

Series D3W, C Style 32-Design Directional Control Valves

Service Bulletin

Bulletin HY14-2543-M10/US

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



ENGINEERING YOUR SUCCESS.

**WARNING – USER RESPONSIBILITY**

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS 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 or system options for further investigation by users having technical expertise.
- The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.
- To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

OFFER OF SALE

The items described in this document are hereby offered for sale by Parker-Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the detailed "Offer of Sale" elsewhere in this document or available at www.parker.com/hydraulicvalve.

SAFETY GUIDE

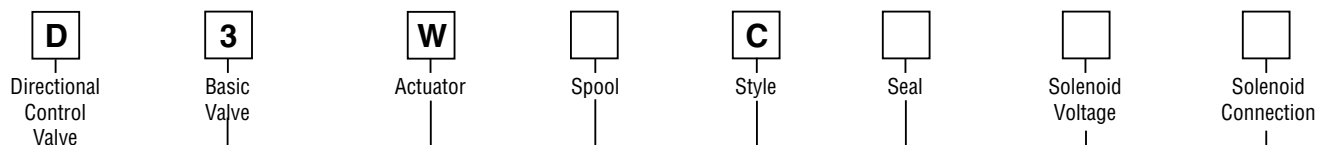
For safety information, see Safety Guide SG HY14-1000 at www.parker.com/safety or call 1-800-CParker.

© Copyright 2014 Parker Hannifin Corporation, All Rights Reserved

Bul HY14-2543-M10.indd, ddp



Ordering Information	2-3
Parts Data	4-7
D3W*C**C**	4
D3W*C**K	5
D3W*C**P**, D3W*C**W**	6
D3W*C**E**	7
Technical Information	8-12
Spool Chart	11
Troubleshooting	13-14
Offer of Sale	15



NFPA D05,
 CETOP 5
 NG10

Wet
 armature
 solenoid

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Symbol	Code	Symbol
1		11	
2		12	
3		14	
4		15	
5		16	
6		21†	
7		22†	
8*		81†	
9**		††	
10†		***	
		82†	
		††	

- * 8 spool has closed crossover.
- ** 9 spool has open crossover.
- † Available only with high-watt rectified AC coils or high-watt DC coils.
- †† Spring centered.
- *** 81 and 82 spools not available with explosion proof.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing solenoid A. Note operators reverse sides for #8 and #9 spools. See installation information for details.

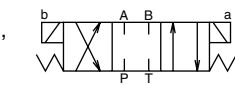
Code	Description
E	24/60 - 24/50 VAC
Y	120/60 - 110/50 VAC
T	240/60 - 220/50 VAC
K	12 VDC
J	24 VDC
D#	120 VDC
U#	98 VDC
Z#	250 VDC

High Watt Coil only.

