

Power Processor - Series 700F

10KVA to 150KVA

Power Conditioning and Regulation for Commercial & Industrial Equipment

General Specifications

PART 1 - GENERAL

1.1 DESCRIPTION

This specification defines the electrical and mechanical characteristics of the Trystar Series 700F Front Access Power Processor, an AC power conditioning system with line voltage regulation. The system specified includes all the components necessary to provide the electrical power quality needed for the improved operation, performance and reliability of commercial and industrial electronic equipment. Power conditioning is accomplished through use of an integral 3 phase, copper wound, triple shielded, low output impedance isolation transformer. Integral transient voltage surge suppression is included to meet and exceed ANSI/IEEE recommendations for surge voltages in AC power circuits. Line voltage correction is accomplished within 1 cycle, preventing undesirable over and under voltage conditions. The regulator incorporates microprocessor control, digital processing, and independent phase regulation to provide the specified voltage, without any voltage over or under-shoots.

1.2 STANDARDS

The Series 700F Power Processor is designed in accordance with applicable portions of the following standards:

- A. American National Standards Institute (ANSI)
- B. Institute of Electrical and Electronic Engineers (IEEE)
- C. National Electric Code (NEC)
- D. National Fire Protection Association (NFPA Article 70)
- E. FCC Article 15, Section J, Class A
- F. ANSI C62.41 Category B-3
- G. UL Listed to Standard 1012
- H. C-UL listed to CSA Standard C22.2, No. 107.1-01

Seismic-rated units with an input nominal voltage of 208VAC, 240VAC, or 480VAC are designed and tested in accordance with applicable portions of the following additional standards:

- I. OSHPD Special Seismic Certification Preapproval (OSP)
- J. ICC - AC156: "Acceptance Criteria for Seismic Certification by Shake-Table Testing of Nonstructural Components and Systems"
- K. California Building Code – CBC 2013
- L. International Building Code – IBC 2015

PART 2 - PRODUCTS

2.1 Input Specifications

- A. Nominal AC input voltage ratings: 600VAC, 480VAC, 240VAC or 208VAC, 3 Phase.
- B. Nominal operating frequency: 60 hertz, +/- 3 hertz.

2.2 Output Specifications

- A. Nominal AC output voltage: 480/277VAC or 208/120VAC, wye derived.
- B. Output impedance: 3-4% typical.
- C. The main power conditioning transformer includes seven (7) full capacity taps per phase, allowing for the tight output voltage regulation specified.
- D. Continuous duty output power ratings: (10) (15) (25) (30) (50) (75) (100) (125) (150) kVA / kW.

2.3 Performance Specifications

- A. Input voltage range: +10, -20% with the output voltage regulated to +/- 3% typical. Extended input voltage range options of (+10%, -40%) (+15, -25%) or (+20, -30%) are available, with the output voltage regulated to +5%, -6% typical.
- B. Response time: < ½ cycle.
- C. Correction time: 1 cycle typical.
- D. Output load regulation: 2.5% typical, when stepping from no load to full load.
- E. Output voltage THD: < 1% THD added to the output waveform under any dynamic linear loading conditions.
- F. Input power factor: > .99 with a resistive load, and triplen harmonics are not reflected to the utility under non-linear loads.
- G. Overload rating: 200% continuous load rating for 30 seconds, 1,000% for 1 cycle.
- H. Common mode noise attenuation: 146 dB minimum.
- I. Transverse mode noise attenuation: 3 dB down at 1,000 hertz, 40 dB down per decade below 50 dB with a resistive load.
- J. Efficiency: 96-97% typical, excitation losses shall be less than 1.5% of the kVA.
- K. MTBF: > 100,000 hours.

2.4 Main Input Circuit Breaker

A main input molded case, thermal magnetic circuit breaker, rated at 125% of the full continuous load input current at the nominal input voltage, is furnished as an integral part of the unit.

2.5 Standard Monitoring

A. Alert Light

An indicator light shows if the output has been disabled by one of the following conditions:

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

B. Indicating Lamps

Output ON indicating lamps are provided for each phase.

2.6 Main Transformer Construction

- A. The transformer windings are of all copper conductor construction with separate primary and secondary isolated windings.
- B. Fully processed, low carbon, silicon-iron transformer steel is used to minimize losses and provide maximum efficiency. Flux density does not exceed 14k gauss.
- C. Class N (200° C) insulation is utilized throughout with a 115° C maximum temperature rise.
- D. The transformer has multiple (three) copper shields to minimize inner winding capacitance, transient and noise coupling between primary and secondary windings. Inner winding capacitance is limited to .001 pF or less.

2.7 Cabinet Construction

- A. Design allows for front access to the status lights, input circuit breaker, serviceable parts, and optional output circuit breaker(s), bypass switch, and metering. No side or rear access is required for system installation, operation or service.
- B. Input and output terminations are front access. Input terminations are made directly to the main input circuit breaker and the input ground terminal provided. Output terminations are made to the copper bus connections provided, 3 phase, neutral and ground, or the optional output circuit breaker(s) and neutral & ground copper bus provided.
- C. Conduit landing plates are provided to permit top and/or bottom entry for input and output power connections.
- D. Ventilation originates from the front of the cabinet and exhausts through the top of the cabinet.
- E. The electronic control section is isolated from transformer section and power terminations.
- F. Transformer section is designed for natural convection cooling.
- G. The cabinet is NEMA 1 rated and constructed using a 12 gauge steel frame with 10 gauge steel floor mounting channels. Optional locking casters, together with mounting brackets to permanently secure the cabinet to the floor, are available.
- H. Exterior panels are pre-treated and powder-coat painted with Trystar’s standard color.

