BRAND HYDRAULICS
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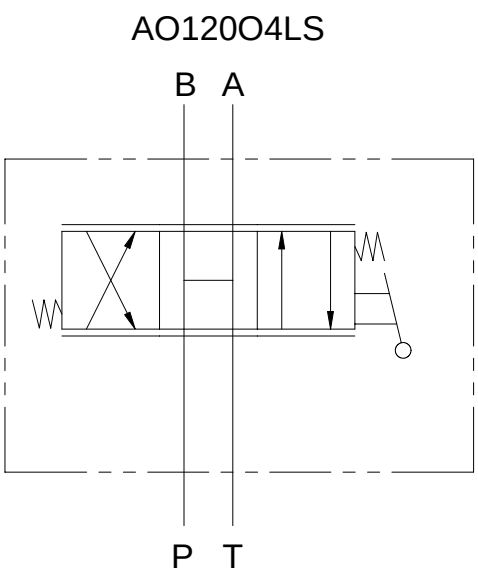
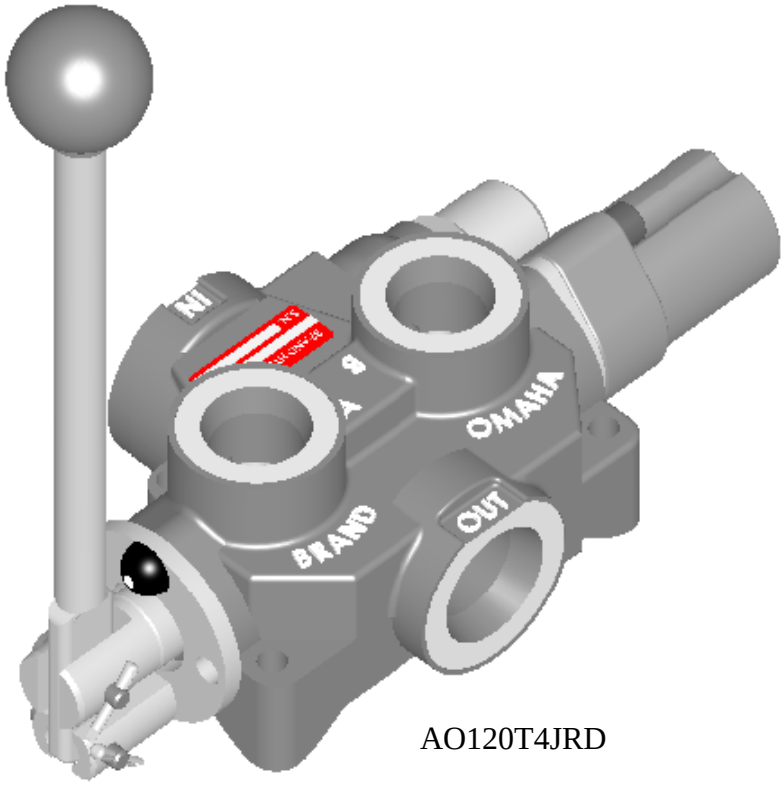
4 – WAY DIRECTIONAL CONTROL VALVE "AO"





AO120T4JRD

FEATURES:

- **S**MALL AND **C**OMPACT to fit your design requirements.
- **P**OSITIVE **M**ETERING in either direction with the manually shifting handle.
- **P**RECISION **G**ROUND **I**OSSO **P**LATED **S**POOL that assures long life.
- **O**PTIONAL **O'R**ING **P**ORTS to eliminate leakage.

SPECIFICATIONS:

- **Rated for 0-18 gpm (0-68.1 lpm).**
- **Rated for 3000 psi (207 bar).**
- **Weighs 5-1/2 lbs. (2.5 kg).**
- **Std. Port sizes (Consult factory for others).**
  - **3/4"NPT Inlet/outlet and 1/2" NPT work ports.**
  - **#12SAE Inlet/outlet and #10SAE work ports.**
- **30 – Micron filtration recommended.**

MATERIALS:

- **Cast Iron Body**
- **Buna N O'Rings**
- **IOSSO Plated Steel Spool**
- **Consult Factory for Stainless Steel Spools**
- **Black Nylon Ball Knob**

AO – GENERAL INFORMATION:

The Brand, 4-way directional control valve is designed to be durable and dependable. The manually shifted handle provides metered flow to either port. Port flow is directly proportional to the movement of the lever. The tank port must go directly back to tank.

SPOOL TYPE – The spool types offered are tandem center 4-way (T), open center 4-way (O), fine metering (M), tandem metering (TM), closed center 4-way (C), and tandem 3-way (T3). (See chart on next page and schematics on page #4 for information on spool types)

ACTUATORS – Lever handle (L) pressurizes the B port when the handle is pushed towards the valve body. Lever handle (J) pressurizes A port when the handle is pushed towards the valve body. Pilot operated (P) is used to shift the valve from a remote location. Rotary handle (H) is used to rotate spool in or out of valve body. No actuator (N) uses L type spool. No actuator (M) uses J type spool.

SPOOL ACTION – Three-position detent (D) holds the spool in neutral and both active positions. Friction detent (F1) applies friction to the spool so that the spool does not move when the handle is released either side of neutral, a detent groove clearly indicates neutral position. Spring center (S) returns the handle to neutral when the handle is released. Spring center detent (SD) springs back to neutral from one position and is mechanically detented in the other position (flow out port A in detent). Spring center friction detent (SF1) springs back to neutral from one direction and functions similar to standard F1 in other direction (flow out port B in friction detent). Spring offset (SO) spring holds spool in one active position (P to B in offset position and neutral). Spring offset (SO2) spring holds spool in one active position (P to B in offset position, neutral and P to A). Rotary friction detent (E) applies friction to the spool as it is rotated so that the spool does not rotate when the handle is released either side of neutral, a detent groove clearly indicates neutral position. Two-position detent (2D) P to B only. Two-position detent (D2) P to A only. Adjustable relief (R) set to 1500 psi at factory. Normally closed electric switch (WC) used with (S), (F1) and (D) options only. Normally open electric switch (WO) used with (S), (F1) and (D) options only.

AO – EXAMPLES OF COMMON MODEL CODES:

AO755T4JRS……..…. 3/4” inlet and outlet ports, 1/2” work ports, tandem center 4-way spool, J style handle, adjustable relief set at 1500 psi and spring centering.

AO755O4JD…..……..…. 3/4” inlet and outlet ports, 1/2” work ports, open center 4-way spool, J style handle, and three position detent.

AO – COMPLETE LIST OF OPTIONS AND ACCESSORIES:

SDC-D…….. Three-position detent kit.
SDC-F1……Ball friction detent.
SDC-S……... Spring centering kit.
SDC-SD…… Spring centering detent kit (P to A in detent).
SDC-SF1…….. Spring center / friction detent (P to B in friction detent).
SDC-SO……Spring offset kit (P to B in offset position and neutral).
SDC-SO2……..Spring offset kit (P to B in offset position, neutral and P to A).
SDC-SWC……..….. Spring centering kit with normally closed electric switch.
SDC-SWO……..... Spring centering kit with normally open electric switch.
SDC-WC…….. Three-position detent kit with normally closed electric switch.
SDC-WO…….. Three-position detent kit with normally open electric switch.
SDC-F1WC……..Ball friction detent with normally closed electric switch.
SDC-F1WO……..Ball friction detent with normally open electric switch.
SDC-HJ…… J style handle kit.
SDC-HL……L style handle kit.
SDC-K……..… Seal kit for AO.

AO – CREATING A MODEL CODE FOR AO'S:

A O _ _ _ _ _ _ _ _

PORT SIZE:
755 – 3/4" inlet/outlet and 1/2" work ports
120 – #12SAE inlet/outlet and #10SAE work ports

SPOOL TYPE:
T – Tandem center
O – Open center
C – Closed center
T3 – Tandem 3-way
M – Fine metering
TM – Tandem metering

FLOW SETTING:
Omit – When using T, C, T3 and O spool
6 – 6 gpm (M and TM only)
12 – 12 gpm (M and TM only)
18 – 18 gpm (M and TM only)

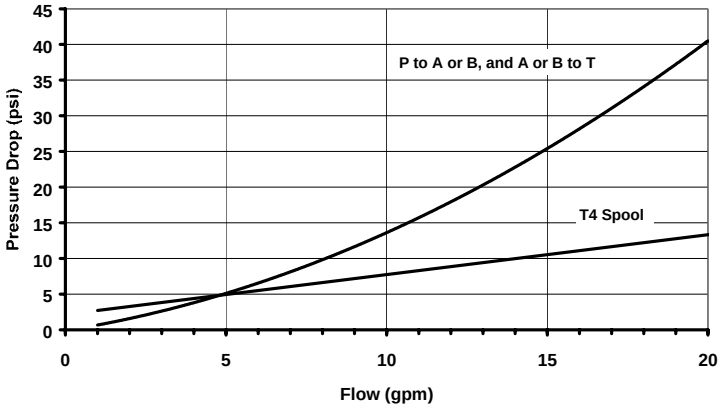
3-WAY OR 4-WAY:
3 – 3-way (Tandem spool only)
4 – 4-way

SPOOL ACTION:
S – Spring center
D – Three-position detent
F1 – Ball friction detent
WC – Norm. close elec. switch (use for S, D and F1)
WO – Norm. open elec. switch (use for S, D and F1)
SO – Spring offset (P to B and neutral)
SO2 – Spring offset (P to B, neutral and P to A)
SD – Spring center / detent
SF1 – Spring center / friction detent (P to B in friction detent)
2D – Two-position detent P to B
D2 – Two-position detent P to A
E – Rotary three-position detent
M – Stroke limiter
R – Adjustable relief

HANDLE OPTION:
L – Lever handle (B port is active when handle is pushed)
J – Lever handle (A port is active when handle is pushed)
P – Pilot operated
N – No actuator (L type spool)
M – No actuator (J type spool)
H – Rotary handle (Used in conjunction with rotary friction detent)

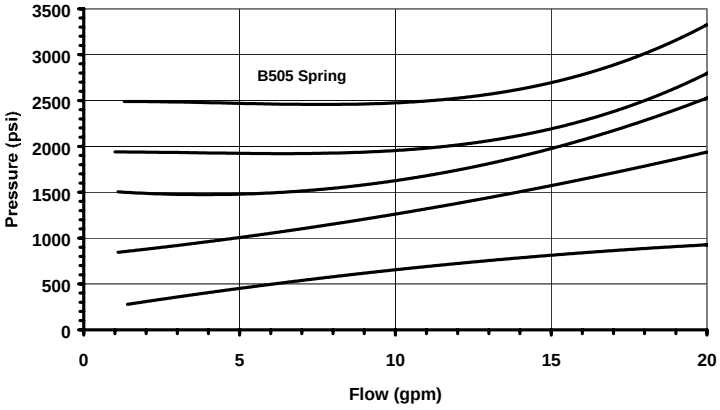
AO – FLOW AND PRESSURE INFO:

Pressure Drop vs. Flow

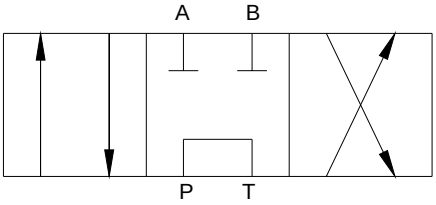


Pressure vs. Flow for AO Relief (R)

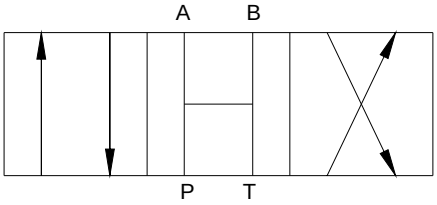
Relief is set at 6 gpm



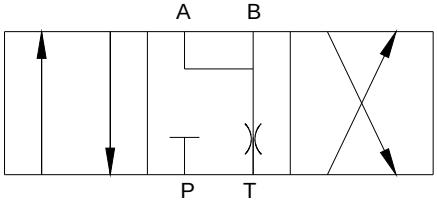
SPOOL SCHEMATICS:



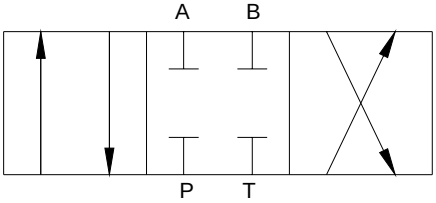
Tandem Center (T) - Powers cylinder or motor in both directions. Pump unloads to tank when spool is in neutral. Cylinder or motor blocked when spool in neutral.



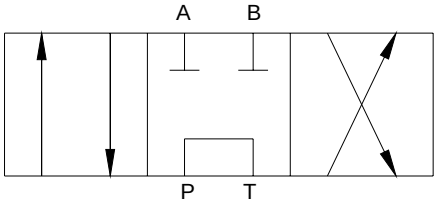
Open Center (O) - All of the ports are connected to tank when the spool is in neutral. Allows cylinder to move or motor to rotate when spool is in neutral.



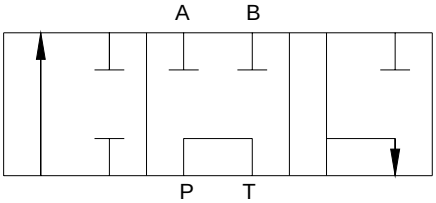
Fine Metering Spool (M) - Requires external locking valves to hold cylinder when spool is in neutral position. Extremely fine metering control. This spool requires a pressure compensated pump.



Closed Center (C)- All ports are blocked in neutral. Blocks cylinder or motor in neutral. Required for use with pressure compensated pump.

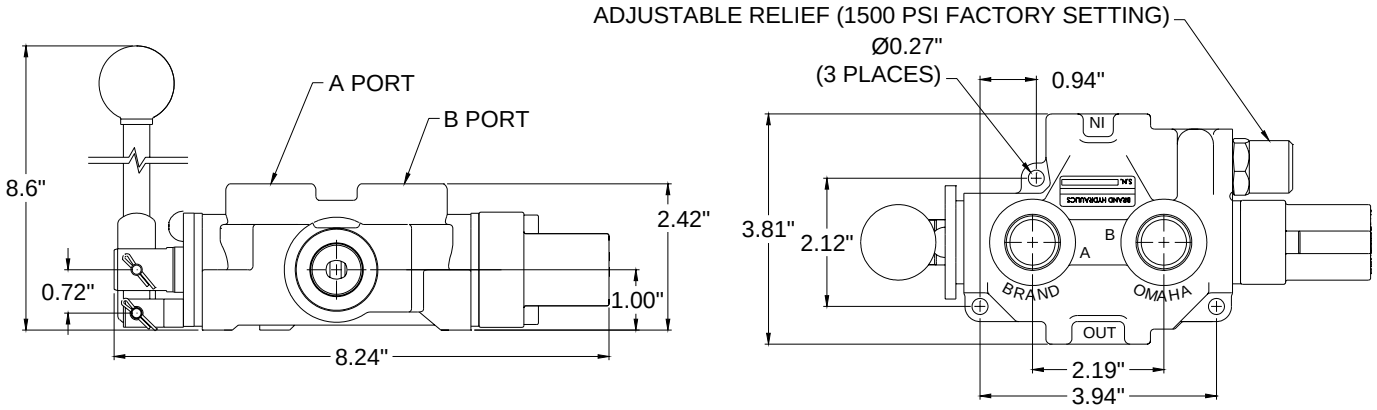


Tandem Metering Spool (TM) - Similar to (T) spool except much finer metering control. Cylinder or motor blocked in neutral and pump unloads to tank.



Tandem Three Way (T3) - Powers the cylinder in one direction. Pump unloads to tank when spool is in neutral, or when spool is being reversed. Cylinder is blocked when spool is in neutral. Port "B" is plugged.

DIMENSIONAL DATA (AO120T4JRD SHOWN):



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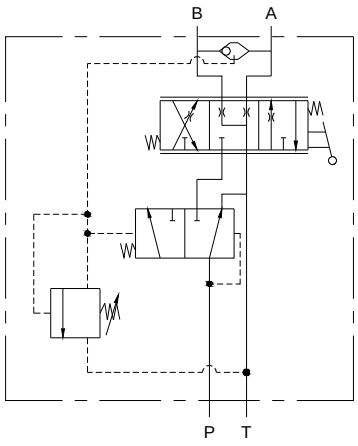
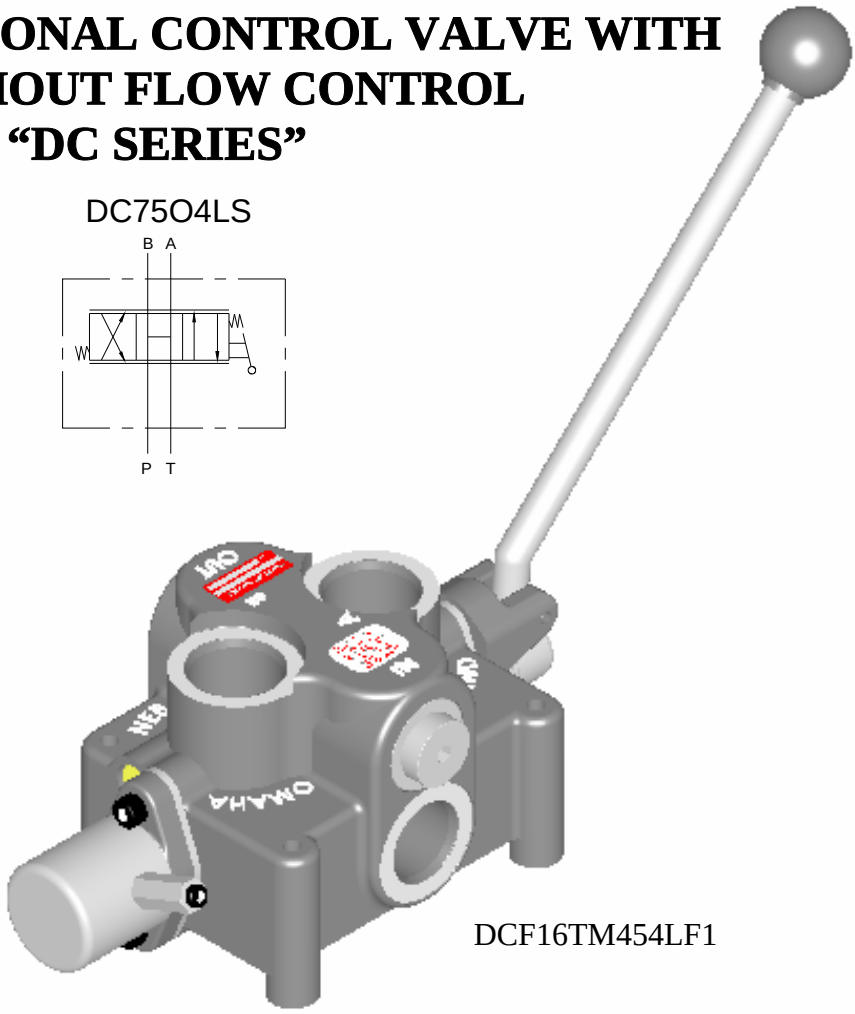
4 – WAY DIRECTIONAL CONTROL VALVE WITH OR WITHOUT FLOW CONTROL "DC SERIES"

DCF16TM304LS



DC75O4LS



DCF16TM454LF1

FEATURES:

- **P**ILOT **O**PERATED **R**ELIEF **V**ALVE is standard on every DCF valve.
- **F**ULL **R**ANGE **P**RESSURE **C**OMPENSATED by-pass type flow control valve (DCF valve).
- **DCF R**EDUCES the number of fittings, plumbing and potential leaks in hydraulic circuits.
- **F**INE **P**OSITIVE **M**ETERING in either direction with the manual handle (DCF valve).
- **P**RECISION **G**ROUND **I**OSSO **P**LATED **S**POOL that assures long life (DC & DCF valves).
- **O**PTIONAL **V**ENT **P**ORT to unload relief (DCF only).
- **O**PTIONAL **P**ILOT **O**PERATED **A**CTUATOR for remote operation (DC & DCF valves).
- **O**PTIONAL **O'R**ING **P**ORTS to eliminate leakage (DC & DCF valves).

SPECIFICATIONS:

- **Rated for 0-45 gpm (0-170 lpm).**
- **Rated for 3000 psi (207 bar).**
- **Std. port sizes (Consult factory for others).**
  - **3/4" NPT all ports.**
  - **#16 SAE (1-5/16-12) all ports.**
- **Weighs 16 lbs. (7.3 kg).**
- **20 – Micron filtration recommended.**

MATERIALS:

- **Cast Iron Body**
- **Buna N O'Rings**
- **IOSSO Plated Steel Spool**
- **Consult Factory for Stainless Steel Spools**
- **High Strength Cast Iron Body (DCF 16SAE only)**

DC SERIES – GENERAL INFORMATION:

The Brand, DCF directional flow control valve combines the features of a four-way directional control valve, a full range pressure compensated by-pass type flow control valve, and a pilot operated pressure relief valve, all in one compact package. This valve reduces the number of fittings, plumbing and potential leakage points in hydraulic circuits. The manual handle provides fine metering to either port. Flow to the work port is directly proportional to the movement of the lever. Flow out of each work port is constant regardless of load changes, this allows the customer to maintain smooth and constant movement of a cylinder or motor. Every DCF comes standard with a pilot operated relief. The tank port must be plumbed directly back to tank.

The Brand, DC directional control valve does not have the flow control feature of the DCF. The DC can be used in series but the spool is difficult to shift when there is tank pressure. The DC offers an optional high lift ball spring relief to take the place of the standard pilot operated relief on the DCF. The manual handle provides metering to either port.

SPOOL TYPE – The spool types we offer are tandem center 4-way (T), open center 4-way (O), closed center 4-way(C), fine metering 4-way (M), tandem metering 4-way (TM), and tandem center 3-way (T3). (See chart on next page and schematics on page #4 for information on spool types)

ACTUATORS – Lever handle (L) pressurizes the B port when the handle is pushed towards the valve body. Pilot operated (P) is used when it is necessary to remotely operate the valve. No actuator (N) L type spool.

SPOOL ATTACHMENTS – Three-position detent (D) holds the spool in neutral and both active positions. Friction detent (F1) applies friction to the spool so that the spool does not move when the handle is released from either side of neutral, a detent groove clearly indicates neutral position. Spring center (S) returns the handle to neutral when the handle is released. Two-position detent (2D) P to B only. Two-position detent (D2) P to A only. Adjustable spool stop handle (AH) allows the customer to stop the spool at any position in one direction only. High lift ball spring relief (B) provides relief for DC only. Vent port (V) allows relief to unload (DCF only). Top port (TP) allows the customer to plumb the inlet, outlet on the same surface as the work ports (DC only).

DC SERIES – EXAMPLES OF COMMON MODEL CODES:

DC16T4LBS…….Four-way directional valve, #16 SAE port size, tandem center four-way spool, L style actuator, high lift ball spring relief and spring center.

DC75O4LBD……Four-way directional valve, 3/4” NPT port size, open center four-way spool, L style actuator, high lift ball spring relief and three-position detent.

DCF16TM304LF1……...Four-way directional flow control, #16 SAE port size, tandem metering spool, 0-30 gpm (0-113 lpm) metering capability, four-way, L style actuator and friction detent.

DCF75M154LS……....Four-way directional flow control, 3/4” NPT port size, fine metering spool, 0-15 gpm (0-57 lpm) metering capability, four-way, L style actuator and spring center.

DC SERIES – COMPLETE LIST OF OPTIONS AND ACCESSORIES:

DC-D……Three-position detent kit for DC and DCF.

DC-D2……...Two-position detent kit for DC and DCF.

DC-AH……...Spool stop for front of valve.

DC-AA……...Spool stop for front and rear of valve.

DC-A……Spool stop for rear of valve (No other attachments may be used with this kit).

DC-HL……...Handle kit for DC and DCF.

DC SERIES – COMPLETE LIST OF OPTIONS AND ACCESSORIES CONT…

DC-K……..…. Seal kit for DC.
DC-KU……..Seal kit for DC with urethane polypac seal.
DC-S……. Spring centering kit for DC and DCF.
DCF-F1……Neutral position friction detent for DC and DCF.
DCF-K…….. Seal kit for DCF.
DCP-K…….. Seal kit for pilot operated DC.
DCF-CART-N……..... Pilot operated pressure relief valve for DCF.
TS-B……..High lift ball spring relief for DC.

DC SERIES – CREATING A MODEL CODE FOR DC'S:

SERIES:
DC – 4-way directional control valve
DCF – 4-way directional control valve with flow control

PORT SIZE:
75 – 3/4" inlet/outlet and work ports
16 - #16SAE inlet/outlet and work ports

SPOOL TYPE:
T3 – Tandem center 3-way (DC only) (Omit 4)
C – Closed center (DC only)
T – Tandem center (DC only)
O – Open center (DC only)
M – Fine metering
TM – Tandem metering

FLOW SETTING:
Omit – When using T and O spool
15 – 0-15 gpm (0-57 lpm) M and TM only
30 – 0-30 gpm (0-113 lpm) M and TM only
45 – 0-45 gpm (0-170 lpm) M and TM only

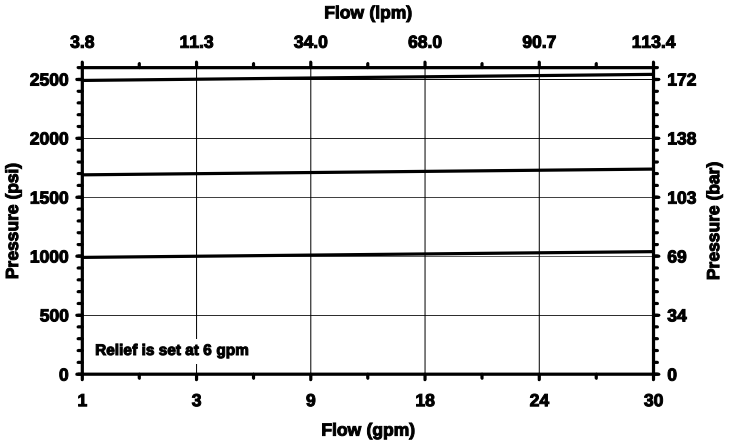
SPOOL ATTACHMENTS:
S – Spring center
D – Three-position detent
F1 – Ball friction detent
AH – Adjustable spool stop handle end
B – High lift ball spring relief for DC (TS-B)
R – Pilot relief (Std. on DCF)
V – Vent port on relief (DCF only)
TP – Top ported (DC only)
2D – Two-position detent (P to B only)
D2 – Two position detent (P to A only)

ACTUATORS:
L – Lever handle (B port is active when handle is pushed)
P – Pilot operated (500 psi max. pilot pressure)
N – No actuator (L type spool)

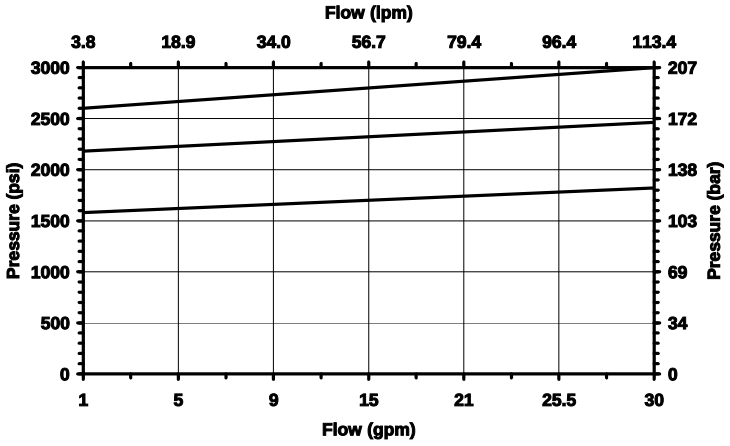
3-WAY OR 4-WAY:
3 – 3-way (Tandem spool and DC only)
4 – 4 -way

DC SERIES – FLOW AND PRESSURE INFO:

Pressure vs. Flow for Pilot Relief (DCF)

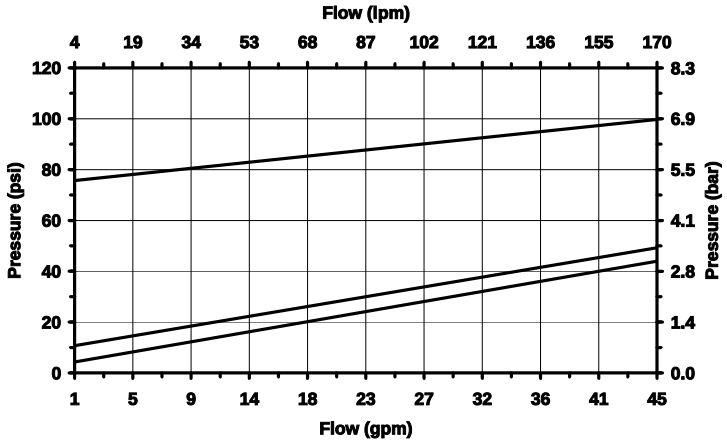


Pressure vs. Flow for B Relief (DC)

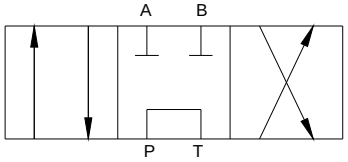


DC SERIES – FLOW AND PRESSURE INFO CONT…

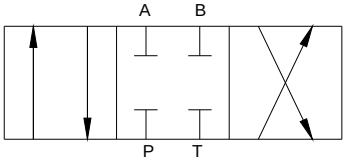
Neutral Flow Pressure Drop



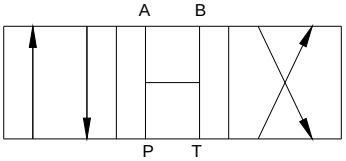
SPOOL SCHEMATICS:



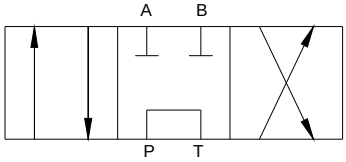
Tandem Center (T) - Powers cylinder or motor in both directions (metering capability is very limited). Pump unloads to tank when spool is in neutral. Cylinder or motor blocked when spool in neutral. This spool is not designed for DCF valve.



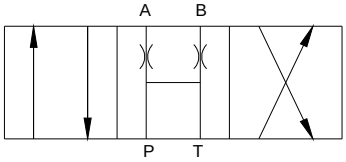
Closed Center (C)- All ports are blocked in neutral. Blocks cylinder or motor in neutral. Required for use with pressure compensated pump. This is not available for DCF valve.



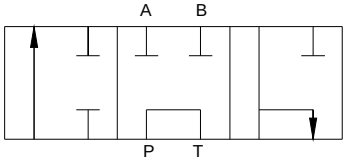
Open Center (O) - All of the ports are connected to tank when the spool is in neutral. Allows cylinder to move or motor to rotate when spool is in neutral. This spool is not designed for DCF valve.



Tandem Metering Spool (TM) - Similiar to (T) spool except much finer metering control. The pressure drop in neutral is lower then the (M) spool. Cylinder or motor blocked in neutral and pump unloads to tank. This spool is designed for DCF valve.

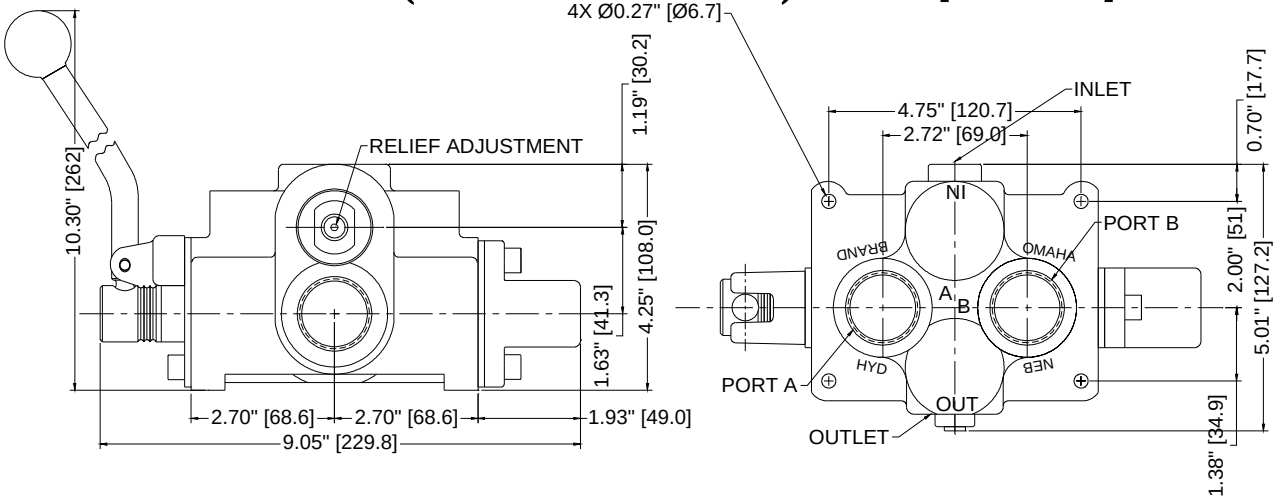


Fine Metering Spool (M) - The pressure drop in neutral is higher then the (TM) spool. Requires external locking valves to hold cylinder, because ports A and B are open (orifice) in the neutral position. Extremely fine metering control. This spool is designed for the DCF valve and acts as closed center in DC valve.



