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PA03
SIGNAL CONDITIONER

Installation, Operation and Maintenance Manual

SERIAL NUMBER_____

The specifications contained in this notice and any user of these specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications that have been changed and are no longer in effect.

PA03
SIGNAL CONDITIONER
Installation, Operation and Maintenance Manual

TM-87916 REV. H

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Thank you for selecting a FLOW TECHNOLOGY, INC. product for your flow measurement application.

Virtually every major commercial, government, and scientific organization is making use of our products, expertise and extensive technical support. This is a culmination of years of refinement in our flowmeter and calibrator designs which has resulted in the technological leadership in the flow measurements field which we enjoy.

We are proud of our quality products, our courteous service and welcome you, as a valued customer, to our growing family.

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The limited warranty does not apply to failures caused by mishandling or misapplication. Seller's warranty obligations shall not apply to any goods which (a) are normally consumed in operation or (b) have a normal life inherently shorter than the warranty period stated herein.

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TM-87916
REVISIONS

DATE	REVISION	ECO NUMBER	APPROVAL
3/26/09	G	20360	J. Blasius
9/29/10	H	21222	R. Reed

Table of Contents

Table of Contents (Tables, Figures and Appendix)

1.0 SCOPE

This manual is provided for information and guidance of personnel responsible for the installation and operation of the PA03 Signal Conditioner manufactured by FLOW TECHNOLOGY, INC. of Phoenix, Arizona.

2.0 PURPOSE

The purpose of this manual is to provide information detailing the operational characteristics of the PA03 Signal Conditioner and includes information for wiring connections for the various applications.

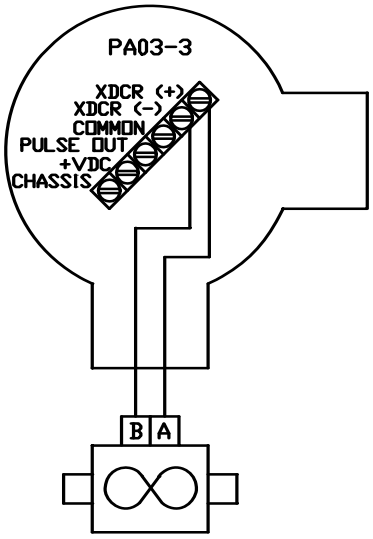
This manual does not contain information or instructions for custom application(s).

3.0 DESCRIPTION

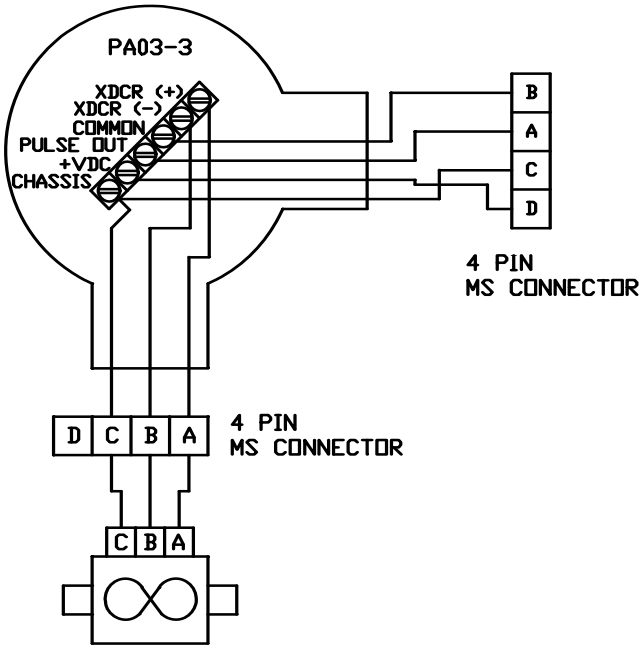
The PA03 Signal Conditioner is a solid state electronic package designed to transmit the output signal of a turbine flowmeter over distances greater than 1000 feet. The unit will also amplify a flowmeter output signal in an environment that is characterized by high electrical noise generated by electrical devices.

The PA03 Signal Conditioner converts the input signals from the flowmeter to a pulse output whose frequency is proportional to the rotation of the flowmeter rotor.

