

VersaFlow TWM 9000 Electromagnetic Flow Converter Specifications

34-VF-03-02 September 2015



The High-Performance Solution

The TWM 9000 is the only electromagnetic flow converter with diagnostics for the instrument and application. TWM 9000 is compatible with all electromagnetic flow sensors and is suitable for all applications.

Highlights

- Complete Diagnostics of the application and instrument
- Quick to install and easy to operate
- Excellent long-term stability
- Optimal zero point stability independent from process properties
- One converter for all applications; helps facilitate procurement, engineering and inventory management.
- Exceeds requirements VDI / VDE/ WIB 2650 and NAMUR NE 107
- Integrated temperature and conductivity measurement
- Suitable for Custody Transfer

Industries

- Chemicals
- Food & Beverage
- Minerals & Mining
- Oil & Gas
- Pharmaceuticals
- Power Plants
- Pulp & Paper
- Water
- Wastewater
- Machinery



Figure 1 – VersaFlow Electromagnetic Flow Converter

Electromagnetic Product Range

VersaFlow converters are compatible with all sensors



All meters consist of a sensor and a converter. The converter may be mounted integral to the sensor, or remotely, either with a field mounting kit or a wall-mounted housing. See sensor specification for details.

Applications

- Products with low conductivity, high solid contents or entrained air
- Inhomogeneous, abrasive and corrosive products
- Quick media changes
- Abrupt changes of pH value
- Pulsating or turbulent flows

Model

| | |
|----------------------------------------------------|------------------------------------|
| C (compact) (Integrally Mounted) | TWM 9000 C |
| F (field), W (wall), R (19" rack) (Remote Mounted) | TWM 9000 F, TWM 9000 W, TWM 9000 R |

Performance

| | |
|-----------------------------------|--------------------------------------------------|
| Maximum measuring error | See Accuracy Curves |
| Repeatability | ±0.06% to OIML R117 |
| Full-scale range (see flow table) | $v = 0.3...12 \text{ m/s} / 1...40 \text{ ft/s}$ |

Conductivity

| | |
|----------------------------------------------|-------------------------------------------------|
| Min. process liquid conductivity (non-water) | As low as $1 \mu\text{S/cm}$ (see flow sensor) |
| Min. process liquid conductivity (water) | $20 \mu\text{S/cm}$ |

Content of solids

| | |
|--------------------------------|-----|
| Maximum percentage (by volume) | 30% |
|--------------------------------|-----|

Display

| | |
|---------------------------------------------------------------------|----------|
| With local display (2 meas. pages: 1 status page, 1 graphical page) | Standard |
|---------------------------------------------------------------------|----------|

Languages

| | |
|------------------------------------------------------------------------------------------------------|----------|
| English, French, German, Dutch, Polish, Portuguese, Danish , Spanish, Swedish, Slovenian, Italian | Standard |
|------------------------------------------------------------------------------------------------------|----------|

Combinations

| | |
|------------------------------------------------------------------|------------------------------|
| VersaFlow Mag 100 Specification 34-VF-03-08 | DN10...150 (3/8" to 6") |
| VersaFlow Mag 1000 Specification 34-VF-03-16 | DN25...3000 (1" to 120") |
| VersaFlow Mag 4000 Specification 34-VF-03-01 | DN2.5...3000 (1/10" to 120") |
| VersaFlow Mag 2000 Specification 34-VF-03-21(F), 34-VF-03-22(SW) | DN2.5...250 (1/10" to 10") |
| VersaFlow Mag 3000 Specification 34-VF-03-23 | DN2.5...150 (1/10" to 6") |

Communication

| | |
|----------------------------------------------------------------|----------|
| Current, pulse & status output, frequency output, limit switch | Standard |
| HART communication, control input, 3 counters | Standard |
| Ex-i | Option |
| Foundation Fieldbus | Option |
| Modbus | Option |

Verification

| | |
|-----------------------------------------|----------|
| Integrated verification, diagnostics: | Standard |
| - instrument / process / measurement | Standard |
| - empty pipe indication / stabilization | Standard |

Custody Transfer

| | |
|-------------------------------------------|---------------------|
| Without | Standard |
| Cold potable water (OIML R-49, KIWA K618) | Option ¹ |
| Other than water (OIML R-117) | Option ¹ |

