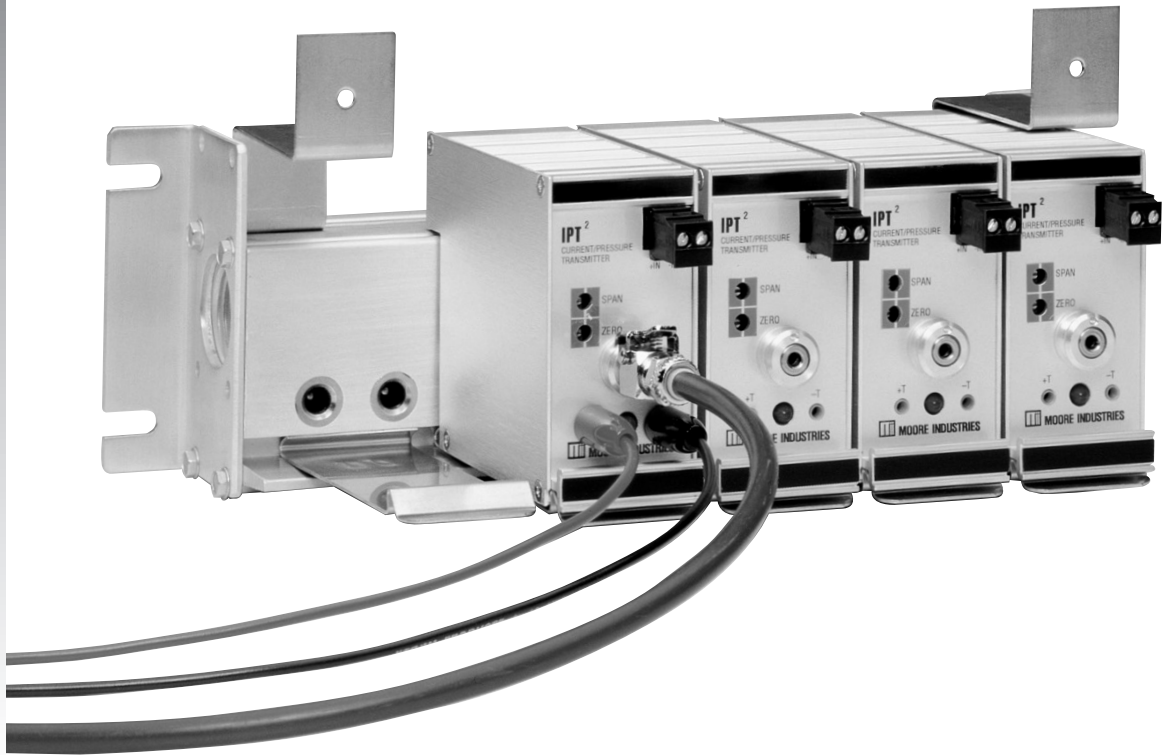


***IPT<sup>2</sup>*** Current-to-Pressure  
(I/P) Transmitter



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## Introduction

This is the users' manual for Moore Industries' advanced current-to-pressure transmitter, the IPT<sup>2</sup>. It contains all of the information needed to configure, install, operate, and maintain the IPT<sup>2</sup>.

The following guidelines are used in this manual:

**WARNING** - Hazardous procedure or condition that could injure the operator.

**Caution** - Hazardous procedure or condition that could damage or destroy the unit.

**Note** - Information that is helpful for a procedure, condition, or operation of the unit.

## The IPT<sup>2</sup>

The IPT<sup>2</sup> is a compact, closed-loop, 2-wire current-to-pressure transmitter that converts a standard process current signal to a pneumatic output. In its compact aluminum housing, the IPT<sup>2</sup> snaps onto standard mounting rails or onto a Moore Industries RIR or SIR. Because of the low dynamic mass of the transducer element, the unit can be mounted in any position and is also insensitive to shock and vibration.

Individual IPT<sup>2</sup>s consist of two parts: the transmitter section and an interlocking pneumatic mounting

block, which snaps onto a rail. Units that are ordered without a mounting block will clip onto an RIR or SIR, which supplies air to each unit using only one pneumatic supply pipe. Both mounting blocks and supply headers contain self-sealing valves. Therefore, the IPT<sup>2</sup> can be removed and replaced without disturbing the pneumatic connections or causing accidental venting of the supply or output air.

Operation can be monitored or calibration performed by using the electrical input and optional pneumatic output test jacks. A red LED display, which indicates the presence of an electrical input signal, is also standard.

Table 1 contains the IPT<sup>2</sup> equipment specifications, including inputs, outputs, power requirements, and performance characteristics.

**Model Number.** The IPT<sup>2</sup> model number describes the equipment type, functional characteristics, operating parameters, any options ordered, and unit housing. If all other documentation is missing, this number is used to identify equipment characteristics. The model number for the IPT<sup>2</sup> is located on a label on the side of the unit.

**Serial Number.** Moore Industries maintains a complete history on every unit it sells and services. This information is keyed to the serial number. When service information is required on the IPT<sup>2</sup>, it is necessary to provide the factory with this number. The serial number is located on the side of the unit.

