

**Hydronic Corporation**

**Air Driven Hydraulic Pumps and Intensifiers**

# **FERRELL-ROSS P820 POWER UNIT**



## **Installation, Use and Maintenance Manual**

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## Introduction

This handbook is intended to give the operator the basic instructions for the use and maintenance of the pump. The air hydraulic pump operator must read this handbook before putting the pump into operation. After correctly installing the pump, keep this manual stored in a safe place. If you have difficulty in understanding any part of this handbook, contact Hydronic Corporation. Regular servicing and correct use of the pump are fundamental in obtaining optimum performance over its life. When contacting our service center, specify the pump model and serial number; this will help us to respond quickly and effectively.

## Guarantee

Hydronic pumps are guaranteed both for the quality of materials used and for overall design. The warranty runs for six months of normal use at eight hours per day and five days per week. The warranty itself does not cover seals or defects arising out of operating with unsuitable fluids or at pressures above the specified maximum. The guarantee cannot cover pumps that may have been tampered with. Defective goods must be sent to Hydronic Corporation at Farmington Hills or to the distributor covering the area, freight pre-paid in either case. Any pump returned to us must be accompanied by a full written description of such faults or defects as have been discovered. Please also ensure that the pump's serial number is attached to the paperwork.

## Identification Plate



**Identification Plate showing:**

**Model code (P820-30)**  
**Serial number**  
**Maximum air pressure**  
**Maximum oil pressure**  
**Date of construction**

## Installation Guide

Pumps may be installed in a horizontal or vertical position for optimum functioning of suction and delivery valves. The round reservoir may be used horizontally and it is advised that the breather and sight glass be interchanged and/or the reservoir rotated to allow the breather to remain uppermost. The suction and return tubes inside the reservoir may also be rotated to ensure fluid is taken from, and returned to, the bottom of the reservoir in any given position.

The air inlet connection can be rotated at 90 ° and piping of not less than 3/8" bore should be used. 1/2" should be used if the pump is to be run at higher speeds for greater flows.

It is advisable to use or maintain :

- Hydraulic oil having viscosity of 150 to 250 SSU
- Oil temperature 32° F to 150° F
- Air temperature 40° F to 100° F
- Room temperature 40° F to 100° F

Obstructive icing of the silencer may occur under certain temperature/humidity conditions. This can be remedied by the addition of antifreeze oil for pneumatic equipment to a mist lubricator.

## Compressed Air System

It will be advisable to fit an air filter/regulator unit having minimum flow capacity of 50 scfm plus a pressure gauge in order to ensure the pump has sufficient air energy to work correctly and provide the hydraulic performance you expect.

## Hydraulic System

Valves, pipes, hoses and accessories should all correspond to maximum working pressure of the pump used and be of a size that will fulfill flow requirements.

## Application

Hydronic air driven hydraulic pumps are designed for operating oil hydraulic circuits and to cover the widest range of requirements to the best advantage. The pump itself operates quite simply, using a known pressure intensification principle. A piston with a large surface area is actuated by compressed air. Attached to it is a piston with a smaller surface area, which is driven in a hydraulic chamber generating a high level of hydraulic pressure. The continuous pumping action is produced by the compressed air being switched by a special seal less valve. By regulating the compressed air supply pressure from 30 psi to 100 psi, the maximum hydraulic pressure can be adjusted by the ratio of the pump used. As the hydraulic load of the circuit increases and the oil pressure rises, the pump will slow down and eventually stop. In this way, the maximum load of the circuit will be maintained without air consumption.

## Storage

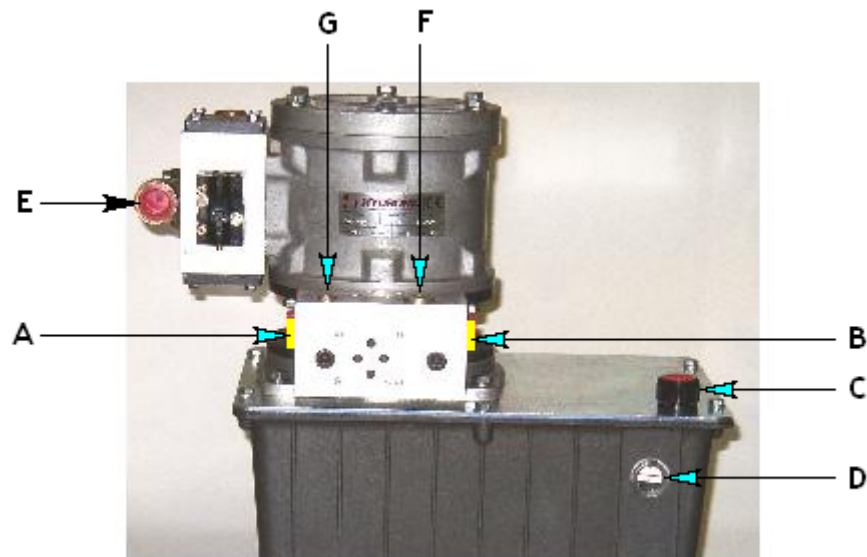
If the pump is to be kept out of use for a long period, clean the pump in general and drain the oil from the tank. Cover the pump and store it in a dry, well-protected place. It is advisable to wrap the pump in a plastic film. To put back into service, check all parts, fill tank with oil and try the pump out to ensure that it working properly. **This operation must be carried out by qualified personnel.**

## Disposal

If the pump is to be scrapped, treat as a special type of waste. Dismantle it and divide it into materials of the same type and dispose of them in accordance with the local laws and regulations in your state.

### Description of the standard pump components

A & B	Oil outlets #6 SAE
C	Oil filler/breather
D	Oil level sight glass
E	Air inlet 1/2" NPT
F	Spare pressure port #8 SAE
G	Oil pressure gauge port #4 SAE



## Starting - Up

Oil pressure can be determined by regulation of the compressed air, bearing in mind of course the multiplication ratio pre-selected for the pump itself.

The models are : P820 RATIO 1:5  
P820 RATIO 1:10  
P820 RATIO 1:20  
P820 RATIO 1:30  
P820 RATIO 1:40

For instance, when supplied with compressed air at 80 psi, the P820-5 will produce oil pressure of 80 x ratio, 400 psi. It should be remembered however, that real efficiency produced by the pump is slightly less than given by the above theoretical calculation. This difference will not be noticed by a hydraulic gauge.

Having connected the compressed air supply at a low pressure, allow the pump to operate slowly until primed and oil comes through to the output port. Now shut off the air supply to the pump and securely connect the hydraulic circuit. Switch on the air supply again and allow the pump to run in order to bleed any air out of the hydraulic circuit.

Pump components:

- Standard block with oil output and return line.
- Modular block for optional mounting D03 valve. Other accessories are available.
- Minimum internal diameter of air supply line is 3/8".
- Optional rotation of the air inlet C in four positions.
- Maximum oil pressure can be preset by regulating the air supply at point C between 30 psi and 100 psi.
- The air exhaust and silencer are mounted to one side at point D.
- The oil outlet is positioned to one side at point E and the return at point F.
- The pump itself works automatically and operates by way of a special valve.
- The hydraulic section comprises a pump casing, piston and dynamic rod-seal assembly.
- The suction side of the pump is equipped with spring-loaded check valve. A spring-loaded outlet ball type check valve is incorporated in the hydraulic piston.

## Fault Finding Chart

Fault	Cause	Remedy
1] Pump does not cycle or runs slowly.	1.1] Low pressure in compressed air line. 1.2] Formation of ice on the exhaust side.  1.3] Accumulation of waste in the silencer. 1.4] Blocked element in air filter/regulator.	1.1] Clear any blockage or restriction on the air line. 1.2] Shut off pump for a short time and drain off water from the filter. 1.3] Remove silencer, clean and replace. 1.4] Close down air-supply, dismantle and clean filter.
2] Pump loses air from silencer when stalled.	2.1] Worn valve or seal	2.1] Replace seal or valve.
3] Excess oil leakage from air silencer.	3.1] Worn hydraulic seal	3.1] Replace seal.
4] Pump cycles without pumping oil.	4.1] Blocked oil-intake 4.2] Bad connection on suction line.	4.1] Clean out filter. 4.2] Check for bad connections or air leaks on suction line.
5] Pump functions but only generates low pressure and does not stall at max. pressure.	5.1] Internal leakage in the circuit. 5.2] Suction valve seats damaged and leaking. 5.3] Output valve seats damaged and leaking. 5.4] Worn oil seal.	5.1] Find heat source and change valve. 5.2] Replace suction valve parts. 5.3] Replace output valve parts. 5.4] Replace seal.

## Maintenance

Periodically release the condensation from the air filter. Replace the hydraulic oil every 1500 hours or whenever the oil is polluted.

**Warning:** Remember that repair work can only be made when pneumatic and hydraulic pressure has been released and you are sure that no pressure remains in the circuit.

## Delivery of the pump

### Transport

All the material shipped, including the detached parts, has been thoroughly checked before being consigned to the forwarding agent. The pump is shipped in double corrugated cardboard packaging, which assures protection of the product.

### Unpacking

On receipt of the product, open the packaging and remove the pump. Take care not to damage any part of the pump. Make an initial check on the pump for damage in transit. In case of damage or if in doubt, do not use the pump and contact Hydronic Corporation or your distributor. The packaging [plastic bags, expanded polystyrene, nails, screws, wood, etc.] must not be left within reach of children since they are potential source of danger. Be sure to dispose of pollutant or non biodegradable materials in the correct way. Materials must be disposed of in accordance with the laws in force.

### Gross weight

P820 standard reservoir	33 lbs.
P820 large reservoir	44 lbs.

### Contents of the package

The packaging will always contain the following:

- 1 x air driven hydraulic pump
- 1 x installation, use and maintenance manual



## Original spare parts

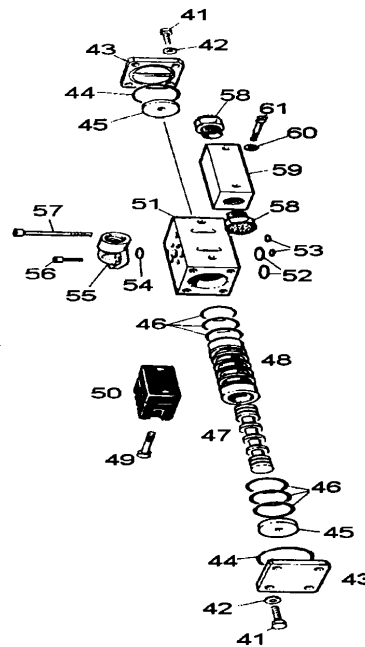
Parts orders must always be accompanied by the following information:

- A] The pump model
- B] The pump serial number
- C] The pump year of construction
- D] The part numbers
- E] The quantity required
- F] The name of the part

A clear and correct statement of this data will allow our after-sales service to respond quickly and appropriately. Every spare part must be replaced by professionally qualified staff. The manufacturer declines all responsibility for malfunctions or accidents deriving from any failure of the product when unqualified persons have made any attempt at repair.

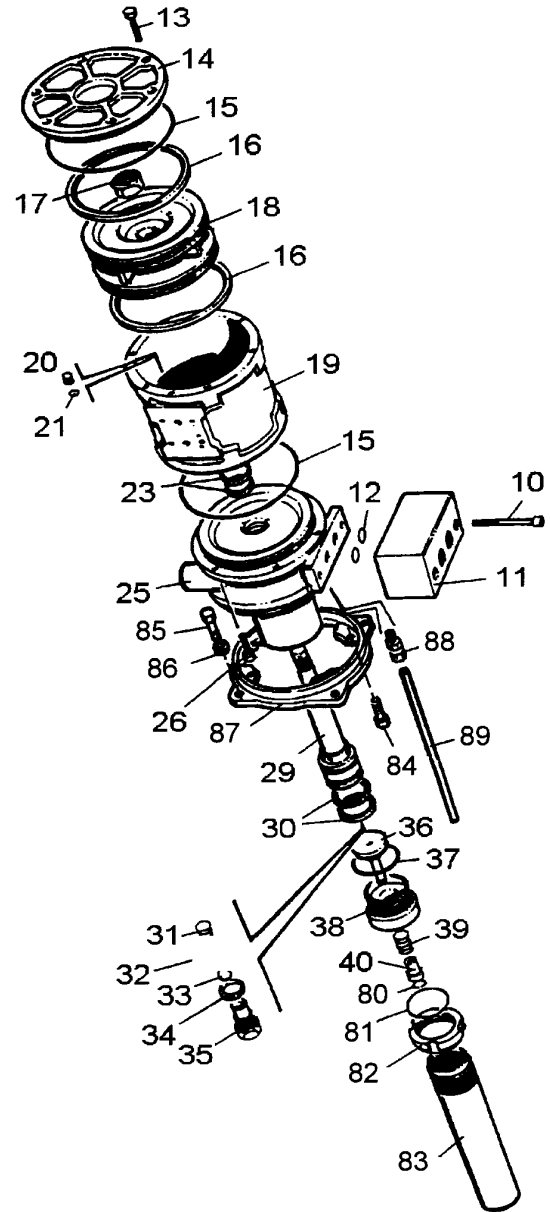
#	Description	Code #	Quantity
41	Screw	3.94.206	8
42	Washer	3.72.102	8
43	Cover	5.27.001	2
44	O-ring	3.51.080	2
45	Plate	5.08.013	2
46	O-ring	3.51.081	6
47	Floating spool	5.66.012	1
48	Sleeve	5.14.016	1
49	Screw	3.94.205	2
50	Pilot valve	4.91.002	1
51	Valve body	5.28.026	1
52	O-ring	3.51.082	2
53	O-ring	3.51.002	2
54	O-ring	3.51.025	1
55	Connector	3.70.005	1
56	Screw	3.94.008	2
57	Screw	3.94.018	3
58	Silencer	3.70.004	2
59	Block	5.65.014	1
60	Washer	3.72.102	2
61	Screw	3.94.205	2

### Air Valve assembly

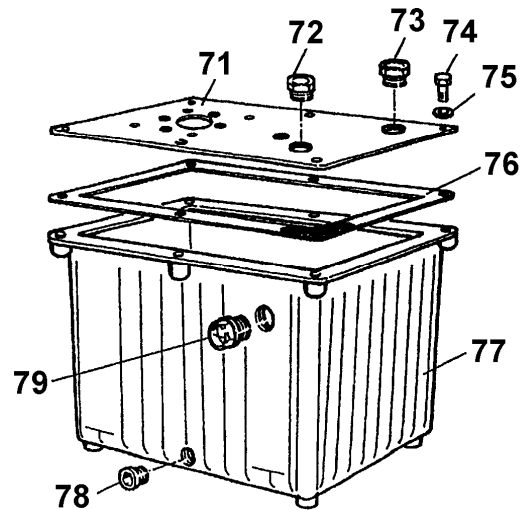


Number	Description	Code #	Quantity
10	Screw	3.94.010	2
11	Distributor body	5.65.004	1
12	O-ring	3.51.109	2
13	Screw+washer	3.94.207	6
14	Cylinder head	5.86.006	1
15	O-ring	3.51.075	2
16	Slip ring	3.51.076	2
	O-ring	3.51.077	2
17	Locknut	3.45.204	1
18	Piston	5.68.045	1
19	Cylinder barrel	5.18.030	1
20	Plug	5.84.002	2
21	O-ring	3.51.083	2
23	O-ring+Slip Ring (ratio)		
	1:5	3.51.089+3.51.088	2
	1:10	3.51.086+3.51.087	2
	1:20	3.51.085+3.51.014	2
	1:30	5.50.019+3.51.057	2
	1:40	3.51.011+3.51.010	2
25	Pump Body (ratio)		
	1:5	5.28.030	1
	1:10	5.28.029	1
	1:20	5.28.028	1
	1:30	5.28.057	1
	1:40	5.28.027	1
26	Screw+Washer	3.94.208+3.72.104	6
27	Screw	3.94.013	2
28	Clamping Plate	5.65.003	1
29	Piston (ratio)		
	1:5	5.68.049	1
	1:10	5.68.048	1
	1:20	5.68.047	1
	1:30	5.68.177	1
	1:40	5.68.046	1
30	O-ring+Slip Ring (ratio)		
	1:5	3.51.096+3.51.097	2
	1:10	3.51.094+3.51.095	2
	1:20	3.51.092+3.51.093	2
	1:30	3.51.173+3.51.033	2
	1:40	3.51.091+3.51.090	2
31	Spring (ratio)		
	1:5+1:10	5.46.028	1
	1:20+1:30+1:40	5.46.029	1
32	Center (ratio)		
	1:5+1:10	5.46.007	1
	1:20+1:30+1:40	5.46.006	1
33	Ball (ratio)		
	1:5+1:10	3.76.006	1
	1:20+1:30+1:40	3.76.002	1
34	Washer (ratio)		
	1:5+1:10	3.52.010	1
	1:20+1:30+1:40	3.52.003	1
35	Valve Connector (ratio)		
	1:5+1:10	5.94.303	1

Tank Mounted Version



	1:20+1:30+1:40	5.94.302	1
36	Valve rod	5.66.011	1
37	O-ring(ratio)		
	1:5+1:10	3.51.127	1
	1:20+1:30+1:40	3.51.055	1
38	Valve body(ratio)		
	1:5+1:10	2.28.032	1
	1:20+1:30+1:40	5.28.031	1
39	Spring	5.64.030	1
40	Guide	5.13.008	1
71	Reservoir Lid	5.055.0150	1
72	Filler/breather	OQ10003A	1
73	Discontinued		
74	Screw (and washer)	3.094.0203	4
75	Washer	3.072.0103	4
76	Gasket	5.050.0006	1
77	Reservoir	3.074.0009	1
78	Plug (and washer)	3.069.0203	1
79	Sight level glass	OQ10004A	1
80	Collet	3.06.006	2
81	O-ring	3.51.079	1
82	Locknut	3.45.212	1
83	Suction tube	6.90.003	1
83/1	Filter	3.41.0021	1
83/2	Bush	5.08.014	1
83/3	O-ring	3.51.084	1
83/5	Self-locking nut	3.31.053	1
84	Screw	3.94.008	4
85	Screw+47	3.94.023	4
86	Washer	3.72.104	4
87	Flange	5.42.002	1
88	Tube	5.90.017	1
89	Connector	3.70.006	1

**Seal Kits**

Ratio	Code #
1:5	3.54.028
1:10	3.54.029
1:20	3.54.030
1:30	3.54.080
1:40	3.54.034



## GENERAL INSTRUCTIONS FOR THE INSTALLATION AND USE OF THE FRL SKILLAIR SYSTEM

- 1) Install the system as near as possible to the point of use.
- 2) Always use the combination of fil-reg-lub in the sequence.
- 3) Always install the fri with the arrows indicating the direction of air flow
- 4) Depressurise the fri system before periodic maintenance
- 5) We recommend assembling the shut off valve prior to the FRL for depressurising the system.
- 6) For the best results we recommend using an FRL which corresponds to the size of the pipe.
- 7) The standard lubricator must be filled before the system is pressurised.
- 8) The oil recommended for all lubricators is: ISO and UNI FD 22 (e.g. ENERGOL HLP 22 "BP"; SPINESSO 22 "ESSO"; PHYDRUS OIL 22 "IP"; MOBIL DTE 22 "MOBIL"; TELLUS OIL 22 "SHELL")
- 9) Do not use cleaning oil, brake fluid oil nor solvents
- 10) Maximum temperature 40°C (with maximum pressure)
- 11) Maximum inlet pressure:  
serie 114 - 138 15 bar (1500 KPA) (217,5 psi)  
serie 238 - 212 13 bar (1300 KPA) (188,5 psi)  
serie 312 - 334 13 bar (1300 KPA) (188,5 psi)
- 12) For the best lubrication result, set the drip rate to approximately 1 drop of oil for 300-600 NL (10-20 Scfm) through the special knob
- 13) Screw for "FRL" wall fitting:  
serial number 114 - 138 M4x50 DIN 912  
serial number 238 - 212 M5x60 DIN 912  
serial number 312 - 334 M5x65 DIN 912
- 14) When reducing regulated pressure always turn regulator below required pressure and adjust up upwards

