PURCHASING DIVISION
CITY OF WORCESTER
MASSACHUSETTS 01608-1895
ROOM 201 – 455 MAIN STREET
PHONE (508) 799-1220

SEALED BID INVITATION
(Supplies, Material, Equipment, Services)

BID NO. 8440-J5
DATE: May 9, 2025
CITY OF WORCESTER **Christopher J. Gagliastro, MCPPO** **Purchasing Agent**
BUYER: Jerry S. Kucera

AN EQUAL OPPORTUNITY AFFIRMATIVE ACTION EMPLOYER

Bidders must state and identify the product offered, such as manufacturer's name, trade name, brand name and quality next to each item. ***WE MUST KNOW WHAT HAS BEEN OFFERED***. By virtue of the offeror's signature below, proposer certifies that the product (s) or service (s) bid are in compliance with the City's terms, conditions and specifications in all aspects.

COMPLETE ORIGINAL COPY (including ALL pages) OF THIS BID MUST BE SUBMITTED IN A SEALED ENVELOPE:

DATE: June 4, 2025 TIME: 10:00 A.M. LOCAL TIME

PLACE: Purchasing Division, Room 201, City Hall, Worcester, Massachusetts

MARK SEALED ENVELOPE: **"Sealed Bid No. 8440-J5, Generator - WPD / DPF"**

The name and address of the bidder must appear in the upper left hand corner of the envelope. The City of Worcester is not responsible for bids not properly marked.

All bids received will be publicly opened and read in the Bid Room, City Hall at date and time shown above. **NO BID WILL BE ACCEPTED AFTER TIME AND DATE SPECIFIED**

BIDDER TO COMPLETE ITEMS BELOW

Item No.	QTY	Description	Mfg.	Model	Bid Price
1	1	**Furnish and deliver one (1) new model Caterpillar Model C15 Generator Set, or approved equal, per the attached specifications and requirements of the City of Worcester Department of Public Facilities** **Bidder shall furnish all equipment and accessories listed herein** **The generator shall be stored a minimum of two (2) months from arrival date at distributors yard, with the assumption the generator lead time is 12 months** **Bid price should only include the cost of materials as labor will be bid out separately** **Questions pertaining to this bid MUST be directed to Jerry S. Kucera via e-mail at kucerajs@worcesterma.gov**	_____	_____	$_____

ABOVE ARE FOR (DEPT.) WORCESTER POLICE DEPARTMENT

DELIVERY TO BE F.O.B. (LOCATION) 9-11 LINCOLN SQUARE, WORCESTER, MA

DELIVERY IS REQUIRED BY: WITHIN 52 WEEKS FROM DATE OF ISSUANCE

BIDDER TO SPECIFY:

DELIVER _____ **WEEKS FROM DATE OF ORDER** _____

PROMPT PAY DISCOUNT: _____ **% 30 DAYS, NET 45 DAYS**

BIDDER _____

ADDRESS _____

CITY/TOWN _____

STATE _____ **ZIP** _____

AUTHORIZED SIGNATURE _____

TITLE _____ **TEL.:** _____

DATE: _____

EMAIL: _____

CONDITIONS

1) Prompt pay discounts will be considered when determining the low bid except when discounts are for a period of less than 30 days. In this event discounts will not be taken into consideration when determining low bid.

2) Time, in connection with discount offered, will be computed from date of completion and/or delivery and acceptance at destination, or from date correct bill or voucher properly certified by the contractor is received if the latter date is later than the date of completion and acceptance and/or delivery and acceptance.

3) As the City of Worcester is exempt from the payment of Federal Excise Taxes, and Massachusetts Sales Tax, prices quoted herein are not to include these taxes.

4) **All prices are to be firm F.O.B. Delivered Destination, City of Worcester, Massachusetts, unless otherwise indicated by the City. Time reserved for award is ninety days.**

5) In case of error in the extension prices quoted herein, the unit price will govern.

6) It is understood and agreed that should any price reductions occur between the opening of this bid and completion of any delivery of any order, the benefit of all such reductions will be extended to the City.

7) The City of Worcester reserves the right to reject any and all bids, wholly or in part, and to make awards in a manner deemed in the best interest of the City.

8) Awards will be made to the bidder quoting the lowest net price in accordance with specifications.

9) The bidder to who a contract is awarded guarantees to the City of Worcester all equipment, materials and/or workmanship for a period of one (1) year after final inspection and acceptance and shall replace promptly any defective equipment, materials and/or workmanship required without additional cost to the City.

