

200 Series Power Supplies - FPS240-24 and FPS120-24



The 200 Series Power Supplies provide power at 24 V dc to 200 Series I/O Baseplates as well as separately to field control loops. These power supplies allow the user to select the size and power necessary to support each specific installation.

OVERVIEW

The Foxboro Evo™ System standard 200 Series power supplies provide 24 V dc to both the standard and Compact 200 Series baseplates. These power supplies are agency certified for use in Class 1, Div. 2 and Zone 2 applications.

- ▶ FPS240-24 (P0924SM)
Nominal input Range: 100-240 V ac and 110-150 V dc
- ▶ FPS120-24 (P0924SL)
Nominal Input Range: 100-240 V ac and 110-300 V dc

These power supplies are recommended for use in sites where a lower-powered and/or smaller sized solution 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 for the supplies' 24 V dc output cables.

Front View



Rear View

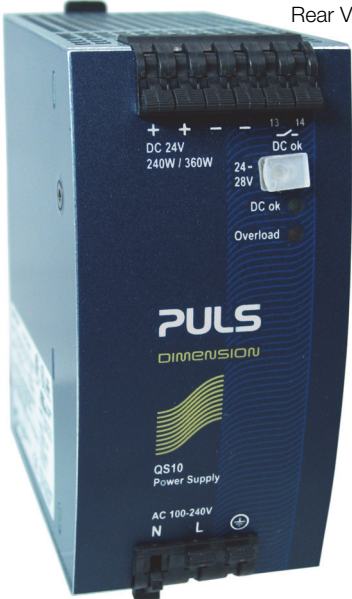


Figure 1. FPS240-24 Power Supply (P0924SM)

Rear View



Front View



Figure 2. FPS120-24 Power Supply (P0924SL)

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

WIDE-RANGE INPUT VOLTAGES

A high-efficiency input circuit in the power supplies automatically accepts a wide voltage range. See “FUNCTIONAL SPECIFICATIONS” on page 4.

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 200 Series 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 I/O 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 and may result in faulty equipment operation. Foxboro provides no guarantee for any 200 Series subsystem equipment's operation if this output voltage is changed.

Input Specifications

FPS240-24 (P0924SM)

Absolute Input Voltage Range

85 to 276 V ac and 88 to 187 V dc

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)

Absolute Input Voltage Range

85 to 264 V ac and 88 to 360 V dc

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

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 2014/30/EU*

Meets the requirements of EN 61000-6-1:2007, EN 61000-6-2:2005/AC:2005, EN 61000-6-3:2007 + A1:2011/AC:2012, EN 61000-6-4:2007 + A1:2011

PRODUCT SAFETY*Underwriters Laboratories (UL) and CSA for U.S. and Canada*Certified as suitable for Class 1 Division 2 Groups A, B, C, D Hazardous Locations, Temperature Code T4 when connected to specified Foxboro processor modules as described in the *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA).*European Low Voltage Directive**2015/35/EU and Explosive Atmospheres (ATEX) Directive 2014/34/EU for use in Zone 2 Category 3G Hazardous Locations II 3G Ex nA nC II T4 Gc***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)	110-150 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.

Weight

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 ($V_{OUT} = \text{ca. } 0\text{V}$) 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

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).

(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 $> 50^{\circ}\text{C}$ (122°F).
For FPS120-24 (P0924SL), 15 W/1000 m (3280 ft) above 2000 m (6562 ft) sea level for temperatures $> 50^{\circ}\text{C}$ (122°F).
(2) Included with each power supply is a grounding terminal block (X0175WL).

