

PROJECT: _____	UNIT TAG: _____	QUANTITY: _____
REPRESENTATIVE: _____	TYPE OF SERVICE: _____	DATE: _____
ENGINEER: _____	SUBMITTED BY: _____	DATE: _____
CONTRACTOR: _____	APPROVED BY: _____	DATE: _____
	ORDER NO.: _____	DATE: _____

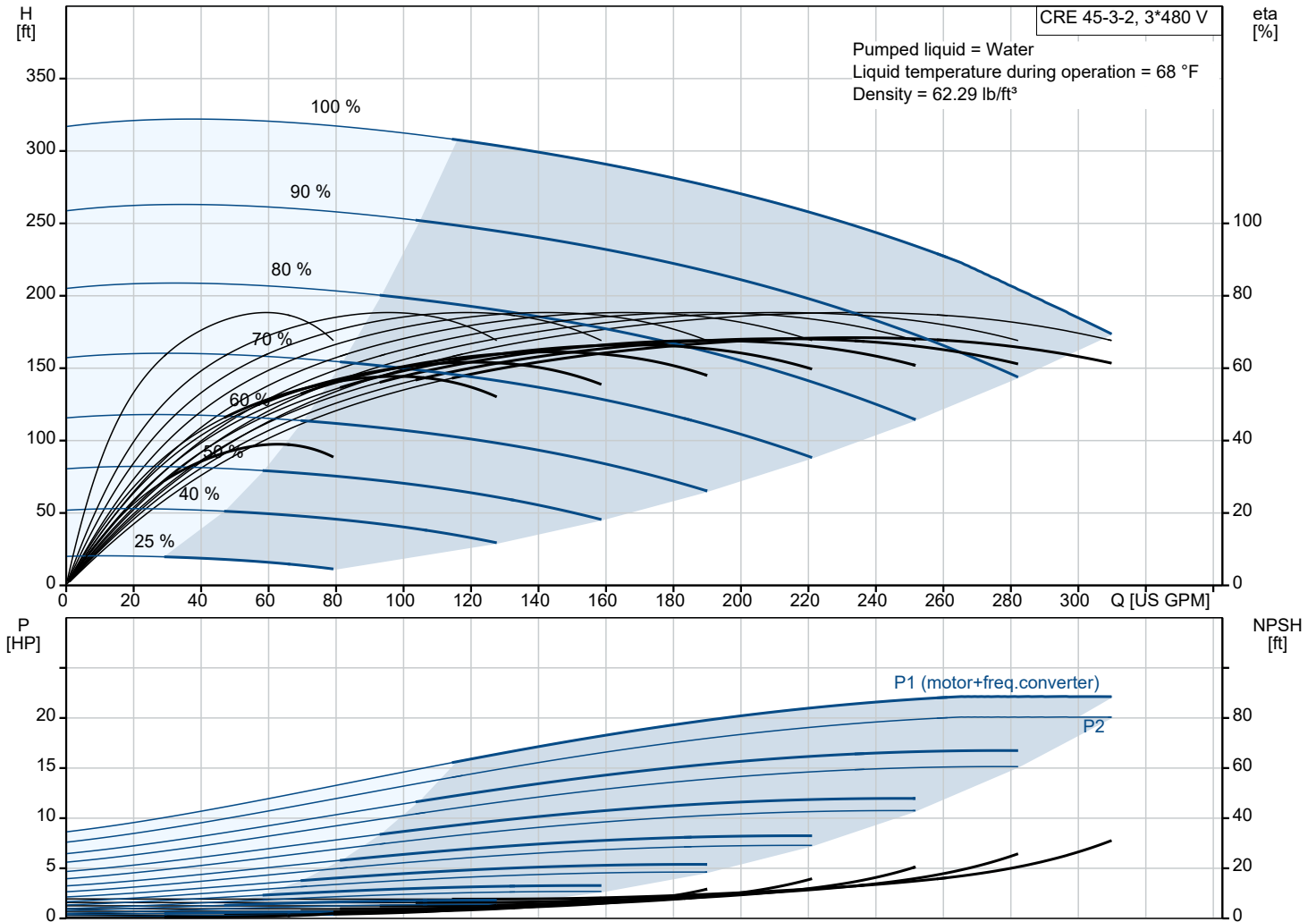


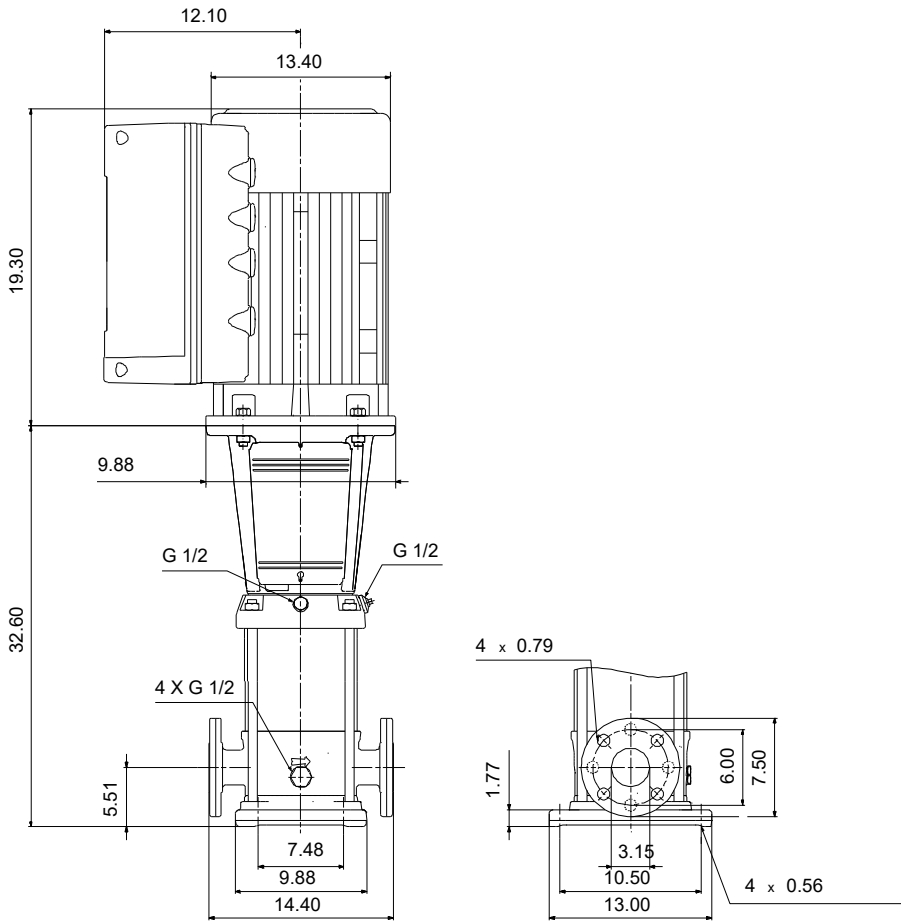
CRE 45-3-2 N-G-A-E-HQQE

Vertical, multistage centrifugal pump with integrated frequency converter. The pump head and base are in cast iron - all other wetted parts are in stainless steel (EN 1.4301)

