

# Solid State Relays System Monitoring Relays (Sense Relay) Type RA.... ..S



- System (line and load) monitoring relay
- Zero switching
- Rated operational current: 25, 50, 90 and 110 AACrms
- Rated operational voltage: 120, 230, 400 and 480 VACrms
- High surge current capability
- Alarm output signal
- LED indication for alarm and supply

## Product Description

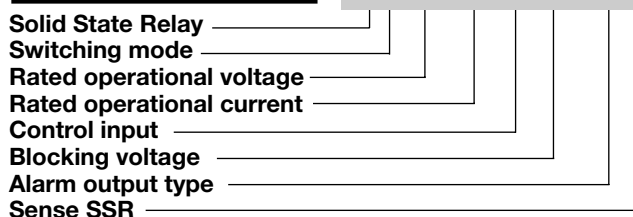
The system monitoring solid state relay (sense relay) provides an alarm output in the event of a circuit failure. Internal circuits monitor:

- line voltage/line current
- correct functioning of the SSR
- SSR input status

The relay is designed for applications where immediate fault detection is required. A red LED indicates an alarm, a green LED indicates DC control supply OK (half LED light intensity) resp. relay switched ON (full LED light intensity).

## Ordering Key

**RA 23 25 H 06 NO S**



## Type Selection

| Switching mode    | Rated operational voltage  | Rated operational current input                                    | Control voltage | Blocking Voltage   | Alarm output   |
|-------------------|--|--|-----------------|--|--|
| A: Zero switching | 12: 120 VACrms<br>23: 230 VACrms<br>40: 400 VACrms<br>48: 480 VACrms | 25: 25 AACrms<br>50: 50 AACrms<br>90: 90 AACrms<br>110: 110 AACrms | H: Active high  | 06: 650 V <sub>p</sub><br>10: 1000 V <sub>p</sub><br>12: 1200 V <sub>p</sub> | NO: NPN, NO<br>NC: NPN, NC<br>PO: PNP, NO<br>PC: PNP, NC |

## Selection Guide

| Rated op. voltage | Control input | Alarm output type | Rated operational current |                |                |                 |
|-------------------|---------------|-------------------|---------------------------|----------------|----------------|-----------------|
|                   |               |                   | 25 AACrms                 | 50 AACrms      | 90 AACrms      | 110 AACrms      |
| 120 VACrms        | Active high   | NPN, NO           | RA 1225 H06NOS            | RA 1250 H06NOS | RA 1290 H06NOS | RA 12110 H06NOS |
|                   |               | NPN, NC           | RA 1225 H06NCS            | RA 1250 H06NCS | RA 1290 H06NCS | RA 12110 H06NCS |
|                   |               | PNP, NO           | RA 1225 H06POS            | RA 1250 H06POS | RA 1290 H06POS | RA 12110 H06POS |
|                   |               | PNP, NC           | RA 1225 H06PCS            | RA 1250 H06PCS | RA 1290 H06PCS | RA 12110 H06PCS |
| 230 VACrms        | Active high   | NPN, NO           | RA 2325 H06NOS            | RA 2350 H06NOS | RA 2390 H06NOS | RA 23110 H06NOS |
|                   |               | NPN, NC           | RA 2325 H06NCS            | RA 2350 H06NCS | RA 2390 H06NCS | RA 23110 H06NCS |
|                   |               | PNP, NO           | RA 2325 H06POS            | RA 2350 H06POS | RA 2390 H06POS | RA 23110 H06POS |
|                   |               | PNP, NC           | RA 2325 H06PCS            | RA 2350 H06PCS | RA 2390 H06PCS | RA 23110 H06PCS |
| 400 VACrms        | Active high   | NPN, NO           | RA 4025 H10NOS            | RA 4050 H10NOS | RA 4090 H10NOS | RA 40110 H10NOS |
|                   |               | NPN, NC           | RA 4025 H10NCS            | RA 4050 H10NCS | RA 4090 H10NCS | RA 40110 H10NCS |
|                   |               | PNP, NO           | RA 4025 H10POS            | RA 4050 H10POS | RA 4090 H10POS | RA 40110 H10POS |
|                   |               | PNP, NC           | RA 4025 H10PCS            | RA 4050 H10PCS | RA 4090 H10PCS | RA 40110 H10PCS |
| 480 VACrms        | Active high   | NPN, NO           | RA 4825 H12NOS            | RA 4850 H12NOS | RA 4890 H12NOS | RA 48110 H12NOS |
|                   |               | NPN, NC           | RA 4825 H12NCS            | RA 4850 H12NCS | RA 4890 H12NCS | RA 48110 H12NCS |
|                   |               | PNP, NO           | RA 4825 H12POS            | RA 4850 H12POS | RA 4890 H12POS | RA 48110 H12POS |
|                   |               | PNP, NC           | RA 4825 H12PCS            | RA 4850 H12PCS | RA 4890 H12PCS | RA 48110 H12PCS |

