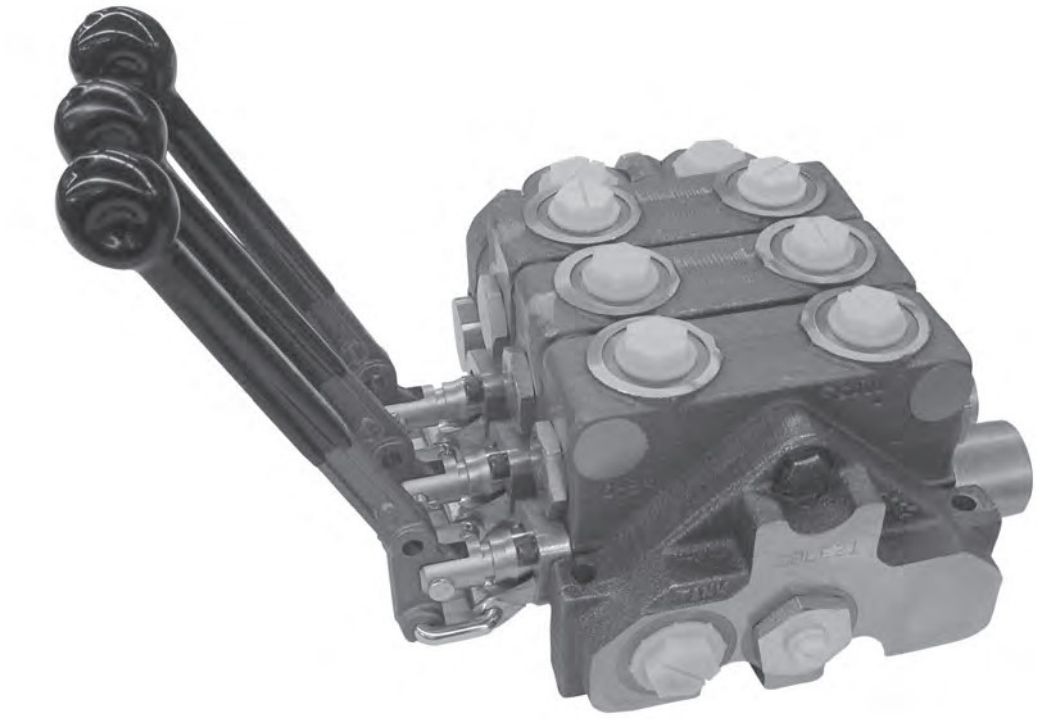
LOAD SENSE SECTIONS



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:

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

2 0 XX X X X X X X

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

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

SPOOL TYPE
H - 3 WAY 3 POSITION
J - 4 WAY 3 POSITION
K - 4 WAY 3 POSITION FREE FLOW MOTOR
M - 4 WAY 4 POSITION FLOAT (USE WITH D SPOOL ACTION)
J05 - 5 GPM PRESSURE COMP (LPC ONLY)
J10 - 10 GPM PRESSURE COMP (LPC ONLY)
J15 - 15 GPM PRESSURE COMP (LPC ONLY)
J20 - 20 GPM PRESSURE COMP (LPC ONLY)
K05 - 5 GPM PRESSURE COMP MOTOR (LPC ONLY)
K10 - 10 GPM PRESSURE COMP MOTOR (LPC ONLY)
K15 - 15 GPM PRESSURE COMP MOTOR (LPC ONLY)
K20 - 20 GPM PRESSURE COMP MOTOR (LPC ONLY)

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)
H - HYDRAULIC ACTUATOR (USE HANDLE OPTION 7)
J - SPRING CENTER W/MICROSWITCH (SWITCHES ON IN OR OUT)***
K - SPRING CENTER W/MICROSWITCH (SWTCHES ON SPOOL IN ONLY)***
M - SPRING CENTER DETENT IN
N - SPRING CENTER DETENT OU
P - 2 POSITION DETENT NEUTRAL & IN (NO OUT POSITION)

