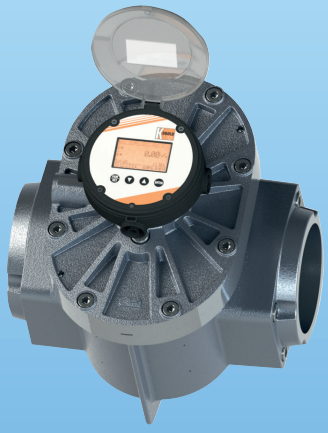
Oval Gear Flowmeter

for Low and High Viscosity Liquids

measuring • monitoring • analyzing

DON



U-PACE

IO-Link

IECEx ATEX

- Measuring Range: 0.13…9.5 GPH to 40…660 GPM
- Viscosity Range: up to 1000 cP (Standard) (Higher Viscosities with Special Cut Rotors)
- Accuracy: ± 0.2% …1% of Reading
- Material: Aluminum or Stainless Steel
- p_{max}: 1450 PSI; t_{max}: 300 °F
- Pulse Output, LCD Display, 4…20 mA, Alarms, Mechanical Totalizer
- Bi-directional Measurement
- U-Pace Electronics: IO-Link and Temperature Measurement

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KOBOLD Instruments, Inc.
1801 Parkway View Drive
Pittsburgh, PA 15205
Main Office:
1.800.998.1020
1.412.788.4890
info@koboldusa.com
www.koboldusa.com

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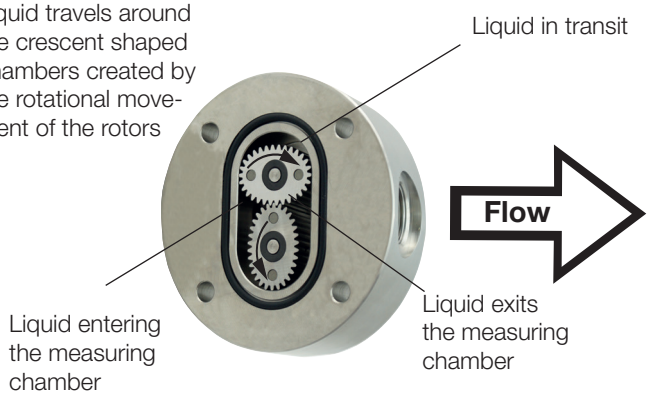
Description

Oval gear flowmeters are categorized as positive displacement flow technology. When liquid flows through this type of positive displacement flowmeter, two oval gear rotors measure a constant volume per rotation within a precisely machined measuring chamber. With each rotation, a constant volume of liquid is measured. The rotation of the oval gears is sensed via magnets embedded within the rotors. These magnets transmit a high resolution pulse output. The output signal can be processed externally via a remote display controller or PLC or via a variety of output/display options available as accessories attached to the flowmeters.

Operation:
Liquid travels around the crescent shaped chambers created by the rotational movement of the rotors



In addition, our U-PACE electronics (Universal Precision and Control Electronics, (order code C3T0) is available and features two outputs arbitrarily configurable by the customer. The compact electronics offers various diagnostic functions and the following features:

- Flow and temperature measurement
- Monitoring, batching and transmitter function
- Batch function with external control input
- Colored, multi-parameter configurable TFT-display, rotatable in 90° increments
- Bidirectional measurement
- Intuitive setup menu via 4 optical touch keys
- 2 configurable outputs (pulse-/frequency-/alarm- and analog output)
- Grand and resettable totalizer
- IO link function

The positive displacement flow technology allows for precise flow measurement of most clean liquids regardless of the media's conductivity. Other liquid properties also have a minimal effect on the performancce of this type of meter. Flow profile conditioning is not required, as with alternative flow technology options, making oval gear installations simple to install in tight spaces and at an economical price.

Areas of Application

Suitable for viscous, non abrasive, clean liquids like:

- Petroleum
- Oil
- Chemicals
- Grease
- Fuels
- Ink
- Pastes

Aluminum body meters are compatible with fuels, fuel oils, & other lubricating liquids. In addition to lubricating media, stainless steel flowmeters are suitable for most products and chemicals.

Technical Data

Materials

DON-1/3	
Body:	Aluminum
Gears:	PPS GF30/PTFE, PEEK
Axles:	316L Stainless Steel
DON-2/4	
Body	
DON-x04 ... DON-x15:	316L Stainless Steel
DON-x20 ... DON-x60:	316L/301* Stainless Steel
Gears	
DON-x04 ... DON-x40:	316L Stainless Steel
DON-x45 ... DON-x60:	301* Stainless Steel
Bearing:	Carbon Graphite
Axles:	316L Stainless Steel

* Closest AISI Equivalent to 1.3955 Stainless Steel

Materials (Continued)

DON-8/9

Body

DON-x04... DON-x15:	316L Stainless Steel
DON-x20 ... DON-x60:	316L/301* Stainless Steel
Gears:	PPS GF 30 / PTFE, PEEK
Axles:	316L Stainless Steel

O-Rings (Media Temperature Limits)

FKM:	-4 ... 300 °F
NBR:	-4 ... 212 °F
FEP with EPDM/FKM core:	5... 248 °F (only for DON-x04...DON-x40)
Fluoroprene®:	-4 ... 300 °F Acc. to Regulation (EC) No. 1935/2004

Electrical Cover (for Cable Connection)

Standard:	Polyamide PA6 GF35 UL94 HB/VO
Optional:	316L Stainless Steel
Cable Entry:	M 20 x 1.5 or 1/2" NPT Adapter

Magnet Encapsulation

DON-x04... DON-x10:	PEEK
DON-x15... DON-x60:	316L Stainless Steel

Screw Material

for Aluminum Housing:	Stainless Steel (Standard) Steel Coated with GEOMET® 321 (for DON-225 and DON-825)
for Stainless Steel Housing:	Stainless Steel (Standard) Steel Coated with GEOMET®321 (optional) for Higher Pressure Rating (See Order Details)

