

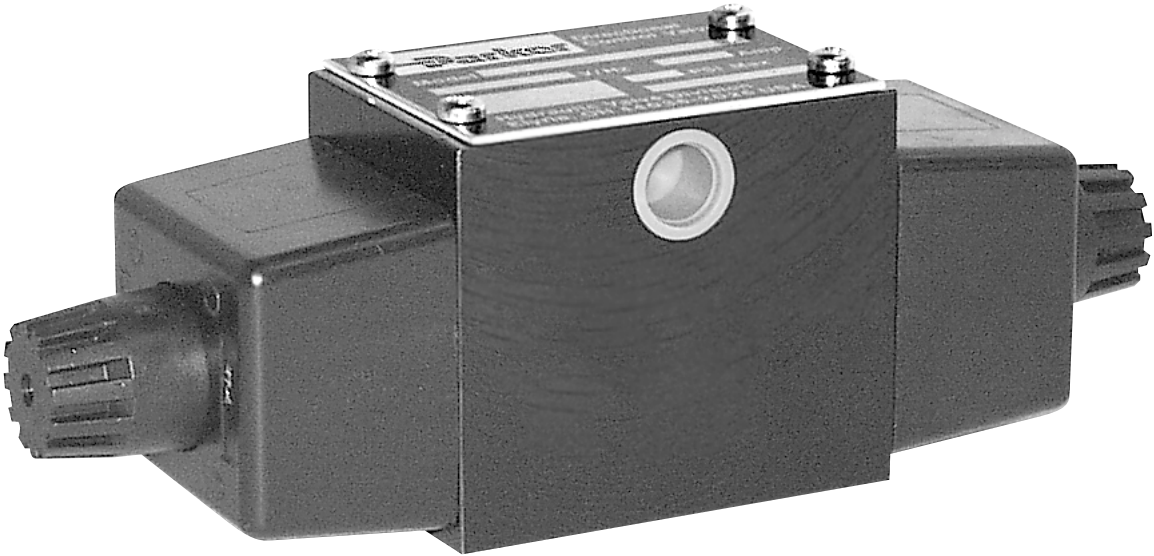


**Bulletin 2542-M10/USA**  
**Service Bulletin**

# **Series D3W, C Style**

Effective: January 1, 2000

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 **WARNING**

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

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**D**

**Directional Control Valve**

**3**

**Basic Valve**

**W**

**Actuator**

**Spool**

**C**

**Style**

**Seal**

**Seal**

**Solenoid Voltage**

**Solenoid Voltage**

**Connector Package**

**Connector Package**

NFPA D05  
 CETOP 5  
 NG 10

Wet armature  
 solenoid

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
E	24/60 - 24/50 VAC
Y *	120/60 - 110/50 VAC
T *	240/60 - 220/50 VAC
K #	12 VDC
J #	24 VDC
D	120 VDC
Z	250 VDC

\* Available in low watt version with integral rectifier.  
 # Low Watt Coil available.

Code	Symbol	Code	Symbol
1		10†	
2		11	
3		12	
4		16	
5		21†	
6		22†	
7		81†	
8*, 9**		82†	

Code	Description
C	Double solenoid, 3 position, spring centered.

This condition varies with spool code

Code	Description
C	Conduit Cavity
K	Conduit Adaptor
P	Hirschmann w/Plug
W*	Hirschmann w/o Plug
S	Double Spade
E	Explosion Proof

\*Not available with signal lights.

\* 8 spool has closed crossover  
 \*\* 9 spool has open crossover  
 † Available only with rectified AC coils or high watt DC coils

# Ordering Information

# Directional Control Valves Series D3W, C Style



**Solenoid Options**

Code	Coil
Omit	High Watt
D†	Explosion Proof, EExd
F	Low Watt
U	Explosion Proof, UL/CSA

† Explosion proof coils are 60 Hz at standard voltage; dual rating not available.



**Tube Options**

Code	Description
Omit	Low Pressure



**Manual Override Options**

Code	Description
Omit	Standard Tube
P	Extended Manual Override
R	Repairable Manual Override



**Electrical Options**

Code	Description
Omit	No Option
V	Varistor Surge Suppressor
Z	AC Rectified Coil

Code	Description
Omit	Standard Response
S4	Soft Shift, 0.040" Orifice
S7†	Soft Shift, 0.070" Orifice

† Recommended for spools 3, 4, 15.

