TRYSTAR

SERIES 700F/M POWER PROCESSOR

OWNERS MANUAL

260KVA

IMAGING AND TREATMENT SERIES

125KVA CONTINUOUS

208V, 240V, 480V OR 600V INPUT

480/277V OUTPUT

THREE PHASE, 60HZ



15765 Acorn Trail / Faribault, MN 55021 / 507.333.3990

TRYSTAR.com

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

ABOUT THIS MANUAL

When viewing electronically, click on the subject to jump to that page. Clicking the header on the front page will launch the Trystar web site. Clicking any where else on the front page will also jump to the Table of Contents. Clicking any blue text will take you to that section of our website.

⚠ 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.

⚠ WARNING ⚠

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

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FEATURES AND SPECIFICATIONS

The Model 700F/M Power Processor provides regulated, conditioned and clean power to CT/MRI/PET/Linear Accelerator/X-Ray and other imaging/ treatment equipment ensuring accurate, clear and most of all sure image scans. The Model 700F/M Power Processor utilizes a proprietary power sampling technique to ensure that the proper voltage value is always present at the load and that there are no damaging effects of over or undershoot of voltage, thus protecting the sensitive medical imaging equipment from erratic voltages generated by most medical grade power conditioners.

Features & Benefits

- Improves Image Scans
- Tight Voltage Regulation
- Low Output Impedance
- Medical Rated
- TVSS and High Frequency Filter
- Optional Input and Output Digital Metering
- Internal Bypass
- Intermittent Duty Rated
- High Efficiency

Technical Specs

- Output Line Voltage Regulation: +/- 2%.
- Output Load Regulation: < 2% from typical steady state load to intermittent power demand.
- K-Factor Rating: K13 design.
- Output Impedance: 2% typical at rated load.
- Internal regulator bypass.
- Efficiency: 97% typical at full load, continuous rating.
- Common Mode Noise Attenuation: 146 db.
- Transverse Mode Noise Attenuation: 3 db down at 1 KHz, 40 db down per decade.
- Phase imbalance: < 2% typical.
- Electrostatic Sheilding: Triple shielded.
- Reflected Harmonics: Load-generated triplen harmonics not reflected to input source.
- Standard Surge Protection Device (SPD): Secondary-connected, 40kA per mode; with high frequency filter and status indicator.
- Optional SPD, 100kA per phase, UL 1449 Listed; with LED status

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indicators

- Optional input and output digital metering.
- Optional output circuit breakers (up to 2).
- UL, C-UL 1012 Listed.
- Meets UL 1449 and ANSI / IEEE C62.41 cat B-3.

Medical-Grade Power Quality for Imaging and Treatment Systems - "Power quality" refers to all electrical environment issues that affect the performance and reliability of electronics-based equipment, systems, and networks prevalent in hospitals and imaging / treatment centers. These issues include grounding and bonding, electrical wiring, electrical disturbances (outages, brownouts, surges, voltage spikes, harmonics, and high-frequency electrical noise), and radiated emissions (EMI, RFI, and ESD). Industry experts believe that as many as 75% of electronics based equipment disruptions and failures are attributed to power quality issues. Think about it: what would it mean to a hospital or imaging / treatment center, if 7 out of 10 equipment problems were prevented? If power quality is affecting equipment performance, it's costing money!

"K(i) Rated" For Increased Surge Capability and High Efficiency - A "K(i) rating" refers to the intermittent kVA or momentary power demand rating. When performing an imaging scan or treatment procedure, most medical equipment has a high inrush current — meaning that the current will rise 3 to 5 times the steady state current, or higher! SureImage medical K(i) rated power conditioners and voltage regulators are designed to supply this demand, while continuing to provide tightly-regulated voltage. Most manufacturers of "standard" transformers, power conditioners, and voltage regulators "over-size" their units to regulate voltage well under these dynamic load conditions. This approach results in increased operating costs, a more expensive installation, and typically a larger unit footprint. Other manufacturers "over-size" their units to prevent automatic bypassing, misinterpreting this normal operation as a system overload. Such an approach results in exposing critical medical equipment to unregulated, unconditioned power.

In contrast, the SureImage products are sized properly for the continuous load rating, providing high efficiency and lower operating costs. In addition, all models are surge-rated to optimize performance, providing your medical equipment with exactly the power it needs.

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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