## Specifications

<p><b>Performance Accuracy:</b> <math>\pm 0.25\%</math> of span including the combined effect of linearity, hysteresis, and repeatability (between 0.5 and 3psi output, error will not exceed <math>\pm 1.0\%</math> of span)</p> <p><b>Stability:</b> Not to degrade from stated accuracy for six months</p> <p><b>Step Response:</b>  <math>&lt; 0.2</math> seconds into 100ml load (6 in<sup>3</sup>) from 10% to 90% of span; Not guaranteed below 3psig output</p> <p><b>Supply Pressure Effect:</b>            Negligible from 20-40psig, steady pressure</p> <p><b>Air Consumption:</b>            0.08 SCFM, typical (0.18 kg/hr)</p> <p><b>Air Capacity:</b>            Minimum 2.0 SCFM</p> <p><b>Air Supply:</b> Instrument air only, 20-40psig. (Must be 5 psig greater than maximum output)</p>	<p><b>Performance (Continued) Voltage Drop:</b>            7.5V, maximum (5V maximum without LED)</p> <p><b>Mounting Position Effect:</b>            Negligible, unit can be mounted in any position</p> <p><b>Shock and Vibration Effect:</b>            0.25%/G or better over 5-15Hz; meets SAMA PMC 31.3</p> <p><b>Ambient Conditions Operating &amp; Storage Range:</b>  <math>-40^{\circ}\text{C}</math> to <math>+80^{\circ}\text{C}</math>  <math>-40^{\circ}\text{F}</math> to <math>+176^{\circ}\text{F}</math></p> <p><b>Ambient Temperature Effect:</b>  <math>&lt; \pm 0.025\%</math> of span/<math>^{\circ}\text{C}</math>, max from <math>0^{\circ}\text{C}</math> to <math>50^{\circ}\text{C}</math>;  <math>&lt; \pm 0.1\%</math> of span/<math>^{\circ}\text{C}</math>, max.</p> <p><b>RFI/EMI Effect:</b>  <math>&lt; \pm 0.1\%</math> of span change at 50V/m @ 20-1000MHz.</p> <p><b>Adjustments Connections Zero &amp; Span:</b> Screw adjusts zero or span by <math>\pm 10\%</math> minimum, non-interactive</p>	<p><b>Adjustments Electrical:</b>            Removable front-mounted terminal blocks, 22-14 AWG</p> <p><b>Connections (Continued) Pneumatic:</b> 1/8-inch NPT female for both supply air and output air on units with optional mounting block.</p> <p><b>Pneumatic Test Jacks:</b>            Monitors output pressure during calibration</p> <p><b>Current Test Jacks:</b> Input current test jacks (labeled +T, -T) for calibration; accepts 2mm (0.08 in) dia x 13mm (.50 in) long phone tip plugs (handles should be less than 8mm (0.32 in) in diameter)</p> <p><b>Indicators LED:</b> Red light-emitting diode indicates presence and intensity of electrical input signal.</p> <p><b>Weight</b> 438g (15.6 oz)</p>
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Specifications subject to change without notice.

## Ordering Information

Unit	Input	Output*	Supply Pressure**	Options	Housing
IPT2 DIN-Style Current-to- Pressure Transmitter	4-20MA	0-20PSIG	25PSI	<b>**Access Designation (Required Selection):</b> -FA1 -FA2 -FA3 -FA4 -FA5 -FA6 -FA7 (Required for WTI Housing) -FA8 (Required for WTI Housing) -FA9 -FA10 -FA11 -FA12  **See Table 1 for more information	DIN Aluminum, DIN-style housing assembly. WTI Rain-proof as defined by NEMA 3R (-FA7 or -FA8 required) WTIP Rain-proof as defined by NEMA 3R with plate and u-bolts for 2" pipe mounting
	4-12MA	1-17PSIG	25PSI		
	12-20MA	3-15PSIG	20PSI		
	into 375Ω	3-16.6PSIG	25PSI		
	maximum	3-18PSIG	25PSI		
	(250Ω	3-27PSIG	35PSI		
	maximum	6-30PSIG	35PSI		
	for units	.2-1BAR	1.4BAR		
	without	20-100KPA	140KPA		
	LED)	.2-1KGCM2	1.4KGCM2		
	Custom ranges also available.	.02-.10MPA	.14MPA		
		†Reverse Output:			
		20-0PSIG	25PSI		
		17-1PSIG	25PSI		
		15-3PSIG	20PSI		
		16.6-3PSIG	25PSI		
		18-3PSIG	25PSI		
		27-3PSIG	35PSI		
		30-6PSIG	35PSI		
		1-.2BAR	1.4BAR		
	100-20KPA	140KPA			
	1-.2KGCM2	1.4KGCM2			
	.10-.02MPA	.14MPA			
	*The unit's output must match the supply pressure to its right.				
	**Supply Pressure must be at least 5psi (0.3 Bar) higher than output pressure. (40psi max)				

When ordering, specify: Unit / Input / Output / Supply Pressure / Options [Housing]  
 Model number example: IPT2 / 4-20MA / 3-15PSIG / 20PSI / -FA1 [DIN]

