Bulletin 1606 — Power Supplies∗❄

- Quick mounting and connecting, innovative DIN-Rail mount, smallest in class
- UL Listed NEC Class 2; Class 1, Div. 2; Semi F47; ODVA Approved
- Low inrush current limiting
- PFC Active or Passive
- Wide range input; auto select input
- Superior overload design (continuous current, no hiccup)
- NEC Class 2 'Limited Power' options
- Selectable operating mode (single/parallel)
- Superior efficiency and temperature rating

Special Modules

- Brownout buffer, DC to DC converter, N+1 redundancy, DC UPS

Standards Compliance

- World-wide Certifications
- NEC Class 2
- Class 1 Div. 2 (T3A)
- cULus, CE, C-Tick, ATEX
- SEMI F47 Compatible
- ABS/GL/RINA (Marine)

Certifications

CE cULus LISTED cULus N223

Table of Contents

∗ Not all features apply to all power supplies; see individual power supply descriptions for specifics
❄ A more detailed list of performance specifications can be found at the Allen-Bradley web site http://www.ab.com/industrialcontrols/products/power_supplies/index.html

How to Select a Bulletin 1606 Power Supply

The Bulletin 1606 line of Power Supplies is designed with "reserve power" thereby eliminating the need to oversize your power supply to start high inrush loads.

Steps to size a Power Supply

1. Determine the "Average" continuous current of the load and the typical inrush current.

2. Select a power supply where the rated load is at/or below the current of the device and the Peak Current is less than the short-circuit rating of the power supply.

Notes:

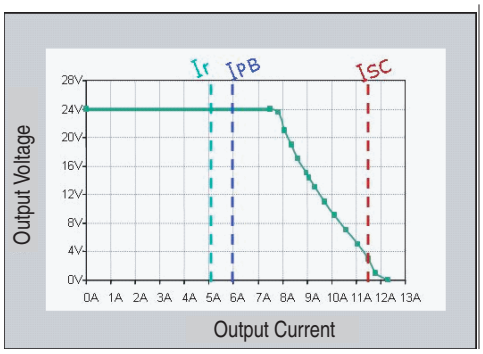
- ReservePower will deliver up to 25% additional current continuously.
- PowerBoost will deliver 150% of rated current for up to 5 s.

Example:

Application: Single Phase 120V input, 24V output, 5 A continuous current with 7.5 A inrush current

Solution: 1606-XLS120E

Output Characteristic for XLS120E (5 A) Power Supply



I_{RATED}: 5 A
$I_{SHORT\ CIRCUIT}$: >9 A
$I_{POWER\ BOOST}$: 7.5 A

Cat. No.	I_{RATED} [A]	$I_{SHORT\ CIRCUIT}$ (25 °C) [A]	$I_{POWER\ BOOST}$ or $I_{RESERVEPOWER}$ [A]
1606-XLS80E	3.3	5.2	5.4§
1606-XLS120E	5	9	7.5§
1606-XLS240E	10	21	15§
1606-XLS480E	20	30	30§
1606-XLS480E-3	20	29	30§
1606-XLSDNET4	3.8	4	—
1606-XLSDNET8	8	7	—
1606-XLE80E	3.3	5.5	3.6
1606-XLE120E	5	11	6
1606-XLE240E	10	16	12

§ Products with ReservePower.
♣ Short circuit current values are temperature dependent for the selected product; i.e., the higher the ambient temperature, the lower the short circuit current.
➢ Hiccup Overload design.

Catalog Number Explanation

Important: The following cat. no. breakdown is for explanation purposes only. It is not a product configurator. Not all combinations of fields are valid product cat. nos. First, select the desired power supply using the Product Selection tables. Then, use this breakdown for verification and explanation only.