## General Specifications

|                             | RA12...06..S       | RA23...06..S       | RA40...10..S        | RA48...12..S        |
|-----------------------------|--------------------|--------------------|---------------------|---------------------|
| Operational voltage range   | 60 to 140 VACrms   | 170 to 250 VACrms  | 150 to 440 VACrms   | 180 to 530 VAC      |
| Blocking voltage            | 650 V <sub>p</sub> | 650 V <sub>p</sub> | 1000 V <sub>p</sub> | 1200 V <sub>p</sub> |
| Zero voltage turn-on        | ≤ 15 V             | ≤ 15 V             | ≤ 15 V              | ≤ 25 V              |
| Operational frequency range | 45 to 65 Hz        | 45 to 65 Hz        | 45 to 65 Hz         | 45 to 65 Hz         |
| Power factor cos φ          | ≥ 0.5 @ 120 VACrms | ≥ 0.5 @ 230 VACrms | ≥ 0.5 @ 400 VACrms  | ≥ 0.5 @ 480 VACrms  |
| Approvals                   | UL, CSA            | UL, CSA            | UL, CSA             | UL, CSA             |
| CE-marking                  | Yes                | Yes                | Yes                 | Yes                 |

## Control Specifications

|   |                                      |  |  |
|---|--------------------------------------|--|--|
| Supply voltage range  | 20 to 32 VDC                         | PNP Alarm output<br>Alarm output voltage open<br>Alarm output voltage @ 100 mA<br>Alarm output current | 0 VDC<br>V <sub>cc</sub> - 2 VDC<br>≤ 100 mA |
| Supply current @ 24 VDC   | ≤ 40 mA DC                           |  |  |
| Response time pick-up @ 50 Hz   | ≤ 10 ms                              |  |  |
| Response time drop-out @ 50 Hz  | ≤ 10 ms                              |  |  |
| Active high control input<br>Pick-up voltage<br>Drop-out voltage<br>Input current (V <sub>c</sub> = 32 V) | Typ. 7 VDC<br>Typ. 6.8 VDC<br>≤ 4 mA | NPN Alarm output<br>Alarm output voltage open<br>Alarm output voltage @ 100 mA<br>Alarm output current | ≤ 32 VDC<br>2 VDC<br>≤ 100 mA                |

