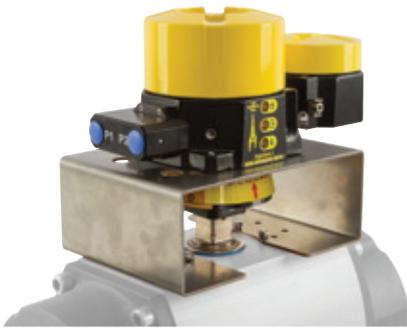


**DIGITAL EPIC-2 POSITION TRANSMITTER**

INTRINSICALLY SAFE OR EXPLOSION PROOF

An intelligent valve position transmitter that offers discrete position control and reliable, non-contact position feedback with digital communication via HART® protocol in a simple, integrated package



**FEATURES**

- Position transmitter with 4-20 mA position feedback.
- Non-contact local or remote mount magnetic sensor with no moving parts, providing high accuracy and reliability.
- Choice of factory configured solenoid coil & valve or custom solenoid valve with a choice of C<sub>v</sub> rating and coil voltage.
- Password protected 3 button local user interface with high contrast graphic LCD (non-intrusive 3 button keypad on XP version).
- Remote user interface using HART® 7 DD/FDT® DTM 1.2 for seamless system integration.
- Easy configuration and auto calibration.
- Emergency Shutdown (ESD) status & alarm.
- Partial Stroke Testing (PST) & pressure profiling .
- Solenoid Operated Valve Testing (SOVT).
- Full Stroke Testing (FST) & pressure profiling.
- Intelligent alarm system.

**GENERAL APPLICATION**

Designed specifically for safety valves, Digital EPIC-2 has advanced diagnostic functions that enable ESD, PST, SOVT and FST to be carried out efficiently and reliably, to ensure effective maintenance of Safety Integrity Levels up to level 3 (IEC 61508).

**TECHNICAL DATA**

Input signal:	0-24 V analog
Output signal:	0-24 V digital
ESD signal:	5 to 30 V DC
Loop output:	9 to 35 V DC
Stroke	
Rotary:	30° to 90°
Linear:	½" to 36" (15 to 914 mm)
Temperature range	
Standard operational:	-40° to +185°F (-40° to +85°C)
Enclosures	
Intrinsically safe:	Engineered resin, aluminum, stainless steel
Explosion proof:	Aluminum, stainless steel

# DIGITAL EPIC-2 POSITION TRANSMITTER

## INTRINSICALLY SAFE/EXPLOSION PROOF

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### OVERVIEW

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Digital EPIC-2 is a second generation, transmitter-based intelligent device that provides the ultimate in functionality at a realistic cost. Its sophisticated diagnostic functions lower the total cost of ownership by suggesting predictive maintenance of the valve under operation before it fails and interrupts the process, with intelligent alarms that pinpoint the root cause of problems, enabling the most appropriate and cost-efficient action.

It features an ultra-fast and reliable non-volatile memory for configuration and event logging with an unlimited number of write cycles and up to four maintenance signatures that can be compared to a baseline signature for preventive maintenance. It's also field upgradeable, via an integral USB port that eliminates the needs for proprietary tools, enabling new functions to be added simply.

### SENSING AND CONTROL

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Within the enclosure is a powerful industry leading ultra low power 32-bit ARM® microcontroller with one non-contact position sensor, two pressure sensors and one temperature sensor. The current consumption of the electronics keeps the device operating even at 3.6 mA with HART® communication during an ESD event.

#### Magnetic position sensor:

- Industrial grade magnetic sensor
- Remote option available up to 50 feet (15 m)
- Resolution: 0.2% FS
- Accuracy<sup>1</sup>: ± 2 - 4% FS
- Effect of temperature: ± 0.4% /10°F/°C
- Effect of external magnetic field: negligible (IEC 61000-4-8)
- Effect of vibration: negligible (IEC 61514-2)

#### Pressure sensors:

- For diagnostic and signature generation
- Input range: 0 to 120 psi
- Connection: 1/4" NPT or 1/4" BSP
- Resolution: 1 psi
- Accuracy<sup>1</sup>: ± 1 psi
- Effect of temperature: ± 1 psi / 100°C

#### Temperature sensor:

- Embedded digital temperature sensor
- Used for alarm generation
- Accuracy<sup>2</sup>: ± 2°F/°C

### NOTES

1. Combined linearity, hysteresis and repeatability over the operating range.
2. Combined linearity, hysteresis and repeatability over the operating temperature range.

