



PC-Programmable Signal
Isolator/Converter with Display

SDY

User's Manual

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Introduction

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

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.

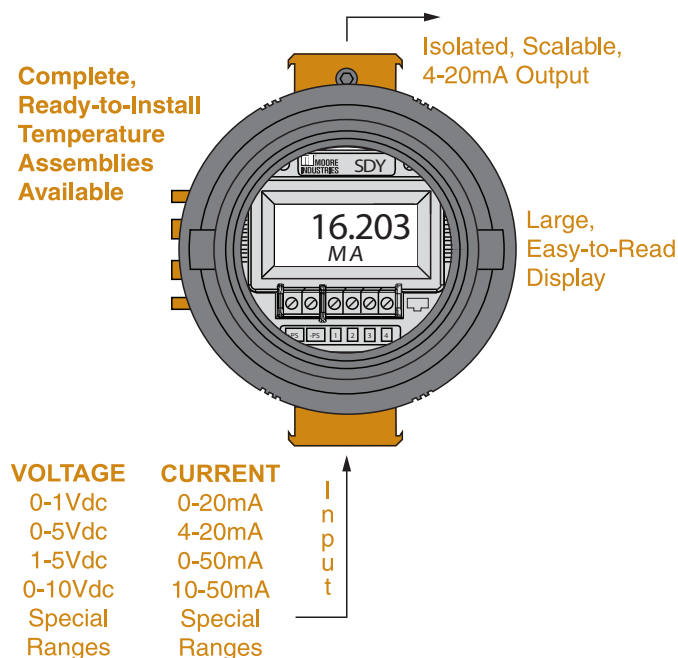
The SDY

The SDY is a versatile, 2-wire (loop-powered), PC-Programmable Signal Isolator/Converter that accepts 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 SDY 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 SDY transmitter features programmable inputs and a trimmable output to boost accuracy.



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Specifications

| | | |
|---|--|---|
| <p>Performance</p> <p>Input Accuracy: Current Input: 3µA (0.006% of full span 50mA) Voltage Input: 0.6mV (0.006% of full span 10V) Output Accuracy: 4.8µA (0.03% of 4-20mA span) Overall Accuracy: Overall accuracy of the unit is the combined input and output accuracy. It includes the combined effects of linearity, hysteresis, repeatability and adjustment resolution. It does not include ambient temperature effect. Stability: Input to output stability (% of span): 1 year: 0.09%; 3 years: 0.15%; 5 years: 0.20% Minimum Input Span: Current, 1.0mA; Voltage, 250mV Isolation: 500Vac/1000Vdc input to output to case Measurement Cycle: Updates 8 times per second Response Time: 256msec typical for the output to change from 10% to 90% for an input step change of 0% to 100% Step Response: 500msec typical from the time an input is applied until the output reaches 90% of its final value</p> | <p>Performance (continued)</p> <p>Input Impedance: Voltage, 1Mohms; Current, 20 ohms Load Effect: Negligible within specified load limits Ripple: 10mVpp, maximum (measured across 250 ohm resistor) Power Supply Effect: 0.002% of span per 1V change Over-Voltage Protection: 48V, maximum on output; 48V reverse polarity protection on output Maximum Input Overrange: Current: 100mA maximum continuous; Voltage on Current Input: ±1.5Vdc peak; Voltage: 18Vdc Load Capability: $\frac{\text{Supply Voltage} - 10V}{0.0214A} = \text{Ohms}$ Output Current Limiting: User-programmable, 3.8 or 21.4mA for input under/over range. Output Tracking: Assuming 4-20mA input and 4-20mA output; the isolator output will follow the input down to 3.8mA when the input fails.</p> | <p>Display Type LCD: Top Row, 10.16mm (0.4 in) high black digits on a reflective background; Bottom Row, 5.72mm (0.225 in) high black digits on a reflective background Format: Two rows of five alphanumeric characters Range: -99999 to 99999 Minimum Display Span: 1.00</p> <p>Ambient Conditions Operating Range: Transmitter: -40°C to +85°C (-40°F to +185°F) Display: -25°C to +85°C (-13°F to +185°F) Storage Range: -40°C to +85°C (-40°F to +185°F) Effect of Ambient Temperature on Accuracy: ±0.015% of span/°C Relative Humidity: 0-95%, non-condensing RFI/EMI Immunity: 20V/m@ 80-1000MHz, 1K AM @ 80% when tested according to IEC 61326 Common Mode Rejection: 100dB, minimum, @50/60Hz Normal Mode Rejection: 60dB, typical, @1Vp-p, 50/60Hz</p> <p>Weight HP Housing: 178g (6.3 oz) BH Housing: 1.5kg (3.3 lbs) D-BOX Housing: 688g (1 lb, 8.3 oz)</p> |
|---|--|---|

Ordering Information

| Unit | Input | Output | Power | Options | Housings |
|---|--|---|--|--|--|
| SDY PC-Programmable Isolator/Converter with Display | PRG Programmable with supplied Configuration Software <u>CURRENT (into 20 ohms)</u> Any range from -2.5mA to 55mA including: 0-20mA 4-20mA 0-50mA 10-50mA <u>VOLTAGE (into 1Mohm)</u> Any range from -0.5V to 11V including: 0-1Vdc 0-5Vdc 1-5Vdc 0-10Vdc (recommended minimum span, 250mV) | 4-20MA User scalable with supplied software | 10-42DC 10-30DC for -IS option | -IS Option (cFMus, ATEX and IECEx Intrinsically Safe approval) | BH2NG 2-Hub, explosion-proof enclosure with glass cover BH3NG 3-Hub, explosion-proof enclosure with glass cover D1LC 1-Hub, low base, clear cover, NEMA 4X (IP66) enclosure D2LC 2-Hub, low base, clear cover, NEMA 4X (IP66) enclosure HP Hockey-puck housing and spring clips DN The DN mounting will fit the TS-32 and TS-35 DIN rail. FL Mounting flanges on HP suitable for relay track or screw mounting FLD Mounting flanges on HP suitable for 3½" relay track or screw mounting SB2NG 2-Hub, Explosion-Proof enclosure with two, ½-inch NPT entry ports and a glass cover SB2MG 2-Hub, Explosion-Proof enclosure with two, M20 x 1.5 entry ports and a glass cover A suffix indicates ANZEx (TestSafe) (Ex d) Flame-Proof approvals (i.e. BH2NGA) E suffix indicates ATEX Ex d (ISseP) Flame-Proof approvals (i.e. BH2NGE) P suffix indicates enclosure comes equipped with base plate and U-bolts for mounting on a 2-inch pipe (i.e. BH2NGP or SB2MGP) |

To order, specify: Unit / Input / Output / Power / Option [Housing]

Model Number Example: SDY / PRG / 4-20MA / 10-30DC / -IS [BH2NG]

Rugged Enclosures Available

We carry a complete line of housings to protect and complement our high-quality isolators. Get the quality you need and the options you require with the ease of just one ordering number.

