

ULTRAVOLT HIGH POWER 1/8C TO 6C SERIES

SINGLE OUTPUT 60, 125, OR 250 W CAPACITOR CHARGING SUPPLY

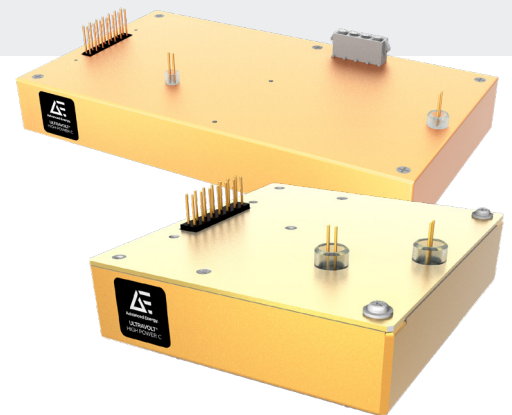
The UltraVolt® High Power C Series of regulated DC-to-DC converters are designed for high voltage capacitor charging applications that demand fast rise times with controlled voltage overshoot

PRODUCT HIGHLIGHTS

- Regulated high voltage outputs ranging from 125 to 6000 VDC maximum
- Single output: positive or negative polarity models
- Choice of 60, 125, or 250 W maximum power
- 24 VDC input
- Output ripple performance < 1.0 %
- Controlled high voltage overshoot enhances longevity of external load components
- Temperature coefficient 50 ppm/°C
- Simplified integration with available 0 to 5 VDC or 0 to 10 VDC interface
- Reliable modular design
- Factory-configured performance, control and integration options
- UL/cUL recognized, IEC-60950-1, CE Mark (LVD and RoHS)

TYPICAL APPLICATIONS

- Capacitive charging and pulsed power applications
- High potential testing and Electrostatic Discharge (ESD)
- Automated Test Equipment (ATE)
- Lasers and opto-electronics
- Ultrasonic pulse generators



AT A GLANCE

Maximum Output Voltage

125, 250, 500, 1 kV, 2 kV, 4 kV,
or 6 kV DC

Maximum Output Power

60, 125, or 250 W

Type

Single Output

Ripple

< 1.0 %

Control

Analog

Temperature Coefficient

50 ppm/°C

ULTRAVOLT HIGH POWER 1/8C TO 6C SERIES

ELECTRICAL SPECIFICATIONS

| Model ¹ | | 1/8C Series | | | 1/4C Series | | |
|-------------------------------------------------------------------------------|-------------------------------------------|-----------------|-------|--------|-----------------|-------|--------|
| High Voltage Output Range (Adjustable Regulated, Positive or Negative Output) | | 0 to 125 VDC | | | 0 to 250 VDC | | |
| High Voltage Outputs | | Single Unipolar | | | Single Unipolar | | |
| Input Voltage (VDC, Nominal) | | 24 VDC | | | 24 VDC | | |
| Power Output (Watts, Nominal) | | 60 | 125 | 250 | 60 | 125 | 250 |
| DC Input | | | | | | | |
| Vin (Input Voltage) Range | VDC | 23 to 30 | | | 23 to 30 | | |
| Vin (Nominal) | VDC | 24 | | | 24 | | |
| Iin (Input Current, Nominal) | A @ 100% HVout, 100% LOAD | < 3.3 | < 6.9 | < 13.5 | < 3.3 | < 6.9 | < 13.5 |
| | A @ 100% HVout, 0% LOAD | < 0.5 | | < 0.8 | < 0.5 | | < 0.8 |
| | A @ disable/standby state | < .075 | | | < .075 | | |
| DC Output | | | | | | | |
| HVout (Output Voltage) | VDC | 0 to 125 VDC | | | 0 to 250 VDC | | |
| Iout (Output Current) | mA (max) @ 0 to 100% HVout, Vin (nominal) | 480 | 1000 | 2000 | 240 | 500 | 1000 |
| Current Scale Factor | mA/V | 400 | 833 | 1667 | 200 | 417 | 833 |
| Pout (Output Power) | Watts (max) | 60 | 125 | 250 | 60 | 125 | 250 |
| Capacitance | Internal storage capacitance (μF) | 0.66 | | 1.32 | 0.20 | | 0.33 |
| Ripple ² | % | < 1.0 | | | < 1.0 | | |