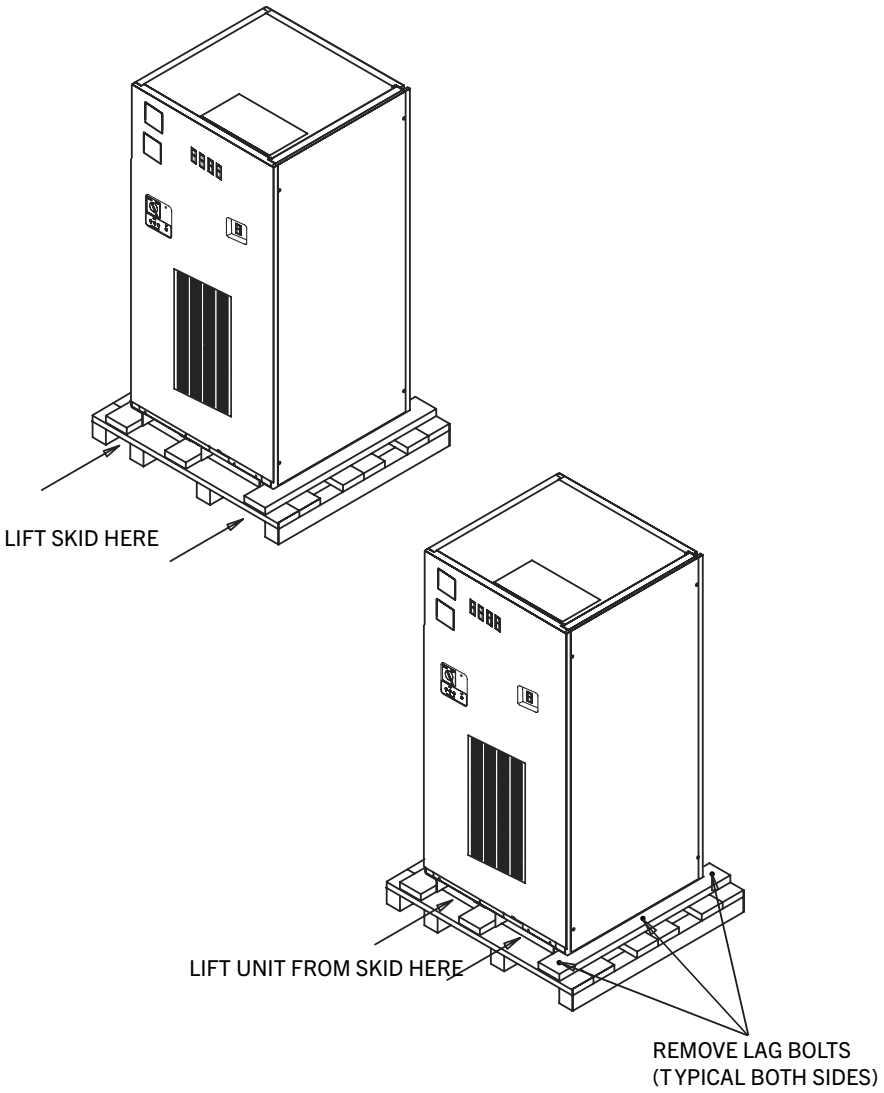
If it is necessary to store the unit for a period of time before it is installed, be sure to place the unit in a clean, dry area. To prevent excessive dust from accumulating on the unit, it is advisable to protect it by replacing it in the original container (if possible). If the original container is 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.

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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.



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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.

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PRELIMINARY INSTALLATION

INSTALLATION CONSIDERATIONS

Prior to installing the Series 700F/M, 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

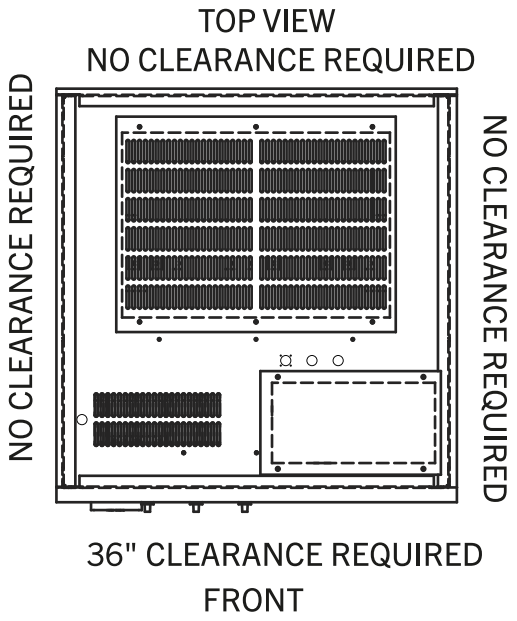
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CHOICE OF LOCATION

These units are intended for installation in a temperature-controlled, indoor area free of conductive contaminants.

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 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. See *"Installation - Cabinet Clearances".* Manual course tap adjustment may be required if the utility trend voltage changes in the future. Access to the rear and/or sides may be required.



NOMINAL INPUT CURRENT AT VARIOUS INPUT VOLTAGES								
MODEL	INPUT VOLTAGE							
	208V	208V INPUT BREAKER SIZE	240V	240V INPUT BREAKER SIZE	480V	480V INPUT BREAKER SIZE	600V	600V INPUT BREAKER SIZE
260K(i)	364A	500A	316A	400A	158A	200A	126A	175A
If unit is provide with no input circuit breaker option, input over-current protection and a disconnect device (circuit breaker) shall be provided by others.								

NOMINAL OUTPUT CURRENT AT VARIOUS OUTPUT VOLTAGES		
MODEL	OUTPUT VOLTAGE	
	208/120V	480/277V
260K(i)	N/A	150A
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.		

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WEIGHT, DIMENSIONS AND BTU's						
MODEL	INTERMITTENT KVA	OPERATIONAL BTU'S / HR	CONTINUOUS KVA	FULL LOAD BTU's / HR	DIMENSIONS	WEIGHT (LBS.)
260K(i)	260	6,394	125	12,788	34.5"W X 36"D X 76"H	2,398
Stated BTU's / Hr is at 100% rated load, 100% duty cycle. Operational BTU's / Hr is typically at 50% of rated load.						

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"

*The Output Neutral and Ground connection points are common to the wye output (208/120 or 480/277 VAC). Therefore, it is considered a single, separately derived, power source and should be wired accordingly.

