Installation Instructions for the **Sensor Interface Terminal Strip**

PK 8400 2

DESCRIPTION

The Sensor Interface Terminal Strip (Sensor ITS) provides an optically isolated interface between the SDS system and programmable logic controller's (PLC) input modules. The ITS receives communications from up to 16 switches/ sensors and converts them to 16 parallel I/O points.

An SDS system can handle up to 126 device addresses (or nodes) and 64 electrical loads. However, an ITS controls only 16 devices (See the Group ID - Device Number Table below). SDS systems can have up to eight ITSs.

ORDER GUIDE

Catalog Listing	Description
SDS-C1ITS-S16	Sensor Interface Terminal Strip (ITS), 16 current sourcing sensor outputs

IDENTIFICATION

The Sensor Interface Terminal Strips must be identified with letters A through H when installed. The letter represents the individual ITS's group ID. Group IDs are selected using on-board DIP switches SW3, SW4 and SW5. ITS "A" will communicate with sensor addresses 1 through 16 and only those sensors. Communications for other sensor address locations will be ignored by ITS "A" and received by the ITS with the correct ID location.

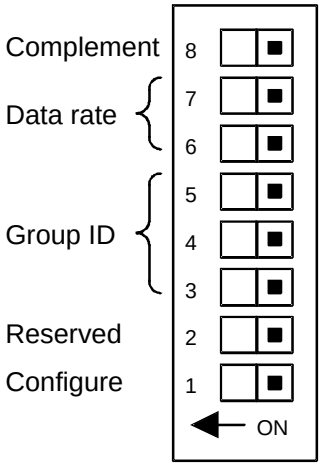
GROUP ID-DEVICE NUMBER TABLE

ID	Node	SW3	SW4	SW5
A	1-16	off	off	off
B	17-32	off	off	on
C	33-48	off	on	off
D	49-64	off	on	on
E	65-80	on	off	off
F	81-96	on	off	on
G	97-112	on	on	off
H	113-126	on	on	on

NOTICE

ITS "H" can interface only 14 device addresses. Addresses 127 and 128 are not available.

DIP SWITCHES



DIP SWITCH ASSIGNMENTS

The DIP switches are used to select the operating parameters, ITS group address, and bus data rate. The DIP switches are located in the lower left corner of the ITS under the access cover. Open the access cover using a small flat head screw driver.

NOTICE

Power to the ITS MUST be turned off when changing DIP switch settings.

Switch 1: Configure/Run Mode

Each ITS maintains a list (or map) of the active devices assigned to it in non-volatile memory. When SW1 is on, the ITS will configure the list of active devices in memory every time power is applied. When the SW1 is turned off, the ITS will confirm that all active devices on the previous list are present and operating correctly every time the system is powered-up. If devices cannot be identified, an error signal is initiated in the ITS. After system check out is finished you should turn SW 1 off.

To add a new device to the bus you must set the device address with the Activator. With the ITS power off, Turn SW 1 on. Add the new device, then turn the power back on. The ITS will add the new device to the list. Turn the power off and return SW 1 to the off position.

Switch 2: Reserved for later use (must be turned off).

Switches 3 - 5: Group Addresses

An ITS can interface up to 16 devices. There can be eight ITSs on a single bus. Each ITS must be assigned a unique ID letter “A” thru “H,” selected via SW3, SW4 and SW5. Each group ID has 16 device addresses assigned to it (See the Group ID - DEVICE NUMBER TABLE for number assignments).

NOTICE

One ITS on every SDS system must be "A." If only one ITS is used, it must be configured as "A."

Switches 6 - 7: Data Rate Selection

The data rate for the entire system is established by the ITS with the "A" ID. All other ITSs and sensor or actuator devices automatically sense the data rate and adjust themselves accordingly. The data rate on the "A" ITS (SW3, SW4, and SW5 turned off) is selected via DIP switches SW6 and SW7. See the Data Rate Table for data rates and switch settings.

