# Instructions for the 800 Series of Strain Gage Pressure Transducers and Transmitters

**The following models are covered in this manual:**

**830**
**831**
**832**
**840**
**841**
**850**
**851**
**860**
**861**



P/N 974039
05/02 Rev D
ECO # 26774

Dynisco
Instruments

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# 1. DESCRIPTION

Dynisco's 800 Series of Pressure Transducers and Transmitters are bonded foil strain gage type, designed to measure pressures up to 60,000 psi. These transducers convert changes in applied pressure into corresponding changes in output voltage or current.

# 2. MODEL NUMBER CONSTRUCTION

The model number designates the features of the 800 Series pressure transducers.

**Model 1234X-567-8-9**
1 = Pressure Reference
2 = 800 Series
3 = Full Scale Output
4 = Accuracy
X = Approval
5 = Pressure Port Thread
6 = Electrical Termination
7 = Wiring
8 = Pressure Range*
9 = Options
*Pressure range is noted on label.

For complete details, refer to the individual ordering guides for each model.

# 3. PRESSURE FITTING (POSITION 5 OF MODEL NUMBER)

The pressure port thread of the standard 800 Series (Code 0 in the model number) is internal $^{1}/_{8}$-27 NPT fabricated from high strength stainless steel.

Options available include the following:

| Code in Model No. | Description |
|---|---|
| 1 | $^{1}/_{4}$-18 NPT, internal |
| 2 | $^{7}/_{16}$-20 UNF, internal, O-ring, per MS33649-4 |
| 3 | High Pressure, internal fitting per autoclave F-250-C |
| 4 | $^{1}/_{4}$-18 NPT, external |
| 5 | $^{1}/_{2}$-14 NPT, external |
| 6 | $^{7}/_{16}$-20 UNF, external, per MS33656-4 |
| 7 | R $^{1}/_{4}$-metric, external |
| 8 | $^{3}/_{4}$-16 UNF, external, flush diaphragm** |
| 9 | Special (consult factory) |

A ..... $^{7}/_{16}$-14 BSP, external
B ..... $^{7}/_{16}$-14 NPSM, external
C ..... Autoclave F-562-C
D ..... 1″ BSP, internal
G ..... Autoclave F-375C

**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.

## 4. ELECTRICAL CONNECTIONS (POSITION 6 OF MODEL NUMBER)

**Code 0 in the model number** — Standard 800 Series models have a Bendix Connector PT02A-10-6P (or equivalent) and require mating connector PT06W-10-6S (SR) (Dynisco P/N 711600).

**Code 1 in the model number** — 800 Series Models with the weathertight option include Bendix PT02H-10-6P (or equivalent) and require mating connector PT06W-10-6S (Dynisco P/N 711610).

**Code 3 in the model number** — Option for the $^{1}/_{2}$-14 NPT conduit fitting with the 4 ft six conductor cable.

**WIRING CODE — Transducers**

| Function | Pin | Color |
|---|---|---|
| Output (+) | A | Red |
| Output (-) | B | Black |
| Input (+) | C | White |
| Input (-) | D | Green |
| Shunt Cal. | E, F | Blue, Orange |

**Code 4 in the model number** — Factory Mutual (FM) Approved 2 wire transmitters, models 840FM and 841FM, are equipped with $^{1}/_{2}$-14 NPT conduit fitting and three 42″ leads. (On non-FM approved 840/1's, the pin connector is available.)

**WIRING CODE — Transmitters**

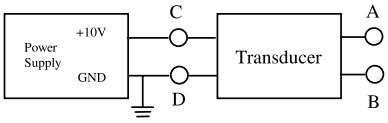
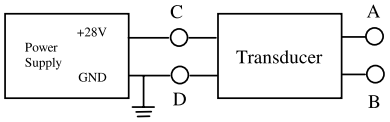
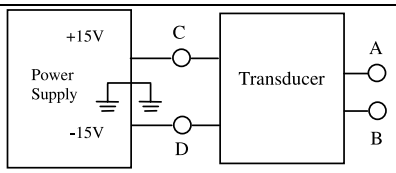
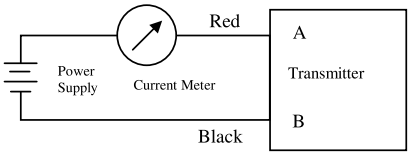
| Function | Pin | Color |
|---|---|---|
| Supply Voltage (+) | A | Red |
| Supply Voltage (-) | B | Black |
| Case Ground | | Green |

Transmitters incorporate reverse polarity protection, but will not function if inputs are reversed.

