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<th>DESCRIPTION</th>
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<td>25 GPM Three Spool Mono-Block Directional Control Valve</td>
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<tr>
<td>RD5000</td>
<td>Solenoid Operated 1, 2, or 3 Spool Mono-Block Valve</td>
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<td>RD4100</td>
<td>15 GPM Single Spool Mono-Block Directional Control Valve</td>
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<td>LVS</td>
<td>11 GPM Two Spool Series Mono-Block Loader Valve</td>
<td>V66</td>
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<td>LVT</td>
<td>10 GPM Two Spool Mono-Block Loader Valve</td>
<td>V68</td>
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<td>14 GPM Two Spool Mono-Block Loader Valve</td>
<td>V69</td>
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<tr>
<td>LS3000</td>
<td>25 GPM Single Spool Log Splitter Control Valve</td>
<td>V71</td>
</tr>
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<td>RD2500</td>
<td>20 GPM Single Spool Mono-Block Directional Control Valve</td>
<td>V73</td>
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<tr>
<td>RD-100</td>
<td>30 GPM Adjustable Flow Control</td>
<td>V76</td>
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<td>RD-1900</td>
<td>30 GPM Adjustable Flow Control</td>
<td>V76</td>
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<tr>
<td>RD-400</td>
<td>30 GPM Priority Divider, Fixed Flow</td>
<td>V78</td>
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<td>RD-500</td>
<td>30 GPM Priority Divider, Adjustable Flow</td>
<td>V78</td>
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<td>RD-200</td>
<td>30 GPM Proportional Divider, Fixed Ratio</td>
<td>V80</td>
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<td>RD-300</td>
<td>30 GPM Proportional Divider with Reverse Flow</td>
<td>V80</td>
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<td>RD-500P</td>
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<td>RD-1000-S</td>
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<td>30 GPM Inline Relief Valve</td>
<td>V82</td>
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<td>DRV</td>
<td>30 GPM Double Relief Valve</td>
<td>V82</td>
</tr>
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<td>RD-1800</td>
<td>20 GPM Ball/Spring Relief</td>
<td>V84</td>
</tr>
<tr>
<td>RD-900</td>
<td>30 GPM Single Selector Valve</td>
<td>V84</td>
</tr>
<tr>
<td>MODEL SS</td>
<td>20 GPM Single Selector Valve</td>
<td>V85</td>
</tr>
<tr>
<td>MODEL DS</td>
<td>40 GPM Double Selector Valve</td>
<td>V86</td>
</tr>
<tr>
<td>RD-1400</td>
<td>30 GPM Lock Valve, Double Pilot Check</td>
<td>V87</td>
</tr>
<tr>
<td>RD-1600</td>
<td>20 GPM Pilot-Operated Check Valve</td>
<td>V87</td>
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<td>Design Charts, Hydraulic Formulas, Metric Conversions</td>
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<td>V89</td>
<td></td>
</tr>
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</table>
SECTIONAL BODY

Series “20”

STANDARD FEATURES

- 1 -10 Work Sections
- Power Beyond Capability
- Load Checks on Each Work Port
- A Float Section can be Installed in any Location in Valve Assembly
- Interchangeable Mounting With Other Popular “20” gpm Stack Valves
- Optional Work Section with Pilot Operated Checks

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Parallel or Tandem Circuit</th>
<th>Foot Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Rating</td>
<td>Weight</td>
</tr>
<tr>
<td>Maximum Operating Pressure</td>
<td>Inlet Cover: Approx 6 lbs</td>
</tr>
<tr>
<td>................................... 3500 psi</td>
<td>Outlet Cover: Approx 3.5 lbs</td>
</tr>
<tr>
<td>Maximum Tank Pressure</td>
<td>Work Section: Approx 9 lbs</td>
</tr>
<tr>
<td>................................... 500 psi</td>
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</tbody>
</table>

Nominal Flow Rating ............... 20 gpm

Please Refer to Pressure Drop Charts. Allowable Pressure Loss thru Valve Determines the Maximum flow.

Maximum Operating Temp .......... 180°F

Filtration: For general purpose valves, fluid cleanliness should meet the ISO 4406 19/17/14 level. For extended life or for pilot operated valves, the 18/16/13 fluid cleanliness level is recommended.
### INLET SECTIONS

**ALL SECTIONS HAVE BOTH TOP AND SIDE INLET AND TANK PORTS**

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>RELIEF TYPE AND SETTING</th>
<th>PORT SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>201A2</td>
<td>NO RELIEF</td>
<td>#12 SAE ORB</td>
</tr>
<tr>
<td>201C2</td>
<td>SHIM ADJUSTABLE 1351-1750 PSI, SET AT 1750 PSI @ 10 GPM</td>
<td>#12 SAE ORB</td>
</tr>
<tr>
<td>201D2</td>
<td>SHIM ADJUSTABLE 1751-2200 PSI, SET AT 2200 PSI @ 10 GPM</td>
<td>#12 SAE ORB</td>
</tr>
<tr>
<td>201E2</td>
<td>SHIM ADJUSTABLE 2201-3000 PSI, SET AT 2300 PSI @ 10 GPM</td>
<td>#12 SAE ORB</td>
</tr>
<tr>
<td>201G2</td>
<td>SHIM ADJUSTABLE 1351-1750 PSI, SET AT 1750 PSI @ 10 GPM</td>
<td>#12 SAE ORB</td>
</tr>
<tr>
<td>201H2</td>
<td>SHIM ADJUSTABLE 1750-2200 PSI, SET AT 2200 PSI @ 10 GPM</td>
<td>#12 SAE ORB</td>
</tr>
<tr>
<td>201J2</td>
<td>SHIM ADJUSTABLE 2201-3000 PSI, SET AT 2500 PSI @ 10 GPM</td>
<td>#12 SAE ORB</td>
</tr>
</tbody>
</table>

### PARALLEL CIRCUIT WORK SECTIONS

**ALL WORK SECTIONS HAVE #10 SAE ORB PORTS, LOAD CHECKS, AND STANDARD LEVER HANDLES. MODELS WITH PORT RELIEFS ARE SHIM ADJUSTABLE.**

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>SPOOL TYPE AND ACTION</th>
<th>PORT RELIEFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>20P1A1A1A</td>
<td>3-WAY SINGLE ACTING W/SPRING CENTER</td>
<td>PLUGGED</td>
</tr>
<tr>
<td>20P1B1A1A</td>
<td>4-WAY DOUBLE ACTING W/SPRING CENTER (WORK PORTS BLOCKED IN NEUTRAL)</td>
<td>PLUGGED</td>
</tr>
<tr>
<td>20P1B5A-S12Q</td>
<td>4-WAY DOUBLE ACTING W/SPRING CENTER, 12VDC SOLENOID OPERATED</td>
<td>PLUGGED</td>
</tr>
<tr>
<td>20P1B6A-S12Q</td>
<td>4-WAY DOUBLE ACTING W/SPRING CENTER, 12VDC SOLENOID OPERATED W/LEVER HANDLE</td>
<td>PLUGGED</td>
</tr>
<tr>
<td>20P1B1D1B</td>
<td>4-WAY 4 POSITION FLOAT W/SPRING CENTER AND FLOAT DETENT</td>
<td>PLUGGED</td>
</tr>
<tr>
<td>20P1B1D1DD</td>
<td>4-WAY DOUBLE ACTING W/SPRING CENTER (WORK PORTS BLOCKED IN NEUTRAL)</td>
<td>2200 PSI</td>
</tr>
<tr>
<td>20P1D1D1DD</td>
<td>4-WAY 4 POSITION FLOAT W/SPRING CENTER AND FLOAT DETENT</td>
<td>2200 PSI</td>
</tr>
<tr>
<td>20L1CA1</td>
<td>4-WAY 3 POSITION W/SPRING CENTER AND P.O. CHECKS</td>
<td>NONE</td>
</tr>
<tr>
<td>20LP1J1A1A</td>
<td>LOAD SENSE 4-WAY DOUBLE ACTING WITH SPRING CENTER</td>
<td>PLUGGED</td>
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</table>

### TANDEM CIRCUIT WORK SECTIONS

**ALL SECTIONS HAVE SIDE OUTLET OUTLET SECTIONS**

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>SPOOL TYPE AND ACTION</th>
<th>PORT RELIEFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>20T1B1A1A</td>
<td>4-WAY DOUBLE ACTING W/ SPRING CENTER (WORK PORTS BLOCKED IN NEUTRAL)</td>
<td>PLUGGED</td>
</tr>
<tr>
<td>20T1D1B1D</td>
<td>4-WAY 4 POSITION FLOAT W/SPRING CENTER AND FLOAT DETENT</td>
<td>PLUGGED</td>
</tr>
<tr>
<td>20T1C1A1A</td>
<td>4-WAY FREE FLOW MOTOR W/ SPRING CENTER (WORK PORTS OPEN TO TANK IN NEUTRAL)</td>
<td>2200 PSI</td>
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</table>

### OUTLET SECTIONS

**ALL SECTIONS HAVE SIDE OUTLET**

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<tr>
<th>PART NO.</th>
<th>EXHAUST OPTION</th>
<th>PORT SIZE</th>
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<tr>
<td>20E21</td>
<td>OPEN CENTER OUTLET W/ CONVERSION PLUG</td>
<td>#12 SAE ORB</td>
</tr>
<tr>
<td>20E22</td>
<td>POWER BEYOND OUTLET W/ #10 SAE POWER BEYOND PORT</td>
<td>#12 SAE ORB</td>
</tr>
<tr>
<td>20E23</td>
<td>CLOSED CENTER OUTLET</td>
<td>#12 SAE ORB</td>
</tr>
<tr>
<td>20LE21</td>
<td>LOAD SENSE OUTLET W/H #4 LOAD SENSE PORT AND BLEED ORIFICE</td>
<td>#12 SAE ORB</td>
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### TIE-ROD KITS

<table>
<thead>
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<th>PART. NO.</th>
<th>WORK SECTIONS</th>
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<tr>
<td>660402001</td>
<td>1 SECTION</td>
<td>660402006</td>
<td>6 SECTION</td>
</tr>
<tr>
<td>660402002</td>
<td>2 SECTION</td>
<td>660402007</td>
<td>7 SECTION</td>
</tr>
<tr>
<td>660402003</td>
<td>3 SECTION</td>
<td>660402008</td>
<td>8 SECTION</td>
</tr>
<tr>
<td>660402004</td>
<td>4 SECTION</td>
<td>660402009</td>
<td>9 SECTION</td>
</tr>
<tr>
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<td>5 SECTION</td>
<td>660402010</td>
<td>10 SECTION</td>
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### SERIES 20 HARDWARE AND SEAL KITS

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<thead>
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<th>WORK SECTIONS</th>
<th>PART. NO.</th>
<th>WORK SECTIONS</th>
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<td>660583006</td>
<td>60 RELIEF Plug</td>
<td>660290201</td>
<td>10 SAE</td>
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<td>660583007</td>
<td>60 RELIEF Plug</td>
<td>660290202</td>
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<td>660583008</td>
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<td>16 SAE</td>
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<tr>
<td>660583009</td>
<td>60 RELIEF Plug</td>
<td>660290204</td>
<td>20 SAE</td>
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<td>660583010</td>
<td>60 RELIEF Plug</td>
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<td>24 SAE</td>
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<td>660583018</td>
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<td>660583021</td>
<td>60 RELIEF Plug</td>
<td>660290216</td>
<td>200 SAE</td>
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### INLET RELIEF KITS

**FOR PRESET CARTRIDGE USE 20 IR-OX PG V28**

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<th>PART. NO.</th>
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<td>66029006</td>
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<td>66029007</td>
<td>16 SAE</td>
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<td>66029008</td>
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<td>66029009</td>
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<td>30 SAE</td>
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### RELIEF HARDWARE KITS

**FOR PRESET CARTRIDGE USE 20 IR-OX PG V28**

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<td>66029020</td>
<td>18 SAE</td>
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<td>66029025</td>
<td>28 SAE</td>
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<tr>
<td>66029026</td>
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### LOAD SENSE KITS

**LOAD SENSE PLUG W/O DRAIN ORIFICE**

<table>
<thead>
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<th>PART. NO.</th>
<th>WORK SECTIONS</th>
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</thead>
<tbody>
<tr>
<td>66029010</td>
<td>10 SAE</td>
</tr>
<tr>
<td>66029011</td>
<td>12 SAE</td>
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<td>14 SAE</td>
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<td>66029013</td>
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<td>66029014</td>
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<td>66029015</td>
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<tr>
<td>66029016</td>
<td>22 SAE</td>
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<tr>
<td>66029017</td>
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<tr>
<td>66029018</td>
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</tr>
<tr>
<td>66029019</td>
<td>28 SAE</td>
</tr>
<tr>
<td>66029020</td>
<td>30 SAE</td>
</tr>
</tbody>
</table>

**RELIEF CARTRIDGES ARE ALSO AVAILABLE WITH STAINLESS STEEL RELIEF SPRINGS.**
**SPECIAL SECTIONS AVAILABLE:**
Use order code Matrix below to generate a model number that meets your requirements. If you prefer, contact your Sales Representative with your specific requirements and a model number will be assigned for you. This model number can then be used for future orders. A minimum order quantity will apply to special valves. Please consult Sales Representative.

### WORK SECTION

**WORK SECTION TYPE**
- P - STANDARD PARALLEL
- T - TANDEM CENTER
- L - PARALLEL WITH BUILT IN PILOT OPERATED CHECKS**
- S - SERIES PILOT PASS THROUGH HOLES***

**PORT SIZE**
1. #10 SAE (7/8-14 THREAD)
2. #8 SAE (3/4-16 THREAD)
3. #12 SAE (1 1/16-12 THREAD)
4. 1/2 NPTF (2000 PSI MAX)
5. 3/8 NPTF (2000 PSI MAX)

**SPOOL TYPE**
- A - 3 WAY 3 POSITION
- B - 4 WAY 3 POSITION
- C - 4 WAY 3 POSITION FREE FLOW MOTOR
- D - 4 WAY 4 POSITION FLOAT (MUST USE FLOAT ACTION)
- E - 3 WAY 3 POSITION FREE FLOW MOTOR
- N - 4 WAY 3 POSITION SERIES
- P - 4 WAY 3 POSITION SERIES MOTOR

**SPOOL ACTIONS**
- A - SPRING CENTER TO NEUTRAL
- B - 3 POSITION DETENT
- C - FRICTION DETENT
- D - FLOAT DETENT (MUST USE FLOAT SPOOL)
- E - SPRING CENTER PNEUMATIC ACTUATOR
- F - 2 POSITION DETENT NEUTRAL & OUT (NO IN POSITION)
- H - HYDRAULIC ACTUATOR (USE HANDLE OPTION 7)
- J - SPRING CENTER W/ MICROSWITCH (SWITCHES ON IN OR OUT)***
- K - SPRING CENTER W/ MICROSWITCH (SWITCHES ON SPOOL IN ONLY)***
- M - SPRING CENTER DETENT IN
- N - SPRING CENTER DETENT OUT
- P - 2 POSITION DETENT NEUTRAL & IN (NO OUT POSITION)

**HANDLE OPTIONS**
- 1 - STANDARD LEVER HANDLE*
- 2 - LESS HANDLE ONLY
- 3 - LESS COMPLETE HANDLE
- 7 - BLANK FOR OPTIONAL JOYSTICK HANDLE

### INLET SECTION

**INLET TYPE**
- I - STANDARD INLET

**PORT SIZE**
1. #10 SAE (7/8-14 THREAD)
2. #12 SAE (1 1/16-12 THREAD)
3. 3/4 NPTF (2000 PSI MAX)

**RELIEF OPTION**
- Blank - LEAVE BLANK FOR INLET WITHOUT RELIEF OR RELIEF PLUG
- A - NO RELIEF PLUG
- B - SHIM ADJUSTABLE RELIEF 500-1350 PSI
- C - SHIM ADJUSTABLE RELIEF 1351-1750 PSI
- D - SHIM ADJUSTABLE RELIEF 1751-2200 PSI
- E - SHIM ADJUSTABLE RELIEF 2201-3000 PSI
- F - ADJUSTABLE RELIEF 500-1350 PSI
- G - ADJUSTABLE RELIEF 1351-1750 PSI
- H - ADJUSTABLE RELIEF 1751-2200 PSI
- J - ADJUSTABLE RELIEF 2201-3000 PSI
- K - ADJUSTABLE RELIEF 3001-3500 PSI

**Valve Assemblies**
The Series 20 sectional body directional control valve can be ordered as separate sections as outlined or as a complete factory tested assembly. This will need to be specified with each order. An assembly model number will be assigned at the time of the order. This assembly number can then be used for future orders.

**ASSEMBLY MODEL NUMBER 20A - X X X X**

XXXX = Sequence of Numbers. This number will be assigned to final valve to be assembled and tested at the factory. Each new order or quote will be assigned a new assembly model number.

**OUTLET SECTION**

**OUTLET TYPE**
- E - STANDARD OUTLET

**PORT SIZE**
1. #10 SAE (7/8-14 THREAD)
2. #12 SAE (1 1/16-12 THREAD)
3. 3/4 NPTF (2000 PSI MAX)

**EXHAUST OPTIONS**
- 1 - STANDARD OPEN CENTER OUTLET WITH CONVERSION PLUG
- 2 - POWER BEYOND OUTLET WITH #10 SAE POWER BEYOND PORT
- 3 - CLOSED CENTER OUTLET*"  
- 4 - STANDARD OPEN CENTER WITH SOLENOID PILOT LINE SEALS

* Often used with no relief. Review application
**CROSS SECTION OF 20P1BA1DA PARALLEL WORK SECTION**

**SPOOLS AND SPOOL ATTACHMENTS**

**OPTION A-** SPRING CENTER TO NEUTRAL

**OPTION B-** 3 POSITION DETENT

**OPTION C-** 4 WAY 3 POSITION FREE FLOW MOTOR

**OPTION D-** FLOAT DETENT WITH SPRING CENTER

---

**OPTIONS**

- **SPOOL OPTION A**: 3 WAY 3 POSITION FOR USE WITH SINGLE ACTING CYLINDERS OR NON-REVERSIBLE MOTORS. THE 'B' WORK PORT IS BLOCKED IN NEUTRAL.
- **SPOOL OPTION B**: 4 WAY 3 POSITION FOR USE WITH DOUBLE ACTING CYLINDERS OR REVERSIBLE MOTORS. THE WORK PORTS ARE BLOCKED IN NEUTRAL.
- **SPOOL OPTION C**: 4 WAY 3 POSITION FREE FLOW MOTOR SPOOL. THE WORK PORTS ARE OPEN TO TANK IN NEUTRAL, ALLOWING A MOTOR TO COAST OR A CYLINDER TO FLOAT.
- **SPOOL OPTION D**: 4 WAY 4 POSITION FLOAT. SAME AS 4 WAY 3 POSITION WITH THE ADDITION OF A FOURTH POSITION FLOAT. THE SPOOL IS DETENTED IN THE FLOAT POSITION AND SPRING CENTERED TO NEUTRAL FROM THE 'A' OR 'B' POWER POSITION.

---

**NOTES**

- INDIVIDUAL LOAD CHECK FOR EACH WORK PORT
- CASTING NUMBER C-630 IS ON THE RIGHT SIDE OF THE WORK SECTION BODY
- PORT RELIEFS AND ANTI-CAVITATION CHECKS AVAILABLE FOR EACH WORK PORT
- THE PARALLEL WORK SECTION HAS A 'P' STAMPED ON THE LEFT SIDE OF THE 'B' WORK PORT
- SEVERAL STANDARD SPOOL ATTACHMENTS
- NOTCHES STAMPED INTO SPOOL PROVIDE EXTRA FINE METERING

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**PRINCE MANUFACTURING CORPORATION • NORTH SIoux CITY, SOUTH DAKOTA 57049**

URL: www.princehyd.com • E-MAIL: prince@princehyd.com • PHONE: (605) 235-1220
**MODEL 20P PARALLEL CIRCUIT**
Parallel circuit construction is the most common. When any one of the spools in a valve bank is shifted it blocks off the open center passage. The oil then flows into the parallel circuit core making oil available to all spools. If more than one spool is fully shifted then oil will go to the section with the lowest pressure requirements. It is possible, however, to meter flow to the spool with the least load and power two unequal loads. The schematic below shows a three section parallel circuit stack valve.

**MODEL 20T TANDEM CIRCUITS**
Tandem circuit construction is also referred to as priority circuit. When the spool of a section is shifted, oil is cut off to all downstream sections. Thus the section nearest to the inlet has priority over the other sections in the valve bank. If more than one spool is fully shifted all the oil will go to the section nearest to the inlet. Metering the upstream section will allow two sections to operate at the same time. The schematic below shows a three section tandem circuit stack valve.

**COMBINED PARALLEL/TANDEM CIRCUITS**
Parallel and tandem circuit work sections can be combined in the same valve bank. Below the 1st and last sections are parallel and the 2nd is tandem. The 1st parallel section has priority over the other two. The 2nd and 3rd sections are in parallel with each other. If the spool of the 1st section is shifted it will cut off oil to the other two. If the spools of the 2nd and 3rd section are both shifted oil will go to the one with the least resistance. It should be noted that it is the section just prior to the tandem section that has priority, not the tandem section. Further if a parallel section is placed just after a tandem, the two sections will be in a parallel.

---

**LOAD CHECK**
Each work port of the Series 20 stack valve has a separate load check. The load check prevents the fall of a cylinder as the spool is shifted. It also prevents the back-flow of oil from the work port to the inlet. The pump must build up enough pressure to overcome the pressure on the work port caused by the weight of the load before the cylinder can move.

Please note that the load check has nothing to do with how well the valve will hold up a cylinder with the spool in neutral. The load check is functional only when the spool is shifted.

**OPEN CENTER APPLICATIONS**
The standard Series 20 stack valve is open center. When the spools are in neutral hydraulic oil is directed from the inlet to the outlet (or power beyond) through the open center core. Moving one or more spools closes off the open center core and directs oil to the work ports. Open center systems most often contain fixed displacement pumps like the Prince SP series gear pumps.

Please note that the maximum pressure in an open center system is controlled by a relief valve. The Series 20 inlet sections are available with a built in relief valve for this purpose.

**CLOSED CENTER APPLICATIONS**
The Series 20 stack valve can be converted to closed center by adding the closed center plug to the outlet section. This blocks off the open center core when the spools are in neutral. These systems often use a variable displacement pressure compensated pump that limits the maximum pressure. When spools are in neutral system pressure is maintained at inlet of the valve. A relief is normally not required or must be set at a higher pressure than the pump compensator.

Please note that this closed center option does not provide for the drain off of standby spool leakage. This can allow a very small amount of oil to enter the work ports when in neutral.
A series circuit valve is most commonly used to control more than one hydraulic component simultaneously. The entire circuit flow is available to each valve section that is actuated. In a two spool series valve with both spools actuated, the oil flows from the inlet to the work port of the first section. The return flow of the first section is directed to the open center core of the second section. (In a parallel valve the return oil from the work port is directed to the tank core.) From the open center core of the second section, the oil flows to the work port with the return oil going to the outlet. In a series circuit valve, the summation of the pressures required for each work section will equal the total pressure required for the circuit. The total pressure required must not exceed the system relief setting for the pump pressure rating. It is not required to have a Series 20 series section as the last section, unless series flow is required to a downstream valve. In this application, a power beyond plug must be used in the outlet section.

The Series 20 series sections may be stacked with 20P parallel circuit valve sections. When using a series section, the immediate downstream section needs to be a series, tandem, or outlet section. 20P sections can be either in front of the Series 20 series sections or behind a combination of series and tandem sections.

For solenoid operation with series sections and a 20U utility section, there needs to be a Series 20 tandem section with pilot passageways between the series section and the utility section.

In the valve assembly shown below, the first and fourth sections are parallel. The second section is series, the third section is tandem. The first parallel section has priority over all downstream valves. When the spool of the first parallel section is actuated, the return oil from the work port is directed to the tank core, thus oil flow to downstream sections is cut off. The second and third sections are in series with each other as well as the second and fourth sections. The third and fourth sections are in parallel with each other.

The Series 20 Series circuit valve sections cannot be used in a closed center valve assembly.
### INLET COVER DIMENSIONS

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>TOP INLET</td>
<td>2.69</td>
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<tr>
<td>TOP OUTLET</td>
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<tr>
<td>SYSTEM RELIEF</td>
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<tr>
<td>INLET</td>
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<td>OUTLET</td>
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<tr>
<td>PART NUMBER WILL BE STAMPED IN THIS LOCATION</td>
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</tr>
</tbody>
</table>

### WORK SECTIONS DIMENSIONS

- **PART NUMBER WILL BE STAMPED IN THIS LOCATION**
- **B WORK PORT**
- **A WORK PORT**
- **SPOOL TRAVEL .312 TO WORK .531 TO FLOAT**
- **LOCATION FOR POWER BEYOND OUTLET OR CLOSED CENTER CONVERSION PLUG**

### DIMENSIONAL DATA

**SEE CHART COLUMN A**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
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<tbody>
<tr>
<td>B WORK PORT</td>
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<td>A WORK PORT</td>
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<tr>
<td>INLET RELIEF</td>
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<tr>
<td>TOP INLET</td>
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<tr>
<td>TOP OUTLET</td>
<td></td>
</tr>
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</table>

### OUTLET COVER DIMENSIONS

**LOCATION FOR POWER BEYOND OUTLET OR CLOSED CENTER CONVERSION PLUG**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
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<tr>
<td>TOP INLET</td>
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<tr>
<td>TOP OUTLET</td>
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### NUMBER OF WORK SECTIONS

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<tr>
<td>10</td>
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</tbody>
</table>
**WORK PORT RELIEF CARTRIDGES**

**OPTION K ANTI-CAVITATION CHECK**
This option allows oil to be drawn from the tank core into the work port if there is a vacuum on the work port. This vacuum would be caused by an overrunning motor or cylinder. The check will be open whenever the pressure in the tank core is higher than that in the work port.

**OPTIONS B, C, D, AND E, SHIM ADJUSTABLE PORT RELIEF**
A port relief can be installed to limit the pressure at the work port to less than the system pressure. Also, it can be installed to provide spike pressure protection when the spool is in the neutral position. The pressure of these reliefs can be changed by changing shims.

**OPTIONS F, G, H, AND J, ADJUSTABLE PORT RELIEF**
This is the same differential poppet type relief as above but externally adjustable within the specified range.

**OUTLET SECTION OPTIONS**

**OPTION 1 STANDARD OPEN CENTER WITH CONVERSION PLUG**
This is the standard outlet option. This option allows for conversion in the field for power beyond or closed center applications. When the spools are in neutral the inlet is unloaded to tank.

**OPTION 3 CLOSED CENTER OUTLET**
This option provides for closed center operation. This is typically used with a variable displacement pressure compensated pump or in a system with an unloading valve. When the spools are neutral the inlet port is blocked.

**OPTION 2 POWER BEYOND WITH #10 SAE BEYOND PORT**
This option provides for a high pressure power beyond port. This would be used if a valve is to be added downstream. The outlet must be connected to tank. When the spools are in neutral the inlet is connected to power beyond port.

**SERIES 20 COMBINATION 3 WAY AND COMBINED FLOW MID-INLET SECTION**

**HANDLE OPTIONS**

**NOTE:** HANDLES ARE COATED WITH BLACK RUBBER

**OPTION 1 STANDARD LEVER HANDLE**

**OPTION 2 LESS HANDLE ONLY**

**OPTION 3 LESS COMPLETE HANDLE**

**PORT SIZE**

**SPOOL ACTION**

**HANDLE OPTIONS**

**MID-INLET RELIEF**

**RELIEF TYPE**

**STANDARD SETTING**

**OPTION NO.**

**NO RELIEF**

**SHIM ADJUSTABLE**

**ADJUSTABLE**

*See Series 20 Tandem Center work section order code for additional options.*

*Description: This section acts as a combination mid-inlet and 3 way 3 position section. The mid-inlet provides an inlet port for a second pump mid stream in the stack valve. The A port is the mid-inlet port and provides combined flow for this section and any downstream sections. The B port and the rest of the section function the same as a 3 way 3 position section. When shifted any upstream sections take priority of the main inlet flow over downstream sections. Both an inlet relief and a mid-inlet relief are required to provide relief protection when both upstream and downstream sections are shifted.*

*See Series 20 Tandem Center work section for dimensional data.*

**APPLICATION DIAGRAMS**

**OPTIONS A NO RELIEF**
When no main inlet relief is required the no relief plug is installed. All inlet sections have the relief cavity machined so a inlet relief can be installed in the field.

**OPTIONS B, C, D, AND E, SHIM ADJUSTABLE INLET RELIEF**
These options provide for an internally shim adjustable main inlet relief. The relief is a hydraulically dampened differential poppet design. This provides for smooth quiet operation in a relief that is moderately tolerant to contamination. The pressure of these reliefs can be changed, within the specified range, by changing shims. This relief is also available with stainless steel relief springs, consult factory.

**OPTIONS F, G, H, AND J, ADJUSTABLE RELIEF**
This is the same relief as above except it is externally adjustable, within the specified range.
**SERIES 20 MID-INLET SECTION**

**FLOW OPTION**
- C - COMBINED FLOW
- S - SPLIT FLOW

**PORT SIZE**
- 10 - #10 SAE (7/8-14 THREAD)
- 20 - #12 SAE (1 1/16-12 THREAD)
- 30 - 1/2-NPTF
- 40 - 3/4-NPTF

**LAST FOUR DIGITS**
- SPECIFY A NON-STANDARD RELIEF PRESSURE IN PSI. LEAVE BLANK FOR STANDARD SETTING.

**TEST DATA**

![Graphs showing pressure drop vs. GPM for different numbers of sections](image)

Oil 140 SUS at 110 degrees F. The pressure drop curves are representative, but the actual pressure drop will vary some from valve to valve. More detailed test data is available upon request.

**ONE WAY WORK PORT RESTRICTOR FOR SERIES 20 SECTIONS**

This restrictor will restrict oil in one direction and allow free flow in the opposite direction. This restrictor consists of an orifice plate that simply drops into the #8 SAE or #10 SAE work port of a 20P, 20T, or 20L work section.

**ORDERING INFORMATION**

- **HEX BRASS RESTRICTOR #8**
  - 670805XXX

- **HEX BRASS RESTRICTOR #10**
  - 670811000

The last three digits of part number are the orifice size in thousandths of an inch.

**EXAMPLE:**
- 670805062 - 62 ORIFICE
- 670805125 - 125 ORIFICE
- 670805000 - NO ORIFICE
SERIES 20 FLOW CONTROL INLET SECTION

**MANUAL (OPT ‘M’) DESCRIPTION:**
This inlet incorporates a manually operated pressure compensated flow control. With the flow control knob turned fully in (clockwise), all of the inlet flow is diverted to the tank core. By turning the flow control knob counter-clockwise, the inlet flow directed to the power core will be proportionally increased. (Approximately 6 turns varies the controlled flow from no flow to 26 GPM. Maximum number of turns on flow control is approximately 8 turns.)