Note! Product picture may differ from actual product

Conditions of Service		Pump Data		Motor Data	
Liquid:	Water	Max pressure at stated temp:	232 psi / 250 °F	Rated power - P2:	20 HP
Temperature:	68 °F	Liquid temperature range:	-22 .. 248 °F	Rated voltage:	460 V
Specific Gravity:	1.000	Maximum ambient temperature:	104 °F	Mains frequency:	60 Hz
		Shaft seal:	HQQE	Enclosure class:	IP55
		Product number:	98183640	Insulation class:	F
				Motor protection:	YES
				Motor type:	160AB
				Eta 1/1:	91.0 %





Materials:

- Base: Cast iron
- Base: EN 1563 EN-GJS-500-7
- Base: ASTM A536 80-55-06
- Impeller: Stainless steel
- Impeller: AISI 304
- Impeller: EN 1.4301
- Material code: A
- Code for rubber: E

Qty.	Description
------	-------------

1 **CRE 45-3-2 N-G-A-E-HQQE**



Note! Product picture may differ from actual product

Product No.: [98183640](#)

Vertical, multistage centrifugal pump with inlet and outlet ports on same the level (inline). The pump head and base are in cast iron – all other wetted parts are in stainless steel. A cartridge shaft seal ensures high reliability, safe handling, and easy access and service. Power transmission is via a rigid split coupling. Pipe connection is via ANSI flanges.

The pump is fitted with a 3-phase, fan-cooled asynchronous motor.

The motor includes a frequency converter and PI controller in the motor terminal box. This enables continuously variable control of the motor speed, which again enables adaptation of the performance to a given requirement.

An operating panel on the motor terminal box enables setting of required setpoint as well as setting of pump to "Min." or "Max." operation or to "Stop". The operating panel has indicator lights for "Operation" and "Fault".

Communication with the pump is possible by means of Grundfos GO Remote (accessory). The remote control enables further settings as well as reading out of a number of parameters such as "Actual value", "Speed", "Power input" and total "Power consumption".

The terminal box holds terminals for these connections:

- pump start/stop input (potential-free contact)
- remote setpoint setting via analog signal, 0-10 V, 0(4)-20 mA
- 10 V voltage supply for setpoint potentiometer, I_{max} = 5 mA
- three analog sensor inputs, 0-10 V, 0(4)-20 mA; the factory-fitted pressure sensor is connected to one of these inputs
- 24 V voltage supply for sensor, I_{max} = 40 mA
- one analog output
- three digital inputs
- two Pt100 inputs
- two potential-free fault signal relays with changeover contact, reporting "Fault", "Operation" or "Ready"
- RS-485 GENIbus connection
- interface for Grundfos CIM fieldbus module.

Liquid:

Pumped liquid: Water
 Liquid temperature range: -22 .. 248 °F
 Selected liquid temperature: 68 °F
 Density: 62.29 lb/ft³

Technical:

Pump speed on which pump data are based: 3497 rpm
 Rated flow: 238 US GPM
 Rated head: 247.4 ft
 Actual impeller diameter: 5.37 in
 Pump orientation: Vertical
 Shaft seal arrangement: Single
 Code for shaft seal: HQQE
 Approvals: CURUS
 Approvals for drinking water: NSF/ANSI 61
 Curve tolerance: ISO9906:2012 3B

Materials:

