

# INJN/VSN/VS RN Assembly Manual

<b><u>Table of Contents:</u></b>	<b><u>Page</u></b>		<b><u>Page</u></b>
<b>System General operation .....</b>	<b>1</b>	<b>Bleeding/Priming System .....</b>	<b>5</b>
<b>Control Configuration .....</b>	<b>1</b>	<b>Fill Lubricant Lines .....</b>	<b>5</b>
<b>VSN Manifold Assembly .....</b>	<b>2</b>	<b>INJN/VSN/VSRN Model Code .....</b>	<b>6</b>
<b>w/ INJN assembly .....</b>	<b>3</b>	<b>Injector Description/Operation .....</b>	<b>7</b>
<b>VSRN Assembly.....</b>	<b>4</b>	<b>INJN/VS/VSR Tech Data.....</b>	<b>8</b>
<b>Tube Connections .....</b>	<b>5</b>	<b>INJN/VS/VSR Spare Parts List .....</b>	<b>8</b>
		<b>VS/VSR Cable Assemblies .....</b>	<b>9</b>

### System General Operation:

Inlet air supply flows through a 5 micron filter and is controlled by an integrated solenoid valve. The valve (injector valve) is used to supply air pressure to a positive displacement injector. The positive displacement injector has a known volume and when pressurized (“fired”), lubricant is dispensed out of the metering chamber, through the injector check valve and into the downstream nozzle oil line.

### Control Configuration:

**Below is a brief description of control requirements necessary to properly run the VSN assembly.**

### Definitions:

**DWELL TIME:** Duration that the injector valve is activated.

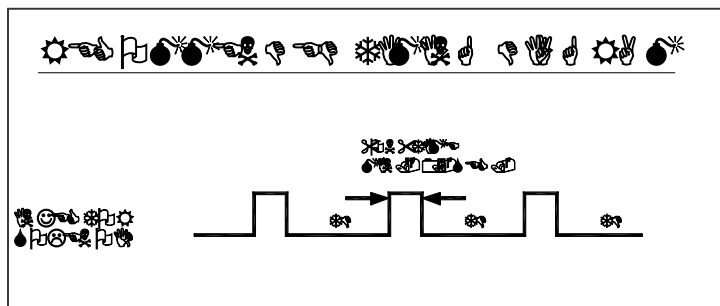
**OFF TIME:** Duration that the injector valve is deactivated.

**INJECTOR CYCLE TIME:** Duration of complete cycle (i.e. Cycle Time = Dwell Time + Off Time)

- 1). **Constant power supply for level and pressure switch fault indicator.**  
(Reference system prints for power requirements.)
- 2). **Injector air valve timing signal.** Signal should be cycled “On/Off” according to the timing diagram shown in Fig. 1. (Note: Dwell time should be set for a minimum time of 0.5 seconds.)

