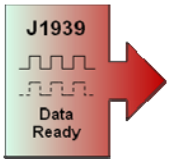
Hydraulic Fan System Controller with J1939 Interface

HFS-J

Hydraulic Fan Drive System Controller User Guide



CE

Hydraulic Fan System Controller with J1939 Interface

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Cautions:

Changing setup values and limits under computer control while the machine is operating may cause sudden machine movement, which may lead to possible **injury** or **death**. It is strongly recommended that any moving parts are disabled prior to any alignment procedure whenever possible. In any case, caution should be exercised during any procedure and work should be completed only by qualified trained personnel.

Hydraulic Fan System Controller with J1939 Interface

Product Overview

- NO software experience needed to apply this controller successfully.
- Pre-written 'Fan Drive' software for easy, fast system configuration, development and production.
- Intuitive Graphical User Interface (GUI) runs on any PC with Windows® XP or newer software (.net compatible).
- 10 – 30VDC operation with full reverse polarity and **SAE J1455 protection**.
- Extended -40°C (-40°F) to +85°C (+185°F) controller operational temperature range.
- **CE approved** to latest international test standards.
- **J1939 CAN Bus communications** for engine and temperature zone data Inputs
- ** J1939 temperature data hard coded for :
  - **Engine water/coolant at PGN 65262,**
  - **Transmission Oil temperature at PGN 65272**
  - **Intake manifold/charge air Temperature at PGN 65270**
- All inputs and outputs protected from shorting to ground or the power supply.
- Diagnostic LED display shows I/O status and module operation at a glance.
- 'Blinking' error code LED for fast on-site 'health check'.
- System wiring and coil fault detection and alarms.
- Alarm output for integration into host system.
- **IP68 (NEMA 6P)** rating on module for harsh environment reliability (connector IP rating may differ).
- Single Deutsch Metri-pack 150 series I/O 12 way connector for easy system wiring.
- Separate RS232 communications connector for programming, monitoring and diagnostics.
- Rugged encapsulated product withstands harsh environments found in mobile applications.
- Non Volatile Memory maintains ALL settings without power
- Completely user configurable for setting confidentiality.
- **Compatible with all manufacturers fan system hydraulic valve and pump control products.**

**** J1939 Temperature Data NOTE:-**

If the J1939 PGN data for temperature is NOT correct for a particular engine, HCT can change the PGN number to one that is correct and re-issue the program code to you. Please use the contact numbers on the back page of this manual to discuss this with our customer support personel.

Product Application Guidelines:

ALWAYS do the following:

- Take a few minutes to FULLY read THESE information / data sheets BEFORE starting.
- Keep High Voltage AC cables separate from Low Voltage DC signal and supply cables.
- Make sure the unit supply voltage is the same as the coils on the valve being driven !
- Ensure that you are aware of the adjustments and consequences on the electronics and hydraulics.
- Make sure you have the correct tools to do the intended job (i.e. P.C., software) e.t.c.
- 'Isolate' this unit from all other equipment BEFORE any form of welding takes place.
- Check ALL connections to and from this unit to ensure NO short or OPEN circuits.
- Check the units supply voltage is CORRECT, ' ELECTRICALLY CLEAN ' and STABLE.
- Operate the units within specified operating temperature for best & reliable performance.
- Ensure that any unused wires / terminals are terminated safely and not shorted together.
- Isolate the controller if ANY form of battery charging or battery boosting takes place on the vehicle.
- Ensure ALL valve connectors are wired correctly, secure, locked and connected to correct coils.
- Observe the set-up procedures in this manual for best operational results.
- Follow and abide by local and country health & safety standards – protect yourself and others !