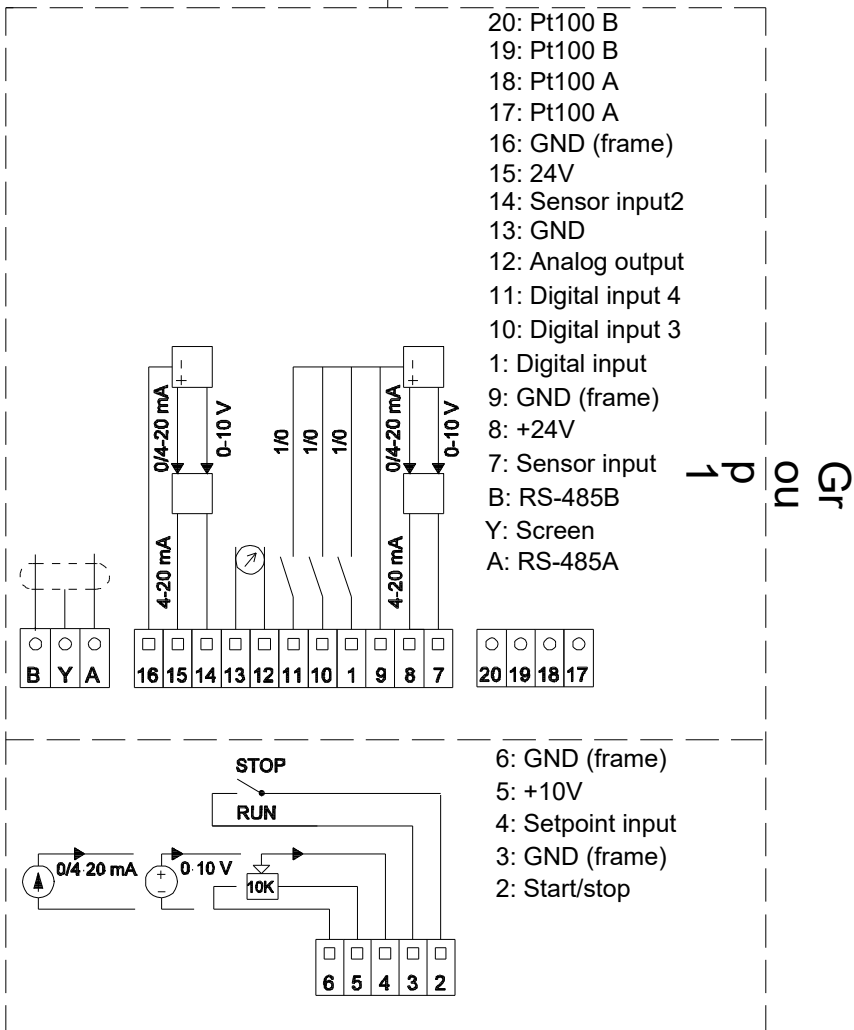
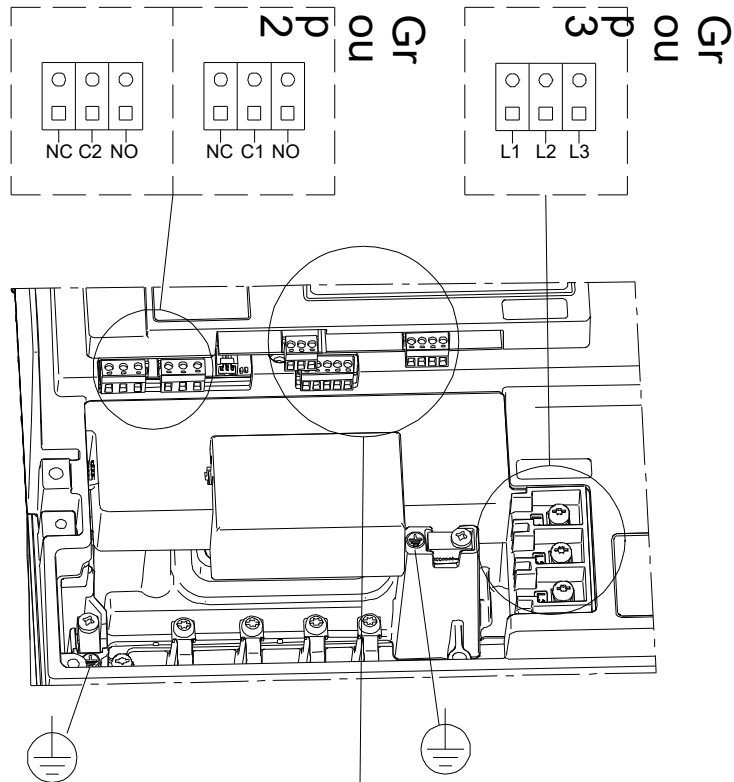
Base: Cast iron
 EN 1563 EN-GJS-500-7
 ASTM A536 80-55-06
 Impeller: Stainless steel
 EN 1.4301
 AISI 304
 Bearing: SIC
 Support bearing: Graflon

Installation:

t max amb: 104 °F
 Maximum operating pressure: 232.06 psi
 Max pressure at stated temp: 232 psi / 250 °F

Qty.	Description
	232 psi / -22 °F
	Type of connection: ANSI
	Size of inlet connection: 3 inch
	Size of outlet connection: 3 inch
	Pressure rating for connection: PN 16
	Flange rating inlet: 150 lb
	Flange size for motor: 254TC
	Electrical data:
	Motor standard: NEMA
	Motor type: 160AB
	IE Efficiency class: NEMA Premium / IE3 60Hz
	Rated power - P2: 20 HP
	Power (P2) required by pump: 20 HP
	Mains frequency: 60 Hz
	Rated voltage: 3 x 460 V
	Service factor: 1.15
	Rated current: 26 A
	Cos phi - power factor: 0.89
	Rated speed: 480-3540 rpm
	Efficiency: IE3 91,0%
	Motor efficiency at full load: 91.0 %
	Number of poles: 2
	Enclosure class (IEC 34-5): IP55
	Insulation class (IEC 85): F
	Motor No: 85901137
	Controls:
	Frequency converter: Built-in
	Pressure sensor: Y
	Others:
	DOE Pump Energy Index VL: 0.46
	Net weight: 444 lb
	Gross weight: 462 lb
	Shipping volume: 29 ft³

98183640 CRE 45-3-2 N-G-A-E-HQQE 60 Hz



Note! All units are in [in] unless others are stated.

Ball Valves

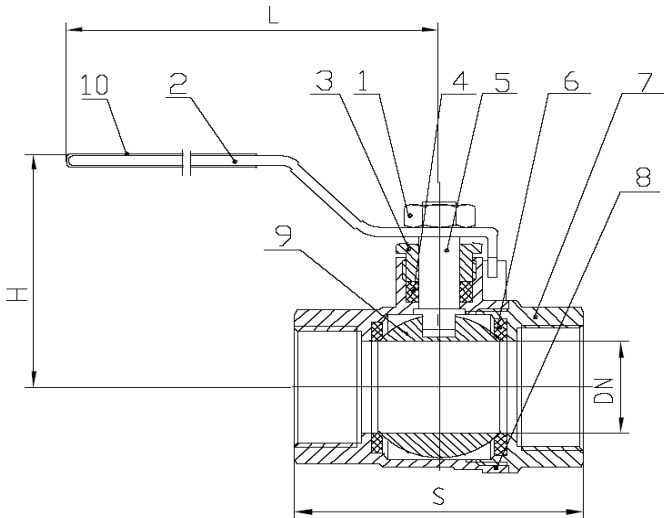


General

- Threaded Ends
- Blow Out Proof Stem
- 600 WOG
- 2-Piece Body
- Teflon Seats
- Teflon Packing

Dimensions & Weights

Size	DN (in)	S (in)	H (in)	L (in)	WT. (lb)
1/4"	0.39	1.76	1.75	3.54	0.35
3/4"	0.75	2.50	2.18	3.94	0.79
1-1/4"	1.26	3.42	2.87	4.80	1.75
1-1/2"	1.57	3.76	3.48	5.91	2.47
2"	1.97	4.25	3.82	5.91	3.46

