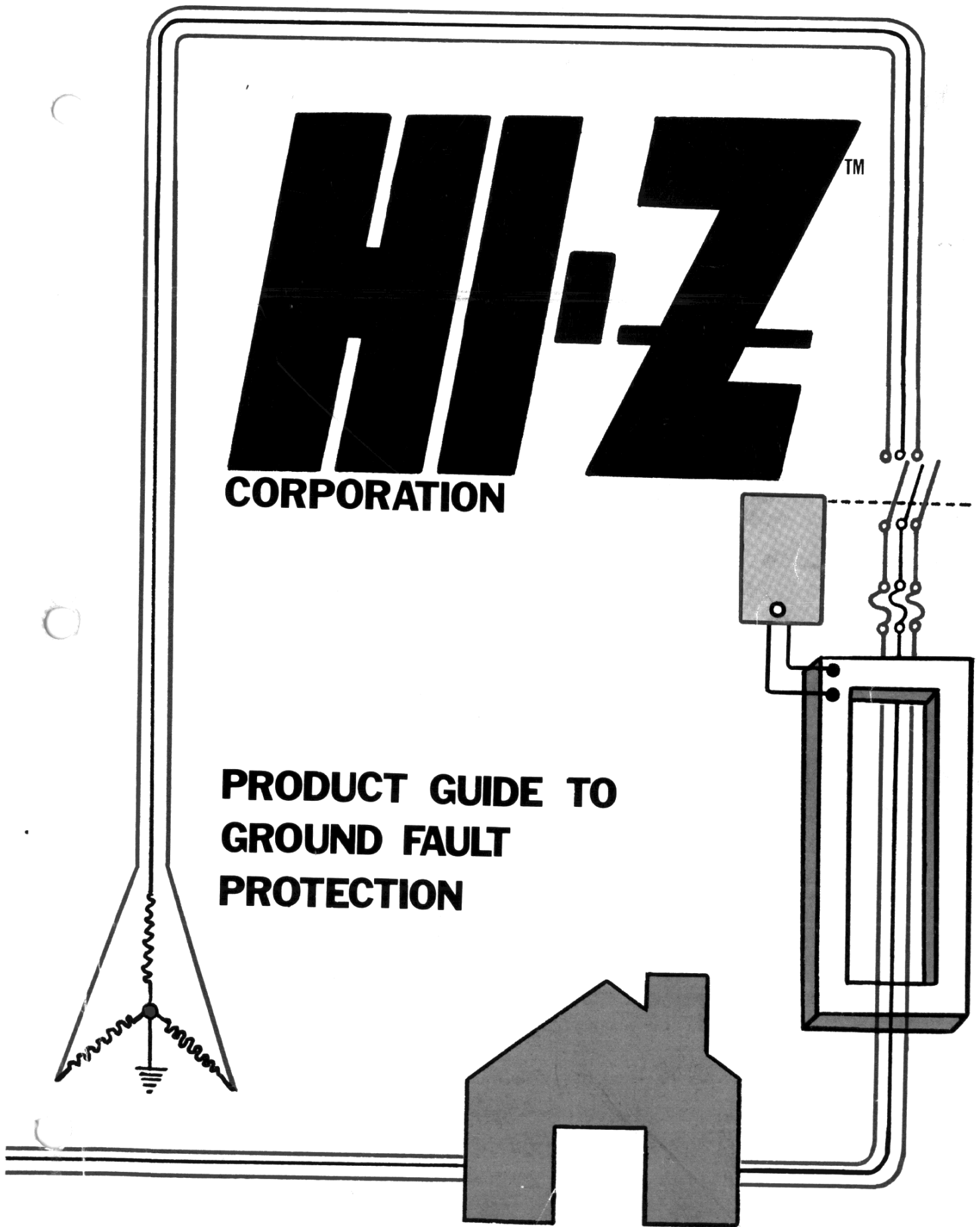
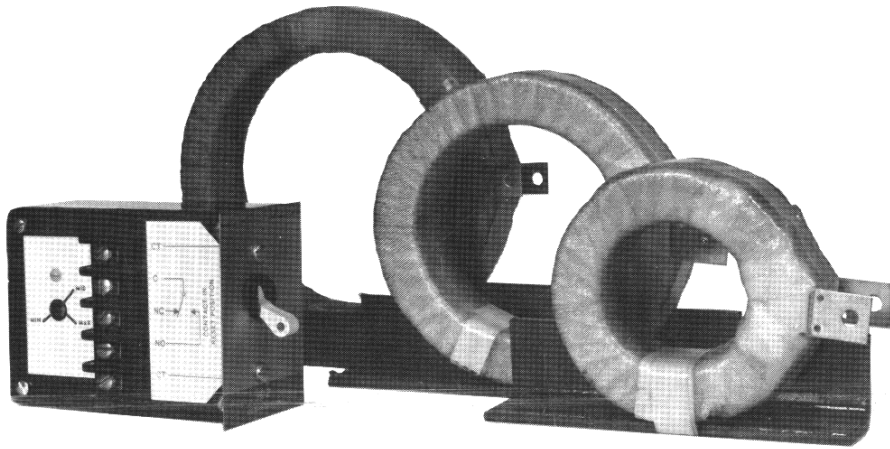


HIZTM

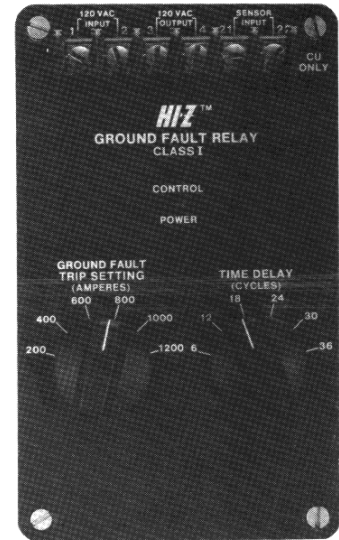
CORPORATION

PRODUCT GUIDE TO GROUND FAULT PROTECTION

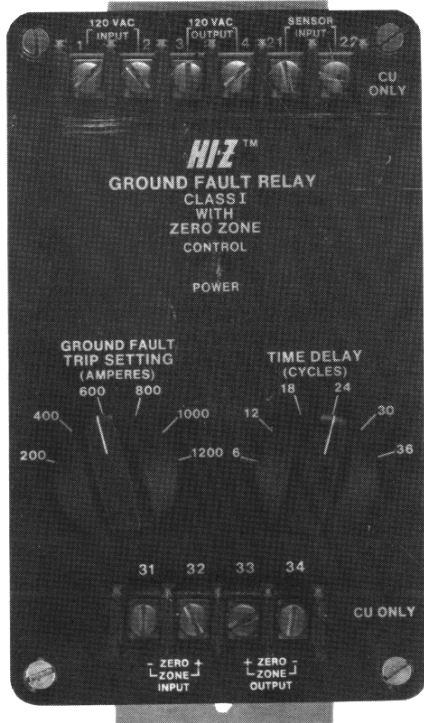




Series AZM Systems



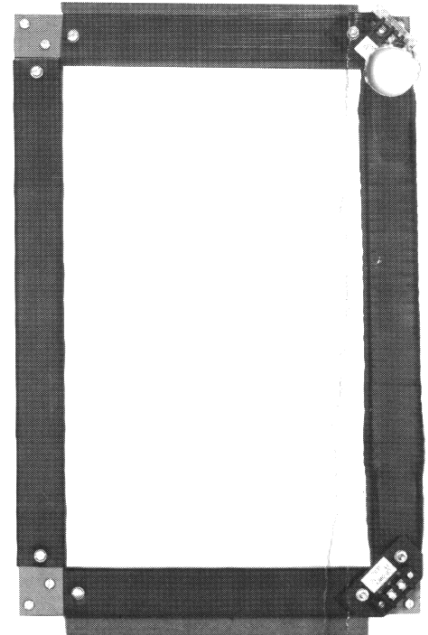
Series Z-2000 Relays



Series Z-2100 Relays



Series IZT Relays



Series ZBT Sensors

HI-Z™
CORPORATION

1130 W. ELIZABETH AVENUE
LINDEN, NEW JERSEY 07036
(201) 862-1946

~~201-862-1946~~ 925-5900
~~800-555-1515~~





GROUND FAULT DETECTORS

HI-Z Corporation's Ground Fault Protectors offer industry a complete line of ground fault sensing and protection equipment. From smallest to largest, all HI-Z products assure the user of the utmost in protection. Ground fault protection is mandatory under the National Electrical Code (see back cover).

A major cause of fires of electrical origin, the low current ground fault is one that is not protected by conventional circuit breakers and fuses. HI-Z Ground Fault Sensors operate in conjunction with normal interrupting devices in the presence of fault currents exceeding preset levels. Sharp, sure, and repeatable response time curves provide definite time delays, making coordination between units simple and accurate.

VERSATILITY

1. Rectangular sensors, used primarily for monitoring buss bars, are provided with a take-apart ability to facilitate their installation around installed buss bars.

The HI-Z split toroid design facilitates their installation around existing cables without disconnecting the conductors. The split toroid feature also facilitates installing new cables as it eliminates the necessity to pull the circuit conductors through the core.

2. The HI-Z toroid sensors are completely insulated and can be placed or mounted in any direction within an enclosure or cable tray. Rectangular sensors are supplied with insulating mounting brackets which allow surface mounting to bulkheads or to user supplied strut.
3. All electronic components are mounted securely to printed circuit boards and sealed to eliminate damage from vibration and contaminating atmospheres. Therefore, they may be mounted in the most convenient way in the installation.

HOW HI-Z GROUND FAULT PROTECTORS FUNCTION

The principle of operation of the HI-Z sensor when installed around all conductors (phase conductors and neutral, if used) is that under normal operating conditions all current flows through the load and returns through the circuit conductors. Any unbalanced load conditions will return through the neutral conductor. With a total net current through the sensor of zero, no current is generated in the sensor's coil. When phase-to-ground fault conditions occur, the fault current returns through the grounding system, not through the circuit conductors. In these cases the unbalanced current now passing through the sensor produces a current proportional to the fault current in the sensor coil. This current is passed through a burden resistor and is converted to a voltage proportional to fault current. The relay unit detects this voltage and when the fault exceeds the preset setting energizes the circuit interruption device.

QUICK GUIDE TO APPLICATIONS

Series AZM Systems

Motor starters, contactors, very fast, variable 5 to 40 amp trip settings, self-contained, self-powered, mechanical indication.

Series Z-2000 Relays

System oriented, 10 to 1200 amp trip ranges, main services, branches, drive for shunt trip disconnects, adjustable time delay, solid state latched output, UL listed.

Series Z-2100 Relays

System oriented, 10 to 1200 amp trip ranges, main services, branches, drive for shunt trip disconnects, adjustable time delay, Zero-Zone interlock coordinated, UL listed.

Series IZT Relays

System oriented, 10 to 1200 amps, main services, branches, self-testing, adjustable time delay, drive for shunt trip disconnects, positive status indication not dependant upon control power, UL listed.

Series ZBT Sensors

Wide range of standard sizes, minimal position sensitivity, compatible with all HI-Z Relays, built-in testing, split core for easy retrofit, UL listed.

HI-ZTM GROUND FAULT DETECTORS

PRICE SHEET
EFFECTIVE: 9/1/81

SPLIT GROUND FAULT SENSORS WITH MOUNTING BRACKETS

MODEL	WINDOW DIMENSIONS (INCHES)	TRIP RANGE (AMPERES)	LIST PRICE \$
ZT30	4-1/8 Round	10 - 1200	261.
ZBT0707	7 x 7	10 - 1200	243.
ZBT0710	7 x 10	10 - 1200	262.
ZBT0717	7 x 17	10 - 1200	344.
ZBT0724	7 x 24	10 - 1200	402.
ZBT0732	7 x 32	10 - 1200	482.
ZBT0736	7 x 36	10 - 1200	532.
ZBT0737	7 x 37	10 - 1200	547.
ZBT1010	10 x 10	10 - 1200	265.
ZBT1017	10 x 17	10 - 1200	348.
ZBT1024	10 x 24	10 - 1200	407.
ZBT1032	10 x 32	10 - 1200	485.
ZBT1036	10 x 36	10 - 1200	535.
ZBT1037	10 x 37	10 - 1200	550.

SENSOR RANGE MUST BE SPECIFIED - STANDARD RANGES

10/60
50/300
200/1200

ADJUSTABLE CURRENT RELAY AND ADJUSTABLE TIME DELAY			
	LIST PRICE \$		LIST PRICE \$
IZT	264.	AZB (Obsolete-not for new design)	132.
Z-2000	165.	ATPI (Obsolete-not for new design)	72.
Z-2010	165.		
Z-2100	182.		
Z-2110	182.		
TPC-Tamper Proof Cover	12.		

RELAY RANGE MUST BE SPECIFIED
STANDARD RANGES

10/60
50/300
200/1200

ADJUSTABLE TIME DELAYS (CYCLES)
ATD 6/36 IZT-TD-0/30
ATD 30/60 IZT-TD-0/60

PRICES: F.O.B. LINDEN, N. J.
TERMS: NET 30 DAYS



1130 W. ELIZABETH AVENUE
LINDEN, NEW JERSEY 07036
(201) 862-1945

(OVER)

MOTOR CONTROL CENTER USE			
MODEL	CORE I.D. (INCHES)	TRIP RANGES (AMPERES)	LIST PRICE \$
<u>AZM-XZM-ZM</u>	1-7/8		
11	1-7/8	5 - 40	152.
21	3	5 - 40	161.
31	4-1/8	5 - 40	170.

STANDARD ADJUSTABLE RELAY RANGE - 5 to 10 Amps
10 to 20 Amps
20 to 40 Amps

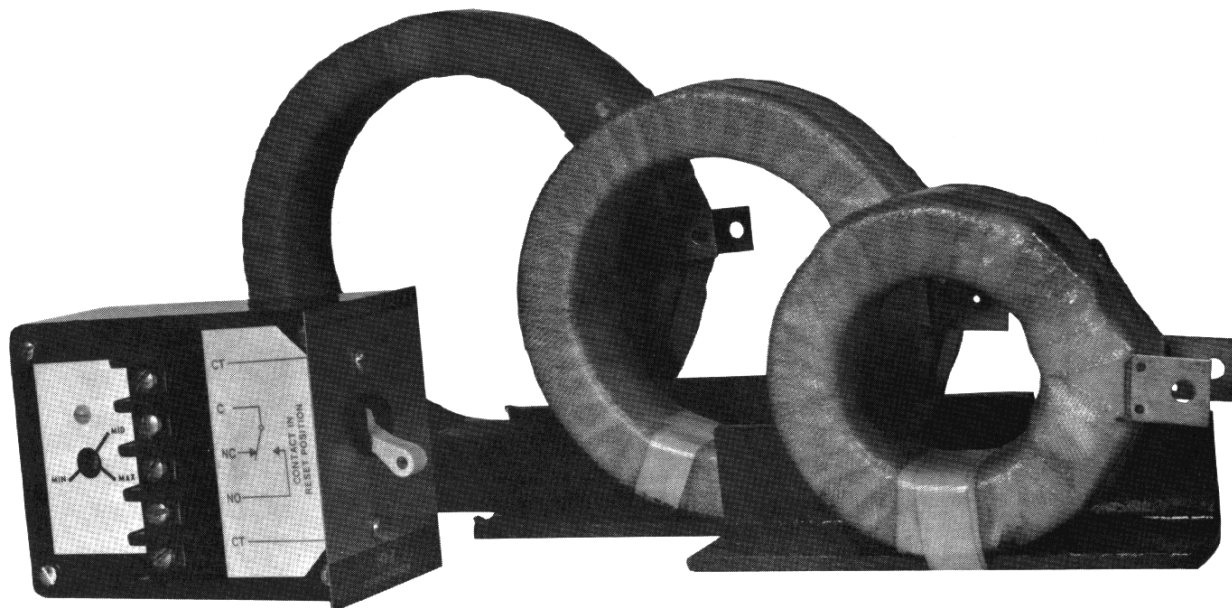
FIXED RANGE - ZM - 5 to 40 Amps
XZM - 8 to 40 Amps

PRICES: F.O.B. LINDEN, N. J.
TERMS : NET 30 DAYS

EFFECTIVE: 9/1/81

HI-Z

SERIES AZM GROUND FAULT SENSORS



APPLICATION

The HI-Z series AZM Ground Fault Sensors are designed for use with motor starters and contactors on grounded electrical distribution systems. Typical uses are an individual motor, lighting or heating circuit actuated by a contactor capable of interrupting the maximum ground fault current available. In such cases the normally closed contact of the relay module is placed in series with the contactor control power. Thus in the event of ground faults, the contactor will open. In other types of control room situations, the relay module is sometimes directly employed to drive annunciators, alarms, interlocks, etc.

A HI-Z series AZM system consists of two parts. The first, a sensing transformer on an integral insulating mounting bracket with a burden resistor permanently connected across its terminals. The sensing transformers are available in three sizes to accommodate almost any installation situation. The second part is a relay module in a panel mount case. The relay output is a set of dry form C contacts rated at 10 amps.

The AZM system is entirely self-contained and self-powered requiring only mechanical mounting and two interconnecting wires.

Model ZM series units are available in two configurations:

AZM units are continuously adjustable in three ranges from 5 to 40 amperes.

XZM units have a very fast reaction time and are factory preset at any trip point between 8 and 40 amperes.

RATINGS

Current detection range: 5-40A

Number of scale steps: 3

Output: Form 'C' contacts rated 10A at 125VAC.

