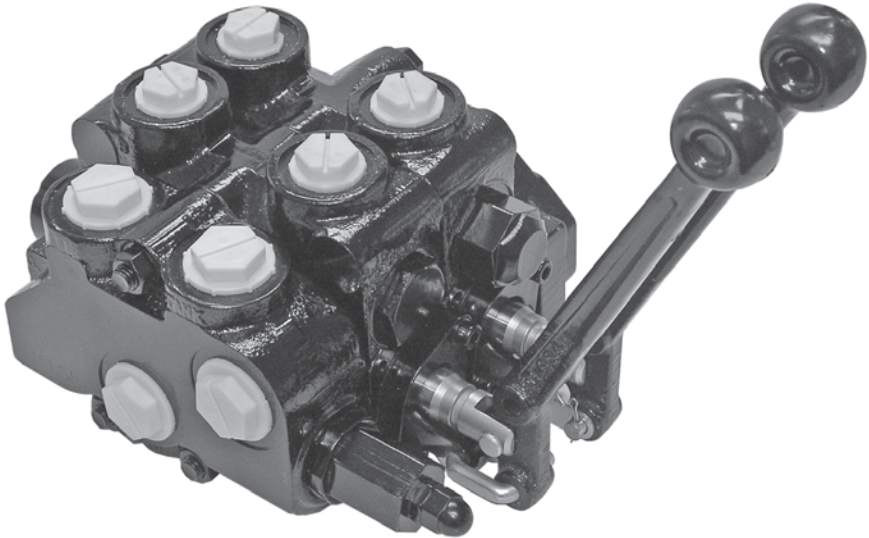


SECTIONAL BODY



Series "20"

VALVES

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
- Extra Fine Spool Metering
- Reversible Handle
- Hard Chrome Plated Spools

SPECIFICATIONS

Parallel or Tandem Circuit Pressure Rating

Maximum Operating Pressure 3500 psi
Maximum Tank Pressure..... 500 psi

Nominal Flow Rating 20 gpm

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

Foot Mounting Weight

Inlet Cover Approx 6 lbs
Outlet Cover Approx 3.5 lbs
Work Section Approx 9 lbs

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.

ORDERING INFORMATION:

The following is a listing of valve sections available from stock on a standard basis.

STANDARD SECTIONS AVAILABLE:

STANDARD INLET SECTIONS

ALL SECTIONS HAVE BOTH TOP AND SIDE INLET AND TANK PORTS

| PART NO. | RELIEF TYPE AND SETTING | PORT SIZE |
|----------|---|-------------|
| 2012A | NO RELIEF | #12 SAE ORB |
| 2012C | SHIM ADJUSTABLE 1351-1750 PSI, SET AT 1750 PSI @ 10 GPM | #12 SAE ORB |
| 2012D | SHIM ADJUSTABLE 1751-2200 PSI, SET AT 2200 PSI @ 10 GPM | #12 SAE ORB |
| 2012E | SHIM ADJUSTABLE 2201-3000 PSI, SET AT 2500 PSI @ 10 GPM | #12 SAE ORB |
| 2012G | ADJUSTABLE 1351-1750 PSI, SET AT 1750 PSI @ 10 GPM | #12 SAE ORB |
| 2012H | ADJUSTABLE 1750-2200 PSI, SET AT 2200 PSI @ 10 GPM | #12 SAE ORB |
| 2012J | ADJUSTABLE 2201-3000 PSI, SET AT 2500 PSI @ 10 GPM | #12 SAE ORB |

STANDARD 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.

| PART NO. | SPOOL TYPE AND ACTION | PORT RELIEFS |
|----------------|--|--------------|
| 20P1AA1AA | 3-WAY SINGLE ACTING W/SPRING CENTER | PLUGGED |
| 20P1BA1AA | 4-WAY DOUBLE ACTING W/SPRING CENTER (WORK PORTS BLOCKED IN NEUTRAL) | PLUGGED |
| 20P1BA5AA-S12Q | 4-WAY DOUBLE ACTING W/SPRING CENTER, 12VDC SOLENOID OPERATED | PLUGGED |
| 20P1BA6AA-S12Q | 4-WAY DOUBLE ACTING W/SPRING CENTER, 12VDC SOLENOID OPERATED W/LEVER HANDLE | PLUGGED |
| 20P1BB1AA | 4-WAY DOUBLE ACTING W/3 POSITION DETENT (WORK PORTS BLOCKED IN NEUTRAL) | PLUGGED |
| 20P1CA1AA | 4-WAY FREE FLOW MOTOR W/SPRING CENTER (WORK PORTS OPEN TO TANK IN NEUTRAL) | PLUGGED |
| 20P1CB1AA | 4-WAY FREE FLOW MOTOR W/3 POSITION DETENT (WORK PORTS OPEN TO TANK IN NEUTRAL) | PLUGGED |
| 20P1DD1AA | 4-WAY 4 POSITION FLOAT W/SPRING CENTER AND FLOAT DETENT | PLUGGED |
| 20P1BA1DD | 4-WAY DOUBLE ACTING W/SPRING CENTER (WORK PORTS BLOCKED IN NEUTRAL) | 2200 PSI |
| 20P1DD1DD | 4-WAY 4 POSITION FLOAT W/SPRING CENTER AND FLOAT DETENT | 2200 PSI |
| 20L1CA1 | 4-WAY 3 POSITION W/SPRING CENTER AND P.O. CHECKS | NONE |
| 20LP1JA1AA | LOAD SENSE 4-WAY DOUBLE ACTING WITH SPRING CENTER | PLUGGED |

STANDARD TANDEM CIRCUIT WORK SECTIONS

| PART NO. | SPOOL TYPE AND ACTION | PORT RELIEFS |
|-----------|---|--------------|
| 20T1BA1AA | 4-WAY DOUBLE ACTING W/ SPRING CENTER (WORK PORTS BLOCKED IN NEUTRAL) | PLUGGED |
| 20T1BA1DD | 4-WAY DOUBLE ACTING W/ SPRING CENTER (WORK PORTS BLOCKED IN NEUTRAL) | 2200 PSI |
| 20T1CA1AA | 4-WAY FREE FLOW MOTOR W/ SPRING CENTER (WORK PORTS OPEN TO TANK IN NEUTRAL) | PLUGGED |

STANDARD OUTLET SECTIONS

ALL SECTIONS HAVE SIDE OUTLET

| PART NO. | EXHAUST OPTION | PORT SIZE |
|----------|---|-------------|
| 20E21 | OPEN CENTER OUTLET W/ CONVERSION PLUG | #12 SAE ORB |
| 20E22 | POWER BEYOND OUTLET W/ #10 SAE POWER BEYOND PORT | #12 SAE ORB |
| 20E23 | CLOSED CENTER OUTLET | #12 SAE ORB |
| 20LE21 | LOAD SENSE OUTLET WITH #4 LOAD SENSE PORT AND BLEED ORIFICE | #12 SAE ORB |

TIE-ROD KITS

| TIE-ROD TORQUE | PART NO. | WORK SECTIONS | PART NO. | WORK SECTIONS |
|----------------|-----------|---------------|-----------|---------------|
| 30-32 ft-lbs | 660402001 | 1 SECTION | 660402006 | 6 SECTION |
| | 660402002 | 2 SECTION | 660402007 | 7 SECTION |
| | 660402003 | 3 SECTION | 660402008 | 8 SECTION |
| | 660402004 | 4 SECTION | 660402009 | 9 SECTION |
| | 660402005 | 5 SECTION | 660402010 | 10 SECTION |

SERIES 20 HARDWARE AND SEAL KITS

| | |
|-----------|---------------------------------------|
| 660190003 | SPRING CENTER KIT |
| 660190004 | 3 POSITION DETENT KIT |
| 660190005 | FRICTION DETENT KIT |
| 660190028 | SPRING CTR PNEUMATIC ACTUATOR KIT |
| 660190001 | VERTICAL HANDLE, LINK & PINS |
| 660190002 | STD. HANDLE, LINK & PINS |
| 660190006 | COMPLETE VERT. HANDLE KIT |
| 660190007 | COMPLETE STD. HANDLE KIT |
| 660190025 | SEAL RETAINER PLATE |
| 660190026 | HANDLE CLEVIS |
| 660290004 | POWER BEYOND PLUG #10 SAE |
| 660290017 | POWER BEYOND PLUG 3/4" NPTF |
| 660290005 | CLOSED CENTER PLUG |
| 660290006 | OPEN CENTER OUTLET PLUG |
| 660585001 | WORK SECTION SEAL KIT |
| 660585008 | LOCK SECTION SEAL KIT |
| 660590030 | SOLENOID OPERATED SECTION SEAL KIT |
| 660585002 | INLET SECTION SEAL KIT |
| 660585003 | OUTLET SECTION SEAL KIT |
| 660585004 | SEAL KIT O-RINGS BETWEEN SECTION ONLY |

| | |
|-----------|---|
| 660585006 | SOLENOID PILOT PASSAGE SEAL KIT |
| 660390103 | 20 WORK SECT COIL & CART ASSY 12VDC/LEADS |
| 660390107 | 20 WORK SECT COIL & CART ASSY 24VDC/LEADS |
| 660290010 | 20 UTIL SECT CONTINUOUS ON PBU CART |
| 660390153 | 20 UTIL SECT PBU COIL & CART ASSY 12VDC/LEADS |
| 660390157 | 20 UTIL SECT PBU COIL & CART ASSY 24VDC/LEADS |
| 270006092 | 20 UTIL SECT PRESSURE REDUCING CART |
| 660290012 | 20 UTIL SECT POWER BEYOND PLUG #10 SAE |

PORT RELIEF KITS

| | |
|-----------|----------------------------|
| 660290002 | NO RELIEF LOAD CHECK PLUG |
| 660290301 | SHIM ADJ. 500 - 1350 PSI |
| 660290303 | SHIM ADJ. 1351 - 1750 PSI |
| 660290305 | SHIM ADJ. 1751 - 2200 PSI |
| 660290307 | SHIM ADJ. 2201 - 3000 PSI |
| 660290401 | ADJUSTABLE 500 - 1350 PSI |
| 660290403 | ADJUSTABLE 1351 - 1750 PSI |
| 660290405 | ADJUSTABLE 1751 - 2200 PSI |
| 660290407 | ADJUSTABLE 2201 - 3000 PSI |
| 660290003 | ANTI-CAVITATION CARTRIDGE |

INLET RELIEF KITS

| | |
|-----------|----------------------------|
| 660290001 | NO RELIEF PLUG |
| 660290101 | SHIM ADJ. 500 - 1350 PSI |
| 660290103 | SHIM ADJ. 1351 - 1750 PSI |
| 660290105 | SHIM ADJ. 1751 - 2200 PSI |
| 660290107 | SHIM ADJ. 2201 - 3000 PSI |
| 660290201 | ADJUSTABLE 500 - 1350 PSI |
| 660290203 | ADJUSTABLE 1351 - 1750 PSI |
| 660290205 | ADJUSTABLE 1751 - 2200 PSI |
| 660290207 | ADJUSTABLE 2201 - 3000 PSI |

RELIEF HARDWARE KITS

| | |
|-----------|--|
| 660190024 | SHIM STYLE TO ADJ STYLE CONVERSION KIT |
| 672000201 | .006 SHIM FOR RELIEF |
| 672000202 | .010 SHIM FOR RELIEF |
| 672000203 | .018 SHIM FOR RELIEF |
| 672000205 | .041 SHIM FOR RELIEF |

LOAD SENSE KITS

| | |
|-----------|-----------------------------------|
| 660290018 | LOAD SENSE PLUG W/DRAIN ORIFICE |
| 660290019 | LOAD SENSE PLUG W/O DRAIN ORIFICE |

SPECIAL SECTIONS AVAILABLE:

Valves 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 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**

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
- E - 3 WAY 3 POSITION FREE FLOW MOTOR

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 (NO IN POSITION)
- J - SPRING CENTER W/ MICROSWITCH (SWITCHES ON IN OR OUT)***
- K - SPRING CENTER W/ MICROSWITCH (SWITCHES ON SPOOL IN ONLY)***
- N - SPRING CENTER DETENT OUT
- M - SPRING CENTER DETENT IN
- P - 2 POSITION DETENT NEUTRAL & IN (NO OUT POSITION)

HANDLE OPTIONS

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

2 0 X X X X X X X

PORT RELIEF "B"

PORT RELIEF "A"

- 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/ANTI-CAV SHIM ADJ 500-1350 PSI SET AT 1350
- M - PORT RELIEF/ANTI-CAV SHIM ADJ 1351-1750 PSI SET AT 1750
- N - PORT RELIEF/ANTI-CAV SHIM ADJ 1751-2200 PSI SET AT 2200
- R - PORT RELIEF/ANTI-CAV SHIM ADJ 2201-3000 PSI SET AT 2500
- S - PORT RELIEF/ANTI-CAV ADJUSTABLE 500-1350 PSI SET AT 1350*
- T - PORT RELIEF/ANTI-CAV ADJUSTABLE 1351-1750 PSI SET AT 1750*
- W - PORT RELIEF/ANTI-CAV ADJUSTABLE 1751-2200 PSI SET AT 2200*
- Y - PORT RELIEF/ANTI-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

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

- * LEVERS ARE COATED WITH BLACK RUBBER
- ** L WORK SECTION REQUIRES SPOOL TYPE C & PORT RELIEFS NOT AVAILABLE
- *** MICROSWITCH INCLUDED.

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

RELIEF SETTINGS: THE LAST FOUR DIGITS REPRESENT THE RELIEF SETTING IN PSI

2 0 I X X - X X X X

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 °

° Often used with no relief. Review application

2 0 E X X

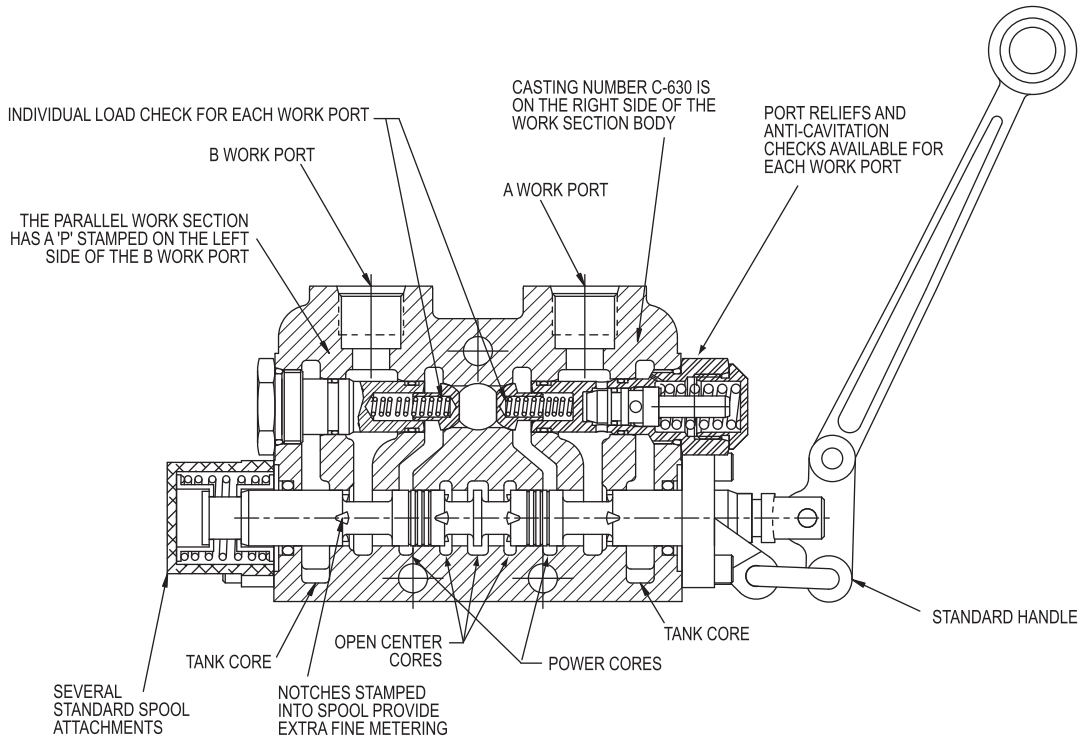
VALVE ASSEMBLIES

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

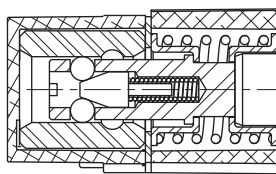
XXXX = Sequence of Numbers. This number will be assigned to final valve to be assembled and tested at the factory. Each new order or quote will be assigned a new assembly model number.

CROSS SECTION OF 20P1BA1DA PARALLEL WORK SECTION

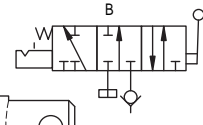


SPOOLS AND SPOOL ATTACHMENTS

OPTION N-
DETENT
SPOOL-OUT W/
SPRING CENTER

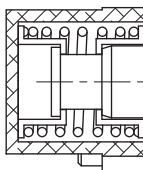


SPOOL OPTION 'A' - 3 WAY 3 POSITION FOR USE WITH SINGLE ACTING CYLINDERS OR NON-REVERSIBLE MOTORS. THE 'B' WORK PORT IS BLOCKED IN NEUTRAL.

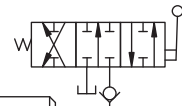


SPOOL OPTION A

OPTION A-
SPRING CENTER TO NEUTRAL

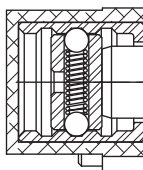


SPOOL OPTION 'B' - 4 WAY 3 POSITION FOR USE WITH DOUBLE ACTING CYLINDERS OR REVERSIBLE MOTORS. THE WORK PORTS ARE BLOCKED IN NEUTRAL.

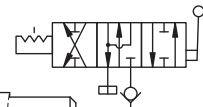


SPOOL OPTION B

OPTION B-
3 POSITION DETENT

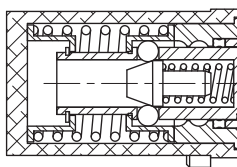


SPOOL OPTION 'C' - 4 WAY 3 POSITION FREE FLOW MOTOR SPOOL. THE WORK PORTS ARE OPEN TO TANK IN NEUTRAL, ALLOWING A MOTOR TO COAST OR A CYLINDER TO FLOAT.

