ArmorPower® On-Machine® Power Supply

Power Supplies

Uninterruptible Power Supplies (UPS)

Transformers

Power Monitoring

Surge and Filter Protection

Bulletin 1607 — ArmorPower™ On-Machine™ Power Supplies

- IP67 and NEC Class 2 ratings
- Vacuum encapsulation technology
- Quick connectors
- Smooth surface, suitable for washdown

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Standards Compliance

UL 508, UL 60950
CSA C22.2 No. 14
CSA C22.2 No. 60950-1
EN/IEC 60950

Certifications

UL Listed (File Number E56639 Guide No. NMTR)
cURus Recognized(File Number E168663 Guide Number QQGQ2/QQGQ8)
CE Marked

Type	Single Output			Dual Output
Bulletin	1607-XT50D1A	1607-XT100D1A	1607-XT200D1A	1607-XT200D2A
Output Power	50 W	91.2 W	192 W (288 with Bonus Power)	91.2 W per Output
Input Voltage (47...63 Hz)	100…240V AC, 100...353V DC		100…240V AC, 100...300V DC	
Efficiency	>88%, 120V AC >89%, 230V AC		>82%, 120V AC >85%, 230V AC	
Output Voltage	24V (+1%)			
Rated Output Current	2.1 A	3.8 A	8 A	3.8 A each Output
Operating Temperature Range (T_{amb})	-25...+70 °C derate 2%/K, 50...70 °C	-25...+70 °C derate 2.5%/K, 50...70 °C	-25...+70 °C derate 2%/K, 50...70 °C	-25...+70 °C derate 2%/K, 50...70 °C
Non-Operating Temperature Range	-40...+85 °C			
Standards Compliance	UL 508, UL 60950, EN/IEC 60950,			
Certifications	UL Listed (File No. E56639, Guide No. NMTR), cURus Recognized (File No. E168663, Guide No. QQGQ2/QQGQ8), CE Marked			
Special Features	NEC Class 2		-	NEC Class 2
Product Selection	**page 8-3**			

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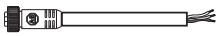
Product Selection

Input Voltage	Output Power [W]	Output Voltage [V DC]	Output Current [A]	Inrush Current	Cat. No.
Single Output					
100…240V AC, 100…353V DC	50	24 (+1%)	2.0	<25 A	**1607-XT50D1A**
	91.2		3.8		**1607-XT100D1A**
100…240V AC, 100…353V DC	192 (288 with bonus power)	24 (+1%)	8	<25 A	**1607-XT200D1A**
Dual Output					
100…240V AC, 100…300V DC	91.2 per output	24 (+1%)	3.8 per output	<25 A	**1607-XT200D2A**

Accessories

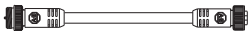
Cordsets



Type	No. of Pins	Assembly Rating	Straight Female	Right Angle Female	Straight Male	Right Angle Male
			Cat. No.			
Input	3-Pin	600V, 13 A	889N-F3AFC-∗F	889N-R3AFC-∗F	—	—
Output	4-Pin	600V, 10 A	—	—	889N-M4AFC-∗F	889N-E4AFC-∗F

∗ Replace symbol with 6 (6 ft), 12 (12 ft), or 20 (20 ft) for standard cable lengths.

Patchcords



Type	No. of Pins	Assembly Rating	Straight Female Straight Male	Straight Female Right Angle Male	Right Angle Female Straight Male	Right Angle Female Right Angle Male
			Cat. No.			
Input	3-Pin	600V, 13 A	889N-F3AFNM-‡	889N-F3AFNE-‡	889N-R3AFNM-‡	889N-R3AFNE-‡
Output	4-Pin	600V, 10 A	889N-F4AFNM-‡	889N-F4AFNE-‡	889N-R4AFNM-‡	889N-R4AFNE-‡

‡ Replace symbol with 1 (1 m), 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.

Terminal Chambers

Type	No. of Pins	Assembly Rating	Straight Female	Straight Male
			Cat. No.	
Input	3-Pin	250V, 12 A	**871A-TS3-N1**	—
Output	4-Pin	250V, 9 A	—	**871A-TS4-NM1**

T-Ports

Type	No. of Pins	Assembly Rating	Cat. No.
Input	3-Pin	300V 8 A	898N-33PB-N4KF
Output	4-Pin		**898N-43PB-N4KF**

Panel Mount Receptacles

Type	No. of Pins	Assembly Rating	Thread Size	Female	Male
				Cat. No.	
Input	3-Pin	250V, 13 A	1/2 in. - 14 NPT	888N-D3AF1-§F	—
Output	4-Pin	600V, 10 A		—	888N-M4AF1-§F

Description	Cat. No.
Mounting nuts for 1/2 inch-14 NPT threaded receptacles are available in bags of 10 pieces	**889A-U1NUT-10**

§ Replace symbol with 1 (1 ft) or 3 (3 ft) for standard cable lengths.

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Input/Output Devices

Description	Cat. No.
Bulletin 1732 ArmorBlock and Bulletin 1732D/E ArmorWeldBlock I/O	
DeviceNet, Input Module, 16 Sink Inputs, DC Micro (M12) connector	**1732D-IB16M12M12**
DeviceNet, Input Module, 16 Sink Inputs, DC Micro (Mini) connector	**1732D-IB16M12MINI**
DeviceNet, Output Module, 16 Source Outputs, DC Micro (M12) connector	**1732D-OB16M12M12**
DeviceNet, Output Module, 16 Source Outputs, DC Micro (Mini) connector	**1732D-OB16M12MINI**
DeviceNet, Self-configuring Module, 16 point I/O, DC Micro (M12) connector	**1732D-16CFGM12M12**
DeviceNet, Self-configuring Module, 16 point I/O, DC Micro (Mini) connector	**1732D-16CFGM12MN**
DeviceNet I/O Module with Diagnostics	1732D-8X8M12D
DeviceNet, I/O Module with Diagnostics, 8 Sink Inputs (2 each on 4 connectors), 8 Source Outputs (2 each on 4 connectors), 1.4/8.0 A per Point/Module, DC Micro (M12) connector	1732D-8X81212HD
Bulletin 1738 ArmorPoint I/O	
ArmorPoint DeviceNet Adapter Module, Drop or Pass-through, with male and female M12 connectors	**1738-ADN12**
ArmorPoint DeviceNet 24V DC Adapter Module with subnet expansion	**1738-ADNX**
ArmorPoint DeviceNet Adapter Module, Drop or Pass-through, with male and female M18 connectors	**1738-ADN18P**
ArmorPoint DeviceNet Adapter Module, Drop only, with male M18 connector	**1738-ADN18**
ArmorPoint Redundant ControlNet Adapter Module	**1738-ACNR**
ArmorPoint Ethernet/IP 10/100 Mbps Adapter Module	**1738-AENT**
Bulletin 1792 ArmorBlock Maxum I/O	
ArmorBlock MaXum I/O Cable Base with Mini connectors, DeviceNet pass-through, and auxiliary power input connection	**1792D-CB18P**

Note: Review exact user and adapter power requirements for all digital products.
Note: The On-Machine power supplies are designed so that user and adapter power are wired in parallel. Also, the following conditions exist:
- Total power (user plus adapter power) equals the On-Machine power supply output channel.
- Both user and adapter power are +24V DC.
- User and adapter power are common and not isolated.

Specifications

	1607-XT50D1A	1607-XT100D1A	1607-XT200D1A	1607-XT200D2A
Output Power	50 W	91.2 W	192 W (288 W with bonus power)	91.2 W per output
Input Voltage (47...63 Hz)	100…240V AC, 100...353V DC		100…240V AC, 100...300V DC	
Operational Range	90…264V AC, 100...353V DC		90…264V AC, 100...300V DC	
Hold-up Time	50 ms			
Rated Input Current	1.0 A (115V AC), 0.5 A (230V AC)	2.0 A (115V AC), 1.0 A (230V AC)	2.4 A (115V AC), 1.2 A (230V AC)	2.2 A (115V AC), 1.1 A (230V AC)
Inrush Current	<25 A			
Efficiency	>88%, 120V AC >89%, 230V AC		>82%, 120V AC >85%, 230V AC	
Output Voltage	24V (+1%)			
Rated Output Current	2.0 A	3.8 A	8 A	3.8 A per output
Ripple Voltage	<240 mV_{PP} bandwidth, 1 MHz			
Noise	<480 mV_{PP} bandwidth, 20 MHz			
Overcurrent Protection	electronic current limited to 2.2…2.7 A	electronic current limited to 3.8…4.1 A	electronic current limited to 12.1…15.6 A (8.4…10.4 A after 4 s bonus power times out)	electronic current limited to 3.8…4.1 A
AC Power On LED Indication for Output 1	yes			
Operating Temperature Range (T_{amb})	-25...+70 °C derate 2.5%/K, 50...70 °C		-25...+60 °C derate 2%/K, 50...60 °C	
Non-Operating Temperature Range	-40...+85 °C			
Humidity	up to 100% with condensation			
MTBF♣	>500 000 hours			
Dimensions (W x H x D)	140 x 36 x 85 mm (5.51 x 1.42 x 3.35 in.)		187 x 74 x 122 mm (7.36 x 2.91 x 4.80 in.)	
Weight	750 g (1.65 lb)		3040 g (6.70 lb)	
Ingress Protection	IP67, EN 60529			
Certifications/Standards	CE, UL 508 (UL LISTED), UL 60950 (cURus), Safety standards = IEC/EN 60950, EN 60529 CE EN 60950; cULus Listed, UL508, cURus Recognized UL60950/CSA C22.2, No. 60950-1			
Special Features	NEC Class 2		—	NEC Class 2

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

Pinouts

Input

Pin	Connection
1	NC
2	L
3	N

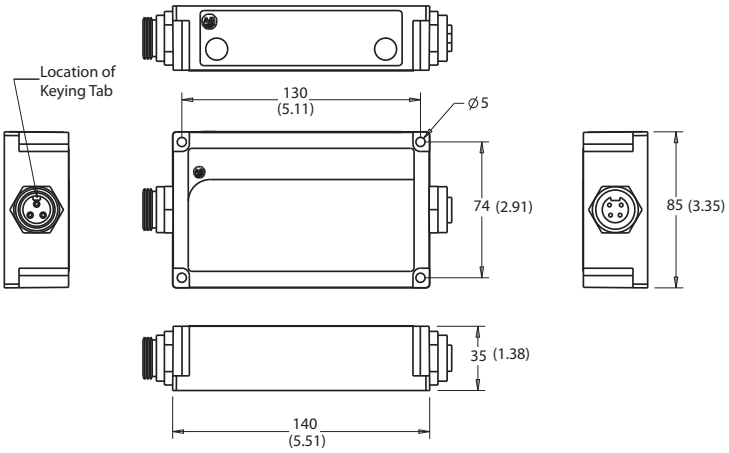
Output

Pin	Connection
1	+
2	+
3	-
4	-

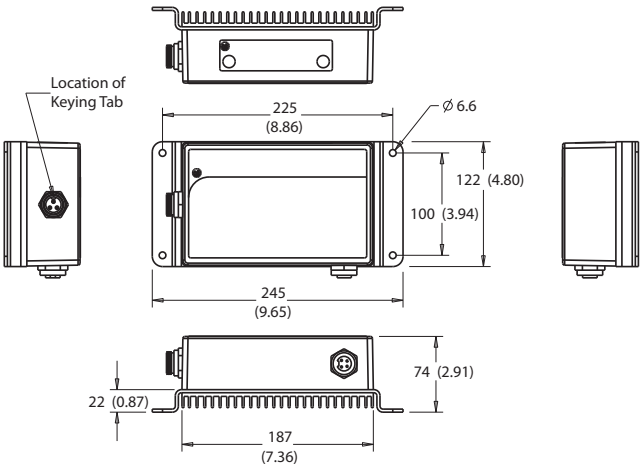
Approximate Dimensions

Dimensions in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

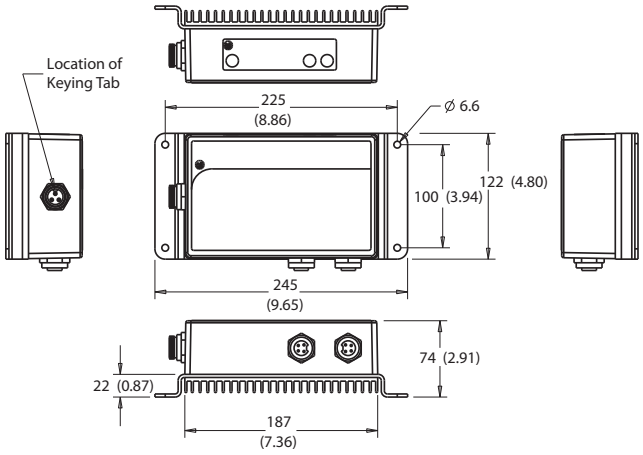
1607-XT50D1A and 1607-XT100D1A



1607-XT200D1A



1607-XT200D2A



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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		
Product Selection	**Page 8-9**	**Page 8-10**	**Page 8-11**

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

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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:

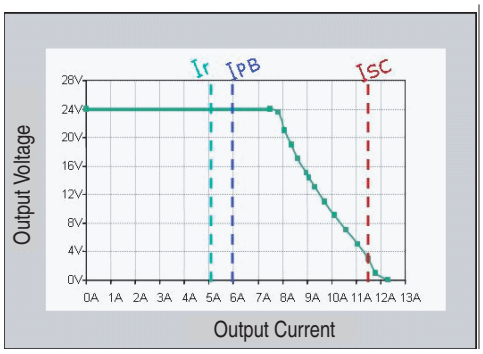
- ReservePower will deliver up to 25% additional current continuously.
- PowerBoost will deliver 150% of rated current for up to 5 s.

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



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.

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.

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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 (*a*) 480 (*b*) E (*c*) ____ (*d*) – 3 (*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**.

1606-XLP Compact — Single- and Two-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, 85…375V DC	15	5…5.5	3	10 A Slow Blow Fuse or **Cat. No. 1489-A1C100**/ 15 A♣	0.28/.017	Yes	—	**1606-XLP15A**
		12…15	1.3		0.28/.017		—	**1606-XLP15B**
		24…28	0.6		0.28/.017		—	**1606-XLP15E**
	25	5…5.5	5		0.60/0.30	Yes	—	**1606-XLP25A**
	30	10…12	3		0.60/0.25	Yes	—	**1606-XLP30B**
		24…28	1.3		0.60/0.35			**1606-XLP30E**
					0.54/0.30		—	1606-XLP30EQ
	36	+/- 12/15V	2.8		0.65/0.40	No	—	**1606-XLP36C**
	50	12…15	4.2		1.00/0.60	Yes	—	**1606-XLP50B**
		24…28	2.1		0.77/0.44	Yes	—	**1606-XLP50E**
		24…28	2.1		1.00/0.60	Yes	—	**1606-XLP50EZ**
		48…56	1		1.00/0.60	Yes	—	**1606-XLP50F**
	54	12...15	4.5		0.91/0.54	Yes	—	1606-XLP60BQ
	54	12...15	4.5		0.97/0.61	Yes	—	1606-XLP60BQT
	60	24...48	2.1		0.98/0.58	Yes	—	1606-XLP60EQ
	60	24...48	2.1		1.05/0.66	Yes	—	1606-XLP60EQT
100…120/220…240V AC, 220…375V DC	72	24…28	3		1.60/0.80	Yes	—	**1606-XLP72E**
	90	12…15	7.5		1.90/0.90	Yes‡	—	**1606-XLP90B**
100…200/200…240V AC, 220…375V DC	95	24…28	3.9		2.00/0.95	No	—	**1606-XLP95E**
	100	24…28	4.2		2.10/1.00	Yes‡	—	**1606-XLP100E**
		48…56	2.1		2.10/1.00	Yes‡	—	**1606-XLP100F**

Two-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	90	24…28	3.75	10 A Slow Blow Fuse or **Cat. No. 1489-A1C100**/ 20 A♣	2 x 0.36	No‡	—	**1606-XLP90E-2**
380…480V AC	100	24…28	4.2		2 x 0.40	Yes‡	—	**1606-XLP100E-2**

♣ 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.

8

Bulletin 1606 Back-of-Panel Brackets

Instead of snapping the power supply onto a DIN Rail, you can mount it to the back of the panel. This set consists of two steel brackets which replace the existing DIN Rail aluminum brackets at the back of the unit.

Note: You need one set per unit.

Description	Cat. No.
Back-of-panel bracket for XLS and XLE power supplies, **below 20 A**	**1606-XLB**
Back-of-panel bracket for XLS and XLE power supplies, **20 A and above**	**1606-XLC**

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_{in} -.5V typ	30	N/A	N/A❄	—	—	**1606-XLRED20-30**
24V DC	960	V_{in} -.6V typ	40	N/A	N/A§	—	—	**1606-XLRED40**
10…60V DC	384	V_{in} 1 -.9V typ	16➢	N/A	N/A	—	—	**1606-XLPRED**
10…60V DC	480	V_{in} 1 -.9V typ	20➢	N/A	N/A	–	–	**1606-XLSRED**
24...28	960	Vin 2.15 typ.	40	N/A	N/A	–	–	**1606-XLSRED40**
24...28	1920	Vin 2.7 typ.	80	N/A	N/A	–	–	**1606-XLSRED80**
24…60V DC	480	V_{in} 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**

8

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-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/ABS
♣ 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

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.

Bulletin 1606-XLP

	1606-XLP15A	1606-XLP15B	1606-XLP15E	1606-XLP25A
Output Volts/Watts	5...5.5V/15 W	12...15V/15 W	24...28V/15 W	5...5.5V/25 W
Input Voltage (47...63 Hz)	100...240V AC wide range; 85...370V DC			
Operational Range	85...264V AC			
Hold-up Time	>168 ms (230V AC) >45 ms (100V AC)	>191 ms (230V AC) >46 ms (100V AC)	>196 ms (230V AC) >47 ms (100V AC)	>170 ms (230V AC) >19 ms (100V AC)
Rated Input Current	<0.28 A (100V AC) <0.17 A (196V AC)			<0.5 A (100V AC) <0.35 A (196V AC)
Efficiency	typ. >77%	typ. >83%	typ. >88%	typ. >80%
Output Voltage	5...5.5V 5.1V preset	12...15V	24...28V	5...5.5V 5.1V preset
Rated Output Current	3 A	1.0...1.3 A	0.54...0.63 A	5 A (at 5.1V), 4.5 A (at 5.5V)
Ripple/Noise	<50 mV_{pp}	<75 mV_{pp}	<50 mV_{pp}	<50 mV_{pp}
Operating Temperature Range (T_{amb})	-10...+70 °C, >60 °C: 0.4 W/K derating			-10...+70 °C >60 °C: 0.5 W/K derating
Non-Operating Temperature Range	-40...+85 °C			
MTBF♣	2 686 000 hours	3 811 000 hours	4 369 000 hours	600 000 hours
Dimensions (W x H x D)	22.5 x 75 x 91 mm			45 x 75 x 91 mm
Weight	130 g			240 g
Certifications/Standards✶	1, 2, 4, 5, 7, 9			
Special Features	NEC Class 2 power supply; ABS/GL/RINA (Marine); Class 1 Div. 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

	1606-XLP30B	1606-XLP30E	1606-XLP30EQ	1606-XLP36C	1606-XLP50B
Output Volts/Watts	10...12V/30 W	24...28V/30 W	24...28V/30 W	±12V/±15V/36 W	12...15V/50 W
Input Voltage (47...63 Hz)	100...240V AC wide range; 85...375V DC				
Operational Range	85...264V AC				
Hold-up Time	>170 ms (230V AC) >18 ms (100V AC)	>190 ms (230V AC) >19 ms (100V AC)	>141 ms (230V AC) >31 ms (100V AC)	>180 ms (230V AC) >18 ms (100V AC)	>170 ms (230V AC) >17 ms (100V AC)
Rated Input Current	<0.6 A (100V AC) <0.25 A (240V AC)	<0.6 A (100V AC) <0.35 A (196V AC)	<0.54 A (100V AC) <0.3 A (230V AC)	<0.65 A (AC 100V AC) <0.4 A (AC 196V AC)	<1.0 A (100V AC) <0.6 A (196V AC)
Efficiency	typ. 84%	typ. 87.5%	typ. 88.5%	typ. 86%	typ. 90%
Output Voltage	10...12V 12V preset (with jumper), 10...12V adjustable (without jumper)	24...28V 24.5V preset	24...28V	±12V (without jumper), ±15V (with jumper) ±15V preset	12...15V 15V preset (with jumper) 12...15V adjustable (without jumper)
Rated Output Current	3 A (@ 10V), 2.5 A (@ 12V)	1.3 A (@ 24.5V), 1 A (@ 28V)	1.3 A (@ 24V), 1 A (@ 28V)	0...2.8 A (@ +12V), 0...1.4 A (@ -12V) 0...2.4 A (@ +15V), 0...1.4 A @ (-15V)	4.2 A (@ 12V), 3.4 A (@ 15V)
Ripple/Noise	<10 mV_{pp}	<50 mV_{pp}	<50 mV_{pp}	<50 mV_{pp}	<100mV_{pp}
Operating Temperature Range (T_{amb})	-10...+70 °C >60 °C: 0.6 W/K derating	-10...+70 °C >60 °C: 0.5 W/K derating	-10...+70 °C >60 °C: 0.8 W/K derating	-10...+70 °C > 60 °C: 1 W/K derating	-10...+70 °C >60 °C: 1 W/K derating
Non-Operating Temperature Range	-10...+70 °C >60 °C: 0.6 W/K derating	-10...+70 °C >60 °C: 0.5 W/K derating	-10...+70 °C >60 °C: 0.5 W/K derating	-10...+70 °C > 60 °C: 1 W/K derating	-10...+70 °C >60 °C: 1 W/K derating
MTBF♣	appr. 650 000 hours		2 123 000 hours	600 000 hours	appr. 600 000 hours
Dimensions (W x H x D)	45 x 75 x 91 mm	45 x 75 x 91 mm	22.5 x 75 x 91 mm	45 x 75 x 91 mm	45 x 75 x 91 mm
Weight	250 g	230 g	140 g	240 g	260 g
Certifications/Standards✶	1, 2, 4, 5, 7, 9				
Special Features	NEC Class 2 power supply; Class 1 Div. 2, ABS/GL/RINA (Marine)	NEC Class 2 power supply; Class 1 Div. 2; Semi F47, ABS/GL/RINA (Marine)	NEC Class 2 power supply; Class 1 Div. 2; Semi F47, ABS/GL/RINA (Marine)	Output voltage adjustable: DC ±12V without jumper or DC ±15V with jumper; NEC Class 2 power supply; Class 1 Div. 2; ABS/GL/RINA (Marine)	Output voltage adjustable: DC 12...15V without jumper or DC 15V with jumper; NEC Class 2 power supply; 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

Bulletin 1606-XLP

	1606-XLP50E	1606-XLP50EZ	1606-XLP50F	1606-XLP60EQ	1606-XLP60EQT
Output Volts/Watts	24...28V/50 W		48...56V/50 W	24...28V/60 W	
Input Voltage (47...63 Hz)	100...240V AC wide range; 85...375V DC				
Operational Range	85...264V AC				
Hold-up Time	>171 ms (230V AC) >17 ms (100V AC)		>170 ms (230V AC) >17 ms (100V AC)	>107 ms (230V AC) >24 ms (120V AC)	
Rated Input Current	<1.0 A (100V AC) <0.6 A (196V AC)				
Efficiency	typ. 88.5%		typ. 90%	typ. 88%	
Output Voltage	24...28V 24.5V preset		48...56V 48V preset	24...28V	
Rated Output Current	2.1 A (@ 24.5V), 1.8 A (@ 28V)		1.05 A (@ 48V), 0.9 A (@ 56V)	2.5 A (@ 24V), 2.1 A (@ 28V)	
Ripple/Noise	<50 mV_{pp}		<200 mV_{pp}	<50 mV_{pp}	
Operating Temperature Range (T_{amb})	-10...+70 °C >60 °C: 1 W/K derating				-40...+70 °C >60 °C: 1 W/K derating
Non-Operating Temperature Range	-40...+85 °C				
MTBF♣	appr. 600 000 hours			> 1 292 000 h	
Dimensions (W x H x D)	45 x 75 x 91 mm				
Weight	240 g			250 g	
Certifications/Standards✶	1, 2, 3, 4, 5, 6, 9			1, 2, 3, 4, 5, 6	
Special Features	NEC Class 2 power supply; ABS/GL/RINA (Marine); Class 1 Div. 2; Semi F47	Removeable Terminations; NEC Class 2 power supply; ABS/GL/RINA (Marine); Class 1 Div. 2	NEC Class 2 power supply; ABS/GL/RINA (Marine)	NEC Class 2 power supply	

✶ 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-XLP60BQ	1606-XLP60BQT	1606-XLP72E	1606-XLP90B	1606-XLP90E-2
Output Volts/Watts	12...15V/54 W	12...15V/54 W	24...28V/72 W	12...15V/90 W	24...28V/90 W
Input Voltage (47...63 Hz)	100...240V	100...240V	100...120/220...240V AC manual select; 220...375V DC	100...120/220...240V AC; 220...375V DC	2Ø, 380...480V AC
Operational Range	85...264V AC	85...264V AC	85...132/184...264V AC		323..552V AC
Hold-up Time	>113 ms (230V AC) >25 ms (120V AC)	>113 ms (230V AC) >25 ms (120V AC)	>40 ms (230V AC) >25 ms (100V AC)	>40 ms (230V AC) >20 ms (196V AC, 100V AC)	>52 ms (400V) >93 ms (480V)
Rated Input Current	<0.91 A (110V AC) <0.54 A (230V AC)	<0.97 A (110V AC) <0.61 A (230V AC)	<1.6 A (100V AC) <0.8 A (220V AC)	<1.9 A	<0.42 A (400V) <0.36 A (480V)
Efficiency	typ. 87.2 %	typ. 87.6 %	typ. 89%	typ. 88.5%	typ. 89%
Output Voltage	12...15V	12...15V	24...28V 24.5V preset (at 2.9 A)	12...15V Preset at 12V	24...28V Preset at 24.5V
Rated Output Current	4.5 A (@ 12V), 3.6 A (@ 15V)	4.5 A (@ 12V), 3.6 A (@ 15V)	3 A (@ 24V), 2.6 A (@ 28V)	7.5 A (@ 12V), 6 A (@ 15V)	3.75 A (@ 24V), 3.2 A (@ 28V)
Ripple/Noise	<50 mV_{pp}	<50 mV_{pp}	<50 mV_{pp}	<50 mV_{pp}	<50 mV_{pp}
Operating Temperature Range (T_{amb})	-10...+70 °C 60...70 °C: 1.4 W/°C derating	-40...+70 °C 60...70 °C: 1.4 W/°C derating	-10...+70 °C >60 °C: 1.5 W/K derating	-10...+70 °C >60 °C: 1 W/K derating	-10...+70 °C >60 °C: 2 W/K derating
Non-Operating Temperature Range	-40...+85 °C				
MTBF♣	—	—	appr. 600 000 hours	appr. 500 000 hours	appr. 500 000 hours
Dimensions (W x H x D)	45 x 75 x 91 mm	45 x 75 x 91 mm	45 x 75 x 91 mm	73 x 75 x 103 mm	73 x 75 x 103 mm
Weight	250 g	250 g	260 g	360 g	360 g
Certifications/Standards✶	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5, 6, 9	1, 2, 3, 4, 5, 6, 7, 9	1, 2, 3, 4, 5, 6, 7, 9
Special Features	NEC Class 2 power supply	NEC Class 2 power supply Operation down to -40 °C	NEC Class 2 power supply; ABS/GL/RINA (Marine); Class 1 Div. 2	NEC Class 2 power supply; ABS/GL/RINA (Marine); Class 1 Div. 2	NEC Class 2 power supply; 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

Bulletin 1606-XLP

	1606-XLP95E	1606-XLP100E	1606-XLP100F	1606-XLP100E-2
Output Volts/Watts	24...28V/95 W	24...28V/100 W	48...56V/100 W	24...28V/100 W
Input Voltage (47...63 Hz)	100...120/220...240V AC auto select; 220...375V DC			2Ø, 380...480V AC
Operational Range	85...132/184...264V AC			323..552V AC
Hold-up Time	>40 ms (230V AC) >20 ms (100V AC)			>48 ms (400V) >85 ms (480V)
Rated Input Current	<2.0 A (100V AC) <0.95 A (220V AC)	<2.1 A (100V AC) <1.0 A (220V AC)		<0.46 A (400V) <0.40 A (480V)
Efficiency	typ. 90%		typ. 91%	typ. 89%
Output Voltage	24...28V 24.5V preset		48...56V 48V preset	24...28V Preset at 24.5V
Rated Output Current	3.9 A (@ 24.5V), 3.2 A (@ 28V)	4.2 A (@ 24.5V), 3.6 A (@ 28V)	2.1 A (@ 48V), 1.8 A (@ 56V)	4.2 A (@ 24V), 3.6 A (@ 28V)
Power Boost	—	—	—	—
Ripple/Noise	<50 mV_{pp}	<50 mV_{pp}	<50 mV_{pp}	<50 mV_{pp}
Operating Temperature Range (T_{amb})	-10...+70 °C >60 °C: 2 W/K derating			
Non-Operating Temperature Range	-40...+85 °C			
MTBF♣	appr. 500 000 hours			
Dimensions (W x H x D)	73 x 75 x 103 mm			
Weight	360 g			
Certifications/Standards✶	1, 2, 3, 4, 5, 6, 7	1, 2, 3, 5, 6, 9	1, 2, 3, 5, 6, 9	
Special Features	NEC Class 2 power supply; Class 1 Div. 2	Single/parallel operation (inclined characteristic) select on front panel; ABS/GL/RINA (Marine); Class 1 Div. 2; Semi F47	Single/parallel operation (inclined characteristic) select on front panel; ABS/GL/RINA (Marine)	

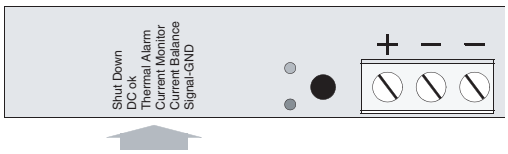
✶ 1) = CE, 2) = UL 508 (cULus LISTED), 3) = UL 1950 (cURus), 4) = CSA C22.2, No. 60950, 5) Safety standards = IEC/EN 60950, EN 50178, 6) EMC standards = EN 55011 (Class B), EN 55022 (Class B), EN 61000-6-2, 7) EMC standards = EN 61000-3-2 (A14), EN 50081-1, 9)ABS/GL/RINA (Marine)
♣ MTBF determined by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

"DC Ok" Output

Function: Indicating whether the unit is operating properly. Output can directly energize a relay or a control light.
Signaling: Output signal is at a "high" level (24V, current source) in normal operation (no overload, overheating, short circuit). When the output signal switches to "low" level (no power at output), Vout remains for 5 ms (nominal) at nominal load.
Connection (signal common): Connection is made with respect to the "Signal GND" terminal (signal output).
Important: Do not connect to the power output (terminals + and -).
Permissible load: resistance - min. 300 Ω, e.g. 24V relay, control lights (LEDs need no series resistance), Evaluation logic.
For 5V signal: In order to receive a 5V signal: switch a 5V Zener diode (0.5 W) and 1 kΩ resistance in parallel between this output and the "Signal GND" terminal.

"Thermal Alarm" Output

Function: Output gives warning shortly before and while overtemperature state occurs. Output can directly control a relay or a control light.
Signaling: Output signal is at a "high" level (24V, current source) in normal operation (no overtemperature). At overtemperature, the output switches to "low". Only when the temperature in the unit increases further will the unit reduce its output current (power output).
Connection and permissible load: same as for "DC ok" output.



"Current Monitor" Output

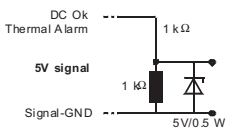
Function: Measuring the output current (power output). Output signal is proportional to the output current of the unit.
Connection: Made with respect to the "Signal GND" terminal (signal output).
Important: Do not connect to the power output (terminals + and -).
Signaling:
Voltage measuring: Voltage at signal output is 1V per 10 A output current (Ri(voltmeter) > 100 k ohm)
Current measurement: Current at signal output is 1 mA per 10 A output current (Ri(ammeter) < 100 W)

"Current Balance" In-/Output

Function: Using these terminals, parallel operating units ensure an equal load sharing (active balancing). Balancing also works reliably with decoupling diodes at the power output (redundancy).
Connection: Connect together "Current Balance" outputs of all units involved.
Important: Signal common here is the - terminal of the power output, not the "Signal GND". Do not connect the "Signal GND" terminals to each other!

"Signal GND" Terminal

Function: Grounding terminal for all signal terminals (not for "Current Balance").
Connection instructions: Do not connect this terminal with terminals + or - of the unit (not even over a load: risk of overload). Do not connect this terminal with terminals of other units (not even with the "Signal GND" terminal of another unit).
Permissible load: Maximum current load: 0.3 A. Terminal is fused internally with a self-healing fuse (polyswitch).



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Bulletin 1606 Special Modules

	1606-XLDC40A	1606-XLDC92D	1606-XLSDNET4	1606-XLSDNET8	1606-XLEDNET3
Output Volts/Watts	24V/40 W	24V/92 W	24V/91 W	24V/192 W	24V...28V/80 W
Input Voltage (47...63 Hz)	18...36V DC	24V DC	100…240V AC; 110...300V DC	AC 100…240V DC 110...300V	100...120V AC/200...240 V AC
Operational Range	16...40V DC	14...32.4V DC	85…264V AC 88…360V DC	85…276 V AC 88…375 V DC	90...132V AC/180...264V AC
Hold-up Time	18...36V DC	18...36V DC	43 ms (120V AC) 77 ms (240V AC)	38 ms (120V AC) 41 ms (240V AC)	>60 ms (120V) >244 ms (240V)
Rated Input Current	<2.9 A	<5.5 A	1.1 A (100V AC) 0.5 A (240V AC)	2.3 A (100V AC) 1.0 A (240V AC)	1.24 A (100V AC) 0.68 A (240V AC)
Efficiency	typ. 82%	typ. 90.3%	typ. 92.4%	typ. 92.7%	typ. 90%
Output Voltage	5.1V	24V	24V	24V	24...28V
Rated Output Current	8 A	3.8 A	3.8 A	8 A	3.3 A @ 24V 2.9 A @ 28V
Ripple/Noise	<50 mV_{PP}	<50 mV_{PP}	< 50 mV_{pp}	< 50 mV_{pp}	<50 mV_{PP}
Operating Temperature Range (T_{amb})	0...+70 °C >60 °C with derating	-25...+70 °C >60 °C with derating	-25...+70 °C >60 °C with derating	-25...+70 °C >60 °C with derating	-25...+70 °C, >60 °C with derating
Non-Operating Temperature Range	-25...+85 °C	-40...+85 °C	-40...+85 °C	-25...+70 °C >60 °C with derating	-40...+85 °C
MTBF♣	> 510 000 hours	-	>581 000 hours	>831 000 hours	>700 000 hours
Dimensions (W x H x D)	49 x 124 x 102 mm	32 x 124 x 102 mm	40 x 124 x 117 mm	60 x 124 x 117 mm	32 x 124 x 102 mm
Weight	470 g	410 g	620 g	900 g	430 g
Certifications/Standards✶	1, 2, 3, 5, 6, 7		1, 2, 3, 5, 6, 7	1, 2, 3, 5, 6, 7	1, 2, 3, 4, 5, 6, 7
Special Features	—		NEC Class 2 power supply; Active PFC; ODVA Approved; Class 1 Div. 2; Semi F47	Active PFC; ODVA Approved; Class 1 Div. 2; Semi F47	NEC Class 2 power supply; ODVA Approved; Class 1 Div. 2; Semi F47

✶ 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

	N+1 Redundancy	N+1 Redundancy	N+1 Redundancy
	1606-XL60DR	1606-XL120DR	1606-XL240DR
Output Volts/Watts	24V/60 W	24V/120 W	24V/240 W
Input Voltage (47...63 Hz)	100...120V/200...240V AC manual select; 160...375V DC	100...120/200...240V AC manual select; 210...375V DC	AC 100...120/200...240V manual select; DC 240...375V
Operational Range	—	85...132/176...264V AC	85...132/176...264 V AC
Hold-up Time	>20 ms (AC 196V)	>37 ms (AC 196V)	>25 ms (AC 196V)
Rated Input Current	<1.3 A (115V)/<0.7 A (230V)	<2.6 A (115V)/<1.4 A (230V)	<6 A (115V)/<2.8 A (230V)
Efficiency	typ. 86.5%	typ. 89%	typ. 89%
Output Voltage	24V	24V	24V
Rated Output Current	2.5 A	5 A	10 A
Power Boost	—	6 A	12 A
Ripple/Noise	<30 mV_{PP}	<30 mV_{PP}	<30 mV_{PP}
Operating Temperature Range (T_{amb})	-10...+70 °C >60 °C with derating	-10...+70 °C >60 °C with derating	0...+70 °C >60 °C with derating
Non-Operating Temperature Range	-10 °C...+70 °C >60 °C with derating	-40...+85 °C	-40...+85 °C
MTBF♣	700 000 hours	480.000 hours	390.000 hours
Dimensions (W x H x D)	49 x 124 x 102 mm	64 x 124 x 102 mm	120 x 124 x 102 mm
Weight	470 g	620 g	980 g
Certifications/Standards✶	1, 2, 3, 5, 6	1, 2, 3, 5, 6, 7	1, 2, 3, 5, 6
Special Features	RDY relay contact; N+1 redundancy; plug connectors; NEC Class 2 power supply	RDY relay contact; N+1 redundancy; plug connectors	RDY relay contact; N+1 redundancy; plug connectors

✶ 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

Bulletin 1606 Redundancy Module

	N+1 Redundancy	N+1 Redundancy	N+1 Redundancy	N+1 Redundancy		N+1 Redundancy	N+1 Redundancy
	1606-XLRED20-30	1606-XLRED40	1606-XLPRED	1606-XLSRED	1606-XLERED	1606-XLSRED40	1606-XLSRED80
Output Volts/Watts	30 A Dual redundancy module	40 A Single redundancy module	8 A Dual redundancy	10 A Dual redundancy		20 A Dual redundancy	40 A Dual redundancy
Input Voltage (47...63 Hz)	DC 24V (max. 35V)		DC 10...60V	DC 10...60V		24...28 V DC	24...28 V DC
Operational Range	18...36 V DC		10...60V DC	10...60V DC		24...28 V DC	24...28 V DC
Rated Input Current	20...30 A (max. 35 A)	0...40 A (max. 50 A)	Single input: 8 A max. Dual input: 16 A max. total	Single input: 10 A max. Dual input: 20 A max. total		Single input: 20 A max. Dual input: 40 A max. total	Single input: 40 A max. Dual input: 80 A max. total
Output Voltage	Vin -0.5V typ.	Vin -0.6V typ.	Vin -0.9V typ.	Vin -0.9V typ.		Vin -2.15V typ.	Vin -2.7V typ.
Rated Output Current	20...30 A (max. 35 A)	0...40 A (max. 50 A)	0...10 A	0...20 A		0...40 A	0...80 A
Operating Temperature Range (T_{amb})	-10 °C...+70 °C		-40 °C...+70 °C >60 °C with derating	-25 °C...+70 °C >60 °C with derating		-25 °C...+70 °C >60 °C with derating	-25 °C...+70 °C >60 °C with derating
Dimensions (W x H x D)	48 x 124 x 102 mm	48 x 124 x 117 mm	45 x 75 x 91 mm	32 x 124 x 102 mm	32 x 124 x 117 mm	36 x 124 x 127 mm	46 x 124 x 127 mm
Weight	625 g	646 g	136 g	290 g	350 g	340 g	440 g
Certifications/Standards*	1, 2, 3, 6		1, 2, 3, 6	1, 2, 3, 6		1, 2, 3, 6	1, 2, 3, 6
Special Features	Dual redundancy module for 2x35 A; N+1 redundancy	Single redundancy module for 2.5-50 A; N+1 redundancy	Redundancy for DC 10...60V applications; ABS/GL/RINA (Marine); Class 1 Div. 2	Redundancy for DC 10...60V applications; Class 1 Div. 2	Redundancy for DC 10...60V applications; Class 1 Div. 2; DC OK	Redundancy for DC 24...28V applications; Class 1 Div. 2	Redundancy for DC 24...28V applications; Class 1 Div. 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
♣ MTBF determined by Siemens norm SN 29500 at full load current and 40 °C

Bulletin 1606-XLSBUFFER

	Buffer Module	Buffer Module
	1606-XLSBUFFER 24	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	Vin -1V: 22.5V fixed	Vin -2V: 45V fixed
Rated Output Current	20 A	20 A
Operating Temperature Range (T_{amb})	-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

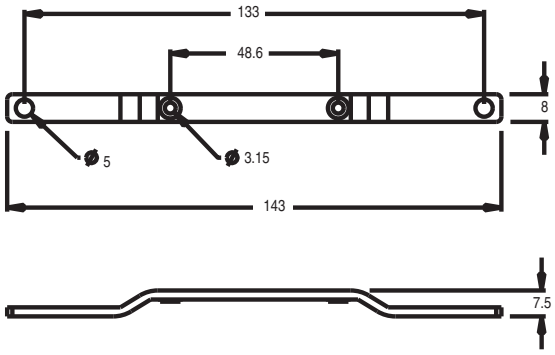
	UPS	UPS	UPS	UPS
	1606-XLS240-UPS	1606-XLS240-UPSC	1606-XLS240-UPSD	1606-XLS240-UPSE
Output Volts/Watts	22.5V...30V/240 W	22.25V/240 W	22.25V and 12V/240 W	
Input Voltage (47...63 Hz)	24V DC (22.5...30V DC)	24V DC (22.5...30V DC)	24V DC (22.5...30V DC)	
Rated Input Current Voltage stand-by mode/charging 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_{amb})	-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			

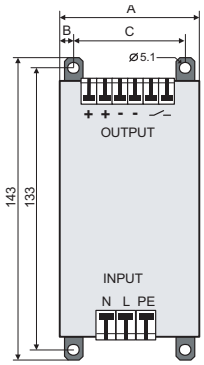
∗ 1) = CE, 2) = UL 508 (cULus LISTED), 3) = UL 1950 (cURus), 4) = CSA C22.2, No. 60950, 5) Safety standards = IEC/EN 60950, EN 50178, 6) EMC standards = EN 55011 (Class B), EN 55022 (Class B), EN 61000-6-2, 7) EMC standards = EN 61000-3-2 (A14), EN 50081-1
♣ MTBF determined by Siemens norm SN 29500 at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

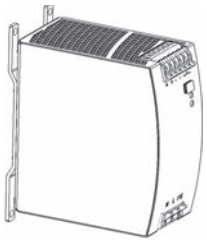
Approximate Dimensions

Approximate dimensions are shown in millimeters (in.) unless otherwise indicated. Dimensions are not to be used for manufacturing purposes.

