DP SERIES

DC REVERSING SOLID STATE CONTACTORS

Features

- Ratings of 20, 40 & 60 Amps
- Load voltage ratings of 1-48 VDC
- Optional Soft Start w/Brake, Soft Start/Soft Stop no Brake
- LED input status indicator. Green (Forward), Yellow (Reverse)
- DC control
- cULus Recognized, IEC Rated, CE & RoHS Compliant

PRODUCT SELECTION

Control Voltage	20 A	40 A	60 A
4-15 VDC	DP4R60D20	DP4R60D40	DP4R60D60
18-32 VDC	DP4R60E20	DP4R60E40	DP4R60E60

SPECIFICATIONS

Output[(1)]

Description	20 A	40 A	60 A
Operating Voltage [VDC]	1-48	1-48	1-48
UL 508 Resistive Load, IEC 60947-4-1 DC-1 [Adc]	20	40	60
UL 508 Motor Controller, IEC 60947-4-1 DC-3 [FLA]	13	14	15
Minimum Load Current [A]	0.10	0.10	0.10
Maximum Surge Current (10ms) [Adc]	80	140	240
Maximum Off-State Leakage Current @ Rated Voltage [µA]	20	20	20
Maximum On-State Voltage Drop @ Rated Current [Vdc]	0.28	0.28	0.30
Combined Thermal Resistance Junction to Case (Rjc) [°C/W]	0.40	0.20	0.13
Maximum On-State Resistance, per switch, (RDS-ON) [Ohms]	0.014	0.007	0.005
Total Power Dissipation per module, 2 switches conducting, Tj=100° C [Watts]	20	40	60
Internal PWM For Soft Start/Stop Versions [Duty Cycle 10-100%] [Hz]	200	200	200
Output Terminal Screw size	10-32 Combo Head	1/4-20 Hex	1/4-20 Hex
Screw Torque Range [lb-in/Nm]	15-20 / 1.7-2.3	20-25 / 2.3-2.8	20-25 / 2.3-2.8
Maximum Wire Size	10 AWG	8 AWG	6 AWG

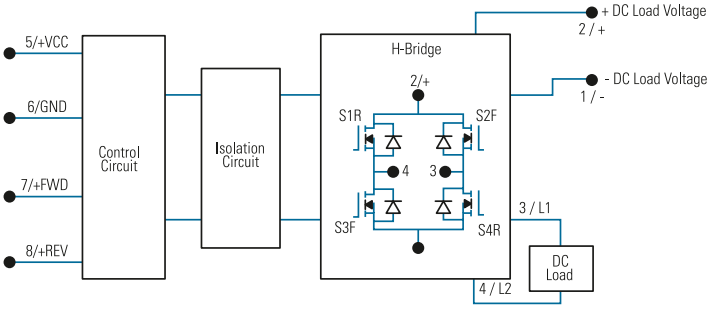
Input[1]

Description	DP4R60Dxx	DP4R60Exx
Logic Supply Voltage Range [VDC]	4.5-15	18-32
Minimum Logic Supply Current [mA] [2]	16	20
Maximum Logic Supply Current [mA] [2]	20	25
Control Voltage Range [VDC]	4.5-15	18-32
Minimum Control Input Current @ Min voltage [mA]	0.20	1.0
Maximum Control Input Current @ Max voltage [mA]	1.0	2.0
Typical Interlocking Time [msec]	200	200
Mating Connector (Not Supplied)	Molex 50579404 or Equivalent	Molex 50579404 or Equivalent

General

Description	Parameters		
Dielectric Strength, Input/Output/Base (50/60Hz)	2500 Vrms		
Minimum Insulation Resistance (@ 500 VDC)	10^9 Ohms		
Maximum Capacitance, Input to Output (pF)	10 pF		
Ambient Operating Temperature Range	-30 to 80 °C		
Ambient Storage Temperature Range	-40 to 100 °C		
Weight (typical)	10.9 oz (310g)	12.2 oz (345g)	12.2 oz (345g)
Housing Material	Valox 420 SEO Black, UL 94 V-0		
Encapsulation	Thermally conductive Epoxy		

