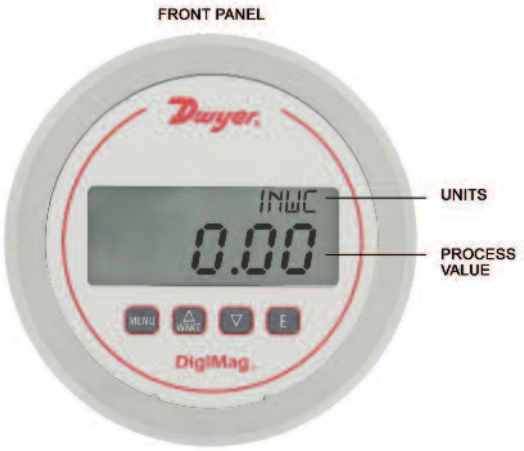
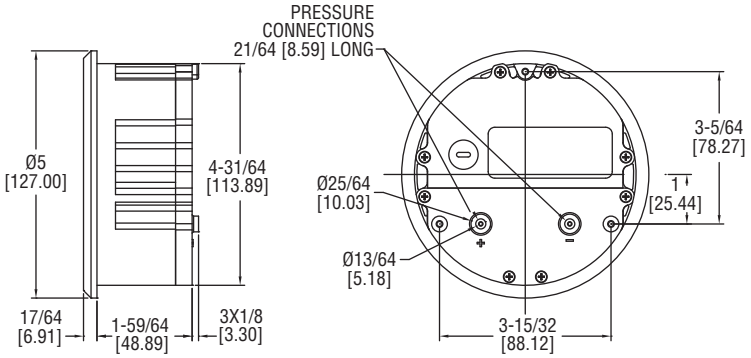
Series DM-1200 DigiMag® Digital Differential Pressure and Air Flow Gage

Specifications - Installation and Operating Instructions





The Series DM-1200 DigiMag® Digital Differential Pressure and Air Flow Gage is the ideal digital instrument to take the place of analog mechanical pressure gages. The DigiMag® Digital Gages are more versatile than analog gages with their ability to be field-programmed to select pressure, air velocity or flow operation. The DigiMag® Digital Differential Pressure Gages have an added feature for filter applications where a set point can be input where the display will blink when the filter is dirty, alerting the user that a maintenance action needs to occur.

Programming the Series DM-1200 is easy using the menu key to access 4 simplified menus which provide access to: Security level; engineering units; K-factor for use with various Pitot tubes and flow sensors, circular or rectangular duct size for volumetric flow operation; filter set point; view peak and valley process readings; digital damping for smoothing erratic process applications; display update to conserve battery life; zero and span field calibration.

The Series DM-1200 DigiMag® Digital Differential Pressure and Air Flow Gage possesses a full-scale accuracy of 1% on ranges down to 2″ w.c. and 2% accuracy down to the very low ranges of 1″ to 0.25″ w.c. DigiMag® Digital Differential Pressure Gages offer power versatility by working with 9-24 VDC line power or simply 9V battery power. If using line power and connecting the 9V battery, the battery will act as a back-up if line power is lost or interrupted.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Housing Materials: Glass filled plastic.
Accuracy: ±1% F.S. including linearity, hysteresis and repeatability; ±2% F.S. for ranges 1″ w.c. and below.
Temperature Limits: 0 to 140°F (-18 to 60°C).
Compensated Temperature Limits: 32 to 122°F (0 to 50°C).
Long Term Stability: ±1% F.S. per year.
Thermal Effect: ±0.05% F.S./°F typ.; ±0.10% F.S./°F for ranges 1″ w.c. and below.
Display: 4-digit LCD (Digits: 0.60″H x 0.33″W).
Display Update: Selectable for 1 second to 10 minutes or update only from button push.
Pressure Limits: 5″ w.c. and lower = 2 psi (13.7 kPa) 10″ w.c. and higher = 11 psi (75 kPa).
Power Requirements: 9V battery or external power supply 9-24 VDC. Battery included but not connected.
Type of Battery: 9V alkaline battery (Duracell® PC 1604 or equivalent).
Battery Service Life: Battery life depending on the Display Update setting: 150 hours (typical) if Display Update = 1 second; 9 months (typical) if Display Update = 10 minutes; 1.5 years (typical) if Display Update is disabled. Battery may last up to four times longer when using lithium-based battery ULTRALIFE U9VL-J.
Current Consumption: 5 mA maximum.
Electrical Connections: Removable terminal block for 16 to 26 AWG.
Electrical Entry: Cable gland for 0.114 to 0.250″ (2.9 to 6.4 mm) diameter cable.
Process Connections: 1/8″ (3 mm) ID tubing.
Enclosure Rating: NEMA 4X (IP66).
Weight: 1.18 lb (535 g).
Size: 5″ (127 mm) O.D. front face.
Agency Approvals: CE, EN 61326-1 [Immunity Test Requirement for Industrial Environments] with the following SPEC:
IEC61000-3-2
IEC61000-3-3
IEC61000-4-2
IEC61000-4-3
IEC61000-4-4
IEC61000-4-5
IEC61000-4-6
IEC61000-4-11

