DESCRIPTION OF OPTION:

This option provides three different functions. The first function measures and displays the stopping time of transducer's shaft. A warning output and a fault output are available to signal when the stopping time of the transducer's shaft exceeds pre-programmed values. The programmable values for the stop time warning and stop time fault outputs can have any value between 0.000 and 0.999 seconds. The controller can measure a maximum stopping time of 9.999 seconds.

The second function is a remote input that, when active, disables the programming of limits 1 through 4.

The third function changes Limits 12 and 13 to Timer Based Limits. These Limits turn on with Position and off after a programmable length of time. Maximum ON time is 99.9 seconds with a resolution of 0.1 seconds and an accuracy of 0.001 seconds.

OUTPUT CONFIGURATION:

This unit has 15 limit outputs and 2 inputs. Limits 1 through 11 are normal position based limits. Limits 12 and 13 are timer based limits. The final two outputs, LS14 and LS15, are used by the Stop Time Monitor function. LS14 is the Stop Time Warning output, LS15 the Stop Time Fault output.

The first of the two inputs, (Input 2), is used by the Stop Time Monitor function. The stop time timer will begin timing with a negative transition on this input and will stop counting when the transducer's shaft has stopped. The second input, (Input 3), is the Limit Program Disable input and is active high. Limits 1 through 4 cannot be modified when this input is active.

The Stop Time Warning and Stop Time Fault outputs are Normally Active and switch off when their programmed values are exceeded. If power is cut-off to the unit, all outputs switch off, and it will appear to be a Stop Time fault condition.


STOP TIME MONITOR TIMING DIAGRAM:

The timing diagram below shows the relationships between the Stop input and the warning and fault outputs.

In this example, the Stop Time Warning output will become inactive 350 mSecs after the controller senses that the Stop Input has been applied. The Stop Time Fault output will become inactive 500 mSecs after the controller senses that the Stop Input has been applied.

An AC Input Module, AMCI number KIA-1, must be used to isolate the Stop Input (IN2) from the input circuitry. Normally, such a module has a time delay of approximately 30 mSecs. The applied Stop Signal must be active for an additional 25 mSecs. in order to be recognized as a valid Stop Signal by the controller. Therefore, the minimum stop time that can be recognized by the controller is 55 mSecs.

The controller determines the Stop Time by sensing the lack of change in the position of the transducer shaft.
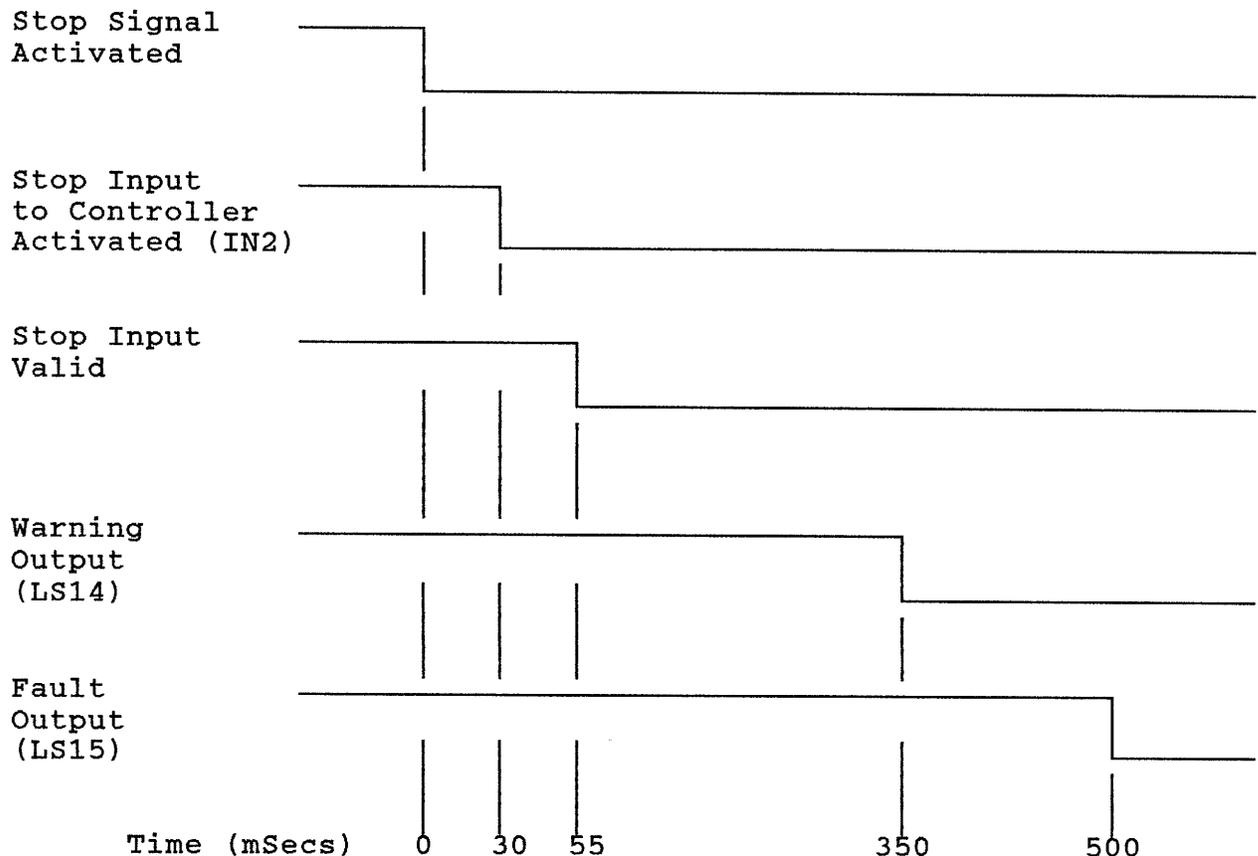
Stop Signal
Activated