**ALL WIRING MUST CONFORM TO NATIONAL ELECTRICAL CODE.**

# 5. ELECTRICAL CHARACTERISTICS AND WIRING

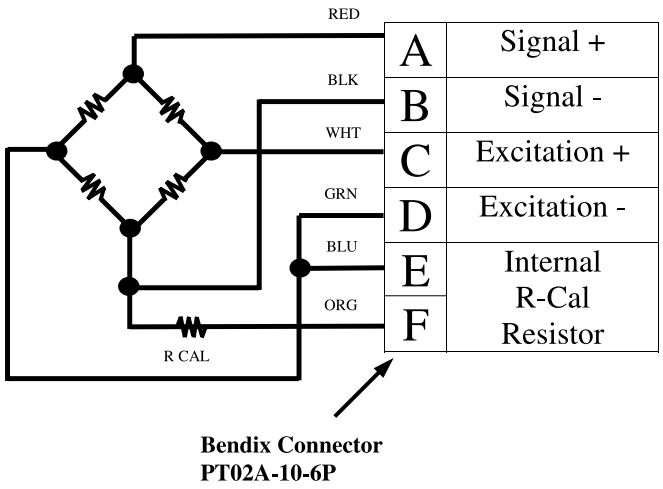
## Fig. 1 Power Supply Requirements and Typical Wiring Diagrams

| TRANSDUCER MODEL | OUTPUT | POWER SUPPLY | WIRING DIAGRAM |
|---|---|---|---|
| 830<br>831<br>832 | 3 mV/V | 10 Vdc<br>(Recommend)<br>15 Vdc<br>(Maximum) |  |
| 850/851<br>860/861 | 0 - 5 Vdc<br>0 - 10 Vdc | Single<br>24 ñ 32 Vdc |  |
| 850/851<br>860/861 | 0 - 5 Vdc<br>0 - 10 Vdc | Split<br><br>85X<br>12 - 16<br>86X<br>14 - 16 |  |
| 840<br>841 | 4 - 20 mA | Single<br>12 ñ 36 Vdc |  |

**MODELS 830/831/832**

Transducers with 3 mV/V output require a well regulated power supply and have a nominal load of 350 ohms. The mV readout should present a high impedance input and have good common mode rejection. Use of six conductor shielded cable (like Dynisco P/N 800024) is recommended to minimize noise pickup.

**Fig. 2 Schematic for 830/831/832**




**MODELS 840/841/850/851/860/861**

Dynisco high level output transducers and transmitters have a voltage regulator, signal conditioner, and amplified incorporated within the device. These models have accessible ZERO and SPAN adjustments. These are factory set and should not require adjustment.

Voltage output devices have a current drain of 45mA maximum at recommended minimum load of 2000 ohms.

Maximum loop impedance of two-wire transmitters (840/1) is 1200 ohms with 36 VDC power supply decreasing linearly through 600 ohms with 24 VDC supply to 0 ohms with 12 VDC supply.

**CONDUIT FITTING** — Units with the $^{1}/_{2}$-14 NPT conduit fitting and leads or cable, should be installed using appropriate conduit or junction box in conformance with local codes. This is essential for environmental protection of the electrical termination.

## 6. OPERATION AND CALIBRATION

After the transducer and the readout have been installed, the system must be calibrated using either a precision pressure source such as a dead-weight tester, or by using the shunt calibration function.

**PRESSURE CALIBRATION** — With no pressure applied, the signal conditioner ZERO control (or ZERO adjustment of high level output transducers) is adjusted for zero pressure indication on the readout. With a known pressure applied to the transducer (typically 80 to 100% of full scale), the

signal conditioner SPAN control (or SPAN adjustment of high level output transducers) is adjusted for the correct readout of the applied pressure.

