



# Guardian Series Safety Compliant Melt Pressure Transducer

PL'c rated mV/V and mA HART pressure transducer  
with integrated safety relay output

## Operating Manual



## Overview

**This manual is intended to cover applications per ISO 13849-1. For applications per standards IEC 61508, 61511, or 62061, please consult Dynisco.**

## Unit Structure

The Guardian Series transducer consists of a pressure sensor and an integrated electronics module. The module generates a buffered output as well as a relay output that signals when an unsafe condition occurs. The Guardian series is PL 'c' rated (per ISO 13849-1) when used in architecture Category 1 and PL'd' rated when used in architecture Category 3.

The safety relay is closed during normal operation. The relay will open when a malfunctioning gage is detected. Pressure above a certain amount (factory settable in 10% increments) or power interruption will also cause the safety relay to open.

## Safety

The pressure transducer (PT) may contain a very small amount of mercury (Hg) as its transmission medium. If the diaphragm is damaged, mercury may escape. Non-toxic NaK is used in the LDA series. NaK is also available as an option for other pressure transducers.

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!

Never transport or store the PT without the protective cap secured over the sensor diaphragm. Remove the cap shortly before installation.

ESD sensitive components. Electrostatic discharge may damage the PT. Take ESD precautions.



## Intended Use

The Guardian Series transducer has been designed to provide a protective measure. This has been done by the avoidance and control of systematic and random failures.

This product will:

Measure the pressure and provide a safety relay output. Since this is being used to perform a protective measure, this sensor should only be used for monitoring the pressure and not controlling the process. Best practices declare that safety and control must be independent from each other.

The Guardian Series transducer detects many hardware failures including an open or short in the measuring gage and if there is an overpressure condition. If any of these failures occur, the output relay will open. It is the user's responsibility to connect this relay to the system in such a way that when this relay opens, it brings the system to a safe state.

This fault state is not latched. It is up to the user to latch this error if desired.

The device has been self certified by Dynisco to meet the requirements of ISO 13849-1; this self- certification is based on our functional safety management plan, internal audits, internal controls and third party FMEDA analysis by exida. Improper use of the equipment may consist of the following:

Any component, technical or electrical modifications to the product  
Use of the product outside the areas described in this manual

Use of the product outside its specifications (See Specifications section)

## 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.



## Functional Safety Ratings (as defined in EN ISO 13849-1):

Device Type:	A
Performance Level (PL):	c when used in architecture Category 1 d when two are installed in a 1oo2 configuration per Category 3

## Recommended practices

This Guardian Series transducer must be installed in such a way that the opening of the output relay will bring the system to a safe state. In this safe state the instrument that is monitoring the pressure should be left operational.

This error indication is not latched. If it is necessary to latch the error until it is manually reset, this is the user's responsibility.

At startup and on a periodic basis the safety system should be tested to ensure proper operation. This will require applying a pressure to the Guardian Series transducer that is over the safe level but less than the maximum pressure. Verify that the protective measure is initiated to take the machine to a safe operating condition.

## Use of qualified personnel

The product may only be assembled, installed, configured, commissioned, operated and maintained by persons with proven skills. Persons with proven skills are suitably experienced to operate devices, systems, plant and machinery in accordance with the general standards and guidelines for safety technology.

It is the user's responsibility only to employ personnel who:

Are familiar with the basic regulations concerning health and safety and accident prevention

Have read and understood the safety guidelines given in this description

Have a good knowledge of the generic and specialist standards applicable to the specific application

## Warranty and liability

All claims to warranty and liability will be rendered invalid if:

- The product was used contrary to the purpose for which it is intended
- Damage can be attributed to not having followed the guidelines in the manual
- Operating personnel are not suitably qualified
- Any type of modification has been made (e.g. Exchanging components on the PCB boards, solder work etc.)

## Disposal

The product must be disposed of properly when it reaches the end of its service life.