Accuracy**

DON-x04:	± 3% of Reading (0.13...0.95 GPH), ± 1% of Reading (0.95...9.5 GPH)
DON-x05...DON-x15:	± 1% of Reading
DON-x20...DON-x60	
SS Rotors:	± 0.5% of Reading; ± 0.2% of Reading w/ Optional Z3/3A Electronics w/ Linearization Function
PPS Rotors:	± 1% of Reading; ± 0.5% of Reading w/ Optional Z3/3A Electronics w/ Linearization Function
Option M4:	± 1% of Reading (Better Accuracy for higher viscosities on request)
Additional Max. Inaccuracy for Elec. Signal Outputs:	analog output 4-20mA for -Lx and -Zx electronics: ± 0.15% full scale Temperature error referenced to room temperature: analog output -CT: < 200ppm/K frequency output -CT: <100ppm/K
Repeatability:	± 0.03 % Typical
Protection Class:	IP 66/67 (IP 65 for M4)

Media Temperature

Options ..Lx, ..Zx, ..M4:	-4...176 °F
DON-1/3/8/9:	-4...176 °F
DON-2/4 w/ Pulse Out and Option ..Zx w/ Cooling Fins:	-4...248 °F
Option ..T0:	-4...302 °F
Models with PPS / PEEK Rotors:	Max. 176 °F
Ambient Temperature:	-4 ... 176 °F
Option M4:	32...140 °F
Options 1A to 5A:	-4...140 °F
Option CT:	-4...140 °F (at Tmedia ≤ 158°F) -4...110 °F (at Tmedia ≤ 176°F)

** Reference Conditions: DON-x10...x60 (Calibration Oil, 4.6 cSt, 77 °F, 14 PSIG)
DON-x04, DON-x05 and DON-x15 for higher viscosities (Calibration Oil, 10 cSt, 68 °F, 14 PSIG)
Accuracy data is valid for given viscosities and higher

ATEX - Approval
Mechanical Explosion Protection: Ⓔx II 2G Ex h IIC T4/T3 Gb
Options 1A/2A/3A/5A:
Intrinsically Safe Ⓔx II 2G Ex ia IIC T4 Gb
(-20 °C ≤ Ta ≤ +60 °C)

Options HE, DE, BE, KE, GE, LE:
Flameproof Enclosure Ⓔx II 2G Ex db IIC T4/T6 Gb
Ⓔx I M2 Ex db I Mb

Options HA, DA, BA, KA, GA:
Intrinsically Safe Ⓔx II 3G Ex ic IIC T4/T3 Gc

IECEx - Approval
Options HE, DE, BE, KE, GE, LE:
Flameproof Enclosure Ex db IIC T4 Gb
Ex db I Mb

Maximum Pressure (Threaded Models)

Model	Maximum Pressure (PSI)			
	DON-1/3	DON-2/4/8/9	DON-1 (Option-M4)	DON-2/8 (Option-M4)
DON-x04	925	1450	-	-
DON-x05			-	-
DON-x10			-	-
DON-x15			-	-
DON-x20		1000*	580	580
DON-x25		870*		
DON-x30	580	725		
DON-x35			435	435
DON-x40	230	230	230	230
DON-x45				
DON-x50				
DON-x55				
DON-x60				

With flanges: Maximum pressure rating as above or as per flange rating, whichever is lower.
* Max pressure of 1450 psi possible with steel screws (see order details)

Pulse Output (.. H0/HE/HA)

Options H0/HE/HA are equipped with a Reed switch pulse output and a Hall sensor pulse output:

Reed Switch Pulse Output

The reed switch output is a two wire, normally open, SPST, voltage free contact ideal for installations without power or for use in hazardous area locations where Intrinsically Safe (I.S.) is required. Note: when using the reed switch output, the liquid temperature must not change at a rate greater than 18 °F per minute.

Average switching life of reed contact (MTTF):
Max. Load (30 V / 10 mA) 5×10^5 switching cycles
Min. Load (<5 V / 10 mA) 5×10^8 switching cycles
Switching Capacity: Max. 30 V_{DC}, Max. 20 mA

Hall Sensor Pulse Output

With this signal output, a Hall Effect sensor is combined with an active push-pull output. The signal output is actively switched either to +Vs or to ground. No additional external circuit is required (e.g. pull-up resistor). The "high" signal is approximately equal to the supply voltage +Vs and the "low" signal is approximately 0 V. The electronic utilizes a 3-wire connection with an external supply voltage of 8 ... 30 V_{DC}. The electrical load may be optionally connected to the supply voltage or to GND. Maximum output current (current source or sink): 100 mA (short circuit protected).

Hall Sensor Pulse Output (.. HU)

Like option H0, except an NPN output in place of the push-pull output and a supply voltage of 5-30 $V_{DC.}$

Hall Sensor Pulse Output, (.. B0/BE/BA)

Like options H0/HE/HA; however with bipolar sensors and alternating polarized magnets. This option is used for pulsating flow, but is not equipped with a Reed switch and has half the k-factor value as compared to H0/HE/HA.

High-Resolution Hall Sensor Pulse Output, (..G0/GE/GA, ..K0/KE/KA)

Like options H0/HE/HA; the models DON-x05 and DON-x10 can be supplied with four times the pulse count per volume unit (..G0/GE/GA) and models DON-x05, DON-x10 and DON-x15 with double the amount of pulses (..K0/KE/KA) (See table «Output Pulse Resolution» on the following pages).

Quadrature Hall Effect Pulse Output (..D0/DE/DA)

The DON with option D0/DE/DA provides two independent Hall sensors. They are arranged to give separate outputs out of phase with one another.
The QUAD output is mostly suitable for detecting bidirectional flows (detection of flow direction) or where a redundant signal is desirable. Maximum output current per channel (current source or sink): 100 mA (short circuit protected).

