




Bulletin 1606  
**Power Supplies**  
 Product Overview

			
<b>Bulletin</b>	<b>1606-XLS</b>	<b>1606-XLE</b>	<b>1606-XLP</b>
<b>Type</b>	<b>Performance Single/Three-Phase</b>	<b>Essential Single/Three-Phase</b>	<b>Compact Single/Two-Phase</b>
<b>Output Power</b>	80...960 W	80...960 W	15...100 W
<b>Input Voltage/ Primary Voltage</b>	100...240, 323...576V AC		
<b>Efficiency</b>	91.6...95%	90...92%	80...90%
<b>Output Voltage/ Secondary Voltage</b>	12...15, 24, 30, 36, 48V DC	12, 24, 48V DC	5, 10...12, 12, 15, 24, 48V DC
<b>Rated Output Current</b>	3.3...40 A	3.3...40 A	0.6...4.5 A
<b>Operating Temperature Range</b>	-25...+70 °C >60 °C with derating	-25...+70 °C >60 °C with derating	-40...+70 °C >60 °C with derating
<b>Non-Operating Temperature Range</b>	-40...+85 °C		
<b>Certifications</b>	cULus, CE, GL, ATEX	UL, CE, CSA, GL	cULus, CE, CSA, GL
<b>Standards Compliance</b>	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
<b>Special Application Products</b>	<ul style="list-style-type: none"> <li>- Compact redundancy module for 10...60V DC</li> <li>- Buffer module for extended ride-through</li> <li>- Redundancy modules</li> <li>- Redundant power supplies</li> <li>- DC UPS</li> <li>- DC converter</li> </ul>		
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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](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:**

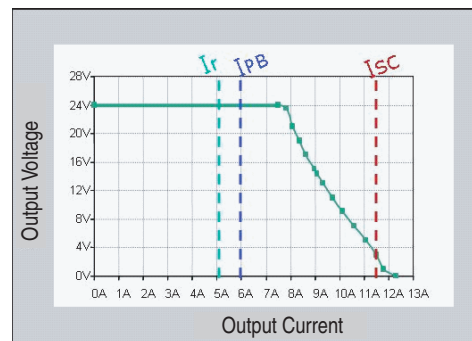
- ReservePower will deliver up to 25% additional current continuously.
- PowerBoost will deliver 150% of rated current for up to 5 s.

**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<sub>RATED</sub>: 5 A  
 I<sub>SHORT CIRCUIT</sub>: >9 A  
 I<sub>POWER BOOST</sub>: 7.5 A

Cat. No.	I <sub>RATED</sub> [A]	I <sub>SHORT CIRCUIT (25 °C)</sub> [A]	I <sub>POWER BOOST OR I<sub>RESERVEPOWER</sub></sub> [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 XLP50EZ XLP50F XLP72E XLP90B XLP100E XLP90B XLP90E-2 XLP95E	XLP15A XLP15B XLP15E XLP25A XLP25A XLP30E XLP30E XLP36C XLP50E XLP50EZ XLP72E XLP90B XLP100E XLP100F XLPRED	XLP15A XLP15B XLP15E XLP25A XLP30B XLP30E XLP50B XLP50E XLP50EZ XLP72E XLP90B 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