Tandem Three Way (T3) - Powers the cylinder in one direction. Pump unloads to tank when spool is in neutral, or when spool is being reversed. Cylinder is blocked when spool is in neutral. Port "B" is plugged. This spool is designed for the DC valve.

DIMENSIONAL DATA (DCF16TM454LS SHOWN): inches & [millimeters]



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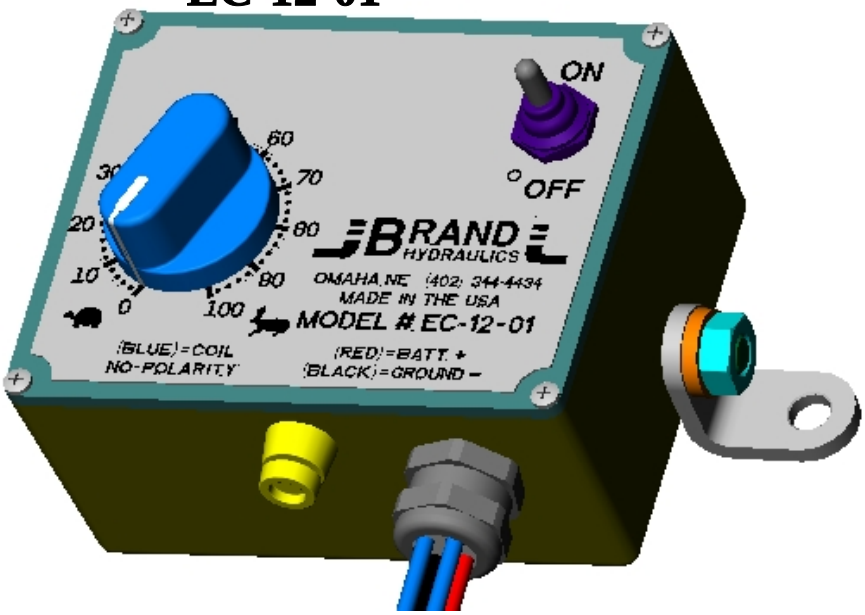
ELECTRONIC CONTROL BOX
EC-12-01



FEATURES:

- **R**UGGED **A**LUMINUM **B**OX **C**ONSTRUCTION to help prevent impact damage.
- **H**EAVY-DUTY **F**OOT **B**RACKETS for quick and secure mounting.
- **C**OLOR **K**EYED **W**IRE **L**EADS for easy wiring and identification.
- **S**TANDARD **18 I**NCHES **L**ONG BY **18**-**A**WG wire (Consult factory for special leads).
- **P**ULSE **W**IDTH **M**ODULATED **(PWM)** output to help reduce the effects of hysteresis.
- **W**EATHERPROOF **S**EALS on power switch, potentiometer, fuse holder, wire bushing and box lid.
- **E**XTERNALLY **M**OUNTED **F**USE **H**OLDER for quick and easy fuse change.
- **S**HORT **C**IRCUIT **P**ROTECTION to guard against over current conditions.
- **S**MOOTH **R**AMP **T**HERMAL **O**VERLOAD **P**ROTECTION to help protect against overheating.
- **I**NPUT **P**ROTECTION from voltage transients, load dumps, 2-battery jumps and reverse polarity hook-ups.
- **P**OWER **S**WITCH is separate from main control knob for turning valve on and off without loss of flow setting.
- **C**IRCUIT **B**OARD is coated with a special conformal coating to guard against moisture.
- **O**PTIONAL **H**IGH **V**ISIBILITY **LED** for indicating that the power switch is on.

SPECIFICATIONS:

- **Supply Voltage: 12.70-18.00 VDC.**
- **Output Voltage: 12 VDC, regardless of input supply voltage between 12.70-18.00 VDC.**
- **Output Current: 1.5 A Max. 1.0 A Nominal.**
- **PWM Frequency: 100 hz Average.**
- **Efficiency: without "L" option: 90% @ 1.0 A.**
- **Efficiency: with "L" option: 85% @ 1.0 amp.**
- **Operating Temp: -40° to 176°F (-40° to 80°C)**
- **Storage Temp: -85° to 194°F (-65° to 90°C)**
- **Approximate Weight: 1.4 lbs. (0.64 kg).**

MATERIALS:

- **All metal parts are stainless steel, nickel-plated and zinc plated to help prevent corrosion.**
- **The control knob is a unique thermal plastic rubber that provides a soft grip with a contemporary look.**

EC – GENERAL INFORMATION:

The Brand, electronic control box is designed to proportionally adjust the Brand EFC-Series valves and other proportional valves that meet the appropriate specifications. The controller's design makes it suitable for use in harsh environments as well as protected installations. The box has extensive weather proofing features to help it stand up against everyday use in sun, rain, snow or anything else that Mother Nature can dish out.

The main control knob is used to linearly adjust the current going through the solenoid on the valve. A large knob and a single turn potentiometer with a large degree of rotation gives smooth and precise adjustments. The controller is Pulse Width Modulated (PWM), which helps reduce the effects of hysterisis.

Each controller produced is burned-in for 24 hours after assembly to assure the controller is operating properly and meets all specifications. There are also many other quality assurance procedures that our controllers go through before they are shipped. All tests are performed with up to date, state of the art test equipment that is calibrated to NIST standards by an independent laboratory on a yearly basis.

EC – COMPLETE LIST OF COMMON MODEL CODES:

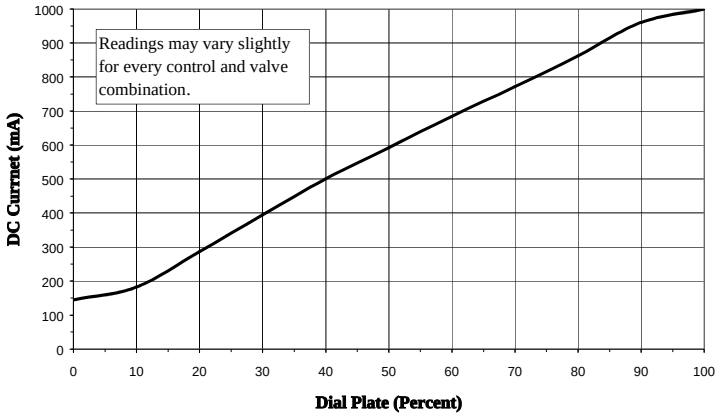
EC-12-01……Electronic control box.
EC-12-01L…….. Electronic control box with LED.

EC – COMPLETE LIST OF OPTIONS AND ACCESSORIES:

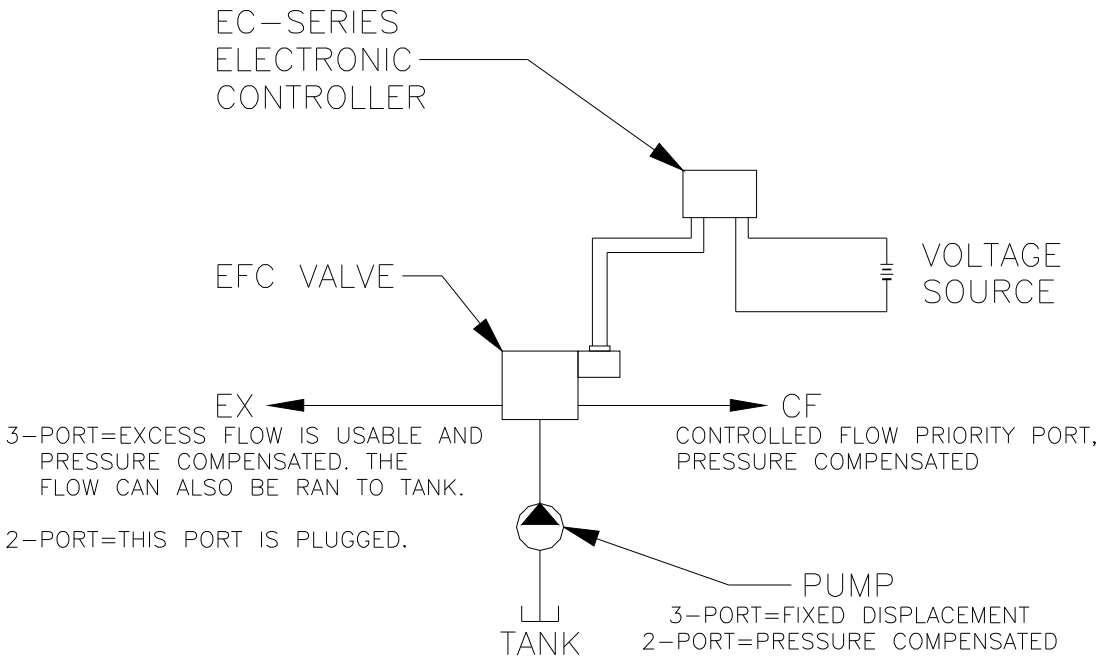
E1726…….. Fuse 1.5 amp.
E1758…….. Switch boot seal.
E1028…….. Surface mount standoff.
E1049…….. Panel mount fuse holder.
E1053…….. Red wire (16 awg).
E1054…….. Black wire (16 awg).
E1055…….. Blue wire (16 awg).
E1747……...…Power switch.
E1071…….. Potentiometer shaft seal.
EWP0017…….. Wall-mount power supply with 6 ft. cord.
WP001…… Female weather-pack (Packard part no. 12015792).
WP002…….....Male weather-pack (Packard part no. 12010973).

EC CURRENT VS. DIAL PLATE:

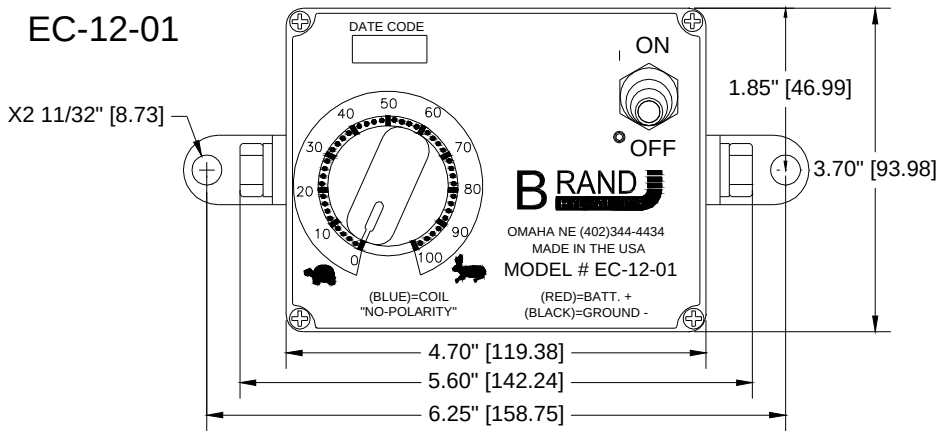
Current vs. Dial Plate for EC-12-01, EC-12-01L and EC-12-02

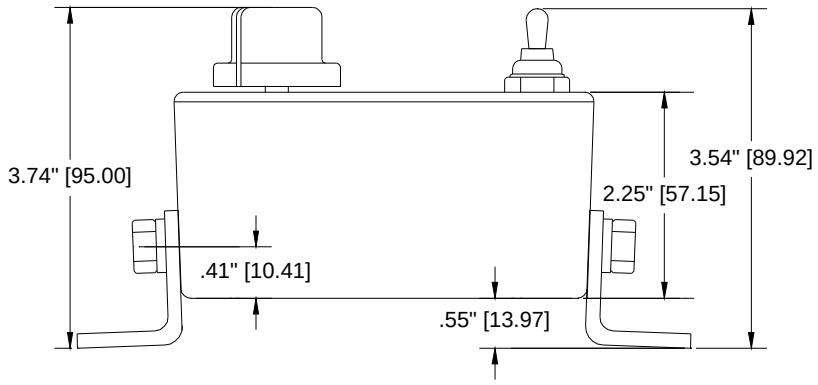


EC/EFC – SERIES SCHEMATIC DRAWING:

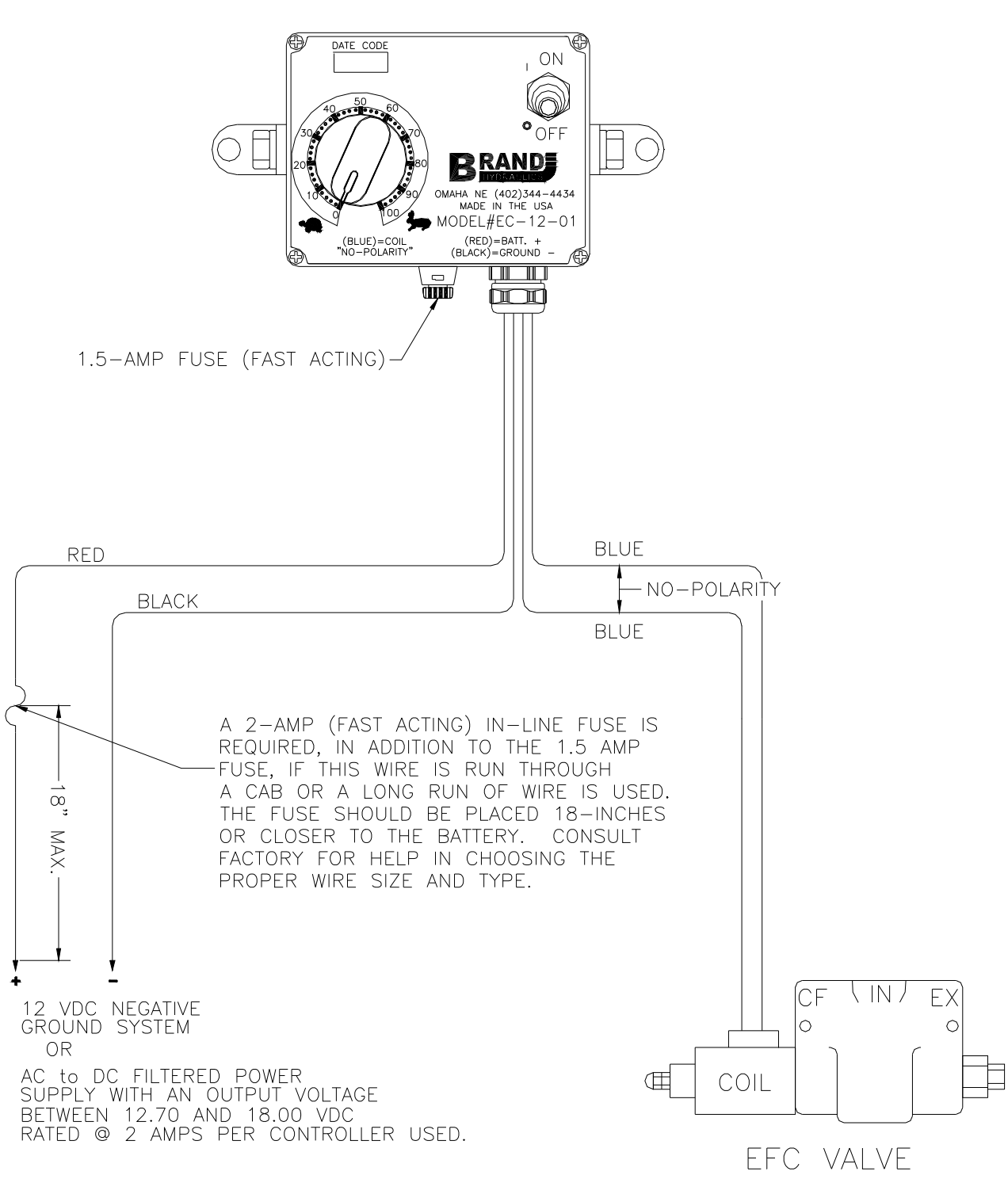


DIMENSIONAL DATA: inches & [millimeters]





EC–12–01 AND EC–12–01L WIRING DIAGRAM:



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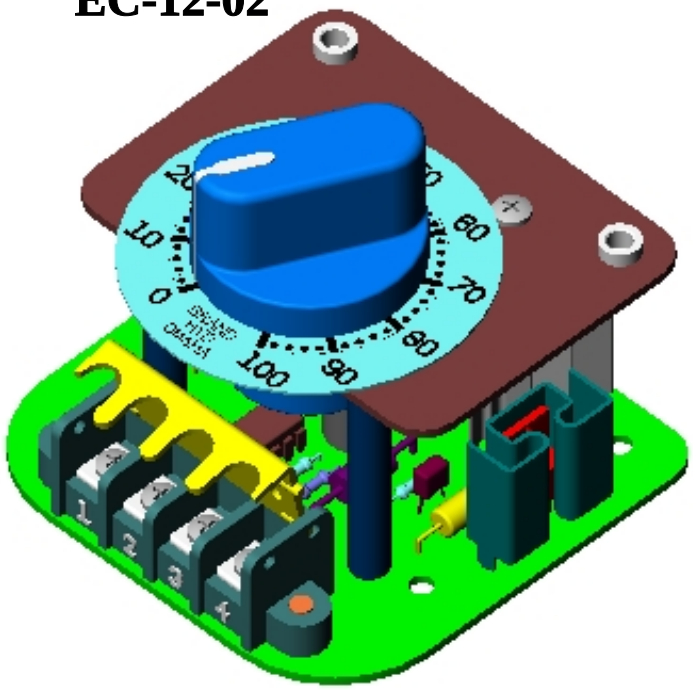
ELECTRONIC PANEL MOUNT CONTROL
EC-12-02



FEATURES:

- **L**IGHTWEIGHT IN **D**ESIGN to minimize panel fatigue.
- **S**MALL IN **S**IZE to minimize space requirements.
- **P**ULSE **W**IDTH **M**ODULATION **O**UTPUT to reduce the effects of hysteresis.
- **S**HORT **C**IRCUIT **P**ROTECTION to guard against over current conditions. (When wired to factory instructions)
- **S**MOOTH **R**AMP **T**HERMAL **O**VERLOAD **S**HUTDOWN to help protect against overheating. Input protection for transients, load dumps, 2-battery jumps, and reverse polarity hook-ups.
- **T**ERMINAL **B**LOCK **H**AS **P**RINTED **N**UMBERS AND A **H**INGE **C**OVER for easy wiring and accidental short circuit prevention.
- **O**PTIONAL **P**OWER **S**WITCH AND **F**USE can be installed separate from the control.
- **T**HE **C**IRCUIT **B**OARD IS **C**OATED WITH A **S**PECIAL **C**ONFORMAL **C**OATING to guard against moisture, dust and other contaminates.
- **O**NLY **T**HREE **S**MALL **H**OLES are required for mounting to panel.
- **F**OUR **P**REDRILLED **H**OLES may be used to surface mount to panel.

SPECIFICATIONS:

- **Supply Voltage: 12.70-18.00 VDC.**
- **Approximate Weight: 6.25 oz (178 g).**
- **Output Current: 1.5 amp Max. 1.0 amp Nominal.**
- **PWM Frequency: 100 hz Average.**
- **Efficiency: 92% @ 1.0 amp.**
- **Operating Temperature: -40° to 176°F (-40° to 80°C)**
- **Storage Temperature: -85° to 194°F (-65° to 90°C)**
- **Output Voltage: 12 VDC, regardless of input supply voltage between 12.70-18.00 VDC.**
- **Approximate volume required behind panel: 16 in^3**

MATERIALS:

- **All metal parts are stainless steel, anodized aluminum and zinc plated steel to help prevent corrosion.**
- **The control knob is a unique thermal plastic rubber that provides a soft grip with a contemporary look.**

EC – GENERAL INFORMATION:

The Brand, electronic panel mount control is designed to proportionally adjust the Brand EFC-Series valves and other proportional valves that meet the appropriate solenoid specifications. The panel mount control is designed to mount behind a control panel in an industrial setting, behind the dash panel of mobile equipment, or in any other mounting location.

The main control knob is used to linearly adjust the current going through the solenoid on the valve. A large knob and a single turn potentiometer with a large degree of rotation gives smooth and precise adjustments. The controller is Pulse Width Modulated (PWM), which helps reduce the effects of hysterisis.

Each controller produced is burned-in for 24 hours to assure the controller is operating properly and meets all specifications. There are also many other quality assurance procedures that our controllers go through before they are shipped. All tests are performed with up to date, state of the art test equipment that is calibrated to NIST standards by an independent laboratory on a yearly basis.

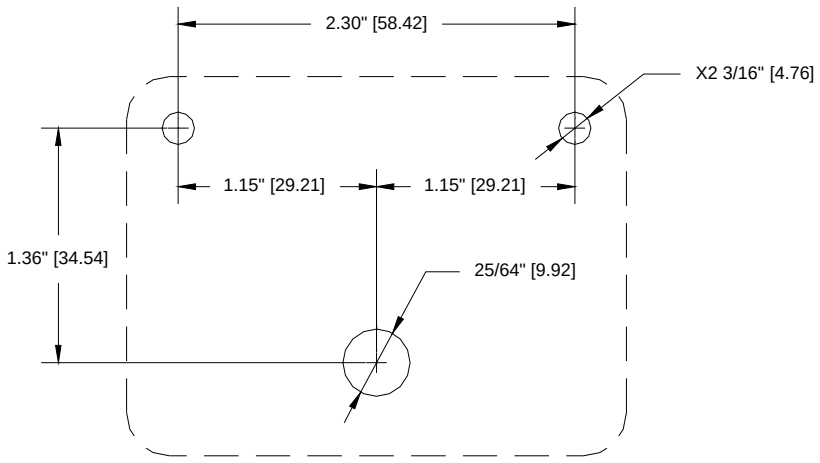
EC – COMPLETE LIST OF COMMON MODEL CODES:

EC-12-02…… Electronic panel mount.
EC-12-02S……..Electronic panel mount control with E1071 and E1130 installed

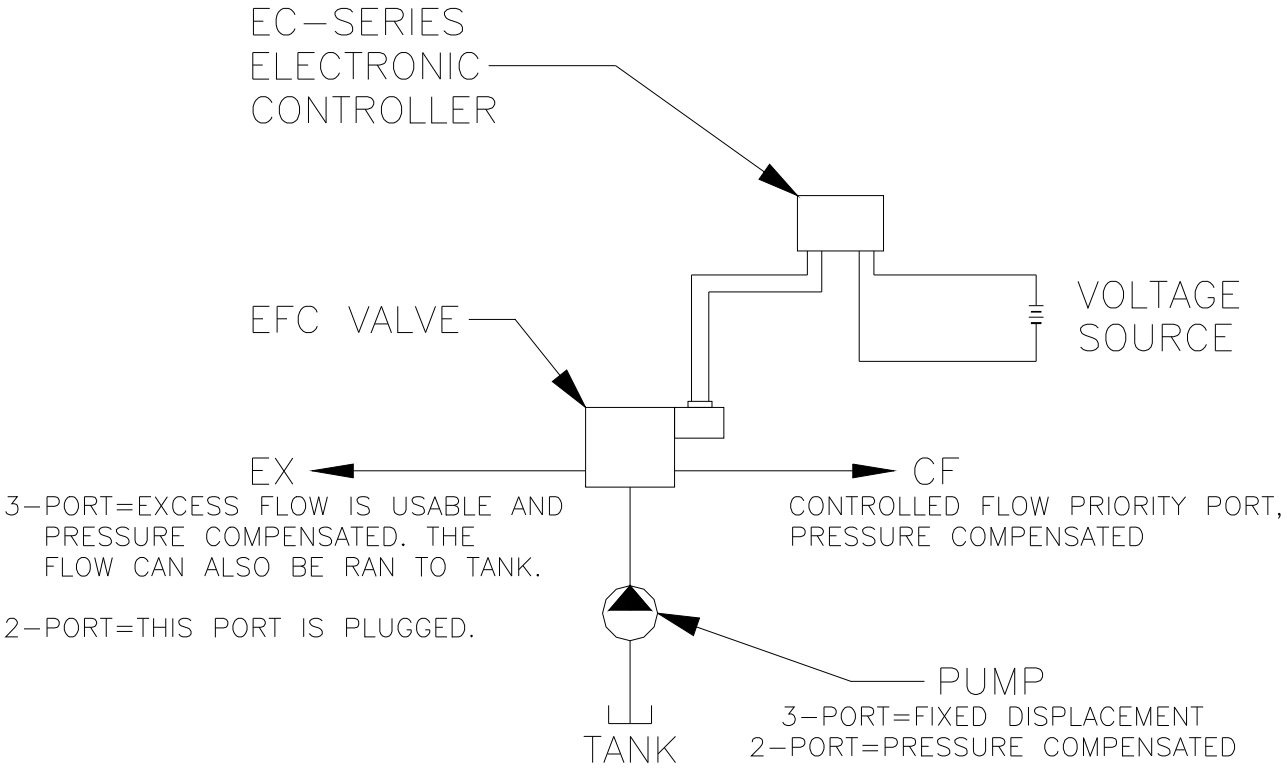
EC – COMPLETE LIST OF OPTIONS AND ACCESSORIES:

E1726…….. Fuse 1.5 amp.
E1758…….. Switch boot seal.
E1028…….. Surface mount standoff.
E1130……..…... Seal screw.
E1049…….. Panel mount fuse holder.
E1053…….. Red wire (16 awg).
E1054…….. Black wire (16 awg).
E1055…….. Blue wire (16 awg).
E1056…….. Power switch.
E1071…….. Potentiometer shaft seal.
EWP0018…….. Wall-mount power supply with 6 ft. cord.
E1130……..…. Pan head phillips seal screw 10-32 x 3/8”
WP001…….Female weather-pack (Packard part no. 12015792).
WP002…….Male weather-pack (Packard part no. 12010973).

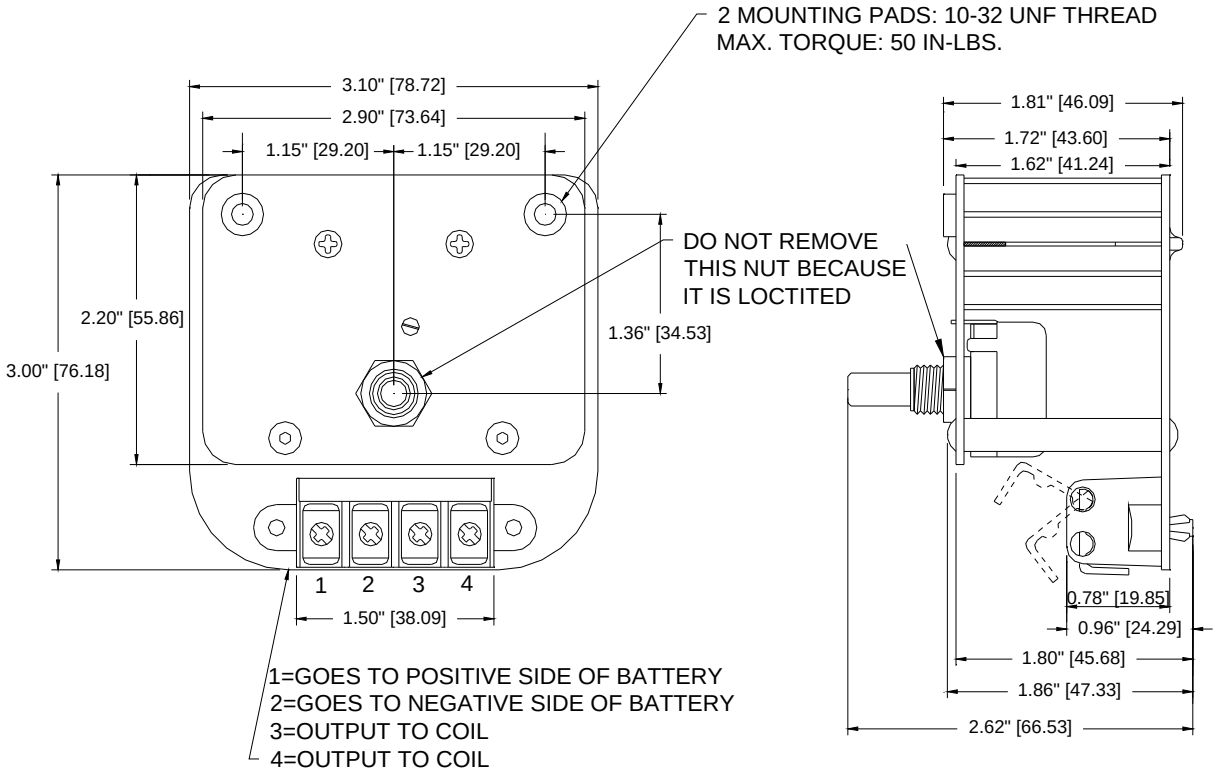
EC – MOUNTING HOLES TEMPLATE: inches & [millimeters]



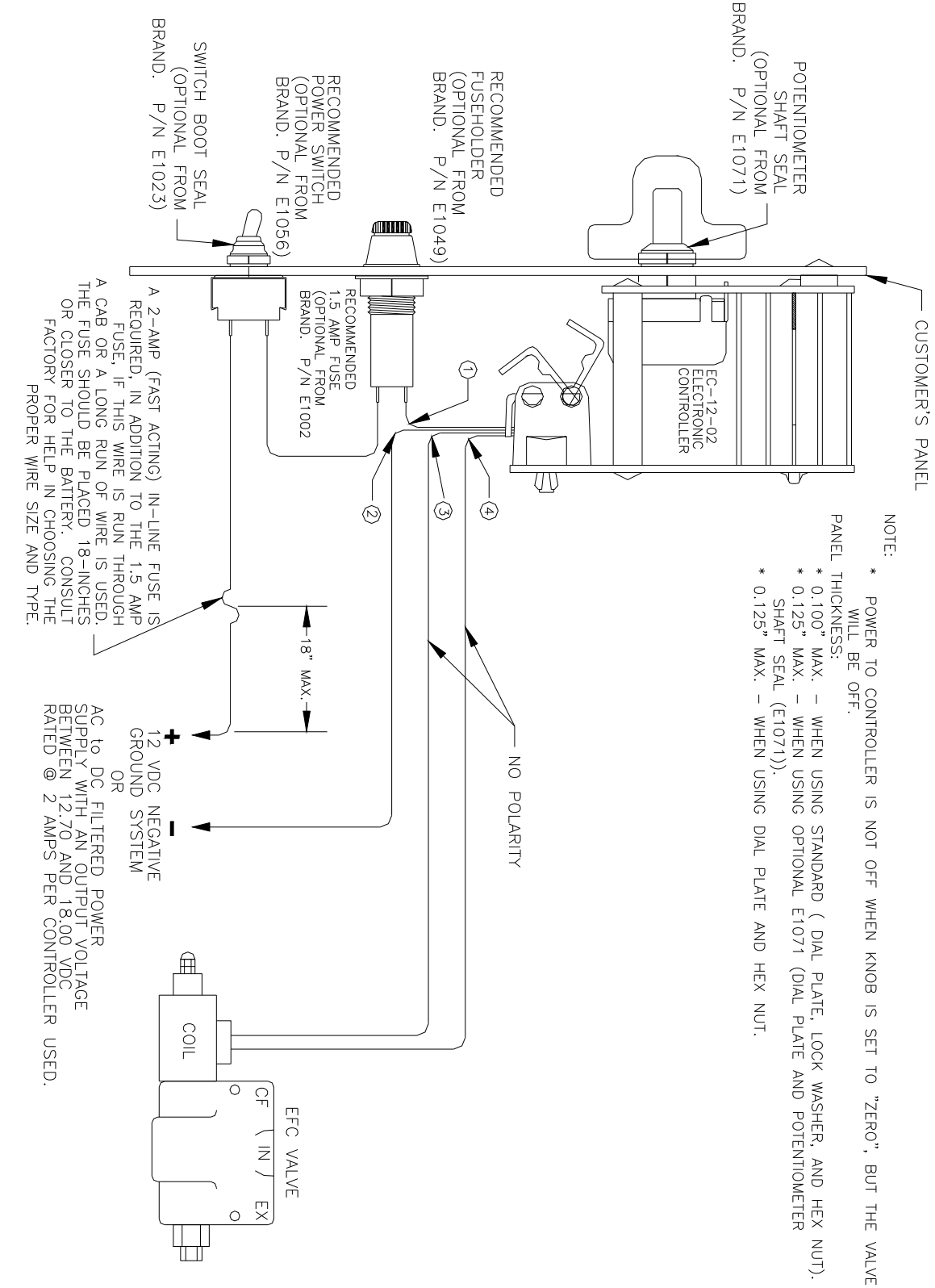
EC/EFC – SERIES SCHEMATIC DRAWING:



DIMENSIONAL DATA: inches & [millimeters]



EC-12-02 WIRING DIAGRAM:



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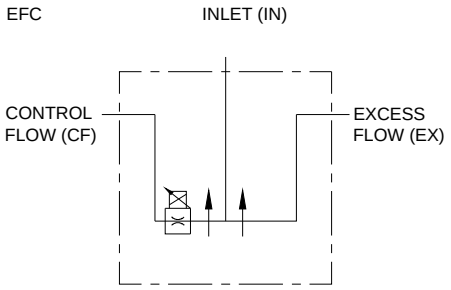
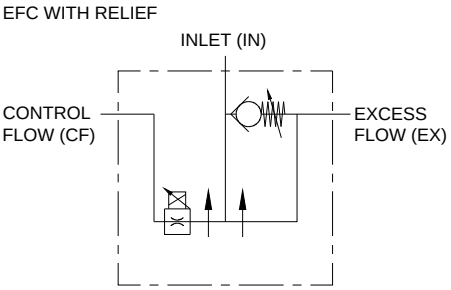
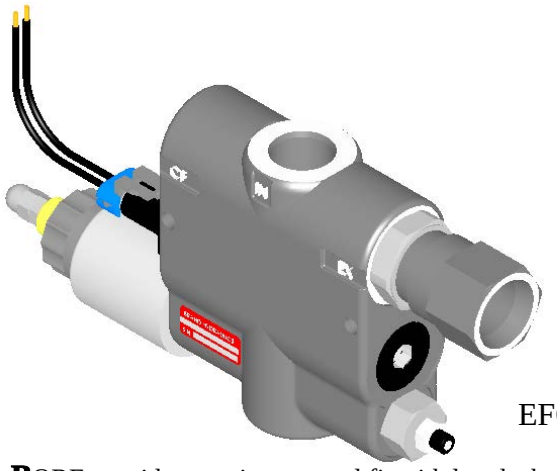
ELECTRONICALLY ADJUSTABLE PROPORTIONAL PRESSURE COMPENSATED FLOW CONTROL "EFC"





EFC12-10-12



EFC12-15-12R22

FEATURES:

- **D**IAMOND **H**ONED **S**POOL **B**ORE provides consistent spool fit with low leakage.
- **O'R**ING **P**ORTS to eliminate leakage.
- **E**VERY **EFC** IS **T**ESTED for shutoff, linearity, max. flow, crack open and pressure compensation.
- **S**TANDARD **3**-PORT allows for pressure compensated flow out of the CF and EX ports.
- **M**ANUAL **O**VERRIDE when electrical power is lost.
- **O**PTIONAL **2**-PORT allows for pressure compensated flow out of CF port.
- **O**PTIONAL **F**REE **R**EVERSE **F**LOW allows fluid to move from the CF port to the inlet.
- **O**PTIONAL **H**IGH **L**IFT **R**ELIEF.