1606 –	XLS	480	E		–	3
	a	*b*	*c*	*d*		*e*

a

Power Supply Type	
Code	Description
XLP	Compact family
XLS	Performance family
XLE	Essential family

b

Rated Output Watts	
Code	Description
15	15 W
25	25 W
30	30 W
36	36 W
40	40 W
50	50 W
60	60 W
72	72 W
80	80 W
90	90 W
95	95 W
100	100 W
120	120 W
180	180 W
240	240 W
480	480 W
720	720 W
960	960 W

c

Output Voltage	
Code	Description
A	5V DC
B	10...12V DC or 12...15 V DC
C	Dual +/- 12 and 15V DC
D	24V DC
E	24...28V DC
F	48...56V DC
G	36...43V DC
M	48V DC

d

Special Functions	
Code	Description
	Can be left blank
C	Conformal coating
R	Redundancy module
P	Power factor correction
Z	Removeable Terminations
X	Semi-Regulated
E	Regional voltage; 230V AC input only
N	Regional voltage; 120V AC input only
A	ATEX

e

Multi-Phase Variations	
Code	Description
	Can be left blank
-2	Two phase
-3	Three phase
-3C	Three phase, conformal coating
-3H	Three phase, input voltage 400V AC and 450...700V DC
-3N	Three phase, input voltage 480V AC
-D	360...900V - DC Only

Note: Special output signals are only available with the 960 W power supply.

Product Selection

1606-XLS Performance — Single- and Three-Phase

Single-Phase

Input Voltage	Output Power [W]	Output Voltage	Output Current [A]	Input Circuit Protection♣	Steady State Input Current 120/230 [V AC]	Parallel Operation	DC OK Relay	Cat. No.
100...240V AC, 110...300V DC	80	24…28	3.3	6 A Slow Blow Fuse or **Cat. No. 1489-A1C060**	1.41/0.82	Yes	—	**1606-XLS80E**
	120	24…28	5		1.10/0.62	Yes	✓	**1606-XLS120E**
	120	24…28	5		1.10/0.62	Yes	✓	∗ **1606-XLS120EA**
	180	12…15	15		1.65/0.93	Yes	✓	**1606-XLS180B**
	240	24…28	10	6 A Slow Blow Fuse or **Cat. No. 1489-A1C060**	2.22/1.22	Yes	✓	**1606-XLS240E**
	240	24…28	10		2.22/1.22	Yes	✓	∗ **1606-XLS240EA**
	240	24…28	10		2.22/1.22	Yes	✓	➢ **1606-XLS240EC**
	240	48…56	5		2.22/1.22	Yes	✓	**1606-XLS240F**
	240	28…32	8		2.22/1.22	Yes	✓	**1606-XLS240K**
	480	24…28	20	10 A Slow Blow Fuse or **Cat. No. 1489-A1C100**	4.56/2.48	Yes	✓	**1606-XLS480E**
	480	24…28	20		4.56/2.48	Yes	✓	➢ **1606-XLS480EC**
	480	24...48	20		4.56/2.48	Yes	✓	∗ **1606-XLS480EA**
200...240V AC	480	48…56	10		4.56/2.48	Yes	✓	**1606-XLS480F**
100...240V AC, 110...300V DC	480	36…42	13.3		4.56/2.48	Yes	✓	**1606-XLS480G**
200...240V AC, 220...300V DC	960	24…28	40		—/4.6	Yes	✓	**1606-XLS960EE**

♣ Unit has internal (not accessible/replaceable) input fuse. Additional protection is not required if used on branch circuits ≤ UL test levels. Consult local codes and regulations for installation.
➢ The **C** suffix in the Cat. No. indicates that the product has **conformal coating**.
∗ The **A** suffix in the Cat. No. indicates that the product carries the **ATEX** rating.

Three-Phase

Input Voltage	Output Power [W]	Output Voltage	Output Current [A]	Input Circuit Protection	Steady State Input Current 400...480 [V AC]	Parallel Operation	DC OK Relay	Cat. No.
380…480V AC, 600V DC	480	24…28	20	6 A Slow Blow Fuse or **Cat. No. 1489-A3C060**	3 x 0.65	Yes	✓	**1606-XLS480E-3**
380…480V AC, 600V DC	480	24…28	20			Yes	✓	➢ **1606-XLS480E-3C**
360…900V DC	480	24…28	20		3 x 0.85	Yes	✓	**1606-XLS480E-D**
380…480V AC, 600V DC	480	48…56	10		3 x 0.65	Yes	✓	**1606-XLS480F-3**
380…480V AC, 600V DC	480	36…42	13.3			Yes	✓	**1606-XLS480G-3**
380…480V AC, 600V DC	960	24…28	40		3 x 1.35	Yes	✓	**1606-XLS960E-3**
380…480V AC, 600V DC	960	48...54	20			Yes	✓	**1606-XLS960F-3**

