

FLOW RATE INDICATOR / TOTALIZER

WITH LINEARIZATION AND PULSE
SIGNAL OUTPUT



D-Series advantages

- Unique, robust IP66, IP67 (NEMA Type4X) panel mount front enclosure made of die cast aluminum, allowing even **big jets** of water and **total immersion**.
- Programming can be done by your own crew with the exact same, plain and sensible menu-driven structure like the F-Series, saving cost and irritation. **Know one, know them all!**

Features

- Displays flow rate, total and accumulated total.
- Eight point linearization of the flowcurve - with interpolation.
- Large 17mm (0.67") digits for flow rate or total.
- Ability to process all types of pulse flowmeter signals.
- Auto backup of settings and running totals.
- Ambient temperature -40°C up to +80°C (-40°F up to 176°F).
- LED backlight option.
- Battery powered or 8 - 30V DC powered, 24V AC and 115 - 230V AC.
- Sensor supply 1.2 / 3 / 8.2 / 12 / 24V DC.

Signal output

- Scaled pulse output according to linearized accumulated total, available as passive and active signal or a robust, highly isolated (NO/NC) relay.

Signal input

Flow

- Reed-switch / Sine wave (coil).
- NAMUR.
- NPN/PNP pulse.
- Active pulse signals.

Applications

- The D-Series is a DIN-sized display and the **better alternative** for your existing, not waterproof, front panel mount indicators in extreme weather outdoor applications or e.g. in food industries where working environments are often cleaned with powerful water jets.
- The D016 fits in flow measurement applications with mechanical flowmeters where a precise calculation over the full measurement range is required and re-transmission of the totalizer function is desired. Alternative model: D014 or the F-Series flow rate indicators.

General information

Introduction

The Do16 is a local panel mount indicator with linearization to display the actual flow rate, total and accumulated total. The total can be reset to zero by pressing the CLEAR button twice. The eleven digit accumulated total however can not be reset to zero. In addition to the average K-Factor or Span, eight linearization points can be entered with their frequencies or values. The unit will interpolate between these points greatly enhancing accuracy in any flowrange. Even for very low frequency applications is catered for. This linearization affects all displayed information as well as the pulse output.

Display

The display has large 17mm (0.67") and 8mm (0.31") digits which can be set to show flow rate and totals. On-screen engineering units are easily configured from a comprehensive menu. The accumulated total can register up to 11 digits and is backed-up in EEPROM memory every minute, just as the running total. The display is a transfective type, which means that a high contrast reading is guaranteed, even in full sunlight. A smart display update function achieves a readable display even at -40°C / -40°F.

Backlight

For those applications where readability during day and night is an issue, a white backlight is available. The intensity can be adjusted in the configuration menu.

Configuration

All configuration settings are accessed via a simple operator menu which can be password protected. Each setting is clearly indicated with an alphanumerical description, which avoids confusing abbreviations. Once familiar with one D-series product, you will be able to program **all models in all series** without a manual. All settings are safely stored in EEPROM memory in the event of sudden power failure.

Pulse output

The scaleable pulse output reflects the count on the accumulated display. The pulse length is user defined from 0.001 second up to 10 seconds. The maximum output frequency is 500Hz. The output signal can be a passive NPN, active PNP or a robust, highly isolated electro-mechanical relay (NO/NC).

Signal input

The Do16 accepts most pulse input signals for volumetric flow or mass flow measurement. The input signal type can be selected by the user in the configuration menu without having to adjust any sensitive mechanical dip-switches, jumpers or trimmers.

