Foxboro Evo™ Process Automation System

Product Specifications

PSS 31H-2W7 B4

DIN Rail Mounted Power Supplies - FPS240-24 and FPS120-24

85-276 V ac Input
24 V dc @ 240 W Output
(P0924SM)

85-264 V ac Input
24 V dc @ 120 W Output
(P0924SL)

The Foxboro Evo™ System FPS240-24 and FPS120-24 DIN rail mounted power supplies provide 24 V dc to the DIN Rail Mounted Subsystem baseplates (at 240 W and 120 W, respectively).

FEATURES:

- Wide range of ac and dc input voltages
- High efficiency
- Power factor correction
- Dual stage current limiting
- Overvoltage shut down circuitry
- Transformer isolated 24 V dc output
- Class 1, DIV 2, Zone 2 applications
- UL® and UL-C Certifications
- Power for external field devices
- Relay contact output for externally powered alarm
- Convection cooling (no fans)
- Horizontal DIN rail mounting

OVERVIEW

The Foxboro Evo™ System DIN rail mounted power supplies provide 24 V dc to both the standard DIN rail mounted baseplates and the Compact 200 Series baseplates (in custom configurations), as well as the conversion mounting structures.

The FPS240-24 and FPS120-24 are power supplies that are agency certified for use in Class 1, Div. 2 and Zone 2 applications.

- FPS240-24 (P0924SM) -
  Input: 85-276 V ac and 88-375 V dc
  Output: 24 V dc at 240 W
- FPS120-24 (P0924SL) -
  Input: 85-264 V ac and 88-360 V dc
  Output: 24 V dc at 120 W

These power supplies are recommended for use in sites where a lower-powered and/or smaller sized solution than the FPS400-24 power supply is desired. They provide bi-stable, quick-connect spring clamp terminals with IP20 finger safe construction for power input/output connections.

They have LED indicators for both power output and overload/short-circuit/over-temperature conditions.

The power supplies include a DIN rail mount earth terminal, which provides a ground point on a DIN rail for the supplies' 24 V dc output cables.

Figure 1. FPS240-24 Power Supply (P0924SM)

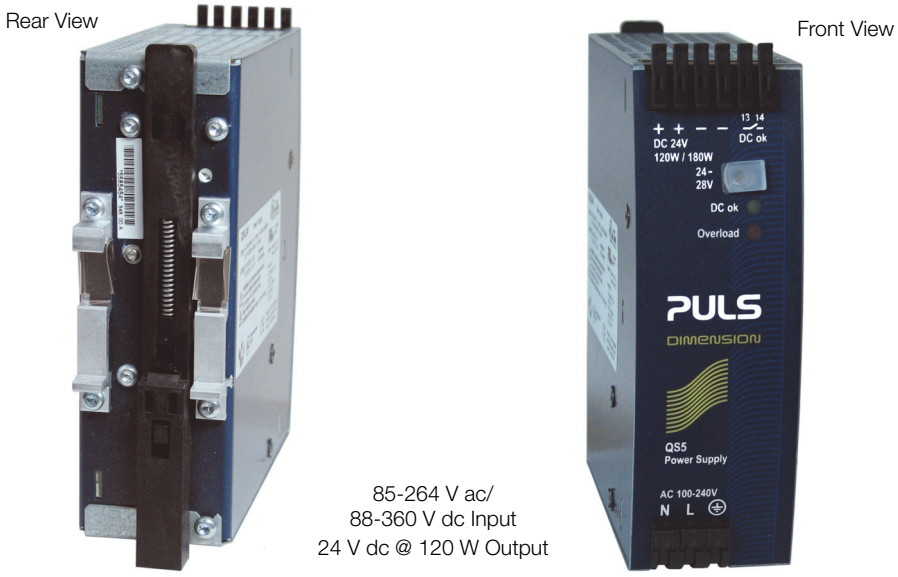


Figure 2. FPS120-24 Power Supply (P0924SL)

WIDE-RANGE INPUT VOLTAGES

A high-efficiency input circuit in the power supplies automatically accepts a range of 85 to 276 V ac for the FPS240-24 or 85 to 264 V ac for the FPS120-24 at 47 to 63 Hz operation. The circuit also accepts a dc voltage input of 88 to 375 V dc for the FPS240-24 or 88 to 360 V dc for the FPS120-24.

