

Pyragon Inc.

Nuclear Obsolescence Replacement Products



Alarm, Transmitter and Isolator, Form, Fit and Functional
replacements for :

Transmation

Fisher Controls

Fisher & Porter

AGM

RIS

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Pyragon, Inc.

Pyragon, Inc. your source for Form, Fit and Function of many Alarms and Transmitters in the Nuclear Industry.

Pyragon, Inc. currently owns the transmitter and alarm product lines formerly made by Transmation of Rochester, NY. This includes models in the 200/300/500/600/900/3000 series.

Many of these products are used in the original control systems of nuclear power plants. The original designs of these products are generally obsolete. However Pyragon has re-engineered these products and has form, fit and functional replacements of many of these items using updated electronics.

In addition to the obsolete Transmation items, we have also engineered replacements for alarms and transmitters made by Fisher Controls, Fischer & Porter, RIS, AGM and many others. Many of these items are the same as the original design, but have added circuitry to better withstand transient bursts and surges, not just on power lines but on the signal lines as well. Additionally we have minimized the use of electrolytic capacitors for better reliability and improved ambient temperature stability for less drift and therefore less need for routine calibrations.

With these new re-engineered designs the user gets the advantage of a form, fit and functional drop in replacement, while getting the advantage of newer technology that provides a superior performance as compared to the original product. All of this is provided in a design that includes no microprocessors or embedded software eliminating the need for software verification testing.

If you don't see the model you are looking for in this brochure, contact us and we can discuss your needs and possibly provide an engineered replacement.

We have extensive experience and understand the demands of the nuclear industry.

Thomas R. Crumlish
PRESIDENT

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Power	120 VAC, +/- 10%, 8 VA
Operating Temp	0-50 C (32-122 F)
Relative Humidity	0-95% RH
Input Signal	4-20 Ma OR 1-5 Vdc
Output Signal	4-20 mA or 1-5 Vdc
Max Output Load	1500 ohms
Seismic Approval	Category B
Transient Immunity	OPG A28M-1982
RFI Immunity	OPG C504-7-77
Accuracy	+/- 0.25% of span
Drift	Short term +/- 0.05% LongTerm +/- 0.1%
Isolation	1000 Vac, input vs output vs power

LS-121-P Signal Isolator

The LS-121-P was developed as a direct form, fit function replacement for the Fisher Controls model LS-121. The LS121-P signal Isolator uses a transformer isolation technique to provide mutual 3 way isolation between input, output and power.

The new LS-121-P several performance enhancements. It has an electrical transient protection circuit on the input and output signal lines as well as the power line. The power supply is a very efficient switching power supply which uses only one electrolytic capacitor as compared to the original unit which had a linear supply with multiple electrolytic capacitors. Additionally the circuit is designed with a low temperature coefficient giving the unit good long term stability requiring reduced calibration maintenance.



Power	120 VAC, +/- 10%
Operating Temp	0-50 C (32-122 F)
Relative Humidity	0-95% RH
Input Signal	mV
Output Signal	4-20 or 10-50 mA
Max Output Load	1500 ohms
Seismic Approval	Category B
Transient Immunity	OH A28M-1982 1000 V _{peak}
RFI Immunity	OH C5047-77
Accuracy	+/- 0.25% of span
Drift	Short term +/- 0.05% LongTerm +/- 0.1%
Isolation	1000 Vac, input vs output vs power

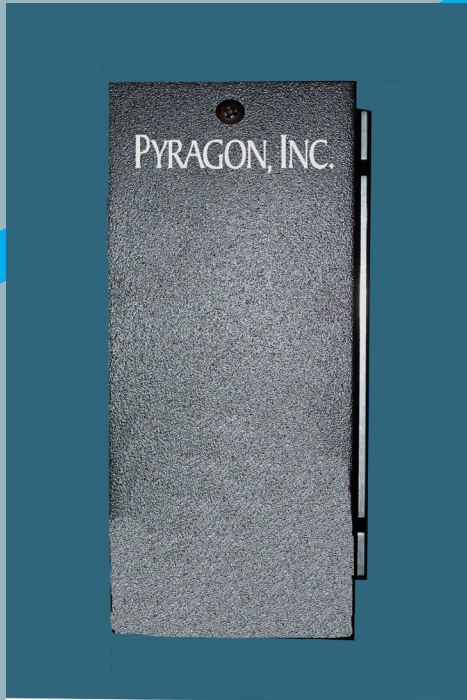
330T-P and 330IT-P Millivolt Isolator/Transmitter

The 330T-P and 330IT-P were developed as a direct form, fit function replacement for the Transmation models 330T and 330IT. It makes use of the same case design, the same terminations and labeling but uses updated electronics.

