

APL-9 Series Valve Position Monitor Installation, Operation & Maintenance Manual



Contents

1. General.....	3
2. Standard specification.....	3
3. Standard Features	4
4. Installation	5
4.1. Mounting bracket.....	5
4.2. Mounting limit switch box	5
4.3. Cam setting	6
4.4. Wiring.....	6
5. Maintenance.....	8
6. Inspection.....	8
7. Storage.....	8
8. Trouble shooting.....	8
9. Tools	9
10. Installation and Maintenance Tips	9

1. General

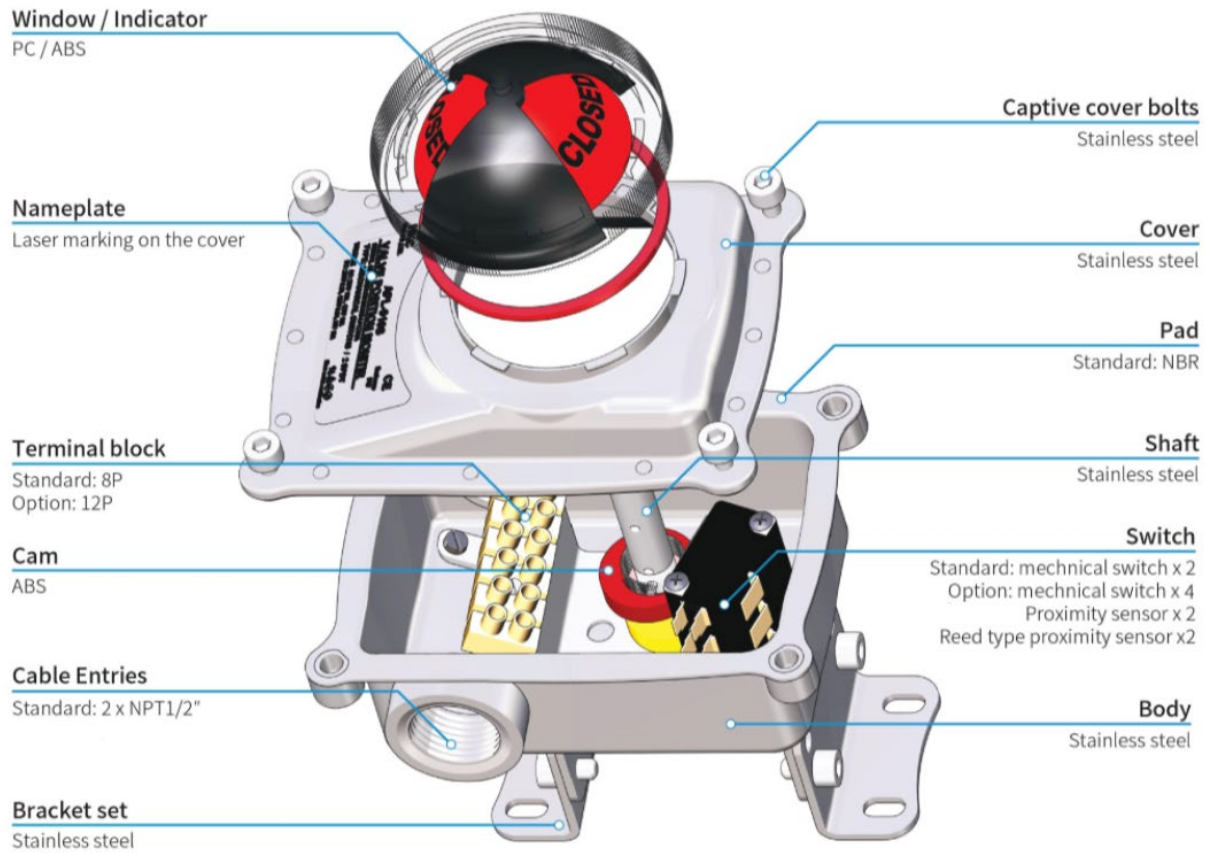
TRIAC Controls APL-9 series limit switch box is designed to provide accurate and reliable valve position signaling and indicating of most valves or actuators manufactured. The press-formed, all stainless-steel housing provides a lightweight and compact design with high corrosion resistance.

