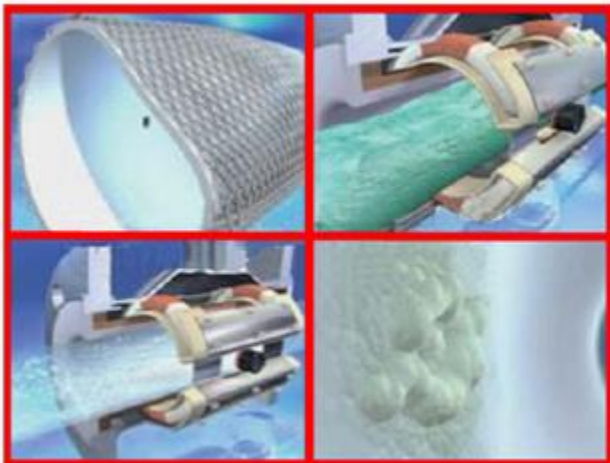


Figure 4

### Diagnosis

The TWM1000 has been equipped with an extensive diagnostic tool for device function and application tests.

- Conductivity measurement
- Electrode error, gas bubbles, solids
- Process or ambient temperature too high
- Empty pipe detection

**Technical Data****Measuring System****Table 1**

Measurement principle	Faraday's law of induction
Function	Continuous measurement of current volume flow, flow velocity, conductivity, mass flow (at constant density), coil temperature of the measuring sensor
Modular construction	The measurement system consists of a measuring sensor and a signal converter
<b>Model</b>	
Compact version (C)	TWM1000 C (0° & 45° version)
Remote version (W)	TWM1000 W
<b>Combinations</b>	
VersaFlow Mag 100 34-VF-03-08	TWM1000 C & W DN10...150 / 3/8" ...6"
VersaFlow Mag 1000 34-VF-03-16	TWM1000 C & W DN25...1200 / 1" ...48"
VersaFlow Mag 4000 34-VF-03-01	TWM1000 C & W DN25... 600 / 1" ... 24";
VersaFlow Mag 3000 34-VF-03-23	TWM1000 C & W: DN2.5...150 / 1/10" ...6";
<b>Communication</b>	
Outputs	Current (incl. HART®), pulse, frequency, status output and/or limit switch.
Counter	2 internal counters with a max. of 8 counter places (e.g. for counting volume and/or mass units).
Verification	Integrated verification, diagnosis functions: flowmeter, empty pipe detection, Stabilization.
<b>Display and user interface</b>	
Graphic display	LC display, backlit white; size: 128x64 pixels, corresponds to 59x31 mm = 2.32"x1.22".
Display functions	2 measured value pages, 1 status page, 1 graphic page (measured values and depictions adjustable as required).
Units	Metric, British and US units selectable as required from lists for volume / mass flow and counting, flow speed, electrical conductivity, temperature.
Language of display texts	English, French, German (others on request)
Operating elements	4 push buttons for operator control of the signal converter without opening the housing.

## Measuring Accuracy

**Table 2**

Maximum measuring error	$\pm 0.3\%$ of the measured value $\pm 1$ mm/s, depending on the measuring sensor (see accuracy curves)
Repeatability	$\pm 0.1\%$

## Operating Conditions

**Table 3**

<b>Temperature</b>		
Process temperature	See also data sheet for the measuring sensor	
Ambient temperature	-40...+65°C / -40...+149°F (ambient temperature 55°C	131°F and higher
	Protect electronics against self-heating, because an increase in the electronics temperature in 10°C / 50°F steps leads to a corresponding reduction of the electronics' service life by a factor of two.)	
Storage temperature	-50...+70°C / -58...+158°F	
<b>conductivity</b>		
Min. process liquid conductivity (non-water)	Min. 5 $\mu\text{S/cm}$ (see also data sheet for the measuring transformer)	
Min. process liquid conductivity (water)	20 $\mu\text{S/cm}$	

## Materials

**Table 4**

Die-cast aluminium (polyurethane-coated)	Standard
Stainless steel 1.4404 / AISI 316L	Option

