Technical
Information
TI 030D/24/ae

Coriolis Mass Flow Measurement System
promass 63

Simultaneous measurement of mass, density and temperature for a broad range of applications for liquids and gases

Flexible system
- The system can be customized to each application
- Wide choice of materials for process connections and measuring tubes, compatible with the fluid
- Simple and cost-effective installation
- Transmitter housing and display can be rotated to fit the flow meter orientation

Safe operation
- Self-draining measuring tubes
- Secondary containment vessel as standard
- High electromagnetic compatibility (EMC)
- Self-monitoring with alarm function
- EEPROM stores data on power failure (no batteries required)
- ISO 9001 manufacturer, quality assured
- FM Approved Class I, Division 1 and 2
- 3A and FDA authorized versions

Accurate measurement
- Measurement accuracy for liquids:
  - Mass flow ± 0.1%
  - Volume flow ± 0.15%
- Measurement accuracy for gases:
  - Mass flow ± 0.5%
- 1000 : 1 operable flow range
- Excellent repeatability

Easy to operate
- Menu-driven operation of all parameters
- Two-line illumintated display, all important variables easily read
- Touch control, programming without opening the housing

Install anywhere
- Compact design
- Insensitive to plant vibration
- Rugged and shock-proof, surfaces resistant to acids and alkalis
- NEMA 4X protection for compact and remote version
- Measurement independent of fluid characteristics

Quality made by Endress+Hauser
ISO 9001

Endress+Hauser
The Power of Know How

Promass Measuring System

Areas of application

The Promass sytem measures the mass and volumetric flowrates of fluids with widely differing characteristics:

- Chocolate, condensed milk, syrup
- Oils, fats
- Acids, alkalis
- Varnishes, paint
- Suspensions, etc.

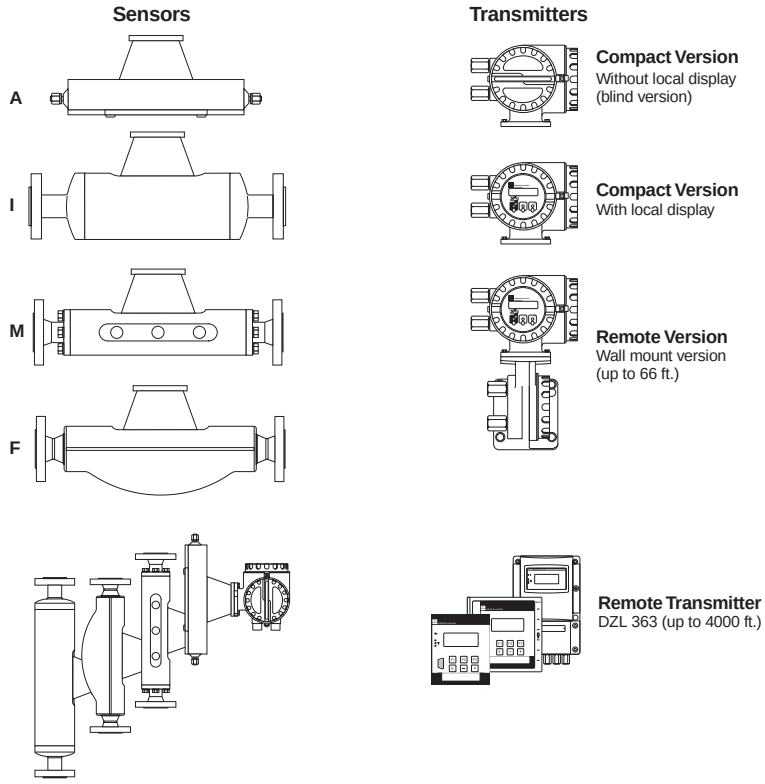
The system also measures the density and temperature of fluids in order to calculate other parameters such as volumetric flow, solids content or density units (standard density °Brix, °Baumé, °API).

The Promass 63, is used wherever mass flow measurement is of critical importance:

- Mixing and batching of raw materials
- Process control
- Measurement of quickly changing densities
- Control and monitoring of product quality

The advantages of this measurement process are demonstrated by its successful use in food processing, the pharmaceutical industry, the chemical and petrochemical industries, waste disposal, energy production, gas applications, etc.

Promass 63



A	1/24” to 1/8”	For very small flow quantities, single tube system in SS or Alloy C-22
I	3/8” to 2”	Single straight tube system (titanium), completely welded version
M	3/8” to 3” 3/8” to 1”	Two straight measuring tubes (titanium), containment vessel up to 1450 psig High pressure version, system pressure up to 5000 psig
F	3/8” to 4”	Two slightly curved measuring tubes in SS or Alloy C-22, completely welded version

The modular Promass 63 measuring system.

Division 1 hazardous information is available from your Endress+Hauser Sales Representative.

Refer to Technical Specifications, Pages 18 - 22

Measuring system

The measuring system consists of:

- Promass 63 transmitter
- Promass A, I, M or F sensor
- Optional DZL 363 remote transmitter (refer to TI 041D/24/ae)

The Promass measuring system is mechanically and electronically designed for maximum flexibility with the transmitters and sensors being combined in any variation.

The wide range of materials and process ocnnections (VCO, NPT, Swagelok, ANSI flanges and Tri-Clamp®) ensure that the measuring system can be adapted to both plant and process conditions.

The transmitter housing and display can be rotated for ease of reading and operation in any orientation. The DZL 363 remote transmitter can be mounted up to 4000 feet from the sensor in a control room or field mounted enclosure.

Sensor Function

Measuring principle

The measuring principle is based on the controlled generation of Coriolis forces. These forces are always present when both translational (straight line) and rotational (revolving) movement occur simultaneously.

$$\vec{F}_C = 2 \times Dm\ (\vec{w} \times \vec{v})$$

$\vec{F}_c$ = Coriolis force
Dm = mass of moving body
$\vec{w}$ = angular velocity
$\vec{v}$ = radial velocity in a rotating or oscillating system

The amplitude of the Coriolis force depends on the moving mass Dm, its velocity v in the system and therefore its mass flow.

The Promass uses an oscillation instead of a constant angular velocity $\vec{w}$. One or two parallel measuring tubes, with fluid flowing through them, are oscillated in anitphase, much like a tuning fork.

The Coriolis forces produced at the measuring tube(s) cause a phase shift in the tube oscillation (see Figure on left):

- When there is zero flow, i.e., with the fluid standing still, both phases are equal (1 : no phase difference)
- When there is mass flow, the tube oscillation is decelerated at the inlet (2) and accelerated at the outlet (3).

As the mass flowrate increases, the phase difference also increases (A-B). The oscillations of the measuring tube(s) are determined using electrodynamic sensors at the inlet and outlet. The measurement principle operates independent of temperature, pressure, viscosity, conductivity or flow profile.

Balanced Measuring System

Two-tube systems (Promass M, F)

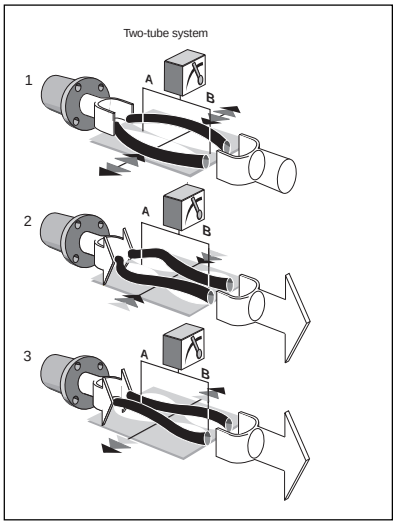
The system balance is ensured by the two measuring tubes vibrating in antiphase.

Single tube systems (Promass A, I)

For single tube systems, other design solutions are necessary for system balance compared to the two-tube systems.

Promass A:
For Promass A, an internal reference mass is used for this purpose.

Promass I:
For Promass I, the system balance necessary for flawless measurement is generated by exciting an eccentrically located, counter-oscillating pendulum mass.
This TMB™ (Torsion Mode Balanced) system is patented and guarantees accurate measurement, also with changing process and ambient conditions.
The installation of Promass I for this reason is just as easy as with two-tube systems! Special fastening measures before and after the meter are therefore not necessary.



Density measurement

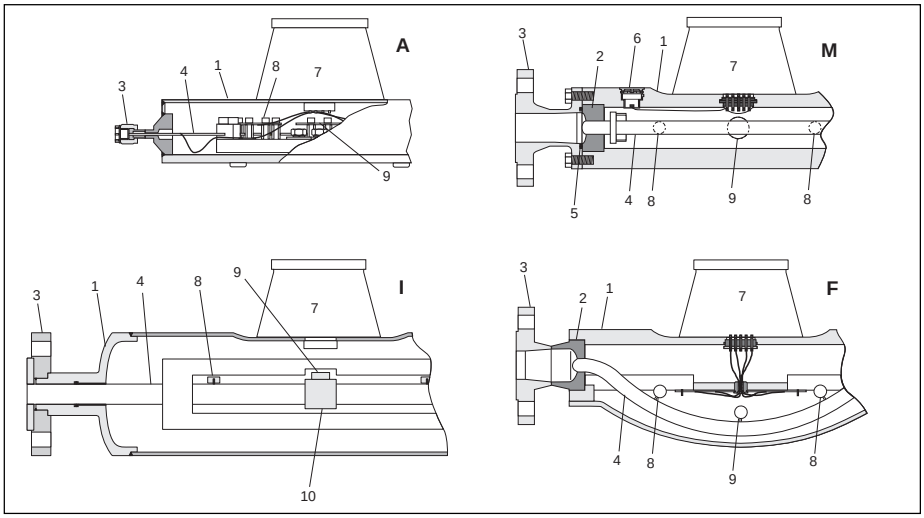
The measuring tube(s) are continuously excited at their resonant frequency. As the mass and therefore the density of the oscillating system changes (measuring tubes and fluid), the vibrating frequency is readjusted. The resonant frequency is thus a function of the density of the fluid and enables the processor to calculate density. This density information can be provided as an output signal.

Temperature measurement

The temperature of the measuring tubes is determined in order to calculate the compensation factor due to temperature effects. This signal corresponds to the process temperature and is also available as an output.

Sectional view of the
Promass A, I, M and F sensors

1 Housing / containment vessel
2 Manifold
3 Process connection
4 Measuring tube(s)
A, 1 curved tube
I, 1 straight tube
M, 2 straight tubes
F, 2 curved tubes
5 Gasket
6 Plug
7 Cable feed through
8 Electrodynamic sensors
9 Excitation system
10 Pendulum mass TMB™ system (Promass I)



Transmitter Function

Function of the Promass 63

The Promass transmitter converts the measured values coming from the sensor into standardized output signals. The following outputs are avialable for these signals:

- Current output (with HART® protocol)
- Pulse/frequency output or 2nd current output
- Relay 1 (e.g., error output)
- Relay 2 (e.g., limit value)
- Auxiliary input, can be configured

Display

Promass 63 has a two-line, illuminated LCD display so that one or two of the following measured values can be read simultaneously:

- Actual flowrate of mass, volume, standardized volume as well as % content of target/carrier liquid with multiphase media
- Density (e.g., g/cc, SG, °Brix, °API)
- Temperature in °F or °C
- Totalized flow

The following are also displayed:

- Alarm messages (process faults)
- Error messages (instrument faults)
- Status messages
- Programming messages

Communications

The Promass 63 can communicate with higher level control systems using an application-specific interface:

- Direct communication with personal computers and the Endress+Hauser Rackbus environment (Modbus, Profibus, Fipbus) is possible via a Rackbus RS 485 interface
- Current output is available for the HART® protocol using SMART technology
- Promass 63 is also available as PROFIBUS PA or DP for direct connection to process control systems, segment couplers or Commutec II.
- Remote operation using these interfaces can also be carried out with the Endress+Hauser Commuwin II program. Detailed information is available from your local sales representative.

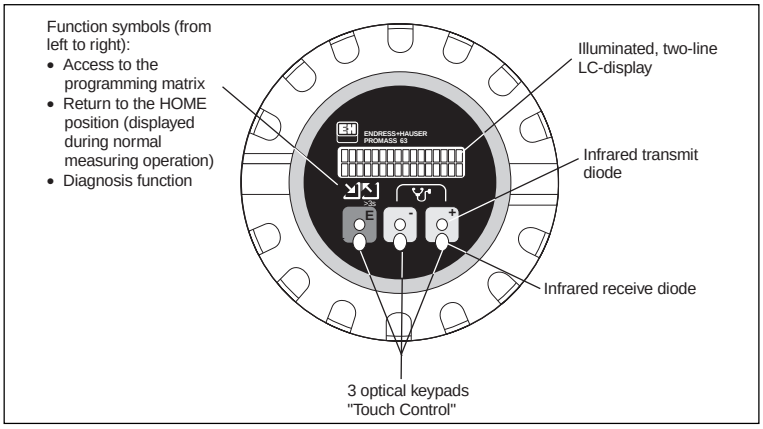
Operation

With the Endress+Hauser menu-driven operation, configuration is very simple. With only three keys, parameters and functions can be specifically chosen and modified, including:

- Display of process variables
- Functions of current output 1 or 2
- Functions of two totalizers
- Functions of the pulse/frequency output
- Relay functions
- Batching functions with integrated counter
- Communications parameters
- Process parameters such as low flow cutoff, empty pipe detection, etc.

