Crydom’s innovative Motion Control solutions leverage the advantage of having an all solid state design making them ideal for motor and motion control applications where precise control, long life and higher PWM frequencies are essential to achieve high performance and reliable operations. Functions such as start/stop control, reversing control, soft start and speed regulation are available in versatile packages.

Crydom, global expert in solid state switching technology, combines technology and innovation to provide customers a wide range of standard Solid State Relays and Solid State Contactors, and specializes in custom designed solid state switching solutions for any load control application. Crydom is a brand of CST.

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, Medical, Food & Beverage and Building Equipment markets.

Basics of AC 3 Phase Motor Control

AC 3 phase motors up to 5 HP are frequently used in control technology for an infinite range of applications. A contactor is the electrical switch used to control the power to a motor for every start/stop operation and therefore it is subject to significant wear.

In some cases the direction of the motor (forward/backward) needs to be controlled; in such cases 2 contactors need to be used together with an interlock to prevent accidental maneuver.

The coil input provides the magnetic force to close the contacts and may be driven by either an AC or DC supply, low voltage (24 VAC, 24 VDC) or high voltage (120 VAC, 230 VAC)

Additional auxiliary contacts can be used to provide memory to control circuits. When energized, the contactor switches the auxiliary contact, maintaining a circuit closed or open depending on the type of contact (normally open or normally closed).
Until now the selection of an appropriate contactor to start and stop a motor has always been a challenge. The selection should include maintenance cost calculation and technical requirements evaluation specific to the application, such as the switching frequency, vibration and shock conditions, available space, desired life span, etc.

SOLICON DRC Series offers performance levels never reached before by a contactor regardless of the technology used: Electromechanical, Solid State or Hybrid!

Replacement and maintenance costs are substantially reduced thanks to its extended operating life, therefore simplifying calculations about the Total Cost of Ownership (TCO) of SOLICON DRC Series contactors.

DRC3P
Solid State Contactor
Available in either 2 or 3 Controlled Legs. Up to 5 HP @ 480 VAC Motor Controller Rated.

DRC3R
Reversing Solid State Contactor
In a 45 mm package. Includes both Forward, Reversing direction and related Interlock Control. Up to 5 HP @ 480 VAC Motor Controller Rated.
Outstanding features all in one contactor!

- Output terminals designed for an easy connection to multiple motor connections in parallel for a total up to 5 HP @ 480 VAC
- Patented proprietary thermal management technology
- Industry standard DIN rail mountable package
- Full compatibility with Schneider Electric’s accessories such as overload relay LRD and thermal magnetic circuit breaker GV2
- Very low input control current
- Input control available in a variety of DC and AC voltage options
- 40% lighter than a similarly rated contactor
- Reversing control (DRC3R includes On/Off and Forward/Reverse control in a compact 45 mm package)
- UL Listed, IEC60947-2 standard package
- ID marker for easy identification
- Embedded solid state auxiliary contacts (Normally Open and Normally Closed)
- LED input status indicator (including 2 different colors for Forward and Reverse)

Complete specifications of SOLICON DRC Series available at: motion.crydom.com
SOLICON DRC Series contactors are a unique switching solution featuring:

- **9000 starts per hour**
  This unique solid state contactor can start/stop a 3 Phase AC Motor at a maximum switching frequency of 9000 cycles/hour.

- **Embedded Auxiliary Contacts**
  DRC Series contactors have embedded solid state auxiliary contacts (Normally Open and Normally Closed).

- **100 kA SCCR**
  SOLICON contactors have a Short Circuit Current Rating of 100 kA (as per UL508A, Supplement SB) making them a flexible solution for panel builders.

- **Flexible Input Control Options**
  This unique series of contactors offers the most widely used AC and DC input control voltage configurations (24 VDC/VAC, 120 VAC, and 230 VAC).

- **Compatible Accessories**
  SOLICON DRC Series contactors offer full mechanical and electrical compatibility with Schneider Electric accessories.

  - **GV2ME**
    Thermal Magnetic Circuit Breaker (Push Button)
  - **GV2P**
    Thermal Magnetic Circuit Breaker (Selector)
  - **LRD**
    Thermal Overload Relay
  - **LR 97**
    Electronic Overload Relay
Why use SOLICON DRC Series Contactors?