**Table 1.** Description of access designation options. (See Figure 4)

Option	LED & Current Test Jacks	Electrical Input Location	Pneumatic Output Supply Location	Pneumatic Test Jack Location
-FA1	Yes	Front	Bottom	None
-FA2	Yes	Front	Rear	None
-FA3	Yes	Front	Bottom	Front
-FA4	Yes	Front	Rear	Front
-FA5	None	Front	Bottom	None
-FA6	None	Front	Rear	None
-FA7	Yes	Front	No mounting block	None
-FA8	Yes	Front	No mounting block	Front
-FA9	None	Front	No mounting block	None
-FA10	None	Front	No mounting block	Front
-FA11	None	Front	Bottom	Front
-FA12	None	Front	Rear	Front

**†Reverse output:** The high-performance line of I/P transmitters utilizes an internal feedback loop to ensure accurate operation. The feedback loop consists of an internal pressure transducer that samples the unit's output pressure and compares it to the input signal. This allows the unit's output to track the input signal. Other I/P transmitters, such as our original IPT, IPH and IPX models, rely solely on mechanical positioning. This is what makes the IPT<sup>2</sup>, IPH<sup>2</sup> and IPX<sup>2</sup>

highly desirable. Since the feedback loop requires power to operate, when there is no input power to the unit, the pneumatic output will be shut off. Units that use mechanical positioning only, will typically still have a pneumatic output (18 PSIG typically) when power is removed. This is not an issue except for those users that rely on this elevated output (18PSIG) to maintain a valve's position upon the unexpected loss of input signal (4-20mA). In such cases, the IPT<sup>2</sup>, reacts differently by shutting off the pneumatic output.

## Instrument Air and Filtration Information

**Note:**

*For optimum performance, the selection and use of a good quality air filtration system is essential. Most users find that it is much less expensive and troublesome to design a system that includes good air filtration than deal with downtime and repairs later.*

A clean, dry air supply is important to assure the maximum service life of an IPT<sup>2</sup>. Good air quality involves removing solids, oil and water from the air after compression. The cleaner the air, the longer the time before servicing is needed.

Oversizing elements avoids performance aberrations and reduces maintenance time. Redundancy should be used where possible to avoid shutdown during maintenance.

**Solids:** Random solid dirt, such as pipe scale and rust, is rarely a problem in compressed air instrument systems. A good filter removes these solids. However, if there is a desiccant dryer in the line, a high-efficiency sub-micron filter is recommended to remove the highly abrasive sub-micron particles produced by the dryer.

**Liquid Oil:** Liquid oil is the most common problem in compressed air instrument systems. A coalescing filter removes sub-micron liquid droplets from the air, and is usually supplied with an automatic drain.

A coalescing filter works by trapping oil and water droplets in a bed of microfibers. The droplets run together at fiber cross-over points, form large liquid drops, and are forced by air flow to a drain. A filter system consisting of a general purpose first-stage filter (about 5 micron) and a high-efficiency coalescing final filter is recommended to obtain contaminant-free air.

The exact location of the first-stage filter is not important; it can be located just ahead of each final filter, or a single first-stage filter can be located on a main line to protect a number of final filters on branch lines. Each final filter (coalescing) should be located just ahead of each pressure regulator. In a new plant installation, an oilless compressor may be used to eliminate this problem.

**Water:** The amount of water in an air system depends on temperature, pressure and the relative humidity of the air.

Sufficient water must be removed to lower the dew point of the air to a temperature below ambient. The dew point (at line pressure) is expressed as the temperature at which any moisture in the system begins to condense.

Water may be removed using a number of techniques, including coalescing filters, refrigeration dryers and desiccant dryers. In addition, a variety of combinations and modular systems may be used for special circumstances.

Care must be taken in the selection and location of the filter, because cooling downstream of the filter can cause more condensation of water. A coalescing filter should be installed immediately upstream of the pressure regulator. This type of filter removes most of the water before the air enters the regulator.

For systems subjected to freezing temperatures, the portion of the system that runs outdoors should have a dryer installed. The dryer reduces the dew point below the lowest expected outdoor temperature. A desiccant dryer is used with a coalescing filter upstream to keep the desiccant dryer from being damaged by oil or overloaded with excessive condensed water. Another high-efficiency coalescing filter is recommended downstream of the dryer, to remove the desiccant particles.

**ISA Specifications:** The Instrument Society of America standard ISA-S73, 1975 (ANSI MC11.1-1975) covers the air quality requirements for instrument grade air for use in pneumatic installations.

The dew point in outdoor installations must be at least 7.8°C (18°F) below the minimum local ambient temperature. For indoor installations, the dew point must be at least 7.8°C (18°F) below the minimum interior temperature or 2°C (35°F), whichever is greater. Although the ISA standard calls for a 35°F dew point, this is often unnecessary indoors, and may be unsatisfactory outdoors under freezing conditions.

Filters that exceed the ISA specification provide very inexpensive protection. Although the ISA specification calls for particle size not to exceed 3 microns and oil content not to exceed 1ppm, most filter manufacturers supply a line of coalescing filters that remove particles down to sub-micron sizes (often 0.01 micron) while also removing oil to below ISA 1ppm specification (often to 0.01ppm).

