

## OVERVIEW

The DATAWATCH IX vibration monitor recording device features a striking graphical VGA display, and four or eight universal inputs for data display and recording. This device is perfect for 4-20mA vibration transmitter inputs.

The 88mm [3.5in] display offers crystal clear visualization of vibration and process parameters with a wide selection of configurable views to best suit the application. Views include: horizontal and vertical trends, horizontal and vertical bar graphs, numeric, alarm panel, and alarm status. The unit also provides user configuration from the front of the product without the need to connect to a PC.

The DATAWATCH IX recording functionality utilizes 50MB onboard Flash memory, removable USB storage and data transfer via Modbus TCP/IP over Ethernet communications. The four or eight universal input channels provide high accuracy 125ms parallel sampling. An additional 30 virtual channels can be utilized to view Modbus inputs, math, counter and totalizer values within the instrument. Each temperature measurement uses one isolated or two adjacent non-isolated channels.



## FEATURES AND BENEFITS

- Automatic data recording
- Panel mounted
- 4-20mA universal inputs (perfect for vibration transmitters)
- USB removable data storage facility
- Compact design
- 50MB flash memory
- Modbus TCP/IP over Ethernet communications
- VGA crystal clear display
- 30 virtual channels
- Multiple I/O options
- Web server
- Four isolated channels
- Eight non-isolated channels

## SPECIFICATIONS

## General

**I/O Types Analog i/p:** Four isolated or Eight non-isolated.  
Note that temperature takes up one isolated input (Not dual channel).

**Digital i/p:** Two

**Digital (logic) o/p:** Two

**Relay o/p:** Four

## Features:

- Modbus TCP master/slave
- USB configuration save/restore
- 30 Virtual channels (each configurable as counter, math, totalizer or comms input)
- Customized start up screen
- Ethernet/IP

## Environmental Performance

## Ambient Temperature Range:

Operating: 0 to 55°C

Storage: -20 to +70°C

## Humidity Range

Operating: 5% to 85% RH non condensing

Storage: 5% to 85% RH non condensing

## Protection:

Front panel: IP65

**Behind Panel:** IP10 (International)

**Shock/Vibration:** BS EN61131-2 (5 to 150 Hz. at 1g; 1 octave per min.)

**Altitude:** <2000 metres

**Atmosphere:** Not suitable for use in explosive or corrosive atmospheres

**Electrical Safety:** BS EN61010-1 (Installation category II; Pollution degree 2)

## Electromagnetic Compatibility Emissions

(Standard units): BS EN61326 Class B – Light industrial

(Low voltage option): BS EN61326 Class A – Heavy industrial

**Immunity:** BS EN61326 Industrial

## Approvals and Compliance

**General:** CE and cUL, EN61010

**PV input:** AMS2750D compliant

**RoHS EU:** China

**Packaging:** BS61131-2 section 2.1.3.3.

## Physical

**Panel Mounting:** 1/4 DIN Rail

**Weight** (Instrument only): 0.44kg (15.52oz)

**Panel Cutout Dimension:** 92 mm x 92 mm (both-0.0 +0.8) or 3.62 in x 3.62 in (both-0.00 +0.03 in)

**Depth Behind Panel:** 90 mm (3.54 in) excluding wiring

## Operator Interface

**Display:** 3.5" TFT color display (320 pixels wide x 240 pixels high)

**Controls:** Four navigation push buttons below the display screen (Page, Scroll, Lower and Raise)

## Power Requirements

## Supply Voltage:

Standard: 24 Vdc (+20%, -15%). See Power Supply Voltage for packaged systems on page 7.

**Power Dissipation:** 9W (max.)

**Fuse Type:** No internal fuse fitted

**Interrupt Protection:** Standard: Holdup >10ms at 85V RMS supply voltage

## Battery Backup

**Stored Data:** Time, date

**Replacement Period:** Three years typical

## Clock (real-time clock) Data:

Support Time: Minimum of 1 year with unit unpowered

Temperature Stability: 0 to 55°C  $\leq \pm 3.5$ ppm

RTC Aging: First year to 10 year  $\leq \pm 5$ ppm

**Type:** Poly-carbon mono fluoride/lithium (BR2330) (PA260195)

Replace battery with Panasonic BR2330/BE only. Use of another battery may present a risk of fire or explosion. See owners manual for safety instructions.

