



## HA AND HD SERIES | 60T PANEL MOUNT



### Features

- Ratings from 25A to 125A @ 48-660 VAC
- SCR output for heavy industrial loads
- Zero Voltage or instantaneous turn-on outputs
- UL/CSA/TUV Approved, CE Compliant to EN60950-1
- Improved SEMS screw and washer
- Redesigned housing with anti-rotation barriers
- AC or DC control
- Direct bond copper substrate
- Direct power lead frame
- Epoxy free design

### PRODUCT SELECTION

Control Voltage	25A	50A	90A	125A
3-32 VDC	HD6025T	HD6050T	HD6090T	HD60125T
90-280 Vrms	HA6025T	HA6050T	HA6090T	HA60125T
18-36 Vrms	HA6025ET	HA6050ET	HA6090ET	HA60125ET

### ORDERING OPTIONS

**H - A - 60 - 25 - E - K - P - G - H - T - -10**

<b>Series</b>	H
<b>Control Voltage</b>	A: 90-280 VAC D: 3-32 VDC AxxxxE: 18-36 VAC
<b>Operating Voltage</b>	48: 48-660 VAC
<b>Rated Load Current</b>	25: 25 Amps      90: 90 Amps 50: 50 Amps      125: 125 Amps
<b>Termination</b>	Blank: Screw F: Quick Connect (Up to 50 Amps only) (1) K: Hex standoffs (2)
<b>Overvoltage Protection</b>	Blank: Not Included P: Included (3)
<b>Input Status LED</b>	Blank: Not Included G: Included
<b>Thermal Pad</b>	Blank: Not Included H: Included
<b>Trigger Circuit</b>	T: Phototransistor
<b>Switching Type</b>	Blank: Zero Voltage Turn-On -10: Instantaneous Turn-On (4)

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

**Note:** Not all part number combinations are available. Contact Crydom Technical support for information on the availability of a specific part number.

## OUTPUT SPECIFICATIONS (5)

Description	25A	50A	90A	125A
Operating Voltage (47-63Hz) [Vrms]	48-660	48-660	48-660	48-660
Transient Overvoltage [Vpk]	1200	1200	1200	1200
Maximum Off-State Leakage Current @ Rated Voltage [mA rms]	5	5	5	5
Minimum Off-State dv/dt @ Maximum Rated Voltage [V/μsec]	500	500	500	500
Maximum Load Current [Arms] (2)(6)	25	50	90	125
Minimum Load Current [mA rms]	40	40	40	150
Maximum 1 Cycle Surge Current (50/60Hz) [A pk]	235/250	597/625	1145/1200	1670/1750
Maximum On-State Voltage Drop @ Rated Current [V rms] (7)	1.15	1.15	1.15	1.15
Thermal Resistance Junction to Case (Rjc) [°C/W]	0.8	0.45	0.27	0.22
Maximum 1/2 Cycle I <sup>2</sup> t for Fusing (50/60Hz) [A <sup>2</sup> sec]	285/259	1770/1629	6560/5976	13950/12709
Minimum Power Factor (at Maximum Load)	0.5	0.5	0.5	0.5

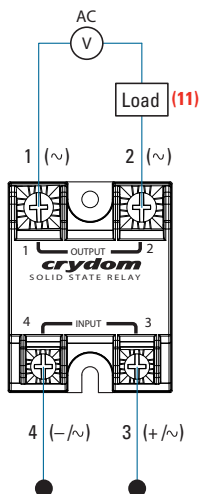
## INPUT SPECIFICATIONS (5)

Description	HD60xxT	HA60xxT	HA60xxET
Control Voltage Range	3-32 VDC	90-280 Vrms	18-36 Vrms
Minimum Turn-On Voltage	3.0 VDC (8)	90 Vrms	18 Vrms
Must Turn-Off Voltage	1.0 VDC	10 Vrms	4.0 Vrms
Minimum Input Current	2 mA	2 mA	2 mA
Maximum Input Current	2.5 mA	4.9 mA	4 mA
Nominal Input Impedance	Current Regulated	60K Ohm	9K Ohm
Maximum Turn-On Time [msec]	1/2 Cycle (9)	10	10
Maximum Turn-Off Time [msec]	1/2 Cycle	40	40

