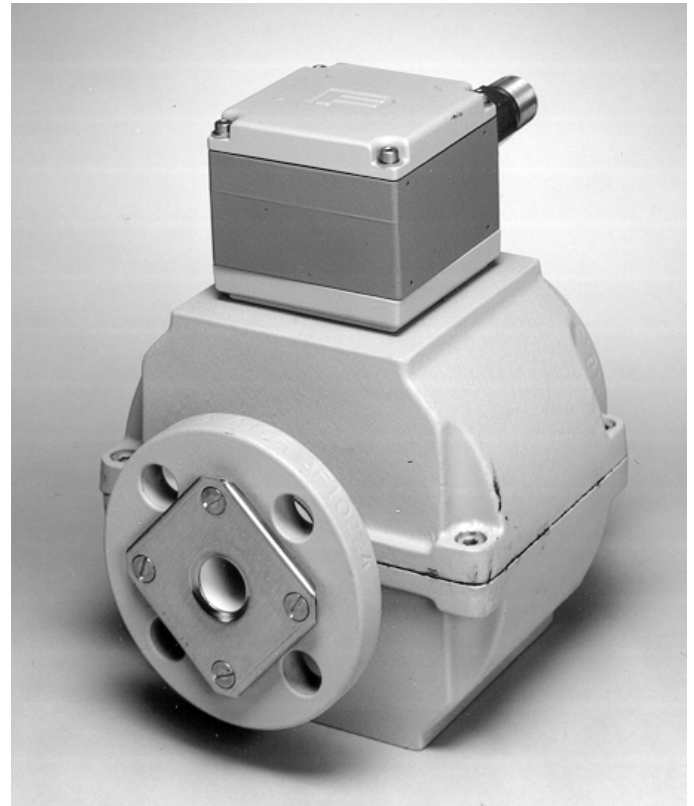


- **Minimum Liquid Conductivity 0.05 μ S/cm.**
Allows many new harsh process liquids to be measured with a magnetic flowmeter.
- **No Wetted Electrodes.** Eliminates the possibility of electrode leaks or process / electrode incompatibility.
- **Immune to Slurry Noise.** No wetted electrodes means electrodes cannot be impinged upon by process solids, this provides a stable output signal for control or indication.
- **Immune to Most Coating Buildup.**
The 10DX3121 is ideal for heavy coating processes such as grease, latex, clays and sludge.
- **Corrosion and abrasion resistant.**
With ETFE TEFZEL[®] liner
- **Separate customer connection box.**
Isolates electronics compartment and protects electronics from the environment.



**Series 10DX3121 Primary
with 50CM2000
Magnetic Flowmeter**

ELECTRODELESS MAGNETIC FLOWMETER (MICROPROCESSOR BASED)

The Series 10DX3121 Magnetic Flowmeter is a smart pulsed DC type volumetric, liquid flow rate detector. It utilizes the properties of a conductive fluid to generate an induced voltage when flowing through a magnetic field. The amplitude of the voltage, thus produced, is directly proportional to the flow rate of the metered liquid. A characterized non-uniform magnetic field design significantly reduces sensitivity to flow profile effects.

The meter's magnet coils are powered by a magnet driver unit. This unique method of magnet coil drive provides total zero point stability. The flow signal developed by this magnetic flowmeter is processed by Signal Converter Model 50CM2000 which can be mounted remotely on a wall or 2-inch pipe.

This flowmeter is similar to the Series 10DX3000 Magnetic Flowmeter with the exception that the 10DX3121 Flowmeter does not have electrodes wetted by the process. The Flowmeter is available in sizes 1" to 12".

Engineering Specifications

Minimum Liquid Conductivity: 0.05 $\mu\text{S}/\text{cm}$. For conductivity below 0.1 $\mu\text{S}/\text{cm}$ and viscosities below 100 centistokes consult factory.

Electrical Power Requirements:
115 Vac, $\pm 10\%$, 50/60 Hz, $\pm 5\%$.

