



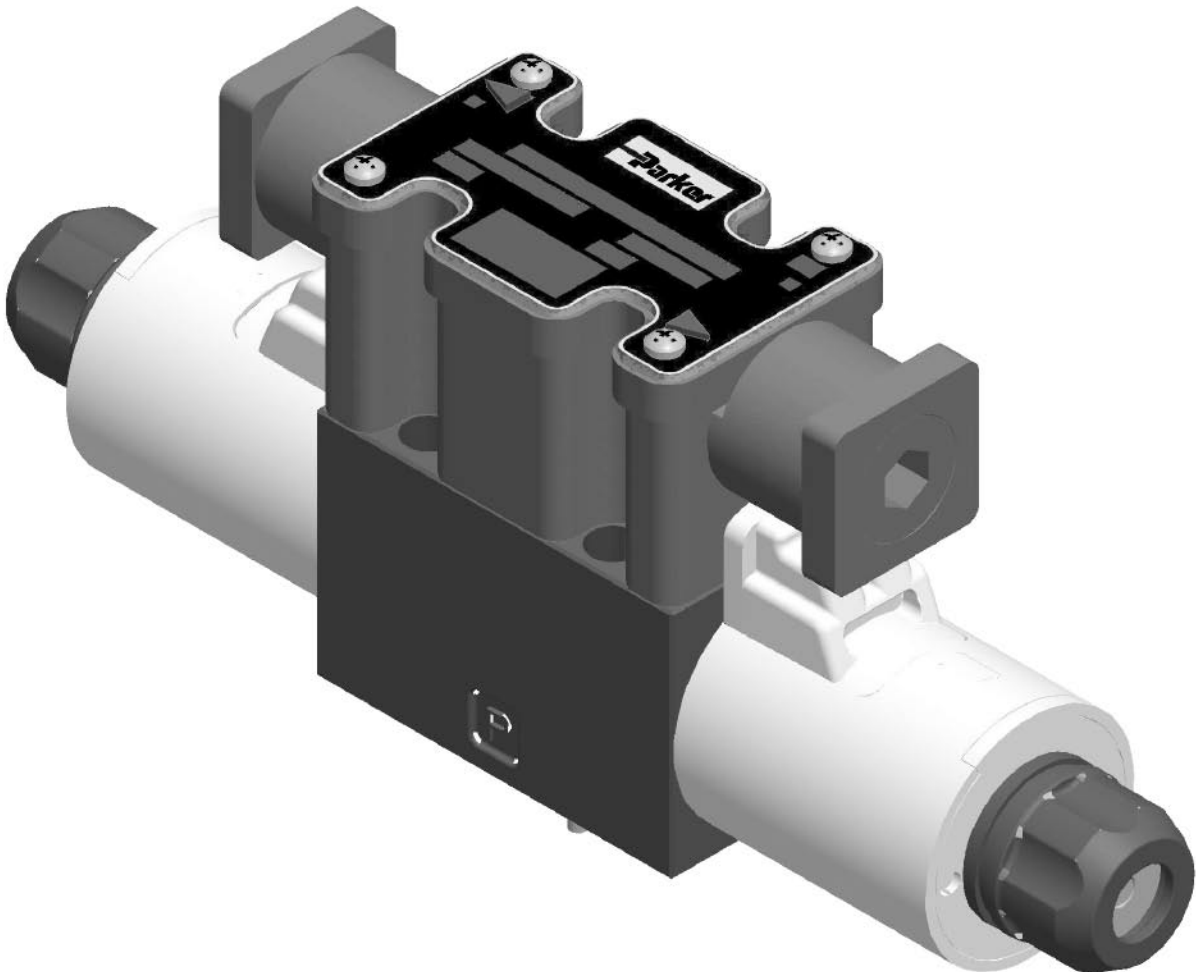
Bulletin HY14-2536-M2/US  
Service Bulletin

# Series D1VW, C Style 91 Design

Effective: May 1, 2007

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## Directional Control Valves



**WARNING – USER RESPONSIBILITY**

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**SAFETY GUIDE**

For safety information, see Safety Guide SG HY14-1000 at [www.parker.com/safety](http://www.parker.com/safety) or call 1-800-CParker.

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**Model Code**

Standard Valves.....1-2

**Parts Data**

D1VW\*\*\*C\*\*G5\*-91 (Conduit Box, Plug-In).....3

D1VW\*\*\*C\*\*C\*-91\* (Conduit Box, Leadwire) .....4

D1VW\*\*\*C\*\*P\*-91, D1VW\*\*\*C\*\*W\*-91, D1VW\*\*\*C\*\*S\*-91, D1VW\*\*\*C\*\*M\*-91 (DIN, Spade, Metri-Pak).....5

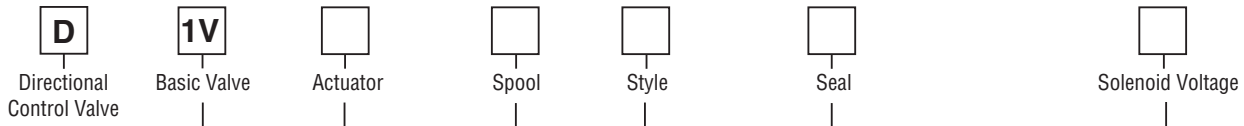
D1VW\*\*\*C\*\*GGS\*5\*-91 (Conduit Box, Soft Shift, Plug-In).....6

D1VW\*\*\*C\*\*PGS\*-91 (DIN Soft Shift) .....7

D1VW\*\*\*C\*\*EU-91, D1VW\*\*\*C\*\*ED-91, D1VW\*\*\*C\*\*EE-91, D1VW\*\*\*C\*\*EO-91 (Explosion Proof) .....8

**Ordering Information** .....9-11**Spool Chart** ..... 12**Wiring Instructions** ..... 13**Coil Data** ..... 14**Troubleshooting Guide** .....15-16

**Standard Valves**



NFPA D03  
CETOP 3  
DIN NG6

| Code       | Description                        |
|------------|------------------------------------|
| <b>W*</b>  | <b>Solenoid, Wet Pin, Screw-in</b> |
| <b>HW*</b> | <b>Reversed Wiring</b>             |

| Code      | Description         |
|-----------|---------------------|
| <b>N</b>  | <b>Nitrile</b>      |
| <b>V</b>  | <b>Fluorocarbon</b> |
| <b>E*</b> | <b>EPR</b>          |

| Code        | Description                |
|-------------|----------------------------|
| <b>A**</b>  | <b>24/50 VAC</b>           |
| <b>D</b>    | <b>120 VDC</b>             |
| <b>G</b>    | <b>198 VDC</b>             |
| <b>J</b>    | <b>24 VDC</b>              |
| <b>K</b>    | <b>12 VDC</b>              |
| <b>L</b>    | <b>6 VDC</b>               |
| <b>N***</b> | <b>220/50 VAC</b>          |
| <b>P***</b> | <b>110/50 VAC</b>          |
| <b>Q**</b>  | <b>100/60 VAC</b>          |
| <b>QD</b>   | <b>100/60 - 100/50 VAC</b> |
| <b>R</b>    | <b>24/60 VAC</b>           |
| <b>T</b>    | <b>240/60 - 220/50 VAC</b> |
| <b>U</b>    | <b>98 VDC</b>              |
| <b>Y</b>    | <b>120/60 - 110/50 VAC</b> |
| <b>Z</b>    | <b>250 VDC</b>             |

\* Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing solenoid A. Note operators reverse sides for #008 and #009 spools. See installation information for details. To configure per DIN standards (A coil over A port, B coil over B port) code valves as D1VHW\*\*\*.