## Application Information

Any approach to providing good instrument air quality should evaluate the worst case air flow and ambient temperature of the location. This is required to determine sizing of the air system elements. A knowledge of yearly humidity cycles is also important for this evaluation.

**Caution:**

*Before placing IPT<sup>2</sup>s in service, all pneumatic lines and mounting blocks or headers (SIRs or RIRs) should be "blown down" to purge contamination and condensation deposited during piping and installation. Also blow down lines to loads, since all output air vents back through the IPT<sup>2</sup>, and there are never filters installed to trap these contaminants (normally only present at start-up). It is recommend this be done for at least an hour, longer if there is evidence of water or oil coming through.*

The IPT<sup>2</sup> requires periodic maintenance. Service in the field is limited to visual inspection and cleaning of the input nozzle filter screen on the IPT<sup>2</sup> and servicing of the compressed instrument air filtration system. The unit may be returned to the factory for complete disassembly, cleaning, and servicing on a periodic basis.

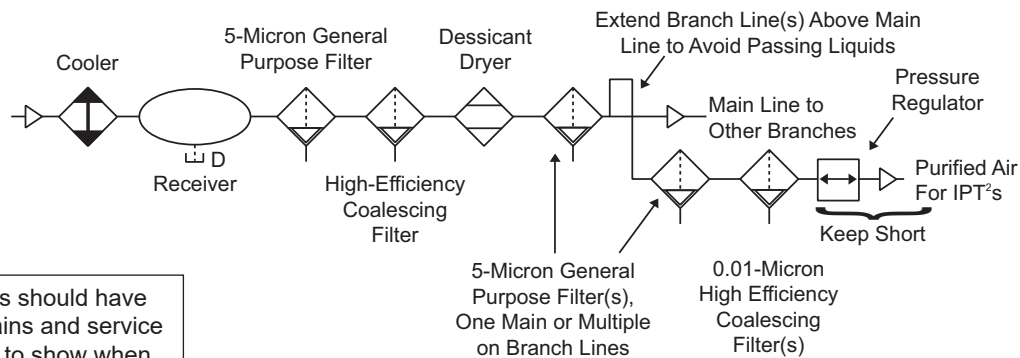
The use of coalescing filters with retention of 0.01 micron particles and droplets is recommended; they remove all undesirable traces of oil and water droplets. Proper placement with respect to the regulator may eliminate the need for dryers, except when coalescing filters are exposed to freezing temperature (keeping in mind that the dew point of the purified air must be kept below worst case ambient).

Figures 1 and 2 illustrate typical non-redundant systems with multiple branch lines. They both work in any environment above freezing and differ only in the placement of the general purpose first-stage filter. Gauges, valves, and differential pressure indicators (for filter service monitoring) are not shown. It is recommended that filters with integral service life indicators or differential pressure indicators be used to help ensure proper servicing, as well as redundancy to avoid shutdown during servicing.

Figures 1 and 2 differ in the method used to remove water. The use of a desiccant type dryer (Figure 2) requires upstream filtration to prevent oil contamination of the desiccant, as well as downstream filtration, to prevent desiccant fines from introducing new contamination.

The service life of an IPT<sup>2</sup> is directly proportional to the cleanliness and dryness of its air supply. The small cost of providing high-quality air ensures a longer, more trouble-free service life for the unit.

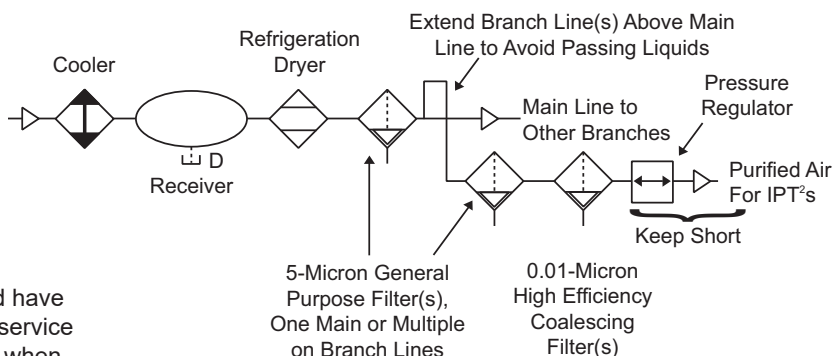
Figure 1. Non-Redundant System with Desiccant Dryer



Note: All filters should have automatic drains and service life indicators to show when elements need changing.



Figure 2. Non-Redundant System with Refrigeration Dryer



Note: All filters should have automatic drains and service life indicators to show when elements need changing.

## Calibration

This section provides information necessary to adjust and calibrate the IPT<sup>2</sup>. Each unit is calibrated and checked at the factory prior to shipment. Before installation, every IPT<sup>2</sup> should be checked by the user for proper operation. Generally, these checks, which are specified under Calibration Procedures, require little or no adjustment.

## Adjustments

The IPT<sup>2</sup> has Zero and Span adjustments located on its front panel. The type of potentiometer used with these adjustments usually require 15 turns of the shaft to move the wiper from one end of its range to the other. It is equipped with a slip clutch at each end to prevent damage if the adjustment is turned beyond the wiper stop. Usually a slight change can be felt when the clutch is at the end of a range (i.e., it is slipping). However, if this change is not felt, either

end can be reached by turning the shaft 15 turns in the desired direction.