| Model ¹ | | 1/2C Series | | | 1C Series | | |
|-------------------------------------------------------------------------------|-------------------------------------------|-----------------|-------|--------|-----------------|-------|--------|
| High Voltage Output Range (Adjustable Regulated, Positive or Negative Output) | | 0 to 500 VDC | | | 0 to 1000 VDC | | |
| High Voltage Outputs | | Single Unipolar | | | Single Unipolar | | |
| Input Voltage (VDC, Nominal) | | 24 VDC | | | 24 VDC | | |
| Power Output (Watts, Nominal) | | 60 | 125 | 250 | 60 | 125 | 250 |
| DC Input | | | | | | | |
| Vin (Input Voltage) Range | VDC | 23 to 30 | | | 23 to 30 | | |
| Vin (Nominal) | VDC | 24 | | | 24 | | |
| Iin (Input Current, Nominal) | A @ 100% HVout, 100% LOAD | <3.3 | < 6.9 | < 13.5 | <3.3 | < 6.9 | < 13.5 |
| | A @ 100% HVout, 0% LOAD | < 0.5 | | < 0.8 | < 0.5 | | < 0.8 |
| | A @ disable/standby state | < .075 | | | < .075 | | |
| DC Output | | | | | | | |
| HVout (Output Voltage) | VDC | 0 to 500 | | | 0 to 1000 | | |
| Iout (Output Current) | mA (max) @ 0 to 100% HVout, Vin (nominal) | 120 | 250 | 500 | 60 | 125 | 250 |
| Current Scale Factor | mA/V | 109 | 208 | 417 | 50 | 114 | 227 |
| Pout (Output Power) | Watts (max) | 60 | 125 | 250 | 60 | 125 | 250 |
| Capacitance | Internal storage capacitance (μF) | 0.094 | | 0.328 | 0.034 | | 0.072 |
| Ripple ² | % | < 1.0 | | | < 1.0 | | |

¹ Standard product specifications shown unless noted. Custom configurations are available.

² Nominal ripple measured @ 100% HVout, 100% LOAD. Valid for 10 to 100% HVout range.

ELECTRICAL SPECIFICATIONS (CONTINUED)

| Model ¹ | | 2C Series | | | 4C Series | | | 6C Series | | |
|-------------------------------------------------------------------------------|-------------------------------------------|-----------------|-------|--------|-----------------|-------|--------|-----------------|-------|--------|
| High Voltage Output Range (Adjustable Regulated, Positive or Negative Output) | | 0 to 2000 VDC | | | 0 to 4000 VDC | | | 0 to 6000 VDC | | |
| High Voltage Outputs | | Single Unipolar | | | Single Unipolar | | | Single Unipolar | | |
| Input Voltage (VDC, Nominal) | | 24 VDC | | | 24 VDC | | | 24 VDC | | |
| Power Output (Watts, Nominal) | | 60 | 125 | 250 | 60 | 125 | 250 | 60 | 125 | 250 |
| DC Input | | | | | | | | | | |
| Vin (Input Voltage) Range | VDC | 23 to 30 | | | 23 to 30 | | | 23 to 30 | | |
| Vin (Nominal) | VDC | 24 | | | 24 | | | 24 | | |
| Iin (Input Current, Nominal) | A @ 100% HVout, 100% LOAD | < 3.3 | < 6.9 | < 13.5 | < 3.3 | < 6.9 | < 13.5 | < 3.3 | < 6.9 | < 13.5 |
| | A @ 100% HVout, 0% LOAD | < 0.5 | | < 0.8 | < 0.5 | | < 0.8 | < 0.5 | | < 0.8 |
| | A @ disable/standby state | < .075 | | | < .075 | | | < .075 | | |
| DC Output | | | | | | | | | | |
| HVout (Output Voltage) | VDC | 0 to 2000 | | | 0 to 4000 | | | 0 to 6000 | | |
| Iout (Output Current) | mA (max) @ 0 to 100% HVout, Vin (nominal) | 30 | 62 | 125 | 15 | 31 | 62 | 10 | 21 | 42 |
| Current Scale Factor | mA/V | 26 | 52 | 104 | 11.5 | 26 | 52 | 6.2 | 17.7 | 35 |
| Pout (Output Power) | Watts (max) | 60 | 125 | 250 | 60 | 125 | 250 | 60 | 125 | 250 |
| Capacitance | Internal storage capacitance (μF) | 0.0168 | | 0.0224 | 0.0084 | | 0.0112 | 0.0056 | | 0.0075 |
| Ripple ² | % | < 1.0 | | | < 1.0 | | | < 1.0 | | |

¹ Standard product specifications shown unless noted. Custom configurations are available.