## Electrical Connection

**Table 5**

Voltage	Standard: 100...230 VAC (-15% / +10%), 50/60 Hz
	Option 1: 24 VDC (-55% / +30%)
	Option 2: 24VAC/DC (AC: -15% / +10%; DC: -25% / +30%)
Power consumption	Standard: 8 VA
	Option 1: 4 W
	Option 2: AC 8 VA; DC: 4 W
Signal cable	Only for remote versions
(type A) DS 300	Max. length: 600 m / 1968 ft (depending on electrical conductivity and measuring)
Cable entries	Standard: M20 x 1.5
	Option: ½" NPT, PF ½

## Outputs

Table 6

<b>Current output</b>	
Function	Measurement of volume and mass (at constant density), HART®
Settings	Without HART®
	Q = 0%: 0... 20 mA
	Q = 100%: 10...21.5 mA
	Error identification: 0...22 mA
	With HART®
	Q = 0%: 4... 20 mA
	Q = 100%: 10...21.5 mA
	Error identification: 3.5...22 mA
Operating data	
Active	$U_{int,nom} = 20 \text{ VDC}$ $I \leq 22\text{mA}$ $R_L \leq 750 \Omega$
Passive	$U_{ext} \leq 32 \text{ VDC}$ $I \leq 22\text{mA}$ $U_0 \geq 2 \text{ V at } I = 22 \text{ mA}$ $R_L \leq (U_{ext} - U_0)/I_{max}$
<b>Pulse / frequency output</b>	
Function	Can be set as a pulse output (e.g.- for volume or mass) or frequency output
Settings	For Q = 100%: 0.01...10000 pulses per second or pulses per unit volume
	Pulse width: setting automatic, symmetric or fixed (0.05...2000 ms)
Operating data	
Passive	$U_{ext} \leq 32 \text{ VDC}$
	$100 \text{ Hz} < f_{max} \leq 10 \text{ kHz}$ : $I \leq 20\text{mA}$ open: $I \leq 0.1 \text{ mA at } U_{ext} = 5 \text{ V}$ $I \leq 0.5\text{mA at } U_{ext} = 24 \text{ V}$ $I \leq 0.7\text{mA at } U_{ext} = 32 \text{ V}$ closed: $U_0 \leq 0.8\text{V at } I = 1 \text{ mA}$ $U_0 \leq 1.5\text{V at } I = 10 \text{ mA}$ $U_0 \leq 3.5\text{V at } I = 100 \text{ mA}$ $f \leq 1 \text{ kHz: } R_L \leq 10 \Omega$ $f \leq 10 \text{ kHz: } R_L \leq 2 \Omega$

