

240 and 290 Series Melt Pressure Transmitters












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



II 1G
ATEX 100a



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1. GENERAL

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1.1 IMPORTANT INFORMATION

This manual applies to the 240 and 290 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.

All reproduction, even partially and for in-house purposes, requires the approval of **DYNISCO**. This manual may not be forwarded to third parties.



1.3 EXPLANATION OF ICONS

The manual uses icons to indicate information pertaining to safety:

ATTENTION

Risk of destruction or damage to equipment, machines or installations



General danger to life or limb



Specific danger to life or limb



You **MUST** do this

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 240 and 290 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 240 and 290 series of pressure transmitters can be used in media temperatures up to 400°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 240 and 290 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.



Toxic hazard!

The PT contains a small amount of mercury (Hg) as its transmission medium. If the diaphragm is damaged, mercury may escape.

Never transport or store the PT without the protective cap. Remove the cap shortly before installation.

If mercury is inhaled or swallowed, seek medical attention immediately!

Mercury is hazardous waste and must be disposed of in accordance with applicable laws. **DYNISCO** will accept defective PTs.

If mercury escapes, use airtight packaging!



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 fro 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 μ F



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

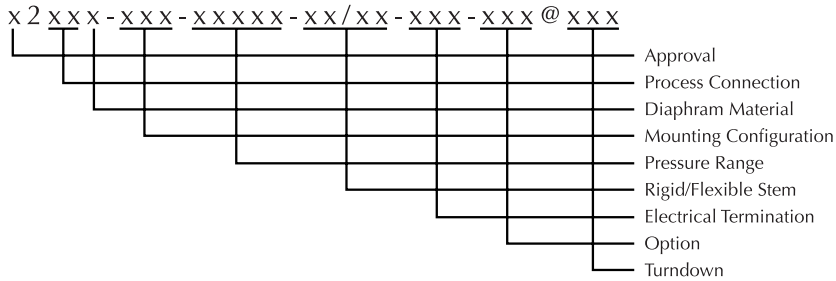
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3.1 ORDERING GUIDES

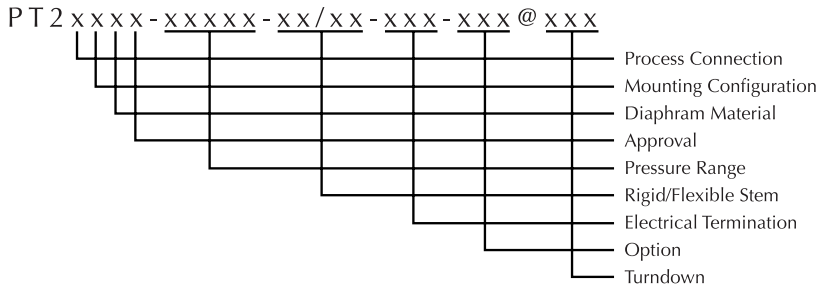
The exact meanings of the letter/digit combinations are given in the corresponding sections of chapter 3.



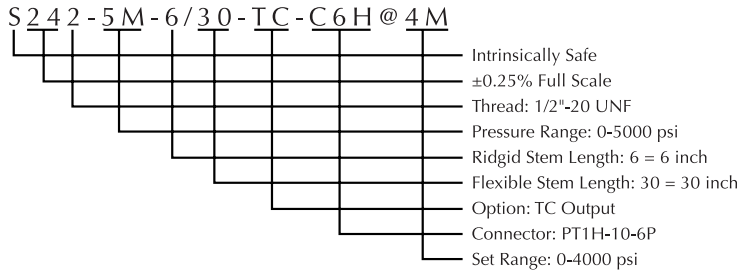
3.1.1 ORDERING GUIDE FOR X242 AND X243



3.1.2 ORDERING GUIDE FOR PT241X, PT244X, PT290X, PT291X, AND PT292X



3.2 ORDERING EXAMPLE



3.3 SAFETY RELATED SPECIFICATIONS

ATEX certificate	No.: SIRA 03ATEX2422
EX-Safety class	EEx ia IIC T ₄ (T _a = -20°C to +80°C)
FM approvals	Class I, Division 1 Groups A, B, C & D

Certified maximum values for EEx ia IIC T₄

TECHNICAL DATA



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 μ F

3.4 PERFORMANCE CHARACTERISTICS

x2xxx - xxx - xxxxx - xx / xx - xxx - xxx@xxx

3.4.1 ACCURACY

(Linearity, hysteresis and repeatability)

3.4.1A X242, X243

$\pm 0.25\%$ of full scale
(0-1500 psi and above)

$\pm 0.50\%$ of full scale
(0-1000 psi and below)

3.4.1B PT241X

$\pm 0.50\%$ of full scale
(0-1500 psi and above)

± 1.0 of full scale
(10-1000 psi and below)

3.4.1C PT244X

$\pm 0.25\%$ of full scale
(0-500 psi and above)

$\pm 0.50\%$ of full scale
(0-250 psi)

3.4.1D PT290X, PT291X, PT292X

$\pm 0.50\%$ of full scale



3.4.2 RESOLUTION

Infinite

3.4.3 REPEATABILITY

±0.10% of full scale

3.5 PRESSURE SIDE CONNECTION

2 = 1/2" 20 UNF 2A (x242x . . .)

1, 3, 4, 90, 91 or 92 = flange (PT241xx-x), (x243x-x), (PT244xx-x), (PT290xx-x), (PT291xx-x), or (PT292xx-x)

3.6 PRESSURE RANGES

3.6.1 PRESSURE RANGES IN PSI

3.6.1A

Model number Permitted pressure range in PSI

x24xx-2.5C-x/xx	0-250
x24xx-5C-x/xx	0-500
x24xx-7.5C-x/xx	0-750
x24xx-1M-x/xx	0-1,000
x24xx-1.5M-x/xx	0-1,500
x24xx-3M-x/xx	0-3,000
x24xx-5M-x/xx	0-5,000
x24xx-7.5M-x/xx	0-7,500
x24xx-10M-x/xx	0-10,000
x24xx-15M-x/xx	0-15,000
x24xx-20M-x/xx	0-20,000
x24xx-30M-x/xx	0-30,000

3.6.1B

Model number Permitted pressure range in PSI

PT24xx-2.5C-x/xx	0-250
PT24xx-5C-x/xx	0-500
PT24xx-7.5C-x/xx	0-750
PT24xx-1M-x/xx	0-1,000
PT24xx-1.5M-x/xx	0-1,500
PT24xx-3M-x/xx	0-3,000

