I/O MODULES



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OVERVIEW

The PAL system has eight input and output modules that are highly configurable by the user during setup. A single PAL system using EtherNet/IP can have up to 128 digital inputs, 128 digital outputs, 16 analog inputs and 16 analog outputs. Each input / output module is protected internally from short-circuit. This chapter will cover each I/O module in detail.

PAL-S01 8-POINT DISCRETE INPUT

PAL System - Discrete Input Module			
Item Part No. Description			
	PAL-S01	NITRA discrete input module, 8-point, 12- 24 VDC, PNP/NPN, 1 common(s), 8 point(s) per common, IP65. For use with PAL series. Mounting hardware included. Requires PAL-EIP bus coupler.	

The PAL-S01 has eight 3-pole M8 connectors for discrete inputs. Each input point is separately configured for polarity, operating state, signal persistence and input filter time. Any unused points should be capped with PAL-ACC02 M8 caps available separately.

WIRING DIAGRAM



PARAMETER CONFIGURATION

Use the information in the table below to configure the parameters for the PAL-S01 8-point digital input module.

Setting	Options	How It Works	Setting Description	
Delevitu	PNP (+VDC) (default) Determines whether the Input		Input is ON when signal pin has +VDC present.	
Polarity	NPN (0VDC)	0VDC.	Input is ON when signal pin has 0VDC present.	
Operating	Normally Open (default)	Determines whether the digital value of the Input is true when	Input is ON when point is enabled.	
State	Normally Closed	the signal is present or true when the signal is not present.	Input is ON when point is not enabled.	
Signal Persistence	Filter Off (default)	Ensures that the EtherNet/IP scanner sees the digital value	Ensures the EtherNet/IP Scanner will see the Input data indicate true if the signal becomes true by leaving the Input data ON for the time period specified. Filter Off means that Input data only indicates true while signal is true.	
	15 ms	by keeping the digital value on for the specified amount of time regardless of whether or not the actual signal is still	Input data indicates true for at least 15 ms when signal becomes true.	
	50 ms		Input data indicates true for at least 50 ms when signal becomes true.	
	100 ms	present.	Input data indicates true for at least 100 ms when signal becomes true.	
Input Filter	Filter Off	This option will only indicate	Filters out spurious Input signals. Filter Off means that Input data only indicates true while signal is true.	
	3 ms (default)	the digital value as true if the signal is on for the specified	Input data indicates true if signal is on for at least 3 ms.	
	10 ms	amount of time to eliminate	Input data indicates true if signal is on for at least 10 ms.	
	20 ms	spurious or noisy signals.	Input data indicates true if signal is on for at least 20 ms.	

SPECIFICATIONS

PAL System - Discrete Input Module Specifications			
Sensors Supply Voltage Corresponding to the supply voltage			
Current for Each Connector	200mA max		
Current for Each Module	500mA max		
Input Impedance	3.9 kΩ		
Type of Input	Software-configurable PNP/NPN		
Protection Overload and short-circuit protected inputs			
Connections 8 M8 3-pole female connectors			
Input Active Signals One LED for each input			

PAL-S02 8-POINT DISCRETE OUTPUT

PAL System - Discrete Output Module			
Item Part No. Description			
	PAL-SO2	NITRA discrete output module, 8-point, 12-24 VDC, PNP/NPN, 1 common(s), 8 point(s) per common, 1A/point, 4A/common, short circuit and overload protection, IP65. Mounting hardware included. Requires PAL-EIP bus coupler.	

The PAL-S02 has eight 3-pole M8 connectors for discrete outputs. Each output point is separately configured for polarity, operating state and fail safe operation. Any unused points should be capped with PAL-ACC02 M8 caps available separately.

WIRING DIAGRAM

Pin assignment of M8 connector



PARAMETER CONFIGURATION

Use the information in the table below to configure the parameters for the PAL-S02 8-point digital output module.