\* Contact HVD for availability.

\*\* High Watt only  
\*\*\* Explosion Proof only.

| Code               | Symbol | Code         | Symbol |
|--------------------|--------|--------------|--------|
| <b>001</b>         |        | <b>011</b>   |        |
| <b>002</b>         |        | <b>014</b>   |        |
| <b>003</b>         |        | <b>015</b>   |        |
| <b>004</b>         |        | <b>016</b>   |        |
| <b>005</b>         |        | <b>020*</b>  |        |
| <b>006</b>         |        | <b>026*</b>  |        |
| <b>007</b>         |        | <b>030**</b> |        |
| <b>008*, 009**</b> |        | <b>081</b>   |        |
| <b>010</b>         |        | <b>082</b>   |        |

\* 008, 020 & 026 spools have closed crossover.  
\*\* 009 & 030 spool have open crossover.  
See Universal Spool Chart for other spool options.

| Code      | Description  | Symbol |
|-----------|--|--------|
| <b>B*</b> | <b>Single solenoid, 2 position, spring offset. P to A and B to T in offset position.</b>   |        |
| <b>C</b>  | <b>Double solenoid, 3 position, spring centered.</b>   |        |
| <b>D†</b> | <b>Double solenoid, 2 position, detent.</b>  |        |
| <b>E</b>  | Single solenoid, 2 position, spring centered. P to B and A to T when energized.  |        |
| <b>F‡</b> | Single solenoid, 2 position. Spring offset, energized to center. Position spool spacer on A side. P to A and B to T in spring offset position. |        |
| <b>H*</b> | <b>Single solenoid, 2 position, spring offset. P to B and A to T in offset position.</b>   |        |
| <b>K</b>  | Single solenoid, 2 position, spring centered. P to A and B to T when energized.  |        |
| <b>M‡</b> | Single solenoid, 2 position, spring offset, energized to center position. Spool spacer on B side. P to B and A to T in spring offset position. |        |

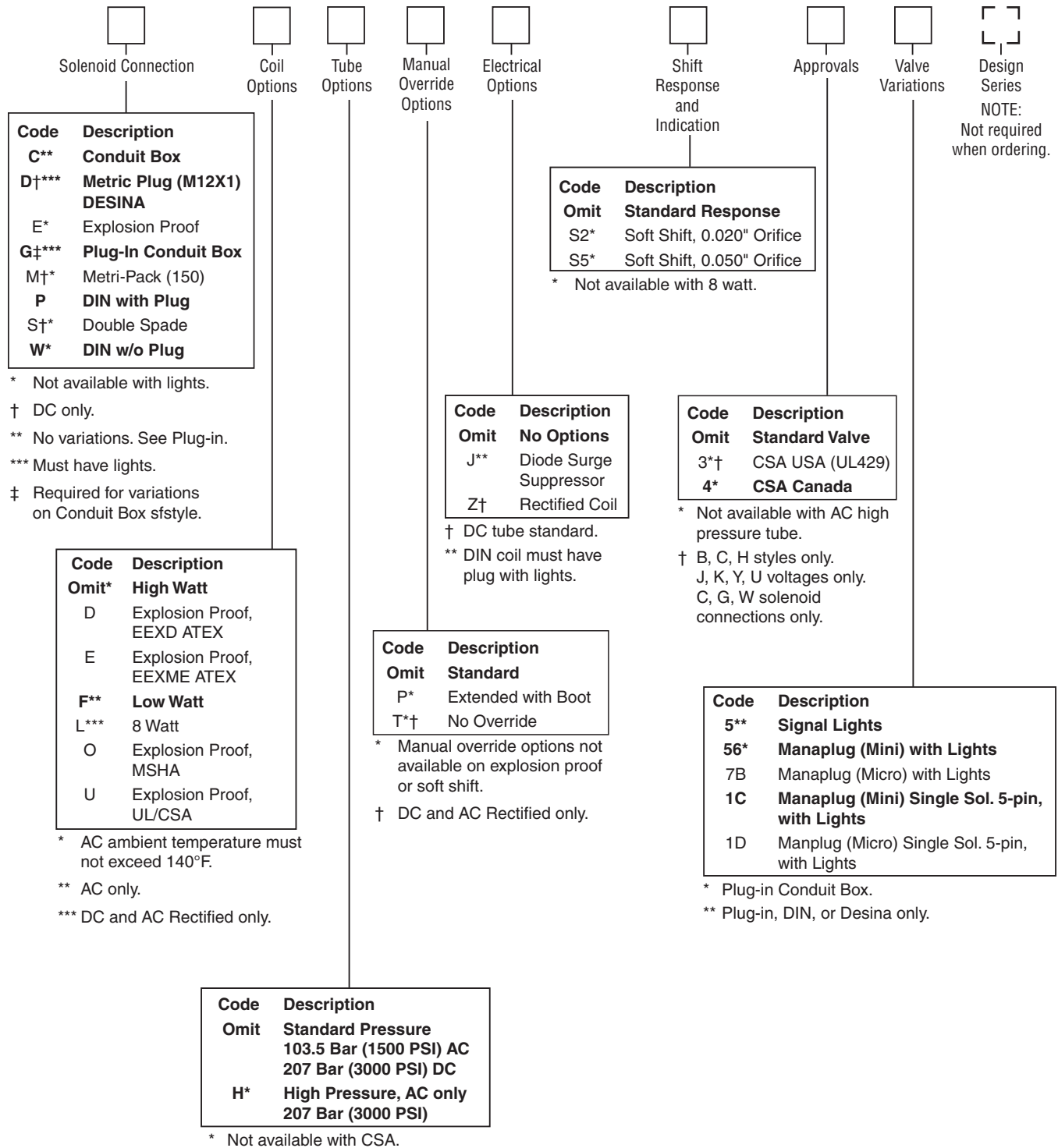
\* 020, 026 and 030 spools only.  
† 020 and 030 spools only.  
‡ High Watt only.