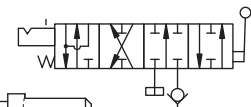


SPOOL OPTION C

OPTION D-
FLOAT DETENT WITH
SPRING CENTER

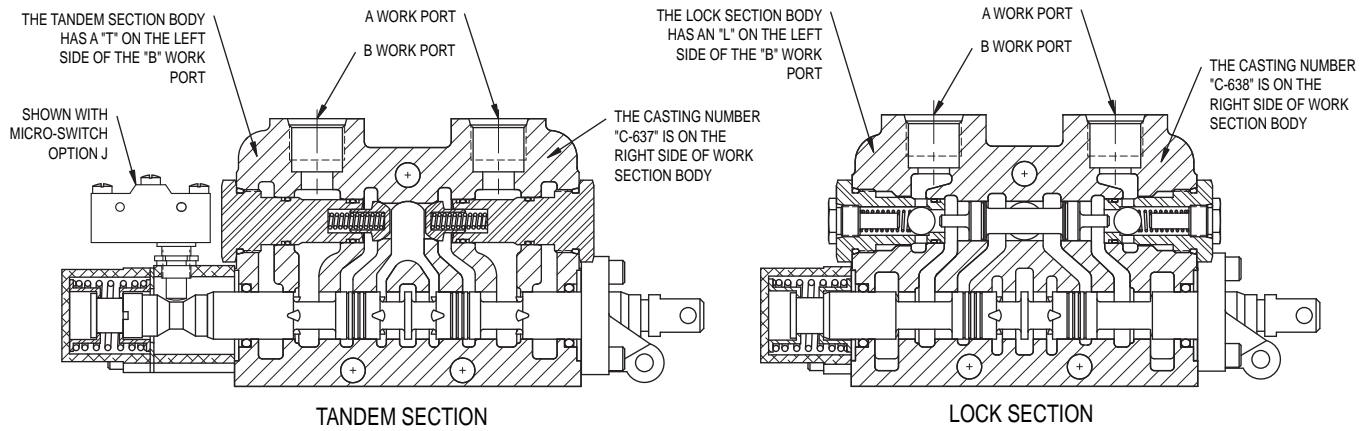


SPOOL OPTION 'D' - 4 WAY 4 POSITION FLOAT. SAME AS 4 WAY 3 POSITION WITH THE ADDITION OF A FOURTH POSITION FLOAT. THE SPOOL IS DETENTED IN THE FLOAT POSITION AND SPRING CENTERED TO NEUTRAL FROM THE 'A' OR 'B' POWER POSITION



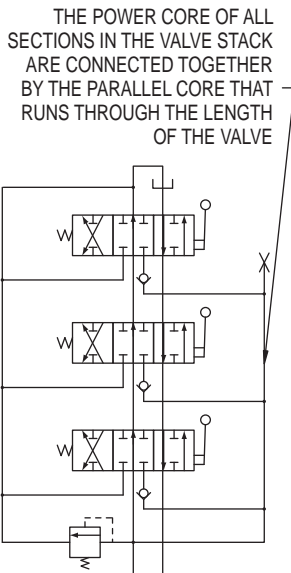
SPOOL OPTION D

CROSS SECTION OF TANDEM WORK SECTION AND LOCK SECTION



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.



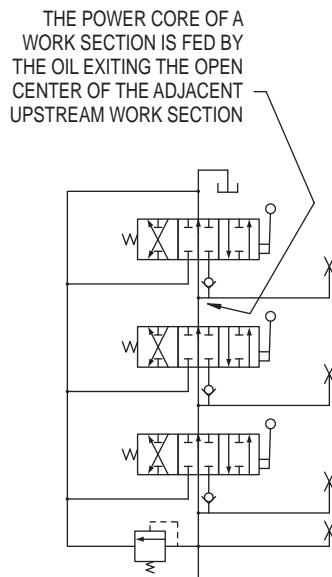
LOAD CHECK

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.

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.



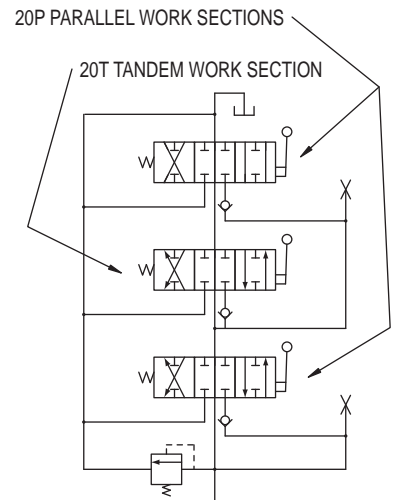
OPEN CENTER APPLICATIONS

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 inlet relief for this purpose.

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.

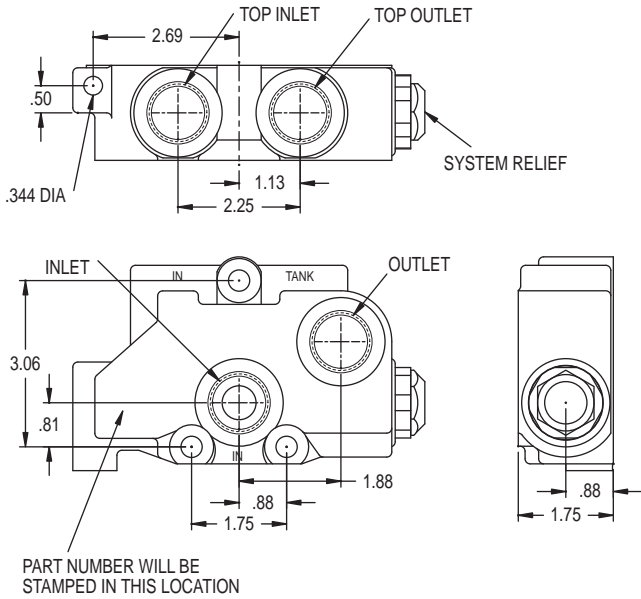


CLOSED CENTER APPLICATIONS

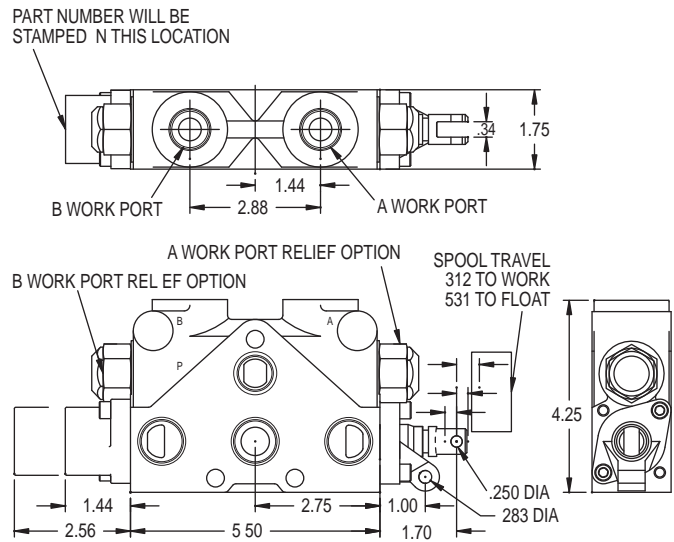
The Series 20 stack valve can be converted to closed center by adding the closed center plug to the outlet section. This blocks off the open center core when the spools are in neutral. These systems often use a variable displacement pressure compensated pump that limits the maximum pressure. When spools 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.

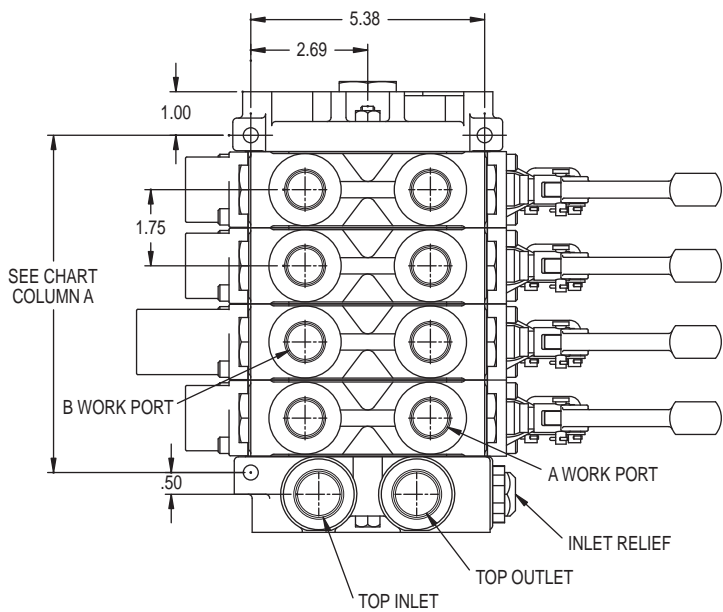
INLET COVER DIMENSIONS



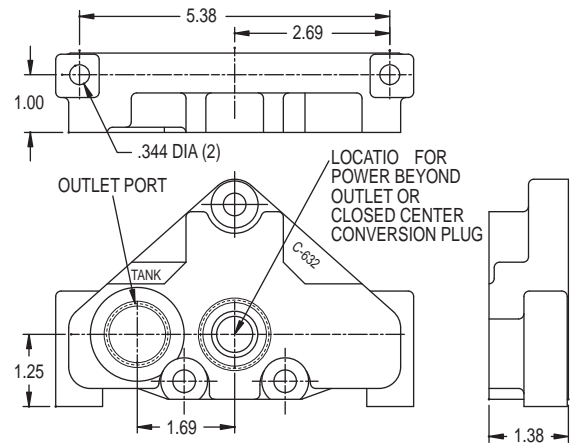
WORK SECTIONS DIMENSIONS



DIMENSIONAL DATA

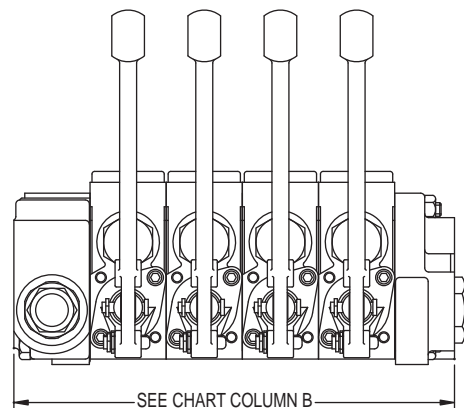
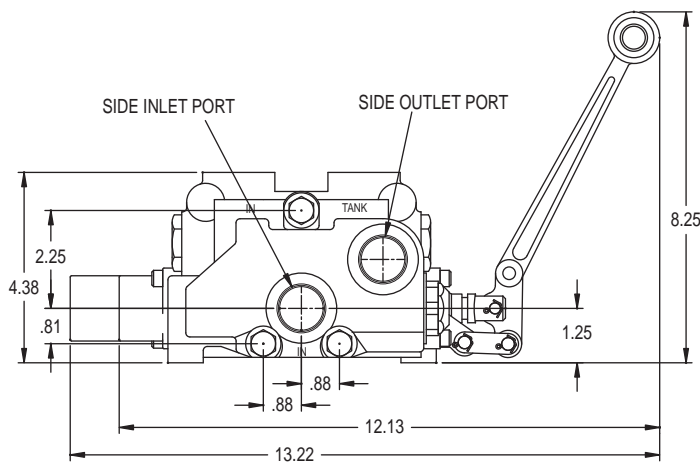


OUTLET COVER DIMENSIONS

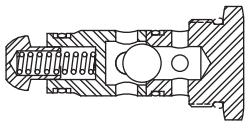


NUMBER OF WORK SECTIONS

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| A | 2.50 | 4.25 | 6.00 | 7.75 | 9.50 | 11.25 | 13.00 | 14.75 | 16.50 | 18.25 |
| B | 4.88 | 6.63 | 8.38 | 10.13 | 11.88 | 13.63 | 15.38 | 17.13 | 18.88 | 20.63 |



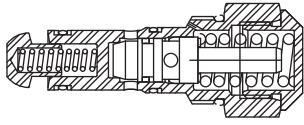
WORK PORT RELIEF CARTRIDGES



OPTION K ANTI-CAVITATION CHECK

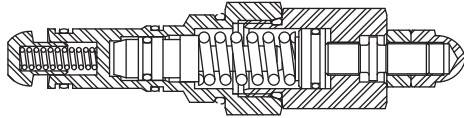
This option allows oil to be drawn from the tank core into the work port if there is a vacuum on the work port. This vacuum would be caused by a overrunning motor or cylinder. The check will be open whenever the pressure in the tank core is higher than that in the work port.

OPTIONS B, C, D, AND E, SHIM ADJUSTABLE PORT RELIEF



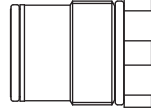
A port relief can be installed to limit the pressure at the work port to less than the system pressure. Also, it can be installed to provide spike pressure protection when the spool is in the neutral position. The pressure of these reliefs can be changed by changing shims.

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.

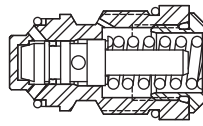
INLET RELIEF CARTRIDGES



OPTION A NO RELIEF

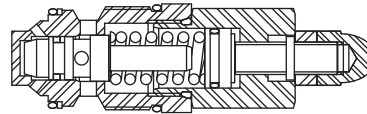
When no main inlet relief is required the no relief plug is installed. All inlet sections have the relief cavity machined so a inlet relief can be installed in the field.

OPTIONS B, C, D, AND E, SHIM ADJUSTABLE INLET RELIEF



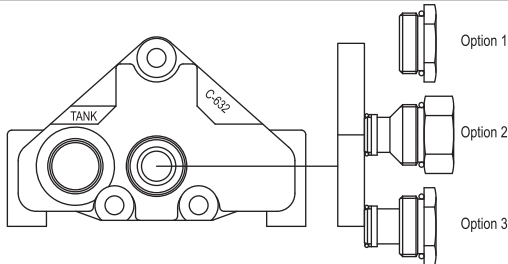
These options provide for an internally shim adjustable main inlet relief. The relief is a hydraulically dampened differential poppet design. This provides for smooth quiet operation in a relief that is moderately tolerant to contamination. The pressure of these reliefs can be changed, within the specified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

OPTIONS F, G, H, AND J, ADJUSTABLE INLET RELIEF



This is the same relief as above except it is 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

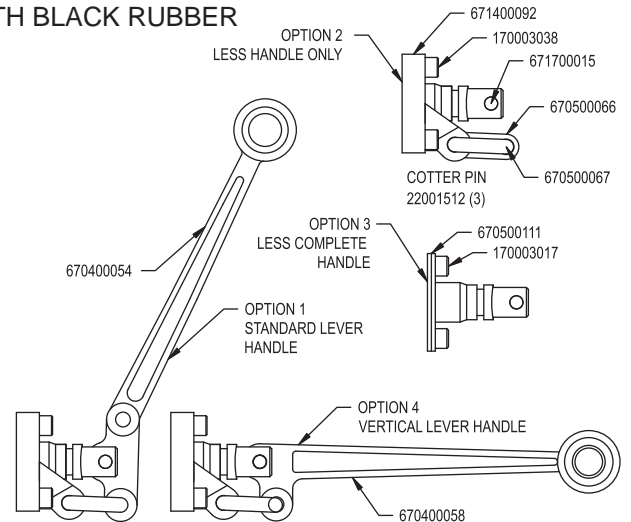
This option provides for closed center operation. This is typically used with a variable displacement pressure compensated pump or in a system with an unloading valve. When the spools are in neutral the inlet port is blocked.

OPTION 2 POWER BEYOND WITH #10 SAE BEYOND PORT

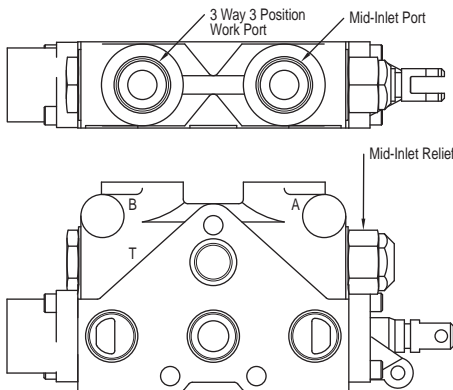
This option provides for a high pressure power beyond port. This would be used if a valve is to be added downstream. The outlet must be connected to tank. When the spools are in neutral the inlet is connected to power beyond port.

HANDLE OPTIONS

NOTE: HANDLES ARE COATED WITH BLACK RUBBER



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



20TM 3 A A 1 E A - X X X X

PORT SIZE*
SPOOL ACTION*
HANDLE OPTIONS *

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

WORK PORT RELIEF *

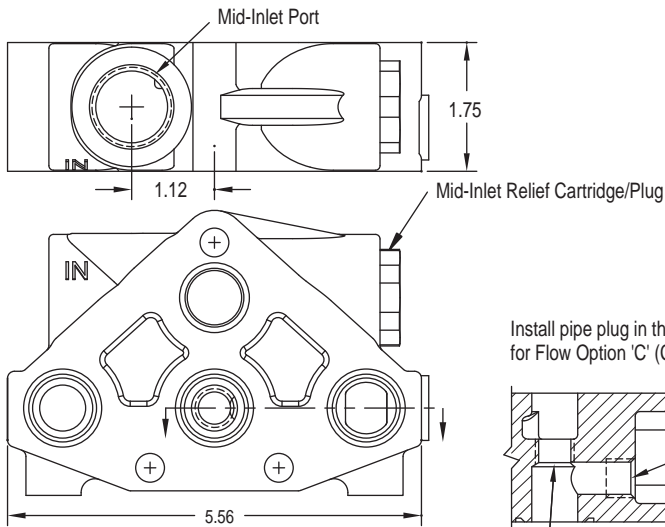
| MID-INLET RELIEF | | |
|--|-------------------|------------|
| RELIEF TYPE | STANDARD SETTING | OPTION NO. |
| NO RELIEF | | A |
| SHIM ADJUSTABLE | 1350 PSI @ 10 GPM | B |
| | 1750 PSI @ 10 GPM | C |
| | 2200 PSI @ 10 GPM | D |
| | 2500 PSI @ 10 GPM | E |
| ADJUSTABLE (not available with handle option 1) | 1350 PSI @ 10 GPM | F |
| | 1750 PSI @ 10 GPM | G |
| | 2200 PSI @ 10 GPM | H |
| | 2500 PSI @ 10 GPM | J |

*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.

SERIES 20 MID-INLET SECTION



Section can be converted from C to S, or S to C, prior to installing section in the stack valve assy.

