GE IS220PSFDH1A

Flame Detector Power Supply



GE IS220PSFDH1A is the Mark VIe flame-detector power supply used with the TRPG turbine trip-protection assembly. It converts the system's 28 VDC supply into the high-voltage power required by the flame-detector circuit, enabling the connected detectors to operate as part of turbine flame monitoring. In the specified three-supply arrangement, the outputs are combined so that one supply can support all eight detectors if the other two fail. Output overvoltage protection, current limiting and diagnostic indicators support supervision of this dedicated detector-power function.

Technical Specifications

Product Identity	
Control system	GE Mark VIe / TRPG flame-detector circuit
Functional Configuration	
Product function	Flame-detector power supply
Nominal output	335 V DC, 5 mA
Output regulation	Unregulated; varies with input
Isolation	1700 V DC
Cooling	Convection; no fan
Configuration	No hardware jumpers or settings
Performance & Power	
Input voltage	28 V DC ±5% (26.6-29.4 V DC)
Current limit	7 mA DC
Environment	
Operating ambient	-30 to +65°C

Selected original manufacturer material follows on pages 3–6.

Compatibility & Selection Guide

System and software compatibility. Three supplies can feed TRPG connectors J3, J4 and J5 through the documented diode-OR arrangement. Each supply can power the eight-detector circuit if the other two supplies fail. There are no hardware jumpers or configurable settings on the pack; compatibility is determined by the TRPG flame-detector power arrangement.

Wiring & Installation Reference

Supply and detector connections

28 V DC input · Source from power distribution · 26.6-29.4 V DC

335 V DC output · TRPG flame-detector supply · Documented J3 / J4 / J5 arrangement

FE / mounting plate · Functional earth · Ground as instructed by GE

Safe mounting and verification

1. Isolate and test Turn off power and verify that no power remains before touching the module or connected circuits.

2. Mount and ground Secure the pack in the specified position above TRPG and connect the grounded mounting arrangement.

3. Verify the circuit Confirm polarity and the detector-supply connections; use the prescribed attenuated test points for measurement.

Installation precautions

Nominal output is 335 V DC. Isolate, test for absence of voltage, and use the manufacturer procedure before handling.

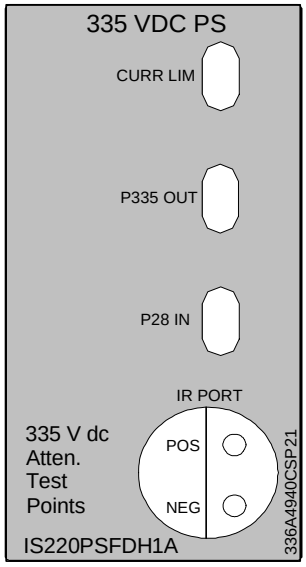
Do not remove, insert or adjust connections while power is applied.

View connection diagram (PDF) — page 4 · View mounting instructions (PDF) — page 4

PSFD Flame Detector Power Supply

PSFD Flame Detector Power Supply

Functional Description



The Flame Detector Power Supply (PSFD) pack typically mounts above the primary gas turbine trip protection (TRPG) terminal board. The source power is 28 V dc, from a power distribution board (JPDL). The output is rated for 335 V dc, 5 mA. Three power supplies are connected to J3, J4, and J5 of the TRPG in a diode-ored, TMR configuration to power up to eight flame detectors. Each supply can power all eight flame detectors should the other two power supplies fail.

The main features of the pack include:

- Convection cooling – no cooling fans used
- Ambient temperature range is -30 to +65ºC (-22 to +149 ºF)
- 28 V dc input ±5% (26.6 to 29.4 V dc)
- Unregulated output varies with input ±5% (318 to 352 V dc)
- 1700 V dc isolation
- Output over voltage protection
- Test point pair to monitor Attenuated 335 V dc Output
- Three diagnostic LEDs
- Outputs can be diode-ored with external diode.
- Output current limit at 7 mA dc
- Soft start hot swap input limits inrush current to 550 mA peak.
- Input filtering limits emissions and reduces sensitivity to input interference

Compatibility

The PSFD provides power to the flame detector circuit on TRPG through TRPG connectors J3, J4, and J5. The PSFD is typically mounted on sheet metal above the TRPG.