**Reference print #570-89499 for solenoid cable detail.**

**Fig. 1: Timing configuration for VSN Manifold Assembly**

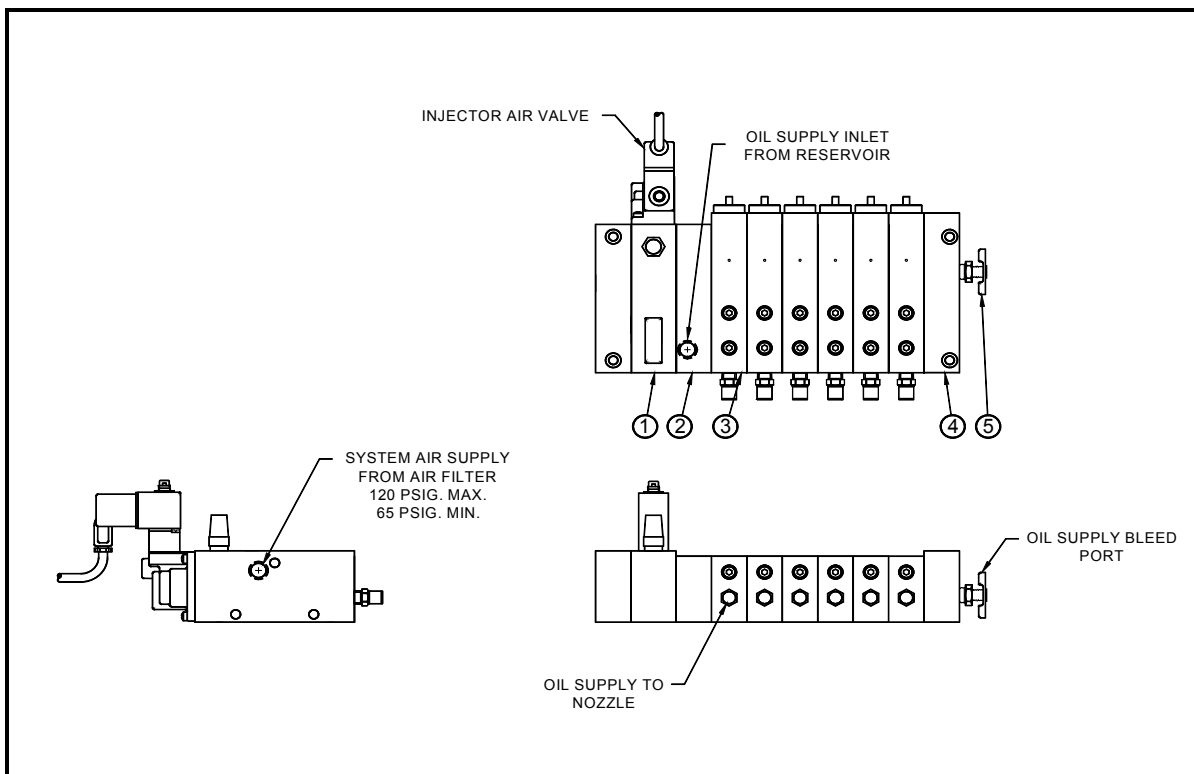


### VSN Manifold Assembly

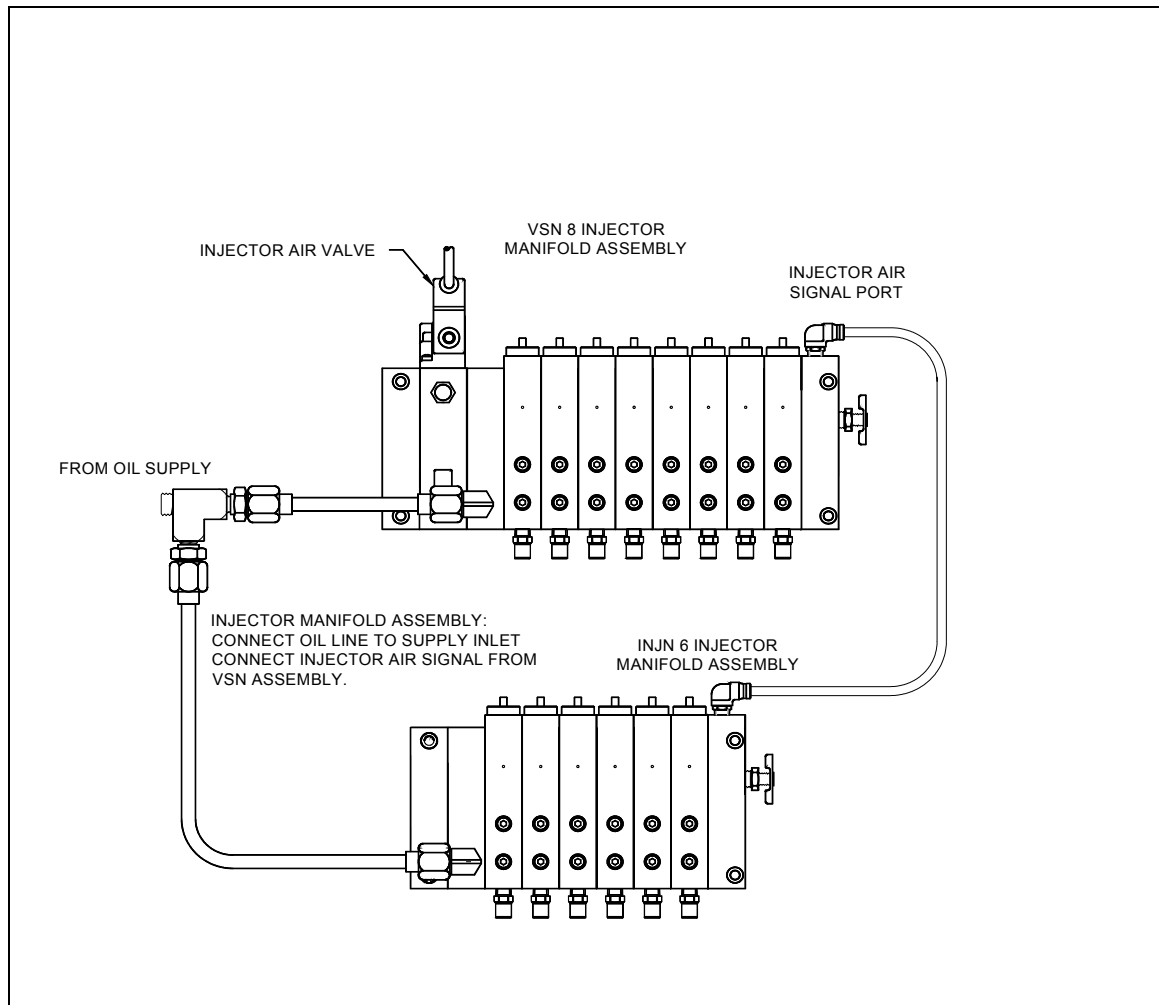
The VSN Manifold assembly is a self contained modular unit that uses a solenoid valve to control the injector air supply as well as the regulated air supply for the nozzle assembly (Ref. Fig. 2).

- a). Injector Solenoid valve (1): This is the first valve in the stack and its sole purpose is to provide a pulsed air signal to the injector.
- b). The following block is the oil feed block (2), receiving oil from the reservoir and feeding all following injectors.
- c). The injector block (3) mainly consist of a positive displacement injector. The pulsed air signal (from the injector solenoid valve) drives a piston-pin assembly forward into an oil-metering chamber. The piston-pin assembly pressurizes the oil, overcoming an integral outlet check valve assembly and oil is dispensed (reference Injector operation section for more information).
- d). The manifold end plate (4), contains the bleed pet-cock (5) and auxiliary ports to run the injector air signal to an external injector assembly.