These units can accept millivolt inputs with spans ranging from 3 to 100 mvDC. The standard output is 4-20maDC but 10-50 maDC is also available as a factory configured option. The maDC current outputs are from a true current source and can drive up to 900 ohms.

Calibration is via zero and span potentiometers on the front faceplate. These units are designed for bulkhead mounting.

Replacement for :
Transmation model 900F Square Root
Extractor



900F-P Square Root Extractor

Power	120 VAC, +/- 10%
Operating Temp	0-50 C (32-122 F)
Relative Humidity	0-95% RH
Input Signal	4-20 Ma
Output Signal	4-20 mA
Max Output Load	1500 ohms
Seismic Approval	Category B
Transient Immunity	OH A28M-1982 1000 Vpeak
RFI Immunity	OH C5047-77
Accuracy	+/- 0.25%
Drift	Short term +/- 0.05% LongTerm +/- 0.1%
Isolation	1000 Vac, input vs output vs power

The 900F-P was developed as a replacement for the Transmation model 900F Square Root Extractor. This design uses an alternate bulkhead mounting approach that is different than the original Transmation design. However there is an optional adapter plate that can be used to match the original mounting dimensions.

This unit reads the analog signal from a differential pressure transmitter measuring the pressure drop across an orifice plate and calculates an analog output signal that is linearly proportional to the flow rate.

The new unit uses an EPROM with a look up table which contains the calculated square root values. The values in the EPROM are accessed using an A/D and D/A on the circuit board. Using this approach means the design does not have any embedded software.

The new 900F-P has several performance enhancements. The 900F-P has 3 way input-output-power isolation. It has an electrical transient protection circuit on the input and output signal lines as well as the power line. The power supply is a very efficient switching power supply which uses only one electrolytic capacitor as compared to the original unit which had a linear supply with multiple electrolytic capacitors. Additionally the circuit is designed with a low temperature coefficient giving the unit good long term stability requiring reduced calibration maintenance.



55PA2000-P.1 Process Alarm Station

Power	120 VAC, +/- 10%
Operating Temp	0-50 C (32-123F)
Relative Humidity	10-90%
Input Signal	4-20mA, 1-5 Vdc or 0-4 Vdc
Output Contact Rating	5 A @ 250 Vac (resistive load)
Rated Relay Life	50 million mechanical operations 1000,000 operations at 5A (resistive)
Response Time	less than 100 mS
Transient Immunity	OH A28M-1982 1000 Vpeak
RFI Immunity	OH C5047-77
Repeatability	+/- 0.1%
Drift	Short term +/- 0.05% LongTerm +/- 0.1%
Deadband	0.3-10%, adjustable
Isolation	1000 Vac, input vs output vs power

The 55PA2000-P.1 is a direct form, fit and function replacement of the Fischer & Porter models 55PA1000 and 55PA2000 alarm stations in the Versa mount case.

Each alarm is configurable to be either a High or Low Process Alarm. The alarm setpoint is adjusted via a 10 turn calibrated setpoint dial that has a vernier style gauge that is settable to 0.1%. It also has a locking provision once the desired setpoint is set.

The available options are (1) the alarm setpoint can be re-transmitted via a 4-20 mADC signal, (2) the setpoint can be set remotely by a 4-20 mADC input.