**SHUNT CALIBRATION** — All 800 Series pressure transducers (except 840/1 transmitters) contain an internal Shunt Calibration resistor (R-CAL) which provides a simulated output of 80% of full scale when pins E and F are shorted. Do not apply pressure to the transducer during calibration.

Refer to instructions with the instrumentation for details on ZERO and SPAN adjustment.

## 7. AGENCY APPROVALS

Several configurations of the 800 Series are designed and approved for use in hazardous classified areas. **Units intended for installation in these areas should bear the applicable approval agency label.**

**EXPLOSION PROOF APPROVAL** — Models 84XE have the Factory Mutual Explosion-Proof Approval for use in Class I, Division 1, Groups A, B, C and D classified areas. (See Figure 3, 000099.) Models 84X with option K189 carries intrinsically safe approval from both Factory Mutual and SIRA.

**INTRINSICALLY SAFE APPROVAL** — Models 840 and 841 are available. SIRA approved for Eex ia IIC intrinsically safe for use in zone 0, 1, or 2 when installed in circuit specified by certificate. (See Figure 4, 000098.)

## 8. REPAIR

Questions concerning warranty, repair cost, delivery, and requests for a RA# should be directed to the Dynisco Repair Department, 508-541-9400 or email: repair@dynisco.com. Please call for a return authorization number (RA#) before returning any product. Damaged products should be returned to:

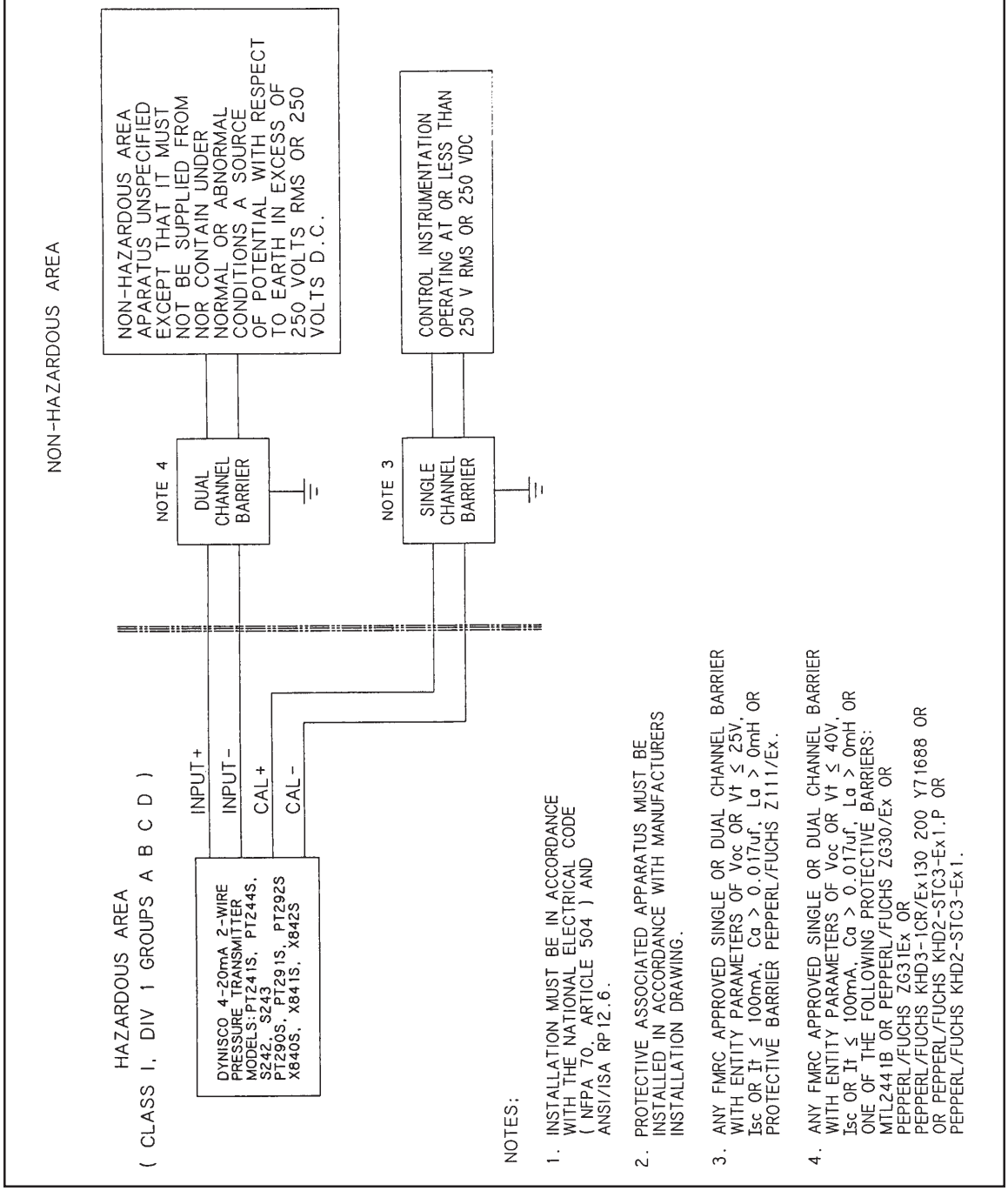
**DYNISCO INSTRUMENTS**
**Attn: RA # _____**
**38 Forge Parkway**
**Franklin, MA 02038**