**Fig. 2: VSN Manifold Single Network with Six Injectors**

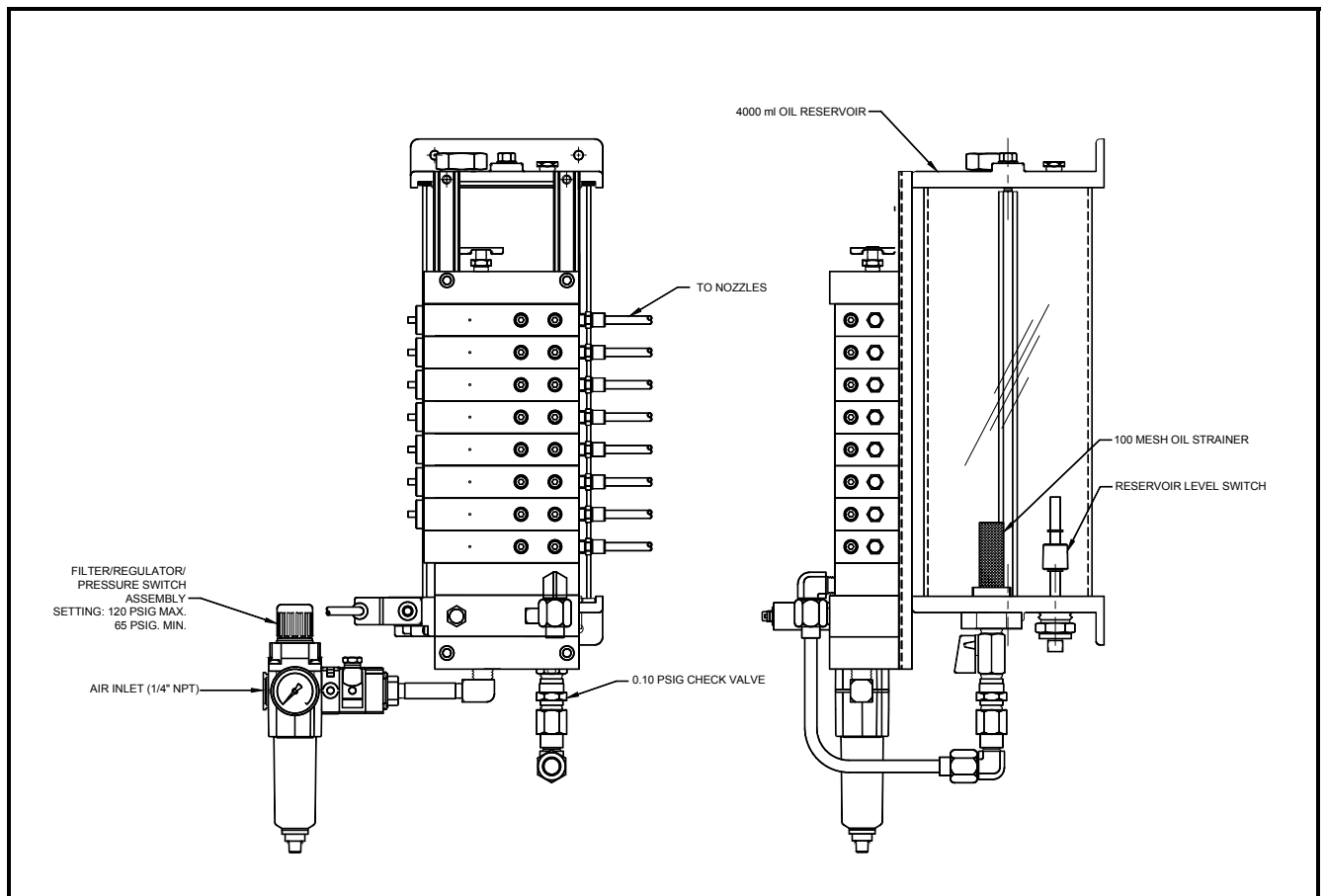


**Fig. 3: VSN Manifold Single Network Assembly with Eight Injectors**  
**INJN Manifold Assembly with Six Injectors**



**For applications requiring more than eight injectors, the VSN manifold end cap can be utilized to run the injector air signal to an additional bank of injectors.**

**Fig. 4: VSRN Assembly w/ Manual Fill Reservoir and VSN Manifold assembly with Eight Injectors**



#### **VSRN Assembly**

The VSRN assembly contains the modular VSN Manifold integrated with a 4000 ml oil reservoir and a filter/pressure switch assembly. The reservoir contains a low level switch and integral oil strainer (100 mesh) with a check valve on the outlet to prevent back flow from the VSN assembly to the reservoir.

## Lubrication Systems

**Tubing Connections:** Reference system part number for type of tubing.

### **Nylon Tubing:**

- Lubricant line: 3/16" O.D.
- Ensure that the tube end is cut square and free from burrs.
- Push the tube end through the collet into the fitting.
- Continue pushing the tube firmly through the O-ring until it bottoms out on the tube stop, then pull back.
- To disconnect, push the tube into the fitting until it bottoms out on the tube stop. Then, while holding down the collet, withdraw the tube.
- Run feed lines from the system in such a manner to avoid damage due to friction or vibration.
- Do not connect the feed lines at this time.

