



AVID Z* Series
 ATEX/IECEX Certified – Ex ia
 Monitor and Control Monitor

INSTALLATION AND OPERATION MANUAL

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Revision History

Revision

8 June 2014, Initial release

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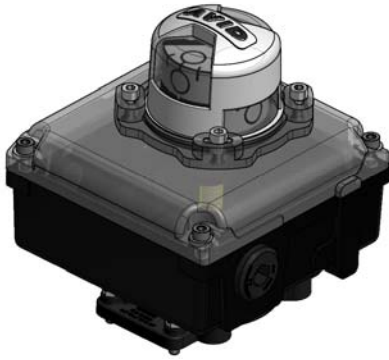
11 December, 2017 Rev. 4

Crane Co. Locations

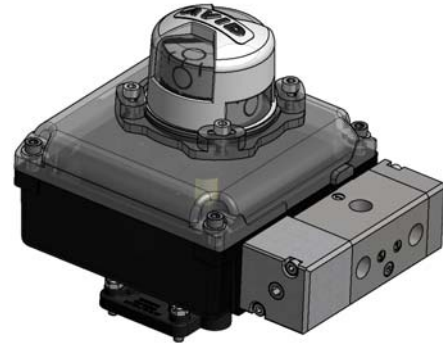
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AVID Monitor



AVID Control Monitor

1.0 Introduction.

This series of products are available in three materials, Grilamid TR90 UV (ZR), Aluminum (ZA) or Stainless Steel CF8M / 316 (ZS) and in two sizes of enclosure.

Both the Z* series Monitor and Control Monitors provide end of travel indication by the means of either electrical switch or inductive sensors mounted within the enclosure. These are activated by cams / triggers mounted on the rotary shaft. The Monitor enclosure construction comprises of a shaft passing through the enclosure housing and cover (when fitted with visual indicator). The two part enclosure has an integral gasket seal and the shaft has up to two 'O'ring seals in the bearing areas.

The Z* Control Monitor has, located within the enclosure, up to two solenoid coils to operate / control process actuators or cylinders, either double acting or spring return, depending on the model ordered.

The Monitor has the option of up to three entries for connection to an external power source in the smaller enclosure and up to five in the larger enclosure. The Control Monitor has two or three respectively depending on whether the one or two coils are selected.

The sizes available are; M20 x 1.5p, M25 x 1.5p, 1/2"-14NPT, 3/4"-14 NPT, Pg13.5 or any other suitable thread that can maintain IP6X ingress rating.

2.0 Product Certification.

<p>CE Ex ia II* T* G* Ex tb IIIC T135°C Db IP6X Tamb -*°C TO +*°C IECEx SIR 09.0062X</p>	<p>CE_{nnnn} Ex II* GD Ex ia II* T* G* Ex tb IIIC T135°C Db IP6X Tamb -*°C TO +*°C SIRA 09 ATEX 2148X</p>
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This equipment may be used in a CAT 1, 2 or 3 Gas and CAT 2 or 3 Dust environments with apparatus groups covering IIA, IIB and IIC (dependent on internal components).

The AVID Monitor & Control Monitors are certified to temperature classes between T1 through to T4 or either T5 or T6 internal component dependent. The maximum ambient temperature range is -40 to +60°C (dependent on enclosure material and internal components).

NOTE – There are low temperature constructions approved to be used at -50°C or -60°C to +*°C when used with certain inductive proximity sensors and seal material(s) when installed in metallic enclosures only.

3.0 Warnings.

NOTE: Before installation of this product, please ensure that the product and its certification is suitable for the intended application.

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection provided by the equipment is not compromised.

The installer shall ensure compliance to the certificate conditions for each of the certified components installed.

All components installed shall be treated as separate intrinsically safe circuits.

When the enclosure is manufactured from aluminium ignition sources due to impact and friction sparks may occur.

This shall be considered when the monitor is being installed, particularly in locations that specifically require Group II, Category 1G equipment.

The maximum dust layer shall be no greater than 5mm (T₅ 135°C).

WARNING: POTENTIAL ELECTROSTATIC CHARGING HAZARD - clean only with damp cloth.



This symbol warns the user of possible danger. Failure to heed this warning may lead to personal injury or death and/or severe damage to equipment.