Default Factory Configuration for SDY

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

Input:

4-20mA

Display:

4-20mA

Settings:

Input Trim OFF

Filter:

60Hz

Output:

4-20mA

Damping:

0s

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Configuration

Configuring the SDY 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 SDY Configuration Software by following the directions on the label.
3. Connecting the SDY to a PC and test setup, running the SDY PC Configuration Program 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 SDY 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 SDY 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 1 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 *SDY SIY TDY TRX TRY 64 bit 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 SDY can be connected to equipment to simulate input and monitor output. You can then change the transmitter's operating parameter

CAUTION:

Any time a connected SDY 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.

Table 1. SDY Configuration Equipment

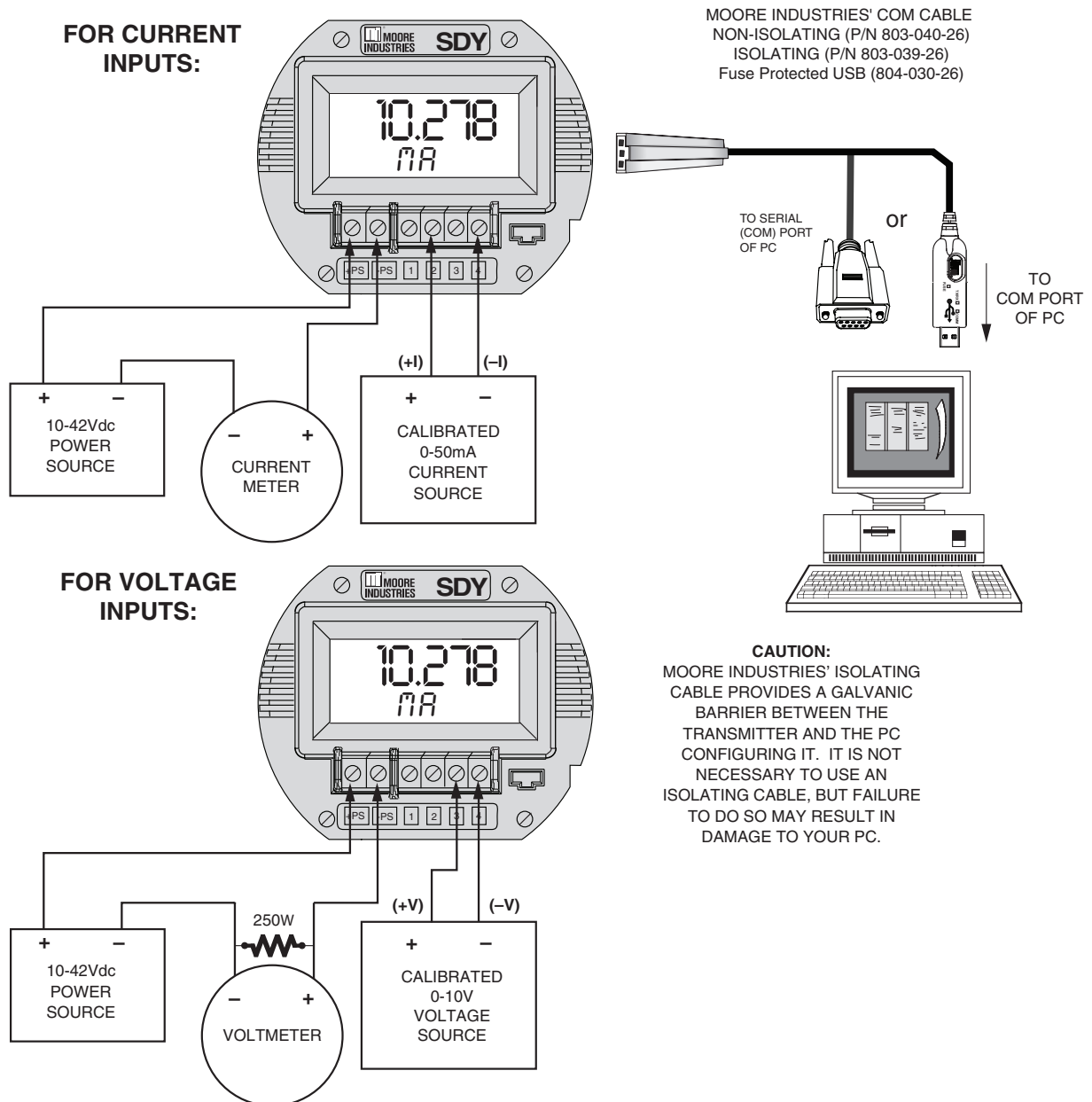
| Device | Specification |
|---------------------------------------|---|
| Current or Voltage Source | Accurate to $\pm 0.05\%$ of span for the intended application |
| Power Supply | 18-42Vdc, $\pm 10\%$ (10-42VDC if no load resistor is used) |
| Precision Load Resistor (optional) | 250 Ω , $\pm 0.01\%$ |
| Multimeter | Accurate to $\pm 0.025\%$ |
| Personal Computer | Microsoft Windows based PC; 16Mb free RAM; 20MB free disk space on hard drive Microsoft Windows XP, Vista or 7 and 1 (one) serial port or one available USB port (with optional USB cable) |
| Moore Industries' Communication Cable | Non- isolating (PN 803-040-26) Isolating (PN 803-039-26) Fuse Protected USB Cable (PN 804-030-26) |

Bench Check Setup

Figure 2 shows a SDY hooked up to the equipment needed to perform the unit configuration, bench check, and output trim. See Table 1 for a list of the necessary equipment. Connect your SDY as shown in the figure and allow approximately 5 minutes for the setup to stabilize.

It is possible to run the SDY 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 SDY. To do this, save the Configuration File to disk, connect the units in succession, and download the same file to each.