### AGENCY APPROVALS

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#### North America

XP/I/1/BCD/T5 Ta = -50°C to +85°C

DIP/II, III/1/EFG/T5 Ta = -50°C to +85°C

I/1/AEx db IIB+H<sub>2</sub>/T5 Gb Ta = -50°C to +85°C

21/AEx tb IIIC/T88°C Db Ta = -50°C to +85°C, Type 4, 4X, IP66, IP67

Intrinsically Safe for Class I, II and III Division1, Groups A,B,C,D; T4; Ta Type 4, 4X, 6P, IP67

Non Incendive Class 1, Division 2, Groups A, B, C, D; T4; Type 4, 4X, 6P, IP67

Class II, Division 2, Groups F, G, T4

#### ATEX/IECEX

EX ia IIC T4 Ga Ta = -40°C to +80°C IP66/IP67

EX nA IIC T4 Gc Ta = -40°C to +80°C IP66/IP67

# DIGITAL EPIC-2 POSITION TRANSMITTER

## INTRINSICALLY SAFE/EXPLOSION PROOF

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### COMMUNICATION

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The Digital EPIC-2 is powered through an analog signal from the control system and provides 4-20 mA position feedback and digital HART communication on the same signal. The safety function is provided from an ESD digital signal from the safety system to the Digital EPIC-2 to de-energize the valve during an emergency shutdown event.

For Foundation Fieldbus and Profibus PA applications please call Westlock.

#### HART details:

- HART revision: 7.3
- PHY compliance: 7.3
- PV: Actual position in % FS
- SV: Loop current in mA FS
- TV: Pressure port 1 in psi
- FV: Pressure port 2 in psi
- Burst: No

#### Loop input:

- Polarity insensitive, two wire 4-20 mA, Namur NE43
- Normal operation: adjustable  $3.8 \leq I \leq 20.5$  mA
- Fixed calibration/PST/FST/SOV current: 12 mA
- Fail condition:  $I \leq 3.6$  or  $I > 21.0$  mA (configurable)
- Minimum operating voltage: 9 V DC
- Maximum operating voltage: 35 V DC

#### ESD input:

- Operating voltage: 5 to 30 V DC
- Polarity insensitive
- Isolated 1500 Vrms
- Maximum current: 1000 mA
- Voltage monitor with configurable HART alert

#### ESD/PST/SOV output:

- Operating voltage: 5 to 30 V DC
- Polarity insensitive
- Isolated 1500 Vrms
- Maximum current:
  - 1000 mA at 77°F (25°C)
  - 500 mA at 185°F (85°C)
- Options available up to 400 V AC/DC
- Contact Westlock for AC and high-voltage options

#### Discrete input:

- Suitable for dry-contact active closed outputs
- Optional remote PST/FST/SOV initiation

#### Discrete output:

- Isolated 1500 Vrms
- Normally closed switch
- Maximum operating voltage: 350 V AC/DC
- Maximum current:
  - 120 mA at 77°F (25°C)
  - 60 mA at 185°F (85°C)
- PST/FST/SOV complete/alert/alarm/fault indication

#### NOTE

1. For reference only. Check your actual device or consult Westlock for more information.

# DIGITAL EPIC-2 POSITION TRANSMITTER

## INTRINSICALLY SAFE/EXPLOSION PROOF

### SETUP, OPTIONS AND RATINGS

#### Setup, calibration and operation

A step by step guided setup wizard on a graphic LCD provides an easy way to configure, calibrate and operate the device locally. Alternatively, a remote HART® DD or FDT® DTM can be used to configure, calibrate and perform advanced diagnostics functions on the device.