Analog Output (..L0/LE)

The options L0 and LE (Exd) are available with a loop-powered 4-20 mA output. The loop must be powered with an external, 16...32 V_{DC} power supply. The maximum resistance of the series loads (PLC analog input / display electronics) depends on the magnitude of the supply voltage and can be calculated as follows:
Max. load [Ohm] = (+Vs – 9 V_{DC}) / 0.02 A [Ω]
Example: +Vs = 32 V_{DC} = > max. load = 1150 Ω
+Vs = 16 V_{DC} => max. load = 350 Ω
The load can be inserted at any point in the current loop, observing correct polarity.

Mechanical Totalizer (..M4)

The DON-x20 .. through DON-x60 .. are available with a 4-digit resettable totalizer and indication of accumulated total value. The motion of the rotors is transmitted to the mechanical register totalizer via an interfacing reduction gear train and dynamic seal assembly. Option M4 is available in liters and gallons for DON-x20 .. through DON-x40 .., and in 10 liters and 10 gallons for DON-x45 .. through DON-x60 ..

Body Material: Enameled Die-cast Aluminum, Powder-coated
Protection: IP 65
Ambient Temp: 32...140 °F
Media Temp: -4...176 °F

Recommended Filter (for example model MFR-DO..):

DON-x04 ... DON-x15 < 75 µm (200 mesh)
DON-x20 ... DON-x35 < 150 µm (100 mesh)
DON-x40 ... DON-x60 < 350 µm (45 mesh)

Electronic with LCD Display

Model	..Z1	..Z2	..Z3	Z5	..ZE	..ZB	..1A	..2A	..3A	..5A
Function	Dual Totalizer	Batching Unit	Rate/Totalizer				Dual Totalizer	Batching Unit	Rate/Totalizer	Rate/Totalizer
Power Supply										
External	5 - 28 V_{DC}	12 - 28 V_{DC}	5 - 28 V_{DC}		9 - 28 V_{DC}	-	U_i = 28 V I_i = 100 mA P_i = 0.7 W			
Battery-Operation (Outputs Inactive)[2]	yes	no	yes	no	yes	yes	yes	no	yes	no
Battery Included in Shipment[3]	yes	-	yes	-	yes	yes	yes	-	yes	-
LCD Display										
Selectable Units	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Decimal Point	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Accumulative Total	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Resettable Total	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Linearization	yes	no	yes	yes	yes	yes	yes	no	yes	yes
Rate Display	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Backlighting	yes	yes	yes	yes	yes	no	no	no	no	no
Input										
Sensors	Hall Sensor / Reed Switch									
Outputs										
4-20 mA	no	no	yes	yes	no	no	no	no	yes	yes
Flow Rate Alarm Min./Max.	no	no	NPN/PNP/ Push-Pull	NPN/PNP/ Push-Pull	no	no	no	no	no	with Solid State Relay Board
Batch End & Control	no	yes	no	no	no	no	no	yes	no	no
Pulse Output	no	no	Push-Pull	Push-Pull	Push-Pull	no	no	no	no	with Solid State Relay Board
2 x SPDT Relays[1]	no	yes	no	yes	no	no	no	with Solid State Relay Board	no	
Installation										
IP 65	yes	yes	yes	yes	IP 66/67	IP 66/67	yes	yes	yes	yes
Cable Entries	M20x1.5 or ½" NPT									
Media Temperature Range (Cooling Fin Option: Max. 250 °F)	-4...176 °F									
Ambient Temperature Range	-4... 176 °F						32 ... 140 °F			
Housing Material	PA6 GF35 UL94 HB/VO / PC UL94 V-2									
ATEX Approval	no						yes			

[1] Replaces solid state outputs, for details see ZOK Datasheet
[2] Battery operation only applicable with the reed switch sensor option of electronics options H0/HE/HA
[3] Options Z5, Z6, Z7, Z8, and Z9 are shipped without batteries

U-PACE electronics (...CT)

The universal U-PACE electronics (Universal Precision and Control Electronics, order code C3T0) features two outputs arbitrarily configurable by the customer. In addition, the U-PACE electronics offers various diagnostic functions and the following features:

- Flow and temperature measurement
- Monitoring, batching and transmitter function
- Batch function with external control input
- Colored, multi-parameter configurable TFT-display, rotatable in 90°steps
- Bidirectional measurement
- Intuitive steup menu via 4 optical touch keys
- 2 configurable outputs (pulse-/frequency-/alarm- and analog output)
- Grand and resettable totallizer
- IO link function

Materials

Housing:	aluminum for DON-1 and DON-3 316L SS for DON-2,4,8,9
Display:	PC
Housing Screw Cap:	PA6

Electrical Details U-PACE

Supply voltage:	19-30 V_{DC} , internal power consumption max. 200mA
Display:	TFT display, 128 x 128 pixels, 1.4" display orientation in 90° steps adjustable
Display repetition rate:	0.5... 10s, adjustable
Pulse output:	Push-Pull, freely scalable, configurable for partial and accumulated totalizer
Frequency output:	Push-Pull, freely scalable, 2kHz @ overflow f_{min} @ FS = 50 HZ f_{max} @ FS = 1000 HZ
Alarm output:	NPN, PNP, Push-Pull configurable max. 30 V_{DC} max. 200mA short-circuit proof
Analog output:	active, 3 wire, 0(4)-20 mA, max. load 500 or 0(2)-10 V_{DC}, (R_i = 500Ω) factory calibrated with R_L = 1M)
Control input:	active signal U_{high} max. 30 V_{DC} 0 < Low < 10 V_{DC} 15 V_{DC} < High < V_s
Batching function:	Batching output OUT2: Push-Pull, High active Control input OUT 1: START/STOP 0.5 s < t_{high} < 4 s RESET t_{high} < 5 s
Response time electrical outputs:	Size X05 to X20 and X45 to X60: < 1.5 s Size Z25 to X40: < 0.5 s

