

			
Bulletin	1606-XLS	1606-XLE	1606-XLP
Type	Performance Single/Three-Phase	Essential Single/Three-Phase	Compact Single/Two-Phase
Output Power	80...960 W	80...960 W	15...100 W
Input Voltage/ Primary Voltage	100...240, 323...576V AC		
Efficiency	91.6...95%	90...92%	80...90%
Output Voltage/ Secondary Voltage	12...15, 24, 30, 36, 48V DC	12, 24, 48V DC	5, 10...12, 12, 15, 24, 48V DC
Rated Output Current	3.3...40 A	3.3...40 A	0.6...4.5 A
Operating Temperature Range	-25...+70 °C >60 °C with derating	-25...+70 °C >60 °C with derating	-40...+70 °C >60 °C with derating
Non-Operating Temperature Range	-40...+85 °C		
Certifications	cULus, CE, GL, ATEX	UL, CE, CSA, GL	cULus, CE, CSA, GL
Standards Compliance	EN 55011 (Class B), EN 55022 (Class B), EN 61000-6-2, EN 61000-3-2 (A14), EN 50081-1, UL 508, UL 1950, RoHS, Class 1 Div. 2	EN 55011 (Class B), EN 55022 (Class B), EN 61000-6-2, EN 61000-3-2 (A14), EN 50081-1, UL 508, UL 1950, CAN/CSA C22.2 No. 107-1, RoHS, Class 1, Div. 2	EN 50081-1, EN 61000-6-2, EN 61000-3-2 (A14), UL 508, UL 60950, CAN/CSA C22.2 No. 60950, RoHS Class 1, Div. 2
Special Application Products	- Compact redundancy module for 10...60V DC - Buffer module for extended ride-through - Redundancy modules - Redundant power supplies - DC UPS - DC converter		
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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



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* 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:

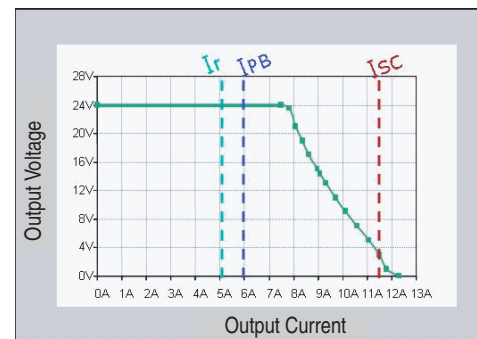
- ReservePower will deliver up to 25% additional current continuously.
- PowerBoost will deliver 150% of rated current for up to 5 s.

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



IRATED: 5 A
 ISHORT CIRCUIT: >9 A
 IPOWER BOOST: 7.5 A

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Cat. No.	IRATED [A]	ISHORT CIRCUIT (25 °C) [A]	IPOWER BOOST OR IRESERVEPOWER [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.

Quick Guide

Bulletin 1606-(number from table) ⌘ Power Supply Quick Guide

	15...40 W	50 W	60 W	72...80 W	90...100 W	120 W	180 W	240 W	480 W	720 W	960 W
5...5.5V	XLP15A XLP25A	—	—	—	—	—	—	—	—	—	—
10...12V	XLP30B	—	—	—	—	—	—	—	—	—	—
12...15V 1-Ph	XLP15B	XLP50B	XLP60BQ XLP60BQT	—	XLP90B	—	XL180B	—	—	—	—
12...15 V 3-Ph	—	—	—	—	XLE96B	—	—	—	—	—	—
(+/-)12 and 15V	XLP36C	—	—	—	—	—	—	—	—	—	—
24...28V 1-Ph	XLP15E XLP30E XLP30EQ	XLP50E XLP50EZ	XL60D XLP60EQ XLP60EQT	XLS80E XLE80E XLP72E	XLP95E XLP100E	XLS120E XLS120EA XLE120E XLE120EC XLE120EE XLE120EN	—	XLS240E XLS240EC XLE240E XLE240EP XLE240EE XLE240EN	XLS480E XLS480EA XLS480EC XLS480EE	—	XLS960EE
24...28V 2-Ph/3-Ph	—	—	—	—	XLP90E-2 XLP100E-2	XLE120E-2	—	XL240E-3C XLE240E-3	XLS480E-3 XLS480E-3C	XL720E-3	XLE960DX-3N XLS960E-3
36...43V	—	—	—	—	—	—	—	—	XLS480G-3	—	—
48...56V 1-Ph	—	XLP50F	—	—	XLP100F	—	—	XLE240F	XLS480F	—	XLS960FE
48...56V 3-Ph	—	—	—	—	—	—	—	XLE240F-3	XLS480F-3	—	XLE960MX-3N XLS960F-3
24V Redundant	—	—	XL60DR	—	—	XL120DR	—	XL240DR	—	—	—
DeviceNet	—	—	—	XLEDNET3	XLSDNET4	—	—	XLSDNET8	—	—	—

⌘ Example: For a 24...28 Volt, 3-Phase, 120 Watt power supply, the **Cat. No.** would be **1606-XL120E-3**.