DATA RATE TABLE

Data Rates	SW6	SW7
125 Kbps	off	off
250 Kbps	off	on
500 Kbps	on	off
1 Mbps	on	on

Switch 8: Complement Mode

When SW8 is turned on, the complement mode performs a binary complement of all ITS I/O points (Normally Open outputs become Normally Closed).

PLUGGABLE TERMINAL BLOCKS

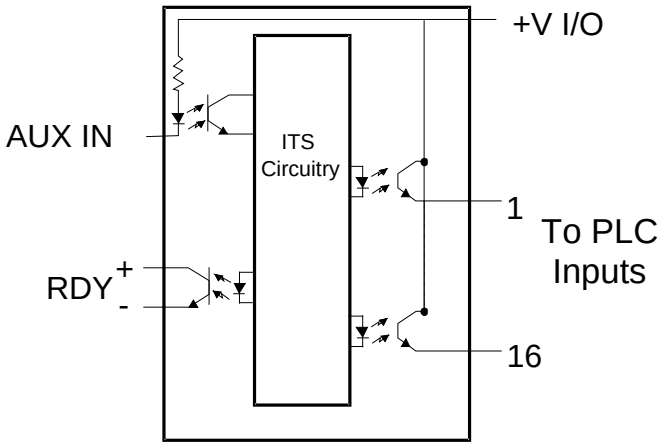
All connections on the ITS are made via pluggable terminal blocks. These terminal blocks have oversized wire clamps to insure a secure connection, while allowing a range of wire sizes from 22 to 10 AWG. The captive clamping screws can be tightened with a small screw driver

AUXILIARY

The AUX IN connection may be used to help locate which device on the bus is reporting an error condition. When the ITS receives an AUX IN signal, it activates the PLC inputs which correspond to devices that have errors.

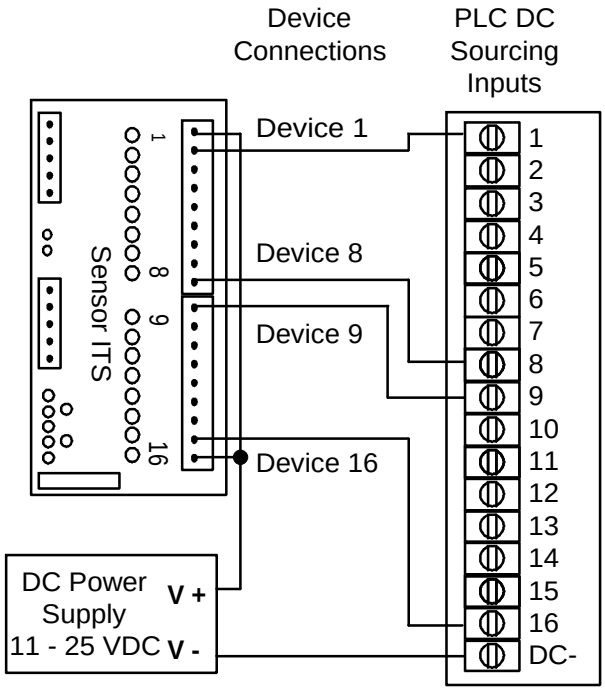
Refer to the SDS Design and Implementation Guide (84-08422-0) for details.

WIRING DIAGRAMS
Equivalent Circuit



DISCRETE PLC CONNECTIONS

Connect the discrete wires from the PLC DC Input modules to the corresponding 18 pin pluggable terminal block on the ITS. Also, connect the positive side of a DC power supply to one or both of the +V I/O pins, #1 and #18. The Eurostyle terminal blocks have screw terminals. A small flat-head screwdriver can be used to connect discrete wires.



