INSTRUCTION MANUAL

FOR

SINGLE-PHASE TIME OVERCURRENT RELAY

MODEL NUMBER: BE1-51A

Basler Electric
Highland, Illinois

Publication: 9 2011 00 990

Revision: F

I N T R O D U C T I O N

The purpose of this Instruction Manual is to furnish information concerning the operation and installation of this device. To accomplish this, the following is provided.

1. Specifications
2. Functional description
3. Operational tests
4. Mounting information

A Service Manual, publication 9 2011 00 620 is available as an aid in troubleshooting and repair.

WARNING

TO AVOID PERSONAL INJURY OR EQUIPMENT DAMAGE, ONLY QUALIFIED PERSONNEL SHOULD PERFORM THE PROCEDURES PRESENTED IN THIS MANUAL.

THIS MANUAL MAY BE USED IN PLACE OF EARLIER EDITIONS BEGINNING WITH REVISION E. FOR INFORMATION CONCERNING PREVIOUS EDITIONS, SEE SECTION 6.

REV	A	B	C	D	E	F
ECA	9436	9621	9794	9913	10144	10757

First Printing: September, 1987

Printed in USA

It is not the intention of this manual to cover all details and variations in equipment, nor does this manual provide data for every possible contingency regarding installation or operation. The availability and design of all features and options are subject to modification without notice. Should further information be required, call Basler Electric Company, Highland, Illinois.

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SECTION 1

GENERAL INFORMATION

PURPOSE

The BE1-51A is a single-phase, low burden, time overcurrent relay designed to provide protection for generators, motors, transformers, and lines against overload and fault conditions. Standard time-current characteristics and a wide setting range provide for accurate coordination with other system protective functions.

TIME OVERCURRENT MONITORING

Time overcurrent relays are used to provide phase and ground fault protection for distribution circuits, generators, transformers, and other major components of the power system. The relays are capable of a wide range of pickup settings and characteristics in order to coordinate properly with other protective devices in the power system.

The BE1-51 family of time overcurrent relays provides single-phase current sensing. These relays feature a pickup setting range of either 0.5 to 4.0 or 1.0 to 12.0 amperes, and a variety of timing characteristics for proper coordination.

The seven standard overcurrent timing functions of the time overcurrent relay provide a means to coordinate with other protective devices, and to discriminate between fault currents and transitory overloads. Table 1-1 illustrates typical applications for the standard time overcurrent characteristic curves.

INSTANTANEOUS OVERCURRENT MONITORING

One instantaneous output, independently adjustable for current level, may be specified as an aid in coordinating the protection scheme.

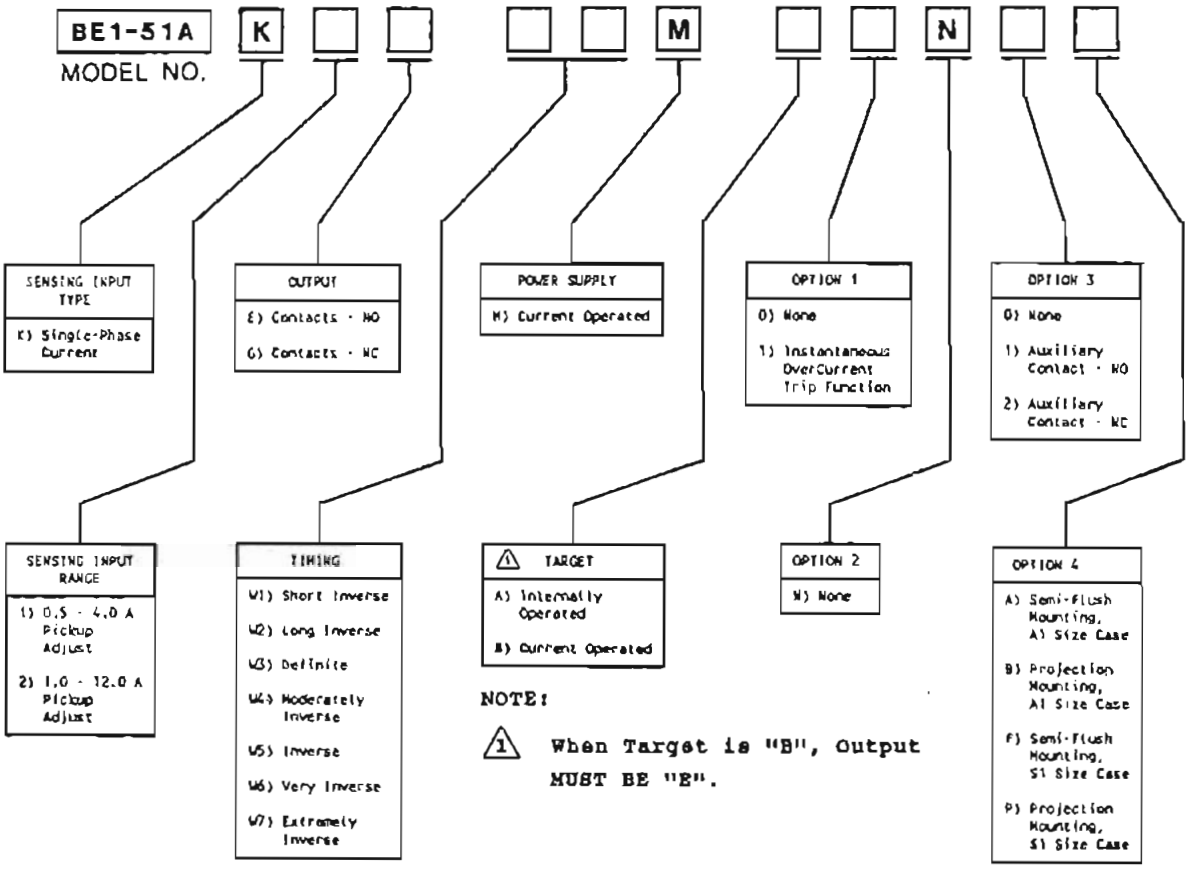
TABLE 1-1. APPLICATIONS SUMMARY

Function		Typical Protective Application	Special Characteristics
Number	Name		
W1	Short Inverse	Generators, busses.	Relatively short time, desirable where preserving system stability is a critical factor.
W2	Long Inverse	Motors.	Provides protection for starting surges and overloads of short duration.
W3	Definite Time	General use.	Fixed time delay according to dial setting. Useful in sequential tripping schemes.
W4	Moderately Inverse	Transmission and feeder lines. Useful in both phase and ground fault applications.	Accommodates moderate load changes, as may occur on parallel lines where one line may occasionally have to carry both loads.
W5 W6 W7	Inverse Very Inverse Extremely Inverse	Feeder lines, or backup protection for other types of relays	Provides additional variations of the inverse characteristic, thereby allowing flexibility in meeting load variations, or in coordinating with other relays.

MODEL AND STYLE NUMBER

The electrical characteristics and operational features included in a specific relay are defined by a combination of letters and numbers which constitutes the device's style number. The model number, BE1-51A, designates the relay as a Basler Electric Class 100 Single-Phase Time Overcurrent Relay. The style number together with the model number describe the features and options in a particular device and appear on the front panel, drawout cradle and inside the case assembly.

STYLE NUMBER IDENTIFICATION CHART



SAMPLE STYLE NUMBER

The style number identification chart above illustrates the manner in which a relay's style number is determined. For example, if the style number were K1E-W5M-B1N2A the device would have the following features:

K - Single-phase current sensing.
1 - Pickup adjustment range of 0.5A to 4.0A for Timed Trip.
E - Normally open main output contacts.
W5 - Inverse time characteristics.
M - Current operated power supply.
B - Current operated targets.
1 - Instantaneous overcurrent trip function included.
N - None
2 - Normally closed auxiliary output contacts.
A - Semi-flush mounting, A1 size case.

SPECIFICATIONS

Current Sensing	Current sensing input is nominally rated at 50/60 Hz with a continuous current rating of 5 times the TAP setting or 15A, whichever is less, for the 0.5 to 4.0A sensing range, or 5 times the TAP setting or 20A, whichever is less, for the 1.0 to 12.0A sensing range. The one-second current rating is 50 times the TAP setting or 500A, whichever is less. See Table 1-2 for typical burden data.
Power Supply	The power supply is a current operated supply deriving its input power from the sensing input transformer.
Pickup Adjustment Ranges	Two current sensing ranges are available and defined by the style chart: 0.5A to 4.0A (range 1) and 1.0A to 12.0A (range 2). Range 1 is adjustable in discrete settings as follows: 0.5, 0.6, 0.7, 0.8, 1.0, 1.2, 1.5, 2.0, 2.5, 3.0, 3.75, and 4.0. Range 2 is adjustable in discrete settings as follows: 1.0, 1.2, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0, 6.0, 7.5, 10, and 12. Setting selection is facilitated by a TAP block and screw arrangement.
Pickup Accuracy	At 25°C, within ±2% of the selected tap setting except for the 12 A tap, which is within ±5%.
Pickup Accuracy Over the Specified Temperature Range	Within ±5% of a reference measurement taken at 25°C, except for the 12 A tap, which is within ±8%.
Dropout	Within 10% of pickup value.
Instantaneous Pickup Adjustment (Optional)	Continuously adjustable from 1 to 40 times the selected TAP setting of the time overcurrent function.
Timing	
Inverse Time Accuracy	There are seven timing characteristic curves available (W1 through W7). The timing characteristic of a specific relay is defined by the style chart. Accuracy is within ±7% or ± 30 milliseconds of the indicated time for any combination of time dial and pickup settings. The time dial is adjustable from 01 to 99 in 01

increments. A setting of 00 provides an instantaneous response to an overcurrent condition. See Time Current Characteristic curves, Figures 1-2 through 1-8.

Instantaneous Response Time

Response time is less than 1.5 cycles for a current magnitude of two times selected TAP setting (for any TAP setting). The response time decreases as the magnitude of the input signal increases. (Figure 1-1.)