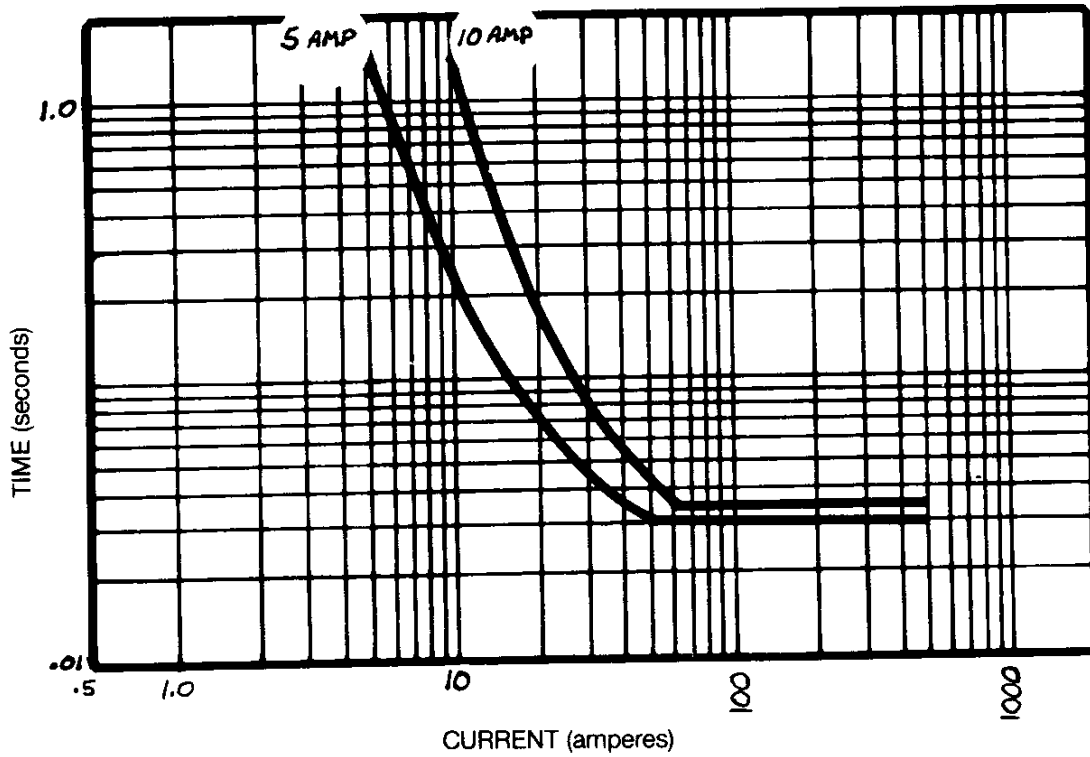
Power requirements: None

Operating temperature range: -20 to 60 °C

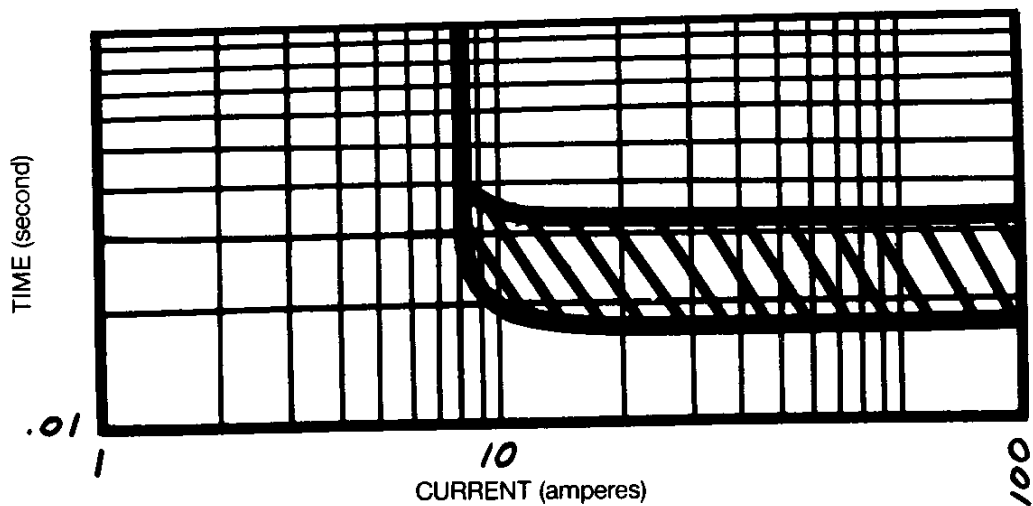
AZM SYSTEM SELECTION GUIDE

CURRENT TRIP RANGE (Amperes)	CORE SIZE (inside dia.) inches			MODEL NUMBER TO ORDER
	1 7/8"	3"	4 1/8"	
5-10	AZM-11/ 5-10	AZM-21/ 5-10	AZM-31/ 5-10	
10-20	AZM-11/10-20	AZM-21/10-20	AZM-31/10-20	
20-40	AZM-11/20-40	AZM-21/20-40	AZM-31/20-40	

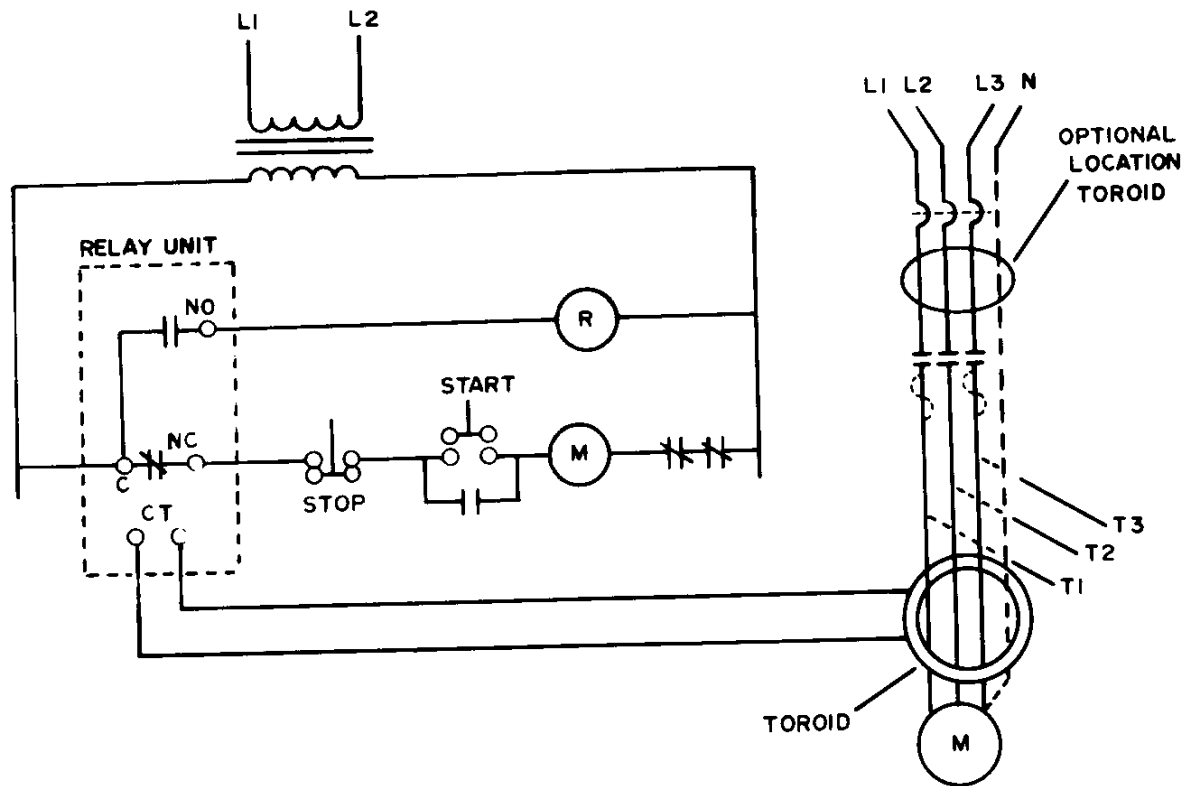
TYPICAL TRIP CURVES FOR HI-Z AZM SERIES RELAYS



TYPICAL TRIP CURVES FOR HI-Z XZM SERIES RELAYS (set at 8 amps)



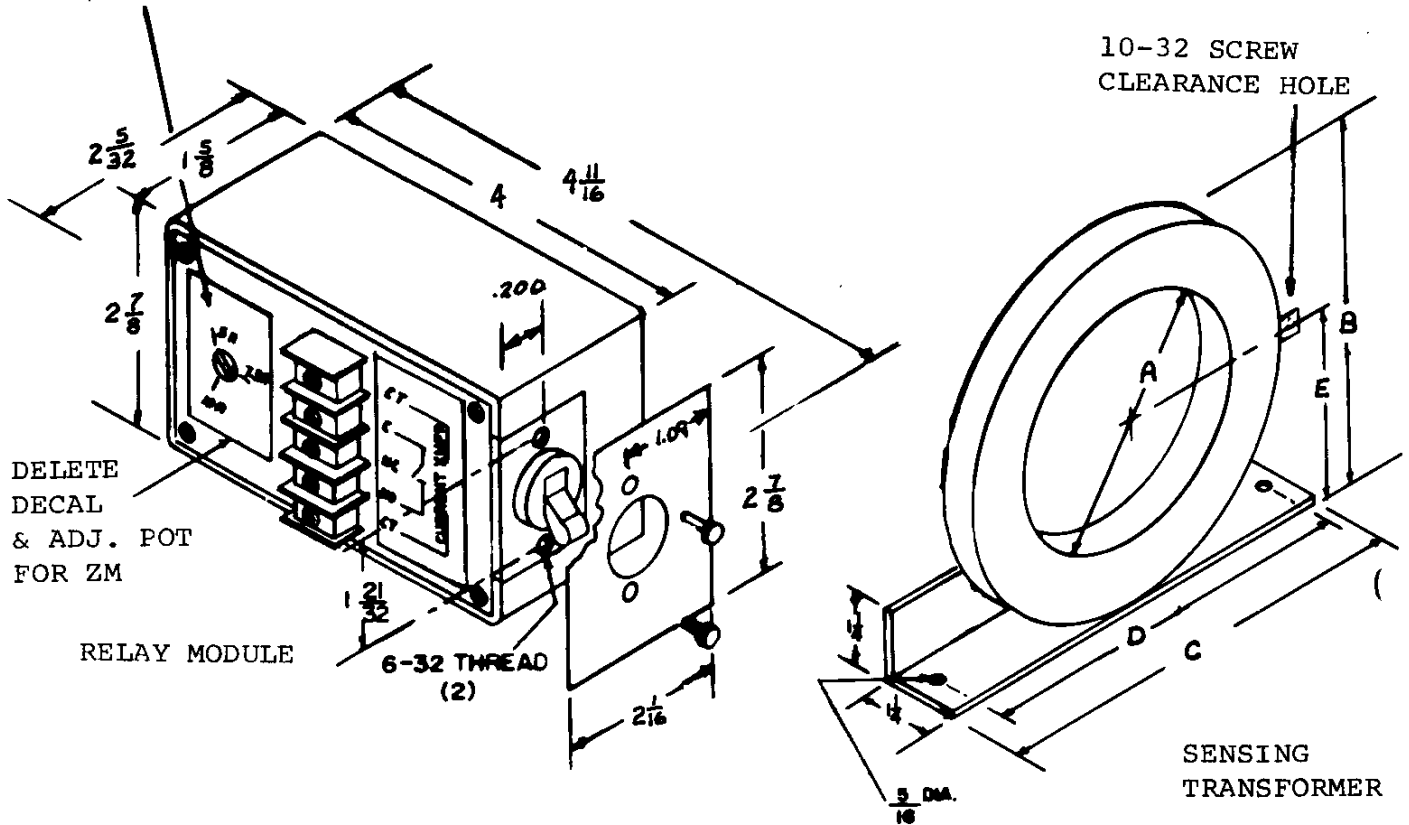
TYPICAL WIRING DIAGRAM
FOR
ZM OR AZM INSTALLATION



FOR SPECIFIC APPLICATION
INFORMATION, CONSULT

DIMENSIONAL INFORMATION FOR
HI-Z SERIES ZM GROUND FAULT PROTECTORS

CAN ALSO BE (10-20A)
OR (20-40A) RANGES



MODEL NUMBER	CORE I.D. "A"	"B" MAX	C	D	"E" MAX
AZM 11	1 7/8"	3 3/8"	4 3/4"	4 1/8"	2 1/8"
AZM 21	3"	4 1/2"	5 7/8"	5 1/4"	2 11/16"
AZM 31	4 1/8"	5 5/8"	7"	6 3/8"	3 1/4"

HI-Z

SERIES Z-2000 GROUND FAULT RELAY

INTRODUCTION

The HI-Z Series Z-2000 Ground Fault Relays are a family of reliable, solid state, system-oriented devices. This series incorporates all the standard HI-Z features, such as adjustable trip ranges from 10 through 1200 amperes and time delays adjustable from 6 through 60 cycles. The range of sensor sizes in this system permits almost any conductor configuration normally encountered to be easily monitored.



APPLICATION

Typical applications for these Ground Fault Systems are on main, feeder and branch circuits with the relay's input connected to the output of a sensor, with the relay output used to drive the shunt trip mechanism of the appropriate disconnecting means.

A HI-Z Series Z-2000 system is composed of two primary components, a sensor (sensing transformer) and a relay module. The sensors are available in two basic configurations that cover all applications. The first is the Z-30T split toroid. This sensor is often used around cable bundles or conduits due to its compact round shape. Second, and most common, is the ZBT series. Available in various sizes, these "window-type" sensors are used primarily for buss-bar power systems. (See Sensor Data Sheets)

The Series Z-2000 relay is a powered, electronic device which receives a signal voltage from one of the HI-Z sensors. This signal is proportional to the current error (ground fault current) in the protected circuit. The relay monitors this voltage and when it exceeds the current pick-up setting, the relay fires after a time delay as selected by the time delay range switch. This is calibrated in cycles of a 60 Hz line. A single fault of duration less than selected for the delay will not cause a false fire. Recurring, "noisy" faults will be accumulated and will result in an output from the relay. The output is a solid state, latching device which, once fired, will remain on until reset. Reset is accomplished by opening the load circuit or removing control power (See Application Notes). The output will easily handle the surges required by large shunt trip coils, but will not trip the most sensitive electronic trigger or flux transfer device.

SERIES Z-2000 RATINGS

CONTROL VOLTAGE:

48 to 120 VAC 50-60 Hz at 2 amperes

OUTPUT VOLTAGE:

Control Voltage minus 1.4 vrms

OUTPUT CURRENT:

2 amperes continuous
20 amperes for 0.25 sec.
40 amperes for 0.033 sec.
0.5 ma required to latch

CURRENT TRIP RANGES:

10/60 = 10 to 60 amps in 10 amp steps
50/300 = 50 to 300 amps in 50 amp steps
200/1200 = 200 to 1200 amps in 200 amp steps

WITHSTAND FAULT CURRENT:

400KA rms symmetrical for 1 second

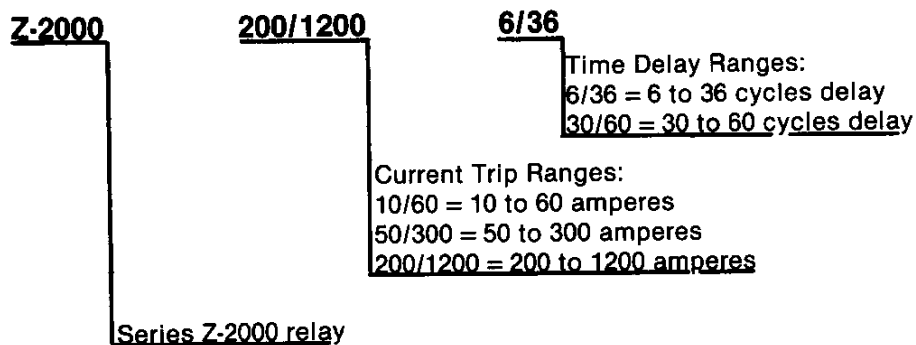
TIME DELAY RANGES:

6/36 = 6 to 36 cycles in 6 cycles steps (60 Hz)
30/60 = 30 to 60 cycles in 6 cycle steps (60 Hz)

For special ranges, consult factory.