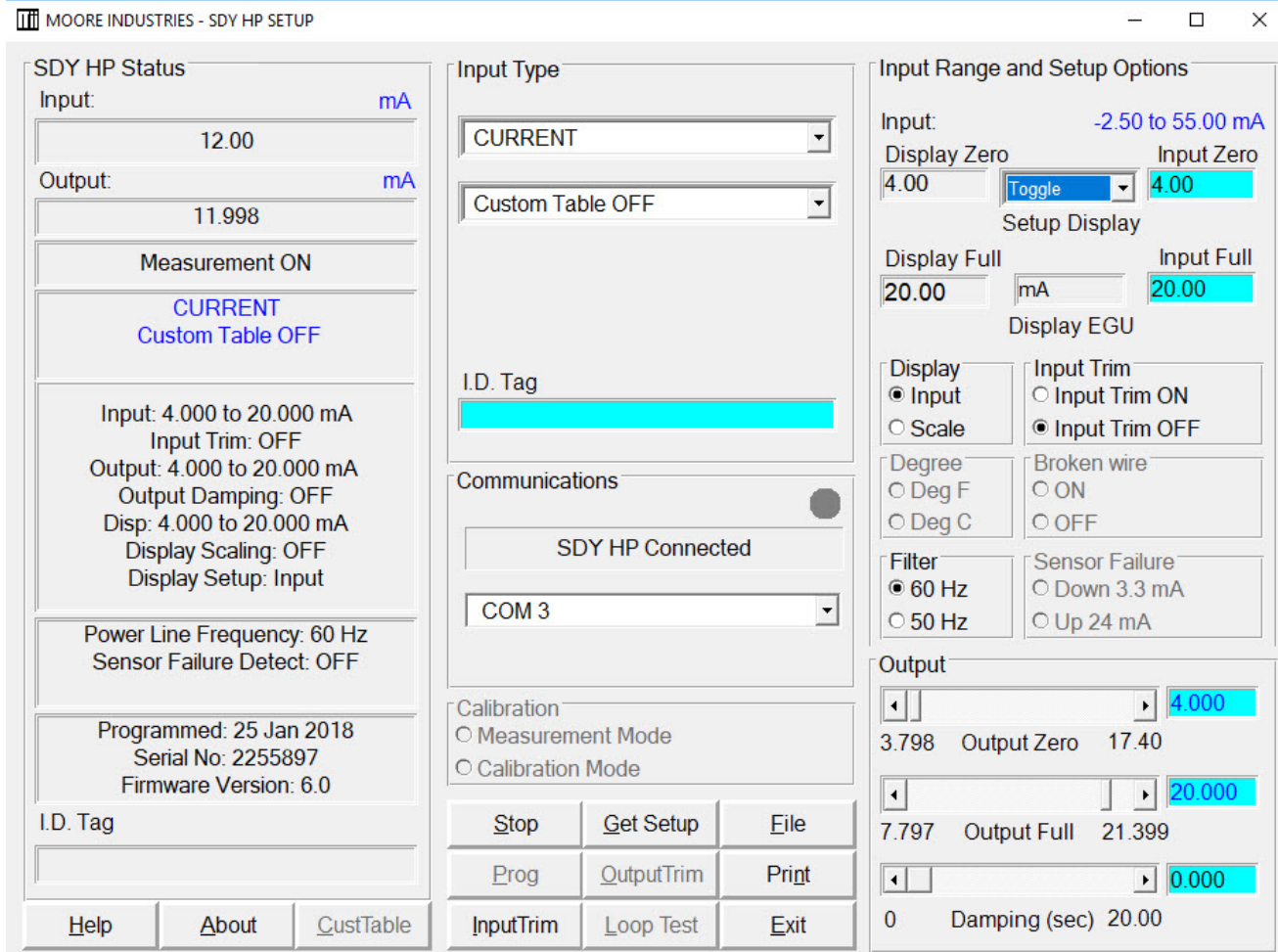
Figure 2. Setting up the SDY for Configuration/Bench Check



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Figure 3. Setting SDY Parameters Using the Configuration Screen



Using the SDY PC Configuration Program

Once the software has been installed on your hard disk:

1. Run the PC Configuration Program.
2. Set the values as appropriate for your SDY application in the various fields of the Configuration Screen shown in Figure 3.

Note:

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

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

To connect the SDY 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 SDY communications cable.

3. When the Configuration File shown on the screen has been modified for your intended application, click the "Stop" button 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 nonvolatile memory of the connected SDY.

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 SDY parameters until the Configuration File is downloaded to SDY memory as described in Step 3 above.

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

Saving the SDY 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 SDY memory. Use this procedure to save information on the configuration of your SDY for downloading into other SDY transmitters, or for record-keeping purposes, etc.

To save the SDY 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 “Selected File Name” box.

Printing Saved Configurations

1. Click on the “File” button. This brings up an Explorer-like window on the left area of the screen.
2. Navigate to the save file you want to print and click on it.
3. Click on the “Print” button.

Note:

Printing saved configurations must be done when the Explorer-like file window is up.

Note:

File names must follow the DOS convention. Eight-character maximum, all lower case, no suffix.

The Configuration Program adds a suffix to the file name automatically.

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.

The left side of the screen will now show the name of the file entered in Step 2 resident on 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 SDY Configuration Screen to bring up a file from your hard disk.

To use a configuration file already on disk:

1. From the Configuration Program Main Screen, click on the “File” button to bring up the File Management portion of the program.
2. Use the Explorer-like file display to locate the file to be retrieved, and click on the file to highlight it.
3. Click on the “Quit File” button.

The Configuration Screen will change to show the parameters entered into the retrieved file. The parameters can now be edited and/or downloaded into the memory of a connected SDY.

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Loading a Configuration File From a Connected SDY

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

Note:

Whenever a unit is correctly connected to your PC, the “SDY Status” section of the Configuration Screen will show the configuration data already stored in unit memory.

To load a configuration file from a SDY, connect a powered SDY and click “Get Setup”.

The editable fields of the SDY Configuration Screen will change to match the data shown in the “Status” portion of the 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 SDY 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 20.032. This number is the number of seconds that the sensor’s value will be averaged over.

Trimming SDY Output

The SDY 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 a current meter, as shown in Figure 2.

To trim SDY output:

1. Set all unit parameters on the SDY Configuration Screen as required for your intended application. Click “Stop” to stop measurement.
2. Click “Out Trim”.
3. Select and move the “Output Zero” or the “Output Full” slide bar to adjust the SDY 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 “Quit Trim”, then “Prog” to program the SDY 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 nonvolatile memory by using the “Prog” function.