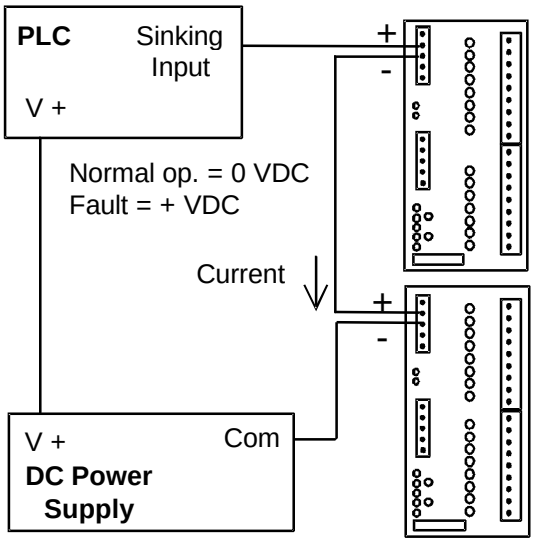
SENSOR INTERFACE TERMINAL STRIP SPECIFICATIONS

Electrical	Voltage range		11 to 25 VDC
	Current consumption		125 mA at 24 VDC
	Data rates		1 Mbps, 500 Kbps, 250 Kbps, 125 Kbps
	Response time*	1 Mbps	0.75 ms
		500 Kbps	1.0 ms
		250 Kbps	1.25 ms
		125 Kbps	1.5 ms
	Operation per sec.	1 Mbps	800 Hz, Typical
		500 Kbps	600 Hz, Typical
		250 Kbps	300 Hz, Typical
		125 Kbps	200 Hz, Typical
Input and Outputs	Sensor Outputs	Type	Sourcing output
		Number	16
		Voltage range	11 to 25 VDC
		Load current	10 mA maximum
		Leakage current	100 µA maximum
		Voltage drop	1.0 VDC maximum
		Isolation from bus	1500 VAC, optically isolated
	Ready Output	Type	Sink or source
		Number	1
		Voltage range	11 to 25 VDC
		Leakage current	100 µA maximum
		Voltage drop	0.4VDC maximum
		Load current	4 mA at 0.4 VDC (V_{SAT})
		Isolation	1500 VAC, optically isolated
	Aux. Input	Type	Active Low
		Number	1
		Voltage range	11 to 25 VDC
		Input current	10 mA maximum at 24 VDC
		Isolation	1500 VAC, optically isolated
Environmental	Temperature	Operating	0 to +60°C (32 to +140°F)
		Storage	-30 to +70°C (-22 to +158°F)
	Humidity		95% RH, non-condensing
	Shock		10 G
	Vibration		2 G at 10 to 500 Hz
	Sealing		NEMA 1, (Normal mounting means)
	Standards	FCC	Part 15, Class A
		UL/CSA	Class 2
Physical	Case size		159,3 x 82,6 x 56,6 mm (6.27 x 3.25 x 2.23 inches)
	Weight		170 grams (6 Oz.)
	Case materials		Valox, PVC, and Acetal
	Mounting		DIN Rail
	Termination		Pluggable terminal blocks

* Response time for ITS includes communication time and hardware through-put time.

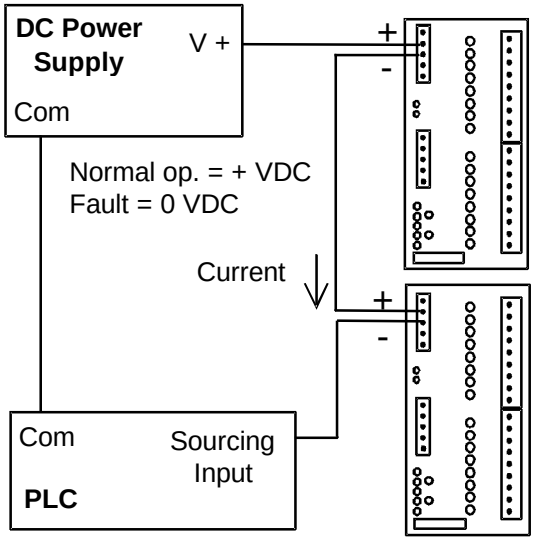
PLC SINKING

When the RDY output is connected to the PLC sinking input, a normal condition is indicated to the PLC by 0 VDC. A fault is indicated by a positive voltage.