Install pipe plug in this location for Flow Option 'S' (Split)

20IM X X X X -XXXX

FLOW OPTION

- C - COMBINED FLOW
- S - SPLIT FLOW

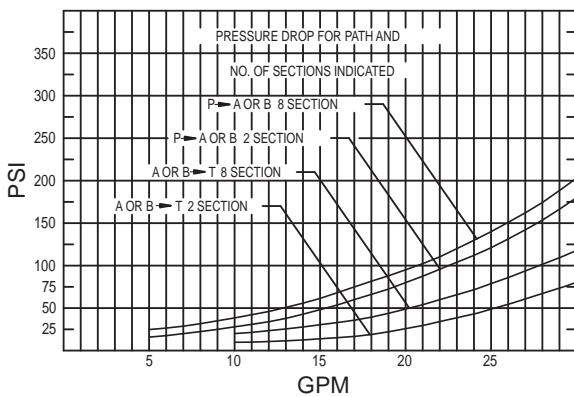
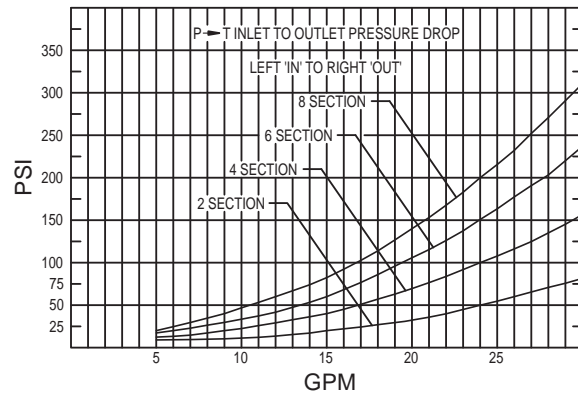
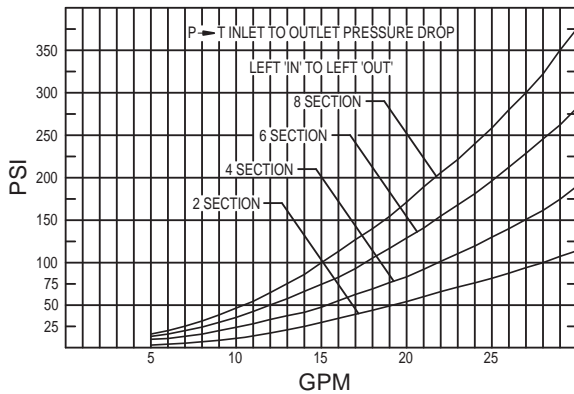
PORT SIZE

- 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.

| MID-INLET RELIEF OPTIONS: | | |
|---------------------------|---------------------------------|-----------------------|
| OPTION NO. | RELIEF TYPE | STD. SETTING @ 10 GPM |
| "BLANK" | BODY LESS RELIEF CARTRIDGE/PLUG | -- |
| A | NO-RELIEF PLUG | -- |
| B | SHIM ADJUSTABLE 500-1350 PSI | 1350 PSI |
| C | SHIM ADJUSTABLE 1350-1750 PSI | 1750 PSI |
| D | SHIM ADJUSTABLE 1750-2200 PSI | 2200 PSI |
| E | SHIM ADJUSTABLE 2200-3000 PSI | 2500 PSI |
| F | ADJUSTABLE 500-1350 PSI | 1350 PSI |
| G | ADJUSTABLE 1350-1750 PSI | 1750 PSI |
| H | ADJUSTABLE 1750-2200 PSI | 2200 PSI |
| J | ADJUSTABLE 2200-3000 PSI | 2500 PSI |
| K | ADJUSTABLE 3000-3500 PSI | 3250 PSI |

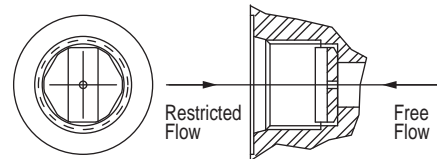
TEST DATA



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 20 SERIES 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**

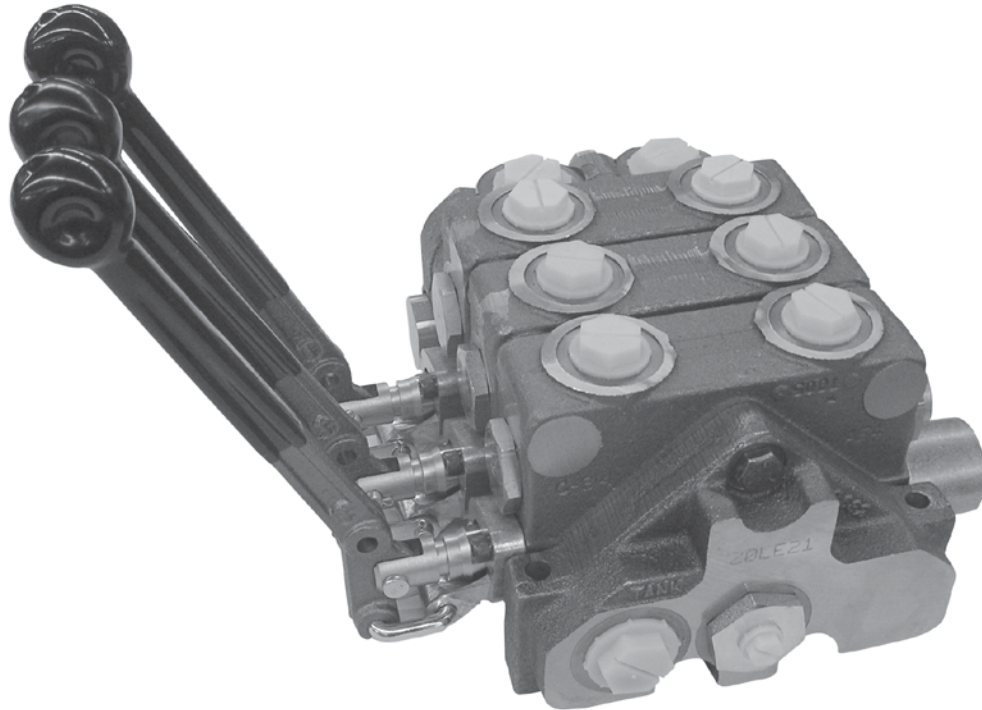
The last three digits of part number are the orifice size in thousandths of an inch.

EXAMPLE: 670805062 .62 ORIFICE
 670805125 .125 ORIFICE
 670805000 NO ORIFICE

VALVES

Directional Control Valves

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.

SPECIAL SECTIONS AVAILABLE:

Valves 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 then be used for future orders. A minimum order quantity will apply to special valves. Please consult Sales Representative.

WORK SECTION

20XX XXXX

WORK SECTION TYPE

LP-STANDARD LOAD SENSE SECTION

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 W/D SPOOL ACTION)

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 (NO IN POSITION)
- J - SPRING CENTER W/MICROSWITCH (SWITCHES ON IN OR OUT)***
- K - SPRING CENTER W/MICROSWITCH (SWITCHES ON SPOOL IN ONLY)***
- N - SPRING CENTER DETENT OUT
- M - SPRING CENTER DETENT IN
- P - 2 POSITION DETENT NEUTRAL & IN (NO OUT POSITION)

HANDLE OPTIONS

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

PORT RELIEF "B"

PORT RELIEF "A"

- 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/ANTI-CAV SHIM ADJ 500-1350 PSI SET AT 1350
- M - PORT RELIEF/ANTI-CAV SHIM ADJ 1351-1750 PSI SET AT 1750
- N - PORT RELIEF/ANTI-CAV SHIM ADJ 1751-2200 PSI SET AT 2200
- R - PORT RELIEF/ANTI-CAV SHIM ADJ 2201-3000 PSI SET AT 2500
- S - PORT RELIEF/ANTI-CAV ADJUSTABLE 500-1350 PSI SET AT 1350*
- T - PORT RELIEF/ANTI-CAV ADJUSTABLE 1351-1750 PSI SET AT 1750*
- W - PORT RELIEF/ANTI-CAV ADJUSTABLE 1751-2200 PSI SET AT 2200*
- Y - PORT RELIEF/ANTI-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

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

* LEVERS ARE COATED WITH BLACK RUBBER
***MICROSWITCH INCLUDED.

SEE PAGE 11 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING

LOAD SENSE OUTLET SECTION

20LEXX

OUTLET TYPE

LE - STANDARD LOAD SENSE OUTLET

PORT SIZE

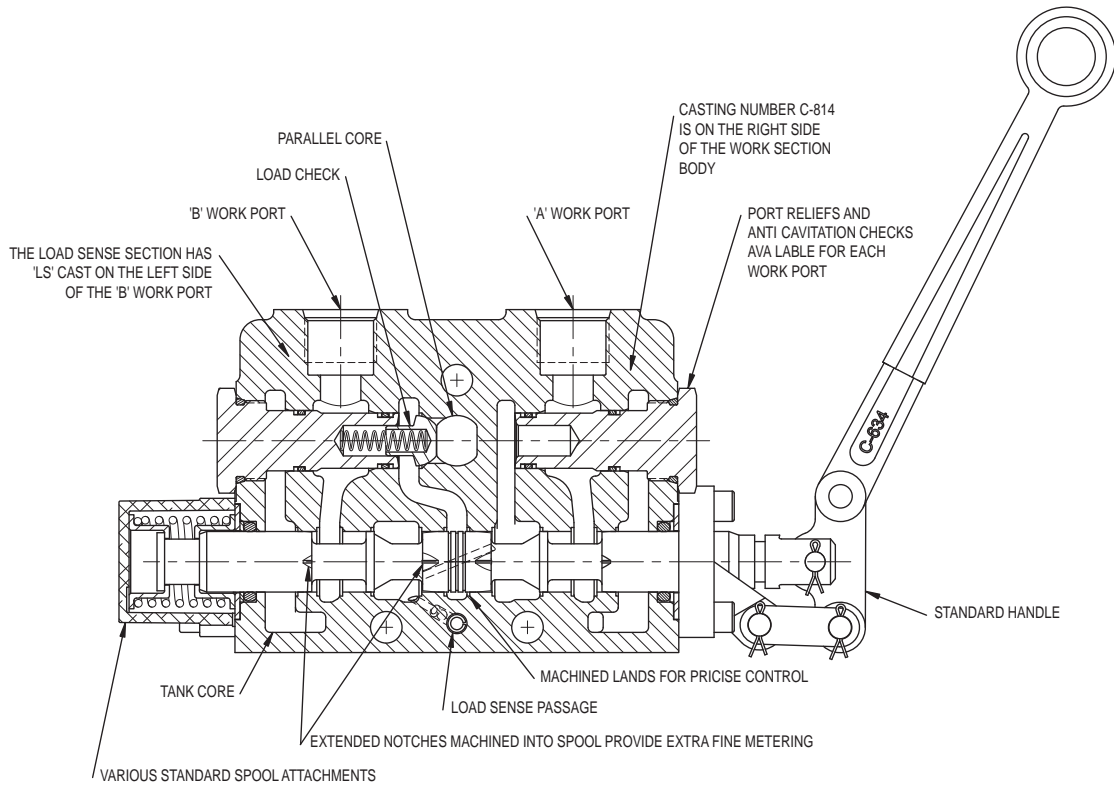
1. #10 SAE (7/8-14 THREAD)
2. #12 SAE (1 1/16-12 THREAD)
3. 3/4 NPTF (2000 PSI MAX)

LOAD SENSE PORT OPTIONS

1. #4 SAE WITH DRAIN ORIFICE
2. #4 SAE WITHOUT DRAIN ORIFICE

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.

CROSS SECTION OF 20LP1JA1AA LOAD SENSE WORK SECTION

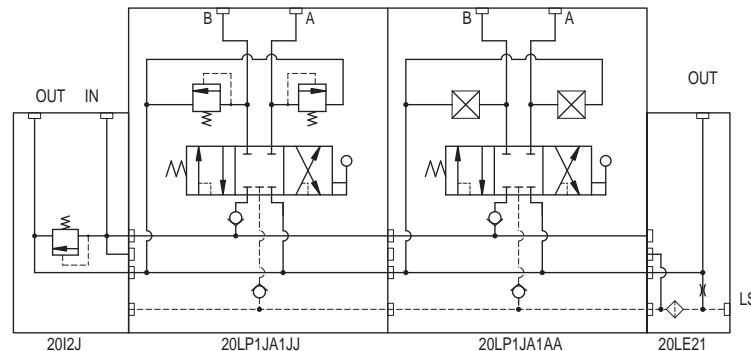


LOAD SENSE CIRCUITS

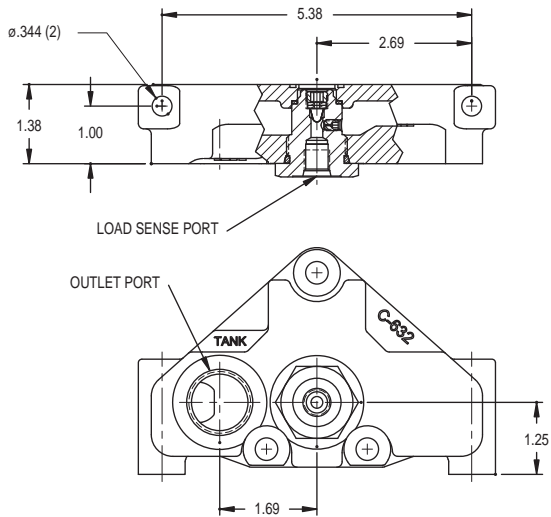
MODEL 20LP LOAD SENSE CIRCUIT

The Series 20LP 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 out flow work port is presented to the valve's 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.

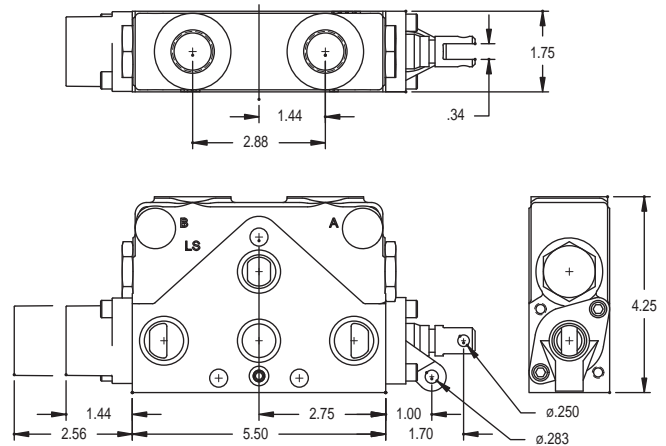
There are a number of benefits to load sense systems, one of the primary ones being in the metering of the flow to the work ports. Metering is typically accomplished when the flow passes through metering notches in the spool. In a load sense valve, the pressure that drives the flow through the notches 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. In summary, the Prince load sense valve provides more precise control, conserves energy and reduces heat generation.



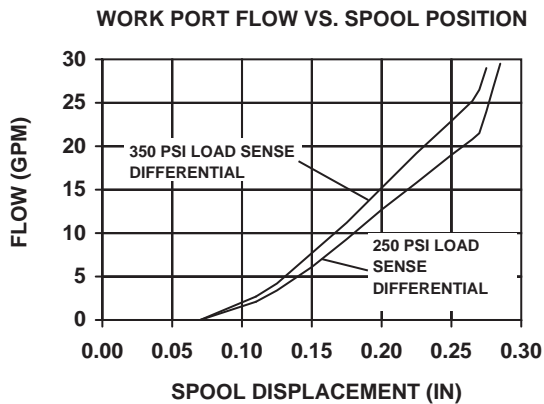
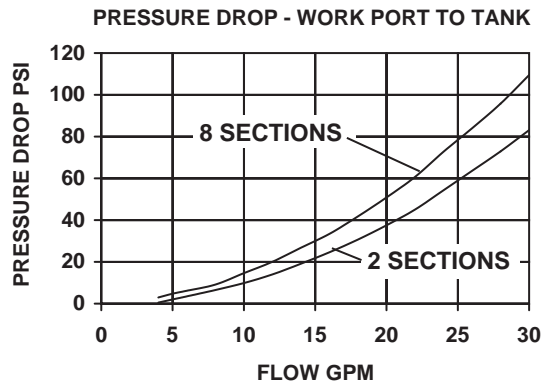
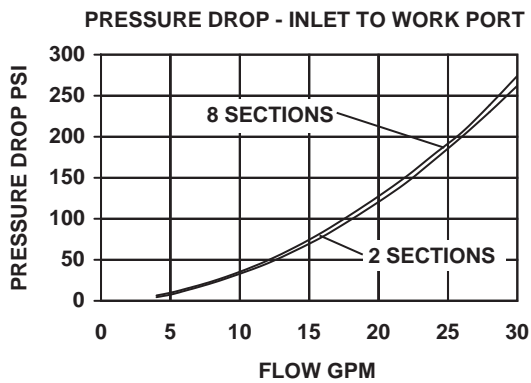
LOAD SENSE OUTLET DIMENSIONS



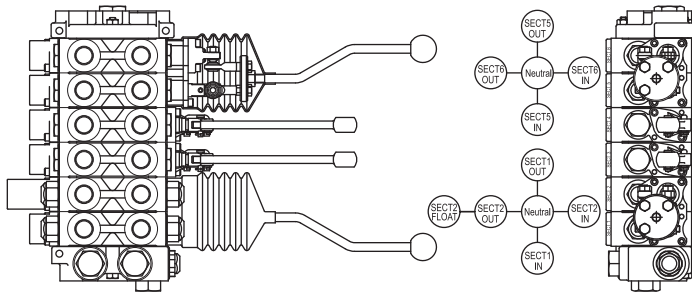
LOAD SENSE WORK SECTION DIMENSIONS



TEST DATA



JOYSTICK HANDLES FOR SERIES "20"



This is a special handle for the SERIES 20 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 typically used on spring center to neutral sections. Normally, the handle is installed at the factory on sections ordered with handle option 7. However, the handle can also be installed in the field on valves originally equipped with standard handles (handle options 1 through 4). This drawing shows two joysticks with offset handles installed on a six section valve.