Operational safety

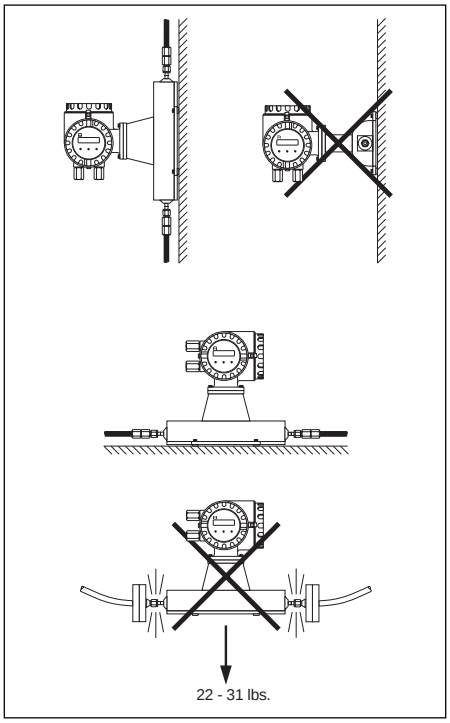
- The Promass measuring system fulfills the safety requirements according to EN 61010
- The Promass measuring system fulfills all general requirements for electro-magnetic compatibility (EMC) IEC 801/VDE 0843 and NAMUR recommendations
- Extensive self-monitoring of the measuring system gives complete operational safety
- Any errors occuring are separately indicated via the configurable relay 1 output
- On power failure, all measuring system data are safely stored in the EEPROM (no batteries required)
- All outputs are electrically isolated from the power circuit, the measuring loop and from each other



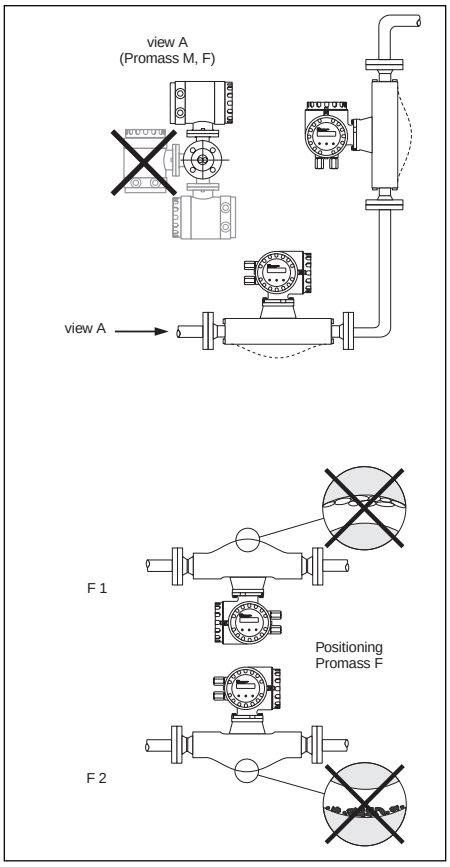
Mounting Guidelines

The Promass sensor does not require special fittings or brackets for mounting. External forces are absorbed by the design of the unit, such as the secondary containment vessel.

The high frequency oscillation of the measuring tubes ensures that correct operation of the measuring system is unaffected by plant vibration.



Orientation, Promass A



Orientation, Promass I, M, F

When mounting, no special precautions need to be taken for turbulence generating devices such as valves, bends, pipe tees, etc., as long as no cavitation occurs.

Orientation (Promass A)

Vertical

Vertical mounting is recommended with the process material flowing upwards. This allows entrained solids to sink down and gases to rise away from the measuring tube. This also allows the measuring tube to be completely drained during no flow which protects the tubes from solids build-up.

Horizontal

When correctly installed, the transmiiter housing is either above or below the piping. This assures that no gas bubbles may collect or solids be deposited in the curved measuring tubes.

Wall and post mounting

The sensor may not be suspended in the piping, that is, without support to avoid excessive stress on the material around the process connection. The sensor housing base plate allows table, wall, or post mounting. The post mounting option requires a special mounting set available from Endress+Hauser.

Orientation (Promass I, M, F)

Vertical

Vertical mounting is recommended with the process material flowing upwards. This allows entrained solids to sink down and gases to rise away from the measuring tube. This also allows the measuring tube to be completely drained during no flow which protects the tubes from solids build-up.

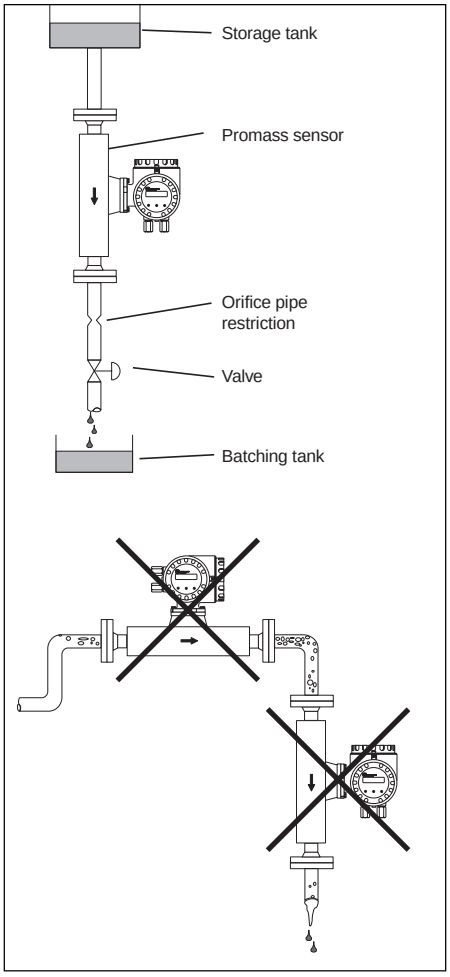
Horizontal

Promass I sensor (single tube) can be mounted in any orientation horizontally.

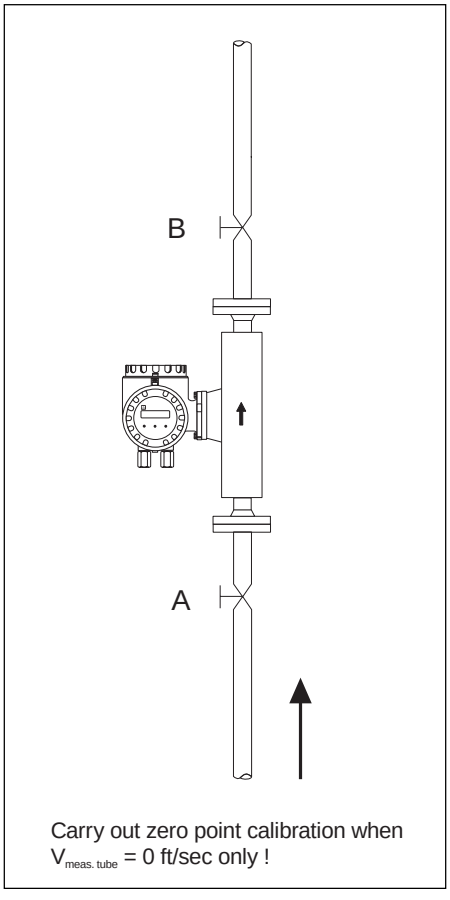
For Promass M and F, the measuring tubes must lie side by side. When correctly installed, the transmitter housing is either above or below the piping (see view A). The Promass F measuring tubes are curved slightly and must be installed per F1 or F2.

- F1 is not suitable for fluids containing gases.
- F2 is not suitable for fluids containing solids.

Mounting Guidelines



Mounting location for vertical piping



Carry out zero point calibration when $V_{meas.\ tube}$ = 0 ft/sec only !

Zero point calibration and shut-off valves

Mounting location

Air or entrained gases in the measuring pipe may cause errors in measurement. Therefore, the following installations are to be avoided:

- Do not install at the highest point of the process piping
- Do not install directly upstream before an unrestricted pipe outlet in a vertical pipe line

Correct installation is still possible using the recommendations shown in the adjacent figure. Restrictions in the piping or an orifice with a smaller cross section than the measuring instrument can prevent the sensor from running empty during measurement.

Nominal diameter (in.)	Æ Orifice / restriction (in.)
1/24	0.03
1/12	0.06
1/8	0.12
3/8	0.24
1/2	0.40
1/2 *	0.60
1	0.55
1 *	0.94
1-1/2	0.87
1-1/2 *	1.38
2	1.10
3	1.97
4	2.56

* Full bore 1/2", 1" and 1-1/2" Promass I versions

Zero point calibration

Once the sensor has been installed, a zero point calibration should be carried out under process conditions in order to ensure that measurement is accurate. The static zero point calibration is fulfilled using completely filled measuring tubes and at "no flow" with shut-off valves both upstream and downstream of the sensor (or use existing shut-off and slide valves, etc.). An example of this is shown in the adjacent figure.

During normal measurement:

Open valves A and B

Zero point calibration **WITH** pumping pressure:

Open valve A
Close valve B

Zero point calibration **WITHOUT** pumping pressure:

Close valve A
Open valve B

Installation Guidelines

System pressure

It is important to avoid cavitation as this can affect tube oscillation. No special measures need to be taken for products which have properties similar to those of water under normal conditions.

With volatile liquids (hydrocarbons, solvents, liquified gases) or other liquids in suction lines, the vapor pressure of the liquid must not drop below a point where the liquid begins to boil. It is also important not to release gases which are found naturally in many liquids. This can be prevented by ensuring that the system pressure is high enough. Ideally, the sensor should be mounted as follows:

- On the pressure side of pumps (avoids low pressure)
- At the lowest point of a vertical pipeline

Corrosion resistance

With corrosive liquids, the chemical resistance of all wetted parts such as measuring tubes, gaskets and process connections must be thoroughly checked. This also applies to the liquids used for cleaning the Promass sensor.

Tracing, thermal insulation

With certain media (chocolate, liquified gases, etc.) heat transfer at the sensor must be avoided. A wide range of materials can be used for thermal insulation.

Heating can be provided either electrically (heat tracing) or supplied by copper tubes with heated water or steam. Heating jackets for heat tracing are available for all sensors.

Caution!

Ensure that the meter electronics are not overheated. The connector between the sensor and the transmitter housing as well as the connection housing of the remote version must be protected from high temperatures.

Fluid temperature / orientation

To ensure that the permitted ambient temperature range for the transmitter is not exceeded (-15°F to + 140°F) positioning is recommended as follows:

High fluid temperature

- Vertical piping, position A
- Horizontal piping, position C

Low fluid temperature

- Vertical piping, position A
- Horizontal piping, position B

Full scale value / meter size

The most suitable meter size is selected by taking into account the measuring range required and the permitted pressure drop.

	Full Scale Range (lb/min)	
Nominal Size (in.)	Liquid	Gas
1/24	0 to 0.73	0 to 0.36
1/12	0 to 3.66	0 to 1.83
1/8	0 to 16.5	0 to 4.58
3/8	0 to 73.3	0 to 7.33
1/2	0 to 240	0 to 23.8
1/2 *	0 to 660	0 to 66.6
1	0 to 660	0 to 66.6
1 *	0 to 1653	0 to 166
1-1/2	0 to 1653	0 to 166
1-1/2 *	0 to 2573	0 to 256
2	0 to 2573	0 to 256
3	0 to 6600	0 to 660
4	0 to 11,667	0 to 1160

* Full bore 1/2", 1" and 1-1/2" Promass I versions.

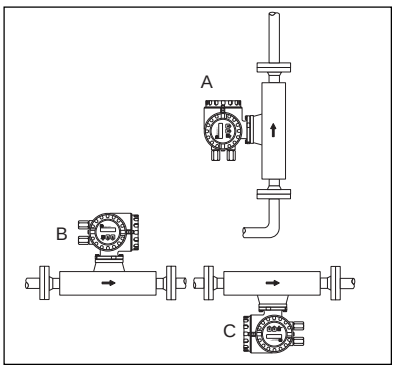
- The minimum recommended full scale value is about 1/20 of the indicated maximum values above
- With most applications, the optimum is considered to be between 20 to 50% of the maximum full scale value
- With abrasive fluids, e.g. fluids containing solids, a lower full scale value should be used (flow velocity < 3 ft/s)
- For gas applications, the flow velocity in the tubes should not exceed half of the sonic speed (Mach 0.5 in that gas)

"Applicator" design software

All important instrument data is contained in the Endress+Hauser software program in order to optimize the design of the measuring system. The software is used for the following calculations:

- Nominal diameter of the sensor with fluid characteristics such as viscosity, density, etc.
- Pressure loss downstream of the measuring point
- Converting mass flow to volumetric flow, etc.
- Simultaneous display of various meter sizes.
- Determining measuring ranges

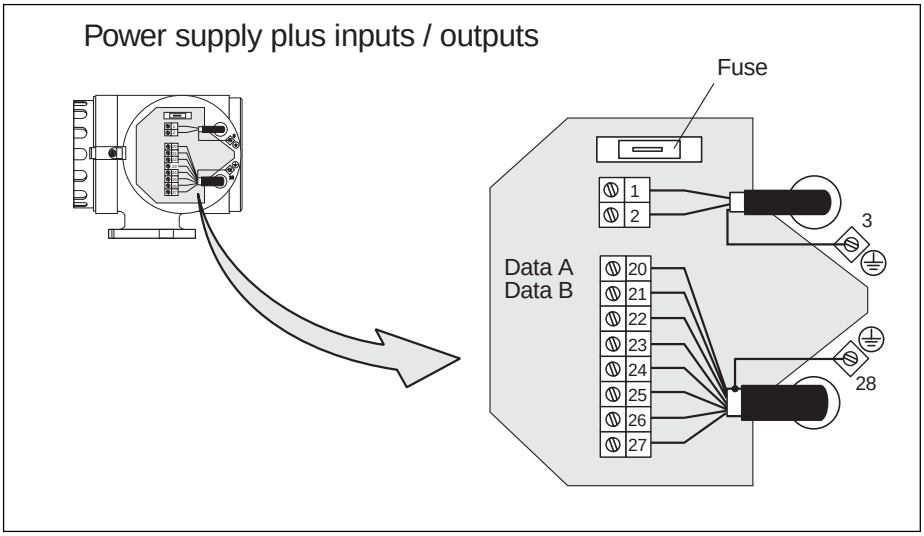
The Applicator runs on any IBM compatible PC with Windows.



