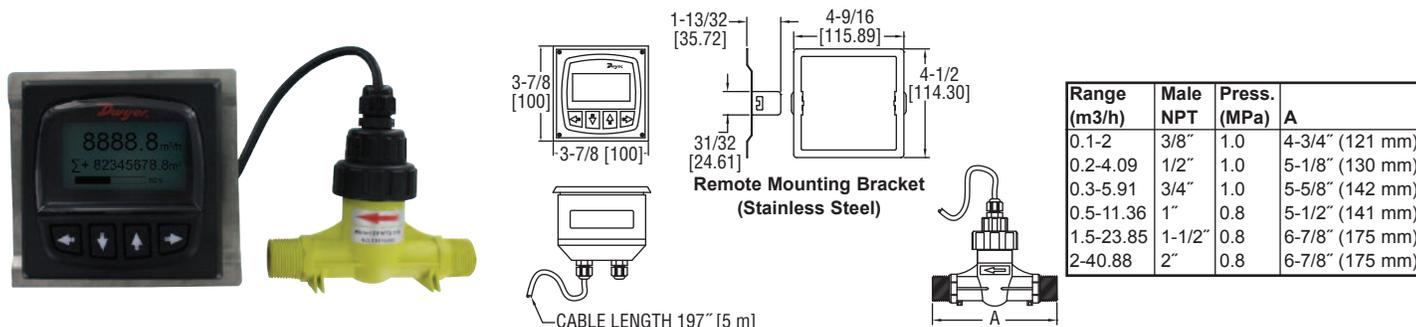




Series DFMT2 Digital Paddlewheel Flow Transmitter

Specifications - Installation and Operating Instructions



The Series DFMT2 Remote Digital Paddlewheel Flow Transmitter is a two piece digital flow transmitter that provides instantaneous, as well as totalizing flow monitoring. The two piece design allows the user to separate the control panel from the application, making it ideal for industrial use in reverse osmosis water purifying systems and any other applications where space is limited. The large backlit display makes navigating through the menu structure simple. The Series DFMT2 uses high accuracy, industry proven paddlewheel technology, offers a user selectable 4 to 20 mA or pulse output, and has a corrosion resistant PVDF sensor giving it a long operation life. Users can reset the totalizer at any time and set a security password protecting the system settings from unauthorized changes.

Installation Instructions

The accuracy of these flowmeters can be affected by disturbances such as pumps, elbows, tees, and valves that are in the flow stream. To reduce the error caused by these disturbances, pick a section of pipe that is at a distance from any pumps, bends or valves. The recommended distance away from elbows and pumps is shown in Figure 1.

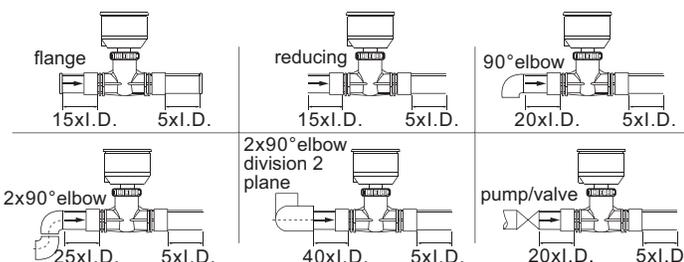


Figure 1: Mounting Straight Pipe Runs Required

Mounting Location

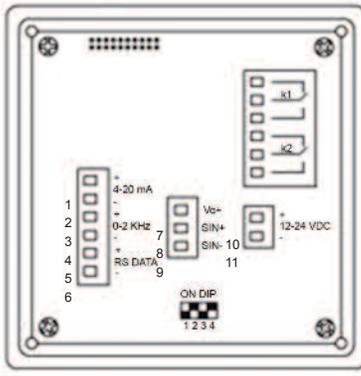
To reduce the possibility of causing damage to the Series DFMT2, it is recommended that the meter be mounted in a full flow pipe. Vertical mounting is acceptable, provided the liquid is flowing up through the meter, or a sufficient back pressure exists on the downward flow. On horizontal mountings, it is recommended that the meter be mounted perpendicular to the pipe. For systems that may have small air pockets at the top of the pipe, the meter can be mounted up to 45° off the vertical normal.