Cat. No. 1606-XLB, Back of Panel Mounting Bracket
For use with Bulletin 1606-XLE and -XLS Power Supplies below 20 A.

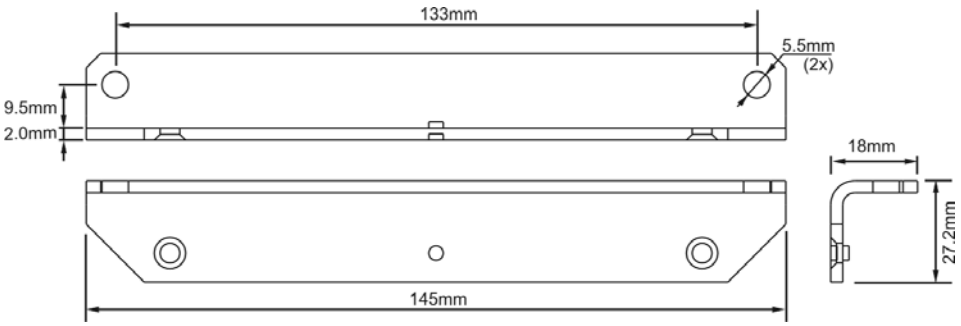






mm	A	B	C
1606-XLS80E	32	4.8	22.5
1606-XLS120E	40	5.3	29.5
1606-XLS240E	60	5.8	48.5
1606-XLS480E-3	65	6.3	40
1606-XLSRED	32	4.8	22.5

Cat. No. 1606-XLC, Back of Panel Mounting Bracket
For use with Bulletin 1606-XLE and -XLS Power Supplies 20 A and above.

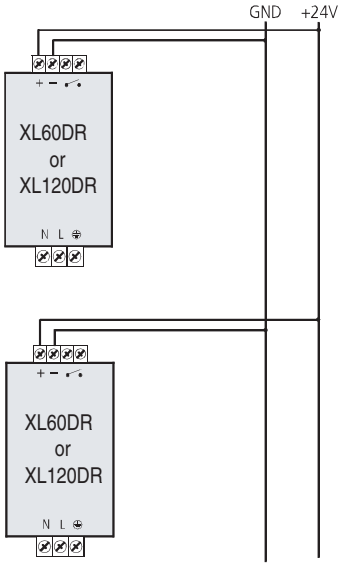


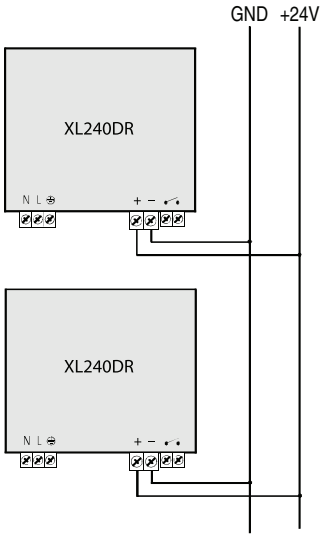
8

1606-XL Redundancy Capabilities

The 1606-XL family has two cost effective methods for providing redundancy to applications that are critical and can not risk failure.

1606-XL60DR, XL120DR and XL240DR Redundant Power Supplies

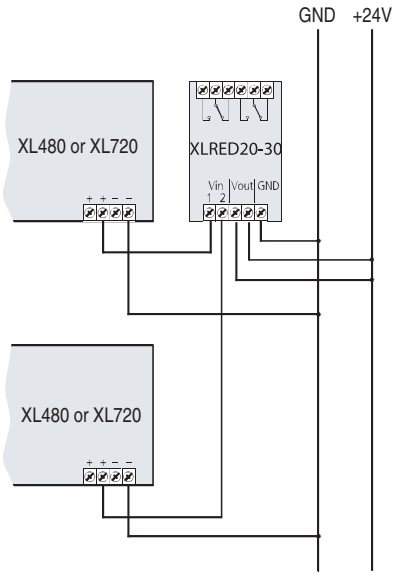


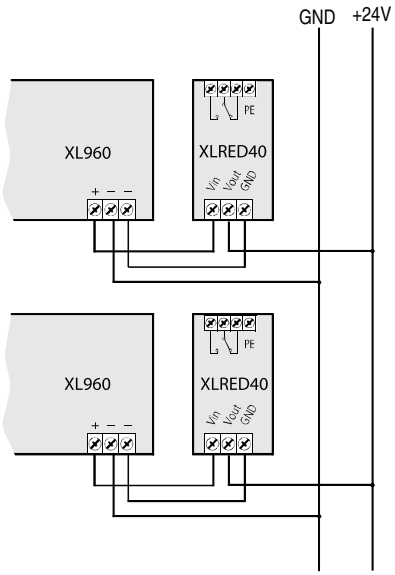


The 1606-XL60DR, XL120DR and XL240DR are enhanced versions of the standard power supplies.

- Each device has internal diodes which provide isolation against DC bus problems corrupting working supplies.
- Provides "DC OK" output relay to allow remote monitoring of DC power status.
- Utilizes pluggable terminals for easy installation.

1606-XLRED20-30 and 1606-XLRED40 Redundancy Modules





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):

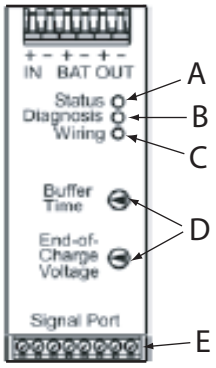
Contact is closed when unit is buffering.

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.



8

Industrial Uninterruptible Power Supply

Product Overview

				
Bulletin	1609-S Industrial	1609-P Commercial	1609-U Industrial	1609-U Commercial
Output Power	350VA/280 W	3000VA	500VA/325 W	750VA/500 W 1000VA/670 W 1500VA/980 W
Input Voltage/ Primary Voltage	120, 208/230V AC			120V AC
Efficiency	96%	86%	96%	95…98%
Output Voltage/ Secondary Voltage	120, 208/230V AC			120V AC
Rated Output Current	2.9 A	17…48 A	4.12 A	—
Operating Temperature Range	0…40 °C	0…40 °C	0…50 °C	0…40 °C
Non-Operating Temperature Range	-20…+60 °C			
Certifications	UL, CSA, CE			UL, CSA
Standards Compliance	EN 50091-1-1, EN 50091-2 (Class 2), UL 1778, CSA C22.2 No. 107-3			UL 1778 FCC Part 15, Class A
Product Selection	**Page 8-25**	**Page 8-32**	**Page 8-28**	**Page 8-36**

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Bulletin 1609-S Series — Industrial Uninterruptible Power Supply

- DIN Rail or back-of-panel mountable
- Line interactive
- Pure sine wave output
- Intelligent battery management system
- Serial communication
- High power capacity

Standards Compliance

UL 1778
CE
CSA C22.2, No. 107
FCC

Certifications

UL Listed (File No. E190749, Guide YEDU)
CSA Certified (File LR1234)

Table of Contents

Catalog Number Explanation

1609 – S (*a*) 350 (*b*) N (*c*) S (*d*)

a

Power Supply Type	
Code	Description
S	Line Interactive, Panel Mount Uninterruptible Power Supply

b

Rated Output Power	
Code	Description
350	350VA (280 W)

c

Output Voltage	
Code	Description
N	120V AC
E	208/230V AC

d

Battery Type	
Code	Description
S	40 °C Battery

Product Selection

Output Power	Input Voltage	Cat. No.
350VA (280 W)	120V AC	**1609-S350NS**
350VA (280 W)	208/230V AC	**1609-S350ES**

Accessories

Description	Output Power	Cat. No.
40 °C replacement battery	500VA (325 W)	**1609-500SBAT**
Remote start cable		**1609-RSC**
DIN Rail kit		**1609-SDK1**
Dry contact I/O communication cable		**1609-SDC1**

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Industrial Uninterruptible Power Supply

Specifications

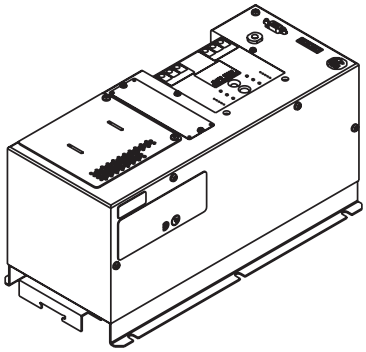
		1609-S350NS	1609-S350ES
Input	Wiring	Touch-proof terminal block	
	Nominal Voltage	120V	208/230V
	Voltage Range, Default	81…143V	160…287V
	Voltage Range, Widest, On Line	75…153V	150…300V
	Nominal Current	2.9 A	1.5 A
	Capacity	350VA/280 W	
	Frequency	47…63 Hz	
	PFC	None, load power factor is reflected in the input line current	
On Line Output	Wiring	Touch-proof terminal block	
	Nominal Voltage	120V	208/230V
	Voltage Range, Default	106…127V	208…253V
	Voltage Range, Widest, On Line	97…136V	196…265V
	Transfer Point Accuracy	+/- (2% of transfer voltage + 1.3)	+/- (2% of transfer voltage + 2.6)
	Overload Protection	Alarm at 107% of rated load input circuit breaker	Alarm at 107% of rated load Premises branch protection 10 A or less
	Efficiency	96% @ 100% resistive load	
	Surge Protection	Per EN50091-2	
On Battery Output	Frequency	Nominal +/- 3 Hz (Locked), Nominal +/- 0.5 Hz (Free-running)	
	THD	< 5% at full (linear) load	
	Voltage Regulation	+/- 5%, + 5…-15% after low battery warning	
	Crest Factor	2.5:1	
	Efficiency	77% @ 100% resistive load	
	Overload Protection	Overload indication and shutdown @ 107% of rate load or electronic current limit and shutdown under short circuit condition	
Battery Pack	Run Time	12 minutes (full load) 24 minutes (50% full load)	
	Type	Sealed lead acid, valve-regulated hot-swappable, user-replaceable	
	Voltage	24V	
	Charger	Temperature-compensated, current-limited, float charger	
	Recharge Time	Less than 3 hours to 90% capacity	
	Lifetime	3…5 years @ 25 °C ambient Lifetime cut in half for every 10 °C above 25 °C	
Environment	Temperature	0…40 °C (operating), -15…45 °C (short-term storage)	
	Altitude	10 000 ft (operating)	
	Humidity	0…95% non-condensing (operating)	
	Heat Output	On line, full load: 137 BTU per hour On line, full load, charging: 190 BTU per hour On battery, full load: 1706 BTU per hour	
	Audible Noise	<45 dB @ 1 m (full load)	
Communication	Serial	Serial RS232 DB-9	
	Options	Dry contact I/O communication cable	
Indicators and Controls	Status LEDs	On line (green) AVR low line (yellow) AVR high line (yellow) On battery (yellow) Overload and fault (red) Bad battery (red) Load percentage of full rating bar graph (green) Battery state of charge bar graph (green) Measured input voltage indicated by load bar graph when recessed switch is held	
	Control Buttons	On/self-test/alarm silence/cold start Output off	
	Audible Alarms	On Battery: 4 short beeps repeats about 20 seconds (mute capability) Low Battery: persistent 0.5 second beep every 1 second (mute capability) Disconnected Battery: continual chirping Failure: continuous tone Replace Battery: occasional On/off change: single beep	

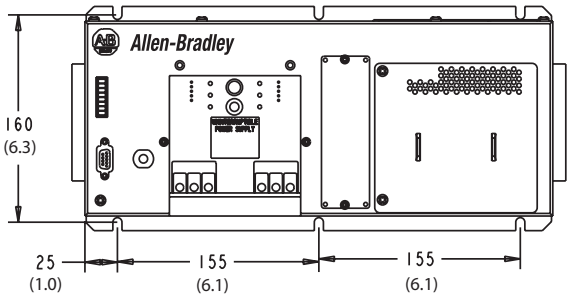
ATTENTION

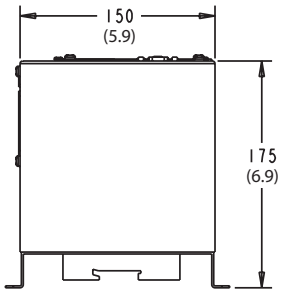
- Wiring of the UPS should be performed by a qualified electrician. Use appropriate size wires.
- In 230V AC applications, the UPS must be protected with a circuit breaker that complies with European standards for branch rated protection per the country of installation.
- In 208V AC applications, the UPS must be protected by a dual-pole, 10 A branch rated, UL 489 circuit breaker.
- The 120V AC 1609-S350NS has supplementary circuit breaker protection. The unit should be protected by a single-pole, 15 A branch rated, UL 489 circuit breaker.
  Allen-Bradley part number 1492-MCAA115 is suggested.
- **The branch circuit breaker must be off prior to wiring the unit.**

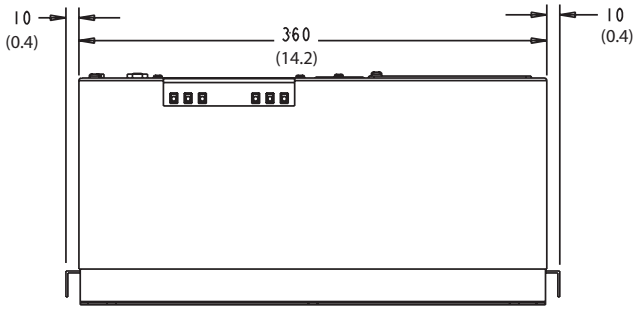
Approximate Dimensions

Approximate dimensions are shown in millimeters (in.) unless otherwise indicated. Dimensions are not to be used for manufacturing purposes.









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Approximate Shipping Weights

Cat. No.	Approx. Shipping Weight [kg (lb)]
1609-S350NS	13.15 (29)
1609-S350ES	13.15 (29)

Bulletin 1609-U — Industrial Uninterruptible Power Supply

- Rugged industrial design
- DIN Rail mountable or back-of-panel mountable
- Elevated temperature performance (up to 50 °C)
- Comprehensive network management
- Remote monitoring/configuration
- "Dry Contact" I/O
- Line interactive
- Pure sine wave output

Standards Compliance

UL 1778
CE
CSA C22.2, No. 107
FCC

Certifications

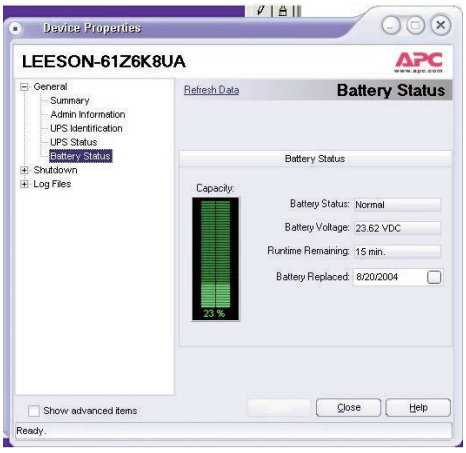
UL Listed (File No. E190749, Guide YEDU)
CSA Certified (File LR1234)

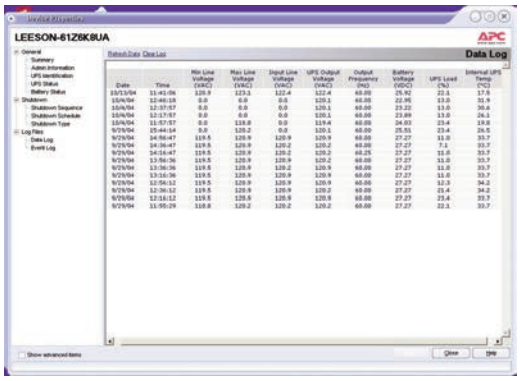
Table of Contents

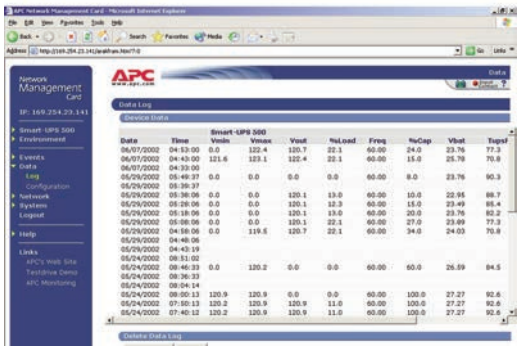
Overview

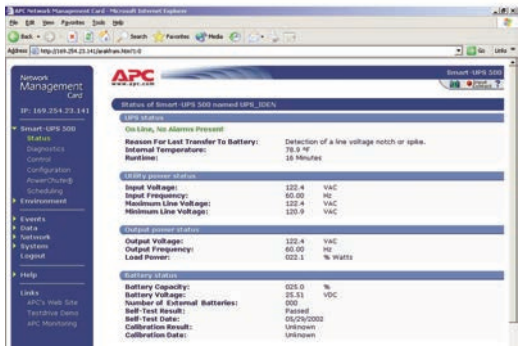
The Bulletin 1609-U has multiple options for remote management. The device is shipped with a DB9 serial cable for serial communication. The product can be configured with the optional 1609-NMC Network Management Card for Ethernet communications. The serial connection utilizes the APC PowerChute® software, the 1609-NMC has an integrated web browser tool. The Network Management Tools allow the user to:

- Log data
- Fault notification
- Customize output relays
- Remote device management
- Log events
- Customize input contacts
- Monitor temperature
- Operating system shutdown
- Can be viewed through RSView® with generic SNMP/OPC server









Catalog Number Explanation

1609 – U (a) 500 (b) N (c) H (d) C (e)

a

Power Supply Type	
Code	Description
U	Uninterruptible Power Supply

b

Rated Output Power	
Code	Description
500	500VA (325 W)

c

Input/Output Voltage	
Code	Description
N	115V AC
E	208/230V AC

d

Special Functions	
Code	Description
S	Standard Battery
H	High Temp. Battery
H	Can be left blank

e

Network Management	
Code	Description
C	NMC included
	Can be left blank

Product Selection

Output Power	Input Voltage	Operating Temperature	Cat. No.	
			Without Network Management Card	With Network Management Card
500VA (325 W)	120V AC	0…40 °C	**1609-U500NS**	**1609-U500NSC**
		0…50 °C	**1609-U500NH**	**1609-U500NHC**
	208/230V AC	0…40 °C	**1609-U500ES**	**1609-U500ESC**
		0…50 °C	**1609-U500EH**	**1609-U500EHC**

Accessories

Description	Output Power	Cat. No.
40 °C replacement battery	500VA (325 W)	**1609-500SBAT**
50 °C replacement battery	500VA (325 W)	**1609-500HBAT**
Network management card		**1609-NMC**
Remote start cable		**1609-RSC**

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Industrial Uninterruptible Power Supply

Specifications

Electrical Ratings		1609-U500N . . .	1609-U500E . . .	Notes
Input	V nom.	120V	230V	—
	Capacity	500VA (325 W)		Transfer points adjustable via software. Low transfer points for the 120V/230V are: 106V, 103V, 100V, 97V and 208V, 200V, 192V respectively. High transfer points for the 120V/230V are: 127V, 130V, 133V, 136V and 253V, 257V, 261V, 265V respectively.
	Voltage Range, default	81…143V	160…287V	Transfer points adjustable via software.
	Voltage Range, widest, on line	75…153V	150…300V	—
	Current nom.	4.12 A	2.20 A	—
	Capacity Frequency	47…63 Hz		Auto-adjusting
	PFC	Load power factor is reflected in the input line current		—
Output	V nom.	120V	208/230V	—
	Capacity	500VA (325 W)		—
On Line	Output Range, default	106…127V	208…253V	This voltage range is the default, controlled by transfer points coded in the UPS
	Output Voltage Range, widest	97…136V	196…265V	By setting the highest, high transfer point and the lowest, low transfer point with software
	Transfer Point Accuracy	+/- (2% of the transfer voltage + 1.3)	+/- (2% of the transfer voltage + 2.6)	In volts AC
On Battery	Frequency	Nominal +/- 3 Hz (Locked), Nominal +/- 0.5 Hz (Free-running) +/- 2%		Typical
	THD	<5% at full (linear) load +/- 2%		Typical
	Crest Factor	3:1		—
Efficiency	On Battery	77%		Typical with resistive load
	On Line	96%		Typical with resistive load
Protection	Surge	EN50091-2		—
	Overload	On Line: alarm at 107%, limited by breakers On Battery: shutdown at 107%		—
	Output Short On Line	Input circuit breakers and/or premises branch protection		—
	Output Short On Battery	Electric current limit, shutdown outputs, and latch off		—
	Thermal Protection	None		—
	Bypass	N/A		—
Regulatory	Safety	UL 1778, CSA, IEC 60950	UL 1778, CSA, IEC 60950-1, EN50091-1-1	—
	EMC	FCC (Class A)	EN50091-2 (Class A)	—
	Markings	UL, CSA, FCC, CE	UL, CSA, FCC, CE	—
Battery Pack	Run Time	9.0 minutes (0.67 p.f.)		325 W full load
		18 minutes (0.67 p.f.)		163 W half load
	Type	Standard: Sealed Lead Acid, valve regulated High Temp.: Sealed Lead Battery		Hot swappable, user replaceable
	Voltage	24V		—
	Charger	Temperature compensated current limited, float charger		—
	Recharge Time	Less than 3 hours to 90% capacity		—
	Lifetime	2…4 years @ 25 °C ambient		—
Environment	Temperature	0…40 °C (operating), 0…50 °C (operating - high temp. option) -20…60 °C (short-term storage)		—
	Altitude	10 000 ft (operating)		Maximum power is derated at higher altitudes
	Humidity	0…95% non-condensing (operating)		—
	Heat Output	On Line, Full Load: 137 BTU per hour On Line, Full Load, Charging: 190 BTU per hour On Battery, Full Load: 1706 BTU per hour		—
	Audible Noise	<45 dB @ 1 meter (full load)		Typical
Communication	DB9	Serial and Contact Closures		Serial communication only when USB is unused
	Dry Contact	Low battery, on battery		N.O., N.C. options for both
	EPO	Via Dry Contact Closure		—
	Network	Via optional Smart-Slot Card (1609-NMC)		—

Notes

208V AC applications: The 1609-U500E ships ready for 230V AC sources. When operating the UPS in 208V AC applications, the UPS low transfer voltage settings are adjusted through the PowerChute® software or the Network Management Card.

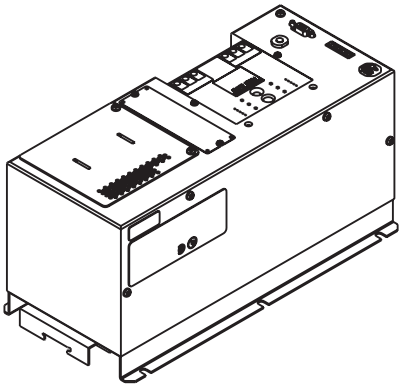
Refer to the PowerChute® User Guide or the Network Management Card instructions for details.

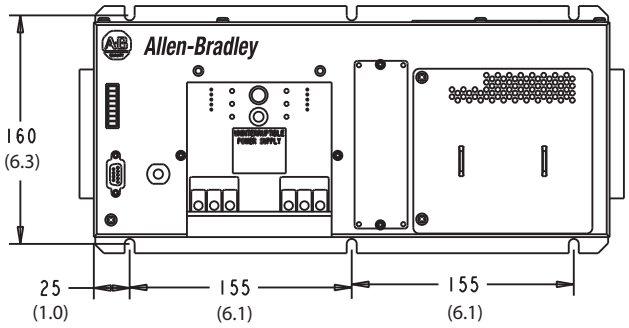
ATTENTION

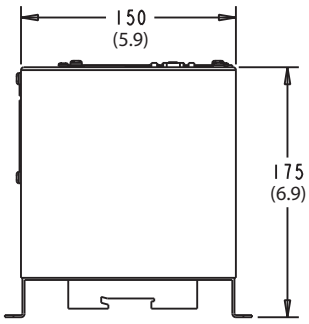
- Wiring of the UPS should be performed by a qualified electrician. Use appropriate size wires.
- In 230V AC applications, the UPS must be protected with a circuit breaker that complies with European standards for branch rated protection per the country of installation.
- In 208V AC applications, the UPS must be protected by a dual-pole, 10 A branch rated, UL 489 circuit breaker.
- The 120V AC 1609-U500N has supplementary circuit breaker protection. The unit should be protected by a single-pole, 15 A branch rated, UL 489 circuit breaker. Allen-Bradley part number 1492-MCAA115 is suggested.
- **The branch circuit breaker must be off prior to wiring the unit.**

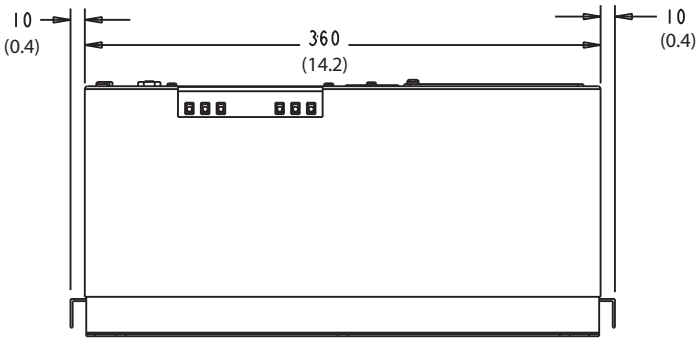
Approximate Dimensions

Approximate dimensions are shown in millimeters (in.) unless otherwise indicated. Dimensions are not to be used for manufacturing purposes.









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Approximate Shipping Weights

Output Power	Input Voltage	Cat. No. Without Network Management Card	Approx. Shipping Weight [kg (lb)]	Cat. No. With Network Management Card	Approx. Shipping Weight [kg (lb)]
500VA (325 W)	120V AC	**1609-U500NS**	14.5 (31.9)	**1609-U500NSC**	15 (33)
		1609-U500NH	13.4 (29.5)	**1609-U500NHC**	13.9 (30.6)
	208/230V AC	**1609-U500ES**	14.5 (31.9)	**1609-U500ESC**	15 (33)
		1609-U500EH	13.4 (29.5)	**1609-U500EHC**	13.9 (30.6)

Bulletin 1609-P Series — Industrial Uninterruptible Power Supply

- Rugged industrial design
- Tower/rack compatible
- Extended runtime
- Battery management system
- Hot-swappable batteries
- Comprehensive network management
- Remote monitoring/configuration
- Double conversion online
- Pure sine wave output
- Frequency and voltage regulation
- Automatic internal bypass

Certifications

UL Listed (File No. E190749, Guide YEDU)
CSA Certified (File LR1234)

Standards Compliance

UL 1778
CE
CSA C22.2, No. 107
FCC

Table of Contents

The Bulletin 1609-P has multiple options for remote management. Please see page 8-28 for details.

Catalog Number Explanation

1609 – P (*a*) 3000 (*b*) N (*c*)

a

Power Supply Type	
Code	Description
P	Double Conversion Online Uninterruptible Power Supply

b

Rated Output Power	
Code	Description
3000	3000VA (2100 W)
5000	5000VA (3500 W)
8000	8000VA (6400 W)
10000	10000VA (8000 W)

c

Input/Output Voltage	
Code	Description
N	120V AC
E	208/230V AC
A	230V AC

Product Selection

Output Power	Input Voltage	Cat. No.
3000VA (2100 W)	120V AC	**1609-P3000N**
3000VA (2100 W)	230V AC	**1609-P3000A**
5000VA (3500 W)	208/230V AC	1609-P5000E
8000VA (6400 W)	208/230V AC	1609-P8000E
10000VA (8000 W)	208/230V AC	1609-P10000E

Accessories

Description	Cat. No.
Network management card (Standard on units 5 kVA and larger)	**1609-NMC**
Remote start cable	**1609-RSC**
Replacement battery	**1609-PBAT**
External battery pack	1609-PXBP
5000VA CCT (120V step down transformer)	1609-5000CCT
Rail kit	1609-PRK1
Hardware kit (for 3 and 5 kVA units)	**1609-HDK1**
Service bypass switch (16 kVA)	**1609-PSB1**

Electrical Ratings		1609-P3000N	1609-P3000A	1609-P5000E	1609-P8000E	1609-P10000E
Input	V nom. (V AC)	120	230	208/230	208/230	208/230
	Voltage Range, default (V AC)	90…150V	160…280V			
	Current (A)	20 nom., 28 max.	11 nom., 14 max.	19 nom., 24 max.	30 nom., 40 max.	39 nom., 48 max.
	Capacity	3000VA (2100 W)		5000VA (3500 W)	8000VA (6400 W)	10 000VA (8000 W)
	Frequency	45…65 Hz (self sensing)				
	PFC	> 0.95				
	Protection	N/A	N/A	N/A	70 A input circuit breaker	
Output	V nom.	120V	208V			
	Capacity	3000VA (2100 W)		5000VA (3500 W)	8000VA (6400 W)	10 000VA (8000 W)
	Protection	3…15 A circuit breaker			N/A	N/A
On Battery	Frequency	Nominal +/- 3 Hz				
	Reg.	+/- 2% static +/- 5% dynamic	+/- 1% static, +/- 5% dynamic			
	THD	<5% at full load				
	Crest Factor	3:01				
Efficiency	On Battery	86%				
	On Line	88%				
Protection	Surge	IEC 1000-4-4				
	Overload	125% : 1 minute, 150% : 30 seconds				
	Output Short	Input circuit breakers and/or premises branch protection				
	Thermal Protection	Yes				
	Bypass	N/A			70 A input circuit breaker	
Regulatory	Safety	UL 1778, cULus, IEC 60950	EN 61000-3-2	UL 1778, cULus, IEC 60950		
	EMC	FCC (Class A)	EN50091-2	FCC (Class A), EN50091-2		
	Markings	cULus, CSA	CE	cULus, CSA, CE		
Battery Pack	Run Time	14 minutes @ full load, 34 minutes @ half load		5…7 minutes @ full load, 13…18 minutes @ half load		
	Type	Sealed Lead Acid, valve regulated, hot swappable, user replaceable				
	Voltage	192V				
	Charger	Temperature compensated current limited, float charger				
	Recharge Time	Less than 3 hours to 90% capacity	Less than 3 hours to 85% capacity			
	Lifetime	2…4 years @ 25 °C ambient				
Environment	Temperature	0…40 °C (operating), -20…60 °C (short term storage)				
	Altitude	10 000 ft (operating)				
	Humidity	0…95% non-condensing (operating)				
	Heat Output (Full Load)	655 BTU/hour		1040 BTU/hour	1536 BTU/hour	2216 BTU/hour
	Audible Noise	<50 dB @ 1 meter (full load)	<55 dB @ 1 meter (full load)			
Rear Panel	AC Outlets	(6) NEMA 5…15 (2) NEMA 5…20	(8) IEC C13 (2) IEC C19		(12) IEC C13 (2) IEC C19	
	AC Inlets	NEMA L5…30	IEC C14	IEC C20	3 position terminal blocks	
Communication	DB9	Serial and Contact Closures				
	EPO	Via Contact Closure				
	Network	Via Network Management Card (1609-NMC, provided as standard with units >3 KVA)				
Indicators and Controls	LED Status	On-line, In Bypass Mode, On Battery, Overload and Replace Battery, Fault, Bar graph for Load, Bar graph for Battery Fuel Gauge, Bar graph for Measured Input Voltage when recessed switch is held				
	Control	(Front panel) On/self-test/alarm silence/cold start/load off				
	Audible	On Battery: 4 short beeps repeats about 20 seconds (mutable), Low Battery: persistent 0.5 second beep every 1 second (mutable), In Bypass: continuous beeping, Failure: continuous tone, Replace Battery: occasional on/off change - single beep				

ATTENTION

- Wiring of the UPS should be performed by a qualified electrician. Use appropriate size wires.
- In 230V AC applications, the UPS must be protected with a circuit breaker that complies with European standards for branch rated protection per the country of installation.
- In 208V AC applications, the UPS must be protected by a dual-pole, 10 A branch rated, UL 489 circuit breaker.
- The 120V AC 1609-P3000N has supplementary circuit breaker protection. The unit should be protected by a single-pole, 15 A branch rated, UL 489 circuit breaker.
  Allen-Bradley part number 1492-MCAA115 is suggested.
- **The branch circuit breaker must be off prior to wiring the unit.**

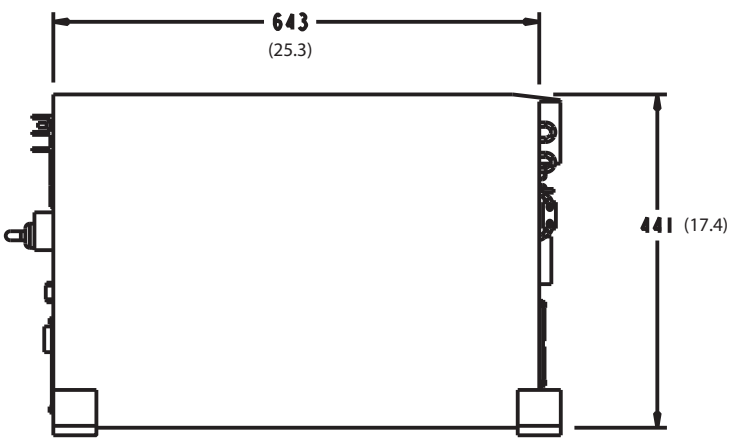
Notes

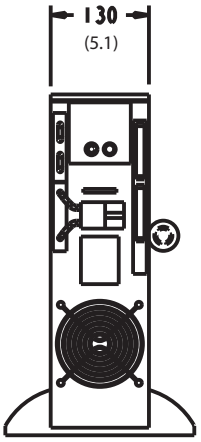
208V AC applications: The 1609-P5000E, 1609-P8000E, and 1609-P10000E, ship ready for 230V AC sources. When operating one of these in 208V AC applications, the UPS low transfer voltage settings are adjusted through the PowerChute® software or the Network Management Card.

Refer to the PowerChute® User Guide or the Network Management Card instructions for details.

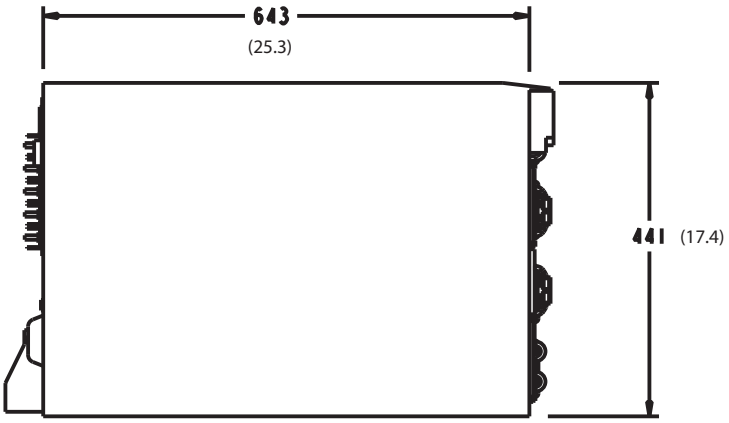
Approximate Dimensions

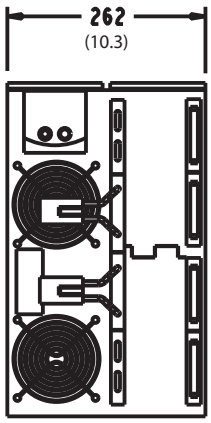
Approximate dimensions are shown in millimeters (in.) unless otherwise indicated. Dimensions are not to be used for manufacturing purposes.





