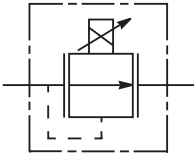
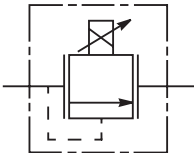
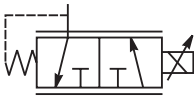
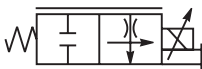
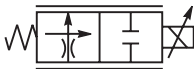
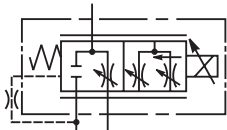
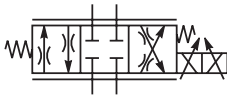
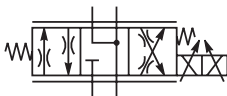


| SERIES                                                                              | CAVITY       | DESCRIPTION                              | FLOW<br>LPM/GPM | PRESSURE<br>BAR/PSI | PAGE NO.  |
|-------------------------------------------------------------------------------------|--------------|------------------------------------------|-----------------|---------------------|-----------|
| Technical Tips.....PV2-PV5                                                          |              |                                          |                 |                     |           |
|    |              |                                          |                 |                     |           |
| <b>PRESSURE RELIEVING</b>                                                           |              |                                          |                 |                     |           |
| AP02B2YP .....                                                                      | C08-2 .....  | Increase Pressure/Increase Current ..... | 5.3/1.4 .....   | 350/5000 .....      | PV6-PV7   |
| AP04G2YP .....                                                                      | C10-2 .....  | Increase Pressure/Increase Current ..... | 95/25 .....     | 350/5000 .....      | PV8-PV9   |
|    |              |                                          |                 |                     |           |
| AP02B2YR .....                                                                      | C08-2 .....  | Decrease Pressure/Increase Current ..... | 5.3/1.4 .....   | 350/5000 .....      | PV10-PV11 |
| AP04G2YR .....                                                                      | C10-2 .....  | Decrease Pressure/Increase Current ..... | 95/25 .....     | 350/5000 .....      | PV12-PV13 |
|    |              |                                          |                 |                     |           |
| <b>PRESSURE REDUCING</b>                                                            |              |                                          |                 |                     |           |
| EPR083R .....                                                                       | C08-3L ..... | Pressure Reducing/Relieving Valve.....   | 22.7/6 .....    | 345/5000 .....      | PV14-PV15 |
| EPR111C .....                                                                       | C10-3L ..... | Pressure Reducing/Relieving Valve.....   | 37.5/10 .....   | 350/5000 .....      | PV16-PV17 |
|  |              |                                          |                 |                     |           |
| <b>FLOW CONTROLS, 2-WAY</b>                                                         |              |                                          |                 |                     |           |
| JP02C 21 .....                                                                      | C08-3 .....  | Flow Control, N.C. ....                  | 23/6 .....      | 210/3000 .....      | PV18-PV19 |
| JP04C 21 .....                                                                      | 3X.....      | Flow Control, N.C. ....                  | 36/9.5 .....    | 210/3000 .....      | PV20-PV21 |
|  |              |                                          |                 |                     |           |
| JP02P 21 .....                                                                      | C08-3 .....  | Flow Control, N.O. ....                  | 19/5 .....      | 210/3000 .....      | PV22-PV23 |
|  |              |                                          |                 |                     |           |
| <b>FLOW CONTROLS, 3-WAY</b>                                                         |              |                                          |                 |                     |           |
| JP04C 31 .....                                                                      | 4C.....      | Priority Flow Control, N.C. ....         | 30/8 .....      | 210/3000 .....      | PV24-PV25 |
|  |              |                                          |                 |                     |           |
| <b>DIRECTIONAL CONTROL</b>                                                          |              |                                          |                 |                     |           |
| GP02 51 .....                                                                       | C08-4 .....  | 4 Way, 3 Pos - Closed Center .....       | 21/5.5 .....    | 350/5000 .....      | PV26-PV27 |
| GP02 52 .....                                                                       | C08-4 .....  | 4 Way, 3 Pos - Closed Center .....       | 17/4.5 .....    | 350/5000 .....      | PV26-PV27 |
| GP02 53.....                                                                        | C08-4.....   | 4 Way, 3 Pos - Float Center.....         | 17/4.5.....     | 350/5000.....       | PV28-PV29 |
| GP02 54.....                                                                        | C08-4.....   | 4 Way, 3 Pos - Float Center.....         | 17/4.5.....     | 350/5000.....       | PV28-PV29 |
|  |              |                                          |                 |                     |           |
| DSP105C1 .....                                                                      | C10-4 .....  | 4 Way, 3 Pos - Closed Center .....       | 32/8.5 .....    | 210/3000 .....      | PV30-PV32 |
| DSP105C4 .....                                                                      | C10-4 .....  | 4 Way, 3 Pos - Float Center .....        | 32/8.5 .....    | 210/3000 .....      | PV30-PV32 |

|                      |
|----------------------|
| CV                   |
| Check Valves         |
| SH                   |
| Shuttle Valves       |
| LM                   |
| Load/Motor Controls  |
| FC                   |
| Flow Controls        |
| PC                   |
| Pressure Controls    |
| LE                   |
| Logic Elements       |
| DC                   |
| Directional Controls |
| SV                   |
| Solenoid Valves      |
| PV                   |
| Proportional Valves  |
| CE                   |
| Coils & Electronics  |
| BC                   |
| Bodies & Cavities    |
| TD                   |
| Technical Data       |

## INTRODUCTION

This technical tips section is designed to help familiarize you with the Parker line of Proportional Valves. In this section we present common options, technical terms, as well as a brief synopsis of the operation and applications of the various products offered in this section. The intent of this section is to help you in selecting the best products for your application.

## COMMON OPTIONS

As you will see, Parker offers a variety of Proportional Valve products. As such, some of the options mentioned below may not be available on all valves. Consult the model coding and dimensions for each valve for specifics. Here are some of the common options available.

**Seals:** Valves are provided with either a 4301 Polyurethane “D”-Ring, Nitrile, or Fluorocarbon Seals. The “D”-Ring eliminates the need for backup rings. You should match the seal compatibility to the temperature and fluid being used in your application.

**Overrides:** Overrides are standard on many of the Parker proportional valves. The override is generally a push type that is flush with the end of the tube. Consult the individual catalog pages for more details.

## TECHNICAL TERMS

To help in applying our proportional valve line of product, we have listed some technical terms below, as well as some helpful hints in applying our valves.

**Ohm's Law:** Electrical current is generated as a result of the relationship between input voltage and the resistance to the flow of electrical current. It is represented in equation form by  $I = V/R$  (or  $V=IR$ ), where  $I$  is current,  $V$  is voltage and  $R$  is resistance. This is an important relationship to remember when dealing with any electrically operated valves. Proportional valves allow varying control of flow or pressure, dependant on the current signal provided. As coils heat up, their resistance rises. This means a higher voltage must be available to maintain the same amount of pressure or flow. Thus, the application needs to be designed such that the full on position is about 70% of the initial current draw. On the individual catalog pages a maximum control current is specified to help in applying our proportional valves.

**PWM:** Pulse Width Modulation (PWM) is the preferred signal for controlling electrical current. PWM is on / off voltage in a square wave form. The percent “on” time or duty cycle provides the average voltage. The valve driver adjusts the duty cycle to obtain current control. We recommend valve drivers with current control for optimum performance. PWM signals also usually provide dither for the proportional valve. Dither is a

small back and forth movement of the valve spool around its set position. This rapid movement reduces the friction of the valve and leads to faster, more accurate response.

**PWM Frequency:** The frequency of a PWM signal is the rate at which the signal is turned on and off. Parker's analog proportional valves are designed to work with low frequency responses between 100-400 Hz. The performance curves on our catalog pages were performed with a PWM signal at 200 Hz.

**Hysteresis:** Due to various factors, the performance of a proportional valve will show a slightly different performance when the current signal is increasing than it will when the signal is being decreased. This difference is usually expressed as a percentage of total input change and is referred to as the hysteresis of the valve.

**Deadband:** Cracking or deadband refers to the amount of the control signal that is needed to produce any movement of the spool. Thus, a 20% deadband means that 20% of the control signal is needed before the spool will move.

CV

Check  
Valves

SH

Shuttle  
Valves

LM

Load/Motor  
Controls

FC

Flow  
Controls

PC

Pressure  
Controls

LE

Logic  
Elements

DC

Directional  
Controls

SV

Solenoid  
Valves

PV

Proportional  
Valves

CE

Coils &  
Electronics

BC

Bodies &  
Cavities

TD

Technical  
Data

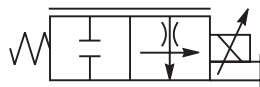
## PRODUCT TYPES / APPLICATIONS

Proportional valves are nothing more than electrically adjustable hydraulic valves. They give the operator nearly infinite adjustment control and flexibility. Parker Hannifin offers various types of proportional flow control, pressure reducing, and relief valves.

### Proportional Flow Control Valve

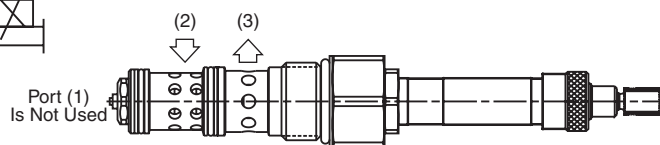
Proportional flow control valves provide pseudo pressure compensation and are used on systems requiring variable electronic control of flow. They allow the operator to vary the control signal to accelerate or decelerate an actuator. A compensator valve can be added to the circuit for enhanced compensation. Some typical applications would include the hoist control for a lift, or the speed control for a winch circuit. Parker offers both normally closed and normally open versions of proportional flow controls.

#### Normally Closed Proportional Flow Control

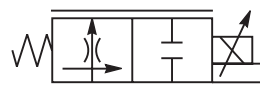


**OPERATION** - With the solenoid coil de-energized, the spool is held in a closed position by the spring force. When the solenoid coil is energized, the amperage of the signal moves the spool into an open position.

The spool is held in this position by a balance between spring force and electrical force. As the current increases, the spools opens further; allowing more flow. As the current decreases, the spool begins closing; allowing less flow. Pseudo compensation is obtained by the pressure drop across the orifices in the spool.

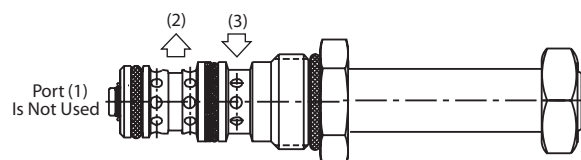


#### Normally Open Proportional Flow Control



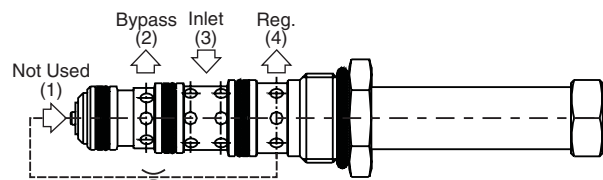
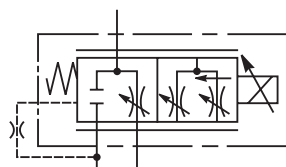
**OPERATION** - With the solenoid coil de-energized, the spool is held in an open position by spring force; allowing full flow to pass. As the solenoid coil is energized, the spool begins to move away from a full open position;

allowing less flow to pass. Once a full electronic signal is given, the spool is held in a closed position; allowing no flow to pass. As the electronic signal is then reduced, the spool begins to open; allowing flow to pass again. Once a constant electronic signal is given, the spool is held in that position by a balance between electronic force and spring force. Pseudo compensation is obtained by the pressure drop across the orifices in the spool.



#### Proportional Priority Bypass Flow Control

The proportional priority bypass flow controls allow electronic control of the flow setting for the priority flow circuit. The priority flow remains constant regardless of changes in load or pressure. The excess inlet flow is diverted or bypassed to tank. The bypass port must not have any restrictions or performance will be hindered.



**OPERATION** - Flow enters the valve through port 3. With the coil de-energized, flow is bypassed to port 2. When the coil is energized, the internal orifice is increased allowing pressure compensated flow to the priority port (port 4). The excess flow is bypassed to port 2. As input current is increased, the priority flow increases and the bypass flow decreases. As the current is decreased, priority flow decreases and bypass flow is increased.

CV

Check  
Valves

SH

Shuttle  
Valves

LM

Load/Motor  
Controls

FC

Flow  
Controls

PC

Pressure  
Controls

LE

Logic  
Elements

DC

Directional  
Controls

SV

Solenoid  
Valves

PV

Proportional  
Valves

CE

Coils &  
Electronics

BC

Bodies &  
Cavities

TD

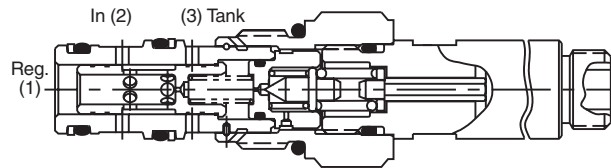
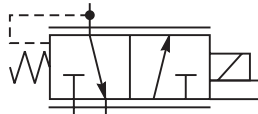
Technical  
Data

**Normally Closed Proportional Pressure Reducing / Relieving Valve**

Normally Closed Proportional Pressure Reducing/Relieving Valves are used to electronically reduce the inlet pressure to one leg of a hydraulic circuit. In addition these valves act as a relief valve, relieving any shocks or surges that occur between its regulating port and the actuator. Pilot operated are generally slower on response due to the two stage performance, but can have a reduced pressure as high as 3000 psi.

**Pilot Operated**

**OPERATION** - With the solenoid coil de-energized, the pilot dart is held open by the spring force. This allows the main spool to close and restricts flow from going from the inlet (2) port to the regulated port (1). As the electronic signal is applied to the coil, the pilot dart is moved towards the pilot seat restricting pilot flow. This restriction raises the effective pressure inside the chamber between the spool and the pilot seat, allowing the spool to travel away from the pilot seat to a position where the pressure at inlet (2) is connected to the regulated pressure port (1). At this point, reduced pressure becomes a function of the electronic signal. As long as the electronic signal is constant, the reduced pressure at the regulated pressure port (2) will remain fixed regardless of any changes in inlet flow or inlet pressure. As the electronic signal increases or decreases, the reduced pressure at port (1) will change with respect to the change in the electronic signal.



CV

Check  
Valves

SH

Shuttle  
Valves

LM

Load/Motor  
Controls

FC

Flow  
Controls

PC

Pressure  
Controls

LE

Logic  
Elements

DC

Directional  
Controls

SV

Solenoid  
Valves

PV

Proportional  
Valves

CE

Coils &  
Electronics

BC

Bodies &  
Cavities

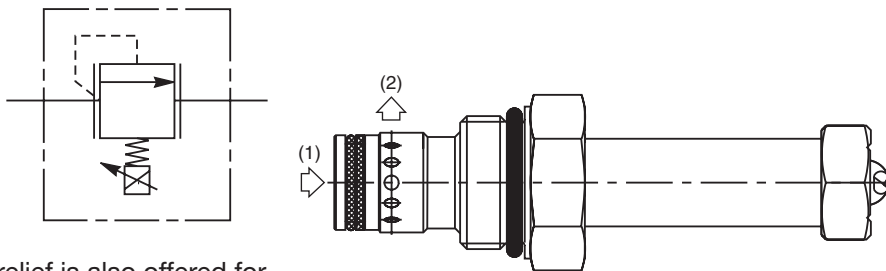
TD

Technical  
Data

**Normally Closed****Proportional Relief Valve**

Normally closed proportional relief valves are used to electronically control the system pressure.

These valves are ideal for circuits with varying system pressures demands. A small flow pilot version of the normally closed proportional relief is also offered for piloting a larger logic element or vented relief valve. The normally closed relief defaults to a maximum pressure setting (i.e. 3000 psi) when there is no current applied.

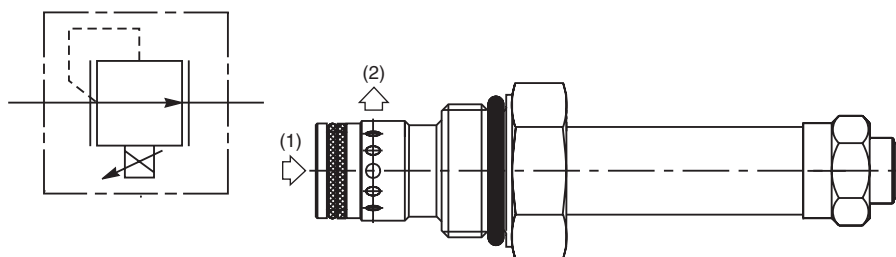


**OPERATION** - With the solenoid coil de-energized, the pilot dart is held closed by the spring. As current is applied to the coil, the pilot dart is moved creating less restriction of the pilot flow. As this restriction is reduced with the increasing current, the pressure setting also decreases. Once a constant electronic signal is given, the pilot dart is held in a given position, holding the pressure setting. This is maintained by the balance between the electronic spring force and the inlet pressure.

**Normally Open****Proportional Relief Valve**

Normally open proportional relief valves are used to electronically control the system pressure.

These valves are ideal for circuits with varying system pressure demands. A small flow pilot version of the normally open proportional relief is also offered for piloting a larger logic element or vented relief valve. The normally open relief defaults to minimum system pressure (i.e. 150 psi) when there is no current applied. Normally closed versions are also available upon request.



**OPERATION** - With the solenoid coil de-energized, the pilot dart is held open by the spring. This allows the main spool to open at minimum pressure 10.4 Bar (150 psi). As current is applied to the coil, the pilot dart is moved towards the pilot seat restricting pilot flow. This restriction raises the effective pressure setting of the valve. Once a constant electronic signal is given, the pilot dart is held in a given position, holding the pressure setting. This is maintained by a balance between electronic spring force and inlet pressure. As the electronic signal is reduced, the pilot dart is moved away from the pilot seat. This lowers the effective pressure setting of the valve.

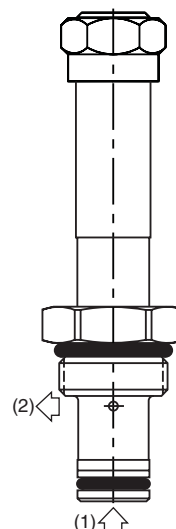
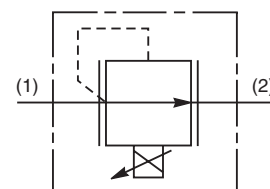
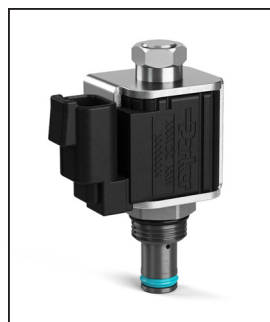
**CV**Check  
Valves**SH**Shuttle  
Valves**LM**Load/Motor  
Controls**FC**Flow  
Controls**PC**Pressure  
Controls**LE**Logic  
Elements**DC**Directional  
Controls**SV**Solenoid  
Valves**PV**Proportional  
Valves**CE**Coils &  
Electronics**BC**Bodies &  
Cavities**TD**Technical  
Data

## General Description

Proportional Relief Valve. Increasing Pressure With Increasing Current. For additional information see Technical Tips on pages PV2-PV5.

