840 Series
Strain Gage Pressure Transmitters

Intrinsically safe and explosion proof pressure transmitters with integrated amplifier for use in hazardous environments

P/N 974123
07/05 Rev. C
ECO # 30337

Dynisco
# Table of Contents

<table>
<thead>
<tr>
<th>Content</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td>3</td>
</tr>
<tr>
<td>2. Notes on safety</td>
<td>5</td>
</tr>
<tr>
<td>3. Technical data</td>
<td>6</td>
</tr>
<tr>
<td>4. Function</td>
<td>15</td>
</tr>
<tr>
<td>5. Transport/delivery</td>
<td>16</td>
</tr>
<tr>
<td>6. Assembly</td>
<td>17</td>
</tr>
<tr>
<td>7. Commissioning</td>
<td>20</td>
</tr>
<tr>
<td>8. Maintenance</td>
<td>24</td>
</tr>
<tr>
<td>9. Troubleshooting</td>
<td>26</td>
</tr>
<tr>
<td>10. CE-Declaration of conformity</td>
<td>27</td>
</tr>
<tr>
<td>11. Ex-Declaration of conformity</td>
<td>28</td>
</tr>
</tbody>
</table>
1. **GENERAL**

1.1 Important information .......................................................................................................... 3
1.2 Copyright ............................................................................................................................. 3
1.3 Explanation of icons ........................................................................................................ .... 4
1.4 Abbreviations ...................................................................................................................... 4
1.5 Correct use ......................................................................................................................... 4
1.6 User’s obligations .............................................................................................................. 4

1.1 **IMPORTANT INFORMATION**

This manual applies to the 840 series only. It must be kept near the equipment in a readily and immediately accessible location at all times. The content of this manual must be read, understood and followed in its entirety. This applies in particular to the notes on safety. Following the safety instructions will help to prevent accidents, defects and malfunctions.

**DYNISCO** will not be held liable for any injury, loss or damage resulting from failure to follow the instructions in this manual.

If the product malfunctions, in spite of having followed the operating instructions, please contact the **DYNISCO** customer service department (see the back of the manual for contact information).

1.2 **COPYRIGHT**

Copyright law requires that this manual be used for in-house purposes only.

It is strictly forbidden to allow reproduction of any kind “in whole or in part” to persons outside of Dynisco.
1.3 **EXPLANATION OF ICONS**

The manual uses icons to indicate information pertaining to safety:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Attention" /></td>
<td>Risk of destruction or damage to equipment, machines or installations</td>
</tr>
<tr>
<td><img src="image" alt="Warning" /></td>
<td>General danger to life or limb</td>
</tr>
<tr>
<td><img src="image" alt="Caution" /></td>
<td>Specific danger to life or limb</td>
</tr>
<tr>
<td><img src="image" alt="Mandatory" /></td>
<td>You MUST do this</td>
</tr>
</tbody>
</table>

The safety instructions are provided again in the individual chapters of the manual.

1.4 **ABBREVIATIONS**

The following abbreviations are used:

- **OM** Operating manual
- **f.s.** Of full scale
- **PT** Pressure transmitter

1.5 **CORRECT USE**

The 840 series of pressure transmitters is specially designed for measuring pressure in explosive atmospheres (safety class, EEx ia IIC T4, Ta=−20°C to +80°C) as part of a larger overall system. It contains an integrated signal amplifier. The 840 series of pressure transmitters can be used in media temperatures up to 85°C. If the pressure transmitter is used in other applications, the safety and accident prevention regulations specific to that application must be followed.

*When using the PT as a safety component in accordance with the EC Machine Directive, Annex IIc, the equipment manufacturer must take any necessary precautions to ensure that malfunctions of the PT cannot cause damage or injury.*

The 840 series of pressure transmitters are also designed for explosion proof areas approved by factory mutual for Class I, Division 1, Groups A, B, C & D. Explosion proof models are also approved for intrinsic safety by factory mutual for Class I, Division 1, Groups A, B, C, & D.

1.6 **USER’S OBLIGATIONS**

The operator or owner of the larger overall system, e.g. a machine, is responsible for following the safety and accident prevention regulations that apply to the specific application.
2. **NOTES ON SAFETY**

The operator or owner of the larger overall system is responsible for following the safety and accident prevention regulations that apply to the specific application.

When planning machinery and using the PT, follow the safety and accident prevention regulations that apply to your application, e.g.:

- EN 60204, Electrical equipment in machines.
- EN 292, Machine safety, general design guidelines.
- DIN 57 100 Part 410, Protection against electric shock.
- EN 50 014:1997, General Requirements
- EN 50 020:1994, Intrinsically safe apparatus
- EN50284:1999, Special requirements frot Group II Category 1G

Mounting and electrical connection of the PT must be done by specialists with EMC training, following all applicable regulations, and in **pressureless, voltage-free, intrinsically safe** condition with the **machine switched off**.

