

# SOLICON

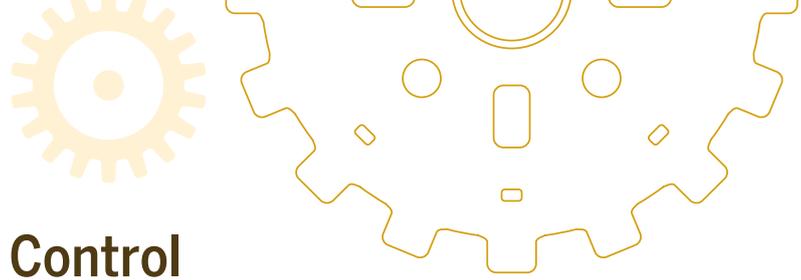
## DRC Series

***crydom***<sup>®</sup>

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

**New  
Models!**



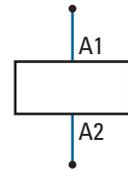
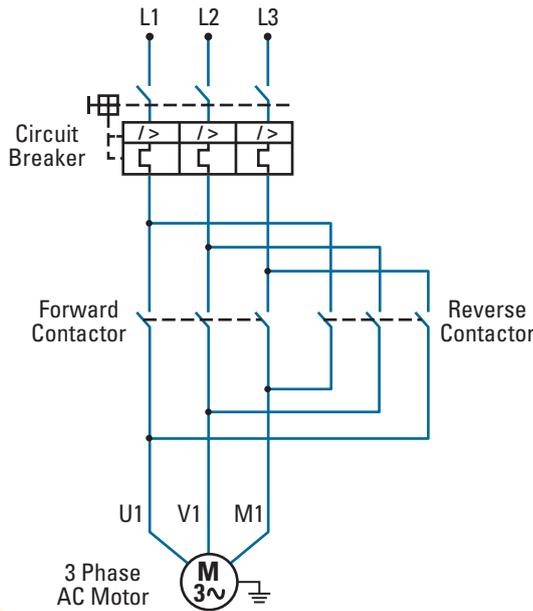
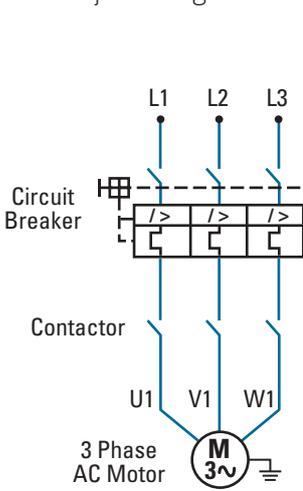


# Basics of AC 3-Phase Motor Control

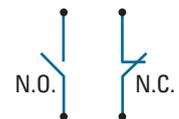
AC 3-phase motors up to 5 HP are frequently used in control technology for an infinite range of applications. A contactor is the electrical switch used to control the power to a motor for every start/stop operation and therefore it is subject to significant wear.

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, 48 VAC, 48 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).



## Motion Control

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.

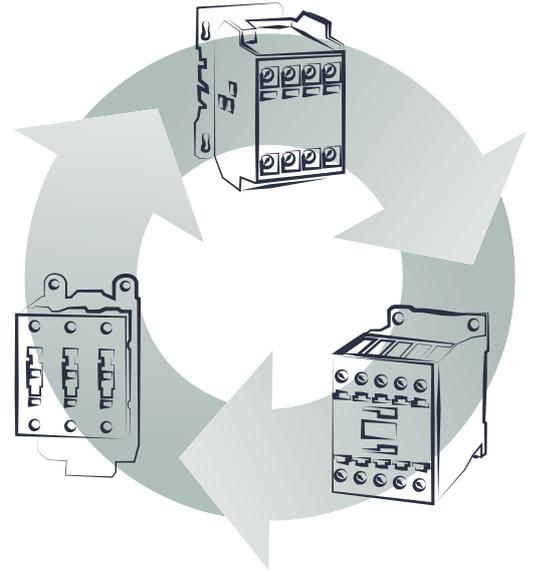
[motion.crydom.com](http://motion.crydom.com)



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.

[www.crydom.com](http://www.crydom.com)

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.



