



PC-Programmable
Signal Isolator/Converter

SIY

User's Manual

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Introduction

This is the users' manual for Moore Industries' SIY PC-Programmable Signal Isolator/Converter. It contains all of the information that is needed to configure, install, operate, maintain, and troubleshoot the SIY. If you require additional assistance, call one of our STAR Centers (for Service, Technical Assistance, and Repair) to talk with a technician or engineer.

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.

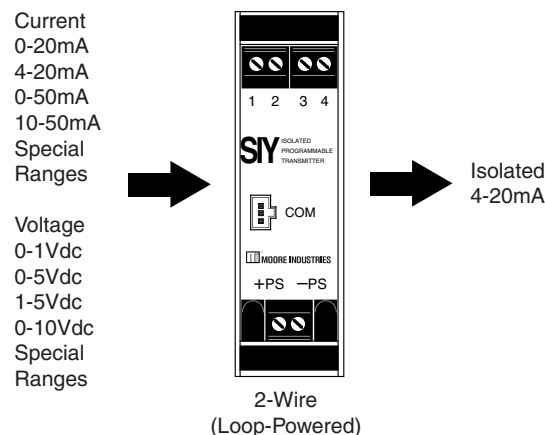
The SIY

The SIY is a versatile, 2-wire (loop-powered), PC-Programmable Signal Isolator/Converter that accepts a current or voltage input and provides an isolated, proportional 4-20mA output. See Figure 1 for a list of accommodated input types.

Typical uses for the SIY include:

- **Isolating Signals** to stop erratic process measurements caused by ground loops
- **Converting Signals** so field instruments can interface directly with indicators, recorders, DCS's, PLC's, and PC-based SCADA systems
- **Diverting Signals** so the output from one transmitter can be sent to two separate locations
- **Protecting Equipment and Signals** by eliminating common electrical paths
- **Boosting Signals** to enable more instruments to be added to an overburdened loop
- **Solving the "Bucking Power Supplies"** problem that occurs when a 4-wire transmitter and a DCS both try to power the same process loop

Figure 1. Compact, yet powerful, the SIY transmitter features programmable inputs and a trimmable output to boost accuracy.



Specifications

<p>Performance</p> <p>Accuracy: ±0.08% of span (includes input accuracy, output accuracy, and the combined effects of linearity, hysteresis, repeatability, and adjustment resolution)</p> <p>Minimum Input Span: Current, 1mA; Voltage, 250mV</p> <p>Isolation: HPP housing, 1500Vrms input to output to case; DIN housing, 500Vrms input to output to case</p> <p>Measurement Cycle: Output updates 8 times per second</p> <p>Output Response: 256msec, maximum (128msec typical) for output to reach full scale response to a 10-90% step change on input</p> <p>Input Impedance: Voltage, 1Mohm; Current, 20ohms</p> <p>Ripple: 10mV peak-to-peak maximum (measured across 250ohm resistor)</p> <p>Load Effect (current outputs): Negligible within specified load limits</p>	<p>Performance (continued)</p> <p>Power Supply Effect: ±0.002% of span per 1V change</p> <p>Over-Voltage Protection: 48V maximum on output; 48V reverse polarity protection on output</p> <p>Maximum Input Overrange: Current: 100mA maximum continuous; Voltage on Current Input: ±5Vdc peak; Voltage: 18Vdc</p> <p>Load Capability: Supply Voltage – 10V = ohms 0.02A</p> <p>Output Current Limiting: 3.8mA (low) and 21.4mA (high)</p> <p>Ambient Conditions</p> <p>Operating Range: –40°C to +85°C (–40°F to +185°F)</p> <p>Storage Range: –40°C to +85°C (–40°F to +185°F)</p> <p>Effect of Ambient Temperature on Accuracy: ±0.015% of span/°C</p>	<p>Ambient Conditions (continued)</p> <p>Relative Humidity: 0-95%, non-condensing</p> <p>RFI/EMI Immunity: 20V/m @ 20-1000MHZ, when tested according to SAMA standard 33.1 (10V/m @ 80-1000MHZ, 1k AM, when tested according to IEC 1000-4-3-1995)</p> <p>Common Mode Rejection: 100dB, minimum, @ 50/60Hz</p> <p>Normal Mode Rejection: 60dB, typical, @ 1V peak-to-peak, 50/60Hz</p> <p>Adjustments The choice of a current or a voltage input is selected via the input terminals; all other settings are made using Windows-based configuration software</p> <p>Weight</p> <p>HPP-Style housing: 65 g (2.3 oz)</p> <p>DIN-Style Housing: 184 g (6.5 oz)</p> <p>LH1-Style Housing: Polyester Cover: 283.5 g (10 oz) Metal Cover: 468 g (16.5 oz)</p>
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Specifications and information subject to change without notice.

Default Factory Configuration for SIY

The following are the factory default configuration settings for your SIY unit:

Input:

4-20mA

Settings:

Input Trim OFF

Filter:

60Hz

Output:

4-20mA

Damping:

0s

Ordering Information

Unit	Input	Output	Power	Options	Housing
SIY PC-Programmable Isolator/Converter	PRG Programmable with supplied Configuration Software and front panel connection terminals for: <u>CURRENT</u> (into 20ohms): Any range from -2.5mA to 55mA including: 0-20mA 4-20mA 0-50mA 10-50mA (recommended minimum span, 1mA) <u>VOLTAGE</u> (into 1Mohm): Any range from -0.5 to 11V including: 0-5Vdc 1-5Vdc 0-10Vdc (recommended minimum span, 250mV)	4-20mA Programmable output span between 4mA minimum and 20mA maximum into 650ohms with 24Vdc power supply	10-42DC 10-30DC Required for ISC, ISE, ISF	-ISC CSA approved IS (HPP) -ISE LCIE-ATEX approved IS (HPP) -ISF FM approved IS (HPP) -VTD Standard Factory Calibration with NIST Test Data Report	DIN DIN-style aluminum housing mounts on 32mm G-type (EN50035) and 35mm Top Hat (EN50022) rails D2LC‡ D-Box, Low-Base Enclosure with Clear Valox Cover, NEMA 4X, IP66, 2-Hub Connections ½-inch NPT Refer to D-Box data sheet for dimensions D2LS‡ D-Box, Low-Base Enclosure with Solid Valox Cover, NEMA 4X, IP66, 2-Hub Connections ½-inch NPT Refer to D-Box data sheet for dimensions HPP Hockey-puck housing for mounting in standard connection heads LH1NS‡ Connection head (NEMA 4X, IP66) with two entry ports: ½-inch NPT cable and process—black PBT polyester cover LH1MS‡ Connection head (NEMA 4X, IP66) with two entry ports: M20 cable and ½-inch NPT process—black PBT polyester cover LH1CS‡ Connection head with two entry ports: M20 cable and G½ (BSP) process—black PBT polyester cover LH1NX Connection head with ½-inch NPT entry and mounting plate for customer's air duct opening—black PBT polyester cover LH2NS* Explosion-proof connection head with two entry ports: ½-inch NPT cable and process—black metal cover LH2MS* Explosion-proof connection head with two entry ports: M20 cable and ½-inch NPT process—black metal cover NOTE: *A suffix with LH2 indicates ANZEx/TestSafe (Ex d) Flame-Proof approval; 2" pipe-mount kit included (i.e., LH2MSA) *E suffix with LH2 denotes ATEX Flame-Proof enclosure; 2" pipe-mount kit included (i.e., LH2MSE) *‡ P suffix indicates enclosure is equipped with 2" pipe-mount hardware kit (i.e., LH1NSP)

When ordering, specify: Unit / Input / Output / Power / Options [Housing]

Model number example: SIY / PRG / 4-20MA / 10-42DC [DIN]

SIY Model Numbers—Ordering

To order additional or replacement transmitters for your application or system, refer to the Ordering Information table and “build” a model number using the information shown in bold text. Specify the following in order:

Unit / Input / Output / Power [Housing]

For a SIY in DIN-style housing, specify:

SIY / PRG / 4-20MA / 10-42DC [DIN]

For a SIY in a *D-BOX* enclosure with two ports and pipe mount hardware, order:

SIY / PRG / 4-20MA / 10-42DC [D2LSP]

Factory Calibration. To order a SIY factory-calibrated to a specific input range, contact your local Moore Industries Sales Representative. Provide the input range you require in the “Calibration Notes” section of the order. They will be happy to provide you with pricing information.

