TRYSTAR

SERIES 700F POWER PROCESSOR

OWNERS MANUAL

37.5KVA
480V INPUT
120/240V OUTPUT,
SINGLE PHASE, 60HZ

IMPORTANT - SAVE THESE INSTRUCTIONS - PLEASE READ THIS MANUAL BEFORE USING EQUIPMENT

15765 Acorn Trail / Faribault, MN 55021 / 507.333.3990

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FEATURES AND SPECIFICATIONS

Trystar engineers and manufactures the industry's highest quality power conditioners and voltage regulators, capitalizing on 40 years of expertise. We have an enviable reputation for quality, which is reflected in the design, workman-ship, and performance of our products.

Subjecting commercial and industrial electrical systems to a harsh, "polluted" electrical environment increases downtime, main-tenance costs, and lost productivity. Maintaining steady, spike-free voltage and keeping ground noise away from the controls, increases the reliability of electronic equipment, contributes to the overall integrity of data, and enhances workflow and productivity.

Trystar front access Series 700F Power Processor is a solid-state, automatic voltage regulator which guards against both high and low voltage conditions. The Series 700F easily corrects wide input voltage deviations to well within the safe operating limits for information technology equipment as recommended by CBEMA and ITIC. The power protection that the Series 700F delivers, meets the IEEE and ANSI standards that define power anomalies, occurrences, and their impact on operations.

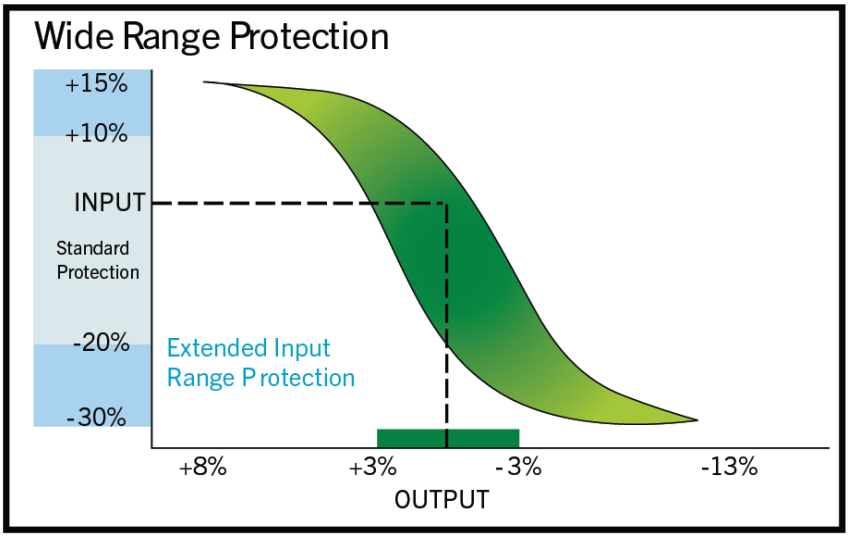
Features & Benefits

- Front access only! All installation, operation, maintenance, and testing can occur from the front of the unit - no side or rear access required.
- 7-tap, microprocessor-controlled for tight voltage regulation, accuracy, and stability.
- Precisely maintains correct voltage to ± 3% within one cycle, and maintains regulation during extended brownouts.
- Low output impedance transformer minimizes voltage distortion and sags commonly associated with high surge currents.
- Triple-shielded isolation transformer provides a noise-free ground, attenuates voltage spikes and transients, and re-establishes the N-G bond.
- Internal manual bypass option maintains system isolation, voltage transformation, and power conditioning.
- Superior compatibility with dynamic loads.
- Increased surge capability, without the need for automatic bypassing, provides full-time power conditioning.
- High-efficiency design results in lower operating cost.

Line Voltage Regulation

Input Line Voltage: +10%, - 20%

Output Line Voltage: ± 3% typical



Product Specifications

- Input Operating Voltage Range: +10%, - 20% from nominal (Extended regulation range options available.)
- Input Frequency: 60 Hz, ± 3 Hz
- Input Power Factor: > .99 PF with resistive load
- Reflected Harmonics: Triplen harmonics are not reflected to the utility under non-linear loads
- Output Line Voltage Regulation: ± 3% from nominal
- Response Time: < 1/2 cycle
- Correction Time: 1 cycle
- Load Regulation: 2.5% typical, no load to full load
- Overload Rating: 200% for 10 seconds; 1000% for 1 cycle
- Noise Attenuation:

  Common Mode: 146 dB

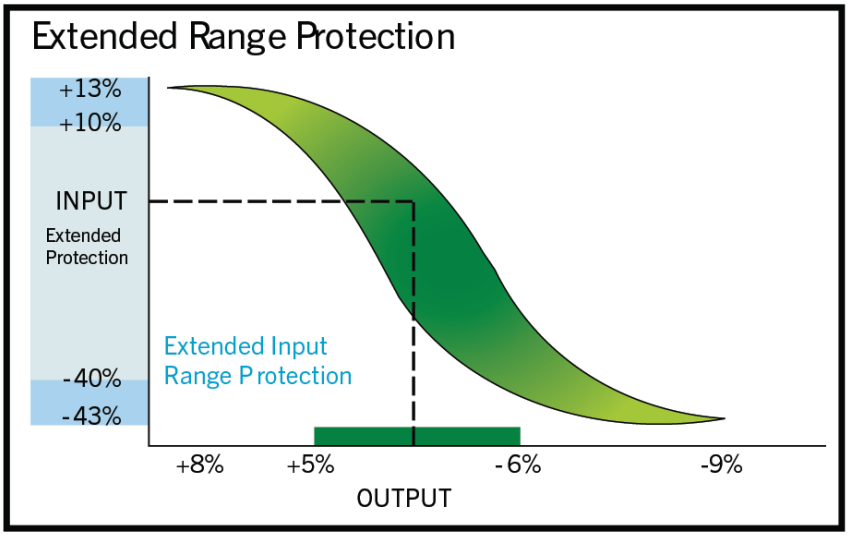
  Transverse Mode: 3 dB down at 1 kHz; 40 dB down per decade to below 50 dB with a resistive load
- Transient Voltage Suppression: Meets ANSI C62.41 Category B-3
- Efficiency :96% - 97% typical, model and load dependant

Extended Line Voltage Regulation

Optional Extended Range for Intermittent Duty only:

Input Line Voltage: +10%, - 40%

Output Line Voltage: + 5%, - 6% typical



RECEIVING, INSPECTING AND STORING THE UNIT

Note: Be sure to remove the front, back or side panels as required, and inspect the inside of the unit for shipping damage.