## Now the choice is simple...



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.

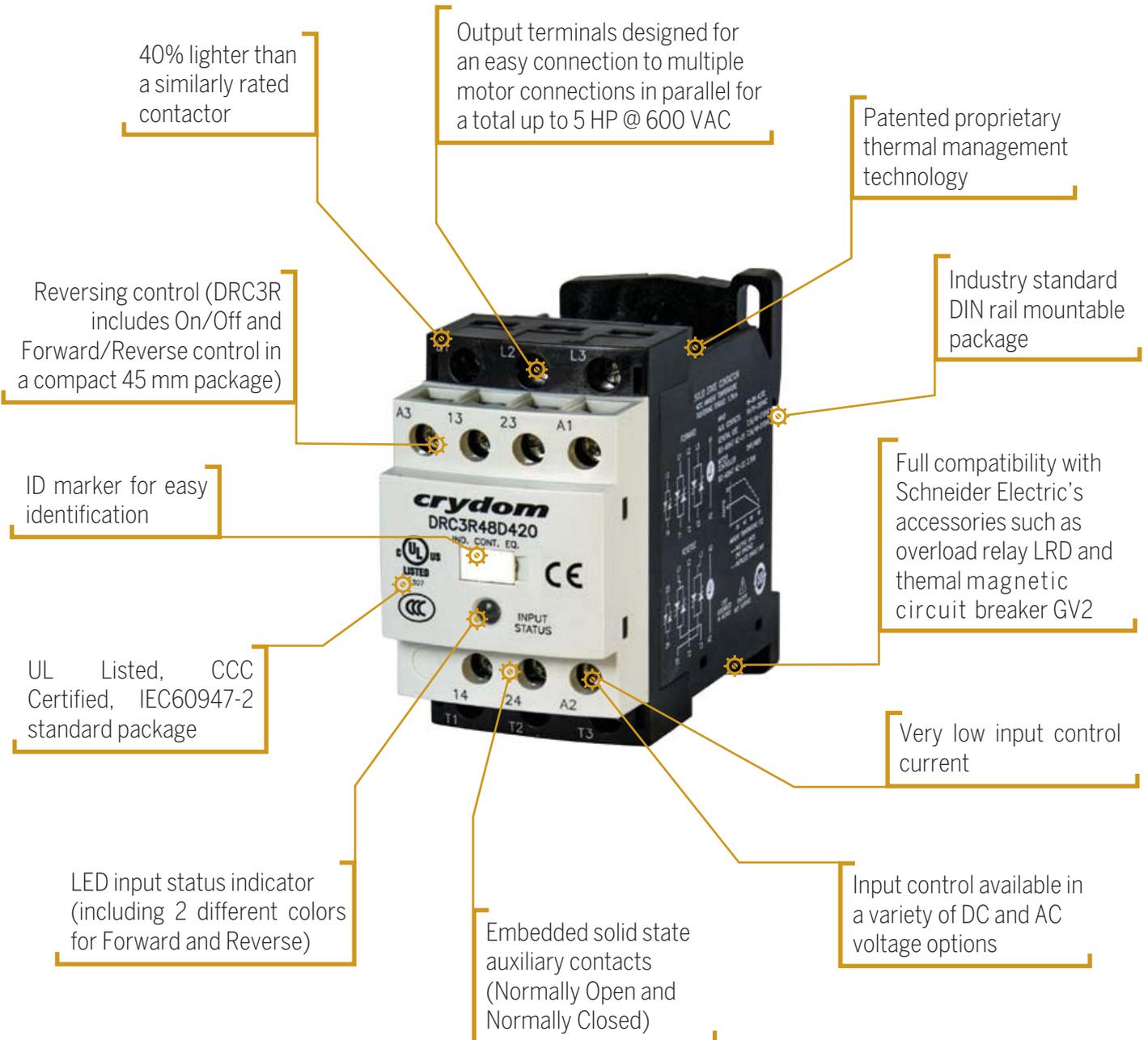


**DRC3P**  
**Solid State Contactor**  
Available in either 2 or 3 Controlled Legs. Up to 5 HP @ 600 VAC Motor Controller Rated.