Accessories

Each shipment of SIY transmitters comes complete with the software needed for configuration. To order programming cables, call your factory Sales Representative for the following part numbers:

- **RS232 and USB, Non-Isolated Configuration Cables**, P/N 803-040-26 (9-pin serial cable) or P/N 804-030-26 (USB cable). These cables are adequate for the majority of applications where the transmitter will be configured in the shop using a grounded, line-powered PC.
- **RS232 Isolated Configuration Cable**, P/N 803-039-26. This cable is for *in situ* field configuring. The cable is equipped with a self-powered input-to-output isolation circuit that protects the PC (typically a laptop or notebook) from possible damage due to high electrical potentials.

Configuration & Bench Check

Configuration of the SIY consists of:

1. Checking to verify that the unit ordered is in fact the one received and that it has been correctly calibrated by the factory according to the order.
2. Installing the SIY Configuration Software.
3. Connecting the SIY to a PC and test setup and using **TDYFamily Configuration.EXE** to check for correct unit tagging, input type and range settings, and output zero/span trim.

Prior to shipment, our team of skilled technicians subjects every SIY to rigorous testing. *Every* product Moore Industries manufactures, sells, and services is guaranteed to meet the strict quality standards that our company demands.

Even if a unit has been configured to your specifications by the factory (factory calibration), it is a good idea to perform a bench check. In addition to providing a safe means of uncovering any unit damage that may have occurred during shipping, the procedures afford the user the opportunity of becoming familiar with SIY operation in a testing environment that is separate from the intended process or application.

Note:

The procedures in this section should be carried out in an environment considered appropriate for the general testing of electronic equipment, rather than in the field. Use a technician’s bench or similar, lab-type environment.

Installing the Configuration Software

Refer to Table below for the equipment needed.

1. Insert the Moore Industries Interface Solution PC Configuration Software CD into the CD drive of the PC. Access the CD and open the "TRX TRY SDY SIY TDY PC Configuration Software" folder.
2. Double-click the installation program located in the folder. Follow the prompts to correctly install the program.

Once the Configuration Program is installed on the PC, the SIY can be connected to equipment to simulate input and monitor output. This makes it easy to create a set of operating parameters, save them to disk, and download them to one or more instruments at a later time.

Connecting the SIY to the PC

Connect the RS-232 or USB end of the cable to the PC's COM port.

The end with the small 3-pin connector will plug in to the face of the SIY.

See Table below for information on the necessary equipment.

Table 1. Assembling the equipment needed to configure the SIY

Device	Specifications
Current or Voltage Source	Accurate to 0.05% of span for the intended application
Power Supply	10-42Vdc, ±10%
Multimeter (optional)	Accurate to ±0.025%; e.g., HP Model 3478A
Precision Load Resistor (optional)	Accurate to ±0.025%; e.g., HP Model 3478A
Personal Computer	Microsoft Windows based PC; 16Mb free RAM; 20MB free disk space on hard drive Microsoft Windows XP, 7, or 10 1 (one) serial port or 1 available USB port (with optional USB cable)
Moore Industries PC Configuration Software	Version 4.5 or greater, successfully installed to the hard drive
Communication Cable	Non-Isolating 803-040-26 (9-pin Serial), Isolating 803-039-26 (9-pin serial) 804-030-26 (USB)

SIY

PC-Programmable
Signal Isolator/Converter

Bench Check Setup

Figure 2 shows a SIY hooked up to the equipment needed to perform the unit configuration, bench check, and output trim. Connect your SIY as shown in the figure and allow approximately 5 minutes for the setup to stabilize.

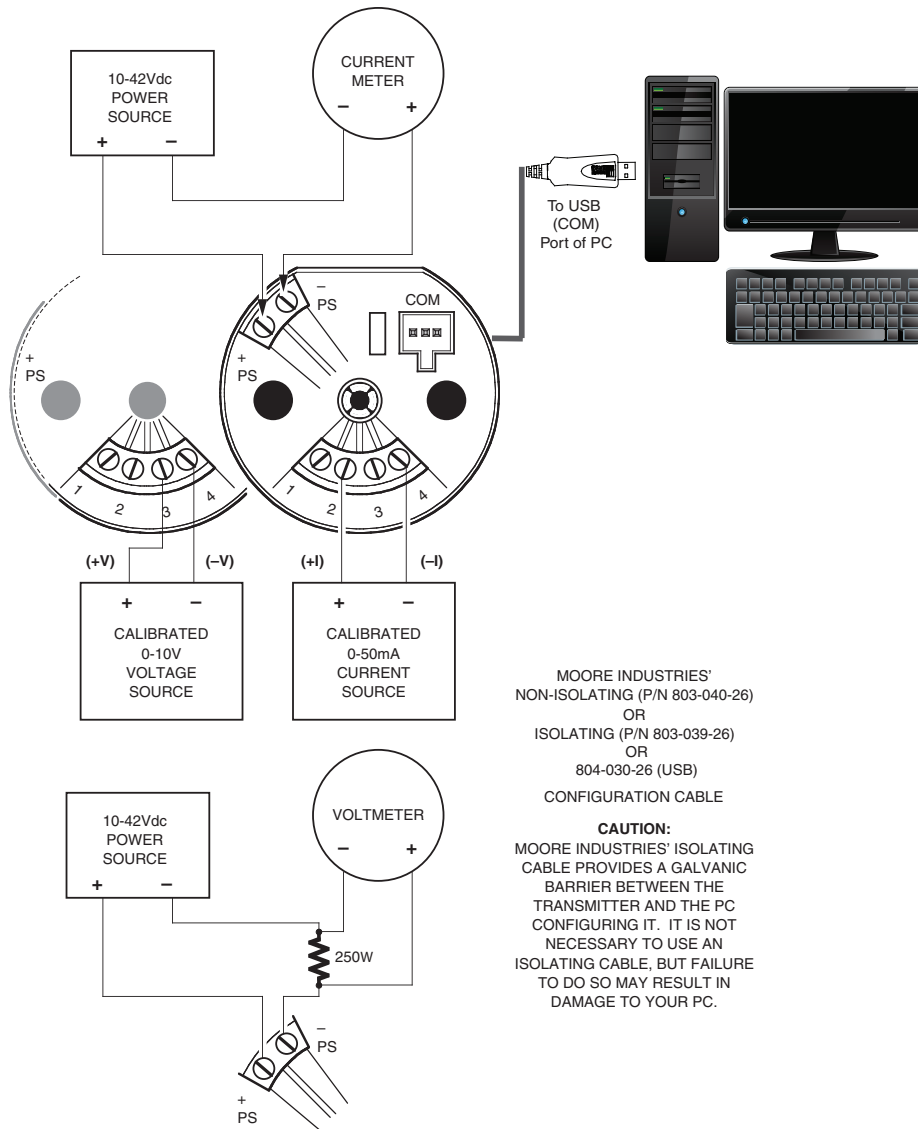
Note:

It is possible to run the SIY Configuration program without actually connecting a unit to the PC, but you will be unable to set a custom linearization table.

This makes it easy to devise and download a single configuration to several SIY's.

Save the Configuration File to disk and connect the units in succession, downloading the same file to each.

Figure 2. Setting up the SIY for Configuration/Bench Check

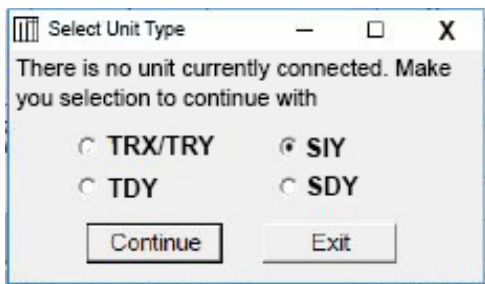


Using the PC Configuration: Overview

Once the software has been installed on your hard disk:

1. In Windows choose "TRX/TRY/TDY/SIY/SDY" from All Programs in the Start menu.
2. Figure 3 shows the unit selection screen that appears when the setup program is started and the unit is not properly connected to the PC.