Setting	Options	How It Works	Setting Description	
Delavity	PNP (+VDC) (default)	Determines whether the point	Output signal presents +VDC when Output data point is true.	
Polarity	NPN (0VDC) outputs + VDC or 0VDC.		Output signal presents 0VDC when Output data point is true.	
Onerating	Normally Open (default)	Determines whether the Output signal is present when	Output signal is present when Output data point is true.	
State Normally Closed		the digital value is true or if the Output signal is present when the digital value is false.	Output signal is present when Output data point is false.	
	Hold Last State	Specifies the behavior of the Outputs when the connection	Output signal will remain at last state when EtherNet/IP connection is lost.	
Fail Safe	Reset Output (default)	to the EtherNet/IP scanner is lost. Note that the "Fail Safe"	Output signal will disable when EtherNet/IP connection is lost.	
	Set Output	byte of the PAL Controller options must be set to 'Fault Mode' for this option to work.	Output signal will enable when EtherNet/IP connection is lost.	

PAL-S03 6-POINT DISCRETE OUTPUT + ADDITIONAL POWER CONNECTION

PAL System - Discrete Output Module			
Item Part No. Description			
	PAL-SO3	NITRA discrete output module, 6-point, 12-24 VDC, PNP/NPN, 1 common(s), 6 point(s) per common, 1A/point, 4A/common, short circuit and overload protection, IP65. Mounting hardware included. Requires PAL-EIP bus coupler and power cable.	

The PAL-S03 has six 3-pole M8 connectors for discrete outputs and one 4-pole power connection to add additional capacity to the electrical bus. This makes it possible to increase the current supplied by the module and system. A PAL-S03 digital output with additional power connection should be used when the current required for the I/O modules will exceed the rated 4A continuous / 6A instantaneous available at the PAL-EIP or PAL-EAD coupler. Each output point is separately configured for polarity, operating state and fail safe operation. The current supplied is the sum of all currents supplied by the PAL-S03 module plus that supplied by all the output modules connected to the left hand side up to another PAL-S03 module with power supply. Any unused points should be capped with PAL-ACC02 M8 caps available separately.

WIRING DIAGRAM



PARAMETER CONFIGURATION

Use the information in the table below to configure the parameters for the PAL-S03 6-point digital output module.

Setting	Options	How It Works	Setting Description
Delavity	PNP (+VDC) (default)	P (+VDC) (default) Determines whether the point Output signal presents +VDC when Output data point is tr	
Polarity	NPN (0VDC)	outputs + VDC or 0VDC.	Output signal presents 0VDC when Output data point is true.
Operating	Normally Open (default)	Determines whether the Output signal is present when	Output signal is present when Output data point is true.
State	Normally Closed	the digital value is true or if the Output signal is present when the digital value is false.	Output signal is present when Output data point is false.
	Hold Last State	Specifies the behavior of the Outputs when the connection	Output signal will remain at last state when EtherNet/IP connection is lost.
Fail Safe	Reset Output (default)	to the EtherNet/IP scanner is lost. Note that the "Fail Safe"	Output signal will disable when EtherNet/IP connection is lost.
	Set Output	byte of the PAL Controller options must be set to 'Fault Mode' for this option to work.	Output signal will enable when EtherNet/IP connection is lost.

SPECIFICATIONS

PAL System - Discrete Output Module Specifications				
	PAL-S02 PAL-S03			
Supply Voltage Range	N/A	12V -10% 24V +30%		
Minimum Operating Voltage	N/A	10.8 V*		
Maximum Operating Voltage	N/A	31.2 V		
Maximum Admissible Voltage	N/A	32V **		
Output Voltage	Corresponding to the supply voltage			
Current for Each Connector	500mA max 1000mA max			
Current for Each Module	3000mA max 4000mA max			
Type of Output	Software-configurable PNP/NPN			
Protection	Overload and sho	ort-circuit protected inputs		
nnections 8 M8 3-pole female connectors 1 M8 4-pole male connector Supply		6 M8 3-pole female connectors for Signals 1 M8 4-pole male connector for Supply		
Status Indicator	One LED for each output			
* Minimum voltage 10.8V required at solenoid pilots. ** IMPORTANT! Voltage greater than 32VDC will damage the system irreparably.				

