



NetSure™ Site Monitoring Unit

Installation and User Manual

Specification Number: 02440103

Model Number: SM-IO2

The information contained in this document is subject to change without notice and may not be suitable for all applications. While every precaution has been taken to ensure the accuracy and completeness of this document, Vertiv assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions. Refer to other local practices or building codes as applicable for the correct methods, tools, and materials to be used in performing procedures not specifically described in this document.

The products covered by this instruction manual are manufactured and/or sold by Vertiv. This document is the property of Vertiv and contains confidential and proprietary information owned by Vertiv. Any copying, use or disclosure of it without the written permission of Vertiv is strictly prohibited.

Names of companies and products are trademarks or registered trademarks of the respective companies. Any questions regarding usage of trademark names should be directed to the original manufacturer.

Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit <https://www.vertiv.com/en-us/support/> for additional assistance.

Visit <https://www.vertiv.com/en-emea/support/> for additional assistance.

Visit <https://www.vertiv.com/zh-CN/support/> for additional assistance.

TABLE OF CONTENTS

Admonishments Used in this Document	iv
Important Safety Instructions	v
Static Warning	vi
1 Introduction	1
1.1 Overview.....	1
1.2 Specifications.....	2
1.2.1 General Technical Specifications.....	2
1.2.2 Dimensions.....	2
1.2.3 Weight.....	2
2 Switch and Jumper Settings	3
2.1 General	3
2.2 Switch Settings on SM-DUE	3
2.3 Jumper Settings on SM-DUE	4
3 Installation	6
3.1 General Requirements.....	6
3.2 Installation Methods.....	6
4 Electrical Connections	7
4.1 Important Safety Instructions.....	7
4.2 General	7
4.3 Wiring Considerations.....	7
4.4 SM-IO2 Frame Ground Connection	7
4.5 Customer Connections to SM-DUE.....	7
4.5.1 General.....	7
4.5.2 Input Power Voltage Connection	10
4.5.3 +5 VDC Power Supply Output Connection.....	11
4.5.4 Ten (10) Monitoring Input Blocks Connections.....	12
4.5.5 CAN Bus Port Connection.....	16
5 Initially Starting, Configuring, and Checking SM-IO2 Operation	18
5.1 Initial Startup Preparation	18
5.2 Initially Starting the SM-IO2	18
5.3 Configuring the SM-IO2.....	18
6 Operation	19
6.1 SM-DUE Indicators.....	19
6.2 Programming.....	19
7 Troubleshooting and Repair	20
7.1 Important Safety Instructions.....	20
7.2 Contact Information.....	20
7.3 Troubleshooting.....	20
7.4 Replacement Procedures.....	21

Admonishments Used in this Document



DANGER! Warns of a hazard the reader **will** be exposed to that will **likely** result in death or serious injury if not avoided. (ANSI, OSHA)



WARNING! Warns of a potential hazard the reader **may** be exposed to that **could** result in death or serious injury if not avoided. This admonition is not used for situations that pose a risk only to equipment, software, data, or service. (ANSI)



CAUTION! Warns of a potential hazard the reader **may** be exposed to that **could** result in minor or moderate injury if not avoided. (ANSI, OSHA) This admonition is not used for situations that pose a risk only to equipment, data, or service, even if such use appears to be permitted in some of the applicable standards. (OSHA)



ALERT! Alerts the reader to an action that **must be avoided** in order to protect equipment, software, data, or service. (ISO)



ALERT! Alerts the reader to an action that **must be performed** in order to prevent equipment damage, software corruption, data loss, or service interruption. (ISO)



FIRE SAFETY! Informs the reader of fire safety information, reminders, precautions, or policies, or of the locations of fire-fighting and fire-safety equipment. (ISO)



SAFETY! Informs the reader of general safety information, reminders, precautions, or policies not related to a particular source of hazard or to fire safety. (ISO, ANSI, OSHA)

Important Safety Instructions

Safety Admonishments Definitions

Definitions of the safety admonishments used in this document are listed under “Admonishments Used in this Document” on page iv.

General Safety



DANGER! YOU MUST FOLLOW APPROVED SAFETY PROCEDURES.

Performing the following procedures may expose you to hazards. These procedures should be performed by qualified technicians familiar with the hazards associated with this type of equipment. These hazards may include shock, energy, and/or burns. To avoid these hazards:

- a) The tasks should be performed in the order indicated.
- b) Remove watches, rings, and other metal objects.
- c) Prior to contacting any uninsulated surface or termination, use a voltmeter to verify that no voltage or the expected voltage is present. Check for voltage with both AC and DC voltmeters prior to making contact.
- d) Wear eye protection.
- e) Use certified and well maintained insulated tools. Use double insulated tools appropriately rated for the work to be performed.

Personal Protective Equipment (PPE)



DANGER! ARC FLASH AND SHOCK HAZARD.

Appropriate PPE and tools required when working on this equipment. An appropriate flash protection boundary analysis should be done to determine the “hazard/risk” category, and to select proper PPE.



Only authorized and properly trained personnel should be allowed to install, inspect, operate, or maintain the equipment.

Do not work on LIVE parts. If required to work or operate live parts, obtain appropriate Energized Work Permits as required by the local authority, per NFPA 70E “Standard for Electrical Safety in the Workplace”.

Handling Equipment Containing Static Sensitive Components



ALERT! Installation or removal of equipment containing static sensitive components requires careful handling. Before handling any equipment containing static sensitive components, read and follow the instructions under “Static Warning” on page vi.

Static Warning



This equipment contains static sensitive components. The warnings listed below must be observed to prevent damage to these components. Disregarding any of these warnings may result in personal injury or damage to the equipment.

1. Strictly adhere to the procedures provided in this document.
2. Before touching any equipment containing static sensitive components, discharge all static electricity from yourself by wearing a wrist strap grounded through a one megohm resistor. Some wrist straps have a built-in one megohm resistor; no external resistor is necessary. Read and follow wrist strap manufacturer's instructions outlining use of a specific wrist strap.
3. Do not touch traces or components on equipment containing static sensitive components. Handle equipment containing static sensitive components only by the edges that do not have connector pads.
4. After removing equipment containing static sensitive components, place the equipment only on static dissipative surfaces such as conductive foam or ESD bag. Do not use ordinary Styrofoam or ordinary plastic.
5. Store and ship equipment containing static sensitive components only in static shielding containers.
6. If necessary to repair equipment containing static sensitive components, wear an appropriately grounded wrist strap, work on a conductive surface, use a grounded soldering iron, and use grounded test equipment.

1 Introduction

1.1 Overview

The SM-IO2 consists of an SM-DUE enclosed in a sheet metal housing. The SM-IO2 is used in applications where an SM-DUE is mounted external to a power system equipped with an NCU controller. The SM-DUE is used to input external monitoring information to the NCU controller. The SM-DUE provides the following monitoring inputs:

- Ten (10) input blocks with each providing the following monitoring inputs:
 - One (1) Load Bus Voltage (0 VDC to 60 VDC) per input block
 - One (1) Load Fuse Alarm (Bus- base of 0 VDC, >10 VDC alarm, <10 VDC normal) per input block
 - One (1) Programmable Analog Input, can be set to accept one (1) of the following inputs per input block:
 - 10 mV DC to 50 mV DC Load Shunt (only load shunts are supported at this time)
 - General-Purpose Current Transducer
 - General-Purpose Voltage Transducer
 - 1 uA/K Temperature Sensor