Figure 3. Choosing the SIY Setup



3. Set the values as appropriate for your intended SIY application in the various fields of the Configuration Screen in Figure 5.

Note:

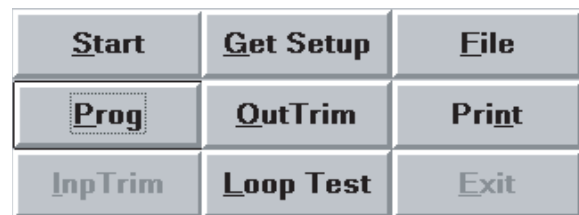
If you are building a Configuration File without a SIY connected, the "SIY Status" section of the screen will be blank, and the "Communication" indicator will show steady on (as opposed to blinking).

During setup, the SIY tests the availability of COM Ports 1 through 4 in your system. The first available COM port is designated for SIY communications and is noted on the Configuration Screen. Your SIY communications cable must be connected to this port.

To connect the SIY to a port other than the default described above, disconnect the transmitter, then change the default selection with the pull down menu. Next reconnect the SIY communications cable.

4. When the Configuration File shown on the screen has been modified for your intended application, click "Stop" to stop measurement.

Figure 4. Accessing the Programming Functions of the Configuration Software.



This will cause the "Prog" button to become available. Click "Prog", and the software will download the parameters on the PC into the non-volatile memory of the connected SIY.

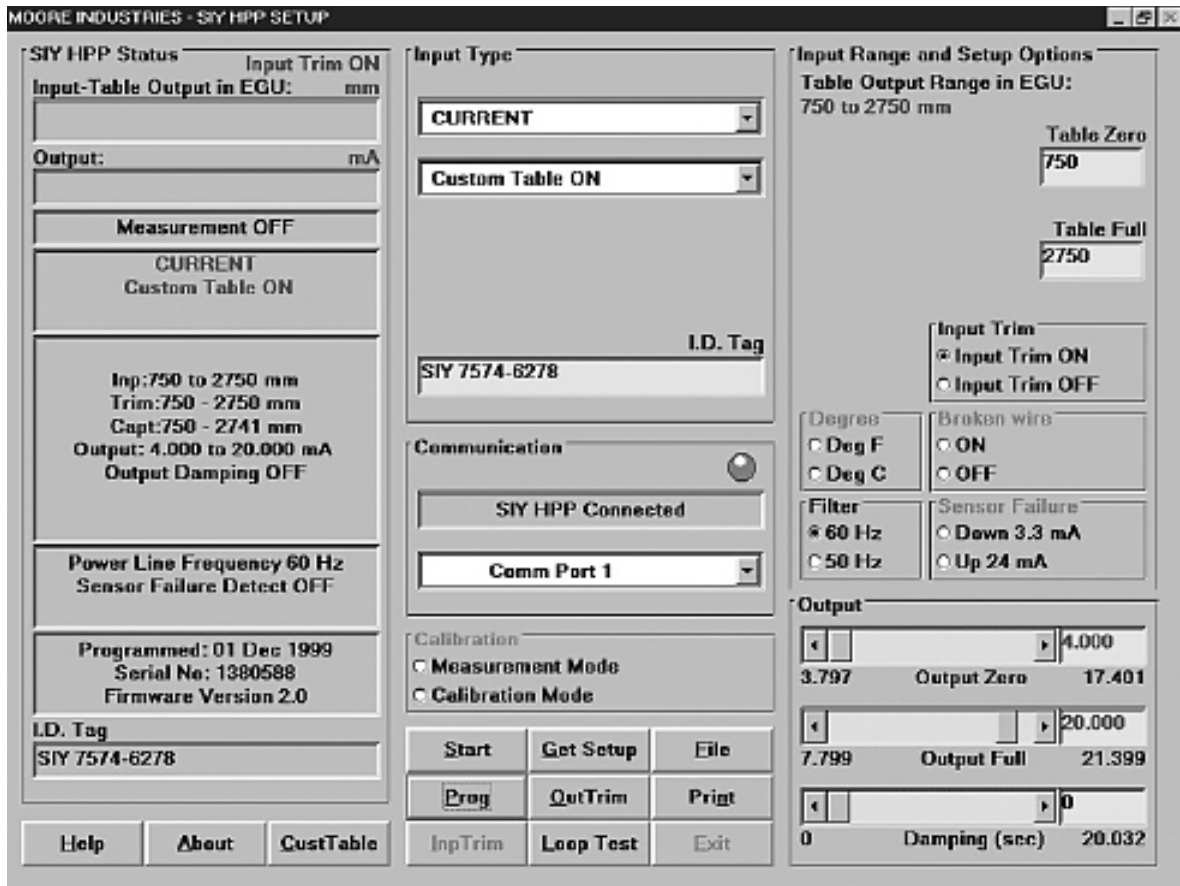
Status of the downloading is shown in the upper left corner of the screen. When completed, the program beeps.

Note:

Changing the settings on the Configuration Screen does not change SIY parameters until the Configuration File is downloaded to SIY memory as described in Step 4 above.

Any time the SIY settings are changed, the configuration date will change to reflect the date the new settings were entered.

Figure 5. Setting SIY Parameters Using the Configuration Screen



Saving the SIY Configuration File to Disk

This is an optional procedure. You do not have to save the file to disk in order to download the file into SIY memory. Use this procedure to save information on the configuration of your SIY for downloading into other SIY transmitters, or for record-keeping purposes, etc.

To save the SIY configuration files to disk:

1. Click on the “File” button. This brings up an Explorer-like window on the left area of the screen.
2. Enter the file name that you wish to save in the “File Name” box, see Figure 6.
3. Use the Explorer-like interface to designate the location on the PC drive for the file to be saved.
4. Click on “Save”
5. Click “Yes” to save the named file to disk.

Using a Configuration File Already on Disk

To download or edit a previously saved Configuration File you can use the “File” button on the SIY Configuration Screen to bring up a file from your hard disk.

To use a configuration file already on disk:

1. Click File on the SIY Configuration Screen to bring up the File Operations function of the program.
2. Click on Open File and select the file you wish to use.
3. When the Configuration File shown on the screen has been modified for your intended application, click “Stop” to stop measurement.

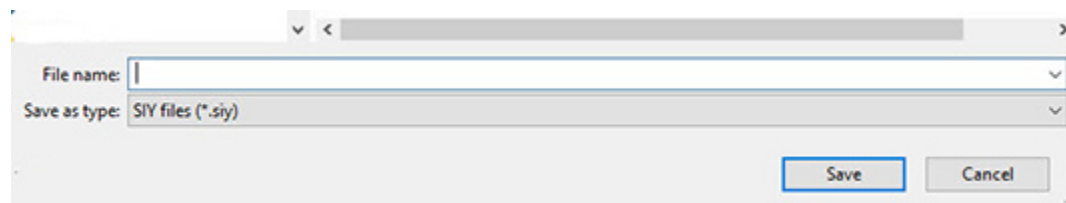
This will cause the “Prog” button to become available. Click “Prog”, and the software will download the parameters on the PC into the non-volatile memory of the connected SIY.

Status of the downloading is shown in the upper left corner of the screen. When completed, the program beeps.

Note:

Changing the settings on the Configuration Screen DOES NOT CHANGE SIY PARAMETERS until the Configuration File is downloaded to SIY memory.

Figure 6. File Name Field for Save File



Loading a Configuration File from a Connected SIY

To edit or view a Configuration File in the non-volatile memory of a connected unit, you can use the “Get Setup” function of the Configuration program.

Connect a powered SIY to your PC and click the “Get Setup” button in the software. It will transfer all the configuration information from your SIY to the PC Configuration Software screen.

Setting Output Damping

To lessen the impact of your sensor’s step increases and decreases, you may want to set the damping time, which will cause the SIY to average out fluctuations over the set amount of time.