#### Graphic LCD:

- LCD readable temperature: -40°F to 158°F (-20°C to 70°C)

#### Keypad for local configuration:

- 3-key ruggedized tactile membrane
- Optional non-intrusive magnetic keypad with magnetic tool

### OPTIONS

#### Real time clock:

- Adjusted using keypad or HART
  - Used for automatic PST/FST/SOV<sup>(2)</sup> function and time-stamped events
  - Back-up: Super-capacitor
  - Back-up life: 14 days at 68°F (20°C)
- Contact Westlock for other options including current/voltage input for 4-wire sensors.

#### Environmental:

- Operating: -40°F to +185°F (-40°C to +85°C)
- Storage: -76°F to +185°F (-60°C to +85°C)
- Relative Humidity: 0 to 95% non-condensed
- Vibration: 2 g, 10 Hz to 1000 Hz
- Shock: 18 g, 3 axis, 100 bumps each axis
- References: IEC61514-2, IEC 60068-2-29/27, IEC 61298-3, IEC 60068-2-1/2

#### Remote mount capability

The Digital EPIC-2 has the ability to be mounted remotely (up to 50 feet / 15 m) from the device it is controlling (please consult about greater distances). This allows the position transmitter to be isolated if the valve is located in either a high vibration, high temperature or extremely corrosive environment.

#### Reliability data

safety Integrity Level: Suitable for use in all SIL 3 applications.



#### IEC 61508 Failure Rates in FIT<sup>(1)</sup>

Device	$\lambda_{SD}$	$\lambda_{SU}$	$\lambda_{DD}$	$\lambda_{DU}$
D-EPIC 2 HART	1	586	0	1

<sup>(1)</sup> FIT = 1 failure / 10<sup>9</sup> hours

Assessment report PEN 16/01-024 R001 VIRI

Safety Manual: SMAN-004 Revision A or later

# DIGITAL EPIC-2 POSITION TRANSMITTER

## INTRINSICALLY SAFE/EXPLOSION PROOF

### Ingress protection rating (base models):

- Resin enclosure: IP65 / TYPE 4/4X/6P
- XP enclosure (aluminum/stainless steel): IP67 / TYPE 4/4X/6P

### Hazardous ratings (Reference only, contact Westlock for approvals and certificates):

Digital EPIC-2 is designed in accordance with criteria for NI, IS and XP applications. In some cases it requires the use of an agency approved barrier. For information on the barrier used by Westlock Controls to obtain the agency approvals listed, appropriate network architecture and segment device limits, contact Westlock.

### HAZARDOUS RATINGS

Type	Housing	Rating
<b>Intrinsically safe</b> Engineered resin, Aluminum or Stainless steel	D530	NEC 500:
	D540	Class I, Division 2; Groups A, B, C & D
	D550	Class II & III, Division 2; Groups F & G  ATEX/IEC: Ex II 1 G Ex ia IIC T4 Ta = -20°C to +60°C Ex II 3 G Ex nA IIC T4 Ta = -20°C to +60°C
<b>Explosion proof*</b> Aluminum or Stainless steel	D510	NEC 500:
	D520	Class I, Division 1; Groups B, C & D Class I, Division 2; Groups A, B, C & D Class II, Division 1; Groups E, F & G  ATEX/IEC: Ex d IIB+H2 AEx d IIB+H2 EX nA IIC AEx nA IIC

\* Contact Westlock for more information.