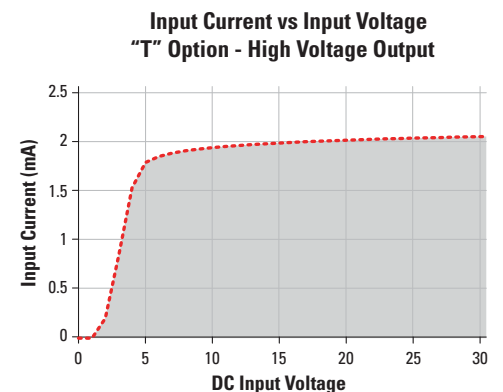
## GENERAL SPECIFICATIONS (1)

Description	Parameters
Ambient Storage Temperature Range	-40 to 125 °C
Dielectric Strength, Input/Output/Base (50/60Hz)	4000 Vrms
Minimum Insulation Resistance (@ 500 VDC)	10 <sup>9</sup> Ohm
Maximum Capacitance, Input/Output	8 pF
Ambient Operating Temperature Range	-40 to 80 °C
Weight (typical)	2.6 oz (74.9 g)
Housing Material	UL94 V-0
Baseplate Material	Aluminum
Input Terminal Screw Torque Range [in-lb/Nm]	13-15 / 1.5-1.7
Load Terminal Screw Torque Range [in-lb/Nm]	18-20 / 2.0-2.2
SSR Mounting Screw Torque Range [in-lb/Nm]	18-20 / 2.0-2.2
Input/Load Terminal Screw Torque Range [in-lb/Nm] (2)	w/"K" option 8-10 / 0.9-1.13
Input/Output Terminal Screw Thread Size	#6-32 UNC / #8-32 UNC
Humidity per IEC60068-2-78	93% non-condensing
LED Input Status Indicator	w/"G" option (green)
MTBF (Mean Time Between Failures) at 40°C ambient temperature (10)	11,641,553 hours (1,328 years)
MTBF (Mean Time Between Failures) at 60°C ambient temperature (10)	7,210,376 hours (823 years)

## WIRING DIAGRAM



Recommended Wire Sizes		
Terminals	Wire Size (Solid / Stranded)	Wire Pull-Out Strength (lb)[N]
Input	24 AWG (0.2 mm <sup>2</sup> ) / 0.2 [minimum]	10 [44.5]
	2 x 12 AWG (3.3 mm <sup>2</sup> ) / 3.3 [maximum]	90 [400]
Output	20 AWG (0.5 mm <sup>2</sup> ) / 0.518 [minimum]	30 [133]
	2 x 10 AWG (5.3 mm <sup>2</sup> ) / 5.3 [maximum]	110 [490]
	2 x 8 AWG (8.4 mm <sup>2</sup> ) / 8.4 [maximum]	90 [400]



# EQUIVALENT CIRCUIT BLOCK DIAGRAMS

Diagram: HD60xxxxT

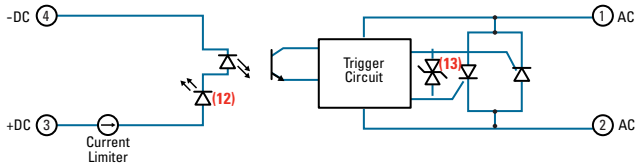
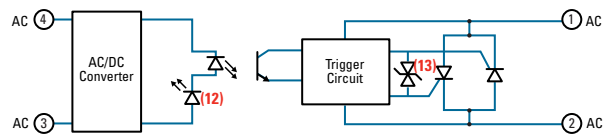


