

User Manual

DSI 2 Sensor Interface

Die Protection Sensor Interface

1121900

Rev. F August 2016

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Changes for Revision F of the DSI 2 User Manual (1121900)

This revision of the DSI 2 user manual covers all versions and includes the following change:

- Modification of the 16-input DSI 2 enclosure (see Figure 2-3, on page 5).

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How To Use This Manual

This manual shows you how to install the DSI 2 sensor interface, connect DSI 2 to die protection controls such as SmartPAC and DiPro 1500, and wire sensors to DSI 2.

Chapter 1 provides an introduction to DSI 2, describing the product's various connection options, explaining the components on the DSI 2 front panel, and listing product specifications.

Chapter 2 shows you how to mount DSI 2, make power connections, wire DSI 2 to a die protection control, and perform test procedures.

Chapter 3 shows you how to wire sensors to the various types of connectors used with DSI 2, including the 4-pin quick-change connector, 5-pin HDP connector, 12-pin QDP connector, and 19-pin HD19 connector.

Appendix A provides a parts list.

Wiring diagrams are provided at the back of the manual.

Important Highlighted Information

Important danger, warning, caution and notice information is highlighted throughout the manual as follows:

DANGER

A DANGER symbol indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.

WARNING

A WARNING symbol indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

CAUTION

A CAUTION symbol indicates a potentially hazardous situation, which, if not avoided, may result in property damage.

NOTICE

A NOTICE symbol indicates important information that you should remember, including tips to aid you in performance of your job.

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Wintriss Controls warrants that Wintriss electronic controls are free from defects in material and workmanship under normal use and service for a period of one year (two years for Shadow light curtains) from date of shipment. All software products (LETS and SBR), electro-mechanical assemblies, and sensors are warranted to be free from defects in material and workmanship under normal use and service for a period of 90 days from date of shipment. Wintriss's obligations under this warranty are limited to repairing or replacing, at its discretion and at its factory or facility, any products which shall, within the applicable period after shipment, be returned to Wintriss Controls freight prepaid and which are, after examination, disclosed to the satisfaction of Wintriss to be defective. This warranty shall not apply to any equipment which has been subjected to improper installation, misuse, misapplication, negligence, accident, or unauthorized modification. The provisions of this warranty do not extend the original warranty of any product which has either been repaired or replaced by Wintriss Controls. No other warranty is expressed or implied. Wintriss accepts no liability for damages, including any anticipated or lost profits, incidental damages, consequential damages, costs, time charges, or other losses incurred in connection with the purchase, installation, repair or operation of our products, or any part thereof.

Please note:

It is solely the user's responsibility to properly install and maintain Wintriss controls and equipment. Wintriss Controls manufactures its products to meet stringent specifications and cannot assume responsibility for consequences arising from their misuse.

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DSI 2 SENSOR INTERFACE
 USER MANUAL
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Chapter 1. Introduction

The DiPro Sensor Interface (DSI) 2 enables up to eight (8-input option) or sixteen (16-input option) sensors to be connected to your die protection control. Depending on the DSI 2 version you purchase (see Figure 1-1), as many as eight sensors can be connected with a single cable, eliminating the need to disconnect and re-connect individual sensor cables on each die change. DSI 2 8-input versions provide front panel connections for up to four mechanical sensors. AC or DC input power options are available.

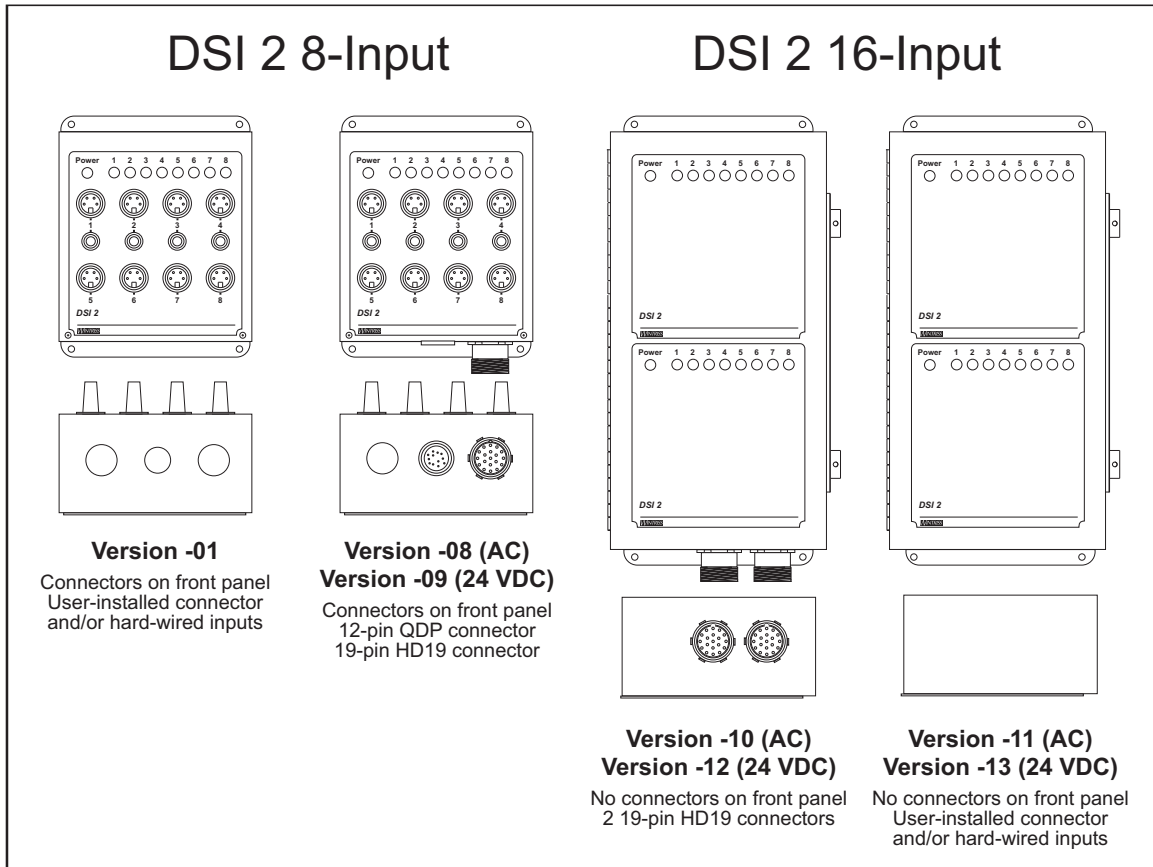


Figure 1-1. DSI 2 8- and 16-Input Versions Showing Connection Options

The DSI 2 has a built-in power supply (24V, 500 mA), which you can use to power compatible DC-powered sensors. Though you should use electronic sensors whenever possible, DSI 2 enables you to continue to use mechanical sensors. End-of-material and buckling sensors, probes, and other mechanical sensors plug into the 8-input DSI 2 as easily as electronic sensors do.

Multiple Sensor Inputs

Eight-input DSI 2 versions -08 and -09 provide a 12- and a 19-pin connector on the bottom of the enclosure that enables you to connect some or all of your sensor inputs with a single connector (see Figure 1-1). Sixteen-input DSI 2 versions -10 and -12 provide two 19-pin connectors. Connection options are as follows (part numbers are provided in Appendix A):

Heavy-duty 19-pin (HD19) Connector

One heavy-duty 19-pin (HD19) connector is located on the bottom of DSI 2 8-input versions -08 and -09; two HD-19 connectors are located on the bottom of 16-input versions -10 and -12. Each connector accepts a rugged HD19 cable that connects to either a die-mounted HDP (Heavy-duty Plug) junction box (see *Wiring Sensors to the HD19 Connector*, page 3-3) or a user-configured 19-pin PC board (see *Installing and Wiring the HD19 Kit*, page 3-7). Both alternatives enable you to connect and disconnect as many as eight sensors from the DSI 2 with a single cable. The HDP junction box comes in four- and eight-sensor models.

QDP 12-pin “Quick Die Plug”

A 12-pin QDP connector is located on the bottom of DSI 2 8-input versions -08 and -09. Provided as a convenience for older installations, the QDP connector also enables you to connect and disconnect up to eight sensors with a single cable (see *Wiring Sensors to the Twelve-pin QDP Connector*, page 3-9).

User-installed Connector

You can install your own connector for connecting multiple sensors with one cable on DSI 2 8-input version -01 and 16-input versions -11 and -13. DSI 2 version -01 provides three knockouts on the bottom of the enclosure. See *Wiring Sensors with a User-installed Connector*, page 3-12.

Hard-wiring Sensors

Some sensors mounted on press components or in other fixed locations do not have to be changed when the die is changed, so it is convenient to hard-wire them. DSI 2 8-input versions allow you to hard-wire up to eight sensors, 16-input versions up to 16 sensors. DSI 2 version -01 provides knockouts. See *Hard-wiring Sensors*, page 3-13.

Individual Sensor Inputs

Sensors can be connected individually to DSI 2 in all 8-input versions, which have connectors for up to eight sensors on their front panels (see Figure 1-2, page 1-3). No front panel connectors are available on 16-input versions. Front panel components are described below.

Power LED

Illuminates when power is applied to the DSI 2 sensor interface.

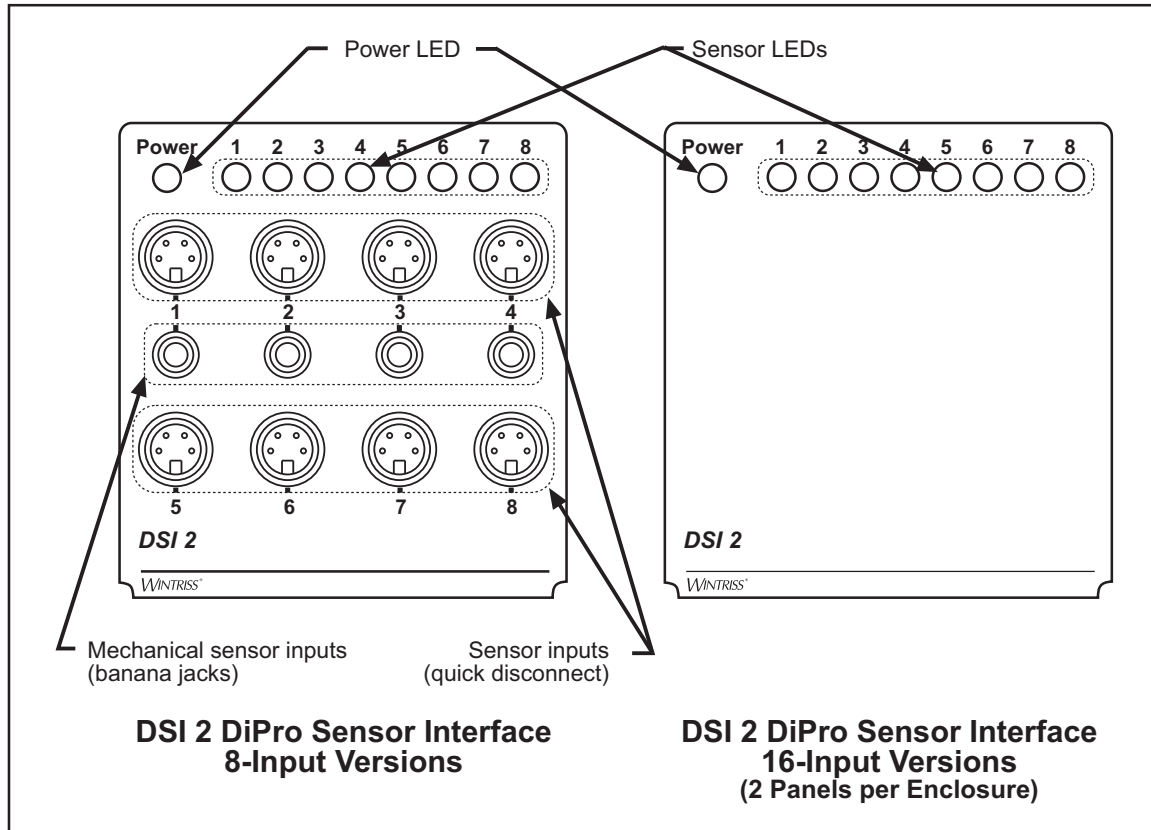


Figure 1-2. DSI 2 Front Panels

Electronic Sensor Inputs

DSI 2 8-input versions have eight 4-pin connectors for use with a wide variety of electronic sensors. Inputs 1 through 4 are “pulse-stretching” inputs. Inputs 5 through 8 are standard inputs.

Mechanical Sensor Inputs

Eight-input DSI 2 versions have four banana jacks for connecting electromechanical sensors, which can be used in place of the 4-pin sensor connectors for inputs 1 through 4. Mechanical sensors can also be connected to inputs 5 through 8 using a special quick-disconnect adaptor (Wintriss part no. DA52301).

Pulse-stretching Sensor Inputs, 1 through 4

Inputs 1 through 4 are pulse-stretching sensor inputs. Use these inputs for sensors that may turn on and off too quickly for your die protection control to detect their signal.

When the signal from any sensor connected to these inputs has an “on” time of less than 10 mS, the DSI 2 lengthens the “on” time of the output to 10 mS. If the sensor’s “on” time is 10 mS or more, the signal is not lengthened. Table 1-1, page 1-4 summarizes the differences between pulse-stretching (i.e., inputs 1-4) and standard inputs (i.e., inputs 5-8).

Table 1-1. Pulse-stretching and Standard Inputs: Signal Length and Typical Applications

| Inputs | Input Signal Duration | Output Signal Duration | Typical Use |
|--------|-----------------------|------------------------|---------------------------------------|
| 1 - 4 | Less than 10 mS | Approximately 10 mS | Fast events such as air-ejected parts |
| 1 - 4 | 10 mS or more | Same as input signal | |
| 5 - 8 | Any duration | Same as input signal | Slow events such as misfeeds |

Example: Pulse stretching

You are sensing an air-ejected part. The signal from the sensor lasts only 2 mS. The die protection control cannot detect such a short signal.

Plug the sensor into one of the pulse-stretching inputs on the DSI 2 (i.e., inputs 1 through 4). The DSI 2 automatically stretches the signal to about 10 mS, long enough for the die protection control to detect it.

Sensor LEDs

Each sensor has its own LED indicator on the front panel of both 8- and 16-input DSI 2 versions. Whenever a sensor actuates, or turns “on,” the corresponding LED illuminates.

Using Die Protection Controls with DSI 2

You can use DSI 2 with most die protection controls including those made by Wintriss. Chapter 2 shows you how to connect DSI 2 to Wintriss controls. User manuals documenting the individual controls also provide instructions for connecting DSI 2. Figure 1-3, page 1-5 illustrates the Wintriss products and sensor types to which DSI 2 can be connected.

Some die protection controls have inputs for electromechanical sensors that provide different impedances (“impedance” is opposition to the flow of electric current). As a rule, use a high-impedance input if the part is dirty or covered with a non-conductive lubricant. Use a low-impedance input if the part is covered with a water-based or conductive lubricant.

DiProPAC boards shipped since August, 2007 are compatible with all impedance levels. However, DiPro Sensor Interface (DSI) 2 cannot be used with low-impedance sensors. If you have a low-impedance application (e.g., a wire probe application in which a part/strip covered with a water-based, conductive lubricant completes the circuit), the sensor must be wired directly to the DiProPAC board.

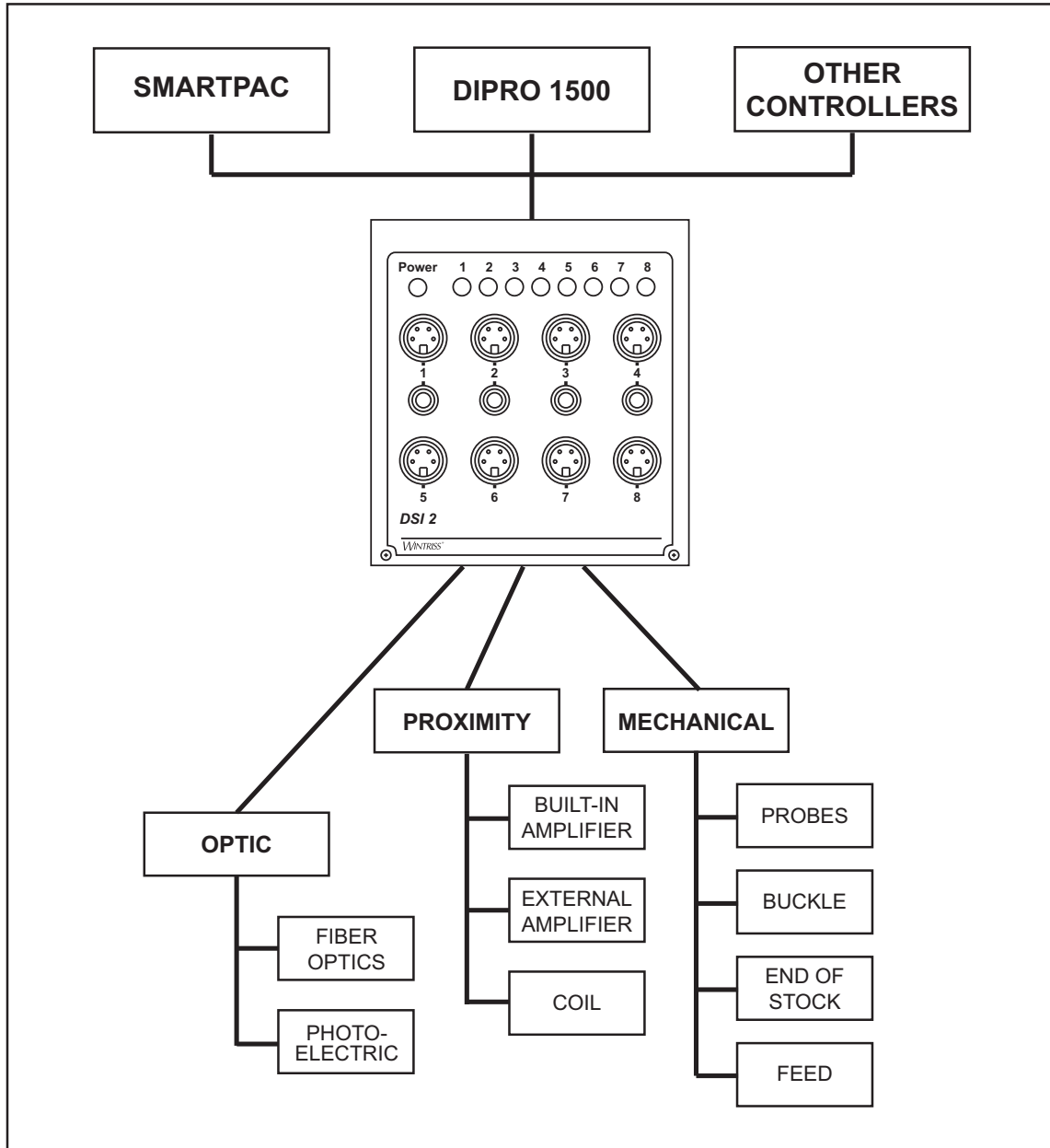


Figure 1-3. DSI 2 Shown with Typical Die Protection Controls and Sensors

Specifications

Specifications for DSI 2 are provided in Table 1-2.