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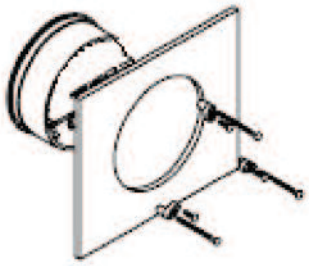
INSTALLATION

Mounting

A vertical position required. That is the position in which all standard models are calibrated at the factory. Provide a 4-9/16″ diameter opening in panel. Insert gage and secure in place with provided screws and adapters.

Included Accessories:
Mounting lugs – 3
6-20 x 2-1/2 screws – 3
4-20 x 3/8 screws – 3 (mounting hole depth is 3/8″ [9.53])
Cable gland – 1



Pressure Connections

Two integral tubing connections are provided on the back of the gage. They are sized to fit 3/16″ (4.8 mm) I.D. x 5/16″ (7.9 mm) O.D. flexible PVC tubing. To measure single positive pressure, connect tubing to the + port and vent the – port to atmosphere. To measure single negative pressure (vacuum), connect tubing to the – port and vent the + port to atmosphere. To measure differential pressure, connect higher pressure to the + port and lower pressure to the – port. Be sure the pressure rating of the tubing exceeds that of the operating ranges.

Electrical Connections

A 9V battery or an external power supply 9-24 VDC can be used to power the unit. If both battery and external power supply are connected, the battery will work as back up power.

Battery Installation

The unit is shipped with a separate 9V alkaline battery. Remove the unit's top back cover then connect the 9V battery to the battery holder as shown in Figure 1.

External Power Supply Installation

Remove the unit's back cover then connect the external power supply to the terminal block as shown in Figure 1.

CAUTION: POWER MUST BE OFF WHILE WIRING CONNECTIONS ARE BEING MADE. DO NOT EXCEED SPECIFIED SUPPLY VOLTAGE RATINGS. PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT.