**Bold: Designates Tier I products and options.**

**Non-Bold: Designates Tier II products and options.**

**These products will have longer lead times.**

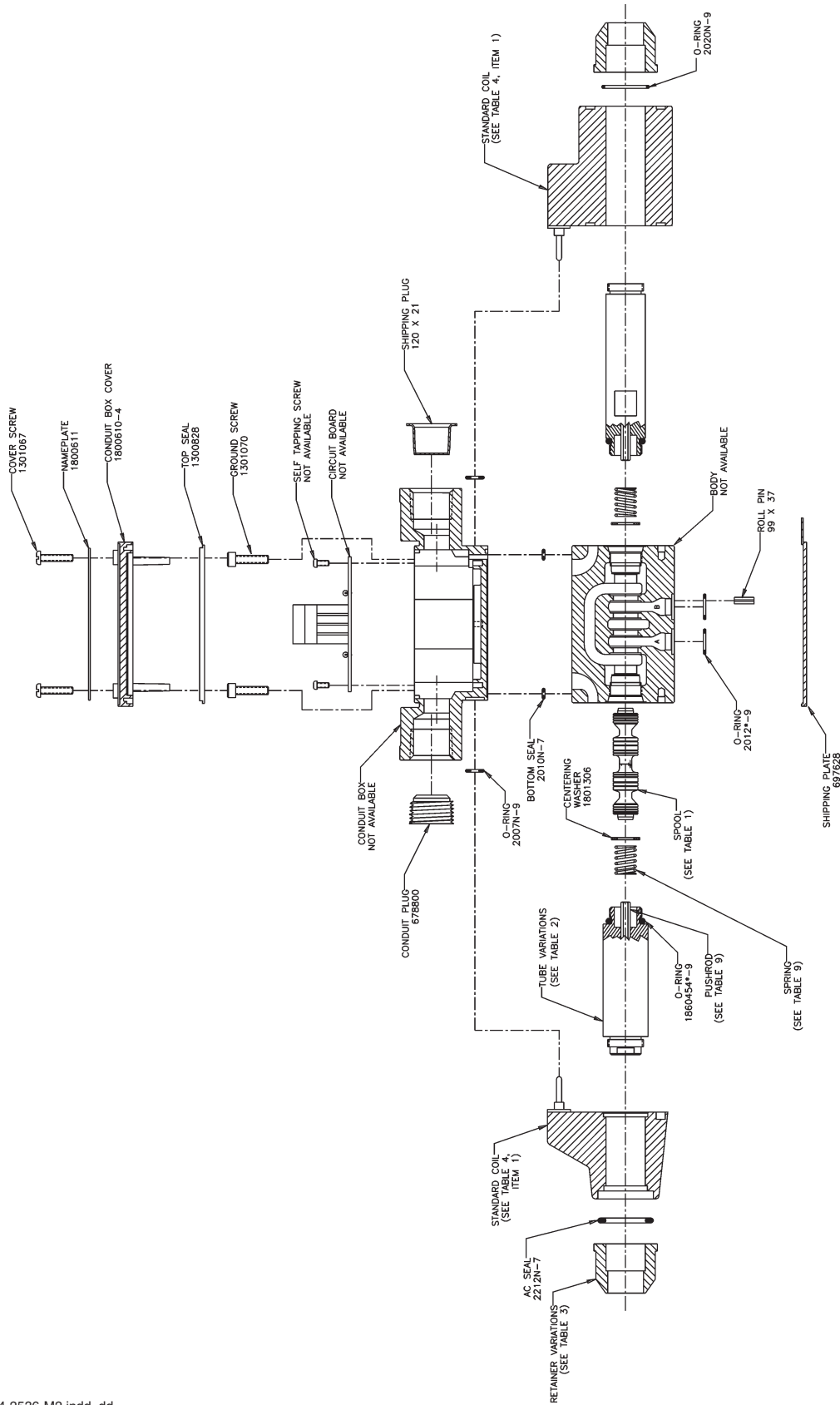
**Standard Valves**



**Bold: Designates Tier I products and options.**

**Non-Bold: Designates Tier II products and options.  
These products will have longer lead times.**

**D1VW\*\*\*C\*\*G5\*-91 Conduit Box, Plug-in**



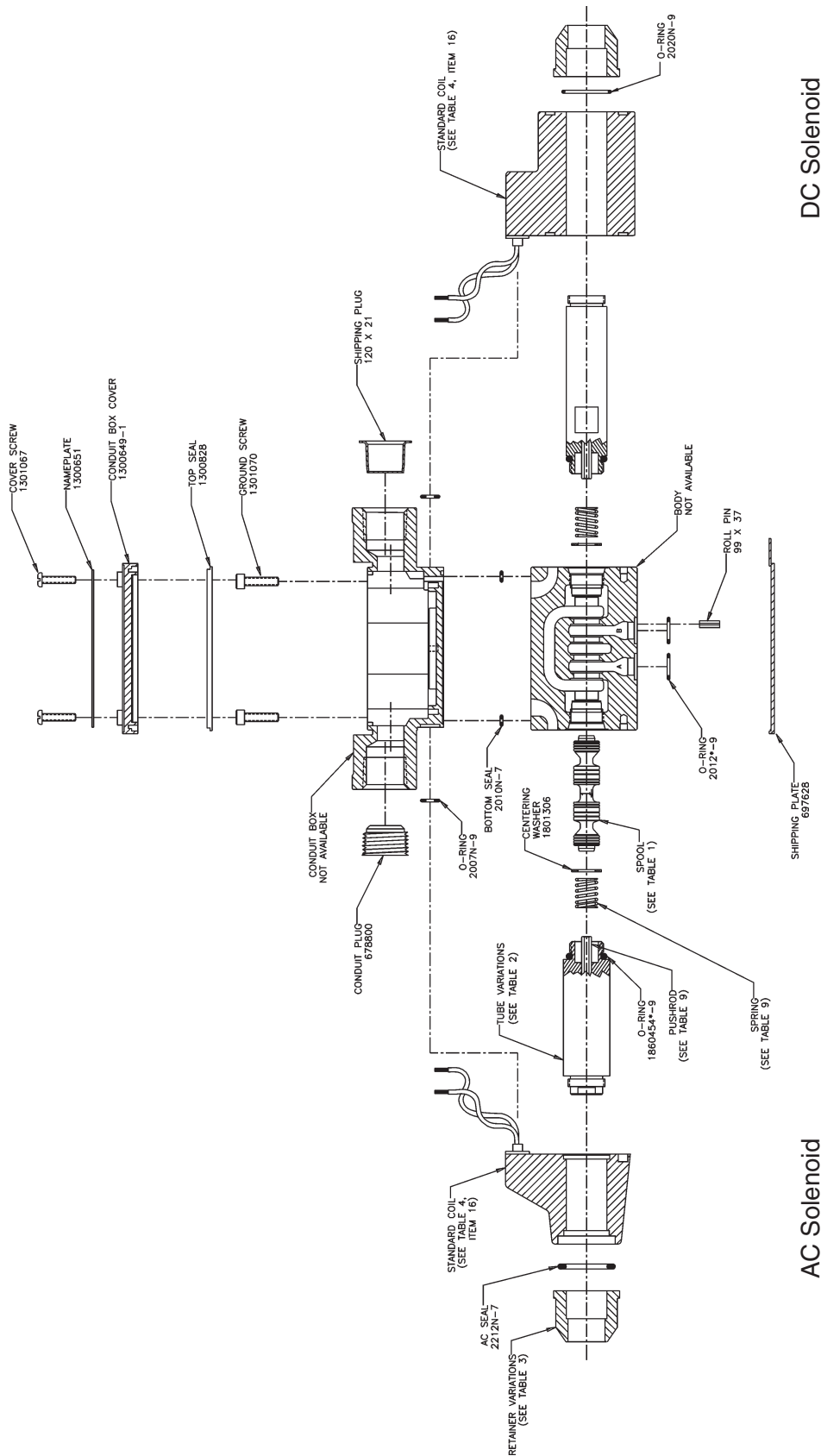
**DC Solenoid**

**AC Solenoid**

**D1VW Double A.C. Solenoid Model**  
**D1VW Double D.C. Solenoid Model**

- Notes:
- 1) AC Solenoid components shown on left side,  
 DC components shown on right side.
  - 2) \* indicates Seal Compound: N = Nitrile, V = Fluorocarbon, E = EPR.

**D1VW\*\*\*C\*\*C\*-91 Conduit Box, Leadwire**



**DC Solenoid**

**AC Solenoid**

**D1VW Double A.C. Solenoid Model**  
**D1VW Double D.C. Solenoid Model**

- Notes:
- 1) AC Solenoid components shown on left side,  
 DC components shown on right side.
  - 2) \* indicates Seal Compound:  
 N = Nitrile, V = Fluorocarbon, E = EPR.