## Output Specifications

|  | RA..25.06..S           | RA..50.06..S            | RA..90.10..S            | RA..110.12..S            |
|--|------------------------|-------------------------|-------------------------|--------------------------|
| Rated operational current AC 51                            | ≤ 25 Arms              | ≤ 50 Arms               | ≤ 90 Arms               | ≤ 110 Arms               |
| AC 53a   | 5 Arms                 | 15 Arms                 | 20 Arms                 | 30 Arms                  |
| Min. operational load current                              | ≤ 200 mA               | ≤ 250 mA                | ≤ 400 mA                | ≤ 500 mA                 |
| Non-rep. surge current t=10 ms                             | ≤ 325 A <sub>p</sub>   | ≤ 600 A <sub>p</sub>    | ≤ 1150 A <sub>p</sub>   | ≤ 1900 A <sub>p</sub>    |
| Off-state leakage current<br>@ rated voltage and frequency | ≤ 6 mA                 | ≤ 6 mA                  | ≤ 6 mA                  | ≤ 6 mA                   |
| I <sup>2</sup> t for fusing t=10 ms                        | ≤ 525 A <sup>2</sup> s | ≤ 1800 A <sup>2</sup> s | ≤ 6600 A <sup>2</sup> s | ≤ 18000 A <sup>2</sup> s |
| Critical dv/dt   | ≥ 500 V/μs             | ≥ 500 V/μs              | ≥ 500 V/μs              | ≥ 500 V/μs               |

## Sense Specifications

|  | RA12..06..S            | RA23..06..S             | RA40..10..S             | RA48..12..S              |
|--|------------------------|-------------------------|-------------------------|--------------------------|
| Current<br>Sensed load current<br>Non-sensed leakage current | ≥ 50 mA<br>≤ 20 mA     | ≥ 50 mA<br>≤ 20 mA      | ≥ 50 mA<br>≤ 20 mA      | ≥ 50 mA<br>≤ 20 mA       |
| Voltage<br>Sensed line voltage<br>Non-sensed line voltage    | ≥ 60 Vrms<br>≤ 30 Vrms | ≥ 120 Vrms<br>≤ 50 Vrms | ≥ 150 Vrms<br>≤ 80 Vrms | ≥ 180 Vrms<br>≤ 100 Vrms |
| Timing<br>Response time from fault to<br>alarm output        | ≤ 100 ms               | ≤ 100 ms                | ≤ 100 ms                | ≤ 100 ms                 |
| Short-circuit of semiconductor                               | Will be sensed         | Will be sensed          | Will be sensed          | Will be sensed           |

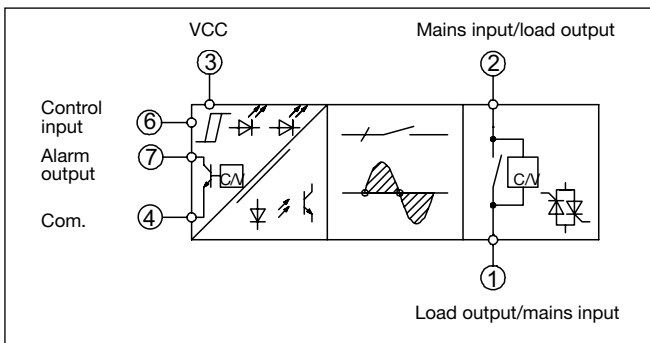
## Thermal Specifications

|                                     | RA..25.....S                       | RA..50.....S                       | RA..90.....S                       | RA..110.....S                      |
|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| Operating temperature               | -20° to +70°C<br>(-4° to +158°F)   | -20° to +70°C<br>(-4° to +158°F)   | -20° to +70°C<br>(-4° to +158°F)   | -20° to +70°C<br>(-4° to +158°F)   |
| Storage temperature                 | -40° to +100°C<br>(-40° to +212°C) | -40° to +100°C<br>(-40° to +212°C) | -40° to +100°C<br>(-40° to +212°C) | -40° to +100°C<br>(-40° to +212°C) |
| Junction temperature                | ≤ 125°C (257°F)                    | ≤ 125°C (257°F)                    | ≤ 125°C (257°F)                    | ≤ 125°C (257°F)                    |
| R <sub>th</sub> junction to case    | ≤ 1.25 K/W                         | ≤ 0.65 K/W                         | ≤ 0.35 K/W                         | ≤ 0.30 K/W                         |
| R <sub>th</sub> junction to ambient | ≤ 12 K/W                           | ≤ 12 K/W                           | ≤ 12 K/W                           | ≤ 12 K/W                           |