The PA03 Signal Conditioner is packaged in a 3½-inch diameter explosion-proof enclosure, NEMA 4X, or a polypropylene. Refer to Section 4.2 for further information. All connections are made to the terminal strip.



PA03 Wiring Diagram
Conduit Hub



PA03 Wiring Diagram
MS CONNECTOR

4.0 OPERATION

The PA03 Signal Conditioner provides a low-level signal to an amplifier. The low-level signal is amplified and converted to an output pulse signal whose frequency is proportional to the rotation of the flowmeter rotor. The output is buffered and the output pulse level is selectable.

CAUTION

DO NOT remove the cover of an explosive-proof enclosure located in a hazardous area while power is applied.

5.0 INSPECTION AND INSTALLATION

5.1 INSPECTION

The equipment is ready for immediate installation upon receipt. However, the unit should be checked to assure that no damage occurred during shipment. At least, a visual inspection for broken or loose components should be conducted.

5.2 INSTALLATION

Figure 2 shows the different enclosures for the PA03. The explosion-proof housing can be mounted on top of the flowmeter or on the end of the conduit. All connections are made to a terminal strip.

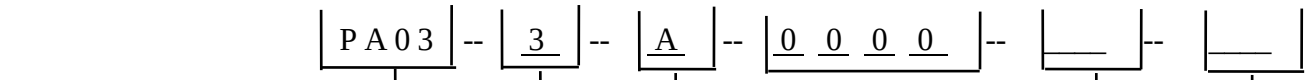
6.0 SPECIFICATIONS

A description of the Model Numbering System, Table 1 is provided in this Section.

Power Requirements:	+5 VDC to 32 VDC at less than 30mA, reverse voltage protected
Signal Input:	
Frequency Range	0 to 10K Hz
Sensitivity	10mV peak-to-peak at 5VDC power input
Signal Output:	
Impedance	1.2K ohms
Output Level	Pulse output level selectable with one resistor
Environmental:	
Temperature Range	
Operating & Storage	-40 to +85°C (-40 to +185°F)
Humidity Range	
Operating & Storage	5 to 95%, Non-Condensing
Enclosures (Refer to Figure 2):	
Polypropylene	
NEMA 4X	
Class 1, Div II, Group A, B, C, & D	

TABLE 1

PA03 MODEL NUMBERING SYSTEM



BASE MODEL NUMBER

INPUT POWER
5 VDC to 32 VDC

SIGNAL INPUT
MAGNETIC

ENCLOSURES
-3 = POLYPROPYLENE (Figure 2A)
B6 = NEMA 4X (Figure 2)
B7 = NEMA 4X, MS Connectors (Figure 2)
-9 = CLASS 1, DIV II GROUP A, B, C & D (Figure 2C)