Temperature measurement

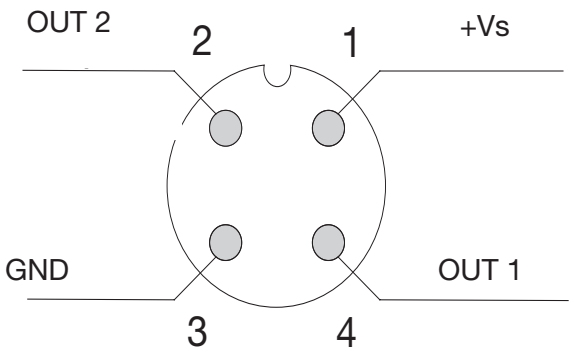
Meas. range:	-4...176°
Accuracy:	± 1.8° F
Response time t_{90} (Sensor)	< 30 sec

Configuration of outputs

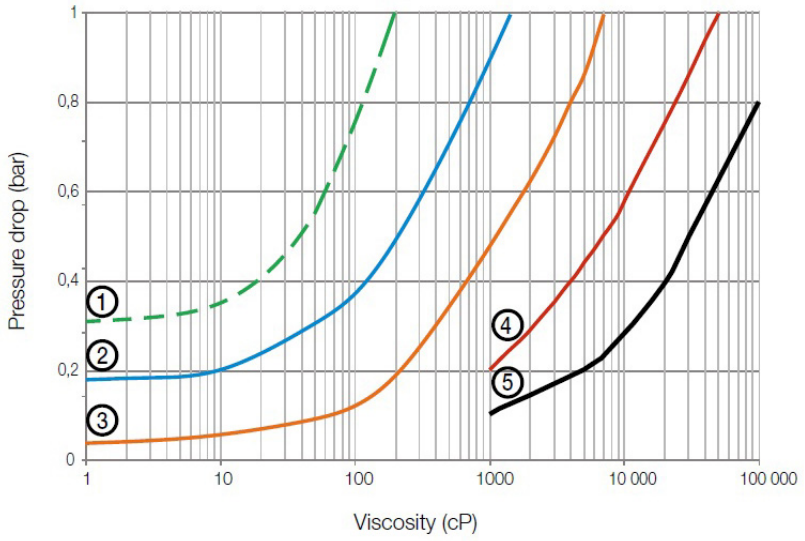
Output 1 (OUT1, PIN4)	Output 2 (OUT2, PIN2)
Analog output 4-20 mA	Analog output 4-20 mA
Analog output 0-20 mA	Analog output 0-20 mA
Analog output 2-10 V	Analog output 2-10 V
Analog output 0-10 V	Anaog output 0-10 V
Switching output NPN/PNP/PP	Switching output NPN/PNP/PP
Pulse output PP	Pulse output PP
Frequency output PP	Frequencey output PP
Communication mode KofiCom	
Communication mode IO-Link	
Control Input	
Control input batching function	Batching output

IO-Link specification

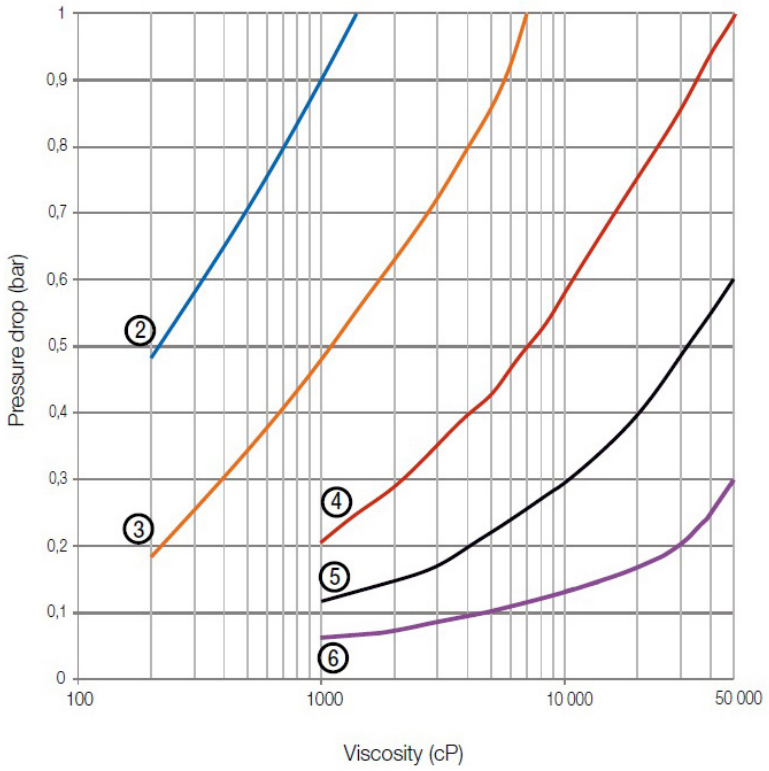
Manufacturer ID:	1105 (decimal), 0 x 0451 (hex)
Manufacturer name:	Kobold Messring GmbH
IO-Link specification:	V1.1
Bitrate:	COM3
Minimal cycle time:	1.1 ms
SIO-Mode:	yes (OUT1 in configuration IO-Link)
Block parameterization:	yes
Operational readiness:	10 s
Max. cable length:	20 m



DON Pressure Drop Versus Viscosity Curves



① Standard Rotors 100 % of Full Scale
② Standard Rotors 50 % of Full Scale
Special Cut Rotors 100 % of Full Scale
③ Standard Rotors 25 % of Full Scale
Special Cut Rotors 50 % of Full Scale
④ Special Rotors 25 % of Full Scale
⑤ Special Rotors 10 % of Full Scale



② Standard Rotors 50 % of Full Scale
Special Cut Rotors 100 % of Full Scale
③ Standard Rotors 25 % of Full Scale
Special Cut Rotors 50 % of Full Scale
④ Special Cut Rotors 25 % of Full Scale
⑤ Special Cut Rotors 10 % of Full Scale
⑥ Special Cut Rotors 5 % of Full Scale

Pressure Drop Limit Versus Flowrate

The curves above represent the pressure drop for standard cut oval rotors. Special cut rotors of DON-3/4/9 have alternate tooth relief which effectively reduces the pressure drop by 50%. When sizing a meter, be sure your selection falls below the 1 bar (14.5 PSI) maximum allowable pressure drop line on the graph.