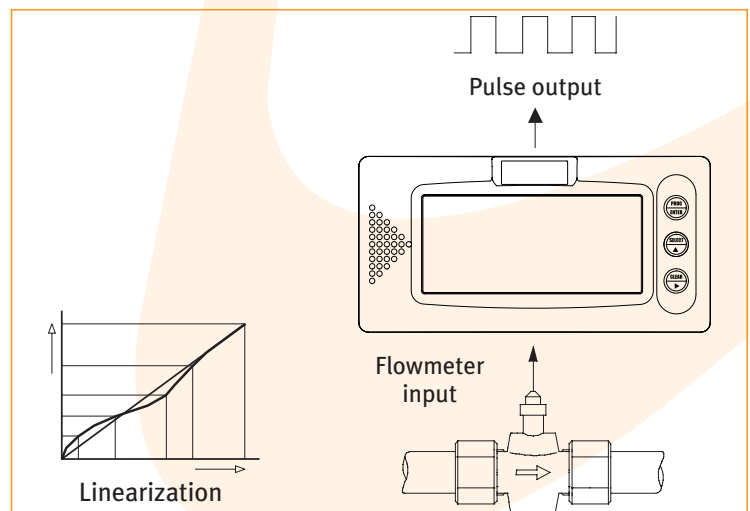
Power requirements

The basic power requirement for the Do16 is 8 - 30V DC. With the 24V AC/DC and 115 - 230V AC power supplies, an 8.2 / 12 / 24V DC sensor supply is offered. Finally we offer a long life lithium battery with a life expectancy that will last up to five years.