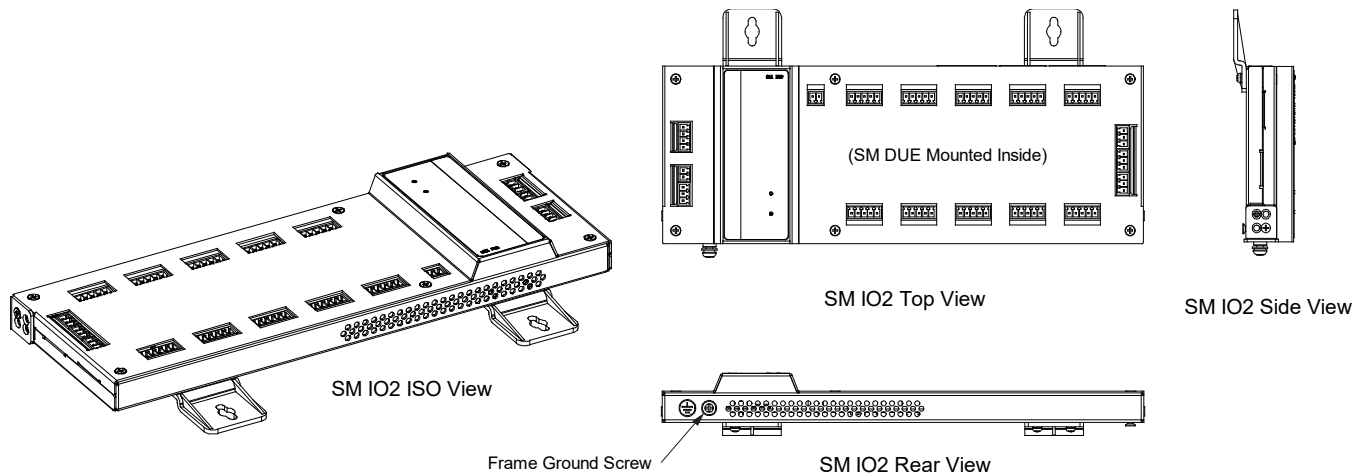


NOTE! Only the SM DUE designated as SMDUE1 and SMDUE2 via the addressing switches can have temperature probes connected to them.

The SM-DUE also contains a +5 VDC power supply output for connection to external Hall devices.

The SM-DUE connects into the NCU CAN bus. Up to eight (8) SM-DUE units can be connected to an NCU. Refer to Figure 1.1 for illustrations of the SM-IO2.

Figure 1.1 SM-IO2 Views



1.2 Specifications

1.2.1 General Technical Specifications

See Table 1.1.

Table 1.1 General Technical Specifications

Item	Description	
Input Power	Input voltage range: 19 VDC to 60 VDC. Maximum input non-destructive voltage: 75 VDC.	
Input Signals	Ten (10) Load Bus Voltage	Valid measurement voltage range: 0 VDC to 60 VDC.
	Ten (10) Load Fuse Alarm	Bus- base of 0 VDC, >10 VDC alarm, <10 VDC normal.
	Ten (10) Analog Inputs	Each can be set to accept one (1) of the following inputs: <ul style="list-style-type: none"> • 10 mV DC to 50 mV DC Load Shunt (only load shunts are supported at this time) • 0 mA to 20 mA General-Purpose Transducer • 0 VDC to 10 VDC General-Purpose Transducer • 1 uA/K Temperature Sensor
Output Signals	+5 VDC Output for External Hall Devices	
Communication	One (1) RS-485 Port (factory use only)	RS-485 isolated asynchronous port. Baud rate: 9600/19200 bps, set by hardware. Data format: N, 8, 1.
	One (1) CAN Bus Port	CAN baud rate: 125 Kbps.
Environmental	Ambient Temperature	Normal: -10 °C to +65 °C. Non Destructive: -40 °C to +75 °C.
	Humidity	Less than 90% without condensation.
	Environment	Atmosphere free of dust, corrosive or explosive vapors, oily fumes, moisture, condensation, metallic particulates, and salinity.
	Altitude	Under 3000 meters.
	Cooling Mode	Air cooling without fan.
Installation	Rack or wall mounting.	
EMC	Complies with standards: EN 55022, EN 61000-4-6, EN 61000-4-2, EN 61000-4-4, EN 61000-4-5, and EN 61000-4-29.	
Safety	Complies with standards: EN60950, UL60950, GR-63, and GR-1089. Safety certifications: CE, UL. Meets the requirements of NEBS level 3.	

1.2.2 Dimensions

Millimeters: 29 mm (Height) X 102 mm (Width) X 287 mm (Length)

Inches: 1.14 inch (Height) X 4.01 inch (Width) X 11.30 inch (Length)

1.2.3 Weight

0.8 kg (1.76 lbs)

2 Switch and Jumper Settings

2.1 General

It is recommended to make any required switch and/or jumper settings prior to installing the SM-IO2.

Switch and jumper settings are made on the SM-DUE installed inside the SM-IO2. Remove the SM-IO2 top cover to access the SM-DUE.



NOTE! The SM-IO2 (SM-DUE) contains two-piece connectors that can be separated. The connector halves must be removed from the mating half attached to the SM-DUE circuit card before the top cover can be removed.

2.2 Switch Settings on SM-DUE

The SM-DUE installed inside the SM-IO2 contains DIP switch SW1. Dip switch SW1 on the SM-DUE is used for parameter settings.

Procedure

1. Set DIP switch SW1 on the SM-DUE per site requirements. Refer to Figure 2.1 for SM-DUE and switch SW1 locations. Refer to Table 2.1 for switch settings.



NOTE! Set each SM-DUE to a different communications address.

Table 2.1 SM-DUE Switch Settings (cont'd on next page)

Communication Address (Use Switch 1, 2, and 3 of SW1)			Function Descriptions
1	2	3	
Off	Off	Off	SM-DUE #1 (Default Setting)
Off	Off	On	SM-DUE #2
Off	On	Off	SM-DUE #3
Off	On	On	SM-DUE #4
On	Off	Off	SM-DUE #5
On	Off	On	SM-DUE #6
On	On	Off	SM-DUE #7
On	On	On	SM-DUE #8

Table 2.1 SM-DUE Switch Settings (cont'd from previous page)

Baud Rate for Serial Port Communication (RS-485 Port) (Use Switch 4 of SW1)		Function Descriptions
4		
Off		19200 (Default Setting)
On		9600
Parameter of Shunt Setting Configured by Hardware or Software (Use Switch 5 of SW1)		Function Descriptions
5		
Off		Shunt parameter is set through software. (Default Setting)
On		Shunt parameter is set through DIP switch.
Shunt Voltage (Use Switch 6 of SW1)		Function Descriptions
6		
Off		25 mV (Default Setting)
On		50 mV
Shunt Current (Use Switch 7 and 8 of SW1)		Function Descriptions
7	8	
Off	Off	500 A (Default Setting)
Off	On	1000 A
On	Off	1500 A
On	On	2000 A

2.3 Jumper Settings on SM-DUE

The SM-DUE installed inside the SM-IO2 contains thirty (30) 2-pin jumpers. Three (3) for each of the ten (10) SM-DUE analog inputs. These jumpers must be set according to the type of analog signal that will be connected to the input.