This new design has several performance enhancements. The 55PA2000-P.1 has 3 way input-output-power isolation including the re-transmitted values. It has an electrical transient protection circuit on the input and output signal lines as well as the power line. The power supply is a very efficient switching power supply which uses only one electrolytic capacitor as compared to the original unit which had a linear supply with multiple electrolytic capacitors. Additionally the circuit is designed with a low temperature coefficient giving the unit good long term stability requiring reduced calibration maintenance

Replacement for :
Rochester Instruments model PTA215
dual process alarm relay



PTA-215-P.1

Power	120 VAC, +/- 10%
Operating Temp	5-50 C (41-122F)
Relative Humidity	10-90%
Input Signals	0.2-1.0 Vdc
Output Contact Rating	5 A @ 250 Vac (resistive load)
Rated Relay Life	100 million mechanical operations 100,000 operations at 5 A (resistive)
Response Time	less than 200 mS
Transient Immunity	OH A28M-1982 1000 Vpeak
RFI Immunity	OH C5047-77
Repeatability	0.25%
Deadband	1%, fixed
Isolation	1000 Vac, input vs output vs power

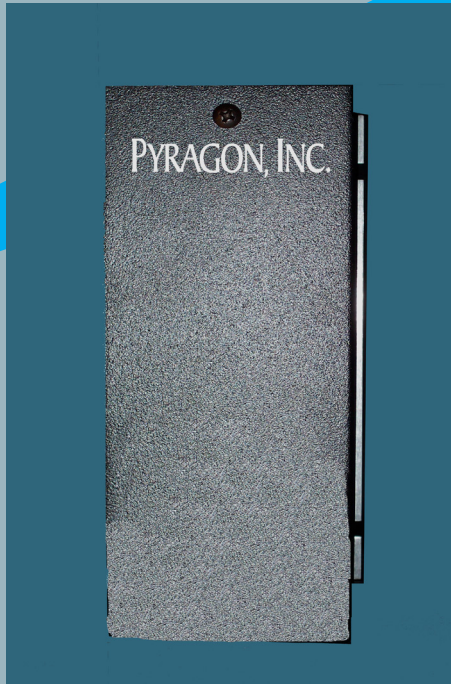
The PTA-215-P.1 is a direct form, fit and function replacement of the Rochester Instruments model PTA215 dual process alarm relay. This replacement card slides directly into the existing 7-way RIS rack mount card cage.

Each alarm is configurable to be either a High or Low Process Alarm. The alarm setpoint is adjusted via a 10 turn calibrated setpoint dial that has a vernier style gauge that is settable to 0.1%. It also has a locking provision once the desired setpoint is set.

The output for each setpoint is a dual form C contact rated at 5A (see specifications).

This new design has several performance enhancements. The PTA-215-P.1 has 3-way input-output-power isolation. It has an electrical transient protection circuit on the input and output signal lines as well as the power line. The power supply is a very efficient switching power supply which uses only one electrolytic capacitor as compared to the original unit which had a linear supply with multiple electrolytic capacitors. Additionally the circuit is designed with a low temperature coefficient giving the unit good long term stability requiring reduced calibration maintenance

Replacement for :
AGM model DCT-TA-4000-13 Current-to-Current Isolator Station



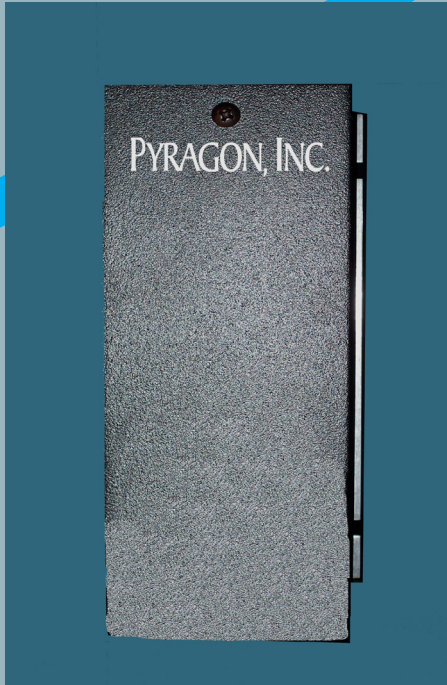
Power	120 VAC, +/- 10% 8 VA
Operating Temp	0-50 C (32-122 F)
Relative Humidity	0-95%
Input Signal	4-20 mA
Output Signal	4-20 mA
Max Output Load	1500 ohms
Seismic Approval	Category B
Transient Immunity	OH A28M-1982 1000 Vpeak
RFI Immunity	OH C5047-77
Accuracy	+/- 0.25%
Drift	Short term +/- 0.05% LongTerm +/- 0.1%
Isolation	1000 Vac, input vs output vs power