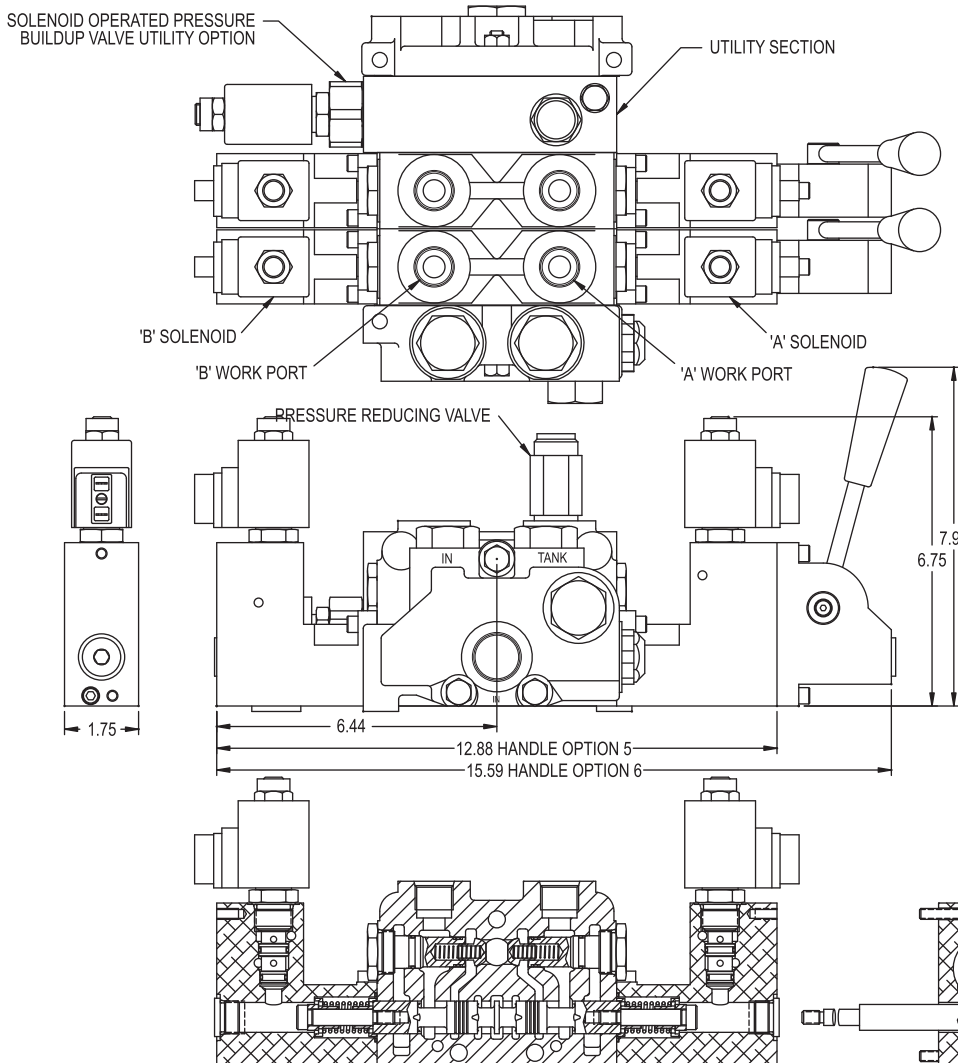
A typical handle to spool movement pattern is shown. Different patterns are also available. The Joystick handle can be used with standard three position spools or with four position float spools. If work port reliefs are required on the joystick end of a section, the relief cartridges must be the shim adjustable type. When two joysticks are installed on the same valve assembly, it is recommended that there be two standard section between them to prevent handle interference.

When ordering a valve assembly, please refer to the following part numbers and indicate which sections the handle is to be installed on. The part numbers refer to the complete joystick assembly required to control two valve sections. Use the same part numbers to order kits for field installation.

JOYSTICK ASSEMBLY W/ STRAIGHT HANDLE:
ASSEMBLED ON VALVE 20JS
KIT 660190016

JOYSTICK ASSEMBLY W/ OFFSET HANDLE:
ASSEMBLED ON VALVE 20JO
KIT 660190017

SERIES "20" SPLIT SOLENOID OPERATORS (SOLENOID OPERATORS ON BOTH ENDS)



SPECIFICATIONS:
1-9 SECTIONS
20 GPM
INTERNAL PILOT
INTERNAL DRAIN

SERIES "20" SOLENOID OPERATED WORK SECTION

The Solenoid Operated Series 20 Work Section allows remote electrical on-off or manual control. The Solenoid Operated Section 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". Internal pilot lines provide pilot pressure to the solenoid actuator. Pilot pressure to initiate spool shift is generated by a "Pressure Build-Up Valve" that is installed in the Utility Section, which must be installed between the last section and the outlet cover, (see Order Code). Two versions of the Pressure Build-up Valve are offered. Options 1 & 2 supply approximately 300 PSI pilot pressure to the solenoid actuator. 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 or line may be required. Any manual sections must be upstream of any solenoid sections in the stack valve assembly. Consult your sales representative for your application.

SOLENOID OPERATED WORK SECTION

2 0 P X X X X X X - S X X X

WORK SECTION TYPE

P - Standard Parallel

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

SPOOL ACTION

A - Spring Center

HANDLE OPTION

5. Solenoid Operated Only (No Lever)
6. Solenoid Operated With Manual Lever

COIL VOLTAGE & TERMINATION *

- S12Q, 12 VDC Double Spade
- S12L, 12 VDC Double Wire
- S12H, 12 VDC DIN 43650
- S12W, 12VDC Weather Pack®
- S24Q, 24 VDC Double Spade
- S24L, 24 VDC Double Wire
- S24H, 24 VDC DIN 43650
- S11C, 120 VAC Conduit
- S11H, 120 VAC DIN 43650

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

*See page V34 for coil details.

UTILITY SECTION

2 0 U X - X X X

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
4. Power Beyond Utility with #10 SAE Power Beyond Port *
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.

COIL VOLTAGE & TERMINATION*

- Omit For Options 2 thru 5
- 12Q, 12 VDC Double Spade
- 12L, 12 VDC Double Wire
- 12H, 12 VDC DIN 43650
- 12W, 12VDC Weather Pack®
- 24Q, 24 VDC Double Spade
- 24L, 24 VDC Double Wire
- 24H, VDC DIN 43650
- 11C, 120 VAC Conduit
- 11H, 120 VAC DIN 43650

PRESET INLET RELIEF CARTRIDGE

20IR - OX - X X X X

Setting in PSI - Leave Blank for Standard

CARTRIDGE CODE / STYLE

| CARTRIDGE CODE / STYLE | STD SETTING |
|-----------------------------|-------------------|
| B - SHIM ADJ 500-1350 PSI | 1350 PSI @ 10 GPM |
| C - SHIM ADJ 1351-1750 PSI | 1750 PSI @ 10 GPM |
| D - SHIM ADJ 1751-2200 PSI | 2200 PSI @ 10 GPM |
| E - SHIM ADJ 2201-3000 PSI | 2500 PSI @ 10 GPM |
| F - SCREW ADJ 500-1350 PSI | 1350 PSI @ 10 GPM |
| G - SCREW ADJ 1351-1750 PSI | 1750 PSI @ 10 GPM |
| H - SCREW ADJ 1751-2200 PSI | 2200 PSI @ 10 GPM |
| J - SCREW ADJ 2201-3000 PSI | 2500 PSI @ 10 GPM |
| K - SCREW ADJ 3001-3500 PSI | 3250 PSI @ 10 GPM |

PRESET WORK PORT RELIEF CARTRIDGE

20PR - OX - X X X X

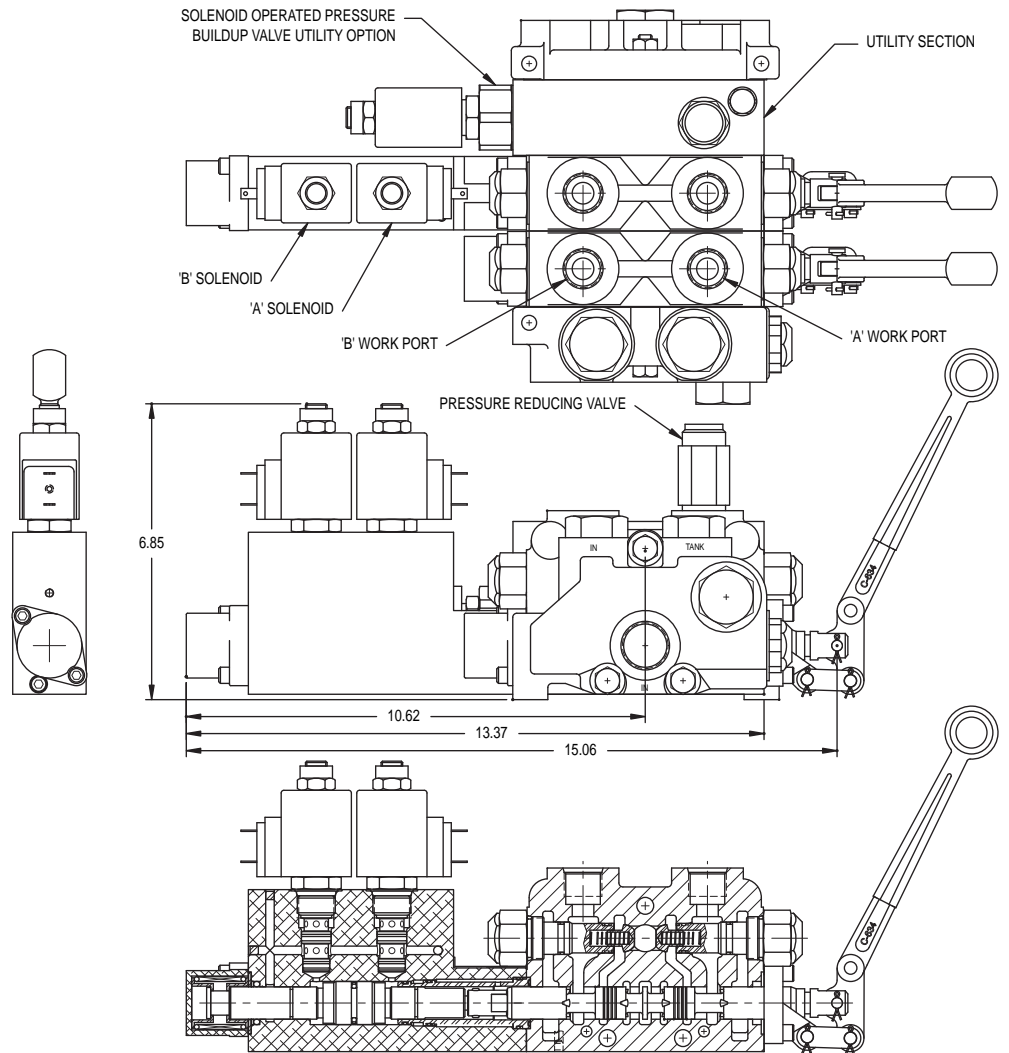
Setting in PSI - Leave Blank for Standard

CARTRIDGE CODE / STYLE

| CARTRIDGE CODE / STYLE | STD SETTING |
|---|------------------|
| B - SHIM ADJ 500-1350 PSI | 1350 PSI @ 3 GPM |
| C - SHIM ADJ 1351-1750 PSI | 1750 PSI @ 3 GPM |
| D - SHIM ADJ 1751-2200 PSI | 2200 PSI @ 3 GPM |
| E - SHIM ADJ 2201-3000 PSI | 2500 PSI @ 3 GPM |
| F - SCREW ADJ 500-1350 PSI | 1350 PSI @ 3 GPM |
| G - SCREW ADJ 1351-1750 PSI | 1750 PSI @ 3 GPM |
| H - SCREW ADJ 1751-2200 PSI | 2200 PSI @ 3 GPM |
| J - SCREW ADJ 2201-3000 PSI | 2500 PSI @ 3 GPM |
| L - ANTI-CAV/SHIM RELIEF 500-1350 PSI | 1350 PSI @ 3 GPM |
| M - ANTI-CAV/SHIM RELIEF 1351-1750 PSI | 1750 PSI @ 3 GPM |
| N - ANTI-CAV/SHIM RELIEF 1751-2200 PSI | 2200 PSI @ 3 GPM |
| R - ANTI-CAV/SHIM RELIEF 2201-3000 PSI | 2500 PSI @ 3 GPM |
| S - ANTI-CAV/SCREW RELIEF 500-1350 PSI | 1350 PSI @ 3 GPM |
| T - ANTI-CAV/SCREW RELIEF 1351-1750 PSI | 1750 PSI @ 3 GPM |
| W - ANTI-CAV/SCREW RELIEF 1751-2200 PSI | 2000 PSI @ 3 GPM |
| Y - ANTI-CAV/SCREW RELIEF 2201-3000 PSI | 2500 PSI @ 3 GPM |

SERIES "20" DUAL SOLENOID OPERATORS (BOTH SOLENOID OPERATORS ON ONE END)

The Series "20" Dual Solenoid Operators offer a work section with solenoid operators and the same handle configurations as the standard manual sections. The work sections operate on the same principal as the Series "20" Split Solenoid Operators. When a solenoid is energized, pilot pressure is applied to a piston which causes the spool to shift. The work sections have internal pilot passage ways and internal pilot drains. The work sections must be used in conjunction with a utility section, as shown in the 20U catalog section, and this section must be installed between the last section and the outlet. The Dual Solenoid work section can be used with split solenoid sections or with manual sections, but the manual sections must be upstream of the solenoid sections. 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 running or light load applications, a restrictor installed in the work port or line may be required.



SOLENOID OPERATED WORK SECTION

WORK SECTION TYPE

P - Standard Parallel

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

SPOOL ACTION

A - Spring Center

HANDLE OPTION

1. Standard Lever Handle
2. Less Handle Only
3. Less Complete Handle
4. Vertical Lever Handle

20 P X X X X X - S X X X

COIL VOLTAGE & TERMINATION *

- S12Q, 12 VDC Double Spade
- S12L, 12 VDC Double Wire
- S12H, 12 VDC DIN 43650
- S12W, 12VDC Weather Pack®
- S24Q, 24 VDC Double Spade
- S24L, 24 VDC Double Wire
- S24H, 24 VDC DIN 43650
- S11C, 120 VAC Conduit
- S11H, 120 VAC DIN 43650

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

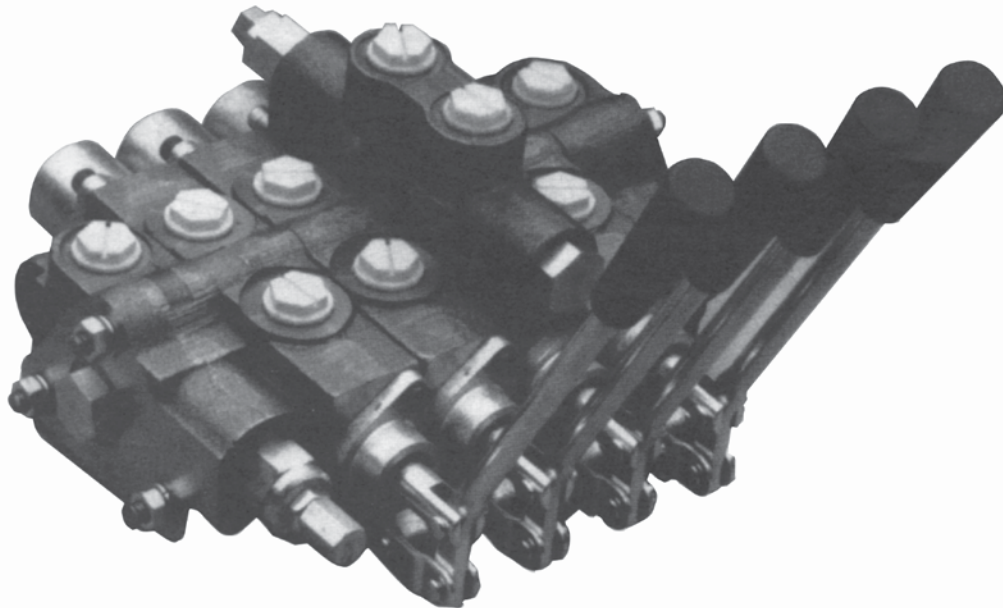
PORT RELIEF "A" OPTION

- 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

*See page V34 for coil details.

Directional Control Valves

SECTIONAL BODY



Model SV

- 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

STANDARD FEATURES

- 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.

ORDERING INFORMATION:

The following is a listing of valve sections available from stock on a standard basis.
STANDARD SECTIONS AVAILABLE:

INLET SECTIONS ALL HAVE BOTH TOP AND SIDE INLET PORTS

| PART NO. | RELIEF TYPE AND SETTING | PORT SIZE |
|----------|---|--------------------------|
| SVI21 | No Relief | #10 SAE ORB (7/8-14 THD) |
| SVI24 | Adjustable Low Pressure Relief Set at 1000 PSI | #10 SAE ORB (7/8-14 THD) |
| SVI15 | Adjustable High Pressure Relief Set At 2000 PSI | #8 SAE ORB (3/4-16 THD) |
| SVI25 | Adjustable High Pressure Relief Set at 2000 PSI | #10 SAE ORB (7/8-14 THD) |

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

| PART NO. | SPOOL TYPE AND ACTION |
|----------|--|
| SVW1AA1 | 3-Way Single Acting w/ Spring Center |
| SVW1BA1 | 4-Way Double Acting w/ Spring Center (Work Ports Blocked in Neutral) |
| SVW1BB1 | 4-Way Double Acting w/ 3 Position Detent (Work Ports Blocked in Neutral) |
| SVW1CA1 | 4-Way Motor Spool w/ Spring Center (Work Ports Open to Tank in Neutral) |
| SVW1CB1 | 4-Way Motor Spool w/ 3 Position Detent (Work Ports Open to Tank in Neutral) |
| SVW1DD1 | 4-Way 4 Position Float w/ Spring Center and Float Detent |
| SVL1CA1 | 4-Way Spool w/ Spring Center (with Pilot Operated Checks on Both Work Ports) |
| SVM1ES1 | 4-Way Meter Spool w/ Spring Center (Work Ports Blocked in Neutral) |

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.

| PART NO. | SPOOL TYPE AND ACTION | PORT RELIEFS |
|-----------|--|-------------------------------|
| SVH1BA1AA | 4-Way Double Acting w/ Spring Center | Port Relief Plugged |
| SVH1BA1GG | 4-Way Double Acting w/ Spring Center | Adjustable 1500-3000 PSI |
| SVH1DD1AA | 4-Way 4 Position Float w/ Spring Center and Float Detent | Port Relief Plugged |
| SVH1DD1BB | 4-Way 4 Position Float w/ Spring Center and Float Detent | Shim Adjustable 1500-3000 PSI |
| SVR1ES1AA | 4-Way Meter Spool w/ Spring Center | Port Relief Plugged |
| SVR1ES1GG | 4-Way Meter Spool w/ Spring Center | Adjustable 1500-3000 PSI |
| SVS1GA1GG | 4-Way Double Acting Series w/ Spring Center | Adjustable 1500-3000 PSI |
| SVS1GA1AA | 4-Way Double Acting Series w/ Spring Center | Port Relief Plugged |

OUTLET SECTIONS ALL HAVE BOTH TOP AND SIDE OUTLET PORTS

| PART NO. | EXHAUST OPTIONS | PORT SIZE |
|----------|--|--------------------------|
| SVE11 | Open Center Outlet w/ Conversion Plug | #8 SAE ORB (3/4-16 THD) |
| SVE21 | Open Center Outlet w/ Conversion Plug | #10 SAE ORB (7/8-14 THD) |
| SVE22 | Power Beyond Outlet w/ #8 SAE Beyond Port | #10 SAE ORB (7/8-14 THD) |
| SVE23 | Closed Center Outlet | #10 SAE ORB (7/8-14 THD) |
| SVE26 | Open Center Outlet Pressure Build-up Valve | #10 SAE ORB (7/8-14 THD) |
| SVE27 | Power Beyond Pressure Build-up Valve | #10 SAE ORB (7/8-14 THD) |

TIE ROD KITS

TIE ROD TORQUE
 150in-lbs ± 6in-lbs
 (12 1/2 ft-lbs ± 1/2)

PART NO.