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

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

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

FOR WORK PORT RELIEF SETTING OTHER THAN STANDARD

20P1BA1DH-18-20
- "B" PORT RELIEF PRESSURE IN HUNDREDS EXAMPLE: 20=2000 PSI
- "A" PORT RELIEF PRESSURE IN HUNDREDS EXAMPLE: 18=1800 PSI

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

SEE PAGE 12 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING

LOAD SENSE OUTLET SECTION

2 0 LE X X

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
3. OUTLET FOR USE WITH 20ILFS INLET (OUTLET SEALS FOR SOLENOID PILOT LINES)

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

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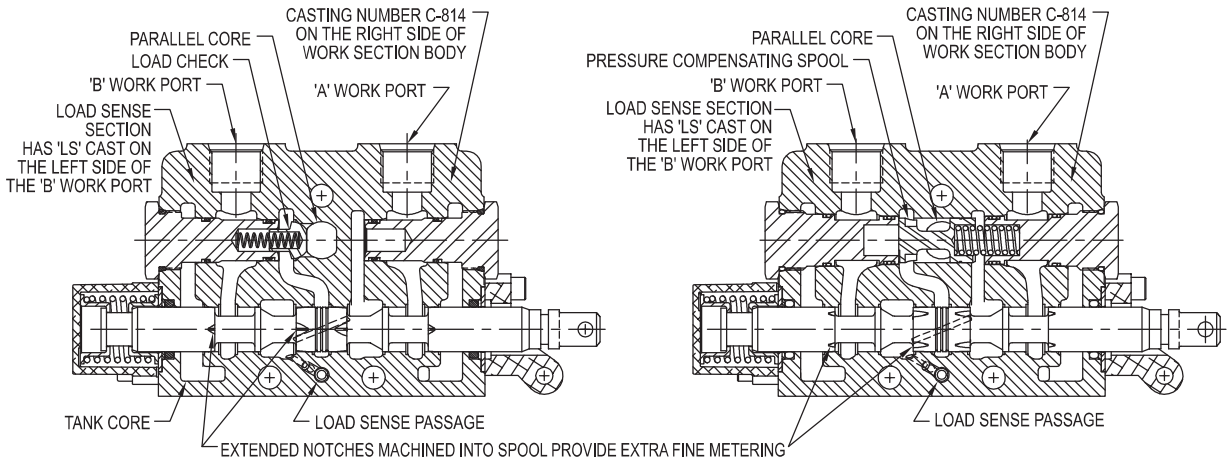
SEE PAGE 5 OF THE STANDARD PRODUCT PRICE LIST FOR PRICING