PAL-S04 4-POINT ANALOG INPUT

PAL System - Analog Input Module			
Item Part No. Description			
	PAL-SO4	NITRA analog input module, 4-channel, current/ voltage, 15-bit, input current signal range(s) of 0-20 mA, 4-20 mA, input voltage signal range(s) of 0-5 VDC, 0-10 VDC, +/- 5 VDC, +/- 10 VDC, IP65.	

The PAL-S04 has four 4-pole M8 connectors for analog inputs. Each input point is separately configured for signal range and filtering. Any unused points should be capped with PAL-ACC02 M8 caps available separately.

Sensor feeding

Sensor Sensor signal

Sensor feeding

Sensor feeding

Sensor signal

Sensor

Sensor feeding

Sensor signal

WIRING DIAGRAM



PARAMETER CONFIGURATION

Use the information in the table below to configure the parameters for the PAL-S04 4-Channel Analog Input module.

Setting	Options	How It Works	Setting Description		
	Off (default)				
	0 to 10V	Determines the type of signal			
	-10 to 10V				
	0 to 5V	being provided to the Analog	Determines the signal read by the Analog Input channel		
Signal Type	-5 to 5V	disables the channel and is	(configurable for each individual channel). Any channel not being used should be set to Off to save on processing time for the		
	1 to 5V	recommended for unused channels to save processing time.	module.		
	0 to 20mA				
	4 to 20mA				
	-20 to 20mA				
	No filter				
	2 values				
	4 values	Averages the values specified to give a 'steadier' digital value. The higher the value, the steadier the result but the slower the update	Input filter. The channel value is averaged by the number of		
Filter	8 values (default)		readings specified. Configuring this option to No filter will deliver		
	16 values		a faster update but with less stability.		
	32 values				
	64 values				

ANALOG INPUT DATA FORMAT

Input Type	Analog Value	Digital Value	State
	+11.7 V	32767	Overflow
10 1/ 40 1 10 1/	+10 V	28095	Nominal Pango
-10 V to +10 V	-10 V	-28095	- Nominal Range
	-11.7 V	-32768	Underflow
	+5.8 V	32767	Overflow
EV to EV	+5 V	28095	Nominal Pango
-5 V to +5 V	-5 V	-28095	- Nominal Range
	-5.8 V	-32768	Underflow
	+5.8 V	32767	Overflow
+1 V to +5 V	+5 V	28095	Nominal Range
	0 V	0	Underflow
	+23 mA	32767	Overflow
20 m 4 to 1 20 m 4	+20 mA	28095	Neminal Dange
-20 MA 10 +20 MA	-20 mA	-28095	Nominal Range
	-23 mA	-32768	Underflow
	+23 mA	32767	Overflow
+4 mA to +20 mA	+20 mA	28095	Nominal Panga
	4 mA	5513	Nominal Range
	0 mA	0	Underflow

PAL-S05 4-POINT ANALOG OUTPUT

PAL System - Analog Output Module		
Item Part No. Description		Description
	PAL-SO5	NITRA analog output module, 4-channel, current/ voltage, 15-bit, output current signal range(s) of 0-20 mA and 4-20 mA, output voltage signal range(s) of 0-5 VDC, +/- 5 VDC, 0-10 VDC and +/- 10 VDC, IP65.

The PAL-S05 has four 4-pole M8 connectors for analog outputs. Each output point is separately configured for signal range, min/max monitoring, fail safe operation and fault mode. Any unused points should be capped with PAL-ACC02 M8 caps available separately.

WIRING DIAGRAM



Analog actuator with internal power supply



Analog actuator with external power supply



PARAMETER CONFIGURATION

Use the information in the table below to configure the parameters for the PAL-S05 4-Channel Analog Output module.