1606-XLE Essential — Single-Phase

Input Voltage	Output Power [W]	Output Voltage	Output Current [A]	Input Circuit Protection	Steady State Input Current 120/230 [V AC]	Parallel Operation ✦	DC OK Relay	Cat. No.
100…120/200…240V AC	80	24…28	3.3	10 A Slow Blow Fuse or **Cat. No. 1489-A1C100/20♣**	1.5/0.68	No	—	**1606-XLE80E**
100…120/200…240V AC	120	24…28	5		2.34/1.23	No	—	**1606-XLE120E**
100…120/200…240V AC		24…28	5		2.34/1.23	No	—	➢ **1606-XLE120EC**
90…132V AC		24…28	5		1.23/—	No	—	**1606-XLE120EN**
180…264V AC		24…28	5		—/1.17	No	—	**1606-XLE120EE**
100…120/200…240V AC	240	24…28	10		4.34/2.23	No	—	**1606-XLE240E**
90…132V AC		24…28	10		3.73/—	Yes	—	**1606-XLE240EN**
180…264V AC		24…28	10		—/2.20	No	—	**1606-XLE240EE**
100…120/200…240V AC		24…28	10		4.34/2.00	No	—	**1606-XLE240EP**
100…120/200…240V AC		48…52	5		4.34/2.23	No	—	**1606-XLE240F**

1606-XLE Essential — Three-Phase

Input Voltage	Output Power [W]	Output Voltage	Output Current [A]	Input Circuit Protection	Steady State Input Current 400...480 [V AC]	Parallel Operation ✦	DC OK Relay	Cat. No.
380…480V AC, 600V DC	96	12...15	8	6 A Slow Blow Fuse or **Cat. No. 1489-A3C060**	2 x 0.56	No	—	**1606-XLE96B-2**
380…480V AC, 600V DC	120	24…28	5		3 x 0.60			**1606-XLE120E-2**
380…480V AC, 600V DC	240	24…28	10		0.68			**1606-XLE240E-3**
380…480V AC, 600V DC	240	48...56	5		3 x 0.60			**1606-XLE240F-3**
480V AC	960	24	40		3 x 1.40			**1606-XLE960DX-3N**
480V AC	960	48	20		3 x 1.40			**1606-XLE960MX-3N**

♣ Unit has internal (not accessible/replaceable) input fuse. Additional protection is not required if used on branch circuits ≤ UL test levels.
‡ Single/parallel operation (inclined characteristic) selectable (jumper). Consult local codes and regulations for installation.
✦ Parallel use for 1 + 1 redundancy only.
➢ The **C** suffix in the Cat. No. indicates that the product has **conformal coating**.

Bulletin 1606-XLS

	1606-XLS960EE	1606-XLS960E-3	1606-XLS960F-3
Output Volts/Watts	24…28V/960 W	24…28V/960 W	24…28V/960 W
Input Voltage (47...63 Hz)	200...240V AC, 220...300V DC	380...480 V AC	200...240V AC, 220...300V DC
Operational Range	170...264V AC, 176...375V DC	380....480V AC, 600V DC	170...264V AC, 176...375V DC
Hold-up Time	32 ms	20 ms	20 ms
Rated Input Current	4.6 A	1.65 A	1.65 A
Efficiency	typ. 94.6%	typ. 95.2%	typ. 95.4%
Output Voltage	24...28V	24...28V	48...54V
Rated Output Current	40 A (@ 24V) 34 A (@ 28V)	40 A (@ 24V) 34.3 A (@ 28V)	20 A (@ 48V) 17.8 A (@ 54V)
ReservePower (typ. 4 s)	60 A (@ 24V) 51 A (@ 28V)	60 A (@ 24V) 51 A (@ 28V)	30 A (@ 48V) 26.7 A (@ 54V)
Ripple/Noise	<100 mV_{PP}	<100 mV_{PP}	<100 mV_{PP}
Operating Temperature Range (T_{amb})	-25 °C...+70 °C		
Non-Operating Temperature Range	-40 °C...+85 °C		
Dimensions (W x H x D)	125 x 124 x 127 mm	110 x 124 x 127 mm	125 x 124 x 127 mm
Weight	1800 g	1500 g	1800 g
Certifications/Standards∗	1, 2, 3, 4, 5, 6, 7, 9		
Special Features	Class 1, Div. 2, ABS/GL/RINA (Marine)		