## REGOLE GENERALI PER L'INSTALLAZIONE E L'UTILIZZO DEL SISTEMA FRL SKILLAIR

- 1) Installare il sistema il più vicino possibile al punto di utilizzo
- 2) Nel caso di combinazioni rispettare sempre la sequenza FIL-REG-LUB
- 3) Inserire il sistema FRL nel circuito in modo che l'aria fluisca nella direzione indicata dalle frecce
- 4) Sprezzurizzare il sistema FRL prima di intervenire sullo stesso
- 5) E consigliabile assemblare a monte dell'FRL la valvola a 3 vie (SHUT-OFF VALVE) per sprezzurizzare il sistema
- 6) Evitare a monte dell'FRL l'uso di tubazioni e raccordi sottodimensionati che diminuiscono l'area di passaggio dell'aria
- 7) Riempire con olio il lubrificatore prima di mettere il sistema in pressione
- 8) Usare per il lubrificatore oli ISO e UNI FD (Es.: ENERGOL HLP 22 "BP"; SPINESSO 22 "ESSO"; PHYDRUS OIL 22 "IP"; MOBIL DTE 22 "MOBIL"; TELLUS OIL 22 "SHELL")
- 9) Non usare: oli detergenti, oli per circuiti frenanti né solventi in generale
- 10) Temperatura massima ammessa 40°C (alla pressione massima)
- 11) Pressione massima d'ingresso:  
serie 114 - 138 15 bar (1500 KPA) (217,5 psi)  
serie 238 - 212 13 bar (1300 KPA) (188,5 psi)  
serie 312 - 334 13 bar (1300 KPA) (188,5 psi)
- 12) Per una corretta lubrificazione, impostare la regolazione sul lubrificatore tramite l'apposita manopola; in modo da erogare 1 goccia ogni 300-600 NL
- 13) Viti fissaggio a parete:  
serie 114 - 138 VTCE M4x50 UNI 5931  
serie 238 - 212 VTCE M5x60 UNI 5931  
serie 312 - 334 VTCE M5x65 UNI 5931
- 14) Nel regolatore la pressione deve essere impostata in salita

## REGLES GENERALES POUR L'INSTALLATION ET L'UTILISATION DU SYSTEME FRL SKILLAIR

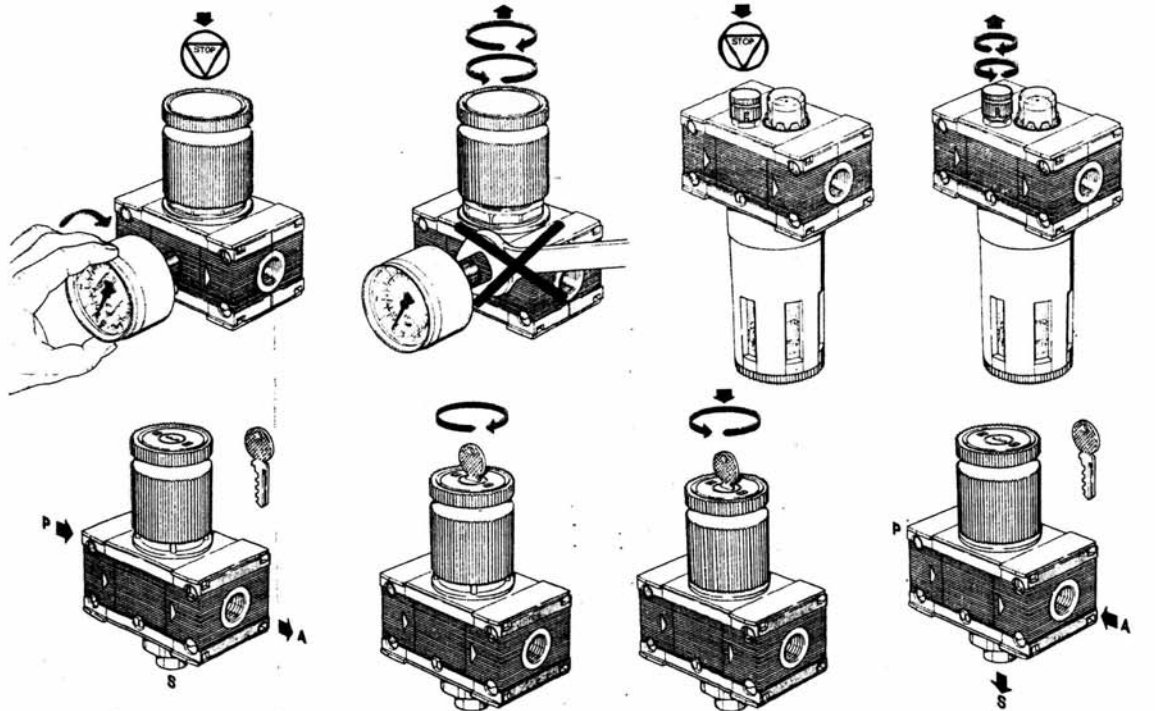
- 1) Installer le système le plus près possible du point d'utilisation
- 2) Dans le cas de combinaisons respecter toujours l'ordre fil.reg.lub.
- 3) Respecter le sens du passage d'air indiqué par les flèches
- 4) Purger le système avant d'intervenir sur celui-ci
- 5) Il est conseillé de monter avant le FRL la vanne à 3 voies pour dépressurisation du système
- 6) Eviter de monter en amont du FRL des tubes et raccords sous-dimensionnés qui diminuent le débit
- 7) Remplir le lubrificateur avant de mettre sous pression le système
- 8) Utiliser de l'huile ISO et UNI FD (ex.: ENERGOL HLP 22 "BP"; SPINESSO 22 "ESSO"; PHYDRUS OIL 22 "IP"; MOBIL DTE 22 "MOBIL"; TELLUS OIL 22 "SHELL")
- 9) Ne pas utiliser d'huile détergente, ni huile pour circuit de freinage ni de solvant en général
- 10) Température maximum du fluide 40 degrés (à la pression maximum)
- 11) Pression d'entrée maximum:  
série 114 - 138 15 bar (1500 KPA) (217,5 psi)  
série 238 - 212 13 bar (1300 KPA) (188,5 psi)  
série 312 - 334 13 bar (1300 KPA) (188,5 psi)
- 12) Pour une lubrification correcte régler le lubrificateur à raison d'une goutte pour 300 à 600 NL au moyen de la poignée
- 13) Vis de fixation sur paroi:  
série 114 - 138 M4x50 DIN 912  
série 238 - 212 M5x60 DIN 912  
série 312 - 334 M5x65 DIN 912
- 14) Dans le régulateur la pression doit impérativement se régler en montant

## BETRIEBSANLEITUNG FÜR DEN EINSATZ BZW. VERBRAUCH DES FRL-SKILLAIR-SYSTEMS:

- 1) Die Wartungseinheit soll so nahe als möglich der Gebrauchsstelle installiert werden.
- 2) Auf den richtigen Zusammenbau der Wartungseinheit ist zu achten: FIL (Filter) - REG. (Regler) - LUB (Öler)
- 3) Die Durchflußrichtung wird von den Strömungspfeilen angezeigt.
- 4) Die Wartungseinheit FRL sollte vor Wartung entspannt werden
- 5) Vor der Wartungseinheit FRL sollte ein Absperrventil installiert werden, um bei Bedarf das System zu entspannen
- 6) Um eine optimale und wirtschaftliche Leistung zu erzielen, sollte die eingesetzte Größe der Wartungseinheit FRL weitgehend mit dem Rohrleitungsquerschnitt übereinstimmen
- 7) Der Standard-Öler (LUB) muss im drucklosen Zustand aufgefüllt werden
- 8) Als geeignete Ölsorten für alle Öler können ISO und UNI FD empfohlen werden:  
(z.B.: ENERGOL HLP 22 "BP"; SPINESSO 22 "ESSO"; PHYDRUS OIL 22 "IP"; MOBIL DTE 22 "MOBIL"; TELLUS OIL 22 "SHELL")
- 9) Für die Reinigung keine Lösungsmittel bzw. Bremsflüssigkeit usw. verwenden
- 10) Maximale zulässige Temperatur 40 Grad C (mit max. Druck)
- 11) Max zulässiger Primärdruck:  
für Serie 114 und 138: 15 bar (1500 KPA) (217,5 psi)  
für Serie 238 und 212: 13 bar (1300 KPA) (188,5 psi)  
für Serie 312 und 334: 13 bar (1300 KPA) (188,5 psi)
- 12) Für eine geeignete Schmierung die Regelung auf dem Schmierer durch den besonderen Griff einstellen, um einen Tropfen je 300-600 NL abzugeben
- 13) Wand-Befestigungsschrauben  
Serie 114 - 138 Schraube M4x50 DIN 912  
Serie 238 - 212 Schraube M5x60 DIN 912  
Serie 312 - 334 Schraube M5x65 DIN 912
- 14) Im Regler soll der Druck aufwärts eingestellt werden

## REGLAS GENERALES PARA LA INSTALACION Y EMPLEO DEL SISTEMA FRL SKILLAIR

- 1) Instalar el sistema lo mas cerca posible del punto de uso
- 2) En el caso de conjuntos respetar la secuencia filtro + regulador + lubricador
- 3) Conectar el grupo FRL en el circuito de modo que el aire fluya en el sentido de la flecha
- 4) Despresurizar el sistema FRL antes de manipular el mismo
- 5) Se aconseja instalar antes del grupo FRL la valvula de 3 vias para poder despresurizar el sistema
- 6) Evitar el empleo antes de la unidad FRL de tuberia y racores bajo dimensionados que disminuyan la area del paso de aire
- 7) Llenar con aceite el lubricador antes de someter la unidad a presion
- 8) Usar para el lubricador aceite ISO y UNI FD 22 (P.E.: ENERGOL HLP 22 "BP"; SPINESSO 22 "ESSO"; PHYDRUS OIL 22 "IP"; MOBIL DTE 22 "MOBIL"; TELLUS OIL 22 "SHELL")
- 9) No usar aceites detergentes, aceites para circuitos de frenos, ni disolventes en general
- 10) Temperatura maxima admitida 40°C (con presion maxima)
- 11) Presion maxima a la entrada:  
serie 114 - 138 15 bar (1500 KPA) (217,5 psi)  
serie 238 - 212 13 bar (1300 KPA) (188,5 psi)  
serie 312 - 334 13 bar (1300 KPA) (188,5 psi)
- 12) Para una corecta lubricacion procurar que el goteo del lubricador sea de una gota cada 300-600 NL
- 13) Tornillos fijacion pared:  
serie 114 - 138 M4x50 DIN 912  
serie 238 - 212 M5x60 DIN 912  
serie 312 - 334 M5x65 DIN 912
- 14) En el regulador la presion debe ser reglada en subida



- The knob is locked and the air flows from P to A
- Manopola bloccata con passaggio aria da P verso A
- Poignée bloquée avec passage d'air de P vers A
- Knopf ist blockiert: Durchfluß von P zu A
- Pomo bloqueado con paso de aire de P hacia A

- Insert the key and turn clockwise
- Introduire la chiave e ruotare in senso orario
- Introduire la clef et tourner dans le sens horaire
- Schlüssel einstellen, rechtsdrehen
- Introducir la llave y girar en el sentido horario

- Push in the knob and turn anticlockwise
- Premere a fine corsa la manopola e ruotare in senso antiorario
- Appuyer à fond sur la poignée et tourner en sens anti-horaire
- Wenn ganz rechtsgedreht, dann drücken und linksdrehen
- Presionar el pomo hasta el final de su carrera y girar en sentido inverso

- Extract the key, the knob is locked and the air flows from A to S
- Estrarre la chiave, manopola bloccata con passaggio aria da A verso S
- Enlever la clef: la poignée reste bloquée avec passage d'air de A vers S
- Schlüssel herausnehmen, Knopf ist blockiert mit Luftdurchfluß von A zu S
- Extraer la llave. El pomo queda bloqueado con paso de aire de A hacia S



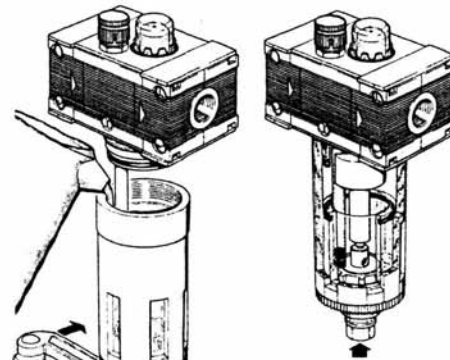
- With pushbutton under central position, the cock is half-automatic with outflow when without pressure and closing when with pressure
- Con pulsante in posizione centrale il rubinetto è semiautomatico con scarico in assenza e chiusura in presenza di pressione
- Avec le bouton en position centrale le robinet est semi automatique, déchargement, en absence et fermeture en présence de pression
- Mit Druckknopf unter mittlerer Stellung ist der Hahn halbautomatisch, mit Ablass wenn ohne Druck und Schliessen wenn mit Druck
- Con el pulsador en la posición central. La purga semi-automática descarga con ausencia de presión y cierra en presencia de presión.



- Push up the button to dump whilst the bowl is pressurised
- Premendo sul pulsante si ottiene lo scarico della condensa "in presenza di pressione"
- En appuyant sur le bouton on obtient le déchargement du condensé en présence de pression
- Beim Drücken vom Ablassventilknopf ermöglicht man die Entleerung unter Druck
- Accionando el pulsador, se obtiene la descarga de condensados en presencia de presión

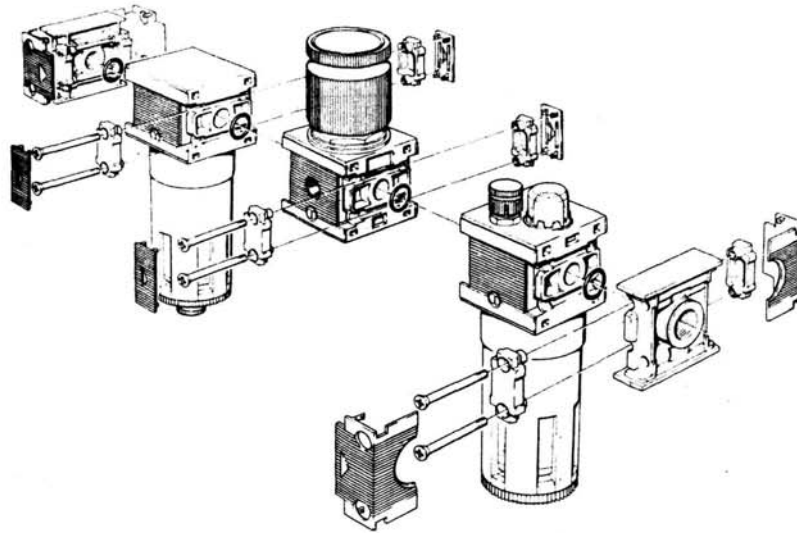


- When rotating the button anticlockwise the cock "closing both with and without pressure" will close by hand
- Ruotando il pulsante in senso antiorario si ottiene la chiusura manuale del rubinetto "chiusura sia in presenza che in assenza di pressione"
- En tournant le bouton en sens anti-horaire on obtient la fermeture du système "fermeture aussi bien en absence qu'en présence de pression"
- Beim Links-drehen erzielt man das Handschliessen des Ventils "Schliessen sowohl mit als auch ohne Druck"
- Girando el pulsador en sentido anti horario se obtiene el cierre manual de la valvula. "Cierre en presencia o ausencia de presión."



- Lubricator with automatic oil filling
- Lubrificatore con riempimento olio automatico
- Lubricateur à remplissage automatique d'huile
- Öl mit automatischer öleinfüllung
- Lubricador con carga automática
- Standard lubricator
- Lubrificatore di serie
- Lubricateur de série
- Serienmäßiger Öler
- Lubricador de serie

ASSEMBLY INSTRUCTIONS  
 SCHEMA DI MONTAGGIO  
 SCHEMA DE MONTAGE  
 MONTAGESCHEMA  
 ESQUEMA DE MONTAJE



TECHNICAL DATA / DATI TECNICI / DONNEES TECHNIQUES / TECHNISCHE ANGABEN / DATOS TECNICOS

FILTER - FILTRO - FILTRE - FILTER - FILTRO

Type	Threaded connection	Filter element	* Flow
Tipo	Attacco filettato	Elemento filtrante	* Portata
Type	Raccordement fileté	Élément filtrant	* Débit
Typ	Gewindeeinsatz	Filterelement	* Durchfluß
Tipo	Rosca	Elemento filtrante	* Caudal
FIL 114	1/4	20 $\mu$	1200 NL/m 42 Scfm
FIL 138	3/8	20 $\mu$	1200 NL/m 42 Scfm
FIL 312	1/2	20 $\mu$	3200 NL/m 113 Scfm
FIL 334	3/4	20 $\mu$	3200 NL/m 113 Scfm

- \* Flow at 6 bar (87 psi), measured  $\Delta P=0.35$  bar (5 psi) and filter element of 20 $\mu$
- \* Portata a 6 bar (87 psi), misurata con  $\Delta P=0.35$  bar (5 psi) con elemento filtrante 20 $\mu$
- \* Débit à 6 bar (87 psi), vérifié avec  $\Delta P=0.35$  bar (5 psi) avec élément filtrant 20 $\mu$
- \* Durchfluß bei 6 bar (87 psi),  $\Delta P=0.35$  bar (5 psi) mit 20 $\mu$  Filterelement gemessen
- \* Caudal a 6 bar (87 psi), medido con  $\Delta P=0.35$  bar (5 psi) con elemento filtrante 20 $\mu$

REGULATOR - REGOLATORE - REGULATEUR - DRUCKREGLER - REGULADOR

Type	Threaded connection	Regulation field	<input type="checkbox"/> Flow
Tipo	Attacco filettato	Campo di regolazione	<input type="checkbox"/> Portata
Type	Raccordement fileté	Domaine de réglage	<input type="checkbox"/> Débit
Typ	Gewindeeinsatz	Regulierbereich	<input type="checkbox"/> Durchfluß
Tipo	Rosca	Campo de regulación	<input type="checkbox"/> Caudal
REG 114	1/4	0-8 bar (116 psi)	1000 NL/m 35 Scfm
REG 138	3/8	0-8 bar (116 psi)	1000 NL/m 35 Scfm
REG 312	1/2	0-8 bar (116 psi)	3000 NL/m 106 Scfm
REG 334	3/4	0-8 bar (116 psi)	3000 NL/m 106 Scfm

- Flow measured with primary pressure 7 bar (101 psi) regulated pressure 6 bar (87 psi)  $\Delta P=10\%$  of preset pressure
- Portata misurata con pressione di monte 7 bar (101 psi) pressione regolata 6 bar (87 psi)  $\Delta P=10\%$  della pressione impostata
- Débit vérifié avec pression en amont de 7 bar (101 psi) pression réglée 6 bar (87 psi)  $\Delta P=10\%$  de la pression fixée
- Durchfluß gemessen mit Eingangsdruck 7 bar (101 psi), regulierter Druck 6 bar (87 psi)  $\Delta P=10\%$  des eingestellten Druckes
- Caudal medido con presión de línea 7 bar (101 psi) presión regulada 6 bar (87 psi)  $\Delta P=10\%$  de la presión fijada