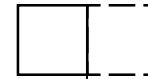


**Shift Response and Indication**

Code	Description
Omit	Standard Valve
4	CSA Approval
K	UL Recognition



**Approvals**



**Variations**

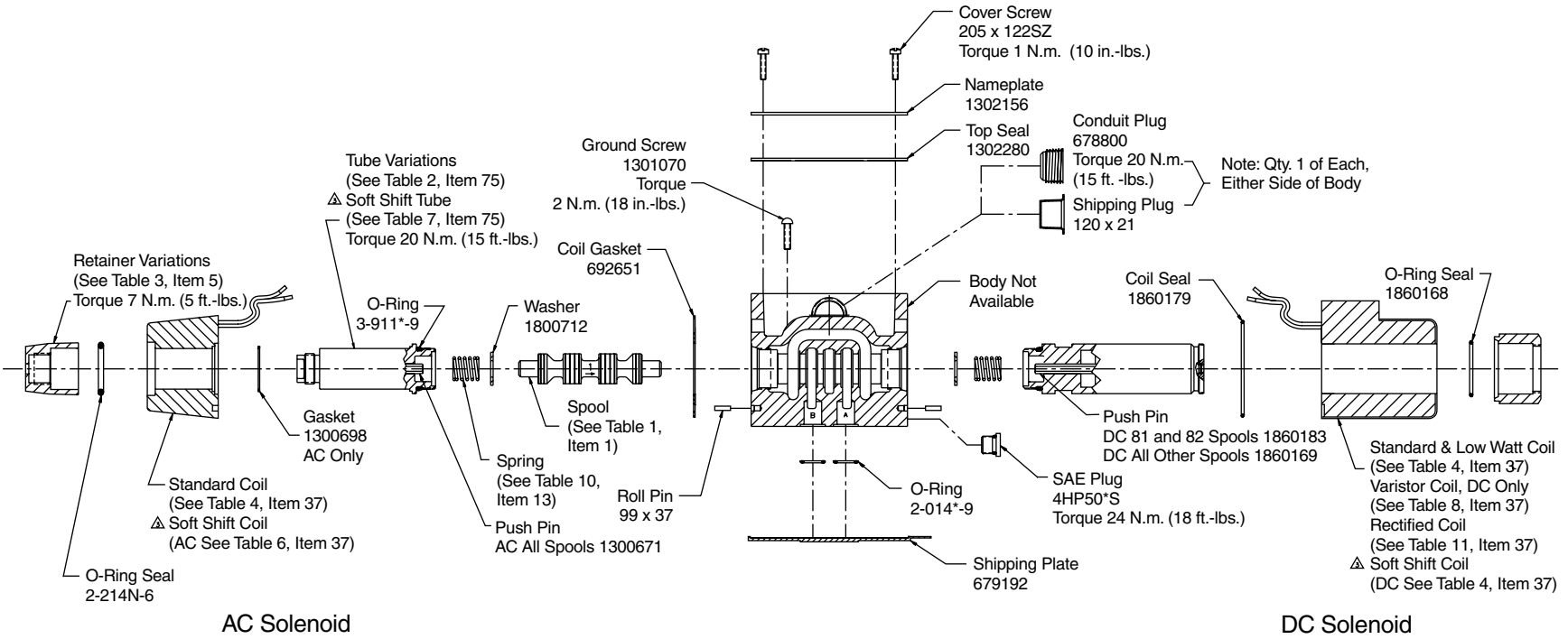
Code	Description
Omit	Standard Valve
5	Signal Lights
6	Manaplug, Brad Harrison Mini
7	Manaplug, Brad Harrison Micro (M12x1)
56	Manaplug (Mini) with Lights
57	Manaplug (Micro) with Lights (M12x1)
1A	Manaplug (Mini) Single Sol. 5-Pin
1B	Manaplug (Micro) Single Sol. 5-Pin (M12x1)
1C	Manaplug (Mini) Single Sol. 5-Pin w/Lights
1D	Manaplug (Micro) Single Sol. 5-Pin w/Lights (M12x1)



**Design Series**

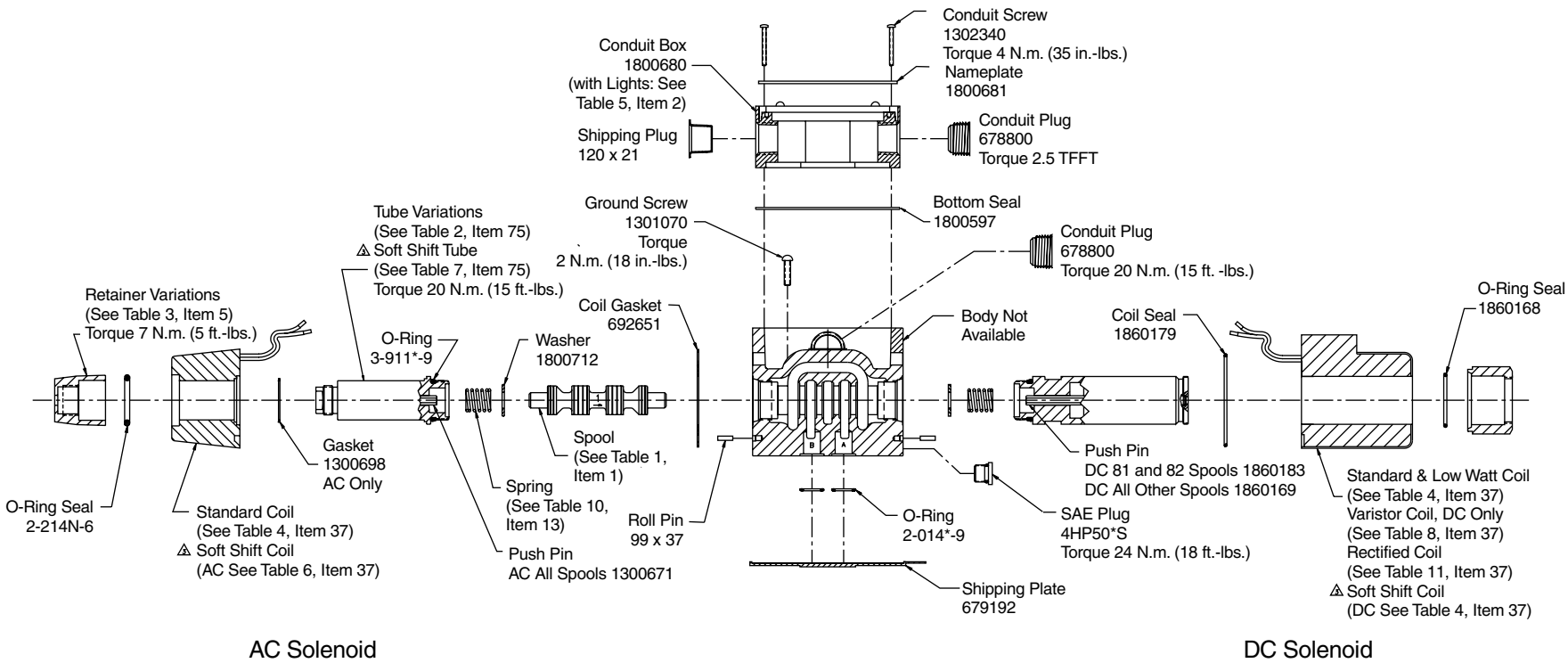
**NOTE:**  
Not required when ordering.