Electrical Connections

Note!
Depending on the ordering information, the transmitter electronics contain different boards:
- HART®
- RS 485
- 2 Current outputs
- PROFIBUS PA
- Ex i
- DZL (for connection to Procom DZL 363 transmitter)

Technical information on instruments with Explosion Proof approvals are given in separate documentation available from Endress+Hauser



	Current, Pulse / Frequency and HART Interface		Serial Interface RS 485 or Auxiliary Input		2 Current Outputs	
3	Ground connection (ground wire)		Ground connection (ground wire)		Ground connection (ground wire)	
1	L1 (AC)	L+ (DC)	L1 (AC)	L+ (DC)	L1 (AC)	L+ (DC)
2	N (AC)	L- (DC)	N (AC)	L- (DC)	N (AC)	L- (DC)
20 (+) 21 (-)	Pulse/frequency output	Active/passive, f=2Hz to 10 k Hz (max. 16,383Hz) Active: 24 VDC, 25 mA (250 mA/20 ms) Passive: 30 VDC, 25 mA (250 mA/20 ms)	Input / output	RS 485 or auxiliary input A +/- 3 to 30 VDC B -/+ R_i = 1.8 kW	Current output 2	Active, 0/4 to 20 mA R_L < 700 W
22 (+) 23 (-)	Relay 1	Max. 60 VAC/0.5 A AC Max. 30 VDC/0.1A DC can be configured, e.g. failure	Relay 1	Max. 60 VAC/0.5 A AC Max. 30 VDC/0.1A DC can be configured, e.g. failure	Relay 1	Max. 60 VAC/0.5 A AC Max. 30 VDC/0.1A DC can be configured, e.g. failure
24 (+) 25 (-)	Relay 2	Max. 60 VAC/0.5 A AC Max. 30 VDC/0.1A DC can be configured, e.g. limit value	Relay 2	Max. 60 VAC/0.5 A AC Max. 30 VDC/0.1A DC can be configured, e.g. limit value	Relay 2	Max. 60 VAC/0.5 A AC Max. 30 VDC/0.1A DC can be configured, e.g. limit value
26 (+) 27 (-)	Current output 1	active, 0/4 to 20 mA R_L < 700 W With HART protocol: 4-20 mA, R_L ³ 250 W	Current output or Pulse/Frequency output	Active, 0/4 to 20 mA R_L < 700 W Active/passive, f=2Hz to 10kHz Active: 24 VDC, 25 mA (250 mA/20ms) Passive: 30 VDC, 25 mA (250 mA/20 ms)	Current output 1	Active, 0/4 to 20 mA R_L < 700 W With HART protocol: 4 to 20 mA, R_L ³ 250 W
28	Ground connection (signal cable shield)		Ground connection (signal cable shield)		Ground connection (signal cable shield)	

	Intrinsically safe outputs		PROFIBUS PA		PROFIBUS DP	
3	Ground connection (ground wire)		Ground connection (ground wire)		Ground connection (ground wire)	
1	L1 (AC)	L+ (DC)	L1 (AC)	L+ (DC)	L1 (AC)	L+ (DC)
2	N (AC)	L- (DC)	N (AC)	L- (DC)	N (AC)	L- (DC)
20 (+) 21 (-)		Not Used	Not Used		Not Used	
22 (+) 23 (-)	Current output	Active, 0/4 to 20 mA R_L < 350 W With HART protocol: 4-20 mA, R_L ³ 250 W	Current output	Active, 0/4 to 20 mA R_L < 350 W	Not used	
24 (+) 25 (-)	Not Used		Not Used		Not Used	
26 (+) 27 (-)	Pulse/frequency output	Passive, f=2 Hz to 10 kHz can be used as a NAMUR contact according to DIN 19234	Bus	PROFIBUS PA (EN 50170, Volume 2, PROFIBUS; IEC 1158-2)	Data B Data A	
28	Ground connection (signal cable shield)		Ground connection (signal cable shield)		Ground connection (signal cable shield)	

NOTE: Refer to Page 9 for DZL 363 Procom connection

Electrical Connections (Con't.)

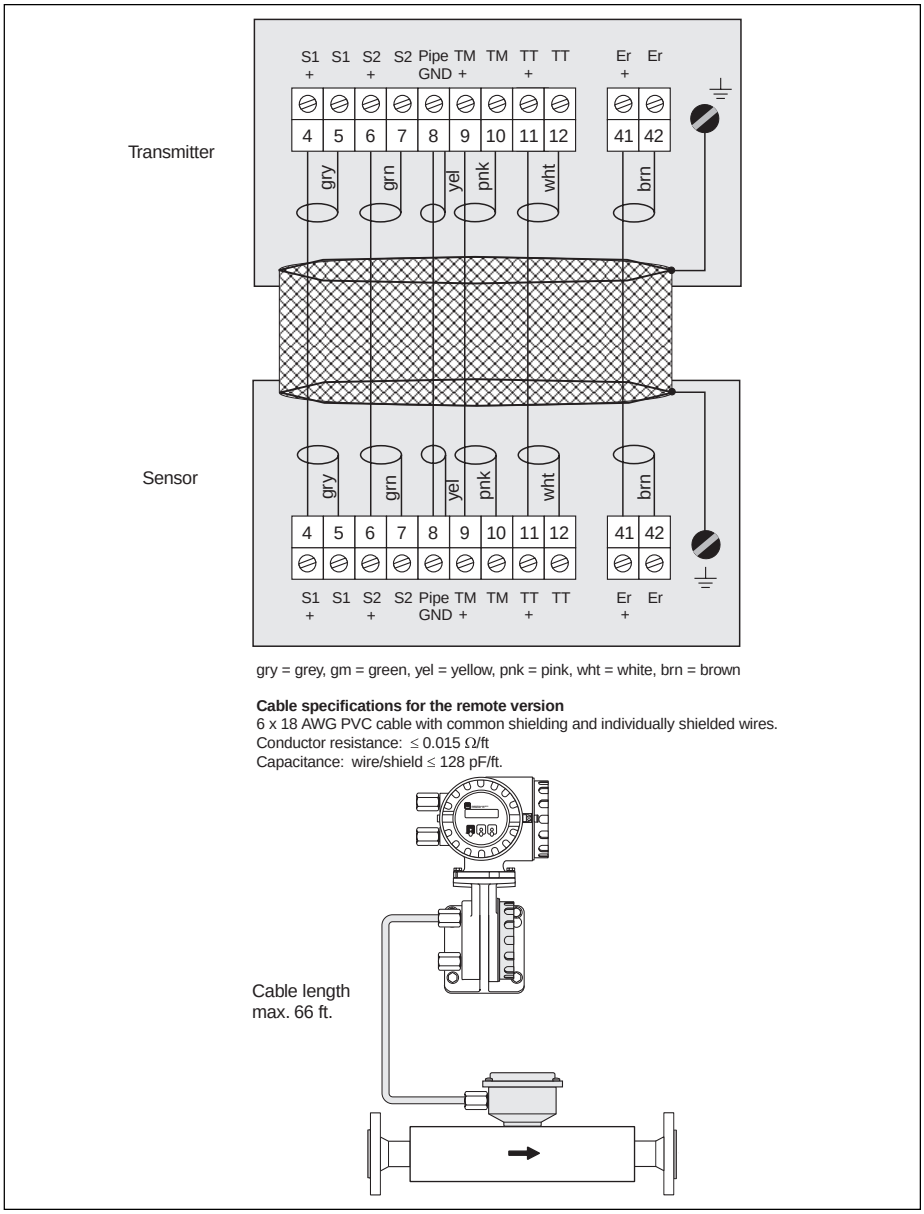
	DZL 363 Procom	
3	Ground connection (ground wire)	
	DoS version *	***Dx version *****
1	1 connected with 24	L1 for AC
2	2 connected with 25	N
		L+ for DC power
		L- supply
	DoS version	***Dx version***
20 (+)	DoS +	Not used
21 (-)	DoS -	
	DoS version	***Dx version***
22 (+)	Not used	Dx + (A data)
23 (-)		Dx - (B data)
	DoS version	***Dx version***
24 (+)	24 connected with 1	Not used
25 (-)	25 connected with 2	
26 (+)	Not used	
27 (-)		
28	Ground connection (signal cable shield)	

* DoS version: The Promass sensor is powered by the Procom DZL 363 transmitter.

** Dx version: The Promass sensor and Procom DZL 363 transmitter are powered with separate power supplies.

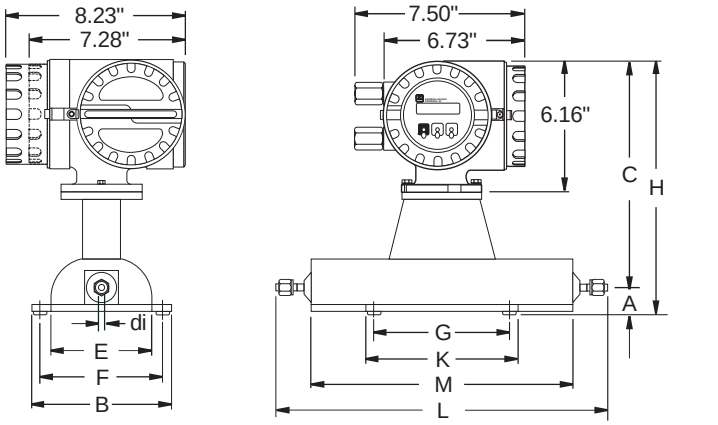
The wiring terminal diagram for the DZL 363 is described in TI 061D/24/ae.

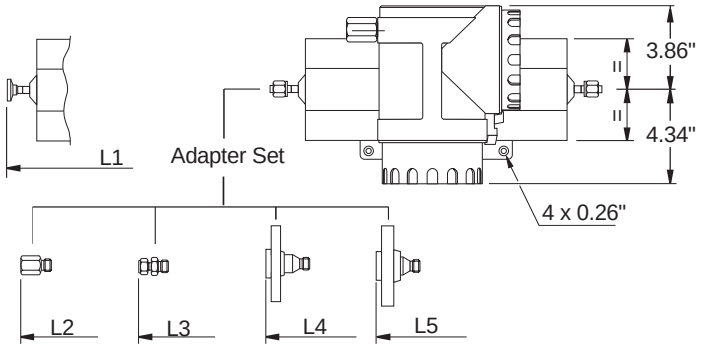
Electrical Connections Remote Version



Dimensions Promass 63 A Sensor

Compact Version





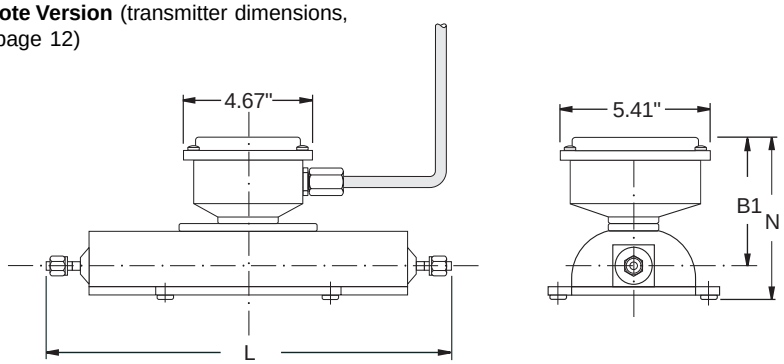
Flange connection with "lap joint flanges"

Process connection	L 4-VCO-4 fittings	L1 1/2" Tri-clamp	L2 1/4" NPT-F	L3 SWAGELOK		L4 1/2" Flange (ANSI)	L5 1/2" Flange (ANSI)
				Meter size	Swagelok fitting	CL 150	CL 300
				1/24", 1/12"	1/8", 1/4"		
				1/8"	1/4"		
1/24"	11.4"	11.7"	14.2"	14.2"		15.5"	15.5"
1/12"	14.6"	14.9"	17.4"	17.4"		18.7"	18.7"
1/8"	19.6"	19.8"	22.4"	22.5"		23.6"	23.6"

Diameter ANSI	di	A	B	C	E	F	G	H	K	M	Weight lbs.
1/24"	0.043"	1.26"	6.50"	10.6"	4.72"	5.70"	6.30"	11.9"	7.09"	8.98"	22
1/12"	0.070"	1.26"	6.50"	10.6"	4.72"	5.70"	6.30"	11.9"	7.09"	12.2"	24
1/8"	0.138"	1.26"	7.88"	11.0"	5.90"	6.89"	8.66"	12.3"	9.45"	17.1"	33

The dimensions for standard and high pressure versions are identical except as noted below.
di dimensions for high high pressure:
1/12" = 0.055"
1/8" = 0.118"

Remote Version (transmitter dimensions, see page 12)



Diameter ANSI	B1	N	L
1/24"	4.80"	6.06"	Dimensions dependent on process connections (see above)
1/12"	4.80"	6.06"	
1/8"	5.20"	6.46"	

NOTE !
Dimensions of Division 1 hazardous area approved instruments are given in separate documentation available from Endress+Hauser on request.

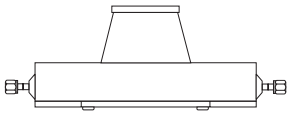
Promass 63 A Process Connections Pressure and Temperature Load Diagrams

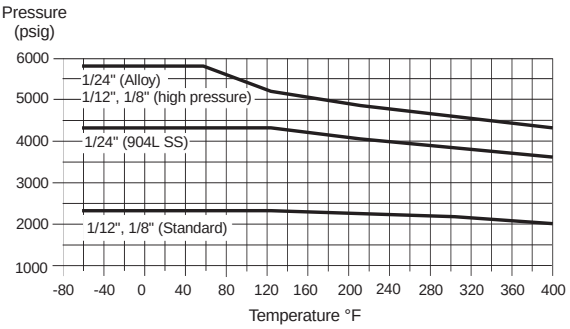
Wetted parts material

Measuring Tube:	904L SS, Alloy C-22 (N06022)
4-VCO-4 Fittings:	904L SS, Alloy C-22 (N06022)
1/2" Tri-Clamp®	904L SS
Adapter Sets:	
- 1/8" or 1/4" SWAGELOK	316 SS
- 1/4" NPT-F	904L SS, Alloy C-22 (N06022)
- Flange, ANSI	904L SS, Alloy C-22 (N06022) Lap joint flanges (not wetted) 316L SS
- Gaskets	O-ring in Viton (+5° to + 400°F), EPDM (- 40° to + 320°F); Silicone (- 60° to + 400°F), Kalrez (- 22° to + 400°F)

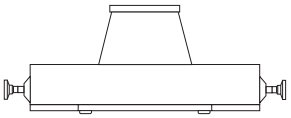
Without Adapter Set

4-VCO-4 fittings





1/2" Tri-Clamp

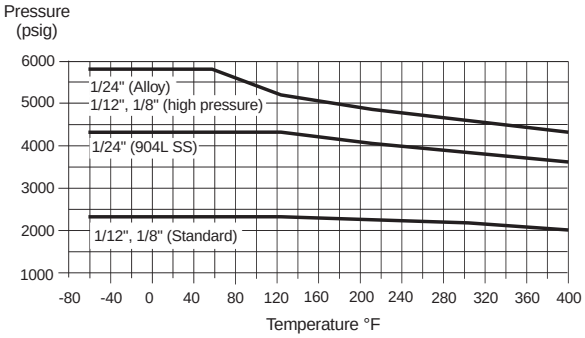


Tri-Clamp:
The material load limit is exclusively determined by the material properties of the Tri-Clamp used. This clamp is not included in the shipment.