### **Steel Tubing:**

- Cut tubing square with a tube cutter or fine-tooth hacksaw.
- Lightly deburr the I.D. and O.D. of the tube end to remove burrs and sharp edges.
- Slip nut and ferrule over deburred tube end. Be sure the long, straight end of the ferrule points toward the tube end.
- Hold tube steady against internal shoulder of fitting body and tighten nut.
- Loosen nut and check for proper set (i.e make sure ferrule is secured to tube). Avoid rotating the ferrule.

### **Bleeding/Priming System:**

- Open the ball valve (located on the reservoir bottom plate) to allow lubricant to fill the system.  
Note: Handle on the ball valve should be inline with the tubing.
- Open the bleed pet-cock valve, located on the VS manifold assembly end cap.
- Allow oil to drain until no air is present, then close pet-cock.
- Manually cycle the injectors: Push in on the injector adjustment cap, starting with the injector closest to the oil feed block. Repeat until lubricant is observed in the feed line.
- Repeat process to each injector.

### **Fill Lubricant Lines:**

- Cycle system until lubricant reaches nozzle position.
- Continue to cycle (to purge tubing of all contaminants).
- Monitor progress. Note: If injectors are not delivering, repeat bleed process.
- Adjust injector output for desired volume.

### Product Type

Valve Stack .....VSN  
Valve Stack With Reservoir .....VSRN  
Injector Stack Only.....INJN

### Voltage

120 VAC .....A  
220-240 VAC, 50/60Hz .....B  
**24 VDC (European Version Only)\*--see below** .....C  
24 VDC.....D  
No Solenoid (INJ only) .....X

**Millennium Timer Options** {connector timer}      *Operating Range*  
Continuous (1) MCT 120V; (2) MCT 240V; (3) MCT 24VDC (2.1 to 200 seconds)  
Continuous (4) MPT 120V; (5) MPT 240V; (6) MPT 24VDC (0.5 to 5 seconds)  
Continuous (7) MCT 120V; (8) MCT 240V; (9) MCT 24VDC (4 to 400 seconds)

### Injector Size

Half-Drop Injector .....H  
Two-Drop Injector .....T

### Number Of Injectors

Range from "1" to "8".....

### Fitting Location

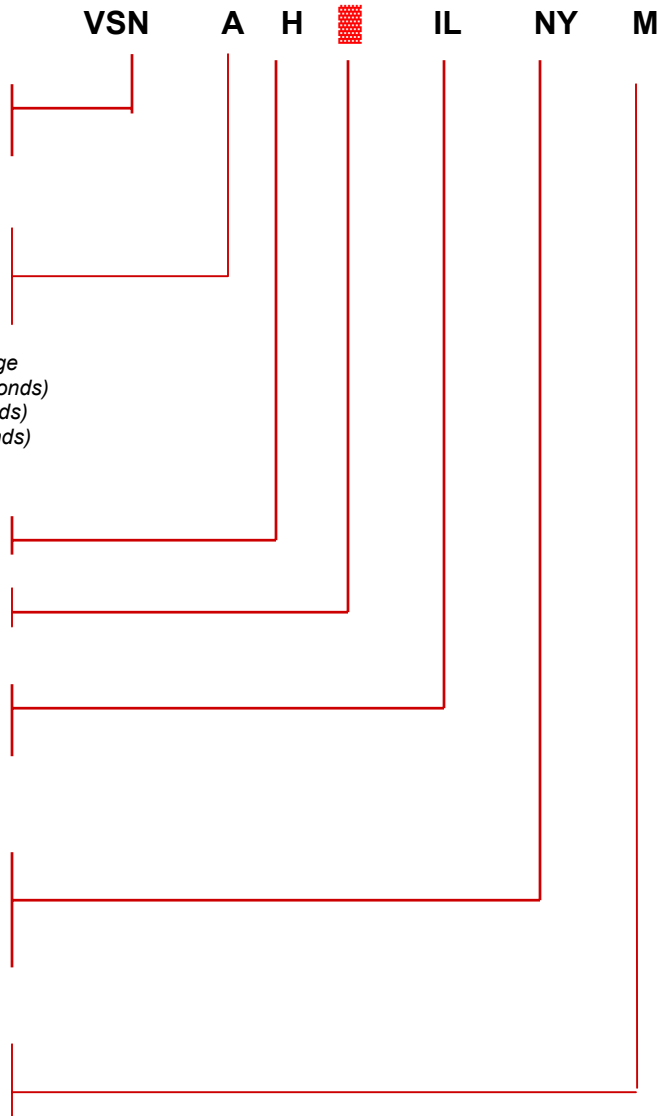
In-Line Location .....IL  
Low-Profile Location .....LP  
No Fittings .....XX