**ELECTRO-PROPORTIONAL (OPT ‘P’) DESCRIPTION:**
This inlet incorporates a solenoid operated, electrically variable pressure-compensated flow control. With no current going through the solenoid, all of the inlet flow is diverted to the tank core. By increasing the current through the solenoid, the flow being directed to the power core will be proportionally increased. (The current range is 400-1600 mA. At a current of 1600 mA max controlled flow is approximately 25 GPM.) Control current is provided via a controller card providing a PWM signal. See Page V38 for more information on a controller.

**TEST DATA**

**Turns vs. Regulated Flow**
Series 20 Manual Flow Control Inlet (25 GPM Inlet Flow)

**Current vs. Regulated Flow**
Series 20 Electro-Proportional Flow Control Inlet (25 GPM Inlet Flow)

**Flow over Relief vs. Pressure**
Series 20 Flow Control Inlet (Relief set at 2500 psi @ 10 gpm)
LOAD SENSE SECTIONS

Series “20”

STANDARD FEATURES

- Extended Length Notches for Very Fine Metering
- Machined Internal Lands for Precise Control and reduced Dead Band
- Low Standby Pressures
- Spool Design for reduced Flow Forces

- Low Spool Actuating Forces
- Use of Standard Series 20 Inlet Sections (20I) and Tie Rod Kits
- Same Mounting Pattern and Envelope as Standard Series 20 Valve

SPECIFICATIONS

Pressure Rating
- Maximum Operating Pressure 3500 psi
- Maximum Tank Pressure 500 psi

Nominal Flow Rating 20 GPM
- Please Refer to Pressure Drop and Flow Charts for Your Application

Foot Mounting
- Maximum Operating Temp. 180°F

20LP Section Weight Approx 10.1 lbs.
20LE Section Weight Approx 4.3 lbs.
## WORK SECTION

**WORK SECTION TYPE**
- LP-STANDARD LOAD SENSE SECTION
- LPC-LOAD SENSE PRESSURE COMPENSATED

### PORT SIZE
- 1. #10 SAE (7/8-14 THREAD)
- 2. #8 SAE (3/4-16 THREAD)
- 3. #12 SAE (1 1/16-12 THREAD)
- 4. 1/2 NPTF (2000 PSI MAX)
- 5. 3/8 NPTF (2000 PSI MAX)

### SPOOL TYPE
- H - 3 WAY 3 POSITION
- J - 4 WAY 3 POSITION
- K - 4 WAY 3 POSITION FREE FLOW MOTOR
- M - 4 WAY 4 POSITION FLOAT (USE WITH D SPOOL ACTION)
- N - SPRING CENTER DETENT
- M - SPRING CENTER DETENT
- K - SPRING CENTER W/MICROSWITCH (SWITCHES ON IN OR OUT)**
- J - SPRING CENTER W/MICROSWITCH (SWITCHES ON IN OR OUT)**
- H - SPRING CENTER TO NEUTRAL
- G - 2 POSITION DETENT
- F - 2 POSITION DETENT NEUTRAL & OUT
- E - SPRING CENTER PNEUMATIC ACTUATOR
- D - FLOAT DETENT
- C - FRICTION DETENT
- B - 3 POSITION DETENT
- A - SPRING CENTER TO NEUTRAL

### SPOOL ACTIONS
- **A** - SPRING CENTER TO NEUTRAL
- **B** - 3 POSITION DETENT
- **C** - FRICTION DETENT
- **D** - FLOAT DETENT
- **E** - SPRING CENTER PNEUMATIC ACTUATOR
- **F** - 2 POSITION DETENT NEUTRAL & OUT

### HANDLE OPTIONS
- **1** - STANDARD LEVER HANDLE
- **2** - LESS HANDLE ONLY
- **3** - LESS COMPLETE HANDLE
- **7** - BLANK FOR OPTIONAL JOYSTICK HANDLE

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## PORT RELIEF “B”

A - NO RELIEF
B - SHIM ADJUSTABLE RELIEF 500-1350 PSI SET AT 1350
C - SHIM ADJUSTABLE RELIEF 1351-1750 PSI SET AT 1750
D - SHIM ADJUSTABLE RELIEF 1751-2200 PSI SET AT 2200
E - SHIM ADJUSTABLE RELIEF 2201-3000 PSI SET AT 2500
F - ADJUSTABLE RELIEF 500-1350 PSI SET AT 1350*
G - ADJUSTABLE RELIEF 1351-1750 PSI SET AT 1750*
H - ADJUSTABLE RELIEF 1751-2200 PSI SET AT 2200*
J - ADJUSTABLE RELIEF 2201-3000 PSI SET AT 2500*
K - ANTI-CAVITATION CHECK*
L - PORT RELIEF/APTI-CAV SHIM ADJ 500-1350 PSI SET AT 1350*
M - PORT RELIEF/APTI-CAV SHIM ADJ 1351-1750 PSI SET AT 1750*
N - PORT RELIEF/APTI-CAV SHIM ADJ 1751-2200 PSI SET AT 2200*
R - PORT RELIEF/APTI-CAV SHIM ADJ 2201-3000 PSI SET AT 2500*
S - PORT RELIEF/APTI-CAV ADJUSTABLE 500-1350 PSI SET AT 1350**
T - PORT RELIEF/APTI-CAV ADJUSTABLE 1351-1750 PSI SET AT 1750**
W - PORT RELIEF/APTI-CAV ADJUSTABLE 1751-2200 PSI SET AT 2200**
Y - PORT RELIEF/APTI-CAV ADJUSTABLE 2201-3000 PSI SET AT 2500**

*ADJUSTABLE PORT RELIEF CARTRIDGES CANNOT BE USED ON THE “A” PORT END OF WORK SECTION WHEN THE STANDARD LEVER HANDLE IS USED BECAUSE OF INTERFERENCE

**ANTI-CAVITATION CHECKS AND RELIEFS NOT AVAILABLE WITH LPC SECTIONS. WORK PORT RELIEFS ON 20LPC USE A DIFFERENT CARTRIDGE THAN THE STANDARD SERIES 20P CARTRIDGE

### FOR WORK PORT RELIEF SETTING OTHER THAN STANDARD

**20P1BA1DH-18-20**

- “B” PORT RELIEF PRESSURE IN HUNDREDS
  - EXAMPLE: 20=2000 PSI
- “A” PORT RELIEF PRESSURE IN HUNDREDS
  - EXAMPLE: 18=1800 PSI

**20P1BA1DH-18-20**

- “B” PORT RELIEF PRESSURE IN HUNDREDS
  - EXAMPLE: 20=2000 PSI
- “A” PORT RELIEF PRESSURE IN HUNDREDS
  - EXAMPLE: 18=1800 PSI

---

## LOAD SENSE PORT OPTIONS

- **1** - #4 SAE WITH DRAIN ORIFICE
- **2** - #4 SAE WITHOUT DRAIN ORIFICE
- **3** - OUTLET FOR USE WITH 20LFS INLET

OUTLET SEALS FOR SOLENOID PILOT LINES

The Prince LE outlet includes a load sense port in a cartridge that is installed in the section. There are two versions of the cartridge, one with a load sense line drain orifice and one without a drain orifice. There is normally a drain orifice in either the valve or the pump controls. Cartridges can be changed in the field to change the configuration. Power beyond is not available in a load sense system.

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SEE PAGE 12 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING

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SEE PAGE 10 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING
MODEL 20LP LOAD SENSE & 20LPC LOAD SENSE PRESSURE COMPENSATED CIRCUITS

The Series 20LP and 20LPC work sections are specifically designed to be used with a pressure-flow compensated pump, commonly known as a load sense pump. The valve is a parallel circuit, closed center design, where flow does not flow through the valve when the spools are centered. A load sense signal line must be connected to the load sense port on the pump and to the load sense port on the 20LE outlet section of the valve. The pressure-flow compensator portion of a load sense pump will maintain (within its flow and pressure limitations) an output pressure equal to the pressure at the load sense port plus the load sense differential pressure. The differential pressure is typically between 150 and 350 psi. The valve is designed so that when a spool is shifted, the pressure at the outlet flow work port is presented to the valves load sense port. The valve incorporates logic and load sense check valves so that when multiple spools are shifted, the highest pressure of any of the work ports is directed to the load sense port. A load sense line bleed orifice needs to be present in either the Prince load sense outlet or the load sense pump controls. The bleed orifice will prevent high pressure from being trapped in the load sense line and sending false signals to the pump.

There are a number of benefits to load sense systems, one of the primary ones being in the metering of the flow to the work ports. Metering is typically accomplished when the flow passes through metering notches in the spool. In a load sense valve, the pressure that drives the flow through the notches is typically limited to the relatively low and nearly constant differential pressure. This relatively low differential pressure makes the notches more effective and gives more resolution in regard to spool travel versus flow out of the work port. Also, this “resolution” remains relatively the same regardless of the pressure required at the work port. The metering notches in the Prince load sense valve have been optimized to give excellent metering characteristics over an extended portion of the spool travel and over the full flow rating of the valve. The internal lands of the casting have also been machined to give repeatable, precise control to the metering characteristics. Another benefit to load sense valves is that, in the minimum flow standby mode, the pump only has to generate the rather low differential pressure thus saving energy as compared to typical open center or standard closed center systems.

The Series 20LPC load sense pressure compensated valve incorporates a pressure compensator upstream to the metering notches on the spool (“pre-comp”). With either a fully shifted or partially shifted spool, work port flow will remain constant regardless of changing load pressure requirements. Pressure compensated sections are particularly useful in applications where the metering of flow, with varying pressure and flow conditions is required. The 20LPC sections have flow rated spools that determine the maximum flow from the individual work section. For instance the maximum flow from a work sections with a J10 spool is 10 gpm. Metering notches extend to the full travel of the spool. The lower flow spools will provide increased flow vs. spool travel resolution. With parallel circuitry, multiple sections can be used simultaneously to meter flow. If the sum of the flow rating of the shifted spools is less than the flow rating of the pump, all sections will receive flow. If the call for flow based on spool position from all work sections calls for more flow than the output of the pump, there may be some division of flow based on the section with the lowest pressure demand. The 20LPC is an optimal choice for proportional solenoid operation. It provides the greatest resolution of all the Prince proportional solenoid valves.
LOAD SENSE OUTLET DIMENSIONS

LOAD SENSE WORK SECTION DIMENSIONS

TEST DATA

PRESSURE DROP - INLET TO WORK PORT

PRESSURE DROP - WORK PORT TO TANK

WORK PORT FLOW VS. SPOOL POSITION
APPLICATION NOTES – 20ILF and 20ILFS:

1. These inlets are for use with a fixed displacement pump (such as a gear pump) and Prince Series 20 load sense sections.
2. When all spools are centered, the inlet allows the pump flow to be diverted to tank at relatively low pressure.
3. When a spool is shifted, the compensator directs the flow to the work port at a flow and pressure relative to the work port/load sense pressure. The inlet retains the enhanced metering control of the load sense work sections.
4. For the 20ILF inlet, the 150 psi compensator is standard. It is typically used with flows up to approximately 25 gpm. For lower flows, a 90 psi compensator can be used. For higher flows, a 230 psi compensator can be used. For the 20ILFS inlet, a 230 psi compensator is standard.

For proportional operators a 350 psi compensator is needed. In the 20ILFS, the compensator generates pilot pressure to initiate a spool shift when a solenoid is energized. Load induced pressure is required to complete and then maintain the spool shift.
5. For the 20ILFS, the flow to the solenoid cartridges is filtered through a 10 µ replaceable cartridge pressure filter. Only the pilot flow is filtered thus providing a long filter life.
6. A Series 20 load sense outlet (20LEx1 for the 20ILF or a 20LEx3 for the 20ILFS) must be used in the stack valve assembly.
7. The load sense port on the outlet needs to be plugged with a steel plug. There is no external load sense line.
8. The 20ILFS requires a tie rod kit for one extra section.

TEST DATA

20ILF PRESSURE DROP INLET TO TANK
LEFT IN TO RIGHT OUT (3 WORK SECTIONS)

20ILF RELIEF CURVE
SET @ 10 GPM
**SERIES 20 SOLENOID OPERATED WORK SECTIONS**

The solenoid operated Series 20 work sections allow remote electrical on-off control or, depending on the model, manual control. The solenoid operated sections contain two, 3 way-2 position screw in style cartridge valves. The screw in cartridges provide a robust platform for the higher tank pressures often seen in mobile applications.

Prince solenoid operated valves are pilot operated valves where pilot pressure is used to shift the spool. Depending on the model, the pilot pressure will be applied either directly to the end of the spool or to a piston that is connected to the spool. When both solenoids are de-energized, both spool end cavities or piston cavities are connected to tank. When the “A” solenoid is energized, pilot pressure is applied to the “A” end of the spool/piston, causing the spool to shift, against spring bias, and allow flow to the “A” work port. Energizing the “B” solenoid causes similar action on the “B” end. Internal pilot passageways convey pilot pressure to the solenoid actuators.

Pilot pressure is typically supplied by a utility section, but in the case of load sense sections or closed center assemblies, it can also be provided by an inlet manifold, which can be provided with filtered pilot flow. If a utility section is used, it must be installed between the last work section and the outlet cover. The utility section, or inlet manifold, limit the pilot pressure to approximately 350 psi.

For an open center system, a pressure build up cartridge is needed in the utility section. The pressure build up section provides pilot pressure to initiate the spool shift. A minimum of approximately 300 psi load induced pressure is required to complete the spool shift and hold the spool in the shifted position. For over center or light load applications a restrictor installed in the work port line may be required. Manual sections used in the same assembly with solenoid sections must either be upstream of solenoid sections or be custom sections machined with pilot passage ways in an assembly using a utility section. In assemblies with an inlet manifold, both solenoid and manual sections can be in the same assembly but, manual sections may have to be machined with pilot passage ways in an assembly required to control two valve sections. Use the same part numbers to order kits for field installation.

For an open center system, a pressure build up cartridge is needed in the utility section. The pressure build up section provides pilot pressure to initiate the spool shift. A minimum of approximately 300 psi load induced pressure is required to complete the spool shift and hold the spool in the shifted position. For over center or light load applications a restrictor installed in the work port line may be required. Manual sections used in the same assembly with solenoid sections must either be upstream of solenoid sections or be custom sections machined with pilot passage ways in an assembly using a utility section. In assemblies with an inlet manifold, both solenoid and manual sections can be in the same assembly but, manual sections may have to be machined with pilot passage ways in an assembly required to control two valve sections. Use the same part numbers to order kits for field installation.

Prince solenoid operators are offered in both a divided design (a solenoid on each end of the section) and a combined design (both solenoids on the end opposite the handle). We also currently offer models in both 10 thread size and 8 thread size solenoid cartridges. The 8 thread size offers a more compact assembly and a more economical choice as compared to a 10 thread size.
A Series 20 solenoid operated section with a handle code of 1, 2, 3 or 4 will designate a combined configuration with both solenoid cartridges on one end, opposite the handle end of the section. The combined operator configurations provide for either electric or manual operation. Handle configurations will be the same as the standard manual sections.

A "C" prefix on the solenoid and coil designation will designate an 8 series design and will have screw in solenoid cartridges with a #8 thread size. The #8 size cartridges allow for a more compact section size. An optional manual override feature is available for the #8 solenoid cartridges. Cartridges and coils on the 8 series are not interchangeable with the Prince 10 series solenoid sections or sections manufactured prior to November 2014. Any of the standard "-S", "-T", "-C" or "-D" style Prince Series 20 solenoid operated work sections may be used in any combination within a stack valve assembly.

**PORT RELIEF “B” OPTION**
- A - Relief Cavity Plugged
- B - Shim Adjustable Relief 500-1350 PSI Set at 1350
- C - Shim Adjustable Relief 1351-1750 PSI Set at 1750
- D - Shim Adjustable Relief 1751-2200 PSI Set at 2200
- E - Shim Adjustable Relief 2201-3000 PSI Set at 2500

**PORT RELIEF “A” OPTION**
- A - Relief Cavity Plugged
- B - Shim Adjustable Relief 500-1350 PSI Set at 1350
- C - Shim Adjustable Relief 1351-1750 PSI Set at 1750
- D - Shim Adjustable Relief 1751-2200 PSI Set at 2200
- E - Shim Adjustable Relief 2201-3000 PSI Set at 2500

Note: Work port relief cartridges on the 20LPC and 20S are different than the standard Series 20P cartridge.

**COIL VOLTAGE & TERMINATION**
- 12Q, 12 VDC Double Spade
- 12L, 12 VDC Double Wire
- 12H, 12 VDC DIN 43650
- 12D, 12 VDC Integral Deutsch
- 24Q, 24 VDC Double Spade
- 24L, 24 VDC Double Wire
- 24H, 24 VDC DIN 43650
- 24D, 24 VDC Integral Deutsch
- 11H, 120 VAC DIN 43650

**PORT SIZE**
1. #10 SAE (7/8-14 THREAD)
2. #8 SAE (3/4-16 THREAD)
3. #12 SAE (1 1/16-12 THREAD)
4. 1/2 NPTF (2000 PSI MAX)

**SPOOL TYPE**
- A - 3 - Way 3-Position
- B - 4 - Way 3-Position
- C - 4 - Way 3-Position Free Flow Motor
- E - 3 - Way 3-Position Free Flow Motor
- H - 3 - Way 3-Position 20LP Only
- J - 4 - Way 3-Position 20LP Only
- K - 4 - Way 3-Position Free Flow Motor - 20 LP Only
- N - 4 - Way 3-Position Series
- P - 4 - Way 3-Position Series Motor
- J05 - 5 GPM Pressure Comp (LPC Only)
- J10 - 10 GPM Pressure Comp (LPC Only)
- J15 - 15 GPM Pressure Comp (LPC Only)
- J20 - 20 GPM Pressure Comp Motor (LPC Only)
- K05 - 5 GPM Pressure Comp Motor (LPC Only)
- K10 - 10 GPM Pressure Comp Motor (LPC Only)
- K15 - 15 GPM Pressure Comp Motor (LPC Only)
- K20 - 20 GPM Pressure Comp Motor (LPC Only)

**SPOOL ACTION**
- A - Spring Center
- C - Standard Solenoid Cartridge
- CM - Solenoid Cartridge w/Manual Override

**HANDLE OPTION**
1. Standard Lever Handle
2. Less Handle Only
3. Less Complete Handle

**SERIES 20 (8 SERIES) TYPE C - SOLENOID OR MANUAL WORK SECTION DIMENSIONS**

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**SERIES 20 (8 SERIES) COMBINED SOLENOID OPERATORS (BOTH OPERATORS ON ONE END)**

---

**8 SERIES SOLENOID OPERATED WORK SECTION**

**WORK SECTION TYPE**
- P - Standard Parallel
- LP - Load Sense
- LPC - Load Sense Pressure Compensated
- S - Series (Use Spool Type N or P)

**PORT SIZE**
1. #10 SAE (7/8-14 THREAD)
2. #8 SAE (3/4-16 THREAD)
3. #12 SAE (1 1/16-12 THREAD)
4. 1/2 NPTF (2000 PSI MAX)

**SPOOL TYPE**
- A - 3 - Way 3-Position
- B - 4 - Way 3-Position
- C - 4 - Way 3-Position Free Flow Motor
- E - 3 - Way 3-Position Free Flow Motor
- H - 3 - Way 3-Position 20LP Only
- J - 4 - Way 3-Position 20LP Only
- K - 4 - Way 3-Position Free Flow Motor - 20 LP Only
- N - 4 - Way 3-Position Series
- P - 4 - Way 3-Position Series Motor
- J05 - 5 GPM Pressure Comp (LPC Only)
- J10 - 10 GPM Pressure Comp (LPC Only)
- J15 - 15 GPM Pressure Comp (LPC Only)
- J20 - 20 GPM Pressure Comp Motor (LPC Only)
- K05 - 5 GPM Pressure Comp Motor (LPC Only)
- K10 - 10 GPM Pressure Comp Motor (LPC Only)
- K15 - 15 GPM Pressure Comp Motor (LPC Only)
- K20 - 20 GPM Pressure Comp Motor (LPC Only)

**SPOOL ACTION**
- A - Spring Center
- C - Standard Solenoid Cartridge
- CM - Solenoid Cartridge w/Manual Override
- *See page V48 for coil details.*
A Series 20 solenoid operated section with a handle code of 5 or 6 will designate a split configuration with a solenoid cartridge on each end of the section. Handle option 5 provides electric operation only. Handle option 6 provides a lever handle for either electric or manual operation.

A “D” prefix on the solenoid and coil designation will designate an 8 series design and will have screw in solenoid cartridges with a #8 thread size. The #8 size cartridges allow for a more compact section size. An optional manual override feature is available for the #8 solenoid cartridges. Cartridges and coils on the 8 series are not interchangeable with the Prince 10 series solenoid sections or sections manufactured prior to November 2014. Any of the standard “-S”, “-T”, “-C” or “-D” style Prince Series 20 solenoid operated work sections may be used in any combination within a stack valve assembly.

### 8 SERIES SOLENOID OPERATED WORK SECTION

**WORK SECTION TYPE**
- P - Standard Parallel
- LP - Load Sense
- LPC - Load Sense Pressure Compensated
- S - Series (Use Spool Type N or P)

**PORT SIZE**
1. #10 SAE (7/8-14 THREAD)
2. #8 SAE (3/4-16 THREAD)
3. #12 SAE (1 1/16-12 THREAD)
4. 1/2 NPTF (2000 PSI MAX)

**SPOOL TYPE**
- A - 3 - Way 3-Position
- B - 4 - Way 3-Position
- C - 4 - Way 3-Position Free Flow Motor
- H - 3 - Way 3-Position - 20LP Only
- J - 4 - Way 3-Position - 20LP Only
- K - 4 - Way 3-Position Free Flow Motor - 20LP Only
- N - 4 - Way 3-Position Series
- P - 4 - Way 3-Position Series Motor
- J05 - 5 GPM Pressure Comp (LP Only)
- J10 - 10 GPM Pressure Comp (LP Only)
- J15 - 15 GPM Pressure Comp (LP Only)
- J20 - 20 GPM Pressure Comp (LP Only)
- K05 - 5 GPM Pressure Comp Motor (LP Only)
- K10 - 10 GPM Pressure Comp Motor (LP Only)
- K15 - 15 GPM Pressure Comp Motor (LP Only)
- K20 - 20 GPM Pressure Comp Motor (LP Only)

**SPOOL ACTION**
- A - Spring Center

*See page V47 for coil details.

### SERIES 20 (8 SERIES) TYPE D & DP - SOLENOID OR MANUAL WORK SECTION DIMENSIONS

**PORT RELIEF “B” OPTION**
- A - Relief Cavity Plugged
- B - Shim Adjustable Relief 500-1350 PSI Set at 1350
- C - Shim Adjustable Relief 1351-1750 PSI Set at 1750
- D - Shim Adjustable Relief 1751-2200 PSI Set at 2200
- E - Shim Adjustable Relief 2201-3000 PSI Set at 2500

**PORT RELIEF “A” OPTION**
- A - Relief Cavity Plugged
- B - Shim Adjustable Relief 500-1350 PSI Set at 1350
- C - Shim Adjustable Relief 1351-1750 PSI Set at 1750
- D - Shim Adjustable Relief 1751-2200 PSI Set at 2200
- E - Shim Adjustable Relief 2201-3000 PSI Set at 2500

Note: Work port relief cartridges on the 20LPC and 20S are different than the standard Series 20P cartridge.

**HANDLE OPTION**
- 5. Solenoid Operated Only (No Lever)

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**COIL VOLTAGE & TERMINATION**
- 12Q, 12 VDC Double Spade
- 12L, 12 VDC Double Wire
- 12H, 12 VDC DIN 43650
- 12D, 12 VDC Integral Deutsch
- 24Q, 24 VDC Double Spade
- 24L, 24 VDC Double Wire
- 24H, 24 VDC DIN 43650
- 24D, 24 VDC Integral Deutsch
- 11H, 120 VAC DIN 43650

**SOLENOID OPERATION**
- D - Standard Solenoid Cartridge
- DM - Solenoid Cartridge w/Manual Override

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**SERIES 20 (8 SERIES) DIVIDED SOLENOID OPERATORS (OPERATORS ON BOTH ENDS)**
A Series 20 solenoid operated section with a handle code of 1, 2, 3 or 4 will designate a combined configuration with both solenoid cartridges on one end, opposite the handle end of the section. The combined operator configurations provide for either electric or manual operation. Handle configurations will be the same as the standard manual sections.

An “S” prefix on the solenoid and coil designation will designate a 10 series design and will have screw in solenoid cartridges with a #10 thread size. Cartridges and coils on the 10 series will be interchangeable with the components on Prince solenoid operated valves manufactured prior to November 2014 as well as current production 10 series valves. The 10 series sections will have a dimensional envelope the same as Prince solenoid operated sections manufactured prior to November, 2014.

**10 SERIES SOLENOID OPERATED WORK SECTION**

**WORK SECTION TYPE**
- P - Standard Parallel
- LP - Load Sense
- LPC - Load Sense Pressure Compensated
- S - Series (Use Spool Type N or P)

**PORT SIZE**
1. #10 SAE (7/8-14 THREAD)
2. #8 SAE (3/4-16 THREAD)
3. #12 SAE (1 1/16-12 THREAD)
4. 1/2 NPTF (2000 PSI MAX)

**SPOOL TYPE**
- A - 3 - Way 3-Position
- B - 4 - Way 3-Position
- C - 4 - Way 3-Position Free Flow Motor
- E - 3 - Way 3-Position Free Flow Motor
- H - 3 - Way 3-Position 20LP Only
- J - 4 - Way 3-Position 20LP Only
- K - 4 - Way 3-Position Free Flow Motor - 20 LP Only
- N - 4 - Way 3-Position Series
- P - 4 - Way 3-Position Series Motor
- J05 - 5 GPM Pressure Comp (LPC Only)
- J10 - 10 GPM Pressure Comp (LPC Only)
- J15 - 15 GPM Pressure Comp (LPC Only)
- J20 - 20 GPM Pressure Comp (LPC Only)
- K05 - 5 GPM Pressure Comp Motor (LPC Only)
- K10 - 10 GPM Pressure Comp Motor (LPC Only)
- K15 - 15 GPM Pressure Comp Motor (LPC Only)
- K20 - 20 GPM Pressure Comp Motor (LPC Only)

**COIL VOLTAGE & TERMINATION**
- 12Q, 12 VDC Double Spade
- 12L, 12 VDC Double Wire
- 12H, 12 VDC DIN 43650
- 12D, 12 VDC Deutsch
- 24Q, 24 VDC Double Spade
- 24L, 24 VDC Double Wire
- 24H, 24 VDC DIN 43650
- 11L, 120VAC Lead Wires
- 24D, 24 VDC Deutsch

**PORT RELIEF “B” OPTION**
- A - Relief Cavity Plugged
- B - Shim Adjustable Relief 500-1350 PSI Set at 1350
- C - Shim Adjustable Relief 1351-1750 PSI Set at 1750
- D - Shim Adjustable Relief 1751-2200 PSI Set at 2200
- E - Shim Adjustable Relief 2201-3000 PSI Set at 2500

**PORT RELIEF “A” OPTION**
- A - Relief Cavity Plugged
- B - Shim Adjustable Relief 500-1350 PSI Set at 1350
- C - Shim Adjustable Relief 1351-1750 PSI Set at 1750
- D - Shim Adjustable Relief 1751-2200 PSI Set at 2200
- E - Shim Adjustable Relief 2201-3000 PSI Set at 2500

**HANDLE OPTION**
1. Standard Lever Handle
2. Less Handle Only
3. Less Complete Handle

**SPOOL ACTION**
- A - Spring Center

*See page V48 for coil details.
A Series 20 solenoid operated section with a handle code of 5 or 6 will designate a split configuration with a solenoid cartridge on each end of the section. Handle option 5 provides electric operation only. Handle option 6 provides a lever handle for either electric or manual operation.

An “S” prefix on the solenoid and coil designation will designate a 10 series design and will have screw in solenoid cartridges with a #10 thread size. Cartridges and coils on the 10 series will be interchangeable with the components on Prince solenoid operated valves manufactured prior to November 2014 as well as current production 10 series valves. The 10 series sections will have a dimensional envelope the same as Prince solenoid operated sections manufactured prior to November, 2014.

**10 SERIES SOLENOID OPERATED WORK SECTION**

**WORK SECTION TYPE**
- P - Standard Parallel
- LP - Load Sense
- LPC - Load Sense Pressure Compensated
- S - Series (Use Spool Type N or P)

**PORT SIZE**
1. #10 SAE (7/8-14 THREAD)
2. #8 SAE (3/4-16 THREAD)
3. #12 SAE (1 1/16-12 THREAD)
4. 1/2 NPTF (2000 PSI MAX)

**SPOOL TYPE**
- A - 3 - Way 3-Position
- B - 4 - Way 3-Position
- C - 4 - Way 3-Position Free Flow Motor
- H - 3 - Way 3-Position - 20LP Only
- J - 4 - Way 3-Position - 20LP Only
- K - 4 - Way 3-Position Free Flow Motor - 20LP Only
- N - 4 - Way 3-Position Series
- P - 4 - Way 3-Position Series Motor
- J05 - 5 GPM Pressure Comp (LPC Only)
- J10 - 10 GPM Pressure Comp (LPC Only)
- J15 - 15 GPM Pressure Comp (LPC Only)
- J20 - 20 GPM Pressure Comp (LPC Only)
- K05 - 5 GPM Pressure Comp Motor (LPC Only)
- K10 - 10 GPM Pressure Comp Motor (LPC Only)
- K15 - 15 GPM Pressure Comp Motor (LPC Only)
- K20 - 20 GPM Pressure Comp Motor (LPC Only)

**COIL VOLTAGE & TERMINATION**
- 12Q, 12 VDC Double Spade
- 12L, 12 VDC Double Wire
- 12H, 12 VDC DIN 43650
- 24Q, 24 VDC Double Spade
- 24L, 24 VDC Double Wire
- 24H, 24 VDC DIN 43650
- 11L, 120VAC Lead Wires
- 24D, 24 VDC Deutsch

**PORT RELIEF “B” OPTION**
- A - Relief Cavity Plugged
- B - Shim Adjustable Relief 500-1350 PSI Set at 1350
- C - Shim Adjustable Relief 1351-1750 PSI Set at 1750
- D - Shim Adjustable Relief 1751-2200 PSI Set at 2200
- E - Shim Adjustable Relief 2201-3000 PSI Set at 2500

**PORT RELIEF “A” OPTION**
- A - Relief Cavity Plugged
- B - Shim Adjustable Relief 500-1350 PSI Set at 1350
- C - Shim Adjustable Relief 1351-1750 PSI Set at 1750
- D - Shim Adjustable Relief 1751-2200 PSI Set at 2200
- E - Shim Adjustable Relief 2201-3000 PSI Set at 2500

**HANDLE OPTION**
5. Solenoid Operated Only (No Lever)

**SPOOL ACTION**
A - Spring Center

*See page V48 for coil details.
SERIES 20 UTILITY SECTIONS (FOR USE WITH SOLENOID OPERATED SECTIONS)

UTILITY SECTION

UTILITY TYPE
U - Standard Utility

UTILITY OPTION
1. Solenoid On-Off Press. Build-Up Valve
2. Mechanical Continuous On Press. Build-up Valve
3. Closed Center Utility Section (Required with Load Sense Assembly)
4. #10 SAE ORB Power Beyond (No Pressure Build-Up) *
5. External Pilot Supply Utility

* Note: With Series 20 solenoid operator assemblies, the power beyond line is connected to the utility section and NOT to a power beyond port in the outlet section. Option 4 requires pilot pressure to be provided by downstream function.