This symbol identifies information about operating the equipment in a particular manner that may damage it or result in a system failure. Failure to heed this warning can lead to total failure of the equipment or any other connected equipment.



Note

This symbol draws attention to information that is essential for understanding the operation and/or features of the equipment.

4.0 Mounting Instructions.

Required Tools: Only use spanners of the correct size or an adjustable spanner to fit hex head bolts in the mounting kit.

4.1 Direct Mount.

- 4.1.1 Select the correct actuator drive adaptor to suit the actuator pinion and insert the 11mm A/F in the correct position and press down.
- 4.1.2 Orientate the AVID Position Monitor and locate the Modmount drive coupler into the actuator drive adaptor. Press down so that the Modmount is fully seated on the actuator mounting face.
- 4.1.3 Using an 8mm A/F spanner, secure the assembly taking care not to exceed the torque specified on the bracket. See Figure 1.

4.2 Namur Mount.

- 4.2.1 Obtain a mounting kit suited for the actuator/valve, commonly available through a local Pentair distributor.
- 4.2.2 Attach the mounting bracket and coupler (if required) to the unit housing with the hardware provided. Typical actuator hardware is M5 (8mm A/F) and monitor mounting M6 (10mm A/F) or M8 (13mm A/F).
- 4.2.3 Attach the unit and mounting system to the actuator. See Figure 1.
- 4.2.4 Ensure axial alignment between unit shaft, coupler and actuator shaft. Failure to correctly align could result in long-term stress-related failure of unit shaft in high cycle or high torque applications.



Before stroking the actuator to the fully closed position, please ensure that the process is safe to do so.

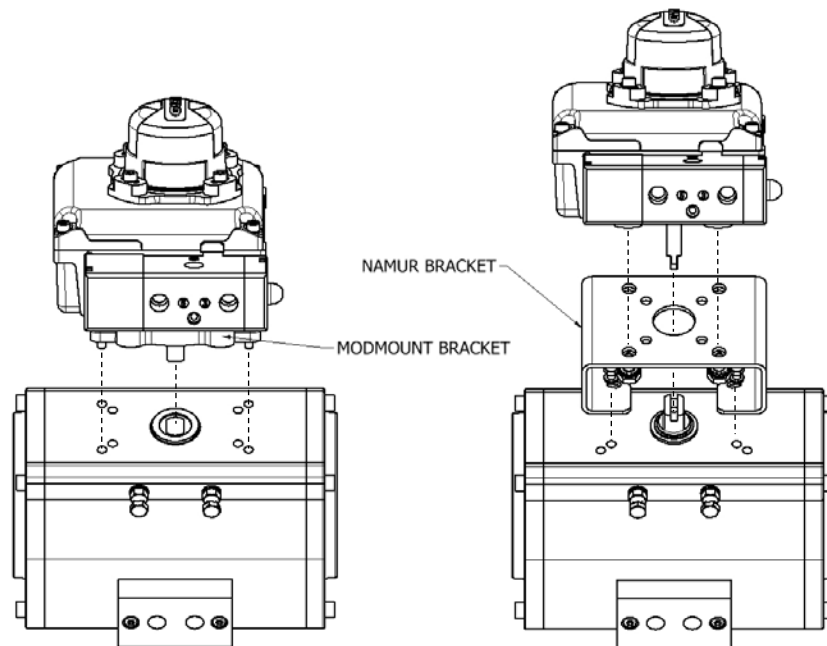


Fig 1

5.0 EaziFix Cam Settings.

- 5.1 To release the cover, loosen the cover retaining screws using a 4mm A/F Allen Key. Lift the cover and twist approx 45° and remove. See Figure 2 below.

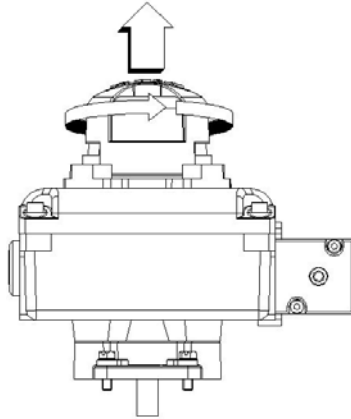


Fig 2

- 5.2 To set switches, lift the bottom EaziFix cam and turn until the switch has activated and then release. The spring will push the EaziFix cam back onto the splined shaft.