Valve Weight:	
Single Solenoid:	
AC	4.3 kg (9.5 lbs)
DC	5.3 kg (11.6 lbs)
Double Solenoid:	
AC	5.0 kg (11.0 lbs)
DC	7.3 kg (16.0 lbs)
Standard Bolt Kit:	
BK98	



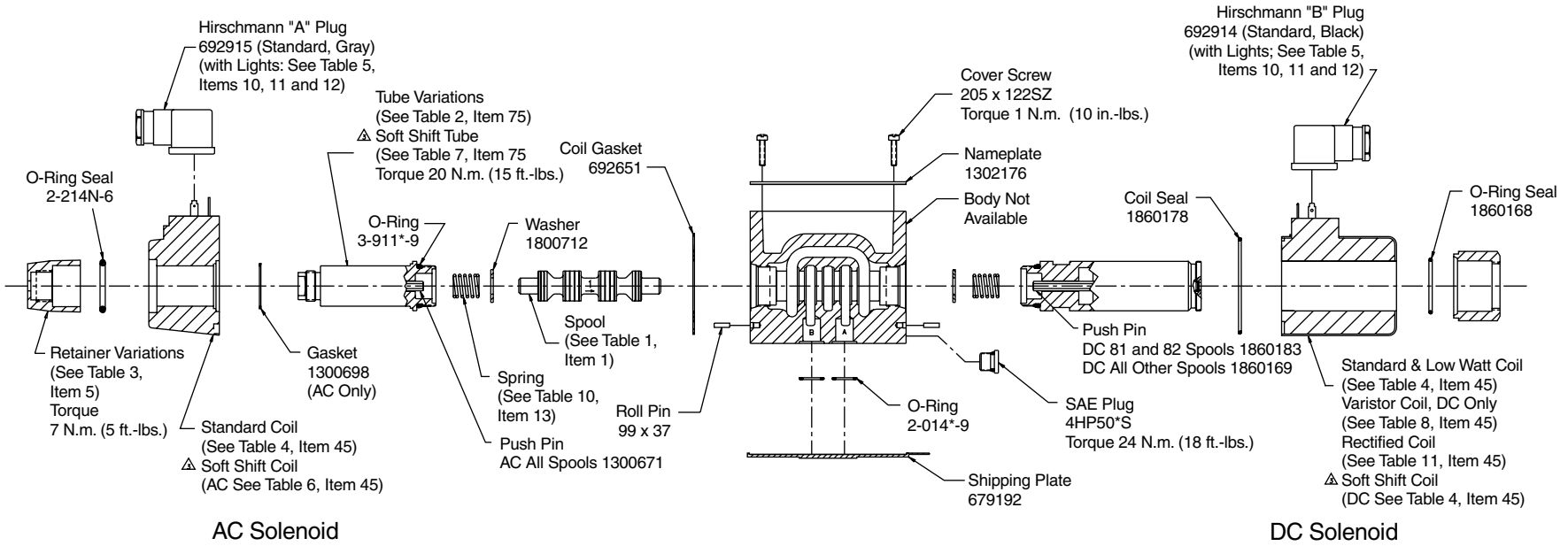
D3W Double AC Solenoid Model  
 D3W Double DC Solenoid Model

**NOTES:**  
 1) \* Indicates Seal Compound: N-Nitrile, V-Fluorocarbon.  
 2) AC Solenoid Components Shown on Left Side, DC Components Shown on Right Side.  
 △ See Detail "A" in Tables Location.



**NOTES:**

- 1) \* Indicates Seal Compound: N-Nitrile, V-Fluorocarbon.
- 2) AC Solenoid Components Shown on Left Side, DC Components Shown on Right Side.
- △ See Detail "A" in Tables Location.

