

Installation, Operation
and Maintenance Manual

PN 750-0068-003,

TransGuard®

Electrical
Transient
Suppression
Filter
Systems

 **Current
Technology.**
THE #1 NAME IN SURGE SUPPRESSION™

A member of the MasterPlan™ family of products



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Your Guide to Installation of the TransGuard Surge Suppression System

Today's sophisticated electronic equipment requires superior suppression filter systems. By selecting Current Technology® devices, you have taken a critical step toward decreasing down-time and ensuring longer product life for your equipment.

The TransGuard® Surge Suppression System is designed to be connected to your electrical distribution system to protect connected sensitive electrical and electronic equipment against the harmful effects of lightning strikes, internally generated transients and high frequency noise. The reliable TransGuard fulfills the single-pulse surge current capacity testing recommendations per NEMA LS1-1992, paragraphs 2.2.9 and 3.9.

The Current Technology TransGuard combines easy and flexible installation with many special features to deliver more performance than any other device in its class.

The TransGuard offers a full range of monitoring options from the most basic phase indicator lights, audible alarm and counters to the most sophisticated power quality monitoring features offered in any surge suppression product. These features include the following:

- Display of true RMS phase voltages
- Display of neutral-to-ground voltage and current
- Counting of swells, surges, sags and outages
- Display of percent available protection remaining

The TransGuard incorporates the patented "Failure Free ISB" (Integrated Suppression Bus). Redundant MOV fusing prevents individual component failure from rendering the protection mode useless. Instead, the failed component safely removes itself from the circuit and all remaining protection is allowed to continue operating as designed. Special circuitry allows the percent remaining protection to be measured and automatically alarmed if capacity drops below 50 percent.

The TransGuard is available in both fiberglass-reinforced polyester NEMA 4X and metallic NEMA 12 enclosures. It is available with or without an integral disconnect. Units equipped with disconnects are available only with metallic enclosures.

TransGuard is available in an open-frame configuration that allows the components of the TransGuard to be mounted without an enclosure inside switchgear or other user-provided enclosures.

Thank you for choosing Current Technology's TransGuard Surge Suppression System. We look forward to fulfilling your facility-wide surge suppression filter system needs.

Installation Assistance

Monday through Friday, 8:00 a.m. to 5:00 p.m. (EST):

800.238.5000 or 804.236.3300

Nights, weekends and U.S. holidays:

888.200.6400

Seven-Year Limited Warranty

Current Technology TransGuard products are warranted for a period of seven years from date of purchase.

Patent Notice

The Current Technology, Inc. TransGuard is protected by patents which may be issued after the publication of this document, as well as by one or more of the following patents: 5,023,746; 4,835,650; 4,675,538; 4,675,772; 5,191,502; 4,860,502; 4,127,888; 5,146,357; 4,794,490; 5,257,157. Current Technology, Inc will enforce and protect its patent rights as provided by Section 35 USC and a \$500,000 litigation protection insurance policy.

Purpose and Applications of the TransGuard Surge Suppression Products

The TransGuard product family is designed to provide surge suppression to all connected loads within a distribution system. The TransGuard uses proven Metal Oxide Varistors (MOVs) and an efficient capacitive filter system to reduce or eliminate transients, impulses, and high-frequency noise within a building's electrical system.

The Importance of Correct Installation

This manual provides guidelines for the proper installation of the TransGuard family of devices. Proper product selection and compliance with these guidelines will help your new suppression system provide years of reliable service. If installers are unsure about the facility's electrical configuration or have other installation-related questions, it is recommended they consult with a master electrician or other qualified electrical professional.

When shortcuts are taken or installation procedures are not followed, the TransGuard system may be damaged or may not provide adequate protection. Improper installation may also void the warranty. It is extremely important to follow these installation procedures carefully.

This manual is designed to step you through the procedure of installing the TransGuard product and connecting it to your electrical system. However, should you have questions about installing the TransGuard please call Current Technology, Inc. Technical Support at 800.238.5000.

WARNING!

WARNING! The TransGuard's warranty is voided if the unit is damaged as a result of improper installation or the installer's failure to verify the following conditions prior to installation.

Pre-Installation Checklist

Before beginning

► Confirm that the voltage(s) and service configuration shown on the TransGuard product label are consistent with the voltage and service configuration of the facility to which it is being attached. A model number is printed on the label affixed to the inside of the TransGuard. Each model number corresponds to the voltage and service configurations printed in the table below:

PRODUCT LABEL DESIGNATION	SYSTEM VOLTAGE, SERVICE CONFIGURATION
TGxx-120/240-2G	120/240VAC, 1 ϕ 3-wire SPLIT-PHASE, w/ground
TGxx-120/208-3GY	120/208VAC, 3 ϕ 4-wire WYE, w/ground
TGxx-220/380-3GY	220/380VAC, 3 ϕ 4-wire WYE, w/ground
TGxx-277/480-3GY	277/480VAC, 3 ϕ 4-wire WYE, w/ground
TGxx-347/600-3GY	347/600VAC, 3 ϕ 4-wire WYE, w/ground
TGxx-120/240-3GHD	120/240VAC, 3 ϕ 4-wire high-leg DELTA, w/ground (B phase must be 208V)
TGxx-240-3DG	240VAC, 3 ϕ 3-wire DELTA, w/ground
TGxx-480-3DG	480VAC, 3 ϕ 3-wire DELTA, w/ground
TGxx-600-3DG	600VAC, 3 ϕ 3-wire DELTA, w/ground

Note: Indicate TransGuard surge current rating by substituting 60, 80, 100, 125, 150, 200, 250, or 300 for “xx” in the above model numbers.

► Check to ensure that a proper Xo bond is installed between the neutral and ground terminals at the transformer upstream from all 3 ϕ WYE, 3 ϕ high-leg DELTA, or 1 ϕ SPLIT-PHASE TransGuard devices (see NEC article 250.) Lack of a proper bond will damage the TransGuard and void the warranty.

► Confirm that the environmental conditions are consistent with the following ranges:

- Ambient Temperatures: The TransGuard must be installed in an area with a temperature between -40° and +140°F.
- Humidity: The TransGuard must be installed in an area with relative humidity between 5% and 95% non-condensing.
- Altitude: The TransGuard must be installed in a location whose altitude is below 13,000 feet.

WARNING!

WARNING! Discontinue installation if (1) your conditions are inconsistent with the checklist above or (2) your conditions cannot be verified. Call Current Technology, Inc.’s Technical Support at 800.238.5000 if you have any questions.

Installation Methods for Common Service Configurations for the Design Engineer and the Installer

Service Configurations

FIG. 1:
3-Phase, 4-Wire WYE

The TransGuard is to be connected in parallel with the electrical system. It may be connected via a circuit breaker, molded case switch, fused switch, or connected directly to the bus of the panelboard or switchboard it is protecting. If direct bus connection is used, Current Technology, Inc. recommends that the TransGuard be equipped with the optional integral disconnect switch.

- Do not connect the TransGuard to the line side of the main service breaker or disconnecting means.
- Do not install the TransGuard where the available short circuit current to the TransGuard unit is less than 1500 RMS symmetrical amperes.

The TransGuard Surge Suppression System is also available in an open frame configuration – i.e. without an enclosure and with its component parts mountable in the user's equipment – e.g. switchgear. Instructions for both the enclosed and open frame configurations of the TransGuard are found in this manual.

Figures 1-4 show the electrical relationship between the TransGuard and these four basic service configurations: WYE, DELTA, High-Leg DELTA and SPLIT-PHASE.