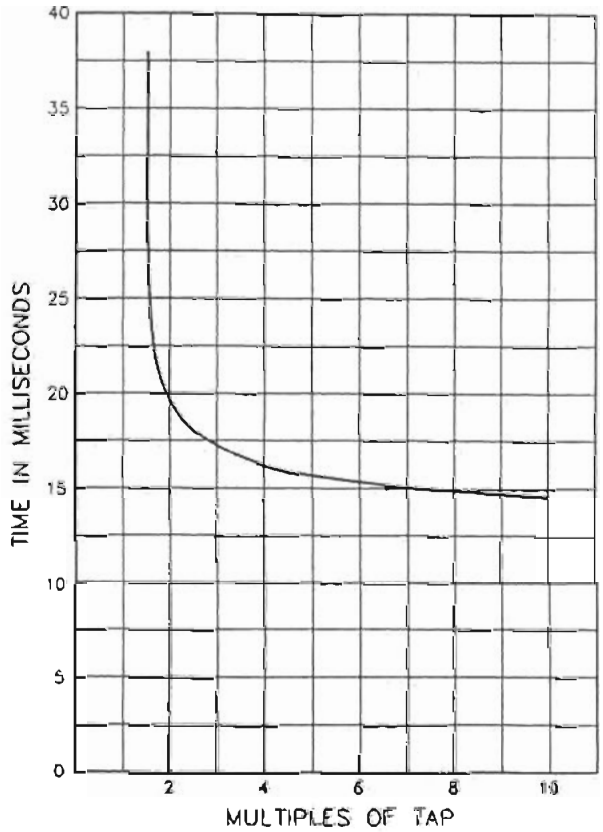


Figure 1-1. Typical Instantaneous Response Characteristics

Targets

Magnetically latched, manually reset, target indicators are optionally available to indicate that a trip output contact has energized. Either internally operated or current operated targets may be specified. Current operated targets require 0.2 A in the output trip circuit to actuate, and trip circuit current must not exceed 30 A for 1 second, and 3 A continuously. Current operated targets may be selected only when normally open (NO) output contacts have been specified.

Outputs	Output contacts are rated as follows. Resistive 120/240 Vac - make, break, and carry 5 A continuously. 250 Vdc - make and carry 30 A for 0.2 seconds, carry 5 A continuously, break 0.1 A. 500 Vdc - make and carry 15 A for 0.2 seconds, carry 5 A continuously, break 0.1 A. Inductive 120/240 Vac, 125 Vdc, 250 Vdc - break 0.1 A (L/R = 0.04).
Shock	15g in each of three mutually perpendicular axes.
Vibration	2g in each of three mutually perpendicular axes swept over the range of 10 to 500 Hz for a total of six sweeps, 15 minutes each sweep.
Dielectric Test	Because of the use of surge suppression components (MOVs) at all of the input and output terminals, a HIPOT test cannot be performed. A megger test (500 Vdc maximum) is recommended if an insulation verification is required. The following are acceptable values. All terminals to terminal 7: 100 MEG min; Current inputs 8 & 9 to 7: 1000 MEG min; Outputs 2, 3, 4, 5, & 6 to 7: 100 MEG min; From 2, 3, 4, 5, 6 to 8 & 9: 1000 MEG min.
Surge Withstand Capability	Qualified to ANSI/IEEE C37.90-1978, C37.90a-1974, and IEC 255.
Fast Transient	Qualified to ANSI/IEEE C37.90.1-198X
Impulse Test	Qualified to IEC 255-5
Temperature	
Operating	-40°C (-40°F) to 70°C (158°F)
Storage	-65°C (-85°F) to 100°C (212°F)
Weight	10.5 pounds net maximum.
Case Size	All relays may be supplied in either an A1 or S1 size case. See Section 4 for dimension and drilling diagrams.

TABLE 1-2. BURDEN DATA

Range	Selected Tap	R + jx (in Ohms) at Indicated Applied Current			
		1 X Tap	3 X Tap	10 X Tap	20 X Tap
1	0.5	8.803 - j(0.532)	3.317 - j(0.200)	1.269 - j(0.043)	0.834 - j(0.019)
	0.6	6.116 - j(0.369)	2.302 - j(0.122)	0.890 - j(0.023)	0.597 - j(0.011)
	0.7	4.514 - j(0.255)	1.710 - j(0.084)	0.665 - j(0.015)	0.450 - j(0.007)
	0.8	3.458 - j(0.196)	1.314 - j(0.054)	0.517 - j(0.010)	0.352 - j(0.011)
	1.0	2.218 - j(0.125)	0.841 - j(0.032)	0.358 - j(0.005)	0.231 - j(0.005)
	1.2	1.524 - j(0.086)	0.593 - j(0.018)	0.238 - j(0.003)	0.166 - j(0.003)
	1.5	0.980 - j(0.052)	0.383 - j(0.012)	0.157 - j(0.001)	0.111 - j(0.002)
	2.0	0.557 - j(0.029)	0.221 - j(0.006)	0.095 - j(0.001)	0.069 - j(0.001)
	2.5	0.361 - j(0.019)	0.145 - j(0.003)	0.065 - j(0.001)	0.048 - j(0.001)
	3.0	0.254 - j(0.012)	0.104 - j(0.002)	0.048 - j(*)	0.037 - j(0.001)
	3.75	0.165 - j(0.009)	0.070 - j(0.001)	0.035 - j(*)	-
	4.0	0.149 - j(0.007)	0.066 - j(0.001)	0.032 - j(*)	-
2	1.0	2.271 - j(0.172)	0.895 - j(0.013)	0.333 - j(0.009)	0.226 - j(0.002)
	1.2	1.586 - j(0.108)	0.612 - j(0.007)	0.241 - j(0.006)	0.162 - j(0.001)
	1.5	1.023 - j(0.062)	0.396 - j(0.005)	0.158 - j(0.003)	0.109 - j(0.002)
	2.0	0.579 - j(0.031)	0.227 - j(0.003)	0.093 - j(0.003)	0.066 - j(0.002)
	2.5	0.371 - j(0.020)	0.148 - j(0.002)	0.062 - j(0.001)	0.045 - j(0.001)
	3.0	0.260 - j(0.014)	0.105 - j(0.001)	0.047 - j(0.001)	0.034 - j(0.001)
	4.0	0.152 - j(0.007)	0.064 - j(0.001)	0.029 - j(0.001)	0.022 - j(0.001)
	5.0	0.097 - j(0.005)	0.042 - j(0.001)	0.021 - j(0.001)	0.017 - j(0.001)
	6.0	0.070 - j(0.004)	0.032 - j(0.001)	0.017 - j(*)	0.014 - j(*)
	7.5	0.047 - j(0.003)	0.023 - j(*)	0.014 - j(*)	0.012 - j(*)
	10.0	0.029 - j(0.002)	0.015 - j(*)	0.011 - j(*)	-
	12.0	0.025 - j(0.002)	0.014 - j(*)	0.009 - j(*)	-

Note: Burden values apply to 50 Hz and 60 Hz units. (*) Less than 0.0005.

CHARACTERISTIC CURVES

The graphs on the following pages illustrate sample curves for all of the time overcurrent functions available as options.

NOTE: A drawing number is given under each graph. Use this number to order a full-size (10" x 12") chart from Basler Electric Company.

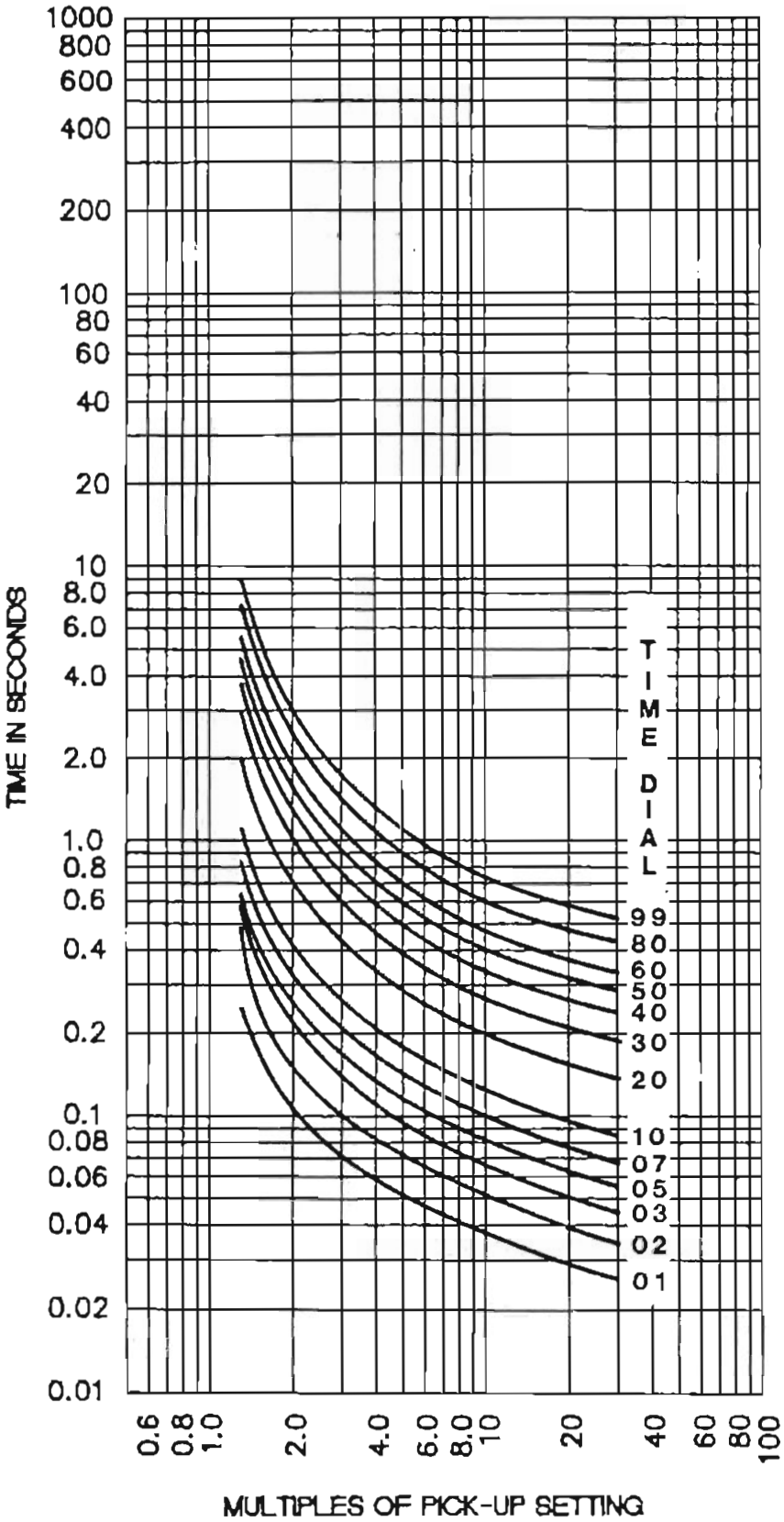


Figure 1-2. Type W1 Characteristic Curves - Short Inverse (Drawing Number 1124)