SPECIFICATIONS:

- **See flow chart for capacity.**
- **3000 psi (207 bar) rating.**
- **Weighs 8-1/2 lbs. (3.9 kg).**
- **Standard Port size #12SAE (1-1/16 – 12).**
- **10-Micron Filtration Recommended.**
- **Pulse Frequency (90 to 115 hz).**
- **Coil**
  -12 VDC standard (24 VDC).
  -9.6 ohms (48 ohms).
  -15 watts (15 watts).
  -1.0 amp max (0.5 amp max.).
- **Response Time**
  -0.035" Standard dash pot (375 ms).
  -0.020" Dash pot (900 ms).
  -0.093 Dash pot (175 ms to 350 ms depending on flow).
- **Spool leakage (3.05 in^3/min. @ 1000 psi ((50 ml/min. @ 68.9 bar) on EX port).**

MATERIALS:

- **Ductile Cast Iron Body**
- **Heat Treated Steel Spools**
- **Buna N O'Rings**
- **Heat Treated Free Reverse Check Seat**

EFC – GENERAL INFORMATION

The Brand, electronically adjustable proportional pressure compensated flow control is an electronically controlled version of the original FC51 style flow control valve. The EFC performance as a flow control is very similar to the FC51 because they both use the same spring and compensator spool. Thus, the control flow port (CF) and the excess flow port (EX) remain usable and pressure compensated.

The main advantage of the EFC over the FC51 is that the flow can be adjusted proportionally with a solenoid instead of manually. As the current to the solenoid increases the variable orifice moves proportionally similar to positioning the rotary side lever on the manual FC's. The solenoid is connected to our EC – series controls which can be sold with the EFC. We also give the choice of a dashpot size, which allows the customer to select a valve that responds to the control box at different rates. Other options are 2-port, free reverse flow and high lift ball spring relief.

2-PORT- The 2-port (2P) option is a modified version of the standard 3-port EFC. This option lets the customer use the control flow port while the excess port is plugged. A special compensator spool was designed to eliminate hunting that can occur between pressure compensated valves and pumps. To use the EFC 2-port a pressure compensated pump is required. The 2-port can be converted to a 3-port (by removing the EX plug), but it will not have the same characteristics as the standard 3-port. (See chart on next page for 2-port EFC)

FREE REVERSE FLOW- The free reverse flow option was designed to be used primarily where cylinders and motors are needed to go in reverse. The flow can only go in reverse from controlled flow (CF) to the inlet (IN). Flow is not metered when it goes in reverse. The steel ball seat inside the compensator spool is heat treated to assure a long life.

HIGH LIFT BALL SPRING RELIEF – The high lift ball spring relief (R) reduces plumbing and provides relief protection. Once the pressure on the inlet port increases above the relief setting the relief valve opens and diverts flow to the EX port while maintaining pressure on the IN port. The EX port must be plumbed back to tank for this relief to work. This relief does not chatter and the cracking pressure from low to high flow is virtually the same. The relief is easily adjustable by simply loosening the lock nut and turning the adjusting fitting. (See relief chart on next page)

EFC – EXAMPLES OF COMMON MODEL CODES:

EFC12-10-12…….. 10 gpm (37.9 lpm) 3-port with 12 volt coil
EFC12-15-12R15..... 15 gpm (56.8 lpm) 3-port, 12 volt coil with 1500 psi (103.4 bar) relief
EFC12-10-122P……. 10 gpm (37.9 lpm) 2-port with 12 volt coil
CEP1000……. 10 gpm (37.9 lpm) 3-port with EC-12-01 control

EFC – CREATING A MODEL CODE FOR EFC'S:

E F C __ __- __- __ __

REVERSE FLOW:
C – Free reverse flow
Omit – No reverse flow

PORT SIZE:
12 - #12SAE (1-1/16 – 12)
** - Contact factory for others

FLOW SETTING:
05 – 0-5 gpm (18.9 lpm)
10 – 0-10 gpm (37.8 lpm)
15 – 0-15 gpm (56.8 lpm)
20 – 0-20 gpm (75.7 lpm)
25 – 0-25 gpm (94.6 lpm)*
30 – 0-30 gpm (113.6 lpm)*

OPTIONS:
2P – 2 port
R15 – Relief set at 1500 psi (103.4 bar) (specify pressure in 100 psi increments)*
.093 – 0.093 dashpot orifice
.020 – 0.020 dashpot orifice

COIL VOLTAGE & TERMINAL:
12 – 12 volt DC
24 – 24 volt DC
PF – Weather pack, female shroud with male pin
PM – Weather pack, male tower with female pin

* - 3 port only

EFC WITH ELECTRONIC CONTROL:

C E P _ _ _ 0 0 _

REVERSE FLOW:
C – Free reverse flow
Omit – No reverse flow

CONTROLS:
D – EC-12-02 (Dashmount)
Omit – EC -12-01 (Weather proof box)

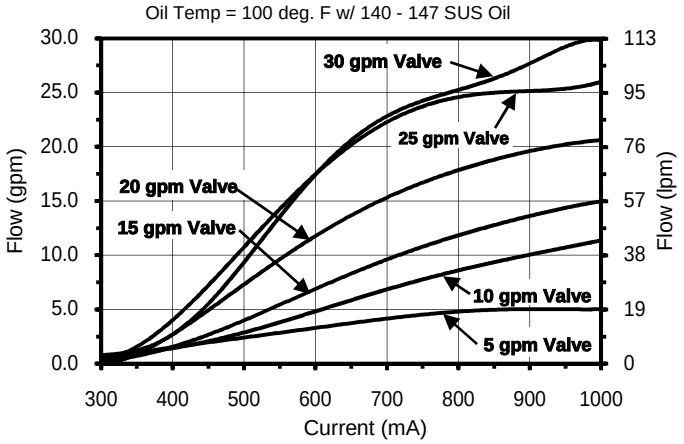
FLOW SETTING:
05 – 0-5 gpm (18.9 lpm)
10 – 0-10 gpm (37.8 lpm)
15 – 0-15 gpm (56.8 lpm)
20 – 0-20 gpm (75.7 lpm)
25 – 0-25 gpm (94.6 lpm)*
30 – 0-30 gpm (113.6 lpm)*

OPTIONS:
2P – 2 port
R15 – Relief set at 1500 psi (103.4 bar) (specify pressure in 100 psi increments)*
.093 – 0.093 dashpot orifice
.020 – 0.020 dashpot orifice
Omit – No options

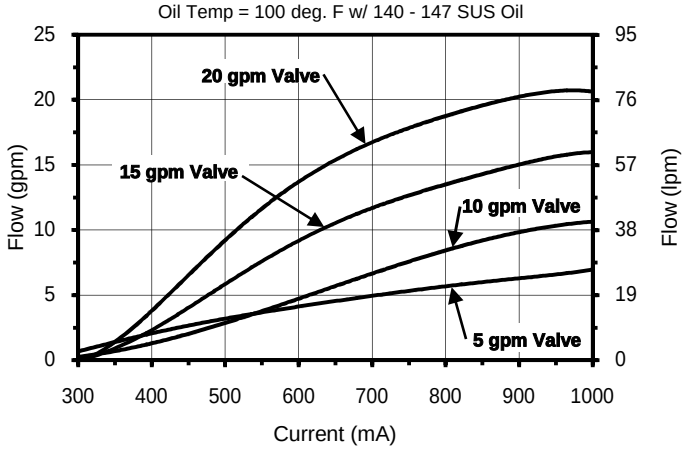
* - 3 port only

EFC FLOW & SOLENOID CURRENT INFO FOR 2-PORT AND 3-PORT:

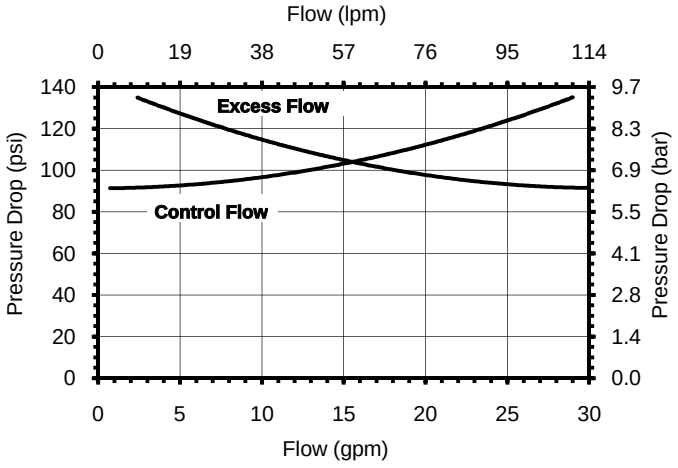
Flow vs. Solenoid Current for EFC 3-Port



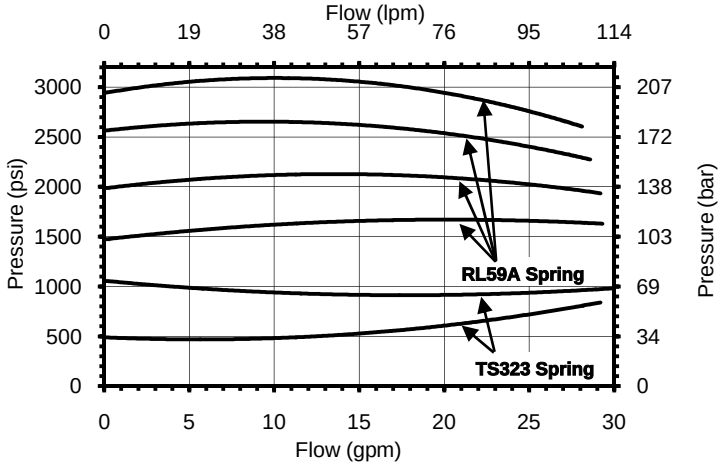
Flow vs. Solenoid Current for EFC 2-Port



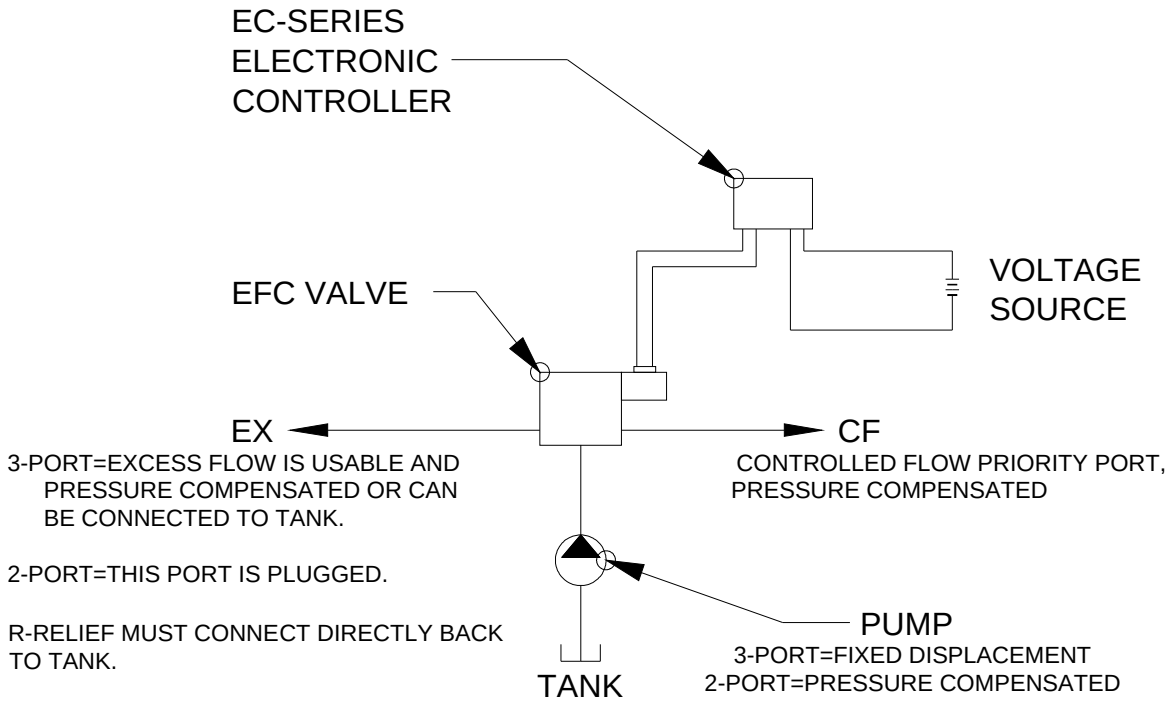
Pressure Drop vs. Flow for EFC Series



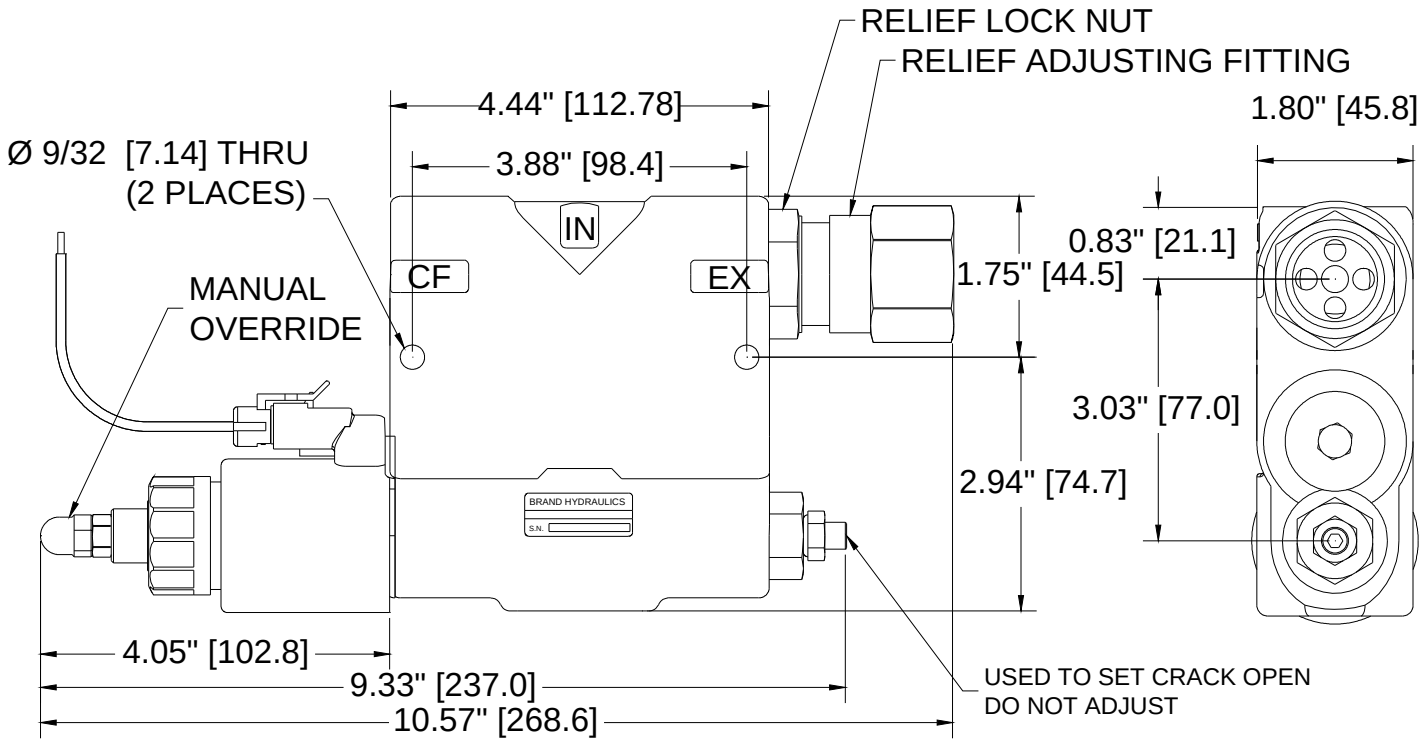
Pressure vs. Flow for EFC with Relief



2 & 3 PORT SCHEMATIC DRAWING:



DIMENSIONAL DATA (EFC WITH RELIEF SHOWN):



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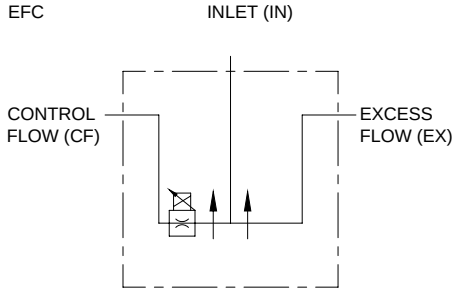
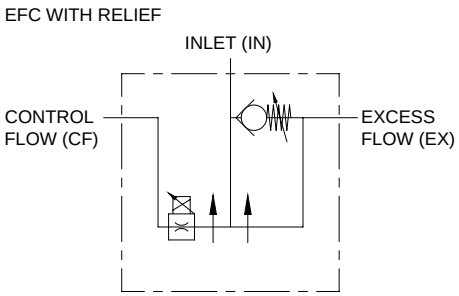
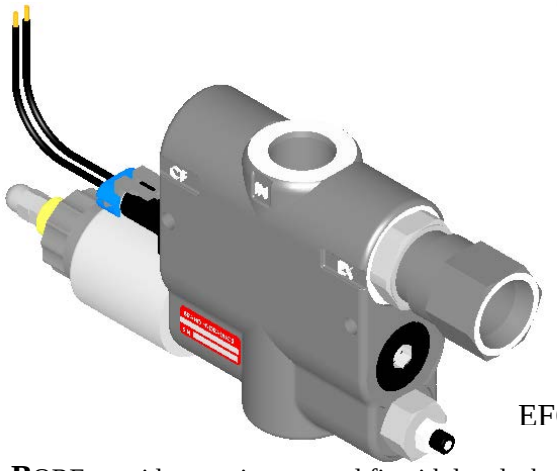
ELECTRONICALLY ADJUSTABLE PROPORTIONAL PRESSURE COMPENSATED FLOW CONTROL "EFC"





EFC12-10-12



EFC12-15-12R22

FEATURES:

- **D**IAMOND **H**ONED **S**POOL **B**ORE provides consistent spool fit with low leakage.
- **O'R**ING **P**ORTS to eliminate leakage.
- **E**VERY **EFC** IS **T**ESTED for shutoff, linearity, max. flow, crack open and pressure compensation.
- **S**TANDARD **3**-PORT allows for pressure compensated flow out of the CF and EX ports.
- **M**ANUAL **O**VERRIDE when electrical power is lost.
- **O**PTIONAL **2**-PORT allows for pressure compensated flow out of CF port.
- **O**PTIONAL **F**REE **R**EVERSE **F**LOW allows fluid to move from the CF port to the inlet.
- **O**PTIONAL **H**IGH **L**IFT **R**ELIEF.

SPECIFICATIONS:

- **See flow chart for capacity.**
- **3000 psi (207 bar) rating.**
- **Weighs 8-1/2 lbs. (3.9 kg).**
- **Standard Port size #12SAE (1-1/16 – 12).**
- **10-Micron Filtration Recommended.**
- **Pulse Frequency (90 to 115 hz).**
- **Coil**
  -12 VDC standard (24 VDC).
  -9.6 ohms (48 ohms).
  -15 watts (15 watts).
  -1.0 amp max (0.5 amp max.).
- **Response Time**
  -0.035" Standard dash pot (375 ms).
  -0.020" Dash pot (900 ms).
  -0.093 Dash pot (175 ms to 350 ms depending on flow).
- **Spool leakage (50 ml/min. @1000 psi on EX port).**

MATERIALS:

- **Ductile Cast Iron Body**
- **Heat Treated Steel Spools**
- **Buna N O'Rings**
- **Heat Treated Free Reverse Check Seat**

EFC – GENERAL INFORMATION

The Brand, electronically adjustable proportional pressure compensated flow control is an electronically controlled version of the original FC51 style flow control valve. The EFC performance as a flow control is very similar to the FC51 because they both use the same spring and compensator spool. Thus, the control flow port (CF) and the excess flow port (EX) remain usable and pressure compensated.

The main advantage of the EFC over the FC51 is that the flow can be adjusted proportionally with a solenoid instead of manually. As the current to the solenoid increases the variable orifice moves proportionally similar to positioning the rotary side lever on the manual FC's. The solenoid is connected to our EC – series controls which can be sold with the EFC. We also give the choice of a dashpot size, which allows the customer to select a valve that responds to the control box at different rates. Other options are 2-port, free reverse flow and high lift ball spring relief.

2-PORT- The 2-port (2P) option is a modified version of the standard 3-port EFC. This option lets the customer use the control flow port while the excess port is plugged. A special compensator spool was designed to eliminate hunting that can occur between pressure compensated valves and pumps. To use the EFC 2-port a pressure compensated pump is required. The 2-port can be converted to a 3-port (by removing the EX plug), but it will not have the same characteristics as the standard 3-port. (See chart on next page for 2-port EFC)

FREE REVERSE FLOW- The free reverse flow option was designed to be used primarily where cylinders and motors are needed to go in reverse. The flow can only go in reverse from controlled flow (CF) to the inlet (IN). Flow is not metered when it goes in reverse. The steel ball seat inside the compensator spool is heat treated to assure a long life.

HIGH LIFT BALL SPRING RELIEF – The high lift ball spring relief (R) reduces plumbing and provides relief protection. Once the pressure on the inlet port increases above the relief setting the relief valve opens and diverts flow to the EX port while maintaining pressure on the IN port. The EX port must be plumbed back to tank for this relief to work. This relief does not chatter and the cracking pressure from low to high flow is virtually the same. The relief is easily adjustable by simply loosening the lock nut and turning the adjusting fitting. (See relief chart on next page)

EFC – EXAMPLES OF COMMON MODEL CODES:

EFC12-10-12…….. 10 gpm 3-port with 12 volt coil
EFC12-15-12R15..... 15 gpm 3-port, 12 volt coil with 1500 psi relief
EFC12-10-122P……. 10 gpm 2-port with 12 volt coil
CEP1000…….. 10 gpm 3-port with EC-12-01 control

EFC – CREATING A MODEL CODE FOR EFC'S:

E F C __ __- __- __ __

REVERSE FLOW:
C – Free reverse flow
Omit – No reverse flow

PORT SIZE:
12 - #12SAE (1-1/16 – 12)
** - Contact factory for others

FLOW SETTING:
05 – 0-5 gpm (18.9 lpm)
10 – 0-10 gpm (37.8 lpm)
15 – 0-15 gpm (56.8 lpm)
20 – 0-20 gpm (75.7 lpm)
25 – 0-25 gpm (94.6 lpm)*
30 – 0-30 gpm (113.6 lpm)*

OPTIONS:
2P – 2 port
R15 – Relief set at 1500 psi (specify pressure in 100 psi increments)*
.093 – 0.093 dashpot orifice
.020 – 0.020 dashpot orifice
Omit – No options

COIL VOLTAGE & TERMINAL:
12 – 12 volt DC
24 – 24 volt DC
PF – Weather pack, female shroud with male pin
PM – Weather pack, male tower with female pin

* - 3 port only

EFC WITH ELECTRONIC CONTROL:

C E P _ _ _ 0 0 _

REVERSE FLOW:
C – Free reverse flow
Omit – No reverse flow

CONTROLS:
D – EC-12-02 (Dashmount)
Omit – EC -12-01 (Weather proof box)

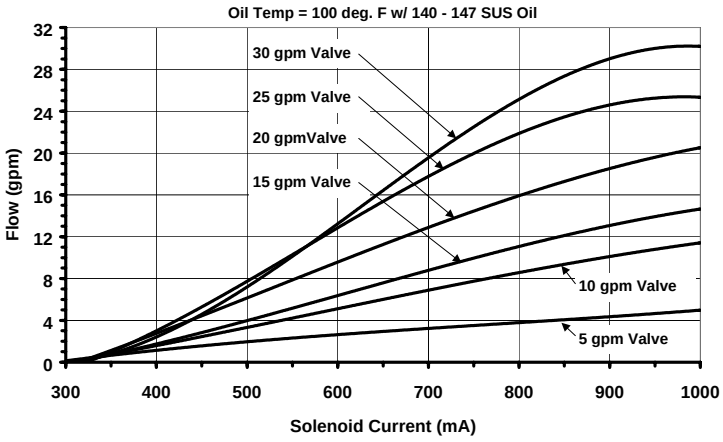
FLOW SETTING:
05 – 0-5 gpm (18.9 lpm)
10 – 0-10 gpm (37.8 lpm)
15 – 0-15 gpm (56.8 lpm)
20 – 0-20 gpm (75.7 lpm)
25 – 0-25 gpm (94.6 lpm)*
30 – 0-30 gpm (113.6 lpm)*

OPTIONS:
2P – 2 port
R15 – Relief set at 1500 psi (specify pressure in 100 psi increments)*
.093 – 0.093 dashpot orifice
.020 – 0.020 dashpot orifice
Omit – No options

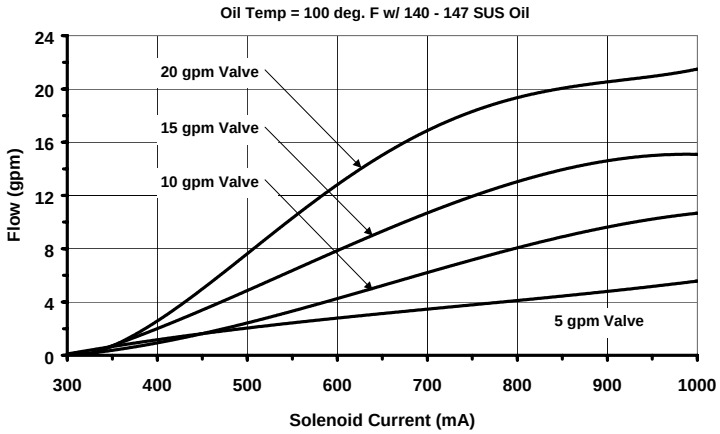
* - 3 port only

EFC FLOW & SOLENOID CURRENT INFO FOR 2-PORT AND 3-PORT:

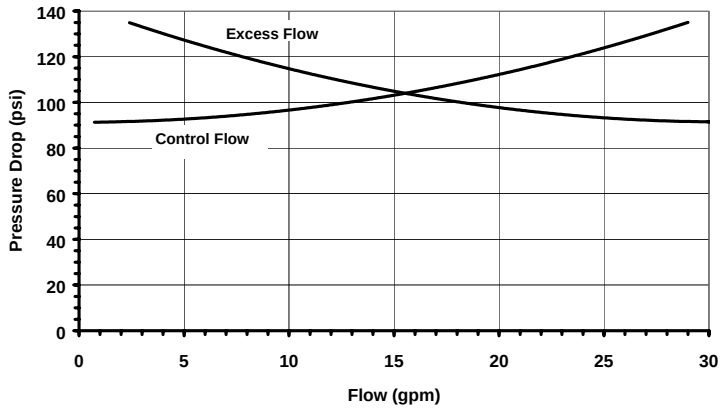
Flow vs. Solenoid Current for EFC 3-Port



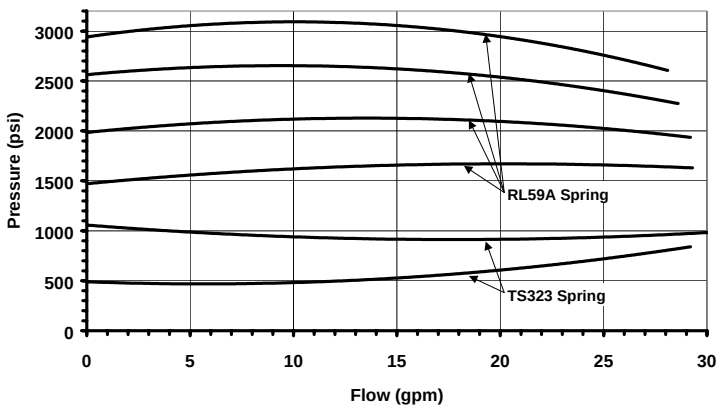
Flow vs. Solenoid Current for EFC 2-Port



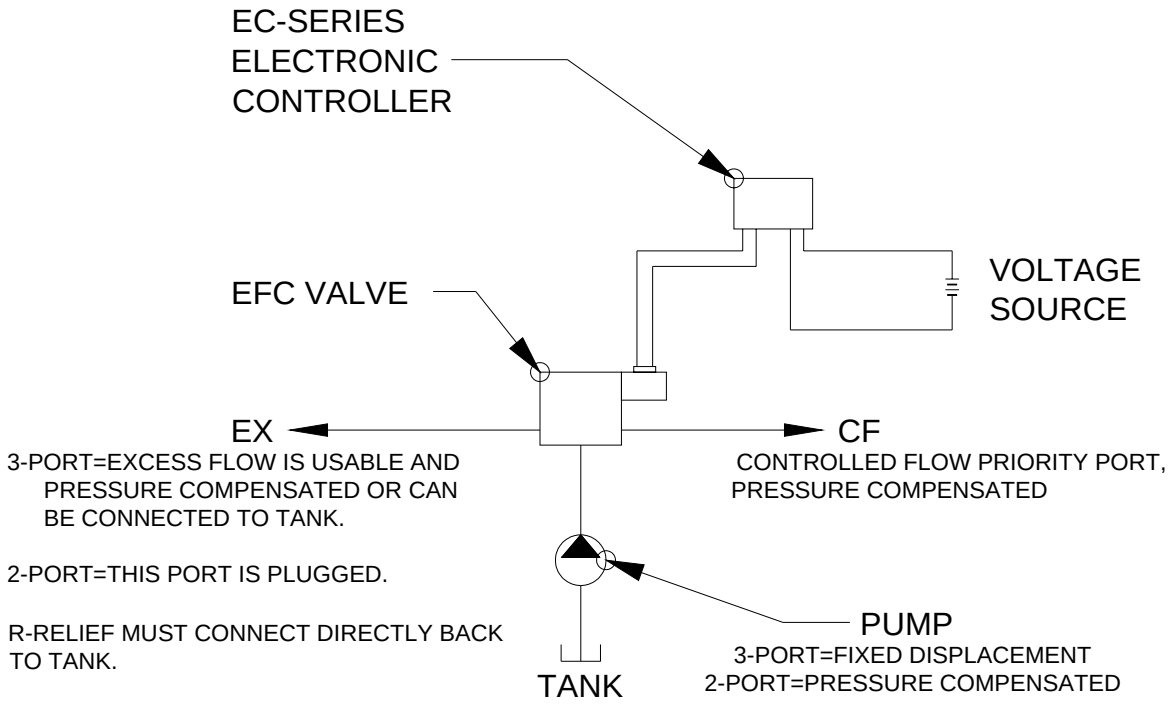
Pressure Drop vs. Flow for EFC Series



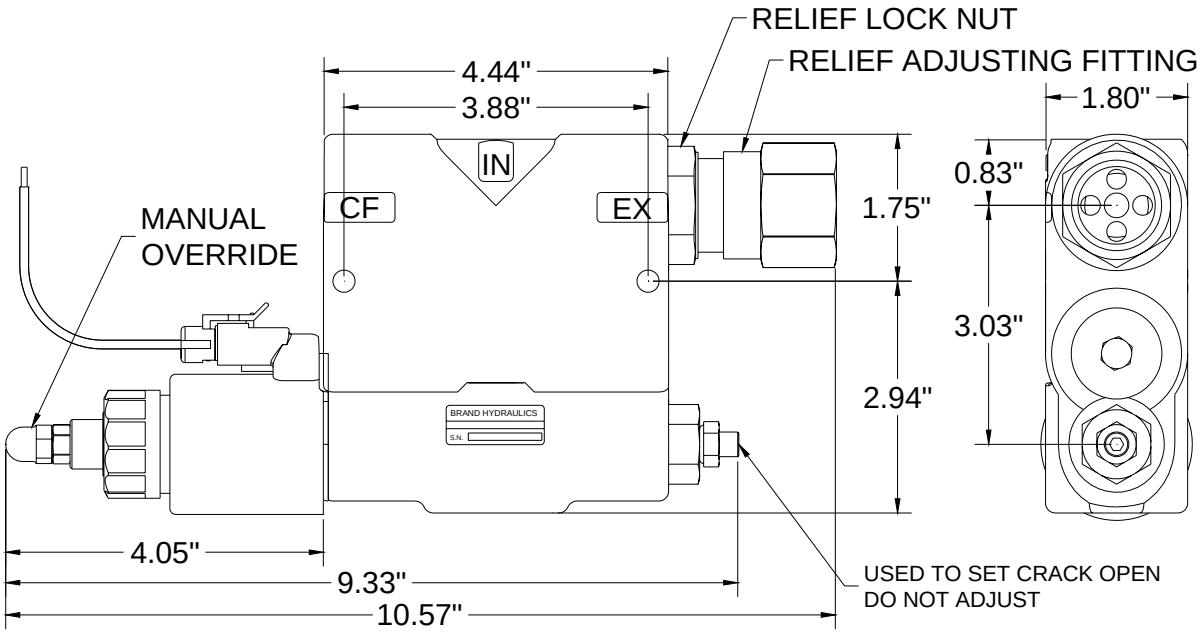
Pressure vs. Flow for EFC with Relief



2 & 3 PORT SCHEMATIC DRAWING:



DIMENSIONAL DATA (EFC WITH RELIEF SHOWN):



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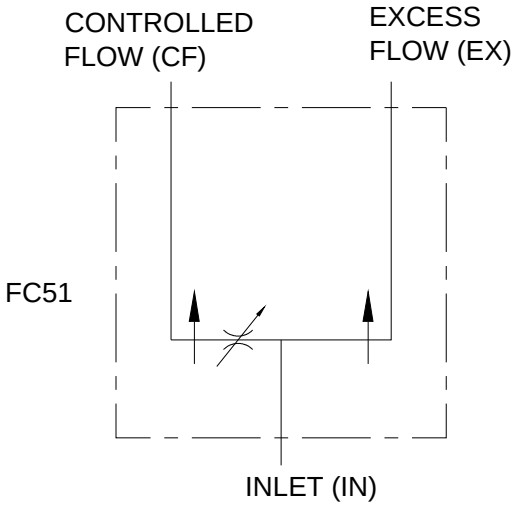
HIGH VOLUME FULL RANGE PRESSURE COMPENSATING VARIABLE FLOW CONTROL "FC"



FEATURES:

- **P**RECISION **G**ROUND **P**LATED **S**POOL that assures long life.
- **D**IAMOND **H**ONED **S**POOL **B**ORE provides consistent spool fit with low leakage.
- **E**VERY **F**C IS **T**ESTED for shutoff, linearity, and pressure compensation.
- **S**TANDARD **3**-PORT allows for pressure compensated flow out of two ports.