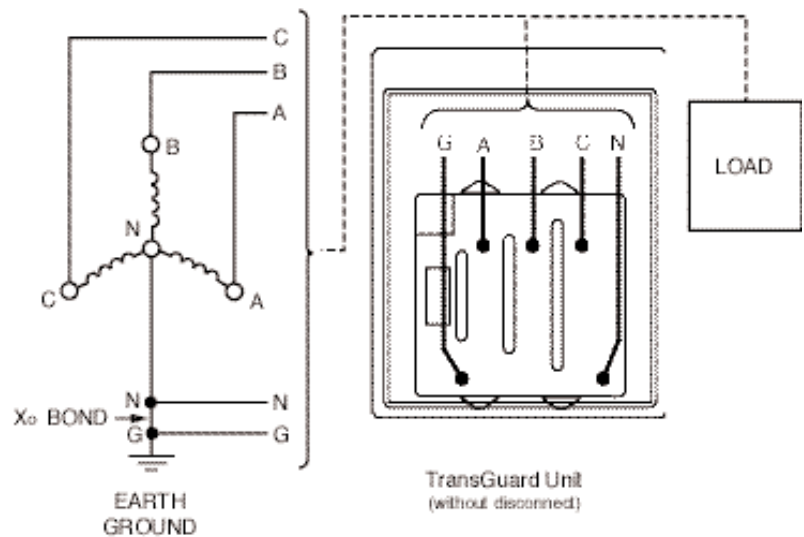


FIG. 2:
3-Phase, 3-Wire DELTA

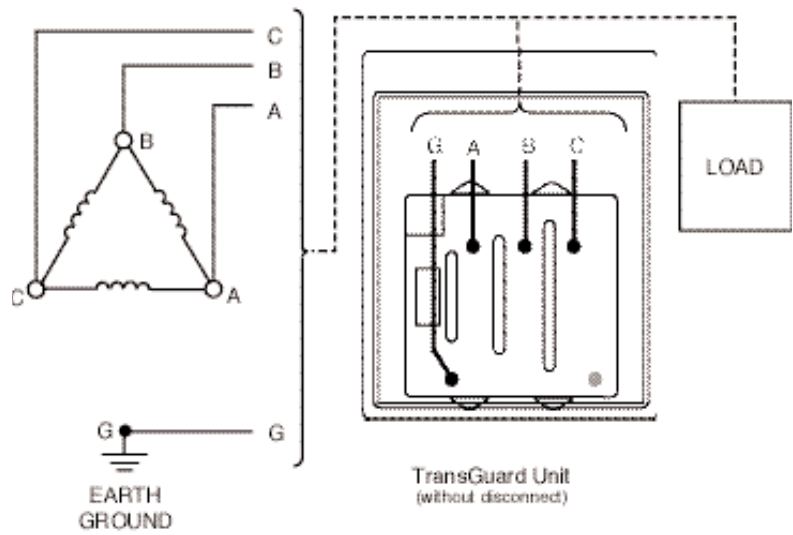


FIG. 3:
3-Phase, 4-Wire High-Leg DELTA

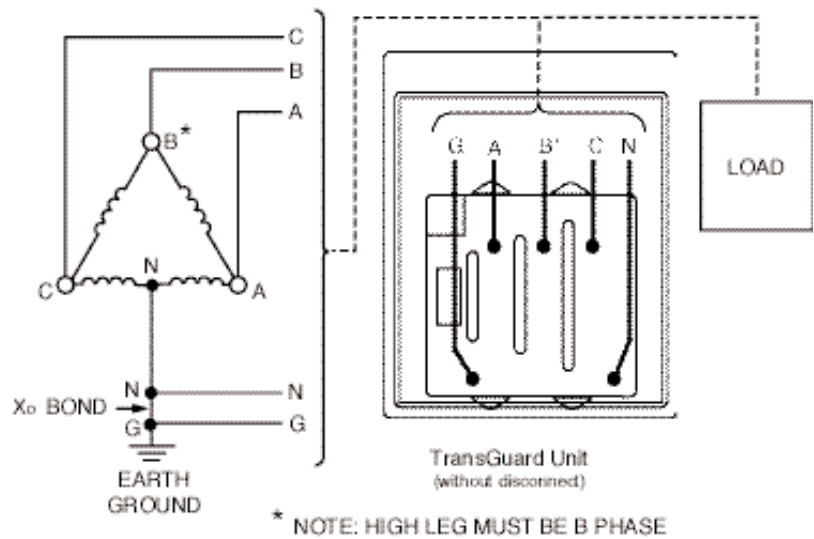
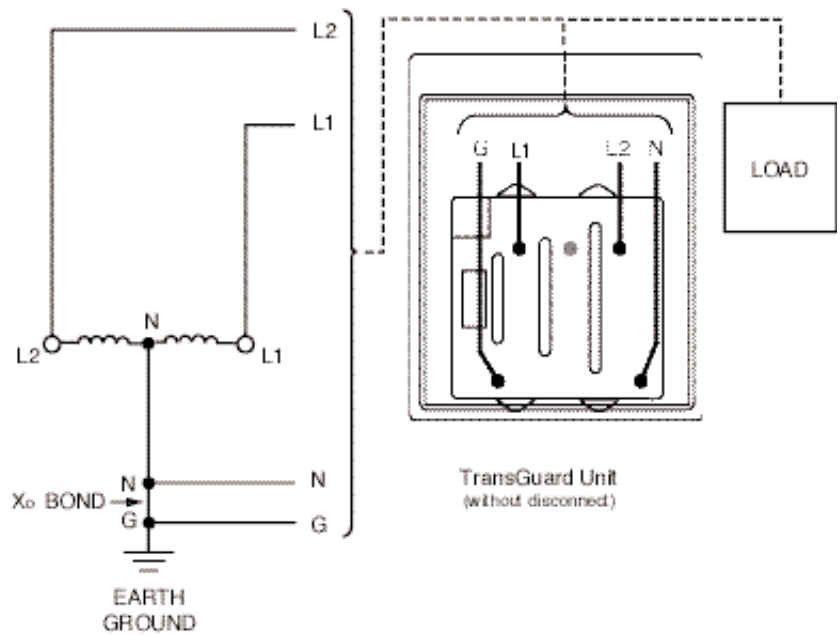


FIG. 4:
1-Phase, 3-Wire
SPLIT-PHASE



Plan Your Installation

WARNING: The performance of the TransGuard will be severely limited if the conductors are too long, are of too small a wire gauge, have too many bends or have sharp bends.

Conductor Routing: The above factors should be addressed during the design of an installation to ensure that there is a suitable place for the TransGuard reserved next to its point of connection to the electrical system. The selected mounting location should ensure short conductor runs providing a direct route with a minimum of bends. If bends are required they should be sweeping bends. Do not make sharp 90° bends for “aesthetic” purposes.

Conductor Length / Sizing and Overcurrent Protection

Conductor Length and Sizing: Conductor length **must** be kept as short as possible and avoid sharp bends. Conductor length **must** never exceed 10 feet in length from phase bus through the TransGuard to the neutral bus or ground bus. The following conductor sizes for phase, ground and neutral connections are recommended. However, where space and bending radii permit, use a larger conductor size.

Model	Use conductor lengths less than 10 feet
TG60	#8 AWG
TG80	#8 AWG
TG100	#6 AWG
TG125	#6 AWG
TG150	#6 AWG
TG200	#2 AWG
TG250	#2 AWG
TG300	#2 AWG

NOTE: The above conductor sizing recommendations ensure that the effective clamping voltage of the TransGuard at the point of connection is kept to a minimum in order to maximize protection. Increasing conductor size to compensate for increased distance has a negligible effect on minimizing clamping voltage. Additionally, conventional voltage-drop calculations appropriate for 60 Hz do not apply to transients.

Overcurrent Protection: The design may require or the installer may choose to connect the TransGuard to a circuit breaker, molded case switch or fused disconnect.

Current Technology recommends feeding all Trans-Guards not equipped with an integral disconnect with a circuit breaker, molded case switch or fused switch.

If a breaker or molded case switch is used for connecting the phase conductors, Current Technology, Inc. recommends a 100 amp rating.

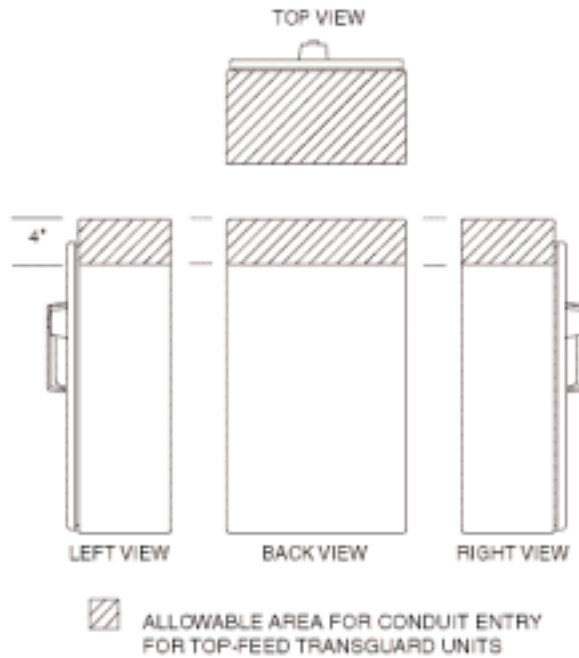
WARNING!

WARNING: If the available short circuit current at the TransGuard is less than 1500 RMS symmetrical amperes do not install the TransGuard. Examples of systems with available short circuit currents less than 1500 amperes include the outputs of small UPS systems and small AC inverters.

Standard: Top-Feed TransGuard® Products

Conduit Openings (Metallic Enclosure, NEMA 4/12)

Punch holes only in the shaded areas as shown in the following illustration.