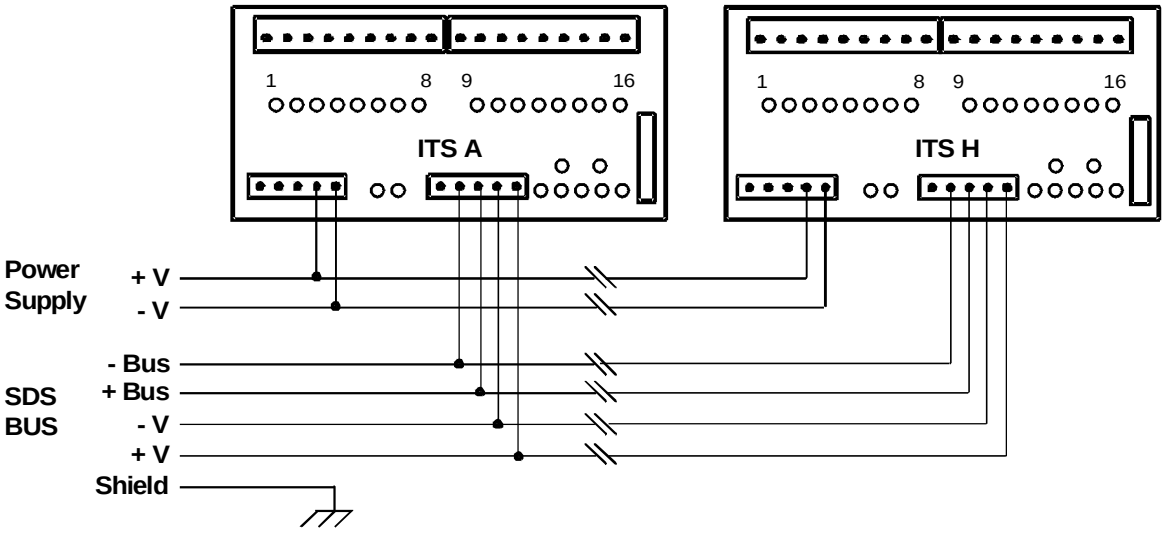


PLC SOURCING

When RDY output is connected to PLC sourcing input, a normal condition is indicated to the PLC by a positive voltage. A fault is indicated by 0 VDC.



ITS BUS AND POWER CONNECTIONS

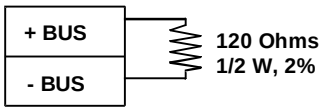


MAIN TRUNK CABLE CONNECTION

ITS Bus Terminal Connections	Wire Color	Mini Pin #
Bus Shield	Shielding	1
Bus Power (+)	Brown	2
Bus Power (-)	Blue	3
+ Bus	Black	4
- Bus	White	5

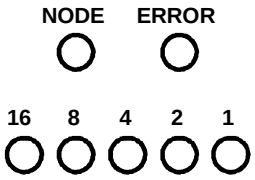
TERMINATION RESISTOR

The SDS bus must be configured with a single trunk. There must be only two termination resistors located at the extreme ends of the main trunk, con-nected between the + BUS and - BUS conductors. The termination resisters should be 120 Ohms, 1/2 Watt, 2% resistors.



ERROR LEDS

When the ERROR LED is on, the error code LEDs (1, 2, 4, 8, 16) indicate error codes as shown in the ERROR CODE TABLE. When the NODE LED is on, the error code LEDs indicate the device address with the error. If the problem is in a device, the error code LEDs will indicate an error in a device when the ER-ROR LED is on and the device address when the Node LED is on.