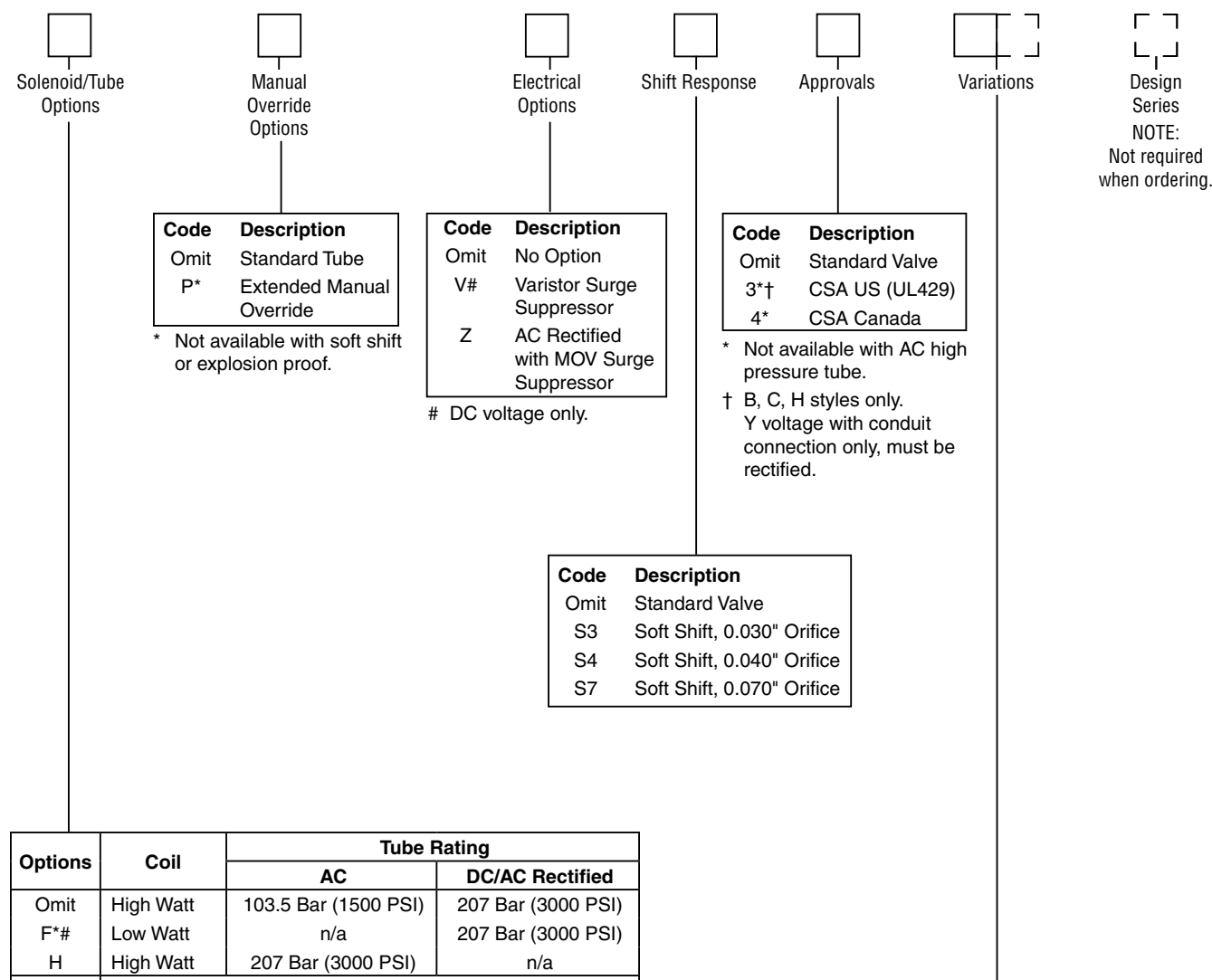
Code	Description
C**	Conduit Cavity
K	Conduit Box
P	Hirschmann w/Plug
W*	Hirschmann w/o Plug
E*	Explosion Proof

- * Lights not available.
- ** No variations (See "K").

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



This condition varies with spool code



Options	Coil	Tube Rating	
		AC	DC/AC Rectified
Omit	High Watt	103.5 Bar (1500 PSI)	207 Bar (3000 PSI)
F*#	Low Watt	n/a	207 Bar (3000 PSI)
H	High Watt	207 Bar (3000 PSI)	n/a
D†	Explosion Proof EEXD ATEX		
U†	Explosion Proof, UL/CSA		

* Available only with J, K and Y (Rectified), T (Rectified) voltages.

Not available with soft shift valves.

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

Valve Weight:

Double Solenoid:

AC 5.0 kg (11.0 lbs)

DC 7.3 kg (16.0 lbs)

Standard Bolt Kit:

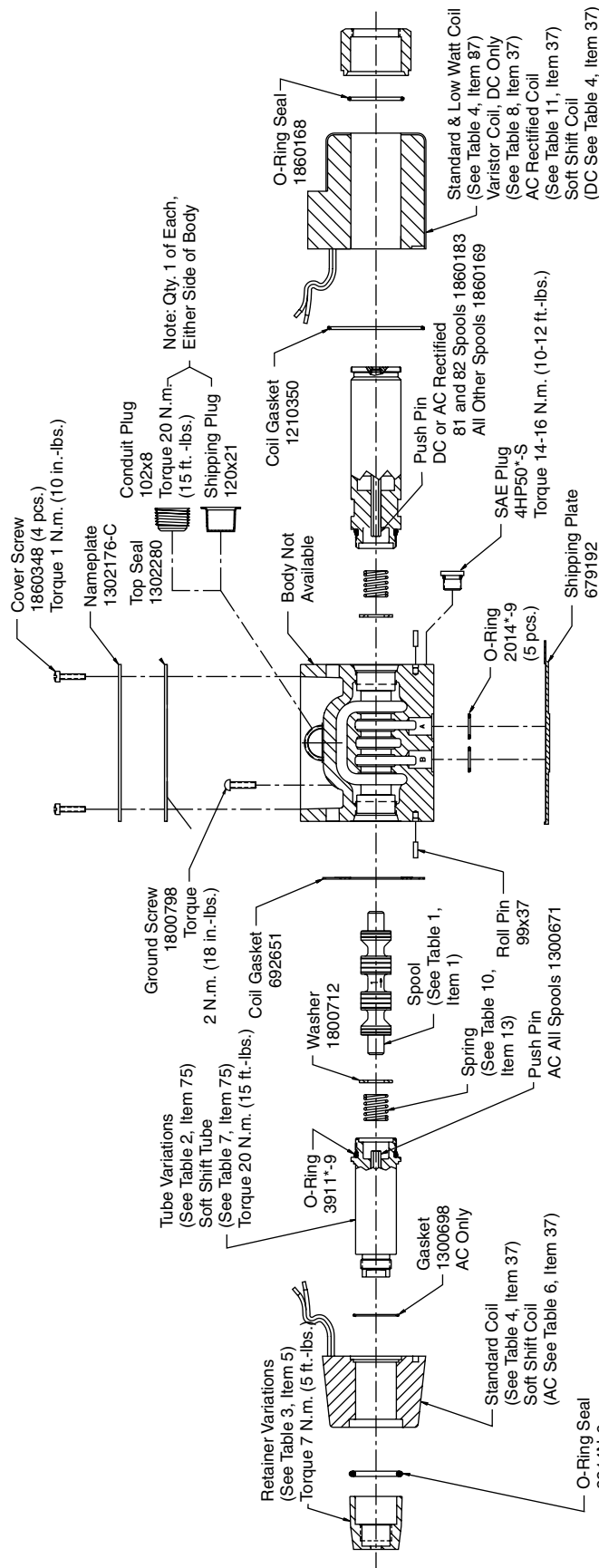
BK98

Seal Kit:

Nitrile SKD3W

Fluorocarbon SKD3WW

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)
1M	Manaplug Opposite Normal