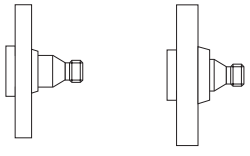
With Adapter Set

1/4" NPT-F

1/8" or 1/4" SWAGELOK

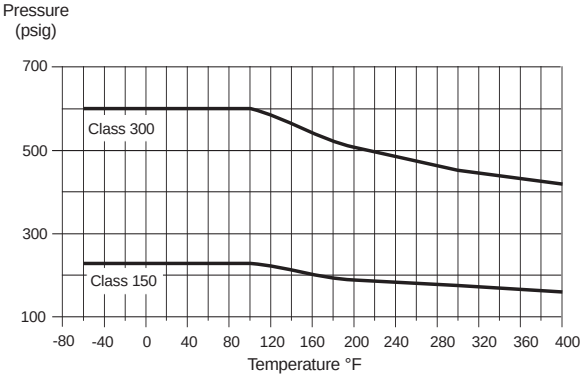


Flanges, ANSI *



Class 150 Class 300

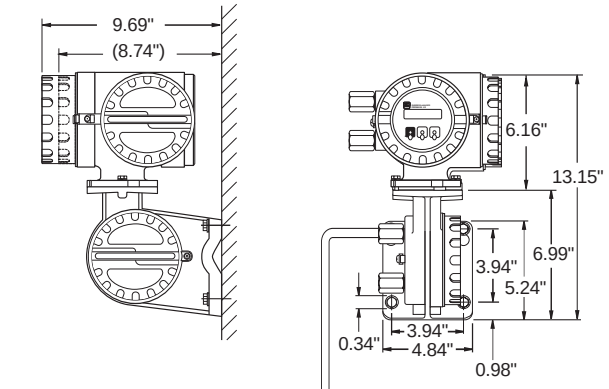
* with 1/2" flanges as standard



Material load curves for Promass A process connections

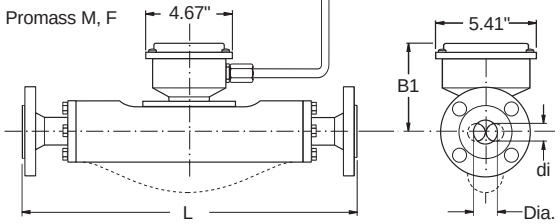
Dimesions Promass 63
I, M and F Sensors

Remote Version

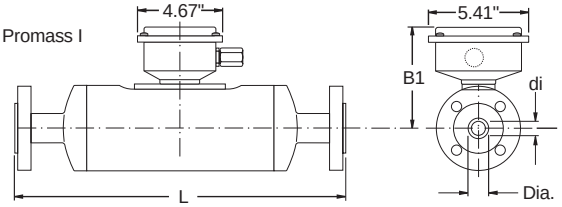


max. 66 ft.

Promass M, F

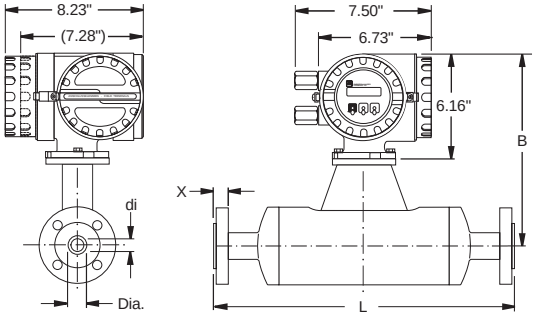


Promass I

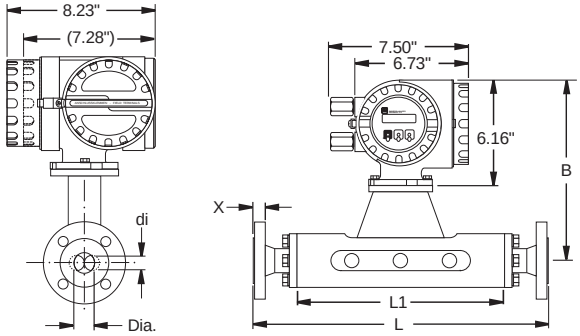


Compact Version

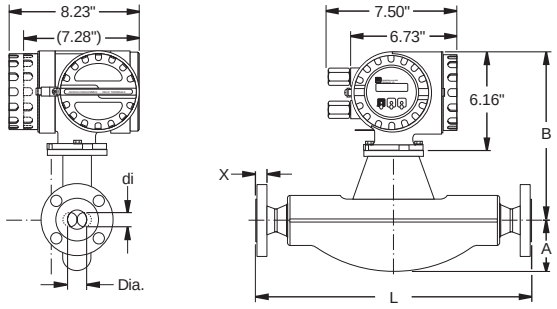
Promass I
3/8" to 2"



Promass M
3/8" to 3"



Promass F
3/8" to 3"



Dia.	L X	L1 [1]	A	B			B1			di			Weight (lbs.)		
				I	M	F	I	M	F	I	M	F	I	M	F
3/8"	Dimensions are dependent on the process connections (refer to the following pages)	10.1"	2.95"	11.3"	10.3"	10.3"	5.45"	4.45"	4.49"	0.34"	0.22"	0.21"	26	24	24
1/2"		11.3"	2.95"	11.3"	10.4"	10.3"	5.45"	4.51"	4.49"	0.45"	0.34"	0.37"	33	26	26
1/2" *		-	-	11.3"	-	-	5.45"	-	-	0.67"	-	-	44	-	-
1"		12.2"	2.95"	11.3"	10.6"	10.3"	5.45"	4.69"	4.49"	0.67"	0.49"	0.47"	44	33	31
1" *		-	-	11.9"	-	-	5.98"	-	-	1.00"	-	-	90	-	-
1-1/2"		16.1"	4.13"	11.9"	11.0"	10.5"	5.98"	5.12"	4.65"	1.00"	0.67"	0.69"	90	53	42
1-1/2" *		-	-	12.5"	-	-	6.57"	-	-	1.40"	-	-	148	-	-
2"		21.4"	5.55"	12.5"	11.4"	11.0"	6.57"	5.51"	5.12"	1.40"	1.00"	1.02"	148	90	66
3"		25.4"	7.87"	-	12.0"	11.9"	-	6.14"	5.96"	-	1.51"	1.59"	-	148	121
4" **		-	-	-	12.0"	11.9"	-	6.14"	5.96"	-	1.51"	1.59"	-	152	134
4"		-	-	-	-	12.6"	-	-	6.42"	-	-	2.02"	-	-	212
6" ***		-	-	-	-	12.6"	-	-	6.42"	-	-	2.02"	-	-	238

* 1/2", 1", and 1-1/2" Full Bore Promass I versions
** 4": nominal diameter 3" with 4" flanges
*** 6": nominal diameter 4", with 6" flanges

[1] Promass M, high pressure version (3/8", 1/2", 1") same dimensions as the standard version.
3/8" size meter has 1/2" flanges as standard.
All weights stated are the compact version.

Promass I, M, F ANSI Process Connections

Promass I

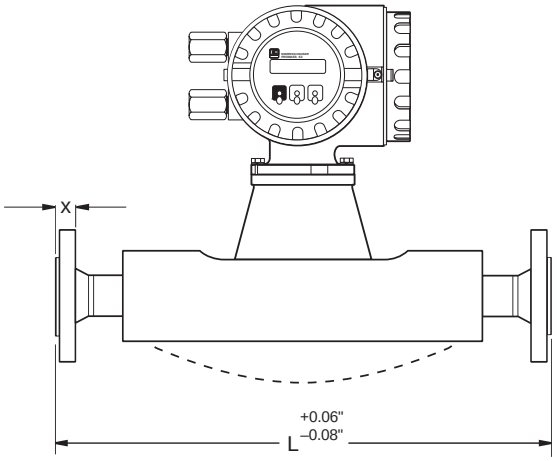
Wetted Parts: Titanium Grade 9
No internal gaskets with welded process connections

Promass M

Flange Material: 316L SS, Titanium Grade 2
Gasket Material: O-ring in Viton (+ 5° to + 300°F), EPDM (- 40° to + 300°F), Silicone (- 60° to + 300°F), Kalrez (- 22° to + 300°F), FEP encapsulated Viton (- 60° to + 300°F)

Promass F

Wetted Parts: 316L SS, Alloy C-22 (N06022)
No internal gaskets with welded process connections



Promass I				
Dia. ANSI	Class 150 / Class 300		Class 600	
	L	X	L	X
3/8"	15.9"	0.79"	15.9"	0.79"
1/2"	17.3"	0.79"	17.3"	0.79"
1/2" *	22.6"	0.79"	22.8"	0.91"
1"	22.8"	0.91"	22.8"	0.91"
1" *	27.6"	0.87"	27.8"	0.98"
1-1/2"	27.9"	1.02"	27.9"	1.02"
1-1/2" *	32.3"	1.02"	32.5"	1.14"
2"	32.6"	1.10"	32.6"	1.10"

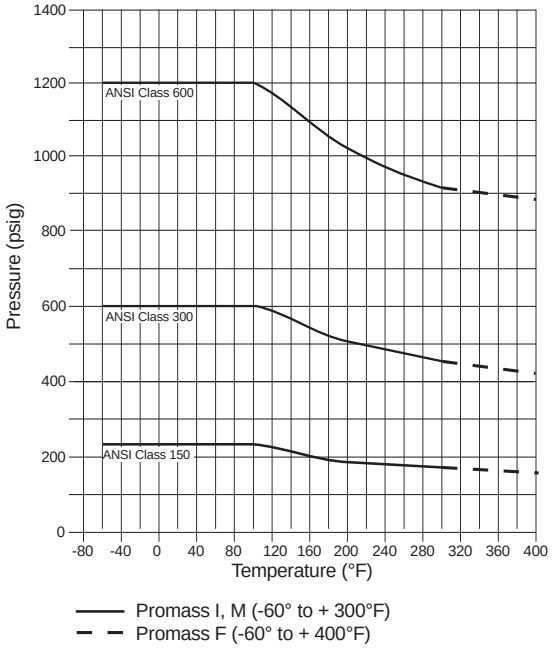
* 1/2", 1", and 1-1/2" Full Bore Promass I versions

Promass M / F						
Dia. ANSI	Class 150		Class 300		Class 600	
	L	X	L	X	L	X
3/8"	14.6"	0.44"	14.6"	0.56"	15.7"	0.81"
1/2"	15.9"	0.44"	15.9"	0.56"	16.5"	0.81"
1"	17.3"	0.56"	17.3"	0.69"	19.3"	0.94"
1-1/2"	21.7"	0.69"	21.7"	0.81"	23.6"	1.13"
2"	28.1"	0.75"	28.1"	0.88"	29.2"	1.25"
3"	33.1"	0.94"	33.1"	1.12"	35.4"	1.50"
4" *	34.4"	0.94"	35.2"	1.25"	-	-
4"	44.4"	0.94"	44.4"	1.25"	45.6"	1.91"
6" **	46.0"	1.00"	-	-	-	-

* 4": nominal diameter 3" with 4" flanges
** 6": nominal diameter 4" with 6" flanges

3/8" size meter has 1/2" flanges as standard.

Pressure Limitations due to Fluid Temperature (316L SS, Alloy C-22)



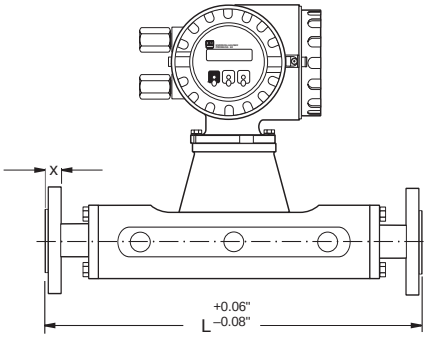
Maximum process pressure for titanium flanges is temperature independent:

150 lb ANSI: 230 psig
300 lb ANSI: 600 psig
600 lb ANSI: 1200 psig

Promass M, PVDF Process Connections

Wetted Parts Materials (ANSI B16.5)

Flange Material: PVDF (Kynar®)
Gasket Material: O-ring in Viton (+ 5° to + 300°F), EPDM (- 40° to + 300°F)
Silicone (- 60° to + 300°F), Kalrez (- 22° to + 300°F)

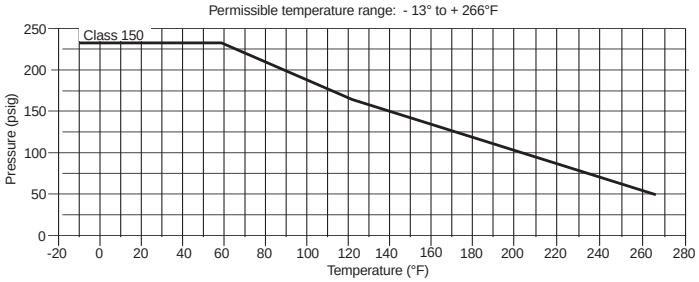


Promass M PVDF Connections			
Dia.	Class 150		Tightening Torque (ft.-lb.)
	L	X	
3/8"	14.6"	0.63"	2.5
1/2"	15.9"	0.63"	2.5
1"	17.3"	0.71"	5.4
1-1/2"	21.7"	0.83"	11.6
2"	28.2"	0.87"	22.6

3/8" instrument fitted with 1/2" flanges

Caution !
- When using PVDF process connections
  - Use only gaskets with a hardness Shore A ≤ 75 and a minimum thickness of 0.07"
  - Use only the specified screw tightening torques (refer to Operating Manual)
- For 2": Support sensors (heavy weight)

Pressure Limitations due to Fluid Temperature



Promass I, M, F VCO Process Connections

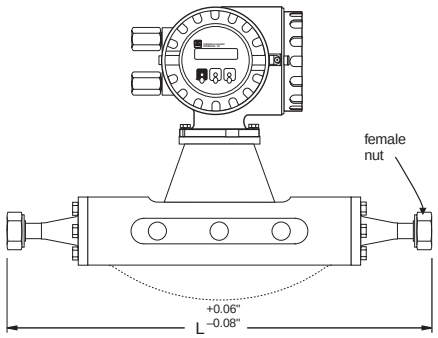
NOTE: Refer to Page 15 for Promass I diagram.