APL-9 limit switch boxes consist of a visual position indicator, quick-set cam assembly, terminal strip, switch assembly and integral mounting bracket. Quick-set cam allows for a quick and simple hand operation in the setting of switches.

2. Standard specification

Model	APL-9** *
Electrical Ratings	Type 4x / 6, IP66 / 67
Enclosure Material	304 stainless steel
Ambient Temperature	-20°C ≤ Ta ≤ +80°C
Conduit Entries	Two NPT 1/2"
Travel Angle	90 degree +/- 10%
Position Indicator	Open: Green Close: Red Language: English
Mechanical Switch	SPDT (10, 12): 16A 1/2HP 125/250Vac, 0.6A 125Vdc, 5A 125Vac SPDT Gold Plated (18): 0.1A 125Vac/30Vdc
Proximity sensor	NAMUR P&F NJ2-V3-N (20): Uo = 8.2V nominal @ Ri = 1kΩ. PNP Sourcing 3-wire P&F NBB2-V3-E2 (23): 10-30Vdc, 100mA@30Vdc SPST Reed Switch (30): 50W Max, 250Vdc 3.0A max.
Terminal Strip	8 position

3. Standard Features



4. Installation

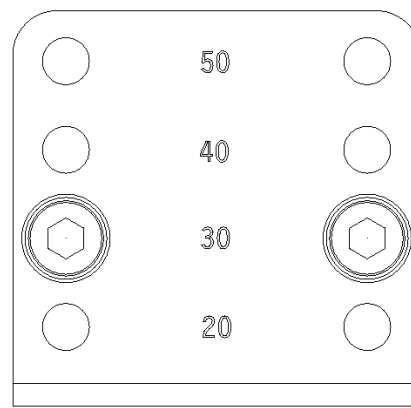
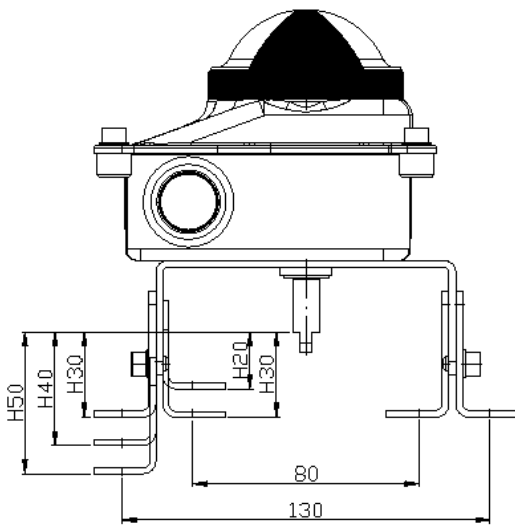


Caution; Where limit switch box or one of parts are to be moved, installed, disassembled, reassembled, care must be taken to not cause injury by sharp edges of corners or rough surfaces or residual electricity.

4.1. Mounting bracket

4.1.1. TRIAC Controls APL-9 is supplied with integral NAMUR VDI/VDE standard bracket and hardware for mounting on actuator. Bracket is configurable to several standard VDI/VDE mounting patterns.

- ① Arrange adjustable bracket feet for (80 x 30) or (130 x 30) mounting.
- ② Position bracket feet at desired height (20mm, 30mm, 40mm or 50mm).
- ③ Tighten the screws using a proper tool.