INSPECTING THE POWER PROCESSOR

Upon receipt of the unit, visually inspect for shipping damage. If any damage is found, the Purchaser must contact the Carrier immediately and file a shipping damage claim.

NOTE: Be sure to remove the front, back or side panels as required, and inspect the inside of the unit for shipping damage.

If any internal damage has occurred or any external damage that could affect the operation of the unit, please contact Trystar.

IMPORTANT NOTICE

This shipment has been carefully inspected, checked and properly packaged at our company.

When it was delivered to the carrier it was in good condition and technically it became your property at that time. Thus, any damage, whether obvious or hidden, must be reported to the transportation company within FIVE days of receipt of the shipment at your premises to avoid forfeiting claims for damages.

FOR ALL SHIPMENTS DAMAGED IN TRANSIT

Leave the items, packing material and carton “AS IS”. Notify your carrier’s local office and ask for immediate inspection of the carton and contents.

After inspection has been made by the carrier, and you have received acknowledgment in writing as to the damage, notify our Customer Service Department to make any required repair arrangements.

It is your responsibility to follow the above instructions or the carrier will not honor any claims for damage. Also, if there are any shortages or questions regarding this shipment, please notify us within FIVE days.

Please note that we cannot be responsible for any service work or back-charges unless authorized by us in writing, before the work is performed.

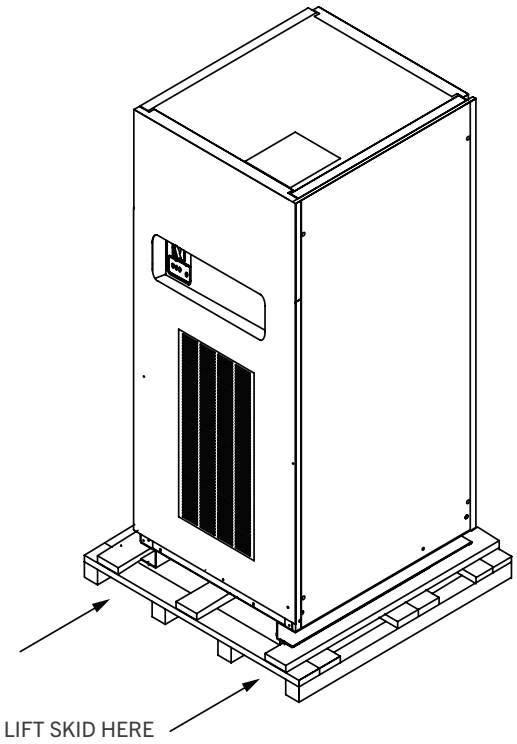
STORING

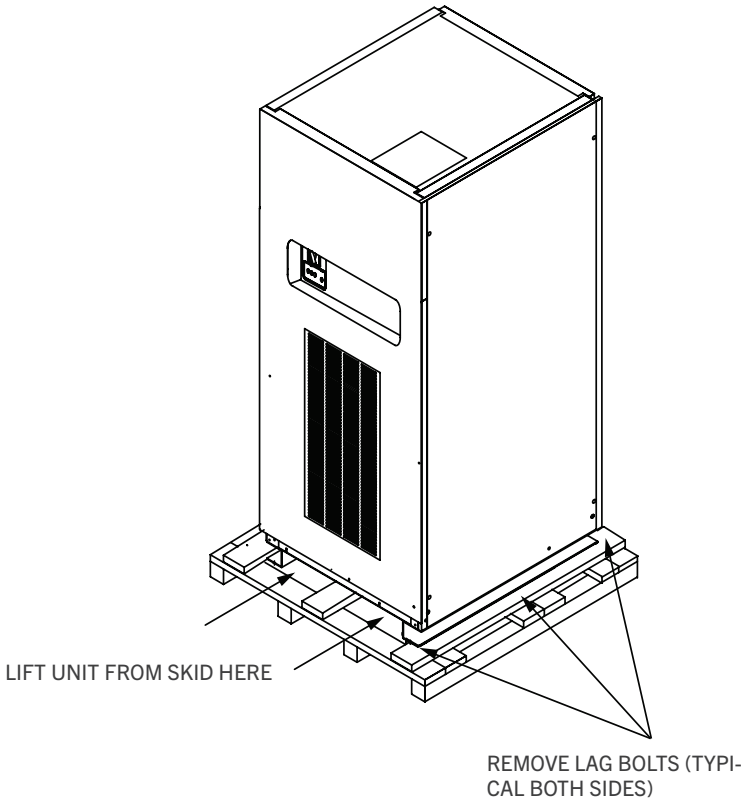
If it is necessary to store the unit for a period of time before it is installed, be sure to place the unit in a clean, dry area. To prevent excessive dust from accumulating on the unit, it is advisable to protect it by replacing it in the original container (if possible). If the original container is not available it is recommended that all openings that lead internally into the unit are covered so that dust, water or any other substance cannot come in contact with the internal components of the system. The unit must be handled at all times with the same care you would give to any piece of precision industrial equipment.

REMOVING THE UNIT FROM THE PALLET

REMOVING THE POWER PROCESSOR FROM PALLET

Please take special care when removing the unit from the pallet. Proper equipment must be used for lifting and moving, and all safety precautions should be taken. Each unit is bolted to a wooden pallet. In order to properly remove the cabinet from the pallet, all bolts connecting the unit to the pallet must be removed completely. The unit can then be lifted off the skid using a pallet jack or fork lift. When lifting the unit off of the pallet, be sure to take proper safety precautions. Serious injury and/or unit damage can result otherwise.