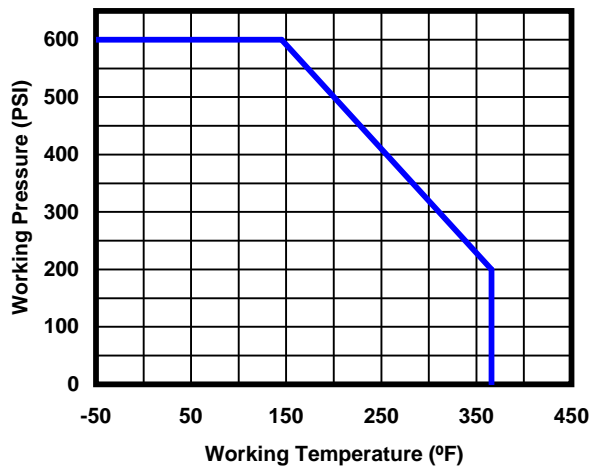


MATERIAL SPECIFICATIONS

NO. PART	MATERIAL (ASTM)
1 NUT	ZINC PLATED STEEL
2 HANDLE	ZINC PLATED STEEL
3 BONNET	BRASS (C37000)
4 PACKING	TEFLON
5 STEM	BRASS (C37000)
6 BALL SEAT	TEFLON
7 END PIECE	LOW LEAD BRASS (LTN60-6)
8 BODY	LOW LEAD BRASS (LTN60-6)
9 BALL	LOW LEAD BRASS (LTN60-6)
10 SLEEVE	PVC

APPROVALS

- NSF 61, IAPMO - N4359
- AB1953, IAPMO - 5653



Wafer Check Valve Silent Check Model 888

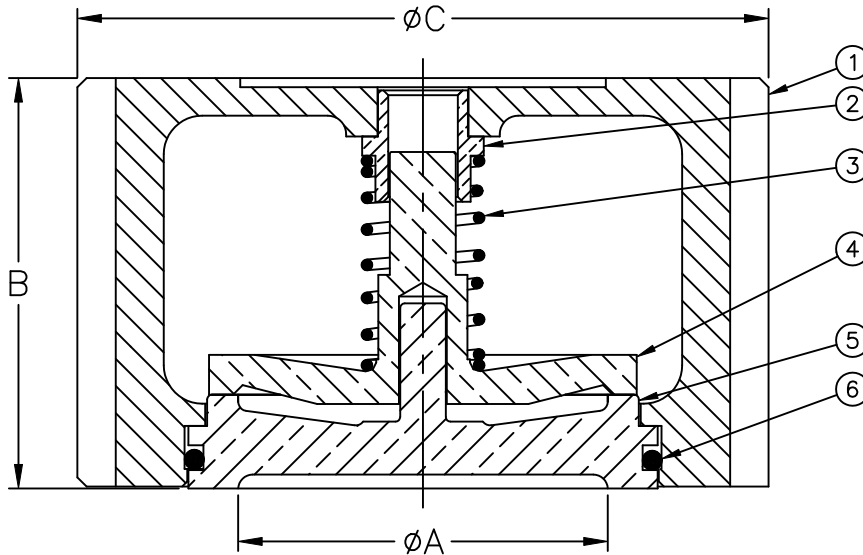
Sizes 2" Thru 6" / 50 mm & 150 mm



Flomatic Corporation



Materials



Item #	Qty	Description	Material	ASTM
1	1	Body (Epoxy Coated)	Cast Iron	A126, Class B
2	1	Bushing	Bronze	C95400
3	1	Spring	Stainless Steel	302
4	1	Poppet	Silicon Brass	C87800
5	1	Seat Ring*	Silicon Brass	C87800
6	1	O'Ring	Buna-n	-----

*OPTIONAL RESILIENT SEAT AVAILABLE, ADD "R" TO THE PART NUMBER 5" AND THE RESILIENT SEATED VALVES ARE NOT NSF61 APPROVED

Max Temp 180°F (82°C)

Max Inlet Pressure (125#) 200 psi (14bar)

Max Inlet Pressure (250#) 400 psi (27bar)

PATENT # 6,024,121

Dimensions

Size		Part #	A		B		C		Weight		# of Bolts		Bolt Size by Flange	
inch	mm		inch	mm	inch	mm	inch	mm	lbs	kg	125#	250#	125#	250#
2	50	2434	2-13/32	61	2-5/8	67	4-1/4	108	5	2.5	4	8	5/8 x 5-1/4	5/8 x 5-1/2
2-1/2	65	2432	2-9/16	65	2-7/8	73	5	127	7	3	4	8	5/8 x 5-1/4	3/4 x 6-1/2
3	80	2435	3-1/4	83	3-1/8	79	5-3/4	146	11	5	4	8	5/8 x 6-1/4	3/4 x 7
4	100	2436	4-3/8	111	4	102	7	178	18	8	8	8	5/8 x 7	3/4 x 8
5	125	2433	5-1/4	133	4-3/4	121	8-3/8	213	25	11.5	8	8	3/4 x 7-3/4	3/4 x 9
6	150	2437	5-29/32	150	5-1/2	140	9-3/4	248	36	16.5	8	12	3/4 x 8-3/4	3/4 x 10

Flomatic Corporation can accept no responsibility for possible errors in catalogues, brochures and other printed material. Flomatic Corporation reserves the right to alter its products without notices. This also applies to product already agreed. All trademarks in this material are property of the respective companies. All right reserved. ©2011 Flomatic Corporation. The drawings & information on this drawing sheet are the sole & exclusive property of Flomatic Corporation. Any reproduction, distribution, display or use of these drawings or information in whole or in part without written authorization of Flomatic Corporation is strictly prohibited.



April 4, 1995
Dwg No: S888-1 Rev S (3/15)