Optional Power:
230 VAC, $\pm 10\%$, 50/60 Hz, $\pm 5\%$
24 VDC, -25%, + 30%, Ripple ≤ 1.5 vp

Power Consumption:
< 23 VA for AC Power; 10W for DC Power

Pressure Limits: At 38°C (100°F)

Sizes	Pressure	ANSI Rating
1" thru 3"	5.10 MPa (740 PSI)	Class 300
4" thru 12"	2.00 MPa (285 PSI)	Class 150

Temperature Limits:

Process Liquid: To 100°C (212°F)

Ambient: -40°C to +65°C (-40° to 150°F)

System Accuracy: Range (span) can be set between 5% and 100% of meter capacity shown in Table 1.

Span: Factory set full scale output signal can be set to any value between minimum and maximum value shown in Table 1.

Size		Minimum Span Setting		Maximum Span Setting	
Inch	mm	GPM	L/M	GPM	L/M
1	25	2.68	10	53.7	200
1.5	40	7.9	30	158	600
2	50	13.2	216	264	1,000
3	80	39.6	148	792	3,000
4	100	52.8	200	1,056	4,000
6	150	132	500	2,642	10,000
8	200	238	900	4,755	18,000
10	250	396	1500	7,925	30,000
12	300	528	2000	10,567	40,378

TABLE 1

Isolation: Input and output signals are fully isolated.

Enclosure Classification: NEMA 4X (IP65) suitable for indoor or outdoor installation. Optional NEMA 4X and accidental submergence 30 ft (10 M)/48 hours (IP67), continuous submergence (IP68).

Safety Classification: General Purpose, FM Approved Class I, Division 2, Groups A, B, C and D.

Vacuum Limit: 0 psia @ $\leq 212^\circ\text{F}$ (100°C)

Materials of Construction

Meter Tube: 304 Stainless Steel

Housing:
Electronics: Die Cast Aluminum, Epoxy Coated
Flowmeter: Welded Cast Steel, Epoxy Coated

Outline & Mounting Dimensions

See Figures 1 & 2.

Electrical Connections: 1/2 inch NPT

Metering Weight

150# Flange Process Connections

Meter Size		Meter Weight	
inch	mm	lbs	kg
1	25	14.3	6.5
1.5	40	18.7	8.5
2	50	22	10
3	80	42	19
4	100	48.5	22
6	150	86	39
8	200	148	67
10	250	218	99
12	300	273	124

Ordering Information

- Specify Model 10DX3121 and flowmeter size (usually same as pipe size).
- Type and class of flange being used.
- Power Source.
- Output signal and maximum flow rate.
- Liquid or slurry (by name, concentration, and operating viscosity, conductivity, temperature and pressure).
- Environment temperature (maximum) and hazard classification.

Sample Specification

The magnetic flowmeter shall be of the low frequency electromagnetic induction type and shall produce a DC pulse signal directly proportional and linear to the operation with a power consumption less than 23 Va. The magnetic flowmeter shall be Series 10DX3121.

The liner shall be made of TEFZEL® and not have electrodes wetted by the process. The meter shall have the ability to measure liquids with a conductivity as low as 0.05 µS/cm. The meter shall be resistant to effects of insulating type coating processes and hard slurry noise.

The electronics portion of the magnetic flowmeter shall include both a magnet driver to power the magnet coils and a signal converter. The signal converter shall be remote mounted and shall be Series 50CM2000. remote mounted and shall be Series 50CM2000.

The meter shall be hydraulically calibrated at a facility located in the United States and the calibration shall be traceable to the National Institute of Standards and Technology. The accuracy of the metering system shall be 1% of rate for flow velocities of 2.6 to 37 feet per second.

The meter size shall be from 1" to 12".

Total zero stability shall be an inherent characteristic of the meter system to eliminate the need to zero adjust the system with a full pipe at zero flow.