**The machine must be secured against being switched back on!**

Ambient temperature for the electronics housing **max. +80°C** (safety class T4 max.).

Higher temperatures can result in damage and malfunction. Do not install the pressure transmitter in places where this temperature is exceeded.

**Explosion hazard!**

Deviation of the supply voltage from the value given in the technical specifications, or false polarity, can damage the pressure transmitter and cause malfunctions that can pose a risk of explosion.

Operate only with an intrinsically safe, EMC compliant power supply with the following specifications when employing the pressure 4-20mA output:

- Supply voltage max. 40 V DC
- Current output max. 100 mA
- Inductivity max. 0
- Capacity max. 0.017 µF

For PT's that are explosion proof Class I, Division 1, Groups A, B, C & D, the power supply rating is 16-40 Vdc.

Do not lay connecting cables in the direct vicinity of cables carrying higher voltage or used to switch inductive or capacitive loads.
3. **TECHNICAL DATA**

3.1 Ordering guides .................................................................................................................................................................................................................................................. 6
3.1.1 Ordering guide for x84xx ........................................................................................................................................................................................................................................ 6
3.2 Ordering example .............................................................................................................................................................................................................................................. 7
3.3 Safety related specifications ............................................................................................................................................................................................................... 7
3.4 Performance characteristics ............................................................................................................................................................................................................. 7
3.4.1 Accuracy ................................................................................................................................................................................................................................................................ 7
3.4.2 Resolution ................................................................................................................................................................................................................................................................ 8
3.4.3 Repeatability ................................................................................................................................................................................................................................................................ 8
3.5 Pressure side connection .............................................................................................................................................................................................................. 8
3.6 Electrical Termination ..................................................................................................................................................................................................................... 8
3.7 Wiring ................................................................................................................................................................................................................................................................ 9
3.8 Pressure ranges ......................................................................................................................................................................................................................... 10
3.8.1 Max. Overload .................................................................................................................................................................................................................................... 10
3.8.2 Burst pressure .................................................................................................................................................................................................................................... 10
3.8.3 Natural frequency .................................................................................................................................................................................................................... 10
3.9 Electrical Data ......................................................................................................................................................................................................................... 10
3.10 Temperature influence ......................................................................................................................................................................................................... 11
3.11 EMC requirements ............................................................................................................................................................................................................. 11
3.12 Materials ......................................................................................................................................................................................................................................... 11
3.13 Environmental Protection ...................................................................................................................................................................................................... 12
3.14 Weight .......................................................................................................................................................................................................................................... 12
3.15 Dimensions ........................................................................................................................................................................................................................... 12

3.1 **ORDERING GUIDES**

The exact meanings of the letter/digit combinations are given in the corresponding sections of chapter 3.

3.1.1 **ORDERING GUIDE FOR X84XX**

```
x 8 4 x - x x - x - x x @ x x x
```

- Pressure Type
- Accuracy
- Approval
- Pressure Port
- Electrical Termination
- Wiring
- Pressure Range
- Option
- Turndown
3.2 **ORDERING EXAMPLE**

```
G 8 4 0 E - 3 4 4 - 6 0 M @ 5 0 M
```

Gage Pressure
±0.5% Full Scale
Explosion Proof
F-250C Autoclave
2 Wire, 42" Leads in 1/2 - 14 NPT
Red (+), Black (-)
Pressure Range: 0-60,000 psi
Set Range: 0-50,000 psi

3.3 **SAFETY RELATED SPECIFICATIONS**

- ATEX certificate No.: SIRA 03ATEX2422
- EX-Safety class EEx ia IIC T4 (Ta = -20°C to +80°C)
- FM approvals Class I, Division 1 Groups A, B, C & D

**Certified maximum values for EEx ia IIC T4**

Associated electrical equipment must satisfy the following conditions:

- Supply voltage max. 40 V DC
- Current output max. 100 mA
- Inductivity max. 0
- Capacity max. 0.017 µF

3.4 **PERFORMANCE CHARACTERISTICS**

x84xx - xxx - xx - xxx@xxx

3.4.1 **ACCURACY**

(Linearity, hysteresis and repeatability)

3.4.1A **X840**

±0.50% of full scale

3.4.1B **X841**

±0.25% of full scale
### 3.4.1C X842

±0.15% of full scale

### 3.4.2 Resolution

Infinite

### 3.4.3 Repeatability

±0.10% of full scale

### 3.5 Pressure Side Connection

The pressure port thread of the standard 840 Series (Code 0 in the model number) is internal 1/8 - 27 NPT fabricated from high strength stainless steel.