1609-P3000N
1609-P3000H
1609-P3000A
1609-P5000E



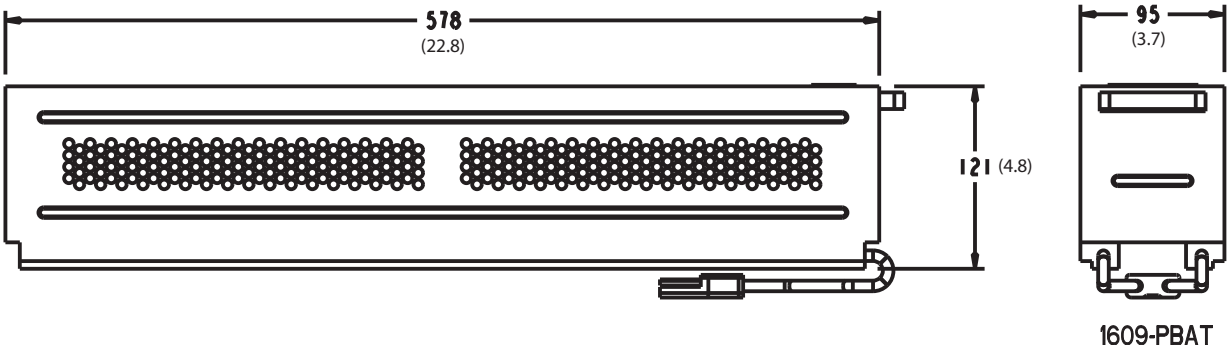


1609-P8000E
1609-P10000E

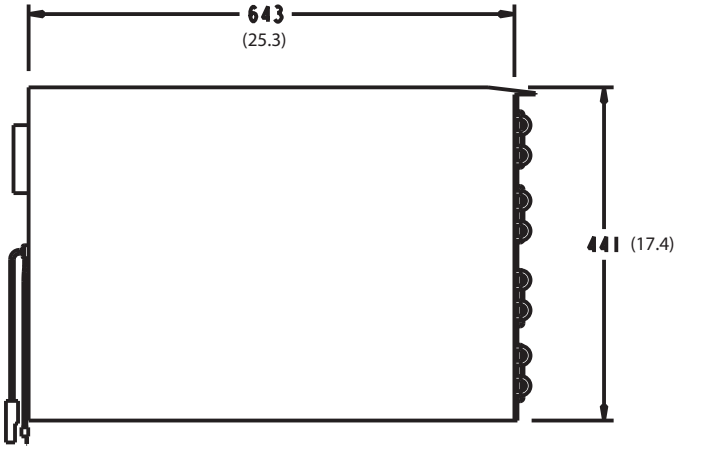
Approximate Shipping Weights

Output Power	Input Voltage	Cat. No.	Approx. Shipping Weight [kg (lb)]
3000VA (2100 W)	120V AC	**1609-P3000N**	63.5 (140)
3000VA (2100 W)	230V AC	**1609-P3000A**	63.5 (140)
5000VA (3500 W)	208/230V AC	1609-P5000E	63.5 (140)
8000VA (6400 W)	208/230V AC	1609-P8000E	128.8 (284)
10000VA (8000 W)	208/230V AC	1609-P10000E	128.8 (284)

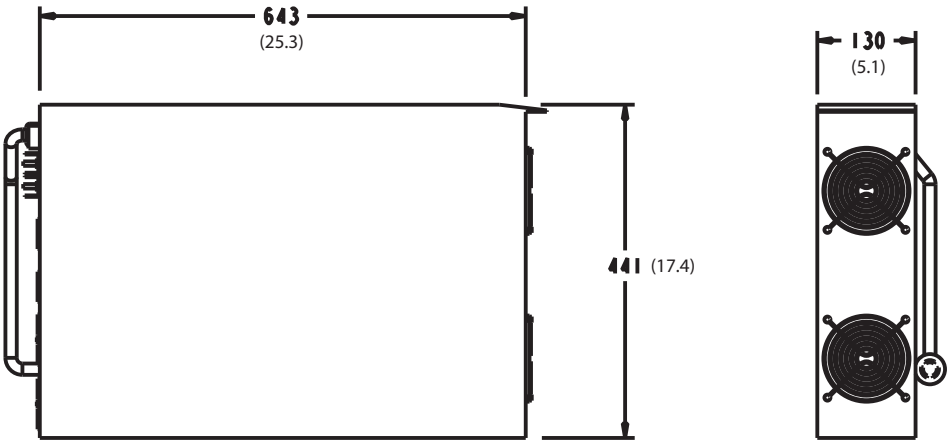
Approximate dimensions are shown in millimeters (in.) unless otherwise indicated. Dimensions are not to be used for manufacturing purposes.



1609-PBAT



1609-PXBP



1609-5000CCT

Approximate Shipping Weights

Description	Cat. No.	Approx. Shipping Weight [kg (lb)]
Replacement battery	**1609-PBAT**	37.2 (82)
External battery pack	1609-PXBP	101.2 (223)
5000VA CCT (120V step down transformer)	1609-5000CCT	63.5 (140)
Rail kit	1609-PRK1	3.6 (8)

Industrial Uninterruptible Power Supply

Overview/Product Selection/Specifications

Bulletin 1609-U — Uninterruptible Power Supply

- Pure sine wave output
- Boost and trim automatic voltage regulation (AVR) provides consistent, clean power by correcting low and high voltage conditions without using the battery
- Intelligent battery management
- USB connectivity and SmartSlot interface
- Comprehensive network management
- Front-access servicing
- Includes:
  CD with software
  Smart UPS signalling
  RS-232 cable
  USB cable

Table of Contents

Standards Compliance

UL 1778
BSMI
CSA C22.2, No. 107
FCC Part 15 Class A

Certifications

UL Listed (File No. E190749, Guide YEDU)
CSA Certified (File LR1234)

Product Selection

Input Voltage	Operating Temperature	Output Power	Cat. No.
120V AC	0…40 °C	750VA (500 W)	**1609-U750N**
		1000VA (670 W)	**1609-U1000N**
		1500VA (980 W)	**1609-U1500N**

Accessories

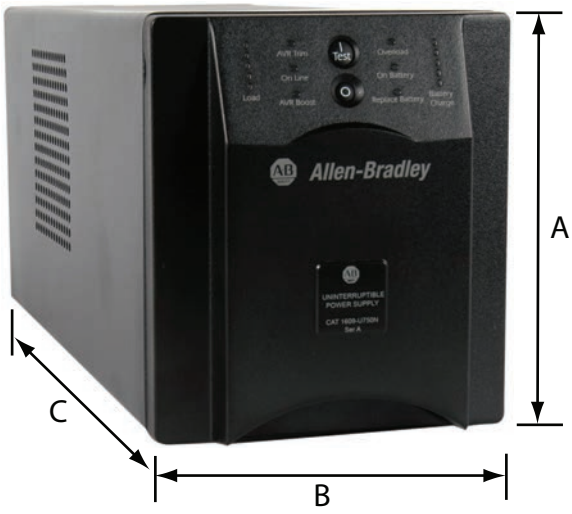
Description	Cat. No.
Network management card	**1609-NMC**
Remote start cable	**1609-RSC**

* The 750, 1000, and 1500 W selections are only available in the 115V AC size (**N**) with a standard battery (**S**). Also if a network management card is desired, it can not be ordered with the product and must be ordered separately. Contact your local Rockwell Automation sales office or Allen-Bradley distributor.

Specifications

Electrical Ratings		1609-U750N	1609-U1000N	1609-U1500N
Input	V nom.	120V		
	Voltage Range, default	82…144V		
	Voltage Range, widest, on line	75…154V		
	Capacity Frequency	50/60 Hz +/- 3 Hz (auto sensing)		
Output	V nom.	120V		
	Capacity	750VA (500 W)	1000VA (670 W)	1500VA (980 W)
	Frequency	47…53 Hz for 50 Hz, nominal 57…63 Hz for 60 Hz, nominal		
	THD	<5% at full load		
	Crest Factor	up to 5:1		
	Output Connections	(6) NEMA 5-15R	(8) NEMA 5-15R	(8) NEMA 5-15R
Protection	Surge Rating	540 J	459 J	459 J
	Filtering	Full time multi-pole noise filtering: 0.3% IEEE surge let-through, zero clamping response time, meets UL 1449		
Regulatory		UL 1778, CSA, BSMI, FCC Part 15 Class A, UL Listed, VCCI	UL 1778, CSA, BSMI, FCC Part 15 Class A	UL 1778, CSA, BSMI, FCC Part 15 Class A
Battery Pack	Typical Run Time, full load	4.6 minutes (500 W)	6.1 minutes (670 W)	6.7 minutes (980 W)
	Typical Run Time, half load	15.9 minutes (250 W)	20.6 minutes (335 W)	23.9 minutes (490 W)
	Type	Maintenance-free, sealed Lead Acid with suspended electrolyte, leakproof		
	Typical Recharge Time	3 hours		
Environment	Temperature	0…40 °C (32…104 °F), operating -15…45 °C (5…113 °F), storage		
	Altitude	0…3000 m (0…10 000 ft), operating		
	Humidity	0…95%, operating		
	Heat Output	90 BTU per hour	100 BTU per hour	135 BTU per hour
	Audible Noise	55 dB @ 1 meter	41 dB @ 1 meter	45 dB @ 1 meter
Communication	Interface Ports	DB9 RS-232, SmartSlot, USB		
	Control Panel	LED status display with load and battery bar graphs and On Line, On Battery, Replace Battery, and Overload indicators		
	EPO	optional		
	Audible Alarm	Alarm when: on battery, distinctive low battery, and configurable delays		

Approximate dimensions are in millimeters (in.) unless otherwise indicated. Dimensions are not to be used for manufacturing purposes.



Output Power [VA (W)]	Height (A)	Width (B)	Depth (C)	Approx. Shipping Weight [kg (lb)]
750 (500)	157 (6.2)	137 (5.4)	358 (14.1)	14.55 (32)
1000 (670)	216 (8.5)	170 (6.7)	439 (17.3)	22 (48.4)
1500 (980)	216 (8.5)	170 (6.7)	439 (17.3)	27 (59.4)

Transformers

				
Bulletin	**1497**	**1497A**	**1497B**	**1497D**
Type	**Control Circuit Transformer**	**Machine Tool Transformer**	**Control Power Transformer**	**General Purpose Transformer**
Features	• Single, dual, and multi-tap primary voltages • Single phase • EN 60-529 finger-safe protection • RoHS compliant • 50/60 Hz, 50 Hz, or 60 Hz • Optional Fusing	• Dual/Multi-tap • RoHS compliant • Single phase • 50/60 Hz • Optional Fusing	• Dual/Multi-tap • RoHS compliant • Single phase • 60 Hz only • Optional Fusing	• Indoor/outdoor non-ventilated enclosure • Single phase • Exceeds requirements of the Uniform Building Code (UBC) and California Code Title 24 • Copper windings provided for all transformers rated 2 kVA and below • Aluminum windings provided for all transformers rated 2 kVA and above • NEMA Type 3R rated enclosures • 50/60 HZ or 60 Hz
Output Power	63…2000VA	50…3000VA	50…3000VA	0.05…25 kVA
Input Voltage/ Primary Voltage	208…600V 220…550 (50 Hz)	208…575V (50/60 Hz)	120…600V	208…600V
Output Voltage/ Secondary Voltage	24…120V 24…230V (50 Hz)	24…120V (50/60 Hz)	24…240V	120…240V
Insulation	63…2000VA — Class 130 °C (55…80 °C temp. rise)	50…150VA — Class 105 °C (55 °C temp. rise) 200…1500VA — Class 130 °C (80 °C temp. rise) 2000…3000VA — Class 180 °C (100 °C temp. rise)		Class 180 °C (115 °C temp. rise)
Certifications	cULus, CE	cULus	cULus	UL, CSA
Standards	CSA C22.2 No. 66.1, EN 61558, UL 5085-1, 5085-2	CSA C22.2 No. 66.1, UL 5085-1, 5085-2	CSA C22.2 No. 66.1, UL 5085-1, 5085-2	CSA C22.2 No. 47 — M90, UL 1561
Product Selection	**Page 8-39**	**Page 8-46**	**Page 8-53**	**Page 8-59**

8

Cat. No. 1497-B-HXJX-3-N Control Circuit Transformer, 3-pole Fuse Block with Optional Cat. No. 1491-R150 Fuse Cover

Cat. No. 1497-C-BASX-0-N Control Circuit Transformer, Non-Fused

Bulletin 1497 — Global Control Circuit Transformers

Bulletin 1497 Global Control Circuit Transformers are designed to reduce supply voltages to control circuits. The complete line of transformers is available with optional factory-installed or panel-mount primary and secondary fuse block. A dual primary and secondary fuse block is pre-wired and mounted on top of the transformer up to 500VA.

- 63…2000VA
- Single, dual, and multi-tap primary voltages
- Single phase
- EN 60-529 finger-safe protection
- RoHS compliant

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Standards Compliance

UL 5085-1, UL 5085-2

EN61558

CSA C22.2 No. 66.1

Certifications

cULus Listed (File No. E52057; Guide No. XPTQ, XPTQ7)
CE

Catalog Number Explanation

Bulletin 1497 Multi-Tap Transformers

1497 – a – b – c – d

a

VA Rating	
Code	Description [VA]
A	63
B	80
C	130
D	200
E	250
F	350
G	500
H	750
J	800
K	1000
L	1600
M	2000

b

Primary and Secondary Voltage		
Code	Primary	Secondary
M1	240V, 208V	120V (60 Hz)
M2	240V, 208V	24V (60 Hz)
M3	240V, 208V	24V, 120V (60 Hz)
M4	415V, 400V, 380V	115X230V (50 Hz)
M5	415V, 400V, 380V	24V (50 Hz)

c

Fuse Block Options§	
Code	Block Options
0	0 Primary, 0 Secondary
1	0 Primary, 1 Secondary
2	2 Primary, 0 Secondary
3	2 Primary, 1 Secondary

d

Factory Installed Options	
Code	Description
N	No Fusing, No Cover

Bulletin 1497 Transformers

1497 – a – BADX – 3 – N

a

VA Rating	
Code	Description [VA]
A	63
B	80
C	130
D	200
E	250
F	350
G	500
H	750
J	800
K	1000
L	1600
M	2000

b

Primary and Secondary Voltage		
Code	Primary	Secondary
HX	208V (60 Hz)	—
AX	240V (60 Hz), 220V (50 Hz)	—
BA∗	240X480V (60 Hz), 220X440V (50 Hz)	—
CX❄	600V (60 Hz), 550V (50 Hz)	—
DX‡	—	120V (60 Hz)
JX	—	24V (60 Hz)
SX	—	120V (60 Hz), 110V (50Hz)
JK	—	24V (50 Hz), 26V (60 Hz)

c

Fuse Block Options§	
Code	Block Options
0	0 Primary, 0 Secondary
1	0 Primary, 1 Secondary
2	2 Primary, 0 Secondary
3	2 Primary, 1 Secondary

d

Factory Installed Options	
Code	Description
N	No Fusing, No Cover

∗ When the primary voltage code **BA** is selected and a 120V AC secondary is desired, the secondary voltage code **SX** should be selected.
❄ VA rating codes **G**, **H**, or **J** with primary voltage over 500V have only cULus approval.
‡ Not available for use with primary voltage code **BA**.
§ VA rating codes **H**…**M** are only available with no fuse block option (**0**).

8

Selecting a Control Circuit Transformer

For proper transformer selection, three characteristics of the load circuit must be determined in addition to the minimum voltage required to operate the circuit. These are total steady-state (sealed) VA, total inrush VA, and inrush load power factor.

- Total steady-state (sealed) VA is the volt-amperes that the transformer must deliver to the load circuit for an extended period of time — the amount of current required to hold the contact in the circuit.
- Total inrush VA is the volt amperes that the transformer must deliver upon initial energization of the control circuit. Energization of electromagnetic devices takes 30…50 milliseconds. During this inrush period, the electromagnetic control devices draw many times normal current — 3…10 times normal is typical.
- Inrush load power factor is difficult to determine without detailed vector analysis of all the load components. Such an analysis is generally not feasible. Therefore, a safe assumption is 40% power factor.

Selection Process

1. Determine the total inrush VA of the control circuits from the table below. Do not neglect the current requirements of indicating lights and other devices that do not have an inrush VA but are re-energized at the same time as the other components in the circuit. Their total VA should be added to the total inrush VA.
2. Refer to the table below, *Regulation Data — Inrush VA*. If the supply circuit voltage (Step 1) is reasonably stable and fluctuates not more than ± 5%, refer to the 90% secondary voltage column. If it fluctuates as much as ± 10%, refer to the 95% secondary voltage column. Go down the column selected until at the inrush VA closest to, but not less than, the inrush VA of the control circuit.
3. Read to the far left side of the chart. The transformer's continuous nominal VA rating is now selected. The secondary voltage that will be delivered under inrush conditions will be either 85%, 90%, or 95% of the rated secondary voltage, depending on the column selected from the table below, *Regulation Data — Inrush VA*. The total sealed VA of the control circuit must not exceed the nominal VA rating of the transformer selected from the table below, *Typical Magnetic Motor Starter and Contactor Data 60 Hz, 120 Volt, 3-Pole*.
4. Refer to the specification tables on the following pages to select a transformer according to the required continuous nominal VA, and primary and secondary voltage combinations.

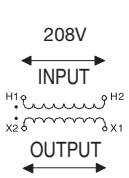
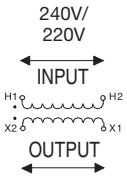
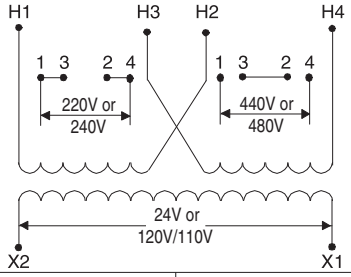
Regulation Data — Inrush VA

Inrush VA at 40% Power Factor				Power Factor Adjustments	
Nominal VA Rating	85%	90%	95%	Power Factor	Multiply By
63	347	289	216	100%	0.64
80	338	290	229	90%	0.67
130	907	745	541	80%	0.71
200	1267	1039	754	70%	0.78
250	1394	1116	781	60%	0.82
350	2870	2298	1584	50%	0.91
500	3786	3013	2065	40%	1.00
750	7360	5763	3786	30%	1.11
800	7360	5763	3786	20%	1.29
1000	8837	6785	4329	10%	1.50
1600	14921	11328	7070	—	—
2000	20500	14850	9100	—	—

Typical Magnetic Motor Starter and Contactor Data 60 Hz, 120 Volt, 3-Pole

	NEMA Size						
Contactor	0	1	2	3	4	5	
Bulletin 500	192	192	240	660	1225	1490	VA Inrush
	29	29	29	45	69	96	VA Sealed

Note: Refer to page 8-40 for information on how to select a control circuit transformer.

	Cat. Nos.					
	Primary 208V (60 Hz)  24V or 120V		Primary 240V (60 Hz)/220V (50 Hz)  24V or 120V/110V		Primary 240X480V (60 Hz) or 220X440V (50 Hz)  	
Continuous VA	Secondary 24V (60 Hz)	Secondary 120V (60 Hz)	Secondary 26V (60 Hz)/ 24V (50 Hz)	Secondary 120V (60 Hz)/ 110V (50 Hz)	Secondary 26V (60 Hz) or 24V (50 Hz)	Secondary 120V (60 Hz) or 110V (50 Hz)
63	**1497-A-HXJX-0-N**	1497-A-HXDX-0-N	1497-A-AXJK-0-N	1497-A-AXSX-0-N	**1497-A-BAJK-0-N**	**1497-A-BASX-0-N**
80	**1497-B-HXJX-0-N**	1497-B-HXDX-0-N	1497-B-AXJK-0-N	1497-B-AXSX-0-N	**1497-B-BAJK-0-N**	**1497-B-BASX-0-N**
130	1497-C-HXJX-0-N	1497-C-HXDX-0-N	1497-C-AXJK-0-N	**1497-C-AXSX-0-N**	**1497-C-BAJK-0-N**	**1497-C-BASX-0-N**
200	**1497-D-HXJX-0-N**	1497-D-HXDX-0-N	1497-D-AXJK-0-N	1497-D-AXSX-0-N	1497-D-BAJK-0-N	**1497-D-BASX-0-N**
250	1497-E-HXJX-0-N	1497-E-HXDX-0-N	1497-E-AXJK-0-N	1497-E-AXSX-0-N	**1497-E-BAJK-0-N**	**1497-E-BASX-0-N**
350	**1497-F-HXJX-0-N**	**1497-F-HXDX-0-N**	1497-F-AXJK-0-N	**1497-F-AXSX-0-N**	1497-F-BAJK-0-N	**1497-F-BASX-0-N**
500	1497-G-HXJX-0-N	1497-G-HXDX-0-N	1497-G-AXJK-0-N	1497-G-AXSX-0-N	1497-G-BAJK-0-N	**1497-G-BASX-0-N**
750	1497-H-HXJX-0-N	**1497-H-HXDX-0-N**	1497-H-AXJK-0-N	1497-H-AXSX-0-N	1497-H-BAJK-0-N	**1497-H-BASX-0-N**
800	1497-J-HXJX-0-N	1497-J-HXDX-0-N	1497-J-AXJK-0-N	1497-J-AXSX-0-N	1497-J-BAJK-0-N	**1497-J-BASX-0-N**
1000	1497-K-HXJX-0-N	**1497-K-HXDX-0-N**	1497-K-AXJK-0-N	1497-K-AXSX-0-N	1497-K-BAJK-0-N	**1497-K-BASX-0-N**
1600	—	1497-L-HXDX-0-N	—	1497-L-AXSX-0-N	—	**1497-L-BASX-0-N**
2000	—	1497-M-HXDX-0-N	—	**1497-M-AXSX-0-N**	—	**1497-M-BASX-0-N**
With 2-Pole Primary and 1-Pole Secondary Top-Mounted Fuse Block ♣ — Fuses Not Included						
63	1497-A-HXJX-3-N	**1497-A-HXDX-3-N**	1497-A-AXJK-3-N	**1497-A-AXSX-3-N**	**1497-A-BAJK-3-N**	**1497-A-BASX-3-N**
80	1497-B-HXJX-3-N	**1497-B-HXDX-3-N**	1497-B-AXJK-3-N	1497-B-AXSX-3-N	**1497-B-BAJK-3-N**	**1497-B-BASX-3-N**
130	1497-C-HXJX-3-N	**1497-C-HXDX-3-N**	1497-C-AXJK-3-N	1497-C-AXSX-3-N	1497-C-BAJK-3-N	**1497-C-BASX-3-N**
200	1497-D-HXJX-3-N	**1497-D-HXDX-3-N**	**1497-D-AXJK-3-N**	1497-D-AXSX-3-N	**1497-D-BAJK-3-N**	**1497-D-BASX-3-N**
250	1497-E-HXJX-3-N	1497-E-HXDX-3-N	1497-E-AXJK-3-N	1497-E-AXSX-3-N	1497-E-BAJK-3-N	**1497-E-BASX-3-N**
350	1497-F-HXJX-3-N	**1497-F-HXDX-3-N**	1497-F-AXJK-3-N	**1497-F-AXSX-3-N**	1497-F-BAJK-3-N	**1497-F-BASX-3-N**
500	1497-G-HXJX-3-N	**1497-G-HXDX-3-N**	1497-G-AXJK-3-N	1497-G-AXSX-3-N	1497-G-BAJK-3-N	**1497-G-BASX-3-N**

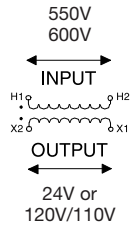
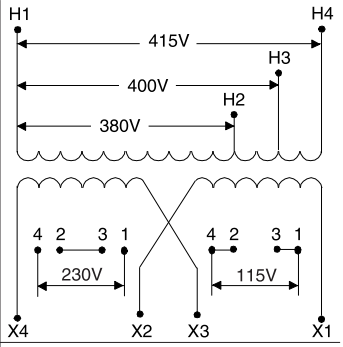
♣ Top-mounted fuse blocks are not available for transformers 750VA and higher.

8

Control Circuit Transformers

Product Selection

Note: Refer to page 8-40 for information on how to select a control circuit transformer.

	Cat. Nos.		
	Primary∗ 600V (60 Hz)/550V (50 Hz) 		Primary 380V, 400V, 415V (50 Hz) 
Continuous VA	Secondary 26V (60 Hz)/24V (50 Hz)	Secondary 120V (60 Hz)/110V (50 Hz)	Secondary 115V/230V (50 Hz)
63	1497-A-CXJK-0-N	**1497-A-CXSX-0-N**	**1497-A-M4-0-N**
80	1497-B-CXJK-0-N	1497-B-CXSX-0-N	**1497-B-M4-0-N**
130	1497-C-CXJK-0-N	1497-C-CXSX-0-N	1497-C-M4-0-N
200	**1497-D-CXJK-0-N**	1497-D-CXSX-0-N	1497-D-M4-0-N
250	1497-E-CXJK-0-N	1497-E-CXSX-0-N	**1497-E-M4-0-N**
350	1497-F-CXJK-0-N	1497-F-CXSX-0-N	**1497-F-M4-0-N**
500	**1497-G-CXJK-0-N**	1497-G-CXSX-0-N	**1497-G-M4-0-N**
750	1497-H-CXJK-0-N	**1497-H-CXSX-0-N**	**1497-H-M4-0-N**
800	1497-J-CXJK-0-N	1497-J-CXSX-0-N	1497-J-M4-0-N
1000	1497-K-CXJK-0-N	1497-K-CXSX-0-N	**1497-K-M4-0-N**
1600	—	1497-L-CXSX-0-N	**1497-L-M4-0-N**
2000	—	1497-M-CXSX-0-N	**1497-M-M4-0-N**
With 2-Pole Primary and 1-Pole Secondary Top-Mounted Fuse Block ♣ — Fuses Not Included			
63	1497-A-CXJK-3-N	**1497-A-CXSX-3-N**	1497-A-M4-3-N
80	1497-B-CXJK-3-N	**1497-B-CXSX-3-N**	**1497-B-M4-3-N**
130	1497-C-CXJK-3-N	**1497-C-CXSX-3-N**	**1497-C-M4-3-N**
200	1497-D-CXJK-3-N	**1497-D-CXSX-3-N**	**1497-D-M4-3-N**
250	1497-E-CXJK-3-N	**1497-E-CXSX-3-N**	**1497-E-M4-3-N**
350	1497-F-CXJK-3-N	**1497-F-CXSX-3-N**	**1497-F-M4-3-N**
500	**1497-G-CXJK-3-N**	**1497-G-CXSX-3-N**	**1497-G-M4-3-N**

∗ Transformers 500…800VA with 500V primary do not carry the CE mark.

♣ Top-mounted fuse blocks are not available for transformers 750VA and higher.

Fuse Sizing Charts

Important: Select the fuse to protect the control circuit conductors in accordance with the National Electrical Code.

Primary Fuse Sizing Chart (When Only Primary Protection is Used)

Maximum Amp Rating for Current Limiting Fuses Based on Transformer Primary Voltage and the National Electrical Code

VA	208V	220V	240V	277V	347V	380V	400V	415V	440V	480V	500V	550V	600V	690V
63	0.75	0.75	0.75	0.5	0.5	0.4	0.4	0.4	0.4	0.25	0.25	0.25	0.25	0.25
80	1	1	1	0.75	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.25
130	1.5	1.5	1.5	1.25	1	1	0.75	0.75	0.75	0.75	0.75	0.5	0.5	0.5
200	2.5	2.5	2.5	2	1.5	1.5	1.5	1.25	1.25	1.25	1	1	1	0.75
250	3	3	3	2.5	2	1.5	1.5	1.5	1.5	1.5	1.5	1.25	1.25	1
350	5	4	4	3	3	2.5	2.5	2.5	2	2	2	1.5	1.5	1.5
500	4	3	3	5	4	3	3	3	3	3	3	2.5	2.5	2
750	6	5	5	4	3	5	5	5	5	4	4	4	3	3
800	6	6	5	4	3	3	3	5	5	5	4	4	4	3
1000	8	7	6	6	4	4	4	4	3	3	3	5	5	4
1600	12	12	11	9	7	7	6	6	6	5	5	4	4	3
2000	12	11	13	12	9	8	8	8	7	6	6	6	5	4

Primary Fuse Sizing Chart (When Primary and Secondary Protection is Used)

Maximum Amp Rating for Current Limiting Fuses Based on Transformer Primary Voltage and the National Electrical Code

VA	208V	220V	240V	277V	347V	380V	400V	415V	440V	480V	500V	550V	600V	690V
63	0.75	0.75	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.25	0.25	0.25
80	1.5	1.5	1.5	1	1	1	1	0.75	0.75	0.75	0.75	0.5	0.5	0.5
130	3	2.5	2.5	2	1.5	1.5	1.5	1.5	1.25	1.25	1.25	1	1	0.75
200	4	4	4	3	2.5	2.5	2.5	2	2	2	2	1.5	1.5	1
250	6	5	5	4	3	3	3	3	2.5	2.5	2.5	2	2	1.5
350	8	7	7	6	5	4	4	4	3	3	3	3	2.5	2.5
500	6	5	5	9	7	6	6	6	5	5	5	4	4	3
750	9	8	7	6	5	9	9	9	8	7	7	6	6	5
800	9	9	8	7	5	5	5	8	8	8	8	7	6	5
1000	12	10	10	9	7	6	6	6	5	5	5	8	8	7
1600	15	15	15	12	11	10	10	9	9	8	8	7	6	5
2000	20	20	20	18	14	12	12	12	10	10	10	9	8	7

Secondary Fuse Sizing Chart

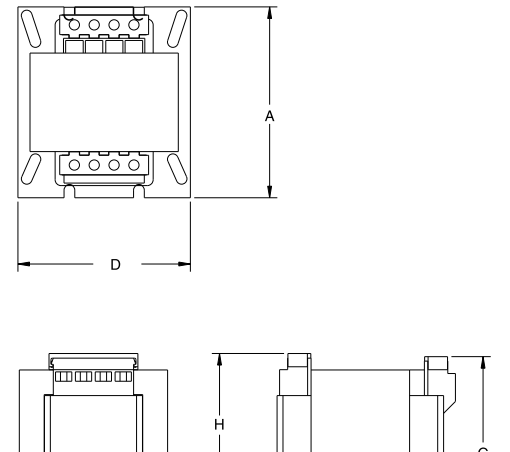
Maximum Amp Rating for Current Limiting Fuses Based on the National Electrical Code

VA	24V	110V	115V	120V	230V
63	4	0.75	0.75	0.75	0.4
80	5	1	1	1	0.5
130	9	1.8	1.8	1.8	0.9
200	13	2.5	2.5	2.5	1.25
250	15	3.2	3.2	3.2	1.5
350	20	4.5	4.5	4.5	2.5
500	30	6.25	6.25	6.25	3
750	45	9	9	9	4.5
800	45	9	9	9	4.5
1000	60	12	12	12	6
1600	100	20	20	20	10
2000	—	25	25	25	12

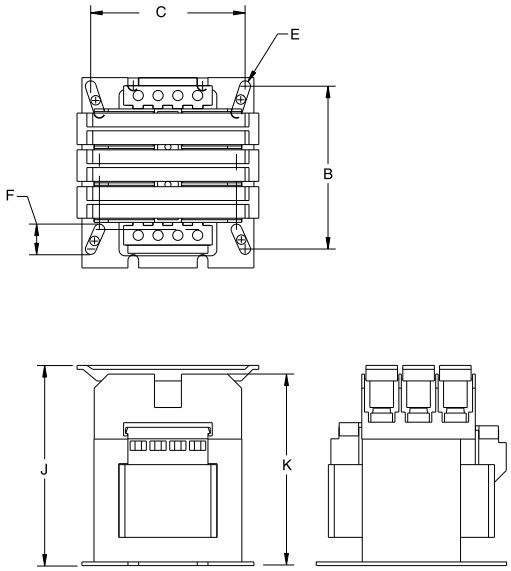
Control Circuit Transformers

Approximate Dimensions

Dimensions are shown in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

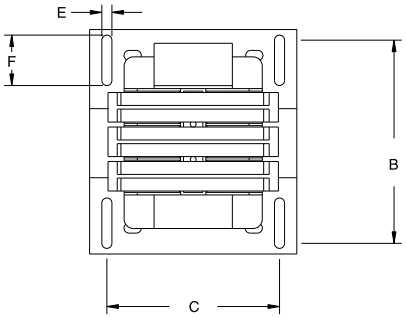


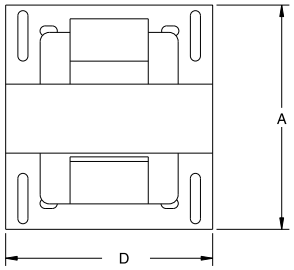
Transformer without Fusing

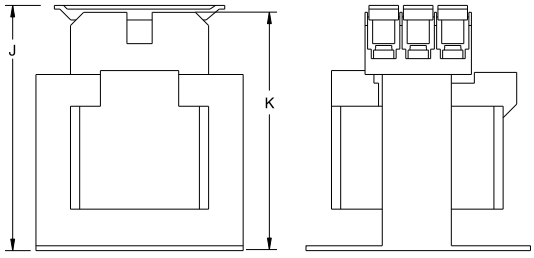


Transformer with Fuse Holder and Covers

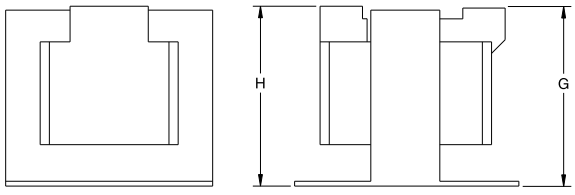
VA	A	B	C	D	E	F	G	H	J	K	Approximate Shipping Wt. — lb (kg)	
											Without Top-Mounted Fuse Block	2-Pole Primary and 1-Pole Secondary Top-Mounted Fuse Block
63	3-7/8 (98.00)	3-1/4 (82.55)	3-1/8 (79.38)	3-1/2 (88.90)	7/32 (5.54)	22/32 (18.29)	2-27/32 (72.39)	2-3/8 (73.91)	4-5/64 (103.51)	3-57/64 (99.01)	4-1/2 (2.04)	4-4/5 (2.18)
80	3-7/8 (98.00)	3-1/4 (82.55)	3-1/8 (79.38)	3-1/2 (88.90)	7/32 (5.54)	22/32 (18.29)	2-27/32 (72.39)	2-3/8 (73.91)	4-5/64 (103.51)	3-57/64 (99.01)	4-1/2 (2.04)	4-4/5 (2.18)
130	3-7/8 (98.00)	3-1/4 (82.55)	3-1/8 (79.38)	3-1/2 (88.90)	7/32 (5.54)	22/32 (18.29)	3-3/8 (85.60)	3-13/32 (86.61)	4-45/64 (119.5)	4-35/64 (115.44)	6-7/10 (3.04)	7-3/20 (3.24)







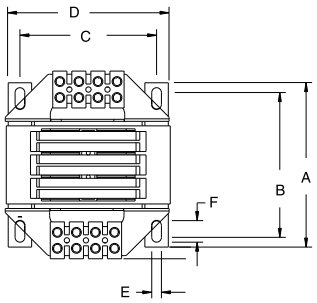
Transformer with Fuse Holder and Covers

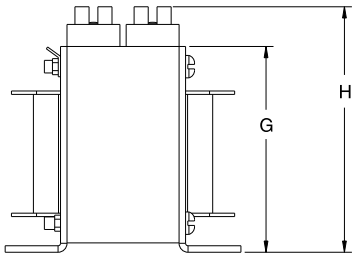


Transformer without Fusing

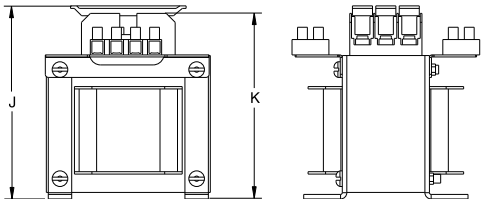
VA	A	B	C	D	E	F	G	H	J	K	Approximate Shipping Wt. — lb (kg)	
											Without Top-Mounted Fuse Block	2-Pole Primary and 1-Pole Secondary Top-Mounted Fuse Block
200	4-7/8 (123.95)	4-7/16 (112.78)	3-3/4 (95.25)	4-1/2 (114.30)	7/32 (5.59)	1-1/8 (28.70)	3-3/8 (85.60)	3-29/32 (86.61)	5-21/64 (135.26)	5-11/64 (131.44)	8-2/5 (3.81)	8-7/10 (3.95)
250	4-7/8 (123.95)	4-7/16 (108.20)	3-3/4 (95.25)	4-1/2 (114.30)	7/32 (5.59)	1-1/8 (28.70)	3-7/8 (98.30)	3-29/32 (98.30)	5-21/64 (135.26)	5-11/64 (131.44)	10-2/5 (4.72)	10-4/5 (4.90)
350	4-7/8 (123.95)	4-7/16 (108.20)	3-3/4 (95.25)	4-1/2 (114.30)	7/32 (5.59)	1-1/8 (28.70)	3-7/8 (98.30)	3-29/32 (98.30)	5-21/64 (135.26)	5-11/64 (131.44)	13-2/5 (6.08)	13-4/5 (6.26)

Dimensions are shown in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.



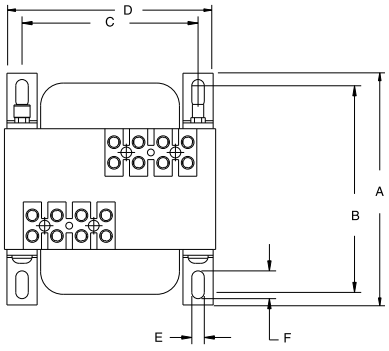


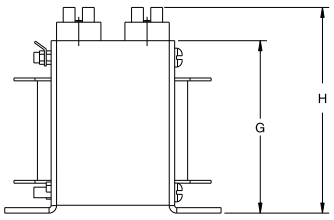
Transformer without Fusing

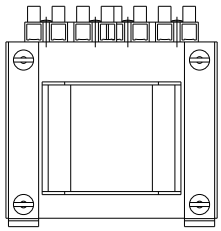


Transformer with Fuse Holder and Covers

VA	A	B	C	D	E	F	G	H	J	K	Approximate Shipping Wt. — lb (kg)	
											Without Top-Mounted Fuse Block	2-Pole Primary and 1-Pole Secondary Top-Mounted Fuse Block
500	5-1/4 (133.35)	4-33/64 (114.81)	4-3/8 (111.25)	5-1/4 (133.35)	5/16 (7.87)	45/64 (18.03)	4-17/32 (114.81)	5-1/2 (139.70)	6-3/16 (156.97)	5-15/16 (150.62)	17-3/5 (7.98)	17-19/20 (8.14)







Transformer without Fusing

VA	A	B	C	D	E	F	G	H	Approximate Shipping Wt. — lb (kg)
									Without Top-Mounted Fuse Block
750	5-3/4 (146.05)	5 (127.51)	4-3/8 (111.25)	5-1/4 (133.35)	5/16 (7.87)	45/64 (18.03)	4-9/16 (114.81)	5-19/32 (137.41)	21-1/2 (9.75)
800	5-3/4 (146.05)	5 (127.51)	4-3/8 (111.25)	5-1/4 (133.35)	5/16 (7.87)	45/64 (18.03)	4-9/16 (114.81)	5-19/32 (137.41)	21-1/2 (9.75)
1000	6-3/8 (161.92)	5-3/8 (136.53)	5-5/16 (134.94)	6-3/8 (161.92)	5/16 (7.87)	45/64 (18.03)	5-33/64 (140.21)	6-1/2 (162.56)	37-1/5 (16.87)
1600	8-1/2 (215.90)	7-1/4 (184.15)	5-3/4 (143.76)	6-3/4 (171.45)	7/16 (10.92)	45/64 (18.03)	5-3/4 (146.05)	7-1/16 (168.66)	50-4/5 (23.04)
2000	9-1/2 (241.30)	8-1/4 (209.55)	5-3/4 (143.76)	6-3/4 (171.45)	7/16 (10.92)	45/64 (18.03)	5-11/64 (149.86)	7-1/16 (172.47)	61 (27.67)

Bulletin 1497A — Machine Tool Transformers

Bulletin 1497A Machine Tool Transformers are designed to reduce supply voltages to control circuits. The complete line of transformers is available with optional factory-installed or panel-mount primary and secondary fuse block/clip.

- 50…3000VA (50/60 Hz)
- RoHS compliant
- Single phase
- Epoxy encapsulated

Table of Contents

Standards Compliance

UL 5085-1, UL 5085-2

CSA C22.2 No. 66.1

Certifications

cULus Listed (File No. E52057; Guide No. XPTQ, XPTQ7)

Catalog Number Explanation

Bulletin 1497A Machine Tool Transformers

1497A – A1 – M6 – 0 – N
a b c d

a

VA Rating	
Code	Description [VA]
A1	50
A2	75
A3	100
A4	150
A5	200
A6	250
A7	300
A8	350
A9	500
A10	750
A11	1000
A12	1500
A13	2000
A14	3000

b

Primary and Secondary Voltage		
Code	Primary	Secondary
M6	220X440V, 230X460V, 240X480V	110, 115, 120V (50/60 Hz)
M7	230/460/575V	115/95V (50/60 Hz)
M8	208/277/380V	115/95V (50/60 Hz)
M18	208/230/480V (50/60 Hz)	120/24V (50/60 Hz)
M19	240X480V (50/60 Hz)	48V (50/60 Hz)

c

Fuse Block Options❄	
Code	Block Options
0	0 Primary, 0 Secondary
1	0 Primary, 1 Secondary
3	2 Primary, 1 Secondary

d

Factory Installed Options	
Code	Description
N	No Taps

Note: For complete list of valid transformer configurations, see Product Selection.
❄ Transformers rated 350VA and below use secondary fuse clips. Transformers rated 500VA and above use secondary fuse blocks.

