

## Gen2 SP3000 Supply Pump

### FDS-SP3000-G2



With the installation of this supply pump into a multi-CP3 system, the small gear pump on the back of each CP3 is deleted and all CP3s in the system are then fed directly with high-pressure supply fuel. This eliminates redundant power drawing pumps that can be prone to failure in certain conditions.

The SP3000 Supply Pump is designed to be combined with the Regulated Filter Head to create the Fuel Delivery System, which will support applications ranging from 400 to 4,000 horsepower.

The pump and housing design keep weight and durability in mind with a steel wear plate separating the pumping element and aluminum housing.

The inlet fitting and supply hose are sized to restrict pump output based on the system needs. This decreases parasitic loss, fuel aeration, and heat generated in the fuel.

- Flow Rate 2,750 Liters per hour
- Volume 13,000 mm<sup>3</sup>/rev
- Body rotates 360° for easy install
- Driven off of CP3 shaft
- Frees up engine accessory drives
- Max of 3 HP parasitic loss
- No electric supply pump needed

The S&S Diesel Motorsport<sup>®</sup> SP3000 Supply Pump is a single solution that replaces the small factory CP3 gear pump and will flow up to 2,750 L/h at pressure which can support up to four Ordnance 650 (650 L/h) CP3 high pressure fuel pumps.

#### Application

Standard or Reverse Rotation CP3-High Pressure Fuel Pump

### Technical Specifications

Fuel Compatibility	Diesel
Weight	1271g (2.8 lbs
Maximum Dimensions	93 x 95 x 66 mm
Max Flow	2,750 L/h
Max Speed	6,000 RPM
Fuel Temperature	-40° to 70°C
Inlet Sizing	See Page 3
Working Pressure	Up to 240psi



## **Regulated Filter Head**

### FDS-RFH-ASM



Hard coat anodized for durability

- Tested to 3,000 liters per hour
- 4-port fuel distribution block
- Donaldson 3-micron fuel filter included
- Pre filter and post filter pressure ports
- Built in pressure regulator

The S&S Diesel Motorsport<sup>®</sup> Regulated Filter Head is a compact unit that features a built-in pressure regulator, stock Cummins mounting flange, filter in and out pressure ports, and a fuel distribution block.

Technical Specifications		
Fuel Compatibility	Diesel	
Weight (No filter)	752 g (1.65 lbs)	
Maximum Dimensions	See Drawings	
Max Flow	3000 L/hr	
Fuel Temperature	-40° to 70°C	
Working Pressure	Up to 240 psi	
Available Regulator Springs	5, 15, 120, 140, and 180 psi	

Application		Key Features
Daily Driver to Race Vehicle		Inlet pressure sensing ports (1/8 npt)
Filter Specifications		Outlet pressure sensing port (1/8 npt)
Included Filter	Donaldson P551311 or P551313	Works for all CP3 Configurations
Efficiency	99% at 3 Micror	Pressure Regulator design optimized for zero chatter operation
Media Type	Cellulose	Steel and Aluminum Construction
Maximum Delta P (Collag	ose Rating) 100 ps	

The filter head design keeps durability in mind with multiple key features: steel insert for filter threads, hard coat anodizing to prevent oxidation and wear in the regulator, and a billet 6061 aluminum body.

The Filter Head is designed to pair with the S&S Diesel Motorsport SP3000 to create the Fuel Delivery System, which will support applications ranging from 400 to 4,000 horsepower.

Multiple springs are supplied to be able to use the filter head for a variety of applications. The regulator port can simply be blocked off if only filtration is needed.



## **Quick Start**

### Keys to Success

- Use -8AN hose for the suction (inlet) and pressure (outlet) ports of the SP3000
- Each inlet is labeled for the direction of the CP3 shaft rotation (FWD-IN and REV-IN)
- Use -8AN hose on the -8AN return fitting of the Regulated Filter Head
- Must use the provided -8AN to -8ORB (Fragola P/N 495103-bk) fitting in the return port of the filter head to properly set the pressure for the low side fuel system
- Tee the filter head return line into the suction line of the SP3000 to help with fuel pressure regulation and fuel foaming

#### OPTIONAL

- Install pressure sensor (sold separately) on port labelled OUT to monitor post-filter pressure
- Install pressure sensor (sold separately) on port labelled IN to monitor pre-filter pressure

#### **Priming Instructions**

- 1) Fill the fuel filter with diesel fuel
- 2) Hand-tighten fuel filter until gasket touches the base, then another <sup>3</sup>/<sub>4</sub> turn (270 degrees)
- 3) Pressurize the fuel tank if it is lower than SP3000 | Rely on gravity if the fuel tank is higher
- 4) Crack the suction line directly at the SP3000 inlet until fuel comes out, then tighten
- 5) Crack the low-pressure supply line directly at the CP3
- 6) Crank the engine until fuel comes out, then tighten
- 7) Ready to start the engine



### **Detailed Information**

When designing your layout, keep in mind the gravity and g-force your supply, return and fuel tank will see. It will help to gravity-feed the SP3000 with fuel from the tank. If you have a long vehicle, remember length of line will restrict the same way the ID of a line will. Vehicles that have options of fuel return ports on the fuel tank, having the return lines returning into liquid (fuel) will help with foaming. If the return fuel is dumping in the top of the tank (air) it can make a foam layer and aerate the fuel.