COIL VOLTAGE & TERMINATION*
(omit for options 2 thru 5)
12Q, 12 VDC Double Spade
12L, 12 VDC Double Wire
12H, 12 VDC DIN 43650
12D, 12 VDC Deutsch
24Q, 24 VDC Double Spade
24L, 24 VDC Double Wire
24H, VDC DIN 43650
24D, 24 VDC Deutsch
11L, 120VAC Lead Wires

COMBINATION OUTLET/UTILITY SECTION

OUTLET PORT SIZE
1. #10 SAE ORB (7/8 – 14 UNF)

PRESSURE BUILD-UP OPTIONS
2. Mechanical Pressure Build-Up
3. Closed Center
4. Mech. Pressure Build-Up; #12 SAE ORB Power Beyond
5. Mech. Pressure Build-Up, Medium Pressure; #12 SAE Power Beyond**
6. Mech. Pressure Build-Up, Medium Pressure**
7. #12 SAE ORB Power Beyond (No Pressure Build-Up)***
8. Load Sense (closed center)

SERIES 20 COMBINATION UTILITY SECTION AND OUTLET
Incorporates both the utility and outlet sections into one manifold.
For use in solenoid operated assemblies (either on/off or proportional).
Provides reducing cartridge (350 psi) limits pressure to solenoids.
Mechanical pressure build-up (open center or PBY), or closed center.
Optional filtration of pilot flow. The 20UE requires a tie rod kit for one extra section.
** Medium pressure builds can be considered for higher flow proportional applications.
*** Build-up option 7 requires pilot pressure to be provided by downstream function.

SERIES 20 SYMBOL SCHEMATIC OF A SOLENOID OPERATOR ASSEMBLY

For remote control options for on/off and proportional solenoids, see page V52.
In the Series 20 proportional work sections, varying pilot pressure is applied to the end of the spools to shift the spool against spring bias. Proportional pressure reducing cartridges are used to vary the pressure on the spools. As the current through the cartridge coil increases, the amount of the available pilot pressure applied to the ends of the spools also, proportionally increases. There will be a threshold pressure/current (dead band) to overcome the initial spring centering force and initial land coverage. Once this pressure/current has been exceeded, increasing the current through the coil will increase the flow from the work ports.

Current to the coils is typically provided by a PWM current control module and a joystick or other input device. The coils require a maximum current of approximately 1300 mA (@ 12 volts), and for reduced hysteresis, a dither frequency of approximately 100 Hz and a dither amplitude of 50 to 100 mA. The controller should have adjustable minimum current and maximum current settings to minimize the dead band before work port flow starts and to maximize the control resolution. See page V38.6 for examples of control module and joystick components.

The proportional work sections require pilot pressure to shift the spools. Approximately 325 psi pilot pressure will fully shift the spool in Prince proportional sections. With open center valve assemblies, the pilot pressure is typically supplied by a compensator inlet (20IC). The compensator inlets will provide adequate pilot pressure regardless of the load induced pressure. On load sense or load sense pressure comp systems used with a fixed displacement pump, a 20ILFS65370 inlet will provide pilot pressure. For load sense and load sense pressure comp systems used with a load sense pump, the standby pressure setting should be approximately 325 psi or more to provide for completely shifting the spool.

Prince offers three basic proportional families. The first is open center proportional (based on the 20P family). The open center family, which is typically used with a fixed displacement (gear) pump is the least expensive of the three families. The open center family will provide controlled starts and stops of the work port flow, however, the metering band is not as wide as the other proportional families. The flow rate is also somewhat pressure dependent. The second family is load sense proportional and is based on the 20LP family. The load sense proportional has a wider metering band and the flow is not pressure dependent. The third family, based on the 20LPC family, is load sense pressure comp proportional. The load sense pressure comp family has the widest metering band, giving the most control and resolution. The load sense pressure comp family also has flow rated spools, providing for high resolution and control even for a few gpm with the 5 gpm spool. Using current minimum and current maximum settings on the controller will enhance the control in all three families.

**SERIES 20 PROPORTIONAL WORK SECTIONS**

**SERIES 20 PROPORTIONAL ASSEMBLIES**
**APPLICATION NOTES:**

The 20IC2F is an inlet assembly used with the "20P" (open center) proportional solenoid assemblies. It is used with fixed displacement pumps (typically gear pumps) and has a compensator cartridge in the manifold that provides approximately 370psi pilot pressure for the proportional solenoids. It also incorporates a pressure reducing cartridge to limit the pressure to the solenoid cartridges, and a 10µ filter cartridge to filter the pilot flow. The 20IC2F requires a tie rod kit for one extra section, and requires a 20Ex4 outlet section to be used.

The 20IC2F has other applications such as low flow systems. The inlet can provide a constant pilot pressure regardless of flow, guaranteeing a shift in either on/off or proportional solenoids. Likewise, systems that also have little to no load induced pressure can benefit from the constant pilot pressure the 20IC2F provides, guaranteeing a shift regardless of work port pressure.

The 10 micron filter included in the inlet helps keep the pilot lines clean. This helps eliminate contamination in the oil being sent to the solenoid cartridges.
SERIES 20 PROPORTIONAL WORK SECTIONS PERFORMANCE CURVES

SERIES 20 OPEN CENTER PROPORTIONAL (20P-DP12D)
WORK PORT FLOW vs. CURRENT

- SPOOL B
- 20 GPM INLET FLOW
- 6 GPM INLET FLOW

SERIES 20 LOAD SENSE PROPORTIONAL (20LP-DP12D)
WORK PORT FLOW vs. CURRENT

- SPOOL J
- 20 GPM INLET FLOW

SERIES 20 LOAD SENSE PRESSURE COMPENSATED PROPORTIONAL (20LPC-DP12D)
WORK PORT FLOW vs. CURRENT

- SPOOL J20
- SPOOL J15
- SPOOL J10
- SPOOL J05

CURRENT (mA)
EXAMPLES OF TYPICAL SERIES 20 SOLENOID OPERATED SECTIONS AND ASSEMBLIES

ON – OFF SOLENOID ASSEMBLIES

SERIES 20 COMMON WORK SECTIONS
20P1BA1AA-C12D (8 series solenoids)
20P1BA5AA-DM12D (8 series-manual override solenoids)
20P1BA6AA-C12L (8 series solenoids)
20P1BA1AA-S12Q (10 series solenoids)
20P1BA6AA-S12H (10 series solenoids)

OPEN CENTER PROPORTIONAL (fixed displacement pump)

SERIES 20 COMMON WORK SECTION
20P1BA5AA-DP12D (proportional solenoids)

LOAD SENSE PROPORTIONAL

SERIES 20 COMMON WORK SECTION
20LP1JA5AA-DP12D (proportional solenoids)

LOAD SENSE PRESSURE COMPENSATED PROPORTIONAL

SERIES 20 COMMON WORK SECTION
20LPC1J15A5AA-DP12D (proportional solenoids, 15 gpm spool)

ON – OFF SOLENOID PUMP TYPE

<table>
<thead>
<tr>
<th>Work Sect.</th>
<th>Inlet</th>
<th>Utility</th>
<th>Outlet</th>
<th>Pump Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>20(P/S)</td>
<td>20Ix</td>
<td>20Ux</td>
<td>20Ex1</td>
<td>FIXED DISPLACEMENT PUMP</td>
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<tr>
<td>20(P/S)</td>
<td>20Ix</td>
<td>n/a</td>
<td>20UE12x</td>
<td>FIXED DISPLACEMENT PUMP</td>
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<tr>
<td>20(LP/LPC)</td>
<td>20ILFS65230</td>
<td>n/a</td>
<td>20LEx3</td>
<td>FIXED DISPLACEMENT PUMP</td>
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<tr>
<td>20(P/S)</td>
<td>20Ix</td>
<td>20U3</td>
<td>20Ex1</td>
<td>PRESSURE COMPENSATED PUMP</td>
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<td>n/a</td>
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<td>PRESSURE COMPENSATED PUMP</td>
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<td>20Ix</td>
<td>20U3</td>
<td>20LExx</td>
<td>LOAD SENSE PUMP</td>
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<tr>
<td>20(LP/LPC)</td>
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<td>n/a</td>
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<td>LOAD SENSE PUMP</td>
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</table>

OPEN CENTER PROPORTIONAL SOLENOID PUMP TYPE

<table>
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<tr>
<th>Work Sect.</th>
<th>Inlet</th>
<th>Outlet</th>
<th>Pump Type</th>
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</thead>
<tbody>
<tr>
<td>20P</td>
<td>20IC2F</td>
<td>n/a</td>
<td>FIXED DISPLACEMENT PUMP</td>
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</tbody>
</table>

LOAD SENSE PROPORTIONAL SOLENOID PUMP TYPE

<table>
<thead>
<tr>
<th>Work Sect.</th>
<th>Inlet</th>
<th>Outlet</th>
<th>Pump Type</th>
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<tbody>
<tr>
<td>20LP</td>
<td>20ILFS65370</td>
<td>n/a</td>
<td>20LEx3</td>
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<tr>
<td>20LP</td>
<td>20Ix</td>
<td>20U3</td>
<td>20LExx</td>
</tr>
<tr>
<td>20LP</td>
<td>20Ix</td>
<td>n/a</td>
<td>20UE18x</td>
</tr>
</tbody>
</table>

LOAD SENSE PRESSURE COMPENSATED PROPORTIONAL SOLENOID PUMP TYPE

<table>
<thead>
<tr>
<th>Work Sect.</th>
<th>Inlet</th>
<th>Outlet</th>
<th>Pump Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>20LPC</td>
<td>20ILFS65370</td>
<td>n/a</td>
<td>20LEx3</td>
</tr>
<tr>
<td>20LPC</td>
<td>20Ix</td>
<td>20U3</td>
<td>20LExx</td>
</tr>
<tr>
<td>20LPC</td>
<td>20Ix</td>
<td>n/a</td>
<td>20UE18x</td>
</tr>
</tbody>
</table>
## SERIES 20 PRESET RELIEF CARTRIDGES

### PRESET INLET RELIEF CARTRIDGE

<table>
<thead>
<tr>
<th>CARTRIDGE CODE / STYLE</th>
<th>STD SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>B - SHIM ADJ 500-1350 PSI</td>
<td>1350 PSI @ 10 GPM</td>
</tr>
<tr>
<td>C - SHIM ADJ 1351-1750 PSI</td>
<td>1750 PSI @ 10 GPM</td>
</tr>
<tr>
<td>D - SHIM ADJ 1751-2200 PSI</td>
<td>2200 PSI @ 10 GPM</td>
</tr>
<tr>
<td>E - SHIM ADJ 2201-3000 PSI</td>
<td>2500 PSI @ 10 GPM</td>
</tr>
<tr>
<td>F - SCREW ADJ 500-1350 PSI</td>
<td>1350 PSI @ 10 GPM</td>
</tr>
<tr>
<td>G - SCREW ADJ 1351-1750 PSI</td>
<td>1750 PSI @ 10 GPM</td>
</tr>
<tr>
<td>H - SCREW ADJ 1751-2200 PSI</td>
<td>2200 PSI @ 10 GPM</td>
</tr>
<tr>
<td>J - SCREW ADJ 2201-3000 PSI</td>
<td>2500 PSI @ 10 GPM</td>
</tr>
<tr>
<td>K - SCREW ADJ 3001-3500 PSI</td>
<td>3250 PSI @ 10 GPM</td>
</tr>
</tbody>
</table>

Setting in PSI - Leave Blank for Standard

### PRESET WORK PORT RELIEF CARTRIDGE

<table>
<thead>
<tr>
<th>CARTRIDGE CODE / STYLE</th>
<th>STD SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>B - SHIM ADJ 500-1350 PSI</td>
<td>1350 PSI @ 3 GPM</td>
</tr>
<tr>
<td>C - SHIM ADJ 1351-1750 PSI</td>
<td>1750 PSI @ 3 GPM</td>
</tr>
<tr>
<td>D - SHIM ADJ 1751-2200 PSI</td>
<td>2200 PSI @ 3 GPM</td>
</tr>
<tr>
<td>E - SHIM ADJ 2201-3000 PSI</td>
<td>2500 PSI @ 3 GPM</td>
</tr>
<tr>
<td>F - SCREW ADJ 500-1350 PSI</td>
<td>1350 PSI @ 3 GPM</td>
</tr>
<tr>
<td>G - SCREW ADJ 1351-1750 PSI</td>
<td>1750 PSI @ 3 GPM</td>
</tr>
<tr>
<td>H - SCREW ADJ 1751-2200 PSI</td>
<td>2200 PSI @ 3 GPM</td>
</tr>
<tr>
<td>J - SCREW ADJ 2201-3000 PSI</td>
<td>2500 PSI @ 3 GPM</td>
</tr>
<tr>
<td>L - ANTI-CAV/SHIM RELIEF 500-1350 PSI</td>
<td>1350 PSI @ 3 GPM</td>
</tr>
<tr>
<td>M - ANTI-CAV/SHIM RELIEF 1351-1750 PSI</td>
<td>1750 PSI @ 3 GPM</td>
</tr>
<tr>
<td>N - ANTI-CAV/SHIM RELIEF 1751-2200 PSI</td>
<td>2200 PSI @ 3 GPM</td>
</tr>
<tr>
<td>R - ANTI-CAV/SHIM RELIEF 2201-3000 PSI</td>
<td>2500 PSI @ 3 GPM</td>
</tr>
<tr>
<td>S - ANTI-CAV/SCREW RELIEF 500-1350 PSI</td>
<td>1350 PSI @ 3 GPM</td>
</tr>
<tr>
<td>T - ANTI-CAV/SCREW RELIEF 1351-1750 PSI</td>
<td>1750 PSI @ 3 GPM</td>
</tr>
<tr>
<td>W - ANTI-CAV/SCREW RELIEF 1751-2200 PSI</td>
<td>2200 PSI @ 3 GPM</td>
</tr>
<tr>
<td>Y - ANTI-CAV/SCREW RELIEF 2201-3000 PSI</td>
<td>2500 PSI @ 3 GPM</td>
</tr>
</tbody>
</table>

Setting in PSI - Leave Blank for Standard
Directional Control Valves

SECTIONAL BODY

Model SV

STANDARD FEATURES

- 1-10 Sections Per Valve Bank
- Load Checks On Each Section
- Hard Chrome Plated Spools
- Compact Construction
- Enhanced Metering Section Available in both the High and Low Sections
- Differential Poppet Style Relief, Adjustable from 1500 to 3000 psi (Also available in Low Pressure Version Adjustable from 500 to 1500 psi)
- Power Beyond Capability
- Reversible Handle
- Mid-Inlet and Lock Valve Section available
- Flow Control Inlet

SPECIFICATIONS

Parallel or Series Circuit Construction
Pressure Rating
- Maximum Operating Pressure ....... 3000 psi
- Maximum Tank Pressure............. 500 psi
Nominal Flow Rating .................. 12 GPM
- Refer to Pressure Drop Curves.

Filtration: For general purpose valves, fluid cleanliness should meet the ISO 4406 19/17/14 level. For extended life or for pilot operated valves, the 18/16/13 fluid cleanliness level is recommended.

Foot Mounting
Maximum Operating Temp...................... 180°F
Weight Per Section
- Inlet Section.................................. Approx 3.75 lbs
- Outlet Section ............................... Approx 3.75 lbs.
- Work Section (Standard) ............... Approx 5.50 lbs.
- Work Section (High) .................... Approx 8.00 lbs.
INLET SECTIONS ALL HAVE BOTH TOP AND SIDE INLET PORTS

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>RELIEF TYPE AND SETTING</th>
<th>PORT SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV121</td>
<td>Adjustable Low Pressure Relief Set at 1000 PSI</td>
<td>#10 SAE ORB (7/8-14 THD)</td>
</tr>
<tr>
<td>SV124</td>
<td>Adjustable High Pressure Relief Set at 2000 PSI</td>
<td>#8 SAE ORB (3/4-16 THD)</td>
</tr>
<tr>
<td>SV125</td>
<td>Adjustable High Pressure Relief Set at 2000 PSI</td>
<td>#10 SAE ORB (7/8-14 THD)</td>
</tr>
</tbody>
</table>

WORK SECTIONS ALL HAVE #8 SAE ORB (3/4-16 THD) PORTS, LOAD CHECK AND STANDARD LEVER HANDLE

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>SPOOL TYPE AND ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVW1BA1</td>
<td>3-Way Single w/ Spring Center</td>
</tr>
<tr>
<td>SVW1BB1</td>
<td>4-Way Double Acting w/ Spring Center (Work Ports Blocked in Neutral)</td>
</tr>
<tr>
<td>SVW1CA1</td>
<td>4-Way Motor Spool w/ Spring Center (Work Ports Open to Tank in Neutral)</td>
</tr>
<tr>
<td>SVW1CB1</td>
<td>4-Way Motor Spool w/3 Position Detent (Work Ports Open to Tank in Neutral)</td>
</tr>
<tr>
<td>SVW1DD1</td>
<td>4-Way 4 Position Float w/ Spring Center and Float Detent</td>
</tr>
<tr>
<td>SVL1CA1</td>
<td>4-Way Spool w/ Spring Center (with Pilot Operated Checks on Both Work Ports)</td>
</tr>
<tr>
<td>SVW1BA11</td>
<td>4-Way Double Acting w/ Spring Center (Work Ports Blocked in Neutral) / Enclosed Handle</td>
</tr>
<tr>
<td>SVW1BA2</td>
<td>4-Way Double Acting w/ Spring Center (Work Ports Blocked in Neutral) / Less Handle Only</td>
</tr>
<tr>
<td>SVW1BA9</td>
<td>4-Way Double Acting w/ Spring Center (Work Ports Blocked in Neutral) / Blank for Optional Joystick Handle</td>
</tr>
<tr>
<td>SVW1DD2</td>
<td>4-Way 4 Position Float w/ Spring Center and Float Detent / Less Handle Only</td>
</tr>
<tr>
<td>SVW2BA6</td>
<td>4-Way Double Acting w/ Spring Center (Work Ports Blocked in Neutral) / Clevis Spool End Only</td>
</tr>
<tr>
<td>SVW1BA4-S12H</td>
<td>4-Way Double Acting w/ Spring Center (Work Ports Blocked in Neutral) 12 VDC DIN 43650</td>
</tr>
<tr>
<td>SVW1BA1-S12G</td>
<td>4-Way Double Acting w/ Spring Center (Work Ports Blocked in Neutral) 12 VDC Double Spade</td>
</tr>
</tbody>
</table>

PORT RELIEF WORK SECTIONS ALL HAVE #8 SAE ORB (3/4-16 THD) PORTS, LOAD CHECK AND STANDARD LEVER HANDLE. MODELS WITH RELIEF FACTORY SET AT 2000 PSI AT 3 GPM.

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>SPOOL TYPE AND ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVH1B1AGG</td>
<td>4-Way Double Acting w/ Spring Center</td>
</tr>
<tr>
<td>SVH1BA1AH</td>
<td>4-Way Double Acting w/ Spring Center</td>
</tr>
<tr>
<td>SVH1BA1HA</td>
<td>4-Way Double Acting w/ Spring Center</td>
</tr>
<tr>
<td>SVR1ES1GG</td>
<td>4-Way Meter Spool w/ Spring Center</td>
</tr>
<tr>
<td>SVS1GA1AA</td>
<td>4-Way Double Acting Series w/ Spring Center</td>
</tr>
<tr>
<td>SVH1DD1BB</td>
<td>4-Way 4 Position Float w/ Spring Center and Float Detent</td>
</tr>
</tbody>
</table>

OUTLET SECTIONS ALL HAVE BOTH TOP AND SIDE OUTLET PORTS

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>EXHAUST OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVE11</td>
<td>Open Center Outlet w/ Conversion Plug</td>
</tr>
<tr>
<td>SVE21</td>
<td>Open Center Outlet w/ Conversion Plug</td>
</tr>
<tr>
<td>SVE22</td>
<td>Power Beyond Outlet w/ #8 SAE Power Beyond Port</td>
</tr>
<tr>
<td>SVE23</td>
<td>Closed Center Outlet</td>
</tr>
<tr>
<td>SVE26</td>
<td>Open Center Outlet Pressure Build-Up Valve</td>
</tr>
<tr>
<td>SVE27</td>
<td>Power Beyond Pressure Build-Up Valve</td>
</tr>
<tr>
<td>SVE28</td>
<td>Medium Pressure Build-Up (for Low Flow Applications)</td>
</tr>
</tbody>
</table>

TIE ROD KITS

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIE ROD TORQUE</td>
<td>660401001 1 Section*</td>
</tr>
<tr>
<td>660401002 2 Sections*</td>
<td></td>
</tr>
<tr>
<td>660401003 3 Sections*</td>
<td></td>
</tr>
<tr>
<td>660401004 4 Sections*</td>
<td></td>
</tr>
<tr>
<td>660401005 5 Sections*</td>
<td></td>
</tr>
<tr>
<td>*Number of Work Sections</td>
<td>660401006 6 Sections*</td>
</tr>
<tr>
<td>660401007 7 Sections*</td>
<td></td>
</tr>
<tr>
<td>660401008 8 Sections*</td>
<td></td>
</tr>
<tr>
<td>660401009 9 Sections*</td>
<td></td>
</tr>
<tr>
<td>660401010 10 Sections*</td>
<td></td>
</tr>
</tbody>
</table>

SPECIAL INLET AND OUTLET SECTIONS AVAILABLE: Sections other than standard models listed can be made to order. Use order code Matrix below to generate a model number that meets your requirements. If you prefer, contact your Sales Representative with your specific requirements and a model number will be assigned for you. This model number can be used for future orders. A minimum order quantity will apply to special valves. Please consult Sales Representative.

INLET SECTIONS

<table>
<thead>
<tr>
<th>PORT SIZE</th>
<th>RELIEF SETTING (in PSI)</th>
<th>RELIEF OPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. #8 SAE ORB (3/4-16 THD)</td>
<td>1. No Relief Plug</td>
<td></td>
</tr>
<tr>
<td>2. #10 SAE ORB (7/8-14 THD)</td>
<td>2. Adj. Low Pressure 500-1500 PSI</td>
<td></td>
</tr>
<tr>
<td>3. #10 SAE ORB (7/8-14 THD)</td>
<td>4. Adj. High Pressure 1500-3000 PSI</td>
<td></td>
</tr>
<tr>
<td>4. #10 SAE ORB (7/8-14 THD)</td>
<td>6. Plastic Plug in relief cavity. Use only when cartridge is to be installed at a later date.</td>
<td></td>
</tr>
</tbody>
</table>

OUTLET SECTIONS

<table>
<thead>
<tr>
<th>PORT SIZE</th>
<th>EXHAUST OPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Std. Open Center Outlet w/Conversion Plug</td>
<td></td>
</tr>
<tr>
<td>2. Power Beyond Outlet w/#8 SAE Beyond Port</td>
<td></td>
</tr>
<tr>
<td>3. Closed Center Outlet</td>
<td></td>
</tr>
<tr>
<td>4. Open Center Outlet Pressure Build-Up</td>
<td></td>
</tr>
<tr>
<td>5. Power Beyond Pressure Build-Up</td>
<td></td>
</tr>
<tr>
<td>6. Medium Pressure Build-Up (For Low Flow Applications)</td>
<td></td>
</tr>
<tr>
<td>7. Medium Pressure Build-Up Power Beyond</td>
<td></td>
</tr>
<tr>
<td>8. #8 SAE Beyond Port</td>
<td></td>
</tr>
<tr>
<td>9. Medium Pressure Build-Up Power Beyond #8 SAE Beyond Port (For Low Flow Applications)</td>
<td></td>
</tr>
</tbody>
</table>

*Often used with no relief. Review application

VALVE ASSEMBLIES

The Model SV sectional body directional control valve can be ordered as separate sections or as a complete factory tested assembly. This will need to be specified with each order. An assembly number will be assigned at the time of the order. This assembly number can then be used for future orders.

ASSEMBLY MODEL NUMBER SVA-XXXX

XXXX = Sequence of Numbers. This number will be assigned to final valve to be assembled and tested at the factory. Each new order or quote will be assigned a new assembly model number. Please use quotation sheet at the end of SV section.
SPECIAL WORK SECTIONS AVAILABLE: Work Sections other than standard models listed can be made to order. Use order code matrix below to generate a model number that meets your requirements. If you prefer, contact your Sales Representative with your specific requirements and a model number will be assigned for you. This model number can be used for future orders. A minimum order quantity will apply to special valves. Please consult Sales Representative.

WORK SECTIONS

SECTION TYPE
W - Std. Work Section
M - Metering Work Section
L - Work Section with Double P.O. Checks
F - Fine Metering

PORT SIZE
1. #6 SAE ORB (3/4-16 THD)
2. #6 SAE ORB (9/16-18 THD)

SPOOL TYPE
A - 3-Way 3-Position
B - 4-Way 3-Position
C - 4-Way 3 Position Motor
D - 4-Way 4 Position Float (Must Use Float Action)
E - 4-Way 3 Position Metering (SVM only)
K - 4-Way 3 Position Counterbalance Drain (SVM)
M - 4-Way 3 Position Counterbalance Drain/Motor (SVM)

WORK SECTIONS

SECTION TYPE
H - Port Relief Section
R - Port Relief Metering Section
S - Series Circuit Port Relief Section
G - Port Relief Fine Metering Section

PORT SIZE
1. #6 SAE ORB (3/4-16 THD)
2. #6 SAE ORB (9/16-18 THD)

SPOOL TYPE
A - 3-Way 3-Position
B - 4-Way 3-Position
C - 4-Way 3 Position Motor
D - 4-Way 4 Position Float (Must Use Float Action)
E - 4-Way 3 Position Metering (SVM only)
K - 4-Way 3 Position Counterbalance Drain (SVM)
M - 4-Way 3 Position Counterbalance Drain/Motor (SVM)

HANDLE OPTION
1. Standard Lever Handle
2. Less Handle Only
3. Less Complete Handle Assembly
4. Adjustable Handle
5. Tang Spool End Only
6. Clevis Spool End Only
7. Vertical Handle
8. Blank for Optional Joystick Handle
9. Blank for Optional Joystick Handle
12. Extended Enclosed Handle

SPOOL ACTION
A - Spring Center (SVH & SVS only)
B - 3 Position Detent
C - Friction Detent
D - Spring Center with Float Detent (SVH only) (Must Use Float Spool)
E - Light Spring Center
F - 2 Position Detent Neutral and Out (No IN Position)
G - 2 Position (Center and Spool Out) - Spring Loaded to Spool Out (Pressure to B Port) Position
H - 2 Position (Center and Spool In) - Spring Loaded to Spool In (Pressure to A Port) Position
J - S/C with MicroSwitch Bracket 2-Position (MicroSwitch not provided)
K - S/C with MicroSwitch Bracket 1-Position (MicroSwitch not provided) (activates on spool out only)
M - Spring Center Detent In
N - Spring Center Detent Out
P - 2 Position Detent Neutral and IN (No OUT Position)
R - Spring Center Pneumatic Actuator
S - Spring Center (SVM & SVF)

PORT RELIEF “A” OPTION
A - Relief Cavity Plugged
B - Non-Adjustable Direct Acting Relief 1500-3000 PSI
C - Non-Adjustable Direct Acting Relief 500-1500 PSI
D - Anti-Cavitation Check
E - Adjustable Combination Port Relief/Anti-Cavitation Check 1000-2500 PSI***
F - Non-Adjustable Combination Port Relief/Anti-Cavitation Check 1000-2500 PSI***
G - Adjustable Direct Acting Relief 1500-3000 PSI
H - Adjustable Direct Acting Relief 500-1500 PSI

PORT RELIEF “B” OPTION
A - Relief Cavity Plugged
B - Non-Adjustable Direct Acting Relief 1500-3000 PSI
C - Non-Adjustable Direct Acting Relief 500-1500 PSI
D - Anti-Cavitation Check
**E - Adjustable Combination Port Relief/Anti-Cavitation Check 1000-2500 PSI***
F - Non-Adjustable Combination Port Relief/Anti-Cavitation Check 1000-2500 PSI***
G - Adjustable Direct Acting Relief 1500-3000 PSI
H - Adjustable Direct Acting Relief 500-1500 PSI

PORT RELIEF PRESSURE IN HUNDREDS
EXAMPLE: 18=1800 PSI at 3 GPM
All Port Reliefs set at 3 GPM

CUSTOM SECTION: For OEM application custom sections can often be designed to meet your specifications. Consult your sales representative with your specifications.
FIELD CONVERSION KITS, REPAIR KITS AND RELIEF CARTRIDGES

SPOOL ATTACHMENT KITS
- 660180001 Spring Center Kit (except SVM)
- 660180002 3 Position Detent Kit
- 660180003 Friction Detent Kit
- 660180037 Spring Center Detent In
- 660180015 S/C w/Micro-Switch, 2 Position*
- 660180016 S/C w/Micro-Switch, 1 Position*

HANDLE KITS
- 660180011 Standard Handle Kit
- 660180032 Clevis Sub-Assy
- 660180005 Complete Handle Kit
- 660180006 Vertical Handle Kit
- 660180026 Spring Center Detent Out
- 660180051 Float Detent Kit
- 660180038 Spring Center Detent In
- 660180015 S/C w/Micro-Switch, 2 Position*
- 660180016 S/C w/Micro-Switch, 1 Position*

VALVES
- 660180033 Bent Joystick Handle Kit
- 660180017 Straight Joystick Handle Kit
- 660180018 Offset Joystick Handle Kit
- 671300011 Rubber Boot for Joystick Handles**

SEAL KITS
- 660580001 SVW/SVM Replacement Seal Kit
- 660580002 Inlet Seal Kit
- 660580003 Outlet Seal Kit
- 660580004 Between Section Seal Kit
- 660580010 SVH/SVR Replacement Seal Kit
- 660580009 SVL Replacement Seal Kit
- 660580011 SVS Replacement Seal Kit

PORT RELIEFS
- 660280003 Shim Adj. Port Relief 500-1500 PSI
- 660280010 Shim Adj. Port Relief 1500-3000 PSI
- 660280007 Adjust. Combination Port Relief/Anti-Cav Check 1000-2500 PSI
- 660280009 Adjust Port Relief 500-1500 PSI
- 660280008 Shim Adj. Combination Port Relief/Anti-Cav Check 1000-2500 PSI

INLET RELIEFS
- 660250006 Inlet Relief Plug
- 660250003 Adj. Low Pressure Inlet Relief
- 660250002 Adj. High Pressure Inlet Relief

OUTLET CARTRIDGES
- 671300001 Rubber Boot for Joystick Handles**

SEAL KITS
- 660580001 SVW/SVM Replacement Seal Kit
- 660580002 Inlet Seal Kit
- 660580003 Outlet Seal Kit
- 660580004 Between Section Seal Kit
- 660580010 SVH/SVR Replacement Seal Kit
- 660580009 SVL Replacement Seal Kit
- 660580011 SVS Replacement Seal Kit

MISC. KITS
- 660180052 Load Check Kit

PERFORMANCE CURVES

PRESSURE DROP P TO T

PRESSURE DROP A OR B TO T

RELIANCE VALVE CURVES

SVS SERIES SECTION TEST DATA

OPEN CENTER PRESSURE DROP P TO T

OPEN CENTER PRESSURE DROP P-A-B-T

MISC. KITS
- 660180052 Load Check Kit

** Boot is to be ordered in addition to joystick handle kits

*Bracket only, Micro-Switch is not provided.
### WORK SECTIONS

- **B WORK PORT**
- **A WORK PORT**
- **SPOOL TRAVEL**
  - 250 TO WORK TYP.
  - .468 TO FLOAT TYP.
- **FLOAT OPTION**
- **PART NUMBER WILL BE STAMPED IN THIS LOCATION TYPICAL**

### OUTLET COVER

- **CONVERSION PLUG**
- **PART NUMBER WILL BE STAMPED IN THIS LOCATION**

### INLET COVER

- **PART NUMBER WILL BE STAMPED IN THIS LOCATION**

### BOTTOM VIEW OF MOUNTING DIMENSIONS

- **3/8-16UNC THD**
- **3 PLACES**

#### Dimensions

<table>
<thead>
<tr>
<th>Number of Work Sections</th>
<th>&quot;A&quot;</th>
<th>&quot;B&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.875</td>
<td>5.875</td>
</tr>
<tr>
<td>2</td>
<td>4.312</td>
<td>7.312</td>
</tr>
<tr>
<td>3</td>
<td>5.750</td>
<td>8.750</td>
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<td>4</td>
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<td>6</td>
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<tr>
<td>7</td>
<td>11.500</td>
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<tr>
<td>8</td>
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<td>15.937</td>
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<tr>
<td>9</td>
<td>14.375</td>
<td>17.375</td>
</tr>
<tr>
<td>10</td>
<td>15.812</td>
<td>18.812</td>
</tr>
</tbody>
</table>

*With #10 plug in inlet & power beyond in outlet.