8

Selecting a Machine Tool Transformer

Selection Process

- Total steady-state (sealed) VA is the volt-amperes that the transformer must deliver to the load circuit for an extended period of time — the amount of current required to hold the contact in the circuit.
- Total inrush VA is the volt amperes that the transformer must deliver upon initial energization of the control circuit. Energization of electromagnetic devices takes 30…50 milliseconds. During this inrush period, the electromagnetic control devices draw many times normal current — 3…10 times normal is typical.
- Inrush load power factor is difficult to determine without detailed vector analysis of all the load components. Such an analysis is generally not feasible. Therefore, a safe assumption is 40% power factor.

For proper transformer selection, three characteristics of the load circuit must be determined in addition to the minimum voltage required to operate the circuit. These are total steady-state (sealed) VA, total inrush VA, and inrush load power factor.

- Total steady-state (sealed) VA is the volt-amperes that the transformer must deliver to the load circuit for an extended period of time — the amount of current required to hold the contact in the circuit.
- Total inrush VA is the volt amperes that the transformer must deliver upon initial energization of the control circuit. Energization of electromagnetic devices takes 30…50 milliseconds. During this inrush period, the electromagnetic control devices draw many times normal current — 3…10 times normal is typical.
- Inrush load power factor is difficult to determine without detailed vector analysis of all the load components. Such an analysis is generally not feasible. Therefore, a safe assumption is 40% power factor.

1. Determine the total inrush VA of the control circuits from the table below. Do not neglect the current requirements of indicating lights and other devices that do not have an inrush VA but are re-energized at the same time as the other components in the circuit. Their total VA should be added to the total inrush VA.
2. Refer to the table below, *Regulation Data — Inrush VA*. If the supply circuit voltage (Step 1) is reasonably stable and fluctuates not more than ± 5%, refer to the 90% secondary voltage column. If it fluctuates as much as ± 10%, refer to the 95% secondary voltage column. Go down the column selected until at the inrush VA closest to, but not less than, the inrush VA of the control circuit.
3. Read to the far left side of the chart. The transformer's continuous nominal VA rating is now selected. The secondary voltage that will be delivered under inrush conditions will be either 85%, 90%, or 95% of the rated secondary voltage, depending on the column selected from the table below, *Regulation Data — Inrush VA*. The total sealed VA of the control circuit must not exceed the nominal VA rating of the transformer selected from the table below.
4. Refer to the specification tables on the following pages to select a transformer according to the required continuous nominal VA, and primary and secondary voltage combinations.

Regulation Data — Inrush VA

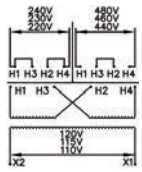
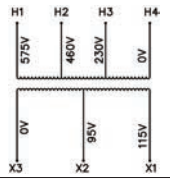
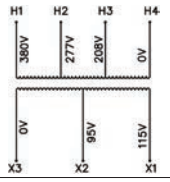
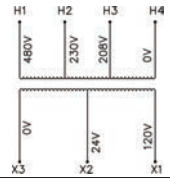
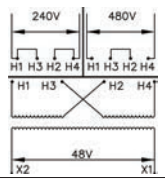
Inrush VA at 40% Power Factor				Power Factor Adjustments	
Nominal VA Rating	85%	90%	95%	Power Factor	Multiply By
50	158	139	116	100%	0.63
75	242	213	177	90%	0.65
100	346	302	249	80%	0.70
150	528	461	379	70%	0.75
200	869	743	585	60%	0.82
250	1057	904	719	50%	0.90
300	1418	1200	937	40%	1.00
350	1620	1361	1047	30%	1.12
500	2681	2221	1648	20%	1.27
750	4560	3718	2700	10%	1.45
1000	7568	6118	4185	—	—
1500	15724	12423	8203	—	—
2000	16941	13660	9484	—	—
3000	25680	20180	13797	—	—

Machine Tool Transformers

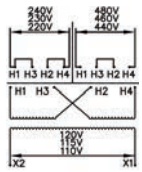
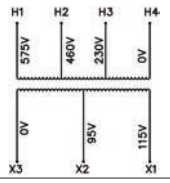
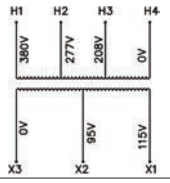
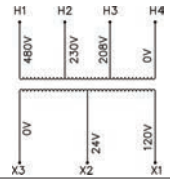
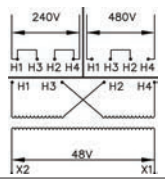
Product Selection

Note: Refer to 8-47 for information on how to select a machine tool transformer.

Transformer without Primary or Secondary Fuse Block/Clip‡

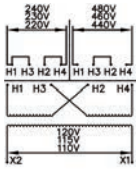
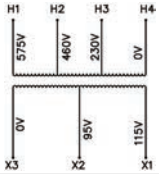
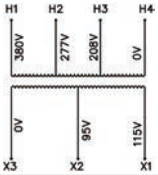
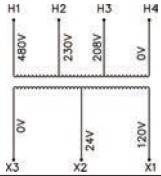
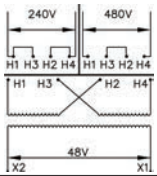
	Cat. Nos.				
	Primary 220x440V, 230x460V, 240x480V (50/60 Hz) 	Primary 230/460/575V (50/60 Hz) 	Primary 208/277/380V (50/60 Hz) 	Primary 208/230/480V (50/60 Hz) 	Primary 240X480V (50/60 Hz) 
Continuous VA	Secondary 110, 115, 120V	Secondary 115/95V	Secondary 115/95V	Secondary 120/24V	Secondary 48V
50	1497A-A1-M6-0-N	1497A-A1-M7-0-N	1497A-A1-M8-0-N	1497A-A1-M18-0-N	1497A-A1-M19-0-N
75	1497A-A2-M6-0-N	1497A-A2-M7-0-N	1497A-A2-M8-0-N	1497A-A2-M18-0-N	1497A-A2-M19-0-N
100	1497A-A3-M6-0-N	1497A-A3-M7-0-N	1497A-A3-M8-0-N	**1497A-A3-M18-0-N**	1497A-A3-M19-0-N
150	**1497A-A4-M6-0-N**	1497A-A4-M7-0-N	1497A-A4-M8-0-N	1497A-A4-M18-0-N	1497A-A4-M19-0-N
200	1497A-A5-M6-0-N	1497A-A5-M7-0-N	1497A-A5-M8-0-N	1497A-A5-M18-0-N	**1497A-A5-M19-0-N**
250	1497A-A6-M6-0-N	1497A-A6-M7-0-N	1497A-A6-M8-0-N	1497A-A6-M18-0-N	1497A-A6-M19-0-N
300	1497A-A7-M6-0-N	1497A-A7-M7-0-N	1497A-A7-M8-0-N	1497A-A7-M18-0-N	**1497A-A7-M19-0-N**
350	1497A-A8-M6-0-N	1497A-A8-M7-0-N	1497A-A8-M8-0-N	1497A-A8-M18-0-N	1497A-A8-M19-0-N
500	**1497A-A9-M6-0-N**	1497A-A9-M7-0-N	1497A-A9-M8-0-N	—	1497A-A9-M19-0-N
750	1497A-A10-M6-0-N	1497A-A10-M7-0-N	1497A-A10-M8-0-N	—	**1497A-A10-M19-0-N**
1000	**1497A-A11-M6-0-N**	1497A-A11-M7-0-N	1497A-A11-M8-0-N	—	1497A-A11-M19-0-N
1500	1497A-A12-M6-0-N	1497A-A12-M7-0-N	1497A-A12-M8-0-N	—	—
2000	**1497A-A13-M6-0-N**	1497A-A13-M7-0-N	1497A-A13-M8-0-N	—	—
3000	**1497A-A14-M6-0-N**	—	—	—	—

Transformer with 1 Secondary Fuse Block/Clip‡

	Cat. Nos.				
	Primary 220x440V, 230x460V, 240x480V (50/60 Hz) 	Primary 230/460/575V (50/60 Hz) 	Primary 208/277/380V (50/60 Hz) 	Primary 208/230/480V (50/60 Hz) 	Primary 240X480V (50/60 Hz) 
Continuous VA	Secondary 110, 115, 120V	Secondary 115/95V	Secondary 115/95V	Secondary 120/24V	Secondary 48V
50	1497A-A1-M6-1-N	1497A-A1-M7-1-N	1497A-A1-M8-1-N	1497A-A1-M18-1-N	1497A-A1-M19-1-N
75	1497A-A2-M6-1-N	1497A-A2-M7-1-N	1497A-A2-M8-1-N	1497A-A2-M18-1-N	1497A-A2-M19-1-N
100	1497A-A3-M6-1-N	1497A-A3-M7-1-N	1497A-A3-M8-1-N	1497A-A3-M18-1-N	1497A-A3-M19-1-N
150	1497A-A4-M6-1-N	1497A-A4-M7-1-N	1497A-A4-M8-1-N	1497A-A4-M18-1-N	1497A-A4-M19-1-N
200	1497A-A5-M6-1-N	1497A-A5-M7-1-N	1497A-A5-M8-1-N	1497A-A5-M18-1-N	1497A-A5-M19-1-N
250	1497A-A6-M6-1-N	1497A-A6-M7-1-N	1497A-A6-M8-1-N	1497A-A6-M18-1-N	1497A-A6-M19-1-N
300	1497A-A7-M6-1-N	1497A-A7-M7-1-N	1497A-A7-M8-1-N	1497A-A7-M18-1-N	1497A-A7-M19-1-N
350	1497A-A8-M6-1-N	1497A-A8-M7-1-N	1497A-A8-M8-1-N	1497A-A8-M18-1-N	1497A-A8-M19-1-N
500	**1497A-A9-M6-1-N**	1497A-A9-M7-1-N	1497A-A9-M8-1-N	—	1497A-A9-M19-1-N
750	**1497A-A10-M6-1-N**	1497A-A10-M7-1-N	1497A-A10-M8-1-N	—	1497A-A10-M19-1-N
1000	1497A-A11-M6-1-N	1497A-A11-M7-1-N	1497A-A11-M8-1-N	—	1497A-A11-M19-1-N
1500	**1497A-A12-M6-1-N**	1497A-A12-M7-1-N	1497A-A12-M8-1-N	—	—
2000	1497A-A13-M6-1-N	1497A-A13-M7-1-N	1497A-A13-M8-1-N	—	—
3000	1497A-A14-M6-1-N	—	—	—	—

‡ Secondary Fuse Block/Clip: Transformers rated 350VA and below use secondary fuse clips. Transformers rated 500VA and above use secondary fuse blocks.

Transformer with 2 Primary and 1 Secondary Fuse Block/Clip‡

	Cat. Nos.				
	Primary 220x440V, 230x460V, 240x480V (50/60 Hz) 	Primary 230/460/575V (50/60 Hz) 	Primary 208/277/380V (50/60 Hz) 	Primary 208/230/480V (50/60 Hz) 	Primary 240X480V (50/60 Hz) 
Continuous VA	Secondary 110, 115, 120V	Secondary 115/95V	Secondary 115/95V	Secondary 120/24V	Secondary 48V
50	**1497A-A1-M6-3-N**	1497A-A1-M7-3-N	1497A-A1-M8-3-N	1497A-A1-M18-3-N	1497A-A1-M19-3-N
75	1497A-A2-M6-3-N	1497A-A2-M7-3-N	1497A-A2-M8-3-N	1497A-A2-M18-3-N	1497A-A2-M19-3-N
100	**1497A-A3-M6-3-N**	1497A-A3-M7-3-N	1497A-A3-M8-3-N	1497A-A3-M18-3-N	1497A-A3-M19-3-N
150	**1497A-A4-M6-3-N**	1497A-A4-M7-3-N	1497A-A4-M8-3-N	1497A-A4-M18-3-N	1497A-A4-M19-3-N
200	**1497A-A5-M6-3-N**	1497A-A5-M7-3-N	1497A-A5-M8-3-N	1497A-A5-M18-3-N	1497A-A5-M19-3-N
250	**1497A-A6-M6-3-N**	1497A-A6-M7-3-N	1497A-A6-M8-3-N	1497A-A6-M18-3-N	1497A-A6-M19-3-N
300	1497A-A7-M6-3-N	1497A-A7-M7-3-N	1497A-A7-M8-3-N	1497A-A7-M18-3-N	1497A-A7-M19-3-N
350	**1497A-A8-M6-3-N**	1497A-A8-M7-3-N	1497A-A8-M8-3-N	1497A-A8-M18-3-N	1497A-A8-M19-3-N
500	**1497A-A9-M6-3-N**	1497A-A9-M7-3-N	1497A-A9-M8-3-N	—	1497A-A9-M19-3-N
750	**1497A-A10-M6-3-N**	1497A-A10-M7-3-N	1497A-A10-M8-3-N	—	1497A-A10-M19-3-N
1000	1497A-A11-M6-3-N	**1497A-A11-M7-3-N**	1497A-A11-M8-3-N	—	1497A-A11-M19-3-N
1500	1497A-A12-M6-3-N	1497A-A12-M7-3-N	1497A-A12-M8-3-N	—	—
2000	1497A-A13-M6-3-N	1497A-A13-M7-3-N	1497A-A13-M8-3-N	—	—
3000	**1497A-A14-M6-3-N**	—	—	—	—

‡ Secondary Fuse Block/Clip: Transformers rated 350VA and below use secondary fuse clips. Transformers rated 500VA and above use secondary fuse blocks.

Fuse Sizing Charts

Important: Select the fuse to protect the control circuit conductors in accordance with the National Electrical Code.

Primary Fuse Sizing Chart (When only primary protection is used)

Maximum Amp Rating for Current Limiting Class C Fuses Based on Transformer Primary Voltage and the National Electrical Code

VA	115V	120V	200V	208V	220V	230V	240V	277V	380V	400V	415V	440V	460V	480V	500V	550V	575V	600V
50	1.25	1.25	0.75	0.6	0.6	0.6	0.6	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.25	0.25	0.25
75	1.8	1.8	1.125	1	1	0.75	0.75	0.75	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3
100	2.5	2.5	1.5	1.4	1.25	1.25	1.25	1	0.75	0.75	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
150	3.5	3.5	2.25	2	2	1.8	1.8	1.6	1.125	1.125	1	1	0.75	0.75	0.75	0.75	0.75	0.75
200	5	5	3	2.8	2.5	2.5	2.5	2	1.5	1.5	1.4	1.25	1.25	1.25	1.125	1	1	1
250	3.5	3.2	3.5	3.5	3.2	3.2	3	2.5	1.8	1.8	1.8	1.6	1.6	1.5	1.5	1.25	1.25	1.25
300	4	4	4.5	4	4	3.5	3.5	3.2	2.25	2.25	2	2	1.8	1.8	1.8	1.6	1.5	1.5
350	5	4.5	5	5	4.5	4.5	4	3.5	2.5	2.5	2.5	2.25	2.25	2	2	1.8	1.8	1.6
500	7	6.25	4	4	3.5	3.5	3.2	5	3.5	3.5	3.5	3.2	3.2	3	3	2.5	2.5	2.5
750	10	10	6.25	6	5.6	5	5	4.5	5.6	5.6	5	5	4.5	4.5	4.5	4	3.5	3.5
1000	12	12	8	8	7	7	6.25	6	4	4	4	3.5	3.5	3.2	3.2	5	5	5
1500	20	15	12	12	10	10	10	9	6.25	6.25	6	5.6	5	5	5	4.5	4	4
2000	20	20	12	12	10	12	12	12	8	8	8	7	7	6.25	6.25	6	5.6	5
3000	30	30	15	15	15	15	15	12	12	12	12	10	10	10	10	9	8	8

Fuse Sizing Charts

Important: Select the fuse to protect the control circuit conductors in accordance with the National Electrical Code.

Primary Fuse Sizing Chart (When only primary protection is used)

Maximum Amp rating for current limiting Class C fuses based on transformer primary voltage and the National Electrical Code

VA	115V	120V	200V	208V	220V	230V	240V	277V	380V	400V	415V	440V	460V	480V	500V	550V	575V	600V
50	1.25	1.25	0.75	0.6	0.6	0.6	0.6	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.25	0.25	0.25
75	1.8	1.8	1.125	1	1	0.75	0.75	0.75	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3
100	2.5	2.5	1.5	1.4	1.25	1.25	1.25	1	0.75	0.75	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
150	3.5	3.5	2.25	2	2	1.8	1.8	1.6	1.125	1.125	1	1	0.75	0.75	0.75	0.75	0.75	0.75
200	5	5	3	2.8	2.5	2.5	2.5	2	1.5	1.5	1.4	1.25	1.25	1.25	1.125	1	1	1
250	3.5	3.2	3.5	3.5	3.2	3.2	3	2.5	1.8	1.8	1.8	1.6	1.6	1.5	1.5	1.25	1.25	1.25
300	4	4	4.5	4	4	3.5	3.5	3.2	2.25	2.25	2	2	1.8	1.8	1.8	1.6	1.5	1.5
350	5	4.5	5	5	4.5	4.5	4	3.5	2.5	2.5	2.5	2.25	2.25	2	2	1.8	1.8	1.6
500	7	6.25	4	4	3.5	3.5	3.2	5	3.5	3.5	3.5	3.2	3.2	3	3	2.5	2.5	2.5
750	10	10	6.25	6	5.6	5	5	4.5	5.6	5.6	5	5	4.5	4.5	4.5	4	3.5	3.5
1000	12	12	8	8	7	7	6.25	6	4	4	4	3.5	3.5	3.2	3.2	5	5	5
1500	20	15	12	12	10	10	10	9	6.25	6.25	6	5.6	5	5	5	4.5	4	4
2000	20	20	12	12	10	12	12	12	8	8	8	7	7	6.25	6.25	6	5.6	5
3000	30	30	15	15	15	15	15	12	12	12	12	10	10	10	10	9	8	8

Primary Fuse Sizing Chart (When primary and secondary protection is used)

Maximum Amp rating for current limiting fuses based on transformer primary voltage and the National Electrical Code

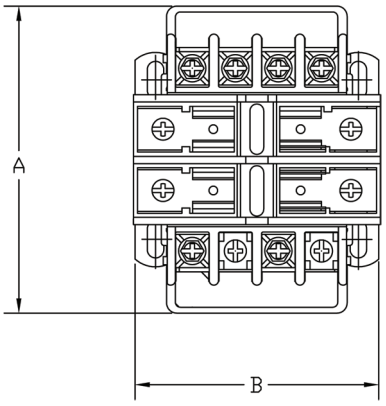
VA	115V	120V	200V	208V	220V	230V	240V	277V	380V	400V	415V	440V	460V	480V	500V	550V	575V	600V
50	1	1	0.6	0.6	0.5	0.5	0.5	0.4	0.3	0.3	0.3	0.25	0.25	0.25	0.25	0.2	0.2	0.2
75	1.6	1.5	0.75	0.75	0.75	0.75	0.75	0.6	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
100	2	2	1.25	1.125	1.125	1	1	0.75	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4
150	3.2	3	1.8	1.8	1.6	1.6	1.5	1.25	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.6	0.6	0.6
200	4	4	2.5	2.25	2	2	2	1.8	1.25	1.25	1.125	1.125	1	1	1	0.75	0.75	0.75
250	5	5	3	3	2.8	2.5	2.5	2.25	1.6	1.5	1.5	1.4	1.25	1.25	1.25	1.125	1	1
300	6.25	6.25	3.5	3.5	3.2	3.2	3	2.5	1.8	1.8	1.8	1.6	1.6	1.5	1.5	1.25	1.25	1.25
350	7	7	4	4	3.5	3.5	3.5	3	2.25	2	2	1.8	1.8	1.8	1.6	1.5	1.5	1.4
500	10	10	6.25	6	5.6	5	5	4.5	3.2	3	3	2.8	2.5	2.5	2.5	2.25	2	2
750	15	15	9	9	8	8	7	6.25	4.5	4.5	4.5	4	4	3.5	3.5	3.2	3.2	3
1000	20	20	12	12	10	10	10	9	6.25	6.25	6	5.6	5	5	5	4.5	4	4
1500	30	30	15	15	15	15	15	12	9	9	9	8	8	7	7	6.25	6.25	6.25
2000	40	40	25	20	20	20	20	15	12	12	12	10	10	10	10	9	8	8
3000	45	45	35	35	30	30	30	25	15	15	15	15	15	15	15	12	12	12

Secondary Fuse Sizing Chart

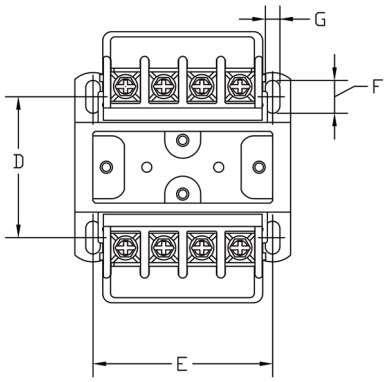
Maximum Amp rating for current limiting midget fuses based on the National Electrical Code

VA	23V	24V	25V	85V	90V	95V	100V	110V	115V	120V	125V	130V	220V	230V	240V
50	3.5	3.2	3.2	0.75	0.75	0.75	0.75	0.75	0.6	0.6	0.6	0.6	0.3	0.3	0.3
75	5	5	5	1.4	1.25	1.25	1.25	1.125	1	1	1	0.75	0.5	0.5	0.5
100	7	6.25	6.25	1.8	1.8	1.6	1.6	1.5	1.4	1.25	1.25	1.25	0.75	0.6	0.6
150	10	10	10	2.8	2.5	2.5	2.5	2.25	2	2	2	1.8	1.125	1	1
200	12	12	12	3.5	3.5	3.5	3.2	3	2.8	2.5	2.5	2.5	1.5	1.4	1.25
250	15	15	15	4.5	4.5	4	4	3.5	3.5	3.2	3.2	3.2	1.8	1.8	1.6
300	20	20	20	5.6	5	5	5	4.5	4	4	4	3.5	2.25	2	2
350	20	20	20	6.25	6.25	6	5.6	5	5	4.5	4.5	4	2.5	2.5	2.25
500	—	—	—	9	9	8	8	7	7	6.25	6.25	6.25	3.5	3.5	3.2
750	—	—	—	12	12	12	12	10	10	10	10	9	5.6	5	5
1000	—	—	—	15	15	15	15	15	12	12	12	12	7	7	6.25
1500	—	—	—	25	25	25	25	20	20	20	20	15	10	10	10
2000	—	—	—	35	35	35	30	30	25	25	25	25	15	12	12
3000	—	—	—	—	—	—	—	45	40	40	40	35	20	20	20

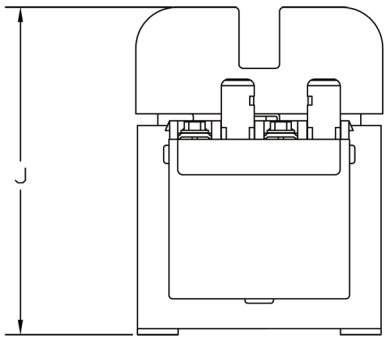
Dimensions are shown in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.



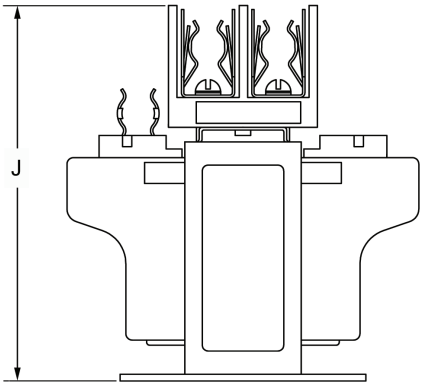
Transformer with 2 Primary Fuse Blocks and 0 or 1 Secondary Fuse Block/Clip (Top View)



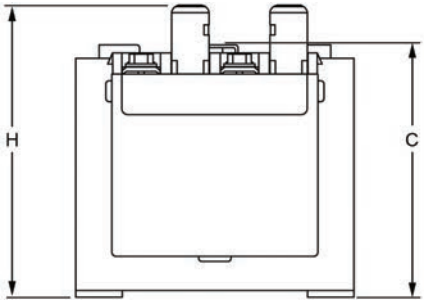
Transformer with 0 Primary Fuse Blocks and 0 or 1 Secondary Fuse Block/Clip (Top View)



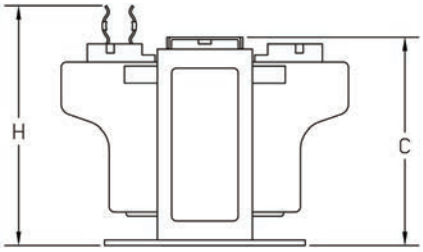
Transformer with 2 Primary Fuse Blocks and 1 Secondary Fuse Block/Clip (Side View)



Transformer with 2 Primary Fuse Blocks and 1 Secondary Fuse Block/Clip (Side View)



Transformer with 0 Primary Fuse Block and Secondary Fuse Block/Clip (Side View)



Transformer with 0 Primary Fuse Blocks and 1 Secondary Fuse Block/Clip (Side View)

VA	Cat. No.	A	B	C	D	E	F	G	H	J	Approx. Shipping Wt. lb (kg)
50	1497A-A1-M6-__-N	3-25/32 (96)	3 (76)	2-23/32 (69)	1-31/32 (50)	2-1/2 (64)	15/32 (12)	1/5 (5)	3-9/64 (80)	4-1/32 (102)	3 (1.4)
	1497A-A1-M7-__-N	4-1/32 (102)			2-1/5 (56)						4 (1.8)
	1497A-A1-M8-__-N										
	1497A-A1-M18-__-N	4-17/32 (115)			2-53/64 (72)						4 (1.8)
	1497A-A1-M19-__-N	3-25/32 (96)			1-31/32 (50)						4 (1.8)
75	1497A-A2-M6-__-N	4-1/32 (102)	3 (76)	2-23/32 (69)	2-27/64 (61)	2-1/2 (64)	15/32 (12)	1/5 (5)	3-9/64 (80)	4-1/32 (102)	4 (1.8)
	1497A-A2-M7-__-N	4-17/32 (115)			2-5/8 (67)						5 (2.3)
	1497A-A2-M8-__-N										
	1497A-A2-M18-__-N		3-3/8 (86)	3-3/64 (77)	3 (76)	2-13/16 (71)			3-15/32 (88)	4-23/64 (110)	5 (2.3)
	1497A-A2-M19-__-N	4-1/32 (102)	3 (76)	2-23/32 (69)	2-27/64 (61)	2-1/2 (64)			3-9/64 (80)	4-1/32 (102)	5 (2.3)
100	1497A-A3-M6-__-N	4 (102)	3-3/8 (86)	3-3/64 (77)	2-27/64 (61)	2-13/16 (71)	15/32 (12)	1/5 (5)	3-15/32 (88)	4-23/64 (110)	5 (2.3)
	1497A-A3-M7-__-N	4-1/16 (103)	3-3/4 (95)	3-23/64 (85)	2-13/16 (71)	3-5/16 (80)			3-49/64 (96)	4-21/32 (118)	6 (2.7)
	1497A-A3-M8-__-N										
	1497A-A3-M18-__-N	4-17/32 (115)			3 (76)						6 (2.7)
	1497A-A3-M19-__-N	4 (102)	3-3/8 (86)	3-3/64 (77)	2-27/64 (61)	2-13/16 (71)			3-15/32 (88)	4-23/64 (110)	6 (2.7)

Machine Tool Transformers

Approximate Dimensions

VA	Cat. No.	A	B	C	D	E	F	G	H	J	Approx. Shipping Wt. lb (kg)
150	1497A-A4-M6-__-N	4-1/16 (103)	3-3/4 (95)	3-23/64 (85)	2-13/16 (71)	3-5/16 (80)	15/32 (12)	1/5 (5)	3-49/64 (96)	4-21/32 (118)	6 (2.7)
	1497A-A4-M7-__-N	4-17/32 (115)			3-3/16 (81)				3-25/32 (96)		7 (3.2)
	1497A-A4-M8-__-N										
	1497A-A4-M18-__-N	5-1/16 (129)							3-49/64 (96)		7 (3.2)
	1497A-A4-M19-__-N	4-1/16 (103)			2-13/16 (71)						7 (3.2)
200	1497A-A5-M6-__-N	4-3/8 (111)	4-1/2 (114)	3-31/32 (101)	2-5/8 (67)	3-3/4 (95)	15/32 (12)	1/5 (5)	4-2/5 (112)	5-9/32 (134)	10 (4.5)
	1497A-A5-M7-__-N										
	1497A-A5-M8-__-N										
	1497A-A5-M18-__-N				2-63/64 (76)						10 (4.5)
	1497A-A5-M19-__-N				2-5/8 (67)						10 (4.5)
250	1497A-A6-M6-__-N	4-3/8 (111)	4-1/2 (114)	3-31/32 (101)	2-53/64 (72)	3-3/4 (95)	15/32 (12)	1/5 (5)	4-2/5 (112)	5-9/32 (134)	10 (4.5)
	1497A-A6-M7-__-N										
	1497A-A6-M8-__-N										
	1497A-A6-M18-__-N	4-3/4 (120)			3-15/32 (88)						10 (4.5)
	1497A-A6-M19-__-N	4-3/8 (111)			2-53/64 (72)						10 (4.5)
300	1497A-A7-M6-__-N	4-3/4 (120)	4-1/2 (114)	3-31/32 (101)	3-3/16 (81)	3-3/4 (95)	15/32 (12)	1/5 (5)	4-2/5 (112)	5-9/32 (134)	12 (5.4)
	1497A-A7-M7-__-N										
	1497A-A7-M8-__-N										
	1497A-A7-M18-__-N	6-7/64 (155)	5-1/4 (133)	4-5/8 (118)	3-7/8 (98)	4-3/8 (111)	1-1/16 (27)	5/16 (8)	4-2/5 (112)	5-15/16 (151)	12 (5.4)
	1497A-A7-M19-__-N	4-3/4 (120)	4-1/2 (114)	3-31/32 (101)	3-3/16 (81)	3-3/4 (95)	15/32 (12)	1/5 (5)	4-2/5 (112)	5-9/32 (134)	12 (5.4)
350	1497A-A8-M6-__-N	4-3/4 (120)	4-1/2 (114)	3-31/32 (101)	3-3/16 (81)	3-3/4 (95)	15/32 (12)	1/5 (5)	4-2/5 (112)	5-9/32 (134)	12 (5.4)
	1497A-A8-M7-__-N	4-63/64 (128)			3-3/4 (95)						14 (6.4)
	1497A-A8-M8-__-N										
	1497A-A8-M18-__-N	6-7/64 (155)	5-1/4 (133)	4-5/8 (118)	3-7/8 (98)	4-3/8 (111)	1-1/16 (27)	5/16 (8)	4-2/5 (112)	5-15/16 (151)	14 (6.4)
	1497A-A8-M19-__-N	4-3/4 (120)	4-1/2 (114)	3-31/32 (101)	3-3/16 (81)	3-3/4 (95)	15/32 (12)	1/5 (5)	4-2/5 (112)	5-9/32 (134)	14 (6.4)
500	1497A-A9-M6-__-N	6-7/64 (155)	5-1/4 (133)	4-5/8 (118)	3-7/8 (98)	4-3/8 (111)	1-1/16 (27)	5/16 (8)	4-2/5 (112)	5-15/16 (151)	19 (8.6)
	1497A-A9-M7-__-N										
	1497A-A9-M8-__-N										18 (8.2)
	1497A-A9-M19-__-N										18 (8.2)
750	1497A-A10-M6-__-N	7-39/64 (193)	5-1/4 (133)	4-5/8 (118)	5-7/8 (149)	4-3/8 (111)	1-1/16 (27)	5/16 (8)	4-2/5 (112)	5-15/16 (151)	28 (12.7)
	1497A-A10-M7-__-N	8-7/64 (206)									32 (14.5)
	1497A-A10-M8-__-N										31 (14.1)
	1497A-A10-M19-__-N	7-39/64 (193)									31 (14.1)
1000	1497A-A11-M6-__-N	7-7/64 (181)	6-3/4 (171)	5-55/64 (149)	4-31/32 (126)	6-1/8 (155)	9/10 (23)	5/16 (8)	4-2/5 (112)	7-3/16 (183)	40 (18.1)
	1497A-A11-M7-__-N										42 (19.1)
	1497A-A11-M8-__-N										41 (18.6)
	1497A-A11-M19-__-N										41 (18.6)
1500	1497A-A12-M6-__-N	8-7/64 (206)	6-3/4 (171)	5-55/64 (149)	6-1/8 (155)	6-1/8 (155)	7/8 (22)	5/16 (8)	4-2/5 (112)	7-3/16 (183)	53 (24)
	1497A-A12-M7-__-N										55 (24.9)
	1497A-A12-M8-__-N										54 (24.5)
2000	1497A-A13-M6-__-N	8-7/64 (206)	6-3/4 (171)	5-55/64 (149)	6-1/8 (155)	6-1/8 (155)	7/8 (22)	5/16 (8)	4-2/5 (112)	7-3/16 (183)	53 (24)
	1497A-A13-M7-__-N	9 (229)									61 (27.7)
	1497A-A13-M8-__-N										58 (26.3)
3000	1497A-A14-M6-__-N	8 (203)	9 (229)	7-41/64 (194)	5-1/4 (133)	7-1/2 (191)	9/10 (23)	7/16 (11)	4-2/5 (112)	8-61/64 (227)	72 (32.7)

Bulletin 1497B — Control Power Transformers

Bulletin 1497B Control Power Transformers are designed to reduce supply voltages to control circuits. The complete line of transformers is available with optional factory-installed or panel-mount primary and secondary fuse block.

- 50…3000VA (60 Hz)
- RoHS compliant
- Single phase
- Epoxy encapsulated

Table of Contents

Standards Compliance

UL 5085-1, UL 5085-2

CSA C22.2 No. 66.1

Certifications

cULus Listed (File No. E52057; Guide No. XPTQ, XPTQ7)

Catalog Number Explanation

Bulletin 1497B Control Power Transformers

1497B – A3 – M11 – 0 – N
a b c d

a

VA Rating	
Code	Description [VA]
A1	50
A2	75
A3	100
A4	150
A5	200
A6	250
A7	300
A9	500
A10	750
A11	1000
A12	1500
A13	2000
A14	3000

b

Primary and Secondary Voltage		
Code	Primary	Secondary
M11	600/575/550V	120X240V (60 Hz)
M12	120X240V	120X240V (60 Hz)
M13	120X240V	24V (60 Hz)
M14	240X480V	120X240V (60 Hz)
M15	380/400/416V	115X230V (60 Hz)
M16	240X480V	24V (60 Hz)
M17	208/240V	24V (60 Hz)

c

Fuse Block Options❄	
Code	Block Options
0	0 Primary, 0 Secondary
1	0 Primary, 1 Secondary
2	2 Primary, 0 Secondary
3	2 Primary, 1 Secondary

d

Factory Installed Options	
Code	Description
N	No Taps

Note: For complete list of valid transformer configurations, see Product Selection.
❄ Transformers rated 350VA and below use secondary fuse clips. Transformers rated 500VA and above use secondary fuse blocks.

8

Selecting a Control Power Transformer

For proper transformer selection, three characteristics of the load circuit must be determined in addition to the minimum voltage required to operate the circuit. These are total steady-state (sealed) VA, total inrush VA, and inrush load power factor.

- Total steady-state (sealed) VA is the volt-amperes that the transformer must deliver to the load circuit for an extended period of time — the amount of current required to hold the contact in the circuit.
- Total inrush VA is the volt amperes that the transformer must deliver upon initial energization of the control circuit. Energization of electromagnetic devices takes 30…50 milliseconds. During this inrush period, the electromagnetic control devices draw many times normal current — 3…10 times normal is typical.
- Inrush load power factor is difficult to determine without detailed vector analysis of all the load components. Such an analysis is generally not feasible. Therefore, a safe assumption is 40% power factor.

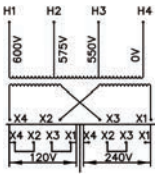
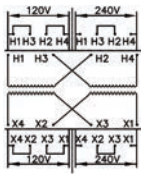
Selection Process

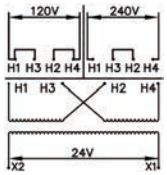
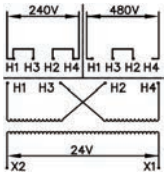
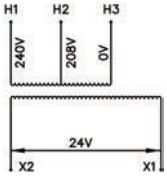
1. Determine the total inrush VA of the control circuits from the table below, *Typical Magnetic Motor Starter and Contactor Data 60 Hz, 120 Volt, 3-Pole*. Do not neglect the current requirements of indicating lights and other devices that do not have an inrush VA but are re-energized at the same time as the other components in the circuit. Their total VA should be added to the total inrush VA.
2. Refer to the table below, *Regulation Data — Inrush VA*. If the supply circuit voltage (Step 1) is reasonably stable and fluctuates not more than ± 5%, refer to the 90% secondary voltage column. If it fluctuates as much as ± 10%, refer to the 95% secondary voltage column. Go down the column selected until at the inrush VA closest to, but not less than, the inrush VA of the control circuit.
3. Read to the far left side of the chart. The transformer's continuous nominal VA rating is now selected. The secondary voltage that will be delivered under inrush conditions will be either 85%, 90%, or 95% of the rated secondary voltage, depending on the column selected from the table below, *Regulation Data — Inrush VA*. The total sealed VA of the control circuit must not exceed the nominal VA rating of the transformer selected from the table below, *Typical Magnetic Motor Starter and Contactor Data 60 Hz, 120 Volt, 3-Pole*.
4. Refer to the specification tables on the following pages to select a transformer according to the required continuous nominal VA, and primary and secondary voltage combinations.

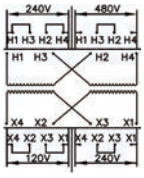
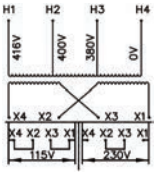
Regulation Data — Inrush VA

Inrush VA at 40% Power Factor				Power Factor Adjustments	
Nominal VA Rating	85%	90%	95%	Power Factor	Multiply By
50	158	139	116	100%	0.63
75	242	213	177	90%	0.65
100	346	302	249	80%	0.70
150	528	461	379	70%	0.75
200	869	743	585	60%	0.82
250	1057	904	719	50%	0.90
300	1418	1200	937	40%	1.00
500	2681	2221	1648	20%	1.27
750	4560	3718	2700	10%	1.45
1000	7568	6118	4185	—	—
1500	15724	12423	8203	—	—
2000	16941	13660	9484	—	—
3000	25680	20180	13797	—	—

Transformers without Fusing Block/Clip

Continuous VA	Primary — 600/575/550V (60 Hz)  Secondary — 120X240V (60 Hz)	Primary — 120x240V (60 Hz)  Secondary — 120X240V (60 Hz)
	Cat. No.	Cat. No.
100	1497B-A3-M11-0-N	1497B-A3-M12-0-N
200	1497B-A5-M11-0-N	1497B-A5-M12-0-N
300	1497B-A7-M11-0-N	1497B-A7-M12-0-N
500	**1497B-A9-M11-0-N**	1497B-A9-M12-0-N
750	—	1497B-A10-M12-0-N
1000	1497B-A11-M11-0-N	1497B-A11-M12-0-N
2000	1497B-A13-M11-0-N	**1497B-A13-M12-0-N**
3000	1497B-A14-M11-0-N	1497B-A14-M12-0-N

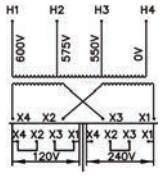
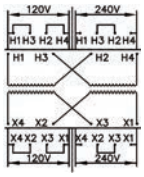
Continuous VA	Primary — 120x240V (60 Hz)  Secondary — 24V (60 Hz)	Primary — 240x480V (60 Hz)  Secondary — 24V (60 Hz)	Primary — 208/240V (60 Hz)  Secondary — 24V (60 Hz)
	Cat. No.	Cat. No.	Cat. No.
50	**1497B-A1-M13-0-N**	1497B-A1-M16-0-N	1497B-A1-M17-0-N
75	1497B-A2-M13-0-N	—	—
100	**1497B-A3-M13-0-N**	1497B-A3-M16-0-N	1497B-A3-M17-0-N
150	1497B-A4-M13-0-N	1497B-A4-M16-0-N	1497B-A4-M17-0-N
200	**1497B-A5-M13-0-N**	—	—
250	1497B-A6-M13-0-N	1497B-A6-M16-0-N	1497B-A6-M17-0-N
300	1497B-A7-M13-0-N	—	—

Continuous VA	Primary — 240x480V (60 Hz)  Secondary — 120X240V (60 Hz)	Primary — 380/400/416V (60 Hz)  Secondary — 115X230V (60 Hz)
	Cat. No.	Cat. No.
100	1497B-A3-M14-0-N	—
150	1497B-A4-M14-0-N	—
200	1497B-A6-M14-0-N	—
500	1497B-A9-M14-0-N	1497B-A9-M15-0-N
750	1497B-A10-M14-0-N	1497B-A10-M15-0-N
1000	1497B-A11-M14-0-N	1497B-A11-M15-0-N
1500	1497B-A12-M14-0-N	**1497B-A12-M15-0-N**
2000	1497B-A13-M14-0-N	1497B-A13-M15-0-N
3000	1497B-A14-M14-0-N	1497B-A14-M15-0-N

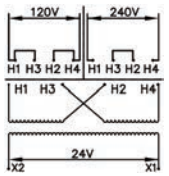
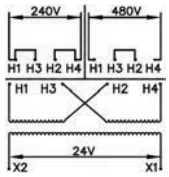
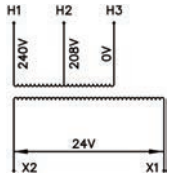
‡ No secondary fusing available

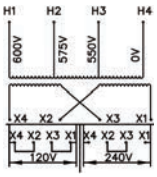
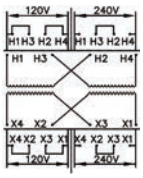
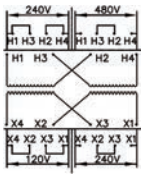
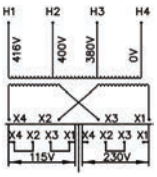
Note: Refer to page 8-54 for information on how to select a control power transformer.