SPECIFICATIONS:

- **See flow chart for capacity.**
- **Rated for 3000 psi (207 bar).**
- **Weighs 28 – 3/4 lbs. (13.0 kg).**
- **30-Micron Filtration Recommended.**
- **Torque to turn side lever spool.**
  -40 in*lbs (4.5Nm) with 3000 (207 bar) psi on CF port or the EX port.

MATERIALS:

- **Ductile Cast Iron Body.**
- **Heat Treated Steel Spools.**
- **Buna N O'Rings.**
- **Consult factory for stainless steel rotary spool.**

FC – GENERAL INFORMATION

The Brand, full range pressure compensating variable flow control is designed so that the orifice area varies as the lever is rotated. Fluid travels past the variable orifice, by the compensator spool and then out the controlled flow port. Therefore the flow out of the CF port is proportional to the orifice area which can vary from closed to wide open. The sum of the controlled flow and the excess flow equals the inlet flow and as the controlled flow increases the excess flow decreases. Both outlet flows are pressure compensated with a spool that maintains a constant flow while adjusting for pressure. Hunting between the compensated pump and our valve is dampened with a cross hole in the casting. Thus, the outlet flow is smooth and constant regardless of the pressure on the CF and EX port.

FC – EXAMPLES OF COMMON MODEL CODES:

FC51-1…… 1” ports and standard 50 gpm (189.3 lpm) rotary spool.
FC51-1 1/2……..…… 1 1/2” ports and 90 gpm (340.7 lpm) rotary spool.
FC51-24*100……..... Number 24SAE ports and 50 gpm (189.3 lpm) rotary spool.

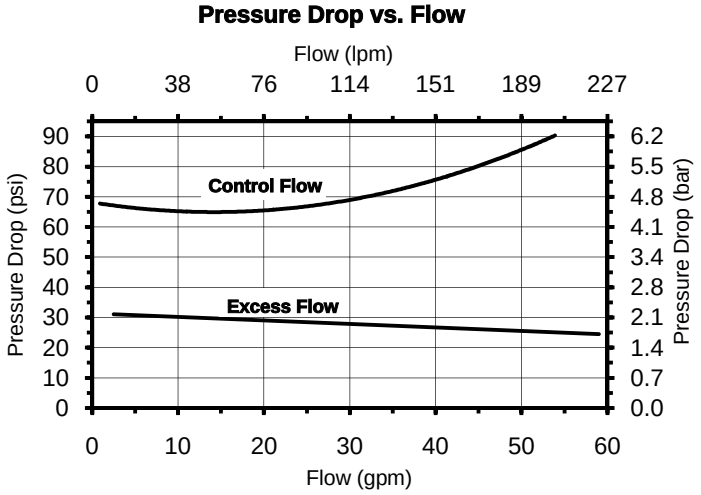
FC – CREATING A MODEL CODE FOR FC’S:

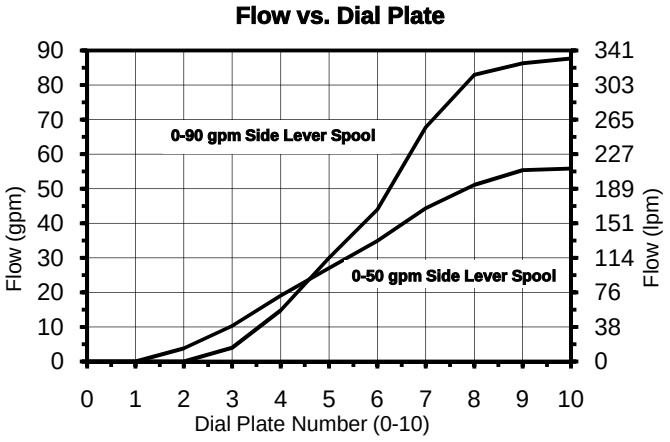
F C 5 1 _ _

PORT SIZE:
1 – 1” NPT (0-50 gpm (0-189.3 lpm) standard)
1 1/4 – 1 1/4” NPT (0-90 gpm (0-340.7 lpm) standard)
1 1/2 – 1 1/2” NPT (0-90 gpm (0-340.7 lpm) standard)
16 - #16SAE (1 5/16 – 12) (0-50 gpm (0-189.3 lpm) standard)
24 - #24SAE (1 7/8 – 12) (0-90 gpm (340.7 lpm) standard)

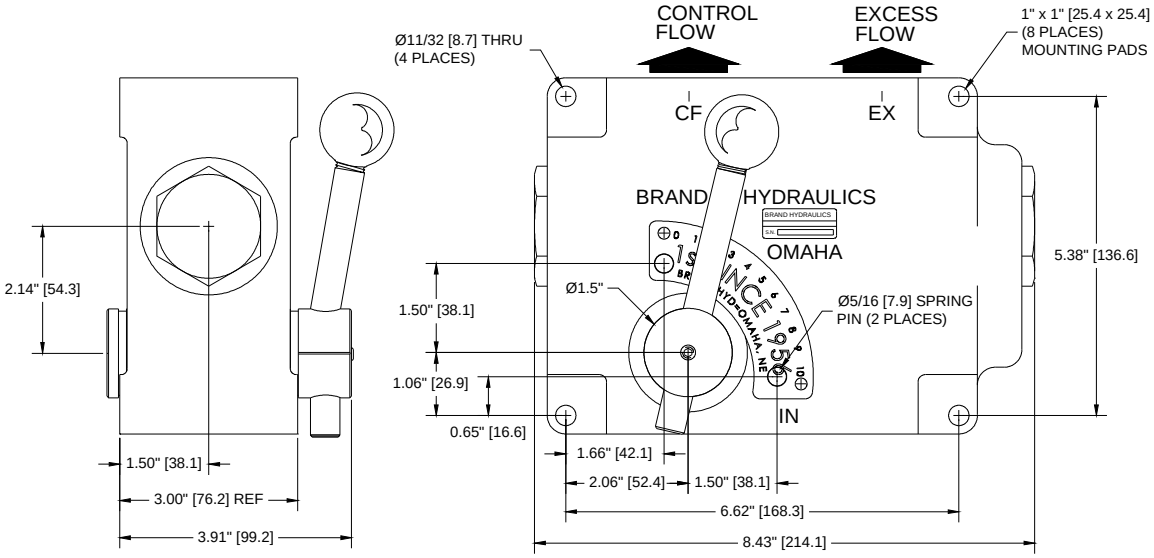
FLOW SETTING:
*100 – 0-50 gpm (0-189.3 lpm)
** - Need not specify for standard flow setting noted under “PORT SIZE”

FC FLOW & PRESSURE INFO:





DIMENSIONAL DATA:



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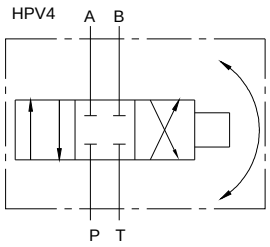
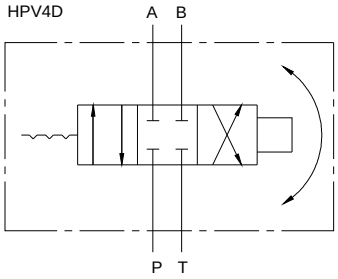
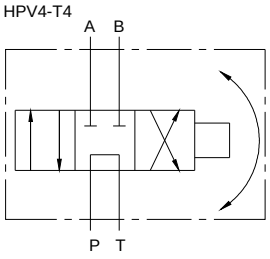
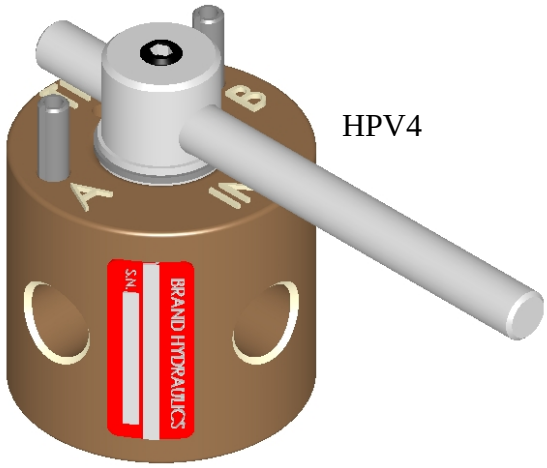
4 – WAY DIRECTIONAL CONTROL VALVE "HPV4"

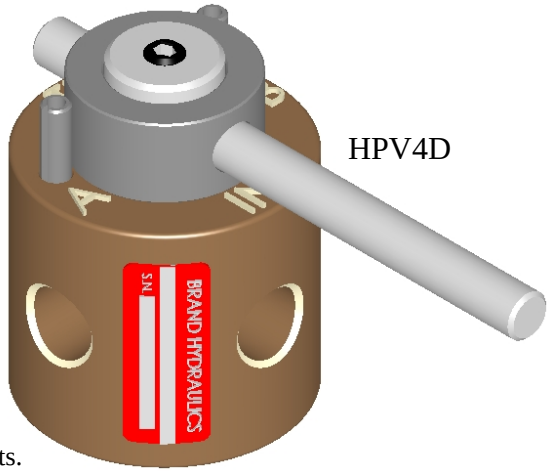








HPV4



HPV4D

FEATURES:

- **S**MALL AND **C**OMPACT to fit your design requirements.
- **C**ROSS **H**OLES IN **S**POOL reduce torque required to rotate the spool.
- **P**RECISION **G**ROUND **I**OSSO **P**LATED **S**POOL that assures long life.
- **O**PTIONAL **# 4 SAE P**ORTING for a better seal between the body and the fitting.
- **O**PTIONAL **T4 S**POOL allows customer to send oil from P to T in the neutral position.
- **O**PTIONAL **T**HREE-**P**OSITION **D**ETENT to hold the spool in either active position or neutral.

SPECIFICATIONS:

- **Rated 0-5 gpm (0-19 lpm).**
- **Rated for 6000 psi (414 bar).**
- **Weighs 1.25 lbs. (0.6 kg).**
- **Standard port size 1/4" NPT all.**
- **30 in lbs (3.4 Nm) to turn HPV4 spool @ 3000 psi (207 bar).**
- **15 degrees of rotation before work ports open to pressure or tank.**
- **30 – Micron filtration recommended.**

MATERIALS:

- **Durabar Gray Cast Iron Body**
- **Buna N O'Rings**
- **IOSSO Plated Steel Spool**

HPV4 – GENERAL INFORMATION:

The Brand, HPV4 directional control valves are small and compact. The HPV4's were designed primarily for use with hand pumps and other low flow applications where size weight and appearance are important. Three-position detent (D) holds the spool in neutral or either active position. Closed center (standard) blocks all ports when in neutral. Tandem center (T4) sends oil from P to T when in the neutral position. The T4 spool should not be used for flows of 4 gpm and greater because the pressure drop increases significantly.

HPV4 – CREATING MODEL CODES FOR HPV4'S:

H P V 4 __ - __ __

SPOOL ACTION:
Omit – Standard o-ring friction
D – Three position detent

PORT SIZE:
Omit – 1/4" NPT all ports
4SAE - #4SAE (7/16-20) all ports

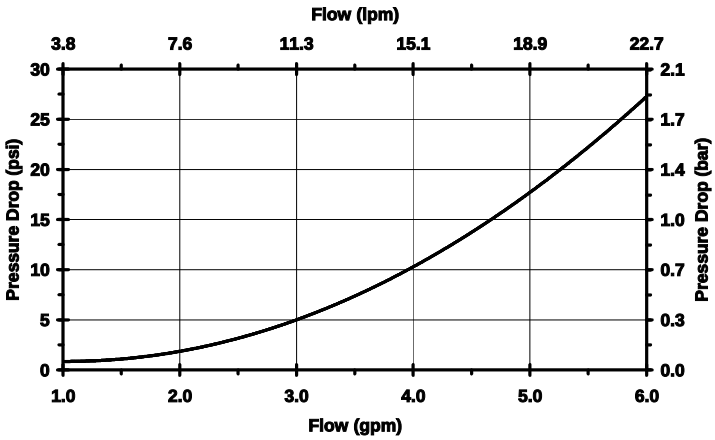
SPOOL TYPE:
Omit – Closed center 4-way spool
T4 – Tandem center 4-way spool

HPV4 – COMPLETE LIST OF OPTIONS AND ACCESSORIES:

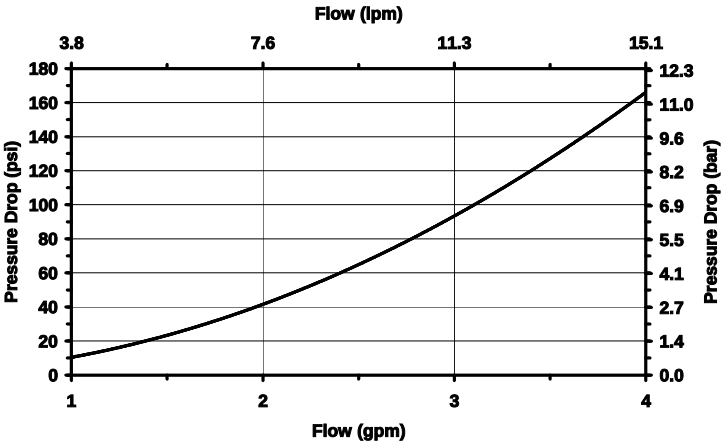
HPV-3D……..….. Three-position friction detent kit.
HPV4-K……..….. Seal kit for HPV4.

HPV4 – FLOW AND PRESSURE INFO:

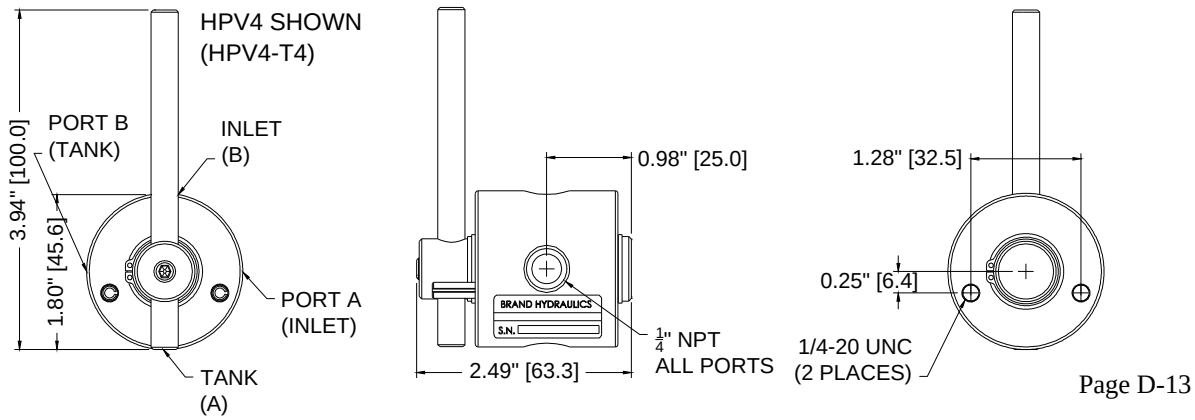
Pressure Drop vs. Flow for P to A or B



Pressure Drop vs. Flow for T4 Spool



DIMENSIONAL DATA: inches & [millimeters]



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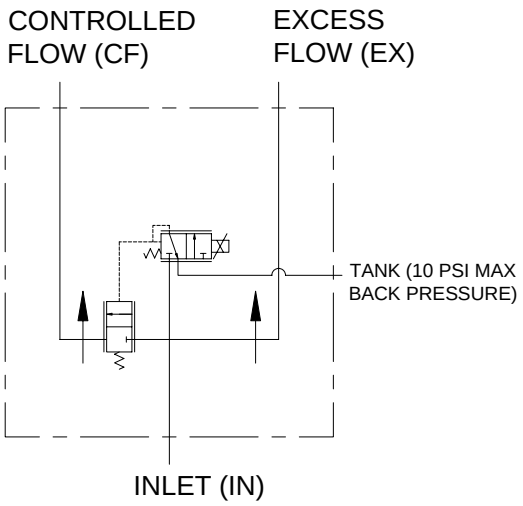
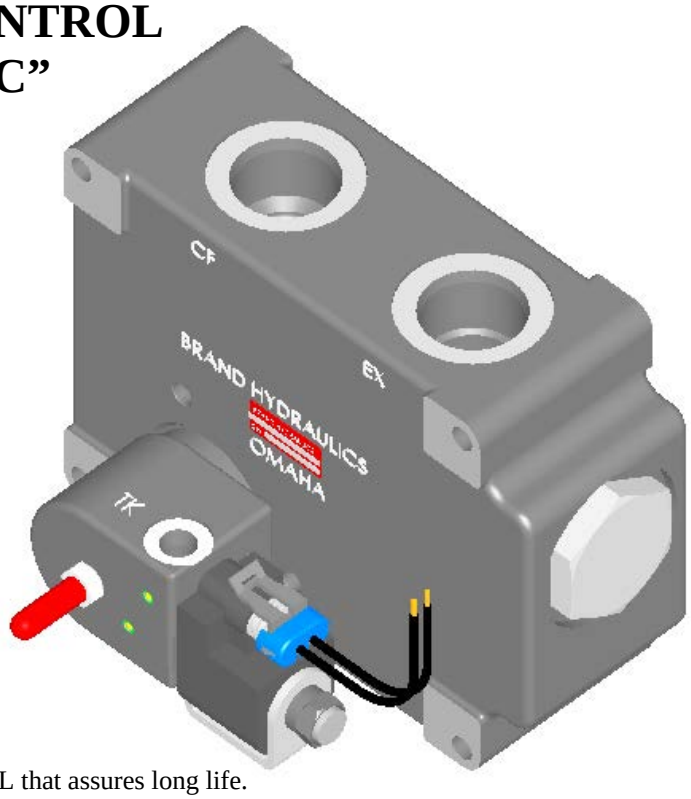
LARGE ELECTRONICALLY ADJUSTABLE PROPORTIONAL PRESSURE COMPENSATED FLOW CONTROL "LEFC"





FEATURES:

- **P**RECISION **G**ROUND **H**EAT **T**REATED **S**POOL that assures long life.
- **D**IAMOND **H**ONED **S**POOL **B**ORE provides consistent spool fit with low leakage.
- **E**VERY **LEFC** IS **T**ESTED for linearity and pressure compensation.
- **S**TANDARD **3**-PORT allows for pressure compensated flow out of two ports.
- **O**PTIONAL **M**ANUAL **O**VERRIDE when electrical power is lost.

SPECIFICATIONS:

- **See flow chart for capacity.**
- **Max. 3000 psi cartridge input pressure.**
- **Nominally Rated for 3000 psi (207 bar).**
- **Tank Port - #4 SAE (10 psi MAX. back pressure)**
- **Weight 32–3/4 lbs. (14.9 kg).**
- **25-Micron Filtration or Better.**
- **Coil 12V DC standard.**
  - **10.4 Ohms.**
  - **14 Watts.**
  - **1.15Amp max.**
  - **Rated 100% continuous duty cycle**
- **Pulse Frequency (90 to 110 Hz)**
- **Operating Temperature: -20° to 210°F (-30° to 100°C)**

MATERIALS:

- **Cast Iron Body.**
- **Heat Treated Steel Spools.**
- **Buna N O'Rings.**

LEFC – GENERAL INFORMATION

The Brand, LEFC (large electronically adjustable proportional pressure compensated flow control) is an electronically controlled version of the original large FC51 style flow control valve. The LEFC performance as a flow control is very similar to the large FC51 because they both use the same spring and compensator spool. Thus, the control flow port (CF) and the excess flow port (EX) remain usable and pressure compensated.

The main advantage of the LEFC over the large FC51 is that the flow can be adjusted proportionally with a solenoid instead of manually. The orifice spool proportionally opens as the current through the solenoid increases, thus increasing the flow out of the CF port (similar to positioning the rotary side lever on the manual FC). The solenoid is connected to our optional EC – series controls which can be sold with the LEFC. Please see the **Electronic Controllers** section for your control needs. We also give the choice of coil voltage, coil terminal and maximum flow setting.

2-PORT- The 2-port (2P) option is a modified version of the standard 3-port EFC. This option lets the customer use the control flow port while the excess port is plugged. To use the EFC 2-port a pressure compensated pump is required. The 2-port can be converted to a 3-port by removing the EX plug.

LEFC – EXAMPLES OF COMMON MODEL CODES:

LEFC164512LM…….… # 16 SAE ports, 45 gpm, 12 VDC coil, 18” double lead coil terminal and manual override.
LEFC165512LM……..….# 16 SAE ports, 55 gpm, 12 VDC coil, 18” double lead coil terminal and manual override.

LEFC – CREATING A MODEL CODE FOR LEFC’S:

L E F C __ __ __ __ M __

PORT SIZE:
16 - #16SAE (1 5/16 – 12) standard
** - Consult factory for others

FLOW SETTING:
45 – 0-45 gpm (0-170.3 lpm)
55 – 0-55 gpm (0-208.2 lpm)
** - Consult factory for others

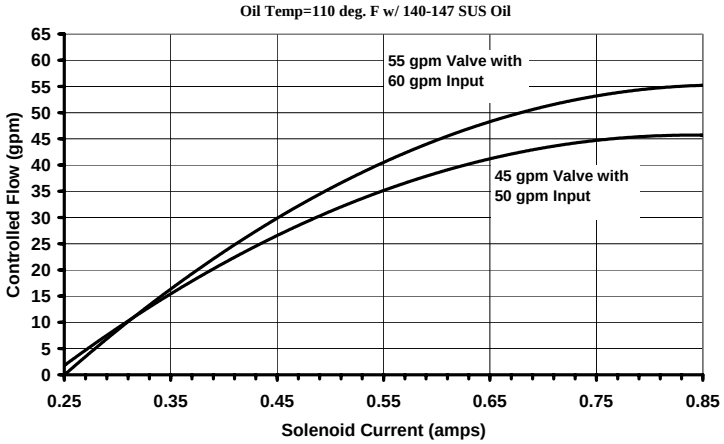
COIL VOLTAGE:
12 – 12 volt DC
24 – 24 volt DC

MANUAL OVERRIDE:
Omit – 3 port (standard)
2P – 2 port

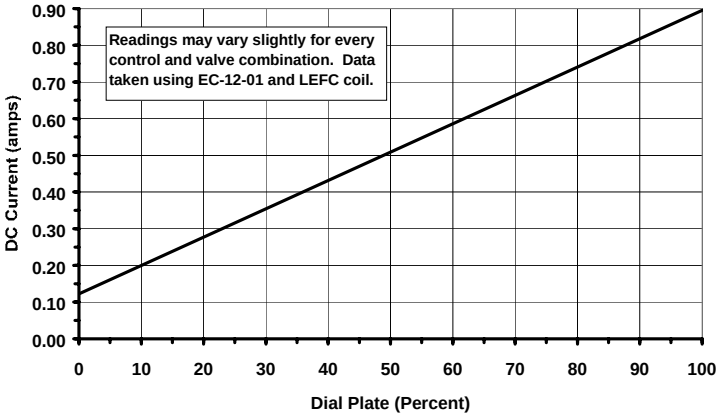
COIL TERMINAL:
L – 18” double lead (standard)
S – Double spade
D – Din 43650 (without Din connector)
PF – Female shroud with male pin
PM – Male tower with female pin

LEFC FLOW & PRESSURE INFO:

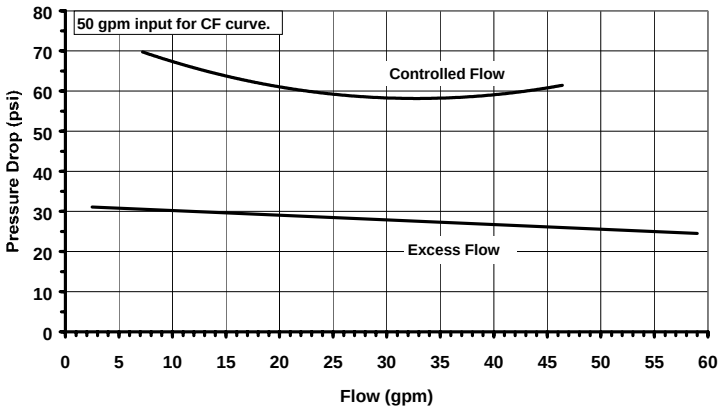
Controlled Flow vs. Solenoid Current



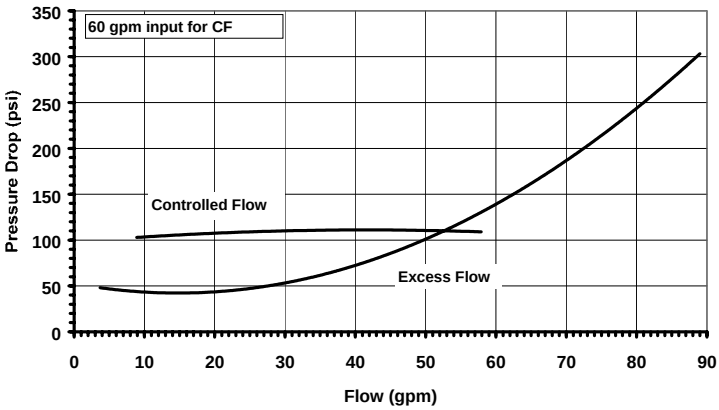
Current vs. Dial Plate for EC-12-01, EC-12-01L and EC-12-02



Pressure Drop vs. Flow for 45 gpm Valve



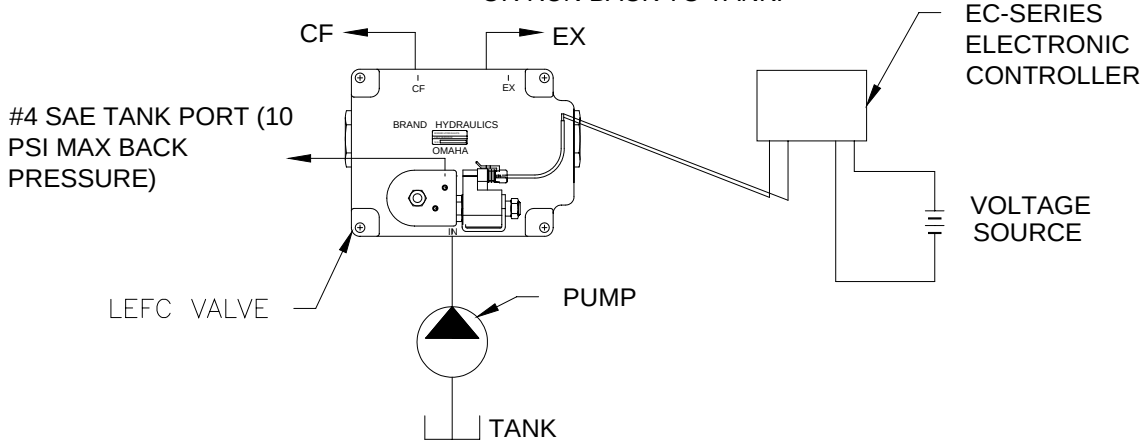
Pressure Drop vs. Flow for 55 gpm Valve



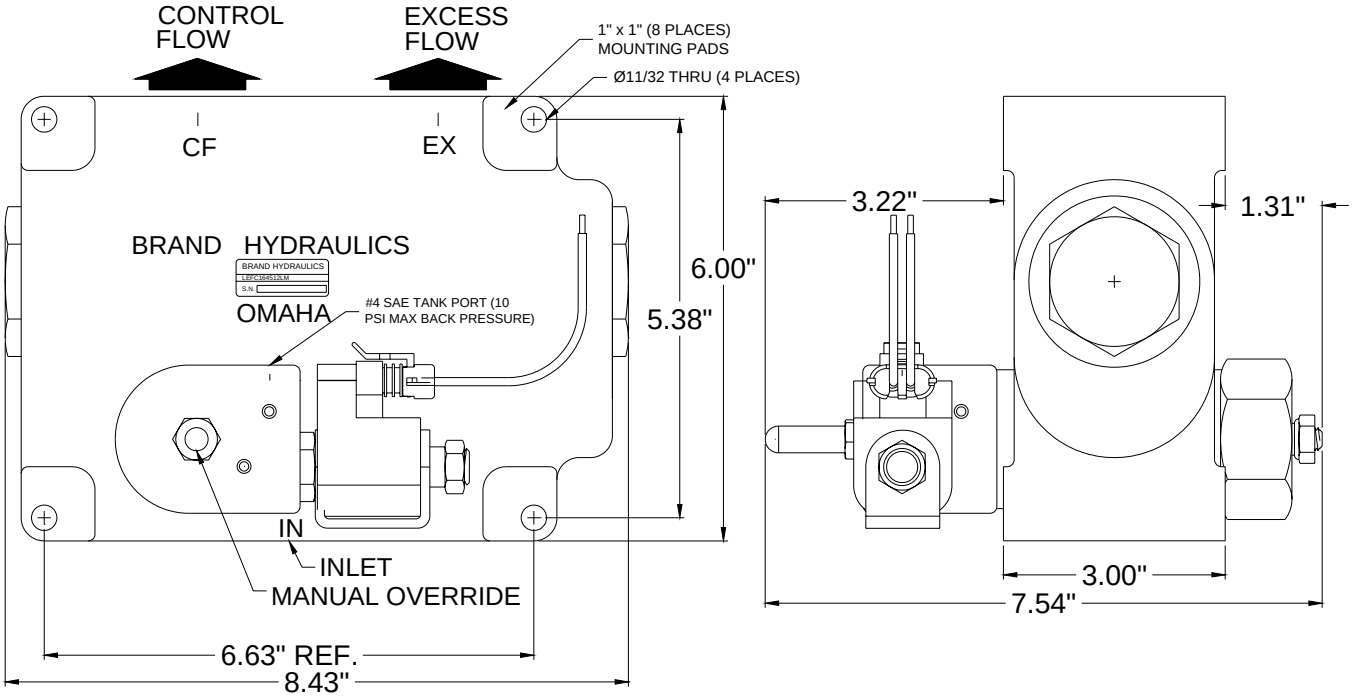
SCHEMATIC DRAWING:

CF-CONTROLLED FLOW PRIORITY PORT, PRESSURE COMPENSATED

EX-EXCESS FLOW IS USABLE AND PRESSURE COMPENSATED. THE FLOW CAN BE USED TO DO WORK OR RUN BACK TO TANK.