**Long Life**
DRC Series are “all” Solid State Contactors with no moving parts. Therefore, there is no wear out of the output since there are no mechanical “contacts”. The typical life expectancy of a DRC Series Solid State Contactor may be more than 50 times that of an equivalently rated electromechanical contactor, making them ideal for repetitive cycle applications.

**Quiet Operation**
Solid State Switching solutions make no acoustical noise when the output changes states. This is highly desirable in many commercial and medical applications.

**Low Power Consumption**
DRC Series Solid State Contactors require very little input power (coil current for EMR contactors) to switch large load currents. Typical input current for the DRC Series is 10 mA verses 200 to 300 mA for EMR contactors, corresponding to greater than a 90% reduction.

**Shock & Vibration Resistance**
DRC Series Solid State Contactors are not susceptible to erratic or unreliable operation when operating in tough environments. Vibration can affect EMR contactor performance in certain installations, but not DRC Solid State Contactors.

**Low Generated Electrical Noise**
DCR Series Solid State Contactor outputs do not “bounce” or create arcs when switching on or off. Thus electrical transients commonly created by contact bounce and arcs of EMR contactors are not created when the DRC switches loads on and off. Additionally, the zero current turn off feature of the DRC further reduces electrical transients created by EMR contactors turning off motor and inductive loads.

**Ideal for Harsh Environments**
DRC Solid State Contactors are designed to meet IEC 60664-1 pollution degree level 2 and will operate in most control applications. DRC Contactors are impervious to magnetic fields and offer up to 4 Kv optical isolation to insure that line transients do not damage the Contactor or get transmitted to sensitive low voltage control equipment.

**Reduced Weight**
SOLICON DRC Series Contactors are lighter compared to equivalently rated electromechanical contactors. SOLICON’s typical weight of 196 grams compares favorably to 320 grams for similarly rated EMR contactors, thus reducing both equipment weight and inbound and outbound freight. Reversing applications benefit even more since 2 EMRs and an interlock are required for such applications.

**Reduced Energy Cost**
Significant energy savings can be achieved through the more precise load control made possible by DRC Solid State Contactor performance. By combining the DRC with precise control circuitry and appropriate programming, load on times can be minimized through frequent on/off cycling, thus providing maximum system efficiency simply not possible with EMR type contactors.

**Space Saving Compact Package**
The compact IEC style package of the DRC Contactor permits motor reversing control in half the space required for EMR type contactors performing the same function. That is a 50% savings in cabinet space!

Complete specifications of SOLICON DRC Series available at: motion.crydom.com
DRC Series contactors can be used in a wide range of AC motors up to 5 HP (3.7 KW) and are particularly suited for demanding applications that require higher levels of reliability such as machine tools, packaging machinery, conveyor systems, hoisting equipment, and auxiliary motors for fans and pumps.

Embedded Control Functions
SOLICON DRC3R Reversing Contactors include embedded electronic interlock control for On/Off and Forward/Reverse motor control insuring that conflicting control signals do not create faults without the use of costly and elaborate electromechanical interlocks necessary for EMR contactors in the same application.

Magnetic Noise Immunity
Magnetic fields have no effect on Solid State Relays or Contactors since unlike electromechanical relays or contactors, there are no magnetic coils or mechanical components needed to move contacts. DRC Solid State Contactors are not only immune to magnetic fields, they do not create any magnetic fields that may interfere with adjacent equipment sensitive to such fields.

LED Status Indicator
Unlike traditional electromechanical contactors, the SOLICON DRC Series has 1 LED on board to indicate the status of the input control voltage. An illuminated LED indicates the presence of a control signal. SOLICON DRC3R Reversing Contactors have 2 LEDs; one indicating the presence of a forward direction control signal, and one of a different color indicating the presence of a reverse direction control signal.

Fast Switching
SOLICON DRC Series Solid State Contactors respond to a control signal in less than 20 milliseconds. Small, and therefore faster EMR contactors, require up to 80 milliseconds to change states, making DRC contactors 4 times faster.