Before stroking the actuator, please ensure that the process is safe to do so and that all hands are kept away from the moving shaft / cams.

- 5.3 Stroke the actuator to the opposite end of travel. Set the top EaziFix cam by pushing down and turning the EaziFix cam until the switch is activated.
- 5.4 Stroke the actuator from one end of stroke to the other several times to check the switch operation. If the switches require adjustment, repeat steps 5.2 to 5.3.

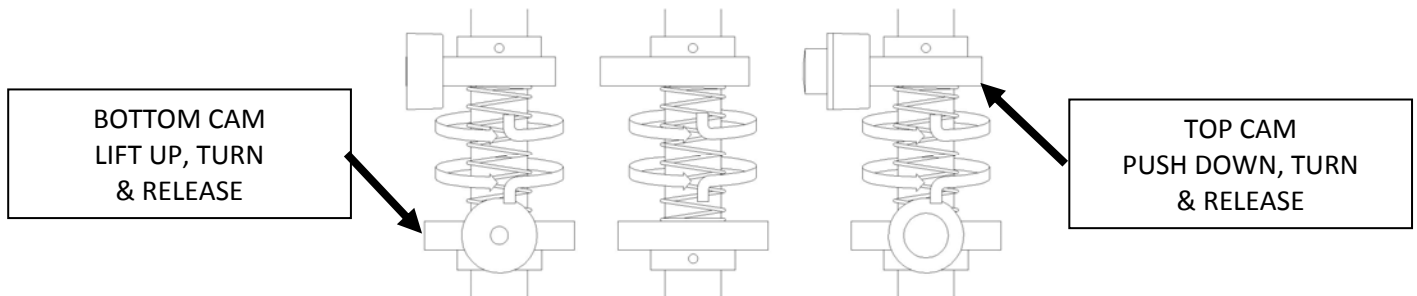


Fig 3

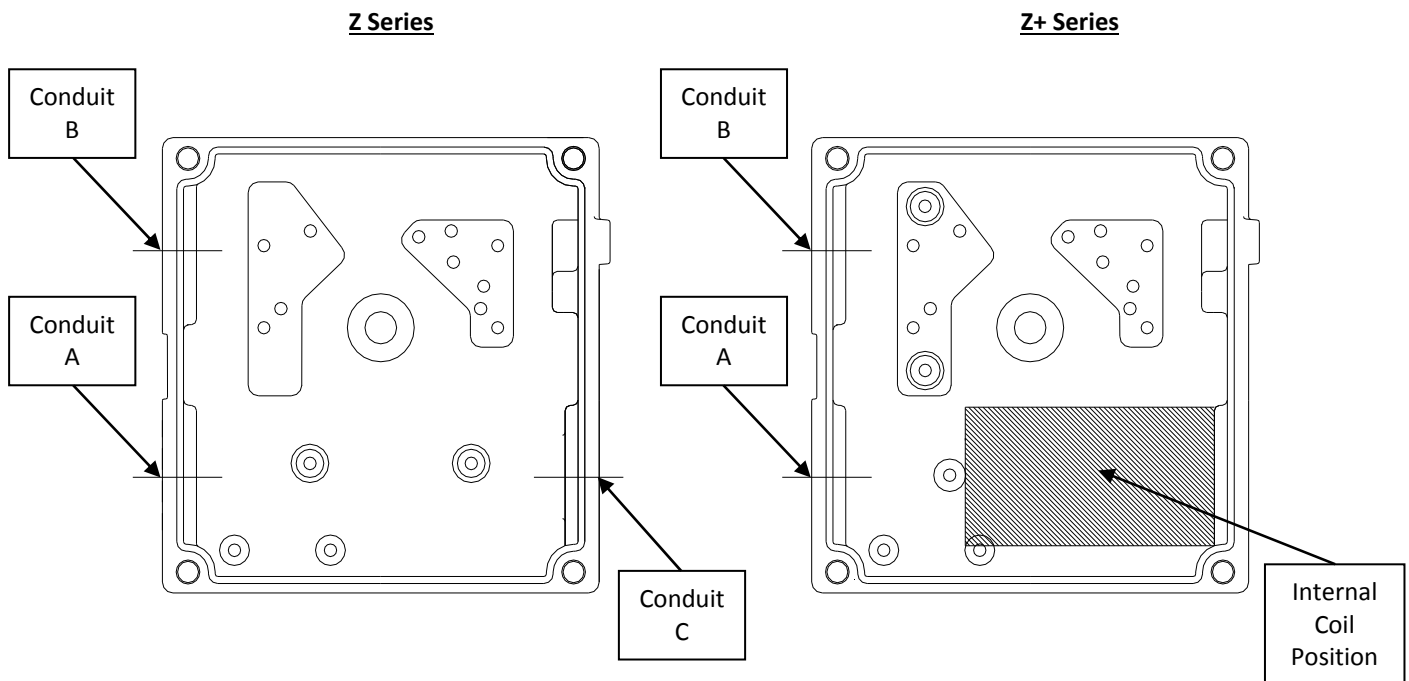
6.0 Field Wiring & Installation.