CROSS SECTION OF LOAD SENSE & LOAD SENSE PRESSURE COMPENSATED WORK SECTIONS

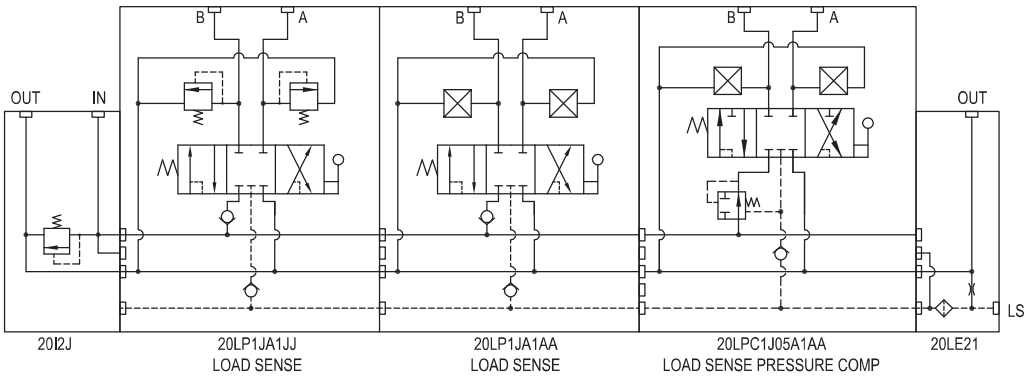


MODEL 20LP LOAD SENSE & 20LPC LOAD SENSE PRESSURE COMPENSATED CIRCUITS

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

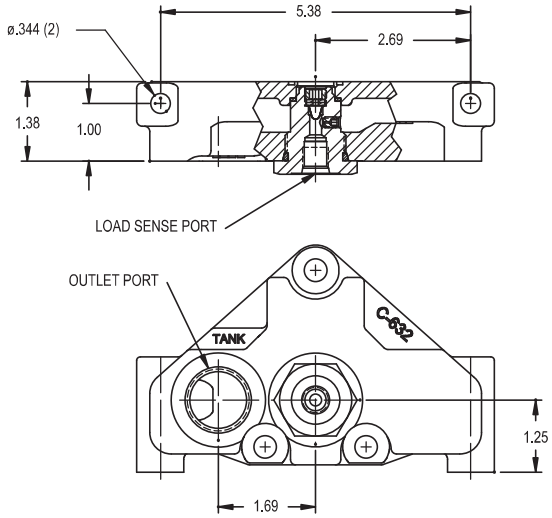
There are a number of benefits to load sense systems, one of the primary ones being in the metering of the flow to the work ports. Metering is typically accomplished when the flow passes through metering notches in the spool. In a load sense valve, the pressure that drives the flow through the notches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

