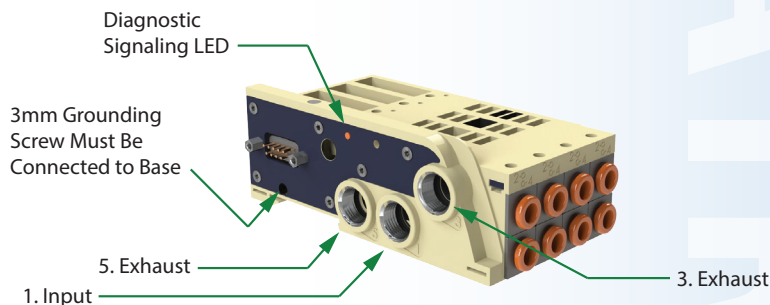







# PAL System - Stand-Alone Valve Bases

## Conventional Stand-Alone Valve Bases

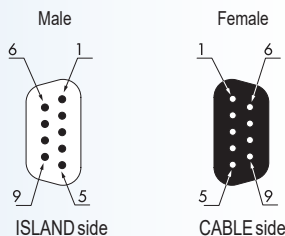
The PAL stand-alone base is a 4-position electro-pneumatic manifold base for PAL valves, available in 2 configurations, with 4 or 8 controls for solenoid pilots. Up to 4 valves with one solenoid pilot can be installed on the manifold base with 4 controls, and up to 4 valves with one or two solenoid pilots can be installed on the manifold base with 8 controls.



PAL System - Stand-Alone Valve Bases					
Item	Part No.	Price	Description	Weight (lbs)	Drawing Link
	<a href="#"><u>PAL-CB4414</u></a>	\$116.00	NITRA pneumatic stand-alone valve base, fiberglass-reinforced thermoplastic, (4) solenoid(s), (4) stations, (1) 1/4in female NPT inlet(s), (8) 1/4in push-to-connect outlet(s), (2) 1/4in female NPT exhaust(s), IP65. For use with PAL series.	0.85	<a href="#"><u>PDF</u></a>
	<a href="#"><u>PAL-CB4814</u></a>	\$132.00	NITRA pneumatic stand-alone valve base, fiberglass-reinforced thermoplastic, (8) solenoid(s), (4) stations, (1) 1/4in female NPT inlet(s), (8) 1/4in push-to-connect outlet(s), (2) 1/4in female NPT exhaust(s), IP65. For use with PAL series.	0.85	<a href="#"><u>PDF</u></a>
	<a href="#"><u>PAL-ACC19</u></a>	\$20.50	NITRA control cable, 9-pin D-sub axial female to pigtail, IP65, 3.2ft/1m cable length. For use with PAL series stand-alone valve base.	0.15	<a href="#"><u>PDF</u></a>
	<a href="#"><u>PAL-ACC20</u></a>	\$22.00	NITRA control cable, 9-pin D-sub axial female to pigtail, IP65, 8.2ft/2.5m cable length. For use with PAL series stand-alone valve base.	0.35	<a href="#"><u>PDF</u></a>
	<a href="#"><u>PAL-ACC21</u></a>	\$25.00	NITRA control cable, 9-pin D-sub axial female to pigtail, IP65, 16.4ft/5m cable length. For use with PAL series stand-alone valve base.	0.60	<a href="#"><u>PDF</u></a>