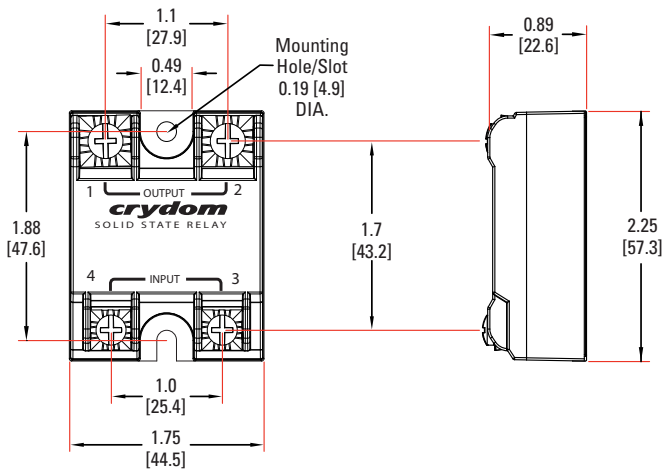
Diagram: HA60xxT



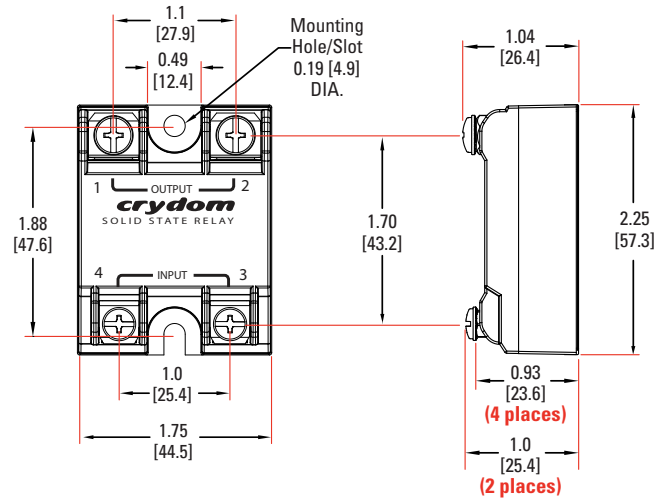
# MECHANICAL SPECIFICATIONS (5)

Tolerances:  $\pm 0.02$  in / 0.5 mm  
All dimensions are in: inches [millimeters]

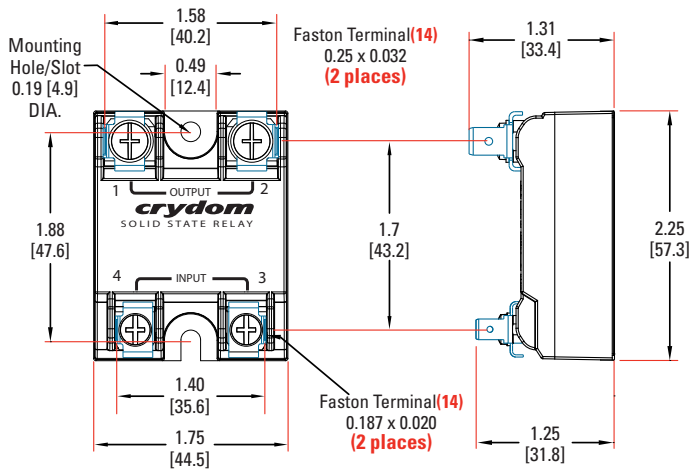
Screw Termination



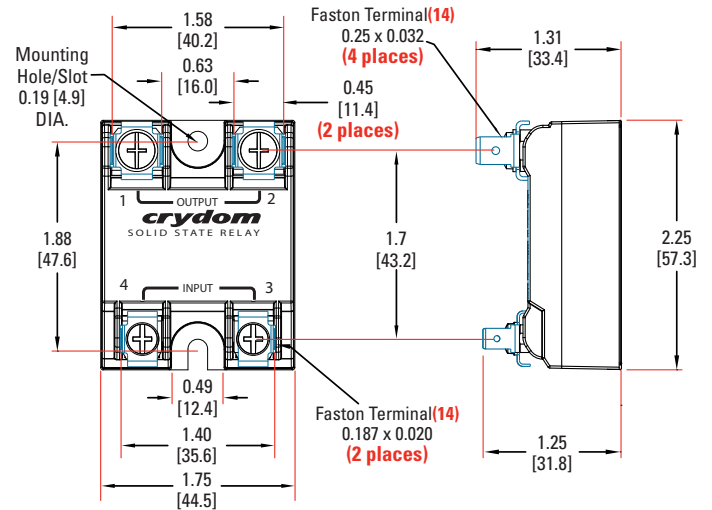
Hex Standoff Termination ("K" Option) (2)