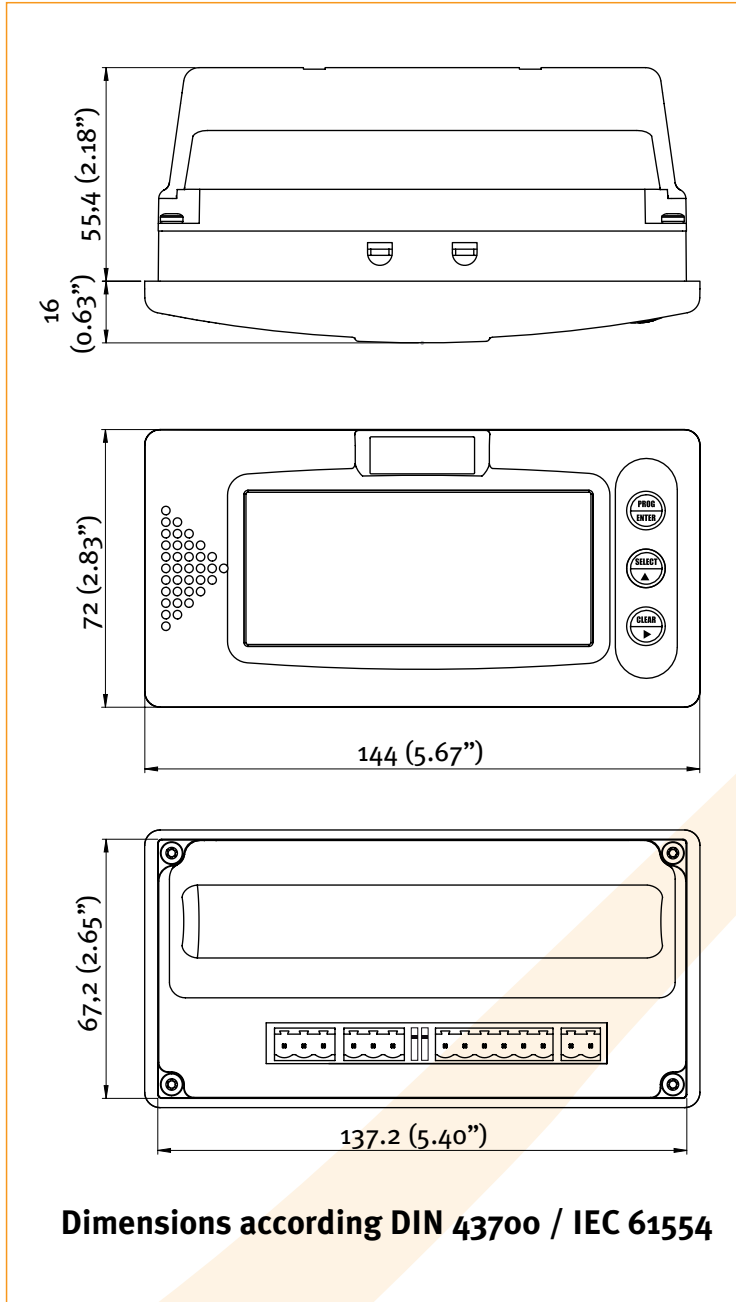
Enclosure

The Do16 is supplied in a unique, robust IP66, IP67 (NEMA Type4X) class panel mount front enclosure made of die cast aluminum, based on a popular DIN sized enclosure of 144 x 72mm. The front enclosure withstands powerful water jets and even total immersion. The maximum thickness of the panel is 6mm (1/4"). The D-Series is the better alternative for your existing, not waterproof, front panel mounted indicators.

