

General Description

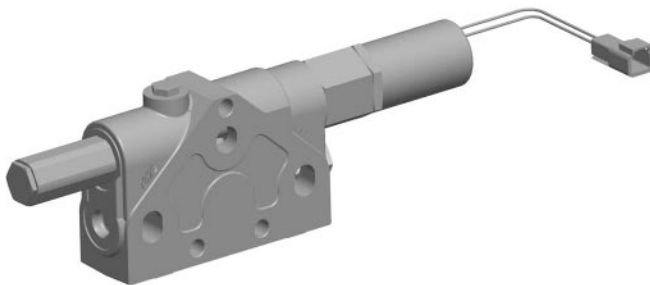
The V20 has been a strong and reliable player in the 75-100 LPM (20-26 GPM) open-center, directional control valve market for many years. Now it has a new, electrohydraulic package designed for open-center systems and for those customers wanting to take machine control to the next level.

The offering consists of the following:

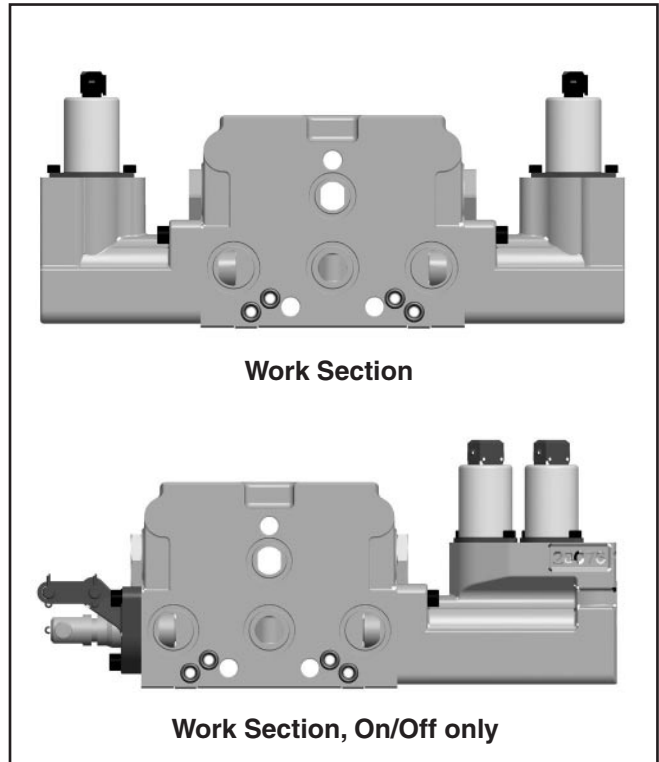
- A global solenoid (pwm) that can be used for proportional or on/off control. The coils have a molded on Amp Jr. or Deutsch connector.
- Work sections rated to 240 Bar (3500 PSI): 4-way, 3-position; and 3-way, 3-position.
- A pilot generating/regulating section that is referred to as a “utility section”. The purpose of this section is to generate and regulate pilot pressure in an open-center circuit. This section is to be placed adjacent to the outlet cover.



Solenoid (1 piece)