---

**DIMENSIONAL DATA**

**VALVES**

**CATV 33-04-21-01**

**PRINCE MANUFACTURING CORPORATION • NORTH SIOUX CITY, SOUTH DAKOTA 57049**

**URL:** www.princehyd.com • **E-MAIL:** prince@princehyd.com • **PHONE:** (605) 235-1220

**V33**
TYPICAL STACK DIMENSIONAL DATA

ENCLOSED HANDLE, OPTIONS 11 AND 12

Durable die cast metal housing. Weather and oil resistant rubber boot. Reversible handle can be mounted in either a vertical or horizontal position. The extended handle option provides the necessary clearance for work port relief and lock cartridges. The extended handle option can also be used on the SVW and SVM, work sections when it is desired to keep handles aligned in an assembly with both low and high sections.

- **THE ROD TORQUE**
  - 150 in-lbs +6 in-lbs
  - (12 1/2 ft-lbs +1/2 in-lbs)

660180149 = Option 11, enclosed handle kit
660180151 = Option 12, extended enclosed handle kit
660180150 = handle kit for enclosed handle options (handle, knob, hex nut)

(handle kit is not included in the Option 11 or 12 kits above)
Parallel circuit sections are by far the most common. The SVW, SVM, SVF, SVH, SVR, SVG and SVL are all of parallel circuit construction. They can be combined together in any order in an assembly. When any one of the spools is shifted, it blocks off the open center passage through the valve. The oil then flows into the parallel circuit core making oil available to all spools. If more than one spool is fully shifted, the oil will go to the spool with the lowest pressure requirements. However, it is possible to meter the flow to the spool with the least load and provide flow to two unequal loads.

ENHANCED METERING SECTIONS
The SVM, SVF, SVR and SVG sections have metering notches machined into the spool to allow for better “feathering” of a load. The spool travel for these sections is also a little longer at .281” vs. .250” for the standard sections. In addition to the metering notches in the spool, the lands in the SVF and SVG bodies have been machined to give more precise control over the flow. The metering notches in the SVF and SVG have been optimized for flows of 10 gpm or less. For enhanced metering on higher flows, it is recommended that the SVM or SVR be used.

LOCK SECTIONS
The SVL section combines both a 4-way directional valve and a double pilot operated check valve. This provides very low leakage when the spool is in neutral. When the spool is shifted, oil is directed through a work port check to the cylinder. Pressure on the work port applies pressure to the shuttle spool, opening the opposite check valve and allowing oil to return into the valve. Depending on load pressures, the metering of the spool may be affected. In some cases a one way restrictor in a work port may be beneficial. Cracking pressure on the standard SVL section is 40psi. Higher pressure cartridges are available.

SERIES CIRCUIT SVS WORK SECTIONS
A series circuit valve is most commonly used to control more than one hydraulic component simultaneously. The entire circuit flow is available to each work section that is actuated. In a two spool series valve with both spools actuated, the oil flows from the inlet to the work port of the first section. The return flow of the first section is directed to the open center core of the second section. (In a parallel valve the return oil from the work port is directed to the tank core.) From the open center core of the second section, the oil flows to the work port with the return oil going to the outlet. In a series circuit valve, the summation of the pressures required for each work section will equal the total pressure required for the circuit. The total pressure required must not exceed the system relief setting or the pump pressure rating. It is not required to have a SV Series section as the last section, unless series flow is required to a downstream valve. In this application, a power beyond plug must be used in the outlet section.

COMBINED SERIES / PARALLEL CIRCUITS
The SV Series circuit valve sections may be stacked with SV parallel circuit valve sections. This allows both series and parallel control in the same valve assembly.

In the valve assembly shown below, the first, third and fourth sections are parallel. The second section is series. The first parallel section has priority over all downstream valves. When the spool of the first parallel section is actuated, the return oil from the work port is directed to the tank core, thus oil flow to downstream sections is cut off. The second and third sections are in series with each other as is the second and fourth sections. The third and fourth sections are in parallel with each other.

SERIES MOTOR SPOOL
The SV Series Motor Spool provides control of reversible hydraulic motors. Both work ports are connected to the open center core in the neutral position. It should be noted that in the neutral position, the work ports will be equally pressurized to the same pressure that is required of any downstream valve sections and that a work port relief in the section will also limit the pressure of any other sections in the valve. The series motor spool should not be used to control a hydraulic cylinder as unwanted cylinder drift may occur in the neutral position.

CLOSED CENTER APPLICATIONS
The SV Series Circuit Valve sections cannot be used in a closed center valve assembly.

URL: www.princehyd.com • E-MAIL: prince@princehyd.com • PHONE: (605) 235-1220

PRINCE MANUFACTURING CORPORATION • NORTH SIOUX CITY, SOUTH DAKOTA 57049
WORK SECTIONS

SV WORK PORT RELIEF*

SV WORK PORT RELIEFS, OPTION B, C, G, & H CAN BE ORDERED PRETESTED. USE ORDER CODE AT RIGHT

* Also used as standard main relief only models and RD4100 models.
**SV INLET RELIEF OPTIONS**

**OPTION 1 NO RELIEF**
This option provides no built-in relief. This is used when a relief is provided elsewhere in the system or in a closed center application. This plug can be replaced with a relief cartridge at a later date.

**OPTION 4 LOW PRESSURE ADJUSTABLE RELIEF**
This option provides for a differential poppet relief adjustable from 500-1500 PSI. Set at 1000 PSI @ 10 GPM.

**OPTION 5 HIGH PRESSURE ADJUSTABLE RELIEF**
This option provides for a differential poppet relief adjustable from 1500-3000 PSI. Set at 2000 PSI @ 10 GPM. The differential poppet relief provides smooth quiet operation with high cracking pressure. RELIEF CARTRIDGES CAN BE ORDERED PRETESTED SEE RV-OX RELIEF, PAGE V68.

**SV OUTLET COVER OPTIONS**

**OPTION 3 CLOSED CENTER OUTLET**
This option provides for closed center operation. This is typically used with a variable displacement pressure compensated pump or in a system with an unloading valve. When the spools are in neutral the inlet port is blocked. Closed center can also be accomplished by plugging the power beyond port of option 2.

**OPTION 6 OPEN CENTER OUTLET PRESSURE BUILD-UP VALVE FOR SOLENOID OPTION**
This option directs oil from inlet thru pressure build-up valve and then to tank. See solenoid section for description of operation. Option 8 is the same as option 6, but has a higher rate spring designed to build pressure in low flow applications. (Flow Ranging from 1 to 6 gpm.)

**OPTION 7 POWER BEYOND PRESSURE BUILD-UP VALVE FOR SOLENOID OPTION**
This option directs oil from inlet thru pressure build-up valve and then downstream. This pressure build-up valve provides a #8 SAE power beyond port. The outlet must be connected to tank. Option 9 is the same as option 7, but has a higher rate spring designed to build pressure in low flow applications. (Flow Ranging from 1 to 6 gpm.)

**SV MID-INLET SECTION**

**OPTION 2 POWER BEYOND OUTLET WITH #8 SAE BEYOND PORT**
This option provides for a high pressure power beyond port. This would be used if a valve is to be added down stream. THE OUTLET PORT MUST STILL BE CONNECTED TO TANK. When spools are in neutral the inlet is connected to the power beyond port.

**OPTION 1 STANDARD OPEN CENTER OUTLET WITH CONVERSION PLUG**
This is the standard outlet option. This option allows for conversion in the field for power beyond or closed center applications. When spools are neutral the inlet is unloaded to tank.

**DESCRIPTION:**
A Mid-Inlet provides an inlet port for a second pump mid stream in the valve stack. A relief can be provided in this section. With the combined flow the flow from both pumps is available to the downstream sections when all the work sections upstream are in neutral. The split flow completely separates the two pump flows. The common tank passage is all that is shared between the two pump flows. **Note:** Split flow mid inlet is not available when used after a series section and the core block plate is not used after a series section.

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This option provides no built-in relief. This is used when a relief is provided elsewhere in the system or in a closed center application. This plug can be replaced with a relief cartridge at a later date.

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**OPTION 7 POWER BEYOND PRESSURE BUILD-UP VALVE FOR SOLENOID OPTION**
This option directs oil from inlet thru pressure build-up valve and then downstream. This pressure build-up valve provides a #8 SAE power beyond port. The outlet must be connected to tank. Option 9 is the same as option 7, but has a higher rate spring designed to build pressure in low flow applications. (Flow Ranging from 1 to 6 gpm.)

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**DESCRIPTION:**
A Mid-Inlet provides an inlet port for a second pump mid stream in the valve stack. A relief can be provided in this section. With the combined flow the flow from both pumps is available to the downstream sections when all the work sections upstream are in neutral. The split flow completely separates the two pump flows. The common tank passage is all that is shared between the two pump flows. **Note:** Split flow mid inlet is not available when used after a series section and the core block plate is not used after a series section.
SV FLOW CONTROL INLET SECTION

PORT SIZE
1- Side and End Inlet #10 SAE ORB
2- Side and End Inlet #10 SAE ORB, with #8 SAE ORB External EF Circuit

RELIEF VALVE
1- No Relief
2- Direct acting non-adjustable 500-1500 psi set at 1000 psi
3- Direct acting non-adjustable 1500-3000 psi set at 2000 psi
4- Direct acting adjustable 500-1500 psi set at 1000 psi
5- Direct acting adjustable 1500-3000 psi set at 2000 psi
*for other settings please specify, i.e. SVIF15P12Q2700 is set at 2700 psi

SOLENOID OPTION
Omit for Flow Control Option M
120-12VDC Double Spade Coil
24Q-24VDC Double Spade Coil
12H-12VDC DIN 43650 Coil
24H - 24VDC DIN 43650 Coil
12L-12VDC Double Lead Wire Coil
24L - 24VDC Double Lead Wire w/ Weatherpak Connector Coil
12W -12VDC Double Lead Wire w/ Weatherpak Connector Coil

FLOW CONTROL OPTION
M- Manual Flow Control
P- Electro-Proportional
U- Solenoid Unloading

The SVIF Flow Control Inlet is interchangeable with the standard SV inlet section.

FLOW CONTROL OPTIONS:
P OPTION incorporates a solenoid operated, electrically variable pressure-compensated flow control cartridge. With the solenoid energized, all of the inlet flow is diverted to the tank core/EF port. By increasing the current through the solenoid, the flow directed to the power core and downstream sections will be proportionally increased, (the maximum rating of the cartridge is 16 gpm at 1500 mA) Control current is normally provided via a controller card providing, a PWM signal.

U OPTION incorporates a solenoid operated, unloader cartridge. With the solenoid de-energized, all of the inlet flow is diverted to the tank core/EF port. With the solenoid energized all the inlet flow is directed to the power core and downstream sections.

M OPTION incorporates a manually operated pressure-compensated flow control cartridge. With the control knob turned fully in (clockwise), all of the inlet flow is diverted to the tank core/EF port. By turning the flow control knob counter clockwise, the inlet flow directed to the power core and downstream sections is proportionally increased. Approximately 5 revolutions varies flow from no flow to full flow.

PORT OPTION The flow being directed to the tank core/EF port may be utilized by a second circuit by inserting a 1/4 pipe plug into the tank core passage on the seal side of the casting and then connecting the EF port to the second circuit.

PROPORTIONAL CONTROL BOX (USE WITH SVIFP & 20IF FLOW CONTROL INLETS); P/N 671300048

The proportional control box is used to provide an adjustable electrical signal to a proportional solenoid on the SVIF and 20IF inlet sections. Once the dial is set, the regulated flow through the valve should remain approximately constant regardless of pressure. Within the operation range, flow varies approximately linearly with dial rotation.

CONNECTIONS AND OPERATION:
• Connect leads to the power supply and solenoid coil. Power supply should be between 9 and 30 VDC.
• With the power off, the inlet flow is directed to tank (or excess flow port).
• To provide power to the control, move the power switch to ‘ON’. (RED LED is on when control box is powered).
• Minimum flow is directed into the valve when 0% on the dial is aligned with the center mark. Maximum flow is directed into the valve when 100% is aligned with the center mark.
• Clockwise knob rotation increases flow into the valve.
• Some adjustment may be needed for operation. I-min, I-max, dither frequency & ramp time can be adjusted. See drawing for calibration instructions
This is a special handle for the model SV stack valve that allows the spools of two adjacent sections to be operated by one common handle. The spools can be operated independently or simultaneously depending on handle movement. The option is normally used on spring center to neutral sections, but can also be used on other sections such as float sections. This handle is normally installed on valves assembled at the factory but can be installed on work sections that have handle option 3 or 9. The drawing at right shows two joysticks with offset handles installed on a six section valve. When two joysticks are installed on the same valve assembly it is recommended that there be two standard sections between them to prevent handle interference. A two section spacer is available, part no. 660380002.

Please refer to these part numbers and state which sections the handle is to be installed on when ordering a valve assembly. This handle can be installed in the field to work sections with handle option 3 (no handle).

### ORDERING INFORMATION

**HEX BRASS RESTRICTOR**

<table>
<thead>
<tr>
<th>#6 SAE 9/16-18</th>
<th>#8 SAE 3/4-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>670805XXX</td>
<td>670805XXX</td>
</tr>
</tbody>
</table>

**SQUARE STEEL RESTRICTOR**

<table>
<thead>
<tr>
<th>#6 SAE 9/16-18</th>
<th>#8 SAE 3/4-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>661181XXX</td>
<td></td>
</tr>
</tbody>
</table>

The last three digits of part number are the orifice size in thousandths of an inch. **EXAMPLE:**

<table>
<thead>
<tr>
<th>#6 SAE 9/16-18THD</th>
<th>#8 SAE 3/4-16THD</th>
</tr>
</thead>
<tbody>
<tr>
<td>670806062</td>
<td>670806062</td>
</tr>
<tr>
<td>670806125</td>
<td>670806125</td>
</tr>
<tr>
<td>670806000</td>
<td>670806000</td>
</tr>
</tbody>
</table>

**ADAPTER WITH HEX BRASS RESTRICTOR**

<table>
<thead>
<tr>
<th>#6 SAE 9/16-18</th>
<th>#8 SAE 3/4-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>661280XXX</td>
<td>661180XXX</td>
</tr>
</tbody>
</table>

**ADAPTER WITH SQUARE STEEL RESTRICTOR AND CONICAL SPRING**

The last three digits of part number are the orifice size in thousandths of an inch. **EXAMPLE:**

<table>
<thead>
<tr>
<th>#6 SAE 9/16-18THD</th>
<th>#8 SAE 3/4-16THD</th>
</tr>
</thead>
<tbody>
<tr>
<td>661280062</td>
<td>661180062</td>
</tr>
<tr>
<td>661280125</td>
<td>661180125</td>
</tr>
<tr>
<td>661280000</td>
<td>661180000</td>
</tr>
</tbody>
</table>
Directional Control Valves

SV SOLENOID OPERATED

Work Sections

• Type “-D” and “-T” Solenoid Operated
• Type “-C” and “-S” Solenoid and Manual Operation

STANDARD FEATURES

• Open center or closed center applications
• Port relief options available
• Internal pilot supply and drain
• 12VDC, 24VDC and 120VAC

• Power beyond capability
• Load checks on each section
• May be stacked with Manual SV Sections
• 8 Series (“C” and “D”) more economical and compact

SPECIFICATIONS

Parallel or Series Circuit Construction
Pressure Rating
Maximum Operating Pressure 3000 psi
Maximum Tank Pressure 150 psi
Nominal Flow Rating 12 GPM
Differential Pressure
Required to Actuator Approx. 150 PSI

Filtration: For general purpose valves, fluid cleanliness should meet the ISO 4406 19/17/14 level. For extended life or for pilot operated valves, the 18/16/13 fluid cleanliness level is recommended.

Foot Mounting
Maximum Operating Temp......................... 180°F
Weight Per Section
Inlet Section .................................. Approx. 3.75 lbs.
Outlet Section .................................. Approx. 3.75 lbs.
Solenoid Operated
Type “-D” and “-T” Work Section......Approx. 11.0 lbs.
Type “-C” and “-S” Work Section .... Approx. 14.5 lbs.
SV (8 SERIES) SOLENOID OR MANUAL WORK SECTIONS
(both solenoids on one end) DESCRIPTION OF OPERATION

The Type “C” SV Solenoid Work Section allows remote electrical on-off or manual control. The “C” sections are 8 series work sections which use screw in cartridges with a #8 thread size. The screw in cartridges provide a robust platform for the higher tank pressures often seen in mobile applications and the #8 size allows for a more compact section size. Cartridges and coils on the 8 series are not interchangeable with the Prince 10 series solenoid sections or sections manufactured prior to November 2014. Any of the standard “S”, “T”, “C” or “D” style Prince SV solenoid operated work sections may be used in any combination within a stack valve assembly.

The Type “C” SV Solenoid Section contains two 3-way 2-position, #8 solenoid cartridge valves and a pilot operated piston attached to the main control spool. When both solenoids are de-energized, both sides of the pilot piston are open to tank pressure and the spool remains spring centered. When solenoid “A” is energized, pilot pressure is applied to one side of the pilot piston, causing the spool to shift from the neutral position and direct flow to work port “A”. When solenoid “B” is energized, pilot pressure is applied to the other side of the pilot piston, causing the spool to shift and direct flow to work port “B”. An optional manual override feature is available for the solenoid cartridges.

Internal pilot lines provide pilot pressure to the solenoid actuator. Pilot pressure is generated by a “Pressure Build-Up Valve” that is installed in the standard outlet section. Two versions of the pressure build-up valve are offered, the open center pressure build-up valve and power beyond pressure build-up valve. Both versions supply 150-200 PSI pilot pressure to the solenoid actuator. A closed center assembly does not require a pressure build-up valve. For an open center system, the pilot pressure can also be provided by an in tank manifold, which can provide filtered pilot flow.

ORDER CODE MATRIX - TYPE “C” SOLENOID OR MANUAL WORK SECTIONS

<table>
<thead>
<tr>
<th>8 SERIES SOLENOID OPERATED SVW, SVM AND SVL SECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SECTION TYPE</strong></td>
</tr>
<tr>
<td>S - Standard Work Section</td>
</tr>
<tr>
<td>V - Lock Section (Use C Spool)</td>
</tr>
<tr>
<td>L - Metering Work Section (Use E, F, or M Spool)</td>
</tr>
<tr>
<td>W - Standard Work Section</td>
</tr>
<tr>
<td>L - Lock Section (Use C Spool)</td>
</tr>
<tr>
<td>M - Metering Work Section (Use E, F, or M Spool)</td>
</tr>
<tr>
<td><strong>PORT SIZE</strong></td>
</tr>
<tr>
<td>1. #8 SAE</td>
</tr>
<tr>
<td><strong>SPOOL TYPE</strong></td>
</tr>
<tr>
<td>A - 3-Way 3-Position</td>
</tr>
<tr>
<td>B - 4-Way 3-Position</td>
</tr>
<tr>
<td>C - 4-Way 3-Position Motor</td>
</tr>
<tr>
<td>E - 4-Way 3 Position Metering (SVW only)</td>
</tr>
<tr>
<td>F - 3-Way 3 Position Metering (SVW only)</td>
</tr>
<tr>
<td>K - 4-Way 3 Position Counterbalance Drain (SVW only)</td>
</tr>
<tr>
<td>M - 4-Way 3 Position Counterbalance Drain (SVM only)</td>
</tr>
<tr>
<td><strong>SPOOL ACTIONS</strong></td>
</tr>
<tr>
<td>A - Spring Center</td>
</tr>
<tr>
<td><strong>HANDLE OPTION</strong></td>
</tr>
<tr>
<td>1. Std. Lever Handle</td>
</tr>
<tr>
<td>2. Less Handle Only</td>
</tr>
<tr>
<td>3. Less Complete Handle Assembly</td>
</tr>
<tr>
<td>4. Adjustable Handle</td>
</tr>
<tr>
<td>5. Tang Spool End Only</td>
</tr>
<tr>
<td>6. Clevis Spool End Only</td>
</tr>
<tr>
<td>7. Vertical Handle</td>
</tr>
<tr>
<td>8. Straight Handle</td>
</tr>
<tr>
<td>9. Enclosed Handle</td>
</tr>
<tr>
<td>10. Extended Enclosed Handle</td>
</tr>
<tr>
<td>11. Enclosed Handle</td>
</tr>
<tr>
<td>12. Extended Enclosed Handle</td>
</tr>
<tr>
<td><strong>COIL VOLTAGE &amp; TERMINATION</strong></td>
</tr>
<tr>
<td>12Q, 12VDC Double Spade</td>
</tr>
<tr>
<td>12L, 12VDC Double Wire</td>
</tr>
<tr>
<td>12H, 12VDC DIN 43650</td>
</tr>
<tr>
<td>12D, 12VDC Integral Deutsch</td>
</tr>
<tr>
<td>24Q, 24VDC Double Spade</td>
</tr>
<tr>
<td>24L, 24VDC Double Wire</td>
</tr>
<tr>
<td>24H, 24VDC DIN 43650</td>
</tr>
<tr>
<td>24D, 24VDC Integral Deutsch</td>
</tr>
<tr>
<td>11H, 120V DIN 43650</td>
</tr>
<tr>
<td><strong>SOLENOID OPERATION</strong></td>
</tr>
<tr>
<td>C: Standard Solenoid Cartridge</td>
</tr>
<tr>
<td>CM: Solenoid Cartridge w/Manual Override</td>
</tr>
</tbody>
</table>

8 SERIES SOLENOID OPERATED PORT RELIEF WORK SECTIONS

| **SECTION TYPE**                                  |
| S - Port Relief Section                           |
| H - Series Section (Use G Spool)                  |
| R - Metering Work Section (Use E, F, or M Spool)  |
| **PORT SIZE**                                     |
| 1. #8 SAE                                        |
| **SPOOL TYPE**                                    |
| A - 3-Way 3-Position                              |
| B - 4-Way 3-Position                              |
| C - 4-Way 3-Position Motor                        |
| E - 4-Way 3 Position Metering (SVR only)          |
| F - 3-Way 3 Position Metering (SVR only)          |
| G - 4-Way Series                                 |
| H - 4-Way Series Motor                            |
| K - 4-Way 3 Position Counterbalance Drain (SVH only) |
| M - 4-Way 3 Position Counterbalance Drain (SVM only) |
| **SPOOL ACTIONS**                                 |
| A - Spring Center                                 |
| **HANDLE OPTION**                                 |
| 1. Std. Lever Handle                              |
| 2. Less Handle Only                               |
| 3. Less Complete Handle Assembly                  |
| 4. Adjustable Handle                              |
| 5. Tang Spool End Only                            |
| 6. Clevis Spool End Only                          |
| 7. Vertical Handle                                |
| 8. Extended Enclosed Handle                       |
| **COIL VOLTAGE & TERMINATION**                    |
| 12Q, 12VDC Double Spade                           |
| 12L, 12VDC Double Wire                            |
| 12H, 12VDC DIN 43650                              |
| 12D, 12VDC Integral Deutsch                       |
| 24Q, 24VDC Double Spade                           |
| 24L, 24VDC Double Wire                            |
| 24H, 24VDC DIN 43650                              |
| 24D, 24VDC Integral Deutsch                       |
| 11H, 120V DIN 43650                               |
| **PORT RELIEF “B” OPTION**                       |
| A - Relief Cavity Plugged                         |
| B - Non-Adjustable Direct Acting                  |
| C - Non-Adjustable Direct Acting                  |
| **PORT RELIEF “A” OPTION**                       |
| A - Relief Cavity Plugged                         |
| B - Non-Adjustable Direct Acting                  |
| C - Non-Adjustable Direct Acting                  |
| **PORT RELIEF “B” OPTION**                       |
| A - Relief Cavity Plugged                         |
| B - Non-Adjustable Direct Acting                  |
| C - Non-Adjustable Direct Acting                  |
| **PORT RELIEF “A” OPTION**                       |
| A - Relief Cavity Plugged                         |
| B - Non-Adjustable Direct Acting                  |
| C - Non-Adjustable Direct Acting                  |

The Type “-D” SV Solenoid Work Section allows remote electrical on-off control. The “-D” sections are 8 series work sections which use screw in cartridges with a #8 thread size. The screw in cartridges provide a robust platform for the higher tank pressures often seen in mobile applications and the #8 size allows for a more compact section size. Cartridges and coils on the 8 series are not interchangeable with the Prince 10 series solenoid sections or sections manufactured prior to November 2014. Any of the standard “-S”, “-T”, “-C” or “-D” style Prince SV solenoid operated work sections may be used in any combination within a stack valve assembly.

The Type “-D” SV Solenoid Section contains two 3-way 2-position, #8 solenoid cartridge valves, one at each end of the main valve body. When both solenoids are de-energized, both ends of the control valve spool are open to tank pressure and the spool remains spring centered. When solenoid “A” is energized, pilot pressure is applied to one end of the control valve spool causing the spool to shift from the neutral position to full stroke which directs flow to work port “A”. When solenoid “B” is energized, pilot pressure is applied to the other end of the control valve spool, causing the spool to shift to full stroke which directs flow to work port “B”. An optional manual override feature is available for the solenoid cartridges.

Internal pilot lines provide pilot pressure to the solenoid actuator. Pilot pressure is generated by a “Pressure Build-Up Valve” that is installed in the standard outlet section. Two versions of the pressure build-up valve are offered, the open center pressure build-up valve and power beyond pressure build-up valve. Both versions supply 150-200 PSI pilot pressure to the solenoid actuator. A closed center assembly does not require a pressure build-up valve. For an open center system, the pilot pressure can also be provided by an in inlet manifold, which can provide filtered pilot flow.

ORDER CODE MATRIX - TYPE “-D” SOLENOID OR MANUAL WORK SECTIONS

8 SERIES SOLENOID OPERATED SVW, SVM AND SVL WORK SECTIONS

<table>
<thead>
<tr>
<th>SECTION TYPE</th>
<th>W - Standard Work Section</th>
<th>L - Lock Section (Use C Spool)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORT SIZE</td>
<td>1. #8 SAE</td>
<td></td>
</tr>
<tr>
<td>SPOOL TYPE</td>
<td>A - 3-Way 3-Position</td>
<td>B - 4-Way 3-Position</td>
</tr>
<tr>
<td></td>
<td>C - 4-Way 3-Position Motor</td>
<td>K - 4-Way 3-Position Counterbalance Drain (SVW only)</td>
</tr>
<tr>
<td>SPOOL ACTIONS</td>
<td>A - Spring Center</td>
<td></td>
</tr>
</tbody>
</table>

8 SERIES SOLENOID OPERATED PORT RELIEF WORK SECTION

<table>
<thead>
<tr>
<th>SECTION TYPE</th>
<th>H - Port Relief Section</th>
<th>S - Series Section (Use G Spool)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORT SIZE</td>
<td>1. #8 SAE</td>
<td></td>
</tr>
<tr>
<td>SPOOL TYPE</td>
<td>A - 3-Way 3-Position</td>
<td>B - 4-Way 3-Position</td>
</tr>
<tr>
<td></td>
<td>C - 4-Way 3-Position Motor</td>
<td>G - 4-Way Series</td>
</tr>
<tr>
<td></td>
<td>H - 4-Way Series Motor</td>
<td>K - 4-Way 3-Position Counterbalance Drain (SVH only)</td>
</tr>
<tr>
<td>SPOOL ACTIONS</td>
<td>A - Spring Center</td>
<td></td>
</tr>
</tbody>
</table>

PORT RELIEF “A” OPTION

A - Relief Cavity Plugged
B - Non-Adjustable Direct Acting Relief 1500-3000 PSI
C - Non-Adjustable Direct Acting Relief 500-1500 PSI
G - Adjustable Direct Acting Relief 1500-3000 PSI
H - Adjustable Direct Acting Relief 500-1500 PSI

PORT RELIEF “B” OPTION

A - Relief Cavity Plugged
B - Non-Adjustable Direct Acting Relief 1500-3000 PSI
C - Non-Adjustable Direct Acting Relief 500-1500 PSI
G - Adjustable Direct Acting Relief 1500-3000 PSI
H - Adjustable Direct Acting Relief 500-1500 PSI

* See page V48 for coil details
The Type “-S” SV Solenoid Work Section allows remote electrical on-off or manual control. The “-S” sections are 10 series work sections which use screw in cartridges with a #10 thread size. Cartridges and coils on the 10 series will be interchangeable with the components on Prince solenoid operated valves manufactured prior to November 2014 was as well current production 10 series valves. Any of the standard “-S”, “-T”, “-C” or “-D” style Prince SV solenoid operated work sections may be used in any combination within a stack valve assembly.