Turning these potentiometers clockwise causes the related output to increase in quantity or become more positive; while turning them counterclockwise causes the related output to decrease in quantity or become more negative.

The Zero and Span potentiometers provide an adjustment range of  $\pm 10\%$  of full scale.

## Calibration Equipment

Table 2 lists the equipment required to calibrate the IPT<sup>2</sup>. This equipment is not supplied with the unit and must be provided by the user.

Table 2. Calibration Equipment

Equipment	Characteristics	Purposes
Adjustable current source	0-50mA output	Simulate input signal
DC milliammeter	Accurate to $\pm 0.05\%$	Measure input signal
Instrument air supply	Filtered	Air supply
Air pressure gauge	Accurate to $\pm 2\%$	Measure air supply pressure
Air pressure gauge	Accurate to $\pm 0.1\%$	Measure output pressure
Phone tip probes (2)	Must have 2mm (0.8 in) diameter tips, .5 inch long	Easy access to input signal (optional)
Pneumatic test coupler MII P/N 163-202-00	For IPT <sup>2</sup> s with optional test jacks	Easy monitoring of output pressure (optional)
Pneumatic load	Volume of 7.5 cubic inches (approx. 120 milliliters)	Provide standard load for testing (per IEC spec. #770)

# IPT<sup>2</sup>

## Test Jacks

The +T and -T test jacks on the front of the IPT<sup>2</sup> are provided as a convenient means of monitoring the process loop to which the product is connected without disconnecting the unit or interrupting the loop.

A milliammeter connected to the +T and -T test jacks will provide a reading in the range of the unit's output rating (Figure 3). The model number of the IPT<sup>2</sup> shows its output range.

### **Caution:**

***The maximum resistance the milliammeter can introduce into the test jack circuit and still provide accurate readings is 10Ω.***

If the milliammeter readings are not as anticipated, verify that the milliammeter is rated for no more than 10Ω impedance. If the unit is suspect of improper operation, remove it from the test jacks and calibrate the IPT<sup>2</sup>.

## Calibration Setup

Figure 3 is an illustration of a typical calibration setup, including optional equipment. To check or calibrate the IPT<sup>2</sup>, connect the unit as shown in this illustration.

## Calibration Procedure

There are two options shown in Figure 3 for monitoring the output of the IPT<sup>2</sup>. The input current may be measured by placing a milliammeter in series with the input terminals as indicated by M1 or connected across the electrical test jacks by a milliammeter of less than 10Ω impedance (+T and -T) as indicated by M2.

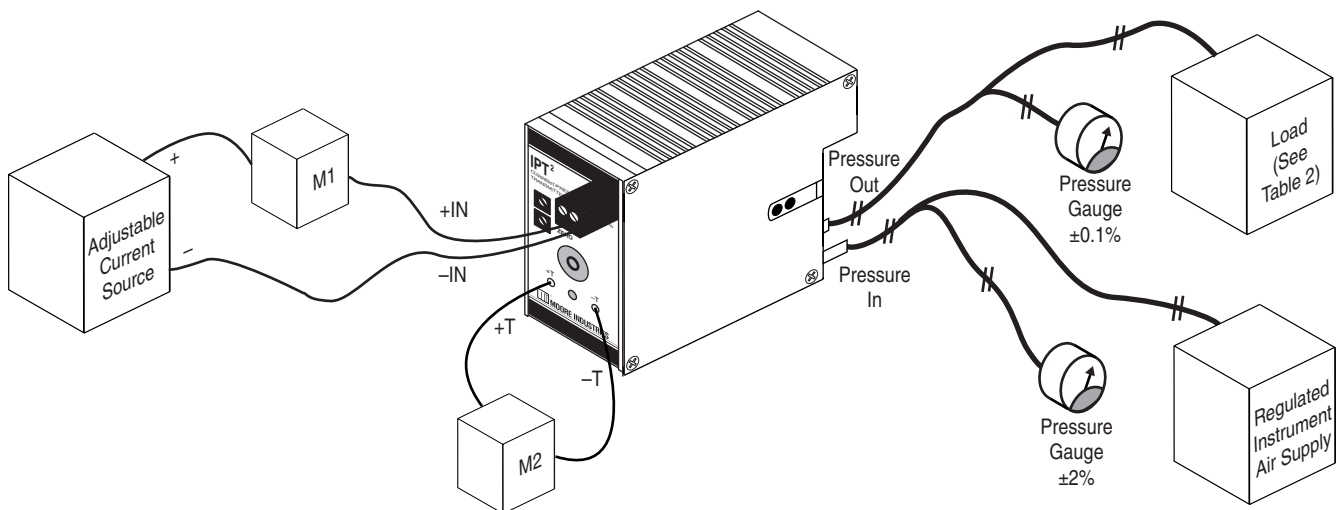
1. For zero adjustment, connect an adjustable current source to the electrical input terminal block. Set the current input signal for zero percent output (e.g. 4mA for a 4-20mA input, 3-15psig output; 20mA for a 4-20mA input, 15-3psig reverse output).