## Wiring

### CONNECTOR D-Sub 9 PIN PRE-WIRED



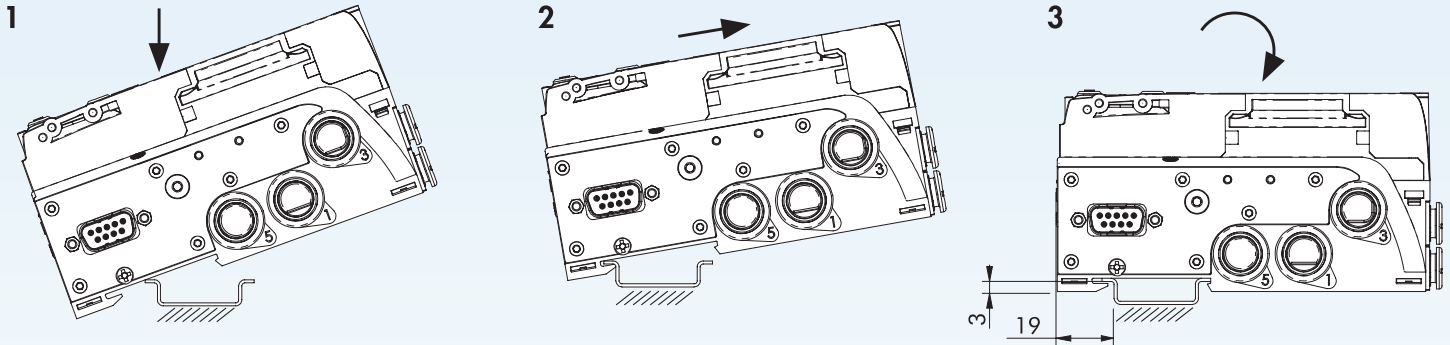
Electric contact position	Color conductor cable	Function	4-position base	8-position base
1	White	1 + VDC	Solenoid pilot 14 valve 1	Solenoid pilot 14 valve 1
2	Brown	2 + VDC	Solenoid pilot 14 valve 2	Solenoid pilot 12 valve 1
3	Green	3 + VDC	Solenoid pilot 14 valve 3	Solenoid pilot 14 valve 2
4	Yellow	4 + VDC	Solenoid pilot 14 valve 4	Solenoid pilot 12 valve 2
5	Grey	5 + VDC	/	Solenoid pilot 14 valve 3
6	Pink	6 + VDC	/	Solenoid pilot 12 valve 3
7	Blue	7 + VDC	/	Solenoid pilot 14 valve 4
8	Red	8 + VDC	/	Solenoid pilot 12 valve 4
9	Black	COM 0VDC	Common	Common



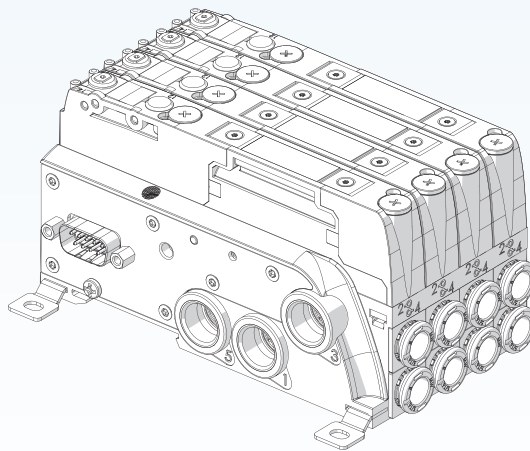
# PAL System - Stand-Alone Valve Bases

## Mounting Options

Mounting to DIN rail is done per the sequence shown below:



Mounting with brackets: The 3 brackets are included with each PAL stand-alone valve base. Push them firmly into the appropriate seats on the bases until they "click".



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.

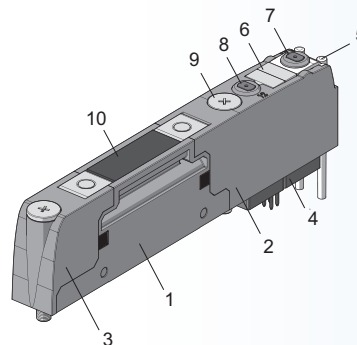


# PAL System - Solenoid Valves







## Solenoid Valves

The valves in the PAL system are designed to ensure high flow using only one small size valve (14 mm wide), without the need of installing a larger size one, to the benefit of component standardization. Models are available with all the main air supply diagrams - from 3/2 to 5/3. The valves are secured to the base with two sturdy M4 captive screws. They come with all the accessories that facilitate their use: manual control, LED light, plate with air supply diagram and technical data and white ID tags. The range also includes:

- High-flow valves which have an innovative system that reaches flow rates that are uncommon for this size of valve.
- Bypass element that makes it possible to boost supply and reliefs or create special pneumatic circuits.
- Circuit shut-off valve PAL-V1-SR to connect/disconnect all station valves.
- Blanking plate to plug blank base positions.