**Hose sizing:** The SP3000 is designed to have a suction line that will determine the amount of fuel we want to flow. We have the most success with running -8 hose from the tank to the SP3000 because most applications are running a fuel tank close to the SP and will have a short run between the two. Keep in mind length will determine flow as well as ID of the hose if you find yourself not using -8 hose. It is also just as important to run a -8 return hose from the regulated filter head back to the suction line. If there are any restrictions in the return line, this will cause the main pressure to rise above our safe margins. There are three -6 and one -8 outputs to supply regulated fuel to your high-pressure fuel pump(s). In most cases we only need two -6 lines to supply the high-pressure pumps. You can run -8 with no problems but we haven't seen any benefits.

**Return Side:** It is important to use a dedicated -8 return line from the filter head and tee into the -8 suction line (reference routing diagram). This will help keep pressure stable and prevent fuel foaming. It is also just as important to use the provided -8AN to -8ORB fitting (Fragola p/n 495103-bk) because the depth of the taper helps determine seat pressure on the regulator nipple. Using a different fitting will cause pressure and spring force change. The high-pressure fuel pump, injector and relief valve return lines would be best if ran separately back to the tank with -6 line for each item. If space is limited, size up the return line when combining with "Y" fittings. Remember that return restrictions are just as critical as low fuel pressure. Any foreign pressure on the backside of the injector can cause anything from erratic idle, misfires, to solenoid separation depending on how sensitive your system is.

**Filter:** Donaldson P551311 (9" tall) or Donaldson P551313 (7" tall) only. Before installing the filter, fill with diesel fuel and lube the o-ring with the fuel used to fill. Spin the filter on to the base until the lubed sealing ring makes contact with the base and rotate another 270 degrees or <sup>3</sup>/<sub>4</sub> turn, it will be tight. You can use the arrows near the top of the filter to help. Solid arrow, triangle, square and circle within the arrow, to easily see 270 degree or <sup>3</sup>/<sub>4</sub> of a turn. Once vehicle is running and the filter has seen multiple heat cycles, check the filter with the same emphasis it took to get to the 270 degree or <sup>3</sup>/<sub>4</sub> turn. Vehicles with higher vibrations we recommend a small marking from filter head to filter so a quick visual glance can provide mental security.

**Pressure Ports:** There is IN and OUT pressure ports on the regulated filter head. Most applications will utilize the OUT port to see the fuel pressure being supplied to the high-pressure fuel pump(s). In some cases, you can utilize the IN port to see filter restrictions and configure service intervals. Most high-performance racing applications won't utilize the IN port.

**SP3000:** It can be used in a reverse or standard rotation. It is marked inlet for the standard and reverse rotation of the pump. Choose accordingly and use the other fitting to supply the regulated filter head inlet. You can run the SP3000 in any 360-degree rotation within the clamping surface. It has a 4mm Allen headed clamp bolt that needs torqued to 75 inch-lbs.

**Regulated Filter Head**: It comes with a 180psi spring pre-installed and can run up to 240psi while working. The pressure can change vehicle to vehicle depending on the return system sizing, length and fuel mixtures. There is also a 5psi and 15psi spring included that can be utilized for Duramax (5psi) based pumps that are more sensitive to case pressure. The 15psi spring is designed for the Cummins/Ram applications.



### Flow Data



### Pump Efficiency: Flow Rate vs Pressure at Specific RPM





## **Pump Suction Hose and Fitting Sizing**

The graphs below will determine the recommended supply pump suction hose size for various high-pressure pump configurations. The recommended safety factor is 20%.



*Example:* The supply pump needs to support (2) 12mm high pressure pumps up to 5,000 rpm.

One 12mm pump consumes 600 L/h, so two pumps consume 1,200 L/h, and a safety factor of 20% should be used. Therefore, the supply pump suction hose needs to support 1,440 L/h (1,200 x 1.2= 1,440). Then find the 1,440 L/h point on the Suction Hose Size graph and select the line that is above that point. In this case, **16 FT** of -8 AN hose will support that requirement.



## Drawings





# **Routing Diagram**