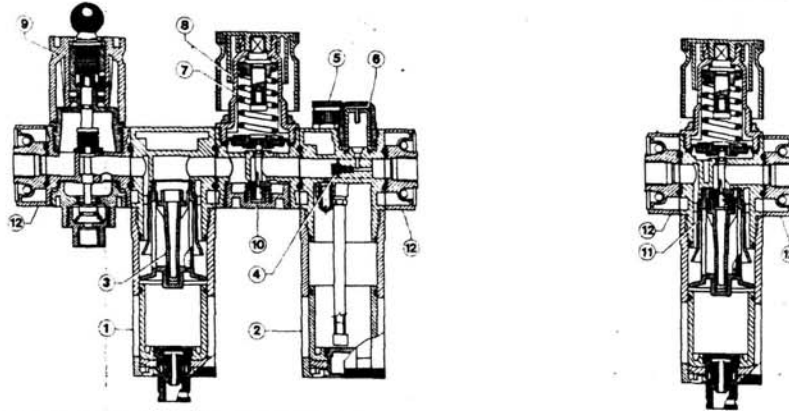
LUBRICATOR - LUBRIFICATORE - LUBRIFICATEUR - ÖLER - LUBRICADOR

Type	Threaded connection	Min air flow for lubrication	* Flow
Tipo	Attacco filettato	Portata minimo intervento	* Portata
Type	Raccordement fileté	Quantité min. d'huile	* Débit
Typ	Gewindeeinsatz	Min Durchfluß für die Ötzufuhr	* Durchfluß
Tipo	Rosca	Caudal/mínimo goteo lubricador	* Caudal
LUB 114	1/4	10 NL/m 0.35 Scfm	900 NL/m 31.8 Scfm
LUB 138	3/8	10 NL/m 0.35 Scfm	900 NL/m 31.8 Scfm
LUB 312	1/2	10 NL/m 0.35 Scfm	3000 NL/m 106 Scfm
LUB 334	3/4	10 NL/m 0.35 Scfm	3000 NL/m 106 Scfm

FILTER REGULATOR - FILTRO REGOLATORE - FILTRE REGULATEUR - FILTER REGLER - FILTRO REGULADOR

Type	Threaded connection	Filter element	Regulation field	<input type="checkbox"/> Flow
Tipo	Attacco filettato	Elemento filtrante	Campo di regolazione	<input type="checkbox"/> Portata
Type	Raccordement fileté	Élément filtrant	Domaine de réglage	<input type="checkbox"/> Débit
Typ	Gewindeeinsatz	Filterelement	Regulierbereich	<input type="checkbox"/> Durchfluß
Tipo	Rosca	Elemento filtrante	Campo de regulación	<input type="checkbox"/> Caudal
FR 114	1/4	20 $\mu$	0-8 bar (116 psi)	1000 NL/m 35 Scfm
FR 138	3/8	20 $\mu$	0-8 bar (116 psi)	1000 NL/m 35 Scfm
FR 312	1/2	20 $\mu$	0-8 bar (116 psi)	3000 NL/m 106 Scfm
FR 334	3/4	20 $\mu$	0-8 bar (116 psi)	3000 NL/m 106 Scfm

SPARES FOR FIL. REG. LUB / RICAMBI PER FIL. REG. LUB / PIECES DE RECHANGE POUR FIL. REG. LUB / ERSATZTEILE FÜR FIL. REG. LUB /  
 RECAMBIO PARA FIL. REG. LUB



1		Cod. Ref.
		9253201 TF 114 138 1/4 - 3/8 RMSA
		9453301 TF 312 334 1/2 - 3/4 RMSA
9453401 TF 312 334 1/2 - 3/4 RA		
2		Cod. Ref.
		9253501 TL 114 138 1/4 - 3/8
		9453601 TL 312 334 1/2 - 3/4
3		Cod. Ref.
		9251705 FP 114 138 1/4 - 3/8 5
		9251706 FP 114 138 1/4 - 3/8 20
		9251707 FP 114 138 1/4 - 3/8 50
		9451705 FP 312 334 1/2 - 3/4 5
		9451706 FP 312 334 1/2 - 3/4 20
9451707 FP 312 334 1/2 - 3/4 50		
4		Cod. Ref.
		9252001 MB 114 138 1/4 - 3/8
9452001 MB 312 334 1/2 - 3/4		
5		Cod. Ref.
		9252201 SR 114 138 312 334
6		Cod. Ref.
		9251302 CVI 114 138 312 334

7		Cod. Ref.
		9250605 MO 114 138 1/4 - 3/8 02
		9250606 MO 114 138 1/4 3/8 04
		9250607 MO 114 138 1/4 3/8 08
		9250608 MO 114 138 1/4 3/8 012
		9450605 MO 312 334 1/2 3/4 04
		9450606 MO 312 334 1/2 3/4 08
9450607 MO 312 334 1/2 3/4 012		
8		Cod. Ref.
		9250800 CS 114 138 1/4 - 3/8 02
		9250810 CS 114 138 1/4 - 3/8 04
		9250811 CS 114 138 1/4 - 3/8 08
		9250812 CS 114 138 1/4 - 3/8 012
		9450805 CS 312 334 1/2 - 3/4 04
		9450806 CS 312 334 1/2 - 3/4 08
9450807 CS 312 334 1/2 - 3/4 012		
9		Cod. Ref.
		9250813 CSV3V 114 138 1/4 - 3/8
		9450809 CSV3V 312 334 1/2 - 3/4
10		Cod. Ref.
		9250704 OTR 114 138 1/4 - 3/8
9450704 OTR 312 334 1/2 - 3/4		
11		Cod. Ref.
		9250902 OTR 114 138 1/4 - 3/8 5
		9250903 OTR 114 138 1/4 - 3/8 20
		9250904 OTR 114 138 1/4 - 3/8 50
		9450902 OTR 312 334 1/2 - 3/4 5
9450903 OTR 312 334 1/2 - 3/4 20		
9450904 OTR 312 334 1/2 - 3/4 50		
12		Cod. Ref.
		9220001 TE 114 1/4 C SEDE
		9220101 TE 114 1/4
		9320001 TE 138 3/8 C SEDE
		9320101 TE 138 3/8
		9420001 TE 312 1/2 C SEDE
9420101 TE 312 1/2		
9520001 TE 334 3/4 C SEDE		
9520101 TE 334 3/4		

This device combines a filter and a pressure regulator in a single unit. It has the dual function of filtering and regulating air from the compressor.

As the filter regulator is made up of the same elements as the regulator and the filter, the performance is the same.

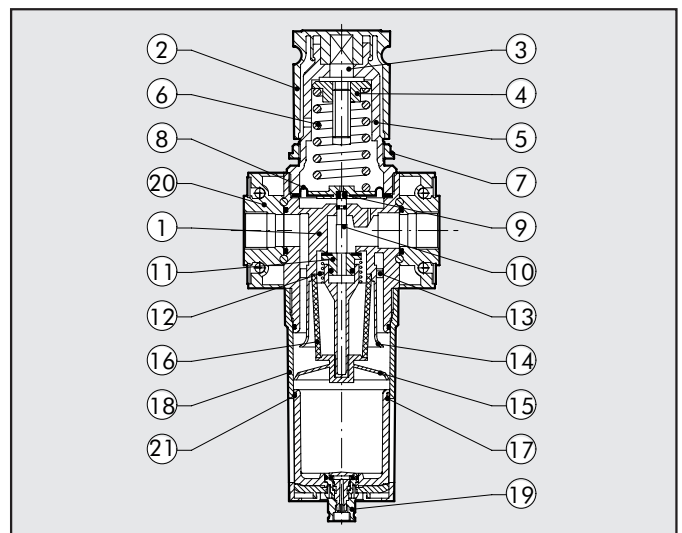
- High flow rates with low load loss.
- Special rolling diaphragm – higher flow rate, greater stability, improved sensitivity.
- Rapid relief of downstream overpressures.
- Stability of the regulated pressure as the mains pressure fluctuates.
- Maximum degree of condensate separation.
- 360° condensate level display.
- Condensate drain with manual/semi-automatic or automatic function.



TECHNICAL DATA	FR 100	FR 100	FR 200	FR 200	FR 200	FR 300	FR 300	FR 300
Threaded port	1/4"	3/8"	1/4"	3/8"	1/2"	1/2"	3/4"	1"
Setting range bar	0÷2 - 0÷4 - 0÷8 - 0÷12		0÷2 - 0÷4 - 0÷8 - 0÷12			0÷2 - 0÷4 - 0÷8 - 0÷12		
Degree of filtration	5µm - 20µm - 50µm		5µm - 20µm - 50µm			5µm - 20µm - 50µm		
Max. input pressure	1.5 MPa - 15 bar - 217 psi		1.3 MPa - 13 bar - 188 psi			1.3 MPa - 13 bar - 188 psi		
Flow rate at 6.3 bar (0.63 MPa-91 psi)	NI/min	1100		1600			3500	
ΔP 0.5 bar (0.05 MPa - 7 psi)	scfm	39		57			125	
Flow rate at 6.3 bar (0.63 MPa-91 psi)	NI/min	1600		3000			5600	
ΔP 1 bar (0.1 MPa - 14 psi)	scfm	57		71			200	
Fluid	Filtered, lubricated or unlubricated compressed air. Lubrication, if used, must be continuous.							
Max temperature	°C	50		50			50	
at 1 MPa; 10 bar; 145 psi	°F	122		122			122	
Weight	Kg	0.5		1			1.8	
Wall fixing screws		M4x50		M5x60			M5x70	
Mounting position		Vertical						
Pressure gauge port		G 1/8"		G 1/8"			G 1/8"	
Bowl capacity	cm <sup>3</sup>	22		45			75	
Drain		Manual/semi-auto (RMSA) Automatic (SAC)		Manual/semi-auto (RMSA) Automatic (SAC)			Manual/semi-auto (RMSA) Automatic (RA)	
Notes	The regulator pressure must always be set upwards. For increased sensitivity, use a pressure regulator with a rated pressure as close as possible to the required value. Do not take air from pressure gauge ports.							

## COMPONENTS

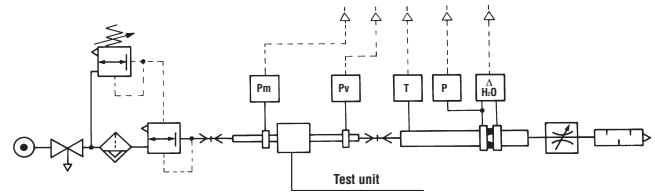
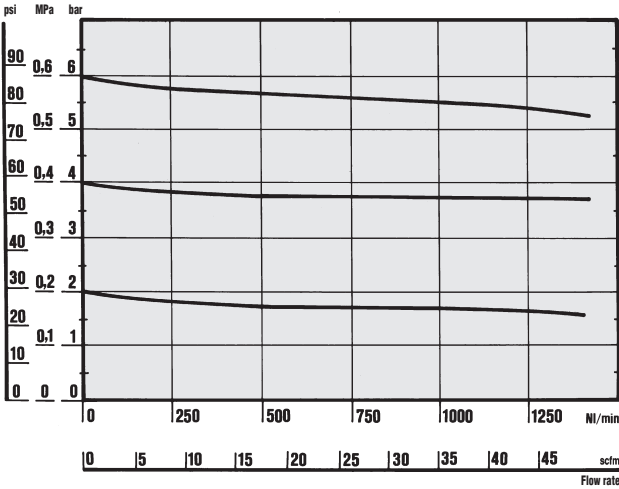
- |                                    |   |
|------------------------------------|---|
| ① Technopolymer body               | ⑭ Technopolymer baffle plug                                 |
| ② Technopolymer knob               | ⑮ Technopolymer screen                                      |
| ③ OT58 brass adjusting screw       | ⑯ Sintered bronze filtered cartridge                        |
| ④ OT58 brass scroll                | ⑰ Clear technopolymer glass                                 |
| ⑤ Technopolymer bell               | ⑱ Bowl: technopolymer for FR100 and FR200, metal for FR 300 |
| ⑥ Steel adjusting spring           | ⑲ Drain (RMSA)  |
| ⑦ Technopolymer ring nut           | ⑳ Zamak end plate   |
| ⑧ Rolling diaphragm                | ㉑ NBR gaskets   |
| ⑨ NBR relieving gasket             |   |
| ⑩ OT58 brass stem                  |   |
| ⑪ Valve with NBR vulcanized gasket |   |
| ⑫ Stainless steel valve spring     |   |
| ⑬ Technopolymer centrifuge         |   |





FR 100 1/4 - 3/8

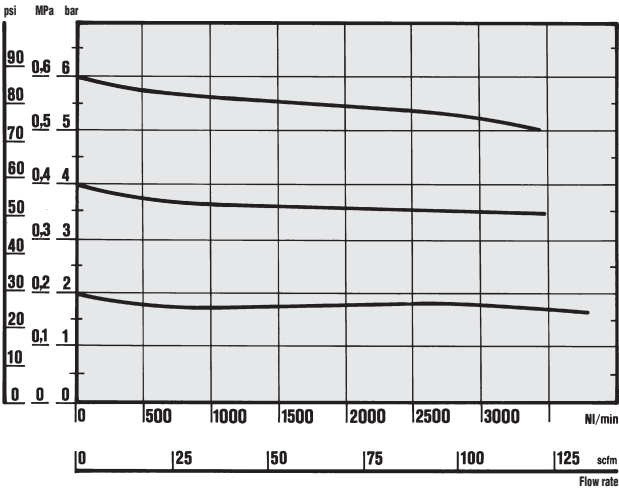
Preset pressure  
Pm = 7 bar - 0.7 MPa - 100 psi



● Flow tests carried out at the Department of Mechanics, Turin Polytechnic, using the computerized test bench following CETOP RP50R recommendations (ISO DIS 6358-2-approved) with ISO 5167 diaphragm gauge.

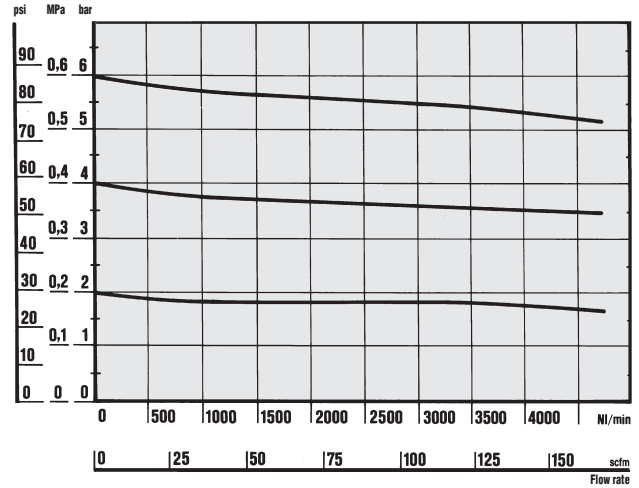
FR 200 1/4 - 3/8 - 1/2

Preset pressure  
Pm = 7 bar - 0.7 MPa - 100 psi

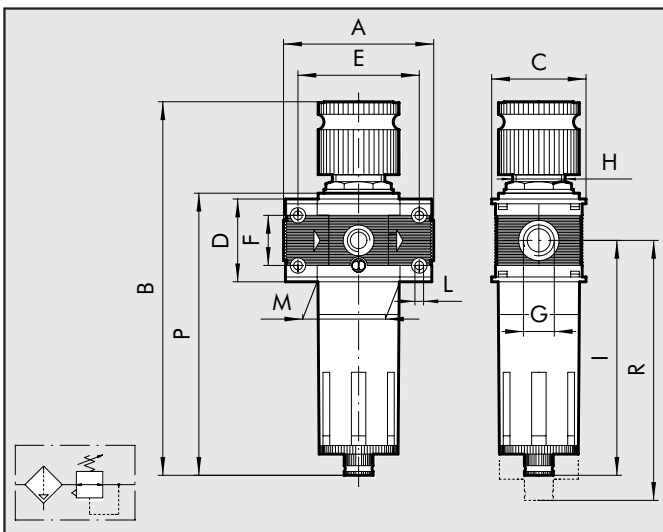


FR 300 1/2 - 3/4 - 1

Preset pressure  
Pm = 7 bar - 0.7 MPa - 100 psi



DIMENSIONS



	FR 100	FR 100	FR 200	FR 200	FR 200	FR 300	FR 300	FR 300
	G 1/4	G 3/8	G 1/4	G 3/8	G 1/2	G 1/2	G 3/4	G 1"
A	78			93.5		110		112
B	199			245				
C	50			63		72		
D	43			55		92		
E	63			78.5				
F	26			36				
G	G 1/4	G 3/8	G 1/4	G 3/8	G 1/2	G 1/2	G 3/4	G 1"
H	30x1.5			40x1.5				
I	122.5			147.5		162.5		
L	M4 hole			M5 hole				
M	43			55.5		65		
P	147			178				
R	137			196		215		

## KEY TO CODES

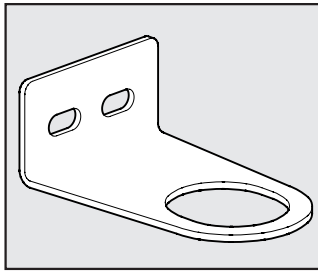
FR	100	1/4	5µm	02	RMSA
ELEMENT	SIZE	THREADED PORT	DEGREE OF FILTRATION	SETTING RANGE	TYPE OF DRAIN
FR	100	1/4	5 µm 20 µm 50 µm	0 ÷ 2 bar 0 ÷ 4 bar 0 ÷ 8 bar 0 ÷ 12 bar	RMSA
	200	3/8			SAC
	300	1/2			RMSA RA

**RMSA:** Semi-auto drain  
**SAC:** Automatic drain for sizes 100 and 200. Operates by depression – requires variable air take-offs.  
**RA:** Automatic drain for size 300. Float-type operation irrespective of the pressure and flow rate.