SAFETY PRECAUTIONS

WARNING

THERE ARE DANGEROUSLY HIGH VOLTAGES PRESENT WITHIN THE ENCLOSURE OF THE POWER SUPPLY SYSTEM.

CAUTION MUST BE TAKEN WHEN WORKING WITH THE SYSTEM.

IT IS RECOMMENDED THAT ALL WORK BE PERFORMED BY QUALIFIED ELECTRICAL PERSONNEL ONLY.

CAUTION

RISK OF ELECTRICAL SHOCK AND HIGH SHORT CIRCUIT CURRENT. THE FOLLOWING PRECAUTIONS SHOULD BE OBSERVED-WHEN WORKING ON THE UNIT:

1) REMOVE WATCHES, RINGS, OR OTHER METAL OBJECTS.

2) USE TOOLS WITH INSULATED HANDLES.

3) WEAR RUBBER GLOVES AND BOOTS.

CAUTION

- FOLLOW ALL STANDARD AND LOCAL ELECTRICAL CODES.
- DO NOT ALLOW WATER OR FOREIGN OBJECTS TO GET INSIDE THE UNIT.
- DO NOT PLACE OBJECTS OR LIQUIDS ON TOP OF THE UNIT.
- DO NOT LOCATE THE UNIT NEAR RUNNING WATER.

PRELIMINARY INSTALLATION

INSTALLATION CONSIDERATIONS

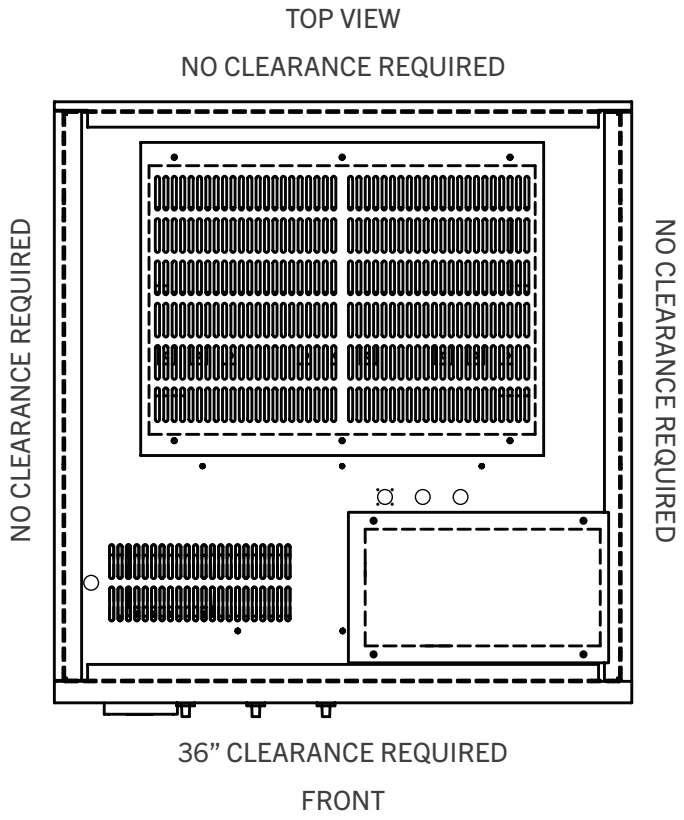
Prior to installing the Series 700F, be sure to take into consideration the installation site you have selected. Power Processors produce heat and therefore require ventilation as well as accessibility. Consider these factors:

- Ventilation
- Size of the Power Processor
- Weight Load
- Audible Noise Requirements
- Remote Emergency Power Off (Repo)
- Monitors
- Options
- Clean Environment
- Input Source Voltage
- Receiving Facilities
- Distribution of Power
- Room Temperature
- Clearances
- Accessibility
- Excessively Long Power Runs
- Proper Ground Techniques

CHOICE OF LOCATION

The unit has been completely inspected and extensively tested under various load conditions prior to shipment. Care to install it at a proper location will assure long trouble-free operation.

The unit is air cooled with the air intake at the bottom and exhausts at the top, front or at the sides. Therefore, it should be installed in a clean, dry place with enough clearance to allow a free flow of air. No clearance is required at the left, right or rear sides of the unit and the wall or other equipment. Allow at least 36 inches of space for maintenance at the front of the unit. Allow at least 24" of space at the top of the unit for air flow. (See "*Installation"- Cabinet Clearances, Input/Output Terminal Location and Conduit Entry Locations" or "Appendix A - Cabinet Outline"*)



NOMINAL INPUT CURRENT AT 480V INPUT VOLTAGE		
MODEL	INPUT VOLTAGE	
	480V	480V INPUT BREAKER SIZE
37.5KVA	82.03	125A

NOMINAL OUTPUT CURRENT AT 120/240V OUTPUT VOLTAGE	
MODEL	OUTPUT VOLTAGE
	120/240V
37.5KVA	156.25A
If unit is provide with no output circuit breaker option, output over-current protection and a disconnect device (circuit breaker) shall be provided by others.	

WEIGHT, DIMENSIONS AND BTU’s				
MODEL	CONTINUOUS KVA	FULL LOAD BTU’s / HR	DIMENSIONS	WEIGHT (LBS.)
37.5KVA	37.5	3,836	29”W X 35.5”D X 66”H	890 (404Kg)
Stated BTU’s / Hr. is at 100% rated load, 100% duty cycle.				

The unit is constructed using an isolation transformer and is considered to be a “separately derived system” It should be grounded in accordance with the NFPA 70 article 250.20 “Alternating-Current Circuits and Systems to Be Grounded”, article 250.20(D) “Separately Derived Systems” and article 250.30 “Grounding Separately Derived Alternating-Current Systems”

REFER TO THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE REQUIREMENTS FOR OVER-CURRENT PROTECTION AND WIRE SIZING.

CAUTION

To reduce the risk of fire, use only on circuits provided with ampere-branch circuit protection, in accordance with the National Electric Code,

ANSI/NFPA 70.