The Type “-S” SV Solenoid Section contains two 3-way 2-position, #10 solenoid cartridge valves and a pilot operated piston attached to the manual control spool. When both solenoids are de-energized, both sides of the pilot piston are open to tank pressure and the spool remains spring centered. When solenoid “A” is energized, pilot pressure is applied to one side of the pilot piston, causing the spool to shift from the neutral position and direct flow to work port “A”. When solenoid “B” is energized, pilot pressure is applied to the other side of the pilot piston, causing the spool to shift and direct flow to work port “B”.

Internal pilot lines provide pilot pressure to the solenoid actuator. Pilot pressure is generated by a “Pressure Build-Up Valve” that is installed in the standard outlet section. Two versions of the pressure build-up valve are offered, the open center pressure build-up valve and power beyond pressure build-up valve. Both versions supply 150-200 PSI pilot pressure to the solenoid actuator. A closed center assembly does not require a pressure build-up valve. For an open center system, the pilot pressure can also be provided by an in-line manifold, which can provide filtered pilot flow.

### ORDER CODE MATRIX - TYPE “-S” SOLENOID OR MANUAL WORK SECTIONS

#### 10 SERIES SOLENOID OPERATED PORT RELIEF WORK SECTIONS

**SECTION TYPE**
- W - Standard Work Section
- L - Lock Section (Use C Spool)
- M - Metering Work Section (Use E, F or M spool)

**PORT SIZE**
1. #8 SAE

**SPOOL TYPE**
- A - 3-Way 3-Position
- B - 4-Way 3-Position
- C - 4-Way 3-Position Motor
- D - 4-Way Series
- E - 4-Way 3 Position Metering (SVR only)
- F - 3-Way 3 Position Metering (SVR only)
- G - 4-Way Series
- H - 4-Way Series Motor

**SPOOL ACTIONS**
- A - Spring Center

**HANDLE OPTION**
1. Std. Lever Handle
2. Less Handle Only
3. Less Complete Handle Assembly
4. Adjustable Handle
5. Tang Spool End Only
6. Clevis Spool End Only
7. Vertical Handle
8. Straight Handle
9. Adjustable Handle
10. Extended Enclosed Handle
11. Enclosed Handle

**COIL VOLTAGE & TERMINATION**
- 12Q, 12 VDC Double Spade
- 12L, 12 VDC Double Wire
- 12H, 12 VDC DIN 43650
- 12D, 12 VDC Deutsch
- 24Q, 24 VDC Double Spade
- 24 L, 24 VDC Double Wire
- 24H, 24 VDC DIN 43650
- 24D, 24 VDC Deutsch
- 11L, 120VAC Lead Wires
- 11D, 12 VDC Deutsch
- 12H, 12 VDC DIN 43650
- 12L, 12 VDC Double Wire
- 12Q, 12 VDC Double Spade

**SOLENOID AND MANUAL OPERATION**
- S - Standard Solenoid Cartridge
- SM - Solenoid Cartridge w/Manual Override

---

### 10 SERIES SOLENOID OPERATED PORT RELIEF WORK SECTIONS

**SECTION TYPE**
- H - Port Relief Section
- S - Series Section (Use G & H Spools)
- R - Metering Work Section (Use E, F or M spool)

**PORT SIZE**
1. #8 SAE

**SPOOL TYPE**
- A - 3-Way 3-Position
- B - 4-Way 3-Position
- C - 4-Way 3-Position Motor
- G - 4-Way Series
- H - 4-Way Series Motor

**SPOOL ACTIONS**
- A - Spring Center

**HANDLE OPTION**
1. Std. Lever Handle
2. Less Handle Only
3. Less Complete Handle Assembly
4. Adjustable Handle
5. Tang Spool End Only
6. Clevis Spool End Only
7. Vertical Handle
8. Straight Handle
9. Adjustable Handle
10. Extended Enclosed Handle
11. Enclosed Handle

**COIL VOLTAGE & TERMINATION**
- 12Q, 12 VDC Double Spade
- 12L, 12 VDC Double Wire
- 12H, 12 VDC DIN 43650
- 12D, 12 VDC Deutsch
- 24Q, 24 VDC Double Spade
- 24 L, 24 VDC Double Wire
- 24H, 24 VDC DIN 43650
- 24D, 24 VDC Deutsch
- 11L, 120VAC Lead Wires
- 11D, 12 VDC Deutsch
- 12H, 12 VDC DIN 43650
- 12L, 12 VDC Double Wire
- 12Q, 12 VDC Double Spade

**SOLENOID AND MANUAL OPERATION**
- S - Standard Solenoid Cartridge
- SM - Solenoid Cartridge w/Manual Override

---

See page V48 for Coil details.
The Type “-T” SV Solenoid Work Section allows remote electrical on-off control. The “-T” sections are 10 series work sections which use screw in cartridges with a #10 thread size. Cartridges and coils on the 10 series will be interchangeable with the components on Prince solenoid operated valves manufactured prior to November 2014 as well as current production 10 series valves. Any of the standard “-S”, “-T”, “-C” or “-D” style Prince SV solenoid operated work sections may be used in any combination within a stack valve assembly.

The Type “-T” SV Solenoid Section contains two 3-way 2-position, #10 solenoid cartridge valves, one at each end of the main valve body. When both solenoids are de-energized, both ends of the control valve spool are open to tank pressure and the spool remains spring centered. When solenoid “A” is energized, pilot pressure is applied to one end of the control valve spool causing the spool to shift from the neutral position to full stroke which directs flow to work port “A”. When solenoid “B” is energized, pilot pressure is applied to the other end of the control valve spool, causing the spool to shift to full stroke which directs flow to work port “B”.

Internal pilot lines provide pilot pressure to the solenoid actuator. Pilot pressure is generated by a “Pressure Build-Up Valve” that is installed in the standard outlet section. Two versions of the pressure build-up valve are offered, the open center pressure build-up valve and power beyond pressure build-up valve. Both versions supply 150-200 PSI pilot pressure to the solenoid actuator. A closed center assembly does not require a pressure build-up valve. For an open center system, the pilot pressure can also be provided by an in line manifold, which can provide filtered pilot flow.

**ORDER CODE MATRIX - TYPE “-T” SOLENOID OR MANUAL WORK SECTIONS**

**10 SERIES SOLENOID OPERATED SVW AND SVL WORK SECTIONS**

<table>
<thead>
<tr>
<th>SECTION TYPE</th>
<th>W - Standard Work Section</th>
<th>L - Lock Section (Use C Spool)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORT SIZE</td>
<td>1. #8 SAE</td>
<td></td>
</tr>
<tr>
<td>SPOOL TYPE</td>
<td>A - 3-Way 3-Position</td>
<td>B - 4-Way 3-Position</td>
</tr>
<tr>
<td></td>
<td>C - 4-Way 3-Position Motor</td>
<td>K - 4-Way 3 Position Counterbalance Drain (SVW only)</td>
</tr>
<tr>
<td>SPOOL ACTIONS</td>
<td>A - Spring Center</td>
<td></td>
</tr>
</tbody>
</table>

**10 SERIES SOLENOID OPERATED PORT RELIEF WORK SECTION**

<table>
<thead>
<tr>
<th>SECTION TYPE</th>
<th>H - Port Relief Section</th>
<th>S - Series Section (Use G &amp; H Spools)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORT SIZE</td>
<td>1. #8 SAE</td>
<td></td>
</tr>
<tr>
<td>SPOOL TYPE</td>
<td>A - 3-Way 3-Position</td>
<td>B - 4-Way 3-Position</td>
</tr>
<tr>
<td></td>
<td>C - 4-Way 3-Position Motor</td>
<td>G - 4-Way Series</td>
</tr>
<tr>
<td></td>
<td>H - 4-Way Series Motor</td>
<td>K - 4-Way 3 Position Counterbalance Drain (SVH only)</td>
</tr>
<tr>
<td>SPOOL ACTIONS</td>
<td>A - Spring Center</td>
<td></td>
</tr>
</tbody>
</table>

**PORT RELIEF “A” OPTION**

| A - Relief Cavity Plugged | B - Non-Adjustable Direct Acting Relief 1500-3000 PSI |
| G - Adjustable Direct Acting Relief 1500-3000 PSI | H - Adjustable Direct Acting Relief 500-1500 PSI |

**PORT RELIEF “B” OPTION**

| A - Relief Cavity Plugged | B - Non-Adjustable Direct Acting Relief 1500-3000 PSI |
| C - Non-Adjustable Direct Acting Relief 500-1500 PSI | G - Adjustable Direct Acting Relief 1500-3000 PSI |
| H - Adjustable Direct Acting Relief 500-1500 PSI |                          |

* See page V48 for coil details
**SV “10 SERIES” TYPE S SOLENOID OR MANUAL WORK SECTION DIMENSIONS**

![Diagram of SV "10 SERIES" TYPE S SOLENOID or Manual Work Section Dimensions]

**PART NUMBER WILL BE STAMPED IN THIS LOCATION**

- **1.437**
- **4.50**
- **7.47**

- **PART NUMBER**
- **WILL BE STAMPED IN THIS LOCATION**

**"10 SERIES" TYPE "S" SOLENOID CARTRIDGE 660263021**

- **PILOT PISTON**
- **"A" SOLENOID**
- **"B" WORK PORT**

**OPTIONS**

- **INTERNAL PILOT LINES**
- **LOAD CHECK**
- **TANK CORE**
- **PARALLEL POWER CORE**

- **"A" WORK PORT**
- **PORT RELIEF OPTIONS**

- **"A" SOLENOID**
- **"B" WORK PORT**

- **"B" SOLENOID**

**"10 SERIES" TYPE "T" SOLENOID CARTRIDGE 660263023**

- **RESTRICTOR ORIFICE**
- **LOAD CHECK**
- **INTERNAL PILOT LINES**

**SV “10 SERIES” TYPE T SOLENOID WORK SECTION DIMENSIONS**

![Diagram of SV "10 SERIES" TYPE T SOLENOID Work Section Dimensions]

- **5.89**
- **3.50**
- **5.34**

- **"A" SOLENOID**
- **"B" WORK PORT**
- **"A" WORK PORT**

- **"B" SOLENOID**

- **"10 SERIES" TYPE "T" SOLENOID CARTRIDGE 660263023**
SV SOLENOID OPERATED WORK SECTION - APPLICATION INFORMATION

For over center or light load applications if the required work port load pressure drops below 200 PSI, the pilot pressure to the spool will drop to the same pressure causing the spring to move the control spool back towards the neutral position. The spool will end up in an intermediate position between neutral and fully shifted. A restrictor installed in the work port or line may be required for this type of application.

For closed center applications the Pressure Build-Up Valve is not required. However, a system pressure of 200 PSI must be maintained in the closed center position to actuate the valve properly.

Proper operation of the solenoid actuators requires a pressure differential of 150-200 PSI above tank pressure. The maximum tank port pressure should not exceed 150 PSI. On “C” and “S” solenoid sections, excessive tank pressure will increase “Seal Drag” and may prohibit the spool from shifting.

The solenoid operated SV section may be converted to accept an external hydraulic pilot supply to the solenoid actuators. Please consult a Sales Representative for more information.

SERIES 8 SOLENOID COILS ALL “C”, “D”, AND “DP” WORK SECTIONS

**COIL PART NUMBERS**

- **12H** – 671302168 - 12 VDC DIN-43650
- **12L** – 671302160 - 12 VDC DUAL LEAD WIRES
- **12Q** – 671302165 - 12 VDC INTEGRAL DEUTSCH
- **24H** – 671302169 - 24 VDC DIN-43650
- **24L** – 671302167 - 24 VDC DUAL LEAD WIRES
- **24Q** – 671302166 - 24 VDC DUAL SPADE
- **11H** – 671302170 - 110 VAC DIN-43650

**COIL SPECIFICATIONS**

- DUTY RATING .................. CONTINUOUS AT 100% VOLTAGE
- INGRESS PROTECTION RATING ......................... IP65
- MAX VOLTAGE ............................................ 19 WATTS
- AMPERAGE DRAW (NOMINAL)
  - 12 VOLT ..................... 1.6 AMP
  - 24 VOLT ..................... 0.78 AMP
  - 110 VOLT ................ 0.19 AMP
- LEAD WIRE LENGTH ........ 18 GAUGE 24" LONG
- AC COILS HAVE INTERNAL FULL WAVE RECTIFIERS
- RATED FOR 1000 VOLTS MAX REVERSE VOLTAGE
- DIN STYLE COILS USE DIN 43650 TYPE A
- DEUTSCH COILS USE DT04-2P CONNECTORS

SERIES 10 SOLENOID COILS ALL “S” AND “T” WORK SECTIONS

**COIL PART NUMBERS**

- **12H** – 671302221 - 12 VDC COIL DIN 43650
- **12L** – 671302220 - 12 VDC COIL DOUBLE WIRE
- **12Q** – 671302226 - 12 VDC COIL DOUBLE SPADE
- **24H** – 671302224 - 24 VDC COIL DIN 43650
- **24L** – 671302223 - 24 VDC COIL DOUBLE WIRE
- **24Q** – 671302227 - 24 VDC COIL DOUBLE SPADE
- **11L** – 671302228 - 120 VAC LEAD WIRES

**COIL SPECIFICATIONS**

- DUTY RATING .................. CONTINUOUS AT 100% VOLTAGE
- INGRESS PROTECTION RATING ......................... IP65
- MAX VOLTAGE ............................................ 19 WATTS
- AMPERAGE DRAW (NOMINAL)
  - 12 Volt ..................... 1.70 AMP
  - 24 Volt ..................... 0.83 AMP
  - 120 Volt .................. 18 AMP
- LEAD WIRE LENGTH ........ 18 GAUGE 12” LONG
- AC COILS HAVE A RECTIFIER ON THE LEAD WIRES.
- LEAD WIRES ARE NOT TO BE REMOVED FOR USE.
- DIN STYLE COILS ARE DIN 43650 TYPE A.

SYMBOL SCHEMATIC OF A 3 SECTION, SOLENOID OPERATED STACK VALVE ASSEMBLY

---

**SVI25**  
**SVW1BA1 – C12Q**  
**OR**  
**SVW1BA1 – S12Q**

**SVW1BA – D12Q**  
**OR**  
**SVW1BA – T12Q**

**SVH1BA1GB – C12Q**  
**OR**  
**SVH1BA1GB – S12Q**

**SVE26**
In the SV proportional work sections, varying pilot pressure is applied to the end of the spools to shift the spool against spring bias. Proportional pressure reducing cartridges are used to vary the pressure on the spools. As the current through the cartridge coil increases, the amount of the available pilot pressure applied to the ends of the spools also, proportionally increases. There will be a threshold pressure/current (dead band) to overcome the initial spring centering force and initial land coverage. Once this pressure/current has been exceeded, increasing the current through the coil will increase the flow from the work ports.

Current to the coils is typically provided by a PWM current control module and a joystick or other input device. The coils require a maximum current of approximately 1300 mA (@ 12 volts), and for reduced hysteresis, a dither frequency of approximately 100 Hz and a dither amplitude of 50 to 100 mA. The controller should have adjustable minimum current and maximum current settings to minimize the dead band before work port flow starts and to maximize the control resolution. See page V38 for examples of control module and joystick components.

The proportional work sections require pilot pressure to shift the spools. Approximately 325 psi pilot pressure will fully shift the spool in Prince proportional sections. With open center valve assemblies, the pilot pressure is typically supplied by a compensator inlet (SVIC).

The SV proportional work sections are open center sections based on the SVM family. The open center sections, which are typically used with a fixed displacement (gear) pump, provide for a cost effective circuit. The open center sections will provide controlled starts and stops of the work port flow, however, the metering band is not as wide as the other proportional families and metering is somewhat pressure dependent. Using current minimum and current maximum settings on the controller will enhance the metering control.

All SV proportional work sections require pilot supply passageways. All SVM-DPxxx proportional sections will automatically have pilot passageways, however, any non-proportional sections in the assembly will also have to have pilot passageways. To designate SVW, SVH, SVM, SVF, SVR or SVG non-proportional sections with pilot passageways, add a “P” after the three letter model prefix. For instance a SVW1BA1 section with pilot passageways would be called out as a SVWP1BA1. An example of a SVH with passageways would be a SVHP1BA1GG. An example of a non-proportional solenoid section to be included in a proportional assembly would be a SVWP1BA1-C12D. Please contact sales at Prince Manufacturing for additional assistance in configuring assemblies.
SVM / SVR PROPORTIONAL SOLENOID OPERATED WORK SECTIONS

WORK SECTION TYPE
M - Standard Metering Section
R - Port Relief Metering Section

PORT SIZE
1. #8 SAE ORB (3/4-16 Thread)

SPOOL TYPE
E - 4-Way 3-Position Metering
M - 4-Way 3-Position Counterbalance Drain/Motor

SPOOL ACTION
S - Spring Center (Metering sections)

PORT RELIEF “A” OPTIONS (OMIT FOR SVM)
A - Relief Cavity Plugged
B - Non-Adjustable Direct Acting Relief 1500-3000 PSI set at 2000
C - Non-Adjustable Direct Acting Relief 500-1500 PSI set at 1000
G - Adjustable Direct Acting Relief 1500-3000 PSI set at 2000
H - Adjustable direct Acting Relief 500-1500 PSI set at 1000

PORT RELIEF “B” OPTION (OMIT FOR SVM)
A - Relief Cavity Plugged
B - Non-Adjustable Direct Acting Relief 1500-3000 PSI set at 2000
C - Non-Adjustable Direct Acting Relief 500-1500 PSI set at 1000
G - Adjustable Direct Acting Relief 1500-3000 PSI set at 2000
H - Adjustable direct Acting Relief 500-1500 PSI set at 1000

COIL VOLTAGE & TERMINATION
12Q, 12 VDC Double Spade
12L, 12 VDC Double Wire
12H, 12 VDC Din 43650
12D, 12 VDC Integral Deutsch
24Q, 24 VDC Double Spade
24L, 24 VDC Double Wire
24H, 24 VDC Din 43650
24D, 24 VDC Integral Deutsch
11H, 120 VAC Din 43650

APPLICATION NOTES:
The SVIC2F is an inlet assembly used with “SVM” (open center) proportional solenoid assemblies. It is used with fixed displacement pumps (typically gear pumps) and has a compensator cartridge in the manifold that provides approximately 350 psi pilot pressure for the proportional solenoids. It also incorporates a pressure reducing cartridge to limit pressure to the solenoid cartridges, and a 10 µ filter cartridge to filter the pilot flow. The SVIC2F requires a tie rod kit for one extra section. Any non-proportional “SV” work sections in the assembly require pilot passageways. A standard “SVE” open center outlet with conversion plug should be used in the assembly.

The SVIC2F has other applications such as low flow systems. The inlet can provide a constant pilot pressure regardless of flow, guaranteeing a shift in either on/off or proportional solenoids. Likewise, systems that also have little to no load induced pressure can benefit from the constant pilot pressure the SVIC2F provides, guaranteeing a shift regardless of work port pressure.

The 10 micron filter included in the inlet helps keep the pilot lines clean. This helps eliminate contamination in the oil being sent to the solenoid cartridges.

To configure work sections to use with this inlet, refer to the text on page V49 that talks about adding a ‘P’ to the model codes.
SV PROPORTIONAL WORK SECTIONS PERFORMANCE CURVES

SV OPEN CENTER PROPORTIONAL (SVM-DP12D)
WORK PORT FLOW vs. CURRENT

![Graph showing work port flow vs. current for SVM-DP12D]

ON – OFF SOLENOID ASSEMBLIES

SV COMMON WORK SECTIONS:
- SVW1BA1-C12D (8 series solenoids)
- SVW1BA-DM12D (8 series-manual override solenoids)
- SVW1BA1-S12L (10 series solenoids)
- SVW1BA-T12L (10 series solenoids)

SV common assembly:
- SVI25; SVW1BA1-C12D; SVE26

OPEN CENTER PROPORTIONAL (fixed displacement pump)

SV COMMON WORK SECTION
- SM1ES-DP12D (proportional solenoids)

SV common assembly: (note: non-solenoid sections require solenoid passageways)
- SVIC2F (compensator inlet); SM1ES-DP12D; SVE21

<table>
<thead>
<tr>
<th>Work Sect.</th>
<th>Inlet</th>
<th>Utility</th>
<th>Outlet</th>
<th>PUMP TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV(W/L/M)</td>
<td>SVIxx</td>
<td>n/a</td>
<td>SVE6</td>
<td>FIXED DISPLACEMENT PUMP</td>
</tr>
<tr>
<td>SV(H/S/R)</td>
<td>SVIxx</td>
<td>n/a</td>
<td>SVE3</td>
<td>PRESSURE COMPENSATED PUMP</td>
</tr>
</tbody>
</table>

OPEN CENTER PROPORTIONAL SOLENOID

<table>
<thead>
<tr>
<th>Work Sect.</th>
<th>Utility</th>
<th>Outlet</th>
<th>PUMP TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV(M/R)</td>
<td>SVIC2F</td>
<td>n/a</td>
<td>SVE1</td>
</tr>
</tbody>
</table>
RADIO REMOTE OFFERINGS FOR ON/OFF SOLENOID OPERATED VALVES

MACRO TRANSMITTERS

- 4 buttons (2 section valve) #671303111
- 6 buttons (3 section valve) #671303112
- 8 buttons (4 section valve) #671303113

RECEIVERS

- 4 outputs (up to 2 section valve) #671303001
- 8 outputs (up to 4 section valve) #671303002

CHARGER (MICRO USB)

- 12 VDC car charger #671303003
- Wall charger #671303005

FEATURES:
- Palm sized transmitter (4.7" x 2.6" x .9" typical)
- Rechargeable transmitter - micro USB (20 hr of active transmitting battery life)
- Range of up to 300 ft
- Two way communication with real time feedback
- Easy sync with receiver
- 900 Hz
- Ingress protection IP66
- Receiver input voltage (9 - 30VDC)

PROPORTIONAL CONTROLLERS & WIRING HARNESSES

Prince proportional operators are often controlled with a thumb or handle control and a PWM control module. Prince offers a small thumb control joystick and a larger handle control joystick, as well as a PWM control module that can be used in conjunction with these joysticks. The control module provides a performance enhancing dither to the current. The minimum and maximum current from the module can also be set to minimize the dead band before work port flow starts and to maximize the control resolution.

The connector on the thumb joystick is a Molex #CGRID/SL (7 male pins). The connector on the handle joystick is a Deutsch #HD14-9-16P (9 male pins). The connector on the PWM control module is a Deutsch #DT04-8P (8 male pins).

Prince offers a harness to connect the joystick, PWM module, and coils with Deutsch connectors. The harness system consists of a coil harness (approximately 60" long) to connect the PWM to the coils, to the power, etc. (671300108). The second part of the harness is a jumper harness that connects either the thumb control joystick or the handle control joystick to the PWM module. The standard length of the jumper harness is 10 feet, but other lengths are available. The 10 foot jumper harness for the thumb control joystick is 671304110. The 10 foot jumper harness for the handle control joystick is 671304210.

Additional controls such as multi spool proportional controllers as well as proportional RF controllers (belly packs) can be quoted upon request. Please contact sales at Prince Manufacturing for additional information.
MODEL RD5000
MONO-BLOCK
Directional Control Valves
1, 2, 3 Spool

Model RD5100

Model RD5200

Model RD5300
MODEL RD5000 DIMENSIONAL DATA

MODEL RD5100
CAPACITY: 30 GPM
MAX. PRESSURE: 3000 PSI
WEIGHT: 14 LBS.

MODEL RD5200
CAPACITY: 25 GPM
MAX. PRESSURE: 3000 PSI
WEIGHT: 23 LBS.

MODEL RD5300
CAPACITY: 25 GPM
MAX. PRESSURE: 3000 PSI
WEIGHT: 34 LBS.
**SPECIAL VALVES AVAILABLE:**
RD5000 Mono-block Valves can be made to order. Use the order code matrix below to generate a model number that meets your requirements. Special features not listed can often be made to your specifications. A minimum order quantity may apply to special valves. Please consult your sales representative.

**MODEL RD5000 ORDER CODE MATRIX:**
Fill each box with one letter or number from each column to generate a model number
Note that first all spools are listed then all spool attachments.

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>PORT SIZE</th>
<th>SPOOL TYPE</th>
<th>SPOOL ATTACHMENTS</th>
<th>RELIEF VALVE</th>
<th>INLET LOCATION</th>
<th>OUTLET LOCATION</th>
<th>POWER BEYOND</th>
<th>HANDLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD51</td>
<td>2</td>
<td>3/4 NPTF In/Out</td>
<td>3 Way, 3 Position Open Center</td>
<td>A</td>
<td>1</td>
<td>A</td>
<td>End</td>
<td>1</td>
</tr>
<tr>
<td>RD52</td>
<td>2</td>
<td>3/4 NPTF In/Out</td>
<td>4 Way, 3 Position Tandem Center</td>
<td>C</td>
<td>2</td>
<td>B</td>
<td>Top</td>
<td>2</td>
</tr>
<tr>
<td>RD53</td>
<td>1</td>
<td>3/4 NPTF In/Out</td>
<td>4 Way, 3 Position Tandem Center</td>
<td>G**</td>
<td>3</td>
<td>C</td>
<td>Bottom</td>
<td>3</td>
</tr>
<tr>
<td>RD54</td>
<td>1</td>
<td>3/4 NPTF In/Out</td>
<td>4 Way, 3 Position Tandem Center</td>
<td>E</td>
<td>4</td>
<td>END</td>
<td>with Power Beyond Option A</td>
<td>4</td>
</tr>
<tr>
<td>RD55</td>
<td>1</td>
<td>3/4 NPTF In/Out</td>
<td>4 Way, 3 Position Tandem Center</td>
<td>D</td>
<td>5</td>
<td>A</td>
<td>Not Provided</td>
<td>5</td>
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<tr>
<td>RD56</td>
<td>1</td>
<td>3/4 NPTF In/Out</td>
<td>4 Way, 3 Position Tandem Center</td>
<td>F</td>
<td>6</td>
<td>B</td>
<td>Conversion Plug Installed</td>
<td>6</td>
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<tr>
<td>RD57</td>
<td>1</td>
<td>3/4 NPTF In/Out</td>
<td>4 Way, 3 Position Tandem Center</td>
<td>H</td>
<td>7</td>
<td>C</td>
<td>Power Beyond Plug Installed with 3/4 NPTF</td>
<td>7</td>
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</table>

**RD532CCCAA5A4B1-25**
The last two digits are Relief pressure in hundreds
Example: 25=2500 psi, all relief settings are at 10 GPM & 105°F.

**Joystick handle will operate both spools using only one lever handle. The two spools can be operated either independently or simultaneously depending on handle movement.

**Often used with no relief. Review application.
RD5000 PRESSURE DROP, RELIEF CURVE AND STANDARD FEATURES

STANDARD FEATURES

* Economical monoblock construction of high tensile strength gray cast iron.
* Load check on each spool.
* Hard chrome plated spool.
* Optional 4 Position Float on 1st spool.
* Differential poppet style relief, adjustable from 1500 to 3000 psi (also available in low pressure version adjustable from 500 to 1500 psi).
* Power beyond and closed center capability.
* Reversible handle.

SPECIFICATIONS

PARALLEL CIRCUIT (RD-5200 & RD-5300)

<table>
<thead>
<tr>
<th>MAXIMUM OPERATING PRESSURE</th>
<th>3000 PSI</th>
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<tr>
<td>MAXIMUM OPERATING TEMPERATURE</td>
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<tr>
<td>MAXIMUM TANK PORT PRESSURE</td>
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<tr>
<td>RECOMMENDED SYSTEM FILTRATION</td>
<td>ISO 4406 19/17/14</td>
</tr>
<tr>
<td>FLOW RATING</td>
<td>30 GPM RD5100</td>
</tr>
<tr>
<td></td>
<td>25 GPM RD5200</td>
</tr>
<tr>
<td></td>
<td>25 GPM RD5300</td>
</tr>
</tbody>
</table>

WEIGHT

| | 14 LBS RD5100 |
| | 23 LBS RD5200 |
| | 34 LBS RD5300 |

RD5100 SINGLE SPOOL VALVE PRESSURE DROP VALUES

<table>
<thead>
<tr>
<th>FLOW (GPM)</th>
<th>INLET TO PORT A OR B</th>
<th>INLET TO OUTLET</th>
<th>A OR B TO OUTLET</th>
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<tbody>
<tr>
<td>5</td>
<td>2</td>
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RD5200 TWO SPOOL VALVE PRESSURE DROP VALUES

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<thead>
<tr>
<th>FLOW (GPM)</th>
<th>INLET TO PORT A OR B</th>
<th>INLET TO WORK PORTS</th>
<th>A OR B TO OUTLET</th>
<th>C OR D TO OUTLET</th>
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<td>5</td>
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<tr>
<td>25</td>
<td>44</td>
<td>83</td>
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RD5300 THREE SPOOL VALVE PRESSURE DROP VALUES

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<tr>
<th>FLOW (GPM)</th>
<th>INLET TO PORT A OR B</th>
<th>INLET TO C OR D</th>
<th>INLET TO E OR F</th>
<th>A OR B TO OUTLET</th>
<th>C OR D TO OUTLET</th>
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PARALLEL CIRCUIT VALVES:
Both the RD-5200 Two-Spool and RD-5300 Three-Spool Valves are parallel circuit valves. When any one of the spools is shifted it blocks off the open center passage thru the valve. The oil then flows into the parallel circuit core making oil available to all spools. If more than one spool is fully shifted then oil will go to the spool with the lowest pressure requirements. However, it is possible to meter the flow to the spool with the least load and power two unequal loads.
# RD5000 ORDERING INFORMATION

**STANDARD MODELS AVAILABLE:** Unless otherwise noted, all models listed have end inlet and outlet locations, power beyond (closed center) conversion plug, and complete handle assemblies. Unless otherwise noted, all models listed have adjustable differential poppet relief; preset 2000 PSI @ 10 GPM. (1500-3000 PSI)

### MISC. AND FIELD CONVERSION KITS FOR MODEL RD-5000 VALVES

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<td>66015001 A</td>
<td>SPRING CENTER KIT</td>
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<td>66015002 B</td>
<td>3 POSITION DETENT KIT</td>
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<tr>
<td>66015003 C</td>
<td>FRICTION DETENT KIT</td>
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<td>66015004 N</td>
<td>1 POSITION DETENT SPOOL</td>
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<td>660150020 P</td>
<td>2 POSITION DETENT W/SPRING CENTER KIT</td>
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<td>660312003 B</td>
<td>CONVERSION PLUG</td>
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<td>660312004 C</td>
<td>POWER BEYOND PLUG #3/4 NPTF</td>
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<tr>
<td>660312008 F</td>
<td>POWER BEYOND PLUG #12 SAE</td>
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### SPOOL OPTIONS:

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<th>SPOOL ATTACHMENT OPTIONS:</th>
<th>PORT SIZES:</th>
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<td>1st SPOOL</td>
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<td>3rd</td>
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<table>
<thead>
<tr>
<th>SYMBOL</th>
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<td>RD516G5A4B1</td>
<td>AUTO-CYCLE TWO SPOOL VALVE 3/4-NPTF 3/4-NPTF</td>
</tr>
<tr>
<td>RD523MMEE5A1A1</td>
<td>AUTO-CYCLE TWO SPOOL VALVE 3/4-NPTF 3/4-NPTF</td>
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<td>RD525MMEE5A4B1</td>
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<tr>
<td>RD525MMEE5A4F1</td>
<td>AUTO-CYCLE TWO SPOOL VALVE 3/4-NPTF 3/4-NPTF</td>
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</table>

- RD522GCGA5A4B6 includes a joystick handle assy.
- RD523MMEE5A1A1 is not convertible & does not have power beyond or closed center capability.
- RD525MMEE5A4F1 has #12 SAE/ORB power beyond installed.