Table 1-2. DSI 2 Specifications

| | |
|--|--|
| Enclosure | 8-input DSI 2: 5.88 x 5.41 x 3.42 in. (149.4 x 137.4 x 86.9 mm), shock-mounted 16-input DSI 2: 12.00 x 6.08 x 4.49 in. (3.04 x 154.4 x 114.0) mm), shock-mounted |
| Input power requirements | 100-240 VAC, 50/60 Hz, 20 VA max. 24 VDC, 0.65 A max. (8-input version -09) 24 VDC, 1.3 A max. (16-input versions -12 and -13) |
| Output voltage to sensors | 24 VDC \pm 5% |
| Total output current to sensors | 8-input DSI 2: 1/2 A max. 16-input DSI 2: 1 A max. |
| Operating temperature | 32° to 122°F (0° to 50°C) |
| LED indicators | Sensor output and power on |
| Maximum number of sensors | 8-input DSI 2: 8 electronic or 4 electronic and 4 electromechanical 16-input DSI 2: 16 electronic or electromechanical in any combination |
| Sensor types | NPN, PNP, 2-wire DC, electromechanical |
| Sensor connections | Power, common, and N/O |
| Pulse-stretching inputs | 8-input DSI 2: Inputs 1-4 (approximately 10 mS) 16-input DSI 2: Inputs 1-4 and 9-12 (approximately 10 mS) |
| Input voltage with sensor actuated | All inputs: NPN: 3 volts maximum PNP: 21 volts minimum |
| Input current with sensor off | 2 mA maximum |
| Quick-change sensor connectors | 4-pin locking plug (Lumberg SV40 or equivalent) HDP (heavy-duty plug) 12-pin QDP "quick-die" locking plug (Lumberg SV120 or equivalent) HD19 "heavy-duty 19-pin" connector (RDE UC-19S1N1280DU or equivalent) |
| Output signals to die protection control | NPN only |

Chapter 2. Installation and Testing

This chapter shows you how to install and test the DSI 2 sensor interface. It is organized in the following sections:

- *Mounting DSI 2*, next
- *Making Power Connections*, page 2-7
- *Connecting Output Cable to Die Protection Control*, page 2-9
- *Testing DSI 2*, page 2-15

Mounting DSI 2

The following sections show you how to mount the DSI 2 8- and 16-input enclosures and the DSI 2 PC board (no enclosure/no display).

CAUTION

PREVENT LIQUIDS FROM ENTERING THE DSI 2 ENCLOSURE

Mount the DSI 2 enclosure vertically as shown in the illustrations in this manual. If you do not mount the unit correctly, oil or other liquids may enter the enclosure.

Failure to comply with these instructions could result in property damage.

Mounting the 8-Input Enclosure

NOTICE

DSI 2 HAS SAME FOOTPRINT AS DSI, DIFFERENT POWER INPUT LOCATION

If you are replacing a DSI sensor interface with the DSI 2, you can mount it in the same location, using the same mounting holes if there is room to bring the power cable into the top of the enclosure. The DSI 2's power cable normally enters through the top of the enclosure; the DSI's power entered through the bottom of the enclosure.

The DSI 2 8-input enclosure includes a base, which is mounted on the press, and a cover, in which the sensor connectors and indicators are installed. When mounting the enclosure, you remove the cover and install only the base. The cover is re-attached to the base when all wiring has been completed.

Follow these guidelines when selecting a location for mounting the enclosure:

- Install the enclosure close to the die opening so that sensors can be connected easily. The length of most sensor cables is approximately 6.6 feet (2 m).
- Locate the enclosure away from excessive oil drip or splash.
- Keep the enclosure out of the pathway of die carts and fork lifts.
- Allow clearance in front of and beneath the enclosure for connectors and cables.

To mount the enclosure, perform the following steps, referring to Figure 2-1 for mounting dimensions and Figure 2-2, page 2-3 for location of components on the DSI 2 PC board:

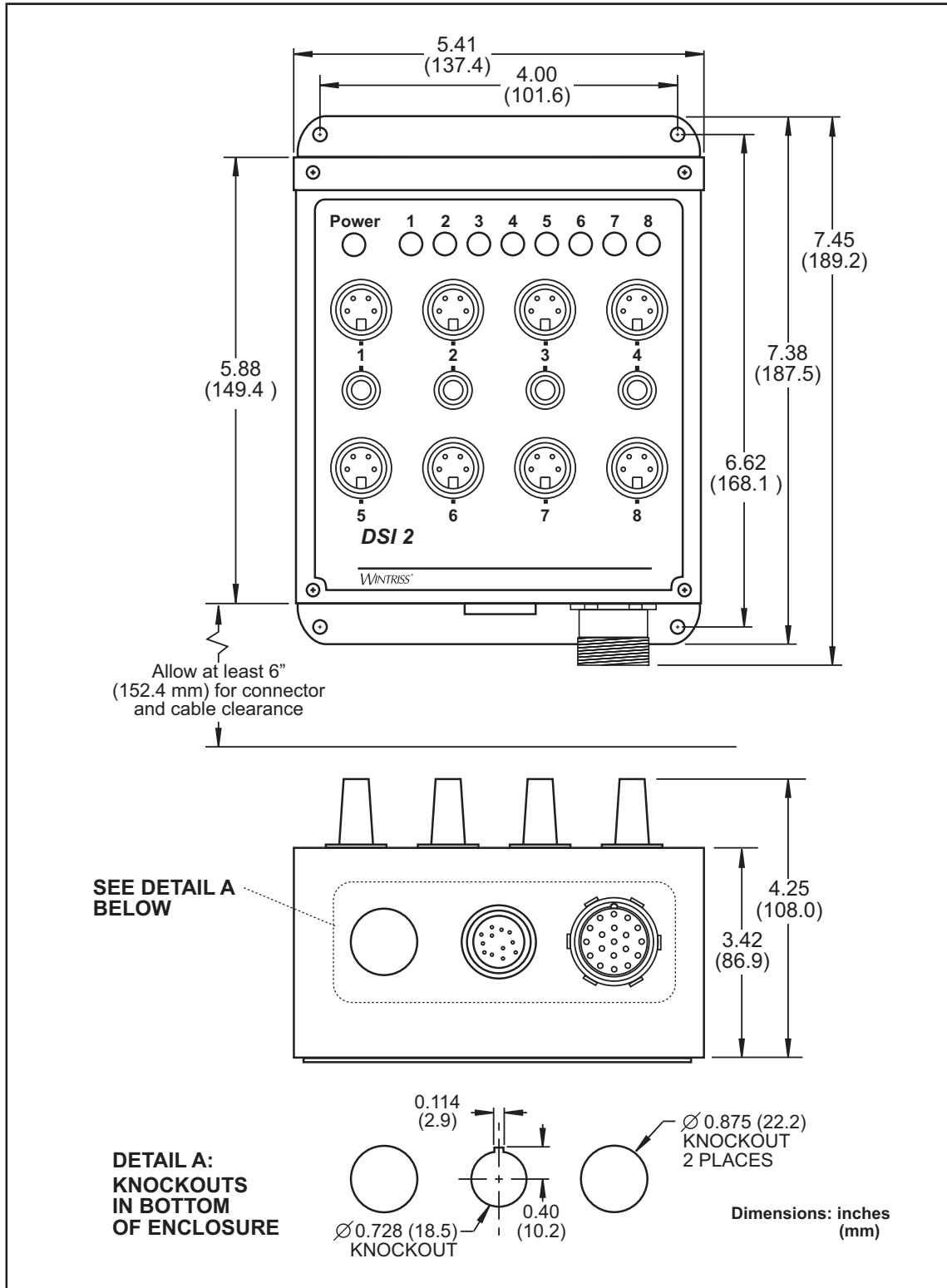


Figure 2-1. DSI 2 8-Input Enclosure: Mounting Dimensions

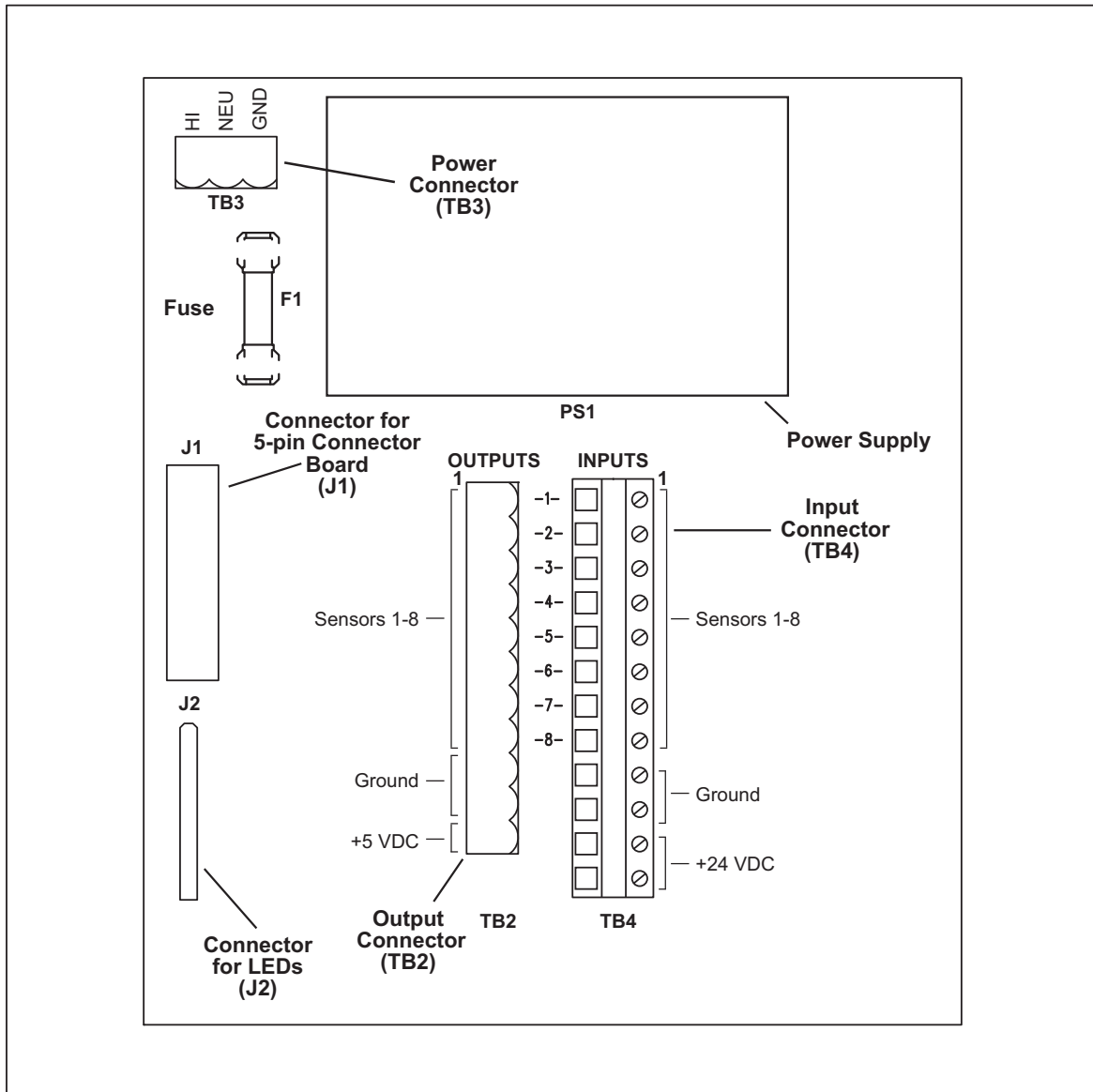


Figure 2-2. DSI 2 PC Board: Location of Components

1. Remove the four screws (your version may have two screws) that secure the cover to the base.
2. Slide the cover down to release it from the base, then open it to the left.
3. Disconnect the two ribbon cables that connect the cover to the PC board (at J1 and J2 in Figure 2-2).
4. Remove the cover and set it aside in a safe place.

NOTICE**UNUSED WIRES FROM 19-PIN CONNECTOR**

If your unit has an HD19 connector installed on the bottom of the enclosure, only twelve of the nineteen wires attached to it are used. These twelve wires are connected to the sensor inputs terminal block (TB4) on the DSI 2 PC board. The other seven wires are not used and are bundled and ty-wrapped to keep them out of the way.

5. Making sure that there is room to plug in the connectors on the front and bottom of the unit, drill and tap holes for mounting the base, using a No. 7 drill and 1/4-20 tap.
6. Mount the base, using the shock mounts supplied.

Mounting the 16-Input Enclosure

The DSI 2 16-input enclosure has a hinged door that can be secured to the base and is mounted as a unit. When selecting a location for mounting the 16-input enclosure, follow the guidelines provided for the 8-input enclosure (see page 2-1).

To mount the enclosure, perform the following steps, referring to Figure 2-3, page 2-5 for mounting dimensions:

1. Making sure that there is room to plug in the connectors on the front and bottom of the unit, drill and tap holes for mounting the enclosure, using a No. 7 drill and 1/4-20 tap.
2. Mount the enclosure, using the shock mounts supplied.

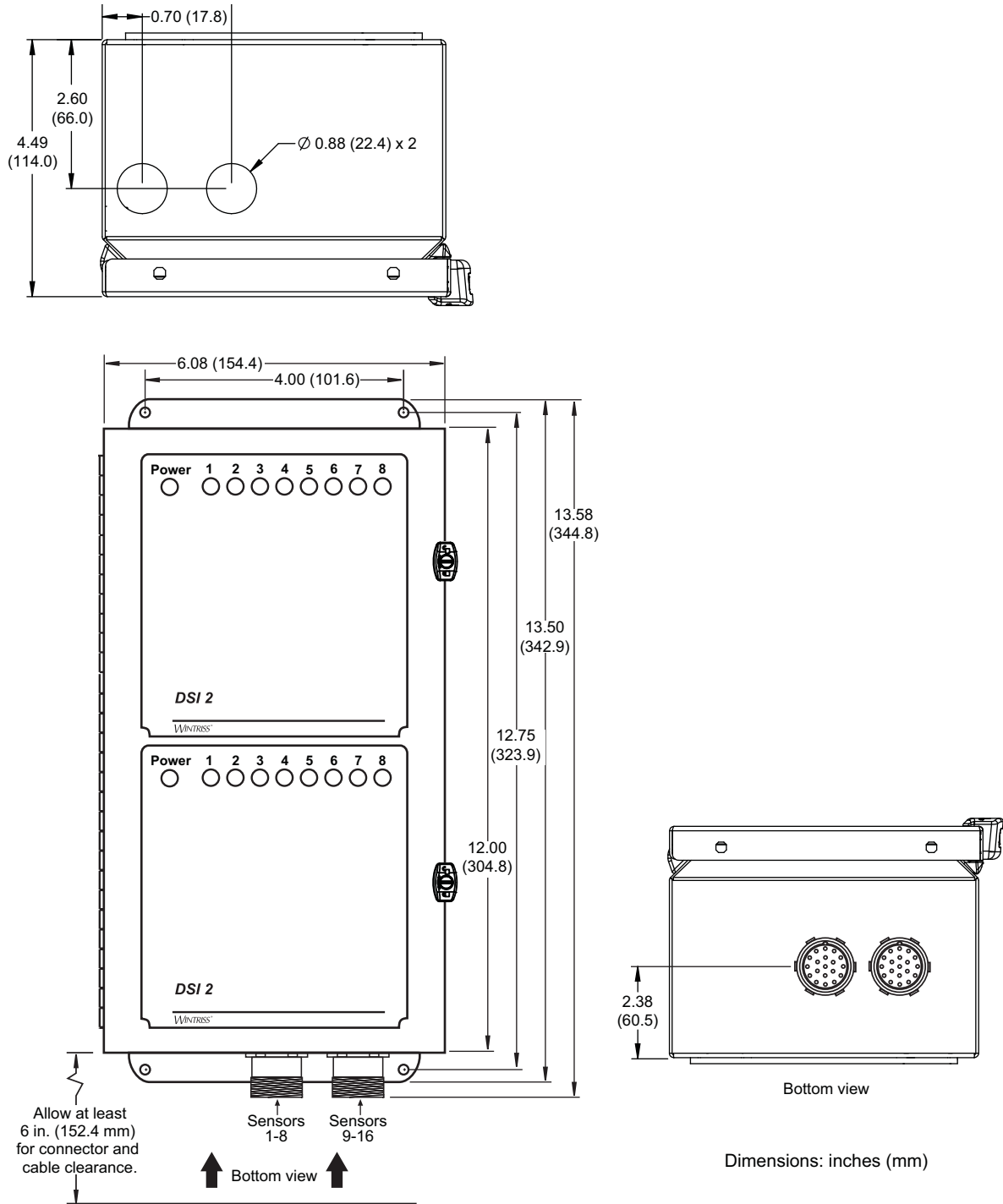


Figure 2-3. DSI 2 16-Input Enclosure: Mounting Dimensions

Mounting the DSI 2 PC Board (No Enclosure/No Display)

To mount the DSI 2 PC board in your enclosure, do the following:

1. Determine a convenient, accessible location within your enclosure in which to mount the DSI 2 board, allowing enough room for installation and maintenance of the board.
2. Mount the board, using the four (4) standoffs provided, referring to Figure 2-4 for mounting dimensions. Standoffs are 6-32 and 5/16 in. long. Recommended screw size is 6-32 x 3/8 in.