Setting	Options	How It Works	Setting Description
	Signal:		
	Off (default)		
	0 to 10V		
	-10V to 10V	Determines what kind of signal	This option configures the signal for each output. Any channel
	0 to 5V	will output.	not being used should be set to Off to save on processing.
	-5V to 5V		
	0 to 20mA		
	4 to 20mA		
Signal	Max Monitor:	These 2 options (Max Monitor	
Monitor /	Disable (default)	and Min Monitor) enable	This option enables the Maximum and Minimum Output
ruu suje	Enable	value output limiting. Enabling	independently. When enabled, the module will limit the
	Min Monitor:	these bits requires specifying	analog output values to the values specified for each channel in the Minimum and Maximum Value Monitor configuration settings.
	Disable (default)	values in the fields described	
	Enable	below.	
Fi	Fail Safe:	This option allows a value to be specified for the analog	When this setting is enabled, the module will output the value specified in Fault Mode Value settings in case of EtherNet/ IP communication loss.
	Hold last value (default)	module to output in case the connection is lost between the	
	Fault Mode value	controllers and the EtherNet/IP scanner module.	
Minimum Value	Valid range for each channel: -32768 to 32767	If the Minimum value monitor is enabled, this is the lower	If this feature is enabled, the firmware will limit the output value to the minimum specified in this field.
Monitor	Default: 384	limit value that the module will output.	
Maximum Value Monitor	Valid range for each channel: -32768 to 32767	If the Maximum value monitor is enabled, this is the upper limit value that the module will	If this feature is enabled, the firmware will limit the output value to the maximum specified in this field.
	Default: 32767	output. If the Fail Safe option is	
Fault Mode Value	Valid range for each channel: -32768 to 32767 Default: 0	enabled, this is the value that the module will output if the connection is lost to the EtherNet/IP scanner. Note that the Fail Safe byte of the PAL Controller options must	If this feature is enabled, the firmware will output this value upon loss of EtherNet/IP connectivity with the client.
		be set to Fault Mode for this option to work.	



*NOTE: The Nitra PAL has fail-safe behavior options of the physical outputs when a Class 1 Implicit connection or Class 3 Explicit connection is established with the PAL-EIP unit. The fail-safe behavior is dependent upon the CIP connection. Since Unconnected Explicit Messaging does not establish or maintain a CIP connection, the fail-safe features are not applicable when using an Unconnected Explicit Message.

SPECIFICATIONS

PAL System - Analog Module Specifications				
	PAL-S04 PAL-S05			
Supply Voltage Range	Corresponding to the supply voltage			
Current for Each Connector	200mA max			
Current for Each Module	650mA max			
Type of Input	Software configurable: 0/10 V; 0/5 V; +/-10 V; +/-5 V; 4/20 mA; 0/20 mA	N/A		
Type of Output	N/A Software configurable: 0/10 V; 0/5 V; +/-10 V; +/-5 V; 4/20 mA; 0/20 mA			
Protection	Overload and short-circuit protected inputs			
Connections	4 M8 4-pin female connectors			
Signal Indicator	One LED for each input or output			
Digital Convert Resolution	15 bit + prefix			

PAL-S06 16-POINT DISCRETE INPUT

PAL System - Wired Discrete Input Module		
Item Part No. Description		
A CONTRACT OF CONTRACT.	PAL-SO6	NITRA discrete input module, 16-point, 12-24 VDC, PNP/NPN, 1 common(s), 16 point(s) per common, IP40. For use with PAL series. Mounting hardware included. Requires PAL-EIP bus coupler.

The PAL-S06 has 16 3-pole spring terminals for discrete inputs. Each input point is separately configured for polarity, operating state, signal persistence and input filter time.

WIRING DIAGRAM

Pin assignment of terminal board connectors



PARAMETER CONFIGURATION

Use the information in the table below to configure the parameters for the PAL-S06 16-point input module.