## Features

- Analog Proportional Relief Valve regulates pressure proportionally to the solenoid current
- Direct acting poppet design
- One piece cartridge housing ensures internal concentricity
- Coil: Waterproof, hermetically sealed, requires no O'Rings; Symmetrical coil can be reversed without affecting performance.

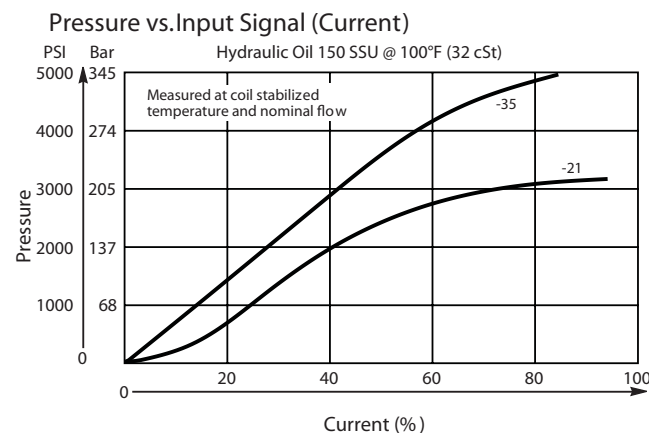
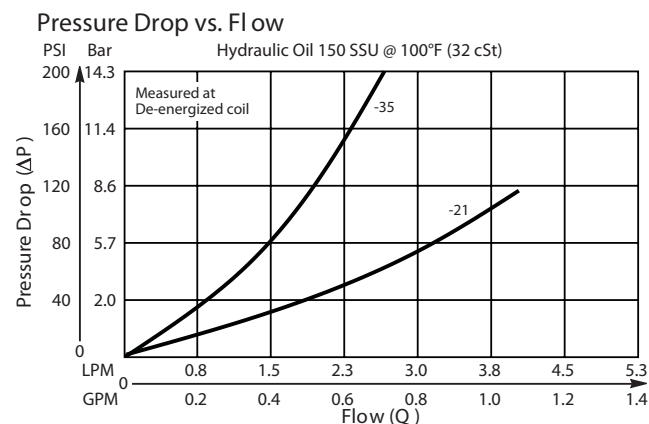


## Specifications

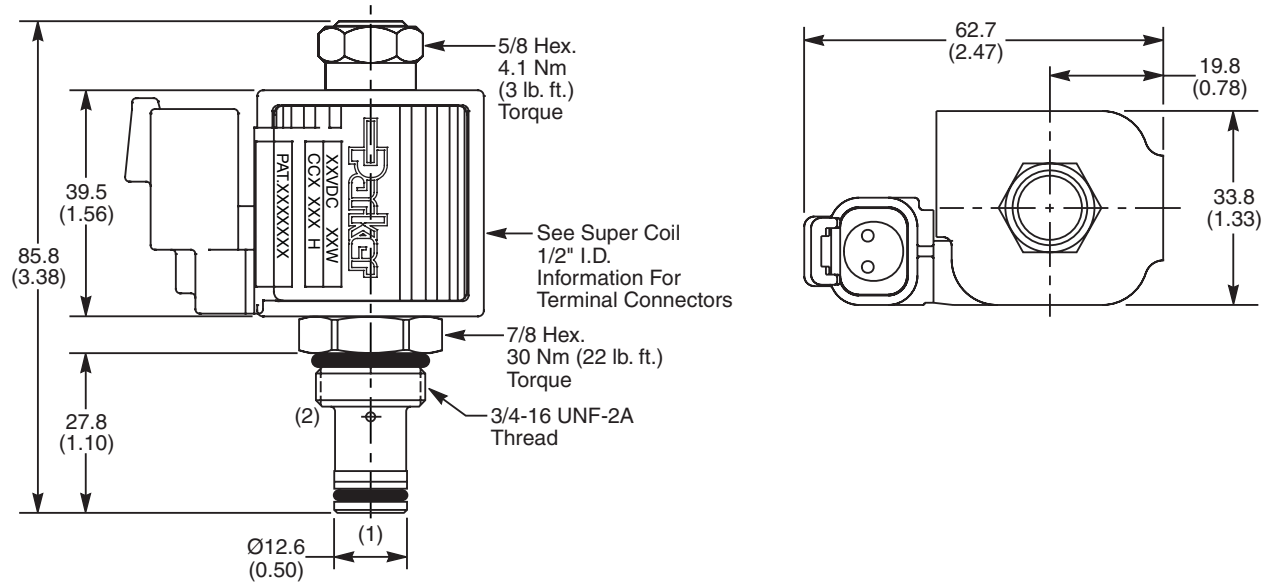
|                                                   |                                                                                                                                                                |                    |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Rated Flow<br>(At 70 PSI ΔP)                      | <b>21C</b>                                                                                                                                                     | 3.0 LPM (0.8 GPM)  |
|                                                   | <b>35C</b>                                                                                                                                                     | 1.3 LPM (.35 GPM)  |
| Max. Pressure At<br>Port 1 @ 75%<br>Input Current | <b>21C</b>                                                                                                                                                     | 210 Bar (3000 PSI) |
|                                                   | <b>35C</b>                                                                                                                                                     | 350 Bar (5000 PSI) |
| Port 2 Pressure Limit                             | 103 Bar (1000 PSI)                                                                                                                                             |                    |
| Hysteresis @<br>200 Hz PWM                        | 5%                                                                                                                                                             |                    |
| Cracking Pressure                                 | <b>21C</b>                                                                                                                                                     | 0.21 Bar (3 PSI)   |
|                                                   | <b>35C</b>                                                                                                                                                     | 0.35 Bar (5 PSI)   |
| Cartridge Material                                | All parts steel. All operating parts hardened steel.                                                                                                           |                    |
| Operating Temp.<br>Range/Seals                    | -37°C to +93°C ("D"-Ring)<br>(-35°F to +200°F)<br>-34°C to +121°C (Nitrile Buna-N)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F) |                    |
| Fluid Compatibility/<br>Viscosity                 | Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt)                                                         |                    |
| Filtration                                        | ISO-4406 18/16/13, SAE Class 4                                                                                                                                 |                    |
| Approx. Weight                                    | 0.06 kg (0.14 lbs.)                                                                                                                                            |                    |
| Cavity                                            | C08-2<br>(See BC Section for more details)                                                                                                                     |                    |

## Performance Curves

### ▲ PWM Current Regulator Recommended



Dimensions    Millimeters (Inches)



Ordering Information

AP02B2YP

08 Size  
Proportional  
Relief Valve



Max Relief  
Setting

**Highlighted** represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

**Coil(s) sold separately.** Please see section CE of this catalog, 1/2" Super-Coil (CC series), for ordering information.

| Code | Max Relief Setting |
|------|--------------------|
| 21C  | 210 Bar (3000 PSI) |
| 35C  | 350 Bar (5000 PSI) |

| Code | Seals    |
|------|----------|
| Omit | "D"-Ring |

Order Bodies Separately  
See section BC

|         |   |                 |   |              |
|---------|---|-----------------|---|--------------|
| B08     | — | 2               | — | 6T           |
| 08 size |   | 2-Way<br>Cavity |   | Port<br>Size |

| Code | Porting / Body Material  |
|------|--------------------------|
| 6T   | SAE-6 / Steel (5000 PSI) |

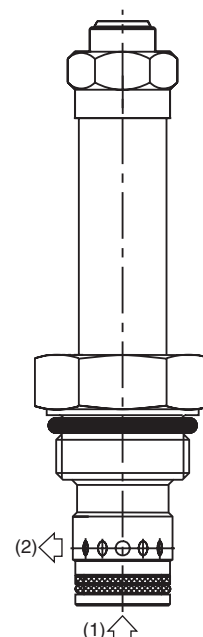
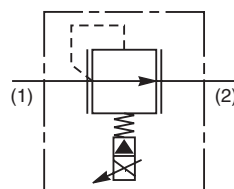
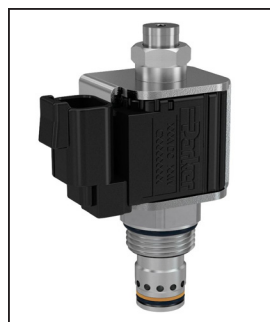
| Kit               | Part Number |
|-------------------|-------------|
| D-Ring Seal       | SK08-2      |
| Nitrile Seal      | SK08-2      |
| Fluorocarbon Seal | SK08-2V     |

## General Description

Proportional Relief Valve. Increasing Pressure With Increasing Current. For additional information see Technical Tips on pages PV2-PV5.

## Features

- Pilot operated spool-type design fits industry common cavity (10-2)
- Relieving pressure output is proportional to DC current input
- Precise setting of factory preset pressure in energized mode
- One piece cartridge housing ensures internal concentricity
- Coil: Waterproof, hermetically sealed, requires no O'Rings; Symmetrical coil can be reversed without affecting performance.

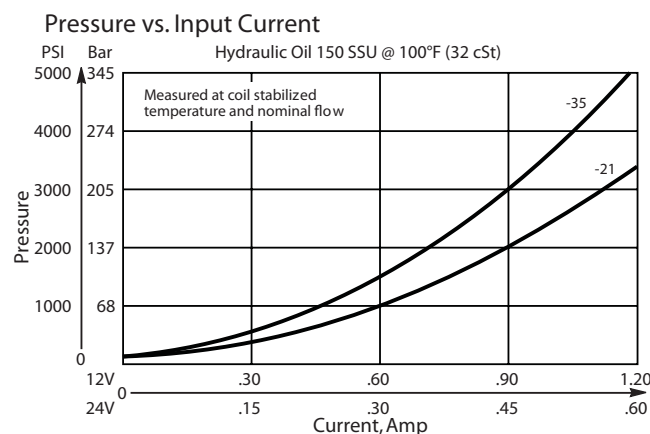
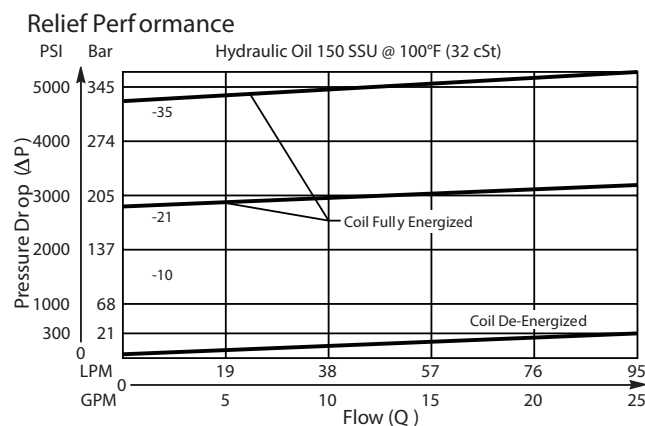


## Specifications

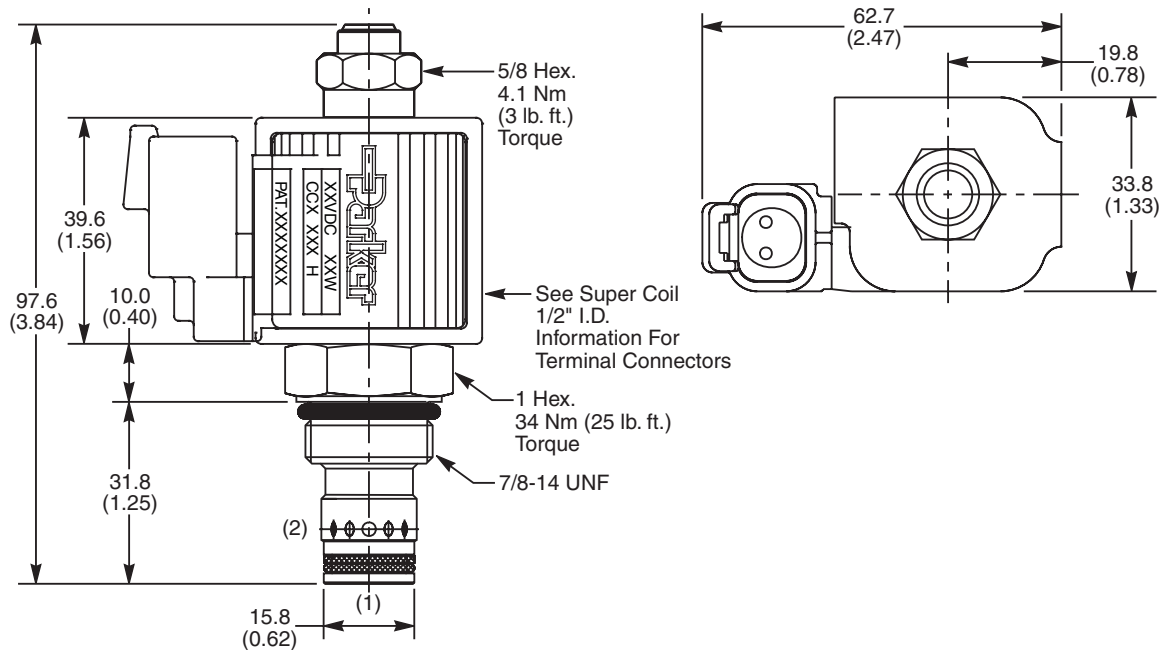
|                                                                                               |                                                                                                              |
|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Rated Flow<br>(At 300 PSI $\Delta P$ )<br>When Coil is Fully<br>De-Energized                  | 95 LPM (25 GPM)                                                                                              |
| Factory Set Relief<br>Pressure When<br>Coil De-Energized<br>Measured at<br>45 LPM (12 GPM)    | <b>21C</b> 210 Bar (3000 PSI)<br><b>35C</b> 350 Bar (5000 PSI)                                               |
| Port 2 Pressure Limit                                                                         | 103 Bar (1000 PSI)                                                                                           |
| Hysteresis @<br>200 Hz PWM                                                                    | < 7%<br>of Maximum Pressure Setting                                                                          |
| Response Time At<br>75% of Nominal<br>Voltage Change<br>(Measured To 90%<br>of Press. Change) | <b>To Unload</b> 10ms<br><b>To Load</b><br><b>21C</b> 60 ms<br><b>35C</b> 80 ms                              |
| Cartridge Material                                                                            | All parts steel. All operating parts<br>hardened steel.                                                      |
| Operating Temp.<br>Range/Seals                                                                | -34°C to +121°C (Nitrile Buna-N)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F) |
| Fluid Compatibility/<br>Viscosity                                                             | Mineral-based or synthetic with<br>lubricating properties at viscosities<br>of 45 to 2000 SSU (6 to 420 cSt) |
| Filtration                                                                                    | ISO-4406 18/16/13, SAE Class 4                                                                               |
| Approx. Weight                                                                                | 0.14 kg (0.31 lbs.)                                                                                          |
| Cavity                                                                                        | C10-2<br>(See BC Section for more details)                                                                   |

## Performance Curves

### ▲ PWM Current Regulator Recommended



Dimensions    Millimeters (Inches)



Ordering Information

**AP04G2YP**    **Max Relief Setting**    **N**    **Seals**

10 Size Proportional Relief Valve

**Highlighted** represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

**Coil(s) sold separately.** Please see section CE of this catalog, 1/2" Super-Coil (CC series), for ordering information.

| Code | Max Relief Setting |
|------|--------------------|
| 21C  | 210 Bar (3000 PSI) |
| 35C  | 350 Bar (5000 PSI) |

| Code | Seals   |
|------|---------|
| N    | Nitrile |

Order Bodies Separately  
See section BC

**B10** – **2** – **8T**

10 size    2-Way Cavity    Port Size

| Code | Porting / Body Material  |
|------|--------------------------|
| 8T   | SAE-8 / Steel (5000 PSI) |

| Kit               | Part Number |
|-------------------|-------------|
| Nitrile Seal      | SK30503N-1  |
| Fluorocarbon Seal | SK30503V-1  |



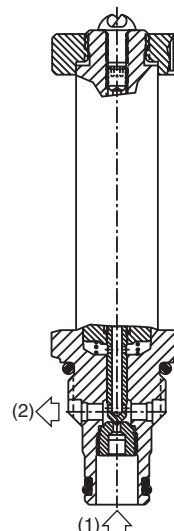
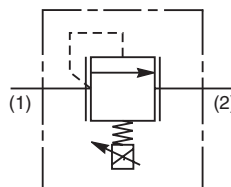
|                      |
|----------------------|
| <b>CV</b>            |
| Check Valves         |
| <b>SH</b>            |
| Shuttle Valves       |
| <b>LM</b>            |
| Load/Motor Controls  |
| <b>FC</b>            |
| Flow Controls        |
| <b>PC</b>            |
| Pressure Controls    |
| <b>LE</b>            |
| Logic Elements       |
| <b>DC</b>            |
| Directional Controls |
| <b>SV</b>            |
| Solenoid Valves      |
| <b>PV</b>            |
| Proportional Valves  |
| <b>CE</b>            |
| Coils & Electronics  |
| <b>BC</b>            |
| Bodies & Cavities    |
| <b>TD</b>            |
| Technical Data       |

## General Description

Proportional Relief Valve. Decreasing Pressure With Increasing Current. For additional information see Technical Tips on pages PV2-PV5.

## Features

- Analog Proportional Relief Valve regulates pressure proportionally to the input solenoid current
- Direct acting poppet design
- One piece cartridge housing ensures internal concentricity
- Coil: Waterproof, hermetically sealed, requires no O'Rings; Symmetrical coil can be reversed without affecting performance.