WARNING: The Z* series should always be handled with care when the cover is removed.

NOTE: Before electrical installation, please read and follow the wiring diagram located inside the cover. The electrical ratings can be found on the product I.D label.

- 6.1 Field wiring must be carried out in accordance with site, local and national electrical codes / requirements. This includes special attention to earth bond to the Aluminium or Stainless Steel enclosure using the internal and external earth points provided.
- 6.2 Installation of this product shall be carried out by competent personnel in accordance with the applicable code of practice such as 60079-14.
- 6.3 The Z series housing can offer up to three conduit entries whereas the Z+ series can offer up to two entries of the following thread sizes; M20 x 1.5p, M25 x 1.5p, ½"-14 NPT or ¾"-14 NPT. The entries are detailed on the product ID label found on the product cover. Please see below the designated conduit location.



- 6.4 The certification applies to equipment without cable glands. When mounting the enclosure in the hazardous area, only suitably rated IP 66 / 67 ATEX / IECEx (dependent on scheme) certified glands **must be used**.
- 6.5 All unused cable entries **must** be plugged with a suitably rated IP 66 / 67 ATEX / IECEx (dependent on scheme) certified blanking devices.
- 6.6 The first two digits of the nomenclature signify the series. As standard the Z* product is supplied with a HiVue visual indicator and the enclosure material is Grilamid.
Z*-*B2**BD00-** is a typical code where digit 4 would signify if a transmitter is fitted, digits 7 & 8 are the switch / sensor options and digits 14 & 15 indicate any special feature such as alternative indicator material or enclosure size.

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The table below details the applicable ambient ranges for certified components.;

Equipment	Tamb (Ta) Range	
Inductive Proximity Sensor (IFM) Type: NS5002 (PTB 01ATEX2191) (IECEX BVS 06.0003)	ATEX (1G)	(T6) -20°C to +55°C
		(T5) -20°C to +60°C
	ATEX (2G)	(T1 - T6) -20°C to +60°C
	IEC	-20°C to +60°C
Inductive Proximity Sensor (TURK): Sensors Type Group A (KEMA 02ATEX1090X) (IECEX KEM 06.0036X)	-25°C to +60°C	
Cylindrical Inductive Sensors (P+F) Types NC and NJ (PTB 00ATEX2048X) (IECEX PTB 11.0037X)	-40°C to + °C (* See certificate ≤ +55°C)	
Cuboidal Inductive Sensors (P+F) Types FJ, NJ, and NC (PTB 00ATEX2032X) (IECEX PTB 11.0021X)	-40°C to + °C (* See certificate ≤ +55°C)	
SN-Sensors (Pepperl + Fuchs) Types NJ and SJ (PTB 00ATEX2049X) (IECEX PTB 11.0092X)	-40°C to + °C (* See certificate ≤ +55°C)	
Slot-type Indicators (Pepperl + Fuchs) Types SJ and SC (PTB 99ATEX2219X) (IECEX PTB 11.0091X)	-40°C to + °C (* See certificate ≤ +55°C)	
T-Switch Proximity Switch (ATEX & IECEX)	(T1 - T4) -40°C to +60°C	
	(T5) -40°C to +45°C	
V3 Micro Switches (ATEX & IECEX)	(T1 - T4) -40°C to +60°C	
	(T5) -40°C to +45°C	
CS Transmitter (ATEX & IECEX)	(T1 - T4) -20°C to +60°C	
RS Transmitter (Bourns Type 3852C) (ATEX & IECEX)	(T1 - T4) -20°C to +60°C	