**Caution** Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

## Ethernet Communications

**Type:** 10/100baseT Ethernet (IEEE802.3)

**Protocols:** Modbus TCP/IP master/slave over Ethernet

**Cable type:** Category 5

**Maximum length:** 100m (110 yards)

## Termination:

RJ45

Green LED illuminated = link connected;

Amber LED flashing shows link activity

## USB Port

**Number of Ports:** One at rear of instrument

**Standard:** USB1.1

**Transmission Speeds:** 1.5MBit/sec (low speed device)

**Maximum Current:** <100mA

**Peripherals Supported:** Memory stick (8GB max), Bar code reader, QWERTY keyboard

SPECIFICATIONS Continued

Update/Archive Rates

**Sample Rate** (input/output): 8Hz  
**Trend Update:** 8Hz max.  
**Archive Sample Value:** Latest value at archive time  
**Display Value:** Latest value at display update time

Analog Input

**Number of Inputs:** Four or Eight  
**Input Types:** dc Volts, dc mV, dc mA, dual mA (external shunt required), dual mV, Thermocouple, RTD (2-wire and 3-wire), Digital (Contact closure)  
**Input Type Mix:** Freely configurable  
**Sample Rate:**  
 8Hz (125ms)  
 4Hz (250ms) if dual input enabled

**Conversion Method:** 16 bit delta sigma

**Input Ranges:** See Table 1 and Table 2

**Mains Rejection (48 to 62Hz)**

Series Mode: > 95dB  
 Common Mode: >179dB

**Common Mode voltage:** 250V ac max.

**Series Mode Voltage:** 280mV at lowest range; 5V p-p at highest range

**Input Impedance:**

40mV, 80mV, 2V ranges > 100MΩ;  
 62.5kΩ for input voltages > 5.6V  
 667kΩ for input ranges < 5.6V

**Overvoltage Protection**

Continuous: ±30V RMS  
 Transient (<1ms): ±200V pk-pk between terminals

**Sensor Break Detection Type:** ac sensor break on each input giving quick response with no associated dc errors

Recognition Time: <3 seconds  
 Minimum Break Resistance: 40mV, 80mV ranges: 5kΩ;  
 other ranges: 12.5kΩ

**Shunt** (mA inputs only): 1Ω to 1KΩ mounted externally

**Additional Error Due to Shunt:** 0.1% of Input

**Isolation:**

Channel to Channel: 300V RMS or

**Note:** If Dual Channel mode enabled primary and secondary inputs are not electrically isolated from each other.

Channel to Common Electronics: 300V RMS Channel to Ground: 300V RMS

**Dielectric Strength Test:** BS EN61010, 1 minute type test

Channel to Channel: 2500V ac  
 Channel to Ground: 1500V ac

Table 1 (Note: Restricted to 2000mV if dual input mode enabled)

| Low Range | High Range | Resolution | Max. Error (Instrument at 25°) | Temp. Performance     |
|-----------|------------|------------|--------------------------------|-----------------------|
| -40mV     | 40mV       | 1.9μV      | 4.6μV + 0.053% of reading      | 13ppm of input per °C |
| -80mV     | 80mV       | 3.2μV      | 7.5μV + 0.052% of reading      |                       |
| -2V       | 2V         | 82μV       | 420μV + 0.044% of reading      |                       |
| -3V       | 3V         | 500μV      | 1.5mV + 0.063% of reading      | 45ppm of input per °C |

Resistance Input Ranges

**Temperature Scale:** ITS90

**Types, Ranges and Accuracies:** See Table 3

**Maximum Source Current:** 200μA

**Pt100 Figures**

Range: 0 to 400Ω (-200 to +850°C)  
 Resolution: 0.05°C  
 Calibration Error: ±0.31°C ±0.023% of measurement in °C at 25°C ambient  
 Temperature Coefficient: ±0.01°C/°C ±25ppm/°C measurement in °C rom 25°C ambient  
 Measurement Noise: 0.05°C peak-peak with 1.6s input filter  
 Linearity error: 0.0033% (best fit straight line)  
 Lead resistance: 0 to 22Ω matched lead resistances  
 Bulb current: 200μA nominal

Table 2 Ohms (RTD) Input Ranges

| Low Range | High Range | Resolution | Max. Error (Instrument at 25°) | Temp. Performance     |
|-----------|------------|------------|--------------------------------|-----------------------|
| 0Ω        | 400Ω       | 20mΩ       | 120mΩ + 0.023% of reading      | 25ppm of input per °C |