**Table 7**

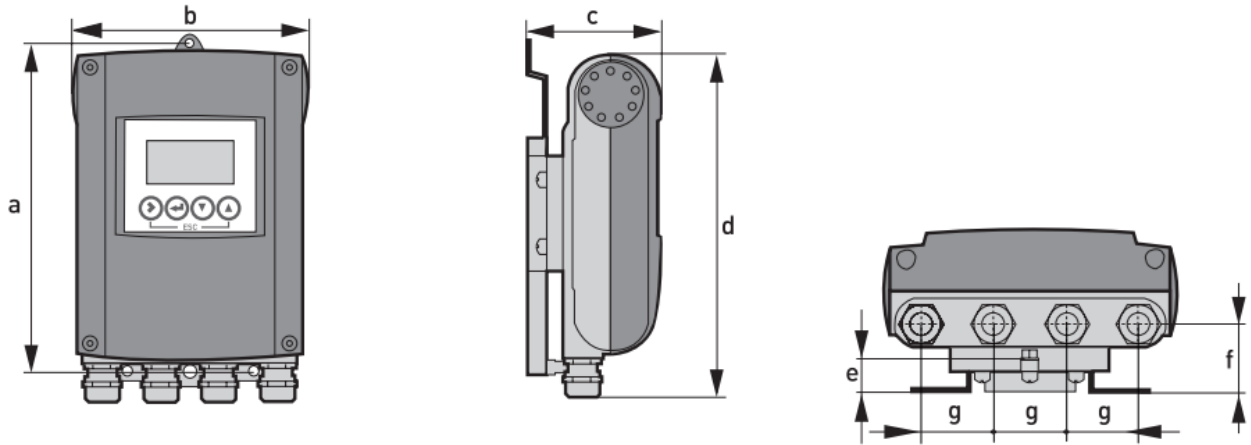
<b>Status output / limit switch</b>	
Function and settings	Settable as automatic measuring range change, indicator for direction of flow, overflow, error, operating point or empty pipe detection
	Valve control with activated dosing function
	Status and/or control: ON or OFF
Operating data	
Passive	$U_{ext} \leq 32 \text{ VDC}$ $I \leq 100 \text{ mA}$ open: $I \leq 0.05 \text{ mA}$ at $U_{ext} = 32 \text{ VDC}$ closed: $U_0 \leq 0.2 \text{ V}$ at $I = 10 \text{ mA}$ $U_0 \leq 2 \text{ V}$ at $I = 100 \text{ mA}$
<b>Low-flow cutoff</b>	
On	0...±9.999 m/s; 0...20.0%, settable in 0.1 % steps, separately for each current and pulse output
Off	0...±9.999 m/s; 0...19.0%, settable in 0.1 % steps, separately for each current and pulse output
<b>Time constant</b>	
Function	Can be set together for all flow indicators and outputs, or separately for: current, pulse and frequency output, and for limit switches and the 2 internal counters
Time setting	0... 100 seconds, set in increments 0.1 second steps

**Table 8**

<b>Hazardous areas</b>	
Non-Ex	Standard
EEx - Zone 1/2	In preparation
<b>Protection category to IEC 529 / EN 60529</b>	
All versions	IP 66 / 67 (corresponds to NEMA 4X/6)

**Dimensions and Weights**

**Wall-Mounted Version**



**Figure 5 - Dimensions of the wall-mounted version, aluminium housing**

**Dimensions and weight in mm and kg**

**Table 9**

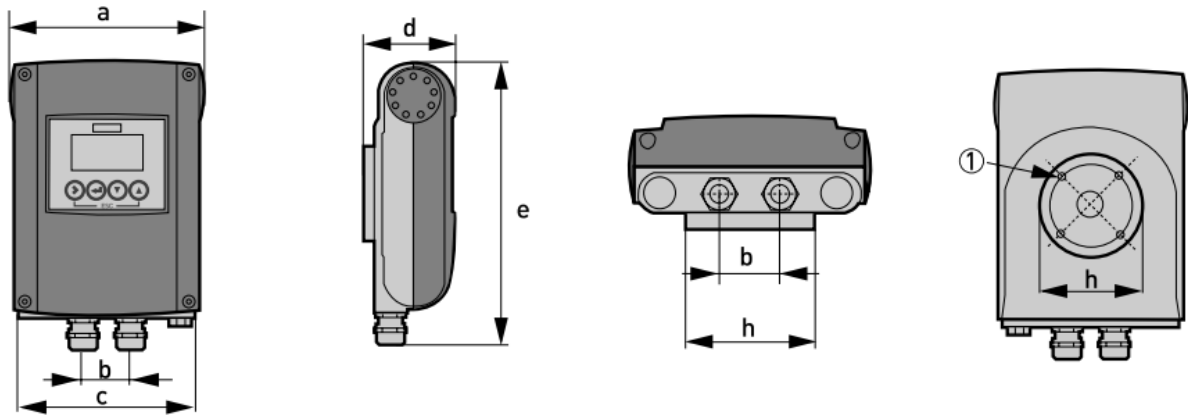
	Dimensions [mm]							Weight [kg]
	a	b	c	d	e	f	g	
Wall-mounted version	241	161	95.2	257	19.3	39.7	40	Std: 1.9