NEVER do the following:

- Arc Weld or Charge Batteries with this dr iver unit connected as damage can occur.
- Attempt to use this unit if you are unsure of electric al OR hydraulic connections or expected operation.
- Attempt to use this unit in Areas where other AC or DC coils HAVE NOT been fully suppressed.
- Use a power supply that is not rated for the correct required O/P current under full load.
- Allow wires TO or FROM the unit to short circuit (to each other or chassis/cabinet e.t.c.).
- Attempt to use this unit in areas of intense RF without adequate screening measures.
- Disconnect or connect wires to or from this unit unless it isolated from the power supply.
- Use this unit in temperatures that exceed those specified as operation may be effected.
- Start this unit without ensuring ALL work areas are clear of personnel !

Software Safety:

The software has been carefully written to give the user the maximum system configuration flexibility while being transparent in operation and easy to use, even for novice system builders and operators.
To ensure safety when using the software and to prevent accidental connection to another module that is not a HFS-J, rules have been written into the software to ensure correct operation at all times:
When the PC running the GUI is first connected to a powere d HFS-J, and before any data exchange can be allowed, a 'Handshake' takes place that confirms the HFS-J internal software (BIOS) is compatible, the serial number and the HFS-J part number. The GUI then checks to ensure that its own revision is compatible with the module software and only then allows the PC and the module to communicate and share data.
If at any point during the process above an error or miss-match is detected, the GUI software will NOT allow communications and will inform the user of the problem via a clear message in the 'Status' window.

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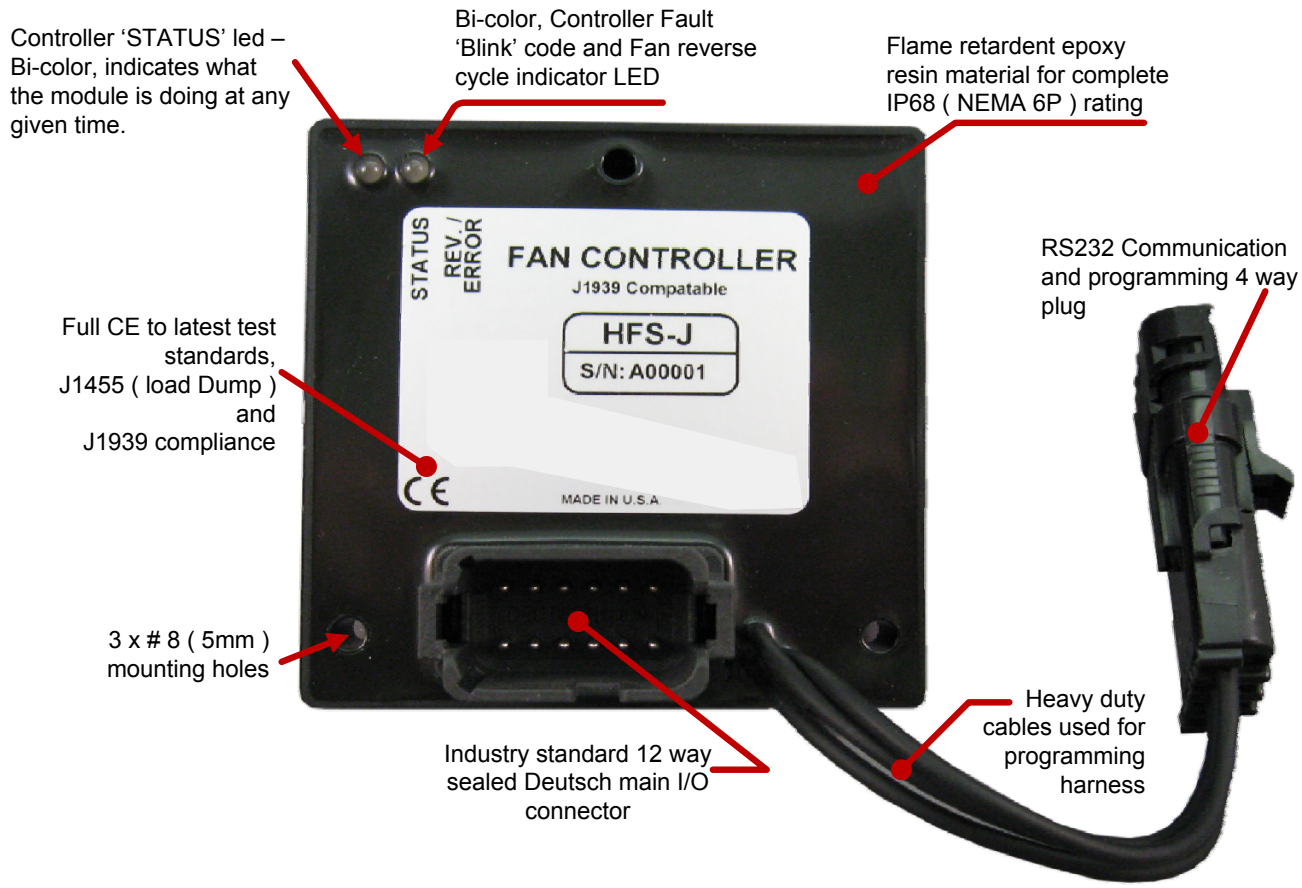
Module Familiarity:



NOTE:

This module has local diagnostic capabilities by way of the two Bi-Color (Red / Green) LED's mounted on the front of the unit. These LED's are used to show the user a variety of 'Blink' codes that equate to the precise issue or error being seen by the controller, so locating and fixing an issue will be quick and effective. This feature is especially useful in the field where test equipment may not be available.

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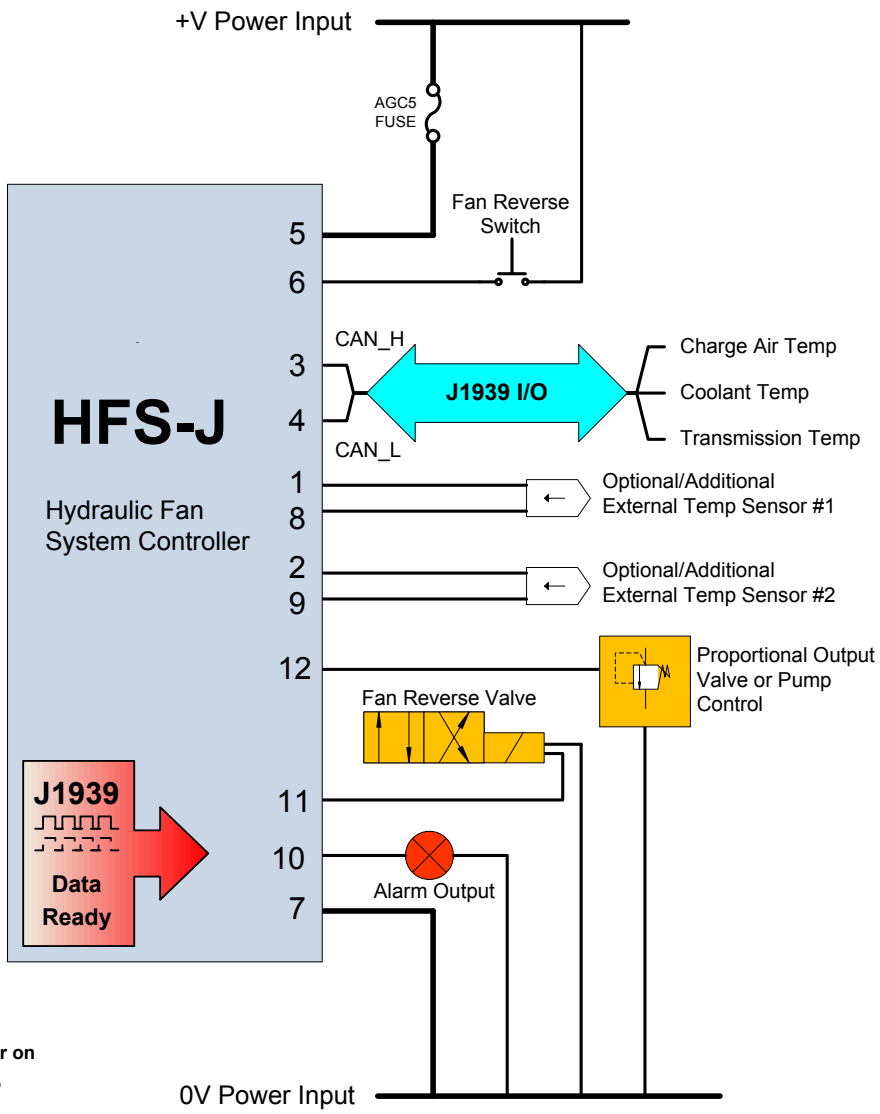
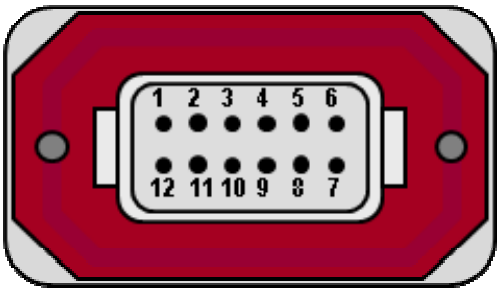
Application Examples:

NOTE:-

Controller MUST have in-line fuse fitted by user in +V Power Input for system protection.



NOTE:-
View looking at 12 way male connector on
HFS - J controller - DTF15-12PB



Pin 1:- Thermistor #1 +signal input.
Pin 2:- Thermistor #2 +signal input.
Pin 3:- CAN_H Input (**J1939**)
Pin 4:- CAN_L Input (**J1939**)
Pin 5:- +Vin - 10 – 30VDC Power supply Input
Pin 6:- Reverse fan input (Momentary)
Pin 7:- 0V power input (Common)
Pin 8:- 0V—Signal common #1
Pin 9:- 0V—Signal common #2
Pin 10:- Alarm output drive (3A max sourcing)
Pin 11:- Reverse valve output drive (3A max sourcing)
Pin 12:- Proportional valve output (3A max sourcing)

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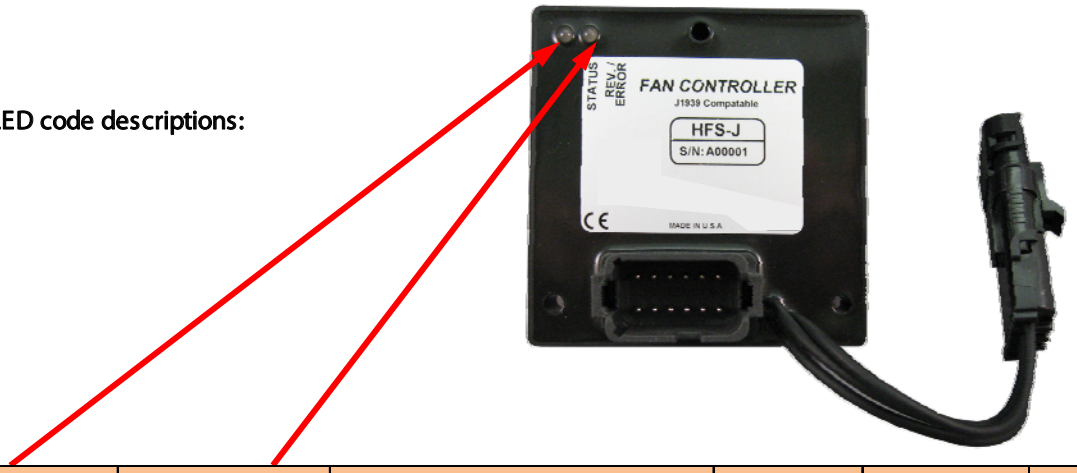
Error LED code descriptions:



Status LED	Reverse / Error LED	Discription	Alarm Output	Fan Output	Reverse Output	NOTE
OFF	OFF	Power Supply < 9.3 VDC	OFF	OFF	OFF	1
OFF	OFF	Power Supply > 30 VDC	OFF	OFF	OFF	1
ON	OFF	Normal Operation	OFF	As Demanded	As Demanded	2
ON	OFF	J1939 RPM Timeout	OFF	Min Current	As Demanded	3
ON	OFF	Reverse Sequence Active	OFF	Reverse SPD %	ON	2
ON	Flashing	J1939 Engine Coolant Timeout	ON	Min Current	As Demanded	3
ON	Flashing	J1939 Transmission Temp Timeout	ON	Min Current	As Demanded	3
ON	Flashing	J1939 Intake Man. Temp. Timeout	ON	Min Current	As Demanded	3
Code = 1	Flashing	J1939 Engine Coolant Over Temp	ON	Min Current	As Demanded	3, 7
Code = 2	Flashing	J1939 Intake Man. Over Temp	ON	Min Current	As Demanded	3, 7
Code = 3	Flashing	J1939 Transmission Over Temp	ON	Min Current	As Demanded	3, 7
Code = 1	Flashing	PWM Output Open	ON	Min Current	OFF	4
Code = 2	Flashing	PWM Output Short	ON	Min Current	OFF	4
Code = 3	Flashing	Alarm Output Short	OFF	Min Current	OFF	3
Code = 5	Flashing	Reverse Output Short	ON	Min Current	OFF	3
Code = 1	Flashing	Unit Temp >80°C	OFF	OFF	OFF	5
Code = 3	Flashing	Thermistor 1 Short	ON	Min Current	OFF	6
Code = 4	Flashing	Thermistor 1 Open	ON	Min Current	OFF	6
Code = 5	Flashing	Thermistor 1 Over Temp	ON	Min Current	OFF	6, 8
Code = 6	Flashing	Thermistor 2 Short	ON	Min Current	OFF	6
Code = 7	Flashing	Thermistor 2 Open	ON	Min Current	OFF	6
Code = 8	Flashing	Thermistor 2 Over Temp	ON	Min Current	OFF	6, 8

NOTES:	
1	Wait for Correct Power
2	Normal Operation
3	Fan Output min current until corrected (Max Fan SPD)
4	Attempt to drive min current to fan until corrected
5	Wait until unit temp < 70°C
6	Fan Output min current until corrected (Max Fan SPD) Reverse Sequence Cancled
7	Reverse Cycle Operates Normaly
8	Reverse Cycle Normal If Reverse Input Switch is used and Overtemp Condition is present before start of cycle

Module Connection Descriptor:

Thermistor #1 Input (Connector terminal 1): (Not Used)

This input is designed to accept a standard NTC thermistor OR a bi-metallic temperature switch. This input should be used in conjunction with the 0V pin # 8 on the connector; the choice is made via the GUI.
If the switch input is selected through the GUI will allow the user to select either HI to LO OR Lo to HI operation.
If this input is NOT used, it should be de-selected by the GUI to avoid false input commands.

Thermistor #2 Input (Connector terminal 2): (Not Used)

This input is designed to accept a standard NTC thermistor OR a bi-metallic temperature switch. This input should be used in conjunction with the 0V pin # 9 on the connector; the choice is made via the GUI.
If the switch input is selected through the GUI will allow the user to select either HI to LO OR Lo to HI operation.
If this input is NOT used, it should be de-selected by the GUI to avoid false input commands.

CAN HI Input (Connector terminal 3):

This is one wire of a twisted pair that connects the controller to the applications J1939 Bus. The cable should be suitable for this type of data connection. Please observe Bus protocol rules and fit termination resistors if required by your configuration

CAN LO Input (Connector terminal 4):

This is the second wire of a twisted pair that connects the controller to the applications J1939 Bus. The cable should be suitable for this type of data connection. Please observe Bus protocol rules and fit termination resistors if required by your configuration

Fan Reverse select Input (Connector terminal 5):

This is a momentary signal input and only required that the input be pulled to +Power Supply for approx. 500mS to initiate the reverse sequence settings, This input is de-bounced in the module software to avoid false triggers.