DCT-TA-4000-13-PX

The DCT-TA-4000-13-PX is a direct form, fit and function replacement for the AGM model DCT-TA-4000-13 Current-to-Current Isolator Station. This unit provides 3-way electrical isolation between input, output and power. The output signal matches the input and can drive a this signal into a 1500 ohm load.

The new DCT-TA-4000-13-PX has several performance enhancements. It has an electrical transient protection circuit on the input and output signal lines as well as the power line. The power supply is a very efficient switching power supply which uses only one electrolytic capacitor as compared to the original unit which had a linear supply with multiple electrolytic capacitors. Additionally the circuit is designed with a low temperature coefficient giving the unit good long term stability requiring reduced calibration maintenance.

Replacement for :
 AGM models DCT-TA-4000 Signal Lim-
 iter, DCT-TA4027 Signal Inverter and
 DCT-TA-4027-2 Signal Converter



DCT-TA-4027-PX

The DCT-TA-4027-PX is a direct form, fit and function replacement for the AGM models DCT-TA-4000 Signal Limiter, DCT-TA4027 Signal Inverter and DCT-TA-4027-2 Signal Converter.

The low limit and zero adjustability is from 4 to 16mADC and the high limit or span adjustability is from 8 to 20mADC. The user can change the configuration from Limiter, to Inverter or converter through a series of on board jumpers.

The limit function limits the output to the preset high or low value if the input goes above or below the limit. The invert function reverses the output from the input and also provides the same limit function as the input. The converter allows for non-standard inputs, such as a 12-20mADC input, to be converter to a standard

The unit has 3-way electrical isolation between input, output and power. The output signal matches the input and can drive a this signal into a 1500 ohm load.

The new DCT-TA-4000-PX has several performance enhancements. It has an electrical transient protection circuit on the input and output signal lines as well as the power line. The power supply is a very efficient switching power supply which uses only one electrolytic capacitor as compared to the original unit which had a linear supply with multiple electrolytic capacitors. Additionally the circuit is designed with a low temperature coefficient giving the unit good long term stability requiring reduced calibration maintenance.

Power	120 VAC, +/- 10% 8 VA
Operating Temp	0-50 C (32-122 F)
Relative Humidity	0-95%
Input Signal	4-20 mA
Output Signal	4-20 mA
Max Output Load	1500 ohms
Seismic Approval	Category B
Transient Immunity	OH A28M-1982 1000 Vpeak
RFI Immunity	OH C5047-77
Accuracy	+/- 0.25%
Isolation	1000 Vac, input vs output vs power
Drift	Short term +/- 0.05% LongTerm +/- 0.1%



ACM-TA-4006-P.1 Square Root Extractor

Power	120 VAC, +/- 10%
Operating Temp	0-50 C (32-122 F)
Relative Humidity	0-95% RH
Input Signal	mV
Output Signal	4-20 or 10-50 mA
Max Output Load	1500 ohms
Seismic Approval	Category B
Transient Immunity	OH A28M-1982 1000 Vpeak
RFI Immunity	OH C5047-77
Accuracy	+/- 0.25% of span
Drift	Short term +/- 0.05% LongTerm +/- 0.1%
Isolation	1000 Vac, input vs output vs power

The ACM-TA-4006-P.1 was developed as a direct form, fit and function replacement for the AGM model ACM-TA-4006 Square Root Extractor.

This unit reads the analog signal from a differential pressure transmitter measuring the pressure drop across an orifice plate and calculates an analog output signal that is linearly proportional to the flow rate.

The new unit uses an EPROM with a look up table, which contains the calculated square root values. The values in the EPROM are accessed using an A/D and D/A on the circuit board. Using this approach means the design does not have any embedded software.