Installation

Warning

To prevent electric shock, turn off power to the pack, then test to verify that no power exists on the module before touching it or any connected circuits.

Caution

To prevent equipment damage, do not remove, insert, or adjust any connections while power is applied to the equipment.

➢ **To install the PSFD pack**

1 Securely mount the TRPG and install the mounting plate for the PSFD. Typically, this mounting is on the upper level above the TRPG. To avoid risk of electrical shock, the mounting plant must be connected to chassis ground, typically FE (Field Earth).

2 Mechanically secure the PSFD using the threaded studs on the housing. The studs slide into a mounting brackets on the mounting plate.

3 Connect the 335 V dc cable between PSFD 2x2 connector P2 and J3, J4, or J5 on the TRPG.

4 Apply 28 V dc power to the pack by plugging in the 1x3 connector P1on the side of the pack. It is not necessary to insert this connector with the power removed from the cable as the I/O pack has inherent soft-start capability that controls current inrush on power application.

Operation

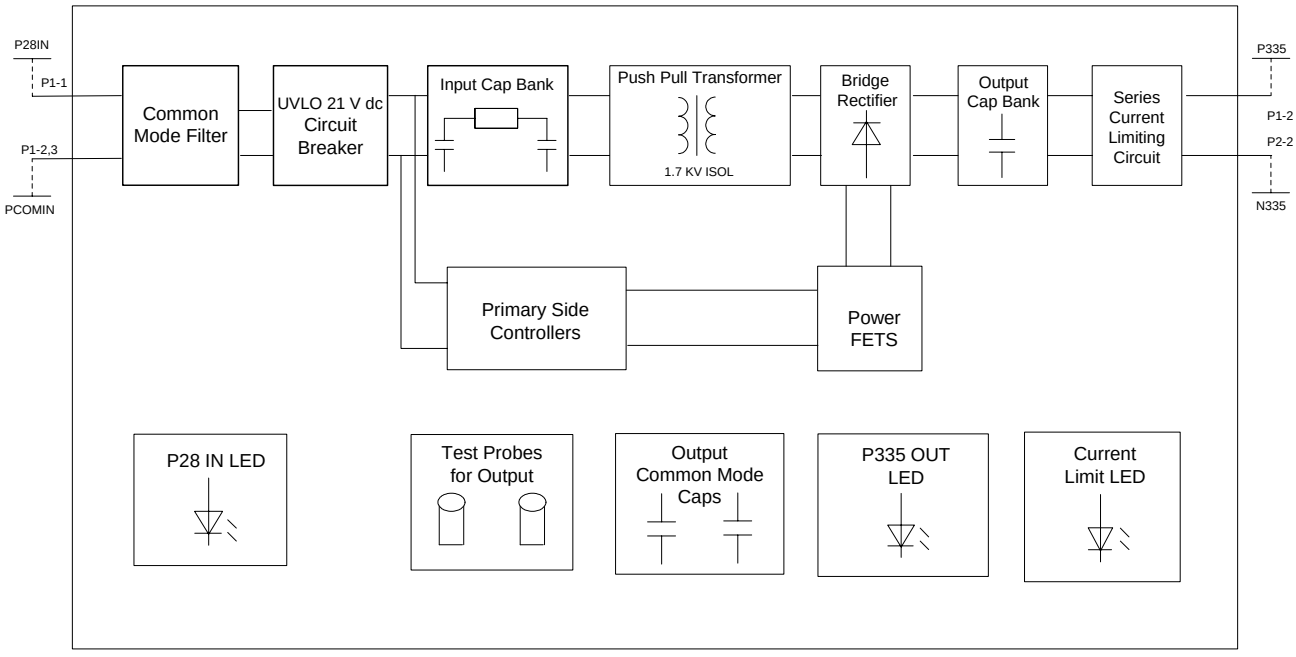
The PSFD produces 335 V dc from 28 V dc. The 28 V dc input is current limited and hot swap compatible. The input is transformer isolated from the floating output. The switching topology is an non-regulated fixed ratio push pull converter. The input and output are current limited and the input is also hot swappable.