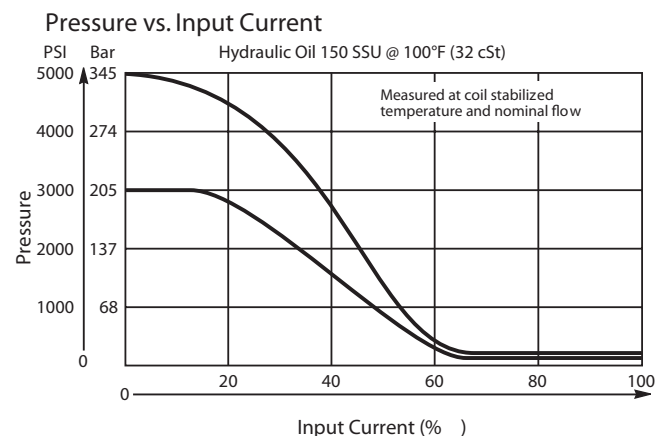
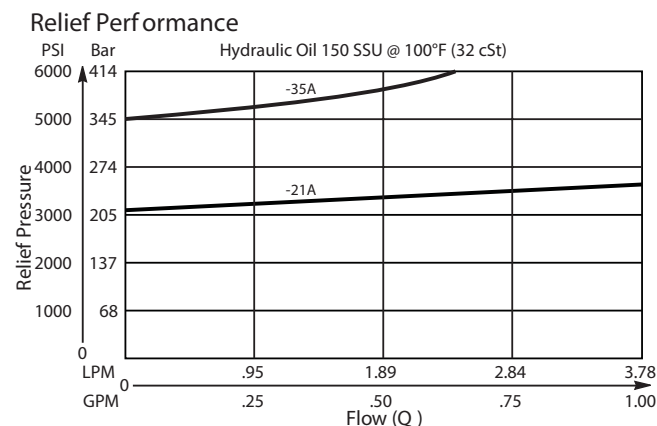


## Specifications

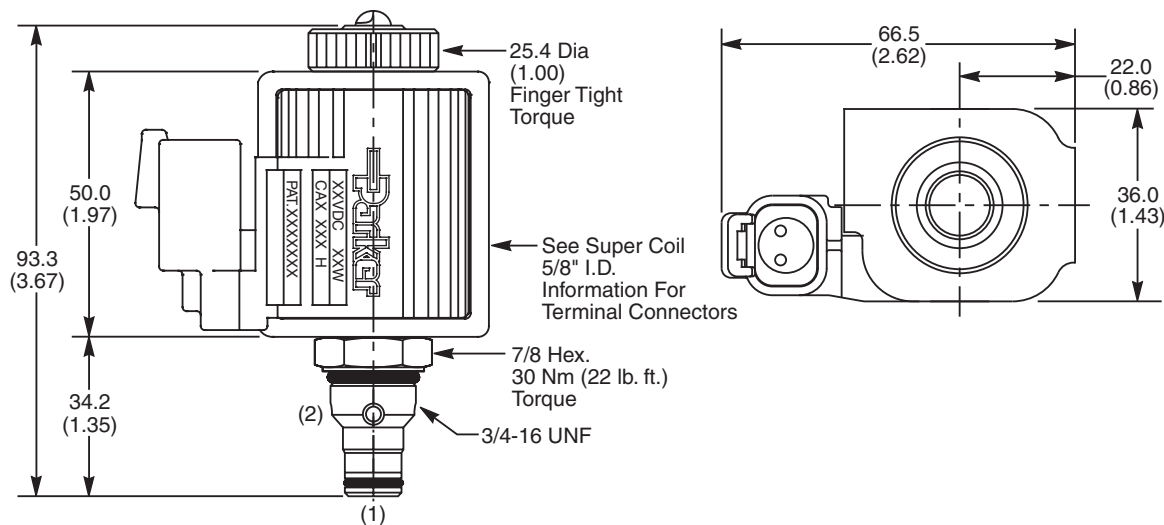
|                                                                                     |                                                                                                                                                                |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated Flow<br>(At 70 PSI ΔP)                                                        | <b>21A</b> 3.0 LPM (0.8 GPM)<br><b>35A</b> 1.3 LPM (.35 GPM)                                                                                                   |
| Factory Set Relief Pressure When De-Energized<br>(±5% -Std.<br>±2% - Low Variation) | <b>21A</b> 210 Bar (3000 PSI)<br><b>35A</b> 350 Bar (5000 PSI)                                                                                                 |
| Port 2 Pressure Limit                                                               | 103 Bar (1000 PSI)                                                                                                                                             |
| Hysteresis @<br>200 Hz PWM                                                          | < 10%                                                                                                                                                          |
| Cracking Pressure                                                                   | <b>21C</b> 0.21 Bar (3 PSI)<br><b>35C</b> 0.35 Bar (5 PSI)                                                                                                     |
| Cartridge Material                                                                  | All parts steel. All operating parts hardened steel.                                                                                                           |
| Operating Temp.<br>Range/Seals                                                      | -37°C to +93°C ("D"-Ring)<br>(-35°F to +200°F)<br>-34°C to +121°C (Nitrile Buna-N)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F) |
| Fluid Compatibility/<br>Viscosity                                                   | Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt)                                                         |
| Filtration                                                                          | ISO-4406 18/16/13, SAE Class 4                                                                                                                                 |
| Approx. Weight                                                                      | 0.09 kg (0.19 lbs.)                                                                                                                                            |
| Cavity                                                                              | C08-2<br>(See BC Section for more details)                                                                                                                     |

## Performance Curves

### ▲ PWM Current Regulator Recommended



Dimensions    Millimeters (Inches)



Ordering Information

|                                         |                       |                               |
|-----------------------------------------|-----------------------|-------------------------------|
| <b>AP02B2YR</b>                         |                       | <b>L</b>                      |
| 08 Size<br>Proportional<br>Relief Valve | Max Relief<br>Setting | Low Variation<br>Now Standard |

**Highlighted** represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

**Coil(s) sold separately.** Please see section CE of this catalog, 5/8" Super-Coil (CA series), for ordering information.

| Code | Max Relief Setting |
|------|--------------------|
| 21A  | 210 Bar (3000 PSI) |
| 35A  | 350 Bar (5000 PSI) |

| Code | Seals    |
|------|----------|
| Omit | "D"-Ring |

Order Bodies Separately  
See section BC

|            |   |                 |   |              |
|------------|---|-----------------|---|--------------|
| <b>B08</b> | — | <b>2</b>        | — | <b>6T</b>    |
| 08 size    |   | 2-Way<br>Cavity |   | Port<br>Size |

| Code | Porting / Body Material  |
|------|--------------------------|
| 6T   | SAE-6 / Steel (5000 PSI) |

| Kit               | Part Number |
|-------------------|-------------|
| D-Ring Seal       | SK08-2      |
| Nitrile Seal      | SK08-2      |
| Fluorocarbon Seal | SK08-2V     |

## General Description

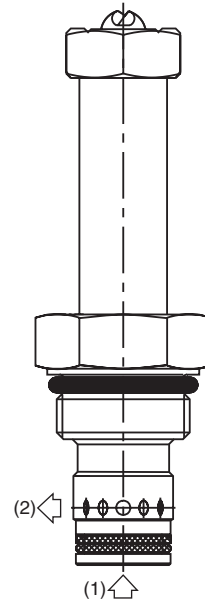
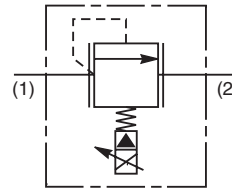
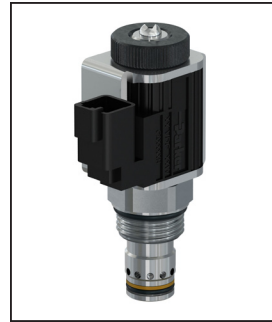
Proportional Relief Valve. Decreasing Pressure With Increasing Current. For additional information see Technical Tips on pages PV2-PV5.

## Features

- Pilot operated spool-type design
- Precise setting of factory preset pressure in de-energized mode
- One piece cartridge housing ensures internal concentricity
- Coil: Waterproof, hermetically sealed, requires no O'Rings; Symmetrical coil can be reversed without affecting performance.

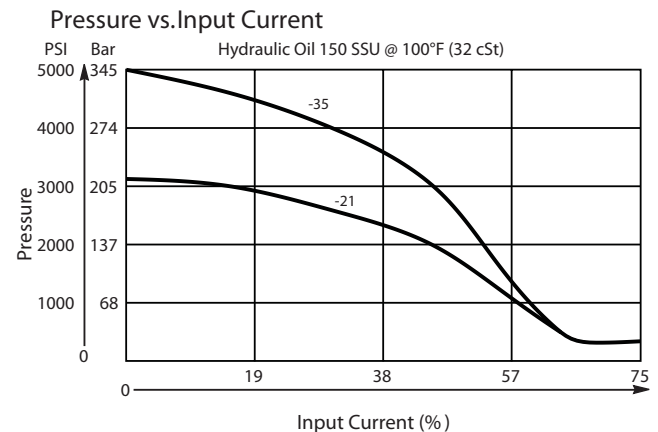
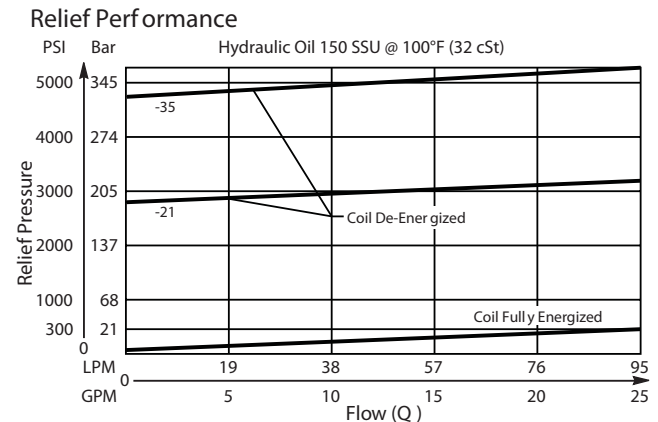
## Specifications

|                                                                                               |                                                                                                              |
|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Rated Flow<br>(At 300 PSI $\Delta P$ )<br>When Coil is Fully Energized                        | 95 LPM (25 GPM)                                                                                              |
| Factory Set Relief Pressure When<br>Coil De-Energized<br>Measured at<br>45 LPM (12 GPM)       | <b>21C</b> 210 Bar (3000 PSI)<br><b>35C</b> 350 Bar (5000 PSI)                                               |
| Port 2 Pressure Limit                                                                         | 103 Bar (1000 PSI)                                                                                           |
| Hysteresis @<br>200 Hz PWM                                                                    | < 7%<br>of Maximum Pressure Setting                                                                          |
| Response Time At<br>75% of Nominal<br>Voltage Change<br>(Measured To 90%<br>of Press. Change) | <b>To Unload</b> 45ms<br><b>To Load</b> 25 ms                                                                |
| Cartridge Material                                                                            | All parts steel. All operating parts hardened steel.                                                         |
| Operating Temp.<br>Range/Seals                                                                | -34°C to +121°C (Nitrile)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F)        |
| Fluid Compatibility/<br>Viscosity                                                             | Mineral-based or synthetic with<br>lubricating properties at viscosities<br>of 45 to 2000 SSU (6 to 420 cSt) |
| Filtration                                                                                    | ISO-4406 18/16/13, SAE Class 4                                                                               |
| Approx. Weight                                                                                | 0.14 kg (0.30 lbs.)                                                                                          |
| Cavity                                                                                        | C10-2<br>(See BC Section for more details)                                                                   |



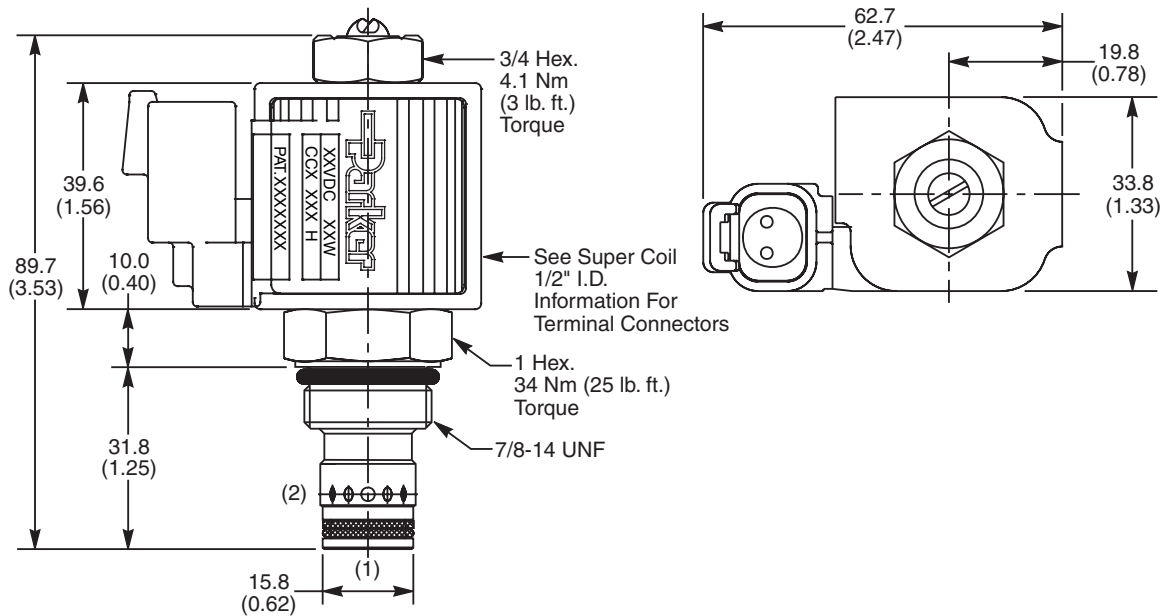
## Performance Curves

### ▲ PWM Current Regulator Recommended



|                      |
|----------------------|
| <b>CV</b>            |
| Check Valves         |
| <b>SH</b>            |
| Shuttle Valves       |
| <b>LM</b>            |
| Load/Motor Controls  |
| <b>FC</b>            |
| Flow Controls        |
| <b>PC</b>            |
| Pressure Controls    |
| <b>LE</b>            |
| Logic Elements       |
| <b>DC</b>            |
| Directional Controls |
| <b>SV</b>            |
| Solenoid Valves      |
| <b>PV</b>            |
| Proportional Valves  |
| <b>CE</b>            |
| Coils & Electronics  |
| <b>BC</b>            |
| Bodies & Cavities    |
| <b>TD</b>            |
| Technical Data       |

Dimensions    Millimeters (Inches)



Ordering Information

**AP04G2YR**    **N**

10 Size Proportional Relief Valve    Max Relief Setting    Seals

**Highlighted** represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

**Coil(s) sold separately.** Please see section CE of this catalog, 1/2" Super-Coil (CC series), for ordering information.

| Code | Max Relief Setting |
|------|--------------------|
| 21C  | 210 Bar (3000 PSI) |
| 35C  | 350 Bar (5000 PSI) |

| Code | Seals   |
|------|---------|
| N    | Nitrile |

Order Bodies Separately  
See section BC

**B10** – **2** – **8T**

10 size    2-Way Cavity    Port Size

| Code | Porting / Body Material  |
|------|--------------------------|
| 8T   | SAE-8 / Steel (5000 PSI) |

| Kit               | Part Number |
|-------------------|-------------|
| Nitrile Seal      | SK30503N-1  |
| Fluorocarbon Seal | SK30503V-1  |



|                      |
|----------------------|
| CV                   |
| Check Valves         |
| SH                   |
| Shuttle Valves       |
| LM                   |
| Load/Motor Controls  |
| FC                   |
| Flow Controls        |
| PC                   |
| Pressure Controls    |
| LE                   |
| Logic Elements       |
| DC                   |
| Directional Controls |
| SV                   |
| Solenoid Valves      |
| PV                   |
| Proportional Valves  |
| CE                   |
| Coils & Electronics  |
| BC                   |
| Bodies & Cavities    |
| TD                   |
| Technical Data       |

## General Description

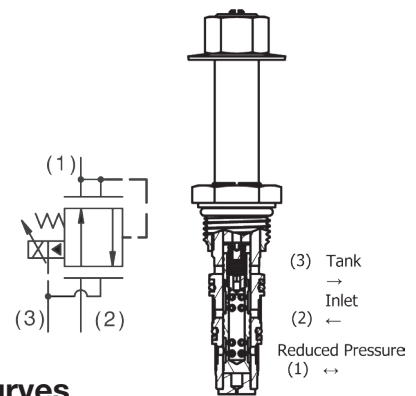
Pilot Operated, Pressure Increasing with Current Proportional Pressure Reducing/ Relieving Valve. For additional information see Technical Tips on pages PV2-PV5.

## Features

- Low hysteresis
- High flow capacity
- 400 Hz PWM signal preferred
- No dynamic seals
- Screw style manual override standard
- Polyurethane "D"-ring eliminates the need for back-up rings

## Specifications

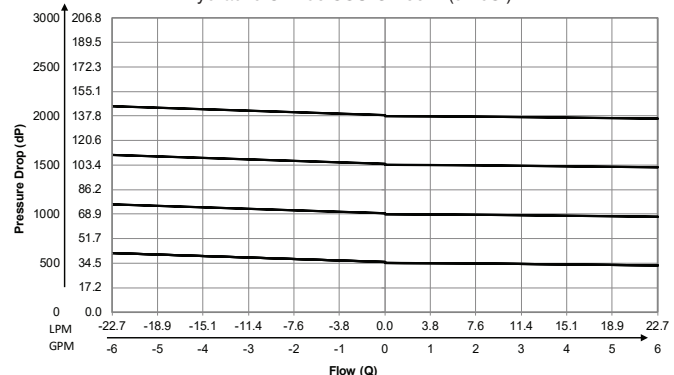
|                                    |                                                                                                                                                                |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated Flow                         | 22.7 LPM (6 GPM)                                                                                                                                               |
| Max. Input Press. At Port 1        | 345 Bar (5000 PSI)                                                                                                                                             |
| Max. Internal Leakage De-energised | 230 cc/min (14 in <sup>3</sup> /min)                                                                                                                           |
| Hysteresis @ 400 Hz PWM            | 4% with 30% to 50% duty cycle                                                                                                                                  |
| Power Consumption                  | 8.4 Watts at max. reduced pressure                                                                                                                             |
| Frequency                          | 200-600 Hz (PWM)                                                                                                                                               |
| Continuous Duty Control Current    | 12VDC .730A    24VDC .365A                                                                                                                                     |
| Cartridge Material                 | All parts steel. All operating parts hardened steel.                                                                                                           |
| Operating Temp. Range/Seals        | -37°C to +93°C ("D"-Ring)<br>(-35°F to +200°F)<br>-34°C to +121°C (Nitrile Buna-N)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F) |
| Fluid Compatibility/ Viscosity     | Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt)                                                         |
| Filtration                         | ISO-4406 18/16/13, SAE Class 4                                                                                                                                 |
| Approx. Weight                     | 0.25 kg (0.55 lbs.) With coil                                                                                                                                  |
| Cavity                             | C08-3L<br>(See BC Section for more details)                                                                                                                    |