FLOMATIC CORPORATION
GLENS FALLS, N.Y. 12801
PHONE (518) 761-9797
FAX (518) 761-9798

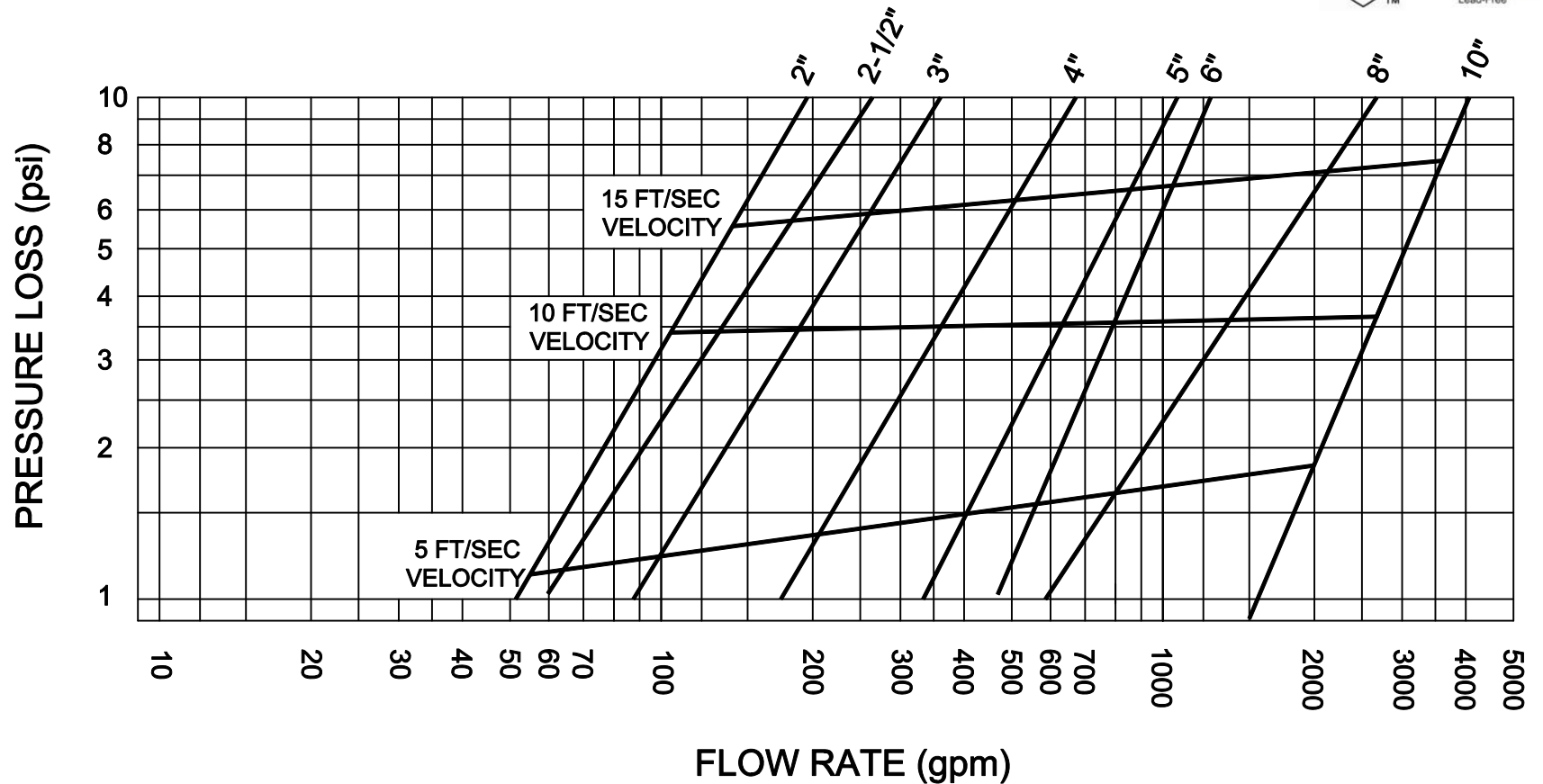
Wafer Check Valve

Headloss Chart

Model 888/888R



Sizes 2" thru 10"/ 50 mm thru 250 mm



PATENT # 6,024,121

Flomatic Corporation can accept no responsibility for possible errors in catalogues, brochures and other printed material. Flomatic Corporation reserves the right to alter its products without notices. This also applies to product already agreed. All trademarks in this material are property of the respective companies. All right reserved. ©2011 Flomatic Corporation. The drawings & information on this drawing sheet are the sole & exclusive property of Flomatic Corporation. Any reproduction, distribution, display or use of these drawings or information in whole or in part without written authorization of Flomatic Corporation is strictly prohibited.



December 28, 1994
Dwg No: S888HL Rev: E (6/13)

FLOMATIC CORPORATION
GLENS FALLS, N.Y. 12801
PHONE (518) 761-9797
FAX (518) 761-9798

D80 Series

Dry or Liquid Filled • Stainless Steel Case

UTILITY GAUGES



D82LFB shown



- ▶ 1 1/2", 2", 2 1/2", 4" Dial Sizes
- ▶ ±1.6% Accuracy (1% Optional)
- ▶ Stainless Steel Case
- ▶ Glycerine Fill Standard

The Trerice **D80 Series** Industrial Gauge is designed for rugged performance requirements at an economical cost. This liquid filled gauge is furnished with a stainless steel case and crimped ring. Wetted parts are either bronze tube with Lead-Free (PBF) brass socket or stainless steel.

- Optional features and case style variations available: Please consult the Options & Accessories Section for details.
- For correct use and application of all pressure gauges, please refer to: Pressure Gauge Standard ASME B40.100.

Specifications

Models	Wetted Parts	
D82B	(dry)	Bronze tube, brass socket
D82LFB	(liquid filled)	Lead-Free (PBF) Meets NSF/ANSI Standards 372 and 61
D83SS	(dry)	316 Stainless steel tube & socket
D83LFSS	(liquid filled)	
Dial Sizes	1 1/2", 2", 2 1/2", 4"	
Fill	Glycerine, other fills available See Optional Features Section	
Movement	D82: Brass D83: 316 Stainless steel	
Connection	Lower male or center back male, (Lower back male 4" Dial only)	
Case	304 stainless steel, stem-mounted flangeless	
Ring	Crimped 304 stainless steel	
Window	Acrylic	
Pointer	Plain, black finished	
Dial Face	Aluminum, white background with black graduations and markings	
Accuracy	±1.6% Full Scale (1% available as an option)	
Maximum Temperature	150°F (65°C)	

Approximate Shipping Weight

- 1 1/2" Dial Size: 0.4 lbs [0.18 kg]
- 2" Dial Size: 0.4 lbs [0.18 kg]
- 2 1/2" Dial Size: 0.5 lbs [0.23 kg]
- 4" Dial Size: 1.0 lbs [0.45 kg]

HOW TO ORDER

Sample Order Number: **D82LFB 25 02 L A 110**

Model	Dial Size	Connection Size	Connection Location	Units of Measure	Range Code
D82LFB	15 1 1/2"	01 1/8 NPT*	L Lower	A psi	See Standard Ranges
D83LFSS	20 2"	02 1/4 NPT**	B Back	D psi/kPa	
D82B	25 2 1/2"	04 1/2 NPT***			
D83SS	40 4"				