660401001 1 Section*
 660401002 2 Sections*
 660401003 3 Sections*
 660401004 4 Sections*
 660401005 5 Sections*
 *Number of Work Sections

PART NO.

660401006 6 Sections*
 660401007 7 Sections*
 660401008 8 Sections*
 660401009 9 Sections*
 660401010 10 Sections*

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

All inlet sections have top and side inlets.

S V I X X - X X X X

PORT SIZE

- #8 SAE ORB (3/4-16 THD)
- #10 SAE ORB (7/8-14 THD)

RELIEF SETTING (in PSI)

- #### RELIEF OPTION
- No Relief Plug
 - Adj. Low Pressure 500-1500 PSI
 - Adj. High Pressure 1500-3000 PSI
 - Plastic Plug in relief cavity. Use only when cartridge is to be installed at a later date.

OUTLET SECTION

All outlet sections have top and side outlets.

S V E X X

PORT SIZE

- #8 SAE ORB (3/4-16 THD)
- #10 SAE ORB (7/8-14 THD)

EXHAUST OPTION

- Std. Open Center Outlet w/Conversion Plug
- Power Beyond Outlet w/#8 SAE Beyond Port
- Closed Center Outlet⁰
- Open Center Outlet Pressure Build-up
- Power Beyond Pressure Build-up #8 SAE Beyond Port

⁰ 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 Section²
- L-Work Section with Double P.O. Checks¹
- F-Fine Metering³

PORT SIZE

- 1. #8 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
- E-4-Way 3 Position Metering (SVM only)
- F-3-Way 3 Position Metering (SVM only)
- J-4-Way 3 Position Fine Metering (SVF only)
- 1. Lock Valve Section available only with Spool Option C.
- 2. Metering Section available only with Spool Options E or F.
- 3. Fine Metering available only with Spool Options J.

S V X X X X X

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. Straight Handle
- 9. Blank for Optional Joystick Handle
- 11. Enclosed Handle
- 12. Extended Enclosed Handle

SPOOL ACTION

- A-Spring Center (SVW & SVL only)
- B-3 Position Detent
- C-Friction Detent
- D-Spring Center w/Float Detent (SVW only)
- 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
- R-Spring Center Pneumatic Actuator
- S-Spring Center (SVM & SVF)

PORT RELIEF WORK SECTIONS

SECTION TYPE

- H-Port Relief Section
- R-Port Relief Metering Section²
- S-Series Circuit Port Relief Section
- G-Port Relief Fine Metering Section³

PORT SIZE

- 1.#8 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
- E-4-Way 3 Position Metering (SVR only)
- F-3-Way 3 Position Metering (SVR only)
- G-4-Way 3 Position Series (SVS only)
- H-4-Way 3 Position Motor Series (SVS only)
- J- 4-Way 3 Position Fine Metering (SVG only)

SPOOL ACTION

- A-Spring Center (SVH & SVS only)
- B- 3 Position Detent
- C-Friction Detent
- D- Spring Center w/ Float Detent (SVH only)
- E-Light Spring Center
- F-2 Position Detent Neutral and Out (No IN Position)
- J-S/C with Micro Switch Bracket 2-Position*
- K-S/C with MicroSwitch Bracket 1-Position*
- M-Spring Center Detent In
- N-Spring Center Detent Out
- R-Spring Center Pneumatic Actuator
- S-Spring Center (SVR & SVG)

*MicroSwitch not provided

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
- 9. Blank for Optional Joystick Handle
- 12. Extended Enclosed Handle

S V X X X X X X X

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 "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
- ** Cannot be used on work sections with float option due to interference with handle.
- *** Do not use in applications that require low work port leakage. Max allowable leakage 5 in³/min @1000 psi.

For Work Port Relief Settings Other Than Standard SVH1BA1GG-18-25

B PORT RELIEF PRESSURE IN HUNDREDS
EXAMPLE: 25=2500 PSI at 3 GPM
All Port Reliefs set at 3 GPM

A 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. Special handles, spool, and spool actions are often easily made because of the SV valve's flexible design. 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
- 660180051 Float Detent Kit
- 660180036 Spring Center Detent In
- 660180037 Spring Center Detent Out
- 660180015 S/C w/Micro-Switch, 2 Position*
- 660180016 S/C w/Micro-Switch, 1 Position*

HANDLE KITS

- 660180011 Std. Handle Kit
- 660180032 Clevis Sub-Assy
- 660180005 Complete Handle Kit
- 660180031 Pin Kit
- 660180026 Vertical Handle Kit
- 660180028 Straight Handle Kit
- 660180007 Complete Adjustable Handle Kit

*Bracket only, Micro-Switch is not provided.

- 660180006 Adjustable Handle Kit
- 660180055 Joystick Handle Kit Less Handle
- 660180033 Bent Joystick Handle Kit
- 660180017 Straight Joystick Handle Kit
- 660180018 Offset Joystick Handle Kit

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

- 660280004 Port Relief Plug
- 660280003 Shim Adj. Port Relief 1500-3000 PSI
- 660280010 Shim Adj. Port Relief 500-1500 PSI
- 660280012 Adj. Combination Port Relief/Anti-Cav Check 1000-2500 PSI

- 660280008 Shim Adj. Combination Port Relief/Anti-Cav Check 1000-2500 PSI
- 660280005 Anti-Cavitation Check
- 660280009 Adj. Port Relief 1500-3000 PSI
- 660280011 Adj. Port Relief 500-1500 PSI
- 672000101 .015 SHIM
- 672000102 .033 SHIM
- 672000103 .060 SHIM

INLET RELIEFS

- 660250006 Inlet Relief Plug
- 660250003 Low Pressure Inlet Relief
- 660250002 High Pressure Inlet Relief

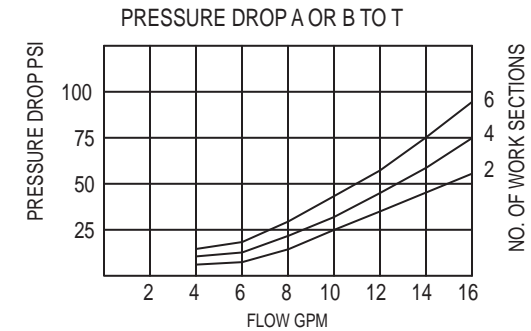
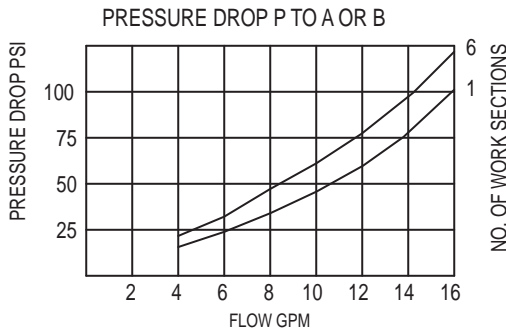
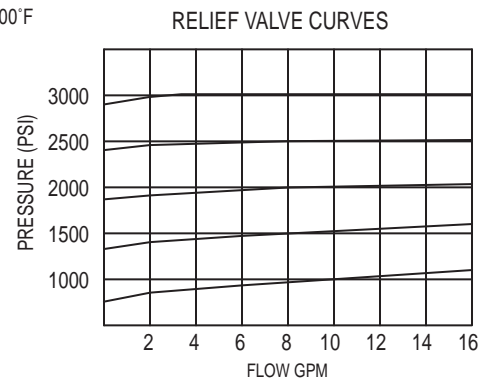
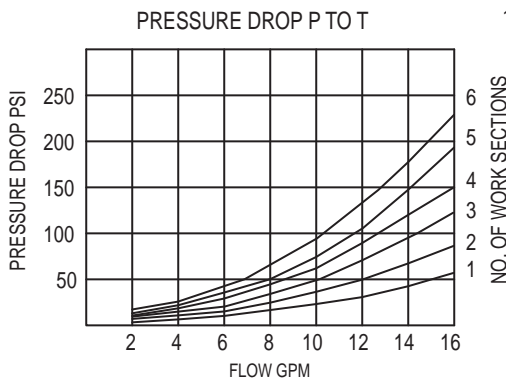
OUTLET CARTRIDGES

- 200400030 Open Center Plug
- 660280001 #8 SAE Power Beyond Cart.
- 660280002 Closed Center Plug
- 660280018 Open Center Build-Up Cart.
- 660280019 Power Beyond Build-Up Cart.

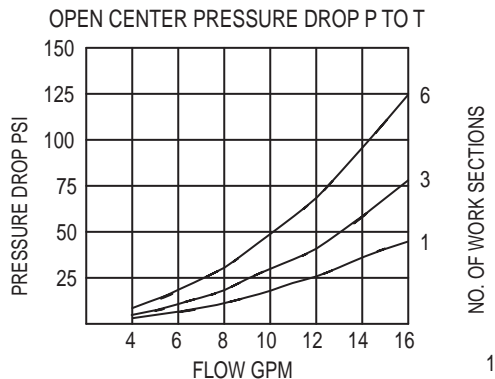
MISC. KITS

- 660180052 Load Check Kit

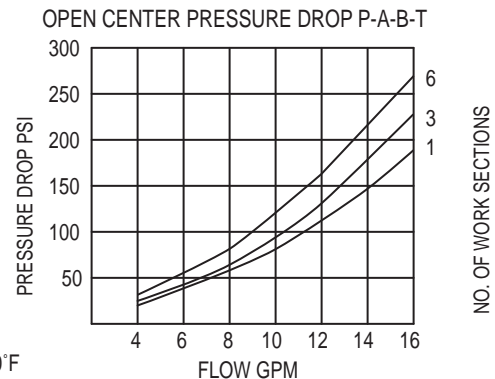
PERFORMANCE CURVES



SVS SERIES SECTION TEST DATA

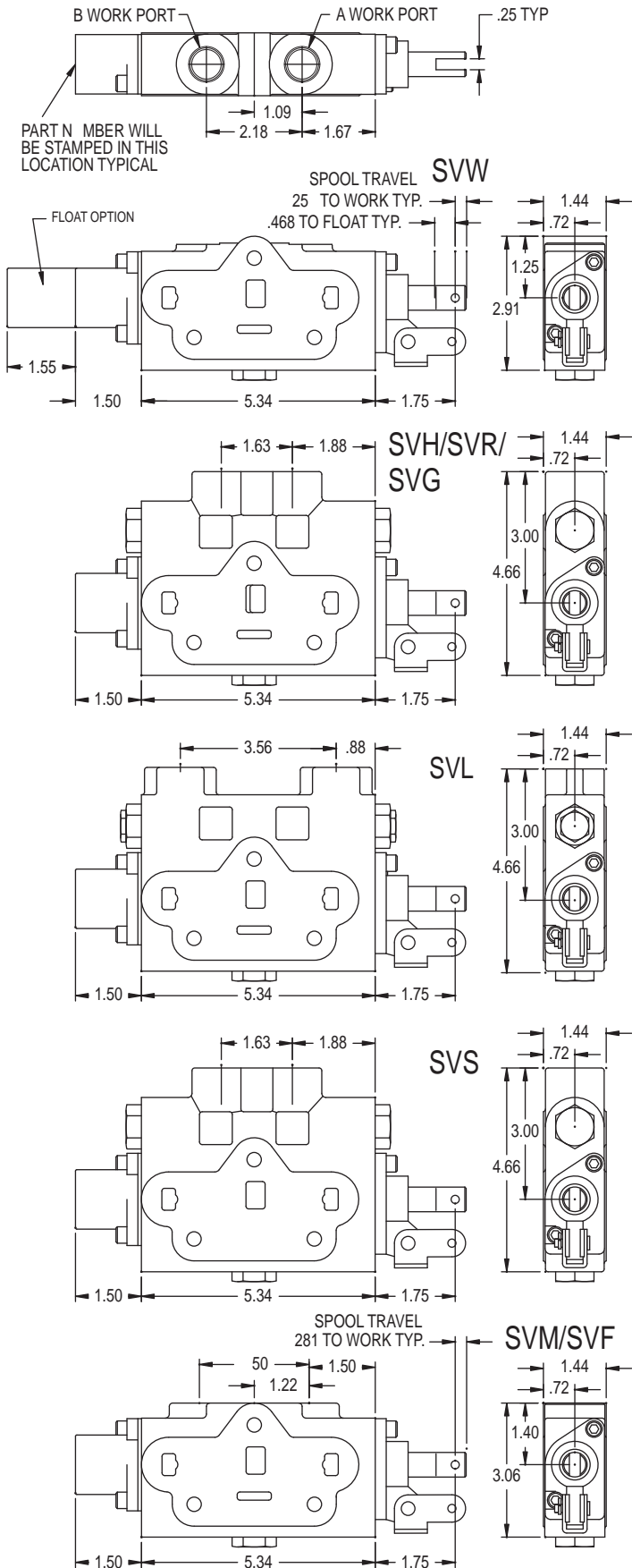


120 SUS OIL AT 100°F

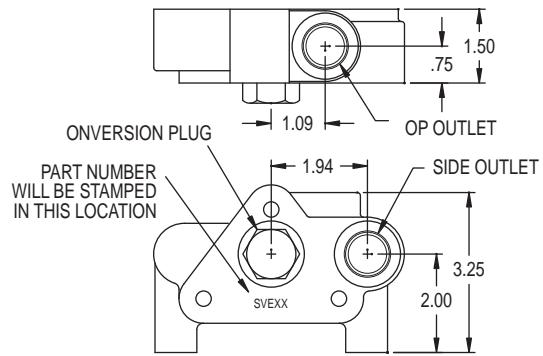


DIMENSIONAL DATA

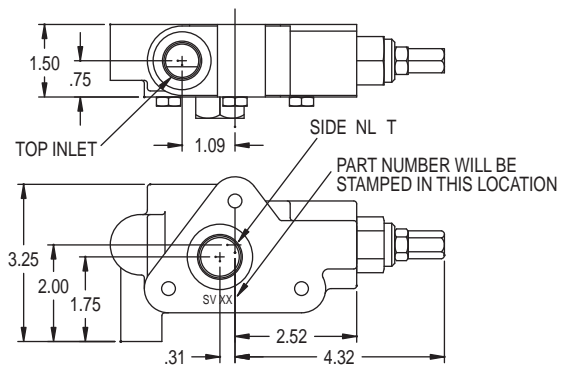
WORK SECTIONS



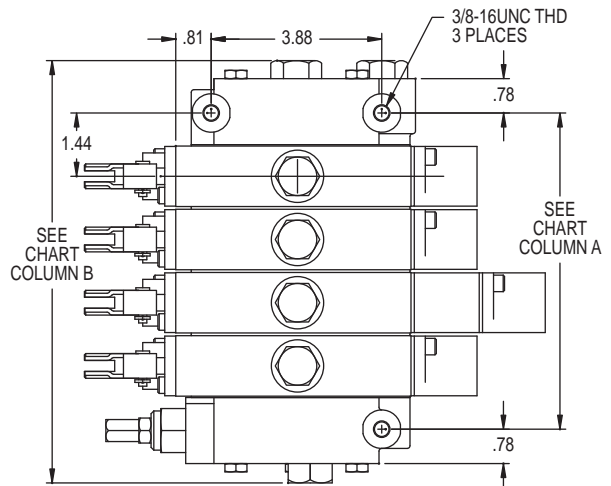
OUTLET COVER



INLET COVER



BOTTOM VIEW OF MOUNTING DIMENSIONS

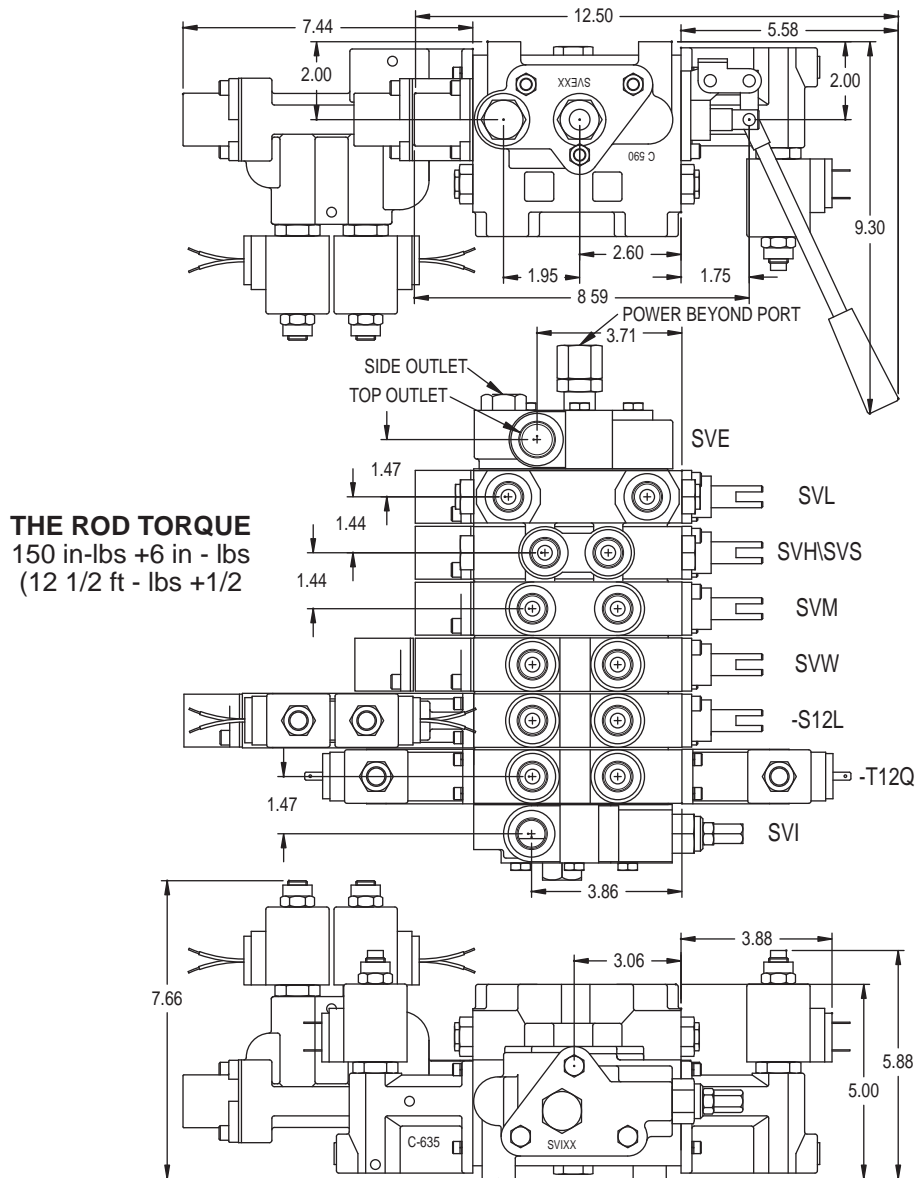


| Number of Work Sections | "A" | "B**" |
|-------------------------|--------|--------|
| 1 | 2.875 | 5.875 |
| 2 | 4.312 | 7.312 |
| 3 | 5.750 | 8.750 |
| 4 | 7.187 | 10.187 |
| 5 | 8.625 | 11.625 |
| 6 | 10.062 | 13.062 |
| 7 | 11.500 | 14.500 |
| 8 | 12.937 | 15.937 |
| 9 | 14.375 | 17.375 |
| 10 | 15.812 | 18.812 |