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

Scaling the SDY Output

To scale the transmitter's output, use the mouse to move the slider bars in the "Output" section of the Main Configuration screen. "Zero Scale Output" effects the zero output, and "Full Scale Output" effects full scale output.

Note:

The SDY Output Scaling function will not operate unless a SDY is connected in the calibration setup shown in Figure 2.

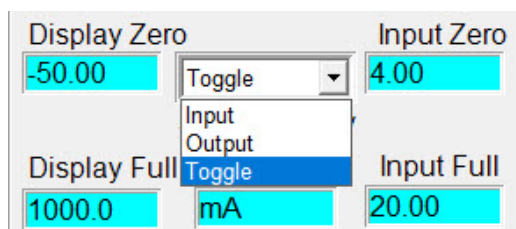
Setting the Display

The SDY has numerous settings for its display, all of which are controlled using the "Input Range and Setup Options" box. You can set the customizable display to display the input, output, or toggle between the two every two seconds. The display will even scale to display any type of engineering units you desire.

Input, Output, and Toggle

The pull-down menu shown below is used to adjust what the SDY displays. There are three settings: "Input", which causes the SDY to display the input it is receiving, "Output", which causes the SDY to display the 4-20mA output it is emitting, and "Toggle", which causes the SDY to switch between displaying Input to Output every two seconds. To switch between these, simply click on the pull-down menu, select the appropriate function, and program the transmitter by clicking the "Prog" button.

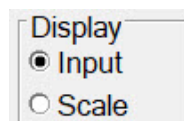
Figure 4. The pull-down menu lets you select what the SDY displays.



Display Zero & Display Full

The display zero and display full show what values will actually be displayed. If the pull-down menu in Figure 4 and the radio button on Figure 5 both have "Input" selected, then Display Zero will match Input Zero and Display Full will match Input Full.

Figure 5. Use the Display radio button to switch from standard input display to a scaleable display of any engineering unit type.



Scaling the Display

The SDY can scale its display. This feature is useful when you need to limit, expand, or manipulate the numbers the SDY displays. Doing this also gives you the option of changing the engineering units being displayed to any engineering unit type.

Scaling the input display is a simple procedure. First, click "Scale" on the radio button in Figure 5.

Note:

If you have the pull-down menu in Figure 4 set to "Output", the Display radio button will not be available.

You can then enter values into the "Display Zero", "Display Full", and "Display EGU" boxes. When you have entered the appropriate values, program the SDY with the new information by clicking the "Prog" button.

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Trimming the Input

Use this feature of the SDY to enhance the accuracy of the transmitter by precisely matching its actual input reading 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”.
3. Click “Start”, then “InpTrim”.
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 Lower” 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 Upper” and wait for it to capture the value.
8. Click on the button labelled “QuiInTrim”, then the “Stop” button, and finally the “Prog” button to send the trim values to the transmitter.

Figure 6. Trim Capture Box

| Input Range and Setup Options | |
|-------------------------------|-------------------|
| Input: | -2.50 to 55.00 mA |
| Captured Lower | Trim Lower |
| 4.00 | Trim Low 4.00 |
| | Trim Upper |
| 20.00 | Trim Upp 20.00 |

Creating a Custom Linearization Table

The SDY 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 SDY 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.
- Note:*
It IS NECESSARY to connect a unit to the PC in order to create a Custom Linearization Table.
2. Use the pull-down menu to set “Linearization ON”.

Figure 7. Linearization must be set to ON to create a custom table

| |
|------------------|
| Custom Table ON |
| Custom Table OFF |
| Custom Table ON |

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.
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.

- Use the “Restore” button to revert to the table stored in the SDY’s memory.

Caution:

Restoring the configuration file erases any values in the table, overwriting them with whatever is stored in the most recent file.

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

The Rules for Custom Linearization:

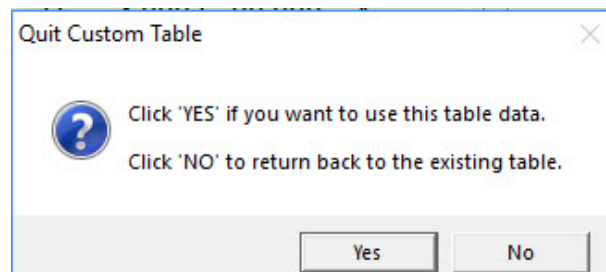
- The difference between any consecutive values in the table (in either column) must be less than 50% of the entire configured range.
- One “Output EGU” value per “Input mV” value only.
- It is not necessary to use all 85 available points, but the first and last points in the curve always default to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

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

Figure 8. Save File Dialog Box



- Click on the “Prog” (Program) button to download the linearization table settings into the transmitter memory.

CAUTION:

Any time a connected SDY 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.

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Installation

The SDY transmitter is available in the HP hockey-puck housing style.

The HP housing is a self-contained unit ready for mounting in one of our durable enclosures, such as the explosion-proof BH or NEMA 4X-compliant D-BOX.

Figure 11 shows the dimensions of the HP housing. The dimensions of the SDY enclosures are shown in Figures 9 and 10.

Mounting and Connections

Moore Industries suggests installing the SDY 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 SDY

To mount the SDY, use 4.5mm (0.18 in) screws to connect the SDY and mounting plate to a connection head or other housing.

Electrical Connections for the SDY

Figure 12 shows the hookups for the SDY. Feed the sensor wiring up through the center thru-hole (and typically, out a side port of the connection head).

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.