INSTALLATION

OPTION WIRING SHOULD BE DONE PRIOR TO CONNECTING PRIMARY INPUT AND OUTPUT POWER LINES

Before installing the Power Processor make sure that the input voltage and the output voltages match the unit’s specification plate.

INPUT WIRE SIZE, GROUNDING AND OUTPUT WIRING

A. Conduit should be used for both input and output wiring.

B. Input wire ampacity is specified in NEC table 310.15(B)(16). Specifying not more 3 connections in a raceway based on an ambient of 30°C and wire rated for 90°C (Note: amperages will need to be adjusted for 40^0 C ambient applications). Grouund wire sizing is specified in NEC table 250. 122.

C. Input phase conductors are terminated directly to the input circuit breaker terminals.
Wire range:

480V	125A	8AWG

D. Input Ground - An ILSCO TA-2/0 terminal allows wire sizes from 2/0 - #14AWG.

E. Output is a 3 wire (4 including ground). If four (3) current carrying conductors are used in a raceway the neutral is assumed to be current carrying and the wire must be de-rated as indicated in the 2011 NEC table 310.15(B)(16).

Example:
1. Assume #10 wire max current = 25 Amps.
2. Multiply 25 x .8 = 20
3. 20 Amps is max current for #10 wire in a raceway with 4 conductors.

Note: Installation is subject to local codes - verify with a local electrical inspector.

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F. All output ground and neutral terminals are copper bus bars w/ two holes. Double bolted lug are recommended. Manufactured by Burndy

RECOMMENDED LUGS: Double bolted type as supplied by Burndy Copper Compression lug, 2 hole Type YA, ¼" stud, ¾" spacing.

YA6CL-2TC14E2 #6 wire	YA25L-2TC14E2 #1/0 wire
YA4CL-2TC14E2 #4 wire	YA26L-2TC14E2 #2/0 wire
YA2CL-2TC14E2 #2 wire	YA27L-2TC14E2 #3/0 wire
YA1CL-2TC14E2 #1 wire.	YA28L-2TC14E2 #4/0 wire X 2

Output connections are made directly to the output bus terminal(s) and output neutral and ground bus provided. The load current is not to exceed the rated total current.

Output connections are made directly to the output bus and/or to the load side (bottom) of the optional output circuit breakers provided (refer to the units output breakers for proper lug wire range sizes). Output neutral and ground bus are also provided *(See "Installation - Cabinet Clearances, Input/Output Terminal Location and Conduit Entry Locations" or "Appendix A - Cabinet Outline"* for bus locations). The load current is not to exceed 80% of the output breaker(s) rating, and not to exceed the rated total current.

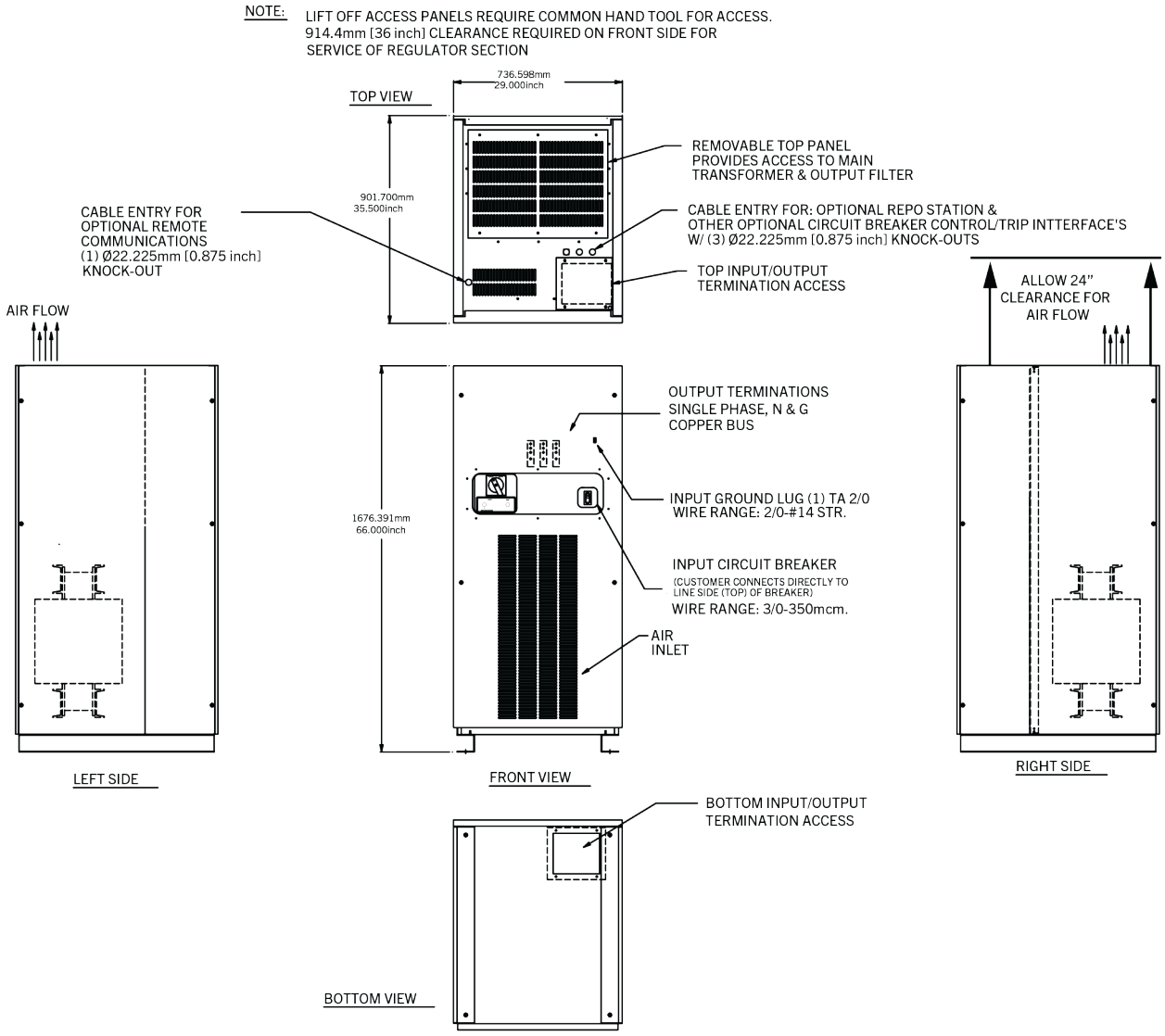
G. Output neutral to ground bonded during manufacturing of the Power Processor. Output neutral is already grounded by the factory.

