sensience
ADVANCED SENSING TECHNOLOGIES

12S, 14S, 15S Series
Time Delay Relays and Sequencers

Time Delay Relays and Sequencers

The Therm-O-Disc type 12S, 14S and 15S series time delay relays and sequencers are fi eld-proven devices for controlling the operation of heating elements and/or fans in electric furnaces and heat pumps. These controls combine a solid-state positive temperature coeffi cient (PTC) heater with bimetal actuated contacts to provide time-delayed electrical switching. A wide variety of bimetal disc and PTC combinations are available to provide a broad range of timings. The 12S is a single timing device while the 14S uses two bimetal discs to achieve two independent timings. The 15S consists of one, two or three 12S and/or 14S controls mounted on a common plate.

Features and Benefits

The 12S, 14S and 15S features include:

- Available with auto-reset SPST, DPST and SPDT switch configurations.
- PTC heater for stable operation over a wide range of temperatures and voltages.
- Snap-action bimetal disc for high-speed contact separation.
- Standard operating ambients between -40°F (-40°C) and 150°F (65.6°C).
- Available with a wide variety of terminals and mounting plates.
- Welded construction for integrity of current-carrying components.
- Quiet operation

Switch Actions and Typical Applications

Automatic Reset SPST – Can be built to either open or close a set of contacts within a specified time range.

Automatic Reset DPST – Utilizes one bimetal disc to simultaneously open or close two independent sets of contacts within a specified time range.

Automatic Reset SPDT – This 12S configuration is the same as the SPST except with the addition of an auxiliary contact that makes and breaks circuit in opposition to the main contacts.

CAUTION . . . When designing a SPDT circuit, an electrical load must be applied to terminal 2 and/or 3 to avoid a transient short circuit condition during switching.

12S Series

The 12S series utilizes one bimetal disc to achieve single-timing operation. The 12S is available in SPST (see figure 1), SPDT (see figure 2), and DPST (see figure 3) switch actions. A variety of standard timings are available for general time delay applications.