**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!



## 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, 24 VAC, 48 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**

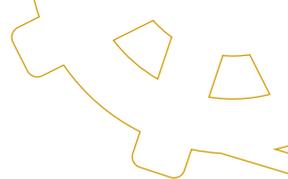
Thermal Magnetic Circuit Breaker (Selector)

#### **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”. Solicon Series has an exceptional MTBF (Mean Time Between Failures) value of 1,398,000 hours (**159 years**) when used at 40°C ambient temperature which is not even comparable to the short life of an electromechanical contactor.

## 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 versus 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

DRC 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.

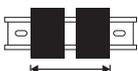


## Reduced Weight

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!



## 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.

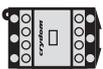


## LED Status Indicator

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).

# Diverse Range of Applications



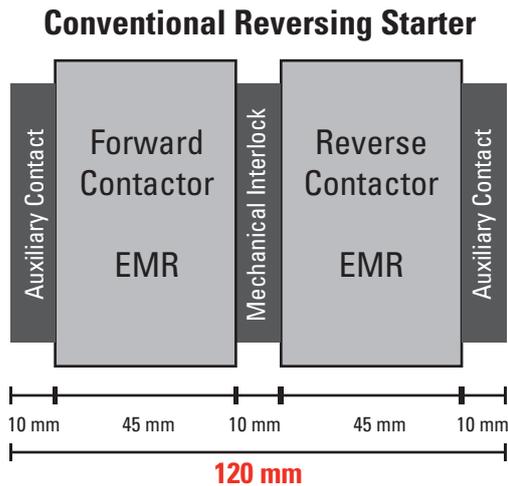
DRC Series contactors can be used in a wide range of AC motors up to 5 HP (3.7 kW) and are particularly suited for demanding applications that require higher levels of reliability such as machine tools, packaging machinery, conveyor systems, hoisting equipment, and auxiliary motors for fans and pumps.





## 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.

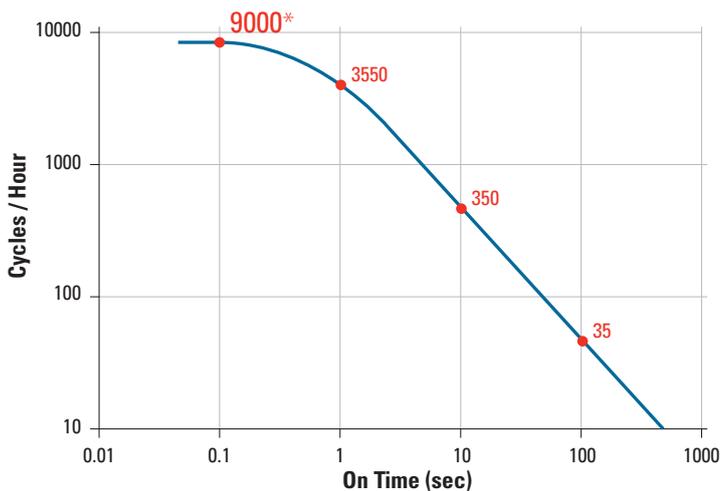


**VS**

**DRC3R Reversing Starter**



## 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 600 VAC
- Fits standard 35 mm DIN rail
- LED input status indicator
- AC or DC control
- Zero voltage (resistive loads) or instantaneous (inductive loads) turn-on output
- Built-in Overvoltage Protection
- Ultra-efficient thermal management design (Patented)
- C-UL-US Listed, CCC Certified, IEC Rated, CE & RoHS Compliant, Horsepower Rated



