

Installation and operating instructions for Westlock 2600 Quantum series valve control monitor with mechanical switches, inductive proximity sensors or Magnum proximity switches



EPSILON 08 ATEX 2372X

Ex d IIC T* Tamb -*°C to +*°C

Ex tD A21 IP6X T*°C Tamb -*°C to +*°C

Aluminium ambient variation -20°C to +85°C (T4/T130°C); -20°C to +80°C (T5/T95°C);

-20°C to +65°C (T6/T80°C)

Stainless steel ambient variation: -60°C to +85°C (T4/T130°C); -60°C to +80°C (T5/T95°C);

-60°C to +65°C (T6/T80°C)

Environmental parameters: 80 kPa (0.8 bar) to 110 kPa (1.1 bar). Air with normal oxygen content, typically 21%.

1 Product description

The 2600 series valve control monitor provides two methods of end of travel indication by the means of mechanical switches, inductive proximity sensors or proximity switches and an external visual indicator.

For applications that require position feed back, ancillary components such as a 4-20 mA current signal transmitter or a resistive signal feed back can be installed.

The 2600 series enclosure is available in two materials; cast Aluminium or 316 stainless steel.

The enclosure construction comprises of a housing with a screwed cover with up to two off integral solenoid coils.

The housing has the option of up to three cable entries for connection to an external power source via appropriate ATEX certified cable glands:

M20 x 1.5p, M25 x 1.5p, 1/2" - 14 NPT or 3/4" - 14 NPT.

The 2600 certification is compliant against the following standards:

EN 60079-0 : 2006	Electrical apparatus for explosive gas atmospheres – Part 0 - General requirements
EN 60079-1 : 2007	Electrical apparatus for explosive gas atmospheres – Part 1 - Flameproof enclosures 'd'
EN 61241-0 : 2006	Electrical apparatus for use in the presence of combustible dust – Part 0 - General requirements
EN 61241-1 : 2006	Electrical apparatus for use in the presence of combustible dust – Part 1 - Protection by enclosures 'tD'

Note: Before installation of this product, please ensure that the product and its certification is suitable for the intended application. This product uses various 'O'ring material and an Eastar Copolyester visual indicator.

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

Installation of any cable entry devices, conduit entry devices or blanking devices shall not compromise the degree of ingress protection level IP6X for use in the presence of combustible dusts.

The unit has an ingress protection of IP66/67 and therefore any conduit device fitted must maintain this.

Note: These products have been certified with a cable entry temperature rise of 4°C.

Ensure that this is taken into consideration when selecting suitable cabling for the ambient temperature in which the product is to be used.

Note: These products are not intended to be assembled directly to process pipe work etc that is heated or cooled to temperatures outside of the range as indicated above.



Warning

Do not open when energised or when an explosive atmosphere is present.



Warning

Electrostatic hazard, clean only with damp cloth.

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2 Mounting instructions

- 2.1 Attach a mounting bracket to the housing base with the M8 fasteners provided with the mounting bracket. Install shaft adaptor / coupler, as appropriate to either the actuator pinion or Quantum shaft.
- 2.2 To ensure that the 2600 series Quantum is mounted correctly, it may be necessary to stroke the actuator to the fully closed position.



Warning

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

- 2.3 With the actuator in the correct position, attach the 2600 series Quantum / bracket to the actuator using the hardware provided in the mounting kit.
- 2.4 Unscrew the cover (Fig. 1) and keep in a safe place. Ensure that the Jack screw (M4 socket head cap screw) remains in the housing (Fig. 2).
- 2.5 To set the switches, lift the bottom cam and turn until the switch has activated and then release. The spring will push the cam back onto the splined shaft.



Warning

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

- 2.6 Stroke the actuator to the opposite end of travel. Set the top cam by pushing down and turning the cam until the switch is activated.



Warning

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

- 2.7 Stroke the actuator from one end of stroke to the other several times to check the switch operation. If the switches require adjustment, repeat steps 2.5 to 2.7.
- 2.8 Beacon setting – if fitted
Loosen the beacon fixing screw, see Fig. 1, rotate beacon window (outer beacon) to indicate appropriate open or closed text as corresponding to actuator position.
- 2.9 Tighten beacon fixing screw sufficiently to prevent movement of window.

3 Field wiring & installation



Warning

The 2600 series should always be handled with care when the cover is removed and wired to electrical power source.

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

- 3.1 Field wiring must be carried out in accordance with site, local and national electrical codes / requirements. This includes special attention to earth bond to the enclosure using the internal and external earth points provided.