Stop Input
to Controller
Activated (IN2)

Stop Input
Valid

Warning
Output
(LS14)

Fault
Output
(LS15)

Time (mSecs)   0   30   55   350   500

## STOP TIME MONITOR PROGRAMMING CHANGES AND ADDITIONS:

The following Keys are used to program and access the Stop Time Monitor Function.

:::::::::B:::::::::	
8	
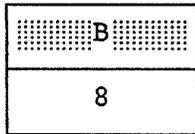
[B] Key: This key is used to display the stopping time of the transducer from 0.055 to 9.999 Seconds. When in Program Mode, the key is used to program the time setpoints for the Stop Time Warning and Fault Limits.
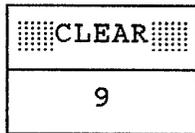
:::::CLEAR::::::	
9	

[CLEAR] Key: When in Program Mode, this key is used to reset the Warning and Fault Limits (LS14 & LS15) after they have been exceeded. In the case of a Stop Time Fault, this key also clears the error message on the controller's display.

PROGRAMMING EXAMPLE:

You want to program the Stop Time Warning Limit to 350 mSecs and a Stop Time Fault limit to 500 mSecs.

PRESS	DISPLAY	COMMENTS
*		Must be in Program Mode. See Section 12.1 of the Users Manual.
[FUNCTION]		Function LED "on".
[B]	"S.TIME x.xxx"	Stop time of the transducer. If display is "STOP FAULT", refer to the next section.
[B]	"ST.WRN 0.xxx"	Stop Time Warning setpoint.
[3,5,0], [ENTER]	"ST.WRN 0.350"	LS14 will de-activate when the stop time exceeds 350 mSecs.
[B]	"ST.LIM 0.xxx"	Stop Time Fault setpoint.
[5,0,0], [ENTER]	"ST.LIM 0.500"	LS15 will de-activate when the stop time exceeds 500 mSecs.

STOP TIME MONITOR FAULT CLEARING:

If the stopping time of the transducer's shaft exceeds the Stop Time Warning setpoint, LS14 will de-activate. The unit will not display a fault message and the unit will continue to operate.

If the stopping time of the transducer's shaft exceeds the Stop Time Fault setpoint, LS15 will also de-activate. If the unit's display is showing the stopping time, the display will change to **"STOP FAULT"**. If the unit is showing any other function, such as POS/TACH, the unit will not display the fault message until the operator changes the display to show the Stopping Time by using the [B] Key.