## Functional description

### Device pinout



CONNECTOR WIRING, mV	
PIN	FUNCTION
A	EXCITATION +
B	SIGNAL +
C	EXCITATION -
D	SIGNAL -
E	INTERNAL CALIBRATION RESISTOR
F	INTERNAL CALIBRATION RESISTOR
G	RELAY CONTACT
H	RELAY CONTACT

CONNECTOR WIRING 4-20mA	
PIN	FUNCTION
A	POWER +
B	SIGNAL -
C	POWER -
D	REZERO +
E	RCAL +
F	RCAL-/REZERO -
G	RELAY CONTACT
H	RELAY CONTACT

CONNECTOR WIRING mA-HART	
PIN	FUNCTION
A	POWER +
B	SIGNAL -
C	POWER -
D	N/C
E	RCAL +
F	RCAL -
G	RELAY CONTACT
H	RELAY CONTACT



## Integrated failure detection mechanisms

**Sensor output above setpoint:** If the sensor’s output increases beyond a defined setpoint (factory settable in 10% increments), the safety output will open.

**Sensor open gage:** If the gage becomes open, the safety relay will open.

**Power interruption:** If power is interrupted to the unit, it will default to a safe state (open).

## System Requirements

Refer to standard product manual

## Connecting safety relay

### Relay specs

Max. switching voltage:

200 Vdc Max. switching

current: 0.5 A

## Troubleshooting

Fault	Possible Cause	Resolution
No signal	Cable breakage or poor contact No supply voltage	Check cable and contact, or replace  Check supply voltage, confirm that relay trips when supply is removed



<p>Strong zero shift when screwing in</p>	<p>Mounting hole incorrectly produced (alignment error)</p> <p>Mounting torque too high</p>	<p>Check hole with test bolt, rework with tool if necessary</p> <p>Adjust to max. 50 Nm mounting torque</p>
<p>No signal change despite pressure rise</p>	<p>Plug forming in front of diaphragm</p> <p>Diaphragm damaged</p> <p>Miswiring, Cable breakage or poor contact</p> <p>No supply voltage</p> <p>Internal failure</p>	<p>Check mounting hole; remove solidified plastic</p> <p>Send pressure transducer to DYNISCO for repair</p> <p>Check cable and wiring, and repair or replace</p> <p>If relay is open, Check supply voltage. If relay is closed then confirm that relay opens when supply is removed. If it does open then proceed per the resolution for “internal failure”</p> <p>Apply Rcal, if relay does not open then send pressure transducer to DYNISCO for repair. If Relay does open, remove sensor and press lightly on diaphragm with thumb. If output does not respond, return to Dynisco for diagnosis.</p>

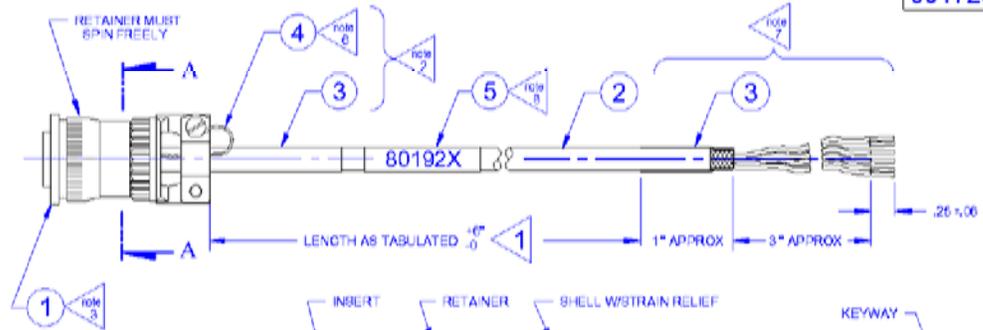


Fault	Possible Cause	Resolution
Relay open	<p>Pressure above factory-defined safe level</p> <p>No supply voltage</p> <p>Pressure sensor damaged</p>	<p>Relieve pressure on PT</p> <p>If relay is open, Check supply voltage. If relay is closed then confirm that relay opens when supply is removed.</p> <p>Return for Dynisco for repair</p>