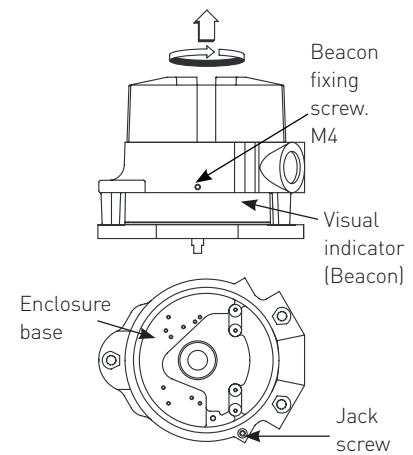


Figure 1 - Standard enclosure

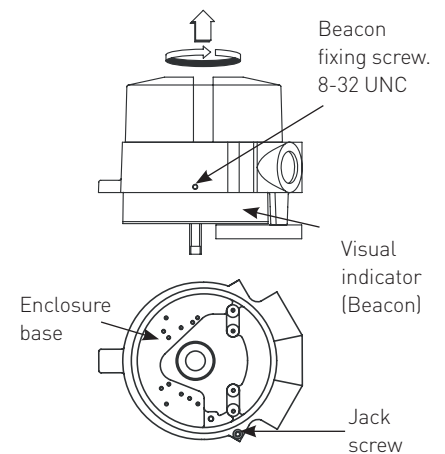


Figure 2 - Alternative enclosure

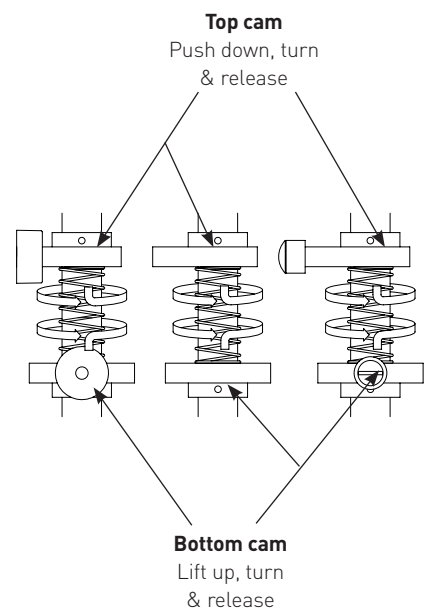


Figure 3

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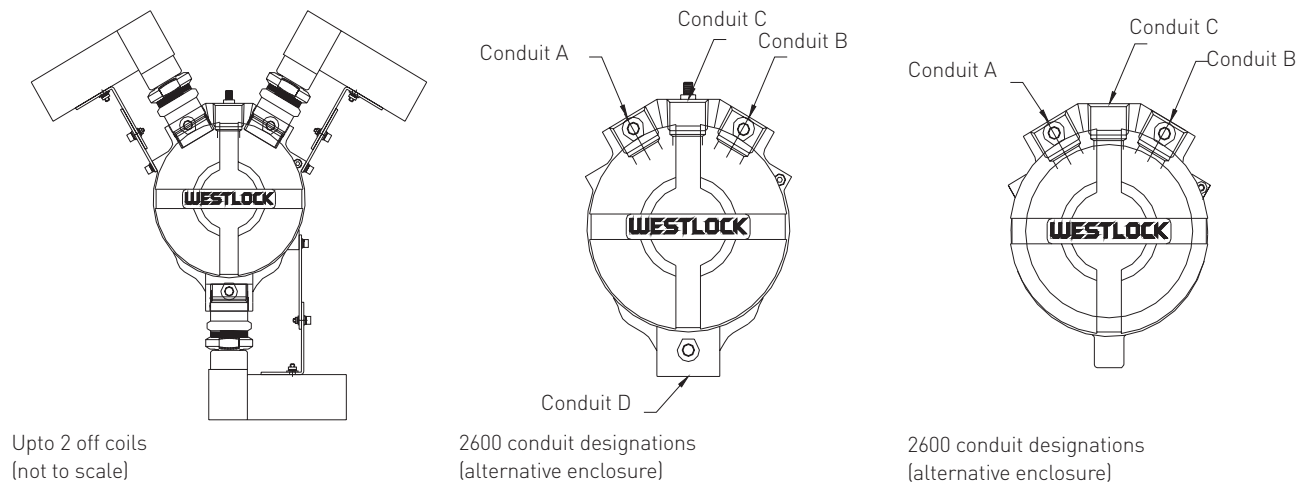