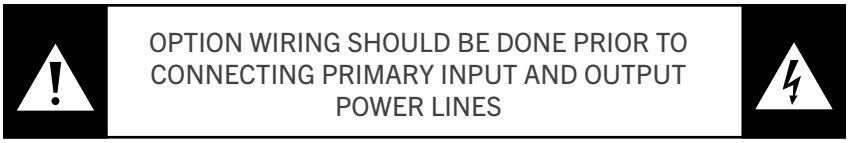
REFER TO THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE REQUIREMENTS FOR OVER-CURRENT PROTECTION AND WIRE SIZING.

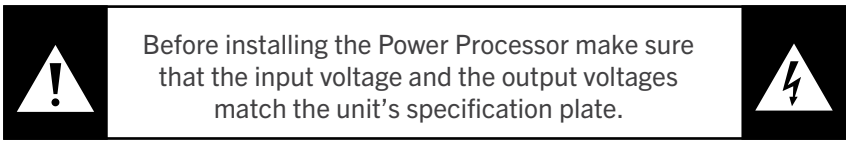
⚠ CAUTION ⚠

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.

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INSTALLATION





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 than 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° C ambient applications). Ground wire sizing is specified in NEC table 250.122.

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

Input Voltage	Input Circuit Breaker	Wire Range
600 VAC	175 Amp breaker	4awg - 4/0
480 VAC	200 Amp breaker	3/0 - 350kcmil
240 VAC	400 Amp breaker	2awg - 600kcmil
208 VAC	500 Amp breaker	(2) 2/0 - 350kcmil

D. Input Ground - An ILSCO TA-250 terminal allows wire sizes from 6awg - 250mcm.

E. Output is a 4 wire (5 including ground). If four (4) 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.

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

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

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

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

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.

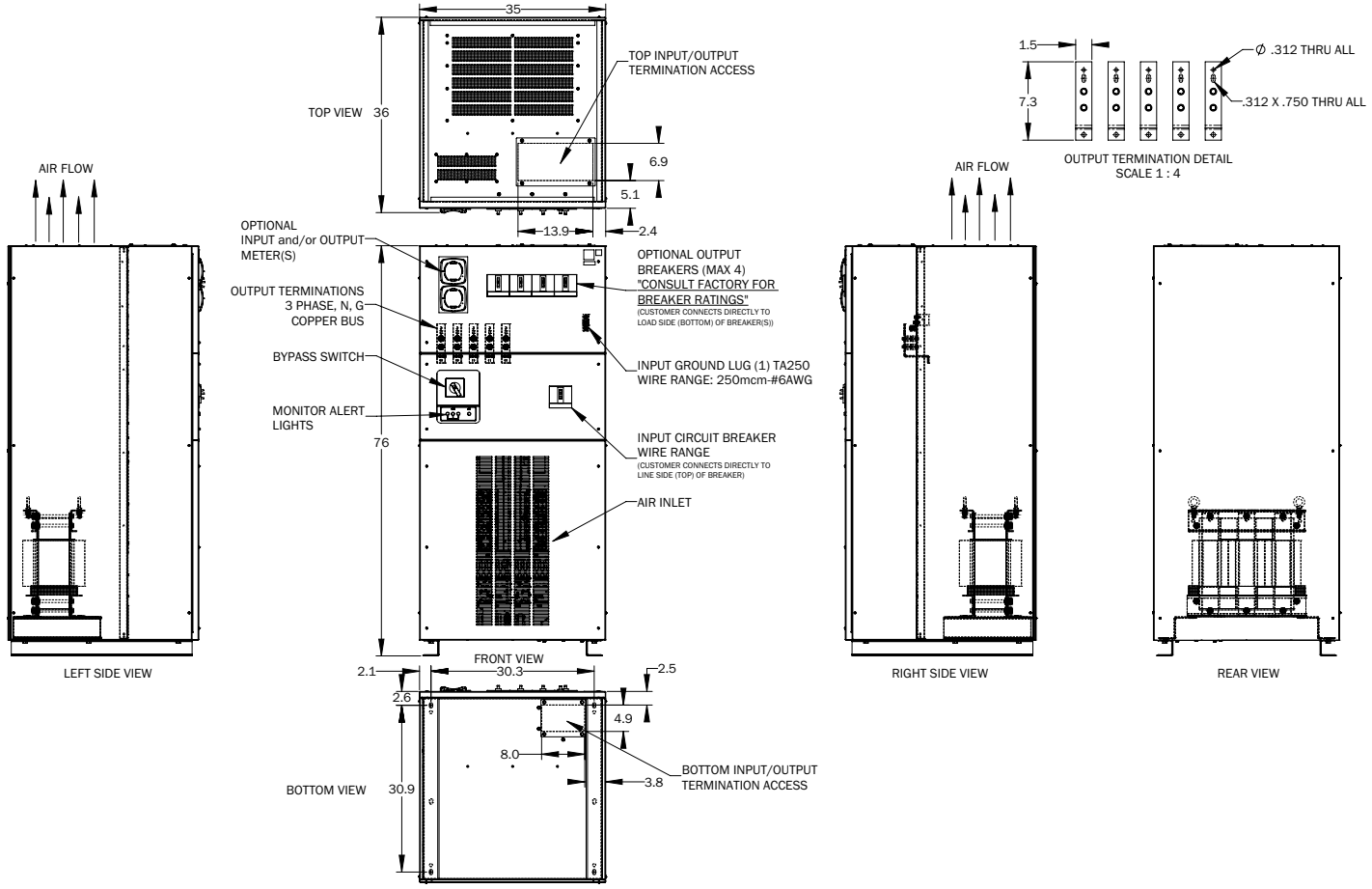
H. Installation is subject to local codes. Verify with a local electrical inspector.