### **Note:**

Observe that the red LED indicator on the front panel is illuminated at zero input current and glows somewhat brighter with increasing current.

2. Using an air pressure gauge to measure the input air supply pressure, connect a filtered air supply to the pneumatic supply port located on the bottom or rear of the unit.
3. If the unit is supplied with the optional front-access pneumatic-output test jack, insert the pneumatic coupler into the receptacle. This avoids having to disturb any operating connections or fittings.

Figure 3. Calibration Setup





**Caution:**

***Coupler must be kept lubricated to prevent damage to O-rings in test jacks. Teflon lubricant is recommended. If grease is used, keep out of air passage.***

If the unit is not supplied with the output test jacks, use an air pressure gauge to measure the output air supply pressure (e.g., read 3psig for a 3-15psig unit or 15psig for a 15-3psig unit).

4. Any deviation in the output pressure (e.g., 3 psig for a 3-15 psig unit or 15 psig for a 15-3 psig unit), can be corrected by using the Zero potentiometer in a range of  $\pm 10\%$ .
5. Set the current input signal for 100 percent output (e.g. 20mA for a 4-20mA input, 3-15psig output; 4mA for a 4-20mA input, 15-3psig reverse output).
6. Any deviation in the output pressure (e.g., 15 psig for a 3-15 psig unit or 3 psig for a 15-3 psig unit), can be corrected by the Span potentiometer over the range of  $\pm 10\%$ .
7. Repeat steps 1 through 6 (as applicable) until no further adjustments are required.

## Installation

Installation of the IPT<sup>2</sup> is divided into three phases: mounting, electrical connections, and pneumatic connections. In most cases, it is easier to mount the IPT<sup>2</sup> before completing the electrical and pneumatic connections.

## Mounting

Individual IPT<sup>2</sup>s consist of two parts: the transmitter and the mounting block. Units without a mounting block snap onto a header. IPT<sup>2</sup>s with a mounting block are rail mounted. Ensure that the unit is mounted in an area free of dust, moisture, and corrosive elements. See Figure 4 for mounting dimensions.

**Note:**

*It is recommended that mounting blocks and headers be purged of any debris prior to mounting the IPT<sup>2</sup>. Insert a small diameter, blunt tip probe into the fitting and unseat the ball-check valves for a few minutes with the filtered instrument air supply in operation.*

Rack- or surface-mounted IPT<sup>2</sup>s should be ordered with a Moore Industries' rack-mounted header (RIR) or a surface-mounted header (SIR). This eliminates the need for an interlocking mounting block and rail. 5, 10 or 15 units can be snapped onto one header, allowing multiple units to receive supply air from one supply pipe. To mount an IPT<sup>2</sup> onto a header, push the unit into place until the retaining lever snaps up flush beneath the handle. To remove an IPT<sup>2</sup>, press down on the retaining lever and lift the unit out by the handle.

**Note:**

*Check valves in the headers prevent the loss of supply or output air during mounting or removal of IPT<sup>2</sup>s.*

Rail-mounted IPT<sup>2</sup>s must use a pneumatic mounting block. Pneumatic mounting blocks are 1.39 inches wide. Using a 0.17 inch wide gauge between blocks provides uniform spacing while occupying minimum rail length.

# IPT<sup>2</sup>

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## Installation in Hazardous Locations

This section contains important information regarding installation of the IPT<sup>2</sup> in Hazardous Area Locations.

This equipment is suitable for use in Class I, Division 2, Groups A, B, C & D or non-hazardous locations only. Field wiring shall be rated for 85°C.

**WARNING:** *Explosion Hazard. Do not disconnect equipment when a flammable or combustible atmosphere is present.*

**AVERTISSEMENT:** *Risque d'explosion. Ne pas débrancher tant que le circuit est sous tension, a moins qu'il ne s'agisse d'un emplacement non dangereux.*

**WARNING:** *Explosion Hazard. Substitution of components may impair suitability for Class I, Division 2.*

**AVERTISSEMENT:** *Risque d'explosion. La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de Classe I, Division 2.*

**WARNING:** *Explosion Hazard. Test Jacks (-T and +T) shall not be connected or disconnected when a flammable or combustible atmosphere is present.*

## Special Conditions of Use

The following instructions must be adhered to when the IPT<sup>2</sup> is used in hazardous locations and potentially explosive atmospheres.

The IPT<sup>2</sup> shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.

The IPT<sup>2</sup> shall be mounted in a tool secured enclosure when installed in a Class I, Division 2 location.

The test jacks (-T and +T) shall not be used when the IPT<sup>2</sup> is installed in a Class I, Division 2 location.

## Australia New Zealand ANZEx Installations

Certificate No.: ANZEx 09.3000X

Nonincendive, Type n application (Ex n)  
Marking Code: Ex n IIC T6@55°C  
Maximum Input Voltage Ui 30V  
Maximum Input Current Ii 110mA

Standards:

AS/NZS 60079.0:2005 Explosive atmospheres - Equipment - General requirements

AS/NZS 60079.15:2006 Explosive atmospheres - Equipment protection by type of protection 'n'

## Electrical Connections

The electrical connections are made to the removable terminal blocks located on the front of the unit. There are two terminals on the IPT<sup>2</sup> for connecting input current.