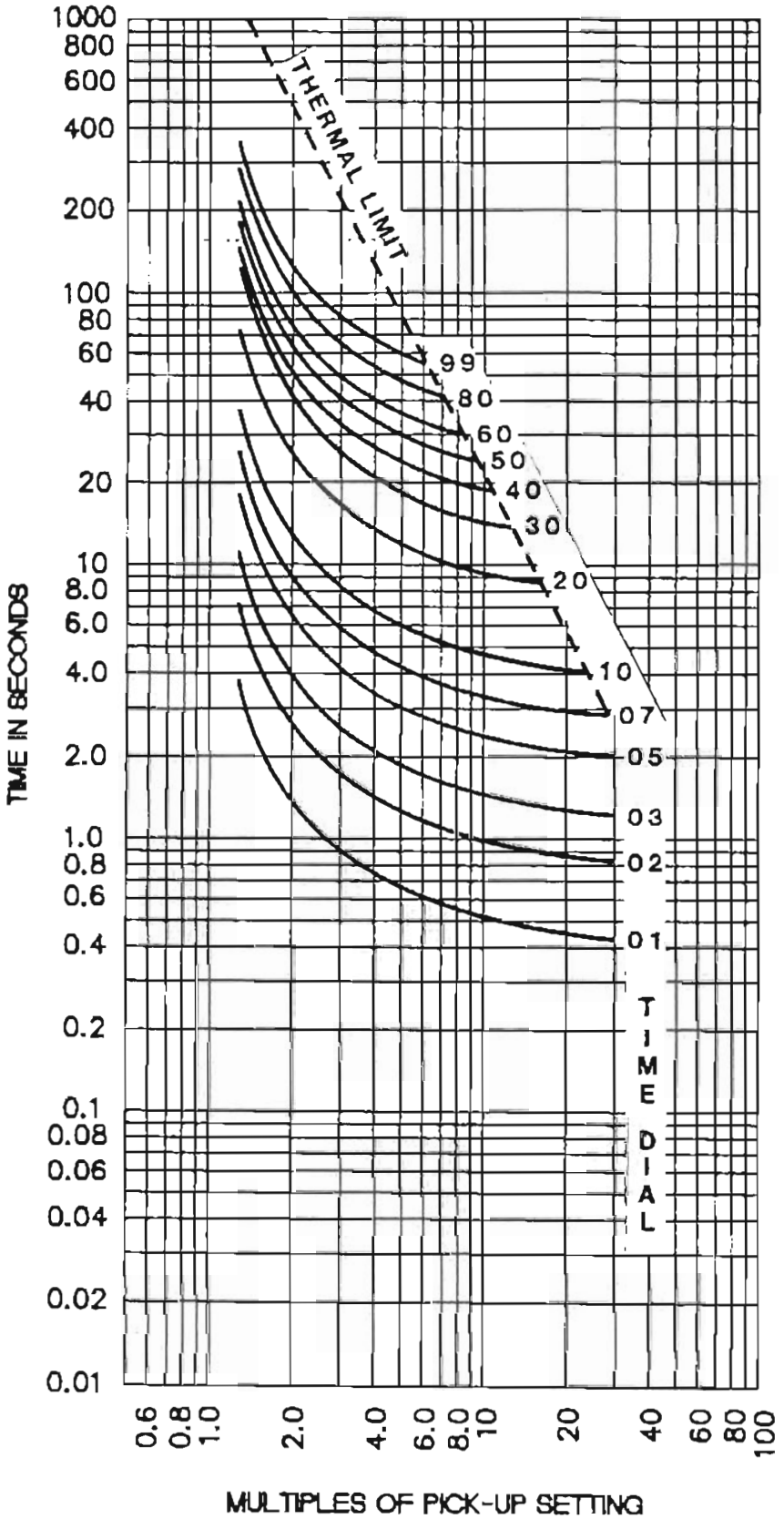


Figure 1-3. Type W2 Characteristic Curves - Long Inverse (Drawing Number 1125)

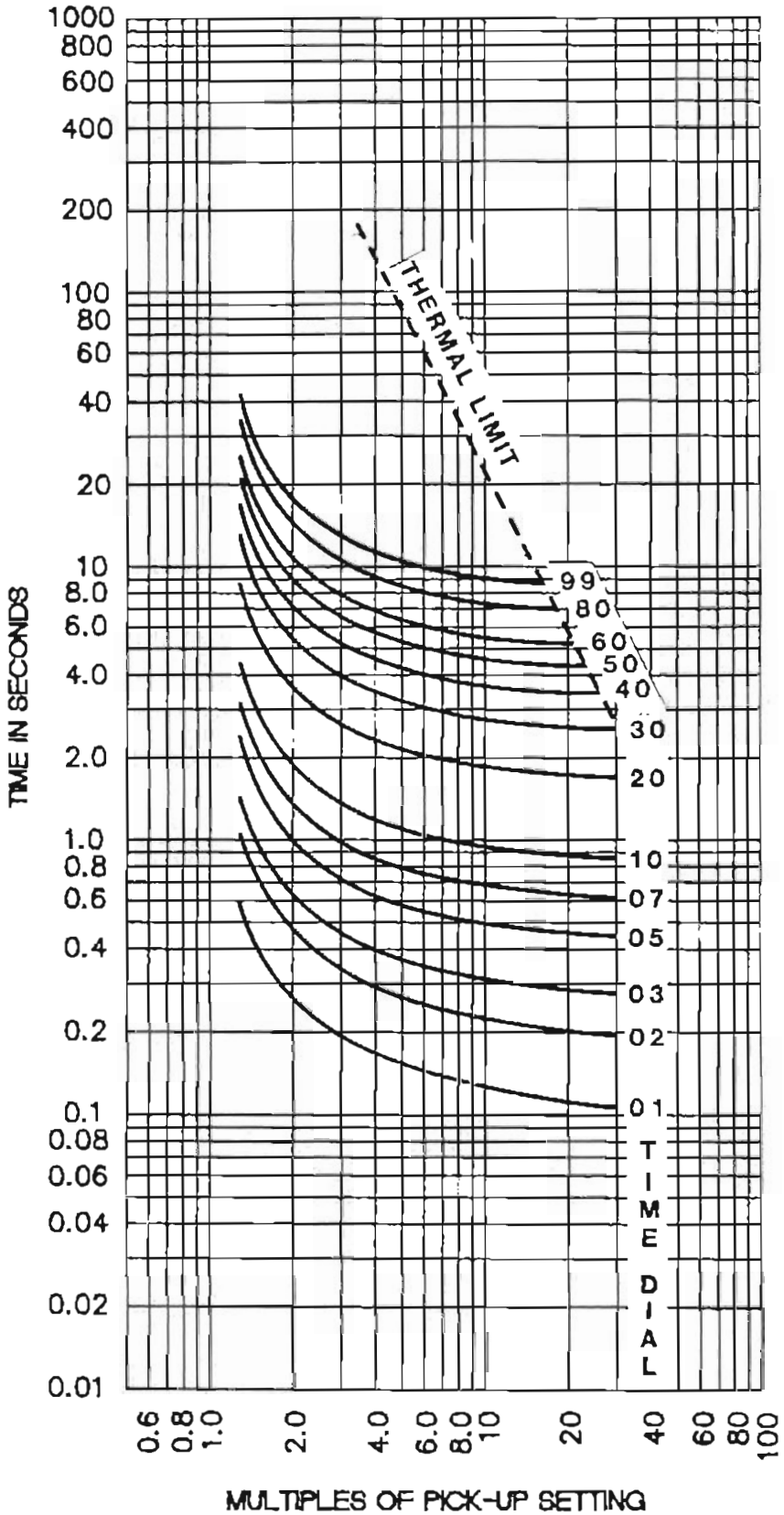


Figure 1-4. Type W3 Characteristic Curves - Definite (Drawing Number 1126)

