

crydom[®]

The Global Expert in **Solid State Switching** Technology



Motion
Control



A brand of
CST
CUSTOM SENSORS & TECHNOLOGIES



Solid State Motion Control

Crydom is well known as a worldwide leading brand of Solid State Switching Technology. Traditionally, applications for Solid State Relays and Solid State Contactors have primarily involved resistive load control. However, recently the benefits of solid state technology have been recognized as beneficial and in some cases mandatory for motor and motion control applications where precise control, long life and higher PWM frequencies are essential to achieve high performance and reliable operation. Consequently, Motion Control has become an important segment for the application of Crydom's Solid State Switching Technology and Products.

Although all solid state relays and contactors have resistive load ratings, not all have Motor Load Ratings which are more demanding. Crydom Motion Control products are designed to meet UL and IEC motor ratings including Locked Rotor Rating, Full Load Current Rating and Horse Power or KW rating.

AC Output

Applications

There are a number of conditions that must be considered when selecting the appropriate motor controller to Start/Stop modern electrical AC motors and associated machinery. These conditions include frequency of starting and stopping, whether light or heavy duty starting, required frequency of reversal, smooth starting/stopping requirements, etc. Crydom offers a wide range AC single phase and 3 phase solid state relays and contactors rated up to **25 HP @ 600 VAC** which are suitable for literally hundreds of AC output Motion Control applications including:

- | | |
|-------------------------------------|--|
| Industrial OEMs: | Plastic Machinery, Packaging & Material Handling Equipment, Metal/Wood/Glass Working Machinery, Valves & Pumps |
| Energy & Infrastructure: | Wind Turbines, Solar Energy Equipment, Mining Machinery, Oil & Gas |
| Food & Beverage: | Bakery Ovens, Dough Dividers, Mixers |
| Medical: | Sterilizers, Autoclaves, X-Ray Equipment |
| Aerospace & Defense: | Missile/Rocket Launchers |
| Building Equipment: | HVAC&R, Compressors, Variable Air Volume Systems |

DC Output

Applications

Crydom's DC Motion Control products utilize advanced DC switching technology with low power dissipation power FETs coupled with high performance optical coupling which provides reliable high power DC switching up to **160 Amp** and operating voltages up to **300 VDC**. Furthermore, Crydom Motion Control products offer the latest in DC Solid State Power control by virtue of Crydom's advanced high speed DC switching circuit for on/off or PWM control up to **1 KHz**.

Although there are a huge number of DC motion control applications for Solid State Relays and Contactors, most can be included into the following categories:

- Transportation:** Trains, Railway Vehicles, Specialty Vehicles, Street Cleaners, Snow Groomers, Construction Machines
- Industrial OEMS:** Material Handling Equipment, Cranes, Pallet Trucks, Industrial Valves
- Commercial OEMs:** Payment Systems, Advertising Displays, Floor Cleaning Equipment
- Aerospace & Defense:** Land Vehicles, Defense Armored, Tanks
- Building Equipment:** Access Control, Highway Toll Systems

motion.crydom.com



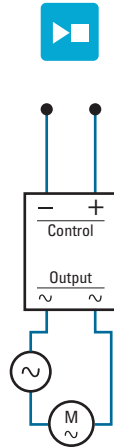
**Motion
Control**

AC Output

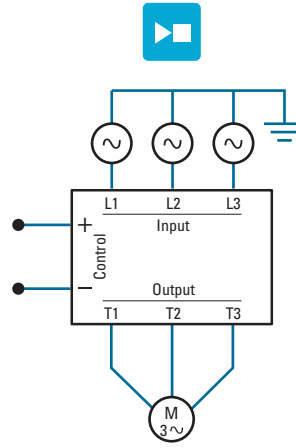
Solid State Relays & Contactors

Crydom offers a wide range of AC solid state switching solutions for Motion Control in panel, DIN rail, PCB and Plug-in mountable packages. These include products to start/stop single phase motors up to 25 HP @ 600 VAC, as well as start/stop and reversing solid state contactors for 3 phase motors up to 7.5 HP @ 480 VAC. For 3 phase motors it is also possible to use 2 single phase solid state relays connecting one leg directly.