Power Supply

| Voltage | Power Consumption | Standard/Option |
|----------------------------------------------|--------------------|-----------------|
| 100...230 VAC (-15% / +10%), 50/60 Hz | 22 VA | Standard |
| 24 VDC (-55% / +30%) | 12 W | Option |
| 24 VAC/DC (AC: -15% / +10%; DC: -25% / +30%) | AC 22 VA; DC: 12 W | Option |

Approval

| | |
|-----------------------------------|---------------------|
| Non Ex | Standard |
| EEx - zone 1 | Option ² |
| FM - Class I DIV 2 | Option ² |
| CSA - Class I DIV 2 | Option ² |
| NEPSI zone 1 | Option ² |
| SAA – Aus Ex zone 1 / 2 (pending) | Option ² |

Protection category (according to IEC 529 / EN 60 529)

| | |
|--------------|----------------------------|
| C (compact) | IP 66 / 67 (eq. to NEMA 6) |
| F (remote) | IP 66 / 67 (eq. to NEMA 6) |
| W (wall) | IP 65 (eq. to NEMA 4/4X) |
| R (19" rack) | IP 20 (eq. to NEMA 1) |

Temperature

| | |
|---------------------|----------------------------|
| Process temperature | See flow sensor |
| Ambient temperature | -40...+65°C / -40...+149°F |
| Storage temperature | -50...+70°C / -58...+158°F |

Signal Cable

| | |
|------------------------------------------------------------------------------------|--------------------------|
| Separate - DS (dep. on measuring sensor and conductivity) | 5...600 m / 15...1950 ft |
| Separate - BTS (dep. on measuring sensor and conductivity) | 5...600 m / 15...1950 ft |
| Separate - LIYCY (Class 1 Div. 2 only) (dep. on measuring sensor and conductivity) | 5...100 m / 15...330 ft |

¹ pending² only for C and F version

Cable Connection

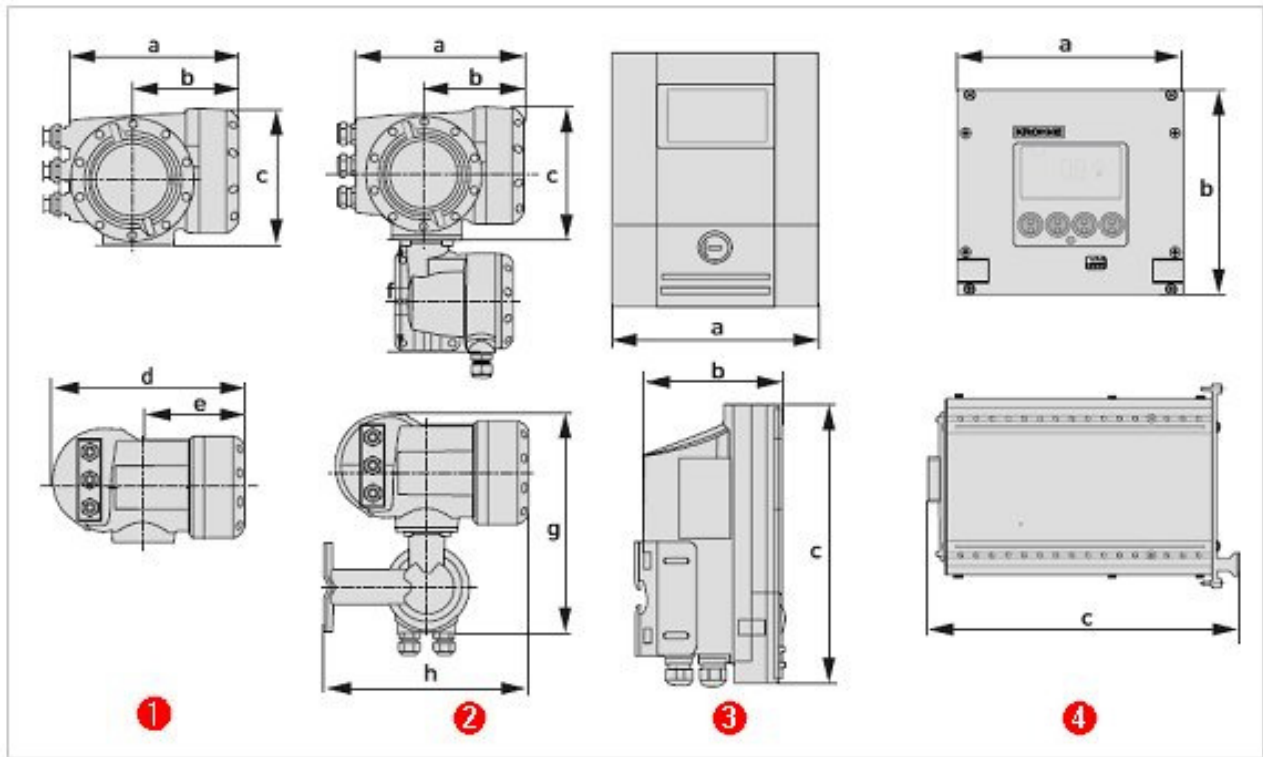
| | |
|-----------|----------|
| M20 x 1.5 | Standard |
| ½" NPT | Option |
| PF ½ | Option |