10) It is understood and agreed that in the event of failure on the part of the bidder to indicate date of delivery and/or completion, delivery and/or completion will be made within twelve (12) days from date of purchase.

11) The Bidder must certify that no official or employee of the City of Worcester, Massachusetts is pecuniarily interested in this quotation or in the contract which the bidder offers to execute or in expected profits to arise therefrom, unless there has been compliance with provisions of G.L. C.43 Sec. 27, and that this quotation is made in good faith without fraud or collusion or connection with any other person submitting a quotation.

12) This inquiry implies no obligation on the part of the buyer, City of Worcester, Mass. Quotations will not be considered unless returned on this form. Your proposal should be forwarded to the office of the Purchasing Department, City of Worcester in a sealed envelope, plainly marked: "Quotation on (item requested)" - also, please show Bid Number.

13) It is understood and agreed that it shall be a material breach of any contract resulting from this bid for the Contractor to engage in any practice which shall violate any provisions of Massachusetts General Laws, Chapter 151B, relative to discrimination in hiring, discharge, compensation, or terms, conditions or privileges of employment because of race, color, religious creed, national origin, sex, age or ancestry.

14) Any prospective bidder requesting a change in or interpretation of existing specifications of terms and conditions must do so within five (5) days (Saturdays, Sundays and Holidays excluded) BEFORE scheduled bid opening date. All requests are to be in writing (e-mailed to kucerajs@worcesterma.gov) to the Purchasing Department. No changes will be considered or any interpretation issued unless request is in our hands within five (5) days (Saturdays, Sundays and Holidays excluded) BEFORE scheduled bid opening date.

15) Bids which are incomplete, not properly endorsed, or signed, or otherwise contrary to these instructions may be rejected as informal by the Purchasing Agent. CONDITIONAL BIDS WILL NOT BE ACCEPTED.

CERTIFICATE OF GOOD FAITH FORM AS REQUIRED BY M.G.L. c. 30B

UNDER MASSACHUSETTS GENERAL LAWS, CHAPTER 30B: SECTION 10, THE FOLLOWING CERTIFICATION MUST BE PROVIDED:

Section 10. A person submitting a bid or a proposal for the procurement or disposal of supplies, or services to any governmental body shall certify in writing, on the bid or proposal, as follows:

" The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals."

(Please Print) _____
Name of Person Signing Bid

_____
Signature of Person Signing Bid

_____
Company

No award will be made without vendor certification of the above.

IMPORTANT NOTICE TO BIDDERS:

BIDDERS ARE ADVISED NOT TO TAKE ANY EXCEPTIONS TO THE CITY'S TERMS & CONDITIONS.
BIDS THAT INCLUDE COMPANY TERMS & CONDITIONS WHICH CONFLICT WITH THOSE OF THE CITY MAY BE REJECTED.

PERFORMANCE SPECIFICATION NOTICE

Any manufacturer / brand names or standards identified in this bid are meant to establish a minimum performance standard. Or-equal products from other manufacturers and/or brands that meet the standards listed are acceptable. The City shall solely make the determination as to products meeting the minimum performance standard. Vendors are encouraged to include product literature with their bid submission to verify product compliance.

Questions pertaining to this bid must be submitted to Jerry S. Kucera via email at kucerajs@worcesterma.gov

STANDBY GENERATOR UPGRADE

WORCESTER POLICE STATION
CITY OF WORCESTER
9-11 LINCOLN SQUARE
WORCESTER, MASSACHUSETTS

April 7, 2024

SHEPHERD ENGINEERING, INC.
1308 Grafton Street
Worcester, Massachusetts 01604
(508) 757-7793

SECTION 26.00.00

ELECTRICAL

PART 1 - GENERAL

1.1 500 KW STANDBY GENERATOR SYSTEM – DIESEL

A. DESCRIPTION OF WORK

1. The City of Worcester will be responsible to purchase under a separate contract the new 500kW (Caterpillar Company or equal) standby diesel generator and related automatic transfer switches. Furnish a separate quote for this equipment.
2. New NEMA 4X generator docking station located on the exterior of the building. Furnish a separate quote for this equipment.
3. All equipment shall be new, factory tested, and delivered ready for field installation. The equipment will be stored by the generator manufacturer or distributor until such a time that the equipment is requested for delivery by the City of Worcester. The equipment will be then shipped to the Worcester Police Department site and set into place by the awarding contractor.
4. The responsibility for performance to this specification shall not be divided among individual component manufacturers but must be assumed solely by the primary manufacturer. This includes generating system design, manufacturer, test, and having a local supplier responsible for service, parts, and warranty for the total system.
5. Generator set mounted sub-assemblies such as cooling system, base, air intake system, exhaust outlet fittings, and generator set mounted controls and switchgear shall also be designed, built, and assembled as a complete unit by the approved engine/generator manufacturer.