APPROVALS
Blank = NO APPROVALS
IS = INTRINSICALLY SAFE

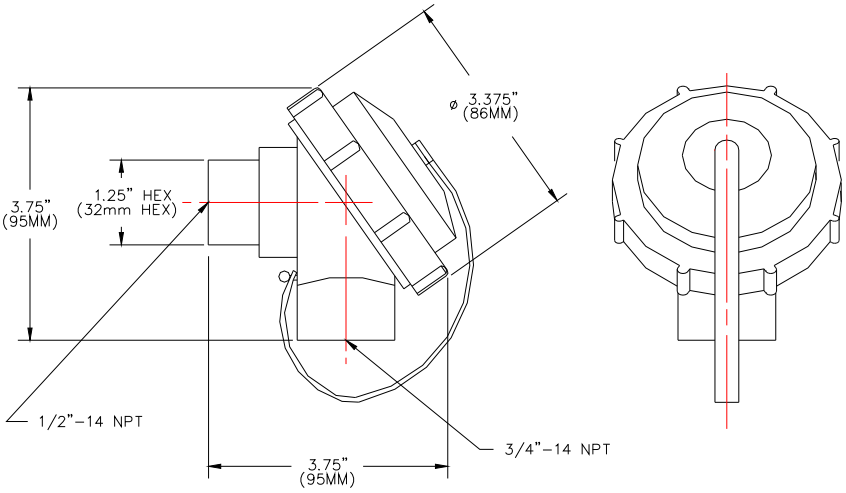


Figure 2A. Polypropylene

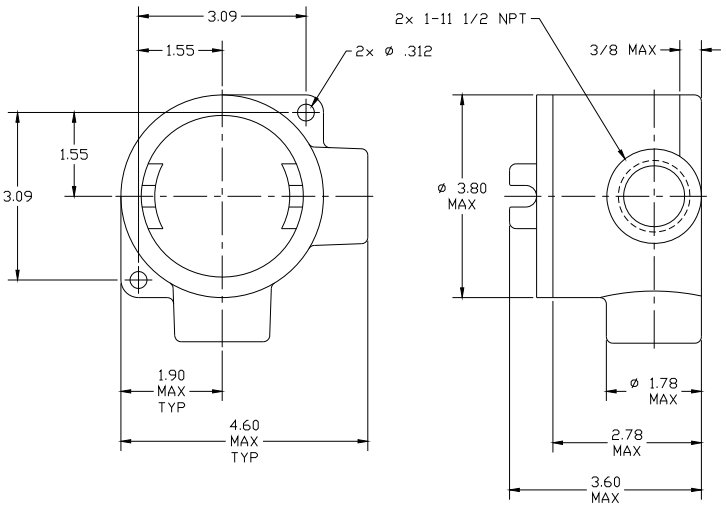
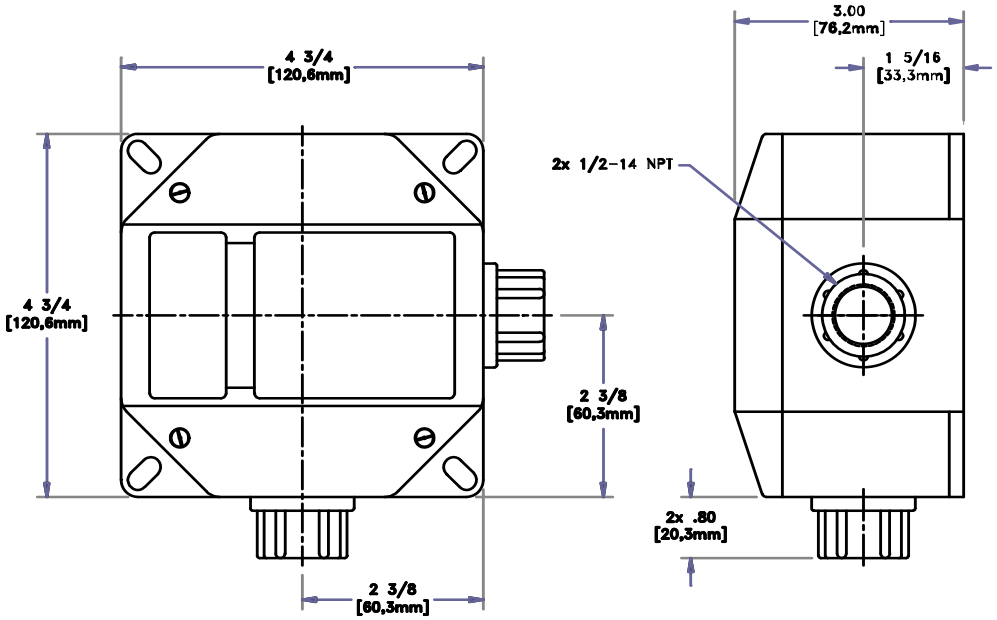
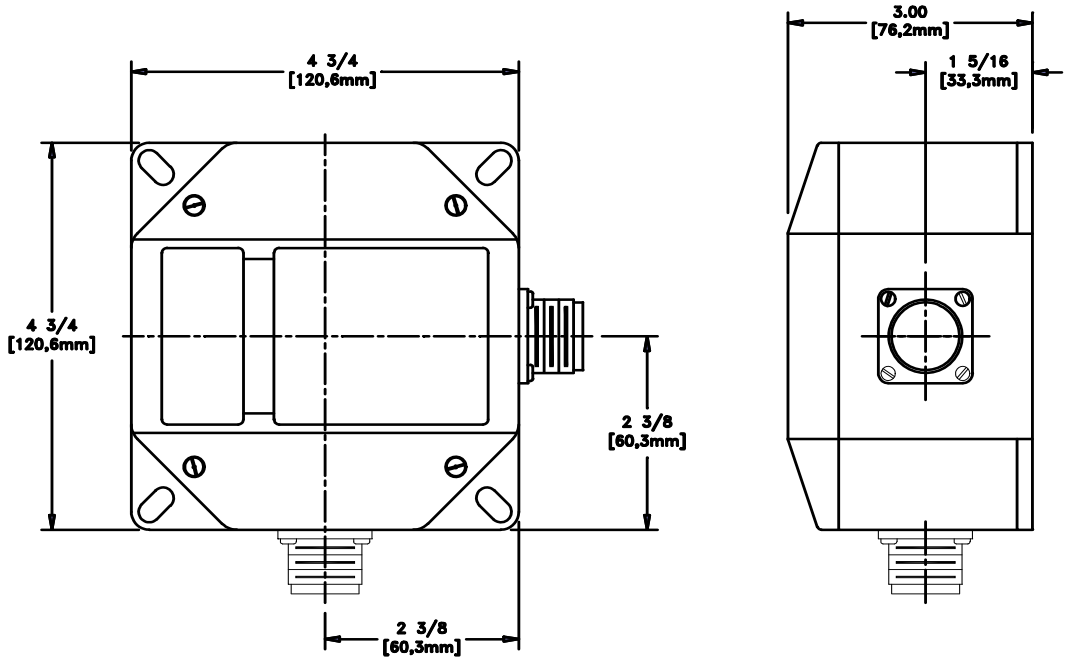