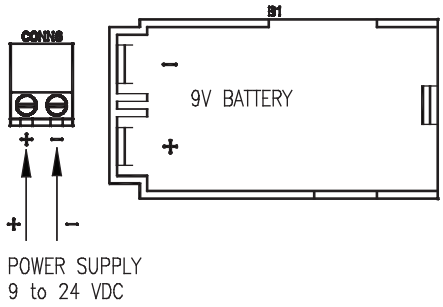


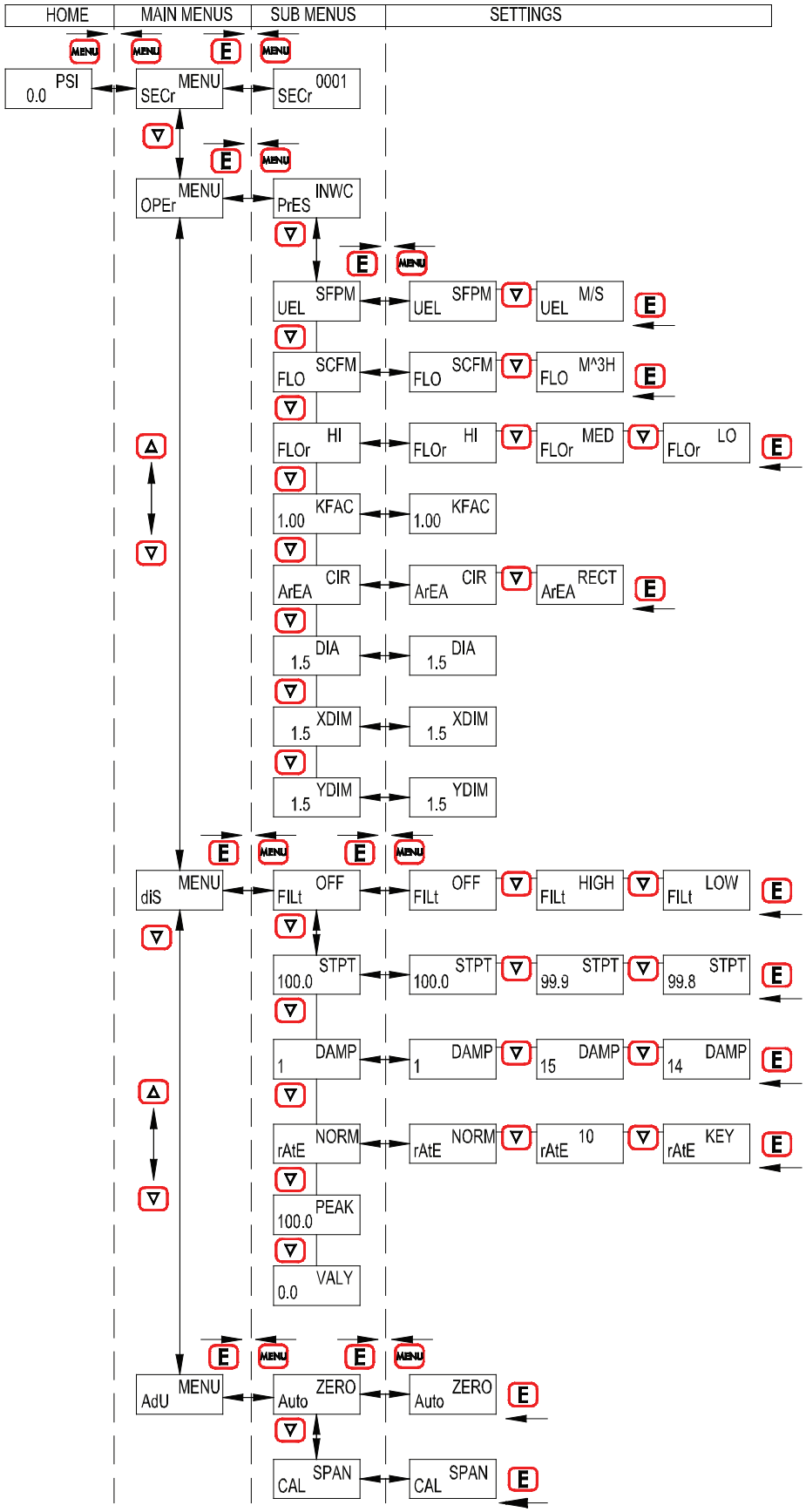
FIGURE 1

OPERATING INSTRUCTIONS

Key Functions

	Home Position Function	Main Menu Function	Sub Menu Function
Menu MENU	Allows access to the menus	Return to home position	Return to previous menu
Up Arrow WAKE	Displays pressure readings instantly (rAtE KEY MODE only)	Sequences through menus	Increments a value
Down Arrow		Sequences through menus	Decrements a value
Enter E	Displays full scale range of unit	Enter into SUB MENU	Changes a value or setting. Press ENTER and display will blink. Adjust with UP or DOWN arrows. Press ENTER to store. Display will stop blinking.