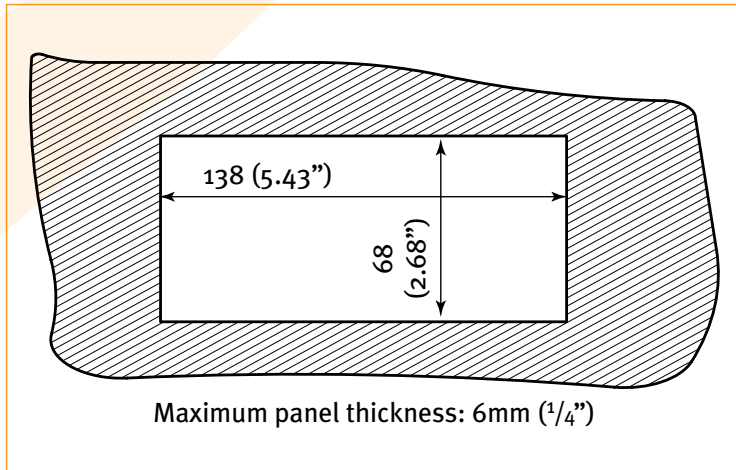
Overview application Do16



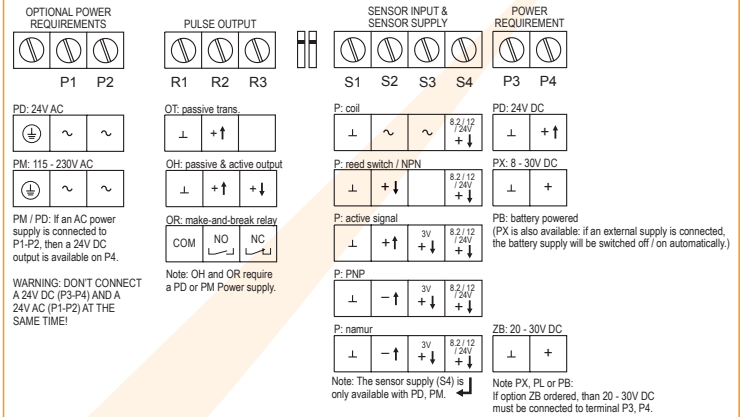
Dimensions enclosure



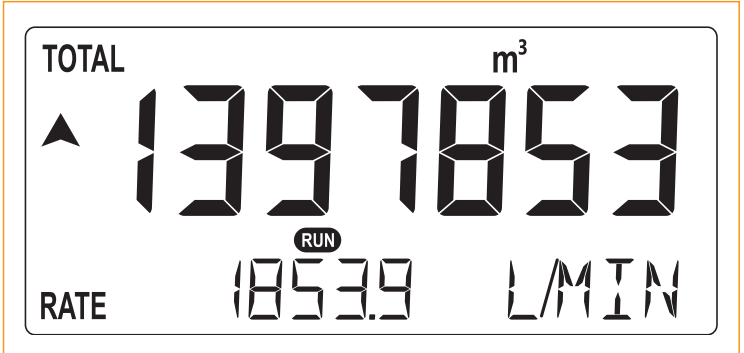
Dimensions panel cut-out



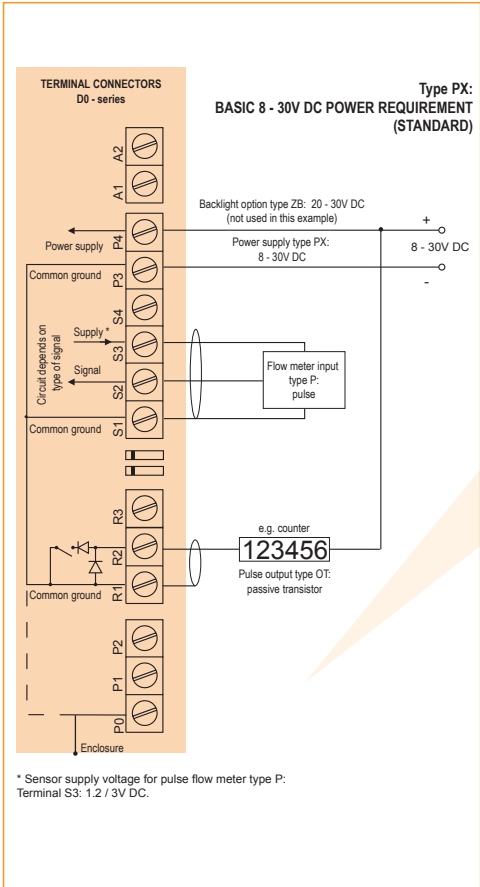
Terminal connections Do16



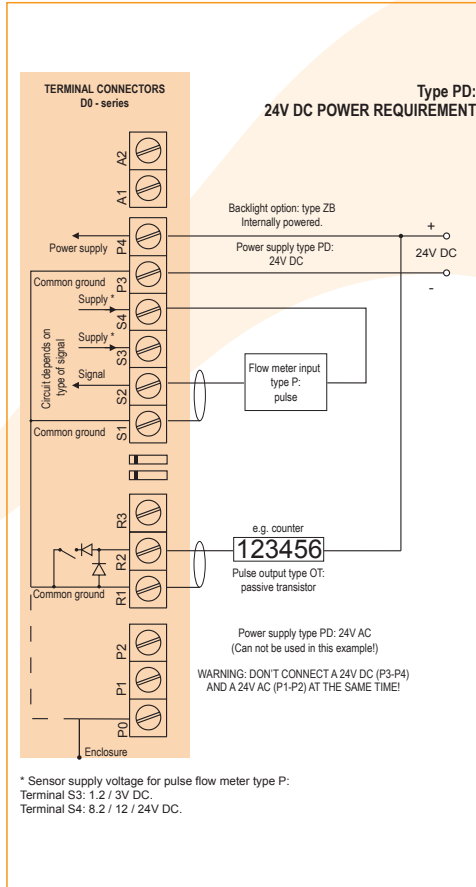
Display example - 90 x 40mm (3.5" x 1.6")