### Intrinsically safe parameters

Intrinsically safe parameters for loop output connector J1 pins 1, 2

### Entity parameters<sup>[4]</sup>

U<sub>i</sub> = 30 V

I<sub>i</sub> = 100 mA

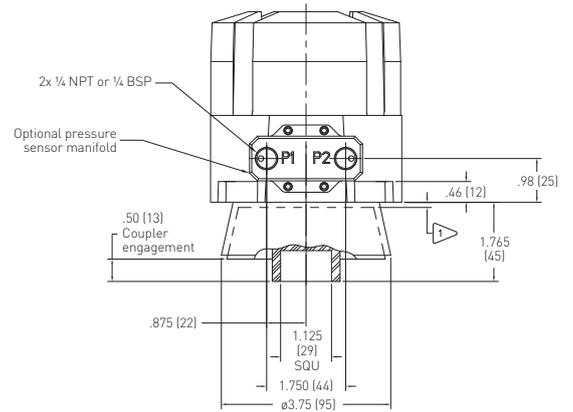
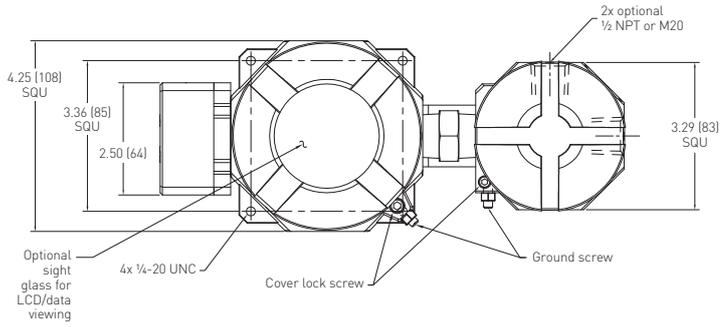
P<sub>i</sub> = 0.75 W

