



PAL System - I/O Modules

Signal Modules

The PAL systems can be configured with a variety of input or output signal modules, which can be mounted on systems with a fieldbus electrical connection. The signal modules can be added at any time. You only need to unscrew the aluminum plate to the left side of the electrical connection module and install the signal modules (mounting tie rods included) and retighten the end plate to the left.

PAL System - Discrete Input Module					
Item	Part No.	Price	Description	Weight (lbs)	Drawing Link
	PAL-S01	\$276.00	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.	0.6	PDF

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



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PAL System - I/O Modules

PAL System - Discrete Output Modules					
Item	Part No.	Price	Description	Weight (lbs)	Drawing Link
	PAL-S02	\$279.00	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.	0.6	PDF
	PAL-S03	\$287.00	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.	0.6	PDF

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 short-circuit protected inputs	
Connections	8 M8 3-pole female connectors	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 can permanently damage the system.		



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PAL System - I/O Modules

PAL System - Analog Modules					
Item	Part No.	Price	Description	Weight (lbs)	Drawing Link
	PAL-S04	\$313.00	NITRA pneumatic automation link (PAL) analog input module, 4-channel, current/voltage, 15-bit, IP65. Requires PAL-EIP bus coupler.	0.55	PDF
	PAL-S05	\$404.00	NITRA pneumatic automation link (PAL) analog output module, 4-channel, current/voltage, 15-bit, IP65. Requires PAL-EIP bus coupler.	0.55	PDF

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	



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PAL System - I/O Modules

PAL System - Wired Discrete Modules					
Item	Part No.	Price	Description	Weight (lbs)	Drawing Link
	PAL-S06	\$313.00	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.	0.5	PDF
	PAL-S07	\$424.00	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.	0.5	PDF

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.		



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PAL System - I/O Modules

PAL System - Temperature Input Module

Item	Part No.	Price	Description	Weight (lbs)	Drawing Link
	<u>PAL-S08</u>	\$519.00	NITRA temperature input module, RTD/thermocouple, 4-channel, 15-bit resolution, IP65. Mounting hardware included. Requires PAL-EIP bus coupler.	0.55	PDF

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
Software Linearization	For RTD: Piecewise linear approximation 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



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PAL System - Accessories and Mounting Options

PAL System - Accessories					
Item	Part No.	Price	Description	Weight (lbs)	Drawing Link
	PAL-ACC01	\$11.50	NITRA base mount, panel. Package of 2. For use with PAL series. Mounting screws included.	0.1	PDF
	PAL-ACC02	\$2.00	NITRA M8 protective cap, for use with PAL series.	0.05	N/A
	PAL-ACC03	\$1.00	NITRA M12 protective cap, for use with PAL series.	0.05	N/A

Mounting Options

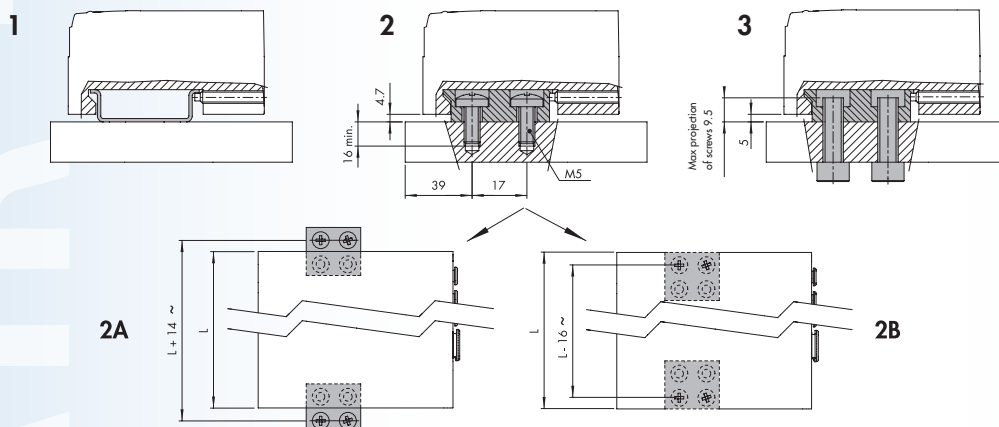
Using the [PAL-ACC01](#)

1. Mounting to DIN rail: tighten the set screws into modules E (electrical connection) and C (closed end plate).
2. Mounting on a flat surface: use the pair of brackets part number [PAL-ACC01](#) and the M5x20 screws supplied.