TECHNICAL DATA



PT24xx-5M-x/xx	0-5,000
PT24xx-7.5M-x/xx	0-7,500

3.6.1C

Model number Permitted pressure range in PSI

PT29xx-25-x/xx	0-25
PT29xx-50-x/xx	0-50
PT29xx-1C-x/xx	0-100
PT29xx-2.5C-x/xx	0-250
PT29xx-5C-x/xx	0-500
PT29xx-7.5C-x/xx	0-750
PT29xx-1M-x/xx	0-1,000
PT29xx-1.5M-x/xx	0-1,500
PT29xx-3M-x/xx	0-3,000
PT29xx-5M-x/xx	0-5,000
PT29xx-7.5M-x/xx	0-7,500
PT29xx-10M-x/xx	0-10,000

3.6.2 MAX. OVERLOAD (WITHOUT INFLUENCING OPERATING DATA)

x24xx	2 x full scale pressure or 35,000 psi, whichever is less.
PT29x	2 x full scale pressure or 15,000 psi, whichever is less.
PT24x	2 x full scale pressure

3.6.3 BURST PRESSURE

6 x nominal value, max. 45,000 psi

3.6.4 NATURAL FREQUENCY

50 Hz [-3db]

3.7 RIGID STEM/FLEXIBLE STEM

3.7.1 X242X, X243X

6 = 152 mm standard length for rigid version
 6/18 = 152 mm stem length / 457 mm flexible stem

Other lengths available



3.7.2 PT241XX

2.031/18 = 2.031" stem length / 18" flexible stem

3.7.3 PT244XX

2.406/18 - 2.406" stem length / 18" flexible stem

Other lengths available

3.7.4 PT290X, PT291X, PT292X

5/30 = 5" stem length / 30" flexible stem

Other lengths available

3.8 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
Power consumption	≤20 mA
Zero balance adjustment range	(x24x and PT24x) -40% to +10% > 500 psi -80% to +20% < 500 psi
	(PT29x) -40% to +10% > 100 psi -80% to +20% < 100 psi

3.9 TEMPERATURE INFLUENCE

Electronics housing

Max. housing temperatures	
Safety class T4	-20°C to +80°C
Compenstated temperature range	-18°C to +65°C
240 Series	



Compenstated temperature range
 PT29x Series -18°C to +60°C

Zero shift due to temperature change on electronics housing
 x24x, PT24x, PT29x 0.01% full scale/°F maximum (0.02% f.s./°C maximum)

Diaphragm (in contact with media)

Maximum temperature at the diaphragm
 x2xxxx 400°C (750°F)

Zero shift due to temperature change on the diaphragm
 x2xxxx 15 psi/100°F typical (27 psi/100°C)
 PT29x, PT24x 1 psi/100°F typical (from 75°F to 450°F)
 2 psi/100°F typical (from 450°F to 600°F)
 0.07 bar/38°C typical (from 24°C to 232°C)
 0.14 bar/38°C typical (from 233°C to 315°C)

3.10 EMC REQUIREMENTS

Conforming to CE in accordance with EMC directive.

Electromagnetic Interference	DIN EN 550223 1995
Immunity	DIN EN 61000-4-2 1995
Radiated, Radio Freq, etc.	DIN EN 61000-4-3 1995 + A1:1998 + A2:2000
Pulse Magnetic Field	DIN EN 61000-4-9 1993 + A1:2001
Surge Immunity	DIN EN 61000-4-5 1995 + A1:2000
Conducted Disturbances	DIN EN 61000-4-6 1996 + A1:2000
Power Frequency Magnetic Field	DIN EN 61000-4-8 1993 + A1:2001

3.11 MATERIALS

Diaphragm	15-5PH Mat. No. 1.4545 DyMax™ coated
Stem	17-4PH Mat. No. 517400

3.12 TORQUE

x242x	x243x	PT292	PT24x, PT290 and PT291
max. 56.5 Nm (500 inch-lbs.)	max. 5.6 Nm (50 inch-lbs.)	max. 14.1 Nm (125 inch-lbs.)	max. 14.1 Nm (125 inch-lbs.)
min. 11.3 Nm (100 inch-lbs.)	min. 4.5 Nm (40 inch-lbs.)	min. 11.3 Nm (100 inch-lbs.)	min. 11.3 Nm (100 inch-lbs.)

TECHNICAL DATA



3.13 ENVIRONMENTAL PROTECTION TO IEC 529

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

3.14 WEIGHT

1-5 lbs.

3.15 DIMENSIONS



4. FUNCTION

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4.1 CONSTRUCTION

The PTs of series 240's and 290'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)
- liquid-filled transmission system (mercury)
- pressure measurements in plastic melt up to a temperature of 400°C

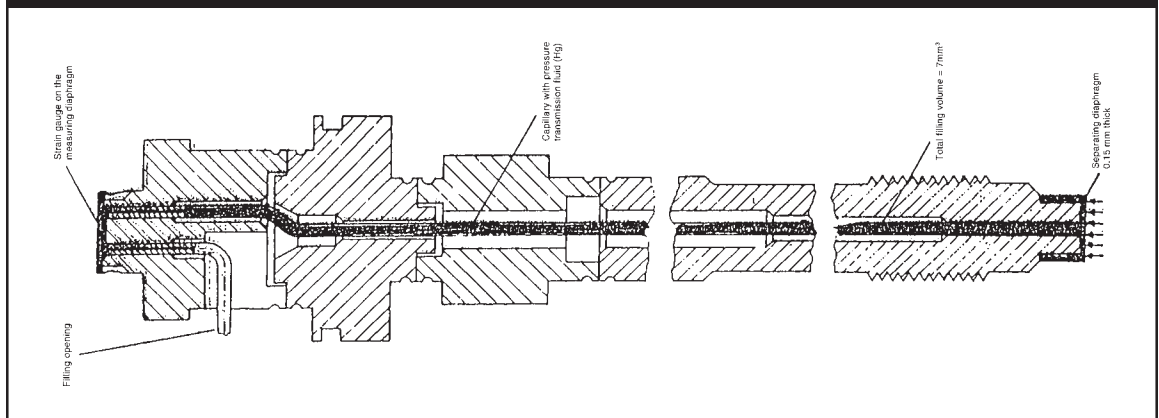
4.2 DESCRIPTION OF FUNCTIONS

Through a closed, liquid-filled pressure transmission system, the PT furnishes an electrical signal that is proportional to the pressure of the melt.

The pressure applied by the medium is forwarded to the measuring diaphragm and the mercury in the capillary. 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 or Volts) proportional to the pressure.

Fig. 4-1 Functioning Principle of the PT of the X242 Series





5. TRANSPORT / DELIVERY

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Toxic hazard!

The PT contains a small amount of mercury (Hg) as its transmission medium. If the diaphragm is damaged, mercury may escape.