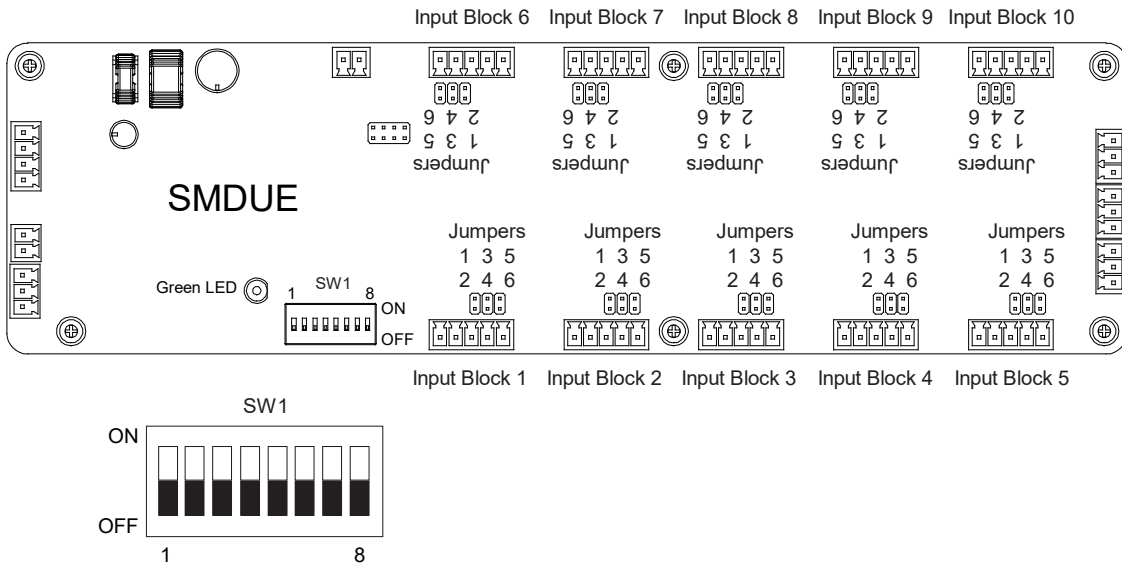
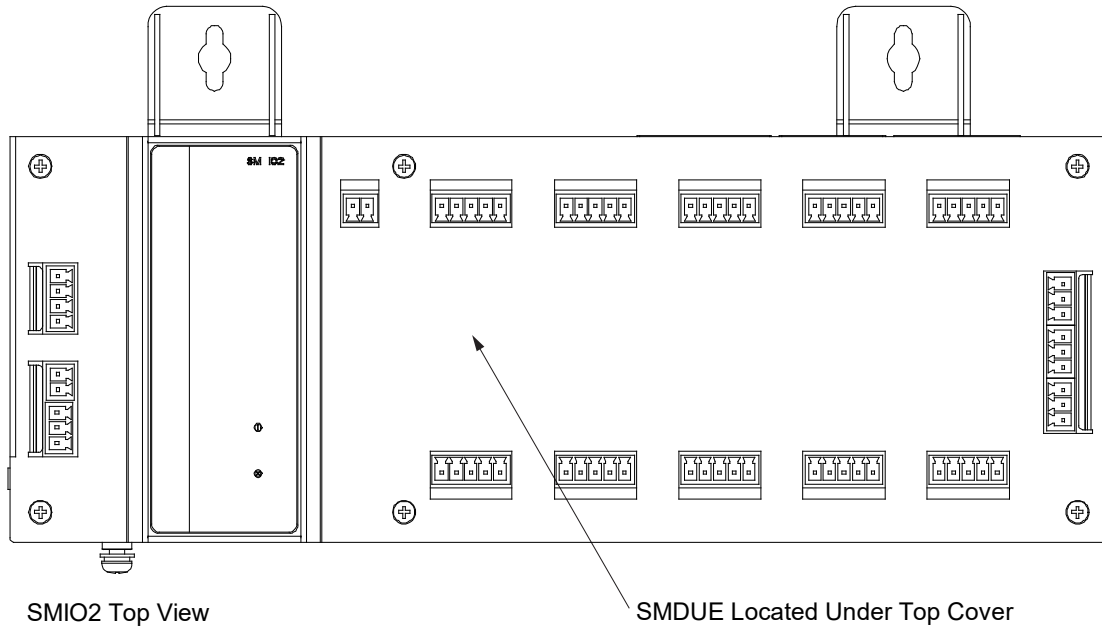
Procedure

1. Set the jumpers on the SM-DUE as required. Refer to Figure 2.1 for SM-DUE and jumper locations. Refer to Table 2.2 for jumper settings. You can store unused jumpers on one terminal of a jumper connector.

Table 2.2 SM-DUE Jumper Settings

Type of Input Signal (V_AI+ and V_AI- Terminals)	Range	Jumper Position		
		1-2	3-4	5-6
General-Purpose Transducer	0 VDC to 10 VDC	OFF	OFF	OFF
Load Shunt Current	10 mV DC to 50 mV DC	ON	OFF	ON
General-Purpose Transducer	0 mA to 20 mA	ON	ON	OFF
Temperature Sensor	1 μ A/K	ON	OFF	OFF

Figure 2.1 SM-DUE Switch and Jumper Location



3 Installation

3.1 General Requirements

Refer to the environmental specifications found in Table 1.1 for recommended site conditions.

It is not recommended to install the SM-IO2 in such a manner that it remains exposed to direct sunlight.

Ventilating openings must not be blocked and temperature of air entering the SM-IO2 must not exceed the rated operating ambient temperature range (see Table 1.1).

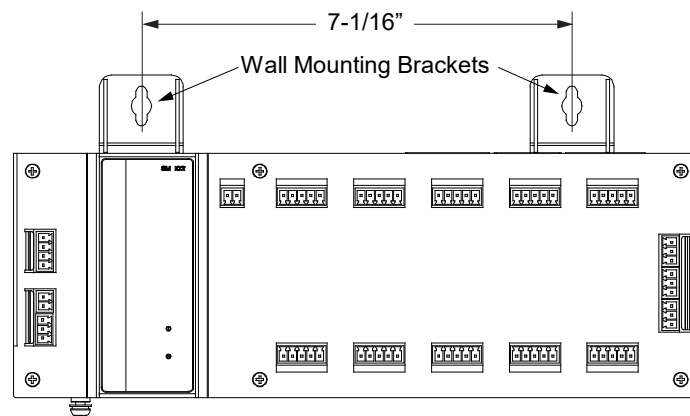
3.2 Installation Methods

Provided with the SM-IO2 are two (2) wall mounting brackets, two (2) wall mounting bracket screws with flat washer (can also be used to mount SM-IO2 to rack), two (2) wall mounting expansion anchors, and two (2) wall mounting anchor screws.

Wall Mounting

The SM-IO2 is mounted on a wall using the two (2) wall mounting brackets shown in Figure 3.1.

Figure 3.1 SM-IO2 (Top View) Showing Wall Mounting Brackets



Procedure

The following procedure outlines steps to mount the SM-IO2 to a suitable wall using the expansion anchors provided with the SM-IO2. If other anchors or wall mounting methods are used, it is up to the installer to be familiar with the installation requirements and techniques to be used in securing the SM-IO2 to a suitable wall using these other anchors or methods. Ensure that the wall and fastening technique are suitable for supporting the weight of the SM-IO2.

1. Install the furnished wall mounting brackets to the SM-IO2 (using the furnished hardware) as shown in Figure 3.1.
2. Temporarily place the SM-IO2 on the wall in the desired mounting location. Use a pencil and mark the location of the wall mounting holes in the center of the slots on the wall mounting brackets. Remove the SM-IO2 from the wall.
3. Drill M6 (6 mm) holes in the wall at the locations marked to a depth of 60 mm (approximately 2.36 inches).
4. Insert a furnished expansion anchor into each hole drilled. Gently hammer each anchor until the top is flush with the wall.
5. Place the SM-IO2 onto the wall, aligning the mounting holes in the wall mounting brackets with the expansion anchors just installed.
6. Secure the SM-IO2 to the wall by screwing the furnished M6 X 60 mm screws with furnished flat washers into the wall mounting anchors. The minimum torque is 50 Nm (36.88 ft-lbs) and the maximum torque is 80 Nm (59.00 ft-lbs).

Rack Mounting

The SM-IO2 can be mounted vertically or horizontally in a rack. The SM-IO2 is mounted in a rack using the rack mounting holes provided in the sides of the SM-IO2. Screws are furnished with the SM-IO2 to either mount the wall mounting brackets to the unit or to be used to secure the unit to a rack.

Procedure

1. Slide the SM-IO2 into the rack.
2. Align the SM-IO2 rack mounting holes with the desired holes in the rack
3. Secure the SM-IO2 to the rack with the furnished screws and washers.