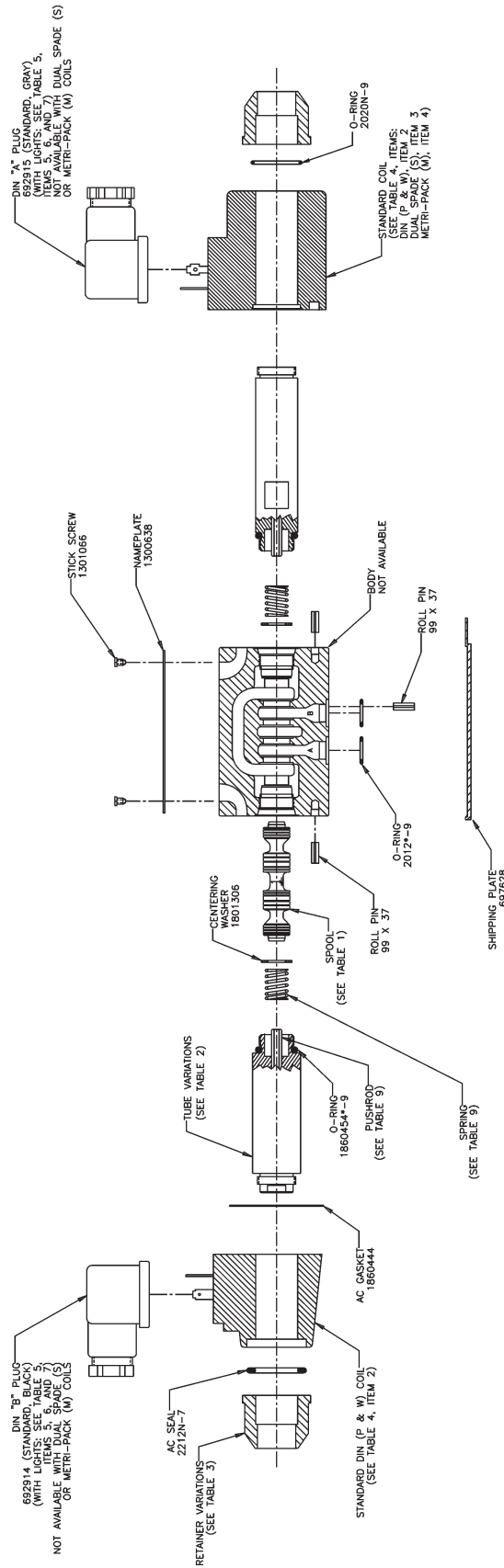


**D1VW\*\*\*C\*\*P\*-91**  
**D1VW\*\*\*C\*\*W\*-91**

**DIN with Plug**  
**DIN without Plug**

**D1VW\*\*\*C\*\*S\*-91**  
**D1VW\*\*\*C\*\*M\*-91**

**Dual Spade**  
**Metri-Pack**



**DC Solenoid**

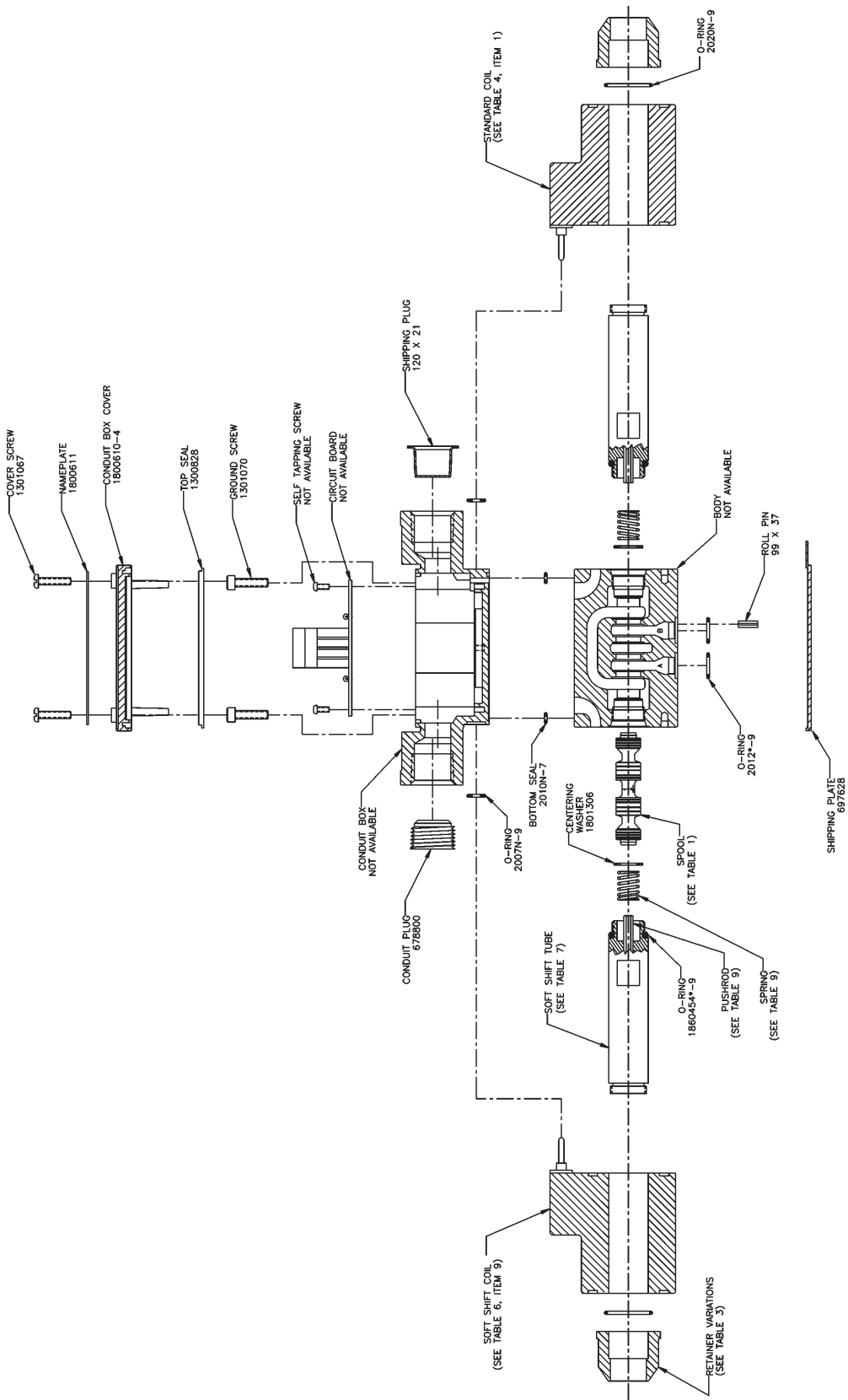
**AC Solenoid**  
 (Not available with 8 watt option)

**D1VW Double A.C. Solenoid Model**  
**D1VW Double D.C. Solenoid Model**

- Notes:
- 1) AC Solenoid components shown on left side,  
 DC components shown on right side.
  - 2) \* Indicates Seal Compound:  
 N = Nitrile, V = Fluorocarbon, E = EPR.



