AERO SYSTEMS ENGINEERING

ISO-9001 Certified

Ethernet Intelligent Temperature Scanner

9046

FEATURES

- Ethernet interface with TCP/IP Protocol
- Throughput Rates of 10 meas/ch/sec
- Configurable for any mix of Thermocouple, RTD, Thermistor, Voltage and/or Resistance
- ±0.25°C Thermocouple (Preliminary)
- ±0.04% reading RTD (Preliminary)
- ±0.0005[V] Voltage (Preliminary)
- Rugged Splash Proof Enclosure
- Hardware and Software Triggered Data Acquisition
- Onboard EU Conversion (mV, Ohms, °C, °F)
- Parallel Outputs for Alternate Data Display
- Fuse Protected Inputs
- Open Circuit Detection

APPLICATIONS

- Turbomachinery Test Stands
- Vehicle Testing
- Process Measurement

The Model 9046 Ethernet Intelligent Temperature Scanner is a completely self-contained high-performance temperature acquisition module for multiple measurements of multiple devices. The 9046 can be configured to read thermocouples, RTDs (385 and 7990), thermistors, voltage signals and/or resistance. The scanner integrates 16 individual uniform temperature references (UTRs) with a microprocessor in a compact, low cost package. Each UTR contains its own thermocouple reference in physical contact with both thermocouple/copper junctions. This arrangement guarantees system accuracy even in thermally dynamic environments. The top connection panel can be configured for any mix of thermocouple types and RTDs. An internal 32-bit microprocessor corrects for sensor zero, span, and nonlinearity errors.

The 9046 provides the capability to sample using three scan lists concurrently at rates up to 10 measurements per channel per second. Temperature data in engineering units is output through a 10 Mbit Ethernet 802.3 interface using TCP/IP protocol. The Model 9046 Ethernet Intelligent Temperature Scanner is supplied with startup software for PC compatible computers. Field firmware upgrades are facilitated using the Host Ethernet interface.

The Model 9046 Ethernet Intelligent Temperature Scanner is a component of the PSI NetScanner™ data acquisition concept. Multiple NetScanner™ units may be networked together to form a distributed intelligent data acquisition system.

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9046 Specifications

After 1 hour warm-up at 25 ºC

Parameter	9046	Comments
Inputs		
Input Types	Thermocouple RTD Thermistor Voltage Resistance	All types (grounded or ungrounded) RTD385, MIL-T-7990B 2.25k, 5k, 10k ±5 VDC 220Ω, 440Ω, 990Ω, 19.8 kΩ,
Number of Inputs	16	Any combination of Thermocouple, RTD, Thermistor, Voltage and/or Resistance measurements
Input Connectors	MS27472T8F35SN (RTD / Voltage) Miniature T/C jack (Thermocouple) MS3470L14-15P (24VDC, Ethernet, etc.) Direct connection	
Static Performance		
Measurement Resolution	± 0.003% Full Scale	
Accuracy (Preliminary)	±0.25°C Thermocouple* ±0.04% reading RTD ±0.0005[V] Voltage	*Stated accuracy is for a Type K thermocouple, other types have shown to be more accurate.
Measurement Rate	10 measurements/channel/second	
Communication	10BaseT Ethernet (RJ45)	
Protocol	TCP/IP	software configurable RARP
Electrical		
Input Voltage	18 to 36 VDC	unregulated
Input Current	200 mA at 24 VDC	
Hardware Trigger Threshold	2.5 VDC	TTL compatible differential input, ±5 VDC common mode voltage
Input Common Mode Range	± 5 VDC	
Environmental / Physical		
Environment	Splash proof protected	
Operating Temp Range	-30 ºC to 70 ºC	optional warming plate for environmental temperature less than –30 ºC
Size	9.50 x 3.50 x 4.04 inches	Length x Width x Height
Weight	6.5 lb/2.95 kg	