Maximum Flowrate Multiplier (for Higher Viscosities)

Viscosity (cPs)	Standard Rotor	Special Cut Rotor
≤ **1,000**	1	1
≤ **2,000**	0.5	1
≤ **4,000**	0.42	0.84
≤ **6,000**	0.33	0.66
≤ **8,000**	0.25	0.5
≤ **30,000**	0.15	0.3
≤ **60,000**	0.12	0.25
≤ **150,000**	0.1	0.2
≤ **250,000**	0.05	0.1
≤ **1,000,000**	0.025	0.05

Special Cut Rotors for Higher Viscosities

For viscosities > 1000 cP, special cut rotors of DON/3/4/9 are normally required to keep the maximum pressure drop from exceeding acceptable levels. This option applies to DON-x15 and larger sizes. For higher viscosities, the flowmeter max. flowrate is derated according to the table above. At viscosities < 1000 cP these special rotors are less accurate

Example:

DON-x25G measuring viscous oil at 8000 cP:

max. flow of 40 GPM x 0.5 = 20.0 GPM new max. flow rate.

Noise Level (in dB) at Full Scale

Size	PPS Gears	SS Gears
x25	83	91
x30	84	93.1
x35	83.5	95
x40	85.4	96
x45	87.5	98
x50	86.1	99.4
x55	86.1	98.1
x60	85	99

Information Required for Order:

To ensure proper operation, this product requires a completed application guide form to be submitted with any order. Please refer to the 'documentation' tab on the bottom of the product page for this product on our website in order to obtain the correct form. You can also contact your KOBOLD representative for this form.

Nominal Output Pulse Resolution*

Model	Flow Range (GPM)	Pulse per Gallon					
		Reed Switch Hx	Hall Sensor Hx	Hall Sensor Bx	Quadrature-Hall Sensor Dx	Hall Sensor, High-Resolution Gx	Hall Sensor, High-Resolution Kx
DON-x04	0.13...9.5 GPH	10107	10107	---	10093	42851	20214
DON-x05	0.13...9.5 GPH	10107	10107	---	10093	42851	20214
DON-x10	0.5...27 GPH	4020	4020	---	4020	16080	8040
DON-x15	4...145 GPH	1329	2657	1329	2657	---	5315
DON-x20	0.26...10.6	310	617	310	617	---	---
DON-x25	2.6...40	98	394	98	197	---	---
DON-x30	4.0...66	51	208	51	102	---	---
DON-x35	8.0...120	24.2	96.5	24.2	51.1	---	---
DON-x40	13...150	18.5	74.2	18.5	37.1	---	---
DON-x45	10...200	9.7	39.0	9.7	19.5	---	---
DON-x50	13...260	5.7	22.3	5.7	11.4	---	---
DON-x55	20...400	3.97	15.9	3.97	7.95	---	---
DON-x60	40...660	2.12	8.71	2.12	4.35	---	---

*The output resolution values listed in the above table are only approximate values. The exact output resolution value is noted within the calibration certificate delivered with each flowmeter.

Order Details (Example: **DON-105G N1 1 L0 N 0**)