Figure 2C. Explosion Proof

Figure 2. PA03 Enclosures.



NEMA 4X
W/CONDUIT HUBS



NEMA 4X
W/MS CONNECTIOS

7.0 MAINTENANCE

7.1 PERIODIC MAINTENANCE

There is no maintenance required for the PA03 units. Cleaning normally associated with electronic equipment is recommended on an as-needed basis.

7.2 SPARE PARTS

It is recommended that one Printed Circuit Board, FLOW TECHNOLOGY, INC. Part Number 84-12715-101, be maintained as a spare part for each unit in service.

7.3 TROUBLESHOOTING

Determine if the defective component is the magnetic pickoff or the printed circuit module.

SYMPTOM	PROBABLE CAUSE	REMARKS
No sine wave at T1 and T2.	No input from flowmeter.	Check flowmeter pickoff.
No saturated sine wave at pin 1 of U1A.	Amplifier U1A has failed.	Replace U1
No pulse output at pin 7 of U1B.	Schmitt trigger has failed.	Replace U1
No pulse output at T4.	Transistor Q1 is defective. OR External load shorted.	Replace Q1 Check external load.

7.4 SCHEMATIC

Figure 3 shows the schematic and Figure 4 shows the component layout for the PA03 Signal Conditioner.

8.0 THEORY OF OPERATION

The PA03 Signal Conditioner consists of an input signal operational amplifier and an output buffer. The input amplifier accepts the low-level signals from a magnetic type flowmeter pickoff with both leads floating. The pulse output is isolated from the load with transistor, Q1. Transistor, Q1, also serves as a buffer to provide more output drive to the load.