² Nominal ripple measured @ 100% HVout, 100% LOAD. Valid for 10 to 100% HVout range.

| Programming and Controls | Standard | I5/I10 Interface |
|--------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| Control Input Impedance | +Output Models: 1.1 MΩ to GND | 10 MΩ |
| | -Output Models: 1.1 MΩ to +5 Vref | |
| Adjust Resistance | 10 to 100 K (Pot. across Vref. and signal GND, wiper to adjust) | Same as Standard |
| Adjust Logic | 0 to 4.64 for +Output, +5 to 0.36 V for -Output, +4.64 VDC for +output or +0.36 VDC for -output = nominal | 0 to +5 (I5), 0 to +10 (I10) |
| Reference Voltage | +5.00 VDC ±1%, Zout = 464 Ω ±1% | +5 V, 3 mA ±0.1% (I5), +10 V, 3 mA ±0.1% (I10) |
| Enable/Disable | 0 to +0.8 disable, +2.0 to 30 enable (default = enable) | 0 to +0.8 disable, +2.0 to 30 enable (default = disable) |

| Stability and Regulation | |
|--------------------------|----------------------------------------------------------------------|
| Stability | 0.01% (100 ppm) @ 100% HVout (after 30 min warmup interval) |
| | 0.02% (200 ppm) @ 100% HVout (per 8 h interval) |
| Line Regulation | 0.01% (100 ppm) @ 100% HVout, 100% Pout, Vin (nominal) |
| Static Load Regulation | 0.01% (100 ppm) @ 100% HVout, 0 to 100% LOAD |
| Temperature Coefficient | 50 ppm/°C (Standard configuration over operating temperature range) |
| Power-On Rise Time | Application dependent (See Rise Time / Capacitor Charging Equations) |

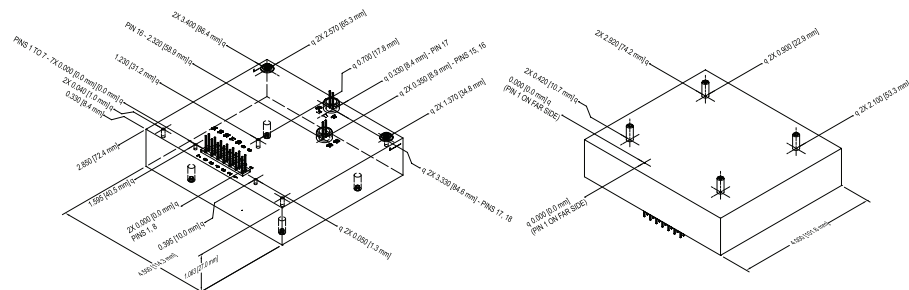
ELECTRICAL SPECIFICATIONS (CONTINUED)

| Environmental | |
|-----------------------------|----------------------------------------------------|
| Operating Temperature Range | -40 to 65°C (-40 to 149°F) bottom case temperature |
| Storage | -55 to 105°C (-67 to 222°F) case temperature |
| Humidity | 0 to 95% RH, non-condensing |
| Altitude | Sea level to 3000 m (10,000 ft) |

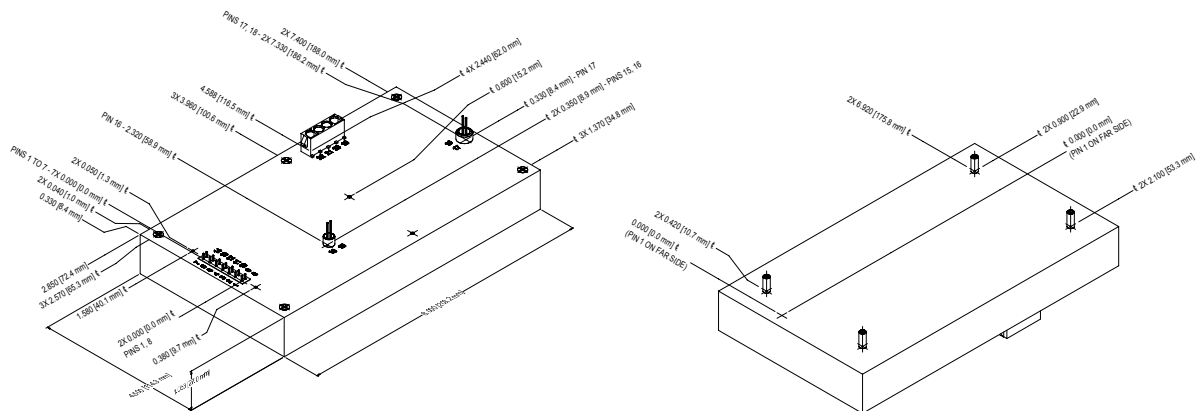
| Regulatory | |
|----------------|--------------------------------------------------------|
| Certifications | UL/cUL recognized, IEC-60950-1, CE mark (LVD and RoHS) |