Position Insensitive
All SOLICON DRC Solid State Contactors are position insensitive in all planes permitting mounting in any position. Their all solid state design means they do not impact adjacent equipment with shock, vibration or magnetic fields generated by coils and moving parts. DRC contactors can be mounted side by side so long as the thermal derating associated with zero spacing is observed (see product datasheet).
Easy to Install & Space Saving!

Mounting on standard 35 mm DIN rail, SOLICON DRC Series Contactors require less DIN rail space in panels (45 mm), including both the standard and reversing contactor with Forward, Reverse & Interlock functions. DRC Series contactors are easy to implement and use, reducing wiring times, saving cabinet space and simplifying BOMs.

Highest Switching Frequency in the Market!

SOLICON Solid State Contactors have advanced switching technology which allows them to operate a motor at a start/stop switching frequency of 9000 cycles/hour*, switching speed never reached before by a solid state, electromechanical or hybrid contactor.

* Performance varies based on operating parameters. See product datasheet for complete switching frequency information.
# DRC Series Contactor

DIN Rail Mounted 3 Phase & Reversing Solid State Contactors

- 7.6 Amp Motor Controller rated Solid State Contactor
- Load voltage range up to 530 VAC
- Fits standard 35 mm DIN rail
- LED input status indicator
- AC or DC control
- Zero crossing (resistive loads) or instantaneous turn-on (inductive loads) output
- Built in Overvoltage Protection
- Ultra-efficient thermal management design (Patented)
- C-UL-US Listed, IEC Rated, CE & RoHS Compliant, Horsepower Rated

## Output Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Operating Voltage Range</th>
<th>Load Voltage</th>
<th>Load Current</th>
<th>Maximum Load Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRC3Pxxxx</td>
<td>48-530</td>
<td>1200</td>
<td>7.6</td>
<td>2330</td>
</tr>
<tr>
<td>DRC3Pxxxx2</td>
<td>48-530</td>
<td>1200</td>
<td>7.6</td>
<td>2330</td>
</tr>
<tr>
<td>DRC3R40xxx</td>
<td>48-415</td>
<td>1200</td>
<td>7.6</td>
<td>2330</td>
</tr>
<tr>
<td>DRC3R40xxxx</td>
<td>48-415</td>
<td>1200</td>
<td>7.6</td>
<td>2330</td>
</tr>
</tbody>
</table>

## Input Specifications

<table>
<thead>
<tr>
<th>Option A</th>
<th>Option B</th>
<th>Option D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Voltage Range</td>
<td>208-265 Vac</td>
<td>90-140 Vac</td>
</tr>
<tr>
<td>Minimum Turn-On Voltage</td>
<td>208 Vac</td>
<td>90 Vac</td>
</tr>
<tr>
<td>Minimum Input Current (mA / 10%)</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Maximum Input Current (mA / 10%)</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

## Solid State Auxiliary Contacts

<table>
<thead>
<tr>
<th>Model</th>
<th>Normally Open Suffix 2x, 1x</th>
<th>Normally Closed Suffix x1</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRC3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Voltage Range</td>
<td>18-280</td>
<td>600</td>
</tr>
<tr>
<td>Maximum Load Current (mA)</td>
<td>600</td>
<td>1</td>
</tr>
<tr>
<td>Minimum Load Current (mA)</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

## General Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>DRC3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dielectric Strength</td>
<td>3750</td>
</tr>
<tr>
<td>Minimum Insulation Resistance (500 VDC)</td>
<td>10³</td>
</tr>
<tr>
<td>Maximum Capacitance, Input/Output (pF)</td>
<td>20</td>
</tr>
<tr>
<td>Ambient Operating Temperature Range (°C)</td>
<td>-20 to 80</td>
</tr>
<tr>
<td>Ambient Storage Temperature (°C)</td>
<td>-40 to 100</td>
</tr>
<tr>
<td>LED Status Indicator (color)</td>
<td>Forward (Green) / Reverse (Amber)</td>
</tr>
<tr>
<td>Short Circuit Current Rating (KA)</td>
<td>100</td>
</tr>
<tr>
<td>Weight (Typical)</td>
<td>2 Controlled Legs (6.940 oz / 196.7 g) / 3 Controlled Legs (9.050 oz / 258 g)</td>
</tr>
<tr>
<td>Housing Material</td>
<td>UL94 V-0</td>
</tr>
<tr>
<td>Housing Color</td>
<td>Black and Light Gray</td>
</tr>
<tr>
<td>Humidity</td>
<td>85% Non-Condensing</td>
</tr>
</tbody>
</table>
### Part Number Nomenclature

