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Technical
Information
TI 027D/24/ae

Electromagnetic Flow Measuring System *promag 30/33/39*



Modular construction
- Providing cost-effective measurement for liquid flow applications

Operational security
- ISO 9001 manufacturer, quality assured
- Full electromagnetic compatibility (EMC)
- Reliable operation through self-diagnostics
- EEPROM saves data (without batteries) on power failure
- Positive Zero Return
- Empty pipe detection
- Galvanically isolated inputs/outputs

Measure precisely
- Measuring error: ±0.5 % or ±0.2 %
- Excellent repeatability
- Bi-directional flow measurement

Easily configured
- Parameters adjusted by miniature switches (Promag 30)
- Calibration simplified through touch control operation (Promag 33)
- Two-line, illuminated display (Promag 33)

Install anywhere
- Integral grounding electrode
- Shock-resistant aluminum housing, resistant to acids and caustics
- NEMA 4X protection for compact and remote versions
- Wide size range $^{1}/_{12}$"-78"
- Flanged version with ISO meter lengths
- Meets 3-A Sanitary standards ($^{1}/_{12}$"-4")
- FM Approved Non-incendive, Class I, Division 2, Groups A-D, dust-ignition proof, Class II, Division I, Groups E-G
- FM Approved, Class I, II & III, Div. 1 Groups A-G sensors available

Quality made by
Endress+Hauser

ISO 9001

Endress+Hauser
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Promag Measuring System

Applications
The Promag measuring system provides cost-effective, precise electromagnetic flow measurement in liquids with a minimum conductivity of 5 µS/cm:
- Acids, caustics, pastes, slurries, pulps
- Potable water, waste water, sewage
- Milk, beer, wine, mineral water, yogurt, molasses

Modular design
Mechanically and electronically, the Promag measuring system is constructed in a modular fashion. Through the exchange of electronic boards, the measuring facility can be expanded at any time. In this way, the meter can be optimally equipped and modified.

The Promag system is available in two versions:
- Compact version: Sensor and transmitter form one mechanical unit
- Remote version: The transmitter can be mounted up to 656 ft from the sensor

Promag 30 field transmitter
- All inputs and outputs are galvanically isolated from the power supply, the measuring circuit and each other.
- Six parameters are settable using miniature switches in the electronics compartment.
- Easier and safer transmitter exchange, since the sensor data is archived in plugable DAT memory chip (EEPROM).
- The local display allows to read off current flowrate and totalizer value. The Empty pipe detection (EPD) is activated using the display.

Promag 33 field transmitter
E+H-Matrix driven operation with two-line, illuminated display and three optical keypads (Touch Control). The keypad is operated without opening the cover.
All inputs and outputs are galvanically isolated from the power supply, the measuring circuit, and each other.
Easier and safer transmitter exchange, since the sensor data is stored in a removable DAT memory chip (EEPROM).

Promag 39 rack transmitter
The same E+H matrix programming as on the Promag 33, but the electronics are housed in a remote transmitter that can be:
- Rackmounted with standard 19" rack hardware
- Panel mounted
- Wall mounted in NEMA 4X enclosure

The versatile Promag 39 comes standard with all available communications outputs, measurement outputs, relays and auxiliary input.

Promag A measuring sensor
Diameters: $^{1}/_{12}$"-1"
Process connections:
- Internal thread
- External thread
- PVC bonding sleeves
- Flexible tubing fittings
- Weld nipples
- Flanges
- Tri-Clamp

Liner: PFA Teflon®

Promag D measuring sensor
Diameters: 1"-4"
Process connections: ANSI, wafer mounting
Liners: PTFE, soft rubber, hard rubber

Promag F measuring sensor
Diameters: $^{1}/_{2}$"-78"
Process connections:
- ANSI flange ($^{1}/_{2}$" - 24")
- AWWA Class D (28" - 78")

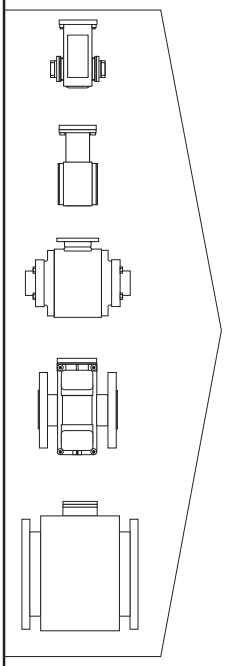
Liners: PTFE, soft rubber, hard rubber

Promag H measuring sensor
Diameters: 1" - 4"
Process connections: Tri-Clamp or weld nipple, 3A approved and EHEDG tested
Liner: Transfer molded, metal-reinforced PFA Teflon, 100% vacuum proof, with I.D.s to match food pipe standards.

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Equipment of the measuring transmitter

Measuring sensor



Promag A
$^{1}/_{12}$“ - 1"

Promag D
1" - 4"

Promag H
1" - 4"

Promag F
$^{1}/_{2}$“ - 12"

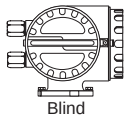
Promag F
14" - 78"

Transmitter

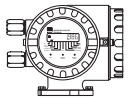
Transmitter Functions

Transmitter Features

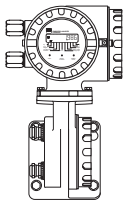
Promag 30



Blind



Compact

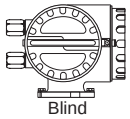


Remote

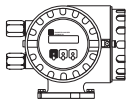
- Power supply board 85 to 260 V AC or 16 to 62 V DC
- Amplifier board with
  Pulse output,
  Current output,
  Status output
  Auxiliary input
- Local display/operating (optional)

When the application demands neither an E+H matrix driven operation nor digital communication, the Promag 30 comes into its own. It has the same highly developed measuring electronics and is operated using internal miniature switches.

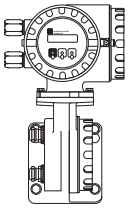
Promag 33



Blind



Compact



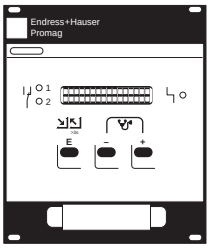
Remote

- Power supply board 85 to 260 V AC or 16 to 62 V DC
- Measuring amplifier board
- Communication board with
  pulse/frequency output,
  current output,
  HART protocol via current output
  alarm output (relay), configurable
  status output (relay), configurable
  or
- Communication board with
  current or pulse/frequency output
  alarm output (relay), configurable
  status output (relay), configurable
  Rackbus RS 485 interface or auxiliary input
- Display/operating module
  (Blind version possible: without display/operating module)

The Promag 33 measuring system expands the advantages of the Promag 30:

- E+H Matrix-driven operation
- Two-line, illuminated display
- Batching with integrated preset counter
- Communication ability
- Empty Pipe Detection

Promag 39



- Power supply board 85 to 260 V AC or 16 to 62 V DC
- Measuring amplifier board
- Communication board with
  pulse/frequency output,
  current output,
  alarm output (relay),
  status output (relay), configurable
- Rackbus interface, RS 485 interface, auxiliary input,
  HART protocol via current output
- Display/operating module

All of the features of the Promag 33 in a remote rackmount, panel mount, or NEMA 4X wall mount enclosure

Figure 1

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Function

Measuring principle

According to Faraday's Law of Magnetic Induction, a voltage will be induced into a conductor which moves in a magnetic field. With the electromagnetic measuring principle, the flowing fluid is the moving conductor. The induced voltage (Ue) is proportional to the flow velocity (v).

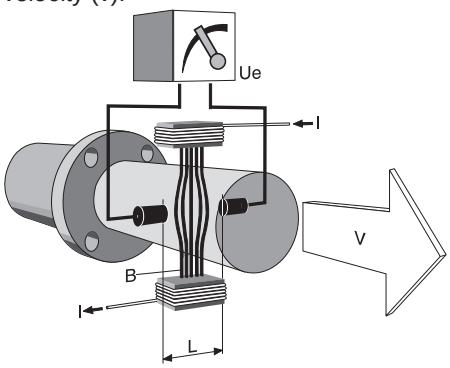


Figure 2
Measuring principle

Using the pipe cross-sectional area, the flow volume is calculated. The DC magnetic field (B) is generated by a switched direct current (I) of alternating polarity. Together with the patented "Integrated Autozero Circuit", this guarantees a stable zero point, and makes the measurement fluid-independent and insensitive to entrained solid particles. Every meter is factory calibrated with the most modern calibration rigs, traceable to national standards.

1000:1 operable flow range

The Promag amplifier has very high measuring dynamics of over 1000:1, which enables it to measure the velocity of a fluid from below 0.033 ft/sec to greater than 33 ft/sec with the specified accuracy.
With pulsating flows, even peak flows of up to 41 ft/sec will not overload the system above the full scale value.

Promag 30

The transmitter houses miniature switches, which allow the following six parameters to be set:

- 0 - 20 mA or 4 - 20 mA current range
- Current full scale value scaling (volume/time), 8 selections
- Pulse weighting in decade steps (volume/pulse), 8 selections
- Engineering units
- Setting of status output (system/process errors or flow direction indication)
- Low flow cutoff (on/off)

For applications where a positive zero return is required, the output signals can be suppressed by an external voltage applied to the auxiliary input.

Promag 33/39

The Promag 33/39 is furnished with a two-line, illuminated LC display. With the E+H Matrix, configuration is very easy. With only three keypads, over 40 parameters can be specifically chosen and modified, e.g.:

- Engineering units
- Current output functions
- Totalizer functions
- Pulse and frequency output functions
- Relay functions
- Limit values
- Batching functions
- Display parameters
- Low flow cutoff
- Empty pipe detection (EPD)
- Single and bidirectional measurement
- Auxiliary input (batching, totalizer reset, dual range measurement, positive zero return

Twelve languages are selectable for the display text. A return to English default startup is possible.
A help function (diagnosis function) is available during programming.

Promag 33 Communication

Depending on which module is fitted, Promag 33 has different interfaces for communication ability with higher level systems. Direct communication to a personal computer and the E+H Rackbus world is possible via the RS 485 interface option. HART protocol (SMART technology) is standard on the current output.
This communication feature enables operation and configuration of instruments which have no local display.

Promag 39 Communication

The standard Promag 39 transmitter comes with all of the following: HART, RS485, Rackbus interface.

Operational security

Extensive measuring system self-monitoring ensures the greatest operational security. Resulting error messages are annunciated at the status output. All data of the measuring system is safely stored (without batteries) in the EEPROM. The Promag measuring system fulfills the general requirements for electromagnetic compatibility (EMC) according to EN 50081 Part 1 and 2 / EN 50082 Part 1 and 2 as well as the NAMUR recommendations, and is CE approved.
A partially filled measured pipe is detected and indicated by empty pipe detection (EPD).
A special circuit for electrode cleaning ensures a correct measurement even if there is conductive deposit in the pipe (e.g. magnetite).

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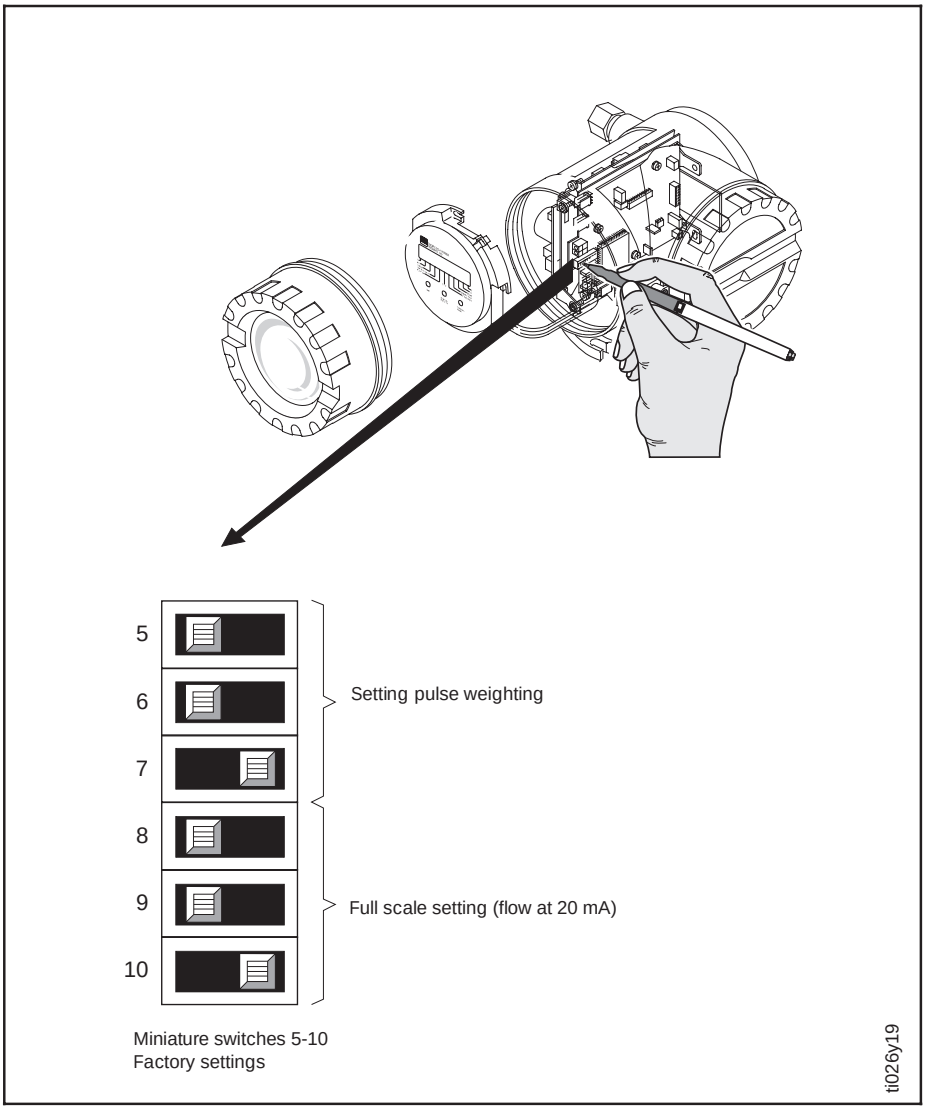


Figure 3
Promag 30
Setting functions

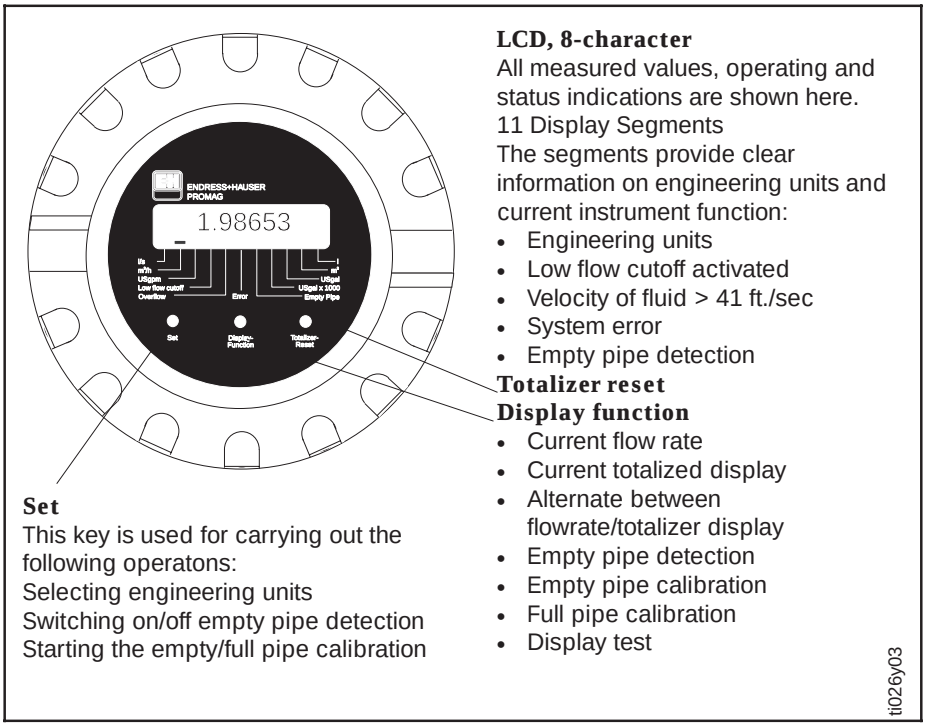


Figure 4
Promag 30 front view, display and keypads

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With the E+H matrix-driven operation, configuration is very easy. With only three keypads, parameters and functions can be specifically chosen and modified, e.g.:

- Display of process variables
- Functions of current output
- Functions of the two totalizers
- Functions of the pulse/frequency output
- Relay functions
- Batching functions with integrated counter
- Communications parameters
- Process parameters (creep suppression, empty pipe detection, etc.)

A number of languages are selectable for the display text. A help function is available at all times during programming.

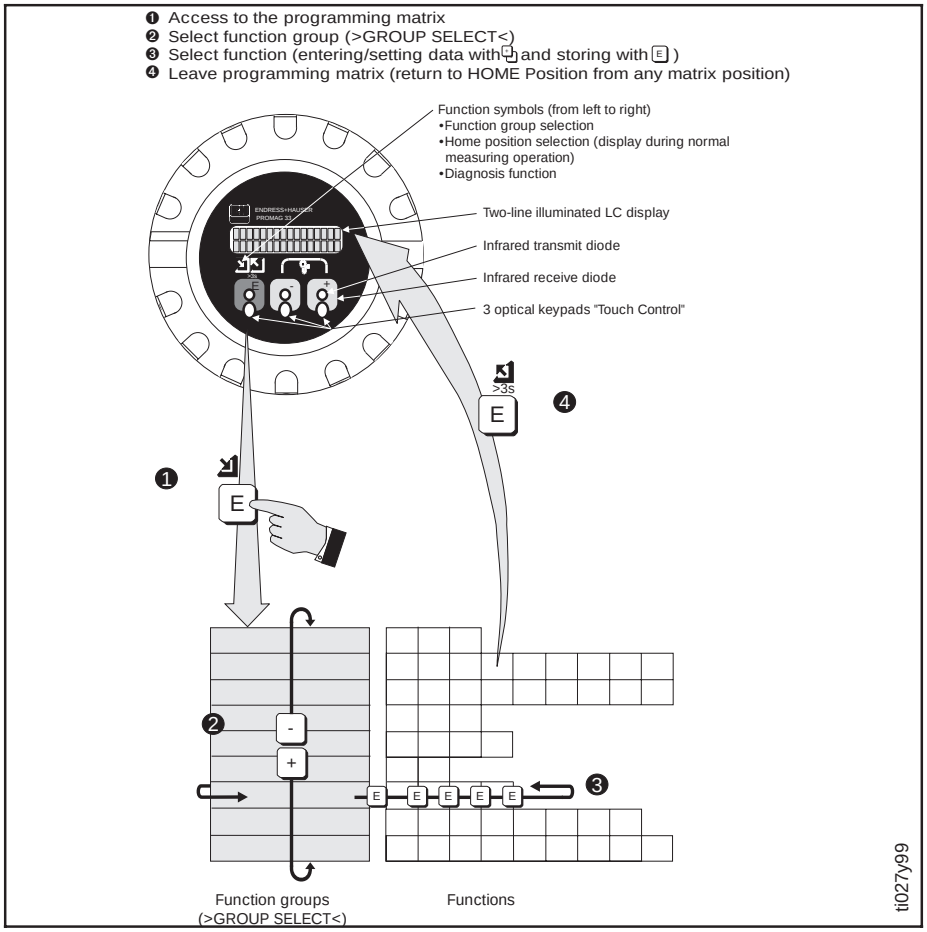


Figure 5
Promag 33 front view display and keypads; selecting functions in the E+H matrix

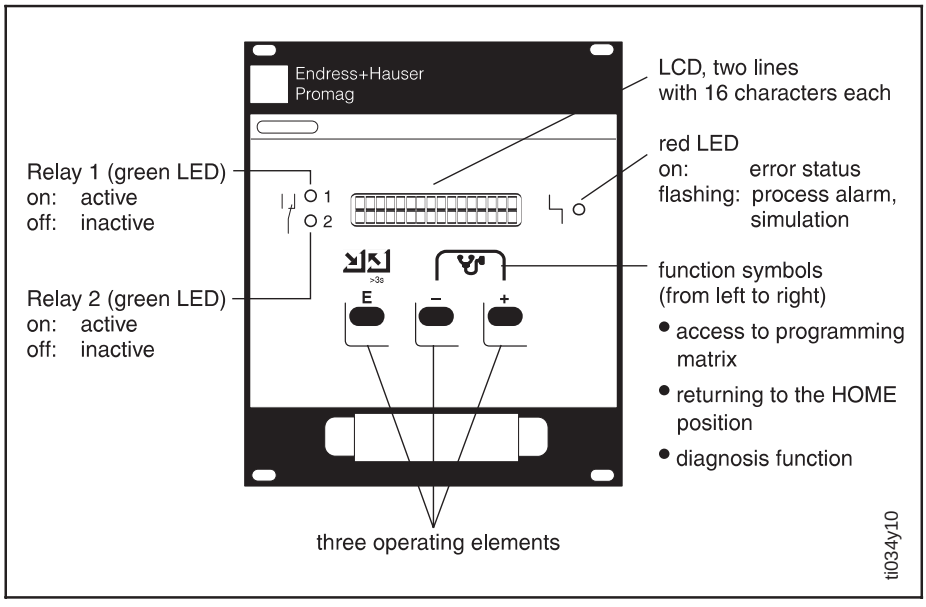


Figure 6
Promag 39 frontview and operating elements

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Installation

Installing the Sensor

The Promag sensor can be mounted vertical or horizontal. To optimize sensor performance and maintain accuracies, the following guidelines are recommended.