Equipment	Tamb (Ta) Range
SOLENOID (NASS) TYPE: 1259 (PTB 02 ATEX 2154) (IECEX PTB 08.0023)	(T1 - T4) -40°C to +60°C
	(T6) -40°C to +50°C
PIEZO VALVE (ASCO) TYPE: 63000#### (IBEXU 01 ATEX 1060X) (IECEX IBE 13.0011X)	(T1 – T6) -20°C to +50°C
SOLENOID (PNEUMATROL LTD) TYPE: EP000/ia (BAS 01 ATEX 1391X) (IECEX BAS 05.0040X)	(T1 – T6) -40°C to +60°C

NOTE : 1) The maximum upper ambient temperature of the equipment when installed with P&F sensors is dependant on its certificate parameters with regards to 'T' class and barrier type. The maximum upper ambient temperature shall not be considered to be higher than the following limits:-

ZR Small Grilamid enclosure = +55°C
 ZS Stainless Steel, ZA Aluminium & ZR larger enclosure = +60°C.

Metal enclosures are rated for -50°C if; enclosure contains either **SJ3,5-SN, NJ4-12GK-SN or NJ10-30GK-SN** sensors only. No other certified proximity switch / sensor, solenoid valve or transmitter specified in

SIRA certificates SIRA 09 ATEX 2148X and IECEX SIR 09.0062X only Buna-n, Silicone, Fluorosilicone, EPDM 'O' ring and gaskets only.

For -60°C, **only** Silicone seals and gaskets shall be used.

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- 2) If the CS or RS transmitter is used in conjunction with any switches, sensors or solenoids then the max surface temp for gas and dust shall be shown on the label.

6.7 The electrical rating of the internal components is as follows;

Switch Type	Electrical Rating	CAT N°
V3 Mechanical SPDT Gold Plated – Simple Apparatus.	U _i = 30V, I _i = 100mA, P _i = 1W, C _i = 10nF, L _i = 10 μH	1
T-Switch - Proximity Switch – Simple Apparatus.	U _i = 30V, I _i = 100mA, P _i = 1W, C _i = 10nF, L _i = 10 μH	1
CS Transmitter	U _i = 28V, I _i = 100mA, P _i = 0.75W, C _i = 68.3nF, L _i = 0 μH	1
RS Transmitter (Bourns type 3852C)	U _i = 28V, I _i = 100mA, P _i = 0.75W	1
IFM NS5002 (BVS 04 ATEX E153) Ex ia IIB only*	U _i = 15V, I _i = 50mA, P _i = 120mW, C _i = 80nF, L _i = 110 μH	1

* IFM NS5002 – for IIC gas group drop to CAT 2.

Turck Sensors –
 Certificate Number KEMA 02 ATEX 1090X
 All sensors “Type Group A” Certified to
 II 1G Ex ia IIC T6
 -25 to +60°C
 U_i = 20V, I_i = 60mA, P_i = 200mW, C_i = 150nF, L_i = 150μH

Coil Max Entity Parameters: U_i = 28V, I_i = 115 mA, C_i = 0mF, L_i = 0mH (NASS) or V_{max} = 35V, I_{max} = 300mA, C_i = 0mF, L_i = 0mH, P_{max} = 2.98W (Pneumatrol Ltd)

- 6.8 Before replacing the enclosure cover, ensure that both of the housing and cover sealing surfaces are clean and undamaged. Tighten the cover screws hand tight using a 4mm A/F standard Allen key.

7.0 Operating and Maintenance Instructions for AVID Solenoid Valve.

7.1 General Description

- 7.1.1 The AVID solenoid valve incorporates elastomer static seals through which a shaped spool moves and are manufactured for 3 or 5 way operation. 3 way is normally used for pilot control of the other relay valves or for the operation of single acting cylinders. 5 way is normally used to control the action of double acting cylinders. The seal spacer assembly forms individual annular chambers opposite each valve port and the grooved spool either closes or allows flow between adjacent chambers, hence the position of the spool determines which ports are open or closed.

The spool is moved by way of a manually or mechanically operated mechanism normally against a return spring. Operation may be by application or removal of a pilot air supply acting as a pilot piston. This form of control is utilized for electrical actuation where integral solenoid valves control the pilot air supply.