Typical Enclosure Configurations (Metallic Enclosure, NEMA 4/12)



Top-Feed
TransGuard without Disconnect

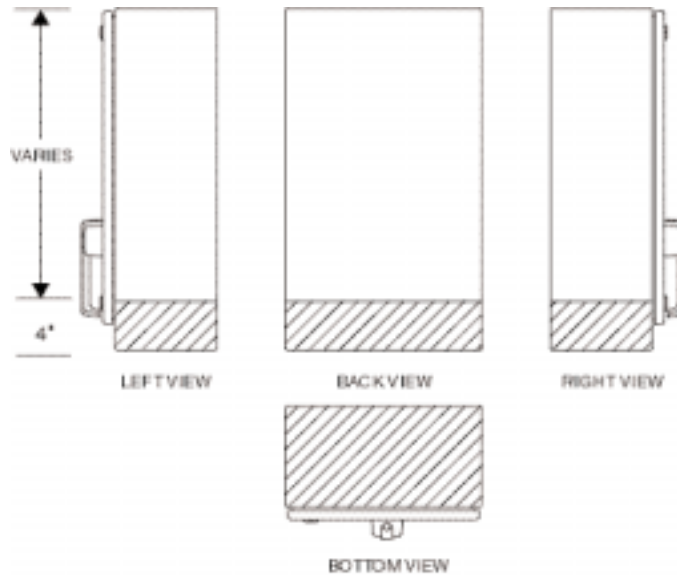


Top-Feed
TransGuard with Disconnect

Option: Bottom-Feed TransGuard® Products

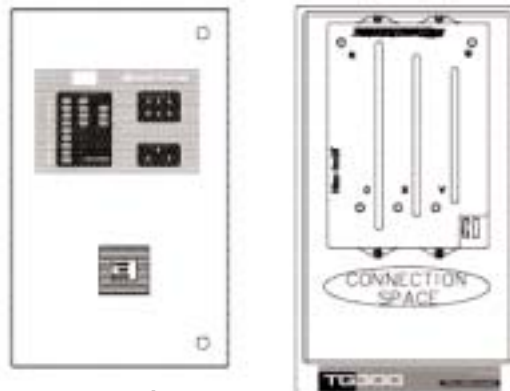
Conduit Openings for Bottom-Feed TransGuard Products (Metallic Enclosure, NEMA 4/12)

Punch holes only in the shaded areas as shown in the following illustration.

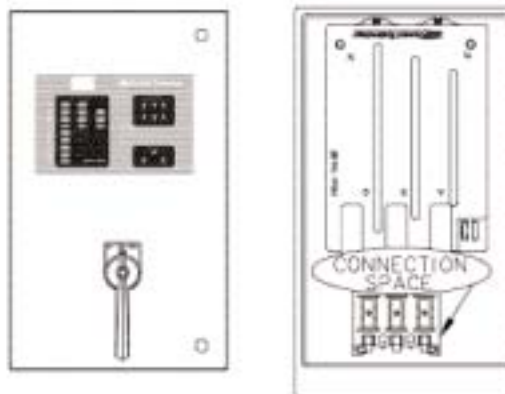


☒ ALLOWABLE AREA FOR CONDUIT ENTRY FOR BOTTOM-FEED TRANSGUARD UNITS

Typical Enclosure Configurations for Bottom-Feed TransGuard Products (Metallic Enclosure, NEMA 4/12)



Bottom-Feed TransGuard without Disconnect

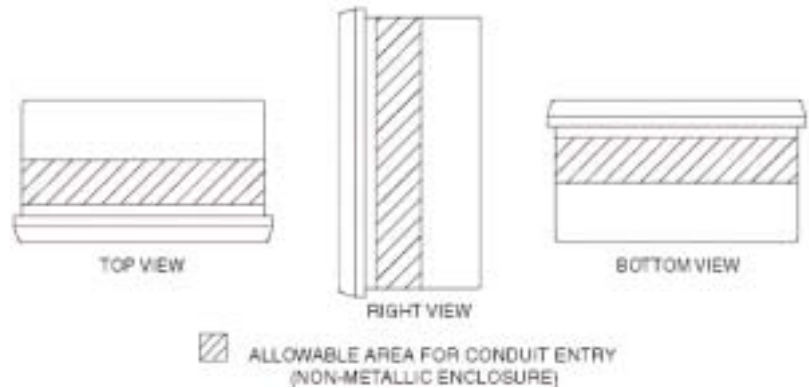


Bottom-Feed TransGuard with Disconnect

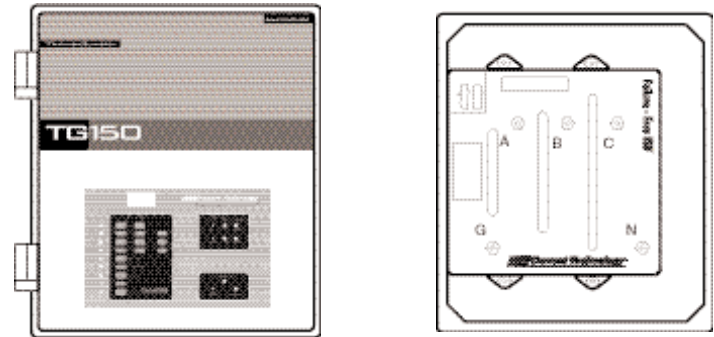
Non-Metallic Enclosures

Conduit Openings (Non-Metallic Enclosure, NEMA 4X)

Punch holes only in the shaded areas as shown in the following illustration.



Typical Enclosure Configurations (Non-Metallic Enclosure, NEMA 4X)



TransGuard with Non-Metallic Enclosure

Mounting

Mount the TransGuard to the building structure using construction methods and hardware appropriate for your site. Install the conduit and pull the conductors as specified above or according to the engineer's design.

Open-Frame Mounting

If your TransGuard is an Open-Frame type (that is, provided without an enclosure and designed for mounting inside switchgear or other user-provided enclosures) refer to the appendix for detailed dimensional data. This data is provided to aid in the design and fabrication of custom mounting arrangements unique to each type of open frame installation.

Electrical Connections

Phases, Neutral* and Ground: Connect the phase, neutral and ground conductors.

For TransGuards equipped with an integral disconnect switch connect the phase conductors to the line-side lugs on the disconnect and the ground and neutral* conductors to the lugs labeled "G" and "N" lugs on the yellow device (ISB).

Connecting Form C Dry Contacts

Before Applying Power: Checklist

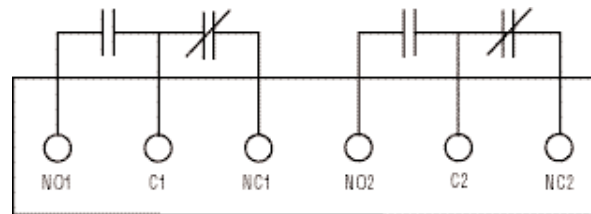
For TransGuards without an integral disconnect switch, connect the phase conductors to the lugs labeled “A”, “B”, and “C” on the ISB and the ground and neutral* conductors to the lugs labeled “G” and “N”.

* DELTA-connected TransGuards do not have a neutral conductor.

Dry Contacts: TransGuards equipped with Advanced Monitoring options have a dual set of Form “C” dry contacts available for connection to user-provided remote alarm and monitoring circuits.

The installer must provide the appropriate raceway and wiring for this circuit observing the restrictions on conduit openings illustrated in an earlier section of this manual. The installer must route the monitoring conductors via the TransGuard’s door hinge to the blue terminal blocks on the door-mounted circuit board. Select the appropriate materials and routing to allow the door to open and close.

The following diagram shows the Form “C” contact configuration. The annotations on the diagram match the markings on the blue terminal block.



FCC TERMINAL BLOCK

► **Field Testing:** Your TransGuard has been carefully tested before leaving the factory. However, the performance of this unit as a surge suppression device can be confirmed in the field prior to startup using a portable DTS-2 Tester.

The optional DTS-2 Tester may have been purchased along with your TransGuard or *Field Startup Testing Service* may have been specified during the purchase of the TransGuard. Check with the owner or owner’s representative to see if this test is required at your site.

If you have questions about Field Startup Testing or would like to arrange for this service, call Current Technology, Inc. Technical Support at 800.238.5000.

- **Confirm Pre-Installation Checklist:** Confirm that the “Pre-Installation Checklist” found in the beginning of this manual was completed correctly before proceeding.
- **Battery Installation:** Your TransGuard will be equipped with a 9 volt battery if you purchased “L2 Advanced Monitoring” or “L3 MasterMIND” monitoring. Look at the circuit board behind the door. If there is a 9 volt battery present it will need to be removed, turned around and reinserted into the holder so that the contacts “snap” into place. If the alarm sounds, press the “ALARM DISABLE” button on the front of the door. The battery is installed backwards for shipping purposes.
- **Confirm Line Voltage:** Measure the line to line voltages feeding the panelboard and be sure they are within $\pm 10\%$ of the rated line voltage of the TransGuard. Use the following table to determine the range of acceptable voltages for each model of the TransGuard.