Orientation

a) The optimum mounting is vertical, with the process flowing upward. At no flow, heavier entrained solids sink downward and lighter fatty contents rise away from the measuring electrode area. This prevents buildup and corrosion of the electrode surface.

b) For horizontal mounting, the electrode axis must lie horizontal. This prevents short term measurement errors due to entrained air bubbles.

Note: The electrode axis plane is the same for all measuring sensors A, D, H, and F.

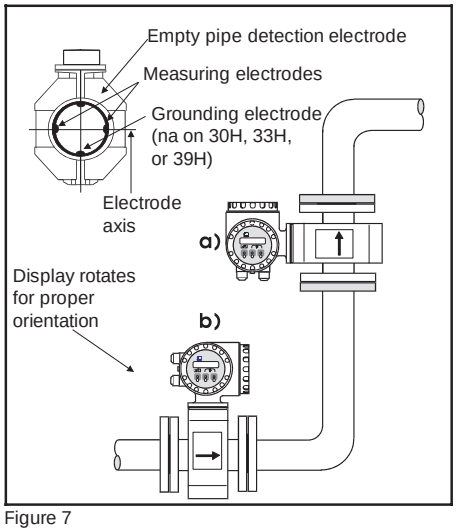


Figure 7

Inlet and outlet runs

The sensor should be mounted away from turbulence-generating components such as valves, elbows, and t-sections whenever possible.

Inlet lengths:	>3 to 5 x D (D=pipe diameter)
Outlet lengths:	>2 x D

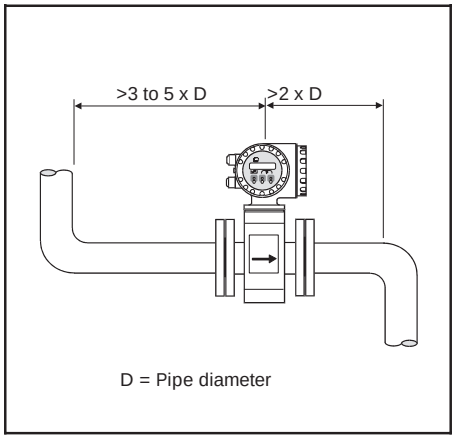


Figure 8

Downward pipe

With the installation suggestion in Figure 9 (siphon, vent valve after the sensor), no partial vacuum exists, even in downward pipe > 15 feet.

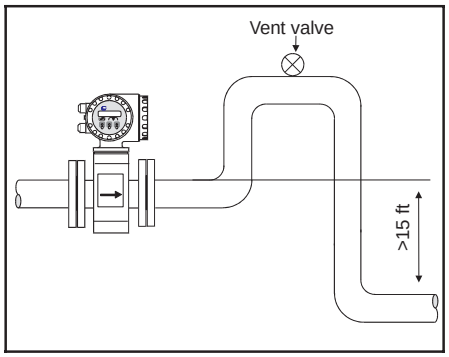


Figure 9

Vibration

Piping should be supported before and after the sensor where vibration is present. Excessive vibration requires the remote mounting of the transmitter.

When the sensor is mounted in piping runs over 33 feet long, mechanical supports are recommended at the sensor location to minimize sagging due to sensor weight or pipe vibrations.

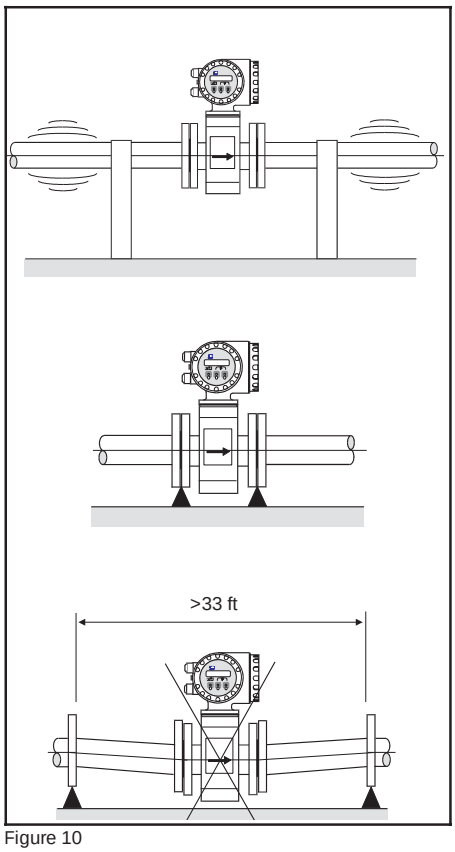


Figure 10

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Mounting location

To ensure correct measurement, the sensor must be mounted where the pipe is always full. Avoid installations at the highest point in the process (avoids air accumulation) or before an open pipe outlet in a downward line.

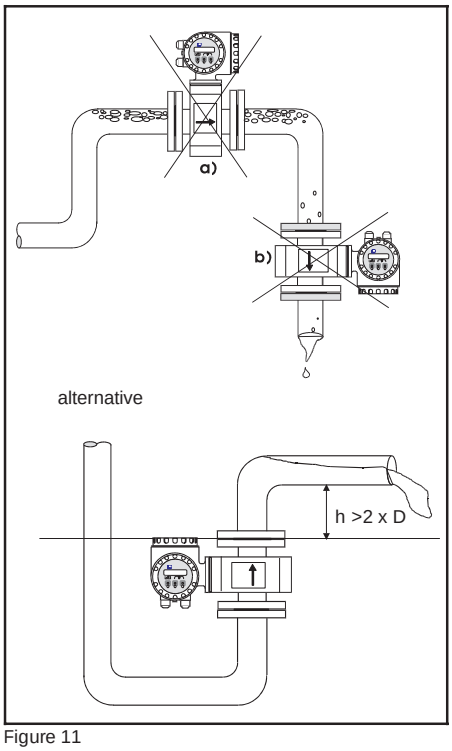


Figure 11

Partially full pipe

In partially full pipe lines, the sensor should be mounted at an incline to ensure the pipe is full at the measuring point. The inlet and outlet pipe lengths should be > 3 to 5 x D and > 2 x D, respectively.

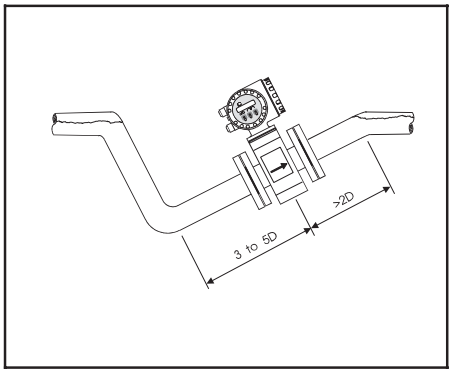


Figure 12

Pump installation

Avoid mounting the sensor in the suction line to prevent the effects of a vacuum (empty or partially full pipe) on the measurement.

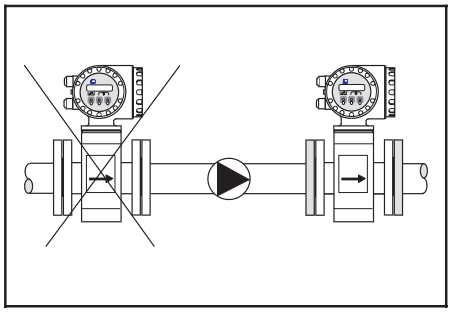


Figure 13

Adapter pieces

With the help of the appropriate adapter pieces (reducers and expanders) the sensor can be mounted in a pipeline of a larger diameter. For slowly flowing fluids, the resulting higher velocity increases the measuring accuracy.

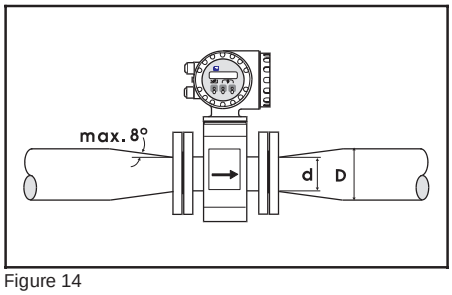


Figure 14

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Installing Remote Transmitter

Mounting of remote version

Necessary where there is:

- Poor access
- Lack of space
- Extreme fluid and ambient temperatures (see Technical Data)
- Excessive vibration (>2g/2 h per day, 10 - 100 Hz)

Note:

- For distances between sensor and transmitter of ≥ 33 feet, the permitted cable length (L_{max}) is determined by the fluid conductivity.
- With the optional empty pipe detection (EPD) the maximum possible cable length between transmitter and sensor is limited to 33 feet.
- Do not lay cable in the vicinity of electrical machinery or switchgear. The relevant cable specifications are listed in the “Wiring” chapter.
- Ensure potential equalization between sensor and transmitter.
- If signal cable is customer-supplied, ensure that the following maximum cable capacitance (Ca) and inductance (La) are not exceeded:

	Hazardous	
Area Group	(Ca)	(La)
A & B	2.5µF	10mH
C	7.5µF	39mH
D	20.0µF	84mH

Mounting of the remote transmitters

The separate installation of transmitter and sensor is advantageous because:

- it assures improved accessibilty
- requires less space
- copes better with extreme fluid and ambient temperatures (see page 34 for temperature ranges)
- or strong vibrations (>2 g/2 h per day; 10 to 100 Hz)

To panel mount the Promag 39 transmitter, use accessory no. 50075239, which also requires an additional wiring connector kit.

Note:

- The maximum admissible cable length L_{max} between sensor and FL transmitter for non-Ex applications is 656 ft. and independent from fluid conductivity provided minimum conductivity is 5 µS/cm.
- Do not lay cable in the vicinity of electrical machinery or switchgear.
- Ensure potential equalization between sensor and transmitter.
- Promag 39 not available with D sensor

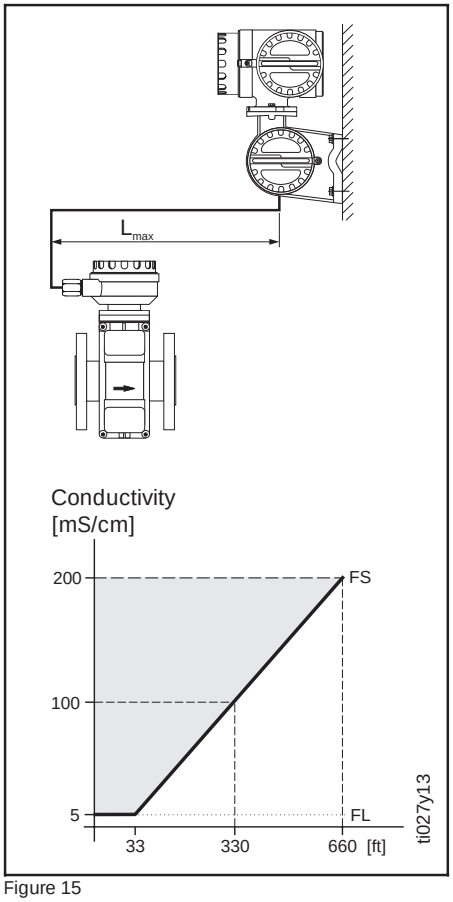


Figure 15

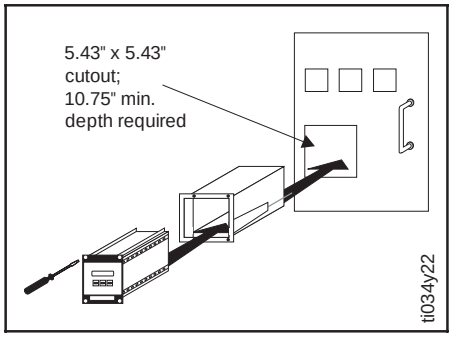


Figure 16
Promag 39 transmitter panel mounting option

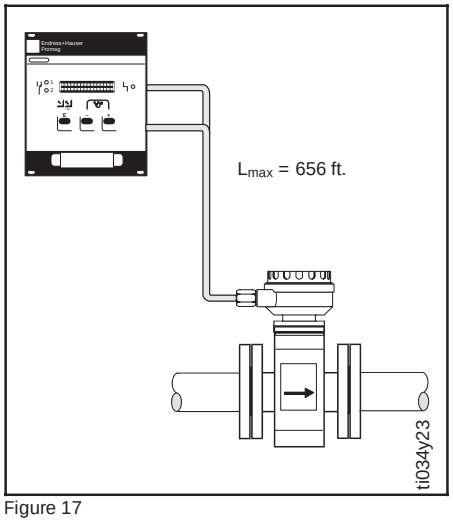


Figure 17
Promag 39 transmitter mounting

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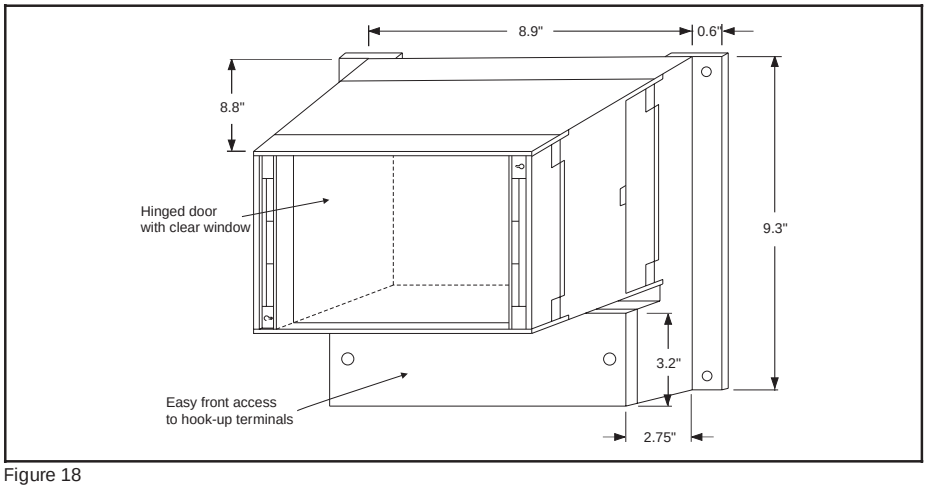


Figure 18
Promag 39 NEMA housing

Optional Transmitter Pipemount Kit
A mounting kit is available for mounting the 30/33 remote transmitter on pipes from $^{3}/_{4}$" to 3". Order part no. 50079605.

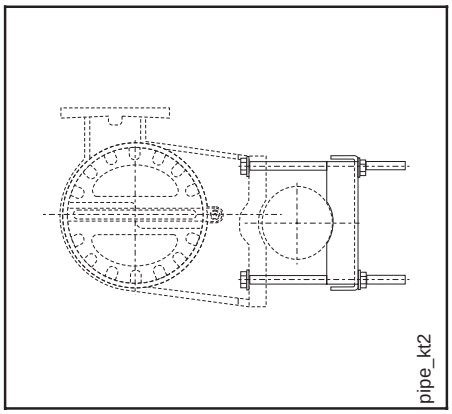


Figure 19
Promag 30/33 remote pipe mount kit

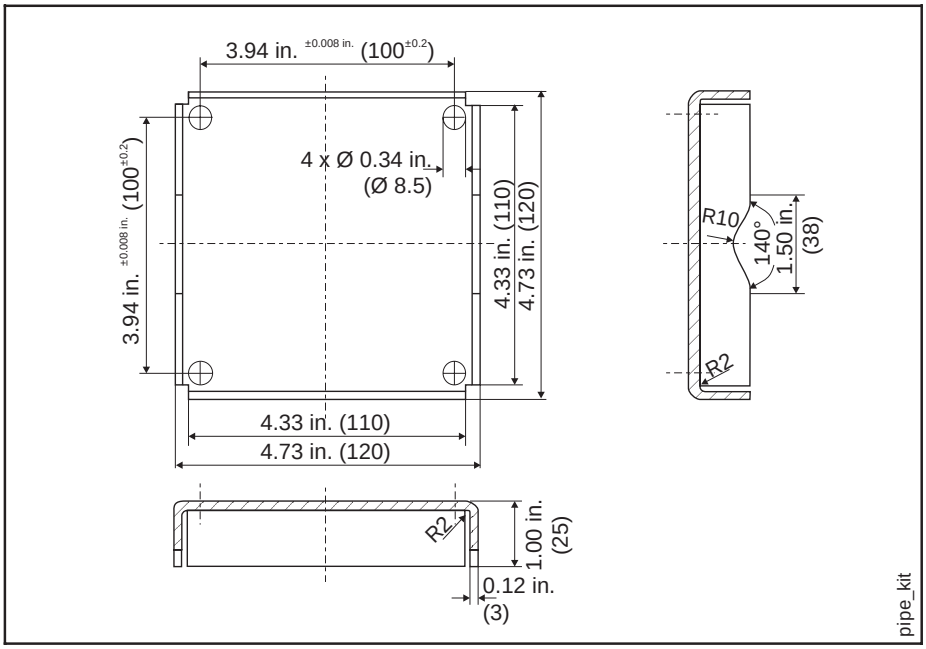


Figure 20
Pipe mount kit dimensions

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Installation

Grounding

Grounding

The sensor and the fluid must be at approximately the same electrical potential, so that the measurement is accurate and that no galvanic corrosion of the electrodes takes place. In most cases, the sensor's built-in grounding electrode (Fig. 21) ensures the required potential equalization. For this reason, it is sufficient to connect the Promag's ground lug to local ground.
The Promag A, D, and F are always fitted with a reference electrode. There is no reference electrode with Promag H as there is always a metallic connection to the product.
For the remote version, this connection takes place via the ground terminal in the sensor wiring compartment.
The following describes potential equalization in special cases:

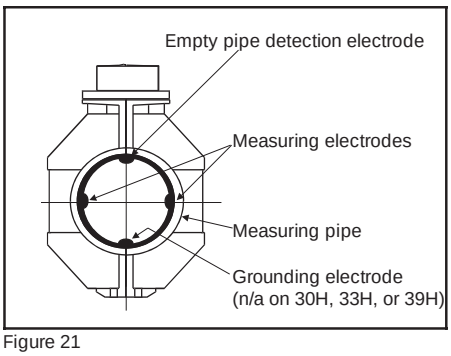


Figure 21

Potential equalization in lined pipelines with cathodic protection

When the fluid cannot be grounded for operational reasons, the meter must be installed isolated from pipework and ground. Please observe the local electrical regulations for such an installation (Fig. 22).

Take care with the mounting materials used to ensure that no electrical path to the meter exists and that the material can withstand the torques.

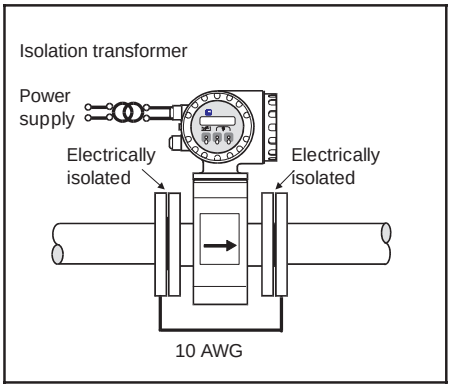


Figure 22

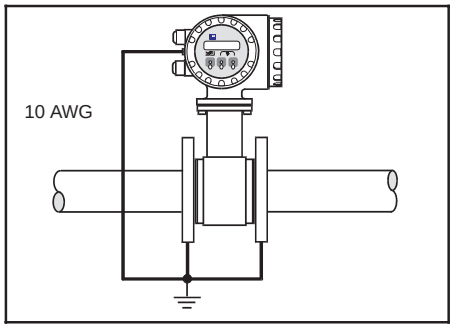


Figure 23

Equalization current in metallic ungrounded pipelines

The fluid can be grounded. Ensure an electrical connection from flange to flange and to the meter (Fig. 23, 25).

Plastic or lined pipeline

This wiring will be necessary if the fluid must be grounded due to potential equalization currents (Fig. 24).
Pay attention to the corrosion resistance of the grounding rings!

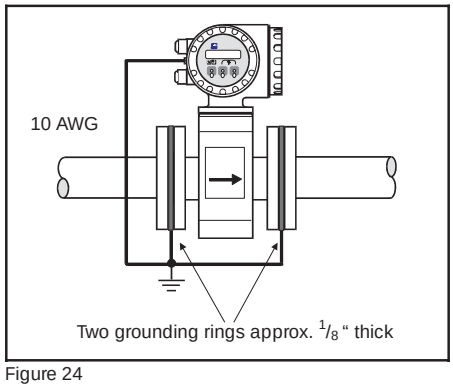


Figure 24

Grounding in areas with strong electrical interference

To ensure full electromagnetic compatibility, a flange to flange connection, together with the meter to earth potential is recommended (Fig. 25).

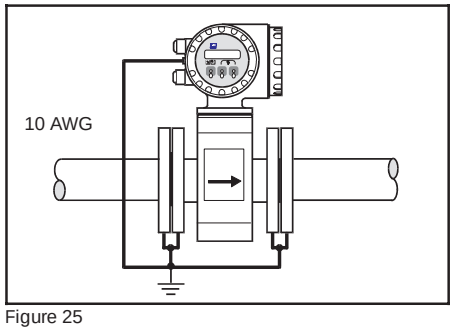


Figure 25

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Installation

Diameter Selection

Diameter selection

As a rule, the pipeline diameter determines the sensor diameter. With a known flowrate and the help of the graphs (Fig. 26), the best size can be selected. Generally a velocity range of 6 to 10 ft/sec should be selected.

A necessary increase in velocity can be achieved through a reduction of the sensor diameter. The higher installation expense is normally balanced by the lower sensor cost.