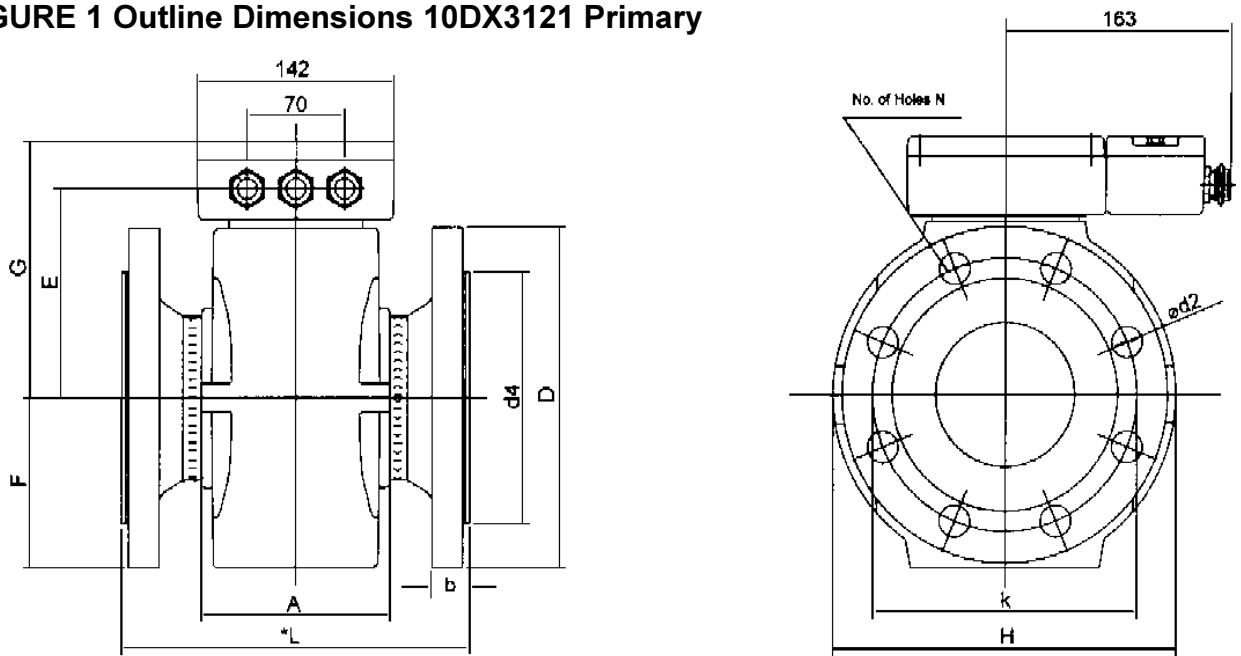
The meter housing shall be NEMA 4X splash-proof and weather resistant design. As an option, the meter shall be capable of NEMA 4X and submergence in up to 33 feet of water for up to 48 hours (IP 67) or continuous submersible (IP 68).

Model Number Designation for the 10DX3121

Model Number 10DX3121

<p>Design Level Specified by ABB</p> <p>Installation Length ISO 13359 (Not for ANSI flanges) For ANSI Flanges</p> <p>Liner Material ETFE TEFZEL®</p> <p>Meter Size 1" (25mm) 1.5" (40mm) 2" (50mm) 3" (80mm) 4" (100mm) 6" (150mm) 8" (200mm) 10" (250mm) 12" (300mm)</p> <p>Flange Connection DIN PN 10 DN 65, DN 500 - 1000 DIN PN 16 DN 25 - 400 DIN PN 25 DIN PN 40 DN 25 - DN 80, except DN 65 ANSI CI 150 (installation length Series 1000) ANSI CI 300 (installation length Series 1000)</p> <p>Flange Material Stainless Steel (1.4541 DN 150 & up) 304 SST, S Stainless Steel (1.4571) 316 SST</p> <p>Electrode Design Capacitive</p> <p>Approvals None FM Approved: Class I, Division 2, Groups A, B, C, and D</p> <p>Protection Class IP 67 (Temporary submergence 33ft., 48 hrs.) IP 68 (Continuous submergence, 33 ft.)</p> <p>Temperature Range - Standard, see Specification Sheet</p> <p>Line Frequency / Excitation Frequency 50 Hz, 12-1/2 Hz 60 Hz, 15 Hz</p> <p>Instrument Tag German English French</p>	<p>*</p> <p>A</p> <p>C</p> <p>N</p> <p>09</p> <p>11</p> <p>12</p> <p>14</p> <p>15</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>C</p> <p>D</p> <p>E</p> <p>F</p> <p>P</p> <p>Q</p> <p>2</p> <p>3</p> <p>A1A</p> <p>A</p> <p>K</p> <p>2</p> <p>3</p> <p>1</p> <p>2</p> <p>4</p> <p>1</p> <p>2</p> <p>3</p>
---	--