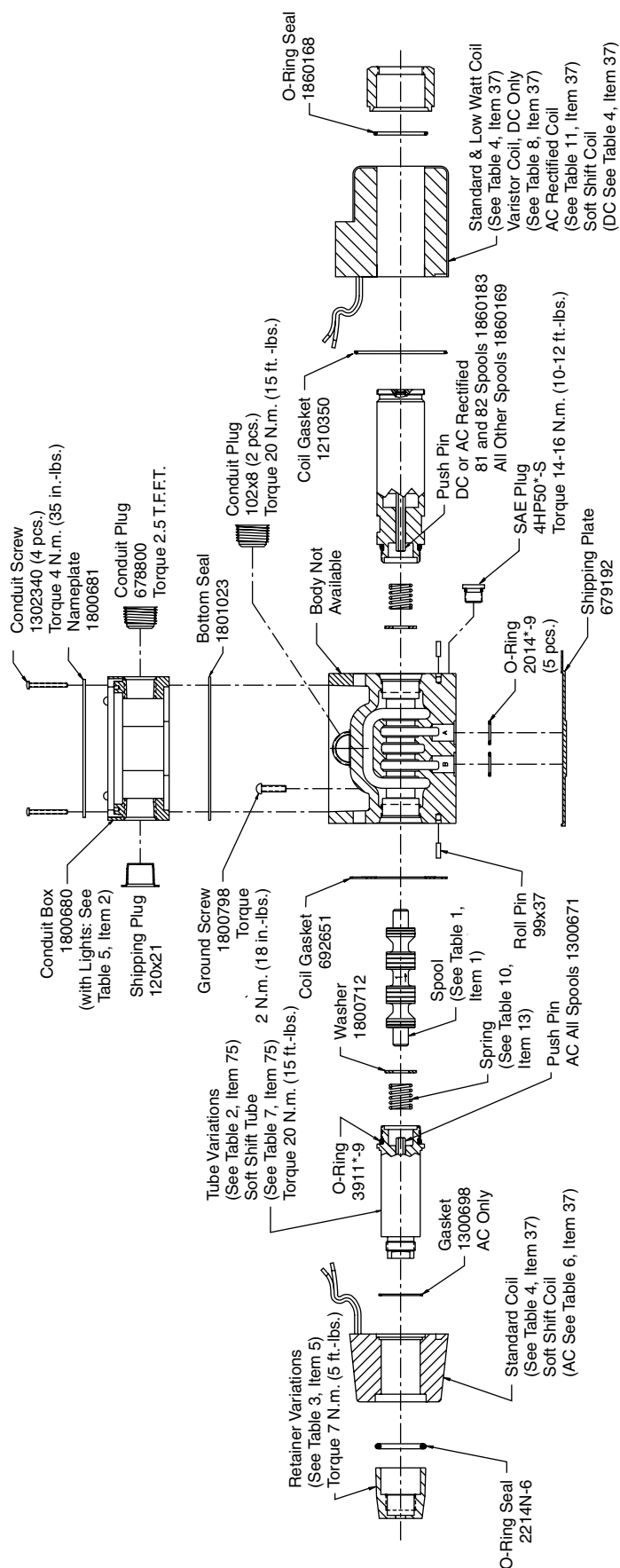


DC or AC Rectified Solenoid

D3W Double AC Solenoid Model
D3W Double DC Solenoid Model

AC Solenoid

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



AC Solenoid

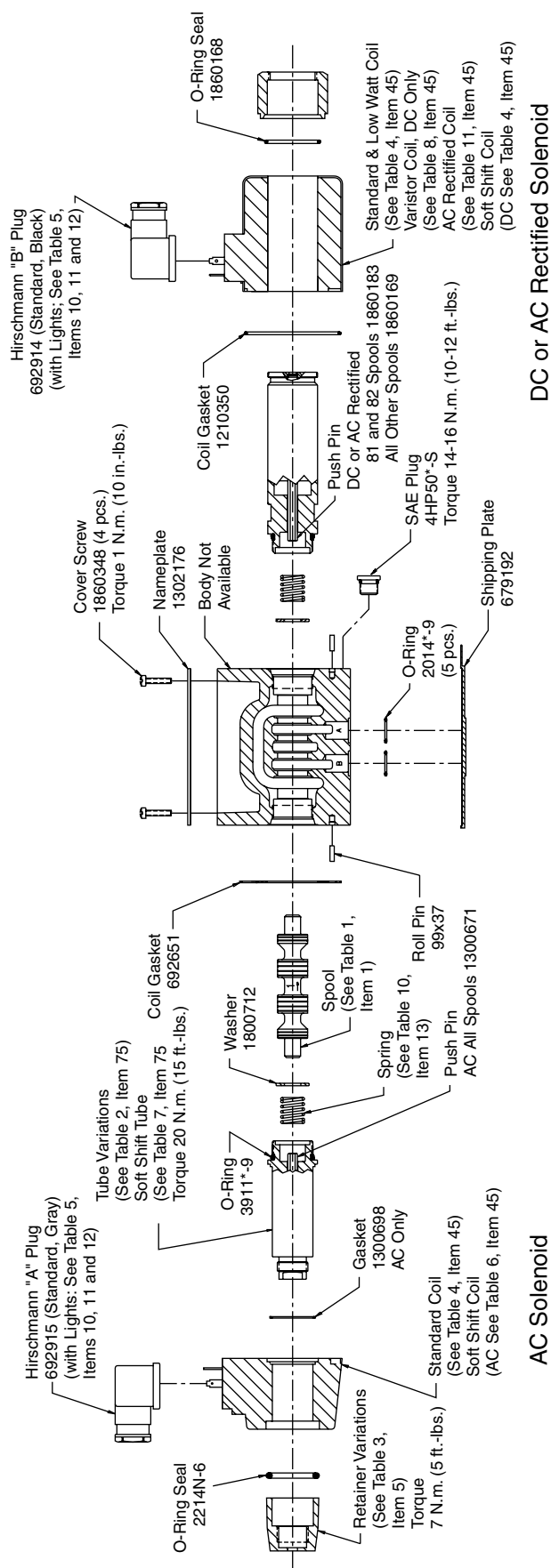
DC or AC Rectified Solenoid

D3W Double AC Solenoid Model
D3W Double DC Solenoid Model

NOTES:

1) * Indicates Seal Compound: N-Nitrile, V-Fluorocarbon.

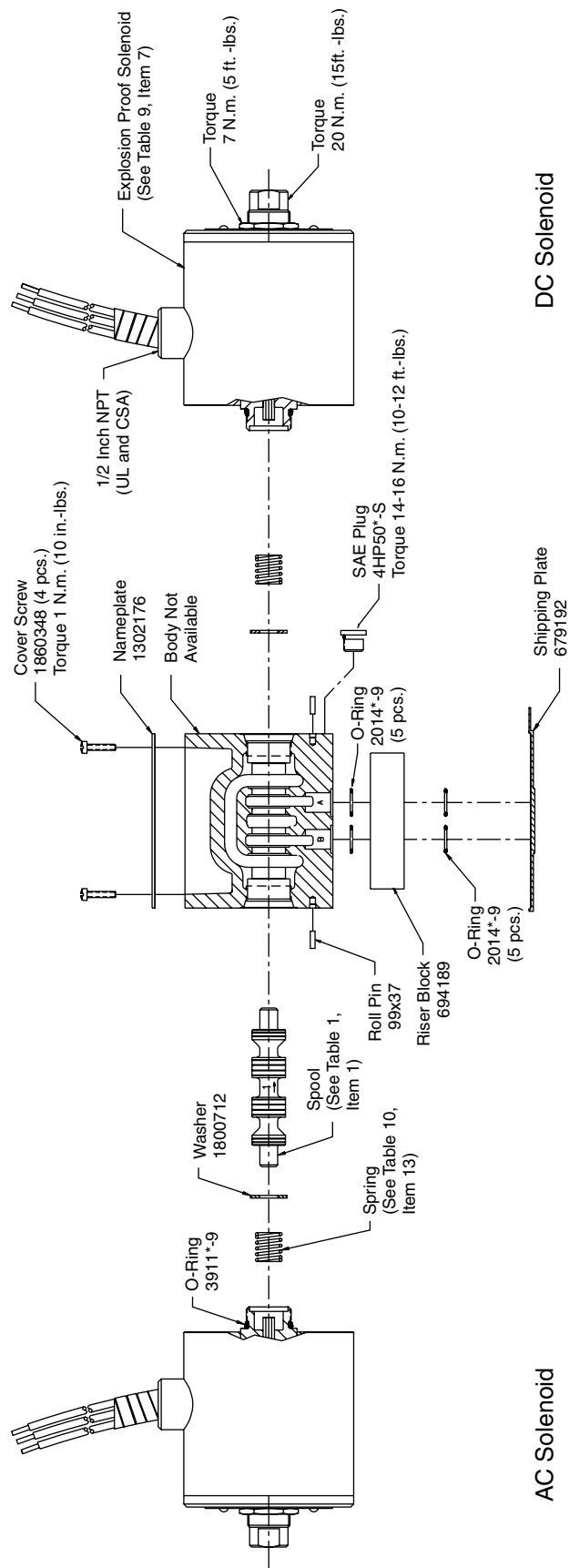
2) AC Solenoid Components Shown on Left Side, DC Components Shown on Right Side.



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.



DC Solenoid

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.

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.

Table 1 (Spools)					
1	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
3	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
2	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 end of body for all spools except 14, 15, 16 and 22.
 - 2 81 and 82 spools are not available with explosion proof.
 - 3 10, 21, 22, 81 and 82 spools only available in high watt rectified AC or high watt DC coils only.