Menu Map


HOME
MAIN MENUS
SUB MENUS
SETTINGS
MENU
E
PSI
0.0
MENU
SECr
0001
SECr
MENU
OPEr
INWC
PrES
SFPM
UEL
M/S
SCFM
FLO
M^3H
HI
FLOr
MED
LO
KFAC
1.00
CIR
ArEA
RECT
DIA
1.5
XDIM
YDIM
MENU
diS
OFF
FILt
HIGH
LOW
STPT
100.0
99.9
99.8
DAMP
1
15
14
NORM
rAtE
10
KEY
PEAK
VALY
0.0
MENU
AdU
ZERO
Auto
SPAN
CAL

MAIN MENU PROGRAMMING INSTRUCTIONS
(Upper Right Display Reads **MENU**)

Security Menu: SECr-MENU
Lock out access to all menus or lock out access to all menus except Auto-Zero function (Auto-ZERO).

Operation Menu: OPEr-MENU
Select the measurement type – pressure, velocity or flow and corresponding engineering units.

Display Menu: diS-MENU
Monitor and adjust display related settings: Filter type, filter point, dampening, display update, peak and valley.

Advanced Menu: AdU-MENU
Perform auto-zero or full-scale calibration.

SECURITY MENU: SECr-MENU
With the gage reading pressure (home position), press and hold the **MENU** key until the **SECr-MENU** is displayed. Press the **E** key to show the security SUB MENU **SECr–0001**. When the security SUB MENU is selected, the present security level is displayed in the upper right hand display. To change the security level, adjust the number displayed to the number shown in the following table for the desired security level.

Security Level Displayed	Access	Password Value to Enter
1	All menus access	10
2	All menus locked except the Auto-zero function	90
3	All menus locked	111

The password values shown in the table cannot be altered, so retain a copy of these pages for future reference.

OPERATION MENU: OPEr-MENU
With the gage reading a numerical value (home position), press and hold the **MENU** key until the **SECr-MENU** is displayed. Press the ▼ key to show the **OPEr-MENU**. Press the **E** key to show the Operation SUB MENUS.

The Operation SUB MENUS are:

PrES – Pressure	**UEL** – Velocity	**FLO** – Flow
FLOr – Flow range	**KFAC** – K Factor	**ArEA** – Area
DIA – Diameter	**XDIM** – X Dimension	**YDIM** – Y Dimension

If the instrument is set for Velocity, the OPEr MENU will have an additional KFAC SUB MENU. If the instrument is set for Flow, the OPEr MENU will have additional KFAC and ArEA SUB MENUS. These will be discussed under Velocity and Flow.

NOTE: When scrolling through the OPEr SUB MENUS, the measurement type the unit is currently set for will show the units in the upper right display. The other measurement types will have a blank upper right display (see below).

UEL (Velocity) SUB MENU:
For velocity measurement, the following units are available:
UEL-SFPM: Velocity – Standard feet per minute
UEL-M/S: Velocity – Meters per second

NOTE: Air velocity and flow readings are based upon standard dry air conditions with an ambient temperature of 70°F and a barometric pressure of 29.92 INHG.

AVAILABLE VELOCITY RANGES

Input Range in w.c.	SFPM Range	M/S Range
0 - 0.25	0 - 2002	0 - 10.17
0 - 0.50	0 - 2832	0 - 14.39
0 - 1.00	0 - 4004	0 - 20.35
0 - 2.00	0 - 5663	0 - 28.77
0 - 5.00	0 - 8954	0 - 45.48
0 - 10.0	0 - 12.66 x 1K	0 - 64.33
0 - 15.0	0 - 15.51 x 1K	0 - 78.76
0 - 25.0	0 - 20.02 x 1K	0 - 101.7
0 - 50.0	0 - 28.32 x 1K	0 - 143.9

FLO (Flow) SUB MENU:
For flow measurements, the following units are available:
FLO – SCFM: Flow – Standard cubic feet per minute
FLO – M^3H: Flow – Cubic meters per hour

FLOr (Flow range) SUB MENU:
The following flow ranges are available:
FLOr – HI: Flow range – High: 999.9 x 1K
FLOr – MED: Flow range – Medium: 99.99 x 1K
FLOr – LO: Flow range – Low: 9999

Table 1: **FLOr = LO**
Maximum Duct Size (English)