**Series**

<table>
<thead>
<tr>
<th>DRC</th>
<th>3P</th>
<th>48</th>
<th>D</th>
<th>4</th>
<th>00</th>
<th>R</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Function</strong></td>
<td>3P: Contactor</td>
<td>3R: Reversing Contactor</td>
<td><strong>Control Voltage</strong></td>
<td>A: 230 VAC</td>
<td>B: 120 VAC</td>
<td>D: 24 VAC/DC</td>
<td><strong>Auxiliary Contacts, N.O. - N.C.</strong></td>
</tr>
</tbody>
</table>

**Tolerances:** ±0.02 in / 0.5 mm

All dimensions are in: inches [millimeters]

- **Required for valid part number**
- **For options only and not required for valid part number**

### Mechanical Dimensions

Tolerances: ±0.02 in / 0.5 mm

All dimensions are in inches [millimeters]

### Derating Curves

**DRC3Px (3 controlled legs)**

- Single unit
- Multiple units (K)

**DRC3PxZ (2 controlled legs) & DRC3R**

- Single unit
- Multiple units (K)

### ID Marker Strips

Packages of 10 plastic strips comprising 10 individual markers which can be placed for easy identifications during the use of multiple units.

- Blank Strips
  - Part no.: CNLB
- Numbered 1 to 10 Strips
  - Part no.: CNLN
- Numbered 11 to 20 Strips
  - Part no.: CNL2

Complete specifications of SOLICON DRC Series available at: [motion.crydom.com](http://motion.crydom.com)
DRC3P Contactor Block Diagrams

DRC3P (3 controlled legs model)
Main Circuit

DRC3P (2 controlled legs model)
Main Circuit

Without Auxiliary Contacts

DRC3Pxxxx400x
Auxiliary Contacts

DRC3Pxxxx420x
(2 Normally Open)
Auxiliary Contacts

DRC3Pxxxx411x
(1 Normally Open - 1 Normally Closed)
Auxiliary Contacts

DRC3R Reversing Contactor Block Diagram

Forward

Reverse

DRC3Rxxxx420 models only

Timing Diagram for DRC3R Reversing Contactor

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input A1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input A3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FWD Direction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100 msec</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REV Direction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100 msec</td>
<td></td>
<td></td>
<td>interlock</td>
</tr>
</tbody>
</table>

Step | Description
--- | ---
1, 4, 10 | Initial Condition A1 & A3 open
2 | A1 is activated, FWD Output wait for 100 ms
3, 9 | FWD direction is activated
4 | A1 change to off, FWD Output is desable at the same time
5 | A3 is activated REV Output wait for 100 ms
6 | REV direction is On
7 | Interlock function is activated, REV is desable due to A1 & A3 are both activated
8 | A3 is open, A1 closed, activation delayed 100 ms

General Notes

(A) All parameters at 25°C unless otherwise specified.
(B) For DRC3P relay will self trigger between 900-1200 V, not suitable for capacitive loads.
(C) Mounted in the Vertical position.
(D) For low temperature operation consider nominal control voltage.
(E) For DRC3R the turn-on time is 100 ms ± 30 ms.
(F) For DRC3R the turn-off time is 20 ms.
(G) For input to auxiliary output the dielectric strength is 2.5 KV.
(H) Reverse Amber Indicator is for DRC3R models only.
(I) When protected with J Class fuses rated 600 VAC, 20 Amp or equivalent.
(K) To achieve maximum ratings, there must be a minimum spacing of 0.8 inch (22 mm) between the devices in free air and a minimum free spacing of 3.15 in (80 mm) at the top and at the bottom.
(L) Normally Open (13 - 14) for DRC3xxxx411 models and DRC3xxxx430 models.
(M) Normally Open (23-24) for DRC3xxxx420 models, Normally Closed (21-22) for DRC3xxxx411 models.
(N) Not available for DRC3xxx400 models.