H. Installation is subject to local codes. Verify with a local electrical inspector.

CABINET CLEARANCES, INPUT / OUTPUT TERMINAL LOCATION AND CONDUIT ENTRY LOCATIONS

1. Input and output terminals are located at the front of the unit.
2. To access terminal blocks, remove conduit panels and any other panels necessary on the front of the unit.
3. Wire accordingly. The terminals will be clearly marked. If there are any discrepancies refer to the schematic which accompanies the unit.

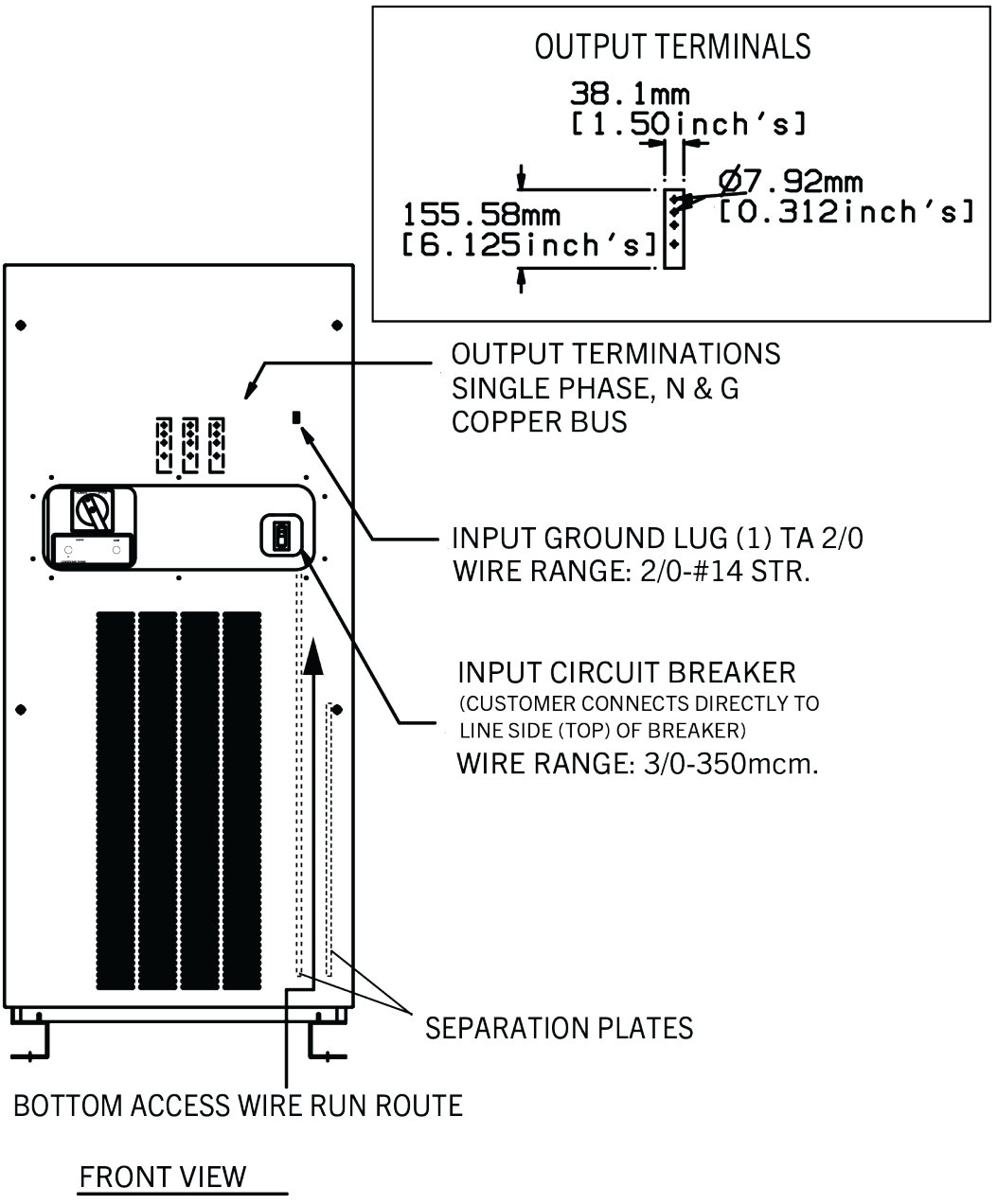
The unit is air cooled with the air intake at the front and exhausts at the top. Therefore, it should be installed in a clean, dry place with enough clearance to allow a free flow of air. Allow at least 36 inches of space at the front of the unit for serviceability. No clearance is required at the rear, left or right sides of the unit.



INPUT & OUTPUT CONNECTIONS

OPTION WIRING SHOULD BE DONE PRIOR TO CONNECTING PRIMARY INPUT AND OUTPUT POWER LINES

1. Input connections are made directly to the unit's 2 pole main input circuit breaker and input ground lug provided. Note the bottom access wire run route illustrated below.
2. Output connections are made directly to the output bus terminations or optional output breakers, output neutral and ground bus terminations are also provided. The load current is not to exceed 80% of the output breaker(s) rating, and not to exceed the rated total current.



BYPASS OPERATION AND MONITORING

CAUTION

PRIOR TO SWITCHING FROM ONE POSITION TO ANOTHER - TURN OFF THE AC INPUT BREAKER. FAILURE TO DO SO WILL RESULT IN SERIOUS DAMAGE TO THE POWER PROCESSOR.

