



PAL System - EtherNet/IP Modules

EtherNet/IP Bus Couplers and Conventional Electrical Modules

Control interface with the PAL system is via one of the units shown below. If I/O modules are to be used, the PAL-EIP bus coupler is required and EtherNet/IP communications is used. For pneumatic only systems, one of the electrical connection modules can be used.

PAL System - EtherNet/IP Modules						
Item	Part No.	Price	Description	Electrical Cables	Weight (lbs)	Drawing Link
	<u>PAL-EIP</u>	\$459.00	NITRA bus coupler, 12-24 VDC, (2) Ethernet 10/100Base-T (M12) port(s), EtherNet/IP, 10/100 Mbps, (128) solenoid(s) per system, IP65. For use with PAL series. Requires 4-pin M8 power cable.	Power: 4-Pole Pico (M8) cable EtherNet: M12 4-Pole, D-Coded cable	1.05	<u>PDF</u>
	<u>PAL-EAD</u>	\$227.00	NITRA local expansion coupler, 12-24 VDC, (1) 4-pin M8 quick-disconnect port(s), number of solenoid(s) inclusive of main system, IP65. For use with PAL series. Requires 4-pin M8 power cable.		1	<u>PDF</u>
PAL System - Conventional Electrical Modules						
	<u>PAL-E25</u>	\$104.00	NITRA electrical connection module, 12-24 VDC, (21) solenoid(s), IP65. For use with PAL series. Requires PAL series 25-pin male D-sub control cable.	Listed below	0.5	<u>PDF</u>
	<u>PAL-E44</u>	\$109.00	NITRA electrical connection module, 12-24 VDC, (38) solenoid(s), IP65. For use with PAL series. Requires PAL series 44-pin male D-sub control cable.		0.5	<u>PDF</u>

PAL System - EtherNet/IP Module Specifications	
Maximum Admissible Current (PAL-EIP, PAL-EAD)	4A continuous, 6A instantaneous for valve supply 4A continuous, 6A instantaneous for bus and signal supply
Maximum Admissible Current (PAL-E25, PAL-E44)	With multi-pole connection 6A continuous, 9A instantaneous With fieldbus connection 4A continuous, 6A instantaneous for valve supply; 4A continuous, 6A instantaneous for bus and signal supply
Protection	Overload and short-circuit protected solenoid pilot Output
Diagnostics	LED signal on valve, LED on electrical connection and software message regarding: short-circuited solenoid pilot; solenoid pilot with coil failure; voltage out of range (undervoltage and overvoltage); module communication control; on switching, configuration other than that stored
Maximum Number of Solenoid Pilots	128
Maximum number of simultaneously controllable solenoid pilots*	38
Maximum Number of I/O	128 digital inputs, 128 digital outputs, 16 analog inputs, 16 analog outputs
Maximum Number of Modules	40 Bases for valves + 16 digital inputs + 16 digital outputs + 4 analog inputs + 4 analog outputs
Maximum Number of Class 1 Input Only/Listen Only Connections	8
Maximum Number of Class 3 Connections	8
Maximum Number of Concurrent TCP Connections (thinking of resources for Unconnected Explicit Messaging)	30
*Note - To actuate a greater number of solenoid pilots at the same time, Intermediate module PAL-M12P with electrical connection must be added.	



Click the icon or scan the QR code to be taken to <https://www.automationdirect.com/selectors/pal> for our online PAL system Configuration Tool for further selection assistance.



PAL System - EtherNet/IP Modules

The cables listed below were designed to fit the electrical connection modules and maintain IP65 protection.

Electrical Module Power Cables						
Item	Part No.	Price	Description	Length	Weight (lbs)	Drawing Link
	PAL-ACC04	\$38.00	NITRA control cable, 25-pin D-sub right-angle female to pigtail, IP65, 3.2ft/1m cable length. For use with PAL-E25 electrical connection module.	3.2 ft (1m)	0.40	PDF
	PAL-ACC05	\$52.00	NITRA control cable, 25-pin D-sub right-angle female to pigtail, IP65, 8.2ft/2.5m cable length. For use with PAL-E25 electrical connection module.	8.2 ft (2.5 m)	0.85	PDF
	PAL-ACC06	\$67.00	NITRA control cable, 25-pin D-sub right-angle female to pigtail, IP65, 16.4ft/5m cable length. For use with PAL-E25 electrical connection module.	16.4 ft (5m)	1.60	PDF
	PAL-ACC07	\$50.00	NITRA control cable, 44-pin D-sub right-angle female to pigtail, IP65, 3.2ft/1m cable length. For use with PAL-E44 electrical connection module.	3.2 ft (1m)	0.65	PDF
	PAL-ACC08	\$70.00	NITRA control cable, 44-pin D-sub right-angle female to pigtail, IP65, 8.2ft/2.5m cable length. For use with PAL-E44 electrical connection module.	8.2 ft (2.5 m)	1.40	PDF
	PAL-ACC09	\$90.00	NITRA control cable, 44-pin D-sub right-angle female to pigtail, IP65, 16.4ft/5m cable length. For use with PAL-E44 electrical connection module.	16.4 ft (5m)	2.65	PDF