Acceptable Voltage Ranges for All SElect Models

TransGuard MODEL NO.	NOMINAL L-L VOLTAGE	-10% TO +10% L-L VOLTAGE
TGxx-120/240-2G	240	216 to 264
TGxx-120/208-3GY	208	188 to 228
TGxx-220/380-3GY	380	342 to 419
TGxx-277/480-3GY	480	432 to 528
TGxx-347/600-3GY	600	540 to 660
TGxx-120/240-3GHD	240	216 to 264
TGxx-240-3DG	240	216 to 264
TGxx-480-3DG	480	432 to 528
TGxx-600-3DG	600	540 to 660

Note: “xx” specifies rating of 60, 80, 100, 125, 150, 200, 250, 300 kA

WARNING!

WARNING! Do not apply power if the measured voltage is not within the range specified for the TransGuard model being installed.

- Apply power to the TransGuard by closing the circuit breaker or switch (if any) feeding the TransGuard or closing the TransGuard’s integral disconnect.
- If you have either the L2 or L3 Advanced Monitoring options, be sure to re-enable the alarm by pressing the “ALARM DISABLE” button. The “ALARM DISABLED” light should not be illuminated and the alarm should not be audible.

Verify Proper Operation



TransGuard with Base Monitoring.



TransGuard with L1 Advanced Monitoring.



TransGuard with L2 Advanced Monitoring.

Depending on which monitoring option your TransGuard came with you can verify proper operation of the unit as follows:

► **If your TransGuard has Base Monitoring** (*see picture*): Verify that the green indicating lights are illuminated. Three-phase units have three (3) green indicating lights labeled “A”, “B”, and “C”. Split-phase units should only have lights “A” and “C” illuminated.

► **If your TransGuard has L1 Advanced Monitoring** (*see picture*): Verify that only the green indicating lights are illuminated and that there are no red lights illuminated. Green lights indicate a normal condition for each phase. Red lights indicate a fault condition. Three-phase units have three indicating lights labeled “A”, “B”, and “C”. Split-phase units should only have lights “A” and “C” illuminated.

The L1 Advanced Monitoring option is equipped with two sets of Form “C” contacts. The relay containing the contacts is in the “alarm condition” when the power is off to the unit, when the unit is encountering loss of power to one or more phases, or the TransGuard is encountering more than 50% loss of capacity due to internal fuse operation. Test the operation of the Form “C” contacts by de-energizing the TransGuard and checking the state of the contacts with a continuity tester or observing the effect of the contacts on the user-provided remote alarm circuits.

For additional information about the L1 Advanced Monitoring option, see the *Advanced Monitoring Operating Manual*.

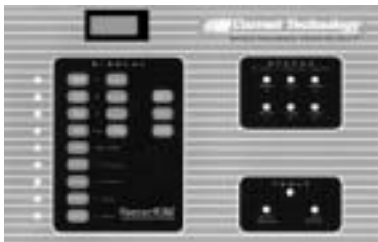
► **If your TransGuard has L2 Advanced Monitoring** (*see picture*): Verify that the green indicating lights are illuminated and that the red “fault” light is off. Three-phase units have three (3) green indicating lights labeled “A”, “B”, and “C”. Split-phase units should only have lights “A” and “C” illuminated.

The L2 Advanced Monitoring option contains an audible alarm that should not operate under normal conditions. The alarm can be tested by pressing the “ALARM TEST” button on the front of the door. The “LOW BATTERY” light should not be illuminated. If it is, change the 9 volt battery on the circuit board behind the door.

The L2 Advanced Monitoring option is also equipped with two sets of Form “C” contacts. The relay containing the contacts is in the “alarm condition” when the power is off to the unit, when the unit is encountering loss of power to one or more phases, or the TransGuard is encountering more than 50% loss of capacity due to internal fuse operation. Test the operation of the Form “C” contacts by de-energizing the TransGuard and checking the state of the contacts with a continuity tester or observing the effect of the contacts on the user-provided remote alarm circuits.

The L2 Advanced Monitoring option is equipped with a surge counter. The number of surges detected by the counter is displayed on a 6 digit LCD display on the front of the TransGuard door. The surge counter will also increment each time power is applied to the unit after being in the “off” state.

For additional information about the L2 Advanced Monitoring option, see the *Advanced Monitoring Operating Manual*.



TransGuard with L3 Advanced Monitoring.

► **If your TransGuard has L3 MasterMIND Monitoring** (*see picture*):

Verify that the green indicating lights are illuminated and that the red “fault” lights are off. Three-phase units have three (3) green indicating lights labeled “A”, “B”, and “C”. Split-phase units should only have lights “A” and “C” illuminated.

The L3 MasterMind Monitoring option contains an audible alarm that should not operate under normal conditions. The alarm can be tested by pressing the “ALARM TEST” button on the front of the door. The “LOW BATTERY” light should not be illuminated. If it is, change the 9 volt battery on the circuit board behind the door.

The L3 MasterMind Monitoring option is equipped with two sets of Form “C” contacts. The relay containing the contacts is in the “alarm condition” when the power is off to the unit, when the unit is encountering loss of power to one or more phases, or the TransGuard is encountering more than 50% loss of capacity due to internal fuse operation. Test the operation of the Form “C” contacts by de-energizing the TransGuard and checking the state of the contacts with a continuity tester or observing the effect of the contacts on the user-provided remote alarm circuits.

Troubleshooting

The L3 MasterMIND Monitoring option has the same features as the L2 Advanced Monitoring plus these additional features:

- RMS Voltage readout
- % Protection Available
- Swell Counter
- Surge Counter
- Sag Counter
- Outage Counter

For additional information about the L3 MasterMind Monitoring option, see the *Advanced Monitoring Operating Manual*.

Your Current Technology TransGuard surge suppression system does not require periodic maintenance. The unit's heavy-duty design should preclude the need for any repairs; however, the following indications and procedures may be appropriate:

INDICATION	PROCEDURE
One or more phase indicator lights are off.	<ol style="list-style-type: none">1. Check that the external power source supplying power to unit is energized.2. Check that the circuit breaker or switch (if appropriate) feeding the TransGuard is turned "on."3. Check the cables connecting the door-mounted devices to the suppression module.4. If all of above are O.K., contact factory.5. If breaker is tripped, use a portable Diagnostic Test Set (DTS-2) to verify unit integrity before resetting the breaker.
MasterTest hand-held test unit or MasterMind Advanced Monitoring indicates less than 50% available capacity.	Contact factory.
Portable Diagnostic Test Set (Current Technology Model DTS-2) indications are not in range for the product.	Contact factory.

Installation Assistance

Our staff is available to support you around the clock.

Monday through Friday, 8:00 a.m. to 5:00 p.m. (EST):

800.238.5000 or 804.236.3300

Nights, weekends and U.S. holidays:

888.200.6400

Operation / Maintenance

The TransGuard Surge Suppression System should provide years of uninterrupted service.

With several levels of monitoring available, the user should be able to verify the normal operation of the TransGuard and confirm that it is connected correctly to the power system.

Current Technology, Inc. does recommend two periodic tests in order to:

- Verify that the unit is able to clamp surges to an acceptable level
- Verify that the unit has acceptable surge handling capacity.

These tests should be coordinated with scheduled maintenance events in your facility. They can be performed in house with the aid of the DTS-2 Portable Test Set and the MasterTEST Portable Set or requested as a service from Current Technology, Inc. or their authorized service representative.

Options

The TransGuard Surge Suppression System is available with the following options:

- L1 Advanced Monitoring
- L2 Advanced Monitoring
- L3 MasterMIND Monitoring
- DTS-2 Portable Test Kit
- MasterTEST Portable Test Kit

7-Year Limited Warranty

The TransGuard is warranted to be defect-free and performance-guaranteed for 7 years.

Specifications

Size and Weight:

MODEL	ENCLOSURE SIZE/WEIGHT	
	NON-METALLIC ENCLOSURE	METAL ENCLOSURE
TG200-300	19.5"H x 17.5"W x 9.5"D / 57 lbs	28"H x 16"W x 9.5"D / 91 lbs
TG100-150	17.5"H x 15.5"W x 7.0"D / 40 lbs	20"H x 16"W x 9.5"D / 59 lbs
TG60-80	15.5"H x 13.5"W x 7.0"D / 28 lbs	16"H x 16"W x 9.5"D / 45 lbs

Note: See Appendix for open frame dimensions and weights.

Single Pulse Surge Ratings: The following single pulse surge ratings are measured and presented in accordance with NEMA LS1-1992 and can be verified with independent laboratory test reports:

- TG60 – 60 kA: All modes
- TG80 – 80 kA: All modes
- TG100 – 100 kA: All modes
- TG125 – 125 kA: All modes
- TG150 – 150 kA: All modes
- TG200 – 200 kA: All modes
- *TG250 – 250 kA: All modes
- *TG300 – 300 kA: All modes

*In compliance with NEMA LS1-1992, TransGuard suppression filter systems are single pulse surge current tested in all modes at rated currents of the product by an industry-recognized independent test laboratory. Single pulse surge current capacities of 200,000 amps or less are established by single-unit testing of all components or sub-assemblies within each mode. Due to present industry test equipment limitations, single pulse surge current capacities over 200,000 amps are established via testing of individual components or sub-assemblies within a mode. Per ANSI/IEEE C62.41-1991 and ANSI/IEEE C62.45-1992, TransGuard suppression filter systems are repetitive surge current capacity tested per mode utilizing a 1.2 x 50 μ sec 20KV open circuit voltage, 8 x 20 μ sec 10 kA short circuit current Category C3 bi-wave at one minute intervals without suffering either performance degradation or more than 10% deviation of clamping voltage at a specified surge current.