### SYMBOLS:

- **RD516G5A4B1**: AUTO-CYCLE TWO SPOOL VALVE 3/4-NPTF 3/4-NPTF
- **RD523MMEE5A1A1**: AUTO-CYCLE TWO SPOOL VALVE 3/4-NPTF 3/4-NPTF
- **RD525MMEE5A4B1**: AUTO-CYCLE TWO SPOOL VALVE 3/4-NPTF 3/4-NPTF
- **RD525MMEE5A4F1**: AUTO-CYCLE TWO SPOOL VALVE 3/4-NPTF 3/4-NPTF

**NOTE:** SEE PAGE 14 & 15 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING.
**RD-5000 SERIES STANDARD AND SPECIAL FEATURE DESCRIPTIONS**

**TWO SPOOL "JOYSTICK" HANDLE**

This handle will operate both spools using only one lever handle. The two spools can be operated either independently or simultaneously depending on handle movement.

The above drawing shows a section view of a 2-spool valve, Model RD522GCGA5A4B1. This is shown as a representative valve model. Other models will differ in appearance.

**LOAD CHECK:**

The load check feature is standard on all RD-5000 series valves. Each spool has a separate load check. The load check will prevent the fall of a cylinder as the spool is shifted. It also prevents the back-flow of oil from the work port to the inlet. As shown below the pump must build up enough pressure to overcome the pressure on the work port caused by the weight of the load before the cylinder can move.

Please note that the load check has nothing to do with how well the valve will hold up a cylinder with the spool in neutral. The load check is functional only when the spool is shifted.

**OPEN CENTER APPLICATIONS:**

The Standard RD-5000 Series Valves are open center type valves. For open center valves the hydraulic oil is directed from the inlet to the outlet, or power beyond, through the open center passage when the spools are in neutral. Moving one or more spools closes off the open center passage and directs oil to the work ports.

Open center systems most often contain fixed displacement pumps. The PMC hydraulic PTO pumps are fixed displacement gear pumps. The maximum pressure in an open center system is controlled by a relief valve. The RD-5000 series valves have a built in relief valve for this purpose.

RD-5000 Series spool options A, C, E and G are all open center spools when used with power beyond options A, B, C and F.

**CLOSED CENTER APPLICATIONS:**

RD-5000 Series Valves are available as closed center type valves. For closed center valves the oil through the open center passage is blocked when the spools are in neutral.

Closed center systems often use a variable displacement pressure compensated pump. When this type of pump is used in a closed center system the system pressure is controlled by the pressure compensator. When the spools of RD-5000 series valve are in neutral, system pressure is maintained at the inlet of the valve. For this reason a relief is normally not required or must be set at a higher pressure than the pump compensator. RD-5000 Series spool options C, E and G are converted to closed center by installing a closed center conversion plug, power beyond option D.

Please note that this closed center option does not provide for the drain off of standby spool leakage. This can allow a very small amount of oil to enter the work ports when in neutral.

The above drawing shows a section view thru work ports of a RD-5100 Single Spool Valve.
**RD-5000 SERIES SPOOL OPTIONS**

### 3 WAY 3 POSITION OPEN CENTER
**OPTION A**
This spool option is used to control a single acting cylinder or a unidirectional motor. In neutral the work port is blocked and oil goes through the open center passage to the next spool of a multi-spool valve or the power beyond of a single spool valve. The “A” port is plugged for this option.

### 4 WAY 3 POSITION TANDEM CENTER
**OPTION C**
This spool option is used to control a double acting cylinder or a reversible motor. In neutral both of the work ports are blocked and oil goes through the open center passage to the next spool of a multi-spool valve or the power beyond of a single spool valve. This is the most popular spool option and is used on most Prince standard valves.

### 4 WAY 3 POSITION CLOSED CENTER
**OPTION D**
This spool option is similar to spool option C above except in neutral the open center passage is blocked. This function is achieved using spool option C with a closed center conversion plug (Power beyond option D).

**FLOAT POSITION OPTION G**
This option uses the same parts as option F above but is not pressure released.

**PRESSURE RELEASE DETENT, DETENT SPOOL ‘OUT’ AND ‘IN’ SPRING CENTER TO NEUTRAL OPTION E**
This option provides a pressure release detent for the spool ‘Out’ position. When the spool is manually placed in the neutral position oil is directed to the ‘B’ work port (the port away from the handle). When the pressure in the ‘B’ port reaches a preset level the detent will release and the spool will center. The detent pressure is factory set at 1400 psi. This pressure is adjustable from 1000 to 2000 psi. The detent release pressure is adjusted by turning the adjusting screw clockwise to increase the pressure and counter-clockwise to decrease the pressure. The spool release is centered neutral from the spool ‘In’ position. This option can be used with spool options A, C or E.

### 3 POSITION SPRING CENTER TO NEUTRAL OPTION A
This option has 3 positions and a spring that returns the spool to neutral when the handle is released. This option is considered standard on many Prince valve models.

**3 POSITION DETENT OPTION B**
This option provides three detented positions. The spool will remain in any of the three positions in which it is manually placed. No centering spring is provided. Note: This option does not positively lock the spool in place. Excessive vibration or shock loads may affect operation.

**PRESSURE RELEASE DETENT, DETENT SPOOL ‘OUT’ ONLY, SPRING CENTER TO NEUTRAL OPTION F**
This option is similar to option E above except the pressure release detent function is on both the spool ‘In’ and ‘Out’ positions. This option is available on RD-5100, valve number 1 spool of RD-5200 and RD-5300 valves.

**FRICITION DETENT OPTION C**
This option provides for a detent in the neutral position only. As the spool is manually moved away from the neutral position it will be held in place by the friction of the detent ball on the detent sleeve. Note: Because the spool is held in place by friction only, excessive vibration may cause spool to move when not in the neutral detent position.

**PRESSURE RELEASE DETENT, DETENT SPOOL ‘IN’ AND ‘OUT’ SPRING CENTER TO NEUTRAL OPTION G**
This is the same as spool option C, 4 way 3 position tandem center, with an added fourth “float” position. In neutral the work ports are blocked (this will hold up a cylinder) and the oil goes through the open center passage to the next spool or power beyond. In the float position the work ports are open to the return (this will allow a cylinder to drift or “float”) and the oil goes to next spool or power beyond. The float position is reached by pushing the spool as far as it will go and is held in place by a detent. This option must be ordered with spool option G.

**4 POSITION SPRING CENTER TO NEUTRAL DETENT SPOOL ‘IN’ FOR FLOAT POSITION OPTION G**
This attachment is used with spool option ‘G’. This option provides for spring center to neutral from either work position. It also provides a 4th position, float detent. The float detent is reached by pushing the spool in as far as it will go. In the float position both work ports are open to return. This allows a cylinder to drift or “float.”

**PRESSURE RELEASE DETENT DETENT SPOOL ‘IN’ AND ‘OUT’ SPRING CENTER TO NEUTRAL OPTION H**
This option is similar to option ‘E’ above except the pressure release detent function is on both the spool ‘In’ and ‘Out’ positions. This option is available on RD-5100 valve number 1 spool of RD-5200 and RD-5300 valves.

**PRESSURE RELEASE DETENT, DETENT SPOOL ‘IN’ AND ‘OUT’ SPRING CENTER TO NEUTRAL OPTION P**
This option uses the same parts as option F above but is not pressure released. The handle must be manually removed from the detent position. The detent holding force is adjustable.

**ADJUSTING SCREW**
ADJUSTING SCREW

**1 POSITION DETENT SPOOL ‘OUT’ SPRING CENTER TO NEUTRAL OPTION N**
This option uses the same parts as option E above but is not pressure released. The handle must be manually removed from the detent position. The detent holding force is adjustable.

**2 POSITION DETENT SPOOL ‘IN’ AND ‘OUT’ SPRING CENTER TO NEUTRAL OPTION P**
This option uses the same parts as option F above but is not pressure released. The handle must be manually removed from the detent position. The detent holding force is adjustable.
**RD-5000 SERIES POWER BEYOND OPTIONS**

**ROTARY ACTUATOR OPTION D**

With this option, rotating the spool approximately 90° clockwise from neutral moves the spool to the full in position, 90° counter clockwise to full out. There is a detent in the neutral position, and in this position, the spool clevis opening is approximately vertical. A handle is not included. This option cannot be added in the field.

**POWER BEYOND NOT PROVIDED OPTION A**

This option provides an outlet only with no provision for power beyond. This option can be used with any open center spools where there is no need for a power beyond port. The end outlet, shown at right, is considered standard but a top or bottom outlet can also be specified. When all the valves spools are in neutral oil goes through the open center core to the outlet. This option cannot be converted in the field to have power beyond. It also cannot be converted from open to closed center.

**CONVERSION PLUG INSTALLED OPTION B**

This option is similar in function to Option A above except the conversion plug is installed in the power beyond location and the end outlet is relocated. This option should be used with the open center spool options and allows the valve to be converted to have power beyond function or be converted from open to closed center. This option is considered the PMC Standard power beyond option because of the flexibility it adds to the valve.

When all the valve spools are in neutral oil goes through open center core to return core and then to outlet.

To convert a valve in the field to have power beyond, remove the conversion plug and replace it with one of the power beyond plugs listed. To convert valve to closed center, replace conversion plug with closed center plug 660312005.

**POWER BEYOND PLUG INSTALLED OPTION C 3/4 NPTF POWER BEYOND PORT OPTION F #12 SAE POWER BEYOND PORT**

This option provides both an outlet and a power beyond port (also referred to as a high pressure carry over port). This also allows another valve to be connected downstream. When all the spools of a RD-5000 series valve are in neutral high pressure oil can go through the open center core and out the power beyond port to the inlet of downstream valve. The downstream valve only receives oil when all spools of the first valve are in neutral. This option must be used with open center spools and the out of valve must be connected to tank.

If the power beyond port is not used on a valve in an open center system the power beyond port must be connected to tank or the power beyond plug replaced with conversion plug 660312003.

A valve with power beyond can be converted to closed center by plugging the power beyond port or installing closed center plug 660312005.

**CLOSED CENTER CONVERSION PLUG INSTALLED OPTION D**

This option converts an otherwise open center valve to closed center operation. The open center core is blocked by the conversion plug. Oil cannot pass through the valve when the spools are in neutral. Closed center systems are normally associated with variable displacement pumps or any other system where the pump flow is unloaded when system pressure is reached.

Note: If the closed center plug is installed in a valve that has a relief it may be necessary to install the no relief plug or adjust the relief pressure above the compensator setting.

Also, this closed center option does not provide for the drain off of standby spool leakage. This can allow a very small amount of oil to enter the work ports when in neutral.

**RD-5000 2 SPOOL SPECIAL APPLICATION VALVE**

**“AUTO-CYCLE” TWO SPOOL VALVE**

This valve is a modified RD-5200 two spool valve that can be used to automatically cycle a hydraulic cylinder. The spools and the valve body have been modified to provide this function. Both spools have the pressure release detent spool attachment. The valve is shown connected to a cylinder in the sketch below. The “B” port is connected to the base of the cylinder. The “A” and “D” ports are tied together and connected to the rod end of the cylinder. The “C” port is plugged. At the beginning of the cycle the cylinder is fully retracted. To begin the cycle both handles are pulled back. Oil is directed to the “B” port and the cylinder will extend until it reaches the end of its stroke. At this point the pressure will build to the detent release pressure and the first spool will center to neutral. Now the oil will go through the open center core to the second spool and is directed out the “D” port to retract the cylinder. When the cylinder reaches the full retract position the pressure will build to the detent release pressure and the second spool will center to neutral. This completes the cycle. To begin the next cycle both handles are again manually pulled back. Please note this valve does not have the loadcheck feature of the standard RD5200 valve. Also the “B” port is open to tank in neutral. Maximum detent pressure setting is 2000 PSI.

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**Model Number RD525MME5A4B1**
The RD5000 valve is available with proportional solenoid operators. The valve will allow controlled starts and stops of the work port flow as well as control of the work port flow rate over a limited metered range. Pilot pressure to initiate spool shift is provided internally by means of a pressure build-up cartridge in the power beyond port. Once the spool shift is initiated, load induced pressure is required to regulate the spool position and flow. By increasing the current through one of the solenoids, increasing pressure is applied to a spool end, causing the spool to shift against spring bias. Full spool shift is at approximately 1200 mA - 12 VDC (600 mA - 24 VDC).

The RD5000 proportional operators are typically controlled with a thumb or handle control and a PWM control module. Prince offers a small thumb control joystick (671300076) and a larger handle control joystick (671300077). A PWM control module (671300107) that can be used in conjunction with these joysticks is also offered by Prince. See page V52 for details.
The Solenoid Operated RD5000 Directional Control Valve allows remote electrical on-off or manual control. This feature can be installed on the RD5100, RD5200, or RD5300. It can be installed on one or all spools of the RD5200 or RD5300. This option can be purchased as kits and installed by customer. Complete valves are available special order only (min. qty. 25) Consult your sales representative. Pressure release detent or float spool options cannot be converted to solenoid operated valves.

The Solenoid Operated RD5000 contains two, 3 way-2 position solenoid cartridge valves and a pilot operated piston attached to the main control spool. When both solenoids are de-energized both sides of the pilot piston are open to tank pressure and the spool remains spring centered. When solenoid A is energized, pilot pressure is applied to one side of the pilot piston causing the spool to shift from the neutral position to work port A. When solenoid “B” is energized, pilot pressure is applied to the other side of the pilot piston causing the spool to shift to work port “B”. In cases where the pilot pressure is provided by the inlet line or #4 SAE port on valve, a “Pressure Build-Up Valve” must be installed in the outlet port. Two versions of the pressure build-up valve are offered. The open center pressure build-up valve and the power beyond pressure build-up valve. Both versions supply 150-200 PSI pilot pressure to the solenoid actuator. When remote pilot is used, the pressure build-up is not required. Because the valve is internally piloted, overcenter or light loads can be a problem. The inlet pressure must be at least 200 psi during operation. Restrictors can be added to eliminate this problem.
MODEL RD4100 SINGLE SPOOL MONO-BLOCK VALVE

RD4100 SPECIFICATIONS
MAXIMUM OPERATING PRESSURE .................. 3000 PSI
MAXIMUM TANK PRESSURE .................. 500 PSI
MAXIMUM OPERATING TEMPERATURE .......... 180°F

RECOMMENDED SYSTEM FILTRATION ............ ISO 4406 19/17/14
FLOW RATING .............................................. 15 GPM

STANDARD FEATURES
- Economical monoblock construction of high tensile strength gray cast iron
- Load check
- Hard chrome plated spool
- Adjustable cartridge relief
- Open center, closed center, and power beyond available
- For use with system flows up to 15 gpm
- For use with system pressures up to 3000 PSI
- Optional top inlet & outlet port locations.

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<tr>
<th>MODEL NUMBER</th>
<th>PORT SIZE</th>
<th>SPOOL TYPE</th>
<th>SPOOL ACTIONS</th>
<th>RELIEF VALVE</th>
<th>INLET LOCATION</th>
<th>OUTLET LOCATION</th>
<th>POWER BEYOND</th>
<th>HANDLE</th>
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<tbody>
<tr>
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<td>A Spring Center</td>
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**STANDARD VALVES AVAILABLE:**
All standard valves have a load check, a complete lever handle assembly, and an adjustable relief, see table below for settings. For other relief settings, please specify.

<table>
<thead>
<tr>
<th>VALVE PART NUMBER</th>
<th>SPOOL TYPE</th>
<th>SPOOL ACTION</th>
<th>IN/OUT PORT SIZE</th>
<th>WORK PORT SIZE</th>
<th>RELIEF SETTING</th>
<th>CONVERTIBLE FROM OPEN CENTER TO CLOSED CENTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD412BA5A1A1</td>
<td>X</td>
<td>X</td>
<td>#10 SAE</td>
<td>#8 SAE</td>
<td>2000 PSI AT 10 GPM</td>
<td>NO</td>
</tr>
<tr>
<td>RD412BA5A2B1</td>
<td>X</td>
<td>X</td>
<td>#10 SAE</td>
<td>#8 SAE</td>
<td>2000 PSI AT 10 GPM</td>
<td>YES</td>
</tr>
<tr>
<td>RD412BB5A2B1</td>
<td>X</td>
<td>X</td>
<td>#10 SAE</td>
<td>#8 SAE</td>
<td>2000 PSI AT 10 GPM</td>
<td>YES</td>
</tr>
<tr>
<td>RD412CA5A2B1</td>
<td>X</td>
<td>X</td>
<td>#10 SAE</td>
<td>#8 SAE</td>
<td>2000 PSI AT 10 GPM</td>
<td>YES</td>
</tr>
<tr>
<td>RD412DD5A2B1</td>
<td>X</td>
<td>X</td>
<td>#10 SAE</td>
<td>#8 SAE</td>
<td>2000 PSI AT 10 GPM</td>
<td>YES</td>
</tr>
</tbody>
</table>

*RD412BA5A1A1-25 THE LAST TWO DIGITS ARE RELIEF PRESSURE IN HUNDREDS. EX: 25=2500 psi. ALL RELIEFS ARE SET AT 10 GPM & 105°F. 
**OFTEN USED WITH NO RELIEF. REVIEW APPLICATION.

SEE PAGE 16 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING
RD-4100 KITS, RELIEF CURVE, & PRESSURE DROP

**RD-4100 SINGLE SPOOL PRESSURE DROP**

110 SUS OIL AT 115°F

<table>
<thead>
<tr>
<th>FLOW (GPM)</th>
<th>INLET TO OUTLET</th>
<th>INLET TO A OR B</th>
<th>A OR B TO OUTLET</th>
<th>Δ P-PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>3</td>
<td>10</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>42</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>26</td>
<td>85</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>

**RD-4100 RELIEF VALVE CURVES**

**POWER BEYOND OPTIONS**

OUTLET PORT LOCATION

WORK PORTS A & B

343 DIA. (2)

STANDARD INLET PORT LOCATION

SEE PAGE 16 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING
MODEL LV
MONO-BLOCK
Directional Control Valves
Especially Suited for Front Loader Market

LVS Series Circuit
Top Ported or Semi-Rear Ported

LVT Parallel Circuit
Top Ported

LVR Parallel Circuit
Rear Ported
MODEL LVS SERIES LOADER VALVE

LVS SPECIFICATIONS
SERIES CIRCUIT (multifunction operation, simultaneous operation of both boom and bucket)
MAXIMUM OPERATING PRESSURE ................................. 3000 PSI
MAXIMUM TANK PRESSURE .............................................. 500 PSI
MAXIMUM OPERATING TEMPERATURE ............................ 180°F
RECOMMENDED SYSTEM FILTRATION .................. ISO 4406 19/17/14
FLOW RATING .............................................................. 11 GPM
WEIGHT .............................................................. 18.5lbs

STANDARD FEATURES
• Economical monoblock construction of high tensile strength gray cast iron
• Load check on each spool
• Hard chrome plated spools
• No face seals on spools
• Adjustable cartridge relief
• Power beyond available
• 4 Position Series Float Spool for loader boom
• 4 Position Regen Spool for loader bucket
• Molded rubber boot
• Patented dual spool lock joystick available

LVS PRESSURE DROP

110 SUS OIL AT 115°F

<table>
<thead>
<tr>
<th>FLOW (GPM)</th>
<th>INLET TO OUTLET</th>
<th>INLET TO WORK</th>
<th>WORK PORTS TO OUTLET</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>6</td>
<td>22</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>18</td>
<td>44</td>
<td>19</td>
</tr>
<tr>
<td>10</td>
<td>64</td>
<td>100</td>
<td>60</td>
</tr>
</tbody>
</table>

PART NUMBER  DESCRIPTION
660590029  SEAL KIT
660180170  SPRING CENTER FLOAT KIT
660180169  SPRING CENTER REGEN KIT
671400252  ROD END
660390016  ROD END W/STUD
671900084  SLIDING SPOOL STUD
660180154  SPOOL LOCK HARDWARE

*LVS1AGR5B1-25*
THE LAST TWO DIGITS ARE THE RELIEF SETTING IN HUNDREDS.
EX: 25=2500 PSI @ 10 GPM
ALL RELIEFS ARE SET AT 10 GPM.

*For other relief settings please specify (see example on the left)*

THE LAST TWO DIGITS ARE THE RELIEF SETTING IN HUNDREDS.
EX: 25=2500 PSI @ 10 GPM
ALL RELIEFS ARE SET AT 10 GPM.
REMOTE CABLE CONTROLS FOR PRINCE VALVES

Heavy duty remote cable controls are available for most Prince directional control valves. The compact controller bodies are of die-cast metal construction and are available in either dual axis or single axis configurations. Dual axis joysticks are constructed with steel swivels and anti-wear bushings. The high strength flexible control cables are jacketed and have quick attach connections.

REMOTE CONTROLLERS

Dual Axis Joystick with lock
660170038
Single Axis
660170039

CONTROL CABLES

49 inches long (1.25 M)
660171125
59 inches long (1.5 M)
660171150
79 inches long (2.0 M)
660171200
89 inches long (2.25 M)
660171225
98 inches long (2.5 M)
660171250

VALUE CONNECTION KITS

RD5000 series kit*
660170037
LVS, LVR or LVT, kit (loader valves)**
660170029
SV stack valve or RD4100 kit***
660170031
Series 20 stack valve kit****
660170035

Note: One control cable and one connection kit is required for each spool controlled. Order the remote controller, the control cables and the connection kits as necessary to complete the remote cable control assembly. The connection kit works for all spool options by adjusting the locking nut.

* Field convertible or order option 3, less handle assembly.
** Order loader valve handle option 8, tang end only.
*** Field convertible from standard handle or order option 6, clevis spool end only.
**** Field convertible or order option 3, less complete handle.

SINGLE SPOOL CONTROL

DUAL AXIS CONTROLLER

Handle can be attached vertical as shown or horizontal

SEE PAGE 18 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING
MODEL LVT TWO SPOOL MONO-BLOCK LOADER VALVE

LVT SPECIFICATIONS
PARALLEL CIRCUIT
MAXIMUM OPERATING PRESSURE ..................................... 3000 PSI
MAXIMUM TANK PRESSURE .............................................. 500 PSI
MAXIMUM OPERATING TEMPERATURE ................................ 180°F
RECOMMENDED SYSTEM FILTRATION ........ISO 4406 19/17/14
FLOW RATING ................................................................. .10 GPM
WEIGHT ........................................................................... 14.6 LBS

STANDARD FEATURES
• Economical monoblock construction of high tensile strength gray cast iron
• Load check on each spool
• Hard chrome plated spool
• Adjustable cartridge relief
• Open center, and power beyond available
• 4 Position Float Spool for loader boom
• 4 Position Regen Spool for loader bucket

STANDARD FEATURES

** PLEASE NOTE that this closed center option does not provide for the drain off of standby spool leakage. This can allow a very small amount of oil to enter the work ports when in neutral. Closed center option is often used with no relief. Review application.

STANDARD VALVES AVAILABLE:
All standard valves have a load check, a complete handle assembly, and an adjustable relief.

<table>
<thead>
<tr>
<th>VALVE PART NUMBER</th>
<th>4 WAY POSITION FLOAT SPOOL</th>
<th>4 WAY POSITION SPool</th>
<th>4 WAY POSITION REGEN SPOOL</th>
<th>A1-B1 SPOOL</th>
<th>A2-B2 SPOOL</th>
<th>SPool TYPE</th>
<th>SPool ACTION</th>
<th>SPOOL ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVT1B5AB1</td>
<td>X</td>
<td>X</td>
<td></td>
<td>SPRING CENTER</td>
<td>SPRING CENTER</td>
<td>FLOAT DETENT</td>
<td>SPRING CENTER</td>
<td>FLOAT DETENT</td>
</tr>
<tr>
<td>LVT1G5AB1</td>
<td>X</td>
<td>X</td>
<td></td>
<td>FLOAT DETENT</td>
<td>SPRING CENTER</td>
<td>FLOAT DETENT</td>
<td>SPRING CENTER</td>
<td>FLOAT DETENT</td>
</tr>
<tr>
<td>LVT1G5AB3</td>
<td>X</td>
<td>X</td>
<td></td>
<td>FLOAT DETENT</td>
<td>SPRING CENTER</td>
<td>FLOAT DETENT</td>
<td>SPRING CENTER</td>
<td>FLOAT DETENT</td>
</tr>
<tr>
<td>LVT1GR5AB3</td>
<td>X</td>
<td>X</td>
<td></td>
<td>FLOAT DETENT</td>
<td>REGEN POSITION</td>
<td>FLOAT DETENT</td>
<td>SPRING CENTER</td>
<td>SPRING CENTER</td>
</tr>
<tr>
<td>LVT1GR5AB5</td>
<td>X</td>
<td>X</td>
<td></td>
<td>REGEN POSITION</td>
<td>FLOAT DETENT</td>
<td>FLOAT DETENT</td>
<td>SPRING CENTER</td>
<td>SPRING CENTER</td>
</tr>
<tr>
<td>LVT1B5AB5</td>
<td>X</td>
<td>X</td>
<td></td>
<td>SPRING CENTER</td>
<td>FLOAT DETENT</td>
<td>SPRING CENTER</td>
<td>SPRING CENTER</td>
<td>SPRING CENTER</td>
</tr>
</tbody>
</table>

LVT PRESSURE DROP

<table>
<thead>
<tr>
<th>FLOW (GPM)</th>
<th>110 SUS OIL AT 115°F</th>
<th>INLET TO OUTLET</th>
<th>INLET TO WORK PORTS</th>
<th>A OR B TO OUTLET</th>
<th>Δ P-PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>15</td>
<td>20</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>35</td>
<td>34</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>95</td>
<td>72</td>
<td>50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PART NUMBER | DESCRIPTION
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>660590017</td>
<td>SEAL KIT</td>
</tr>
<tr>
<td>660180078</td>
<td>SPRING CENTER KIT</td>
</tr>
<tr>
<td>660180076</td>
<td>SPRING CENTER FLOAT KIT</td>
</tr>
<tr>
<td>660180077</td>
<td>SPRING CENTER REGEN KIT</td>
</tr>
<tr>
<td>660180073</td>
<td>COMPLETE HANDLE KIT</td>
</tr>
<tr>
<td>660180011</td>
<td>HANDLE KIT</td>
</tr>
<tr>
<td>660180072</td>
<td>CLEVIS SUB-ASSY</td>
</tr>
<tr>
<td>660280004</td>
<td>RELIEF PLUG</td>
</tr>
<tr>
<td>660280009</td>
<td>RELIEF CART. OPTION 5</td>
</tr>
<tr>
<td>270006122</td>
<td>PILOT RELIEF CART. OPTION 6</td>
</tr>
</tbody>
</table>

** PLEASE NOTE that this closed center option does not provide for the drain off of standby spool leakage. This can allow a very small amount of oil to enter the work ports when in neutral. Closed center option is often used with no relief. Review application.

5/16-18 UNC MOUNTING HOLES ON BOTH TOP AND BOTTOM OF VALVE
NOTE: NEUTRAL POSITION SPOOL LOCK AVAILABLE
MODEL LVR TWO SPOOL MONO-BLOCK LOADER VALVE

LVR SPECIFICATIONS
PARALLEL CIRCUIT
MAXIMUM OPERATING PRESSURE .................. 3000 PSI
MAXIMUM TANK PRESSURE ................. 500 PSI
MAXIMUM OPERATING TEMPERATURE .......... 180°F
RECOMMENDED SYSTEM FILTRATION........ISO 4406 19/17/14
FLOW RATING............. 4 GPM
WEIGHT ........................................... 22.6 LBS

STANDARD FEATURES
• Economical monoblock construction of high tensile strength gray cast iron
• Load check on each spool
• Hard chrome plated spool
• Adjustable cartridge relief
• Open center, and power beyond available
• 4 Position Float Spool for loader boom
• 4 Position Regen Spool for loader bucket

5/16-18 UNC MOUNTING HOLES ON BOTH TOP AND BOTTOM OF VALVE

NOTE: NEUTRAL POSITION SPOOL LOCK AVAILABLE

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>PORT SIZE</th>
<th>SPOOL &amp; ACTION</th>
<th>RELIEF VALVE</th>
<th>IN/OUT PORT</th>
<th>POWER BEYOND</th>
<th>HANDLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVR</td>
<td></td>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
<td>1</td>
</tr>
<tr>
<td>LVR Rear Ported  Two Spool Loader Valve</td>
<td>#8 SAE In/out</td>
<td>A-B 4 Way 4 Position Float, Spring Center with Soft Stop</td>
<td>Direct Acting Adjustable 1500-3000 PSI Set at 2000 PSI</td>
<td>A-All Ports On End of Valve</td>
<td>Standard: Open Center (Power Beyond Port Plugged)</td>
<td>Standard Handles</td>
</tr>
<tr>
<td></td>
<td>#8 SAE In/out</td>
<td>A-B 4 Way 4 Position Regen, Spring Center with Soft Stop</td>
<td>4 Standard: Direct Acting Adjustable 500-1500 PSI Set at 1000 PSI</td>
<td>5 Closed Center</td>
<td>2 Clevis Spool End Only</td>
<td>2 Clevis Spool End Only</td>
</tr>
<tr>
<td></td>
<td>#8 SAE Work Ports</td>
<td>A-B 4 Way 4 Position Float, Spring Center with Float Detent</td>
<td>6 Pilot Operated Adjustable 500-3000 PSI Set at 2000 PSI</td>
<td>7 Joystick for power beyond on Bottom (Use with RG, BG or BB)</td>
<td>5 Joystick for power beyond on Left (Use with RG, BG, or BB)</td>
<td>5 Joystick for power beyond on Right (Use with RG, BG, or BB)</td>
</tr>
<tr>
<td></td>
<td>#8 SAE Work Ports</td>
<td>B-B 4 Way 4 Position Float, Spring Center with Float Detent</td>
<td>8 Spring Centered</td>
<td>8 Universal joystick contains parts and instructions for all mounting options</td>
<td>8 Universal joystick contains parts and instructions for all mounting options</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#6 SAE Work Ports</td>
<td>C-D 4 Way 4 Position Float, Spring Center with Float Detent</td>
<td>9 Spring Centered</td>
<td>9 Universal joystick contains parts and instructions for all mounting options</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>#6 SAE Work Ports</td>
<td>C-D 4 Way 3 Position Spring Centered</td>
<td>10 Spring Centered</td>
<td>10 Universal joystick contains parts and instructions for all mounting options</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>#6 SAE Work Ports</td>
<td>C-D 4 Way 3 Position</td>
<td>11 Spring Centered</td>
<td>11 Universal joystick contains parts and instructions for all mounting options</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PLEASE NOTE that this closed center option does not provide for the drain off of standby spool leakage. This can allow a very small amount of oil to enter the work ports when in neutral. Closed center option is often used with no relief. Review application.**

STANDARD VALVES AVAILABLE:
All standard valves have a load check, a complete handle assembly, and an adjustable relief.