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

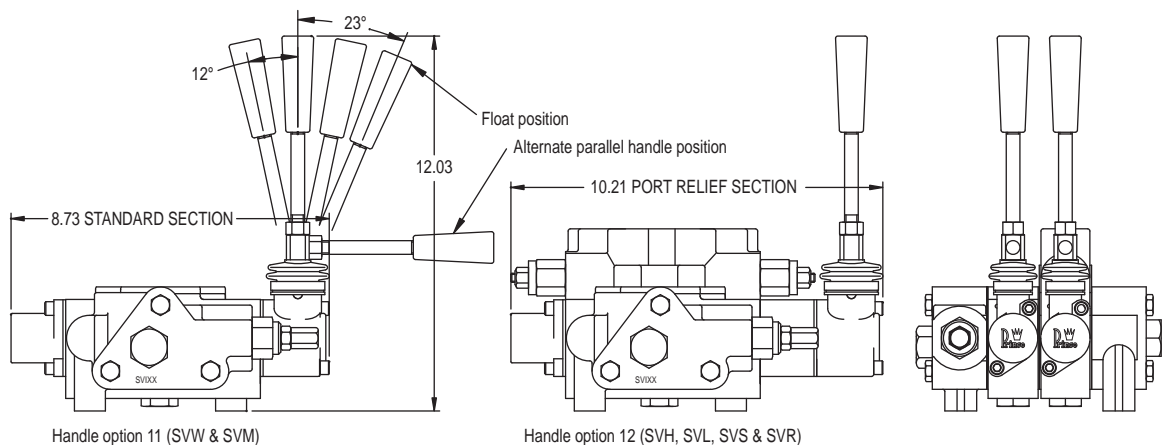
VALVES

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.



PARALLEL CIRCUIT SVW, SVM, SVF, SVH, SVR, SVG AND SVL WORK SECTIONS

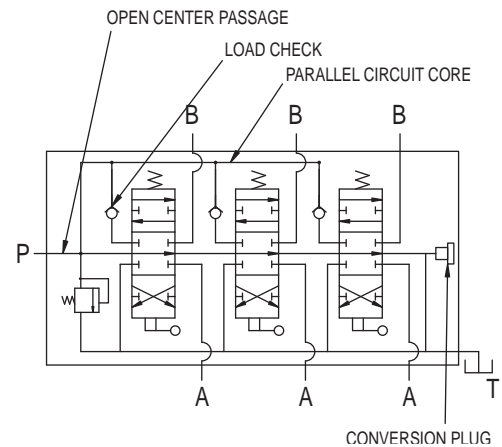
Parallel circuit sections are by far the most common. The SVW, SVM, SVF, SVH, SVR, SVG and SVL are all of parallel circuit construction. They can be combined together in any order in an assembly. When any one of the spools is shifted, it blocks off the open center passage through the valve. The oil then 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.

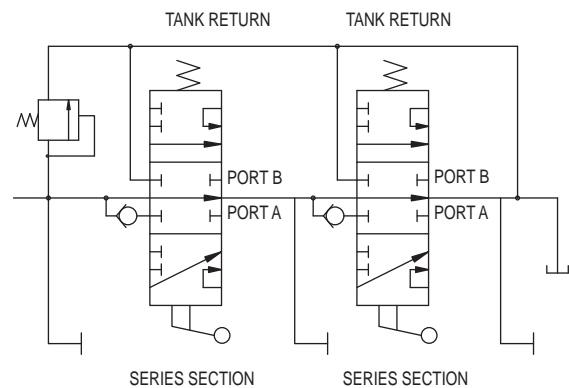
LOCK SECTIONS

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.



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 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 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.

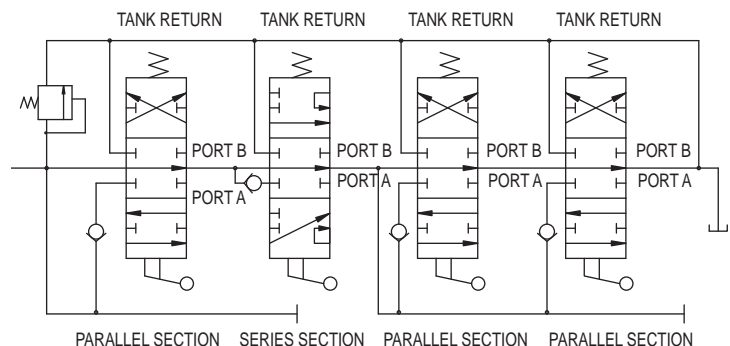
In the valve assembly shown below, the first, third and fourth sections are parallel. The second section is series. The first parallel section has priority over all downstream valves. When the spool of the first parallel section is actuated, the return oil from the work port is directed to the tank core,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

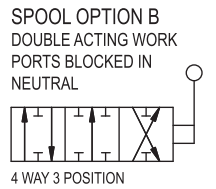
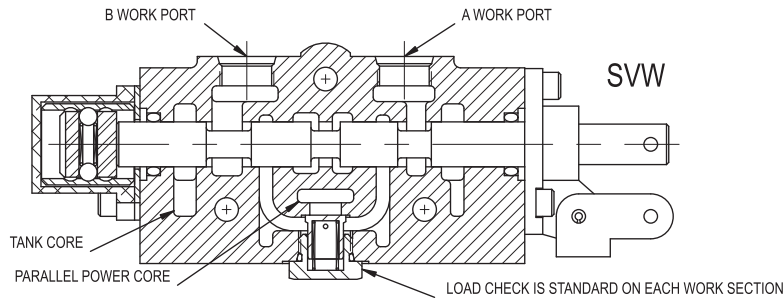
CLOSED CENTER APPLICATIONS

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

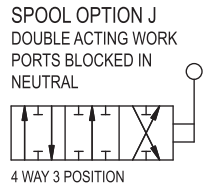
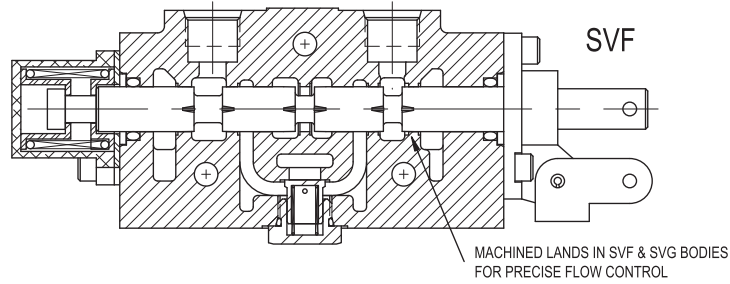


WORK SECTIONS

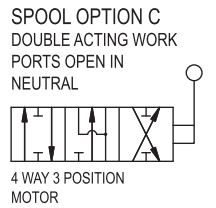
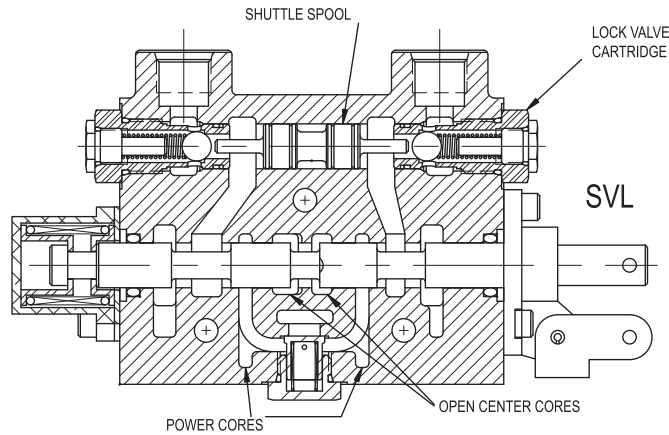
SPOOL ATTACHMENT OPTION B
3 POSITION DETENT



SPOOL ATTACHMENT OPTION S
SPRING CENTER (FINE METERING)

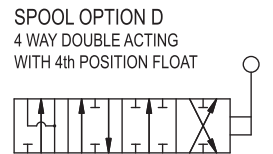
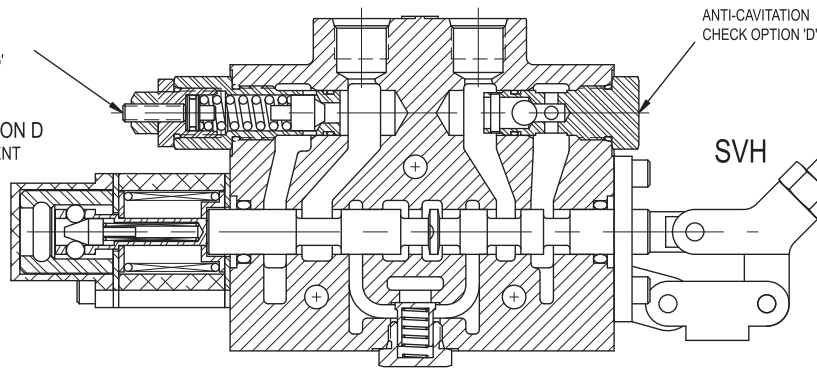


SPOOL ATTACHMENT OPTION A
SPRING CENTER



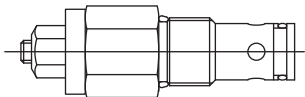
ADJUSTABLE DIRECT
ACTING RELIEF OPTION 'G'

SPOOL ATTACHMENT OPTION D
SPRING CENTER W/FLOAT DETENT



SV WORK PORT RELIEF

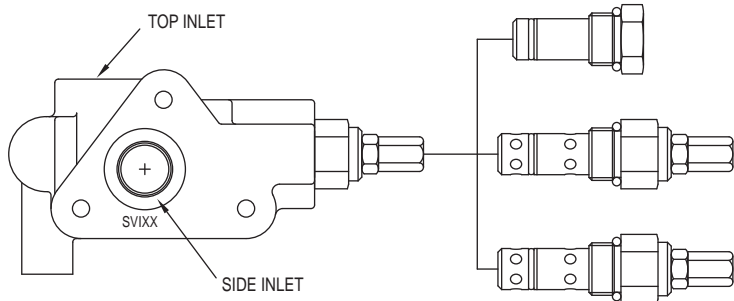
SV WORK PORT RELIEFS, OPTION B, C, G, & H CAN BE ORDERED PRETESTED. USE ORDER CODE AT RIGHT



| PR | - | 0 | - | - |
|--------------|------------------|--|---|---|
| MODEL NUMBER | PORT SIZE | RELIEF TYPE | PRESSURE SETTING | |
| | 0 CARTRIDGE ONLY | H- ADJUSTABLE 1500-3000 PSI L- ADJUSTABLE 500-1500 PSI NH- NON-ADJUSTABLE 1500-3000 PSI NL- NON-ADJUSTABLE 500-1500 PSI | SPECIFY RELIEF PRESSURE. LEAVE BLANK FOR STANDARD SETTINGS. STANDARD SETTING: 2000 PSI for H and NH 1000 PSI for L and NL | |

VALVES

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

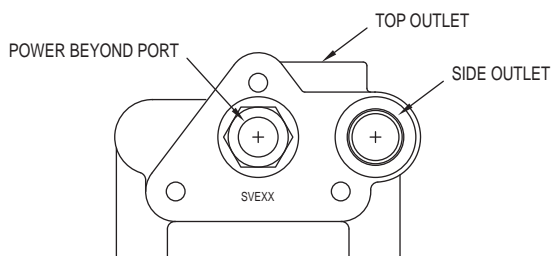
This option provides for a differential poppet relief adjustable from 500-1500 PSI. Set at 1000 PSI @ 10 GPM.

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 V65.

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.

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.

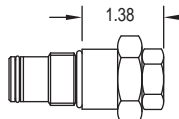
OPTION 1 STANDARD OPEN CENTER OUTLET WITH CONVERSION PLUG

This is the standard outlet option. This option allows for conversion in the field for power beyond or closed center applications. When spools are in neutral the inlet is unloaded to tank.



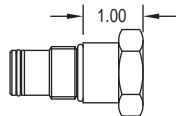
OPTION 6 OPEN CENTER OUTLET PRESSURE BUILD-UP VALVE FOR SOLENOID OPTION

This option directs oil from open center core thru pressure build-up valve and then to tank. See solenoid section for description of operation.



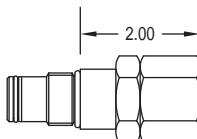
OPTION 2 POWER BEYOND OUTLET WITH #8 SAE BEYOND PORT

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.

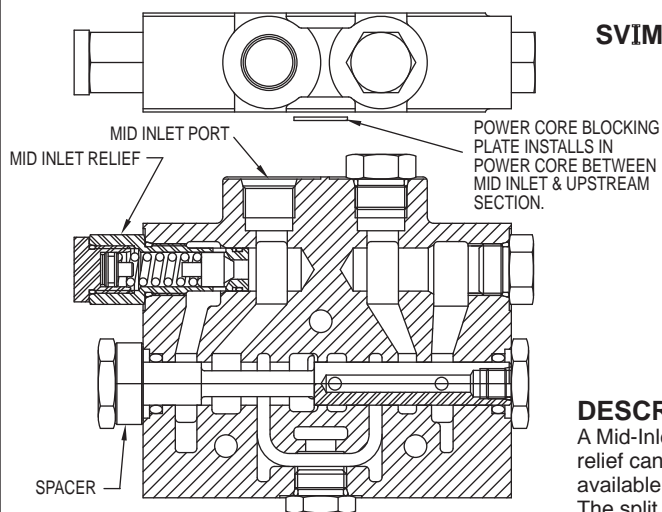


OPTION 7 POWER BEYOND PRESSURE BUILD-UP VALVE FOR SOLENOID OPTION

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.



SV MID-INLET SECTION



SPLIT MID-INLET SHOWN CAN BE CONVERTED TO COMBINED MID-INLET BY MOVING SPACER TO OPPOSITE END

SVIM 1 X X - X X X X

Last Four Digits Specify
A Non-Standard Relief Pressure.
When blank, refer to standard setting

- 1-No Relief
- 2-SHIM Adjustable 500-1500 PSI Std. Setting 1000 PSI @ 10GPM
- 3-SHIM Adjustable 1500-3000 PSI Std. Setting 2000 PSI @ 10 GPM
- 4-Adjustable 500-1500 PSI Std. Setting 1000 PSI @ 10 GPM
- 5-Adjustable 1500-3000 PSI Std. Setting 2000 PSI @ 10 GPM

C-Combined Flow Mid-Inlet
S-Split Flow Mid-Inlet (not available after a series section)
See Section View at left. Note
Location of Spacer, Part Number 671200035

1. Port Size #8 SAE ORB (3/4-16 THD)

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 ————— SVIFXXX

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. SVIF15P12Q-2700 is set at 2700 psi

SOLENOID OPTION
Omit for Flow Control Option M
12Q-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 Coil
12W - 12VDC Double Lead Wire w/ Weatherpak Connector Coil
24W - 24VDC Double Lead Wire w/ Weatherpak Connector Coil

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

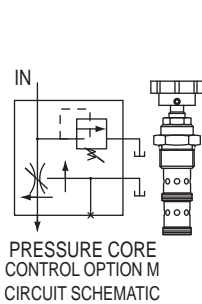
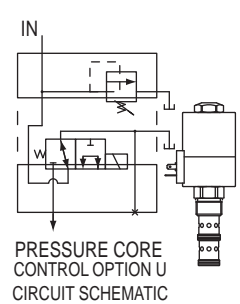
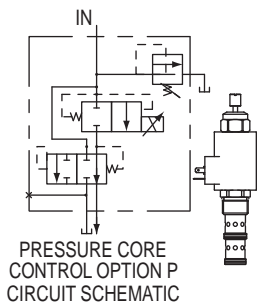
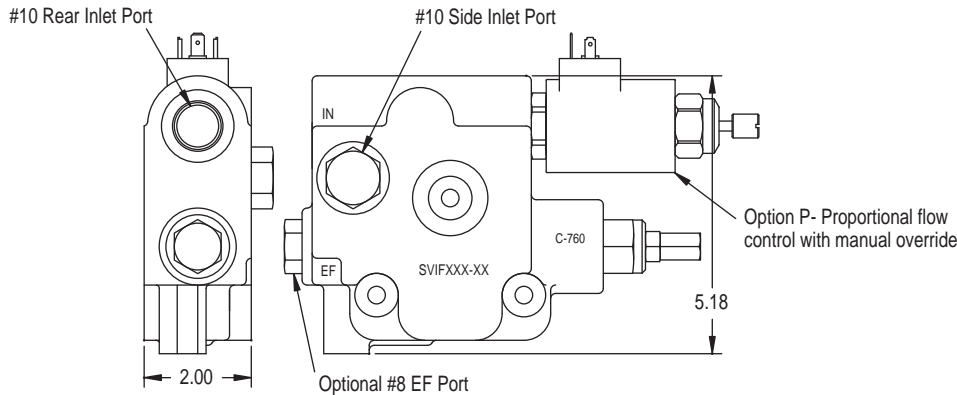
The SVIF Flow Control Inlet is interchangeable with the standard SV inlet section.