Utility Section



Work Section

Work Section, On/Off only

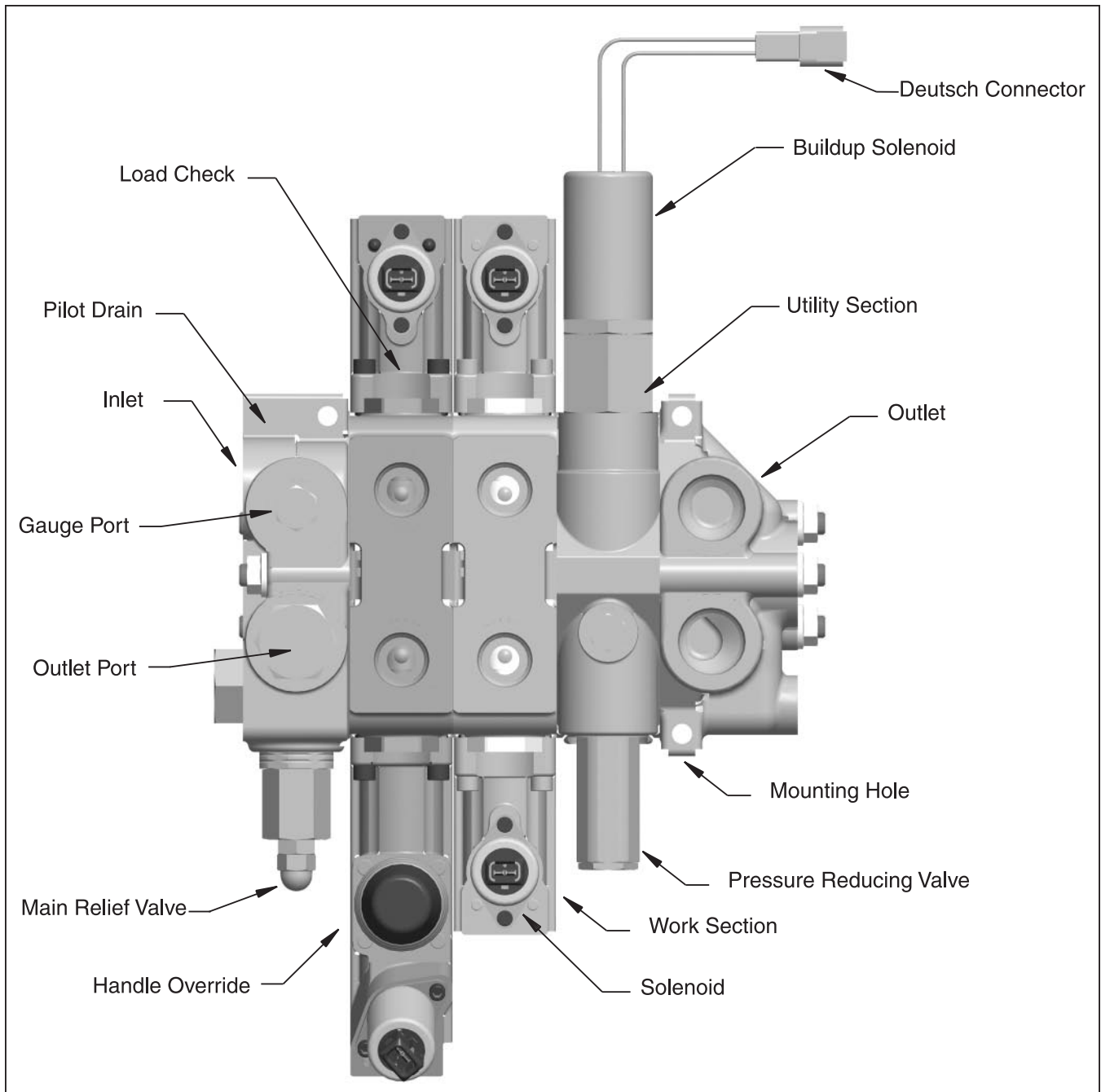
Operation

Open-center valves that are operated by either hydraulic-remotes or electrohydraulics require a way to generate and regulate the pilot pressure. For hydraulic-remote operation, the regulated pilot pressure is needed for the pilot controllers. For electrohydraulic operation, the regulated pilot pressure is required for the work section solenoids. Generation and regulation of the pilot signal can be accomplished externally with an in-line solution, however, this approach requires extra plumbing.

The V20 has an integrated section that selectively generates and regulates the pilot pressure to be sent to the hydraulic-remote controllers, or the solenoids installed in the work section.

When an operator selects a spool, a signal is sent to a normally open solenoid in the “utility” section. Pressure will then build until it reaches the setting of the buildup cartridge. This is sufficient pressure to move the main spool, so that it can be connected to the load pressure. At that point, the inlet of the valve will see system pressure, and the pressure-reducing valve in the “utility section” will regulate the pilot pressure to the hydraulic-remote controllers or the work section solenoids.

For electrohydraulic operation, optimizing machine control is achieved by having a dedicated drain for the work section solenoids. Therefore, the V20EH package isolates the solenoid within the control valve, and the solenoid drain port is located in the inlet.



Benefits

- The pressure required to move the spools is generated and regulated internal to the V20 valve. This eliminates the need for any in-line devices and the associated plumbing which saves installation cost.
- Minimal impact on open-center pressure drops when the main spools are in neutral. This is because pressure generation is "triggered" to on, only when a spool is selected. The benefit is less heat generation and reduced fuel consumption.
- Minimal impact on loop pressure drops: P-A/B and A/B-T which maximizes horsepower utilization.
- There is an option to have the mechanical buildup for full on-time operation, useful in many applications where the PTO is engaged only when work is to be done.
- A dedicated solenoid drain to the reservoir optimizes solenoid performance. This translates into consistent metering and machine controllability.
- An extended bonnet for screw-adjustable work port relief valves in an option available for those applications requiring this type of adjustable pressure control (consult factory).
- Handle with manual override.

Specifications

| | |
|---|---|
| Pressures | Pump Inlet Ports: 240 Bar (3500 PSI) Service Ports: 276 Bar (4000 PSI) Pilot: 35 Bar (508 PSI) (input or internal supply) Tank Return Ports: 15 Bar (220 PSI) Solenoid Drain: 2 Bar (29 PSI) |
| Flow Rates (maximum recommended) | 95 LPM (25 GPM) |
| Leakage Performance | Mineral oil, 100 SUS @ 49°C (120°F) @ 69 Bar (1000 PSI) 12 cc/min with no port accessories 22 cc/min with an RV or RV & AC |
| Hydraulic Fluid | Mineral Base oil For other fluids, consult factory Viscosity, working range: 15-380mm ² /s (15-380 cSt) |
| Hydraulic Oil Temperature | Recommended Operating Range without Solenoid Operation: -30° to 90°C (-22 to 194°F) Recommended Operating Range with Solenoid Operation: -20° to 80°C (-4 to 176°F) |
| Filtration (ISO4406) | 20/18/14 in Main Flow Paths 18/16/13 Pilot Supply |

Weights

| | |
|-------------------------------------|-------------------|
| Inlet with relief | 3.5 kg (7.8 lbs) |
| Work section – manual spring return | 4.4 kg (9.7 lbs) |
| Work section – hydraulic remote | 4.5 kg (9.9 lbs) |
| Work section – solenoid operated | 6.2 kg (13.6 lbs) |
| Work section – pilot generation | 4.1 kg (9.1 lbs) |
| Add for port relief | 0.1 kg (0.2 lbs) |
| Outlet | 1.5 kg (3.4 lbs) |