DIMENSIONAL DATA:



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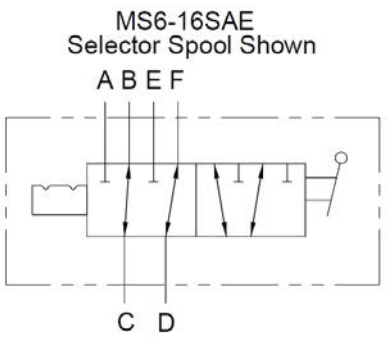
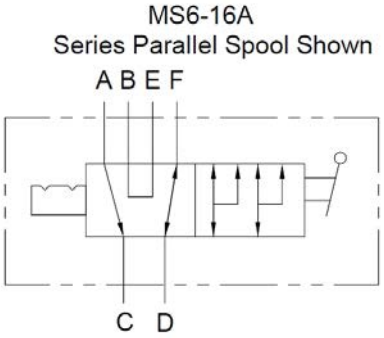
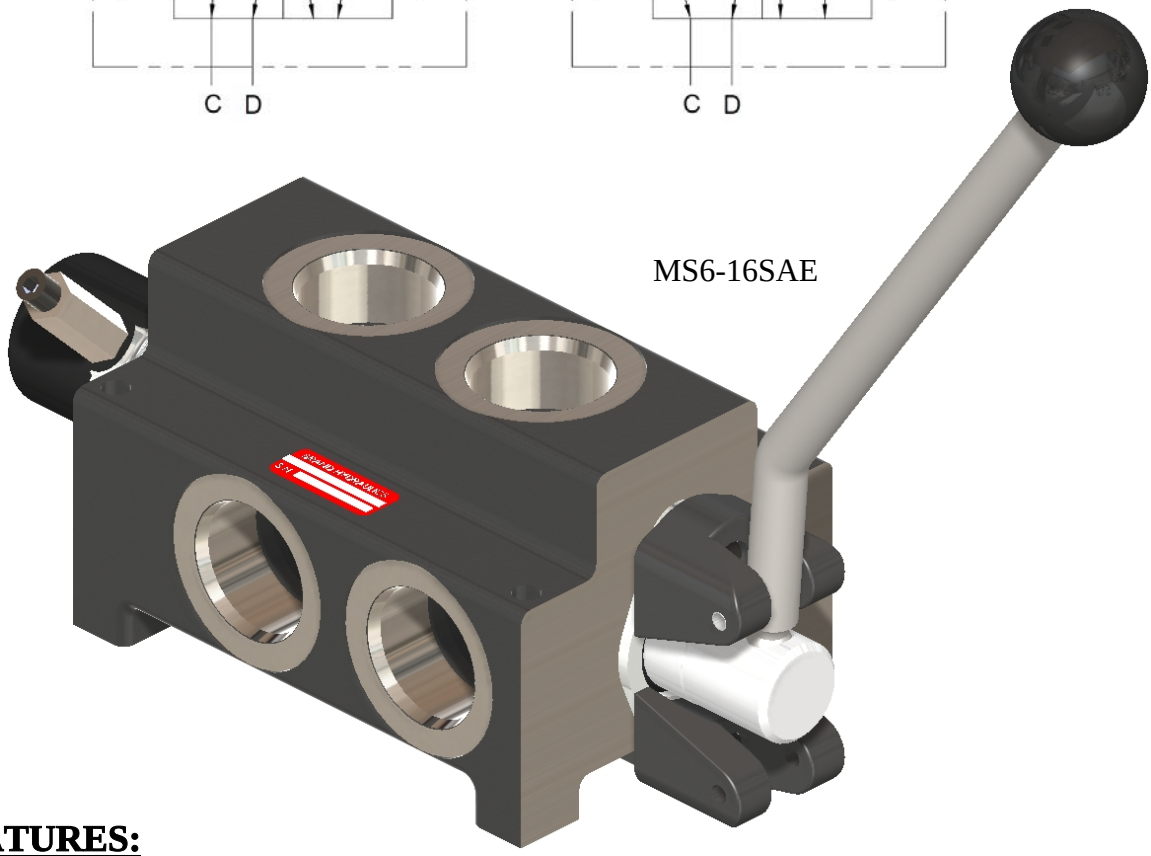
6-WAY MANUAL SELECTOR VALVE "MS6"







MS6-16SAE

FEATURES:

- **P**RECISION **G**ROUND **I**OSSO **P**LATED **S**POOL that assures long life.
- **O'R**ING **P**ORTS to eliminate leakage.
- **R**IGID **H**ANDLE allows customer to shift spool smoothly.
- **S**TANDARD **T**WO **P**OSITION **D**ETENT to hold spool in either active position.
- **S**TANDARD **P**OLYPAK **S**EALS for an increased pressure rating.

SPECIFICATIONS:

- **Rated for 5000 psi (345 bar).**
- **Flow rating 0-45 gpm (0-170 lpm).**
- **30-Micron filtration recommended.**
- **Weighs 14.3 lbs. (6.5 kg).**
- **Standard port size #16 SAE all.**

MATERIALS:

- **Ductile Cast Iron Body**
- **Buna N O'Rings**
- **IOSSO Chrome Plated Steel Spools**

MS6 – GENERAL INFORMATION

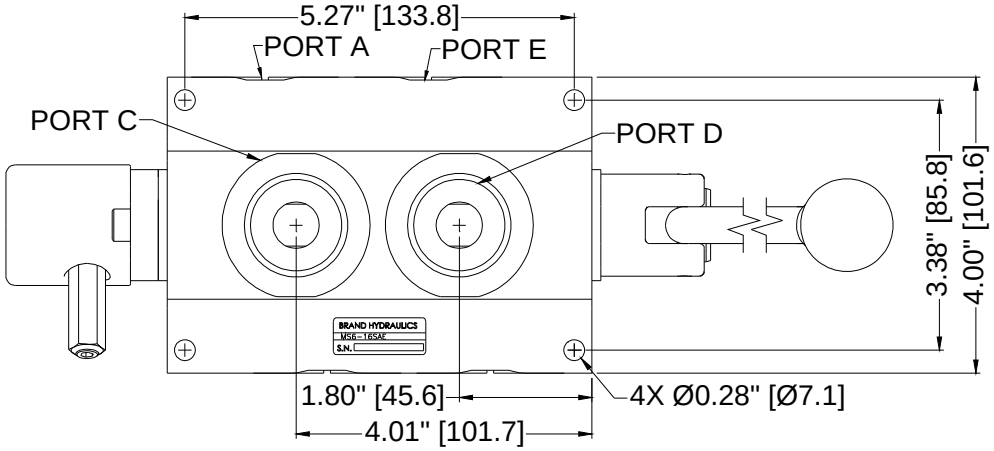
The Brand, MS6 series valve comes standard with two-position detent and manual handle. The MS6 offers a selector spool or a series-parallel spool. Both ports on the top of the valve serve as the inlet and outlet while the ports on the sides are plumbed into two separate circuits. The MS6 allows up to 45 gpm flow.

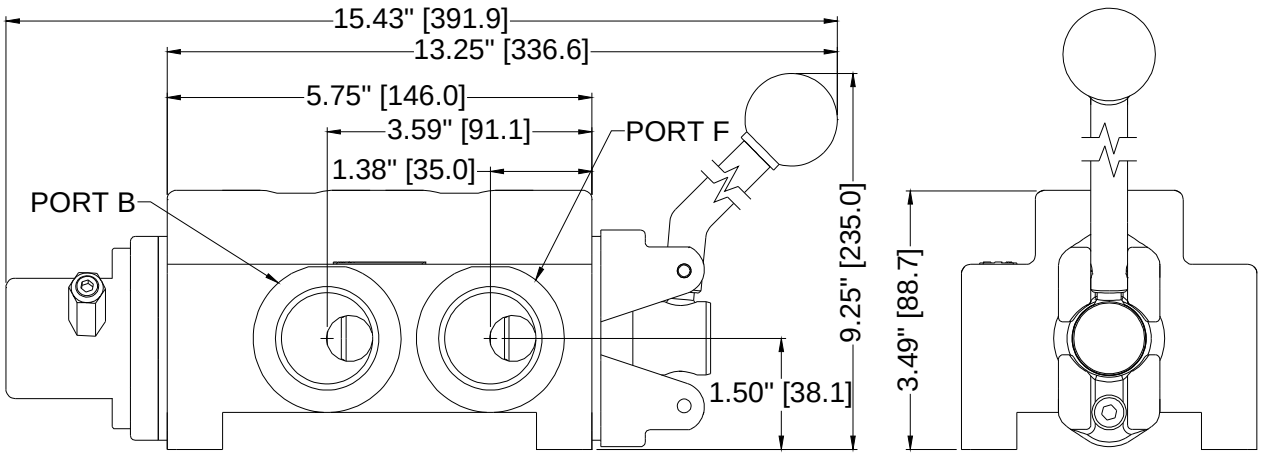
SPOOLS – The selector spool allows you to flow out of either set of side ports while the other side ports are closed. The selector spool could be used to control two double action cylinders or two reversible motors with one 4-way directional control valve. It could also be used to control four single action cylinders with one 4-way directional control valve. The series-parallel spool allows you to direct flow to both set of side ports in series or in parallel. The series parallel spool allows you to direct flow into two motors with the flow run in parallel or in series between the motors.

MS6 – COMPLETE LIST OF MODEL CODES:

MS6-16SAE……16 SAE all ports, 45 gpm (170 lpm) rating and 6 ports.
MS6-16PSO……16 SAE all ports, 45 gpm (170 lpm) rating, pilot operated, spring offset and 6 ports.
MS6-16A……….16 SAE all ports, 45 gpm rating and 6 ports, Series-Parallel Spool

DIMENSIONAL DATA (MS6-16SAE SHOWN):





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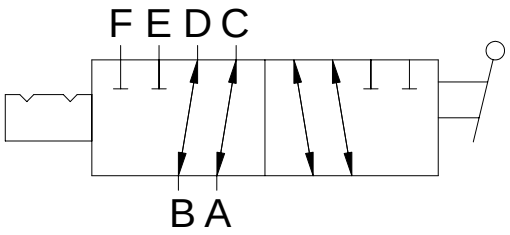
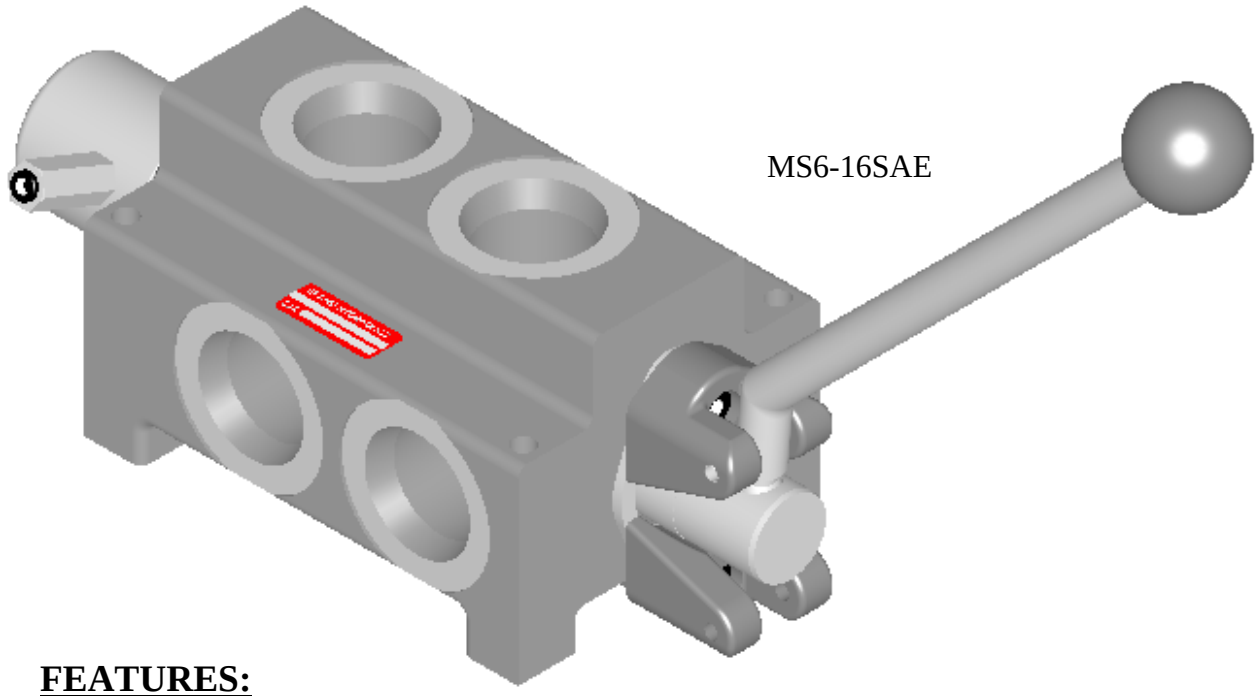
6-WAY MANUAL SELECTOR VALVE "MS6"





MS6-16SAE

FEATURES:

- **P**RECISION **G**ROUND **I**OSSO **P**LATED **S**POOL that assures long life.
- **O'R**ING **P**ORTS to eliminate leakage.
- **R**IGID **H**ANDLE allows customer to shift spool smoothly.
- **S**TANDARD **T**WO **P**OSITION **D**ETENT to hold spool in either active position.
- **S**TANDARD **P**OLYPAK **S**EALS for an increased pressure rating.

SPECIFICATIONS:

- **Rated for 5000 psi (345 bar).**
- **Flow rating 0-45 gpm (0-170 lpm).7**
- **30-Micron filtration recommended.**
- **Weighs 14.3 lbs. (6.5 kg).**
- **Standard port size #16 SAE all.**

MATERIALS:

- **Ductile Cast Iron Body**
- **Buna N O'Rings**
- **IOSSO Chrome Plated Steel Spools**

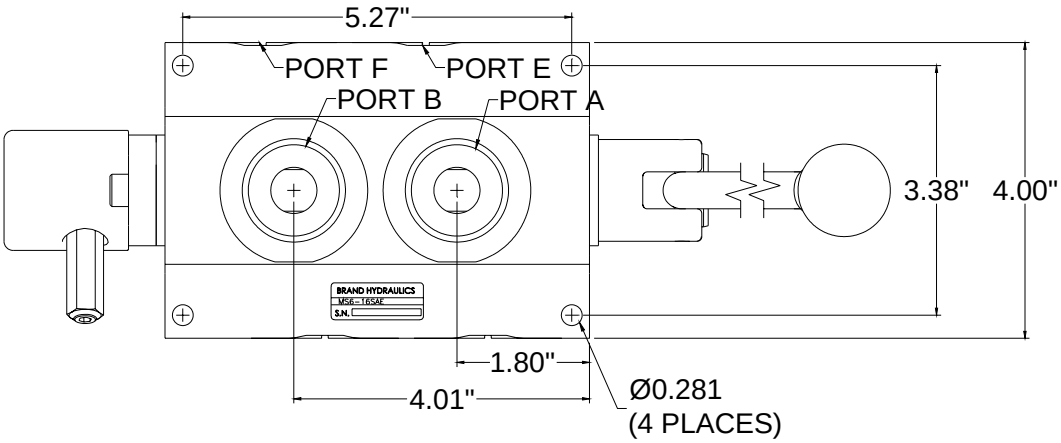
MS6 – GENERAL INFORMATION

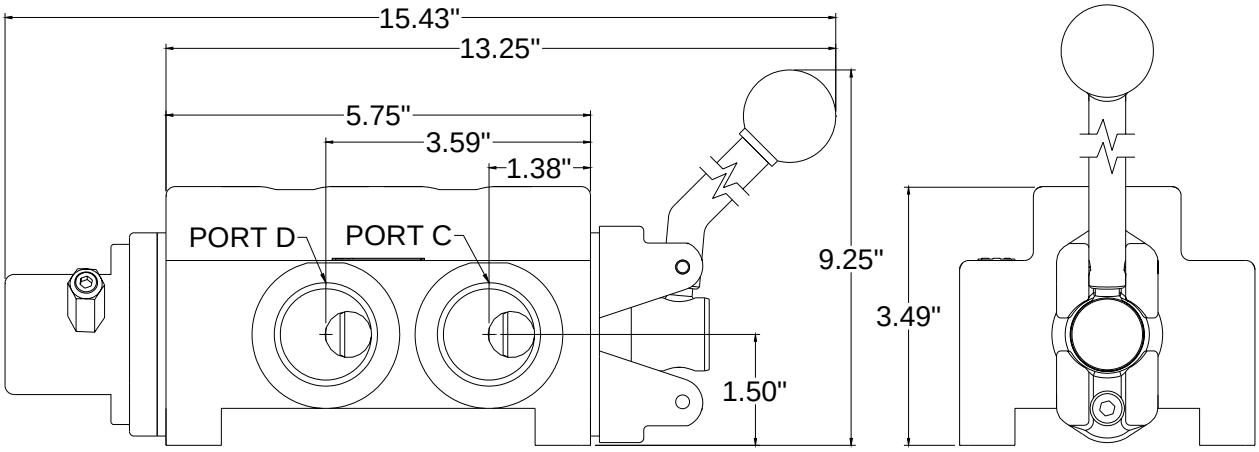
The Brand, MS6 six-port selector valve comes standard with two-position detent and manual handle. Both ports on the top of the valve serve as the inlet and outlet while the ports on either side are plumbed into two separate circuits. The MS6 allows up to 45 gpm out of either side ports while the other set of side ports are closed.

MS6 – COMPLETE LIST OF MODEL CODES:

MS6-16SAE……..16 SAE all ports, 45 gpm rating and 6 ports.
MS6-16PSO……..16 SAE all ports, 45 gpm rating, pilot operated, spring offset and 6 ports.

DIMENSIONAL DATA (MS6-16SAE SHOWN):





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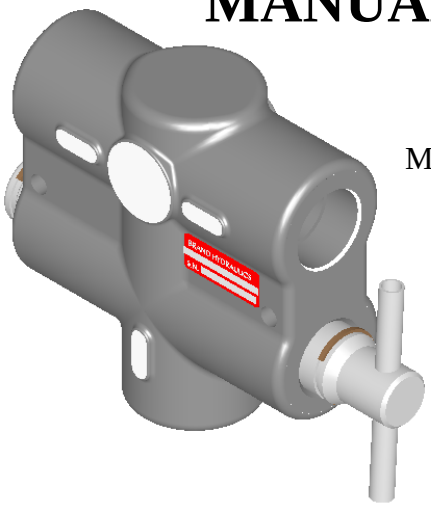
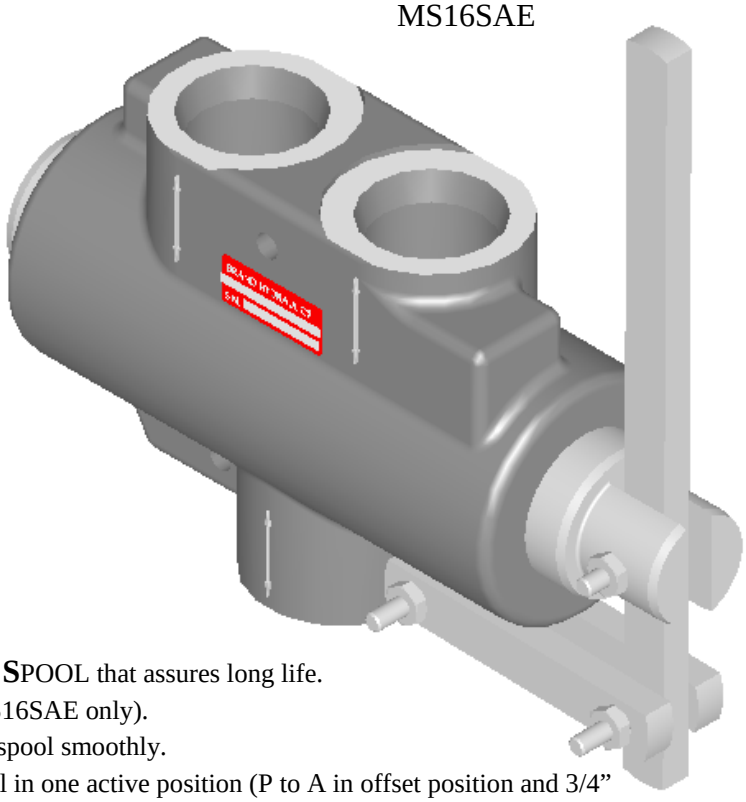
MANUAL SELECTOR VALVE "MS"

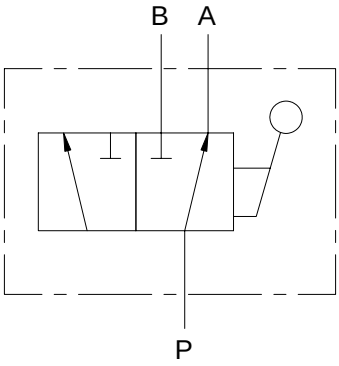


MS75-3/4

MS16SAE



MS16SAE OR MS75-3/4



FEATURES:

- **P**RECISION **G**ROUND **I**OSSO **P**LATED **S**POOL that assures long life.
- **O'R**ING **P**ORTS to eliminate leakage (MS16SAE only).
- **R**IGID **H**ANDLE allows customer to shift spool smoothly.
- **O**PTIONAL **S**PRING **O**FFSET holds spool in one active position (P to A in offset position and 3/4" NPT only).

SPECIFICATIONS:

- **Rated for 3000 psi (207 bar).**
- **Flow rating**
  - **3/4" NPT 0-30 gpm (0-113 lpm).**
  - **#16 SAE 0-45 gpm (0-170 lpm).**
- **30-Micron filtration recommended.**
- **Weight**
  - **MS75 5.5 lbs. (2.5 kg).**
  - **MS16SAE 9 lbs. (4.1 kg).**
- **Standard port sizes.**
  - **3/4" NPT all ports.**
  - **#16 SAE (1 5/16-12) all ports.**

MATERIALS:

- **High Strength Cast Iron Body (MS16SAE)**
- **Cast Iron Body (MS75)**
- **Buna N O'Rings**
- **IOSSO Plated Steel Spools**

MS – GENERAL INFORMATION

The Brand, MS two-position manual selector valves are available in two different sizes MS75 and MS16SAE. The MS16SAE allows up to 45 gpm out of either port and has a manual handle for effortless shifting of the spool. The MS75 allows up to 30 gpm out of either port and has a "T" grip handle for effortless push/pull shifting of the spool. The inlet is orificed to ports A and B when the spool is being shifted from port A to port B or vise versa.

MS – COMPLETE LIST OF MODEL CODES:

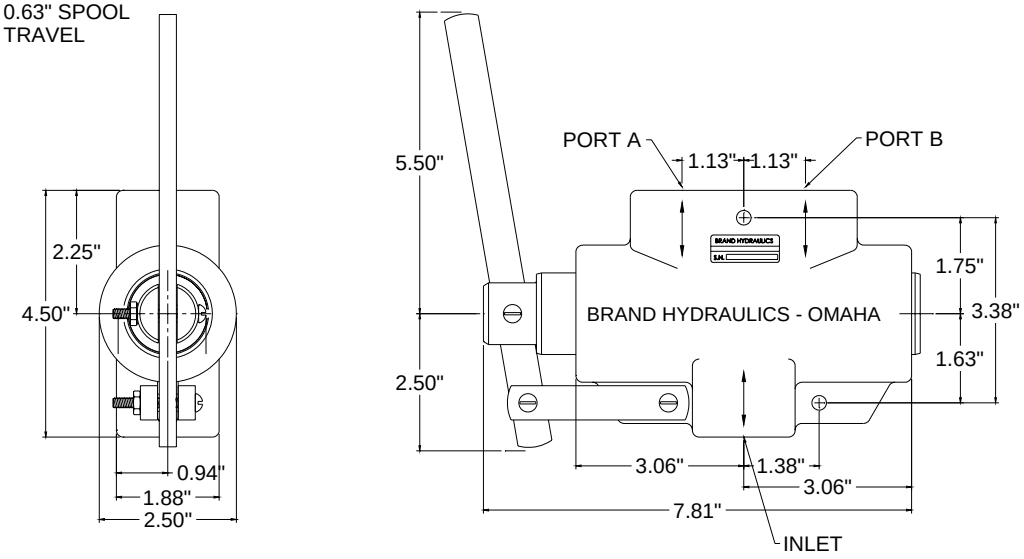
MS75-3/4…….. 3/4" NPT all ports and rated for 0-30 gpm.
MS75-SO…….. 3/4" NPT all ports, rated for 30 gpm and spring offset (P to A in offset position).
MS16SAE……. 16 SAE all ports and rated for 45 gpm.

MS – COMPLETE LIST OF OPTIONS AND ACCESSORIES:

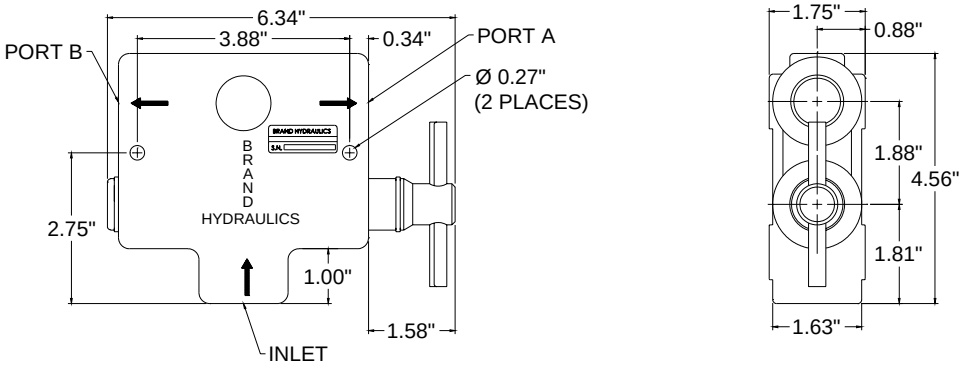
LMS-K……...Seal kit for MS16SAE valve.
MS-K……..... Seal kit for MS75 valve.

DIMENSIONAL DATA:

MS16SAE
0.63" SPOOL
TRAVEL



MS75-3/4
0.50" SPOOL TRAVEL



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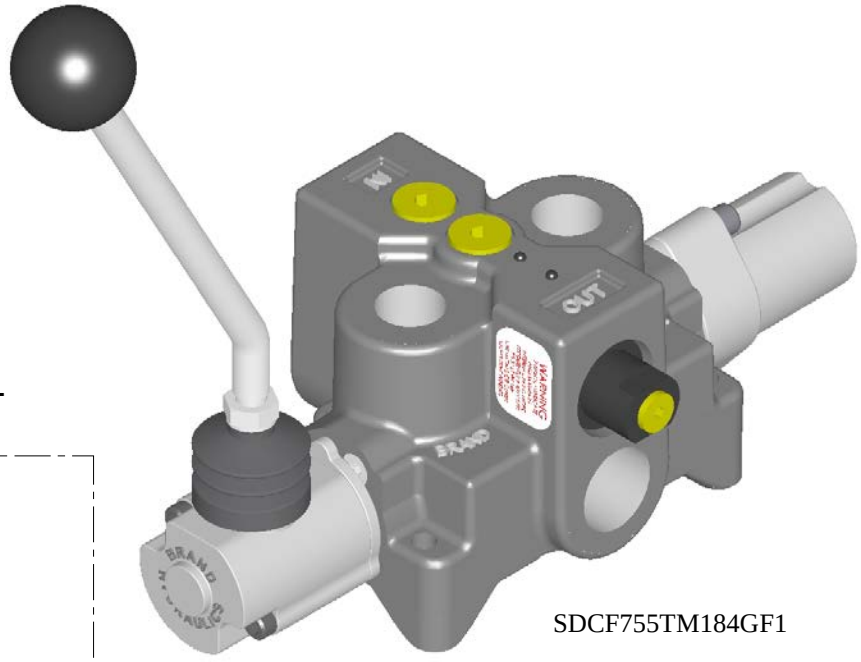
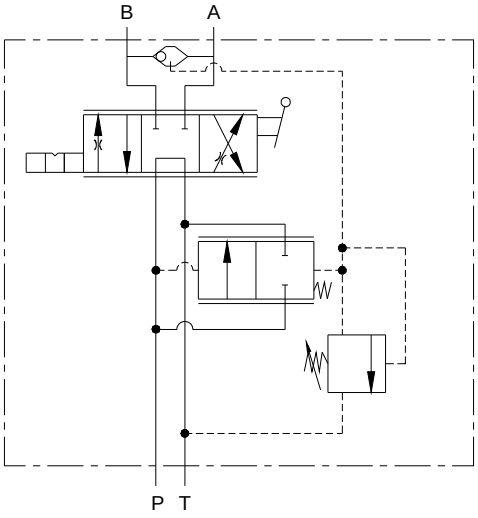
4 – WAY DIRECTIONAL CONTROL WITH PRESSURE COMPENSATED FLOW CONTROL "SDCF"



SDCF755TM184GF1

SDCF755TM124GF1



FEATURES:

- **A**DJUSTABLE **P**ILOT **O**PERATED **R**ELIEF **V**ALVE is standard on every SDCF.
- **F**ULL **R**ANGE **P**RESSURE **C**OMPENSATED by-pass type flow control valve built in.
- **SDCF R**EDUCES the number of fittings, plumbing and potential leaks in hydraulic circuits.
- **F**INE **P**OSITIVE **M**ETERING in either direction with the manual handle.
- **P**RECISION **G**ROUND **I**OSSO **P**LATED **S**POOL that assures long life.
- **O**PTIONAL **O'R**ING **P**ORTS to eliminate leakage.

SPECIFICATIONS:

- **Rated for 0-18 gpm (0-68.1 lpm).**
- **Rated for 3000 psi (207 bar).**
- **Weighs 6-1/2 lbs. (2.9 kg).**
- **30 – Micron filtration recommended.**

MATERIALS:

- **Cast Iron Body**
- **Buna N O'Rings**
- **IOSSO Plated Steel Spool**
- **Consult Factory for Stainless Steel Spools**

SDCF – GENERAL INFORMATION:

The Brand, SDCF combines the features of a four-way directional control valve, a full range pressure compensated by-pass type flow control valve, and an adjustable pilot operated pressure relief valve all in one compact package. This valve reduces the number of fittings, plumbing and potential leakage points in hydraulic circuits. The manual handle allows the customer to meter the flow out of either port. Flow to the work port is directly proportional to the movement of the lever. Flow out of each work port is constant regardless of load changes, this allows the customer to maintain smooth and constant movement of a cylinder or motor. Every SDCF comes standard with a pilot operated relief. The tank port must be plumbed directly back to tank.

SPOOL TYPE – The spool types we offer are tandem center (T), open center (O), open meter center (OM), fine metering (M), and tandem metering (TM). (See chart on next page and schematics on page #4 for information on spool types)

ACTUATORS – Standard enclosed lever handle (G) pressurizes the B port when the handle is pushed towards the valve body (vertical mount). Enclosed lever handle (C) is similar to (G) except horizontal mount. Lever handle (L) pressurizes the B port when the handle is pushed towards the valve body. Lever handle (J) pressurizes A port when the handle is pushed towards the valve body. Rotary handle (H) is used to rotate spool in or out of valve body. No actuator (N) G type spool. No actuator (M) J type spool.

SPOOL ACTION – Three-position detent (D) holds the spool in neutral and both active positions. Friction detent (F1) applies friction to the spool so that the spool does not move when the handle is released either side of neutral, a detent groove clearly indicates neutral position. Spring center (S) returns the handle to neutral when the handle is released. Spring center detent (SD) springs back to neutral from one position and is mechanically detented in the other position (flow out port A in detent). Spring center friction detent (SF1) springs back to neutral from one direction and functions similar to standard F1 in other direction (flow out port B in friction detent). Spring offset (SO) spring holds spool in one active position (flow out port B). Spring offset (SO2) spring holds spool in one active position (P to B in offset position, neutral and P to A). Rotary friction detent (E) applies friction to the spool as it is rotated so that the spool does not rotate when the handle is released either side of neutral, a detent groove clearly indicates neutral position. Two-position detent (2D) P to B only. Two-position detent (D2) P to A only. Two-position friction (F2) P to A only. Normally closed electric switch (WC) used with (S), (F1) and (D) options only. Normally open electric switch (WO) used with (S), (F1) and (D) options only.

SDCF – EXAMPLES OF COMMON MODEL CODES:

SDCF755TM64GF1….. 3/4” inlet and outlet ports, 1/2” work ports, 0-6 gpm (0-22.7 lpm) tandem metering spool, G style handle and neutral position friction detent.

SDCF120TM184GF1….. #12SAE inlet and outlet ports, #10SAE work ports, 0-18 gpm (0-68.0 lpm) tandem metering spool, G style handle and neutral position friction detent.