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

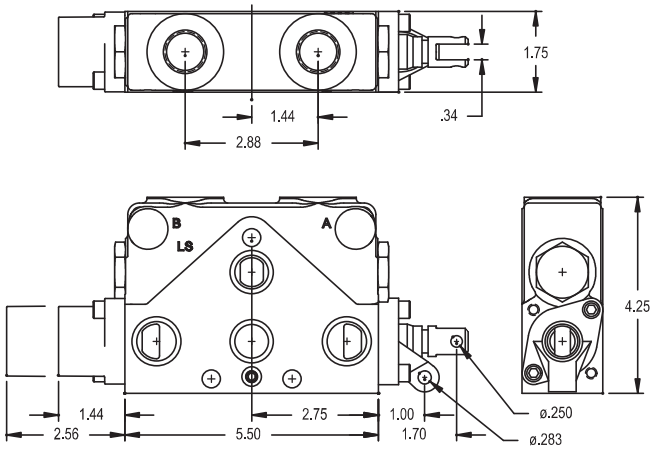


VALVES

LOAD SENSE OUTLET DIMENSIONS

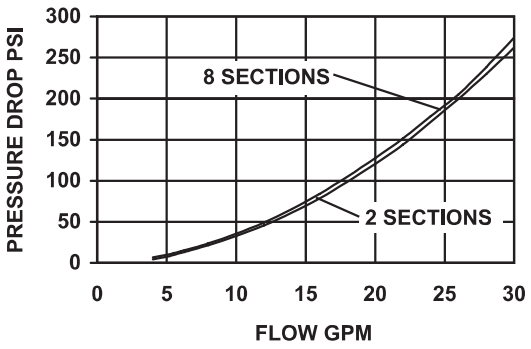


LOAD SENSE WORK SECTION DIMENSIONS

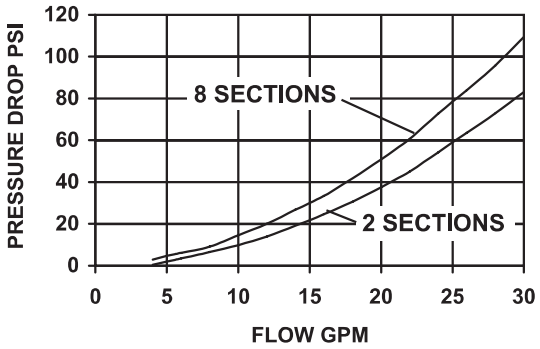


TEST DATA

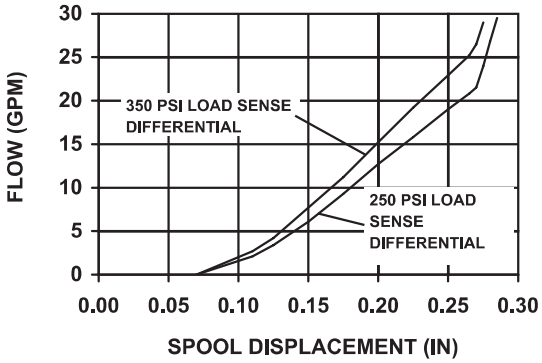
PRESSURE DROP - INLET TO WORK PORT



PRESSURE DROP - WORK PORT TO TANK



WORK PORT FLOW VS. SPOOL POSITION



VALVES

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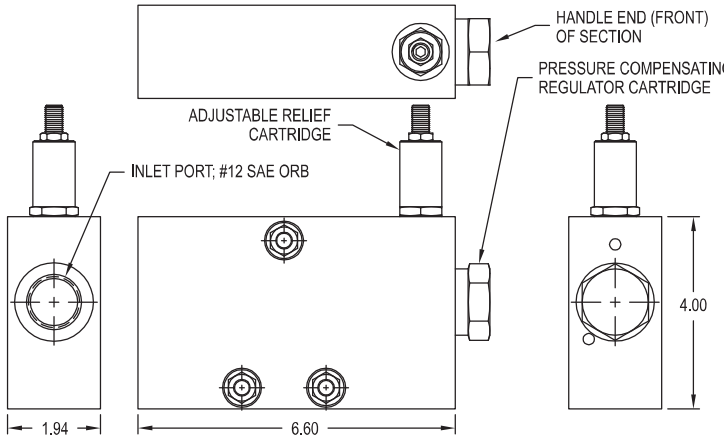
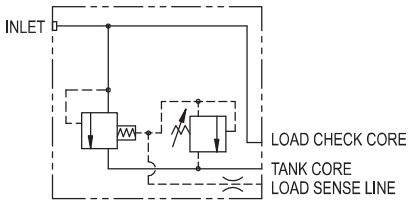
SERIES 20 LOAD SENSE INLET (FOR FIXED DISPLACEMENT PUMP)



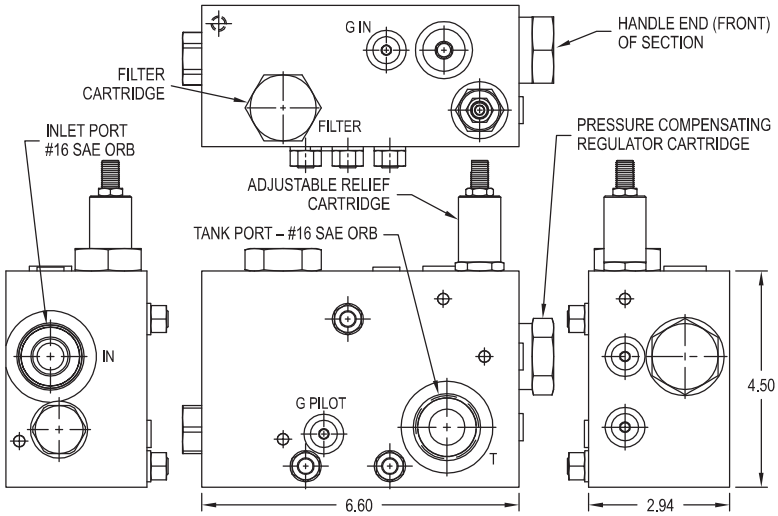
20ILF25___ – XXXX

COMPENSATOR SETTING:
090 – 90 PSI COMPENSATOR
150 – 150 PSI COMPENSATOR (STANDARD)
230 – 230 PSI COMPENSATOR

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



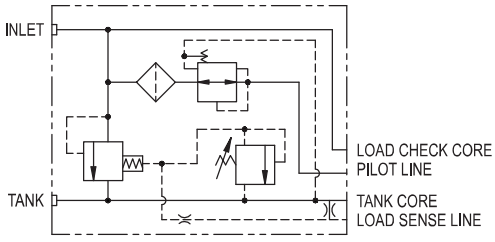
SERIES 20 LOAD SENSE INLET (FOR FIXED DISPLACEMENT PUMP w/SOLENOID OPERATORS)