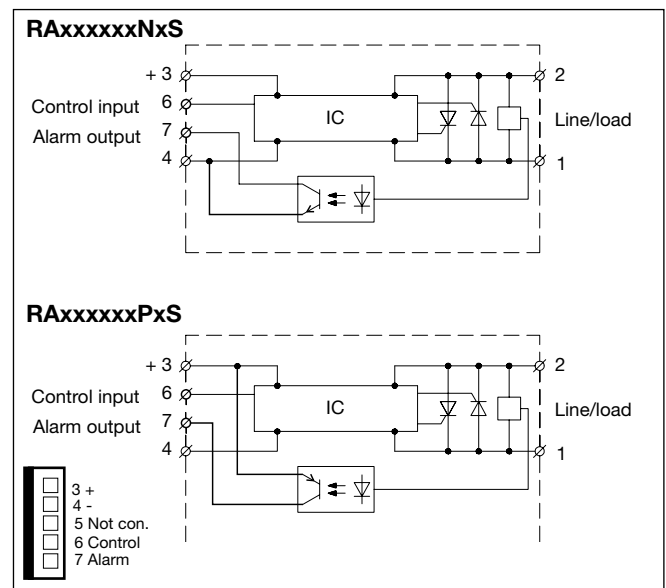
## Isolation

|  |               |
|--|---------------|
| Rated isolation voltage<br>Input to output | ≥ 4000 VACrms |
| Rated isolation voltage<br>Output to case  | ≥ 4000 VACrms |