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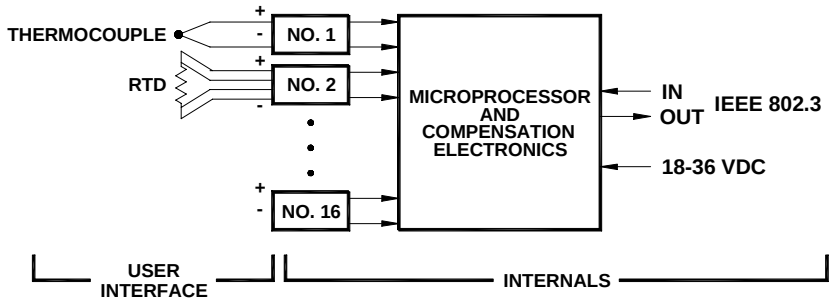
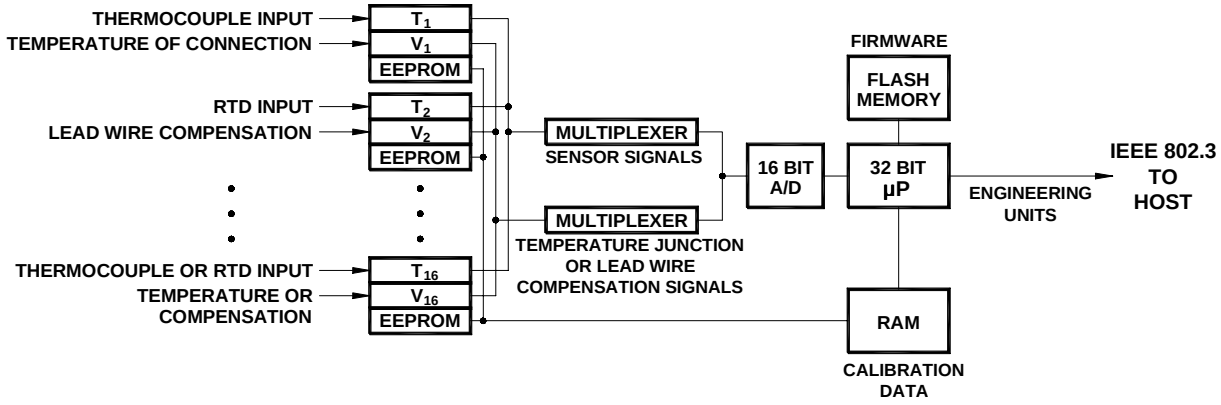
9046 Theory of Operation

The 9046 combines integral UTRs with a miniature data acquisition system to provide a multichannel temperature scanner. The integration of the microprocessor with the UTRs provides several benefits in addition to the compact nature of the Intelligent Temperature Scanner. This pre-engineered approach to temperature acquisition offers guaranteed system accuracy, unlike individual thermocouple or RTD wire runs where stated accuracy is met only if the many user-considerations are addressed, especially with respect to wire length, noise, and multiple connector effects.

The Model 9046 Ethernet Intelligent Temperature Scanners output temperature data in engineering units digitally compensated for zero, span, nonlinearity and temperature effects. The scanner permits on-line rezero and even span calibration capability under microprocessor control.