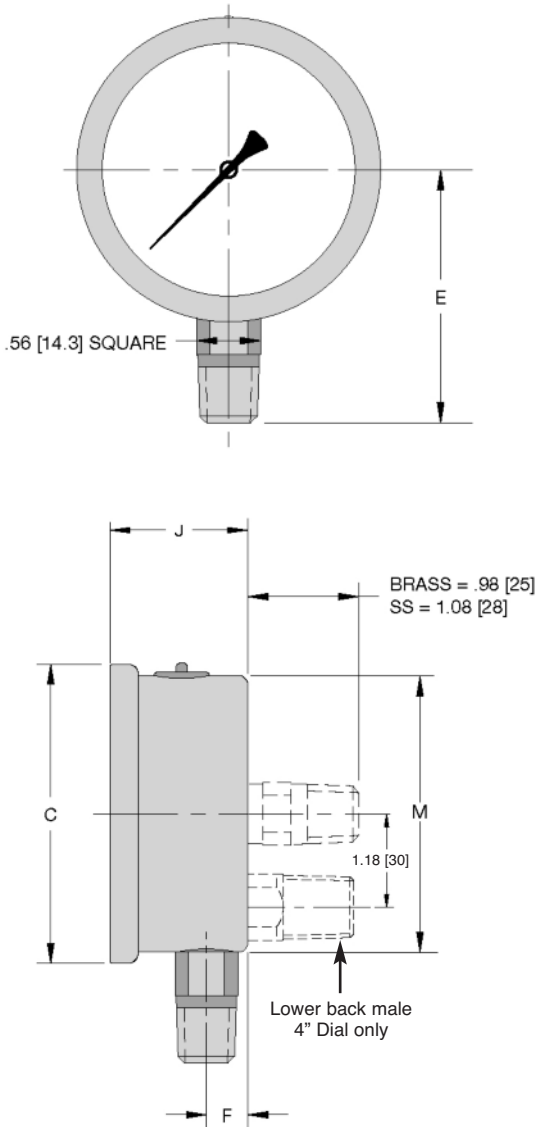
- * 1/8 NPT connection size not available with 4" dial size.
- ** 1/4 NPT connection size not available with 1 1/2" dial size.
- *** 1/2 NPT connection size only available with 4" dial size.

D80 Series

Dry or Liquid Filled • Stainless Steel Case

All dimensions are nominal. Dimensions in [] are in millimeters.

UTILITY GAUGES



Standard Ranges

psi Ranges (A)		D82		D83	
Range Code	Specific Range (psi)	Figure Intervals	Minor Divisions	Figure Intervals	Minor Divisions
010	30" Hg to 0	5	0.5	5	0.5
020	30" Hg to 15 psi	10/5	1/0.5	10/5	1/0.5
030	30" Hg to 30 psi	10/5	1/1	10/5	1/1
040	30" Hg to 60 psi	10/10	2/1	10/10	2/1
050	30" Hg to 100 psi	30/20	2/2	30/20	2/2
060	30" Hg to 150 psi	30/30	5/2	30/30	5/2
070	30" Hg to 300 psi	30/50	5/5	30/50	5/5
080	0 to 15 psi	3	0.2	3	0.2
090	0 to 30 psi	5	0.5	5	0.5
100	0 to 60 psi	10	1	10	1
110	0 to 100 psi	10	1	10	1
120	0 to 160 psi	20	2	20	2
130	0 to 200 psi	20	2	20	2
140	0 to 300 psi	50	5	50	5
150	0 to 400 psi	50	5	50	5
160	0 to 600 psi	100	10	100	10
180	0 to 1000 psi	100	20	100	20
190	0 to 1500 psi	300	20	300	20
200	0 to 2000 psi	200	20	200	20
210	0 to 3000 psi	500	50	500	50
220	0 to 5000 psi	1000	100	1000	100

Ranges over 5000 PSI are not available on D82LFB.

230	0 to 10000 psi	N/A	N/A	2000	200
240	0 to 15000 psi	N/A	N/A	3000	200

For dual scale ranges specify the appropriate **Units of Measure: D** (psi/kPa) followed by the corresponding **A** (psi) **Range Code**

Dial Size	C	E	F	J	M
1 1/2" D82	1.85 [47]	1.50 [38]	0.32 [8]	1.06 [27]	1.61 [41]
1 1/2" D83	1.85 [47]	1.50 [38]	0.32 [8]	1.06 [27]	1.61 [41]
2" D82	2.28 [58]	1.89 [48]	0.39 [10]	1.14 [29]	2.05 [52]
2" D83	2.28 [58]	2.05 [52]	0.35 [9]	1.18 [30]	2.05 [52]
2 1/2" D82	2.68 [68]	2.24 [57]	0.39 [10]	1.18 [30]	2.44 [62]
2 1/2" D83	2.68 [68]	2.32 [59]	0.51 [13]	1.38 [35]	2.44 [62]
4" D82	4.29 [109]	3.07 [78]	0.47 [12]	1.42 [36]	3.90 [99]
4" D83	4.29 [109]	3.94 [100]	0.75 [19]	1.93 [49]	3.94 [100]