Figure 4

- 3.2 Installation of this product shall be carried out by competent personnel in accordance with the applicable code of practice such as EN60079-14.
- 3.3 The 2600 Quantum control monitor housing can offer up to three of the following conduit entries;
M20 x 1.5p, M25 x 1.5p, 1/2" - 14 NPT or 3/4" - 14 NPT. These entries are detailed on the product I.D label found on the product housing. Please see Fig. 4 for conduit positions.
- 3.4 The certification applies to equipment **without** cable glands. When mounting the flameproof enclosure in the hazardous area, only suitably rated IP66/67 ATEX certified flameproof glands **must be used**.
- 3.5 All unused cable entries must be plugged with a suitably rated IP66/67 ATEX certified blanking devices.
- 3.6 The first two digits of the Westlock nomenclature signifies the series with the third digit defining whether the product has a visual beacon or not.
The table below details the applicable ambient ranges:

Series code	Cover type	T class	Ambient range aluminium	Ambient range stainless steel
264*	Beacon	T6 (80°C)	-20°C to +65°C	-60°C to +65°C
264*	Beacon	T5 (95°C)	-20°C to +80°C	-60°C to +80°C
264*	Beacon	T4 (130°C)	-20°C to +85°C	-60°C to +85°C
266*	No beacon	T6 (80°C)	-20°C to +65°C	-60°C to +65°C
266*	No beacon	T5 (95°C)	-20°C to +80°C	-60°C to +80°C
266*	No beacon	T4 (130°C)	-20°C to +85°C	-60°C to +85°C

- 3.7 The forth digit designates the switch / sensor type. The following table details the most common switch / sensor types together with their electrical ratings.

Series code/Switch designation	Electrical rating
22*5 Mechanical (SPDT)	15 A - 125 or 250 V AC; 0.5 A - 125 V DC; 0.25 A - 250 V DC
22*6 Mechanical (DPDT)	10 A - 125 or 250 V AC; 10 A - 28 V DC; 0.2 A - 125 V DC
22*7 Inductive proximity sensors	
22*9 Magnum ratings	3 A - 120 V AC; 1.5 A - 240 V AC or 2 A - 24 V DC

Note: The series code signifies the maximum electrical rating of the product, suitable overloading protection must be provided to prevent these values being exceeded

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- 3.8 The tenth digit designates the coil voltage and type. The following table details the voltages and power ratings:

Voltage / Type	Power rating
12 V DC	0.7 W
24 V DC	0.7 W
125 V DC	1 W
90-120 V AC	4 VA
220-240 V AC	4 VA
Other	Limited to 1 W or 4 VA

- 3.9 The 2600 series valve position monitor has the option for position feedback by the means of a resistive signal (RS) or current signal (CS).
The RS transmitter electrical ratings are – 1 K Ohms (standard) or 5 K Ohms (optional).
See I.O.M TECH-084.
The CS transmitter electrical ratings are – current loop 4-20 mA at 18 to 24 V DC.
See I.O.M TECHUK-301

- 3.10 Before replacing the enclosure cover, ensure that both of the housing and cover threads are clean and undamaged. Screw the cover onto the housing ensuring that it is not cross threaded and turns freely. Continue tightening the cover until metal to metal condition is achieved between the bottom edge of the cover and the housing surface.

Lock the cover as follows:

Using a 3 mm A/F Allen key / wrench, rotate the Jack screw in an anti-clockwise direction until sufficient pressure has been applied to the bottom edge of the cover to prevent the cover from being removed by hand.

4 Product repair & service

- 4.1 Inspection of this product shall be carried out by suitably trained personnel in accordance with the applicable code of practice such as EN60079-17.
- 4.2 In the event of any repairs that may be required such tasks must be carried out by suitably trained / competent personnel in accordance with the applicable code of practice such as EN60079-19.
- 4.3 The certification of this product has been approved based on the material of construction as per the drawings listed in the schedule within this certificate. Any replacement parts that are not made in accordance to the listed drawing will invalidate the approval / certification.
- 4.4 Replacement parts must be purchased through Westlock Controls UK Ltd or via an approved Westlock Controls distributor

Alternative manufacturing location:

Westlock Controls Corporation
280 Midland Avenue
Saddle Brook
New Jersey
07662

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5 Operating and maintenance instructions for Falcon & Falcon II solenoid valve

5.1 General description

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

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

5.1.2 Optional features - Falcon II

5.1.2.1 No-voltage release (latching)

With the coil first energized, the palm button is then manually moved and latched.

The inward movement of the palm button causes the valve to shift.