Setting the damping time is simple; simply click on the damping value bar under the “Output” portion of the screen (in the bottom-right corner), or click on the box to the right of the “Damping (sec)” area and type in a number between 0 and 20

Trimming SIY Output

The SIY has a function that allows precise control over its output. Note that to activate this function, a unit must be connected in the setup to current meter, as shown in Figure 2.

To trim SIY output:

1. Set all unit parameters on the SIY Configuration Screen as required for your intended application.

When the Configuration File shown on the screen has been modified for your application, click “Stop” to stop measurement.

2. Click “OutputTrim”.
3. Select and move the “Zero Scale Output” or the “Full Scale Output” slide bar to adjust the SIY output.

Monitor the output with a calibrated current meter or with a voltmeter measuring the drop across a precision, 250 Ohm resistor (see Figure 2).

4. When both zero and full scale have been adjusted to satisfaction, press “QuitTrim”, then “Prog” to program the SIY with the new trim values.

Note:

Changing the settings shown on the screen in “Trim” mode DOES NOT CHANGE THE UNIT’S OPERATING PARAMETERS, it only updates the screen. The settings are saved to non-volatile memory by using the “Prog” function.

The “SIY Status” area of the Configuration Screen will reflect the new output settings being downloaded into unit memory.

Trimming the Input

Use this feature of the SIY to enhance the accuracy of the transmitter by precisely matching its actual reading of the input to its scaling of the either one or two input points. Trim the input by following the directions below:

1. Connect the transmitter to your PC using the setup shown in Figure 2.
2. Click the radio button labeled "Input Trim On". Then click "Start", and "InputTrim".
4. Select whether you will trim two points (upper and lower) or just one point by clicking on the appropriate radio button in the "Trim Pnts" section.
5. In the "Trim Lower" and "Trim Upper" boxes, type in the sensor's value that you are trimming.
6. Attach an input source to the transmitter. Using a calibrated multimeter to determine the current, set the input source to match the "Trim Lower" value you have chosen. Click "Trim Low" and wait for it to capture the value.
7. Using a calibrated multimeter to determine the current, set the input source value to match the "Trim Upper" value you have chosen. Click "Trim Upp" and wait for it to capture the value. Download the new file to the transmitter, and you are done.

Figure 7. Trim Capture Box

The screenshot shows a software window titled "Input Range and Setup Options". Inside, it displays "Table Output Range in EGU: 750 to 2750 mm". Below this, there are two sections for input capture. The first section, "Captured Lower", shows a value of 750 in a text box, a "Trim Lower" button, and another text box containing 750. The second section, "Captured Upper", shows a value of 2741 in a text box, a "Trim Upper" button, and another text box containing 2750.

Input Range and Setup Options		
Table Output Range in EGU: 750 to 2750 mm		
Captured Lower	Trim Lower	
750	Trim Lower	750
Captured Upper	Trim Upper	
2741	Trim Upper	2750

Creating a Custom Linearization Table

The SIY supports user-defined linearization of both voltage and current inputs. Up to 85 input/output points can be defined, and the user can also specify the format and engineering units of the output (viewable with the Configuration Program).

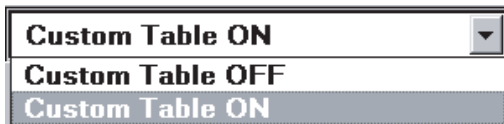
This section explains how to create a Custom Linearization Table for downloading into SIY memory.

The instructions assume that the Configuration Program has been loaded successfully. Moore Industries also suggests saving the initial settings resident in the transmitter before making any changes.

To create a Custom Linearization Table:

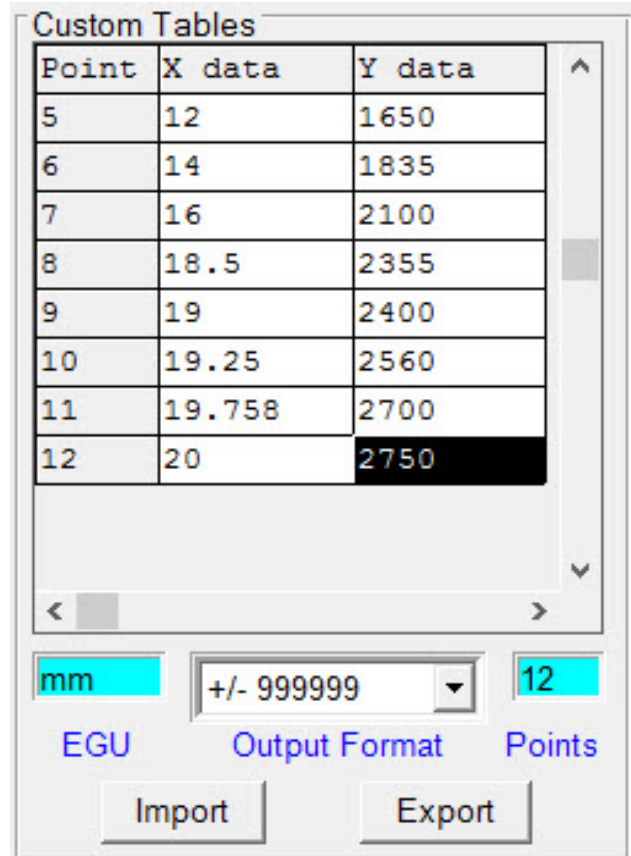
1. Attach the equipment listed in Table 1 as shown in Figure 2 and start the PC Configuration Program.
2. Click the “CustTable” button in the lower-left area of the Configuration Main Screen.

Figure 8. Linearization Must be set to ON to create a Custom Table



3. Click on the “CustTable” (Customize Linearization Table) button. This causes the Configuration Program to change its upper-right corner area to accommodate the table.

Figure 9. Custom Table Display



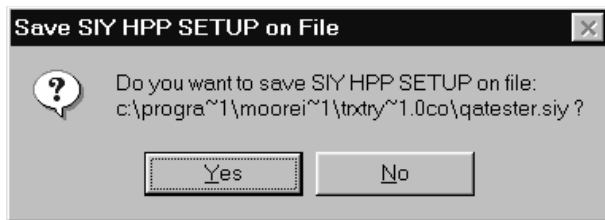
4. Use the table fields to set values for input and output from the transmitter’s intended application.

Use the Up, Down, Left, and Right arrow keys on the PC keyboard to move the cursor among the cells in the table.

5. Use the “EGU” field to set the Engineering units of the readout from the transmitter when connected to the Configuration Program.
6. Set the “Output Format” field to the desired resolution using the pull-down menu.
7. Enter the number of points to use to constitute the Linearization Table in the “Points” field.

8. When the table is complete, click on the “QuitTable” button and answer “Yes” to the following dialog (or something similar)

Figure 10. Save File Dialog Box



9. Click on the “Prog” (Program) button to download the output trim settings into the transmitter memory.

CAUTION:

Any time a connected SIY is “programmed” by downloading a Configuration File into memory, ALL of the configuration parameters resident in the transmitter memory at the time of the download are OVERWRITTEN.

This includes things like: tag name, calibration date, trim values, etc.

Once a transmitter’s memory is “erased” in this fashion, the old operating parameters are unrecoverable, and will have to be regenerated from scratch if needed again.

The Rules for Custom Linearization:

- The difference between any consecutive values in the table (in either column) must be less than 50% of the entire configured range.
- One “Output EGU” value per “Input mV” value only.
- It is not necessary to use all 85 available points, but the first and last points in the curve always default to the 0% and 100% input scale (input range).
- If you decide not to use all 85 points, you must change the number of points in the “Points” field to the number you wish to use.

Note:

Moore Industries suggests filling in the EGU (Engineering Units), then the number of points, and finally the values in the table.

Installation

The SIY transmitter is available in either the HPP hockey-puck housing style or the compact, universal, DIN-style housing.

The HPP housing includes a metal mounting plate secured to the bottom. The case is designed to fit inside the popular 30-35 mm connection head. The DIN-style housing can be mounted on either 32 mm, G-type DIN rail (EN50035), or 35mm, Top Hat rail (EN50022). The DIN-housed unit is also equipped with removable terminal blocks.

Figure 11 shows the dimensions of the HPP housing. The dimensions of the DIN-style SIY are shown in Figure 12.