Output Specifications (A)	DRC3P48x4x	DRC3P48x4x2	DRC3P60x4x	DRC3P60x4x2	DRC3R40x4x	DRC3R48x4x
Operating Voltage Range (47-63 Hz) [Vrms]	48-530	48-530	48-600	48-600	48-415	48-510
Transient Overvoltage [Vpk] (B)	1200	1200	1200	1200	1200	1600
Maximum Off-State Leakage Current @ Rated Voltage [mArms]	3	3	1	1	5.5	5.5
Maximum Off-State dv/dt @ Maximum Rated Voltage [V/μsec]	500	500	500	500	500	500
Load Current, Resistive UL508/AC51 @ 40°C [Arms] (C)	5	7.6	5	7.6	7.6	7.6
Load Current, Motor Controller UL508/AC53 @ 480VAC [Arms] (C)	4.8	7.6	4.8	7.6	7.6	7.6
Minimum Load Current [Arms]	0.15	0.15	0.15	0.15	0.15	0.15
Maximum Surge Current [Apk] 1 Cycle 60Hz	750	750	750	750	750	625
Maximum Surge Current [Apk] 1 Cycle 50Hz	716	716	716	716	716	597
Maximum I <sup>2</sup> t for Fusing (8.33msec)[A <sup>2</sup> sec]	2330	2330	2330	2330	2330	1621
Maximum I <sup>2</sup> t for Fusing (10msec)[A <sup>2</sup> sec]	2560	2560	2560	2560	2560	1779
Maximum On-State Voltage Drop @ Rated Current [Vrms]	1.35 per channel	1.35 per channel	1.35 per channel	1.35 per channel	1.5 per channel	1.5 per channel
Minimum Power Factor (with Maximum Load)	0.5	0.5	0.7	0.7	0.5	0.5
Ratings according to UL 508/IEC60947-4-2 [HP/kW]: 240 VAC	1 / 0.75	2 / 1.5	1 / 0.75	2 / 1.5	2 / 1.5	2 / 1.5
Ratings according to UL 508/IEC60947-4-2 [HP/kW]: 400 VAC	2 / 1.5	3 / 2.2	2 / 1.5	3 / 2.2	3 / 2.2	3 / 2.2
Ratings according to UL 508/IEC60947-4-2 [HP/kW]: 480 VAC	3 / 2.2	5 / 3.7	3 / 2.2	5 / 3.7	-	5 / 3.7
Motor Ratings @ 600 VAC [HP/kW]	-	-	3 / 2.2	5 / 3.7	-	-

Input Specifications (A)	Option A	Option B	Option C	Option D	Option E
Control Voltage Range	208-265 VAC	90-140 VAC	36-55 VAC / VDC	18-30 VAC / VDC (P)	18-30 VDC
Minimum Turn-On Voltage (D)	208 VAC	90 VAC	36 VAC / VDC	18 VAC / VDC	18 VDC
Must Turn-Off Voltage	40 VAC	10 VAC	4 VAC / VDC	4 VAC / VDC	4 VDC
Minimum Input Current (for On-State) [mA ± 10%]	6.1	7.5	12	12.5	12.5
Maximum Input Current [mA ± 10%]	8	13	20	32	32
Nominal Input Impedance	33k	12.5k	3k	0.93k	0.93k
Maximum Delay to Turn-On [Ohms] (E)	30	30	30	20	100 ± 30
Maximum Turn-Off Time [msec] (F)	40	40	40	30	20

Solid State Auxiliar Contacts (A)	Normally Open Suffix 2x, 1x	Normally Closed Suffix x1
Operating Voltage Range (47-63 Hz) [Vrms]	18-280	18-280
Transient Overvoltage [Vpk]	600	600
Maximum Load Current [Arms]	1	1
Minimum Load Current [mA]	5	5
Maximum Surge Current [Apk] 1 Cycle 60Hz	40	40
Maximum Surge Current [Apk] 1 Cycle 50Hz	38	38
Maximum I <sup>2</sup> t for Fusing (8.33msec)[A <sup>2</sup> sec]	6.7	6.7
Maximum I <sup>2</sup> t for Fusing (10msec)[A <sup>2</sup> sec]	7.2	7.2
Maximum Off-State Leakage Current @ Rated Voltage	0.1 mArms	5 mA
Maximum Off-State dv/dt @ Maximum Rated Voltage [mArms]	500	500
Maximum Delay to Turn-On [msec] (E)	20	80
Maximum Turn-Off Time [msec] (F)	30	30