+Power Supply Input (Connector terminal 6):

This terminal is the **MAIN +Supply** Voltage input on the controller. To provide the best possible noise resistance and current capability, this input should be taken directly to battery positive or power supply +V output using a large current capacity cable.

NOTE:
Make sure the unit has an in-line fuse fitted to protect the system, the module and the warranty.

Power Common Input (Connector terminal 7):

This terminal is the **MAIN 0V** or Power Common input on the card. To provide the best possible noise resistance and current capability, this input should be taken directly to battery negative or power supply 0V (GND) output using a large current capacity cable.

Signal Common Input (Connector terminal 8):

This input should be used in conjunction with the thermistor input # 1and is internally connected to Power Common (Terminal 7) on the card. To provide the best possible noise resistance Sig Com should be used as the only ground for the temperature sensors.

Signal Common Input (Connector terminal 9):

This input should be used in conjunction with the thermistor input # 2 and is internally connected to Power Common (Terminal 7) on the card. To provide the best possible noise resistance Sig Com should be used as the only ground for the temperature sensors.

Alarm Output (Connector terminal 10):

This output can SOURCE up to 3 amps at supply voltage and can be used to connect to an audio device or light indicator to show the systems alarm condition. This output is reverse polarity, short and open circuit protected and monitored for short circuits to ground connection by the controller GUI software.

NOTE:

If this output is used with an inductive load unless a correct 'flyback' device is used to protect the controller from back EMF.

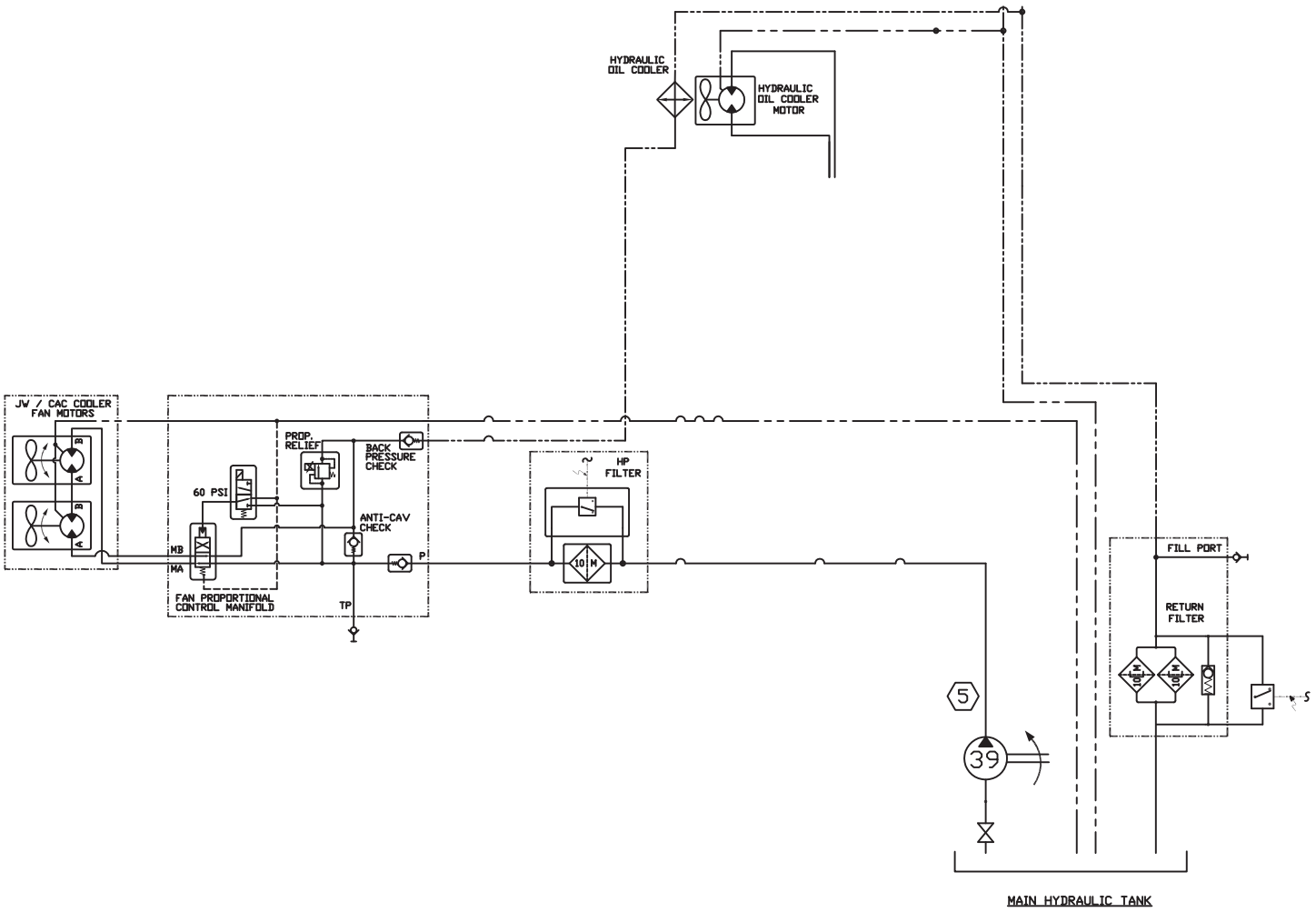
Because of the open and short monitoring feature, there is a minimal current present at all times, even when the output is OFF.