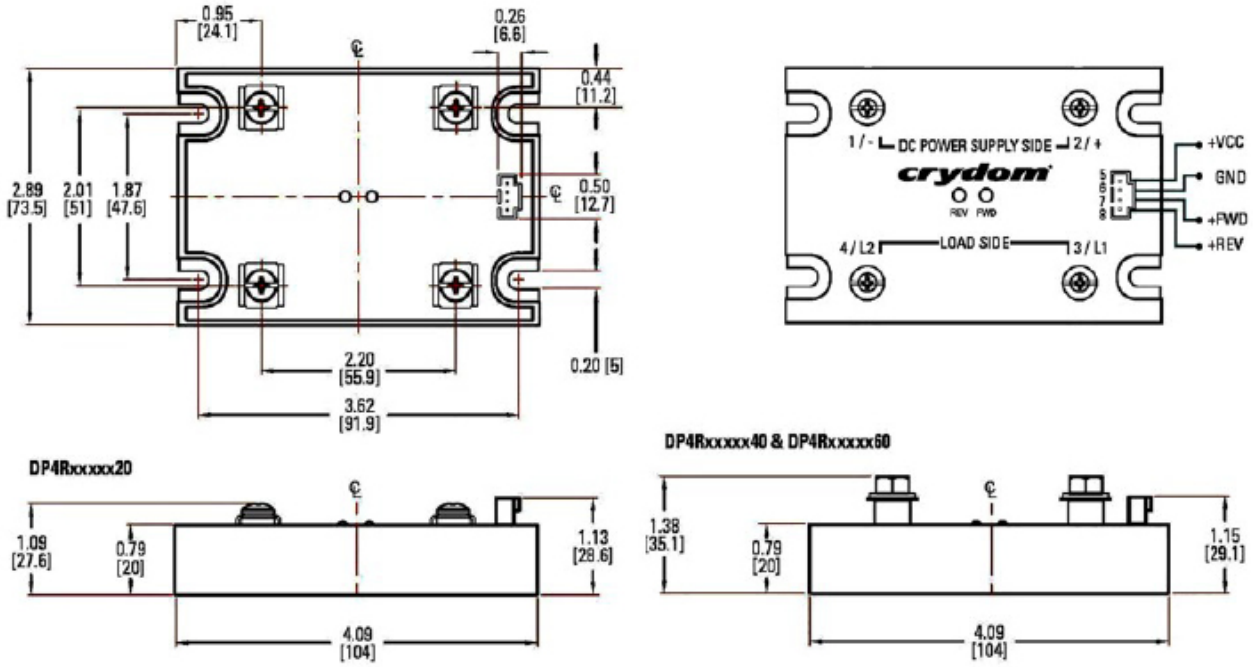
WIRING DIAGRAM



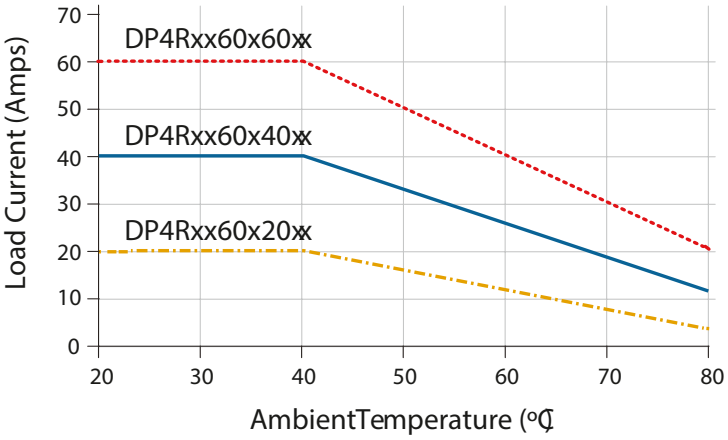
Status Functions	Green LED (Forward)	Yellow LED (Reverse)
Initial Logic Voltage On	Flash Twice	Flash Twice
Forward ON	ON	OFF
Reverse ON	OFF	ON
Dynamic Brake	Flash Once	Flash Once
Interlocking	Flash 3x Intermittently	Flash 3x Intermittently