4 Electrical Connections

4.1 Important Safety Instructions



DANGER! Adhere to the “Important Safety Instructions” starting on page v.

4.2 General

Customer connections are made on the SM-DUE installed inside the SM-IO2. These connection points are accessed from the outside of the SM-IO2 (through cutouts in the SM-IO2 sheet metal housing).

4.3 Wiring Considerations

All wiring should follow the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC), and applicable local codes. For operation in countries where the NEC is not recognized, follow applicable codes.

4.4 SM-IO2 Frame Ground Connection

A frame ground screw (M4) is located on the outside of the SM-IO2 enclosure.

Procedure

1. Connect a frame ground lead to the frame ground screw located on the SM-IO2 enclosure. Refer to Figure 1.1 for location. Recommended torque is 20 in-lbs.

4.5 Customer Connections to SM-DUE

4.5.1 General

The SM-DUE installed inside the SM-IO2 is used to input external monitoring information to the NCU controller. Customer connections are provided for the following:

- Input Power Voltage (19 VDC to 60 VDC)
- +5 VDC Power Supply Output for Connection to External Hall Devices

- Ten (10) input blocks with each providing the following monitoring inputs:
 - One (1) Load Bus Voltage (0 VDC to 60 VDC) per input block
 - One (1) Load Fuse Alarm (Bus- base of 0 VDC, >10 VDC alarm, <10 VDC normal) per input block
 - One (1) Programmable Analog Input, can be set to accept one (1) of the following inputs per input block:
 - 10 mV DC to 50 mV DC Load Shunt (only load shunts are supported at this time)
 - General-Purpose Current Transducer
 - General-Purpose Voltage Transducer
 - 1 uA/K Temperature Sensor



NOTE! Only the SM-DUE designated as SMDUE1 and SMDUE2 via the addressing switches can have temperature probes connected to them.

- CAN Bus Port

Refer to the following procedures and make connections to the SM-DUE as required. Refer to Figure 4.1 for SM-DUE location. Refer to Figure 4.2 for SM-DUE connector locations. See also “Switch Settings on SM-DUE” on page 3 and “Jumper Settings on SM-DUE” on page 4.

Figure 4.1 SM-DUE Location

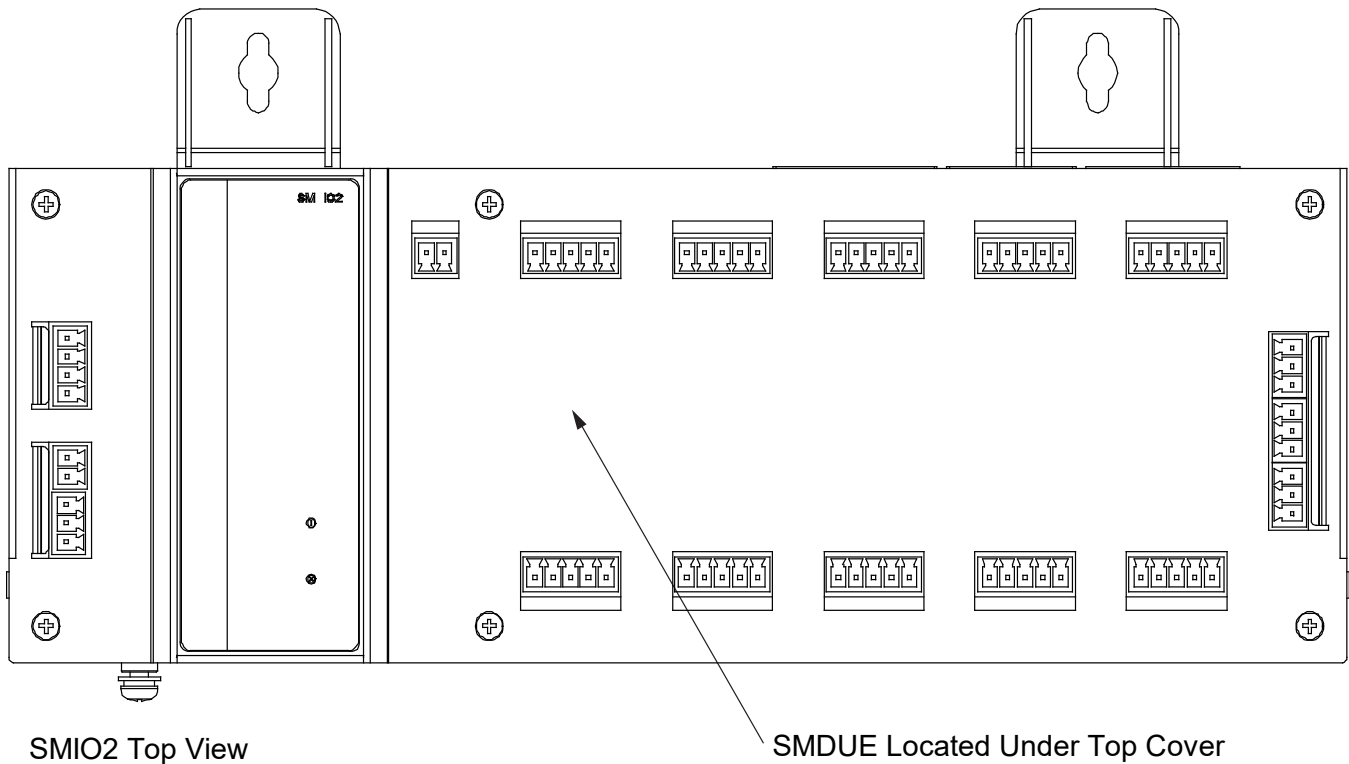
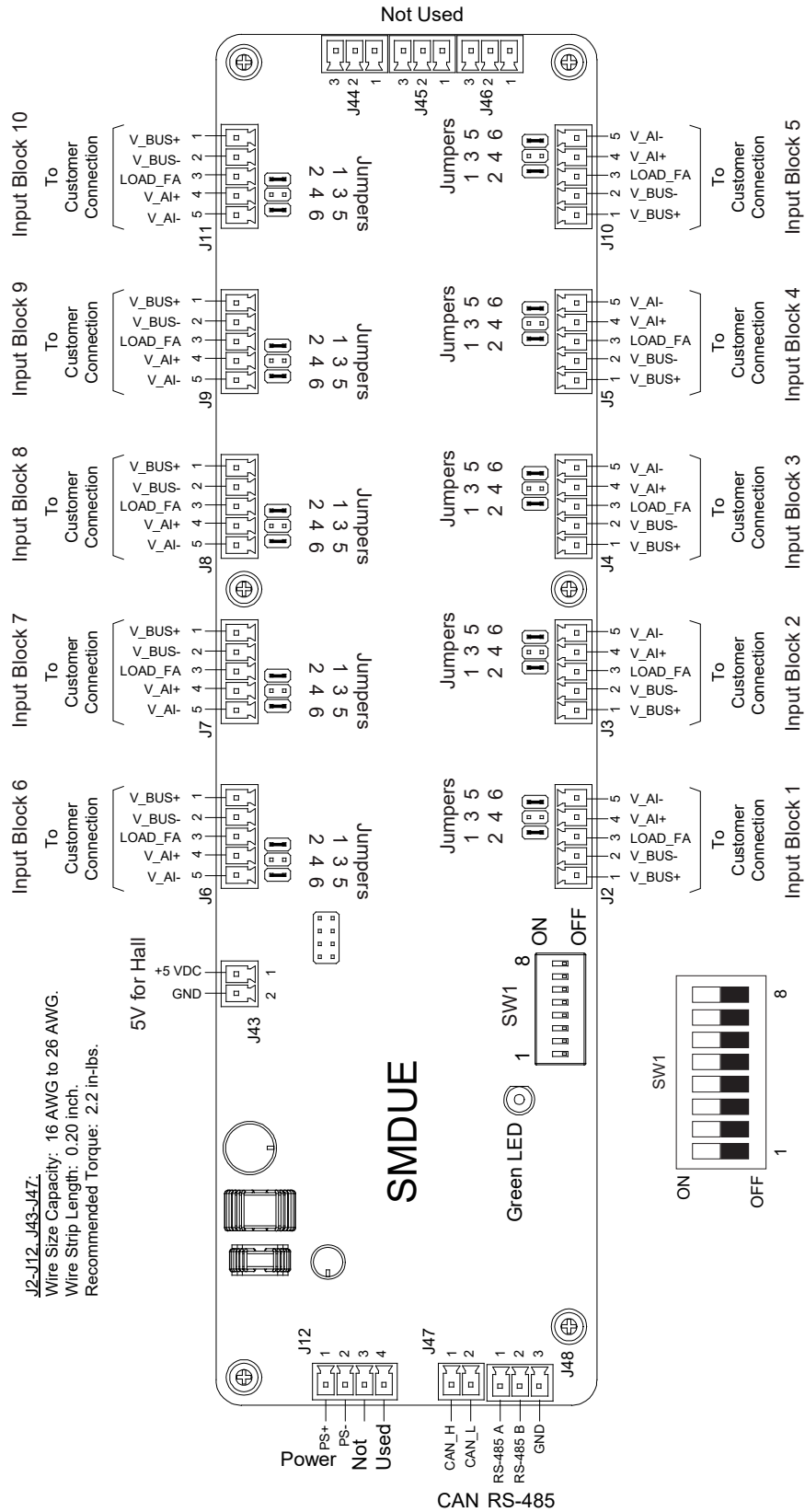