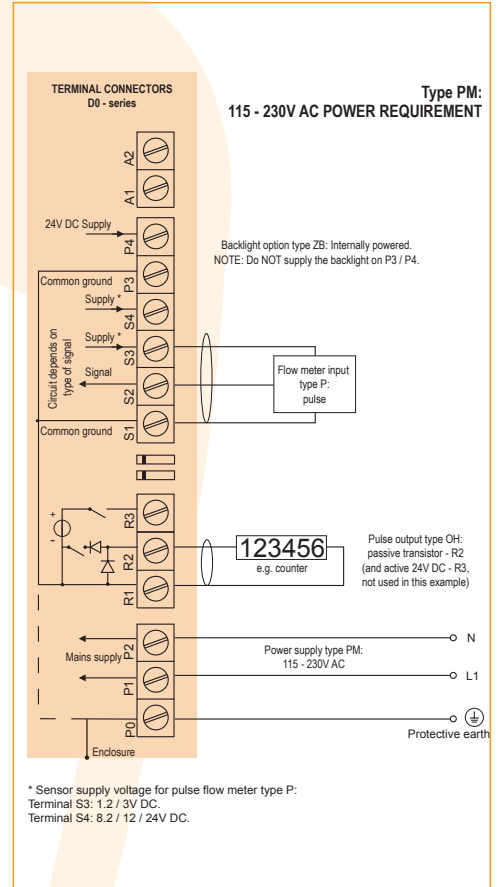
Wiring diagram Do16-P-OT-PX-(ZB)