SPECIFICATIONS

- Service:** Compatible clean liquids.
- Range:** See model chart.
- Wetted Materials:**
 - Sensor and Impeller: PVDF;
 - Shaft: Ceramic;
 - O-Rings: Fluoroelastomer;
- Accuracy:** ±1.5% FS.
- Repeatability:** ±0.5% FS.
- Output:**
 - Analog: 4 to 20 mA (750 Ω max. loop resistance);
 - Pulse: NPN square wave output;
 - Frequency: 0 to 2 kHz (adjustable);
 - Pulse width: 0 to 1000 ms (adjustable).
- Electrical Connections:** Removable screw terminal.
- Temperature Limits:**
 - Process: -4 to 194°F (-20 to 90°C);
 - Ambient: -4 to 149°F (-20 to 65°C).
- Pressure Limit:** 145 psi (1.0 MPa).
- Power Requirements:** 12 to 24 VDC.
- Power Consumption:** 2 W.
- Display:** 2.38 x 1.25" (60.33 x 31.75 mm) LCD.
- Totalizing Display Maximum:** 9,999,999,999.
- Process Connection:** See model chart.
- Enclosure Rating:** IP65.
- Enclosure Material:** ABS plastic.
- Weight:** See model chart.

Model	Range GPM (m³/h)	Connection	Weight lb (kg)
DFMT2-10A	0.44 to 7.93 (0.1 to 1.8)	3/8" NPT	1.76 (0.8)
DFMT2-15A	0.88 to 17.61 (0.2 to 4)	1/2" NPT	1.81 (0.82)
DFMT2-20A	1.32 to 26.42 (0.3 to 6)	3/4" NPT	1.85 (0.84)
DFMT2-25A	2.20 to 52.83 (0.5 to 12)	1" NPT	1.94 (0.88)
DFMT2-40A	6.61 to 105.67 (1.5 to 24)	1-1/2" NPT	2.20 (1.0)
DFMT2-50A	8.81 to 176.11 (2 to 40)	2" NPT	2.43 (1.1)

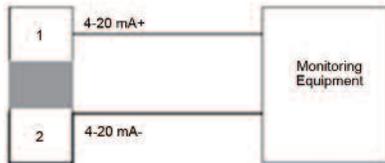
ELECTRICAL CONNECTIONS



Item	Label	Function
1	4 to 20 mA+	4 to 20 Output
2	4 to 20 mA-	
3	0 to 2 kHz+	Frequency/ Pulse Output
4	0 to 2 kHz-	
5	RS DATA+	RS485 Communication
6	RS DATA-	
10	12 to 24 V+	Input Power Terminals
11	12 to 24 V-	
7	Vo+	Power to Sensor (Blue)
8	SIN+	Communication to Sensor (Red)
9	SIN-	Communication to Sensor (Black)

4 to 20 mA Output

The Series DFMT2 can provide a variable current output that is proportional to the detected flow rate. This output can be used in a range of external interface devices, and can be calibrated to suit a particular flow range. The maximum load resistance is 750 Ω , including the cables used to connect.

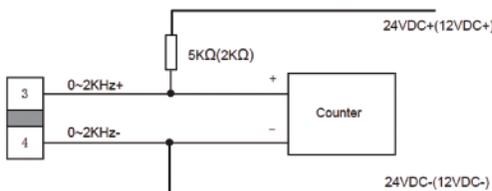


Pulse (Frequency) Output

The Series DFMT2 offers a frequency pulsed output that can be configured as a linear flow proportional frequency output or a standard pulsed output via the unit software. The maximum pulse output frequency is 5 kHz with a pulse amplitude of 24V and a maximum load current of 0.2A. The pulse output frequency is adjustable from 100-5000 Hz (please refer to "To Change The Maximum Frequency" under "Pulse Output Setup").