The new ACM-TA-4006-P.1 several performance enhancements. The 900F-P has 3 way input-output-power isolation. It has an electrical transient protection circuit on the input and output signal lines as well as the power line. The power supply is a very efficient switching power supply which uses only one electrolytic capacitor as compared to the original unit which had a linear supply with multiple electrolytic capacitors. Additionally the circuit is designed with a low temperature coefficient giving the unit good long term stability requiring reduced calibration maintenance.



Type of Instrument	RTD Transmitter
Input Signal	100 ohm and 200 ohm RTD
Output	4-20 mADC
Power Supply	120 VAC +/- 10% 60 Hz +/- 2%
Power Consumption	<5W
Accuracy	+/- 0.1% Span
Repeatability	0.1% Span
Line Voltage Effect	<0.5% for a + 10% line voltage change
Temperature Effect	180 ppm/Deg C
Ambient Temperature Range	4-50 Deg C
Mounting	Surface / Bulk Head
Terminations	Screw Terminal
Enclosure	Nema 1

350TN

The 350TN is a form-fit-function replacement of the Transmation model 350T. It makes use of the same case design, the same terminations, but has updated electronics. This makes the 350TN the ideal replacement for nuclear plant applications where the documentation changes are demanding.

The 350TN can accept resistance spans from 10 to 400 ohms. The RTD types can be Platinum, Nickel or Copper. The standard output is 4-20 mADC although 10-50 mADC can be ordered as a factory configured option.

The low bridge current used on the 250TN avoids self heating of the RTD, thereby giving the user a more reliable reading. The output current is from a true current source and can supply 4-20 mADC into a load of up to 900 ohms.



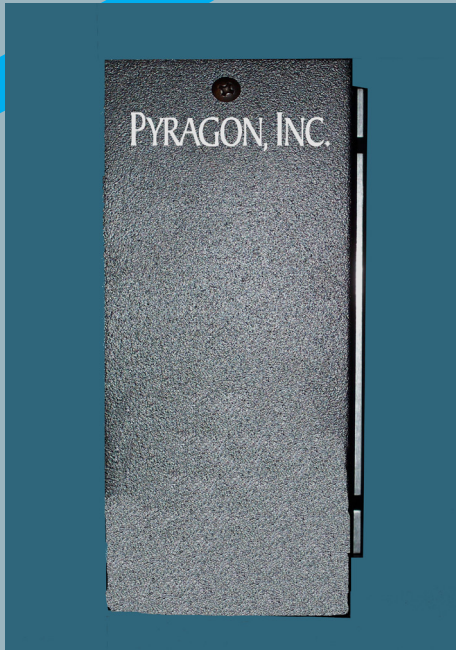
SSM-A-4010-P.1 High/ Low Selector and Median Selector Station

Power	120 VAC, +/- 10%
Operating Temp	0-50 C (32-122 F)
Relative Humidity	0-95% RH
Input Signal	4-20 mA, 10-50 mA or 1-5 Vdc
Output Signal	4-20 mA
Max Output Load	1500 ohms
Seismic Approval	Category B
Transient Immunity	OH A28M-1982 1000 Vpeak
RFI Immunity	OH C5047-77
Accuracy	+/- 0.25%
Isolation	1000 Vac, input vs output vs power

The SSM-A-4010-P.1 is a direct form, fit and function replacement for the AGM models SSM-A-4010L, 4010M, 4010H units. This four channel selector accepts up to four (4) analog inputs and provides one(1) analog output. The output corresponds to either the Lowest, Median or Highest input based upon how the unit is configured.

One version is customer configurable between Low and High Selection. A second version is used for Median selection.

The new design has several performance enhancements. The SSM-A-4010-P.1 has 3 way input-output-power isolation. It has an electrical transient protection circuit on the input and output signal lines as well as the power line. The power supply is a very efficient switching power supply which uses only one electrolytic capacitor as compared to the original unit which had a linear supply with multiple electrolytic capacitors. Additionally the circuit is designed with a low temperature coefficient giving the unit good long term stability requiring reduced calibration maintenance