Promass M

Flange Material: 316L SS
Gasket Material: See data above

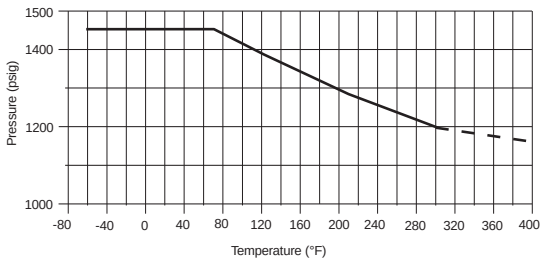
Promass F

Wetted Parts: 904L SS
No internal gaskets with welded process connections



Promass M / F	
Dia.	L
3/8" 8-VCO-4 (1/2")	15.4"
1/2" 12-VCO-4 (3/4")	16.9"

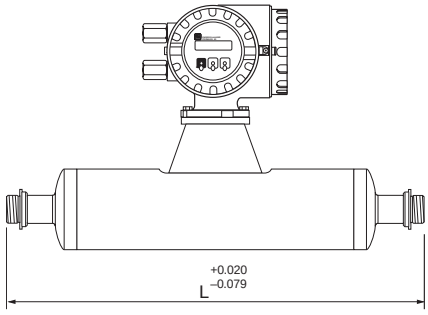
Pressure Limitations due to Fluid Temperature



Promass I VCO Process Connections

Promass I

Connection Material: Titanium Grade 2
Gasket Material: No internal gaskets with welded process connections



Diameter / Connection (without nut)	Promass I L
3/8" 12-VCO-4 (3/4")	16.9"
1/2" 12-VCO-4 (3/4")	18.3"

Promass I, M, F Sanitary Process Connections

Promass I

Wetted Parts: Titanium Grade 2
No internal gaskets with welded process connections

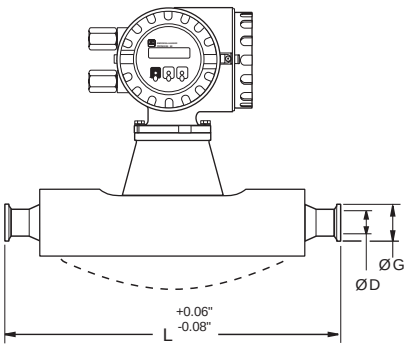
Promass M

Tri-clamp Material: 316L SS
Gasket Material: Flat gaskets, EPDM (- 40° to + 300°F), Silicone (- 60° to + 300°F)

Promass F

Wetted Parts: 316L SS
No internal gaskets with welded process connections

Tri-Clamp®



Promass M / F				
Dia.	Clamp	L	ØG	ØD
3/8"	1/2"	14.4"	0.98"	0.37"
3/8"	1"	14.4"	1.98"	0.87"
1/2"	1/2"	15.7"	0.98"	0.37"
1/2"	1"	15.7"	1.98"	0.87"
1"	1"	17.1"	1.98"	0.87"
1-1/2"	1-1/2"	22.0"	1.98"	1.37"
2"	2"	28.3"	2.52"	1.87"
3" M	3"	31.5"	3.58"	2.87"
3" F	3"	35.4"	3.58"	2.87"
4" *	4"	44.4"	4.68"	3.83"

3/8" and 1/2": With 1" connections as standard.
* 4" only available for Promass F

Promass I				
Dia.	Clamp	L	ØG	ØD
3/8"	1/2"	16.8"	0.98"	0.37"
3/8"	3/4"	16.8"	0.98"	0.63"
3/8"	1"	16.8"	1.98"	0.87"
1/2"	1/2"	18.2"	0.98"	0.37"
1/2"	3/4"	18.2"	0.98"	0.63"
1/2"	1"	18.2"	1.98"	0.87"
1/2" *	3/4"	23.7"	0.98"	0.63"
1"	1"	23.7"	1.98"	0.87"
1" *	1"	28.7"	1.98"	0.87"
1-1/2"	1-1/2"	28.7"	1.98"	1.37"
1-1/2" *	1-1/2"	33.4"	1.98"	1.37"
2"	2"	33.5"	2.52"	1.87"

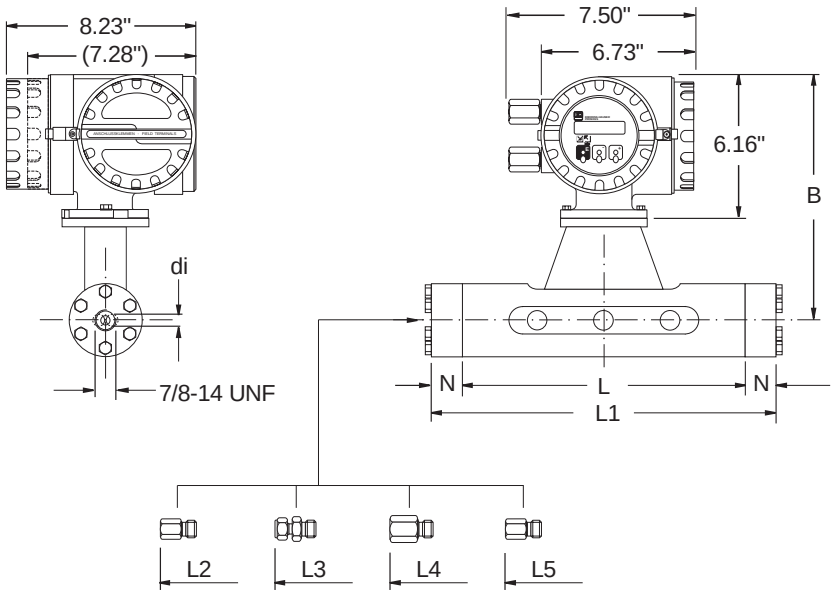
* 1/2", 1" and 1-1/2" Promass I full bore versions.

NOTE: The material load limit is exclusively determined by the material properties of the Tri-clamp® used. This clamp is not included in the shipment.

Tri-Clamp® Dimensions

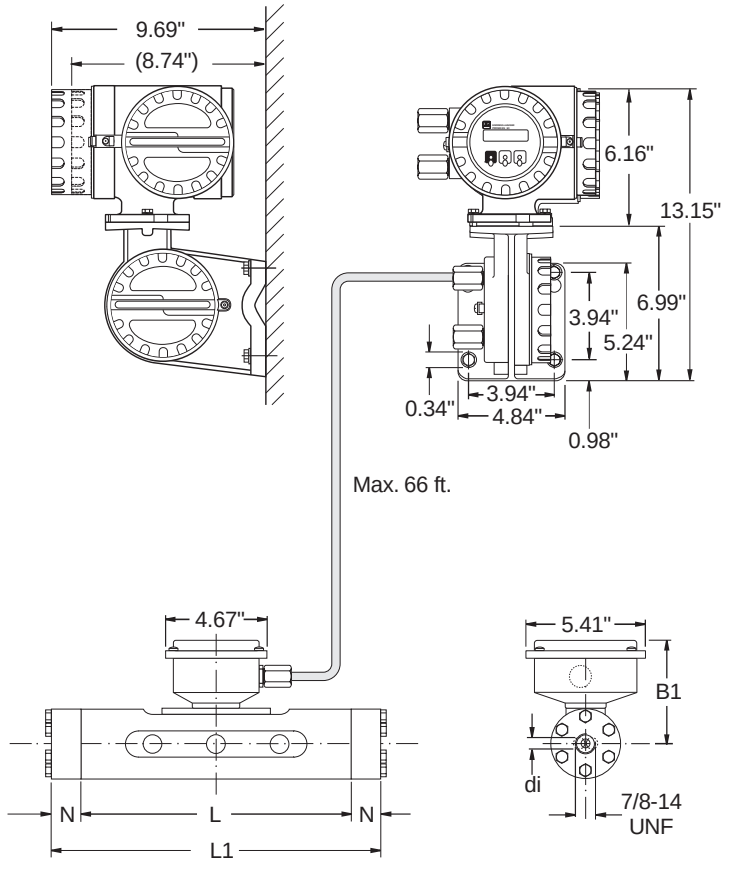
Promass 63 M High Pressure Version Dimensions

Compact Version



Process connection	N	L without connectors	L1 with connectors	L2 G 3/8"	L3 VCO with 1/2" SWAGELOK	L4 1/2" NPT	L5 3/8" NPT	B	B1	di	Weight (lbs.)
3/8"	0.94"	10.1"	12.0"	14.0"	14.4"	14.6"	14.1"	10.3"	4.45"	0.19"	24
1/2"	0.94"	11.3"	13.1"	15.2"	15.6"	15.7"	15.2"	10.4"	4.51"	0.31"	26
1"	1.01"	12.2"	14.9"	16.9"	17.4"	17.5"	16.9"	10.6"	4.69"	0.40"	33

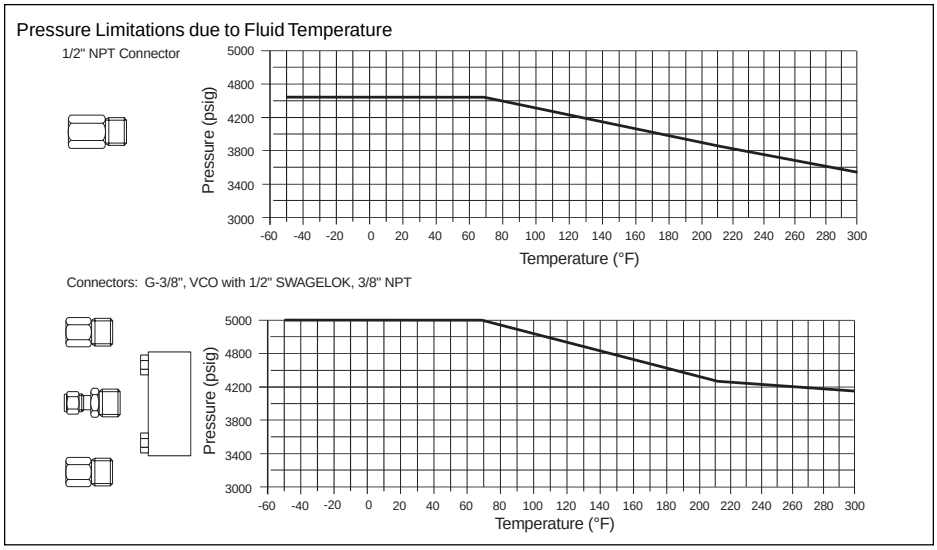
Remote Version



Promass 63 M High Pressure Version Pressure Limitations

Wetted parts material

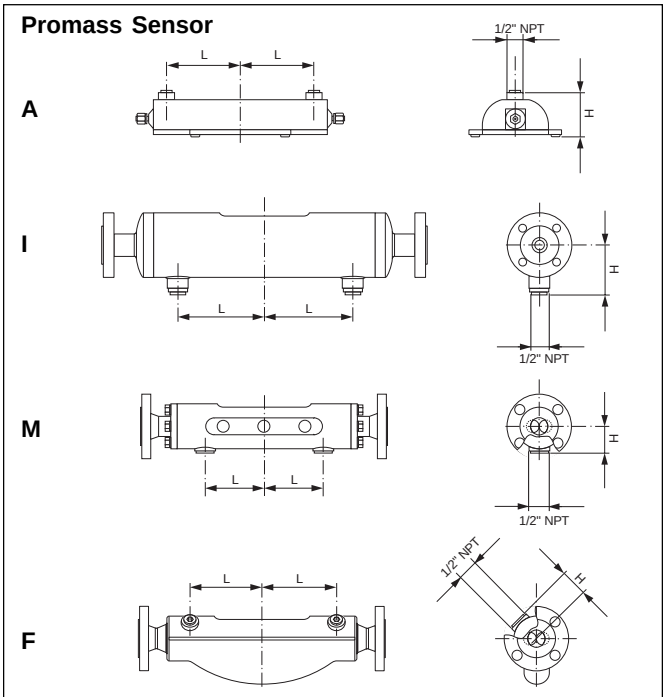
Measuring Tube:	Titanium Grade 9
Connectors:	316L SS
Fittings:	316 SS
Gasket Material:	O-rings in Viton (+ 5° to + 300°F), Silicone (- 60° to + 300°F)



Purge Fittings (Pressure Monitoring)

NOTE !
Internal 1/2" NPT plugs are provided for Promass 63 purge connections (if specified). Plugs are installed to prevent dry nitrogen gas from leaking out. Plugs are to be removed ONLY if the secondary containment section is immediately filled with a dry inert gas.

Promass Sensor



Dia.	Promass A		Promass I		Promass M		Promass F	
ANSI	L	H	L	H	L	H	L	H
1/24"	3.62"	3.43"	-	-	-	-	-	-
1/12"	5.12"	3.43"	-	-	-	-	-	-
1/8"	7.58"	3.82"	-	-	-	-	-	-
3/8"	-	-	2.40"	3.08"	3.35"	1.73"	4.25"	1.85"
1/2"	-	-	3.11"	3.08"	3.94"	1.83"	4.33"	1.85"
1/2"*	-	-	3.11"	3.08"	-	-	-	-
1"	-	-	5.83"	3.08"	4.33"	1.97"	5.12"	1.85"
1"*	-	-	5.83"	3.08"	-	-	-	-
1-1/2"	-	-	7.72"	3.58"	6.10"	2.32"	6.10"	2.05"
1-1/2" *	-	-	7.72"	3.58"	-	-	-	-
2"	-	-	10.0"	4.14"	8.27"	2.66"	8.90"	2.52"
3"	-	-	-	-	8.27"	3.21"	11.0"	3.39"
4"	-	-	-	-	-	-	13.5"	3.94"

* 1/2", 1", 1-1/2" "FB" = Full bore versions of Promass I

Technical Data

Application

Instrument name	Flow measuring system “Promass 63”
Instrument function	Mass and volumetric flow measurement of liquids and gases in closed piping.

Function and System Design

Measuring principle	Mass flow measurement according to the Coriolis measuring principle (see pages 7-8)
Measuring system	Instrument family “Promass 63” consisting of: Transmitter: Promass 63 Sensor: Promass A, I, M and F • Promass A 1/24”, 1/12”, 1/8” (DN 1, 2, 4) and 1/12”, 1/8” (DN 2, 4) (high pressure version) Single tube system in SS or Alloy C-22 • Promass I 3/8”, 1/2”, 1”, 1-1/2”, 2” (DN 8, 15, 25, 40, 50) (completely welded version) Straight single tube system in titanium 1/2” (DN 15) “FB, 1” (DN 25) “FB”, 1-1/2” (DN 40) “FB”: Full bore versions with a higher full scale value (see table below) • Promass F 3/8”, 1/2”, 1”, 1-1/2”, 2”, 3”, 4” (DN 8, 15, 25, 40, 50, 80, 100) (completely welded version) Two slightly curved measuring tubes in SS or Alloy C-22 (only for 3/8” - 3” / DN 8 - 80) • Promass M 3/8”, 1/2”, 1”, 1-1/2”, 2”, 3” (DN 8, 15, 25, 40, 50, 80) Two straight measuring tubes in titanium. Containment vessel up to 1450 psi (100 bar). 3/8”, 1/2”, 1” (DN 8, 15, 25) high pressure version for operating pressures up to 5000 psi (350 bar). Two versions are available: • Compact version • Remote version, maximum 66 feet (20 m)

Input variables

Measured variables	• Mass flow rate (is proportional to the phase difference fo the two sensors on the measuring tube which detect differences in it oscillation, see page 3) • Fluid density (is proportional to the resonance frequency of the measuring tubes) • Fluid temperature (is measured with temperature sensors)
Measuring range	**Ranges for full scale values**

Size	DN	Liquid $\dot{m}_{min(L)}$ to $\dot{m}_{max(L)}$	Gas $\dot{m}_{min(L)}$ to $\dot{m}_{max(L)}$
1/24”	1	0 to 0.73 lb/min (0 to 20.0 kg/h)	The full scale depends on the density of the gas. The full scale value can be determined with the following formula: $\dot{m}_{max(G)} = \frac{\dot{m}_{max(L)} \cdot \rho_{(G)}}{x \cdot 1.6}$ $\dot{m}_{max(G)}$ = Full scale value gas (t/h) $\dot{m}_{max(L)}$ = Full scale value of liquid (t/h) (value from table) $\rho_{(G)}$ = gas density (kb/m³) (at operating condition) x = constant (kg/m3) Promass A, x = 20 Promass I, M, F x = 100
1/12”	2	0 to 3.7 lb/min (0 to 100.0 kg/h)	
1/8”	4	0 to 16.5 lb/min (0 to 450.0 kg/h)	
3/8”	8	0 to 73.5 lb/min (0 to 2.0 t/h)	
1/2”	15	0 to 238 lb/min (0 to 6.5 t/h)	
1/2” *	15 *	0 to 666 lb/min (0 to 18.0 t/h)	
1”	25	0 to 666 lb/min (0 to 18.0 t/h)	
1” *	25 *	0 to 1650 lb/min (0 to 45.0 t/h)	
1-1/2”	40	0 to 1650 lb/min (0 to 45.0 t/h)	
1-1/2” *	40 *	0 to 2570 lb/min (0 to 70.0 t/h)	
2”	50	0 to 2570 lb/min (0 to 70.0 t/h)	
3”	80	0 to 6600 lb/min (0 to 180.0 t/h)	
4”	100	0 to 11,667 lb/min (0 to 350.0 t/h)	

* 1/2”, 1”, 1-1/2” “FM” = Full Bore versions of Promass I

Example for calculating a gas full scale:
Sensor: Promass F ® x = 100
Nominal dia. 2” (DN 50) ® 70 t/h (full scale value liquid from table above)
Gas: Air with a density of 60.3 kg/m³ (at 68°F) and 725 psi

$$\dot{m}_{max(G)} = \frac{\dot{m}_{max(L)} \cdot \rho_{(G)}}{x \cdot 1.6} \qquad \frac{70 \cdot 60.3}{100 \cdot 1.6} = 26.4 \text{ t/h}$$

Operable flow range	Up to 1000 : 1 This enables totalizer values to be accurately determined even in pulsating systems, e.g. reciprocating pumps.
Auxiliary input (with RS 485 board)	V = 3 to 30 VDC, R_i = 1.8 kW Configurable for: zero point adjustment, positive zero return, totalizer reset, batching or full scale switching.