EtherNet/IP Wiring

Connection to the network

IN or P1 (M12 female connector, D encoding)



- 1 = TD+
- 2 = RD+
- 3 = TD-
- 4 = RD-

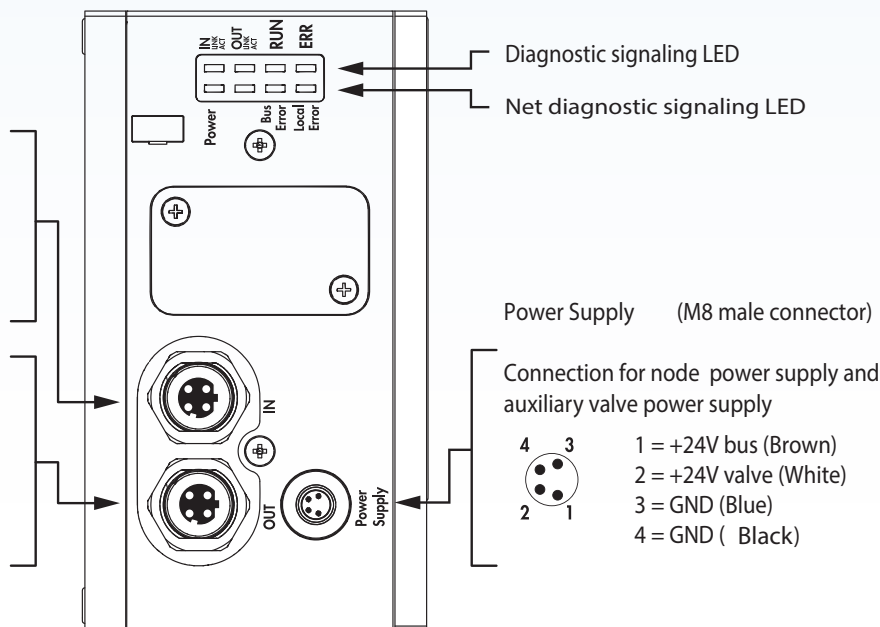
Metal ring nut = Shield

OUT or P2 (M12 female connector, D encoding)



- 1 = TD+
- 2 = RD+
- 3 = TD-
- 4 = RD-

Metal ring nut = Shield

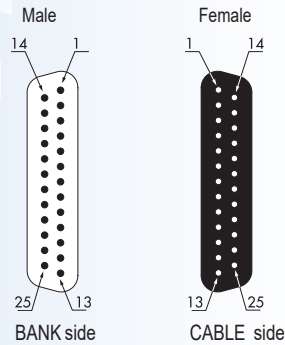




PAL System - EtherNet/IP Modules

Wiring

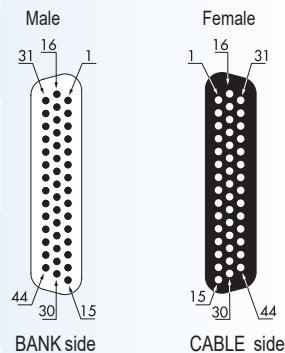
D-SUB 25-PIN CONNECTOR



PIN	Color of the corresponding wire (DIN 47100)	Function
1	White	1
2	Brown	2
3	Green	3
4	Yellow	4
5	Grey	5
6	Pink	6
7	Blue	7
8	Red	8
9	Black	9
10	Violet	10
11	Grey + Pink ring	11
12	Red + Blue ring	12
13	White + Green ring	13