FIGURE 1 Outline Dimensions 10DX3121 Primary



Meter Size (Inch)	Flg Rtg	*L	k	d ⁴	D	N	A	E	F	G	H	Weight (KG)
1"	150	10-5/8 (270)	3-1/8 (79.4)	2 (50.8)	4-1/4 (107.9)	4	4-13/16 (122)	3-55/64 (98)	2-7/8 (73)	5-15/64 (133)	6-11/16 (170)	6.5
	300		3-1/2 (88.9)		4-7/8 (123.8)							
1 1/2"	150	11-1/32 (280)	3-7/8 (98.4)	2.5 (73)	5 (127)	4	4-13/16 (122)	3-55/64 (98)	2-7/8 (73)	5-15/64 (133)	6-11/15 (170)	8.5
	300		4-1/2 (114.3)		6-1/8 (155.6)							
2"	150	11-1/32 (280)	4-3/4 (120.6)	3-5/8 (92.1)	6 (152.4)	4	4-13/32 (112)	4-7/32 (107)	3-7/32 (82)	5-33/64 (140)	7-3/32 (180)	10
	300		5 (127)		6-1/2 (165.1)							8
3"	150	13-3/8 (340)	6 (152.4)	5 (127)	7-1/2 (190.5)	8	4-13/32 (112)	4-27/32 (123)	3-7/8 (98)	6-9/64 (156)	7-7/8 (200)	19
	300		6-5/8 (168.3)		8-1/4 (209.5)							20
4"	150	15-3/4 (400)	7-1/2 (900)	6-3/16 (157)	9 (229)	8	5-1/8 (130)	5-5/8 (143)	4-5/8 (118)	6-59/64 (176)	9 (229)	22
	300		7-7/8 (200)		10 (254)						10 (254)	24
6"	150	17-23/32 (450)	9-1/2 (241)	8-1/2 (215)	11 (279)	8	6-11/16 (170)	6-13/16 (173)	5-13/16 (148)	8-7/64 (206)	11 (279)	39
	300		10-5/8 (270)		12-1/2 (318)						12	12-1/2 (318)
8"	150	19-11/16 (500)	11-3/4 (298)	10-5/8 (270)	13-1/2 (343)	8	7-43/64 (195)	8-1/16 (205)	7-1/32 (179)	9-3/8 (238)	13-1/2 (343)	67
	300		13 (330)		15 (381)						12	15 (381)
10"	150	21-21/32 (550)	14-1/4 (362)	12-3/4 (324)	16 (406)	12	9-27/32 (250)	9-11/64 (233)	8-5/32 (207)	10-15/32 (266)	16 (406)	99
	300		15-1/4 (387)		17-1/2 (444)						16	17-1/4 (444)
12"	150	21-21/32 (550)	17 (431.8)	15 (381)	19 (482.6)	12	9-27/32 (250)	11-1/32 (280)	9-27/32 (250)	12-9/32 (250)	19 (482.6)	124
	300		17-3/4 (450.8)		20-1/2 (520.7)						16	20-1/2 (520.7)

SMART DC SIGNAL CONVERTER Model 50CM2000

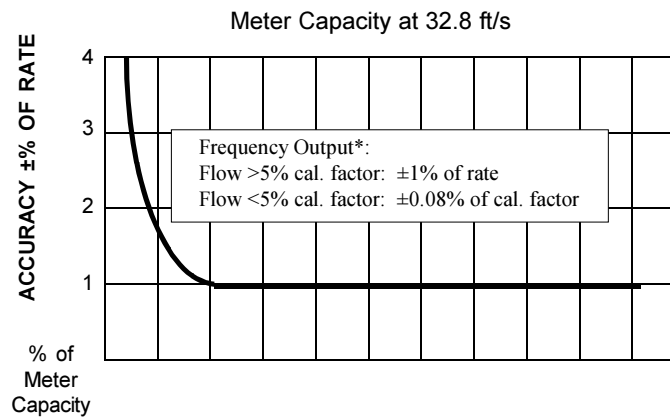
The Series 50CM2000 Magnetic Flowmeter Signal Converter is a m-processor based DC unit. The coils of the magnetic flowmeter are excited with pulsed DC current in order to generate the magnetic field. As a conductive liquid passes through this magnetic field, an electrical voltage is induced which is directly proportional to its velocity. The voltage is sensed by non-wetted electrodes and sent to the converter which digitally processes these signals and configures them into analog and digital output signals.

