

**FEATURES/BENEFITS**

- Zero-cross models with system diagnostics
- Very low zero-cross turn-on voltage
- Input and output protection and control LED standard
- IP20 protection by flaps on terminals
- With double removable input connectors; spring terminals
- Designed in conformity with EN60947-4-3 (IEC947-4-3) and EN60950/VDE0805 (Reinforced Insulation)

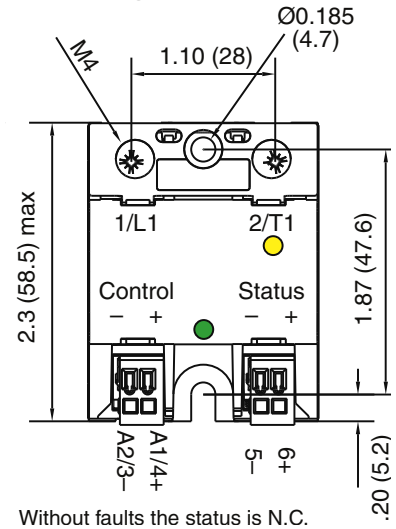
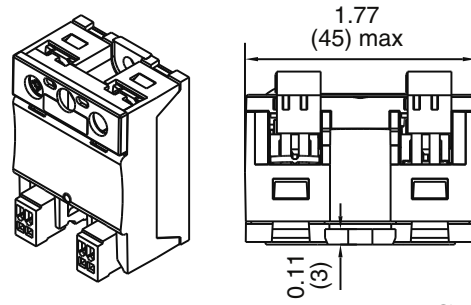


Two removable input connectors with spring terminals  
Grey: Control  
Orange: Status



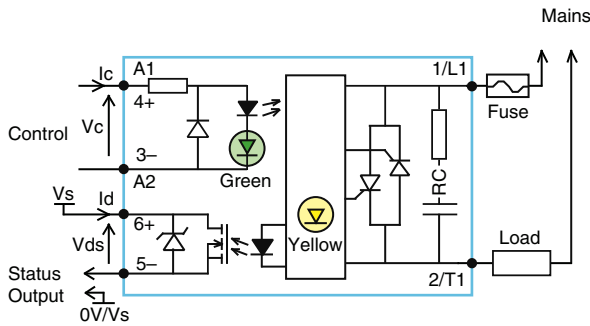
Part No.	Load Voltage	Load Current	Control Voltage	Switch Type
SSH24D35	50-265 Vac	35A	7-30 Vdc	Zero Cross
SSH24D50	24-265 Vac	50A	7-30 Vdc	Zero Cross
SSH48D50	24-510 Vac	50A	7-30 Vdc	Zero Cross
SSH48D75	24-510 Vac	75A	7-30 Vdc	Zero Cross

**MECHANICAL SPECIFICATION**



Without faults the status is N.C.

**TYPICAL APPLICATION**



1/L1 and 2/T1 can be swapped  
SSR must be mounted on a heat sink

Figure 1 — SSH relays

**CONTROL CHARACTERISTICS**

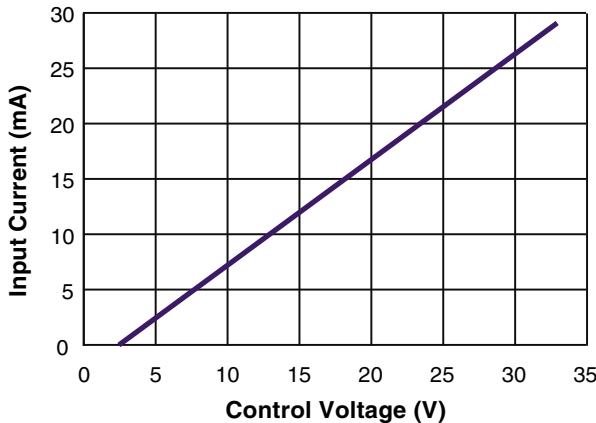


Figure 3 — SSH relays

Figure 2 — SSH relays

**ELECTRICAL SPECIFICATIONS**

(+25°C ambient temperature unless otherwise specified)

**INPUT (CONTROL) SPECIFICATIONS**

	Min	Max	Units
Input Current Range	4	28	mA
Must Turn-Off Voltage		3.0	Vdc
Reverse Voltage Protection		30	V
Input Resistor (Typ)		1000	Ω