B. MANUFACTURER

1. The engine and generator shall be the product of an ISO 9001 certified manufacturer. The design is based on a Caterpillar engine/generator set. The naming of a specific manufacture does not waive any requirements or performance of individual components described in this specification. Engine and generator shall be as manufactured by Caterpillar, Kohler Power Systems ONAN/Cummins Northeast, or Generac.

C. SYSTEM RATING

A. The electric power generating system including engine mounted radiator shall have a site capability of:

500 KW

625 kVA ~ 0.8 PF, standby rating

480/277 Volts AC, Wye connected, 3 Phase, 60 Hertz

500 Altitude (Feet)

104 Maximum Engine Ambient Temperature (°F)

-20 Maximum Outside Temperature (°F)

D. SUBMITTALS

Submittals for approval shall include but not be limited to:

a. Certification of Prototype Testing.
b. Component List - A breakdown of all components and options
c. Technical Data - Manufacturer produced generator set specification or data sheet identifying make and model of engine and generator and including relevant component design and performance data.
d. Auxiliary Equipment - Specification or data sheets, including switchgear, transfer switch, vibration isolators, and day tank.
e. Drawings - General dimensions drawings showing overall generator set measurements, mounting location, and interconnect points for load leads, fuel, exhaust, cooling and drain lines.
f. Wiring Diagrams - Wiring diagrams, schematics and control panel outline drawings published by the manufacturer for controls and switchgear showing interconnect points and logic diagrams for use by contractor and owner.
g. Warranty Statements - Warranty verification published by the manufacturer.

E. PRODUCTION TESTS

1. The system manufacturer shall perform production tests on the complete generator set supplied at the generator set manufacturers facility. A certified report of these tests shall be available when requested at the time of the generator set order. These tests and controls shall include, but not be limited to, the following:

a. Operation at rated kW
b. Operation at rated kVA
c. Transient and steady state governing
d. Transient and steady state voltage regulation
e. Operation of all alarm and shutdown devices
f. Single step load pickup of rated kW
g. Operation at 2250 rpm (125% overspeed) at room temperature

F. PROTOTYPE TESTS

1. The system manufacturer must certify that engine, generator, controls, and switchgear have been tested as complete system of representative engineering models (not on equipment sold). Prototype testing shall include:

a. Fuel consumption at 1/4,1/2, 3/4, and full load
b. Exhaust emissions
c. Mechanical and exhaust noise
d. Governor speed regulation at 1/4, 1/2, 3/4, and full load; and during transients
e. Motor starting kVA
f. Generator temperature rise in accordance with NEMA MG 1-22.40
g. Voltage regulation at 1/4, 1/2, 314, and full load; and during transients

h. Harmonic analysis, voltage waveform deviation and telephone influence factor
i. Generator short circuit capability
j. Cooling system performance
k. Torsional analysis
l. Linear vibration analysis
m. Generator revolving field assembly for 2 hours at 2700 rpm (150% overspeed) and 70C, and each production unit tested at 2250 rpm (125% overspeed) at room temperature.

G. WARRANTY / SERVICE

A. The manufacturer's and dealer's standard warranty shall in no event be for a period of less than two (2) years from date of initial start-up of the system and shall include repair parts, labor, reasonable travel expense necessary for repairs at the job site, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Applicable deductible costs shall be specified in the manufacturer's warranty. Running hours shall not be a limiting factor for the system warranty by either the manufacturer or servicing dealer. Submittals received without written warranties as specified will be rejected in their entirety.
B. The generator set supplier shall have factory trained service representatives and tooling necessary to install, test, maintain, and repair all provided equipment and shall be located within 50 miles of the customers site.
C. The generator set supplier shall have sufficient parts inventory to maintain over the counter availability of at least 90% of any required parts and shall guarantee 100% parts availability within 48 hours from the time an order is entered with the dealer.
D. Furnish at the time of the bid a maintenance contract form complete with all projected yearly costs.

H. SYSTEM PERFORMANCE

1. The power generating system shall conform to the following performance criteria at the site conditions:

a. Rating - Engine brake horsepower shall be sufficient to deliver full rated generator set kW/kVA when operated at rated rpm and equipped with all engine-mounted parasitic and external loads such as radiator fans and power generators.
b. Start Time and Load Acceptance - Engines shall start, achieve rated voltage and frequency, and be capable of accepting load within 10 seconds when properly equipped and maintained.
c. With the power generating system at normal operating temperature, it shall accept a 100% block load, less applicable derating factors, in accordance with NFPA 110.
d. Frequency regulation shall be Isochronous, regulated to within +/- 0.25 % from no load to full load.
e. Voltage regulation shall be +/- 0.5% for any steady state load between no load and full load.