Solenoid Specifications

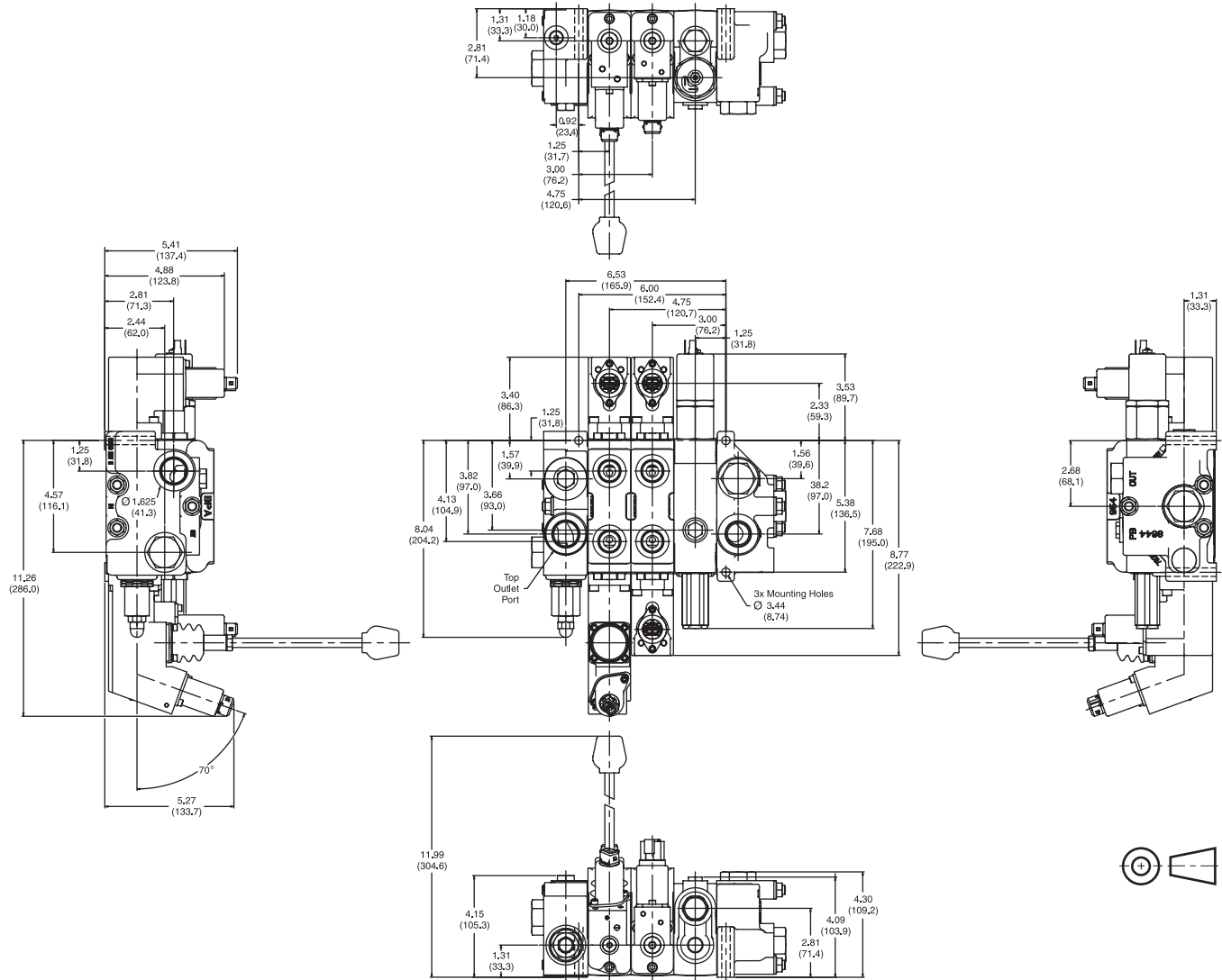
| | |
|---|---|
| Voltage | 12 or 24 VDC |
| Frequency | 100 ±10 Hz |
| Pilot | 35 Bar (508 PSI) 15-23 LPM (4-6 GPM) |
| Current Input (I) | 1.5A for 12 VDC 0.75A for 24 VDC |
| Current (mA) for Spool Shift | 12V 24V |
| Start Shift | 400 200 |
| Full Shift | 1200 600 |
| Insulation Material | Class H |
| Duty Cycle | 100% |
| R20 Ohm | 4.72 (±5%) for 12 VDC 20.82 (±5%) for 24 VDC |
| Fluid Cleanliness | 17/14 per ISO 4406 |
| Ambient Temperature | -30° to 80°C (-22 to 176°F) |
| Fluid Temperature | -20° to 80°C (-4 to 176°F) |

Connections

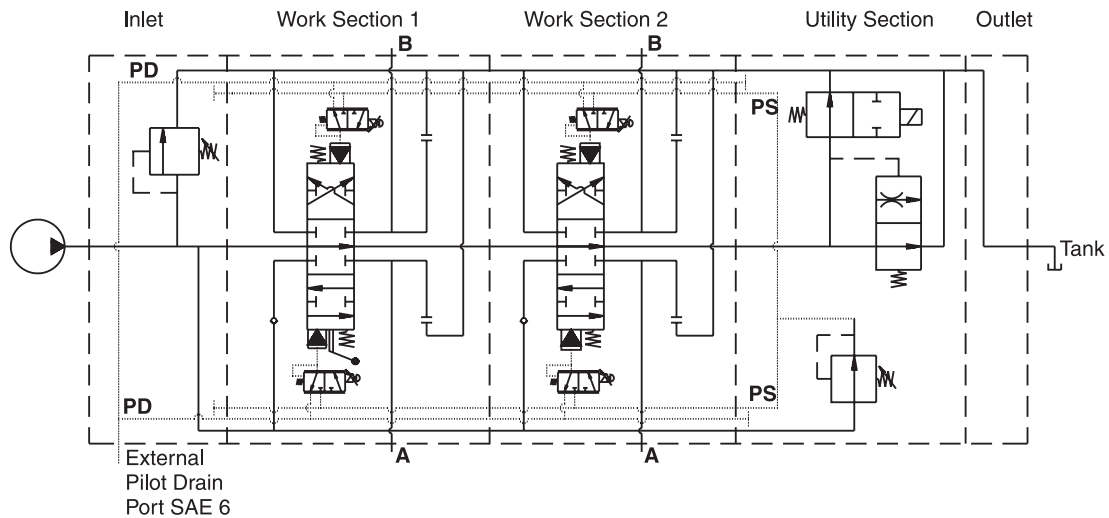
O-ring boss ports SAE-J1926-1
BSPP ports ISO 1179-1