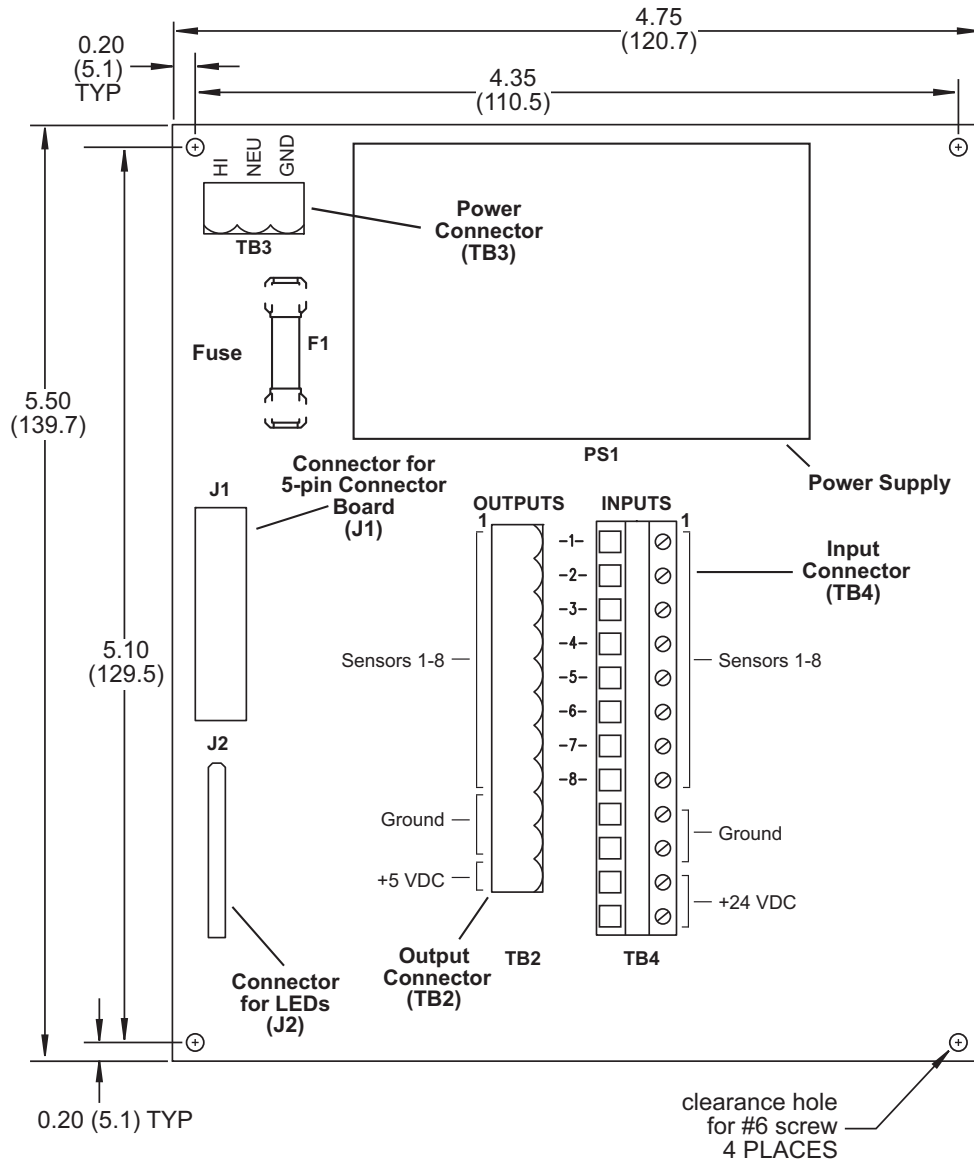


Figure 2-4. DSI 2 PC Board: Mounting Dimensions

Making Power Connections

⚠ WARNING

ELECTRIC SHOCK HAZARD

- Turn off and disconnect power from the DSI 2 sensor interface, press, press control and other equipment used with the press before making any wiring connections. This includes disconnecting power to the machine control and motor.
- Remove all fuses and “tag out” per OSHA 1910.147 Control of Hazardous Energy (Lockout/Tagout).
- Ensure that installation is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

NOTICE

POWER CONNECTIONS IN DIFFERENT LOCATION FROM DSI SENSOR INTERFACE

The DSI 2 power connections are at the top of the unit, while the DSI connections are at the bottom. If you are replacing a DSI sensor interface with the DSI 2, you may need to run longer power wires to be able to make the connection.

NOTICE

MAKE POWER CONNECTIONS TO BOTH PC BOARDS IN 16-INPUT DSI 2 UNITS

If you are wiring a 16-input DSI 2, you must make AC or DC power connections to terminal block TB3 on both PC boards.

If you have purchased DSI 2 8-input version -01 or -08 or 16-input version -10 or -11, which use an AC power supply, perform the *Connecting AC Power* procedure, next. If you have purchased DSI 2 8-input version -09 or 16-input version -12 or -13, which are DC units, perform the *Connecting DC Power* procedure, page 2-8.

Connecting AC Power

To wire AC power, follow these steps:

1. Determine how you will bring wiring from your AC power source to DSI 2. You need three wires: high, neutral and ground. No. 16 wire is recommended (use No. 14 if local codes require it).
2. Run AC wiring through flexible, liquid-tight conduit to one of the knockouts at the top of the DSI 2 base or enclosure. Leave a small service loop inside the base or enclosure.
3. Locate terminal block TB3 at the upper left of the DSI 2 PC board (see Figure 2-2).
4. Connect the HI (black) and NEUtral (white) wires to TB3 as shown in Figure 2-5, page 2-8. To connect the wires, do the following:
 - a. Strip wires 1/4 in. (6.4 mm) from the end.
 - b. Insert the bare part of the wire into the terminal 90% of the way.

- c. Tighten the screw so that the metal teeth clamp down on the bare wire for a tight connection.
5. Connect the GND (green) wire to the closest ground stud on the inside of the base or enclosure. Make sure the wire is attached securely.

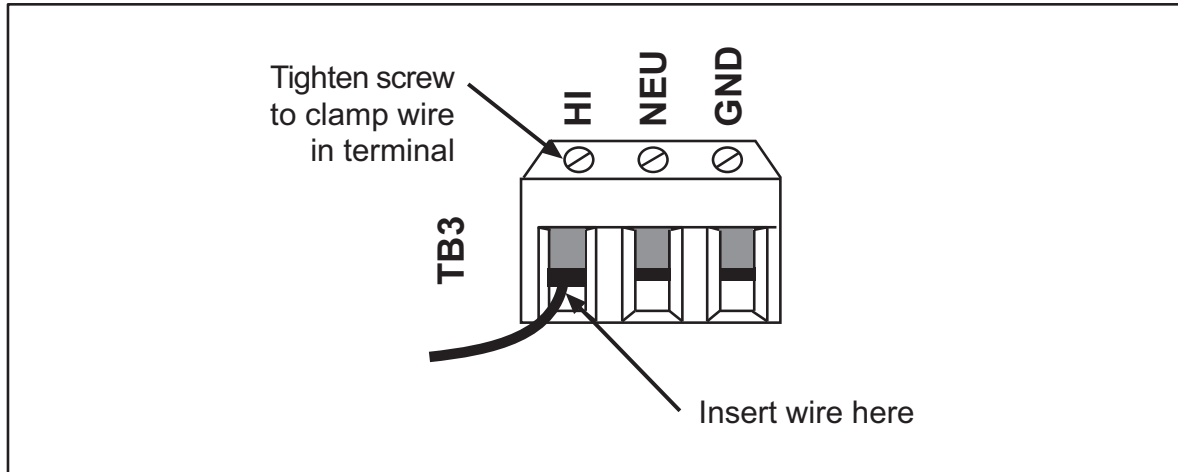


Figure 2-5. AC Power Connections (TB3 on the DSI 2 PC Board)

Connecting DC Power

If you have a 24 VDC version of DSI 2, connect DC power as follows, referring to Figure 2-6.

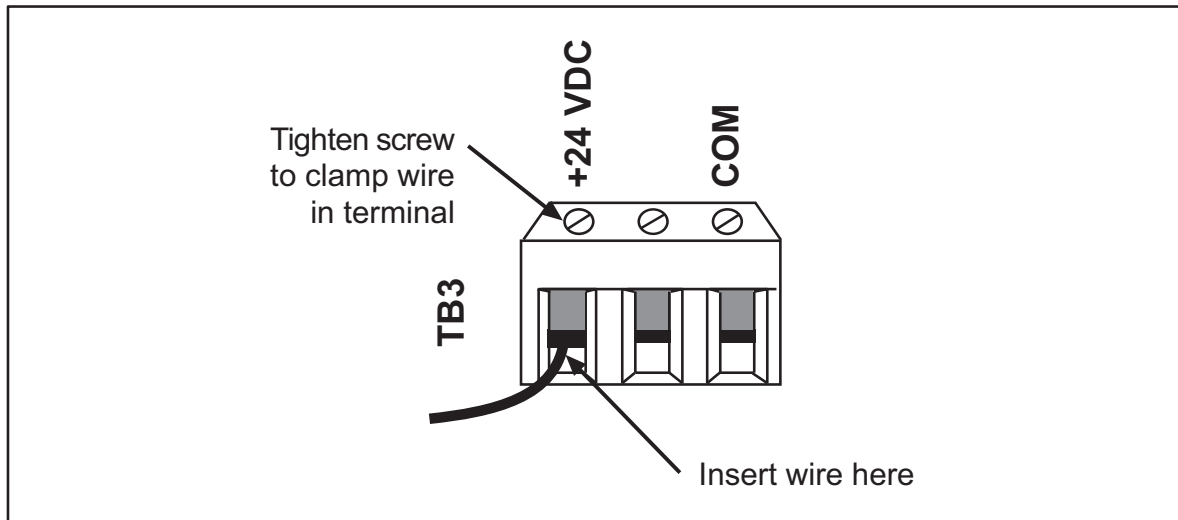


Figure 2-6. DC Power Connections (TB3 on the DSI 2 PC Board)

1. Perform steps 1 to 3 in the *Connecting AC Power* procedure, page 2-7.
2. Connect two wires, +24 VDC and COMMON, to TB3 as shown in Figure 2-6.
3. If there is a ground wire available, connect it to the closest ground stud on the inside of the base or enclosure. Make sure the wire is attached securely.

Connecting Output Cable to Die Protection Control

⚠ WARNING

ELECTRIC SHOCK HAZARD

- Complete this and any other wiring connections before applying power to the DSI 2.
- Turn off and disconnect power from the DSI 2, press, press control and other equipment used with the press before making any wiring connections. This includes disconnecting power to the machine control and motor.
- Remove all fuses and “tag out” per OSHA 1910.147 Control of Hazardous Energy (Lockout/Tagout).
- Ensure that installation is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

NOTICE

MAKE OUTPUT CONNECTIONS TO BOTH PC BOARDS IN 16-INPUT DSI 2 UNITS

If you are wiring a 16-input DSI 2, you must make output connections to terminal block TB2 on both PC boards.

An output cable that supplies sensor signals to your die protection control is provided with DSI 2. You connect the cable to terminal strip TB2 on the DSI 2 PC board (see Figure 2-2).

NOTICE

TERMINATE BOTH ENDS OF SHIELD

Be sure to terminate the cable shield at both ends (i.e., at DSI 2 and at DiProPAC/SmartPAC 2 or other Wintriss unit).

The DSI 2 output should be used only with an NPN-type control. If you are using a die protection control not made by Wintriss Controls Group, be sure that it is an NPN-type.

Follow the instructions below to connect the output cable from DSI 2 to your die protection control, contacting Wintriss Tech. Support if you need help.

1. Find the 12-wire, shielded output cable supplied with the DSI 2.
2. Run the cable through flexible, liquid-tight conduit between your die protection control and DSI 2 and through one of the knockouts in the bottom of the DSI 2 base or enclosure. You must create your own knockouts on DSI 2 16-input versions.
3. Ground the cable shield to the stud inside the base or enclosure, as follows, referring to Figure 2-7, page 2-10.
 - a. Strip the cable jacket as far as the end of the conduit fitting.
 - b. Cut the drain wire to a length that allows you to wrap it at least once around the nearest ground stud.
 - c. Loosen the nut on the stud, wrap the drain wire around the stud under the nut, and tighten the nut. Make sure the wire is securely attached.

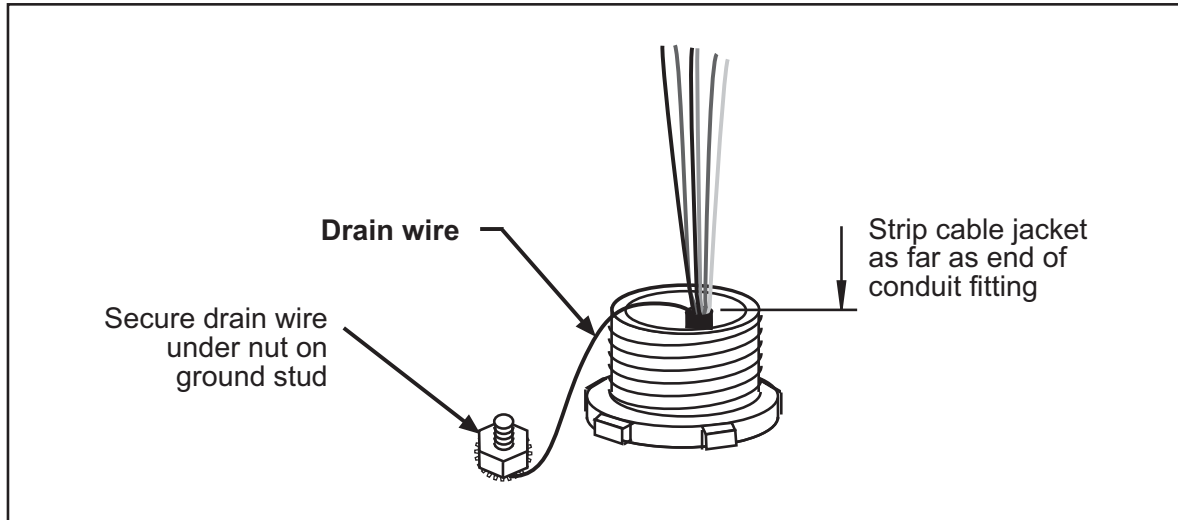


Figure 2-7. DSI 2 Output Cable Shield Drain Wire Connected to Ground Stud

4. Connect output cable wires to terminal block TB2 on the DSI 2 PC board as shown in the wiring tables that start on page 2-11. To connect wires:
 - a. Strip each wire 1/4 in. (6.4 mm).
 - b. Insert the bare part of the wire into the terminal 90% of the way.
 - c. Tighten the screw so that the metal teeth clamp down on the bare wire for a tight connection.
5. Double check all connections when done. Leave a service loop inside the base or enclosure.

NOTICE

TRIM UNUSED WIRES

If your installation does not require using all twelve of the wires in the cable, cut the extra wires flush with the end of the cable jacket.

6. Connect the other end of the cable to your die protection control in a similar fashion, making sure to ground the shield to the enclosure as you did at the DSI 2 end.
7. If you have wired an 8-input DSI 2, replace the cover on the base after completing the installation, as follows:
 - a. Plug the two ribbon cables on the cover into J1 and J2 on the DSI 2 PC board.
 - b. Place the cover over the base below the lip at its top, then slide the base under the lip.
 - c. Secure the cover with the screws you removed when you installed the base (see page 2-3).