Figure 4.2 SM-DUE Connector Locations



4.5.2 Input Power Voltage Connection

General

- Input power to the SM-DUE is connected to J12. The ungrounded input lead should be fused at 1 ampere.
- Refer to Table 4.1 for connector pinout information.
- Refer to Figure 4.2 for connector location.

Table 4.1 Input Power Voltage Connector J12

Connector	Pin No.	Signal Name	Signal Symbol	Description
J12	1	Power Input+	PWR + (PS+)	Positive (+) Input Power Lead
	2	Power Input-	PWR – (PS-)	Negative (-) Input Power Lead
	3	Not Used		
	4	Not Used		

Procedure



WARNING! Check for correct polarity before making connections.

1. Connect the positive (+) input power lead to pin 1 of J12.
2. Connect the negative (-) input power lead to pin 2 of J12.

4.5.3 +5 VDC Power Supply Output Connection

General

- The SM-DUE contains a +5 VDC power supply. Input power to a Hall device can be connected to J43.
- Refer to Table 4.2 for connector pinout information.
- Refer to Figure 4.2 for connector location.

Table 4.2 Input Power to Hall Device Connector J43

Connector	Pin No.	Signal Name	Signal Symbol	Description
J43	1	Power Supply Output+	5VDC + (+5 VDC)	Power Output for Hall Sensor Device
	2	Power Supply Output-	5VDC - (GND)	

Procedure

1. Connect the positive (+) input power lead from a Hall device to pin 1 of J43.
2. Connect the negative (-) (ground) input power lead from a Hall device to pin 2 of J43.

4.5.4 Ten (10) Monitoring Input Blocks Connections

General

- Inputs to the ten (10) monitoring input blocks are connected to J2, J3, J4, J5, J6, J7, J8, J9, J10, and J11.
- Refer to Table 4.3 for connector pinout information. Refer to Table 4.4 for input block and connector mapping.
- Refer to Figure 4.2 for connector location.
- See also “Switch Settings on SM-DUE” on page 3 and “Jumper Settings on SM-DUE” on page 4.

Table 4.3 Input Block Monitoring Input Signals Connectors J2, J3, J4, J5, J6, J7, J8, J9, J10, J11

Connector	Pin No.	Signal Name	Signal Symbol	Description
J2, J3, J4, J5, J6, J7, J8, J9, J10, J11	1	Positive (+) Load Bus Voltage	V+ (V_BUS+)	Load Bus Voltage Monitoring
	2	Negative (-) Load Bus Voltage	V- (V_BUS-)	
	3	Load Fuse Alarm	LF (LOAD_FA)	Load Fuse Alarm Monitoring
	4	Positive (+) Analog Input	AI+ (V_AI+)	See Note Below
	5	Negative (-) Analog Input	AI- (V_AI-)	



NOTE! Terminals 4 and 5 of J2, J3, J4, J5, J6, J7, J8, J9, J10, J11 can be set to accept one (1) of four (4) types of input signals via jumper settings: 0 VDC to 10 VDC general-purpose transducer, 10 mV DC to 50 mV DC load shunt (only load shunts are supported at this time), 0 mA to 20 mA general-purpose transducer, and 1 uA/K temperature sensor. See also “Jumper Settings on SM-DUE” on page 4.



NOTE! Only the SM-DUE designated as SMDUE1 and SMDUE2 via the addressing switches can have temperature probes connected to them.

Table 4.4 Input Block and Connector Mapping

Input Block	1	2	3	4	5	6	7	8	9	10
Connector	J2	J3	J4	J5	J10	J6	J7	J8	J9	J11

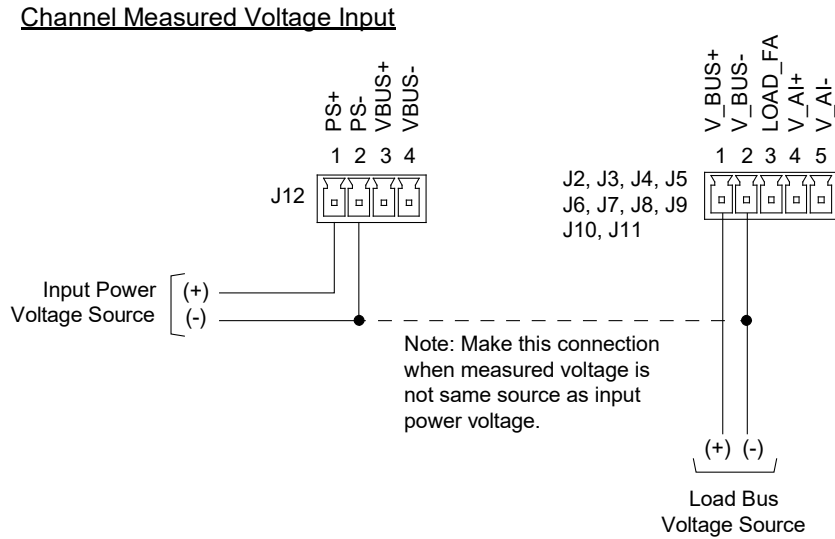
Procedure

1. Refer to “Jumper Settings on SM-DUE” on page 4 and set each input block’s analog input for the type of signal being connected.
2. For each input block (connectors J2, J3, J4, J5, J6, J7, J8, J9, J10, J11), connect the following signals. Refer to the next sections for specific connection details.
 - Connect the positive (+) load bus voltage monitoring lead to pin 1.
 - Connect the negative (-) load bus voltage monitoring lead to pin 2.
 - Connect the fuse alarm monitoring lead to pin 3 (Bus- base of 0 VDC, >10 VDC alarm, <10 VDC normal).
 - Connect the positive (+) analog input lead to pin 4.
 - Connect the negative (-) analog input lead to pin 5.

Load Bus Voltage Monitoring Connections

Refer to Figure 4.3 for a wiring diagram.