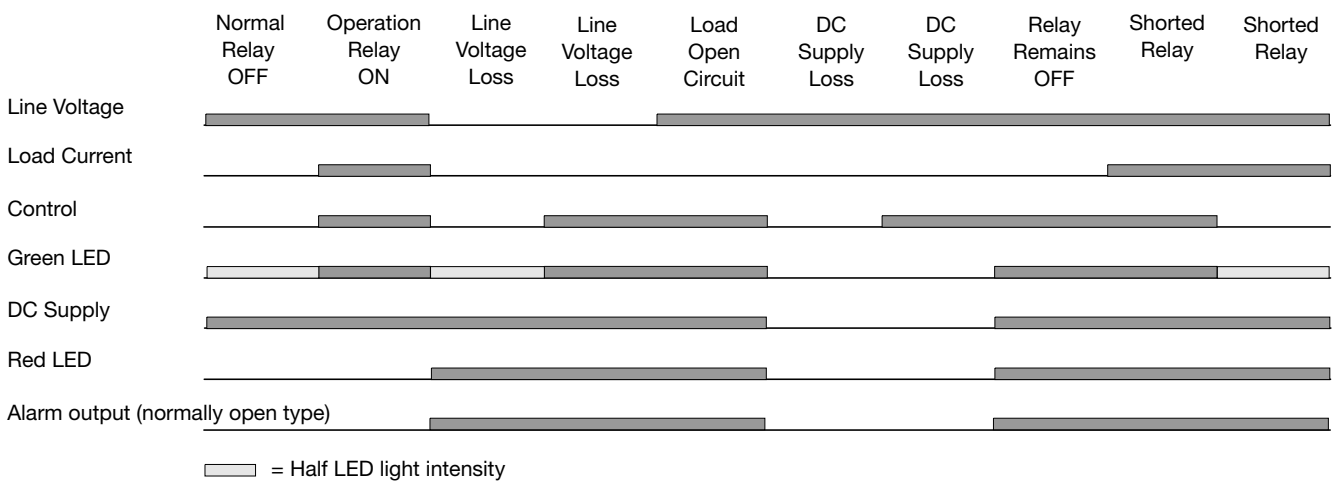
## Functional Diagram



## Wiring Diagrams



## Operation Diagram





## Heatsink Dimensions (load current versus ambient temperature)

### RA ..25 .....S

| Load current [A] | Thermal resistance [K/W] |      |      |      |      |      | Power dissipation [W] |
|------------------|--------------------------|------|------|------|------|------|-----------------------|
|                  | 20                       | 30   | 40   | 50   | 60   | 70   |                       |
| 25               | 2                        | 1.7  | 1.4  | 1    | 0.71 | 0.40 | 32                    |
| 22.5             | 2.5                      | 2.1  | 1.8  | 1.4  | 1    | 0.66 | 27                    |
| 20               | 3.1                      | 2.7  | 2.3  | 1.9  | 1.4  | 1    | 23                    |
| 17.5             | 4                        | 3.5  | 3    | 2.5  | 2    | 1.4  | 20                    |
| 15               | 4.9                      | 4.3  | 3.7  | 3.1  | 2.5  | 1.9  | 16                    |
| 12.5             | 6.2                      | 5.4  | 4.6  | 3.9  | 3.1  | 2.3  | 13                    |
| 10               | 8.1                      | 7.1  | 6.1  | 5.1  | 4    | 3    | 10                    |
| 7.5              | 11.3                     | 9.9  | 8.5  | 7.1  | 5.6  | 4.2  | 7                     |
| 5                | -                        | 15.6 | 13.3 | 11.1 | 8.9  | 6.7  | 5                     |
| 2.5              | -                        | -    | -    | -    | 18.7 | 14   | 2                     |

Ambient temp. [°C]

### RA ..50 .....S

| Load current [A] | Thermal resistance [K/W] |      |      |      |      |      | Power dissipation [W] |
|------------------|--------------------------|------|------|------|------|------|-----------------------|
|                  | 20                       | 30   | 40   | 50   | 60   | 70   |                       |
| 50               | 0.92                     | 0.76 | 0.60 | 0.45 | 0.29 | -    | 63                    |
| 45               | 1.2                      | 0.99 | 0.80 | 0.62 | 0.44 | 0.26 | 55                    |
| 40               | 1.5                      | 1.3  | 1.1  | 0.85 | 0.63 | 0.42 | 47                    |
| 35               | 1.9                      | 1.6  | 1.4  | 1.1  | 0.89 | 0.63 | 40                    |
| 30               | 2.4                      | 2.1  | 1.8  | 1.5  | 1.2  | 0.91 | 33                    |
| 25               | 3                        | 2.7  | 2.3  | 1.9  | 1.5  | 1.1  | 26                    |
| 20               | 3.9                      | 3.5  | 3    | 2.5  | 2    | 1.5  | 20                    |
| 15               | 5.5                      | 4.8  | 4.1  | 3.4  | 2.7  | 2.1  | 15                    |
| 10               | 8.6                      | 7.5  | 6.4  | 5.4  | 4.3  | 3.2  | 9                     |
| 5                | 17.9                     | 15.6 | 13.4 | 11.2 | 8.9  | 6.7  | 4                     |

Ambient temp. [°C]

### RA ..90 .....S

| Load current [A] | Thermal resistance [K/W] |      |      |      |      |      | Power dissipation [W] |
|------------------|--------------------------|------|------|------|------|------|-----------------------|
|                  | 20                       | 30   | 40   | 50   | 60   | 70   |                       |
| 90               | 0.63                     | 0.53 | 0.42 | 0.32 | -    | -    | 97                    |
| 80               | 0.81                     | 0.69 | 0.57 | 0.45 | 0.33 | -    | 84                    |
| 70               | 1                        | 0.89 | 0.75 | 0.61 | 0.47 | 0.33 | 71                    |
| 60               | 1.3                      | 1.2  | 1    | 0.83 | 0.66 | 0.49 | 59                    |
| 50               | 1.7                      | 1.5  | 1.3  | 1.1  | 0.85 | 0.64 | 47                    |
| 40               | 2.2                      | 1.9  | 1.7  | 1.4  | 1.1  | 0.83 | 36                    |
| 30               | 3.1                      | 2.7  | 2.3  | 1.9  | 1.5  | 1.2  | 26                    |
| 20               | 4.8                      | 4.2  | 3.6  | 3    | 2.4  | 1.8  | 17                    |
| 10               | 10                       | 8.8  | 7.5  | 6.3  | 5    | 3.8  | 8                     |