PHYSICAL SPECIFICATIONS (CONTINUED)**Part Numbers (Cont.)****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

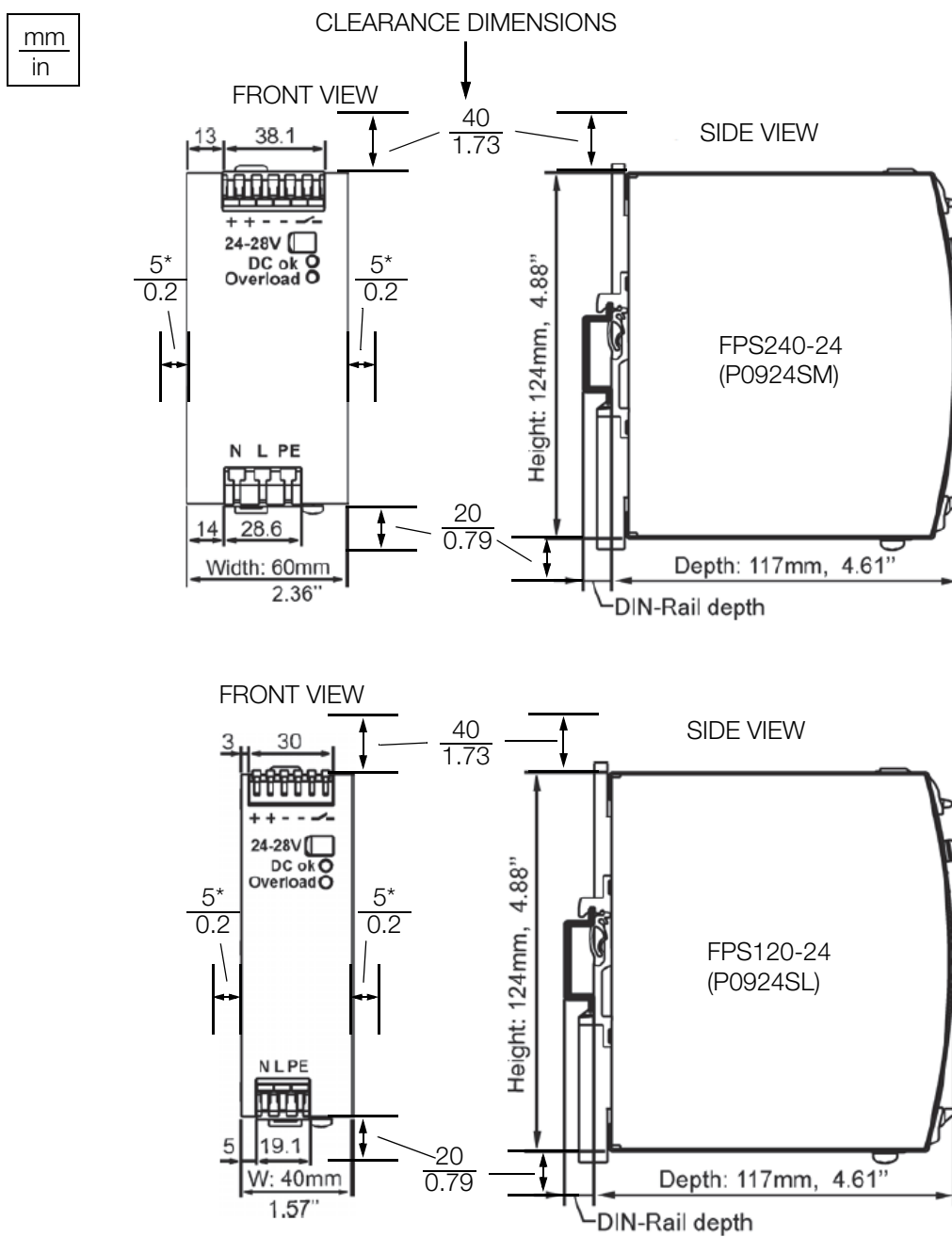
CONTACT RATINGS*Maximum*

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



* 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 31H-2SOV	Standard 200 Series Subsystem Overview
PSS 31H-2W100	100 Series Fieldbus Module Upgrade Subsystem Overview
PSS 31H-2CERTS	Standard and Compact 200 Series I/O - Agency Certifications
PSS 31H-2W3	Standard 200 Series Power Supply
PSS 31H-2SBASEPLT	Standard 200 Series Baseplates
PSS 31H-2W8	100 Series Conversion Mounting Structures
PSS 31H-2COV B3	Compact 200 Series I/O Subsystem Overview
PSS 31H-2W12 B3	DIN Rail Mounted High Density 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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