ACM-TA-4005-P.1 Adder/Subtractor Station

Power	120 VAC, +/- 10% 8 VA
Operating Temp	0-50 C (32-122 F)
Relative Humidity	0-95%
Input Signal	Four (4) 4-20 mA
Output Signal	4-20 mA
Max Output Load	1500 ohms
Seismic Approval	Category B
Transient Immunity	OH A28M-1982 1000 Vpeak
RFI Immunity	OH C5047-77
Accuracy	+/- 0.25%
Isolation	1000 Vac, input vs output vs power
Drift	Short term +/- 0.05% LongTerm +/- 0.1%

The ACM-TA-4005-P.1 is a direct form, fit and function replacement for the AGM model ACM-TA-4005. This four channel station accepts up to four (4) analog inputs and provides one(1) analog output. Each input on this adder/subtractor can be configured for either addition or subtraction. There is also a K factor for each input with a range of 0.1 to 3.8. This can be used to weigh each input with a gain factor. This capability results in the following formula

$$\text{Output} = \pm K_{In1} \pm K_{In2} \pm K_{In3} \pm K_{In4}$$

This new design has several performance enhancements. The ACM-TA-4005-P.1 has 3 way input-output-power isolation as well as input to input isolation. It has an electrical transient protection circuit on the input and output signal lines as well as the power line. The power supply is a very efficient switching power supply which uses only one electrolytic capacitor as compared to the original unit which had a linear supply with multiple electrolytic capacitors. Additionally the circuit is designed with a low temperature coefficient giving the unit good long term stability requiring reduced calibration maintenance



Type of Instrument	Dual Current Alarm
Input Signal	4-20 MADC
Alarm Outputs	2 SPDT 10A relays
Alarm Contact Configuration	Eng above or below set-point
Power Supply	120 VAC +/- 10% 60 Hz +/- 2%
Ambient Temperature Range	0 to 50 Deg C
Accuracy	< 0.2% of Span
Deadband	2% Optional Adjustable 0.2 to < 10%
Temperature Effect	180 ppm/ Deg C
Line Voltage Effect	<0.5% for a + 10% line voltage change
Mounting	Surface / Bulk Head
Terminations	Screw Terminal

210AN Current Alarm

Model 210AN Current Alarm accepts standard current signals through an input amplifier. A heavy duty relay is actuated when the signal reaches the alarm setpoint.

A infinite resolution potentiometer for screwdriver adjust of setpoint is standard. A 10 turn calibrated dial potentiometer for setpoint adjustments is available as an option High-low, low-low, or high-high alarm action is available in a single package in the Dual Alarm unit.

Sensitive fixed deadband (2% of range) or optional adjustable deadband allows use of the unit as a rugged on-off controller Electronic latching action with remote or built-in push button reset can also be obtained for memory of " off-normal" conditions.



Type of Instrument	Dual T/C Alarm
Input Signal	Type K T/C
Alarm Outputs	2 SPDT 10A Relays
Alarm Contact Configuration	Customer to specify relay action, alarm above or below setpoint, and action on power failure
Power Supply	117 VAC +/- 10% 60 Hz +/- 2%
Ambient Temperature Range	0 to 50 Deg C
Accuracy	< 0.2% of Span
Deadband	2% Optional Adjustable 0.2 to 10%
Temperature Effect	180 ppm/ Deg C
Line Voltage Effect	<0.5% for a + 10% line voltage change
Mounting	Surface / Bulk Head
Terminations	Screw Terminal

610AN Thermocouple Alarm

The Pyragon 610AN Thermocouple Alarm directly accepts standard thermocouple signals from ISA Types J, K, R, S, T, E or B thermocouples. Both normally energized or normally de-energized relay outputs are available. These units may be field converted for either service by simple jumper changes.

Both input types are available in Dual Alarm units. High-low, Low-high, Low-low or High-high Alarm action in a single package is a model 620AN (T/C). Infinite resolution, screwdriver adjustable potentiometer is provided for set point adjustment. High input impedance allows long signal leads to be used.

High common mode rejection permits the use of both grounded and ungrounded inputs.

Sensitive fixed deadband or optional adjustable deadband allows use of these instruments as rugged on-off controllers. Industrialized integrated circuits, silicon solid state electronics and 10 Amp precious metal relay contacts assure long term reliability in wide ambient temperature applications and industrial environments.



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