REPETITIVE SURGE CURRENT CAPACITY PER MODE	
MODEL	IMPULSES
TG60	> 3,500
TG80	> 4,000
TG100	> 4,500
TG125	> 5,000
TG150	> 5,500
TG200	> 6,500
TG250	> 7,000
TG300	> 7,500

Repetitive Surge Rating: The following repetitive surge current capacities were achieved in all modes utilizing a 1.2 x 50 μ sec, 20 kV open circuit voltage, 8 x 20 μ sec, 10 kA short-circuit current Category C3 bi-wave at one minute intervals without performance degradation of more than 10% deviation of clamping voltage.

Operating Frequency: 47 to 63 Hertz

Noise Attenuation: The following EMI-RFI noise rejection, or attenuation values, for TransGuard are in compliance with test and evaluation procedures outlined in NEMA LS1 –1992, paragraphs 2.2.11 and 3.11. :

EMI-RFI FILTER ATTENUATION (dB)				
PRODUCT	ATTENUATION FREQUENCY			
	100 KHz	1MHz	10MHz	100MHz
TG 60, 80	50 dB	37 dB	38 dB	53 dB
TG 100, 125, 150	44 dB	33 dB	36 dB	53 dB
TG 200, 250, 300	41 dB	31 dB	35 dB	53 dB

Note: Standardized insertion loss data obtained utilizing MIL-STD-220A 50 ohm insertion loss methodology. Noise source path = 100' to model maximum average circuit distance, filter connection distance = 6".

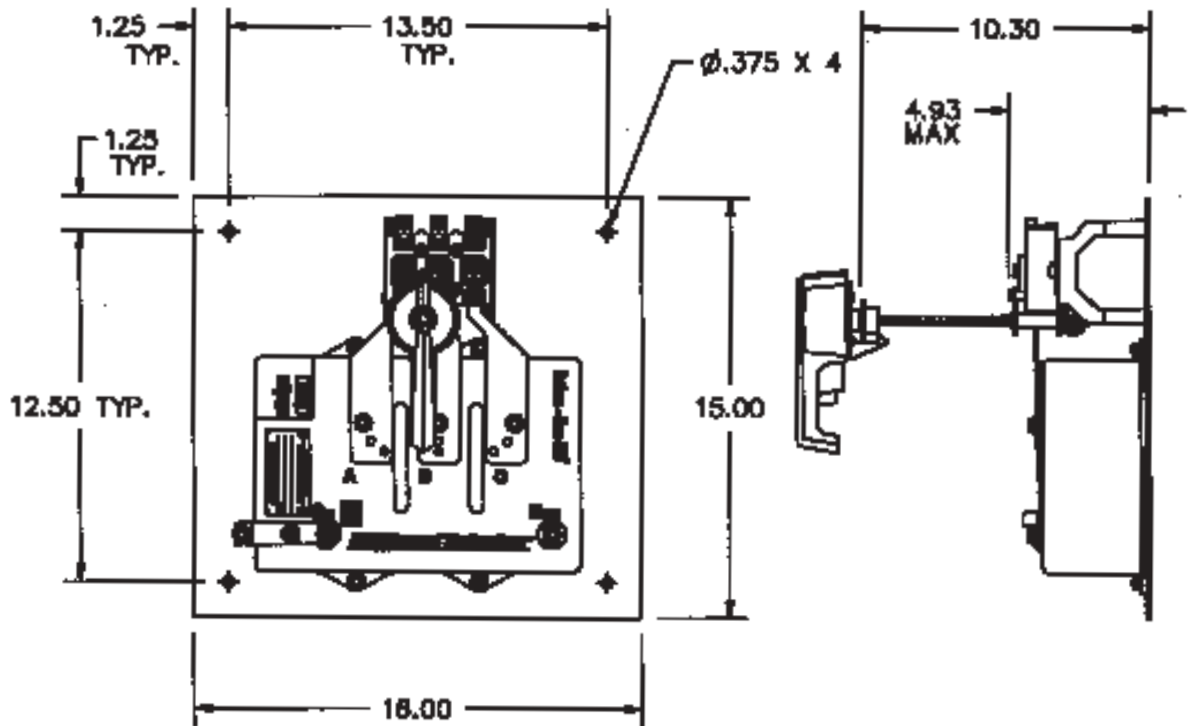
Standards and Listings

The following standards and listings apply to the TransGuard product line:

- NEMA LS1-1992
- UL 1449, 2nd Edition
- UL 1283
- UL Recognized Fusing
- CSA C22.2
- ANSI/IEEE C62.41 – 1991
C62.45 – 1992

For additional information see the TransGuard Suppression Filter System GUIDE SPECIFICATIONS.

REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
1	ENGINEERING RELEASE	10/07/99	PJ MFG
2	ENGINEERING RELEASE	10/14/99	PJ MFG
3	ENGINEERING RELEASE	12/5/99	FS MFG



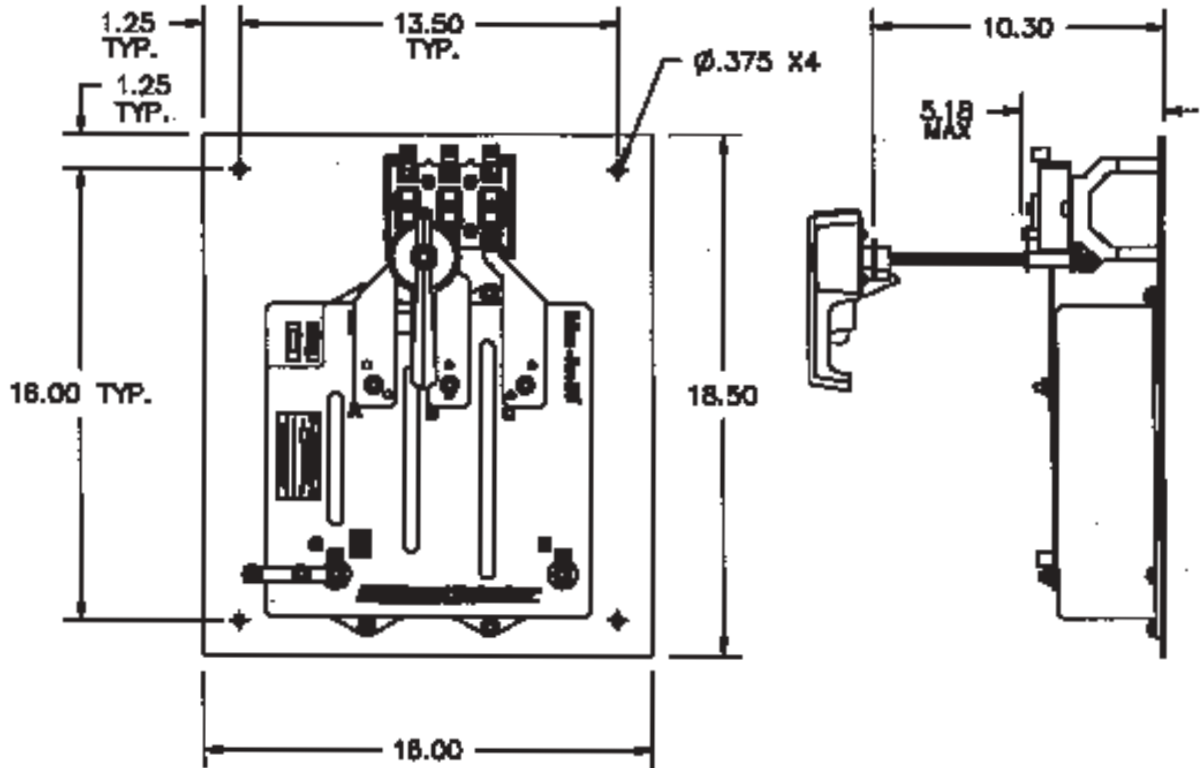
NOTES: UNLESS OTHERWISE SPECIFIED

1. WEIGHT: 45 LBS MAX.
 2. OPTIONAL LENGTH SHAFT KITS AVAILABLE FROM MANUFACTURER.
- PROPERTY OF CURRENT TECHNOLOGY INC.
 PROPRIETARY INFORMATION
 - ALL RIGHTS RESERVED -
 CURRENT TECHNOLOGY INC.