Data sheet

MBS 3000 pressure transmitter for industrial applications

Introduction

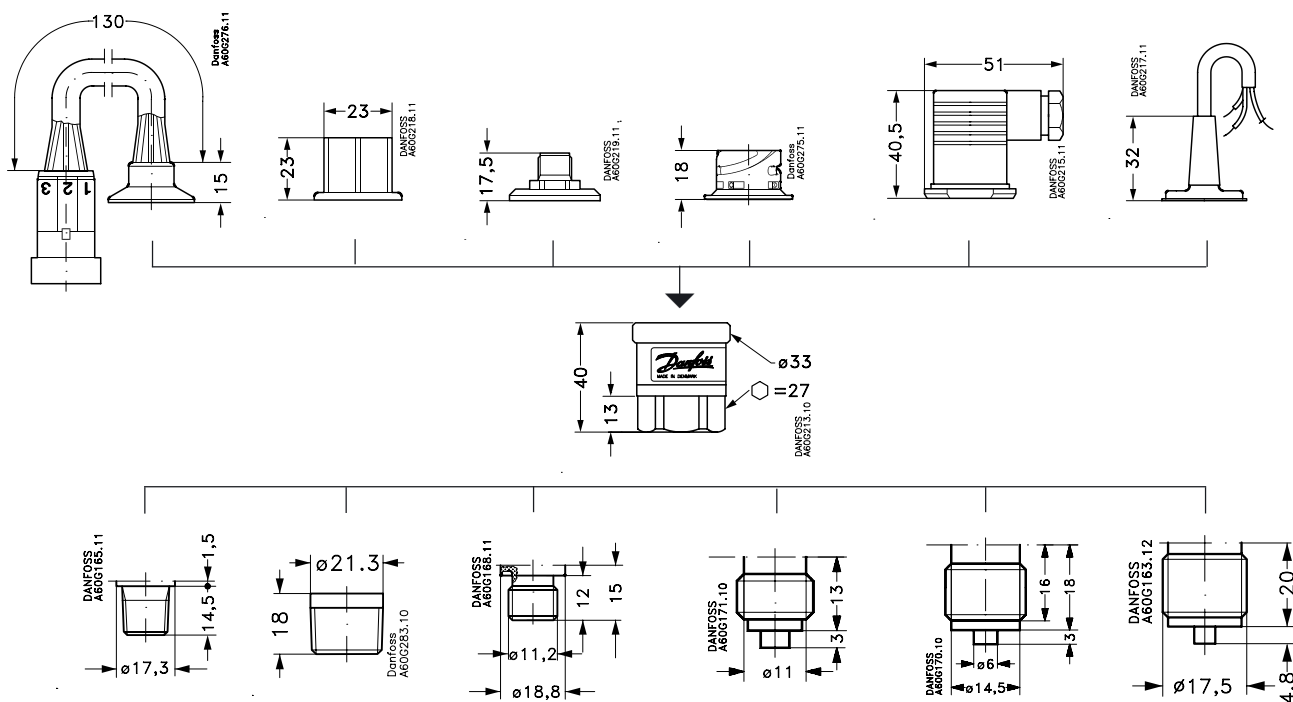


- Designed for use in severe industrial environments
- Enclosure and wetted parts of acid-resistant stainless steel (AISI 316L)
- All standard output signals: 4-20 mA, 0-5 V, 1-5 V, 1-6 V, 0-10 V
- A wide range of pressure and electrical connections
- Temperature compensated and laser calibrated
- Typical applications:
 - Pumps
 - Compressors
 - Pneumatics
 - Water treatment

Dimensions

Ordering

Type code Page 4	8	2	5	7	1	3
	AMP Superseal 1.5 series (male)	AMP Econoseal J series (male)	IEC 947-5-2 M12x1, 4-pin	ISO 15170-A1-3.2-Sn (Bayonet plug)	DIN 43650, Pg 9	2 m screened cable



Ordering

	1/4 - 18 NPT	1/2 - 14 NPT	DIN 3852-E-G1/4 Gasket: DIN 3869-14	G 1/4 A (EN 837)	G 3/8 A (EN 837)	G 1/2 A (EN 837)
Type code page 4	AC04	AC08	GB04	AB04	AB06	AB08

Technical data

Main specifications

Pressure connections	see page 1							
Measuring ranges [bar]	0-1 0-25	0-1.6 0-40	0-2.5 0-60	0-4 0-100	0-6 0-160	0-10 0-250	0-16 0-400	0-600
Output signals	4-20 mA	0-5 V	1-5 V	1-6 V	0-10 V			
Electrical connections	see page 3							

Performance (IEC 770)

Accuracy	±0.5% FS (typ.) ±1% FS (max.)
Non-linearity (best fit straight line)	≤ ±0.5% FS
Hysteresis and repeatability	≤ ±0.1% FS
Thermal zero point shift	≤ ±0.1% FS/10K (typ.) ≤ ±0.2% FS/10K (max.)
Thermal sensitivity (span) shift	≤ ±0.1% FS/10K (typ.) ≤ ±0.2% FS/10K (max.)
Response time	< 4 ms
Overload pressure	6 × FS (max. 1500 bar)
Burst pressure	6 × FS (max. 2000 bar)
Durability, P: 10-90% FS	>10×10 ⁶ cycles

Electrical specifications

	Nom. output signal (short-circuit protected)		
	4 – 20 mA	0-5, 1-5, 1-6 V d.c.	0-10 V d.c.
Supply voltage [U _B], polarity protected	9 → 32 V d.c.	9 → 30 V d.c.	15 → 30 V d.c.
Supply - current consumption	-	≤ 5 mA	≤ 8 mA
Supply voltage dependency	≤ ±0.05% FS/10 V		
Current limitation (linear output up to 1.5x nom. range)	34 mA (typ.)	-	
Output impedance	≤ 25Ω		
Load [R _L] (load connected to 0V)	R _L ≤ (U _B -9V)/0.02	R _L ≥ 10 kΩ	R _L ≥ 15 kΩ

Environmental conditions

Medium temperature range	-40 → +85°C		
Ambient temperature range (depending on electrical connection)	see page 3		
Compensated temperature range	0 → +80°C		
Transport temperature range	-50 → +85°C		
EMC - Emission	EN 61000-6-3		
EMC - Immunity	Electrostatic discharge	Air mode 8 kV	EN 61000-6-2
		Contact mode 4 kV	EN 61000-6-2
	RF field	10 V/m, 26 MHz - 1 GHz	EN 61000-6-2
		conducted 10 V _{rms} , 150 kHz - 30 MHz	EN 61000-6-2
	Transient	burst 4 kV (CM), Clamp	EN 61000-6-2
surge 1 kV (CM,DM), Rg = 42Ω		EN 61000-6-2	
Insulation resistance	> 100 MΩ at 100 V d.c.		
Mains frequency test	500 V, 50 Hz	SEN 361503	
Vibration stability	Sinusoidal	15.9 mm-pp, 5Hz-25Hz	IEC 60068-2-6
		20 g, 25 Hz - 2 kHz	
Shock resistance	Random	7.5 g _{rms} , 5 Hz - 1 kHz	IEC 60068-2-34, IEC 60068-2-36
	Shock	500 g / 1 ms	IEC 60068-2-27
Enclosure (depending on electrical connection)	Free fall	IEC 60068-2-32	
	see page 3		

Mechanical characteristics

Materials	Wetted parts	DIN 17440-1.4404 (AISI 316 L)
	Enclosure	DIN 17440-1.4404 (AISI 316 L)
	Electrical connections	see page 3
Weight (depending on pressure connection and electrical connection)	0.2-0.3 kg	