## ORDERING CODES

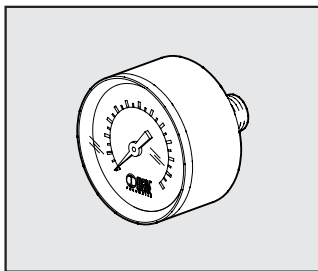
Code	Description	Code	Description	Code	Description
<b>SK 100 FILTER REGULATOR</b>		<b>SK 200 FILTER REGULATOR</b>		<b>SK 300 FILTER REGULATOR</b>	
3283007A	FR 100 5 08 RMSA WITHOUT END PLATES	3483007A	FR 200 5 08 RMSA WITHOUT END PLATES	4483004A	FR 300 5 08 RMSA WITHOUT END PLATES
3283008A	FR 100 20 08 RMSA WITHOUT END PLATES	3483008A	FR 200 20 08 RMSA WITHOUT END PLATES	4483005A	FR 300 20 08 RMSA WITHOUT END PLATES
3283009A	FR 100 50 08 RMSA WITHOUT END PLATES	3483009A	FR 200 50 08 RMSA WITHOUT END PLATES	4483006A	FR 300 50 08 RMSA WITHOUT END PLATES
3283010A	FR 100 5 012 RMSA WITHOUT END PLATES	3483010A	FR 200 5 012 RMSA WITHOUT END PLATES	4483007A	FR 300 5 012 RMSA WITHOUT END PLATES
3283011A	FR 100 20 012 RMSA WITHOUT END PLATES	3483011A	FR 200 20 012 RMSA WITHOUT END PLATES	4483008A	FR 300 20 012 RMSA WITHOUT END PLATES
3283012A	FR 100 50 012 RMSA WITHOUT END PLATES	3483012A	FR 200 50 012 RMSA WITHOUT END PLATES	4483009A	FR 300 50 012 RMSA WITHOUT END PLATES
3283031A	FR 100 5 08 SAC WITHOUT END PLATES	3483031A	FR 200 5 08 SAC WITHOUT END PLATES	4483013A	FR 300 5 08 RA WITHOUT END PLATES
3283032A	FR 100 20 08 SAC WITHOUT END PLATES	3483032A	FR 200 20 08 SAC WITHOUT END PLATES	4483014A	FR 300 20 08 RA WITHOUT END PLATES
3283033A	FR 100 50 08 SAC WITHOUT END PLATES	3483033A	FR 200 50 08 SAC WITHOUT END PLATES	4483015A	FR 300 50 08 RA WITHOUT END PLATES
3283034A	FR 100 5 012 SAC WITHOUT END PLATES	3483034A	FR 200 5 012 SAC WITHOUT END PLATES	4483016A	FR 300 5 012 RA WITHOUT END PLATES
3283035A	FR 100 20 012 SAC WITHOUT END PLATES	3483035A	FR 200 20 012 SAC WITHOUT END PLATES	4483017A	FR 300 20 012 RA WITHOUT END PLATES
3283036A	FR 100 50 012 SAC WITHOUT END PLATES	3483036A	FR 200 50 012 SAC WITHOUT END PLATES	4483018A	FR 300 50 012 RA WITHOUT END PLATES
3283007	FR 100 1/4 5 08 RMSA	3483007	FR 200 1/4 5 08 RMSA	4483004	FR 300 1/2 5 08 RMSA
3283008	FR 100 1/4 20 08 RMSA	3483008	FR 200 1/4 20 08 RMSA	4483005	FR 300 1/2 20 08 RMSA
3283009	FR 100 1/4 50 08 RMSA	3483009	FR 200 1/4 50 08 RMSA	4483006	FR 300 1/2 50 08 RMSA
3283010	FR 100 1/4 5 012 RMSA	3483010	FR 200 1/4 5 012 RMSA	4483007	FR 300 1/2 5 012 RMSA
3283011	FR 100 1/4 20 012 RMSA	3483011	FR 200 1/4 20 012 RMSA	4483008	FR 300 1/2 20 012 RMSA
3283012	FR 100 1/4 50 012 RMSA	3483012	FR 200 1/4 50 012 RMSA	4483009	FR 300 1/2 50 012 RMSA
3283031	FR 100 1/4 5 08 SAC	3483031	FR 200 1/4 5 08 SAC	4483013	FR 300 1/2 5 08 RA
3283032	FR 100 1/4 20 08 SAC	3483032	FR 200 1/4 20 08 SAC	4483014	FR 300 1/2 20 08 RA
3283033	FR 100 1/4 50 08 SAC	3483033	FR 200 1/4 50 08 SAC	4483015	FR 300 1/2 50 08 RA
3283034	FR 100 1/4 5 012 SAC	3483034	FR 200 1/4 5 012 SAC	4483016	FR 300 1/2 5 012 RA
3283035	FR 100 1/4 20 012 SAC	3483035	FR 200 1/4 20 012 SAC	4483017	FR 300 1/2 20 012 RA
3283036	FR 100 1/4 50 012 SAC	3483036	FR 200 1/4 50 012 SAC	4483018	FR 300 1/2 50 012 RA
3383007	FR 100 3/8 5 08 RMSA	3583007	FR 200 3/8 5 08 RMSA	4583004	FR 300 3/4 5 08 RMSA
3383008	FR 100 3/8 20 08 RMSA	3583008	FR 200 3/8 20 08 RMSA	4583005	FR 300 3/4 20 08 RMSA
3383009	FR 100 3/8 50 08 RMSA	3583009	FR 200 3/8 50 08 RMSA	4583006	FR 300 3/4 50 08 RMSA
3383010	FR 100 3/8 5 012 RMSA	3583010	FR 200 3/8 5 012 RMSA	4583007	FR 300 3/4 5 012 RMSA
3383011	FR 100 3/8 20 012 RMSA	3583011	FR 200 3/8 20 012 RMSA	4583008	FR 300 3/4 20 012 RMSA
3383012	FR 100 3/8 50 012 RMSA	3583012	FR 200 3/8 50 012 RMSA	4583009	FR 300 3/4 50 012 RMSA
3383031	FR 100 3/8 5 08 SAC	3583031	FR 200 3/8 5 08 SAC	4583013	FR 300 3/4 5 08 RA
3383032	FR 100 3/8 20 08 SAC	3583032	FR 200 3/8 20 08 SAC	4583014	FR 300 3/4 20 08 RA
3383033	FR 100 3/8 50 08 SAC	3583033	FR 200 3/8 50 08 SAC	4583015	FR 300 3/4 50 08 RA
3383034	FR 100 3/8 5 012 SAC	3583034	FR 200 3/8 5 012 SAC	4583016	FR 300 3/4 5 012 RA
3383035	FR 100 3/8 20 012 SAC	3583035	FR 200 3/8 20 012 SAC	4583017	FR 300 3/4 20 012 RA
3383036	FR 100 3/8 50 012 SAC	3583036	FR 200 3/8 50 012 SAC	4583018	FR 300 3/4 50 012 RA
		3683007	FR 200 1/2 5 08 RMSA	4683004	FR 300 1 5 08 RMSA
		3683008	FR 200 1/2 20 08 RMSA	4683005	FR 300 1 20 08 RMSA
		3683009	FR 200 1/2 50 08 RMSA	4683006	FR 300 1 50 08 RMSA
		3683010	FR 200 1/2 5 012 RMSA	4683007	FR 300 1 5 012 RMSA
		3683011	FR 200 1/2 20 012 RMSA	4683008	FR 300 1 20 012 RMSA
		3683012	FR 200 1/2 50 012 RMSA	4683009	FR 300 1 50 012 RMSA
		3683031	FR 200 1/2 5 08 SAC	4683013	FR 300 1 5 08 RA
		3683032	FR 200 1/2 20 08 SAC	4683014	FR 300 1 20 08 RA
		3683033	FR 200 1/2 50 08 SAC	4683015	FR 300 1 50 08 RA
		3683034	FR 200 1/2 5 012 SAC	4683016	FR 300 1 5 012 RA
		3683035	FR 200 1/2 20 012 SAC	4683017	FR 300 1 20 012 RA
		3683036	FR 200 1/2 50 012 SAC	4683018	FR 300 1 50 012 RA

**MOUNTING BRACKET FOR REG.** Code Description



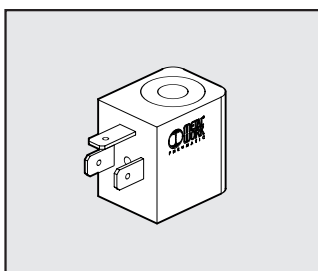
9200701	SF100- BIT-ND1/4
9400701	SF200-ND-3/8 1/2
9400702	SF300

**PRESSURE GAUGES** Code Description



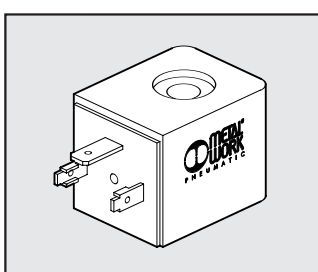
9700101	ACC. M 40 1/8 12
9700102	ACC. M 40 1/8 04
9800101	ACC. M 50 1/8 12
9800102	ACC. M 50 1/8 04
9900101	ACC. M 63 1/4 12

**CONTROL FOR APR and V3V SOLENOID** Code Description



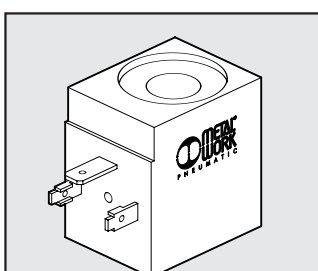
W0215000101	COIL 2W 383.24V CC
W0215000111	COIL 2W 391.24V 50/60HZ
W0215000121	COIL 2W 393.110V 50/60HZ
W0215000131	COIL 2W 394.220V 50/60HZ

**ELECTRIC CONTROL FOR V3V APR WITH CNOMO** Code Description



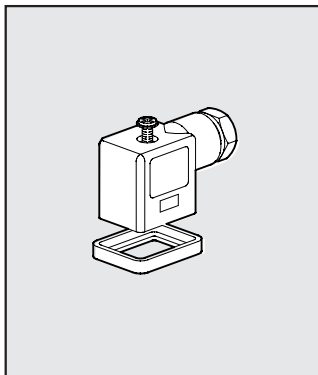
W0210010100	COIL 30 D8 5W-24VDC
W0210011100	COIL 30 D8 5VA-24VAC 50/60 HZ
W0210012100	COIL 30 D8 5VA-110VAC 50/60 HZ
W0210013100	COIL 30 D8 5VA-220VAC 50/60 HZ

**ELECTRIC CONTROL FOR CDV CDML LUBRICATOR** Code Description



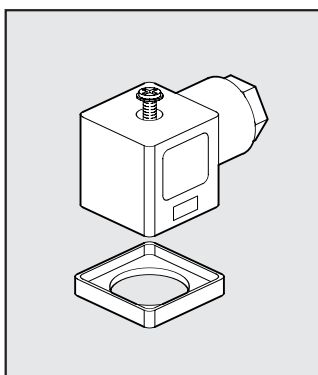
W0216001001	COIL 24 V CC
W0216001011	COIL 24V 50/60HZ
W0216001021	COIL 110V 50/60HZ
W0216001031	COIL 220V 50/60HZ

**ELECTRIC CONNECTOR FOR V3V-APR ELPN** Code Description



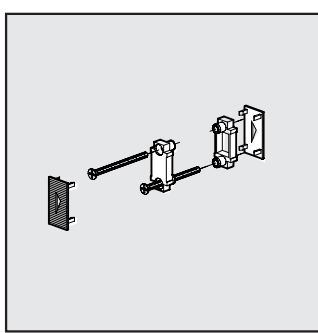
W0970510012	ACC. CONNECTOR 22 LED 24V
W0970510013	ACC. CONNECTOR 22 LED 110V
W0970510014	ACC. CONNECTOR 22 LED 220V
W0970510015	ACC. CONNECTOR 22 LED VDR 24V
W0970510016	ACC. CONNECTOR 22 LED VDR 110V
W0970510017	ACC. CONNECTOR 22 LED VDR 220V

**ELECTRIC CONNECTOR FOR V3V APR WITH CNOMO** Code Description



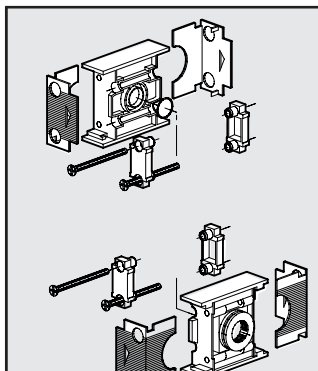
W0970520033	ACC. CONNECTOR 30 STD
W0970520034	ACC. CONNECTOR 30 LED 24V
W0970520035	ACC. CONNECTOR 30 LED 110V
W0970520036	ACC. CONNECTOR 30 LED 220V
W0970520037	ACC. CONNECTOR 30 LED VDR 24V
W0970520038	ACC. CONNECTOR 30 LED VDR 110V
W0970520039	ACC. CONNECTOR 30 LED VDR 220V

**CONNECTOR KIT FOR SKILLAIR CODE A** Code Description



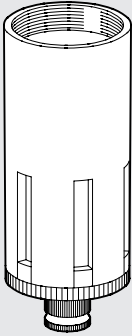
9230301	ACC. CONNECTOR KIT 100
9330301	ACC. CONNECTOR KIT 200
9430301	ACC. CONNECTOR KIT 300
9630301	ACC. CONNECTOR KIT 400

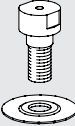
**INPUT/OUTPUT END PLATE KIT** Code Description

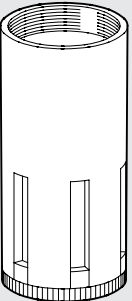


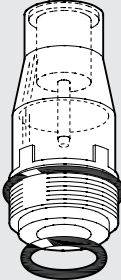
9230401	ACC. IN/OUT END PLATE KIT 100 1/4
9330501	ACC. IN/OUT END PLATE KIT 100 3/8
9330601	ACC. IN/OUT END PLATE KIT 200 1/4
9330701	ACC. IN/OUT END PLATE KIT 200 3/8
9330801	ACC. IN/OUT END PLATE KIT 200 1/2
9430701	ACC. IN/OUT END PLATE KIT 300 1/2
9530901	ACC. IN/OUT END PLATE KIT 300 3/4
9531001	ACC. IN/OUT END PLATE KIT 300 1"
9631001	ACC. IN/OUT END PLATE KIT 400 1"
9631101	ACC. IN/OUT END PLATE KIT 400 1 1/4"
9631201	ACC. IN/OUT END PLATE KIT 1 1/2"
9631301	ACC. IN/OUT END PLATE KIT 2"

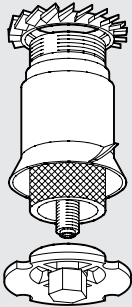
# SPARES Skillair®

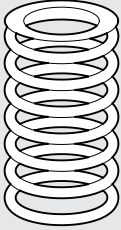
FILTER BOWL	Code	Description
	9253301	SPARES TF 100 RMSA
	9255301	SPARES TF 100 SAC
	9353301	SPARES TF 200 1/2 RMSA
	9355301	SPARES TF 200 1/2 SAC
	9453401	SPARES TF 300 RMSA
	9453301	SPARES TF 300 RA
	9653401	SPARES TF 400 RMSA
9653301	SPARES TF 400 RA	

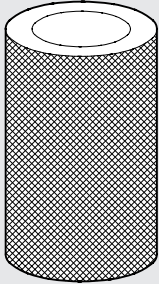
VENTURI LUBRICATOR DIAPHRAGM	Code	Description
	9252001	SPARES MB 100 ND 1/4
	9352001	SPARES MB 200 N/D 3/8-1/2
	9452001	SPARES MB 300 1/2 3/4
	9652601	SPARES MB 400

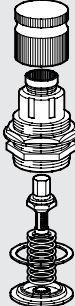
LUBRICATOR BOWL	Code	Description
	9253501	SPARES TL 100
	9202503	SPARES TL 100 CA
	9202502	SPARES TL 100 CD
	9202501	SPARES TL 100 ML
	9353501	SPARES TL 200
	9302501	SPARES TL 200 CA
	9302503	SPARES TL 200 CD
	9302502	SPARES TL 200 ML
	9453501	SPARES TL 300
	9202403	SPARES TL 300 CA
	9202401	SPARES TL 300 CD
	9202402	SPARES TL 300 ML
	9653501	SPARES TL 400
	9653502	SPARES TL 400 CA
9653504	SPARES TL 400 CD	
9653503	SPARES TL 400 ML	

TRANSPARENT LUBRICATOR COVER	Code	Description
	9251302	SPARES CVL 100-200-300-400 BIT

FILTERING ELEMENTS	Code	Description
	9251705	SPARES FP 100 5
	9251706	SPARES FP 100 20
	9251707	SPARES FP 100 50
	9351705	SPARES FP 200 5
	9351706	SPARES FP 200 20
	9351707	SPARES FP 200 50
	9451705	SPARES FP 300 5
	9451706	SPARES FP 300 20
	9451707	SPARES FP 300 50
	9651706	SPARES FP 400 5
	9651707	SPARES FP 400 20
	9651705	SPARES FP 400 50

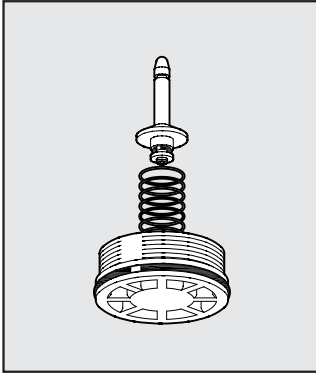
SPRINGS FOR REDUCERS AND FRs	Code	Description
	9250605	RIC.MO 100 02
	9250606	RIC.MO 100 04
	9250607	RIC.MO 100 08
	9250608	RIC.MO 100 012
	9350605	RIC.MO 200 02
	9350606	RIC.MO 200 04
	9350607	RIC.MO 200 08
	9350608	RIC.MO 200 012
	9450605	RIC.MO 300 04
	9450606	RIC.MO 300 08
	9450607	RIC.MO 300 012
	9450608	RIC.MO 300 02

FILTERING/PURIFICATION ELEMENTS	Code	Description
	9251711	KIT SPARES FP DEP. 100
	9351711	KIT SPARES FP DEP. 200
	9451711	KIT SPARES FP DEP. 300
	9651711	KIT SPARES FP DEP. 400

UPPER COVER FOR REGULATOR AND FR	Code	Description
	9250800	RIC.CS 100 02
	9250810	RIC.CS 100 04
	9250811	RIC.CS 100 08
	9250812	RIC.CS 100 012
	9350800	RIC.CS 200 02
	9350810	RIC.CS 200 04
	9350811	RIC.CS 200 08
	9350812	RIC.CS 200 012
	9450805	RIC.CS 300 04
	9450806	RIC.CS 300 08
	9450807	RIC.CS 300 012
	9450808	RIC.CS 300 02

**COMPLETE POPPET FOR REGULATORS**

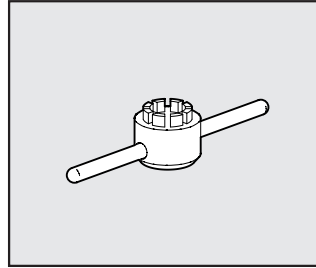
Code Description



- 9250704 SPARES OTR 100
- 9350704 SPARES OTR 200
- 9450704 SPARES OTR 300
- 9650704 SPARES OTR 400

**POPPET DISASSEMBLY SPANNER (FOR REG.)**

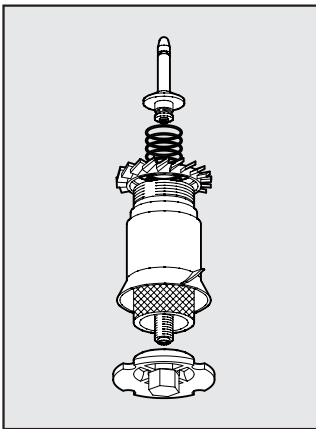
Code Description



- 9220501 SPARES R CAP DISASS.  
WR. 100
- 9323501 SPARES R CAP DISASS.  
WR. 200
- 9420501 SPARES R CAP DISASS.  
WR. 300

**COMPLETE POPPET FOR FR**

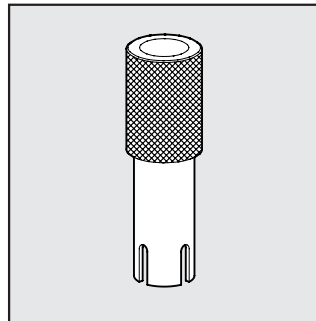
Code Description



- 9250902 SPARES OTFR 100 1/4 3/8 5
- 9250903 SPARES OTFR 100 1/4 3/8 20
- 9250904 SPARES OTFR 100 1/4 3/8 50
- 9350902 SPARES OTFR 200 1/4 3/8 1/2 5
- 9350903 SPARES OTFR 200 1/4 3/8 1/2 20
- 9350904 SPARES OTFR 200 1/4 3/8 1/2 50
- 9450902 SPARES OTFR 300 1/2 3/4 5
- 9450903 SPARES OTFR 300 1/2 3/4 20
- 9450904 SPARES OTFR 300 1/2 3/4 50

**POPPET DISASSEMBLY SPANNER (FOR FR)**

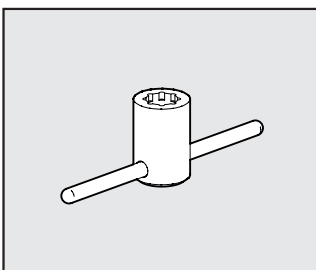
Code Description



- 9220801 SPARES FR CAP DISASS.  
WR. 100
- 9320801 SPARES FR CAP DISASS.  
WR. 200
- 9420801 SPARES FR CAP DISASS.  
WR. 300