Accuracy

Output signal	• *Relay output 1* Maximum 60 VAC / 0.5 A or max. 30 VDC / 0.1A Either NC or NO via a jumper available (factory setting, NO). Configurable for error message (failure), empty pipe detection, full scale switching, batch precontact, flow direction, limit value.

Technical Data (con't.)

Output variables continued	
Output signal (con't.)	• *Relay output 2* Maximum 60 VAC / 0.5A or max. 30 VDC / 0.1A Either NC or NO via a jumper available (factory setting, NC). Configurable like relay 1 except "failure" and "batch contact". • *Current output 1 and 2* 0/4 to 20 mA (according to NAMUR recommendations), R_L <700W freely assignable t different measured values, time constant freely selectable (0.01 to 100.00 seconds), full scale value selectable, temperature coefficient typical 0.005% of full scale per °C, HART® protocol via current output 1 only. • *Pulse/Frequency output* Freely assignable to one flow variable, active/passive selectable; active, 24 VDC, 25 mA (250 mA during 20 ms), R_L > 100W; passive, 30 VDC, 25 mA (250 mA during 20 ms) - Frequency output: f_{End} selectable up to 10 kHz, On/Off ratio 1:1, pulse width maximum 10 seconds - Pulse output: pulse weighting adjustable, pulse polarity adjustable pulse width adjustable (50 ms to 10 s) above frequency of $1/_{(2 \times \text{pulse width})}$ the On/Off ratio is 1:1
Signal on alarm	The following applies until the fault has been cleared: • Current output ® failure mode selectable • Pulse/frequency output ® failure mode selectable • Relay 1 ® de-energized if configured to "FAILURE" • Relay 1 / 2 ® de-energized on power supply failure
Load	R_L < 700W (current output)
Creep suppression	Switch points for low flow selectable. Hysteresis, -50%
Accuracy	
Reference conditions	Error limits based on ISO/DIS 11631 • 68° to 86°F (20° to 30°C), 29 to 58 psi (2 to 4 bar) • Calibration rig based on national standards • Zero point calibrated under operating conditions • Field density calibration carried out (or special density calibration)
Measured error	• *Massflow rate (liquids):* Promass A, M, F ±0.10%±[(zero stability / flow rate) x 100]% of rate Promass I ±0.15%±[(zero stablitiy / flow rate) x 100]% of rate • *Mass flow rate (gas):* Promass A, M, F ±0.50%±[(zero stability / flow rate) x 100]% of rate • Promass I ±0.50%±[(zero stability / flow rate) x 100]% of rate • *Volume flow rate (liquids):* Promass A, M ±0.25%±[(zero stability / flow rate) x 100]% of rate Promass I ±0.50%±[(zero stability / flow rate) x 100]% of rate Promass F ±0.15%±[(zero stability / flow rate) x 100]% of rate Zero stability, refer to table below NOTE! • The values refer to the pulse/frequency output. • Additional measuring error of the current output ± 5 mA

Dia.	DN.	Max. full scale lb/min (kg/h)	Zero stability Promass A, M, F lb/min (kg/h)	Zero stability PromassI lb/min (kg/h)
1/24"	1	0.73 (20)	0.000036 (0.0010)	N/A
1/12"	2	3.7 (100)	0.00018 (0.0050)	N/A
1/8"	4	16.5 (450)	0.0008 (0.0225)	N/A
3/8"	8	73.5 (2000)	0.004 (0.100)	0.0074 (0.200)
1/2"	15	238 (6500)	0.012 (0.325)	0.3822 (0.650)
1/2" *	15 *	660 (18000)	N/A	0.0661 (1.800)
1"	25	660 (18000)	0.33 (0.900)	0.0661 (1.800)
1" *	25 *	1650 (45000)	N/A	0.1653 (4.500)
1-1/2"	40	1650 (45000)	0.083 (2.250)	0.1653 (4.500)
1-1/2" *	40 *	2570 (70000)	0.129 (3.500)	0.2572 (7.000)
2"	50	2570 (70000)	0.129 (3.500)	0.2572 (7.000)
3"	80	6600 (180000)	0.330 (9.000)	N/A
4"	100	11667 (350000)	0.514 (14.00)	N/A

* 1/2", 1", 1-1/2" "FB" = Full Bore Promass I versions

Technical Data (con't.)

Accuracy continued

Measured error (con't.)

Example for calculating the measuring uncertainty:
Promass F ± 0.10% calibration ± [zero stability / flow rate) x 100]% of rate: 1" (DN 25), Q = 132 lb/min (3.6 th/h / 3600 kg/h):

$$\text{Measured error ®} \pm 0.1\% \pm \frac{0.33\text{lb/min}}{132\text{ lb/min}} \times 100 = \pm 0.125\%$$

Density:

- Standard calibration (density calibration in the field):
  Promass F ± 0.0005 g/cc
  Promass M, A ± 0.001 g/cc
  Promass I ± 0.002 g/cc
- Special calibration (optional):
  Calibration range = 0.8 to 1.8 g/cc, 40 to 175°F (5° to 80°C)
  Promass F ± 0.001g/cc
  Promass M, A ± 0.002 g/cc
  Promass I ± 0.004 g/cc

Temperature:
Promass F, M, A, I ± 1°F ± 0.003 x (T-32)
(T = fluid temperature in °F)
± 0.5°C ± 0.005 x T
(T = fluid temperature in °C)

Process effects

- *Process temperature effects:*
  The below value represents the zero point error due to the changing process temperature away from the temperature at which a zero point adjustment was carried out:
  Promass A, I, M, F typical = ± 0.0002% / nominal flow rate / °C
- *Process pressure effects:*
  The below defined values represent the effect on accuracy of mass flow due to changing process pressure away from calibration pressure (values in % of rate / psi)

Diameter		Flow rate % of rate / psi				
ANSI	DN.	Promass A	Promass I	Promass M	Promass MP	Promass F
1/24"	1	none	-	-	-	-
1/12"	2	none	-	-	-	-
1/8"	4	none	-	-	-	-
3/8"	8	-	0.0004	0.0006	0.0004	none
1/2"	15	-	0.0003	0.0005	0.0003	none
1/2" *	15 *	-	0.0004	-	-	-
1"	25	-	0.0004	0.0006	0.0002	none
1" *	25 *	-	none	-	-	-
1-1/2"	40	-	none	0.0003	-	-0.0002
1-1/2" *	40 *	-	0.0004	-	-	-
2"	50	-	0.0004	none	-	-0.0005
3"	80	-	-	none	-	-0.0006
4"	100	-	-	-	-	-0.0008

* 1/2", 1", 1-1/2" "FB" = Full Bore Promass I versions

Operating conditions

Installation conditions	Orientation: vertical or horizontal Restrictions and other recommendations, refer to pages 9 onward.
Inlet / outlet sections	Installation site is independent of inlet and outlet sections
Connection cable length	Maximum 66 feet (20 m) for remote version
Ambient conditions	Transmitter and sensor: -13° to +140°F (-25° to +60°C). Version with enhanced climate resistance, -40° to +140°F (-40° to +60°C) • Depending on the product temperature, certain installation positions are to be observed to ensure that the permitted ambient temp. range for the transmitter is not exceeded (see page 11). • An all weather cover should be used to protect the housing from direct sunlight when mounted outdoors. This is especially important in warmer climates with high ambient temperatures. • If ambient temperature is below -13°F (-25°C), a version with a display is not recommended.
Storage temperature	-40° to +176°F (-40° to +60°C)
Degree of protection	Transmitter, NEMA 4X; sensor, NEMA 4X (EN 60529)
Shock resistance	According to IEC 68-2-31
Vibration resistance	Up to 1 g, 10 to 150 Hz according to IEC 68-2-6
Electromagnetic compatibility (EMC)	According to EN 50081 Part 1 and 2 / EN 50082 Part 1 and 2 as well as to NAMUR recommendations

Technical Data (con't.)

Operating conditions continued	
Process conditions	*Fluid temperature:* • Sensor Promass A -60° to +400°F (-50° to +200°C) Promass I -60° to +300°F (-50° to +150°C) Promass M -60° to +300°F (-50° to +150°C) Promass F -60° to +400°F (-50° to +200°C) • Gaskets Viton +5° to +400°F (-15° to +200°C) EPDM -40° to +320°F (-40° to +160°C) Silicone -60° to +400°F (-50° to +200°C) Kalrez -22° to +410°F (-30° to +210°C) FEP encapsulated Viton -60° to +400°F (-50° to +200°C)
	Pressure: • Promass A Fittings: max. 2320 psi (160 bar), standard version; max. 5800 psi (400 bar), high pressure version Flanges: ANSI CL 150, CL 300 / DIN PN 40 / JIS 10K Containment vessel: 375 psi (25 bar) • Promass I Flanges: ANSI CL 150, CL 300, CL 600 / DIN PN 40, to 100 / JIS 10K, 20K, 40K, 63K Containment vessel: 375 psi (25 bar), optional 600 psi (40 bar) • Promass M Flanges: ANSI CL 150, CL 300, CL 600 / DIN PN 40, to 100 / JIS 10K, 20K, 40K, 63K Containment vessel: 600 psi (40 bar), optional 1500 psi (100 bar) • Promass M (high pressure version) Measuring tubes, connector fittings; max. 5000 psi (350 bar) Containment vessel: 1500 psi (100 bar) • Promass F Flanges: ANSI CL 150, CL 300, CL 600 / DIN PN 40 to 100 / JIS 10K, 20K, 40K, 63K Containment vessel: 3/8" to 3" (DN 8 to 80); 375 psi (25 bar) 4" (DN 100); 250 psi (16 bar) 3/8" to 2" (DN 8 to 50); optional 600 psi (40 bar) Caution! The material load curves (pressure / temperature diagrams) for all process connections can be found on pages 14, 16, 17 and 20.
Pressure loss	Dependent on nominal diameter and sensor type. Consult Endress+Hauser for Applicator PC software to determine pressure loss.
Mechanical construction	
Design / dimensions	Refer to pages 13 thru 21
Weight	Refer to pages 13, 15 and 19
Materials	• *Transmitter housing* Powder-coated die-cast aluminum • *Sensor housing / containment vessel* Promass A, I, F: Surface resistance to acids and alkalis 304 SS (1.4301) Promass M: Surface resistance to acids and alkalis 3/8" to 2" (DN 8 to DN 50); chemically nickel-plated steel; 3" (DN 80), 304L SS (1.4313) • *Sensor connection housing (remote version)* 304 SS (1.4301) • *Process connections* Promass A, refer to page 13; Promass M (high pressure), refer to page 19; Promass I, M, F, refer to pages 16, 17, and 18 • Measuring tubes Promass A: 904L SS (1.4539), Alloy C-22 (N06022) Promass I: Titanium Grade 9 Promass M: 3/8" to 2" (DN 8 to 50), titanium Grade 9 3" (DN 80), titanium Grade 2 Promass F: 3/8" to 4" (DN 8 to 100), 904L SS (1.4539) 3/8" to 3" (DN 8 to 80), Alloy C-22 (N06022) • *Gaskets* Promass A, F: No internal seals Promass I, M: Refer to pages 16, 17, 18 Promass M: High pressure version only; silicone, viton

Technical Data (con't.)