**For technical assistance please call 800-221-2201 or 508-541-9400 or fax 508-541-9436.**

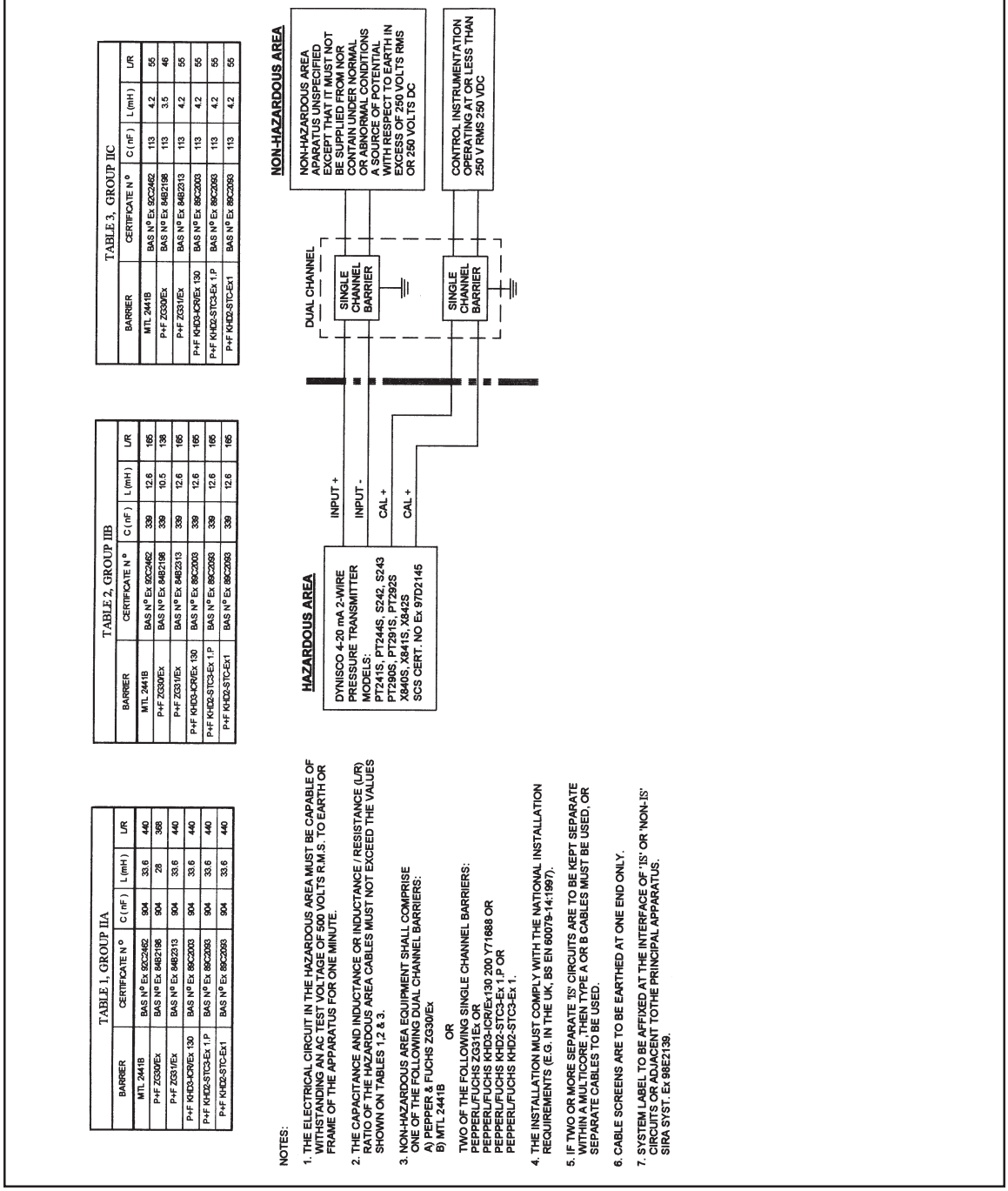
## 9. WARRANTY

This Dynisco product is warranted under terms and conditions set forth in the Dynisco Web Pages. Go to www.dynisco.com and click on “Warranty” at the bottom of any page for complete details.

## Fig. 3 000099


NON-HAZARDOUS AREA
HAZARDOUS AREA
( CLASS I, DIV 1 GROUPS A B C D )
DYNISCO 4-20mA 2-WIRE PRESSURE TRANSMITTER MODELS: PT241S, PT244S, S242, S243 PT290S, PT291S, PT292S X840S, X841S, X842S
INPUT+
INPUT-
CAL+
CAL-
NOTE 4
DUAL CHANNEL BARRIER
NOTE 3
SINGLE CHANNEL BARRIER
NON-HAZARDOUS AREA APARATUS 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 D.C.
CONTROL INSTRUMENTATION OPERATING AT OR LESS THAN 250 V RMS OR 250 VDC
NOTES;
1. INSTALLATION MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE ( NFPA 70, ARTICLE 504 ) AND ANSI/ISA RP12.6.
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 Vt ≤ 25V, Isc OR It ≤ 100mA, Ca > 0.017uf, La > 0mH OR PROTECTIVE BARRIER PEPPERL/FUCHS Z111/Ex.
4. ANY FMRC APPROVED SINGLE OR DUAL CHANNEL BARRIER WITH ENTITY PARAMETERS OF Voc OR Vt ≤ 40V, Isc OR It ≤ 100mA, Ca > 0.017uf, La > 0mH OR ONE OF THE FOLLOWING PROTECTIVE BARRIERS: MTL2441B OR PEPPERL/FUCHS ZG30/Ex OR PEPPERL/FUCHS ZG31Ex OR PEPPERL/FUCHS KHD3-1CR/Ex130 200 Y71688 OR OR PEPPERL/FUCHS KHD2-STC3-Ex1.P OR PEPPERL/FUCHS KHD2-STC3-Ex1.