You can choose where to position the brackets in relation to the base:

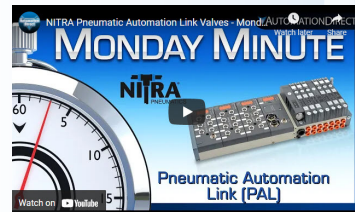
- 2a. Protruding brackets: Can be used to install the base + brackets unit from above. First secure the brackets to the modules E and C using the set screws, then secure everything with M5x20 screws.
 - 2b. Concealed brackets: the overall dimensions of the base are reduced. First secure the brackets to the flat top with M5x20 screws, then place the base onto the brackets and lock the two set screws provided in the modules E and C.
3. Mounting through a wall: use the brackets part number [PAL-ACC01](#). The brackets come with M6 threaded holes and can be fixed with M6 screws (not included in the supply) passing through the wall. The brackets can fixed either protruded or concealed.

Note: Planar surfaces are required to ensure correct mounting. Avoid twisting or bending the valve units.





Pneumatic Automation Link (PAL)



Click on the thumbnail or go to
<https://www.automationdirect.com/VID-PN-0055> for a
 short video on the Nitra PAL system.

The Pneumatic Automation Link (PAL) system is defined as an electro-pneumatic system as it can contain both electrical I/O as well as a solenoid valve bank. In effect, a single assembly can combine solenoid valves of various types, digital or analog I/O and common power sources for all of the above.

Using a limited variety of basic components many different configurations can be built. Valves supported are compact yet have high flow ratings (Cv) and high performance. The system can be controlled by direct wiring if only pneumatic valves are used or via Ethernet/IP if a combination of electrical I/O and valves are part of your application. To simplify wiring and system design, DC power is connected through a central module using M8 connections. All PAL components come with an efficient diagnostic system.



Click or scan the QR code to be taken to <https://cdn.automationdirect.com/static/manuals/nitra-pal/nitrapal.html> for online PAL system Documentation including Manual and Module Options Insert.

PAL System - General Specifications				
Nominal Supply Voltage	12 or 24 VDC			
Minimum Operating Voltage	10.8 V *			
Maximum Operating Voltage	31.2 V			
Maximum Admissible Voltage	32V **			
Power for Each Controlled Pilot	3W for 15ms, then holding 0.3 W			
Drive (for multi-pole)	PNP or NPN			
Solenoid Rating	100% ED			
Protection	Overload and short-circuit protected solenoid pilot Output			
Maximum Number of Solenoid Pilots	21 or 38 multi-pole connection; field bus 128			
Ambient Temperature	-10°C to + 50°C (at 8 bar) 14°F to 122°F (at 8 bar)			
Operating Pressure			5/2 and 5/3	3/2
	Common supply	Port 1	3 to 8 bar (43 to 116 psi)	3.5 to 8 bar (51 to 116 psi)
	Separate pilot supply	Assisted valves	Vacuum to 10bar (Vacuum to 145psi)	
		Pilot pressure	3 to 8 bar (43 to 116 psi)	
Actuation Response Time (TRA) / Reset Response Time (TRR) at 6 bar	TRA/TRR valve 2/2 and 3/2		14 / 28 ms	
	TRA/TRR valves 5/2 monostable and shut-off valve		12 / 45 ms	
	TRA/TRR valve 5/2 bistable		12 / 14 ms	
	TRA/TRR valve 5/3		15 / 45 ms	
	TRA/TRR valve 3/2 high flow		13 / 36 ms	
Fluid	Unlubricated air			
Air Quality Required	ISO 8573-1 class 4-7-3			
Degree of Protection	IP65 (with connectors connected or plugged if not used)			
Agency Approvals	CE, cURus			
* Minimum voltage 10.8V required at solenoid pilots.				
** IMPORTANT! Voltage greater than 32VDC can permanently damage the system.				