1. BODY: technopolymer
2. CONTROL: technopolymer
3. BASE: technopolymer
4. SOLENOID PILOT
5. DISPLAY: LED light and optical tester in technopolymer
6. TAG: removable
7. MANUAL CONTROL 14, for port 4: locking, brass
8. MANUAL CONTROL 12, for port 2: locking, brass
9. SCREW FOR MOUNTING TO THE BASE: M4 with PH 1 Phillips-head, galvanized steel. Max. torque: 1.2 Nm
10. TAG: technopolymer with laser-etched wording

PAL System - Solenoid Valves					
Item	Part No.	Price	Description	Weight (lbs)	Drawing Link
	<a href="#"><u>PAL-V2-32C</u></a>	\$45.00	NITRA solenoid valve, modular, 3-way, 2-position, (2) N.C., single solenoid spring return, reinforced technopolymer body, IP65, locking manual override, Cv=0.64, 12-24 VDC.	0.2	<a href="#"><u>PDF</u></a>
	<a href="#"><u>PAL-V2-32A</u></a>	\$50.00	NITRA solenoid valve, modular, 3-way, 2-position, (2) N.O., single solenoid spring return, reinforced technopolymer body, IP65, locking manual override, Cv=0.64, 12-24 VDC.	0.2	<a href="#"><u>PDF</u></a>
	<a href="#"><u>PAL-V2-32C32A</u></a>	\$50.00	NITRA solenoid valve, modular, 3-way, 2-position, (1) N.C. / (1) N.O., single solenoid spring return, reinforced technopolymer body, IP65, locking manual override, Cv=0.64, 12-24 VDC.	0.2	<a href="#"><u>PDF</u></a>
	<a href="#"><u>PAL-V1-52</u></a>	\$33.50	NITRA solenoid valve, 5-way, 2-position, single solenoid spring return, reinforced technopolymer body, IP65, locking manual override, Cv=0.7, 12-24 VDC.	0.15	<a href="#"><u>PDF</u></a>
	<a href="#"><u>PAL-V2-52</u></a>	\$47.00	NITRA solenoid valve, 5-way, 2-position, double solenoid, reinforced technopolymer body, IP65, locking manual override, Cv=0.7, 12-24 VDC.	0.2	<a href="#"><u>PDF</u></a>
	<a href="#"><u>PAL-V2-53C</u></a>	\$50.00	NITRA solenoid valve, 5-way, 3-position, center closed, double solenoid, reinforced technopolymer body, IP65, locking manual override, Cv=0.49, 12-24 VDC.	0.2	<a href="#"><u>PDF</u></a>



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 - Solenoid Valves

PAL System - Solenoid Valves					
Item	Part No.	Price	Description	Weight (lbs)	Drawing Link
	<a href="#">PAL-V1-32C</a>	\$37.50	NITRA solenoid valve, modular, 3-way, 2-position, (1) high-flow N.C., single solenoid spring return, reinforced technopolymer body, IP65, locking manual override, Cv=1.28, 12-24 VDC.	0.15	<a href="#">PDF</a>
	<a href="#">PAL-V1-32A</a>	\$37.50	NITRA solenoid valve, modular, 3-way, 2-position, (1) high-flow N.O., single solenoid spring return, reinforced technopolymer body, IP65, locking manual override, Cv=1.28, 12-24 VDC.	0.15	<a href="#">PDF</a>
	<a href="#">PAL-V1-SR</a>	\$57.00	NITRA solenoid bank shut-off pressure relief valve, 5-way, 2-position, single solenoid spring return, reinforced technopolymer body, IP65, locking manual override, Cv=1.07, 12-24 VDC.	0.2	<a href="#">PDF</a>
	<a href="#">PAL-V0-PLUG</a>	\$6.75	NITRA blanking plug, fiberglass reinforced plastic. For use with PAL series valve bases.	0.1	N/A
	<a href="#">PAL-Y38</a>	\$4.25	NITRA pneumatic push-to-connect fitting, Y, reinforced technopolymer body, (2) 5/16in (8mm) plug-in to 3/8in push-to-connect.	0.05	<a href="#">PDF</a>
	<a href="#">PAL-ACC17</a>	\$5.25	NITRA base screw, replacement. Package of 10. For use with PAL series.	0.05	N/A

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			
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)	
* Minimum voltage 10.8V required at solenoid pilots.				
** IMPORTANT! Voltage greater than 32VDC can permanently damage the system.				



# PAL System - Solenoid Valves

## HOW TO GET HIGH-FLOW RATE FOR EACH PNEUMATIC FUNCTION

Note: The two cartridges on the base (2 and 4) must fit the Ø 8mm pipe.

Outputs 2 and 4 must be connected one to the other. To do this, you can use the special PAL-Y38 fitting.

When connecting one or more valves using the PAL-Y38 fitting, the pneumatic system functions must be configured according to the following diagram.