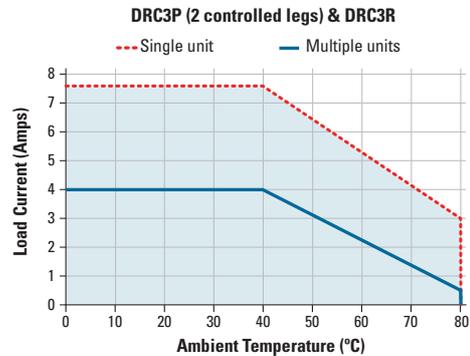
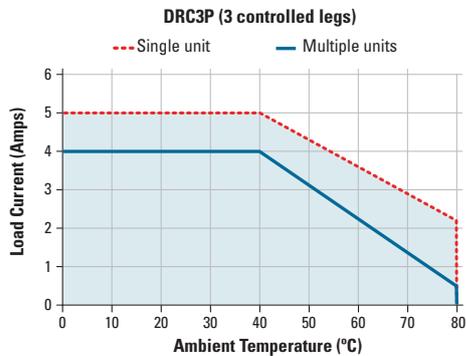
General Specifications (A)	DRC3
Dielectric Strength, Input-Output to Baseplate (50/60Hz) [Vrms] (G)	3750
Minimum Insulation Resistance (@ 500 VDC) [Ohm]	10 <sup>9</sup>
Maximum Capacitance, Input/Output [pF]	20
Ambient Operating Temperature Range [°C]	-30 to 80
Ambient Storage Temperature Range [°C]	-40 to 100
LED Status Indicator (color) (H)	Forward (Green) / Reverse (Amber)
Short Circuit Current Rating [kA] (J)	100
Weight (typical)	2 Controlled Legs (6.940 oz [196.7 g]) / 3 Controlled Legs (8.050 oz [228 g])
Housing Material	UL94 V-0
Housing Color	Black and Light Gray
Humidity	85% Non-Condensing

## Part Number Nomenclature

<p><b>Series</b></p> <p><b>DRC</b></p>	<p><b>3P</b></p> <p><b>Function</b> 3P: Contactor 3R: Reversing Contactor</p>	<p><b>48</b></p> <p><b>Operating Voltage</b> 40: 400 VAC (3R function only) 48: 480 VAC 60: 600 VAC (3P function only)</p>	<p><b>D</b></p> <p><b>Control Voltage</b> A: 208-265 VAC B: 90-140 VAC C: 36-55 VAC/DC D: 18-30 VAC/DC (3P function only) E: 18-30 VDC (3R function only)</p>	<p><b>4</b></p> <p><b>Load Current per Phase</b> 4: 7.6 Amp FLA (x2 Controlled Legs &amp; 3R function); 4.8 Amp FLA (x3 Controlled Legs only)</p>	<p><b>00</b></p> <p><b>Auxiliary Contacts, N.O. - N.C.</b> 00: Not included 11: 1 Solid State Auxiliary Contact, Normally Open; 1 Solid State Auxiliary Contact, Normally Closed (3P function only) 20: 2 Solid State Auxiliary Contacts, Normally Open</p>	<p><b>R</b></p> <p><b>Switching Mode</b> (3P function only) Blank: Zero Voltage Turn-On R: Instantaneous Turn-On</p>	<p><b>2</b></p> <p><b>Controlled Legs</b> (3P function only) Blank: 3 Controlled Legs 2: 2 Controlled Legs</p>
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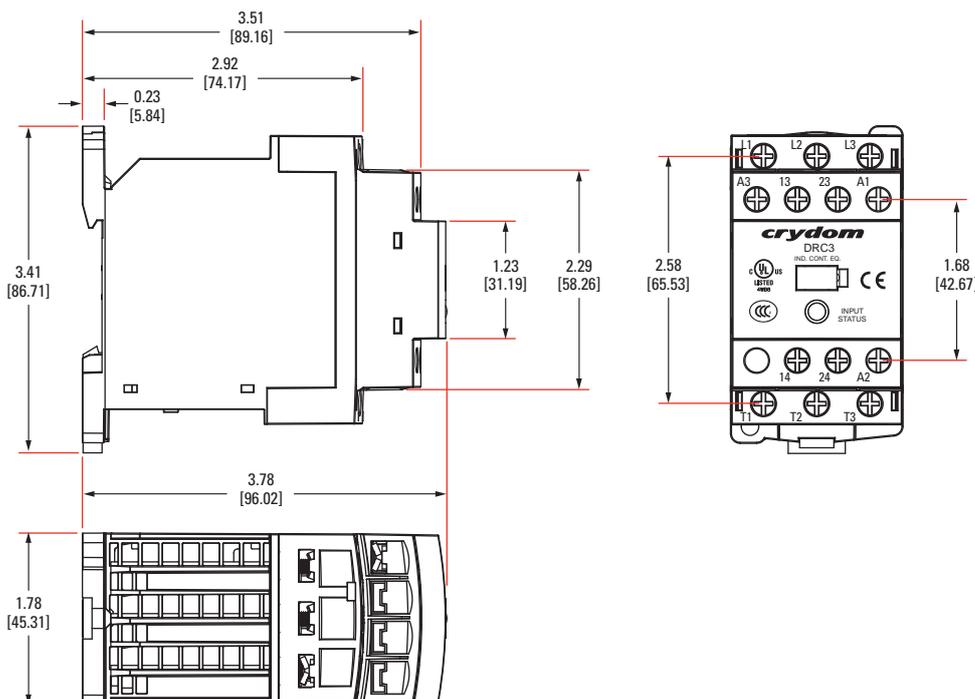
● Required for valid part number  
● For options only and not required for valid part number