Transformers with 2 Primary and 0 Secondary Fuse Block/Clip‡

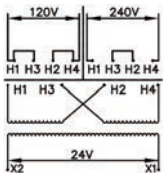
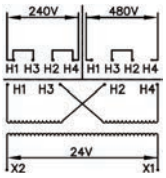
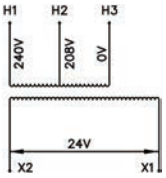
Continuous VA	Primary — 600/575/550V (60 Hz)  Secondary — 120X240V (60 Hz)	Primary — 120x240V (60 Hz)  Secondary — 120X240V (60 Hz)
	Cat. No.	Cat. No.
100	1497B-A3-M11-2-N	1497B-A3-M12-2-N
200	1497B-A5-M11-2-N	1497B-A5-M12-2-N
300	1497B-A7-M11-2-N	1497B-A7-M12-2-N

Transformers with 2 Primary and 1 Secondary Fuse Block/Clip‡

Continuous VA	Primary — 120x240V (60 Hz)  Secondary — 24V (60 Hz)	Primary — 240x480V (60 Hz)  Secondary — 24V (60 Hz)	Primary — 208/240V (60 Hz)  Secondary — 24V (60 Hz)
	Cat. No.	Cat. No.	Cat. No.
50	1497B-A1-M13-3-N	1497B-A1-M16-3-N	1497B-A1-M17-3-N
75	1497B-A2-M13-3-N	—	—
100	1497B-A3-M13-3-N	1497B-A3-M16-3-N	1497B-A3-M17-3-N
150	1497B-A4-M13-3-N	1497B-A4-M16-3-N	1497B-A4-M17-3-N
200	1497B-A5-M13-3-N	—	—
250	1497B-A6-M13-3-N	1497B-A6-M16-3-N	1497B-A6-M17-3-N
300	1497B-A7-M13-3-N	—	—

Continuous VA	Primary — 600/575/550V (60 Hz)  Secondary — 120X240V (60 Hz)	Primary — 120x240V (60 Hz)  Secondary — 120X240V (60 Hz)	Primary — 240x480V (60 Hz)  Secondary — 120X240V (60 Hz)	Primary — 380/400/416V (60 Hz)  Secondary — 115X230V (60 Hz)
	Cat. No.	Cat. No.	Cat. No.	Cat. No.
500	1497B-A9-M11-3-N	1497B-A9-M12-3-N	1497B-A9-M14-3-N	1497B-A9-M15-3-N
750	—	1497B-A10-M12-3-N	1497B-A10-M14-3-N	1497B-A10-M15-3-N
1000	**1497B-A11-M11-3-N**	**1497B-A11-M12-3-N**	1497B-A11-M14-3-N	**1497B-A11-M15-3-N**
1500	—	—	1497B-A12-M14-3-N	1497B-A12-M15-3-N
2000	1497B-A13-M11-3-N	1497B-A13-M12-3-N	**1497B-A13-M14-3-N**	**1497B-A13-M15-3-N**
3000	**1497B-A14-M11-3-N**	**1497B-A14-M12-3-N**	1497B-A14-M14-3-N	1497B-A14-M15-3-N

Transformers with 0 Primary and 1 Secondary Fuse Block/Clip‡

Continuous VA	Primary — 120x240V (60 Hz)  Secondary — 24V (60 Hz)	Primary — 240x480V (60 Hz)  Secondary — 24V (60 Hz)	Primary — 208/240V (60 Hz)  Secondary — 24V (60 Hz)
	Cat. No.	Cat. No.	Cat. No.
50	1497B-A1-M13-1-N	1497B-A1-M16-1-N	1497B-A1-M17-1-N
75	1497B-A2-M13-1-N	—	—
100	1497B-A3-M13-1-N	1497B-A3-M16-1-N	1497B-A3-M17-1-N
150	1497B-A4-M13-1-N	1497B-A4-M16-1-N	1497B-A4-M17-1-N
200	1497B-A5-M13-1-N	—	—
250	1497B-A6-M13-1-N	1497B-A6-M16-1-N	1497B-A6-M17-1-N
300	1497B-A7-M13-1-N	—	—

‡ Secondary Fuse Block/Clip: Transformers rated 350VA and below use secondary fuse clips. Transformers rated 500VA and above use secondary fuse blocks.

8

Fuse Sizing Charts

Important: Select the fuse to protect the control circuit conductors in accordance with the National Electrical Code.

Primary Fuse Sizing Chart (When only primary protection is used)

Maximum Amp rating for current limiting fuses based on transformer primary voltage and the National Electrical Code

VA	115V	120V	200V	208V	220V	230V	240V	277V	380V	400V	415V	440V	460V	480V	500V	550V	575V	600V
50	1.25	1.25	0.75	0.6	0.6	0.6	0.6	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.25	0.25	0.25
75	1.8	1.8	1.125	1	1	0.75	0.75	0.75	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3
100	2.5	2.5	1.5	1.4	1.25	1.25	1.25	1	0.75	0.75	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
150	3.5	3.5	2.25	2	2	1.8	1.8	1.6	1.125	1.125	1	1	0.75	0.75	0.75	0.75	0.75	0.75
200	5	5	3	2.8	2.5	2.5	2.5	2	1.5	1.5	1.4	1.25	1.25	1.25	1.125	1	1	1
250	3.5	3.2	3.5	3.5	3.2	3.2	3	2.5	1.8	1.8	1.8	1.6	1.6	1.5	1.5	1.25	1.25	1.25
300	4	4	4.5	4	4	3.5	3.5	3.2	2.25	2.25	2	2	1.8	1.8	1.8	1.6	1.5	1.5
350	5	4.5	5	5	4.5	4.5	4	3.5	2.5	2.5	2.5	2.25	2.25	2	2	1.8	1.8	1.6
500	7	6.25	4	4	3.5	3.5	3.2	5	3.5	3.5	3.5	3.2	3.2	3	3	2.5	2.5	2.5
750	10	10	6.25	6	5.6	5	5	4.5	5.6	5.6	5	5	4.5	4.5	4.5	4	3.5	3.5
1000	12	12	8	8	7	7	6.25	6	4	4	4	3.5	3.5	3.2	3.2	5	5	5
1500	20	15	12	12	10	10	10	9	6.25	6.25	6	5.6	5	5	5	4.5	4	4
2000	20	20	12	12	10	12	12	12	8	8	8	7	7	6.25	6.25	6	5.6	5
3000	30	30	15	15	15	15	15	12	12	12	12	10	10	10	10	9	8	8

Primary Fuse Sizing Chart (When primary and secondary protection is used)

Maximum Amp rating for current limiting fuses based on transformer primary voltage and the National Electrical Code

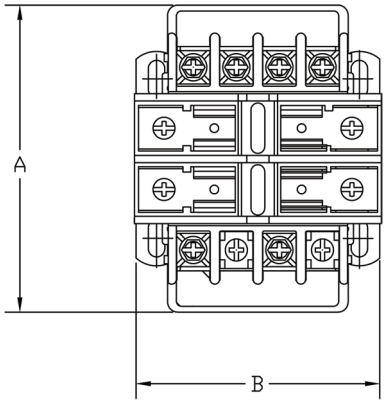
VA	115V	120V	200V	208V	220V	230V	240V	277V	380V	400V	415V	440V	460V	480V	500V	550V	575V	600V
50	1	1	0.6	0.6	0.5	0.5	0.5	0.4	0.3	0.3	0.3	0.25	0.25	0.25	0.25	0.2	0.2	0.2
75	1.6	1.5	0.75	0.75	0.75	0.75	0.75	0.6	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
100	2	2	1.25	1.125	1.125	1	1	0.75	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4
150	3.2	3	1.8	1.8	1.6	1.6	1.5	1.25	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.6	0.6	0.6
200	4	4	2.5	2.25	2	2	2	1.8	1.25	1.25	1.125	1.125	1	1	1	0.75	0.75	0.75
250	5	5	3	3	2.8	2.5	2.5	2.25	1.6	1.5	1.5	1.4	1.25	1.25	1.25	1.125	1	1
300	6.25	6.25	3.5	3.5	3.2	3.2	3	2.5	1.8	1.8	1.8	1.6	1.6	1.5	1.5	1.25	1.25	1.25
350	7	7	4	4	3.5	3.5	3.5	3	2.25	2	2	1.8	1.8	1.8	1.6	1.5	1.5	1.4
500	10	10	6.25	6	5.6	5	5	4.5	3.2	3	3	2.8	2.5	2.5	2.5	2.25	2	2
750	15	15	9	9	8	8	7	6.25	4.5	4.5	4.5	4	4	3.5	3.5	3.2	3.2	3
1000	20	20	12	12	10	10	10	9	6.25	6.25	6	5.6	5	5	5	4.5	4	4
1500	30	30	15	15	15	15	15	12	9	9	9	8	8	7	7	6.25	6.25	6.25
2000	40	40	25	20	20	20	20	15	12	12	12	10	10	10	10	9	8	8
3000	45	45	35	35	30	30	30	25	15	15	15	15	15	15	15	12	12	12

Secondary Fuse Sizing Chart

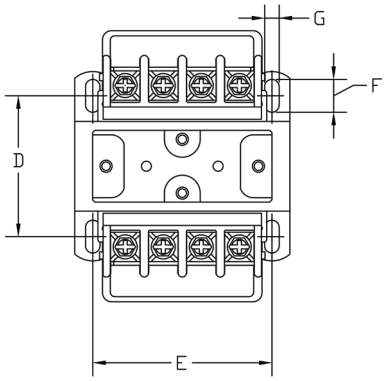
Maximum Amp rating for current limiting fuses based on the National Electrical Code

VA	23V	24V	25V	85V	90V	95V	100V	110V	115V	120V	125V	130V	220V	230V	240V
50	3.5	3.2	3.2	0.75	0.75	0.75	0.75	0.75	0.6	0.6	0.6	0.6	0.3	0.3	0.3
75	5	5	5	1.4	1.25	1.25	1.25	1.125	1	1	1	0.75	0.5	0.5	0.5
100	7	6.25	6.25	1.8	1.8	1.6	1.6	1.5	1.4	1.25	1.25	1.25	0.75	0.6	0.6
150	10	10	10	2.8	2.5	2.5	2.5	2.25	2	2	2	1.8	1.125	1	1
200	12	12	12	3.5	3.5	3.5	3.2	3	2.8	2.5	2.5	2.5	1.5	1.4	1.25
250	15	15	15	4.5	4.5	4	4	3.5	3.5	3.2	3.2	3.2	1.8	1.8	1.6
300	20	20	20	5.6	5	5	5	4.5	4	4	4	3.5	2.25	2	2
350	20	20	20	6.25	6.25	6	5.6	5	5	4.5	4.5	4	2.5	2.5	2.25
500	—	—	—	9	9	8	8	7	7	6.25	6.25	6.25	3.5	3.5	3.2
750	—	—	—	12	12	12	12	10	10	10	10	9	5.6	5	5
1000	—	—	—	15	15	15	15	15	12	12	12	12	7	7	6.25
1500	—	—	—	25	25	25	25	20	20	20	20	15	10	10	10
2000	—	—	—	35	35	35	30	30	25	25	25	25	15	12	12
3000	—	—	—	—	—	—	—	45	40	40	40	35	20	20	20

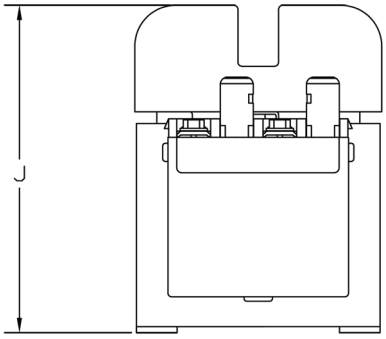
Dimensions are shown in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.



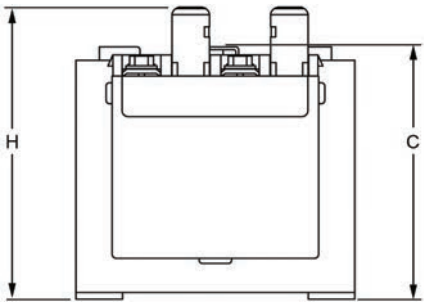
Transformer with 2 Primary Fuse Blocks and 0 or 1 Secondary Fuse Block/Clip
(Top View)



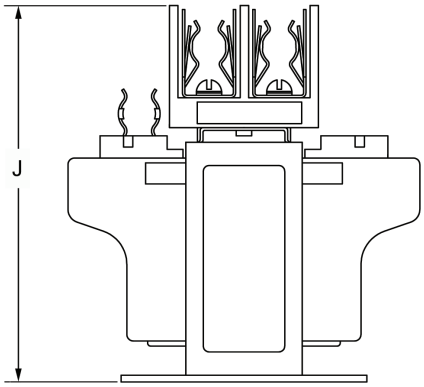
Transformer with 0 Primary Fuse Blocks and 0 or 1 Secondary Fuse Block/Clip
(Top View)



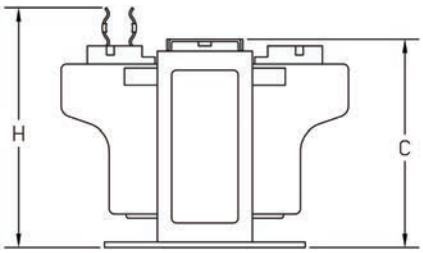
Transformer with 2 Primary Fuse Blocks and 1 Secondary Fuse Block/Clip
(Side View)



Transformer with 0 Primary Fuse Block and 1 Secondary Fuse Block/Clip
(Side View)



Transformer with 2 Primary Fuse Blocks and 1 Secondary Fuse Block/Clip
(Side View)



Transformer with 0 Primary Fuse Blocks and 1 Secondary Fuse Clip
(Side View)

Control Power Transformers

Approximate Dimensions

VA	Cat. No.	A	B	C	D	E	F	G	H	J	Approx. Shipping Wt. lb (kg)
50	**1497B-A1-M13-0-N**	3-25/32 (96)	3 (76)	2-23/32 (69)	1-31/32 (50)	2-1/2 (64)	15/32 (12)	1/5 (5)	3-9/64 (80)	4-1/32 (102)	3 (1.4)
	1497B-A1-M16-0-N										
	1497B-A1-M17-0-N										
75	1497B-A2-M13-0-N	4-1/32 (102)	3 (76)	2-23/32 (69)	2-27/64 (61)	2-1/2 (64)	15/32 (12)	1/5 (5)	3-9/64 (80)	4-1/32 (102)	4 (1.8)
100	1497B-A3-M11-0-N	4-1/16 (103)	3-3/4 (95)	3-23/64 (85)	2-13/32 (61)	3-1/8 (80)	15/32 (12)	1/5 (5)	3-49/64 (96)	4-21/32 (118)	5 (2.3)
	1497B-A3-M12-0-N	4 (102)	3-3/8 (86)	3-3/64 (77)	2-27/64 (61)	2-13/16 (71)			3-15/32 (88)	4-23/64 (110)	
	1497B-A3-M13-0-N										
	1497B-A3-M14-0-N										
	1497B-A3-M16-0-N										
	1497B-A3-M17-0-N										
150	1497B-A4-M13-0-N	4-1/16 (103)	3-3/4 (95)	3-23/64 (85)	2-13/16 (71)	3-5/16 (80)	15/32 (12)	1/5 (5)	3-49/64 (96)	4-21/32 (118)	6 (2.7)
	1497B-A4-M14-0-N										
	1497B-A4-M16-0-N										
	1497B-A4-M17-0-N										
200	1497B-A5-M11-0-N	4-3/8 (111)	4-1/2 (114)	3-31/32 (101)	2-5/8 (67)	3-3/4 (95)	15/32 (12)	1/5 (5)	4-2/5 (112)	5-9/32 (134)	10 (4.5)
	1497B-A5-M12-0-N										
	1497B-A5-M13-0-N										
250	1497B-A6-M13-0-N	4-3/8 (111)	4-1/2 (114)	3-31/32 (101)	2-53/64 (72)	3-3/4 (95)	15/32 (12)	1/5 (5)	4-2/5 (112)	5-9/32 (134)	10 (4.5)
	1497B-A6-M14-0-N										
	1497B-A6-M16-0-N										
	1497B-A6-M17-0-N										
300	1497B-A7-M11-0-N	4-3/4 (120)	4-1/2 (114)	3-31/32 (101)	3-3/16 (81)	3-3/4 (95)	15/32 (12)	1/5 (5)	4-2/5 (112)	5-9/32 (134)	12 (5.4)
	1497B-A7-M12-0-N										
	1497B-A7-M13-0-N										
500	**1497B-A9-M11-0-N**	6-7/64 (155)	5-1/4 (133)	4-5/8 (118)	3-7/8 (98)	4-3/8 (111)	1-1/16 (27)	5/16 (8)	—	5-15/16 (151)	18 (8.2)
	1497B-A9-M12-0-N										
	1497B-A9-M14-0-N										
	1497B-A9-M15-0-N										
750	1497B-A10-M12-0-N	7-39/64 (193)	5-1/4 (133)	4-5/8 (118)	5-7/8 (149)	4-3/8 (111)	1-1/16 (27)	5/16 (8)	—	5-15/16 (151)	28 (12.7)
	1497B-A10-M14-0-N										
	1497B-A10-M15-0-N										
1000	1497B-A11-M11-0-N	7-7/64 (181)	6-3/4 (171)	5-55/64 (149)	4-31/32 (126)	6-1/8 (155)	9/10 (23)	5/16 (8)	—	7-3/16 (183)	40 (18.1)
	1497B-A11-M12-0-N										
	1497B-A11-M14-0-N										
	1497B-A11-M15-0-N										41 (18.6)
1500	1497B-A12-M14-0-N	8-7/64 (206)	6-3/4 (171)	5-55/64 (149)	6-1/8 (155)	6-1/8 (155)	7/8 (22)	5/16 (8)	—	7-3/16 (183)	53 (24)
	1497B-A12-M15-0-N										
2000	1497B-A13-M11-0-N	8-7/64 (206)	6-3/4 (171)	5-55/64 (149)	6-1/8 (155)	6-1/8 (155)	7/8 (22)	5/16 (8)	—	7-3/16 (183)	61 (27.7)
	1497B-A13-M12-0-N										53 (24)
	1497B-A13-M14-0-N	9 (229)									
	1497B-A13-M15-0-N	8-7/64 (206)									
3000	1497B-A14-M11-0-N	8-9/16 (217)	9 (229)	7-41/64 (194)	5-13/16 (148)	7-1/2 (191)	9/10 (23)	7/16 (11)	—	8-61/64 (227)	78 (35.4)
	1497B-A14-M12-0-N										
	1497B-A14-M14-0-N										
	1497B-A14-M15-0-N										

Bulletin 1497D — 1-Phase General Purpose Transformers

Bulletin 1497D General Purpose Transformers are generally used for supplying appliance, lighting, motorized machine, and power loads from electrical distribution systems.

- 0.050…25.0 kVA (60 & 50/60 Hz)
- Indoor/outdoor non-ventilated enclosure
- Single phase
- Resin encapsulated
- Exceeds requirements of the Uniform Building Code (UBC) and California Code Title 24
- Copper windings provided for all transformers rated 2 kVA and below
- Aluminum windings provided for all transformers rated 3 kVA and above
- NEMA Type 3R rated enclosures

Table of Contents

Standards Compliance

CSA C22.2 No. 47 — M90
UL 1561

Certifications

UL Listed (File No. E311296; Guide No. XQNX)
CSA Certified

Your order must include the cat. no. of the control circuit transformer selected.

Catalog Number Explanation

Bulletin 1497D General Purpose Transformers

1497D – A1 – M10 – 0 – N
a b c d

a

VA Rating	
Code	Description [VA]
A1	50
A2	75
A3	100
A4	150
A6	250
A9	500
A10	750
A11	1000
A12	1500
A13	2000
A14	3000
A15	5000
A16	7500
A17	10000
A18	15000
A20	25000

b

Primary and Secondary Voltage		
Code	Primary	Secondary
M10	240X480V	120/240V (60 Hz)
M11	600V	120/240V (60 Hz)
M14	240X480V	120/240V (50/60 Hz)
M20	208V	120/240V (60 Hz)
M21	480V	120/240V (60 Hz)
M22	480V	120/240V (50/60 Hz)
M23	600V	120/240V (50/60 Hz)
M24	480V	208V (60 Hz)

c

Fuse Block Options	
Code	Block Options
0	0 Primary, 0 Secondary

d

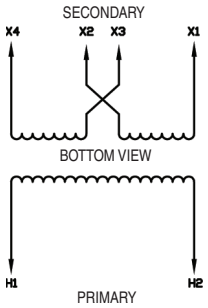
Factory Installed Options	
Code	Description
2	Two 5% taps below rated primary volts
22	2.5% taps: 2 above and 2 below rated primary volts
4	Four 2.5% taps below rated primary volts
N	No taps

Note: For complete list of valid transformer configurations, see Product Selection.

8

208V Primary with No Taps

Secondary — 120/240V



Primary — 208V

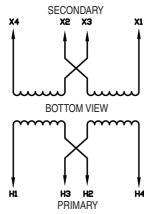
Winding	Voltage Accuracy [V]	Connect	Line
Primary	208	—	H1-H2
Secondary	240	X2-X3	X1-X4
	240/120∗	X2-X3	X1-X3-X4
	120	X1X3-X2X4	X1-X4

∗ Three wire operation

Continuous kVA	Frequency [Hz]	Temp. Rise [°C (°F)]	Cat. No.
0.050	60	115 (239)	1497D-A1-M20-0-N
0.075			1497D-A2-M20-0-N
0.100			1497D-A3-M20-0-N
0.150			1497D-A4-M20-0-N
0.250			1497D-A6-M20-0-N
0.500			1497D-A9-M20-0-N
0.750			1497D-A10-M20-0-N
1.0			1497D-A11-M20-0-N
1.5			1497D-A12-M20-0-N
2.0			1497D-A13-M20-0-N
3.0			1497D-A14-M20-0-N
5.0			1497D-A15-M20-0-N
7.5			1497D-A16-M20-0-N
10.0			1497D-A17-M20-0-N
15.0			1497D-A18-M20-0-N
25.0			1497D-A20-M20-0-N

240x480V Primary with No Taps

Secondary — 120/240V



Primary — 240x480V

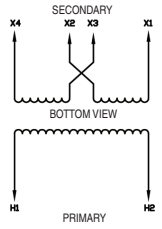
Winding	Voltage Accuracy [V]	Connect	Line
Primary	480	H2-H3	H1-H4
	240	H1H3-H2H4	H1-H4
Secondary	240	X2-X3	X1-X4
	240/120∗	X2-X3	X1-X3-X4
	120	X1X3-X2X4	X1-X4

∗ Three wire operation

Continuous kVA	Frequency [Hz]	Temp. Rise [°C (°F)]	Cat. No.
0.050	60	115 (239)	1497D-A1-M10-0-N
	50/60		1497D-A1-M14-0-N
0.075	60		1497D-A2-M10-0-N
	50/60		1497D-A2-M14-0-N
0.100	60		1497D-A3-M10-0-N
	50/60		1497D-A3-M14-0-N
0.150	60		1497D-A4-M10-0-N
	50/60		1497D-A4-M14-0-N
0.250	60		1497D-A6-M10-0-N
	50/60		1497D-A6-M14-0-N
0.500	60		**1497D-A9-M10-0-N**
	50/60		1497D-A9-M14-0-N
0.750	60		1497D-A10-M10-0-N
	50/60		1497D-A10-M14-0-N
1.0	60		**1497D-A11-M10-0-N**
	50/60		1497D-A11-M14-0-N
1.5	60		1497D-A12-M10-0-N
	50/60		1497D-A12-M14-0-N
2.0	60		1497D-A13-M10-0-N
	50/60		1497D-A13-M14-0-N
3.0	60		**1497D-A14-M10-0-N**
	50/60		1497D-A14-M14-0-N
5.0	60		1497D-A15-M10-0-N
	50/60		1497D-A15-M14-0-N
7.5	60		1497D-A16-M10-0-N
	50/60		1497D-A16-M14-0-N
10.0	60		1497D-A17-M10-0-N
	50/60		1497D-A17-M14-0-N
15.0	60		1497D-A18-M10-0-N
	50/60		1497D-A18-M14-0-N
25.0	60		1497D-A20-M10-0-N
	50/60		1497D-A20-M14-0-N

480V Primary with No Taps

Secondary — 120/240V

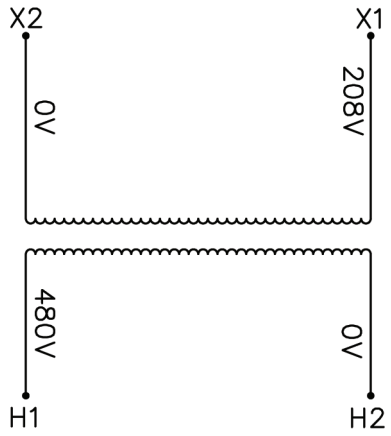


Primary — 480V

Winding	Voltage Accuracy [V]	Connect	Line
Primary	480	—	H1-H2
Secondary	240	X2-X3	X1-X4
	240/120∗	X2-X3	X1-X3-X4
	120	X1X3-X2X4	X1-X4

Continuous kVA	Frequency [Hz]	Temp. Rise [°C (°F)]	Cat. No.
0.050	60	115 (239)	1497D-A1-M21-0-N
0.075			1497D-A2-M21-0-N
0.100			1497D-A3-M21-0-N
0.150			1497D-A4-M21-0-N
0.250			1497D-A6-M21-0-N
0.500			1497D-A9-M21-0-N
0.750			1497D-A10-M21-0-N
1.0			1497D-A11-M21-0-N
1.5			1497D-A12-M21-0-N
2.0			1497D-A13-M21-0-N
3.0			1497D-A14-M21-0-N
5.0	50/60	115 (239)	1497D-A15-M22-0-N
7.5			1497D-A16-M22-0-N
10.0			1497D-A17-M22-0-N
15.0			1497D-A18-M22-0-N
25.0			1497D-A20-M22-0-N

Secondary — 208V

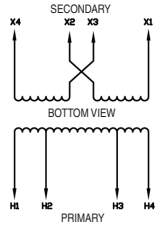


Primary — 480V

Continuous kVA	Frequency [Hz]	Temp. Rise [°C (°F)]	Cat. No.
0.050	60	115 (239)	1497D-A1-M24-0-N
0.075			1497D-A2-M24-0-N
0.100			1497D-A3-M24-0-N
0.150			1497D-A4-M24-0-N
0.250			1497D-A6-M24-0-N
0.500			1497D-A9-M24-0-N
0.750			1497D-A10-M24-0-N
1.0			1497D-A11-M24-0-N
1.5			1497D-A12-M24-0-N
2.0			1497D-A13-M24-0-N
3.0			1497D-A14-M24-0-N
5.0			1497D-A15-M24-0-N
7.5			1497D-A16-M24-0-N
10.0			1497D-A17-M24-0-N
15.0			1497D-A18-M24-0-N
25.0			1497D-A20-M24-0-N

480V Primary with Two 5% Taps Below Rated Primary Volts

Secondary — 120/240V



Primary — 480V

Winding	Voltage Accuracy [V]	Connect	Line
Primary	480	—	H1-H4
	456	—	H2-H4
	432	—	H2-H3
Secondary	240	X2-X3	X1-X4
	240/120∗	X2-X3	X1-X3-X4
	120	X1X3-X2X4	X1-X4

Continuous kVA	Frequency [Hz]	Temp. Rise [°C (°F)]	Tap Quantity	Cat. No.
0.250	50/60	115 (239)	(2) 5% FCBN	1497D-A6-M22-0-2
0.500				1497D-A9-M22-0-2
0.750				1497D-A10-M22-0-2
1.0	60			1497D-A11-M21-0-2
	50/60			1497D-A11-M22-0-2
1.5	60			**1497D-A12-M21-0-2**
	50/60			1497D-A12-M22-0-2
2.0	60			1497D-A13-M21-0-2
	50/60			1497D-A13-M22-0-2
3.0	60			1497D-A14-M21-0-2
	50/60			1497D-A14-M22-0-2
5.0	60			1497D-A15-M21-0-2
7.5				1497D-A16-M21-0-2
10.0				1497D-A17-M21-0-2
15.0				1497D-A18-M21-0-2
25.0				1497D-A20-M21-0-2

∗ Three wire operation

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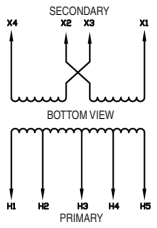
480V Primary with Two 2.5% Taps Above & Two 2.5% Below Rated Primary Volts

Secondary — 120/240V



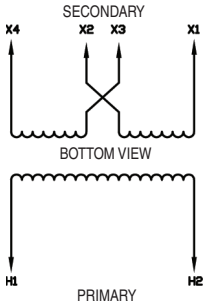
Primary — 480V

Winding	Voltage Accuracy [V]	Connect	Line
Primary	504	—	H1-H5
	492	—	H1-H4
	480	—	H1-H3
	468	—	H2-H4
	456	—	H2-H3
Secondary	240	X2-X3	X1-X4
	240/120∗	X2-X3	X1-X3-X4
	120	X1X3-X2X4	X1-X4

Continuous kVA	Frequency [Hz]	Temp. Rise [°C (°F)]	Tap Quantity	Cat. No.
3.0	60	115 (239)	(2) 2.5% FCAN (2) 2.5% FCBN	1497D-A14-M21-0-22
5.0				1497D-A15-M21-0-22
7.5				1497D-A16-M21-0-22
10.0				1497D-A17-M21-0-22
15.0				1497D-A18-M21-0-22
25.0				1497D-A20-M21-0-22

600V Primary with No Taps

Secondary — 120/240V



Primary — 600V

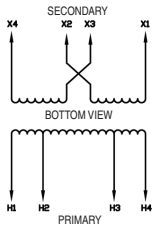
Winding	Voltage Accuracy [V]	Connect	Line
Primary	600	—	H1-H2
Secondary	240	X2-X3	X1-X4
	240/120∗	X2-X3	X1-X3-X4
	120	X1X3-X2X4	X1-X4

∗ Three wire operation

Continuous kVA	Frequency [Hz]	Temp. Rise [°C (°F)]	Cat. No.
0.050	60	115 (239)	1497D-A1-M11-0-N
0.075			1497D-A2-M11-0-N
0.100	60		1497D-A3-M11-0-N
	50/60		1497D-A3-M23-0-N
0.150	60		1497D-A4-M11-0-N
0.250	60		1497D-A6-M11-0-N
	50/60		1497D-A6-M23-0-N
0.500	60		1497D-A9-M11-0-N
	50/60		1497D-A9-M23-0-N
0.750	60		1497D-A10-M11-0-N
	50/60		1497D-A10-M23-0-N
1.0	60		1497D-A11-M11-0-N
1.5			1497D-A12-M11-0-N
2.0			1497D-A13-M11-0-N
3.0			1497D-A14-M11-0-N
5.0			1497D-A15-M11-0-N
7.5			1497D-A16-M11-0-N
10.0			1497D-A17-M11-0-N
15.0			1497D-A18-M11-0-N
25.0			1497D-A20-M11-0-N

600V Primary with Two 5% Taps Below Rated Primary Volts

Secondary — 120/240V



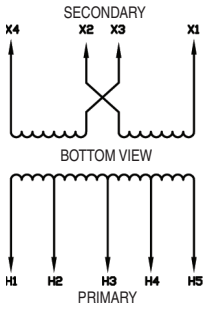
Primary — 600V

Winding	Voltage Accuracy [V]	Connect	Line
Primary	600	—	H1-H2
	570	—	H1-H3
	540	—	H2-H3
Secondary	240	X2-X3	X1-X4
	240/120∗	X2-X3	X1-X3-X4
	120	X1X3-X2X4	X1-X4

Continuous kVA	Frequency [Hz]	Temp. Rise [°C (°F)]	Tap Quantity	Cat. No.
0.250	50/60	115 (239)	(2) 5% FCBN	1497D-A6-M23-0-2
0.500				1497D-A9-M23-0-2
1.0	60			1497D-A11-M11-0-2
	50/60			1497D-A11-M23-0-2
1.5	60			1497D-A12-M11-0-2
2.0				**1497D-A13-M11-0-2**
3.0	60			1497D-A14-M11-0-2
	50/60			1497D-A14-M23-0-2
5.0	60			1497D-A15-M11-0-2
7.5				1497D-A16-M11-0-2
10.0				1497D-A17-M11-0-2

600V Primary with Four 2.5% Taps Below Rated Primary Volts

Secondary — 120/240V



Primary — 600V

Winding	Voltage Accuracy [V]	Connect	Line
Primary	600	—	H1-H5
	585	—	H1-H4
	570	—	H1-H3
	555	—	H2-H4
	540	—	H2-H3
Secondary	240	X2-X3	X1-X4
	240/120∗	X2-X3	X1-X3-X4
	120	X1X3-X2X4	X1-X4

∗ Three wire operation

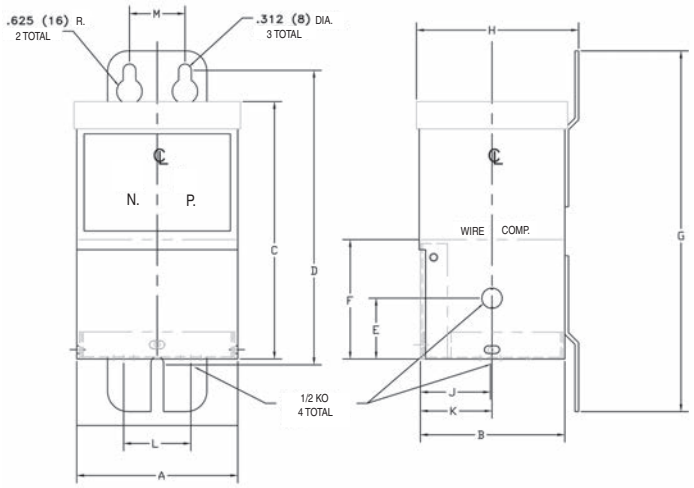
Continuous kVA	Frequency [Hz]	Temp. Rise [°C (°F)]	Tap Quantity	Cat. No.
15.0	60	115 (239)	(4) 2.5% FCBN	1497D-A18-M11-0-4
25.0				1497D-A20-M11-0-4

8

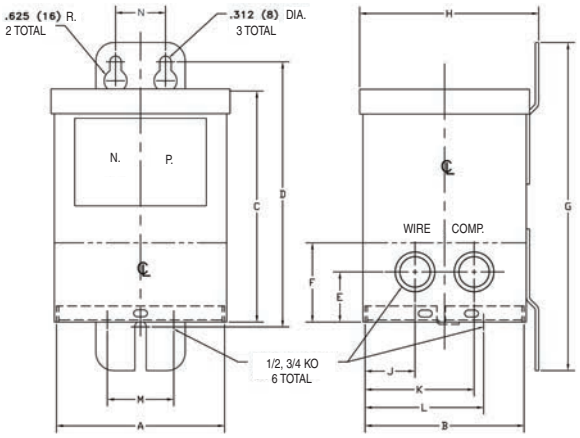
General Purpose Transformers

Approximate Dimensions

Dimensions are shown in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

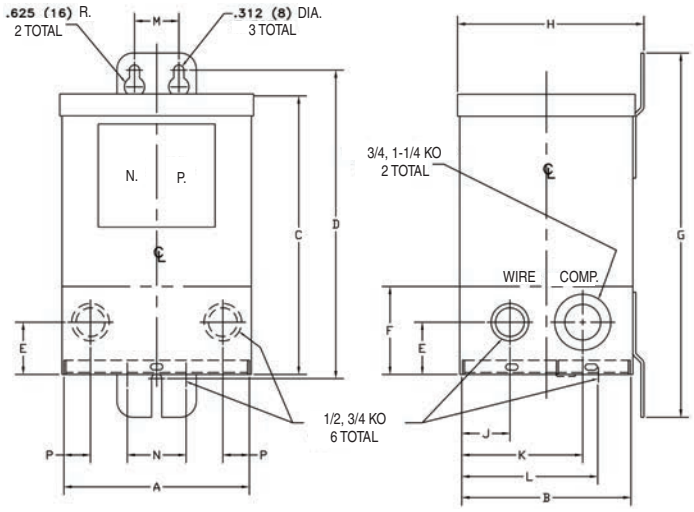


VA (Code)	Primary and Secondary Voltage Code	A	B	C	D	E	F	G	H	J	K	L	M	Approximate Shipping Wt. lb (kg) Copper
50 (A1)	M10, M20, M21, M24	3-31/32 (101)	3-9/16 (90)	6-23/64 (162)	7-17/64 (185)	1-1/2 (38)	2-61/64 (75)	8-29/32 (226)	4 (102)	1-47/64 (44)	1-49/64 (45)	1-2/3 (42)	1-3/8 (35)	8 (4)
	M14	3-31/32 (101)	3-9/16 (90)	6-23/64 (162)	7-3/8 (187)	1-1/2 (38)	2-61/64 (75)	8-29/32 (226)	4 (102)	1-47/64 (44)	1-49/64 (45)	1-2/3 (42)	1-3/8 (35)	8 (4)
	M11	3-31/32 (101)	3-9/16 (90)	6-23/64 (162)	7-17/64 (185)	1-1/2 (38)	2-61/64 (75)	8-29/32 (226)	4 (102)	1-47/64 (44)	1-49/64 (45)	1-2/3 (42)	1-3/8 (35)	8 (4)
75 (A2)	M10, M11, M14, M20, M21, M24	3-31/32 (101)	3-9/16 (90)	6-23/64 (162)	7-17/64 (185)	1-1/2 (38)	2-61/64 (75)	8-29/32 (226)	4 (102)	1-47/64 (44)	1-49/64 (45)	1-2/3 (42)	1-3/8 (35)	8 (4)
100 (A3)	M10, M11, M14, M20, M21, M23, M24	3-31/32 (101)	3-9/16 (90)	6-23/64 (162)	7-17/64 (185)	1-1/2 (38)	2-61/64 (75)	8-29/32 (226)	4 (102)	1-47/64 (44)	1-49/64 (45)	1-2/3 (42)	1-3/8 (35)	8 (4)
150 (A4)	M10, M11, M20, M21, M24	3-31/32 (101)	3-9/16 (90)	6-23/64 (162)	7-17/64 (185)	1-1/2 (38)	2-61/64 (75)	8-29/32 (226)	4 (102)	1-47/64 (44)	1-49/64 (45)	1-2/3 (42)	1-3/8 (35)	8 (4)



VA (Code)	Primary and Secondary Voltage	A	B	C	D	E	F	G	H	J	K	L	M	N	Approximate Shipping Wt. lb (kg) Copper
150 (A4)	M14	4-39/64 (117)	3-33/64 (89)	6-5/16 (160)	7-1/4 (184)	1-3/8 (35)	2-5/32 (55)	8-31/32 (228)	4-1/6 (103)	15/16 (24)	2-9/16 (65)	2-1/2 (64)	1-53/64 (46)	1-3/8 (35)	15 (6)
250 (A6)	M10, M11, M14, M20, M21, M22, M23, M24	4-39/64 (117)	3-33/64 (89)	6-5/16 (160)	7-1/4 (184)	1-3/8 (35)	2-5/32 (55)	8-31/32 (228)	4-1/16 (103)	15/16 (24)	2-9/16 (65)	2-33/64 (64)	1-53/64 (46)	1-3/8 (35)	15 (6)
500 (A9)	M10, M11, M14, M20, M21, M23, M24	4-39/64 (117)	4-23/64 (111)	6-5/16 (160)	7-1/4 (184)	1-3/8 (35)	2-5/32 (55)	8-31/32 (228)	4-29/32 (125)	1-3/8 (35)	3 (76)	3-3/8 (86)	1-53/64 (46)	1-3/8 (35)	16 (7)

Dimensions are shown in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.