Materials Used

| | |
|---------------------------------------------------------------|---------------------|
| Die-cast aluminum (polyurethane coated); C and F version only | Standard |
| Polyamide - polycarbonate; W version only | Standard |
| Stainless steel 316 L (1.4404); C and F version only | Option |
| Custody transfer lead & sealing; C and F version only | Option ¹ |

¹ pending

Dimensions and Weights



- 1 Compact version (TWM 9000 C)
- 2 Field housing (TWM 9000 F) - remote version
- 3 Wall-mounted housing (TWM 9000 W) - remote version
- 4 19" rack (TWM 9000 R) - remote version

Dimensions and Weights in mm and kg

| Version | Dimensions mm [inches] | | | | | | | | Weights kg [lbs] |
|------------|------------------------|---------------|----------------|----------------|---------------|-----------------|------------------|----------------|------------------|
| | a | b | c | d | e | f | g | h | |
| TWM 9000 C | 202 (7.95) | 120 (4.75) | 155 (6.10) | 260 (10.20) | 137 (5.40) | - | - | - | 4.2 (9.30) |
| TWM 9000 F | 202 (7.95) | 120 (4.75) | 155 (6.10) | - | - | 140.5 (5.50) | 295.8 (11.60) | 277 (10.90) | 5.7 (12.60) |
| TWM 9000 W | 198 (7.80) | 138 (5.40) | 299 (11.80) | - | - | - | - | - | 2.4 (5.30) |
| TWM 9000 R | 142 (5.60) | 129 (5.08) | 195 (7.68) | - | - | 140.5 (5.53) | 295.8 (11.65) | 277 (10.90) | 1.2 (2.65) |

I/O Specifications

Overall Functionality

| | |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function | Continuous measurement of actual volume flow rate, flow velocity, conductivity, massflow (at const. density), coil temperature. Integrated batch controller |
| | Bidirectional flow measurement and totalisation |
| | Flow direction identified via status or current output |
| | Diagnostics: Accuracy, linearity, electrode contamination, noise, flow profile, field current, coil resistance and temperature, empty or non-full pipe + derived functions |

Current Output

| | | | |
|----------------|---------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function | Measurement of volume and mass (at constant density), HART [®] communication | | |
| Settings | With HART[®] | | Without HART |
| | Q = 0%: 4...15 mA | | Q = 0%: 0...15 mA |
| | Q = 100%: 10...21.5 mA | | Q = 100%: 10...21.5 mA |
| | Error identification: 3.5...22 mA | | Error identification: 0...22 mA |
| Operating data | Basic I/Os | Modular I/Os | EEx-i |
| Active | U _{int,nom} = 24 VDC I ≤ 22 mA R _L ≤ 1 kΩ | | U _{int,nom} = 20 VDC I ≤ 22 mA R _L ≤ 450 Ω |
| | | | U ₀ = 21 V I ₀ = 90mA P ₀ = 0.5W C ₀ = 90 nF / L ₀ = 2 mH C ₀ = 110 nF / L ₀ = 0.5mH |
| Passive | U _{ext} ≤ 32 VDC I ≤ 22 mA U ₀ ≤ 1.8 V at I = 22 mA | | U _{ext} = 32 VDC I ≤ 22 mA U ₀ ≤ 4 V at I = 22 mA |
| | | | U _i = 30 V I _i = 100 mA P _i = 1W C _i = 10 nF L _i ~ 0 mH |

