



**INSTALLATION & INSTRUCTION"**

**VITAL TIMER RELAY ASSEMBLY, A44999-02**

JULY 2008, REVISED JULY 2014

DOCUMENT NO. SIG-00-08-02  
VERSION A.1

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Technical assistance and sales information on **Siemens Industry, Inc., Rail Automation** products may be obtained at the following locations:

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CUSTOMER SERVICE: (800) 626-2710  
TECHNICAL SUPPORT: (800) 793-7233  
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## FCC RULES COMPLIANCE

The equipment covered in this manual has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

## DOCUMENT HISTORY

Version	Release Date	Sections Changed	Details of Change
A	July 2008		Initial release
A.1	July 2014		Rebrand for Siemens

## NOTES, CAUTIONS, AND WARNINGS

Throughout this manual, notes, cautions, and warnings are frequently used to direct the reader's attention to specific information. Use of the three terms is defined as follows:

### **WARNING**

#### **WARNING**

INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY. WARNINGS ALWAYS TAKE PRECEDENCE OVER NOTES, CAUTIONS, AND ALL OTHER INFORMATION.

### **CAUTION**

#### **CAUTION**

REFERS TO PROPER PROCEDURES OR PRACTICES WHICH IF NOT STRICTLY OBSERVED, COULD RESULT IN A POTENTIALLY HAZARDOUS SITUATION AND/OR POSSIBLE DAMAGE TO EQUIPMENT. CAUTIONS TAKE PRECEDENCE OVER NOTES AND ALL OTHER INFORMATION, EXCEPT WARNINGS.

### **NOTE**

#### **NOTE**

Generally used to highlight certain information relating to the topic under discussion.

If there are any questions, contact Siemens Industry Inc., Rail Automation Application Engineering.

## ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

Static electricity can damage electronic circuitry, particularly low voltage components such as the integrated circuits commonly used throughout the electronics industry. Therefore, procedures have been adopted industry-wide which make it possible to avoid the sometimes invisible damage caused by electrostatic discharge (ESD) during the handling, shipping, and storage of electronic modules and components. Siemens Industry, Inc., Rail Automation has instituted these practices at its manufacturing facility and encourages its customers to adopt them as well to lessen the likelihood of equipment damage in the field due to ESD. Some of the basic protective practices include the following:

- Ground yourself before touching card cages, assemblies, modules, or components.
- Remove power from card cages and assemblies before removing or installing modules.
- Remove circuit boards (modules) from card cages by the ejector lever only. If an ejector lever is not provided, grasp the edge of the circuit board but avoid touching circuit traces or components.
- Handle circuit boards by the edges only.
- Never physically touch circuit board or connector contact fingers or allow these fingers to come in contact with an insulator (e.g., plastic, rubber, etc.).
- When not in use, place circuit boards in approved static-shielding bags, contact fingers first. Remove circuit boards from static-shielding bags by grasping the ejector lever or the edge of the board only. Each bag should include a caution label on the outside indicating static-sensitive contents.
- Cover workbench surfaces used for repair of electronic equipment with static dissipative workbench matting.
- Use integrated circuit extractor/insertor tools designed to remove and install electrostatic-sensitive integrated circuit devices such as PROM's (OK Industries, Inc., Model EX-2 Extractor and Model MOS-40 Insertor (or equivalent) are highly recommended).
- Utilize only anti-static cushioning material in equipment shipping and storage containers.

For information concerning ESD material applications, please contact the Technical Support Staff at 1-800-793-7233. ESD Awareness Classes and additional ESD product information are also available through the Technical Support Staff.