Table 3 RTD Type Details

| RTD Type | Overall Range (°C) | Standard             | Max. Linearization Error |
|----------|--------------------|----------------------|--------------------------|
| Cu10     | -20 to +400        | General Electric Co. | 0.01°C                   |
| Cu53     | -70 to +200        | RC21-4-1966          |                          |
| JPT100   | -220 to +630       | JIS C1604:1989       |                          |
| Ni100    | -60 to + 250       | DIN43760:1987        |                          |
| Ni120    | -50 to +170        | DIN43760:1987        |                          |
| Pt100    | -200 to + 850      | IEC751               | 0.09°C                   |
| Pt100A   | -200 to + 600      | Recorders SA         |                          |

**SPECIFICATIONS Continued**

**Thermocouple Data**

**Temperature Scale:** ITS90  
**CJC Types:** Off, internal, external, remote.  
**Remote CJC Source:** Any input channel  
**Internal CJC Error:** <1°C max., with instrument at 25 °C  
**Internal CJC Rejection Ratio:** 40:1 from 25°C  
**Upscale/Downscale Drive:** High, low or none independently configurable for each channel's sensor break detection  
**Types, Ranges and Accuracies:** See Table 4

**Table 4 Thermocouple Types, Ranges and Accuracies**

| T/C Type             | Overall Range (°C) | Standard                  | Max. Linearization Error                     |
|----------------------|--------------------|---------------------------|--|
| B                    | 0 to +1820         | IEC584.1                  | 0 to 400°C = 1.7°C<br>400 to 1820°C = 0.03°C |
| C                    | 0 to +2300         | Hoskins                   | 0.12°C                                       |
| D                    | 0 to +2495         | Hoskins                   | 0.08°C                                       |
| E                    | -270 to +1000      | IEC584.1                  | 0.03°C                                       |
| G2                   | 0 to +2315         | Hoskins                   | 0.07°C                                       |
| J                    | -210 to +1200      | IEC584.1                  | 0.02°C                                       |
| K                    | -270 to +1372      | IEC584.1                  | 0.04°C                                       |
| L                    | -200 to +900       | DIN43710:1985 (to IPTS68) | 0.02°C                                       |
| N                    | -270 to +1300      | IEC584.1                  | 0.04°C                                       |
| R                    | -50 to +1768       | IEC584.1                  | 0.04°C                                       |
| S                    | -50 to +1768       | IEC584.1                  | 0.04°C                                       |
| T                    | -270 to +400       | IEC584.1                  | 0.02°C                                       |
| U                    | -200 to +600       | DIN43710:1985             | 0.08°C                                       |
| NiMo/NiCo            | -50 to +1410       | ASTM E1751-95             | 0.06°C                                       |
| Platinel             | 0 to +1370         | Engelhard                 | 0.02°C                                       |
| Mi/NiMo              | 0 to +1406         | Ipsen                     | 0.14°C                                       |
| Pt20%Rh/<br>Pt40%/Rh | 0 to +1888         | ASTM E1751-95             | 0.07°C                                       |

**Relay and Logic I/O**

O/P1, O/P2 and O/P3 logic I/O and Relay Specification

**Active (current on) Current Sourcing Logic Output (O/P1 or O/P2 only):**

Voltage o/p across terminals: +11V min.; +13V max.  
 Short circuit output current: 6mA min. (steady state); 44mA max. (switch current)

**Inactive (current off) Current Sourcing Logic Output (O/P1 or O/P2 only):**

Voltage output across terminals: 0V (min.); 300mV (max.)  
 Output source leakage current into short circuit: 0µA (min.); 100µA (max.)

**Active (current on) Contact Closure Sourcing Logic Input (O/P1 only):**

Input current Input at 12V: 0mA (min.); 44mA (max.)  
 Input at 0V: 6mA min. (steady state); 44mA max. (switch current)