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CABINET CLEARANCES, INPUT / OUTPUT TERMINAL LOCATION ANDCONDUIT 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.

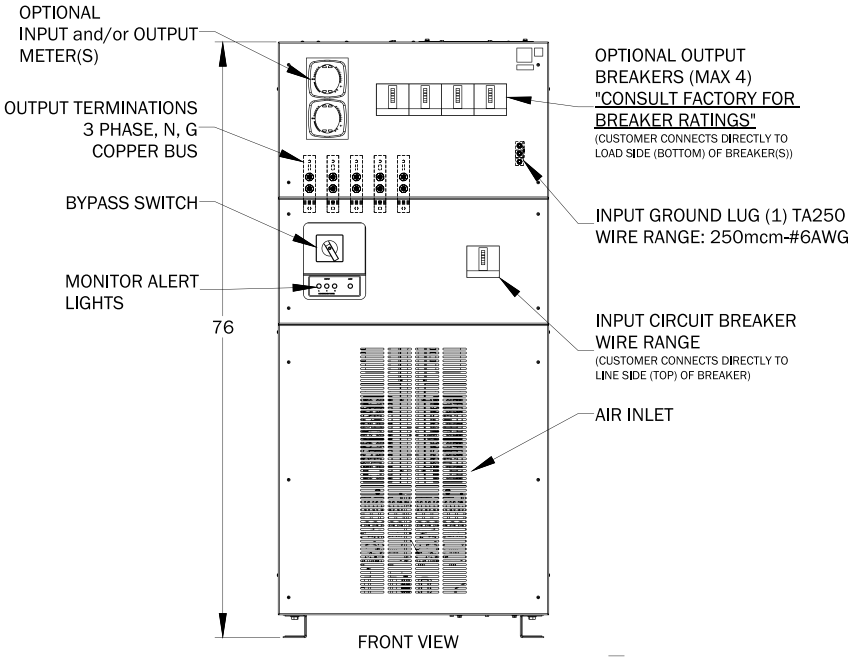


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INPUT & OUTPUT CONNECTIONS

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

1. Input connections are made directly to the unit's 3 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.



A maximum quantity of two (2), 3 phase main output CBs, ranging from 15A to 250A, are available as options. All main output Circuit Breaker selections are 600VAC rated, 25kAIC @ 208VAC, and 18kAIC @ 480VAC.

260K(i) Max circuit breaker ratings:

200A Circuit Breaker - 480V output

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OPTION INSTALLATION

OPTION DESCRIPTION AND INSTALLATION

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

UOV2020 UNDER/OVER VOLTAGE SHUTOFF

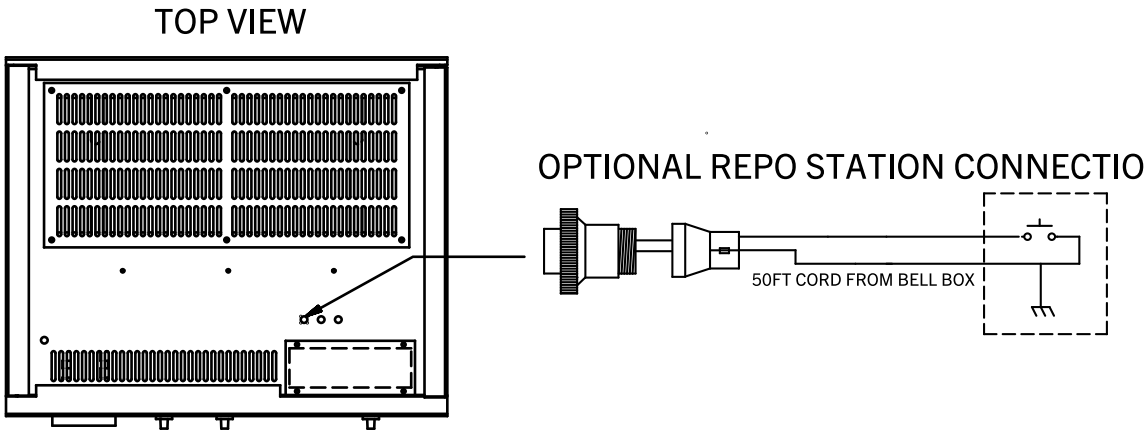
When the output voltage goes above or below the preset value, the unit electronically shuts off. The preset voltages can be set from 75% of nominal up to 115% of nominal. It does not trip the main breaker; however, the system is reset by cycling the input breaker. The under/over ranges can be adjusted as required. Factory installed and set, there is no external wiring or set up required for this option.

PSO2020 UNDER/OVER VOLTAGE AND LOSS OF POWER TRIP

When the output voltage goes above or below the preset value or detects a loss of power, the shunt trip coil is energized, which in turn shuts off the main breaker. The preset voltages can be set from 75% of nominal up to 115% of nominal. The circuit breaker must be reset manually. Includes shunt trip breaker. The under/over ranges can be adjusted as required. Factory installed and set, there is no external wiring or set up required for this option.

REP2020 REMOTE EMERGENCY POWER OFF (REPO)

Consists of a guarded “Emergency OFF” button which when depressed, will shunt trip the input circuit breaker of the Power Processor. The REPO station can be remotely located. Supplied with 50 ft. cable and 24VDC shunt trip breaker. The main circuit breaker must be manually reset to re-energize the system. Connect the REPO assembly to the provided connector on the top of the unit as shown below.