30mm bracket height

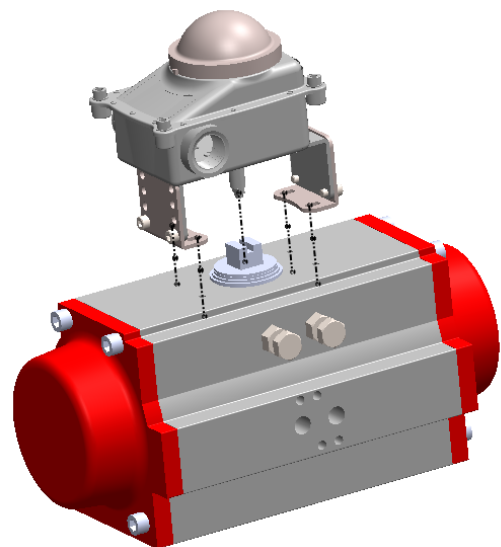
4.2. Mounting limit switch box



Caution: Do not attempt to work on limit switch box without first shutting off incoming power

- 4.2.1. Prior to mounting the limit switch, enclosure must be checked for any damage.
- 4.2.2. Damaged parts must be replaced with original spare parts.
- 4.2.3. Limit switch boxes are standard with a NAMUR shaft that enables direct attachment to actuator pinion without a coupler. These shafts feature a 4mm wide tang that engages the 4mm slot in NAMUR actuators.

- ① Check to be sure the drive slot on the top of the actuator and the shaft of switch box are the same direction.
- ② Ensure proper mounting configuration of bracket feet.
- ③ Tighten the bolts using the proper tool.
- ④ Check the assembly for proper operation.



4.3. Cam setting

4.3.1. The color of cams matches the position indicator to help set the cams easily without wiring diagram. Cams can be easily set without tools. APL series cams are splined and can be set by lifting up or pushing down on the cam to be set.

Self-locking, spring loading ensures cams never slip out of adjustment.

4.3.2. Loosen the captive cover bolts with an applicable tool. (Wrench or Screwdriver recommended)

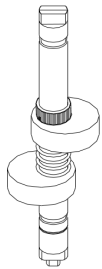
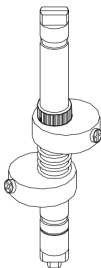
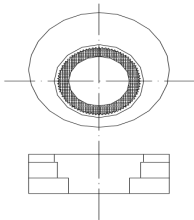
4.3.3. Remove cover carefully.

4.3.4. Open cam setting

- ① Operate the actuator to fully open position
- ② Lift the bottom green cam up and rotate it until the switch is activated.
- ③ Release the cam so it fits back over the cam gear.

4.3.5. Close cam setting

- ① Operate the actuator to fully closed position
- ② Push the upper red cam down and rotate it until the switch is activated.
- ③ Release the cam so it fits back over the cam gear.

Mechanical switches	Proximity sensors	Splined cam
		

4.4. Wiring



Danger: HAZARDOUS VOLTAGE. No electrical power should be connected until all wiring and limit switch adjustments have been completed.

4.4.1. APL limit switch box enclosure feature prewired switches. All user connections are made at a numbered terminal strip. A wiring diagram, located inside the cover, indicates which terminal numbers correspond to switch contacts, such as normally open (NO), normally closed (NC), etc. Follow the wiring diagram and electrical code to connect the switches to your system.

4.4.2. Solenoid valve may also can be wired through the APL enclosure. Two auxiliary terminals are typically included as standard.

4.4.3. APL limit switch box has two cable entries on the body. A blanking plug that meets the type of protection must be installed in unused cable entries. Cable gland is not supplied by TRIAC Controls and shall be provided by installer or user.

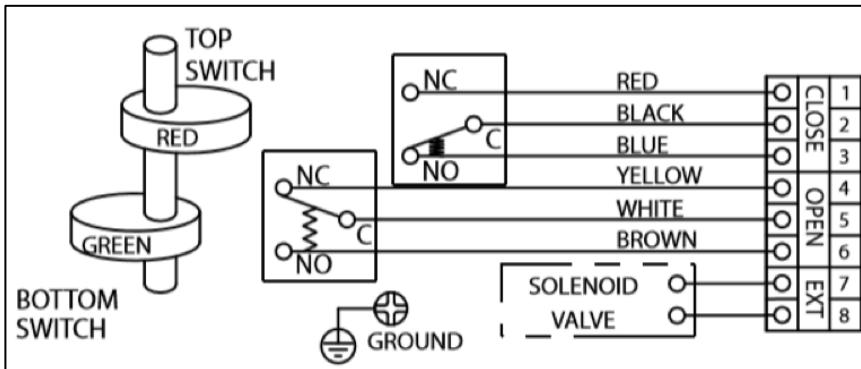


Note;