The electrical terminals are compression screw sockets that accept 22 to 14 AWG hookup wire. To complete these connections, use a slotted screwdriver with a head approximately 0.125 inch (3mm) in width to secure the wire leads to the transmitter. Loosen each screw prior to inserting the wire being terminated. Strip and then tin the end of each wire with 60/40 solder. Then, while holding the uninsulated end of the wire in place, tighten the screw of the corresponding terminal.

## Recommended Ground Wiring Practices

Moore Industries recommends the following ground wiring practices:

- Any Moore Industries product in a metal case or housing should be grounded.
- The protective earth conductor must be connected to a system safety earth ground before making other connections.
- All input signals to, and output signals from, Moore Industries' products should be wired using a shielded, twisted pair wiring technique. Shields should be connected to an earth or safety ground.

- For the best shielding, the shield should be run all the way from the signal source to the receiving device. (see Note below)
- The maximum length of unshielded input and output signal wiring should be 2 inches.

**Note:**

Some of Moore Industries' instruments can be classified as receivers (IPT<sup>2</sup>, IPX<sup>2</sup>, etc.) and some can be classified as transmitters (TRX, TRY, etc.) while some are both a receiver and a transmitter (SPA<sup>2</sup>, HIM, etc). Hence, your shield ground connections should be appropriate for the type of signal line being shielded. The shield should be grounded at the receiver and not at the signal source.

## Pneumatic Connections

Supply air must be clean, dry instrument air. It is recommended that all particles larger than 1 micron be removed. Use of 1/4-inch tubing allows sufficient air for one unit. When using RIR or SIR headers, up to 30 IPT<sup>2</sup>s may be run from a 3/4-inch NPT pipe without degrading performance, provided the air supply pressure is sufficient. Output tubing should be 1/4-inch, though larger tubing may be desirable for exceptionally long runs. Purge the output tubing and the controlled device before connecting to the IPT<sup>2</sup> or RIR/SIR.

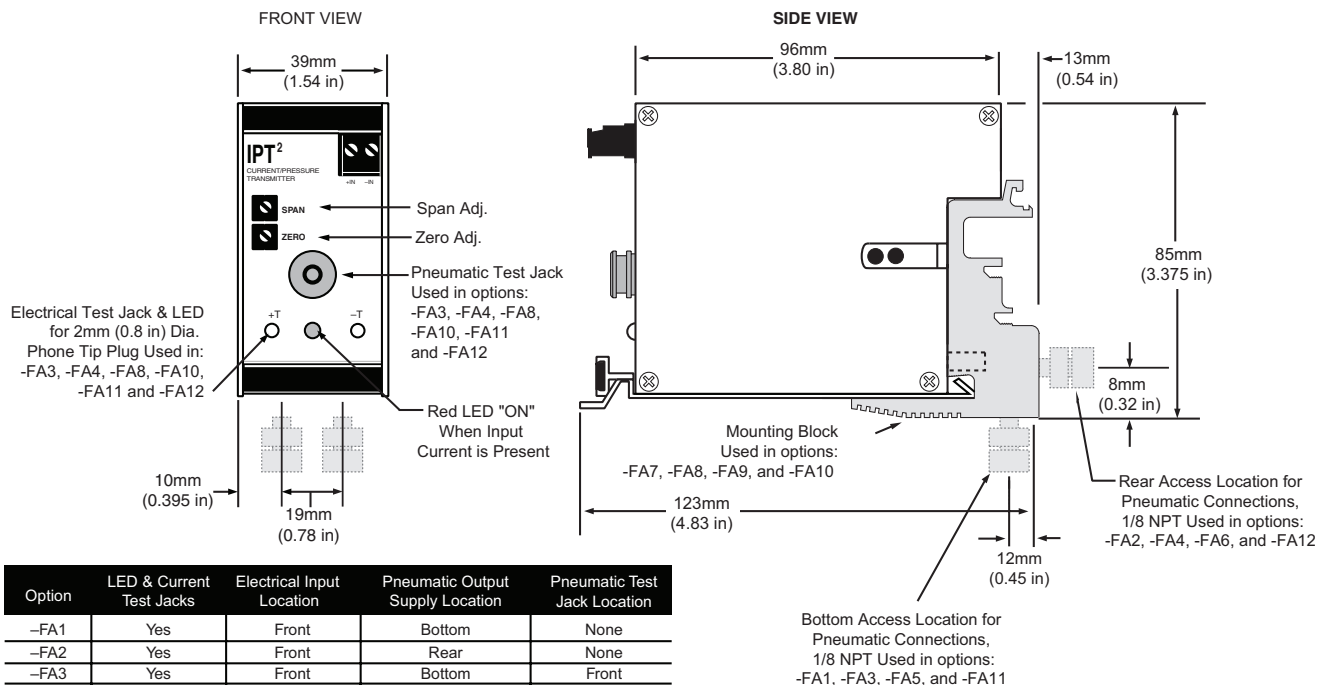
**Caution:**

**Output air cycles back through the IPT<sup>2</sup>. Contamination in the output line or controlled device may easily enter and damage the IPT<sup>2</sup>.**

## CE Conformity

Installation of any Moore Industries' products that carry the CE marking must adhere to the guidelines in the Recommended Ground Wiring Practices section in order to meet the EN 61326 requirements set forth in the applicable EMC directive.