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UVR2020-24 24VDC UNDER VOLTAGE / LOSS OF POWER TRIP

Adds to the main input circuit breaker; consisting of 24VDC under voltage coil solenoid. Instantaneously opens the circuit breaker when the under-voltage trip supply voltage drops to a value between 35% and 70% of its rated voltage. A manual reset is required. The input circuit breaker may be closed when the supply voltage of the under-voltage trip reaches 85% of rated voltage. 24VDC supplied by customer. Refer to the drawing below and the circuit diagram supplied with the unit for wiring instructions.

UVR2020-120 120VAC UNDER VOLTAGE / LOSS OF POWER TRIP

Adds to the main input circuit breaker; consisting of 120VAC under voltage coil solenoid. Instantaneously opens the circuit breaker when the under-voltage trip supply voltage drops to a value between 35% and 70% of its rated voltage. A manual reset is required. The input circuit breaker may be closed when the supply voltage of the undervoltage trip reaches 85% of rated voltage. 120VAC supplied by customer. Refer to the drawing below and the circuit diagram supplied with the unit for wiring instructions.

SPD100 SURGE PROTECTION DEVICE (SPD) - 100kA RATING

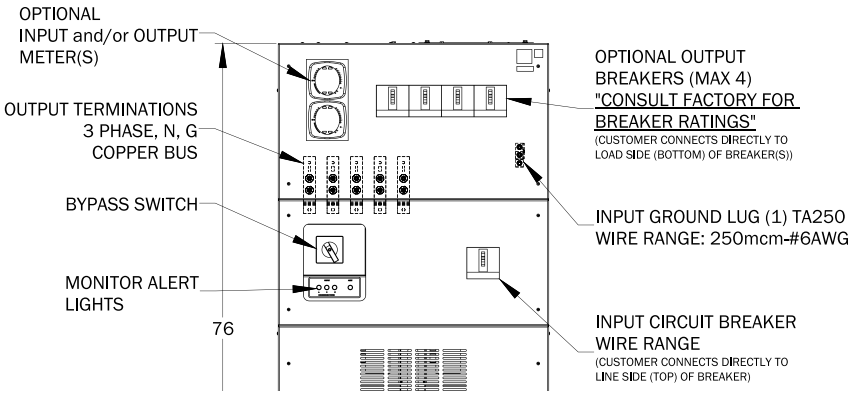
Integral, fused, 3 phase, secondary connected surge protection device (SPD), with a peak surge current capacity rating of 100kA per phase. The SPD has a nominal discharge current rating of 20kA, and a short circuit current rating (SCCR) of 100kA. The SPD includes LED monitoring of each phase, and is UL 1449 Listed. This optional SPD may be selected as an alternative to the standard 40kA per mode output SPD with High Frequency Filter.

STC2020-24 SHUNT TRIP

Adds to the main input circuit breaker; consisting of 24VDC shunt trip coil solenoid. When the shunt trip coil is energized, the main input circuit breaker is de-energized. A manual reset is required. 24VDC supplied by customer. Refer to the drawing below and the circuit diagram supplied with the unit for wiring instructions.

STC2020-120 SHUNT TRIP

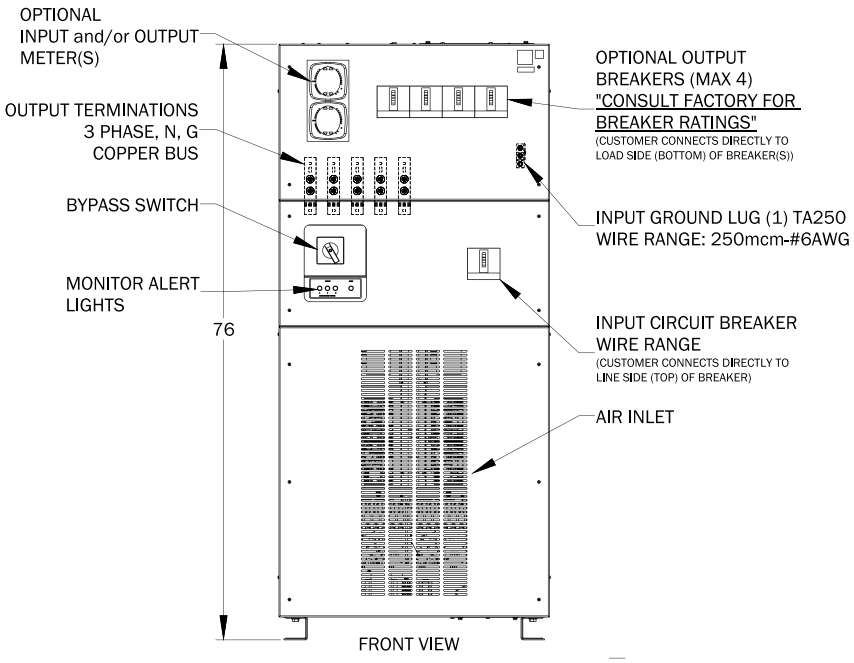
Adds to the main input circuit breaker; consisting of 120VAC shunt trip coil solenoid. When the shunt trip coil is energized, the main input circuit breaker is de-energized. A manual reset is required. 120VAC supplied by customer. Refer to the drawing below and the circuit diagram supplied with the unit for wiring instructions.