When utilizing the unit with a linear proportional frequency output, the liter/pulse option must be set to 0.0 (please refer to "To Change the Liters/Pulse" under the "Pulse Output Setup") and the frequency output signal scaled to the desired range within the units capability (please refer to "To Set Qmax" under the "Percentage Range" to scale frequency output signal).

When utilizing the unit as a standard pulsed output (please refer to "Pulse Output Setup" under the "System Setup Menu").

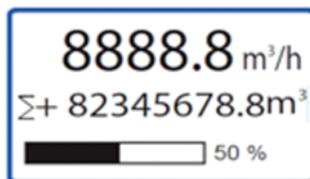


RS485 Communication (Optional)

The Series DFMT2 features optional RS485 Communication. This must be specified at time of order and will not function otherwise. The RS data communication option will remain visible in the unit's software and on the terminal board but will not be functional. Please contact factory for RS485 communication output capable units.

USING THE SERIES DFMT2

When first turned on, the Series DFMT2 will initialize, and then it will turn to the measurement reading screen.



The top number is the instantaneous flow reading, followed by the total amount of liquid passed. The bottom bar shows the percentage of flow in relation to the maximum flow rate.

To access the menu, press the key on the keypad. Navigate through the menu using the and to select a sub menu, and the key to enter a sub menu. To return to the measurement reading screen, or to return from a sub menu, press the key.

Unit Adjustment

The Series DFMT2 can display flow units of L/s, L/min, L/h, m³/s, m³/min, m³/h, US gal/s, US gal/min, and US gal/h. The totalization units can be displayed in L, m³, and US gallons.

To change flow units:

Steps	Operation Instructions	Display
1	From the menu, select "Basic".	
2	Select "PV Units".	
3	Use and to change the desired flow units.	
4	Press to select units.	
5	Press to confirm the change, or press to cancel the change.	

To change totalization units:

Steps	Operation Instructions	Display
1	From the menu, select "Basic".	
2	Select "Total Units".	
3	Use and to change the desired flow units.	
4	Press to select units.	
5	Press to confirm the change, or press to cancel the change.	

Resolution

The Series DFMT2 has a selectable resolution of up to 3 decimal points for both the flow and totalization units.

To change flow resolution:

Steps	Operation Instructions	Display
1	From the menu, select "Basic".	
2	Select "PV Decimal".	
3	Use and to change the desired flow resolution.	
4	Press to select resolution.	
5	Press to confirm the change, or press to cancel the change.	

To change totalization resolution:

Steps	Operation Instructions	Display
1	From the menu, select "Basic".	
2	Select "Total Decimal".	
3	Use and to change the desired totalization resolution.	
4	Press to select resolution.	
5	Press to confirm the change, or press to cancel the change.	

Damping Factor

The Series DFMT2 has the capability to introduce a damping factor allowing the user to delay the response time of the display and output. This function is used to smooth out a reading of flows that has rapid spikes or dips in the flow rate.

To adjust the damping factor:

Steps	Operation Instructions	Display
1	From the menu, select "Basic".	
2	Select "Damping".	
3	Use ▲, ▼, and ► to change the desired flow resolution.	
4	Press ◀ to select resolution.	
5	Press ◀ to confirm the change, or press ► to cancel the change.	

SYSTEM SETUP MENU

Password Protection

The Series DFMT2 has a system setup menu that is password protected. The password must be entered each time a user accesses the system setup menu. The unit is initially setup to have a password of 0200.

To change the password:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "New Password".	
4	Use ▲, ▼, and ► to create the desired password.	
5	Press ◀ to select the password.	
6	Press ◀ to confirm the change, or press ► to cancel the change.	