Figure 4.3 Load Bus Voltage Monitoring Connections

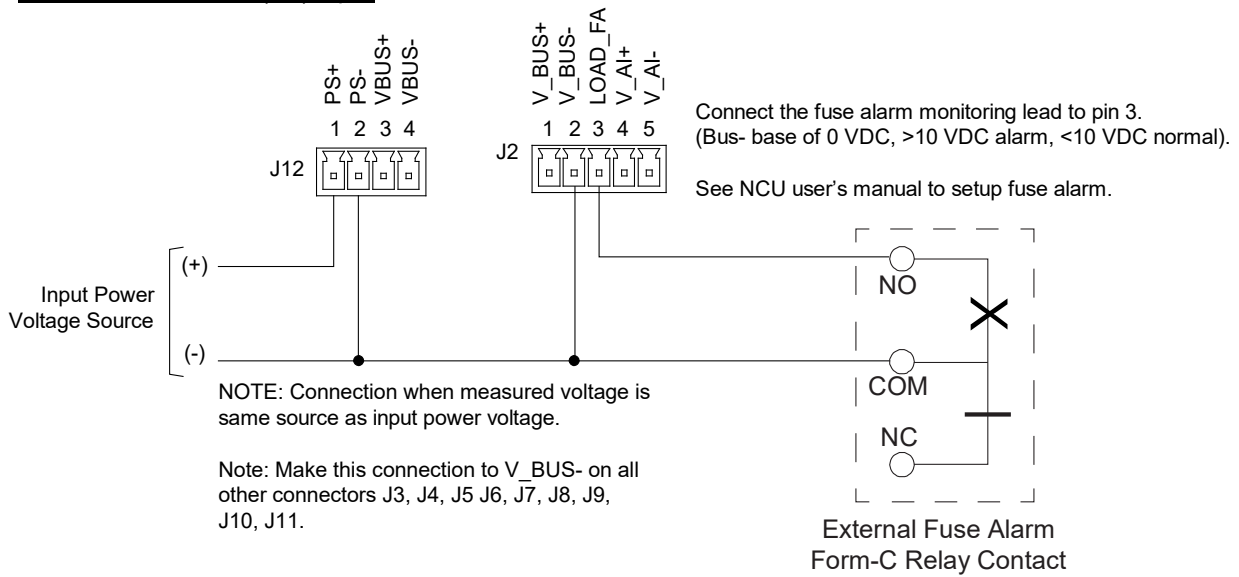


Load Fuse Alarm (FA) Input Connections

Refer to Figure 4.4 for a wiring diagram.

Figure 4.4 Load Fuse Alarm Connections

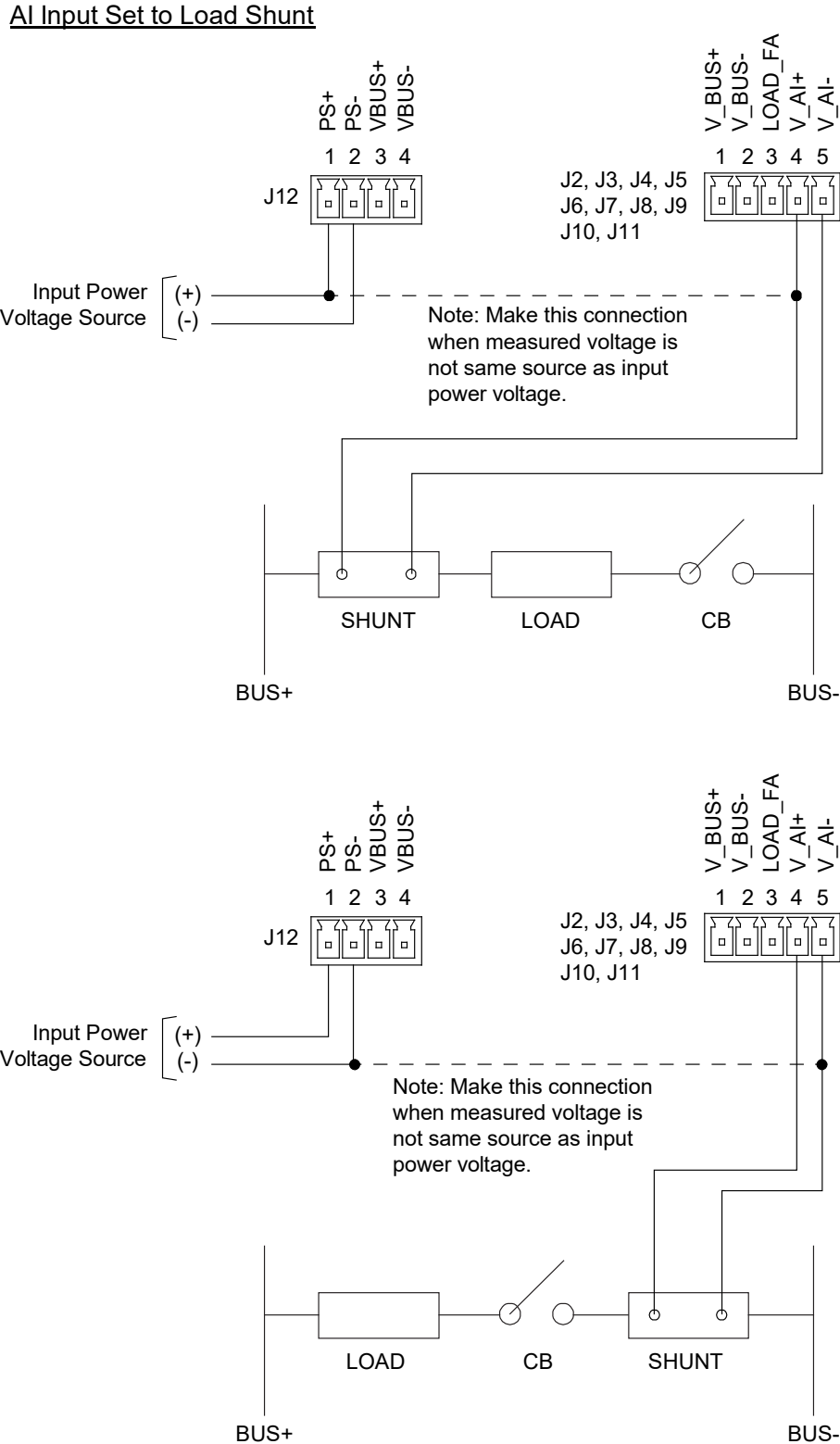
Channel Fuse Alarm (FA) Input



Analog Input (AI) Connections when Set for Load Shunt

Refer to Figure 4.5 for a wiring diagram.

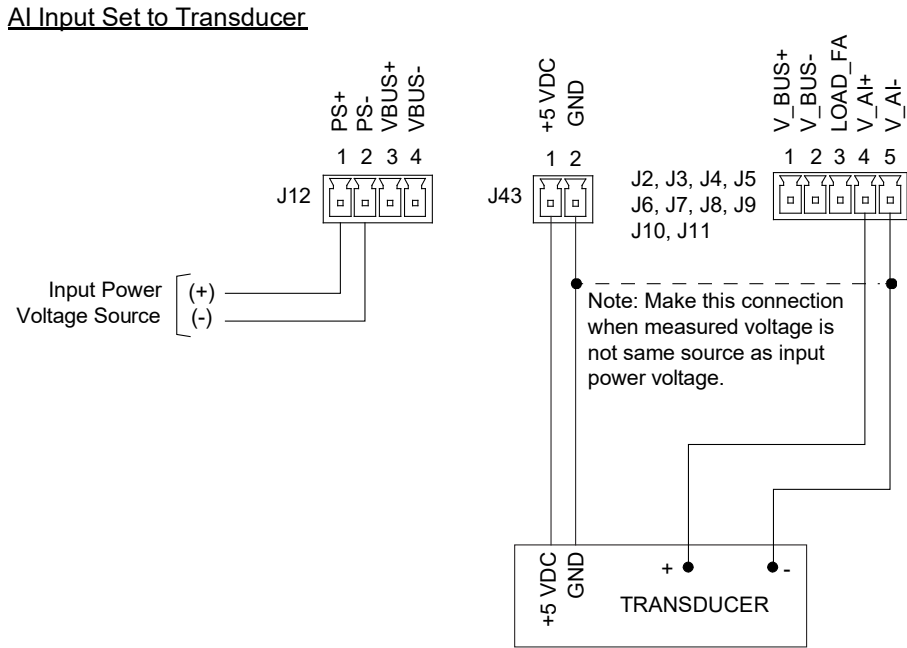
Figure 4.5 Analog Input (AI) Connections when Set for Load Shunt



Analog Input (AI) Connections when Set for Transducer

Refer to Figure 4.6 for a wiring diagram.

