Wiring Diagrams

5-pin Euro-Style Hookup

Wiring the 5-pin Euro-style connector depends on the model and power requirements of the device. Connecting dc power to the communication pins will cause permanent damage.

	Wire No.	Wire Color	Description
	1	Brown	10 to 30V dc
	2	White	RS485 / D1 / B / +
	3	Blue	dc common (GND)
	4	Black	RS485 / D0 / A / –
	5	Gray	Comms Gnd

Terminal Block (IP67 Models)

AI*x* or A*x*. Analog IN *x*.
AO*x*. Analog OUT *x*.
DI*x*. Discrete IN *x*.
DO*x*. Discrete OUT *x*.
GND. Ground/dc common connection.
PWR. Power, 10 to 30V dc power connection.

DX80...C Wiring

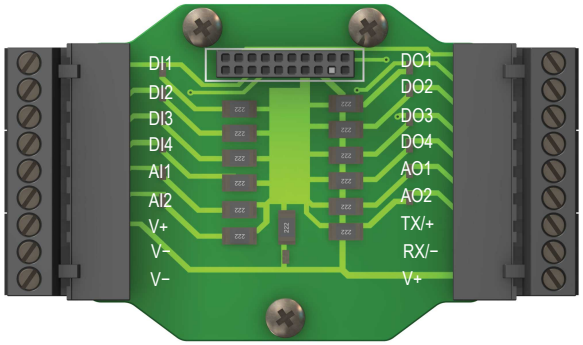
Wiring power to the DX80...C models varies depending the power requirements of the model.

Terminal Label	Gateway, DX85 *	10 to 30V dc Powered Nodes	Battery Powered Nodes **
V+	10 to 30V dc	10 to 30V dc	
Tx/+	RS485 / D1 / B / +		
V-	dc common (GND)	dc common (GND)	dc common (GND)
Rx/-	RS485 / D0 / A / -		
B+			3.6 to 5.5V dc

* Connecting dc power to the communication pins will cause permanent damage.

** For FlexPower devices, do not apply more than 5.5V to the gray wire.

Terminal Block (IP20 Models)



AI*x* or A*x*. Analog IN *x*.

AO*x*. Analog OUT *x*.

DI*x*. Discrete IN *x*.

DO*x*. Discrete OUT *x*.

PWR. Power, 10 to 30V dc power connection.

RX/-. Serial comms line

TX/+. Serial comms line

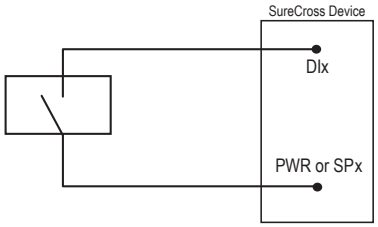
V+. Power, 10 to 30V dc power connection.

V-. Ground/dc common connection.

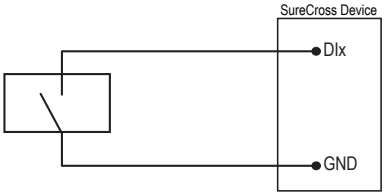
Wiring Diagrams for Discrete Inputs

Connecting dc power to the communication pins will cause permanent damage. For the DX8*x*...C models, PWR in the wiring diagram refers to V+ on the wiring board and GND in the wiring diagram refers to V- on the wiring board.

Discrete Input Wiring (PNP)



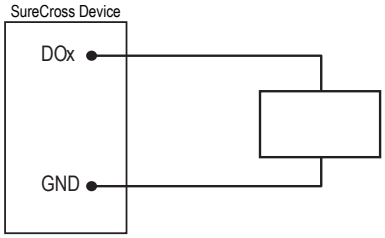
Discrete Input Wiring (NPN)



Wiring Diagrams for Discrete Outputs

Connecting dc power to the communication pins will cause permanent damage. For the DX8*x*...C models, PWR in the wiring diagram refers to V+ on the wiring board and GND in the wiring diagram refers to V- on the wiring board.