## Performance Curves

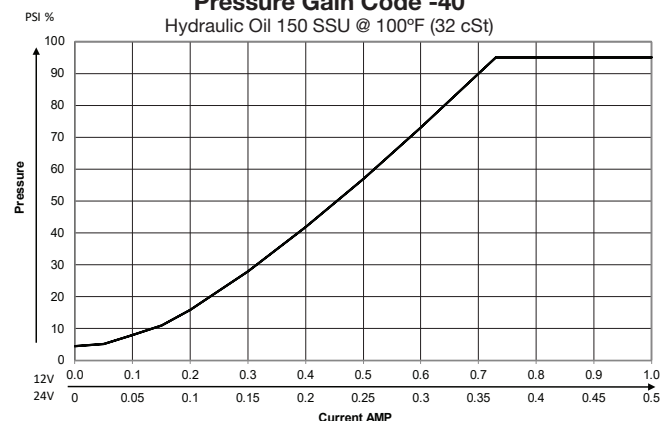
### Current Regulator PWM Recommended

**Regulated Pressure vs. Flow (Through Cartridge Only)**  
 Hydraulic Oil 150 SSU @ 100°F (32 cSt)



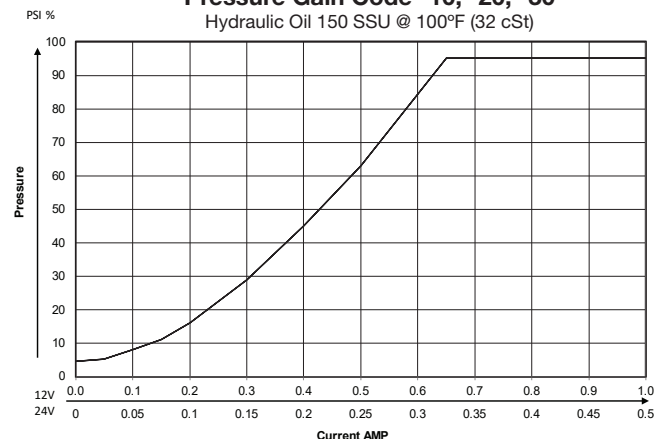
### Pressure Gain Code -40

Hydraulic Oil 150 SSU @ 100°F (32 cSt)

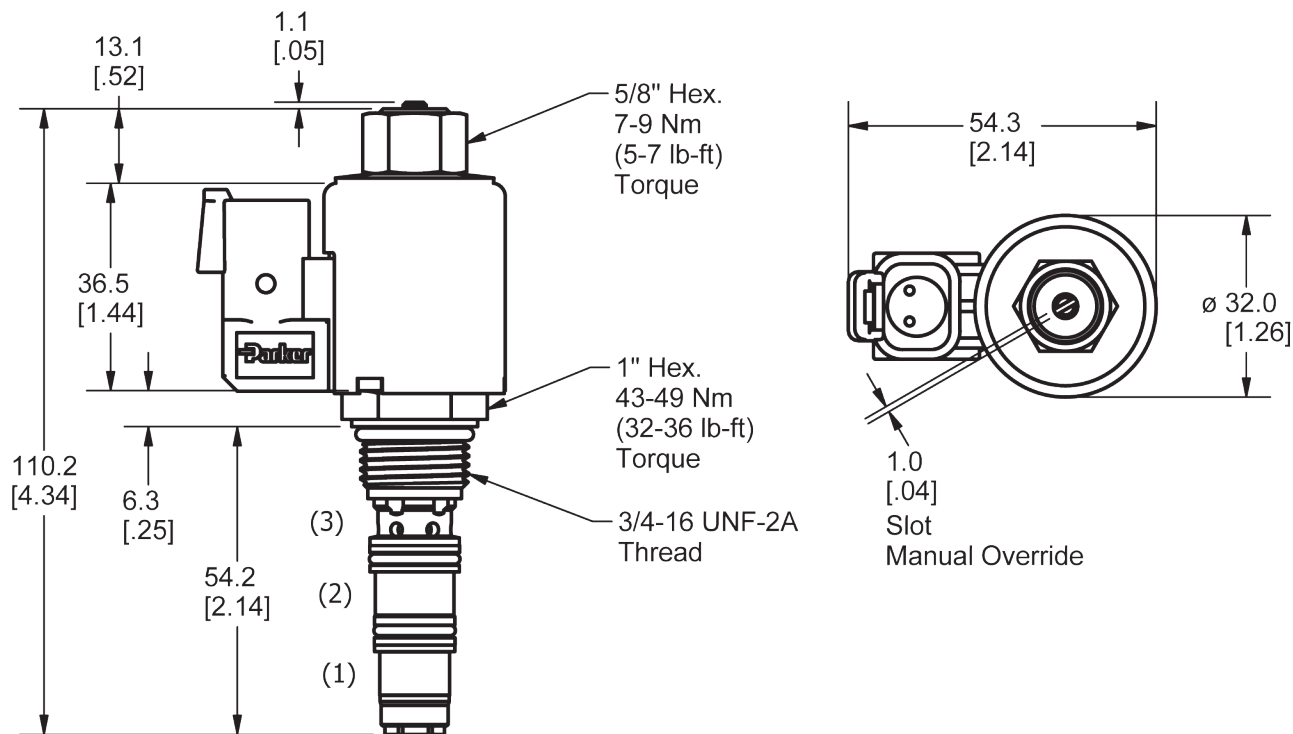


### Pressure Gain Code -10, -20, -30

Hydraulic Oil 150 SSU @ 100°F (32 cSt)



**Dimensions** Millimeters (Inches)



**Ordering Information**

**EPR083**

08 Size  
Proportional  
Valve

**R**

Style



Pressure  
Range

**Highlighted** represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

**Coil(s) sold separately.** Please see section CE of this catalog, 1/2" Coil Short Proportional (SW7L series), for ordering information.

| Code | Coil Type                                   |
|------|---------------------------------------------|
| R    | Pilot operated increasing "rising" pressure |

| Code | Pressure Range (Output) |
|------|-------------------------|
| 20   | 138 Bar (2000 PSI)      |
| 40   | 276 Bar (4000 PSI)      |

| Code | Seals    |
|------|----------|
| Omit | "D"-Ring |

Order Bodies Separately  
See section BC

|            |   |                 |   |              |
|------------|---|-----------------|---|--------------|
| <b>B08</b> | — | <b>3L</b>       | — | <b>8T</b>    |
| 08 size    |   | 3-Way<br>Cavity |   | Port<br>Size |

| Code | Porting / Body Material  |
|------|--------------------------|
| 8T   | SAE-8 / Steel (5000 PSI) |

| Kit               | Part Number |
|-------------------|-------------|
| D-Ring Seal       | SK08-3      |
| Nitrile Seal      | SK08-3      |
| Fluorocarbon Seal | SK08-3V     |

## General Description

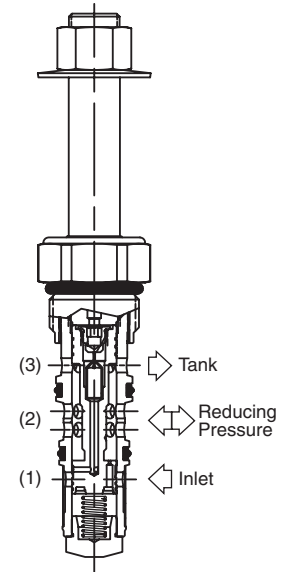
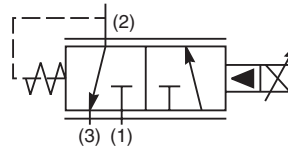
Pilot Operated, Normally Closed, Proportional Pressure Reducing/Relieving Valve. For additional information see Technical Tips on pages PV2-PV5.

## Features

- High flow capacity
- Low hysteresis
- 400 Hz PWM signal preferred
- No dynamic seals
- Polyurethane "D"-Ring eliminates need for backup rings

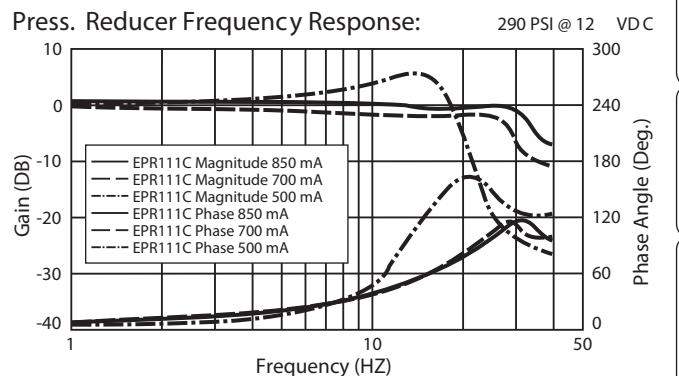
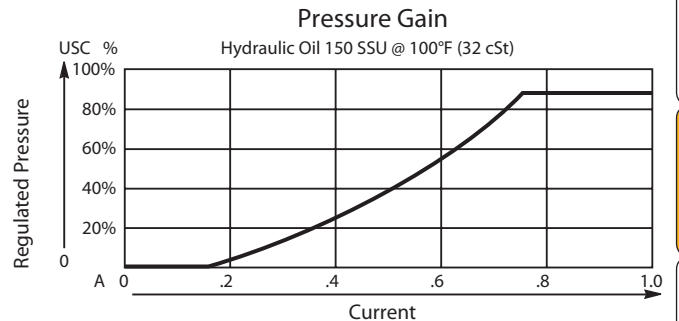
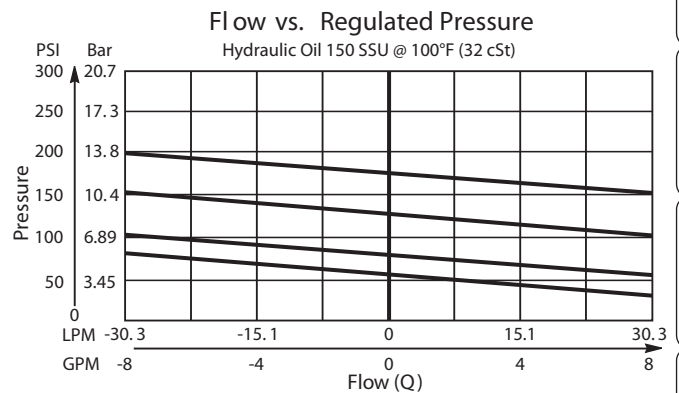
## Specifications

|                                  |                                                                                                                                                |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated Flow                       | 37.5 LPM (10 GPM)                                                                                                                              |
| Maximum Input Pressure at Port 2 | 350 Bar (5000 PSI)                                                                                                                             |
| Maximum Internal Leakage         | 0.5 LPM (0.13 GPM) @ 20.7 Bar (300 PSI)<br>0.95 LPM (0.25 GPM) @ 207 Bar (3000 PSI)                                                            |
| Hysteresis @ 400 Hz PWM          | 4% with 60% duty cycle                                                                                                                         |
| Power Consumption                | 9 watts at max. reduced pressure                                                                                                               |
| Frequency                        | 200-600 Hz (PWM)                                                                                                                               |
| Maximum Control Current          | <b>12 VDC</b> .90A <b>24 VDC</b> .45A                                                                                                          |
| Cartridge Material               | All parts steel. All operating parts hardened steel.                                                                                           |
| Operating Temp. Range/Seals      | -37°C to +93°C ("D"-Ring) (-35°F to +200°F)<br>-34°C to +121°C (Nitrile) (-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon) (-15°F to +400°F) |
| Fluid Compatibility/Viscosity    | Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt)                                         |
| Filtration                       | ISO-4406 18/16/13, SAE Class 4                                                                                                                 |
| Approx. Weight                   | 0.59 kg (1.3 lbs.)                                                                                                                             |
| Cavity                           | C10-3L<br>(See BC Section for more details)                                                                                                    |



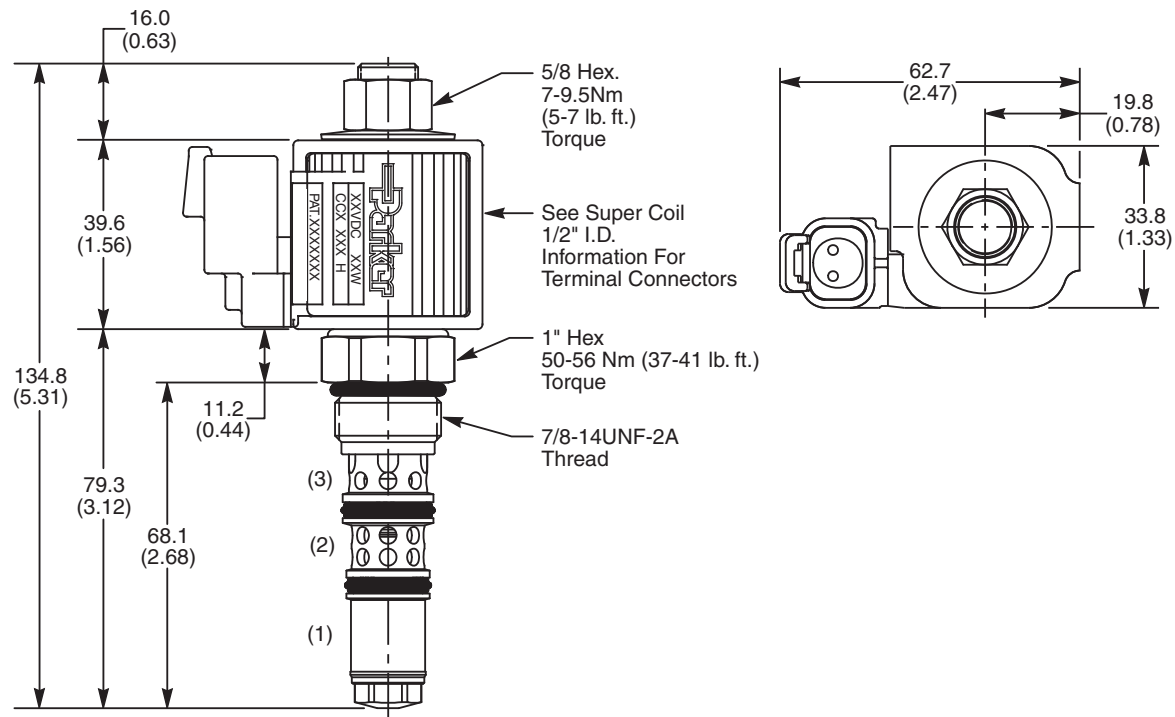
## Performance Curves

### ▲ PWM Current Regulator Recommended



|                      |
|----------------------|
| <b>CV</b>            |
| Check Valves         |
| <b>SH</b>            |
| Shuttle Valves       |
| <b>LM</b>            |
| Load/Motor Controls  |
| <b>FC</b>            |
| Flow Controls        |
| <b>PC</b>            |
| Pressure Controls    |
| <b>LE</b>            |
| Logic Elements       |
| <b>DC</b>            |
| Directional Controls |
| <b>SV</b>            |
| Solenoid Valves      |
| <b>PV</b>            |
| Proportional Valves  |
| <b>CE</b>            |
| Coils & Electronics  |
| <b>BC</b>            |
| Bodies & Cavities    |
| <b>TD</b>            |
| Technical Data       |

Dimensions      Millimeters (Inches)



Ordering Information

EPR111

11 Size  
Proportional  
Red./Rel. Valve

C

Style

Pressure  
Range

Highlighted represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

Coil(s) sold separately. Please see section CE of this catalog, 1/2" Super-Coil (CC series), for ordering information.

| Code | Style                           |
|------|---------------------------------|
| C    | Normally Closed, Pilot Operated |

| Code | Seals    |
|------|----------|
| Omit | "D"-Ring |

| Code | Pressure Range      |
|------|---------------------|
| 10   | 68.9 Bar (1000 PSI) |
| 20   | 138 Bar (2000 PSI)  |
| 30   | 207 Bar (3000 PSI)  |

| Kit               | Part Number |
|-------------------|-------------|
| D-Ring Seal       | SK10-3L     |
| Nitrile Seal      | SK10-3LN    |
| Fluorocarbon Seal | SK10-3LV    |

Order Bodies Separately  
See section BC

B10

10 size

—

3L

3-Way  
Cavity

—

8T

Port  
Size

| Code | Porting / Body Material  |
|------|--------------------------|
| 8T   | SAE-8 / Steel (5000 PSI) |

## General Description

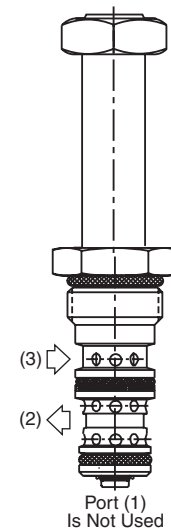
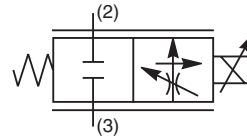
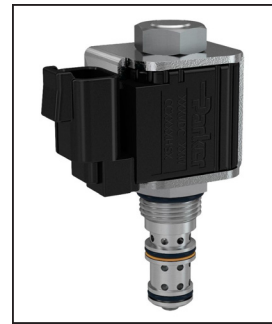
2 Way, Normally Closed, Proportional Flow Regulator Valve. Pressure Compensated. For additional information see Technical Tips on pages PV2-PV5.

## Features

- One piece cartridge housing ensures internal concentricity
- Coil: Waterproof, hermetically sealed, requires no O'Rings; Symmetrical coil can be reversed without affecting performance.
- Nonmagnetic spool and housing assembly
- Factory-adjusted low variation option (Model "L") is available for applications where low variation of flow from valve to valve is essential at a given current.