Mounting and Connections

Moore Industries suggests installing the SIY by first mounting the unit in its intended application, then making the electrical connections to input, output, and power.

Before any installation, make sure that the unit has been bench checked to ensure that it is configured and calibrated for its intended application.

Mounting the HPP-Housed SIY

Use 4.5mm (0.18 in) screws to connect the SIY and mounting plate to a connection head or other housing.

Mounting the DIN-Housed SIY

For a Top Hat DIN rail, seat the upper extrusion on the back panel over the top of the rail and pivot downward until the housing locks into place.

For a G-type rail, seat the extrusion under the top lip of the rail and pivot downward.

Electrical Connections for the HPP-Housed SIY

Figure 13 shows the hookups for the SIY when in their HPP housing configuration. Feed the sensor wiring up through the center thru-hole (and typically, out a side port of the connection head).

Electrical Connections for the DIN-Housed SIY

Figure 14 shows the hookups for the SIY in DIN-style housing. Refer to the section on ground wiring practices when installing this type of transmitter.

Electrical Safety Information

Refer to the Electrical Safety Manual included at the end of this manual, also available as a separate document.

Figure 11. Dimensions of the HPP version of the SIY

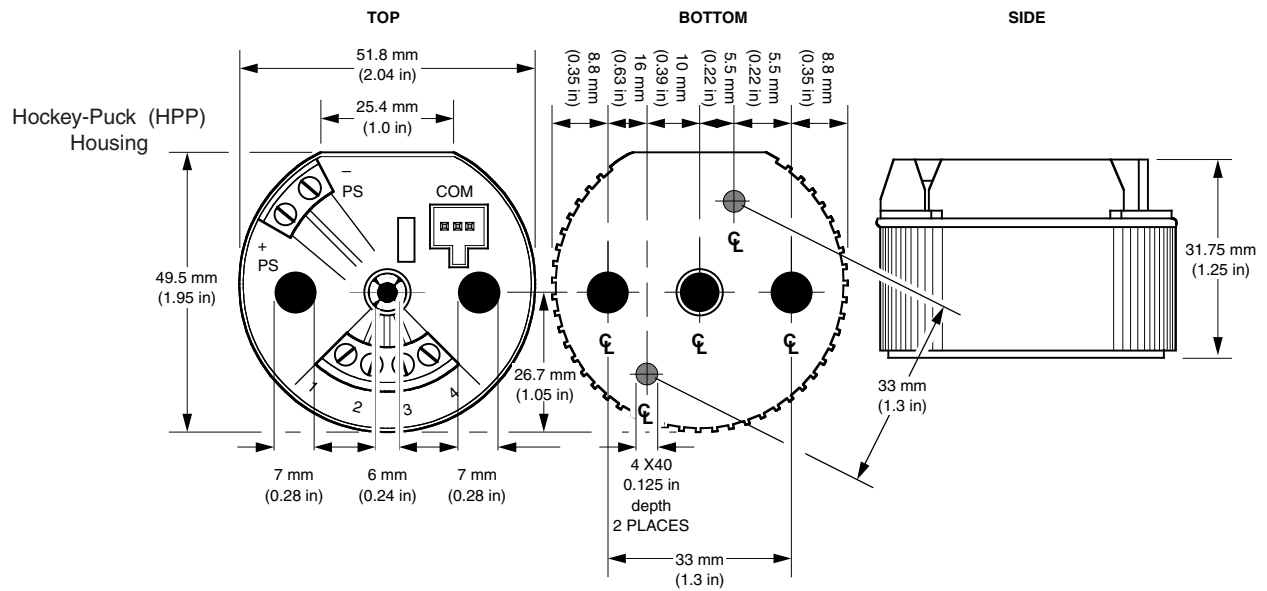
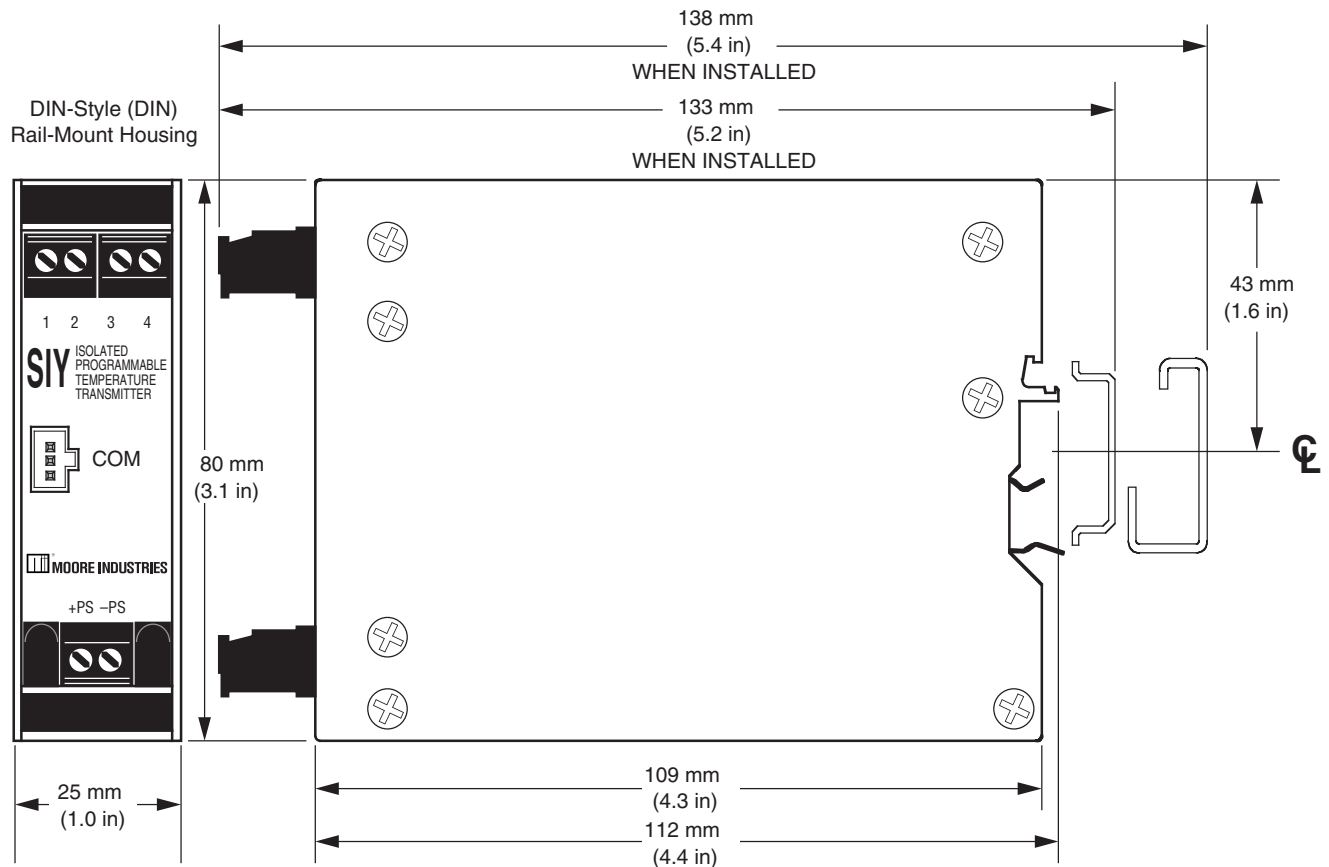


Figure 12. Dimensions of the DIN-Style version of the SIY



Operation

Once programmed, calibrated, installed, and supplied with the correct power, SIY transmitters begin to operate. Depending upon environmental conditions, they can be expected to continue to operate unattended for extended periods of time.

Maintenance

Moore Industries suggests you perform a quick check for terminal tightness and general unit condition every 6-8 months. Always adhere to any site requirements for programmed maintenance.

Troubleshooting

If a transmitter's performance begins to deteriorate noticeably and a physical check of the installation uncovers no adverse conditions or damage, remove the unit from service and perform the calibration procedures listed earlier in this manual. Check in particular the Trim Output procedure.