**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

**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

**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

**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 <b>Cat. No. 1489-A1C060</b>	1.41/0.82	Yes	—	<b>1606-XLS80E</b>
	120	24...28	5		1.10/0.62	Yes	✓	<b>1606-XLS120E</b>
	120	24...28	5		1.10/0.62	Yes	✓	* <b>1606-XLS120EA</b>
	180	12...15	15		1.65/0.93	Yes	✓	<b>1606-XLS180B</b>
	240	24...28	10	6 A Slow Blow Fuse or <b>Cat. No. 1489-A1C060</b>	2.22/1.22	Yes	✓	<b>1606-XLS240E</b>
	240	24...28	10		2.22/1.22	Yes	✓	* <b>1606-XLS240EA</b>
	240	24...28	10		2.22/1.22	Yes	✓	> <b>1606-XLS240EC</b>
	240	48...56	5		2.22/1.22	Yes	✓	<b>1606-XLS240F</b>
	240	28...32	8		2.22/1.22	Yes	✓	<b>1606-XLS240K</b>
	480	24...28	20		4.56/2.48	Yes	✓	<b>1606-XLS480E</b>
	480	24...28	20	4.56/2.48	Yes	✓	> <b>1606-XLS480EC</b>	
	480	24...48	20	4.56/2.48	Yes	✓	* <b>1606-XLS480EA</b>	
200...240V AC	480	48...56	10	10 A Slow Blow Fuse or <b>Cat. No. 1489-A1C100</b>	4.56/2.48	Yes	✓	<b>1606-XLS480F</b>
100...240V AC, 110...300V DC	480	36...42	13.3		4.56/2.48	Yes	✓	<b>1606-XLS480G</b>
200...240V AC, 220...300V DC	960	24...28	40		—/4.6	Yes	✓	<b>1606-XLS960EE</b>

\* 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.

## 1606 Special Modules

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.
18...36V DC	40	5.1	8	N/A	N/A	Yes	—	1606-XLDC40A
14...32.4V DC	92	24	3.8	N/A	N/A	—	—	1606-XLDC92D
100...240V AC, 110...300V DC	91	24	3.8	6 A SLOW BLOW FUSE OR 1489-A1C060/20 A♣	1.02/0.48	Yes	✓	1606-XLSDNET4
100...240V AC, 110...300V DC	192	24	8	6 A SLOW BLOW FUSE OR 1489-A1C060/20 A♣	2.13/1.00	Yes	✓	1606-XLSDNET8
100...120/200...240V AC	80	24...28	3.3	10 A SLOW BLOW FUSE OR 1489-A1C100/20 A♣	1.50/0.68	No	—	1606-XLEDNET3
100...120/200...240V AC, 160...375V DC	60	24	2.5	10 A SLOW BLOW FUSE OR 1489-A1C100/16 A♣	1.30/0.70	Yes‡	✓	1606-XL60DR
100...120/200...240V AC, 210...375V DC	120		5	10 A SLOW BLOW FUSE OR 1489-A1C100/16 A♣	2.60/1.40	Yes‡	✓	1606-XL120DR
100...120/200...240V AC, 240...375V DC	240		10	10 A SLOW BLOW FUSE OR 1489-A1C100/10 A♣	6.00/2.60	Yes‡	✓	1606-XL240DR
24V DC	720	V <sub>in</sub> -5V typ	30	N/A	N/A⊛	—	—	1606-XLRED20-30
24V DC	960	V <sub>in</sub> -6V typ	40	N/A	N/A§	—	—	1606-XLRED40
10...60V DC	384	V <sub>in</sub> 1 -.9V typ	16➤	N/A	N/A	—	—	1606-XLPRED
10...60V DC	480	V <sub>in</sub> 1 -.9V typ	20➤	N/A	N/A	—	—	1606-XLSRED
24...28	960	V <sub>in</sub> 2.15 typ.	40	N/A	N/A	—	—	1606-XLSRED40
24...28	1920	V <sub>in</sub> 2.7 typ.	80	N/A	N/A	—	—	1606-XLSRED80
24...60V DC	480	V <sub>in</sub> 1 -.9V typ	20➤	N/A	N/A	—	✓	1606-XLERED

## 1606 Special Modules with UPS

Input Voltage	Output Power [W]	Output Voltage	Output Current [A]	Cat. No.
22.5...30V DC	240	22.5	10	⊛ 1606-XLS240-UPS
22.5...30V DC	240	22.5	10	1606-XLS240-UPSC
22.5...30V DC	240	12/22.5	5/10	1606-XLS240-UPSD
22.5...30V DC	240	22.5	10	1606-XLS240-UPSE
24...28.8V DC	480	22.5...27.8	20	1606-XLSBUFFER24
48...56V DC	960	45...54	10	1606-XLSBUFFER48