## Specifications

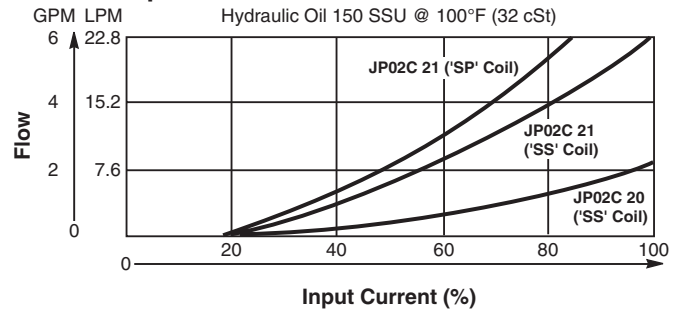
|                                          |                                                                                                                                                   |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated Flow                               | <b>20</b> 7.5 LPM (2 GPM) Low Flow ('SS' Coil)<br><b>21</b> 15 LPM (4 GPM) Standard ('SS' Coil)<br><b>21</b> 23 LPM (6 GPM) High Flow ('SP' Coil) |
| Maximum Input Pressure at Port 3         | 210 Bar (3000 PSI)                                                                                                                                |
| Minimum Pressure Differential            | <b>20</b> 10.3 Bar (150 PSI) Low Flow<br><b>21</b> 13.8 Bar (200 PSI) Standard<br><b>21</b> 20.7 Bar (300 PSI) High Flow                          |
| Maximum Internal Leakage                 | 570 cc (35 cu. in.) @ 210 Bar (3000 PSI)                                                                                                          |
| Hysteresis @ 100 Hz PWM                  | <10% (Low Flow and Standard)<br><3% (High Flow)                                                                                                   |
| Cracking Pressure                        | 25% of Input Signal                                                                                                                               |
| Variation of Flow @ 35% of Rated Current | <b>Model "L"</b><br>±7% Of Rated Flow                                                                                                             |
| Cartridge Material                       | All parts steel. All operating parts hardened steel.                                                                                              |
| Operating Temp. Range/Seals              | -34°C to +121°C (Nitrile)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F)                                             |
| Fluid Compatibility/Viscosity            | Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt)                                            |
| Filtration                               | ISO-4406 18/16/13, SAE Class 4                                                                                                                    |
| Approx. Weight                           | 0.08 kg (0.17 lbs.)                                                                                                                               |
| Cavity                                   | C08-3<br>(See BC Section for more details)                                                                                                        |



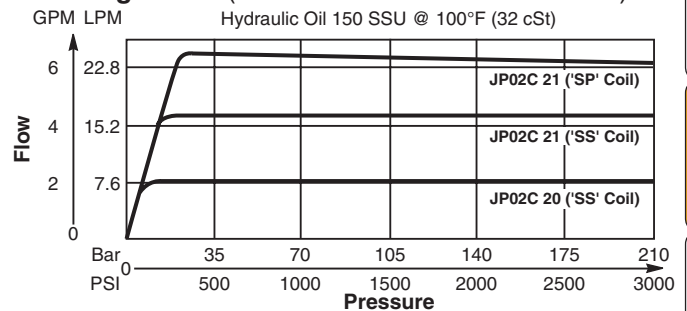
## Performance Curves

### ▲ PWM Current Regulator Recommended

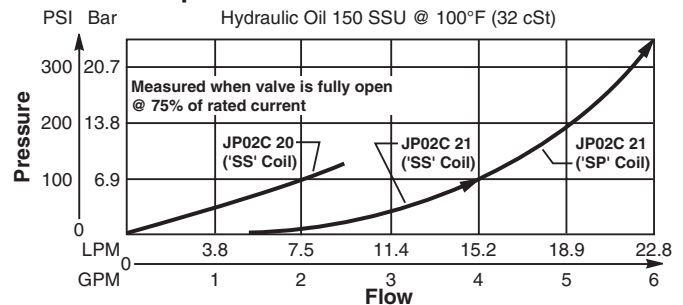
#### Flow vs. Input Current



#### Flow Regulation (Measured 75% of Rated Current)

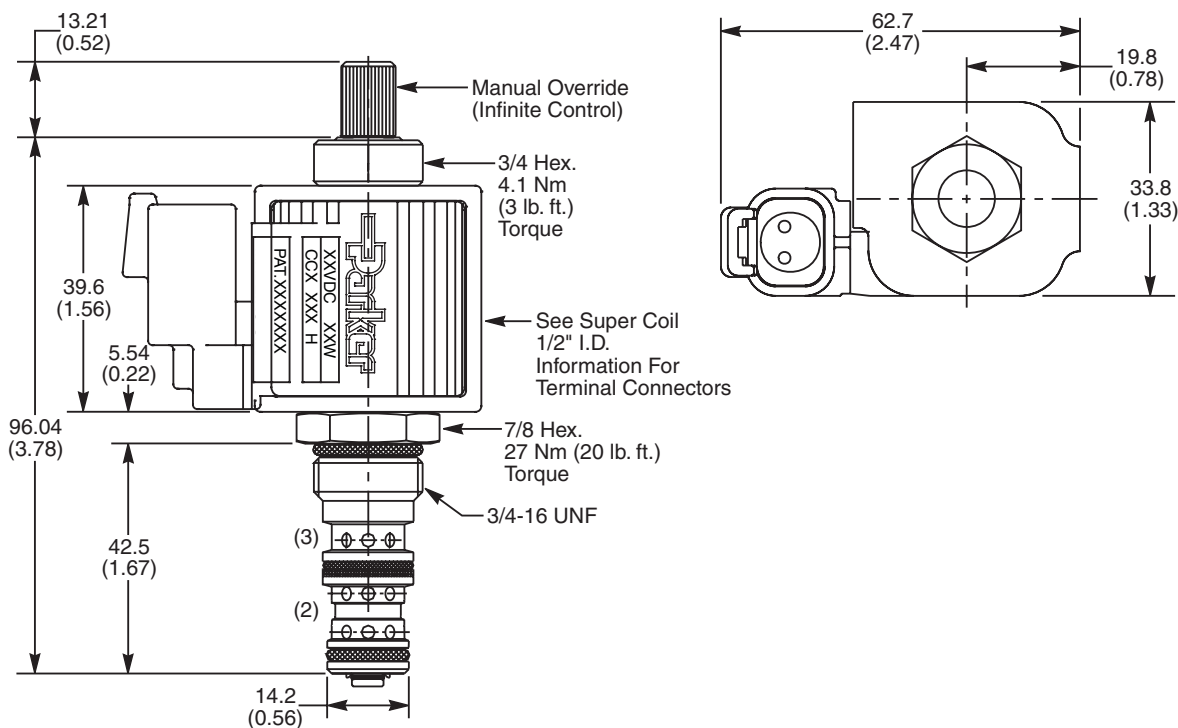


#### Pressure Drop vs. Flow



|                      |
|----------------------|
| <b>CV</b>            |
| Check Valves         |
| <b>SH</b>            |
| Shuttle Valves       |
| <b>LM</b>            |
| Load/Motor Controls  |
| <b>FC</b>            |
| Flow Controls        |
| <b>PC</b>            |
| Pressure Controls    |
| <b>LE</b>            |
| Logic Elements       |
| <b>DC</b>            |
| Directional Controls |
| <b>SV</b>            |
| Solenoid Valves      |
| <b>PV</b>            |
| Proportional Valves  |
| <b>CE</b>            |
| Coils & Electronics  |
| <b>BC</b>            |
| Bodies & Cavities    |
| <b>TD</b>            |
| Technical Data       |

Dimensions    Millimeters (Inches)



Ordering Information

|                            |       |                 |               |          |                |
|----------------------------|-------|-----------------|---------------|----------|----------------|
| <b>JP02C</b>               |       |                 |               | <b>N</b> | <b>L</b>       |
| 08 Size Proportional Valve | Style | Override Option | Filter Screen | Seals    | Flow Variation |

**Highlighted** represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

**Coil(s) sold separately.** Please see section CE of this catalog, 1/2" Super-Coil (CC series), for ordering information.

| Code | Style (Maximum Regulated Flow)       |
|------|--------------------------------------|
| 20   | Low Flow ('SS' Coil) 7.5 LPM (2 GPM) |
| 21   | Standard ('SS' Coil) 15 LPM (4 GPM)  |
| 21   | High Flow ('SP' Coil) 23 LPM (6 GPM) |

| Code | Override Option       |
|------|-----------------------|
| 0    | Not Required          |
| 5    | Infinite Control M.O. |

| Code | Filter Screen                |
|------|------------------------------|
| 0    | Not Available                |
| 1    | 60 Mesh Screen on Inlet Port |

| Code     | Seals          |
|----------|----------------|
| <b>N</b> | <b>Nitrile</b> |

| Code     | Flow Variation                    |
|----------|-----------------------------------|
| <b>L</b> | Low Variation (±7% of Rated Flow) |

| Kit               | Part Number |
|-------------------|-------------|
| Nitrile Seal      | SK30105N-1  |
| Fluorocarbon Seal | SK30105V-1  |

Order Bodies Separately  
See section BC

|            |   |              |   |           |
|------------|---|--------------|---|-----------|
| <b>B08</b> | — | <b>3</b>     | — | <b>6T</b> |
| 08 size    |   | 3-Way Cavity |   | Port Size |

| Code | Porting / Body Material  |
|------|--------------------------|
| 6T   | SAE-6 / Steel (5000 PSI) |

## General Description

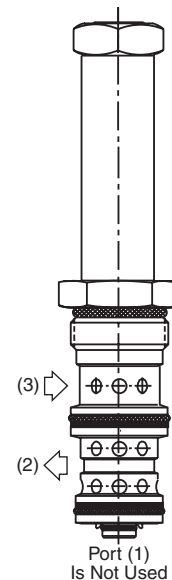
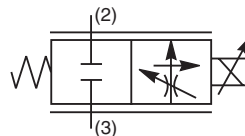
2 Way, Normally Closed, Proportional Flow Regulator Valve. Pressure Compensated.  
 For additional information see Technical Tips on pages PV2-PV5.

## Features

- One piece cartridge housing ensures internal concentricity
- Coil: Waterproof, hermetically sealed, requires no O'Rings; Symmetrical coil can be reversed without affecting performance.
- Nonmagnetic spool and housing assembly
- Factory-adjusted low variation option (Model "L") is available for applications where low variation of flow from valve to valve is essential at a given current.

## Specifications

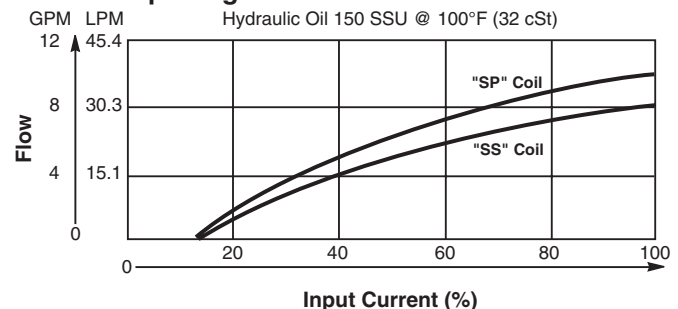
|                                          |                                                                                                         |
|------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Rated Flow                               | <b>21</b> 30 LPM (8 GPM)<br>Standard ('SS' Coil)<br><b>21</b> 36 LPM (9.5 GPM)<br>High Flow ('SP' Coil) |
| Maximum Input Pressure at Port 2         | 210 Bar (3000 PSI)                                                                                      |
| Minimum Pressure Differential            | <b>21</b> 13.8 Bar (200 PSI) Standard<br><b>21</b> 20.7 Bar (300 PSI) High Flow                         |
| Maximum Internal Leakage                 | 780 cc (46 cu. in.)<br>@ 210 Bar (3000 PSI)                                                             |
| Hysteresis @ 100 Hz PWM                  | 7%                                                                                                      |
| Cracking Pressure                        | 25% of Input Signal                                                                                     |
| Variation of Flow @ 35% of Rated Current | <b>Model "L"</b><br>±7% Of Rated Flow                                                                   |
| Cartridge Material                       | All parts steel. All operating parts hardened steel.                                                    |
| Operating Temp. Range/Seals              | -34°C to +121°C (Nitrile)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F)   |
| Fluid Compatibility/Viscosity            | Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt)  |
| Filtration                               | ISO-4406 18/16/13, SAE Class 4                                                                          |
| Approx. Weight                           | 0.13 kg (0.28 lbs.)                                                                                     |
| Cavity                                   | 3X<br>(See BC Section for more details)                                                                 |



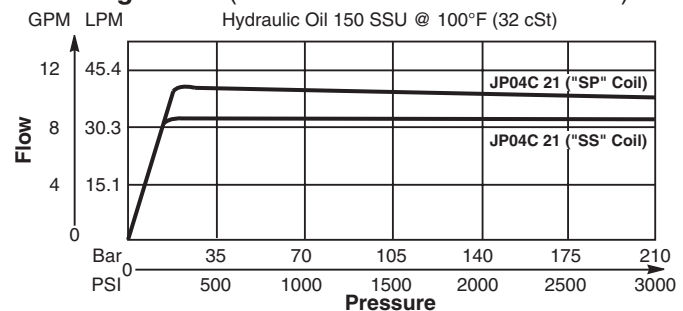
## Performance Curves

### ▲ PWM Current Regulator Recommended

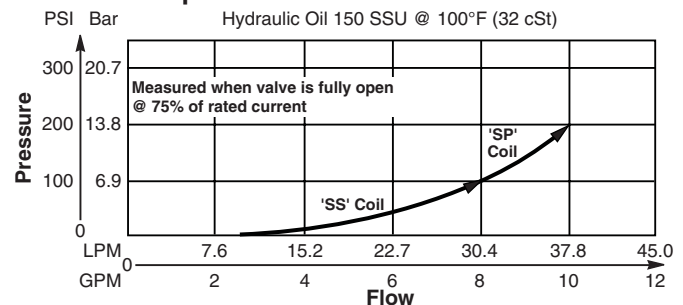
#### Flow vs. Input Signal



#### Flow Regulation (Measured 75% of Rated Current)

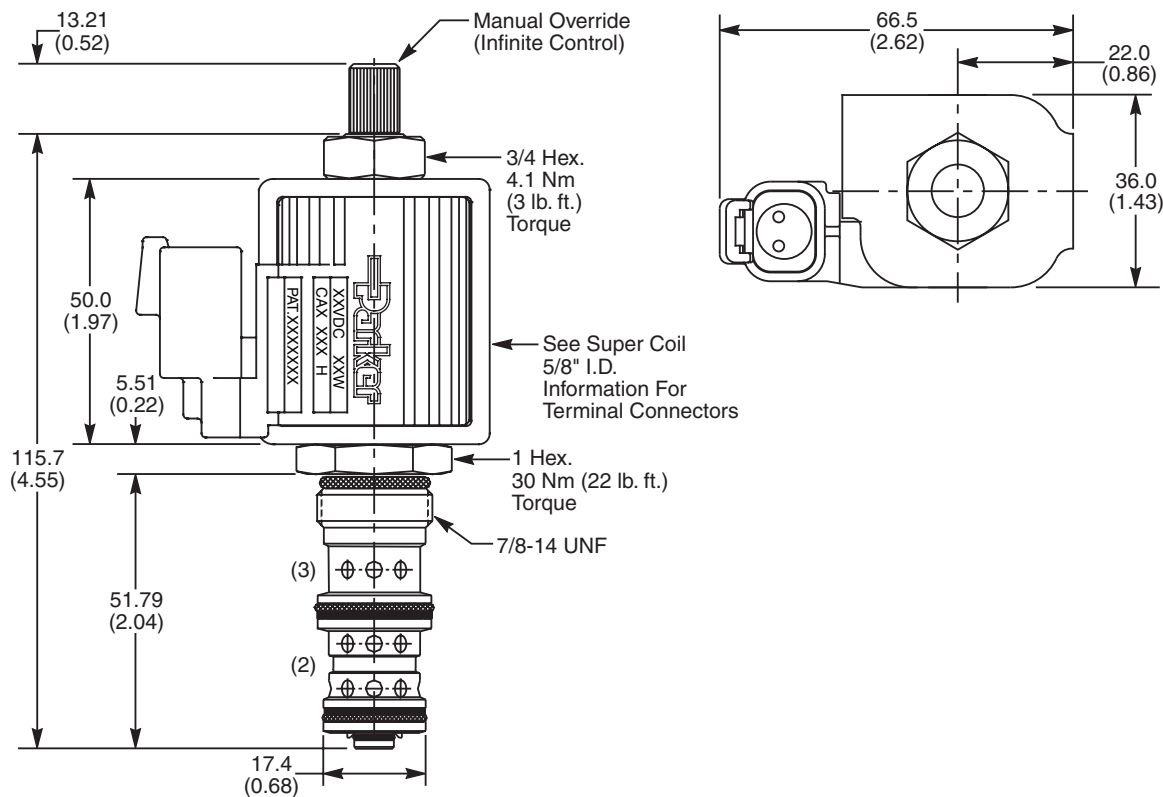


#### Pressure Drop vs. Flow



|                      |
|----------------------|
| CV                   |
| Check Valves         |
| SH                   |
| Shuttle Valves       |
| LM                   |
| Load/Motor Controls  |
| FC                   |
| Flow Controls        |
| PC                   |
| Pressure Controls    |
| LE                   |
| Logic Elements       |
| DC                   |
| Directional Controls |
| SV                   |
| Solenoid Valves      |
| PV                   |
| Proportional Valves  |
| CE                   |
| Coils & Electronics  |
| BC                   |
| Bodies & Cavities    |
| TD                   |
| Technical Data       |

Dimensions    Millimeters (Inches)



Ordering Information

|                                  |           |                    |                  |          |                   |
|----------------------------------|-----------|--------------------|------------------|----------|-------------------|
| <b>JP04C</b>                     | <b>21</b> |                    |                  | <b>N</b> | <b>L</b>          |
| 10 Size<br>Proportional<br>Valve | Style     | Override<br>Option | Filter<br>Screen | Seals    | Flow<br>Variation |

**Highlighted** represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

**Coil(s) sold separately.** Please see section CE of this catalog, 5/8" Super-Coil (CA series), for ordering information.

| Code | Style (Maximum Regulated Flow)         |
|------|----------------------------------------|
| 21   | Standard ('SS' Coil) 30 LPM (8 GPM)    |
| 21   | High Flow ('SP' Coil) 36 LPM (9.5 GPM) |

| Code | Override Option       |
|------|-----------------------|
| 0    | Not Required          |
| 5    | Infinite Control M.O. |

| Code | Filter Screen            |
|------|--------------------------|
| 0    | Not Available            |
| 1    | 60 Mesh Screen on Port 2 |

| Code     | Seals          |
|----------|----------------|
| <b>N</b> | <b>Nitrile</b> |

| Code | Flow Variation                       |
|------|--------------------------------------|
| L    | Low Variation<br>(±7% of Rated Flow) |

| Kit               | Part Number |
|-------------------|-------------|
| Nitrile Seal      | SK30106N-1  |
| Fluorocarbon Seal | SK30106V-1  |

Order Bodies Separately  
See section BC

|             |            |                  |
|-------------|------------|------------------|
| <b>LB10</b> | <b>553</b> | <b>S</b>         |
| Line Body   | Porting    | Body<br>Material |

| Code | Porting  |
|------|----------|
| 553  | 1/2" SAE |

| Code | Body Material    |
|------|------------------|
| S    | Steel (5000 PSI) |

|                         |
|-------------------------|
| <b>CV</b>               |
| Check<br>Valves         |
| <b>SH</b>               |
| Shuttle<br>Valves       |
| <b>LM</b>               |
| Load/Motor<br>Controls  |
| <b>FC</b>               |
| Flow<br>Controls        |
| <b>PC</b>               |
| Pressure<br>Controls    |
| <b>LE</b>               |
| Logic<br>Elements       |
| <b>DC</b>               |
| Directional<br>Controls |
| <b>SV</b>               |
| Solenoid<br>Valves      |
| <b>PV</b>               |
| Proportional<br>Valves  |
| <b>CE</b>               |
| Coils &<br>Electronics  |
| <b>BC</b>               |
| Bodies &<br>Cavities    |
| <b>TD</b>               |
| Technical<br>Data       |

## General Description

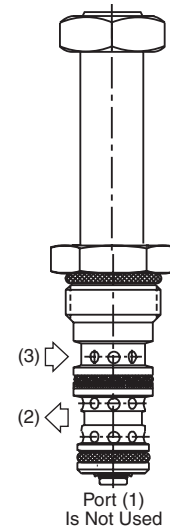
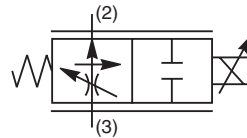
2 Way, Normally Open, Proportional Flow Regulator Valve. Pressure Compensated.  
 For additional information see Technical Tips on pages PV2-PV5.