**D1VW\*\*C\*\*GG5\*5\*-91 Conduit Box Soft Shift, Plug-in**



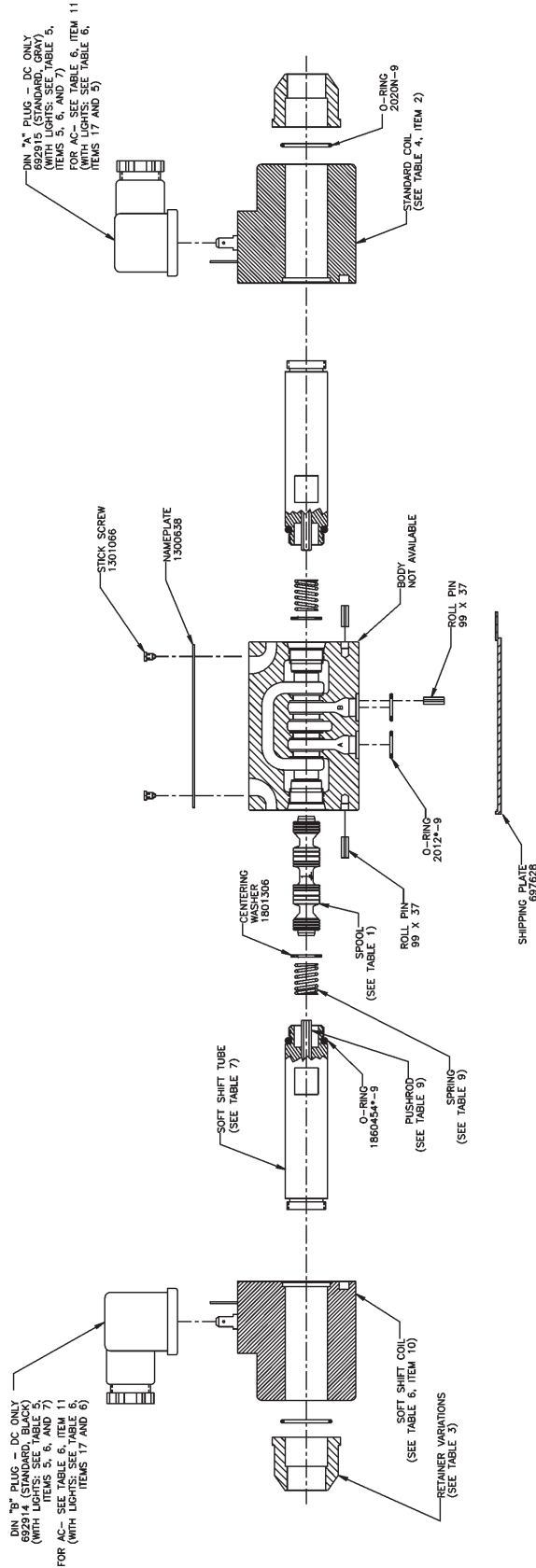
DC Solenoid

AC Solenoid (Rectified)

D1VW Double A.C. Solenoid Model  
 D1VW Double D.C. Solenoid Model

- Notes:
- 1) AC Solenoid components shown on left side,  
 DC components shown on right side.
  - 2) \* indicates Seal Compound:  
 N = Nitrile, V = Fluorocarbon, E = EPR.

**D1VW\*\*\*C\*\*PGS\*-91    DIN Soft Shift with Plug (Required with AC)**  
**D1VW\*\*\*C\*\*WGS\*-91    DIN Soft Shift without Plug (DC Only)**



**DC Solenoid**

**AC Solenoid (Rectified)**

D1VW Double A.C. Solenoid Model  
 D1VW Double D.C. Solenoid Model

- Notes:**
- 1) AC Solenoid components shown on left side,  
 DC components shown on right side.
  - 2) \* Indicates Seal Compound:  
 N = Nitrile, V = Fluorocarbon, E = EPR.



**Table 1 – Spools**

| Code | Part Number | Qty | Description          |
|------|-------------|-----|----------------------|
| 1    | 697601      | 1   | #1 Spool             |
| 2    | 697602      | 1   | #2 Spool             |
| 3    | 697603      | 1   | #3 Spool             |
| 4    | 697604      | 1   | #4 Spool             |
| 5    | 697605      | 1   | #5 Spool             |
| 6    | 697606      | 1   | #6 Spool             |
| 7    | 697607      | 1   | #7 Spool             |
| 8    | 697608      | 1   | #8 Spool             |
| 9    | 1302128     | 1   | #9 Spool             |
| 10   | 697610      | 1   | #10 Spool            |
| 11   | 697611      | 1   | #11 Spool            |
| 14   | 697607      | 1   | #7 Spool Reversed    |
| 15   | 697603      | 1   | #3 Spool Reversed    |
| 16   | 697605      | 1   | #5 Spool Reversed    |
| 21   | 697621      | 1   | #21 Spool            |
| 22   | 697621      | 1   | #21 Spool Reversed   |
| 81   | 1210011     | 1   | #1 20% Overlap Spool |
| 82   | 1210012     | 1   | #11 20% Bleed Spool  |

△1

△1 Arrow points toward "A" port for all spools except: 14, 15, 16 & 22.

△3 81 and 82 spools not applicable with explosion proof options.

**Table 2 – Tube Variations**

| Code         | Part Number | Qty | Description                    |
|--------------|-------------|-----|--------------------------------|
| Omit or F    | 1860432     | 2   | A.C. Tube<br>1500 PSI          |
| H            | 1860431     | 2   | A.C. Tube<br>3000 PSI          |
| G            | 1860428     |     | D.C. Tube<br>3000 PSI          |
| P<br>or FP   | 1860434     | 2   | Extended A.C. Tube<br>1500 PSI |
| HP<br>or FHP | 1860433     | 2   | Extended A.C. Tube<br>3000 PSI |
| GP<br>or LGP | 1860429     |     | Extended D.C. Tube<br>3000 PSI |

**Table 3 – Retainer Variations**

| Code                 | Part Number | Qty | Description                   |
|----------------------|-------------|-----|-------------------------------|
| All Except<br>P & T  | 1860456     | 2   | AC Standard Retainer          |
|                      | 1860437     |     | DC Standard Retainer          |
| P or FP<br>HP or FHP | 1860463     | 2   | AC Extended Override Retainer |
|                      | 1860452     |     | AC Extended Override Boot     |
| P<br>GP or LGP       | 1860437     | 2   | DC Extended Override Retainer |
|                      | 1860452     |     | DC Extended Override Boot     |
| T                    | 1860438     | 2   | DC Tamper Proof Retainer      |