Table 2-1. Wiring Connections from 1st DSI 2 to DiProPAC/DiProPAC 32 (SmartPAC 2)
(see Figure 3 at end of manual)

| Wire color* | 1st DSI 2 (TB2) | | DiProPAC (TB554) | |
|-------------|-------------------------------------|-----------------|-------------------------------------|-----------------|
| | Pin # | Pin Designation | Pin # | Pin Designation |
| Brown | 1 | SENSOR 1 | 282 | SENSOR 1 |
| Red | 2 | SENSOR 2 | 283 | SENSOR 2 |
| Orange | 3 | SENSOR 3 | 284 | SENSOR 3 |
| Yellow | 4 | SENSOR 4 | 285 | SENSOR 4 |
| Green | 5 | SENSOR 5 | 286 | SENSOR 5 |
| Blue | 6 | SENSOR 6 | 287 | SENSOR 6 |
| Violet | 7 | SENSOR 7 | 288 | SENSOR 7 |
| Gray | 8 | SENSOR 8 | 289 | SENSOR 8 |
| | | No connection | 290 | Sensor power |
| Black | 9 | GND | 291 | GND |
| | 10 | GND | | No connection |
| | 11 | +5 VDC | | No connection |
| Shield | Terminate drain wire to ground stud | | Terminate drain wire to ground stud | |

* Your colors may be different

Table 2-2. Wiring Connections from 2nd DSI 2 to DiProPAC/DiProPAC 32 (SmartPAC 2)
(see Figure 3 at end of manual)

| Wire color* | 2nd DSI 2 (TB2) | | DiProPAC (TB554) | |
|-------------|-------------------------------------|-----------------|-------------------------------------|-----------------|
| | Pin # | Pin Designation | Pin # | Pin Designation |
| Brown | 1 | SENSOR 1 | 292 | SENSOR 9 |
| Red | 2 | SENSOR 2 | 293 | SENSOR 10 |
| Orange | 3 | SENSOR 3 | 294 | SENSOR 11 |
| Yellow | 4 | SENSOR 4 | 295 | SENSOR 12 |
| Green | 5 | SENSOR 5 | 296 | SENSOR 13 |
| Blue | 6 | SENSOR 6 | 297 | SENSOR 14 |
| Violet | 7 | SENSOR 7 | 298 | SENSOR 15 |
| Gray | 8 | SENSOR 8 | 299 | SENSOR 16 |
| | | No connection | 300 | Sensor power |
| Black | 9 | GND | 301 | GND |
| | 10 | GND | | No connection |
| | 11 | +5 VDC | | No connection |
| Shield | Terminate drain wire to ground stud | | Terminate drain wire to ground stud | |

* Your colors may be different.

Table 2-3. Wiring Connections from 3rd DSI 2 to DiProPAC 32 (SmartPAC 2)
(see Figure 4 at end of manual)

| Wire color* | 1st DSI 2 (TB2) | | DiProPAC 32 (TB555) | |
|-------------|-------------------------------------|-----------------|-------------------------------------|-----------------|
| | Pin # | Pin Designation | Pin # | Pin Designation |
| Brown | 1 | SENSOR 1 | 180 | SENSOR 17 |
| Red | 2 | SENSOR 2 | 181 | SENSOR 18 |
| Orange | 3 | SENSOR 3 | 182 | SENSOR 19 |
| Yellow | 4 | SENSOR 4 | 183 | SENSOR 20 |
| Green | 5 | SENSOR 5 | 184 | SENSOR 21 |
| Blue | 6 | SENSOR 6 | 185 | SENSOR 22 |
| Violet | 7 | SENSOR 7 | 186 | SENSOR 23 |
| Gray | 8 | SENSOR 8 | 187 | SENSOR 24 |
| | | No connection | 188 | Sensor power |
| Black | 9 | GND | 189 | GND |
| | 10 | GND | | No connection |
| | 11 | +5 VDC | | No connection |
| Shield | Terminate drain wire to ground stud | | Terminate drain wire to ground stud | |

* Your colors may be different

Table 2-4. Wiring Connections from 4th DSI 2 to DiProPAC 32 (SmartPAC 2)
(see Figure 4 at end of manual)

| Wire color* | 2nd DSI 2 (TB2) | | DiProPAC 32 (TB555) | |
|-------------|-------------------------------------|-----------------|-------------------------------------|-----------------|
| | Pin # | Pin Designation | Pin # | Pin Designation |
| Brown | 1 | SENSOR 1 | 190 | SENSOR 25 |
| Red | 2 | SENSOR 2 | 191 | SENSOR 26 |
| Orange | 3 | SENSOR 3 | 192 | SENSOR 27 |
| Yellow | 4 | SENSOR 4 | 193 | SENSOR 28 |
| Green | 5 | SENSOR 5 | 194 | SENSOR 29 |
| Blue | 6 | SENSOR 6 | 195 | SENSOR 30 |
| Violet | 7 | SENSOR 7 | 196 | SENSOR 31 |
| Gray | 8 | SENSOR 8 | 197 | SENSOR 32 |
| | | No connection | 198 | Sensor power |
| Black | 9 | GND | 199 | GND |
| | 10 | GND | | No connection |
| | 11 | +5 VDC | | No connection |
| Shield | Terminate drain wire to ground stud | | Terminate drain wire to ground stud | |

* Your colors may be different.

Table 2-5. Wiring Connections from DSI 2 to DiPro 1500

| Wire color* | DSI 2 (TB2) | | DiPro 1500 (TB101) | |
|-------------|-------------------------------------|-----------------|-------------------------------------|-----------------|
| | Pin # | Pin Designation | Pin # | Pin Designation |
| Brown | 1 | OUT 1 | 1 | SENSOR 1 |
| Red | 2 | OUT 2 | 2 | SENSOR 2 |
| Orange | 3 | OUT 3 | 3 | SENSOR 3 |
| Yellow | 4 | OUT 4 | 4 | SENSOR 4 |
| Green | 5 | OUT 5 | 5 | SENSOR 5 |
| Blue | 6 | OUT 6 | 6 | SENSOR 6 |
| | 7 | OUT 7 | | No connection |
| | 8 | OUT 8 | | No connection |
| Black | 9 | GND | 11 | GND |
| | 10 | GND | | No connection |
| | 11 | +5 VDC | | No connection |
| Shield | Terminate drain wire to ground stud | | Terminate drain wire to ground stud | |

* Your colors may be different.

Table 2-6. Wiring Connections from DSI 2 to Spectrum DiPro

| Wire color* | DSI 2 (TB2) | | Spectrum DiPro (TB22) | |
|-------------|-------------------------------------|-----------------|-------------------------------------|-----------------|
| | Pin # | Pin Designation | Pin # | Pin Designation |
| Brown | 1 | OUT 1 | 2 | SENSOR 1 |
| Red | 2 | OUT 2 | 3 | SENSOR 2 |
| Orange | 3 | OUT 3 | 4 | SENSOR 3 |
| Yellow | 4 | OUT 4 | 5 | SENSOR 4 |
| Green | 5 | OUT 5 | 6 | SENSOR 5 |
| Blue | 6 | OUT 6 | 7 | SENSOR 6 |
| Violet | 7 | OUT 7 | 8 | SENSOR 7 |
| Gray | 8 | OUT 8 | 9 | SENSOR 8 |
| Black | 9 | GND | 1 | GND |
| | 10 | GND | 10 | No connection |
| | 11 | +5 VDC | | No connection |
| Shield | Terminate drain wire to ground stud | | Terminate drain wire to ground stud | |

* Your colors may be different.

Table 2-7. Wiring Connections from DSI 2 to ProPAC Process Monitor, Sensors 1-8

| Wire color* | DSI 2 (TB2) | | ProPAC Process Monitor | |
|-------------|-------------------------------------|-----------------|-------------------------------------|---------------------------|
| | Pin # | Pin Designation | Sensors 1-4 TB 3 Pin # | Sensors 5-8 TB 4 Pin # |
| Brown | 1 | OUT 1 | 1 | |
| Red | 2 | OUT 2 | 3 | |
| Orange | 3 | OUT 3 | 5 | |
| Yellow | 4 | OUT 4 | 7 | |
| Green | 5 | OUT 5 | | 1 |
| Blue | 6 | OUT 6 | | 3 |
| Violet | 7 | OUT 7 | | 5 |
| Gray | 8 | OUT 8 | | 7 |
| Black | 9 | GND | 10 | |
| | 10 | GND | No connection | No connection |
| | 11 | +5 VDC | No connection | No connection |
| Shield | Terminate drain wire to ground stud | | Terminate drain wire to ground stud | |

* Your colors may be different.

Table 2-8. Wiring Connections from DSI 2 to ProPAC Process Monitor, Sensors 9-16

| Wire color* | DSI 2 (TB2) | | ProPAC Process Monitor Add-on Board | |
|-------------|-------------------------------------|-----------------|--|------------------------------|
| | Pin # | Pin Designation | Sensor 9-12 TB102 Pin # | Sensors 13-16 TB103 Pin # |
| Brown | 1 | OUT 1 | 1 | |
| Red | 2 | OUT 2 | 3 | |
| Orange | 3 | OUT 3 | 5 | |
| Yellow | 4 | OUT 4 | 7 | |
| Green | 5 | OUT 5 | | 1 |
| Blue | 6 | OUT 6 | | 3 |
| Violet | 7 | OUT 7 | | 5 |
| Gray | 8 | OUT 8 | | 7 |
| Black | 9 | GND | 8 | |
| | 10 | GND | No connection | No connection |
| | 11 | +5 VDC | No connection | No connection |
| Shield | Terminate drain wire to ground stud | | Terminate drain wire to ground stud | |

* Your colors may be different.

Testing DSI 2

This section provides test procedures to ensure that your DSI 2 has been installed correctly and is operating properly. You must perform these tests before using your DSI 2.

NOTICE

If you have installed the DSI 2 PC board (no enclosure/no display) in your enclosure, you must test the DSI 2 from the die protection control (i.e., SmartPAC 2) that the unit is wired to.

Testing Power

To test DSI 2 power connections, perform the following steps:

1. Apply power to the DSI 2. Notice whether the power LED illuminates. If you are testing a 16-input unit, both LEDs should illuminate.
 - If the power LED illuminates, the power input is working properly. Proceed to *Testing Sensor Inputs 1 through 4*, next.
 - If the power LED does not illuminate, check to make sure that the power has been wired properly. Refer to *Connecting AC Power*, page 2-7 or *Connecting DC Power*, page 2-8.

Testing Sensor Inputs 1 through 4

To test the first four sensor inputs, follow these steps:

1. Connect a wire to the banana jack at sensor input 1.
2. Ground the other end of the wire by contacting one of the mounting bolts.
3. Note whether the first LED at DSI 2 illuminates. In addition, ensure that the corresponding LED at your die protection control also illuminates (refer to that product's user manual if necessary).
 - If the LEDs on both units illuminate, this sensor input is working properly. Proceed to step 4.
 - If the LEDs on one or both units fail to illuminate, check that you have properly connected the output connector to your die protection control. Once this test is successful, proceed to step 4.
4. Repeat steps 1 through 3 for sensor inputs 2, 3, and 4.
5. When you are done, proceed to the *Testing Sensor Inputs 5 through 8*, next.

Testing Sensor Inputs 5 through 8

Use one of your electronic sensors to test each of the sensor inputs 5 through 8. Follow these steps:

1. Connect the sensor to the 4-pin socket at sensor input 5.

2. Actuate the sensor.
3. Note whether LED 5 on the DSI 2 and the corresponding LED on your die protection control illuminate. (Refer to the user manual for that die protection control if necessary).
 - If the LEDs on both units illuminate, this sensor input is wired correctly. Proceed to step 4.
 - If one or both of these LEDs fail to illuminate, check to make sure that you have properly connected the output connector to your die protection control. Once this test is successful, proceed to step 4.
4. Repeat steps 1 through 3 for sensor inputs 6, 7, and 8. When you are done, you have successfully tested your DSI 2.

NOTICE

SENSOR LED STAYS LIT CONSTANTLY

If a sensor LED on the DSI 2 front panel stays on constantly, check for sensor integrity and correct installation as follows:

- Disconnect the sensor or sensors from the DSI 2 and test with a separate power supply. If the sensor does not work properly, replace it. If it does work properly, check for the conditions below.
- If you have one solid-state sensor connected to this DSI 2 input, the sensor may have an internal pull-up or pull-down resistor, which interferes with the DSI 2's automatic NPN/PNP detection feature. Install a diode between the sensor and the DSI 2 sensor input, following the instructions on page 3-15.
- If you have installed two or more solid-state sensors in series connected to this DSI 2 sensor input, install a diode between the sensor series and the DSI 2 input, following the instructions on page 3-14.

What to Do Next

After you install and test your DSI 2 sensor interface, make any necessary adjustments to your die protection control, such as setting the ready signal. See your controller instruction manual (e.g. Wintriss DiPro 1500 user manual) for making controller settings and adjustments. Proceed to Chapter 3 to wire your sensors to the DSI 2.

Chapter 3. Wiring Sensors

This chapter shows you how to wire your sensors to the various types of connectors that either plug directly into the DSI 2 or into another device that is, in turn, connected to the DSI 2. The chapter is organized in the following sections:

- *Wiring Sensors to the DSI 2 Four-pin Connector*, page 3-2
- *Wiring Sensors to the HD19 Connector*, page 3-3
- *Wiring Sensors to the Twelve-pin QDP Connector*, page 3-9
- *Wiring Sensors with a User-installed Connector*, page 3-12
- *Hard-wiring Sensors*, page 3-13
- *Installing a Diode When Wiring Solid-state Sensors*, page 3-14
- *Installing a Resistor with Two-Wire Proximity Sensors*, page 3-15

NOTICE

WITH PROPAC USE DSI 2 FOR DIGITAL SENSORS ONLY

When using DSI 2 with the ProPAC process monitor, wire only digital (i.e., die protection) sensors to DSI 2. Use the ProPAC Sensor Interface (PSI) for analog sensors.

NOTICE

CONNECT SENSOR DIRECTLY TO EXTERNAL AMPLIFIER

- For a sensor with an external amplifier, connect the sensor head directly to the amplifier. Make no additional connections.
- Connect the power and output wires from the amplifier through the 12-pin QDP or 19-pin HDP connector or hard wire them to the DSI 2 input.

NOTICE

INPUTS 1 THROUGH 4 PERFORM PULSE-STRETCHING

Inputs 1 through 4 lengthen the “on” time of the sensor signal to 10 mS when the duration of the signal falls below 10 mS. See *Pulse-stretching Sensor Inputs, 1 through 4*, page 1-3.

NOTICE

SEE APPENDIX A FOR PART NUMBERS.

Wiring Sensors to the DSI 2 Four-pin Connector

⚠ WARNING

ELECTRIC SHOCK HAZARD

- Complete all sensor wiring connections before connecting the sensor to the DSI 2.
- Ensure that installation is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

The DSI 2 sensor connector, a Lumberg SV40 four-pin connector (see Figure 3-1), fits the eight Lumberg sockets on the front panel of DSI 2 8-input units. All Wintriss electronic sensors come with the sensor wires already attached to this kind of connector. For sensors with amplifiers, the amplifier cable will have the connector attached. There are three wiring connections between the sensor (or amplifier) and the 4-pin connector.

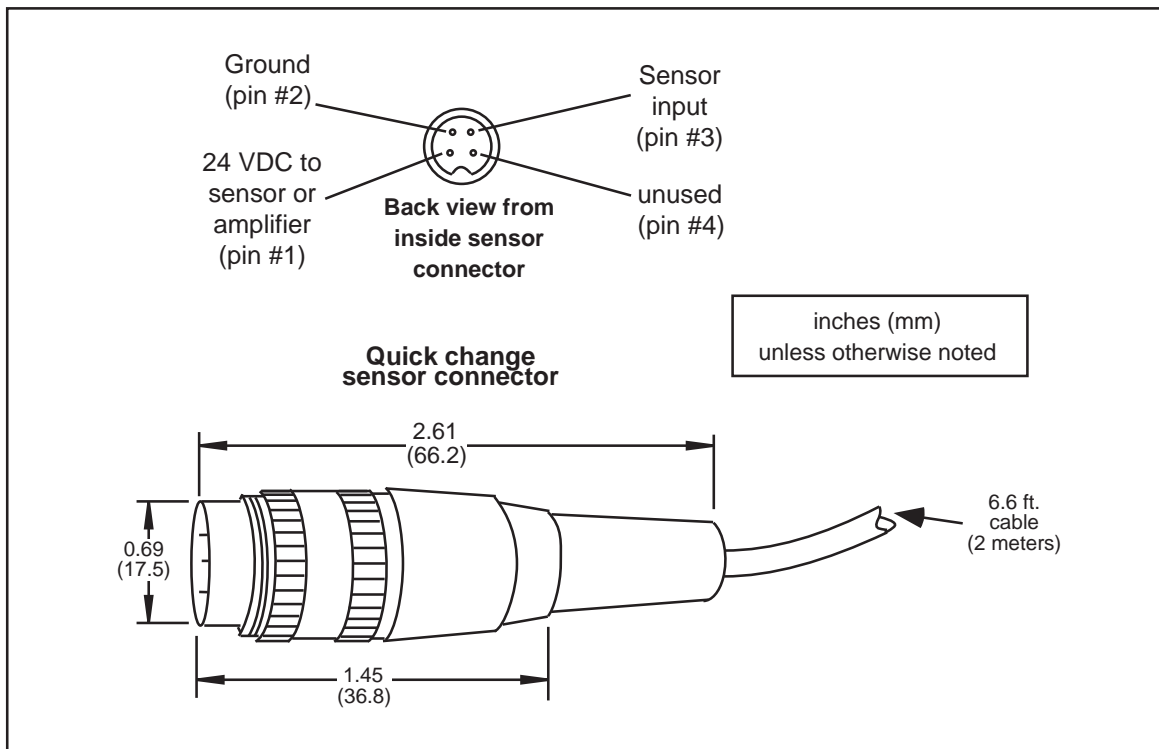


Figure 3-1. Four-pin Quick-change Sensor Connector: Dimensions and Pinout

Wiring Sensors to the HD19 Connector

⚠ WARNING

ELECTRIC SHOCK HAZARD

- Complete all sensor wiring connections before connecting the sensor to the HDP junction box.
- Ensure that installation is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

DSI 2 8-input versions -08 and -09 are equipped with an HD19 connector; 16-input versions -10 and -12 have two HD19 connectors. The HD19 connector allows you to use the mating HD19 cable to connect DSI 2 to sensors plugged into an HDP (Heavy-duty Plug) die-mounted junction box or wired to an HD19 PC board in a user-provided enclosure. The heavy-duty, 19-conductor HD19 cable is available in three sizes: 5', 10', and 15' (see Appendix A for part numbers).