### Type Of Fitting

(Nylon: 3/16" O.D. Tubing Steel Tube: 1/8" O.D. Tubing)  
Nylon Push-In Fittings .....NY  
Nylon Compression Fittings .....NC  
Steel Tube Fittings: Carbon Steel .....CS  
Steel Tube Fittings: Stainless Steel .....SS  
No Fittings.....XX

### Reservoir Fill Options: (Omit for VSN or INJN products)

Manual Fill .....M  
Central Fill .....P  
Manual Fill/High Level Switch .....MH  
Central Fill/High Level Switch .....PH  
{a low-level switch is a standard feature}



\* DIN 43650 (LED & Surge Suppressor) solenoid connectors with metric tube fittings.

In-Line Fitting Location



Low-Profile Fitting Location



(Note: product shown above is in the VS configuration. The actual product will not include a pressure regulator, and it will include only one air solenoid.)

### Model 570-10000 Half-Drop Injector (0.015 ml) Model 570-10002 Two-Drop Injector (0.060 ml)

#### SPECIFICATIONS

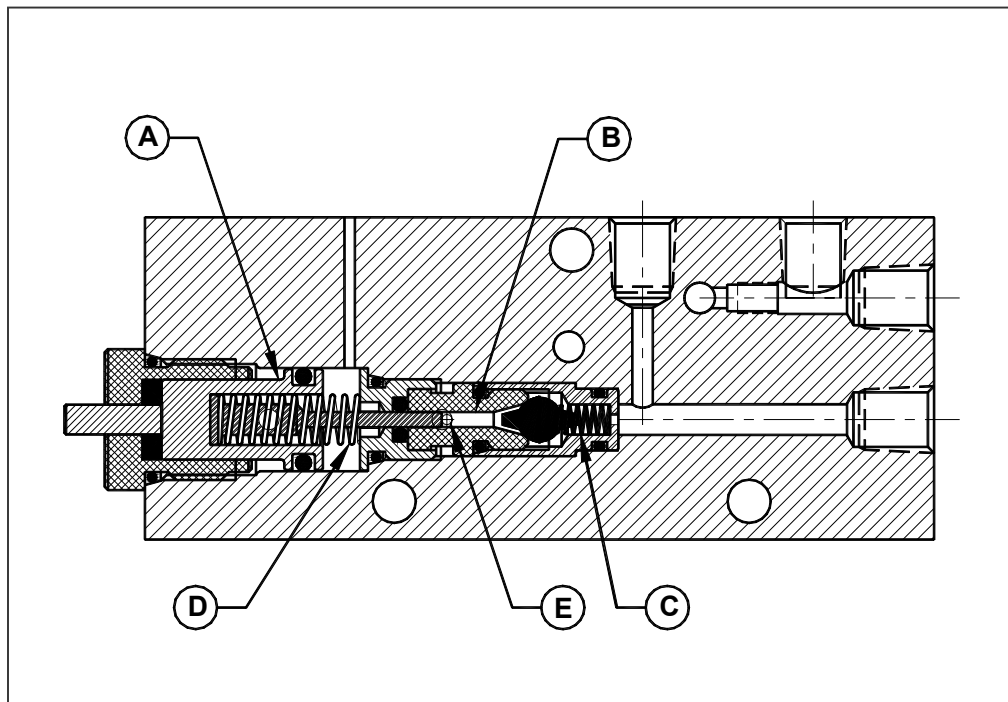
Lubricant viscosity range: 100-2000 SUS  
 Operating pressure (air): 65-120 psi (4.5-8.3 bar).  
 Operating pressure (oil): 200 psi max. (8 bar)  
 Pumping ratio 40:1 (theoretical) for 570-10000, 10:1 (theoretical) for 570-10002  
 Output volume (oil):  
     570-10000: 0.015ml/cycle (0.001 in<sup>3</sup>)  
     570-10002: 0.060ml/cycle (0.004 in<sup>3</sup>)  
 Maximum speed: 120 cpm (2 Hz)  
 Outlet port size oil & air: 1/8 NPTF  
 Monitor port size oil & air: 1/8 NPTF