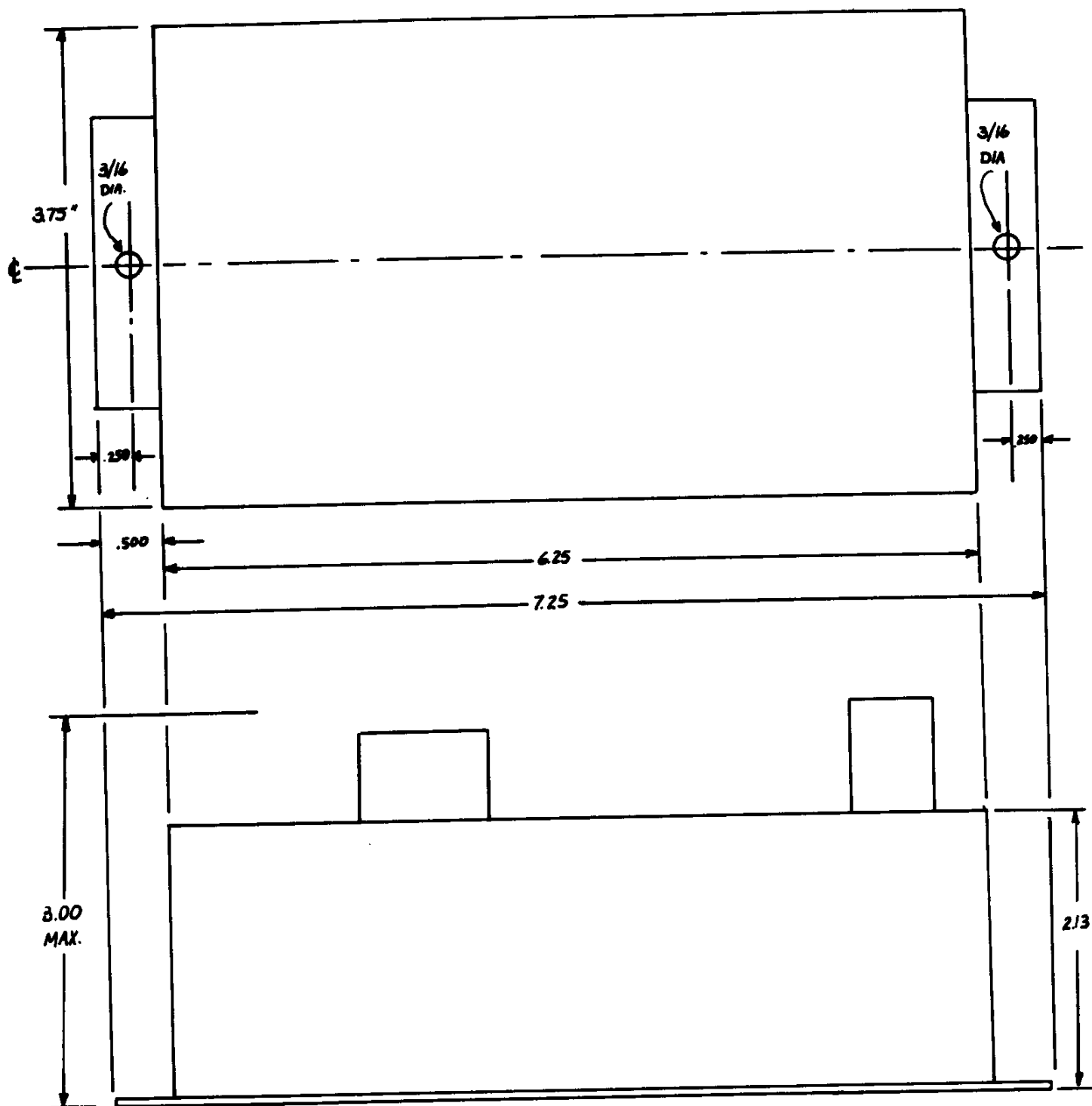
SERIES Z-2000 RELAY ORDERING INFORMATION

When specifying, use the following format:

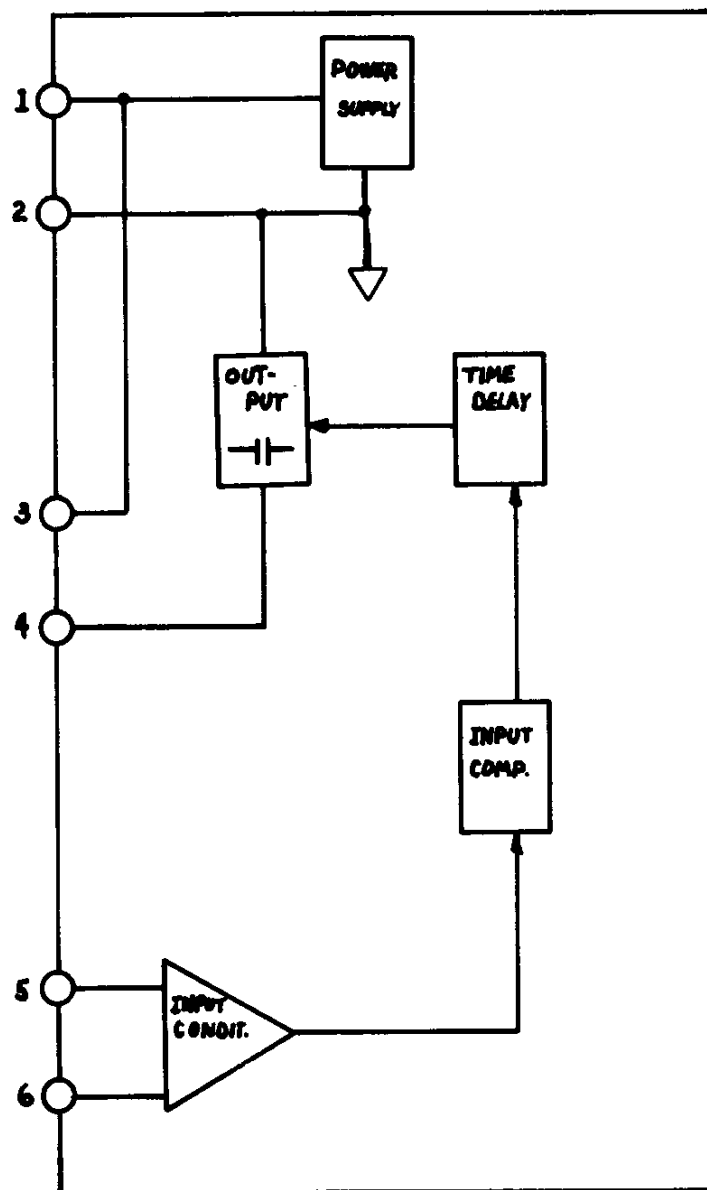


To order sensors, see "Sensor Data" sheet.

Dimensional Information For HI-Z Series Z-2000 Relay

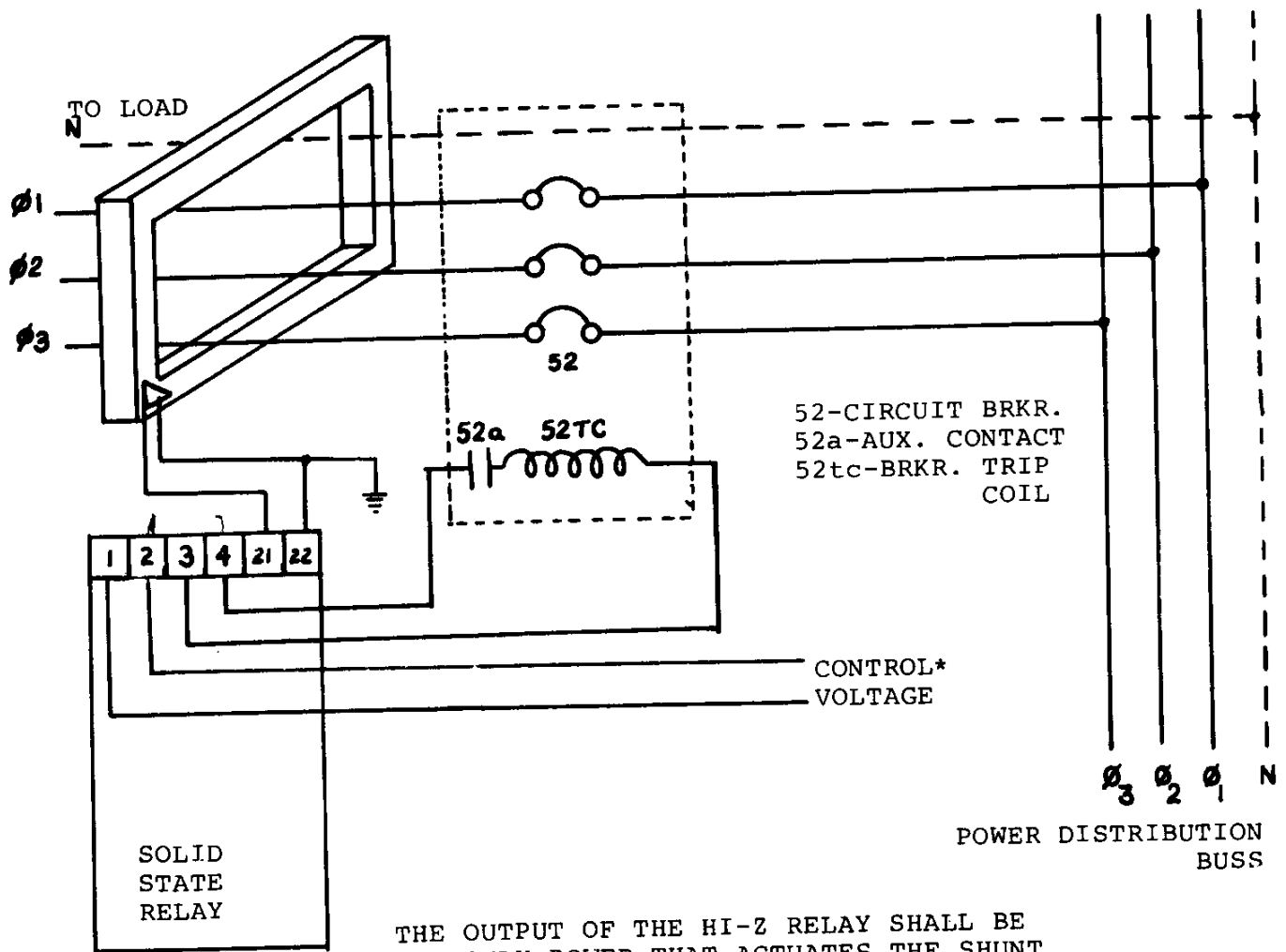


APPLICATION NOTE
2000-1



Z-2000 RELAY BLOCK DIAGRAM

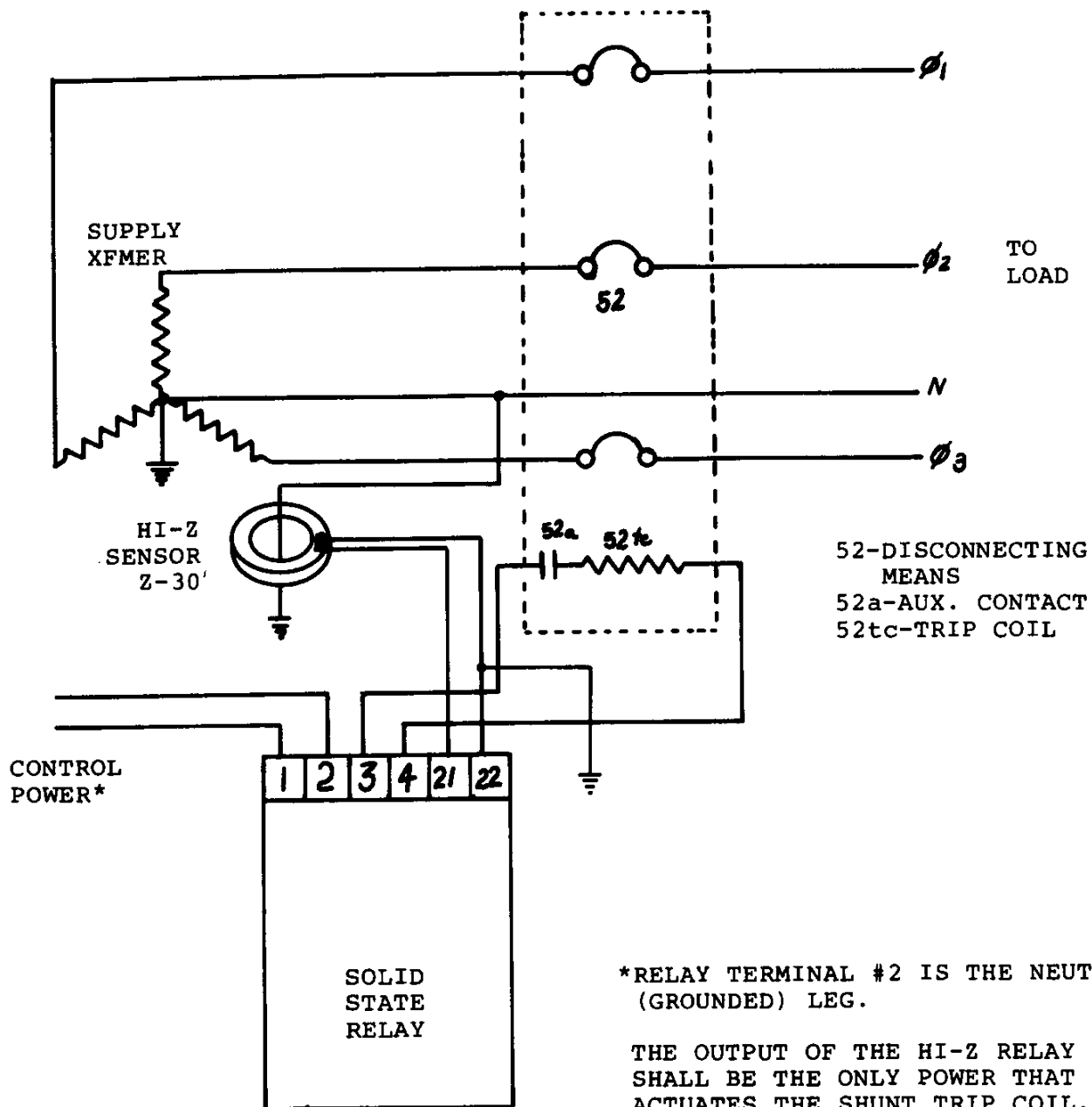
APPLICATION NOTE 2000-2



THE OUTPUT OF THE HI-Z RELAY SHALL BE THE ONLY POWER THAT ACTUATES THE SHUNT TRIP COIL. IF PARALLEL ENERGIZATION IS REQUIRED, A BUFFER RELAY SHOULD BE USED.
*RELAY TERMINAL #2 IS THE NEUTRAL LEG (GROUNDED).
FOR SPECIFIC APPLICATION INFORMATION, CONSULT THE FACTORY.

STANDARD HOOK-UP FOR A.C. SHUNT TRIP COILS

APPLICATION NOTE 2000-3



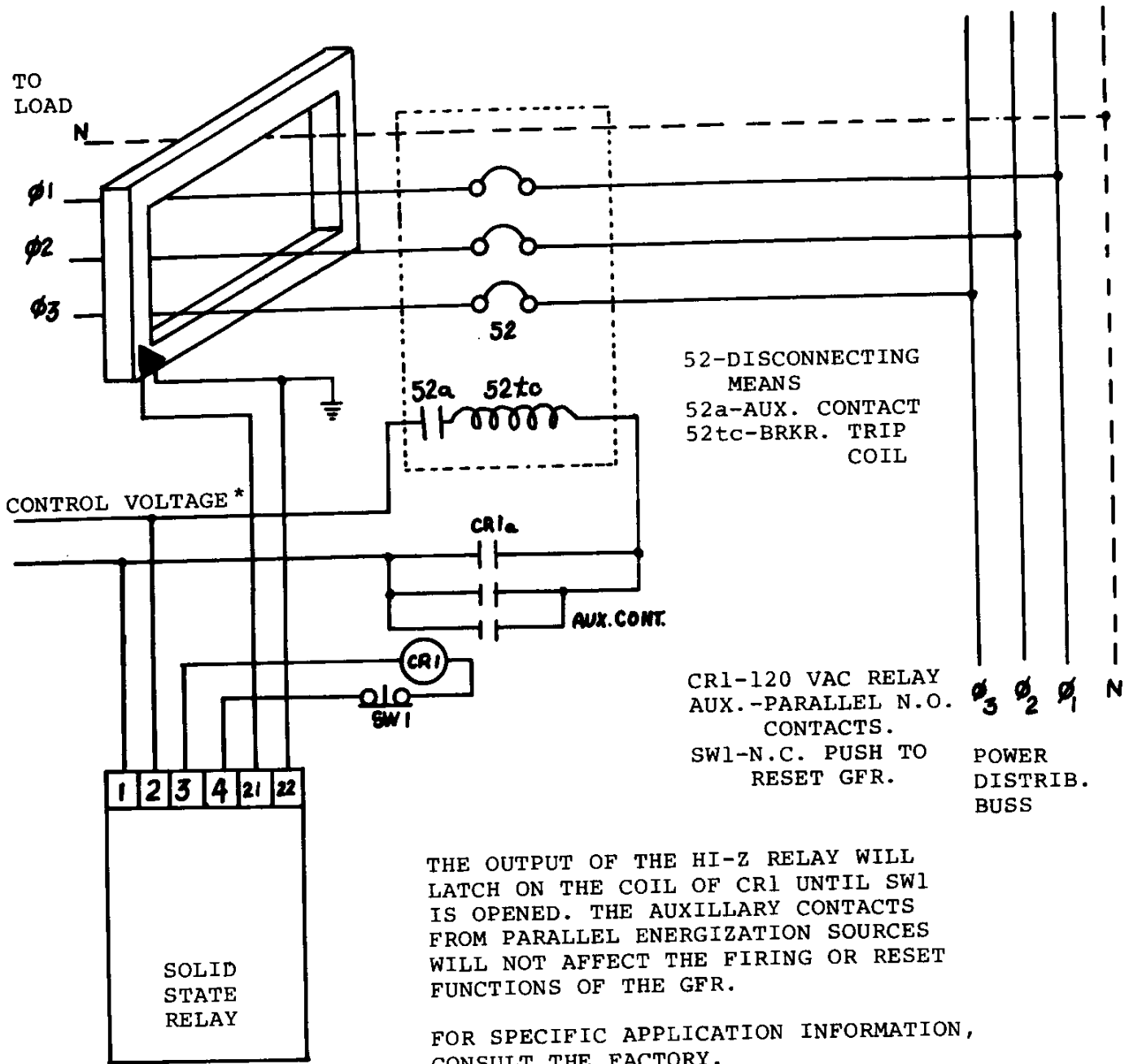
*RELAY TERMINAL #2 IS THE NEUTRAL
(GROUNDED) LEG.

THE OUTPUT OF THE HI-Z RELAY
SHALL BE THE ONLY POWER THAT
ACTUATES THE SHUNT TRIP COIL.
IF PARALLEL ENERGIZATION IS
REQUIRED, A BUFFER RELAY MUST
BE USED.

FOR SPECIFIC APPLICATION
INFORMATION, CONSULT THE
FACTORY.

GROUND STRAP HOOK-UP FOR A.C. SHUNT TRIP COILS

APPLICATION NOTE 2000-4



STANDARD HOOK-UP FOR INTERPOSING RELAYS

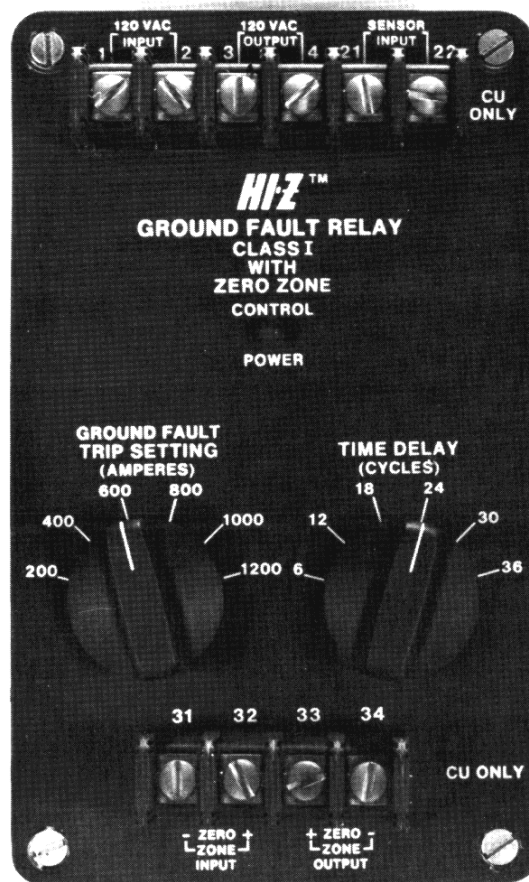
HI-Z

SERIES Z-2100 GROUND FAULT RELAY

INTRODUCTION

The HI-Z Series Z-2100 Ground Fault Relays are a family of reliable, solid state, system-oriented devices. This series incorporates all the standard HI-Z features, such as adjustable trip ranges from 10 through 1200 amperes and time delays adjustable from 6 through 60 cycles. The range of sensor sizes in this system permits almost any conductor configuration normally encountered to be easily monitored.