MECHANICAL SPECIFICATIONS

60 and 125 W



250 W



| Construction | |
|---------------|--------------------------------------------------------|
| Standard Case | Aluminum (Anodized per MIL-A-8625 Type II) |
| Heatsink | Aluminum (Anodized, -H Option) |
| PCB Standoffs | Zinc-plated steel (-Z11 Option) |
| Labels | Static-dissipative polyester |
| Cooling | Natural convection and conduction |
| Encapsulation | Silicone-based RTV (contact factory for other options) |
| Pins | Gold-plated bronze |

MECHANICAL SPECIFICATIONS (CONTINUED)

| Volumes and Weights | 60 W | | 125 W | | 250 W | |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Volume (Module body only) | cm ³ | in ³ | cm ³ | in ³ | cm ³ | in ³ |
| | 313.55 | 19.13 | 313.55 | 19.13 | 634 | 38.7 |
| Weight (Standard Configuration) | g | oz | g | oz | g | oz |
| | 603 | 21.3 | 603 | 21.3 | 1220 | 43 |

INTERFACE

Connections — 60 W and 125 W Units

| Pin | Function: Standard | Function: I5 or I10 option |
|-----------|---------------------------|------------------------------------------------|
| 1 and 8 | Input Power Ground Return | Input Power Ground Return |
| 2 and 9 | Positive DC power input | Positive DC power input |
| 3 | Iout Monitor | Buffered Current Monitor (3mA max) |
| 4 | Enable/Disable | Enable/Disable |
| 5 | Signal Ground | Signal Ground |
| 6 | Voltage Programming | Voltage Programming |
| 7 | +5 VDC Reference Output | +5 VDC (-I5) or +10 VDC (I10) Reference Output |
| 10 | N/C | N/C |
| 11 | N/C | Current Mode Indicator |
| 12 | N/C | Voltage Mode Indicator |
| 13 | N/C | Current Programming |
| 14 | Output Voltage Monitor | Buffered Voltage Monitor (3mA max) |
| 15 and 16 | HV Ground Return | HV Ground Return |
| 17 and 18 | HV Output | HV Output |

Connections — 250 W Units

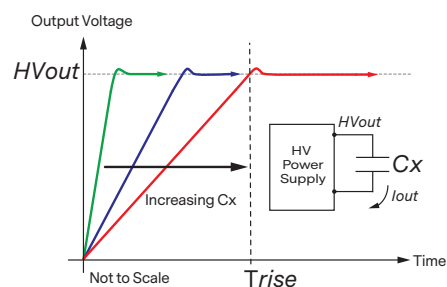
| Pin | Function: Standard | Function: I5 or I10 option |
|---------|-------------------------|------------------------------------------------|
| 1 and 8 | N/C | N/C |
| 2 and 9 | N/C | N/C |
| 3 | Iout Monitor | Buffered Current Monitor (3 mA max) |
| 4 | Enable/Disable | Enable/Disable |
| 5 | Signal Ground | Signal Ground |
| 6 | Voltage Programming | Voltage Programming |
| 7 | +5 VDC Reference Output | +5 VDC (-I5) or +10 VDC (I10) Reference Output |
| 10 | N/C | N/C |
| 11 | N/C | Current Mode Indicator |

INTERFACE (CONTINUED)

Connections — 250 W Units (Continued)

| Pin | Function: Standard | Function: I5 or I10 option |
|-----------|---------------------------|-------------------------------------|
| 12 | N/C | Voltage Mode Indicator |
| 13 | N/C | Current Programming |
| 14 | Output Voltage Monitor | Buffered Voltage Monitor (3 mA max) |
| 15 and 16 | HV Ground Return | HV Ground Return |
| 19 and 20 | Positive DC Power Input | Positive DC Power Input |
| 21 and 22 | Input Power Ground Return | Input Power Ground Return |
| 17 and 18 | HV Output | HV Output |

RISE TIME / CAPACITOR CHARGING



$$Trise = \frac{(Co + Cx) \times HVout}{Iout}$$

$$Iout = (Co + Cx) \times HVout \times freq$$

$$Pout = \frac{(Co + Cx) \times (HVout)^2}{2 \times Trise}$$

$Trise$ = Rise time (Seconds)

Co = Internal storage capacitance (Farads)

Cx = External capacitive load (Farads)

$freq$ = Switching frequency (Hz)

$HVout$ = Output voltage (VDC)

$Iout$ = Output current (Amps)

$Pout$ = Output power (Watts)

STANDARD OPTIONS

The High Power C series can be configured with options that adapt its performance and packaging to many application requirements. Customized models to meet specialized voltage ranges, packaging and environmental needs are also available. For a complete list of available options, contact factory.