Pulse or Frequency Output

| | | | |
|----------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Function | Can be set as a pulse output (e.g.- for volume or mass counting) 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 | Basic I/Os | Modular I/Os | EEx-i |
| Active | - | U _{nom} = 24 VDC | - |
| | | f_{max} ≤ 100 Hz: I ≤ 20 mA open: I ≤ 0.05 mA closed: U _{0, nom} = 24 V at I = 20 mA | |
| Passive | U _{ext} ≤ 32 VDC | 100 Hz < f_{max} ≤ 10 kHz: I ≤ 20 mA open: I ≤ 0.05 mA closed: U _{0, nom} = 22.5 V at I = 1 mA U _{0, nom} = 21.5 V at I = 10mA U _{0, nom} = 19 V at I = 20 mA | - |
| | | f_{max} δ 100 Hz: I ≤ 100 mA open: I ≤ 0.05 mA at U _{ext} = 32 VDC closed: U ₀ ≤ 0.2 V at I = 10 mA U ₀ ≤ 2 V at I = 100mA | |
| NAMUR | - | Passive to EN 60947-5-6 open: I _{nom} = 0.6mA closed: I _{nom} = 3.8mA | Passive to EN 60947-5-6 open: I _{nom} = 0.43 mA closed: I _{nom} = 4.5mA |
| | | | U _i = 30 V I _i = 100 mA P _i = 1 W C _i = 10 nF L _i ~ 0 mH |

Status Output/Limit Switch

| | | | |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 | Basic I/Os | Modular I/Os | EEx-i |
| Active | - | $U_{int} = 24 \text{ VDC}$ $I \leq 20 \text{ mA}$ open: $I \leq 0.05 \text{ mA}$ closed: $U_{0,nom} = 24 \text{ V at } I = 20 \text{ mA}$ | - |
| 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: $U_0 \leq 0.2 \text{ V at } I = 10 \text{ mA}$ $U_0 \leq 2 \text{ V at } I = 100 \text{ mA}$ | $U_{ext} = 32 \text{ VDC}$ $I \leq 100 \text{ mA}$ $R_L \leq 47 \text{ k}\Omega$ open: $I \leq 0.05 \text{ mA at}$ $U_{ext} = 32 \text{ VDC}$ closed: $U_0 \leq 0.2 \text{ V at } I = 10 \text{ mA}$ $U_0 \leq 2 \text{ V at } I = 100 \text{ mA}$ | - |
| NAMUR | - | Passive to EN 60947-5-6 open: $I_{nom} = 0.6 \text{ mA}$ closed: $I_{nom} = 3.8 \text{ mA}$ | Passive to EN 60947-5-6 open: $I_{nom} = 0.43 \text{ mA}$ closed: $I_{nom} = 4.5 \text{ mA}$ $U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1 \text{ W}$ $C_i = 10 \text{ nF}$ $L_i = 0 \text{ mH}$ |

Control Input

| | | | |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function | Hold value of the outputs (e.g. for cleaning counter and error reset, range change). | | |
| | Start of dosing when dosing function is activated. | | |
| Operating data | Basic I/Os | Modular I/Os | EEx-i |
| Active | - | $U_{int} = 24 \text{ VDC}$ Terminals open: $U_{0,nom} = 22 \text{ V}$ Terminals bridged: $I_{nom} = 4 \text{ mA}$ On: $U_0 \geq 12 \text{ V}$ with $I_{nom} = 1.9 \text{ mA}$ Off: $U_0 \leq 10 \text{ V}$ with $I_{nom} = 1.9 \text{ mA}$ | - |
| Passive | $U_{ext} \leq 32 \text{ VDC}$ $I_{nom} = 6.5 \text{ mA}$ at $U_{ext} = 24 \text{ VDC}$ $I_{nom} = 8.2 \text{ mA}$ at $U_{ext} = 32 \text{ VDC}$ On: $U_0 \geq 8 \text{ V}$ with $I_{nom} = 2.8 \text{ mA}$ Off: $U_0 \leq 2.5 \text{ V}$ with $I_{nom} = 0.4 \text{ mA}$ | $U_{ext} \leq 32 \text{ VDC}$ $I \leq 9.5 \text{ mA}$ at $U_{ext} = 24 \text{ V}$ $I \leq 9.5 \text{ mA}$ at $U_{ext} = 32 \text{ V}$ On: $U_0 \geq 3 \text{ V}$ with $I_{nom} = 1.9 \text{ mA}$ Off: $U_0 \leq 2.5 \text{ V}$ with $I_{nom} = 1.9 \text{ mA}$ | $U_{ext} \delta 32 \text{ VDC}$ $I \leq 6 \text{ mA}$ at $U_{ext} = 24 \text{ V}$ $I \leq 6.6 \text{ mA}$ at $U_{ext} = 32 \text{ V}$ On: $U_0 \geq 5.5 \text{ V}$ or $I \geq 4 \text{ mA}$ Off: $U_0 \leq 3.5 \text{ V}$ or $I \leq 0.5 \text{ mA}$ |
| | | | $U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1 \text{ W}$ $C_i = 10 \text{ nF}$ $L_i = 0 \text{ mH}$ |
| NAMUR | - | Active to EN 60947-5-6 Terminals open: $U_{0,nom} = 8.7 \text{ V}$ Terminals bridged: $I_{nom} = 7.8 \text{ mA}$ On/off: $U_{0, nom} = 6.3 \text{ V}$ with $I_{nom} = 1.9 \text{ mA}$ Identification for open terminals: $U_0 \geq 8.1 \text{ V}$ with $I \leq 0.1 \text{ mA}$ Identification for bridged terminals: $U_0 \leq 1.2 \text{ V}$ with $I \geq 6.7 \text{ mA}$ | - |