20ILFS65___ – XXXX

COMPENSATOR SETTING:
230 – 230 PSI COMPENSATOR
350 – 350 PSI COMPENSATOR
(PROPORTIONAL OPERATORS)

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

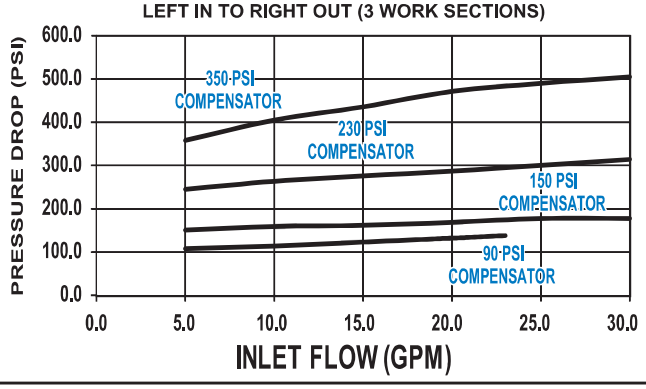


APPLICATION NOTES – 20ILF and 20ILFS:

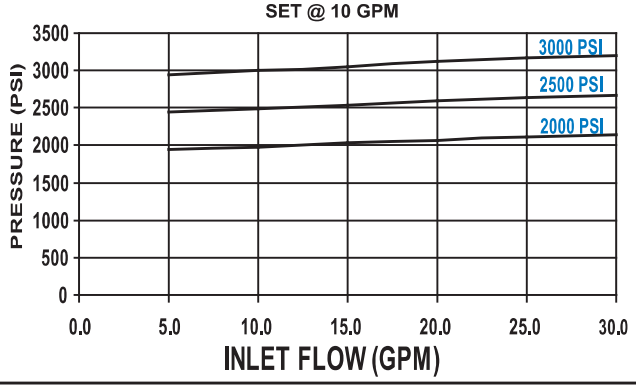
1. These inlets are for use with a fixed displacement pump (such as a gear pump) and Prince Series 20 load sense sections.
2. When all spools are centered, the inlet allows the pump flow to be diverted to tank at relatively low pressure.
3. When a spool is shifted, the compensator directs the flow to the work port at a flow and pressure relative to the work port/load sense pressure. The inlet retains the enhanced metering control of the load sense work sections.
4. For the 20ILF inlet, the 150 psi compensator is standard. It is typically used with flows up to approximately 25 gpm. For lower flows, a 90 psi compensator can be used. For higher flows, a 230 psi compensator can be used. For the 20ILFS inlet, a 230 psi compensator is standard. For proportional operators a 350 psi compensator is needed. In the 20ILFS, the compensator generates pilot pressure to initiate a spool shift when a solenoid is energized. Load induced pressure is required to complete and then maintain the spool shift.
5. For the 20ILFS, the flow to the solenoid cartridges is filtered through a 10 µ replaceable cartridge pressure filter. Only the pilot flow is filtered thus providing a long filter life.
6. A Series 20 load sense outlet (20LEx1 for the 20ILF or a 20LEx3 for the 20ILFS) must be used in the stack valve assembly.
7. The load sense port on the outlet needs to be plugged with a steel plug. There is no external load sense line.
8. The 20ILFS requires a tie rod kit for one extra section.

TEST DATA

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



20ILF RELIEF CURVE
SET @ 10 GPM



VALVES

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