The flow velocity should also be determined by the fluid's physical properties:

- Abrasive fluids (potter's clay, lime slurry, ore slurry): <6 ft/sec
- Fluids causing build up (wastewater slurry, etc.): >6 ft/sec

Diameter, full scale value scaling

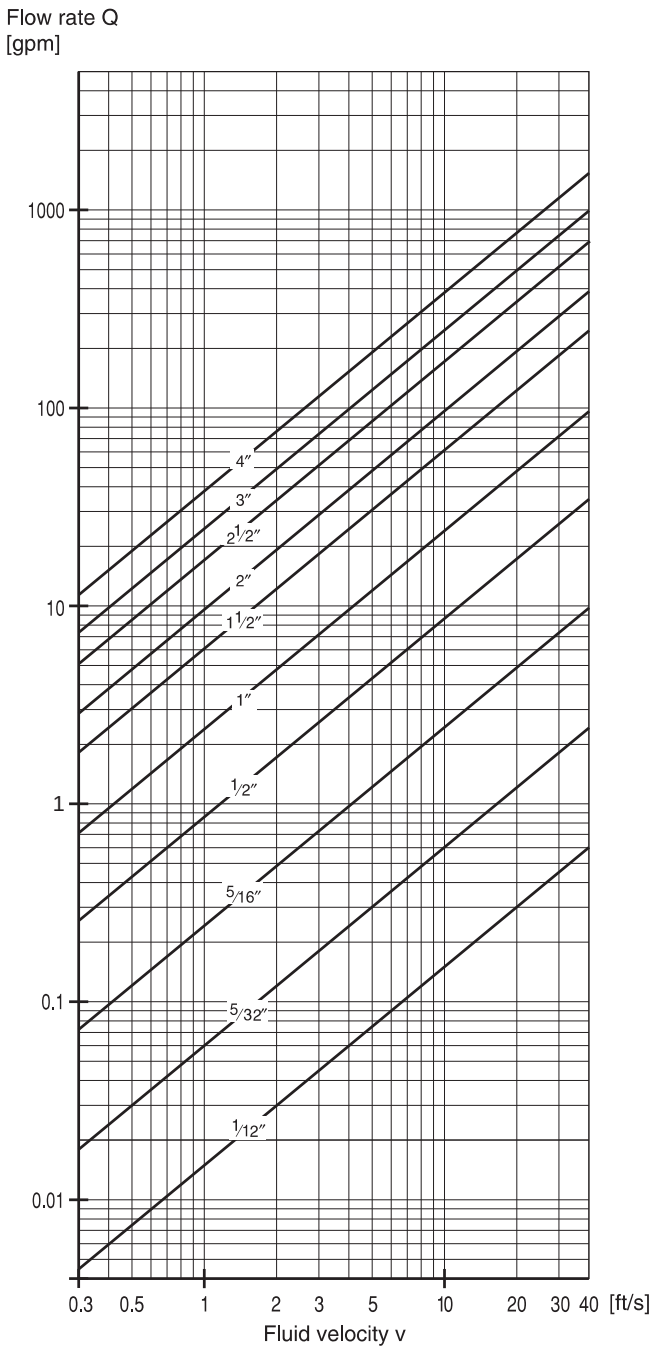
Size [inches]	Minimum full scale value (Scaling at v ~ 1.0 ft/sec)	Ideal full scale value (Scaling at v ~ 8 ft/sec)	Maximum full scale value (Scaling at v ~ 33 ft/sec)
1/12"	0.015 gpm	0.13 gpm	0.49 gpm
5/32"	0.060 gpm	0.57 gpm	1.99 gpm
5/16"	0.24 gpm	1.98 gpm	7.96 gpm
1/2"	0.85gpm	7 gpm	28 gpm
1"	2.4 gpm	20 gpm	77.8 gpm
1 1/2"	6.0 gpm	48 gpm	199 gpm
2"	9.4 gpm	79 gpm	311 gpm
2 1/2"	15.8 gpm	132 gpm	526 gpm
3"	24.0 gpm	198 gpm	796 gpm
4"	37.4 gpm	312 gpm	1244 gpm
6"	84.1 gpm	700 gpm	2801 gpm
8"	150 gpm	1246 gpm	4979 gpm
10"	234 gpm	1946 gpm	7780 gpm
12"	337gpm	2800 gpm	11200 gpm
14"	458 gpm	3840 gpm	15250 gpm
16"	498 gpm	5000 gpm	19915 gpm
18"	757 gpm	6345 gpm	25205 gpm
20"	934 gpm	7835 gpm	31120 gpm
24"	1345 gpm	11280 gpm	44815 gpm
28"	1830 gpm	15355 gpm	60995 gpm
30"	2101 gpm	17625 gpm	70025 gpm
32"	2391 gpm	20055 gpm	79670 gpm
36"	3026 gpm	25380 gpm	100830 gpm
40"	3735 gpm	31335 gpm	124485 gpm
42"	4118 gpm	34545 gpm	137250 gpm
48"	5328 gpm	45120 gpm	179260 gpm
54"	6807 gpm	56723 gpm	226904 gpm
56"	7321 gpm	61004 gpm	244024 gpm
60"	8404 gpm	70031 gpm	280127 gpm
64"	9562 gpm	79683 gpm	318722 gpm
66"	10794 gpm	89952 gpm	359810 gpm
72"	12102 gpm	100845 gpm	403385 gpm
78"	14940 gpm	124500 gpm	498004 gpm

Table 1

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Installation

Diameter Selection



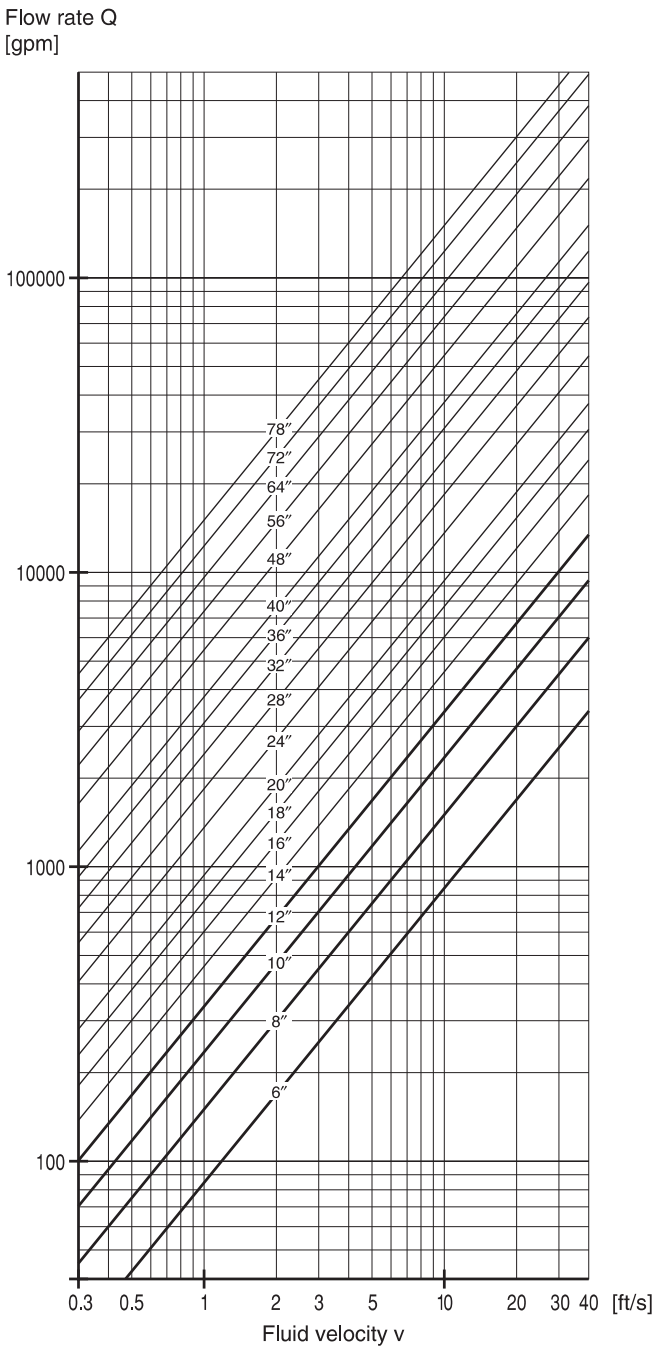


Figure 26

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Transmitter Outputs

Current and pulse output

The current and pulse outputs must be scaled within the ranges shown in Table 1 (page 13). The 20mA current, pulse frequency and/or pulse scaling is customer programmable between those ranges. The measuring device is capable of measuring in both flow directions, i.e., bidirectional.
Current and pulse output values are always positive (= unipolar), and are proportional to flow rate.

A maximum peak of 25 mA is possible, and for the pulse/frequency output up to 163% of the set end frequency (400 Hz for the Promag 30 and 10,000 Hz for the Promag 33).
The factory calibration is standard and carried out in one direction (forward); optional for both directions.
The configurable status output signals the corresponding flow direction.

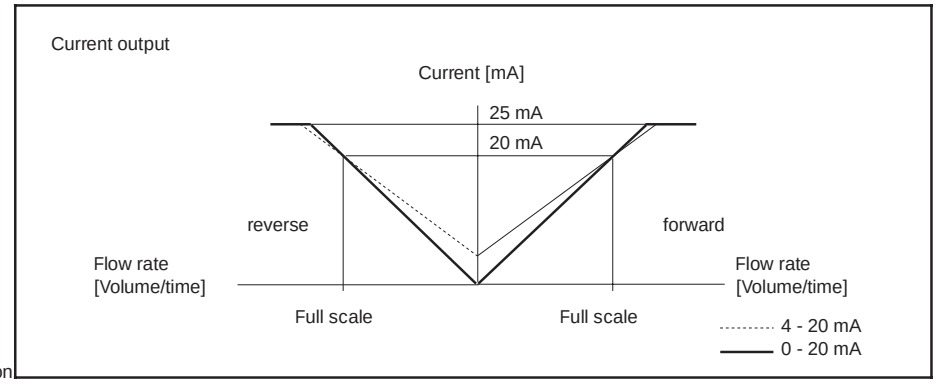


Figure 27
Current output behavior with bidirectional operation

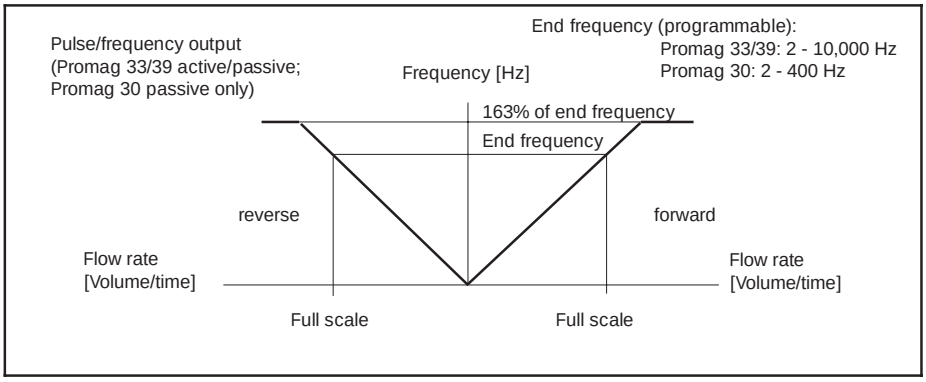


Figure 28
Pulse/frequency output behavior with bidirectional operation

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Promag 30

Status output (Open Collector)

The status output can be selectively configured for:
Error messages
System errors (fault)
Process errors (alarm)
Power supply failure
Exceeding measuring range when: v ≥ 41 ft./sec
Flow direction indication

The status output operates as a fail-safe output, i.e., during normal error-free operation, the output is closed (transistor conducting).

Auxiliary input

- Positive Zero Return
  With the use of an external voltage (3 - 30 V DC), the auxiliary input controls the status of the current and pulse outputs. As long as the voltage is present, the current output is set to 0/4 mA and the pulse output to the initial value (transistor not conducting), and the totalizer is stopped.

Applicaton example:
Interrupt of the measuring operation during pipeline cleaning.

- Totalizer reset:
  The auxiliary input can be reconfigured as an external reset for the totalizer using a jumper (with the local display option only). With an external voltage (3 - 30 V DC), the totalizer value can be reset to “0".

Promag 33/39

Alarm output (Relay 1)

A system error or a power failure is indicated by the alarm output.
Corresponding error messages appear on the transmitter display.
Existing error messages can be viewed for system diagnosis.
All Relay 2 functions can also be assigned to Relay 1.

Auxiliary input

Applying a 3 to 30 V DC voltage enables the following functions to be activated:

- Level control
  - Dual range end value 1 <—> 2 (Current output 1)
  - Positive zero return
- Pulse control
  - Activate batching cycle
  - Reset totalizer to zero

Status output (Relay 2)

The Promag 33 status output relay provides one of six possible functions to monitor the process:

- Limit value (safety MIN/MAX)
- Flow direction recognition
- Empty pipe detection (full/empty pipe)
- Automatic switching between two current value ranges
- Batching (filling) (pre-batch contact at Relay 1)
- Exceeding the measuring range v ≥ 41 ft/sec.

Relay switching

Relays 1 and 2 can be configured normally open or closed by means of a jumper on the applicable communications circuit board.

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Wiring

Promag 30

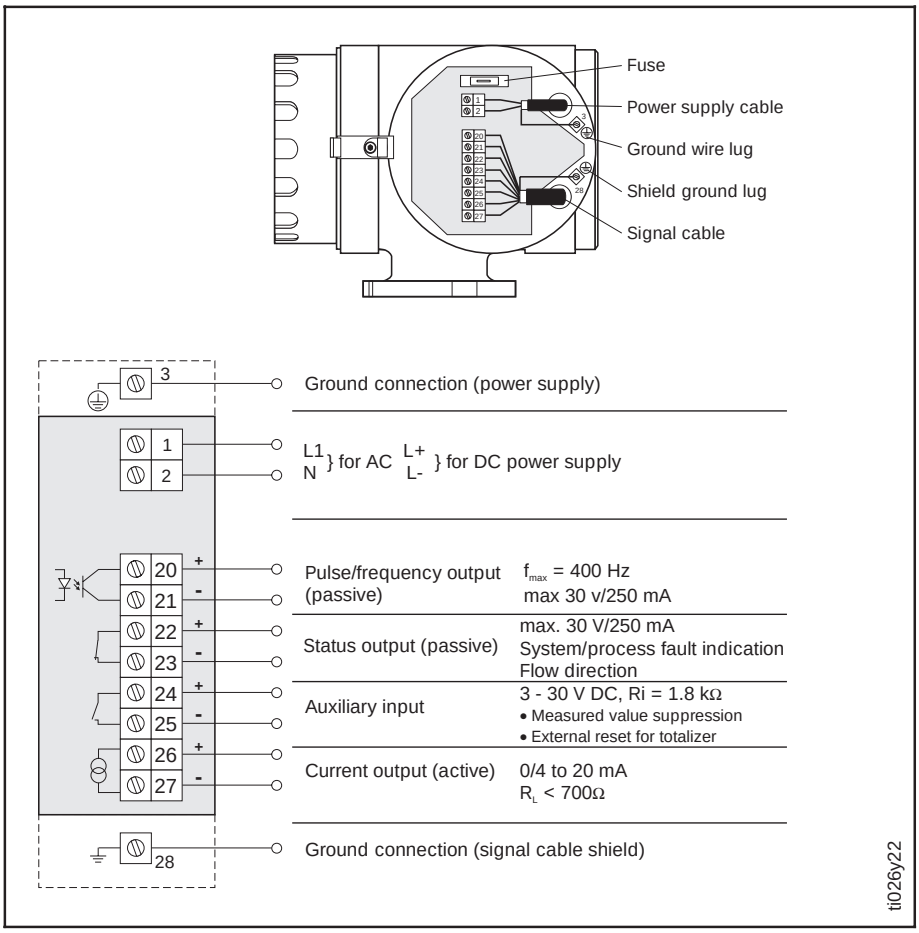


Figure 29
Electrical connection of Promag 30 power supply, input and output signals

Promag 33 (HART)

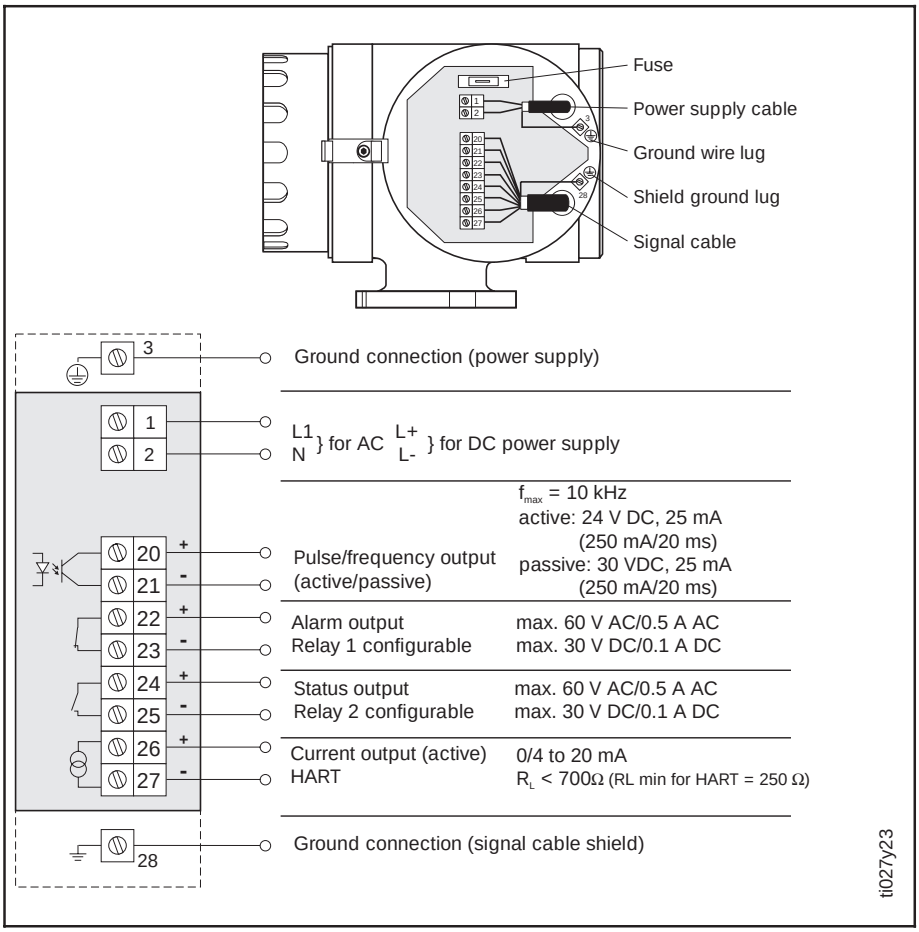


Figure 30
Electrical connection of Promag 33 power supply and output signals (HART® communication module)

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Promag 33 (RS485/Aux.)

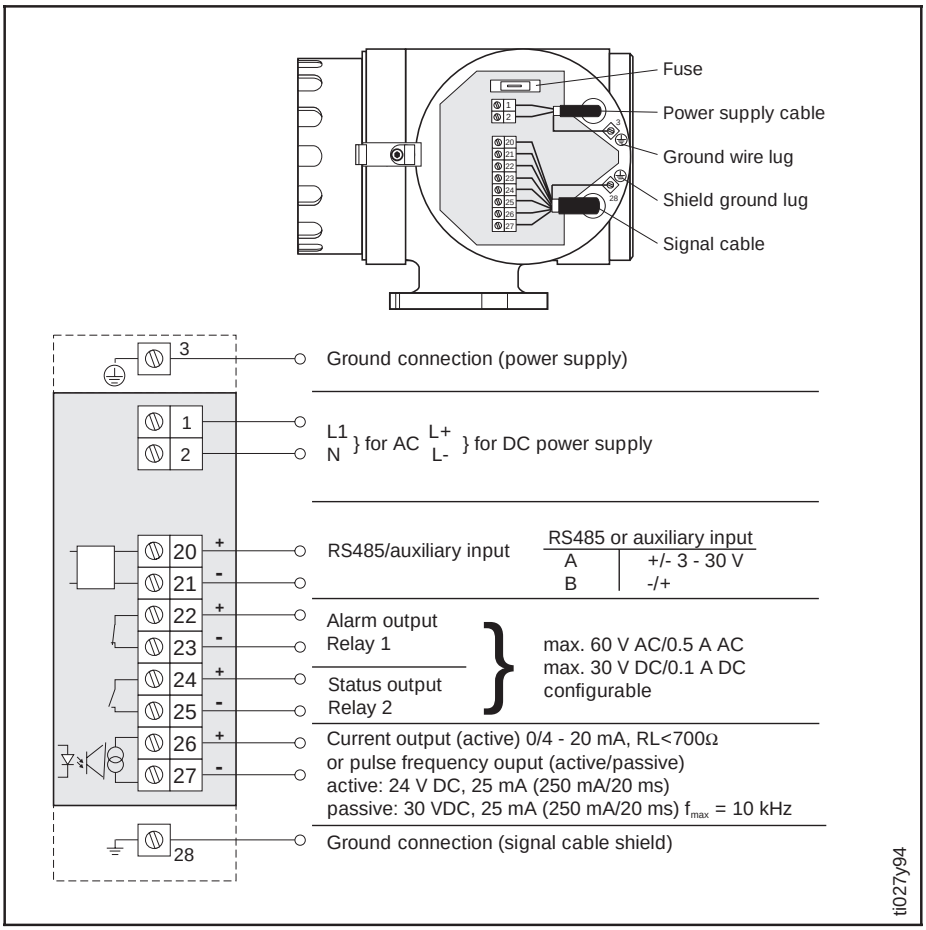


Figure 31
Electrical connection of Promag 33 power supply, input and output signals (with RS485 communication module)

Connections

Transmitters with a Rackbus link are connected to a process control system via the gateways MODBUS ZA 672, PROFIBUS ZA 673 (with an additional plug-in board for PROFIBUS) or FIP ZA 674.
Transmitters with HART protocols are connected directly via the Commubox. The appropriate driver (DDE server) can be selected with ordering

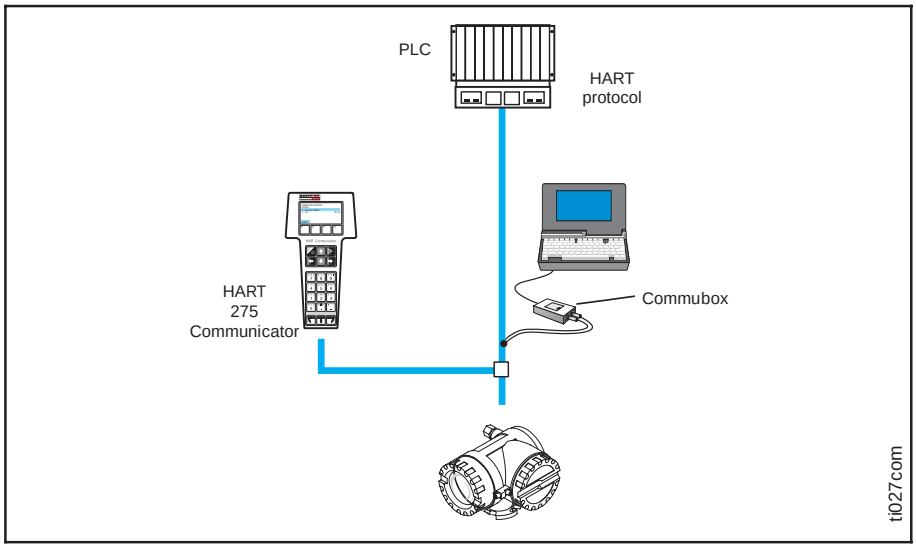


Figure 32
Connecting transmitters with HART protocols to a laptop running Commuwin II, using the Commubox interface adapter.