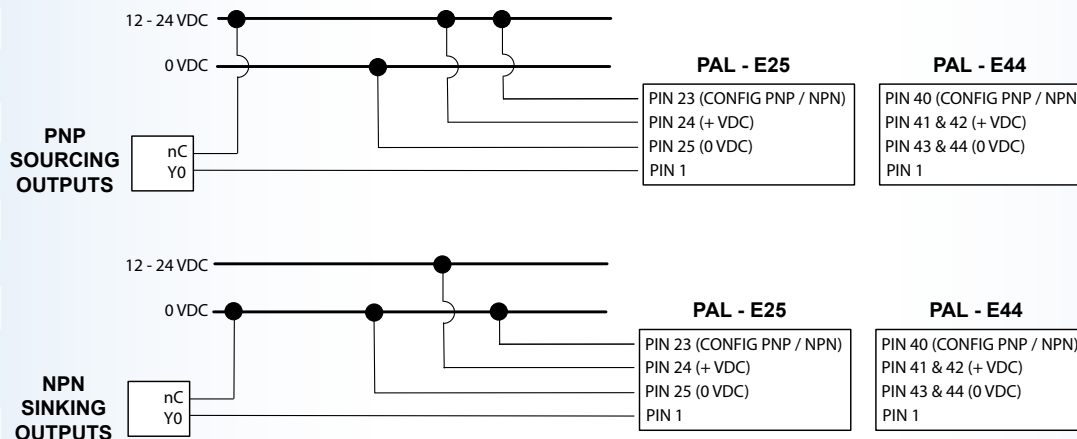
PIN	Color of the corresponding wire (DIN 47100)	Function
14	Brown + Green ring	14
15	White + Yellow ring	15
16	Yellow + Brown ring	16
17	White + Grey ring	17
18	Grey + Brown ring	18
19	White + Pink ring	19
20	Pink + Brown ring	20
21	White + Blue ring	21
22	Brown + Blue ring	Fault reporting
23	White + Red ring	* Config. PNP/NPN
24	Brown + Red ring	+VDC
25	White + Black ring	0VDC

D-SUB 44-PIN CONNECTOR



PIN	Color of the corresponding wire (DIN 47100)	Function
1	White	1
2	Brown	2
3	Green	3
4	Yellow	4
5	Grey	5
6	Pink	6
7	Blue	7
8	Red	8
9	Black	9
10	Violet	10
11	Grey + Pink ring	11
12	Red + Blue ring	12
13	White + Green ring	13
14	Brown + Green ring	14
15	White + Yellow ring	15
16	Yellow + Brown ring	16
17	White + Grey ring	17
18	Grey + Brown ring	18
19	White + Pink ring	19
20	Pink + Brown ring	20
21	White + Blue ring	21
22	Brown + Blue ring	22

PIN	Color of the corresponding wire (DIN 47100)	Function
23	White + Red ring	23
24	Brown + Red ring	24
25	White + Black ring	25
26	Brown + Black ring	26
27	Grey + Green ring	27
28	Yellow + Grey ring	28
29	Pink + Green ring	29
30	Yellow + Pink ring	30
31	Green + Blue ring	31
32	Yellow + Blue ring	32
33	Green + Red ring	33
34	Yellow + Red ring	34
35	Green + Black ring	35
36	Yellow + Black ring	36
37	Grey + Blue ring	37
38	Pink + Blue ring	38
39	Grey + Red ring	Fault reporting
40	Pink + Red ring	* Config. PNP/NPN
41	Grey + Black ring	+VDC
42	Pink + Black ring	+VDC
43	Blue + Black ring	0VDC
44	Red + Black ring	0VDC





PAL System - Accessories and Mounting Options

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

Mounting Options

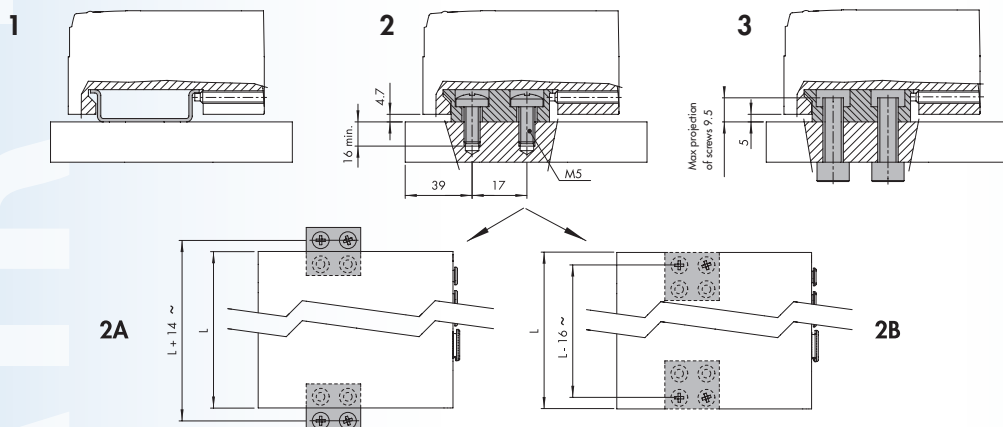
Using the [PAL-ACC01](#)

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:

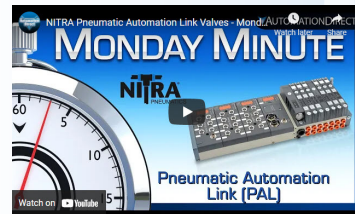
- 2a. Protruding brackets: Can be used to install the base + brackets unit from above. First secure the brackets to the modules E and C using the set screws, then secure everything with M5x20 screws.
 - 2b. Concealed brackets: the overall dimensions of the base are reduced. First secure the brackets 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.				