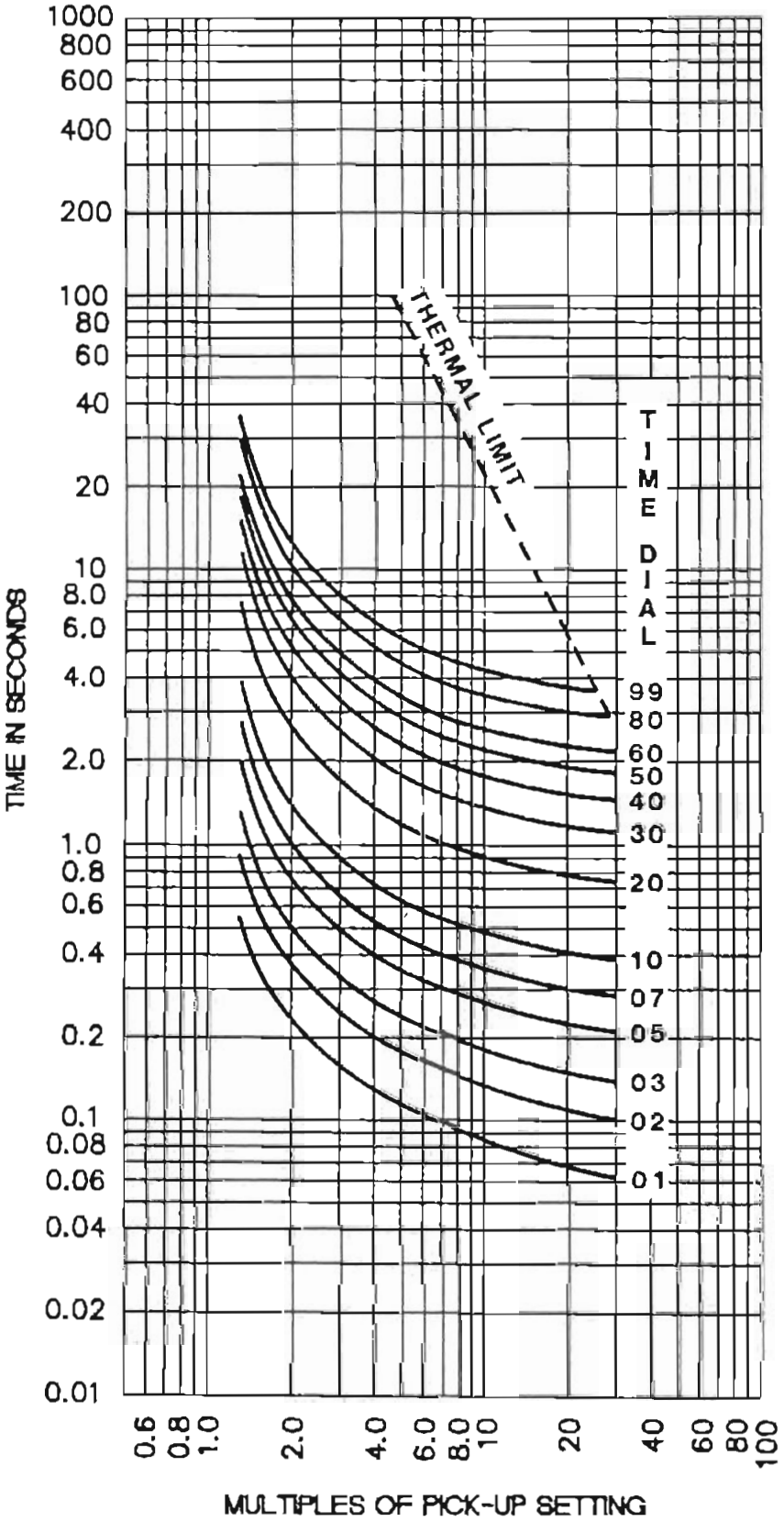


Figure 1-5. Type W4 Characteristic Curves - Moderately Inverse (Drawing Number 1127)

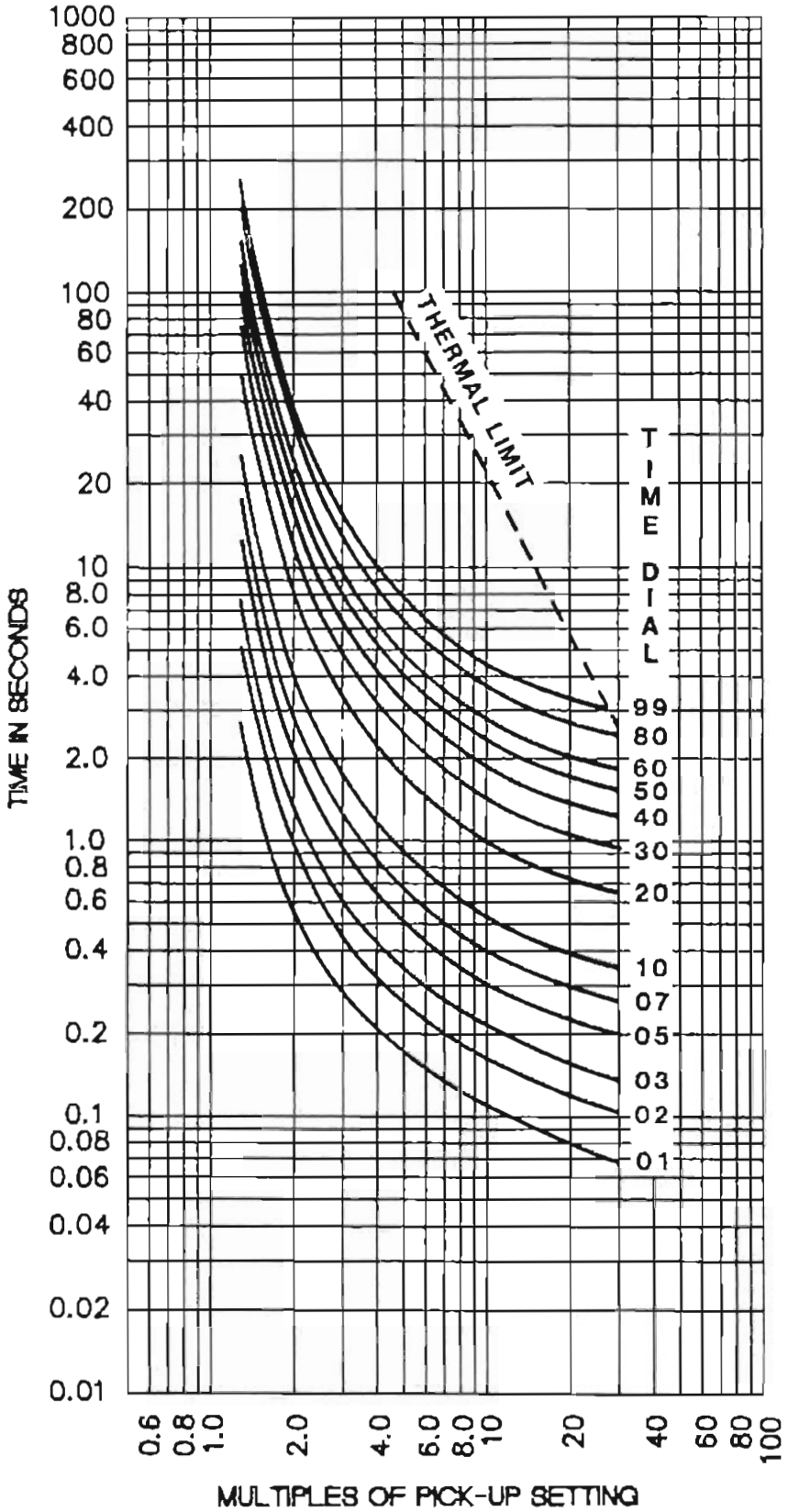


Figure 1-6. Type W5 Characteristic Curves - Inverse (Drawing Number 1128)

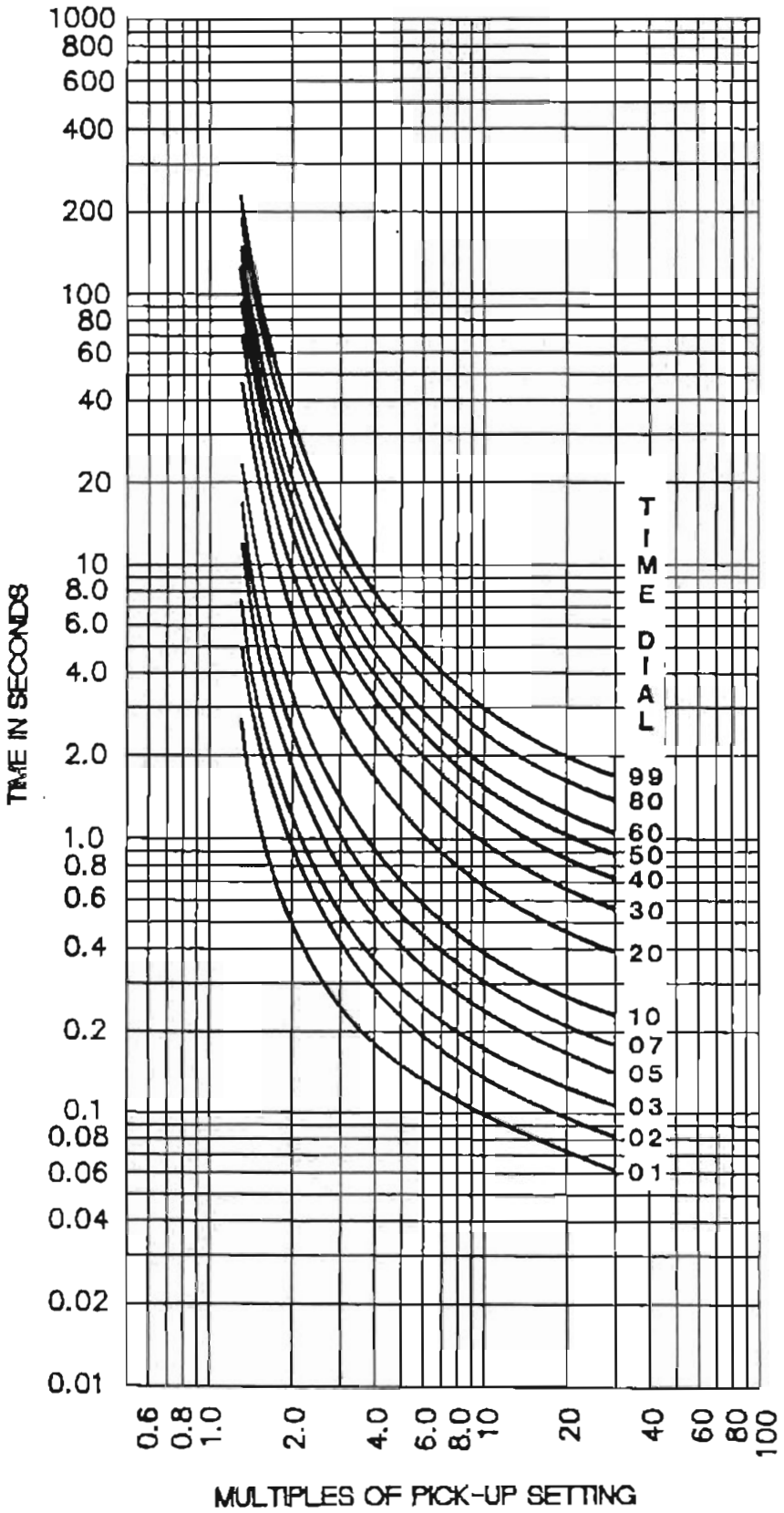


Figure 1-7. Type W6 Characteristic Curves - Very Inverse (Drawing Number 1129)

