

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

ALLEN-BRADLEY CONTROLLOGIX

1606-XLB480E

SINGLE-PHASE POWER SUPPLY

Used with the applicable Bulletin 1606 basic power supplies configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Allen-Bradley official manufacturer documentation



Basic Power Supply – 24V, 20 A, 480 W, Single-phase Input

Catalog Number 1606-XLB480E



Allen-Bradley

by ROCKWELL AUTOMATION

Reference Manual

Original Instructions

Specifications

Attributes	Values	Notes
Output voltage	DC 24V	Nominal
Adjustment range	24...28V	Factory setting 24.1V
Output current	20.0...17.1 A	Below 55 °C (131 °F) ambient
	12.5...10.7 A	At 70 °C (158 °F) ambient
	Derate linearly between 55...70 °C (131...158 °F).	
Input voltage AC	AC 100...240V	±10%
Mains frequency	50...60 Hz	±6%
AC Input current	4.3 / 2.3 A	At 120 / 230V AC
Power factor	0.99 / 0.97	At 120 / 230V AC
AC Inrush current	15 / 35 A pk	At 120 / 230V AC, 40 °C (104 °F), cold start
Efficiency	94.2 / 95.3%	At 120 / 230V AC
Losses	29.6 / 23.7 W	At 120 / 230V AC
Hold-up time	27 / 27 ms	At 120 / 230V AC
Temperature range	-25...+70 °C (-13...+158 °F)	—
Size (W x H x D)	59 x 124 x 127 mm (2.32 x 4.88 x 5.00 in.)	—
Weight	810 g (1.97 lb)	—

Catalog Numbers

Catalog Numbers	Descriptions
1606-XLB480E	Industrial grade power supply
1606-XLSBUFFER24	Buffer module
1606-XLSRED4HE	Dual redundancy module
1606-XLBRED20	Dual redundancy module

AC Input

The device is suitable to be supplied from TN, TT, or IT mains networks with AC voltage.

Attributes		Values	Notes
AC input	Nom	AC 100...240V	—
AC input range	Min	90...264V AC	Continuous operation
	Min	264...300V AC	Occasionally for 500 ms max
Allowed voltage L or N to earth	Max	300V AC	Continuous, according to IEC 60664-1
Input frequency	Nom	50...60 Hz	±6%
Turn-on voltage	Typ	81V AC	Steady-state value, see Figure 1
Shut-down voltage	Typ	63V AC / 71V AC	At no load / nom load, steady-state value, see Figure 1
External input protection		The device is designed, tested and approved for branch circuits up to 20 A without additional protection device. For higher branch circuits use an additional protection device. If an external input protection device is utilized, do not use one smaller than a 10A B- or 6A C-characteristic to avoid a nuisance tripping of the circuit breaker.	

Attributes		Values			Notes
		AC 100V	AC 120V	AC 230V	
Input current	Typ	5.2 A	4.3 A	2.3 A	At 24V, 20 A, see Figure 3
Power factor	Typ	0.99	0.99	0.97	At 24V, 20 A, see Figure 4
Crest factor	Typ	1.6	1.7	2.0	At 24V, 20 A, The crest factor is the mathematical ratio of the peak value to RMS value of the input current waveform.
Start-up delay	Typ	420 ms	300 ms	230 ms	See Figure 2
Rise time	Typ	100 ms	100 ms	100 ms	At 24V, 20 A constant current load, 0 mF load capacitance, see Figure 2
	Typ	140 ms	140 ms	140 ms	At 24V, 20 A constant current load, 20 mF load capacitance, see Figure 2
Turn-on overshoot	Max	200 mV	200 mV	200 mV	See Figure 2

Figure 1 - Input voltage range, typ

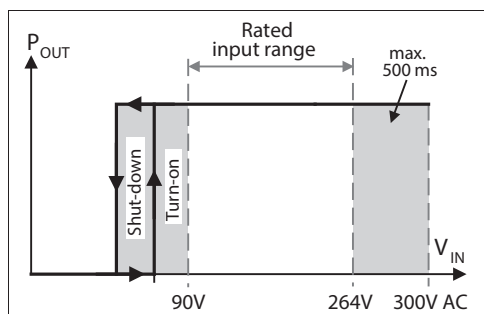


Figure 2 - Turn-on behavior, definitions

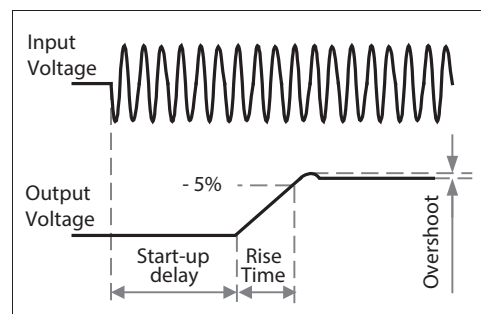


Figure 3 - Input current vs. output load at 24V

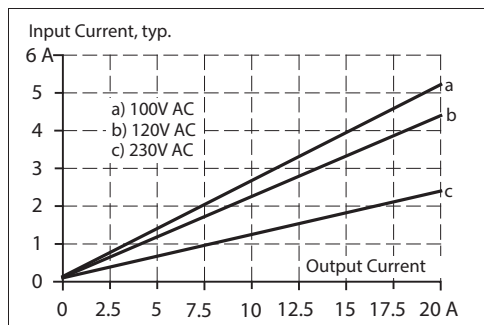
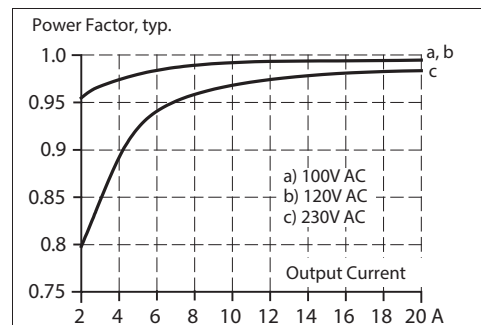


Figure 4 - Power factor vs. output load



Input Inrush Current

An active inrush limitation circuit (NTCs, which are bypassed by a relay contact) limits the input inrush current after turn-on of the input voltage.