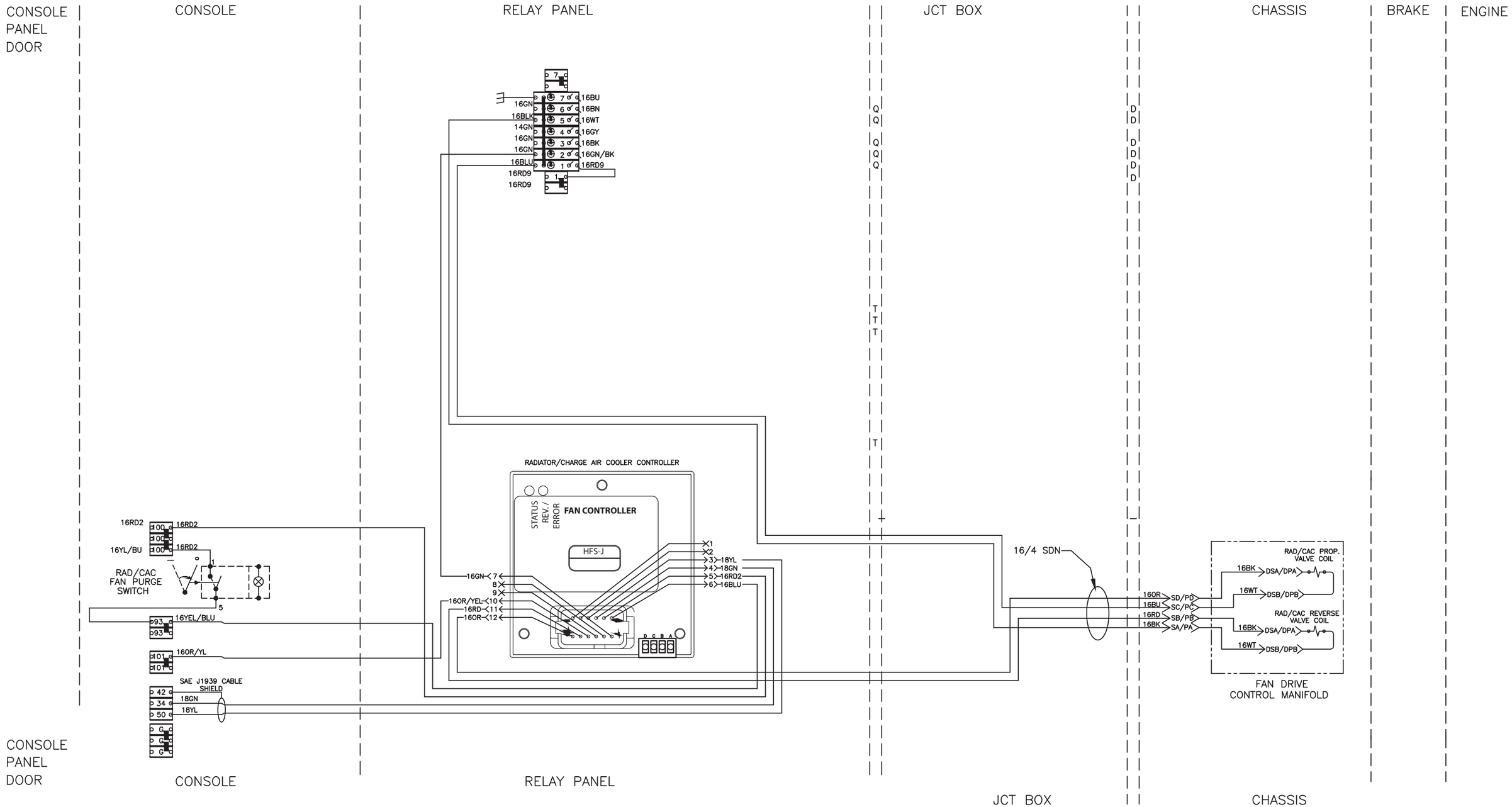
Reverse Valve Output (Connector terminal 11):

