

Series 1400 SELECTRONIC® Annunciator Installation and Operation Manual

S14-92134N
Revised 03-94
Section 50



Please read the following information before installing. This installation information is intended for all Series 1400 models. FOUR STAGE ENGINE DRIVEN operation information— see Attachment S14E-92229N.
FOUR STAGE ELECTRIC MOTOR DRIVEN operation information—see Attachment S14M-92230N.

GENERAL INFORMATION

WARNING

BEFORE BEGINNING INSTALLATION OF THIS MURPHY PRODUCT

- ✓ Disconnect all electrical power to the machine.
- ✓ Make sure the machine cannot operate during installation.
- ✓ Follow all safety warnings of the machine manufacturer.
- ✓ Read and follow all installation instructions.

Suitable for Class I, Division 1, Group D,
Hazardous Locations.

Description

The S1400 is a microprocessor based fault annunciator. It tells in alphanumeric characters which protective device has signaled an alarm or caused equipment shutdown. Basic programming for each application is completed at Murphy and can be changed in the field by simply plugging in a new preprogrammed microchip. A digital output version (S1400-SP) interfaces with micro-controllers (7 bit straight binary code). The basic system consists of (1) the module, (2) terminal block assembly (32 position rail mount), (3) a 36 inch (914 mm) flat ribbon cable for connection of the terminal block to the monitor, and (4) a power supply which includes the control Inputs/Outputs and an intrinsically safe barrier with cable assembly.

The S1400 and S1400-SP are powered from a 120 VAC or 12/24 VDC, Class I, Division 1 explosion-proof power supply. The monitor is rated intrinsically safe.

Module

The S1400 module is the brain of the annunciator system. It contains a microcomputer, a 32 point multiplexer, a dot matrix alphanumeric display and a 6-button membrane keypad for operator access to field adjustable functions. (See figure, p-2.)

Display

The S1400 module displays each mode of operation. The display is a dot matrix alphanumeric 32-character display. By observing the monitor the operator can determine the operating status of the control system.

Power Supply

An explosion-proof enclosure designed for Class I, Division 1, Group D hazardous locations (CSA approved.) contains the supply voltage conditioning circuits, battery charger, module power supply, backup batteries

Installation Accessories

Hardware, tools, and optional equipment needed to install the S1400.

- For CD ignition applications use an S14RSA92 adapter. (See Opto-isolator note under specifications section, p-2).
- For normally open prelude permissive function use a 20P100 SWICHGAGE® or a suitable pressure switch. For normally closed prelude permissive function use a 20EO-100 SWICHGAGE® or a suitable pressure switch. (See Permissive Function, p-2.)
- Mounting rail (see page 3 for specifications).
- Hardware for power supply mounting (four 5/16 in. [8 mm] size bolts or machine screws, 1-1/2 in. [38 mm] minimum length).
- Tools as needed for the system mounting, needle nose pliers, set of sockets, blade type screwdriver.
- 18 ga. wire for extension and hook up. Set of wire terminating tools and wire terminations such as ring or spade terminals.

and the intrinsically safe barriers for isolation between the power supply and the low energy module circuits. The power supply accepts 120 VAC, 50-60 Hz and/or 12-24 VDC input power. 24 VDC power can be used as primary power or as a backup source of power when 120 VAC is used. 120 VAC power is connected between terminals #1 and #2 of the 18 position power input and output terminal block. 24 VDC is connected between terminal #3 and #4, with terminal #3 positive with respect to terminal #4.

Control Relays

The power supply has four control relays to provide form “C” SPDT outputs. The output relay functions for Four Stage Electric Motor Driven applications are: lube control, drive motor, cooler motor, and alarm.

The output relay functions for Four Stage Engine Driven applications are: lube control, ignition ground, fuel valve control, and alarm. Relay functions for custom programs will depend upon specific application.

Four light emitting diodes (LED's) located adjacent to the relays, turn ON to indicate when the relays are energized.