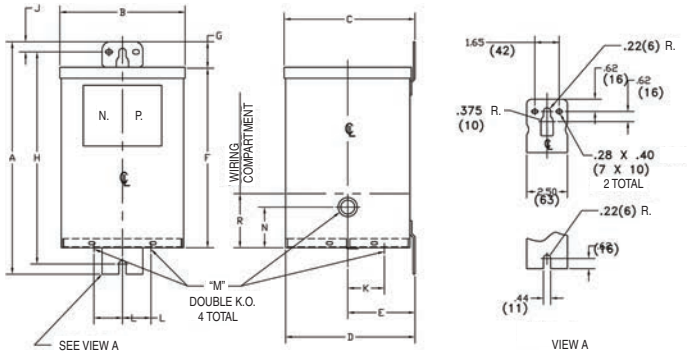
VA (Code)	Primary and Secondary Voltage	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Approximate Shipping Wt. lb (kg) Copper
500 (A9)	M22, M23	5-47/64 (146)	5-15/64 (133)	8-5/8 (219)	9-35/64 (243)	1-5/8 (41)	2-47/64 (69)	11-9/32 (287)	5-3/4 (146)	1-1/2 (38)	3-3/4 (95)	4-1/4 (108)	1-3/8 (35)	1-53/64 (46)	7/8 (22)	24 (11)
750 (A10)	M11, M21	5-47/64 (146)	5-15/64 (133)	8-5/8 (219)	9-35/64 (243)	1-5/8 (41)	2-47/64 (69)	11-9/32 (287)	5-3/4 (146)	1-1/2 (38)	3-3/4 (95)	4-1/4 (108)	1-3/8 (35)	1-53/64 (46)	7/8 (22)	24 (11)
750 (A10)	M10, M14, M20, M22, M23, M24	5-47/64 (146)	5-15/64 (133)	8-5/8 (219)	9-35/64 (243)	1-5/8 (41)	2-47/64 (69)	11-9/32 (287)	5-3/4 (146)	1-1/2 (38)	3-3/4 (95)	4-1/4 (108)	1-3/8 (35)	1-53/64 (46)	7/8 (22)	36 (16)
* 1000 (A11)	M10, M11, M14, M20, M21, M24	5-47/64 (146)	5-15/64 (133)	8-5/8 (219)	9-35/64 (243)	1-5/8 (41)	2-47/64 (69)	11-9/32 (287)	5-3/4 (146)	1-1/2 (38)	3-3/4 (95)	4-1/4 (108)	1-3/8 (35)	1-53/64 (46)	7/8 (22)	36 (16)
1000 (A11)	M22, M23	6-1/10 (155)	6 (152)	10-3/4 (273)	11-49/64 (299)	1-3/4 (44)	3 (76)	13-13/32 (341)	6-33/64 (166)	1-7/8 (48)	4-1/8 (105)	4-53/64 (122)	1-3/8 (35)	1-53/64 (46)	1 (25)	50 (23)
1500 (A12)	M10, M11, M14, M20, M21, M22, M24	6-1/10 (155)	6 (152)	10-3/4 (273)	11-49/64 (299)	1-3/4 (44)	3 (76)	13-13/32 (341)	6-33/64 (166)	1-7/8 (48)	4-1/8 (105)	4-53/64 (122)	1-3/8 (35)	1-53/64 (46)	1 (25)	50 (23)
2000 (A13)	M10, M11, M14, M20, M21, M24	6-1/10 (155)	6 (152)	10-3/4 (273)	11-49/64 (299)	1-3/4 (44)	3 (76)	13-13/32 (341)	6-33/64 (166)	1-7/8 (48)	4-1/8 (105)	4-53/64 (122)	1-3/8 (35)	1-53/64 (46)	1 (25)	50 (23)

* 1" and 1-1/2" knock-outs (two total)

General Purpose Transformers

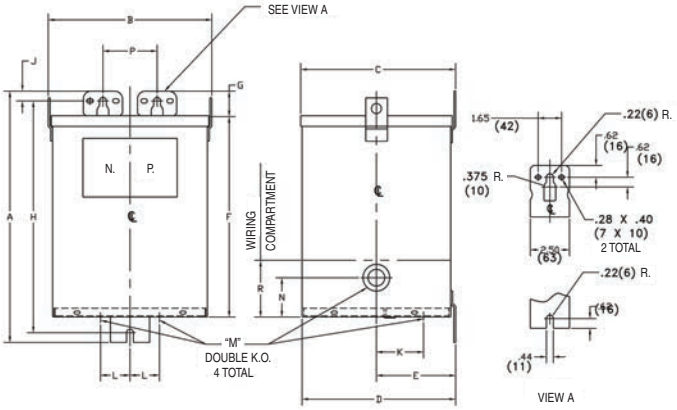
Approximate Dimensions

Dimensions are shown in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.



VA (Code)	Primary and Secondary Voltage	A	B	C	D	E	F	G	H	J	K	L	M	N	R	Approximate Shipping Wt. lb (kg)
‡ 2000 (A13)	M22	14-1/4 (362)	7-11/16 (195)	8 (203)	7-15/16 (202)	4-1/6 (103)	11-1/16 (281)	1-5/8 (41)	13 (330)	5/8 (16)	2-1/4 (57)	1-3/4 (44)	1/2, 3/4 (13, 19)	2-1/2 (64)	3-21/64 (84)	69 (31)
❄ 3000 (A14)	M10, M11, M20, M21, M24	14-1/4 (362)	7-11/16 (195)	8 (203)	7-15/16 (202)	4-1/6 (103)	11-1/16 (281)	1-5/8 (41)	13 (330)	5/8 (16)	2-1/4 (57)	1-3/4 (44)	1/2, 3/4 (13, 19)	2-1/2 (64)	3-21/64 (84)	65 (30)

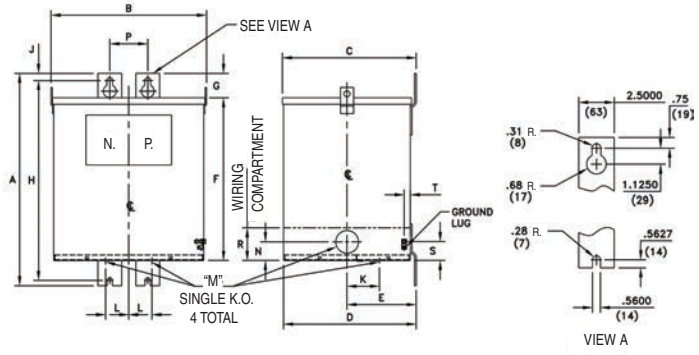
‡ Copper
❄ Aluminum



VA (Code)	Primary and Secondary Voltage	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	Approx. Shipping Wt. lb (kg) Aluminum
3000 (A14)	M14, M22, M23	16 (406)	10-3/8 (264)	9-57/64 (251)	9-4/5 (249)	5-1/6 (129)	12-53/64 (326)	1-5/8 (41)	14-3/4 (375)	5/8 (16)	3 (76)	1-7/8 (48)	3/4, 1-1/4 (19, 32)	3/4, 1-1/4 (19, 32)	3-15/32 (88)	—	3-39/64 (92)	113 (51)
5000 (A15)	M10, M11, M20, M21, M24	16 (406)	10-3/8 (264)	9-57/64 (251)	9-4/5 (249)	5-1/6 (129)	12-53/64 (326)	1-5/8 (41)	14-3/4 (375)	5/8 (16)	3 (76)	1-7/8 (48)	3/4, 1-1/4 (19, 32)	3/4, 1-1/4 (19, 32)	3-15/32 (88)	—	3-39/64 (92)	113 (51)
5000 (A15)	M14, M22	16 (406)	10-3/8 (264)	9-57/64 (251)	9-4/5 (249)	5-1/6 (129)	12-53/64 (326)	1-5/8 (41)	14-3/4 (375)	5/8 (16)	3 (76)	1-7/8 (48)	3/4, 1-1/4 (19, 32)	2-1/2 (64)	3-15/32 (88)	—	3-39/64 (92)	123 (55)
7500 (A16)	M10, M11, M20, M21, M24	16 (406)	10-3/8 (264)	9-57/64 (251)	9-4/5 (249)	5-1/6 (129)	12-53/64 (326)	1-5/8 (41)	14-3/4 (375)	5/8 (16)	3 (76)	1-7/8 (48)	3/4, 1-1/4 (19, 32)	2-1/2 (64)	3-15/32 (88)	—	3-39/64 (92)	123 (55)
7500 (A16)	M14, M22	19 (483)	13-3/8 (340)	10-33/64 (267)	10-15/32 (266)	5-7/6 (138)	15-53/64 (402)	1-5/8 (41)	17-3/4 (451)	5/8 (16)	3-3/8 (86)	1-7/8 (48)	3/4, 1-1/4 (19, 32)	2-1/2 (64)	3-15/32 (88)	1, 1-1/2 (25, 38)	3-3/4 (95)	193 (87)
10000 (A17)	M10, M11, M20, M21, M24	19 (483)	13-3/8 (340)	10-33/64 (267)	10-15/32 (266)	5-7/6 (138)	15-53/64 (402)	1-5/8 (41)	17-3/4 (451)	5/8 (16)	3-3/8 (86)	1-7/8 (48)	3/4, 1-1/4 (19, 32)	2-1/2 (64)	3-15/32 (88)	1, 1-1/2 (25, 38)	3-3/4 (95)	193 (87)
10000 (A17)	M14, M22	19 (483)	13-3/8 (340)	10-33/64 (267)	10-15/32 (266)	5-7/6 (138)	15-53/64 (402)	1-5/8 (41)	17-3/4 (451)	5/8 (16)	3-3/8 (86)	1-7/8 (48)	3/4, 1-1/4 (19, 32)	2-1/2 (64)	3-15/32 (88)	1, 1-1/2 (25, 38)	3-3/4 (95)	216 (98)
15000 (A18)	M10, M11, M20, M21, M22	19 (483)	13-3/8 (340)	10-33/64 (267)	10-15/32 (266)	5-7/6 (138)	15-53/64 (402)	1-5/8 (41)	17-3/4 (451)	5/8 (16)	3-3/8 (86)	1-7/8 (48)	3/4, 1-1/4 (19, 32)	2-1/2 (64)	3-15/32 (88)	1, 1-1/2 (25, 38)	3-3/4 (95)	216 (98)

Dimensions are shown in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

Cat. No. 1491-R150
Fuse Cover without Fuse



VA (Code)	Primary and Secondary Voltage	A	B	C	D	E	F	G	H	J	K	L
15000 (A18)	M14, M22	23-5/16 (592)	16-11/32 (415)	14- 1/8 (359)	14-1/16 (357)	7-25/64 (188)	18-1/16 (459)	2-19/32 (66)	22 (558)	3/4 (19)	3-7/16 (87)	2-7/16 (62)
25000 (A20)	M10, M11, M14, M20, M21, M22, M24	23-5/16 (592)	16-11/32 (415)	14- 1/8 (359)	14-1/16 (357)	7-25/64 (188)	18-1/16 (459)	2-19/32 (66)	22 (558)	3/4 (19)	3-7/16 (87)	2-7/16 (62)

VA (Code)	Primary and Secondary Voltage	M	N	P	R	S	T	Approximate Shipping Wt. lb (kg)
								Aluminum
15000 (A18)	M14, M22	2 (51)	2-7/16 (62)	4 (102)	4-7/16 (113)	2 (51)	21/32 (17)	375 (170)
25000 (A20)	M10, M11, M14, M20, M21, M22, M24	2 (51)	2-7/16 (62)	4 (102)	4-7/16 (113)	2 (51)	21/32 (17)	375 (170)

Fuse Block Kits — For Use when Fuse Block is Not Integrated with the Transformer

Cat. No. 1491-R165
1-Pole Fuse Block

Cat. No. 1491-R167
2-Pole Fuse Block

Cat. No. 1491-R171
3-Pole Fuse Block

Cat. No. 1491-R169
3-Pole Fuse Block

Cat. No. 1491-R150
Fuse Cover without Fuse

8

These control circuit fusing kits are intended to be used for control circuit transformer protection and protection of control circuits capable of delivering no more than 200 000 RMS symmetrical amps, 600V maximum.

Description✶	Cat. No.
Fuse cover — per pole	**1491-R150**
One-pole kit — panel-mounted (midget fuse)❄	**1491-R165**
Two-pole kit — panel-mounted (two Class CC fuses)❄	**1491-R162**
Two-pole kit — panel-mounted (two midget fuses)❄	1491-R167
Three-pole kit — panel-mounted (one midget fuse/two Class CC fuses)❄	1491-R169
Three-pole kit — panel-mounted (three Class CC fuses)❄	**1491-R171**
Single-pole kit — Bulletin 500 line controller mounted (Class CC fuses)‡	**599-FR04**
One-pole kit — panel-mounted (31…60 A Class J fuse)	1491-R173
One-pole kit — panel-mounted (61…100 A Class J fuse)	1491-R175

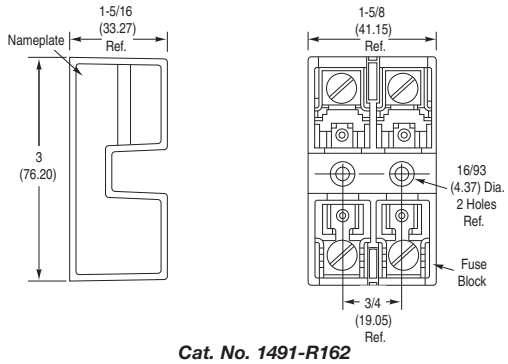
✶ For control circuit transformers with a 350VA or larger rating, it is recommended that Bussmann Type FNQ-R, Ferraz-Shawmut Type ATDR, Littelfuse Type KLDR time delay fuses, or equivalent be used for primary fusing.

❄ These kits use only Class CC or Midget fuses (rated 0.5…30 A) such as those offered by the following manufacturers:
- Bussmann KTK-R
- Ferraz-Shawmut ATM R
- Littelfuse KLK

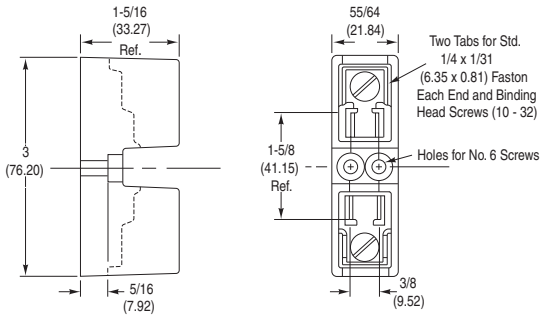
‡ Cat. No. 599-FR04 is rated for 6 A fuse maximum. Controller mounting applies to size 0…5 devices only.

Dimensions are shown in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

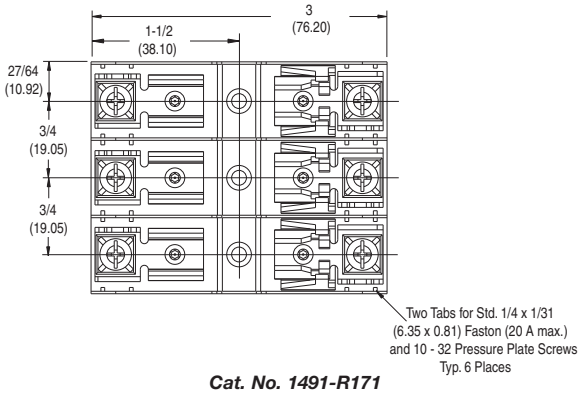
Note: Electrical clearance required to top of fuse block.



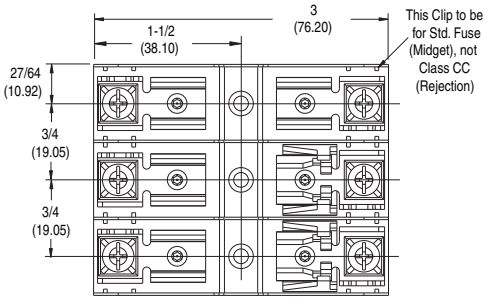
Cat. No. 1491-R162
Cat. No. 1491-R167



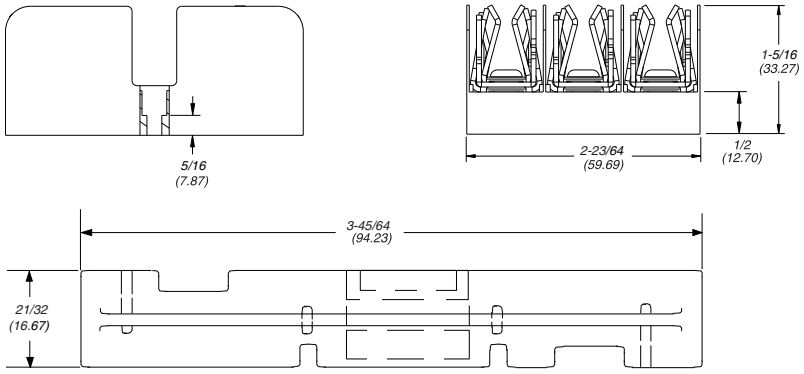
Cat. No. 1491-R165



Cat. No. 1491-R171



Cat. No. 1491-R169



Cat. No. 1491-R150

Powermonitor™ Products

Our Powermonitor products meet the needs of producers and consumers of electric power. These products provide monitoring and control information for substation and distribution centers, electrical control panels, and many utility, commercial, and industrial applications including motor control centers.

The following power management application definitions help explain the advantages of using power monitoring products.

Demand management is a control system designed to minimize electrical demand penalties that can represent up to 30% of a typical industrial utility bill.

Activity-based cost accounting is a management system that allows a customer to allocate energy costs based on actual usage, which is based on sub-metering rather than other measurements such as square footage allocation.

Power control is a control system where electricity is the process output. There is usually on-site generation, emergency load shedding, or a system where a high-quality and stable electric power source is critical to the process.

Power quality is a management system that monitors power quality events or conditions that could cause a production shutdown like voltage sags, brownouts, transients, and high harmonic distortion.

Load profiling is a management system where electrical loads are monitored or profiled. These load profiles let the user prepare for utility deregulation and make fact-based decisions on future demand-side management control systems.

Power Monitoring Product and Features	See Page
Powermonitor™ 3000 (Bulletin 1404) • Compact size • Oscillography, harmonic analysis, and transient detection • Multiple communication options • Various update rates • Configurable logs up to 45000 parameters deep • Time stamp data logging of system measurements and events	8-71, 8-73, and 8-76
Powermonitor™ 1000 (Bulletin 1408) • Compact size • Multiple communication options • Integrated LCD display • Wiring diagnostics • Time of use (on-peak, off-peak) • Integral data logs • Integral web page	8-71, 8-73, and 8-77 8-71, 7-6, and 8-76
PowerPad Portable Powermonitor™ (Bulletin 1412) • Measures true RMS AC voltage, current, and power • Single phase, three phase, and DC • Capture and display harmonics to the 50th order • Capture transients down to 1/256th of a cycle • Waveform and phasor diagram display • Harmonic data including THD, crest factor, K-factor • Time-stamped record of alarms, surges, and sags • Optically isolated RS-232 communication port • Includes software for data storage, analysis, and reports	8-71, 8-74, and 8-77
Current Transformer (Bulletin 1411) • Low voltage (600 V AC) • Metering grade • Variety of types including round, rectangular, and split-core	8-71, 8-75, and 8-78
Power Monitoring Software (Bulletin 9307) • RSEnergyMetrix® • RSPower™	8-71, 8-75, and 8-80
Combination Generator Control Module (Bulletin 1407) • Generator protection • Excitation control • Synchronization control • Full featured metering • Integration with Allen-Bradley ControlLogix family	8-72, 8-75, and 8-80
Capacitor Bank Controller (Bulletin 1413) • PLC-based Capacitor bank control • Power factor correction • Auto or manual step size configuration • Selectable operating modes • Alarms	8-72, and 8-80

Powermonitor 3000 Products (Bulletin 1404)

The Powermonitor 3000 has four versions, the M4, M5, M6, and the M8. The M4 unit provides basic metering including frequency, voltage, current, and power. It also provides calculated information such as energy consumption, power factor, and total harmonic distortion. The unit also has onboard logging capability that can store data, record the min and max of each parameter, and keep an event log.

The M5 offers M4 functionality with flash upgrade capabilities to higher levels. The M6 unit contains all of this functionality in addition to power quality features such as, extensive waveform capture and storage and spectral analysis up to the 41st harmonic. The M8 adds more sophisticated power quality tools, greater speeds, accuracy and captures sub-cycle transients as well as harmonic analysis up to the 63rd harmonic.

For more information, see publication 1404-PP005.*

Powermonitor 1000 Products (Bulletin 1408)

Energy management and understanding energy costs are a major focus today in the manufacturing industry. The Powermonitor 1000 is a cost effective energy monitoring and control solution. The Powermonitor 1000 is perfect for your applications where load profiling, cost allocation, or energy control is required. It can also provide seamless integration to your existing energy monitoring systems where sub-metering is required. The Powermonitor 1000 is available in five models (two transducers, and three energy-monitors), with features and a price point to meet your application.

Transducer models feature the ability to measure voltage, current, and power related tags. Energy monitor models feature the ability to measure consumption related tags such as real, reactive, and apparent energy. The top-of-the-line energy monitor (EM3) provides all the features of both the transducer and energy monitor models.

The Powermonitor 1000 integrates into your existing energy monitoring systems featuring, RSView, RSPower, or RSEnergyMetrix to further enhance the view into energy costs. Your existing Allen-Bradley PLC's (PLC-5®, SLC™, ControlLogix® Family) can also easily communicate to the Powermonitor 1000 to allow energy data to be used in control systems.

For more information, see publication 1408-PP001.*

PowerPad Portable Powermonitor (Bulletin 1412)

Wouldn't it be nice if you could look inside your electrical system and see what's going on? Troubleshooting would be so much easier if you could see the volts, amps, and harmonic content in real time and take pictures to document and analyze. Now you can do just that and more. The full-color graphical display lets you see and analyze each signal clearly. Its high-speed sample rate, at 256 samples per cycle, provides excellent fidelity in reproducing waveforms and capturing transients that happen as fast as 62.5 µs.

4 MB of memory is conveniently partitioned to let you store four different types of data, synchronized or independent of each other. You can store up to 12 screen snapshots, up to 50 captured transients that contain four cycles for each active input, and 4096 alarm events. You can also record trend data for days, weeks, or even months.

Additional sets of three current probes are available, including 240 A, 1200 A, 6 A/120 A clamp-on probes, 24 and 36 in. "rope" 6500 A current probes, and a single 1000 A AC/1400 A DC clamp-on probe.

For more information, see publication 1412-PP001.*

Current Transformers (Bulletin 1411)

The 1411 series is a full line of low-voltage Current Transformers (CTs) for various power measurement devices and applications.

Power measurement devices include protective relays, analog devices, transducers, and power monitors. The purpose of CTs is to scale high currents to more manageable levels, while preserving a reasonable level of accuracy. CTs typically scale the currents flowing through their primaries to 5 amps (full scale) on their secondaries. The majority of power measurement devices are designed to accept this current level.

Bulletin 1411 Current Transformers are available in ratios from 50:5 to 3500:5 in a variety of solid core, split core, and window sizes.

For more information, see publication 1411-SG001.*

Power Monitoring Software

There are three types of power monitoring software:

- **RS**EnergyMetrix® software offers complete energy management for all utilities on a wide area network
- **RS**Power™ and **RS**Power™Plus software offers simple integration of power monitoring information into an existing human machine interface

RSEnergyMetrix (Bulletin 9307-EM)

RSEnergyMetrix is a sophisticated web-enabled, energy management software that puts critical energy information at your desktop.

The RSEnergyMetrix software suite combines data communication, client-server applications, and Microsoft's advanced .NET™ web technology to provide you with a complete energy-management solution.

With RSEnergyMetrix, you can capture, analyze, store, and share energy data across your entire enterprise via a LAN or WAN using a simple web browser. This makes it a snap to distribute the knowledge you need to optimize energy consumption, which can help improve productivity while lowering energy costs.

Features and Benefits:

Scalable — Has the scalability to add components while maintaining your original investments.

- RSEnergyMetrix Manager
- RSEnergyMetrix RT, real-time view and configure
- RSEnergyMetrix 3PX, 3rd-party OPC connectivity
- RSEnergyMetrix ReportsPlus
- RSEnergyMetrix ChartsPlus

Connectivity — Remote connectivity from PC to metering points.

- Connectivity through RSLinx: RS-232, RS-485, Ethernet, DeviceNet, RIO passthru, optical, and modem (RSLinx Lite is included with the manager package)
- Third part connectivity – with 3PX option via OPC

Configuration — RSEnergyMetrix provides easy and flexible configuration.

- Configure water, air, gas, electricity, and steam meters or any energy or production related inputs
- Configure Manual Meters as placeholders in the database for manual data entry
- Configure user defined data sources such as standard PLC-5 or SLC hardware types or Generic OPC
- Flexible configuration allows you to:
  - Create a model of your facility for utility accounting
  - Put meters in multiple groupings for cost allocation
  - Set and change meter configuration values remotely
  - Set multi-level password protection and privileges

Monitoring and Analysis — RSEnergyMetrix is a powerful load profiling, cost allocation and billing analysis tool.

- Log usage, cost and power quality data
- View any parameter in real time with the RT option
- Create historical trend reports and charts
- View historical trending of individual meters and groups and save tabular data for further processing and analysis
- Establish consumption baseline and user defined time of use periods
- Create custom rate plans using the rate plan menu and line item scripting
- Assign rate plans to meters or groups of meters
- Import and export rate schedules in XML format
- Create and print daily or monthly cost and billing reports by:
  - Meter
  - Business group
  - Department
  - Site
- Create energy budgets and forecasts
- Compare and contrast alternative utility rates; do "what-if" for other rate structures
- Print and store all reports and charts

Software and Hardware Requirements for a Midrange Server:

- Windows® 2003 (or 2000) Server or Advanced Server
- Microsoft® SQL Server 2005 (or 2000 SP3a min) Standard or Enterprise
- 2 or 4 CPU 800+ MHz Pentium® III or better
- 1 GB RAM
- 30 GB hard disk (separate disk(s) for operating system/log files and RAID 5 for main database files preferred)

For more information, see technical data: ENEMTX-TD001.*

RSPower and RSPowerPlus Software

RSPower is a .NET/Windows-based software program that configures and displays data from all Rockwell Automation power monitors. RSPower is a complete tool that allows you to save power monitor data to disk, print data, harmonics, and waveforms, and manage your power monitor configurations.

Install RSPower software and begin working with your power monitoring equipment from your desktop.

RSPower software provides quick and easy configuration, monitoring, and integration of power information.

- Organize your Allen-Bradley power monitors into a graphical tree to represent your specific configuration or view the power monitors in a sorted list
- Upload and download your power monitor configuration parameters from your PC
- Save your entire site configuration as well as the individual data from each monitor
- Continuous access to all power data from your PC
- Display your data in pop-up views of real-time data
- Display historical data stored within the power monitor
- RSPower contains a browseable OPC server to simultaneously provide power monitor data to many external software packages
- Flexible communications via RSLinx to communicate with power monitors RSPowerPlus provides additional reporting and trending features

RSPowerPlus provides the following additional features:

- Run pre-configured monthly or yearly, billing or electrical consumption reports for each individual Powermonitor utilizing the TOU function in the Powermonitor 1000 and 3000 family of products
- Display real-time trending for up to five parameters simultaneously
- Display historical trending for data directly from the trend log of each meter
- User defined limits for monitoring of electrical parameters (i.e. demand monitoring)

For more information, see technical data RSPWR-TD002.*

Combination Generator Control Module (Bulletin 1407)

The Combination Generator Control Module (CGCM) sets a new standard for generator control. The CGCM combines excitation control, generator protection, synchronization control, and full-featured metering in a single compact product. The CGCM, when used in conjunction with a ControlLogix® Automation Controller, provides a highly robust and flexible platform for generator control and system supervision.

- ControlNet port
- Four excitation control modes (AVR, FCR, PF and VAR)
- Adjustable soft start voltage buildup
- OEL and UEL in AVR, VAR, and PF modes
- Volts/Hertz compensation
- Line drop compensation
- Auto-tracking between modes
- Redundant CGCM auto-tracking and auto-transfer
- Generator paralleling with droop or cross-current compensation
- Generator paralleling with real power load sharing
- Synchronizing for one or two breakers
- Loss of excitation current (ANSI 40)
- Metering functions: Voltage, Current, Frequency, Power, Power Factor, Energy, Excitation Current and Voltage
- Generator overvoltage (ANSI 59)
- Generator undervoltage (ANSI 27)
- Loss of sensing (ANSI 60FL)
- Loss of PMG (ANSI 27)
- Reverse VAR (ANSI 40Q)
- Over frequency (ANSI 81O)
- Under frequency (ANSI 81U)
- Reverse power (ANSI 32R)
- Rotating diode monitor (ANSI 58)
- Phase rotation error (ANSI 47)
- Generator over current (ANSI 51/27F)
- Over excitation voltage (ANSI 59F)
- Synchronization parameters include: Frequency, Phase Rotation, Phase Angle, Voltage Magnitude

For more information, see publication 1407-PP001.*

Capacitor Bank Controller (Bulletin 1413)

The capacitor bank controller is a pre-engineered control system containing a MicroLogix 1400 controller, one or more Powermonitor 1000 products, and an optional human-machine interface(HMI). Pre-engineered ladder logic code in the controller gathers real and reactive power data from up to four power feeds(utility feeds and/or generators). The logic operates on the data in standard engineering units of kVAR and kW and minimizes imported and exported reactive power by switching up to 10 steps of capacitance. This strategy controls power factor while reducing the likelihood of voltage surge caused by excessive kVAR export.

Functions:

- Autoconfigure
- Manual configure
- Discharge timer on each step
- Selectable operating modes

Powermonitor 3000

Environmental		
Operating Temperature, Ambient	1404-MX05X-000, DNT, 1404-DM	–20…+60 °C (–4…+140 °F)
	1404-MX05X-RIO, RS232, ENT	0…55 °C (32…132 °F)
Storage Temperature		–40…+85 °C (–40…+185 °F)
Humidity		5…95% non-condensing
Vibration	10…500 Hz	**operational:** 2 g (±0.012 in.) **non-operational:** 2.5 g (±0.015 in.)
Shock	1/2 sine pulse, 11 ms duration	**operational:** 30 g **non-operational:** 30 g

Input and Output Ratings	
Control Power Input	120/240V AC 50/60Hz or 125/250V DC
Voltage Input Impedance	1 MΩ min., 399V AC max. V1, V2, and V3 to N
Current Sense Inputs	Overload withstand: 15 A continuous, 200 A for 1 s Burden: 0.05 VA Impedance: 0.002 Ω Maximum crest factor (at 5 A): 3.0
Status Inputs	Contact closure (internal 24V DC)
Control Relay Output	ANSI C37.90-1989
KYZ Output	Solid-state KYZ = 80 mA at 240…300V DC

Operational Data		
	Nominal	Range
Voltage	347V 600V	15…399V $_{L-N}$ rms 26…691V $_{L-L}$ rms
Current	5 A	50 mA…10.6 A rms
Frequency	50 or 60 Hz	40…75 Hz

Metering by model type				
	M4	M5	M6	M8
Accuracy				
Voltage	±0.2%	±0.05%	±0.05%	±0.05%
Current	±0.2%	±0.05%	±0.05%	±0.05%
Frequency	±0.05 Hz	±0.05 Hz	±0.05 Hz	±0.05 Hz
Power	±0.4%	±0.1%	±0.1%	±0.1%
Energy	Class 1.0 - ANSI C12.16	Class 0.5 - ANSI C12.20 / EN 60687, Class 0.2 also available		
Features				
Configurable Setpoints	10	10	20	20
Waveform Captures	—	—	8	2
Harmonic Analysis				
Order	—	—	41st	63rd
%THD	X	X	X	X
TIF	—	—	X	X
K-factor	X	X	X	X
Crest factor	—	—	X	X
IEEE 519 Compliance	—	—	X	X
Transient Detection	—	—	—	X

Powermonitor 1000

General Specifications		
Dielectric withstand	Control power	2500V
	Voltage inputs	2500V
	Current inputs	2500V
	Status inputs	2500V
	KYZ output	2500V
Terminal Blocks	0.34…2.5 mm² (22…14 AWG), 75 °C (167 °F) min. copper wire only; recommended torque 0.8 N•m (7 lb•in)	
Operating Temperature	-10…+60 °C (14…140 °F)	
Storage Temperature	-40…+85 °C (-40…+185 °F)	
Humidity	5…95%, non-condensing	
Vibration	2.0 g 10…500 Hz	
Shock	30 g peak each axis (operating) 50 g peak each axis (non-operating)	

Input and Output Ratings	
Control Power	85…264V AC, 47…63 Hz, 2.5 VA max.
Voltage Sense Inputs: V1, V2, V3	Input impedance: 5 MΩ Min. input current: 2 mA max.
Current Sense Inputs: I1, I2, I3, I4	Overload withstand: 15 A continuous, 200 A for 1/2 s Burden: 0.05 VA Impedance: 0.002 Ω Max. crest factor (at 5 A): 3.0 Starting current: 5 mA
Status Inputs	Contact closure (internal 24V DC)
KYZ Output	30 mA at 240V AC/300V DC

Accuracy and Range							
	Accuracy in % of Full-Scale Reading at 25 °C (77 °F) 50/60 Hz Unity Power Factor						
		Applies to:					Nominal/ Range
Parameter		TR1	TR2	EM1	EM2	EM3	
Voltage Sense Inputs: V1, V2, V3	±0.5%	X	X			X	347V/ 15…399V $_{L-N}$ rms 600V/ 26…691V $_{L-L}$ rms
Current Sense Input: I1, I2, I3, I4	±0.5%	X	X			X	5 A/ 0.05…1.0 A rms
Frequency	±0.05 Hz	X	X			X	50 or 60 Hz/ 40…75 Hz
Power Functions: kW, kVA, kVAR	EN62053-21:2003 Accuracy Requirement Class 1		X			X	
Demand Functions: kW, kVA					X	X	
Energy Functions: kWH, kVAH				kWh only	X	X	
Metering Update Rates	100 ms: V, I, Hz 200 ms: Power	X	X	X	X	X	

Fast transient external influence tested at 2 kV.