J. EMISSIONS

1. Packaged generator set shall be EPA certified and in compliance with the 2019 Commonwealth of Massachusetts Emission regulations.

K. DIESEL ENGINE

1. The diesel engine shall be a stationary, liquid cooled, 1800 rpm, four-cycle design, with dry exhaust manifolds. It shall have 12 cylinders with a minimum cubic inch displacement of 1649 and be manufactured in the United States.

L. ENGINE ACCESSORY EQUIPMENT

1. The engine shall be cooled by an engine mounted, vertical radiator with blower type fan, using a 50% antifreeze/coolant mixture. Antifreeze shall have a service life of 3000 hours without maintenance. The radiator shall properly cool the engine while the engine is operating at full load and 0.25 inch H_20 external air restriction. The minimum ambient capability shall be 110°F. Air flow total for combustion and cooling shall not exceed 60,000 CFM.
2. Electric starting motor and control circuit capable of three complete starting cycles without overheating.
3. Mechanical, positive displacement lube oil pump with replaceable full flow filter, oil cooler, and dip stick.
4. Mechanical, positive displacement fuel transfer pump with replaceable full flow filter.
5. Fuel Filter and serviceable fuel system components shall be located to prevent fuel from spilling onto genset batteries.
6. Manually operated fuel priming pump.
7. Replaceable dry element air filter.
8. Engine mounted electrically powered, thermostatically controlled jacket water heater sized to ensure proper starting. Shall include isolation valves and adjustable thermostat.
9. Flexible, stainless steel exhaust connector.
10. Flexible fuel lines
11. Battery charging alternator with regulator and charge rate ammeter.

M. GENERATOR

A. The generator shall be close coupled, drip proof and guarded, constructed to NEMA 1 and IP 22 standards, single bearing, salient pole, revolving field, synchronous type with amortisseur windings in the pole faces of the rotating field and skewed stator windings to produce optimum voltage waveform.
B. The generator shall be capable of delivering rated kVA at 60 Hz and 0.8 PF within +/- 5% of rated voltage.
C. All insulation systems shall meet NEMA MG-1 standards for Class H systems. The actual generator temperature shall be limited to Class F levels (130 ^{0}C rise by resistance over 40 ^{0}C ambient). Materials which support fungus growth shall not be used.
4. The revolving field coils shall be precision wet layer wound with epoxy based material applied to each layer of magnet wire. The revolving field assembly shall be prototype tested for 2 hours at 2700 rpm (150% overspeed) and 70^{0}C, and each production unit shall be tested at 2250 rpm (125% overspeed) at room temperature. The revolving field assembly shall be balanced to 0.5 mil peak-peak. The stator shall have two dips and bakes using Class H impregnating varnish.
5. A 3 phase permanent magnet (PMG) generator shall provide the source of excitation to the exciter to increase immunity to non-linear loads and to maintain 300% of rated current for 10 seconds during short circuit conditions.

6. The automatic voltage regulator (AVR) shall maintain generator output voltage within +/- 0.5% for any constant load between no load and full load. The regulator shall be a totally solid state design which includes electronic
voltage buildup, volts per Hertz regulation, three phase sensing, overexcitation protection, loss of sensing protection, temperature compensation, shall limit voltage overshoot on startup, and shall be environmentally sealed.

N. CIRCUIT BREAKER

1. Two (2) 400 ampere 100% rated 3 pole, 208 volt, 42KAIC rated main line circuit breakers shall be provided to protect the generator against external faults and provide a positive disconnect device at the generator output terminals. The breaker shall be UL listed with shunt trip device connected to the engine generator safety shutdowns. The breaker shall be mounted on the generator in a NEMA 1P22 guarded drip-proof enclosure which provides direct access for cable from the top or bottom.

O. CONTROLS - GENERATOR SET MOUNTED

1. The control panel shall be designed and built by the approved engine-generator manufacturer. It shall be mounted on the generator set and incorporate 100% solid state microprocessor based control circuitry and digital instrumentation. All electronic control components are to be mounted in sealed, dust tight, watertight, metal housings. Housings which must be opened for service or setup are not acceptable. All output circuits greater than lOO mA shall be fuse or circuit breaker protected. The panel shall be labeled with ISO symbols and comply with IEC 144, IP 22, and NEMA 12 for external environmental resistance, and IP 44 and NEMA 12 for resistance of the internal sealed modules. The control panel shall be capable of facing the right, left, or rear and shall be vibration isolated.