The charging current into EMI suppression capacitors is disregarded in the first microseconds after switch-on.

Attributes		Values			Notes
		AC 100V	AC 120V	AC 230V	
Inrush current	Max	15 A pk	18 A pk	42 A pk	At 40 °C (104 °F), cold start
	Typ	13 A pk	13 A pk	25 A pk	At 25 °C (77 °F), cold start
	Typ	13 A pk	15 A pk	35 A pk	At 40 °C (104 °F), cold start
Inrush energy	Max	3 A ² s	3 A ² s	3 A ² s	At 40 °C (104 °F), cold start

Figure 5 - Typical turn-on behavior at nominal load, 120V AC input, and 25 °C (77 °F) ambient

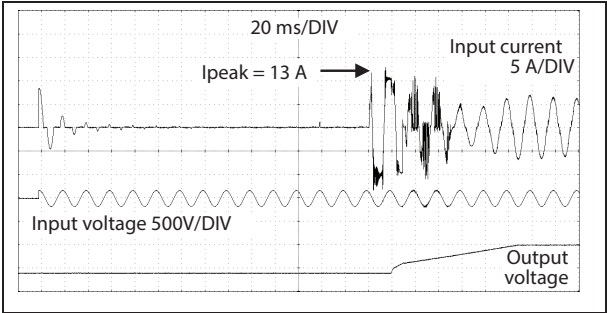
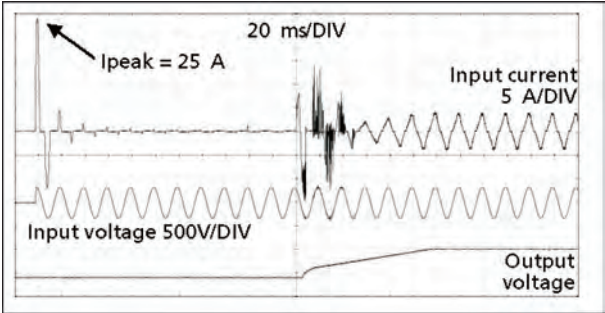


Figure 6 - Typical turn-on behavior at nominal load, 230V AC input, and 25 °C (77 °F) ambient



Efficiency and Power Losses

Attributes		Values			Notes
		AC 100V	AC 120V	AC 230V	
Efficiency	Typ	93.6%	94.2%	95.3%	At 24V, 20 A
Average efficiency ⁽¹⁾	Typ	93.4%	93.8%	94.5%	25% at 5 A, 25% at 10 A, 25% at 15 A, 25% at 20 A
Power losses	Typ	5.7 W	4.6 W	3.5 W	At 24V, 0 A
	Typ	15.6 W	14.8 W	13.2 W	At 24V, 10 A
	Typ	32.8 W	29.6 W	23.7 W	At 24V, 20 A

(1) The average efficiency is an assumption for a typical application where the power supply is loaded with 25% of the nominal load for 25% of the time, 50% of the nominal load for 25% of the time, 75% of the nominal load for 25% of the time, and 100% of the nominal load for 25% of the time.

Figure 12 - Efficiency vs. output current at 24V, typ

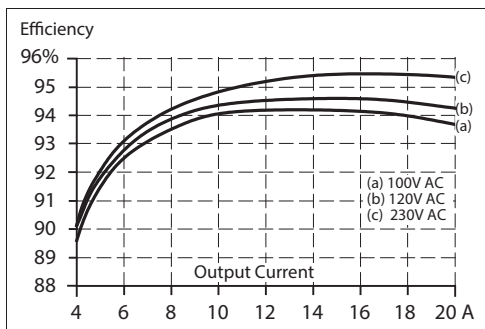


Figure 14 - Efficiency vs. input voltage at 24V, 20 A, typ

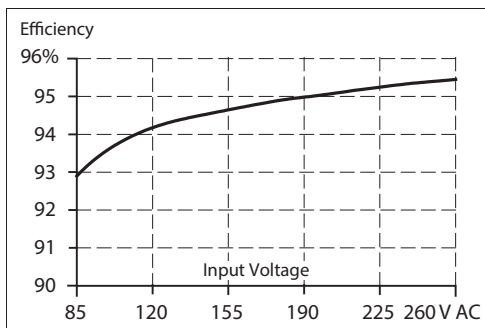


Figure 13 - Losses vs. output current at 24V, typ

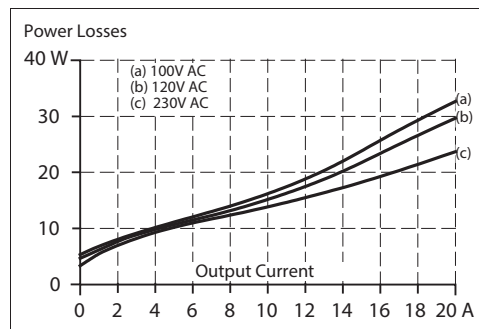


Figure 15 - Losses vs. input voltage at 24V, 20 A, typ