BYPASS SWITCH

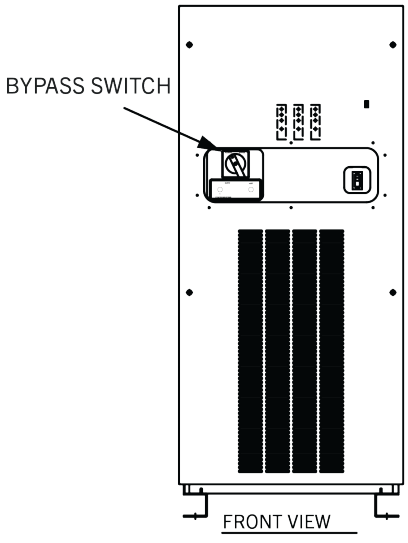
The manual by-pass switch is a break before make switch located on the rear of the Model 700F. The manual bypass switch is used to bypass all power electronics in case of failure. Prior to switching from one position to another - turn off the AC input breaker. Failure to do so will result in serius damage to the power processor.

NORMAL MODE

With the switch in the normal position, the Model 700F will provide clean and regulated power to the critical loads. The Model 700F should have the switch in the normal position unless a failure has occurred.

BYPASS MODE

A manually operated rotary bypass switch bypasses the regulator portion of the system. The transformer and suppression circuitry remains in the circuit when in the bypass mode. When the switch is in the bypass position, the Model 700F will provide clean power to the critical loads. In the bypass position, the unit will not regulate the incoming voltage. The Model 700F should be placed in the bypass position if a failure of the system has occurred. This provides the loads with some protection until a service technician arrives.



START UP

WARNING

THERE ARE DANGEROUSLY HIGH VOLTAGES PRESENT WITHIN THE ENCLOSURE OF THE POWER SUPPLY SYSTEM. CAUTION MUST BE TAKEN WHEN WORKING WITH THE ENCLOSURE. IT IS RECOMMENDED THAT ALL WORK BE PERFORMED BY QUALIFIED ELECTRICAL PERSONNEL ONLY.

NOTE: INITIAL START-UP SHOULD BE PERFORMED WITH NO LOAD ON SYSTEM.

1. Re-install all panels that may have been removed during installation.
2. Make sure the input circuit breaker is in the **off** position.
3. Energize the primary building power.
4. Turn on the main AC input breaker.
5. Verify that the output voltage is within the specified range.
6. Turn the system off.
7. Connect the loads ons at a time and repeat Step 4.

PREVENTIVE MAINTENANCE

WARNING

DANGER OF ELECTRICAL SHOCK, TURN OFF ALL POWER SUPPLY-ING THIS EQUIPMENT PRIOR TO MAINTENANCE.

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PREVENTIVE MAINTENANCE

To ensure longer component life and trouble-free operation, minor preventive maintenance procedures should be performed at regular intervals, for example once every year. More frequent inspection intervals would be needed for more severe operating conditions and larger number of hours of continuous operation.

At each service inspection, any accumulated dust, dirt or foreign particles should be carefully removed. Special care should be exercised in cleaning the SCR's (Power Mods), heatsinks and the control assembly.

CORRECTIVE MAINTENANCE AND TROUBLESHOOTING

Corrective maintenance might have to be performed on any of the three main component types in the Series 700F Power Processor:

Transformer

The transformer is designed with a considerable safety margin. Normally the only malfunction that can take place is a short either to the core or to the shield. It can be checked easily with an ohmmeter.

Electronic Control Board

The electronic control board has a large number of components on it. The failure of any of these components can cause a malfunction of the whole system. It is recommended that if the control board is suspected of malfunctioning, the board should be returned to the factory for repair or be replaced with a new or spare board.

Inverse Parallel Silicon Rectifiers (SCR's or Power Mods)

The silicon controlled rectifiers (SCR's) usually fail in the shorted mode. When this happens, normally the fuselink will be blown open to clear the short and prevent damage to the transformers. The individual SCR can be checked with an ohmmeter.

A simple performance checklist has been developed for use in maintenance. See *"Performance Checklist"*

Note: Preventive Maintenance Plans are available. Please contact the Customer Support Group for information.

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PERFORMANCE CHECKLIST

Companys_____

Model #_____Serial#_____

1. Customer Comments or Problems_____
2. Power Processor Environment Clean and Dust Free Yes_____ No_____
3. Electrically wired properly ie...Conductor Sizing, Breakers, Grounding
4. Verify Input Voltage (See specification tag)
5. Check Tightness of Electrical Connections:

   _____Input Connections_____Output Connections_____Heatsink Connections (SCR's)

   _____Circuit Board Connections_____By-Pass Switch_____Fuse Connections

   _____Fan Connections_____Transformer Connections

6. Exercise all circuit breakers-

   _____Input Breaker_____Output Breakers

7. Input/Output Voltage Checks (Adjust as Needed).

   No Load Input

   H1-H2_____VAC

   No Load Output

   L1-N_____VAC L1-L2_____VAC

   L2-N_____VAC

8. Available Load Input

   H1-H2_____VAC

   Available Load Output

   L1-N_____VAC L1-L2_____VAC

   L2-N_____VAC

9. Input/Output Current Checks (Balance as Needed).

   Input

   H1_____Amps

   H2_____Amps

   Output

   H2_____Amps

   L2_____Amps

   N_____Amps

   G_____Amps

10. Fans Operational_____

GENERAL TROUBLESHOOTING

⚠ WARNING ⚠

THERE ARE DANGEROUSLY HIGH VOLTAGES PRESENT WITHIN THE ENCLOSURE OF THE POWER SUPPLY SYSTEM. CAUTION MUST BE TAKEN WHEN WORKING WITH THE ENCLOSURE. IT IS RECOMMENDED THAT ALL WORK BE PERFORMED BY QUALIFIED ELECTRICAL PERSONNEL ONLY.