Options available include the following:

<table>
<thead>
<tr>
<th>Code in Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1/8 - 27 NPTF, internal</td>
</tr>
<tr>
<td>1</td>
<td>1/4 - 18 NPT, internal</td>
</tr>
<tr>
<td>2</td>
<td>7/16 - 20 UNF, internal, O-ring, per MS33649-4</td>
</tr>
<tr>
<td>3</td>
<td>High Pressure, internal fitting per autoclave F-250-C</td>
</tr>
<tr>
<td>4</td>
<td>1/4 - 18 NPT, external</td>
</tr>
<tr>
<td>5</td>
<td>1/2 - 14 NPT, external</td>
</tr>
<tr>
<td>6</td>
<td>7/16 - 20 UNF, external, per MS33656-4</td>
</tr>
<tr>
<td>7</td>
<td>R 1/4 - metric, external</td>
</tr>
<tr>
<td>8</td>
<td>3/4 - 16 UNF, external, flush diaphragm**</td>
</tr>
<tr>
<td>9</td>
<td>Special (consult factory)</td>
</tr>
<tr>
<td>A</td>
<td>1/2 - 14 BSP, external</td>
</tr>
<tr>
<td>B</td>
<td>7/16 - 14 NPSM, external</td>
</tr>
<tr>
<td>C</td>
<td>Autoclave F-562-C</td>
</tr>
<tr>
<td>D</td>
<td>1” BSP, internal</td>
</tr>
<tr>
<td>G</td>
<td>Autoclave F-375C</td>
</tr>
</tbody>
</table>

** Each flush diaphragm transducer or transmitter is shipped with a DYNASEAL, Dynisco P/N 633014, for the pressure port seal. Recommended torque, for an adequate seal, is 100 in-lbs. Care should be exercised with the low pressure ranges. The flush diaphragm can be inadvertently overloaded with thumb pressure, which can be the equivalent of several hundred psi.

### 3.6 Electrical Termination

The electrical terminations of the standard 840 series (Code 4 in the Model Number) is 2 wire, 4”
long leads and a 1/2 - 14 NPT conduit fitting fabricated from high strength stainless steel.

Options available include the following:

**Code in Model No.**  **Description**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>PT02A-10-6P</td>
</tr>
<tr>
<td>1</td>
<td>PT02H-10-6P, hermetically sealed</td>
</tr>
<tr>
<td>2</td>
<td>PT1H-10-6P, hermetically sealed</td>
</tr>
<tr>
<td>3</td>
<td>4’ six conductor wire, 1/2 - 14 conduit fitting</td>
</tr>
<tr>
<td>4</td>
<td>42” two conductor wire with ground, 1/2 - 14 conduit fitting</td>
</tr>
<tr>
<td>5</td>
<td>30’ two conductor wire with ground, 1/2 - 14 conduit fitting</td>
</tr>
<tr>
<td>9</td>
<td>Special (consult factory)</td>
</tr>
</tbody>
</table>

### 3.7 Wiring

The wiring of the standard 840 series (Code 4 in the Model Number) is 2 wire red and black. Options available include the following:

**Code in Model No.**  **Description**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Connector (see above)</td>
</tr>
<tr>
<td>1</td>
<td>DHF/DV (BLH) wiring</td>
</tr>
<tr>
<td>2</td>
<td>Six conductor wiring</td>
</tr>
<tr>
<td>3</td>
<td>Six conductor DHF/DV (BLH) wiring</td>
</tr>
<tr>
<td>4</td>
<td>2 wire red and black</td>
</tr>
<tr>
<td>5</td>
<td>2 wire A and B</td>
</tr>
<tr>
<td>6</td>
<td>2 wire white and black</td>
</tr>
<tr>
<td>9</td>
<td>Special (consult factory)</td>
</tr>
</tbody>
</table>

#### Fig. 3-1  Power Supply Requirement and Typical Wiring Diagram

<table>
<thead>
<tr>
<th>TRANSDUCER MODEL</th>
<th>OUTPUT</th>
<th>POWER SUPPLY</th>
<th>WIRING DIAGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>840  841  842</td>
<td>4 - 20 mA</td>
<td>Single 12 - 36 Vdc</td>
<td>[Diagram]</td>
</tr>
</tbody>
</table>