FLOW CONTROL OPTIONS:
P OPTION incorporates a solenoid operated, electrically variable pressure-compensated flow control cartridge. With the solenoid de-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 2 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.

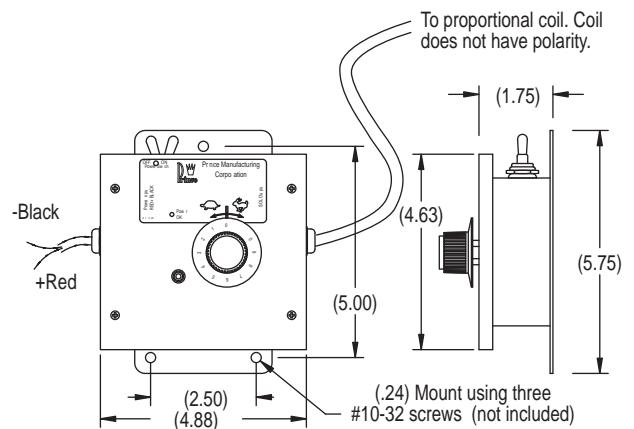


PROPORTIONAL CONTROLLER BOX (for use with SVIFP flow control inlet), PART NO. 67130048

The proportional controller box is used to provide an adjustable electrical signal to a proportional solenoid on the SVIFP inlet. Once the dial is set, the regulated flow through the valve should remain approximately constant regardless of pressure. Within the operating range, flow varies approximately linearly with dial rotation.

CONNECTIONS AND OPERATION:

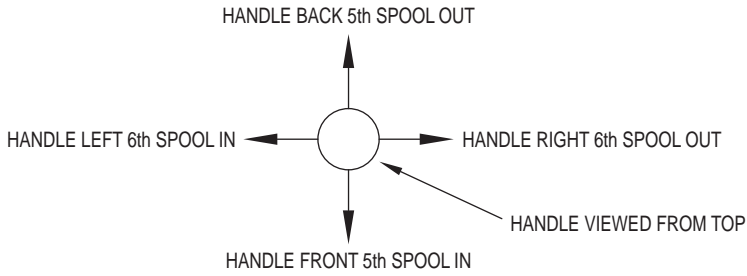
- *Connect leads to the power supply and solenoid. Power supply should be between 9 and 32 VDC.
- *With the power off, the inlet flow is directed to the tank (or excess flow port).
- *To provide power to the control, move the power switch to ON. (Green LED is ON when control is powered).
- *Minimum flow is directed into the valve when 0 on the dial is aligned with the center mark. Maximum flow is directed into the valve when 10 on the dial is aligned with the center mark.
- *Clockwise rotation increases flow.
- *Typically, no adjustments are needed for operation, (I-min and I-max pots are preset for the normal maximum and minimum flows)



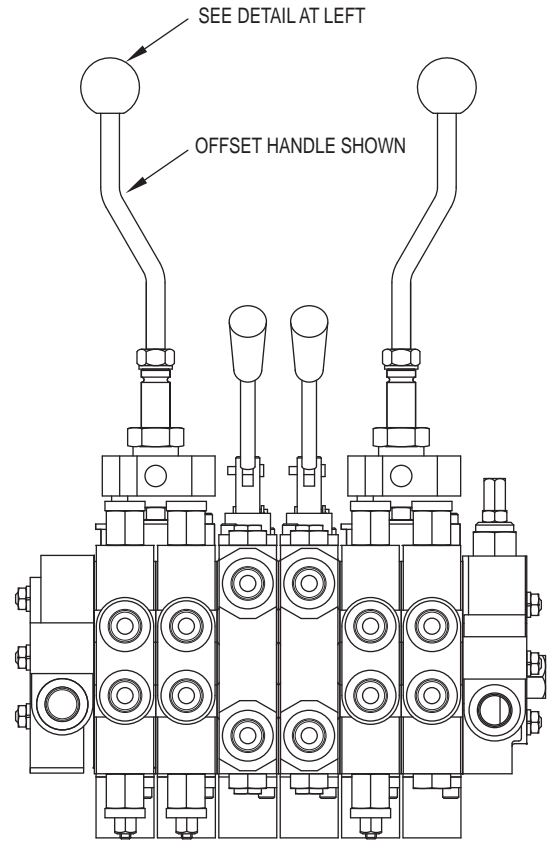
Control comes with 6 ft of cable for power leads and 6 ft of cable for coil leads. Control box protection rating is IP67.

VALVES

JOYSTICK HANDLE FOR MODEL SV STACK VALVE



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.



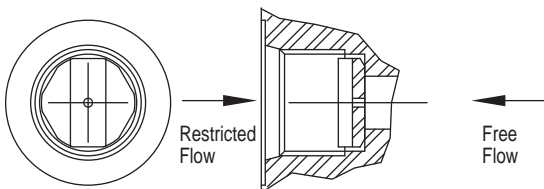
Please refer to these part numbers and state which sections the handle is to be installed on when ordering a valve assembly. This handle can be installed in the field to work sections with handle option 3 (no handle).

- JOYSTICK ASSEMBLY W/STRAIGHT HANDLE:
 ASSEMBLED ON VALVE SVJS
 KIT 660180017
- JOYSTICK ASSEMBLY W/OFFSET HANDLE:
 ASSEMBLED ON VALVE SVJO
 KIT 660180018
- JOYSTICK ASSEMBLY W/BENT HANDLE:
 ASSEMBLED ON VALVE SVJB
 KIT 660180033

A molded rubber boot (671300011) is available for the joystick.

ONE WAY WORK PORT RESTRICTOR FOR SVH, SVM, SVR, & SVL WORK 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 work port of a SVH, SVM, SVR, & SVL work section.



ORDERING INFORMATION

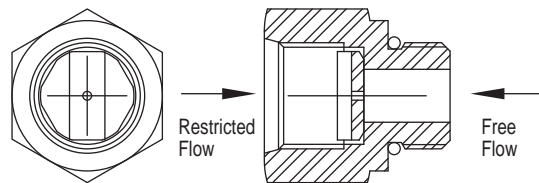
| | | |
|-------------------------|----------------------|-----------|
| HEX BRASS RESTRICTOR | | |
| #6 SAE 9/16-18 | #8 SAE 3/4-16 | |
| 670806XXX | 670805XXX | |
| SQUARE STEEL RESTRICTOR | | 661181XXX |
| CONICAL SPRING | | |

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

| | | |
|--------------------------|-------------------------|--------------|
| #6 SAE 9/16-18THD | #8 SAE 3/4-16THD | |
| 670806062 | 670805062 | .062 ORIFICE |
| 670806125 | 670805125 | .125 ORIFICE |
| 670806000 | 670805000 | NO ORIFICE |

ONE WAY WORK PORT RESTRICTOR FOR SVW WORK SECTIONS

This restrictor will restrict oil in one direction and allow free flow in the opposite direction. This restrictor consists of the orifice plate as described at left and an adapter fitting that allow use in the standard SVW #8 SAE work port.



ORDERING INFORMATION

| | | |
|--------------------------------|----------------------|-----------|
| ADAPTER W/HEX BRASS RESTRICTOR | | |
| #6 SAE 9/16-18 | #8 SAE 3/4-16 | |
| 661280XXX | 661180XXX | |
| ADAPTER WITH SQUARE STEEL | | 661182XXX |
| RESTRICTOR AND CONICAL SPRING | | |

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

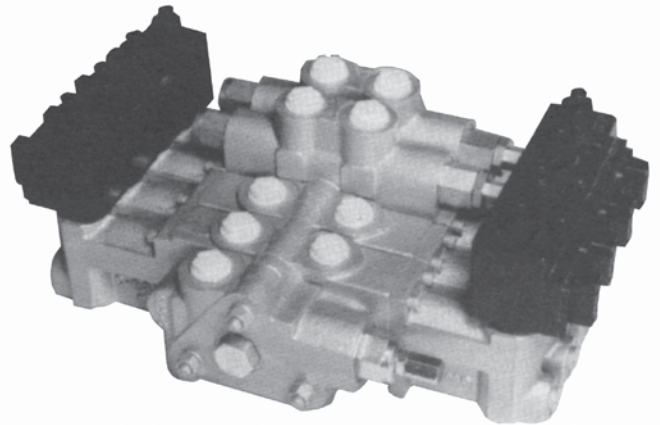
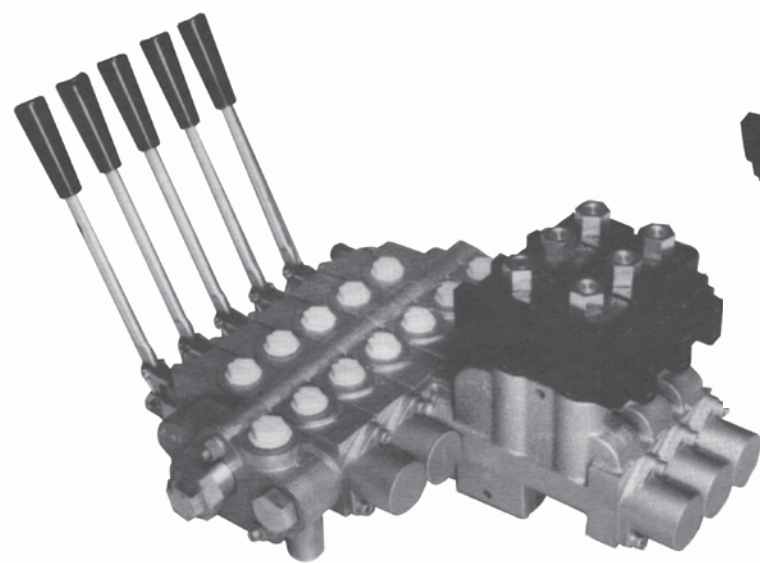
| | | |
|--------------------------|-------------------------|--------------|
| #6 SAE 9/16-18THD | #8 SAE 3/4-16THD | |
| 661280062 | 661180062 | .062 ORIFICE |
| 661280125 | 661180125 | .125 ORIFICE |
| 661280000 | 661180000 | NO ORIFICE |

Directional Control Valves

SV SOLENOID OPERATED

Work Sections

- Type “-T” Solenoid Operated
- Type “-S” Solenoid and Manual Operation



VALVES

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

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 “-T” Work Section Approx. 11.0 lbs.

Type “-S” Work Section Approx. 14.5 lbs.

TYPE “-T” SOLENOID DESCRIPTION OF OPERATION

The **Type “-T” Solenoid Operated SV Work Section** allows remote electrical on-off control. This solenoid operated SV section may be assembled with other standard SV manual sections, or type “-S” solenoid and manual sections.

The **Type “-T” Solenoid Operated SV Section contains** two 3-way 2-position 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 neutral to full stroke on “A” work port. 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 on “B” work port.

Internal pilot lines provide pilot pressure to the solenoid actuators. 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 the power beyond pressure build-up valve. Both versions supply 150-200 PSI pilot pressure to the solenoid actuators.

TYPE “-S” SOLENOID AND MANUAL DESCRIPTION OF OPERATION

The **Type “-S” Solenoid and Manual Operated SV Work Section** allows remote electrical on-off or manual control. This solenoid operated SV section may be assembled with other standard SV manual sections, or type “-T” solenoid sections.

The **Type “-S” Solenoid and Manual Operated SV Section 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”.

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 the power beyond pressure build-up valve. Both versions supply 150-200 PSI pilot pressure to the solenoid actuator.

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.** 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 information.

On Line Information Available

Additional valve information is available on line at www.princehyd.com
Information available includes:

- Parts manuals for many common Prince valves.
- CAD drawing files for many common Prince valves.
- Instruction sheets.
- Updated Prince catalog pages.
- Prince catalog in electronic format.

ORDERING INFORMATION:

The following is a listing of valve sections available from stock on a standard basis.

STANDARD SECTIONS AVAILABLE:

SOLENOID OPERATED SVW WORK SECTIONS ALL HAVE #8 SAE PORTS AND LOAD CHECK

| PART NO. | SPOOL TYPE/VOLTAGE |
|-------------|-------------------------------|
| SVW1BA-T12Q | 4 WAY-3 POSITION/12 VDC |
| SVW1AA-T12Q | 3 POSITION/12 VDC |
| SVW1CA-T12Q | 4 WAY-3 POSITION MOTOR/12 VDC |
| SVW1BA-T11C | 4 WAY-3 POSITION/120 VAC |

For Inlets, Outlets and Tie-rod Kits, please refer to SV Section

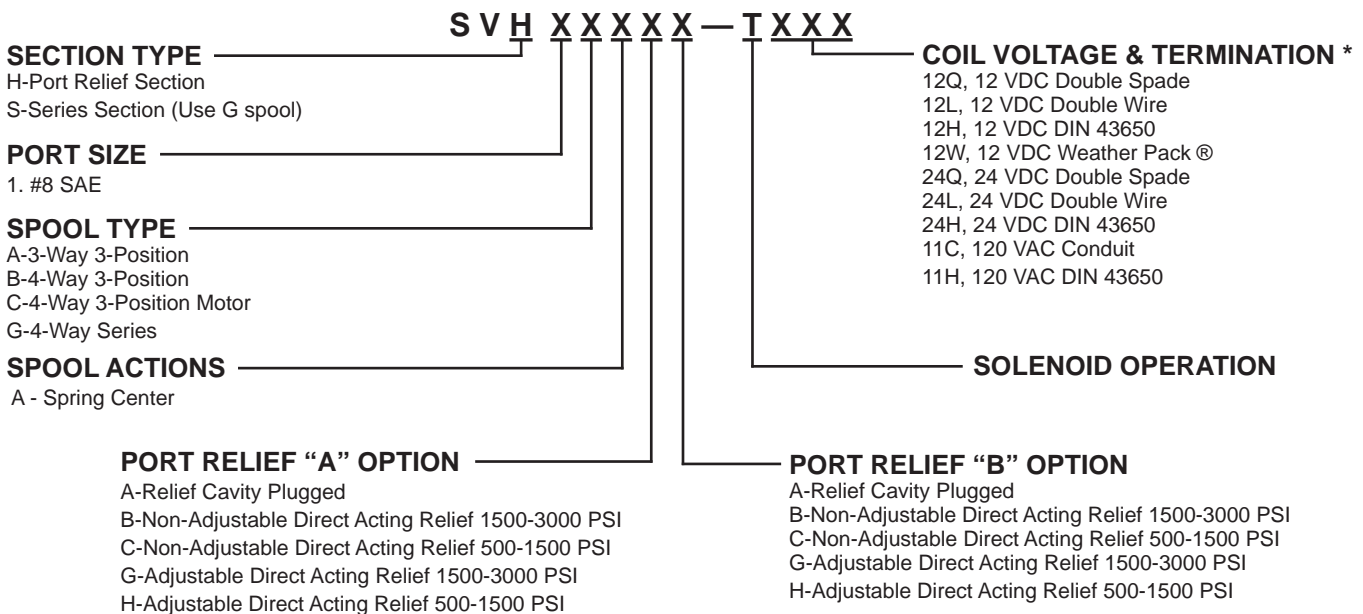
SOLENOID OPERATED SVH WORK SECTIONS ALL HAVE #8 SAE PORTS AND LOAD CHECK. MODELS WITH RELIEF, FACTORY SET AT 2000 PSI AT 3 GPM

| PART NO. | SPOOL TYPE/VOLTAGE | PORT RELIEFS |
|---------------|-------------------------------|----------------------------|
| SVH1BAGG-T12Q | 4 WAY-3 POSITION/12 VDC | ADJUSTABLE 1500-3000 PSI |
| SVH1BAAA-T12Q | 4 WAY-3 POSITION/12 VDC | PORT RELIEF PLUGGED |
| SVH1CAGG-T12Q | 4 WAY-3 POSITION MOTOR/12 VDC | ADJUSTABLE 1500 - 3000 PSI |

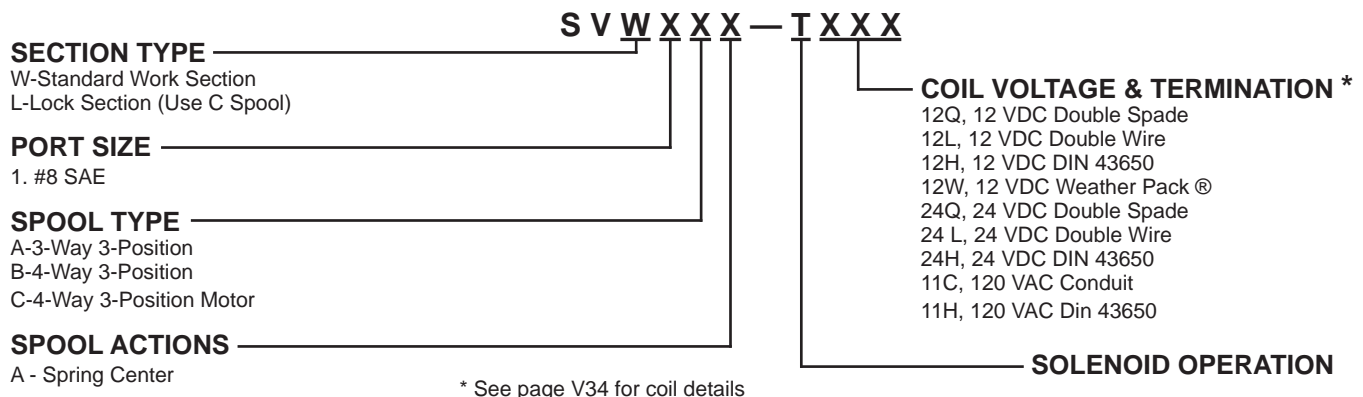
SPECIAL SECTIONS AVAILABLE:

Sections other than the standard models listed can be made to order. Use the 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 contact your Sales Representative.

SOLENOID OPERATED PORT RELIEF WORK SECTION



SOLENOID OPERATED SVW AND SVL WORK SECTIONS



* See page V34 for coil details

ORDERING INFORMATION: "-S" SOLENOID AND MANUAL WORK SECTIONS

The following is a listing of valve sections available from stock on a standard basis.