DIVISION 2, ZONE 2 APPLICATION

The power supplies are UL and UL-C listed (to UL 1950) as having a Safety Extra Low Voltage (SELV), and have IEC/EN 60950-1 certifications. They can be used in Division 2 and Zone 2 applications.

POWER FOR EXTERNAL FIELD DEVICES

The actual amount of power required in a DIN rail mounted subsystem (Compact or standard) or 100 Series FBM Upgrade subsystem depends on the number of Fieldbus Modules (FBMs)/Fieldbus Communication Modules (FCMs)/Field Control Processors (FCPs) and Termination Assembly Adapters (TAAs) being powered, the types of termination assemblies used, and whether internal or external powering is used for the individual field device(s).

The FPS240-24 and FPS120-24 can also be used as a field power supply to power external field devices. However, for system integrity field devices and DIN rail baseplates or conversion mounting structures should not be powered from the same FPS240-24 and FPS120-24.

PACKAGING

The conformal coated design provides protection for corrosive atmospheres such as hydrogen sulfides and chlorine, as found in many process control plants.The power supplies have DIN rail mounting clips for mounting on a horizontal DIN rail. Due to heat considerations, mounting on a vertical DIN rail is not supported.

STATUS ALARMS

Visual LED indicators for power output and overload/short-circuit/over-temperature conditions are contained on the power supplies. To indicate when the 24 V dc output dips more than 10% for longer than 1 millisecond, a “DC ok” relay contact output is available to activate an externally powered alarm. A customer-supplied cable is required to connect the normally-open relay contact (with spring clamp terminals) to an external FBM or other monitoring device.

SAFETY WIRING

The power supply is designed to be used with special cables (ordered separately) to make installation easy and improve personal safety. Refer to “PHYSICAL SPECIFICATIONS” on page 7.

FUNCTIONAL SPECIFICATIONS

Maximum Ratings

OUTPUT VOLTAGE

Factory set at 24.1 V dc

CAUTION

The output voltage of the FPS240-24 (P0924SM) and FPS120-24 (P0924SL) power supplies is set to 24.1 V by default. This voltage must not be changed. Do not expose or turn the output voltage potentiometer on these power supplies. Doing so will invalidate the warranty for these power supplies and any equipment connected to them. Invensys provides no guarantees for any DIN Rail mounted subsystem equipment’s operation if this output voltage is changed.

Input Specifications

FPS240-24 (P0924SM)

Input Voltage Range
85 to 276 V ac and 88 to 375 V dc (Refer to Table 1)
Input Frequency
47 to 63 Hz
Nominal Input Current
2.22/1.22 A at 120/230 V ac
Efficiency (at Maximum Power, 10A, 24V)
90%+ typical
Inrush Current
4/7 A, at 120/230 V ac (peak at cold start)
Input Transient Protection
Included

FPS120-24 (P0924SL)

Input Voltage Range
85 to 264 V ac and 88 to 360 V dc (Refer to Table 1)
Input Frequency
47 to 63 Hz
Nominal Input Current
1.10/0.62 A at 120/230 V ac
Efficiency (at Maximum Power, 5A, 24V)
90%+ typical
Inrush Current
9/11 A, at 120/230 V ac (peak at cold start)
Input Transient Protection
Included

FUNCTIONAL SPECIFICATIONS (CONTINUED)

Output Specifications

FPS240-24 (P0924SM)

Output Voltage
24 V dc nominal factory setting (Refer to Table 1)
Output Current
10 A continuous @ 24 V dc
15 A for 4 seconds, typical, @ 24 V dc
Output Power
240 W continuous @ 24 V dc
360 W for 4 seconds, typical, @ 24 V dc
Voltage Line Regulation
10 mV maximum, 60 to 300 V ac
Voltage Load Regulation
100 mV maximum
Ripple and Noise Voltage
<50mVpp, 20Hz to 20MHz, 50Ω
Temperature Derating
6 W/°C, +60 to +70°C
Startup Time
800ms at 100 V ac input
650ms at 120 V ac input
340ms at 230 V ac input
Overshoot
100 mV
Input Fusing (Non-User Accessible)
T6.3A H.B.C. internal fuse

FPS120-24 (P0924SL)

Output Voltage
24 V dc nominal factory setting (Refer to Table 1)
Output Current
5 A continuous @ 24 V dc
7.5 A for 4 seconds, typical, @ 24 V dc
Output Power
120 W continuous @ 24 V dc
180 W for 4 seconds, typical, @ 24 V dc
Voltage Line Regulation
20 mV maximum, 85 to 264 V ac
Voltage Load Regulation
100 mV maximum
Ripple and Noise Voltage
<50 mVpp, 20Hz to 20MHz, 50Ω
Temperature Derating
3 W/°C, +60 to +70°C
Startup Time
120ms at 100 V ac input
110ms at 120 V ac input
85ms at 230 V ac input
Overshoot
100 mV

Protection Features

OVERVOLTAGE PROTECTION
Factory set at 32-36 V dc
The power supplies have power factor corrections.