Red  
A  
Transmitter  
Black  
B
3.8 PRESSURE RANGES

<table>
<thead>
<tr>
<th>Model number</th>
<th>Permitted pressure range in PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>x84xx-xxx-2.5C</td>
<td>0-250</td>
</tr>
<tr>
<td>x84xx-xxx-5C</td>
<td>0-500</td>
</tr>
<tr>
<td>x84xx-xxx-1M</td>
<td>0-750</td>
</tr>
<tr>
<td>x84xx-xxx-1.5M</td>
<td>0-1,000</td>
</tr>
<tr>
<td>x84xx-xxx-2.5M</td>
<td>0-1,500</td>
</tr>
<tr>
<td>x84xx-xxx-3M</td>
<td>0-3,000</td>
</tr>
<tr>
<td>x84xx-xxx-5M</td>
<td>0-5,000</td>
</tr>
<tr>
<td>x84xx-xxx-7.5M</td>
<td>0-7,500</td>
</tr>
<tr>
<td>x84xx-xxx-10M</td>
<td>0-10,000</td>
</tr>
<tr>
<td>x84xx-xxx-15M</td>
<td>0-15,000</td>
</tr>
<tr>
<td>x84xx-xxx-20M</td>
<td>0-20,000</td>
</tr>
<tr>
<td>x84xx-xxx-30M</td>
<td>0-30,000</td>
</tr>
<tr>
<td>x84xx-xxx-35M</td>
<td>0-35,000</td>
</tr>
<tr>
<td>x84xx-xxx-40M</td>
<td>0-40,000</td>
</tr>
<tr>
<td>x84xx-xxx-50M</td>
<td>0-50,000</td>
</tr>
<tr>
<td>x84xx-xxx-60M</td>
<td>0-60,000</td>
</tr>
</tbody>
</table>

3.8.1 Max. Overload (without influencing operating data)

x84xx  
250-30,000 psi: 1.5x rated pressure  
35,000-60,000 psi: 1.2x rated pressure

3.8.2 Burst pressure

250 psi:  
10x rated pressure  
500-3,000 psi:  
5x rated pressure  
5,000-10,000 psi:  
3x rated pressure  
15,000-30,000 psi:  
2.5x rated pressure  
35,000-60,000 psi:  
1.5x rated pressure

3.8.3 Natural Frequency

50 Hz [-3db]

3.9 Electrical data

Configuration 4-arm Wheatstone bridge strain gauge with int. amplifier  
Output signal 2-wire 4 - 20 mA  
Supply voltage 16-40 VDC for EEx ia IIC T4 and FM approved explosion proof models
Maximum loop impedance

- 1200 ohms with 36 VDC
- 600 ohms with 24 VDC
- 0 ohms with 12 VDC

Power consumption

≤20 mA

Zero balance

±2% FSO

Zero adjustment

±5% FSO

3.10 TEMPERATURE INFLUENCE

Electronics housing

Max. housing temperatures
Safety class T4  -20°C to +80°C
Compensated temperature range  -18°C to +66°C
Operating temperature range  -29°C to +85°C

Zero shift due to temperature change on electronics housing
x840x  ±0.018% full scale/°C typical (±0.036% f.s./°C maximum)
x841x  ±0.009% full scale/°C
x842x  ±0.006% full scale/°C

3.11 EMC REQUIREMENTS

Conforming to CE in accordance with EMC directive.

Electromagnetic Interference Immunity  
DIN EN 55022 1995  
DIN EN 61000-4-2 1995
Radiated, Radio Freq, etc. 
Pulse Magnetic Field 
DIN EN 61000-4-9 1993 + A1:2001
Surge Immunity 
Conducted Disturbances 
DIN EN 61000-4-6 1996 + A1:2000
Power Frequency Magnetic Field 
DIN EN 61000-4-8 1993 + A1:2001

3.12 MATERIALS

Diaphragm  15-5PH Mat. No. 1.4545
Wetted Materials  17-4PH Mat. No. 517400
3.13 **ENVIRONMENTAL PROTECTION TO IEC 529**

PT housing with conduit 1P66 nema 4x
PT02A-10-6P 1P55 nema 4x (Using Dyinsco P/N 711600)
PT02H-10-6P 1P66 nema 4x (Using Dyinsco P/N 711610)
PT1H-10-6P 1P66 nema 4x (Using Dyinsco P/N 711610)

3.14 **WEIGHT**

~17 oz.

3.15 **DIMENSIONS**
Fig. 3-2 x84x Models, Part 1

TECHNICAL DATA

ZERO AND SPAN ADJUSTS ARE PROTECTED BY SEAL SCREWS
(1/4-20 x 3/8 LONG)

Fittings

-4 FITTING
(5-10,000 PSI)

-5 FITTING
(5-10,000 PSI)

-6 FITTING
(5-7,500 PSI)

-7 FITTING
(5-10,000 PSI)

-8 FITTING
(5-10,000 PSI)

DETAIL OF: A = PSIA, B = PSIG
FOR ALL FITTINGS

RPM APPLICABLE FITTINGS 75A AND 150B RATING
Fig. 3-3  x84xx Models, Part 2

**TECHNICAL DATA**

**ELECTRICAL TERMINATION**

- SHELL CONFIGURATION ON BOTH SHEETS 1 & 2 APPLY
- (A) NO. 4 SOCKET HEAD CAP SCREWS
- STRANDED WIRES (GROUND WIRE) TO SHELL
- CONFIGURATION FOR UNITS WITH K165 OPTION

**Fig. 3-3**

- A FITTING (1,000, 40,000 PSI)
- B FITTING (1,000, 60,000 PSI)
- C FITTING (1,000, 80,000 PSI)
- D FITTING (1,000, 30,000 PSI)
4. **FUNCTION**

4.1 Construction ........................................................................................................................................................................ 15
4.2 Description of Functions .............................................................................................................................................................. 15

4.1 **CONSTRUCTION**

The PTs of series 840’s are industry standard.