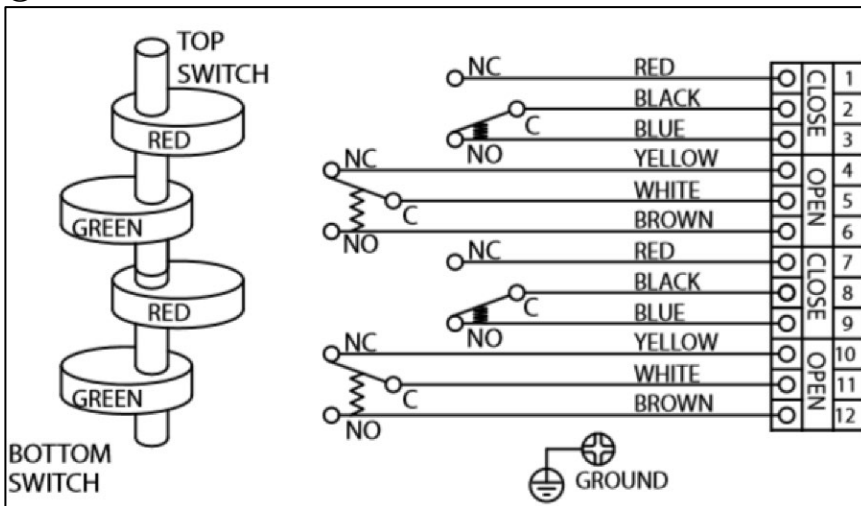
Grounding must be connected once all wiring had been completed.

Internal/External grounding wire square shall be min. 18AWG recommended

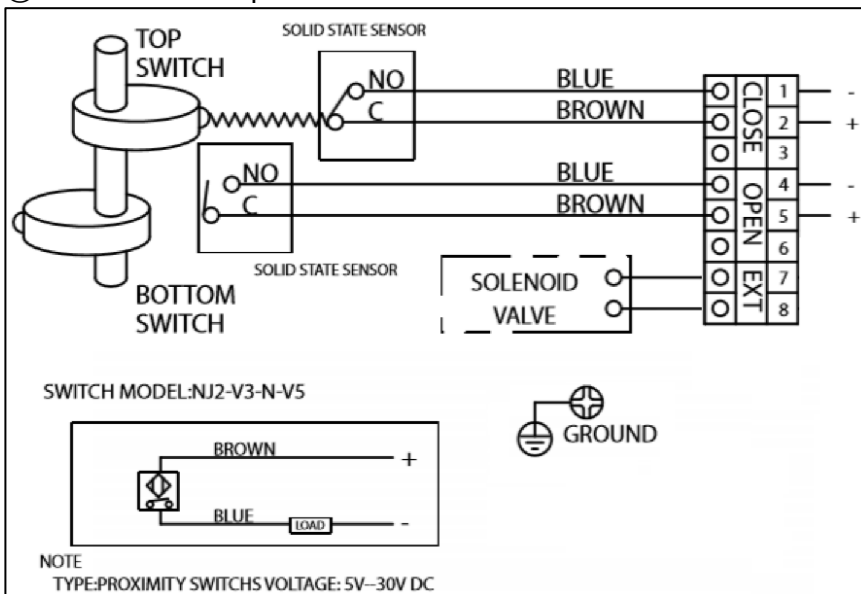
① 2 SPDT



② 4 SPDT



③ 2 NAMUR Output P&F NJ2-V3-N



5. Maintenance



Caution: Shut off incoming power and air supply on the valve actuator before maintenance of limit switch box.