## Features

- One piece cartridge housing ensures internal concentricity
- Coil: Waterproof, hermetically sealed, requires no O'Rings; Symmetrical coil can be reversed without affecting performance.
- Nonmagnetic spool and housing assembly
- Factory-adjusted low variation option (Model "L") is available for applications where low variation of flow from valve to valve is essential at a given current.

## Specifications

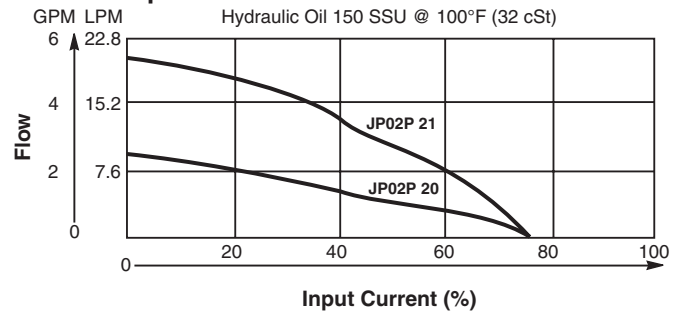
|                                          |                                                                                                        |
|------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Rated Flow                               | <b>20</b> 9.5 LPM (2.5 GPM) Standard ('SS' Coil)<br><b>21</b> 19 LPM (5 GPM) High Flow ('SP' Coil)     |
| Maximum Input Pressure at Port 2         | 210 Bar (3000 PSI)                                                                                     |
| Minimum Pressure Differential            | <b>20</b> 10.3 Bar (150 PSI) Standard<br><b>21</b> 20.7 Bar (300 PSI) High Flow                        |
| Maximum Internal Leakage                 | 570 cc (35 cu. in.) @ 210 Bar (3000 PSI)                                                               |
| Hysteresis @ 100 Hz PWM                  | <3%                                                                                                    |
| Cracking Pressure                        | 25% of Input Signal                                                                                    |
| Variation of Flow @ 35% of Rated Current | <b>Model "L"</b><br>±7% Of Rated Flow                                                                  |
| Cartridge Material                       | All parts steel. All operating parts hardened steel.                                                   |
| Operating Temp. Range/Seals              | -34°C to +121°C (Nitrile)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F)  |
| Fluid Compatibility/Viscosity            | Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt) |
| Filtration                               | ISO-4406 18/16/13, SAE Class 4                                                                         |
| Approx. Weight                           | 0.08 kg (0.17 lbs.)                                                                                    |
| Cavity                                   | C08-3<br>(See BC Section for more details)                                                             |



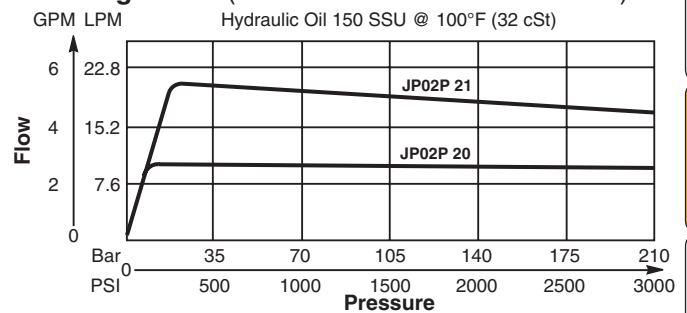
## Performance Curves

### ▲ PWM Current Regulator Recommended

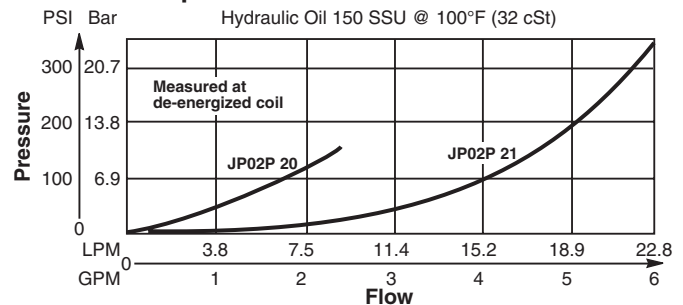
#### Flow vs. Input Current



#### Flow Regulation (Measured 75% of Rated Current)

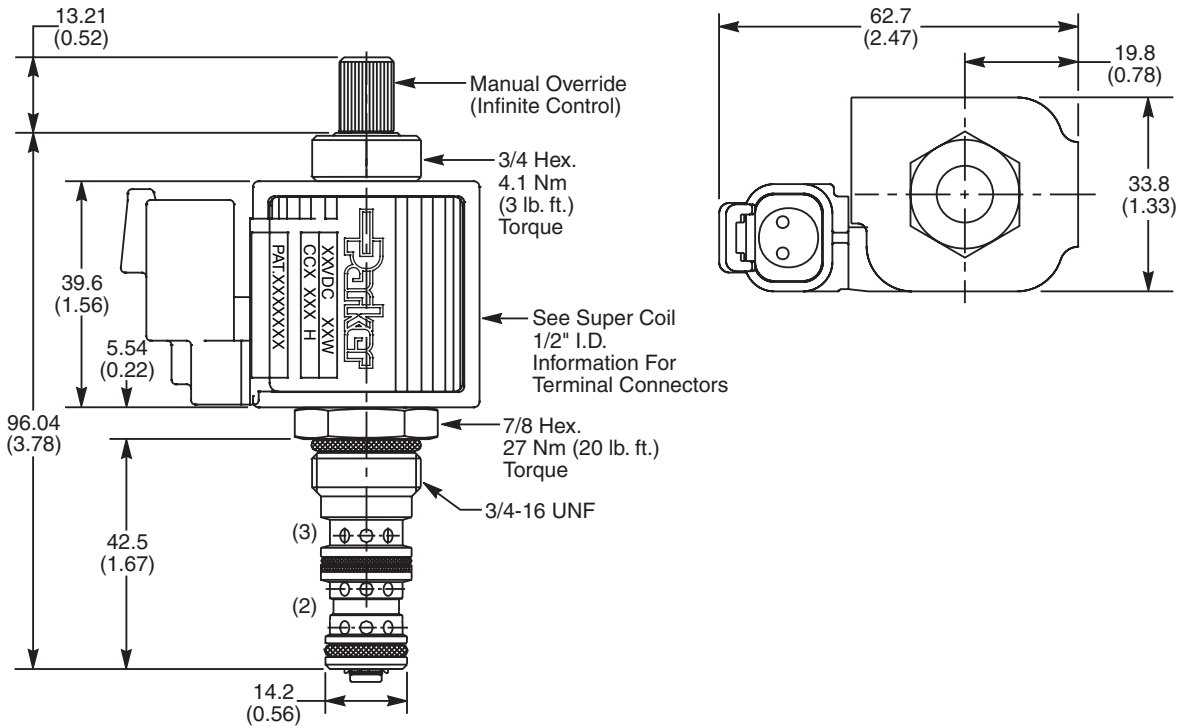


#### Pressure Drop vs. Flow



|                      |
|----------------------|
| <b>CV</b>            |
| Check Valves         |
| <b>SH</b>            |
| Shuttle Valves       |
| <b>LM</b>            |
| Load/Motor Controls  |
| <b>FC</b>            |
| Flow Controls        |
| <b>PC</b>            |
| Pressure Controls    |
| <b>LE</b>            |
| Logic Elements       |
| <b>DC</b>            |
| Directional Controls |
| <b>SV</b>            |
| Solenoid Valves      |
| <b>PV</b>            |
| Proportional Valves  |
| <b>CE</b>            |
| Coils & Electronics  |
| <b>BC</b>            |
| Bodies & Cavities    |
| <b>TD</b>            |
| Technical Data       |

Dimensions    Millimeters (Inches)



Ordering Information

|                            |       |                 |               |          |                |
|----------------------------|-------|-----------------|---------------|----------|----------------|
| <b>JP02P</b>               |       |                 |               | <b>N</b> | <b>L</b>       |
| 08 Size Proportional Valve | Style | Override Option | Filter Screen | Seals    | Flow Variation |

**Highlighted** represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

**Coil(s) sold separately.** Please see section CE of this catalog, 1/2" Super-Coil (CC series), for ordering information.

| Code | Style (Maximum Regulated Flow)         |
|------|----------------------------------------|
| 20   | Standard ('SS' Coil) 9.5 LPM (2.5 GPM) |
| 21   | High Flow ('SP' Coil) 19 LPM (5 GPM)   |

| Code | Override Option       |
|------|-----------------------|
| 0    | Not Required          |
| 5    | Infinite Control M.O. |

| Code | Filter Screen            |
|------|--------------------------|
| 0    | Not Available            |
| 1    | 60 Mesh Screen on Port 2 |

| Code     | Seals          |
|----------|----------------|
| <b>N</b> | <b>Nitrile</b> |

| Code | Flow Variation                    |
|------|-----------------------------------|
| L    | Low Variation (±7% of Rated Flow) |

| Kit               | Part Number |
|-------------------|-------------|
| Nitrile Seal      | SK30105N-1  |
| Fluorocarbon Seal | SK30105V-1  |

Order Bodies Separately  
See section BC

|            |   |              |   |           |
|------------|---|--------------|---|-----------|
| <b>B08</b> | — | <b>3</b>     | — | <b>6T</b> |
| 08 size    |   | 3-Way Cavity |   | Port Size |

| Code | Porting / Body Material  |
|------|--------------------------|
| 6T   | SAE-6 / Steel (5000 PSI) |

## General Description

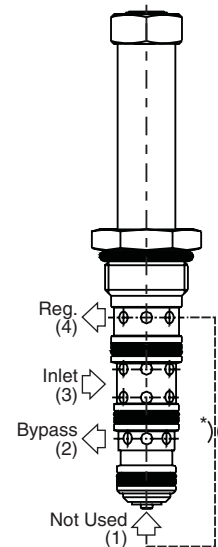
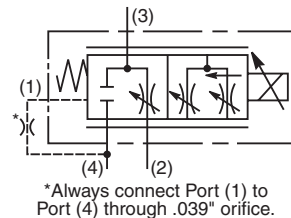
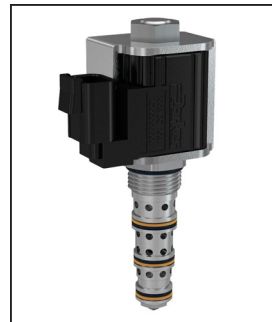
3 Way, Normally Closed, Proportional Flow Regulator Valve. Pressure Compensated. For additional information see Technical Tips on pages PV2-PV5.

## Features

- Analog proportional pressure compensated flow control valve regulates flow proportionally to the input solenoid current
- One piece cartridge housing ensures internal concentricity
- Coil: Waterproof, hermetically sealed, requires no O'Rings; Symmetrical coil can be reversed without affecting performance.
- Nonmagnetic spool and housing assembly
- Factory-adjusted low variation option (Model "L") is available for applications where low variation of flow from valve to valve is essential at a given current.

## Specifications

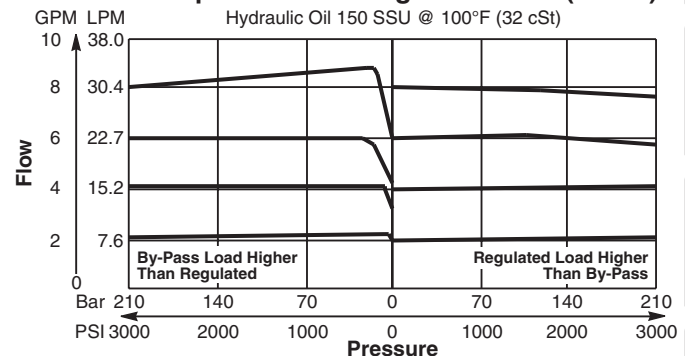
|                                  |                                                                                                        |
|----------------------------------|--------------------------------------------------------------------------------------------------------|
| Rated Inlet Flow                 | 60 LPM (16 GPM)                                                                                        |
| Rated Regulated Flow             | <b>31</b> 26 LPM (7 GPM) Standard ('SS' Coil)<br><b>31</b> 30 LPM (8 GPM) High Flow ('SP' Coil)        |
| Maximum Input Pressure at Port 3 | 210 Bar (3000 PSI)                                                                                     |
| Minimum Pressure Differential    | <b>31</b> 13.8 Bar (200 PSI) Standard<br><b>31</b> 20.7 Bar (300 PSI) High Flow                        |
| Maximum Internal Leakage         | 780 cc (46 cu. in.) @ 210 Bar (3000 PSI)                                                               |
| Hysteresis @ 100 Hz PWM          | 7%                                                                                                     |
| Opening Point                    | <b>Standard</b><br>21% of Nominal Amperage<br><b>High Flow</b><br>17% of Nominal Amperage              |
| Variation of Opening Point       | <b>Model "L"</b><br>±20% of Amperage                                                                   |
| Cartridge Material               | All parts steel. All operating parts hardened steel.                                                   |
| Operating Temp. Range/Seals      | -34°C to +121°C (Nitrile)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F)  |
| Fluid Compatibility/Viscosity    | Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt) |
| Filtration                       | ISO-4406 18/16/13, SAE Class 4                                                                         |
| Approx. Weight                   | 0.14 kg (0.31 lbs.)                                                                                    |
| Cavity                           | 4C<br>(See BC Section for more details)                                                                |



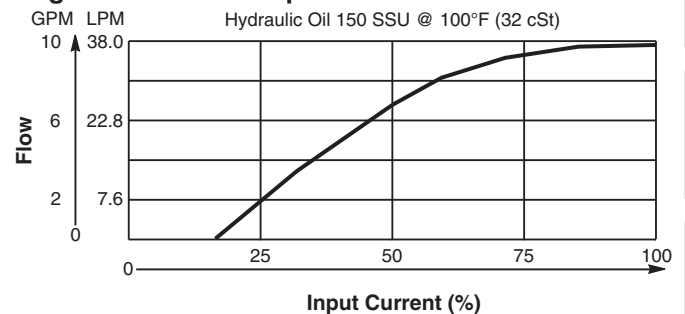
## Performance Curves

### ▲ PWM Current Regulator Recommended

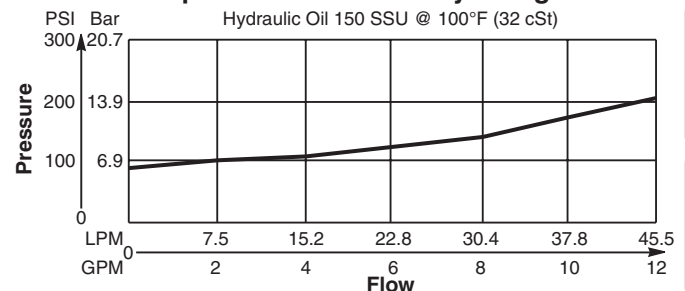
#### Pressure Compensation of Regulated Flow (Port 4)



#### Regulated Flow vs. Input Current Stabilized

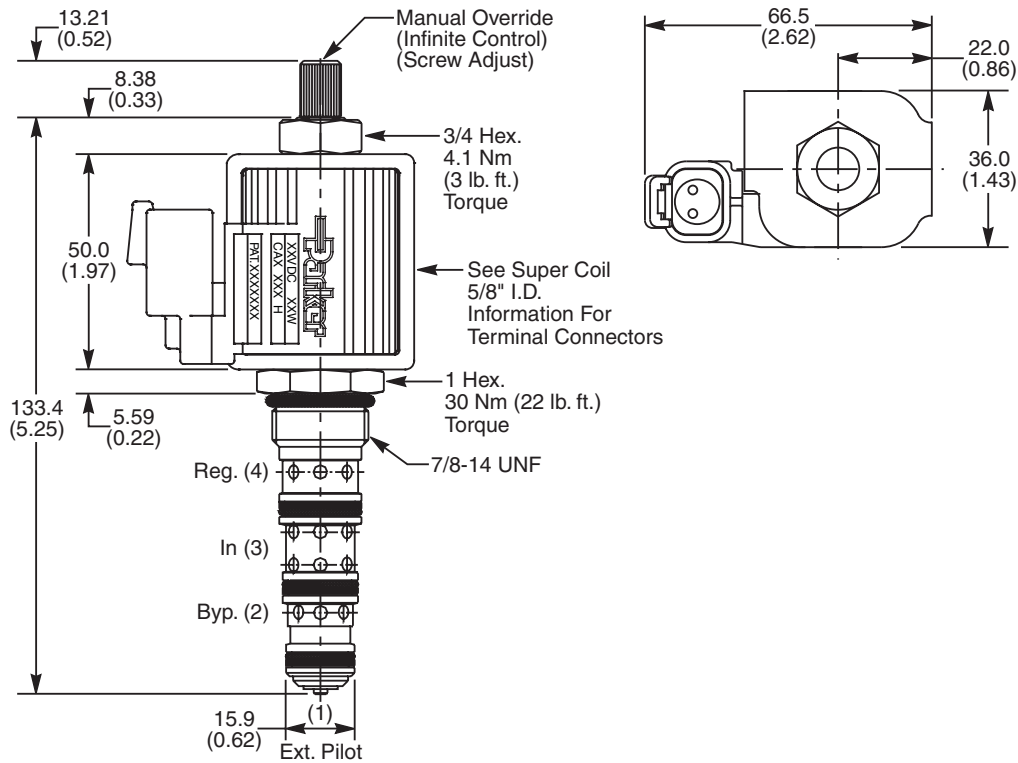


#### Pressure Drop vs. Flow at Coil Fully Energized



|                      |
|----------------------|
| <b>CV</b>            |
| Check Valves         |
| <b>SH</b>            |
| Shuttle Valves       |
| <b>LM</b>            |
| Load/Motor Controls  |
| <b>FC</b>            |
| Flow Controls        |
| <b>PC</b>            |
| Pressure Controls    |
| <b>LE</b>            |
| Logic Elements       |
| <b>DC</b>            |
| Directional Controls |
| <b>SV</b>            |
| Solenoid Valves      |
| <b>PV</b>            |
| Proportional Valves  |
| <b>CE</b>            |
| Coils & Electronics  |
| <b>BC</b>            |
| Bodies & Cavities    |
| <b>TD</b>            |
| Technical Data       |

Dimensions    Millimeters (Inches)



Ordering Information

|                            |           |                 |               |          |                |
|----------------------------|-----------|-----------------|---------------|----------|----------------|
| <b>JP04C</b>               | <b>31</b> |                 | <b>0</b>      | <b>N</b> | <b>L</b>       |
| 10 Size Proportional Valve | Style     | Override Option | Filter Screen | Seals    | Flow Variation |

**Highlighted** represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

**Coil(s) sold separately.** Please see section CE of this catalog, 5/8" Super-Coil (CA series), for ordering information.

| Code | Style (Maximum Regulated Flow)       |
|------|--------------------------------------|
| 31   | Standard ('SS' Coil) 26 LPM (7 GPM)  |
| 31   | High Flow ('SP' Coil) 30 LPM (8 GPM) |

| Code     | Seals          |
|----------|----------------|
| <b>N</b> | <b>Nitrile</b> |

Order Bodies Separately  
See section BC

|             |            |               |
|-------------|------------|---------------|
| <b>LB10</b> | <b>562</b> | <b>S</b>      |
| Line Body   | Porting    | Body Material |

| Code | Override Option                 |
|------|---------------------------------|
| 0    | Not Required                    |
| 5    | Screw Adjust (Infinite Control) |

| Code | Flow Variation                    |
|------|-----------------------------------|
| L    | Low Variation (±7% of Rated Flow) |

| Code | Porting                   |
|------|---------------------------|
| 562  | 1/2" SAE Steel (5000 PSI) |

| Code | Filter Screen |
|------|---------------|
| 0    | Not Available |

| Kit               | Part Number |
|-------------------|-------------|
| Nitrile Seal      | SK30082N-1  |
| Fluorocarbon Seal | SK30082V-1  |

|                      |
|----------------------|
| <b>CV</b>            |
| Check Valves         |
| <b>SH</b>            |
| Shuttle Valves       |
| <b>LM</b>            |
| Load/Motor Controls  |
| <b>FC</b>            |
| Flow Controls        |
| <b>PC</b>            |
| Pressure Controls    |
| <b>LE</b>            |
| Logic Elements       |
| <b>DC</b>            |
| Directional Controls |
| <b>SV</b>            |
| Solenoid Valves      |
| <b>PV</b>            |
| Proportional Valves  |
| <b>CE</b>            |
| Coils & Electronics  |
| <b>BC</b>            |
| Bodies & Cavities    |
| <b>TD</b>            |
| Technical Data       |

## General Description

4 Way, 3 Position, Proportional Directional Control Valve. Closed Center Spool. For additional information see Technical Tips on pages PV2-PV5.