SPST Switch Action *(12S20)*

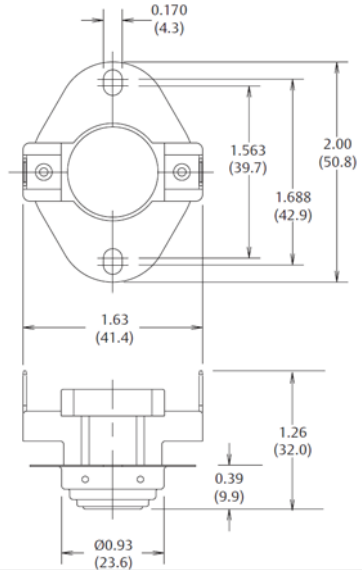


Figure 1

SPDT Switch Action *(12S50)*

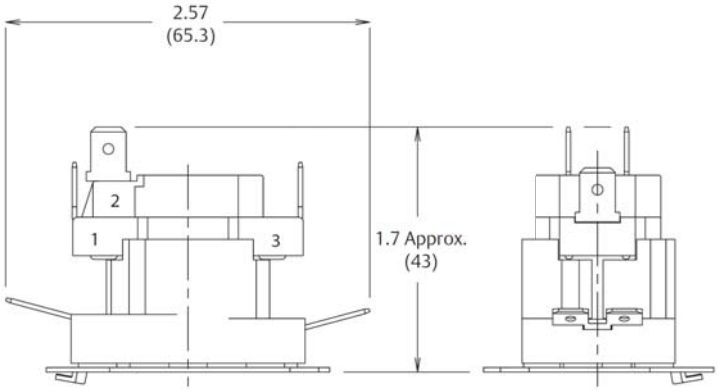
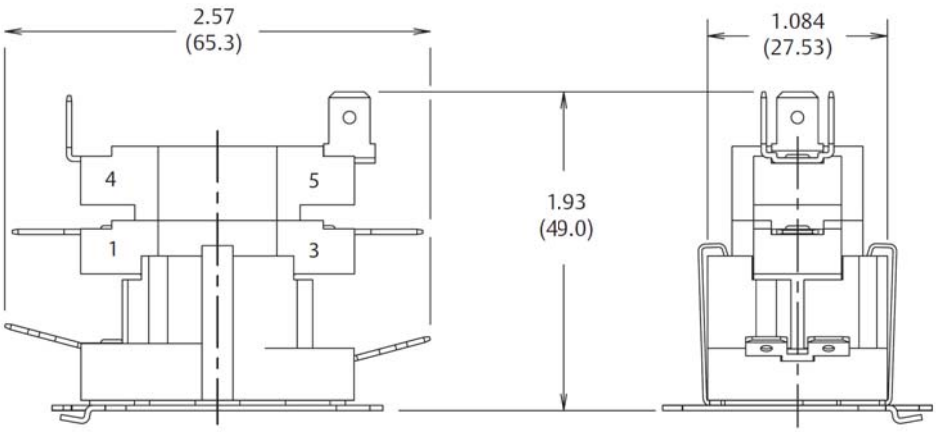


Figure 2



DPST Switch Action
(12S22)
Figure 3
Dimensions are shown in inches and (millimeters).

12S Timings*

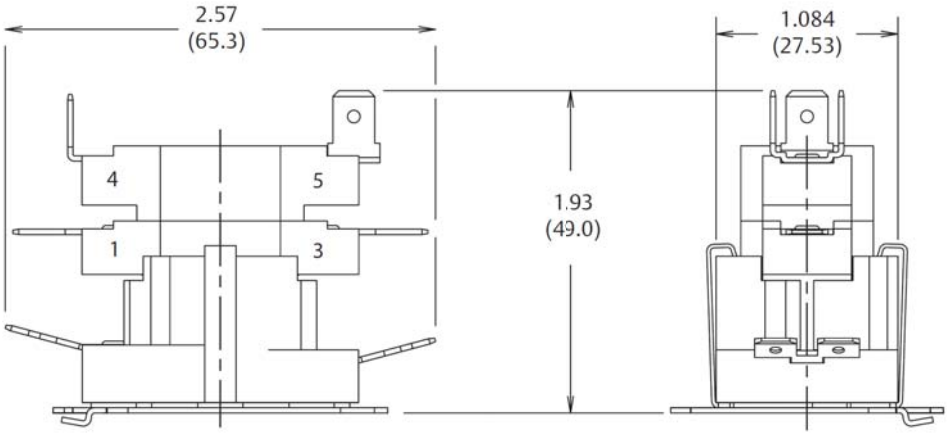
PTC	ON	OFF
24VAC	1-30 Sec.	40-80 Sec.
	10-40 Sec.	20-60 Sec.
	20-55 Sec.	15-55 Sec.
	25-110 Sec.	5-45 Sec.

*Please contact us to discuss specific timings needed.

14S Series

The 14S series is available in two possible configurations:

- 2 stages, where each stage is SPST and operated by a disc for each stage. The two stages can have different on/off times. See figure 4.
- 3 stages, where the two lower stages are DPST operated simulataneously by one disc. The top stage is SPST and operated by the other disc.



SPST Switch Action (Each Stage)
(14S22)
Figure 4
Dimensions are shown in inches and (millimeters).

14S Timings*

PTC	ON	OFF
24VAC	1-110 Sec.	1-110 Sec.

*Please contact us to discuss specific timings needed.

15S Series

The 15S series consists of either two or three 12S and /or 14S controls mounted on a common baseplate. The timing of the package assures that a set of designated contacts will turn on fi rst and turn off last.

The chart shows the timing range for the 15S package.

15S Timings*

PTC	ON	OFF
24V	1-110 Sec.	1-110 Sec.

*Please contact us to discuss specific timings needed.