Powermonitor 1000, Continued

Measured Parameters by model type					
Logged Parameters	TR1	TR2	EM1	EM2	EM3
Voltage	X	X			X
Current	X	X			X
Frequency	X	X			X
Voltage Unbalance	X	X			X
Current Unbalance	X	X			X
Real Power [kW]		X			X
Reactive Power [kVAR]		X			X
Apparent Power [kVA]		X			X
True Power Factor		X			X
Real Energy [kWh]			X	X	X
Reactive Energy [kVARh]				X	X
Apparent Energy [kVAHh]				X	X
Real Power Demand [kW]				X	X
Reactive Power Demand [kVAR]				X	X
Apparent Power Demand [kVA]				X	X
Projected Real Power [kW]				X	X
Projected Reactive Power [kVAR]				X	X
Projected Apparent Power [kVA]				X	X
Demand Power Factor				X	X
Logs	**TR1**	**TR2**	**EM1**	**EM2**	**EM3**
Energy Log			X	X	X
Minimum/Maximum Log	X	X		X	X
Load Factor Log				X	X
Status Log	X	X	X	X	X

PowerPad Portable Powermonitor

Electrical			
Sampling Frequency	256 samples per cycle		
Data Storage	4 MB partitioned for waveforms, transients, alarms, and trend recording		
Voltage (TRMS)	Phase-to-Phase: 830V Phase-to-Neutral: 480V		
Current (TRMS)	240 A Clamp: 0…6 A/120 A or 0…240 A 1000 A AC/1400 A DC Clamp: 0…1000 A AC, 0…1400 A DC		1200 A Clamp: 0…1200 A 6500 A Clamp: 0…6500 A
Measurement	**Range**	**Resolution**	**Accuracy**
Single-Phase RMS Voltages	6…480V	0.1V	±0.5% ±2cts
Phase-to-Phase RMS Voltages	10…830V	0.1V	±0.5% ±2cts
Single-Phase Peak Voltages	6…680V	1V	±(1% ±5cts)
Phase-to-Phase Peak Voltages	10…1360V	1V	±(1% ±5cts)
Frequency (Hz)	40…69 Hz	0.01 Hz	±0.01 Hz
DC Voltage Component	6…650V	0.1V	±1% ±2cts
Current Probes (Arms) –MN Clamp –SR Clamp –AmpFlex™ Probe	 0…240 A 0…1200 A 10…6500 A	 0.1 A 0.1 A; 1…1000 A 0.1 A; 1…1000 A	 ±(0.5% + 2 cts) ±(0.5% + 2 cts) ±(0.5% + 1 A)
Active (Real) Power (kW)	0…9999 kW	Four digits (10 000ct)	±1% ±1ct @ PF ≥ 0.8
Reactive Power (kVAR)	0…9999 kVAR	Four digits (10 000ct)	±1% ±1ct @ PF ≤ 0.8
Apparent Power (kVA)	0…9999 kVA	Four digits (10 000ct)	±1% ±1ct
Power Factor (PF & DPF)	-1.000…1.000	0.001	±(1.5% + 0.01)
Active Energy (kWh)	0…9999 MWh	Four digits (10 000ct)	±1% ±1ct @ PF ≥ 0.8
Reactive Energy (kVARh)	0…9999 MVARh	Four digits (10 000ct)	±1% ±1ct @ PF ≤ 0.8
Apparent Energy (kVAh)	0…9999 MVAh	Four digits (10 000ct)	±1% ±1ct
Unbalance (V & A)	0…100%	0.1%	±1% ±1ct
Phase Angles (V-A, A-A, V-V)	-179…180°	1°	±2° ±1ct
Harmonics (1…50) F=40…69Hz (V ≥ 50V, A > Inom/100	0…999%	0.1%	±1% + 5ct
Total Harmonic Distortion (V & A)	0…999%	0.1%	±1% + 5ct
K-factor (Akf)	1…99.99	0.01	±5% ±1ct
Flicker (Pst)	0.00…9.99	0.01	–
Power Source	9.6V NiMH rechargeable battery pack AC supply: 110/230VAC ±20% (50/60Hz)		
Battery Life	6 hours with display on; ≤96 hrs with display off (record mode)		
Environmental			
Operating Temperature	0…50 °C (32…122 °F)		
Storage Temperature	-20…+50 °C (-4…+122 °F)		
Mechanical			
Display	1/4 VGA (320 x 240) color LCD		
Dimensions	240 x 180 x 55 mm (9.5 x 7 x 2 in.)		
Weight	2.1 kg (4.6 lb)		
Safety			
Safety Rating	EN 61010-1, 600V Cat. III, Pollution Degree 2		
Double Insulation	Yes		
CE Mark	Yes		

Crest Factor at 6500 A = 1

Current Transformers

Core Type	Split or solid
Current Ratio Range	50:5…6000:5
Burden Range	1…200 VA
Window Sizes	Round Window: 1.00", 2.5", 1.13", 3.25", 1.47", 5.75", 2.31", 6.31", 8.25" Rectangular Window: 2.00 x 5.5", 0.75 x 0.75", 4.5 x 4.5", 1.3 x 1.6", 1.42 x 1.53", 1.3 x 2.15", 2.75 x 2.7", 2 x 3.5", 2.6 x 6.25"
Certifications	UL, CSA
Standards	ANSI/IEEE C57.13, IEC 44-1

RSPower Software

System Hardware Requirements	
Compatible Microprocessor	Pentium 4 or P4
RAM	256 MB
Hard Disk	100 MB of available space
Drive	CD-ROM/DVD-ROM
Disk Drive	3.5 inch, 1.44 MB
Operating System	Windows 2000, Windows 2000 Server, Windows XP, or Windows Server 2003
	Microsoft .NET Framework 2.0
Application	Adobe Acrobat Reader
Communication Type	RSLinx Classic 2.51 OEM or higher (if not bundled with communications drivers)
Communication Interface	Appropriate communications interface to the Powermonitor
Devices	Bulletin 1400 Powermonitor, 1403 Powermonitor II, 1404 Powermonitor 3000, 1408 Powermonitor 1000
External Connections	Serial, Ethernet, ControlNet™, DeviceNet™ or Remote I/O connection to the power monitor

Combination Generator Control Module

Operating Power Requirements					
Source	No. of Phases	Wiring Configuration	Voltage	Frequency	VA (max.)
Permanent Magnet Generator	1	PMG-A & PMG-C	Min: 56V rms Max: 300V rms	Min: 50 Hz Max: 342 Hz	3070
	3	Floating wye	Min: 56V $_{L-L}$ rms Max: 300V $_{L-L}$ rms		
Separately Excited	1	PMG-A & PMG-C	Min: 56V rms Max: 300V rms		
	3	Floating wye	Min: 56V $_{L-L}$ rms Max: 300V $_{L-L}$ rms		
	3	Grounded wye (grounded neutral)	Min: 56V $_{L-L}$ rms Max: 300V $_{L-L}$ rms		
	3	Floating delta	Min: 56V L-L rms		
	3	Open delta, floating	Min: 56V $_{L-L}$ rms Max: 300V $_{L-L}$ rms		

Generator and Bus Voltage Sensing Values				
No. of Phases	Wiring Configuration	Grounded Connection Available	Voltage	Frequency
1	VA & VC	No	Min: 57V rms Max: 150V rms	Min: 20 Hz Max: 90 Hz
3	Floating wye	No	Min: 99V $_{L-L}$ rms Max: 208V $_{L-L}$ rms	
1	Grounded wye	Yes	Min: 99V $_{L-L}$ rms Max: 208V $_{L-L}$ rms	
3	Open delta, grounded "B" phase	Yes	Min: 99V $_{L-L}$ rms Max: 208V $_{L-L}$ rms	

Generator Current Sensing	
Type	Three-phase plus cross current compensation input
Frequency	50/60 Hz
Range	1 or 5 A maximum continuous
Burden	<0.1 VA per phase for metering CTs <2.5 VA per phase for cross current inputs
3 Phase	Open delta, grounded "B" phase

Field Output	
Continuous Voltage	32, 63, or 125V DC
Continuous Current	15 A DC
10 second Forcing Voltage	50, 100, or 200V DC
10 second Forcing Current	30 A DC

Powermonitor 3000 (Bulletin 1404)

(1404-M4, M5, M6, and M8) — 120/240 Volt Power Supply Option	
Description	Cat. No.
Powermonitor 3000 Display Module	**1404-DM**
M4 Monitors	
RS-485	**1404-M405A-000**
RS-485 and RS-232	1404-M405A-232
RS-485 and ControlNet	**1404-M405A-CNT**
RS-485 and DeviceNet	**1404-M405A-DNT**
RS-485 and Remote I/O	1404-M405A-RIO
RS-485 and Ethernet	**1404-M405A-ENT**
M5 Monitors	
RS-485	1404-M505A-000
RS-485 and RS-232	1404-M505A-232
RS-485 and ControlNet	**1404-M505A-CNT**
RS-485 and DeviceNet	**1404-M505A-DNT**
RS-485 and Remote I/O	**1404-M505A-RIO**
RS-485 and Ethernet	**1404-M505A-ENT**
M6 Monitors	
RS-485	1404-M605A-000
RS-485 and RS-232	1404-M605A-232
RS-485 and ControlNet	1404-M605A-CNT
RS-485 and DeviceNet	**1404-M605A-DNT**
RS-485 and Remote I/O	**1404-M605A-RIO**
RS-485 and Ethernet	**1404-M605A-ENT**
M8 Monitors	
RS-485	1404-M805A-000
RS-485 and RS-232	1404-M805A-232
RS-485 and ControlNet	1404-M805A-CNT
RS-485 and DeviceNet	1404-M805A-DNT
RS-485 and Remote I/O	1404-M805A-RIO
RS-485 and Ethernet	1404-M805A-ENT

(1404-M4, M5, M6, and M8) — 24 Volt Power Supply Option	
Description	Cat. No.
M4 Monitors	
RS-485	1404-M405B-000
RS-485 and RS-232	1404-M405B-232
RS-485 and ControlNet	1404-M405B-CNT
RS-485 and DeviceNet	1404-M405B-DNT
RS-485 and Remote I/O	1404-M405B-RIO
RS-485 and Ethernet	1404-M405B-ENT
M5 Monitors	
RS-485	1404-M505B-000
RS-485 and RS-232	1404-M505B-232
RS-485 and ControlNet	1404-M505B-CNT
RS-485 and DeviceNet	1404-M505B-DNT
RS-485 and Remote I/O	1404-M505B-RIO
RS-485 and Ethernet	1404-M505B-ENT
M6 Monitors	
RS-485	1404-M605B-000
RS-485 and RS-232	1404-M605B-232
RS-485 and ControlNet	1404-M605B-CNT
RS-485 and DeviceNet	1404-M605B-DNT
RS-485 and Remote I/O	1404-M605B-RIO
RS-485 and Ethernet	1404-M605B-ENT
M8 Monitors	
RS-485	1404-M805B-000
RS-485 and RS-232	1404-M805B-232
RS-485 and ControlNet	1404-M805B-CNT
RS-485 and DeviceNet	1404-M805B-DNT
RS-485 and Remote I/O	1404-M805B-RIO
RS-485 and Ethernet	1404-M805B-ENT

(1404) — 120/240 Volt Power Supply/Class 2 Option	
Description	Cat. No.
M5 Monitors	
RS-485	1404-M505A-000-02
RS-485 and RS-232	1404-M505A-232-02
RS-485 and ControlNet	1404-M505A-CNT-02
RS-485 and DeviceNet	1404-M505A-DNT-02
RS-485 and Remote I/O	1404-M505A-RIO-02
RS-485 and Ethernet	1404-M505A-ENT-02
M6 Monitors	
RS-485	1404-M605A-000-02
RS-485 and RS-232	1404-M605A-232-02
RS-485 and ControlNet	1404-M605A-CNT-02
RS-485 and DeviceNet	1404-M605A-DNT-02
RS-485 and Remote I/O	1404-M605A-RIO-02
RS-485 and Ethernet	1404-M605A-ENT-02
M8 Monitors	
RS-485	1404-M805A-000-02
RS-485 and RS-232	1404-M805A-232-02
RS-485 and ControlNet	1404-M805A-CNT-02
RS-485 and DeviceNet	1404-M805A-DNT-02
RS-485 and Remote I/O	1404-M805A-RIO-02
RS-485 and Ethernet	1404-M805A-ENT-02

(1404) — 24 Volt Power Supply/Class 2 Option	
Description	Cat. No.
M5 Monitors	
RS-485	1404-M505B-000-02
RS-485 and RS-232	1404-M505B-232-02
RS-485 and ControlNet	1404-M505B-CNT-02
RS-485 and DeviceNet	1404-M505B-DNT-02
RS-485 and Remote I/O	1404-M505B-RIO-02
RS-485 and Ethernet	1404-M505B-ENT-02
M6 Monitors	
RS-485	1404-M605B-000-02
RS-485 and RS-232	1404-M605B-232-02
RS-485 and ControlNet	1404-M605B-CNT-02
RS-485 and DeviceNet	1404-M605B-DNT-02
RS-485 and Remote I/O	1404-M605B-RIO-02
RS-485 and Ethernet	1404-M605B-ENT-02
M8 Monitors	
RS-485	1404-M805B-000-02
RS-485 and RS-232	1404-M805B-232-02
RS-485 and ControlNet	1404-M805B-CNT-02
RS-485 and DeviceNet	1404-M805B-DNT-02
RS-485 and Remote I/O	1404-M805B-RIO-02
RS-485 and Ethernet	1404-M805B-ENT-02

Revenue metering compliance to ANSI C12.20 and EN 60687 Class 0.2 Accuracy

Powermonitor 3000 Field Upgrade Kits❄

Description	Cat. No.
PM3000 M5 to M6 Field Upgrade	40863-600-51
PM3000 M6 to M8 Field Upgrade	40863-600-52
PM3000 M5 to M8 Field Upgrade	40863-600-53

❄ When a device model is upgraded to an M6 or M8, the device will support the new model functionality but retains the accuracy class of the original manufactured device.

Powermonitor 1000 (Bulletin 1408)

Description	Cat. No.
Transducer TR1 - Serial	1408-TR1A-485
Transducer TR1 - EtherNet	1408-TR1A-ENT
Transducer TR2 - Serial	1408-TR2A-485
Transducer TR2 - EtherNet	**1408-TR2A-ENT**
Energy Monitor EM1- Serial	1408-EM1A-485
Energy Monitor EM1- EtherNet	1408-EM1A-ENT
Energy Monitor EM2- Serial	1408-EM2A-485
Energy Monitor EM2- EtherNet	1408-EM2A-ENT
Energy Monitor EM3 - Serial	1408-EM3A-485
Energy Monitor EM3 - EtherNet	**1408-EM3A-ENT**

Powermonitor 1000 Field Upgrade Kits

Description	Cat. No.
PM 1000 485 to ENT Field Upgrade	1408-UP485-ENT
PM 1000 EM1 to EM3 Field Upgrade	1408-UPE1-E3
PM 1000 EM2 to EM3 Field Upgrade	1408-UPE2-E3
PM 1000 TR1 to EM3 Field Upgrade	1408-UPT1-E3
PM 1000 TR2 to EM3 Field Upgrade	1408-UPT2-E3

PowerPad Portable Power Monitor (Bulletin 1412)

Description	Cat. No.
PowerPad Portable Powermonitor w/ 240 A Probes	1412-PP2127-48
PowerPad Portable Powermonitor w/ 1200 A Probes	1412-PP2127-49
PowerPad Portable Powermonitor w/ 24 in., 6500 A Probes	1412-PP2127-50
PowerPad Portable Powermonitor w/ 36 in., 6500 A Probes	1412-PP2127-51

PowerPad Portable Power Monitor Accessories	
Description	**Cat. No.**
Set of three probes (240 A)	1412-PP2137-01
Set of three probes (1200 A)	1412-PP2137-02
Set of three 24 in. probes (6500 A)	1412-PP2137-03
Set of three 36 in. probes (6500 A)	1412-PP2137-04
One probe (1000 A AC/1400 A DC)	1412-PP2137-05
Set of three probes (6/120 A)	1412-PP2137-06

Current Transformers — Split Core (Bulletin 1411) for Energy Management Systems and Instrumentation

Current Ratio	Burden [VA]	ANSI Metering Class B0.1	B0.2	B0.5	Accuracy	Cat. No.
2.00 x 5.50 in. window size						
250:5	1.5	4.8	—	—	—	1411-600-251
300:5	2.0	2.4	—	—	—	1411-600-301
400:5	1.5	2.4	4.8	—	—	1411-600-401
500:5	2.0	2.4	4.8	—	—	1411-600-501
600:5	2.5	2.4	2.4	—	—	1411-600-601
800:5	5.0	1.2	1.2	2.4	—	1411-600-801
1000:5	7.5	1.2	1.2	2.4	—	1411-600-102
1200:5	15	0.6	1.2	1.2	—	1411-600-122
1500:5	20	0.6	0.6	1.2	—	1411-600-152
1600:5	20	0.6	0.6	1.2	—	1411-600-162
2000:5	30	0.6	0.6	0.6	—	1411-600-202
4.50 x 4.50 in. window size						
400:5	1.0	4.8	—	—	—	**1411-601-401**
500:5	1.5	4.8	4.8	—	—	1411-601-501
600:5	2.0	2.4	4.8	—	—	1411-601-601
800:5	2.5	1.2	2.4	4.8	—	1411-601-801
1000:5	5.0	1.2	1.2	4.8	—	1411-601-102
1200:5	10.0	1.2	1.2	2.4	—	**1411-601-122**
1500:5	15.0	1.2	1.2	1.2	—	1411-601-152
1600:5	15.0	1.2	1.2	1.2	—	1411-601-162
2000:5	20.0	0.6	0.6	1.2	—	**1411-601-202**
1.42 x 1.53 in. window size						
100:5	1.0	—	—	—	±5%	1411-604-101
150:5	1.0	—	—	—	±4%	1411-604-151
200:5	1.0	—	—	—	±2%	1411-604-201
250:5	2.0	—	—	—	±2%	1411-604-251
300:5	2.0	—	—	—	±1.5%	1411-604-301
400:5	2.5	—	—	—	±1.5%	1411-604-401
2.75 x 2.70 in. window size (weatherproof)						
200:5	2.5	—	—	—	2%	1411-606-201
250:5	3.0	—	—	—	1%	1411-606-251
300:5	3.5	—	—	—	1%	1411-606-301
350:5	4.0	—	—	—	1%	1411-606-351
400:5	5.0	—	—	—	1%	1411-606-401
500:5	6.0	—	—	—	1%	1411-606-501
600:5	8.0	—	—	—	1%	1411-606-601
750:5	10	—	—	—	1%	1411-606-751
800:5	12	—	—	—	1%	1411-606-801
1000:5	15	—	—	—	1%	1411-606-102
1200:5	20	—	—	—	1%	1411-606-122

Current Ratio	Burden [VA]	ANSI Metering Class B0.1	B0.2	B0.5	Accuracy	Cat. No.
2.60 x 6.25 in. window size (weatherproof)						
500:5	6.0	—	—	—	±1%	1411-608-501
600:5	8.0	—	—	—	±1%	1411-608-601
800:5	12	—	—	—	±1%	1411-608-801
1000:5	13	—	—	—	±1%	1411-608-102
1200:5	16	—	—	—	±1%	1411-608-122
1500:5	25	—	—	—	±1%	1411-608-152
1600:5	27	—	—	—	±1%	1411-608-162
2000:5	33	—	—	—	±1%	1411-608-202
2500:5	42	—	—	—	±1%	1411-608-252
3000:5	50	—	—	—	±1%	1411-608-302
3200:5	54	—	—	—	±1%	1411-608-322
0.75 x 0.75 in. window size (clamp-on)						
100:0.1	5 Ω	—	—	—	±1%	1411-614-101-01
200:0.1	5 Ω	—	—	—	±1%	1411-614-201-01
1.30 x 1.60 in. window size (clamp-on)						
100:5	1.0	—	—	—	±5%	1411-615-101
200:5	2.0	—	—	—	±3%	1411-615-201
300:5	3.5	—	—	—	±1%	1411-615-301
400:5	8.5	—	—	—	±1%	1411-615-401
200:1	1.5	—	—	—	±1%	1411-615-201-1
1.30 x 2.15 in. window size (clamp-on)						
200:5	2.0	—	—	—	±3%	1411-616-201
400:5	5.0	—	—	—	±1%	1411-616-401
800:5	5.0	—	—	—	±1%	1411-616-801
400:0.1	5 Ω	—	—	—	±1%	1411-616-401-01
2.00 x 3.50 in. window size						
400:5	1.0	2.4	4.8	—	—	1411-617-401
500:5	2.0	2.4	4.8	—	—	1411-617-501
600:5	2.5	2.4	2.4	—	—	1411-617-601
800:5	5.0	1.2	1.2	2.4	—	1411-617-801
1000:5	7.5	1.2	1.2	2.4	—	1411-617-102
1200:5	15.0	0.6	1.2	1.2	—	1411-617-122

Current Transformers — Solid Core (Bulletin 1411)

Current Ratio	Burden [VA]	ANSI Metering Class B0.1	B0.2	B0.5	B0.9	B1.8	Cat. No.
5.75 in. dia. window size (for relay and metering)							
600:5	—	0.3	0.3	0.3	0.6	0.6	1411-120-601
800:5	—	0.3	0.3	0.3	0.3	0.6	1411-120-801
1000:5	—	0.3	0.3	0.3	0.3	0.6	1411-120-102
1200:5	—	0.3	0.3	0.3	0.3	0.3	1411-120-122
1500:5	—	0.3	0.3	0.3	0.3	0.3	1411-120-152
1600:5	—	0.3	0.3	0.3	0.3	0.3	1411-120-162
2000:5	—	0.3	0.3	0.3	0.3	0.3	1411-120-202
2500:5	—	0.3	0.3	0.3	0.3	0.3	1411-120-252
3000:5	—	0.3	0.3	0.3	0.3	0.3	1411-120-302
4000:5	—	0.3	0.3	0.3	0.3	0.3	1411-120-402
6.31 in. dia. window size (for metering)							
1000:5	—	0.3	0.3	0.3	0.6	1.2	1411-125-102
1200:5	—	0.3	0.3	0.3	0.6	1.2	1411-125-122
1500:5	—	0.3	0.3	0.3	0.3	0.6	1411-125-152
1600:5	—	0.3	0.3	0.3	0.3	0.6	1411-125-162
2000:5	—	0.3	0.3	0.3	0.3	0.6	1411-125-202
2500:5	—	0.3	0.3	0.3	0.3	0.6	1411-125-252
3000:5	—	0.3	0.3	0.3	0.3	0.6	1411-125-302
3500:5	—	0.3	0.3	0.3	0.3	0.3	1411-125-352
4000:5	—	0.3	0.3	0.3	0.3	0.3	1411-125-402
0.25 in. dia. window size (for metering)							
400:5	4.0	0.6	1.2	2.4	2.4	4.8	1411-126-401
500:5	7.5	0.6	0.6	1.2	2.4	2.4	1411-126-501
600:5	10	0.6	0.6	1.2	2.4	2.4	1411-126-601
800:5	20	0.3	0.3	0.6	0.6	1.2	1411-126-801
1000:5	25	0.3	0.3	0.6	0.6	1.2	1411-126-102
1200:5	40	0.3	0.3	0.3	0.6	0.6	1411-126-122
1500:5	50	0.3	0.3	0.3	0.3	0.6	1411-126-152
1600:5	50	0.3	0.3	0.3	0.3	0.6	1411-126-162
2000:5	60	0.3	0.3	0.3	0.3	0.3	1411-126-202
2500:5	75	0.3	0.3	0.3	0.3	0.3	1411-126-252
3000:5	90	0.3	0.3	0.3	0.3	0.3	1411-126-302
3200:5	95	0.3	0.3	0.3	0.3	0.3	1411-126-322
3500:5	100	0.3	0.3	0.3	0.3	0.3	1411-126-352
4000:5	125	0.3	0.3	0.3	0.3	0.3	1411-126-402
5000:5	140	0.3	0.3	0.3	0.3	0.3	1411-126-502
6000:5	140	0.3	0.3	0.3	0.3	0.3	1411-126-602
2.50 in. dia. with round exterior (for relay and metering)							
50:5	1.5	2.4	—	—	—	—	1411-180RL-500
75:5	2.5	1.2	2.4	—	—	—	1411-180RL-750
100:5	2.5	1.2	2.4	4.8	—	—	1411-180RL-101
150:5	5.0	0.6	1.2	2.4	4.8	—	1411-180RL-151
200:5	12.5	0.6	0.6	1.2	2.4	—	1411-180RL-201
250:5	12.5	0.3	0.3	0.6	1.2	—	1411-180RL-251
300:5	25	0.3	0.3	0.6	1.2	2.4	1411-180RL-301
400:5	50	0.3	0.3	0.3	0.6	1.2	1411-180RL-401
500:5	50	0.3	0.3	0.3	0.6	1.2	1411-180RL-501
600:5	50	0.3	0.3	0.3	0.6	1.2	1411-180RL-601
750:5	50	0.3	0.3	0.3	0.6	1.2	1411-180RL-751
800:5	75	0.3	0.3	0.3	0.6	1.2	1411-180RL-801
1000:5	100	0.3	0.3	0.3	0.3	0.6	1411-180RL-102
1200:5	125	0.3	0.3	0.3	0.3	0.3	1411-180RL-122
1500:5	160	0.3	0.3	0.3	0.3	0.3	1411-180RL-152
1600:5	175	0.3	0.3	0.3	0.3	0.3	1411-180RL-162
2000:5	200	0.3	0.3	0.3	0.3	0.3	1411-180RL-202

Current Ratio	Burden [VA]	ANSI Metering Class B0.1	B0.2	B0.5	B0.9	B1.8	Cat. No.
2.50 in. dia. with square exterior (for relay and metering)							
50:5	1.5	2.4	—	—	—	—	1411-180SHT-500
75:5	2.5	1.2	2.4	—	—	—	1411-180SHT-750
100:5	2.5	1.2	2.4	4.8	—	—	1411-180SHT-101
150:5	5.0	0.6	1.2	2.4	4.8	—	1411-180SHT-151
200:5	12.5	0.6	0.6	1.2	2.4	—	1411-180SHT-201
250:5	12.5	0.3	0.3	0.6	1.2	—	1411-180SHT-251
300:5	25	0.3	0.3	0.6	1.2	2.4	1411-180SHT-301
400:5	50	0.3	0.3	0.3	0.6	1.2	1411-180SHT-401
500:5	50	0.3	0.3	0.3	0.6	1.2	1411-180SHT-501
600:5	50	0.3	0.3	0.3	0.6	1.2	1411-180SHT-601
750:5	50	0.3	0.3	0.3	0.6	1.2	1411-180SHT-751
800:5	75	0.3	0.3	0.3	0.6	1.2	1411-180SHT-801
1000:5	100	0.3	0.3	0.3	0.3	0.6	1411-180SHT-102
1200:5	125	0.3	0.3	0.3	0.3	0.3	1411-180SHT-122
1500:5	160	0.3	0.3	0.3	0.3	0.3	1411-180SHT-152
1600:5	175	0.3	0.3	0.3	0.3	0.3	1411-180SHT-162
2000:5	200	0.3	0.3	0.3	0.3	0.3	1411-180SHT-202

Current Ratio	Burden [VA]	Accuracy	Cat. No.
1.00 in. dia. with round exterior (for relay and metering)			
50:5	1.5	±2%	1411-2DRL-500
60:5	2.0	±2%	1411-2DRL-600
75:5	3.0	±2%	1411-2DRL-750
80:5	4.0	±2%	1411-2DRL-800
100:5	5.0	±1%	1411-2DRL-101
120:5	5.0	±1%	1411-2DRL-121
125:5	5.0	±1%	1411-2DRL-1250
150:5	8.0	±1%	1411-2DRL-151
200:5	10.0	±1%	1411-2DRL-201
250:5	12.5	±1%	1411-2DRL-251
300:5	15	±1%	1411-2DRL-301
1.13 in. dia. with square exterior and bracket (for relay and metering)			
50:5	1.5	±3%	1411-2SFT-500
60:5	2.0	±3%	1411-2SFT-600
75:5	2.0	±2%	1411-2SFT-750
80:5	2.0	±2%	1411-2SFT-800
100:5	2.0	±1%	1411-2SFT-101
120:5	2.5	±1%	1411-2SFT-121
125:5	2.5	±1%	1411-2SFT-1250
150:5	4.0	±1%	1411-2SFT-151
200:5	4.0	±1%	1411-2SFT-201
250:5	6.0	±1%	1411-2SFT-251
300:5	8.0	±1%	1411-2SFT-301
1.13 in. dia. with square exterior (for relay and metering)			
50:5	1.5	±3%	1411-2SHT-500
60:5	2.0	±3%	1411-2SHT-600
75:5	2.0	±2%	1411-2SHT-750
80:5	2.0	±2%	1411-2SHT-800
100:5	2.0	±1%	1411-2SHT-101
120:5	2.5	±1%	1411-2SHT-121
125:5	2.5	±1%	1411-2SHT-1250
150:5	4.0	±1%	1411-2SHT-151
200:5	4.0	±1%	1411-2SHT-201
250:5	6.0	±1%	1411-2SHT-251
300:5	8.0	±1%	1411-2SHT-301

Current Transformers — Solid Core (Bulletin 1411)

Current Ratio	Burden [VA]	ANSI Metering Class B0.1	B0.2	B0.5	B0.9	B1.8	Accuracy	Cat. No.
1.47 in. dia. window size (for energy mgmt. systems and instrumentation)								
200:5	12.5	0.6	0.6	1.2	2.4	4.8	—	1411-605-201
400:5	25	0.3	0.3	0.6	1.2	1.2	—	1411-605-401
600:5	30	0.3	0.3	0.3	0.6	1.2	—	1411-605-601
2.31 in. dia. window size (for energy mgmt. systems and instrumentation)								
150:5	2.5	0.6	1.2	4.8	4.8	—	—	1411-607-151
800:5	35	0.3	0.3	0.3	0.6	0.6	—	1411-607-801
3.25 in. dia. window size with round exterior (for metering)								
200:5	5.0	1.2	1.2	2.4	4.8	4.8	—	1411-8RL-201
250:5	7.5	0.6	0.6	1.2	2.4	4.8	—	1411-8RL-251
300:5	15	0.6	0.6	1.2	2.4	2.4	—	1411-8RL-301
400:5	25	0.3	0.3	0.6	1.2	2.4	—	1411-8RL-401
500:5	35	0.3	0.3	0.6	0.6	1.2	—	1411-8RL-501
600:5	50	0.3	0.3	0.6	0.6	1.2	—	1411-8RL-601
750:5	50	0.3	0.3	0.6	0.6	1.2	—	1411-8RL-751
800:5	60	0.3	0.3	0.3	0.6	0.6	—	1411-8RL-801
1000:5	75	0.3	0.3	0.3	0.6	0.6	—	1411-8RL-102
1200:5	75	0.3	0.3	0.3	0.3	0.6	—	1411-8RL-122
1500:5	90	0.3	0.3	0.3	0.3	0.6	—	1411-8RL-152
1600:5	100	0.3	0.3	0.3	0.3	0.6	—	1411-8RL-162
2000:5	120	0.3	0.3	0.3	0.3	—	—	1411-8RL-202
2500:5	50	0.3	0.3	0.3	0.3	—	—	1411-8RL-252
3000:5	60	0.3	0.3	0.3	0.3	—	—	1411-8RL-302
3200:5	70	0.3	0.3	0.3	0.3	—	—	1411-8RL-322
4000:5	80	0.3	0.3	0.3	0.3	—	—	1411-8RL-402
3.25 in. dia. window size with square exterior (for metering)								
200:5	5.0	1.2	1.2	2.4	4.8	4.8	—	1411-8SHT-201
250:5	7.5	0.6	0.6	1.2	2.4	4.8	—	1411-8SHT-251
300:5	15	0.6	0.6	1.2	2.4	2.4	—	1411-8SHT-301
400:5	25	0.3	0.3	0.6	1.2	2.4	—	1411-8SHT-401
500:5	35	0.3	0.3	0.6	0.6	1.2	—	1411-8SHT-501
600:5	50	0.3	0.3	0.6	0.6	1.2	—	1411-8SHT-601
750:5	50	0.3	0.3	0.6	0.6	1.2	—	1411-8SHT-751
800:5	60	0.3	0.3	0.3	0.6	0.6	—	1411-8SHT-801
1000:5	75	0.3	0.3	0.3	0.6	0.6	—	1411-8SHT-102
1200:5	75	0.3	0.3	0.3	0.3	0.6	—	1411-8SHT-122
1500:5	90	0.3	0.3	0.3	0.3	0.6	—	1411-8SHT-152
1600:5	100	0.3	0.3	0.3	0.3	0.6	—	1411-8SHT-162
2000:5	120	0.3	0.3	0.3	0.3	—	—	1411-8SHT-202
2500:5	50	0.3	0.3	0.3	0.3	—	—	1411-8SHT-252
3000:5	60	0.3	0.3	0.3	0.3	—	—	1411-8SHT-302
3200:5	70	0.3	0.3	0.3	0.3	—	—	1411-8SHT-322
4000:5	80	0.3	0.3	0.3	0.3	—	—	1411-8SHT-402
1.05 in. dia. window size (for ammeters, energy mgmt. sys., and instr.)								
50:5	1.5	—	—	—	—	—	±3%	1411-AL-500
60:5	2.0	—	—	—	—	—	±3%	1411-AL-600
75:5	2.0	—	—	—	—	—	±2%	1411-AL-750
80:5	2.0	—	—	—	—	—	±2%	1411-AL-800
100:5	2.0	—	—	—	—	—	±1%	1411-AL-101
120:5	2.5	—	—	—	—	—	±1%	1411-AL-121
125:5	2.5	—	—	—	—	—	±1%	1411-AL-1250
150:5	4.0	—	—	—	—	—	±1%	1411-AL-151
200:5	4.0	—	—	—	—	—	±1%	1411-AL-201
250:5	6.0	—	—	—	—	—	±1%	1411-AL-251
300:5	8.0	—	—	—	—	—	±1%	1411-AL-301
400:5	10	—	—	—	—	—	±1%	1411-AL-401

RSEnergyMetrix Power Management Software (Bulletin 9307)

Description	Cat. No.
RSEnergyMetrix Manager (0…8 meters)	**9307-EM8MGRENE**
RSEnergyMetrix Manager (9…64 meters)	**9307-EM64MGRENE**
RSEnergyMetrix Manager (65…10 000 meters)	**9307-EM10KMGRENE**
RSEnergyMetrix Real Time	**9307-EMRTENE**
RSEnergyMetrix 3rd Part OPC Client Connectivity (0…8 meters)	**9307-EM83PXENE**
RSEnergyMetrix 3rd Part OPC Client Connectivity (9…64 meters)	**9307-EM643PXENE**
RSEnergyMetrix 3rd Part OPC Client Connectivity (65…10 000 meters)	**9307-EM10K3PXENE**
RSEnergyMetrix ReportsPlus	**9307-EMRPTENE**
RSEnergyMetrix ChartsPlus	**9307-EMCHTENE**
RSEnergyMetrix Manager (0 - 8 meters) with MSSQL - 1, Processor Unlimited MSSQL Clients	9307-8MGDBPENE
RSEnergyMetrix Manager (9 - 64 meters) with MSSQL - 1, Processor Unlimited MSSQL Clients	9307-64MGDBPENE
RSEnergyMetrix Manager (65 - 10K meters) with MSSQL - 1, Processor Unlimited MSSQL Clients	9307-10KMGDBPENE
RSEnergyMetrix Manager (0 - 8 meters) with MSSQL - 1, MSSQL Client only	9307-8MGDBCENE
RSEnergyMetrix Manager (9 - 64 meters) with MSSQL - 1, MSSQL Client only	9307-64MGDBCENE
RSEnergyMetrix Manager (65 - 10K meters) with MSSQL - 1, MSSQL Client only	9307-10KMGDBCENE

RSPower and RSPowerPlus Power Management Software (Bulletin 9307)

Description	Cat. No.
RSPower Works without Comms Drivers	9307-RSP32WENE
RSPower Runtime without Comms Drivers	9307-RSP32RENE
RSPower Runtime bundled with Comms Drivers	9307-RSP32LXRENE
RSPower Works bundled with Comms Drivers	9307-RSP32LXWENE
RSPowerPlus Runtime bundled with Comms Drivers	9307-RSPPLXRENE
RSPowerPlus Works bundled with Comms Drivers	9307-RSPPLXWENE
RSPowerPlus Runtime without Comms Drivers	9307-RSPPRENE
RSPowerPlus Works without Comms Drivers	9307-RSPPWENE

Combination Generator Control Module (Bulletin 1407)

Description	Cat. No.
Combination Generator Control Module	1407-CGCM

Capacitor Bank Controllers (Bulletin 1413)

Description	Cat. No.
CapBank Controller without PanelView	1413-CAP-ME
CapBank Controller with PanelView	1413-CAP-ME-PE

			
Bulletin	4983-DH	4983-DS	4983-DD
Type	**DIN Rail Heavy-Duty AC Surge Protective Device**	**DIN Rail AC Power Surge Protective Device**	**DIN Rail Dataline Surge Protective Device**
Features	• High energy absorption capability • Robust design avoids unnecessary replacement • DIN Rail mounted, Type 2 • Visual (on unit), and remote status indicator	• Compact modular design • Robust design avoids unnecessary replacement • DIN Rail mounted, Type 2 • Replacement (Pluggable) Module • Visual (on unit), and remote status indicator	• Compact modular design • Cost-effective protection • Protects industrial communication networks
AC Network	110…277/480Y	110…600V	4…20 mA loop RS232, RS485
Max. Continuous Operating Voltage	150V AC 330V AC	150…690V AC	8…28V DC
Protection Level (Up)	1 or 1.5 kV	0.9…1.8 kV	25…40V
UL1449 Voltage Protection Rating (VPR)	0.4 or 0.6 kV	700, 1000, 1500, 1800, 2500V	—
Standards Compliance/Certifications	UL 1449, CSA C22.2 No. 8, IEC 61643-1, CE, EN 61643-11	UL 1449, CSA C22.2 No. 8, IEC 61643-1, CE, EN 61643-1	UL 497B, IEC 61643-21
Operating Temperature (non-condensing)	-40...+80 °C	-40...+80 °C	-40...+80 °C
Product Selection	**Page 8-82**	**Page 8-84**	**Page 8-87**

		
Bulletin	4983-PF	4983-DC
Type	**Panel Mount Filter**	**DIN Rail Combination Filter and Surge Protective Device**
Features	• Protects equipment from noise disturbances • Features Islatrol technology • LED power indication	• Small combination (filter and SPD) package size • Features Islatrol technology • LED power indication
Operating Voltage	120V or 240V AC	120V or 240V AC
Max. Continuous Operating Voltage	150 Vrms @ 120V AC 275 Vrms @ 240V AC	150 Vrms @ 120V AC 320 Vrms @ 240V AC
Ampacity	2…30 A	3…20 A
Line Frequency	47…63 Hz	47…63 Hz
Standards Compliance/Certifications	UL 1283, CSA, CE	UL 1283, UL 1449, CSA, CE
Operating Temperature (non-condensing)	-40...+60 °C derate linearly to 60% @ +70 °C	-40...+60 °C derate linearly to 60% @ +70 °C
Product Selection	**Page 8-89**	**Page 8-93**

Bulletin 4983-DH DIN Rail Heavy-Duty AC Surge Protective Devices

- Highest energy absorption capability of all Bulletin 4893 products
- Robust design avoids unnecessary replacement
- DIN Rail mounted Type 2
- Visual status indicator (on unit)
- Remote status indicator

Bulletin 4983-DH is a heavy-duty surge protector. This SPD combines a high-energy varistor (MOV) network with a gas discharge tube to increase performance in protection level, life duration, and suppression of leakage current. The Bulletin 4983-DH product is connected in parallel.

Table of Contents

Standards Compliance

- UL 1449, 3rd Edition
- CSA C22.2, No. 8
- IEC 61643-1
- EN 61643-11

Certifications

- cURus (File E334011, Guide VZCA2, VZCA8)
- CE Marked
- CSA Marked

Cat. No. Explanation

Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; not all combinations will produce a valid catalog number.

4983 — D H 120 — 25
a b c d

a

Mount	
Code	Description
D	DIN Rail

b

Type	
Code	Description
H	Heavy Duty

c

Voltage	
Code	Description
120	120V
300	230V and 480Y/277V

d

Current Rating	
Code	Description
25	25 kA
50	50 kA

Product Selection

AC Network	Connection Mode	No. of Poles and Devices Needed	Max. Continuous Operating Voltage (MCOV) (U_c) [V AC]	Lightning Current 10/350 µs (I_{imp}) [kA]	Max. Discharge Current 8/20µs (I_{max}) [kA]	Nominal Discharge Current 8/20µs (I_n) [kA]	Protection Level (U_p) [kV]	UL 1449 Voltage Protection Rating (VPR) [V]	Appropriate Fusing* [A Max.]	Cat. No.
120	L/G or N/G	1	150	25	70	20	1.0	1200	250	**4983-DH120-25**
	L/G, N/G	2								
120/208	L1/G, L2/G, L3/G, N/G	4								
230/400	L/G or N/G	1	330	25	70	20	1.5	900	250	**4983-DH300-25**
	L/G, N/G	2								
	L1/G, L2/G, L3/G, N/G	3								
	L1/G, L2/G, L3/G, N/G	4								
277/480Y	L1/G, L2/G, L3/G, N/G	4								
230/400	L/G or N/G	1	330	50	70	20	1.5	1200	500	**4983-DH300-50**
	L/G, N/G	2								
	L1/G, L2/G, L3/G or N/G	3								
	L1/G, L2/G, L3/G, N/G	4								
277/480 Y	L1/G, L2/G, L3/G, N/G	4								

* Fuses required to protect the surge protector in case of short-circuit failure. They must be installed in series with each pole of the surge protector.

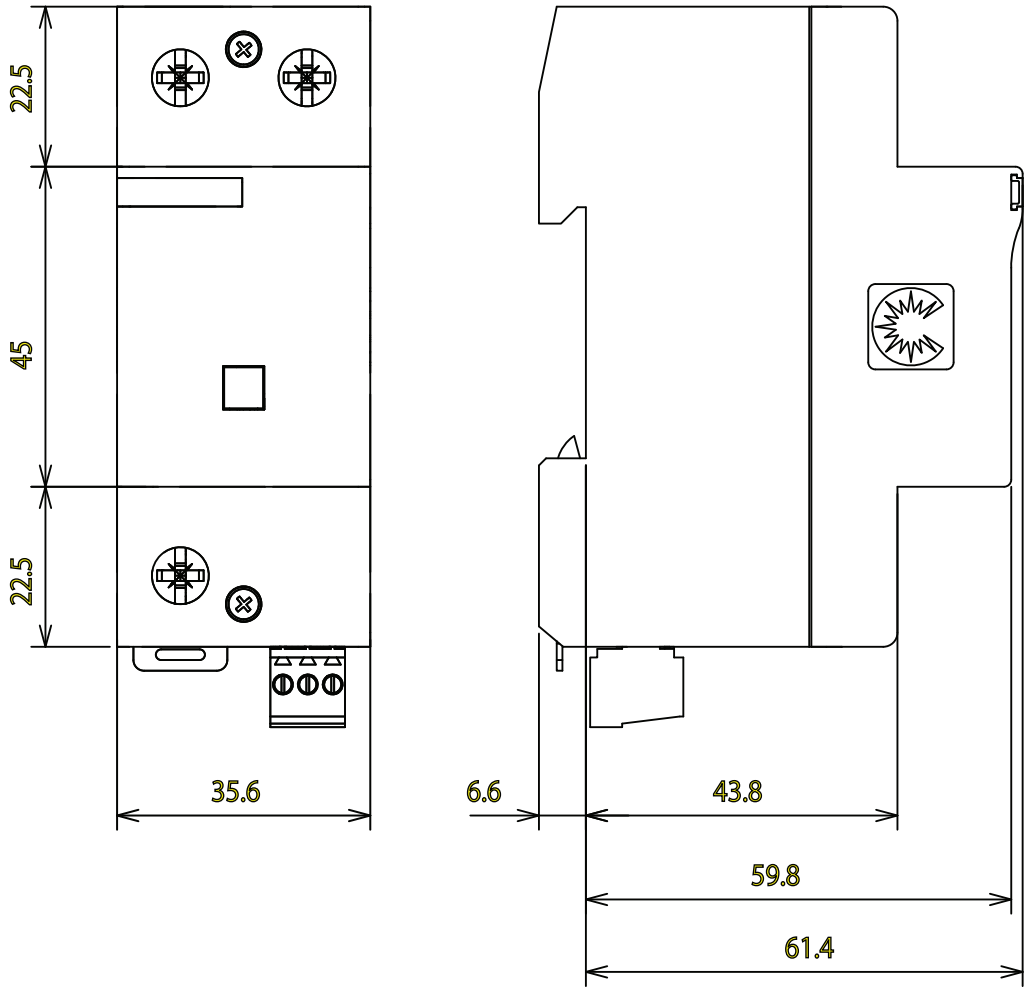
Note: N = Neutral
L/N = Line/neutral
N/G = Neutral/ground

Specifications

Connection/Mounting Type	Parallel/DIN Rail mount
Standards Compliance	UL 1449, CSA C22.2, No. 8, IEC 61643-1, EN 61643-11
Certifications	cURus recognized, CE marked, CSA
Conductor Material	Cu, solid or stranded
Conductor Range	#10…2 AWG (6…35 mm²)
Strip Length	0.5 in. (12 mm)
Tightening Torque	22.1 lb•in. (2.5 N•m)
No. of Conductors/Terminal	1
Operating Temperature	-40…+80 °C

Approximate Dimensions

Note: Dimensions are shown in millimeters. Dimensions are not intended for manufacturing purposes.