ISOLATION RESISTANCE
500 V ac input to output

OVER CURRENT PROTECTION
Support loads with a higher short-term power requirement without damage or shutdown for up to four seconds

FUNCTIONAL SPECIFICATIONS (CONTINUED)

Vibration
2 g (17.8 to 500 Hz)

Regulatory Compliance

ELECTROMAGNETIC COMPATIBILITY (EMC)

European EMC Directive 89/336/EEC, 93/68/EEC and the Low-voltage Directive (LVD) 73/23/EWG
Meets:
EN 55011, EN 55022, FCC Part 15, CISPR 11, CISPR 22, EN 55022 - Conducted emission standard
EN 55011, EN 55022 - Radiated emission
EN 61000-3-2 - Harmonic input current
EN 61000-3-3 - Voltage fluctuations, flicker

EN 61000-4-2 Electrostatic Discharge
±8 kV contact, 15 kV air discharge

IEC/EN 61000-4-3 Radiated Field Immunity
10 V/m at 80 to 1000 MH

IEC/EN 61000-4-4 Electrical Fast Transient/Burst Immunity (Repetitive transient wave)
±4 kV common mode on mains input
±2 kV common mode on output

IEC/EN 61000-4-5 Surge Immunity
Input
±2 kV line-to-neutral
±4 kV neutral/line-to-protected earth (ground)
Output
500 V positive-to-negative
500 V positive/negative-to-protected earth (ground)

ELECTROMAGNETIC COMPATIBILITY (EMC) (CONT.)

IEC/EN 61000-4-6 Immunity to Conducted Disturbances Induced by Radio-frequency Fields
10 V (rms) at 150 kHz to 80 MHz with 80% amplitude modulation at 1 kHz

IEC/EN 61000-4-11 Mains Voltage Dips
70% of 100 V ac - 70 V ac, 10ms
40% of 100 V ac - 40 V ac, 100ms
40% of 100 V ac - 40 V ac, 1000ms

IEC/EN 61000-4-11 Voltage Interruptions
0 V ac, 5000ms

SEMI F47 0200 Voltage Sags
96 V ac, 1000ms
84 V ac, 500ms
60 V ac, 200ms

PRODUCT SAFETY

Underwriters Laboratories (UL) for U.S. and Canada
UL/UL-C listed as suitable for USA Class I, Zone 2, Aex nC IIC, and Class I, Division 2 Groups A, B, C, D Hazardous Locations, temperature code T4. These modules are also UL and UL-C listed as associated apparatus for supplying non-incendive communication circuits for Class I, Division 2, Groups A-D hazardous locations when connected to specified Foxboro processor modules as described in the ***DIN Rail Mounted Subsystem User's Guide*** (B0400FA).

European Low Voltage Directive 73/23/EEC and Explosive Atmospheres (ATEX) Directive 94/9/EC

Calibration Requirements
Calibration or voltage adjustment of the power supply is not required.

Table 1. Nominal Input and Output and Regulatory Compliance

Power Supply	Input			Maximum Rated Output (+), dc		
	V	A	Hz	V	W	A
FPS240-24 (P0924SM)	100-240 V ac	2.22/1.22	50 to 60	24	240	10
FPS240-24 (P0924SM)	110-300 V dc	2.37/0.87	-	24	240	10
FPS120-24 (P0924SL)	100-240 V ac	1.10/0.62	50 to 60	24	120	5
FPS120-24 (P0924SL)	110-300 V dc	1.19/0.44	-	24	120	5

ENVIRONMENTAL SPECIFICATIONS

Operating

TEMPERATURE
–25 to 70°C (–13 to +158°F)

RELATIVE HUMIDITY
5 to 95% (noncondensing)

ALTITUDE(1)
0 to +6,000 m (0 to +20,000 ft)

Storage

TEMPERATURE(1)
–40 to +85°C (–40 to +185°F)

RELATIVE HUMIDITY
5 to 95% (noncondensing)

ALTITUDE
0 to +12,000 m (–1,000 to +40,000 ft)

PHYSICAL SPECIFICATIONS

Mounting
Horizontal DIN-rail only.