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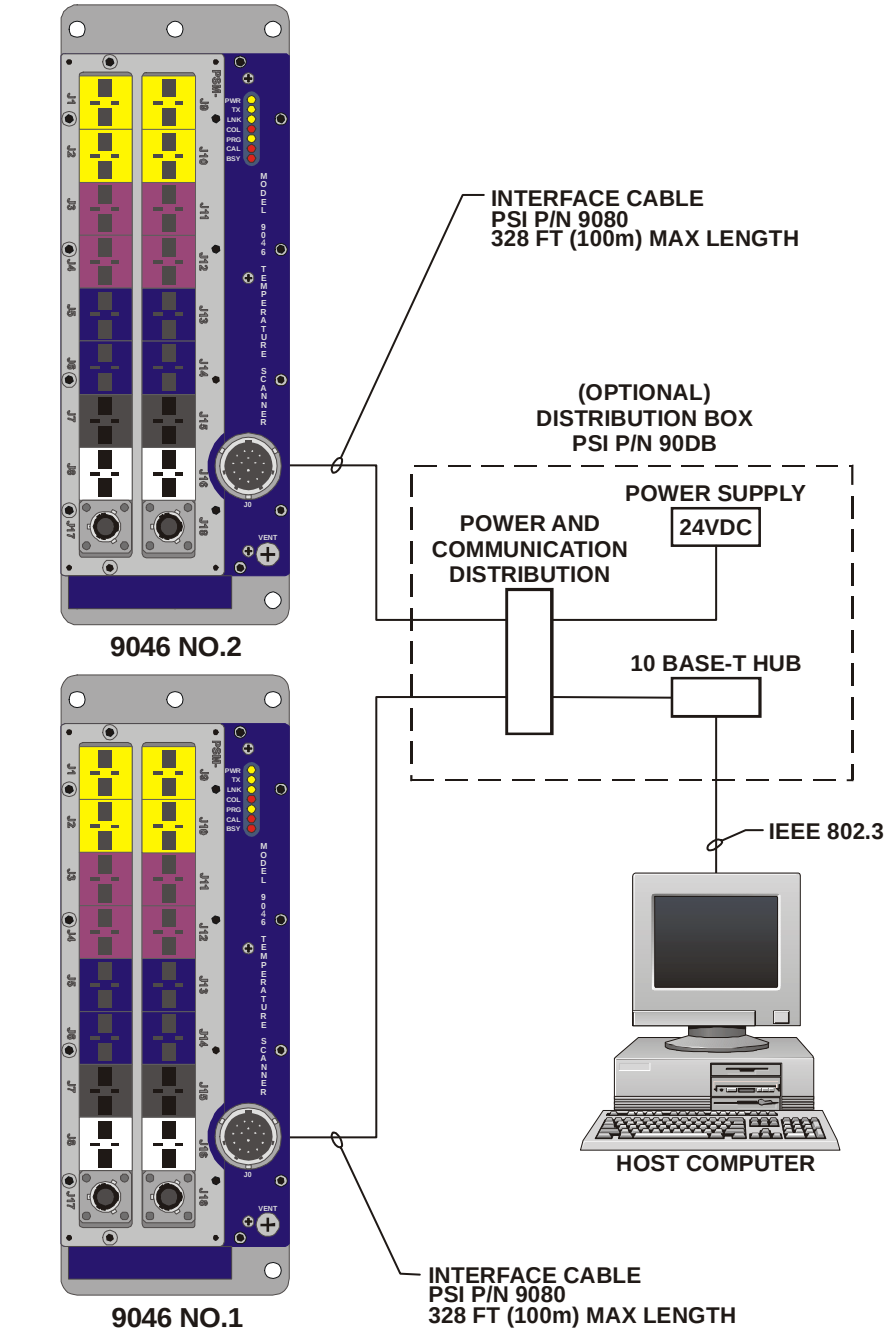
9046 Networking Example

Multiple NetScanner™ or compatible third party devices may be networked together. The illustration shown on this page shows the required cables and accessories necessary to integrate two Ethernet Intelligent Temperature Scanners to a desktop computer.



(1) ASE offers pre-engineered solutions for power and communication distribution depending on configuration.