Mechanical construction continued	
Materials (con't.)	• *Measuring tubes (con't.)* Promass F: 3/8" to 4" (DN 8 to 100), 904L SS (1.4539) 3/8" to 3" (DN 8 to 80), Alloy C-22 (N06022) • *Gaskets* Promass A, F: No internal seals Promass I, M: Refer to pages 16, 17, 18 Promass M: High pressure version only; silicone, viton
Process connections	Promass A: *Welded process connections:* 4-VCO-4 fittings, 1/2" Tri-clamp® *Screw-on process connections:* flanges (ANSI, DIN2501, JIS B2238), NPT-F and SWAGELOK fittings Promass I: *Welded process connections:* 12-VCO-4 fittings, flanges (ANSI, DIN2501, JIS B2238) *Sanitary connections:* Hygienic coupling DIN 11851, Tri-clamp®, and SMS 1145 Promass M: *Screw-on process connections:* 8-VCO-4 fittings, 12-VCO-4 fittings, flanges (ANSI, DIN, JIS B2238) *Sanitary connections:* Tri-clamp®, hygienic coupling DIN 11851, SMS 1145 Promass M high pressure: *Screw-on process connections:* 1/2" or 3/8" NPT, G 3/8", and 1/2" SWAGELOK coupling, connector with 7/8-14 UNF internal thread Promass F: *Welded process connections:* Flanges (ANSI, DIN 2501, JIS B2238), 8-VCO-4 fittings, 12-VCO-4 fittings *Sanitary connections:* Tri-clamp®, hygienic coupling DIN 11851, SMS 1145
Electrical connection	• Wiring diagrams: see pages 8 and 9 • Cable entries (input / output, remote version): 1/2" NPT, PG 13.5 (5-15 mm) conduit entries, M20 x 1.5 (8-15 mm) or G 1/2" threads for cable entries. • Galvanic isolation: all circuits for inputs, outputs, power supply, and sensor are galvanically isolated from each other. • Cable specifications (remote version), see page 9.
User interface	
Operation	The instrument can basically be configured in two different ways: *Configuration with DIP switches and/or local display:* • DIP switches for setting basic instrument functions • Local display and push buttons for additional functions • Jumper for configuring the auxiliary input *Configuration using HART® protocol:* • HART® handheld terminal DXR 275 • Commuwin II software (remote configuration, process visualization)
Display	LCD 8-digit. 11 segments for dispalyed engineering units and operating status
Communication	Current output with superimposed HART® protocol
Power supply	
Supply voltage	• *Transmitter:* 85 to 230 VAC, +10%, 50/60 Hz 20 to 55 VDC, 16 to 62 VDC • *Sensor:* Power is supplied by the transmitter
Power consumption	AC: < 15 VA (including sensor) DC: < 15 W (including sensor)
Power supply failure	Bridges minimum one power cycle (22 ms). • EEPROM saves measuring system data on power failure (no batteries required) • DAT = exchangeable data storage module which stores all sensor data such as calibration data, nominal diameter, sensor version, etc.
Certificates and approvals	
Hazardous area	Information on presently available hazardous area versions (e.g. FM, CSA, CENELEC, SEV) can be supplied by Endress+Hauser on request. All explosion protection data is given in separate documents.
CE mark	By attaching the CE mark, Endress+Hauser confirms that the instrument fulfills all the requirements of the relevant EC directives.

Promass 63 A Ordering Information

Promass 63 A [1] - [2] [3] [4] [5] [6] [7] [8] [9] [10]

1 Nominal Size / Tube Material

	Size		Full Scale lb/min		Material
	in.	mm	liquid	gas	
S01	1/24	1	0.75	0.37	904L SS
C01	1/24	1	0.75	0.37	Alloy C-22 (N06022)
S02	1/12	2	3.7	1.8	904L SS
C02	1/12	2	3.7	1.8	Alloy C-22 (N06022)
S04	1/8	4	17	4.6	904L SS
C04	1/8	4	17	4.6	Alloy C-22 (N06022)

2 Process Connection / Material
- SVW Cajon 4-VCO-4 couplings
- STW 1/2" Tri-clamp couplings, 3-A (only for SS version)
- PVW High pressure version < 5800 psi, Cajon 4-VCO-4 couplings (only for 1/12" and 1/8" SS version)
- SPW 1/2" Tri-clamp couplings, 3-A, 240 grit surface (only for SS version)

3 Secondary Containment / Certificates *
- 0 360 psi secondary containment
- 1 360 psi secondary containment, with 3.1B material and 2.3 pressure test certificate
- 2 360 psi secondary containment, including purge connections, with 2.3 pressure test certificate
- 3 360 psi secondary containment, including purge connections, with 3.1B material and 2.3 pressure test certificate

4 Calibration
- 0 0.1% flow calibration, standard density calibration
- 1 0.1% flow calibration, 0.2% density calibration
- 2 5-point 0.1% flow calibration, standard density calibration (specify flow range)
- 3 5-point 0.1% flow calibration, 0.2% density calibration (specify flow range)

5 Protection Type / Version
- A NEMA 4X compact version
- B NEMA 4X remote version, 33 ft. cable included
- C NEMA 4X remote version, 66 ft. cable included

6 Cable Entries
- 2 1/2" NPT

7 Approvals
- 5 FM approved NI, Class I, Div. 2, Grps. A-D; DIP Class II, III, Div. 1, Grps. E-G
- 6 FM approved XP Class I, Div. 1, Grps A-D; DIP Class II, III, Div. 1, Grps. E-G

8 Display Option
- A Blind
- B Display with touch control

9 Power Supply
- 1 85 to 260 VAC, 50/60 Hz (Not for DoS interface to Procom DZL 363)
- 2 16 to 62 VDC
- 3 Power supplied by Procom DZL 363 transmitter (DoS 2-wire connection only)
- 4 Enhanced climate resistance 85 to 260 VAC, 50/60 Hz
- 5 Enhanced climate resistance 20 to 55 VAC, 16 to 62 VDC
- 6 Enhanced climate resistance Procom DZL supplied power

10 Signal Outputs
- A Frequency and current / HART output
- B Current output and Rackbus RS 485
- C Frequency output and Rackbus RS 485
- D Current output and auxiliary input (must order display option "B")
- E Frequency output and auxiliary input (must order display option "B")
- F 2 current outputs / HART
- G DoS interface to Procom DZL 363 transmitter, power supplied by Procom (not for display with Touch Control version)
- H PROFIBUS PA and one current output, intrinsically safe (only for Class I, Div. 1)
- L Data interface to Procom DZL 363, power NOT supplied by Procom (not for display with Touch Control version)
- M IS data interface to Procom DZL 363, power NOT supplied by Procom (only for Class I, Div. 1 version, not for display with Touch Control version)
- N IS current / HART and frequency (passive) output (only for Class I, Div. 1 version)
- T PROFIBUS PA and one current output (not for Class I, Div. 1 version)
- W PROFIBUS DP (not for Class I, Div. 1 version)

* 2.3 pressure test certificate includes individual pressure test of measuring system and type test of secondary containment. 3.1B material certificate includes measuring system and secondary containment.

Promass 63 F Ordering Information

Promass 63 F [1] - [2] [3] [4] [5] [6] [7] [8] [9] [10]

1 Nominal Size / Tube Material

	Size in.	Size mm	Full Scale lb/min liquid	Full Scale lb/min gas	Material
S08	0.37	8	74	7.4	904L SS
C08	0.37	8	74	7.4	Alloy C-22 (N06022)
S15	0.5	15	238	23.8	904L SS
C15	0.5	15	235	23.8	Alloy C-22 (N06022)
S25	1	25	660	66	904L SS
C25	1	25	660	66	Alloy C-22 (N06022)
S40	1.5	40	1650	165	904L SS
C40	1.5	40	1650	165	Alloy C-22 (N06022)
S50	2	50	2570	257	904L SS
C50	2	50	2570	257	Alloy C-22 (N06022)
S80	3	80	6600	660	904L SS
C80	3	80	6600	660	Alloy C-22 (N06022)
S1H	4	100	11667	1160	904L SS

2 Process Connection

AAW	150 lb ANSI / 316L SS or Alloy C-22 (3/8", 1/2", 1", 1-1/2", 2" and 3" flanges)
ABW	300 lb ANSI / 316L SS or Alloy C-22 (3/8", 1/2", 1", 1-1/2", 2" and 3" flanges)
ACW	600 lb ANSI / 316L SS or Alloy C-22 (3/8", 1/2", 1", 1-1/2", 2" and 3" flanges)
FTA	Tri-clamp sanitary coupling with 3-A (stainless only), 3/8" to 1" sizes, 1" clamp
FTW	Tri-clamp sanitary coupling without 3-A (stainless only), 3/8" to 1" sizes, 1" clamp
FUA	1/2" Tri-clamp sanitary coupling with 3-A (0.5" stainless only), 3/8" to 1/2" only
FUW	1/2" Tri-clamp sanitary coupling without 3-A (0.37" and 0.5" stainless only)
CVW	Cajon 8-VCO-4 (1/2") coupling, 316L SS (3/8" stainless measuring tube only)
CWW	Cajon 12-VCO-4 (3/4") coupling, 316L SS (1/2" stainless measuring tube only)
PAW	150 lb ANSI, 4" SS flanges (not for use on 3/8" to 2" meters)
PBW	300 lb ANSI, 4" SS flanges (not for use on 3/8" to 2" meters)
UAW	150 lb ANSI, 6" SS flange (for 4" sensor only)
999	Other

3 Secondary Containment / Certificates *

0	360 psi secondary containment
2	580 psi secondary containment, with 2.3 pressure test certificate
3	580 psi secondary containment, including purge connections, with 2.3 pressure test certificate
4	580 psi secondary containment, with 3.1B material and 2.3 pressure test certificate
5	580 psi secondary containment, including purge connections, with 3.1B material and 2.3 pressure test certificate
A	250 psi secondary containment, 4" sensor only
B	360 psi secondary containment with pressure test certificates (not for 3/8" to 2" sizes)
C	360 psi secondary containment, with 3.1B material with pressure test certificate (not for 3/8" to 2" sizes)
F	250 psi secondary containment wiht 2.3 pressure test certificate, 4" sensor only
G	250 psi secondary containment, including purge connections, with 2.3 pressure test certificate, 4" sensor only
H	250 psi secondary containment with 2.3 pressure test certificate, with 2.18B material and 2.3 pressure test certificate, 4" sensor only
9	Other

4 Calibration

0	0.1% flow calibration, standard density calibration
1	0.1% flow calibration, 0.1% density calibration
2	5-point 0.1% flow calibration, standard density calibration (specify flow range)
3	5-point 0.1% flow calibration, 0.1% density calibration (specify flow range)
9	Other

5 Protection Type / Version

A	NEMA 4X compact version
B	NEMA 4X remote version, 33 ft. cable included
C	NEMA 4X remote version, 66 ft. cable included

6 Cable Entries

2	1/2" NPT
9	Other

7 Approvals

4	FM approved, XP, Class I, Div. 1, Groups C-D; Dust ignition proof, Class II, III, Div. 1, Grps E-G (not for 3/8" - 2")
5	FM approved NI, Class I, Div. 2, Grps. A-D; DIP Class II, III; Div. 1, Grps. E-G
6	FM approved XP Class I, Div. 1, Grps A-D; DIP Class II, III; Div. 1, Grps. E-G (not for 3")

8 Display Option

A	Blind
B	Display with touch control

9 Power Supply

1	85 to 260 VAC, 50/60 Hz (not for DoS interface to Procom DZL 363)
2	20 to 55 VAC, 16 to 62 VDC (not for DoS interface to Procom DZL 363))
3	Power supplied by Procom DZL 363 transmitter (DoS 2-wire connection only)
4	Enhanced climate resistance 85 to 260 VAC, 50/60 Hz
5	Enhanced climate resistance 20 to 55 VAC, 16 to 62 VDC
6	Enhanced climate resistance Procom DZL supplied power

10 Signal Outputs

A	Frequency and current / HART output
B	Current output and Rackbus RS 485
C	Frequency output and Rackbus RS 485
D	Current output and auxiliary input (must order display option "B")
E	Frequency output and auxiliary input (must order display option "B")
F	2 current outputs / HART
G	DoS interface to Procom DZL 363 transmitter power supplied by Procom (not for display with Touch Control version)
H	PROFIBUS PA and one current output, intrinsically safe (only for Class I, Div. 1)
L	Data interface to Procom DZL 363, power NOT supplied by Procom (not for display with Touch Control version)
M	IS data interface to Procom DZL 363, power NOT supplied by Procom (only for Class I, Div. 1 version, not for display with Touch Control version)
N	IS current / HART and frequency (passive) output (only for Class I, Div. 1 version)
T	PROFIBUS PA and one current output (not for Class I, Div. 1 version)
W	PROFIBUS DP (not for Class I, Div. 1 version)

* 2.3 pressure test certificate includes individual pressure test of measuring system and type test of secondary containment. 3.1B material certificate includes measuring system and secondary containment.

Promass 63 M Ordering Information

Promass 63 M [1] - [2] [3] [4] [5] [6] [7] [8] [9] [10] [11]

1 Nominal Size / Tube Material

	Size		Full Scale lb/min		Material
	in.	mm	liquid	gas	
T08	0.37	8	74	7.4	Titanium
T15	0.5	15	238	23.8	Titanium
T25	1	25	660	66	Titanium
T40	1.5	40	1650	165	Titanium
T50	2	50	2570	257	Titanium
T80	3	80	6600	660	Titanium

2 Process Connection / Material

SA	150 lb ANSI / 316L SS
PA	150 lb ANSI / 316L SS, 4" flange on 3" sensor
TA	150 lb ANSI / Titanium
QA	150 lb ANSI / PVDF
SB	300 lb ANSI / 316L SS
PB	300 lb ANSI / 316L SS, 4" flange on 3" sensor
TB	300 lb ANSI / Titanium
SC	600 lb ANSI / 316L SS
TC	600 lb ANSI / Titanium
AT	Tri-clamp sanitary coupling with 3-A
ST	Tri-clamp sanitary coupling without 3-A
AU	1/2" Tri-clamp sanitary coupling with 3-A (only for 3/8" and 1/2" sensor)
SU	1/2" Tri-clamp sanitary coupling without 3-A (only for 3/8" and 1/2" sensor)
SV	Cajon 8-VCO-4 (1/2") couplings / 316L SS (only for 3/8" sensor)
SW	Cajon 12-VCO-4 (3/4") couplings / 316L SS (only for 1/2" sensor)
WO	Without process connections

3 Internal Seals / Material

A	Viton o-rings (not for Tri-clamp couplings)
B	EPDM o-rings (not for Tri-clamp couplings)
C	Silicone o-rings (not for Tri-clamp couplings)
D	FEP encapsulated Viton o-rings (not for Tri-clamp or Kynar flanges)
E	Kalrez o-rings (not for Tri-clamp couplings)
F	Silicone flat gaskets (only for Tri-clamp couplings)
G	EPDM flat gaskets (only for Tri-clamp couplings)
W	No seals (only versions without connections)

4 Secondary Containment / Certificates *

0	580 psi secondary containment
2	1450 psi secondary containment, with 2.3 pressure test certificate
4	1450 psi secondary containment, including purge connections, with 2.3 pressure test certificate)
6	1450 psi secondary containment, with 3.1B material and 2.3 pressure test certificate (not for PVDF flanges)
8	1450 psi secondary containment, including purge connections, with 3.1B material and 2.3 pressure test certificate (not for PVDF flanges)

5 Calibration

0	0.1% flow calibration, standard density calibration
1	0.1% flow calibration, 0.2% density calibration
2	5-point 0.1% flow calibration, standard density calibration (specify flow range)
3	5-point 0.1% flow calibration, 0.2% density calibration (specify flow range)

6 Protection Type / Version

A	NEMA 4X compact version
B	NEMA 4X remote version, 33 ft. cable included
C	NEMA 4X remote version, 66 ft. cable included

7 Cable Entries

2	1/2" NPT

8 Approvals

4	FM approved XP, Class I, Div. 1, Grps B-D; DIP Class II, III, Div. 1, Grps E-G (for 3" size only)
5	FM approved NI, Class I, Div. 2, Grps. A-D; DIP Class II, III, Div. 1, Grps. E-G
6	FM approved XP, Class I, Div. 1, Grps. A-D; DIP Class II, III, Div. 1, Grps. E-G

9 Display

A	Blind
B	Display with touch control

10 Power Supply

1	85 to 260 VAC, 50/60 Hz (not for DoS interface to Procom DZL 363)
2	20 to 55 VAC or 16 to 62 VDC (not for DoS interface to Procom DZL 363)
3	Power supplied by Procom DZL 363 transmitter (DoS 2-wire connection only)
4	Enhanced climate resistance 85 to 260 VAC, 50/60 Hz
5	Enhanced climate resistance 20 to 55 VAC, 16 to 62 VDC
6	Enhanced climate resistance Procom DZL supplied power

11 Signal Outputs

A	Frequency and current / HART output
B	Current output and Rackbus RS 485
C	Frequency output and Rackbus RS 485
D	Current output and auxiliary input (must order display option "B")
E	Frequency output and auxiliary input (must order display option "B")
F	2 current outputs / HART
G	DoS interface to Procom DZL 363 transmitter power supplied by Procom (not for display with Touch Control version)
H	PROFIBUS PA and one current output, intrinsically safe (only for Class I, Div. 1)
L	Data interface to Procom DZL 363, power NOT supplied by Procom (not for display with Touch Control version)
M	IS data interface to Procom DZL 363, power NOT supplied by Procom (only for Class I, Div. 1 version, not for display with Touch Control version)
N	IS current / HART and frequency (passive) output (only for Class I, Div. 1 version)
T	PROFIBUS PA and one current output (not for Class I, Div. 1 version)
W	PROFIBUS DP (not for Zone 1/ CL I, Div. 1)

* 2.3 pressure test certificate includes individual pressure test of measuring system and type test of secondary containment. 3.1B material certificate includes measuring system and secondary containment.