| Description | SAE# | O-ring boss | BSPP |
|-----------------------------|------|----------------|---------|
| Inlet Port, Top or Side | 12 | 1-1/16"-12 UNF | 3/4"-14 |
| Outlet Port, Top or Side | 12 | 1-1/16"-12 UNF | 3/4"-14 |
| Work Ports | 12 | 1-1/16"-12 UNF | 3/4"-14 |
| Work Ports | 10 | 7/8"-14 UNF | 1/2"-14 |

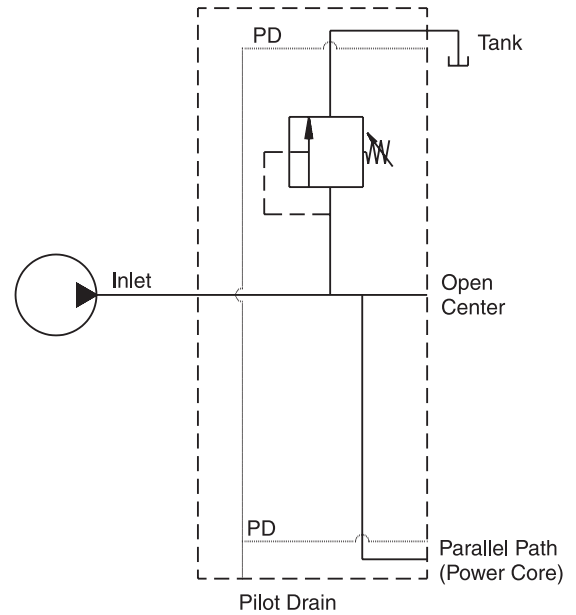
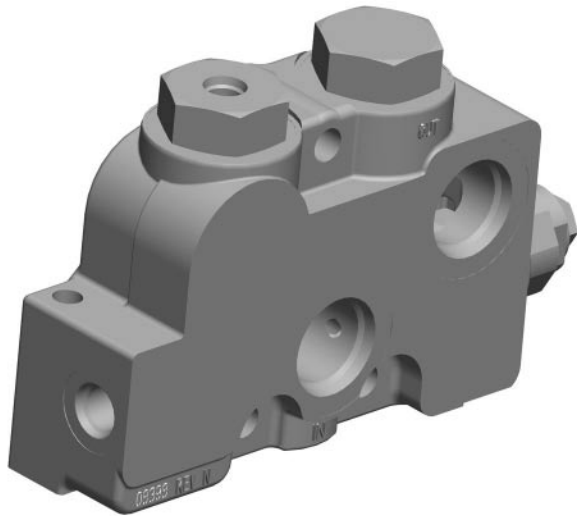
Inch equivalents for millimeter dimensions are shown in (**)



Schematic Assembly



Inlet



V20 Inlet Cover (Housing 8398)

| Product Code | Side High Pressure | Side Low Pressure | Top High Pressure | Top Low Pressure | Pilot Drain |
|--------------|--------------------|-------------------|-------------------|------------------|-------------|
| 20-LC-12-EH | SAE-12 | SAE-12 | SAE-12 | SAE-12 | SAE-6 |

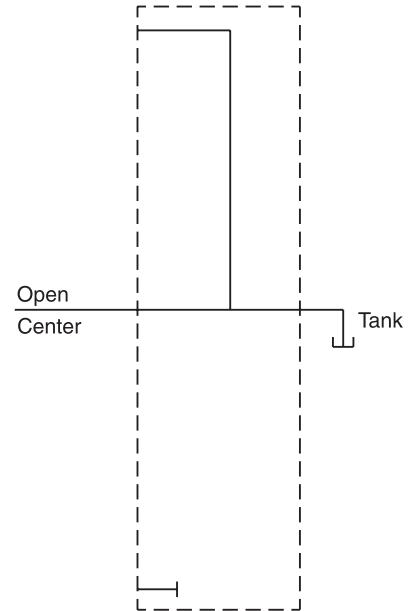
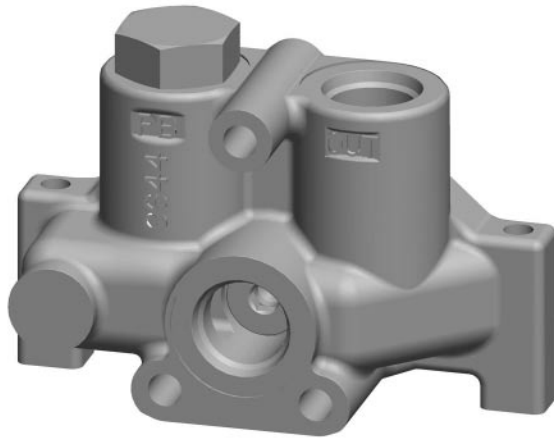
- NOTES: 1. The above inlet cover is machined to accept any of the main relief cartridges listed below.
2. Two port plugs are furnished with each cover, one is machined with an SAE 4 port.
3. The pilot drain port should not be tee'd into the valve's tank line, low return line pressure is required for the solenoids to operate properly.