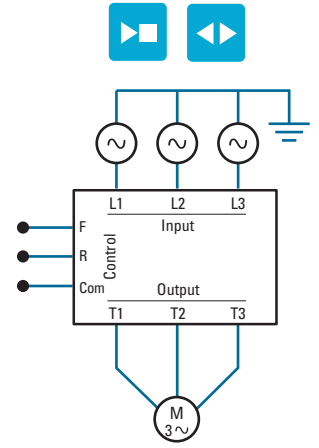
Single Phase



3 Phase



3 Phase Reversing



AC Output

| | Max Current [Amp] | Motor Power Rating | | | | | | | | Description | Functions | |
|--------------------|-------------------|------------------------------------|------|------------------------|-----|-------------------|------|------|------|-------------|--|-----|
| | | HP | | | | Kw | | | | | | |
| | | UL508 Resistive IEC 60947-4-1 AC-1 | | UL508 Motor Controller | | IEC60947-4-1 AC-3 | | | | | | |
| Three Phase | | | | | | | | | | | | |
| Panel Mount | | 25 | 0.75 | 1 | 2 | 3 | 0.56 | 0.74 | 1.48 | 2.22 | <ul style="list-style-type: none"> EMC Compliant (Level 3) for reliable operation AC or DC control voltage options LED input status indicator, IP20 Built-in Transient Overvoltage Protection UL 508 Overload endurance rated UL & cUL Recognized, CE & RoHS Compliant | ▶ |
| | | 50 | 1.5 | 3 | 5 | 7.5 | 1.11 | 2.22 | 3.7 | 5.55 | | |
| Panel Mount | | 25 | 0.75 | 1 | 2 | 3 | 0.56 | 0.74 | 1.48 | 2.22 | <ul style="list-style-type: none"> Motor Reversing Solid State Contactor Protective FWD/REV interlock built-in function DC control voltage LED input status indicator, IP20 UL & cUL Recognized, CE & RoHS Compliant | ▶ ◀ |
| | | 50 | 1.5 | 3 | 5 | 7.5 | 1.11 | 2.22 | 3.7 | 5.55 | | |
| DIN Rail Mount | | 2.4 | - | 0.5 | 1 | 1 | - | 0.37 | 0.75 | 0.75 | <ul style="list-style-type: none"> AC or DC control voltage options LED input status indicator Built-in Transient Overvoltage Protection Compact DIN rail package UL & cUL Recognized, CE & RoHS Compliant | ▶ |
| | | 4.2 | - | 0.75 | 1.5 | 2 | - | 0.37 | 0.75 | 0.75 | | |
| | | 2.4 | - | 0.5 | 1 | 1 | - | 0.37 | 0.75 | 0.75 | <ul style="list-style-type: none"> Motor Reversing Solid State Contactor Protective FWD/REV interlock built-in function AC or DC control voltage options LED input status indicator Built-in Transient Overvoltage Protection UL & cUL Recognized, CE & RoHS Compliant | ▶ ◀ |
| | | 4.2 | - | 1 | 1.5 | 2 | - | 0.75 | 1.1 | 1.5 | | |
| | | 7.6 | - | 2 | 3 | 5 | - | 1.5 | 2.2 | 3.7 | <ul style="list-style-type: none"> Ultra-efficient thermal management design AC or DC control voltage options Embedded Solid State Auxiliary Contacts Zero-crossing or instantaneous turn-on output Built-in Transient Overvoltage Protection C-UL-US Listed, IEC Rated & RoHS Compliant | ▶ |
| | | 7.6 | - | 2 | 3 | 5 | - | 1.5 | 2.2 | 3.7 | | |
| | | 7.6 | - | 2 | 3 | 5 | - | 1.5 | 2.2 | 3.7 | <ul style="list-style-type: none"> Motor Reversing Solid State Contactor Ultra-efficient thermal management design AC or DC control voltage options Embedded Solid State Auxiliary Contacts Protective FWD/REV interlock built-in function Built-in Transient Overvoltage Protection C-UL-US Listed, IEC Rated & RoHS Compliant | ▶ ◀ |
| | | 7.6 | - | 2 | 3 | 5 | - | 1.5 | 2.2 | 3.7 | | |