The main advantages are:
- Intrinsically safe EEx ia IIC T4
- thermal stability
- resistance to aggressive media
- insensitivity to electromagnetic radiation (EMC)

4.2 **DESCRIPTION OF FUNCTIONS**

Through a closed, direct contact measurement system, the PT furnishes an electrical signal that is proportional to the pressure of the media.

The pressure is applied by the medium on the measuring diaphragm. The deflection of the measuring diaphragm changes the resistance of the strain gauge bonded to the measuring diaphragm. The strain gauge is a Wheatstone bridge.

Depending on the model, the integrated amplifier generates an electrical signal (mA) proportional to the pressure.
5. **Transport / Delivery**

5.1 Transport / packing / transport damage ................................................................. 16  
5.2 Storage ..................................................................................................................... 16  
5.3 Scope of delivery ..................................................................................................... 16  

**ATTENTION** ESD sensitive component. Electrostatic discharge may damage the PT. Take ESD precautions.

5.1 **Transport/Packing/Transport Damage**

- Do not let the PT be damaged by other items during transit.  
- Use only the original packaging.  
- Report transport damage to **DYNISCO** immediately in writing.

5.2 **Storage**

- Store the PT in original packaging only.  
- Protect against dust and moisture.

5.3 **Scope of delivery**

- Pressure Transmitter  
- Calibration sheet  
- Operating manual with declaration of conformity
6. **ASSEMBLY**

6.1 Mounting the Pressure Transmitter ................................................................. 17
6.2 Electrical connection .......................................................................................... 18
6.2.1 EMC / CE compliant connection ................................................................. 18
6.3 Connection assignments ..................................................................................... 19

Ambient temperature for the electronics housing max. +80°C (safety class T4 max.).

Higher temperatures can result in damage and malfunction.

Do not install the pressure transmitter in places where this temperature is exceeded.

**6.1 MOUNTING THE PRESSURE TRANSMITTER**

Mounting and electrical connection of the PT must be done by specialists with EMC training, following all applicable regulations, and in **pressureless, voltage-free, intrinsically safe** condition with the **machine switched off**.

The machine must be secured against being switched back on!

**ATTENTION** ESD sensitive component. Electrostatic discharge may damage the PT. Take ESD precautions.

**ATTENTION** Before mounting the PT, check the process connection carefully.

**ATTENTION** Before mounting the PT, ensure that the process connection is free from media.

**ATTENTION** To prevent the PT from sticking permanently in the process connection, coat the thread section of the transmitter with high temperature resistant grease or a suitable parting agent.

**ATTENTION** Always use a torque wrench when screwing the PT in and out. Do not apply the tool to the housing or housing / electrical connection!

- Screw the PT into the process connection and tighten.
6.2 **Electrical Connection**

Mounting and electrical connection of the PT must be done by specialists with EMC training, following all applicable regulations, and in pressureless, voltage-free, intrinsically safe condition with the machine switched off.

The machine must be secured against being switched back on!

Do not lay connecting cables in the direct vicinity of cables carrying higher voltage or used to switch inductive or capacitive loads.

Operate only with an intrinsically safe, EMC compliant power supply with the following specifications when employing the pressure 4-20 mA output:

- Supply voltage max. 40 V DC
- Current output max. 100 mA
- Inductivity max. 0
- Capacity max. 0.017 µF

**ATTENTION** ESD sensitive component. Electrostatic discharge may damage the PT. Take ESD precautions.

**ATTENTION** The electrical connection must comply with EMC requirements.

**ATTENTION** If the electrical connection is not made as described in section 6.3, or if cables / cable connectors / cable glands other than those stipulated by DYNISCO are used, DYNISCO cannot guarantee that EMC requirements will be satisfied.

6.2.1 **EMC / CE Compliant Connection**

- Earth the machine section with the screw-in trunnion / process connection for the PT in accordance with regulations. The PT must be connected to earth via the screw-in trunnion / process connection.

- Connect the shield of the connecting cable on both sides, making sure it conducts with full and continuous contact.

- When introducing the connecting cable into an EMC compliant switch cabinet, for example, connect the shield correctly (cable gland, conducting, full contact, continuous) to the conductive housing or route it via built-in cable connector that is also connected to the conductive housing.

- Connect unused cable cores or free cable ends correctly to the cable shield on both sides.
6.3 CONNECTION ASSIGNMENTS

Conduit / Leads
Red + Signal/Power
Black - Signal/Power
Green Ground

Connector
A + Signal/Power
B - Signal/Power

Transmitter incorporates over-voltage protection and reverse polarity protection and will not operate if inputs are reversed.
7. Commissioning

7.1 Supply Voltage

Please read the entire manual prior to installation and use.