## Features

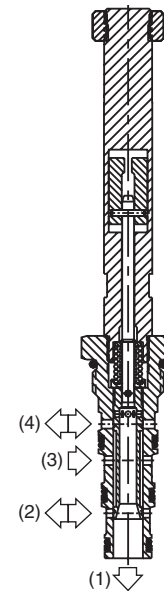
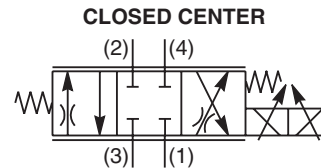
- One piece cartridge housing ensures internal concentricity
- Coil: Waterproof, hermetically sealed, requires no O'Rings; Symmetrical coil can be reversed without affecting performance.

## Specifications

|                                          |                                                                                                        |
|------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Operating Pressure                       | <b>Ports 2, 3 and 4</b><br>350 Bar (5000 PSI)<br><b>Port 1</b><br>210 Bar (3000 PSI)                   |
| Hysteresis @ 100 Hz PWM                  | <6%                                                                                                    |
| Cracking Flow                            | 25% to 30% of Input Signal                                                                             |
| Variation of Flow                        | ±15% @ 75% of Nominal Current and Constant ΔP Maintained by Pressure Compensator                       |
| Port to Port Leakage                     | 10 cu. in/min @ 3000 PSI                                                                               |
| <b>Step Response Time at 75% of Amps</b> | On 50 ms<br>Off 40 ms                                                                                  |
| Cartridge Material                       | All parts steel. All operating parts hardened steel.                                                   |
| Operating Temp. Range/Seals              | -34°C to +121°C (Nitrile)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F)  |
| Fluid Compatibility/Viscosity            | Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt) |
| Filtration                               | ISO-4406 18/16/13, SAE Class 4                                                                         |
| Approx. Weight                           | 0.15 kg (0.34 lbs.)                                                                                    |
| Cavity                                   | C08-4<br>(See BC Section for more details)                                                             |

## Typical Performance

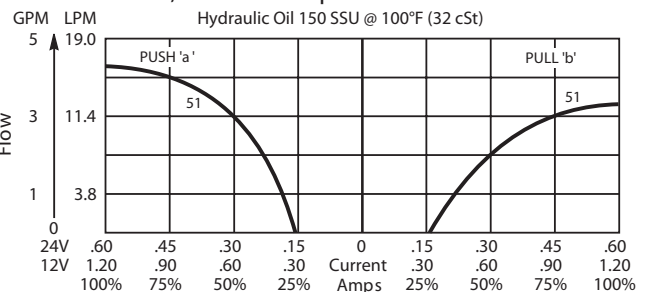
| SPOOL TYPE AND FLOW | RATED FLOW AT 75% OF NOMINAL CURRENT LPM - (GPM) |                                  | SUPER COIL TYPE |      | Compensator ΔP Bar (PSI) |
|---------------------|--------------------------------------------------|----------------------------------|-----------------|------|--------------------------|
|                     | 'a' SOLENOID PUSH P to A, B to T                 | 'b' SOLENOID PULL P to B, A to T | PUSH            | PULL |                          |
| 51 Standard         | 13.3 - (3.5)                                     | 17 - (4.5)                       | SP              | SP   | 15 (220)                 |
|                     | 11.4 - (3.0)                                     | 15.2 - (4.0)                     | SS              | SS   | 15 (220)                 |
| 52 High Flow        | 21 - (5.5)                                       | 17 - (4.5)                       | SP              | SP   | 20 (290)                 |
|                     | 17.4 - (4.5)                                     | 13 - (3.5)                       | SP              | SP   | 15 (220)                 |



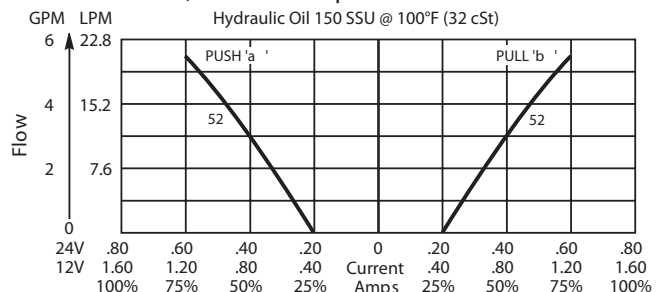
## Performance Curves

### ▲ PWM Current Regulator Recommended

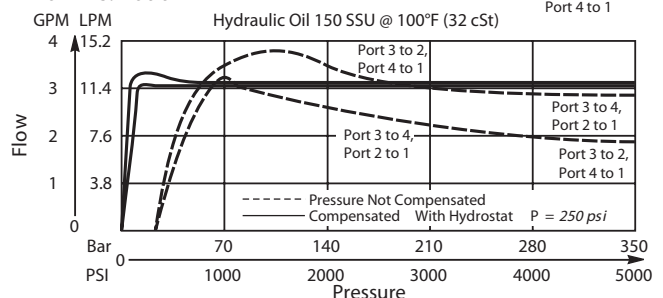
51L With 5 Bar, 75 PSI Compensator  
 51 With 15 Bar, 220 PSI Compensator and SS Coil



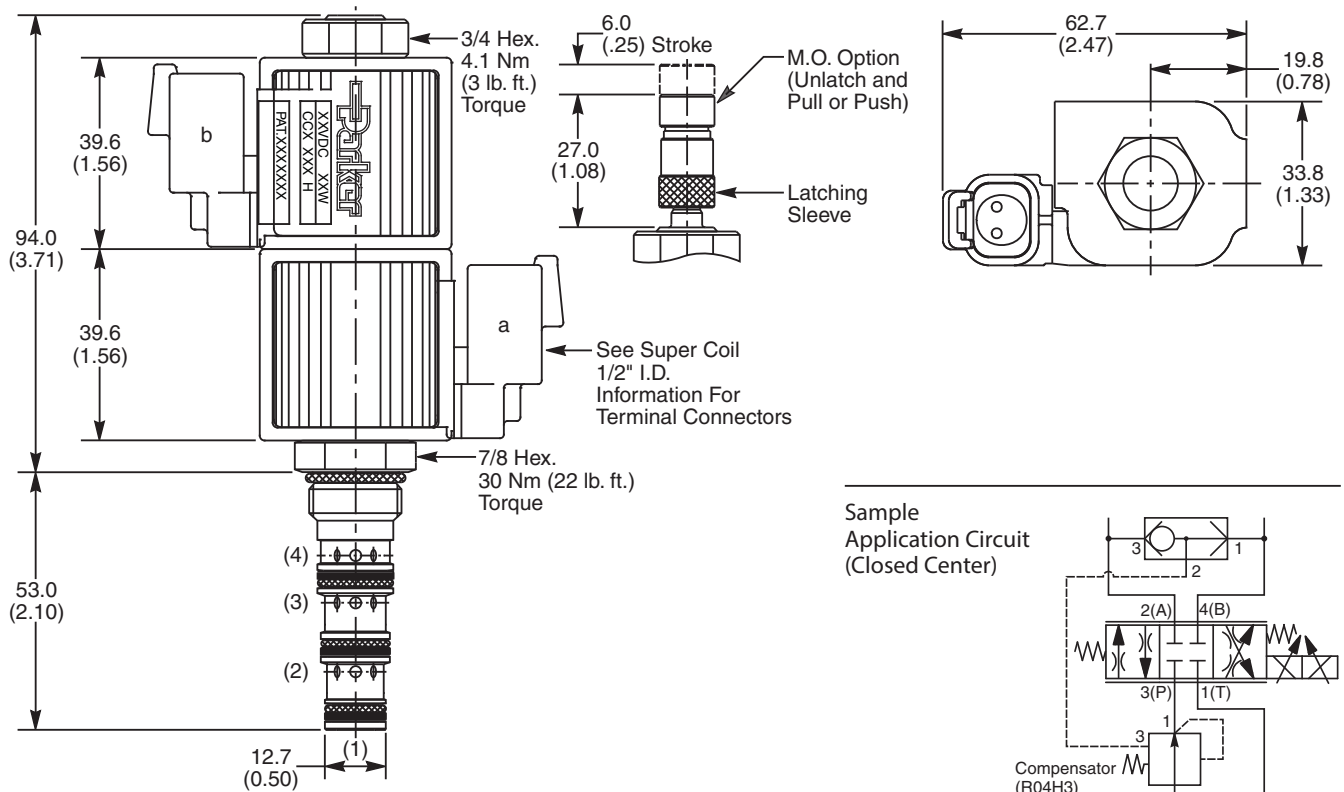
52 With 20 Bar, 290 PSI Compensator and SP Coil



### Flow vs. Load



## Dimensions Millimeters (Inches)



## Ordering Information

|                            |       |                 |          |
|----------------------------|-------|-----------------|----------|
| <b>GP02</b>                |       |                 | <b>N</b> |
| 08 Size Proportional Valve | Style | Override Option | Seals    |

**Highlighted** represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

Coil(s) sold separately. Please see section CE of this catalog, 1/2" Super-Coil (CC series), for ordering information.

| Code | Style - Floating Center (Flow Pressure and Performance) |
|------|---------------------------------------------------------|
| 51   | Standard                                                |
| 52   | High Flow                                               |

| Code | Override Option |
|------|-----------------|
| Omit | Not Required    |
| 1    | Manual Override |

| Code | Seals   |
|------|---------|
| N    | Nitrile |

Order Bodies Separately  
See section BC

|            |   |              |   |           |
|------------|---|--------------|---|-----------|
| <b>B08</b> | — | <b>4</b>     | — | <b>6T</b> |
| 08 size    |   | 4-Way Cavity |   | Port Size |

| Code | Porting / Body Material  |
|------|--------------------------|
| 6T   | SAE-6 / Steel (5000 PSI) |

| Kit               | Part Number |
|-------------------|-------------|
| Nitrile Seal      | SK30078N-1  |
| Fluorocarbon Seal | SK30078V-1  |

## General Description

4 Way, 3 Position, Proportional Directional Control Valve. Floating Center Spool. For additional information see Technical Tips on pages PV2-PV5.

## Features

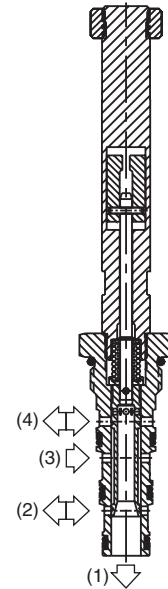
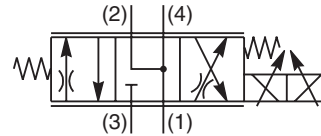
- One piece cartridge housing ensures internal concentricity
- Coil: Waterproof, hermetically sealed, requires no O'Rings; Symmetrical coil can be reversed without affecting performance.

## Specifications

|                                          |                                                                                                        |
|------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Operating Pressure                       | <b>Ports 2, 3 and 4</b><br>350 Bar (5000 PSI)<br><b>Port 1</b><br>210 Bar (3000 PSI)                   |
| Hysteresis @ 100 Hz PWM                  | <6%                                                                                                    |
| Cracking Flow                            | 25% to 30% of Input Signal                                                                             |
| Variation of Flow                        | ±15% @ 75% of Nominal Current and Constant ΔP Maintained by Pressure Compensator                       |
| Port to Port Leakage                     | 10 cu. in/min @ 3000 PSI                                                                               |
| <b>Step Response Time at 75% of Amps</b> | On 50 ms<br>Off 40 ms                                                                                  |
| Cartridge Material                       | All parts steel. All operating parts hardened steel.                                                   |
| Operating Temp. Range/Seals              | -34°C to +121°C (Nitrile)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F)  |
| Fluid Compatibility/Viscosity            | Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt) |
| Filtration                               | ISO-4406 18/16/13, SAE Class 4                                                                         |
| Approx. Weight                           | 0.15 kg (0.34 lbs.)                                                                                    |
| Cavity                                   | C08-4<br>(See BC Section for more details)                                                             |

## Typical Performance

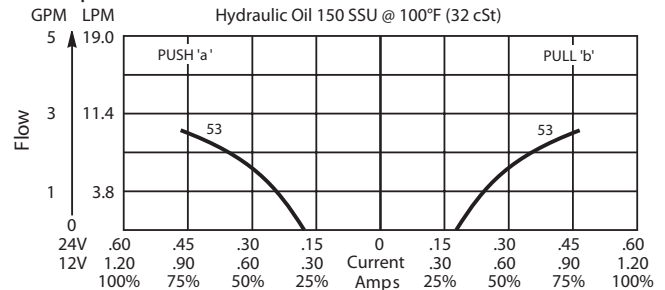
| SPOOL TYPE AND FLOW | RATED FLOW AT 75% OF NOMINAL CURRENT LPM - (GPM) |                                  | SUPER COIL TYPE |      | Compensator ΔP Bar (PSI) |
|---------------------|--------------------------------------------------|----------------------------------|-----------------|------|--------------------------|
|                     | 'a' SOLENOID PUSH P to A, B to T                 | 'b' SOLENOID PULL P to B, A to T | PUSH            | PULL |                          |
| 53 Standard         | 14 - (3.8)                                       | 15 - (4.0)                       | SP              | SP   | 10 (150)                 |
|                     | 9 - (2.5)                                        | 10 - (2.7)                       | SS              | SS   | 5 (75)                   |
| 54 High Flow        | 17 - (4.5)                                       | 19 - (5.0)                       | SP              | SP   | 20 (290)                 |
|                     | 15 - (4.0)                                       | 15 - (4.0)                       | SS              | SS   | 15 (220)                 |



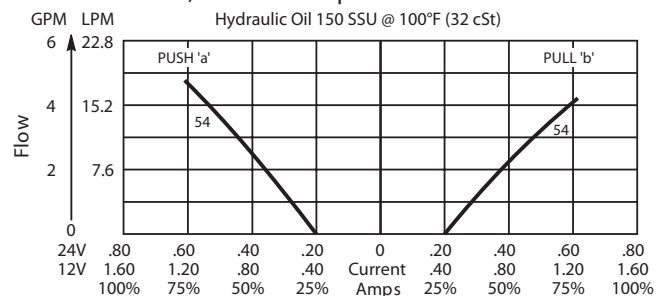
## Performance Curves

### ▲ PWM Current Regulator Recommended

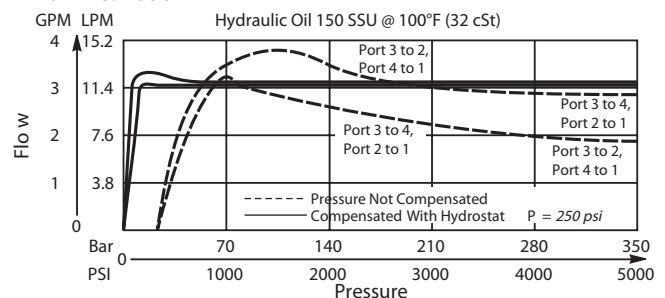
53 and 53L With 5 Bar, 75 PSI Compensator and SS Coil



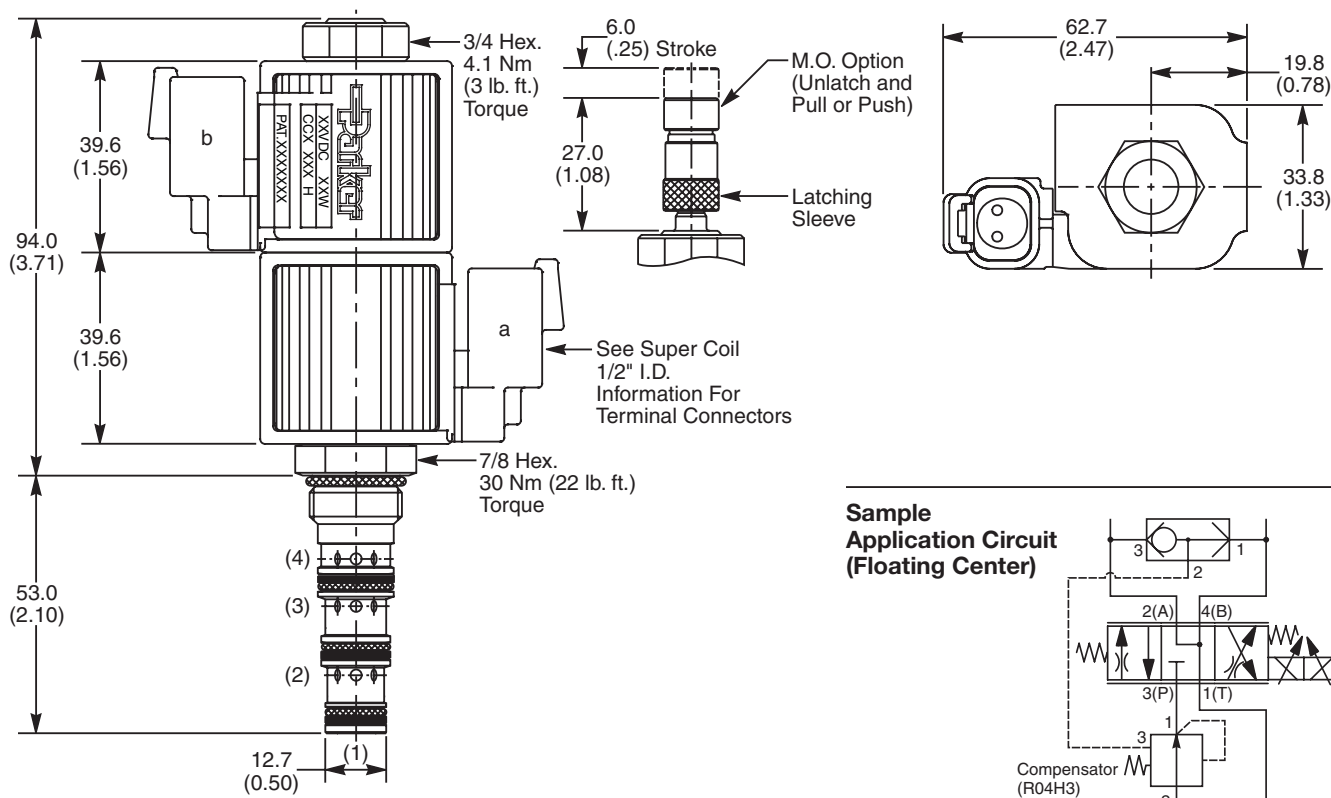
54 With 20 Bar, 290 PSI Compensator and SP Coil



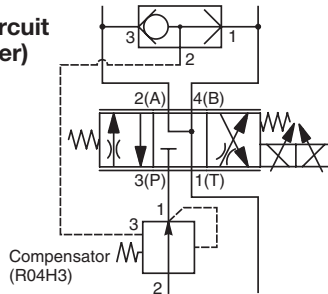
### Flow vs. Load



Dimensions    Millimeters (Inches)



Sample Application Circuit (Floating Center)



Ordering Information

|             |  |  |          |
|-------------|--|--|----------|
| <b>GP02</b> |  |  | <b>N</b> |
|-------------|--|--|----------|

08 Size  
Proportional  
Valve

Style

Override  
Option

Seals

**Highlighted** represents preferred options that offer the shortest lead times. Other options may be available, but at extended lead times.