PTC Heater

Solid state PTC (Positive Temperature Coeffi cient) heaters are used to bias the operation of the contacts. These heaters are self-current limiting for stable switch operation over a range of temperatures and over-voltages. The standard line of controls uses a 24VAC PTC rated for Class II circuits. The peak inrush current of the 24VAC PTC heater varies from .35 to 1.0 amps. The inrush current drops below 1/2 of the peak value within approximately 10 seconds and reaches a steady state current between 0.10 and 0.18 amps.

Operating Ambients

The standard sequencer line is designed to operate in ambients ranging from -40°F to 150°F (-40°C to 65.6°F). The actual sequencer ON and OFF times are 100% checked to the required timings at a 75°F (23.9°C) ambient. The OFF timings are determined after the PTC heater has been energized for a total of five minutes. Timings in an ambient above or below 75°F (23.9°C) will vary and should be evaluated in the end use application to determine suitability. A specfic high ambient construction is available at extra cost to allow operation up to 165°F (74°C). This construction requires an “H” in our type number (example 12SH22).

Standard Terminals and Markings

The standard heater terminals are .032” x .250” (6.3 x .8mm) double 15° brass male quick connects. The stage terminals are .032 x .250” (6.3 x .8 mm) tin plated brass. See figures 1, 2, 3, 4 for common stage terminals and terminal numbering

Mounting Plates

The standard mounting plate incorporates a tab and hole arrangement for mounting one (see figure 5) or two (see figure 6) controls. The standard mounting plate for three controls incorporates a slot and hole arrangement (see figure 7). Optional or custom mounting plates are available to meet specific application requirements.

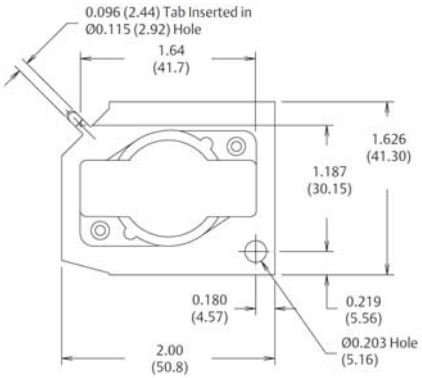


Figure 5

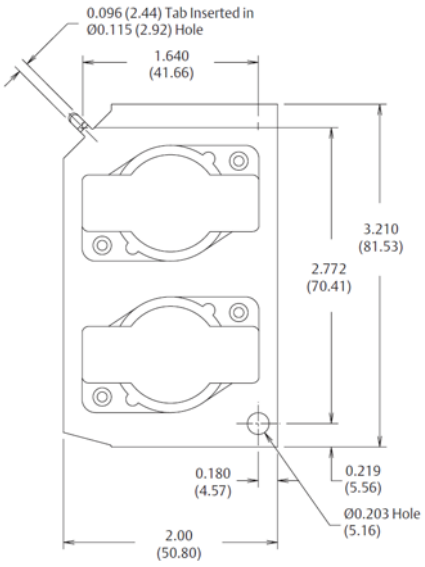


Figure 6

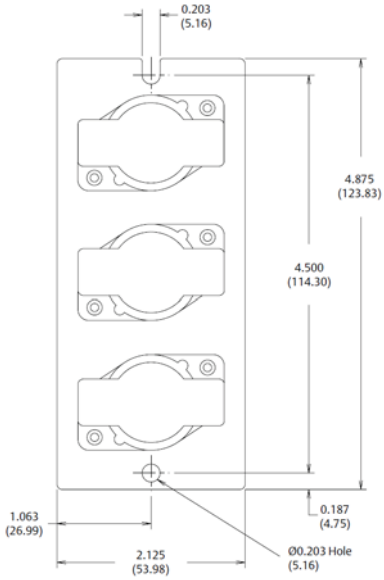


Figure 7

Electrical Spacings

The 12S, 14S, 15S series have electrical spacings of 1/4” (6.35mm) through air and 3/8” (9.52mm) over surface to ground. With the suffix “X,” increased spacings of 3/8” (9.53mm) through air and 1/2” (12.7mm) over surface to ground are available.