Featured in this relay is Zero-Zone. This is a zone-selective interlocking method whereby minimum time delays are implemented throughout the system. Then, in the case of a fault, the least amount of time is wasted in clearing the offending branch.



APPLICATION

Typical applications for these Ground Fault Systems are on main, feeder and branch circuits with the relay's input connected to the output of a sensor, with the relay output used to drive the shunt trip mechanism of the appropriate disconnecting means.

A HI-Z Series Z-2100 system is composed of two primary components, a sensor (sensing transformer) and a relay module. The sensors are available in two basic configurations that cover all applications. The first is the Z-30T split toroid. This sensor is often used around cable bundles or conduits due to its compact round shape. Second, and most common, is the ZBT series. Available in various sizes, these "window-type" sensors are used primarily for buss-bar power systems. (See Sensor Data Sheets)

The Series Z-2100 relay is a powered, electronic device which receives a signal voltage from one of the HI-Z sensors. This signal is proportional to the current error (ground fault current) in the protected circuit. The relay monitors this voltage and when it exceeds the current pick-up setting, the relay fires. A fault occurring on a line will result in an output in under one cycle from the unit monitoring that circuit. Other upstream relays will receive a signal from the relay on the faulted zone and will revert to the timing preset on their delay switches. Should the fault not clear immediately, the upstream relays will take their turn in time sequence. With this type of coordination, minimal delays need be set on any unit since all units are in an "instantaneous" stand-by-mode. The output is a solid state, latching device which, once fired, will remain on until reset. Reset is accomplished by opening the load circuit or removing control power (See Application Notes). The output will easily handle the surges required by large shunt trip coils, but will not trip the most sensitive electronic trigger or flux transfer device.

SERIES Z-2100 RATINGS

CONTROL VOLTAGE:

48 to 120 VAC 50-60 Hz at 2 amperes

OUTPUT VOLTAGE:

Control Voltage minus 1.4 vrms

OUTPUT CURRENT:

2 amperes continuous
20 amperes for 0.25 sec.
40 amperes for 0.033 sec.
0.5 ma required to latch

CURRENT TRIP RANGES:

10/60 = 10 to 60 amps in 10 amp steps
50/300 = 50 to 300 amps in 50 amp steps
200/1200 = 200 to 1200 amps in 200 amp steps

WITHSTAND FAULT CURRENT:

400KA rms symmetrical for 1 second

TIME DELAY RANGES:

6/36 = 6 to 36 cycles in 6 cycles steps (60 Hz)
30/60 = 30 to 60 cycles in 6 cycle steps (60 Hz)

ZERO-ZONE INPUT:

Standby-0.0 VDC
Delay-1 to 6VDC

ZERO-ZONE OUTPUT:

Standby-0.0 VDC
Delay-4.5-6 VDC

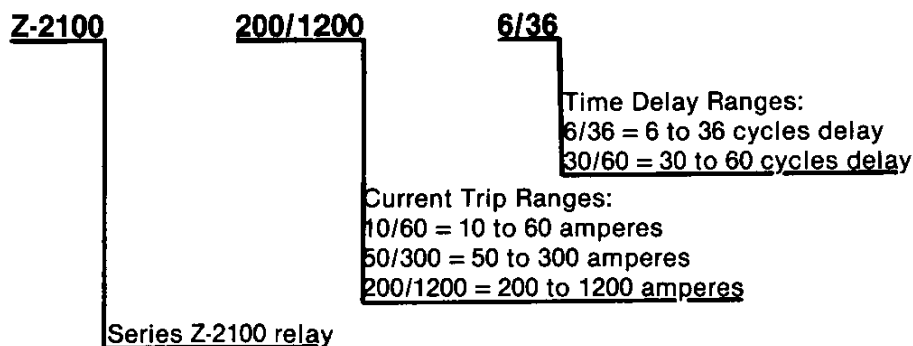
ZERO-ZONE FANOUT:

10 levels minimum

For special ranges, consult factory.

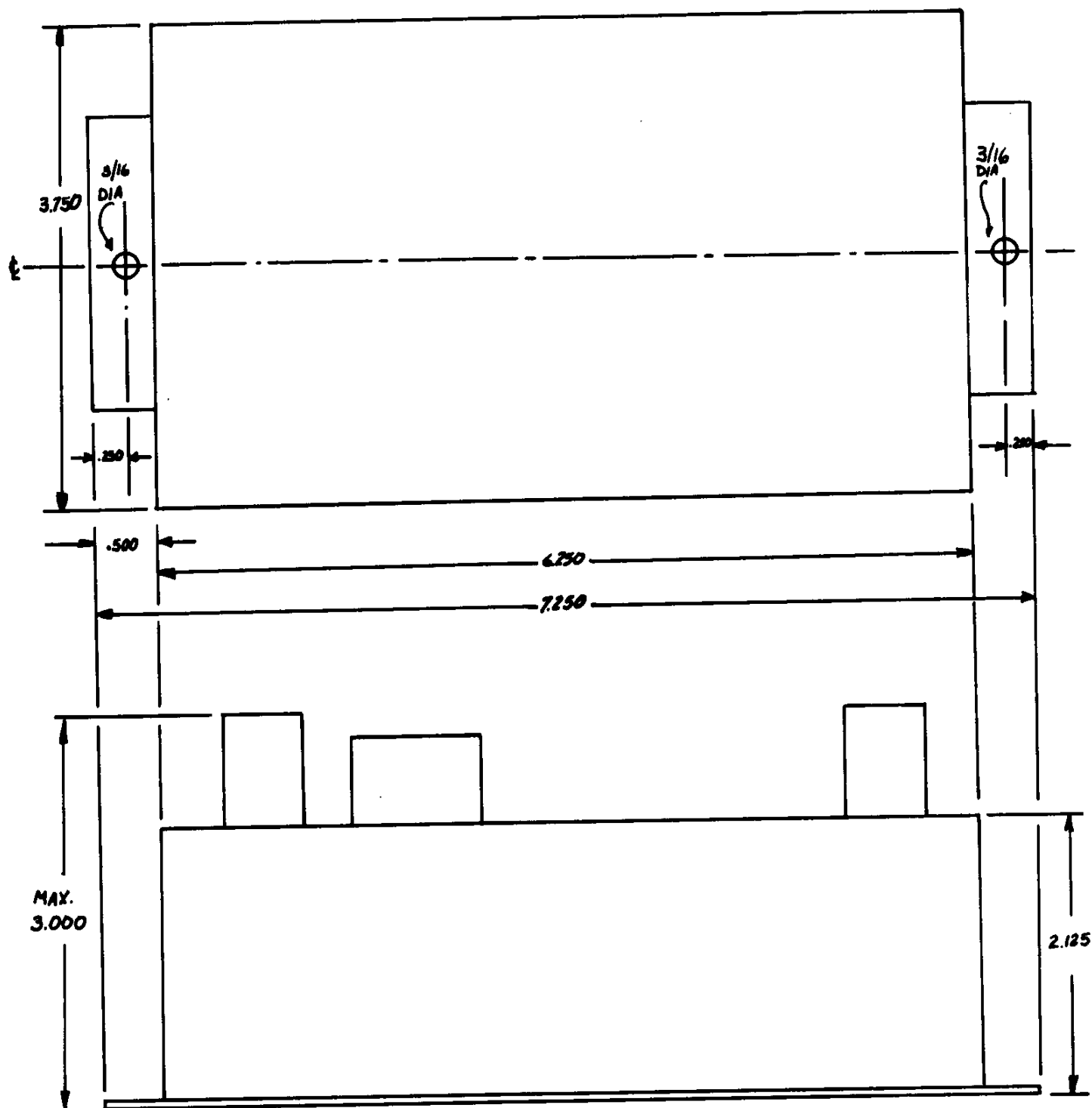
SERIES Z-2100 RELAY ORDERING INFORMATION

When specifying, use the following format:

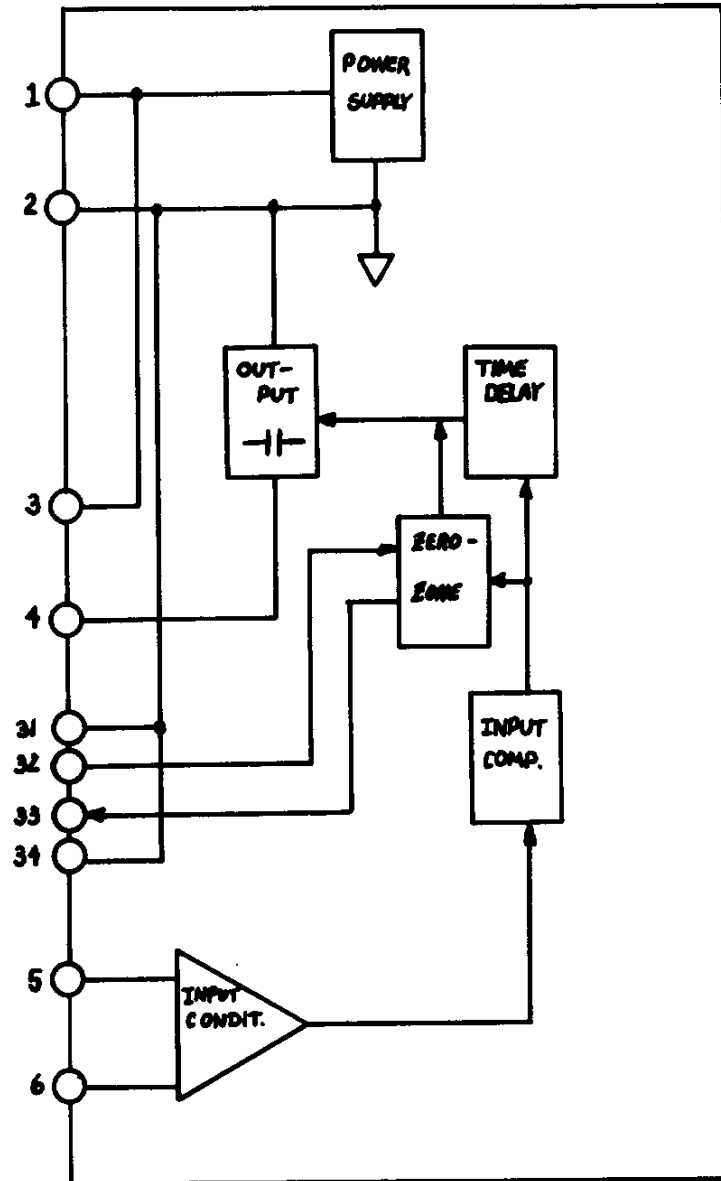


To order sensors, see "Sensor Data" sheet.

Dimensional Information For HI-Z Series Z-2100 Relay



APPLICATION NOTE
2100-1



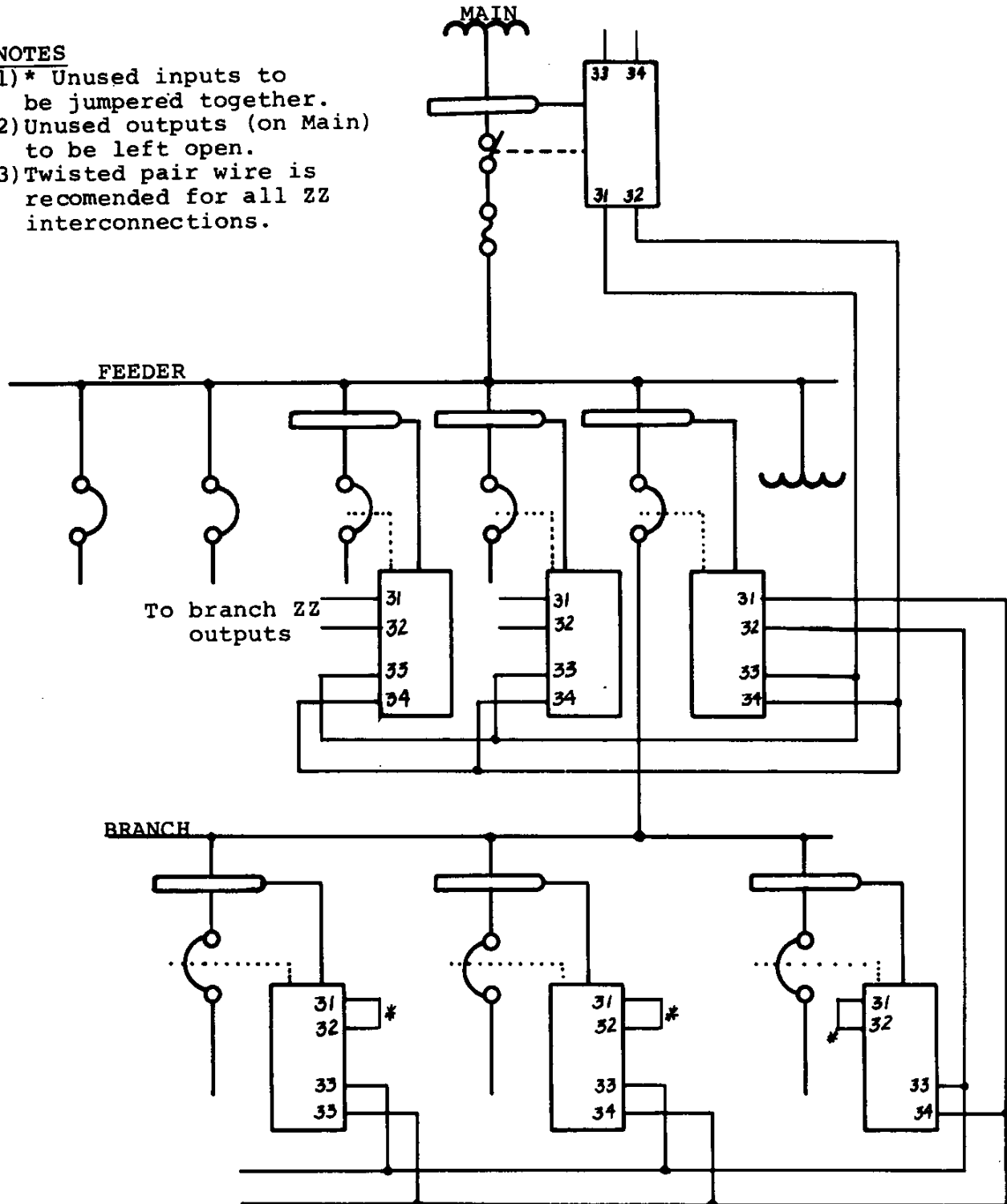
Z-2100 RELAY BLOCK DIAGRAM

APPLICATION NOTE Z-2100-2
UTILIZING ZERO-ZONE

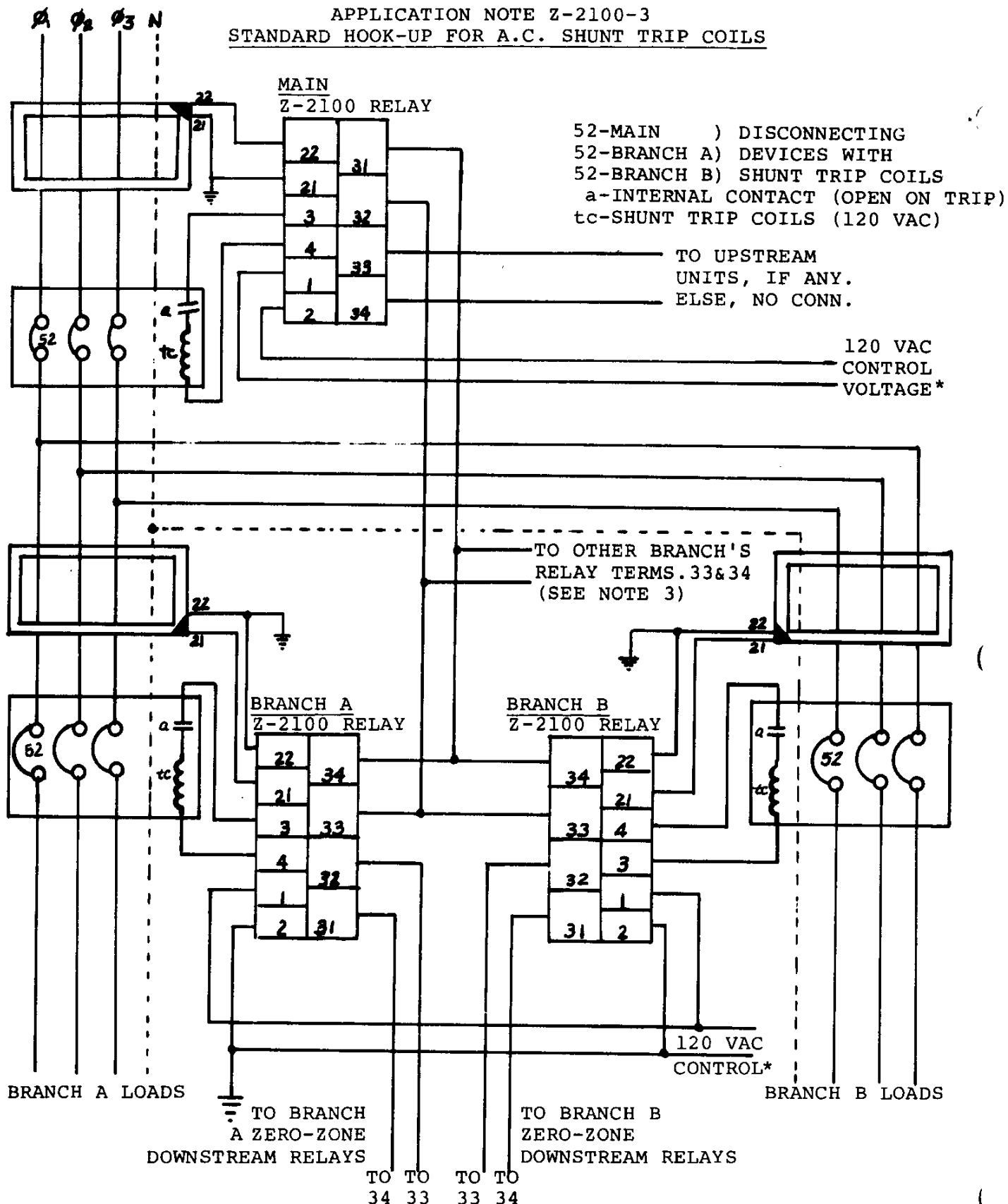
All the ZERO-ZONE outputs of GFRs within a branch level will be paralled together and fed to the ZERO-ZONE input of the branch feeder's GFR. The feeders' ZERO-ZONE outputs in turn are paralleled together to the main GFR ZERO-ZONE input. The following diagram shows a three level typical system.