Mass

FPS240-24 (P0924SM)
0.9 kg (1.98 lb)

FPS120-24 (P0924SL)
0.62 kg (1.37 lb)

Dimensions
See “DIMENSIONS–NOMINAL” on page 9.

Cooling
Convection cooled (no fans)

Indicators
Green LED (DC ok) indicates when output is within specified operating range (>23.5 V dc).
Red LED (Overload) indicates output overload (V_{OUT} < 90%), short circuit (V_{OUT} = ca. 0V) or over-temperature condition (LED blinks).

Part Numbers

POWER SUPPLY(2)
FPS240-24 (P0924SM)
24 V dc @ 240 W output
FPS120-24 (P0924SL)
24 V dc @ 120 W output

(1) Reduce output power or ambient temperature above 2000 m (6562 ft) sea level.
For FPS240-24 (P0924SM), 7.5 W/1000 m (3280 ft) above 2000 m (6562 ft) sea level for temperatures > 50°C (122°F).
For FPS120-24 (P0924SL), 15 W/1000 m (3280 ft) above 2000 m (6562 ft) sea level for temperatures > 50°C (122°F).
(2) Included with each power supply is a grounding terminal block (X0175WL).

PHYSICAL SPECIFICATIONS (CONTINUED)

Part Numbers (Cont.)

AC INPUT TERMINAL BLOCK CABLE
Connects ac Input to Power Supplies - Qty 1 required - Must be ordered separately.

- P0170PA - 1.8 m (6 ft)
- (For IE16/32 and Molded Structural Foam FE8 enclosure upgrades)
  P0924SW - 1 m (3.3 ft) - for rear-mounted power supplies
- (For IE16/32 and Molded Structural Foam FE8 enclosure upgrades)
  P0924SX - 2 m (6.6 ft) - for front-mounted power supplies

POWER SUPPLY TO BASEPLATES CABLE
Connects power supply to baseplates. One or two cables can be used per power supply.
The following cables support Modular Baseplates (P0926KE/HF/HJ/HM/HT/KH/HZ/JC/JF/JM).

- P0922XR - 1.0 m (3.3 ft) - Main Cable
- P0922XS - 3.0 m (9.8 ft).

POWER SUPPLY TO CONVERSION MOUNTING STRUCTURES CABLE
Connects power supply to conversion mounting structures. One or two cables can be used per power supply.
The following cable supports conversion mounting structures (P0924JL/JM/JN/JP).

- P0922XR - 1.0 m (3.3 ft) - Main Cable

Alarm Status Relay (DC ok)

TYPE
Normally Open (NO)

ALARM STATUS CONTACT VOLTAGE
The DC-ok feature requires that the output voltage reaches 90% of the nominal (24 V) level. If this level cannot be achieved, the overload lamp will be on and the DC-ok contact will be open. The overload signal will shut off as soon as the 90% point is reached.

CONTACT CLOSES
As soon as the output voltage reaches 90% of the nominal 24 V output voltage.

CONTACT OPENS
When the output voltage dips more than 10% below 24 V for >1 msec.
Short dips will be extended to a signal length of 250 ms. Dips shorter than 1 ms will be ignored.

CONTACT RE-CLOSES
As soon as the output voltage exceeds 90% of the adjusted voltage