This output can SOURCE up to 3 amps at supply voltage and can be used to connect to the directional valve or stroker polarity relay used to reverse the fan motor flow direction when the purge or De-ice feature is used. This is a normally OFF output that goes to supply voltage when energized.
This output is reverse polarity, short and open circuit protected and fully monitored by the controller GUI software.

Proportional Valve Output (Connector terminal 12):

This output can SINK up to 3 amps at supply voltage and can be used to directly control the proportional valve or pump stroker used for fan speed control. This output is reverse polarity, short and open circuit protected and fully monitored by the controller GUI software.


HYDRAULIC OIL COOLER
HYDRAULIC OIL COOLER MOTOR
JV / CAC COOLER FAN MOTORS
PROP. RELIEF
BACK PRESSURE CHECK
60 PSI
ANTI-CAV CHECK
MB
MA
P
TP
FAN PROPORTIONAL CONTROL MANIFOLD
HP FILTER
10 M
FILL PORT
RETURN FILTER
5
39
MAIN HYDRAULIC TANK


CONSOLE PANEL DOOR
CONSOLE
RELAY PANEL
JCT BOX
CHASSIS
BRAKE
ENGINE
16GN
16BLK
14GN
16GN
16GN
16BLU
16RD9
16RD9
16BU
16BN
16WT
16GY
16BK
16GN/BK
16RD9
Q
Q
Q
Q
Q
D
D
D
D
D
D
T
T
T
T
RADIATOR/CHARGE AIR COOLER CONTROLLER
STATUS
REV./
ERROR
FAN CONTROLLER
HFS-J
D C B A
16GN
16OR/YEL
16RD
16OR
7
8
9
10
11
12
1
2
3
4
5
6
18YL
18GN
16RD2
16BLU
16RD2
16YL/BU
16RD2
RAD/CAC
FAN PURGE
SWITCH
16YEL/BLU
16OR/YL
SAE J1939 CABLE
SHIELD
18GN
18YL
16/4 SDN
16OR
16BU
16RD
16BK
SD/PD
SC/PC
SB/PB
SA/PA
RAD/CAC PROP.
VALVE COIL
16BK
DSA/DPA
16WT
DSB/DPB
RAD/CAC REVERSE
VALVE COIL
16BK
DSA/DPA
16WT
DSB/DPB
FAN DRIVE
CONTROL MANIFOLD
CONSOLE PANEL DOOR
CONSOLE
RELAY PANEL
JCT BOX
CHASSIS