STANDARD SECTIONS AVAILABLE:

SOLENOID OPERATED SVW WORK SECTIONS ALL HAVE #8 SAE PORTS, LOAD CHECK AND STANDARD LEVER HANDLE

| PART NO. | SPOOL TYPE/VOLTAGE |
|--------------|-------------------------------|
| SVW1AA1-S12Q | 3 WAY-3 POSITION/12 VDC |
| SVW1BA1-S12Q | 4 WAY-3 POSITION/12 VDC |
| SVW1CA1-S12Q | 4 WAY-3 POSITION MOTOR/12 VDC |
| SVW1BA1-S24Q | 4 WAY-3 POSITION/24 VDC |

For Inlets, Outlets and Tie-rod Kits, please refer to SV Section

SOLENOID OPERATED SVH WORK SECTIONS ALL HAVE #8 SAE PORTS, LOAD CHECK AND STANDARD LEVER HANDLE MODELS WITH RELIEF, FACTORY SET AT 2000 PSI AT 3 GPM

| PART NO. | SPOOL TYPE/VOLTAGE | PORT RELIEFS |
|----------------|----------------------------|-------------------------|
| SVH1BA1AA-S12Q | 4 WAY DOUBLE ACTING/12 VDC | PORT RELIEF PLUGGED |
| SVH1BA1AA-S24Q | 4 WAY DOUBLE ACTING/24 VDC | PORT RELIEF PLUGGED |
| SVH1BA1BB-S12Q | 4 WAY DOUBLE ACTING/12 VDC | SHIM ADJ. 1500-3000 PSI |
| SVH1BA1BB-S24Q | 4 WAY DOUBLE ACTING/24 VDC | SHIM ADJ. 1500-3000 PSI |

SPECIAL SECTIONS AVAILABLE:

Sections other than the standard models listed can be made to order. Use the 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 contact your Sales Representative.

SOLENOID OPERATED SVW AND SVL SECTION

S V W X X X X - S X X X

SECTION TYPE

W-Standard Work Section
L-Lock Section (Use C Spool)

PORT SIZE

1. #8 SAE

SPOOL TYPE

A-3-Way 3-Position
B-4-Way 3-Position
C-4-Way 3-Position 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

COIL VOLTAGE & TERMINATION *

12Q, 12 VDC Double Spade
12L, 12 VDC Double Wire
12H, 12 VDC DIN 43650
12W, 12VDC Weather Pack®
24Q, 24 VDC Double Spade
24 L, 24 VDC Double Wire
24H, 24 VDC DIN 43650
11C, 120 VAC Conduit
11H, 120 VAC DIN 43650

SOLENOID AND MANUAL OPERATION

7. Vertical Handle
8. Straight Handle
11. Enclosed Handle
12. Extended Enclosed Handle

PORT RELIEF WORK SECTIONS

S V H X X X X X X - S X X X

SECTION TYPE

H-Port Relief Section
S-Series Section (Use G 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

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
12. Extended Enclosed Handle

COIL VOLTAGE & TERMINATION*

12Q, 12 VDC Double Spade
12L, 12 VDC Double Wire
12H, 12 VDC DIN 43650
12W, 12 VDC Weather Pack®
24Q, 24 VDC Double Spade
24 L, 24 VDC Double Wire
24H, 24 VDC DIN 43650
11C, 120 VAC Conduit
11H, 120 VAC DIN 43650

SOLENOID AND MANUAL OPERATION

PORT RELIEF "B" OPTION

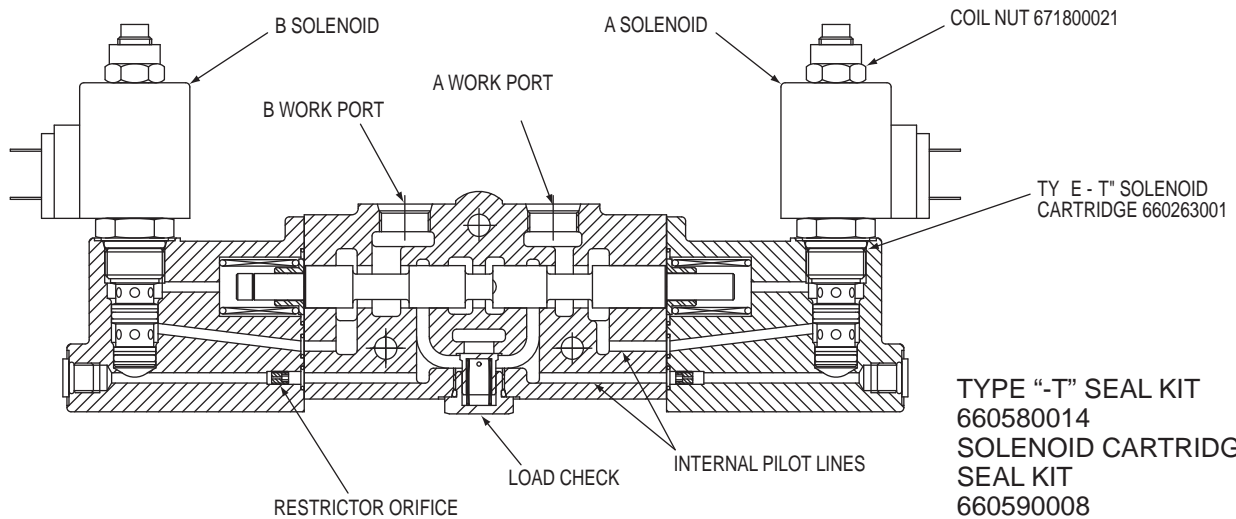
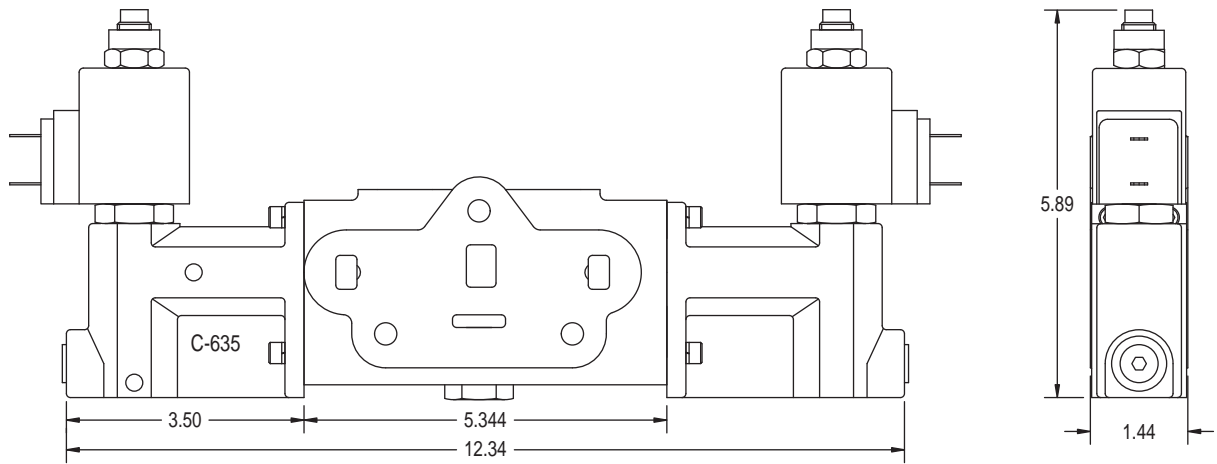
A-Relief Cavity Plugged
B-Non-Adjustable Direct Acting Relief 1500-3000 PSI
C-Non-Adjustable Direct Acting Relief 500-1500 PSI

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
H-Adjustable Direct Acting Relief 500-1500 PSI

*See page V34 for Coil details

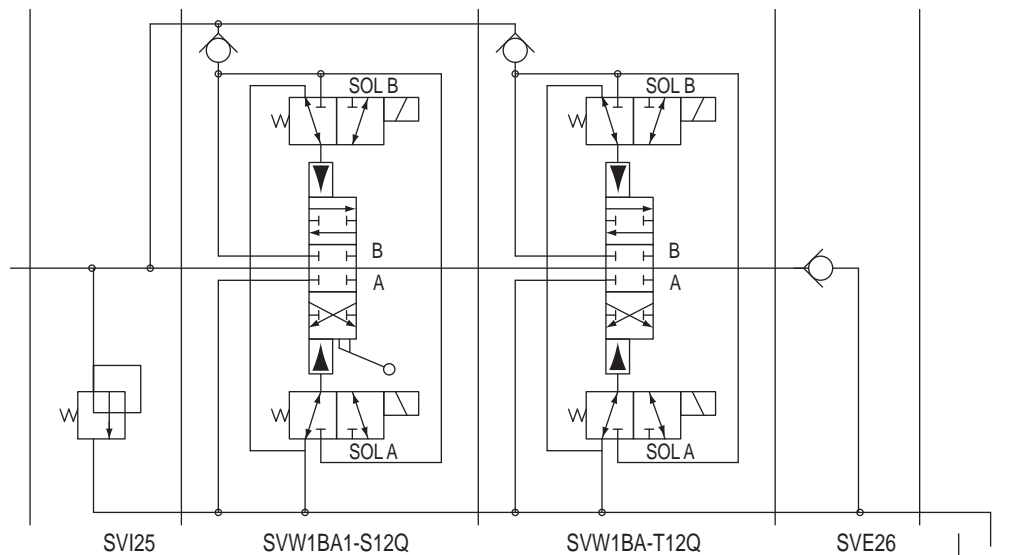
SOLENOID OPERATED TYPE "-T" WORK SECTION DIMENSIONAL DATA



TYPE "-T" SEAL KIT
 660580014
SOLENOID CARTRIDGES
 SEAL KIT
 660590008
**NOTE: THIS OPTION CANNOT
 BE ADDED IN THE FIELD.**

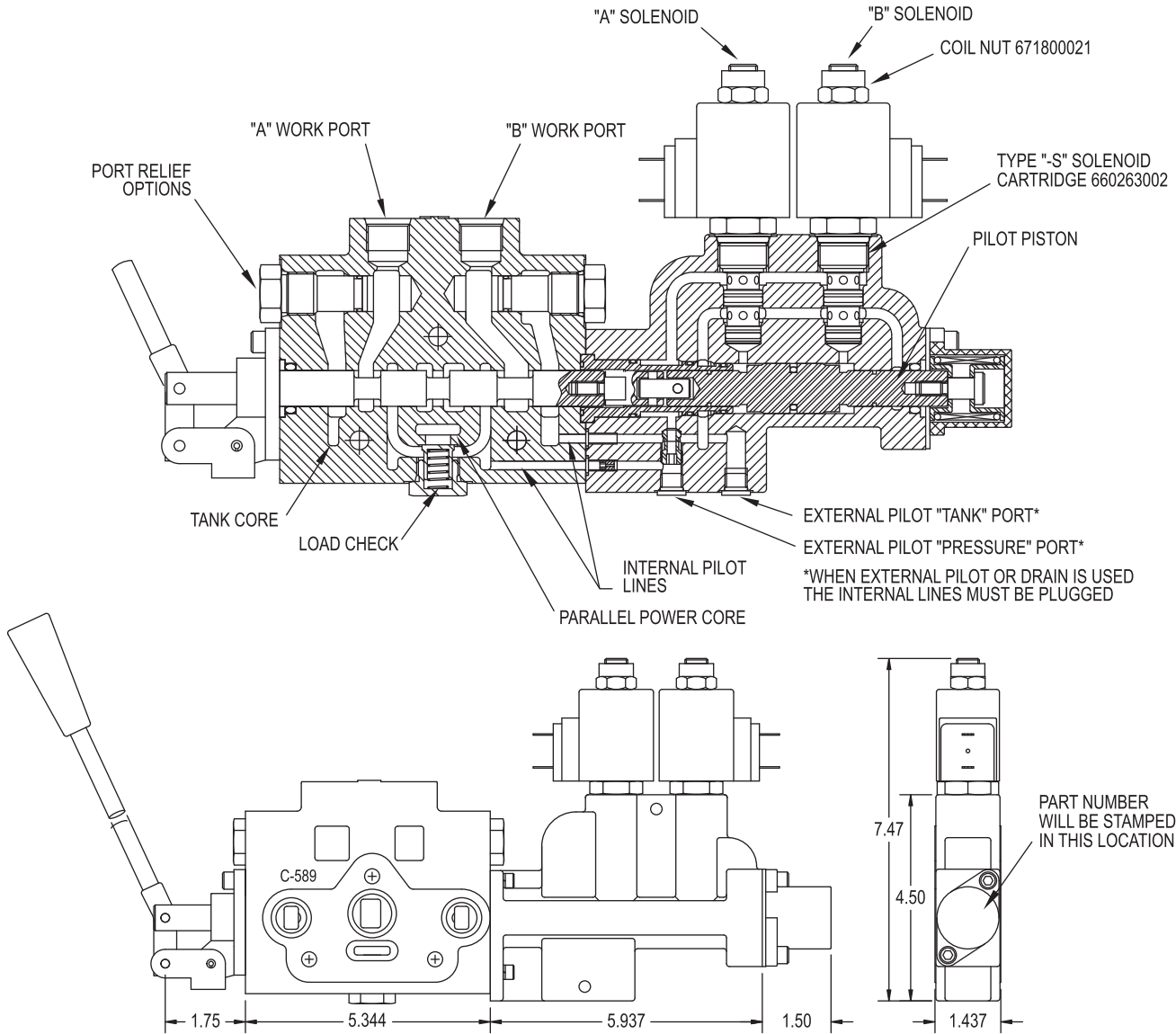
NOTE: For additional data on inlet and outlet sections, valve assemblies, etc. Please refer SV information in this catalog.

SYMBOL EXAMPLE TWO SECTION STACK



VALVES

SOLENOID AND MANUAL OPERATED WORK SECTION TYPE "-S" DIMENSIONAL DATA



TYPE "-S" SEAL KIT 660580005
SOLENOID CARTRIDGES SEAL KIT 660590008

NOTE: THIS OPTION CANNOT BE
ADDED IN THE FIELD

NOTE: For additional dimensional data on inlet and outlet sections, valve assemblies, etc. please refer SV information in this catalog.

SOLENOID COILS - ALL SOLENOID OPERATED SPOOLS

COIL PART NUMBERS

671302002 12 VDC H TYPE COIL DIN 43650
671302003 12 VDC L TYPE COIL DOUBLE WIRE
671322004 12 VDC Q TYPE COIL DOUBLE SPADE
671302013 12 VDC W TYPE COIL WEATHER PACK®
671302006 24 VDC H TYPE COIL DIN 43650
671302007 24 VDC L TYPE COIL DOUBLE WIRE
671322008 24 VDC Q TYPE COIL DOUBLE SPADE
671302009 120 VAC C TYPE COIL CONDUIT
671302010 120 VAC H TYPE COIL DIN 43650

COIL SPECIFICATIONS

DUTY RATINGCONTINUOUS AT 100% VOLTAGE
INGRESS PROTECTION RATING IP65
WATTAGE20 WATTS
STABILIZED TEMPERATURE 217°F WITH 77°F AMBIENT
AMP DRAW AT 77°

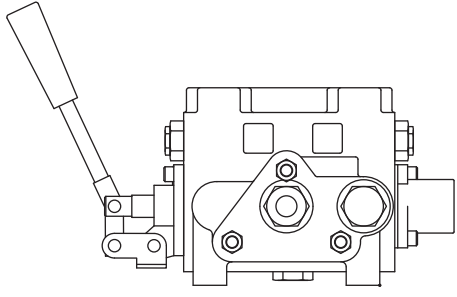
12VOLT 1.70 AMPS
24 VOLT83 AMPS
120 VOLT..... .18 AMPS

LEAD WIRE LENGTH 18 GAUGE 12" LONG
AC COILS ARE INTERNALLY RECTIFIED WITH A FULL WAVE
BRIDGE (NO IN RUSH CURRENT).

DIN STYLE COILS ARE DIN 43650 TYPE A.

USE WEATHER PACK® TYPE COILS WITH MALE PACKARD CONNECTOR #12015792
"WEATHER PACK CONNECTORS".

PRINCE MANUFACTURING
P.O. BOX 7000
N. SIOUX CITY, SD 57049-7000
PHONE (605) 235-1220
FAX (605) 235-1082



**STACK VALVE ASSEMBLY
QUOTATION REQUEST FORM**

DATE _____
SUBMITTED BY _____
CUSTOMER _____
ADDRESS _____

PHONE _____
FAX _____
YEARLY REQUIREMENTS _____
CURRENT SUPPLIER _____

**VALVE ASSEMBLY MODEL
NUMBER. ASSIGNED UPON
RECEIVING REQUEST.**

**FILL IN THE CHART BELOW USING ORDER CODE FROM SERIES 20 OR MODEL SV SECTION
NOTE ANY PORT RESTRICTORS, JOYSTICKS HANDLES, ETC. IN SPACE PROVIDED**

| ITEM | SECTION NUMBER | SECTION NOTES | LIST |
|-----------------------------|----------------|---|------|
| INLET SECTION | | RELIEF: PSI @ GPM | |
| WORK SECTION 1 | | A RELIEF: PSI @ GPM B RELIEF: PSI @ GPM | |
| WORK SECTION 2 | | A RELIEF: PSI @ GPM B RELIEF: PSI @ GPM | |
| WORK SECTION 3 | | A RELIEF: PSI @ GPM B RELIEF: PSI @ GPM | |
| WORK SECTION 4 | | A RELIEF: PSI @ GPM B RELIEF: PSI @ GPM | |
| WORK SECTION 5 | | A RELIEF: PSI @ GPM B RELIEF: PSI @ GPM | |
| WORK SECTION 6 | | A RELIEF: PSI @ GPM B RELIEF: PSI @ GPM | |
| WORK SECTION 7 | | A RELIEF: PSI @ GPM B RELIEF: PSI @ GPM | |
| WORK SECTION 8 | | A RELIEF: PSI @ GPM B RELIEF: PSI @ GPM | |
| WORK SECTION 9 | | A RELIEF: PSI @ GPM B RELIEF: PSI @ GPM | |
| WORK SECTION 10 | | A RELIEF: PSI @ GPM B RELIEF: PSI @ GPM | |
| OUTLET SECTION | | | |
| TIE ROD KIT | | | |
| SPECIAL INSTRUCTIONS | | ASSEMBLY CHARGE (SV ONLY) | |
| | | TOTAL | |

VALVES