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Promag 30/33 (remote version)

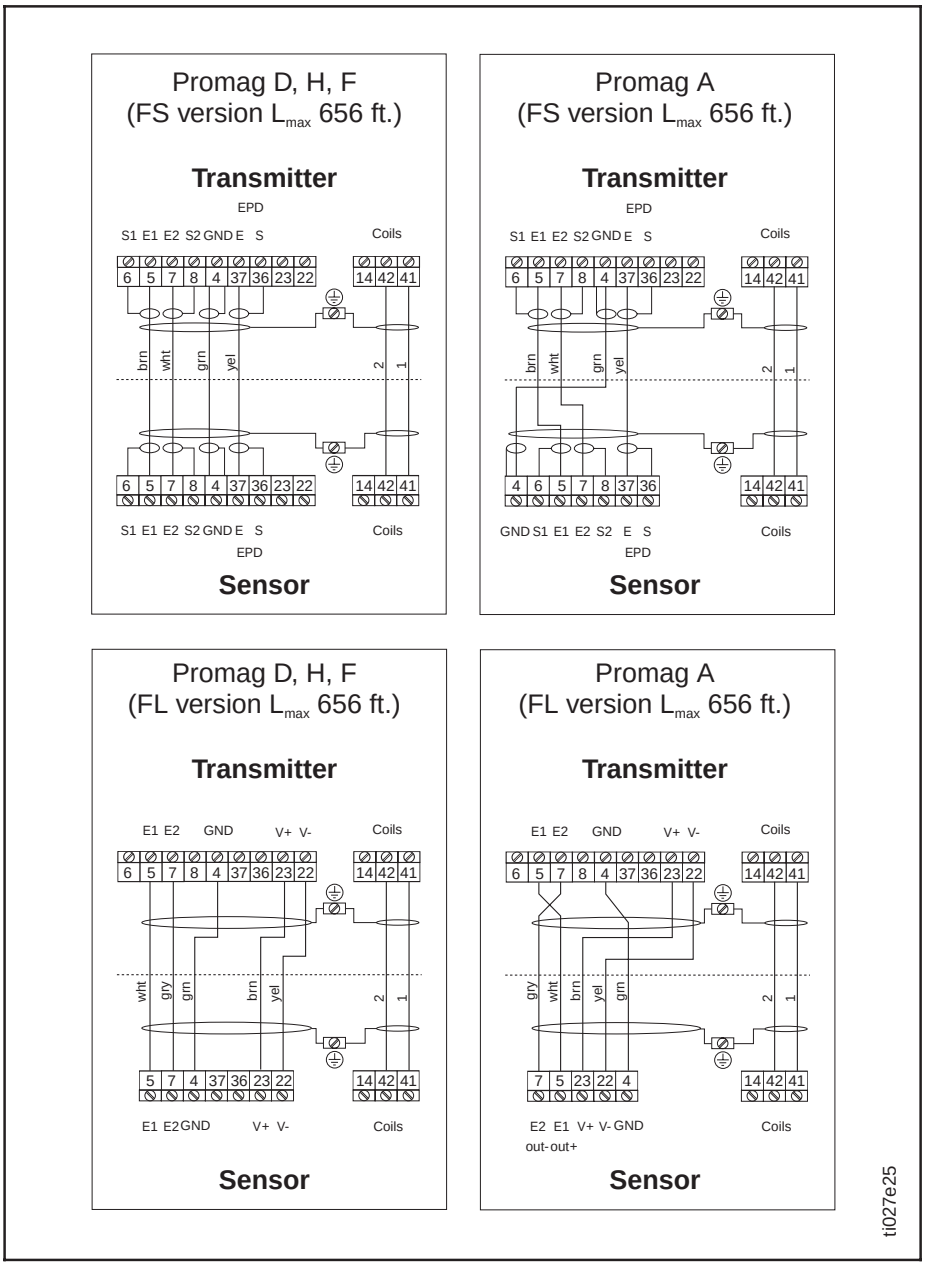
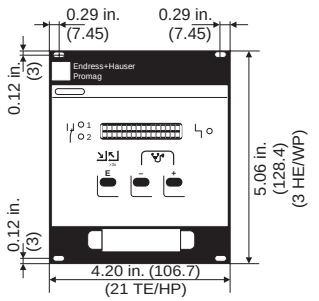
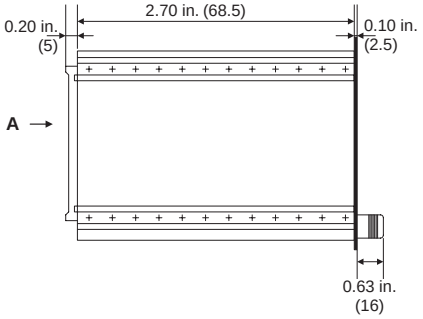


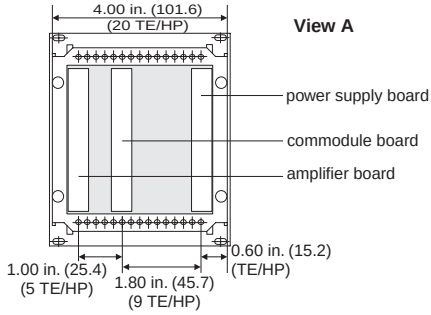
Figure 33
Promag 30/33
connection between sensor and transmitter
(remote version only)

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Promag 39



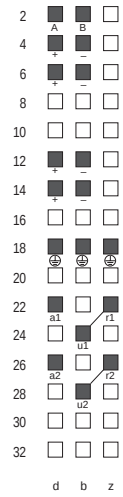




Refer to Promag 30/33 A, F, & H for sensor dimensions.

ti034y40

Commodule board



RS 485 hardware standard; Rackbus protocol
E+H hardware standard; Rackbus protocol

pulse/frequency output (active/passive)
active: 24 V DC, 25 mA (250 mA for 20 ms), R_L >100 Ω
passive: Open Collector, 30 V DC; 25 mA (250 mA for 20 ms)

auxiliary input (3 to 30 V DC)

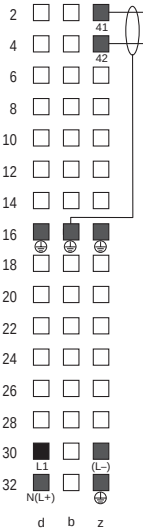
current output 0/4 to 20 mA ($R_{L\ min}$ for HART = 250 Ω)

relay 1 alarm output: available as NC (u1 - r1) and NO contact, maximum 250 V AC/30 V DC, max. 1 A

relay 2 status output: available as NC (u2 - r2) and NO contact, maximum 250 V AC/30 V DC, max. 1 A

ti034x34

Power supply board



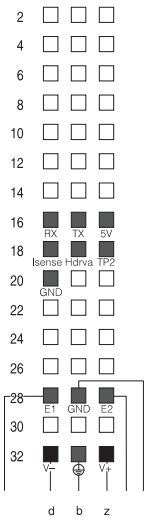
coil terminals

ground terminal (coil circuit cable shield)

power supply
L1/N for AC
L+/L– for DC

ti034x35

Amplifier board



service connection

sensor connection
E1: electrode 1
GND: measuring ground
E2: electrode 2

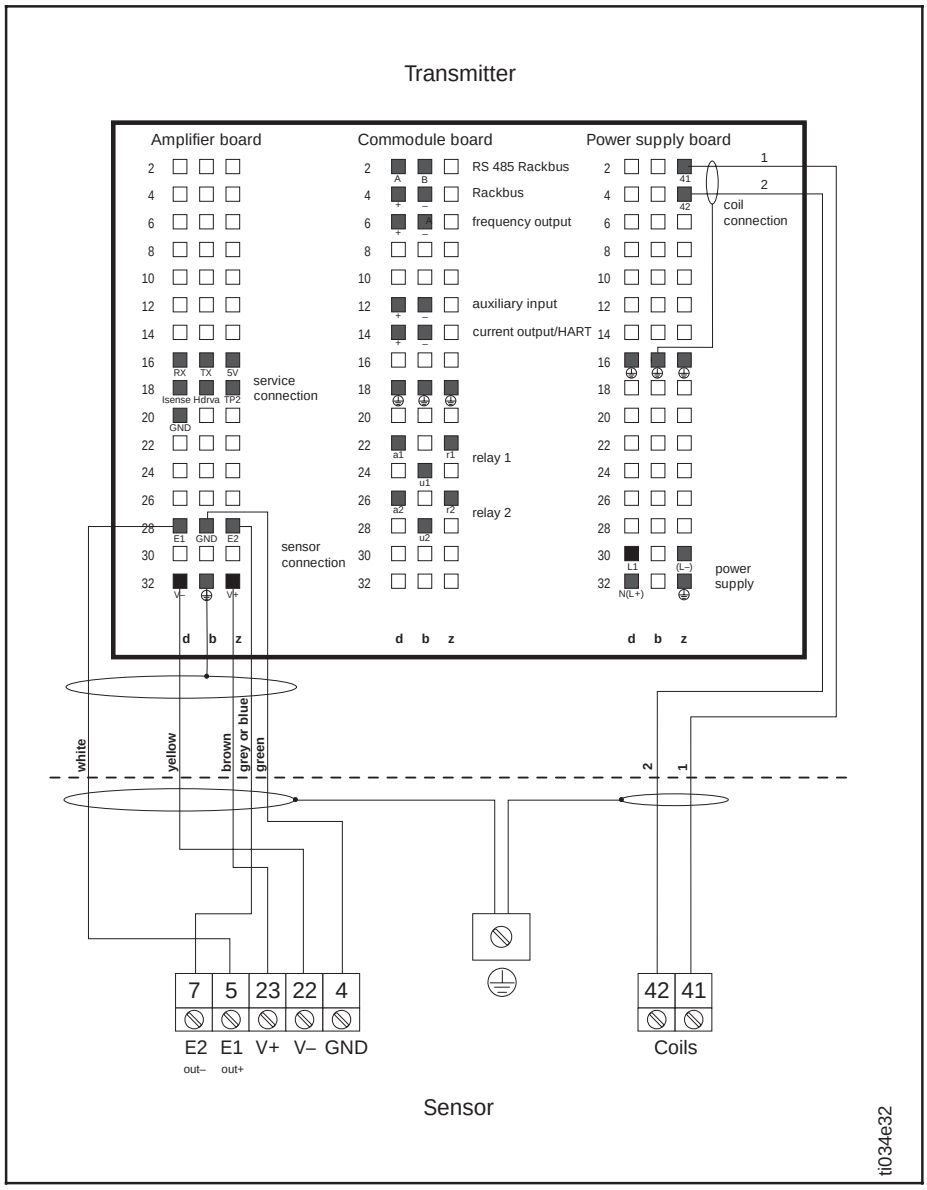
preamplifier
V–, GND, V+
(power supply)

ti034x36

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Promag 39 A
(FL version)

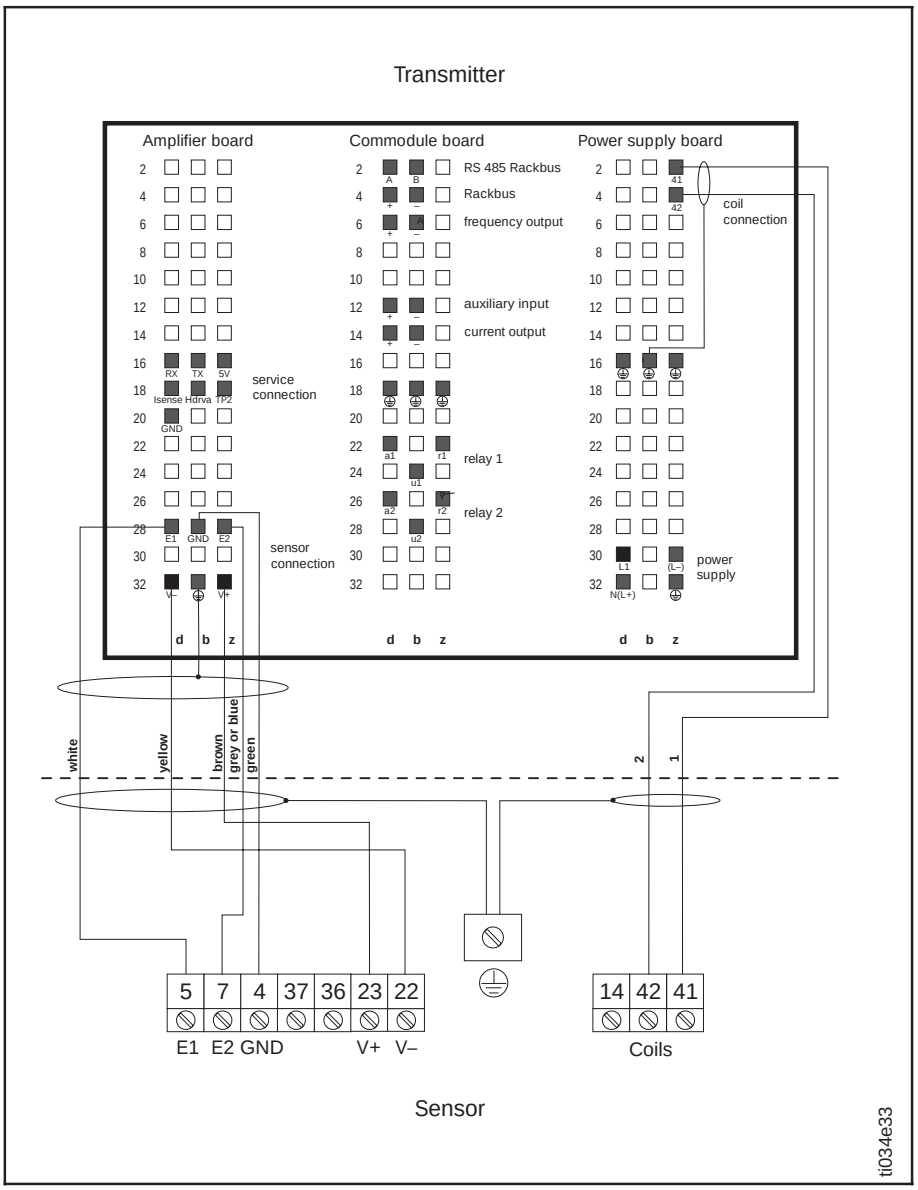
Wiring diagram transmitter-sensor



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Promag 39 H and F (FL version)

Wiring diagram transmitter-sensor



Cable Specifications

Promag 30/33 remote version (FS) cable specifications (E + H supplied)

Coil cable: 2 conductor 18 AWG PVC cable with overall shield
Resistance: 0.011 Ω/ ft
Capacitance: core/core, grounded shield 36 pF/ft

Signal cable: 4 conductor 20 AWG PVC cable
Resistance: 0.015 Ω/ ft (EPD L_{max}=33 ft)
Capacitance: core/shield 128 pF/ft

Customer Supplied: See page 10 for cable specifications

Promag 30/33/39 remote version (FL) cable specifications (E + H supplied)

Coil cable: 2 conductor 18 AWG PVC cable with overall shield
Resistance: 0.011 Ω/ ft
Capacitance: core/core, grounded shield 36 pF/ft

Signal cable: 5 conductor 18 AWG PVC cable with overall shield
Conductor resistance: 0.011 Ω/ ft
Capacitance: core/core 36 pF/ft

Note:
The cable must be resistant to an ambient temperature of max. +176°F if the Promag H is operated at a process temperature of +300°F

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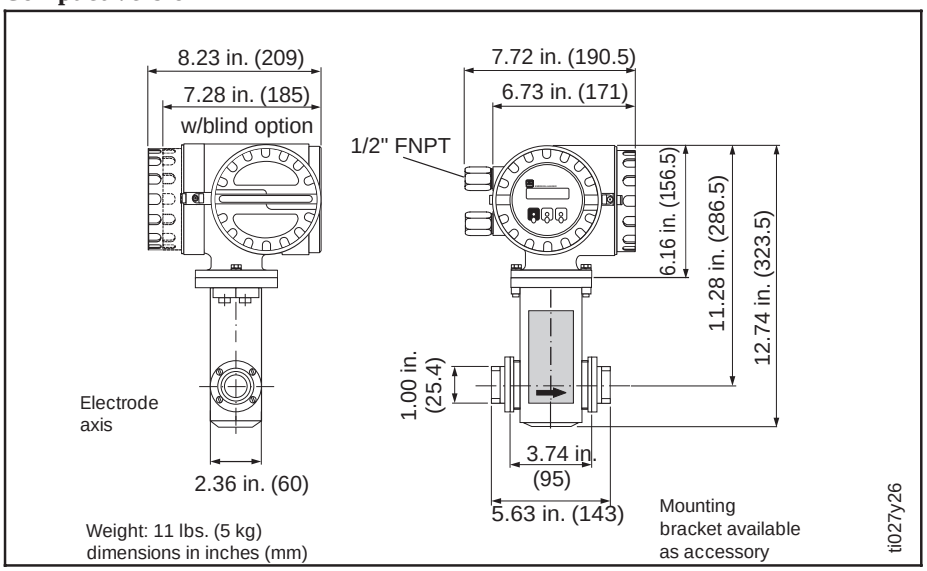
Dimensions

Promag 30/33 A
$^{1}/_{12}$" - 1"

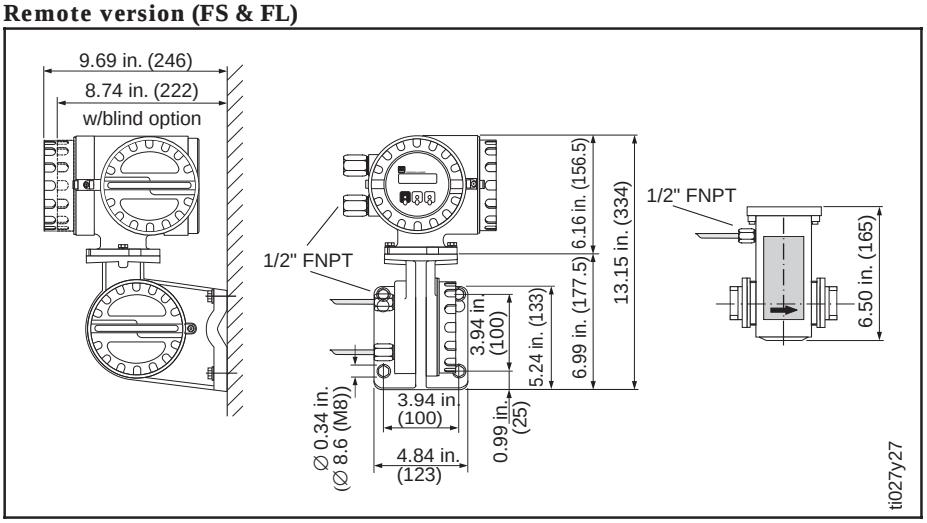
When ordering the blind option, use blind option dimensions

Note: The dimensions and weights of FM Class I, Div. 1 sensors can differ from those stated here. Refer to the separate FM documentation EX 006D/24/A2/06.96 available from Endress + Hauser.