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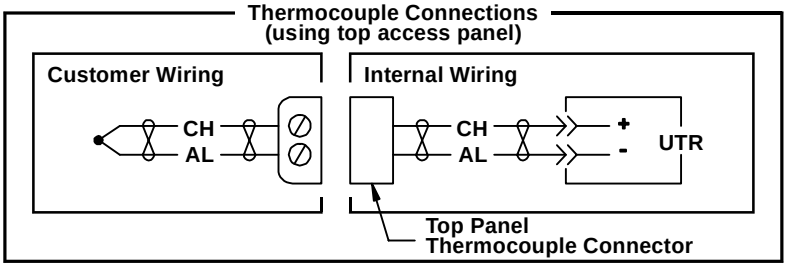
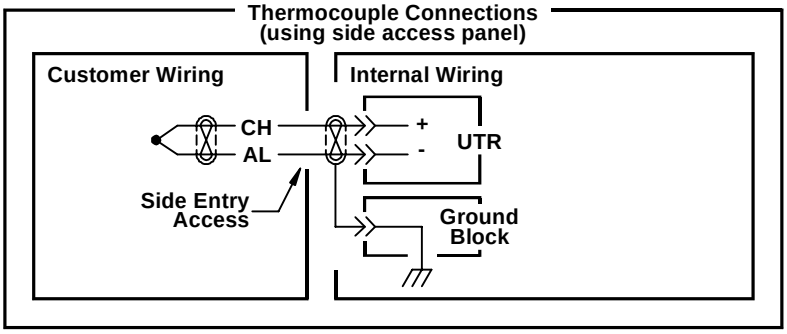
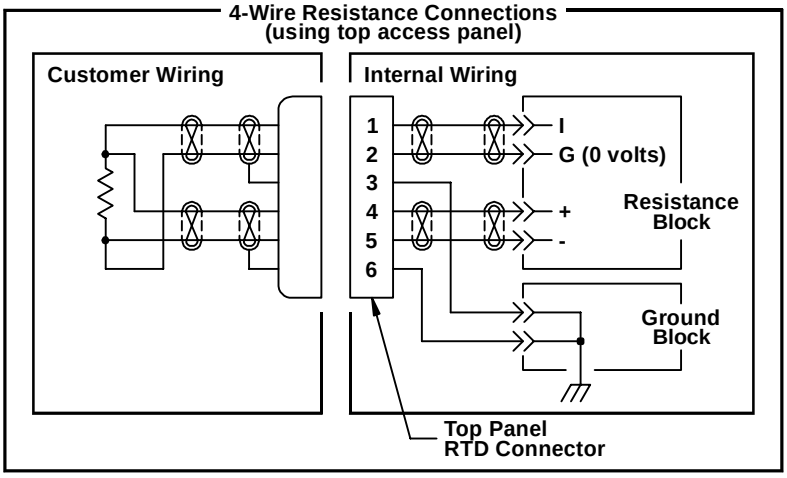
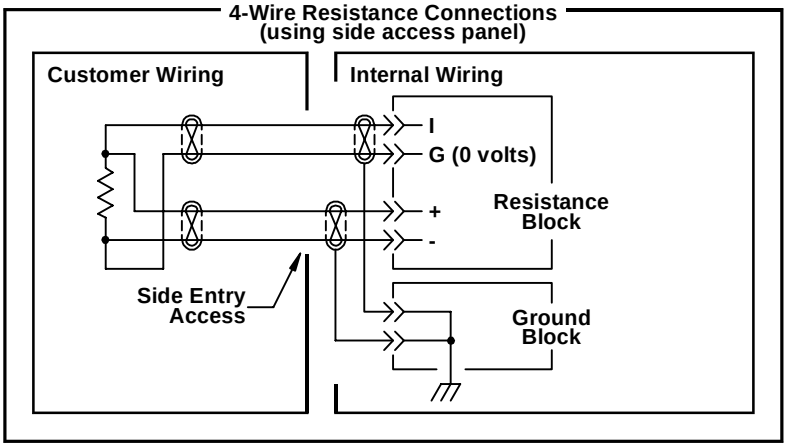
9046 Connection Diagrams