Never transport or store the PT without the protective shell bolted in place. Remove the shell shortly before installation.

If mercury is inhaled or swallowed, seek medical attention immediately.

Mercury is hazardous waste and must be disposed of in accordance with applicable laws. **DYNISCO** will accept defective PTs.

If mercury escapes, use airtight packaging!

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

- PT with diaphragm protection cap
- Fastening clip (transmitter with flexible stem only)
- Calibration sheet
- Operating manual with declaration of conformity



6. ASSEMBLY

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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 HOLE

ATTENTION To produce the mounting hole, use only **DYNISCO** machining tool kit (DYNISCO P/N 200925).

- Drill the mounting hole as shown in fig. 6-1, 6-2, 6-3, 6-4, 6-5, 6-6.

Fig. 6-1 Mounting Hole x242

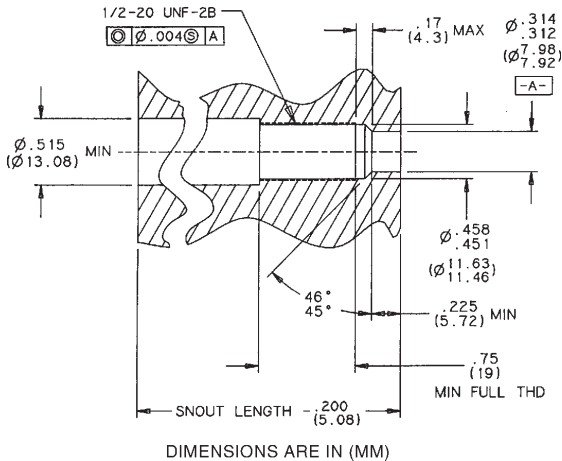




Fig. 6-2 Mounting hole x243

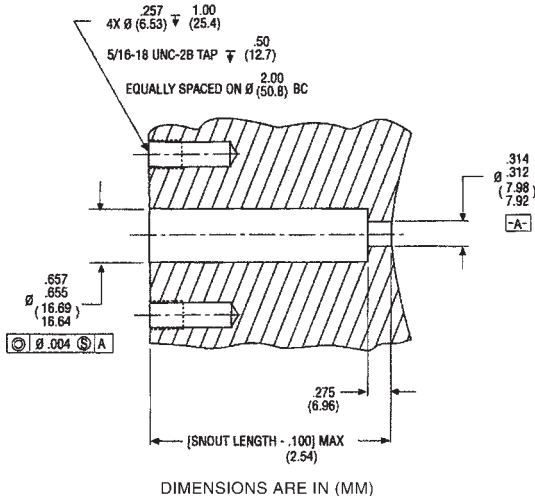


Fig. 6-3 Mounting hole PT241x

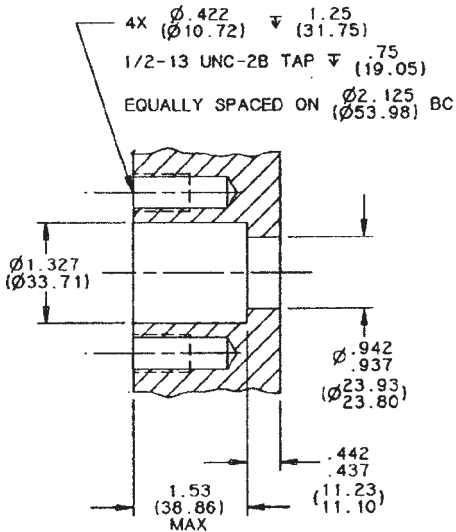
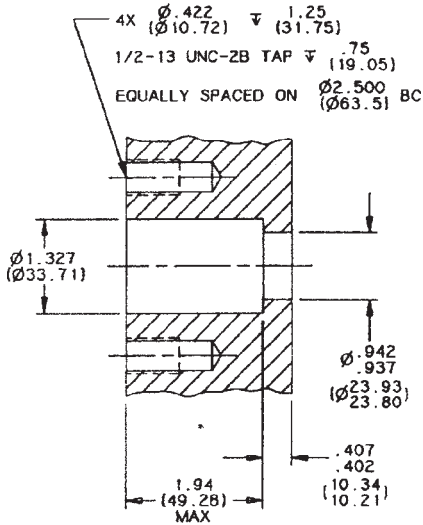


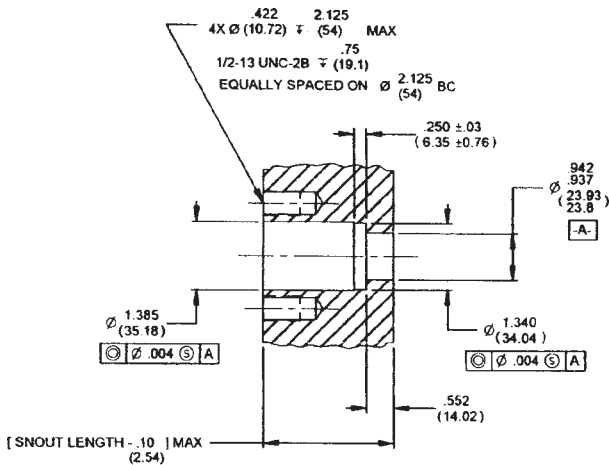


Fig. 6-4 Mounting hole PT244x



DIMENSIONS ARE IN IN (MM)

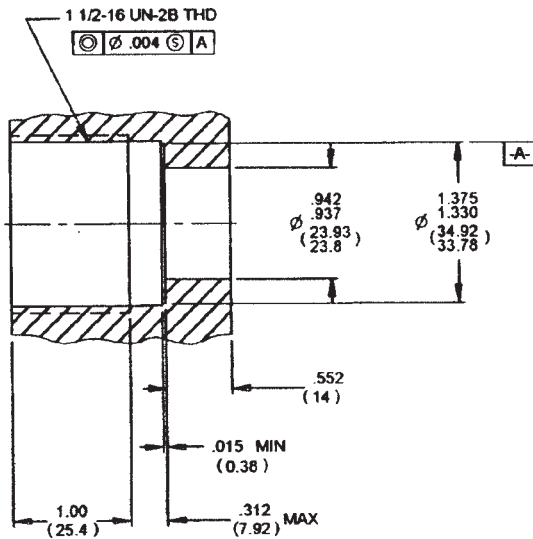
Fig. 6-5 Mounting hole PT290 & PT291



MOUNTING HOLE CONFIGURATION
REQUIRES USE OF SEALING GASKET



Fig. 6-6 Mounting hole PT292



When reworking the mounting hole, pay particular attention to the centricity of:

- the hole,
- the thread, if present, and
- the sealing surface.