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RBS2020 REGULATOR BYPASS SWITCH

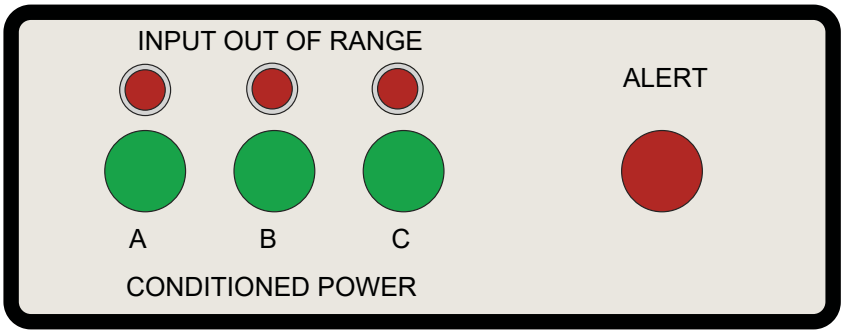
The Power Processor has a main isolation transformer and regulator. This option bypasses the regulator portion of the Power Processor. The bypassing is done by manually setting the switch when the power is **OFF**. Factory installed, there is no external wiring or set up required for this option. See *"Bypass Operation and Monitoring"* for proper use.



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

IOR100 INPUT OUT OF RANGE INDICATORS

Input "Out of Range" red indicating LEDs indicating that the input voltage is out of the range of the regulator. If any phase of the input voltage source exceeds the specified +10%, -15% from nominal, the appropriate phase LED will illuminate. Factory installed and set, there is no external wiring or set up required for this option.



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SHARK100V1 THREE PHASE METER

Digitally displays the output voltages L-L, L-N,and output currents. Factory installed and set, there is no external wiring or set up required for this option. For function and use, see the monitor manual supplied with the Power Processor.

SHARK100V4 THREE PHASE METER

Digitally displays Voltage, Current, kVA, kVAh, kW, kWh, kVARs, kVARh, power factor, frequency, % THD, % load bar, with limits exceeded alarm. Includes RS485 communication using MODBUS or DNP 3.0 protocols. Meter can be provided on the input and/or output.

For function and use, see the monitor manual supplied with the Power Processor.

SHARK200V4 ADVANCED THREE PHASE METER

Digitally displays Voltage, Current, kVA, kVAh, kW, kWh, kVARs, kVARh, power factor, frequency, % THD, % load bar, plus data-logging with time stamp and programmable limit alarms on all measured parameters. Features a waveform scope to view the real-time waveform for voltage and current. Includes RS485 communication using MODBUS or DNP 3.0 protocols. Meter can be provided on the input and/or output.

For function and use, see the monitor manual supplied with the Power Processor.

SHARK200V6 ADVANCED THREE PHASE METER WITH POWER QUALITY MONITORING

Same features as the Shark200V4, plus power quality monitoring with event logging, advanced harmonic analysis, and a 512 samples per cycle waveform recorder. Meter can be provided on the input and/or output.

For function and use, see the monitor manual supplied with the Power Processor.

OPTIONAL COMMUNICATIONS CAPABILITY ON SHARK200V4 AND SHARK200V6 (SELECT UP TO 2)

INP100S - Ethernet TCP / IP and MODBUS TCP Web Card

RO1S - Form C Relay Contacts Board, 2 inputs/outputs

20mAOS - 4 channel 4-20mA Current Outputs



For function and use, see the monitor manual supplied with the Power Processor.

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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 front of the Model 700F. The manual bypass switch is used to bypass all power electronics in case of failure.

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.

STANDARD MONITORING

Overtemp sensing devices are mounted at critical points on the SCR regulating assembly and the main transformer. If an overtemp condition exists the unit will electronically shut off, however, the cooling fans will continue to operate. The “ALERT” light will illuminate and hold until the overtemp is corrected. The main AC input breaker must be turned off in order to reset the “ALERT” light.

ALERT LIGHT - An indicator light indicates if the output has been disabled by one of the following conditions:

1. Transformer over-temperature
2. SCR thermal over-temperature

INDICATING LAMPS - Output ON indicating lamps are provided for each phase.

INPUT OUT OF RANGE INDICATORS

Input “Out of Range” red indicating LEDs illuminate if the input voltage is out of the range of the regulator. If any phase of the input voltage source exceeds the specified +10%, -15% from nominal, the appropriate phase

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LED will illuminate. Factory installed and set, there is no external wiring or set up required for this option.

OPTIONAL MONITORING

SHARK100V4, SHARK200V4 AND SHARK200V6

For function and use, see the monitor manual supplied with the Power Processor.

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. Verify output phase rotation is correct.
7. Turn the system off.
8. Connect the loads one at a time and repeat Step 4.

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PREVENTIVE MAINTENANCE

⚠ WARNING ⚠

DANGER OF ELECTRICAL SHOCK, TURN OFF ALL POWER SUPPLYING THIS EQUIPMENT PRIOR TO MAINTENANCE.

⚠ 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.

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.

A. Remove the required panels and 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.

B. 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 fusible link (were applicable) in series with the SCR will be blown open to clear the short and prevent damage to the transformer(s). The individual SCR can be checked with an ohmmeter.

C. A simple performance checklist has been developed for use in maintenance. See *"Performance Checklist"* and check off items 1-7.

D. After items 1-7 have been checked on the *"Performance Checklist"*, the next step is to check the operation of the system.

E. Replace any panels that were previously removed. Turn the unit on with no load. Check item 8 on the performance checklist.