2. The panel shall include the following equipment / functions:

   a. Automatic remote start capability with mode of operation selectable from a panel-mounted 4-position switch (Stop, Manual, Automatic, Reset).
   b. Cycle crank with adjustable "crank" and "rest" times.
   c. Adjustable cool down timer.
   d. Emergency Stop push button requiring manual reset.
   e. Voltage adjustment potentiometer to adjust voltage +10, -25% of rated.

3. A communications adapter shall be provided to allow RS-232 communications between the generator set and a remote Personal Computer or other RS-232 device. Use of the adapter will allow the generator set to be remotely started or stopped and provide access to any of the engine or generator operational parameters as well as all alarms, shutdowns, or diagnostic codes. A Windows based software package shall be provided with the adapter.

   1. Individual flashing LED's shall be provided. The use of a common alarm or shutdown lamp which depend on a separate display to determine the alarm or fault condition is not acceptable. Separate LED annunciation
   shall be provided for:

      1. Overspeed (red)

2. Overcrank (red)
3. High Coolant temperature (red)
4. Low Oil pressure (red)
5. Emergency Stop (red)
6. Low Coolant Level (red)

2. NFPA 99 alarm module with common alarm and silence switch. Separate LED annunciation shall be provided for:
   1. Approach High Coolant Temperature (Amber)
   2. Approach Low Oil Pressure (Amber)
   3. Low Water Temperature (Amber)
   4. Low DC Volts (Red)
   5. Low Fuel (Amber)
   6. Fuel Tank Rupture (Red)
   7. Ground Fault (Red)

3. Remote Annunciator Panel
   1. The engine generator shall be supplied with a flush (surface) mount remote annunciator panel with face plate, mounted to annunciation terminal strip, to give remote indication of the following:
      a. Generator powering load (position signal from ATS)
      b. Battery charger malfunction (red)
      c. High jacket water temperature (prewarn-amber) (shutdown – red)
      d. Low water temperature (prewarn-amber)
      e. Low oil pressure (prewarn-amber) (shutdown-red)
      f. Low fuel
      g. Overspeed (red)
      h. Overcrank (red)
      i. Fuel tank rupture
      j. Low water level
      k. Ground fault
      l. Horn silence
      m. Panel illumination lights (2) with ON/OFF switch. Separate digital displays shall be provided for the engine and generator parameters. These displays shall allow the simultaneous display of AC parameters and at least one (selectable) engine parameter to be displayed at the same time. Requirements for these displays are as follows:

   1. Digital display and phase selector switch for generator operational parameters. True RMS sensing of these parameters shall be utilized to minimize distortion due to non-linear loads and ensure accuracy.
   2. AC volts (+/- 0.5% accuracy)
   3. AC amps (+/- 0.5% accuracy)
   4. Hertz (+1-0.3 Hz accuracy)
   5. Kilowatts (Total and per phase)
   6. Kilovars (Total)
   7. Kilovolt – Amps KVA (Total)
   8. Kilowatt – Hours KWHR (Total)
   9. Kilovar – Hours KVAR-HR (Total)
   10. Percent of rated power (Total)

11. Power Factor (Average Total and per phase)

e. Digital display for:

1. Engine RPM (+/- 0.5% accuracy)
2. DC voltage (+/- 0.5% accuracy)
3. Oil pressure (+/- 0.5% accuracy)
4. Coolant temperature (+/- 0.5% accuracy)
5. Operating hours

f. Diagnostic capability:

1. Must provide dual level diagnostics identifying both system level and component level. The diagnostic codes shall be maintained in a history log specifying the number of occurrences, and second/minute/hr at which they occur.

g Protective Relaying (Programmable trip point and time delay)

1. Overvoltage (alarm & shutdown)
2. Undervoltage (alarm & shutdown)
3. Overfrequency (alarm & shutdown)
4. Underfrequency (alarm & shutdown)
5. Overcurrent (alarm & shutdown)
6. Reverse Power (shutdown)

h. Sensors:

1. Sensors providing a pulse width modulated output shall be utilized for oil pressure, coolant temperature sensing and shall be protected against a fault to battery. The usable output range of the sensor shall be limited to 5% to 95% duty cycle. Output outside the usable range shall be diagnosed as a fault condition and appropriate diagnostic shall be provided. Separate speed sensing signals shall be provided for overspeed protection and electronic governor.

i. Ambient parameters:

1. Operating: -40C to +70C (-40 F to +158 F)
2. Storage: -55 C to +85 C (-67 F to +185 F)
3. Humidity: 0 to 100% relative humidity

j. Must be impervious to salt spray, fuel, oil and oil additives, coolant, spray cleaners, chlorinated solvents, hydrogen sulfide and methane gas, and dust.