System Input Terminal Block

Sensor input terminal block consists of a 64-position, 32 pair input rail-mount terminal block for interface of panel or field-mounted end devices. End devices must be mechanical switches (non energy storing devices). The terminal block can be used for Normally Open sensors (one wire), and/or Normally Closed sensors (two wires). Factory installed jumpers are supplied for each sensor input.

Ribbon Cable

A 36 in. (914 mm) flat ribbon cable is required for connection of the S1400 module and the sensor input terminal block. The cable is supplied with two D-sub 37 PIN connectors at each end of the cable.

Power and Control Cable

The S1400 module is connected to the power supply via the 9-conductor shielded cable. The cable is factory-sealed on the power supply end, and has a D-sub miniature connector on the monitor end. Outputs from the module are transmitted to control relay drivers in the power supply via four conductors of the 9-conductor shielded cable.

System Power Backup Battery

The backup power is provided by a 12 VDC, 600 MAh rechargeable Ni-cad battery pack. A temperature compensated, constant current battery charger maintains full charge on the battery pack when primary power is on. If the battery is fully discharged when primary power is turned on, it will take approximately 24 hours to bring batteries up to full charge. At full charge the battery pack will maintain operation of the S1400 system for approximately 5 hours after primary power failure. The battery output is regulated to 6 VDC for the monitor supply voltage.

Sensor Inputs

The sensor inputs are divided into three major groups identified as class "A", class "B", or class "C".

Class "A" inputs are operative (armed) all the time.

Class "B" inputs are enabled after the preset Start-Run time period.

Class "C" inputs are armed only after the fault has been cleared for (2) seconds. (Example: Process Variables).

Opto-isolated Input

The Opto-isolated input is a special input in the explosion-proof power supply which can be preprogrammed as:

1. Remote Reset Input (standard programs): Resets Start-Run timer and enables the Class "B" lockouts.
2. Explosion-proof Shutdown (optional): for Normally Open or for Normally Closed systems.

Permissive Function

This function was designed to monitor prelude pressure input. Terminal 32 of the sensor terminal block is reserved for a permissive prelude input. The pressure signal can be obtained from a pressure switch with normally open or normally closed contacts that indicates whether or not sufficient oil pressure has been reached during prelubing. If permissive pressure has not been reached, the system will not allow start-up.

Intrinsically Safe Barrier

The power supply circuit is isolated from the S1400 module by the intrinsically safe barrier located on the printed circuit board (power supply enclosure), between the power supply output and the power and control cable terminal block.

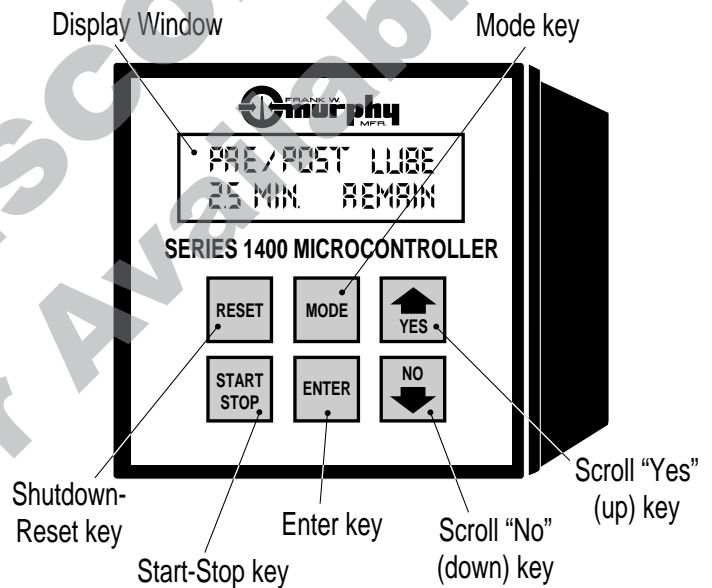
The intrinsically safe barrier consists of seven (7) separate barriers. The power output to the module is isolated by a Fuse Barrier (FB barrier) mounted inside a sub-module attached to the power supply circuit board. The four (4) control outputs from the S1400 module are isolated by zener diode shunt barriers.