SDCF – COMPLETE LIST OF OPTIONS AND ACCESSORIES:

SDC-D…….. Three-position detent kit.
SDC-F1……. Ball friction detent.
SDC-S……... Spring centering kit.
SDC-SD…… Spring centering detent kit (P to A in detent).
SDC-SF1…….. Spring center / friction detent (P to B in friction detent).
SDC-SO…… Spring offset kit (P to B in offset position and neutral).
SDC-SO2…….. Spring offset kit (P to B in offset position, neutral and P to A)
SDC-SWC……..….. Spring centering kit with normally closed electric switch.
SDC-SWO……..... Spring centering kit with normally open electric switch.
SDC-WC…….. Three-position detent kit with normally closed electric switch.
SDC-WO…….. Three-position detent kit with normally open electric switch.
SDC-F1WC…….. Ball friction detent with normally closed electric switch.
SDC-F1WO…….. Ball friction detent with normally open electric switch.

SDCF – COMPLETE LIST OF OPTIONS AND ACCESSORIES CONT…

SDC-HG…….. G style handle kit (recommended).
SDC-HJ…… J style handle kit.
SDC-HL……L style handle kit.
SDCF-K……Seal kit for SDCF.
SDCF-CART……..….. Pilot operated pressure relief cartridge for SDCF.

SDCF – CREATING A MODEL CODE FOR SDCF'S:

S D C F __ __ __ 4 __ __ __ __

PORT SIZE:
755 – 3/4" inlet/outlet and 1/2" work ports
120 - #12SAE inlet/outlet and #10SAE work ports

SPOOL TYPE:
T – Tandem Center
O – Open Center
OM – Open metering
M – Fine metering
TM – Tandem metering

FLOW SETTING:
Omit – When using T and O spool
6 – 0-6 gpm (0-22.7 lpm) OM, M and TM only
12 – 0-12 gpm (0-45.4 lpm) OM, M and TM only
18 – 0-18 gpm (0-68.0 lpm) OM, M and TM only

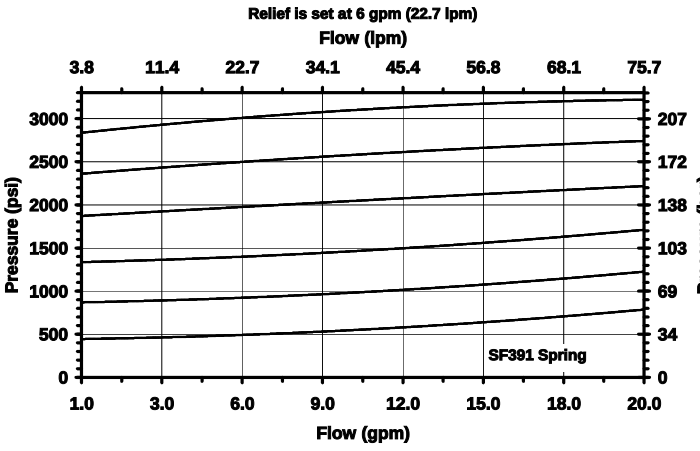
HANDLE OPTION:
G – Enclosed handle (B port is active when handle is pushed, recommended)
C – Enclosed handle (horizontal mount)
L – Lever handle (B port is active when handle is pushed
J – Lever handle (A port is active when handle is pushed)
N – No actuator (G type spool)
M – No actuator (J type spool)
H – Rotary handle (Used only in conjunction with rotary friction detent)

SPOOL ACTION:
S – Spring center
D – Three-position detent
F1 – Friction detent
WC – Norm. close elec. switch (used with S, D and F1)
WO – Norm. open elec. switch (used with S, D and F1)
SO – Spring offset (P to B and neutral)
SO2 – Spring offset (P to B in offset position, neutral and P to A)
SD – Spring center / detent (P to A in detent)
SF1 – Spring center / friction detent (P to B in friction detent)
2D – Two-position detent P to B
D2 – Two-position detent P to A
F2 – Two-position friction P to A
E – Rotary friction detent
M – Stroke limiter

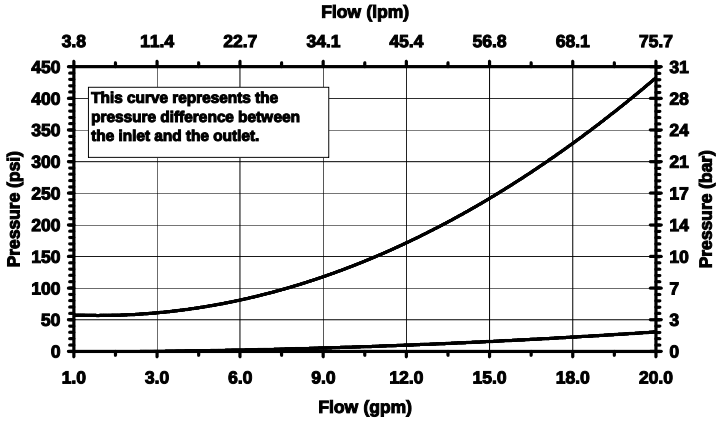
RELIEF OPTION:
Omit – Standard relief
N – No relief

SDCF – FLOW AND PRESSURE INFO:

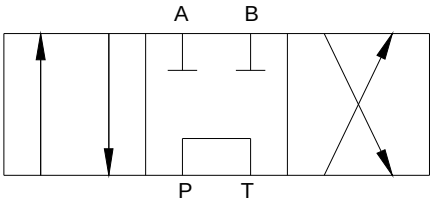
Pressure vs. Flow for Pilot Relief



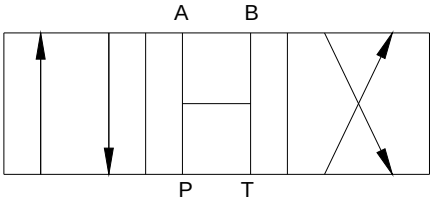
Neutral Flow Pressure Drop



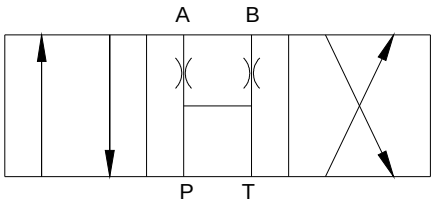
SPOOL SCHEMATICS:



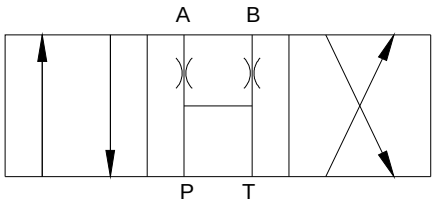
Tandem Center (T) - Powers cylinder or motor in both directions (metering capability is very limited). Pump unloads to tank when spool is in neutral. Cylinder or motor blocked when spool in neutral.



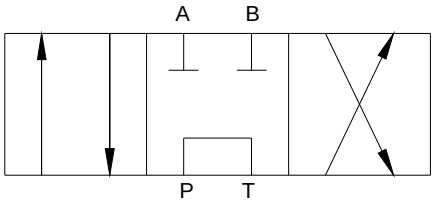
Open Center (O) - All of the ports are connected to tank when the spool is in neutral. Allows cylinder to move or motor to rotate when spool is in neutral.



Fine Metering Spool (M) - The pressure drop in neutral is higher then the (OM) and (TM) spools. Requires external locking valves to hold cylinder, because ports A and B are open (orificed) in the neutral position. Extremely fine metering control.

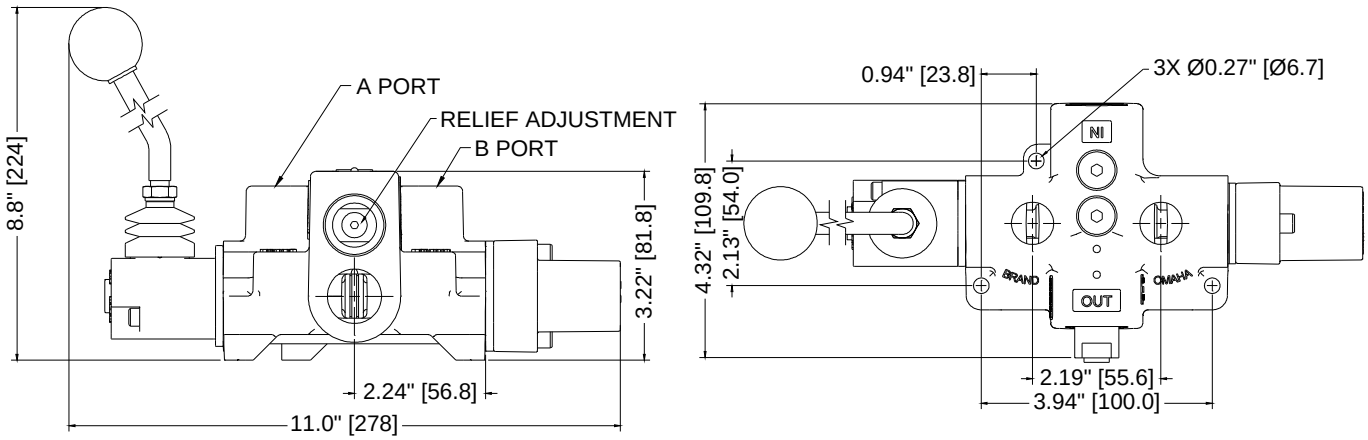


Open Metering Spool (OM) - The neutral pressure drop is much lower then the (M) spool. Extremely fine metering control. Ports A and B are open (orificed) in the neutral position.



Tandem Metering Spool (TM) - Similiar to (T) spool except much finer metering control. The pressure drop in neutral is lower then the (M) spool. Cylinder or motor blocked in neutral and pump unloads to tank.

DIMENSIONAL DATA (SDCF755TM124GF1 SHOWN): inches & [millimeters)



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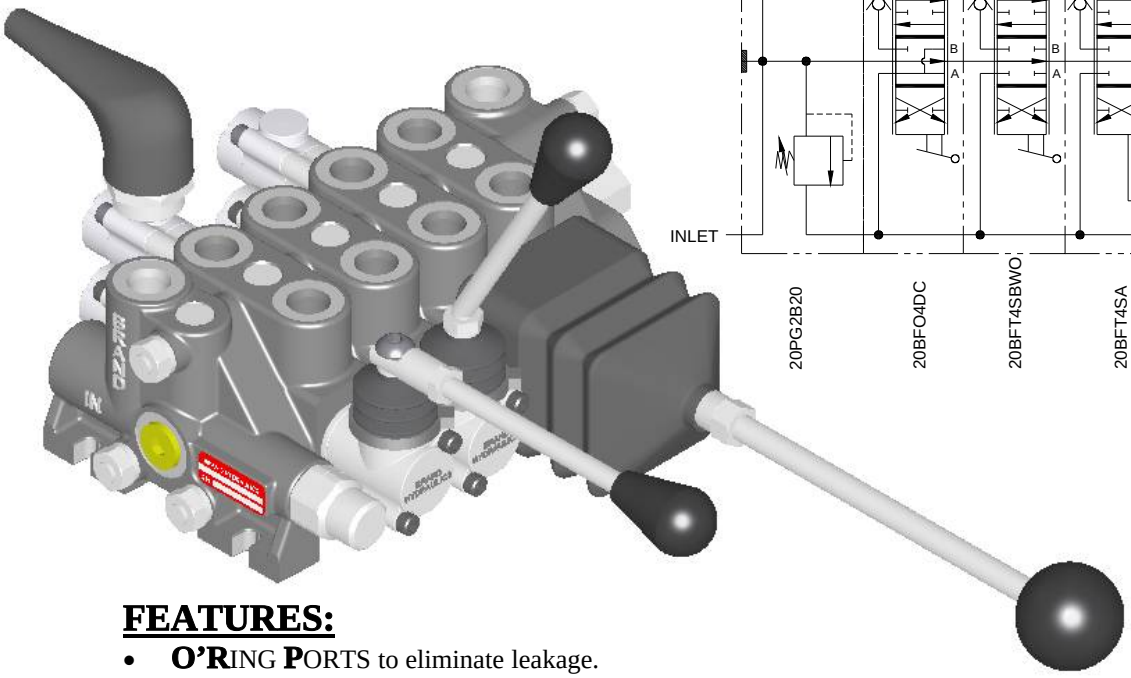
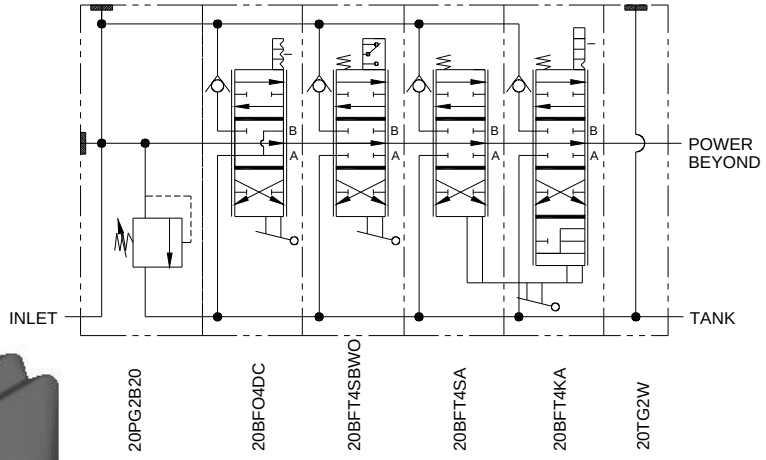
SECTIONAL DIRECTIONAL CONTROL VALVE "SERIES 20"





FEATURES:

- **O'R**ING **P**ORTS to eliminate leakage.
- **M**ETERING **S**POOLS provide smooth control of load.
- **P**OWER **B**EYOND **C**APABILITY to fit your multi-valve circuits.
- **P**RECISION **G**ROUND **I**OSSO **P**LATED **S**POOL that assure long life.
- **D**IAMOND **H**ONED **S**POOL **B**ORES provide consistent spool fit with low leakage.
- **E**NCLOSED **H**ANDLES increase handle rigidity and eliminate exposure to the elements.
- **I**NDIVIDUAL **L**OAD **C**HECK built into each section to prevent the load from dropping when the spool is shifted.
- **A**LL **S**ECTIONS & **A**SSEMBLIES ARE 100% **T**ESTED including both internal & external leakage & flow tests.

SPECIFICATIONS:

- **6 gpm Nominal Capacity (see flow chart).**
- **Pressure Ratings:**
  - **4500psi (301 bar), Parallel**
  - **3000psi (207 bar), Series**
- **400 psi (27 bar) max tank pressure.**
- **6 sections max (consult factory for more).**
- **10-Micron Filtration Recommended.**
- **Assembly Torque = 85 inch-lbs.**
- **Weights: Inlet = 2.6 lbs. (1.2 kg).**
  Work = 3.1 lbs. (1.4 kg).
  Outlet = 2.2 lbs. (1.0 kg).
- **Port Size: #6SAE (9/16-18), All Ports**

MATERIALS:

- **Cast Iron Body.**
- **Iosso Chrome Plated Steel Spools**
- **Buna N O'Rings (standard).**
- **Stress Proof Tie Rods**

SERIES 20 – GENERAL INFORMATION:

The Brand, Series 20 Sectional Directional Control Valves are assembled to meet our customer's requirements for up to six individual applications per assembly (consult factory for more sections). Brand Hydraulics does not charge anything extra for this process and assembly is priced solely on the overall sum of the prices of its components.

When assembled in their normal manner the series 20 spool sections are in parallel. When the spools are in neutral position, the flow passes by each spool and then onto the tank (outlet) port. If two or more spools are shifted simultaneously their work ports are in parallel. The oil flow will take the path of least resistance allowing lighter loads to move first. All spools are machined with metering chamfers, and have a high "handle vs. spool" movement ratio, resulting in good metering capability. Input flow can be divided among several circuits (spool sections) by feathering the spools.

INLETS – can be provided with no relief, or an adjustable ball spring relief. Standard inlets are end ported (1) which is not field convertible. The other optional inlets are machined with end, top (2) and side (3) ports, these two options are field convertible to all three ports.

OUTLETS – are available end ported (1) which is not convertible to top or side porting. The other optional outlets are top (2) and side (3) porting; these two options are field convertible to all three ports. Options (2) and (3) are machined for power beyond and closed center cartridge. Specify (W) to receive the outlet assembled with power beyond cartridge. Specify (C) to receive the outlet assembled with closed center cartridge.

WORK SECTIONS:

SPOOL TYPE – Open Center four-way (O) connects ports A and B to tank in neutral. Tandem Center four-way (T) blocks port A and B in neutral. Tandem Center, three-way (T3) powers a cylinder in one direction. Please note that closed center four-way operation can be obtained by using a tandem center four-way spool and a closed center plug in the assembly's outlet section.

SPOOL ACTION – Standard spring center (S) returns the handle to neutral when the handle is released. Standard three-position detent (D) holds the spool in neutral and both active positions. Spring center detent (SD or DS) springs back to neutral from one position and is mechanically detented in the other direction. Fourth-position float (K) is similar to spring center except it has a fourth position that makes all ports common to each other (last spool section only). Two-position detent (D2) P to A only. Two-position detent (2D) P to B only.

ACTUATORS – Joystick handle (A) is used to actuate two adjacent spool sections with one handle (use on any spool section). B-style handle (B) is assembled to the valve vertically. C-style handle (C) is assembled to the valve horizontally.

OPTIONS – Normally open electric switch (WO) used with spring center option only. Normally closed electric switch (WC) is used with spring center option only.

ACCESSORY ITEMS – All standard tie rod kits contain rods, lock washers and hex nuts. Please be sure to note correct tie rod torque spec of 85 inch pounds.

Seal kits, power beyond kit, closed center kit and many other accessory items are available, please see the "SERIES 20 COMPLETE LIST OF OPTIONS AND ACCESSORIES" section of this catalog, for model codes and descriptions of these items.

ASSEMBLY – model codes and list prices for complete assemblies will be issued by the factory, upon request of an authorized Brand Distributor. All model codes so issued become proprietary to the requesting distributor. Model codes so issued will not be descriptive in nature, but shall be of sequential numerical type. Individual sections and accessories can be purchased so that custom valve stacks may be assembled or modified outside the factory.

SERIES 20 – EXAMPLES OF COMMON MODEL CODES:

INLET SECTIONS
20PG1…….. Inlet section plain, no relief, end ported.
20PG1B20…… Inlet section, end ported, and adjustable ball spring relief set at 2000 psi.

OUTLET SECTIONS
20TG1……...Plain, end ported.
20TG2W……Top ported outlet with power beyond cartridge, convertible to end ported.

WORK SECTIONS
20BFO4DC…..……... Open center, four-way, three-position detent, horizontal handle.
20BFT4SB……..…… Tandem center, four-way, spring to center, vertical handle.

HANDLE KITS
20HA…….. Joystick handle, used to shift two adjacent spools.
20HB…….. Standard enclosed handle kit, handle is in vertical position.
20HC…….. Optional enclosed handle kit, handle is in horizontal position.

TIE ROD KITS
20TR1…….Tie rod kit for valve stack containing a standard inlet, outlet and one spool section.
20TR2…….Tie rod kit for valve stack containing a standard inlet, outlet and two spool sections.

STANDARD ASSEMBLY MODEL CODES:
20A1……..…..... Single spool assembly, tandem center four-way, spring to center action, no relief and with B style handle assembly. End ported inlet and outlet.
20AB1…….Same as above but with an adjustable ball spring relief added and set at 2000 psi.
20A2……...…… Two spool assembly, tandem center four-way, spring to center action, no relief, and with B-style handle assemblies. End ported inlet and outlet.
20AB2…...……..Same as above but with an adjustable ball spring relief added and set at 2000 psi

Standard assemblies are available with up to 6 spool sections using the model code format outlined above for the one and two spool assemblies.

SERIES 20 – CREATING A MODEL CODE FOR SERIES 20:

INLET SECTION: 2 0 P G __ __ __

PORTING:
1 – End port (not convertible)
2 – Top port (convertible to end or side port)
3 – Side port (convertible to top or end port)

RELIEF:
Omit – Not machined for relief
B – Adjustable ball spring relief

RELIEF SETTING:
15 – 1500 psi
20 – 2000 psi
ETC…

OUTLET SECTION: 2 0 T G __ __

PORTING:
1 – End port (not convertible)
2 – Top port (convertible to end or side port)
3 – Side port (convertible to top or end port)

OPTION:
Omit – No options
W – Power beyond cartridge used with top port (2) call out
C – Closed center cartridge used with top port (2) call out

SERIES 20 – CREATING A MODEL CODE FOR SERIES 20 CONT…

WORK SECTION: 20 B F__ __ __ __ __ __

PARALLEL/SERIES:
Omit – Parallel
S – Series

SPOOL TYPE:
T – Tandem center
O – Open center

TYPE:
3 – Three–way (T spool only)
4 – Four-way

SPOOL ACTION:
S – Spring center
D – Three-position detent
SD – Spring center (P to A) / detent
DS – Detent / spring center (P to B)
K – Fourth-position float / spring center (Last spool only)
D2 – Two-position detent P to A
2D – Two position detent P to B

OPTION:
WO – Normally open electric switch (Spring center only)
WC – Normally closed electric switch (Spring center only)

ACTUATORS:
A – Joystick assembly for adjacent spool sections
B – Vertical handle assembly
C – Horizontal handle assembly

SERIES 20 – COMPLETE LIST OF OPTIONS AND ACCESSORIES:

20-AGCC…….….. Closed center plug kit, for outlet sections with porting 2 in their model code. (Cannot be used with power beyond)
20-AGPB……..…..Power beyond cartridge kit, for outlet sections with porting 2 in their model code.
20-D……..…..Three-position detent kit.
20-D2……..…..…...Two-position detent kit, P to A and neutral.
20-2D……..…... Two-position detent kit, P to B and neutral.
20-DS……..…..Spool is detented in one work position (P to A), and springs to center (P to B) from the other.
20-SD……..…...Spool springs to center in one work position (P to A), and detented (P to B) in other position.
20-K……..…..Fourth position float kit, use on last spool section in assembly only.
20-S……..Spring to center kit.
20-SWC……..…… Spring to center kit with normally closed electric switch.
20-SWO……...Spring to center kit with normally open electric switch.
20ASB……. Series block, installed between two spool sections puts them in series. (0.656” [16.7mm] casting width) Note: Adjacent work section towards Inlet must have Series call out in model code. Joystick (“A” option) Cannot be used when 20ASB is used between two adjacent work sections.
20ASD……. Series drain block, required for inlet relief to function correctly when using series block(s) in an assembly. (0.656” [16.7mm] casting width)
20HA……... Joystick handle kit for series 20, note, this kit may only be used on two adjacent spool sections in a valve assembly, and both of these two sections must have the (A) actuator call out in their model codes.
20HB……...B-style handle kit, with bent handle, use on spool sections with (B) handle call out.
20HC…….…..... C-style handle kit, with straight handle, use on spool sections with (C) handle call out.
20HB-K……..…. Replacement handle kit which includes ball knob, bent handle and jam nut.
20HC-K……..…. Replacement handle kit which includes ball knob, straight handle, jam nut, linkage and cap screw.
20TR_ ……Tie rod kits, specify number of spool sections in valve assembly, i.e. 3 spool sections in valve assembly, requires using 20TR3 tie rod kit. Please note that when using extra items in the assembly, such as series blocks, drain blocks etc., the tie rod kit must have its length extended.

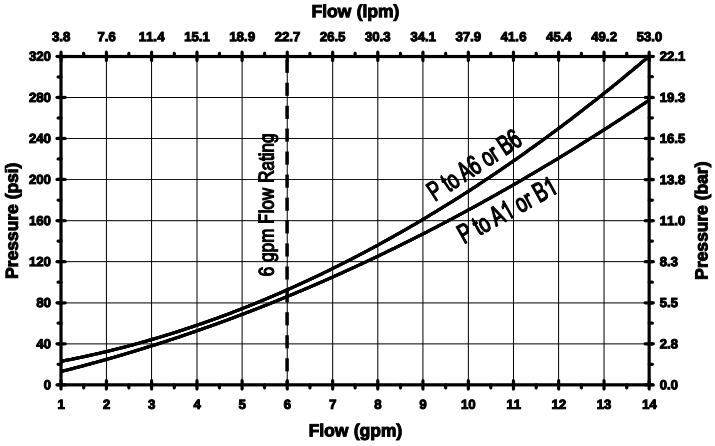
Seal Kits:

20AK……... Replacement seal kit for work section.
20BK……Seal kit, contains seals for use in between work sections.
20CK……..… Replacement seal kit for inlet section.
20DK……..…… Replacement seal kit for outlet sections.

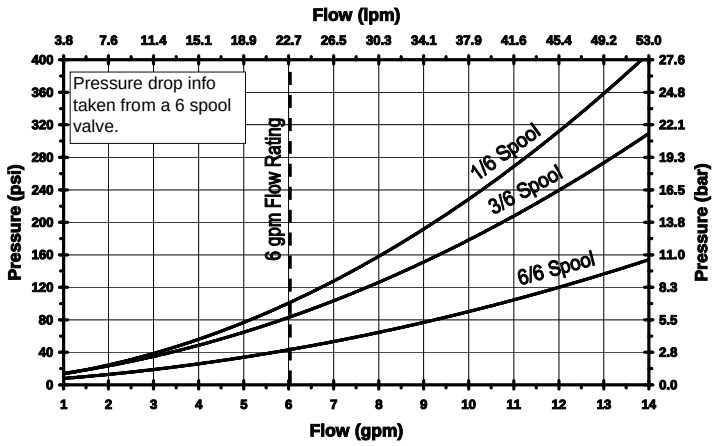
Please feel free to contact the factory with your ideas regarding custom options or accessories, we will be happy to review them to see if they can be put into production for your assemblies.

SERIES 20 FLOW AND PRESSURE INFO:

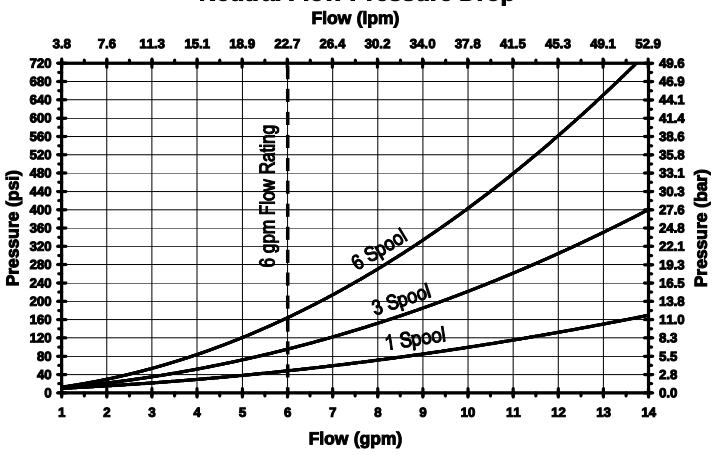
Pressure Drop vs. Flow for P to A or B



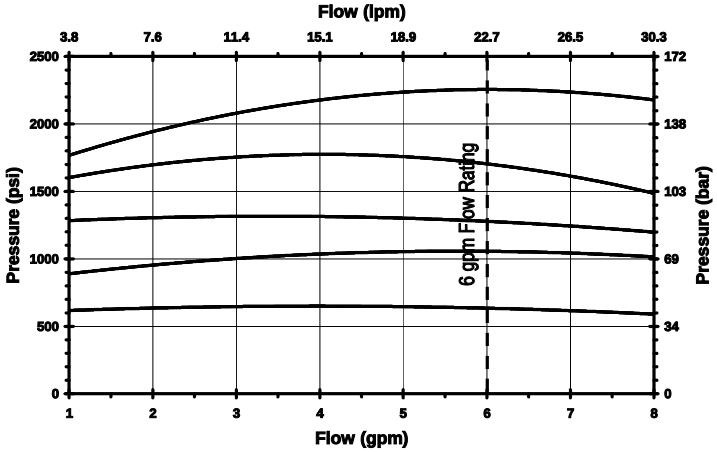
Pressure Drop vs. Flow for A or B to T



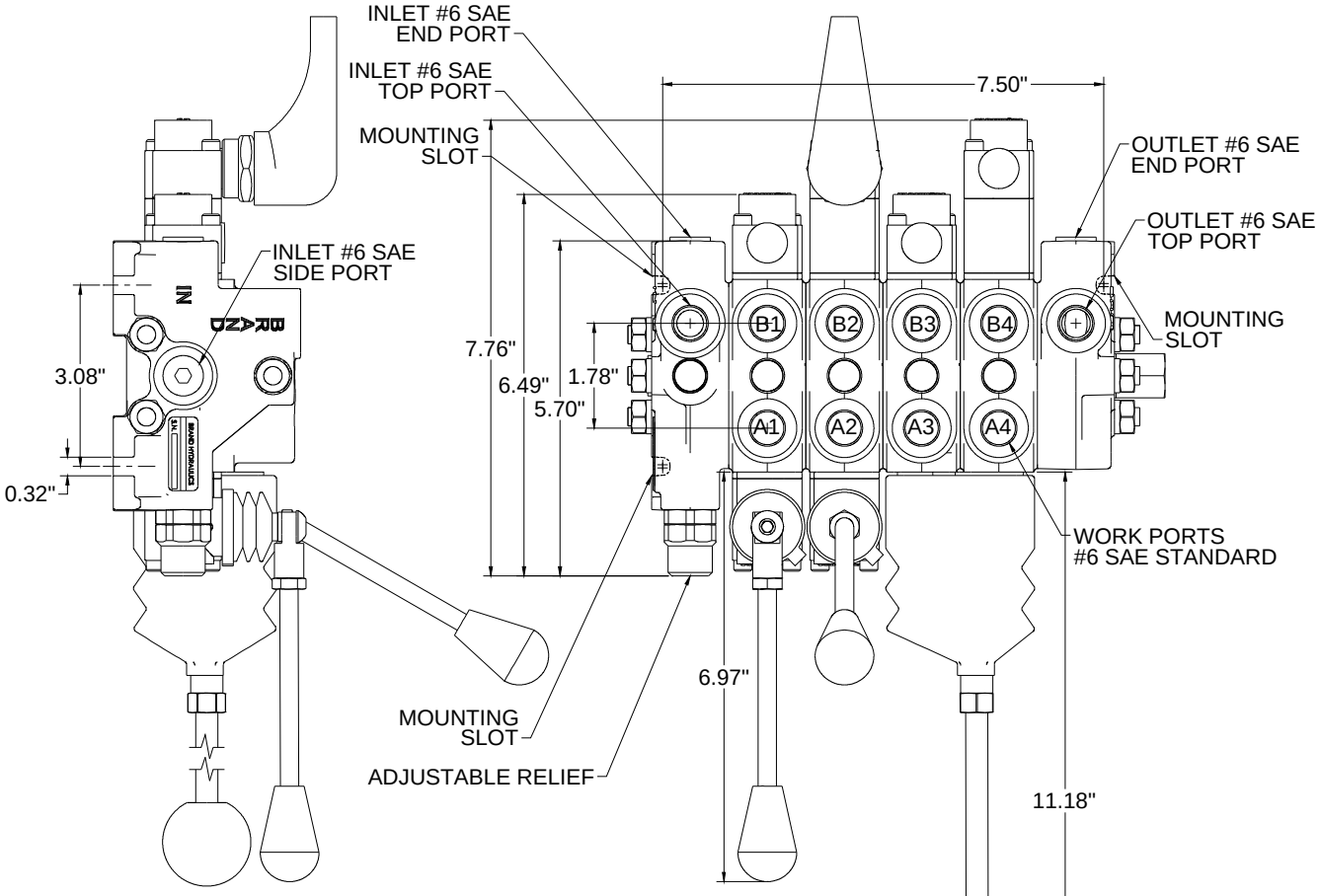
Neutral Flow Pressure Drop

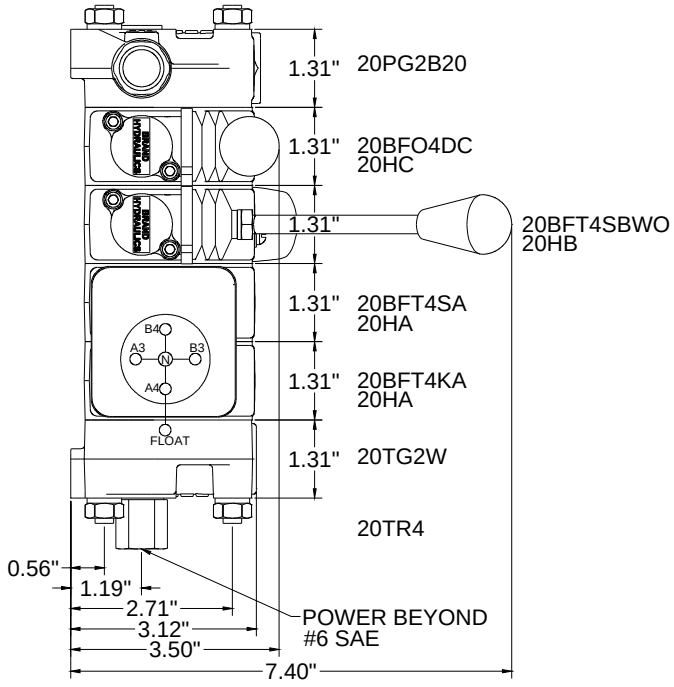


Pressure vs. Flow for S20 Ball Spring Relief



DIMENSIONAL DATA:





VALVE ASSEMBLY ARRANGEMENT:

	20A_____	**PRICE**
INLET	20PG_____	
SPOOL #1	20BF_____	
SPOOL #2	20BF_____	
SPOOL #3	20BF_____	
SPOOL #4	20BF_____	
SPOOL #5	20BF_____	
SPOOL #6	20BF_____	
SPOOL #7	20BF_____	
SPOOL #8	20BF_____	
SPOOL #9	20BF_____	
SPOOL #10	20BF_____	
SPOOL #11	20BF_____	
SPOOL #12	20BF_____	
OUTLET	20TG_____	
MISC.	_____	
TIE ROD (Torque to 85 inch lbs)	20TR_____	
HANDLES	20H_____QNTY._____XPRICE_____=	$_____
ASSEMBLY	20A_____LIST	$_____

DISTIBUTOR:_____

ADDRESS:_____

CITY:_____**STATE:**_____**ZIP:**_____**DATE:**_____

It is the purchaser's responsibility to determine the suitability of any Brand Hydraulics product for an intended application, and to insure that it is installed in accordance with all federal, state, local, private safety, health regulations, and codes and standards. Due to the unlimited variety of machines, vehicles, and equipment on which our products can be used, it is impossible for Brand Hydraulics to offer expert advice on the suitability of a product for a specific application. We believe that it is our customer’s responsibility to undertake the appropriate testing and evaluation to prevent injury to the end user.