## Derating Curves (K)



## Mechanical Dimensions

Tolerances: ±0.02 in / 0.5 mm  
All dimensions are in: inches [millimeters]



## ID Marker Strips



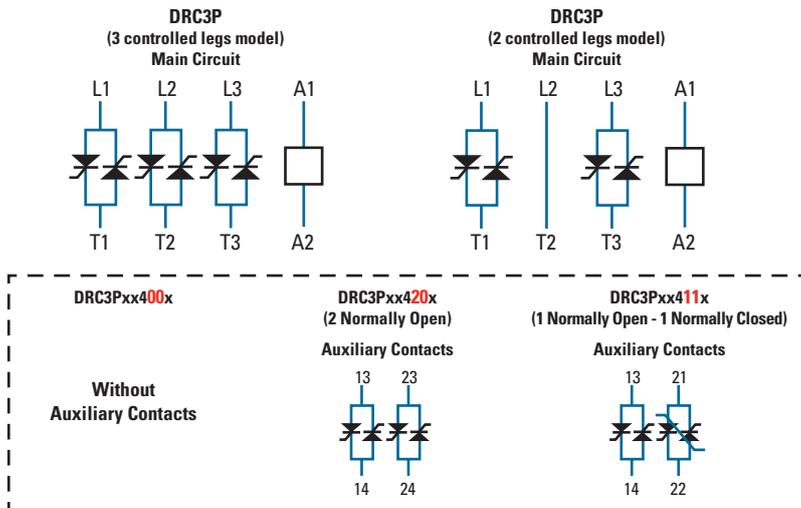
Packages of 10 plastic strips comprising 10 individual markers which can be placed for easy identifications during the use of multiple units.

**Blank Strips**  
Part no.: CNLB

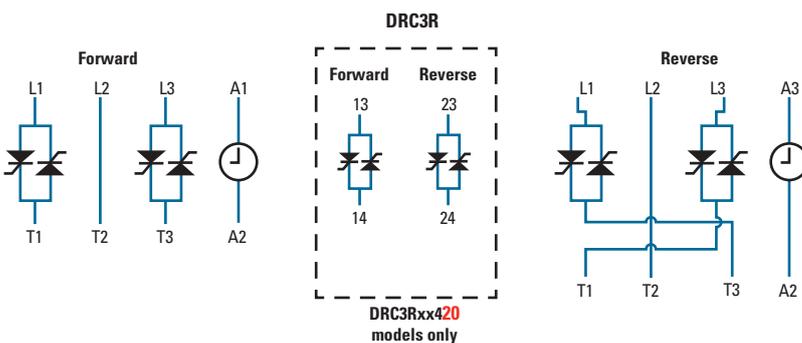
**Numbered 1 to 10 Strips**  
Part no.: CNLN

