

## Modulating and Reversing Fan Drive HICs

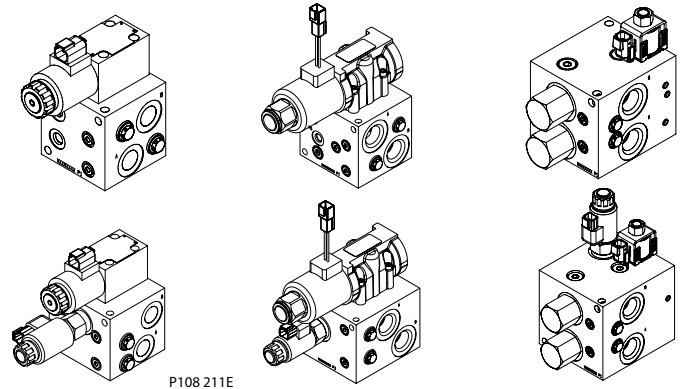
As Comatrol, a member of the Sauer-Danfoss Group, we engineer, manufacture and supply screw-in Cartridge Valves and Hydraulic Integrated Circuits (HIC) to market-leading quality levels. We work closely with our customers around the world to deliver optimal machine control solutions based on their specific needs.

New emission regulations have increased the heat rejection needs of diesel engines and tightened the engine operating temperature range necessary to meet allowable diesel exhaust limits. A hydraulic modulating fan drive system allows the machine designer to keep engine temperature in a narrow operating band and saves engine power and fuel for the majority of operating conditions.

Off-highway mobile machinery OEMs and distributors can choose from 6 types of pre-engineered hydraulic integrated circuits (HICs) designed to provide speed control and reversing for hydraulic modulating fan drive motors in open circuit hydraulic fan drive systems.

For more information on Comatrol cartridge valves and HICs, refer to Cartridge Valves Technical Information 520L0588.

Local Address:



P108 211E

Family of Fan Drive HICs

### Features

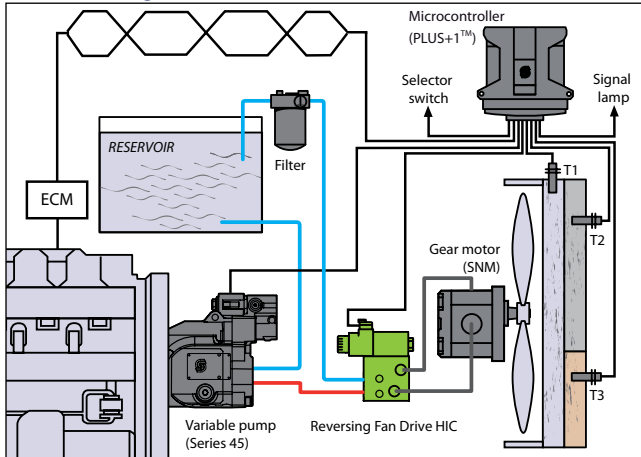
- Integrated and compact design:
  - Designed and tested specifically for fan drive systems
  - Configurable for quick availability
- Proportional control allows the engine temperature to be controlled within narrow limits:
  - Helps meet the requirements of new emissions legislation
  - The engine can be run more efficiently – improving fuel economy and reducing emissions
- Increased design flexibility:
  - HIC valve can be placed in the most suitable location on the machine
  - Reduce parasitic losses by limiting flow to and from the fan drive motor
  - The gear motor is shorter compared to a fan motor with integrated valve
  - Two sets of mounting holes for mounting flexibility (SAE and Metric compatible)
- Increased productivity:
  - Fan is reversible to purge (de-clog) coolers and radiators
  - Prevents overheating with purged cooler
  - More power available for useful work when radiator is not clogged
- Automatic cleaning sequence programmed using PLUS+1™:
  - Manual or Automatic activation

### Functions

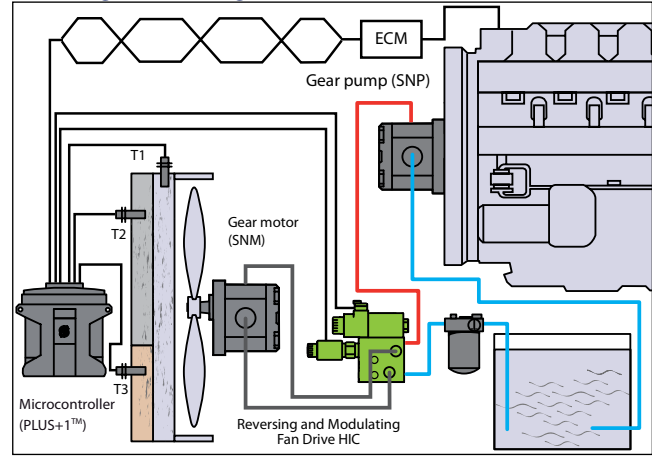
- Proportional relief valve:
  - Regulates fan speed by controlling pressure drop across fan motor
  - Normally closed to ensure full fan speed in the absence of electrical signal
  - PLUS+1® compliant
- Solenoid reversing valve:
  - Reverses flow to the fan motor to reverse fan direction
  - Open transition spool to reduce the likelihood of pressure spikes during reversals
  - Sized to minimize parasitic losses due to pressure drop
- Dual shock valve with anti-cavitation checks:
  - Trims the maximum motor torque by absorbing pressure spikes (shock effects) at the work ports
  - Anti-cavitation feature allows additional flow to the motor through the tank port when motor overruns the pump
  - PVLV shock valves (from PVG) allow for a compact design.
- Custom designs available upon request:

**System Diagrams**

Fan Drive System with Variable Open Circuit Piston Pump and Reversing HIC



Fan Drive System with Open Circuit Gear Pump and Reversing/Modulating HIC



**Technical Data**

Short Code	Description	Pressure bar [psi]	Flow	Schematic	Example - Full Nomenclature
RFD-40-000	Provides reversing control and over-pressure protection/anti-cavitation for variable pump fan drive circuits, up to 40 LPM.	210 [3045]	40 [10.6]		RFD-40-000-12L-DE-NP-250-8S RFD-40-000-12L-DE-NP-250-4B
RFD-80-000	Provides reversing control and over-pressure protection/anti-cavitation for variable pump fan drive circuits, up to 80 LPM.	210 [3045]	80 [21.1]		RFD-80-000-12L-DE-NP-250-10S RFD-80-000-12L-DE-NP-250-6B
RFD-120-000	Provides reversing control and over-pressure protection/anti-cavitation for variable pump fan drive circuits, up to 120 LPM.	210 [3045]	120 [31.7]		RFD-120-000-12L-DE-NP-250-12S RFD-120-000-12L-DE-NP-250-6B
RFD-40-PRV	Provides modulating and reversing control with over-pressure protection/anti-cavitation for open circuit pump fan drive circuits, up to 40 LPM.	210 [3045]	40 [10.6]		
RFD-80-PRV	Provides modulating and reversing control with over-pressure protection/anti-cavitation for open circuit pump fan drive circuits, up to 80 LPM.	210 [3045]	80 [21.1]	RFD-80-PRV-12L-DE-Y-250-10S RFD-40-PRV-12L-DE-Y-250-6B	
RFD-120-PRV	Provides modulating and reversing control with over-pressure protection/anti-cavitation for open circuit pump fan drive circuits, up to 120 LPM.	210 [3045]	120 [31.7]		RFD-120-PRV-12L-DE-Y-250-12S RFD-120-PRV-12L-DE-Y-250-6B

**Model Code Example**

**RFD - 40 - PRV - 12L - DE - Y - 250 - 8S**

**RFD** = Reversing Fan Drive HIC

**Size** (flow across directional valving @ 11 bar pressure drop from P-A-B-T):  
40 = 40 LPM [11 GPM]  
80 = 80 LPM [21 GPM]  
120 = 120 LPM [31 GPM]

**Proportional Control:**  
PRV = Proportional Relief Valve  
000 = None

Coil Voltage (All coils):	PRV	Solenoid		
Max Current @ 20°C	All	RFD-40	RFD-80	RFD-120
12L = 12 VDC	1.10 A	2.72 A	2.72 A	1.34 A
24L = 24 VDC	0.55 A	1.29 A	1.29 A	0.67 A

**Coil Termination** (All coils):  
DE = Deutsch

**Proportional Relief Valve (PRV) Setting @ Crack Pressure for RFD40:**  
NP = No PRV (use with Proportional Control: '000 = None')  
F = 45 bar [653 psi]  
I = 75 bar [1088 psi]  
M = 100 bar [1450 psi]  
O = 120 bar [1740 psi]  
Q = 140 bar [2030 psi]  
S = 160 bar [2320 psi]  
U = 185 bar [2683 psi]  
W = 205 bar [2973 psi]  
Y = 225 bar [3263 psi]

Housing and Ports:	Housing and Ports:	Housing and Ports:
<b>RFD40:</b> 8S = Al, #8SAE 4B = Al, 1/2 BSP	<b>RFD80:</b> 10S = Al, #10SAE 6B = Al, 3/4 BSP	<b>RFD120:</b> 12S = Al, #12 SAE 6B = Al, 3/4 BSP

**Shock Valve Setting** (keep at least 25 bar higher than PRV setting):  
080 = 80 bar [1160 psi], PRV = 055  
100 = 100 bar [1450 psi], PRV = 075, 085  
125 = 125 bar [1813 psi], PRV = 095  
150 = 150 bar [2175 psi], PRV = 105, 115  
175 = 175 bar [2538 psi], PRV = 125, 135  
210 = 210 bar [3045 psi], PRV = 145, 165  
230 = 230 bar [3336 psi], PRV = 165, 185, 195  
250 = 250 bar [3625 psi], PRV = 205

**Proportional Relief Valve (PRV) Setting @ Crack Pressure for RFD80 and RFD120:**  
NP = No PRV (use with Proportional Control: '000 = None')  
F = 55 bar [798 psi]  
I = 95 bar [1233 psi]  
M = 105 bar [1523 psi]  
O = 125 bar [1813 psi]  
Q = 135 bar [1958 psi]  
S = 155 bar [2248 psi]  
U = 185 bar [2683 psi]  
W = 205 bar [2973 psi]