## TABLE OF CONTENTS

Section	Title	Page
	PROPRIETARY INFORMATION .....	ii
	TRANSLATIONS .....	ii
	WARRANTY INFORMATION.....	ii
	SALES AND SERVICE LOCATIONS.....	ii
	FCC RULES COMPLIANCE .....	ii
	DOCUMENT HISTORY .....	iii
	NOTES, CAUTIONS, AND WARNINGS .....	iv
	ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS .....	v
1.0	OVERVIEW .....	1
2.0	ELECTRONIC TIMER.....	2
3.0	OUTPUT RELAY .....	2
4.0	TIMER SETTING .....	3
5.0	OPERATION.....	3
5.1	TIMER STATES AND INDICATIONS.....	4
5.2	FAILURE INDICATIONS (LEDS) .....	4
6.0	SPECIFICATIONS.....	5
6.1	GENERAL.....	5
6.2	DETAILS FOR TYPE ST PLUG-IN VITAL TIMER RELAY .....	5
6.2.1	Field Requirements.....	6
6.2.2	Shop Requirements .....	6
6.2.3	Power Hookup .....	6

## LIST OF FIGURES

Figure 1.	A44999-02 Vital Timer Relay Unit .....	1
Figure 2.	Relay Specifications and Contact Arrangement.....	5
Figure 3.	Power Connections to Relay Base.....	6

## 1.0 OVERVIEW

The A44999-02 Vital Timer Relay is designed to provide a precise, preset pick-up delay for time locking, electric switch lock releases and other vital signal timing applications for a nominal 12 volt system. It consists of a vital solid state electronic timer module mounted together with a Type ST neutral relay in a double-wide ST relay housing.

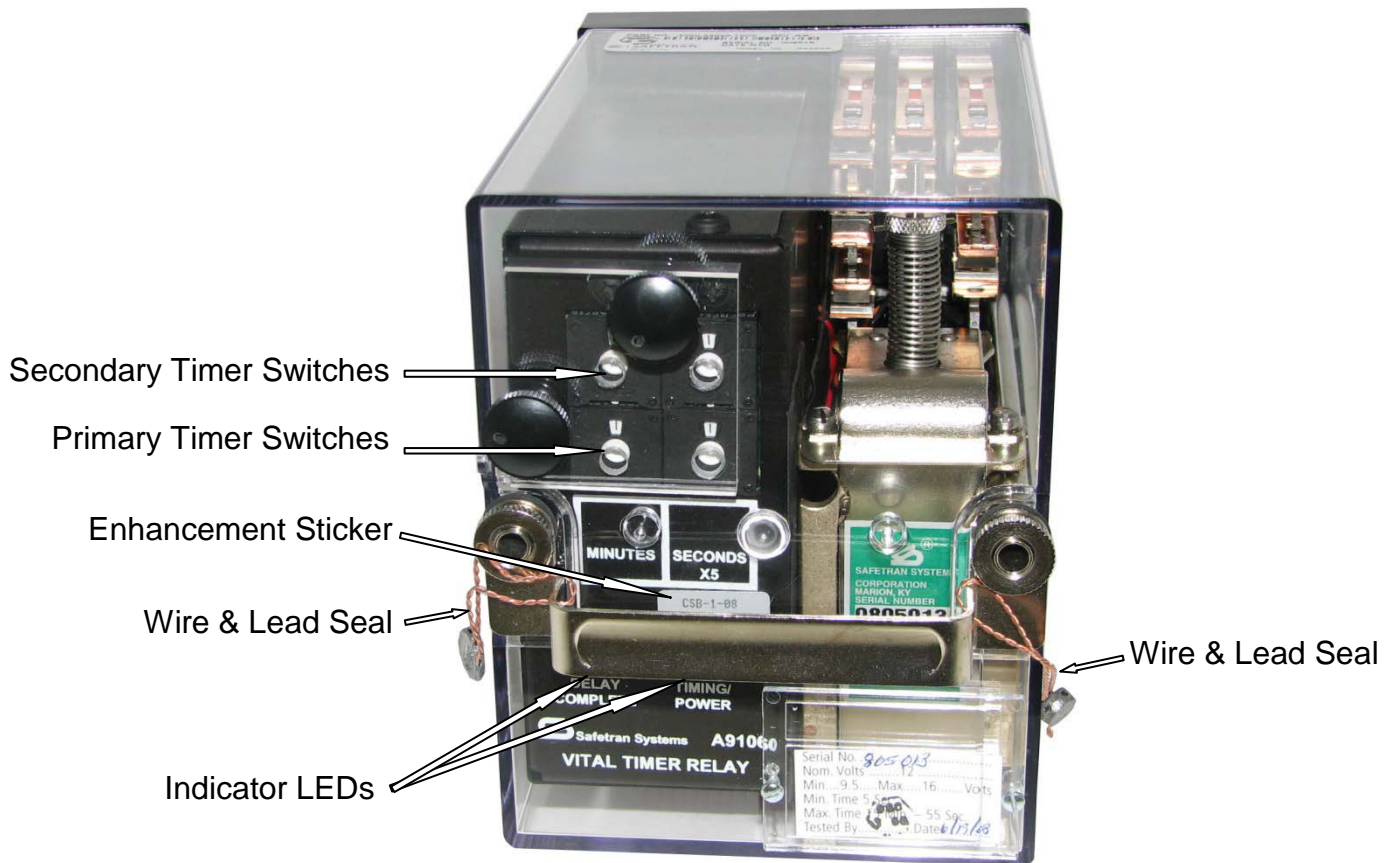
The electronic timer is adjustable in increments of five seconds, from 5 seconds minimum to 15 minutes, 55 seconds maximum. Timing starts upon application of power. At the end of the timing period, the relay will energize. The unit will respond only with proper input polarity.