Measuring Range	Housing / Rotor Material[4]			Connection	O-ring Material	Electronic / Display	Cable Entry	Option
	Aluminum with PPS / PEEK[12] Rotor	Stainless Steel	St. Steel with PPS / PEEK[12] Rotor					
0.13...9.5 GPH	**DON-104G..**	**DON-204G..**	**DON-804G..**	**..N1..** = ⅛" NPT **..R1..** = G ⅛	**..1..** = FKM **..3[14]..** = FEP with EPDM/FKM Core **..4..** = NBR **..5[13]..** = Fluoroprene® **..9..** = Special Materials (not for ATEX)	**..H0..** = Pulse Output Hall Sensor (Push-Pull) / Reed Switch **..HU[14]..** = Pulse Output Hall Sensor (NPN) / Reed Switch, Supply 5-30 V_{DC} **..B0[3]..** = Pulse Output Hall Sensor (Push-Pull) for Pulsating Flow **..T0[8]..** = Pulse Output Hall Sensor (Push-Pull), High-Temp 300 °F Max. **..K0[9]..** = Pulse Output Hall Sensor (Push-Pull), High Resolution (x2) **..G0[2]..** = Pulse Output Hall Sensor (Push-Pull), High Resolution (x4) **..D0..** = Quad. Hall Sensor 2 Phased Outputs (Push-Pull) **..L0..** = 4...20 mA Loop Powered, Analog Output **..Z1..** = LCD Dual Totalizer with Battery Supply, Outputs Deactivated (ZOK-Z1) **..Z2..** = LCD Batching Unit (ZOK-Z2) **..Z3..** = LCD Totalizer, Rate, Outputs: 4-20 mA, Alarm, Pulse (ZOK-Z3) (Impulses not for Battery Supply) **..Z5..** = Z3 + 2 SPDT Relays **..Z6..** = Z1 + B0 **..Z7..** = Z3 + B0 **..Z8..** = Z1 + D0 **..Z9..** = Z3 + D0 **..ZE..** = LCD Rate / Total (ZOE with External Supply / with Battery) **..ZB[11]..** = LCD Rate / Total (ZOE without External Supply / with Battery) **..HE..** = H0 + ATEX (Exd) **..BE[3]..** = B0 + ATEX (Exd) **..KE[9]..** = K0 + ATEX (Exd) **..GE[2]..** = G0 + ATEX (Exd) **..DE..** = D0 + ATEX (Exd) **..LE..** = L0 + ATEX (Exd) **..HA..** = H0 + ATEX (Exi) **..BA[3]..** = B0 + ATEX (Exi) **..KA[9]..** = K0 + ATEX (Exi) **..GA[2]..** = G0 + ATEX (Exi) **..DA..** = D0 + ATEX (Exi) **..1A..** = ZOK-E1 + HA ATEX (Exi) **..2A..** = ZOK-E2 + HA ATEX (Exi) **..3A..** = ZOK-E3 + HA ATEX (Exi) **..5A..** = ZOK-E5 + HA ATEX (Exi) **..CT[15]..** = Compact display, 2 outputs (current/voltage/pulse/frequency/alarm output/10-link configurable) M12 x1 plug	**..M..** = M20 **..N..** = ½" NPT **..S[7]..** = M20 with Cooling Fin **..T[7]..** = ½" NPT with Cooling Fin	**..0** = Without **..N** = Without Battery **..Y** = Special Request, not for ATEX. (Specify in clear text, e.g. check valve)
0.13...9.5 GPH	**DON-105G..**	**DON-205G..**	**DON-805G..**	**..N1..** = ⅛" NPT **..R1..** = G ⅛				
0.5...27 GPH	**DON-110G..**	**DON-210G..**	**DON-810G..**	**..N2..** = ¼" NPT **..R2..** = G ¼				
4...145 GPH	**DON-115G..**	**DON-215G..**	**DON-815G..**	**..N3..** = ⅜" NPT **..R3..** = G ⅜				
0.26...10.6 GPM	**DON-120G..**	**DON-220G..**	**DON-820G..**	**..N4..** = ½" NPT **..R4..** = G ½ **..P4[5]..** = ½" NPT (1450 psi) **..H4[5]..** = G ½ (1450 psi)				
2.6...40 GPM	**DON-125G..**	**DON-225G..**	**DON-825G..**	**..N6..** = 1" NPT **..R6..** = G 1 **..A6..** = 1" 150 lb ANSI Flange **..B6..** = 1" 300 lb ANSI Flange **..F6..** = DN25 PN40 DIN Flange **..P6[5]..** = 1" NPT (1450 psi) **..H6[5]..** = G 1 (1450 psi)				
4.0...66 GPM	**DON-130G..**	**DON-230G..**	**DON-830G..**	**..N8..** = 1½" NPT **..R8..** = G 1½ **..A8..** = 1½" 150 lb ANSI Flange **..B8..** = 1½" 300 lb ANSI Flange **..F8..** = DN40 PN40 DIN Flange				
8.0...120 GPM	**DON-135G..**	**DON-235G..**	**DON-835G..**	**..N9..** = 2" NPT **..R9..** = G 2 **..A9..** = 2" 150 lb ANSI Flange				
13...150 GPM	**DON-140G..**	**DON-240G..**	**DON-840G..**	**..B9[1]..** = 2" 300 lb ANSI Flange **..F9..** = DN50 PN16 DIN Flange **..C9[8]..** = DN50 PN40 DIN Flange				
10...200 GPM	**DON-145G..**	**DON-245G..**	**DON-845G..**	**..NB..** = 3" NPT **..RB..** = G 3 **..AB..** = 3" 150 lb ANSI Flange **..FB..** = DN80 PN16 DIN Flange				
13...260 GPM	**DON-150G..**	**DON-250G..**	**DON-850G..**					
20...400 GPM	**DON-155G..**	**DON-255G..**	**DON-855G..**	**..NC..** = 4" NPT **..RC..** = G 4 **..AC..** = 4" 150 lb ANSI Flange **..FC..** = DN100 PN16 DIN Flange				
40...660 GPM[10]	**DON-160G..**	**DON-260G..**	**DON-860G..**			**..M4[6]..** = Mechanical Totalizer	**..0..** = Without	

[1] Only for DON-x35 [2] Only for DON-x04, -x05 and -x10 [3] Not for DON-x04, -x05 and -x10 [4] Replace 'G' with 'H' to order LPM (LPH) [5] With steel screws, only for DON-2.. and DON-8.. [6] Only for DON-x20...DON-x60. Please specify flow direction when ordering (Possible flow directions: Bottom to Top, Left to Right, or Right to Left) [7] Not for electronic options 1A to 5A, not for DON-1.. and DON-8.. [8] Only for DON-2 [9] Only for DON-x04, -x05, -x10, -x15 without reed switch [10] Calibrated up to 580 GPM. Higher flow rate calibration on request [11] Without backlighting [12] From DON-x20 PPS [13] Only for DON-x04...DON-x20, this version is not calibrated (no calibration certificate). Use k-factor values from the datasheet [14] Only for DON-x04...DON-x40 [15] l/min-package (nameplate (l/min or ml/min, °C, bar)), calibrated range and temperature °C, GPM-package (nameplate (GPM or GPH, °F, PSI)), calibrated range and temperature °F))

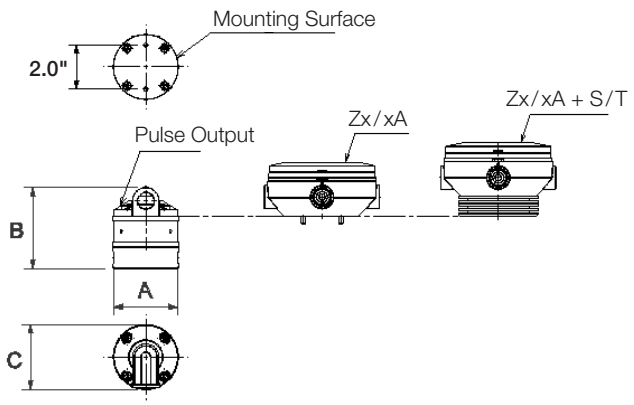
Order Details (Example: **DON-105G N1 1 L0 N 0**)