Pressure sealing takes place on the 45° beveled sealing surface and on the front cylindrical section of the PT (see figures 6-1, 6-2, 6-3, 6-4, 6-5, 6-6).

The sealing surface must be:

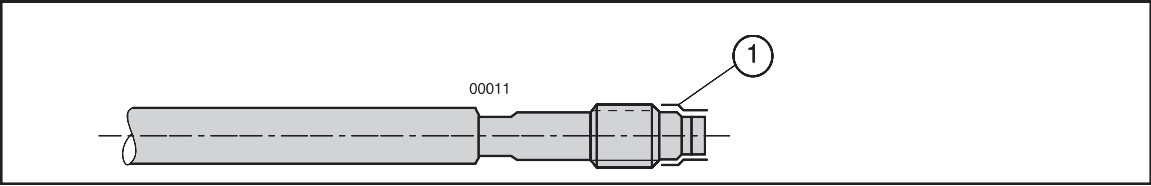
- correctly machined
- free from marks and rough edges
- free from solidified plastic residue.

6.2 CHECKING THE MOUNTING HOLE (NOT FLANGED MODELS)

- Paint the test bolt DYNISCO on the marked area (figure 6-7, item 1) with marking ink up to the thread.



Fig. 6-7 Test Bolt with Marking Ink



- Insert the test bolt in the mounting hole.
- Twist it in by hand until the two sealing surfaces make contact.
- Remove and examine the test bolt.

The only acceptable abrasion of marking ink is at the sealing edge (45°), evenly over the entire circumference.

If the ink has been rubbed off in other places too:

- rework the mounting hole.

6.3 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!



Toxic hazard!

The PT contains a small amount of mercury (Hg) as its transmission medium. If the diaphragm is damaged, mercury may escape.

Never transport or store the PT without the protective cap bolted in place. Remove the cap shortly before installation.

If mercury is inhaled or swallowed, seek medical attention immediately!

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

ATTENTION Before mounting the PT, check the mounting hole carefully. The PT must only be mounted in holes that satisfy the requirements stipulated in chapter 6.1. A hole that does not satisfy these requirements can damage the PT.

ATTENTION Before mounting the PT, ensure that the mounting hole is free from plastic residue.



Remove plastic residue with the **DYNISCO** cleaning tool kit. A test bolt is included with this cleaning set.

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

- Check the mounting hole with the test bolt, and clean with cleaning set if necessary.
- Coat the thread section of the transmitter with high temperature resistant grease or a suitable parting agent.

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 / sensor connection!

ATTENTION Maximum mounting torque 500 inch-pounds for 1/2-20 UNF transmitters. If the mounting torque is too high, the PT may be damaged or its zero point may shift.

- Screw the PT into the mounting hole and tighten.

6.4 MOUNTING PTS WITH FLEXIBLE STEM

Mounting a PT with a flexible stem to the pressure sensor is done analogously to the procedure in 6.3.

ATTENTION Avoid kinking or crushing the flexible stem.

Minimum bending radius

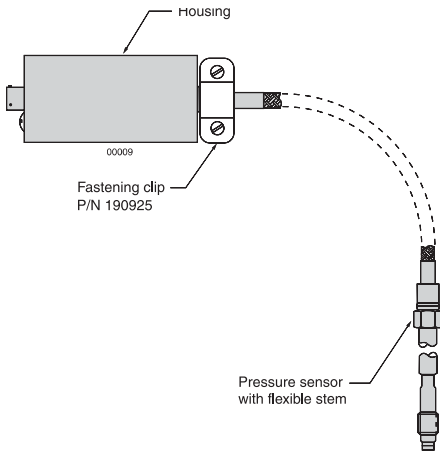
- **1" (25 mm)** for protected capillary

The connector must be easily accessible (on connector versions).

- Mount the electronics housing of the PT with the fastening clip. See mounting example in figure 6-8.
- Additionally secure the flexible stem between the electronics housing with a standard cable clip.



Fig. 6-8 Mounting Example for Pressure Transmitter with Flexible Stem



ASSEMBLY

6.5 INSTALLING THE FLANGED PRESSURE TRANSMITTER

Installation of the flange mounted pressure transmitter is analogous to the procedure described under 6.3, except mounting torque is designed for the mounting bolts and varies depending on specific transmitter. See specification section 3.12 for details.

6.6 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 μ F



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 chapter 6.6.1, or if cables / cable connectors / cable glands other than those stipulated by **DYNISCO** are used, **DYNISCO** cannot guarantee that EMC requirements will be satisfied.

6.6.1 EMC / CE COMPLIANT CONNECTION

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

6.7 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.

6.8 FLANGE CONFIGURATIONS



Fig. 6-9 x243 Flange Configurations

REV	ECO	BY	APP	DATE
I	23746	KEM		10/07/04 R
U	23571	DRG	HWM	12/20/04
V	23752	DRG	HWM	4/27/05

CONTROLLED PRODUCT
 CHANGES MUST BE APPROVED BY
 ALL APPROVAL COORDINATOR
 BEFORE EXECUTION

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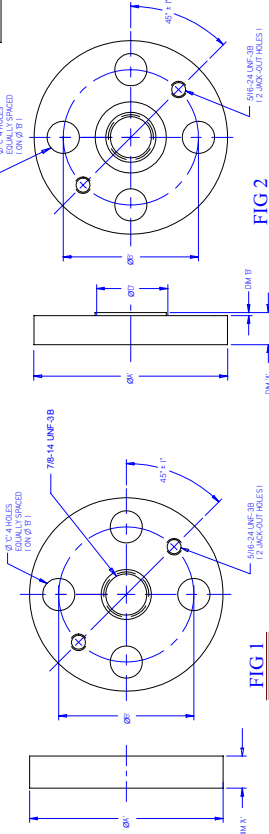