Low Flow Cut-Off

| | |
|-----|-------------------------------------------------------------------------------------------------|
| 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 |

Time Constant

| | |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 3 internal counters |
| Time setting | 0...100 seconds, settable in 0.1 second steps |

I/O-Module Combination Possibilities

| | | | | |
|---------------|--|-----------|----------|-------------|
| Communication | | | | |
| | | Basic I/O | Ex-i I/O | Modular I/O |

Current Output

| | | | | |
|------------------|--|--|--|--|
| Active / passive | | | | |
| HART | | | | |

Pulse and Status Output

| | | | | |
|------------------------------|--|--|--|--|
| Active | | | | |
| Passive | | | | |
| Namur (acc. to EN 60947-5-6) | | | | |

Control Input

| | | | | |
|------------------------------|--|--|--|--|
| Active | | | | |
| Passive | | | | |
| Namur (acc. to EN 60947-5-6) | | | | |

Foundation Fieldbus

| | | | | |
|-------------------------------|--|--|--|--|
| Foundation Fieldbus (pending) | | | | |
|-------------------------------|--|--|--|--|

Modbus

| | | | | |
|--------|--|--|--|--|
| Modbus | | | | |
|--------|--|--|--|--|

Protection

| | | | | |
|----------|--|--|--|--|
| Ex-d / e | | | | |
|----------|--|--|--|--|

standard
 optional
 on request

Note:

Ex-i I/O: up to 1 additional in-/output module possible (see I/O-module combinations)

Modular I/O: up to 2 additional in-/output module possible (see I/O-module combinations)

I/O Modules

| | I/O | | 1st module | | 2nd module | |
|---|-------------------------------------------|---|--------------------|---|--------------------|-----------------------------------------------------|
| 1 | Basic | 0 | no module possible | 0 | no module possible | |
| 2 | Ex-i (Ia + Pp) | 1 | Ex-i (Ia + Pp/Cp) | | | |
| 3 | Ex-i (Ip + Pp) | 2 | Ex-i (Ip + Pp/Cp) | | | |
| 4 | Modular (Ia + Pa) | 8 | no module | 8 | no module | |
| 6 | Modular (Ia + Pp) | A | Ia | A | Ia | Ia = current output - active |
| 7 | Modular (Ia + Pn) | B | Ip | B | Ip | Ip = current output - passive |
| 8 | Modular (Ip + Pa) | C | Pa/Sa | C | Pa/Sa | Pa/Sa = pulse/status output - active, high current |
| B | Modular (Ip + Pp) | E | Pp/Sp | E | Pp/Sp | Pp/Sp = pulse/status output - passive, high current |
| C | Modular (Ip + Pn) | F | Pn/Sn | F | Pn/Sn | Pn/Sn = pulse/status output - passive, Namur |
| E | Foundation Fieldbus | H | Cn | H | Cn | Cn = control input - active, Namur |
| G | RS485 Modbus | | | | | |
| H | RS485 Modbus with interactive termination | | | | | |

The TWM 9000 with standard basic I/O covers almost all applications, having 4 I/Os:

- active/passive current output (+HART)
- passive pulse/status output
- passive status output
- passive status output / control input

The I/O-module combination is thus 1-0-0 (see above).