V20 Main Relief Valves

| Product Code | PSI Range 500-3500 | PSI Range 500-1249 | PSI Range 1250-1749 | PSI Range 1750-1999 | PSI Range 2000-2599 | PSI Range 2600-3200 |
|--------------|------------------------------------|--------------------|---------------------|---------------------|---------------------|---------------------|
| RP51A-3000 | X | | | | | |
| WH-1200 | | X | | | | |
| WH-1700 | | | X | | | |
| WH-1950 | | | | X | | |
| WH-2550 | | | | | X | |
| WH-3000 | | | | | | X |
| K-20-NR | Relief Plug Kit (No Relief Option) | | | | | |

- NOTES: 1. The inlet cover must have a main relief valve or a relief plug in place to operate.
2. RP51A-3000 is a pilot operated relief valve and screw adjustable.
3. The WH models are differential area poppet type relief valves and shim adjusted.

Outlet



V20 Outlet Cover (Housing 8644)

| Model Number | Side Low Pressure | Top Low Pressure |
|--------------|-------------------|------------------|
| 20-RC-12-EH | SAE-12 | SAE-12 |

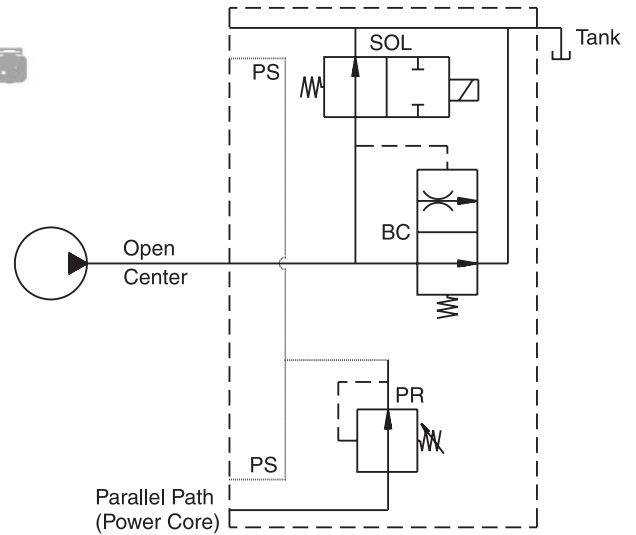
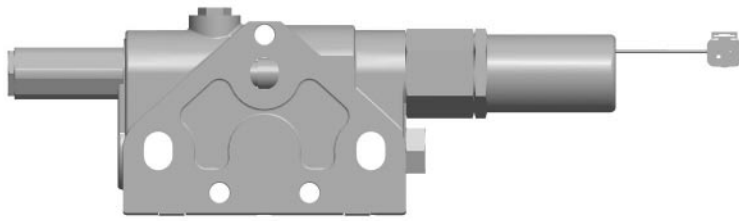
- NOTES: 1. Contact factory for power beyond options.
2. The 6770 outlet housing is NOT recommended for EH banks, consult factory for details.

V20 Section Stud Assembly Kits

| Product Code | Work Sections with Utility Section | Work Sections, Externally Piloted |
|--------------|------------------------------------|-----------------------------------|
| K-20-EH-1 | – | One Section |
| K-20-EH-2 | One Section | Two Sections |
| K-20-EH-3 | Two Sections | Three Sections |
| K-20-EH-4 | Three Sections | Four Sections |
| K-20-EH-5 | Four Sections | Five Sections |
| K-20-EH-6 | Five Sections | Six Sections |
| K-20-EH-7 | Six Sections | Seven Sections |
| K-20-EH-8 | Seven Sections | Eight Sections |
| K-20-EH-9 | Eight Sections | Nine Sections |

- NOTES: 1. Kits include studs, face seals and nuts.
2. Remember to add the utility section to the section count.
3. Stud Torque is 28 ft-lb.

Utility Section



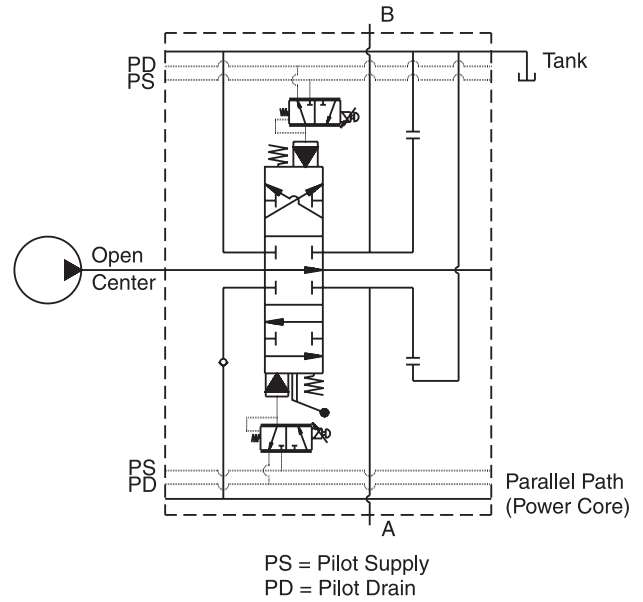
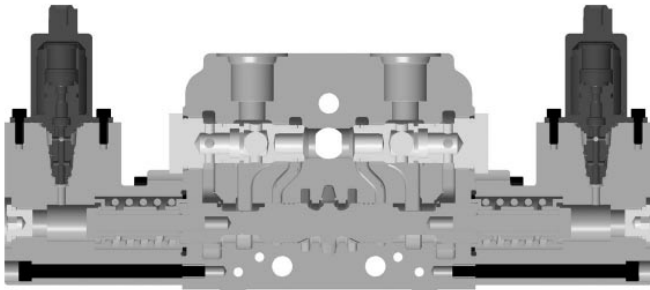
PR = Press Reducing Cartridge
BC = Buildup Cartridge
SOL = On/Off Solenoid
PS = Pilot Supply