SYMPTOM	PROBABLE CAUSES.
1. No Output on One or More Phases.	A. No Input. B. Blown Fuselink. C. Defective SCR or Power Mod. D. Defective Control Card. E. Defective Sense Card.
2. Output is too High or too Low.	A. Input Out of Range. B. Control Card Adjustment. C. Defective Control Card. D. Defective Sense Card. E. Defective SCR or Power Mod.
3. Input Breaker Tripping Off.	A. System Overloaded B. Defective Circuit Breaker. C. Shorted Taps
4. Blowing Fuselink	A. Shorted SCR(s) or Power Mod(s) B. Output Loads Shorted

WARRANTY

Trystar warrants that our products and their components will remain free from defects in material and workmanship for the duration of the respective warranty period* from the date of shipment and agrees to replace, F.O.B. its factory, any parts which fault through defect in material or workmanship during such period. Non payment for the product to either the reseller, rep, distributor or the factory direct will result in revocation of warranty, technical support and service contracts. **Warranty begins from date of shipment unless a factory start-up is purchased, then the warranty begins from date of Start Up or 90 days from ship date; whichever comes first.**

If a Start-Up is purchased with the unit(s) or within 30 days from original ship date, the 1st year warranty is upgraded to include onsite labor and expenses during normal business hours (Monday - Friday, 8AM - 4PM). Start up includes all travel and living expenses. Start up description: Testing all emergency circuitry - Calibration - Inspection - Exercising all circuit breakers - Cooling fan check - Input and output parameter check - Air intake / exhaust check - Re-torque all high current terminals - Input/ Output verification- Written report. User training to be done at time of start up (no return visits). Product installation is required to be complete before start up can be scheduled.

Products:

- Power Processor (700F) / 1 Year parts only. From original shipment date / Excludes on site labor and expenses unless otherwise noted.

1. This Warranty shall be effective only if and so long as the system is installed and operated in the manner specified in the manual which accompanied the product, and is operated within the ratings on the nameplate of the system.
2. This Warranty shall be effective provided the purchaser pays the cost of transporting the faulty component(s) to and from Trystar factory at the purchaser's own expense, unless the item covered under service contract with Trystar There is no cost for installation of the replacement component(s) when done at the factory. Otherwise installation of the replacement component(s) are the responsibility of the purchaser, unless the item is covered under service contract with Trystar If after inspection the faulty component has been caused by misuse or abnormal conditions in the judgment of Trystar, the purchaser will be charged for repairs based on parts and labor required. This Warranty does not cover fuses, light bulbs, and other normally expendable items. Trystar service personnel are not included in this warranty unless covered by a Trystar service contract.
3. This Warranty shall be void if any alteration is made to the system, or any of its components are altered by anyone other than an authorized Trystar service person, without the written permission of Trystar
4. This Warranty is in lieu of all other warranties, expressed or implied. Trystar neither assumes, nor authorizes any person to assume for it, any liability other than that specifically set forth in this Warranty. Except for its obligations, Trystar assumes no liability or responsibility for personal injury, loss of life, consequential or other damages resulting from defects in, or failure of, the system or any of its components.

CUSTOMER SUPPORT

SERIES 700F POWER PROCESSOR PRODUCT SUPPORT SERVICES

Contact Trystar

WHAT A CUSTOMER SUPPORT PLAN OFFERS

HOT LINE: 507-333-3990

RESPONSE TIME : Immediate 24 hour phone support. If problem is not solved, we will make every effort to have your system running within 48 hours.

***START-UP:** On site start-up assures equipment is installed and operating properly.

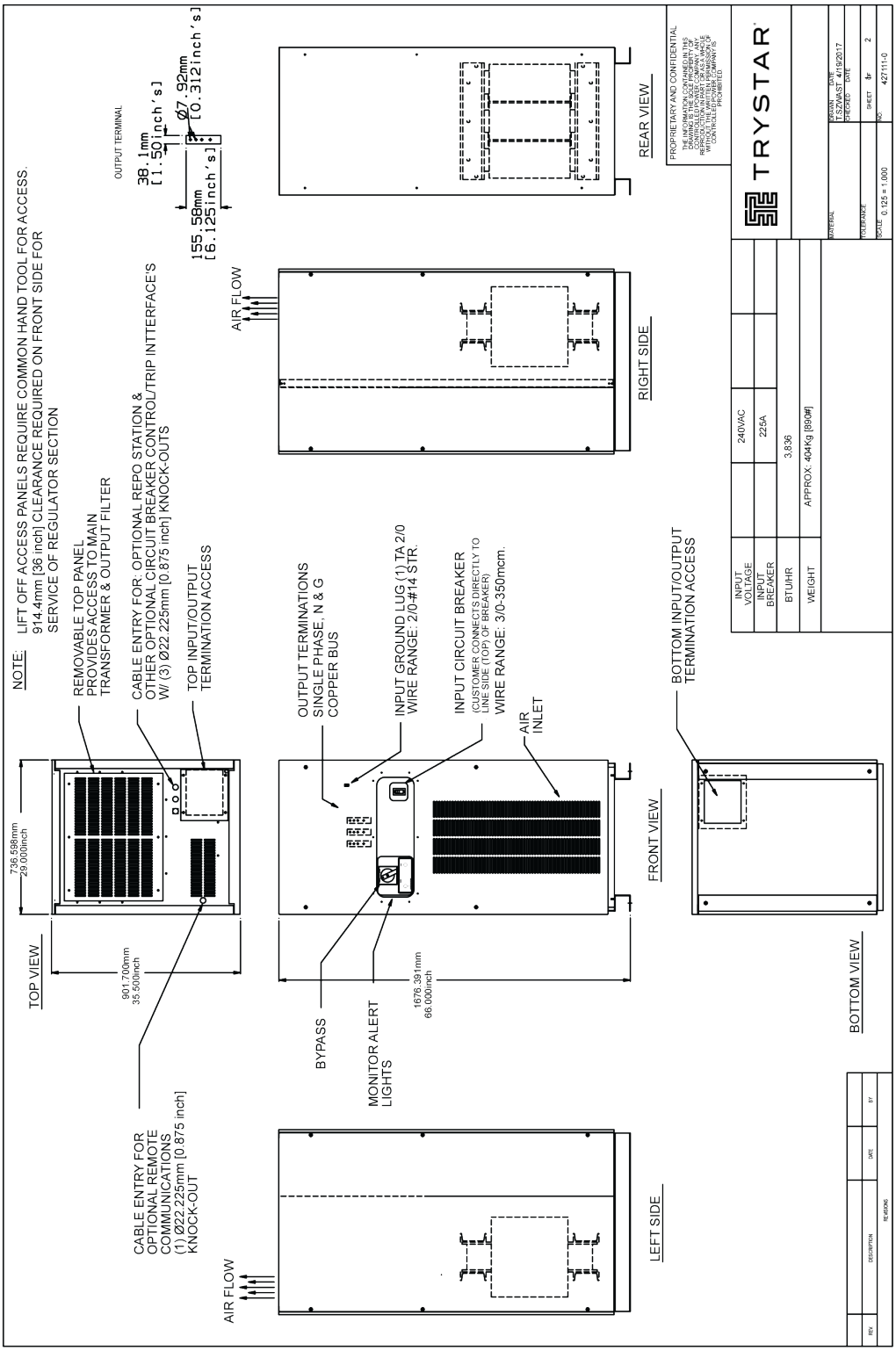
FIELD REPAIRS: Customer Support Plans cover parts, labor, travel, living and freight expenses.