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9046 Ordering Information

BASE UNIT (16 CHANNELS)						READ DOWN TO BUILD MODEL NUMBER CODE COMPLETED NUMBER SHOULD BE FORMATTED AS SHOWN BELOW.
QTY	TYPE	MODEL NUMBER CODE				
	THERMOCOUPLE	PSM	→	PSM		PSM-X-XXXXXXXXXXXXXXXXXX-X-X-X-XXX-X-X (-X)**

DEFINE TOP ACCESS PANEL CONNECTIONS (FILL IN ONLY THE LEFT SIDE OR RIGHT SIDE CHART)								
QTY	TYPE	MODEL NUMBER CODE				MODEL NUMBER CODE	TYPE	QTY
	TOP ACCESS PANEL WITH MINI T/C JACKS AND/OR RTD CONNECTORS (FILL IN BELOW)	H	→	X	←	N	NO TOP ACCESS COVER PANEL (FILL IN BELOW)	

DEFINE CHANNEL LAYOUT. WRITE "RTD" (NOTE RTD=I) OR THE THERMOCOUPLE TYPES FOR EACH CHANNEL. IF MINI T/C JACKS OR RTD CONNECTORS ARE NOT REQUIRED, DO NOT USE THIS CHART.						DEFINE CHANNEL LAYOUT. WRITE IN "RTD" OR "UTR." IF TOP ACCESS PANEL IS USED, DO NOT USE THIS CHART.		
CHAN.	TYPE	MODEL NUMBER CODE				MODLE NUMBER CODE	TYPE	CHAN.
1		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		1
2		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		2
3		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		3
4		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		4
5		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		5
6		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		6
7		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		7
8		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		8
9		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		9
10		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		10
11		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		11
12		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		12
13		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		13
14		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		14
15		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		15
16		E, J, K, R, S, T, C OR I	→	X	←	U=UTR OR I=RTD		16
17	(CONNECTOR ONLY)	E, J, K, R, S, T, C OR I	→	X	←	N=NOT APPLICABLE		17
18	(CONNECTOR ONLY)	E, J, K, R, S, T, C OR I	→	X	←	N=NOT APPLICABLE		18

C=COPPER/COPPER

MATING CONNECTORS (USED WITH TOP ACCESS ONLY)						MATING CONNECTORS (USED WITH TOP ACCESS ONLY)	
QTY	TYPE	MODEL NUMBER CODE				MODEL NUMBER CODE	
	K THERMOCOUPLE	M=MATING CONNECTORS SUPPLIED N=NO MATING CONNECTORS SUPPLIED	→	X	←	N=NO MATING CONNECTORS SUPPLIED	
	T THERMOCOUPLE						
	J THERMOCOUPLE						
	E THERMOCOUPLE						
	U COPPER						
	OTHER THERMOCOUPLE						
	RTD						

DEFINE SIDE ACCESS PANEL (SELECT ONLY ONE)						DEFINE SIDE ACCELL PANEL (SELECT ONLY ONE)		
QTY	TYPE	MODEL NUMBER CODE				MODEL NUMBER CODE	TYPE	QTY
	1.125" NPT	T				T	1.125" NPT	
	MS CONNECTOR (SIZE 17) 22GA PINS	7	→	X	←	7	MS CONNECTOR (SIZE 17) 22GA PINS	
	MS CONNECTOR (SIZE 22) 20GA PINS	2				2	MS CONNECTOR (SIZE 22) 20GA PINS	
	SIDE COVER ONLY	N				N	SIDE COVER ONLY	

INTERNAL MODULE UTR AND CURRENT SOURCE MATING PINS						INTERNAL MODULE UTR AND CURRENT SOURCE MATING PINS		
QTY	TYPE	MODEL NUMBER CODE				MODEL NUMBER CODE	TYPE	QTY
	3 PER UTR (T/C) AND 6 PER CURRENT SOURCE (RTD)	P=SUPPLY PINS (2 SETS PER CONNECTION) N=NOT SUPPLIED	→	X	←	P=SUPPLY PINS (2 SETS PER CONNECTION) N=NOT SUPPLIED	3 PER UTR (T/C) AND 6 PER CURRENT SOURCE (RTD)	