General Electrical Ratings

The agency ratings can be used as a guide when evaluating specific applications. However, the mechanical, electrical, thermal and environmental conditions to which a control may be exposed in an application may differ significantly from agency test conditions. Therefore, the user must not rely solely on agency ratings, but must perform adequate testing of the product to confirm that the control selected will operate as intended in the user’s application.

UL Agency Rating

Type	Switching Action	Volts AC	Resistive Amps	Inductive amps		Pilot Duty VA	Cycles	Agency Recognition
				FLA	LRA			
12S/15S	SPST	240	25	8	48	-	100,000	UL E19279
		240	30*	-	-	-	100,000	
		277	25	-	-	-	30,000	
		480	12.5	5	30	480	100,000	
12S	SPDT (Main Contacts 1-3)	240	25	8	48	-	100,000	
		277	25	-	-	-	30,000	
		480	12.5	5	30	480	100,000	
12S	SPDT (Auxiliary Contacts 1-2)	240	-	4.1	8	125	30,000	
		277	25	-	-	-	30,000	
		480	-	-	-	125	30,000	
		480	-	3	16	-	100,000	
12S/15S	DPST	120	-	13.8	82.8	125	30,000	
		240	25	8	48	125	100,000	
		240	30*	-	-	-	30,000	
		277	25	-	-	-	30,000	
		480	12.5	5	30	480	100,000	
14S	2 Pole and 3 Pole	240	25	8	-	-	100,000	
		240	30*	-	-	-	100,000	
		480	12.5	5	-	-	100,000	

CSA Agency Ratings

Type	Switching Action	Volts AC	Resistive amps	Inductive amps		Pilot Duty VA	Cycles	Agency Recognition
				FLA	LRA			
12S/15S	SPST	120	-	1.0	6.0	-	100,000	CSA 062037
		240	-	5.0	30	-	100,000	
		240	30*	-	-	-	100,000	
		480	-	-	-	125	100,000	
12S	SPDT (Main Contacts 1-3)	120	-	10	60	-	100,000	
		240	-	5	30	-	100,000	
		480	-	-	-	125	100,000	
12S	SPDT (Auxiliary Contacts 1-2)	120	10	-	-	125	100,000	
		240	5	5	30	-	100,000	
		480	-	-	-	125	30,000	
12S/15S	DPST	120	-	10	60	-	100,000	
		240	25	5	30	-	100,000	
		240	30*	-	-	-	100,000	
		480	-	-	-	125	100,000	
14S	2 Pole+ 3 Pole	240	25	5	30	-	100,000	
		240	30*	-	-	-	100,000	
		480	-	-	-	12.5	100,000	

* Note: For complete ratings information, please contact our Sales Engineering Department. At thermostat end-of-life, the contacts may remain permanently closed or open. Maximum combination inductive/resistive, where maximum inductive load is 7FLA, 42LRA. Upper Stage Only.

Part Numbering System

Common Sequencer Type Numbers for 12S and 145

Type	Number of Stages	Description
12S20	1	Normally Open, SPST
12S22	2	Normally Open, DPST
12S50	1	Normally Open, SPDT
14S22	2	Normally Open, Each Stage SPST
14S222	3	Normally Open – Lower Two Stages DPST Upper Stage SPST

15S Type Numbers

1st Suffix 1st sequencer on baseplate	2nd Suffix 2nd sequencer on baseplate (if provided)	3rd Suffix 3rd sequencer on baseplate (if provided)	Base sequencer type at each location
1	1	1	12S20
2	2	2	12S22
4	4	4	14S22

You can combine any above configurations on a common base plate.
Example: 15S221 would contain 12S22-12S22-12S20