**Dimensions and weight in inches and lbs**

**Table 10**

	Dimensions [inches]							Weight [lbs]
	a	b	c	d	e	f	g	
Wall-mounted version	9.50	6.34	3.75	10.12	0.76	1.56	1.57	Std: 4.2

**Compact 0° version**



(1) 4 X M6

Figure 6 - Dimensions of compact 0° version, aluminium housing

**Dimensions and weight in mm and kg**

Table 11

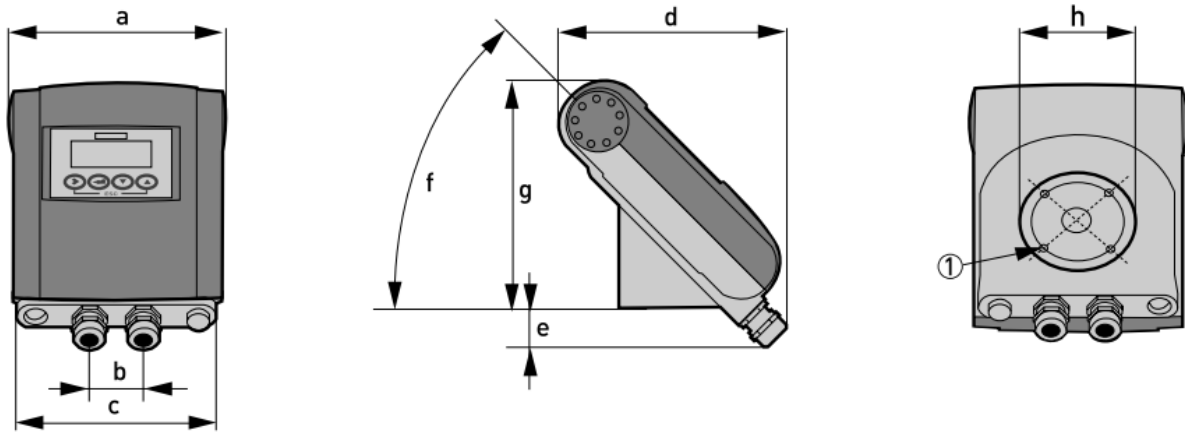
	Dimensions [mm]								Weight [kg]
	a	b	c	d	e	f	g	h	
0° version	161	40	155	81.5	257	-	-	Ø72	Std: 1.9 Ex: 2.4

**Dimensions and weight in inches and lbs**

Table 12

	Dimensions [inches]								Weight [lbs]
	a	b	c	d	e	f	g	h	
0° version	6.34	1.57	6.1	3.21	10.12	-	-	Ø2.83	Std: 4.2 Ex: 5.3

**Compact 45° version**



(1) 4 X M6

Figure 7 - Dimensions of compact 45° version, aluminium housing

**Dimensions and weight in mm and kg**

Table 13

	Dimensions [mm]								Weight [kg]
	a	b	c	d	e	f	g	h	
45° version	161	40	155	184	27.4	45°	186	Ø72	Std: 2.1 Ex: 2.6

**Dimensions and weight in inches and lbs**

Table 14

	Dimensions [inches]								Weight [lbs]
	a	b	c	d	e	f	g	h	
45° version	6.34	1.57	6.10	7.24	1.08	45°	7.32	Ø2.83	Std: 4.6 Ex: 5.7