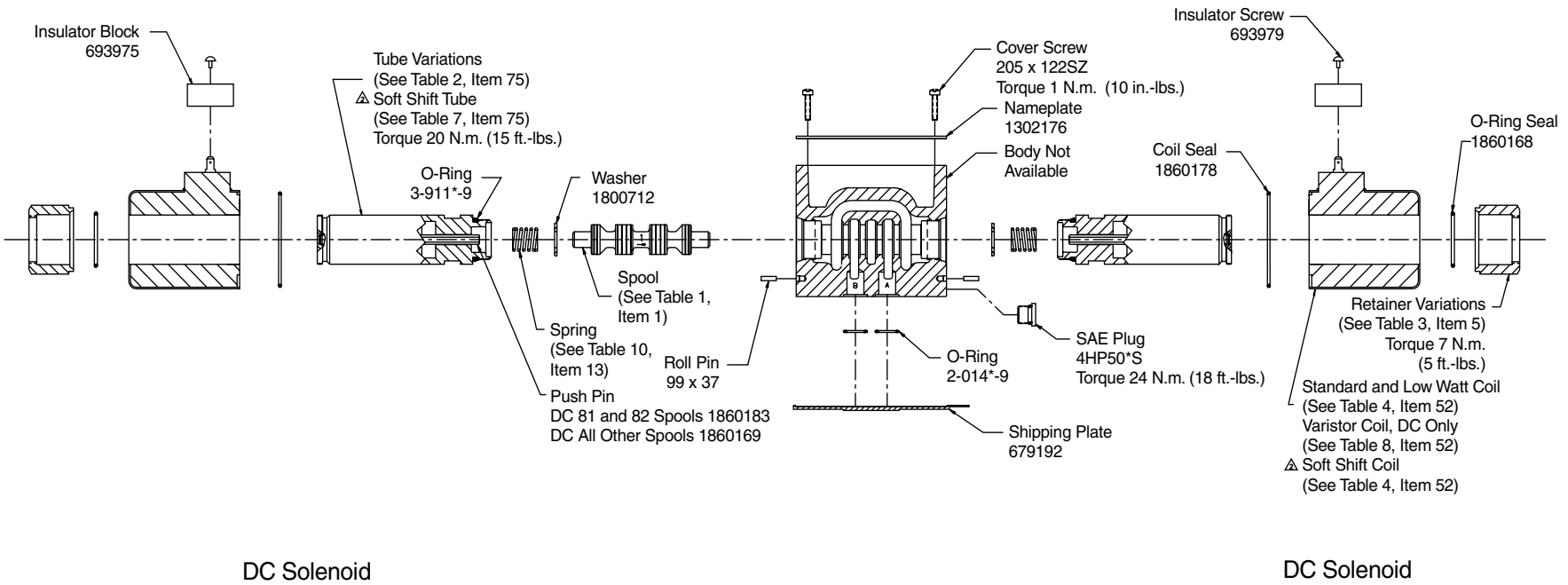


D3W Double AC Solenoid Model  
 D3W Double DC Solenoid Model

NOTES:

- 1) \* Indicates Seal Compound: N-Nitrile, V-Fluorocarbon.
- 2) AC Solenoid Components Shown on Left Side, DC Components Shown on Right Side.
- Δ See Detail "A" in Tables Location.





D3W Double DC Solenoid Model

NOTES:

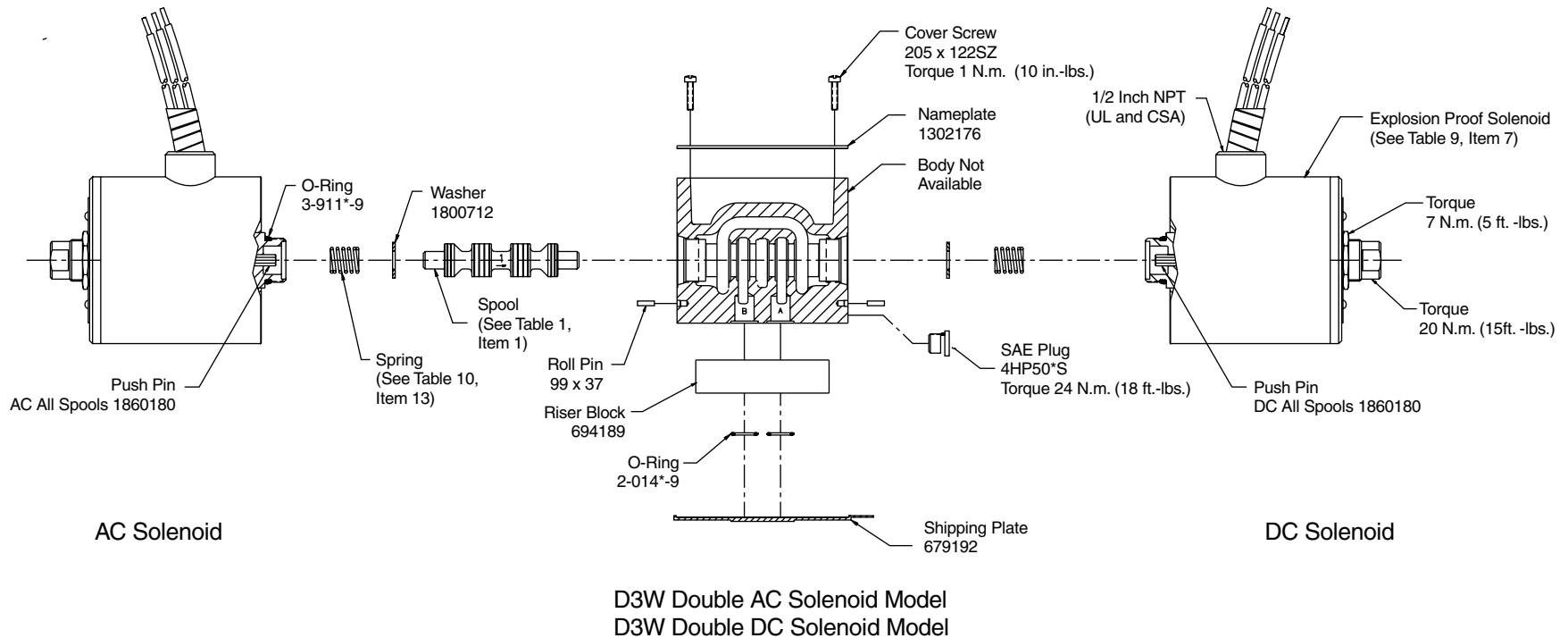
- 1) \* Indicates Seal Compound: N-Nitrile, V-Fluorocarbon.
- ▲ See Detail "A" in Tables Location

**ALIGNMENT INSTRUCTIONS**

1. Loosen or remove hex nut.
2. Loosen the large end cap by turning it counter-clockwise as viewed from the end.
3. Rotate the coil to align the conduit.
4. Tighten the large end cap by hand. Use of any tools could damage the unit. A .002 inch feeler gage should not enter the joint between the coil and the end cap.
5. Replace the hex nut and torque to 20 N.m. (15 ft.-lbs.) maximum.

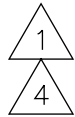
**ALIGNMENT INSTRUCTIONS**

1. Loosen or remove hex nut.
2. Loosen the large end cap by turning it counter-clockwise as viewed from the end.
3. Rotate the coil to align the conduit.
4. Tighten the large end cap by hand. Use of any tools could damage the unit. A .002 inch feeler gage should not enter the joint between the coil and the end cap.
5. Replace the hex nut and torque to 20 N.m. (15 ft.-lbs.) maximum.