**OUTPUT (LOAD) SPECIFICATIONS**

	Min	Max	Units
Peak Voltage			
SSH24DXX		600	V <sub>peak</sub>
SSH48DXX		1200	V <sub>peak</sub>

Load Current Range (Resistive)

	Min	Max	Units
35 output current	.005	40	Arms
50 output current	.005	60	Arms
75 output current	.005	90	Arms

Maximum Surge Current Rating (Non-Repetitive)

35 output current		500	A
50 output current		720	A
75 output current		1200	A

On-State Voltage Drop

0.9 V

Output Power Dissipation (Max)

35 output current	$0.9 \times 0.9 \times I + 0.015 \times I^2$	W
50 output current	$0.9 \times 0.9 \times I + 0.012 \times I^2$	W
75 output current	$0.9 \times 0.9 \times I + 0.0045 \times I^2$	W

Zero-Cross Window (Typical)	±12	Vac	
Off-State Leakage Current	5	mA	
Turn-On Time (60 Hz)	8.3	ms	
Turn-Off Time (60 Hz)	8.3	ms	
Off-State dv/dt	500	V/μs	
Maximum di/dt (Non-Repetitive)	50	A/μs	
Operating Frequency	0.1	400	Hz

I<sup>2</sup>t for fuse matching (<10ms)

35 output current	1250	A <sup>2</sup> s
50 output current	2500	A <sup>2</sup> s
75 output current	7200	A <sup>2</sup> s

Junction-Case Thermal Resistance

35 output current	0.6	°C/W
50 output current	0.45	°C/W
75 output current	0.4	°C/W

Conducted Immunity Level

IEC/EN61000-4-4 (bursts)	2kV criterion A
IEC/EN61000-4-5 (bursts)	2kV criterion A with external VDR

**GENERAL SPECIFICATIONS**

(+25°C ambient temperature unless otherwise specified)

**ENVIRONMENTAL SPECIFICATIONS**

	Min	Max	Units
Operating Temperature	-40	+100	°C
Storage Temperature	-40	+100	°C
Ambient Humidity		85	%
Input-Output Isolation	4000		V <sub>rms</sub>
Output-Case Isolation	4000		V <sub>rms</sub>
Output-Status Isolation	2500		V <sub>rms</sub>
Input-Status Isolation	2500		V <sub>rms</sub>
Insulation Resistance @ 500Vdc	1000		MΩ
Rated Impulse Voltage		4000	V
Protection Level (CEI529)		IP20	
Vibration (10–55 Hz according to CE168)	1.5		mm
Shock (according to CE168)		30/50	g
Housing Material	PA6 UL94VO		
Baseplate	Aluminum, nickel-plated		