<table>
<thead>
<tr>
<th>VALVE PART NUMBER</th>
<th>SPOOL TYPE</th>
<th>SPOOL ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVR1GB5AB7-25</td>
<td>4 Way 4 Position Float A-B Spool</td>
<td>A-B Spool</td>
</tr>
<tr>
<td></td>
<td>4 Way 4 Position Float C-D Spool</td>
<td>C-D Spool</td>
</tr>
<tr>
<td></td>
<td>4 Way 4 Position Float A-B Spool</td>
<td>A-B Spool</td>
</tr>
<tr>
<td></td>
<td>4 Way 4 Position Float C-D Spool</td>
<td>C-D Spool</td>
</tr>
</tbody>
</table>

LVR1GB5AB7-25
THE LAST TWO DIGITS ARE THE RELIEF SETTING IN HUNDREDS. EX: 2D=2500 PSI @ 10 GPM. ALL RELIEFS ARE SET AT 10 GPM.

5/16-18 UNC MOUNTING HOLES ON BOTH TOP AND BOTTOM OF VALVE

LVR PRESSURE DROP

**PLEASE NOTE that this closed center option does not provide for the drain off of standby spool leakage. This can allow a very small amount of oil to enter the work ports when in neutral. Closed center option is often used with no relief. Review application.**

STANDARD VALVES AVAILABLE:
All standard valves have a load check, a complete handle assembly, and an adjustable relief.

<table>
<thead>
<tr>
<th>VALVE PART NUMBER</th>
<th>VALVE TYPE</th>
<th>4 WAY 3 POSITION</th>
<th>4 WAY 4 POSITION FLOAT A-B</th>
<th>4 WAY 4 POSITION FLOAT C-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVR1GB5AB6</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>LVR1GB5AB4</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

SEE PAGE 18 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING
4 WAY 4 POSITION REGEN SPOOL OPERATION
This spool option allows for these four functions of the loader bucket cylinders: “NEUTRAL”, cylinder ports blocked to hold bucket in place; “BUCKET ROLLBACK” directs oil to hose 1 to retract bucket cylinder; “BUCKET TIP” directs oil to hose 2 to extend the bucket cylinder with full pressure (Please Note there is a soft stop at this handle position); “BUCKET REGEN” combines the oil from the tractor pump with the oil returning from hose 1 and it directs it to hose 2 to tip the bucket faster (referred to as REGENERATION or “REGEN”). It is necessary to push the handle past the soft stop at the normal bucket tip position to get to the regen position. Also Please Note that the cylinder force will be reduced when in the regen position.

4 WAY 4 POSITION FLOAT SPOOL OPERATION
This spool option allows for these four functions of the loader boom cylinders: “NEUTRAL”, cylinder ports blocked to hold boom in place; “BOOM RAISE” directs oil to hose 3 to extend boom cylinders; “BOOM LOWER” directs oil to hose 4 to retract the boom cylinders with full pressure (Please Note there is a soft stop at this handle position); “BOOM FLOW” connects all boom cylinder ports to tank allowing the boom to fall to the ground. It is necessary to push the handle past the soft stop at the normal boom down position. There is a detent that will hold handle in the float position. While in the float position the loader boom cylinders will move up and down or “FLOAT” to match the ground level as the tractor moves forward or backward.

Joystick Handle
The joystick handle will operate both spools using one lever handle. The two spools can be operated independently or at the same time depending upon handle movement. Because we allow for maximum mounting flexibility, we have 4 options for the LVT and 2 options for the LVS. The handle shift pattern for all is shown at right.
Directional Control Valves

LOG SPLITTER CONTROL VALVE

Model LS3000

SINGLE SPOOL MONO-BLOCK 20GPM

Model RD2500
**MODEL LS3000 DIMENSIONAL DATA**

On LS-3000 Models, pressure release detent is in the spool out position.
On LS-3060 Models, pressure release detent is in the spool in position.

---

**STANDARD FEATURES**
- Hydraulically balanced, hard chrome plated spool
- Handle can be installed in “up” or “down” position
- Detent release pressure adjustable from 1000 to 2000 PSI
- For use with system flows up to 25 GPM
- Relief valve adjustable up to 2750 PSI
- Tandem center spool (in neutral position, both work ports blocked, pump unloaded to tank)
- Ideal for log-splitter applications. Available with 3/4” NPTF work ports for higher flow applications

---

**SPECIFICATIONS:**
1. Max design and test pressure 2750 PSI
2. Max tank port pressure-150 PSI
3. Flow rating-25 GPM max.
4. Relief valve setting-2250 PSI
5. This valve has one position pressure release detent with spring center to neutral.
6. Weight: 10 lbs.
7. Recommended filtration-ISO 4406 19/17/14
8. Max operation temp-180° F
9. In exposed environments do not mount with spool vertical and handle end down.

---

**MODEL LSR-3060 RAPID EXTEND LOG SPLITTER VALVE**

---

**STANDARD FEATURES**
- Hydraulically balanced, hard chrome plated spool
- Handle can be installed in “up” or “down” position
- Detent release pressure adjustable from 1000 to 2000 PSI
- Extend flows of up to 25 GPM with inlet flows of 4 GPM
- Relief valve adjustable up to 3500 PSI
- Tandem center spool
- Manual shift from high speed mode to high force mode
- Spring center 4 position spool with soft stop
- Pressure release detent on retract

---

**FUNCTION:**
The Prince LSR-3060-3 log splitter valve features an extremely fast “Rapid Extend” high speed mode. The LSR has been specifically designed to reduce system costs by allowing a single stage pump to be used in systems currently using two stage (hi-low) pumps. When extra splitting force is required, the LSR allows the user to manually shift from high speed mode to high force mode. A “soft stop” differentiates between high force and high speed modes. Laboratory testing has not shown a significant difference in working cycle times between single stage/rapid extend systems and two stage systems. (Working cycle is the average time between extending the cylinder to split the first log and extending to split the next log after the split wood has been removed and a new log has been placed on the log splitter.)

---

**SPECIFICATIONS:**
1. Max design and test pressure 3500 PSI
2. Max tank port pressure -150 PSI
3. Nominal inlet flow rating 4 gpm
4. Standard relief valve setting – 2250 psi
5. This valve has a pressure release detent from spool in with spool center to neutral
6. The valve has a 4 position spool with normal extend and retract positions and a 4th rapid extend position
7. Max operating temperature - 180°F.
8. In exposed environments, do not mount with spool in the vertical position
9. Dimensionally similar to the LS3000 valve
10. In center position, B port connected to tank.
**STANDARD FEATURES**
- Economical monoblock construction of high tensile strength gray cast iron
- Load check
- Hard chrome plated spool
- Adjustable ball spring relief (1000 PSI to 3000 PSI)
- Open center to closed center conversion available on some models
- For use with system flows to 20 GPM
- For use with system pressures to 3000 PSI

**SPECIFICATIONS:**
1. Max design and test pressure 3000 PSI
2. Max tank port pressure-150 PSI
3. Flow rating-20 GPM max.
4. Relief valve setting-1500 PSI
5. Weight: 9.5 lbs.
6. Recommended filtration-ISO 4406 19/17/14
7. Max operation temp-180°F
8. In exposed environments, do not mount with spool vertical and handle end down.

**RD-2575-T4-ESA 1 PARTS BREAKDOWN**

**NON-STANDARD RELIEF SETTINGS**
RD2575-T4-ESA1-25
THE LAST TWO DIGITS ARE THE RELIEF SETTING
IN HUNDREDS, Ex: 25=2500 PSI @ 12 GPM. ALL RELIEFS ARE SET AT 12 GPM.

**ITEM** | **PART NUMBER** | **DESCRIPTION**
---|---|---
1 | 660130001 | HANDLE KIT
2 | 660125004 | RELIEF KIT
3 | 660525001 | SEAL KIT
4 | 660125002 | SPRING CENTER KIT
5 | 660150015 | LOAD CHECK KIT
6 | 660125001 | 3 POSITION DETENT KIT

**OPEN TO CLOSED CENTER CONVERSION**
This feature allows an otherwise open center valve to be converted to closed center operation. As shown, a 3/8 NPTF pipe plug is installed in the bottom of the outlet port to block open center passage. A pipe thread sealant should be used. This feature is standard on all RD-2500 valves except for the 1/2 NPTF inlet and outlet port option. The pipe plug is included with these models. Discard the pipe plug if the valve is used on an open center application. PLEASE NOTE that this closed center option does not provide for the drain off of standby spool leakage. This can allow a very small amount of oil to enter the work ports when in neutral.

**NOTE:** The Spool is matched to the valve body at the factory and therefore body and spool are not available as repair parts.
### PRESSURE DROP

<table>
<thead>
<tr>
<th>FLOW (GPM)</th>
<th>RD-2500</th>
<th>LS-3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>9</td>
<td>39</td>
</tr>
<tr>
<td>15</td>
<td>19</td>
<td>60</td>
</tr>
<tr>
<td>20</td>
<td>31</td>
<td>90</td>
</tr>
</tbody>
</table>

#### 110 SUS OIL AT 115° \(\Delta P\text{-PSI}\)

### STANDARD VALVES AVAILABLE

All standard valves have a load check (except LS3000 models), a complete lever handle assembly, and an adjustable ball-spring relief, see below for settings. For other relief settings, please specify.

#### VALVE PART NUMBER

<table>
<thead>
<tr>
<th>VALVE PART NUMBER</th>
<th>SPOOL TYPE</th>
<th>SPOOL ACTION</th>
<th>PRESSURE DROP</th>
<th>IN/OUT PORT SIZE</th>
<th>WORK PORT SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD-2555-T4-ESA1</td>
<td>X</td>
<td>X</td>
<td>1/2 NPTF</td>
<td>2/2 NPTF</td>
<td>1500 PSI @ 12 GPM</td>
</tr>
<tr>
<td>RD-2575-T4-ESA1</td>
<td>X</td>
<td>X</td>
<td>3/4 NPTF</td>
<td>2/2 NPTF</td>
<td>1500 PSI @ 12 GPM</td>
</tr>
<tr>
<td>RD-2575-T4-EDA1</td>
<td>X</td>
<td>X</td>
<td>3/4 NPTF</td>
<td>2/2 NPTF</td>
<td>1500 PSI @ 12 GPM</td>
</tr>
<tr>
<td>RD-2575-M3-ESA1</td>
<td>X</td>
<td>X</td>
<td>3/4 NPTF</td>
<td>2/2 NPTF</td>
<td>1500 PSI @ 12 GPM</td>
</tr>
<tr>
<td>RD-2508-T4-ESA1</td>
<td>X</td>
<td>X</td>
<td>#10 SAE</td>
<td>#8 SAE</td>
<td>1500 PSI @ 12 GPM</td>
</tr>
<tr>
<td>RD-2575-M4-EDA1</td>
<td>X</td>
<td>X</td>
<td>3/4 NPTF</td>
<td>2/2 NPTF</td>
<td>1500 PSI @ 12 GPM</td>
</tr>
<tr>
<td>LS-3000-1 (detent spool out)</td>
<td>X</td>
<td>X</td>
<td>3/4 NPTF</td>
<td>2/2 NPTF</td>
<td>2250 PSI @ 3 GPM</td>
</tr>
<tr>
<td>LS-3000-9 (detent spool out)</td>
<td>X</td>
<td>X</td>
<td>3/4 BSPP</td>
<td>2/2 BSPP</td>
<td>2250 PSI @ 3 GPM</td>
</tr>
<tr>
<td>LS-3000-2 (detent spool out)</td>
<td>X</td>
<td>X</td>
<td>3/4 NPTF</td>
<td>2/2 NPTF</td>
<td>2250 PSI @ 3 GPM</td>
</tr>
<tr>
<td>LS-3060-1 (detent spool in)</td>
<td>X</td>
<td>X</td>
<td>3/4 NPTF</td>
<td>2/2 NPTF</td>
<td>2250 PSI @ 3 GPM</td>
</tr>
<tr>
<td>LS-3060-9 (detent spool in)</td>
<td>X</td>
<td>X</td>
<td>3/4 BSPP</td>
<td>2/2 BSPP</td>
<td>2250 PSI @ 3 GPM</td>
</tr>
<tr>
<td>LS-3040-1</td>
<td>X</td>
<td>X</td>
<td>3/4 NPTF</td>
<td>2/2 NPTF</td>
<td>2250 PSI @ 3 GPM</td>
</tr>
<tr>
<td>LSR-3060-3 (detent spool in)</td>
<td>X</td>
<td>X</td>
<td>1/2 NPTF</td>
<td>1/2 BSPP</td>
<td>2250 PSI @ 3 GPM</td>
</tr>
<tr>
<td>LSR-3060-8 (detent spool in)</td>
<td>X</td>
<td>X</td>
<td>1/2 BSPP</td>
<td>1/2 BSPP</td>
<td>2250 PSI @ 3 GPM</td>
</tr>
</tbody>
</table>

### 4 WAY SPOOL

This spool option is used to control a double acting cylinder. In neutral, both of the work ports are blocked and oil goes through the open center passage to the outlet. This is the most popular spool option.

![4 Way Spool Diagram](image)

### 3 WAY SPOOL

This spool option is used to control a single acting cylinder or a uni-directional motor. In neutral the work port is blocked and oil goes through the open center passage to the outlet. The “B” work port is plugged for this option.

![3 Way Spool Diagram](image)

### 4 WAY MOTOR SPOOL

This spool option is used to control a reversing motor or a double acting cylinder. In neutral the work ports are connected to tank and oil goes through the open center passage to the outlet. This allows a motor to free-wheel or a cylinder to float in the neutral position.

![4 Way Motor Spool Diagram](image)

### LOAD CHECK

The load check feature is standard on all RD-2500 valve models. The load check will prevent the fall of a cylinder as the spool is shifted. It does this by preventing the back-flow of oil from work port to inlet. The pump must build up enough pressure to overcome the pressure on the work port and lift the load check poppet. The load check has nothing to do with holding a cylinder when the spool is in neutral.

![Load Check Diagram](image)
## PRESSURE COMPENSATED ADJUSTABLE FLOW CONTROL VALVES

### MODEL RD-100
**TOP PORT FLOW CONTROL**

![Image of RD-100 valve](image1.png)

The PRINCE valve models RD-100 and RD-1900 are pressure compensated adjustable flow control valves. By rotating the handle, the flow out the "CF", or controlled flow port, can be varied from approximately 0 to the maximum controlled flow shown in the chart below. Any remaining flow is bypassed to the "EF" or excess flow port. This flow can be used to power another circuit or can be returned to tank. Once the controlled flow is set it will remain nearly constant with variations in pressure on either the controlled or excess flow ports.

Please note: If during operation the controlled flow port is blocked the valve will compensate in such a way as to shut off flow to the excess port.

These valves can also be used as a restrictive flow control by plugging the excess flow port.

The PRINCE valve models RDRS-100 and RDRS-1900 have a built in adjustable pressure relief. For these models the excess flow port must be connected to tank.

It should be noted that whenever these or any valve is used to bypass or restrict, flow heat will be generated. Steps may be required to keep oil temperature from becoming too high.

### VALVE SPECIFICATIONS:
- **Capacity:** 30 gpm max inlet flow
- **Pressure:** 3000 psi max
- **Weight:**
  - RD-100: 8 lbs.
  - RD-1900: 9 lbs.

### FIELD REPAIR KITS:
- Handle hardware: 660301002
- Seal Kit: 660501001

## STANDARD MODELS AVAILABLE

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>PORT SIZES</th>
<th>CONTROLLED FLOW RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD-137-8</td>
<td>3/8 NPTF</td>
<td>0-8 GPM</td>
</tr>
<tr>
<td>RD-150-8</td>
<td>1/2 NPTF</td>
<td>0-8 GPM</td>
</tr>
<tr>
<td>RD-150-16</td>
<td>1/2 NPTF</td>
<td>0-16 GPM</td>
</tr>
<tr>
<td>RD-175-16</td>
<td>3/4 NPTF</td>
<td>0-16 GPM</td>
</tr>
<tr>
<td>RD-175-30</td>
<td>3/4 NPTF</td>
<td>0-30 GPM</td>
</tr>
<tr>
<td>RD-108-8</td>
<td>#8 SAE</td>
<td>0-8 GPM</td>
</tr>
<tr>
<td>RD-112-30</td>
<td>#12 SAE</td>
<td>0-30 GPM</td>
</tr>
<tr>
<td>RDRS-150-16</td>
<td>1/2 NPTF</td>
<td>0-16 GPM</td>
</tr>
<tr>
<td>RDRS-175-30</td>
<td>3/4 NPTF</td>
<td>0-30 GPM</td>
</tr>
</tbody>
</table>

For Other Relief Settings Please Specify:

- **RDRS-150-16-20**
  - Relief Pressure in Hundreds Example: 20=2000 PSI
- **RDRS-1950-16-20**
  - Relief Pressure in Hundreds Example: 20=2000 PSI

These models have built in relief set at 1500 psi @ 10 GPM. Adjustment Range 1000 to 2500 psi

Special combinations of port size and controlled flow range are available in O E M quantities. Please consult your sales representative.

### SYMBOL

- **CF**
- **EF**
- **IN**

![Diagram of CF and EF symbols](image2.png)
MODEL RD-100 AND RD-1900
PARTS BREAKDOWN AND DIMENSIONS

As illustrated in the circuit below the RD-100/RD-1900 adjustable flow control valves can be used to control the speed of a hydraulic motor. In this circuit oil from a source is directed into the inlet of the valve. By moving the handle the flow can be varied from approximately zero when handle is vertical to maximum when the handle is horizontal. Oil not going to the controlled flow port is bypassed to the excess flow port where it can be used to supply another circuit or returned to tank. Instead of the control flow directly supplying a motor it can be used as an adjustable priority divider and provide adjustable priority flow to a directional control valve bank. Also as illustrated the RD-100/RD-1900 can be used as a restrictive type flow control. In this circuit the excess flow port is blocked. This would normally be used with a pressure compensated pump or in a closed center system.

APPLICATONS:

**BYPASS FLOW CIRCUIT**

- MOTOR
- TO TANK OR SECONDARY CIRCUIT
- (CONTROLLED FLOW PORT)
- (EXCESS FLOW PORT)
- RD-100

**RESTRICTIVE FLOW CIRCUIT**

- MOTOR
- (CONTROLLED FLOW PORT)
- (EXCESS FLOW PORT PLUGGED)
- RD-100

**VALVES**
CONSTANT VOLUME PRIORITY DIVIDERS

MODEL RD-400
FIXED FLOW PRIORITY DIVIDER

The PRINCE model RD-400 is a constant volume priority divider. It can be used in applications where two circuits are to be supplied by a single pump such as power steering systems. In operation the flow of oil supplied to the inlet is divided into two flows, the priority flow and the excess flow. The priority flow will remain nearly constant with variations in pressure on either the priority or excess flow port and will also remain nearly constant with variations in the inlet flow.

The priority flow GPM is determined by a fixed orifice inside the main spool. The desired priority GPM must be specified with model number, see below. The PRINCE model RD-400-R provides the same function as described above with the addition of a built in pressure relief for the priority port only. This relief is internally adjustable and requires a separate line to tank. The relief is factory set at 1500 PSI. Relief Range is 500 to 2500psi.

VALVE SPECIFICATIONS:
Capacity: 30 gpm max inlet flow Weight: RD-400 7 lbs.
Pressure: 3000 psi max RD-400-R 7.5 lbs.

To complete the model number fill in the blank with the desired priority GPM from the list at right.
EX: RD-400-3 for 3 GPM priority flow; RD-405-R-6 for 6 GPM priority flow.

MODEL RD-400-R
FIXED FLOW PRIORITY DIVIDER WITH PRIORITY PRESSURE RELIEF

MODEL RD-500
ADJUSTABLE FLOW PRIORITY DIVIDER

The PRINCE model RD-500 is an adjustable constant volume priority divider. This valve provides the same function as the PRINCE model RD-400 except the priority flow is adjustable from 2 GPM to 12 GPM. The priority flow is set using the adjusting screw and is then locked in place to maintain setting. This allows setting to be fine tuned in the field to the exact flow needed.

VALVE SPECIFICATIONS
Capacity: 30 gpm max inlet flow
Pressure: 3000 psi max
Weight: 7 lbs.

V78

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SEE PAGE 19 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING
MODEL RD-400, RD-400R AND RD-500
PARTS BREAKDOWN AND DIMENSIONS

RD-400

NOTE: spools are not available separately
The PRINCE model RD-200 valve is a pressure compensated proportional flow divider. The standard models of this valve will take one inlet flow and split it into two nearly equal outlet flows. The valve is also available with special ratio spools which will split the flow into two flows proportional to the ratio specified. Because the valve is pressure compensated the valve will maintain the divider ratio with quite different loads on the outlet ports as long as the inlet flow is within the range given in the chart below. Flow through the RD-200 cannot be reversed.

The PRINCE model RD-300 provides the same function as the RD-200 with the added feature of free reverse checks. This allows the reverse flow of oil from the outlet ports to the inlet port. The reverse flow is not pressure compensated.

### Valve Specifications:
- **Capacity:** 30 gpm max inlet flow
- **Weight:** RD-200 7 lbs.
- **Pressure:** 3000 psi max

### Models Available

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Divider Ratio</th>
<th>Port Size</th>
<th>Inlet Flow Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD-237-8</td>
<td>50:50</td>
<td>3/8 NPTF</td>
<td>4-8 GPM</td>
</tr>
<tr>
<td>RD-250-16</td>
<td>50:50</td>
<td>1/2 NPTF</td>
<td>8-16 GPM</td>
</tr>
<tr>
<td>RD-275-30</td>
<td>50:50</td>
<td>3/4 NPTF</td>
<td>16-30 GPM</td>
</tr>
<tr>
<td>RD-300-8</td>
<td>50:50</td>
<td>3/4 16 SAE</td>
<td>4-8 GPM</td>
</tr>
<tr>
<td>RD-312-30</td>
<td>50:50</td>
<td>1-1/16-12 SAE</td>
<td>16-30 GPM</td>
</tr>
</tbody>
</table>

In OEM quantities the RD-200 and RD-300 valves are available with special divider ratios. Ratios available are: 2:1, 80:20, 70:30, 60:40, and others as required. When ordering specify the divider ratio after the model number. EXAMPLE: RD-250-16 (70:30)

The PRINCE model RD-500P is a pressure compensated proportional flow divider valve with one fixed and one adjustable orifice. This valve provides the same function as the RD-200 except the divider ratio can be changed in the field.

### Valve Specifications:
- **Capacity:** 30 gpm max inlet flow
- **Weight:** RD-500P 7 lbs.
- **Pressure:** 3000 psi max

### Models Available

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Port Size</th>
<th>Inlet Flow Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD-537P-B</td>
<td>3/8 NPTF</td>
<td>4-8 GPM</td>
</tr>
<tr>
<td>RD-550P-B</td>
<td>1/2 NPTF</td>
<td>8-16 GPM</td>
</tr>
<tr>
<td>RD-575P-B</td>
<td>3/4 NPTF</td>
<td>16-30 GPM</td>
</tr>
</tbody>
</table>

The PRINCE valve model RD-1000-S is an internally piloted adjustable sequence valve. This valve will prevent the flow of oil from going to the sequence port until the pressure on the inlet port reaches the sequence pressure. The sequence pressure is adjustable within the range given in chart below. A built in check valve allows flow from sequence port to inlet. To operate properly the drain port must be connected to tank. This valve is a spool type sequence valve and will provide smooth operation but should not be used in applications that require low leakage.

### Valve Specifications:
- **Capacity:** 30 gpm max inlet flow
- **Weight:** 7 lbs.
- **Pressure:** 3000 psi max

### Models Available

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Port Size Inlet and Sequence</th>
<th>Drain Port</th>
<th>Spring</th>
<th>Sequence Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD-1050-S</td>
<td>1/2 NPTF</td>
<td>3/8 NPTF</td>
<td>L</td>
<td>40-350 PSI</td>
</tr>
<tr>
<td>RD-1075-S</td>
<td>3/4 NPTF</td>
<td>3/8 NPTF</td>
<td>M</td>
<td>350-1700 PSI</td>
</tr>
</tbody>
</table>

To complete the model number fill in the blank with the spring letter that corresponds to desired counter balance pressure range. EXAMPLE: RD-1050SM for 350-1700 psi spring range. Standard settings are 300 psi, 1500 psi and 1500 psi for ranges L, M and H respectively.

---

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SEE PAGE 19 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING
MODEL RD-200, RD-300, RD-300-AB, RD-500P, AND RD-1000S PARTS BREAKDOWN AND DIMENSIONS

**RD-200**

![Diagram of RD-200 valve]

**RD-300**

![Diagram of RD-300 valve]

**RD-500P**

![Diagram of RD-500P valve]

**RD-1000S**

![Diagram of RD-1000S valve]

**Model RD-200**

- **Seal Kit No. 660502001**

**Model RD-300**

- **Seal Kit No. 660503001**

**Model RD-500P**

- **Seal Kit No. 660505001**

**Model RD-1000S**

- **Seal Kit No. 660510001**

The RD-300AB valve has a built-in automatic bypass. This allows oil to crossover from one outlet to the other when the pressure difference between the two outlet reaches 750 PSI.
### Differential Poppet Style Relief Valves - RV and DRV Series

#### Model RV
**Differential Poppet Inline Relief**

The PRINCE valve model RV is a differential poppet type inline relief. The valve is made up of a relief cartridge and a cast iron valve body. The differential poppet type relief provides smooth quiet performance with a minimum variation between cracking and full flow pressures. This type relief is also less sensitive to system contamination. The model RV is well suited as a system relief up to 30 GPM and 3000 psi. It is available in two pressure ranges and both an externally adjustable and shim adjustable version.

**Valve Specifications:**
- Capacity: 30 gpm max inlet flow
- Pressure: 3000 psi max
- Weight: 3 lbs.

#### Model DRV
**Differential Poppet Double Relief**

The PRINCE valve model DRV is a differential poppet type double relief. This valve uses the same relief cartridge as the model RV. The double relief is used in systems that require cross over relief protection such as reversible hydraulic motor, or double acting cylinders.

**Valve Specifications:**
- Capacity: 30 gpm max inlet flow
- Pressure: 3000 psi max
- Weight: 5.5 lbs.

#### Model RV-0
**Differential Poppet Relief Cartridge**

The PRINCE valve model RV-0 is the differential poppet relief cartridge used in many valve models. It is available preset to install into RV valves in the field or into a custom application. This relief cartridge can also be used in the RD5100, RD5200, RD5300 and SV stack valve inlet section.

**Valve Specifications:**
- Capacity: 30 gpm max inlet flow
- Pressure: 3000 psi max

### Standard Models Available

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Valve Type</th>
<th>Relief Setting</th>
<th>Port Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>RV-1H</td>
<td>Adjustable 1500-3000 PSI</td>
<td>2000 PSI @ 10 GPM</td>
<td>#12 SAE</td>
</tr>
<tr>
<td>DRV-1HH</td>
<td>Adjustable 1500-3000 PSI</td>
<td>2000 PSI @ 10 GPM</td>
<td>3/4” NPTF</td>
</tr>
<tr>
<td>RV-2H</td>
<td>Adjustable 1500-3000 PSI</td>
<td>2000 PSI @ 10 GPM</td>
<td>1/2” NPTF</td>
</tr>
<tr>
<td>DRV-2HH</td>
<td>Adjustable 1500-3000 PSI</td>
<td>2000 PSI @ 10 GPM</td>
<td>3/4” NPTF</td>
</tr>
<tr>
<td>RV-4H</td>
<td>Adjustable 1500-3000 PSI</td>
<td>1000 PSI @ 10 GPM</td>
<td>1/2” NPTF</td>
</tr>
<tr>
<td>DRV-4HH</td>
<td>Adjustable 500-1500 PSI</td>
<td>1000 PSI @ 10 GPM</td>
<td>1” NPTF</td>
</tr>
<tr>
<td>RV-2L</td>
<td>Adjustable 500-1500 PSI</td>
<td>1000 PSI @ 10 GPM</td>
<td>1” NPTF</td>
</tr>
<tr>
<td>DRV-2LL</td>
<td>Adjustable 500-1500 PSI</td>
<td>1000 PSI @ 10 GPM</td>
<td>1” NPTF</td>
</tr>
</tbody>
</table>

See Page 19 & 20 of the Standard Product Price List for Pricing
MODEL RV AND DRV SPECIAL MODELS AND MOUNTING DIMENSIONS

SPECIAL MODEL RV RELIEF VALVES
Other relief valve models not listed on previous page are available in OEM quantities. To select a model number use the order code matrix shown at right. Consult a sales representative if options other than those listed are required.