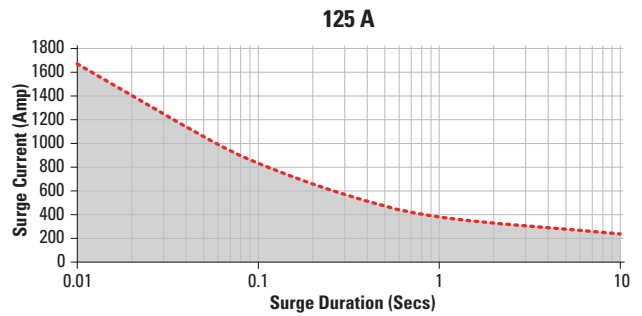
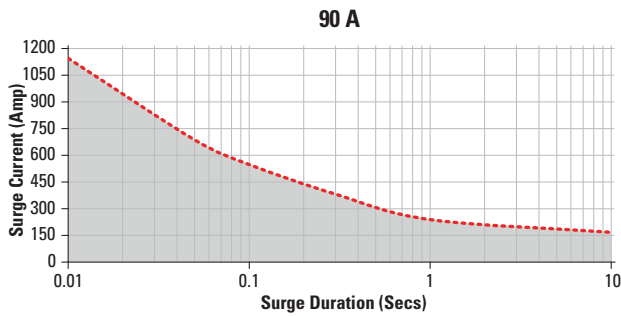
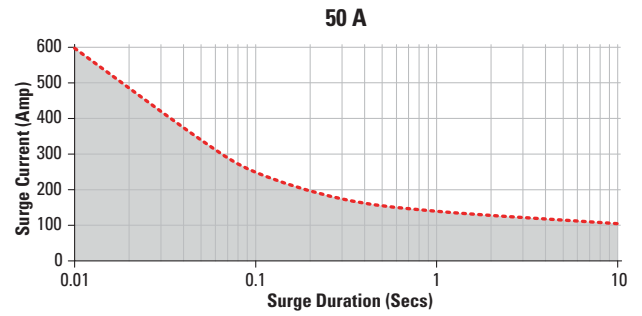
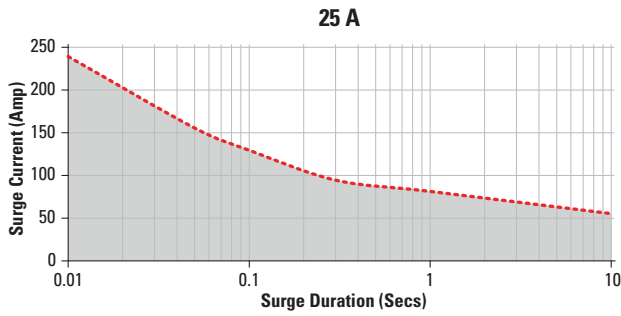
Quick Connect Termination ("F" Option) - Up to 25 Amp (1)



Quick Connect Termination ("F" Option) - Up to 50 Amp (1)

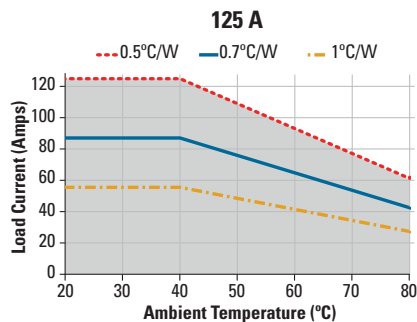
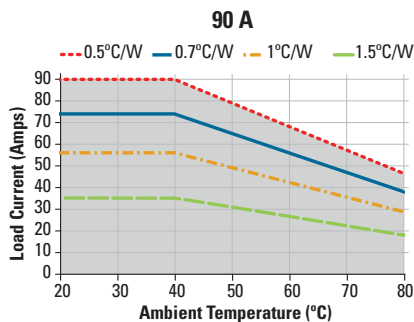
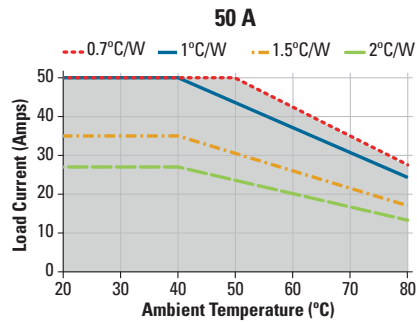
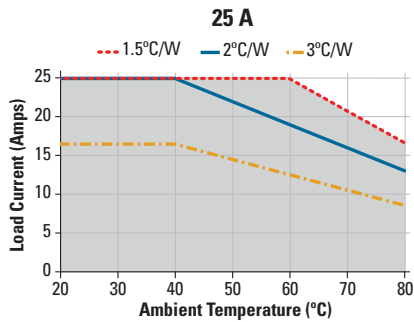