The next section shows you how to install the HDP junction box and wire and connect HDP sensor connectors. Instructions for wiring and installing the HD19 kit, which provides an HD19 PC board that you can install in your own enclosure, are provided starting on page 3-7.

Connecting Sensors to the HDP Junction Box

The following sections provide instructions for installing the HDP junction box, wiring your sensors to the 5-pin HDP connectors, and plugging the HDP connectors into the junction box.

Installing the HDP Junction Box

Your die-mounted sensors plug into one or more HDP junction boxes, which are mounted on the die. HDP junction boxes are available in 4-port and 8-port versions. Mount the junction boxes as follows, referring to Figure 3-2, page 3-4 for mounting dimensions:

1. Find a location on the die that
 - Is accessible for installation and maintenance
 - Can be reached by both the HD19 and sensor cables and allows space for the connectors and cables
 - Is safe from damage during press operation
2. Drill and tap holes for four 8-32 mounting screws. See Figure 3-2 for hole locations.
3. Mount the HDP junction box to the die, using #8 screws at least 1.5 in. long.

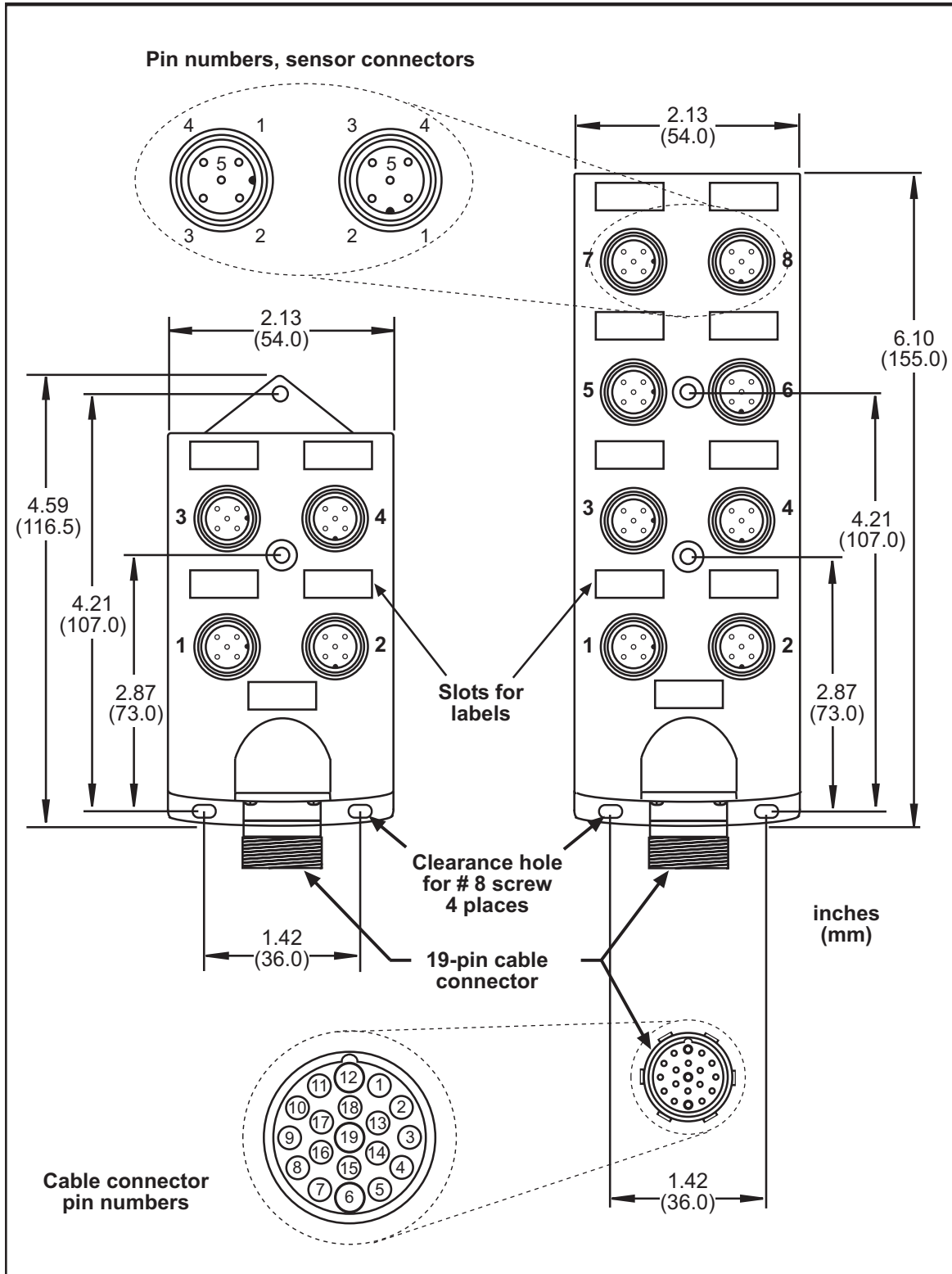


Figure 3-2. HDP Junction Box: Mounting Dimensions and Connector Pin Locations

Wiring HDP Sensor Connectors

Sensors connect to the HDP junction box via 5-pin HDP connectors. To wire your sensors to the HDP connectors, do the following, referring to the accompanying figures and table and to Figure 1 at the back of the manual:

1. Test the two rubber seals that are provided with your connector (seals have different inside diameters) to determine which one provides the snugest fit around your sensor cable.
2. Using the seal you selected, thread the cable through the parts of the connector assembly as shown in Figure 3-3.

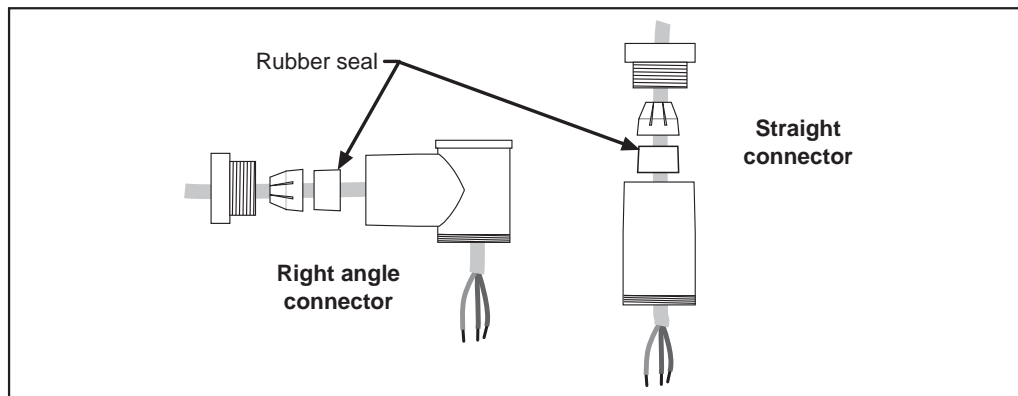


Figure 3-3. HDP Connector Showing Cable Being Threaded through Components

3. Strip the cable jacket 1 in. from the end of the cable, then strip the insulation 1/4 in. from the ends of the individual wires.
4. Connect wire #5 to the center terminal on the HDP connector, first threading it through the sleeving provided, as shown in Figure 3-4, page 3-6:
 - a. Loosen the connection screw.
 - b. Insert the exposed wire into the connection.
 - c. Tighten the connection screw.
 - d. Slide the sleeving down over the connection boss to prevent other wires from shorting to it.
5. Connect wires #1 and #4 to their assigned terminals (labelled “1” and “4”) on the HDP connector as shown in Figure 3-4 and in Table 3-1, page 3-6.
6. Assemble the HDP connector as shown in Figure 3-5, page 3-6.
7. Repeat steps 1 through 6 for each sensor cable.

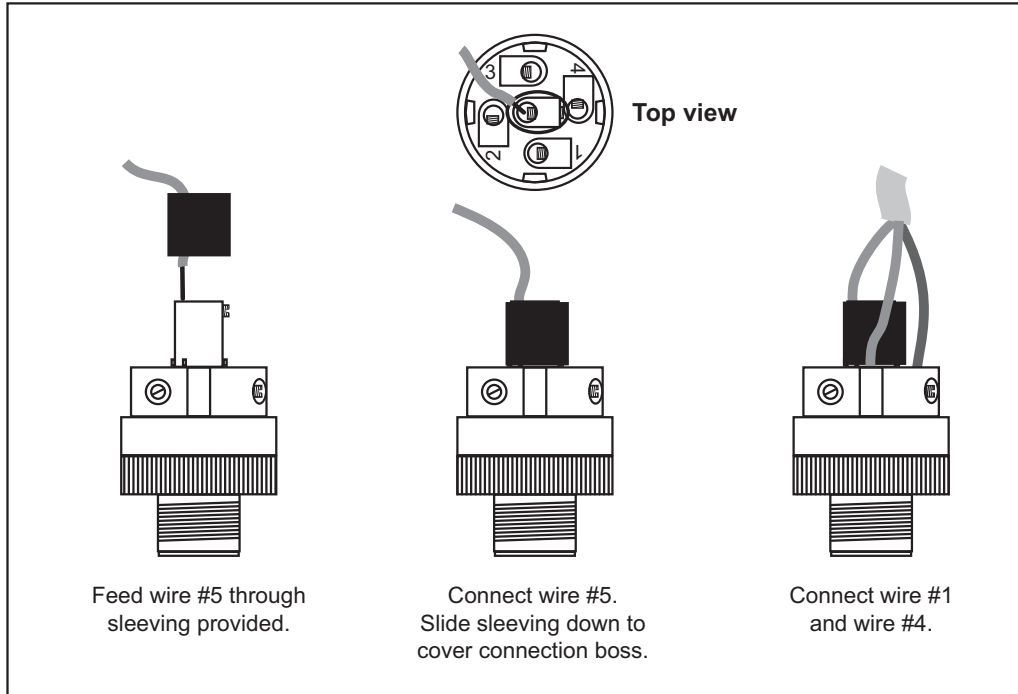


Figure 3-4. HDP Connector Showing Sensor Wires Being Connected to Terminals

Table 3-1. HDP Connector Wiring Connections

| Connection (Pin #) | Sensor Wires |
|--------------------|---------------|
| 1 | + V |
| 2 | No connection |
| 3 | No connection |
| 4 | Signal |
| 5 | Ground |

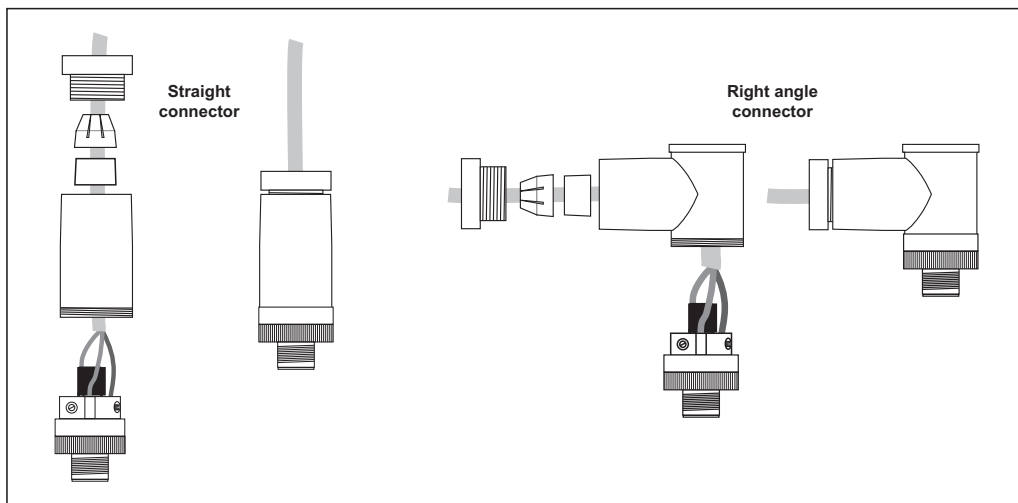


Figure 3-5. HDP Connector Components: Assembly

Connecting Sensors to the HDP Junction Box

After you have wired your sensors to the five-pin HDP connectors, plug the connectors into the HDP junction box, referring to Figure 3-2 for sensor number locations.

When you mount the die on the press, connect the HDP junction box to the DSI 2, using an HD19 cable. HD19 cable pin connections are shown in Table 3-2.

Table 3-2. HD19 Cable Pin Connections

| HD19 Connector Pin # | Sensor Connection * |
|----------------------|---------------------|
| 1 | J8 SIG |
| 2 | J6 SIG |
| 3 | J4 SIG |
| 4 | No connection |
| 5 | J2 SIG |
| 6 | No connection |
| 7 | No connection |
| 8 | No connection |
| 9 | No connection |
| 10 | No connection |
| 11 | J7 SIG |
| 12 | GND |
| 13 | No connection |
| 14 | No connection |
| 15 | J1 SIG |
| 16 | J3 SIG |
| 17 | J5 SIG |
| 18 | No connection |
| 19 | + V |

* Sensor GND connections not used

Installing and Wiring the HD19 Kit

WARNING

ELECTRIC SHOCK HAZARD

- Ensure that the HD19 cable is disconnected from the HD19 PC board before wiring sensors to the PC board.
- Complete all sensor wiring connections before plugging in the HD19 cable.
- Ensure that installation is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

Users who want to build their own die-mounted junction box can purchase the HD19 kit, which allows you to connect up to eight sensors to the DSI 2 with an HD19 cable. The HD19 kit includes a PC board with an HD19 plug on one side and a 12-pin terminal block on the other, a 12-pin connector that plugs into the terminal block, and the necessary mounting hardware. The HD19 cable is ordered separately (see Appendix A for part numbers).

To install and wire the HD19 kit, do the following:

1. Install the HD19 PC board in your die-mounted junction box (see Figure 3-6 for mounting dimensions).

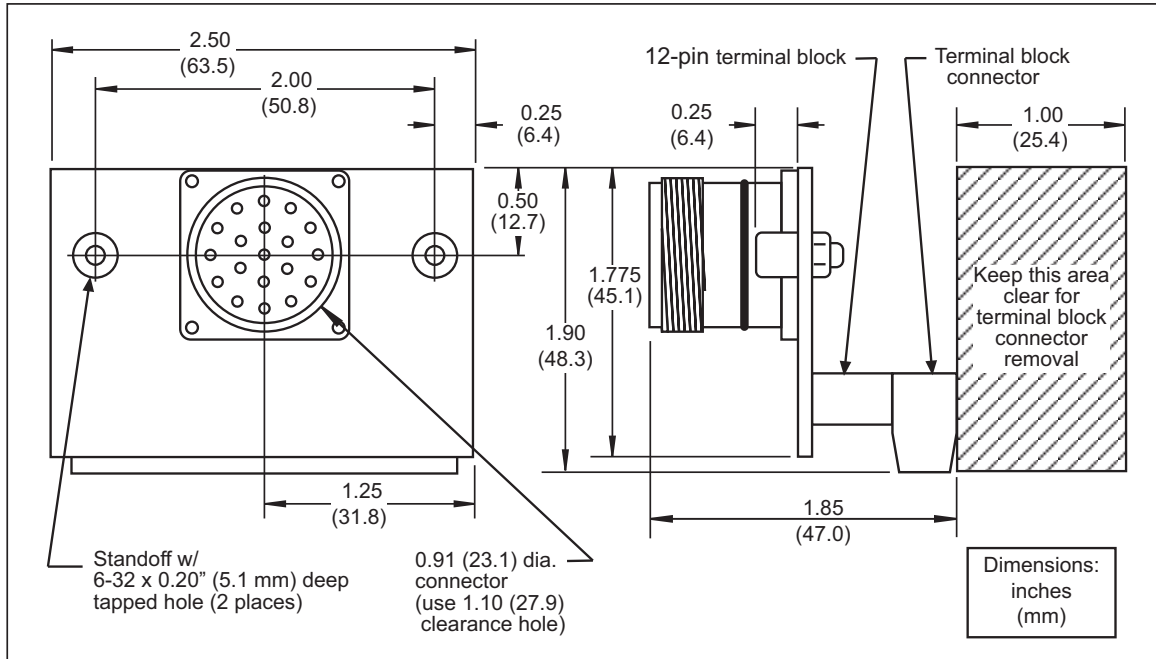


Figure 3-6. HD19 PC Board: Mounting Dimensions

2. Wire your die-mounted sensors to terminal block TB9 on the HD19 PC board, referring to Figure 3-7, below, and Table 3-3, page 3-9 for wiring connections.

NOTICE

The twelve pins on the HD19 PC board terminal block are wired to the appropriate twelve pins in the 19-pin connector; the other seven pins in the 19-pin connector are not used.