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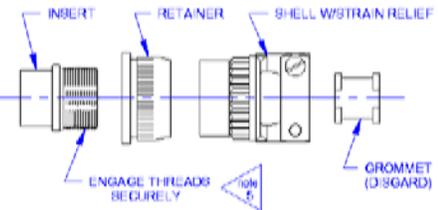
CONNECTOR WIRING	
PIN	CONDUCTOR
A	WHITE
B	RED
C	GREEN
D	BLACK
E	BLUE
F	ORANGE
G	VIOLET
H	YELLOW



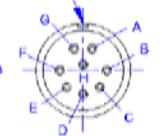
**NOTES:**

1. CUT CABLE TO REQUIRED LENGTH  $\pm 0.1$ ".
2. STRIP CABLE JACKET BACK 1/2". CUT A 2" LENGTH OF BUSSWIRE (ITEM 4) WRAP ONCE AROUND EXPOSED SHIELD CLOSE TO CABLE JACKET, SOLDER TO SHIELD.
3. CONNECTOR (ITEM 1) SLIDE SHELL W/STRAIN RELIEF THEN RETAINER OVER CABLE AND BUSSWIRE, DISCARD GROMMET, REFER TO DETAIL 'A'.
4. REMOVE SHIELD BEYOND BUSSWIRE. STRIP AND TIN WIRES 1/8" AND SOLDER TO CONNECTOR PINS PER WIRING.
5. TIGHTEN THE INSERT INTO THE SHELL USING A GRIPPING TOOL i.e. SOFT JAW PLIERS (DO NOT LEAVE TOOLING MARKS). ENSURE THAT THE RETAINER SPINS FREELY.
6. WRAP BUSSWIRE AROUND STRAIN RELIEF SCREW OF CONNECTOR AND SECURE IN PLACE.
7. ON OTHER CABLE END, STRIP CABLE JACKET BACK APPROX 3-1/2", STRIP WIRE JACKET BACK 1/4" AND TIN LEADS. INSTALL A 1" LENGTH OF SHRINK TUBING OVER CABLE JACKET AND EXPOSED SHIELD AS SHOWN.
8. MARK CABLE MARKER WITH ASSEMBLY PART NUMBER THEN INSTALL ONTO CABLE TO WITHIN 0" OF CONNECTOR.

DETAIL 'A'  
CONNECTOR ASSEMBLY



VIEW A-A  
CONNECTOR WIRING SIDE



PART NO.	LENGTH DIM 'L'
801728	10 II
801729	20 II

ITEM	PART NO.	DESCRIPTION	QTY
5	938024	CABLE MARKER	1
4	912004	BUSS WIRE, 22 AWG	3"
3	810010	HEAT SHRINK TUBING	3"
2	800775	CABLE, 8 COND, 22 GA	A/R
1	710700	CONN PC06A-12-8S (SR)	1

RELEASED TO: 801728-729 (REV. 0001)

1. PLACE ORDER # 01  
2. PLACE ORDER # 02  
3. FINISHING # 03  
4. DRILL # 04  
5. ASSEMBLY # 05  
6. FINISH # 06  
7. TEST # 07  
8. SHIP TO BE FREE OF DEFECTS  
9. ALL DIMENSIONS ARE IN INCHES

MODEL NO. \_\_\_\_\_

DO NOT SCALE DRAWING

MATERIAL \_\_\_\_\_

TITLE

**CABLE ASSEMBLY  
PC06A-12-8S(SR) 3" LEADS  
(SHIELDED, 8 COND)**

DRAWN: DRG DATE: 02/17/11

DESIGNED: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED: MPL DATE: 02/22/11

FINISH: \_\_\_\_\_

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**Dynisco**

DATE: 02/22/11

DWG. NO. **801728-729**

SCALE: NONE SHEET 1 OF 1