**Numbered 11 to 20 Strips**  
Part no.: CNL2

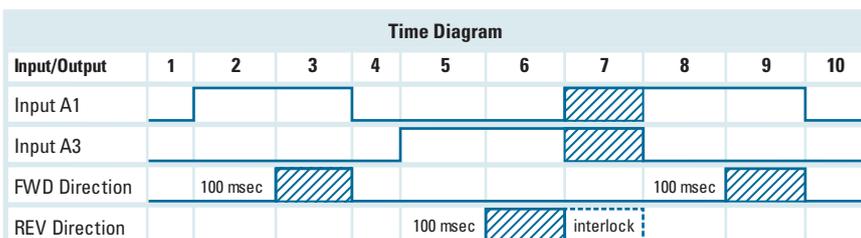
## DRC3P Contactor Block Diagrams



## DRC3R Reversing Contactor Block Diagram

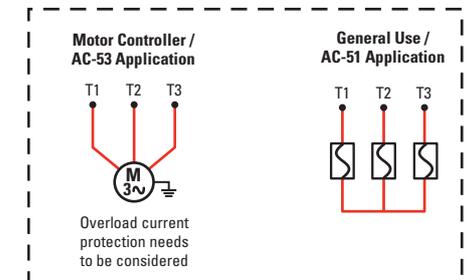
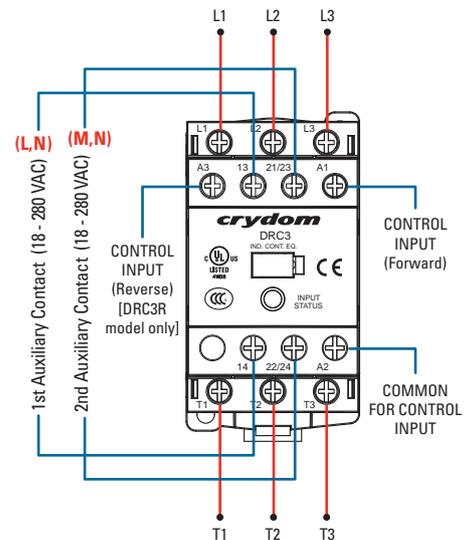


## Timing Diagram for DRC3R Reversing Contactor



Step	Description
1, 4, 10	Initial Condition A1 & A3 open
2	A1 is activated, FWD Output waits for 100 msec
3, 9	FWD direction is activated
4	A1 changes to off. FWD Output is disabled at the same time
5	A3 is activated REV Output waits for 100 msec
6	REV direction is On
7	Interlock function is activated. REV is disabled due to A1 & A3 both being active
8	A3 is open, A1 closed, activation delayed 100 msec

## Wiring Diagram



## 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 msec ± 30 msec.
- (F) For DRC3R the turn-off time is 20 msec.
- (G) For input to auxiliary output the dielectric strength is 2.5 kV.
- (H) Reverse Amber Indicator is for DRC3R models only.
- (J) 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 0.9 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 DRC3xxx411 models and DRC3xxx420 models.
- (M) Normally Open (23-24) for DRC3xxx420 models, Normally Closed (21-22) for DRC3xxx411 models.
- (N) Not available for DRC3xxx400 models.
- (P) On DRC3R models the range for option D is 18-30 VAC.

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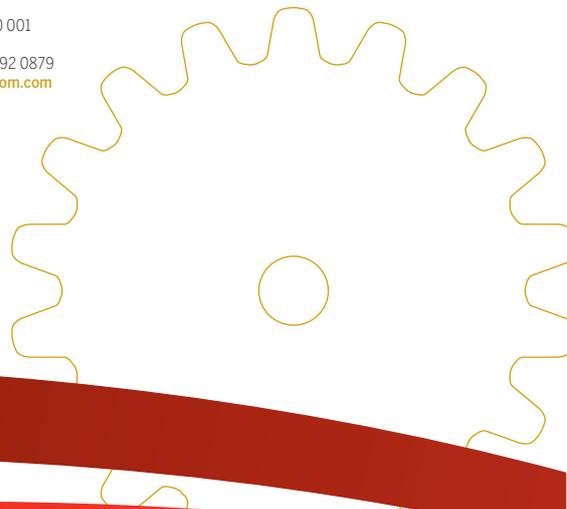
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