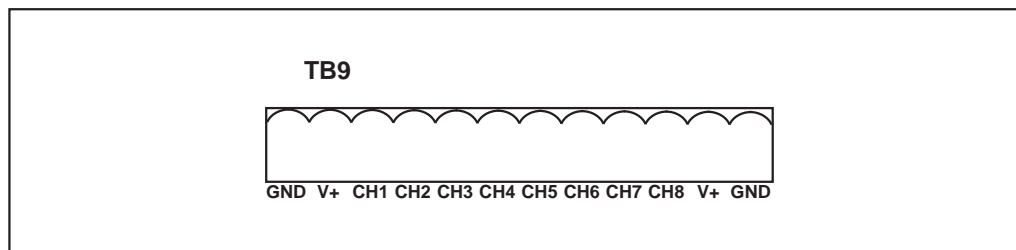


Figure 3-7. Terminal Block TB9 on HD19 PC Board: Pin Designations

Table 3-3. HD19 PC Board: Wiring Connections

| TB9 Pin # * | TB9 Pin Designation | HD19 Connector Pin Location |
|-------------|---------------------|-----------------------------|
| 1 and 12 | GND | 12 |
| 2 and 11 | 24 VDC | 19 |
| 3 | Sensor 1 | 15 |
| 4 | Sensor 2 | 5 |
| 5 | Sensor 3 | 16 |
| 6 | Sensor 4 | 3 |
| 7 | Sensor 5 | 17 |
| 8 | Sensor 6 | 2 |
| 9 | Sensor 7 | 11 |
| 10 | Sensor 8 | 1 |

* Terminate shield to ground stud nearest entry point (see page 2-10).

- Plug one end of the HD19 cable into the HD19 PC board connector and the other end into the HD19 connector on the bottom of the DSI 2.

Wiring Sensors to the Twelve-pin QDP Connector

WARNING

ELECTRIC SHOCK HAZARD

- Ensure that the QDP cable is disconnected from the QDP kit PC board before wiring sensors to the PC board.
- Complete all sensor wiring connections before plugging in the QDP cable.
- Ensure that installation is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

The 12-pin QDP (Quick Die Plug) connector on the bottom of DSI 2 8-input versions -08 and -09 enables you to use one QDP cable to connect up to eight sensors. The QDP cable connects to the QDP kit, which you can install in a die-mounted junction box. The kit consists of a circuit board assembly (with connector and terminal block) and mounting hardware. The cable is purchased separately (see Appendix A for part numbers). Figure 3-8, page 3-10 shows the assemblies used for a QDP installation.

1. Install your QDP kit circuit board in a suitable enclosure on the die (see Figure 3-9, page 3-10 for mounting dimensions). If your sensors have amplifiers, install a DIN rail in the enclosure, and mount the amplifiers on it.
2. Wire your die-mounted sensors to terminal block TB9 on the QDP circuit board, referring to Figure 3-10, Figure 3-11, and Table 3-4, page 3-11, for QDP circuit board connections.
3. Plug one end of the QDP cable into the QDP kit connector and the other end into the QDP connector on the bottom of the DSI 2.

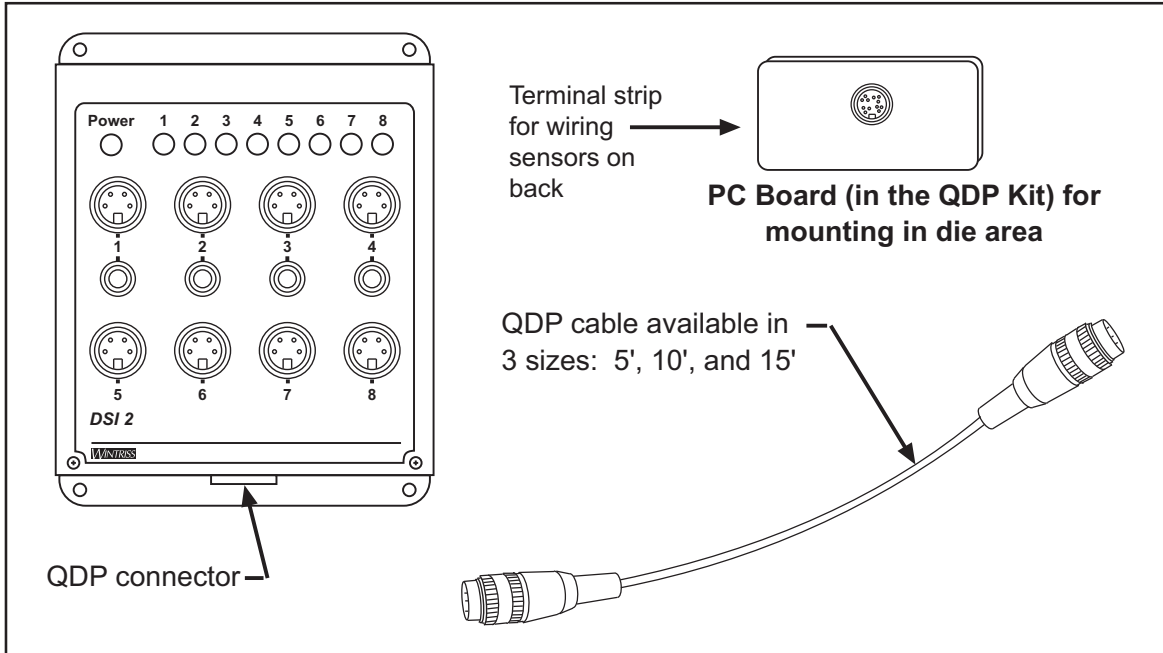


Figure 3-8. DSI 2 and QDP Assembly

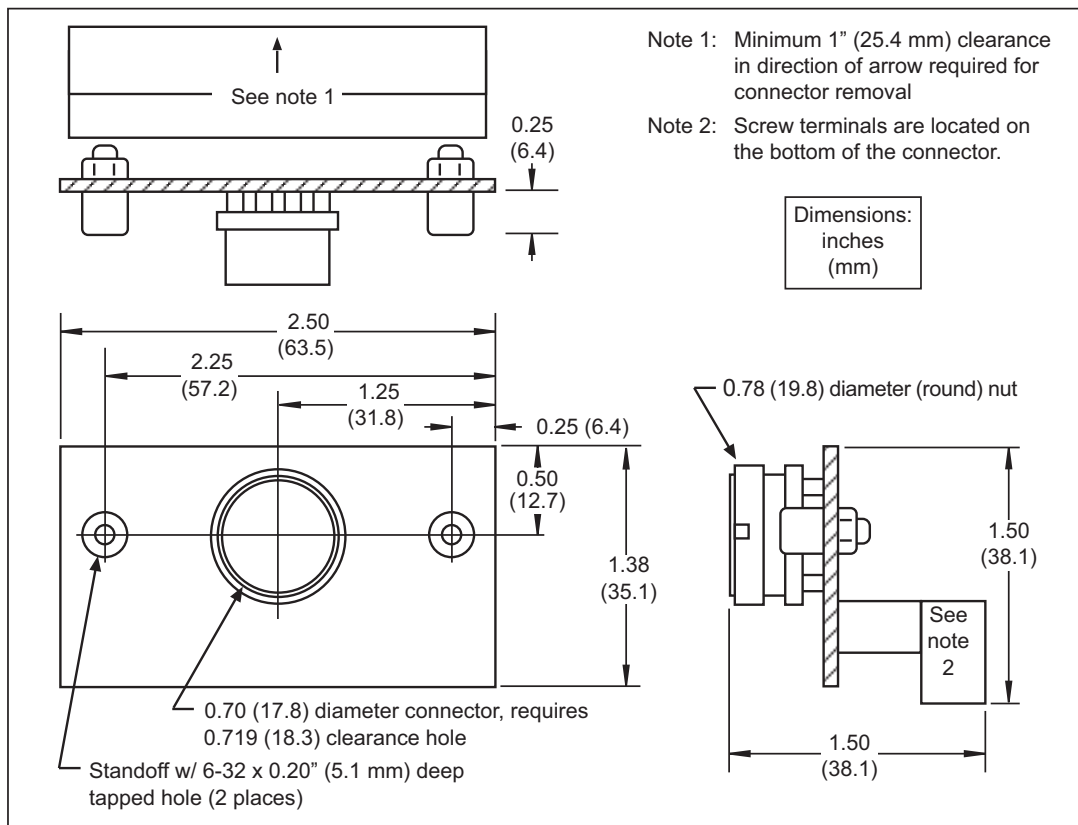


Figure 3-9. QDP PC Board: Mounting Dimensions

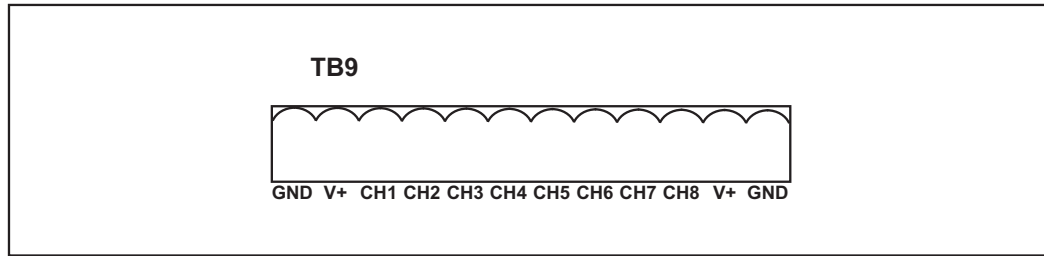


Figure 3-10. Terminal Block TB9 on QDP PC Board: Pin Designations

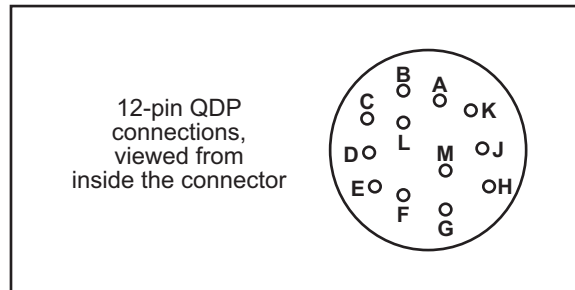


Figure 3-11. Twelve-pin QDP Connector Pin Locations

Table 3-4. QDP PC Board: Wiring Connections

| TB9 Pin # * | TB9 Pin Designation | QDP 12-pin Connector Pin Location |
|-------------|---------------------|-----------------------------------|
| 1 | GND | A |
| 2 | 24 VDC | J |
| 3 | Sensor 1 | L |
| 4 | Sensor 2 | M |
| 5 | Sensor 3 | C |
| 6 | Sensor 4 | D |
| 7 | Sensor 5 | E |
| 8 | Sensor 6 | F |
| 9 | Sensor 7 | G |
| 10 | Sensor 8 | H |
| 11 | 24 VDC | K |
| 12 | GND | B |

* Terminate shield to ground stud nearest entry point (see page 2-10).

Wiring Sensors with a User-installed Connector

⚠ WARNING

ELECTRIC SHOCK HAZARD

- Complete all sensor wiring to your connector before plugging it into the DSI 2.
- Ensure that installation is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

You can use other connectors than a Wintriss HD19 or 12-pin QDP connector to wire your sensors to DSI 2. DSI 2 8-input version -01 and 16-input versions -11 and -13 are configured for user-installed connectors. When selecting a connector, make sure you can install it in one of the knockouts in the bottom of the DSI 2 8-input version -01 enclosure (see Figure 2-1, page 2-2) or a user-drilled hole in DSI 2 16-input version -11 and -13 enclosures. Table 3-5 shows the pin numbers on terminal block TB4 on the DSI 2 PC board to which you wire your connector. Columns 3 and 4 in Table 3-5 provide space for you to document the pin number and wire color for each connection. If you have a 16-input DSI 2, you can wire user-installed connectors to both PC boards.

Table 3-5. Terminal Block TB4 Connections for User-installed Connector to DSI 2

| DSI 2 TB4 Pin # | Sensor Connection | User-provided Connector Pin # | Wire Color |
|----------------------------|--------------------------|--|-------------------|
| 1 | Sensor 1 | | |
| 2 | Sensor 2 | | |
| 3 | Sensor 3 | | |
| 4 | Sensor 4 | | |
| 5 | Sensor 5 | | |
| 6 | Sensor 6 | | |
| 7 | Sensor 7 | | |
| 8 | Sensor 8 | | |
| 9 | GND | | |
| 10 | GND | | |
| 11 | +24 VDC | | |
| 12 | +24 VDC | | |

* Terminate shield to ground stud nearest entry point (see page 2-10).

Hard-wiring Sensors

⚠ WARNING

ELECTRIC SHOCK HAZARD

- Turn off and disconnect power from the DSI 2 sensor interface, press, press control and other equipment used with the press before making any wiring connections. This includes disconnecting power to the machine control and motor.
- Remove all fuses and “tag out” per OSHA 1910.147 Control of Hazardous Energy (Lockout/ Tagout).
- Complete all sensor wiring before applying power to the DSI 2.
- Ensure that installation is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

If you want to hard-wire sensors to the DSI 2, run your cable through one of the knockouts in the bottom of the 8-input DSI 2 version -01 enclosure or a user-drilled hole in 16-input version -11 and -13 enclosures. Wire your sensors to terminal block TB4 as shown in Table 3-6. Use the space provided in column 3 of the table to document wire color or other identification for each sensor. If you have a 16-input DSI 2, you can make hard-wiring connections to both PC boards.

Table 3-6. Terminal Block TB4 Connections for Hard-wiring Sensors to DSI 2

| DSI 2 TB4 Pin # * | Sensor Connection | Wire Color |
|--------------------------|--------------------------|-------------------|
| 1 | Sensor 1 | |
| 2 | Sensor 2 | |
| 3 | Sensor 3 | |
| 4 | Sensor 4 | |
| 5 | Sensor 5 | |
| 6 | Sensor 6 | |
| 7 | Sensor 7 | |
| 8 | Sensor 8 | |
| 9 | GND | |
| 10 | GND | |
| 11 | +24 VDC | |
| 12 | +24 VDC | |

* Terminate shield to ground stud nearest entry point (see page 2-10).

Installing a Diode When Wiring Solid-state Sensors

Diodes must be installed when wiring solid-state sensors under two circumstances: when the sensors are wired in series or when a sensor contains a pull-up or pull-down resistor. Diodes are included with your DSI 2. If you need additional diodes, you can use one of the following:

- 1N4005 (available from the factory: Wintriss part # DA39772)
- 1N4001-04

Installing a Diode with Sensors Wired in Series

NOTICE

DO NOT MIX NPN AND PNP SENSORS WHEN WIRING IN SERIES

Each input to the DSI 2 sensor interface automatically recognizes whether a connected solid-state sensor is PNP or NPN. For this reason, you must not mix PNP and NPN sensors in the same series.

NOTICE

NPN SENSORS WIRED IN SERIES AS INSTRUCTED IN THIS DOCUMENT ALSO WORK WITH THE OLDER MODEL DSI

You can connect NPN sensors wired in series to either DSI or DSI 2. The older model DSI recognizes only NPN solid-state sensors.

If you wire two or more solid-state sensors in series to connect to a single DSI 2 sensor input, you must install a diode as shown in Figure 3-12, below, and the appropriate figure at the end of the manual. Wire the series of sensors as shown whether you use a DSI 2 individual connector, QDP Kit, HD19 PCB Kit, a user-specific connector, or hard-wire the sensors to DSI 2.

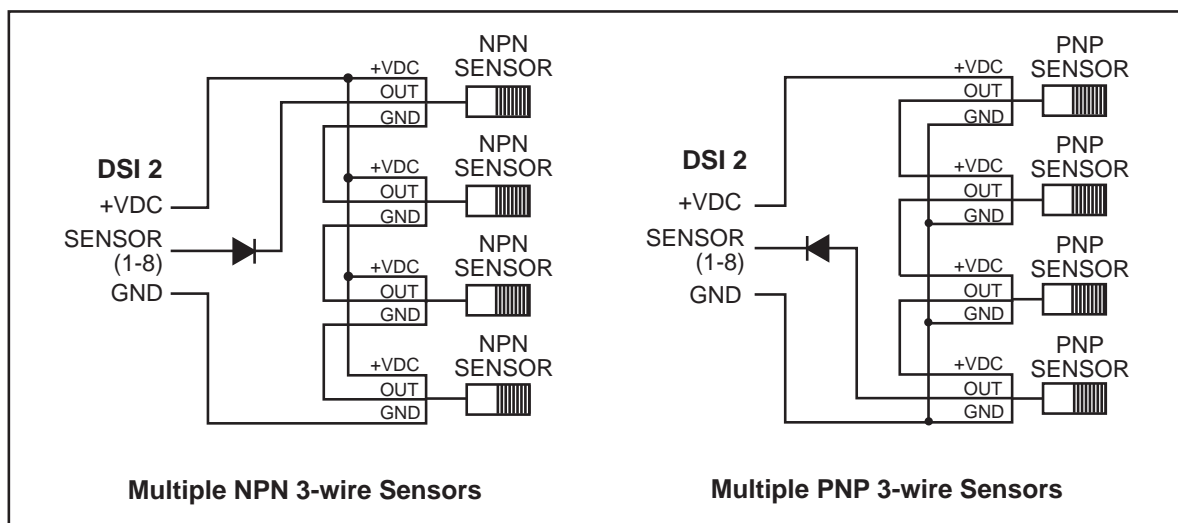


Figure 3-12. Diode Wired with Multiple Solid-state Sensors in Series

Installing a Diode with Sensors Using a Pull-up or Pull-down Resistor

If you use sensors that contain an internal pull-up or pull-down resistor, presence of the resistor will interfere with the DSI 2's automatic NPN/PNP detection feature. To make the sensor compatible with the DSI 2, wire a diode into the sensor output (DSI 2 input) line, as shown in Figure 3-13. Wire the sensor as shown whether you use a DSI 2 individual connector, QDP Kit, HD19 PCB Kit, user-specific connector, or hard-wire the sensor to DSI 2.