**UPPER COVER DISASSEMBLY SPANNER**

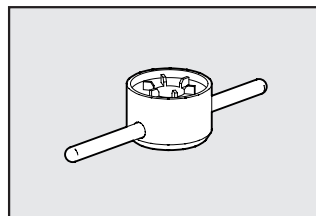
Code Description



- 9220701 SPARES COVER SPANNER

**CAP DISASSEMBLY SPANNER**

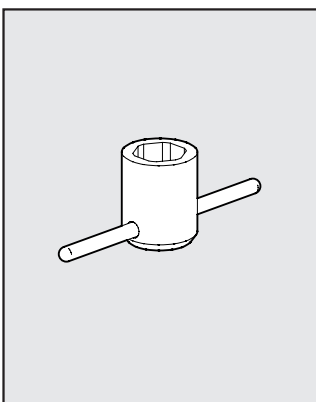
Code Description



- 9220601 SPARES CAP DISASS. 100
- 9323601 SPARES CAP DISASS. 200
- 9420601 SPARES CAP DISASS. 300

**REG and FR VISUAL DOME DISASSEMBLY SPANNER**

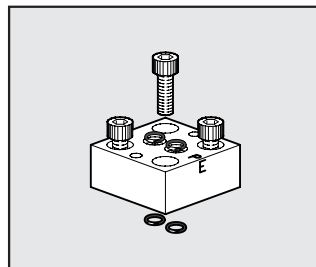
Code Description



- 9220401 SPARES DOME  
DIS. SPANNER 100
- 9323401 SPARES DOME  
DIS. SPANNER 200
- 9420401 SPARES DOME  
DIS. SPANNER 300

**PROVISION FOR SOLENOID CONTROL TO CNOMO FOR APR-300 AND V3V 300**

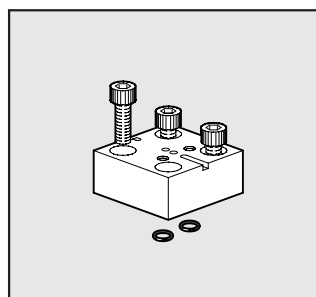
Code Description



- 9454001 SPARES PCE TO CNOMO

**PROVISION FOR MICRO SOLENOID CONTROL FOR APR-300 and V3V 300**

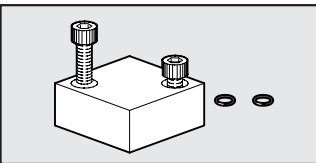
Code Description



- 9453601 SPARES PCE MICRO

**PROVISION FOR PNEUMATIC CONTROL FOR APR-300 and V3V 300**

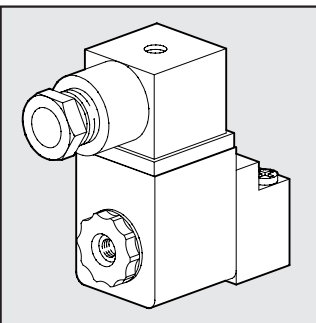
Code Description



9453701 SPARES PCP PNEUMATIC

**CNOMO SOLENOID CONTROL FOR APR-300 and V3V 300**

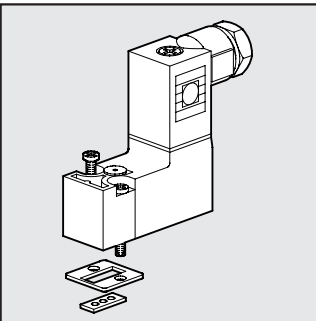
Code Description



9453901 SPARES CEC CNOMO 24CC  
 9453902 SPARES CEC CNOMO 24V  
 9453903 SPARES CEC CNOMO 110V  
 9453904 SPARES CEC CNOMO 220V

**MICRO SOLENOID CONTROL FOR APR-300 and V3V 300**

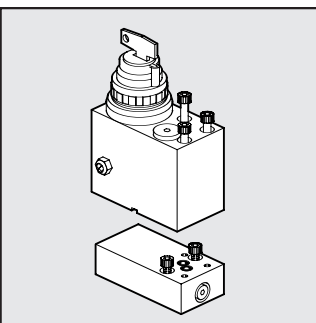
Code Description



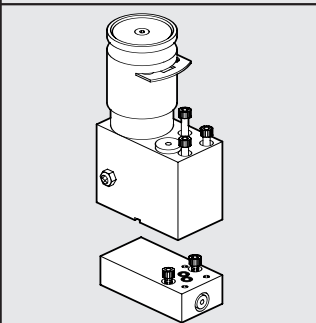
9453801 SPARES CEM MICRO 24CC  
 9453802 SPARES CEM MICRO 24V  
 9453803 SPARES CEM MICRO 110V  
 9453804 SPARES CEM MICRO 220V

**V3V CONTROL 400**

Code Description



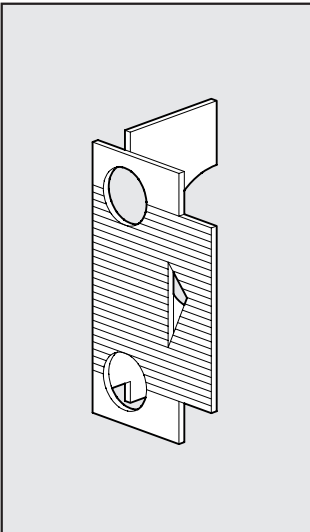
9455401 SPARES KIT C.C. 400



9455601 SPARES KIT LOCKABLE 400

**INPUT/OUTPUT COVER PLATE**

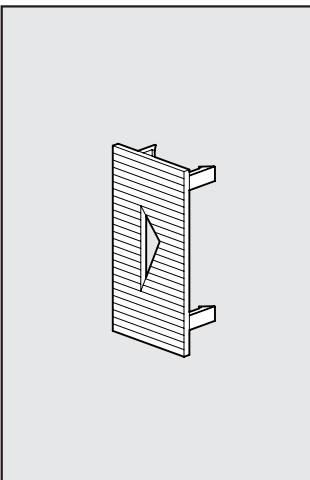
Code Description



9152103 SPARES OUTPUT COVER PLATE 100  
 9152105 SPARES INPUT COVER PLATE 100  
 9152115 SPARES OUTPUT COVER PLATE 200  
 9152116 SPARES INPUT COVER PLATE 200  
 9152104 SPARES OUTPUT COVER PLATE 300  
 9152106 SPARES INPUT COVER PLATE 300  
 9152118 SPARES OUTPUT COVER PLATE 400  
 9152119 SPARES INPUT COVER PLATE 400

**INTERMEDIATE COVER PLATE**

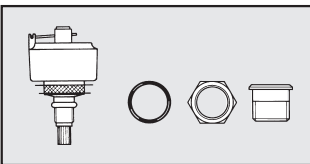
Code Description



9152107 SPARES INTERMEDIATE COVER PLATE 100  
 9152114 SPARES INTERMEDIATE COVER PLATE 200  
 9152108 SPARES INTERMEDIATE COVER PLATE 300  
 9152117 SPARES INTERMEDIATE COVER PLATE 400

**AUTODRAIN (RA)**

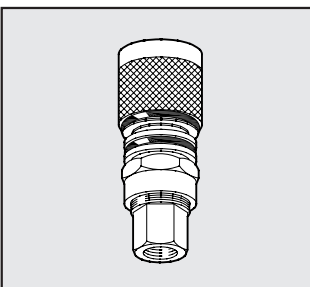
Code Description



9000802 RIC. RA 300-400

**AUTODRAIN TAP (SAC)**

Code Description



9000803 RIC. SAC 100-200



NFPA SIZE:  
D03 & D05

# DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, DIRECT OPERATED

## Common 115

D03	D05	Symbol
D03S-1A-115A-35	D05S-1A-115A-35	A
D03S-1AY-115A-35	D05S-1AY-115A-35	AY
D03S-2B-115A-35	D05S-2B-115A-35	B
D03S-2C-115A-35	D05S-2C-115A-35	C
D03S-2F-115A-35	D05S-2F-115A-35	F
D03S-2H-115A-35	D05S-2H-115A-35	H
D03S-2K-115A-35	D05S-2K-115A-35	K
D03S-2T-115A-35	D05S-2T-115A-35	T
D03S-3A-115A-35	D05S-3A-115A-35	A

## Common Configurations

### Electrical Box

### Din Coil



## Ordering Information



### SOLENOID DIRECTIONAL VALVE PART NUMBERING SYSTEM:

**D03 S-2 B-115 A-35** Example: D03 Valve, double solenoid, 3 position, spring centered, all ports blocked in center, 115 volt- ac coils

Size	Code	Actuator	Code	Configuration	Code	Spool Function	Voltage	Current/ Connector
D03	S	Solenoid	1	Single solenoid • 2 position spring offset	A	P to A, B to T	12	A AC
D05	SD	Soln. w/ Din Coil	2	Double solenoid • 3 position spring centered	AY	P to A, B to T	24	D DC
	SX	Electric Shockless	3	Double solenoid • 2 position no center, detented	B	All Ports Blocked	115	W/ Light DIN only:
	SDX	Electric Shockless Din Coil	5	Single solenoid • 2 position spring centered	C	A & B Blocked P to T	230	AL AC
	SF	Hydraulic Shockless			F	A & B to T P Blocked		DL DC
	SDF	Hydraulic Din Coil- Shockless			H	All Ports Open		
					K	A to T P & B Blocked		
					T	P to A & B, T Blocked		

**Seal Options:** "V" for Viton- specify after current type Ex: D03S-2B-115A-V-35

Specify: (special order)  
SL for lead wire  
SP for single spade plug

Notes:  
Other Voltages available.  
Lights included standard on electrical box style.

Code "R" (reversed) added behind spool code for flow supplied opposite of standard.  
Codes 1AR & 1AYR spool & coil reversed  
Codes 2+R & 3AR electrical box reversed  
Code 5+R coil provided on reversed to side

A spool is closed in transition  
AY spool is open in transition

# DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, DIRECT OPERATED



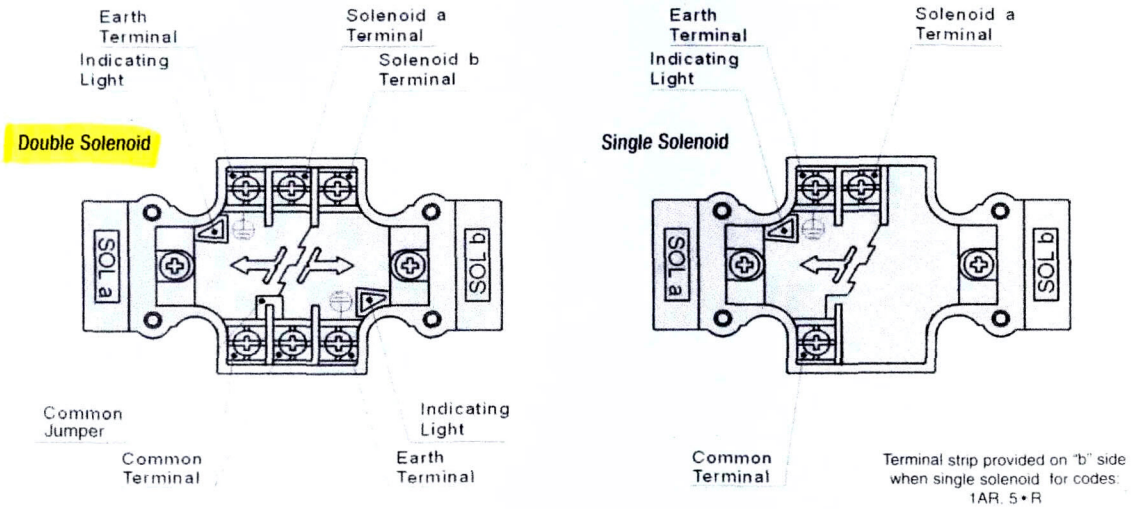
NFPA SIZE:  
D03 & D05

## Electrical Information

D03	Solenoid Coil Specifications											
Solenoid Voltage	115V-AC			230V-AC			115V-RAC (rectified)		230V-RAC (rectified)		12V-DC	24V-DC
Coil Model D03S (Elect. Box)	2BH-C1/C3			2BH-C2/C4			2BF-R1/R3		2BF-R2/R4		2BF-D1	2BF-D2
Coil Model D03SD (DIN)	2AH-C1/C3			2AH-C2/C4			2AF-R1/R3		2AF-R2/R4		2AF-D1	2AF-D2
Applied Voltage	AC110		AC120	AC220		AC240	AC110 AC120		AC220 AC240		DC12	DC24
Frequency (Hz)	50	60	60	50	60	60	50 / 60		50 / 60			
Starting Current (A)	2.2	2.0	2.2	1.1	1.0	1.0						
Holding Current (A)	0.54	0.41	0.47	0.25	0.19	0.23	0.31	0.32	0.15	0.16	2.5	1.25
Holding Power (W)	25	22	28	25	22	28	30	32	30	32	30	30
Permissible Voltage Range (V)	80-120			180-240			80-130		180-250		10.8-13.2	21.6-26.4
Insulation Resistance (MΩ)	100 or above (500V)											

D05	Solenoid Coil Specifications											
Solenoid Voltage	115V-AC			230V-AC			115V-RAC (rectified)		230V-RAC (rectified)		12V-DC	24V-DC
Coil Model D05S (Elect. Box)	3BH-C1/C3			3BH-C2/C4			3EB-R1/R3		3EB-R2/R4		3EB-D1	3EB-D2
Coil Model D05SD (DIN)	3AH-C1/C3			3AH-C2/C4			3EA-R1/R3		3EA-R2/R4		3EA-D1	3EA-D2
Applied Voltage	AC110		AC120	AC220		AC240	AC110 AC120		AC220 AC240		DC12	DC24
Frequency (Hz)	50	60	60	50	60	60	50 / 60		50 / 60			
Starting Current (A)	5.5	4.6	5.0	2.7	2.3	2.5						
Holding Current (A)	1.1	0.86	1.0	0.52	0.42	0.48	0.46	0.49	0.22	0.24	3.0	1.5
Holding Power (W)	36	34	42	36	34	32	31	34	30	33	31	36
Permissible Voltage Range (V)	80-120			180-240			80-130		180-250		10.8-13.2	21.6-26.4
Insulation Resistance (MΩ)	100 or above (500V)											

## Electrical Box Wiring



- Notes:
- DIN Coils manufactured to accept standard 3 pin DIN 43 650 and ISO 4400 connectors.
  - AC Coils are rated for both 50/60Hz (rewiring not required)
  - DC coils are not polarity sensitive
  - Rectifier is supplied: in the electrical box- D03S, D05S in the coil (internal)- D03SD, D05SD
  - Hydraulic shockless AC valves are always supplied with rectifier.
  - Hydraulic shockless valves will not operate as shockless until the tank line has become filled with oil- occurs automatically after the first few cycles. Mounting valve below the reservoir oil level or using check valve ensures that the tank line remains filled.
  - Do not supply electrical power to the AC coils unless the coil is mounted on the valve.
  - Do not exceed voltage specifications shown above.



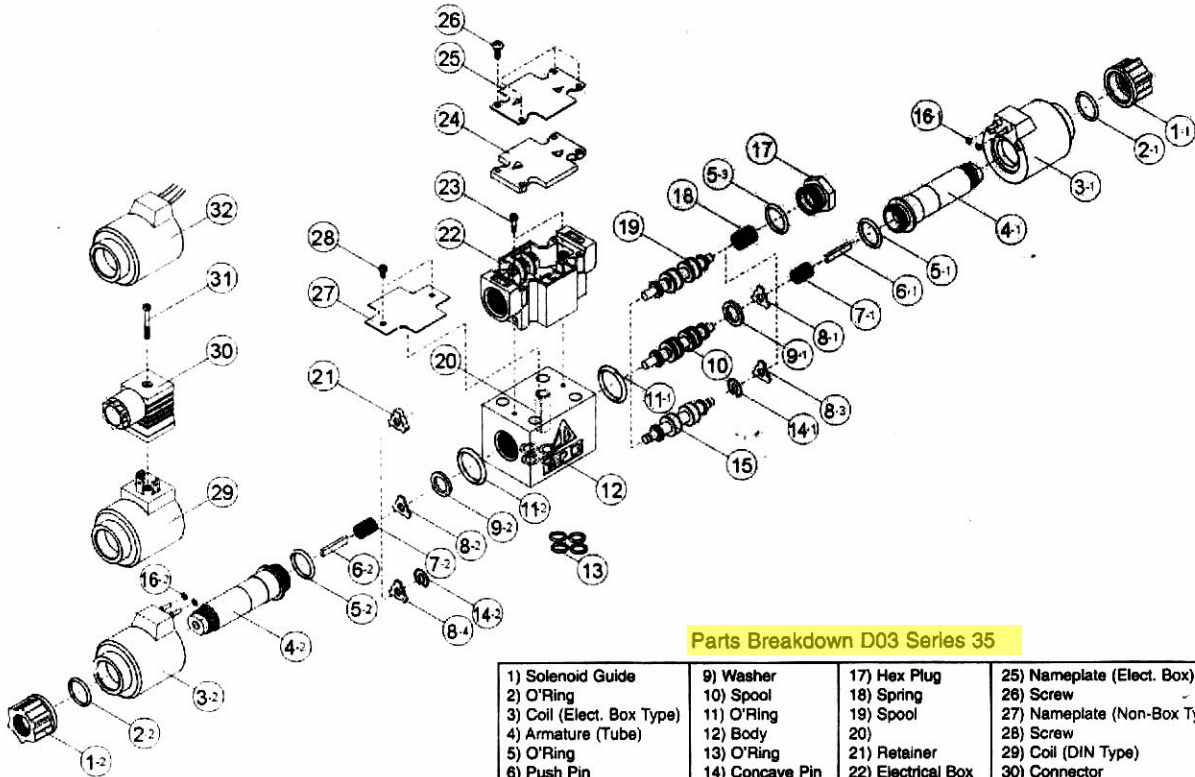


NFPA SIZE:  
D03 & D05

# DIRECTIONAL CONTROL VALVES

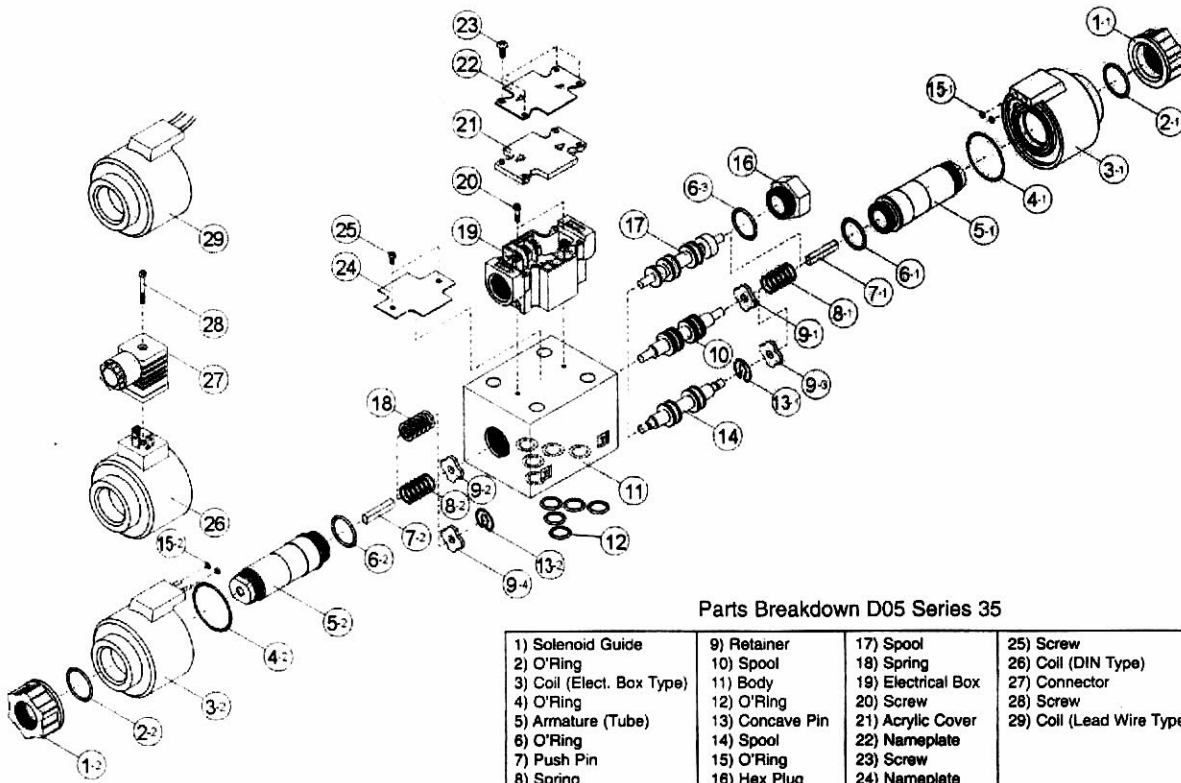
SOLENOID ACTUATED, DIRECT OPERATED

## Illustrated Parts Breakdown



Parts Breakdown D03 Series 35

1) Solenoid Guide	9) Washer	17) Hex Plug	25) Nameplate (Elect. Box)
2) O'Ring	10) Spool	18) Spring	26) Screw
3) Coil (Elect. Box Type)	11) O'Ring	19) Spool	27) Nameplate (Non-Box Types)
4) Armature (Tube)	12) Body	20)	28) Screw
5) O'Ring	13) O'Ring	21) Retainer	29) Coil (DIN Type)
6) Push Pin	14) Concave Pin	22) Electrical Box	30) Connector
7) Spring	15) Spool	23)Screw	31) Screw
8) Retainer	16) O'Ring	24) Acrylic Cover	32) Coil (Lead Wire Type)