QTY	INTL NO.	ITEM NO.	PART NUMBER	DESCRIPTION/REMARKS
REQD BY:	DATE:	CURRENT TECHNOLOGY, INC.		
JERRY D. BATES	10/04/99	3001 WEST STORY RD. IRVING, TEXAS 75038		
DESIGNED BY:	DATE:	TITLE: DWG. OUTLINE,		
<i>[Signature]</i>	12/14/99	OPEN FRAME, TG60-80,		
MANUFACTURED BY:	DATE:	WITH DISCONNECT		
QUALITY CONTROL:	DATE:	SIZE: A	DRAWING NO. 780-0008-004	REV. 3
FORMAL RELEASE:	DATE:	SCALE: NONE	CAD FILE NO. 00080043	SHT 1 OF 1
REVISION BY:	DATE:			
M.F. GOMES	12/02/99			
PLT DATE: 12/02/99				

Appendix: Open-Frame Drawings

REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
1	ENGINEERING RELEASE	10/07/99	PJ MFG
2	ENGINEERING RELEASE	10/14/99	PJ MFG
3	ENGINEERING RELEASE	12/5/99	PS MFG



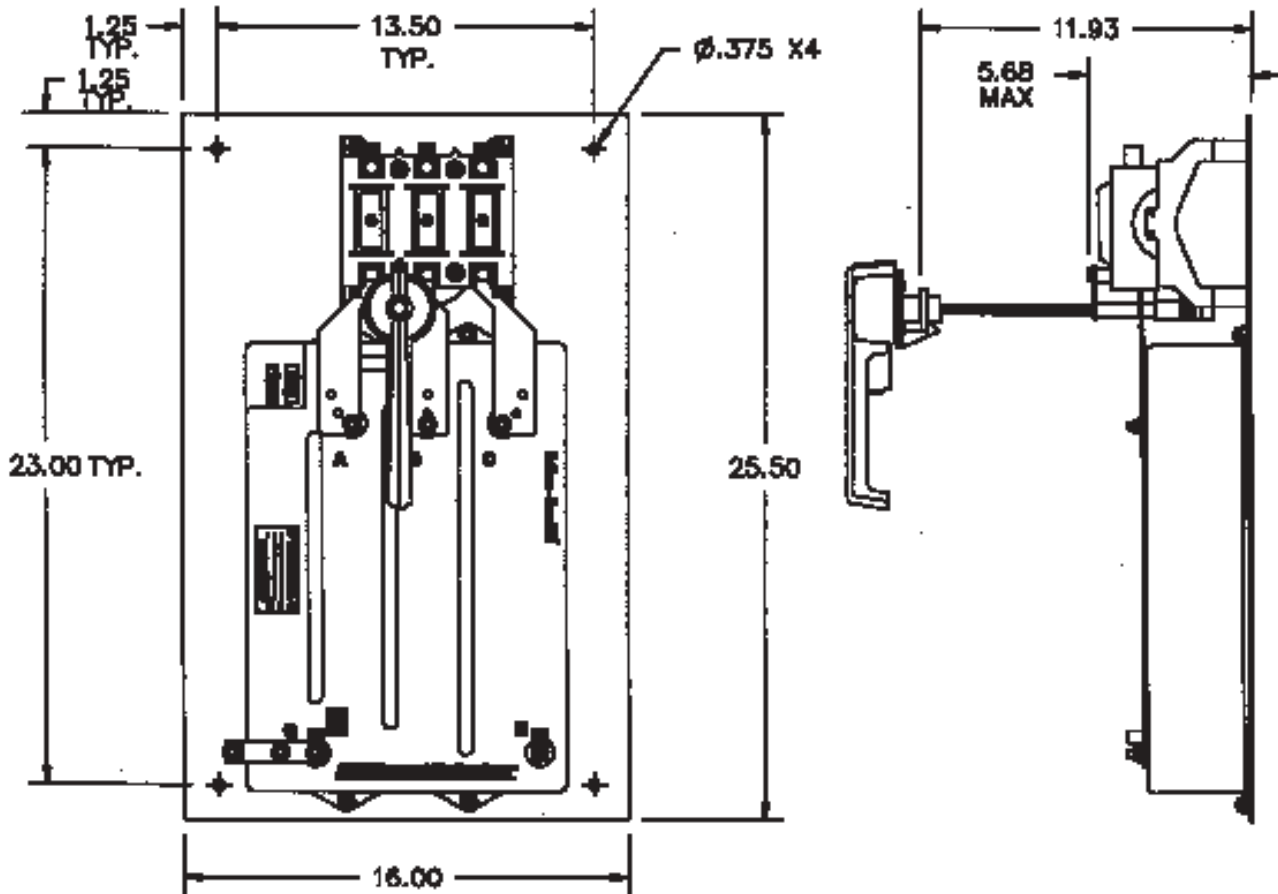
NOTES: UNLESS OTHERWISE SPECIFIED

1. WEIGHT: 59 LBS MAX.
2. OPTIONAL LENGTH SHAFT KITS AVAILABLE FROM MANUFACTURER.

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QTY REQD	SH-1 NO.	FORM NO.	PART NUMBER	DESCRIPTION/NOMENCLATURE
DESIGN BY: M.F. GOMES	DATE: 10/01/99	CURRENT TECHNOLOGY, INC. 3001 WEST STORY RD. IRVING, TEXAS 75038 TITLE: DWG. OUTLINE OPEN FRAME, TG100-150, WITH DISCONNECT		
DESIGNED BY: <i>[Signature]</i>	DATE: 10/12/99			
MANUFACTURING:	DATE:			
QUALITY CONTROL:	DATE:			
FORMAL RELEASE:	DATE:	SIZE: A	DRAWING NO. 780-0008-005	REV. 3
DESIGN BY: M.F. GOMES	DATE: 12/02/99	SCALE: NONE	CAD FILE NO. 00080053	SHT 1 OF 1
PLLOT DATE: 12/02/99				

REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
1	ENGINEERING RELEASE	10/07/99	PJ MFG
2	ENGINEERING RELEASE	10/14/99	PJ MFG
3	ENGINEERING RELEASE	12/5/99	FS MFG



NOTES: UNLESS OTHERWISE SPECIFIED

1. WEIGHT: 91 LBS MAX.
2. OPTIONAL LENGTH SHAFT KITS AVAILABLE FROM MANUFACTURER.

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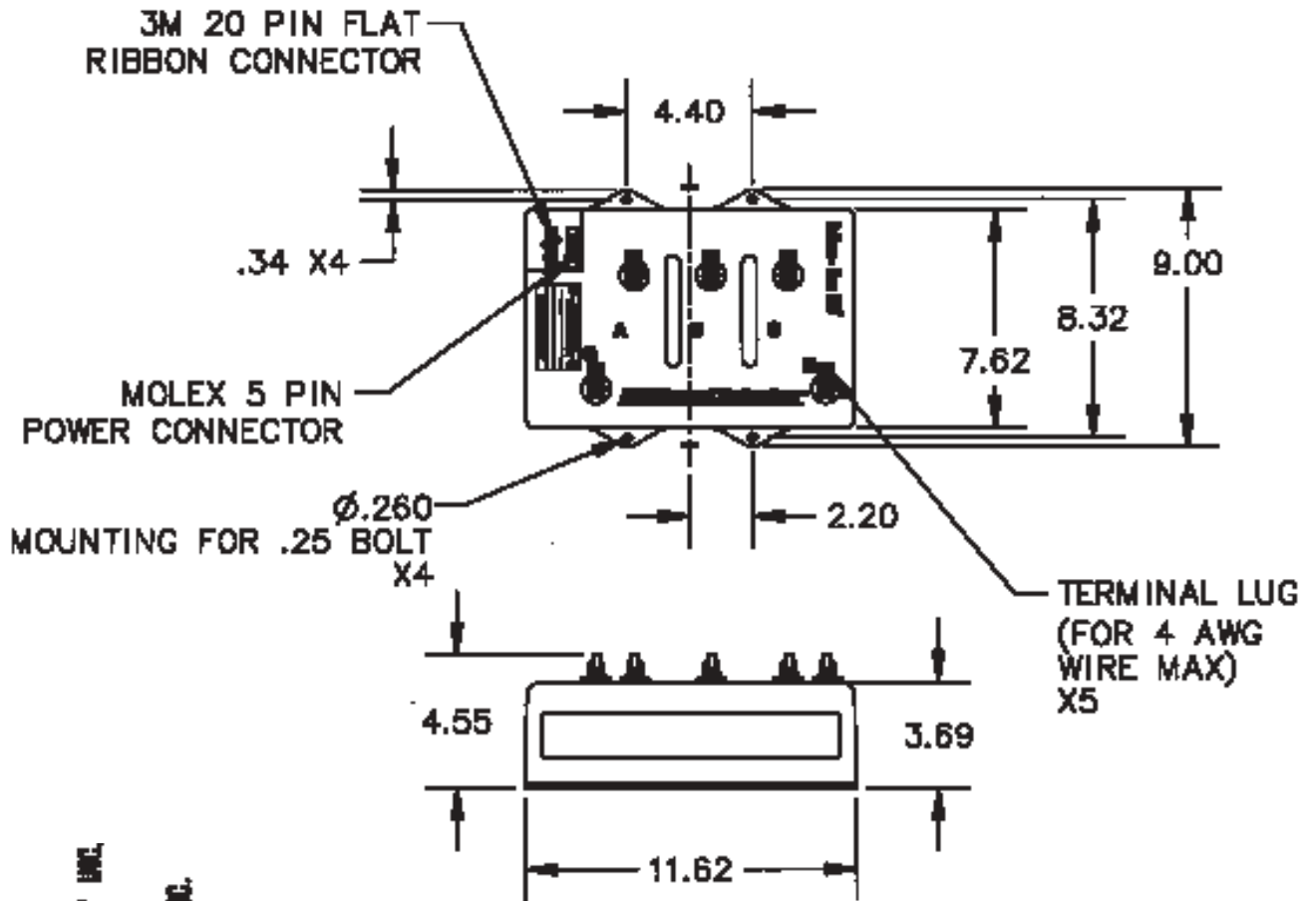
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QTY REQD	ENT. NO.	ITEM NO.	PART NUMBER	DESCRIPTION / NOMENCLATURE
DESIGN BY M.F. GOMES	DATE 10/04/99	CURRENT TECHNOLOGY, INC. 3001 WEST STORY RD. IRVING, TEXAS 75038 TITLE: DWG, OUTLINE, OPEN FRAME, TG200-300 WITH DISCONNECT		
DRAWN BY S. J. Baker	DATE 12/15/99			
MANUFACTURING:	DATE			
QUALITY CONTROL:	DATE			
FORMAL RELEASE:	DATE	SIZE A	DRAWING NO. 780-0008-006	REL 3
REVISION BY M.F. GOMES	DATE 12/03/99	SCALE NONE	Q&S FILE NO. 00080063	ENT 1 OF 1
PLT DATE 12/03/99				

REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
1	ENGINEERING RELEASE	03/30/99	TFC LBO

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE REFERENCE AND ARE IN INCHES.
2. UNIT WEIGHT IS 18 LBS, YELLOW COLOR, POLYCARBONATE.
3. UL RECOGNIZED 200K AIC INTERNAL FUSING.
4. UL 1449 SECOND EDITION.



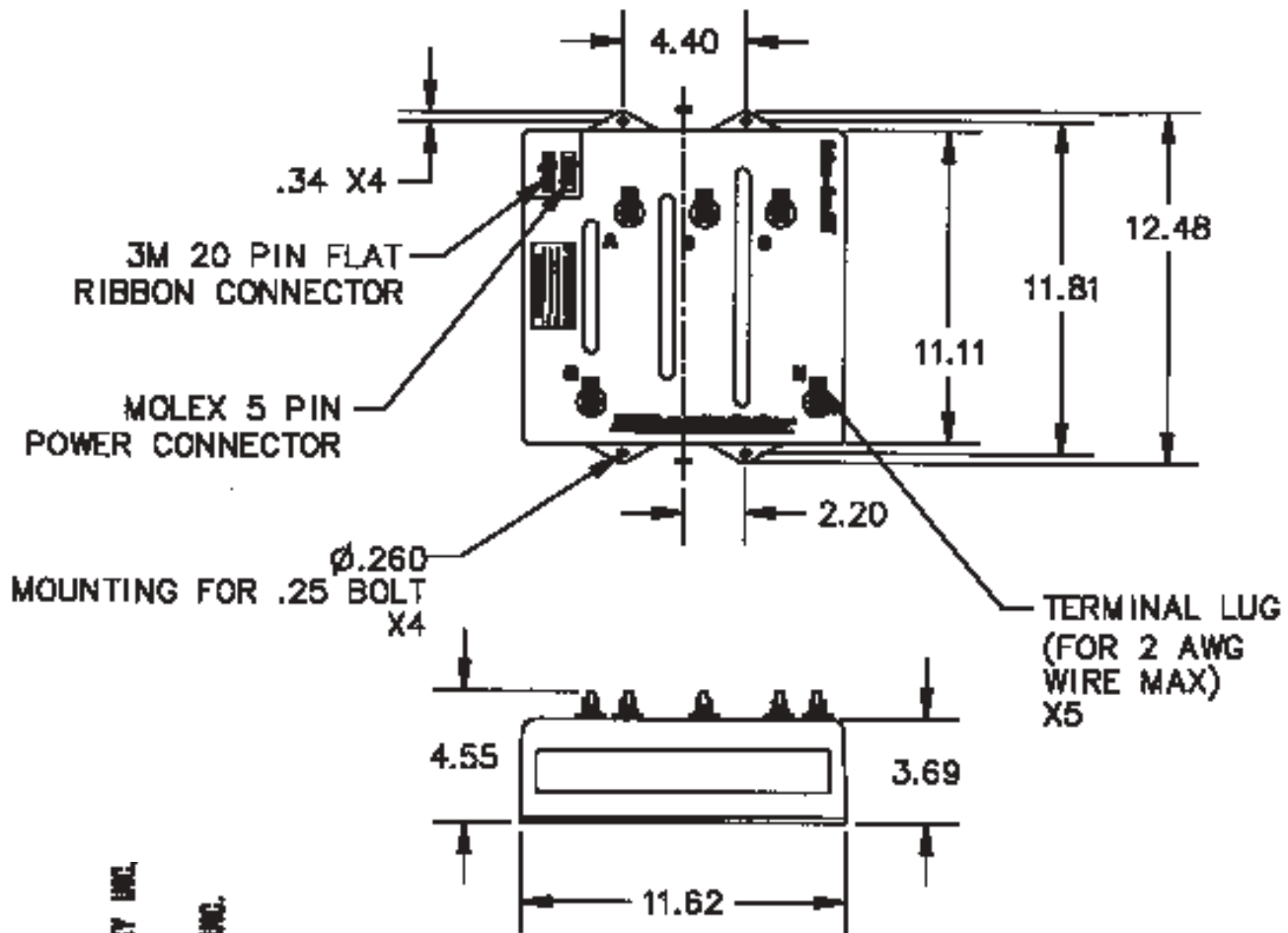
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QTY REQD	INTL NO.	ITEM NO.	PART NUMBER	DESCRIPTION/NOMENCLATURE
DESIGN BY L.B. OWEN	DATE 03/24/99	CURRENT TECHNOLOGY, INC. 3001 WEST STORY RD. IRVING, TEXAS 75038		
CHECKED BY JERRY D. BATES	DATE 03/30/99			
ENGINEERING TOM GRISLER	DATE 03/30/99	TITLE DWG. OUTLINE, OPEN FRAME, ISB 60-80		
MANUFACTURING	DATE			
QUALITY CONTROL	DATE			
FORMAL RELEASE	DATE			
REVISION BY L.B. OWEN	DATE 03/30/99	SIZE A	DRAWING NO. 780-0008-001	REV. 1
PLDT DATE 03/30/99	SCALE 1:6	CAD FILE NO. 00080011	SHT 1	OF 1


REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
1	ENGINEERING RELEASE	03/30/99	TFC LBO

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE REFERENCE AND ARE IN INCHES.
2. UNIT WEIGHT IS 28 LBS, YELLOW COLOR, POLYCARBONATE.
3. UL RECOGNIZED 200K AIC INTERNAL FUSING.
4. UL 1449 SECOND EDITION.