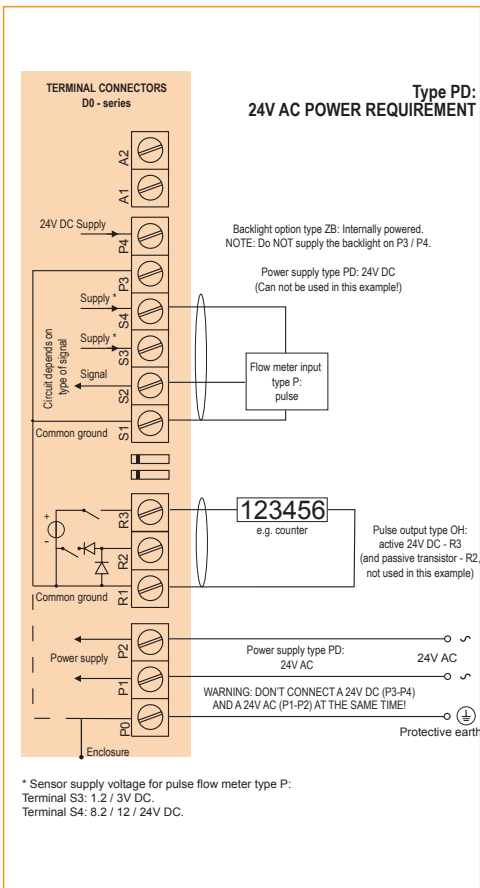
Wiring diagram Do16-P-OT-PD-ZB



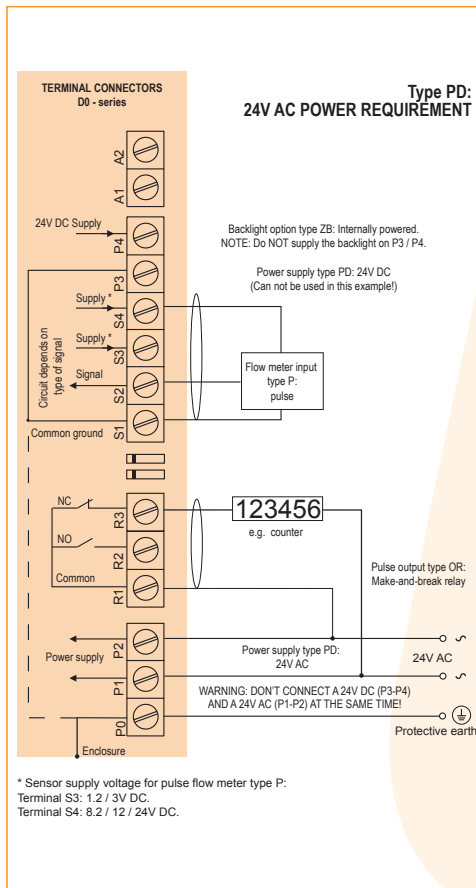
Wiring diagram Do16-P-OH-PM-ZB



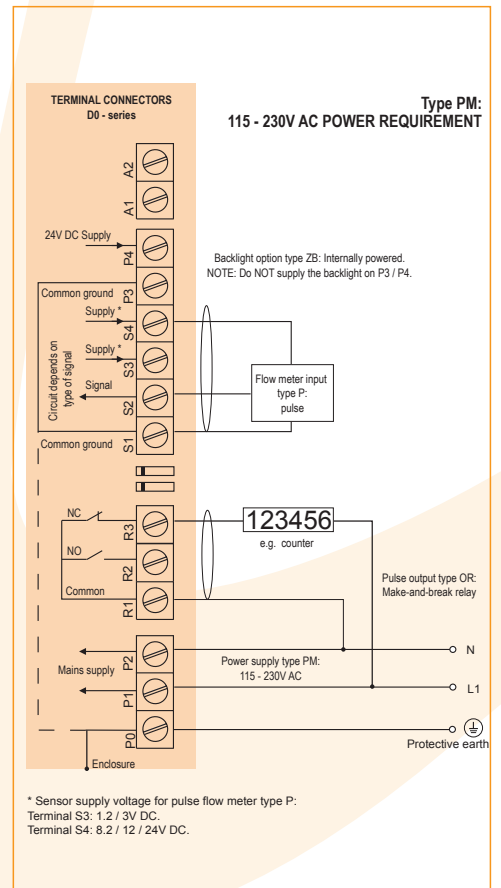
Wiring diagram Do16-P-OH-PD-ZB



Wiring diagram Do16-P-OR-PD-ZB



Wiring diagram Do16-P-OR-PM-ZB



Technical specification

General

Display	
Type	High intensity reflective numeric and alphanumeric LCD, UV-resistant.
Dimensions	90 x 40mm (3.5" x 1.6").
Digits	Seven 17mm (0.67") and eleven 8mm (0.31") digits. Various symbols and measuring units.
Refresh rate	User definable: fast, 1sec, 3sec, 15sec, 30sec, off.
Option ZB	Transflective LCD with white LED-backlight. Intensity can be adjusted in the configuration menu. Good readings in full sunlight and darkness.

Ambient temperature

Safe areas	-40°C to +80°C (-40°F to +176°F).
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Power requirements

Type PB	Long life Lithium battery - life-time depends upon settings and configuration - up to 5 years. (requires PX)
Type PD	24V AC/DC ± 10%. Power consumption max. 10 Watt.
Type PM	115 - 230V AC ± 10%. Power consumption max. 15 Watt.
Type PX	8 - 30V DC. Power consumption max. 0.3 Watt.
Type ZB	20 - 30V DC. Power consumption max. 1 Watt. With type PD / PM: internally powered.

Sensor excitation

Type PB/PX	3V DC for pulse signals and 1.2V DC for coil pick-up.
Note	This is not a real sensor supply. Only suitable for sensors with a very low power consumption like coils (sine wave) and reed-switches.
Type PD / PM	8.2 / 12 / 24V DC 8.2V DC, Iout max. 35mA @ 20°C. 12V DC, Iout max. 50mA @ 20°C. 24V DC, Iout max. 75mA @ 20°C. (this voltage can vary depending on the input supply voltage)
Note PD/PM	Total consumption of sensor, active output OH and backlight may not exceed 75mA @ 24V DC @ 20°C.

Terminal connections

Type	Removable plug-in terminal strip. Wire max. 1.5mm ² and 2.5mm ² .
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Data protection

Type	EEPROM backup of all settings. Data retention at least 10 years.
Password	Configuration settings can be password protected.

Directives & Standards

EMC	Directive 2014/30/EU, FCC 47 CFR part 15.
Low voltage	Directive 2014/35/EU.
RoHS	Directive 2011/65/EU.
IP & NEMA	EN 60529 & NEMA 250.

Enclosure

General	
Window	Polycarbonate window.
Sealing	Silicone.
Control keys	Three industrial micro-switch keys. UV-resistant silicone keypad.