Measuring Range [15]	Housing/Rotor Material[4]			Connection	O-ring Material	Electronic/Display	Cable Entry	Option
	Aluminum with PPS/PEEK[12] Rotor for High Viscosities	Stainless Steel for High Viscosities	St. Steel with PPS/PEEK[12] Rotor for High Viscosities					
0.13...9.5 GPH	-	-	-	**..N1..** = ⅛" NPT **..R1..** = G ⅛	**..1..** = FKM **..3**[14]**..** = FEP with EPDM/FKM Core **..4..** = NBR **..5**[13]**..** = Fluoroprene® **..9..** = Special Materials (not for ATEX)	**..H0..** = Pulse Output Hall Sensor (Push-Pull)/Reed Switch **..HU**[14]**..** = Pulse Output Hall Sensor (NPN)/Reed Switch, Supply 5-30 V_{DC} **..B0**[3]**..** = Pulse Output Hall Sensor (Push-Pull) for Pulsating Flow **..T0**[8]**..** = Pulse Output Hall Sensor (Push-Pull), High-Temp 300 °F Max. **..K0**[9]**..** = Pulse Output Hall Sensor (Push-Pull), High Resolution (x2) **..G0**[2]**..** = Pulse Output Hall Sensor (Push-Pull), High Resolution (x4) **..D0..** = Quad. Hall Sensor 2 Phased Outputs (Push-Pull) **..L0..** = 4...20 mA Loop Powered Analog Output **..Z1..** = LCD Dual Totalizer with Battery Supply, Outputs Deactivated (ZOK-Z1) **..Z2..** = LCD Batching Unit (ZOK-Z2) **..Z3..** = LCD Totalizer, Rate, Outputs: 4-20 mA, Alarm, Pulse (ZOK-Z3) (Impulses not for Battery Supply) **..Z5..** = Z3 + 2 SPDT Relays **..Z6..** = Z1 + B0 **..Z7..** = Z3 + B0 **..Z8..** = Z1 + D0 **..Z9..** = Z3 + D0 **..ZE..** = LCD Rate/Total (ZOE with External Supply/with Battery) **..ZB**[11]**..** = LCD Rate/Total (ZOE without External Supply/ with Battery) **..HE..** = H0 + ATEX (Exd) **..BE**[3]**..** = B0 + ATEX (Exd) **..KE**[9]**..** = K0 + ATEX (Exd) **..GE**[2]**..** = G0 + ATEX (Exd) **..DE..** = D0 + ATEX (Exd) **..LE..** = L0 + ATEX (Exd) **..HA..** = H0 + ATEX (Exi) **..BA**[3]**..** = B0 + ATEX (Exi) **..KA**[9]**..** = K0 + ATEX (Exi) **..GA**[2]**..** = G0 + ATEX (Exi) **..DA..** = D0 + ATEX (Exi) **..1A..** = ZOK-E1 + HA ATEX (Exi) **..2A..** = ZOK-E2 + HA ATEX (Exi) **..3A..** = ZOK-E3 + HA ATEX (Exi) **..5A..** = ZOK-E5 + HA ATEX (Exi) **..CT**[16]**..** = Compact display, 2 outputs (current/voltage/pulse/frequency/alarm output/10-link configurable) M12 x1 plug	**..M..** = M20 **..N..** = ½" NPT **..S**[7]**..** = M20 with Cooling Fin **..T**[7]**..** = ½" NPT with Cooling Fin	**..0** = Without **..N** = Without Battery **..Y** = Special Request, not for ATEX. (Specify in clear text, e.g. check valve)
0.13...9.5 GPH	-	-	-	**..N1..** = ⅛" NPT **..R1..** = G ⅛				
0.5...27 GPH	-	-	-	**..N2..** = ¼" NPT **..R2..** = G ¼				
4...145 GPH	**DON-315G..**	**DON-415G..**	**DON-915G..**	**..N3..** = ⅜" NPT **..R3..** = G ⅜				
0.26...10.6 GPM	**DON-320G..**	**DON-420G..**	**DON-920G..**	**..N4..** = ½" NPT **..R4..** = G ½ **..P4**[5]**..** = ½" NPT (1450 psi) **..H4**[5]**..** = G ½ (1450 psi)				
2.6...40 GPM	**DON-325G..**	**DON-425G..**	**DON-925G..**	**..N6..** = 1" NPT **..R6..** = G 1 **..A6..** = 1" 150 lb ANSI Flange **..B6..** = 1" 300 lb ANSI Flange **..F6..** = DN25 PN40 DIN Flange **..P6**[5]**..** = 1" NPT (1450 psi) **..H6**[5]**..** = G 1 (1450 psi)				
4.0...66 GPM	**DON-330G..**	**DON-430G..**	**DON-930G..**	**..N8..** = 1½" NPT **..R8..** = G 1½ **..A8..** = 1½" 150 lb ANSI Flange **..B8..** = 1½" 300 lb ANSI Flange **..F8..** = DN40 PN40 DIN Flange				
8.0...120 GPM	**DON-335G..**	**DON-435G..**	**DON-935G..**	**..N9..** = 2" NPT **..R9..** = G 2 **..A9..** = 2" 150 lb ANSI Flange **..B9**[1]**..** = 2" 300 lb ANSI Flange				
13...150 GPM	**DON-340G..**	**DON-440G..**	**DON-940G..**	**..F9..** = DN50 PN16 DIN Flange **..C9**[8]**..** = DN50 PN40 DIN Flange				
10...200 GPM	**DON-345G..**	**DON-445G..**	**DON-945G..**	**..NB..** = 3" NPT **..RB..** = G 3 **..AB..** = 3" 150 lb ANSI Flange				
13...260 GPM	**DON-350G..**	**DON-450G..**	**DON-950G..**	**..FB..** = DN80 PN16 DIN Flange				
20...400 GPM	**DON-355G..**	**DON-455G..**	**DON-955G..**	**..NC..** = 4" NPT **..RC..** = G 4				
40...660 GPM[10]	**DON-360G..**	**DON-460G..**	**DON-960G..**	**..AC..** = 4" 150 lb ANSI Flange **..FC..** = DN100 PN16 DIN Flange		**..M4**[6]**..** = Mechanical Totalizer	**..0..** = Without	