Table 2 (Tube Variations)				
Code	Item	Part Number	Qty	Description
Omit or H	75	1300666	1	AC Tube 103.5 Bar (1500 PSI)
		1301710		AC Tube 207 Bar (3000 PSI)
		1860213		DC or AC Rectified Tube 207 Bar (3000 PSI)
P or HP	75	1860174	1	Extended AC Tube 103.5 Bar (1500 PSI)
		1860176		Extended AC Tube 207 Bar (3000 PSI)
		1860165		Extended DC or AC Rectified Tube 207 Bar (3000 PSI)

Table 3 (Retainer Variations)				
Code	Item	Part Number	Qty	Description
All except P, HP & T	5	693568	1	AC Standard Retainer
		1860167		DC Standard or AC Rectified Retainer
P or HP	5	1300128	1	AC Extended Override Retainer
		1860171		DC or AC Rectified Extended Override Retainer
		697161		Extended Override Boot

Table 4 (Standard Coils)				
Solenoid 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	1	691745-1	1300574
Y*	120/60 – 110/50 VAC, 32 Watt	1	691740-1	691750
T*	240/60 – 220/50 VAC, 32 Watt	1	691743-1	693987
K*	12 VDC, 36 Watt	1	1860156-K	1860152-K
K*F	12 VDC, 18 Watt (Low Watt)	1	1860157-K	1860153-K
J*	24 VDC, 36 Watt	1	1860156-J	1860152-J
J*F	24 VDC, 18 Watt (Low Watt)	1	1860157-J	1860153-J
D*	120 VDC	1	1860156-D	1860152-D
U*	98 VDC	1	1860156-U	1860152-U
Z*	250 VDC	1	1860156-Z	1860152-Z

Table 5 (Signal Lights)									
Code	Item	Part Number	Qty	Description	Code	Item	Part Number	Qty	Description
All Plugs (*P*5)	10	697047	A/R	Label – “A” Solenoid	YK*5	2	1800679-Y	1	Conduit Box Cover, 120 VAC
	11	697048	A/R	Label – “B” Solenoid	TK*5		1800679-T	1	Conduit Box Cover, 240 VAC
					EK*5		1800679-E	1	Conduit Box Cover, 24 VAC
YP*5	12	694936	1	Plug with Light, 100 – 120V	KK*5		1800679-K	1	Conduit Box Cover, 12 VAC
TP*5		694936	1	Plug with Light, 240V	JK*5		1800679-J	1	Conduit Box Cover, 24 VAC
KP*5		694935	1	Plug with Light, 12V	DK*5		1800679-D	1	Conduit Box Cover, 120 VAC
JP*5		694935	1	Plug with Light, 24V	ZK*5		1800679-Z	1	Conduit Box Cover, 250 VAC
DP*5		694936	1	Plug with Light, 100 – 120V			697799	1	Warning Label

Table 6 (Soft Shift Coils, AC Only)				
Solenoid Connection			C/K (Conduit)	P/W (Hirschmann)
Item			37	45
Code	Description	Qty	Part Number	Part Number
Y*S	120/60 – 110/50 VAC, 36 Watt	1	1860299-36-YZ-6	1860154-Y
T*S	240/60 – 220/50 VAC, 36 Watt	1	1860299-36-TZ-6	1860154-T

Table 7 (Soft Shift Tubes)				
Code	Item	Part Number	Qty	Description
S3	75	1860172-3	1	207 Bar (3000 PSI) Soft Shift Tube
S4	75	1860172-4	1	207 Bar (3000 PSI) Soft Shift Tube
S7	75	1860172-7	1	207 Bar (3000 PSI) Soft Shift Tube

Table 8 (Varistor Coils, DC Only)				
Solenoid Connection			C/K (Conduit)	P/W (Hirschmann)
Item			37	45
Code	Description	Qty	Part Number	Part Number
K*	12 VDC	1	1860159-K	1860155-K
J*	24 VDC	1	1860159-J	1860155-J
D*	120 VDC	1	1860159-D	1860155-D
Z*	250 VDC	1	1860159-Z	1860155-Z