**Open Circuit Input Voltage:** 11V (min.); 13V (max.)

**Open Circuit (inactive) Resistance:** 500Ω (min.); ∞ (max.)

**Closed Circuit (active) Resistance:** 0Ω (min.); 150Ω (max.)

**Relay Contacts**

**Contact Switching Power (resistive):**

Max. 2A at 230V  
 Min. 100mA at 12V

**Current Through Terminals:** 2A

**Digital Inputs**

Dig InA and Dig InB contact closure logic input

**Contact Closure**

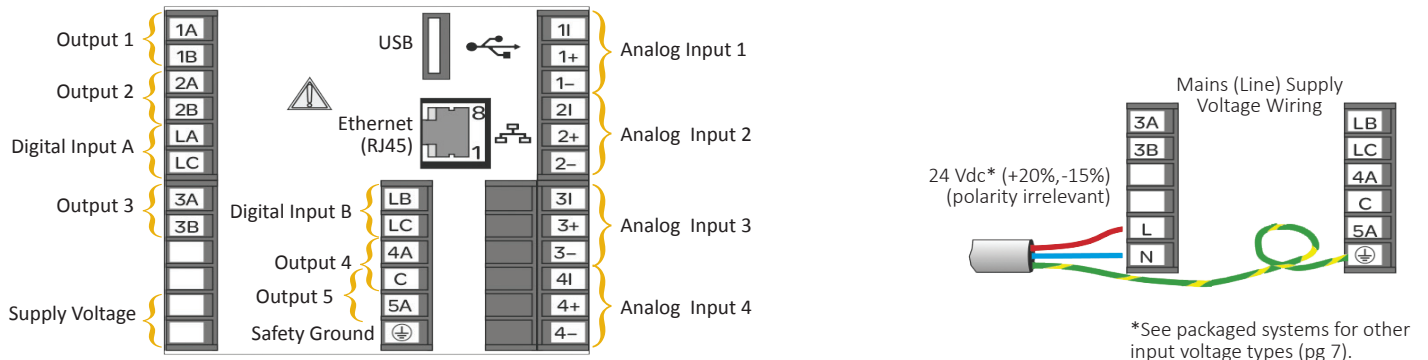
Short circuit sensing current (source): 5.5mA (min.); 6.5mA (max.)

Open circuit (inactive) resistance: 600Ω (min.); ∞ (max.)

Closed circuit (active) resistance: 0Ω (min.); 300Ω (max.)



## REAR TERMINALS



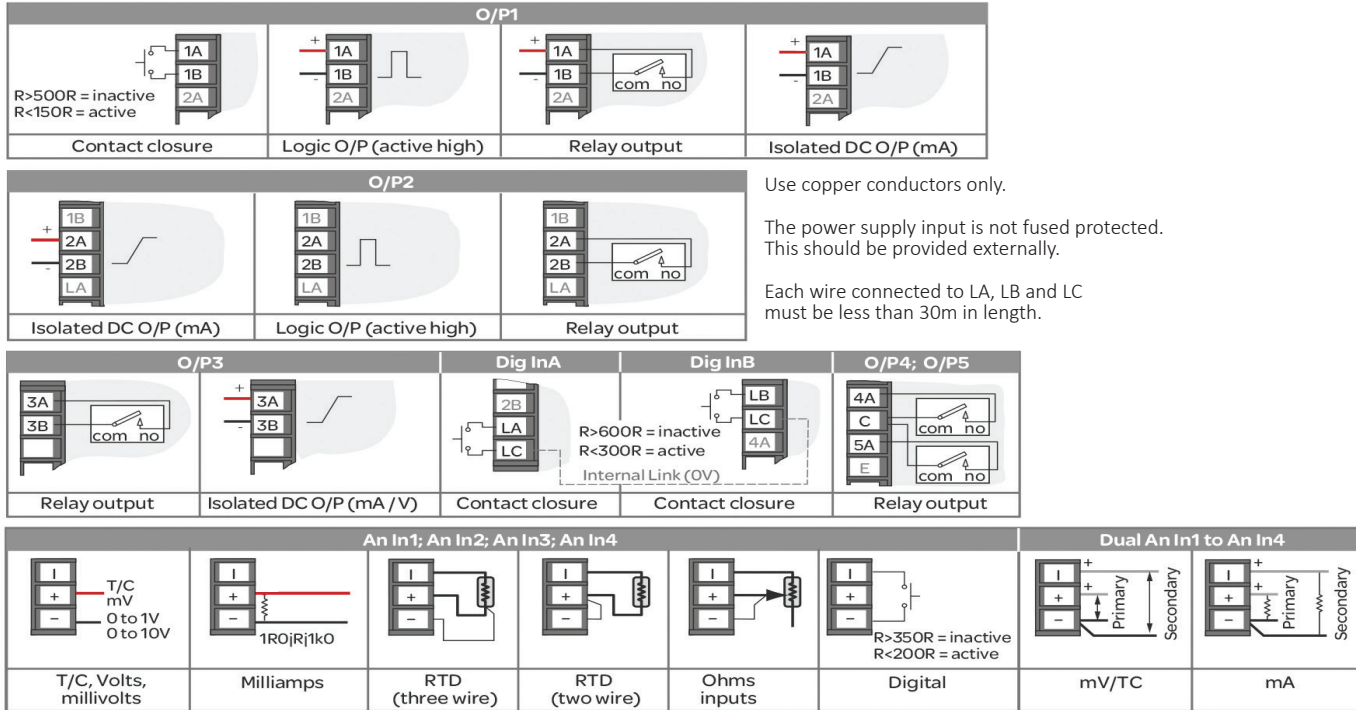
Note: Temperature takes up one analog input (Not dual channel).