Figure 13 Connecting the HPP-Housed SIY

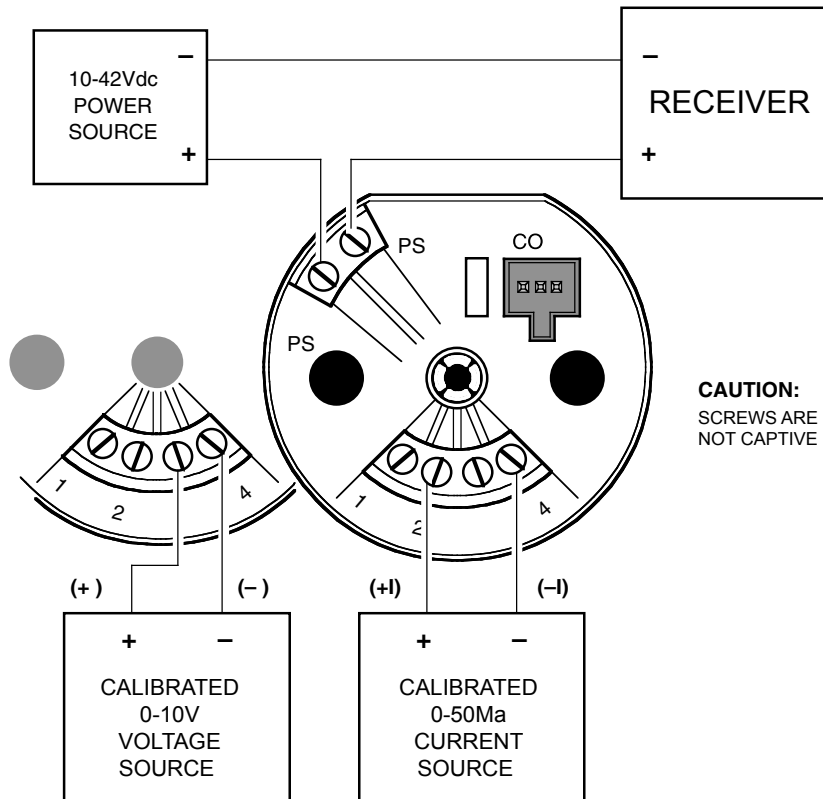
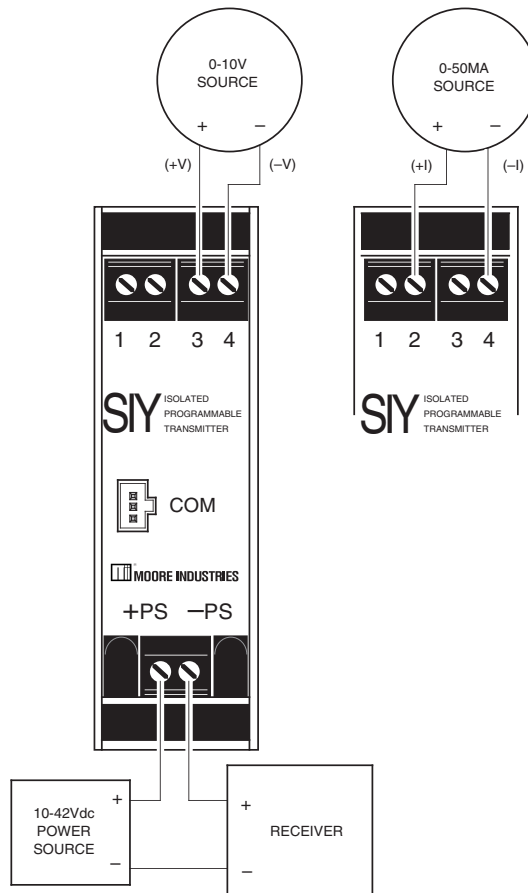


Figure 14. Connecting the DIN-Housed SIY



Customer Support

Moore Industries is recognized as the industry leader in delivering top quality to its customers in products and services. We perform a battery of stringent quality assurance checks on every unit we ship. If any Moore Industries product fails to perform up to rated specifications, call us for help. Our highly skilled staff of trained technicians and engineers pride themselves on their ability to provide timely, accurate, and practical answers to your process instrumentation questions. Factory phone numbers are on the back cover.

If problems involve a particular SIY, there are several pieces of information you can gather **before** you call the factory that will help our staff get you answers more efficiently. When you call, please have:

- The model number of the unit in question.
- The serial number of the unit in question.
- The job number (if available).
- The purchase order under which the unit was shipped (if available).

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

THE COMPANY MAKES NO EXPRESS, IMPLIED OR STATUTORY WARRANTIES (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY GOODS OR SERVICES SOLD BY THE COMPANY. THE COMPANY DISCLAIMS ALL WARRANTIES ARISING FROM ANY COURSE OF DEALING OR TRADE USAGE, AND ANY BUYER OF GOODS OR SERVICES FROM THE COMPANY ACKNOWLEDGES THAT THERE ARE NO WARRANTIES IMPLIED BY CUSTOM OR USAGE IN THE TRADE OF THE BUYER AND OF THE COMPANY, AND THAT ANY PRIOR DEALINGS OF THE BUYER WITH THE COMPANY DO NOT IMPLY THAT THE COMPANY WARRANTS THE GOODS OR SERVICES IN ANY WAY.

ANY BUYER OF GOODS OR SERVICES FROM THE COMPANY AGREES WITH THE COMPANY THAT THE SOLE AND EXCLUSIVE REMEDIES FOR BREACH OF ANY WARRANTY CONCERNING THE GOODS OR SERVICES SHALL BE FOR THE COMPANY, AT ITS OPTION, TO REPAIR OR REPLACE THE GOODS OR SERVICES OR REFUND THE PURCHASE PRICE. THE COMPANY SHALL IN NO EVENT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES EVEN IF THE COMPANY FAILS IN ANY ATTEMPT TO REMEDY DEFECTS IN THE GOODS OR SERVICES, BUT IN SUCH CASE THE BUYER SHALL BE ENTITLED TO NO MORE THAN A REFUND OF ALL MONIES PAID TO THE COMPANY BY THE BUYER FOR PURCHASE OF THE GOODS OR SERVICES.

ANY CAUSE OF ACTION FOR BREACH OF ANY WARRANTY BY THE COMPANY SHALL BE BARRED UNLESS THE COMPANY RECEIVES FROM THE BUYER A WRITTEN NOTICE OF THE ALLEGED DEFECT OR BREACH WITHIN TEN DAYS FROM THE EARLIEST DATE ON WHICH THE BUYER COULD REASONABLY HAVE DISCOVERED THE ALLEGED DEFECT OR BREACH, AND NO ACTION FOR THE BREACH OF ANY WARRANTY SHALL BE COMMENCED BY THE BUYER ANY LATER THAN TWELVE MONTHS FROM THE EARLIEST DATE ON WHICH THE BUYER COULD REASONABLY HAVE DISCOVERED THE ALLEGED DEFECT OR BREACH.

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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Electrical Safety Manual

This document allows the user quick access to all electrical information for the purpose of safety installation in a specific area. The Electrical Safety Manual does not replace the full manual that is included with the unit; refer to the full manual for additional details on specification, unit configuration, customer service, warranty, and more.

Safety Messages

All Moore Industries instrumentation should only be used for the purpose and in the manner described in both manuals. If you use this product in a manner other than that for which it was intended, unpredictable behavior could ensue with possible hazardous consequences.

Qualified Personnel

The Moore Industries' product/systems described in the manuals may be operated only by personnel qualified for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these Moore Industries' products/systems.

Proper Use of Moore Industries Products

Moore Industries' products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Moore Industries'. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Installation and Wiring

Instructions in this section and others may require special precautions to ensure the safety of the personnel performing the operations. Notes, Cautions and Warnings that may cause potential safety issues are indicated throughout this guide.

Note: Make sure to calibrate and bench check the instruments prior to installation. Also, install all instruments in their intended application before making any electrical connections. For DIN rail mounted instruments, allow enough room for pivoting instruments vertically on the rail for removal in applications involving multiple banks of units. To remove the unit from the DIN rail you will need a simple tool such as a straight blade screwdriver. Insert the blade of the screwdriver into the cavity at the bottom of the locking mechanism and rotate it. This will release the locking mechanism from the DIN rail and allow you to remove the unit.