Figure 4. Mounting Dimensions



# IPT<sup>2</sup>

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## Operation

### Reverse output operation:

Once adjusted and installed, the IPT<sup>2</sup> operates unattended, except for occasional cleaning of the air supply filters.

If a malfunction is isolated to the IPT<sup>2</sup>, refer to the Troubleshooting section for recommendations. A unit may become warm during operation, especially where the ambient temperature is elevated. This is normal and should not be cause for alarm.

The high-performance line of I/P transmitters utilizes an internal feedback loop to ensure accurate operation. The feedback loop consists of an internal pressure transducer that samples the unit's output pressure and compares it to the input signal. This allows the unit's output to track the input signal.

Since the feedback loop requires power to operate, when there is no input power to the unit, the pneumatic output will be shut off. Units that use mechanical positioning only, will typically still have a pneumatic output when power is removed.

This is not an issue except for those users that rely on this elevated output (18PSIG) to maintain a valve's position upon the unexpected loss of input signal (4-20mA). In such cases, the IPT<sup>2</sup> reacts differently by shutting off the pneumatic output.

## Maintenance

After the IPT<sup>2</sup> has been installed into the application, no maintenance is required.

However, the IPT<sup>2</sup> is equipped with a plunger to clean the orifice. To use the orifice-plunger, depress the plunger located on the side of the unit. This pushes a stainless steel wire through the orifice and removes any particles lodged inside. The output pressure will fluctuate when the plunger is activated.

If the plunger does not fix the problem, the supply air filter screen should be removed and flushed with trichloroethane (TCE) and then air dried before replacement. Follow the directions below.

1. Remove the IPT<sup>2</sup> from the mounting block by pressing down on the locking lever and pulling straight out to disengage the pneumatic fittings.
2. To remove the supply air filter screen, first slide the nozzle retainer clip to the right and then pull the nozzle out of the main body.
3. Remove the filter screen and flush with TCE and air dry before reinstalling.
4. Slide the nozzle back into the main body.

## Troubleshooting

Many components of the IPT<sup>2</sup> have been thermally aged, tested, and selected using a computer-aided design program. This usually makes field repair unnecessary. It is therefore recommended that any unit found to be performing below specifications be returned to the factory in accordance with the instructions found on the back cover of this manual.

If a problem is suspected with the IPT<sup>2</sup>, review the following steps:

1. Make sure that all connections are clean and tight.
2. Verify that bench instruments used to take measurements have the proper range and accuracy and are currently certified.
3. Check that the bleed-air port (located in a slot on the right side panel) is not restricted.
4. Using a test jumper, connect one end to the metal case and the other end to an "IN" terminal while observing the output pressure. The output pressure should not change.
5. If a change in the relationship between the input and the output occurs, try to correct it by re-adjusting the Zero and Span controls.
6. If the response time lengthens or the span drops, this may indicate a blockage due to air supply contamination. Clean the orifice and the supply air filter as described in the Maintenance section.

## RETURN PROCEDURES

To return equipment to Moore Industries for repair, follow these four steps:

1. Call Moore Industries and request a Returned Material Authorization (RMA) number.

### Warranty Repair –

If you are unsure if your unit is still under warranty, we can use the unit's serial number to verify the warranty status for you over the phone. Be sure to include the RMA number on all documentation.

### Non-Warranty Repair –

If your unit is out of warranty, be prepared to give us a Purchase Order number when you call. In most cases, we will be able to quote you the repair costs at that time. The repair price you are quoted will be a "Not To Exceed" price, which means that the actual repair costs may be less than the quote. Be sure to include the RMA number on all documentation.

2. Provide us with the following documentation:
  - a) A note listing the symptoms that indicate the unit needs repair
  - b) Complete shipping information for return of the equipment after repair
  - c) The name and phone number of the person to contact if questions arise at the factory
3. Use sufficient packing material and carefully pack the equipment in a sturdy shipping container.
4. Ship the equipment to the Moore Industries location nearest you.

The returned equipment will be inspected and tested at the factory. A Moore Industries representative will contact the person designated on your documentation if more information is needed.

The repaired equipment, or its replacement, will be returned to you in accordance with the shipping instructions furnished in your documentation.

### WARRANTY DISCLAIMER

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### RETURN POLICY

For a period of thirty-six (36) months from the date of shipment, and under normal conditions of use and service, Moore Industries ("The Company") will at its option replace, repair or refund the purchase price for any of its manufactured products found, upon return to the Company (transportation charges prepaid and otherwise in accordance with the return procedures established by The Company), to be defective in material or workmanship. This policy extends to the original Buyer only and not to Buyer's customers or the users of Buyer's products, unless Buyer is an engineering contractor in which case the policy shall extend to Buyer's immediate customer only. This policy shall not apply if the product has been subject to alteration, misuse, accident, neglect or improper application, installation, or operation. THE COMPANY SHALL IN NO EVENT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.



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