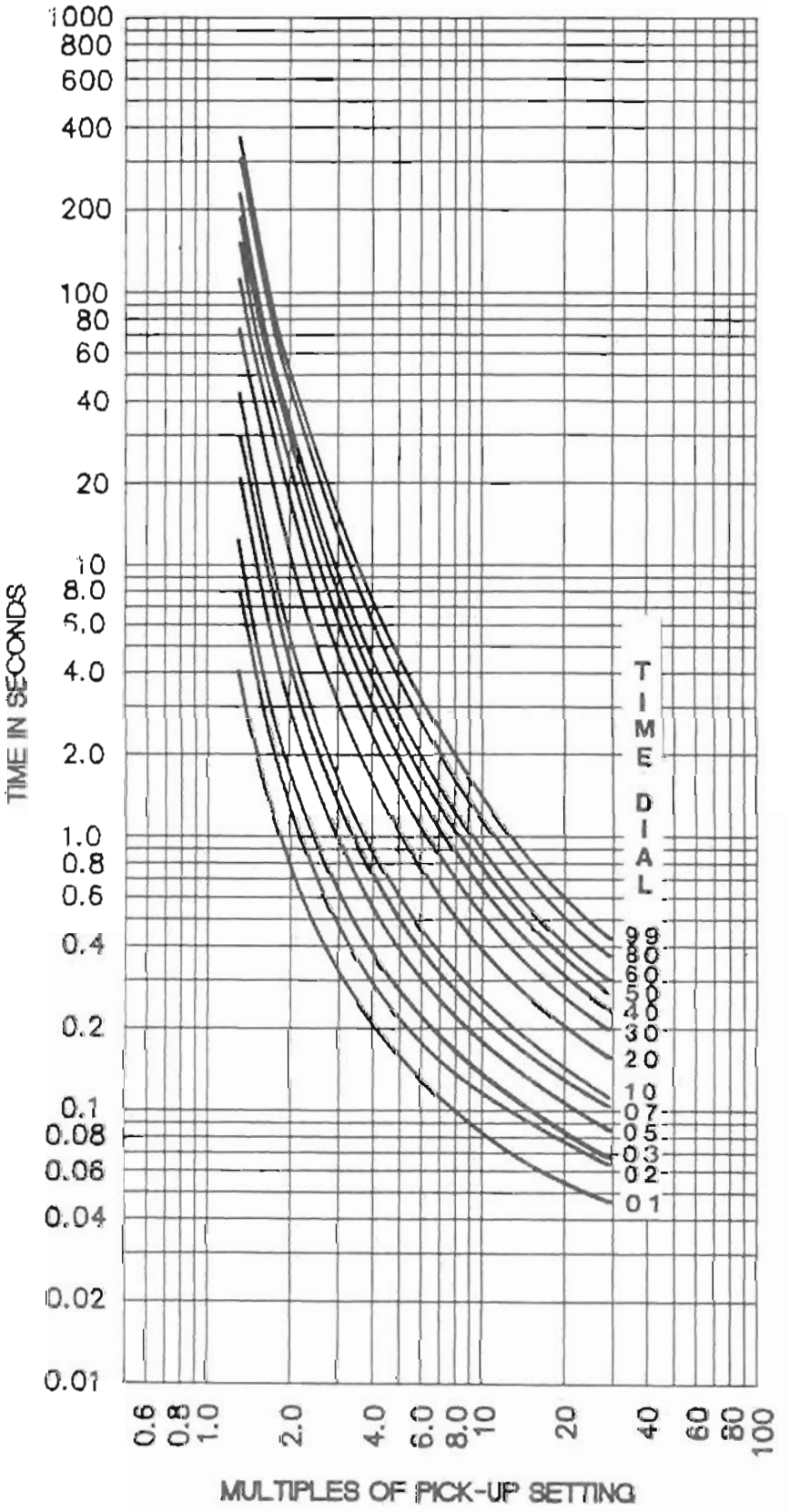


Figure 1-8. Type W7 Characteristic Curves - Extremely Inverse (Drawing Number 1130)

SECTION 2

CONTROLS AND INDICATORS

The following table is referenced to Figure 2-1.

LOCATOR	CONTROL OR INDICATOR	FUNCTION
A	Target Indicators	Magnetically latching, manually reset target indicators trip from black to red to indicate that the corresponding output relay has been energized.
B	PICKUP Indicator	Red LED illuminates to indicate that the pickup setting of the relay has been exceeded.
C	TIME DIAL	Two 10-position rotary switches used to select a particular characteristic curve of the selected set of inverse curves. Adjustable from 01 to 99 in 01 increments. A setting of 00 provides an instantaneous response to the overcurrent condition.
D	INST ADJUST (Optional)	Multi-turn potentiometer used to establish the pickup level for the Instantaneous overcurrent function of the relay. Continuously adjustable from 1 to 40 times the selected TAP setting of the overcurrent function.
E	TAP Block	Tap block and screw arrangement is used to establish the pickup level for the time overcurrent function of the relay. See Specifications, Section 1, for definition of ranges and discrete TAP settings.
F	Target Reset Lever	Mechanical linkage used to manually reset the magnetically latched target indicators.

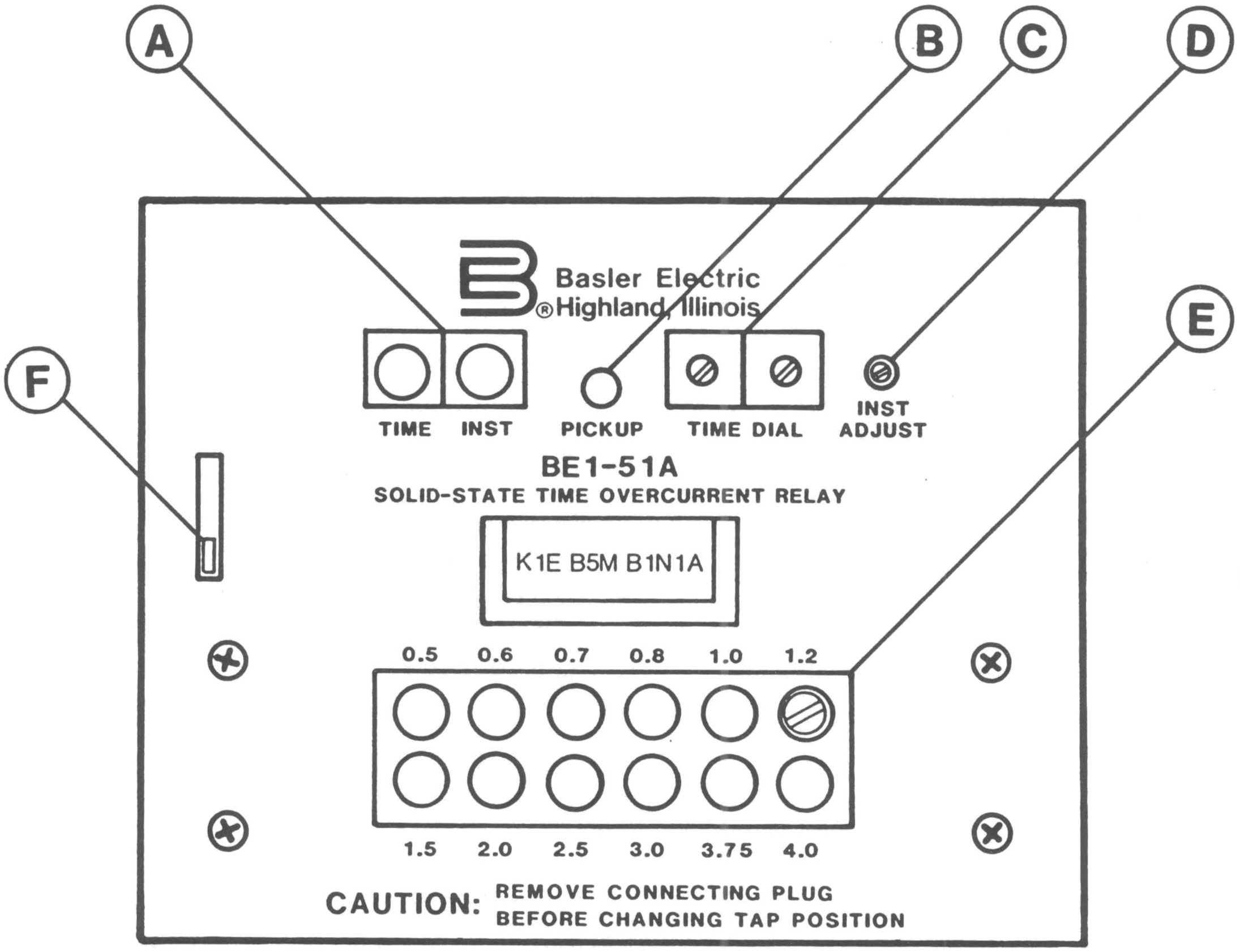


Figure 2-1. Location of Controls and Indicators

SECTION 3

FUNCTIONAL DESCRIPTION

The following descriptions are referenced to the Functional Block Diagram, Figure 3-1 below.