**NOTES:**

- 1) \* Indicates Seal Compound: N-Nitrile, V-Fluorocarbon.
- 2) AC Solenoid Components Shown on Left Side, DC Components Shown on Right Side.



CODE	ITEM	PART NUMBER	QTY	DESCRIPTION
1	1	1300601	1	#1 SPOOL
2	1	1300602	1	#2 SPOOL
3	1	1300603	1	#3 SPOOL
4	1	1300604	1	#4 SPOOL
5	1	1300605	1	#5 SPOOL
6	1	1300606	1	#6 SPOOL
7	1	1300607	1	#7 SPOOL
8	1	1300608	1	#8 SPOOL
9	1	1300609	1	#9 SPOOL
10	1	1300610	1	#10 SPOOL
11	1	1300611	1	#11 SPOOL
12	1	1300664	1	#12 SPOOL
14	1	1300607	1	#7 SPOOL REVERSED
15	1	1300603	1	#3 SPOOL REVERSED
16	1	1300605	1	#5 SPOOL REVERSED
21	1	1301701	1	#21 SPOOL
22	1	1301701	1	#21 SPOOL REVERSED
81	1	1210161	1	#81 SPOOL
82	1	1210162	1	#82 SPOOL



**NOTES:**

- 1 ARROW POINTS TOWARD "A" PORT FOR ALL SPOOLS EXCEPT 14,15, 16 AND 22.
- 2 FOR "E" AND "K" STYLES WITH 8 OR 9 SPOOLS, SOLENOID IS ON OPPOSITE END OF THAT SHOWN IN ILLUSTRATION.
- 3 81 AND 82 SPOOLS NOT APPLICABLE WITH EXPLOSION PROOF OPTIONS.
- 4 10,21,22,81 AND 82 SPOOLS ONLY AVAILABLE IN RECTIFIED AC OR HIGH WATT DC ONLY.

CODE	ITEM	PART NUMBER	QTY	DESCRIPTION
OMIT or F	75	1300666	A/R	A.C. TUBE 1500 PSI
		1860163		D.C. TUBE 1500 PSI
P or FP	75	1860174	A/R	EXTENDED A.C. TUBE 1500 PSI
		1860165		EXTENDED D.C. TUBE 1500 PSI
R or FR	75	1860175	A/R	REPAIRABLE A.C. TUBE 1500 PSI
		1860166		REPAIRABLE D.C. TUBE 1500 PSI

CODE	ITEM	PART NUMBER	QTY	DESCRIPTION
ALL EXCEPT R,S,P & T	5	693568	A/R	AC STANDARD RETAINER
		1860167		DC STANDARD RETAINER
P or FP HP or FHP	5	1300128	A/R	AC EXT. OVERRIDE RETAINER
		1860171		DC EXT. OVERRIDE RETAINER
		697161		EXTENDED OVERRIDE BOOT
ALL R ALL S	5	1300700	A/R	AC REPAIR. OVERRIDE RETAINER
		1860167		DC REPAIR. OVERRIDE RETAINER
ALL T	5	693568	A/R	AC STANDARD RETAINER
		1300812		TAMPERPROOF DISC (AC ONLY)
		1300532		TAMPERPROOF DISC (AC ONLY)
		1860182		DC TAMPERPROOF RETAINER

CODE	DESCRIPTION	QTY	SOL CONNECTION	C (CONDUIT)	P/W (HIRSCHMANN)	S (DUAL SPADE)
			ITEM	37	45	52

CODE	DESCRIPTION	QTY	PART NUMBER	PART NUMBER	PART NUMBER
E*	24/50-24/60 VAC, 32/36 WATT	A/R	691745-1	1300574	N/A
Y*	120/60-110/50 VAC, 32 WATT	A/R	691740-1	691750	N/A
T*	240/60-220/50 VAC, 32 WATT	A/R	691743-1	693987	N/A
K*	12 VDC, 36 WATT	A/R	1860156-K	1860152-K	1860160-K
K*F	12 VDC, 18 WATT (LOW WATT)	A/R	1860157-K	1860153-K	1860161-K
J*	24 VDC, 36 WATT	A/R	1860156-J	1860152-J	1860160-J
J*F	24 VDC, 18 WATT (LOW WATT)	A/R	1860157-J	1860153-J	1860161-J
D*	120 VDC	A/R	1860156-D	1860152-D	1860160-D
Z*	250 VDC	A/R	1860156-Z	1860152-Z	1860160-Z

CODE	ITEM	PART NUMBER	QTY	DESCRIPTION	CODE	ITEM	PART NUMBER	QTY	DESCRIPTION
ALL PLUGS (*P*5)	10	A697047	A/R	LABEL - "A" SOLENOID	YK*5	2	1800679-Y	1	CONDUIT BOX COVER, 120VAC
	11	A697048	A/R	LABEL - "B" SOLENOID	TK*5		1800679-T	1	CONDUIT BOX COVER, 240VAC
				EK*5	1800679-E		1	CONDUIT BOX COVER, 24VAC	
YP*5		B694936	A/R	PLUG WITH LIGHT, 100-120V	KK*5		1800679-K	1	CONDUIT BOX COVER, 12VDC
TP*5		B694936	A/R	PLUG WITH LIGHT, 240V	JK*5		1800679-J	1	CONDUIT BOX COVER, 24VDC
KP*5	12	B694935	A/R	PLUG WITH LIGHT, 12V	DK*5		1800679-D	1	CONDUIT BOX COVER, 120VDC
JP*5		B694935	A/R	PLUG WITH LIGHT, 24V	ZK*5		1800679-Z	1	CONDUIT BOX COVER, 250VDC
DP*5		B694936	A/R	PLUG WITH LIGHT, 100-120V			697799	1	WARNING LABEL