Remote Reset Function in terminal block

The S1400 can be configured for Remote Reset through sensor input terminal #32 (must connect to dry contact mechanical switches, or an approved explosion-proof barrier must be used).

NOTE: To make a selection for channel configuration, output relay options, opto-isolator option, and to assist you with your selection, just give us a call. (Phone and fax numbers on back page.)

THE SERIES 1400 MODULE



SPECIFICATIONS

Specifications

Power Consumption: 120 VAC (8 watts), 24 VDC (7.2 watts) or 12 VDC (2.5 watts).

Sensor Inputs: For up to 32 normally open (NO) and/or normally closed (NC) sensor inputs such as Murphy SWICHGAGE® control instruments. Each input is factory programmed as a class A, B, or C for shutdown, alarm, or control function.

Opto-isolated Input: 12-120 VDC or 24-120 VAC, the opto-isolated input is typically used as a run input.

NOTE: For connection of the S1400 with a CD ignition system use the S14RSA92 adapter. Connect the adapter in series between the ignition lead and the opto-isolator input.

Outputs: Four (4) SPDT relays, 4A, 1/20 HP, 125/250 VAC/3A, 30 VDC.

Timers: Four (4) adjustable timers designated for: lockout at start-up, test timer, prelude, and postlude.

Time Delay: A delay before ignition ground or electric motor stop, for up to 0.9 minutes each.

Program Memory: Memory held in EPROM, 4k, 192 bytes of RAM.

Backup Battery: Recharged during normal operation. Provides up to 5 hours backup time.

Operating Temperatures: 32° to 122°F (0° to 50°C).

Storage Temperatures: -4° to 158°F (-20° to 70°C).

Case: ABS, 1/4 DIN (90 x 90 mm).

Interface Output: Digital, 7 bit straight binary code. (Requires an S1400SP module, this option is not CSA approved).

Display: Alphanumeric Dot Matrix, 2 line 32-character display.

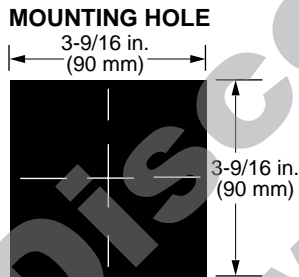
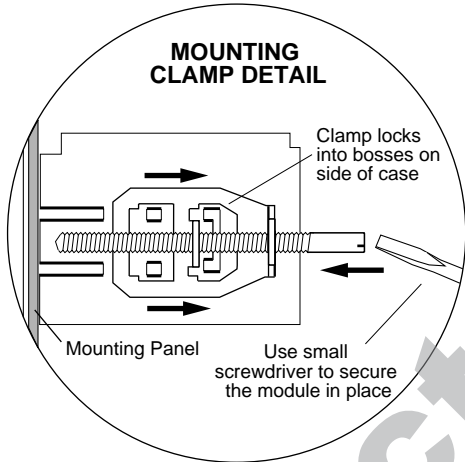
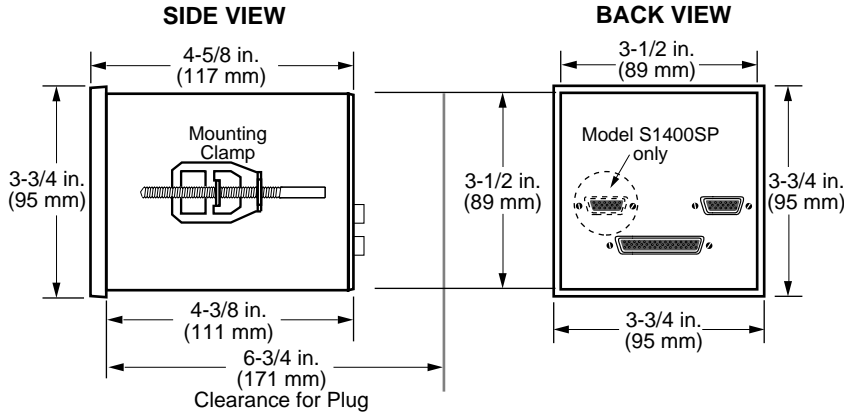
Power Supply: Enclosure: *Explosion-proof, Class I, Division 1.*
Barrier: *Intrinsically safe barrier built into power supply, 120 VAC and 12 or 24 VDC power supply barrier.*