## TERMINATION DETAILS

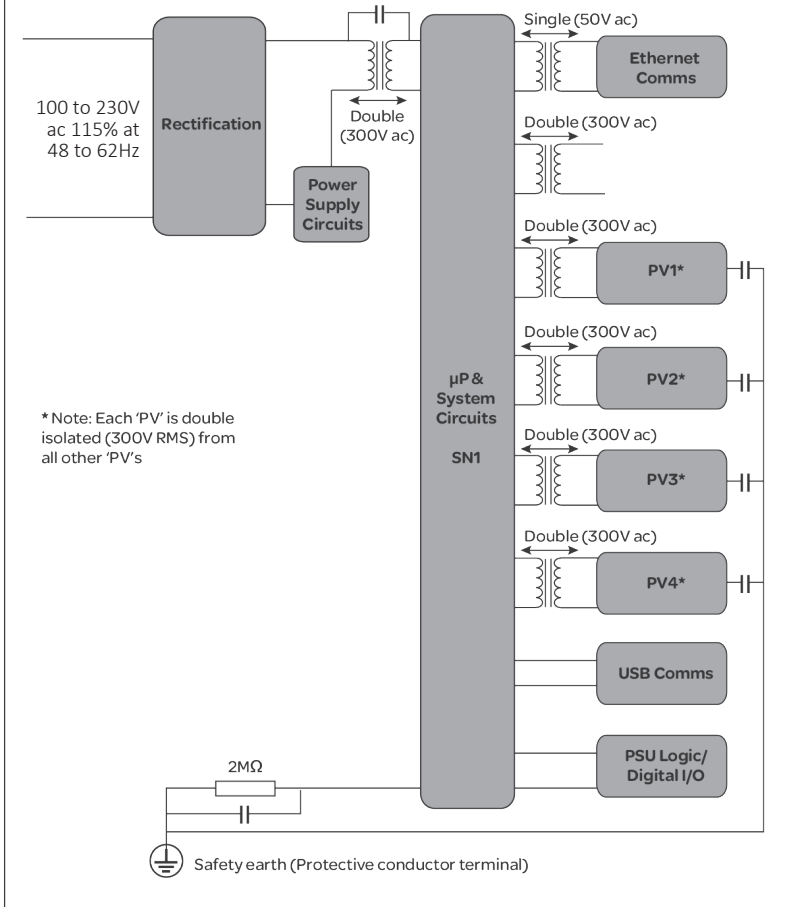
The screw terminals accept wire sizes in the range:

Single wire 0.205 to 2.08mm<sup>2</sup> (14 to 24 AWG) 2 wires 0.205 to 1.31mm<sup>2</sup> (16 to 24 AWG) inclusive.

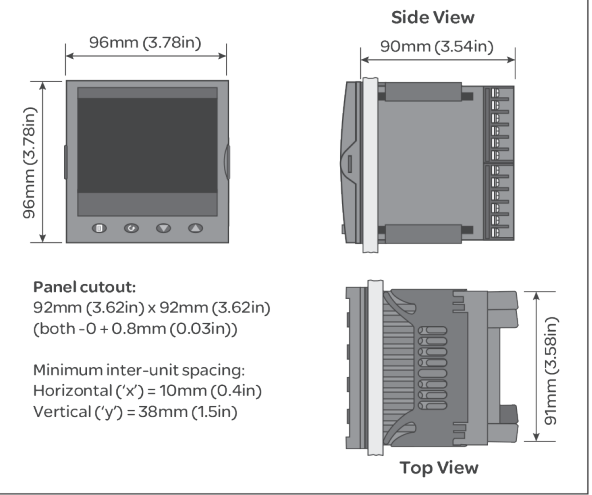
Screw terminals should be tightened to a torque not exceeding 0.4Nm (3.54 lb in).