Moore Industries suggests installing by first mounting the unit in its intended application, then making the electrical connections to input, output, and power.

The HPP housing includes a metal mounting plate secured to the bottom. The case is designed to fit inside the popular 30-35 mm connection head. The DIN-style housing can be mounted on either 32 mm, G-type DIN rail (EN50035), or 35mm, Top Hat rail (EN50022). The DIN-housed unit is also equipped with removable terminal blocks.

Electrical Connections

When installing any Moore Industries product, always follow all local regulations and standards for grounding, shielding, and safety. Use +90°C suitable wiring for all connections.

WARNING: Terminals on this unit may be connected to hazardous voltages. Before making ANY connections to this unit, always remove power from the loop or instrument power terminals.

WARNING: If this unit is used in a manner not specified by Moore Industries, the protection provided by the equipment may be impaired.

Input/Output Wiring

The input/output connections can be made with 14 to 24 AWG (2.5mm² to 0.2mm²) wire. The end of each conductor should be stripped no more than 0.25in (7mm). Tighten the screws on the terminal block to 4.4 - 5.3 lbf/in² (0.5 - 0.6 N/m²).

Power Supply Wiring

All power connections should be made with 14 or 16 AWG (2mm² or 1.3mm²) wire. The end of each conductor should be stripped no more than 0.25in (7mm). The end of the stripped wire should be tinned with solder, or inserted into a ferrule and crimped before being placed into a terminal block. Tighten the screws on the terminal block to 4.4 - 5.3 lbf/in² (0.5 - 0.6 N/m²).

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 un-shielded input and output signal wiring should be 2 inches.

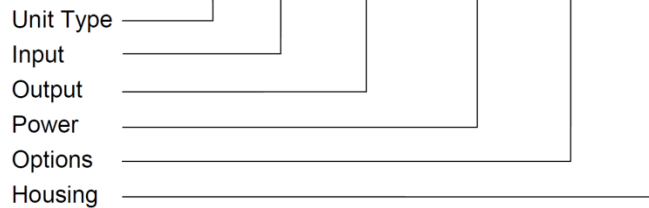
Note: Some of Moore Industries' instruments can be classified as receivers (IPT2, IPX2, etc.) and some can be classified as transmitters (TRX, TRY, etc.) while some are both a receiver and a transmitter (SPA2, HIM, etc). Hence, your shield ground connections should be appropriate for the type of signal line being shielded. The shield should be grounded at the receiver and not at the signal source.

CE Certification-related Guidelines

The grounding and wiring practices described above must be followed in order for the unit(s) to meet the requirements set forth in EMC standard EN 61326.

Model Structure

EXAMPLE SIY / PRG / 4-20MA / 10-30DC / -ISE [HPP]



Specifications

Supply Voltage:

Standard Nominal:

10-42Vdc, 24mA max.

Intrinsically Safe:

Ui = 30Vdc, Ii = 110mA, Pi = 825mW

Terminals: Rated CAT I

Operating & Storage Range:

-40°C to +85°C (-40°F to +185°F)

Installation in Hazardous Locations

This section contains important information regarding installation of SIY in Hazardous Area Locations.

Note: The SIY-DIN is suitable for use in Non-Hazardous locations only. See cCSAus installations.

WARNING: Do not separate power connector when energized.

WARNING: Substitution of components is not allowed, as it may impair the intrinsic safety.

AVERTISSEMENT: La substitution de composants peut compromettre la sécurité intrinsèque.

WARNING: To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

AVERTISSEMENT: Risque d'explosion. Avant de déconnecter l'équipement, couper le courant ou s'assurer que débrancher tant que l'emplacement est désigné non dangereux.

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

Maximum operating parameters of the "COM" port for use in Non-Hazardous areas shall not exceed 3.0V, 300µA and 240µW.

Specific Conditions of Use

The following instructions must be adhered to when the SIY is used in hazardous locations and potentially explosive atmospheres.

FM Installations

Intrinsically Safe Applications

Class I, Division 1, Groups A, B, C & D T6

Class I, Zone 0, AEX ia IIC T6 Ga

Nonincendive Applications

Class I, Division 2, Groups A, B, C & D T6

Operating Ambient Temperature Range:

-40°C ≤ Tamb. ≤ +60°C

When installed as Division 1 or Zone 0 equipment, install per I.S. Control Drawing 100-100-60.

The SIY shall be mounted within a tool-secured enclosure which meets the requirements of ANSI/UL 61010-1 and is capable of accepting applicable wiring methods per the NEC*. The enclosure shall have a minimum type of protection IP20, but shall have a suitable degree of protection against deterioration of the equipment that would adversely affect its suitability for use in Class I, Division 1, Zone 0 or Division 2 locations.

No connections shall be made to the communications "COM" port in Hazardous (Classified) Locations.

Programming through the communication port shall only be done in the unclassified location using the Moore Industries USB cable, Part No. 804-030-26.

CSA Installations

Intrinsically Safe Applications

Class I, Division 1, Groups A-D T6@60°C ambient

Nonincendive Applications

Class I, Division 2, Groups A-D T6@60°C ambient

The SIY is of open type unit Certified as a component for use only in other equipment where the suitability of the combination is to be determined by the authority having jurisdiction.

European Union Installations

(ATEX 2014/34/EU)

Intrinsically Safe Applications

II 2 G EEx ib IIC

The model SIY is intrinsically safe. It can be used in potentially explosive atmospheres and can only be connected to certified intrinsically safe associated equipment. This combination must be compatible with regards to intrinsic safety.

The specific electrical parameters of the SIY are:

Terminals +ps -ps: Ui ≤ 30V; Ii ≤ 110mA; Pi ≤ 0.82W;

Ci ≤ 50.2nF; Li = 0

Terminals 1,2,3,4: Uo ≤ 6.5V; Io ≤ 110mA, Po ≤ 0.82W;

Co ≤ 2.96µF; Lo ≤ 2.9mH

The electrical parameters of the certified associated intrinsically safe equipment must not exceed any of the following values:

Terminals +ps -ps: Uo ≤ 30V; Io ≤ 110mA; Po ≤ 0.82W

The "COM" port must not be used in hazardous areas.

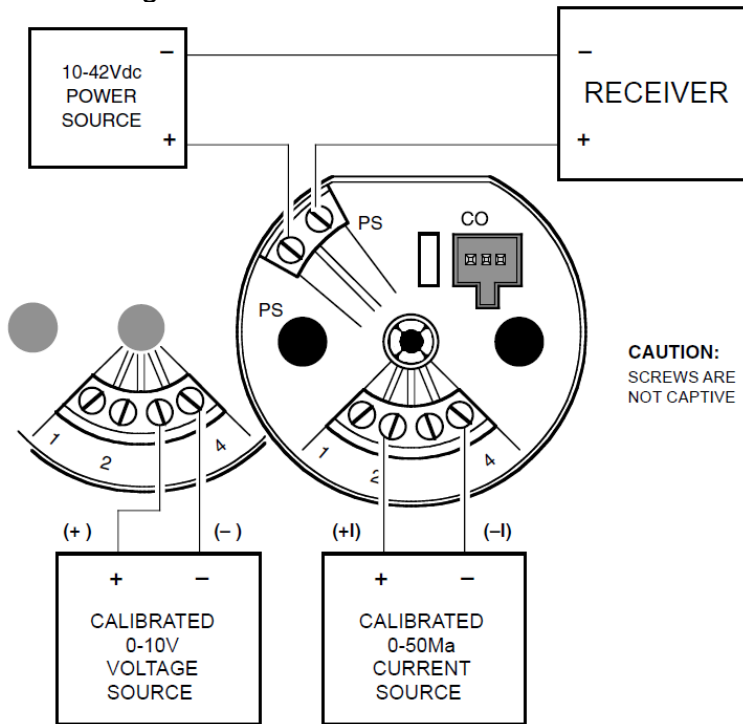
The operating ambient temperature must be between -40° C and 60° C