P. BASE

1. The engine and generator shall be assembled to the base using vibration isolators which comply with seismic zone 2. The generator set base shall be designed and built by the engine-generator manufacturer to resist deflection, maintain alignment, and minimize resonant linear vibration.

Q. BATTERY CHARGER

1. A dual rate 10 ampere battery charger shall be provided which shall accept 120 volt AC single phase input to provide 24 volt DC output. It shall be fused on the AC input and DC output, incorporate current limiting circuitry, and include a DC ammeter and voltmeter. The use of a crank disconnect relay to protect the charger during starting is not allowable. The charger shall be housed in a NEMA 1 enclosure vibration suitable for wall mounting.
2. The charger shall include LED annunciation for low battery voltage, high battery voltage, battery charger malfunction, and AC failure; and dry contacts for battery charger malfunction and low battery voltage.

R. BATTERIES

1. Twenty-four (24) volt starting batteries; sized as recommended by the generator set manufacturer to comply with the starting and temperature specifications; battery cables, and base mounted battery rack shall be provided. The batteries shall be warranted by the gen set manufacturer.

S. EXHAUST SILENCER

1. A critical exhaust silencer shall be sized and supplied by the engine supplier. The silencer and associated piping shall not impose more than 27 inches water restriction.
2. The silencer shall utilize a high temperature coating system to prevent rusting and shall be mounted near the engine to minimize noise and condensation. A provision for draining moisture shall be included.
3. The silencer shall be mounted and insulated inside the sound attenuated enclosure for outdoor applications.
4. Furnish a ten foot (10’-0”) stainless exhaust stack to be installed on the unit by the installing contractor – complete with all necessary guy wire and related attachements.

T. WEATHERPROOF HOUSING WITH FUEL TANK BASE

1. A weatherproof, sound attenuated factory skin enclosure shall be provided to house the engine/generator and accessories. The enclosure is to be in compliance with the National Electrical Code (NEC), and the National Fire Protection Association (NFPA) for clearance around electrical equipment as specified. A factory provided sound attenuated enclosure will be accepted under the condition that it meets the following:

   - Rigidity wind test equal to 115 MPH
   - Roof load equal to 50 lbs. per sq. ft.
   - Floor load equal to 200 lbs. per sq. ft.
   - Rain test equal to 4" per hour
   - Certified to meet the BOCA basic bldg. and mech. Codes

2. Enclosure will consist of a roof, fuel tank and rupture basin base, two (2) side walls, and two (2) end walls, of stressed skin, semimonocoque construction.

3. The system shall include a cooling and combustion air inlet silencer section, an equipment enclosure section, and a cooling air discharge silencer section. It shall be designed to reduce source noise by an estimated average 75 dBA as measured at 23 feet. The enclosure shall be designed as follows:

a. Roof and walls shall each be of one-piece semi-monocoque construction. All framing members shall be 6063-T6 aluminum, or aluminized steel. Skin material shall be min. thickness 0.040" prepainted aluminum (roof shall be mill-finish). A minimum of six colors shall be available for enclosure exterior. Skin panels shall be hard-riveted to framing members on 3" centers maximum. Pop rivets and bolts are not acceptable fasteners to attach exterior skin to framing. Roof assembly shall be cambered to aid in rain runoff.
b. Insulation in walls and roof shall be semi-rigid, thermo-acoustic, thickness as required to meet the noise criteria specified. Lining shall be perforated, mill-finish aluminum. Self-adhesive foam and loose or bat-type insulating materials will not be accepted.