The Unit replaces most electromechanical vital timer relays and is plug compatible with an Alstom (GRS) A62-6276 timer relay.



### WARNING

**USER TO ENSURE CORRECT APPLICATION AND TIMELY MAINTENANCE OF VITAL TIMER IS PERFORMED. INCORRECT APPLICATION OR MAINTENANCE CAN RESULT IN UNSAFE OPERATION.**



**Figure 1. A44999-02 Vital Timer Relay Unit**

## 2.0 ELECTRONIC TIMER

Revision B and later Timer Units consist of a digital electronic timer on a single printed circuit board. The single PCB is a direct replacement for the two printed circuit boards used in previous Revision A units. The timer circuitry is contained in an aluminum housing. Timing is controlled by dual high accuracy oscillators, each with an adjustable divider to an accuracy of less than one second over the entire timing range. Switches protected by a removable front cover set the timing interval in increments of five seconds as indicated above. LED lamps are provided to indicate timing in progress, timing complete and an error condition.

Timing commences when power is applied to the input terminals of the relay. If power remains on, the electronic module will energize the relay after the present interval. If power is interrupted before completion of the timing cycle, the timer is instantaneously reset. The full timing interval will commence when the input terminals are reenergized.

To assure vitality, the electronic timer module incorporates both a primary and a secondary timer. Each is set independently to the desired timer interval. Both primary and secondary timers must conclude the timer interval within one second of each other to activate the relay drive. Other vital internal checking is also continually performed.

Power for the internal relay is developed by an electronic relay driver within the unit. Relay drive, and thus relay pickup and dropaway, are independent of the input voltage to the unit. An electronic threshold detector stops the timing or, if the relay is picked up, drops it if the input voltage falls below that level. The reset level is also determined by the electronic threshold.

Pickup and dropaway levels on the relay tag represent these electronic threshold levels.

## 3.0 OUTPUT RELAY

The relay is nominal 12 volt, 500 ohm ST neutral type with 2FB-3F-2B contacts. The 2FB-3F contacts are silver/carbon and 2B contacts silver/silver. The coils of the relay are connected internally to the timer module and are not accessible externally.

Contact ratings are 4 amps @ 30 volts DC or AC, non inductive.

After time-out, the electronic relay driver provides proper drive for the relay for all operating voltages over the 9.5 volt threshold level of the unit. While the electronic module is timing, relay voltage is zero.

For shop test and service to determine actual pickup and dropaway of the relay itself, it is necessary to disconnect the relay from the electronic module and perform all tests typical of a DC neutral relay.