Design Features

- μ -Processor based converter for use with the Model 10DX3121 Electrodeless Primary.
- External totalizer reset contact is software configurable.
- Dual range is standard. System can be set for automatic or manual switching.
- User configurable unit: Allowing any unit desired by customer to be configured.
- Bi-directional flow indication via directional contact or split 4-20 mA range.
- Automatic system monitoring with error diagnostics and alarms.
- Standard $\pm 1\%$ of rate accuracy.
- All data is stored in non-volatile memory for 10 years without battery back-up.
- Utilizes surface mount and ASIC technology for long term reliability.
- Enclosure classification is NEMA 4X as standard for use in corrosive environments.
- 0.5 second full scale response time.
- Available with remote pipe or wall mounting.
- Back lit 2 line x 16 characters liquid crystal display.

Engineering Specifications

System Accuracy



Range: Typically configured from 1.64 to 32.8 ft/s (0.2 to 10 m/s)

Rangeability: 20:1

Display: Illuminated LC display, 2 lines each with 16 alphanumeric characters, 5x7 dot matrix. Each line is configurable for a number of different items. Please refer to the instruction manual for details.

Data Entry: Input of configuration data is by means of a three pushbutton arrangement in the field mounted version.

Language: Configuration in English, Danish, Dutch, Finnish, German, Italian, Spanish or Swedish is possible.

Program Protection: Three digit password is entered by the user to limit entry to configuration.

Current Output: User defined 4-20, 0-20, 2-10, 0-10, 4-12-20, and 0-10-20 mA into 0-750W load. The last two choices are for bi-directional flow.

Bi-Directional Flow: Indication and totalization in both forward and reverse directions. Flow direction indicated by contact closure. The scaled frequency option provides a separate output for each flow direction.

Isolation: Inputs and outputs are isolated 400V.

Scaled Frequency Output: 24 Vdc, 150 W minimum load, 0-4 kHz maximum, pulse width from 0.1 ms to 2000 ms, pulse factors from 0.001 to 1000 per unit of flow.

Low Flow Cut-off: 0 to 10% configurable.

Damping: 1 to 100 seconds configurable.

Response Time: 0.5 second minimum.

Power Requirements: 240/230/220/120/115/110/48/
24 Vac +10% / - 10% 24/48 Vdc ±30%
Effect 0.2% of rate per 10% change in line voltage.
Power consumption <23 VA including primary
Line frequency 50/60 Hz ±6%.

Coil Excitation Frequency:

Standard: 6.25 or 7.5 for 50/60 Hz power
Optional: 12/5 / 15 for 50/60 Hz power

Contact Outputs: For alarm and flow direction

Relay: Max. 28V, max. 250 mA, max. 3 W
Optocoupler: UCE<25 Vdc, IEC<7.5 mA

Contact Input: For zero return, external totalizer reset

Relay: Max. 28V, max. 250 mA, max. 3 W
Optocoupler: UCE<25Fdc, ICE<7.5mA

Serial Interface:

- via RS-232C
Baud rate: 110 to 9600 Baud
Maximum Cable Length: 50 ft. (15m)
Number of Nodes: 1 instrument
- via RS-485
Baud rate: 110 to 28.8K Baud
Maximum Cable Length: 4000 ft (1200m)
Number of Nodes: 32 instruments
- via HART® Protocol
1200 bits/s using frequency shift keying
Maximum cable length: 5000 ft (1500m)

Certification: General Purpose

Physical Characteristics

Ambient Temperature: -4°F to 140°F (-20°C to 60°C)

Relative Humidity: 10 to 90% non-condensing

Vibration Limit:

- <0.75G continuous (10 to 150 Hz)
- <1.5G intermittent (10 to 150 Hz)

Enclosure Classification: NEMA 4X, IEC 529

IP65 (weather tight and dust tight)

Housing: Three piece aluminum housing with gasketed covers, panel or wall-mounting.