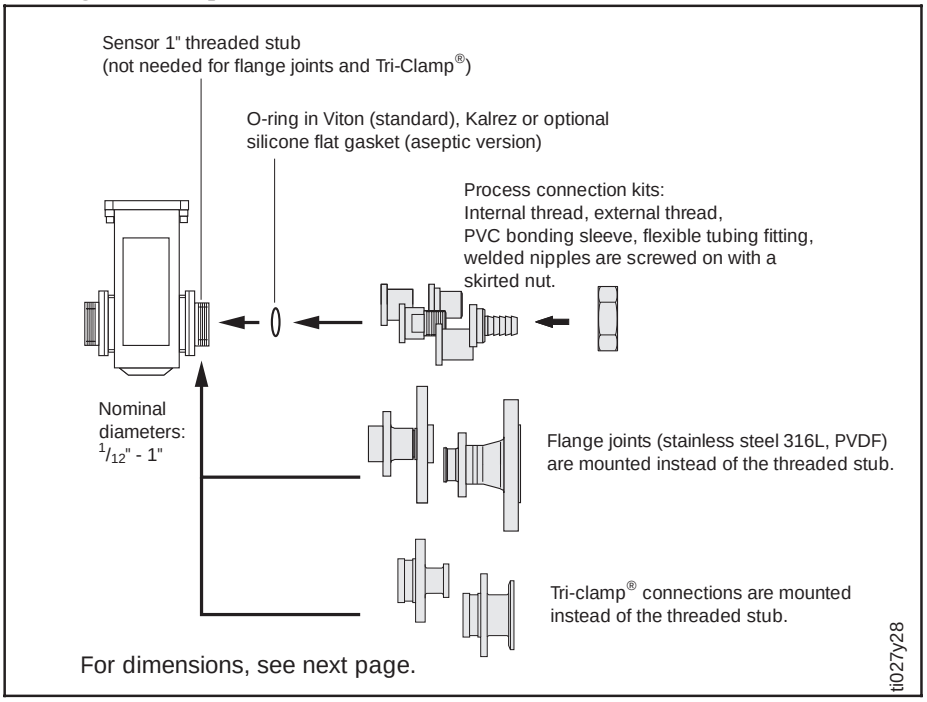
Compact version



Remote version (FS & FL)



Promag A sensor process connections



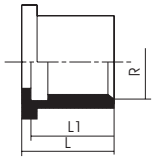
For dimensions, see next page.

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Dimensions

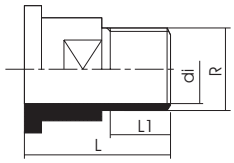
Promag A
Process Connections

Internal thread



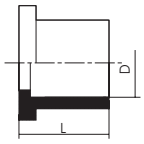
Meter size	L	L1	R (NPT)
1/12" - 1/2"	0.79	0.71	1/2"
1"	1.77	0.87	1"

External thread



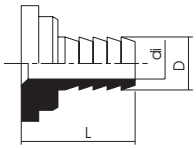
Meter size	L	L1	di	R (NPT)
1/12"-1/2"	1.65	0.91	0.63	1/2"
1"	1.97	0.66	0.87	1"

PVC bonding sleeve



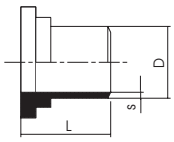
Meter size	L	D
1/12" - 1/2"	0.75	0.79
1"	2.60	0.98
1"	2.72	1.26

Flexible tubing fitting



Meter size	L	D	di	LW
1/12"- 1/2"	1.18	0.57	0.35	0.51
1/12"- 1/2"	1.18	0.69	0.50	0.63
1/12"- 1/2"	1.18	0.83	0.63	0.75

Weld nipple



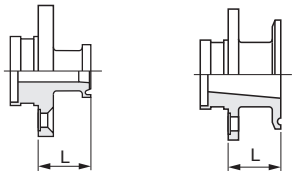
PIPE

Meter size	L	D	s
1/12" - 1/2"	0.79	0.84	0.10
1"	1.18	1.33	0.13

SANITARY TUBING

Meter size	L	D	s
1/12" - 1/2"	0.79	0.71	0.04
1"	1.18	1.06	0.10

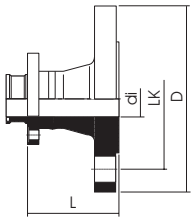
Tri-Clamp
316L
stainless steel



Tri-Clamp	L	For meters
1/2"	0.94 in.	1/12" to 5/16"
3/4"	0.94 in.	1/2"
1"	0.94 in.	1/2" to 1"

Flange
316L stainless steel
ANSI B16.5
dimensions

1/12" - 1/2":
with 1/2" flanges
1":
with 1" flanges

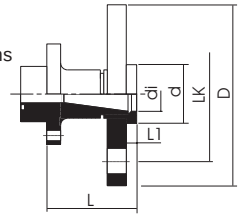


ANSI B16.5 flanges

Meter size	Class 150				Class 300		
	L	D	LK	di	L	D	LK
1/12" - 1/2"	2.46	3.50	2.38	0.62	2.64	3.75	2.62
1"	2.69	4.25	3.12	1.05	2.94	4.88	3.50

Flange
PVDF
ANSI B16.5 dimensions

1/12" - 1/2":
with 1/2" flanges
1":
with 1" flanges



ANSI B16.5 flanges,
Class 150

Meter size	L	L1	D	d	di	LK ANSI
1/12" - 1/2"	2.07	0.24	3.74	1.34	0.64	2.36
1"	2.07	0.28	4.53	1.97	1.07	3.11

Dimensions in inches

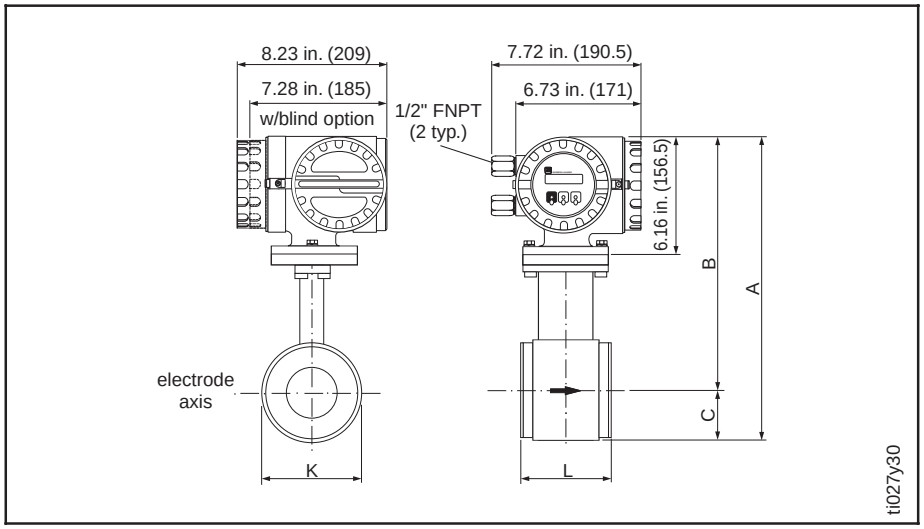
Face-to-face lengths: **2 x L + 5.63 in**
2 x L + 3.74 in for flange version

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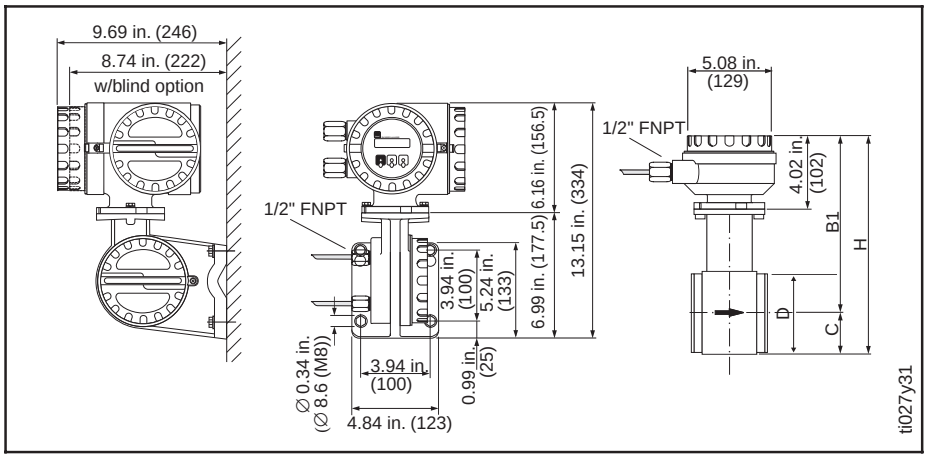
Dimensions

Promag 30/33 D
1" - 4"

Compact version



Remote version (FS & FL)



Size	L [in]	D [in]	A [in]	B [in]	B1 [in]	C [in]	Weight* [lbs]
1"	3.94	2.76	13.60	12.22	10.08	1.38	8.8
1 1/2"	3.94	3.35	14.19	12.52	10.37	1.67	11.0
2"	3.94	3.94	14.78	12.81	10.67	1.97	11.0
3"	5.91	5.12	15.96	13.41	11.26	2.56	16.5
4"	5.91	6.30	17.15	14.00	11.85	3.15	22.0

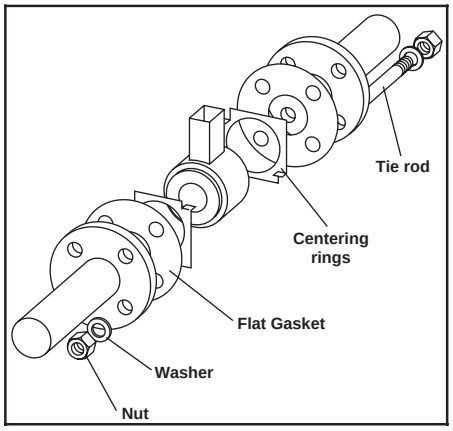
*Weights for compact version

Process connection concept

Wafer mounting is achieved with the help of a mounting set.
The mounting set consists of:

- Tie rods
- Centering rings (not required for 1 1/2" or 3")
- Nuts
- Washers

Flat gaskets (user-supplied) must be used.



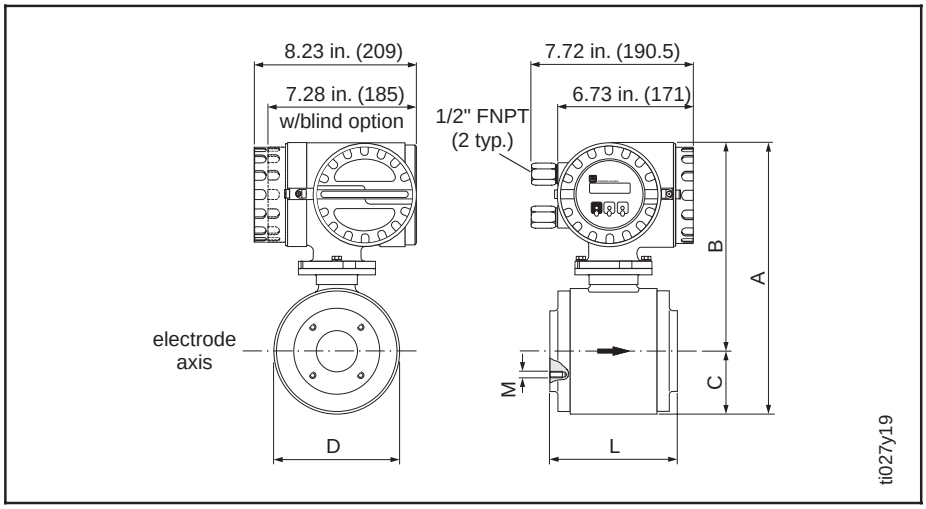
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Dimensions

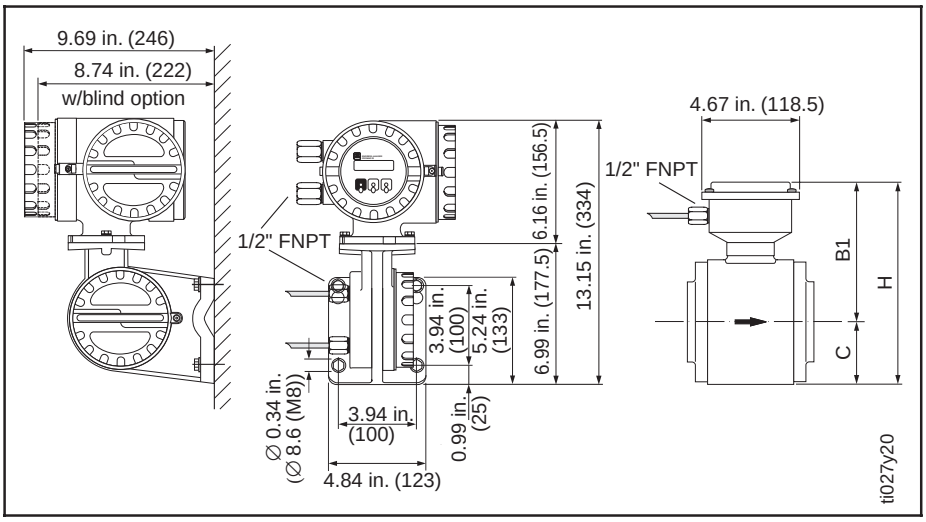
Promag 30/33 H
1" - 4"

When ordering the blind option, use blind option dimensions

Compact version



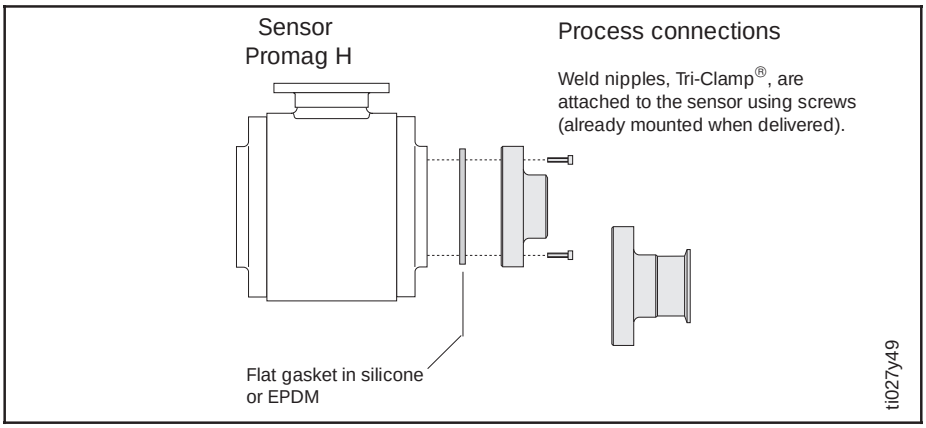
Remote version (FS and FL version)



Size [in.]	L [in.]	A [in.]	B [in.]	B1 [in.]	C [in.]	D [in.]	H [in.]	M [thread]	Weight* [lbs.]
1"	5.50	12.5	10.0	6.24	2.52	5.04	8.76	M6	19.8
1 1/2"	5.50	12.5	10.0	6.24	2.52	5.04	8.76	M6	20.9
2"	5.50	13.5	10.5	6.73	3.01	6.02	9.74	M8	26.5
2 1/2"	5.50	13.5	10.5	6.73	3.01	6.02	9.74	M8	26.5
3"	7.87	15.5	11.5	7.72	4.00	7.99	11.7	M12	48.5
4"	7.87	15.5	11.5	7.72	4.00	7.99	11.7	M12	47.4

*Weights for compact version

Promag H sensor process connections

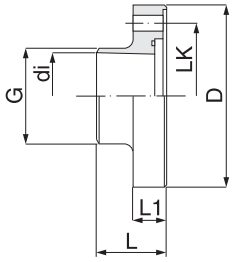


Note: A weld-in tool is available for installation, see pg. 46.

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Process Connections Promag H

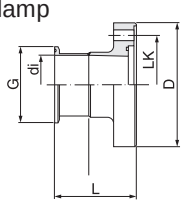
Weld nipple
316L stainless steel



Size in.	D	G	di	L	L1	LK
1	2.95	1.06	0.89	1.65	0.75	2.20
1 1/2	3.62	1.57	1.39	1.65	0.75	2.80
2	4.13	2.17	1.89	1.65	0.75	3.29
2 1/2	4.76	2.60	2.36	1.65	0.83	3.94
3	5.79	3.11	2.86	1.65	0.94	4.76
4	6.61	4.09	3.84	1.65	0.94	5.57

Note: Never weld the nipples to pipe while the flow sensor is attached. A weld-in tool is available — see pg. 46.

Tri-Clamp



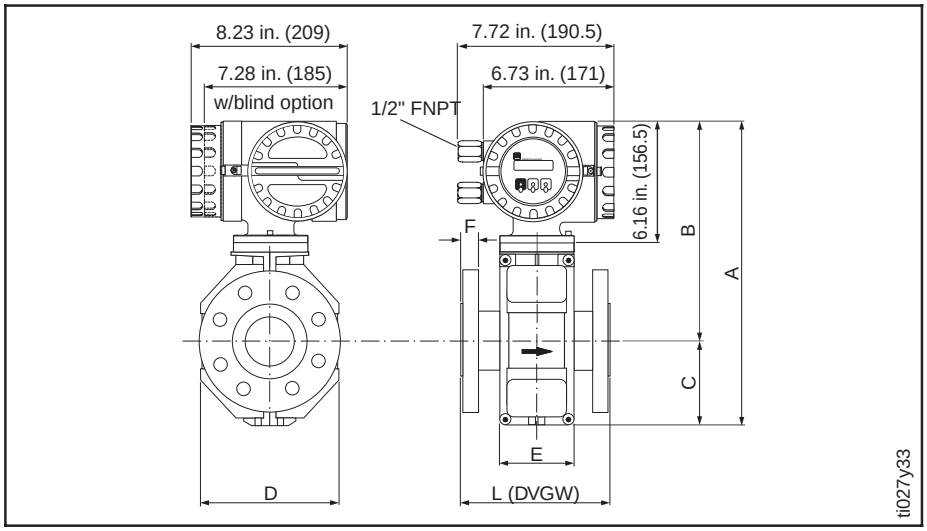
Size in.	di	G	D	L	LK
1	0.87	1.98	2.95	2.70	2.20
1 1/2	1.37	1.98	3.62	2.70	2.80
2	1.87	2.52	4.13	2.70	3.29
2 1/2	2.37	3.05	4.76	2.70	3.94
3	2.87	3.58	5.79	2.70	4.76
4	3.83	4.68	6.61	2.70	5.57

Face-to-face lengths: 1" - 2 1/2" → 2 x L +5.35 in.
3" - 4" → 2 x L +7.72 in.

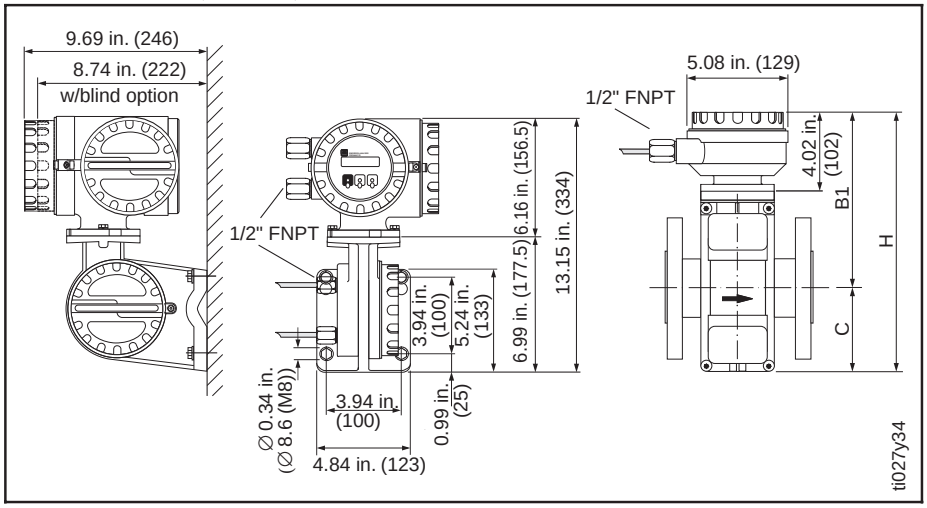
Dimensions

Promag 30/33 F
1/2" - 12"

Compact version



Remote version (FS & FL)



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Size [in.]	L* [in]	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	H [in]	B1 [in]	Weight [lbs]
1/2"	7.87	13.41	10.10	3.31	4.72	3.70	0.44	12.80	9.49	14.3
1"	7.87	13.41	10.10	3.31	4.72	3.70	0.56	12.80	9.49	16.1
1 1/2"	7.87	13.41	10.10	3.31	4.72	3.70	0.69	12.80	9.49	20.7
2"	7.87	13.41	10.10	3.31	4.72	3.70	0.75	12.80	9.49	23.3
3"	7.87	15.37	11.08	4.29	7.09	3.70	0.94	14.76	10.47	30.8
4"	9.84	15.37	11.08	4.29	7.09	3.70	0.94	14.76	10.47	35.2
6"	11.81	18.56	12.66	5.91	10.24	5.51	1.00	17.95	12.05	56.1
8"	13.78	20.73	13.64	7.09	12.76	6.14	1.12	20.12	13.03	77.7
10"	17.72	22.70	14.63	8.07	15.75	6.54	1.19	22.09	14.02	106.7
12"	19.68	24.67	15.61	9.06	18.11	6.54	1.25	24.06	15.00	126.5
14"	21.70	29.10	18.00	11.10	22.20	10.90	1.37	28.40	17.30	234.0
16"	23.60	31.10	19.00	12.10	24.30	10.90	1.44	30.50	18.40	274.0
18"	25.60	33.10	20.00	13.10	26.20	11.50	1.56	32.50	19.40	507.0
20"	25.60	35.10	21.00	14.10	28.20	11.50	1.69	34.50	20.40	375.0
24"	30.70	39.10	23.00	16.10	32.20	15.80	1.87	38.50	22.40	485.0
28"	35.80	47.10	27.00	20.10	40.20	23.20	1.31	46.50	26.40	728.0
30"	38.40	47.10	27.00	20.10	40.20	24.70	1.37	46.50	26.40	926.0
32"	40.90	48.70	27.80	21.00	41.90	25.50	1.50	48.10	27.10	926.0
36"	46.10	54.70	30.80	24.00	47.90	30.90	1.63	54.10	30.20	1213.0
40"	51.20	60.70	33.80	26.90	53.90	33.90	1.63	60.10	33.20	1433.0
42"	53.70	62.70	34.80	27.90	55.80	35.90	1.75	62.10	34.20	2095.0
48"	61.40	70.50	38.70	31.80	63.60	39.10	1.75	69.90	38.10	2315.0
54"	69.10	78.66	42.76	35.91	71.81	49.29	2.13	76.16	40.61	4741.0
56"	71.65	84.57	45.70	38.86	77.72	49.29	—	82.42	43.56	3969.0
60"	76.77	86.46	46.65	39.80	79.61	54.80	2.25	84.31	44.51	5733.0
64"	81.89	90.00	48.43	41.57	83.15	58.35	—	87.85	46.28	5512.5
66"	84.45	92.91	49.88	43.03	86.06	58.35	2.50	90.77	47.74	8158.5
72"	92.13	100.4	53.62	46.77	93.54	64.25	2.63	98.25	41.48	7276.5
78"	102.4	104.3	55.59	48.74	97.48	68.19	2.75	102.2	43.44	9040.5

* Thickness of the flange face includes sealing strip. The face-to-face length is independent of the pressure rating.