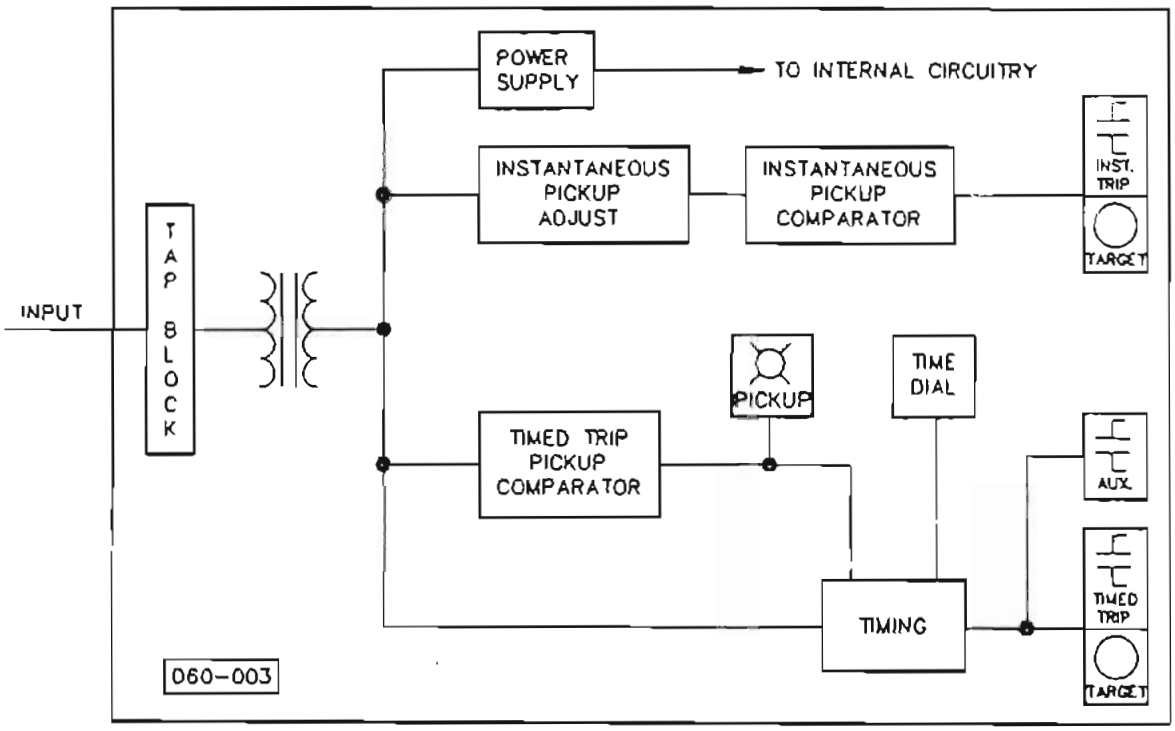


Figure 3-1. Functional Block Diagram

CURRENT SENSING

The BE1-51A Time Overcurrent Relay's input transformer senses a single phase of system current, receiving its input, in turn, from the (5A nominal) secondary of a system transformer. The sensing input transformer is nominally rated at 50/60 Hz, with a maximum burden of 10VA at TAP value current. The continuous current rating is dependent upon the input range selected. For range 1 (0.5 to 4.0A) the maximum continuous rating is 5 times TAP or 15A, whichever is less. For range 2 (1.0 to 12.0A) the maximum continuous rating is 5 times TAP or 20A, whichever is less. One-second current rating is defined as 50 times TAP or 500A, whichever is less. For current ratings below one second, the rating may be calculated using the formula

$$I^2 = K/T$$

where T is the time in seconds that the current flows, and $K = (50 \times \text{tap})^2$.

When the connecting plug ("paddle") is removed, the CT inputs are shorted.

TAP BLOCK

The TAP block and screw arrangement facilitiates the selection of the overcurrent pickup value.

WARNING

TO AVOID PERSONAL INJURY OR EQUIPMENT DAMAGE, THE TAP SCREW MUST BE SECURELY TIGHTENED. IF THE TAP SCREW IS TO BE CHANGED OR REMOVED, IT IS IMPERATIVE THAT RELAY CONNECTING PLUGS ARE FIRST REMOVED. (THIS ENGAGES THE INTERNAL SHORTING BAR WHICH PREVENTS HIGH VOLTAGE ARCING.)

POWER SUPPLY

The BE1-51A incorporates a current operated power supply that derives its operating power from the input sensing transformer.

PICKUP

The BE1-51A Time Overcurrent Relay has two overcurrent functions available: the timed overcurrent function (standard with the relay) and an optional instantaneous overcurrent function. The timed overcurrent function is adjustable over the ranges defined by the style chart, in discrete tap settings as indicated in the Specifications portion of Section 1. The instantaneous overcurrent function is continuously adjustable from 1 to 40 times the selected TAP setting for the timed function.

The monitored current is scaled and rectified to a representative value, then compared to an internally established reference voltage. When the representative value exceeds the reference level, indicating that an overcurrent condition exists, timing is initiated (timed function) or the output circuit is energized (optional instantaneous function).

TIMING

The timing circuit consists of an oscillator circuit and a counter. The oscillator circuit is held reset until the pickup level is exceeded, at which time the oscillator circuit is enabled. The frequency of the oscillator circuit is dependent upon the magnitude of input current and the selected time current characteristic. The larger the current magnitude, the higher the oscillator frequency. The output pulses from the oscillator circuit are counted by the timer. When the time-current characteristic has been satisfied, the "timed" output relay is energized.

There are seven available time current characteristics for the BE1-51A. The specific timing characteristics of a relay are determined by two characters in the style number. The timing characteristic is further adjustable by means of a front-panel time dial from 01 to 99 in increments of 01. A setting of 00 indicates an instantaneous output. Each consecutive setting of the time dial represents selection of an individual curve of the set. See Figures 1-2 through 1-8.

OUTPUTS

Separate output contacts are provided for the time trip function of the relay and, if selected, for the instantaneous function. Contact configuration may be either normally open (NO) or normally closed (NC) as determined by the style chart. An optional auxiliary output contact, which operates simultaneously with the main (timed) output, may be selected for the time trip function. It may be of the normally open or normally closed type.

TARGETS

A target indicator is provided as a standard feature for the timed function of the relay. If the instantaneous function has been selected, a target indicator will also be provided. Targets may be either internally operated or current operated, (operating when a minimum of 0.2 A flows in the output trip circuit). The target provides a visual indication of a trip condition. When operated, the target is magnetically latched, and must be manually reset after the abnormal current condition has been removed or corrected.

SECTION 4

INSTALLATION

GENERAL

When not shipped as part of a control or switchgear panel, the relays are shipped in sturdy cartons to prevent damage during transit. Immediately upon receipt of a relay, check the model and style number against the requisition and packing list to see that they agree. Visually inspect the relay for damage that may have occurred during shipment. If there is evident damage, immediately file a claim with the carrier and notify the Regional Sales Office, or contact the Sales Representative at Basler Electric, Highland, Illinois.

In the event the relay is not to be installed immediately, store the relay in its original shipping carton in a moisture and dust free environment. When the relay is to be placed in service, it is recommended that the following operational test be performed prior to installation.

RELAY OPERATING PRECAUTIONS

Before installation or operation of the relay, note the following precautions:

1. A minimum of 0.2 A in the output circuit is required to ensure operation of current operated targets.

2. Do not touch target indicator vanes. Always reset targets by use of the target reset lever.

3. The relay is a solid-state device. If a wiring insulation test is required, remove the connecting plug and withdraw the cradle from its case.

4. When the connecting plug is removed, the relay is disconnected from the operating circuit and will not provide system protection. Always be sure that external operating (monitored) conditions are stable before removing a relay for inspection, test, or service. Also, be sure that connecting plug is in place before replacing the front cover.

5. Be sure the relay case is hard wired to earth ground using the ground terminal (terminal #7) on the rear of the unit. Use a separate ground lead to the ground bus for each relay.

DIELECTRIC TEST

In accordance with IEC 255-5 and ANSI/IEEE C37.90-1978, one-minute dielectric (high potential) tests may be performed up to 2500 Vac (45-65 Hz) except across open contacts, which may be tested up to 1500 Vac. Note that this device employs decoupling capacitors to ground from terminals 2, 6, 8, and 9. Accordingly, a leakage current is to be expected at these terminals.

MOUNTING

Relay outline dimensions and panel drilling diagrams are supplied on pages 4-5 through 4-7.

CONNECTIONS

Typical external connections are shown in Figures 4-4 and 4-5.

Incorrect wiring may result in damage to the relay. Be sure to check model and style number against the options listed in the Style Number Identification Chart before connecting and energizing a particular relay. Connections should be made with 14 AWG stranded wire or better.

NOTE: Be sure the relay case is hard-wired to earth ground with no smaller than 12 AWG copper wire attached to the ground terminal on the rear of the relay case. When the relay is configured in a system with other protective devices, always use a separate lead to the ground bus from each relay.

OPERATIONAL TEST PROCEDURE

The following procedure verifies operation and calibration of the relay. Terminal numbers may be found in the connection diagram on page 4-8.

Should the data obtained from these procedures not fall within the specified tolerances, consider the following when evaluating results.

1. The inherent error of the test equipment used.
2. Possible inconsistencies in the method of testing.
3. The tolerance level of external components used in the test setup.

W A R N I N G

TO AVOID PERSONAL INJURY OR EQUIPMENT DAMAGE, THE TAP SCREW MUST BE EXTREMELY TIGHT AT ALL TIMES THAT CURRENT IS ADMITTED. TO CHANGE TAP POSITION, FIRST REMOVE PADDLE TO ALLOW THE SHORTING BARS TO BYPASS THE CURRENT. THIS PREVENTS HIGH VOLTAGE ARCING.

Instantaneous Pickup (Option 1-1)

STEP 1. Adjust the INST. ADJUST pickup pot fully CCW. Adjust the TIME DIAL to 99. Place the TAP screw to the 0.5 (minimum of range 1), or 1.0 (minimum of range 2) position.

STEP 2. Connect a variable current source to sensing input terminals 8 and 9. Begin at 0 amps and slowly increase current to a point where the instantaneous output relay energizes. Record the current at this point. Current should be 0.5 A $\pm$2% (range 1), or 1.0 A $\pm$2% (range 2).

STEP 3. Verify that the INST target indicator actuates(if present), flipping from black to red.

STEP 4. Reduce input current to 0 amps and adjust the INST. ADJUST pickup pot fully CW.

STEP 5. Reset target indicator.

Timed Pickup Accuracy

STEP 1. Place the TAP screw in the 0.5 A (range 1) or the 1.0A (range 2) position. Adjust the Time Dial to 00. Adjust INST (if present) fully CW. Begin applying sensing input current from some value below selected tap (0 amps).

STEP 2. Increase the input current source to a point where the PICKUP LED just illuminates. Verify that the current reading at this point is 0.5 ±0.01A (range 1) or 1.0 ±0.02A (range 2).

STEP 3. Repeat steps 1 and 2 for the following TAP settings and accuracies.

TAP Setting		Accuracy	
Range 1	Range 2	Range 1	Range 2
0.8	2.0	0.8 ±0.016A	2.0 ±0.04A
1.5	4.0	1.5 ±0.03A	4.0 ±0.08A
3.0	7.5	3.0 ±0.06A	7.5 ±0.15A
4.0	12.0	4.0 ±0.08A	12.0 ±0.24A

NOTE: Verify target and (if present) auxiliary relay operation with each trip of the main output. Reset target after each trip.