SOL CONNECTION	C/K (CONDUIT)	P/W (HIRSCHMANN)
ITEM	37	45

CODE	DESCRIPTION	QTY	PART NUMBER	PART NUMBER
E*	24/50-24/60 VAC, 32/36 WATT	A/R	1860158-E	1860154-E
Y*	120/60-110/50 VAC, 32 WATT	A/R	1860158-Y	1860154-Y
T*	240/60-220/50 VAC, 32 WATT	A/R	1860158-T	1860154-T

CODE	ITEM	PART NUMBER	QTY	DESCRIPTION
S4	75	1860172-4	A/R	AC 1500 PSI SOFT SHIFT TUBE
S7	75	1860172-7	A/R	AC 1500 PSI SOFT SHIFT TUBE
RS4	75	1860164	A/R	AC 1500 PSI REPAIRABLE SOFT SHIFT TUBE
		1301663	A/R	.040 ORIFICE
RS7		1860164	A/R	AC 1500 PSI REPAIRABLE SOFT SHIFT TUBE
		1800748	A/R	.070 ORIFICE

SOL CONNECTION	C/K (CONDUIT)	P/W (HIRSCHMANN)	S (DUAL SPADE)
ITEM	37	45	52

CODE	DESCRIPTION	QTY	PART NUMBER	PART NUMBER	PART NUMBER
K*	12 VDC	A/R	1860159-K	1860155-K	1860162-K
J*	24 VDC	A/R	1860159-J	1860155-J	1860162-J
D*	120 VDC	A/R	1860159-D	1860155-D	1860162-D
Z*	250 VDC	A/R	1860159-Z	1860155-Z	1860162-Z

**Table 9 (Explosion Proof Coils)**

<b>Table 9 (Explosion Proof Coils)</b>				
<i>SOL CONNECTION</i>			D (CENELEC)	U (UL & CSA)
<i>ITEM</i>			7	7
<i>CODE</i>	<i>DESCRIPTION</i>	<i>QTY</i>	<i>PART NUMBER</i>	<i>PART NUMBER</i>
YE	120/60 VAC	A/R	1302310-Y	132308-Y
TE	240/60 VAC	A/R	1302310-T	132308-T
PE	110/50 VAC	A/R	1302310-P	132308-P
NE	220/50 VAC	A/R	1302310-N	132308-N
KE	12 VDC	A/R	1302310-K	132308-K
JE	24 VDC	A/R	1302310-J	132308-J
DE	120 VDC	A/R	1302310-D	132308-D
ZE	250 VDC	A/R	1302310-Z	132308-Z

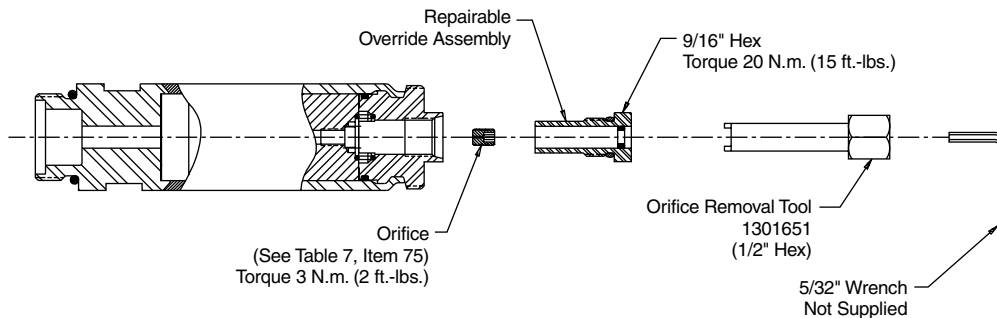
**Table 10 (Springs)**

<i>CODE</i>	<i>ITEM</i>	<i>PART NUMBER</i>	<i>QTY</i>	<i>DESCRIPTION</i>
ALL EXCEPT F	13	1301262	2	AC SPRING FOR SPOOLS 1,2,3,4,5,6,11,12,15,16
		1301263		AC SPRING FOR SPOOLS 7,8,9,14
ALL EXCEPT F	13	1800683	2	DC SPRING FOR SPOOLS 1,3,4,5,6,10,11,15,16,21,81,82
		1800684		DC SPRING FOR SPOOLS 2,7,8,9,12,14
F	13	1800685	2	DC LOW WATT SPRING FOR SPOOLS 1,3,4,5,6,11,15,16
		1800686		DC LOW WATT SPRING FOR SPOOLS 2,7,8,9,12,14

**Table 11 (Rectified Coils, AC Only)**

<i>SOL CONNECTION</i>			C/K (CONDUIT)	P/W (HIRSCHMANN)
<i>ITEM</i>			37	45
<i>CODE</i>	<i>DESCRIPTION</i>	<i>QTY</i>	<i>PART NUMBER</i>	<i>PART NUMBER</i>
E*	24/50-24/60 VAC, 32/36 WATT	A/R	1860158-E	1860154-E
Y*	120/60-110/50 VAC, 32 WATT	A/R	1860158-Y	1860154-Y
T*	240/60-220/50 VAC, 32 WATT	A/R	1860158-T	1860154-T

**Detail A: Repairable Soft Shift Option  
(Codes "RS4" and "RS7")**



**Solenoid Ratings\*\***

<b>Insulation</b>	Class H
<b>Allowable Deviation from rated voltage</b>	-10% to +15%
<b>Armature</b>	Wet pin type

\*\* DC Solenoids available with optional molded metal oxide varistor (MOV) for surge suppression.  
 Leadwire length 6" from coil face.