MOUNTING DIMENSIONS

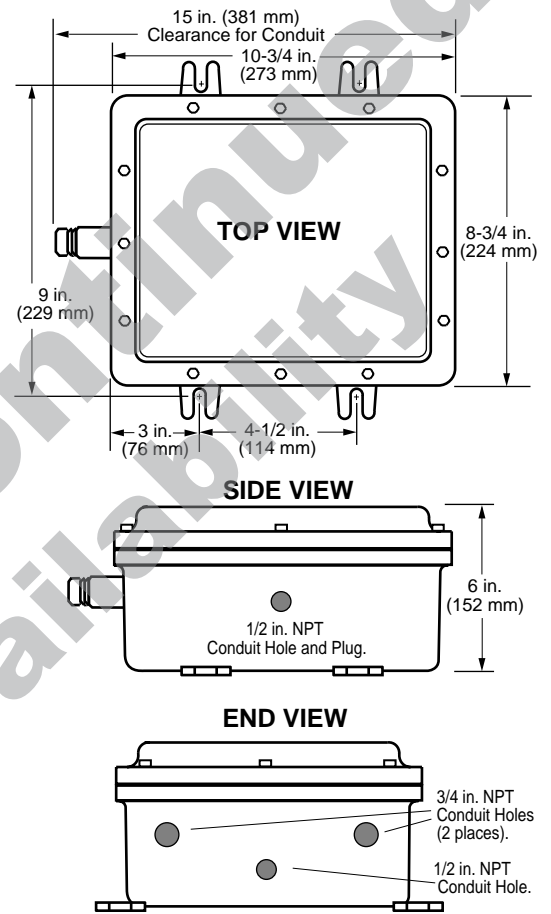


WARNING: Perform the mounting operation with power source off. The S1400 module was designed to be mounted within a weatherproof enclosure. It is intended for mounting in a flat panel. First, cut a square mounting hole of 3-5/8 in. (92 mm) x 3-5/8 in. (92 mm). Insert the module from the front side of the panel and install the two mounting clamps one on each side of the case, (see mounting clamp detail). Secure the unit to the panel by tightening the clamps with a blade type screwdriver.

S1400 MODULE

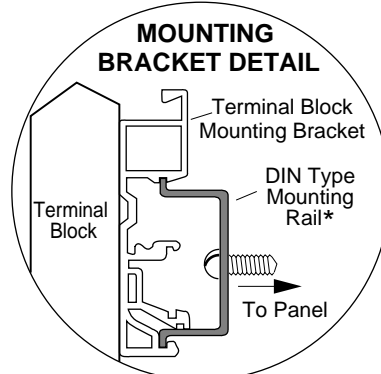
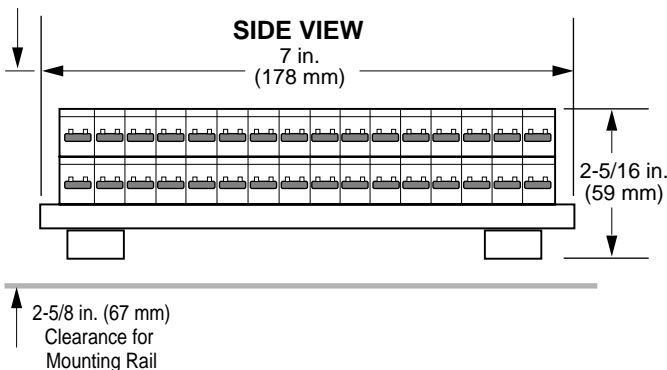
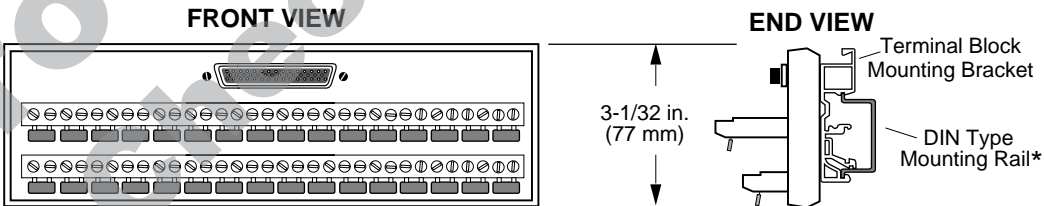