C<sub>i</sub> = 2.2 nF

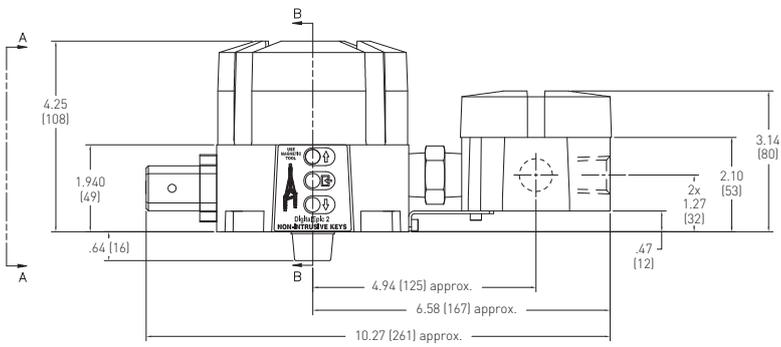
L<sub>i</sub> = 40 uH

# DIGITAL EPIC-2 POSITION TRANSMITTER

## DIMENSIONS - D510 & D520 EXPLOSIONPROOF / FLAMEPROOF



View A-A shown with Beacon for rotary applications



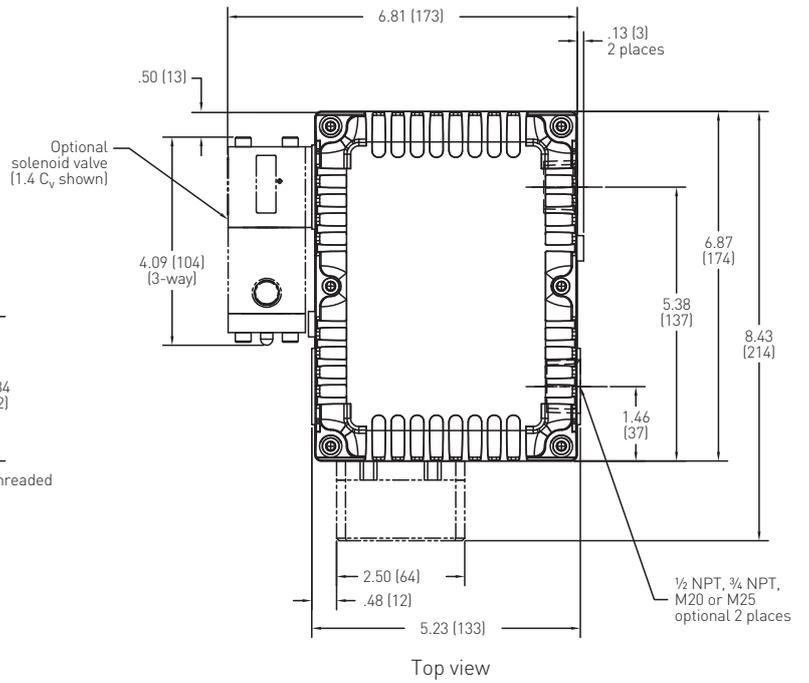
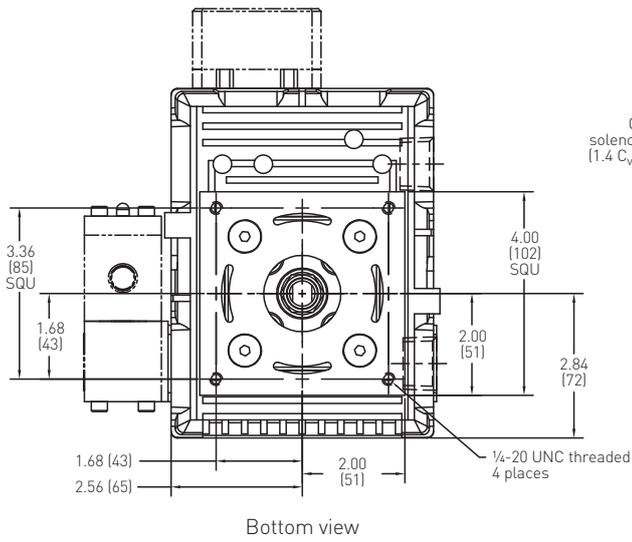
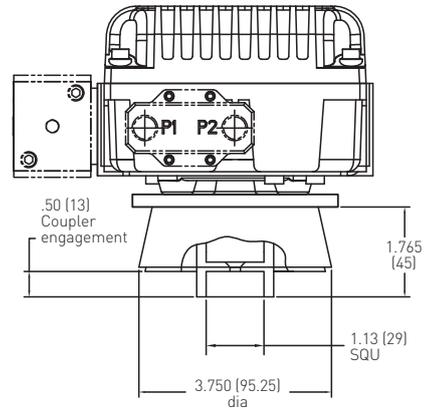
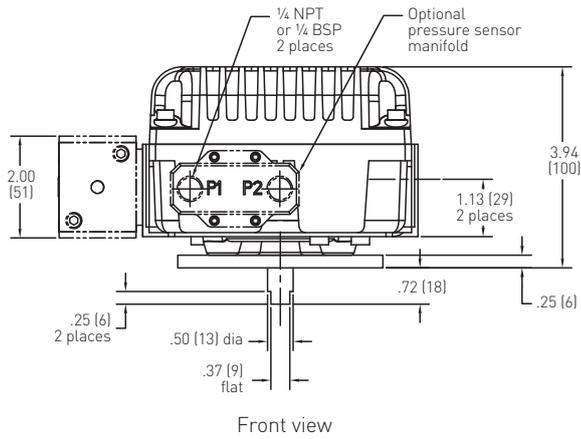
View shown w/o Beacon for linear applications

### NOTES

1. .115 [2.92] spacing is required for clearance between inner Beacon & bottom of housing.
2. All dimensions are in inches (millimeters).

# DIGITAL EPIC-2 POSITION TRANSMITTER

DIMENSIONS - D530, D540, D550 NON-INCENDIVE AND D550 NON-SPARKING / INTRINSICALLY SAFE



# DIGITAL EPIC-2 POSITION TRANSMITTER

## SELECTION GUIDE - D510 & D520 EXPLOSIONPROOF / FLAMEPROOF

### Base Model

D510 D-EPIC2 Digital Transmitter with XP Site Glass, ESD/PST capability & Non-intrusive Calibration

D520 D-EPIC2 Digital Transmitter

#### Application Type

- LV Linear Transmitter (Free magnet assy. Include up to 2½" stroke, for strokes > 2½", consult Sales Representative)\*
- LR Linear Transmitter with Remote Mount Option (magnet note in LV options applies)\*
- RO Rotary Transmitter
- RR Rotary Transmitter with Remote Mount Option

#### ESD/PST - Diagnostics

- 00 None (Required choice for D520)
- 11 ESD/PST Function (Simplex single coil)
- 1N ESD/PST Function with Pressure profiling and SOVT (NPT fittings)
- 1B ESD/PST Function with Pressure profiling and SOVT (BSP Fittings)

#### Optional Approval

- F FM Approval
- A ATEX Exd, E a and IEC Exd, E a approved

#### Conduit Options

- 1 ½" NPT (Quantity based on ESD/PST option chosen)
- 2 M20 (Quantity based on ESD/PST option chosen)

D510 RO 1N F 1 = Model Number **D510R01NF1**

\* Valve stroke and fail position must be specified at time of quotation for LV and LR options.