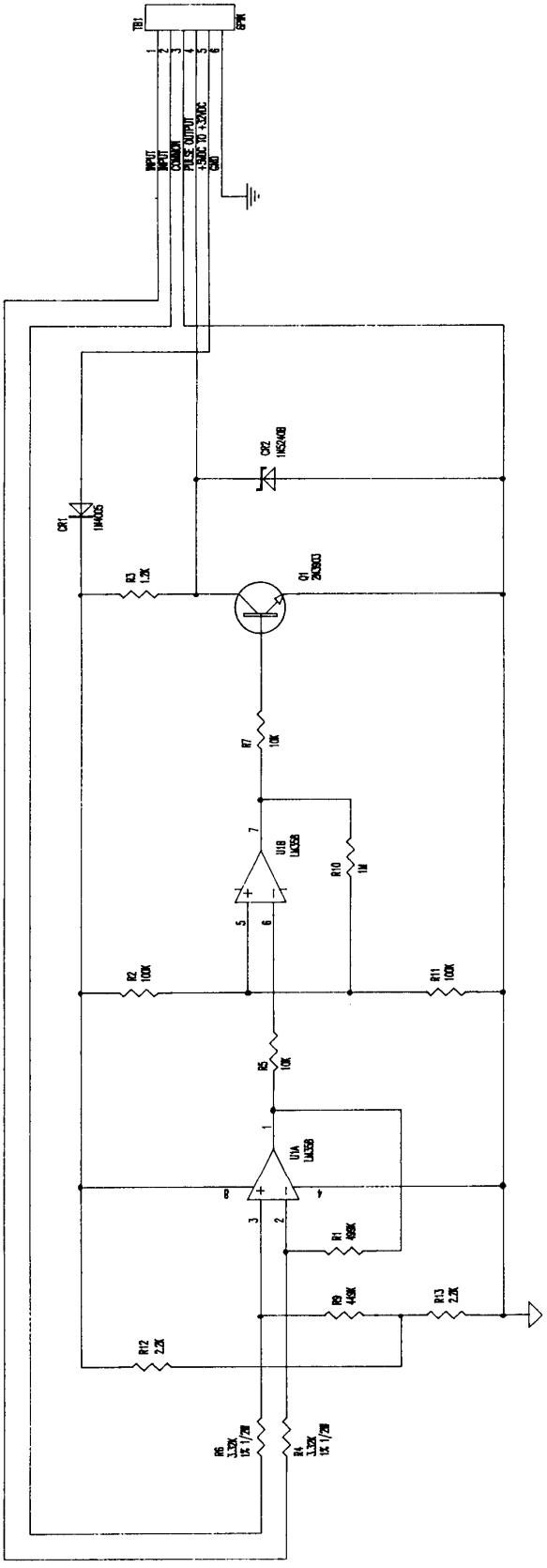


Figure 3. PA03 Signal Conditioner Schematic.

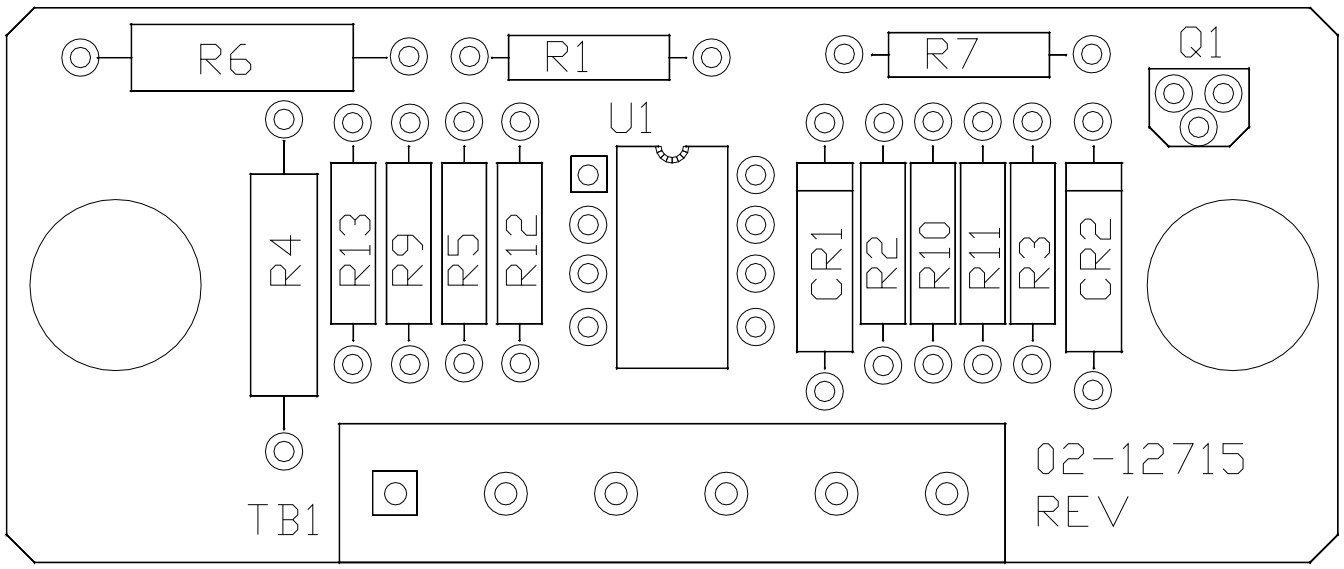
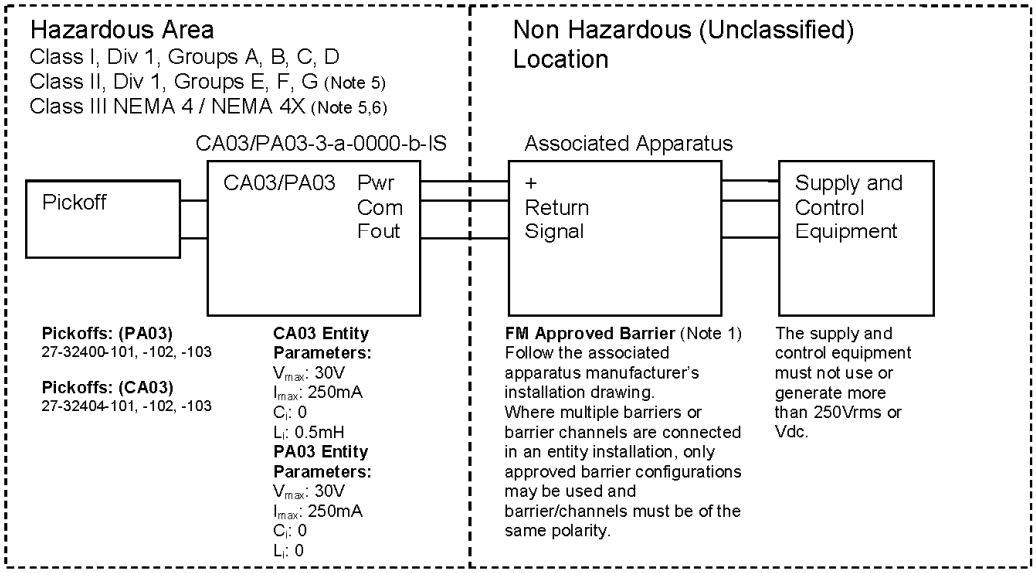