Cable Entrance: Five 1/2" NPT conduit or
PG 13.5 cable connections.

Weight:

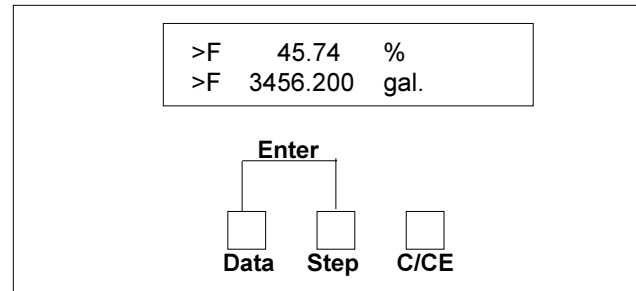
- Wall enclosure = 9.71bs. (4.4Kg)
- Rack= 4 lbs. (1.8Kg)

Signal Cable: Maximum signal cable length is 660 feet.

Signal cable should be distanced from high magnetic fields. 30 ft. (10m) is supplied as standard.

Data Configuration

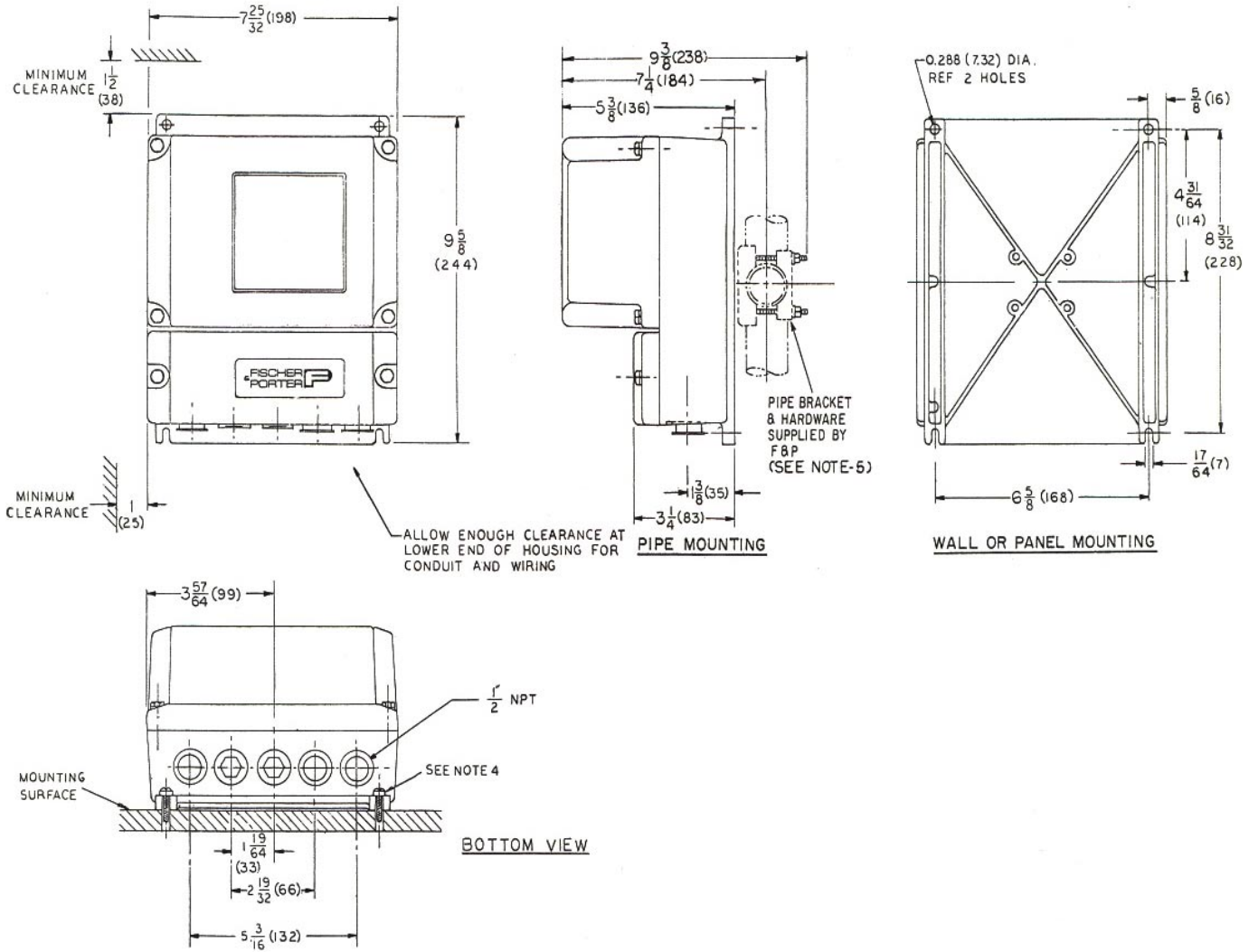
All database interrogations and changes are addressed through the three pushbuttons shown below.