MECHANICAL SPECIFICATIONS

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



THERMAL DERATE INFORMATION



DP Series Part No.	Required Heat Sink [°C/W]	Crydom Heat Sink Part No.
DP4Rxx60x20xx	1.5	HS103/HS103DR
DP4Rxx60x40xx	1.0	HS103/HS103DR
DP4Rxx60x60xx	0.5	HS053

OPERATING MODES

Start: When either FWD or REV Control signal is applied, and after Control Signal Delay, DC power supply on terminals 1/- and 2/+ is directly connected to Load at terminals 3/L1 and 4/L2 with a polarity according to the control signal. The start option can be combined with Stop and/or Dynamic Brake options.

Stop: Load is disconnected from DC power supply. All FET switches (S1, S2, S3 & S4) inside the DP Series SSC are turned off. This simple Stop option is available only in combination with the simple Start option (suffix Blank).

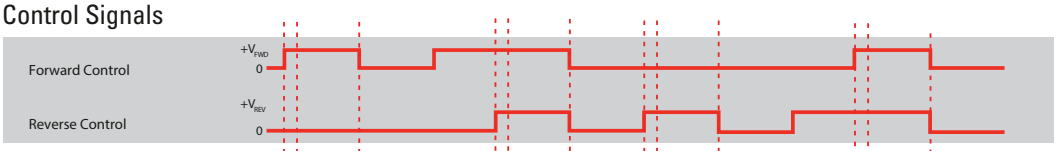
Soft Start/Ramp Up: It is a modified Start where the DC power supply is connected to the load using a 200 Hz pulse width modulation with a duty cycle going from 10% to 100%. Soft Start/Ramp Up time is defined to SA, SB and SC suffixes. After Soft Start/Ramp Up time is elapsed, the Load will remain continuously energized for ad long as FWD or REV Control signal is applied. This option can be combined with Soft Stop/Ramp Down, and Dynamic Braking modes, but not with simple Stop.

Soft Start/Ramp Down: It is a modified Stop where the DC power supply is disconnected from Load using a 200 Hz pulse width modulation with a duty cycle going from 100% to 0%. After Soft Stop/Ramp Down time is elapsed, the Load will remain continuously de-energized waiting for a new FWD or REV Control signal. Soft Stop/Ramp time is tied to Soft Start/Ramp Up time selected by SA, SB and SC suffixes and can be combined with Soft Start/Ramp Up only.

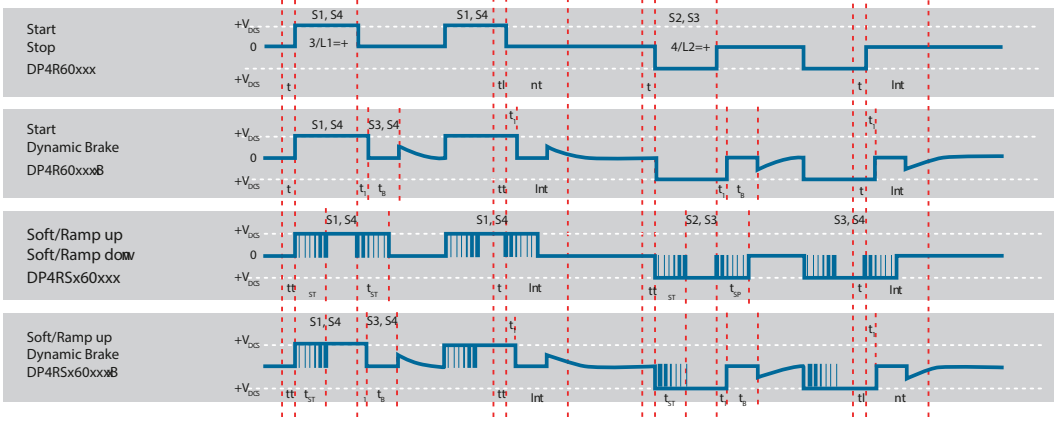
Dynamic Brake: It could be used as modified Stop where the FET switches inside the DP Series SSC are arranged in such a way that they provide a path for the Load Current to keep flowing after the DC power supply has been disconnected. This mode allows for energy stored in some type of loads to be discharged. i.e. back EMF on DC motors. Timing for Dynamic Brake is selected by suffixes B2, B5, B8 and B where the latest will keep the braking or discharging path enabled for as long as FWD and REV Control signals are removed.