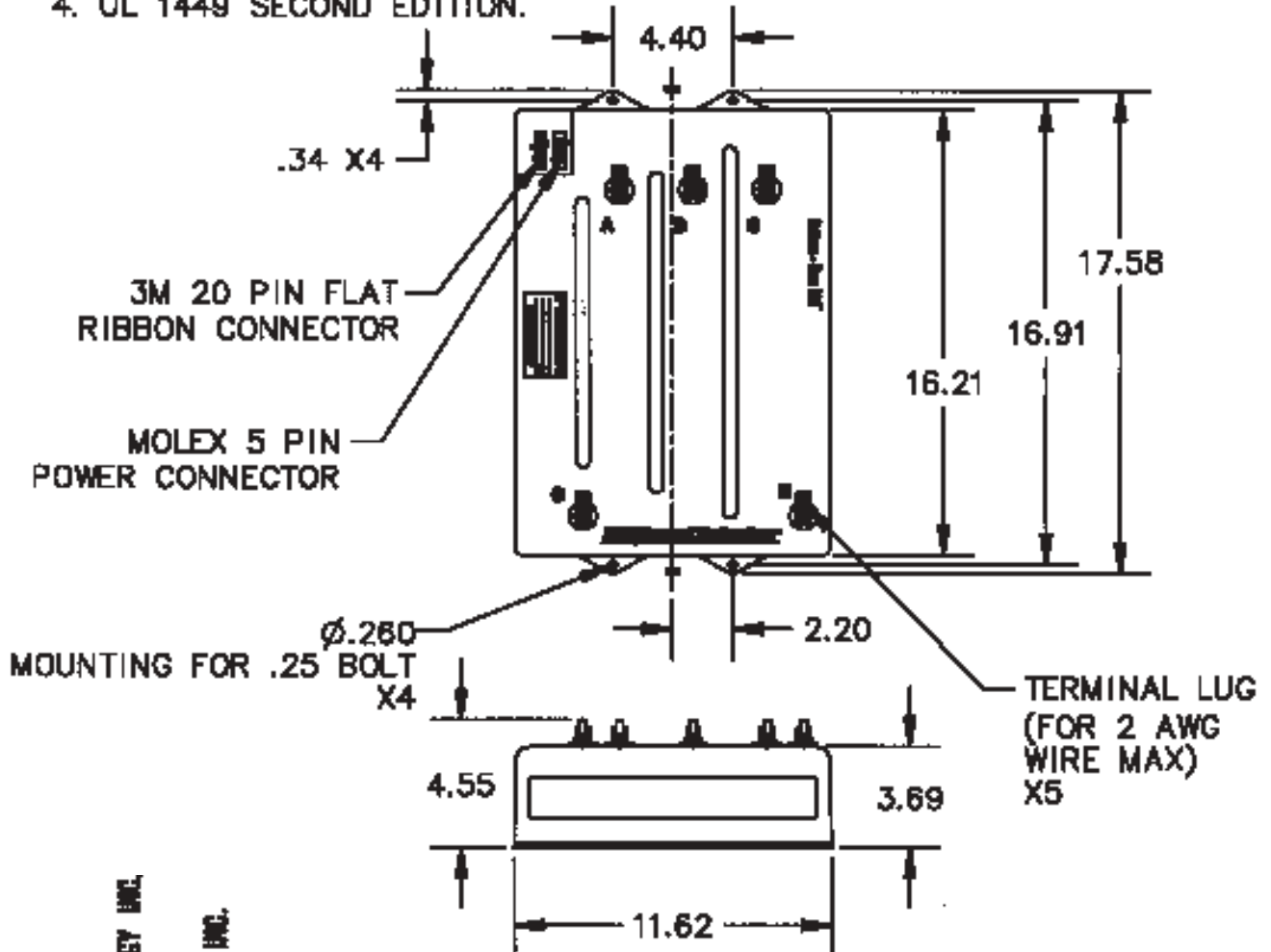
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 PROPRIETARY INFORMATION
 ALL RIGHTS RESERVED -
 CURRENT TECHNOLOGY INC.

QTY	INTL. NO.	ITEM NO.	PART NUMBER	DESCRIPTION/NOMENCLATURE
DRAWN BY	L.B. OWEN	DATE	03/24/99	 CURRENT TECHNOLOGY, INC. 3001 WEST STORY RD. IRVING, TEXAS 75038
DESIGNED BY	JERRY D. BATES	DATE	03/30/99	
APPROVED BY	TOM CRISSLER	DATE	03/30/99	TITLE
MANUFACTURING		DATE		DWG. OUTLINE, OPEN FRAME, ISB 100-150
QUALITY CONTROL		DATE		SIZE
FORMAL RELEASE		DATE		A
REVISION BY	L.B. OWEN	DATE	03/30/99	DRAWING NO.
PLG DATE	03/30/99			780-0008-002
				REV.
				1
				SCALE
				1:6
				DWG FILE NO.
				00080021
				SHEET
				1 OF 1

REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
1	ENGINEERING RELEASE	03/30/99	TFC LBO

NOTES: UNLESS OTHERWISE SPECIFIED

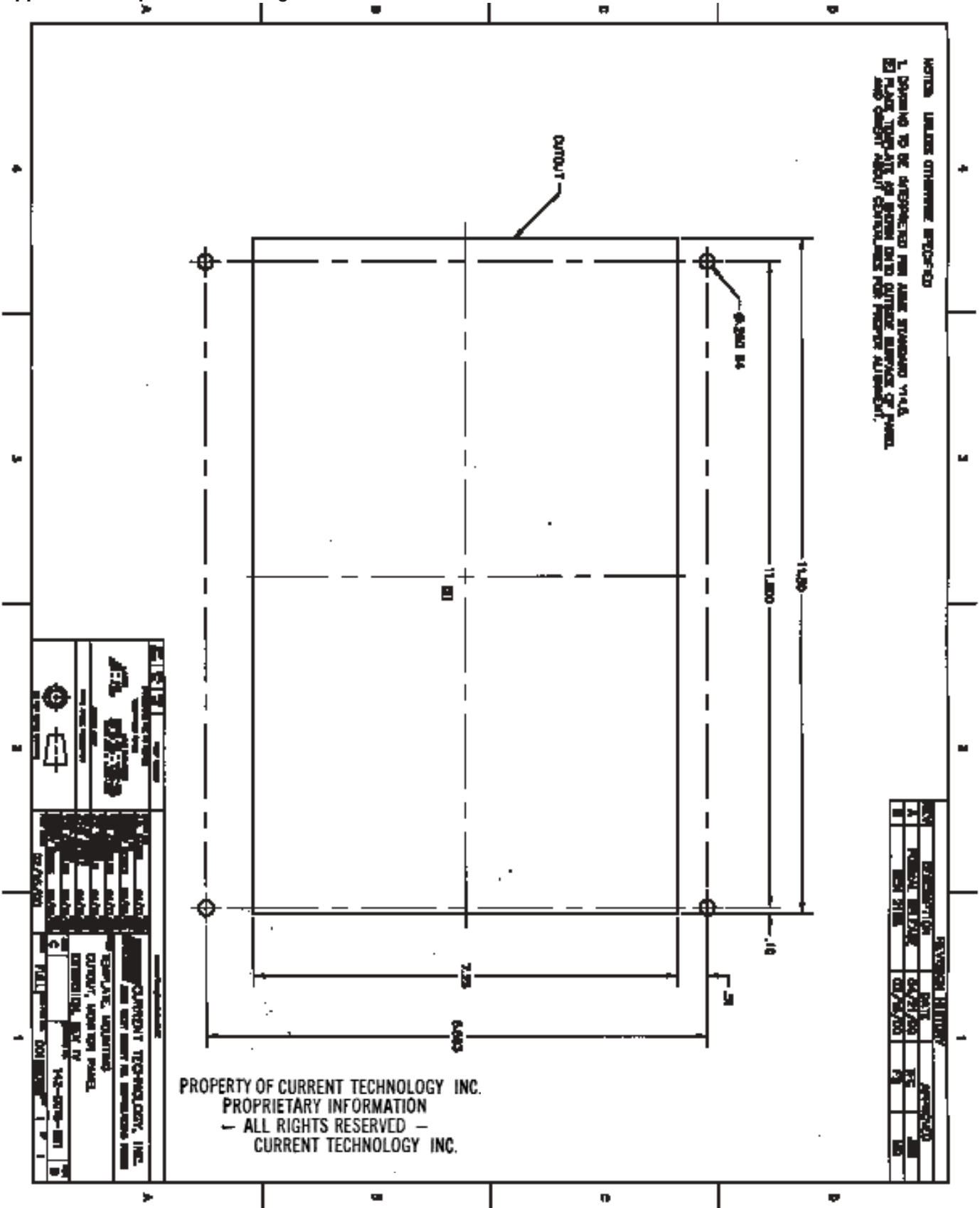
1. ALL DIMENSIONS ARE REFERENCE AND ARE IN INCHES.
2. UNIT WEIGHT IS 44 LBS, YELLOW COLOR, POLYCARBONATE.
3. UL RECOGNIZED 200K AIC INTERNAL FUSING.
4. UL 1449 SECOND EDITION.



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QTY REQD	INTL NO.	ITEM NO.	PART NUMBER	DESCRIPTION/ABBREVIATION
DRAWN BY: L.B. OWEN			DATE: 03/24/99	CURRENT TECHNOLOGY, INC. 3001 WEST STORY RD. IRVING, TEXAS 75038
CHECKED BY: JERRY D. BATES			DATE: 03/30/99	
ENGINEER: TOM CHISSLER			DATE: 03/30/99	
MANUFACTURING:			DATE:	
QUALITY CONTROL:			DATE:	TITLE: DWG, OUTLINE, OPEN FRAME, ISB 200-300
FORMAL RELEASE:			DATE:	
REVISION BY: L.B. OWEN			DATE: 03/30/99	SIZE: A
PLOT DATE: 03/30/99			SCALE: 1:6	DRAWING NO. 780-0008-003
			CAD FILE NO. 00080031	SHEET 1 OF 1

Appendix: Template, Mounting Cutout



REV	DESCRIPTION	DATE	APPROVED
1	ISSUE	04/21/00	RE
2	REVISED	02/28/00	RE

	CURRENT TECHNOLOGY, INC. 145-5076-100 145-5076-100
145-5076-100 145-5076-100	145-5076-100 145-5076-100

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