**Table 4 – Standard Coils**

| Solenoid Connection |                           |     | G (Conduit Box)<br>(Plug-In) | P & W<br>(DIN) | S<br>(Dual Spade) | M<br>(Metri-Pack) | C (Conduit Box)<br>(Leadwire) |
|---------------------|---------------------------|-----|------------------------------|----------------|-------------------|-------------------|-------------------------------|
| Code                | Description               | Qty | Part Number                  | Part Number    | Part Number       | Part Number       | Part Number                   |
| Y*                  | 120/60–110/50 VAC 21 Watt | 2   | 1860422-21-Y                 | 1860423-21-Y   | N/A               | N/A               | 1860436-21-Y                  |
| T*                  | 240/60–220/50 VAC 21 Watt | 2   | 1860422-21-T                 | 1860423-21-T   | N/A               | N/A               | 1860436-21-T                  |
| QD                  | 100/60–100/50 VAC         | 2   | N/A                          | 1860423-25-QD  | N/A               | N/A               | N/A                           |
| R*                  | 24/60 21 Watt             | 2   | 1860422-21-R                 | N/A            | N/A               | N/A               | 1860436-21-R                  |
| L*                  | 6 VDC                     | 2   | 1860410-30-6                 | 1860414-30-6   | 1860415-30-6      | 1860413-30-6      | 1860435-30-6                  |
| K*                  | 12 VDC                    | 2   | 1860410-30-12                | 1860414-30-12  | 1860415-30-12     | 1860413-30-12     | 1860435-30-12                 |
| KL                  | 12 VDC 8 Watt             | 2   | 1860410-10-12                | 1860414-10-12  | 1860415-10-12     | 1860413-10-12     | 1860435-10-12                 |
| J*                  | 24 VDC                    | 2   | 1860410-30-24                | 1860414-30-24  | 1860415-30-24     | 1860413-30-24     | 1860435-30-24                 |
| JL                  | 24 VDC 8 Watt             | 2   | 1860410-10-24                | 1860414-10-24  | 1860415-10-24     | 1860413-10-24     | 1860435-10-24                 |
| D*                  | 120 VDC                   | 2   | 1860410-30-120               | 1860414-30-120 | 1860415-30-120    | 1860413-30-120    | 1860435-30-120                |
| DL                  | 120 VDC 8 Watt            | 2   | 1860410-10-120               | 1860414-10-120 | 1860415-10-120    | 1860413-10-120    | 1860435-10-120                |
| Z*                  | 250 VDC                   | 2   | 1860410-30-250               | 1860414-30-250 | 1860415-30-250    | 1860413-30-250    | 1860435-30-250                |
| ZL                  | 250 VDC 8 Watt            | 2   | 1860410-10-250               | 1860414-10-250 | 1860415-10-250    | 1860413-10-250    | 1860435-10-250                |
| U*                  | 98 VDC                    | 2   | N/A                          | 1860414-30-98  | N/A               | 1860413-30-98     | N/A                           |
| G*                  | 198 VDC                   | 2   | N/A                          | 1860414-30-198 | N/A               | 1860413-30-198    | N/A                           |

**Table 5 – Signal Lights**

| Code  | Item | Part Number | Qty | Description               |
|-------|------|-------------|-----|---------------------------|
| ALL   | 5    | 697047      | 1   | Label – "A" Solenoid      |
|       | 6    | 697048      | 1   | Label – "B" Solenoid      |
| YP*5  | 7    | 694936      | 2   | Plug with Light, 100-120V |
| QP*5  |      | 694936      | 2   | Plug with Light, 100-120V |
| QDP*5 |      | 694936      | 2   | Plug with Light, 100-120V |
| TP*5  |      | 694936      | 2   | Plug with Light, 240V     |
| KP*5  |      | 694935      | 2   | Plug with Light, 12V      |
| JP*5  |      | 694935      | 2   | Plug with Light, 24V      |
| DP*5  |      | 694936      | 2   | Plug with Light, 100-120V |
|       |      |             |     |                           |

**Table 7 – Soft Shift Tubes, DC or AC Rectified**

| Code | Part Number | Qty | Description                             |
|------|-------------|-----|---|
| GS2  | 1860430-2   | 2   | 3000 PSI Soft Shift Tube, .020" Orifice |
| GS3  | 1860430-3   | 2   | 3000 PSI Soft Shift Tube, .030" Orifice |
| GS4  | 1860430-4   | 2   | 3000 PSI Soft Shift Tube, .040" Orifice |
| GS5  | 1860430-5   | 2   | 3000 PSI Soft Shift Tube, .050" Orifice |

**Table 6 – Soft Shift Coils, AC Rectified Only**

| Solenoid Connection |                   |     | G (Conduit)    | P (DIN w/Plug) | DIN Plugs, AC Rectified Only** |                                 |     |             |
|---------------------|-------------------|-----|----------------|----------------|--------------------------------|---------------------------------|-----|-------------|
| Item                |                   |     | 9              | 10             | Item                           | Description                     | Qty | Part Number |
| Code                | Description       | Qty | Part Number    | Part Number    |                                |                                 |     |             |
| Y*G                 | 120/60–110/50 VAC | 2   | 1860410-30-98  | 1860414-30-98  | 11                             | Rectified Standard, Plug "A"    | 1   | 1301053     |
| T*G                 | 240/60–220/50 VAC | 2   | 1860410-30-214 | 1860414-30-214 |                                | Rectified Standard, Plug "B"    | 1   | 1301054     |
| QD*G                | 100/60–100/50 VAC | 2   | 1860410-30-86  | 1860414-30-86  | 17                             | Rectified with Lights, Plug "A" | 1   | 1300712     |
|                     |                   |     |                |                |                                | Label, "A" Solenoid             | 1   | 697047      |
|                     |                   |     |                |                | 17                             | Rectified with Lights, Plug "B" | 1   | 1300712     |
|                     |                   |     |                |                |                                | Label, "B" Solenoid             | 1   | 697048      |

\*\*Must be rectified plug when using AC with soft shift.

**Table 8 – Explosion Proof Coils**

| Solenoid Connection |                   |     | U (UL/CSA)     | D (EEXD)       | E (EEXME)      | O (MSHA)       |
|---------------------|-------------------|-----|----------------|----------------|----------------|----------------|
| Item                |                   |     | 12             | 13             | 14             | 15             |
| Code                | Description       | Qty | Part Number    | Part Number    | Part Number    | Part Number    |
| YE                  | 120/60–110/50 VAC | 2   | 1860427-27-Y   | 1860424-25-Y   | 1860425-30-Y   | 1860426-27-Y   |
| TE                  | 240/60–220/50 VAC | 2   | 1860427-27-T   | 1860424-25-T   | 1860425-30-T   | 1860426-27-T   |
| QE                  | 100/60 VAC        | 2   | 1860427-27-Q   | 1860424-25-Q   | 1860425-30-Q   | 1860426-27-Q   |
| RE                  | 24/60 VAC         | 2   | 1860427-27-R   | N/A            | 1860425-30-R   | 1860426-27-R   |
| AE                  | 24/50 VAC         | 2   | N/A            | 1860424-17-A   | 1860425-30-A   | N/A            |
| NE                  | 220/50 VAC        | 2   | 1860427-27-N   | 1860424-25-N   | 1860425-30-N   | N/A            |
| PE                  | 110/50 VAC        | 2   | 1860427-27-P   | 1860424-25-P   | 1860425-30-P   | N/A            |
| LE                  | 6 VDC             | 2   | 1860421-33-6   | 1860418-33-6   | 1860419-30-6   | 1860420-33-6   |
| KE                  | 12 VDC            | 2   | 1860421-33-12  | 1860418-33-12  | 1860419-30-12  | 1860420-33-12  |
| JE                  | 24 VDC            | 2   | 1860421-33-24  | 1860418-33-24  | 1860419-30-24  | 1860420-33-24  |
| DE                  | 120 VDC           | 2   | 1860421-33-120 | 1860418-33-120 | 1860419-30-120 | 1860420-33-120 |
| ZE                  | 250 VDC           | 2   | 1860421-33-250 | 1860418-33-250 | 1860419-30-250 | 1860420-33-250 |