Be sure that the area is clean before disassembly and maintenance of limit switch box.

Clean all parts and housing before reassembly.

- Refer to the part list when ordering replacement or spare parts.

5.1. Maintenance, under normal conditions at six-month intervals or 100,000 cycle operation.

When conditions are more severe, more frequent inspections may be required.

- ① Ensure valve actuator alignment
- ② Ensure wiring is insulated, connected and terminated properly
- ③ Ensure all screws are present and tight
- ④ Ensure cleanliness of internal electrical devices
- ⑤ Ensure conduit connections are installed properly and are dry
- ⑥ Check internal devices for condensation
- ⑦ Check enclosure O rings seals and verify that the O ring is not pinched between housing
- ⑧ Visually inspect during open/close cycle
- ⑨ Inspect identification labels for wear and replace if necessary



Warning;

Treat cover with care. Mating surfaces must not be damaged in any way.

6. Inspection

- 6.1. The limit switch box should be inspected upon receipt to ensure that no damage has been sustained on transit.
- 6.2. Check the item and quantity of products with packing list or related documents.
- 6.3. Check the limit switch box o-ring. Damage to it can cause the corrosion of internal parts.
- 6.4. Check the adjustment of cams and make sure they are securely held on the shaft gear.

7. Storage

The products must be stored in a clean, cool and dry area. The unit shall be stored with the cover installed and the conduit openings sealed with metal plugs. Storage must be off the floor, covered with a sealed dust protector.

8. Trouble shooting

The following instructions are offered for the most common difficulties encountered during installation and start-up.

Signal fails to main control room.

- ① Check wiring of limit switch box is in accordance with wiring diagram.
- ② Check if the cams or switches are damaged or broken.
- ③ Check the main signal wire from the terminal strip.
- ④ Check if the cams are set properly.
- ⑤ Adjust mounting of the limit switch box.

9. Tools

- ① 1 Set Metric Allen Key (Hex Wrench)
- ② Set Screw Drivers
- ③ 1 Set Metric Wrench
- ④ 1 Wire Stripper long Nose
- ⑤ 1 Needle nose plier
- ⑥ 1 Multi Meter (AC, DC, Resistance)
- ⑦ 1 4-20mA Loop Calibrator (if applicable 16 adapted)

10. Installation and Maintenance Tips

For any installation and maintenance work, the following should be observed:



Caution:

A regular inspection and maintenance performed by qualified and trained personnel.

When working in potentially explosive areas, observe the standard EN 60079-14 "Electrical Installations in Hazardous Areas".

Work at the open actuator under voltage must only be performed if it is assured that for the duration of the work there is no danger of explosion.

Observe additional national regulations.

- 10.1. Check the limit switch box visually. Ensure that no outside damage or changes are visible.
- 10.2. Check electric connecting cables and ensure they are without damage and are wired correctly.
- 10.3. Cable entries, cable glands, plugs etc. have to be checked for correct tightness and sealing.
- 10.4. Check whether enclosure connections are fastened correctly.
- 10.5. Take care of possible discoloration of the terminals and wires.
- 10.6. Check the enclosure joints for dirt and corrosion.
- 10.7. Ensure that all housing covers are handled carefully and that the seals are checked.
- 10.8. If defects which affect the safety are detected during maintenance, repair measures have to be taken immediately.
- 10.9. Any kind of surface coating for the mating surfaces between housing and cover is not permitted.
- 10.10. When exchanging parts, seals etc. only original TRIAC Controls spare parts shall be used.

A-T Controls product, when properly selected, is designed to perform its intended function safely during its useful life. However, the purchaser or user of A-T Controls products should be aware that A-T Controls products might be used in numerous applications under a wide variety of industrial service conditions. Although A-T Controls can provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser / user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of A-T Controls products. The user should read and understand the installation operation maintenance (IOM) instructions included with the product, and train its employees and contractors in the safe use of A-T Controls products in connection with the specific application.

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For product specifications go to <http://download.a-tcontrols.com/>

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