F. Turn on loads and check items 9-10 of the "*Performance Checklist*".

G. Check to make sure all fans are operational.

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

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

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PERFORMANCE CHECKLIST

Company_____

Model #_____Serial #_____

1. Customer Comments or Problems_____
2. Power Processor Environment Clean and Dust Free Yes_____ No_____
3. Phase Rotation Correct (ABC) Yes_____ No_____
4. Electrically wired properly ie...Conductor Sizing, Breakers, Grounding
5. Verify Input Voltage (See specification tag)
6. 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
7. Exercise all circuit breakers-

   _____Input Breaker_____Output Breakers
8. Input/Output Voltage Checks (Adjust as Needed).

No Load Input		No Load Output	
A-B_____VAC	_____	A-N_____VAC	A-B_____VAC
B-C_____VAC	_____	B-N_____VAC	B-C_____VAC
A-C_____VAC	_____	C-N_____VAC	A-C_____VAC

9.

Available Load Input		Available Load Output	
A-B_____VAC	_____	A-N_____VAC	A-B_____VAC
B-C_____VAC	_____	B-N_____VAC	B-C_____VAC
A-C_____VAC	_____	C-N_____VAC	A-C_____VAC

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

Input	Output
A_____Amps	A_____Amps
B_____Amps	B_____Amps
C_____Amps	C_____Amps
	N_____Amps
	G_____Amps

11. Fans Operational_____

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GENERAL TROUBLESHOOTING

⚠ WARNING ⚠

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SYMPTOM	PROBABLE CAUSES
1. No Output on One or More Phases.	A. No Input.
	B. Blown Fuse.
	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 Breaker.
	C. Shorted Taps.
4. Blowing Semi-Conductor Fuses	A. Shorted SCR's or Power Modules.
	B. Output Loads Shorted.

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WARRANTY

This Warranty applies only to the original purchaser who must properly register the product within thirty (30) days of receipt.

https://www.trystar.com/services/warranty-information/

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/M) / 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's 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 Company, the purchaser will be charged for repairs based on parts and labor required. This Warranty does not cover fuses, light bulbs, and

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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.

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CUSTOMER SUPPORT

MODEL 700F/M POWER PROCESSOR PRODUCT SUPPORT SERVICES

Contact Trystar.

TRYSTAR NATIONWIDE CUSTOMER SUPPORT

Trystar offers total customer support that assures your critical equipment is maintained properly for trouble-free operation**.**

WHAT A CUSTOMER SUPPORT PLAN OFFERS

HOT LINE: Call 24 Hours 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. *Start-up may be substituted for preventive maintenance on new units.

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

PLAN	ON SITE COVERAGE	PARTS COVERED	FIELD REPAIR LABOR COVERED	FACTORY REPAIR LABOR COVERED	FREIGHT COVERED	TRAVEL EXPENSES COVERED
SILVER	NONE	YES	NO	YES	NO	NO
GOLD	M-F 8AM-4PM	YES	YES	YES	YES	YES
PLATINUM	24-7	YES	YES	YES	YES	YES

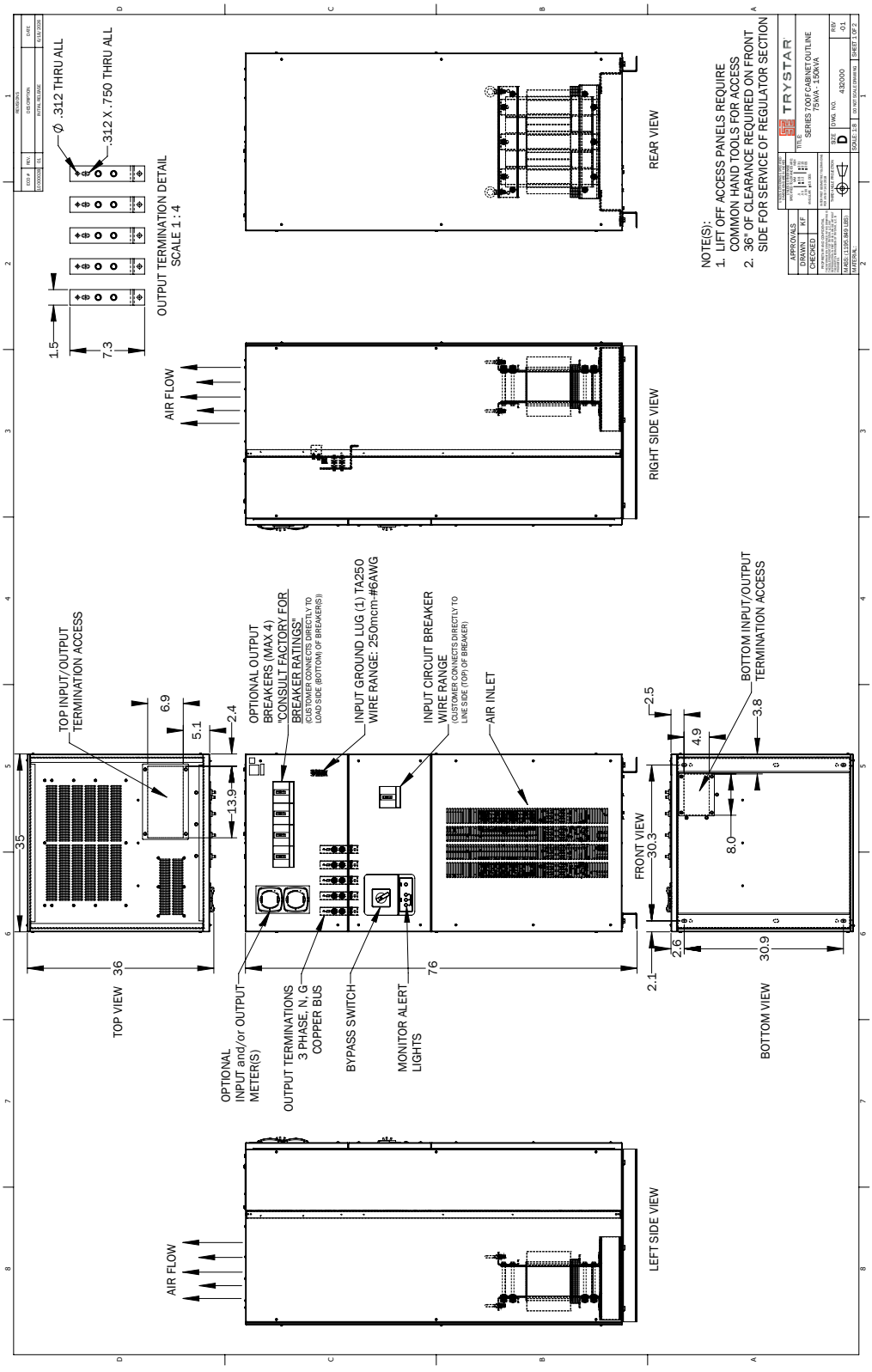
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APPENDIX A