Setting	Options	How It Works	Setting Description
Plarity	PNP (+VDC) (default)	Determines whether the Input	Input is ON when signal pin has +VDC present.
	NPN (0VDC)	0VDC.	Input is ON when signal pin has 0VDC present.
Operating	Normally Open (default)	Determines whether the digital value of the Input is true when	Input is ON when point is enabled.
State	Normally Closed	the signal is present or true when the signal is not present.	Input is ON when point is not enabled.
Signal 15 Persistence 50 10 10	Filter Off (default)	Ensures that the EtherNet/IP scanner sees the digital value by keeping the digital value on for the specified amount of time regardless of whether	Ensures the EtherNet/IP Scanner will see the Input data indicate true if the signal becomes true by leaving the Input data ON for the time period specified. The (Filter Off) setting disables this feature (Input data only indicates true while signal is true). The other values will ensure that the Input data is indicated for the value specified.
	15 ms		
	50 ms		
	100 ms	or not.	
	Filter Off	Only indicates the digital value	Filters out spurious Input signals. The (Filter Off) setting disables filter (Input Data only indicates true while signal is true). The other values will filter out input signals shorter than the value
Input Filter	3 ms (default)	as true if the signal is on for	
	10 ms	to eliminate spurious or noisy	
	20 ms	signals.	specified.

PAL-S07 16-POINT DISCRETE OUTPUT

PAL System - Wired Discrete Output Module		
ltem	Part No. Description	
and the second s	PAL-SO7	NITRA discrete output module, 16-point, 12- 24 VDC, PNP/NPN, 1 common(s), 16 point(s) per common, 0.5A/point, 3A/common, short circuit and overload protection, IP40. Mounting hardware included. Requires PAL-EIP bus coupler.

The PAL-S07 has 16 3-pole spring terminals for discrete outputs. Each output point is separately configured for polarity, operating state and fail safe operation.

WIRING DIAGRAM

Pin assignment of terminal board connectors



PARAMETER CONFIGURATION

Use the information in the table below to configure the parameters for the PAL-S07 16-point digital output module.

Setting	Options	How It Works	Setting Description
Delevity	PNP (+VDC) (default) Determines whether the point		Output signal presents +VDC when Output data point is true.
Polarity	NPN (0VDC)	outputs +VDC or 0VDC.	Output signal presents 0VDC when Output data point is true.
Operating	Normally Open (default)	Determines whether the Output signal is present when	Output signal is present when Output data point is true.
State Normally Closed Normally Closed Output signal is present when the digital value is false.	Output signal is present when Output data point is false.		
	Hold last state	Specifies the behavior of the Outputs when the connection	Output signal will remain at last state when EtherNet/IP connection is lost.
Fail Safe	Reset Output (default)	to the EtherNet/IP scanner is lost. Note that the Fail Safe byte of the PAL Controller	Output signal will disable when EtherNet/IP connection is lost.
Set Output Options must be set to Fault Mode for this option to work.	Output signal will enable when EtherNet/IP connection is lost.		

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SPECIFICATIONS

PAL System - Wired Discrete Module Specifications				
	PAL-S06 PAL-S07			
Supply Voltage Range	Corresponding to the supply voltage N/A			
Output Voltage	N/A	Corresponding to the supply voltage		
Current for Each Connector	200mA max	500mA max		
Current for Each Module	500mA max	3000mA max*		
Input Impedance	3.9 kΩ	N/A		
Type of Input	Software-configurable PNP/NPN	N/A		
Type of Output	N/A	Software-configurable PNP/NPN		
Protection	Overload and short-circuit protected inputs			
Connections	4 12-pin connectors with spring clamping			
Maximum Wire Size	20 AWG (0.5 mm²)			
Status Indicator	One LED for each input or output			
Degree of Protection IP40				
* IMPORTANT: the module is powered via the fieldbus. Check that the total current of connected outputs is not greater than 3.5 A.				

PAL-S08 4-POINT ANALOG TEMPERATURE INPUT

PAL System - Temperature Input Module		
ltem	m Part No. Description	
	PAL-S08	NITRA temperature input module, RTD/ thermocouple, 4-channel, 15-bit resolution, IP65. Mounting hardware included. Requires PAL-EIP bus coupler.

The PAL-S08 has four 3-pole M8 connectors for analog temperature inputs. Each input point is separately configured for the type of RTD or thermocouple, number of wires, resolution, filtering, min/max monitoring and short or open circuit handling. Any unused points should be capped with PAL-ACC02 M8 caps available separately.