Figure 4.6 Analog Input (AI) Connections when Set for Transducer



Analog Input (AI) Connections when Set for Temperature Probe

Refer to Figure 4.7 for a wiring diagram.



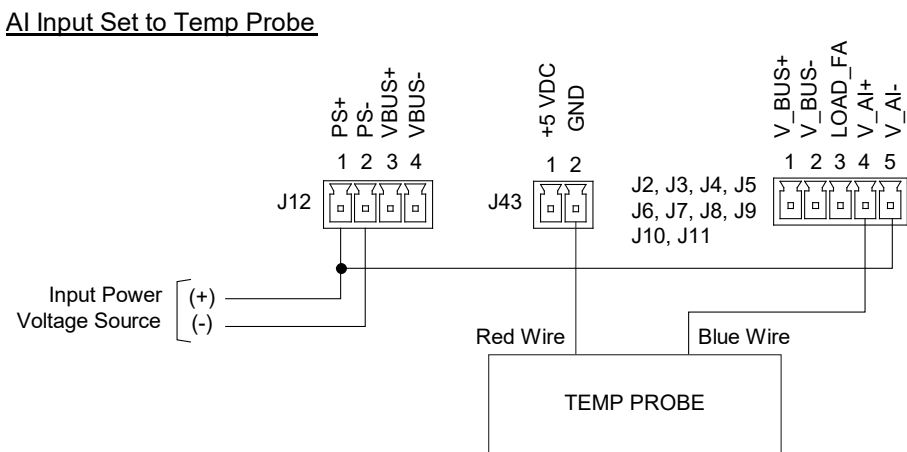
-  **NOTE!** The connector end must be cut off from the temperature probe and the temperature probe hardwired into the unit.
-  **NOTE!** Only the SM-DUE designated as SMDUE1 and SMDUE2 via the addressing switches can have temperature probes connected to them.

Figure 4.7 Analog Input (AI) Connections when Set for Temperature Probe



4.5.5 CAN Bus Port Connection

General

- The SM-IO2 (SM-DUE) is connected into the NCU CAN Bus via connector J47. Communication between the SM-DUE and the NCU is accomplished through the CAN port (J47).
- The CAN port (J47) can also be used to interconnect multiple SM-IO2 (SM-DUE) units together.
- Refer to Table 4.5 for connector pinout information.
- Refer to Figure 4.2 for connector location.

Table 4.5 CAN Bus Port Connector J47

Connector	Pin No.	Signal Name	Signal Symbol	Description
J47	1	CAN Communication H	CAN_H	CAN Port
	2	CAN Communication L	CAN_L	

Procedure (Connecting to NCU)

1. Connect the SM-IO2 (SM-DUE) into the NCU CAN Bus per Table 4.5. Connect CAN_H to CAN_H. Connect CAN_L to CAN_L. Refer to the power system documentation for NCU CAN port description and location.

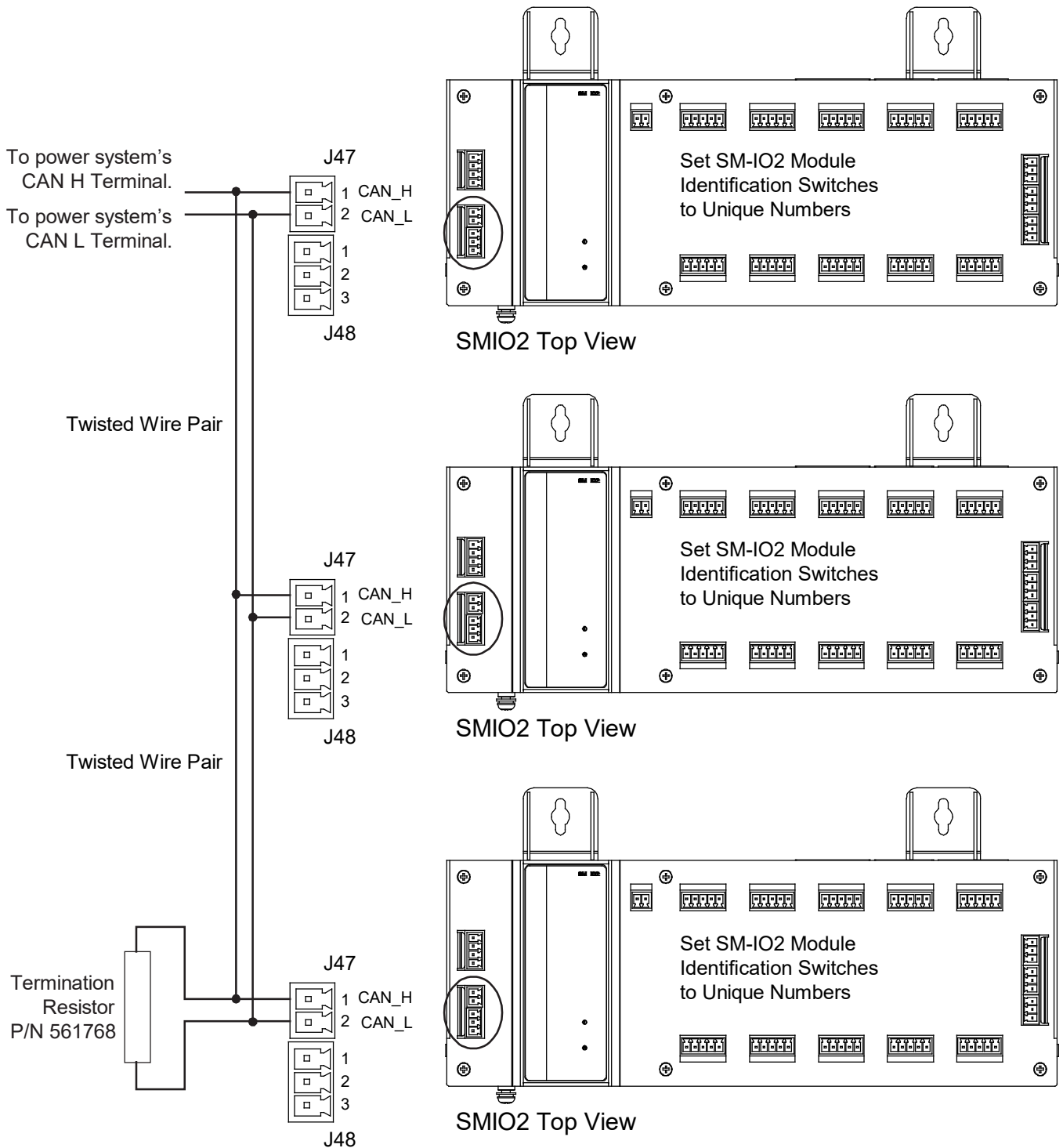
Procedure (Connecting Multiple SM-DUE Units Together)



NOTE! The NCU can communicate with up to eight (8) SM-IO2 (SM-DUE) units. Set each SM-IO2 (SM-DUE) to a unique address number.

1. To connect multiple SM-IO2 (SM-DUE) units together, for all units connect the CAN_H terminals together and connect the CAN_L terminals together (CAN_H to CAN_H, CAN_L to CAN_L). See Figure 4.8.
2. Connect termination resistor P/N 561768 to last SM-IO2 in NCU CAN bus. Cut lugs off P/N 561768 termination resistor and connect to J47 Pin 1 and Pin 2 along with the CAN_H and CAN_L leads. See Figure 4.8.