FIG 1

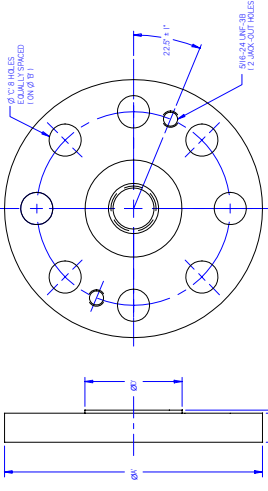


FIG 2

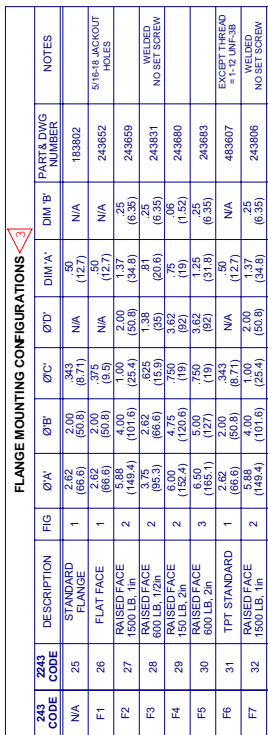


FIG 3

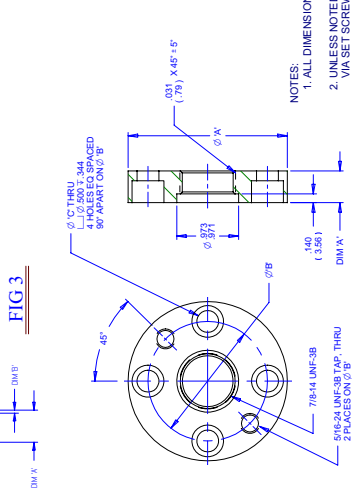
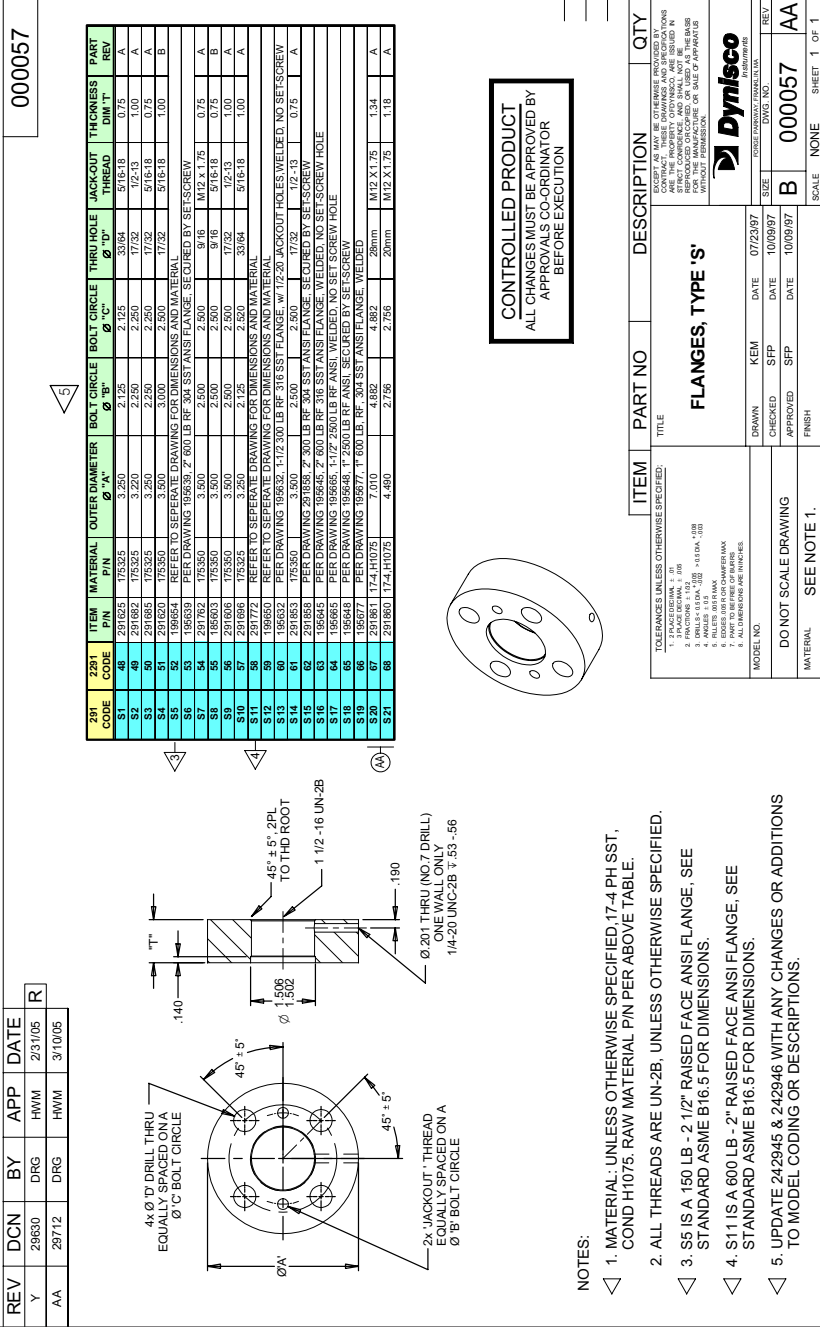


FIG 4

243 CODE	DESCRIPTION	FIG	ØA'	ØB'	ØC'	ØD'	DIM A'	DIM B'	PARTS DWG NUMBER	NOTES
F1	STANDARD FLANGE	1	2.62 (66.6)	2.00 (50.8)	3.95 (8.71)	N/A	55 (12.7)	N/A	183802	5/16-18 JACKOUT HOLES
F2	FLAT FACE	2	2.62 (66.6)	2.00 (50.8)	3.75 (8.5)	N/A	50 (12.7)	N/A	243652	
F3	RAISED FACE	2	5.88 (148.0)	4.00 (101.6)	1.00 (25.4)	2.00 (50.8)	1.37 (34.6)	0.25 (6.35)	243659	WELDED NO SET SCREW
F4	RAISED FACE	2	3.75 (95.3)	2.62 (66.6)	2.62 (66.6)	3.95 (100.0)	2.00 (50.8)	0.81 (20.6)	243831	WELDED NO SET SCREW
F5	RAISED FACE	2	6.00 (152.4)	4.75 (120.6)	1.00 (25.4)	2.00 (50.8)	1.37 (34.6)	0.25 (6.35)	243680	
F6	RAISED FACE	3	1.65 (41.8)	1.65 (41.8)	1.65 (41.8)	1.65 (41.8)	1.65 (41.8)	1.65 (41.8)	243683	
F7	TPT STANDARD	1	2.62 (66.6)	2.00 (50.8)	3.43 (8.71)	N/A	50 (12.7)	N/A	483807	EXCEPT THREAD = 1-1/2 INIF-3B
F8	RAISED FACE	2	5.88 (148.0)	4.00 (101.6)	1.00 (25.4)	2.00 (50.8)	1.37 (34.6)	0.25 (6.35)	243806	WELDED NO SET SCREW
F9	RAISED FACE	1	3.50 (88.9)	2.62 (66.6)	2.62 (66.6)	3.95 (100.0)	2.00 (50.8)	0.81 (20.6)	243824	
F10	STANDARD	4	2.50 (63.5)	1.876 (47.4)	3.44 (87.1)	2.00 (50.8)	1.37 (34.6)	0.25 (6.35)	183849	
F11	IPX184 FLANGE	2	6.25 (158.8)	4.25 (108.0)	1.00 (25.4)	2.25 (57.1)	1.50 (38.1)	0.38 (9.65)	243858	1/2 JACKOUT HOLES IF APG IN DIM ON DWG
F12	RING TYPE JOINT	2	1.65 (41.8)	1.65 (41.8)	1.65 (41.8)	1.65 (41.8)	1.65 (41.8)	1.65 (41.8)	243703	RING JOINT IF APG IN DIM ON DWG
F13	RAISED FACE	2	4.25 (108.0)	3.25 (82.5)	1.00 (25.4)	2.00 (50.8)	1.37 (34.6)	0.25 (6.35)	243866	WELDED NO SET SCREW
F14	RAISED FACE	2	5.88 (148.0)	4.00 (101.6)	1.00 (25.4)	2.00 (50.8)	1.37 (34.6)	0.25 (6.35)	243967	WELDED NO SET SCREW
F15	RAISED FACE	3	6.50 (165.1)	5.00 (127.0)	1.00 (25.4)	2.00 (50.8)	1.37 (34.6)	0.25 (6.35)	243869	
F16	TPT FLANGE	N/A	6.68 (169.6)	5.00 (127.0)	1.00 (25.4)	2.00 (50.8)	1.37 (34.6)	0.25 (6.35)	243863	MODEL TPT2