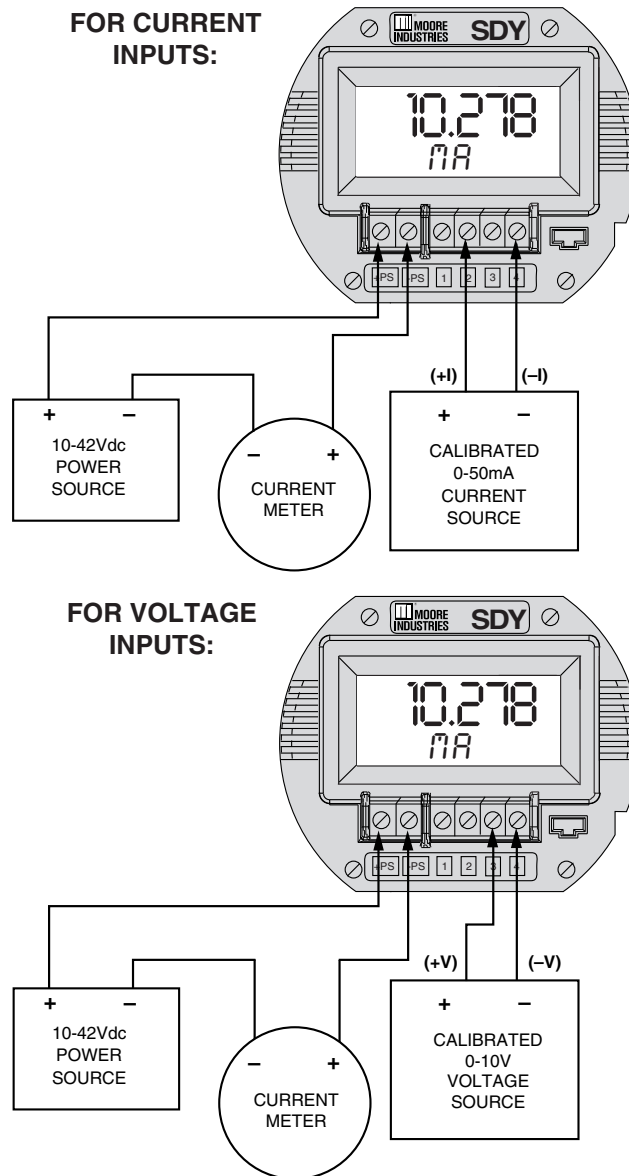
Note:

Some of Moore Industries' instruments can be classified as receivers (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 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 9. Connecting the HP-Housed SDY.



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Figure 10. The dimensions of the explosion-proof BH housing for the SDY unit.

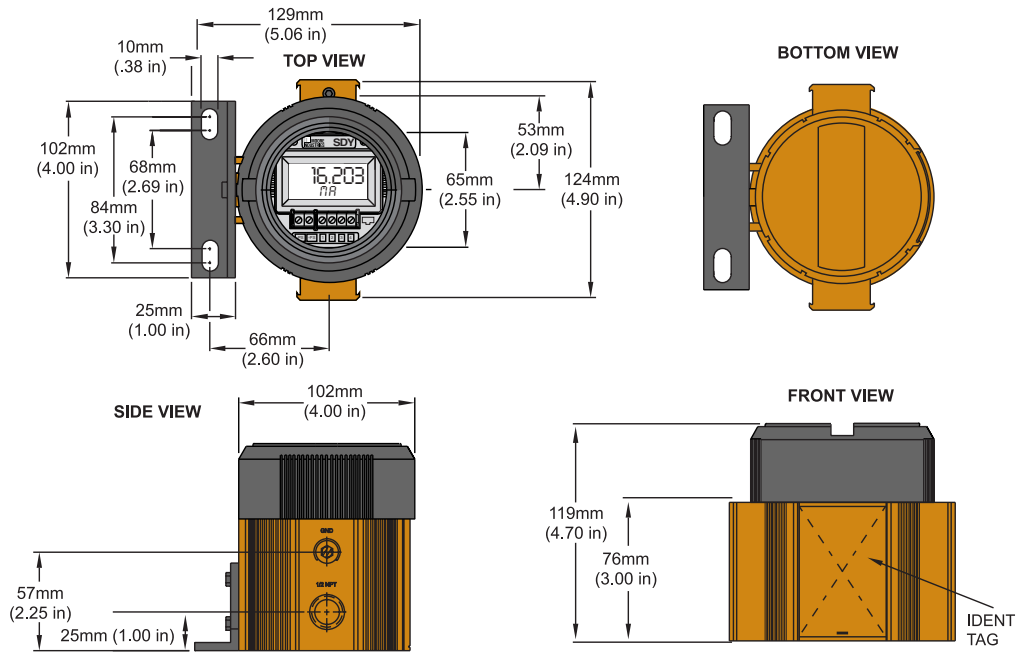


Figure 11. The dimensions of the D-BOX housing for the SDY unit.