WIRING DIAGRAM

Pin assignment of Temperature Sensors (PT and NI Series)





Pin assignment of Temperature Sensors (Thermocouples)

1 = CJC - Cold-Junction Compensation via external sensor Pt1000 (optional)

2 4 3

2 = V+ Input signal from sensor 3 = CJC - Cold-Junction Compensation via external sensor Pt1000 (optional) 4 = V- Input signal from sensor







PARAMETER CONFIGURATION

Use the information in the table below to configure the parameters for the PAL-S08 temperature input module.

Setting	Options	How It Works	Setting Description
Unit of	Celsius (default)	Select between Celsius and	Module setting for temperature format.
Measurement	Fahrenheit	format for the module.	
Noise	50Hz (default)		Suppresses noise generated by main electrical supply. 50/60Hz slow delivers a high level of filtering, but updates
	60Hz	This is a module setting	
Suppression	50/60Hz slow	filtering or faster update.	the channels more slowly. 50/60Hz fast delivers less
	50/60Hz fast		intering, but updates the channels faster.
	No sensor (default)		
	Pt100 (TK=0.00385)		
	Pt200 (TK=0.00385)		
	Pt500 (TK=0.00385)		
	Pt1000 (TK=0.00385)		
	Pt100 (TK=0.00391)		
	Pt200 (TK=0.00391)		
	Pt500 (TK=0.00391)		
	Pt1000 (TK=0.00391)	Choose between the	
	Ni100 (TK=0.00617)	different available RTD and Thermocouple types Choose	Types of sensors and thermocouples the module
Sensor Type	Ni200 (TK=0.00617)	0 to disable the channel. It	supports. Set all unused channels to No sensor to save
	Ni500 (TK=0.00617)	is recommended to disable	on processing time.
	Ni1000 (TK=0.00617)	processing time.	
	ТС Туре Е		
	ТС Туре Ј		
	ТС Туре Т		
	ТС Туре К		
	ТС Туре N		
	TC Type S		
	ТС Туре В		
	TC Type R		
	CJC Compensation:	There is an internal CJC	There is an internal Cold Junction Compensation but it may be better to use an external CJC (such as a Pt1000) for cases where sudden temperature changes occur.
	External (default)	but in some applications with some sensor types an external	
	Internal	CJC (such as with the Pt1000) may work better.	
	Resolution:	Determines the resolution of	Choose the resolution of temperature display. This only applies to RTD sensors with temperature reading range of +/- 327 C.
Resolution Parameters	0.1 (default)	only applies to RTD sensors with temperature reading	
	0.01	range of +/- 327 C.	
	Filter:	This digital filter setting works in conjunction with the	The digital filter setting that works in conjunction with the Noise Suppression filter. Sync4 provides greater filtering but slower updates than Sync3.
	Sync 3 (default)	module Noise Suppression filter. Sync4 provides greater	
	Sync 4	filtering than Sync3, but has slower updates.	
(table continued on next page)			