Parts Breakdown D05 Series 35

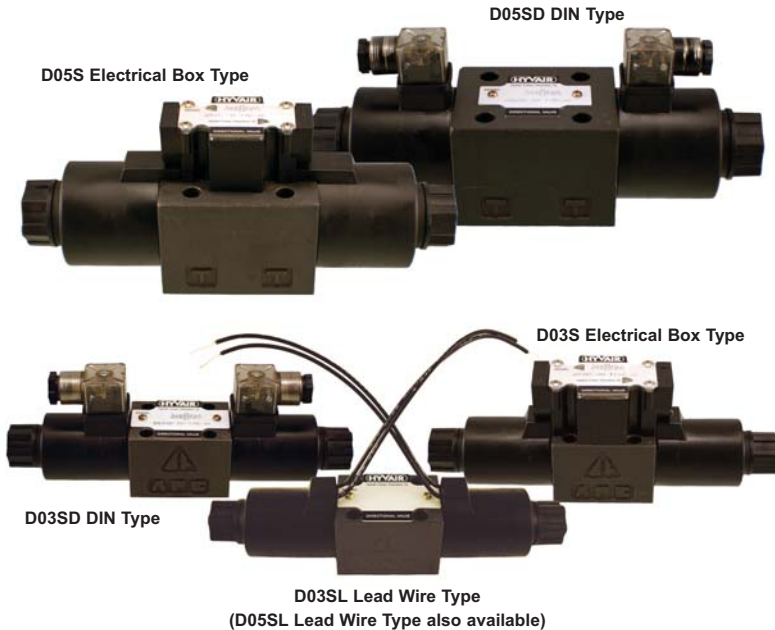
1) Solenoid Guide	9) Retainer	17) Spool	25) Screw
2) O'Ring	10) Spool	18) Spring	26) Coil (DIN Type)
3) Coil (Elect. Box Type)	11) Body	19) Electrical Box	27) Connector
4) Armature (Tube)	12) O'Ring	20) Screw	28) Screw
5) O'Ring	13) Concave Pin	21) Acrylic Cover	29) Coil (Lead Wire Type)
6) O'Ring	14) Spool	22) Nameplate	
7) Push Pin	15) O'Ring	23) Screw	
8) Spring	16) Hex Plug	24) Nameplate	

# SOLENOID VALVES

## D03 & D05 SERIES 35- SOLENOID VALVES



**Series 35  
High Flow  
High Pressure  
Directional Valves**



NFPA SIZE: D03 & D05

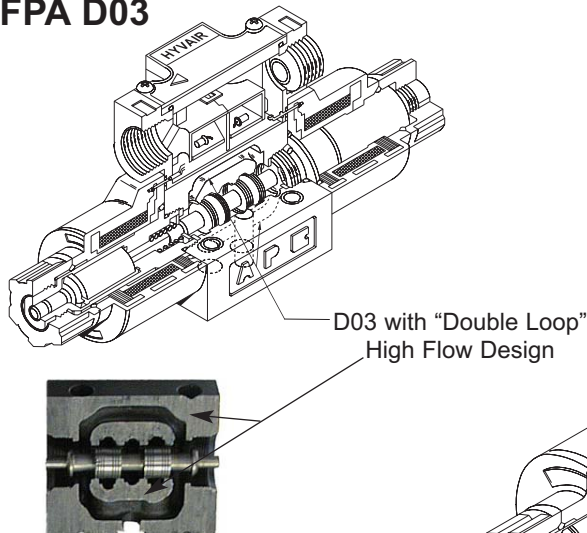
### Features

- High Flow/ High Pressure:** Up to 25 gpm (D03) and 40 gpm (D05)/ 5000 psi working pressure\*.
- Oil Immersed, Quiet Solenoid Design:** Moving core immersed in hydraulic oil provides quiet operation.
- High Tank Port Pressure:** Up to 3000 psi tank port back pressure (Check each spool type for max. allowable).
- Twin Tank Line Design:** Upper and lower tank line channels (Double Loop) greatly reduces pressure drop.
- Wiring:** Electrical box with indicator lights and terminal strip connection standard. DIN connector provided standard on DIN style coils. (Connectors may optionally be supplied with lights.)
- Hydraulic/ Electric Shockless:** Valve coils available electric shockless (rectified)- reducing voltages spikes, extending relay contact life, and providing even quieter operation. Spool shifting time is increased up to four times by metering the oil in the core tube. Option F (Electrical Box version only)
- Maintenance:** Indicator lamps to diagnose connection; Plug-in coils provide easy changing without disturbing wiring.
- High Reliability:** Valve designed to last 30 million spool shifts under proper use.
- Bolt Kit included with valve standard**

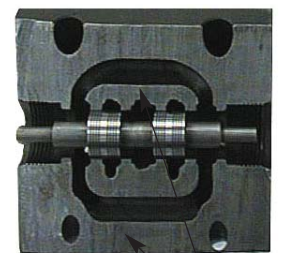
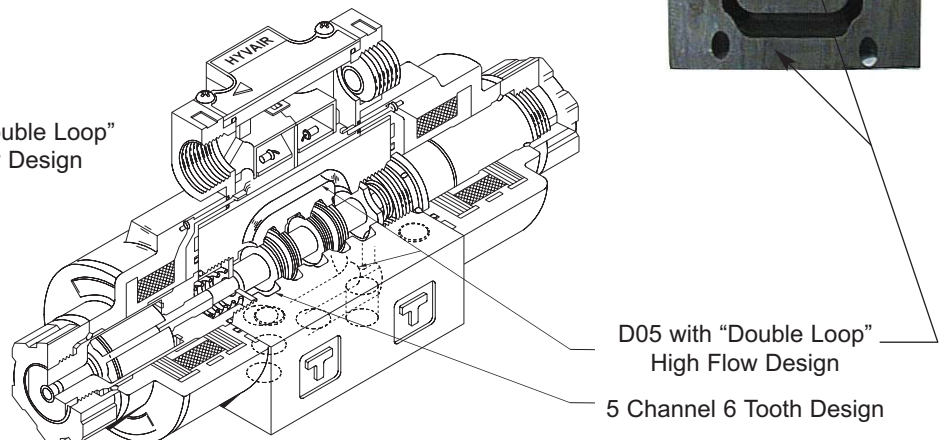
\*Some spools rated less- check max. pressures and flows chart

### Internal Structure

#### NFPA D03



#### NFPA D05



Electrical box with indicator lights and terminal strip connection standard.

Electrical boxes shown with optional rectifiers. (Code X)



# SOLENOID VALVES

## D03 & D05 SERIES 35- SOLENOID VALVES



### Specifications

NFPA SIZE: D03 & D05

Model		D03 Series				D05 Series									
		Standard type		Hydraulic Shockless type		Standard type				Hydraulic Shockless type					
		Max. operating pressure psi (MPa)	Max. flow l/min (gpm)	Max. operating pressure psi (Mpa)	Max. flow gpm (liters/min)	AC		DC & Rectified		Max. operating pressure psi (Mpa)	Max. flow gpm (liters/min)				
Max. operating pressure psi (Mpa)	Max. flow gpm (liters/min)					Max. operating pressure psi (Mpa)	Max. flow gpm (liters/min)								
Symbol	Valve spool type														
	1A8	5000 (35)	7.9 (30)	30 (7.9)	10.6 (40)	22.5 (85)	22.5 (85)	3600 (25)	50 (13.2)	10.6 (40)	3600 (25)	18.5 (70)	25 (3620)	26.4 (100)	22.5 (85)
	1A8R														
	3A8														
	1A														
	1AR														
	3A														
	1AY														
	1ARY														
	3AY														
	5B														
	5BR														
	2J														
	2B														
	2T														
	2K1														
	2F1														
	2K	AC: 65 (17.1) DC: 80 (21.1)													
	2F														
	2H														
	2C	3600 (25)	50 (13.2)	10.6 (40)	3600 (25)	18.5 (70)	25 (3620)	26.4 (100)	22.5 (85)						
	2C5														

Note: The maximum flow capacity is shown here. The maximum flow of each valve differs depending on pressure. See HP (Pressure-Flow) curve for each model.



# SOLENOID VALVES

## D03 & D05 SERIES 35- SOLENOID VALVES

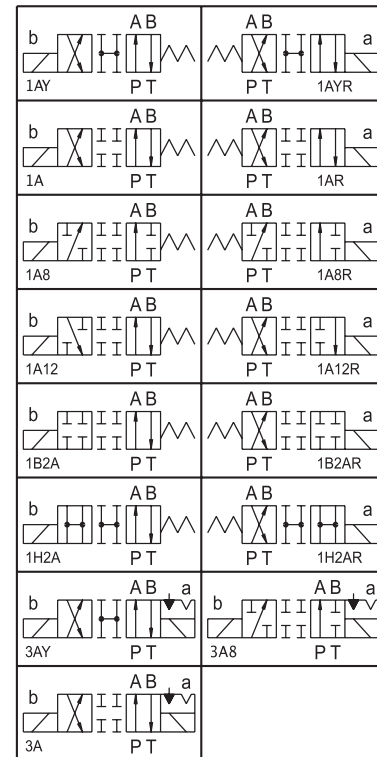
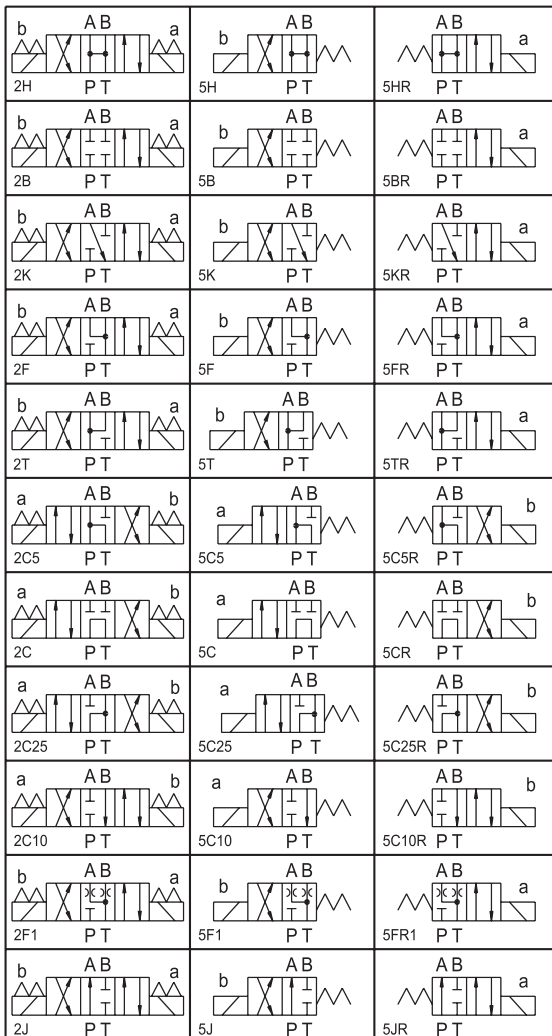


### Specifications

NFPA SIZE: D03 & D05

		D03			D05		
		AC solenoid	DC solenoid		AC solenoid	DC solenoid	
			Built-in rectifier			Built-in rectifier	
		AC	RAC	DC	AC	RAC	DC
Max. operating pressure	P, A, B ports	5070 psi (35 MPa)			Note: Less for some valve types such as hyd. shockless and tandem spool		
Maximum permissible back pressure	T port	3040 psi (35:21 MPa)			2320 psi (16 MPa)		
Changeover frequency (cycles/min)	Standard type	300	120	300	300	120	240
	Shockless type	—		120	—		120
Mounting Surface	Nfpa, (ISO)	T3.5.1.MR1-D03, (4401-03)			T3.5.1.MR1-D05, (4401-05)		
Internal Leakage	cu-in/min, (ml/min)	0.18, (3)			0.22, (3.5)		
Mass lbs (kg)	Double solenoids	4 (1.8)	4.4 (2.0)		9.2 (4.2)	11 (5.0)-35	
	Single solenoid	3.1 (1.4)	3.3 (1.5)		7.9 (3.6)	8.6 (3.9)-35	
Recommended operating conditions	Operating temperature range	-4 ~ 158 °F (-20 ~ 70 °C)			41 ~ 140° F (5 ~ 60 °C)		
	Operating viscosity	80 ~ 1400 SUS (15 ~ 300 mm /s <sup>2</sup> )					
	Viscosity index	90 or above					
	Filtration	25 µm or less					

### Symbols



# SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES



NFPA SIZE: D03 & D05

## Common 115 VAC Models

D03	D05	Symbol
D03S-1A-115A-35	D05S-1A-115A-35	A
D03S-1AY-115A-35	D05S-1AY-115A-35	AY
D03S-2B-115A-35	D05S-2B-115A-35	B
D03S-2C-115A-35	D05S-2C-115A-35	C
D03S-2F-115A-35	D05S-2F-115A-35	F
D03S-2H-115A-35	D05S-2H-115A-35	H
D03S-2K-115A-35	D05S-2K-115A-35	K
D03S-2T-115A-35	D05S-2T-115A-35	T
D03S-3A-115A-35	D05S-3A-115A-35	A

## Common Configurations

Electrical Box

Din Coil



## Ordering Information

### D03 S-2 B-115 A-35

Size	Code	Actuator	Code	Configuration	Code	Spool Function	Voltage	Current/ Connector
D03	S	Solenoid	1	Single solenoid • 2 position spring offset	A	P to A, B to T	12	A   AC D   DC
D05	SD	Soln. w/ Din Coil	2	Double solenoid • 3 position spring centered	AY	P to A, B to T	24	
	SF	Hydraulic Shockless	3	Double solenoid • 2 position no center, detented	B	All Ports Blocked	115	
			5	Single solenoid • 2 position spring centered	C	A & B Blocked P to T	230	
					F	A & B to T P Blocked		
					H	All Ports Open		
					K	A to T P & B Blocked		
					T	P to A & B, T Blocked		

Specify: (special order)  
SL for lead wire  
SP for single spade plug

Notes:  
Lights included standard on electrical box style.

## Mounting Bolt/ O'Ring Information

Size	Thread US Metric	Torque in-lbs/ (Nm)	O'Ring
D03	10 - 24 UNC	40 - 45 (4.5 - 5.1)	9mm I.D. x 2mm C.S.
D05	1/4 - 20 UNC	105 - 110 (11.9 - 12.4)	11.8mm I.D. x 2.4mm C.S.

A spool is closed in transition  
AY spool is open in transition

Code "R" (reversed) added behind spool code for flow supplied opposite of standard.  
Codes 1AR & 1AYR: spool & coil reversed  
Codes 2\*R & 3AR: electrical box reversed  
Code 5\*R: coil provided on reversed b side



# SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES



NFPA SIZE: D03 & D05

## Electrical Information

D03	Solenoid Coil Specifications											
Solenoid Voltage	115V-AC		230V-AC			115V-RAC (rectified)		230V-RAC (rectified)		12V-DC	24V-DC	
Coil Model D03S (Elect. Box)	2BH-C1/C3		2BH-C2/C4			2BF-R1/R3		2BF-R2/R4		2BF-D1	2BF-D2	
Coil Model D03SD (DIN)	2AH-C1/C3		2AH-C2/C4			2AF-R1/R3		2AF-R2/R4		2AF-D1	2AF-D2	
Applied Voltage	AC110		AC120		AC220		AC240		DC12		DC24	
Frequency (Hz)	50	60	60	50	60	60	50 / 60		50 / 60			
Starting Current (A)	2.2	2.0	2.2	1.1	1.0	1.0						
Holding Current (A)	0.54	0.41	0.47	0.25	0.19	0.23	0.31	0.32	0.15	0.16	2.5	1.25
Holding Power (W)	25	22	28	25	22	28	30	32	30	32	30	30
Permissible Voltage Range (V)	80-120		180-240			80-130		180-250		10.8-13.2	21.6-26.4	
Insulation Resistance (M $\Omega$ )	100 or above (500V)											

D05	Solenoid Coil Specifications											
Solenoid Voltage	115V-AC		230V-AC			115V-RAC (rectified)		230V-RAC (rectified)		12V-DC	24V-DC	
Coil Model D05S (Elect. Box)	3BH-C1/C3		3BH-C2/C4			3EB-R1/R3		3EB-R2/R4		3EB-D1	3EB-D2	
Coil Model D05SD (DIN)	3AH-C1/C3		3AH-C2/C4			3EA-R1/R3		3EA-R2/R4		3EA-D1	3EA-D2	
Applied Voltage	AC110		AC120		AC220		AC240		DC12		DC24	
Frequency (Hz)	50	60	60	50	60	60	50 / 60		50 / 60			
Starting Current (A)	5.5	4.6	5.0	2.7	2.3	2.5						
Holding Current (A)	1.1	0.86	1.0	0.52	0.42	0.48	0.46	0.49	0.22	0.24	3.0	1.5
Holding Power (W)	36	34	42	36	34	32	31	34	30	33	31	36
Permissible Voltage Range (V)	80-120		180-240			80-130		180-250		10.8-13.2	21.6-26.4	
Insulation Resistance (M $\Omega$ )	100 or above (500V)											

## Other Configurations

Examples of Code "R"- Reversed

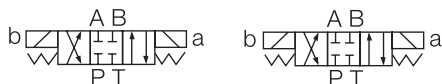
(symbols shown in simplified form)



**D03SD-2B**  
(standard)

**D03SD-2BR**

(no change to DIN coil valve, electrical box flipped for opposite coil markings)



**D03SD-1A**  
(standard)

**D03SD-1AR**

(coil supplied reversed from normal position & spool reversed)



(symbol shown blocked during valve transition only)



**D03SD-5B**  
(standard)

**D03SD-5BR**

(right or "b" coil side of valve provided)



### Notes:

- DIN Coils manufactured to accept standard 3 pin DIN 43 650 and ISO 4400 connectors.
- AC Coils are rated for both 50/60Hz (rewiring not required)
- DC coils are not polarity sensitive
- Rectifier is supplied: in the electrical box- D03S, D05S in the coil (internal)- D03SD, D05SD
- Hydraulic shockless AC valves are always supplied with rectifier.
- Hydraulic shockless valves will not operate as shockless until the tank line has become filled with oil- occurs automatically after the first few cycles. Mounting valve below the reservoir oil level or using check valve ensures that the tank line remains filled.
- Do not supply electrical power to the AC coils unless the coil is mounted on the valve.
- Do not exceed voltage specifications shown above.
- Electrical power should be maintained on detented valves (spool code 3A). Detent only maintains start-up position of the valve.