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7.1.2 Optional Features.

No-Voltage Release (Latching)

With the coil first energized, the palm button is then manually moved and latched. The inward movement of the palm button causes the valve to shift. When the coil is de-energized, the palm button and latching mechanism are automatically tripped, allowing the valve to return to its original position. See Fig. 1

Manual Locking Override

Manually depress palm button and rotate clockwise for maintained condition, must manually disengage to return to original position. See Fig. 2

Momentary Override

Spring return momentary push type, must hold in to actuate. See Fig. 3

Hex Drive Maintained Override

Insert allen key in hex head screw and rotate clockwise (4-5 turns) to shift spool. Valve will stay put until hex head screw is rotated counter clockwise (4-5 turns) back to original position. See Fig. 4

D/C - Dual Coil Option

Five way valves are available with a coil/pilot valve on each end of the AVID valve, coil "A" and coil "B".

When coil "A" is energized the valve will shift. If coil "A" is then de-energized, the valve will remain in this position.

The valve will not return to the original state until coil "A" is de-energized and coil "B" is energized.

The process is the same for coil "B".

Fig 4

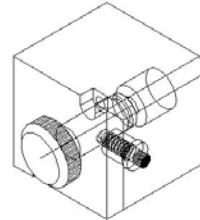


Fig 5

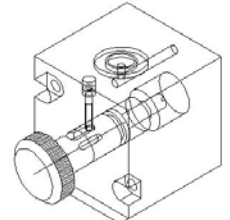


Fig 6

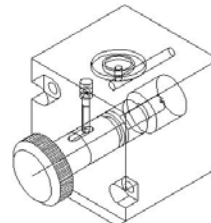
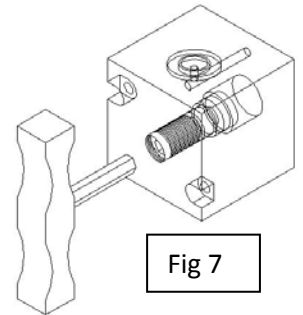


Fig 7



NOTE - For Dual Coil Valves

The valve may be in either position upon installation. Refer to the Air Flow Diagrams and energize the appropriate coil (with air) to reset valve to the desired position.

Dual coil valves require both an electrical signal and air pressure to operate. See Air Flow Diagram for air pressure requirements.

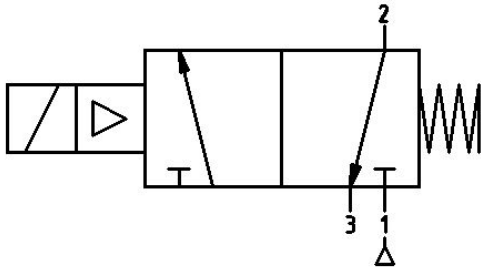
If either or both inputs are lost the valve will remain in its current position.

Both coils should never be energized simultaneously.

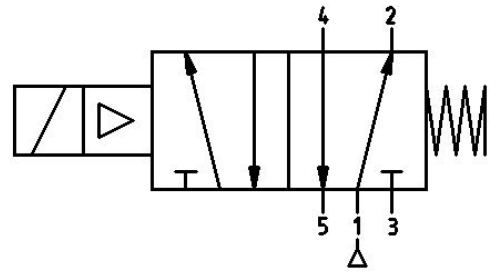
7.2 **Specifications**

Operating Pressure: 45-140 PSIG
 Operating Media: Non Lubricated Filtered Air to 20 Microns

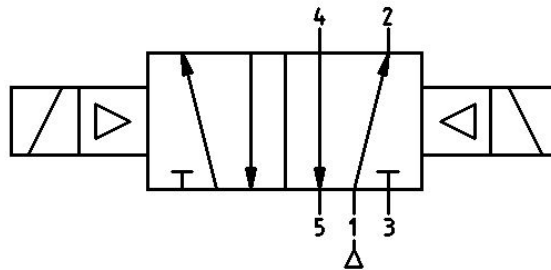
7.3 **Pneumatic Porting Configurations**



3/2 Spring Return Valve.
Description of Operation:
Solenoid De-Energised -
 Air flows from Outlet Port 2 to Exhaust Port 3.
Solenoid Energised -
 Air flows from Inlet Port 1 to Outlet Port 2.