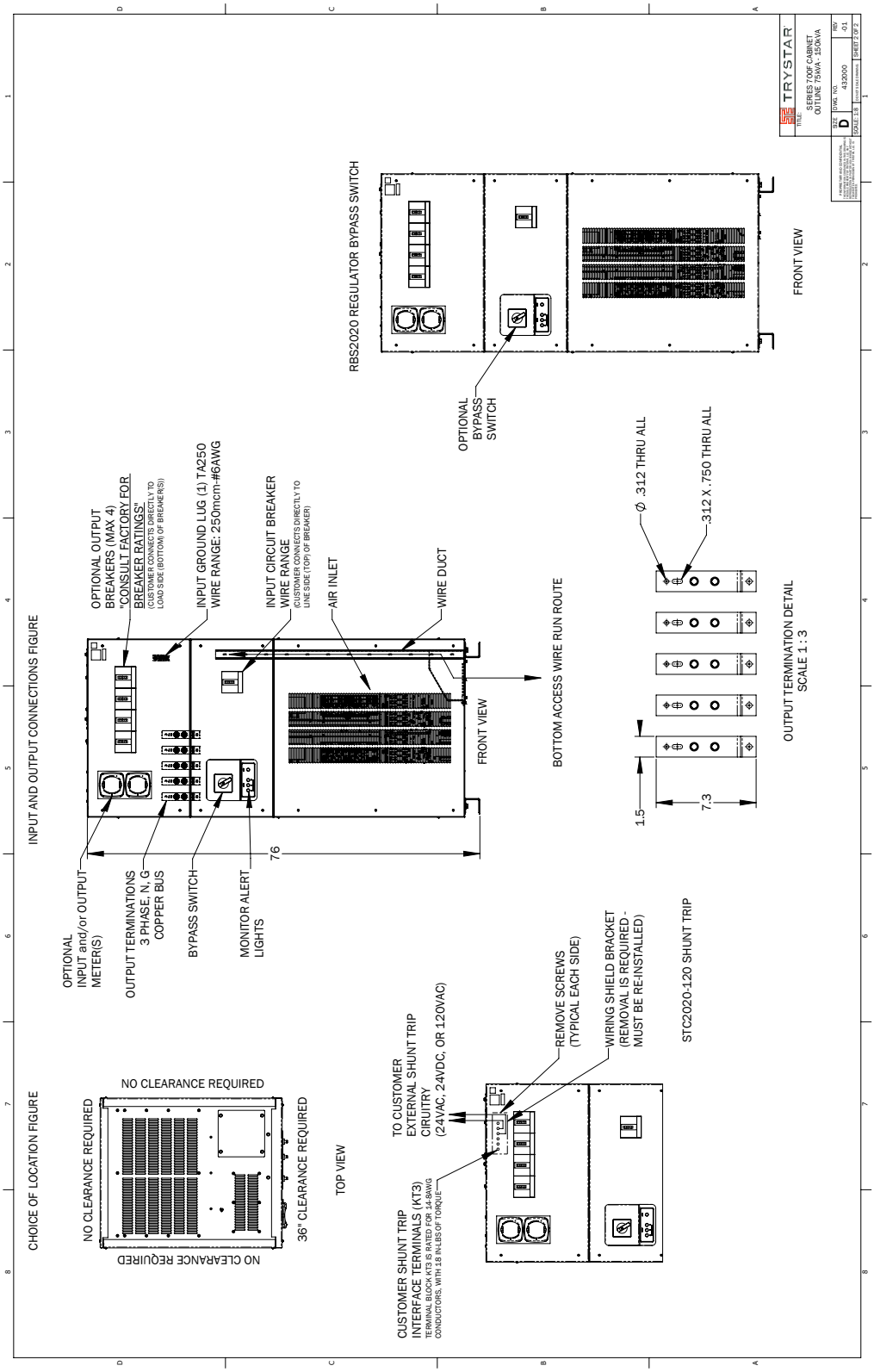
RELATIVE DRAWINGS

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CABINET OUTLINE



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NOTES

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