POWER AND COMMUNICATIONS CABLE						POWER AND COMMUNICATIONS CABLE		
QTY	TYPE	MODEL NUMBER CODE				MODEL NUMBER CODE	TYPE	QTY.
	DASH NUMBER IS CABLE LENGTH IN FT (300 FT MAX LENGTH)	*ENTER THREE DIGIT NUMBER OF CABLE LENGTH IN FEET. ZERO FEET INDICATES JUST THE MATING CONNECTOR IS TO BE SUPPLIED. *ENTER "NCB" FOR NO CABLE TO BE SUPPLIED.	→	XXX	←	*ENTER THREE DIGIT NUMBER OF CABLE LENGTH IN FEET. ZERO FEET INDICATES JUST THE MATING CONNECTOR IS TO BE SUPPLIED. *ENTER "NCB" FOR NO CABLE TO BE SUPPLIED.	DASH NUMBER IS CABLE LENGTH IN FT (300 FT MAX LENGTH)	

CALIBRATION CABLE						CALIBRATION CABLE		
QTY	TYPE	MODEL NUMBER CODE				MODEL NUMBER CODE	TYPE	QTY
	3 FEET IN LENGTH (ONE PER SYSTEM IS TYPICALLY REQUIRED)	C=CALIBRATION CABLE IS SUPPLIED N=NO CALIBRATION CABLE IS SUPPLIED	→	X	←	C=CALIBRATION CABLE IS SUPPLIED N=NO CALIBRATION CABLE IS SUPPLIED	3 FEET IN LENGTH (ONE PER SYSTEM IS TYPICALLY REQUIRED)	

PANEL COVER REQUIRED FOR ACCEPTANCE (EUROPE ONLY)						PANEL COVER REQUIRED FOR ACCEPTANCE (EUROPE ONLY)		
QTY	TYPE	MODEL NUMBER CODE				MODEL NUMBER CODE	TYPE	QTY
	EACH PANEL IS CUSTOM CUT FOR THE MODULES CONFIGURATION	CE=CE PANEL IS SUPPLIED N=NO CE PANEL IS SUPPLIED	→	X	←	CE=CE PANEL IS SUPPLIED N=NO CE PANEL IS SUPPLIED	EACH PANEL IS CUSTOM CUT FOR THE MODULES CONFIGURATION	

EU FIRMWARE						EU FIRMWARE		
QTY	TYPE	MODEL NUMBER CODE				MODEL NUMBER CODE	TYPE	QTY
	ENGINEERING UNIT CONVERSION FIRMWARE	M=EU FIRMWARE OMIT FOR mV OR A/D COUNTS ONLY	→	X **	←	M=EU FIRMWARE OMIT FOR mV OR A/D COUNTS ONLY	ENGINEERING UNIT CONVERSION FIRMWARE	

** - IF DASH AND CHARACTER ARE OMITTED, UNIT DOES NOT HAVE EU CONVERSION FIRMWARE

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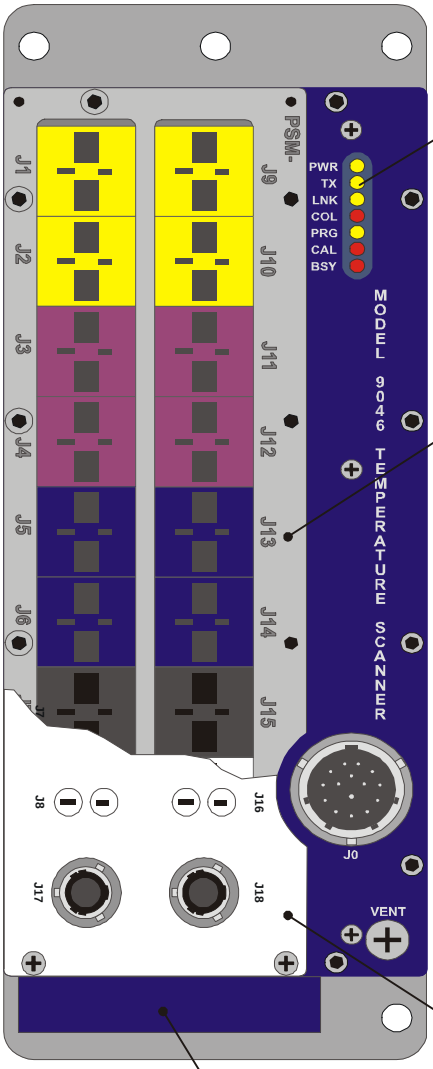