Note: The dimensions and weights of FM Class I, Div. 1 sensors can differ from those stated here. Refer to the separate FM documentation EX 006D/24/A2/06.96 available from Endress + Hauser.

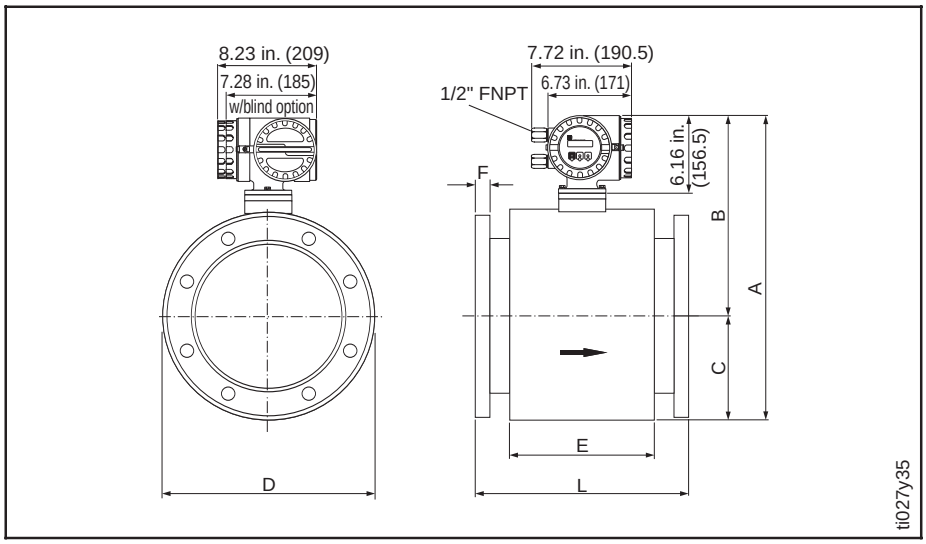
Table 2

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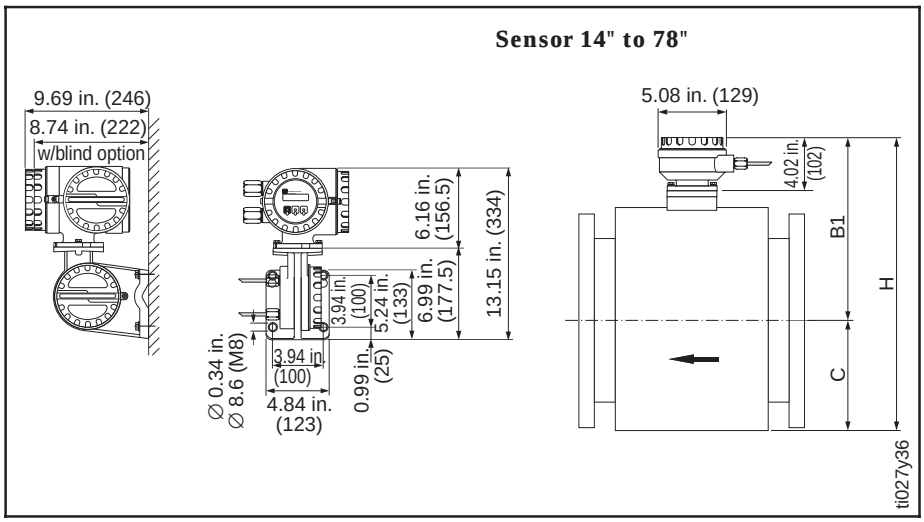
Dimensions

Promag 30/33 F
14" - 78"

Compact version



Remote version (FS & FL)



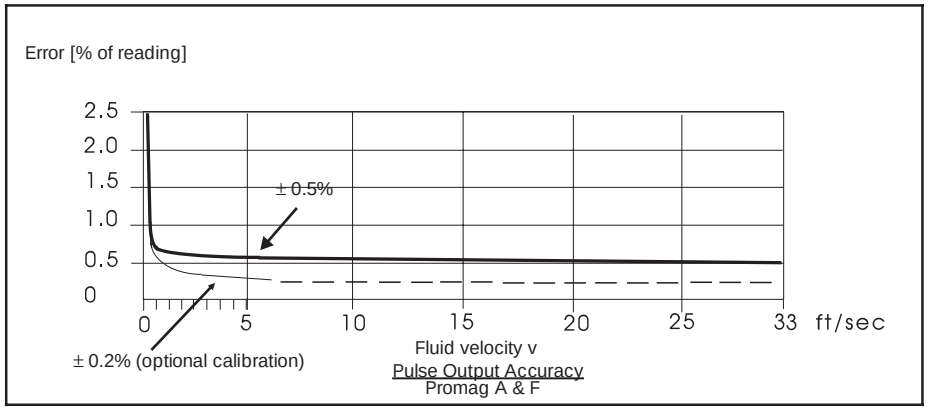
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Technical Data

Error Limits

Measuring uncertainty under reference conditions

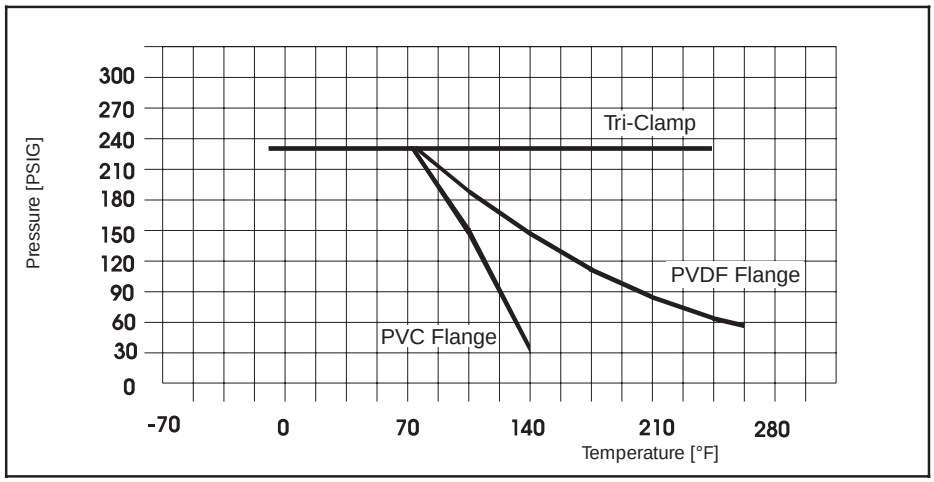
Pulse output	Promag 30/33/39 A, H, & F: +/- 0.5% of reading +/-0.01% of max. full scale (33 ft/s) Promag 30/33D: +/-0.7% of reading +/00.01 % of max. full scale (33 ft/s)
Current output	Same as pulse output accuracy plus: Promag 30 +/-1 uA; Promag 33/39 +/-5 uA
Repeatability	+/-0.1% of rate +/00.005 % of max full scale (33 ft/s)
Options	Promag 30/33/39 A, H, & F: +/- 0.2% of reading +/-0.05% of Qk (Qk = customer desired full scale flow rate for calibration, greater than 6 ft/s up to 33 ft/s) Promag 30/33 D: +/- 0.45% of reading +/-0.05% of Qk
Power supply voltage	within the specified range, supply fluctuations have no influence (galvanically isolated).



Promag 30/33/39 A Process Connections

Pressure limitations due to fluid temperature

Bonding sleeve material:	PVC
Flange material:	PVDF
Tri-Clamp material:	316LSS



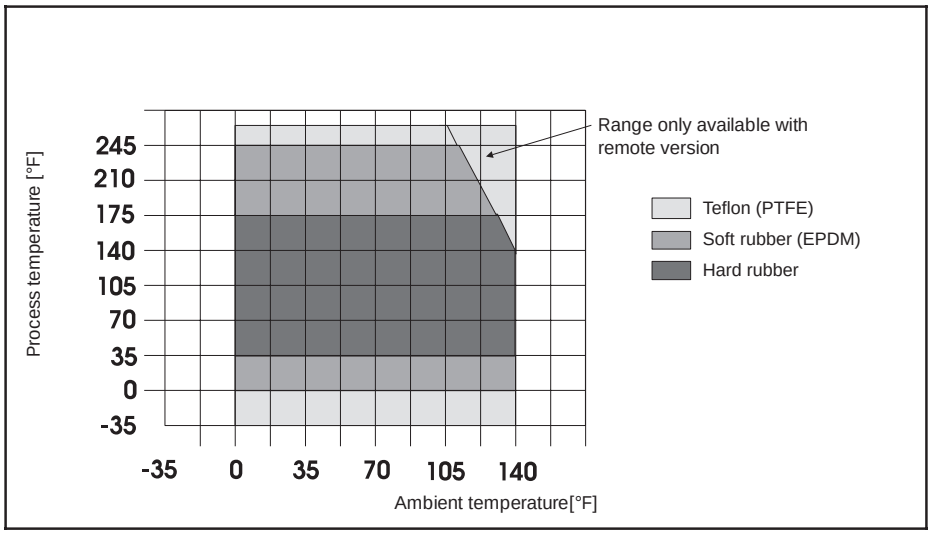
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Technical Data
Promag 33 F

Note: The maximum operable temperature of the Promag A, H, and D sensors is governed by liner material (see page 32).

Temperature range

With high fluid and ambient temperatures, a separately mounted Promag F sensor and Promag transmitter is necessary (danger of electronics overheating).



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Technical Data

Measuring Sensor

	Promag A measuring sensor	Promag D measuring sensor	Promag F measuring sensor	Promag H measuring sensor
Diameter	1/12 ", 5/32 ", 5/16 ", 1/2 ", 1"	1" - 4"	1/2" - 78"	1" - 4"
Maximum pressure	PVC or PVDF - see Pg. 29 580 PSIG SS threaded 230 PSIG for Tri-clamp Flanged per ANSI B16.5 Class 150	580 PSIG	Per ANSI B16.5: Class 150 (1/2" - 24") Class 300 option (1/2" - 6") Per AWWA: Class D (28" - 78")	230 PSIG
Process connection	external or internal thread, PVC sleeves, flexible tube fittings, weld nipple, Tri-Clamp, Flange connection (ANSI)	Wafer	Flange connection (ANSI B16.5)	Sanitary weld nipple or Tri-clamp: 3A Authorized: 316LSS
Flange material	ANSI: 316LSS, PVDF Thread adapter: 316LSS; PVC		A 105 carbon steel (standard) 316LSS	
Fluid temperature range and liner material[1]	-4 to +265 °F PFA	-40 to +300 °F PTFE -4 to +250 °F soft rubber +32 to +175 °F hard rubber	-40 to +265 °F PTFE (1/2"-24") -40 to +300 °F PTFE (for remote version, in preparation) -4 to +250 °F soft rubber/ EPDM (1/2"-78") +32 to +175 °F hard rubber (3"-78")	-4 to +300 °F PFA -4 to +265 °F with EPDM gaskets
Ambient temperature range	-4 to +140 °F	-4 to +140 °F	-4 to +140 °F	-4 to +140 °F
Electrode material[1]	316LSS (standard), Hastelloy C 22, platinum/rhodium 80/20, tantalum	Hastelloy C 22 (standard), 316LSS, platinum/rhodium 80/20, tantalum	Hastelloy C 22 (standard), 316LSS, platinum/rhodium 80/20, tantalum	316LSS
Fitted electrodes	measuring electrodes grounding electrode empty pipe detection electrode	measuring electrodes grounding electrode empty pipe detection electrode	measuring electrodes grounding electrode empty pipe detection electrode	measuring electrodes empty pipe detection electrode — grounding not required.
Minimum conductivity	5 µS/cm*	5 µS/cm*	5 µS/cm*	5 µS/cm*
Gasket material	Viton (standard), Kalrez, Silicone (sanitary version)	—	—	EPDM, Silicone
Housing material	316LSS incl. thread adapter (see also process connection dimensions)	Epoxy-painted steel (Option: 316LSS)	Epoxy coated die-cast aluminum	316LSS
Protection type	NEMA 4X (standard)	NEMA 4X (standard) submersible to 30 ft. for 48 hrs. (option)	NEMA 4X (standard) submersible varies by size	NEMA 4X (standard)
CIP cleanable (observe max. temperature)	yes	yes	yes	yes
SIP cleanable	—	—	—	yes
Power supply	The sensor is powered by the transmitter			
Cable entries (remote version)	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT

[1] Endress + Hauser cannot guarantee the compatibility of wetted parts with any specific process fluid. The customer assumes responsibility and liability for the final choice of materials.

* 1 µS/cm fluids and slurries with high solids content can be measured using Promag 35S. See separate bulletin TI 035D/06/ae.

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Technical Data

Measuring Transmitter, Measuring System

Promag 30
measuring transmitter

Housing material
epoxy coated die-cast aluminum

Electrical classification
FM approved non-incendive Class I, Division 2, Groups A-D; Dust ignition-proof, Class II, III, Division 1, Groups EF&G; CSA Class I, Division 2, Groups A-D; CSA Class I, Division I, Groups A-D

Protection type
NEMA 4X

Ambient temperature range
-4 to +140 °F

Shock and vibration immunity
acceleration to 2 g/2 h per day, 10 - 100 Hz
(complete measuring system)

Cable entries
power supply cable and signal cable (outputs) $^{1}/_{2}$" NPT

Power supply
85 - 260 V AC, 45 - 65 Hz
16 - 62 V DC
Power supply brownouts: bridges min. of 1 cycle (≤ 22 ms)

Power consumption
AC: <15 VA (incl. sensor)
DC: <15 W (incl. sensor)

Galvanic isolation
inputs and outputs galvanically isolated from power supply (VDE 0160), from sensor and each other (U_{max} = 500 V)

Current output
0/4 - 20 mA settable, galvanically isolated, R_L <700 Ω, selectable full scale value, temperature coefficient typ.: 0.001% o.r./°C

Pulse output (Open Collector)
f_{max} = 400 Hz, U_{max} = 30 V, I_{max} = 250 mA, galvanically isolated, selectable pulse value, duty cycle approx. 50/50, pulse width max. = 2 S

Response time

	Pulse Freq Output	Analog Output
$^{1}/_{12}$"	.67 sec	3.1 sec
$^{5}/_{32}$" - 4"	.53 sec	3.0 sec
6" - 8"	.80 sec	3.3 sec
10" - 16"	1.1 sec	3.6 sec
18" - 20"	1.2 sec	3.7 sec
24"	1.3 sec	3.9 sec
28" - 30"	1.6 sec	4.2 sec
32" - 36"	1.9 sec	4.4 sec
40" - 42"	2.1 sec	4.7 sec
48"	2.4 sec	5.1 sec

Status output (Open Collector)
U_{max} = 30 V, I_{max} = 250 mA (open collector) settable for: system and process error messages, flow direction indication

Auxiliary input
V= 3 to 30 V DC, Ri = 1.8 kΩ, galvanically isolated, positive zero return or totalizer reset w/display

Electromagnetic immunity (EMI)
acc. to EN 50081 Part 1 and 2 / EN 50082 Part 1 and 2, and NAMUR recommendations (complete measuring system), CE approval

Data storage on power failure
EEPROM stores data of the measuring system
(without batteries) on power failure

Display
8-digit LCD for rate, total, or rate/total
Includes empty pipe detection feature

Totalizer
8 digit with capacity to count the number of times the totalizer rolls over (or overflows)

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Technical Data

Promag 33
measuring transmitter

Housing material	epoxy coated die-cast aluminum
Electrical classification	FM approved non-incendive Class I, Division 2, Groups A-D; Dust ignition-proof, Class II, III, Division 1, Groups EF&G; CSA Class I, Division 2, Groups A-D; CSA Class I, Division I, Groups A-D
Protection type	NEMA 4X
Ambient temperature range	-4 to +140 °F
Shock and vibration immunity	acceleration to 2 g/2 h per day, 10 - 100 Hz (complete measuring system)
Cable entries	power supply cable and signal cable (outputs) $^1/_2$ " NPT
Power supply	85 - 260 V AC, 45 - 65 Hz 16 - 62 V DC Power supply brownouts: bridges min. of 1 cycle (≦ 22 ms)
Power consumption	AC: <15 VA (incl. sensor) DC: <15 W (incl. sensor)
Galvanic isolation	inputs and outputs galvanically isolated from power supply (VDE 0160), from sensor and each other (U_{max} = 500 V)
Current output	0/4 - 20 mA settable, galvanically isolated, R_L <700 Ω, (with HART at least 250 Ω) selectable time constant, scaleable full scale value, temperature coefficient typ.: 0.005% o.r./°C
Pulse/frequency output	active/passive selectable, galvanically isolated, active: 24 V DC, 25 mA (250 mA/20 ms), R_L >100 Ω passive: open collector, 30 V DC, 25 mA (250 mA/20 ms) Frequency output: f_{End} = selectable to 10 kHz, duty cycle approx 50/50; pulse width max. 2 s Pulse output: selectable pulse value, selectable pulse polarity, setable pulse width (50 ms - 2 s) Above a frequency of 1/(2 x pulse width), the on/off ratio is 1:1.
Response time	

	Pulse Freq Output	Analog Output
$^1/_{12}$ "	.42 sec	.47 sec+*
$^5/_{32}$ " - 4"	.33 sec	.38 sec+*
6" - 8"	.50 sec	.55 sec+*
10" - 16"	.67 sec	.72 sec+*
18" - 20"	.75 sec	.80 sec+*
24"	.83 sec	.88 sec+*
28" - 30"	1.0 sec	1.1 sec+*
32" - 36"	1.1 sec	1.2 sec+*
40" - 42"	1.3 sec	1.4 sec+*
48"	1.5 sec	1.6 sec+*

* Minimum response time - current output response time can be increased by adjusting time constant.

Alarm output	Relay 1, choice of opening or closing contacts available, max. 60 V AC/30 V DC, max. 0.5 A AC/0.1 A DC, galvanically isolated. Configurable for alarm, alarm + EPD, limit value 1, Empty Pipe Detection (EPD), overranging (v ≥ 41 ft/s), dual range mode, pre-batch contact or flow direction
Status output	Relay 2, choice of opening or closing contacts available, max. 60 V AC/30 V DC, max. 0.5 A AC/0.1 A DC, galvanically isolated. Configurable for limit value 2, dual range mode, batching contact, empty pipe detection, flow direction or overranging v ≥ 41 ft./s.
Auxiliary input	V= 3 to 30 V DC, pulse or level control, Ri = 1.8 kΩ, galvanically isolated. Can be configured for: Reset totalizer, activate batching cycle, dual range mode, positive zero return
Communication	SMART technology (HART protocol via current output) standard RS 485 interface (Rackbus protocol) optional
Data storage on power failure	EEPROM stores data of the measuring system (without batteries) on power failure
Display	LC display, illuminated, two-lines (16 characters each)
Electromagnetic immunity (EMI)	acc. to EN 50081 Part 1 and 2 / EN 50082 Part 1 and 2, and NAMUR recommendations (complete measuring system), CE approval
Totalizer	7 digit with capacity to count the number of times the totalizer rolls over (or overflows) (non-volatile, stored on power failure)

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Technical Data

Promag 39 measuring transmitter

Housing	19" rack cassette 21 TE (128x106x196)
Protection type	NEMA 1, NEMA 4 accessory housing available Panel mount housing available
Ambient temperature	–13 to +122 °F display +32 to +122°F
Resistance to shock and vibration	acceleration up to 2 g/2 h per day, 10 to 100 Hz (complete measuring system)
Cable entries	spring contact DIN 41612 F 48
Power supply	85 to 260 V AC, 45 to 65 Hz, 16 to 62 V DC Power supply brownouts: Bridges a min. of 1 cycle (22 ms)
Power consumption	AC: <15 VA (incl. sensor) DC: <15 W (incl. sensor)
Galvanic isolation	inputs and outputs galvanically isolated from power supply, from sensor and each other
Current output	0/4 to 20 mA adjustable,galvanically isolated, R_L <700 Ω (with HART at least 250 Ω) selectable time constant, scalable full scale value, temperature coefficient typically: 0.005% o.r./ °C
Pulse/frequency output	choice of active/passive, galvanically isolated, active: 24 V DC, 25 mA (250 mA/20 ms), R_L >100 Ω passive: open collector, 30 V DC, 25 mA (250 mA for 20 ms) Frequency output: f_{End} = selectable to 10 kHz, duty cycle approx. 50/50; pulse width max. 2 s Pulse output: selectable pulse value, selectable pulse polarity, pulse width adjustable (50 ms to 2 s); above a frequency of $^1/_{(2 \times \text{pulse width})}$, the pulse/pause ratio is 1:1.
Alarm output	Relay 1, NO and NC contacts standard, max. 250 V AC/30 V DC, max. 1 A, galvanically isolated, programmable for limit value 2, exceeding measuring range (v ≥ 41 ft/s), dual range mode, batching or direction of flow
Status output	Relay 2, NO and NC contacts standard, max. 250 V AC/30 V DC, max. 1 A, galvanically isolated programmable for limit value 2, exceeding measure range (v ≥ 41 ft/s),dual range mode, batching or direction of flow
Communication	RS 485 interface (Rackbus protocol) or Rackbus (Rackbus protocol) and SMART (HART protocol via current output)
Data storage on power failure	EEPROM saves data of the measuring system (without batteries) in the event of a power failure
Display	LCD, two-lines (16 characters each)
Electromagnetic Immunity	according to EN 50081 Part 1 and 2, EN 50082 Part 1 and 2, and NAMUR recommendations (complete measuring system), CE approved
Auxiliary input	V= 3 to 30 V DC, pulse or level control, Ri = 1.8 kΩ, galvanically isolated. Can be configured for: Reset totalizer, activate batching cycle, dual range mode, positive zero return
Totalizer	7 digit with capacity to count the number of times the totalizer rolls over (or overflows) (non-volatile, stored on power failure)