NOTES

- 1)* Unused inputs to be jumpered together.
- 2) Unused outputs (on Main) to be left open.
- 3) Twisted pair wire is recommended for all ZZ interconnections.



APPLICATION NOTE Z-2100-3
STANDARD HOOK-UP FOR A.C. SHUNT TRIP COILS



- NOTES: 1) BOTTOM-MOST UNITS SHOULD HAVE TERMS. 31 & 32 JUMPERED.
2) TERMINALS 2, 31, 34 ARE INTERNALLY CONNECTED.
3) ADDITIONAL BRANCHES AT A GIVEN LEVEL ARE PARALLELED TOGETHER ON THEIR ZERO-ZONE OUTPUTS (TERMS. 33 & 34).

* RELAY TERMINAL #2 IS THE NEUTRAL (GROUNDED) LEG.

HI-Z SERIES IZT GROUND FAULT SENSOR

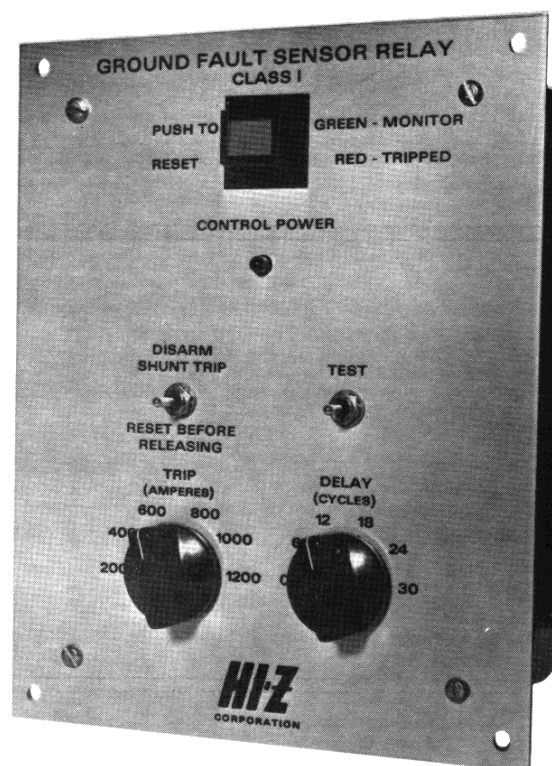
APPLICATION

The HI-Z Series IZT Ground Fault Sensors are designed to combine the functions of several models described elsewhere in the catalog with a complete, self-diagnostic test. Of major interest is the constant visual indication as to status without concern for power loss, etc. With trip ranges from 50 to 1200 amperes and many sizes of sensing transformers, virtually any fault protection usage is covered. Typical applications are on main, feeder and branch services with trip coordination determined by the built-in zero to 30 cycle time delay. With the sensor placed around the conductors and the relay module mounted in the control panel, the unit's output is used to activate the shunt trip coil of the appropriate circuit breaker. One method of sensing involves placing **only** the ground conductor through the sensor, thus monitoring directly any ground system currents. In other cases all the power and (if used) neutral conductors to be monitored are passed through the sensing transformer. Then any imbalance in the current loop (a ground fault) will be reacted to as per settings.

A HI-Z Series IZT system is composed of two primary components, a sensing transformer and a control/relay module. The sensors are available in two basic configurations that cover all applications. The first is the Z-30 T split torroid. This unit features a split core allowing it to be taken apart and installed without disrupting existing conductors. This coil is often used around cable bundles or conduits due to its compact round size. Second in the sensor family is the ZBT series. Available in various sizes, these "window type" sensing transformers are used primarily for buss bar power systems. In these cases, the need for a rectangular sensor of some size is easily satisfied by the many sizes in the ZB group. Installation in new and retrofit applications is aided by the ability to split the core diagonally and then reassemble it around the undisrupted conductors.

Unique to the HI-Z Series IZT sensors is the addition of a second winding on the sensor which, when driven from the test panel, causes the sensor to "see" a fault condition and thus be exercised. Front panel controls allow the test to include just the sensor and relay with no service interruption, or to trigger a complete system action resulting in the activation of the breaker. A visual indication is present on the relay front panel which will show, without regard to power loss, positive indication as to the state of the output. Once tripped, reset is accomplished only by pressing the reset/indicator button once the fault condition has been cleared.

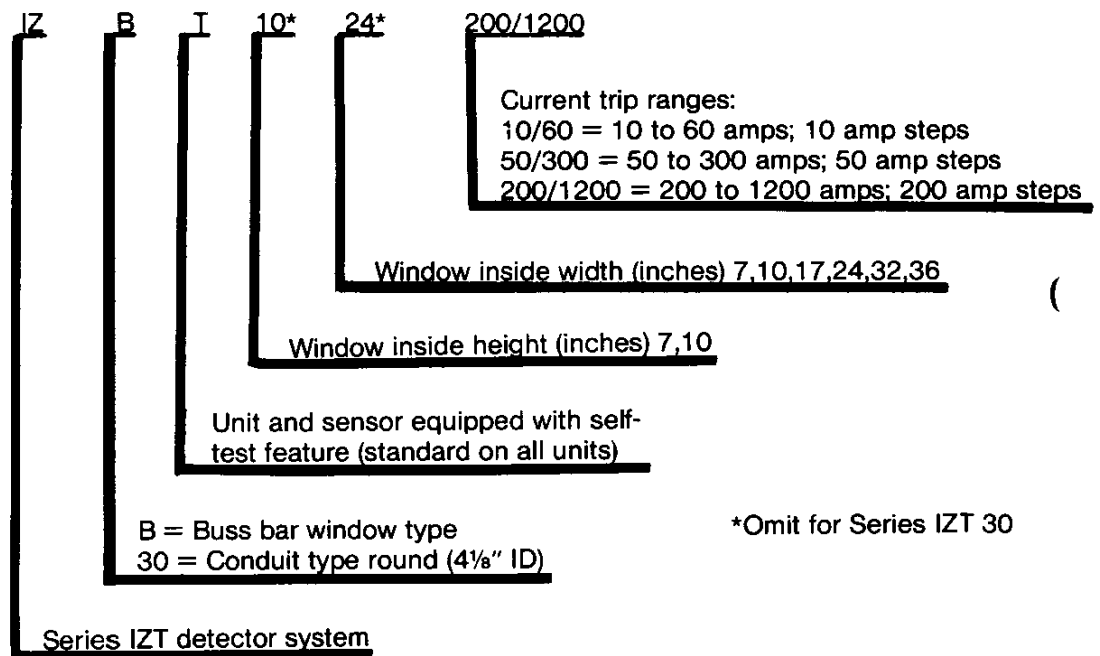
Together these functions and features make up the most complete line of self-diagnostic fault detection available.



UL LISTED

SERIES IZT ORDERING INFORMATION

When specifying an IZT series system, use the following format:

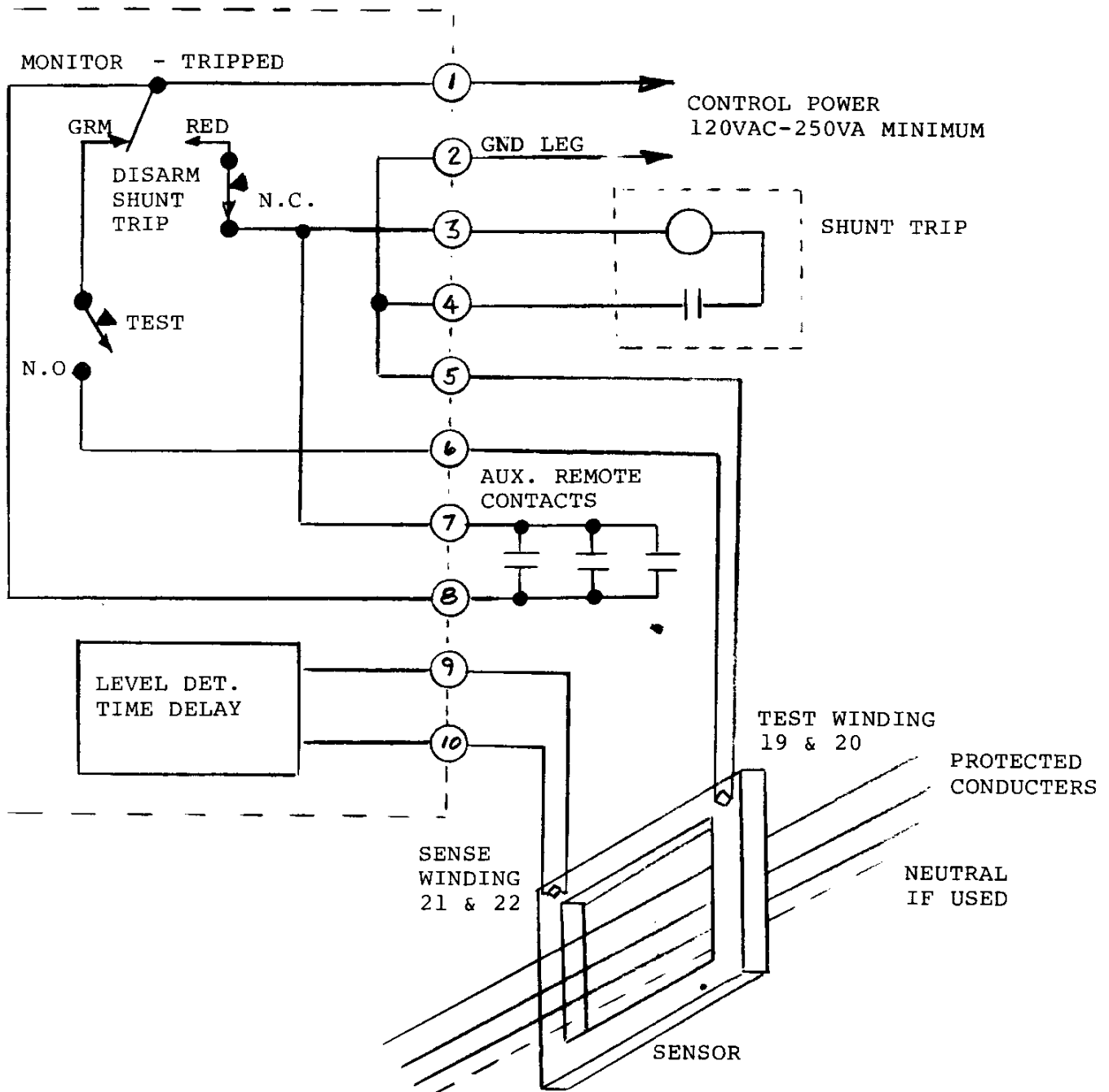


All IZT units are supplied with adjustable time delays of 0 to 30 or 0, 36 to 60, all in 6 cycle increments.

For special ranges, consult factory.

IZT TYPICAL WIRING DIAGRAM

IZT RELAY/TD



HI-Z™

FIGURE 11

FOR SPECIFIC APPLICATION
INFORMATION CONSULT THE
FACTORY

HI-Z SERIES ZBT SENSORS

INTRODUCTION

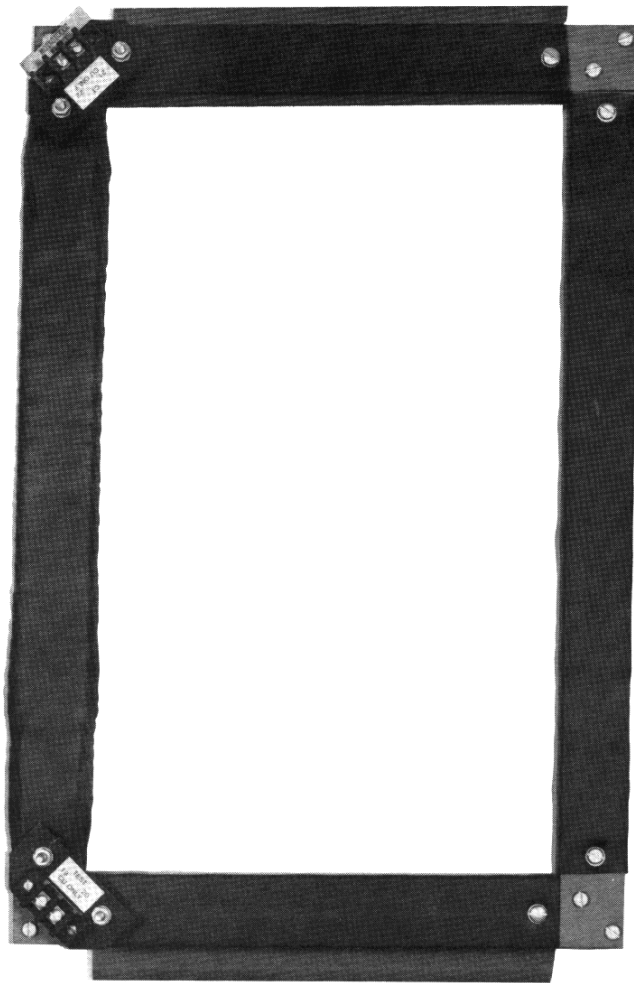
HI-Z sensors are simply dedicated current transformers. Their purpose is to sense the total current flowing in the conductors passing through them. They come in a variety of widths and lengths and cover all the ranges offered in any of the HI-Z Ground Fault Relays.

APPLICATION

The ZBT is the most used of the HI-Z sensors. Typical uses are on main, feeder and branch circuits. Available in various sizes these "window-type" sensors are used primarily for buss-bar systems. In these cases, the need for a rectangular sensor of some size is easily satisfied by the many sizes in this group. Installation in new and retrofit applications is simplified by the ability to split the core and reassemble it around the undisturbed conductors.

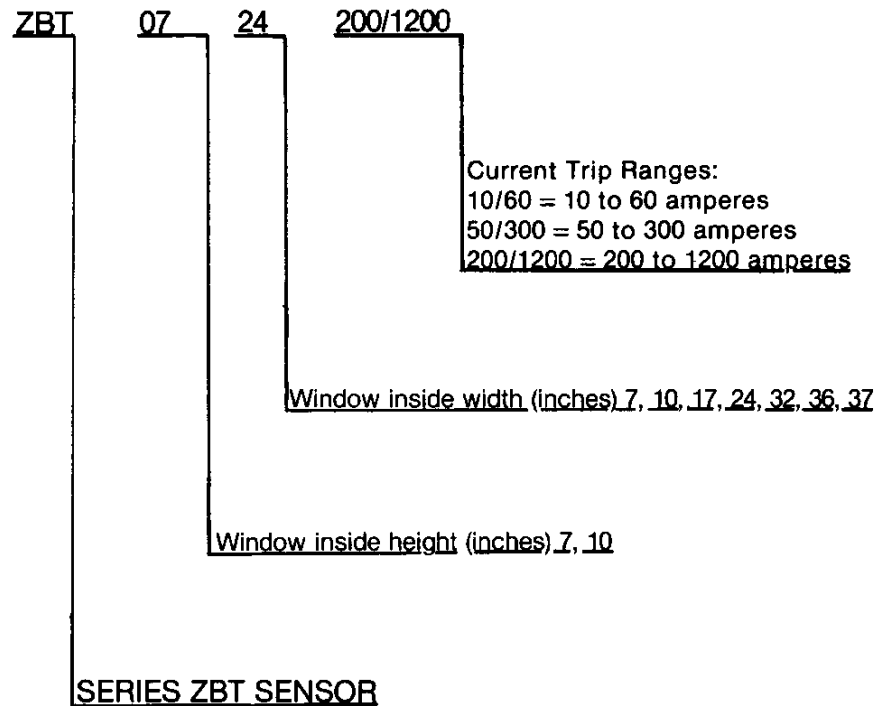
Once in use, the sensor will provide an output signal to the relay. Under normal conditions, all the current flowing in a conductor will return through some combination of the others, thus summing to zero the total current. Any ground fault creates an error in the summation. This total ground fault current appears as primary current to the sensor. The secondary winding and burden resistor then yield an output voltage in proportion to the ground fault current. Actual current trip range in HI-Z units is a function only of the sensor secondary/burden combination. Any HI-Z relay will correctly function with any ZBT sensor requiring only changes in trip range legends on the relay.

ZBT sensors also have an additional winding which, when driven with 120 VAC, causes the sensor to "see" a simulated fault condition in excess of it's highest range. This permits the complete HI-Z Ground Fault System to be exercised.