Fig. 6-10 PT29x "S" Type Flanges



- NOTES:
- 1. MATERIAL: UNLESS OTHERWISE SPECIFIED, 17-4 PH SST, COND H1075, RAW MATERIAL P/N PER ABOVE TABLE.
 - 2. ALL THREADS ARE UN-2B, UNLESS OTHERWISE SPECIFIED.
 - 3. S5 IS A 150 LB - 2 1/2" RAISED FACE ANSI FLANGE, SEE STANDARD ASME B16.5 FOR DIMENSIONS.
 - 4. S11 IS A 600 LB - 2" RAISED FACE ANSI FLANGE, SEE STANDARD ASME B16.5 FOR DIMENSIONS.
 - 5. UPDATE 242945 & 242946 WITH ANY CHANGES OR ADDITIONS TO MODEL CODING OR DESCRIPTIONS.

7. COMMISSIONING

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7.2	Calibration	35
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7.5	Hazardous area electrical configuration	36

7.1 SUPPLY VOLTAGE

Please read the entire manual prior to installation and use.



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.

7.2 CALIBRATION

PTs of the x2xxx and PT2xxx series may have an internal calibration signal. Connecting terminals E and F switches the calibration signal to the signal output. It is 80% of the full scale pressure of the transmitter (B300 option must be specified).

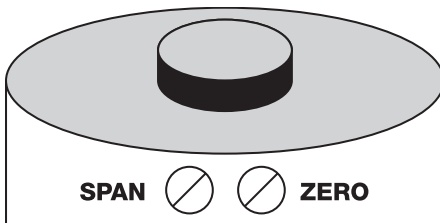
ATTENTION Calibrate in pressureless state and at room temperature. Other ambient temperatures will corrupt the signal. Use an adjustment screwdriver!

ATTENTION Do not change the installed position of the PT after calibration. If the position is changed you must re-calibrate the PT.

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





- 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.
- If B300 option is specified, connect terminals E and F. The calibration signal is connected to the output.
- Adjust calibration value (80% of full scale pressure) at potentiometer adjusting span screw and verify on the meter.
- Check the zero setting again.
- Repeat the zero adjustment and calibration value as necessary.

7.3 ZERO ADJUSTMENT

For PTs of series x2xxx and PT2xxx's, 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 melt 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 will be damaged. If it is hard to tell when the operating temperature has been reached, use a combined PT with thermocouple.

ATTENTION Operating temperature at the PT diaphragm **max. 400°C (752°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

Fig. 7-2 Electrical Configuration for Intrinsically Safe Hazardous Areas

TABLE 3. GROUP IIC

BARRIER	CERTIFICATE NO	C1 (#)	L (mH)	I (R)
MTL 2441B	BAS NP Ex. 9522602	113	4.2	55
PF Z530EX	BAS NP Ex. 98E2198	113	3.5	46
PF Z531EX	BAS NP Ex. 98E2313	113	4.2	55
PF-KHD3-DCREX-150	BAS NP Ex. 98C2093	113	4.2	55
PF-KHD2-STC3-EX-1 P	BAS NP Ex. 98C2093	113	4.2	55
PF-KHD2-STC-EX-1	BAS NP Ex. 98C2093	113	4.2	55

TABLE 2. GROUP IIB

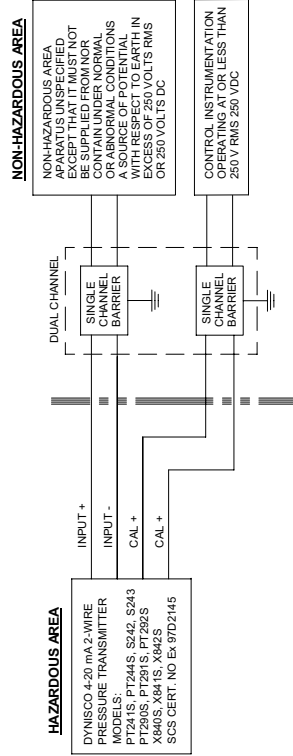
BARRIER	CERTIFICATE NO	C1 (#)	L (mH)	I (R)
MTL 2441B	BAS NP Ex. 9522602	339	12.6	165
PF Z530EX	BAS NP Ex. 98E2198	339	10.5	138
PF Z531EX	BAS NP Ex. 98E2313	339	12.6	165
PF-KHD3-DCREX-150	BAS NP Ex. 98C2093	339	12.6	165
PF-KHD2-STC3-EX-1 P	BAS NP Ex. 98C2093	339	12.6	165
PF-KHD2-STC-EX-1	BAS NP Ex. 98C2093	339	12.6	165

TABLE 1. GROUP IIA

BARRIER	CERTIFICATE NO	C1 (#)	L (mH)	I (R)
MTL 2441B	BAS NP Ex. 9522602	904	33.6	440
PF Z530EX	BAS NP Ex. 98E2198	904	28	368
PF Z531EX	BAS NP Ex. 98E2313	904	33.6	440
PF-KHD3-DCREX-150	BAS NP Ex. 98C2093	904	33.6	440
PF-KHD2-STC3-EX-1 P	BAS NP Ex. 98C2093	904	33.6	440
PF-KHD2-STC-EX-1	BAS NP Ex. 98C2093	904	33.6	440

NOTES:

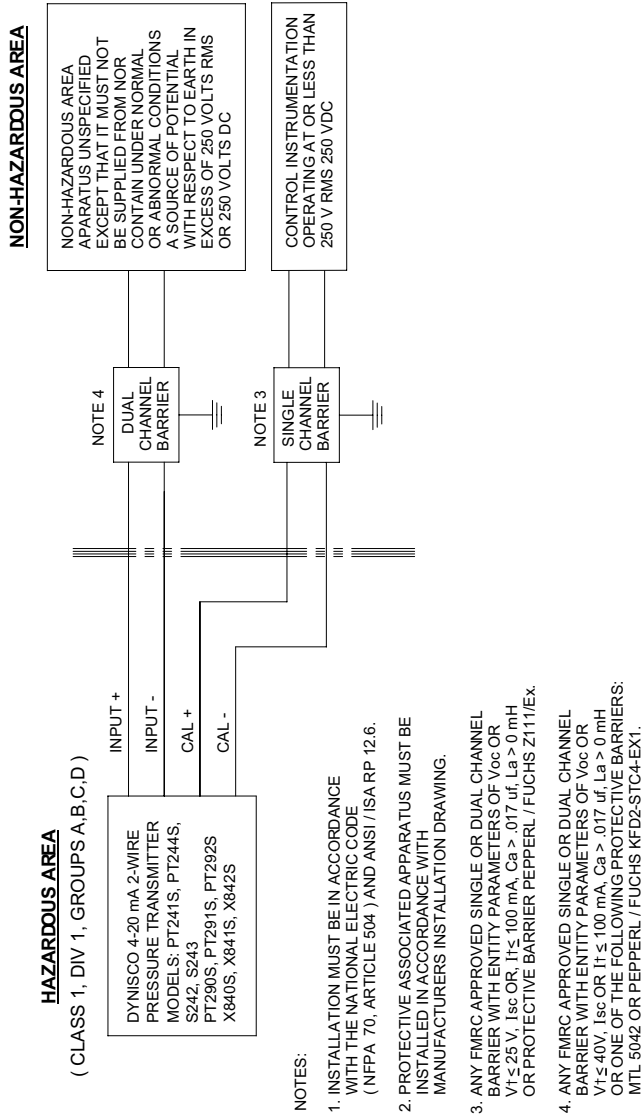
1. THE ELECTRICAL CIRCUIT IN THE HAZARDOUS AREA MUST BE CAPABLE OF WITHSTANDING AN AC TEST VOLTAGE OF 500 VOLTS R.M.S. TO EARTH OR FRAME OF THE APPARATUS FOR ONE MINUTE.
2. THE CAPACITANCE AND INDUCTANCE OR INDUCTANCE /RESISTANCE (I/R) VALUES IN THE HAZARDOUS AREA CABLES MUST NOT EXCEED THE VALUES SHOWN ON TABLES 1, 2, & 3.
3. NON-HAZARDOUS AREA EQUIPMENT SHALL COMPRISE ONE OF THE FOLLOWING DUAL CHANNEL BARRIERS:
 - a) MTL 2441B
 - OR
 - b) MTL 2441B
4. TWO OF THE FOLLOWING SINGLE CHANNEL BARRIERS:
 - PEPPERL FUCHS KHD2-STC3-EX 1 P OR
 - PEPPERL FUCHS KHD2-STC3-EX 1 P OR
 - PEPPERL FUCHS KHD2-STC3-EX 1 P OR
 - PEPPERL FUCHS KHD2-STC3-EX 1.
5. THE INSTALLATION MUST COMPLY WITH THE NATIONAL INSTALLATION REQUIREMENTS (E.G. IN THE UK: BS EN 60754-1:1997).
6. 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.
7. SYSTEM LABEL TO BE AFFIXED AT THE INTERFACE OF 'IS' OR 'NON-IS' CIRCUITS OR ADJACENT TO THE PRINCIPAL APPARATUS. SIRA SYST. EX 98E2139.



COMMISSIONING



Fig. 7-3 Electrical Configuration for Explosion Proof Hazardous Areas





8. MAINTENANCE

8.1	Maintenance	39
8.2	Thermocouple/RTD replacement	39
8.3	Repair/disposal	41
8.4	Warranty	41

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 must be removed with the melt in molten condition. 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 Before removing the PT, the medium must be in molten condition.

ATTENTION Removing the transmitter with the medium 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/sensor connection!

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

8.2 THERMOCOUPLE/RTD REPLACEMENT

A defective thermocouple is easy to replace.



- Loosen the hexagon socket screw at the top end of the sensor stem.
- Remove the defective thermocouple from the probe stem.

ATTENTION When fitting the new thermocouple, the pressure transmitting capillary must be located in the slot of the thermocouple.

- Insert the new thermocouple all the way into the probe stem.
- Tighten the hexagon socket screw at the top of the sensor stem to secure the thermocouple.

Fig. 8-1 Thermocouple

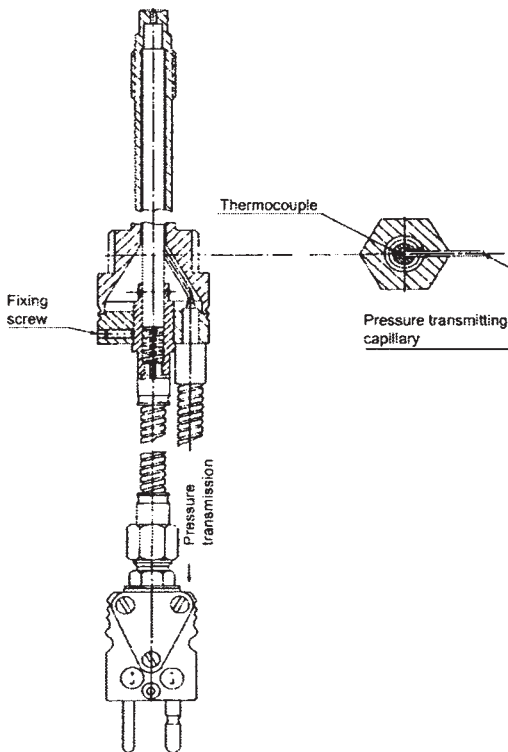




Fig. 8-2 Thermocouple Options

THERMOCOUPLE OPTIONS		
CODE	TYPE	FLEX LENGTH DIM 'D'
TC	J	3in (76mm)
TC1	DUAL J	3in (76mm)
TC2	J	18in (457mm)
TC3	J	30in (762mm)
TC4	J	36in (914mm)
TC5	J	60in (1524mm)
TC8	K	3in (76mm)
TC7	DUAL K	3in (76mm)
TC8	T	3in (76mm)
TC10	J	30in (762mm)
TC11	DUAL E	3in (76mm)
TC12	K	60in (1524mm)
TC13	DUAL J	18in (457mm)
TC15	K	20in (508mm)
TC16	J	6in (152mm)
TC17	K	30in (762mm)
TC18	DUAL J	30in (762mm)
TC19	E	3in (76mm)
TC20	J	24in (610mm)
RTD1	3 WIRE 100 ohm	3in (76mm)
RTD2	3 WIRE 100 ohm	18in (457mm)
RTD3	3 WIRE 100 ohm	36in (914mm)
RTD4	3 WIRE 100 ohm	60in (1524mm)
RTD5	3 WIRE 100 ohm	30in (762mm)

8.3 REPAIR/DISPOSAL



Toxic hazard!