Ambient temp. [°C]

### RA ..110 .....S

| Load current [A] | Thermal resistance [K/W] |      |      |      |      |      | Power dissipation [W] |
|------------------|--------------------------|------|------|------|------|------|-----------------------|
|                  | 20                       | 30   | 40   | 50   | 60   | 70   |                       |
| 110              | 0.43                     | 0.35 | 0.27 | -    | -    | -    | 126                   |
| 90               | 0.63                     | 0.53 | 0.42 | 0.32 | -    | -    | 97                    |
| 80               | 0.81                     | 0.69 | 0.57 | 0.45 | 0.33 | -    | 84                    |
| 70               | 1                        | 0.89 | 0.75 | 0.61 | 0.47 | 0.33 | 71                    |
| 60               | 1.3                      | 1.2  | 1    | 0.83 | 0.66 | 0.49 | 59                    |
| 50               | 1.7                      | 1.5  | 1.3  | 1.1  | 0.85 | 0.64 | 47                    |
| 40               | 2.2                      | 1.9  | 1.7  | 1.4  | 1.1  | 0.83 | 36                    |
| 30               | 3.1                      | 2.7  | 2.3  | 1.9  | 1.5  | 1.2  | 26                    |
| 20               | 4.8                      | 4.2  | 3.6  | 3    | 2.4  | 1.8  | 17                    |
| 10               | 10                       | 8.8  | 7.5  | 6.3  | 5    | 3.8  | 8                     |

Ambient temp. [°C]