SERIES ZBT ORDERING INFORMATION

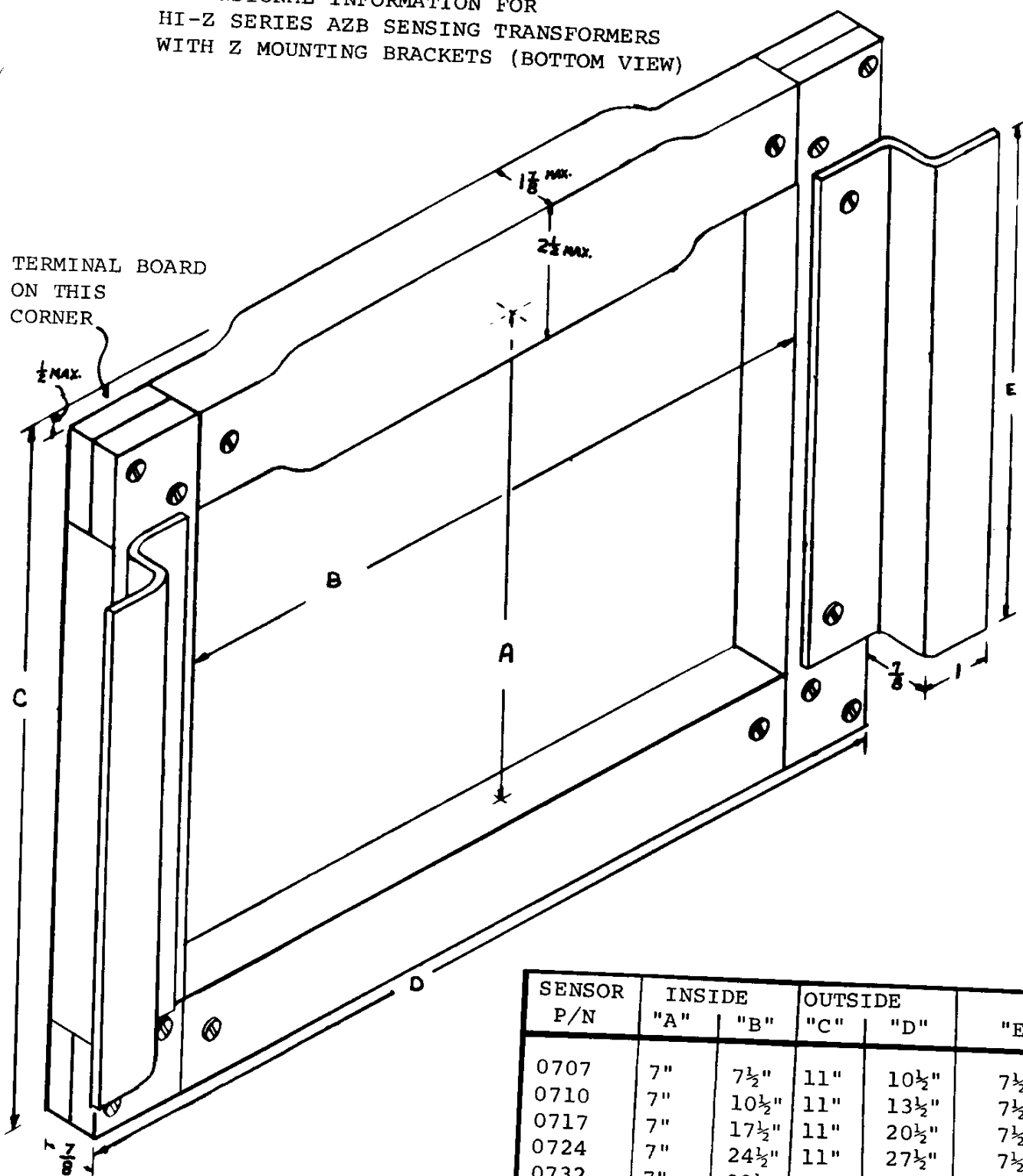
When specifying, use the following format:



WITHSTAND FAULT CURRENT:
400KA rms symmetrical for 1 second

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DIMENSIONAL INFORMATION FOR
HI-Z SERIES AZB SENSING TRANSFORMERS
WITH Z MOUNTING BRACKETS (BOTTOM VIEW)



SENSOR P/N	INSIDE		OUTSIDE		
	"A"	"B"	"C"	"D"	
0707	7"	7 $\frac{1}{2}$ "	11"	10 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "
0710	7"	10 $\frac{1}{2}$ "	11"	13 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "
0717	7"	17 $\frac{1}{2}$ "	11"	20 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "
0724	7"	24 $\frac{1}{2}$ "	11"	27 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "
0732	7"	32 $\frac{1}{2}$ "	11"	35 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "
0736	7"	36 $\frac{1}{2}$ "	11"	39 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "
1010	10"	10 $\frac{1}{2}$ "	14"	13 $\frac{1}{2}$ "	10 $\frac{1}{2}$ "
1017	10"	17 $\frac{1}{2}$ "	14"	20 $\frac{1}{2}$ "	10 $\frac{1}{2}$ "
1024	10"	24 $\frac{1}{2}$ "	14"	27 $\frac{1}{2}$ "	10 $\frac{1}{2}$ "
1032	10"	32 $\frac{1}{2}$ "	14"	35 $\frac{1}{2}$ "	10 $\frac{1}{2}$ "
1036	10"	36 $\frac{1}{2}$ "	14"	39 $\frac{1}{2}$ "	10 $\frac{1}{2}$ "

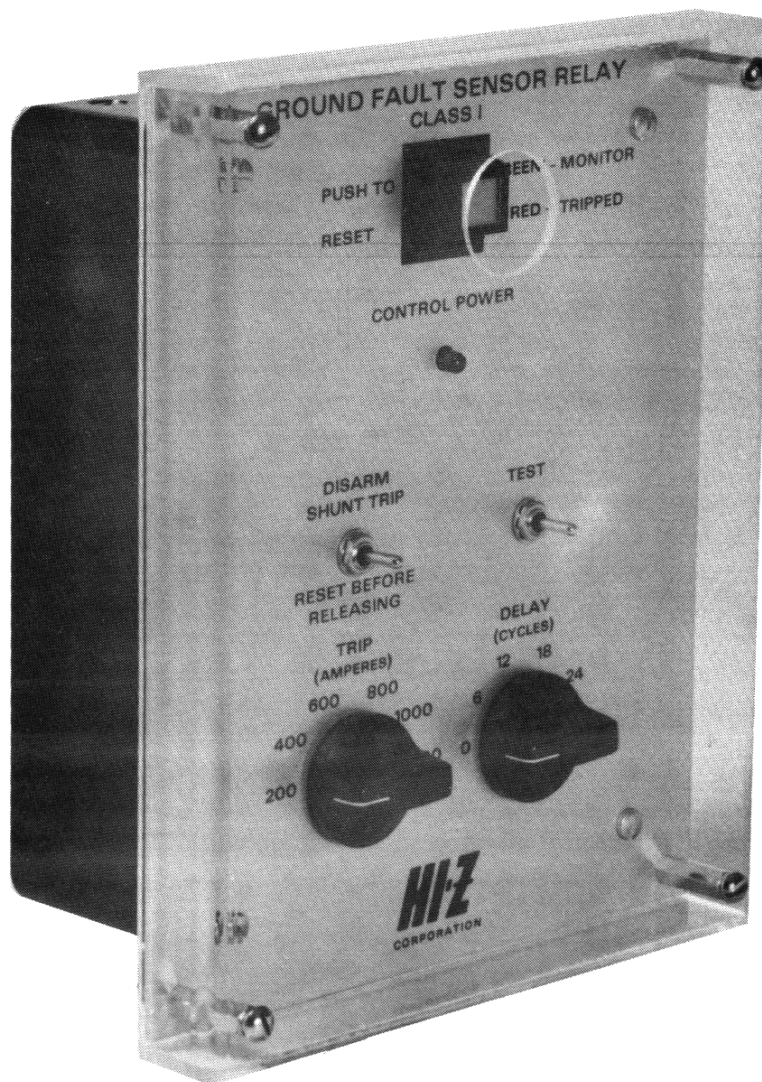
HI-Z

MODEL TPC TAMPER PROOF COVER FOR HI-Z MODEL IZT RELAY

APPLICATION

This clear, plastic cover completely surrounds the face panel and all controls of an IZT Series relay thus preventing unauthorized or accidental activation of the test functions or changing of trip or time delay settings. In place, it offers an unobstructed visual check of settings and status while keeping unauthorized fingers out. The reset function is available through the cover. Removal for testing is simple and quick, requiring only a standard screwdriver.

This option is recommended for use where switchgear is in a high-traffic area or where accidental tripping of the ground fault system could produce hazardous power outages. It is a simple, inexpensive method of limiting access to critical controls in your power system. All required hardware is shipped with the cover.



OBSOLETE. . NOT FOR NEW DESIGN

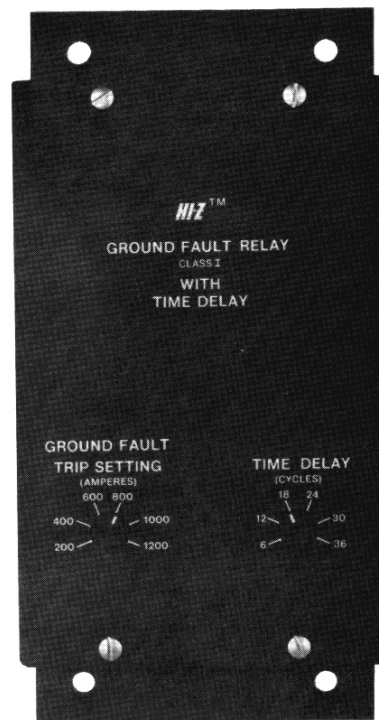
HI-Z SERIES AZ GROUND FAULT SENSORS

APPLICATION

The HI-Z series AZ Ground Fault Sensors are designed as a dependable, system-oriented method of fault detection. With trip ranges from 10 through 1200 amperes and many sizes of sensing transformers, virtually any fault protection usage is covered. Typical applications are on main services, feeder and branch circuits with line voltages being of little or no concern. With the sensor placed around the conductors and the relay module mounted in the control panel, the unit's output is used to drive the shunt trip coil of the appropriate circuit breaker. One method of detection used is to pass **only** the ground conductor through the coil, thus monitoring directly ground system currents. In all other cases all the power and (if used) neutral conductors to be monitored are passed through the sensing transformer. Then any imbalance in the current loop (a ground fault) will be reacted to as per settings.

A HI-Z series AZ system is composed of two primary components, a sensing transformer and a relay module. The sensors are available in two basic configurations that cover all applications. The first is the model Z30 split torroid. This unit features a split core allowing it to be taken apart and placed around existing conductors without having to reconnect them.

This coil is often used around cable bundles or conduits. Second in the sensor family is the model ZB. Available in various sizes, these "window type" sensing transformers are used primarily for buss-bar power systems. In these cases the need for a rectangular sensor of some size is satisfied easily by the many sizes offered. Installation in new or retrofit applications is simplified by the ability to split the core diagonally and then reassemble it around the undisrupted conductors. Both sensor styles work in conjunction with an AZ Relay/TD module as a complete system. The Relay/TD is surface mounted where convenient and connected to the shunt trip coil of its assigned circuit interruptor. These units are incrementally adjustable both in current (3 ranges) and time delay (2 ranges). The incremental adjustment feature greatly simplifies coordination of GFP systems by preventing the accidental overlap of settings possible in continuous adjustment relays. Together, the various sensor and relay combinations comprise a comprehensive fault detection system.



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OBSOLETE. . .NOT FOR NEW DESIGN

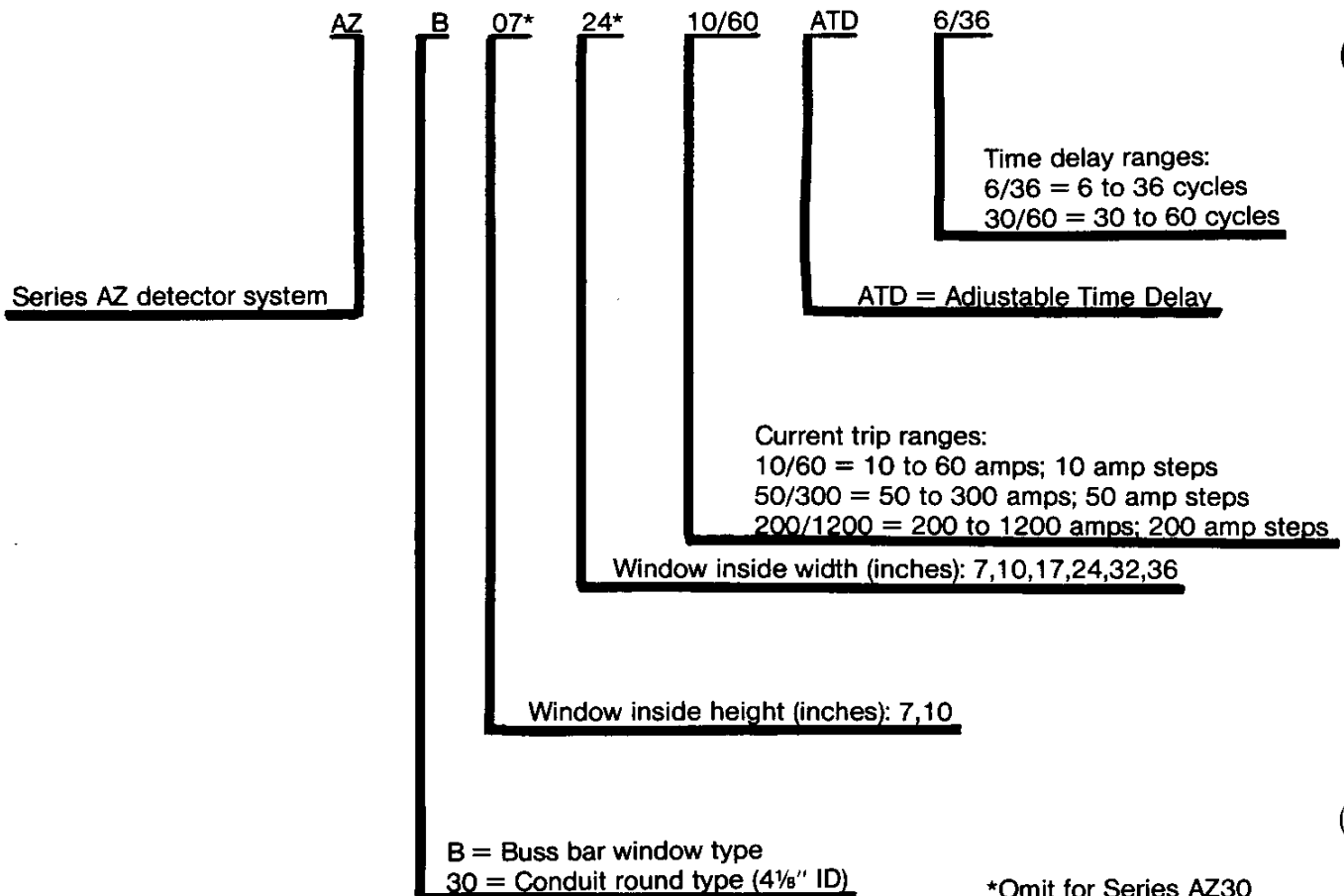
RATINGS

Current Trip Range: 10 to 1200 amperes
Number of Ranges: 3 overlapping, 6 steps each equal to minimum setting.
Time Delay: Instantaneous (no delay) to 60 cycles
Number of Ranges: 2 overlapping in 6 cycle steps
Power Requirements: 48 to 120 volts AC or DC (per trip coil)
Output: 2.0 amperes

For specific hook-up and installation information, see Appendix C

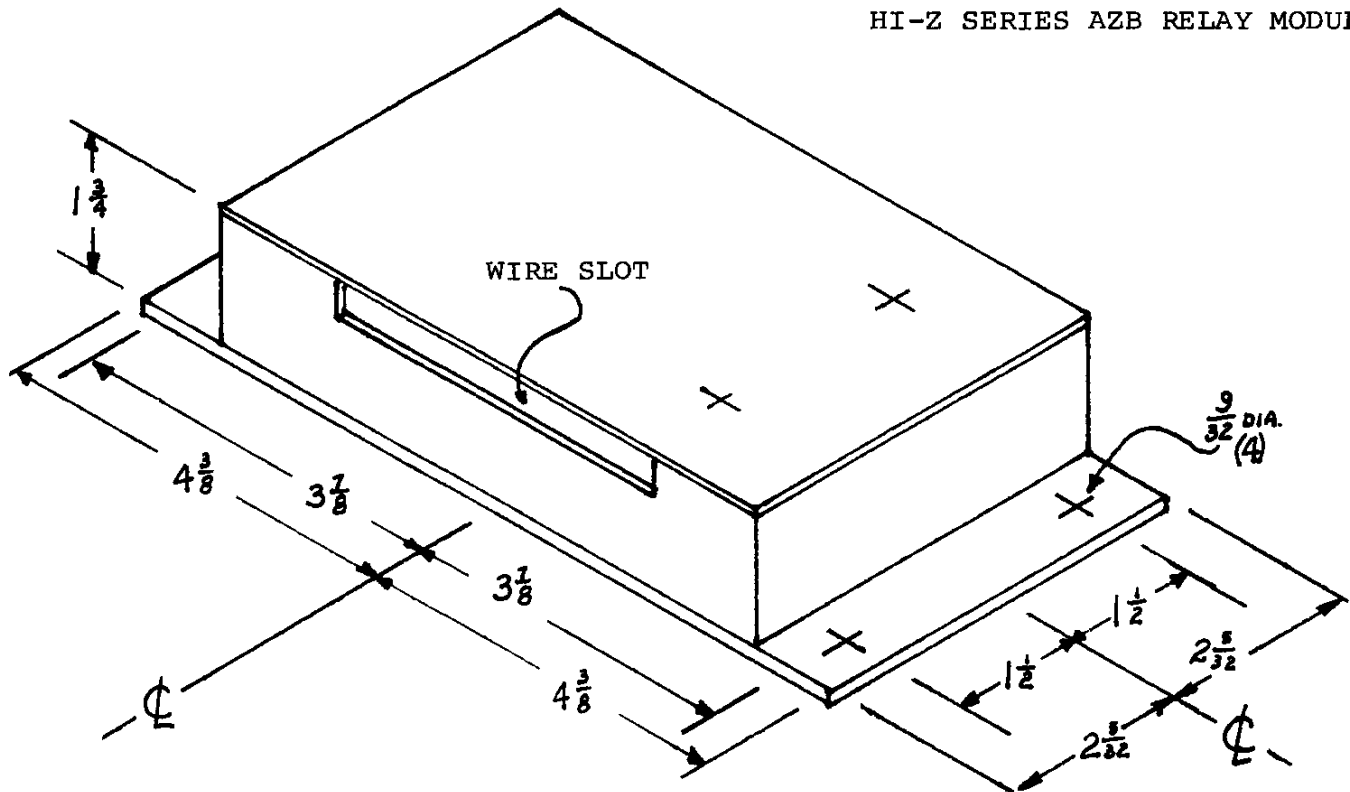
SERIES AZ ORDERING INFORMATION

When specifying an AZ series system, use the following format:



For special ranges, consult factory.