The following Keystrokes will clear a Warning or Fault error:

PRESS	DISPLAY	COMMENTS
*		Must be in Program Mode. See Section 12.1 of the Users Manual.
[FUNCTION]		Function LED "on".
[B]	"S.TIME x.xxx" or " STOP FAULT "	Stop Time Warning Error or Stop Time Fault Error.
[CLEAR]	"S.TIME x.xxx"	Stop Fault Cleared. Both limits re-activated. Unit will be displaying the correct Stopping Time if Stopping Time < 9.999 Seconds.

TIMER BASED LIMITS PROGRAMMING ADDITIONS AND CHANGES:

The keys listed on this page and the next are used to program and access the timer based Limits.

```
┌──────────────┐
│   LS         │
├──────────────┤
│    NEXT      │
└──────────────┘
```
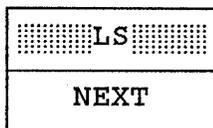
[LS] Key: This key is used to program and inspect the limit setpoints. The minimum ON time is 0.1 Seconds

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TIMER BASED LIMITS PROGRAMMING ADDITIONS AND CHANGES: (cont'd)
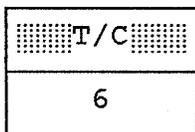
▒▒▒T/C▒▒▒ 6	**[T/C] Key:** Repeatedly using this key will display the running values of Limits 12 and 13. Only one limit can be displayed at a time.
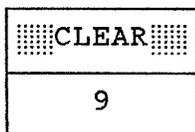
▒▒CLEAR▒▒ 9	**[CLEAR] Key:** When in Program Mode and displaying the running values of Limit 12 or 13, this key will reset the running value to zero and reset the output.

PROGRAMMING EXAMPLE:

You want to program Limit 12 to turn on at position 45 and turn off 14.6 seconds later. You also want Limit 13 to turn on at position 135 and turn off 37.3 seconds later.

PRESS	DISPLAY	COMMENTS
*		Must be in Program Mode. See Section 12.1 of the User Manual.
[FUNCTION]		Function LED "on".
[LS]	"LS<u>0</u>1 "	
[1, 2, ENTER]	"12-PPP<TT.T"	PPP = Position ON. TT.T = Seconds active.
[0,4,5,] [1,4,6,ENTER]	"12-045<14.6"	Limit turns on at POS 45 and turns off after 14.6 seconds.
[NEXT]	"13-PPP<TT.T"	PPP = Position ON. TT.T = Seconds active.
[1,3,5,] [3,7,3,ENTER]	"13-135<37.3"	Limit turns on at POS 135 and turns off after 37.3 Seconds.
[PROGRAM]	"P.xxx-T.yyyy"	Exit Program Mode.

CLEARING ACTIVE TIMER BASED LIMITS:

During the initial set-up or when a fault condition occurs, it may be necessary to stop the timer based limits before they have completed their ON cycle. The following keystrokes show how to accomplish this.

Example: While testing the initial setpoints entered above, the user discovers that LS13 is active 2.5 seconds too long. The Limit is still timing out and the user wishes to stop the Limit before it finishes timing out.

| PRESS	DISPLAY	COMMENTS
*		Must be in Program Mode. See Section 12.1 of the User Manual.
[FUNCTION]		Function LED "on".
[T/C]	"LST.12 x.xx"	LS12 timer value.
[T/C]	"LST.13 x.xx"	LS13 timer value. Note that both timers increment at 100 mSEC intervals.
[CLEAR]	"LST.13 0.00"	LS13 timer reset to zero and the Limit Output deactivated.

NOTES ON THE TIMER BASED LIMITS:

1) Each limit mimics a retriggerable one-shot. That is, the limit is turned on by an event, (reaching a programmed position) and turns off a certain amount of time after the event. However, if the event occurs again before the limit times out, the timer is reset to zero and begins timing again. What this means to the application is simple. **If the time ON is programed to a value greater than the time it takes to complete one revolution of the transducer's shaft, the limit will turn on during the first revolution and will not turn off until the machine is stopped.**

2) The timer based limits will function correctly only when the position is incrementing. If the position is decrementing when a timer based limit is activated, the limit will turn on approximately 2° before the programmed position is reached. With a standard set-up, the position will increment with a clockwise rotation of the transducer shaft. This can be changed by reversing two wires on the transducer cable.

TYPICAL RB-2 SOLID STATE RELAY BOARD CONNECTIONS:

NOTE: A RB-2 Relay Board has LS16 re-configured as an input.