STATUS LED

PWR- Indicates power is applied
TX- Indicates transmission
LNK- Indicates valid 10 Base-T link detected
PRG- Indicates PURGE/LEAK position requested
CAL- Indicates requested rezero mainifold position. ON when requesting the REZERO/CAL position
BSY- Indicates when unit is performing tasks

TOP ACCESS PANEL

No Top Access-
Top Access-
(specify type - per/channel)

ELECTRICAL INTERFACE CONNECTOR

+24 VDC Power
10 Base-T
Hardware Trigger

CE PANEL COVER (optional)

Specified by connection type (RTD and/or Thermocouple) per/channel

SIDE ACCESS PANEL

1.125" NPT
MS Connector (size 17) 22 Ga. pins
MS Connector (size 22) 20 Ga. pins
No Side Access (cover)

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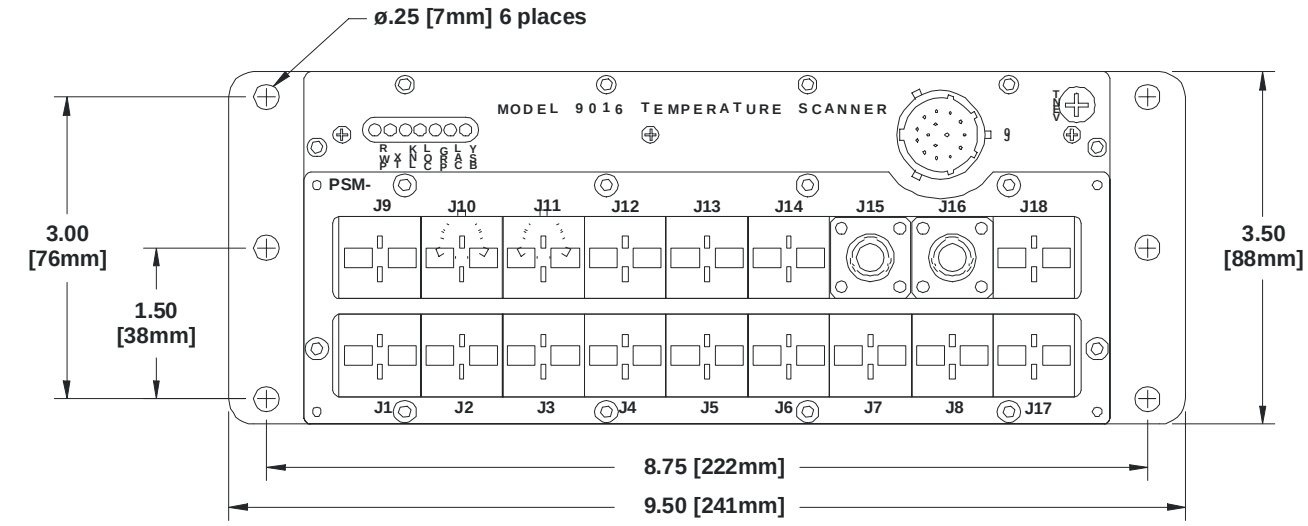
9046 Physical Characteristics



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