4. An integral double walled fuel tank underframe with floor and rupture basin shall be supplied, consisting of the following: a rupture basin utilizing minimum 7 ga. steel channel perimeter walls and bottom; a U.L. listed (per U.L. 142) above-ground capable of a minimum of **72 hours of capacity** in a rectangular tank of minimum 12 ga. steel construction. The tank shall have venting and emergency venting per U.L. 142, lockable fill, low level and high level alarm contacts, and a D.C. electric analog level gauge. The cross members shall incorporate 3/8" thick steel tapping plates for genset mounting. The rupture basin shall have a float contact to indicate tank rupture, and the entire system shall be leak tested prior to installation. **The tank shall have remote sensing in the event of rupture. The remote sensing equipment shall be installed within the remote annunciator.**
5. Four-point lifting provisions shall be provided at or near the enclosure base, with capacity suitable for rigging the entire assembly. Quality assurance procedures of the manufacturer shall include regular testing of the lift devices.
6. Two (2) single personnel access doors shall be provided. Door shall consist of an extruded aluminum frame with skin material matching enclosure. Door shall be fully gasketed to form a weather tight perimeter seal. Hinges shall be forged aluminum with stainless steel pins, handle shall be stainless steel and padlockable, and lock mechanism shall be three-point, with panic hardware to allow opening from inside even when padlocked.
7. Air handling shall be as follows: Air will enter the enclosure through removable hood(s) or an integral, baffled plenum. Motor operated damper(s) will be provided, wired to open upon engine startup. Radiator discharge will be through a gravity operated damper and into a hood or vertical plenum, as dictated by airflow. The system shall not exceed 0.5" w.g. total external static pressure to ensure adequate airflow for cooling and combustion.
8. A bolt-in-place removable wall panel shall be provided for maintenance and/or equipment installation.
9. Enclosure manufacturer shall provide all necessary hardware to internally mount the specified exhaust silencer(s) and maintain the weatherproof integrity of the system. Silencer and exhaust flex shall be insulated.
10. Provide a set of stairs at each door, complete with handrails. Stairs to be shipped loose and installed by contractor at site.

U. INSTALLATION / ON SITE TESTING

1. The installation shall be performed in accordance with shop drawings, specifications, and the manufacturer's instructions; and shall comply with applicable state and local codes.

2. The generator set shall be tested as defined below by the manufacturers authorized dealer to show it is free of any defects and will start automatically and carry full load. This testing is to be performed at the jobsite. Testing shall be completed in the presence of the owner's engineer or his appointed representative. With the exception of fuel, all consumables necessary for testing shall be furnished by the bidder. Any defects which become evident
during the test shall be corrected by the bidder at his own expense.
3. Proper operation of the following shall be demonstrated:
    a. All auxiliary equipment supplied to this specification
    b. Starting and charging system components.
    c. All controls, engine shutdowns, and safety devices
4. The unit shall demonstrate the ability to start from a "cold" standby condition (ie. normal standby mode with engine coolant temperature at normal temperature established by properly functioning jacket water heater.
5. The unit shall be tested utilizing a load bank test to allow for operation at 75% of full load rating for one hour followed by three hours operation at 100% full load. After the first half-hour stabilization period at full load, the following shall be recorded at fifteen minute intervals:
    1. Voltage, amperage and frequency
    2. Fuel pressure, oil pressure and water temperature
    3. Exhaust gas temperature at engine exhaust outlet
    4. Ambient temperature

V. SERVICE MANUALS AND PARTS BOOKS

A. The system manufacturer's authorized local dealer shall furnish three copies each of the manuals and books listed below for each unit under this contract:

1. OPERATING INSTRUCTIONS - with description and illustration of all switchgear controls and indicators; and engine and generator controls and indicators.
2. PARTS BOOKS - that illustrate and list all assemblies, subassemblies and components, except standard fastening hardware (nuts, bolts, washers, etc.).
3. PREVENTATIVE MAINTENANCE INSTRUCTIONS - on the complete system that cover daily, weekly, monthly, biannual, and annual maintenance requirements and include a complete lubrication chart.
4. ROUTINE TEST PROCEDURES - for all electronic and electrical circuits and for the main AC generator.
5. TROUBLESHOOTING CHART - covering the complete generator set showing description of trouble, probable cause, and suggested remedy.

1.2 AUTOMATIC TRANSFER SWITCHES

A. WORK INCLUDED
   A. Provide two (2) Automatic Transfer Switches rated for 400 Amp, 3 pole, 480/277 volt, in NEMA 3R enclosures.

B. SYSTEM
   A. Furnish the automatic transfer switches to automatically transfer between the normal and emergency power source. The transfer switch shall be supplied as part of the engine/generator package for system responsibility.

C. APPLICABLE STANDARDS

A. The automatic transfer switches covered by these specifications shall be designed, tested, and assembled in strict accordance with all applicable standards of ANSI, U.L., IEEE and NEMA.

D. SUBMITTALS

A. Manufacturer shall submit shop drawings for review, which shall include the following, as a minimum:

1. Descriptive literature

2. Plan, elevation, side, and front view arrangement drawings, including overall dimensions, weights and clearances, as well as mounting or anchoring requirements and conduit entrance locations.