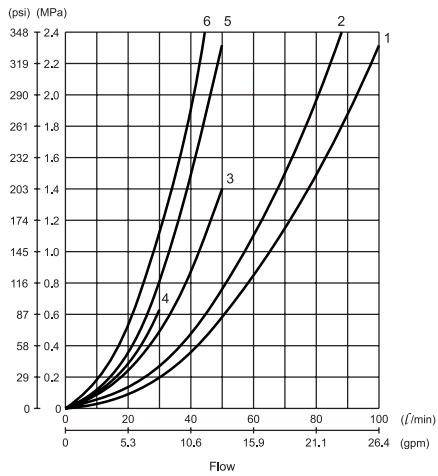
# SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES



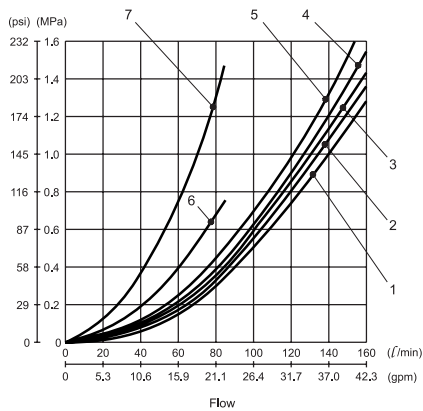
NFPA SIZE: D03 & D05

## Pressure Drop Curves



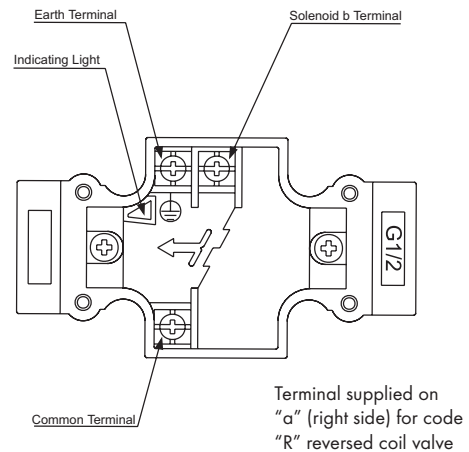
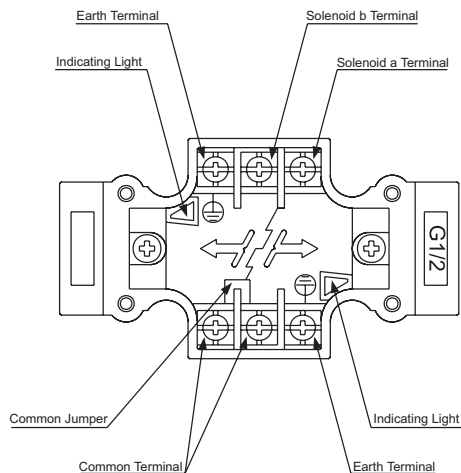
Model	Valve spool type	P→A	P→B	A→T	B→T	P→T
D03 SERIES	1A8, 1A8R, 3A8	4	4	—	—	—
	1A, 1AR	2	2	2	2	—
	3A	2	2	2	2	—
	1AY, 1AYR, 3AY	1	1	1	1	—
	2H	1	1	1	1	1
	5B, 5BR, 2B, 2F	2	2	2	2	—
	2K, 2K1	2	2	1	2	—
	2J	1	2	2	2	—
	2F	2	2	1	1	—
	2C	6	6	5	5	3
	2C5	1	6	2	5	3
	2T	1	1	2	2	—

Viscosity of hydraulic fluid 150 SUS {32 mm /s<sup>2</sup>}



Model	Valve spool type	P→A	P→B	A→T	B→T	P→T
D05 SERIES	1A8, 1A8R, 3A8	5	5	—	—	—
	5B	—	3	3	—	—
	5BR	3	—	—	3	—
	1A, 1AR, 3A	3	3	4	4	—
	1AY, 1AYR	1	1	4	4	—
	3AY	2	2	1	1	—
	2K	3	3	1	3	—
	2J	1	3	3	3	—
	2H	1	1	1	1	1
	2B, 2K1, 2F1	3	3	3	3	—
	2F	3	3	1	1	—
	2C	7	7	7	7	6
	2C5	1	7	1	7	6
2T	1	1	3	3	—	

Viscosity of hydraulic fluid 150 SUS {32 mm /s<sup>2</sup>}



# SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES

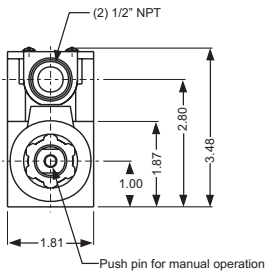


NFPA SIZE: D03 & D05

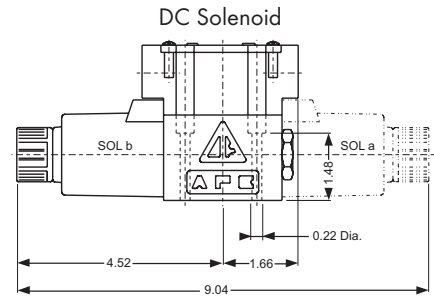
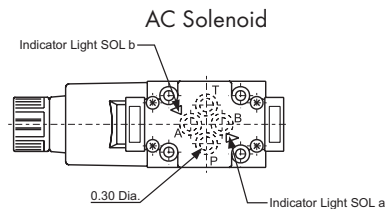
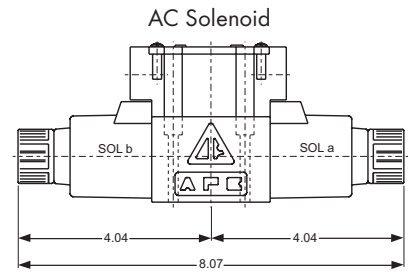
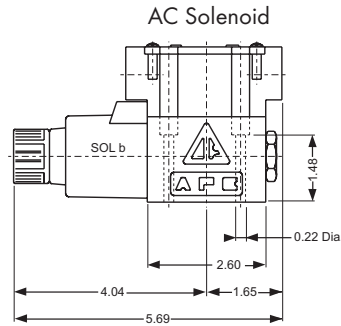
## Electrical Box Type D03S D03SF

Units: Inches

Mounting: (4) 10-24 SHCS x 1-3/4"  
Torque 40-45 in-lbs



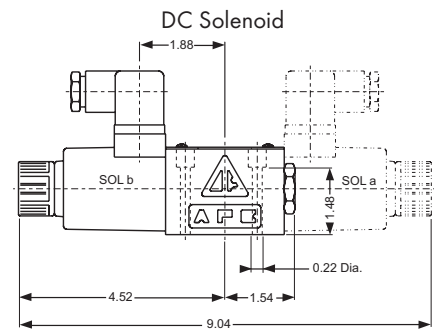
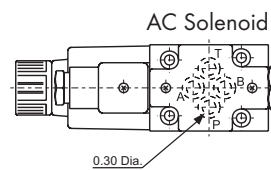
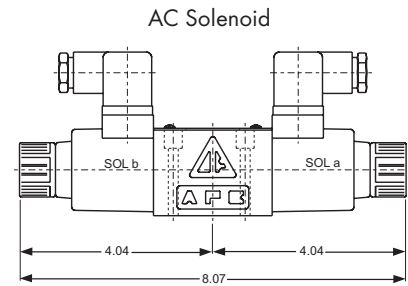
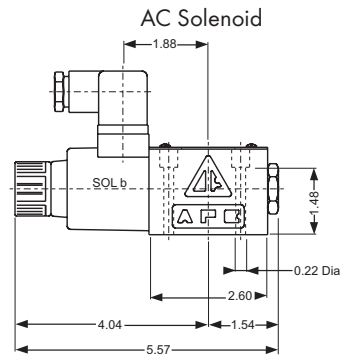
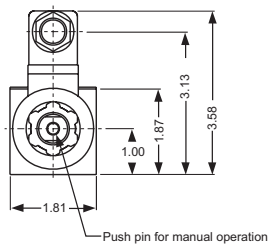
## Dimensional Data



## DIN Type D03SD

Units: Inches

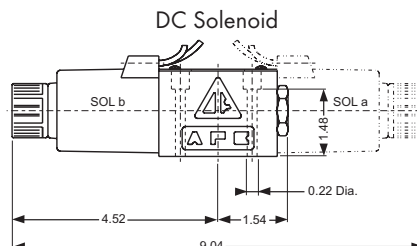
Mounting: (4) 10-24 SHCS x 1-3/4"  
Torque 40-45 in-lbs



## Lead Wire Type D03SL

Units: Inches

Mounting: (4) 10-24 SHCS x 1-3/4"  
Torque 40-45 in-lbs





# SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES



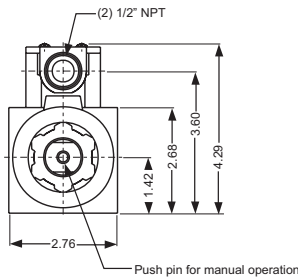
NFPA SIZE: D03 & D05

## Electrical Box Type D05S D05SF

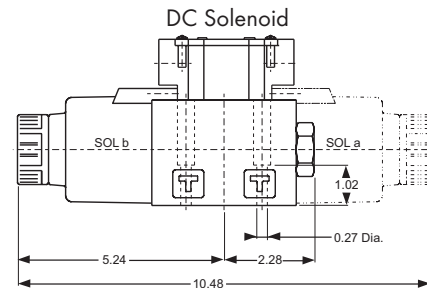
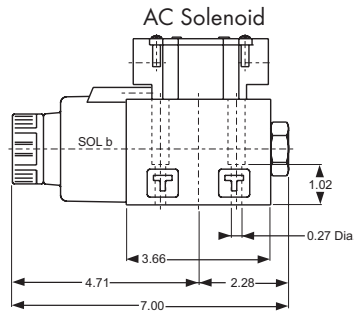
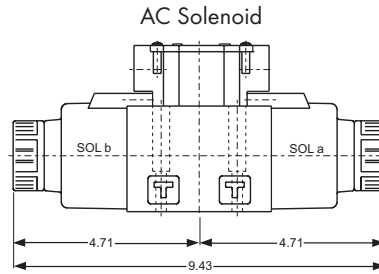
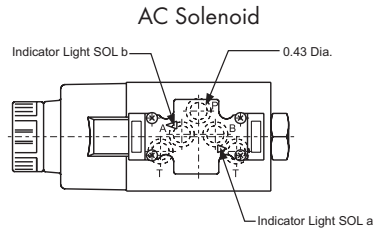
Units: Inches

Mounting: (4) 1/4-20 SHCS x 1-1/2"

Torque 105-110 in-lbs



## Dimensional Data

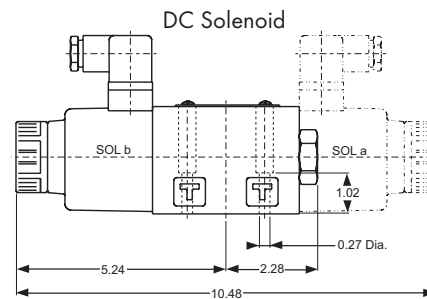
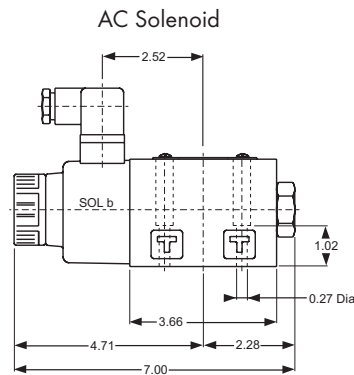
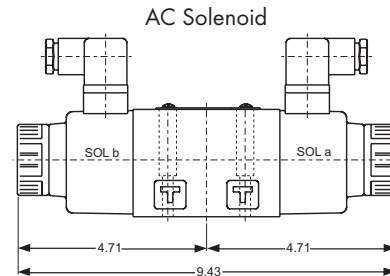
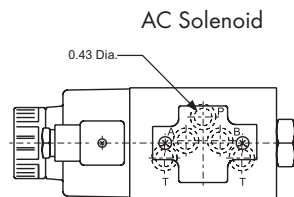
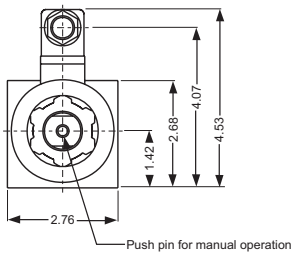


## DIN Type D05SD

Units: Inches

Mounting: (4) 1/4-20 SHCS x 1-1/2"

Torque 105-110 in-lbs

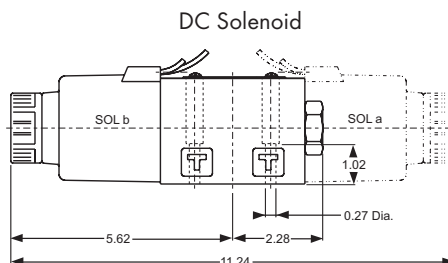


## Lead Wire Type D05SL

Units: Inches

Mounting: (4) 1/4-20 SHCS x 1-1/2"

Torque 105-110 in-lbs



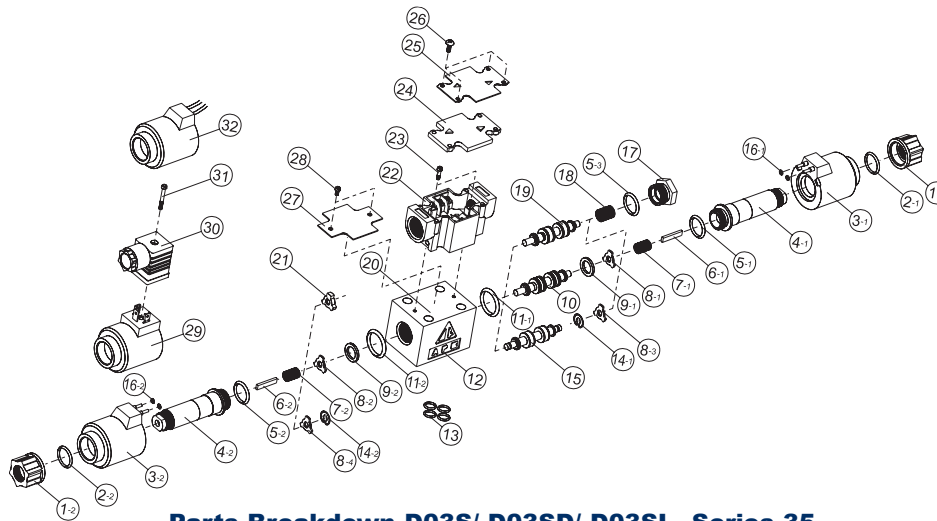
# SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES



NFPA SIZE: D03 & D05

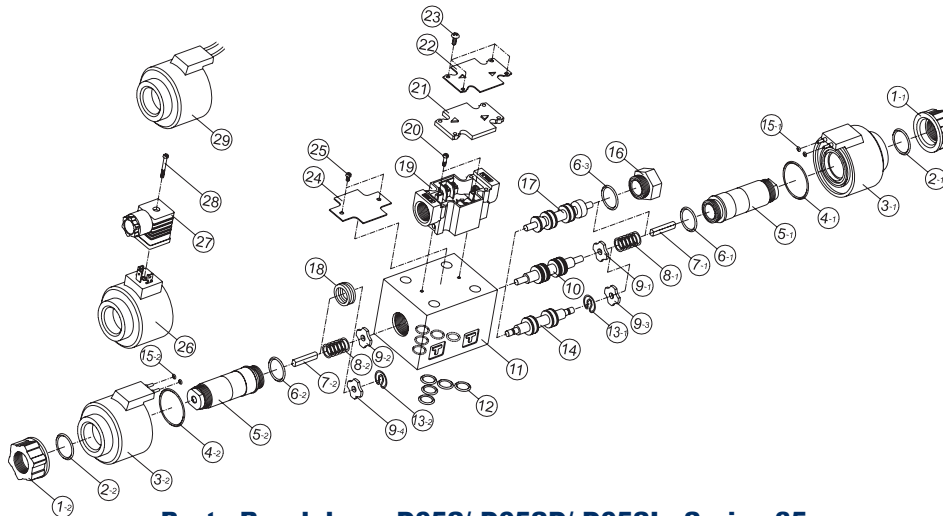
## Parts Breakdown D03S/ D03SD/ D03SL Series 35



### Parts Breakdown D03S/ D03SD/ D03SL Series 35

1) Solenoid Nut	9) Washer	17) Hex Plug	25) Nameplate (Elect. Box)
2) O-Ring	10) Spool (3 position)	18) Spring	26) Screw
3) Coil For Elect. Box Type)	11) O-Ring	19) Spool (2 pos. single coil)	27) Nameplate (Non-Box Type)
4) Armature (Core Tube)	12) Body	20) Body	28) Screw
5) O-Ring	13) O-Ring	21) Retainer	29) Coil (For DIN Type)
6) Push Pin	14) Concave Pin	22) Electrical Box	30) Connector
7) Spring	15) Spool (2 position detent)	23) Screw	31) Screw
8) Retainer	16) O-Ring	24) Acrylic Cover	32) Coil (For Lead Wire Type)

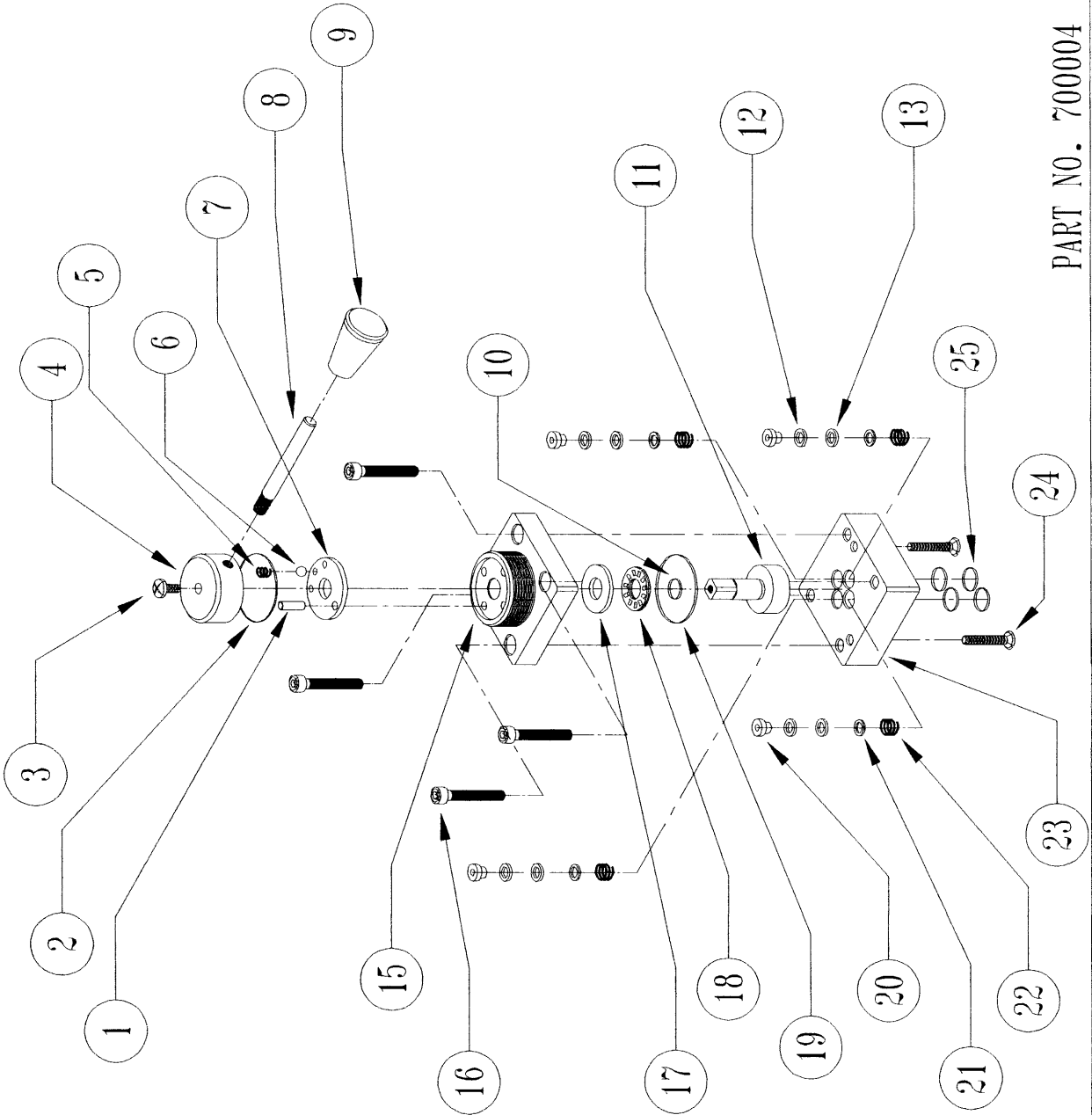
## Parts Breakdown D05S/ D05SD/ D05SL Series 35