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Ordering Information

Boldface items have standard delivery times

Ordering Code: Promag 30A

1	2	3	4	5	6	7	8	9	10	11	12	13

1 LINER MATERIAL
T Teflon (PFA)

2 Size

	in.	mm.	Full Scale GPM min.	max.
02	**1/12**	**2**	**0.02**	**0.5**
04	**5/32**	**4**	**0.1**	**2.0**
08	**5/16**	**8**	**0.5**	**10.0**
15	**1/2**	**15**	**1.5**	**30**
25	**1**	**25**	**5**	**100**

3 PROCESS CONNECTION/GASKET MATERIAL

Connections which require an additional process connection mounting set (see p. 46)

A 1" threads/316LSS, Viton gasket
B 1" threads/316LSS, Kalrez gasket
C 1" threads/316LSS, Silicone gasket - 3A sanitary
D 1" threads/PVC, Viton gasket
E 1" threads/PVC, Kalrez gasket
1 1" threads/316LSS, Viton gasket - 3A Sanitary
G Other

Connections which DO NOT require an additional process connection mounting set

H ANSI 150-lb. flange/316LSS, Viton gasket
K ANSI 150-lb. flange/316LSS, Kalrez gasket
L ANSI 300-lb. flange/316LSS, Viton gasket
M ANSI 300-lb. flange/316LSS, Kalrez gasket
R ANSI 150-lb. flange/PVDF, Viton gasket
S ANSI 150-lb. flange/PVDF, Kalrez gasket
2 1" Tri-Clamp, 316LSS, Silicone gasket
3 1" Tri-Clamp, 316LSS, Viton gasket
4 1/2" Tri-Clamp, 316LSS, Silicone gasket, for 1/12" - 5/16" only
5 1/2" Tri-Clamp, 316LSS, Viton gasket, for 1/12" - 5/16" only
6 3/4" Tri-Clamp, 316LSS, Silicone gasket, for 1/2" only
7 3/4" Tri-Clamp, 316LSS, Viton gasket, for 1/2" only
9 Other

4 ELECTRODES/MATERIALS
D 316LSS measuring/grounding/empty pipe detection electrodes (not for blind version)
H Hastelloy C-22 measuring/grounding/empty pipe detection electrodes (not for blind version)
N Tantalum measuring/grounding/empty pipe detection electrodes (not for blind version)
R Platinum/20% Rhodium measuring/grounding electrodes
T Platinum/20% Rhodium measuring/grounding/empty pipe detection electrodes (not for blind version)
9 Other

5 CERTIFICATES
1 Standard, without certificate
9 Other

6 PROTECTION TYPE/VERSION
E NEMA 4X compact version
F NEMA 4X remote version, FS
L NEMA 4X remote version, FL without EPD
9 Other

7 CABLE ENTRIES
D 1/2" NPT
9 Other

8 CABLE FOR REMOTE VERSION
1 Separate/compact version without cable
4 16.5-ft coil/signal cable with empty pipe detection, FS
5 33-ft coil/signal cable with empty pipe detection, FS
8 Coil/signal cable with empty pipe detection, FS, specify length in feet (max 656 ft (EPD max 33 ft))
B 33-ft coil/signal cable, FL (without empty pipe detection)
C Coil/signal cable, FL (without empty pipe detection) specify length in feet (max 656 ft)
9 Other

9 CALIBRATION
1 3-point standard calibration
2 5-point calibration
3 0.2% calibration
4 Bidirectional std. 3-point calibration
9 Other

10 APPROVALS
D FM approved NI - Class I, Div. 2, Groups ABCD; DIP - Class II, Div. 1, Groups EFG
E FM approved Class I, II & III, Div. I, Groups A-G (compact version only)
F CSA Class I, Div. 2, Groups ABCD
G CSA Class I, Div. 1, Groups ABCD (compact version only, up to 12")
O FM approved Class I, II & III, Div. 1, Groups A-G sensor for use with Class I, Div. 2 transmitter (FL version only)
9 Other

11 DISPLAY OPTION
1 Blind
2 Display, with empty pipe detection
9 Other

Note: All stock meters will include empty pipe detection electrode but it will not be functional unless the display option is also ordered.

12 POWER SUPPLY
1 85-260 VAC, 50/60 Hz
2 16-62 VDC
9 Other

13 SIGNAL OUTPUTS
B Pulse and current output with auxiliary input
C Pulse and current output with auxiliary input and automatic electrode cleaning.
9 Other

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Ordering Information

Ordering Code: Promag 33A

1	2	3	4	5	6	7	8	9	10	11	12	13

1 LINER MATERIAL
T Teflon (PFA)

2 Size

			Full Scale GPM	
	in.	mm.	min.	max.
02	**1/12**	**2**	**0.013**	**0.44**
04	**5/32**	**4**	**0.062**	**2.2**
08	**5/16**	**8**	**0.22**	**7.9**
15	**1/2**	**15**	**0.85**	**28.0**
25	**1**	**25**	**2.20**	**79.2**

3 PROCESS CONNECTION/GASKET MATERIAL

Connections which require an additional process connection mounting set (see p. 46)

A 1" threads/316LSS, Viton gasket
B 1" threads/316LSS, Kalrez gasket
C 1" threads/316LSS, Silicone gasket - 3A sanitary
D 1" threads/PVC, Viton gasket
E 1" threads/PVC, Kalrez gasket
1 1" threads/316LSS, Viton gasket - 3A Sanitary

Connections which DO NOT require an additional process connection mounting set

H ANSI 150-lb. flange/316LSS, Viton gasket
K ANSI 150-lb. flange/316LSS, Kalrez gasket
L ANSI 300-lb. flange/316LSS, Viton gasket
M ANSI 300-lb. flange/316LSS, Kalrez gasket
R ANSI 150-lb. flange/PVDF, Viton gasket
S ANSI 150-lb. flange/PVDF, Kalrez gasket
2 1" Tri-Clamp, 316LSS, Silicone gasket
3 1" Tri-Clamp, 316LSS, Viton gasket
4 1/2" Tri-Clamp, 316LSS, Silicone gasket, for 1/12" - 5/16" only
5 1/2" Tri-Clamp, 316LSS, Viton gasket, for 1/12" - 5/16" only
6 3/4" Tri-Clamp, 316LSS, Silicone gasket, for 1/2" only
7 3/4" Tri-Clamp, 316LSS, Viton gasket, for 1/2" only
9 Other

4 ELECTRODES/MATERIALS
D 316LSS measuring/grounding/empty pipe detection electrodes
H Hastelloy C-22 measuring/grounding/empty pipe detection electrodes
N Tantalum measuring/grounding/empty pipe detection electrodes
R Platinum/20% Rhodium measuring/grounding electrodes
T Platinum/20% Rhodium measuring/grounding/empty pipe detection electrodes
9 Other

5 CERTIFICATES
1 Standard, without certificate
9 Other

6 PROTECTION TYPE/VERSION
E NEMA 4X compact version
F NEMA 4X remote version
L NEMA 4X remote version, FL without EPD
9 Other

7 CABLE ENTRIES
D 1/2" NPT
9 Other

8 CABLE FOR REMOTE VERSION
1 Separate/compact version without cable
4 16.5-ft coil/signal cable with empty pipe detection, FS
5 33-ft coil/signal cable with empty pipe detection, FS
8 Coil/signal cable with empty pipe detection, FS, specify length in feet (max 656 ft (EPD max 33 ft))
B 33-ft coil/signal cable, FL (without empty pipe detection)
C Coil/signal cable, FL (without empty pipe detection) specify length in feet (max 656 ft)
9 Other

9 CALIBRATION
1 3-point standard calibration
2 5-point calibration
3 0.2% calibration
4 Bidirectional std. 3-point calibration
9 Other

10 APPROVALS
D FM approved NI - Class I, Div. 2, Groups ABCD; DIP - Class II, Div. 1, Groups EFG
E FM approved Class I, II & III, Div. I, Groups A-G (compact version only)
F CSA Class I, Div. 2, Groups ABCD
G CSA Class I, Div. 1, Groups ABCD (compact version only, up to 12")
O FM approved Class I, II & III, Div. 1, Groups A-G sensor for use with Class I, Div. 2 transmitter (FL version only)
9 Other

11 DISPLAY OPTION
1 Blind
2 Display, with Touch Control
9 Other

12 POWER SUPPLY
1 85-260 VAC, 50/60 Hz
2 16-62 VDC
9 Other

13 SIGNAL OUTPUTS
A Frequency & current/HART outputs
B Current output and Rackbus RS485
C Frequency output and Rackbus RS485
D Current output and auxiliary input (must order display option 2)
E Frequency output and auxiliary input (must order display option 2)
F Frequency & current/HART outputs with automatic electrode cleaning*
G Current output & Rackbus RS485 with automatic electrode cleaning*
H Frequency output & Rackbus RS485 with automatic electrode cleaning*
K Current output and auxiliary input with automatic electrode cleaning* (must order display option)
L Frequency output and auxiliary input with automatic electrode cleaning* (must order display option)
9 Other

* Cannot be ordered as FL remote, or with Div. 1 approval

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Ordering Information

Ordering Code: Promag 39A

1	2	3	4	5	6	7	8	9	10	11	12	13

1 LINER MATERIAL
T Teflon (PFA)

2 Size

			Full Scale GPM	
	in.	mm.	min.	max.
02	$^{1}/_{12}$	2	0.015	0.49
04	$^{5}/_{32}$	4	0.06	1.99
08	$^{5}/_{16}$	8	0.24	7.96
15	$^{1}/_{2}$	15	0.85	28.0
25	1	25	2.40	77.8

3 PROCESS CONNECTION/GASKET MATERIAL

Connections which require an additional process connection mounting set (see p. 46)

A 1" threads/316LSS, Viton gasket
B 1" threads/316LSS, Kalrez gasket
C 1" threads/316LSS, Silicone gasket - 3A sanitary
D 1" threads/PVC, Viton gasket
E 1" threads/PVC, Kalrez gasket
1 1" threads/316LSS, Viton gasket - 3A Sanitary

Connections which DO NOT require an additional process connection mounting set

H ANSI 150-lb. flange/316LSS, Viton gasket
K ANSI 150-lb. flange/316LSS, Kalrez gasket
L ANSI 300-lb. flange/316LSS, Viton gasket
M ANSI 300-lb. flange/316LSS, Kalrez gasket
R ANSI 150-lb. flange/PVDF, Viton gasket
S ANSI 150-lb. flange/PVDF, Kalrez gasket
2 1" Tri-Clamp, 316LSS, Silicone gasket
3 1" Tri-Clamp, 316LSS, Viton gasket
4 $^{1}/_{2}$" Tri-Clamp, 316LSS, Silicone gasket, for $^{1}/_{12}$" - $^{5}/_{16}$" only
5 $^{1}/_{2}$" Tri-Clamp, 316LSS, Viton gasket, for $^{1}/_{12}$" - $^{5}/_{16}$" only
6 $^{3}/_{4}$" Tri-Clamp, 316LSS, Silicone gasket, for $^{1}/_{2}$" only
7 $^{3}/_{4}$" Tri-Clamp, 316LSS, Viton gasket, for $^{1}/_{2}$" only
9 Other

4 ELECTRODES/MATERIALS
D 316LSS measuring/grounding electrodes
F Hastelloy C-22 measuring/grounding electrodes
L Tantalum measuring/grounding electrodes
R Platinum/20% Rhodium measuring/grounding electrodes
9 Other

5 CERTIFICATES
1 Standard, without certificate
9 Other

6 PROTECTION TYPE/VERSION
H NEMA 4X sensor remote version, FL
9 Other

7 CABLE ENTRIES
A PG 11 sensor cable glands
9 Other

8 CABLE FOR REMOTE VERSION
1 No cable
B 33-ft coil/signal cable, FL
C Coil/signal cable, FL, specify length in feet (max 656 ft)
9 Other

9 CALIBRATION
1 3-point standard 0.5% calibration
2 5-point calibration 0.5% calibration
4 Bidirectional 3-point 0.5% calibration
9 Other

10 APPROVALS
A General Purpose
9 Other

11 DISPLAY OPTION
1 Digital display with menu controlled operation via keypad
9 Other

12 POWER SUPPLY
1 85-260 VAC, 50/60 Hz
2 16-62 VDC
9 Other

13 SIGNAL OUTPUTS
1 Frequency/current, auxiliary input, relay 1, relay 2, HART interface, Rackbus or Rackbus RS485 interface
9 Other

Wiring Connector Kits

w/flat pin terminals	#50048142
w/solder lug	#50048140

Note: A wiring connector kit is required for every Promag 39 transmitter, even when panel mount kit is not ordered.

Accessories:

Panel Mount accessory (requires one wiring connector kit)	#50075239
NEMA 4X wall enclosure	C/F

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Ordering Information

Ordering Code: Promag 30D

1	2	3	4	5	6	7	8	9	10	11	12	13

1 LINER MATERIAL
- H Hard rubber
- **T Teflon (PTFE)**
- W Soft rubber (EPDM)

2 Size

			Full Scale GPM	
	in.	mm.	min.	max.
25	**1**	**25**	**5**	**100**
40	**1.5**	**40**	**10**	**200**
50	**2**	**50**	**20**	**400**
80	**3**	**80**	**50**	**1,000**
1H	**4**	**100**	**75**	**1,500**

3 SENSOR HOUSING MATERIAL
- **B Epoxy-coated carbon steel**
- D 316LSS
- 9 Other

4 ELECTRODES/MATERIALS
- D 316LSS measuring/grounding/empty pipe detection electrodes
- **H Hastelloy C-22 measuring/grounding/empty pipe detection electrodes**
- N Tantalum measuring/grounding/empty pipe detection electrodes
- R Platinum/20% Rhodium measuring/grounding electrodes
- T Platinum/20% Rhodium measuring/grounding/empty pipe detection electrodes
- 9 Other

5 CERTIFICATES
- **1 Standard, without certificate**
- 9 Other

6 PROTECTION TYPE/VERSION
- **E NEMA 4X compact version**
- **F NEMA 4X remote version, FS**
- L NEMA 4X remote version, FL (EPD not possible)
- 9 Other

7 CABLE ENTRIES
- **D $^1/_2$" NPT**
- 9 Other

8 CABLE FOR REMOTE VERSION
- **1 Separate/compact version without cable**
- **4 16.5-ft coil/signal cable with empty pipe detection, FS**
- **5 33-ft coil/signal cable with empty pipe detection, FS**
- **8 Coil/signal cable with empty pipe detection, FS, specify length in feet (max 656 ft (EPD max 33 ft))**
- B 33-ft coil/signal cable, FL (without empty pipe detection)
- C Coil/signal cable, FL (without empty pipe detection) specify length in feet (max 656 ft)
- 9 Other

9 CALIBRATION
- **1 3-point standard calibration**
- **2 5-point calibration**
- **3 0.5% calibration**
- **4 Bidirectional std. 3-point calibration**
- 9 Other

10 APPROVALS
- **D FM approved NI - Class I, Div. 2, Groups ABCD; DIP - Class II, Div. 1, Groups EFG**
- 9 Other

11 DISPLAY OPTION
- **1 Blind**
- **2 Display, with empty pipe detection**
- 9 Other

12 POWER SUPPLY
- **1 85-260 VAC, 50/60 Hz**
- **2 16-62 VDC**
- 9 Other

13 SIGNAL OUTPUTS
- **B Pulse and current output with auxiliary input (must order display option 2)**
- C Pulse and current output with auxiliary input and automatic electrode cleaning (not available as FL remote)
- 9 Other

Note: Promag 30D requires a process connection mounting set (see page 46).
All stock meters will include empty pipe detection electrode but it will not be functional unless the display option is also ordered.

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Ordering Information

Ordering Code: Promag 33D

1	2	3	4	5	6	7	8	9	10	11	12	13

1 LINER MATERIAL
- H Hard rubber
- W Soft rubber (EPDM)
- **T Teflon (PTFE)**

2 Size

			Full Scale GPM	
	in.	mm.	min.	max.
25	**1**	**25**	**2.4**	**77.8**
40	**1.5**	**40**	**6.0**	**199**
50	**2**	**50**	**9.4**	**311**
80	**3**	**80**	**24.0**	**796**
1H	**4**	**100**	**37.4**	**1,244**

3 SENSOR HOUSING MATERIAL
- **B Epoxy-coated carbon steel**
- D 316LSS (only available w/PTFE liner)
- 9 Other

4 ELECTRODES/MATERIALS
- D 316LSS measuring/grounding/empty pipe detection electrodes
- **H Hastelloy C-22 measuring/grounding/empty pipe detection electrodes**
- N Tantalum measuring/grounding/empty pipe detection electrodes
- R Platinum/20% Rhodium measuring/grounding electrodes
- T Platinum/20% Rhodium measuring/grounding/empty pipe detection electrodes
- 9 Other

5 CERTIFICATES
- **1 Standard, without certificate**
- 9 Other

6 PROTECTION TYPE/VERSION
- **E NEMA 4X compact version**
- **F NEMA 4X remote version**
- L NEMA 4X remote version, FL
- 9 Other

7 CABLE ENTRIES
- **D $^1/_2$" NPT**
- 9 Other

8 CABLE FOR REMOTE VERSION
- **1 Separate/compact version without cable**
- **4 16.5-ft coil/signal cable with empty pipe detection, FS**
- **5 33-ft coil/signal cable with empty pipe detection, FS**
- **8 Coil/signal cable with empty pipe detection, FS, specify length in feet (max 656 ft (EPD max 33 ft))**
- B 33-ft coil/signal cable, FL (without empty pipe detection)
- C Coil/signal cable, FL (without empty pipe detection) specify length in feet (max 656 ft)
- 9 Other

9 CALIBRATION
- **1 3-point standard calibration**
- **2 5-point calibration**
- **3 0.5% calibration**
- **4 Bidirectional std. 3-point calibration**
- 9 Other

10 APPROVALS
- **D FM approved NI - Class I, Div. 2, Groups ABCD; DIP - Class II, Div. 1, Groups EFG**
- 9 Other

11 DISPLAY OPTION
- **1 Blind**
- **2 Display, with Touch Control**
- 9 Other

12 POWER SUPPLY
- **1 85-260 VAC, 50/60 Hz**
- **2 16-62 VDC**
- 9 Other

13 SIGNAL OUTPUTS
- **A Frequency & current/HART outputs**
- B Current output and Rackbus RS485
- C Frequency output and Rackbus RS485
- D Current output and auxiliary input (must order display option 2)
- E Frequency output and auxiliary input (must order display option 2)
- F Frequency & current/HART outputs with automatic electrode cleaning*
- G Current output & Rackbus RS485 with automatic electrode cleaning*
- H Frequency output & Rackbus RS485 with automatic electrode cleaning*
- K Current output and auxiliary input with automatic electrode cleaning* (must order display option)
- L Frequency output and auxiliary input with automatic electrode cleaning* (must order display option)
- 9 Other

Note: Promag 33D requires a process connection mounting set (see page 46).