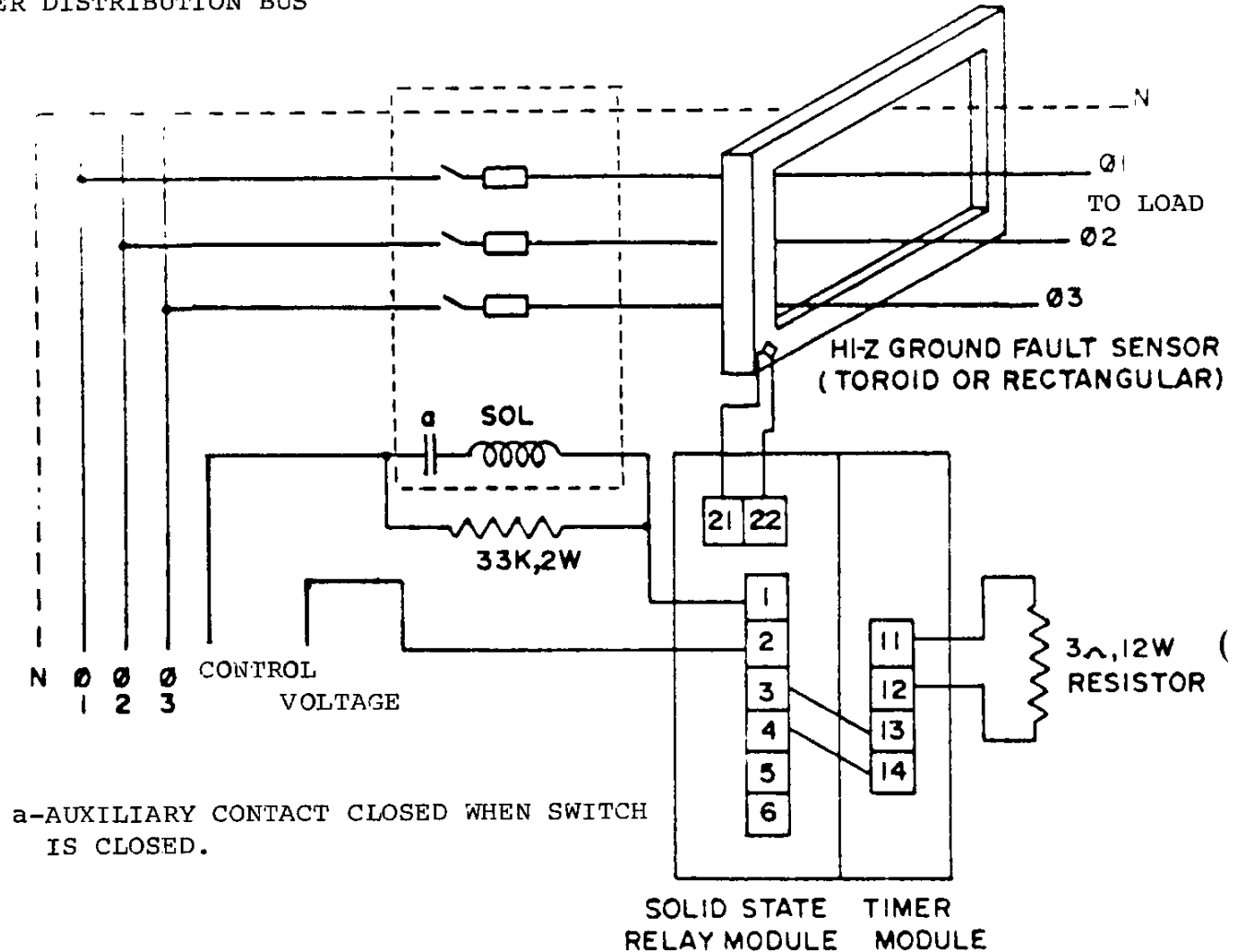
DIMENSIONAL INFORMATION FOR
HI-Z SERIES AZB RELAY MODULES



OBSOLETE. . .NOT FOR NEW DESIGN

CONNECTION OF THE HI-Z GROUND FAULT
SENSOR WITH TIME DELAY, TO A
BOLTED PRESSURE SWITCH.

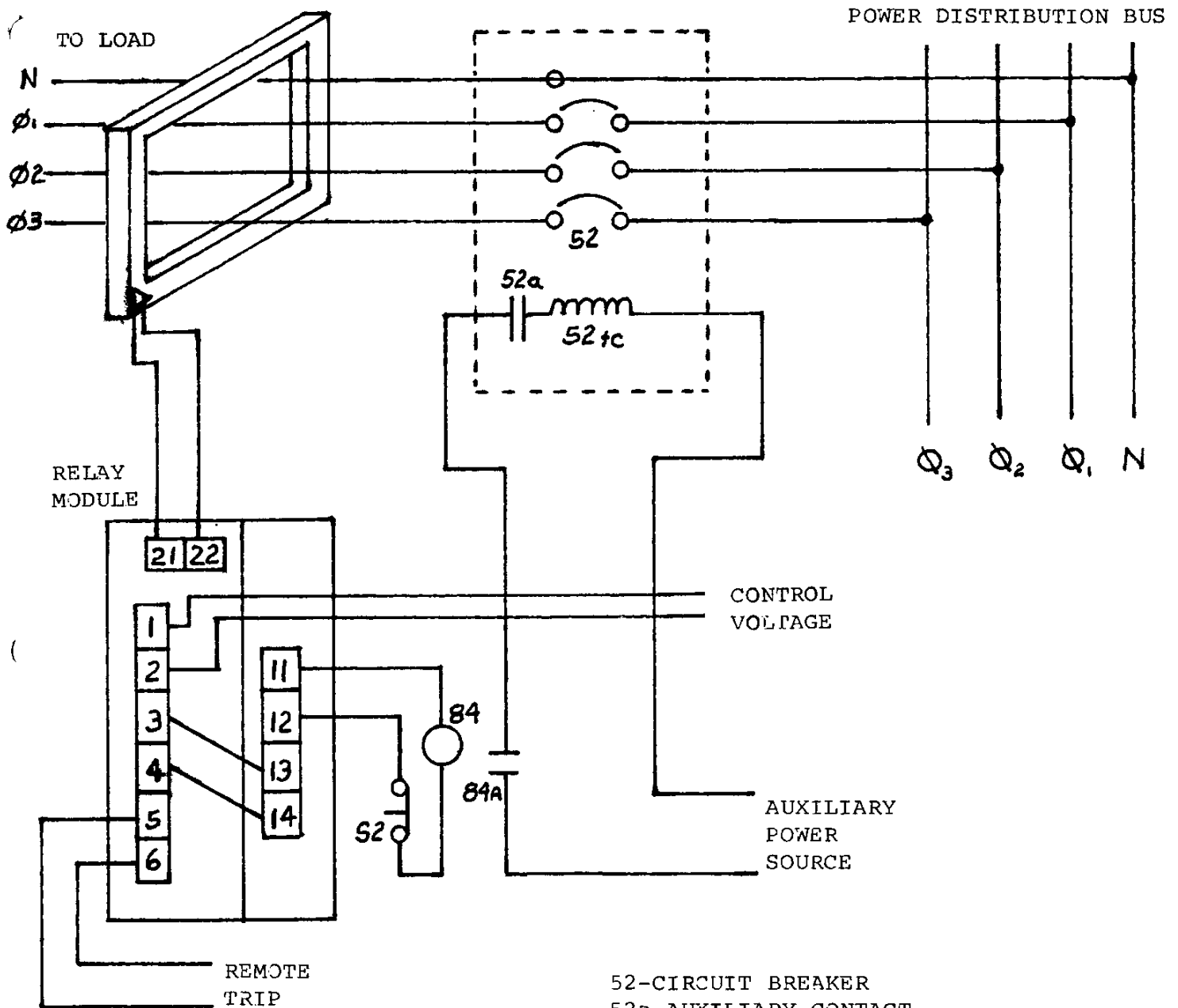
POWER DISTRIBUTION BUS



FOR OPERATION OF BOLTED PRESSURE CONTACT SWITCH WIRE THE CONTROL VOLTAGE AS SHOWN, THROUGH THE (a) CONTACT AND TRIP SOLENOID COIL TO TERMINAL #1 ON THE RELAY MODULE, CONNECT THE CONTROL VOLTAGE LEAD TO TERMINAL #2. PLACE A 3 OHM 12 WATT RESISTOR ACROSS TERMINALS #11 & #12 ON THE TIMER MODULE AND A 33K, 2 WATT RESISTOR BETWEEN CONTROL TERMINALS OF BOLTED PRESSURE CONTACT SWITCH.

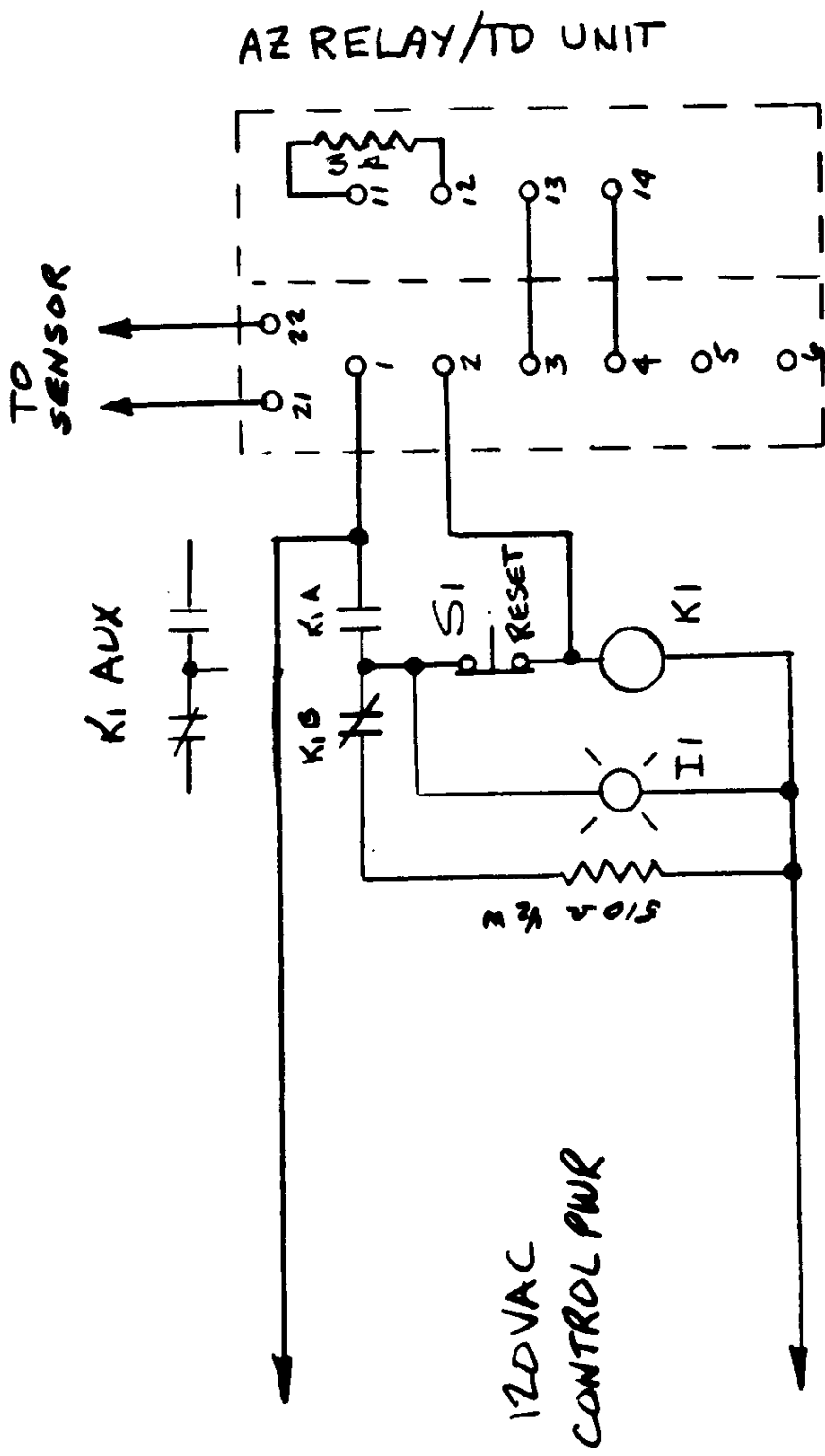
FOR SPECIFIC APPLICATION
INFORMATION, CONSULT THE
FACTORY.

CONNECTION OF A HI-Z GROUND FAULT
SENSOR TO A SHUNT TRIP BREAKER
USING AN AUXILIARY CONTROL RELAY



52-CIRCUIT BREAKER
52a-AUXILIARY CONTACT
52tc-CIRCUIT BREAKER SHUNT TRIP COIL
84-120 VDC CONTROL RELAY
S1-SHUNT TRIP PUSH BUTTON (N.O.)
S2-RESET PUSH BUTTON (N.C.)