V20 Utility Section (Housing 7820)

| Product Code | 12V Solenoid See Note 3 | Deutsch Connector | 8 Inch Lead Wires | Always ON; Mechanical | Power Beyond | Closed-Center Systems |
|---------------|---------------------------------------|----------------------|----------------------|--------------------------|-----------------|--------------------------|
| 20-UT-EH-12 | X | | X | | | |
| 20-UT-EH-12-D | X | X | | | | |
| 20-UT-EH-MECH | | | | X | | |
| 20-UT-EH-PB | | | | | See Note 4 | |
| 20-UT-EH-CC | | | | | | See Note 5 |
| K-20-EH-EP | External Pilot Bonnet Kit. See Note 6 | | | | | |

- NOTES: 1. Utility Section must be stacked adjacent (upstream) to the right outlet cover.
2. Solenoids have 6 in. lead wires terminated with Deutsch DT04-2P receptacle with pin terminals.
3. 24V solenoids are available if your application demands it. Consult factory.
4. For Power Beyond applications, consult factory. Ask for the application bulletin.
5. Closed center systems, consult factory. Ask for the application bulletin.
6. A utility section is not required when a regulated external pilot supply is available. K-20-EH-EP is a kit that incorporates two specially machined bonnets that accept the external pilot source. Each side of the bank must be fed pilot pressure for it to operate.

Work Section, Standard

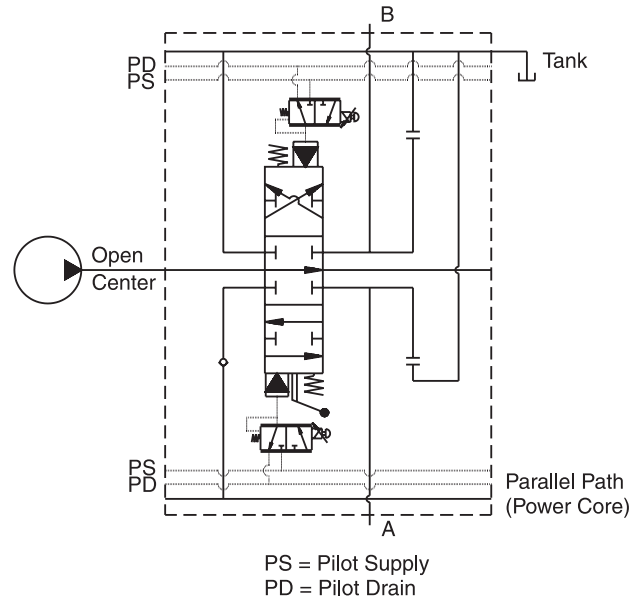
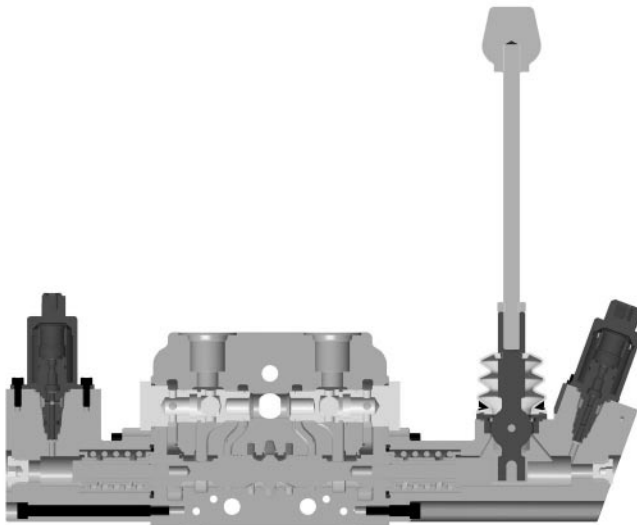


V20 Parallel Work Sections (Housing 10954)

| Model Number | 3-Way 3-Pos | 4-Way 3-Pos | 4-Way 3-Pos Free Flow | SAE-10 Ports | SAE-12 Ports | Amp Jr. | Amp Jr. w/Pin Override | Deutsch | 12V |
|-------------------|----------------|----------------|-----------------------------|-----------------|-----------------|---------|------------------------------|---------|-----|
| 20-10-03-EH-12-A1 | X | | | X | | X | | | X |
| 20-12-03-EH-12-A1 | X | | | | X | X | | | X |
| 20-10-04-EH-12-A1 | | X | | X | | X | | | X |
| 20-12-04-EH-12-A1 | | X | | | X | X | | | X |
| 20-10-F4-EH-12-A1 | | | X | X | | X | | | X |
| 20-12-F4-EH-12-A1 | | | X | | X | X | | | X |
| | | | | | | | | | |
| 20-10-03-EH-12-A2 | X | | | X | | | X | | X |
| 20-12-03-EH-12-A2 | X | | | | X | | X | | X |
| 20-10-04-EH-12-A2 | | X | | X | | | X | | X |
| 20-12-04-EH-12-A2 | | X | | | X | | X | | X |
| 20-10-F4-EH-12-A2 | | | X | X | | | X | | X |
| 20-12-F4-EH-12-A2 | | | X | | X | | X | | X |
| | | | | | | | | | |
| 20-10-03-EH-12-D | X | | | X | | | | X | X |
| 20-12-03-EH-12-D | X | | | | X | | | X | X |
| 20-10-04-EH-12-D | | X | | X | | | | X | X |
| 20-12-04-EH-12-D | | X | | | X | | | X | X |
| 20-10-F4-EH-12-D | | | X | X | | | | X | X |
| 20-12-F4-EH-12-D | | | X | | X | | | X | X |

- NOTES: 1. These work sections can be used as ON/OFF or proportional depending on the signal input to the solenoids.
2. For 24V applications, please consult factory.
3. All bonnets are machined to accept the standard spool travel limiter / manual override kits.