Pneumatic function	3/2 NC Part No. PAL-V1-32C	3/2 NO Part No. PAL-V1-32A	5/2 Momentary Part No. PAL-V1-32C PAL-V1-32A	5/2 * Maintained Part No. PAL-V2-52 PAL-V2-52	5/3 OC (Open Center) Part No. PAL-V1-32C PAL-V1-32C	5/3 PC (Pressure Center) Part No. PAL-V1-32A PAL-V1-32A	5/3 CC* (Closed Center) Part No. PAL-V2-53C PAL-V2-53C
Valves to be used							
Y-fitting layout							
Flow rate at 6.3 ΔP 1 bar [SCFM]	44.1	44.1	44.1	49.4	44.1	44.1	35.3

In order to get 5/2 momentary, 5/2 maintained and 5/3 CC high flow, use two parallel valves, by energizing the solenoids simultaneously.

\* The PAL-Y38 fittings of this valve must be installed longitudinally with one PAL-Y38 fitting connecting the two outputs (2) and the other the two outputs (4). The solenoid pilots must be operated simultaneously.

## Solenoid Valve Diagrams

Diagram PAL-V2-32C

(2) 3-way, 2-pos, Single Solenoid, N.C.

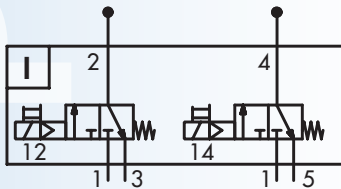


Diagram PAL-V2-32A

(2) 3-way, 2-pos, Single Solenoid, N.O.

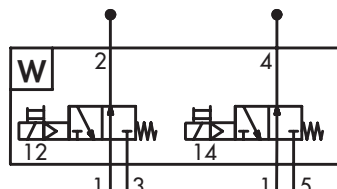


Diagram PAL-V2-32C32A

(2) 3-way, 2-pos, Single Solenoid, N.C./N.O.

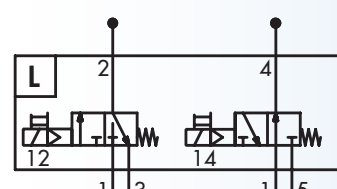


Diagram PAL-V1-52

5-way, 2-pos, Single Solenoid, non-locking

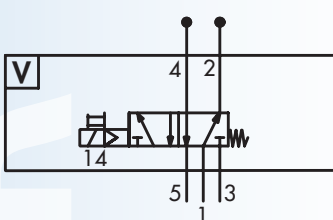


Diagram PAL-V2-52

5-way, 2-pos, Single Solenoid, locking

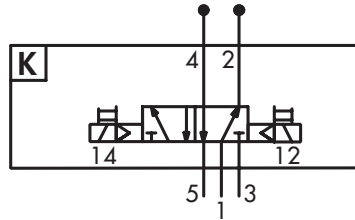


Diagram PAL-V2-53C

5-way, 3-pos, Double Solenoids, Center Closed

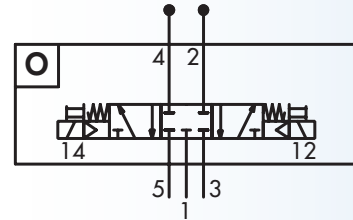


Diagram PAL-V1-32C

3-way, 2-pos, Single Solenoid, N.C., high flow

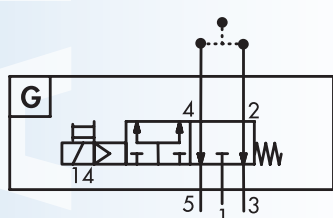


Diagram PAL-V1-32A

3-way, 2-pos, Single Solenoid, N.O., high flow

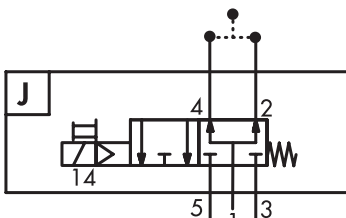
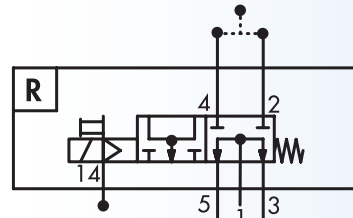


Diagram PAL-V1-SR

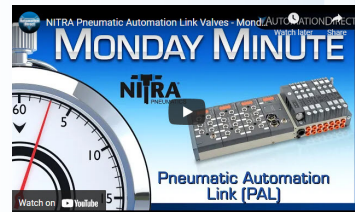
Shut-off Valve







# 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.				