**SURGE CURRENT**

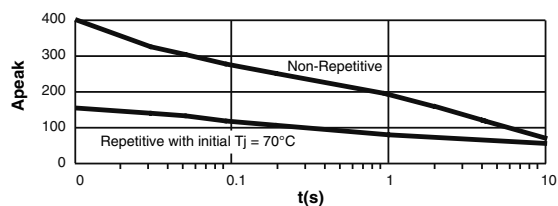


Figure 4a — 35A output current

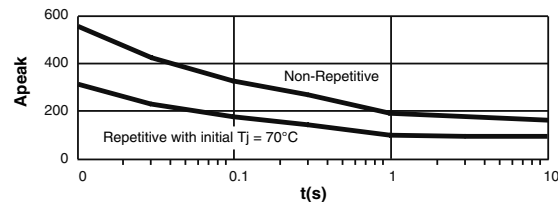


Figure 4b — 50A output current

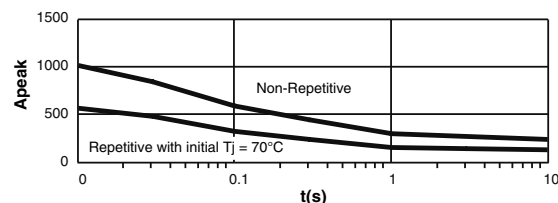


Figure 4c — 75A output current

**THERMAL CURVES**

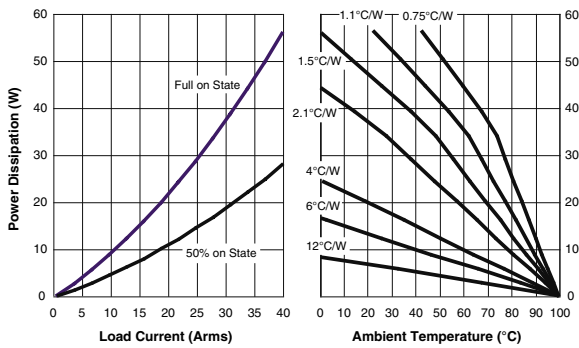


Figure 5a — 35A output power

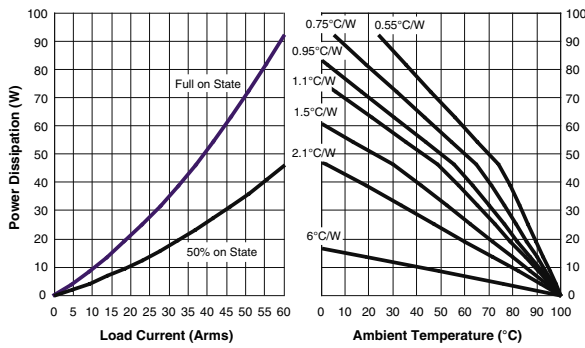


Figure 5b — 50A output power

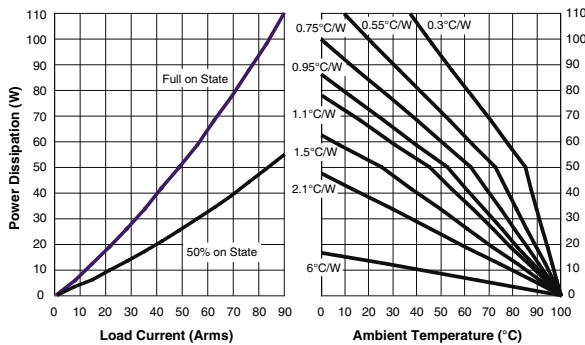


Figure 5c — 75A output power

12°C/W corresponds to a relay without heat sink  
6°C/W corresponds to a relay mounted on a DIN-rail adaptor (Teledyne P/N DL12)

**STATUS OUTPUT ANSWER CHARACTERISTICS**

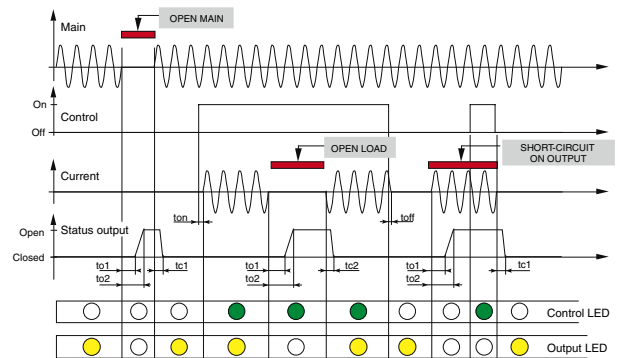
	Min	Max	Units
Voltage Range	1	32	V
Output Current		0.1	A
On Resistance		2	Ω
Open Delay (to1) (faults)	70		ms
Total Open Delay (to2) (faults)	120		ms
Close Main Delay (tc1) (tc2)		20	ms
Maximum Cable Length for Open Load	30		m

**DIAGNOSTIC DESCRIPTION**

Control	Control LED	Main	Load	SSR	Output LED	Output Status
0	○	No	x	x	○	Open
1	●	No	x	x	○	Open
0	○	Yes	OK	OK	●	Closed
1	●	Yes	OK	OK	●	Closed
0	○	Yes	Open	OK	○	Open
0	○	Yes	OK	Short-Circuit	○	Open
1	●	Yes	Open	OK	○	Open
1	●	Yes	OK	Short-Circuit	○	Open

Figure 6 — SSH relays

**DIAGNOSTICS OVERVIEW**



- Output status is normally closed without failure on the relay and the load. The output LED is normally ON:
- In case of failure on the load (open) or on the SSR (short-circuit condition):
  - the status is open
  - the output LED is switched OFF