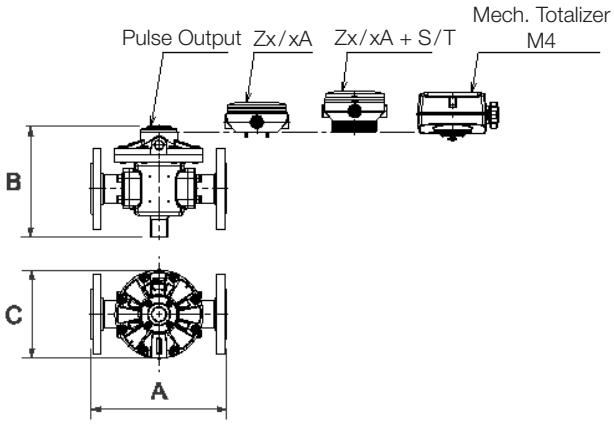
[1] Only for DON-x35 [2] Only for DON-x04, -x05 and -x10 [3] Not for DON-x04, -x05 and -x10 [4] Replace 'G' with 'H' to order LPM (LPH) [5] With steel screws, only for DON-3.. and DON-9.. [6] Only for DON-x20...DON-x60. Please specify flow direction when ordering (Possible flow directions: Bottom to Top, Left to Right, or Right to Left) [7] Not for electronic options 1A to 5A, not for DON-3.. and DON-9.. [8] Only for DON-4 [9] Only for DON-x04, -x05, -x10, -x15 without reed switch [10] Calibrated up to 580 GPM. Higher flow rate calibration on request [11] Without backlighting [12] From DON-x20 PPS [13] Only for DON-x04...DON-x20, this version is not calibrated (no calibration certificate). Use k-factor values from the datasheet [14] Only for DON-x04...DON-x40 [15] Refer to the "Maximum Flowrate Multiplier (for Higher Viscosities)" table for the actual max. flow rate [16] l/min-package (nameplate (l/min or ml/min, °C, bar)), calibrated range and temperatue °C, GPM-package (nameplate (GPM or GPH, °F, PSI)), calibrated range and temperature °F))

Dimensions DON-1/2/3/4/8/9)...

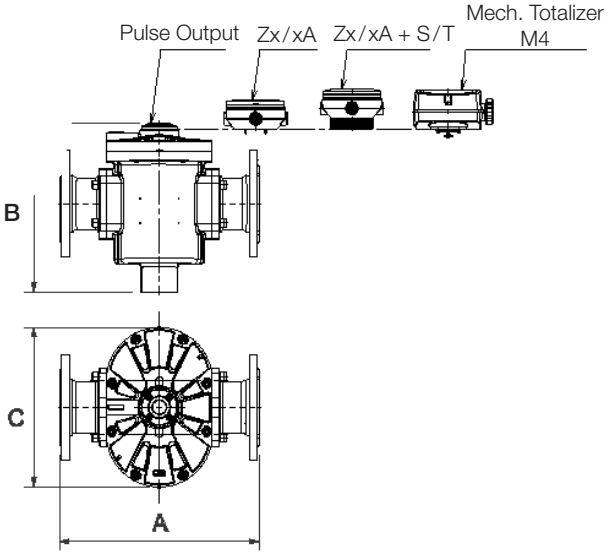
DON-x04...DON-x15



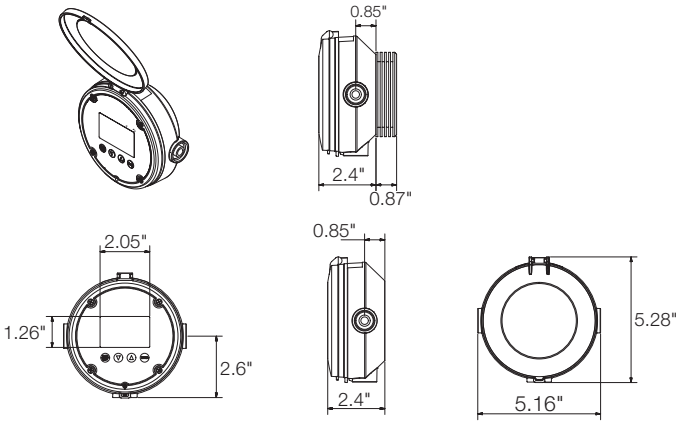
DON-x20...DON-x40



DON-x45...DON-x60



Electronic with LCD Display Zx/xA



Dimensions* DON-1/2/3/4/8/9... (± 0.08")

Model	A		B			C		
	Thread Connection	Flange Connection	Pulse Output	Zx/xA	Mechanical Totalizer M4	Pulse Output/Lx	Zx/xA	Mechanical Totalizer M4
DON-x04	2.67"	-	3.62"	5.16"	-	2.83"	5.28"	-
DON-x05	2.67"	-	3.62"	5.16"	-	2.83"	5.28"	-
DON-x10	2.67"	-	3.62"	5.16"	-	2.83"	5.28"	-
DON-x15	2.67"	-	3.89"	5.43"	-	2.83"	5.28"	-
DON-x20	4.33"	-	4.13" (3.98")	5.28" (5.12")	7.17" (7.01")	4.41"	5.28"	6.50"
DON-x25	6.93"	9.33"	5.36"	6.50"	7.64"	4.72"	5.28"	6.69"
DON-x30	7.40"	9.92"	6.54"	7.68"	8.78"	6.42"	6.42"	7.88"
DON-x35	8.34"	10.90"	6.77"	7.92"	9.61"	7.09"	7.09"	7.88"
DON-x40	8.34"	10.90"	9.69"	10.83"	11.77"	7.09"	7.09"	7.88"
DON-x45	10.50"	13.90"	9.13"	10.28"	11.18"	9.37"	9.37"	9.41"
DON-x50	11.60"	15.00"	9.02"	10.16"	11.89"	11.41"	11.41"	11.41"
DON-x55	11.60"	15.30"	10.80"	11.93"	13.66"	11.41"	11.41"	11.41"
DON-x60	12.60"	16.30"	13.80"	14.96"	16.70"	13.03"	13.03"	13.03"

**Dimensions for DON-2/4/8/9... are specified in ( ) only when they are different from DON-1/3...*

DON with CT Electronics