Figure 4.8 Connecting Multiple SM-IO2 (SM-DUE) Together



5 Initially Starting, Configuring, and Checking SM-IO2 Operation

5.1 Initial Startup Preparation

Refer to the separate NCU controller manual (UM1M830BNA) supplied with the system connected to the SM-IO2 for complete NCU controller operating information.

5.2 Initially Starting the SM-IO2

Procedure

1. Apply input power to the SM-IO2.
2. The SM-IO2 starts and goes through an initialization process. The “Operation” LED will flash during the initialization process. After the initialization process is complete, the “Operation” LED will stay flashing to indicate normal operation.



NOTE! On initial power up of the SM-DUE, a controller reboot may be required to update controller SM-DUE inventory.

3. Refer to the next section “Configuring the SM-IO2” and set the SM-IO2 as required for your application.

5.3 Configuring the SM-IO2

Refer to the NCU controller manual (UM1M830BNA) for detailed instructions on how to program the SM-DUE located inside the SM-IO2.

6 Operation

6.1 SM-DUE Indicators

There is one (1) status LED indicator located on the SM-DUE (visible through the SM-IO2 top cover). Refer to Figure 6.1 for location. Refer to Table 6.1 for indicator functions.

Figure 6.1 SM-DUE Indicator Locations

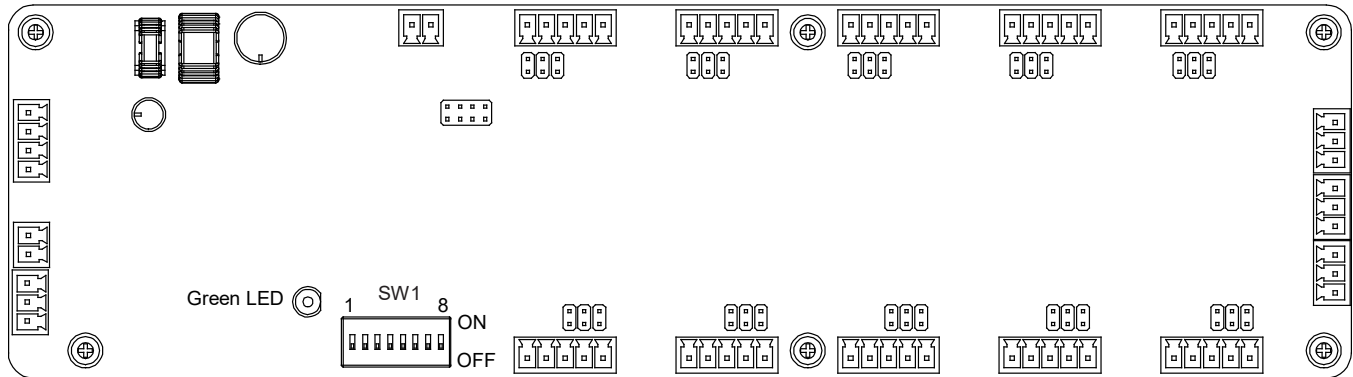


Table 6.1 SM-DUE Indicators

Indicator	Normal State	Fault State	Description
Operation (Green)	Flashing	--	Unit is operating normally.
	--	Off	Unit is non-operational.

6.2 Programming

Refer to the separate NCU controller manual (UM1M830BNA) supplied with the system connected to the SM-IO2 for complete SM-DUE programming and NCU interface information.

7 Troubleshooting and Repair

7.1 Important Safety Instructions



DANGER! Adhere to the “Important Safety Instructions” starting on page v.

7.2 Contact Information

Refer to Section 4154 (provided with your customer documentation) for support contact information.

7.3 Troubleshooting

LED Indication Error

Requirement: When power is supplied to the SM-DUE, the “Operation” LED should flash.

Issue: SM-DUE “Operation” LED is OFF.

Possible Solutions: Check if the power input wiring of the SM-DUE is correct. Use a multimeter to check if the input voltage to the SM-DUE meets requirements. Check if the wiring of the other terminals is correct.

Incorrect Measurement Readings

Issue: The NCU is unable to obtain correct data when doing measurements.

Possible Solutions: Check if the SM-DUE jumper settings are correct. Check if the input wiring is securely connected to the proper terminals. Check if the input voltage to the SM-DUE is correct. Check if the input configuration is correct at the NCU. Check the CAN connection.

CAN Communication Failure

Issue: Communication through the CAN port fails.

Possible Solution: Check if the CAN port is correctly connected.

7.4 Replacement Procedures

SM-DUE Circuit Card Replacement



NOTE! The SM-DUE is located inside the SM-IO2. Refer to Figure 2.1.

Procedure

1. Performing this procedure may activate external alarms. Do one of the following. If possible, disable these alarms. If these alarms cannot be easily disabled, notify the appropriate personnel to disregard any future alarms associated with this system while the procedure is being performed.



WARNING! Damage to the circuit card may result if the next step is not followed.

2. Connect an approved grounding strap to your wrist. Attach the other end to a suitable ground.
3. The SM-IO2 (SM-DUE) contains two-piece connectors that can be separated so they can be removed without removing the individual wires. Carefully label the connectors plugged into the SM-IO2 (SM-DUE). These connectors must be plugged into the same mating connector half on the replacement SM-DUE. Refer to Figure 4.2 on page 9.
4. Unplug all connectors plugged into the SM-IO2 (SM-DUE). **REMOVE THE POWER CONNECTOR (J12) FIRST.**
5. The SM-IO2 (SM-DUE) contains two-piece connectors that can be separated. The connector halves must be removed from the mating half attached to the SM-DUE circuit card before the top cover can be removed. Remove any remaining connector halves (that do not have customer wiring).
6. Remove the screws securing the SM-IO2 top cover. Remove the top cover to access the SM-DUE. Remove the SM-DUE from the SM-IO2 by removing the screws securing it.
7. In this step, ensure you do not intermix the old and replacement SM-DUE circuit cards. Set the switches and jumpers on the replacement SM-DUE circuit card to the same settings as the old SM-DUE circuit card. See also “Switch Settings on SM-DUE” on page 3 and “Jumper Settings on SM-DUE” on page 4.
8. Orient the replacement SM-DUE circuit card over its mounting position inside the SM-IO2, and secure with the screws removed from the old SM-DUE circuit card.
9. Replace the SM-IO2 top cover and secure with the screws previously removed.
10. Plug all connectors previously removed from the SM-IO2 (SM-DUE) into the appropriate mating connector half on the SM-IO2 (SM-DUE). Refer to the labels applied in Step 3. **PLUG THE POWER CONNECTOR (J12) LAST.**
11. Remove the grounding wrist strap.
12. Temporarily remove then re-insert the NCU. Wait for the NCU to initialize.
13. Enable the external alarms, or notify appropriate personnel that this procedure is finished.
14. Ensure that there are no local or remote alarms active on the system.

This page intentionally left blank.

Connect with Vertiv on Social Media



<https://www.facebook.com/vertiv/>



<https://www.instagram.com/vertiv/>



<https://www.linkedin.com/company/vertiv/>



<https://www.twitter.com/vertiv/>



Vertiv.com | Vertiv Headquarters, 505 N Cleveland Ave, Westerville, OH 43082, USA

© 2023 Vertiv Group Corp. All rights reserved. Vertiv™ and the Vertiv logo are trademarks or registered trademarks of Vertiv Group Corp. All other names and logos referred to are trade names, trademarks or registered trademarks of their respective owners. While every precaution has been taken to ensure accuracy and completeness here, Vertiv Group Corp. assumes no responsibility, and disclaims all liability, for damages resulting from use of this information or for any errors or omissions.