The PT contains a small amount of mercury (Hg) as its transmission medium. If the diaphragm is damaged, mercury may escape.

Never transport or store the PT without the protective cap bolted in place. Remove the cap shortly before installation.

If mercury is inhaled or swallowed, seek medical attention immediately!

Mercury is hazardous waste and must be disposed of in accordance with applicable laws. **DYNISCO** will accept defective PTs.

If mercury escapes, use airtight packaging!

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

For addresses, see the back cover of the operating manual.

8.4 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.

9. ACCESSORIES

- Machining tool kit 1/2"-20UNF-2A P/N 200295
- Cleaning tool kit 1/2"-20UNF-2A P/N 200100
- Machining tool kit M18 x1.5 P/N 200105
- Cleaning tool kit M18 x1.5 P/N 200100
- Mounting Bracket P/N 190750



10. TROUBLESHOOTING

10.1 Troubleshooting 43

10.1 TROUBLESHOOTING

Fault	Possible Cause	Resolution
No signal	Cable breakage or poor contact	Check cable and contact, or replace
	No supply voltage	Check supply voltage
Strong zero shift when screwing in	Mounting hole incorrectly produced (alignment error)	Check hole with test bolt, rework with tool if necessary
	Mounting torque too high	Adjust to recommended mounting torque
No signal change despite pressure rise	Plug forming in front of diaphragm	Check mounting hole; remove solidified plastic
	Diaphragm damaged	Send pressure transmitter to DYNISCO for repair



11. 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


Dynisco Instruments
Vice President of Operations



12. EX DECLARATION OF CONFORMITY



sira
Certification Service

EX DECLARATION

1 EC TYPE-EXAMINATION CERTIFICATE

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: Sira 03ATEX2422

4 Equipment: X24XX, X84XX, PT24XX and PT29XX Pressure Transducers

5 Applicant: Dynisco Instruments

6 Address: 38 Forge Parkway
Franklin
Massachusetts
USA

7 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:



II 1 G

EEx ia IIC T4

T_{amb} = -20°C to +80°C

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

M D Shearman
Certification Manager

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Sira Certification Service

Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900 Fax: +44 (0) 1244 681330
Email: exhazard@siratc.co.uk

Sira Certification Service is a service of Sira Test & Certification Ltd



SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 03ATEX2422

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

Ui = 40V
 Ii = 100mA
 Ci = 17nF
 Li = 0

Calibration terminals

Ui = 25V
 Ii = 100mA
 Ci = 17nF
 Li = 0

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

14 DESCRIPTIVE DOCUMENTS

14.1	Drawing No.	Sheet	Rev.	Date	Title
	000052	1 of 1	B	06 Aug 97	Certification Dwg Electrical Connections (Connectors)
	241099	1 to 2	B	06 Sept 02	Certification Dwg PT241, PT244 (E) (S)
	242098	1 to 2	G	06 Sept 02	Certification Dwg S242 (Intrinsically Safe)
	242110	1 of 1	E	09 Dec 99	Assembly X24X-XX-XX/XX Intrinsically Safe (S) Explosionproof (E)
	242927	1 of 1	D	05 Sept 03	Engraving Drawing X24XX, PT24XX, PT29XX, X84XX
	243098	1 to 2	D	06 Sept 02	Certification Dwg S243 (Intrinsically Safe)
	290099	1 of 2	D	06 Sept 02	Certification Dwg PT29XX
	290099	2 of 2	D	06 Sept 02	Certification Dwg PT29XX
	856278	1 of 1	C	29 Aug 03	Label (Intrinsically Safe)
	856280	1 of 1	E	05 Sept 03	CE Nameplate 24VDC input, 4-20mA output
	870098	1 to 2	E	19 Dec 01	Certification Dwg X84XS (Intrinsically Safe)
	952195B	1 of 1	A	15 Oct 96	Drill Drawing Amp Board
	952195D	1 of 4	A	15 Oct 96	Layout Dwg Amp Board Layer 1

Date 19 September 2003

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sira
Certification Service

EX-DECLARATION

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 03ATEX2422

Drawing No.	Sheet	Rev.	Date	Title
952195D	2 of 4	A	15 Oct 96	Layout Dwg Amp Board Layer 2
952195D	3 of 4	A	15 Oct 96	Layout Dwg Amp Board Layer 3
952195D	4 of 4	A	15 Oct 97	Layout Dwg Amp Board Layer 4
952196B	1 of 1	D	13 Feb 98	Drill Dwg Plug Board
952196D	1 of 2	D	13 Feb 98	Layout Dwg Plug Board Layer 1
952196D	2 of 2	D	13 Feb 98	Layout Dwg Plug Board Layer 2
952197B	1 of 1	C	13 Feb 98	Drill Dwg Compo Board
952197D	1 of 2	C	13 Feb 98	Layout Dwg Compo Board Layer 1
952197D	2 of 2	C	13 Feb 98	Layout Dwg Compo Board Layer 2
999500A	1 of 2	A	15 Oct 96	Assembly Dwg Amp Board (Top)
999500A	2 of 2	A	15 Oct 96	Assembly Dwg Amp Board (Bottom)
999501A	1 to 2	D	13 Feb 98	Assembly Dwg Plug Board
999502A	1 of 2	C	12 Nov 98	Assembly Dwg Compo Board (Top)
999502A	2 of 2	C	12 Nov 98	Assembly Dwg Compo Board (Bottom)
999500C	1 of 1	B	04 Nov 97	Schematic 4-20 mA Amplifier Board
999501C	1 of 1	C	17 Nov 97	Schematic Plug board 4-20 mA
999502C	1 of 1	A	15 Oct 96	Schematic Compo Board
BM999500	1 to 2	C	14 Oct 98	Amp Board PX24X/84X BM999500
BM999501	1 of 1	E	12 Nov 98	Plug Board X24X/84X BM999501
BM999502	1 of 1	B	13 Feb 98	Compo Board PX24X/84X BM999502

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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