Range in w.c.	SCFM Range	Max Duct Size sq ft
0.25	9999	4.994
0.50	9999	3.531
1.00	9999	2.497
2.00	9999	1.766
5.00	9999	1.117
10.0	9999	0.789
15.0	9999	0.644
25.0	9999	0.499
50.0	9999	0.353

Table 2: **FLOr = LO**
Maximum Duct Size (Metric)

Range in w.c.	M^3/hr Range	Max Duct Size M^2
0.25	9999	0.273
0.50	9999	0.193
1.00	9999	0.136
2.00	9999	0.096
5.00	9999	0.061
10.0	9999	0.043
15.0	9999	0.035
25.0	9999	0.027
50.0	9999	0.019

Table 3: **FLOr = MED**
Maximum Duct Size (English)

Range in w.c.	SCFM Range	Max Duct Size sq ft
0.25	99.99x1K	49.94
0.50	99.99x1K	35.31
1.00	99.99x1K	24.97
2.00	99.99x1K	17.66
5.00	99.99x1K	11.17
10.0	99.99x1K	7.898
15.0	99.99x1K	6.446
25.0	99.99x1K	4.994
50.0	99.99x1K	3.530

Table 4: **FLOr = MED**
Maximum Duct Size (Metric)

Range in w.c.	M^3/hr Range	Max Duct Size M^2
0.25	99.99x1K	2.731
0.50	99.99x1K	1.930
1.00	99.99x1K	1.364
2.00	99.99x1K	0.965
5.00	99.99x1K	0.610
10.0	99.99x1K	0.431
15.0	99.99x1K	0.352
25.0	99.99x1K	0.273
50.0	99.99x1K	0.193

Table 5: **FLOr = HI**
Maximum Duct Size (English)

Range in w.c.	SCFM Range	Max Duct Size sq ft
0.25	999.9x1K	499.4
0.50	999.9x1K	353.1
1.00	999.9x1K	249.7
2.00	999.9x1K	176.6
5.00	999.9x1K	111.7
10.0	999.9x1K	78.98
15.0	999.9x1K	64.46
25.0	999.9x1K	49.94
50.0	999.9x1K	35.30

Table 6: **FLOr = HI**
Maximum Duct Size (Metric)

Range in w.c.	M^3/hr Range	Max Duct Size M^2
0.25	999.9x1K	27.31
0.50	999.9x1K	19.30
1.00	999.9x1K	13.64
2.00	999.9x1K	9.654
5.00	999.9x1K	6.107
10.0	999.9x1K	4.317
15.0	999.9x1K	3.526
25.0	999.9x1K	2.731
50.0	999.9x1K	1.931

KFAC (K Factor) SUB MENU:

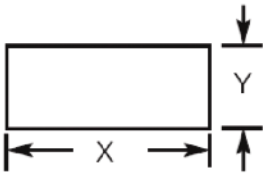
1.00-KFAC: K Factor = 1.00

K factor becomes accessible if the instrument is set for Velocity or Flow. When the DigiMag® is used with a Pitot tube, the manufacturer may specify a K factor. The adjustment range is 0.01 to 2.00. The factory setting is 1.

ArEA (Area), DIA (Diameter), XDIM (X dimension) and YDIM (Y dimension) SUB MENUS:
These SUB MENUS become accessible if the instrument is set for Flow. When measuring flow, the area of the duct must be specified. Tables 1 to 6 show the input range vs. maximum flow and duct size. For a rectangular duct the maximum size is specified by the X, Y dimensions. For a circular duct the maximum size is specified by the diameter. X, Y and circular dimensions are entered in feet with 0.001 foot resolution for FLOr = LO, 0.01 foot resolution for FLOr = MED and 0.1 foot resolution for FLOr = HI, or entered in millimeters with 1 millimeter resolution.

ArEA – Area, select **CIR** for a circular duct or **RECT** for a rectangular duct. If a circular duct is selected the DIA SUB MENU will be activated. If a rectangular duct is selected, the XDIM and YDIM SUB MENUS will be activated.