# DIGITAL EPIC-2 POSITION TRANSMITTER / FALCON V SOLENOID VALVE

SELECTION GUIDE - D530, D540, D550 NON-INCENDIVE AND D550 NON-SPARKING / INTRINSICALLY SAFE

## Base Model

- D530 D-EPIC2 Digital Transmitter (Lrg. Resin Encl. w/ three Conduits (F) or two (F) when used with Falcon Valve or push button)
- D540 D-EPIC2 Digital Transmitter (Lrg. Aluminum w/ three conduits (F) or two conduits (F) when used with Falcon Valve or push button)
- D550 D-EPIC2 Digital Transmitter (Lrg. 316 Stainless Steel Encl. w/ three conduits (F) or two conduits (F) when used with Falcon Valve or push button)

## Application Type

- LV Linear Transmitter (Free magnet assy. Include up to 2½" stroke, for strokes > 2½", consult Sales Rep.)\*
- LR Linear Transmitter with Remote Mount Option (magnet note in LV options applies)\*
- RO Rotary Hall Effect Transmitter
- RR Rotary Hall Effect Transmitter with Remote Mt. Opt.

## Future options

0000 Future options

### ESD/PST - Diagnostics

- |    |   |    |  |
|----|---|----|--|
| 11 | ESD/PST Function (Simplex single coil)                  | 31 | ESD/PST Function (Simplex single coil with push button)                  |
| 1N | ESD/PST Function with Pressure profiling (NPT fittings) | 3N | ESD/PST Function with Pressure profiling (NPT fittings with push button) |
| 1B | ESD/PST Function with Pressure profiling (BSP Fittings) | 3P | ESD/PST Function with Pressure profiling (BSP fittings with push button) |

### Coil Voltage

- 0 None
- I 24 V DC

### Falcon V Valve Bodies

- |     |  |     |  |
|-----|--|-----|--|
| 2V3 | 1.4 C <sub>v</sub> , 3-Way, Brass        | 2V7 | 1.4 C <sub>v</sub> , 4-Way, Brass        |
| 3V3 | 1.4 C <sub>v</sub> , 3-Way, Aluminum     | 3V7 | 1.4 C <sub>v</sub> , 4-Way, Aluminum     |
| 5V3 | 1.4 C <sub>v</sub> , 3-Way, 316 SS       | 5V7 | 1.4 C <sub>v</sub> , 4-Way, 316 SS       |
| 3V4 | 4.3 C <sub>v</sub> , 3-Way, Aluminum**** | 3V8 | 4.3 C <sub>v</sub> , 4-Way, Aluminum**** |
| 540 | 3.5 C <sub>v</sub> , 3-Way, 316 SS***    | 580 | 3.5 C <sub>v</sub> , 4-Way, 316 SS***    |

### Over-ride Option (Adders must be doubled for Dual Coil)

- 0 None\*\*
- M Momentary\*\*\*
- L Locking\*\*\*
- R No-voltage Release, Non-Latching (available in 1.4 C<sub>v</sub> only)
- N No-voltage Release, Latching (available in 1.4 C<sub>v</sub> only)
- E External Pilot\*\*\*

### Approval Options

- IS FM Approved IS/NI
- AI ATEX and IEC Approved Exia/Exna

### Conduit Options

- 1 ½" NPT (Quantity based on options)
- 2 M20 (Quantity based on options)
- 3 ¾" NPT (Quantity based on options)
- 4 M25 (Quantity based on options)

D550

RO

0000

1B

I

5V3

0

AI

2

= Model Number **D550R00001BI5V3AI2**

## NOTES

- \* Valve stroke and fail position must be specified at time of quotation for LV and LR options.
- \*\* No override should be used for ESD valves with SIL rating.
- \*\*\* Options M, L, E are not available with option "54" & "58" Falcon Valve Bodies. These options are available in 303 SS, please contact Sales for availability.
- \*\*\*\* 3V4 valves have ports 2 & 3 plugged at the factory for 3-way functionality.







[www.westlockcontrols.com](http://www.westlockcontrols.com)

**Westlock.** We reserve the right to change designs and specifications without notice.