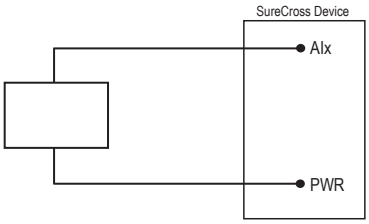
Discrete Output Wiring (PNP)



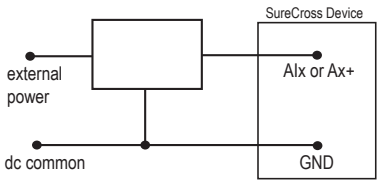
Wiring Diagrams for Analog Inputs

Connecting dc power to the communication pins will cause permanent damage. Do not exceed analog input ratings for analog inputs. Only connect sensor outputs to analog inputs.

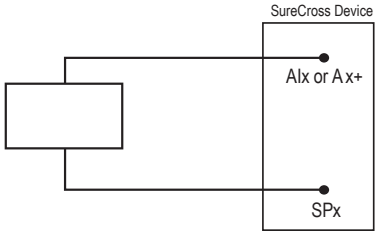
Analog Input Wiring (10 to 30V dc Power)



Analog Input Wiring (Externally Powered Sensors)



Analog Input Wiring (Switch Powered Sensors)

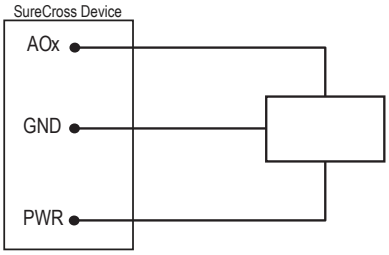


(Only possible in models with switch power (SPx) outputs)

Wiring Diagrams for Analog Outputs

Connecting dc power to the communication pins will cause permanent damage. Do not exceed analog input ratings for analog inputs. Only connect sensor outputs to analog inputs.

Analog Output Wiring



Modbus Register Table

I/O	Modbus Holding Register		I/O Type	Units	I/O Range		Holding Register Representation		Terminal Block Labels
	Gateway or DX85	Any Node			Min. Value	Max. Value	Min. (Dec.)	Max. (Dec.)	
1	1	1 + (Node# × 16)	Discrete IN 1	-	0	1	0	1	DI1
2	2	2 + (Node# × 16)	Discrete IN 2	-	0	1	0	1	DI2
3	3	3 + (Node# × 16)	Discrete IN 3	-	0	1	0	1	DI3
4	4	4 + (Node# × 16)	Discrete IN 4	-	0	1	0	1	DI4
5	5	5 + (Node# × 16)	Analog IN 1	mA V	0.0 0.0	20.0 10.0	0	65535	AI1
6	6	6 + (Node# × 16)	Analog IN 2	mA V	0.0 0.0	20.0 10.0	0	65535	AI2
7	7	7 + (Node# × 16)	Reserved						
8	8	8 + (Node# × 16)	Device Message						

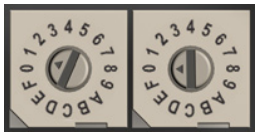
I/O	Modbus Holding Register		I/O Type	Units	I/O Range		Holding Register Representation		Terminal Block Labels
	Gateway or DX85	Any Node			Min. Value	Max. Value	Min. (Dec.)	Max. (Dec.)	
9	9	9 + (Node# × 16)	Discrete OUT 1	-	0	1	0	1	DO1
10	10	10 + (Node# × 16)	Discrete OUT 2	-	0	1	0	1	DO2
11	11	11 + (Node# × 16)	Discrete OUT 3	-	0	1	0	1	DO3
12	12	12 + (Node# × 16)	Discrete OUT 4	-	0	1	0	1	DO4
13	13	13 + (Node# × 16)	Analog OUT 1	mA V	0.0 0.0	20.0 10.0	0	65535	AO1
14	14	14 + (Node# × 16)	Analog OUT 2	mA V	0.0 0.0	20.0 10.0	0	65535	AO2
15	15	15 + (Node# × 16)	Control Message						
16	16	16 + (Node# × 16)	Reserved						

Some analog I/O models may use milliamps or voltage, depending on the model. Check the models table (on page 1) of your product's data sheet to determine which model you have.