When the coil is de-energized, the palm button and latching mechanism are automatically tripped, allowing the valve to return to its original position. See Fig. 5A.

5.1.2.2 Manual locking override

Manually depress palm button and rotate clockwise for maintained condition, must manually disengage to return to original position. See Fig. 5B.

5.1.2.3 Momentary override

Spring return momentary push type, must hold in to actuate. See Fig. 5C.

5.1.2.4 Hex drive maintained override

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

5.1.2.5 D/C - Dual coil option

5 way valves are available with a coil/pilot valve on each end of the Falcon II valve, coil 'A' and coil 'B'.

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

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

The process is the same for coil 'B'.

Note: For dual coil valves

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

Dual coil valves require both an electrical signal and air pressure to operate. See air flow diagram for air pressure requirements.

If either or both inputs are lost the valve will remain in it's current position.

Both coils should never be energized simultaneously.

5.1.3 Specifications

Operating pressure: 45 - 120 psig / 3.1 - 8.2 bar

Operating media: Non lubricated filtered air to 20 microns

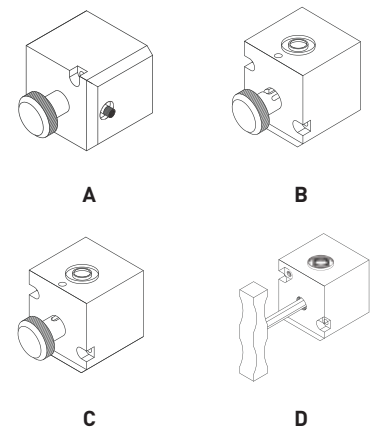


Figure 5

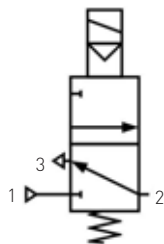
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5.1.4 Field wiring

Complete the electrical wiring in accordance with national and local electrical requirements.

The ground wire should be secure under the earth screw. Check all screws for tightness.

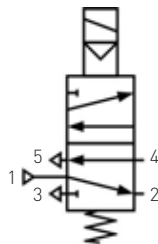


Spring return valve

Description of operation:

Solenoid de-energized - air flows from Outlet Port 2 to Exhaust Port 3.

Solenoid energized - air flows from Inlet Port 1 to Outlet Port 2.

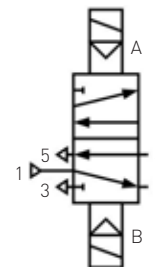


Spring return valve

Description of operation:

Solenoid de-energized - air flows from Inlet Port 1 to Outlet Port 2 and exhausts from Port 4 to Port 5.

Solenoid energized - air flows from Inlet Port 1 to Outlet Port 4 and exhausts from Port 2 to Port 3.



Dual coil valve

Description of operation:

Coil B de-energized - air flows from Inlet Port 1 to Outlet Port 2 and exhausts from Port 4 to Port 5.

Coil A energized - air flows from Inlet Port 1 to Outlet Port 4 and exhausts from Port 2 to Port 3.

Figure 6 - Air line designation, 1/4" NPT or BSP air ports for inlet, outlet and exhaust

5.1.5 (Air line) Installation considerations

Air mains and lines should be large enough to avoid excessive pressure loss under conditions of maximum flow. Air lines should be installed with as few restrictions as possible if the cost of compressed air is to be kept to a minimum. Sharp turns in piping should be avoided for more efficient air flow and economical air power. It is advisable to pitch the mains in the direction of air flow so that both gravity and air flow will carry the water to traps or water legs located at frequent intervals.

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

5.1.6 Air flow

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

5.1.7 Air service equipment

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

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

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

5.1.8 Tubes and fittings

The use of copper, stainless steel, nylon or polyethylene tube is recommended for piping up air circuits and equipment. As a general rule, pipe threaded fittings should not be assembled to a specific torque because the torque required for a reliable joint varies with thread quality, port and fitting materials, sealant used, and other factors. The suggested method of assembling pipe threaded connections is to assemble them finger tight and then wrench tighten further to a specified number of turns from finger tight. The assembly procedure given below is for reference only, the fitting should not be over tightened for this will lead to distortion and most likely, complete valve failure.

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

Maintenance

Routine maintenance is usually confined to the periodic replenishment of Dow Corning III lubricant or equivalent to spool and spring.