The TWM 9000 with modular I/O can be tailor-made to any application:

- Suppose you require a converter with passive pulse output and 3 passive current outputs. The I/O-module combination then becomes B-B-B.
- Suppose you require a converter with 2 active pulse/status outputs. The I/O-module combination then becomes either 4-C-8 or 8-C-8 (depending on whether active or passive current output is required). The latter '8' indicates that 1 additional module can be added in the future.

For I/O-module combinations, not described in the overview on the right, please consult HONEYWELL.

Example for Combination of I/O's

| Basic I/O | | |
|-----------|---|---|
| 1 | 2 | 3 |
| 1 | 0 | 0 |

| Ex- I/O | | |
|---------|---|---|
| 1 | 2 | 3 |
| 2 | 0 | 0 |
| | 1 | |
| | 2 | |

| | | |
|---|---|---|
| 3 | 0 | 0 |
| | 1 | |
| | 2 | |

| | | |
|---|---|---|
| D | 0 | 0 |
| | 1 | |
| | 2 | |

| | | |
|---|---|---|
| E | 0 | 0 |
| | 1 | |
| | 2 | |

| Modular I/O | | | Modular I/O | | | Modular I/O | | | Modular I/O | | | | |
|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|---|---|
| Comm | 1st | 2nd | Comm | 1st | 2nd | Comm | 1st | 2nd | Comm | 1st | 2nd | | |
| 4 | 8 | 8 | 6 | 8 | 8 | 7 | 8 | 8 | 8 | 8 | 8 | | |
| | A | 8 | | A | 8 | | E | 8 | | F | 8 | B | 8 |
| | | A | | | A | | | E | | | F | | B |
| | | C | | | K | | | H | | | C | | |
| | | G | | | | | | | | | G | | |
| | C | 8 | | C | 8 | | K | 8 | | H | 8 | C | 8 |
| | | C | | | E | | | F | | | C | | |
| | | G | | | K | | | H | | | G | | |
| | | G | | | | | | | | | G | | |
| | G | 8 | | G | 8 | | K | 8 | | H | 8 | G | 8 |
| | | G | | | K | | | H | | | G | | |
| | | G | | | | | | | | | G | | |
| G | | | | | G | | | | | | | | |
| D | 8 | 8 | E | 8 | 8 | G | 8 | 8 | H | 8 | 8 | | |
| | A | 8 | | A | 8 | | C | 8 | | C | 8 | A | 8 |
| | | A | | | C | | | C | | | A | | |
| | | C | | | K | | | K | | | C | | |
| | | K | | | | | | | | | K | | |
| | C | 8 | | C | 8 | | K | 8 | | K | 8 | C | 8 |
| | | C | | | C | | | C | | | C | | |
| | | K | | | K | | | K | | | K | | |
| | | K | | | | | | | | | K | | |
| | K | 8 | | K | 8 | | K | 8 | | K | 8 | K | 8 |
| | | K | | | K | | | K | | | K | | |
| | | K | | | | | | | | | K | | |
| K | | | | | K | | | | | | | | |
| B | 8 | 8 | C | 8 | 8 | F | 8 | 0 | C | 8 | 0 | | |
| | B | 8 | | B | 8 | | F | 8 | | A | 0 | C | 8 |
| | | B | | | B | | | F | | | A | | |
| | | E | | | H | | | E | | | C | | |
| | | K | | | | | | | | | E | | |
| | E | 8 | | E | 8 | | H | 8 | | K | 0 | C | 8 |
| | | E | | | F | | | F | | | C | | |
| | | K | | | H | | | G | | | C | | |
| | | K | | | | | | | | | E | | |
| | K | 8 | | K | 8 | | H | 8 | | K | 0 | C | 8 |
| | | K | | | H | | | H | | | C | | |
| | | K | | | | | | | | | H | | |
| K | | | | | K | | | | | | | | |