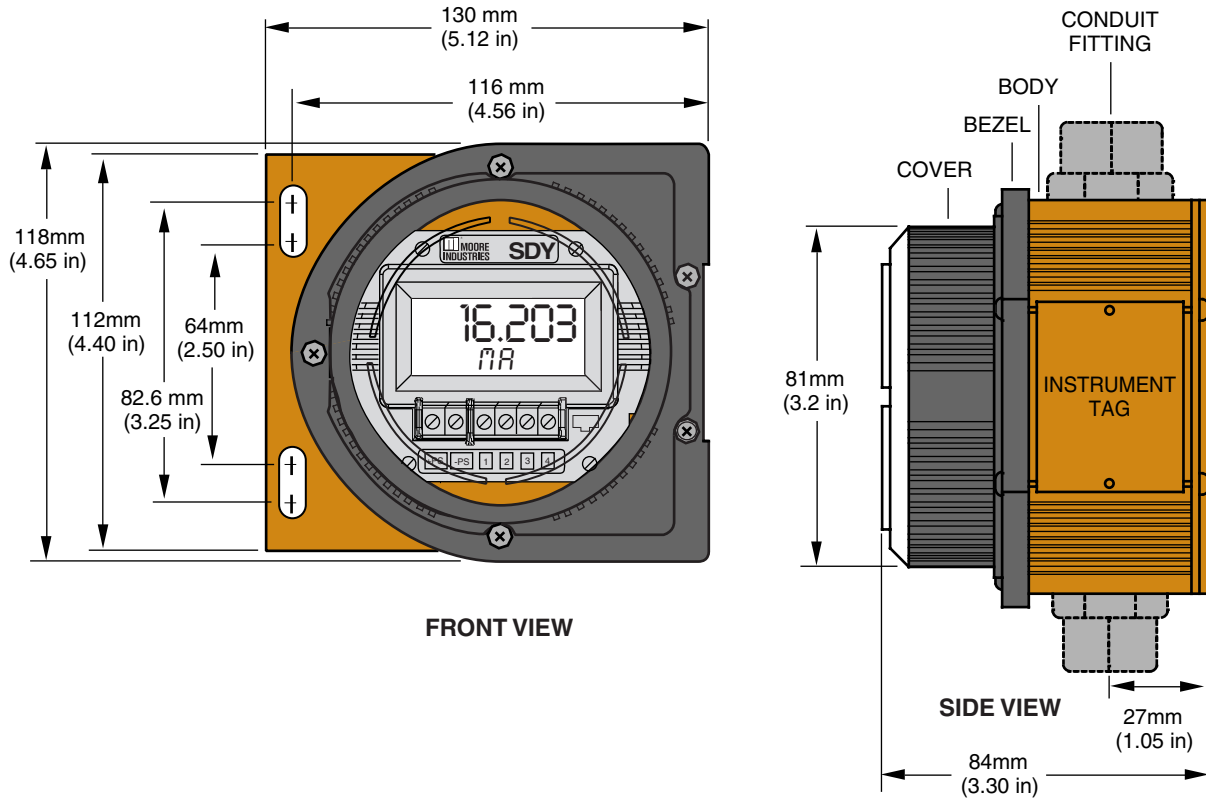
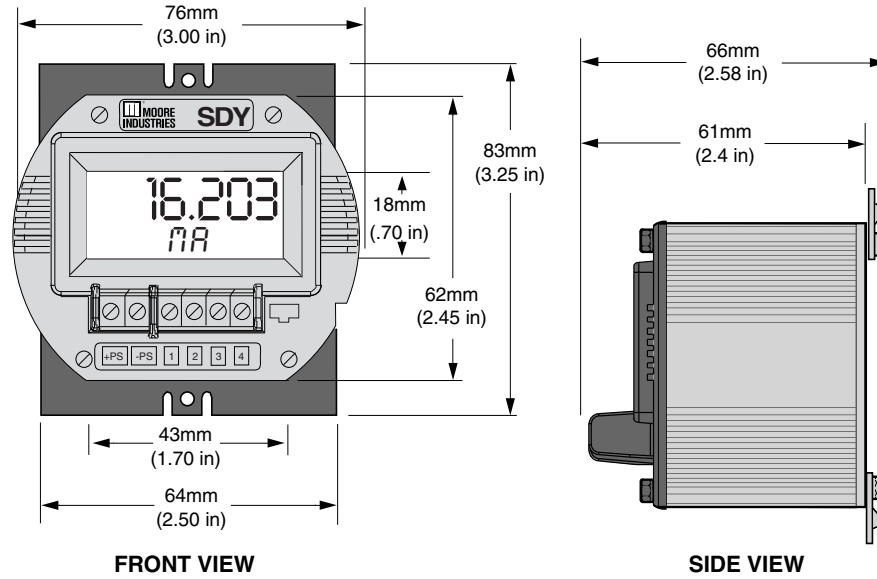


Figure 12. The dimensions of the HP housing for the SDY unit.



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Installation in Hazardous Locations

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

WARNING:

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

WARNING:

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

WARNING:

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

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

Specific Conditions of Use

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

cFMus Installations

Intrinsically Safe Applications Class I, Division 1, Groups A-D Class1, Zone 0, AEx ia IIC, Ex ia IIC

The SDY shall be installed in an enclosure which maintains an ingress protection rating of at least IP20 and also meets the requirements of ANSI/ISA 61010-1 or C22.2 No 1010-1.

The COM port shall not be used in Hazardous areas.

Nonincendive, Type n Applications Class I, Division 2, Groups A-D Class1, Zone 2, AEx nA IIC, Ex nA IIC

When installed as Division 2 equipment, the SDY shall be mounted within a tool-secured enclosure which meets the requirements of ANSI/ISA 61010-1 or C22.2 No. 1010-1 and be capable of accepting the applicable wiring method per the NEC or as specified in the C22.1 Canadian Electrical Code, Part I.

When installed as Zone 2 equipment, the SDY shall be mounted within a tool-secured enclosure which meets the requirements of ANSI/ISA 60079-0 or CAN/CSA-E60079-0 and ANSI/ISA 60079-15 or CAN/CSA 60079-15 and be capable of accepting the applicable wiring methods per the NEC or as specified in the C22.1 Canadian Electrical Code, Part I. The enclosure shall, at a minimum, meet the requirements of IP54.

On installation of Zone 2 equipment, the SDY shall be provided with supply transient protection external to the apparatus such that the voltage at the supply terminals of the SDY does not exceed 58.8V peak or 58.8Vdc.

The COM port shall not be used in Hazardous areas.

European Union Installations (ATEX 2014/34/EU Directive)

Intrinsically Safe Applications - Zone 0 II 1 G Ex ia IIC

The SDY shall be installed in an enclosure which maintains an ingress protection rating of at least IP20.

The communications port shall be programmed through Moore Industries Cable, Part No. 804-030-26, as described on Control Drawing 100-100-54.

The Cable cannot be used in Hazardous Areas or in ambient temperatures in excess of 75° C.

Type n Applications – Zone 2 II 3 G Ex nA IIC

When installed as Category 3 equipment, the SDY shall be mounted within a tool-secured enclosure which meets the requirements of EN 60079-0 and EN 60079-15 and is capable of accepting the applicable wiring methods specified in EN 60079-14. The enclosure shall, at a minimum, meet the requirements of IP54.

On installation, the SDY shall be provided with supply transient protection external to the apparatus such that the voltage at the supply terminals of the SDY does not exceed 119V peak or 119Vdc.

The COM port shall not be used in Hazardous areas.

IECEX Installations

Intrinsically Safe Applications - Zone 0 Ex ia IIC

The SDY shall be installed in an enclosure which maintains an ingress protection rating of at least IP20.

The communications port shall be programmed through Moore Industries Cable, Part No. 804-030-26, as described on Control Drawing 100-100-54.

The Cable cannot be used in Hazardous Areas or in ambient temperatures in excess of 75° C.

Type n Applications – Zone 2 Ex nA IIC

When installed as EPL Gc equipment, the SDY shall be mounted within a tool-secured enclosure which meets the requirements of IEC60079-0 and IEC60079-15 and be capable of accepting the applicable wiring methods for the country of origin.

The enclosure shall, at a minimum, meet the requirements of IP54. On installation, the SDY shall be provided with supply transient protection external to the apparatus such that the voltage at the supply terminals of the SDY does not exceed 119V peak or 119Vdc.

The COM port shall not be used in Hazardous areas.

SDY

PC-Programmable Signal
Isolator/Converter with Display

Operation

Once programmed, calibrated, installed, and supplied with the correct power, SDY 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.

Getting Help

The SDY Configuration Program is equipped with a context-sensitive help system that you can activate at any time while using the PC Configuration Software.