Figure 4. Component Layout.

APPENDIX A - INSTALLATION OF INTRINSICALLY SAFE UNITS

CA03/PA03



Notes:

1. The barrier must be approved under the FM entity concept.
2. Installation must be in accordance with ANSI/ISA-RP12-06-01 (Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instruments Part 1: Intrinsic Safety) and the ANSI-NFPA 70 (National Electrical Code)
3. The structure to which the CA03/PA03 and pickoffs are mounted must be at the same earth potential as the barrier earth ground.
4. Supply (Pwr) and signal (Fout) must be run in individual twisted shielded pairs.
5. Only the -102 pickoff sensors are suitable for Class II and Class III hazardous locations.
6. The NEMA 4X rating applies to the CA03/PA03-3-a-0000B6-c enclosure only.
7. The maximum cable inductance between the PA03 and associated apparatus must not exceed 3.8mH.
8. The CA03 is a 5-30 volt powered device, which outputs a 0-10V pulse.
9. The PA03 is a 22-30 volt powered device, which outputs a 0-10V pulse.

Equipment that is FM approved for intrinsic safety may be connected to FM approved barriers based on the "Entity Concept". The combination is then intrinsically safe if the FM entity concept is acceptable to the authority having jurisdiction (AHJ) of the installation.

The FM approved barrier must meet the following criterion:

V_{oc} or $U_o \le V_{max}$ or U_i
I_{sc} or $I_o \le I_{max}$ or I_i
C_a or $C_o \ge C_i + C_{cable}$
L_a or $L_o \ge L_i + L_{cable}$
The configuration of the associated apparatus must be FM approved under entity concept

No changes may be made to this drawing without FM approval

Installation Control Drawing	Last ECO	Date	Approved
	21225	9/27/10	R REED

TITLE: **FM Installation Control Drawing** **CA03/PA03 SIGNAL CONDITIONER**	PREPARED	DATE	APPROVED	DATE
	J. Walker	4/12/2010		

Size	Drawing No.	Rev	
A	76-61827	H	Sheet 7 of 8

SF-69985 Rev A per ECO 20855