They are identified as "Data", "Step", and "C/CE". To gain access to the data base, it is necessary to leave the normal "monitoring mode" and enter the "configuration mode". This is accomplished by pressing the "C/CE" pushbutton. The various parameters of the data base can then be viewed by moving up or down through the menu by pressing either the "Data" or "Step" pushbuttons. Data is accessed and changes entered by pressing "Data" and "Step" simultaneously. They constitute the "Enter" button. If no entries or changes are made, the unit will revert to the monitoring mode after about 20 seconds.

There are two ways to make changes to the database. One is by entering numeric values, and the other is by making a selection from the menu. Numbers are entered by using the "Data" and "Step" buttons. The "Data" button is used to select numbers 0 through 9, decimal point, etc. The "Step" button is used to move to the next digit. When changing a menu item, the "Data" and "Step" buttons are used to scroll through the selections. "Enter" ("Data" and "Step" together) must be depressed to store the selection in memory.

Outline Dimensions of Remote Signal Converter



Notes:

1. Dimensions are in inches, dimensions in parentheses () are in Millimeters.
2. Dimensions guaranteed only if this print is certified.
3. All dimensions subject to manufacturing tolerance of $\pm 1/8$ (3mm).
4. Mounting hardware supplied by customer.
5. For piping mounting, pipe yoke bracket for connection to customer 2" (ND50) horizontal or vertical pipe as shown.

Model Number Designation for the 50CM2000

Model Number 50CM2

	01	02	03	04	05	06	07	08	09	10	11	12
Connected to Flowmeter Primary												
Standard Flowmeter Primary												
EEx-Design												
Design Level		A										
Software Level (Specified by Factory)			*									
Approvals												
None				A								
Others upon request				Z								
Housing												
Field mount housing with window					B							
Contact Outputs												
Optocoupler							1					
Relay							2					
Pulse Output, 1-channel Terminals V8/V9 standard												
Active							1					
Passive							2					
Option pulse output 2-channel separate for forward and reverse flow, upon request ²⁾							3					
Operating Mode												
Continuous flow rate measurement								A				
Parameter Setting Entry												
Standard with 3 buttons ³⁾									A			
With magnetic stick									B			
Accessories												
None											A	
serial data link RS232C											B	
Serial data link RS485											C	
HART-Protocol											G	
Supply Power												
230 V, 50/60 Hz												B
115/120V, 50/60 Hz												C
110 V, 50/60 Hz												D
48 V, 50/60 Hz												E
24 V, 50/60 Hz												F
24 V / 48 V DC												H
Instrument Tag												
German												1
English												2
French												3
Other upon request												9

1) Ordering information for the card mount frame may

2) Totalization in the forward flow direction (standard), the alarm output is not available.

3) Opening the housing cover is necessary

Signal Cable: A 10 m long signal cable is included with each meter. For longer lengths please request P/N D173D018U02.



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