**Explosion hazard!**
Deviations of the supply voltage from the value given in the technical specifications, or false polarity, can damage the pressure transmitter and cause malfunctions that can pose a risk of explosion.

7.2 Calibration

**ATTENTION** Calibrate in pressureless state and at room temperature. Other ambient temperatures will corrupt the signal. Use an adjustment screwdriver!

The adjustment is made at two potentiometer screws in the cover section of the electronic housing.

- Remove the cap screws from the potentiometers.

![Fig. 7-1 Electronics Housing Cover](image)

- Connect a meter or suitable instrument to the signal output to verify the settings.
- Adjust zero at potentiometer adjusting zero screw and verify on meter.
7.3 Zero Adjustment

For PTs of series x84x, adjust zero at operating temperature!

- Wait until a steady operating temperature is reached at the pressure sensor.
- Adjust zero at potentiometer adjusting zero screw and verify on the meter.
- Replace the cover screws on the potentiometers.

7.4 Operation

**ATTENTION** Before starting the machine, wait until the medium at the diaphragm of the PT has reached its operating/processing temperature. If the machine is started before the medium reaches its operating temperature, the PT may be damaged.

**ATTENTION** Operating temperature at the PT diaphragm **max. 85°C (185°F)**. Higher temperatures will damage the PT.

Ambient temperature for the electronics housing **max. +80°C** (safety class T4 max.). Higher temperatures can result in damage and malfunction.

Do not install the pressure transmitter in places where this temperature is exceeded.

7.5 Hazardous Area Electrical Configuration
**COMMISSIONING**

**NON-HAZARDOUS AREA APPARATUS UNSPECIFIED EXCEPT THAT IT MUST NOT BE SUPPLIED FROM OR CONTAIN UNDER NORMAL OR ABNORMAL CONDITIONS A SOURCE OF POTENTIAL WITH RESPECT TO EARTH IN EXCESS OF 250 VOLTS RMS OR 250 VOLTS DC**

- **A**
  - Single Channel Barrier
  - Dual Channel Barrier
- **B**
  - Single Channel Barrier
  - Dual Channel Barrier

**NOTES:**
1. THE ELECTRICAL CIRCUIT IN THE HAZARDOUS AREA MUST BE CAPABLE OF WITHSTANDING AN AC TEST VOLTAGE OF 500 VOLTS RMS. TO EARTH OR FRAME OF THE APPARATUS FOR ONE MINUTE.
2. THE CAPACITANCE AND INDUCTANCE / RESISTANCE (L/R) RATIO OF THE HAZARDOUS AREA CABLES MUST NOT EXCEED THE VALUES SHOWN ON TABLES 1, 2 & 3.
5. IF TWO OR MORE SEPARATE 'IS' CIRCUITS ARE TO BE KEPT SEPARATE WITHIN A MULTICORE, THEN TYPE A OR B CABLES MUST BE USED, OR SEPARATE CABLES TO BE USED.
6. CABLE SCREENS ARE TO BE EARTHED AT ONE END ONLY.
7. SYSTEM LABEL TO BE AFFIXED AT THE INTERFACE OF 'IS' OR 'NON-IS' CIRCUITS OR ADJACENT TO THE PRINCIPAL APPARATUS.

**TABLE 1, GROUP IIA**

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>CERTIFICATE NO</th>
<th>C (nF)</th>
<th>L (mH)</th>
<th>L/R</th>
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<tbody>
<tr>
<td>MTL 2441B</td>
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<td>904</td>
<td>35.6</td>
<td>440</td>
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<td>P+F ZG31Ex</td>
<td>BAE Ex 9482131</td>
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<td>BAE Ex 952023</td>
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**TABLE 2, GROUP IIB**

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<th>L (mH)</th>
<th>L/R</th>
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<td>165</td>
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<td>BAE Ex 9482131</td>
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<td>165</td>
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<td>P+F KHD3-ICR</td>
<td>BAE Ex 952023</td>
<td>339</td>
<td>12.6</td>
<td>165</td>
</tr>
<tr>
<td>P+F KHD2-STC</td>
<td>BAE Ex 952029</td>
<td>339</td>
<td>12.6</td>
<td>165</td>
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**TABLE 3, GROUP IIC**

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<th>L (mH)</th>
<th>L/R</th>
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<td>BAE Ex 92C2462</td>
<td>113</td>
<td>4.2</td>
<td>55</td>
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<tr>
<td>P+F ZG31Ex</td>
<td>BAE Ex 9482131</td>
<td>113</td>
<td>4.2</td>
<td>55</td>
</tr>
<tr>
<td>P+F KHD3-ICR</td>
<td>BAE Ex 952023</td>
<td>113</td>
<td>4.2</td>
<td>55</td>
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<tr>
<td>P+F KHD2-STC</td>
<td>BAE Ex 952029</td>
<td>113</td>
<td>4.2</td>
<td>55</td>
</tr>
</tbody>
</table>