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>PORT SIZE</th>
<th>RELIEF TYPE</th>
<th>PRESSURE SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>RV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RV</td>
<td>1 - #12 SAE</td>
<td>H- Adjustable</td>
<td>Specify Relief Pressure in PSI. Leave Blank for Standard Setting</td>
</tr>
<tr>
<td>RV</td>
<td>2 - #12 SAE</td>
<td>L- Adjustable</td>
<td>1500-3000 PSI</td>
</tr>
<tr>
<td>RV</td>
<td>3 - #12 SAE</td>
<td>NL- Non-Adjustable</td>
<td>500-1500 PSI</td>
</tr>
<tr>
<td>RV</td>
<td>4 - 1/2 NPTF</td>
<td>NH- Non-Adjustable</td>
<td>1500-3000 PSI</td>
</tr>
<tr>
<td>RV</td>
<td>5 - #12 SAE</td>
<td>NL- Non-Adjustable</td>
<td>500-1500 PSI</td>
</tr>
<tr>
<td>RV</td>
<td>6 - #12 SAE</td>
<td>No Body.</td>
<td></td>
</tr>
</tbody>
</table>

SPECIAL MODEL DRV RELIEF VALVES
Other relief valve models not listed on previous page are available in OEM quantities. To select a model number using the order code matrix at right. Consult a sales representative if options other than those listed are required.

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>PORT SIZE</th>
<th>RELIEF TYPE</th>
<th>PRESSURE SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRV</td>
<td>0 - Cartridge only; No Body.</td>
<td>H- Adjustable</td>
<td>Specify Relief Pressure in PSI. Leave Blank for Standard Setting</td>
</tr>
<tr>
<td>DRV</td>
<td>1 - #12 SAE</td>
<td>L- Adjustable</td>
<td>1500-3000 PSI</td>
</tr>
<tr>
<td>DRV</td>
<td>2 - #12 SAE</td>
<td>NL- Non-Adjustable</td>
<td>500-1500 PSI</td>
</tr>
<tr>
<td>DRV</td>
<td>3 - #12 SAE</td>
<td>NH- Non-Adjustable</td>
<td>1500-3000 PSI</td>
</tr>
<tr>
<td>DRV</td>
<td>4 - 1/2 NPTF</td>
<td>NL- Non-Adjustable</td>
<td>500-1500 PSI</td>
</tr>
<tr>
<td>DRV</td>
<td>5 - #12 SAE</td>
<td>No Body.</td>
<td></td>
</tr>
</tbody>
</table>

RV-SERIES MOUNTING DIMENSIONS

|                     |                     |                     |
|                     |                     |                     |
|                     |                     |                     |
|                     |                     |                     |

DRV-SERIES MOUNTING DIMENSIONS

|                     |                     |                     |
|                     |                     |                     |
|                     |                     |                     |
|                     |                     |                     |

FIELD CONVERSION KITS:
660250002  ADJ. RELIEF CARTRIDGE 1500-3000 PSI RV ONLY
660250003  ADJ. RELIEF CARTRIDGE 500-1500 PSI RV ONLY
660250004  NON-ADJUSTABLE RELIEF CARTRIDGE 1500-3000 PSI RV ONLY
660250005  NON-ADJUSTABLE RELIEF CARTRIDGE 500-1500 PSI RV ONLY
660250011  ADJ. RELIEF CARTRIDGE 500-3000 PSI DRV ONLY
660250012  NON-ADJUSTABLE RELIEF CARTRIDGE 1500-3000 DRV ONLY
660250015  Adj Relief Cartridge 500-1500 PSI DRV ONLY
660250016  Non-Adjustable Relief Cartridge 500-1500 PSI DRV ONLY
660590001  RV SEAL KIT
660590004  DRV SEAL KIT
670300005  1500-3000 PSI RELIEF SPRING
670300008  500-1500 PSI RELIEF SPRING

NOTE: The RV and DRV cartridges are not the same. To order a non-preset cartridge, use the 9-digit part number above. To order a Preset Cartridge, use the RV-0x-xx option above or the DRV-0x-xx option above.

RV-SERIES RELIEF CURVES

AT VARIOUS SET POINTS.
110 SUS OIL AT 115°F.

FLOW (GPM)
PRESSURE (PSI)

MACHINING DIMENSIONS FOR RELIEF VALVE CARTRIDGE

TANK CAVITY
NO. 10 SAE PORT
7/8-14 UNF-2B X 0.625 DEEP

TANK PORT
PRESSURE PORT

SEE PAGE 19 & 20 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING
MODEL RD-1800 PRESSURE RELIEF
MODEL RD-900 SELECTOR VALVE

The PRINCE valve model RD-1800 is a direct acting ball/spring type pressure relief. The valve is compact and simple in design. This type relief is fast opening and is well suited for pressure spike protection. The performance curves below indicate the low cracking pressure typical to ball/spring reliefs. Please refer to the model RV relief for a system pressure relief. The valve is available with a standard steel seat, model RD-1800S, or with a hardened seat, model RD-1800H. Both models are externally adjustable.

**VALVE SPECIFICATIONS:**
- **Capacity:** 20 gpm max inlet flow
- **Pressure:** 2500 psi max
- **Weight:** 2 lb.
- **Adjustment Range:** 1000 PSI to 2500 PSI

**SYMBOL**

**STANDARD MODELS AVAILABLE**

<table>
<thead>
<tr>
<th>MODEL #</th>
<th>PORT SIZES</th>
<th>MAX FLOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD-1837-S</td>
<td>3/8 NPTF</td>
<td>8 GPM</td>
</tr>
<tr>
<td>RD-1850-H</td>
<td>1/2 NPTF</td>
<td>16 GPM</td>
</tr>
<tr>
<td>RD-1850-S</td>
<td>1/2 NPTF</td>
<td>16 GPM</td>
</tr>
<tr>
<td>RD-1875-S</td>
<td>3/4 NPTF</td>
<td>20 GPM</td>
</tr>
</tbody>
</table>

**NOTE:** Relief settings are 1500 PSI @ 12 GPM. For non-standard relief settings specify PSI in hundreds and GPM after model number.

**EX:** RD-1850-S-12-10 for 1200 PSI @ 10 GPM

The PRINCE valve model RD-900 is a manual 3-way 2-position selector valve. This valve will allow one pump source to supply two separate circuits. Pushing the handle in diverts oil flow to port away from handle. Pulling the handle out diverts oil flow to port nearest handle.

**VALVE SPECIFICATIONS**
- **Capacity:** 30 gpm max inlet flow
- **Pressure:** 3000 psi max
- **Weight:** 7 lbs.

**SYMBOL**

**STANDARD MODELS**

<table>
<thead>
<tr>
<th>MODEL #</th>
<th>PORT SIZES</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD-950</td>
<td>1/2 NPTF</td>
</tr>
<tr>
<td>RD-975</td>
<td>3/4 NPTF</td>
</tr>
</tbody>
</table>

SEAL KIT 660590025

SEE PAGE 19 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING
**SINGLE SELECTOR VALVE**

The PRINCE valve model SS is a manual 3-way 2 position selector valve. This valve will allow one pump source to supply two circuits. With the standard selector spool pulling the spool out diverts oil to port nearest handle, pushing the spool in diverts oil to the port away from the handle. The valve has an inlet on both the bottom and front of the valve body. Special options include lever handle and a float spool. The float spool connects the inlet to both outlets when the spool is pushed in and blocks both outlets when spool is pulled out.

**VALVE SPECIFICATIONS:**
- Capacity: 20 gpm max inlet flow
- Pressure: 3000 psi
- Weight: 4 lbs.

*For use at 3000 psi, a lever handle (handle option E) is recommended.

**STANDARD MODELS AVAILABLE**

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>PORT SIZE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS-2A1D</td>
<td>1/2 NPTF</td>
<td>SELECTOR WITH KNOB HANDLE</td>
</tr>
<tr>
<td>SS-3A1D</td>
<td>#8 SAE</td>
<td>SELECTOR WITH KNOB HANDLE</td>
</tr>
<tr>
<td>SS-2A1A</td>
<td>1/2 NPTF</td>
<td>SELECTOR WITHOUT ATTACHMENTS</td>
</tr>
<tr>
<td>SS-2A1E</td>
<td>1/2 NPTF</td>
<td>SELECTOR WITH LEVER HANDLE</td>
</tr>
<tr>
<td>SS-2A1B</td>
<td>1/2 NPTF</td>
<td>SELECTOR WITH CLEVIS</td>
</tr>
</tbody>
</table>

**PARTS BREAKDOWN AND DIMENSIONS**

**MODEL SS**

**LEVER HANDLE OPTION E**
- KIT NO. 660170007
- KIT INCLUDES:
  - .25 WIDE CLEVIS
  - .187 DIA PINS

**KNOB OPTION D**
- PART NO. 670400031
- KIT INCLUDES:
  - .38 SPOOL TRAVEL
  - 3.52 SPOOL ATTACHMENTS
  - 2.08 ROLLER MAY BE MOUNTED VERTICAL OR HORIZONTAL

**SPECIAL MODEL SS SELECTOR VALVES**

Other selector valves not listed as standard above are available in OEM quantities. To select a model number use the order code matrix at right. Consult a sales representative if options other than those listed are required.
The PRINCE valve model DS is a manual 6-way 2 position double selector valve. This valve will divert the flow going to two separate hydraulic circuits. For example two double acting cylinders or two reversible hydraulic motors can be operated by one four-way valve. When the double selector spool is pushed in, the C and D ports (top ports) are connected to the A and E ports (right ports). When the selector spool is pulled out, the C and D ports are connected to the B and F ports (left ports). An optional series/parallel spool is also available. This spool will run two reversible hydraulic motors in series when the spool is out and in parallel when the spool is pushed in.

**VALVE SPECIFICATIONS:**
- Capacity: 40 GPM max inlet flow
- Pressure: 2500 psi
- Weight: 9 lbs.

**KITS:**
- LEVER HANDLE 660170001
- SPRING OFFSET KIT 660170003
- 2 POSITION DETENT KIT 660170004
- END CAP KIT 660170010
- SEAL KIT 660590005
- KNOB PART NO. 670400029
- SNAP RING PART NO. 230017018
- CLEVIS PART NO. 671400059

**STANDARD MODELS AVAILABLE**

<table>
<thead>
<tr>
<th>MODEL #</th>
<th>PORT SIZE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS-4A1E</td>
<td>3/4 NPTF</td>
<td>DOUBLE SELECTOR WITH LEVER HANDLE</td>
</tr>
<tr>
<td>DS-5A1E</td>
<td>#12 SAE</td>
<td>DOUBLE SELECTOR WITH LEVER HANDLE</td>
</tr>
<tr>
<td>DS-4A1D</td>
<td>3/4 NPTF</td>
<td>DOUBLE SELECTOR WITH KNOB HANDLE</td>
</tr>
<tr>
<td>DS-4A1A</td>
<td>3/4 NPTF</td>
<td>DOUBLE SELECTOR WITHOUT ATTACHMENTS</td>
</tr>
<tr>
<td>DS-1A1E</td>
<td>1/2 NPTF</td>
<td>DOUBLE SELECTOR WITH LEVER HANDLE</td>
</tr>
</tbody>
</table>

**SPECIAL MODEL DS SELECTOR VALVES**

Other double selector valves not listed as standard are available in OEM quantities. To select a model number use the order code matrix below. Consult a sales representative if options other than those listed are required.

**STANDARD PRODUCT PRICE LIST FOR PRICING**
PILOT-OPERATED CHECK VALVES

MODEL RD-1400
LOCK VALVE DOUBLE PILOT-OPERATED

The PRINCE valve model RD-1400 is a double pilot-operated lock valve. This valve will lock a cylinder in place when a directional control valve is in the neutral position. In operation oil is directed to one of the valve ports and oil can free flow to the corresponding cylinder port. The pressure on this valve port will shift the pilot spool opening the opposite check valve. This will allow oil to return through the opposite check valve. This valve has a hardened steel seat and steel ball and therefore should not be used in applications requiring absolutely zero leakage. When using a pilot operated check to lower a heavy load the valve may chatter. An orifice in the line in some cases may be beneficial.

STANDARD MODELS AVAILABLE

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>PORT SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD-1450</td>
<td>1/2 NPTF</td>
</tr>
<tr>
<td>RD-1475</td>
<td>3/4 NPTF</td>
</tr>
</tbody>
</table>

VALVE SPECIFICATIONS:
- Capacity: 30 gpm max inlet flow
- Pressure: 3000 psi max
- Weight: 7 lbs.
- Pilot Ratio: 4:1
- Decompression Ratio: 16:1

MODEL RD-1600
PILOT OPERATED CHECK VALVE

The PRINCE valve model RD-1600 is a pilot operated check valve. This valve blocks oil from flowing from the cylinder port to the valve port until sufficient pressure is applied to the pilot port. Oil can free flow from the valve port to the cylinder port. The valve has a two stage poppet allowing smooth chatter free operation.

STANDARD MODELS AVAILABLE

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>VALVE AND CYL. PORT</th>
<th>PILOT PORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD-1637</td>
<td>3/8 NPTF</td>
<td>1/4 NPTF</td>
</tr>
<tr>
<td>RD-1650</td>
<td>1/2 NPTF</td>
<td>1/4 NPTF</td>
</tr>
<tr>
<td>RD-1608</td>
<td>#8 SAE (3/4-16)</td>
<td>#4 SAE (7/16-20)</td>
</tr>
</tbody>
</table>
MISCELLANEOUS INFORMATION

Hydraulic Fluid – Good-quality mineral-based hydraulic fluid is recommended. Any fluid used must be compatible with the Buna-N in the Seals typically used in the standard valves. Filtration – For general purpose valves, fluid cleanliness should meet the ISO 4406 19/17/14 level. For extended life or for pilot operated valves, the 18/16/13 fluid cleanliness is recommended.

Thread Sealant – Use a quality non-Teflon thread sealant is recommended for tapered pipe threads. (Use of Teflon tape is not recommended.)

MALVASE FORMULARY AND DESIGN INFORMATION

<table>
<thead>
<tr>
<th>cylinder area (sq.in)</th>
<th>cylinder dia. (inches)</th>
<th>psi x' 7854</th>
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<tr>
<td>1.00</td>
<td>1.00</td>
<td>1.27</td>
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<td>1.13</td>
<td>1.13</td>
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<td>3.78</td>
</tr>
<tr>
<td>4.00</td>
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HYDRAULIC CYLINDER FORCE (lbs.)

<table>
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<th>CYL. DIA.</th>
<th>PSI</th>
<th>500</th>
<th>1000</th>
<th>1500</th>
<th>2000</th>
<th>3000</th>
<th>4000</th>
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<tr>
<td>1/8</td>
<td>30</td>
<td>52</td>
<td>68</td>
<td>90</td>
<td>120</td>
<td>160</td>
<td>220</td>
</tr>
<tr>
<td>3/32</td>
<td>50</td>
<td>83</td>
<td>109</td>
<td>143</td>
<td>194</td>
<td>258</td>
<td>344</td>
</tr>
<tr>
<td>1/4</td>
<td>75</td>
<td>124</td>
<td>161</td>
<td>215</td>
<td>286</td>
<td>378</td>
<td>500</td>
</tr>
<tr>
<td>5/32</td>
<td>100</td>
<td>166</td>
<td>222</td>
<td>296</td>
<td>393</td>
<td>511</td>
<td>664</td>
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<td>3/8</td>
<td>150</td>
<td>245</td>
<td>326</td>
<td>433</td>
<td>566</td>
<td>728</td>
<td>931</td>
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<tr>
<td>7/32</td>
<td>200</td>
<td>326</td>
<td>433</td>
<td>566</td>
<td>728</td>
<td>931</td>
<td>1180</td>
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<tr>
<td>1/2</td>
<td>250</td>
<td>400</td>
<td>533</td>
<td>683</td>
<td>866</td>
<td>1083</td>
<td>1350</td>
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HYDRAULIC CYLINDER SPEED (inches/second)

<table>
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<tr>
<th>PSI</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
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<tbody>
<tr>
<td>100</td>
<td>0.5</td>
<td>0.55</td>
<td>0.60</td>
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<tr>
<td>200</td>
<td>0.60</td>
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<td>0.70</td>
<td>0.75</td>
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<td>300</td>
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<td>400</td>
<td>0.70</td>
<td>0.75</td>
<td>0.80</td>
<td>0.85</td>
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To convert

<table>
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<th>inches</th>
<th>multiplier</th>
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<tbody>
<tr>
<td>meters</td>
<td>39.37</td>
<td></td>
</tr>
<tr>
<td>centimeters</td>
<td>0.3937</td>
<td></td>
</tr>
<tr>
<td>millimeters</td>
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<tr>
<td>inches</td>
<td>0.0254</td>
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HYDRAULIC PUMP

Formula:

\[ \text{GPM} = \frac{1}{2} \times \left( \frac{\text{PSI}}{231} \right) \times \left( \frac{\text{cfm}}{0.8} \right) \times \left( \frac{\text{r/min}}{60} \right) \]

<table>
<thead>
<tr>
<th>GPM</th>
<th>PSI</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
<th>900</th>
<th>1000</th>
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<tbody>
<tr>
<td>1/4</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.06</td>
</tr>
<tr>
<td>3/8</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.09</td>
</tr>
<tr>
<td>1/2</td>
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PRESURE DROP ACROSS AN ORIFICE

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<th>Orifice Size</th>
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<td>1/4</td>
</tr>
<tr>
<td>1/2</td>
<td>3/8</td>
</tr>
<tr>
<td>1/2</td>
<td>1/2</td>
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<tr>
<td>1/2</td>
<td>5/8</td>
</tr>
<tr>
<td>1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>1/2</td>
<td>1</td>
</tr>
</tbody>
</table>

VALVES

<table>
<thead>
<tr>
<th>VALVE</th>
<th>SIZE</th>
<th>OPENING</th>
<th>MAX. PRESSURE</th>
<th>MIN. PRESSURE</th>
</tr>
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<tbody>
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<td>1/8</td>
<td>0.04</td>
<td>400</td>
<td>800</td>
<td>1600</td>
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<tr>
<td>3/32</td>
<td>0.06</td>
<td>600</td>
<td>1200</td>
<td>2400</td>
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<td>1/4</td>
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<td>800</td>
<td>1600</td>
<td>3200</td>
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<tr>
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<td>1000</td>
<td>2000</td>
<td>4000</td>
</tr>
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<td>3/8</td>
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<td>2400</td>
<td>4800</td>
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<td>2800</td>
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<tr>
<td>1/2</td>
<td>0.16</td>
<td>1600</td>
<td>3200</td>
<td>6400</td>
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</tbody>
</table>

V88 PRINCIPAL MANUFACTURING CORP. • NORTH SIOUX CITY, SOUTH DAKOTA 57049
URL: www.princehyd.com • E-MAIL: prince@princehyd.com • PHONE: (605) 235-1220

CAT# B88-04-21-01
## Parker Gresen to Prince Manufacturing

### Parker/Gresen Models: V20, V10, SP, SPK, 300, 400 & Accessory

<table>
<thead>
<tr>
<th>Series</th>
<th>Prince Manufacturing Models: Series 20, SV, RD5000, RD2500 &amp; Accessory</th>
<th>Parallel Work Sections</th>
<th>Parallel Work Sections 20 GPM 3500 PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARKER/GRESEN V20</td>
<td>PRINCE SERIES 20 STACKABLE VALVE</td>
<td>20-10-4 With K-20-VH-B Handle</td>
<td>20P1BA1AA 4 Way 3 Position, #10 SAE Ports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20-50-4 With K-20-VH-B Handle</td>
<td>20P4BA1AA 4 Way 3 Position, 1/2” NPTF Ports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20-10-4 With K-20-VH-B Handle and Two RC-2550 Work Port Reliefs</td>
<td>20P1BA1EE 4 Way 3 Position, #10 SAE Ports With 2500 PSI Work Port Reliefs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20-50-K4 With K-20-VH-B Handle</td>
<td>20P4DD1AA 4 Way 4 Position With Float, 1/2” NPTF Ports</td>
</tr>
<tr>
<td></td>
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<td>20-10-DF4 With K-20-VH-B Handle</td>
<td>20P1CB1AA 4 Way 3 Position, #10 SAE Ports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20T-10-04 With K-20-VH-B Handle</td>
<td>20T1BA1AA 4 Way 3 Position, #10 SAE Ports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20-10-L04 With K-20-VH-B Handle</td>
<td>20L1CA1 4 Way 3 Position, #10 SAE Ports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inlet Sections (Left Cover)</td>
<td>Inlet Sections (Left Cover)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20-LC-12 With WH-2550 Relief</td>
<td>20L2E 4 Way 3 Position, #8 SAE Ports, Standard Handle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20-LC-75 With WH-2550 Relief and K-WH-A Adjusted Kit</td>
<td>20L3J 3/4” NPTF Ports, Adjusted Relief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outlet Sections (Right Cover)</td>
<td>Outlet Sections (Right Cover)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20-RC-12-E</td>
<td>20E21 #12 SAE Ports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-LC10 With RCMA-3000 Relief</td>
<td>10LC10A #10 SAE Ports, Convertible to Power Beyond or Closed Center</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-RC-10-EY</td>
<td>See SV Valve In Catalog, or on <a href="http://www.princehyd.com">www.princehyd.com</a></td>
</tr>
</tbody>
</table>

### Parker/Gresen Models: Series 20, SV, RD5000, RD2500 & Accessory

| Prince Manufacturing Models: Series 20, SV, RD5000, RD2500 & Accessory | Parallel Work Sections | Parallel Work Sections 20 GPM 3500 PSI |
|---|---|---|---|
|  |  | 20-10-4 With K-20-VH-B Handle | 20P1BA1AA 4 Way 3 Position, #10 SAE Ports |
|  |  | 20-50-4 With K-20-VH-B Handle | 20P4BA1AA 4 Way 3 Position, 1/2” NPTF Ports |
|  |  | 20-10-4 With K-20-VH-B Handle and Two RC-2550 Work Port Reliefs | 20P1BA1EE 4 Way 3 Position, #10 SAE Ports With 2500 PSI Work Port Reliefs |
|  |  | 20-50-K4 With K-20-VH-B Handle | 20P4DD1AA 4 Way 4 Position With Float, 1/2” NPTF Ports |
|  |  | 20-10-DF4 With K-20-VH-B Handle | 20P1CB1AA 4 Way 3 Position, #10 SAE Ports |
|  |  | 20T-10-04 With K-20-VH-B Handle | 20T1BA1AA 4 Way 3 Position, #10 SAE Ports |
|  |  | 20-10-L04 With K-20-VH-B Handle | 20L1CA1 4 Way 3 Position, #10 SAE Ports |
|  |  | Inlet Sections (Left Cover) | Inlet Sections (Left Cover) |
|  |  | 20-LC-12 With WH-2550 Relief | 20L2E 4 Way 3 Position, #8 SAE Ports, Standard Handle |
|  |  | 20-LC-75 With WH-2550 Relief and K-WH-A Adjusted Kit | 20L3J 3/4” NPTF Ports, Adjusted Relief |
|  |  | Outlet Sections (Right Cover) | Outlet Sections (Right Cover) |
|  |  | 20-RC-12-E | 20E21 #12 SAE Ports |
|  |  | 10-LC10 With RCMA-3000 Relief | 10LC10A #10 SAE Ports, Convertible to Power Beyond or Closed Center |
|  |  | 10-RC-10-EY | See SV Valve In Catalog, or on www.princehyd.com |

### Parker/Gresen Models: Series 20, SV, RD5000, RD2500 & Accessory

<p>| Prince Manufacturing Models: Series 20, SV, RD5000, RD2500 &amp; Accessory | Parallel Work Sections | Parallel Work Sections 20 GPM 3500 PSI |
|---|---|---|---|
|  |  | 20-10-4 With K-20-VH-B Handle | 20P1BA1AA 4 Way 3 Position, #10 SAE Ports |
|  |  | 20-50-4 With K-20-VH-B Handle | 20P4BA1AA 4 Way 3 Position, 1/2” NPTF Ports |
|  |  | 20-10-4 With K-20-VH-B Handle and Two RC-2550 Work Port Reliefs | 20P1BA1EE 4 Way 3 Position, #10 SAE Ports With 2500 PSI Work Port Reliefs |
|  |  | 20-50-K4 With K-20-VH-B Handle | 20P4DD1AA 4 Way 4 Position With Float, 1/2” NPTF Ports |
|  |  | 20-10-DF4 With K-20-VH-B Handle | 20P1CB1AA 4 Way 3 Position, #10 SAE Ports |
|  |  | 20T-10-04 With K-20-VH-B Handle | 20T1BA1AA 4 Way 3 Position, #10 SAE Ports |
|  |  | 20-10-L04 With K-20-VH-B Handle | 20L1CA1 4 Way 3 Position, #10 SAE Ports |
|  |  | Inlet Sections (Left Cover) | Inlet Sections (Left Cover) |
|  |  | 20-LC-12 With WH-2550 Relief | 20L2E 4 Way 3 Position, #8 SAE Ports, Standard Handle |
|  |  | 20-LC-75 With WH-2550 Relief and K-WH-A Adjusted Kit | 20L3J 3/4” NPTF Ports, Adjusted Relief |
|  |  | Outlet Sections (Right Cover) | Outlet Sections (Right Cover) |
|  |  | 20-RC-12-E | 20E21 #12 SAE Ports |
|  |  | 10-LC10 With RCMA-3000 Relief | 10LC10A #10 SAE Ports, Convertible to Power Beyond or Closed Center |
|  |  | 10-RC-10-EY | See SV Valve In Catalog, or on <a href="http://www.princehyd.com">www.princehyd.com</a> |</p>
<table>
<thead>
<tr>
<th>SP Series</th>
<th>PRINCE VALVE</th>
<th>1,2,3 SPOOL MONO-BLOCK</th>
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<tr>
<td>SP-4-HP, SPX-4-HP</td>
<td>RD512CA5A4B1</td>
<td>4 Way 3 Position, 3/4&quot; In &amp; Out, 1/2&quot; Work Ports, Spring Center</td>
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<td>SPK-4-HP</td>
<td>RD512GC5A4B1</td>
<td>4 Way 4 Position with Float Detent, 3/4&quot; In &amp; Out, 1/2&quot; Work Ports, Spring Center</td>
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<td>SP-4-4-HP, SPX-4-4-HP</td>
<td>RD522CCA5A4B1</td>
<td>4 Way 3 Position, 3/4&quot; In &amp; Out, 1/2&quot; Work Ports, Spring Center</td>
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<tr>
<td>SPK-4-4-HP</td>
<td>RD522GC5A4B1</td>
<td>4 Way 4 Position with 1&quot; Spool Float Detent, 3/4&quot; In &amp; Out, 1/2&quot; Work Ports, Spring Center</td>
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<tr>
<td>SP-4-4-4-HP, SPX-4-4-4-HP</td>
<td>RD532CC5A5A4B1</td>
<td>4 Way 3 Position, 3/4&quot; In &amp; Out, 1/2&quot; Work Ports, Spring Center</td>
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<tr>
<td>SPK-4-4-4-HP</td>
<td>RD532GC5A4B1</td>
<td>4 Way 4 Position with 1&quot; Spool Float Detent, 3/4&quot; In &amp; Out, 1/2&quot; Work Ports, Spring Center</td>
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<tr>
<td>300/400 Series</td>
<td>RD2500 Series</td>
<td>30 GPM – 3000 PSI</td>
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<tr>
<td>300</td>
<td>RD2575-T3-ESA1</td>
<td>3 Way 3 Position, 3/4&quot; In &amp; Out, 1/2&quot; Work Ports, Spring Center</td>
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<tr>
<td>400</td>
<td>RD2575-T4-ESA1</td>
<td>4 Way 3 Position, 3/4&quot; In &amp; Out, 1/2&quot; Work Ports, Spring Center</td>
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<tr>
<td>410</td>
<td>RD2575-T4-EDA1</td>
<td>4 Way 3 Position Detent, 3/4&quot; In &amp; Out, 1/2&quot; Work Ports</td>
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<td>410-40</td>
<td>RD2575-M4-EDA1</td>
<td>4 Way 3 Position Detent, Motor Spool, 3/4&quot; In &amp; Out, 1/2&quot; Work Ports</td>
</tr>
</tbody>
</table>

### Accessory Valves

| CFD-10-5-NR | RD-412-5 | Constant Volume Priority Flow Divider, #12 Ports |
| CFD-10-6-HP | RD-412-R-6 | Constant Volume Priority Flow Divider, #12 Ports |
| CFD-50-3-HP | RD-400-R-3 | Constant Volume Priority Flow Divider, 3/4" Ports |
| CFD-50-4 | RD-400-R-4 | Constant Volume Priority Flow Divider, 3/4" Ports |
| CFD-50-10-HP | RD-400-R-10 | Constant Volume Priority Flow Divider, 3/4" Ports |
| CFD-75-3-HP | RD-405-R-3 | Constant Volume Priority Flow Divider, 3/4" Ports |
| CFD-75-3-NR | RD-405-3 | Constant Volume Priority Flow Divider, 3/4" Ports |
| CFD-75-5-NR | RD-405-5 | Constant Volume Priority Flow Divider, 3/4" Ports |
| CFD-75-10-NR | RD-405-10 | Constant Volume Priority Flow Divider, 3/4" Ports |
| CFD-A-50 | RD-550 | Screw Adjust Priority Flow Control, 1/2" Ports |
| DS-12 | DS-4A1D | Double Selector, 3/4" Ports |
| DS-75 | DS-5A1D | Double Selector, #12 Ports |
| DWV-12-25 | DRV-1NHNN-2500 | Double Cross-Over Relief (Cushion), #12 Ports |
| DWV-50-A-12 | DRV-4LL-12-12 | Double Cross-Over Relief (Cushion), 1/2" Ports |
| DWV-50-20 | DRV-4HNN-2000 | Double Cross-Over Relief (Cushion), 1/2" Ports |
| DWV-75-A | DRV-2HH | Double Cross-Over Relief (Cushion), 3/4" Ports |
| DWV-75-20 | DRV-2HNN-2000 | Double Cross-Over Relief (Cushion), 3/4" Ports |
| HM-50 | SS-2B1B | Two Position Float Valve, 1/2" Ports |
| JT-50-HP, JL-50-HP | RD-1850H | Adjustable Relief (Ball Spring), 1/2" Ports |
| LD1-50-1S | RD-1650 | Single Lock Valve, 1/2" Ports |
| LO-50-D | RD-1450 | Double Lock Valve, 1/2" Ports |
| PD-12-50 | RD-212-30 | Proportional Flow Divider, #12 Ports |
| PD-50-50-50 | RD-250-16 | Proportional Flow Divider, 1/2" Ports |
| PD-50-60-40 | RD-250-16(60/40) | Proportional Flow Divider, 1/2" Ports |
| S-50 | RD-950 | Selector Valve, 1/2" Ports |
| S-75 | RD-975 | Selector Valve, 3/4" Ports |
| SM-50, S-50 | SS-2A1D, RD-950 | Single Selector 1/2" Work Ports |
| SM-8 | SS-3A1D | Single Selector #8 Work Ports |
| WJL-10-A | RV-3H | Adjustable Relief (Differential Poppet), #10 Ports |
| WJL-50-13 | RV-4L | Adjustable Relief (Differential Poppet), 1/2" Ports |
| WJL-50-20 | RV-4H | Adjustable Relief (Differential Poppet), 1/2" Ports |

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