For available part numbers and complete product specifications, see product datasheet at www.crydom.com

Functions:



Start/Stop



Reversing



Soft Start



Speed Control

AC Output Single Phase

| | Max Current [Amp] | Motor Power Rating | | | | | | | | | | Description | Functions | |
|----------------|--------------------|---------------------------------------|---------|------------------------|---------|---------|---------|---------|-------------------|----------|---------|-------------|--|---|
| | | HP | | | | | Kw | | | | | | | |
| | | UL508 Resistive IEC 60947-4-1 AC-1 | | UL508 Motor Controller | | | | | IEC60947-4-1 AC-3 | | | | | |
| | | 120 VAC | 240 VAC | 380 VAC | 480 VAC | 600 VAC | 120 VAC | 240 VAC | 380 VAC | 480 VAC | 600 VAC | | | |
| PCB Mount | CX | 5 | - | 0.25 | 0.33 | 0.5 | - | - | 0.18 | 0.25 | 0.37 | - | <ul style="list-style-type: none"> AC or DC control voltage options Standard SIP package for high density PCB applications High surge current rating UL Recognized, CSA & VDE Certified, CE & RoHS Compliant | |
| Panel Mount | H16WD | 25 | - | 1.5 | 2 | 3 | 3 | - | 1.1 | 1.5 | 2.2 | 2.2 | <ul style="list-style-type: none"> 1600 Volt blocking Optional LED status indicator DC control voltage UL Recognized, CE & RoHS Compliant | |
| | | 50 | - | 3 | 5 | 5 | 10 | - | 2.2 | 3.7 | 3.7 | 7.4 | | |
| | | 75 | - | 5 | 7.5 | 10 | 15 | - | 3.7 | 5.6 | 7.4 | 11.2 | | |
| | | 90 | - | 7.5 | 15 | 20 | 25 | - | 5.6 | 11.2 | 14.9 | 18.6 | | |
| | CW | 10 | 0.5 | 1.5 | - | 2.5 | - | 0.4 | 1.1 | - | 1.9 | - | <ul style="list-style-type: none"> Universal AC/DC voltage input option EMC Compliant Removable IP20 cover LED input status indicator UL Recognized, CSA & TUV Certified, CE & RoHS Compliant | |
| | | 25 | 1 | 3 | - | 5 | - | 0.7 | 2.2 | - | 3.7 | - | | |
| | | 50 | 2 | 5 | - | 7.5 | - | 1.5 | 3.7 | - | 5.6 | - | | |
| DIN Rail Mount | DRA1-CX | 5 | - | 0.25 | 0.33 | 0.5 | - | - | 0.18 | 0.25 | 0.37 | - | <ul style="list-style-type: none"> 10 mm single channel assembly Cage style screw terminals Fits standard 35 mm DIN rail LED status indicator AC or DC control voltage options CE & RoHS Compliant | |
| | | 5 | 0.125 | 0.33 | - | - | - | - | - | - | - | - | | |
| | DR-OAC | 3 | - | 0.25 | 0.33 | 0.5 | - | - | 0.18 | 0.25 | 0.37 | - | <ul style="list-style-type: none"> DIN rail & panel mountable 4kV optical isolation with LED indicator DC control voltage UL Recognized, CSA Certified, CE & RoHS Compliant | |
| | | 6 | - | 0.5 | 1 | 2 | - | - | 0.37 | 0.75 | 1.5 | - | | |
| | | 12 | - | 1 | 2 | 3 | - | - | 0.75 | 1.5 | 2.2 | - | | |
| | SeriesOne DR | 3 | - | 0.25 | 0.33 | 0.5 | - | - | 0.18 | 0.25 | 0.37 | - | <ul style="list-style-type: none"> LED input status indicator UL 508 Overload endurance rated AC or DC control voltage options High surge current rating UL & cUL Listed, CE & RoHS Compliant | |
| | | 6 | - | 0.5 | 1 | 2 | - | - | 0.37 | 0.75 | 1.5 | - | | |
| | SeriesOne DR Timer | 6 | - | 0.33 | - | - | - | - | 1.44 (A) | - | - | - | <ul style="list-style-type: none"> Compact size (11 mm wide) LED timer status indicator 8 Industry standard timing functions AC or DC control voltage options UL & cUL Listed, CE & RoHS Compliant | |
| | | 6 | - | 0.33 | - | - | - | - | 1.44 (A) | - | - | - | | |
| | Plug-in Mount | LifePlus ED | 3 | - | 0.25 | - | - | - | - | 0.37 (A) | - | - | - | <ul style="list-style-type: none"> Industry standard EMR plug-in package LED input status indicator Fits standard DIN rail & PCB mountable sockets AC or DC control voltage options UL & cUL Recognized, CE & RoHS Compliant |
| 5 | | | - | 0.5 | - | - | - | - | 0.55 (A) | - | - | - | | |