5/2 Spring Return Valve.
Description of Operation:
Solenoid De-Energised -
 Air flows from Inlet Port 1 to Outlet Port 2 and exhausts from Port 4 to 5.
Solenoid Energised -
 Air flows from Inlet Port 1 to Outlet Port 4 and exhausts from Port 2 to 3.



Dual Coil Valve.
Description of Operation:
Coil B De-Energized -
 Air flows from Inlet Port 1 to Outlet Port 2 and exhausts from Port 4 to 5.
Coil 'A' Energized -
 Air flows from Inlet Port 1 to Outlet Port 4 and exhausts from Port 2 to 3.

7.4 **(Air Line) Installation Considerations.**

Air Mains and lines should be large enough to avoid excessive pressure loss under conditions of maximum flow.

Air lines should be installed with as few restrictions as possible if the cost of compressed air is to be kept to a minimum. Sharp turns in piping should be avoided for more efficient air flow and economical air power.

It is advisable to pitch the mains in the direction of air flow so that both gravity and air flow will carry the water to traps or water legs located at frequent intervals.

To help in preventing condensed moisture from reaching the point of usage, down pipes should never be taken directly from the bottom of air pipes or mains. Connection should be made at the top of the main and a long radius return bend used.

7.5 **Air Flow.**

Pipe sizes are normally determined on semi empirical lines, basis for selection being an acceptable pressure drop e.g. not more than 10% of the applied pressure. In sizing pipes, consideration should be given to likely future demands, as a system will be inefficient if the demand outgrows the supply. It is always better to over size mains as this will reduce air velocity and make water separation more effective.

7.6 **Air Service Equipment.**

The importance of proper filtration (20 Micron) and lubrication of the air supply to pneumatic equipment can never be over-emphasized as a means of decreasing friction and preventing corrosion and wear due to moisture and abrasive solids being present in the air supply.

At higher pressures than recommended, pneumatic equipment can wear excessively with no significant increase in output and compressed air is consequently wasted.

There is much to be gained, therefore, from providing pneumatic equipment with serviced air by including suitable airline filters, pressure regulators and lubricants in the installation.

7.7 **Tubes and Fittings.**

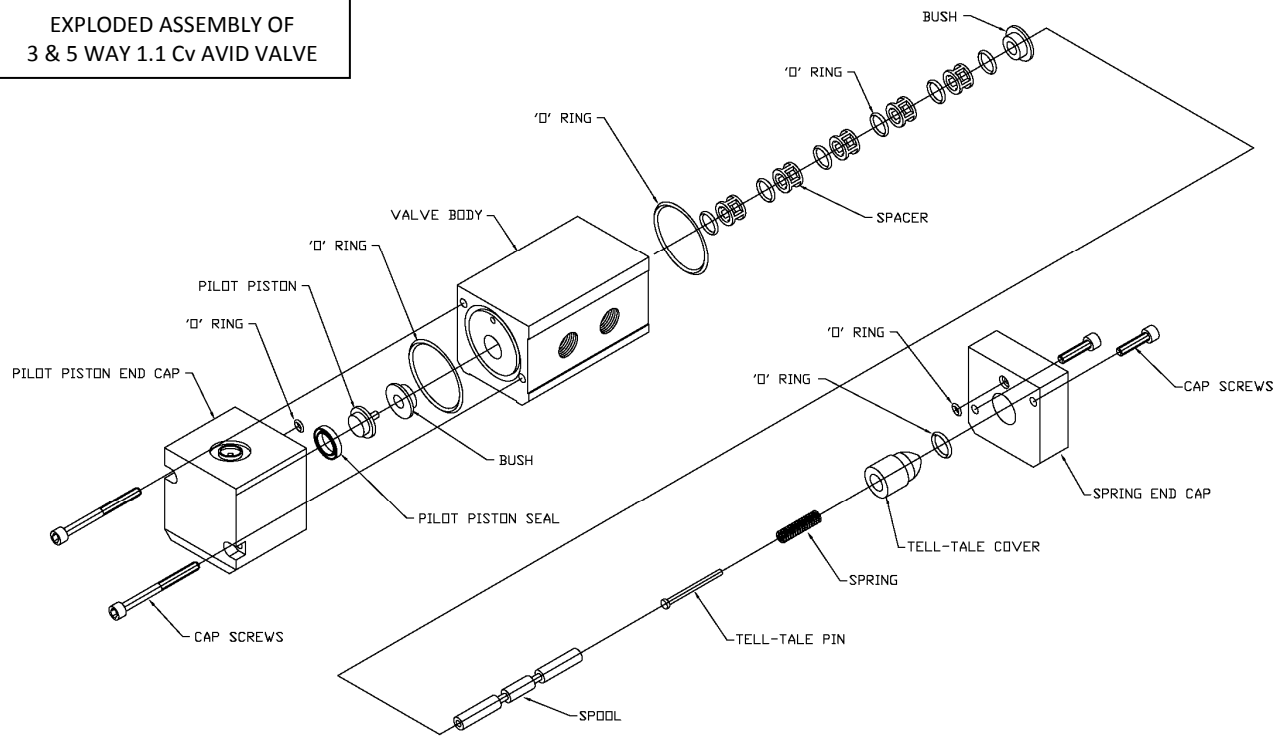
The use of copper, stainless steel, nylon or polyethylene tube is recommended for piping up air circuits and equipment. As a general rule, pipe threaded fittings should not be assembled to a specific torque because the torque required for a reliable joint varies with thread quality, port and fitting materials, sealant used, and other factors.