## SURGE CURRENT INFORMATION



Non repetitive peak surge current at Tj initial 40°C.

## THERMAL DERATE INFORMATION



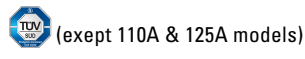
## GENERAL NOTES

- (1) Single pair (up to 25A) Double pair\* (up to 50A). \***Caution:** User must connect both pairs.
- (2) Option "K" is designed and tested for use with printed circuit boards or ring/fork terminals having a thickness between 0.031 and 0.093 inches (0.79 to 2.36 mm), and loads rated up to 50 Amps. For higher load currents, the "K" standoff temperature must not exceed 105°C. For additional application assistance please contact Crydom Technical Support.
- (3) Output will self trigger between 900-1200Vpk, Min., not suitable for capacitive loads.
- (4) Instantaneous turn-on version is not recommended for capacitive loads. Use zero turn-on only.
- (5) All parameters at 25°C unless otherwise specified.
- (6) Heat sinking required, see derating curves.

- (7) For 40mA minimum current, the voltage drop increases over maximum rated.
- (8) Increase minimum voltage by 1V for operations from -20 to -40°C. For relays with option "G" minimum control voltage is 4.5VDC
- (9) Turn-on time for Instantaneous turn-on versions is 0.02 msec (DC Control Models).
- (10) All parameters at 50% power rating and 100% duty cycle (contact Crydom tech support for detailed report).
- (11) Load can be wired to either SSR output terminal 1 or 2.
- (12) Elective Input Status LED, "G" option.
- (13) Elective Overvoltage Protection, "P" option.
- (14) Mechanical dimensions vary from G3 models.

## AGENCY APPROVALS AND CERTIFICATIONS

Designed in accordance with the requirements of IEC 62314  
 IEC 61000-4-2 : Electrostatic Discharge – Level 3  
 IEC 61000-4-4 : Electrically Fast Transients – Level 3  
 IEC 61000-4-5 : Electrical Surges – Level 3  
 IEC 600068-2-6: Vibration 0.33mm and 0.75mm Amplitude over 10-55 Hz  
 IEC 600068-2-27: Shock Resistance 15g/11ms



## ACCESSORIES

### Protective Cover & Hardware Kits

#### Protective Cover

Part number: KS101









Clear plastic cover compatible with all new S1 designs. Safety covers provide added protection from electric shock when installing or checking equipment.

#### Hardware Kit

Part number: HK4



Bag with 2 square brass accessories and 2 screw 8-32 x 5/8 for output. Used to mount TMR1 lug terminals.

Recommended Accessories					
 Cover	 Hardware Kit	 Heat Sink Part No.	 Thermal Resistance [°C/W]	 Lug Terminal	 Thermal Pad
KS101	HK1	HS501DR	5.0	TRM1	HSP-1
	HK4	HS301 / HS301DR	3.0	TRM6	HSP-2
		HS251	2.5		
		HS202 / HS202DR	2.0		
		HS201 / HS201DR	2.0		
		HS172	1.7		
		HS151 / HS151DR	1.5		
		HS122 / HS122DR	1.2		
		HS103 / HS103DR	1.0		
		HS101	1.0		
		HS073	0.7		
		HS072	0.7		
		HS053	0.5		
		HS033	0.36		
HS023	0.25				



## 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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