To enable Help, click on "Help" in the window on the bottom edge of the Configuration Screen.

Click on the portion of the screen that you would like more information about.

For more help, click on the "About" button in the lower-right corner of the screen. This will display the telephone numbers at which you can contact Moore Industries' trained staff of Customer Service Technicians for assistance.

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 SDY, 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).

Appendix A: Intrinsic Safety

The following pages contain the installation diagram for the SDY carrying the intrinsically safe option. It also includes guidelines for setting up zener barriers necessary in these types of applications.

These diagrams must be used to augment the installation instructions earlier in this manual for units that are to operate in areas requiring intrinsically safe instrumentation.

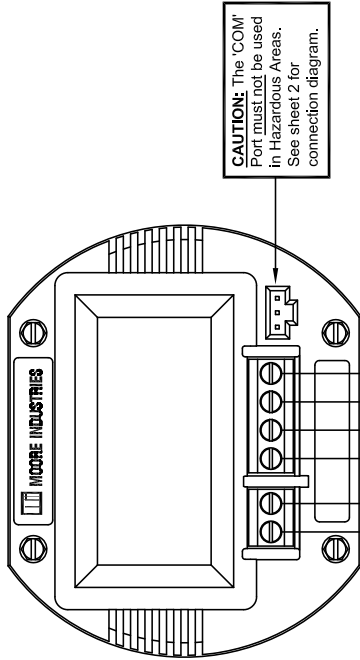
| | | | | | |
|--|--|--|--|---|---|
| | DO NOT SCALE DRAWING | | CATEGORY: CONTROL DRAWING TITLE: Installation Diagram: SDY [HP] or TDY [HP] Intrinsically Safe System | DRAWING NUMBER: 100-100-54 SHEET 1 of 2 | REVISION: D |
| | TOLERANCES (UNLESS NOTED) DECIMALS = ±0.01 mm FRACTIONS = ±1/32" | DRAWN: Gus H. Elias CHECKED: W. H. Co. ENGINEER: Gus H. Elias SCALE: NONE | 9/00 9/00 9/00 | REVISED BY: ECO 16898 DATE: 6/13 BY: CW APPROVAL: CB | NOTICE RE PROPRIETARY INFORMATION: This drawing and the information contained herein are the proprietary property of Moore Industries International, Inc. (MI) and should not be reproduced or disclosed to any third party without the written consent of an authorized officer of MI. |

Model TDY:
PC-Programmable Temperature Transmitter with Display

Model SDY:
PC-Programmable Signal Isolator/Converter with Display

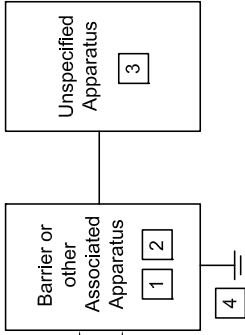
Hazardous Area / Explosive Atmosphere

Non-Hazardous Area



NOTE: If Ca of the Associated Apparatus is greater than 3µF, then the total cable capacitance shall be limited to 3µF.

| Entity Parameters | |
|----------------------|--|
| Associated Apparatus | Ca or Co ≥ Ci + Ccable La or Lo ≥ Li + Lcable Ui or Vmax ≥ Voc or Vt If or Imax ≥ Isc or It |
| | PI ≥ Po |




-- NOTE --
SEE SHEET 2 FOR INSTALLATION NOTES

-- WARNING --
Substitution of components may impair Intrinsic Safety. To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

Certified Product
This is a controlled 'Related' 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.)

| Area Classification | T Rating |
|--|---|
| Intrinsically Safe | Class I, Div. 1, Groups A-D Class I, Zone 0, Group IIC Group II, Category 1, Gas Group IIC, EPL = Ga |
| Nonincendive | Class I, Div. 2, Groups A-D Class I, Zone 2, Group IIC |
| Non-Sparking | Group II, Category 3, Gas Group IIC, EPL = Gc |
| Operating Temperature Range: -40°C ≤ Tamb. ≤ +85°C | |

| Entity Parameters | | | |
|-------------------------------|---|---|--|
| Sensor Terminals (1, 2, 3, 4) | RTD, T/C, mV, Ω | Ω (SDY) | mV (SDY) |
| | Uo = 6.51 Vdc Io = 61.1 mA Po = 100 mW Co = 21.9 µF Lo = 9.52 mH | Ui = 1 Vdc Ii = 50 mA Pi = 64 mW Ci = 66 nF Li = 0 mH | Ui = 7.9 Vdc Ii = 8 µA Pi = 64 µW Ci = 66 nF Li = 0 mH |
| | Co = 499.9 µF Lo = 38.09 mH | Group IIB | |
| | Co = 999.9 µF Lo = 76.19 mH | Group IIA | |
| Power/Loop (+PS & -PS) | Ui or Vmax = 30 Vdc Ii or Imax = 110 mA Pi or Pmax = 825 mW Ci = 10.34 nF Li = 0 mH | Must use +90°C suitable cabling | |

| | | | | | | | | |
|---|---|---|---------------------------|---|---|-------|-------------|-----------|
|  | DO NOT SCALE DRAWING | | CATEGORY: CONTROL DRAWING | | DRAWING NUMBER: 100-100-54 SHEET 2 of 2 | | REVISION: D | |
| | TOLERANCES (UNLESS NOTED) DECIMALS = ±0.0075mm FRACTIONS = ±1/32" | DRAWN: Gus H. Elias CHECKED: See Sht. 1 ENGINEER: See Sht. 1 SCALE: NONE | DATE: 9/00 | TITLE: Installation Diagram: SDY [HP] or TDY [HP] Intrinsically Safe System | REVISED BY: SEE SHEET 1 | DATE: | BY: | APPROVAL: |

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Installation Notes:

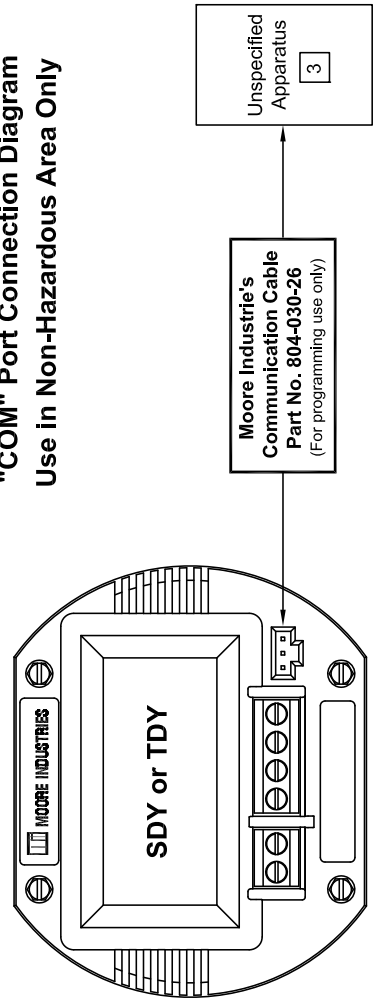
- The Associated Apparatus must be FM Approved for installations in the U.S.; Canadian Approved for installations in Canada; ATEX Certified for installations in Europe and IECEx Certified for IECEx installations.
- Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
- The control room equipment (unspecified apparatus) connected to the Associated Apparatus must not generate more than 250 Vrms or Vdc, or the marked Um on the associated apparatus, whichever is less.
- Installations in the U.S. shall be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the latest edition of the National Electrical Code (ANSI/NFPA 70). Resistance between Intrinsically Safe Ground and earth ground must be less than 1.0 Ohm.
- Installation in Canada shall be in accordance with the latest edition of the C22.1 Canadian Electrical Code, Part I.
- Installation in Europe shall be in accordance with the latest editions of the wiring practices for the country of origin and EN 60079-14.
- Installation for IECEx certification shall be in accordance with the latest editions of the wiring practices for the country of origin.
- The Entity Concept allows interconnection of associated apparatus and intrinsically safe apparatus when the following is true: $U_o \leq U_i$, $I_o \leq I_i$, $P_o \leq P_i$, $C_o \leq C_i + C_{cable}$; $L_o \leq L_i + L_{cable}$.
- The mV and Ohm's equipment must be FM Approved and meet the entity requirements for installations in the U.S.; Canadian Approved and meet the entity requirements for installations in Canada; ATEX Certified and meet the entity requirements for installations in Europe and IECEx Certified and meet the entity requirements for IECEx installations.
- No revision is allowed to this drawing without prior FM Approval.

-- WARNING --
 Substitution of components may impair Intrinsic Safety. To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

Where English is not a language of the Country in which the equipment is being used, please apply to Moore Industries International, Inc. (MI) for a suitable translation.

Installation may only be carried out by suitably trained personnel and in accordance with national wiring regulations or codes of practice.

**"COM" Port Connection Diagram
 Use in Non-Hazardous Area Only**



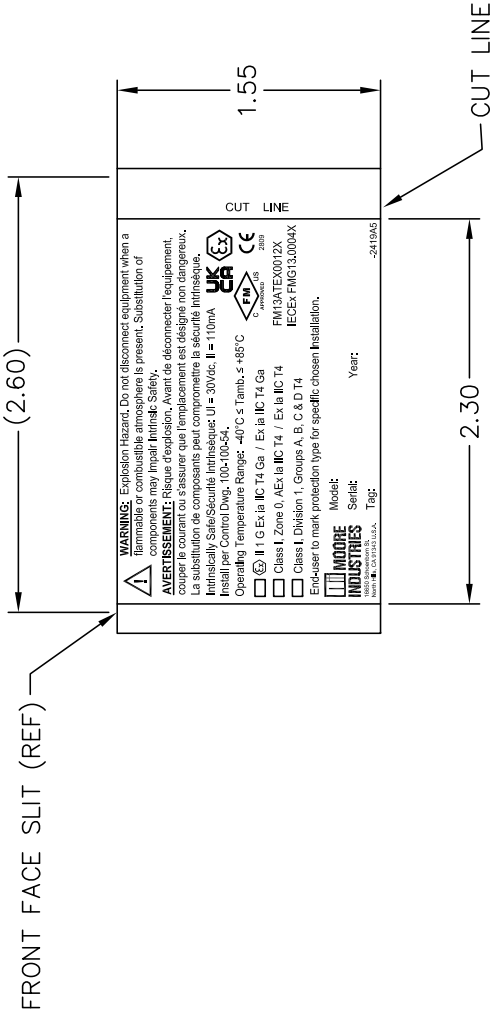
Certified Product
 This is a controlled "Related" or "Schedule" drawing. No modifications are permitted without the notification and (real approval of the Certifying Engineer (related drawings) or the Certifying Agency (schedule drawings).

| | | | | | | |
|---|--|--|------------------------------|---|------------------------------|--|
|  | DO NOT SCALE DRAWING | | CATEGORY: COMPUTERIZED LABEL | | DRAWING NUMBER: 200-251-2419 | REVISION: A5 |
| | TOLERANCES (UNLESS NOTED) DECIMALS =inches/mm .X =±.1 /2.54 .XX =±.01 /0.25 .XXX =±.005/0.125 HOLES =±.003/0.080 ANGLES =±1/2° | DRAWN C. Whan CHECKED V. Garcia ENGINEER W. Tchan SCALE 1/1 | 1/13 1/13 1/13 | TITLE ID LABEL, SDY/TDY [HP] -cFMus/IECEX/ATEX Intrinsically Safe | | REVISOR BY: ECO DATE: 12/22 BY: TG |

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Certified Product
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This drawing is related to schedule drawing 200-251-2419, Revision A, and is technically equivalent.



NOTES: UNLESS OTHERWISE SPECIFIED

1. MATERIAL: .002 SILVER, IDENTIPLATE (MII P/N 200-305-00) CUT TO SIZE AS SHOWN. REFER TO LABEL SPEC. DRAWING 200-305-00. ADHESIVE BACKING IS UL/CSA APPROVED HIGH PERFORMANCE ACRYLIC. PRINTING IS WITH BLACK, UL/CSA, THERMAL TRANSFER RIBBON (801-003-96).
2. THE FIXED TEXT AND GRAPHIC FIELDS FOR THIS LABEL ARE STORED UNDER NO. 200-251-2419 IN THE LEGI 93 LABEL MACHINE COMPUTER HARD DISK.
3. TO PRINT THIS LABEL: JOB SPECIFIC MODEL, SERIAL, AND TAG NUMBERS WILL BE DOWNLOADED FROM THE MENTOR DATA FILE AND PRINTED ALONG WITH THE FIXED TEXT AND GRAPHICS (SUPPLIED BY THE LEGI 93 DATA FILE) TO CREATE THE FINISHED LABEL.
4. ALL MATERIAL MUST BE ROHS COMPLIANT.

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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