## Bulletin 1606 Special Module Accessories

Description	Cat. No.
7 Ah/12V Battery Assembly with Bracket, for use with DC UPS	1606-XLSBATASSY1
7 Ah/12V Battery	1606-XLSBAT1
Battery bracket for 7 Ah/12V battery	1606-XLSBATBR1
26 Ah/12V Battery Assembly with Bracket, for use with DC UPS	1606-XLSBATASSY2
26 Ah/12V Battery	1606-XLSBAT2
Battery bracket for 26 Ah/12V battery	1606-XLSBATBR2

⊛ To be used alongside 20, 30, and 40 A power supplies.

‡ Single/parallel operation (inclined characteristic) selectable (jumper).

§ To be used alongside 40 A power supplies (or smaller).

♣ Unit has internal (not accessible/replaceable) input fuse. Additional protection is not required if used on branch circuits ≤ UL test levels.

➤ See product specifications for proper use.

⊛ **Cat. No. 1606-XLS240-UPS** is a charging module, used along side a power supply and a battery assembly. **The battery assembly must be ordered separately.** Order **Cat. No. 1606-XLSBATASSY1** for 7 Ah/ 12V battery assembly or **Cat No. 1606-XLSBATASSY2** for 26 Ah/ 12V battery assembly. Consult local codes and regulations for installation.

## Bulletin 1606-XLSBUFFER

	Buffer Module 1606-XLSBUFFER 24	Buffer Module 1606-XLSBUFFER 48
Output Volts	22.5V DC	45V DC
Input Current	80 mA typ. 600 mA max.	40 mA typ. 500 mA max.
Hold-up Time	200 ms @ 20 A	100 ms @ 20 A
Output Voltage	V <sub>in</sub> -1V: 22.5V fixed	V <sub>in</sub> -2V: 45V fixed
Rated Output Current	20 A	20 A
Operating Temperature Range (T <sub>amb</sub> )	-25...+70 °C	
Non-Operating Temperature Range	-40...+85 °C	
Dimensions (W x H x D)	64 x 124 x 102 mm	64 x 124 x 102 mm
Weight	740 g	740 g
Certifications/Standards*	1, 2, 3, 5, 6	
Special Features	Selectable buffered voltage; ‡	

\* 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

‡ Low inrush current

## Bulletin 1606-XLS UPS

	UPS 1606-XLS240-UPS	UPS 1606-XLS240-UPSC	UPS 1606-XLS240-UPSD	UPS 1606-XLS240-UPSE
Output Volts/Watts	22.5V...30V/240 W	22.25V/240 W	22.25V and 12V/240 W	
Input Voltage (47...63 Hz)	24V DC (22.5...30V DC)	24V DC (22.5...30V DC)	24V DC (22.5...30V DC)	
Rated Input Current Voltage stand-by mode/charging mode	typ. 0.12 A/ max. 1.3 A	typ. 0.12 A/ max. 1.3 A	—	typ. 0.12 A/ max. 1.3 A
Operational Range	22.5...30V DC	22.5...30V DC	22.5...30V DC	22.5...30V DC
Hold-up Time	battery dependent			
Output Voltage	22.4V	22.25V	22.25V	22.25V
Rated Output Current	10 A	10 A	10 A	10 A
Power Boost	15 A	15 A	15 A	15 A
Operating Temperature Range (T <sub>amb</sub> )	-25...+60 °C		-25...+40 °C	
Non-Operating Temperature Range	-40...+85 °C		-20...+50 °C	
MTBF♣	886 000 hours	886 000 hours	788 000 hours	886 000 hours
Dimensions (W x H x D)	49 x 124 x 117	123 x 124 x 119	49 x 124 x 117	49 x 124 x 117
Weight	530 g	2850 g	650 g	545 g
Certifications/Standards*	1, 2, 3, 5, 6			
Special Features	Inhibit replacement battery buffering			

\* 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

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

## 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.