**Flow Tables****Flow rate in m/s and m<sup>3</sup>/h****Table 15**

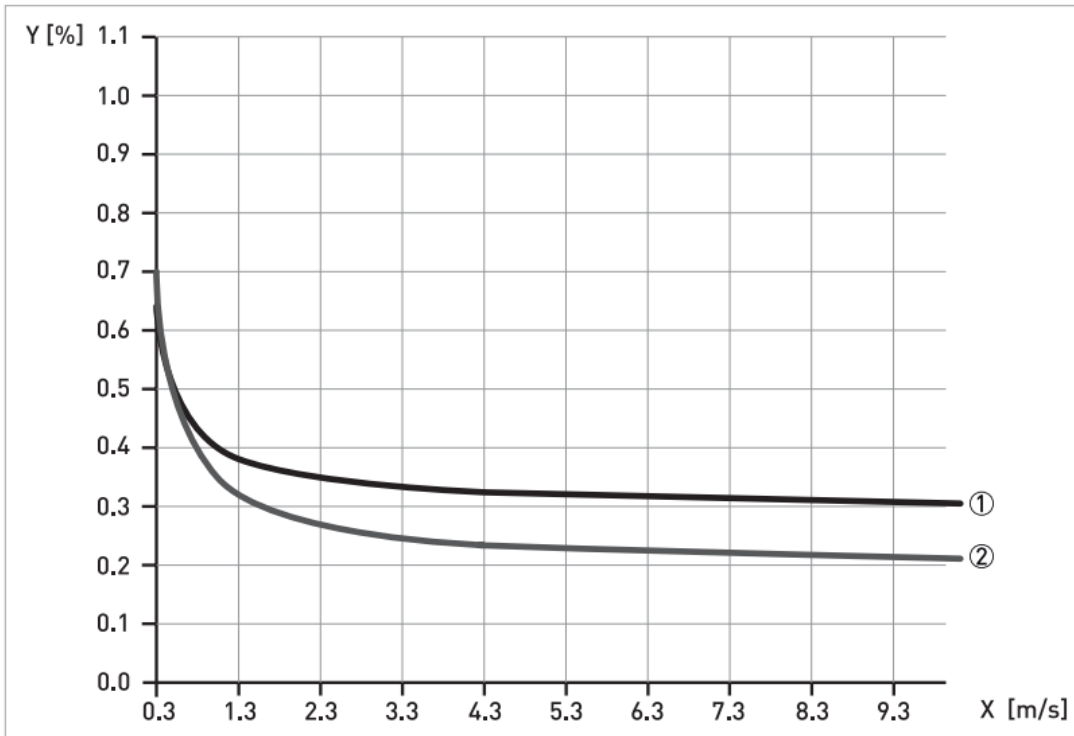
	<b>Q<sub>100%</sub> in m<sup>3</sup>/h</b>			
<b>v [m/s]</b>	<b>0.3</b>	<b>1</b>	<b>3</b>	<b>12</b>
<b>DN [mm]</b>	<b>Min. flow</b>	<b>Nominal flow</b>		<b>Max. flow</b>
2.5	0.005	0.02	0.05	0.21
4	0.01	0.05	0.14	0.54
6	0.03	0.10	0.31	1.22
10	0.08	0.28	0.85	3.39
15	0.19	0.64	1.91	7.63
20	0.34	1.13	3.39	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

## Flow Rate in ft/s and gallons/min

Table 16

	<b>Q<sub>100%</sub> in .US gallons/min</b>			
<b>v [ft/s]</b>	<b>1</b>	<b>3.3</b>	<b>10</b>	<b>40</b>
<b>DN [inch]</b>	<b>Min. flow</b>	<b>Nominal flow</b>		<b>Max. flow</b>
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

**Measuring Accuracy**



**Figure 8 - Measuring accuracy**

- X [m/s]: flow velocity
- Y [%]: deviation from the actual measured value (mv)
- 
- **Reference conditions**
  - Medium: water
  - Temperature: +5...+35°C / +41...+95°F
  - Pressure: 0.1...5 barg / 1.5...72.5 psig
  - Inlet run: ≥ 5 DN; Outlet run: ≥ 2 DN

**Table 17**

	DN [mm]	DN [inch]	Standard accuracy (1)	Optimized accuracy (2)
VersaFlow Mag 1000/ 4000/ 3000	10...1200	3/8...48	±0.3% of mV +1 mm/s	±0.2% of mv ± 1.5 mm/s
VersaFlow Mag 100	10...150	3/8...6	±0.4% of mV +1 mm/s	
VersaFlow Mag 3000/ 4000	2.5...609	1/10...24		

## Sales and Service

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**Honeywell**

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