DIA – Diameter, enter the diameter of a duct
XDIM – Enter the "X" dimension of a duct
YDIM – Enter the "Y" dimension of a duct



DISPLAY MENU: diS – MENU
With the gage reading a numerical value (home position), press and hold the **MENU** key until the **SECr-MENU** is displayed. Press the ▼ key until the LCD shows **diS – MENU**. Press the **E** key to show the Display SUB MENUS.

FILTER TYPE SETTING
With the LCD reading **FILt – OFF**, press the **E** key; the display will blink. Press the ▼ key to change the filter type then press the **E** key to save the desired filter type.

FILt – OFF: Filter type = OFF. The filter function is disabled.
FILt – HIGH: Filter type = HIGH. The display blinks when pressure is greater than the filter point.
FILt – LOW: Filter type - LOW. The display blinks when pressure is less than the filter point.

FILTER POINT SETTING
With the LCD reading **0.00 – SPPT**, press the **E** key; the display will blink. Press the ▲ or ▼ key to change the filter point then press the **E** key to save the desired filter point.

0.00 – SPPT: Filter point = 0.00. The filter point may be set to anywhere within the range of the instrument.

DAMPING SETTING
With the LCD reading **1 – DAMP**, press the **E** key; the display will blink. Press the ▲ or ▼ key to change the damping level then press the **E** key to save the desired damping level.

1 – DAMP: Damping level = 1. The damping level can be adjusted from 1 to 15. Damping stabilizes the display from instabilities due to things such as vibration and excessive pressure fluctuations. The damping function adjusts the amount of readings that are averaged for each display update.

DISPLAY UPDATE SETTING
With the LCD reading **rAtE – NORM**, press the **E** key; the display will blink. Press the ▼ key to change the display update rate then press the **E** key to save the desired display update rate.

rAtE – NORM: Display update = Normal (1 second).
The gage reads the process pressure and updates the LCD every second.

rAtE – 10: Display update = 10 minutes.
The gage reads the process pressure and updates the LCD every 10 minutes.

rAtE – KEY (On-Touch mode): Display update is disabled.
The gage reads the process pressure and updates the LCD whenever the ▲ key is pressed. If the ▲ key is released, the LCD will hold and display the last pressure reading.

NOTES:
1. Depending on the Display Update setting, the battery life is shown below:
   -150 hours (typical) if Display Update is set for "Normal" 1 second update. rAtE-NORM
   -1 year (typical) if Display Update is set for 10 minutes. rAtE-10
   -2 years (typical) if Display Update is disabled. rAtE-KEY
2. If the Display Update is set for 10 minutes or disabled (On-Touch mode), the process pressure value can be read instantly by pressing and holding the ▲ key on the front panel. Also the LCD will automatically show "ALAr" if the filter point has been exceeded.

PEAK AND VALLEY SETTING
100.0 – PEAK: Peak value = 100.0
The peak feature stores the highest pressure reading the instrument has measured since the last reset or power up. At power up **PEAK** is reset to the present pressure reading. To manually reset the **PEAK** value, press the **E** key while in the **PEAK** SUB MENU.

0.0 – VALY: Valley value = 0.0
The valley feature stores the lowest pressure reading the instrument has measured since the last reset or power up. At power up **VALY** is reset to the present pressure reading. To manually reset the **VALY** value, press the **E** key while in the **VALY** SUB MENU.

ADVANCED MENU: AdU – MENU
With the gage reading pressure (home position), press and hold the **MENU** key until the **SECr-MENU** is displayed. Press the ▼ key until the display shows the **AdU – MENU**. Press the **E** key to show the advanced function SUB MENUS.