Table 9 (Explosion Proof Coils)				
Solenoid Connection			D (ATEX)	U (UL & CSA)
Item			7	7
Code	Description	Qty	Part Number	Part Number
YE*	120/60 VAC	1	1302310-Y	1302308-Y
TE*	240/60 VAC	1	1302310-T	1302308-T
PE*	110/50 VAC	1	1302310-P	1302308-P
NE*	220/50 VAC	1	1302310-N	1302308-N
KE*	12 VDC	1	1302310-K	1302308-K
JE*	24 VDC	1	1302310-J	1302308-J
DE*	120 VDC	1	1302310-D	1302308-D
ZE*	250 VDC	1	1302310-Z	1302308-Z

Table 10 (Springs)				
Code	Item	Part Number	Qty	Description
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 or AC Rectified Spring for Spools 1,3,4,5,6,10,11,15,16,21, 22, 81,82
		1800684		DC or AC Rectified Spring for Spools 2,7,8,9,12,14
F	13	1800685	2	DC or AC Rectified Low Watt Spring for Spools 1,3,4,5,6,11,15,16
		1800686		DC or AC Rectified Low Watt Spring for Spools 2,7,8,9,12,14

Table 11 (Rectified Coils, AC Only)				
Solenoid Connection			C/K (Conduit)	P/W (Hirschmann)
Item			37	45
Code	Description	Qty	Part Number	Part Number
Y*Z	120/60 – 110/50 VAC, 36 Watt	1	1860299-36-YZ-6	1860154-Y
T*Z	240/60 – 220/50 VAC, 36 Watt	1	1860299-36-TZ-6	1860154-T
Y*FZ	120/60 – 110/50 VAC, 18 Watt	1	1860299-18-YZ-6	1860216-Y
T*FZ	240/60 – 220/50 VAC, 18 Watt	1	1860299-18-TZ-6	1860216-T

Spools

B-Solenoid *(A-Solenoid)		A-Solenoid *(B-Solenoid)		B-Solenoid *(A-Solenoid)		A-Solenoid *(B-Solenoid)	
	A PORT	B PORT			A PORT	B PORT	
			1 Spool 1300601				11 Spool 1300611
			2 Spool 1300602				12 Spool 1300664
			3 Spool 1300603				14 Spool 1300607
			4 Spool 1300604				15 Spool 1300603
			5 Spool 1300605				16 Spool 1300605
			6 Spool 1300606				21 Spool 1301701
			7 Spool 1300607				22 Spool 1301701
			8 Spool 1300608				81 Spool 1210161
Note Reverse Operator Location							
			9 Spool 1300609				82 Spool 1210162
Note Reverse Operator Location							
			10 Spool 1300610				

* For 8 and 9 spools only.

Note: Arrow points to A port end on all spools except 14, 15, 16 and 22.

Solenoid Ratings**

Insulation	Class H
Allowable Deviation from rated voltage	DC, AC Rectified -10% to +15%
	AC -5% to +5%
Armature	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	—	1.50	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
U	98 VDC	—	0.37†	36
Z	250 VDC	—	0.14†	36

† DC holding amps.

D3W Rectified AC Solenoid Electrical Characteristics‡

Solenoid Code	Nominal Volts/Hz	In Rush Amps	Holding Amps	Watts
Y	120/60	—	.37	36
	110/50			
T	240/60	—	.18	36
	220/50			
YF	120/60	—	.18	18
	110/50			
TF	240/60	—	.09	18
	220/50			

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

Explosion Proof Solenoids

Explosion Proof Solenoid Ratings

U.L. / C.S.A. (EU)	Class I, Div. 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds 1 & 2, EN50018: 200

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

*Dual frequency not available on explosion proof coils.

† DC holding amps.

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.

Continued on the next page

Problem: Valve spool fails to move

	Cause	Recommendation
Mechanical	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.
Electrical	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

	Cause	Recommendation
Mechanical	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.
Electrical	Improper voltage	Check voltage requirements for valve model.
	Faulty connection	Check connections.
	Faulty coil	Check coil resistance.

Offer of Sale with Warranty Limitations

Offer of Sale

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods, services or work described will be referred to as "Products".

1. **Terms and Conditions.** Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is subject to these Terms and Conditions or any newer version of the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional terms or conditions of Buyer's order or any other document issued by Buyer.