BRAND HYDRAULICS
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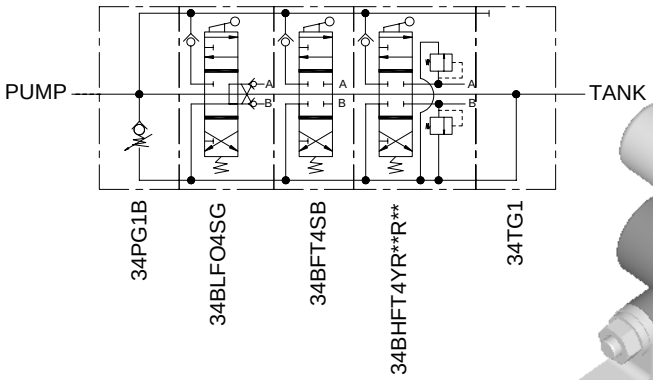
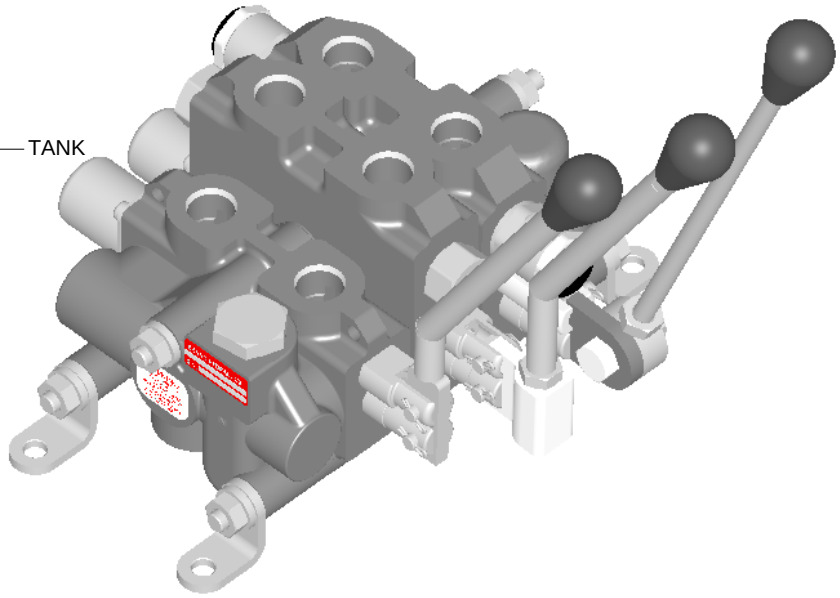
ISO 9001:2000 WITH DESIGN
Certificate #02.002.1

SECTIONAL DIRECTIONAL CONTROL VALVE
"SERIES 34"





FEATURES:

- **I**NDIVIDUAL **L**OAD **C**HECK built into each section that prevents the load from dropping when the spool is shifted.
- **P**RECISION **G**ROUND **C**HROME **P**LATED **S**POOL that assures long life.
- **D**IAMOND **H**ONED **S**POOL **B**ORE provides consistent spool fit with low leakage.
- **M**ETERING **N**OTCHES give smooth control of load.
- **A**DJUSTABLE **H**ANDLES position handle in any location from 90° up to 90° down.
- **O'R**ING **P**ORTS to eliminate leakage.
- **S**PECIAL **M**ODIFICATIONS are easily made to fit your particular application.
- **P**ARALLEL OR **S**ERIES flow paths are possible.
- **A**LL **S**ECTIONS & **A**SSEMBLIES ARE 100% **T**ESTED includes both internal & external leakage tests & flow tests.
- **P**OWER **B**EYOND **C**APABILITY to fit your multi-valve circuits.

SPECIFICATIONS:

- **12 gpm Nominal Capacity (see flow chart).**
- **3500 psi (241 bar).**
- **400 psi (27 bar) max tank pressure.**
- **12 sections max (consult factory for more).**
- **10 Micron Filtration Recommended.**
- **Assembly Torque = 85 inch-lbs.**
- **Weight -Inlet/outlet = 6 lbs. (2.7 kg).**
  -Low spool section = 4 lbs. (1.8 kg).
  -High spool section = 6 lbs. (2.7 kg).
- **Port Sizes -Inlet/outlet #10SAE (7/8 – 14).**
  -Work Ports #8SAE (3/4 – 16).

MATERIALS:

- **Cast Iron Body.**
- **Hard Chrome Plated Steel Spools**
- **Buna N O'Rings (standard).**
- **Stress Proof Steel Handles & Tie Rods**
- **Delrin Load Check Poppet**

SERIES 34 – GENERAL INFORMATION:

The Brand, Series 34 Sectional Directional Control Valves are assembled to meet our customer's requirements for up to twelve individual applications per assembly. Brand Hydraulics does not charge anything extra for this process and assembly is priced solely on the overall sum of the prices of its components.

When assembled in their normal manner the series 34 spool sections are in parallel. When the spools are in neutral position the flow passes by each spool and then onto the tank (outlet) port. If two or more spools are shifted simultaneously their work ports are in parallel, and the oil flow will take the path of least resistance allowing lighter loads to move first. All spool sections are cast with metering notches, and have a high "handle vs. spool" movement ratio, resulting in good metering capability. Input flow can be divided among several circuits (spool sections) by feathering the spools. Series 34 spool sections may also operate in series by installing a series block in between each spool section. Please note that when using series blocks in an assembly it is necessary to use a drain block immediately after the inlet in order for the inlet's relief to function correctly.

INLETS – can be provided with no relief, with a adjustable ball spring relief, or with an adjustable area-differential cartridge relief. Standard inlets are field convertible to be end ported (1), or top ported (2), by shifting a plug from one port to the other.

LOW SPOOL SECTIONS:

SPOOL TYPE – Open center four-way (O) connects ports A and B to tank in neutral. Tandem center four-way (T) blocks port A and B in neutral. Tandem center four-way with metering (M) blocks port A and B in neutral and meters flow when shifted. Tandem center three-way (T3) powers a cylinder in one direction. Please note that closed center four-way operation can be obtained by using a tandem center four-way spool and a closed center plug in the assembly's outlet section.

SPOOL ACTION – Standard spring center (S) returns the handle to neutral when the handle is released. Standard three-position detent (D) holds the spool in neutral and both active positions. Spring center detent (SD or DS) springs back to neutral from one position and is mechanically detented in the other direction. Fourth-position float (K) is similar to spring center except it has a fourth position that makes all ports common to each other (last spool section only). Two-position detent (D2) P to A only. Two position detent (2D) P to B only.

ACTUATORS – B-style handle (B) is non-adjustable and is the most common (use on low spool sections only). G-style handle (G) is also non-adjustable (use on any spool section). Y-style handle (Y) allows the customer to adjust the handle from straight up to straight down (use on any spool section). Joystick handle (A) is used to actuate two adjacent spool sections with one handle (use on any spool section).

OPTION – Machined for bolt on (M) cross over relief or double lock. Normally open electric switch (WO) used with spring center option only. Normally closed electric switch (WC) used with spring center option only. Cable attachment (Z) used with spring center option only on spring center side (Cable actuators must have own integral centering mechanism). Jacketed cable adapter (C) allows the customer to move the spool from a remote location. Machined to attach for handle on B port side of valve (E).

HIGH SPOOL SECTIONS – are available with the same spool type, spool action, actuator and option choices as the low spool section, but offers added features such as individual port reliefs or double lock valves. Three types of reliefs are offered for high sections machined with port relief cavities – ball spring (B), area-differential (R) or area-differential with anti-cavitation check (C). Please note that all high sections require use of adjustable (Y), non-adjustable (G) or joystick (A) handle assembly to assure full spool travel. Series block cannot follow a high spool section unless the working pressure for the previous sections is below 800 psi.

SERIES 34 – GENERAL INFORMATION CONT…

OUTLET SECTION – is available end ported (1) which is not convertible to top port, or top ported (2) which is field convertible to end ported. Available machined for power beyond but without power beyond cartridge (A), machined for power beyond and with the power beyond cartridge (B), closed center plug (C) not available with power beyond, and field convertible open to closed center (D) without breaking open the valve stack.

ACCESSORY ITEMS – both mid-inlets and mid-outlets are available, both are available as either split flow or combined flow type.

All standard tie rod kits contain rods, foot brackets, lock washers and hex nuts. Please be sure to note correct tie rod torque spec of 85 inch pounds.

Bolt on pilot operated double-lock, bolt-on cross-over relief or bolt on single relief valve attachments are available (require low spool section with option (M), machined for bolt on attachment). Flow restricting orifices which screw into the work ports of spool sections are available, either pressure compensated (83AFF) or non-compensated (84AFF).

Seal kits, replacement relief cartridges, series blocks, relief drain blocks and many other accessory items are available, please see the "SERIES 34 COMPLETE LIST OF OPTIONS AND ACCESSORIES" section of this catalog, for model codes and descriptions of these items.

ASSEMBLY – model codes and list prices for complete assemblies will be issued by the factory, upon request of an authorized Brand Distributor. All model codes so issued become proprietary to the requesting distributor. Model codes so issued will not be descriptive in nature, but shall be of sequential numerical type.

Individual sections and accessories can be purchased so that custom valve stacks may be assembled or modified outside the factory.

SERIES 34 – EXAMPLES OF COMMON MODEL CODES:

INLET SECTIONS

34PG1……... Inlet section plain, no relief, end ported.
34PG1B20…… Inlet section, end ported, and adjustable ball spring relief set at 2000 psi.

OUTLET SECTIONS

34TG1……... Plain, end ported.
34TG1A…… Machined for power beyond, but less power beyond cartridge, end ported.

LOW SPOOL SECTIONS

34BFO4DB……... Open center, four-way, three-position detent, uses B-style handle.
34BFT4SB…… Tandem center, four-way, spring to center, uses B-style handle

HIGH SPOOL SECTIONS

34BHFT4SYR10R10….. Tandem center, four-way, spring to center, Y-style handle and area-differential reliefs set at 1000 psi.
34BLFO4SG…… Pilot operated double lock valves, open center, four-way, spring to center and G-style handle.

SERIES 34 – EXAMPLES OF COMMON MODEL CODES CONT…

HANDLE KITS:

34HB…….. Standard handle kit, for spool sections with B machining option in model code.
34HG……..Non-adjustable handle kit, for spool sections with G machining option in model code.
34HY…….. Adjustable angle handle kit, for spool sections with Y machining option in model code.

TIE ROD KITS:

34TR1…….Tie rod kit for valve stack containing a standard inlet, outlet and one spool section.
34TR2…….Tie rod kit for valve stack containing a standard inlet, outlet and two spool sections.

STANDARD ASSEMBLY MODEL CODES:

34A1B…….....Single spool assembly, tandem center four-way, spring to center action, no relief and with B style handle assembly. End ported inlet and outlet.
34AB1B……. Same as above but with an adjustable ball spring relief added and set at 2000 psi.
34A2B…… Two spool assembly, tandem center four-way, spring to center action, no relief, and with B-style handle assemblies. End ported inlet and outlet.
34AB2B……..Same as above but with an adjustable ball spring relief added and set at 2000 psi

Standard assemblies are available with up to 12 spool sections using the model code format outlined above for the one and two spool assemblies.

SERIES 34 – CREATING A MODEL CODE FOR SERIES 34:
INLET SECTION:

3 4 P G _ _ _ _

PORTING:
1 – End port
2 – Top port

RELIEF:
Omit – No relief
B – Adjustable ball spring relief
C – Area-diff. cartridge relief

RELIEF SETTING:
10 – 1000 psi
15 – 1500 psi
20 – 2000 psi
ETC…

END SPOOL SECTION:

3 4 T G _ _

PORTING:
1 – End port
2 – Top port

OPTION:
Omit – No options
A – Machined for power beyond, no cartridge
B – Machined for power beyond, with cartridge
C – Closed center plug (Not available with power beyond)
D – Convertible from open to closed center, screw type adjustment (Not available with power beyond)

SERIES 34 – CREATING A MODEL CODE FOR SERIES 34 CONT…

LOW SPOOL SECTION:

34 B F __ __ __ __ __ __ __

SPOOL TYPE:
T – Tandem center
O – Open center
M – Tandem with metering (4-way only)

TYPE:
3 – Three–way (T spool only)
4 – Four-way

SPOOL ACTION:
S – Spring center
D – Three-position detent
SD – Spring center (P to A) / detent
DS – Detent / spring center (P to B)
K – Fourth-position float / spring center (Last spool only)
D2 – Two-position detent P to A
2D – Two position detent P to B

OPTION:
M – Machined for bolt on option
WO – Normally open electric switch (Spring center only)
WC – Normally closed electric switch (Spring center only)
Z – Cable attachment on spring center end of valve
C – Jacketed cable adapter
E – Machined for handle on B port end of valve

ACTUATORS:
B – Fixed angle handle (Standard)
G – Fixed angle handle
Y – Variable angle handle
A – Joystick assembly for adjacent spool sections

HIGH SPOOL SECTION WITH LOCK(S):

3 4 B L __ F __ __ __ __ __ __ __

LOCK TYPE:
1 – Single lock
Omit – double lock

SPOOL TYPE:
T – Tandem center
O – Open center
M – Tandem with metering (4-way only)

TYPE:
3 – Three–way (T spool only)
4 – Four-way

SPOOL ACTION:
S – Spring center
D – Three-position detent
SD – Spring center (P to A) / detent
DS – Detent / spring center (P to B)
K – Fourth-position float / spring center (Last spool only)
D2 – Two-position detent P to A
2D – Two position detent P to B

OPTION:
WO – Normally open electric switch (Spring center only)
WC – Normally closed electric switch (Spring center only)
Z – Cable attachment on spring center end of valve
C – Jacketed cable adapter
E – Machined for handle on B port end of valve

ACTUATORS:
G – Fixed angle handle
Y – Variable angle handle
A – Joystick assembly for adjacent spool sections
Note: B-style handle not available on high sections

HIGH SPOOL SECTION WITH PORT RELIEF(S):

3 4 B H F _ _ _ _ _ _ _ _ _ _ _ _ _

SPOOL TYPE:
T – Tandem center
O – Open center
M – Tandem with metering (4-way only)

TYPE:
3 – Three-way (T spool only)
4 – Four-way

SPOOL ACTION:
S – Spring center
D – Three-position detent
SD – Spring center (P to A) / detent
DS – Detent / spring center (P to B)
K – Fourth-position float / spring center (Last spool only)
D2 – Two-position detent P to A
2D – Two position detent P to B

ACTUATORS:
G – Fixed angle handle
Y – Variable angle handle
A – Joystick assembly for adjacent spool sections
Note: B-style handle not available on high sections

RELIEF TYPE "A" PORT:
B – High lift ball spring
C – Combination area-differential relief with anti-cavitation check
R – Area-differential
P – Cavity plugged, no relief
Q – Anti-cavitation check, no relief

RELIEF SETTING:
10 – 1000 psi
15 – 1500 psi
20 – 2000 psi
ETC…

REPEAT RELIEF TYPE AND SETTING FOR "B" PORT:

OPTION:
WO – Normally open electric switch (Spring center only)
WC – Normally closed electric switch (Spring center only)
Z – Cable attachment on spring center end of valve
C – Jacketed cable adapter
E – Machined for handle on B port end of valve

SERIES 34 – COMPLETE LIST OF OPTIONS AND ACCESSORIES:

34AFCR……..… Cross over relief valve, bolt on type, for spool sections with M in model code.
34AFDL…….. Double lock valve, bolt on type, for spool sections with M in model code.
34AFSR……...Single relief valve, bolt on type, for spool sections with M in model code.
34K…….. Fourth position float kit, use on last spool section in assembly only.
34AGPB…….. Power beyond cartridge kit, for outlet sections with A or B in their model code.
34AWC……Spring to center kit with normally closed electric switch.
34AWO……... Spring to center kit with normally open electric switch.
34AS…….…... Spacer block (adds 0.75" between spool sections).
34ASB……. Series block, installed in between two spool sections puts them in series.
34ASD……. Series drain block, required for inlet relief to function correctly when using series block(s) in an assembly.
34ASI…….. Isolator block.
34ASOL…….. Mid-outlet solid block.
34ASP……. Spool end adapter kit, converts spools machined to accept handles to spools having a tapped (5/16-18) end for attaching actuator cables or rods.
34ASPB …… Same as 34ASP, except, with blank end (customer taps to their own spec).
34AZ……Spring to center kit with tap (5/16-18) for cable attachment (note: spring to center mechanism is intended to shift the spool only, cable actuators must have their own integral centering mechanism).
34AZ2…….…....Same as 34AZ except tap is 1/4-28.

SERIES 34 – COMPLETE LIST OF OPTIONS AND ACCESSORIES CONT…

34B10…….. High lift ball spring relief cartridge, set at 1000 psi, for spool section codes beginning 34BH. (Available in pressure setting increments of 100 psi , please specify desired setting as per this example).
34BFMIC…… Mid-inlet combined flow.
34BFMIS……Mid-inlet split flow.
34BFMOI……...Mid- outlet/inlet (flow exits out A port, and is accepted back in at B port).
34BFMOS…….. Mid-outlet split flow.
34BHFMIC…….Mid-inlet, combined flow, with cavities for port reliefs. Port relief cartridge options and call outs are the same for this unit as those for the 34BH type high spool sections.
34BHFMIS……. Mid-inlet, split flow, with cavities for port reliefs. Port relief cartridge options and call outs are the same for this unit as those for the 34BH type high spool sections.
34C10…….. Combination area-differential relief / anti-cavitation check cartridge, set at 1000 psi, for spool section codes beginning 34BH. (Available in pressure setting increments of 100 psi, please specify desired setting as per this example.)
34CK……... Seal kit for series 34 area-differential relief cartridges.
34CP……... Relief port cavity plug, for spool section codes beginning 34BH.
34D…….. Three-position detent kit, for low or high spool section.
34D2……... Two-position detent kit, pressure to A port in the detent position.
342D……... Two-position detent kit, pressure to B port in the detent position.
34DS…….. Detent kit, spool is detented in one work position (P to A), and springs to center from the other.
34SD……... Same as 34DS but detent and spring center directions are reversed (P to B when spool detented).
34EM……..Electric actuator with spring to center action only. Actuator is on or off only, no proportional control. Can be used on first spool of assembly.
34HA……... Joystick handle kit for series 34, note, this kit may only be used on two adjacent spool sections in a valve assembly, and both of these two sections must have the (A) machining for handle type call out in their model codes.
34HB…….. B-style handle kit, with bent handle, use on spool sections with (B) handle call out.
34HBS……... B-style handle kit, with straight handle, use on spool sections with (B) handle call out.
34HB-90……. B-style handle kit, with handle bent at 90 degrees, use on spool sections with (B) handle call out.
34HG…….. G-style handle kit, with bent handle, use on spool sections with (G) handle call out.
34HGS……... G-style handle kit, with straight handle, use on spool sections with (G) handle call out.
34HY……... Y style handle kit, handle angle adjusts to clear relief and lock cartridges in high spool sections, or to facilitate "handle through panel" mounting of valve assemblies. Please note that different length handle rods can be furnished, contact factory for details. Standard rod length is 9.41".
34IEC…….. Adapter to add anchor point for jacket, when jacketed cable actuation is required.
34Q…….. Anti-cavitation check cartridge, no relief included in this kit.
34R10…….. Area differential relief cartridge, set at 1000 psi, for spool section codes beginning 34BH, and inlets with C in model code. (Available in pressure setting increments of 100 psi, please specify desired setting as per this example)
34S…….. Spring to center kit, for low or high spool section.
34TR_ ……Tie rod kits, specify number of spool sections in valve assembly, i.e. 3 spool sections in valve assembly, requires using 34TR3 tie rod kit. Please note that when using extra items in the assembly, such as series blocks, drain blocks, isolator blocks etc., the tie rod kit must have its length extended.
83AFF01……. Pressure compensated flow control, set at 1 gpm, screws into work port of any spool section, meters flow into said port. (Available in whole gallon increments to 10 gpm, please specify desired setting as per this example.)
84AFF__…… Non-pressure compensated flow control, specify orifice size required in blank (i.e. 84AFF.50).
P1156…….. Closed center plug, installs in any basic outlet except ones with D in model code. (Cannot be used with power beyond)

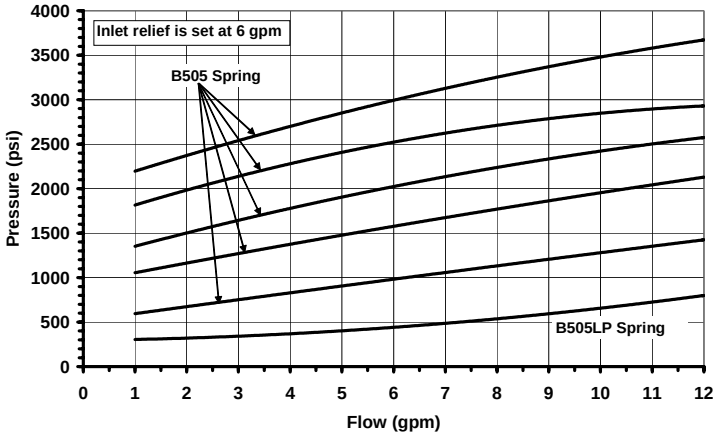
Seal Kits:

34ADLK……..Seal kit for bolt on double lock valve attachment.
34AK……... Replacement seal kit for basic low spool section.
34BK……Seal kit, contains seals for use in between spool sections.
34CK……... Seal kit for series 34 area-differential relief cartridges.

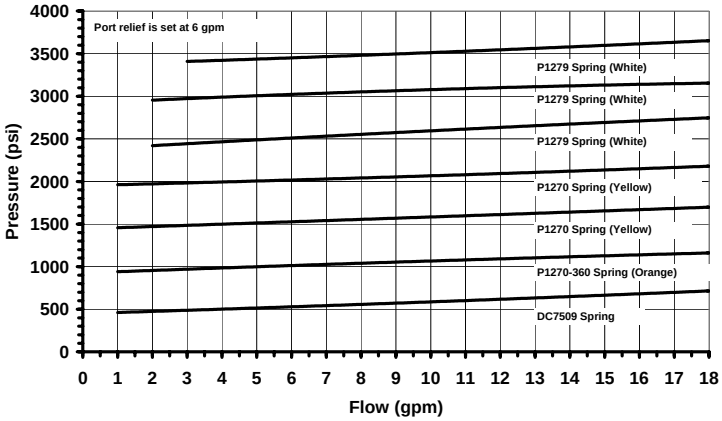
Please feel free to contact the factory with your ideas regarding custom options or accessories, we will be happy to review them to see if they can be put into production for your assemblies.

SERIES 34 FLOW AND PRESSURE INFO:

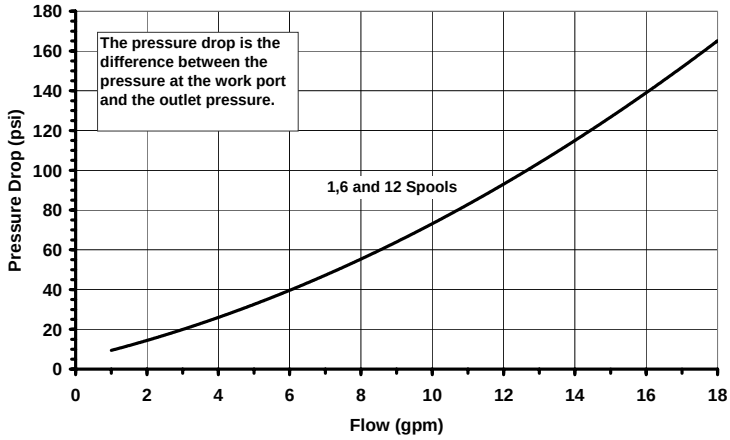
Pressure Drop vs. Flow for Inlet Ball Spring Relief



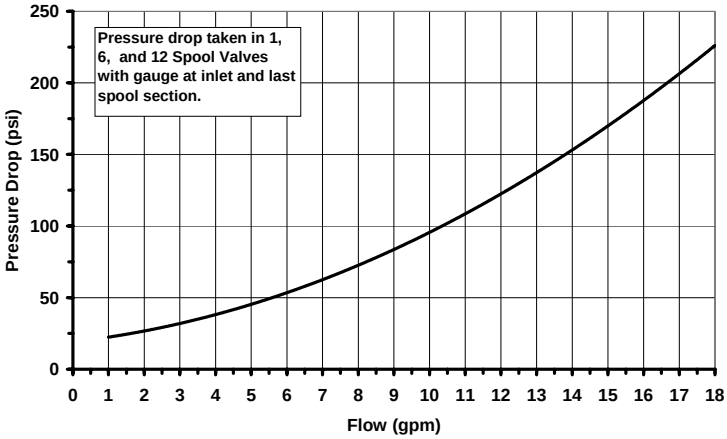
Pressure Drop vs. Flow for S34 Relief



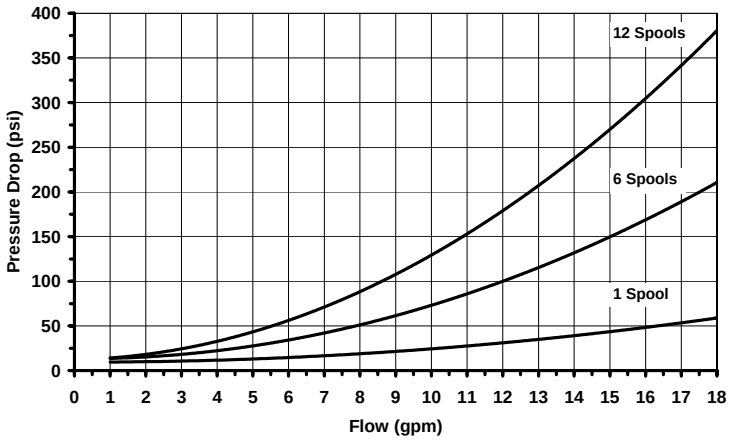
Pressure Drop vs. Flow for A or B-T



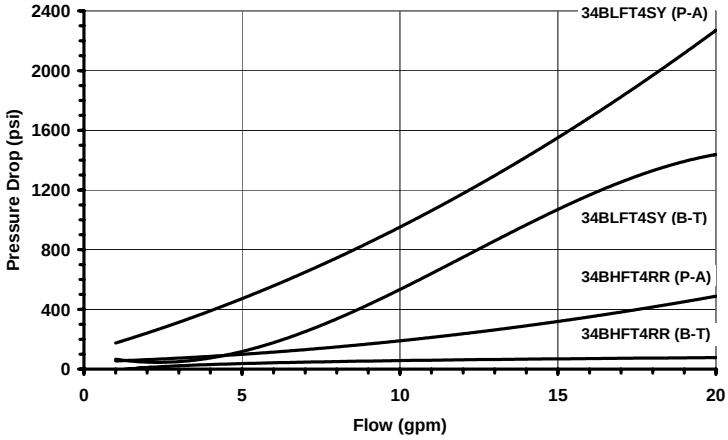
Pressure Drop vs. Flow for P-A or B



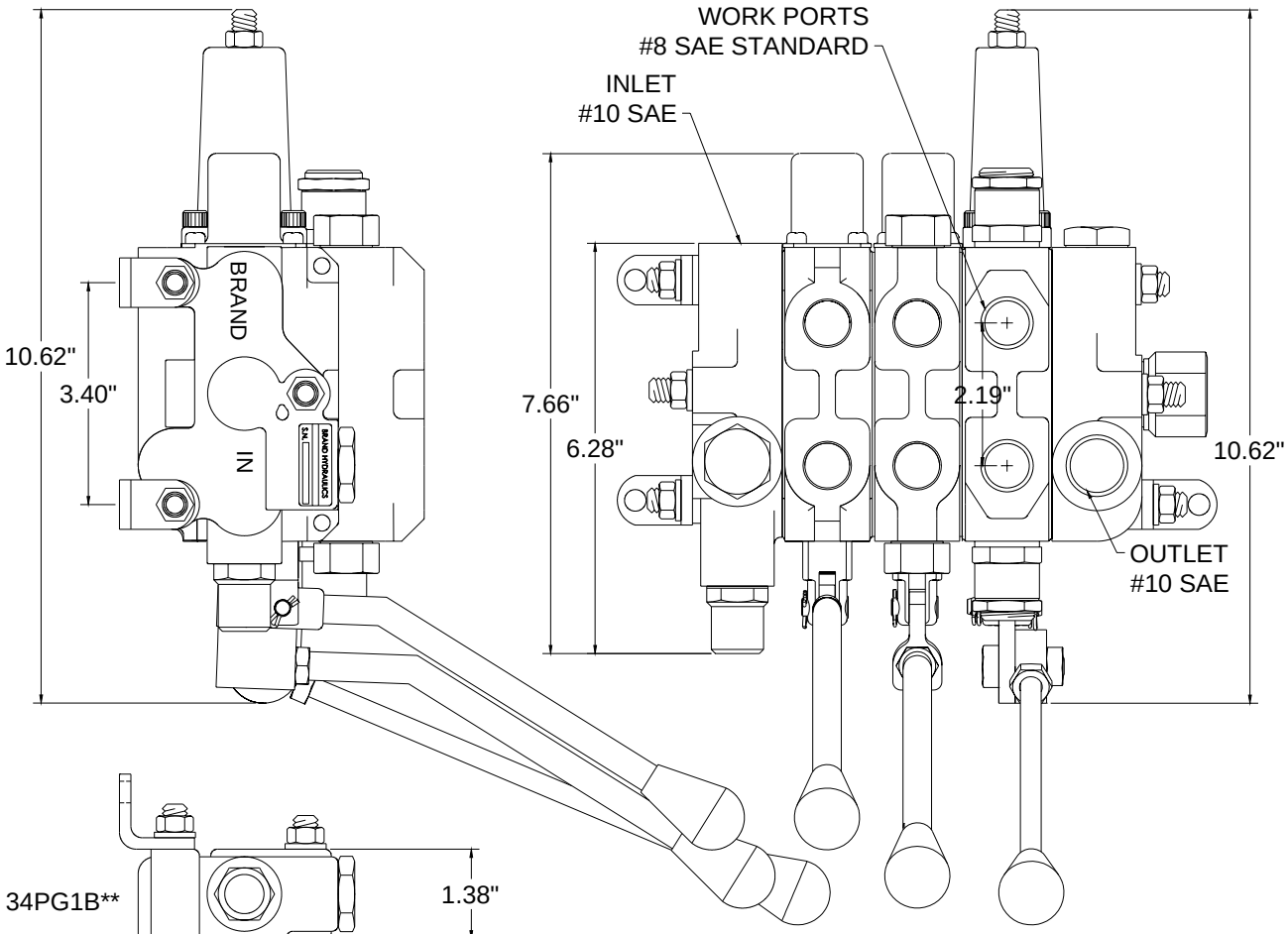
Pressure Drop vs. Flow for P-T

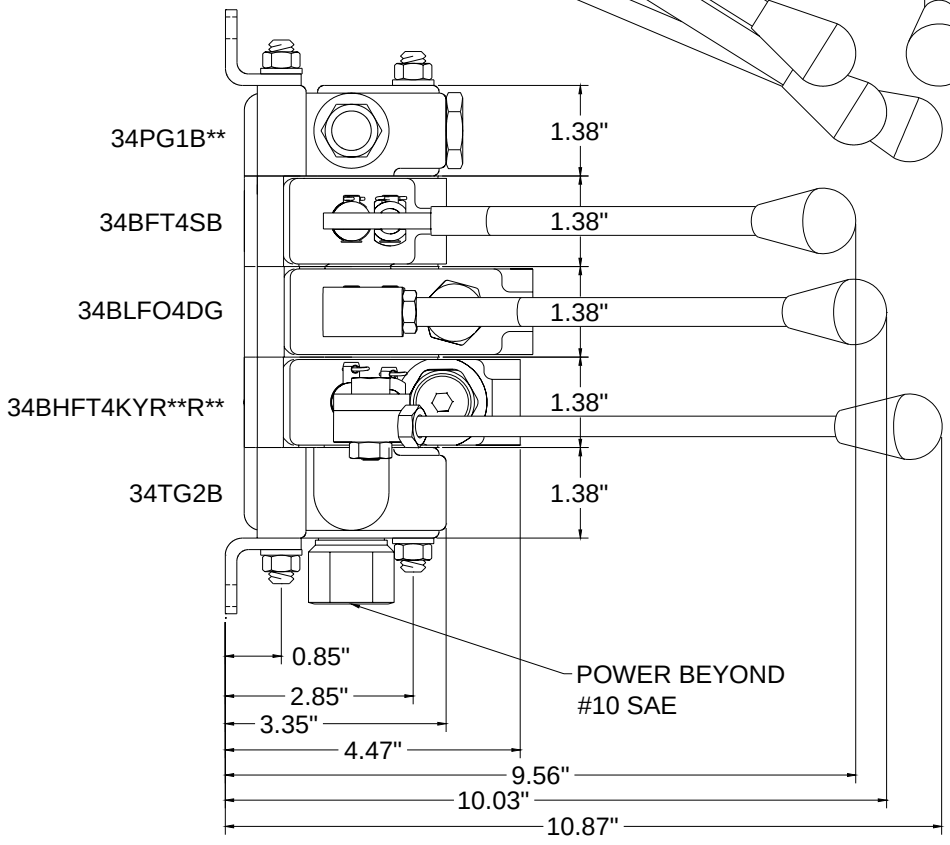


Pressure Drop For High Sections



DIMENSIONAL DATA:





VALVE ASSEMBLY ARRANGEMENT:

		PRICE
	34A_____	
INLET	34PG_____	
SPOOL #1	34B_____	
SPOOL #2	34B_____	
SPOOL #3	34B_____	
SPOOL #4	34B_____	
SPOOL #5	34B_____	
SPOOL #6	34B_____	
SPOOL #7	34B_____	
SPOOL #8	34B_____	
SPOOL #9	34B_____	
SPOOL #10	34B_____	
SPOOL #11	34B_____	
SPOOL #12	34B_____	
OUTLET	34TG_____	
MISC.	_____	
TIE ROD (Torque to 85 inch lbs)	34TR_____	
HANDLES	34H_____QNTY._____XPRICE_____=	$_____
ASSEMBLY	34A_____LIST	$_____

DISTIBUTOR:_____

ADDRESS:_____

CITY:_____**STATE:**_____**ZIP:**_____**DATE:**_____

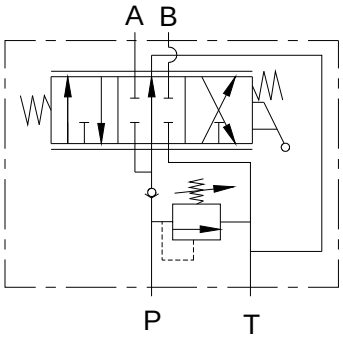
BRAND HYDRAULICS
Shipping: 2332 So 25th St (Zip 68105)
Mailing: P.O. Box #6069 (Zip 68106)
Omaha NE
Phone: (402) 344-4434
Fax: (402) 341-5419
HTTP://WWW.BRAND-HYD.COM

ISO 9001:2000 WITH DESIGN
Certificate #02.002.1

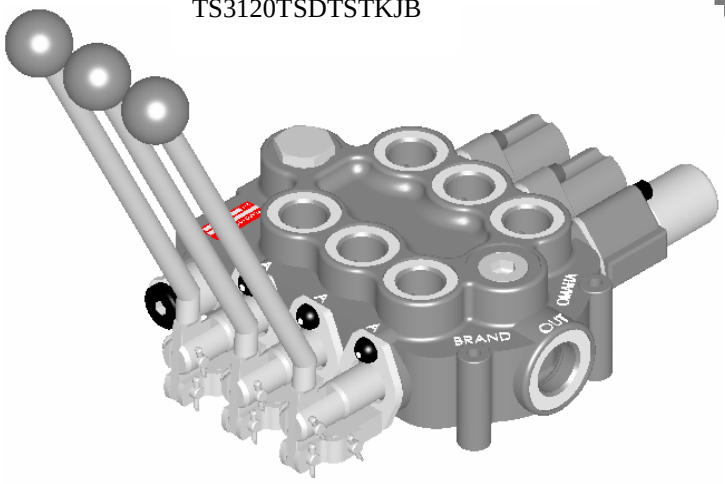
MONO BLOCK DIRECTIONAL CONTROL VALVE

"TS"

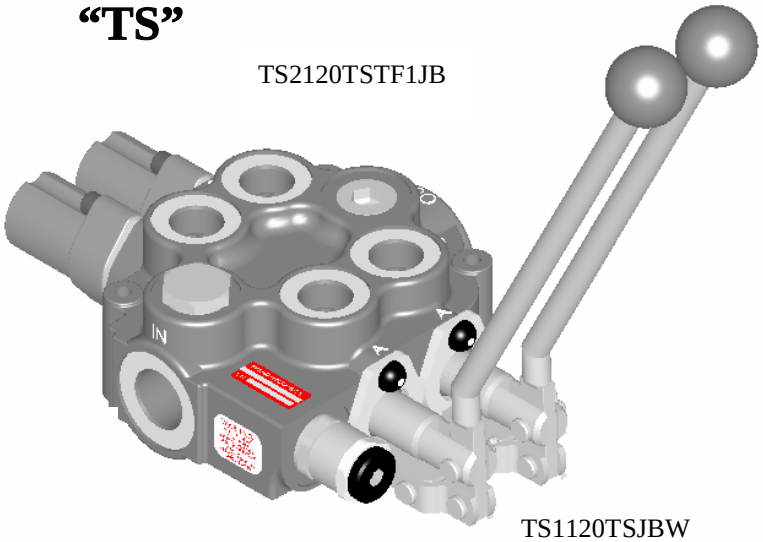
TS1120TSLB



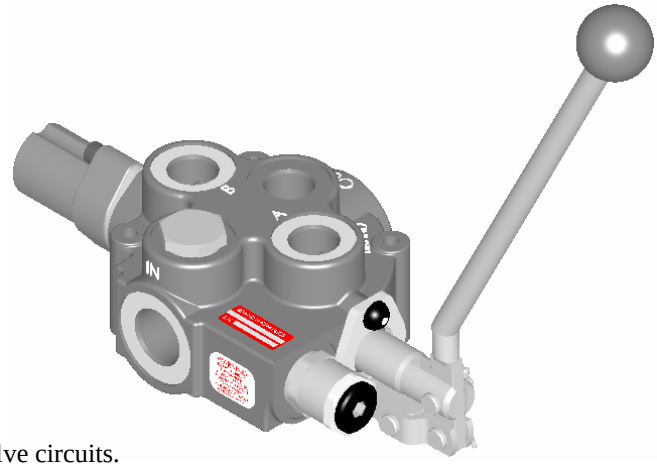
TS3120TSDTSTKJB



TS2120TSTF1JB



TS1120TSJBW



FEATURES:

- **O'R**ING **P**ORTS to eliminate leakage.
- **P**OWER **B**EYOND **C**APABILITY to fit your multi valve circuits.
- **B**UILT IN **A**NTI-**D**ROP **C**HECK prevents the load from dropping when the spool is shifted.
- **F**OURTH **P**OSITION **F**LOAT allows spool movement to a fourth position and makes all ports common to each other (last spool only).
- **P**RECISION **G**ROUND **I**OSSO **P**LATED **S**POOL that assures long life.

SPECIFICATIONS:

- **18 gpm (68.0 lpm) Nominal Capacity.**
- **Rated up to 3000 psi (207 bar).**
- **Port Sizes-Inlet/Outlet #12SAE (1-1/16-12).**
  -Work Ports #10SAE (7/8-14).
- **10 Micron Filtration Recommended.**
- **Weight -TS1 = 9 lbs. (4.1 kg).**
  -TS2 = 14 lbs. (6.4 kg).
  -TS3 = 20 lbs. (9.1 kg).

MATERIALS:

- **Cast Iron Body**
- **Buna N O'Rings**
- **IOSSO Plated Steel Spools**
- **Black Nylon Ball Knob**

TS – GENERAL INFORMATION

The Brand, mono block directional control valve is available in one (TS1), two (TS2) and three (TS3) spool configurations. This valve was designed for applications in which one valve is required to operate separate circuits independently. The TS offers parallel, tandem center 4-way, open center 4-way(motor spool), and tandem 3-way spools. The valve is also field convertible to closed center and power beyond.

SPOOLS – The tandem three-way (T3) powers a cylinder in one direction. Tandem center 4-way (T) powers a cylinder or a motor in both directions. Closed center 4-way (C) blocks all ports in neutral and must be used with a pressure compensated pump. Open center 4-way (O) connects all ports to tank when in neutral.

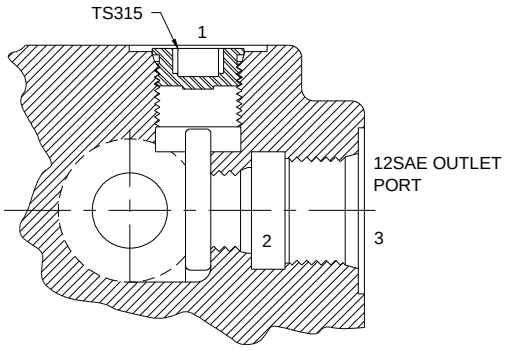
SPOOL ACTION – Three position detent (D) holds the spool in neutral and both active positions. Rotary friction detent (E) applies friction to the spool as it is rotated so that the handle does not rotate when the handle is released, a detent groove clearly indicates neutral position (only available on TS1). Friction detent (F1) applies friction to the spool so that the spool does not move when the handle is released, a detent groove clearly indicates neutral position. Spring center (S) returns the handle to neutral when the handle is released. Spring center detent (SD) springs back to neutral from one position and is mechanically detented in the other position. Fourth position float (K) is similar to spring center except it has a fourth position that makes all ports common to each other (last spool section only). Normally open electric switch (WO) is used with (S), (F1) and (D) options. Normally closed electric switch (WC) is used with (S), (F1) and (D) options. The electric switches can be used on the TS1, TS2 and TS3 (first and third spool only).

ACTUATORS – Lever handle (L) pressurizes the B port when the handle is pushed towards the valve body. Lever handle (J) pressurizes the A port when the handle is pushed towards the valve body. Rotary handle (H) is used to rotate spool in or out. No actuator (N) is used when it is necessary to connect the spool to an external actuator (L type spool). No actuator (M) is used when it is necessary to connect the spool to an external actuator (J type spool).

OPTIONS – Power beyond (W) offers high pressure carryover for valves down stream. The TS series is also field convertible to power beyond. Area differential relief cartridge (B) is available in pressure intervals of 100 psi (6.9 bar).

GENERAL CONVERSION INFORMAT ION

NOTE: The standard 1, 2 and 3 spool castings with (O) or (T) spools are assembled at the factory with the TS315 plug in the 10SAE (7/8-14) (1) top port.



CLOSED CENTER CONVERSION – To have the casting in closed center operation, both the top port (1) and internal port (2) must be plugged. Take the TS315 plug from the top port (1) and insert it into the internal port (2). Then plug the top port (1) with any std. SAE plug (7/8 – 14) or purchase a plug from the factory. Closed center blocks “Pump” only, the condition of ports A and B depend on the spool type. (See illustration above)

POWER BEYOND CONVERSION – To convert the valve to power beyond operation, take the TS315 plug from the top port (1) and insert it into the internal port (2). Next, plumb a #10 SAE ;fitting from the top port (1) to the adjoining valve. Lastly, run a line from the #12 SAE outlet port (3) to the reservoir. (See illustration above)

TS – EXAMPLES OF COMMON MODEL CODES:

TS1120TSJBW…… Single spool valve, tandem center 4-way spool (T), spring center (S), lever handle (J), area-diff. relief cartridge (B) and power beyond (W).

TS2120TDTSJB……Two spool valve, the first section has a tandem center 4-way spool (T) with three position detent (D), the second section has a tandem center 4-way spool (T) with spring center (S), lever handles (J), and area-diff. relief cartridge (B).

TS3120TSTSTKJ…….... Three spool valve, the first and second sections have a tandem center 4-way spools (T) with spring center (S), the third section has a tandem center 4-way spool (T) with fourth position float (K) and lever handles (J).

TS – CREATING A MODEL CODE FOR TS'S:

T S __ 120 __ __ __ __ __ __ __ __

VALVE SERIES:
1 – One spool
2 – Two spool
3 – Three spool

SPOOL (First section):
T3 – Tandem 3-way
T – Tandem center 4-way
C – Closed center 4-way
O – Open center 4-way

SPOOL ACTION:
D – Three position detent
E – Rotary friction detent (TS1 only)
F1 – Friction detent
S – Spring center
SD – Spring center detent
K – Fourth position float
WO – Norm. open elec. switch
WC – Norm. closed elec. switch

OPTIONS:
W – Power beyond
B – Area-differential relief cartridge
Omit – No relief or power beyond

HANDLE OPTION:
L – Lever handle (B port is active when handle is pushed)
J – Lever handle (A port is active when handle is pushed)
H – Rotary handle (used in conjunction with rotary friction detent)
N – No actuator (L type spool)
M – No actuator (J type spool)

REPEAT SPOOL AND SPOOL ACTION FOR THIRD SECTION:

REPEAT SPOOL AND SPOOL ACTION FOR SECOND SECTION:

TS – COMPLETE LIST OF OPTIONS AND ACCESSORIES:

34R10…….….. Area differential relief cartridge set at 1000 psi (69.0 bar). (Available in pressure setting increments of 100 psi (6.9 bar), please specify desired setting as per this example)

TS-FL……... Fourth position float, must be used on last spool of TS2 and TS3.

TS-HJ……... TS handle kit with ball knob. (One per spool)

TS-HJBL……. TS handle kit double bend, away, offset left with ball knob. (One per spool)

TS-HJBR……. TS handle kit double bend, away, offset right with ball knob. (One per spool

TS-HJS……. TS straight handle kit with ball knob. (One per spool)

TS-K…… Seal kit for TS series. (One, two or three spools)

TS3HL-K…… Handle linkage kit for TS3. (Three linkages per kit)

TS-NB…….. Plug for relief cavity.

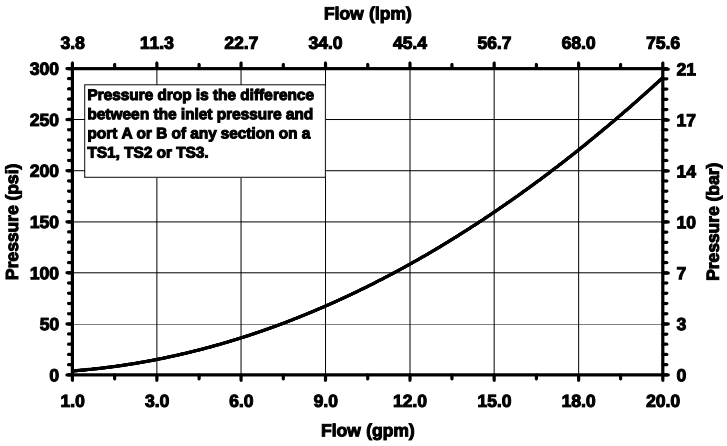
SDC-D…….. Three-position detent kit.

SDC-F1……. Ball friction detent.

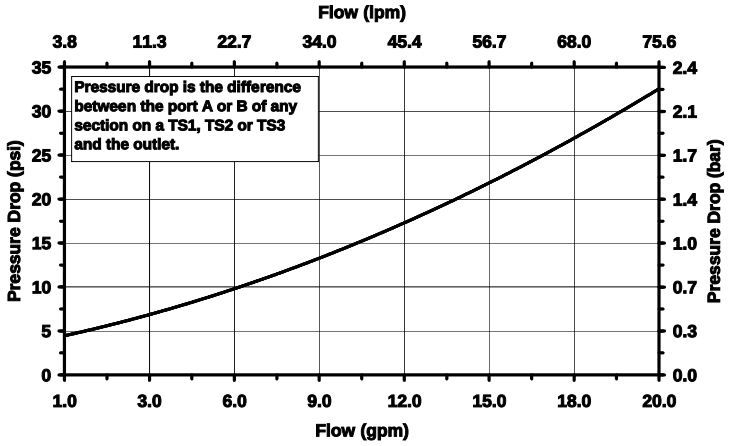
SDC-S……... Spring centering kit.

TS – FLOW AND PRESSURE INFO:

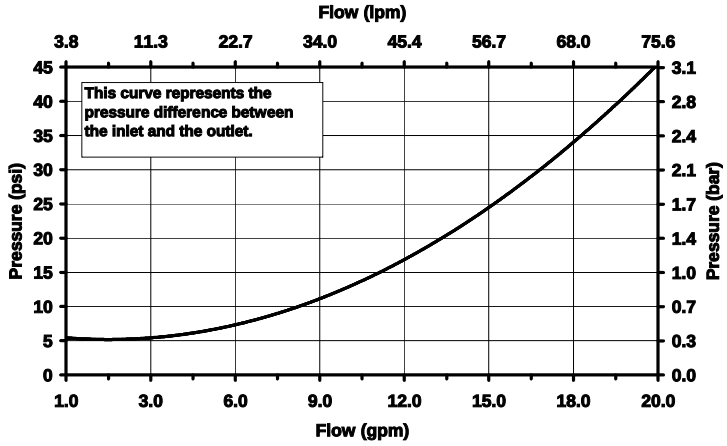
Pressure Drop vs. Flow for P to A or B



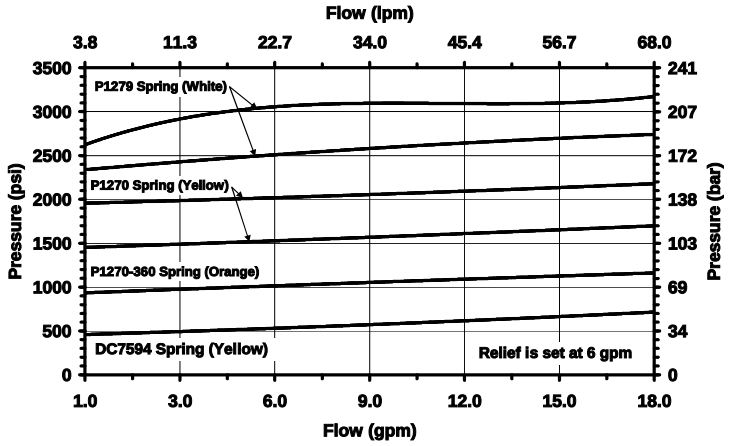
Pressure Drop vs. Flow for A or B to T



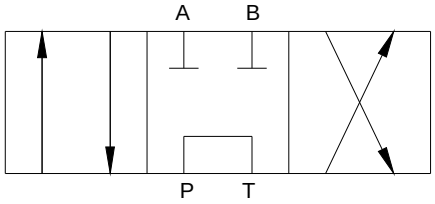
Neutral Flow Pressure Drop



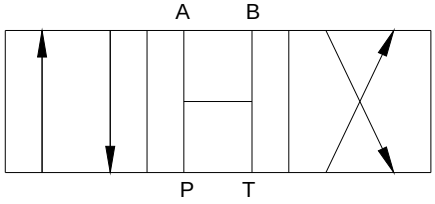
Pressure vs. Flow for Area-Differ. Port Relief (B)



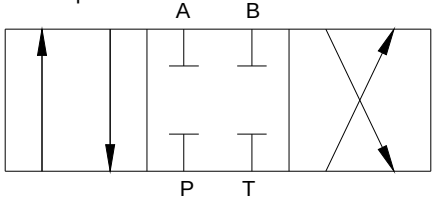
SPOOL SCHEMATICS:



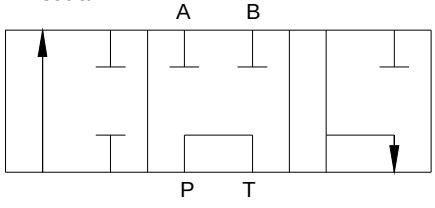
Tandem Center (T) - Powers cylinder or motor in both directions. Pump unloads to tank when spool is in neutral. Cylinder or motor blocked when spool in neutral.



Open Center (O) - All of the ports are connected to tank when the spool is in neutral. Allows cylinder to move or motor to rotate when spool is in neutral



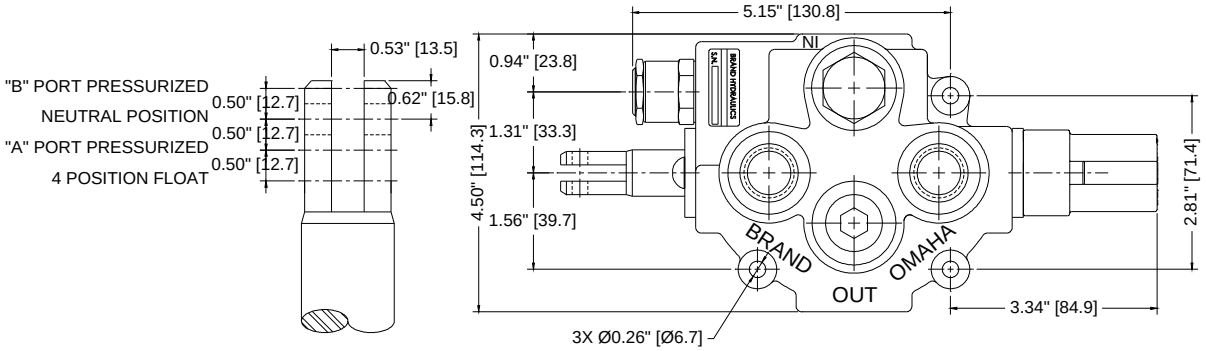
Closed Center (C)- All ports are blocked in neutral. Blocks cylinder or motor in neutral. Required for use with pressure compensated pump.



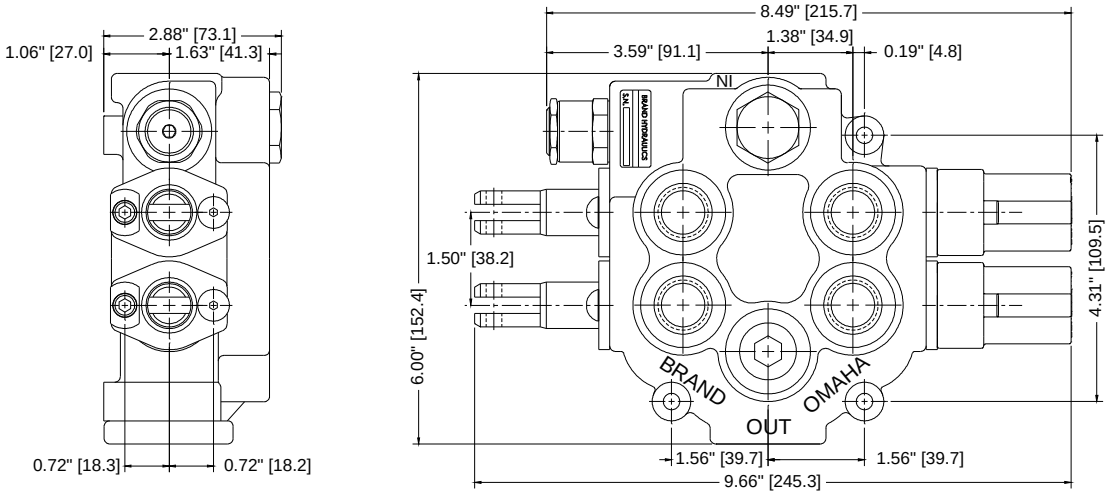
Tandem Three Way (T3) - Powers the cylinder in one direction. Pump unloads to tank when spool is in neutral, or when spool is being reversed. Cylinder is blocked when spool is in neutral. Port "B" is plugged.

DIMENSIONAL DATA: inches & [millimeters]

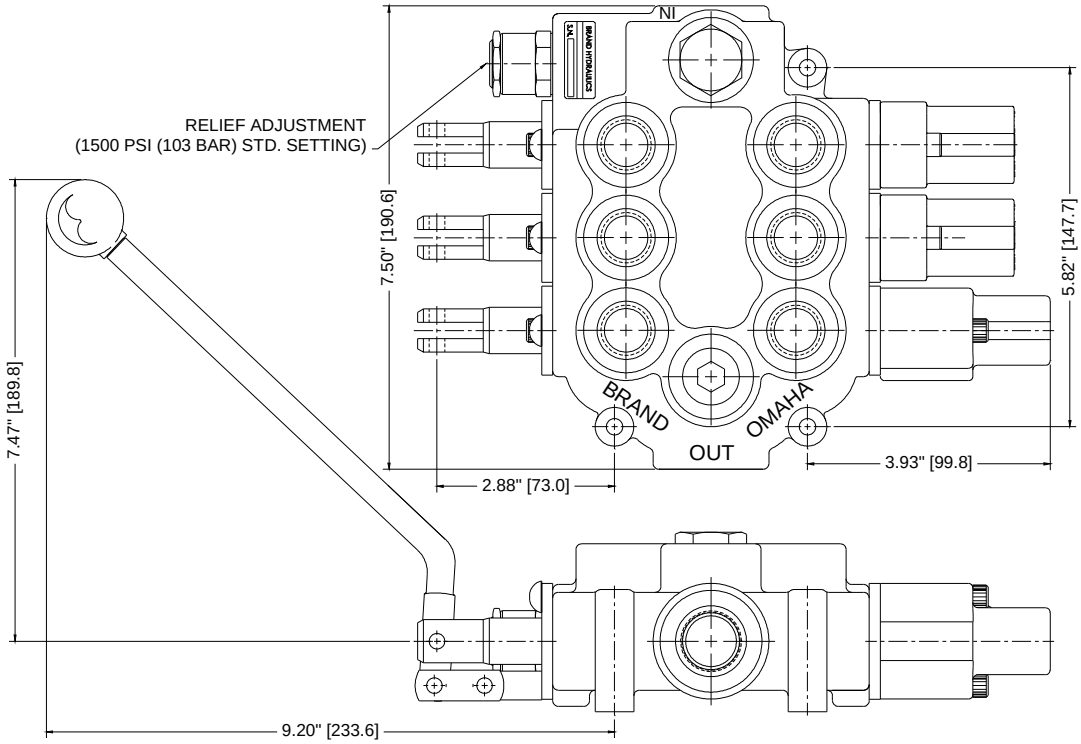
TS1120TF1JB

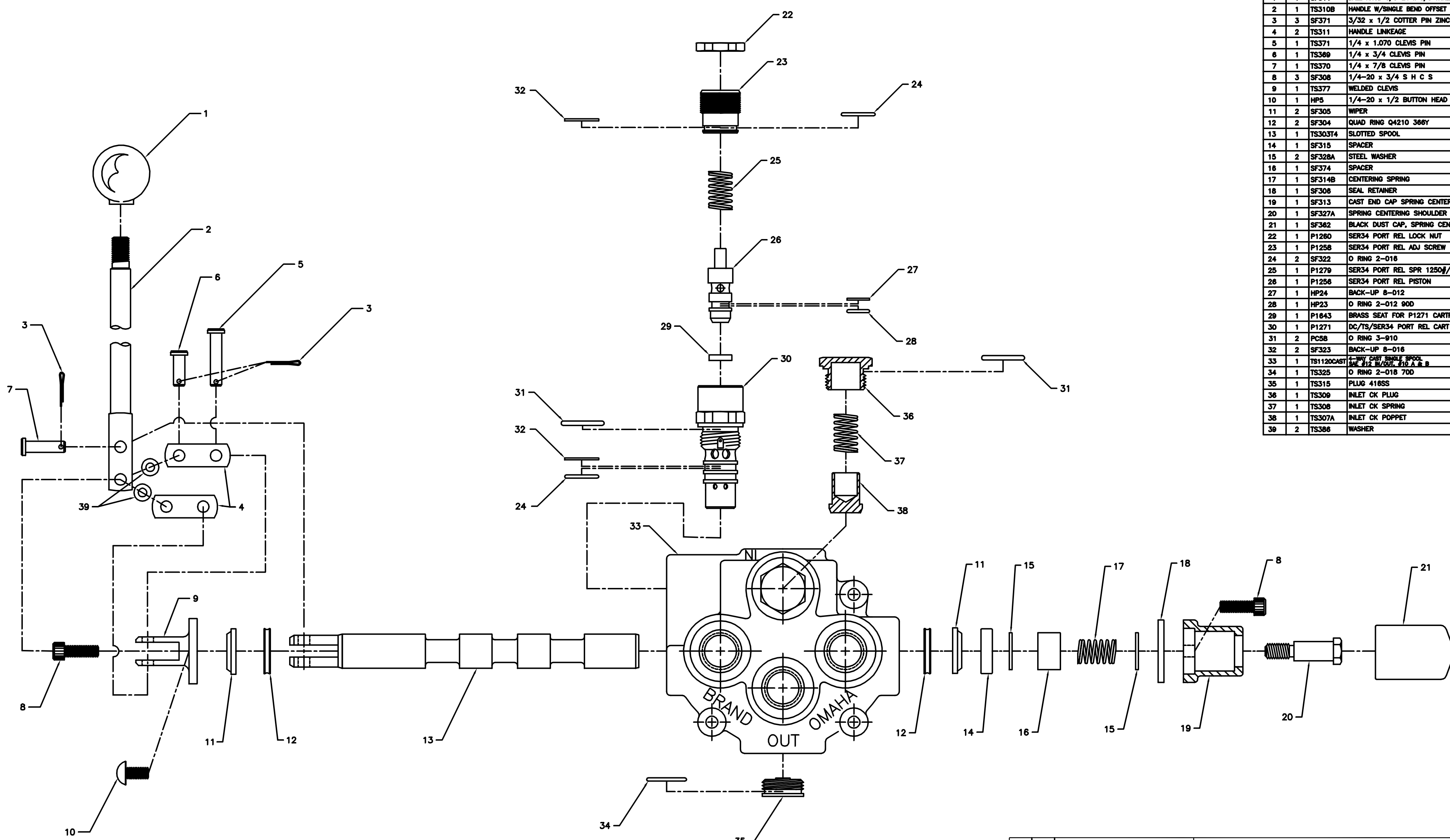


TS2120TF1TSJB



TS3120TSDTSTKJB





#	QTY.	PART #	DESCRIPTION
1	1	SF311	BALL KNOB 3/8-24 x 5/8 THREAD, BLACK
2	1	TS310B	HANDLE W/SINGLE BEND OFFSET FROM BODY
3	3	SF371	3/32 x 1/2 COTTER PIN ZINC
4	2	TS311	HANDLE LINKEAGE
5	1	TS371	1/4 x 1.070 CLEVIS PIN
6	1	TS369	1/4 x 3/4 CLEVIS PIN
7	1	TS370	1/4 x 7/8 CLEVIS PIN
8	3	SF308	1/4-20 x 3/4 S H C S
9	1	TS377	WELDED CLEVIS
10	1	HP5	1/4-20 x 1/2 BUTTON HEAD SOC
11	2	SF305	WIPER
12	2	SF304	QUAD RING Q4210 366Y
13	1	TS303T4	SLOTTED SPOOL
14	1	SF315	SPACER
15	2	SF328A	STEEL WASHER
16	1	SF374	SPACER
17	1	SF314B	CENTERING SPRING
18	1	SF306	SEAL RETAINER
19	1	SF313	CAST END CAP SPRING CENTER
20	1	SF327A	SPRING CENTERING SHOULDER BOLT
21	1	SF362	BLACK DUST CAP, SPRING CENTER
22	1	P1260	SER34 PORT REL LOCK NUT
23	1	P1258	SER34 PORT REL ADJ SCREW
24	2	SF322	O RING 2-016
25	1	P1279	SER34 PORT REL SPR 1250#/INCH
26	1	P1256	SER34 PORT REL PISTON
27	1	HP24	BACK-UP 8-012
28	1	HP23	O RING 2-012 90D
29	1	P1643	BRASS SEAT FOR P1271 CARTRIDGE
30	1	P1271	DC/TS/SER34 PORT REL CART
31	2	PC58	O RING 3-910
32	2	SF323	BACK-UP 8-016
33	1	TS1120CAST	4-WAY CAST SINGLE SPOOL SAE #12 IN/OUT, #10 A & B
34	1	TS325	O RING 2-018 70D
35	1	TS315	PLUG 416SS
36	1	TS309	INLET CK PLUG
37	1	TS308	INLET CK SPRING
38	1	TS307A	INLET CK POPPET
39	2	TS386	WASHER

REV.	DATE	DESCRIPTION

BRAND HYDRAULICS CO., INC.
2332 SOUTH 25TH STREET, OMAHA NEBRASKA 68105

TITLE: DIRECTIONAL CONTROL W/ POWER BEYOND

MATERIAL:

STANDARD TOLERANCE UNLESS NOTED: .00 = ±.015, .000 = ±.010, < ± 2°, FRACTION ±1/32

HEAT TREAT_____ ± 2 RC X_____DEEP
GRIND_____ ±0.0002 DIA. & TAPER
PLATE_____ ±0.0002 DIA. & TAPER

DRAWN BY: J. CASEY
DATE: 2/24/98
SCALE: FULL

FILENAME: TS1120TSJBW
DISK: --
PART NO.: TS1120TSJBW