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Ordering Information

Ordering Code: Promag 30F

1	2	3	4	5	6	7	8	9	10	11	12	13

1 LINER MATERIAL

H Hard rubber
T Teflon (PTFE)
W Soft rubber (EPDM)
Polyurethane (consult factory)

2 Size

	in.	mm.	Full Scale GPM min.	max.
15*	**0.5**	**15**	**1.5**	**30**
25*	**1**	**25**	**5**	**100**
40*	**1.5**	**40**	**10**	**200**
50*	**2**	**50**	**20**	**400**
80	**3**	**80**	**50**	**1,000**
1H	**4**	**100**	**75**	**1,500**
1F	**6**	**150**	**150**	**3,000**
2H	**8**	**200**	**250**	**5,000**
2F	**10**	**250**	**500**	**10,000**
3H	**12**	**300**	**750**	**15,000**
3F	14	350	1,000	20,000
4H	16	400	1,000	20,000
4F	18	450	1,500	30,000
5H	20	500	2,000	40,000
6H	24	600	3,000	60,000
7H	28	700	4,000	80,000
7F	30	750	5,000	100,000
8H	32	800	5,000	100,000
9H	36	900	5,000	100,000
T0	40	1000	7,500	150,000
V0	42	1050	10,000	200,000
T2	48	1200	10,000	200,000

Consult factory for 54" - 78" sizes

3 PROCESS CONNECTION/MATERIAL

M 150-lb. ANSI/A105 steel ($^1/_2$" - 24" only)
N 300-lb. ANSI/A105 steel ($^1/_2$" - 6" only)
R 150-lb. ANSI/316LSS ($^1/_2$"-24" only)
S 300-lb. ANSI/316LSS ($^1/_2$"-6" only)
P 150-lb. AWWA Class D/A105 steel 28" - 78"
9 Other

4 ELECTRODES/MATERIALS

D 316LSS measuring/grounding/empty pipe detection electrodes
H Hastelloy C-22 measuring/grounding/empty pipe detection electrodes
N Tantalum measuring/grounding/empty pipe detection electrodes
R Platinum/20% Rhodium measuring/grounding electrodes
T Platinum/20% Rhodium measuring/grounding/empty pipe detection electrodes
9 Other

5 CERTIFICATES

1 Standard, without certificate
9 Other

6 PROTECTION TYPE/VERSION

E NEMA 4X compact version
F NEMA 4X remote version FS
G NEMA 6 submersible remote version FS
L NEMA 4X remote, FL without EPD
M NEMA 6 submersible remote version, FL without EPD
9 Other

7 CABLE ENTRIES

D $^1/_2$" NPT
9 Other

8 CABLE FOR REMOTE VERSION

1 Separate/compact version without cable
4 16.5-ft coil/signal cable with empty pipe detection, FS
5 33-ft coil/signal cable with empty pipe detection, FS
8 Coil/signal cable with empty pipe detection, FS, specify length in feet (max 656 ft (EPD max 33 ft))
B 33-ft coil/signal cable, FL (without empty pipe detection)
C Coil/signal cable, FL (without empty pipe detection) specify length in feet (max 656 ft)
9 Other

9 CALIBRATION

1 3-point standard calibration
2 5-point calibration
3 0.2% calibration
4 Bidirectional std. 3-point calibration
9 Other

10 APPROVALS

D FM approved NI - Class I, Div. 2, Groups ABCD; DIP - Class II, Div. 1, Groups EFG
E FM approved Class I, II & III, Div. I, Groups A-G (compact version only)
F CSA Class I, Div. 2, Groups ABCD
G CSA Class I, Div. 1, Groups ABCD (compact version only, up to 12")
O FM approved Class I, II & III, Div. 1, Groups A-G sensor for use with Class I, Div. 2 transmitter (FL version only)
9 Other

11 DISPLAY OPTION

1 Blind
2 Display with empty pipe detection
9 Other

12 POWER SUPPLY

1 85-260 VAC, 50/60 Hz
2 16-62 VDC
9 Other

13 SIGNAL OUTPUTS

B Pulse and current output with auxiliary input (must order display option 2)
C Pulse and current output with auxiliary input and automatic electrode cleaning (not available as FL remote or with Div. I approval)
9 Other

*Not available with hard rubber liner.
Note: All stock meters will include empty pipe detection electrode but it will not be functional unless the display option is also ordered.

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Ordering Information

Ordering Code: Promag 33F

1	2	3	4	5	6	7	8	9	10	11	12	13

1 LINER MATERIAL

H Hard rubber
W Soft rubber (EPDM)
T Teflon (PTFE)
Polyurethane (consult factory)

2 Size

	in.	mm.	Full Scale GPM min.	Full Scale GPM max.
15*	**0.5**	**15**	**0.85**	**28**
25*	**1**	**25**	**2.2**	**79**
40*	**1.5**	**40**	**6.2**	**198**
50*	**2**	**50**	**9.3**	**313**
80	**3**	**80**	**24**	**797**
1H	**4**	**100**	**38**	**1,248**
1F	**6**	**150**	**84**	**2,800**
2H	**8**	**200**	**150**	**4,975**
2F	**10**	**250**	**234**	**7,780**
3H	**12**	**300**	**335**	**11,200**
3F	14	350	458	15,250
4H	16	400	498	19,915
5H	18	450	757	25,205
6H	24	500	934	31,120
7H	28	700	1,830	60,995
7F	30	750	2,101	70,025
8H	32	800	2,391	79,670
9H	36	900	3,026	100,830
T0	40	1000	3,735	124,485
V0	42	1050	4,118	137,250
T2	48	1200	5,378	179,260

Consult factory for 54" - 78" sizes

3 PROCESS CONNECTION/MATERIAL

M 150-lb. ANSI/A105 steel ($^1/_2$" - 24")
N* 300-lb. ANSI/A105 steel ($^1/_2$" - 6")
P Class D AWWA/A 105 steel (28"-78" only)
R 150-lb. ANSI/316LSS ($^1/_2$"-24" only)
S* 300-lb. ANSI/316LSS ($^1/_2$"-6" only)
9 Other

4 ELECTRODES/MATERIALS

D 316LSS measuring/grounding/empty pipe detection electrodes
H Hastelloy C-22 measuring/grounding/empty pipe detection electrodes
N Tantalum measuring/grounding/empty pipe detection electrodes
R Platinum/20% Rhodium measuring/grounding electrodes
T Platinum/20% Rhodium measuring/grounding/empty pipe detection electrodes
9 Other

5 CERTIFICATES

1 Standard, without certificate
9 Other

6 PROTECTION TYPE/VERSION

E NEMA 4X compact version
F NEMA 4X remote version FS
G NEMA 6 submersible remote version FS
L NEMA 4X remote, FL without EPD
M NEMA 6 submersible remote version, FL without EPD
9 Other

7 CABLE ENTRIES

D $^1/_2$" NPT
9 Other

8 CABLE FOR REMOTE VERSION

1 Separate/compact version without cable
4 16.5-ft coil/signal cable with empty pipe detection, FS
5 33-ft coil/signal cable with empty pipe detection, FS
8 Coil/signal cable with empty pipe detection, FS, specify length in feet (max 656 ft (EPD max 33 ft))
B 33-ft coil/signal cable, FL (without empty pipe detection)
C Coil/signal cable, FL (without empty pipe detection) specify length in feet (max 656 ft)
9 Other

9 CALIBRATION

1 3-point standard calibration
2 5-point calibration
3 0.2% calibration
4 Bidirectional std. 3-point calibration
9 Other

10 APPROVALS

D FM approved NI - Class I, Div. 2, Groups ABCD; DIP - Class II, Div. 1, Groups EFG
E FM approved Class I, II & III, Div. I, Groups A-G (compact version only)
F CSA Class I, Div. 2, Groups ABCD
G CSA Class I, Div. 1, Groups ABCD (compact version only, up to 12")
O FM approved Class I, II & III, Div. 1, Groups A-G sensor for use with Class I, Div. 2 transmitter (FL version only)
9 Other

11 DISPLAY OPTION

1 Blind
2 Display with Touch Control
9 Other

12 POWER SUPPLY

1 85-260 VAC, 50/60 Hz
2 16-62 VDC
9 Other

13 SIGNAL OUTPUTS

A Frequency & current/HART outputs
B Current output and Rackbus RS485
C Frequency output and Rackbus RS485
D Current output and auxiliary input (must order display option 2)
E Frequency output and auxiliary input (must order display option 2)
F Frequency & current/HART outputs with automatic electrode cleaning*
G Current output & Rackbus RS485 with automatic electrode cleaning*
H Frequency output & Rackbus RS485 with automatic electrode cleaning*
K Current output and auxiliary input with automatic electrode cleaning* (must order display option)
L Frequency output and auxiliary input with automatic electrode cleaning* (must order display option)
9 Other

*Not available with hard rubber liner.

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Ordering Information

Ordering Code: Promag 39F

1	2	3	4	5	6	7	8	9	10	11	12	13

1 LINER MATERIAL

H	Hard rubber
W	Soft rubber (EPDM)
T	Teflon (PTFE)
9	Polyurethane

2 Size

	in.	mm.	Full Scale GPM min.	Full Scale GPM max.
15*	0.5	15	0.85	28
25*	1	25	2.4	77
40*	1.5	40	6	199
50*	2	50	9.4	311
80	3	80	24	796
1H	4	100	37.4	1,244
1F	6	150	84.1	2,801
2H	8	200	150	4,979
2F	10	250	234	7,780
3H	12	300	337	11,200
3F	14	350	458	15,250
4H	16	400	498	19,915
4F	18	450	757	24,,205
5H	20	500	934	31,120
6H	24	600	1,345	44,815
7H	28	700	1,830	60,995
7F	30	750	2,101	70,025
8H	32	800	2,391	79,670
9H	36	900	3,026	100,830
T0	40	1000	3,735	124,485
V0	42	1050	4,118	137,250
T2	48	1200	5,378	179,260

Consult factory for 54" - 78" sizes

3 PROCESS CONNECTION/MATERIAL

M	150-lb. ANSI/A105 steel ($^1/_2$" - 24")
N*	300-lb. ANSI/A105 steel ($^1/_2$" - 6")
P	Class D AWWA/A 105 steel (24" - 78")
R	150-lb. ANSI/316LSS ($^1/_2$" - 24")
S*	300-lb. ANSI/316LSS ($^1/_2$" - 6")
9	Other

4 ELECTRODES/MATERIALS

D	316LSS measuring/grounding electrodes
H	Hastelloy C-22 measuring/grounding electrodes
L	Tantalum measuring/grounding electrodes
R	Platinum/20% Rhodium measuring/grounding electrodes
9	Other

5 CERTIFICATES

1	Standard, without certificate
9	Other

6 PROTECTION TYPE/VERSION

H	NEMA 4X sensor remote version, FL
K	NEMA 6 submersible remote version, FL
9	Other

7 SENSOR CABLE ENTRIES

A	PG 13.5 sensor cable glands
9	Other

8 CABLE FOR REMOTE VERSION

1	No cable
B	33-ft coil/signal cable, FL (without empty pipe detection)
C	Coil/signal cable, FL (without empty pipe detection) specify length in feet (max 656 ft)
9	Other

9 CALIBRATION

1	3-point standard 0.5% calibration
2	5-point 0.5% calibration
4	Bidirectional 3-point 0.5% calibration
9	Other

10 APPROVALS

A	General Purpose **
9	Other

11 DISPLAY OPTION

1	Digital display with menu controlled operation via keypad
9	Other

12 POWER SUPPLY

1	85-260 VAC, 50/60 Hz
2	16-62 VDC
9	Other

13 SIGNAL OUTPUTS

1	Frequency/current output, auxiliary input, relay 1, relay 2, HART interface, Rackbus or Rackbus RS 485 interface
9	Other

*Not available with hard rubber liner.
** These options are not FM approved at this time and must be ordered as general purpose.

Wiring Connector Kits

w/flat pin terminals	#50048142
w/solder lug	#50048140

Note: A wiring connector kit is required for every Promag 39 transmitter, even when panel mount kit is not ordered.

Accessories:

Panel Mount accessory (requires one wiring connector kit)	#50075239
NEMA 4X wall enclosure	C/F

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Ordering Information

Ordering Code: Promag 30H

1	2	3	4	5	6	7	8	9	10	11	12	13

1 LINER MATERIAL
P Teflon (PFA)

2 Size

			Full Scale GPM	
	in.	mm.	min.	max.
22	**1**	**25**	**5**	**100**
40	**1.5**	**40**	**10**	**200**
50	**2**	**50**	**20**	**400**
65	**2.5**	**65**	**30**	**600**
80	**3**	**80**	**50**	**1,000**
1H	**4**	**100**	**75**	**1,500**

3 PROCESS CONNECTIONS
A Weld connection for OD tubing
F Tri-Clamp connection
9 Other

4 ELECTRODES/MATERIALS
C 316LSS measuring/empty pipe detection electrodes*
9 Other

5 SEAL MATERIAL
A EPDM gaskets
B Silicone (MVQ) gaskets
9 Other

6 PROTECTION TYPE/VERSION
E NEMA 4X compact version
F NEMA 4X remote version, FS
L NEMA 4X remote version, FL (empty pipe detection not possible)
9 Other

7 CABLE ENTRIES
C 1/2" NPT
9 Other

8 CABLE FOR REMOTE VERSION
1 Separate/compact version without cable
5 33-ft coil/signal cable with empty pipe detection, FS
8 Coil/signal cable with empty pipe detection, FS, specify length in feet (max 656 ft (EPD max 33 ft))
B 33-ft coil/signal cable, FL (without empty pipe detection)
C Coil/signal cable, FL (without empty pipe detection) specify length in feet (max 656 ft)
9 Other

9 CALIBRATION
1 3-point standard 0.5% calibration
3 0.2% calibration (not for FL version)
4 Bidirectional 3-point 0.5% calibration
9 Other

10 APPROVALS
D FM approved NI - Class I, Div. 2, Groups ABCD; DIP - Class II, Div. 1, Groups EFG
F CSA Class I, Div. 2, Groups ABCD
9 Other

11 DISPLAY OPTION
1 Blind
2 Display, with empty pipe detection
9 Other

12 POWER SUPPLY
1 85-260 VAC, 50/60 Hz
2 16-62 VDC
9 Other

13 SIGNAL OUTPUTS
B Pulse and current output with auxiliary input
C Pulse and current output with auxiliary input and automatic electrode cleaning (cannot be ordered as FL remote version)
9 Other

Note: All stock meters will include empty pipe detection electrode but it will not be functional unless the display option is also ordered.

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Ordering Information

Ordering Code: Promag 33H

1	2	3	4	5	6	7	8	9	10	11	12	13

1 LINER MATERIAL
P Teflon (PFA)

2 Size

	in.	mm.	Full Scale GPM min.	Full Scale GPM max.
22	**1**	**25**	**2.4**	**77**
40	**1.5**	**40**	**6**	**199**
50	**2**	**50**	**9.4**	**311**
65	**2.5**	**65**	**15.8**	**525**
80	**3**	**80**	**24**	**796**
1H	**4**	**100**	**37.4**	**1,244**

3 PROCESS CONNECTIONS
A Weld connection for OD tubing
F Tri-Clamp connection
9 Other

4 ELECTRODES/MATERIALS
C 316LSS measuring/empty pipe detection electrodes
9 Other

5 SEAL MATERIAL
A EPDM gaskets
B Silicone (MVQ) gaskets
9 Other

6 PROTECTION TYPE/VERSION
E NEMA 4X compact version
F NEMA 4X remote version, FS
L NEMA 4X remote version, FL (empty pipe detection not possible)
9 Other

7 CABLE ENTRIES
C $^1/_2$" NPT
9 Other

8 CABLE FOR REMOTE VERSION
1 Remote/compact version without cable
5 33-ft coil/signal cable with empty pipe detection, FS
8 Coil/signal cable with empty pipe detection, FS, specify length in feet (max 656 ft (EPD max 33 ft))
B 33-ft coil/signal cable, FL (without empty pipe detection)
C Coil/signal cable, FL (without empty pipe detection) specify length in feet (max 656 ft)
9 Other

9 CALIBRATION
1 3-point standard 0.5% calibration
3 0.2% calibration (not for FL version)
4 Bidirectional 3-point 0.5% calibration
9 Other

10 APPROVALS
D FM approved NI - Class I, Div. 2, Groups ABCD; DIP - Class II, Div. 1, Groups EFG
F CSA Class I, Div. 2, Groups ABCD
9 Other

11 DISPLAY OPTION
1 Blind
2 Display, with Touch Control
9 Other

12 POWER SUPPLY
1 85-260 VAC, 50/60 Hz
2 16-62 VDC
9 Other

13 SIGNAL OUTPUTS
A Frequency and current/HART outputs
B Current output and Rackbus RS 485
C Frequency output and Rackbus RS 485
D Current output and auxiliary input (1)
E Frequency output and auxiliary input (1)
F Frequency and current/HART outputs with automatic electrode cleaning (2)
G Current output and Rackbus RS 485 with automatic electrode cleaning (2)
H Frequency output and Rackbus RS 485 with automatic electrode cleaning (2)
K Current output and auxiliary input with automatic electrode cleaning (1,2)
L Frequency output and auxiliary input with automatic electrode cleaning (1,2)
9 Other

(1) Must order display option "2"
(2) Cannot be ordered as FL remote version

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Ordering Information

Ordering Code: Promag 39H

1	2	3	4	5	6	7	8	9	10	11	12	13

1 LINER MATERIAL
P Teflon (PFA)

2 Size

			Full Scale GPM	
	in.	mm.	min.	max.
22	**1**	**25**	**2.4**	**77**
40	**1.5**	**40**	**6**	**199**
50	**2**	**50**	**9.4**	**311**
65	**2.5**	**65**	**15.8**	**525**
80	**3**	**80**	**24**	**796**
1H	**4**	**100**	**37.4**	**1,244**

3 PROCESS CONNECTIONS
A Weld connection for OD tubing
F Tri-Clamp connection
9 Other

4 ELECTRODES/MATERIALS
C 316LSS measuring electrodes*
9 Other

5 SEAL MATERIAL
A EPDM gaskets
B Silicone (MVQ) gaskets
9 Other

6 PROTECTION TYPE/VERSION
H NEMA 4X sensor remote version, FL
9 Other

7 SENSOR CABLE ENTRIES
A PG13.5 cable gland
9 Other

8 CABLE FOR REMOTE VERSION
1 No cable
B 33-ft coil/signal cable, FL (without empty pipe detection)
C Coil/signal cable, FL (without empty pipe detection) specify length in feet (max 656 ft)
9 Other

9 CALIBRATION
1 3-point standard 0.5% calibration
4 Bidirectional 3-point 0.5% calibration
9 Other

10 APPROVALS
A General Purpose
9 Other

11 DISPLAY OPTION
1 Digital display with menu controlled operation via keypad
9 Other

12 POWER SUPPLY
1 85-260 VAC, 50/60 Hz
2 16-62 VDC
9 Other

13 SIGNAL OUTPUTS
1 Frequency/current output, auxiliary input, relay 1, relay 2, HART interface, Rackbus or Rackbus RS485 interface
9 Other

Wiring Connector Kits

w/flat pin terminals	#50048142
w/solder lug	#50048140

Note: A wiring connector kit is required for every Promag 39 transmitter, even when panel mount kit is not ordered.

Accessories:

Panel Mount accessory (requires one wiring connector kit)	#50075239
NEMA 4X wall enclosure	C/F

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Ordering Information

Promag A Process Connectons —DK1A

1	2	3	4	5	6

1 SENSOR SIZE (IN.)

02	**1/12**
04	**5/32**
08	**5/16**
15	**1/2**
25	**1**

2 PROCESS CONNECTION

	Connection Style	Compatible Sensor sizes	Compatible Gaskets
0	**Internal thread for 1/2" pipe**	**1/12 -1/2"**	**Viton, Kalrez**
1	**Internal thread for 1" pipe**	**1"**	**Viton, Kalrez**
2	**External thread for 1/2" pipe**	**1/12 -1/2"**	**Viton, Kalrez**
3	**External thread for 1" pipe**	**1"**	**Viton, Kalrez**
4	**Bonding sleeves for 1/2" PVC pipe**	**1/12 -1/2"**	**Viton**
5	**Bonding sleeves for 1" PVC pipe**	**1"**	**Viton**
A	**Weld connection for 1/2" pipe**	**1/12 -1/2"**	**Viton, Kalrez**
B	**Weld connection for 1" pipe**	**1"**	**Viton, Kalrez**
G	**Flexible tubing fitting for 19 mm ID hose**	**1/12 -1/2"**	**Viton**
H	**Flexible tubing fitting for 16 mm ID hose**	**1/12 -1/2"**	**Viton**
K	**Flexible tubing fitting for 13 mm ID hose**	**1/12 -1/2"**	**Viton**
V	**Sanitary weld connection for 3/4" tubing**	**1/12 -1/2"**	**Silicone**
6	**Sanitary weld connection for 1" tubing**	**1"**	**Silicone**
9	Other		

3 MATERIAL: PROCESS CONNECTION

1	**316LSS (not for bonding sleeves)**
2	PVC (only for bonding sleeves)
9	Other

4 MATERIAL: BOLTS/NUTS

1	**Standard**
9	Other

5 MATERIAL: GASKETS

A	**Viton O-ring (not for sanitary weld)**
B	**Kalrez O-ring (only for threaded and weld)**
C	**Silicone gasket (only for sanitary weld)**
9	Other

6 OPTION

1	**Standard**
9	Other

Promag D Process Connections — DK1D

1	2	3	4	5	6

1 SENSOR SIZE (IN.)

25	**1**
40	**1.5**
50	**2**
80	**3**
1H	**4**

2 PROCESS CONNECTION

3	**150-lb. ANSI**
4	**300-lb. ANSI**
9	Other

3 MATERIAL: PROCESS CONNECTION

0	**None provided**
9	Other

4 MATERIAL: BOLTS/NUTS

0	**Carbon steel**
9	Other

5 MATERIAL: GASKETS

0	**Without gaskets**
9	Other

6 OPTION

0	**Standard (no options)**
9	Other

Promag H Process Connections — DK1H

1	2	3

Spare parts — one connection set is supplied with original meter

1 SENSOR SIZE (IN.)

A	**1**
C	**1.5**
D	**2**
E	**2.5**
F	**3**
G	**4**

2 PROCESS CONNECTION

2	**No connection**
3	**Weld connection**
8	**Tri-clamp connection**
9	Other

3 SEAL MATERIAL

A	Without seals
1	**EPDM gaskets**
2	**Silicone (MVQ gaskets)**
9	Other

Accessory weld-in tool

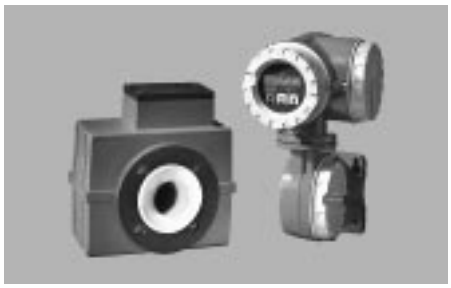
1"	50081273
1 1/2"	50081275
2"	50081276
2 1/2"	50081277
3"	50081278
4"	50081279

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Supplementary Documentation

- ❏ Technical Information Promag 35S TI 035D/06/ae
- ❏ Promag 30 Installation and Operation Manual
- ❏ Promag System Information SI 010D/06/e
- ❏ Commuwin System Information SI 018F/00/e/9.95
- ❏ Magphant Technical Information TI 036D/24/ae
- ❏ Dosimag System Information SI 021F/24/ae

Other Endress + Hauser Magnetic Flow Meters



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Dosimag for Sanitary Filling and Dosing applications

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