#### DESCRIPTION

The Orsco Injector serves a multi-function purpose of dispensing and monitoring both air and oil to the spray nozzle. Due to the stackable modular design there has been a significant reduction in the amount of tubing and connectors necessary to assemble the unit.

#### OPERATION

As air enters the upper piston area "A" it pushes the piston/plunger downward due to the ambient pressure below the piston. When the piston/pin assembly moves downward the oil in the pumping chamber "B" is pressurized to overcome the outlet check spring "C" and oil is dispensed. When the pressure is vented from the top of the air piston "A", the piston return spring "D" pushes the piston/pin assembly back to the return position. As the piston assembly returns, the outlet check closes creating a vacuum in the pumping chamber "B". When the pin returns beyond the oil inlet hole "E", lubricant flows into the volume chamber completing the cycle.



### INJN/VSN/VSRR Tech Data

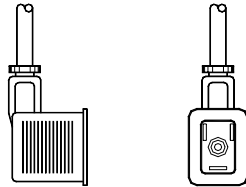
Temperature Range:	-20° F to 120° F (7° C to 50° C)
Operating Voltage:	24 VDC 120 VAC - 60 Hz 230 VAC - 50/60 Hz
Solenoid Power Requirements	
24 VDC	6 Watts
120 VAC	7 Watts
230 VAC	7 Watts
Solenoid Enclosure Classification	Nema 4, per DIN 40050 – IP 65
Reservoir	
Capacity	4000 ml (244 in <sup>3</sup> )
Tube Material:	Acrylic
Seal Material:	Buna N
Filter:	100 mesh (150 micron)
Level Switch	
Material:	Buna N
Max. switching power:	70 VA
Max. switching current:	0.7 Amp
Switch contact (dry state)	SPST - N.C.
Lubricant Range:	100-2000 SUS
Injector Output	
#570-10000	0.015 ml (.001 in <sup>3</sup> )
#570-10002	0.060 ml (.004 in <sup>3</sup> )
Inlet Air pressure	4.45– 8.3 bar (65-120 psi)
Main Air filter micron rating:	5 micron
Main Air Regulator (Relieving):	160 psig (Factory preset @ 65 psig)
Air Inlet port	1/4" NPT
Lines	
Nozzle Oil Supply	3/16" O.D. Nylon
Min. bend radius	19 mm (0.75")
Working pressure	13.8 bar(200 psi) @ 23.9° C (75° F)
Burst pressure	55.1 bar (800 psi) @ 23.9° C (75° F)
Thread Sealant	
Standard	Loctite 565 (Teflon-based) (Non-Teflon based sealant available upon request)