**Table 9 – D1VW-91 Springs and Pushrods**

| Valve                                 | Spool   | Description    | Style          | Spring  |         |         | Pushrod |         |         |         |         |         |         |
|---------------------------------------|---|----------------|----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                                       |   |                |                | 1860447 | 1860446 | 1860445 | 1860400 | 1860401 | 1860402 | 1860403 | 1860404 | 1860439 | 1860441 |
| Standard<br>(Non-Soft Shift)<br>Valve | 1, 4, 10,<br>11, 21, 22                         | DC-8W          | All Except F/M |         |         |         |         |         |         |         |         |         |         |
|                                       |   | DC-30W         | All Except F/M |         |         |         |         |         |         |         |         |         |         |
|                                       |   | AC-21W         | All Except F/M |         |         |         |         |         |         |         |         |         |         |
|                                       |   | AC-30W         | All Except F/M |         |         |         |         |         |         |         |         |         |         |
|                                       |   | DC-8W          | F & M          |         |         |         |         |         |         |         |         |         |         |
|                                       |   | DC-30W         | F & M          |         |         |         |         |         |         |         |         |         |         |
|                                       |   | AC-21W         | F & M          |         |         |         |         |         |         |         |         |         |         |
|                                       |   | AC-30W         | F & M          |         |         |         |         |         |         |         |         |         |         |
|                                       | 2, 3/15, 5/16,<br>6, 7, 8, 9, 14,<br>16, 20, 30 | DC-8W          | All Except F/M |         |         |         |         |         |         |         |         |         |         |
|                                       |   | DC-30W         | All Except F/M |         |         |         |         |         |         |         |         |         |         |
|                                       |   | AC-21W         | All Except F/M |         |         |         |         |         |         |         |         |         |         |
|                                       |   | AC-30W         | All Except F/M |         |         |         |         |         |         |         |         |         |         |
|                                       |   | DC-8W          | F & M          |         |         |         |         |         |         |         |         |         |         |
|                                       |   | DC-30W         | F & M          |         |         |         |         |         |         |         |         |         |         |
|                                       |   | AC-21W         | F & M          |         |         |         |         |         |         |         |         |         |         |
|                                       |   | AC-30W         | F & M          |         |         |         |         |         |         |         |         |         |         |
|                                       | 20D/30D   | DC-8W          | D              |         |         |         |         |         |         |         |         |         |         |
|                                       |   | DC-30W         | D              |         |         |         |         |         |         |         |         |         |         |
|                                       |   | AC-21W         | D              |         |         |         |         |         |         |         |         |         |         |
|                                       |   | AC-30W         | D              |         |         |         |         |         |         |         |         |         |         |
|                                       | 81/82   | DC-8W          | All Except F/M |         |         |         |         |         |         |         |         |         |         |
| DC-30W                                |   | All Except F/M |                |         |         |         |         |         |         |         |         |         |         |
| Soft Shift<br>Valve                   | 1, 4, 10,<br>11, 21, 22                         | DC-30W         | All Except F/M |         |         |         |         |         |         |         |         |         |         |
|                                       |   | DC-30W         | F & M          |         |         |         |         |         |         |         |         |         |         |
|                                       | 2, 3/15, 5/16,<br>6, 7, 8, 9,<br>14, 20, 30     | DC-30W         | All Except F/M |         |         |         |         |         |         |         |         |         |         |
|                                       |   | DC-30W         | F & M          |         |         |         |         |         |         |         |         |         |         |
|                                       | 20D/30D   | DC-30W         | D              |         |         |         |         |         |         |         |         |         |         |
|                                       | 81/82   | DC-30W         | All Except F/M |         |         |         |         |         |         |         |         |         |         |

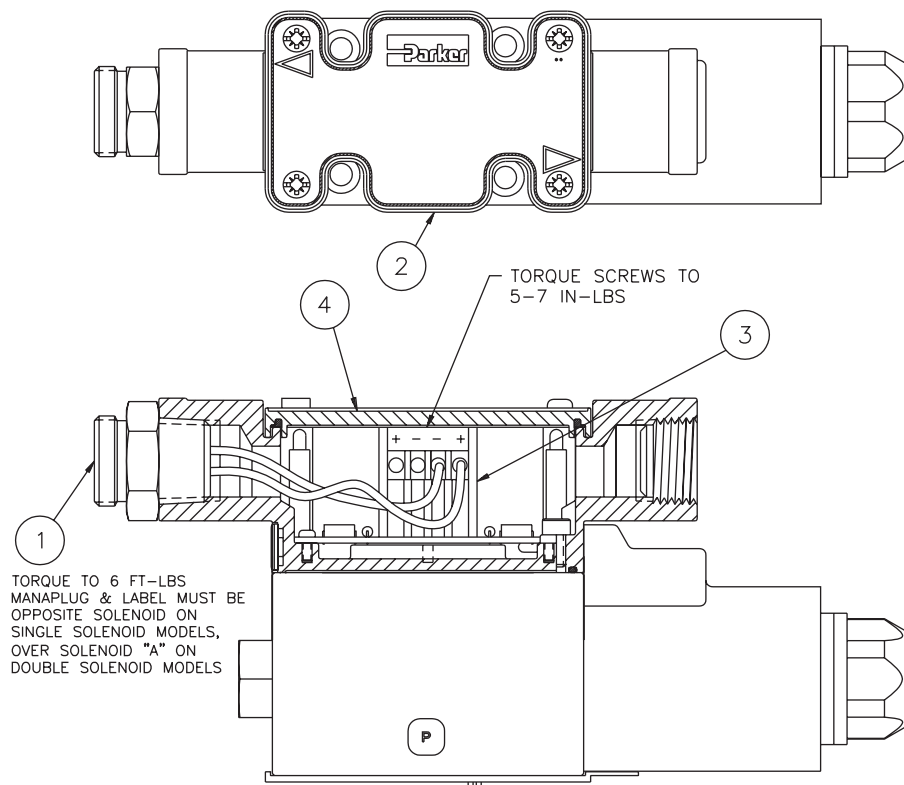
| B-SOLENOID<br>* (A-SOLENOID) |                                 | A-SOLENOID<br>* (B-SOLENOID) |                     | B-SOLENOID<br>* (A-SOLENOID) |                    | A-SOLENOID<br>* (B-SOLENOID) |                     |
|------------------------------|---------------------------------|------------------------------|---------------------|------------------------------|--------------------|------------------------------|---------------------|
|                              |                                 |                              |                     |                              |                    |                              |                     |
|                              | 1 Spool<br>697601               |                              | 10 Spool<br>697610  |                              | 2 Spool<br>697602  |                              | 11 Spool<br>697611  |
|                              |                                 |                              |                     |                              |                    |                              |                     |
|                              | 3 Spool<br>697603               |                              | 7 Spool<br>697607   |                              | 4 Spool<br>697604  |                              | 14 Spool<br>697607  |
|                              |                                 |                              |                     |                              |                    |                              |                     |
|                              | 5 Spool<br>697605               |                              | 3 Spool<br>697603   |                              | 5 Spool<br>697605  |                              | 15 Spool<br>697603  |
|                              |                                 |                              |                     |                              |                    |                              |                     |
|                              | 6 Spool<br>697606               |                              | 21 Spool<br>697621  |                              | 7 Spool<br>697607  |                              | 21 Spool<br>697621  |
|                              |                                 |                              |                     |                              |                    |                              |                     |
|                              | 8 Spool<br>697608               |                              | 81 Spool<br>1210011 |                              | 8 Spool<br>697608  |                              | 81 Spool<br>1210011 |
|                              | *Note Reverse Operator Location |                              |                     |                              |                    |                              |                     |
|                              |                                 |                              |                     |                              |                    |                              |                     |
|                              | 9 Spool<br>1302128              |                              | 82 Spool<br>1210012 |                              | 9 Spool<br>1302128 |                              | 82 Spool<br>1210012 |
|                              | *Note Reverse Operator Location |                              |                     |                              |                    |                              |                     |

**Variation 56 – Double Solenoid Plug-in Models with Lights and 5-Pin Manaplug (Mini)**

| Valve | Spool                         | Nameplate Marking | Wiring Diagram | Sol. Code   | Item | Part Number | Qty | Description       |
|-------|-------------------------------|-------------------|----------------|-------------|------|-------------|-----|-------------------|
| D1VW  | All Spools Except 008 and 009 |                   |                | A<br>L<br>L | 1    | 1302154     | 1   | Manaplug, 5-Pin   |
|       |                               |                   |                |             | 2    | 697629      | 1   | Warning Label     |
|       |                               |                   |                |             | 4    | 1800610-4   | 1   | Conduit Box Cover |
|       |                               |                   |                |             | 5    | 1800611     | 1   | Nameplate         |
| D1VHW | Spools 008 and 009 Only       |                   |                | A<br>L<br>L |      |             |     |                   |
| D1VHW | All Spools Except 008 and 009 |                   |                |             |      |             |     |                   |
| D1VW  | Spools 008 and 009 Only       |                   |                |             |      |             |     |                   |

● Wiring diagrams show the backside of plug.