#### 4.0 TIMER SETTING

Time is set by means of four screwdriver adjusted switches on the front of the relay located under a sealed clear cover. These are accessed by removing two #8 thumbscrews and removing the cover.

The lower two switches set time for the primary timing channel and the upper two switches for the secondary timing channel. To operate, both primary and secondary channels must be set for the same time interval.

The left switches set time in minutes, and the right switches set time in seconds. Time on the seconds switch is in five (5) second increments, and actual time is the switch reading in multiples of 5. Time set on the minutes and seconds switches is additive. Minutes switches have active positions for 0 to 15. Seconds switches have positions from 0 to 11 (0 to 55 seconds).

As an example, for six minutes and 45 seconds, the minutes (left) switch would be on 6 and the seconds (right) switch would be on 9 ( $9 \times 5 = 45$ ).

The timer has a range from 5 seconds minimum to 15 minutes, 55 seconds maximum.



#### WARNING

**AFTER SETTING THE REQUIRED TIME, THE CLEAR COVER OVER THE SWITCHES SHOULD BE REPLACED AND THE THUMBSCREWS TIGHTENED. A WIRE AND LEAD SEAL WILL SECURE THE TIME SETTING AND SHOULD BE APPLIED ONLY AFTER OPERATING THE UNIT AND VERIFYING THAT THE DESIRED TIME-OUT AND PROPER SIGNAL SYSTEM OPERATION IS ACHIEVED.**

#### 5.0 OPERATION

Timing begins upon applying nominal 12 volt energy to the + and – battery terminals of the unit. The TIMING/POWER lamp on the front panel will light indicating the electronic timer is operating. After the preset timer interval, the relay will energize. At the same time, the DELAY COMPLETE lamp will light, indicating that the relay is energized and the timing cycle is complete.

If the battery energy is removed at any time during the timing cycle, the timer will reset and will restart for the full time cycle upon reapplication of energy. If battery energy is removed at any time after the timing cycle is complete, the relay will deenergize immediately. Upon reapplication of energy, the full time cycle will run before the relay is again energized.

If battery energy is interrupted for longer than 500 ms, the timer will reset and restart the full time cycle upon reapplication of energy.

## 5.1 TIMER STATES AND INDICATIONS

The following table presents the operational states of the Vital Timer and the corresponding indications and output conditions.

TIMER STATE	TIMER CONDITION	TIMER/POWER LED	DELAY COMPLETE LED	RELAY OUTPUT
Off/Initialize	Timer reset	Off	Off	De-Energized
Running	Timer running but not expired	Flash at $3 \pm 0.3$ Hz	Off	De-Energized
Expired	Timer has expired and stopped	On	On	Energized
Error Detected	Timer stopped and reset	Alternating flash both LEDs at $10 \pm 0.1$ Hz		De-Energized

## 5.2 FAILURE INDICATIONS (LEDS)

In the event of an error condition, the two front indicator LEDs will continually flash at a 10 Hz rate until power (Input) is reset. No relay output will be present. Whenever this failure indication is observed action should be taken to investigate and troubleshoot the problem. The relay will not energize under this condition.

## 6.0 SPECIFICATIONS

### 6.1 GENERAL

Dimensions:	Safetran ST-2 Relay Housing and Base
Weight:	9.4 Pounds
Timing Range:	5 Seconds to 15 Minutes, 55 Seconds in 5 Second Steps
Input Voltage:	9.0 – 18.0 Volts DC, Battery or Filtered Supply
Input Current:	0.2 Amp
Temperature:	-40C to 71C (+40F to 160F)
Relative Humidity:	5% to 95%, Non-condensing