## Fig. 4 000098


TABLE 1, GROUP IIA
BARRIER | CERTIFICATE N ° | C (nF) | L (mH) | L/R
MTL 2441B | BAS N° Ex 99C2462 | 904 | 33.6 | 440
P+F Z030/Ex | BAS N° Ex 8482198 | 904 | 28 | 368
P+F Z031/Ex | BAS N° Ex 8482313 | 904 | 33.6 | 440
P+F KHD3-HCR/Ex 130 | BAS N° Ex 99C2003 | 904 | 33.6 | 440
P+F KHD2-STC3-Ex 1.P | BAS N° Ex 99C2093 | 904 | 33.6 | 440
P+F KHD2-STC-Ex1 | BAS N° Ex 99C2093 | 904 | 33.6 | 440
TABLE 2, GROUP IIB
BARRIER | CERTIFICATE N ° | C (nF) | L (mH) | L/R
MTL 2441B | BAS N° Ex 99C2462 | 339 | 12.6 | 165
P+F Z030/Ex | BAS N° Ex 8482198 | 339 | 10.5 | 138
P+F Z031/Ex | BAS N° Ex 8482313 | 339 | 12.6 | 165
P+F KHD3-HCR/Ex 130 | BAS N° Ex 99C2003 | 339 | 12.6 | 165
P+F KHD2-STC3-Ex 1.P | BAS N° Ex 99C2093 | 339 | 12.6 | 165
P+F KHD2-STC-Ex1 | BAS N° Ex 99C2093 | 339 | 12.6 | 165
TABLE 3, GROUP IIC
BARRIER | CERTIFICATE N ° | C (nF) | L (mH) | L/R
MTL 2441B | BAS N° Ex 99C2462 | 113 | 4.2 | 55
P+F Z030/Ex | BAS N° Ex 8482198 | 113 | 3.5 | 46
P+F Z031/Ex | BAS N° Ex 8482313 | 113 | 4.2 | 55
P+F KHD3-HCR/Ex 130 | BAS N° Ex 99C2003 | 113 | 4.2 | 55
P+F KHD2-STC3-Ex 1.P | BAS N° Ex 99C2093 | 113 | 4.2 | 55
P+F KHD2-STC-Ex1 | BAS N° Ex 99C2093 | 113 | 4.2 | 55
NOTES:
1. THE ELECTRICAL CIRCUIT IN THE HAZARDOUS AREA MUST BE CAPABLE OF WITHSTANDING AN AC TEST VOLTAGE OF 500 VOLTS R.M.S. TO EARTH OR FRAME OF THE APPARATUS FOR ONE MINUTE.
2. THE CAPACITANCE AND INDUCTANCE OR INDUCTANCE / RESISTANCE (L/R) RATIO OF THE HAZARDOUS AREA CABLES MUST NOT EXCEED THE VALUES SHOWN ON TABLES 1,2 & 3.
3. NON-HAZARDOUS AREA EQUIPMENT SHALL COMPRISE ONE OF THE FOLLOWING DUAL CHANNEL BARRIERS:
A) PEPPER & FUCHS Z030/Ex
B) MTL 2441B
OR
TWO OF THE FOLLOWING SINGLE CHANNEL BARRIERS:
PEPPERL/FUCHS Z031/Ex OR
PEPPERL/FUCHS KHD3-HCR/Ex130 200 Y71688 OR
PEPPERL/FUCHS KHD2-STC3-Ex 1.P OR
PEPPERL/FUCHS KHD2-STC-Ex 1.
4. THE INSTALLATION MUST COMPLY WITH THE NATIONAL INSTALLATION REQUIREMENTS (E.G. IN THE UK, BS EN 60079-14:1997).
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 TOTHE PRINCIPAL APPARATUS.
SIRA SYST. Ex 98E2139.
HAZARDOUS AREA
DYNISCO 4-20 mA 2-WIRE PRESSURE TRANSMITTER MODELS:
PT241S, PT244S, S242, S243
PT239S, PT291S, PT292S
X844S, X841S, X842S
SCS CERT. NO Ex 97D2145
INPUT +
INPUT -
CAL +
CAL +
DUAL CHANNEL
SINGLE CHANNEL BARRIER
SINGLE CHANNEL BARRIER
NON-HAZARDOUS AREA
NON-HAZARDOUS AREA APARATUS 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
CONTROL INSTRUMENTATION OPERATING AT OR LESS THAN 250 V RMS 250 VDC

## NOTES:

## WARRANTY REGISTRATION CARD

Dynisco Instruments

MODEL NUMBER _____

SERIAL NUMBER _____

DATE PURCHASED _____

PURCHASED FROM _____

NAME _____

COMPANY _____

DIVISION _____

STREET _____

CITY _____ STATE _____ ZIP _____

COUNTRY _____

TELEPHONE _____ FAX _____

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