Special Applications

Bulletin Number	NEC Class 2	ABS/GL Marine	Hazardeous Location Rating, Class 1 Div 2	ODVA Requirements	Conformal Coating	ATEX
1606-XLE	XLE80E	All XLE Power Supplies	All XLE Power Supplies	XLEDNET3	XLE120EC	—
1606-XLP	XLP15A XLP15B XLP15E XLP25A XLP30B XLP30E XLP36C XLP50B XLP50E XLP50EZ XLP50F XLP72E XLP90B XLP90E-2 XLP95E	XLP15A XLP15B XLP15E XLP25A XLP30E XLP36C XLP50E XLP50EZ XLP72E XLP90B XLP100E XLP100F XLPRED	XLP15A XLP15B XLP15E XLP25A XLP30B XLP30E XLP50B XLP50E XLP50EZ XLP72E XLP90B XLP95E XLP100E XLPRED	—	—	—
1606-XLS	XLSDNET4	ALL XLS Power Supplies	All XLS Power Supplies*	XLSDNET4 XLSDNET8	XLS240EC XLS480E-C XLS480E-3C	XLS120EA XLS240EA XLS480EA

* Cat. No. 1606-XLS240K does not have Hazardeous Location Rating.

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

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

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

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

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

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-XLS80E	1606-XLS120E 1606-XLS120EA❖	1606-XLS180B	1606-XLS240E 1606-XLS240EA❖ 1606-XLS240EC⌘
Output Volts/Watts	24...28V/80 W	24...28V/120 W	12...15V/180 W	24...28V/240 W
Input Voltage (47...63 Hz)	100...240V AC, 110...300V DC	100...240V AC, 110...300V DC	100...240V AC, 110...300V DC	100...240V AC, 110...300V DC
Operational Range	85...276V AC, 88...375V DC	85...264V AC, 88...360V DC	85...264V AC, 88...360V DC	85...276V AC, 88...375V DC
Hold-up Time	27...174 ms	33...59 ms	32 ms	27 ms
Rated Input Current	1.4 A (100V AC), 0.82 A (240V AC)	1.4 A (100V AC), 0.65 A (240V AC)	1.65 A (120V AC), 0.93 A (230V AC)	2.8 A (100V AC), 1.2 A (240V AC)
Efficiency	typ. 90.0%	typ. 92.7%	typ. 91.5%	typ. 91.8%
Output Voltage	24...28V	24...28V	12...15V	24...28V
Rated Output Current	3.4 A (@ 24V) 3.0 A (@ 28V)	5 A (@ 24V) 4.5 A (@ 28V)	15 A	10 A (@ 24V) 9 A (@ 28V)
ReservePower (typ. 4 s)	5.4 A (@ 24V) 5.0 A (@ 28V)	7.5 A (@ 24V) 6.7 A (@ 28V)	22.5 (@12V)	15 A (@ 24V) 13.5 A (@ 28V)
Ripple/Noise	<100 mV _{PP}	<50 mV _{PP}	<50 mV _{PP}	<50 mV _{PP}
Operating Temperature Range (T _{amb})	-25...+70 °C >60 °C with derating			
Non-Operating Temperature Range	-40...+85 °C			
MTBF❖	>650 000 hours	>831 000 hours	>577 000 hours	>581 000 hours
Dimensions (W x H x D)	32 x 124 x 102 mm	40 x 124 x 117 mm	60 x 124 x 117 mm	60 x 124 x 117 mm
Weight	420 g	620 g	900 g	900 g
Certifications/Standards*	1, 2, 3, 5, 6, 7, 9			1, 2, 3, 5, 6, 7, 8, 9
Special Features	Active PFC; Class 1 Div. 2; Semi F47, 9) 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, 8) ATEX, 9) GL/RABS

❖ MTBF determined by Siemens norm SN 29500 at full load current and 40 °C, 8) ATEX