**Hazardous Area**

- DYnisco 4-20 mA 2-WIRE PRESSURE TRANSMITTER MODELS: PT2418, PT2445, S242, S243, PT2905, PT2915, PT2925, X5403, X6413, X6423
- SCS CERT. NO Ex 97D2145

**Non-Hazardous Area**

- SINGLE CHANNEL BARRIER
- DUAL CHANNEL

**Fig. 7-2** Electrical Configuration for Intrinsically Safe Hazardous Areas
HAZARDOUS AREA
(CLASS 1, DIV 1, GROUPS A,B,C,D)

DYNISCO 4-20 mA 2-WIRE
PRESSURE TRANSMITTER
MODELS: PT241S, PT244S,
S242, S243
PT290S, PT291S, PT292S
X840S, X841S, X842S

NOTES:
1. INSTALLATION MUST BE IN ACCORDANCE
   WITH THE NATIONAL ELECTRIC CODE
   (NFPA 70, ARTICLE 504) AND ANSI / ISA RP 12.6.
2. PROTECTIVE ASSOCIATED APPARATUS MUST BE
   INSTALLED IN ACCORDANCE WITH
   MANUFACTURERS INSTALLATION DRAWING.
3. ANY FMRC APPROVED SINGLE OR DUAL CHANNEL
   BARRIER WITH ENTITY PARAMETERS OF Voc OR
   V ≤ 25 V, I ≤ 100 mA, C > 0.017 uf, L > 0 mH
   OR PROTECTIVE BARRIER PEPPERL / FUCHS Z111/Ex.
4. ANY FMRC APPROVED SINGLE OR DUAL CHANNEL
   BARRIER WITH ENTITY PARAMETERS OF Voc OR
   V ≤ 40 V, I ≤ 100 mA, C > 0.017 uf, L > 0 mH
   OR ONE OF THE FOLLOWING PROTECTIVE BARRIERS:
   MTL 5042 OR PEPPERL / FUCHS KFD2-STC4-EX1.

NON-HAZARDOUS AREA

CONTROL INSTRUMENTATION
OPERATING AT OR LESS THAN
250 V RMS 250 VDC

NON-HAZARDOUS AREA
APPARATUS UNSPECIFIED
EXCEPT THAT IT MUST NOT
BE SUPPLIED FROM NOR
CONTAIN UNDER NORMAL
OR ABNORMAL CONDITIONS
A SOURCE OF POTENTIAL
WITH RESPECT TO EARTH IN
EXCESS OF 250 VOLTS RMS
OR 250 VOLTS DC
8. **MAINTENANCE**

8.1 Maintenance ..................................................................................................................... 24
8.2 Repair/disposal .................................................................................................................. 24
8.3 Warranty ............................................................................................................................ 25

8.1 **MAINTENANCE**

Mounting and electrical connection of the PT must be done by specialists with EMC training, following all applicable regulations, and in **pressureless, voltage-free, intrinsically safe** condition with the **machine switched off**.

**The machine must be secured against being switched back on!**

**Burn hazard!**
The PT can be very hot when removed.

**Wear protective gloves!**

**ATTENTION** ESD sensitive component. Electrostatic discharge may damage the PT. Take ESD precautions.

**ATTENTION** Always remove the PT before cleaning the machine with abrasives or steel wire brushes or suchlike.

**ATTENTION** Removing the transmitter if the medium is in solidified condition can damage the diaphragm of the PT.

**ATTENTION** Do not clean the screw-in section of the PT with hard objects. This will damage the PT!

**ATTENTION** Always use a torque wrench applied to the designated hexagon collar when screwing the PT in and out. Do not apply the tool to the housing or housing/electrical connection!

- Remove the PT.
- Carefully clean the PT/process connection of the transmitter with a soft cloth, while the medium is still malleable.

8.2 **REPAIR/DISPOSAL**

Please send defective PTs to your **DYDISCO** representative.

For addresses, see the back cover of the operating manual.
8.3 **WARRANTY**

This DYNISCO product is warranted under terms and conditions set forth in the DYNISCO web pages. Go to www.dynisco.com and click “warranty” at the bottom of any page for complete details.
# Troubleshooting

<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible Cause</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>No signal</td>
<td>Cable breakage or poor contact</td>
<td>Check cable and contact, or replace</td>
</tr>
<tr>
<td></td>
<td>No supply voltage</td>
<td>Check supply voltage</td>
</tr>
<tr>
<td>Strong zero shift when screwing in</td>
<td>Process connection incorrectly produced (alignment error)</td>
<td>Check process connection with test bolt, rework if necessary</td>
</tr>
<tr>
<td></td>
<td>Mounting torque too high</td>
<td>Adjust to recommended mounting torque</td>
</tr>
<tr>
<td>No signal change despite pressure rise</td>
<td>Plug forming in front of diaphragm</td>
<td>Check process connection</td>
</tr>
<tr>
<td></td>
<td>Diaphragm damaged</td>
<td>Send pressure transmitter to <strong>DYNISCO</strong> for repair</td>
</tr>
</tbody>
</table>
10. CE DECLARATION OF CONFORMITY