Panel mount enclosure

Dimensions	144 x 72 x 71.4mm (5.67" x 2.83" x 2.81") - W x H x D according DIN 43700 / IEC 61554.
Panel cut-out	138 x 68mm (5.43" x 2.68") L x H.
Material	Die-cast aluminum front panel + GRP back enclosure
Protection	IP66, IP67 (NEMA Type4X) at the front-side.
Weight	325 gr.
Panel thickness	Max. 6mm (1/4").

Signal input

Flowmeter sensor

Type P	Coil / sine wave (HI: 20mVpp or LO: 80mVpp - sensitivity selectable), NPN/PNP, open collector, reed-switch, Namur, active pulse signals 8.2 - 12 - 24V DC.
Frequency	Minimum 0Hz - maximum 7kHz for total and flow rate. Maximum frequency depends on signal type and internal low-pass filter. E.g. reed switch with low-pass filter: max. frequency 120Hz.
K-Factor	0.000010 - 9,999,999 with variable decimal position.
Low-pass filter	Available for all pulse signals.
Option ZF	coil sensitivity 10mVpp.
Option ZG	coil sensitivity 5mVpp.

Signal output

Digital output

Function	Pulse output - transmitting accumulated total.
Frequency	Max. 500Hz. Pulse length user definable between 1msec up to 10 seconds.
Type OH	<ul style="list-style-type: none"> Active 24V DC transistor output (PNP); Load max. 75mA. Requires PD/PM. Passive transistor output (NPN) - not isolated; Max. 24V DC - 300mA per output. Requires PD/PM.
Type OR	Isolated electro-mechanical relay (NO/NC). Req. PD/PM. Maximum resistive load: 2A @ 250V AC / 30V DC. Maximum inductive load: 0.5A (pilot duty applications)
Note OR	In case of inductive load, use RC snubbers.
Type OT	Passive transistor output (NPN) - not isolated. Max. 50V DC - 300mA per output.

Operational

Operator functions

Displayed functions	<ul style="list-style-type: none"> Linearized flow rate and / or total. Linearized total and accumulated total. Total can be reset to zero by pressing the CLEAR-key twice.
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Total

Digits	7 digits.
Units	L, m ³ , GAL, USGAL, kg, lb, bbl, no unit.
Decimals	0 - 1 - 2 or 3.
Note	Total can be reset to zero.

Accumulated total

Digits	11 digits.
Units / decimals	According to selection for total.
Note	Can not be reset to zero.

Flow rate

Digits	7 digits.
Units	mL, L, m ³ , Gallons, kg, Ton, lb, bl, cf, RND, ft ³ , scf, Nm ³ , NI, igaal - no units.
Decimals	0 - 1 - 2 or 3.
Time units	/sec - /min - /hr - /day.

Ordering information

Standard configuration: Do16-P-HB-OT-PX-XX-ZX.

ordering information:	D016	-P	-HB	-O	-P	-XX	-Z
Flowmeter input signal							
P	Pulse input: coil, npn, pnp, namur, reed-switch.						
Panel mount front enclosure - IP66, IP67 (NEMA Type4X)							
HB	Aluminum DIN 43700 / IEC 61554 front panel.						
Digital output signal							
OH	Active and passive transistor output - requires PD / PM.						
OR	Highly isolated mechanical relay output - requires PD / PM.						
OT	Passive transistor output - standard configuration.						
Power requirements							
PD	24V AC / DC + sensor supply.						
PM	115 - 230V AC + sensor supply.						
PX	Basic power supply 8 - 30V DC (no real sensor supply).						
Additional battery supply (optional)							
PB	Lithium battery powered - requires PX.						
Hazardous area							
XX	Safe area only.						
Other options							
ZB	Backlight.						
ZF	Coil input 10mVpp - requires type P.						
ZG	Coil input 5mVpp - requires type P.						
ZX	No options.						

The bold marked text contains the standard configuration.

Specifications are subject to change without notice.



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