FOR SPECIFIC APPLICATION
INFORMATION, CONSULT THE
FACTORY



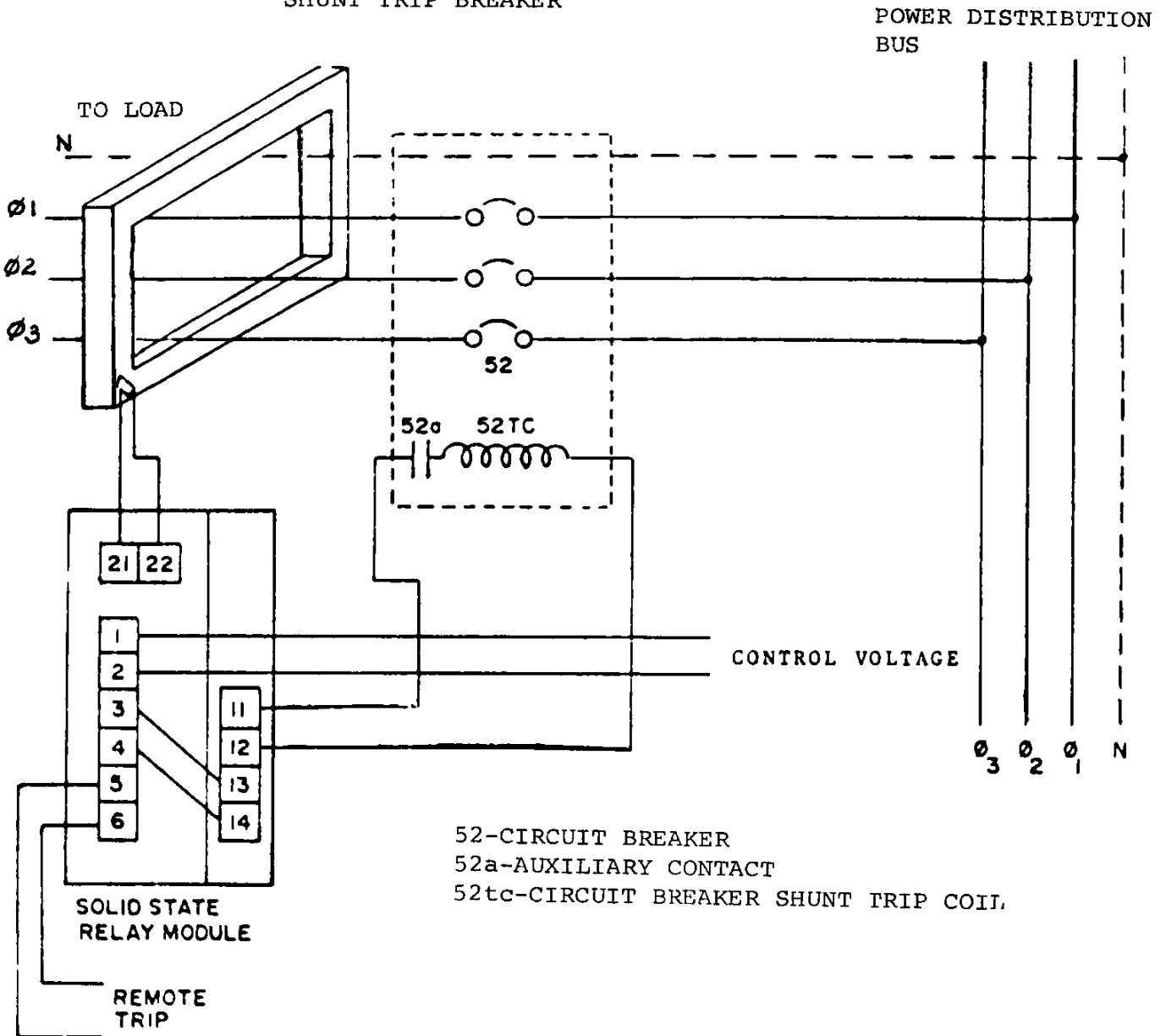
AUX. CONTACTS MAY
BE USED TO OPERATE
DISCONNECT DEVICE

I1 - 120VAC INDICATOR LAMP
K1 - P.B. PRIIAYO DPDT 120VAC
OR EQUIV.
S1 - N.C. MOMENTARY SWITCH

H1-Z INDICATING LATCH CIRCUIT

4-1-80 *WJH*

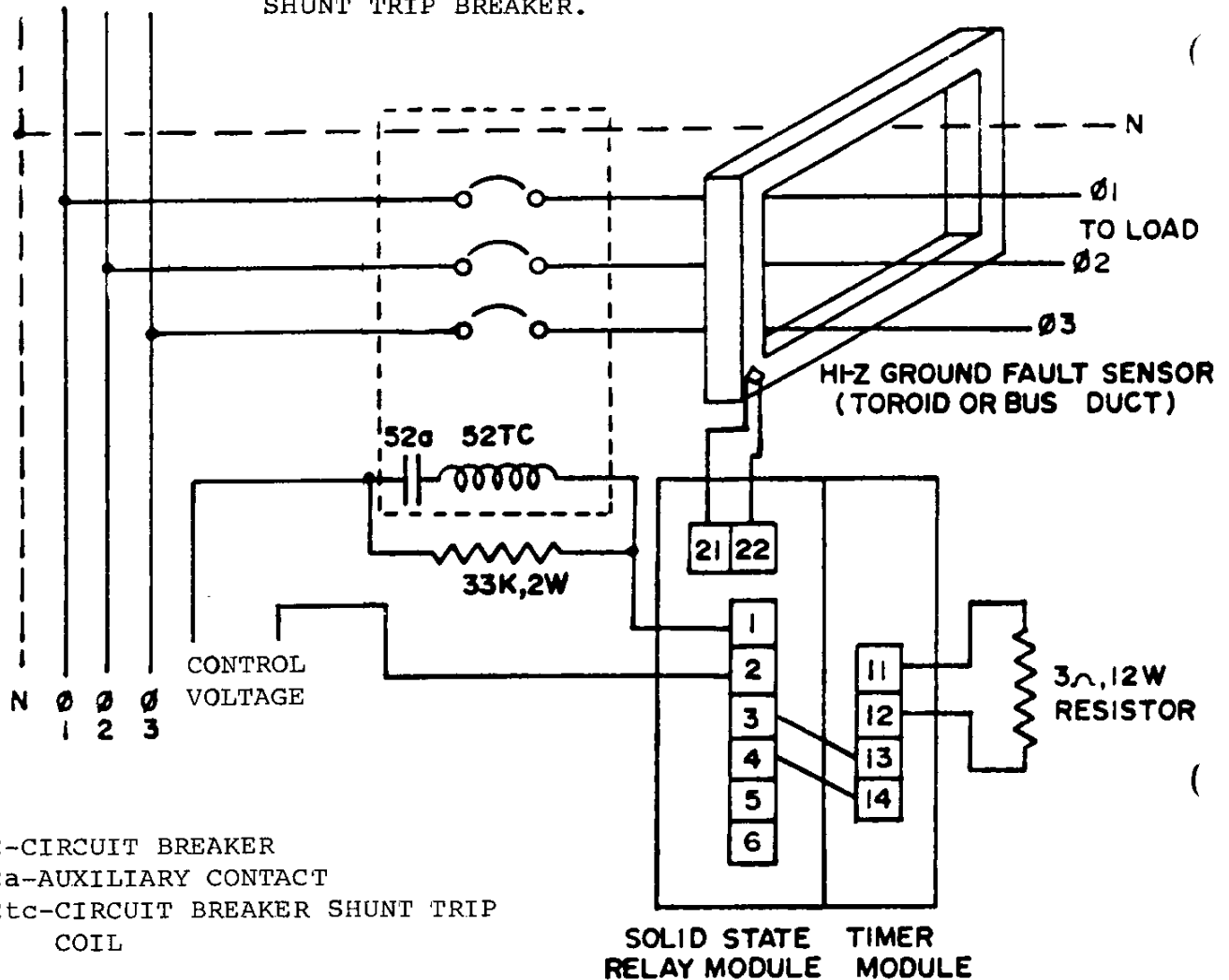
CONNECTION OF THE HI-Z GROUND FAULT
SENSOR WITH A TIME DELAY, TO A D.C.
SHUNT TRIP BREAKER



THE OUTPUT OF THE HI-Z UNIT SHALL BE THE ONLY POWER
THAT ACTUATES THE SHUNT TRIP COIL. IF PARALLEL
ENERGIZATION OF THE SHUNT TRIP COIL IS REQUIRED, A
BUFFER RELAY SHOULD BE USED.

FOR SPECIFIC APPLICATION
INFORMATION, CONSULT THE
FACTORY.

CONNECTION OF THE HI-Z GROUND FAULT
SENSOR WITH TIME DELAY, TO AN A.C.
SHUNT TRIP BREAKER.



52-CIRCUIT BREAKER
52a-AUXILIARY CONTACT
52tc-CIRCUIT BREAKER SHUNT TRIP
COIL

FOR OPERATION OF A.C. SHUNT
WIRE THE CONTROL VOLTAGE AS SHOWN,
THROUGH THE NORMALLY OPEN CIRCUIT
BREAKER AUXILIARY CONTACT AND SHUNT TRIP
COIL, TO TERMINAL #1 ON THE SOLID STATE RELAY
MODULE. CONNECT THE CONTROL RETURN LEAD TO
TERMINAL #2.

PLACE A 3 OHM 12 WATT RESISTOR ACROSS TERMINALS
#11 AND #12 AND A 33K, 2 WATT RESISTOR ACROSS
CIRCUIT BREAKER TERMINALS. (BOTH RESISTORS SUPPLIED)

FOR SPECIFIC APPLICATION
INFORMATION, CONSULT THE
FACTORY.

OBSOLETE. . .NOT FOR NEW DESIGN

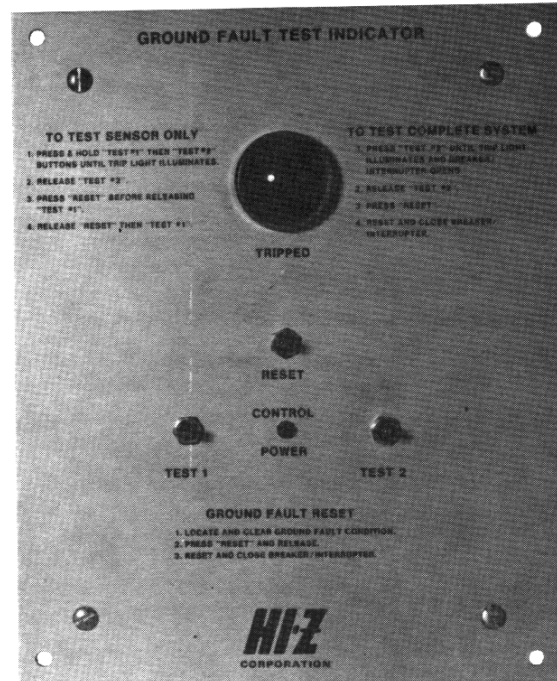
HI-Z SERIES TP CONTROLS

APPLICATION

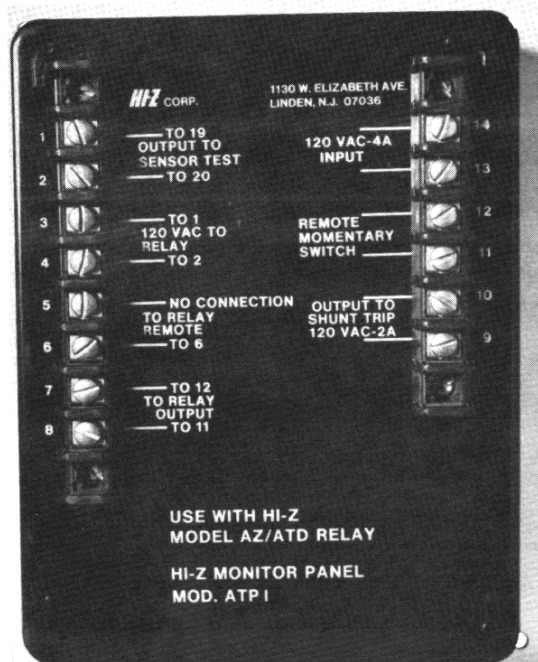
The HI-Z Series TP controls are system test devices for use with the HI-Z Series AZ ground fault sensors. When connected to the sensor, relay module, and breaker, the test panel causes the sensor to "see" a fault condition. Thus the entire system with or without the actual breaker can be activated and exercised. The ability for a remote trip is also gained by the addition of the Series TP.

This series is fully compatible with all but the series ZM which is self-contained and the Series IZT which includes the test capability as a built-in feature. In all applicable uses, installation is easy, straight forward, and is accomplished in a manner compatible with the rest of the HI-Z relay units.

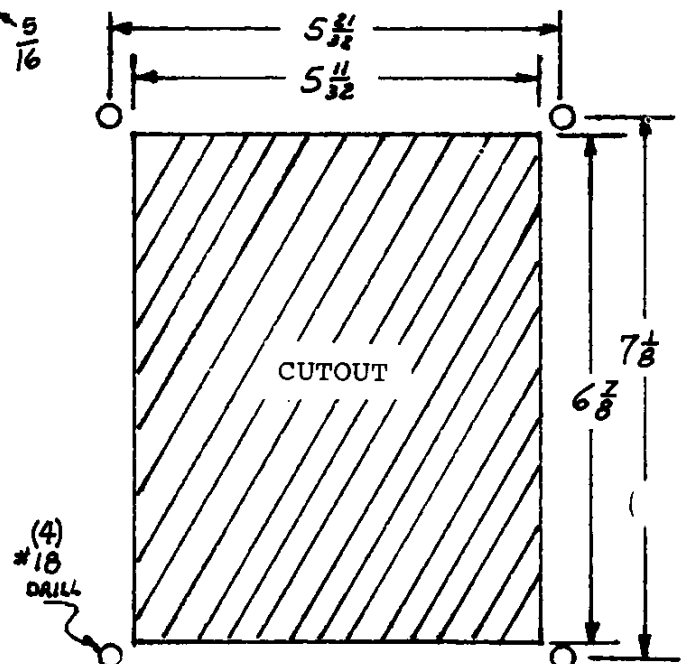
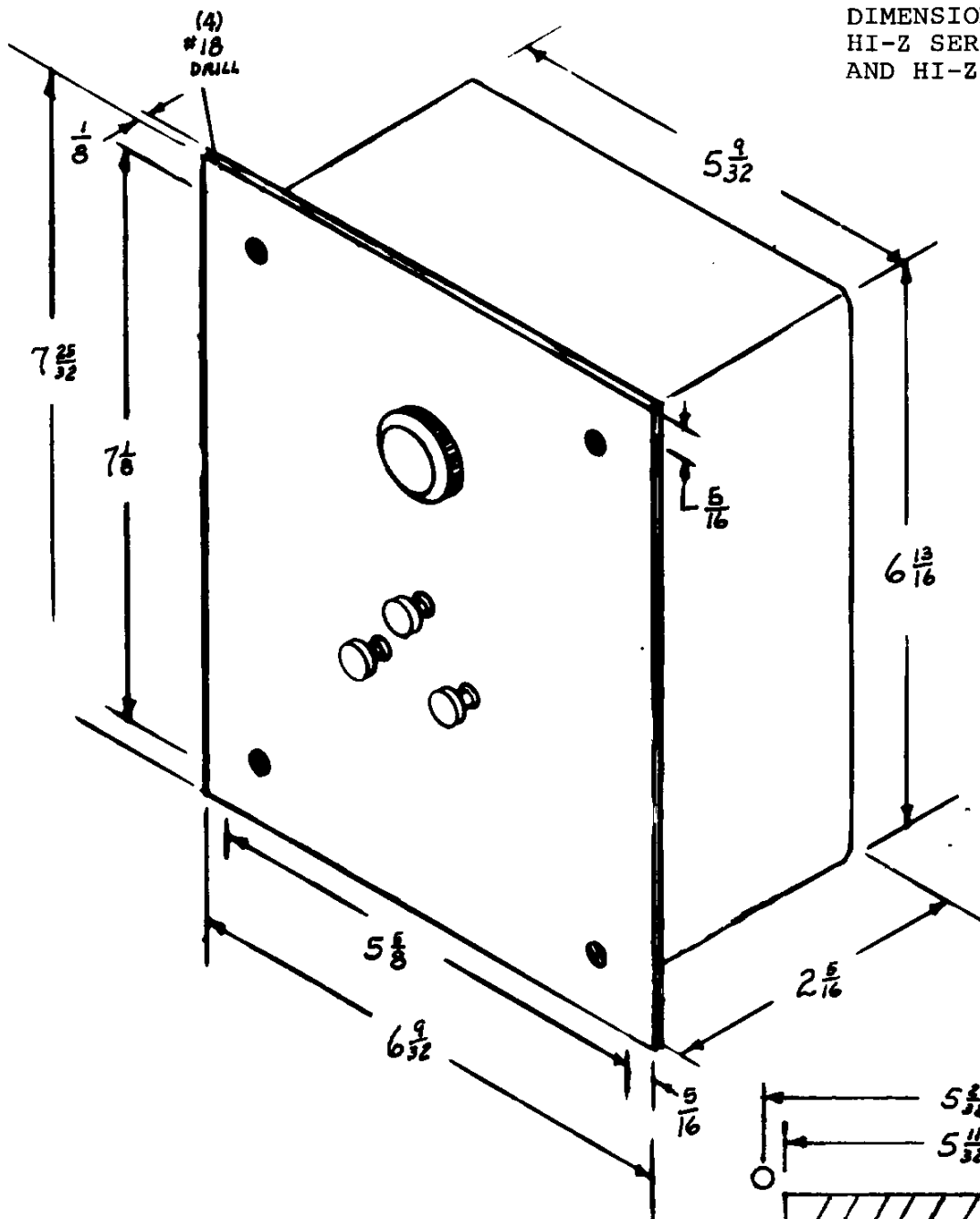
In cases where the test feature is desired as a retrofit to an existing system, the sensing transformer will need to be replaced with a test winding equipped model. This provides no installation problems as both the old and new sensors can be taken apart, removed and reinstalled leaving conductors undisturbed.

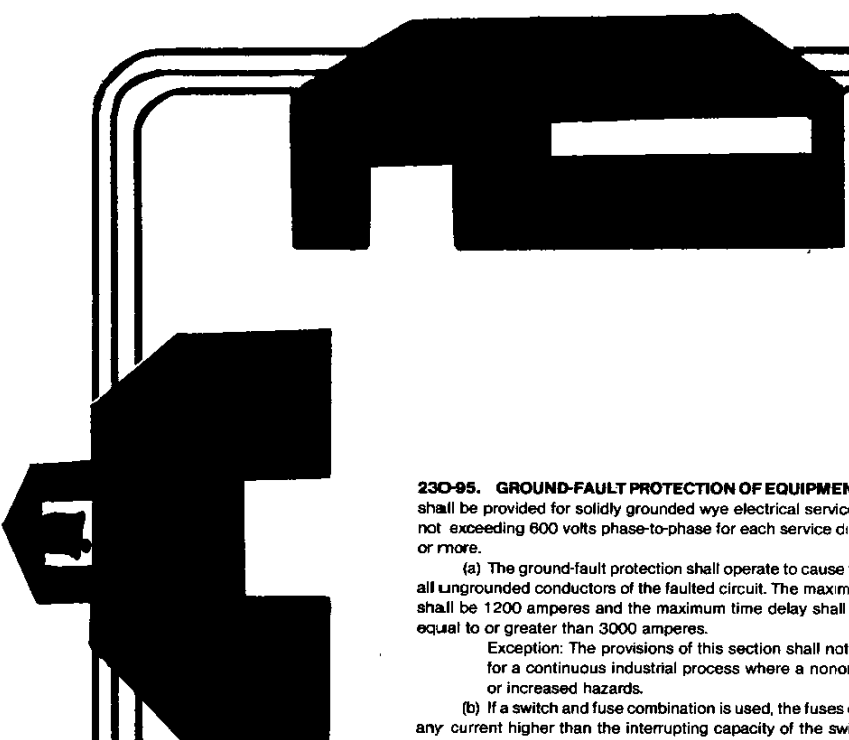


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DIMENSIONAL INFORMATION FOR
HI-Z SERIES IZT RELAY
AND HI-Z TEST PANELS





230-95. GROUND-FAULT PROTECTION OF EQUIPMENT. Ground-fault protection of equipment shall be provided for solidly grounded wye electrical services of more than 150 volts to ground, but not exceeding 600 volts phase-to-phase for each service disconnecting means rated 1000 amperes or more.

(a) The ground-fault protection shall operate to cause the service disconnecting means to open all ungrounded conductors of the faulted circuit. The maximum setting of the ground-fault protection shall be 1200 amperes and the maximum time delay shall be one second for ground-fault currents equal to or greater than 3000 amperes.

Exception: The provisions of this section shall not apply to a service disconnecting means for a continuous industrial process where a nonorderly shutdown will introduce additional or increased hazards.

(b) If a switch and fuse combination is used, the fuses employed shall be capable of interrupting any current higher than the interrupting capacity of the switch during a time when the ground-fault protective system will not cause the switch to open.

As used in this section, the rating of the Service Disconnecting Means is considered to be the rating of the largest fuse that can be installed or the highest trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted.

It is recognized that ground-fault protection may be desirable for service disconnecting means rated less than 1000 amperes on solidly grounded systems having more than 150 volts to ground, not exceeding 600 volts phase-to-phase.

As used in this section, solidly grounded means that the grounded conductor (neutral) is grounded without inserting any resistor or impedance device.

Ground-fault protection that functions to open the service disconnecting means will afford no protection from faults on the line side of the protective element. It serves only to limit damage to conductors and equipment on the load side in the event of the protective element.

This added protective equipment at the service equipment will make it necessary to review the overall wiring system for proper selective overcurrent protection coordination. Additional installations of ground-fault protective equipment will be needed on feeders and branch circuits where maximum continuity of electrical service is necessary.

Where ground-fault protection is provided for the service disconnecting means and interconnection is made with another supply system by a transfer device, means or devices may be needed to assure proper ground-fault sensing by the ground-fault protection equipment.

(c) The ground-fault protection system shall be performance tested when first installed. The test shall be conducted in accordance with approved instructions which shall be provided with the equipment. A written record of this test shall be made and shall be available to the authority having jurisdiction.

HI-Z IS REPRESENTED BY:

WESTERN U.S.
The Carrick Corporation
8932 Reseda Blvd.
Northridge, California 91346
(213) 886-6604

NORTH CENTRAL U.S.
The Conrardy Company
2 Talcott Rd.
Park Ridge, Illinois 60068
(312) 692-2226

SOUTH CENTRAL U.S.
Jim King Sales Company
4801 Richmond Ave.
Houston, Texas 77027
(713) 621-6915

SOUTHEAST U.S.
Heritage Sales Assoc.
149 Hexham Circle
Irmo, South Carolina 29063
(803) 781-8259

OUTSIDE THESE AREAS CALL DIRECT TO HI-Z