TIMING

Instantaneous Response Time (Option 1-1)

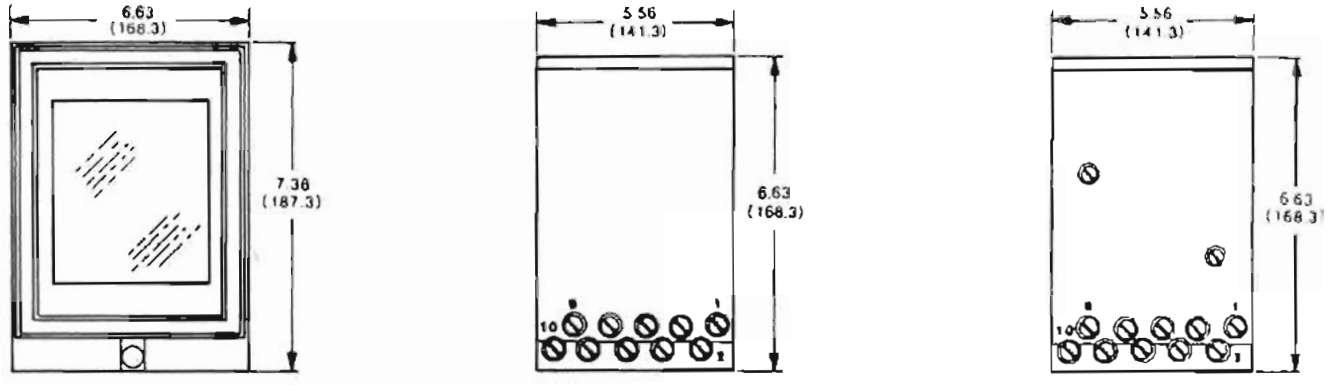
STEP 1. Adjust the INST. ADJUST pickup pot fully CCW. Place the TAP screw to the 0.5A (range 1) or 1.0A (range 2) position.

STEP 2. Apply sensing input current at 2 times TAP (1.0A, range 1 or 2.0A, range 2) and measure the response time. The measured time should be less than 69 ms for 60 Hz applications and less than 80 ms for 50 Hz applications.

Time Current Characteristics

STEP 1. Place the TAP screw to the 0.5A (range 1) or 1.0A (range 2) position. Place the Time Dial in the 01 position.

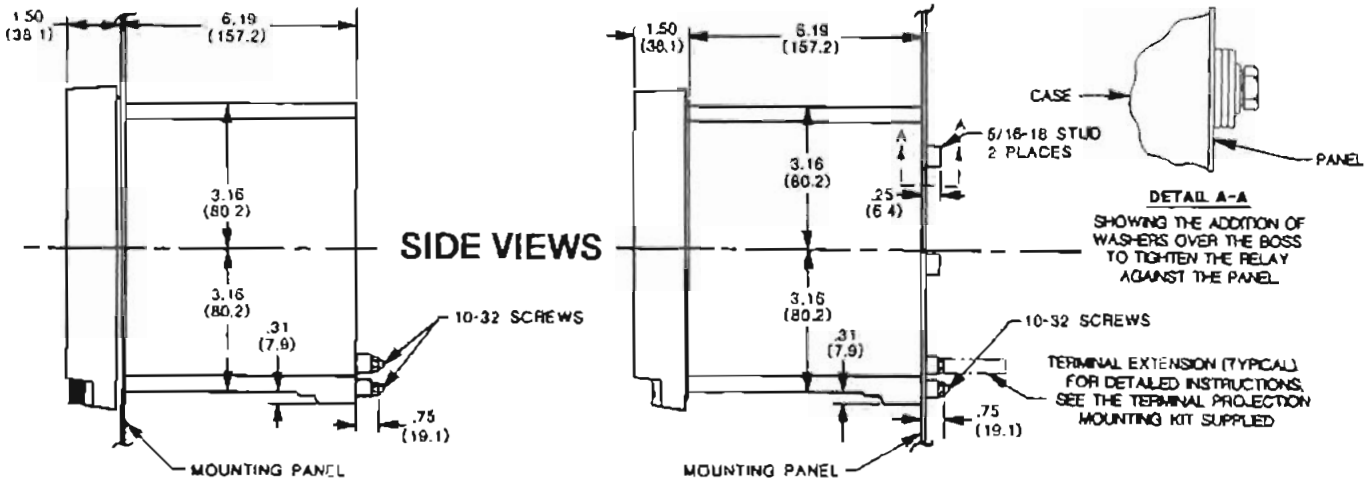
STEP 2. Apply sensing input current at 2.0 and 5.0 times the tap setting, each time measuring the time interval to trip. The measured times should match the appropriate characteristic curve ±7.0% or ±30 milliseconds, whichever is greater. (Reference Figures 1-2 through 1-8.)



FRONT VIEW

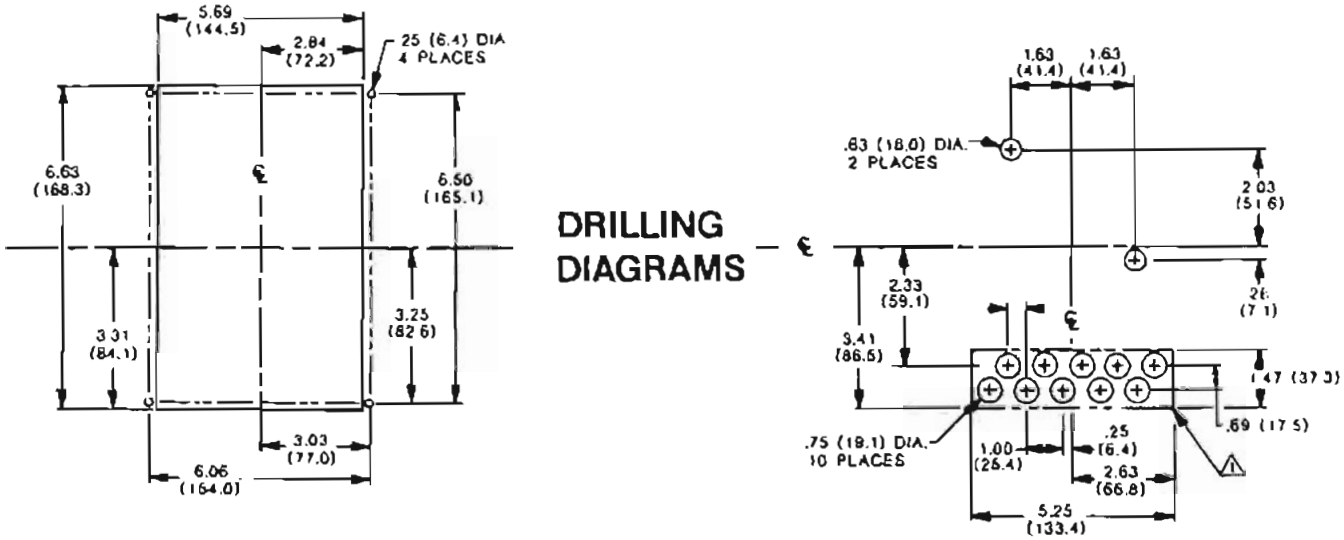
REAR VIEW
SEMI-FLUSH MOUNTED

REAR VIEW
PROJECTION MOUNTED



SEMI-FLUSH MOUNTED

PROJECTION MOUNTED

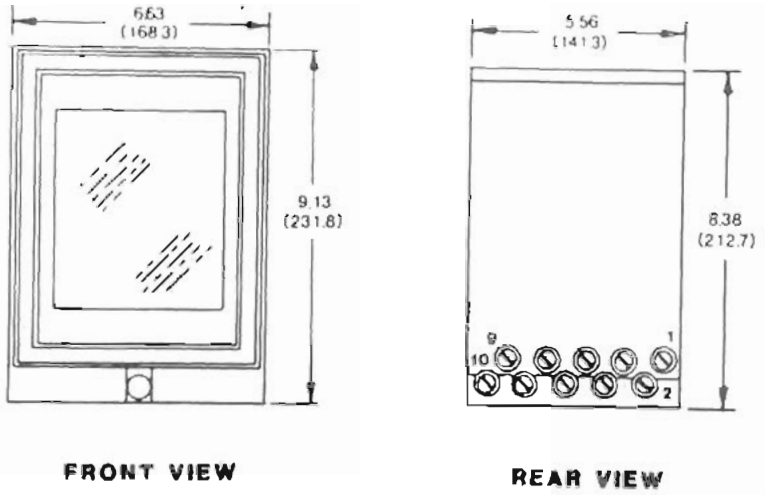


SEMI-FLUSH MOUNTED

PROJECTION MOUNTED
LOOKING AT REAR OF CASE.

⚠ OPTIONAL CUTOUT MAY REPLACE (10) DRILLED HOLES

Figure 4-1. A1 Case



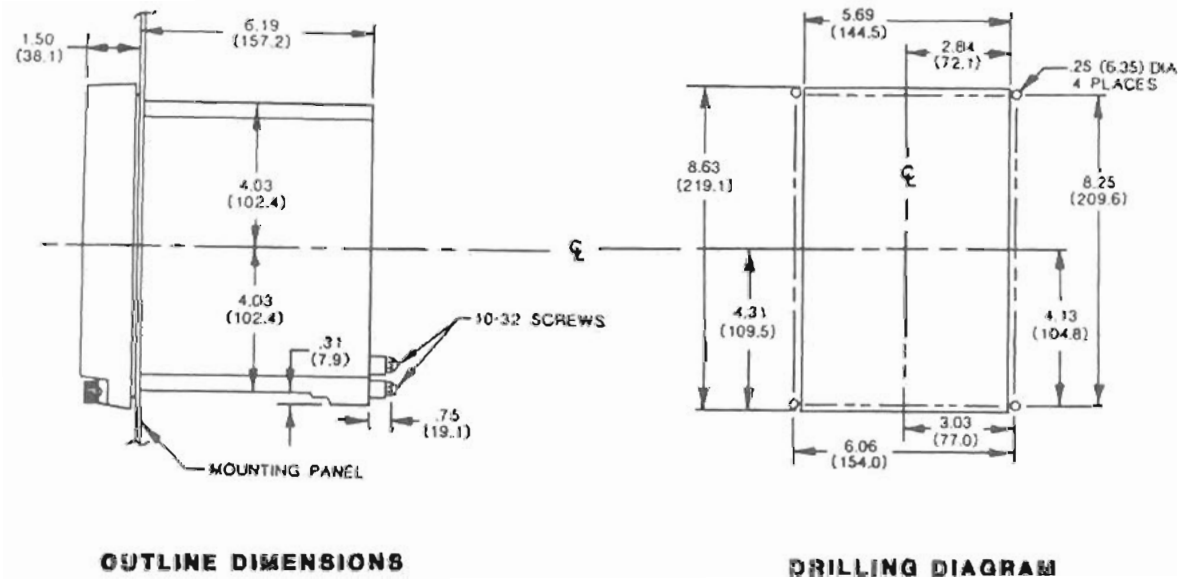
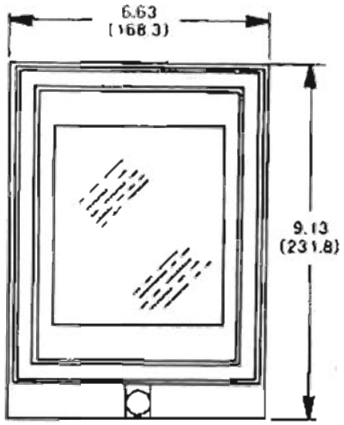
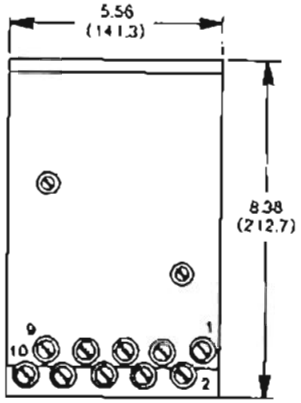