ERROR CODE TABLE

LED	ERROR	REMEDY
1	Checksum error	Sensor device should be replaced
2		Reserved
4	Device off bus error	Check bus wiring for disconnections or breaks
8	Device error	Check operation of sensor device indicated by LED
16	Missing device error	Check operation of sensor device indicated by LED

DEVICE ADDRESS TABLE

ITS LEDs: ● = on, ❍ = off					Device Address, ITS IDs							
16	8	4	2	1	ID A	ID B	ID C	ID D	ID E	ID F	ID G	ID H
❍	❍	❍	❍	❍	NO*	NO*	NO*	NO*	NO*	NO*	NO*	NO*
❍	❍	❍	❍	●	1	17	33	49	65	81	97	113
❍	❍	❍	●	❍	2	18	34	50	66	82	98	114
❍	❍	❍	●	●	3	19	35	51	67	83	99	115
❍	❍	●	❍	❍	4	20	36	52	68	84	100	116
❍	❍	●	❍	●	5	21	37	53	69	85	101	117
❍	❍	●	●	❍	6	22	38	54	70	86	102	118
❍	❍	●	●	●	7	23	39	55	71	87	103	119
❍	●	❍	❍	❍	8	24	40	56	72	88	104	120
❍	●	❍	❍	●	9	25	41	57	73	89	105	121
❍	●	❍	●	❍	10	26	42	58	74	90	106	122
❍	●	❍	●	●	11	27	43	59	75	91	107	123
❍	●	●	❍	❍	12	28	44	60	76	92	108	124
❍	●	●	❍	●	13	29	45	61	77	93	109	125
❍	●	●	●	❍	14	30	46	62	78	94	110	126
❍	●	●	●	●	15	31	47	63	79	95	111	NA**
●	❍	❍	❍	❍	16	32	48	64	80	96	112	NA**

*NO = Normal Operation **NA = Not Available

Sensor Interface Terminal Strip

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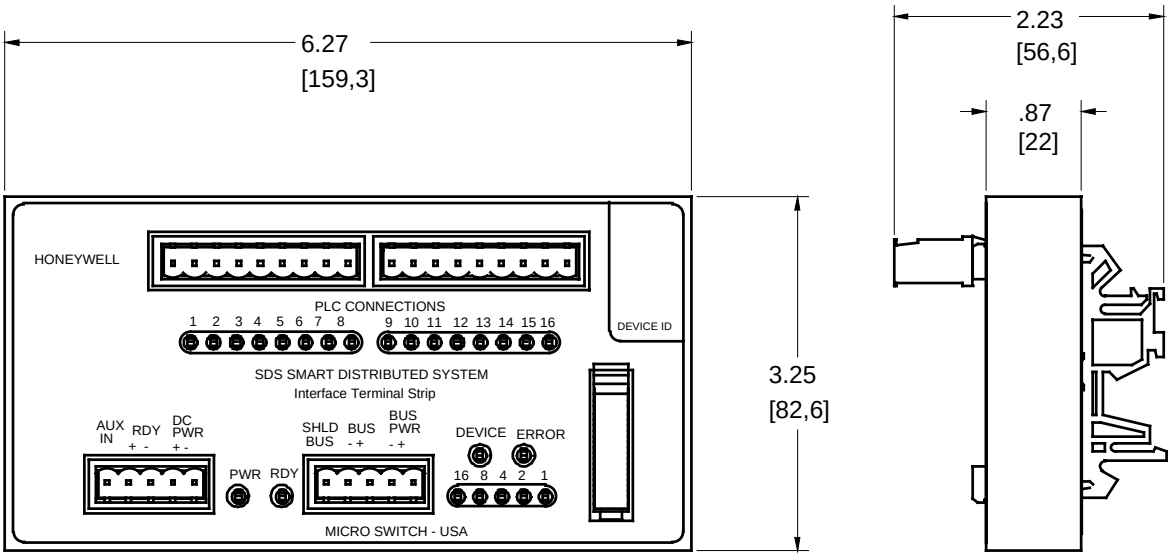
ITS READY OUTPUT CONNECTIONS

Use the optically isolated Ready Output (RDY) connections to provide indication of an error or fault condition to the control system in one or more of the ITSs.

When the ITS detects no faults, RDY terminals act like a closed switch. When the ITS detects an error condition, the RDY terminals act like an open switch.

MOUNTING DIMENSIONS (for reference only)



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