### Parts Breakdown D05S/ D05SD/ D05SL Series 35

1) Solenoid Nut	9) Retainer	17) Spool (2 pos. single coil)	25) Screw
2) O-Ring	10) Spool (3 position)	18) Retainer	26) Coil (For DIN Type)
3) Coil For Elect. Box Type)	11) Body	19) Joint Box	27) Connector
4) O-Ring	12) O-Ring	20) Joint Box Screw	28) Screw
5) Armature (Core Tube)	13) Concave Pin	21) Acrylic Cover	29) Coil (For Lead Wire Type)
6) O-Ring	14) Spool (2 position detent)	22) Nameplate	
7) Push Pin	15) O-Ring	23) Screw	
8) Spring	16) Hex Plug	24) Nameplate (Non-Box Type)	





ITEM	QTY.	PART. #	DESCRIPTION
1.	1	670010	PIN, DOWEL
2.	1	512024	O-RING (DUSTSEAL) *
3.	1	620008	SCREW
4.	1	760014	BONNET
5.	1	960016	SPRING, DETENT
6.	1	910001	BALL, DETENT (.187)
7.	1	760015	PLATE, DETENT
8.	1	760018	HANDLE
9.	1	940002	KNOB
10.	1	512012	O-RING, SHAFT *
11.	1	760121	ROTOR
12.	4	518008	B-U RING, POPPET *
13.	4	512008	O-RING, POPPET *
14.			
15.	1	760118	BODY
16.	4	610001	SCREW, SOCKETHEAD
17.	1	970004	WASHER, THRUST
18.	1	970003	BEARING, THRUST
19.	1	512121	O-RING, BODY *
20.	4	760017	POPPET
21.	4	760019	WASHER, POPPET
22.	4	960015	SPRING, POPPET
23.	1	760013	BASE
24.	2	620006	SCREW, ASSY.
25.	4	562011	O-RING, MANIFOLD *

△ △

△ ORDER AS AN ASSY. \* INCLUDED IN SEAL KIT  
760182

**ENGINEERING**  
INCORPORATED  
5945 DEBATA WAY UNIT D GILBERT CA 95020 (408) 847-9920

SCALE: 1/2 FSCM 6 3 4 6 5 DRAWN BY: ROBERT  
DATE: 02/07 NEXT ASSY. APPR. BY:

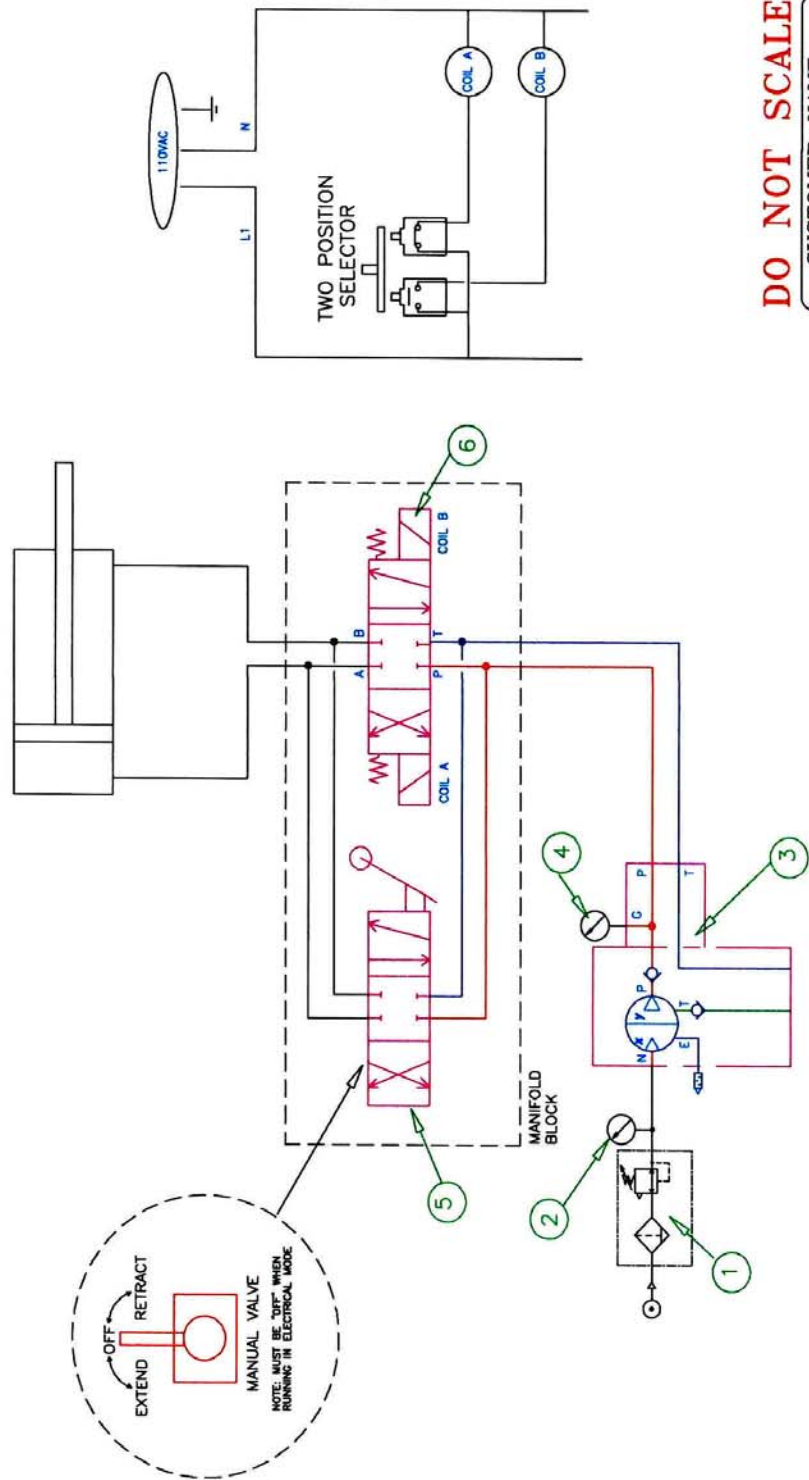
TOLERANCES  
XX ± .010  
XXX ± .005  
FRAC ± 1/32  
X ± 1/2°  
FINISH 63 RMS

TITLE  
MDC VALVE, DIRECTIONAL CONTROL  
DRAWING NO.  
CAD-19 MDCM055N0 HV  
REV. A

PART NO. 700004

BILL OF MATERIAL		
ITEM/AMT.	MANUFACTURER	DESCRIPTION
1	METALWORK	3883008U FILTER/REGULATOR
2	METALWORK	4303326 GAUGE
3	HYDRONIC	FB20-30-N-R25 PUMP
4	DYNAMIC	CF1P-210D GAUGE
5	TR-ENGINEERING	MOCL-0-7-5-N-0 MANUAL-VALVE
6	HYVAR	D03SD28119A35 SOL-VALVE

NOTES:  
 1. SOLENOID COILS TO BE SWITCHED SUCH THAT BOTH COILS ARE NEVER ENERGIZED AT THE SAME TIME.  
 2. MANUAL VALVE TO BE USED AS BACK-UP TO THE ELECTRICAL VALVE. WHEN NOT IN USE, MOVE TO THE CENTER POSITION "OFF".  
 3. VEGETABLE OIL MAY BE USED AS HYDRAULIC FLUID



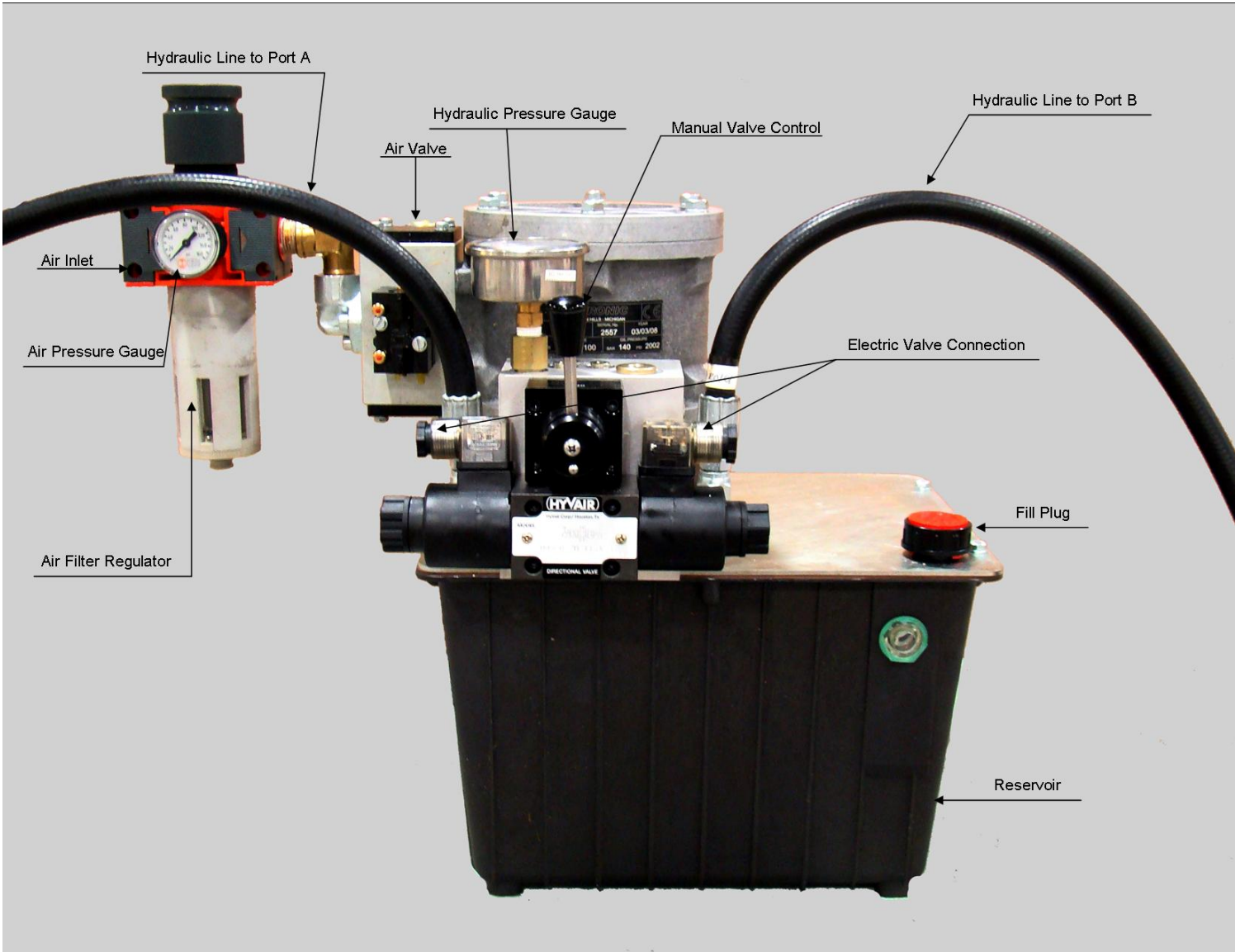
**DO NOT SCALE**

CUSTOMER-NAME  
 LOCATION

**ASE**  
 AIR SYSTEMS ENGINEERING, INC.

PART. NAME:	AIR DRIVEN PUMP SYSTEM
PART. NO.:	HCS-73843-ASE
REV.:	1
SHEET No.:	SCALE:

NAME:	
JOB NO.:	
DRAWN:	JRS
DATE:	2/26/07
TOLERANCE UNLESS OTHERWISE SPECIFIED	
.XX	± .010" .XXXX ± .0005"
.XXX	± .005" ANGLE ± 1/2°
BREAK ALL SHARP EDGES. DO NOT SCALE	



Hydraulic Line to Port A

Hydraulic Pressure Gauge

Manual Valve Control

Hydraulic Line to Port B

Air Valve

Air Inlet

Air Pressure Gauge

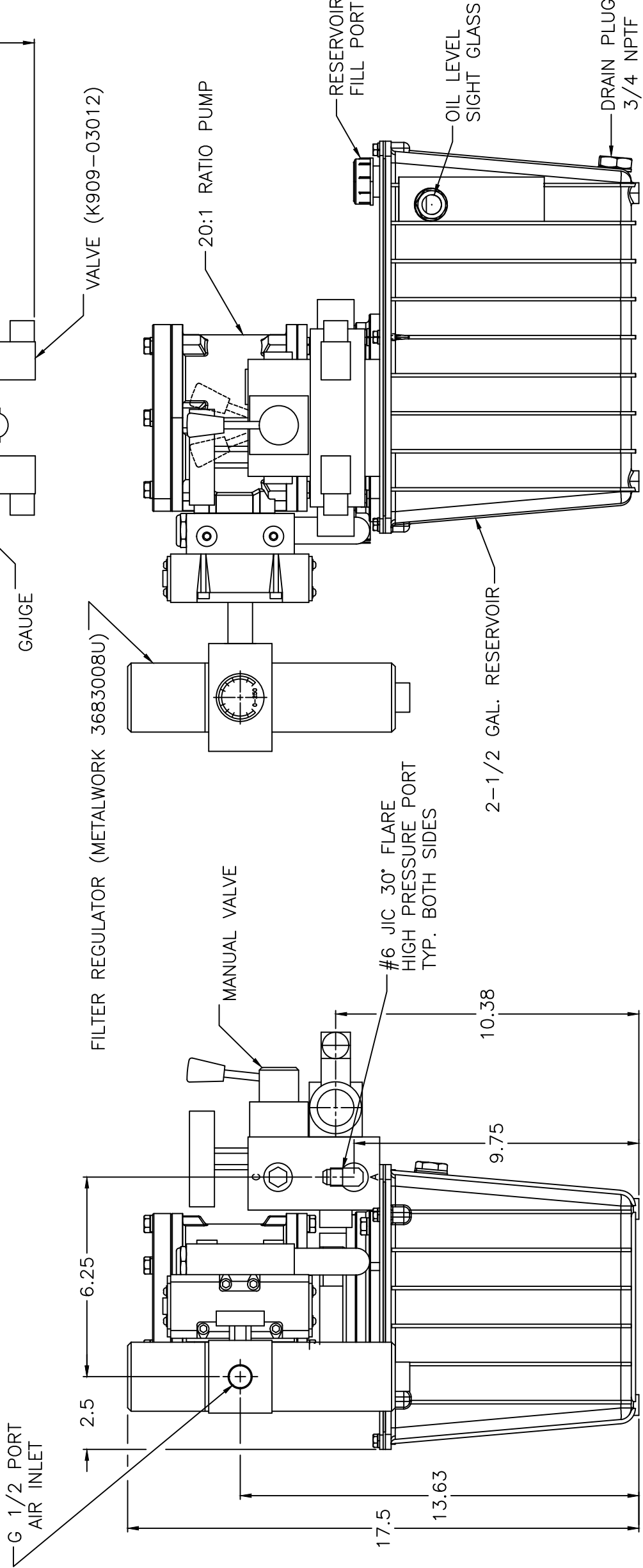
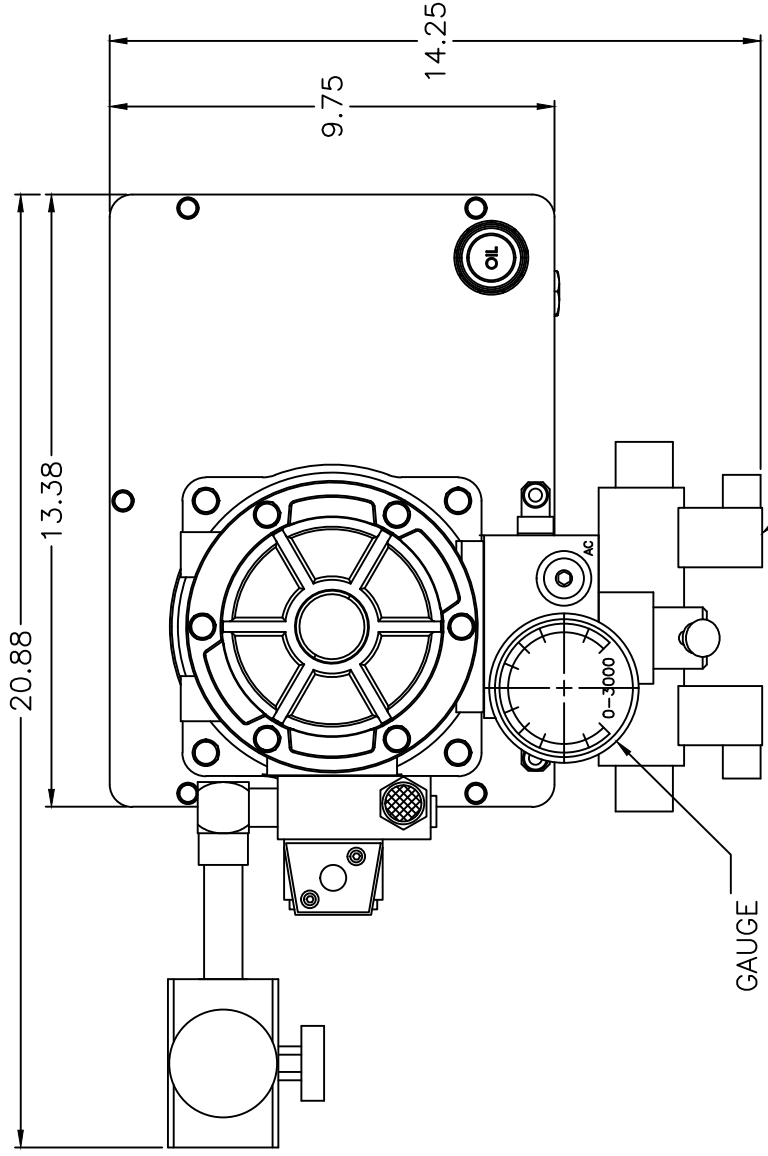
Electric Valve Connection

Air Filter Regulator

Fill Plug

Reservoir

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REV	ECN	DESCRIPTION	BY	DATE
A	K100236	RELEASE PRINT	DJ	10/28/10

DWG NO.	REV
K201-00133	

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED REMOVE BURRS & SHARP EDGES .010 MAX DO NOT SCALE DRAWING TOLERANCES ON: 2 PL DECIMALS ± .010 3 PL DECIMALS ± .005 ANGLES ± 0° 30' FRACTIONS ± .015	DWN D. BARTEK DSGN	22OCT10
	CHKD D. BARTEK APVD	22OCT10
	TREATMENT:	
	MATERIAL:	

**HYDRONIC CORPORATION**  
 32613 FOLSOM RD., FARMINGTON HILLS, MI 48336

TITLE: PUMP, AIR DRIVEN HYDRAULIC  
 230V & MANUAL 4 WAY VALVE, 20:1

DRAWING NO. K201-00133  
 SCALE: HALF