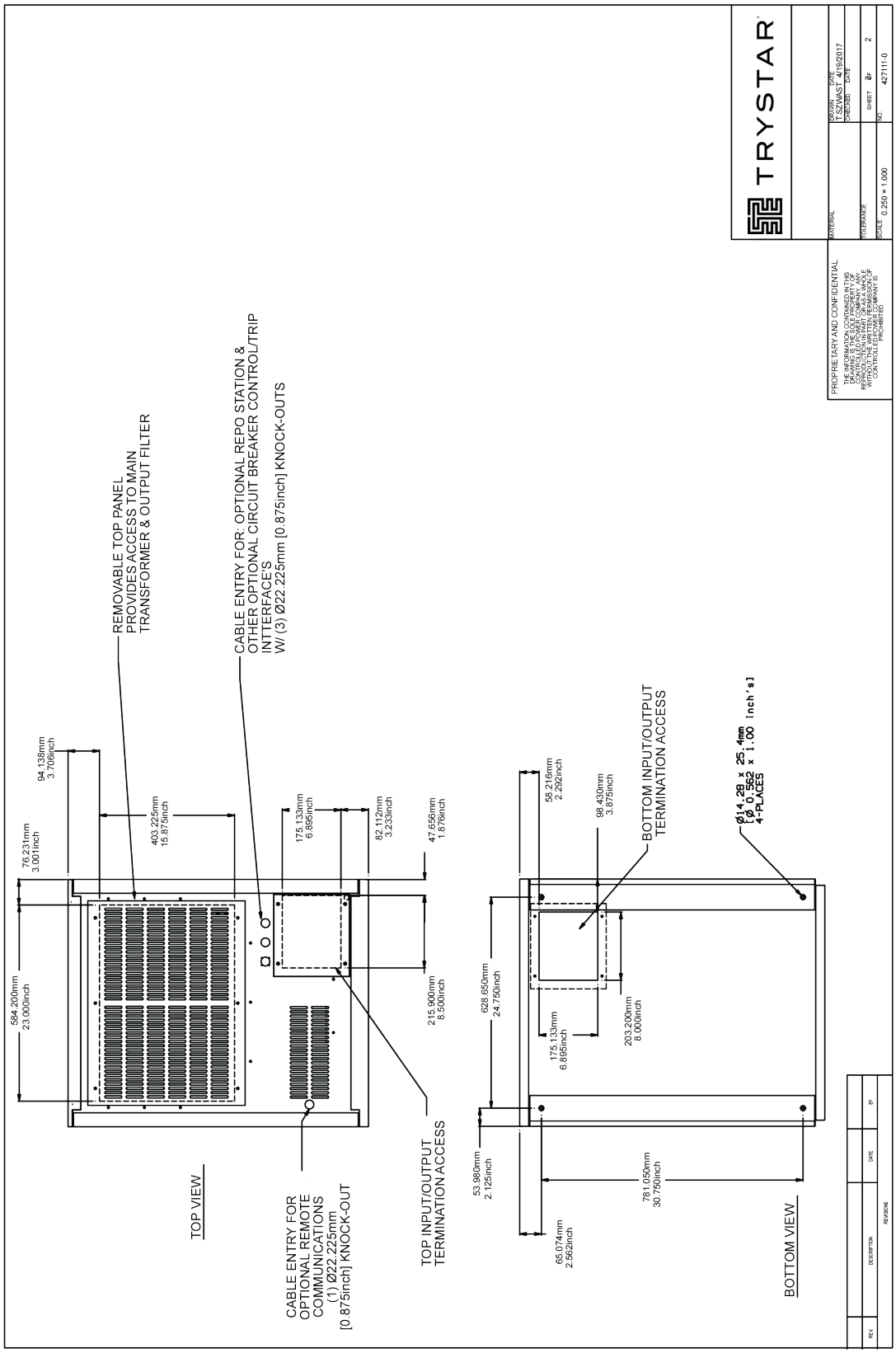
PREVENTIVE MAINTENANCE: Optional scheduled preventive maintenance includes the following:

- Inspection
- Exercising all circuit breakers.
- Re-torquing all high current terminals and connectors.
- Testing all emergency circuitry.
- Calibration
- Clean internal and external
- Verify Cooling System
- -Written Report

*Start up may be substituted for preventive maintenance on new units.

CABINET OUTLINE





SYMBOLS

Caution

The following symbol indicates that caution should be taken when performing the process required in this manual. Damage to the unit or personal harm could happen if proper precautions are not taken.

Shock Hazard

The following symbol indicates that there is a risk of electrical shock if proper precaution are not followed. Only qualified personnel should perform the actions required in this manual.

NOTES

TRYSTAR®

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