POWER SUPPLY BOX



TERMINAL BLOCK (rail mount)

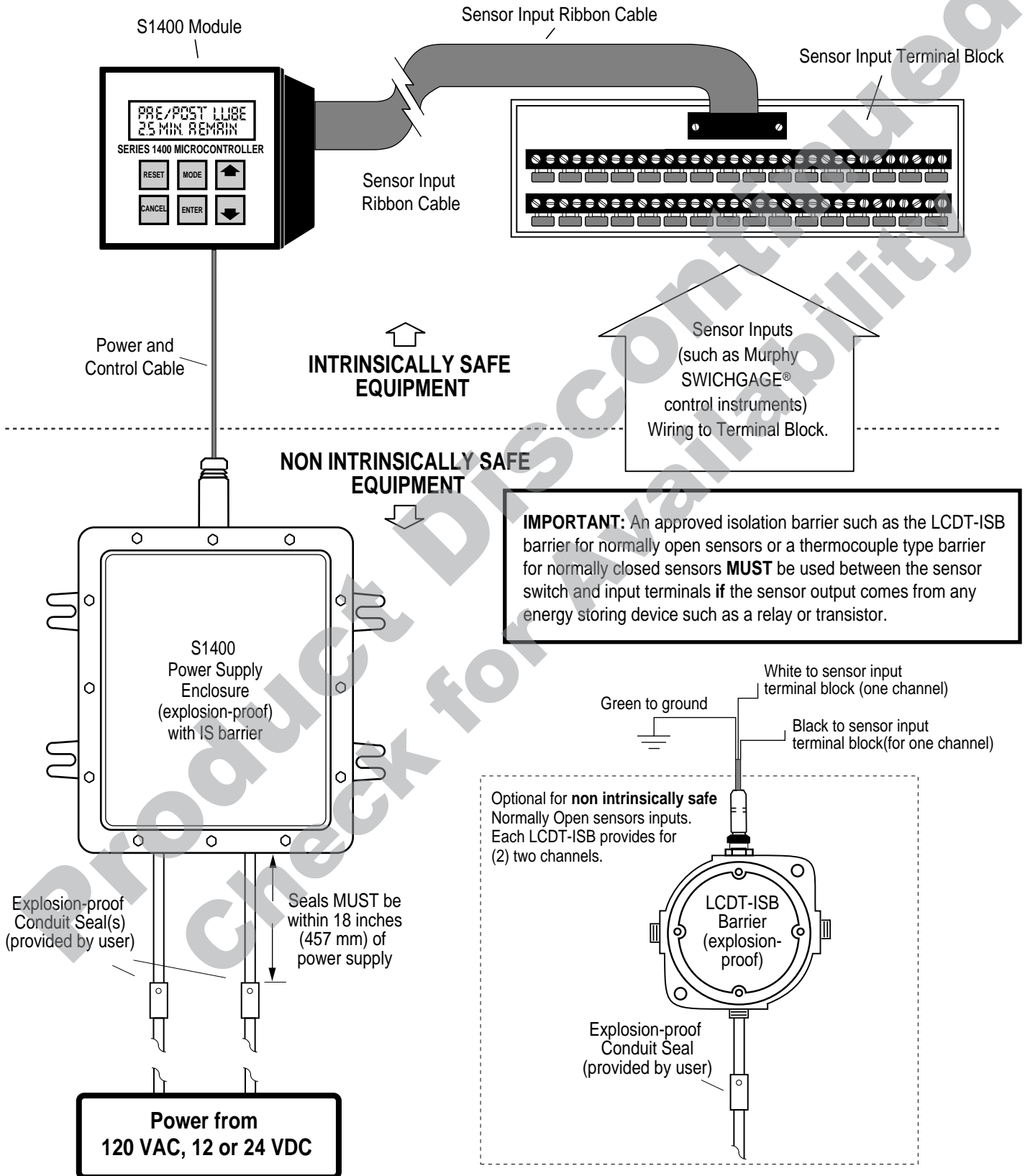
* The terminal block has (2) two rail mount clamps for easy panel mounting. Mounting rail is **NOT** supplied. Standard DIN mounting rail models: DIN 46277, EN50035, and EN50022 zinc-plated steel are recommended. The recommended length for the mounting rail is 7 inches (178 mm) minimum.