The suggested method of assembling pipe threaded connections is to assemble them finger tight and then wrench tighten further to a specified number of turns from finger tight.

The assembly procedure given below is for reference only, the fitting should not be over tightened for this will lead to distortion and most likely, complete valve failure.

1. Inspect port and connectors to ensure that the threads on both are free of dirt, burrs and excessive nicks.
2. Apply sealant/lubricant or Teflon tape to the male pipe threads. With any sealant tape, the first one or two threads should be left uncovered to avoid system contamination.
3. Screw the connector into the port to the finger tight position.
4. Wrench tighten the connector approximately 1 - 2 turns (to seal) from finger tight. Again this is only reference – the fitting should NOT be over tightened

EXPLODED ASSEMBLY OF
3 & 5 WAY 1.1 Cv AVID VALVE



8.0 Product Repair & Service.

- 8.1 It is recommended that a periodic visual and operation evaluation is carried out of the Monitor / Control Monitor at least once a year or every 1 million cycles. If the shaft requires lubrication then a suitable (NLGI 2) rated grease such as Rocol Sapphire Lo Temp 2 should be used. Please note that if any other lubricant other than Rocol Sapphire Lo Temp 2 then is shall be compatible with the shaft 'O'ring material.
- 8.2 For Control Monitors ONLY - It is recommended that a periodic visual and operation evaluation is carried of the Control Monitor AVID solenoid valve at least once a year or every 1 million cycles. If the spool & seals require lubrication then use Molykote 55 grease.
- 8.3 Inspection of this product shall be carried out by periodically by suitably trained personnel in accordance with the applicable code of practice such as 60079-17 to ensure that it is maintained in a satisfactory condition.
- 8.4 The equipment is not intended to be repaired by the user. The repair of this equipment is to be carried out by the manufacturer, or their approved agents, in accordance with the applicable code of practice such as 60079-19.
- 8.5 The equipment contained within this product can be replaced with like for like parts / assemblies ONLY.
- 8.6 The certification of this product has been approved based on the material of construction as per the drawings listed in the schedule within this certificate. Any replacement parts that are not made in accordance to the listed drawing will invalidate the approval / certification.
- 8.7 Replacement parts must be purchased through Crane Co. or via an approved AVID distributor.

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Crane Co. Customer Satisfaction Questionnaire.

In a continuous effort to improve our products and service to our customers, we would appreciate a small moment of your time to complete the following questions about your recent purchase;

Rating us from 1 to 10 (1 being poor and 10 excellent) please indicate your perception of our performance.
Thank you, your feedback is essential to our improvement and success.

How Do You Rate....

		10	9	8	7	6	5	4	3	2	1
1	Quality of the product? Comments -										
2	Use of this IOM? Comments -										
3	Ease of use of this product? Comments -										
4	Crane Co. as a manufacturer? Comments -										
5	Delivery leadtime? Comments -										
6	Condition of product received? Comments -										

If you have any other comments, please indicate below;

Company :
Customer Name :
Position :
Date :
Please fax completed questionnaires to +1-201-794-0913