P.S. = Power Supply
AC or DC: Depending
on Load Requirements
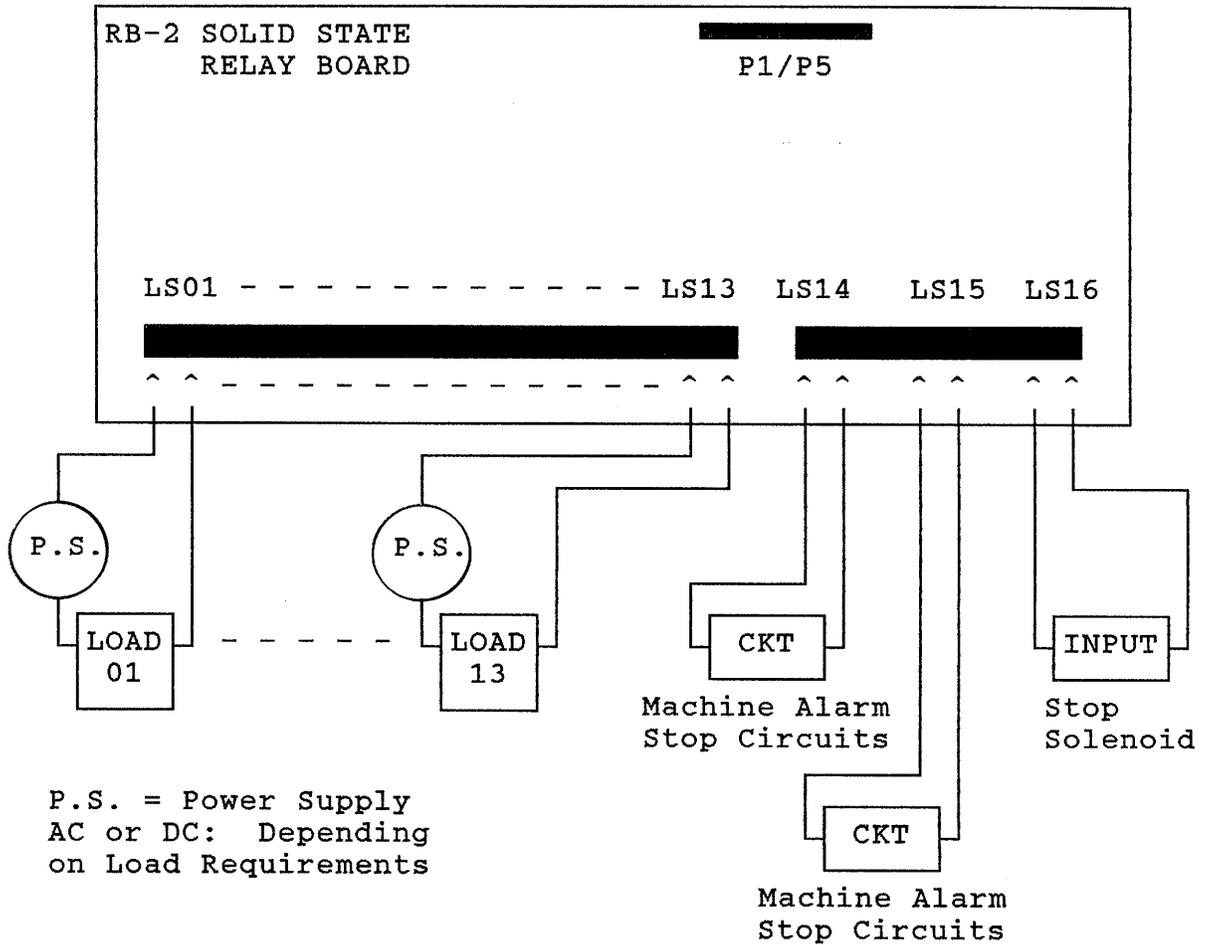
Output Relays	
KA-1	12-140 Vac @ 3A
KA-2	24-280 Vac @ 3A
KD-1	4 - 60 Vdc @ 3A
KD-2	4 -200 Vdc @ 1A

Input Relays	
KIA-1	90-140 Vac/dc
KID-1	5 - 60 Vdc

TYPICAL MRB-1 MECHANICAL RELAY BOARD CONNECTIONS:

> NOTE: LS16 is not available as an input on a MRB-1 Relay
> Board. A separate input relay must be used and
> connected to the MRB-1 Board.
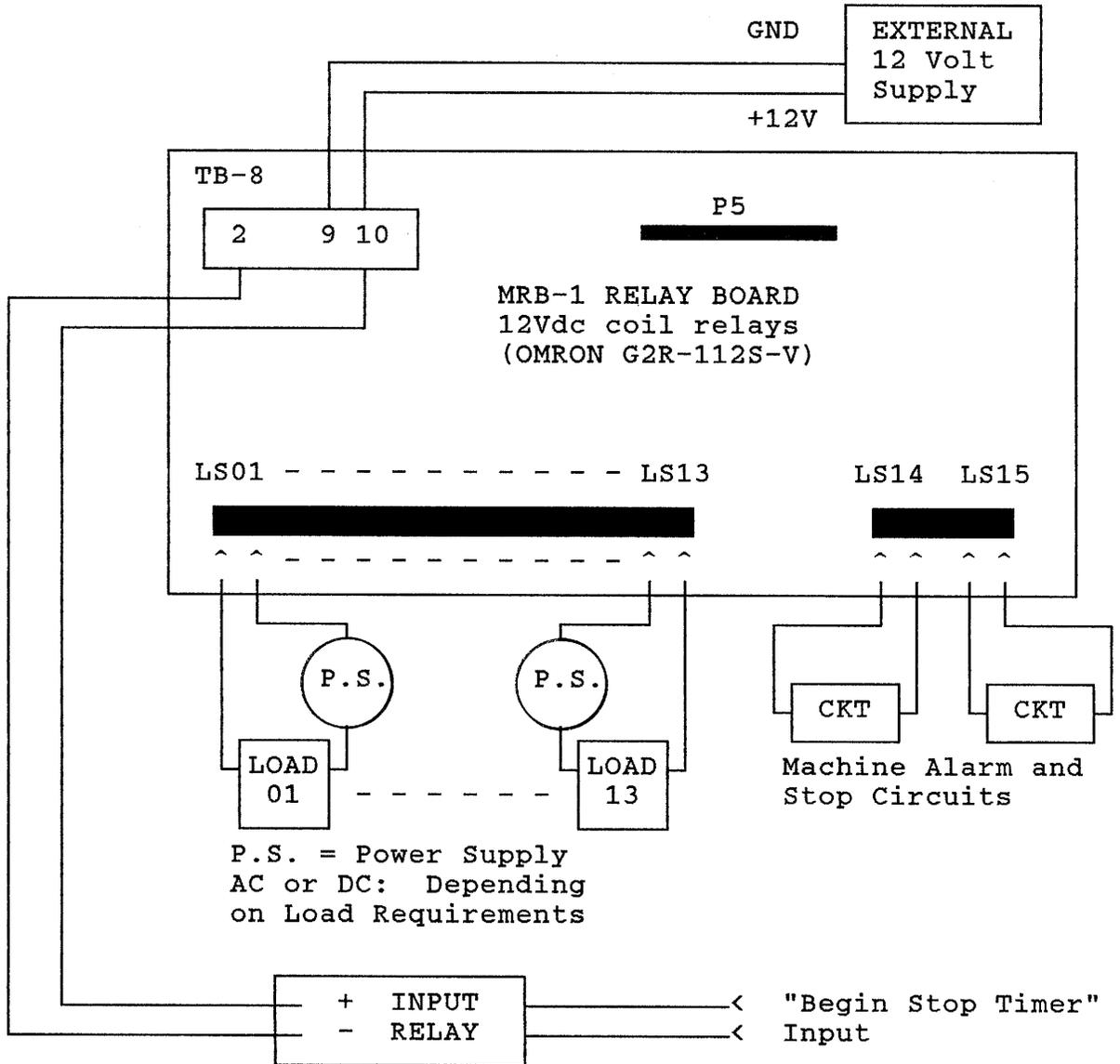
> NOTE: The external power supply **must** be connected to
> **Pins 9 and 10 of TB8** to insure the proper operation of
> the relays. **Pin 9 of TB8 is Ground and Pin 10 of TB8
> is +12 Vdc. These connections must not be reversed.**
> The Power Supply should have an earth ground lead in
> its power cord that is connected to the Ground Bus.