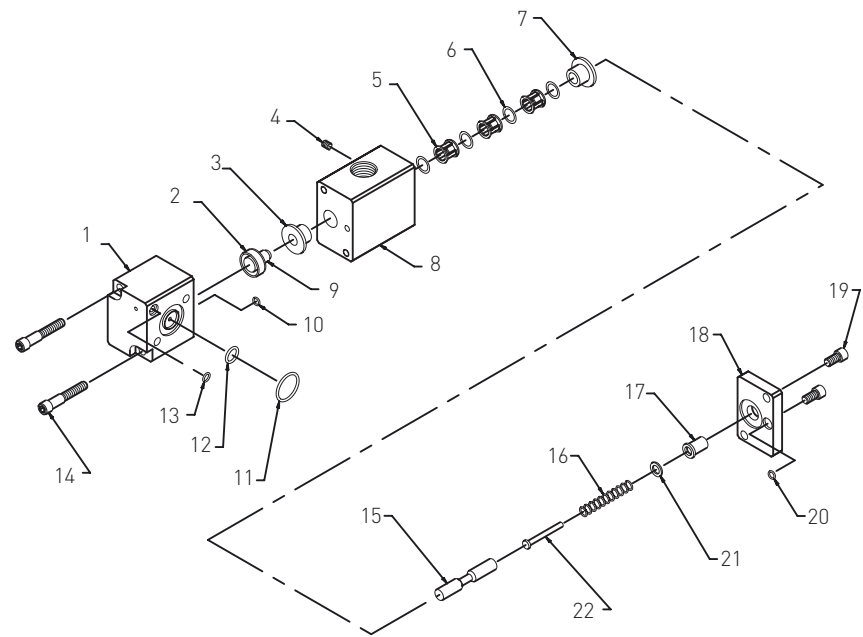
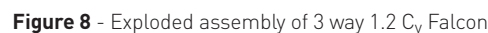


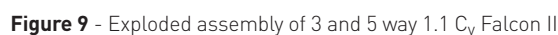
Figure 7 - Exploded assembly of 3 way 1.5 Cv Falcon

Parts list		
No.	Part name	
1.	Pilot end cap	VA-10036
2.	Pilot piston seal	GS-100 17
3.	Bushing	BU-10013
4.	Set screw	HD-100441
5.	Spacer	VA-10048
6.	O-ring	GS-20002
7.	Bushing	BU-10013
8.	Valve body	VA-10038
9.	Pilot piston	VA-10050
10.	O-ring	GS-20017
11.	O-ring	GS-20020
12.	O-ring	GS-20002
13.	O-ring	GS-20018
14.	SCKT HD cap screw	HD-10432
15.	Spool	VA-10477
16.	Spring	HD-10165
17.	Indicator cap	VA-10078
18.	End cap	VA-10063
19.	SCKT HD cap screw	HD-10348
20.	O-ring	GS-20017
21.	Indicator S/S washer	HD-10181
22.	Indicator pin	VA-10066

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1.	Pilot HD cap screw	HD-10431
2.	Pilot end cap	VA-10043
3.	O-Ring	GS-20021
4.	Pilot piston seal	GS-10018
5.	Pilot piston sleeve	VA-10052
6.	Guide washer	VA-10056
7.	Spacer	VA-10049
8.	O-ring	GS-20022
9.	Bonded seal	GS-10019
10.	Valve body	VA-10041
11.	O-ring	GS-20017
12.	Pilot piston	VA-10051
13.	O-ring	GS-20020
14.	O-ring	GS-20002
15.	O-ring	GS-20018
16.	Spring	HD-10066
17.	Indicator cap	VA-10079
18.	SCKT HD cap crew	HD-10431
19.	End cap	VA-10065
20.	Bushing	BU-10014
21.	Indicator pin	VA-10068
22.	Spool	VA-10054



1.	Pilot piston end cap	V5243
2.	O-Ring	OZ0IN070/00125
3.	Pilot piston	V5119
4.	O-Ring	OZ0IN070/01062
5.	Valve body	5/2 V5246 5/3 V5314
6.	O-Ring	OZ0IN0070/01062
7.	O-Ring	5/2 V5042 6 off 3/2 V5042 4 off
8.	Bush	V5084
9.	Spacer	5/2 V4734 5 off 3/2 V4734 3 off
10.	Bush	V5084
11.	Pilot piston seal	V4163
12.	Cap screws	OSM04KS40
13.	O-Ring	OZ0IN010/0130
14.	O-Ring	OZ0IN070/00125
15.	Cap screws	OSM04KS16
16.	Spring end cap	V5244
17.	Tell-tale cover	V5247
18.	Spring	V4571
19.	Tell-tale pin	V5026
20.	Spool	5/2V5212 3/2 V5313