Device Configuration

Setting the Slave ID on a DX85 Remote I/O Device

On a DX85 Modbus RTU Remote I/O device, use the rotary dials to set the device's Slave ID.



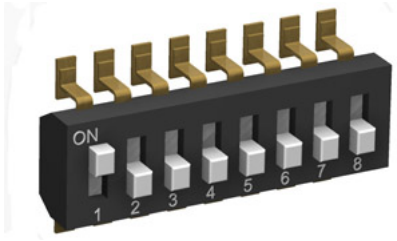
In Rotary Dial Decimal Mode, the left dial acts as the left digit and the right dial acts as the right digit, allowing the Slave ID to be set from 01 through 99.

In Rotary Dial Hex Mode, the left dial acts as the left digit and the right dial acts as the right digit, allowing the Slave ID to be set from 01 through F7 for a total of 247 slaves.

The 12 I/O DX85 models use Rotary Dial Decimal Mode and do not have a DIP switch selection for this option.

To configure the DX85 using the UCT, the DX85's Slave ID must be set to 01.

DIP Switch Changes



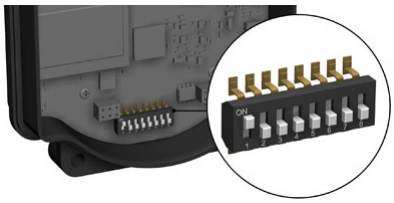
Before making any changes to the DIP switch positions, disconnect the power. For devices with batteries integrated into the housing, remove the battery for at least one minute.

DIP switch changes will not be recognized if power isn't cycled to the device.

Accessing the Internal DIP Switches

To access the internal DIP switches, follow these steps:

1. Unscrew the four screws that mount the cover to the bottom housing.
2. Remove the cover from the housing without damaging the ribbon cable or the pins the cable plugs into.
3. Gently unplug the ribbon cable from the board mounted into the bottom housing. For integrated battery models (no ribbon cable) and Class I, Division 2 certified devices (ribbon cable is glued down), skip this step.
4. Remove the black cover plate from the bottom of the device's cover.



The DIP switches are located behind the rotary dials. After making the necessary changes to the DIP switches, place the black cover plate back into position and gently push into place. Plug the ribbon cable in after verifying that the blocked hole lines up with the missing pin. Mount the cover back onto the housing.

DIP Switch Settings for a DX85

Use the DIP switches 1 through 4 on the board to set the baud rate and parity and DIP switch 5 to set the rotary dial mode.

	DIP Switches				
	1	2	3	4	5
Baud Rate: 19200	OFF*	OFF*			
Baud Rate: 38400	OFF	ON			
Baud Rate: 9600	ON	OFF			
Baud Rate: 19200	ON	ON			
Parity: None			OFF*	OFF*	
Parity: Even			OFF	ON	
Parity: Odd			ON	OFF	
Parity: None			ON	ON	
Rotary Dial Decimal Mode					OFF*
Rotary Dial Hex Mode					ON

* Default configuration

Verify Communications on the DX85 Modbus RTU Remote I/O

After powering up, verify the DX85 is communicating properly. LED 1 should be on and green.

Status	LED 1	LED 2
Power ON	Green ON	-
Device error, contact factory	Red flashing	Red flashing
Modbus communication active	-	Yellow flashing
Modbus communication error	-	Red flashing

The Modbus communication LEDs refer to the communication between the DX85 and what it is connected to (host system, Gateway, Data Radio, etc).

Specifications

General

Power*
Requirements: +10 to 30V dc (For European applications: +10 to 24V dc, ± 10%). (See UL section below for any applicable UL specifications)
Consumption: Less than 1.4 W (60 mA) at 24V dc

Housing
Polycarbonate
Weight: 0.26 kg (0.57 lbs)
Mounting: #10 or M5 (M5 hardware included)
Max. Tightening Torque: 0.56 N·m (5 in·lbf)

Interface
Indicators: Two bi-color LEDs

Wiring Access
Four PG-7, One 1/2-inch NPT, One 5-pin Euro-style male connector

* For European applications, power the DX80 from a Limited Power Source as defined in EN 60950-1.