HAZARDOUS AREAS INSTALLATION



WARNING: For hazardous application requirements, the S1400 complete system must be installed in accordance with the National Electrical Code (NEC) Class I, Division 1, Group D (article 504) specifications, and per Murphy drawing HC12046.



SYSTEM TYPICAL HOOK UP

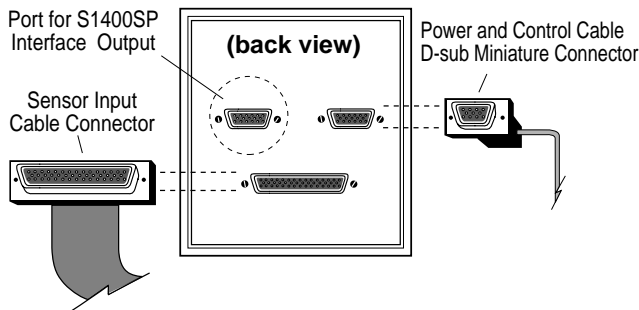


CAUTION: Perform the wiring operation with the power source “OFF” and the area made non-hazardous. Make sure the voltage and current requirements are within the S1400 system ratings. Conduit is required to protect wires from damage. REFER TO THE SPECIFIC SYSTEM APPLICATION WIRING DIAGRAM SUPPLIED WITH YOUR UNIT.

1. MODULE CONNECTIONS

- Interconnect the S1400 module and the power supply with the power and control cable and secure the connector in place by tightening the screws on each side of the connector.
- Repeat step (a.) for the interface output port (if applicable).
- The sensor connector from the terminal block simply plugs into the back of the S1400 module.

S1400 Module



2. TYPICAL POWER SUPPLY CONNECTIONS



WARNING: Do NOT route the power supply wiring and the sensor input lead wiring in the same conduit.

a. Conduit installation:

- Remove power before opening power supply cover.
- Install one 1/2 in. NPT or two 3/4 in. NPT conduits, from customer end of the Power Supply.

Note: Follow NEC guidelines for maximum number of wires in conduit.

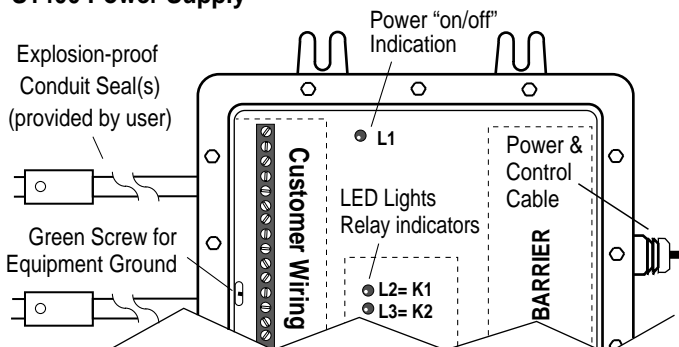
- Install an approved explosion-proof seal in the conduit within 18 in. (457 mm) of Power Supply enclosure (seal unused conduit holes).