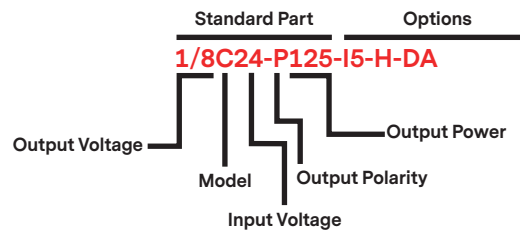
| Option | Description |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -I5 | Upgrades analog interface to provide more precise control and monitoring of both HVout and Iout using 0 to 5 VDC (full scale) signals. Also adds Iout control and voltage/current mode indication capability not available on the Standard Interface. Not available with -I10 option. |
| -I10 | Upgrades analog interface to provide more precise control and monitoring of both HVout and Iout using 0 to 10 VDC (full scale) signals. Also adds Iout control and voltage/current mode indication capability not available on the Standard Interface. Not available with -I5 option. |
| -H | Mounts a heatsink onto the case bottom to assist in convective heat dissipation. |
| -DA | Replaces header with D-sub connector (Type DA-15, Male). Not available with -DAR or -Z11 option. |
| -DAR | Replaces header with right-angle D-sub connector (Type DA-15, Male). Not available with -DA or -Z11 option. |
| -Z11 | Permits PCB mounting by adding seven 4.8 mm (0.188 in) x #4-40 threaded standoffs to the case top. Not available with -DA or -DAR option. |

ORDERING INFORMATION

| | | |
|--------------------|-----------------------------------------------------|------|
| Type | 0 to 125 VDC Output | 1/8C |
| | 0 to 250 VDC Output | 1/4C |
| | 0 to 500VDC Output | 1/2C |
| | 0 to 1000 VDC Output | 1C |
| | 0 to 2000 VDC Output | 2C |
| | 0 to 4000 VDC Output | 4C |
| | 0 to 6000 VDC Output | 6C |
| Input | 24 VDC Nominal | 24 |
| Polarity | Positive Output | -P |
| | Negative Output | -N |
| Power | 60 W Output | 60 |
| | 125 W Output | 125 |
| | 250 W Output | 250 |
| Heatsink | 1.02 cm (0.400") high (sized to fit case) | -H |
| PCB Support | (6) 0.47 cm (0.187") standoffs on top of cover | -Z11 |
| Enhanced Interface | 5 V Control and Monitors | -I5 |
| | 10 V Control and Monitors | -I10 |
| Connection Options | Straight 15-Pin D-sub connector (Type DA-15Male) | -DA |
| | Right-angle 15-Pin D-sub connector (Type DA-15Male) | -DAR |

* Available only with I5 or I 10 options

* -DA and -DAR not available with a -Z11 option





For international contact information,
visit advancedenergy.com.

powersales@aei.com (Sales Support)
productsupport.ep@aei.com (Technical Support)
+1 888 412 7832

ABOUT ADVANCED ENERGY

Since 1981, Advanced Energy (AE) — and its UltraVolt® family of products — has perfected how power performs for its customers. For both end users and OEMs, AE's comprehensive portfolio of standard and custom high-voltage components precisely match system specifications to deliver unparalleled energy, quality, and performance. Through close customer collaboration, design expertise, application insight, and world-class support, AE creates successful partnerships and enables customers to push the boundaries of innovation and stay ahead of evolving market needs.

PRECISION | POWER | PERFORMANCE | TRUST



CAUTION:
High Voltage

Read and understand all documentation before you install, operate, or maintain Advanced Energy high voltage power supplies. Follow all safety instructions and precautions to protect against property damage and serious or possibly fatal bodily injury. Never defeat safety interlocks or grounds.

Specifications are subject to change without notice. Not responsible for errors or omissions. ©2019 Advanced Energy Industries, Inc. All rights reserved. Advanced Energy®, AE®, and Ultravolt® are U.S. trademarks of Advanced Energy Industries, Inc.