General Notes

(A) Motor load rating according to IEC62314.

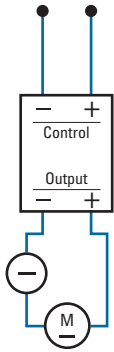
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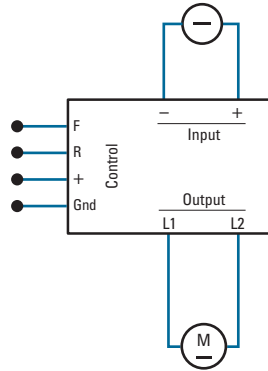
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Start/Stop & Speed Control



Reversing & Soft Start



DC Output

Solid State Relays & Contactors

A variety of DC solid state relays and contactors allow our customers to start/stop, reverse, soft start/stop and regulate the speed of motors rated up to 15 Amps nominal current. Depending on motor specifications (nominal and surge current), and considering the maximum resistive loads of the selected relay (up to 160 Amps), the real motor power that they can control is considerably higher. The high switching frequency of Crydom solid state contactors, working with a PWM signal up to 1 KHz, allows to have accurate motor speed regulation suitable for a wide range of applications.

DC Output

| | Max Output Voltage [VDC] | Max Current [Amp] | Motor Current Rating [Amp] | Max PWM [Hz] | Description | Functions | |
|------------------|----------------------------|--------------------------------------|---|--------------|--|--|--|
| | | IEC 60947-4-1DC-1 UL508 Resistive | IEC 60947-4-1DC-3 UL508 Motor Controller | | | | |
| Panel Mount | <p>PowerPlus DC</p> | 300 | 10 | - | 1000 | <ul style="list-style-type: none"> • PWM control up to 1 KHz • AC or DC control voltage options • LED input status indicator • Optional IP20 cover • MOSFET output, easily paralleled for higher current applications • UL Recognized, CE & RoHS Compliant | |
| | | 150 | 20 | - | 1000 | | |
| | | 150 | 40 | - | 900 | | |
| | | 150 | 60 | - | 900 | | |
| | | 72 | 80 | - | 700 | | |
| | | 72 | 100 | - | 700 | | |
| | <p>HDC</p> | 150 | 120 | 17 | 1000 | <ul style="list-style-type: none"> • PWM control up to 1 KHz • AC or DC control voltage options • LED input status indicator • Low on-state voltage drop • UL Recognized, CE & RoHS Compliant | |
| | | 150 | 160 | 25 | 1000 | | |
| <p>DP</p> | 48 | 20 | 13 | - | <ul style="list-style-type: none"> • Reversing Solid State Contactor • Optional soft start, soft stop & braking functions • Selectable soft start/stop ramp up to 1 sec. • DC control voltage • 2 LED input status indicators • UL & cUL Recognized, CE & RoHS Compliant | | |
| | 48 | 40 | 14 | - | | | |
| | 48 | 60 | 15 | - | | | |
| DIN Rail Mount | <p>DRA4D</p> | 250 | 6 | 2 | - | <ul style="list-style-type: none"> • Reversing Solid State Contactor • DC control voltage • Compact DIN rail mounting package • 2 LED input status indicators • UL & cUL Recognized, CE & RoHS Compliant | |
| | | 100 | 12 | 4 | - | | |
| Plug-in Mount | <p>LifePlus ED</p> | 80 | 5 | 2 | 500 | <ul style="list-style-type: none"> • Industry standard EMR plug-in package • AC or DC control voltage options • LED input status indicator • Fits standard DIN rail & PCB mountable sockets • UL Recognized, CE & RoHS Compliant | |