### 6.2 DETAILS FOR TYPE ST PLUG-IN VITAL TIMER RELAY

		Characteristic	Original Requirements	Contact/Coil Arrangement		
Time Relay	Voltage Range		9.0 – 18.0 VDC	<p>(Front of Relay)</p>		
	Operating Current		200 milliamps			
	Timing Range		5 sec to 15 min-55 se			
	Timing Increment		5 sec			
	Timing Accuracy		±1 sec			
	Temperature Range		-40C (-40F) to 71C (160F)			
Relay Only	Coils	Nominal Voltage	12 VDC		<p>(Rear of Relay)</p>	
		Resistance	25 Ohm ± 5% each coil			
	P.U. W.C.	Voltage	6.05 volts Maximum			
		Current	12.1 milliamps Maximum			
	D.A.	Voltage	2.85 volts Maximum			
		Current	5.7 milliamps Maximum			
	Contacts	Arrangement				2FB-3F-2B
		Rating				4 Amps/30 Volts
		Material	2FB-3F	Silver/Carbon		
			2B	Silver/Silver		
		Dynamic Gap		.020" Minimum		
		Contact Gap		.050" Minimum		
		Pressure	Back (S/S)	21 grams Minimum		
			Front (C/S)	45 grams Minimum		
			Back (S/C)	25 grams Minimum		
		Overtravel per Adjustment A		*See Notes Below		
		Resistance	N.O.	40 milliohms Maximum @10 VDC, 1.0 Amps		
N.C.			20 milliohms Maximum @10 VDC, 1.0 Amps			
Armature Travel		.087" Minimum				
Retainer Gap Reference		.002" to .004"				
Residual Screw (Adjustable)		.010" Minimum				
Stop Pin (Fixed)		.008" Minimum				

Figure 2. Relay Specifications and Contact Arrangement

**\* OVERTRAVEL NOTES**

N.O. Front contacts to make with .032" and break with 0.41" between armature residual screw and core.  
N.C. Back contacts to make with .066" and break with .059" between armature residual screw and core.

Adjust armature compression spring to have 2 ounce (56.7 grams) minimum at the adjustable screw to just raise the armature stop.

**6.2.1 Field Requirements**

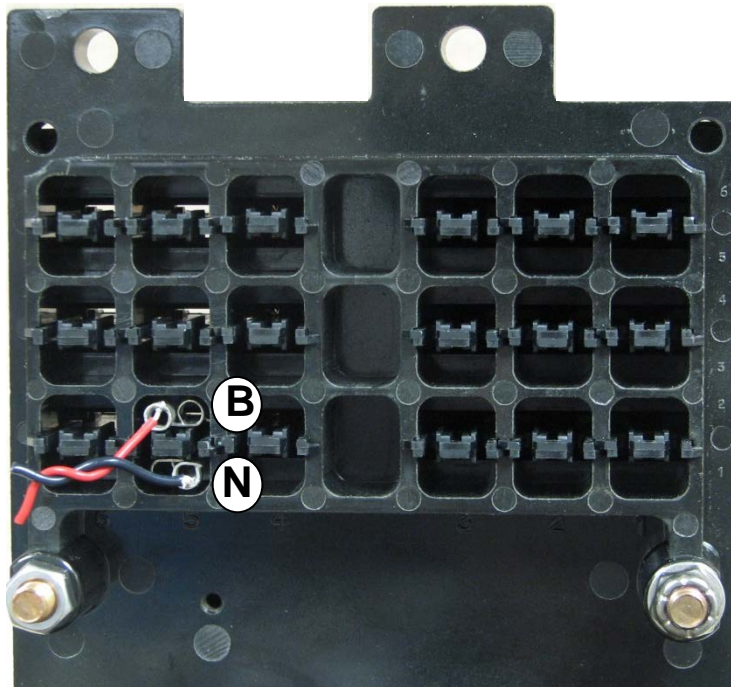
Drop Away Value – Not less than 70% of original marking.  
Pickup/Working Value – Not greater than 110% of original marking.

**6.2.2 Shop Requirements**

Drop Away Value – Not less than 95% of original marking.  
Pickup/Working Value – Not greater than 105% of original marking.

**6.2.3 Power Hookup**

The figure below shows the power connections on the connection side of the relay base.



**Figure 3. Power Connections to Relay Base**

**NOTES**

# SIEMENS

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