Important: Green screw above conduit hole (power supply) is to attach equipment ground per NEC.

b. Customer Wiring: Install non-intrinsically safe wiring to power supply through conduit installed in “step 2-a”.

- Run wiring from the power source to the S1400 power supply.
- Connect the 120 VAC “L1” lead to terminal 1 in power supply.
- Connect the 120 VAC “N” lead to terminal 2 in power supply and connect ground to terminal 4, and to equipment ground.
- For 12 or 24 VDC, connect “DC(+)” lead to terminal 3 on power supply. Connect “DC(-)” lead to terminal 4. (Refer to Power Supply Wiring Diagram, supplied with your unit.)

S1400 Power Supply



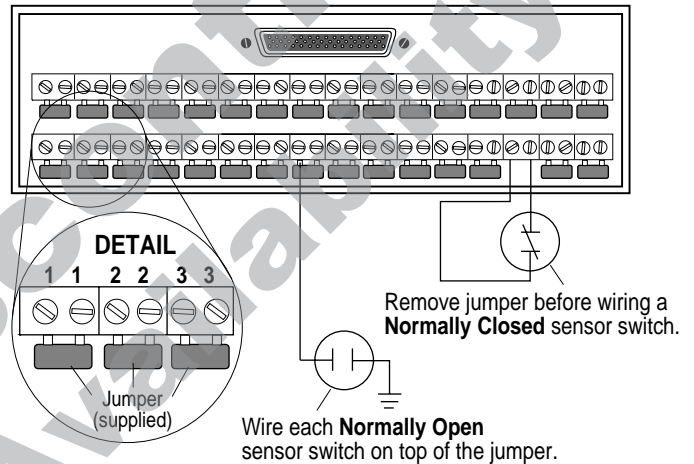
3. NORMALLY OPEN SENSOR INPUT WIRING

Wire each normally open sensor on top of the factory supplied jumper. Loosen the screw and slide the wire lead into the terminal without removing the jumper (either side of jumper).

4. NORMALLY CLOSED SENSOR INPUT WIRING

Remove the factory-supplied jumper completely. Connect the two sides of the normally closed sensor to the two terminals of the terminal block.

S1400 Sensor Input Terminal Block

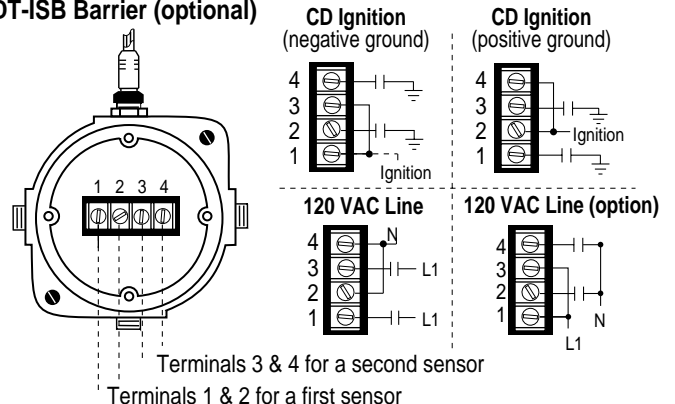


NOTE: All switches connected to terminal block must be dry contact mechanical switches.

5. INTRINSICALLY SAFE BARRIER WIRING (for normally open sensor only) Important: Secure area of hazardous conditions before opening barrier cover or operating sensor contacts.

- Run Sensor switches wiring through conduit and isolate from the S1400 terminal block with an explosion-proof barrier.
- For wiring refer to the following typical wiring diagrams.

Normally Open System Barrier LCDT-ISB Barrier (optional)



NOTE: Terminals #1 & #3 must be (+) positive with respect to #2 and #4.

Normally Closed System Barrier

For normally closed non-intrinsically safe sensors, use an approved intrinsically safe barrier, and wire according to manufacturer's instructions.

TROUBLESHOOTING INSTRUCTIONS



WARNING: Do NOT open power supply until operations have been shut down and area has been rendered non-hazardous. Do NOT run sensor wires in conduit with any other wire. Do NOT apply voltage to any annunciator input terminals. Do NOT bundle sensor wires with any other wiring. Make sure the voltage and current requirements are within the S1400 system ratings.