Inputs and Outputs

Discrete Inputs
Rating: 3 mA max current at 30V dc
ON Condition: Greater than 8V
OFF Condition: Less than 5V

Discrete Outputs
ON Condition: Supply minus 2V
OFF Condition: Less than 2V
Output State Following Timeout: OFF

Discrete Output Rating (PNP)
100 mA max current at 30V dc
ON-State Saturation: Less than 3V at 100 mA
OFF-state Leakage: Less than 10 µA

Analog Inputs and Outputs
Rating: 24 mA
Input Impedance: 100 Ohms
Accuracy: 0.1% of full scale +0.01% per °C
Resolution: 12-bit

To verify the analog input's impedance, use an Ohm meter to measure the resistance between the analog input terminal (AI*x*) and the ground (GND) terminal.

Communication

Hardware (RS-485)
Interface: 2-wire half-duplex RS-485
Baud Rates: 9.6k, 19.2k (default), or 38.4k
Data Format: 8 data bits, no parity, 1 stop bit

Environmental

Rating
Rating for DX85 models:IEC IP67; NEMA 6; (See UL section below for any applicable UL specifications)
Rating for DX85...C models: IEC IP20; NEMA 1 (In a suitable enclosure: Class I, Division 2, Group A, B, C, D; T4 −40 to 80° C)
Operating Temperature: −40 to +85° C (Electronics); −20 to +80° C (LCD)
Operating Humidity: 95% max. relative (non-condensing)
Radiated Immunity: 10 V/m, 80-2700 MHz (EN61000-6-2)

Shock and Vibration
IEC 68-2-6 and IEC 68-2-7
Shock: 30g, 11 millisecond half sine wave, 18 shocks
Vibration: 0.5 mm p-p, 10 to 60 Hz

Refer to the SureCross™ DX80 Wireless I/O Network product manual, Banner p/n 132607, for installation and waterproofing instructions. Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.

Certifications

DX8x...C (External Wiring Terminal Models)

CSA: Class I, Division 2, Groups A, B, C, D (Ex/A Ex nA II T4); Certificate: 1921239

LCIE/ATEX: Zone 2 (II 3G / Ex nA IIC); Certificate: LCIE 10 ATEX 1012 X

UL Listing

Maximum ambient temperature: 70°C
Mounting instructions: See document 132607
Power rating: 10 to 30V dc, UL Class 2
Enclosure environmental rating: UL Type 1

Included with Device (DX85 and DX85...C Models)

The following items ship with the DX85 models.

Included with Device	Model	Qty	Item
DX80 Access Hardware Kit *	BWA-HW-002	4	Plastic threaded plugs, PG-7
		4	Nylon gland fittings, PG-7
		4	Hex nuts, PG-7
		1	Plug, 1/2" NPT
		1	Nylon gland fitting, 1/2" NPT
Mounting Hardware Kit	BWA-HW-001	4	Screw, M5-0.8 x 25mm, SS
		4	Screw, M5-0.8 x 16mm, SS
		4	Hex nut, M5-0.8mm, SS
		4	Bolt, #8-32 x 3/4", SS
PTFE Tape *	BWA-HW-003	1	PTFE Tape
SureCross Literature CD	79685	1	SureCross Literature CD
Cable	MQDC1-506	1	Cable, 5-pin Euro (single ended), Straight, 2m
	BWA-HW-011	1	IP20 Screw Terminal Headers (2 pack) (ships with DX85...C models only)

* Not included with DX85...C models.

Warnings

The manufacturer does not take responsibility for the violation of any warning listed in this document.

Make no modifications to this product. Any modifications to this product not expressly approved by Banner Engineering could void the user's authority to operate the product. Contact the Factory for more information.

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