If you do not install a diode with this type of sensor, the corresponding sensor LED on the DSI 2 front panel will stay lit continuously even though the sensor is otherwise operating properly.

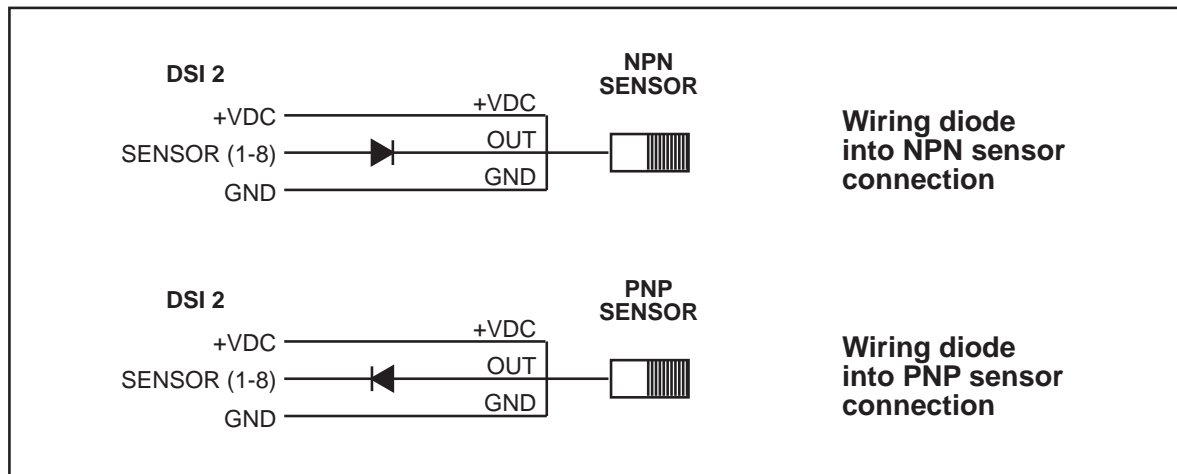


Figure 3-13. Diode Wired with Solid-state Sensor Containing Pull-up or Pull-down Resistor

Installing a Resistor with Two-Wire Proximity Sensors

When wiring 2-wire DC proximity sensors, you must install a resistor across the sensor leads. The resistance value is different for different sensors, so you may have to try two or more resistors before you find the one that works with your sensor.

Follow the steps below to connect a two-wire sensor to your DSI 2 and determine the correct resistance value.

1. Making sure that the DSI 2 is powered down, connect the two-wire sensor to the DSI 2, using a 1.2 K Ω resistor (1/4 watt), as shown in Figure 3-14, page 3-16 and in the appropriate wiring diagram at the back of the manual.
2. Power up the DSI 2.

3. While watching the sensor LED on the DSI 2, actuate the sensor.
 - If the LED is off when the sensor is not actuated, and turns on when the sensor is actuated, this is a correct installation of the sensor. Proceed with the rest of your installation.
 - If the LED is on all the time, the resistance is too small. Power down the DSI 2 and re-install the sensor with the next larger standard resistor value (for example, 1.5 K Ω). Repeat steps 2 and 3.
 - If the LED is off all the time, the resistance is too large. Power down the DSI 2 and re-install the sensor with a resistor of the next smaller standard value (for example, 1 K Ω). Repeat steps 2 and 3.

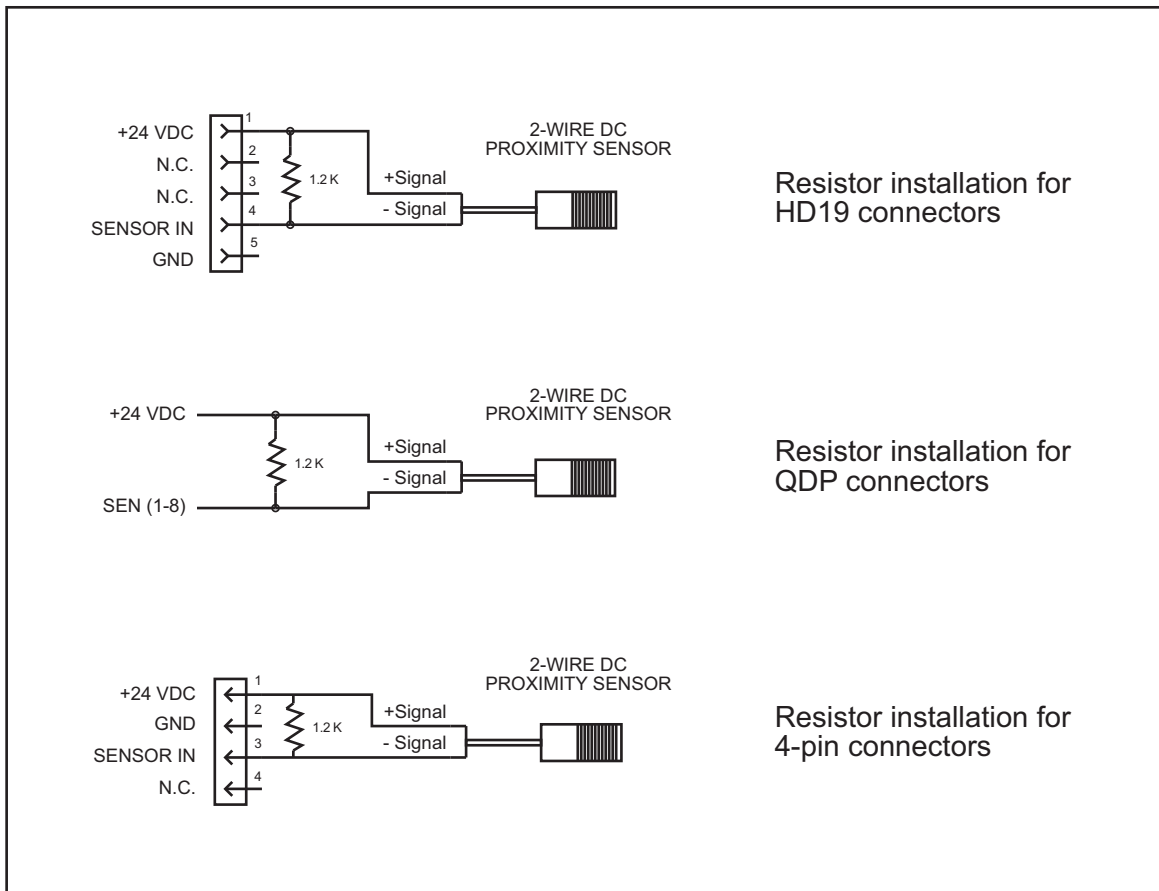


Figure 3-14. Two-wire DC Proximity Sensor Wiring Showing Installation of a Resistor

Appendix A. Part Numbers

Call the factory to order parts for your DSI 2 sensor interface. Part numbers are shown in Table A-1.

Table A-1. DSI 2 Part Numbers

| Item | Wintriss Part Number | |
|--|-----------------------------|---------|
| Fuse, AC versions: 250V, 0.5A, Slo-Blo, MT type | DA46966 | |
| Fuse, DC versions: 250V, 1A, Slo-Blo, MT type | DA63840 | |
| 4-pin sensor connector (Lumberg SV40) for use with DSI 2 sensor interface | DA47397 | |
| HDP die-mounted junction box | 4-port: | 4322101 |
| | 8-port: | 4322102 |
| 5-pin sensor connectors for use with HDP junction box | straight: | 2269201 |
| | right-angle: | 2269202 |
| HD19 cable with HD19 connectors | 5': | 4310801 |
| Female connector: RDE UC-191PN1280DU | 10': | 4310802 |
| Male connector: RDE UC-19S1N1280DU | 15': | 4310803 |
| HD19 PC board kit: PC board with HD19 connector 12-pin terminal block Mounting hardware | 4268902 | |
| QDP kit: PC board with QDP connector (Lumberg SV120) 12-pin terminal block Mounting hardware | 4268901 | |
| QDP 12-pin terminal block | DA47009 | |
| QDP cable, 12-pin | 5': | 4268801 |
| | 10': | 4268802 |
| | 15': | 4268803 |
| DSI 2 output cables | 30': | 4245203 |
| | 100': | 4245204 |
| Diode (1N4005) to install with solid state sensors wired in series Alternative diode: 1N4001-04 | DA39772 | |
| 11-pin output connector (Phoenix) for DSI 2 PC board | DA47008 | |
| 3-pin power connector (Phoenix) for DSI 2 PC board | DA47010 | |

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Wintriss Manuals

| Wintriss Product | Installation Manual Doc. No. | User Manual/CD Doc. No. |
|--|-------------------------------------|--------------------------------|
| AutoSet (1500, 1500 Plus, 1504, 1504 Plus) | DA71747 | DA71447 |
| AutoSetPAC (Tonnage Monitor) | DA71413 | DA71443 |
| Die Protection Handbook | N.A. * | 1130300 * |
| DiPro 1500 | DA71428 | DA71447 |
| DSI 2 Sensor Interface | N.A. * | DA66970 * |
| LETS Machine Interface (LMI) | N.A. * | DA71974* |
| MultiPAC Types 1 and 2 | DA71409 | DA71443 |
| MultiPAC Types 4 and 5 | DA71410 | DA71443 |
| ProCam 1500 | DA71430 | DA71447 |
| ProPAC (Process Monitor – In-die Measurement) | DA71411 | DA71443 |
| RamPAC (Shut Height, Counterbalance & Cushion Control) | DA71412 | DA71443 |
| Servofeed Interface – Coe/Wintriss | DA71415 | DA71443 |
| Servofeed Interface - CWP/Wintriss | DA71416 | DA71443 |
| Servofeed Interface - DiPro | DA71429 | DA71447 |
| Servofeed Interface - Electrocraft/Wintriss | DA71417 | DA71443 |
| Servofeed Interface - Indramat/Wintriss | DA71418 | DA71443 |
| Servofeed Interface - ProCam | DA71431 | DA71447 |
| Servofeed Interface - SmartPAC | DA71420 | DA71443 |
| Servofeed Interface - Waddington/Wintriss | DA71419 | DA71443 |
| Shadow V Safety Light Curtain | DA71433 | DA71449 |
| Shadow VI Safety Light Curtain | DA71422 | DA71445 |
| Shadow VII Safety Light Curtain | N. A. * | 1129400 * |
| Shadow 8 Safety Light Curtain | N. A. * | 1139300 * |
| SmartPAC (w/ DiProPAC & ProCamPAC) | DA71439 | DA71454 |
| SmartPAC Hydraulic | DA71435 | DA71451 |
| SmartPAC Run Mode (Spanish) | N. A. * | DA71443 * |
| SmartPAC w/ WPC II Integration | DA71440 | DA71455 |
| SmartPAC 2 (w/ DiProPAC & ProCamPAC) | DA71406 | DA71441 |
| SmartPAC 2 Hydraulic | DA71436 | DA71451 |
| SmartPAC 2 Servo | DA71437 | DA71452 |
| SmartPAC 2 w/ WPC 2000 Integration | DA71407 | DA71442 |
| SmartPAC 2 w/WPC 2000 Run Mode (Spanish) | N. A. * | DA71443 |
| WaveFormPAC (Advanced Load Analyzer) | DA71414 | DA71443 |
| Wintriss Brake Monitor | DA71432 | DA71448 |
| Wintriss Clock Display | N. A. * | DA67206 * |
| WPC II Wintriss Press Control | DA71438 | DA71453 |
| WPC 1000 Wintriss Press Control | DA71423 | DA71446 |
| WPC 2000 Wintriss Press Control | DA71421 | DA71444 |
| WPC 2000 Option 2 | DA71408 | DA71442 |

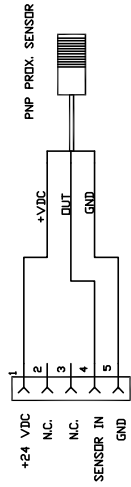
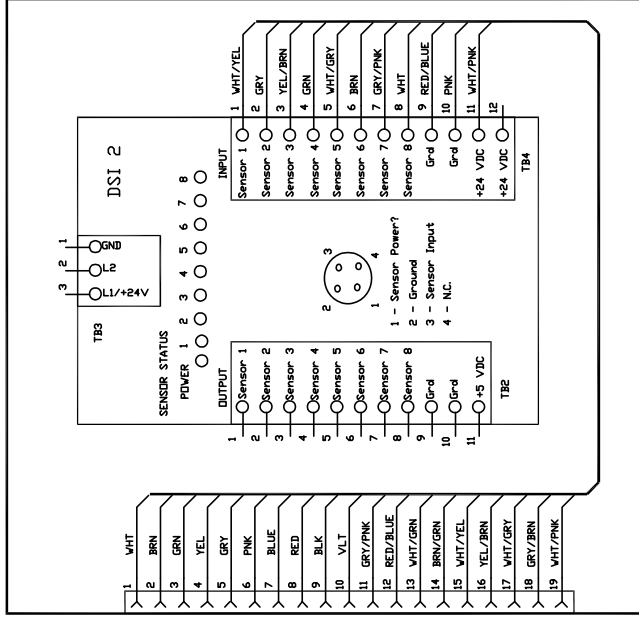
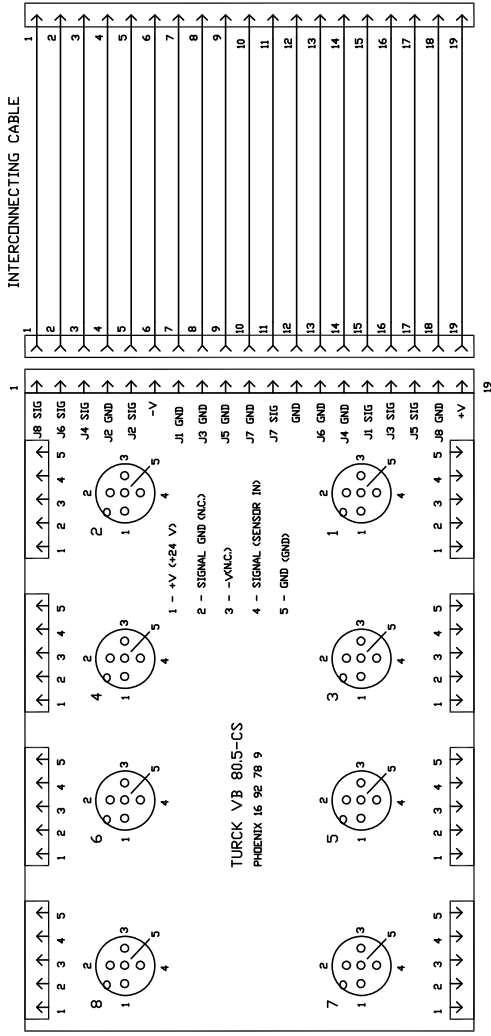
* Installation Manual not available; User Manual available in hard copy only. Die Protection Handbook available in hard copy (1102400) and on CD (1130300).

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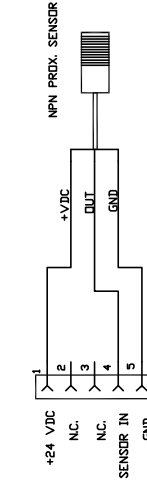
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WARNING: IF YOU ARE USING TWO DSI 2 UNITS, DO NOT CONNECT THE 24 VDC OUTPUTS FROM THE UNITS TOGETHER.

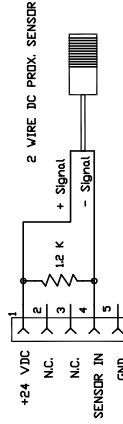
THIS DIE MOUNTED CONNECTOR BOX CAN BE A 4, 6 OR 8 SENSOR DEVICE. THE CONNECTING CABLE WILL FIT ALL THREE SIZES.



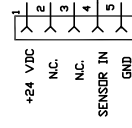
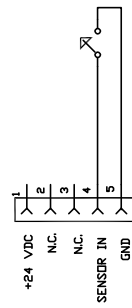
This sensor wired for the ProPAC has 4.7K res. from 4 to 5.



This sensor wired for the ProPAC has 4.7K res. from 1 to 4.