cCSAus Installations General Locations

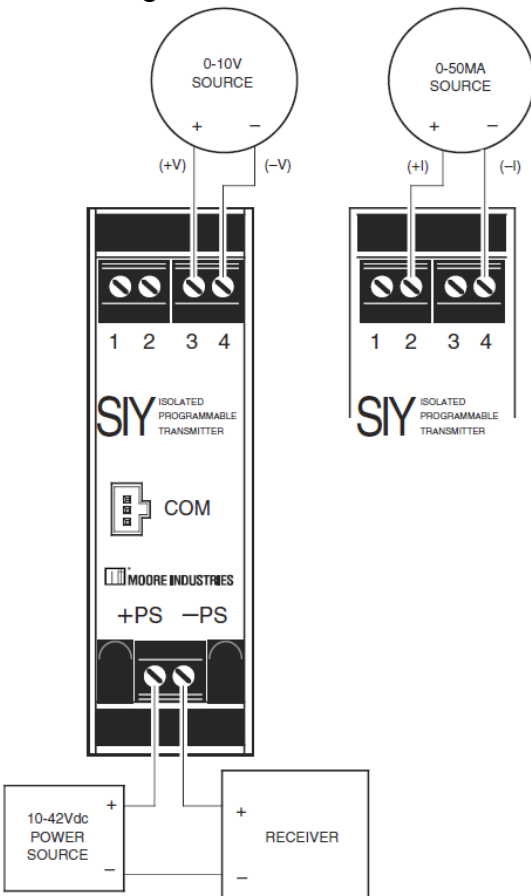
The equipment is certified only for use in other equipment where the suitability of the combination is to be determined.

Connection Diagrams

Connecting the HPP-Housed SIY



Connecting the DIN-Housed SIY





DO NOT SCALE DRAWING		CATEGORY CONTROL DRAWING	
TOLERANCES (UNLESS NOTED)		DRAWN Gus H. Elias	10/00
DECIMALS = 1/1000	FRACTIONS = 1/32	CHECKED C.B.	08/04
X = ±.1 / 2.54	XX = ±.03 / 0.76	ENGINEER Gus H. Elias	10/00
XXX = ±.00125	AKGLES = ±.30	SCALE NONE	

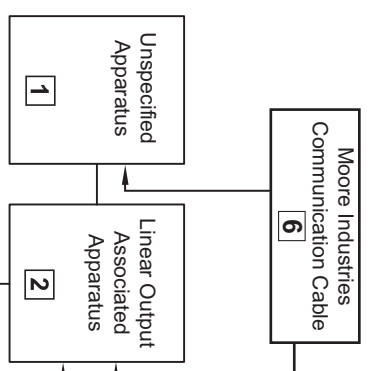
DRAWING NUMBER 100-100-60		REVISION D
TITLE Field Installation Diagram: SIY [HPP] PC-Prog. Signal Isolator/Converter Intrinsically Safe System For Hazardous "Classified" Locations		REVISED BY ECO 18886
DATE 07/20	BY T.G. W.T.	APPROVAL

NOTICE RE PROPRIETARY INFORMATION: This drawing and the information contained herein are the proprietary property of Moore Industries International, Inc. (MII) and should not be reproduced or disclosed to any third party without the written consent of an authorized officer of MII.

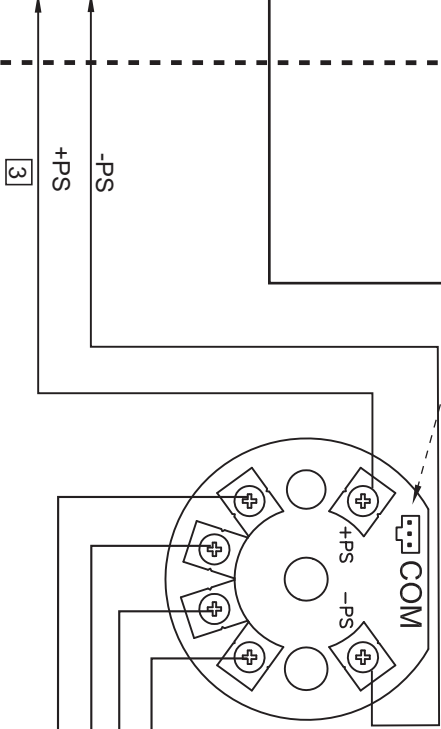
Certified Product
This is a controlled 'Revised' or 'Schedule' drawing. No modifications are permitted without the notification and final approval of the Certifying Engineer (related dwgs.) or the Certifying Agency (schedule dwgs.)

**Un-Classified
(Non-Hazardous/Safe) Area**

Warning: The 'COM' Port Must Not Be Used In Hazardous 'Classified' Locations



Ground/Earth Path Resistance
Must Not Exceed 1 Ω
(Barrier must be Agency approved)



mA, mV, V:
 C_a or $C_o = 10 \mu F$
 L_a or $L_o = 2.7mH$
 V_{oc} or $V_t = 6.51 Vdc$
 I_{sc} or $I_t = 110 mA$
 $P_o = 0.560 W$

**Entry Parameters
(Power/Loop, +PS & -PS):**
 V_{max} or $U_i = 30 Vdc$
 I_{max} or $I_i = 110 mA$
 P_{max} or $P_i = 0.825 W$
 $C_i = 10.34 nF$
 $L_i = 0 \mu H$
 C_a or $C_o \geq C_i + C_{cable}$
 L_a or $L_o \geq L_i + L_{cable}$
 V_{max} or $U_i \geq V_{oc}$ or V_t
 I_{max} or $I_i \geq I_{sc}$ or I_t
 $P_i \geq P_o$

Input Device must be 'Agency' approved per application area (CSA, FM, IISep, LCIE, etc...).

AREA CLASSIFICATION		T Rating
FM US &	Intrinsically Safer: Class I, Division 1, Groups A, B, C & D	T6 @ +60°C
CSA International	Non-Incendive: Class I, Division 2, Groups A, B, C & D	
FM (US NEC 500)	Intrinsically Safer: Class I, Zone 0, AEX ia IIC	
LCIE/ATEX	Intrinsically Safer: Ⓢ II 2G EEx ib IIC	
T. Code: T6 @ 60°C Maximum Operating Ambient Temperature Range: -40°C ≤ Tamb. ≤ +60°C		

Installation Notes:

- Associated apparatus which is unspecified except that it **must not** be supplied from, or contain under normal or abnormal conditions a source of potential with respect to earth in excess of 250 Vrms or 250 Vdc which is considered to be the Safe Area's maximum voltage.
- The Linear Output Associated Apparatus **must** be approved by the "specific" (CSA/ECS/FMLCIE/SAA/SIRATUV, etc.) certifying agency for I.S. connections in: "Class I, Division 1, Groups A, B, C & D" or "Zone 0" locations. The output voltage (**V_{oc}**, **V_t** or **U_o**) **must not** exceed **30 Vdc**, the output current (**I_{sc}**, **I_t** or **I_o**) **must not** exceed **110 mA** and, the output power (**P_o**) **must not** exceed **0.825W (P_i)**. Also, it **must** be installed per the manufacturer's guidelines. *A Shunt Zener Barrier is NOT required for Non-Incendive (or Class I, Division 2 or Type N) installations.*
- For FM applications, installation **must** be in accordance to "ANSI/ISA-RP12.06.01" (Installation of I.S. Systems for Hazardous "Classified" Locations) and the National Electric Code "ANSI/NFPA 70". For CSA applications, adhere to the "Canadian Electric Code C22.1" most current publication on I.S. installation guidelines. For ATEX applications, adhere to "EN 60079-14:1997" or any equivalent, most current and pertaining publication on I.S. installation guidelines.
- Warning:** Substitution of components may impair the Intrinsic Safety of the unit. DO NOT open or service the unit when either energized or if an explosive gas/dust atmosphere is present. Disconnect power servicing. Also read, understand and adhere to the manufacturer's installation and operating procedures. The maximum power parameters of the COM port (to be used only in safe/non-hazardous areas) are: Vmax = 3.0 Vdc, Imax = 300uA, Pmax = 240uW. No connections shall be made to the communications "COM" port in Hazardous (Classified) Locations. Programming through the communication port shall only be done in the unclassified location using the Moore Industries USB cable, Part No. 804-030-26.