∗ 1) = CE, 2) = UL 508 (cULus LISTED), 3) = UL 1950 (cURus), 4) = CSA C22.2, No. 60950, 5) Safety standards = IEC/EN 60950, EN 50178, 6) EMC standards = EN 55011 (Class B), EN 55022 (Class B), EN 61000-6-2, 7) EMC standards = EN 61000-3-2 (A14), EN 50081-1, 9) ABS/GL/RINA (Marine)
♣ MTBF determined by Siemens norm SN 29500 at full load current and 40 °C

	1606-XLE80E	1606-XLE120E 1606-XLE120EC⌘	1606-XLE120EE	1606-XLE120EN	1606-XLE240E	1606-XLE240EE	1606-XLE240EN	1606-XLE240EP	1606-XLE240F
Output Volts/ Watts	24V...28V/ 80 W	24V...28V/ 120 W	24V...28V/ 120 W	24V...28V/ 120 W	24V...28V/ 240 W	24V...28V/ 240 W	24V...28V/ 240 W	24V...28V/ 240 W	48V...52V/ 240 W
Input Voltage (47...63 Hz) [V AC]	100...120/ 200...240	100...120/ 200...240	200...240	100...120	100...120/ 200...240	200...240	100...120	100...120/200...240	
Operational Range [V AC]	90...132/ 180...264	90...132	180...264	90...132	90...132/ 180...264	180...264	90...132	90...132/180...264	
Hold-up Time	>60 ms (120V) >244 ms (240V)	>80 ms (120V) >78 ms (240V)	>80 ms (120V)	>78 ms (240V)	>46 ms (120V) >42 ms (240V)	>45 ms (240V)	>46 ms (120V)	>46ms (120V) >42ms (240V)	>46ms (120V) >42ms (240V)
Rated Input Current	1.24 A (100V AC) 0.68 A (240V AC)	2.6 A (100V AC) 1.3 A (240V AC)	2.6 A	1.4 A	5 A (100V AC) 2.5 A (240V AC)	2.7 A	5 A	<5.0 A (115V)/ <2.3 A (230V)	<1.3 A (115V)/ <0.7 A (230V)
Efficiency	typ. 90%	typ. 90%	typ. 90%	typ. 90.2%	typ. 91%	typ. 91.6 %	typ. 90.8 %	typ. 91%	typ. 92%
Output Voltage	24...28V								48...52V
Rated Output Current	3.3 A @ 24V 2.9 A @ 28V	5 A @ 24V 4.3 A @ 28V	5 A @ 24V	5 A @ 24V	10 A @ 24V 8.6 A @ 28V	10 A @ 24V	10 A @ 24V	10 A	5 A @ 48V 4.6 A @ 52V
Ripple/Noise	<50 mV_{PP}								
Operating Temperature Range (T_{amb})	-25...+70 °C, >60 °C with derating								
Non-Operating Temperature Range	-40...+85 °C								
MTBF♣	>700 000 hours								
Dimensions (W x H x D)	32 x 124 x 102 mm	32 x 124 x 117 mm			60 x 124 x 117 mm				
Weight	430 g	500 g	500 g	500 g	700 g	700 g	700 g	800 g	700 g
Certifications/Standards∗	1, 2, 3, 4, 5, 6, 7, 9								
Special Features	NEC Class 2	—							

∗ 1) = CE, 2) = UL 508 (cULus LISTED), 3) = UL 1950 (cURus), 4) = CSA C22.2, No. 60950, 5) Safety standards = IEC/EN 60950, EN 50178, 6) EMC standards = EN 55011 (Class B), EN 55022 (Class B), EN 61000-6-2, 7) EMC standards = EN 61000-3-2 (A14), EN 50081-1, 9) ABS/GL/RINA (Marine)
♣ MTBF determined by Siemens norm SN 29500 at full load current and 40 °C.
⌘ Indicates conformal coating.