Work Section, Handle Override

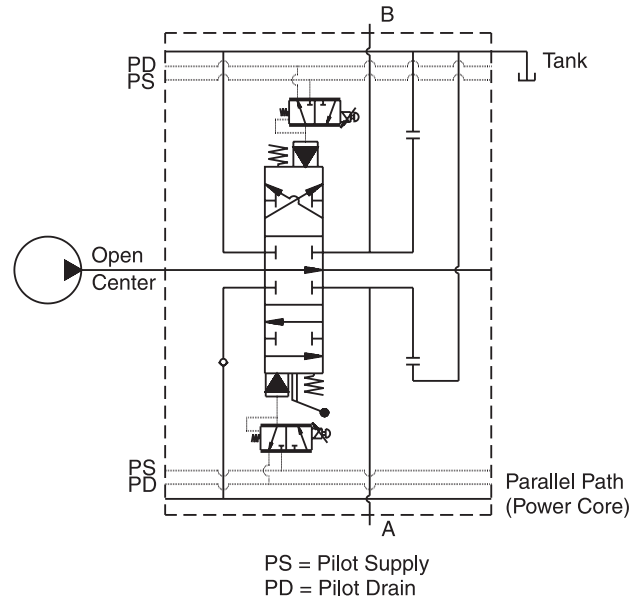
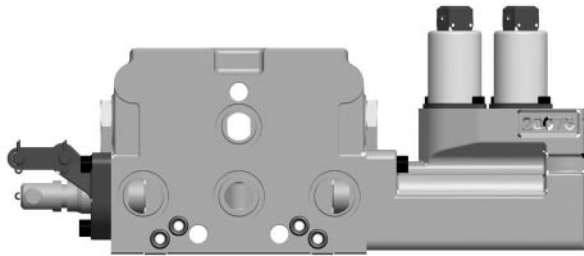


V20 Parallel Work Sections (Housing 10954) Handle Override

| Model Number | 3-Way 3-Pos | 4-Way 3-Pos | 4-Way 3-Pos Free Flow | SAE-10 Ports | SAE-12 Ports | Amp Jr. | Deutsch | 12V Solenoid | Handle Override |
|-----------------------|----------------|----------------|-----------------------------|-----------------|-----------------|---------|---------|-----------------|--------------------|
| 20-10-03-EH-12-A1-HRO | X | | | X | | X | | X | X |
| 20-12-03-EH-12-A1-HRO | X | | | | X | X | | X | X |
| 20-10-04-EH-12-A1-HRO | | X | | X | | X | | X | X |
| 20-12-04-EH-12-A1-HRO | | X | | | X | X | | X | X |
| 20-10-F4-EH-12-A1-HRO | | | X | X | | X | | X | X |
| 20-12-F4-EH-12-A1-HRO | | | X | | X | X | | X | X |
| 20-10-03-EH-12-D-HRO | X | | | X | | | X | X | X |
| 20-12-03-EH-12-D-HRO | X | | | | X | | X | X | X |
| 20-10-04-EH-12-D-HRO | | X | | X | | | X | X | X |
| 20-12-04-EH-12-D-HRO | | X | | | X | | X | X | X |
| 20-10-F4-EH-12-D-HRO | | | X | X | | | X | X | X |
| 20-12-F4-EH-12-D-HRO | | | X | | X | | X | X | X |

- NOTES: 1. These work sections can be used as ON/OFF or proportional depending on the signal input to the solenoids.
2. For 24V applications, please consult factory.
3. Spool travel limiter / manual override kits are available for these sections. The handle side is different, consult the accessories page.

Work Section, Single Ended

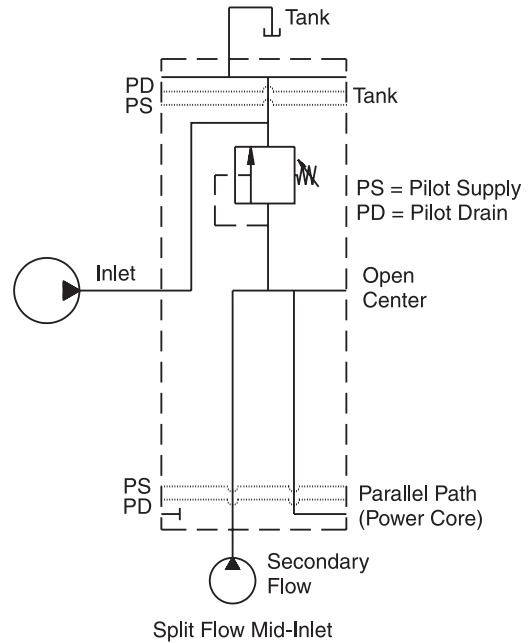
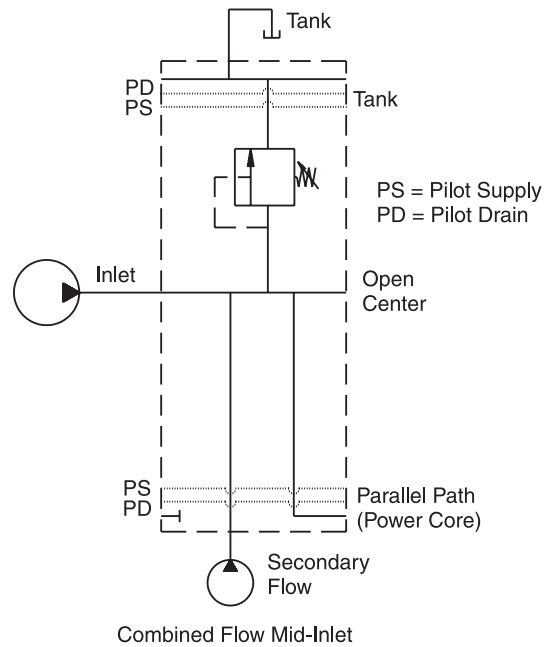
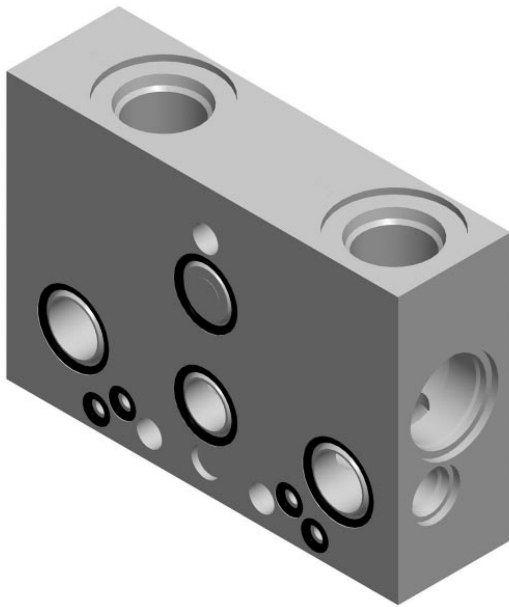