**Plug-in Conduit Variation**



Note: H, K and M styles shown

**Wiring Instructions**

*(Dashed lines indicate wiring thru terminal strip – no assembly required here)*

1. Install manaplug (Item 1) over solenoid "A" on double solenoid models (opposite solenoid on single solenoid models).
2. Slip ground screw (1301070) through ring terminal on green ground wire (from manaplug) and secure to valve body.
3. Insert manaplug wires into terminal strip (Item 3) in box as shown in wiring diagram. Ensure all wire strands are contained by the connector and tighten clamping screws to 0.5 Nm (5 in. lbs.).
4. Install cover on the conduit box.
5. Place warning label (Item 2) on conduit box side, as shown.



## Solenoid Ratings

|   |  |
|---|--|
| <b>Insulation System</b>                      | Class F  |
| <b>Allowable Deviation from rated voltage</b> | -15% to +10% for DC and AC rectified coils<br>-5% to +5% for AC Coils                                      |
| <b>Armature</b>                               | Wet pin type   |
| <b>CSA File Number</b>                        | LR60407  |
| <b>Environmental Capability</b>               | DC Solenoids meet NEMA 4 and IP67 when properly wired and installed. Contact HVD for AC coil applications. |

## Explosion Proof Solenoid Ratings\*

|                          |  |
|--------------------------|--|
| <b>UL &amp; CSA (EU)</b> | Class I, Div 1 & 2, Groups C & D<br>Class II, Div 1 & 2, Groups E, F & G<br>As defined by the NEC    |
| <b>MSHA (EO)</b>         | Complies with 30CFR, Part 18   |
| <b>ATEX (ED)</b>         | Complies with ATEX requirements for:<br>Exd, Group IIB; EN50014: 1999+ Amds.<br>1 & 2, EN50018: 2000 |

\* Allowable Voltage Deviation  $\pm 10\%$ .

Note that Explosion Proof AC coils are single frequency only.

| Code                             |            | Voltage              | In Rush Amps Amperage | In Rush Amps D1VW VA | Holding Amps D1VW @ 3MM | Watts D1VW | Resistance D1VW |
|----------------------------------|------------|----------------------|-----------------------|----------------------|-------------------------|------------|-----------------|
| Voltage Code                     | Power Code |                      |                       |                      |                         |            |                 |
| D                                | L          | 120 VDC              | N/A                   | N/A                  | 0.09 Amps               | 10 W       | 1584.00 ohms    |
|                                  |            |                      | N/A                   | N/A                  | 0.26 Amps               | 30 W       | 528.00 ohms     |
| G                                |            | 198 VDC              | N/A                   | N/A                  | 0.15 Amps               | 30 W       | 1306.80 ohms    |
| J                                | L          | 24 VDC               | N/A                   | N/A                  | 0.44 Amps               | 10 W       | 51.89 ohms      |
|                                  |            |                      | N/A                   | N/A                  | 1.32 Amps               | 30 W       | 17.27 ohms      |
| K                                | L          | 12 VDC               | N/A                   | N/A                  | 0.88 Amps               | 10 W       | 12.97 ohms      |
|                                  |            |                      | N/A                   | N/A                  | 2.64 Amps               | 30 W       | 4.32 ohms       |
| L                                | L          | 6 VDC                | N/A                   | N/A                  | 1.67 Amps               | 10 W       | 3.59 ohms       |
|                                  |            |                      | N/A                   | N/A                  | 5.00 Amps               | 30 W       | 1.20 ohms       |
| Q                                | F          | 100 VAC / 60 Hz      | 1.70 Amps             | 170 VA               | 0.56 Amps               | 24 W       | 26.0 ohms       |
| QD                               | F          | 100 VAC / 60 Hz      | 1.35 Amps             | 135 VA               | 0.41 Amps               | 18 W       | 31.2 ohms       |
| QD                               | F          | 100 VAC / 50 Hz      | 1.50 Amps             | 150 VA               | 0.57 Amps               | 24 W       | 31.2 ohms       |
| R                                | F          | 24/60 VAC, Low Watt  | 6.67 Amps             | 160 VA               | 2.20 Amps               | 23 W       | 1.52 ohms       |
| T                                | F          | 240/60 VAC, Low Watt | 0.70 Amps             | 168 VA               | 0.22 Amps               | 21 W       | 145.00 ohms     |
| T                                | F          | 220/50 VAC, Low Watt | 0.75 Amps             | 165 VA               | 0.26 Amps               | 23 W       | 145.00 ohms     |
| U                                |            | 98 VDC               | N/A                   | N/A                  | 0.10 Amps               | 30 W       | 960.00 ohms     |
| Y                                | F          | 120/60 VAC, Low Watt | 1.40 Amps             | 168 VA               | 0.42 Amps               | 21 W       | 36.50 ohms      |
| Y                                | F          | 110/50 VAC, Low Watt | 1.50 Amps             | 165 VA               | 0.50 Amps               | 23 W       | 36.50 ohms      |
| Z                                | L          | 250 VDC              | N/A                   | N/A                  | 0.04 Amps               | 10 W       | 6875.00 ohms    |
|                                  |            |                      | N/A                   | N/A                  | 0.13 Amps               | 30 W       | 1889.64 ohms    |
| <b>Explosion Proof Solenoids</b> |            |                      |                       |                      |                         |            |                 |
| R                                |            | 24/60 VAC            | 7.63 Amps             | 183 VA               | 2.85 Amps               | 27 W       | 1.99 ohms       |
| T                                |            | 240/60 VAC           | 0.76 Amps             | 183 VA               | 0.29 Amps               | 27 W       | 1.34 ohms       |
| N                                |            | 220/50 VAC           | 0.77 Amps             | 169 VA               | 0.31 Amps               | 27 W       | 1.38 ohms       |
| Y                                |            | 120/60 VAC           | 1.60 Amps             | 192 VA               | 0.58 Amps               | 27 W       | 33.50 ohms      |
| P                                |            | 110/50 VAC           | 1.47 Amps             | 162 VA               | 0.57 Amps               | 27 W       | 34.70 ohms      |
| Q                                |            | 100/60 VAC           | 1.90 Amps             | 192 VA               | 0.70 Amps               | 27 W       | 38.60 ohms      |
| K                                |            | 12 VDC               | N/A                   | N/A                  | 2.75 Amps               | 33 W       | 4.36 ohms       |
| J                                |            | 24 VDC               | N/A                   | N/A                  | 1.38 Amps               | 33 W       | 17.33 ohms      |
| D                                |            | 120 VDC              | N/A                   | N/A                  | 0.28 Amps               | 33 W       | 420.92 ohms     |
| Z                                |            | 250 VDC              | N/A                   | N/A                  | 0.13 Amps               | 33 W       | 1952.66 ohms    |

## 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 clearance 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 2b.
- c. The spool clearance 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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