Interlock: It will shut down all FET switches inside the DP Series within 0.2 sec after both control signals FWD and REV are applied at the same time. An Interlock condition will trigger a modified Stop such as Soft Stop/Ramp Down or Dynamic Brake whenever an option has been selected.

Control Signals



Load Voltage Signals[3]



Int: Interlock
t: Control Signal Validation Delay = 0.2 sec, except for Start / Stop (0.025 sec)
t_1: 0.15 sec Break-before-make delay
t_B: Dynamic Brake time
- B2: 0.2 sec
- B5: 0.5 sec
- B8: 0.8 sec
- B: Continuous

t_{SP}: Soft Stop/Ramp Down time = t_{ST}
t_{ST}: Soft Start/Ramp Up time
- SA: 0.2 sec
- SB: 0.5 sec
- SC: 1 sec

V_{DCS}: VDC power supply
t_{FWD}: Forward Control Signal
t_{REV}: Reverse Control Signal

ORDERING OPTIONS

Example : DP4RSB60D40BH

DP	4R	SB	60	D	40	B	H

Series

DP

Function

4R: 4 Channel DC Reversing

Start Mode

Blank: Start
SA: Soft Start/Ramp Up, 0.2 sec
SB: Soft Start/Ramp Up, 0.5 sec
SC: Soft Start/Ramp Up, 1 sec

Rated Operating Voltage

60: 1-48 VDC

Control Voltage

D: 4.5-15 VDC
E: 18-32 VDC

Operating Current

20: 20 Amps
40: 40 Amps
60: 60 Amps

Stop Mode

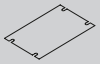
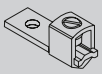
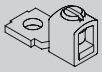
Blank: Stop Mode matches Start Mode
B2: Dynamic Brake, 0.2 sec
B5: Dynamic Brake, 0.5 sec
B8: Dynamic Brake, 0.2 sec
B8: Dynamic Brake, Continuous

Thermal Pad

Blank: Not Included
H: Included

— Required for valid part number
☐ For options only and not required for valid part number

ACCESSORIES

DP Series Part No.	 HK1	 HS053	 HS103 HS103DR	 HSP-3 HSP-5	 TRM1	 TRM6
DP4Rxx60x20xx	•		•	•		•
DP4Rxx60x40xx	•		•	•	•	
DP4Rxx60x60xx	•	•		•	•	

GENERAL NOTES

(1) All parameters at 25°C unless otherwise specified.
(2) Input circuit incorporates active current limiter.
(3) Load voltage signals shown are typical of a DC motor, behavior may change for other load types.

AGENCY APPROVALS & CERTIFICATIONS

IEC 60068-2-6 Vibration – Compliant [1.55mm/ 10-55Hz]
IEC 60068-2-27 Shock – Compliant [15G/11ms]
IEC 61000-4-2 : Electrostatic Discharge – Level 2
IEC 61000-4-4 : Electrically Fast Transients – Level 2 (Criteria A)
IEC 61000-4-5 : Electrical Surges - Level 2 (Criteria A)

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WARNINGS

RISK OF MATERIAL DAMAGE AND HOT ENCLOSURE
- The product's side panels may be hot, allow the product to cool before touching
- Follow proper mounting instructions including torque values
- Do not allow liquids or foreign objects to enter this product

Failure to follow these instructions can result in serious injury, or equipment damage.

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH
- Disconnect all power before installing or working with this equipment
- Verify all connections and replace all covers before turning on power

Failure to follow these instructions will result in death or serious injury.

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