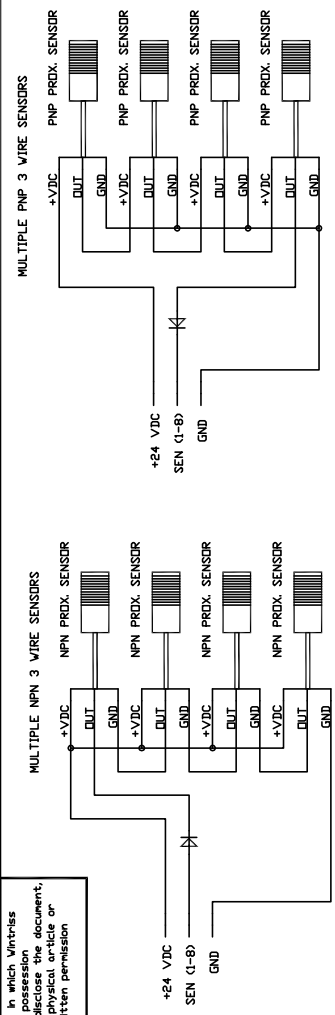
1.2K IS A TYPICAL VALUE (SEE INSTRUCTIONS FOR DETAILS)



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|-------|-----------|---|----------------|
| DRAWN | DATE | WINTRISS CONTROLS GROUP | |
| CHK. | 6/9/10 | TITLE | |
| ENG. | APPROVALS | WINTRISS DSI 2 WITH HD19 CONNECTOR WITH PDP AND CABLE | |
| MFG. | | CODE IDENT NDL | SIZE |
| PLW | | C | DRAWING NUMBER |
| REL | | | FIGURE 1 |
| | | SCALE | SHEET |
| | | NONE | DF |

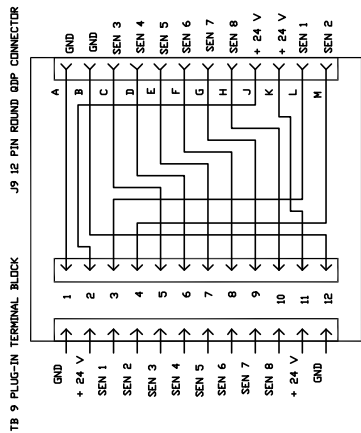
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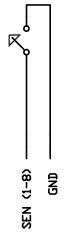
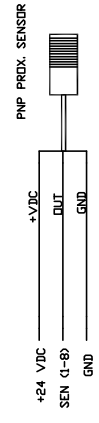
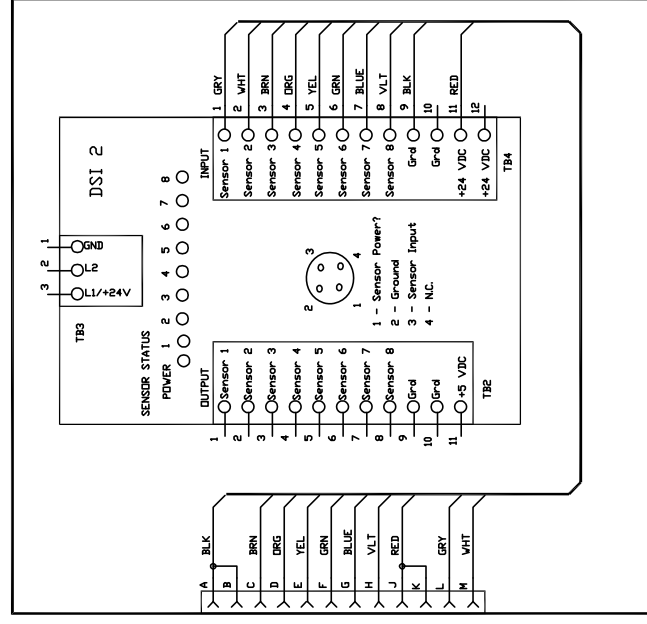
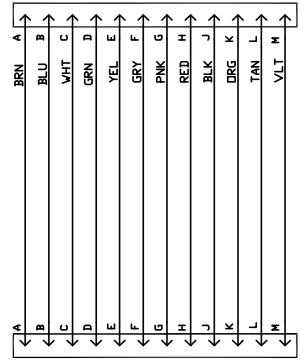
WARNING IF YOU ARE USING TWO DSI 2 UNITS, DO NOT CONNECT THE 24 VDC OUTPUTS FROM THE UNITS TOGETHER.

WINTRISS QDP PC BOARD

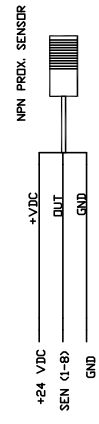


DIE MOUNTED SENSORS WIRE TO THIS CONNECTOR. SEE WIRING DIAGRAMS BELOW.

QDP INTERCONNECTING CABLE (TURK CABLE WITH YELLOW MOLDED ENDS)

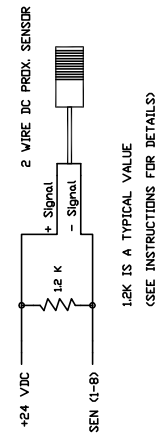
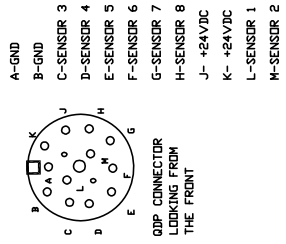


TYPICAL FOR MECHANICAL SENSORS. USE THIS FOR MECHANICAL SWITCHES AND SWITCHED PROBES.



USE THIS FOR UNSWITCHED PROBES. THESE PROBES ARE GROUNDED BY THE PART OR THE PRESS FRAME.

QDP PINOUT

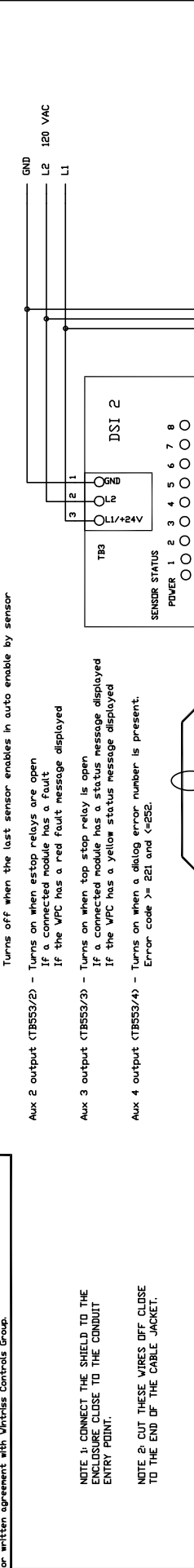


12K IS A TYPICAL VALUE (SEE INSTRUCTIONS FOR DETAILS)

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| CHK. | | | | |
| ENG. | | | | |
| MFG. | | | | |
| FILENAME | | | | |
| REL. | | | | |
| TITLE | | SCALE | SHEET | OF |
| WINTRISS DSI 2 WITH QDP CONNECTOR WITH QDP AND CABLE | | NONE | 2 | 2 |
| CODE IDENT. NO. | SIZE | DRAWING NUMBER | REV | |
| | C | FIGURE 2 | | |

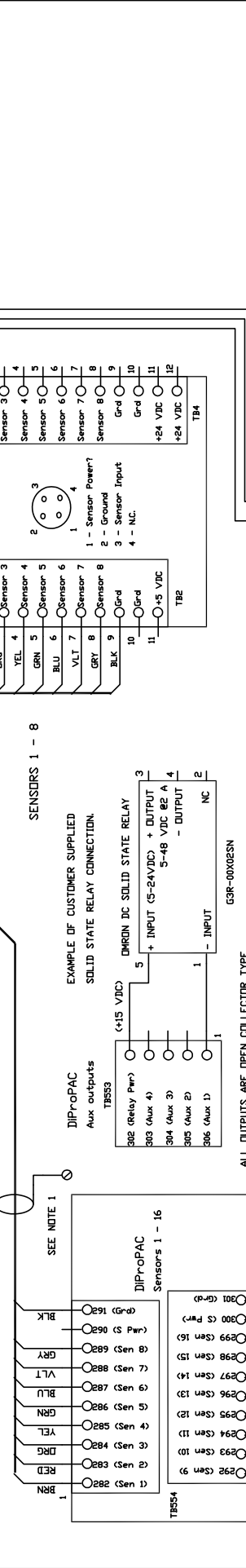
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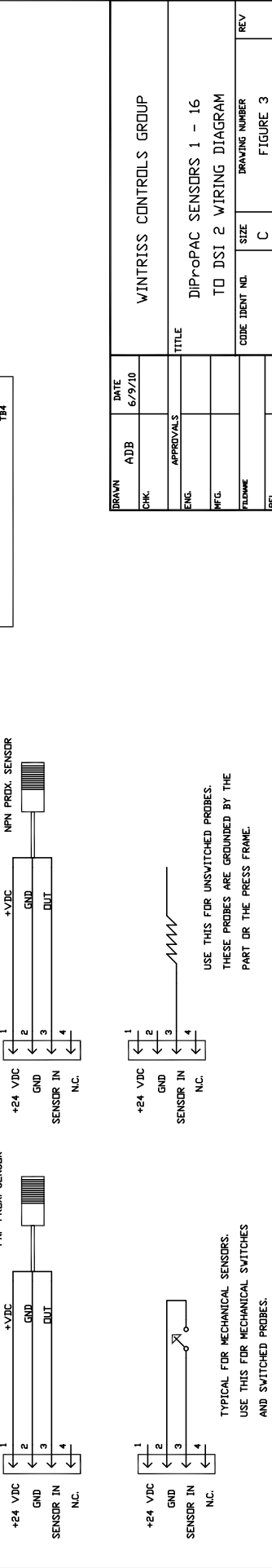
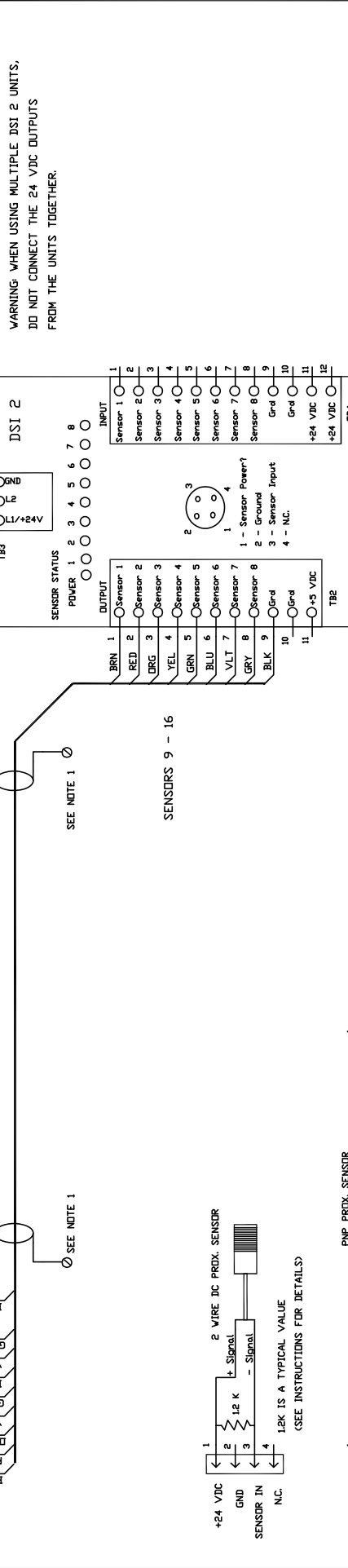
AUXILIARY OUTPUT FUNCTIONS:
 Aux 1 output (TB553/1) - Turns on when Dipro sensors are disabled.
 Turns off when sensors enabled in auto enable by tool.
 Turns off when the last sensor enables in auto enable by sensor.
 Aux 2 output (TB553/2) - Turns on when estop relays are open.
 If a connected module has a fault.
 If the MPC has a red fault message displayed.
 Aux 3 output (TB553/3) - Turns on when top stop relay is open.
 If a connected module has a status message displayed.
 If the MPC has a yellow status message displayed.
 Aux 4 output (TB553/4) - Turns on when a dialog error number is present.
 Error code >= 2E1 and <= 2E2.

NOTE 1: CONNECT THE SHIELD TO THE ENCLASURE CLOSE TO THE CONDUIT ENTRY POINT.
NOTE 2: CUT THESE WIRES OFF CLOSE TO THE END OF THE CABLE JACKET.



EXAMPLE OF CUSTOMER SUPPLIED SOLID STATE RELAY CONNECTION:
 TB553
 302 (Aux 1) Pwr
 303 (Aux 4)
 304 (Aux 3)
 305 (Aux 2)
 306 (Aux 1) NC
 5 (+15 VDC) DMRDM DC SOLID STATE RELAY
 + INPUT (5-24VDC) + OUTPUT
 5-48 VDC 82 A
 - OUTPUT
 1 - INPUT NC 2
 ALL OUTPUTS ARE OPEN COLLECTOR TYPE AND CAN SINK 10 MA TO GROUND.

WARNING: WHEN USING MULTIPLE DSI 2 UNITS, DO NOT CONNECT THE 24 VDC OUTPUTS FROM THE UNITS TOGETHER.



TYPICAL FOR MECHANICAL SENSORS:
 USE THIS FOR MECHANICAL SWITCHES AND SWITCHED PROBES.
USE THIS FOR UNSWITCHED PROBES:
 THESE PROBES ARE GROUNDED BY THE PART OR THE PRESS FRAME.

| | | |
|--------|-----------|--------------------------|
| DRAWN | DATE | WINTRISS CONTROLS GROUP |
| ADB | 6/9/10 | |
| CHK. | | |
| ENG. | APPROVALS | TITLE |
| MFG. | | DIPRO-PAC SENSORS 1 - 16 |
| FLOWM. | | TO DSI 2 WIRING DIAGRAM |
| REL. | | CODE IDENT NDL |
| | | SIZE |
| | | C |
| | | DRAWING NUMBER |
| | | FIGURE 3 |
| | | REV |
| | | SCALE |
| | | NONE |
| | | SHEET |
| | | DF |

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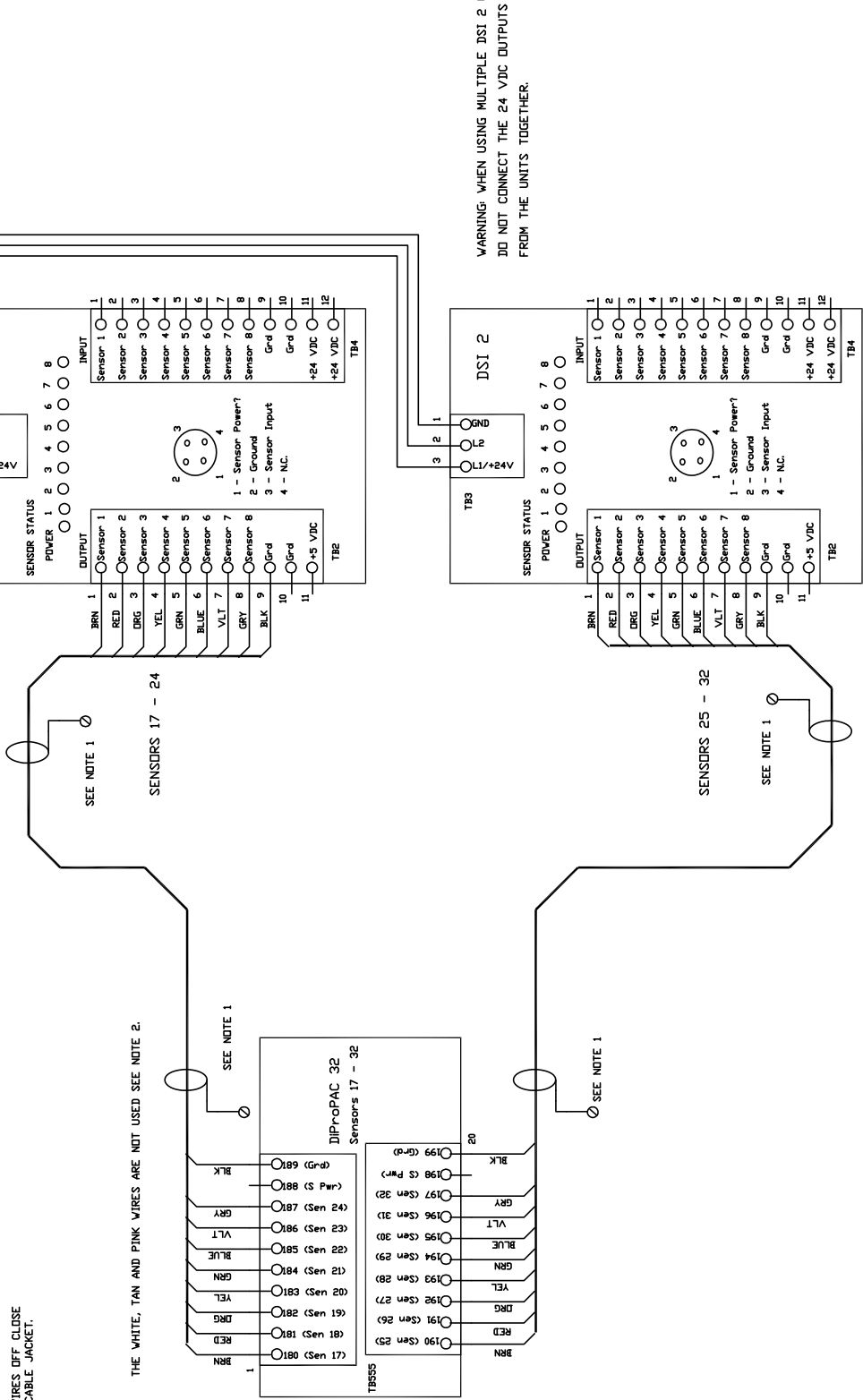
| REV | DESCRIPTION | DATE | APP'D |
|-----|-------------|------|-------|
| | | | |

NOTE: DIPRO 32 MODULE ONLY WORKS WITH THE SMARTPAC 2 UNIT.

NOTE 1: CONNECT THE SHIELD TO THE ENCLOSURE CLOSE TO THE CONDUIT ENTRY POINT.

NOTE 2: CUT THESE WIRES OFF CLOSE TO THE END OF THE CABLE JACKET.

THE WHITE, TAN AND PINK WIRES ARE NOT USED SEE NOTE 2.



WARNING: WHEN USING MULTIPLE DSI 2 UNITS, DO NOT CONNECT THE 24 VDC OUTPUTS FROM THE UNITS TOGETHER.

| | | |
|------------------------------|--------|-------------------------|
| DRAWN | DATE | WINTRISS CONTROLS GROUP |
| ADB | 6/9/10 | |
| CHK. | | |
| ENG. | | |
| MFG. | | |
| FLOWM. | | |
| REL. | | |
| TITLE | | |
| DIPRO PAC 32 SENSORS 17 - 32 | | |
| TO DSI 2 WIRING DIAGRAM | | |
| CODE IDENT NDL | SIZE | DRAWING NUMBER |
| | C | FIGURE 4 |
| SCALE | NONE | SHEET |
| | | DF |