Troubleshooting Instructions

Before going through the check list below, refer to the connections and operation procedures. Also check your system wiring schematic.

If any problems persist after you have made these checks, consult your nearest Murphy facility.

1. Symptom: No display

- a. Check that the miniature D-sub 9-pin connector (power and control cable) is firmly connected to the back of the S1400 module. Check the power and control cable for cracks or broken wire.
- b. Check for power failure or power input shutdown.

NOTE: If after all of the above has been done, and there is still no display, return the S1400 module to us.

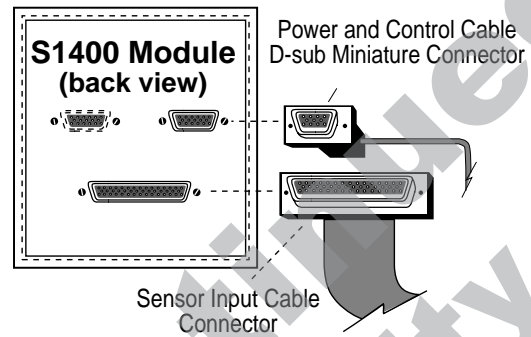
2. Symptom: Engine fails to start (Sensor switch fault display cannot be cleared.)

- a. Check that the miniature D-sub 9-pin connector (power and control cable) is properly connected to the back of the S1400 module.
- b. Check that the sensor input cable connector (ribbon cable) is properly connected to the back of the S1400 module.
- c. Check the display window for low battery voltage. A fading display will indicate loss of primary and backup power. To fully charge the battery pack allow 24 hours with primary power ON.

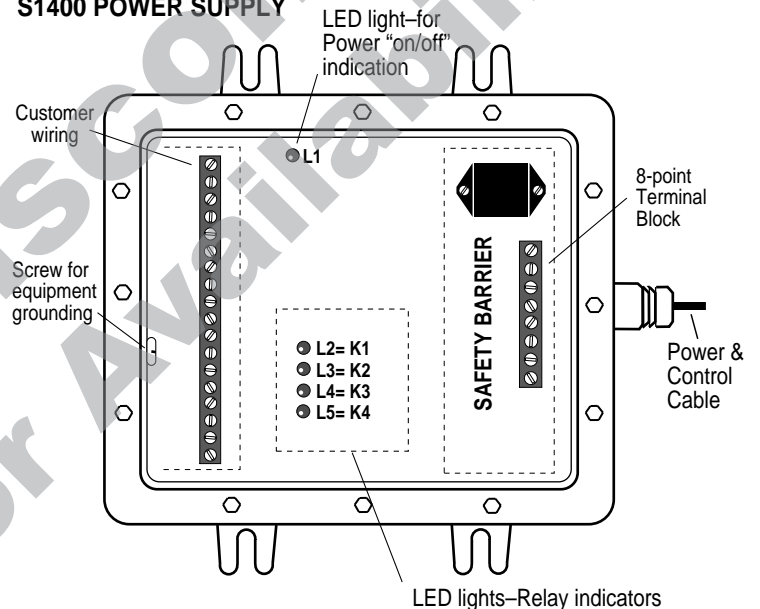
NOTE: Backup battery package can only be replaced at the factory.

- d. Check to see that LED lights are lit indicating relays are functioning
- e. Check that the 8 leads on the 8-point terminal block under the Safety Barrier cover are connected and tight. (See drawing.)
- f. Measure the voltage between terminals #1 and #2 on the 8-point terminal block, (voltage should read between 5 VDC and 6 VDC). Do this with the power input connected to power supply, and with it disconnected. There should not be more than a 0.5 V difference between the readings with the panel connected, and not connected.

NOTE: If shutdowns still result, send the complete system back to us.



S1400 POWER SUPPLY



WARRANTY

A two year limited warranty on materials and workmanship is provided with this Murphy product. Details are available on request and are packed with each unit.

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.



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