Accessories



Sockets

- DRS1
- DRS4
- DRSED
- PCBSED



Protective Covers

- KS100
- KS101
- KS300



ID Marker Strips

- CNLB
- CNLN
- CNL2



Thermal Pads

- HSP1
- HSP2
- HSP3
- HSP5



Hardware Kits

- HK1
- HK2
- HK4



Lug Terminals

- TRM1
- TRM6
- TRM3/0



Filters

- 1F25
- 3F20
- 3F20-4



Heat Sinks

- HS501DR
- HS301 / HS301DR
- HS251
- HS201 / HS201DR
- HS172
- HS151 / HS151DR
- HS103 / HS103DR
- HS072
- HS053
- DIN Rail Bracket

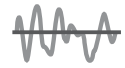
Crydom Motion Control Solutions



Long Life



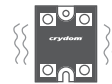
Quiet Operation



Minimum Electrical Noise



Low Power Consumption



Shock & Vibration Resistant



Ideal for Harsh Environments



High Compatibility with Control Systems



Fast Switching



Position Insensitive



Embedded Control Functions



Space Saving Compact Package



Magnetic Noise Immunity

Crydom Motion Control solutions leverage the advantages of having an all solid state design making them more reliable and cost effective than different technology solutions such as EMRs. Furthermore, they also offer considerable advantages when compared to similar technology solutions which include:

- **Low turn-on/turn-off time** for DC relays and contactors which allow for accurate PWM control making them ideal for motor speed control
- **Low leakage current** recommended to prevent problems when controlling low power motors more sensitive to leakage current
- **Low on-state resistance** for DC output relays to prompt heat dissipation allowing use of smaller heat sinks making them a convenient solution for reduced size applications
- **Embedded Interlock** protective function in reversing modules making them easier to install and use
- **UL508 Overload Endurance** rating for enhanced reliability

For more information on Crydom Motion Control solutions, contact your local authorized Crydom Distributor, Representative or Crydom Sales Office, or visit www.crydom.com



Custom Sensors & Technologies (CST) is a specialist in sensing, control and motion products.

Through its brands, **BEI Kimco, BEI Sensors, BEI PSSC, Crouzet, Crydom, Kavlico, Newall** and **Systron Donner Inertial**, CST offers customizable, reliable and efficient components for mission-critical systems in Aerospace & Defense, Transportation, Energy & Infrastructures, Commercial & Industrial OEMs, Medical, Food and Beverage and Building Equipment markets.

Focused on **premium value** offers and committed to excellence, CST, with 4,400 employees worldwide and sales of \$604M US in 2012, is the dependable and adaptable partner for the most demanding customers.

www.cstsensors.com



Crydom is the world leading brand of Solid State Relays, all manufactured and sold by Custom Sensors & Technologies (CST). Crydom product offer includes thousands of catalog off-the-shelf items, as well as custom-designed solid state relays and related products.

At Crydom virtually everything is accomplished in-house to assure complete control over production, delivery and above all quality. With design, development, manufacturing and management personnel under one roof, we're geared for fast response to your requirements.

Because of our dedication to quality, most Crydom products are approved by UL, CSA, VDE and TUV; and carry the CE mark signifying conformance with European directives. Also, our products comply with the latest legal environmental directives, like RoHS and China RoHS which always provide a competitive advantage to our customers.

Our ongoing R&D programs have allowed us for years to be leaders in our industry. We are well known for constantly innovating new circuit and technology-related inventions to satisfy the switching needs of the most demanding applications.

Our more than 40 years of experience providing top notch switching solutions and support make Crydom the indisputable global expert in solid state relay technology and preferred choice of companies all over the world.

www.crydom.com

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