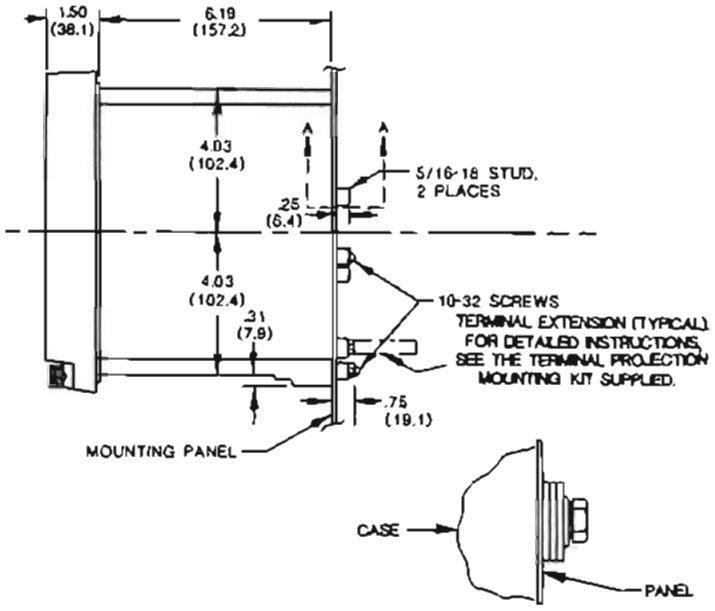
Figure 4-2. S1 Semi-Flush Mounted Case



FRONT VIEW



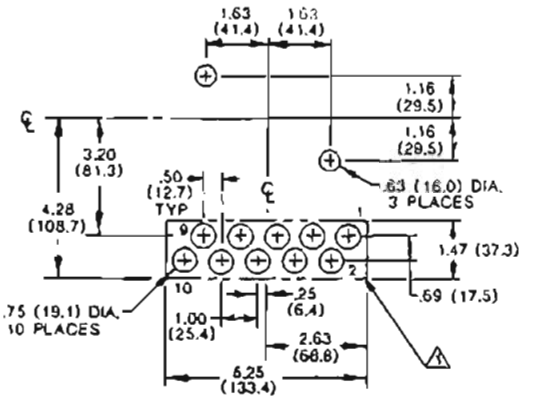
REAR VIEW



OUTLINE DIMENSIONS

DETAIL A-A

SHOWING THE ADDITION OF WASHERS OVER THE BOSS TO TIGHTEN THE RELAY AGAINST THE PANEL.



1 OPTIONAL CUTOUT MAY REPLACE (10) DRILLED HOLES

DRILLING DIAGRAM

LOOKING AT REAR OF CASE.

Figure 4-3. S1 Projection Mounted Case

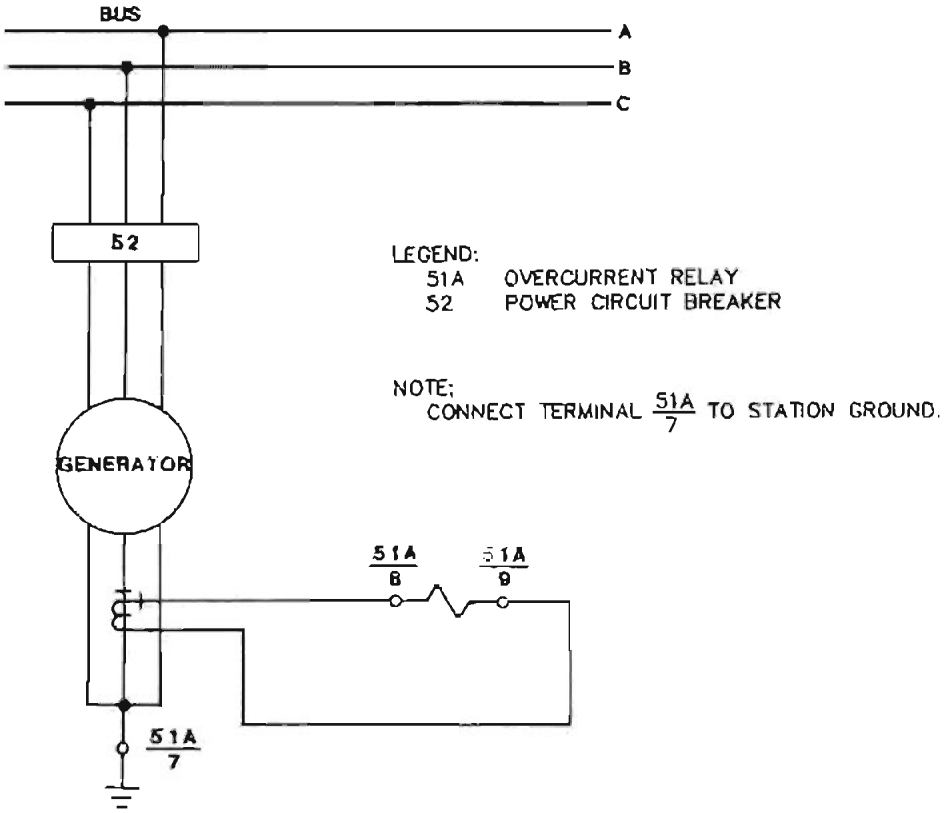


Figure 4-4. Current Sensing Connections

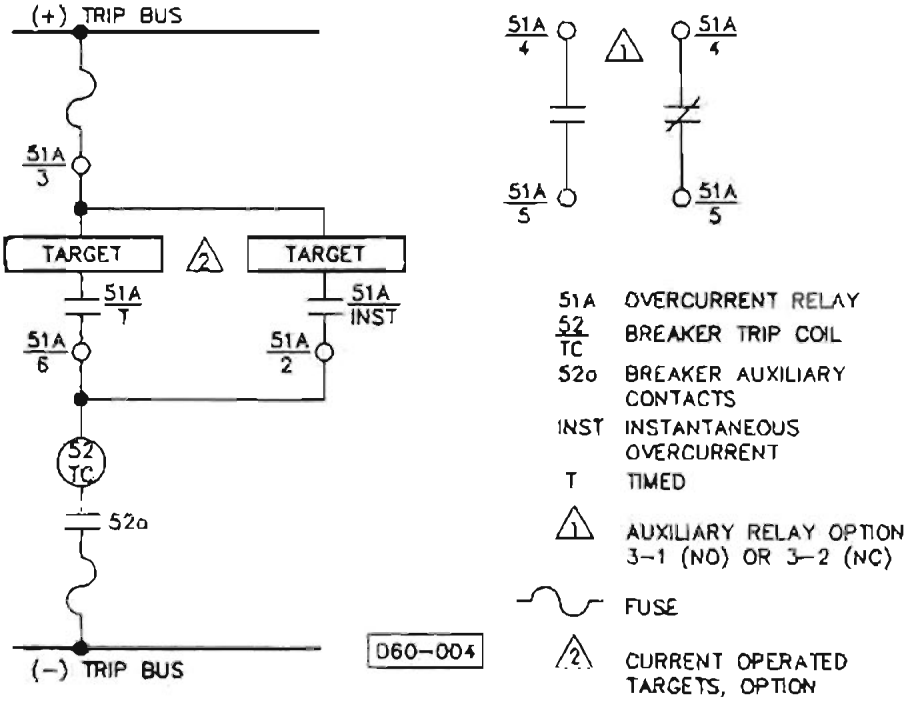


Figure 4-5. Control Circuit Connections

SECTION 5

MAINTENANCE

GENERAL

Basler relays are static devices which require no preventive maintenance other than a periodic operational check. The operational test procedure of Section 4 provides an adequate check to verify proper operation of the relay. If the relay fails to function properly, consult the Service Manual (publication number 9 2011 00 620), or the relay may be returned to the factory for repair. When returning the relay to the factory, ship the entire relay cradle assembly, preferably in its case.

IN-HOUSE REPAIR

If in-house repair is to be attempted, component values may be obtained from the schematics or the parts list in the Service Manual, and replacement parts may be purchased locally. The quality of replacement parts must be at least equal to that of the original components.

Where special components are involved, Basler Electric part numbers may be obtained from the number stamped on the component or assembly, the schematic, or the parts list. These parts may be ordered directly from Basler Electric. Complete boards or assemblies may be ordered by supplying the following information.

1. Model and style number
2. Relay serial number
3. Board or assembly
   a) part number
   b) serial number
   c) revision letter
4. The name of the board or assembly

C A U T I O N

REMOVAL AND DIRECT SUBSTITUTION OF PRINTED CIRCUIT BOARDS OR INDIVIDUAL COMPONENTS DOES NOT NECESSARILY MEAN THAT THE RELAY WILL OPERATE PROPERLY. ALWAYS CHECK AND/OR CALIBRATE RELAY BEFORE PLACING IT INTO AN OPERATING SYSTEM.

SECTION 6

MANUAL CHANGE INFORMATION

This section contains information concerning previous editions of the manual beginning with Revision E. The substantive changes to date are summarized in the following table.

REVISION	SUMMARY OF CHANGES
E	Time overcurrent curves redrawn. Figure 4-4 corrected by showing terminal 7.
F	Page 1-5: Because of the installed surge suppression components, it is not practical to perform an isolation test. Accordingly, the isolation test formerly specified is replaced by a dielectric test. Elsewhere, various editing changes of minor import were made, and Section 6 was added.