2.8 BTU’s / Hour, Weight and Dimensions

Output kVA Rating	Full Load BTU’s / Hour	Weight (lbs)	Dimensions
10	1705	610	29”W x 24”D x 59”H
15	2558	690	29”W x 24”D x 59”H
25	4263	870	29”W x 24”D x 59”H
30	4808	890	29”W x 24”D x 59”H
50	7332	1176	29”W x 36”D x 66”H
75	9514	1575	34.5”W x 36”D x 76”H
100	11,883	2014	34.5”W x 36”D x 76”H
125	14,748	2137	34.5”W x 36”D x 76”H
150	17,698	2240	34.5”W x 36”D x 76”H

2.9 Environmental

- A. Operating temperature: -20°C to +40°C.
- B. Relative humidity: 0-95% non-condensing.
- C. Altitude: 5,000 feet above sea level without de-rating.
- D. Audible noise: \leq 50 dba at 1 meter distance.

2.10 Optional Equipment

- A. Remote emergency power off options include:
 - 1. Input breaker provided with a 24VDC or 120VAC under voltage trip relay to interface with an on-site emergency power off circuit. An external 24VDC or 120VAC power source is supplied by others and required to energize the breaker.
 - 2. Input breaker provided with a 24VDC or 120VAC shunt trip coil solenoid to interface with an on-site emergency power off circuit. An external 24VDC or 120VAC power source is supplied by others and required to shunt trip the breaker.
 - 3. Shunt trip input breaker provided to interface with a Remote Emergency Power Off push button station, provided on a 50 ft. cable, which terminates within the power conditioner/regulator enclosure.
- B. Manually operated rotary switch provided to bypass the regulator portion of the system. The regulator is either on-line or bypassed with one turn of the switch. The transformer, high frequency filtering, and electrical noise suppression remain in the circuit when in the bypass mode.
- C. Digital input and/or output meters, flush-mounted on the front of the unit for ease of operation and viewing. Options include:
 - 1. Shark100V4 digital meter to measure and display voltage, current, kVA, kVAh, kW, kWh, kVARs, kVARh, power factor, frequency, and % THD. Includes a % load bar, limits exceeded alarms, and RS485 communication using MODBUS or DNP 3.0 protocols.
 - 2. Shark200V4 digital meter to measure and display voltage, current, kVA, kVAh, kW, kWh, kVARs, kVARh, power factor, frequency, and % THD. Includes a % load bar, data-logging with time stamp, programmable limit alarms on all measured parameters, a waveform scope feature to view the real-time voltage and current waveform, and RS485 communication using MODBUS or DNP 3.0 protocols.
 - 3. Shark200V6 digital meter to measure and display voltage, current, kVA, kVAh, kW, kWh, kVARs, kVARh, power factor, frequency, and % THD. Includes a % load bar, data-logging with time stamp, programmable limit alarms on all measured parameters, a waveform scope feature to view the real-time voltage and current waveform, and RS485 communication using MODBUS or DNP 3.0 protocols. The meter provides power quality monitoring with event logging, advanced harmonic analysis, and a 512 samples per cycle waveform recorder.
- D. Shark200V4 or V6 digital meter provided with up to two (2) of the following options:
 - 1. Ethernet TCP and MODBUS TCP web card.
 - 2. Two form C relay contacts to trigger on user-set alarms.
 - 3. Four channel 4-20mA outputs, assignable to any parameter.

- E. Up to two (2) output circuit breakers can be selected on models 10kVA – 50kVA, and up to four (4) on models 75kVA – 150kVA. Available output CBs range from 15 amps to the maximum CB amperage rating for each kVA size.

Below indicates either the maximum or recommended output CB rating. *If only one (1) output CB is selected at 208 VAC on the units rated 75 kVA and above, the higher amperage rating shown may be selected.

<u>KVA</u>	<u>480V</u>	<u>208V</u>	<u>*208V</u>
10	15A	35A	
15	25A	60A	
25	40A	90A	
30	45A	110A	
50	80A	175A	
75	125A	250A	300A
100	150A	250A	350A
125	200A	250A	450A
150	225A	250A	600A

Note: Breaker AIC ratings: 18 kAIC at 480V / 25 kAIC at 208V.

- F. Red LEDs (one per phase) provided to indicate if the source voltage exceeds the specified input range of the regulator.
- G. Output under/over voltage shutoff options included:
1. Output is electronically shut off if the output voltage exceeds adjustable limits. The system is reset by cycling the input breaker.
 2. Input breaker is shunt tripped if the output voltage exceeds adjustable limits, or a loss of power is detected. A manual resetting of the input breaker is required.

2.11 Warranty

Trystar guarantees all systems to be free from defects in material and workmanship for a period of (1) year following shipment from the factory.