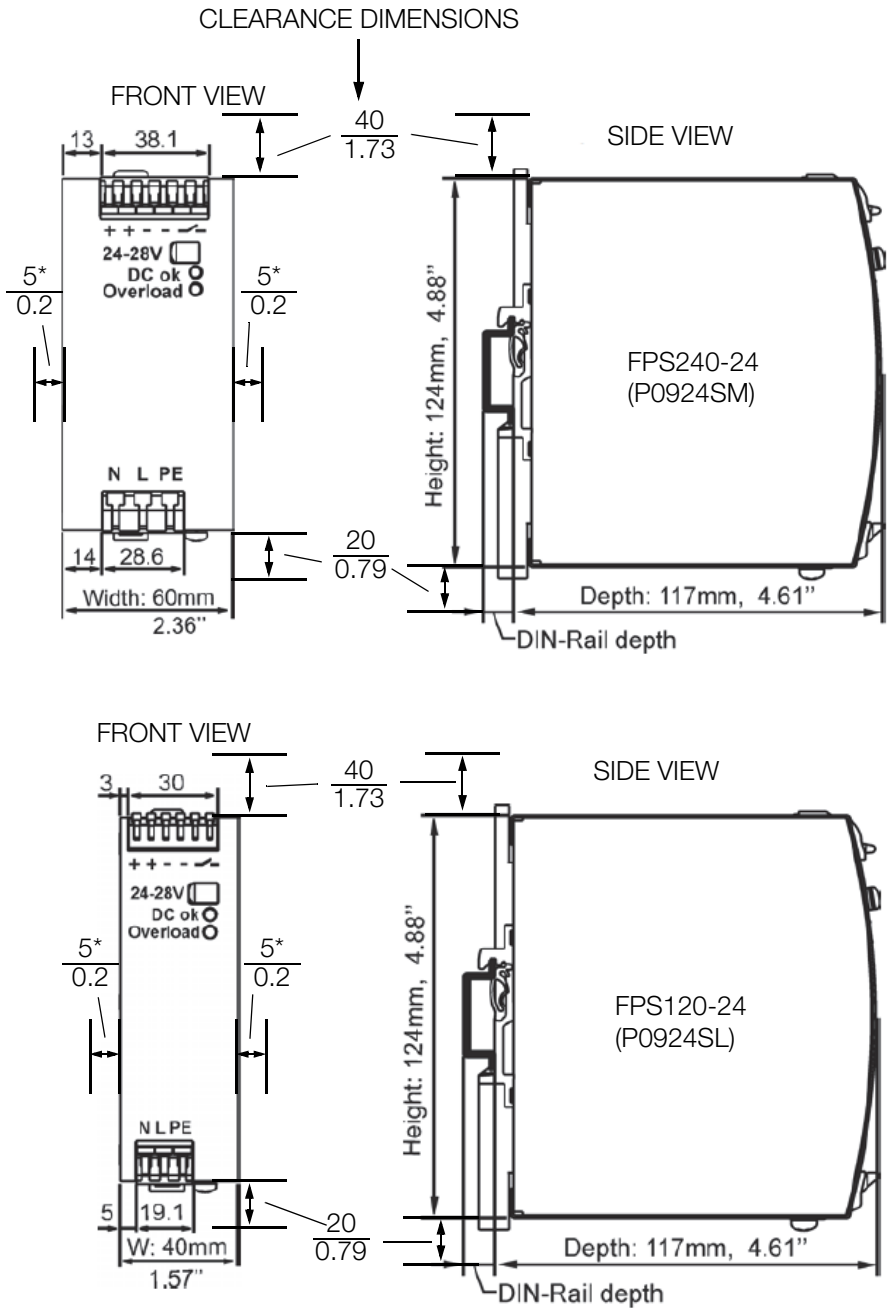
CONTACT RATINGS

Maximum
60 V dc 0.3 A, 30 V dc 1 A, 30 V ac 0.5 A (resistive load)

Minimum
1 mA at 5 V dc (min. permissible load)

DIMENSIONS–NOMINAL

mm
in



* If the adjacent device is a heat source, 15 mm (0.59 in) clearance is recommended on the left and right sides of these power supplies.

RELATED PRODUCT SPECIFICATION SHEETS

PSS Number	Description
PSS 21H-2W1 B3	DIN Rail Mounted FBM Subsystem Overview
PSS 21H-2W1 B4	100 Series Fieldbus Module Upgrade Subsystem Overview
PSS 31H-2W2 B3	DIN Rail Mounted FBM Equipment, Agency Certifications
PSS 31H-2W3 B4	DIN Rail Mounted Power Supplies - FPS400-24
PSS 21H-2W6 B4	DIN Rail Mounted Modular Baseplates
PSS 21H-2W8 B4	100 Series Conversion Mounting Structures
PSS 31H-2COV B3	Compact 200 Series I/O Subsystem Overview
PSS 31H-2W12 B3	DIN Rail Mounted Compact 200 Series I/O Equipment, Agency Certifications
PSS 31H-2C480 B4	Compact Power Supply - FPS480-24
PSS 31H-2C200 B4	Compact 200 Series 16-Slot Horizontal Baseplate

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