2. **Price Adjustments; Payments.** Prices stated on Seller's quote or other documentation offered by Seller are valid for 30 days, and do not include any sales, use, or other taxes unless specifically stated. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and is due 30 days from the date of invoice or such other term as required by Seller's Credit Department, after which Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. **Delivery Dates; Title and Risk; Shipment.** All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon placement of the products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

4. **Warranty.** Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of eighteen months from the date of delivery to Buyer. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISESTHE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. **Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 30 days after delivery. Buyer shall notify Seller of any alleged breach of warranty within 30 days after the date the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for an amount due on any invoice) must be commenced within 12 months from the date of the breach without regard to the date breach is discovered.

6. **LIMITATION OF LIABILITY.** UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. **IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**

7. **User Responsibility.** The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

8. **Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, will be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer ordering the items manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. **Special Tooling.** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

10. **Buyer's Obligation; Rights of Seller.** To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. **Improper Use and Indemnity.** Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright

infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

12. **Cancellations and Changes.** Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

13. **Limitation on Assignment.** Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

14. **Force Majeure.** Seller does not assume the risk and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

15. **Waiver and Severability.** Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

16. **Termination.** Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of any provision of this agreement (b) appointments a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.

17. **Governing Law.** This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.

18. **Indemnity for Infringement of Intellectual Property Rights.** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

19. **Entire Agreement.** This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

20. **Compliance with Law, U. K. Bribery Act and U.S. Foreign Corrupt Practices Act.** Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase products or otherwise benefit the business of Seller.

02/12

Extensive Hydraulic Product Offering

Accumulators



Piston, bladder and diaphragm type accumulators, gas bottles and KleenVent reservoir isolators.

www.parker.com/accumulator

Compact Hydraulics



Self-contained with a motor, gear pump, reservoir, internal valving, load hold checks and relief valves.

www.parker.com/oildyne

Cylinders



Standard and custom hydraulic cylinders for industrial and mobile applications.

www.parker.com/hydcyl

Electronics/Remote Controls



Parker's unique IQAN approach combines sturdy, well-tested hardware with intelligent, flexible computing power.

www.parker.com/iqan

Filtration



Pressure and return line filters enhance machine life, reduce maintenance and lower costs.

www.parker.com/hydraulicfilter

Integrated Hydraulic Circuits



Solutions for complex circuits that include threaded cartridge valves integrated into a single manifold.

www.parker.com/hcs

Motors



Full line of high and low speed motors provides power up to 15,000 in-lbs of torque.

www.parker.com/pumpmotor

Power Take Off



Parker Chelsea leads the industry for engineering, innovation and performance in auxiliary power systems.

www.parker.com/chelsea

Power Units



The most complete line of standard, pre-engineered, cataloged hydraulic power units in the industry.

www.parker.com/pumpmotor

Pumps



Broad line of energy-efficient hydraulic pumps that includes piston, vane and gear pumps.

www.parker.com/mobpump

Rotary Actuator



Industry leader in the design and manufacture of hydraulic rack and pinion, and vane style rotary actuators.

www.parker.com/actuator

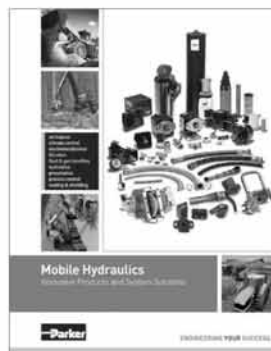
Valves and Controls



Hydraulic valves for virtually every hydraulic equipment application, from simple to precise control.

www.parker.com/hydraulicvalve

Covering the Industrial and Mobile markets, each catalog is paired with an interactive DVD. Call for your comprehensive guides today. 1-800-C-Parker.



Mobile Hydraulics
Bulletin HY19-1012/US



Industrial Hydraulics
Bulletin HY01-1001/US



Parker Hannifin Corporation
Hydraulic Valve Division
520 Ternes Avenue
Elyria, Ohio 44035 USA
Tel: 440-366-5100
Fax: 440-366-5253
www.parker.com/hydraulicvalve

Bulletin HY14-2543-M10/US,
06/14

Your Local Authorized Parker Distributor