Full-Scale Flowrates

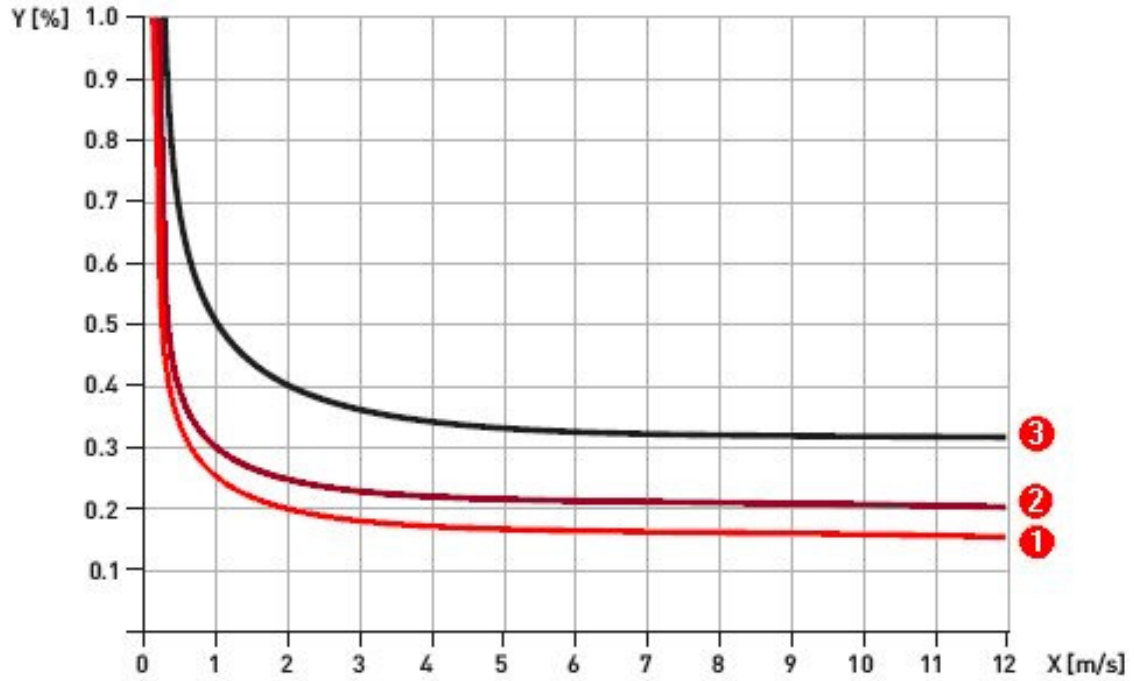
Flowrates in m/s and m³/h

| v [m/s] | Q _{100%} in m ³ /h | | |
|---------|----------------------------------------|----------|-----------|
| | 0.3 | 3 | 12 |
| DN [mm] | minimum | nominal | maximum |
| 2.5 | 0.01 | 0.05 | 0.21 |
| 4 | 0.01 | 0.14 | 0.54 |
| 6 | 0.03 | 0.31 | 1.22 |
| 10 | 0.08 | 0.85 | 3.39 |
| 15 | 0.19 | 1.91 | 7.63 |
| 20 | 0.34 | 3.39 | 13.57 |
| 25 | 0.53 | 5.30 | 21.21 |
| 32 | 0.87 | 8.69 | 34.74 |
| 40 | 1.36 | 13.57 | 54.29 |
| 50 | 2.12 | 21.21 | 84.82 |
| 65 | 3.58 | 35.84 | 143.35 |
| 80 | 5.43 | 54.29 | 217.15 |
| 100 | 8.48 | 84.82 | 339.29 |
| 125 | 13.25 | 132.54 | 530.15 |
| 150 | 19.09 | 190.85 | 763.40 |
| 200 | 33.93 | 339.30 | 1357.20 |
| 250 | 53.01 | 530.13 | 2120.52 |
| 300 | 76.34 | 763.41 | 3053.64 |
| 350 | 103.91 | 1039.08 | 4156.32 |
| 400 | 135.72 | 1357.17 | 5428.68 |
| 450 | 171.77 | 1717.65 | 6870.60 |
| 500 | 212.06 | 2120.58 | 8482.32 |
| 600 | 305.37 | 3053.70 | 12214.80 |
| 700 | 415.62 | 4156.20 | 16624.80 |
| 800 | 542.88 | 5428.80 | 21715.20 |
| 900 | 687.06 | 6870.60 | 27482.40 |
| 1000 | 848.22 | 8482.20 | 33928.80 |
| 1200 | 1221.45 | 12214.50 | 48858.00 |
| 1400 | 1433.52 | 14335.20 | 57340.80 |
| 1600 | 2171.46 | 21714.60 | 86858.40 |
| 1800 | 2748.27 | 27482.70 | 109930.80 |
| 2000 | 3393.00 | 33930.00 | 135720.00 |
| 2200 | 4105.50 | 41055.00 | 164220.00 |
| 2400 | 4885.80 | 48858.00 | 195432.00 |
| 2600 | 5733.90 | 57339.00 | 229356.00 |
| 2800 | 6650.10 | 66501.00 | 266004.00 |
| 3000 | 7634.10 | 76341.00 | 305364.00 |