ENG-High-Power-1/8C-6C-235-01 02.15.2023

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Advanced Energy:

[1/4C24-P250](#) [1/4C24-P20](#) [1/2C24-P125](#) [1/4C24-N60-I10-DAR-H](#) [1/4C24-P60-I5-DA-H](#) [1/8C24-N125-I10-DAR](#)
[1/8C24-P125-DAR-H](#) [1/8C24-P250-I10-DAR](#) [1/8C24-P60-I5-DA-H](#) [2C24-N125-DAR](#) [2C24-NP125-I5-H-1](#) [2C24-P60-](#)
[H](#) [4C24-N60-I10-DAR](#) [4C24-P125-DA-H](#) [4C24-P60-DA-H](#) [6C24-N125-DA-H](#) [6C24-N60-I5-DAR](#) [1/4C24-N125-I10-](#)
[DA-H](#) [1/8C24-N125-I5](#) [1/8C24-N125-I5-DA](#) [1/8C24-N60-I10-DA](#) [1/8C24-N60-I10-DA-H](#) [1/8C24-P125-I5-DA](#) [1/8C24-](#)
[P60-I10-DA-H](#) [2C24-N125-I10-H](#) [2C24-N60-I10-DA](#) [2C24-NP250-I5-1](#) [2C24-P250-DAR](#) [4C24-N60-DAR](#) [4C24-P60-](#)
[I10-DAR](#) [6C24-N125-I10-DAR-H](#) [4C24-N60-DA-H](#) [4C24-P250-DA](#) [1/4C24-N250-I10-DA](#) [1/4C24-NP125-I5-1](#) [1/8C24-](#)
[N60-DA-H](#) [1/8C24-P60-H](#) [1/8C24-P60-I5](#) [2C24-N125-I5-DAR-H](#) [2C24-N60-I5-DAR](#) [4C24-P60-DAR-H](#) [6C24-NP250-](#)
[I10-H-1](#) [6C24-P125-DAR](#) [6C24-P60-I10-DAR](#) [1/4C24-N60-I10-DA-H](#) [1/8C24-N125-I10-DA](#) [1/8C24-P125-DA-H](#)
[1/8C24-P60-I5-DAR-H](#) [2C24-N60-I5-DA](#) [2C24-P60-DAR](#) [4C24-N250-DA](#) [4C24-N60-I10-H](#) [6C24-N125-I5-DA-H](#)
[6C24-N60-I5-DA](#) [1/4C24-N125-DAR-H](#) [1/4C24-N60-I5-H](#) [1/4C24-NP125-I5-H-1](#) [1/4C24-NP250-I10-H-1](#) [1/8C24-](#)
[N125-DAR](#) [1/8C24-N60-I10-DAR](#) [1/8C24-P125-I10-DA-H](#) [2C24-N125-I5-DAR](#) [2C24-P250-I10-DAR](#) [4C24-N125-I5-](#)
[DAR](#) [4C24-N250-I10-DA](#) [4C24-N60-DAR-H](#) [4C24-N60-I5-DA-H](#) [4C24-P125-I10-DA](#) [4C24-P125-I5-H](#) [6C24-N125-](#)
[DAR-H](#) [6C24-N60-I10-H](#) [6C24-P60-I10-DAR-H](#) [6C24-P60-I5-DAR](#) [2C24-N125-I10-DAR](#) [6C24-P125-DA](#) [1/4C24-](#)
[N125-I5-H](#) [1/4C24-N60-H](#) [1/4C24-P60-DAR](#) [1/8C24-N60-DAR-H](#) [1/8C24-NP250-I10-H-1](#) [2C24-NP125-I10-H-1](#)
[2C24-P125-I10-DA-H](#) [2C24-P125-I10-DAR-H](#) [2C24-P125-I5-DAR-H](#) [4C24-N250-I10](#) [4C24-N60-I10-DA](#) [4C24-P60-](#)
[I10-DA](#) [6C24-N60-DA-H](#) [6C24-N60-DAR-H](#) [6C24-N60-I10-DAR-H](#) [6C24-P60-I5-DAR-H](#) [1/4C24-N125-I5-DA](#) [1/4C24-](#)
[NP125-I10-1](#) [1/4C24-P125-I5-DA-H](#) [1/4C24-P60-DA](#) [1/8C24-N60-I5](#) [1/8C24-N60-I5-DA-H](#) [1/8C24-P60-DA](#) [2C24-](#)
[P125-DAR-H](#) [2C24-P250-I5-DA](#)