**Coil(s) sold separately.** Please see section CE of this catalog, 1/2" Super-Coil (CC series), for ordering information.

| Code | Style - Floating Center (Flow Pressure and Performance) |
|------|---------------------------------------------------------|
| 53   | Standard                                                |
| 54   | High Flow                                               |

| Code | Seals   |
|------|---------|
| N    | Nitrile |

| Code | Override Option |
|------|-----------------|
| Omit | Not Required    |
| 1    | Manual Override |

Order Bodies Separately  
See section BC

|            |                 |              |
|------------|-----------------|--------------|
| <b>B08</b> | <b>4</b>        | <b>6T</b>    |
| 08 size    | 4-Way<br>Cavity | Port<br>Size |

| Code | Porting / Body Material  |
|------|--------------------------|
| 6T   | SAE-6 / Steel (5000 PSI) |

| Kit               | Part Number |
|-------------------|-------------|
| Nitrile Seal      | SK30078N-1  |
| Fluorocarbon Seal | SK30078V-1  |

|                      |
|----------------------|
| <b>CV</b>            |
| Check Valves         |
| <b>SH</b>            |
| Shuttle Valves       |
| <b>LM</b>            |
| Load/Motor Controls  |
| <b>FC</b>            |
| Flow Controls        |
| <b>PC</b>            |
| Pressure Controls    |
| <b>LE</b>            |
| Logic Elements       |
| <b>DC</b>            |
| Directional Controls |
| <b>SV</b>            |
| Solenoid Valves      |
| <b>PV</b>            |
| Proportional Valves  |
| <b>CE</b>            |
| Coils & Electronics  |
| <b>BC</b>            |
| Bodies & Cavities    |
| <b>TD</b>            |
| Technical Data       |

## General Description

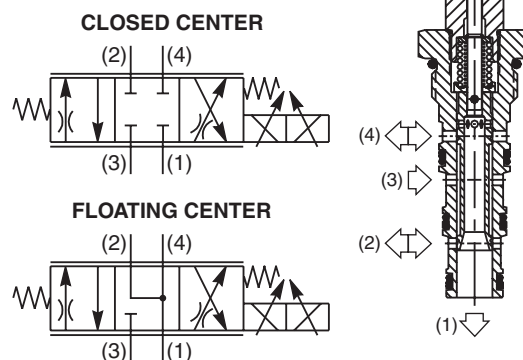
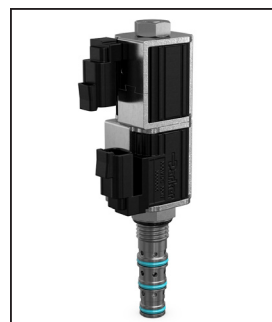
4 Way, 3 Position, Proportional Directional Control Valve. Closed Center or Floating Center Spool.  
 For additional information see Technical Tips on pages PV2-PV5.

## Features

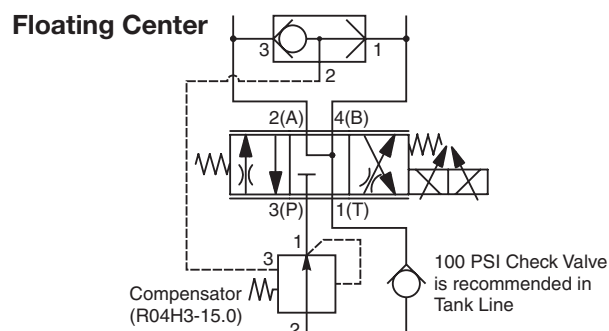
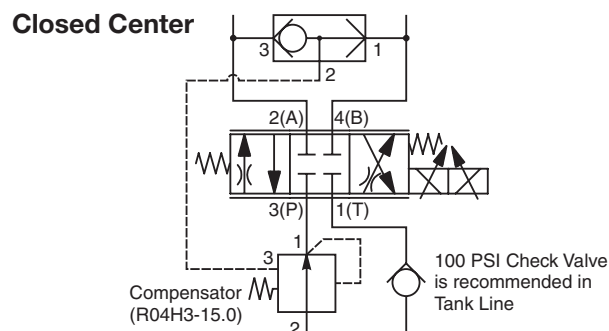
- One piece cartridge housing ensures internal concentricity
- Coil: Waterproof, hermetically sealed, requires no O'Rings; Symmetrical coil can be reversed without affecting performance.
- All external parts zinc plated

## Specifications

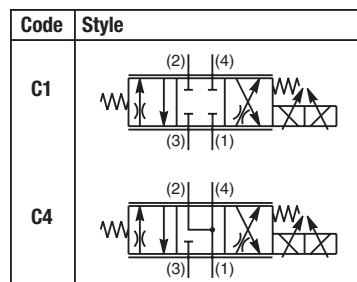
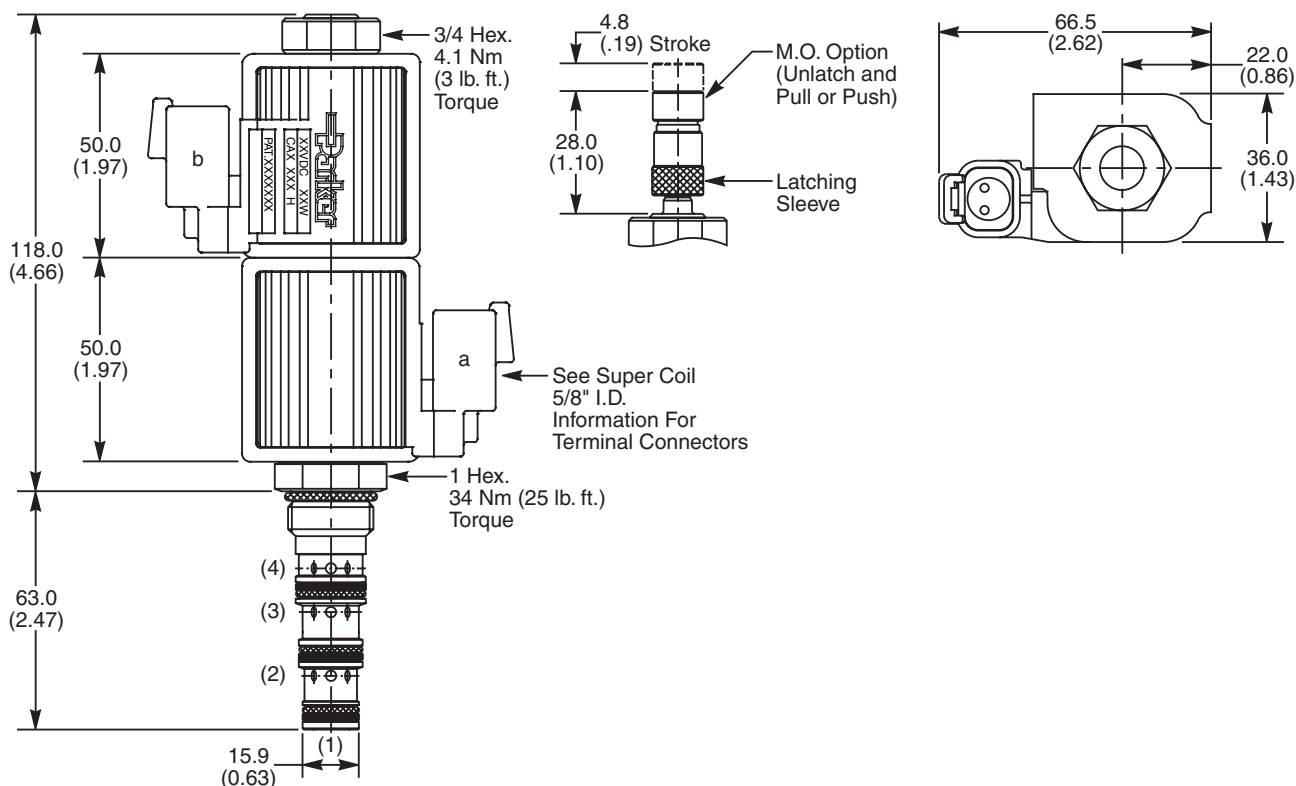
|                                   |                                                                                                                                                         |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Pressure                | 210 Bar (3000 PSI)                                                                                                                                      |
| Hysteresis @ 100 Hz PWM           | <6%                                                                                                                                                     |
| Cracking Flow                     | 25% to 30% of Input Signal                                                                                                                              |
| Variation of Flow                 | ±15% @ 75% of Nominal Current and Constant ΔP Maintained by Pressure Compensator                                                                        |
| Port to Port Leakage              | 10 cu. in. @ 3000 PSI                                                                                                                                   |
| Step Response Time at 75% of Amps | On 50 ms<br>Off 40 ms                                                                                                                                   |
| Cartridge Material                | All parts steel. All operating parts hardened steel.                                                                                                    |
| Operating Temp. Range/Seals       | -37°C to +93°C ("D"-Ring)<br>(-35°F to +200°F)<br>-34°C to +121°C (Nitrile)<br>(-30°F to +250°F)<br>-26°C to +204°C (Fluorocarbon)<br>(-15°F to +400°F) |
| Fluid Compatibility/Viscosity     | Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt)                                                  |
| Filtration                        | ISO-4406 18/16/13, SAE Class 4                                                                                                                          |
| Approx. Weight                    | 0.28 kg (0.57 lbs.)                                                                                                                                     |
| Cavity                            | C10-4<br>(See BC Section for more details)                                                                                                              |



## Sample Application Circuit



Millimeters (Inches)



| Code | Override Options |
|------|------------------|
| Omit | None             |
| M    | Push/Pull        |

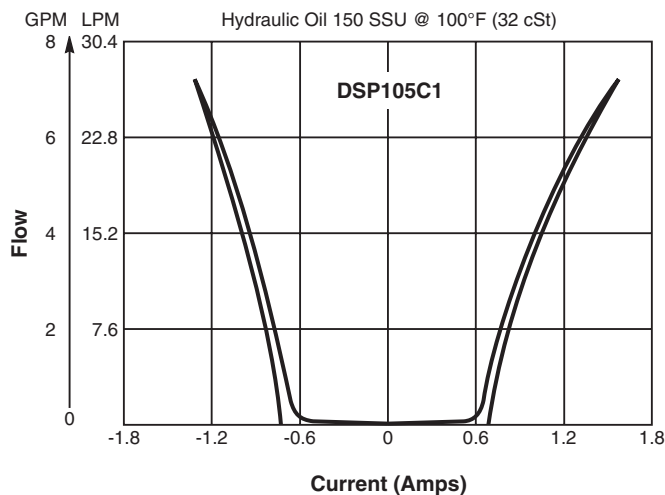
|             |                 |
|-------------|-----------------|
| <b>Code</b> | <b>Seals</b>    |
| <b>Omit</b> | <b>“D”-Ring</b> |

| Kit               | Part Number |
|-------------------|-------------|
| D-Ring Seal       | SK10-4      |
| Nitrile Seal      | SK10-4      |
| Fluorocarbon Seal | SK10-4V     |

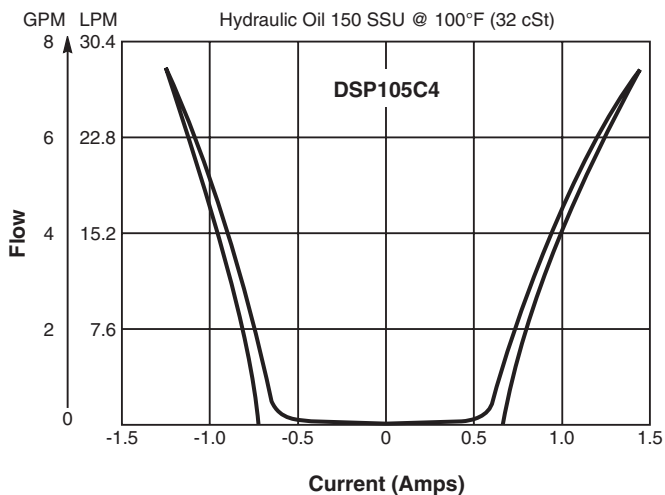
| Code | Porting / Body Material  |
|------|--------------------------|
| 8T   | SAE-6 / Steel (5000 PSI) |

▲ PWM Current Regulator Recommended

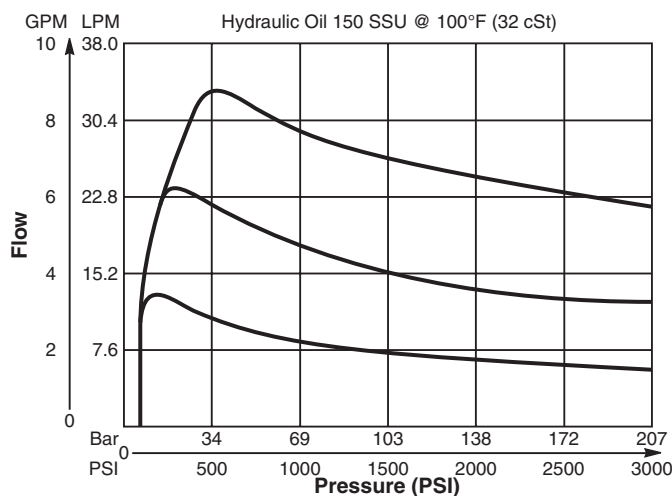
C1 With 15 Bar, 220 PSI Compensator and SP Coil



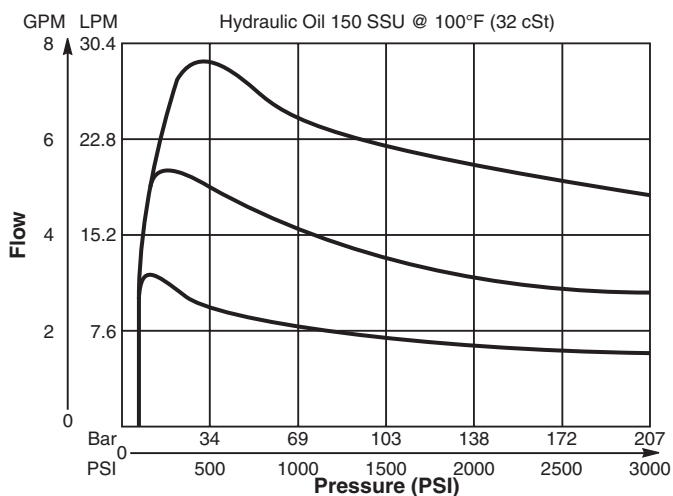
C4 With 15 Bar, 220 PSI Compensator and SP Coil



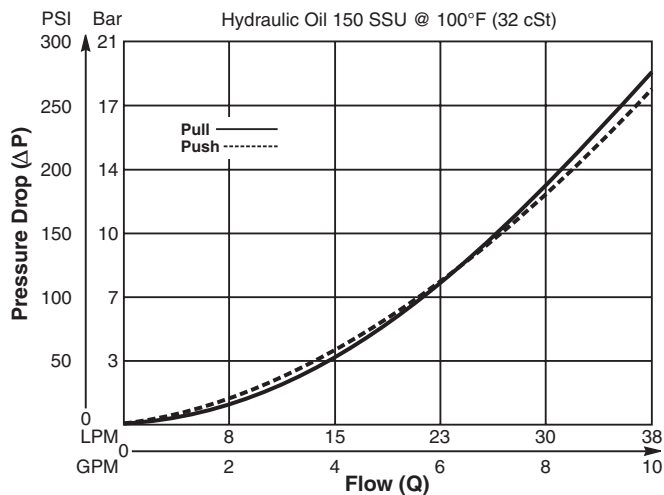
Pressure Compensation Pull Coil  
Inlet to Work Port



Pressure Compensation Push Coil  
Inlet to Work Port



C1 Spool Port 3 to 4



CV

Check  
Valves

SH

Shuttle  
Valves

LM

Load/Motor  
Controls

FC

Flow  
Controls

PC

Pressure  
Controls

LE

Logic  
Elements

DC

Directional  
Controls

SV

Solenoid  
Valves

PV

Proportional  
Valves

CE

Coils &  
Electronics

BC

Bodies &  
Cavities

TD

Technical  
Data