**D3W\*\*\*\*F Solenoid Electrical Characteristics†**

Solenoid Code	Nominal Volts/Hz	In Rush Amps	Holding Amps	Watts
KF	12 VDC	—	3.00	18
JF	24 VDC	—	0.75	18

† Based on nominal voltage @ 22°C (72°F)

**D3W Solenoid Electrical Characteristics†**

Solenoid Code	Nominal Volts/Hz	In Rush VA	Holding VA	Nominal Watts (Ref)
Y	120/60	298	95	32
	110/50	294	102	
T	240/60	288	96	32
	220/50	288	101	
E	24/60	290	77	32
	24/50	381	110	
K	12 VDC	—	3.00†	36
J	24 VDC	—	1.50†	36
D	120 VDC	—	0.30†	36
Z	250 VDC	—	0.14†	36

† DC holding amps.

**Explosion Proof Solenoids**

**Explosion Proof Solenoid Ratings**

<b>U.L. (EU) C.S.A.</b>	Class I, Div. 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C
<b>CENELEC (ED)</b>	Complies with BASEEFA requirements for BS5501: Parts 1 and 5 Ex'd CENELEC EN50 – D18, Group II B

**Electrical Characteristics\* ED and EU**

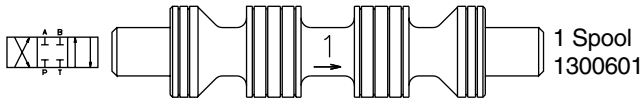
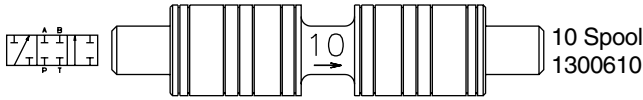
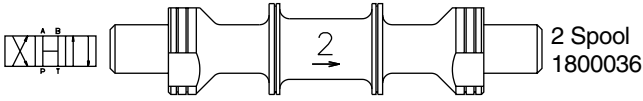
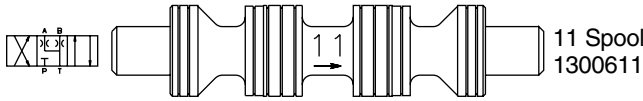
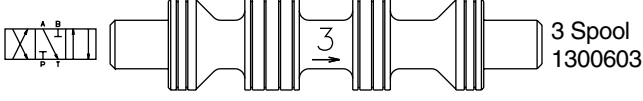
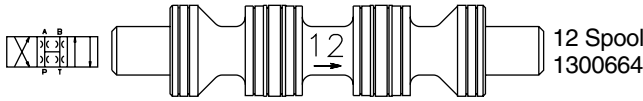
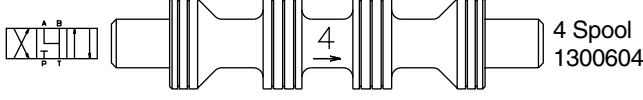
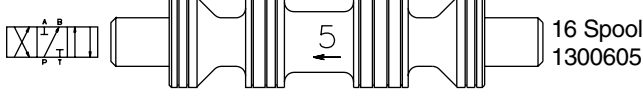
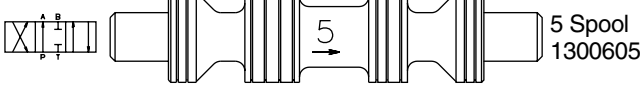
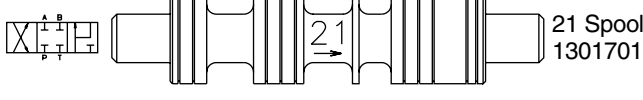
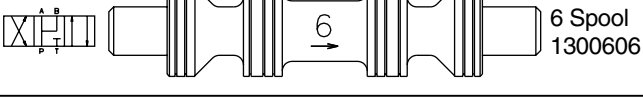
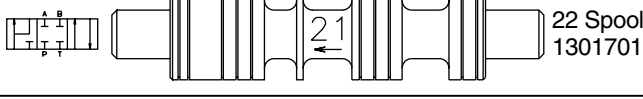
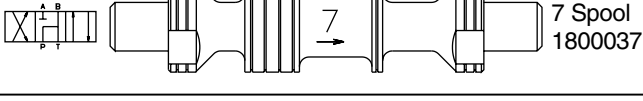
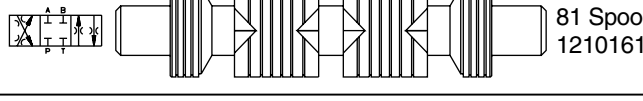
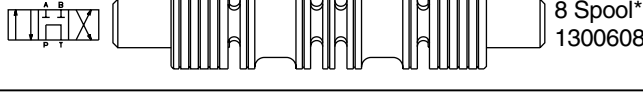
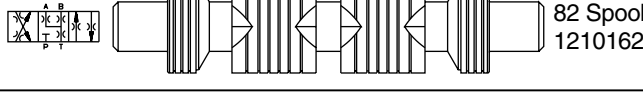
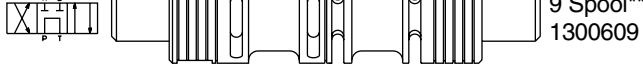
Solenoid Code	Nominal Volts/Hz	In Rush VA	Holding VA	Nominal Watts (Ref)
Y	120/60	266	82	36
T	240/60	266	82	36
K	12 VDC	—	3.00†	36
J	24 VDC	—	1.50†	36
D	120 VDC	—	0.30†	36
Z	250 VDC	—	0.14†	36

\*Dual frequency not available on explosion proof coils.

† DC holding amps.