The output voltage can be monitored locally using a differential pair of test points, attenuated 100:1.

The PSFD displays three status LEDs:

- Output current limit
- 335 V dc output present
- 28 V dc input present

The input and output LEDs do not indicate any particular voltage level and simply annunciate the presence of input or output voltage. Similarly, the current limit LED is for indication only and does not provide a measurement of the over current magnitude. The current limit LED is in series with the signal path for the activation signal. In the event that the current limit LEDs fails open, a circuit bypasses the LED and the limiter continues to function.



This 25 kHz switching power supply topology is push-pull with no feedback, that is it is open loop. The output increases and decreases proportionately to the input voltage. The push pull transformer has a 1:12 turns ratio to raise the 28 V dc input to 336 V dc. Diode drops reduce the output voltage another 1.5 V dc, resulting in 334 to 335 V dc. The load regulation is good, even in this open loop design, because the current capacity of the power stage is much greater than the required load current.

The input circuit breaker provides inrush current protection as well as over current protection. During current limiting, the breaker modulates a series pass FET on and off to limit power dissipation. The PSFD is hot pluggable and will not disturb other sensitive loads if it is connected to an operating P28 V dc bus. If a circuit failure and short circuit occur downstream of the circuit breaker, the fast acting circuit breaker prevents this short from propagating onto the 28 V dc bus. An EMI filter reduces noise propagation onto the 28 V dc bus. A 33 V transorb, immediately after the input connector, protects the PSFD from voltage transients and momentary reverse bias connections.

The output limiter restricts the output current to 7 mA, even during a direct short. The output can stay shorted indefinitely even in a 65°C (149 °F) ambient. A 385 V MOV provides transient protection at the output.

Specifications

Item	PSFD Specification
Maximum Input Voltage	29.4 V dc
Under voltage lockout (UVLO) range	22.1 – 26.4 V dc
Inrush current limit	550 mA for 40 uS, 300 mA steady state
Start up time at full load, 28 V dc	34 mS
Input current at full load, 28 V dc	137 mA
Input current ripple at full load, 28 V dc	66 mA at 50 kHz
Power consumption at full load, 28 V dc	4.1 W
Maximum power consumption at full load, 29.4 V dc input	4.5 W
Full load output	5 mA
Output short circuit current limit with self recovery	7 mA
Minimum output voltage, full load, 26.6 V dc input	317 V dc
Output voltage at full load, 28 V dc input	333 V dc
Maximum output voltage, no load, 29.4 V dc input	355 V dc
Output over voltage protection	385 V MOV
Efficiency at full load	40%
Load regulation	-0.5%
Typical output ripple at full load	520 m Vp-p at 50 kHz
Line regulation	11%
Nominal switching frequency	25 ±6 kHz
Test point attenuation of 335 V dc	100:1 Referenced to case
Voltage isolation, output to input	1700 V dc
Size	8.26 cm high x 4.19 cm wide x 12.1cm deep (3.25 in x 1.65 in x 4.78 in)
Temperature, operating	-30 to +65ºC (-22 to +149 ºF)
Assembly technology	Surface mount

Diagnostics

LEDs

- Current Limit, Red, DS3 – activates at 6-7 mA.
- P335 Out, Green, DS2 – high voltage may be present at the output. A precise voltage level cannot be discerned from this LED.
- P28 In, Green, DS1 – voltage is present at the input. A precise voltage level cannot be discerned from this LED.

Test Points

The output voltage can be monitored locally using a differential pair of test points. The positive and negative test points connect to the positive and negative outputs through 100:1 attenuators which are referenced to the chassis for safety. Each test point can be touched without risk or electrical shock. Furthermore, each test point can be shorted to the chassis indefinitely. The test points are designated TP_POS (inboard) and TP_NEG (outboard). The test points are accessed by rotating the round plastic cover on the top.

Configuration

There are no jumpers or hardware settings on the board.

Alarms

The output voltage from each PSFD is attenuated and sensed on the TREG terminal board. The sensed voltage is monitored by the PPRO or VPRO modules. In a TMR configuration, if any of the three PSFD fails to provide 335 V dc, an alarm is annunciated in the ToolboxST* application or HMI.