PERCENTAGE RANGE

The user can configure the percentage of flow display bar to show a specified range within the products allowable range. The option "Qmax(m³/h)" in the system setup menu allows the user to set a flow rate at which the bar will show 100%. The option "Low Cutoff%" allows the user to set a flow rate at which the Series DFMT2 to display zero, and set any outputs to zero.

To set Qmax:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "Signal".	
4	Select "Qmax(m ³ /h)".	
5	Use ▲, ▼, and ► to create the desired Qmax.	
6	Press ◀ to select the desired value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

To change low cutoff:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "Signal".	
4	Select "Low Cutoff%".	
5	Use ▲, ▼, and ► to input desired cutoff %.	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

PULSE OUTPUT SETUP

The Series DFMT2 has a customizable pulse output option. The user can configure this output's maximum frequency, the number of liters per pulse, the pulse width, and whether the pulse level is active low or active high.

To change the maximum frequency:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "Pulse Output".	
4	Select "Freq Max(Hz)".	
5	Use ▲, ▼, and ► to input desired frequency upperlimit.	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

To change the liters/pulse:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "Pulse Output".	
4	Select "Liter/Pulse".	
5	Use ▲, ▼, and ► to input desired liters per pulse ratio.	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

To change the pulse width:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "Pulse Output".	
4	Select "PulseWidth(ms)".	
5	Use ▲, ▼, and ► to input desired pulse width.	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

To change baud rate:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "RS485 Output".	
4	Select "Baudrate".	
5	Use ▲, ▼, and ► to select desired baud rate.	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

PULSE LEVEL

The pulsed output on the Series DFMT2 can be programmed to be active high or active low.

To change pulse level:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "Pulse Output".	
4	Select "Pulse Level".	
5	Use ▲ and ▼ to select active high or active low.	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

To set parity:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "RS485 Output".	
4	Select "Parity".	
5	Use ▲, ▼, and ► to select parity type.	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

RS485 COMMUNICATIONS OUTPUT (OPTIONAL)

The Series DFMT2 also has a RS485 communications output capability. The user can alter the protocol, baud rate, parity, stop bit, and the device address. The RS485 output works on 8 data bits.

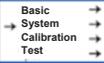
To set protocol:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "RS485 Output".	
4	Select "RS485 Protocol".	
5	Use ▲, ▼, and ► to select MODBUS.	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

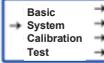
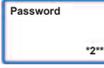
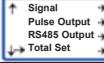
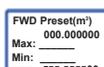
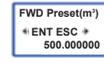
To set stop bit:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "RS485 Output".	
4	Select "Stop Bit".	
5	Use ▲, ▼, and ► to choose the stop bit.	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

To set device address:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "RS485 Output".	
4	Select "Dev Address".	
5	Use ▲, ▼, and ► to input desired device address.	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

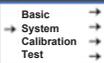
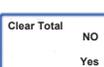
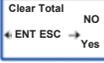
To preset totalizer:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "Total Set".	
4	Select "Clear Total".	
5	Use ► to select "Yes" or "No".	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

CLEAR AND SET TOTALIZER

The Series DFMT2 has a totalizing function that is displayed on the main screen. This value can be cleared or set to a predetermined value.

To clear totalizer:

Steps	Operation Instructions	Display
1	From the menu, select "System".	
2	Use ▲, ▼, and ► to input current password. Press ◀ to enter password.	
3	Select "Total Set".	
4	Select "Clear Total".	
5	Use ► to select "Yes" or "No".	
6	Press ◀ to select value.	
7	Press ◀ to confirm the change, or press ► to cancel the change.	

MAINTENANCE/REPAIR

Upon final installation of the Series DFMT2, no routine maintenance is required. The Series DFMT2 is not field serviceable and should be returned if repair is needed. Field repair should not be attempted and may void warranty.

WARRANTY/RETURN

Refer to "Terms and Conditions of Sale" in our catalog and on our website. Contact customer service to receive a Return Goods Authorization number before shipping the product back for repair. Be sure to include a brief description of the problem plus any additional application notes.