V20 Parallel Work Sections (Housing 10954) Single Ended

| Model Number | 3-Way 3-Pos | 4-Way 3-Pos | 4-Way 3-Pos Free Flow | SAE-10 Ports | SAE-12 Ports | Amp Jr. | Deutsch | 12V Solenoid | Single Ended Actuator |
|----------------------|----------------|----------------|-----------------------------|-----------------|-----------------|---------|---------|-----------------|-----------------------------|
| 20-10-03-EH-12-A1-SE | X | | | X | | X | | X | X |
| 20-12-03-EH-12-A1-SE | X | | | | X | X | | X | X |
| 20-10-04-EH-12-A1-SE | | X | | X | | X | | X | X |
| 20-12-04-EH-12-A1-SE | | X | | | X | X | | X | X |
| 20-10-F4-EH-12-A1-SE | | | X | X | | X | | X | X |
| 20-12-F4-EH-12-A1-SE | | | X | | X | X | | X | X |
| 20-10-03-EH-12-D-SE | X | | | X | | | X | X | X |
| 20-12-03-EH-12-D-SE | X | | | | X | | X | X | X |
| 20-10-04-EH-12-D-SE | | X | | X | | | X | X | X |
| 20-12-04-EH-12-D-SE | | X | | | X | | X | X | X |
| 20-10-F4-EH-12-D-SE | | | X | X | | | X | X | X |
| 20-12-F4-EH-12-D-SE | | | X | | X | | X | X | X |

- NOTES: 1. These work sections can only be used as ON/OFF.
2. The standard clevis and handle bracket are present on the front side of the valve.
3. For 24V applications, please consult factory.

Mid-Inlets



| Product Code | Split Flow | Combined Flow | SAE-12 | Main Relief Port |
|--------------|------------|---------------|--------|------------------|
| 20-12-SF-EH | X | | X | X |
| 20-12-CF-EH | | X | X | X |

NOTE: 1. These mid-inlets are machined to accept any of the main relief cartridges listed.

V20 Solenoids

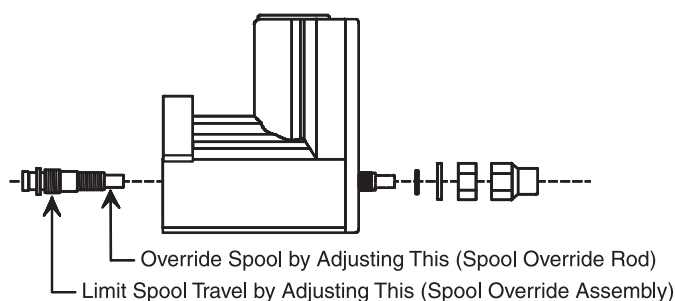


| Product Code | 12V | 24V | Amp Jr. | Amp Jr. w/Manual Override | Deutsch |
|--------------|-----|-----|---------|---------------------------|---------|
| 20-EH-12-A1 | X | | X | | |
| 20-EH-12-A2 | X | | | X | |
| 20-EH-12-D | X | | | | X |
| 20-EH-24-A1 | | X | X | | |
| 20-EH-24-A2 | | X | | X | |
| 20-EH-24-D | | X | | | X |

| | |
|------------|---|
| K-20-A1-LW | Amp Jr. connector with 8 inch long lead wires |
|------------|---|

V20 Accessories

Solenoid End Cap Spool Travel Limiter and Spool Overrides



| | |
|---------------|---|
| K-20-TL-MO-S | Screw type travel limiter/manual override. 1 |
| K-20-TL-IH | Screw type travel limiter/manual override for Handle Override Sections. 1,2 |
| K-20-EH-EP | External pilot bonnet kit.3 |
| K-20-CONT-ON | Utility Section Mechanical Pressure Control cartridge. |
| K-20-12-CNTRL | Utility Section 12V Pressure Control cartridge. |
| K-20-24-CNTRL | Utility Section 24V Pressure Control cartridge. |

- NOTES: 1. These override kits will not fit into the Single Ended (SE) sections.
2. Use this kit for the Handle Override side of the valve only, use K-20-TL-MO-S for the opposite side.
3. Two bonnets are included in this kit.