### INJN/VSN/VSRR Spare Parts List

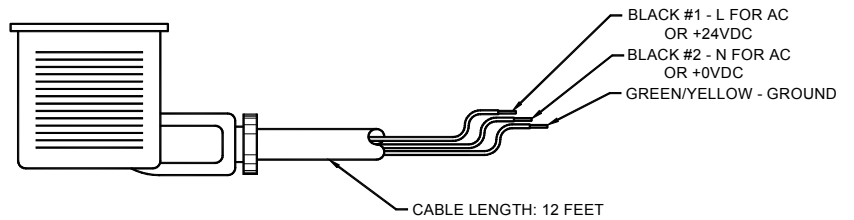
Valves	Orsco Item No.
110/120 AC Injector Air Valve Block	549-20000
240/220 AC Injector Air Valve Block	549-20001
24 VDC Injector Air Valve Block	549-20002
110/120 AC Valve Coil	549-20009
240/220 AC Valve Coil	549-20011
24 VDC Valve Coil	549-20010
Solenoid Kit	549-20012
Spool Assembly Kit	549-20013
<u>Injector Spare Parts</u>	
Injector (Half-Drop)	570-10000
Injector (Double-Drop)	570-10002
Injector Tie Rod	785-43100
Filter/Regulator, 5 micron	549-99313
5 micron Filter Element	549-90013
Gauge: 160 PSI	105-09190-0624
0.1 psi Check Valve	481-99967
Pressure switch (preset @ 50 psig)	549-11013
<u>Valve Stack Parts</u>	
Injector Manifold End Cap	116-43500
Valve Manifold End Cap	116-43501
Oil Feed Block	116-43600
<u>Fittings</u>	
<u>Nylon Tube Push In Fittings</u>	
3/16" Tube x 1/8" NPT Straight	549-11055
<u>Fitting Nylon Tube Compression</u>	
3/16" Tube x 1/8" NPT Straight	575-12602
<u>Steel Tube Fittings (Mat'l: Carbon Steel)</u>	
1/8" Steel Tube x 1/8" NPT Straight	344-96554
<u>Steel Tube Fittings (Mat'l: Stainless Steel)</u>	
1/8" Steel Tube x 1/8" NPT SS Ftg.	999-99312
<u>Tubing</u>	
3/16" O.D. Nylon	565-19185



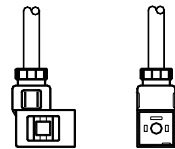
Fig. 5: VSN/VSRN Cable Assemblies



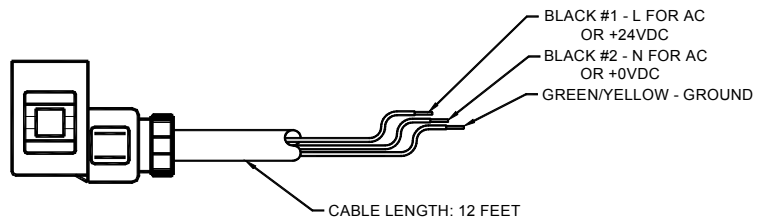
DIN 43650 FORM-A  
CABLE GRIP: FOR CABLES  
1/4" TO 5/16" IN DIAMETER



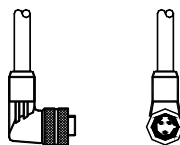
1: SOLENOID CABLE ASSEMBLY  
#570-89499



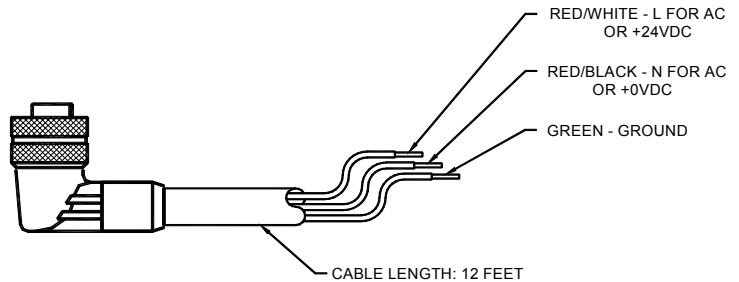
DIN 43650 FORM-C  
CABLE GRIP: FOR CABLES  
1/4" TO 5/16" IN DIAMETER



2: PRESSURE SWITCH CABLE ASSEMBLY  
#570-89498



MICRO STYLE AC PLUG  
90° CONNECTOR  
PVC CABLE  
IP68 NEMA 6P



3: FLOAT SWITCH CABLE ASSEMBLY  
#297-07184