**Spools**

**Directional Control Valves  
Series D3W, C Style**

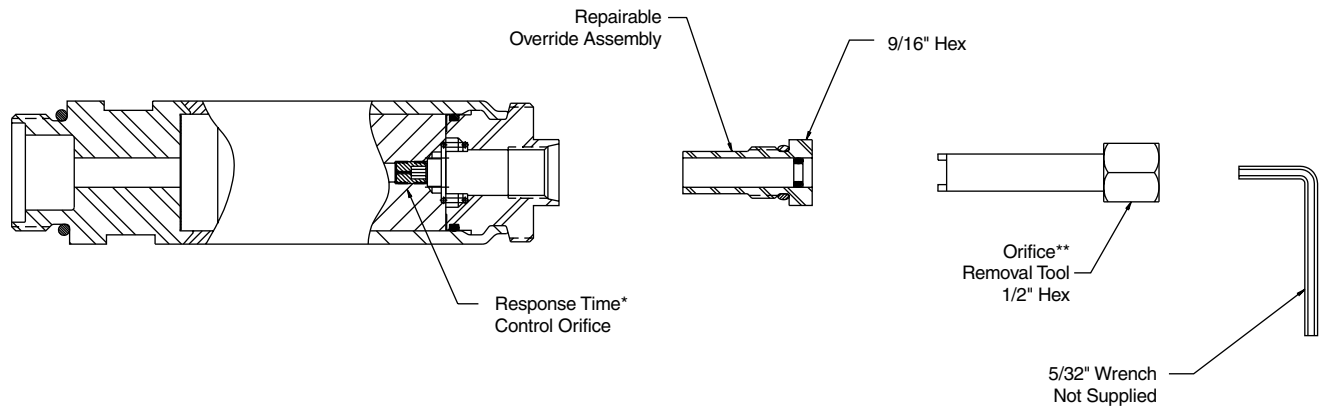
B-SOLENOID * (A-SOLENOID)	A-SOLENOID * (B-SOLENOID)	B-SOLENOID * (A-SOLENOID)	A-SOLENOID * (B-SOLENOID)
 1 Spool 1300601	 10 Spool 1300610		
 2 Spool 1800036	 11 Spool 1300611		
 3 Spool 1300603	 12 Spool 1300664		
 4 Spool 1300604	 16 Spool 1300605		
 5 Spool 1300605	 21 Spool 1301701		
 6 Spool 1300606	 22 Spool 1301701		
 7 Spool 1800037	 81 Spool 1210161		
 8 Spool* 1300608	 82 Spool 1210162		
 9 Spool** 1300609			

\* 8 spool has closed crossover

\*\* 9 spool has open crossover

### Soft Shift with Tool

#### Repairable Soft Shift Tool



\*\* Orifice Removal Tool with Kit Part Number 1301661



## Warning

Before any circuit connection is broken, be sure to turn off all power and relieve system pressure. Lower all vertical loads and cylinders, lock any load which could produce pressure and discharge any accumulators. Plug and cap all lines and openings to prevent contamination from entering the system.

## Cleaning and Inspection

1. Proper cleaning is a critical part of preventive maintenance in the use of directional control valves. All parts should be cleaned with a solvent that is compatible with the system fluid. Compressed air may also work well when cleaning orifices and passage ways, but proper filtration must be employed to remove water and contamination.

**NOTE:** Always make sure all parts have been cleaned before reassembling.

2. Inspection

- a. Inspect all passage ways for obstructions.
- b. Inspect all washers, push pins, plungers and pole faces for signs of wear and/or mushrooming. Inspect all springs for signs of distortion. Replace parts as necessary.
- c. Look for nicks and burrs on the spool and bore lands. Nicks in these areas indicate likely contamination of the system fluid.

3. If there are no signs of nicks or burrs on the spool and bore, check the spool movement as follows:

- a. Lubricate the spool and bore with clean system fluid.
- b. Insert the spool back into the body and slowly move the spool back and forth. The spool should move freely. If there is any sticking between the spool and the bore, remove the spool and repeat 2a, 2c and 3a.
- c. The spool movement can also be checked by placing the valve body on end and inserting the spool. Gravity will pull the spool to the other end if there is no sticking.
- d. After several attempts have been made without resolution, replace the valve.

## Troubleshooting

### Problem: Valve spool fails to move

	Cause	Recommendation
<b>Mechanical</b>	Recommended flow exceeded	Check maximum flow rate for appropriate spool by spool function.
	Recommended pressure exceeded	Check maximum pressure rating for valve.
	Improper installation connections	Check installation drawings.
	Contamination in system	Disassemble, inspect, clean and flush.
	Improper assembly	Check proper assembly. Refer to drawing for appropriate model.
	Valve has silted	Disassemble and clean valve.
<b>Electrical</b>	Power off	Turn power on.
	Improper voltage	Check voltage requirements for valve model.
	Faulty connection	Check connections.
	Faulty coil	Check coil resistance.

**Problem: Valve produces undesirable response**

	<b>Cause</b>	<b>Recommendation</b>
<b>Mechanical</b>	Recommended flow exceeded	Check maximum flow rate for appropriate spool by spool function.
	Recommended pressure exceeded	Check maximum pressure rating for valve.
	Improper installation connections	Check installation drawings.
	Contamination in system	Disassemble, inspect, clean and flush.
	Improper assembly	Check proper assembly. Refer to drawing for appropriate model.
	Improper fluid	Check fluid recommendations.
	Recommended temperature exceeded (indicated by fluid discoloration or spool tarnishing)	Check maximum temperature recommendations.
	Incorrect orifice size (soft shift only)	Check orifice size for desired response time.
<b>Electrical</b>	Improper voltage	Check voltage requirements for valve model.
	Faulty connection	Check connections.
	Faulty coil	Check coil resistance.

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**Parker Hannifin Corporation**  
Hydraulic Valve Division  
520 Ternes Avenue  
Elyria, Ohio 44035 USA  
Tel: (440) 366-5200  
Fax: (440) 366-5253  
Web Site: <http://www.parker.com/hydraulicvalve>

Bulletin 2542-M10/USA,  
5M, 1/00, PHD