Figure 7 — SSH relays


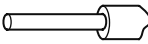

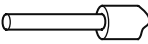

**CONTROL WIRING**



Option clip

With double removeable input connector  
Pluggable spring connector  
Min AWG28  
Max AWG14

**POWER WIRING**

Number of Wires				Screwdriver Type	Recommended Torque
1		2			
Solid (no ferrule)	Fine Stranded (with ferrule)	Solid (no ferrule)	Fine Stranded (with ferrule)	 Pozidriv 2	N.m 1.2
					
AWG16...AWG8	AWG16...AWG10	AWG16...AWG8	AWG16...AWG10		

**OPTIONAL CONNECTIONS**



Directly with wires,  
with or without ferrules



With tips  
(ring terminals)

**Power with tips**



AWG6  
16mm<sup>2</sup>



AWG4  
16mm<sup>2</sup>  
W max = 13mm



AWG0  
50mm<sup>2</sup>  
for high current

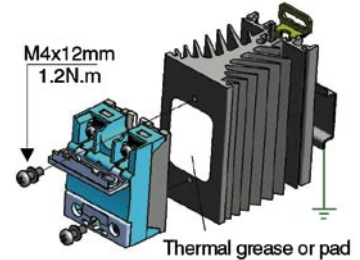
**Options**

Fastons: Call us




 2–2.5°C/W  
 Teledyne P/N FW151

 1.1°C/W  
 Teledyne P/N FW108

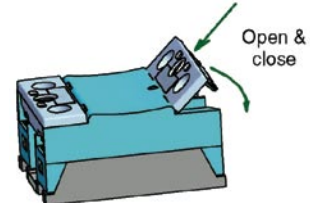
 0.3°C/W  
 Teledyne P/N FW031


Thermal grease or pad


 DIN Rail Adapter  
 Teledyne P/N DL12

### Mounting

HIPpak SSRs must be mounted on heat sinks. A large range of heat sinks is available. For heat-sink mounting, use thermal grease or a thermal pad with high conductivity specified by Teledyne.


 Thermal Pad  
 Teledyne P/N –12


Removable IP20 touch-proof flaps

### Typical Loads

SSH relays with zero-cross turn-on are designed for most types of loads.

Our data sheet lists the AC-51 current value corresponding to resistive loads.

For other loads, check the inrush current at turn ON and possible overvoltages at turn OFF:

- AC-55b — Incandescent lamps. Inrush current is generally 10 times  $I_n$  during few 10ms.
- AC-55a — Electric discharge lamp. These loads often have overcurrent at turn ON and overvoltage at turn OFF, so use 400VAC SSR on 230VAC mains.
- AC-58 — One-pole motors. These loads often have overcurrent at turn ON and overvoltage at turn OFF, so use 400VAC SSR on 230VAC mains and adapt the SSR current to the starting current of the motor.
- AC-53 — Three-phase motors. 2 or 3 SH zero-cross relays can drive these motors, but generally use E3P/E3PT or other three-phase relays or SH random range.
- AC-56a — Transformer loads. Very high inrush current up to 100 times  $I_n$ . Use SH random relay or peak control SSR.
- AC-56b — Capacitor loads with very high current at turn ON and overvoltage at turn OFF. Our high-voltage relays are well adapted for high inrush current.

### Protection

- To protect the SSR against a short-circuit of the load, use a fuse with a  $I^2t$  value =  $1/2 I^2t$  value specified.

### EMC

Immunity:

- Our data sheets list the immunity level of our SSRs according to the main standards for these of products: IEC/EN61000-4-4 and IEC/EN61000-4-5. You can compare the high immunity level with other products on the market.

Emission:

- Teledyne SSRs are designed in compliance with standards for class A equipment (Industry).
- Use of this product in domestic environments may cause radio interference. In this case the user may be required to employ additional devices to reduce noise. SSRs are complex devices that must be interconnected with other equipment (loads, cables, etc.) to form a system. Because the other equipment or interconnections may not be under Teledyne's control, it shall be the responsibility of the system integrator to ensure that systems containing SSRs comply with the requirement of any rules and regulations applicable at the system level.
- The very low zero-cross voltage of SSH relays (<12 volts) improved the conducted emission level in comparison with most SSRs on the market with zero-cross voltage often higher than 50 volts.