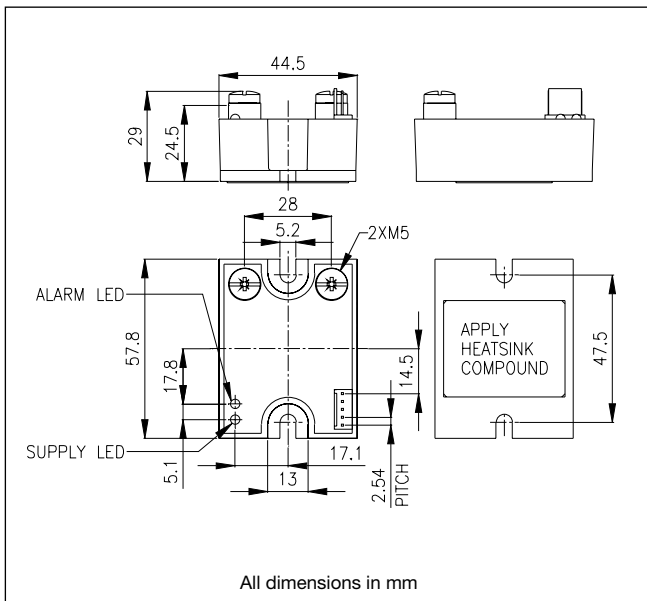
## Heatsink Selection

| Carlo Gavazzi Heatsink<br>(See "General Accessories") | Thermal resistance.. | ...for power dissipation |
|---|----------------------|--------------------------|
| No heatsink required                                  | ---                  | N/A                      |
| RHS 300   | 5.00 K/W             | > 0 W                    |
| RHS 100   | 3.00 K/W             | > 25 W                   |
| RHS 45C   | 2.70 K/W             | > 60 W                   |
| RHS 45B   | 2.00 K/W             | > 60 W                   |
| RHS 90A   | 1.35 K/W             | > 60 W                   |
| RHS 45C plus fan                                      | 1.25 K/W             | > 0 W                    |
| RHS 45B plus fan                                      | 1.20 K/W             | > 0 W                    |
| RHS 112A  | 1.10 K/W             | > 100 W                  |
| RHS 301   | 0.80 K/W             | > 70 W                   |
| RHS 90A plus fan                                      | 0.45 K/W             | > 0 W                    |
| RHS 112A plus fan                                     | 0.40 K/W             | > 0 W                    |
| RHS 301 plus fan                                      | 0.25 K/W             | > 0 W                    |
| Consult your distributor                              | > 0.25 K/W           | N/A                      |
| Infinite heatsink - No solution                       | ---                  | N/A                      |

## Housing Specifications

|  |  |
|--|--|
| Weight   | Approx. 110 g                                    |
| Housing material                                     | Noryl GFN 1, black                               |
| Base plate 25, 50 A<br>90, 110 A                     | Aluminium, nickel-plated<br>Coper, nickel-plated |
| Potting compound                                     | Polyurethane                                     |
| Relay<br>Mounting screws<br>Mounting torque          | M5<br>≤ 1.5 Nm                                   |
| Power terminal<br>Mounting screws<br>Mounting torque | M5 x 6<br>≤ 2.4 Nm                               |
| Control connector                                    | 5 pole,<br>centre distance 2.54 mm               |

## Dimensions



## Accessories

Heatsinks  
 DIN rail adapter  
 Varistors  
 Fuses  
 Connector for ribbon cable: Methode 1300-105-424  
 Header for PCB mounting: Methode 1100-8-105-01  
 Ribbon cable: 5 x 0.5 mm<sup>2</sup>,  
 centre distance 2.54 mm

## Ribbon Cable Selection

**RCS 5-200-0\***

R-System \_\_\_\_\_  
 Cable sense \_\_\_\_\_  
 5-wire \_\_\_\_\_  
 Cable length in cm \_\_\_\_\_

\* 0: No connector mounted (Method 1300-105-424)  
 1: 1 connector mounted  
 2: 2 connectors mounted

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [Solid State Relays - Industrial Mount](#) category:*

*Click to view products by [Carlo Gavazzi](#) manufacturer:*

Other Similar products are found below :

[6225XXASRS-DC3](#) [D2440-C](#) [H10CA4890](#) [D4875C](#) [D53TP50DH-10](#) [1395831-1](#) [1616010-6](#) [BR312BY](#) [A-1326](#) [AQY210SXE01](#)  
[AQY221N2SYD01](#) [AQY414SXE01](#) [26532764](#) [H10CA4850](#) [H12CA4890VL](#) [RA2410-D06](#) [D1202F](#) [D53TP50-10](#) [W230E-1-12](#) [W230T-3-](#)  
[12](#) [W6125ASX-1](#) [W6225DSX-2](#) [W6240DSX-4](#) [W6240DTX-2](#) [1-1617030-3](#) [1-1617033-9](#) [1-1617033-7](#) [MS2-D2420](#) [MS2-D2430](#) [A-1440](#)  
[4-1617080-0](#) [RJ1P60V50E](#) [RN1F48I50](#) [70.362.1028.0](#) [7-1393030-8](#) [Z5.509.0828.0](#) [W230E-2-5](#) [G3RV-SR700-D](#) [AC110](#) [G3RV-SR500-AL](#)  
[AC100](#) [G3RV-SR500-D](#) [ACDC24](#) [G3RV-SR500-AL](#) [ACDC24](#) [G3RV-SR700-D](#) [ACDC24](#) [G3RV-SR700-AL](#) [ACDC24](#) [G3RV-SR500-D](#)  
[DC12](#) [G3RV-SR700-A](#) [ACDC24](#) [G3RV-SR500-A](#) [ACDC24](#) [2912138](#) [2912141](#) [SSRDAC10](#) [1613353](#)