DECLARATION OF CONFORMITY

We Dynisco Instruments
38 Forge Parkway
Franklin Ma. 02038

Declare in our sole responsibility, that the following product(s):
S24X, PT24XS, PT29XS, X84XS (X indicating a variable number or letter)

To which this declaration relates is in conformity with the following standard(s): or other normative document(s):
EN 50081-2 "Electromagnetic Compatibility. Generic emission standard. Part2"
EN 50082-2 "Electromagnetic Compatibility. Generic immunity standard. Part2"
when the mating connector is a Bendix EMI Plug.

Following the provisions of the directive:
VDE 0839 Part 82-2/February 1996

Date: August 10, 2000

[Signature]
Dynisco Instruments
Vice President of Operations
11. EX DECLARATION OF CONFORMITY

EC TYPE-EXAMINATION CERTIFICATE


2. Certificate Number: Sira 03ATEX2422

3. Equipment: X24XX, X34XX, PTZ4XX and PT29XX Pressure Transducers

4. Applicant: Dynisco Instruments

5. Address: 38 Forge Parkway Franklin Massachusetts USA

6. This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8. Sira Certification Service, notified body number 0518, in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number R52A10315A.

9. Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

- EN 50014:1997 (A1 and A2)
- EN 50020:2002
- EN 50284:1999

10. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11. This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12. The marking of the equipment shall include the following:

Ex
II 1 G
EEEx ia IIC T4
T_{amb} = -20°C to +80°C

M D Shearman
Certification Manager

Project Number 52A10315
Date 19 September 2003
C. Index 13

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Sira Certification Service
Rake Lane, Eccleston, Chester, CH8 7JN, England
Tel: +44 (0) 1244 070500 Fax: +44 (0) 1244 681330
Email: exhazard@sirato.co.uk
Sira Certification Service is a service of Sira Test & Certification Ltd
SCEDULE

EC TYPE-EXAMINATION CERTIFICATE

13 DESCRIPTION OF EQUIPMENT

Series X24XX, X84XX, PT24XX and PT29XX is a two-wire pressure transmitter designed to output a 4-20 mA signal corresponding to 0-100% of the full-scale pressure range. The circuit is designed to work with a supply voltage range of 16 to 40 V DC. Two additional terminals are provided to calibrate a specific measurement system. By shorting these two terminals, a fixed pre-set output signal at 80% full-scale is impressed on the output. The system is designed such that the calibration circuit is isolated from the amplifier circuit, so that only two barriers need be used when the customer chooses to use the calibration feature in a hazardous area.

The enclosure material is stainless steel.

For the connection of associated apparatus the following entity parameters apply.

Input terminals

\[
\begin{align*}
U_i &= 40V \\
I_i &= 100mA \\
C_i &= 17nF \\
L_i &= 0
\end{align*}
\]

Calibration terminals

\[
\begin{align*}
U_i &= 25V \\
I_i &= 100mA \\
C_i &= 17nF \\
L_i &= 0
\end{align*}
\]

Note: Only linear supplies may be connected to the apparatus.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawing No. Sheet Rev. Date Title

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<thead>
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<th>Drawing No.</th>
<th>Sheet</th>
<th>Rev.</th>
<th>Date</th>
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<td>B</td>
<td>06 Aug 97</td>
<td>Certification Dwg Electrical Connections (Connectors)</td>
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<td>06 Sept 02</td>
<td>Certification Dwg PT241, PT244 (E) (S)</td>
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<td>242098</td>
<td>1 to 2</td>
<td>G</td>
<td>06 Sept 02</td>
<td>Certification Dwg S242 (Intrinsically Safe)</td>
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<tr>
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<td>09 Dec 99</td>
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<tr>
<td>242927</td>
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<td>05 Sept 03</td>
<td>Engraving Drawing X24XX, PT24XX, PT29XX, X84XX</td>
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<td>06 Sept 02</td>
<td>Certification Dwg S243 (Intrinsically Safe)</td>
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<td>Certification Dwg PT29XX</td>
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<td>D</td>
<td>06 Sept 02</td>
<td>Certification Dwg PT29XX</td>
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<td>C</td>
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Date 19 September 2003

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Sira Certification Service

ST&C(Chester) Form 9176 Issue 8

Page 2 of 3
# SCHEDULE

## EC TYPE-EXAMINATION CERTIFICATE

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14.2 Report No. R52A10315A

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

None

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSRs)**

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in Report No. R52A10315A.

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

---

**Date** 19 September 2003

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**Sira Certification Service**

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Email: exhazard@sira intl.co.uk

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