Promass 63 MP
Ordering Information

Promass 63 MP [1] - [2] [3] [4] [5] [6] [7] [8] [9] [10] [11]

Nominal line pressure up to 5000 psi (350 bar), burst pressure > 20,000 psi (1400 bar)

1 Nominal Size / Tube Material

	Size		Full Scale lb/min		Material
	in.	mm	liquid	gas	
08	0.37	8	74	7.4	Titanium
15	0.5	15	238	23.8	Titanium
25	1	25	660	66	Titanium

2 Process Connection / Material
- WO Without process connections
- UA Connector with female thread (7/8”-14 UNF)
- UB Connector with G-3/8” couplings
- UC Connector with 3/8” NPT couplings
- UD Connector with 1/2” NPT couplings
- UE Connector with 1/2” SWAGELOK couplings

3 Internal Seals / Material
- A Viton o-rings
- C Silicone o-rings
- W No seals (onlly versions without connectors)

4 Secondary Containment / Certificates *
- 2 2.3 pressure test of measuring system, 7500 psi
- 4 2.3 pressure test of measuring system, 7500 psi, including purge connections
- 6 2.3 pressure test of measuring system, 7500 psi and 3.1B material certificate
- 8 2.3 pressure test of measuring system, 7500 psi and 3.1B material certificate, including purge ocnnections

5 Calibration
- 0 0.1% flow calibration, standard density calibration
- 1 0.1% flow calibration, 0.2% density calibration
- 2 5-point 0.1% flow calibration, standard density calibration (specify flow range)
- 3 5-point 0.1% flow calibration, 0.2% density calibration (specify flow range)

6 Protection Type / Version
- A NEMA 4X compact version
- B NEMA 4X remote version, 33 ft. cable included
- C NEMA 4X remote version, 66 ft. cable included

7 Cable Entries
- 2 1/2” NPT

8 Approvals
- 5 FM approved NI, Class I, Div. 2, Grps. A-D; DIP Class II, III, Div. 1, Grps. E-G
- 6 FM approved XP, Class I, Div. 1, Grps. A-D; DIP Class II, III, Div. 1, Grps. E-G

9 Display
- A Blind
- B Display with touch control

10 Power Supply
- 1 85 to 260 VAC, 50/60 Hz (not for DoS interface to PROCOM DZL 363)
- 2 20 to 55 VAC, 16 to 62 VDC (not for DoS interface to PROCOM DZL 363
- 3 Power supplied by Procom DZL 363 transmitter (DoS 2-wire connection only)
- 4 Enhanced climate resistance 85 to 260 VAC, 50/60 Hz
- 5 Enhanced climate resistance 20 to 55 VAC, 16 to 62 VDC
- 6 Enhanced climate resistance Procom DZL supplied power

11 Signal Outputs
- A Frequency and current / HART output
- B Current output and Rackbus RS 485
- C Frequency output and Rackbus RS 485
- D Current output and auxiliary input (must order display option “B”)
- E Frequency output and auxiliary input (must order display option “B”)
- F 2 current outputs / HART
- G DoS interface to Procom DZL 363 transmitter power supplied by Procom (not for display with Touch Control version)
- H PROFIBUS PA and one current output, intrinsically safe (only for Class I, Div. 1)
- L Data interface to Procom DZL 363, power NOT supplied by Procom (not for display with Touch Control version)
- M IS data interface to Procom DZL 363, power NOT supplied by Procom (only for Class I, Div. 1 version, not for display with Touch Control version)
- N IS current / HART and frequency (passive) output (only for Class I, Div. 1 version)
- T PROFIBUS PA and one current output (not for Class I, Div. 1 version)
- W PROFIBUS DP (not for Zone 1/ Class I, Div. 1 version)

* 2.3 pressure test certificate includes individual pressure test of measuring system without couplings, test pressure 7500 psi. 3.1B material certificate includes measuring system and secondary containment.

Promass 63 I Ordering Information

Promass 63 I [1] - [2] [3] [4] [5] [6] [7] [8] [9] [10]

1 Nominal Size / Tube Material

	Size in.	Size mm	Full Scale lb/min liquid	Full Scale lb/min gas	Material
T08	0.37	8	74	7.4	Titanium
T15	0.5	15	238	23.8	Titanium
T16 *	0.5	15	660	66	Titanium
T25	1	25	660	66	Titanium
T26 *	1	25	1650	165	Titanium
T40	1.5	40	1650	165	Titanium
T41 *	1.5	40	2570	257	Titanium
T50	2	50	2570	257	Titanium

2 Process Connection / Material
- AAW 150 lb ANSI / Wetted parts Titanium
- ABW 300 lb ANSI / Wetted parts Titanium
- ACW 600 lb ANSI / Wetted parts Titanium
- CWW Cajon 12-VCO-4 (3/4") couplings / 316L SS (only for 3/8" and 1/2" sensor)
- FT3 Tri-clamp sanitary coupling with 3-A approval
- FTH Tri-clamp coupling, polished verson with 3-A approval, 240 grit finish
- FU3 1/2" Tri-clamp sanitary coupling with 3-A approval (only for 3/8" and 1/2" sensor, not to be used with 1/2" full bore sensor)
- FUH 1/2" Tri-clamp coupling, polished version with 3-A approval, 240 grit finish (only for 3/8" and 1/2" sensor, not to be used with 1/2" full bore sensor)
- FP3 3/4" Tri-clamp sanitary coupling with 3-A approval (only for 3/8", 1/2" and 1/2" full bore sensor)
- FPH 3/4" Tri-clamp coupling, polished version with 3-A approval, 240 grit finish (only for 3/8", 1/2" and 1/2" full bore sensor)

NOTE!
FU3 and FUH cannot be used with 1/2" Full Bore Sensor

3 Secondary Containment / Cerificates **
- 0 360 psi secondary containment
- 2 580 psi senondary containment with 2.3 pressure test certificate
- 3 580 psi secondary containment, including purge connections, with 2.3 pressure test certificate
- 4 580 psi secondary containment, with 3.1B material and 2.3 pressure test certificate
- 5 580 psi secondary containment, including pruge connections, with 3.1B material and 2.3 pressure certificate

4 Calibration
- 0 0.2% flow calibration, standard density calibration
- 1 0.2% flow calibration, 0.4% density calibration
- 2 5-point 0.2% flow calibration, standard density calibration (specify flow range)
- 3 5-point 0.2% flow calibration, 0.4% density calibration (specify flow range)

6 Protection Type / Version
- A NEMA 4X compact version
- B NEMA 4X remote version, 33 ft. cable included
- C NEMA 4X remote version, 66 ft. cable includedr

7 Cable Entries
- 2 1/2" NPT

8 Approvals
- 4 FM approved XP, Class I, Div. 1, Grps C-D; DIP Class II, III, Div. 1, Grps E-G (for 1-1/2" Full Bore sensor and 2" sensor only)
- 5 FM approved NI, Class I, Div. 2, Grps. A-D; DIP Class II, III, Div. 1, Grps. E-G
- 6 FM approved XP, Class I, Div. 1, Grps. A-D; DIP Class II, III, Div. 1, Grps. E-G (for 3/8" to 1-1/2" and 1/2" plus 1" Full Bore sensors only)

9 Display
- A Blind
- B Display with touch control

10 Power Supply
- 1 85 to 260 VAC, 50/60 Hz (not for DoS interface to PROCOM DZL 363)
- 2 20 to 55 VAC, 16 to 62 VDC (not for DoS interface to PROCOM DZL 363)
- 3 Power supplied by Procom DZL 363 transmitter (DoS 2-wire connection only)
- 4 Enhanced climate resistance 85 to 260 VAC, 50/60 Hz
- 5 Enhanced climate resistance 20 to 55 VAC, 16 to 62 VDC
- 6 Enhanced climate resistance Procom DZL supplied power

11 Signal Outputs
- A Frequency and current / HART output
- B Current output and Rackbus RS 485
- C Frequency output and Rackbus RS 485
- D Current output and auxiliary input (must order display option "B")
- E Frequency output and auxiliary input (must order display option "B")
- F 2 current outputs / HART
- G DoS interface to Procom DZL 363 transmitter power supplied by Procom (not for display with Touch Control version)
- H PROFIBUS PA and one current output, intrinsically safe (only for Class I, Div. 1)
- L Data interface to Procom DZL 363, power NOT supplied by Procom (not for display with Touch Control version)
- M IS data interface to Procom DZL 363, power NOT supplied by Procom (only for Class I, Div. 1 version, not for display with Touch Control version)
- N IS current / HART and frequency (passive) output (only for Class I, Div. 1 version)
- T PROFIBUS PA and one current output (not for Class I, Div. 1 version)
- W PROFIBUS DP (not for Zone 1/ Class I, Div. 1 version)

* Full Bore version

** 2.3 pressure test certificate includes individual pressure test of measuring system and type test of secondary containment. 3.1B material certificate includes measuring system and secondary containment.

Promass 63 A Process Connection Adapter Set Ordering Information

DK3A [1] - [2] [3] [4]

1 Size

	in.	mm
02	1/12 and 1/24	1 and 2
04	1/8	4

2 Process Connection / Material

A1	1/4" NPT-F thread adapter / 904L SS
A2	1/4" NPT-F thread adapter / Alloy C-22 (N06022)
B3	1/8" Swagelok connector / 316 SS (only for Promass A 1/24" and 1/12" sensors)
C3	1/4" Swagelok connector / 316 SS
F1	1/2" Lap joint flange, 150 lb ANSI / 316L SS; wetted material 904L SS
F2	1/2" Lap joint flange, 150 lb ANSI / 316L SS; wetted material Alloy C-22 (N06022)
G1	1/2" Lap joint flange, 300 lb ANSI / 316L SS; wetted material 904L SS
G2	1/2" Lap joint flange, 300 lb ANSI / 316L SS; wetted material Alloy C-22 (N06022)

3 Certification

A	Standard

4 Material, Seals

1	Viton o-ring
2	EPDM o-ring
3	Silicone o-ring
4	Kalrez o-ring

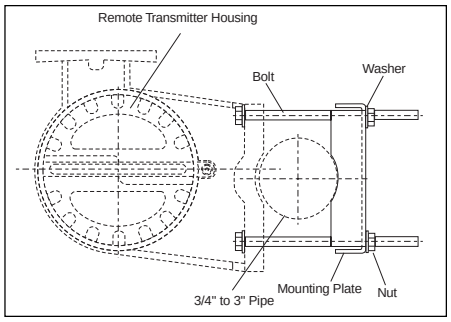
Accessories

Transmitter Pipe Mounting Kit

A mounting kit is available for mounting the Promass 30 / 33 remote transmitter on pipes from 3/4" to 3". The mounting kit includes:

- 1 mounting plate
- 4 bolts, M8 x 150 mm (5-15/16")
- 4 washers
- 8 nuts, M8

Order Part Number: **50076905**



Remote Mounting Kit

Pipe Mounting Stand

For Promass A:
Promass A - code A01 and A02 (1/24" and 1/12" sensor) for pipe sizes 3/4" to 3".
Order Part Number: **50077972**

Promass A - code A04 (1/8" sensor) for pipe sizes 3/4" to 3"
Order Part Number: **50079218**

Supplementary Documentation

System Information Promass	SI 014D/24/ae
Operating Manual Promass 63	BA 014D/24/ae
Technical Information Promass 60	TI 029D/24/ae
Operating Manual Promass 60	BA013D/24/ae

United States

Endress+Hauser
2350 Endress Place
Greenwood, IN 46143
Phone: (317) 535-7138
1-800-428-4344
FAX: (317) 535-8498

Regional Office
Endress+Hauser
600 Kenrick, Ste. B-14
Houston, TX 77060
Phone: (281) 999-1991
FAX: (281) 999-1891

Regional Office
Endress+Hauser
P.O. Box 901
Harvey, LA 70059
Phone: (504) 366-3264
FAX: (504) 366-3816

Sterling IPC
Div. of Endress+Hauser
68950 Powell Road
P.O. Box 604
Romeo, MI 48065
Phone: (810) 752-0700
FAX: (810) 752-0705

Canada

Endress+Hauser
Canada Ltd.
1440 Graham's Lane
Unit 1, Burlington
ON, L7S 1W3
Phone: (905) 681-9292
1-800-668-3199
FAX: (905) 681-9444

Endress+Hauser
Canada Ltée
6800 Côte de Liesse, Ste. 100
St. Laurent, Que
H4T 2A7
Téléphone: (514) 733-0254
Télécopieur: (514) 733-2924

Mexico

Endress+Hauser
Calle Camino Sta. Teresa 1384
C.P. 10200 Mexico D.F.
Phone: (525)568-9658
FAX: (525) 568-4183

Endress+Hauser
The Power of Know How