Bulletin 4983-DS DIN Rail AC Surge Protective Devices

- Compact modular design
- Robust design avoids uneccessary replacement
- DIN Rail mounted, Type 2
- Replacement (pluggable) module
- Visual status indicator (on unit)
- Remote status indicator

Bulletin 4983-DS offers a number of options to meet your basic surge protection needs. The Bulletin 4983-DS products are connected in parallel and use an MOV to clamp high-voltage surges. The Bulletin 4983-DS devices are primarily used in the main electrical panel for the protection of 1- and 3-phase systems.

Table of Contents

Standards Compliance

- UL 1449, 3rd Edition
- CSA C22.2, No. 8
- IEC 61643-1
- EN 61643-11

Certifications

- cURus Recognized Component (File No. E334011, Guide VZCA2, VZCA8)
- CE Marked
- CSA

Cat. No. Explanation

Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; not all combinations will produce a valid catalog number.

4983 — D S 120 — 40 1
a b c d e

a

Mount	
Code	Description
D	DIN Rail

b

Type	
Code	Description
S	Standard duty

c

Voltage	
Code	Description
120	120V
230	230V
277	480Y/277V
480	480V Delta
600	600V

d

Current Rating	
Code	Description
40	40 kA
80	80 kA

e

Poles	
Code	Description
1	1-pole
2	2-pole
3	3-pole
4	4-pole
1G	1-pole + 1
3G	3-pole + 1

8

AC Network	Connection Mode	No. of Poles	Max. Continuous Operating Voltage (MCOV) (U_c) [V AC]	Max. Discharge Current 8/20µs (I_{max}) [kA]	Nominal Discharge Current 8/20µs (I_n) [kA]	Protection Level (U_p) [kV]	UL 1449 Voltage Protection Rating (VPR) [V]	Appropriate Fuse* [A] Max.	Cat. No. Base and Module	Cat. No. Replacement Module Only	Cat. No. Replacement Module Only Gas Discharge Tube
120	L/G or N/G	1	150	40	20	0.9	700	125	**4983-DS120-401**	**4983-DS120-40**	—
	L/G, N/G	2							**4983-DS120-402**		
120/208Y	L1/G, L2/G, L3/G	3							**4983-DS120-403**		
	L1/G, L2/G, L3/G, N/G	4							**4983-DS120-404**		
230/400	L/G or N/G	1	275			1.25	1000		**4983-DS230-401**	4983-DS230-40	—
	L/G, N/G	2							**4983-DS230-402**		
	L1/G, L2/G, N/G	3							**4983-DS230-403**		
277	L/G or N/G	1	420			1.8	1500		**4983-DS277-401**	**4983-DS277-40**	—
277/480Y	L1/G, L2/G, L3/G	3							**4983-DS277-403**		
	L1/G, L2/G, L3/G, N/G	4							**4983-DS277-404**		
480D	L1/G, L2/G, L3/G	3	550			1.8	1800		**4983-DS480-403**	**4983-DS480-40**	—
230/400	L/G, N/G	2	275	40	20	1.25	1000	125	**4983-DS230-401G**	4983-DS230-40	**4983-DS230-40G**
	L1/G, L2/G, L3/G, N/G	4					1000		**4983-DS230-403G**		
120	L/G or N/G	1	150	80	20	0.9	700	125	**4983-DS120-801**	**4983-DS120-80**	—
	L/G, N/G	2							**4983-DS120-802**		
120/208Y	L1/G, L2/G, L3/G	3							**4983-DS120-803**		
230/400	L/G or N/G	1	275			1.25	1000		**4983-DS230-801**	**4983-DS230-80**	—
	L/G, N/G	2							**4983-DS230-802**		
	L1/G, L2/G, N/G	3							**4983-DS230-803**		
277	L/G or N/G	1	420			1.8	1500		**4983-DS277-801**	**4983-DS277-80**	—
277/480Y	L1/G, L2/G, L3/G	3							**4983-DS277-803**		
	L1/G, L2/G, L3/G, N/G	4							**4983-DS277-804**		
480D	L1/G, L2/G, L3/G	4	680				2500		**4983-DS277-804**		
600D	L1/G, L2/G, L3/G	4	690						**4983-DS600-804**	**4983-DS600-80**	—

* Fuses required to protect the surge protector in case of short-circuit failure. They must be installed in series with each pole of the surge protector.

Note: N = Neutral
L/N = Line/neutral
N/G = Neutral/ground

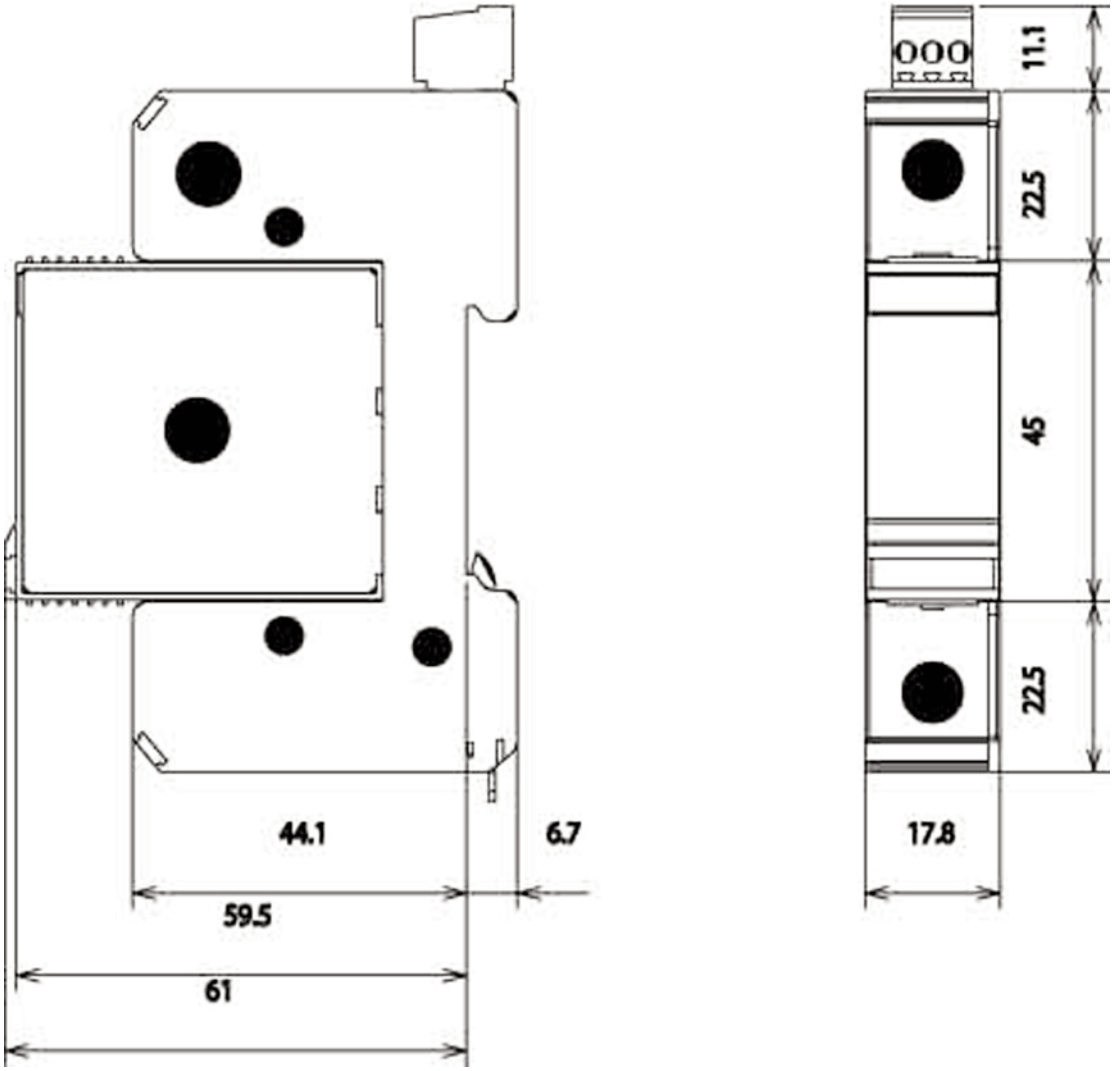
8

Specifications

Connection/Mounting Type	Parallel/DIN Rail mount
Standards Compliance	UL 1449, CSA 22.2 No.8, IEC 61643-1, EN 61643-11
Certifications	cURus, CSA, CE marked
Conductor Material	Cu, solid or stranded
Conductor Range	#10…4 AWG (4…28 mm²)
Strip Length	0.4 in. (10 mm)
Tightening Torque	17.8…22.1 lb•in. (2.0…2.5 N•m)
No. of Conductors/Terminal	1
Operating Temperature	-40…+80 °C

Approximate Dimensions

Note: Dimensions are shown in millimeters. Dimensions are not intended for manufacturing purposes.



Bulletin 4983-DD DIN Rail Dataline Surge Protective Devices

- Compact, modular design
- Cost-effective to protect individual loads

Bulletin 4983-DD SPDs are designed to protect industrial communication networks. This device uses a combination of 3-electrode gas discharge tubes and fast-clamping diodes. Typical applications include industrial processing equipment, transmission systems, I/O cards, probes, actuators, and displays.

Table of Contents

Standards Compliance

- UL 497B
- IEC 61643-21

Certifications

- UL Listed (File No. E317213, Guide QVGQ)
- CE Marked

Cat. No. Explanation

Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; not all combinations will produce a valid catalog number.

4983 — D D 06
a b c

a

Mount	
Code	Description
D	DIN Rail

b

Type	
Code	Description
D	Dataline UL 497B

c

Voltage	
Code	Description
06	6V
12	12V
24	24V

Product Selection

AC Network	Max. Continuous Operating Voltage (MCOV) [V DC]	Nominal Discharge Current 8/20µs (I_n) [kA]	Max. Discharge Current 8/20µs (I_{max}) [kA]	Protection Level (U_p)	Nom. Line Voltage [V]	Line Type	Cat. No.
4…20 mA Loop type	28	5	20	40 V	24V	1 pair with shield	**4983-DD24**
RS232 type	15	5	20	30 V	12V	1 pair with shield	**4983-DD12**
High-speed transmission (LAN) RS485 type, RS422 type	8	5	20	25 V	6V	1 pair with shield	**4983-DD06**

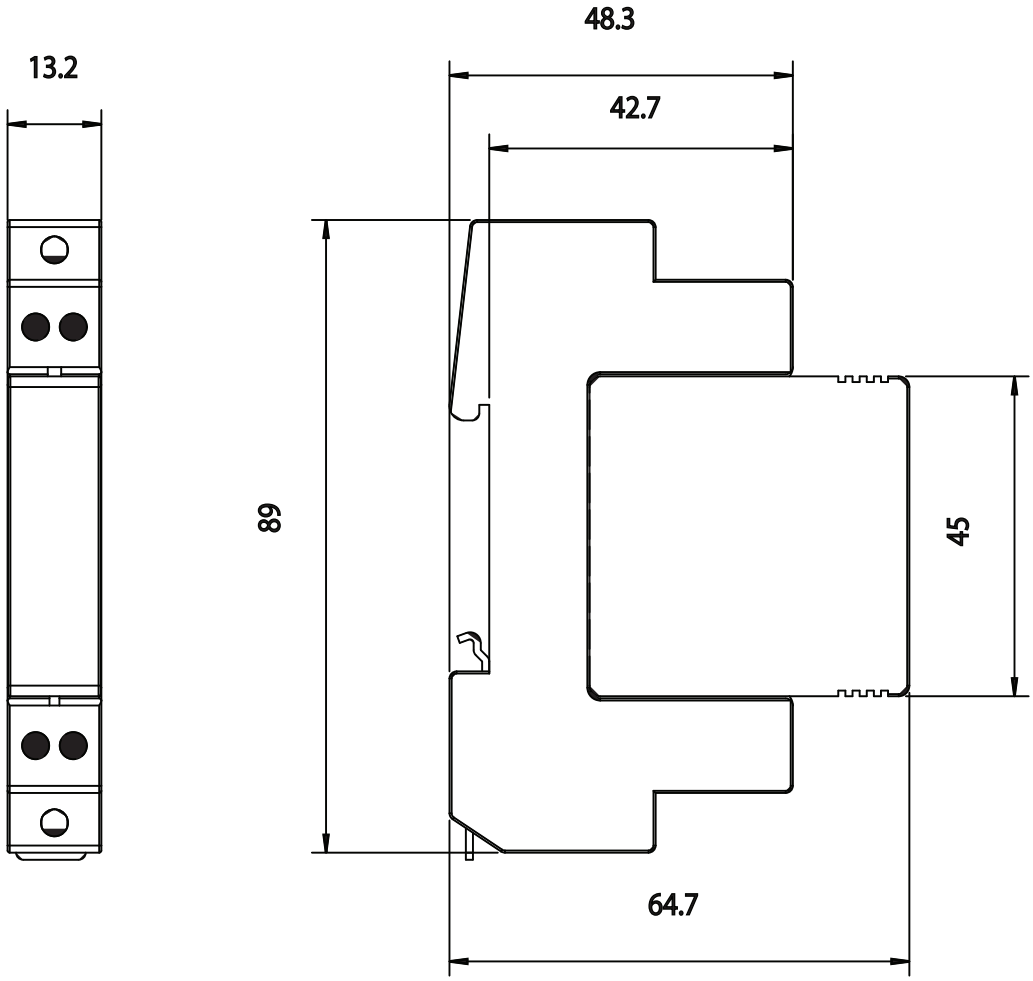
8

Specifications

Connection/Mounting Type	Series/DIN Rail mount
Standards Compliance	UL 497B, IEC 61643-21
Certifications	CE Marked, UL Listed
Conductor Material	Cu, solid or stranded
Conductor Range	#21…16 AWG (0.4…1.5 mm^2)
Strip Length	0.2 in. (5 mm)
Tightening Torque	4.4 lb•in (0.5 N•m)
No. of Conductors/Terminal	1
Operating Temperature	-40…+80 °C

Approximate Dimensions

Note: Dimensions are shown in millimeters. Dimensions are not intended for manufacturing purposes.



Bulletin 4983-PF Panel Mount Filter

- Features Islatrol filter technology
- LED power indication
- Panel (flange) mount

Bulletin 4983-PF is a panel (flange) mount filter product. The main function of the Bulletin 4983-PF filter is noise protection; it monitors and cleans the wave of high frequency noise disturbances that can cause premature aging.

Table of Contents

Standards Compliance

- UL 1283
- IEC 61643-1
- EN 61643-11

Certifications

- UR recognized component (File No. E316867, Guide FOKY2)
- CE Marked
- CSA C22.2

Cat. No. Explanation

Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; not all combinations will produce a valid catalog number.

4983 — P F 120 — 2
a b c d

a

Mount	
Code	Description
P	Panel/Flange

b

Type	
Code	Description
F	Filter UL 1283

c

Voltage	
Code	Description
120	120V
240	240V

d

Current Rating	
Code	Description
2	2.5 A
5	5 A
15	15 A
30	30 A

Product Selection

Operating Voltage [V AC]	Max. Continuous Operating Voltage	Line Frequency [Hz]	Ampacity [A]	Cat. No.
120	150 Vrms @ 120	47…63	2.5	**4983-PF120-02**
			5.0	**4983-PF120-05**
			15	**4983-PF120-15**
			30	**4983-PF120-30**
240	275 Vrms @ 240		2.5	**4983-PF240-02**
			5.0	**4983-PF240-05**
			15	**4983-PF240-15**
			30	**4983-PF240-30**

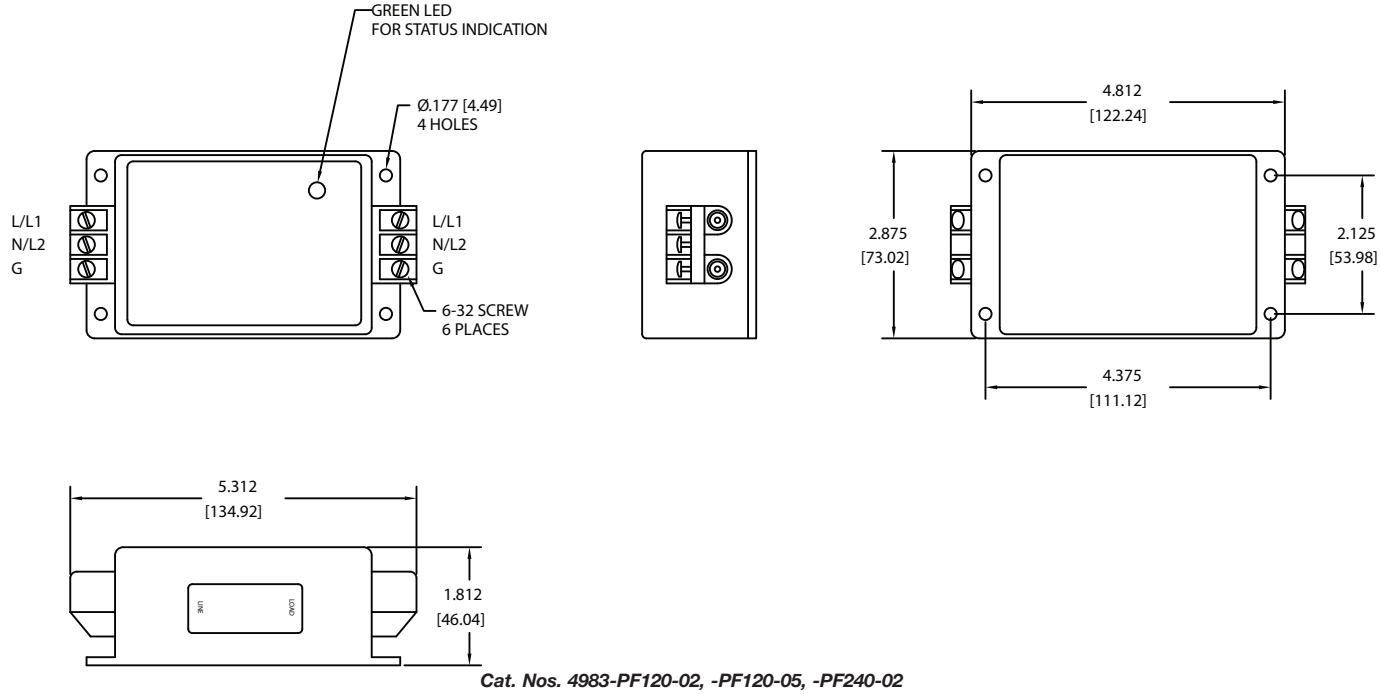
8

Specifications

Connection/Mounting Type	Series/Panel (Flange) mount
Enclosure	Grey, high-impact plastic, 94V-0, product label
Approximate Weight	2.5 A — 1.5 lb 5.0 A — 1.5 lb 15 A — 4 lb 30 A — 6.5 lb
Modes of Protection	Line — Neutral Line — Line Line — PE Neutral — PE
Certifications	UR recognized component, CE Marked
Typical Cat. A Ringwave Rating	< 10V peak
Typical Cat. B Ringwave Rating	< 50V peak
Status Indication	Single green LED for power indication
Response Time	Normal mode: < 0.5 ns Common Mode: < 5 ns
Operating Temperature	-40…+60 °C derate linearly to 60% @ +70 °C
Fusing	Appropriate external fusing is required
Frequency Response (Forward - Reverse) 100 kHz…50 MHz	Normal Mode — 90 dB min. Common Mode — 60 dB min. 3 kHz cut-off frequency
Peak Surge Current Capability (8 x 20 µs) **All Mode Unit** Line to Neutral Line to Ground Neutral to Ground	 15 kA 15 kA 15 kA

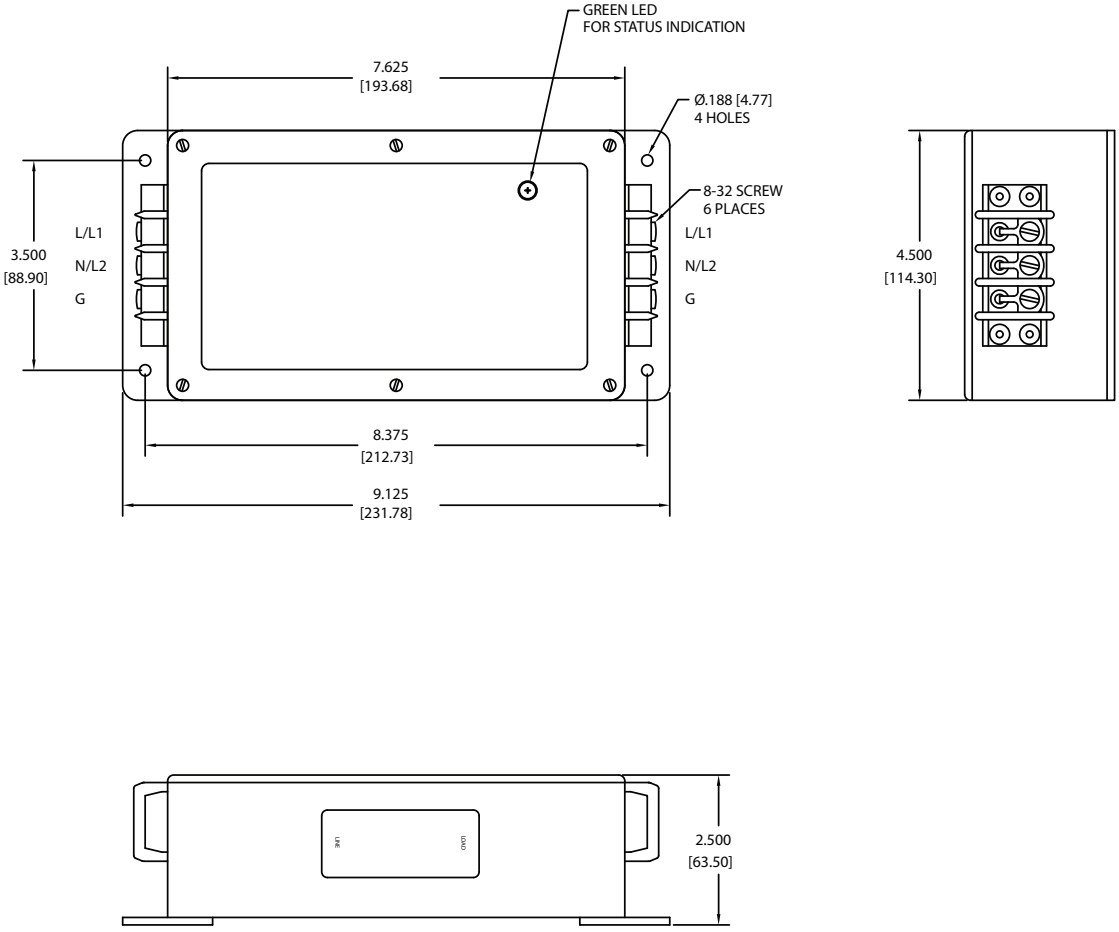
Approximate Dimensions

Note: Dimensions are shown in inches (millimeters). Dimensions are not intended for manufacturing purposes.



Cat. Nos. 4983-PF120-02, -PF120-05, -PF240-02

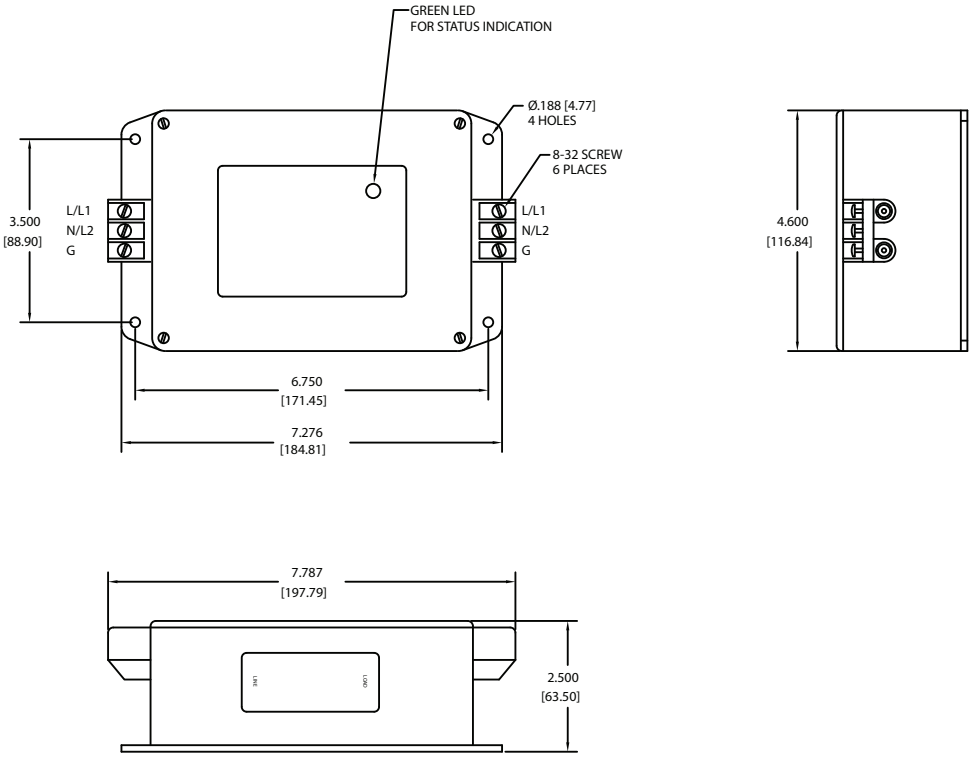
Note: Dimensions are shown in inches (millimeters). Dimensions are not intended for manufacturing purposes.



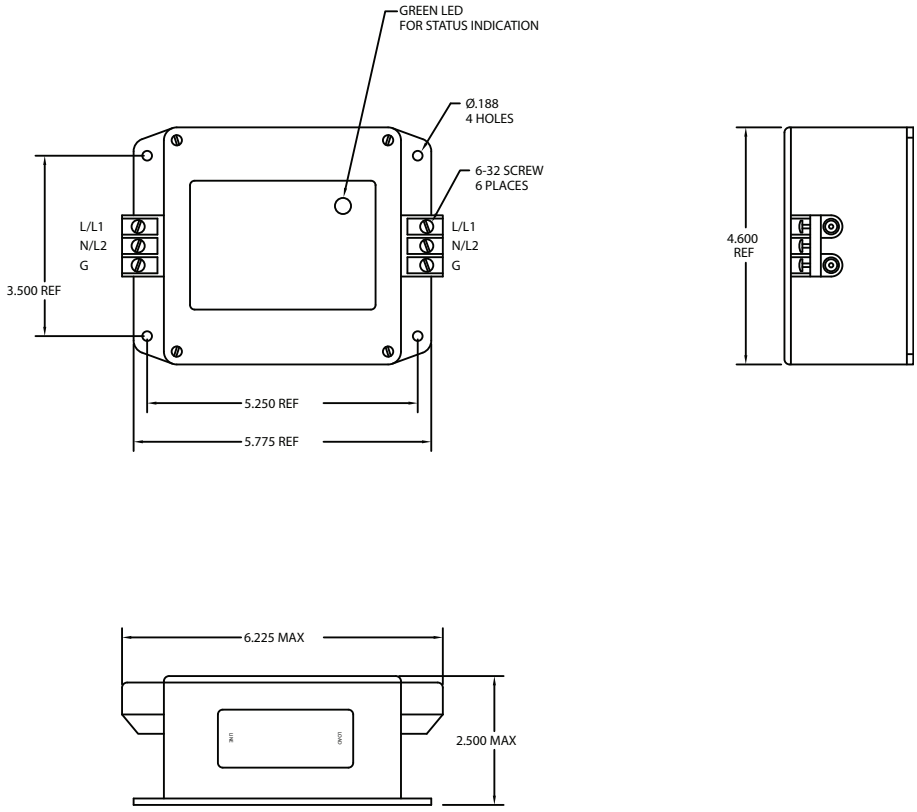
Cat. Nos. 4983-PF120-30, -PF240-15, -PF240-30

8

Note: Dimensions are shown in inches (millimeters). Dimensions are not intended for manufacturing purposes.



Cat. Nos. 4983-PF120-15



Cat. No. 4983-PF240-05

Bulletin 4983-DC DIN Rail Filter and Surge Protective Devices

- Small combination (filter and SPD) package size
- Features Isatrol technology
- All-mode transient protection with exceptional Line to Neutral value of 25 kA
- LED power indication
- Form C contact for remote status indication
- DIN Rail mountable

Bulletin 4983-DC is the combination of a filter and a surge protective device. The Bulletin 4983-DC product meets both UL 1449 and UL 1283. This product allows transient and noise protection in one small package.

Table of Contents

Standards Compliance

- UL 1283
- UL 1449
- IEC 61643-1
- EN 61643-11
- CSA C22.2

Certifications

- cURus Recognized Component (File No. E334011, Guide VZCA2, VZCA8), (File No. E316867, Guide FOKY2)
- CSA
- CE Marked

Cat. No. Explanation

Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; not all combinations will produce a valid catalog number.

4983 — D C 120 3
a b c d

a

Mount	
Code	Description
D	DIN Rail

b

Type	
Code	Description
C	Combo UL 1449/UL 1283

c

Voltage	
Code	Description
120	120V
240	240V

d

Current Rating	
Code	Description
3	3 A
5	5 A
10	10 A
20	20 A

8

DIN Rail Filter and Surge Protective Device — Bulletin 4983-DC

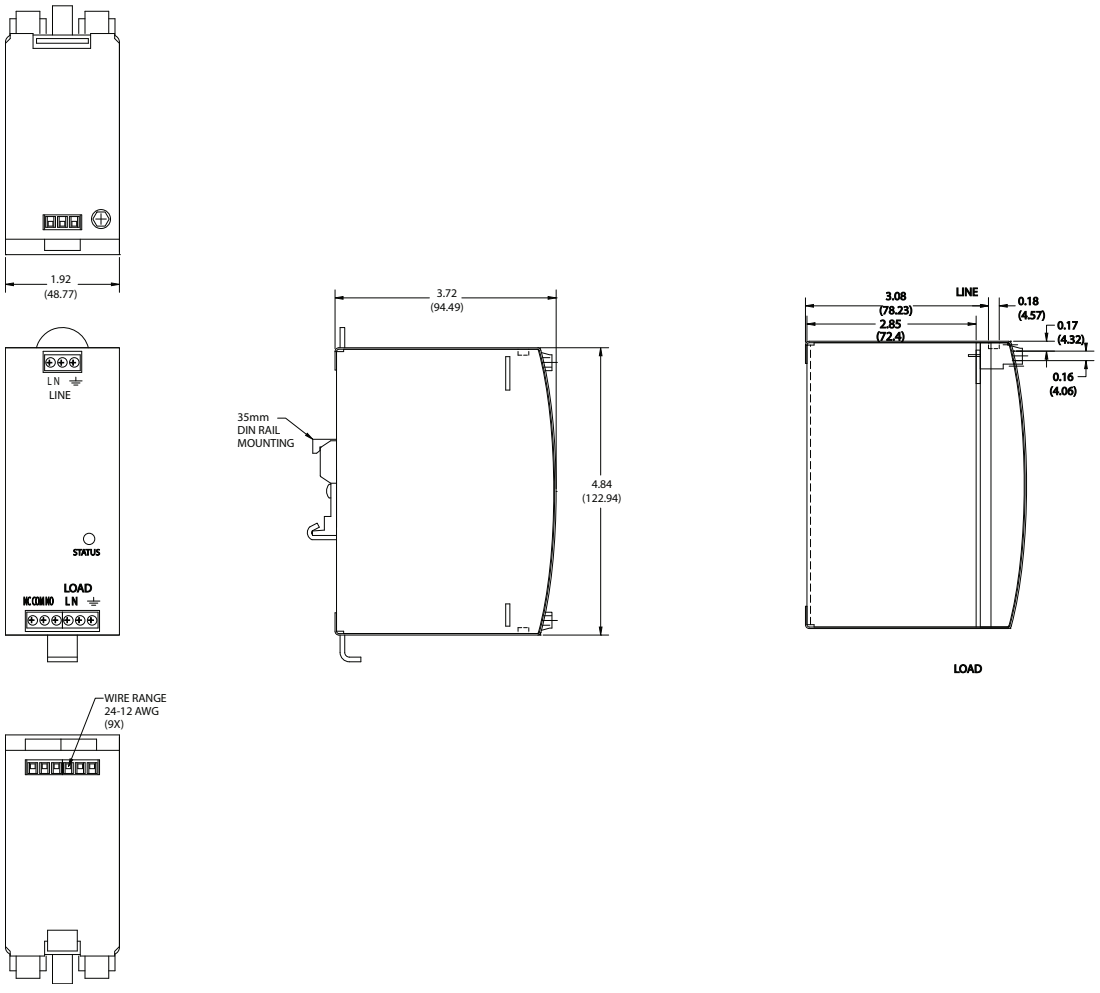
AC Network	Connection Mode	Frequency [Hz]	Max. Continuous Operating Voltage (MCOV) (Uc) [V AC]	Maximum Discharge Current 8/20µs (Imax) [kA]			Nominal Discharge Current 8/20µs (In) [kA]	UL1449 Voltage Protection Rating (VPR) [V AC]				Ampacity [A]	Cat. No.
				L/G	L/N	N/G		L/G	L/N	N/G	L-L		
120V AC	L/G, L/N, N/G	47...63	150	10	25	10	3	600	400	600	-	3.0	**4983-DC120-03**
												5.0	**4983-DC120-05**
												10	**4983-DC120-10**
												20	**4983-DC120-20**
240V AC			320					1200	-	-	800	3.0	**4983-DC240-03**
												5.0	**4983-DC240-05**
												10	**4983-DC240-10**
												20	**4983-DC240-20**

Specifications

Connection/Mounting Type	Series/DIN Rail mount
Enclosure	Metal, DIN Rail mount, product label
Approximate Weight	3 A — 1 lb 5 A — 1 lb 10 A — 1.5 lbs 20 A — 1.5 lbs
Modes of Protection	Line — Neutral Line — Line Line — PE Neutral — PE
Certifications	UR Recognized, CSA, CE Marked
Typical Cat. A Ringwave Rating	< 60V peak
Typical Cat. B Ringwave Rating	< 100V peak
Status Indication	Single green LED indicating MOV integrity Single form C contact (10 A @ 250V AC, 5 A @ 100V DC)
Response Time	Normal mode: < 0.5 ns Common Mode: < 5 ns
Operating Temperature	-40…+60 °C derate linearly to 60% @ +70 °C
Fusing	Appropriate external fusing is required
Frequency Response 100 kHz…50 MHz	Normal Mode (100 kHz…50 MHz) — 90 dB min. Common Mode (5…50MHz) — 60 dB min. 50 kHz cut-off frequency

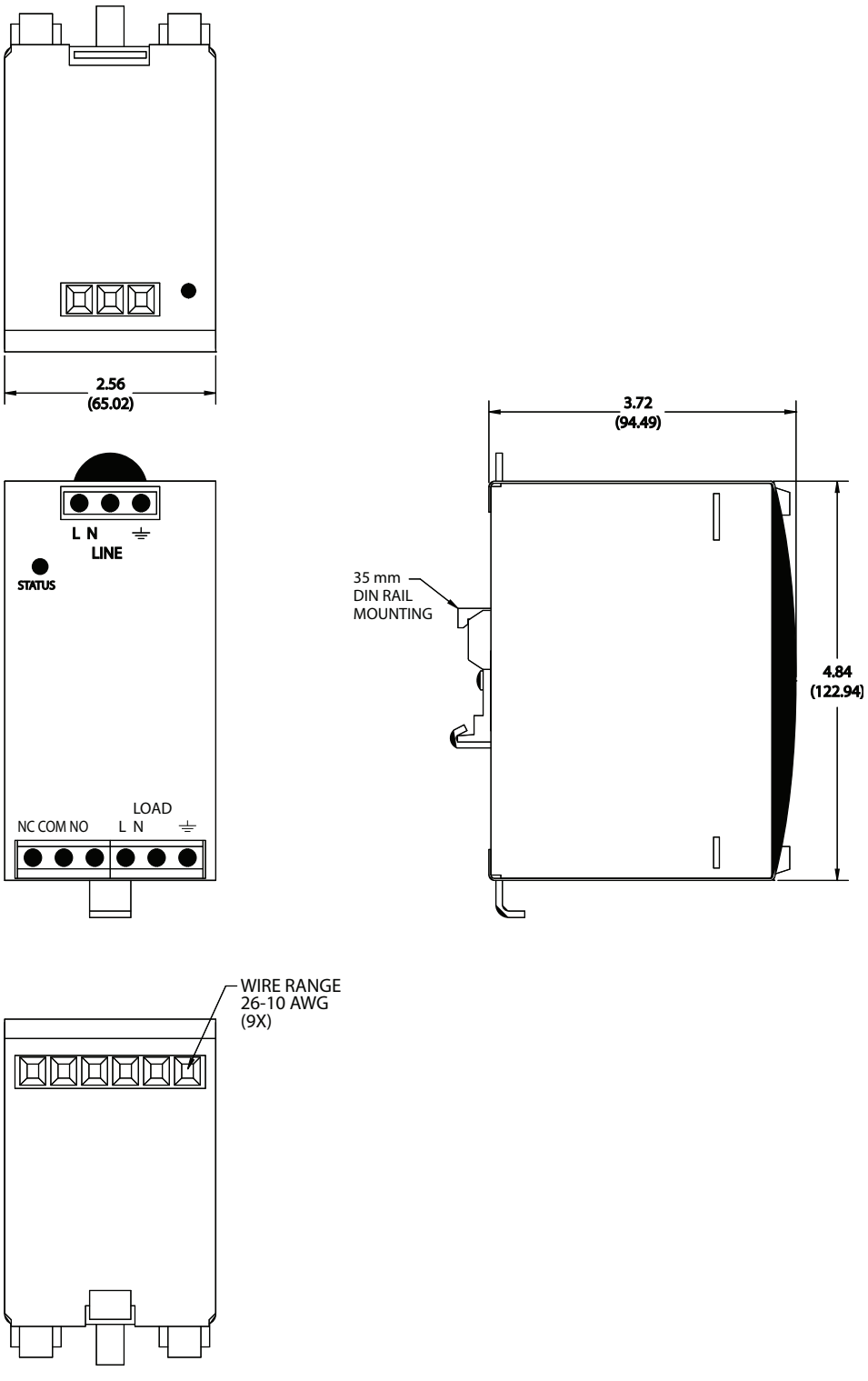
Approximate Dimensions

Note: Dimensions are shown in inches (millimeters). Dimensions are not intended for manufacturing purposes.



Cat. Nos. 4983-DCxxx-03, -DCxxx-05

Note: Dimensions are shown in inches (millimeters). Dimensions are not intended for manufacturing purposes.



Cat. Nos. 4983-DCxxx-10, -DCxxx-20