Electrical connections

Type code, page 4					
1	2	5	7	8	3
DIN 43650, Pg 9 	AMP Econoseal J series (male) 	IEC 947-5-2 M12x1 	ISO 15170-A1-3.2-Sn (Bayonet plug) 	AMP Superseal 1.5 series (male) 	2 m screened cable
<i>Ambient temperature</i>					
-40 → + 85 °C	-40 → + 85 °C	-25 → +85 °C	-40 → +85 °C	-40 → +85 °C	-30 → +85 °C
<i>Enclosure</i>					
IP 65	IP 67	IP 67	IP 67 / IP 69K	IP 67	IP67
<i>Materials</i>					
Glass filled polyamid, PA 6.6	Glass filled polyamid, PA 6.6 ¹⁾	Nickel plated brass, CuZn/Ni	Glass filled polyester, PBT	Glass filled polyamid, PA 6.6 ²⁾	Polyolifin cable with PE shrinkage tubing
<i>Electrical connection, 4-20 mA output (2 wire)</i>					
Pin 1: +supply Pin 2: ÷supply Pin 3: Not used Earth: Connected to MBS housing	Pin 1: +supply Pin 2: ÷supply Pin 3: Not used	Pin 1: +supply Pin 2: Not used Pin 3: Not used Pin 4: ÷supply	Pin 1: +supply Pin 2: ÷supply Pin 3: Ventilation Pin 4: Not used	Pin 1: +supply Pin 2: ÷supply Pin 3: Not used	Brown wire: +supply Black wire: ÷supply Red wire: Not used Orange: Not used Screen: Not connected to MBS housing
<i>Electrical connection, 0-5V, 1-5V, 1-6V, 0-10V output</i>					
Pin 1: +supply Pin 2: ÷supply Pin 3: Output Earth: Connected to MBS housing	Pin 1: +supply Pin 2: ÷supply Pin 3: Output	Pin 1: +supply Pin 2: not used Pin 3: Output Pin 4: ÷supply	Pin 1: +supply Pin 2: Output Pin 3: Ventilation Pin 4: ÷supply	Pin 1: +supply Pin 2: ÷supply Pin 3: Output	Brown wire: Output Black wire: ÷supply Red wire: + supply Orange: Not used Screen: Not connected to MBS housing

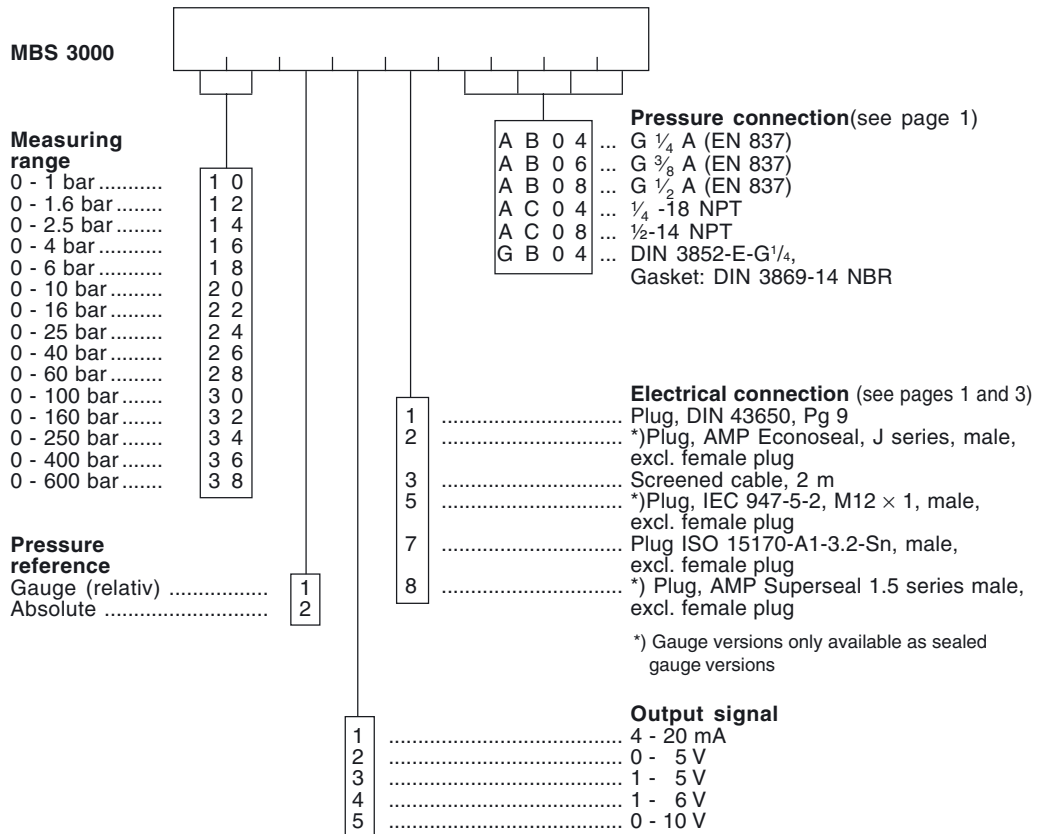
¹⁾ Female plug: Glass filled polyester, PBT

²⁾ Wire: PETFE (teflon)
Protection sleeve: PBT mesh (polyester)

Ordering of standard MBS 3000 with DIN 43650 plug Pg 9

Pressure connection	Pressure range Pe	Type	Code no.
G 1/4 A (EN 837)	0 - 1 bar	MBS 3000 1011-1 AB04	060G1113
	0 - 1.6 bar	MBS 3000 1211-1 AB04	060G1429
	0 - 2.5 bar	MBS 3000 1411-1 AB04	060G1122
	0 - 4 bar	MBS 3000 1611-1 AB04	060G1123
	0 - 6 bar	MBS 3000 1811-1 AB04	060G1124
	0 - 10 bar	MBS 3000 2011-1 AB04	060G1125
	0 - 16 bar	MBS 3000 2211-1 AB04	060G1133
	0 - 25 bar	MBS 3000 2411-1 AB04	060G1430
	0 - 40 bar	MBS 3000 2611-1 AB04	060G1105
	0 - 60 bar	MBS 3000 2811-1 AB04	060G1106
	0 - 100 bar	MBS 3000 3011-1 AB04	060G1107
	0 - 160 bar	MBS 3000 3211-1 AB04	060G1112
	0 - 250 bar	MBS 3000 3411-1 AB04	060G1111
	0 - 400 bar	MBS 3000 3611-1 AB04	060G1109
0 - 600 bar	MBS 3000 3811-1 AB04	060G1110	

Ordering of special versions



Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.