## ISOLATION



## INSTALLATION





## HOW TO ORDER

DW - IX - **A A**

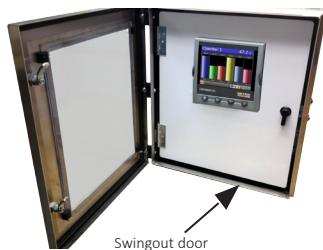
| AA | Dual Input Channels                         |
|----|---|
| 04 | 4 inputs isolated*                          |
| 08 | 8 inputs non isolated*                      |
| 12 | 4 inputs isolated & 8 inputs non isolated** |
| 16 | 16 inputs non isolated**                    |

\*BB Options 03-06 only

\*\* BB Options 07-08 only



Enclosure Dimensions for BB 03/04:  
8.6 W x 10.6 H x 7.6 D (in)  
218.4 W x 269.2 H x 193 D (mm)



Enclosure Dimensions for BB 05/06:  
10 W x 12 H x 8.7 D (in)  
255 W x 305 H x 221 D (mm)



Enclosure Dimensions for BB 07/08:  
12 W x 14 H x 6 D (in)  
305 W x 356 H x 157 D (mm)

**B B**

| BB | Panel Type  |
|----|---|
| 03 | NEMA 4X wall mount <b>polycarbonate enclosure</b> front hinged door complete with wall mounting brackets. Datawatch mounted in the door and wired to a termination assembly complete with 240/120VAC 2 amp circuit breaker.<br><b>Front panel mount NEMA 4X USB port. Integral 24V DC power supply wired to power up to eight (8) vibration transmitters and the Datawatch IX monitor.</b>  |
| 04 | NEMA 4X wall mount <b>316 stainless steel enclosure</b> front hinged door complete with wall mounting brackets. Datawatch mounted in the door and wired to a termination assembly complete with 240/120VAC 2 amp circuit breaker.<br><b>Front panel mount NEMA 4X USB port. Integral 24V DC power supply wired to power up to eight (8) vibration transmitters and the Datawatch IX monitor.</b>  |
| 05 | NEMA 4X wall mount <b>polycarbonate enclosure with transparent window</b> in front hinged door complete with wall mounting brackets. Datawatch is mounted to the <b>swingout door</b> , inside the enclosure, and wired to a termination assembly complete with 240/120VAC 2 amp circuit breaker. <b>The USB port is on the back side of the DATAWATCH IX. Integral 24V DC power supply wired to power up to eight (8) vibration transmitters and the Datawatch IX monitor.<sup>2</sup></b>       |
| 06 | NEMA 4X wall mount <b>316 stainless steel enclosure with transparent window</b> in front hinged door complete with wall mounting brackets. Datawatch is mounted to the <b>swingout door</b> , inside the enclosure, and wired to a termination assembly complete with 240/120VAC 2 amp circuit breaker. <b>The USB port is on the back side of the DATAWATCH IX. Integral 24V DC power supply wired to power up to eight (8) vibration transmitters and the Datawatch IX monitor.<sup>2</sup></b> |
| 07 | NEMA 4X wall mount <b>polycarbonate enclosure</b> front hinged door complete with wall mounting brackets. Datawatch mounted in the door and wired to a termination assembly complete with 240/120VAC 2 amp circuit breaker.<br><b>Front panel mount NEMA 4X USB port. Integral 24V DC power supply wired to power up to sixteen (16) vibration transmitters and two (2) Datawatch IX monitors.</b>  |
| 08 | NEMA 4X wall mount <b>316 stainless steel enclosure</b> front hinged door complete with wall mounting brackets. Datawatch mounted in the door and wired to a termination assembly complete with 240/120VAC 2 amp circuit breaker.<br><b>Front panel mount NEMA 4X USB port. Integral 24V DC power supply wired to power up to sixteen (16) vibration transmitters and two (2) Datawatch IX monitors.</b>  |

### NOTES:

- 1. The DATAWATCH IX systems are factory configured** for four (4) isolated or eight (8) non-isolated, 4 to 20 mA vibration transmitters (0 to 1.0 ips (0 to 25 mm/s)) with alarm levels set at 0.3 ips (8 mm/s). Users may reconfigure as required.
- 2. For Class 1 DIV. 1 and Class 1 DIV. 2 applications** use a Purge and Vent System similar to P&F Bebcos Purge Panel (P/N: IDDIA-LPS-CI-YZ-RH) and P&F Bebcos Purge Vent (P/N: EPV-Z-SA-OO). Use with BB option 05 and 06 only.