▼AUTOMATIONDIRECT

Chapter 4: I/O Modules

Setting	Options	How It Works	Setting Description
	Filter setting:		
	No Filter (default)		
	1 sample		
	2 samples	This option determines the number of samples that are	Filter Setting determines the number of samples that are
	4 samples	averaged. The greater the	acquired before updating the digital value. The higher
	8 samples	value, the steadier the value	the samples, the greater the filtering but slower updates.
	16 samples		
	32 samples		
	64 samples		
	Max Value Monitor:	An alarm option to inform the user when the temperature has exceeded a specified value. Enabling this option	
Filtor	Disabled (default)	requires specifying the Maximum temperature value in the field below. If the temperature exceeds the value specified, it will	Max Value Monitor enables the Max Temperature monitor and will generate an alarm if the value is exceeded. Use the Max Temperature value setting if enabling this option.
Diagnostic Parameters	Enabled	be indicated in Input Byte 0 (status byte). The error data will be between 0xD4 – 0xD7.	
	Min Value Monitor:	An alarm option to inform the user when the temperature has dropped below a specified value. Enabling this	Min Value Monitor enables the Min Temperature monitor and will generate an alarm if the value is exceeded. Use the Min Temperature value setting if enabling this option.
	Disabled (default)	option requires specifying the Minimum temperature value in the field below. If the temperature is below	
	Enabled	the value specified, it will be indicated in Input Byte 0 (status byte). The error data will be between 0xD4 – 0xD7.	
	Short Circuit detect:	An alarm option to inform the user that a channel has short	This option enables Short circuit detection for the channel. An alarm is generated if a short circuit is detected.
	Disabled (default)	circuited. If a short circuit is detected, it will be indicated in Input Byte 0 (status byte).	
	Enabled	The error data will be between 0xD4 – 0xD7.	
Filter	Open Circuit detect:	An alarm option to inform the user that a channel has an open circuit. If an open circuit	This bit enables Open circuit detection for the channel. An alarm is generated if an open circuit is detected.
Diagnostic Parameters (cont'd)	Disabled (default)	is detected, it will be indicated in Input Byte 0 (status byte).	
	Enabled	The error data will be between 0xD4 – 0xD7.	
Minimum Temperature	Valid range for each channel: -32768 to 32767Default: 1	This value is used in conjunction with the Min Value Monitor to signal an alarm when the temperature has dropped below the value specified in this field. Valid range is -32768 to 32767.	Minimum Temperature value used for the Minimum Temperature detection function.
Maximum Temperature	Valid range for each channel: -32768 to 32767Default: 127	This value is used in conjunction with the Max Value Monitor to signal an alarm when the temperature has risen above the value specified in this field. Valid range is -32768 to 32767.	Maximum Temperature value used for the Maximum Temperature detection function.

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SPECIFICATIONS

PAL System - Temperature Input Module Specifications			
Sensors Supply Voltage	Corresponding to the supply voltage		
Maximum Input Voltage	30VDC		
Sensor Type (RTD)	Platinum (-200 to +850°C): Pt100, Pt200, Pt500, Pt1000 (TK = 0.00385 and TK = 0.00391) Nickel (-60 to +180°C): Ni100, Ni120, Ni500, Ni1000 (TK = 0.00618)		
Connections Type (RTD)	2, 3 or 4-wire		
Type of Thermocouple (TC)	J, E, T, K, N, S, B, R		
Cold Junction Compensation for Thermocouples	Internal: With internal electronic sensor included External (recommended in case of sudden changes in the ambient temperature): PT1000 sensor for connection with the M8 thermocouple connector		
Temperature Range	-200 to + 800 °C (-328 to + 1472 °F)		
Digital Convert Resolution	15 bit + prefix		
Max Error Compared to Ambient Temperature	±0.5% (TC) ±0.06% (RTD)		
Max. Basic Error (Ambient T 25°C)	± 0.6 °C (with 4-wire RTD with 0.1 resolution) ± 0.2 °C (with 4-wire RTD with 0.01 resolution)		
Repeatability (Ambient T 25°C)	±0.03%		
Address Employment	2 bytes for each input - 8 bytes per module		
Cycle time (Module)	240ms		
	For RTD: Piecewise linear approximation		
Software Linearization	For TC: NIST (National Institute of Standards and Technology) Linearization based on ITS-90 scale (International Temperature Scale of 1990) for the thermocouple linearization		
Maximum Length of Shielded Cable for the Connection	< 30m		
Status Indicator	One LED for each input and reporting to the Master		

CLOSED END SPACER MODULE

PAL System - Closed End Spacer Module		
Item	Part No.	Description
and the second	PAL-SPC	NITRA closed end spacer, IP65. For use with PAL series assemblies without pneumatics.

To use the PAL system bank without pneumatics the closed end spacer module is needed. Only one module per bank required.

INSTALLATION

Hand tighten the three tie rods (1) of the spacer module for connection to the bus coupler (2).



While aligning the tie rods, carefully mate the spacer module (3) onto the electrical module. Make sure the board fits into the slots provided. DO NOT FORCE!



Place the assembly on a flat surface, insert the closed end plate (4), three lock washers (5) and tighten the three nuts (6) using a 4mm hex wrench at a torque of 2Nm [18 lb-in]. Make sure the electronic boards are properly aligned. DO NOT FORCE!