❖ Indicates ATEX rating

⌘ Indicates conformal coating

	1606-XLS480E 1606-XLS480EA❖ 1606-XLS480EC⌘	1606-XLS480E-3 1606-XLS480E-3C⌘	1606-XLS480F	1606-XLS480F-3	1606-XLS480G	1606-XLS480G-3
Output Volts/Watts	24...28V/480 W	24...28V/480 W	48...56V/480 W	48...56V/480 W	36...42V/480 W	36...42V/480 W
Input Voltage (47...63 Hz)	100...240V AC /110...300V DC	380...480V AC, 600V DC	100...240V AC, 110...300V DC	380...480V AC	100...240V AC, 110...300V DC	380...480V AC, 600V DC
Operational Range	85...276V AC, 88...375V DC	323...552V AC, 450...780V DC	85...276V AC, 88...375V DC	323...552 V AC	85...276V AC, 88...375V DC	323...552V AC, 450...780V DC
Hold-up Time	32...51 ms	19 ms	32...51 ms	22 ms	32...51 ms	22 ms
Rated Input Current	4.6 A (100V AC), 2.5 A (240V AC)	0.9 A (380V AC), 0.65 A (480V AC)	4.6 A (100V AC), 2.5 A (240V AC)	0.79 A (380V AC), 0.65 A (480V AC)	4.6 A (100V AC), 2.5 A (240V AC)	0.79 A (380V AC), 0.65 A (480V AC)
Efficiency	typ. 92.4%	typ. 94.8%	typ. 92.4%	typ. 95.4 %	typ. 92.4%	typ. 94.8%
Output Voltage	24...28V	24...28V	24...28V	48...55V	36...42V	36...42V
Rated Output Current	20 A (@ 24V) 17 A (@ 28V)	20 A (@ 24V) 17.5 A (@ 28V)	20 A (@ 24V) 17 A (@ 28V)	10 A (@ 48V)	13 A (@ 36V)	13.3 A (@ 36V)
ReservePower (typ. 4 s)	30 A (@ 24V) 26 A (@ 28V)	30 A (@ 24V) 26 A (@ 28V)	30 A (@ 24V)	15 A (@ 48V)	20 A (@ 42V)	20 A (@ 42V)
Ripple/Noise	<100 mV _{PP}	<100 mV _{PP}	<100 mV _{PP}	<100 mV _{PP}	<100 mV _{PP}	<100 mV _{PP}
Operating Temperature Range (T _{amb})	-25...+70 °C >60 °C with derating					
Non-Operating Temperature Range	-25...+70 °C >60 °C with derating					
MTBF❖	>469 000 hours	>690 000 hours	>469 000 hours	>690 000 hours	> 407 000 hours	> 690 000 hours
Dimensions (W x H x D)	84 x 124 x 127 mm	65 x 124 x 127 mm	84 x 124 x 127 mm	65 x 124 x 127 mm	82 x 124 x127 mm	65 x 124 x127 mm
Weight	1200 g	870 g	1200 g	870 g	1200 g	870 g
Certifications/Standards❖	1, 2, 3, 5, 6, 7, 8, 9		1, 2, 3, 5, 6, 7, 9			
Special Features	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, 8) ATEX, 9) ABS/GL/RINA (Marine)

❖ MTBF determined by Siemens norm SN 29500 at full load current and 40 °C

❖ Indicates ATEX rating

⌘ Indicates conformal coating

Extensive Diagnostic & Monitoring Functions

Protective Features:

- Wrong battery voltage (24V instead of 12V)
- Wrong battery polarity
- Too high ambient temperature
- Output overload or output short-circuit
- Deep discharge (battery) protection
- Wrong polarity on input terminals
- Over-voltage protection (malfunctioning of the internal regulation loops)

A - Status LED (green):

- Ready: Battery is charged > 85%, no wiring failure is recognized, input voltage is sufficient and inhibit signal is not active.
- Charging: Battery is charging and battery capacity is below 85%.
- Buffering: Unit is in buffer mode.

B - Diagnosis LED (yellow):

- Overload: Output has switched off, due to long overload in buffer mode or due to high temperatures.
- Replace battery: Indicates a battery which failed the battery quality test (SCH test). Battery should be replaced soon.
- Buffer time expired: Output has switched off due to settings of buffer time. The signal will be stored and displayed for 15 minutes.
- Inhibit active: Indicates that buffering is disabled due to an active inhibit signal.

C - Check wiring LED (red):

- Check wiring between DC UPS and battery, as well as the battery itself. Also indicates when input voltage is not in range.

D - Adjustor:

- Buffer time limiter: User accessible switch which limits the maximum buffer time in a buffer event, to save battery capacity.
- End-of-charge voltage: User accessible potentiometer which sets the end-of-charge voltage. Adjust the potentiometer according to the expected battery temperature.

E - Signal contacts:

Ready (contact 1-2):

Contact is closed when battery is charged more than 85%, no wiring failure is recognized, input voltage is sufficient, and inhibit signal is not active.

Buffering (contact 3-4):

Contact is closed when unit is buffering.

Replace battery (contact 5-6):

Contact is closed when input voltage is sufficient and battery quality test (SCH test) indicates a negative result, three times in a row.

Inhibit input (contact 7&8):

The inhibit input disables buffering. In normal mode, a static signal is required. In buffer mode, a pulse with a minimum length of 250 ms is required to stop buffering. The inhibit is stored and can be reset by cycling the input voltage.