Flowrates in ft/s and gallons/min

| v [ft/s] | Q _{100%} in US gallons/min | | |
|-----------|-------------------------------------|-----------|------------|
| | 1 | 10 | 40 |
| DN [inch] | minimum | nominal | maximum |
| 1/10 | 0.02 | 0.23 | 0.93 |
| 1/8 | 0.06 | 0.60 | 2.39 |
| 1/4 | 0.13 | 1.34 | 5.38 |
| 3/8 | 0.37 | 3.73 | 14.94 |
| 1/2 | 0.84 | 8.40 | 33.61 |
| 3/4 | 1.49 | 14.94 | 59.76 |
| 1 | 2.33 | 23.34 | 93.36 |
| 1.25 | 3.82 | 38.24 | 152.97 |
| 1.5 | 5.98 | 59.75 | 239.02 |
| 2 | 9.34 | 93.37 | 373.47 |
| 2.5 | 15.78 | 159.79 | 631.16 |
| 3 | 23.90 | 239.02 | 956.09 |
| 4 | 37.35 | 373.46 | 1493.84 |
| 5 | 58.35 | 583.24 | 2334.17 |
| 6 | 84.03 | 840.29 | 3361.17 |
| 8 | 149.39 | 1493.29 | 5975.57 |
| 10 | 233.41 | 2334.09 | 9336.37 |
| 12 | 336.12 | 3361.19 | 13444.77 |
| 14 | 457.59 | 4574.93 | 18299.73 |
| 16 | 597.54 | 5975.44 | 23901.76 |
| 18 | 756.26 | 7562.58 | 30250.34 |
| 20 | 933.86 | 9336.63 | 37346.53 |
| 24 | 1344.50 | 13445.04 | 53780.15 |
| 28 | 1829.92 | 18299.20 | 73196.79 |
| 32 | 2390.23 | 23902.29 | 95609.15 |
| 36 | 3025.03 | 30250.34 | 121001.37 |
| 40 | 3734.50 | 37346.00 | 149384.01 |
| 48 | 5377.88 | 53778.83 | 215115.30 |
| 56 | 6311.60 | 63115.99 | 252463.94 |
| 64 | 9560.65 | 95606.51 | 382426.03 |
| 72 | 12100.27 | 121002.69 | 484010.75 |
| 80 | 14938.92 | 149389.29 | 597557.18 |
| 88 | 18075.97 | 180759.73 | 723038.90 |
| 96 | 21511.53 | 215115.30 | 860461.20 |
| 104 | 25245.60 | 252456.02 | 1009824.08 |
| 112 | 29279.51 | 292795.09 | 1171180.37 |
| 120 | 33611.93 | 336119.31 | 1344477.23 |

Accuracy



Y [%]: Deviation of actual measurement value
 X [m/s]: Flow velocity

Reference conditions

Medium: Water

Temperature: 20°C / 68°F

Pressure: 1 bar / 14.5 psi

Inlet: ≥ 5DN

| VersaFlow version | DN [mm] | DN [inches] | Accuracy | Curve |
|----------------------|------------|-------------|----------------------|-------|
| Mag 2000 | 10....100 | 3/8...10 | 0.15% of MV + 1 mm/s | 1 |
| Mag 1000, 3000, 4000 | 10....1600 | 3/8...80 | 0.2% of MV + 1 mm/s | 2 |
| Mag 100 | 10...150 | 3/8...6 | 0.3% of MV + 2 mm/s | 3 |
| Mag 1000, 4000 | >1600 | >64 | 0.3% of MV + 2 mm/s | 3 |
| Mag 2000, 3000, 4000 | <10 | <3/8 | 0.3% of MV + 2 mm/s | 3 |

Specifications are subject to change without notice.

For More Information

Learn more about how Honeywell's VersaFlow TWM 9000 Electromagnetic Flow Converter can help facilitate procurement, engineering and inventory management, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

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