Auto ZERO: auto-zero

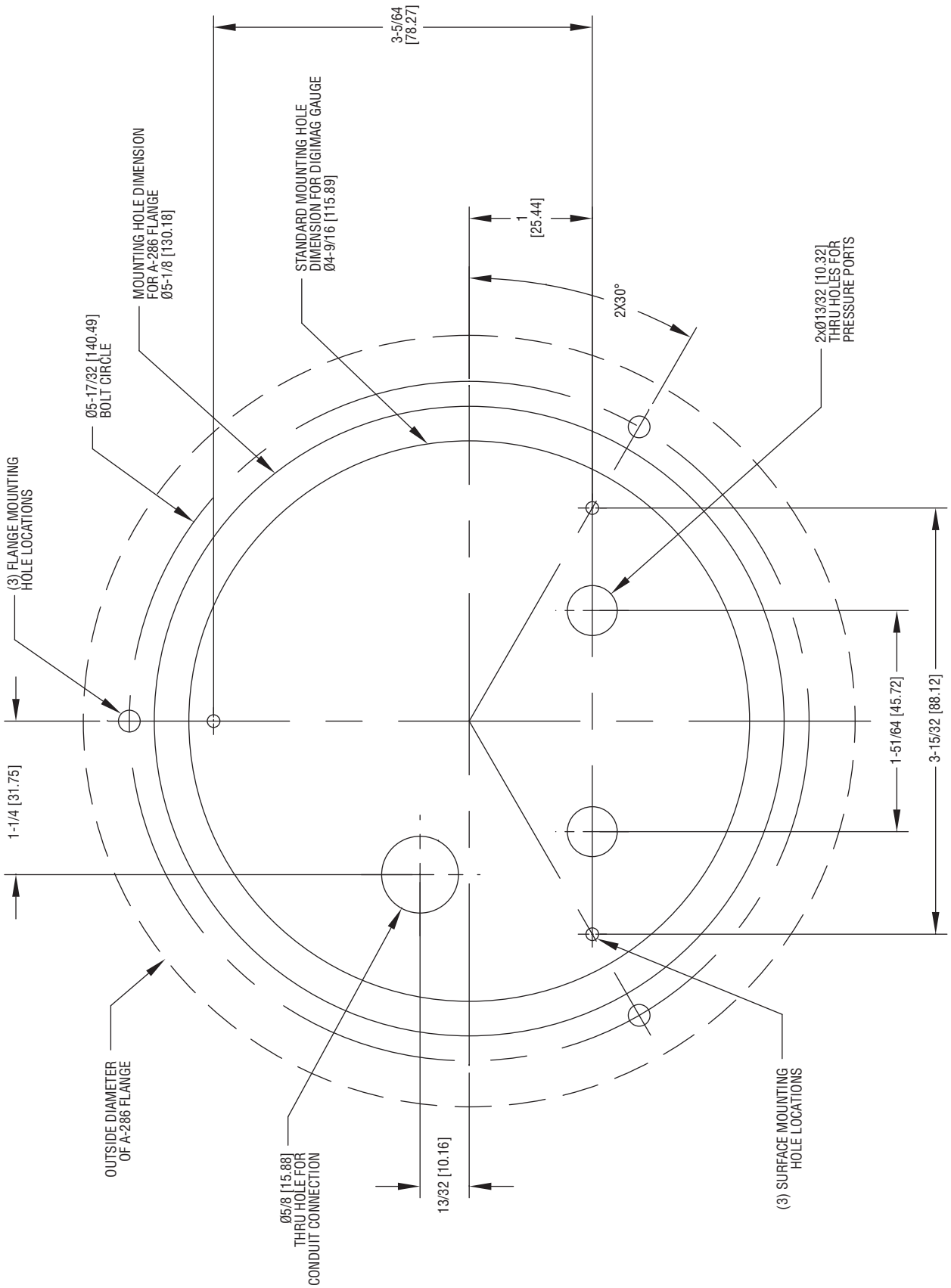
NOTE: For accurate calibration, DO NOT apply any pressure when performing this function.

With the display reading **Auto ZERO**, release pressure to Zero then press the **E** key; the display will blink. Press the **E** key again to complete the Auto-zero.

CAL – SPAN: full-scale calibration
With the display reading **CAL – SPAN**, apply full-scale pressure then press the **E** key; the display will blink. Press the **E** key again to save the full-scale calibration or press the **MENU** key to cancel the calibration.

MAINTENANCE
Upon final installation of the Series DM-1200 DigiMag® Digital Differential Pressure Gage, no routine maintenance is required. A periodic check of the system is recommended. The Series DM-1200 is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return good authorization number before shipping.

Mounting Template



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