3. Schematic diagrams.

4. Wiring diagrams.

5. Accessory list.

E. ACCEPTABLE MANUFACTURERS

A. Russelectric, ASCo, Zenith will be the only manufacturers accepted.

F. CONSTRUCTION

A. General

1. The service entrance rated transfer switches shall be mounted in a NEMA 3R enclosures. Enclosures shall be fabricated from 12 gauge steel. The enclosure shall be sized to exceed minimum wire bending space required by UL 1008.

2. The transfer switches shall be equipped with an internal welded steel pocket, housing an operations and maintenance manual.

3. The transfer switch shall be top and bottom accessible.

4. The main contacts shall be capable of being replaced without removing the main power cables.

6. The main contacts shall be visible for inspection without any major disassembly of the transfer switch.

7. All bolted bus connections shall have Belleville compression type washers.

8. When a solid neutral is required, a fully rated bus bar with required AL-C neutral lugs shall be provided.

9. Control components and wiring shall be front accessible. All control wires shall be multiconductor 18 gauge 600 volt SIS switchboard type point to point harness. All control wire terminations shall be identified with tubular sleeve-type markers.

10. The switch shall be equipped with 90 degrees C rated copper/aluminum solderless mechanical type lugs.

11. The complete transfer switch assembly shall be factory tested to ensure proper operation and compliance with the specification requirements. A copy of the factory test report shall be available upon request.

B. Automatic Transfer Switch

1. The transfer switch shall be double throw, actuated by two electric operators momentarily energized, and connected to the transfer mechanism by a simple over center type linkage. Minimum transfer time shall be 400 milliseconds.

2. The normal and emergency contacts shall be positively interlocked mechanically and electrically to prevent simultaneous closing. Main contacts shall be mechanically locked in both the normal and emergency positions without the use of hooks, latches, magnets, or springs, and shall be silver-tungston alloy. Separate arcing contacts with magnetic blowouts shall be provided on all transfer switches. Interlocked, molded case circuit breakers or contactors are not acceptable.

3. The transfer switch shall be equipped with a safe load break external manual operator, designed to prevent injury to operating personnel. The manual operator shall provide the same contact to contact transfer speed as the electrical operator to prevent a flashover from switching the main contacts slowly. The external manual operator shall be safely operated from outside of the transfer switch enclosure while the enclosure door is closed.

C. Automatic Transfer Switch Controls

1. The transfer switch shall be equipped with a microprocessor based control system, to provide all the operational functions of the automatic transfer switch. The controller shall have two asynchronous serial ports. The controller shall have a real time clock with Nicad battery back-up.

2. The CPU shall be equipped with self-diagnostics which perform periodic checks of the memory I/O and communication circuits, with a watchdog/power fail circuit

3. The controller shall use industry standard open Engineered communication protocol for high speed serial communications via multidrop connection to other controllers and to a master terminal with up to 4000 ft of cable, or further, with the addition of a communication repeater. The serial communication port shall be RS422/485 compatible.

4. The serial communication port shall allow interface to either the manufacturers or the owner’s furnished remote supervisory control.

5. The controller shall have password protection required to limit access to qualified and authorized personnel.

6. The controller shall include a 20 character, LCD display, with a keypad, which allows access to the system.

7. The controller shall include three phase over/under voltage, over/under frequency, phase sequence detection and phase differential monitoring on both normal and emergency sources.

8. The controller shall be capable of storing the following records in memory for access either locally or remotely:

   a. Number of hours transfer switch is in the emergency position (total since record reset).
   b. Number of hour's emergency power is available (total since record reset).
   c. Total transfer in either direction (total since record reset).
   d. Date, time, and description of the last four source failures.
   e. Date of the last exercise period.
   f. Date of record reset.

D. Sequence of Operation

1. When the voltage on any phase of the normal source drops below 80% or increases to 120%, or frequency drops below 90%, or increase to 110%, or 20% voltage differential between phases occurs, after a programmable time delay period of 0-9999 seconds factory set at 3 seconds to allow for momentary dips, the engine starting contacts shall close to start the generating plant.

2. The transfer switch shall transfer to emergency when the generating plant has reached specified voltage and frequency on all phases. This shall occur within ten seconds of power loss.

3. After restoration of normal power on all phases to a preset value of at least 90% to 110% of rated voltage and at least 95% to 105% of rated frequency, and voltage differential is below 20%, an adjustable time delay period of 0-9999 seconds (factory set at 350 seconds) shall delay retransfer to allow stabilization of normal power. If the emergency power source should fail during this time delay period, the switch shall automatically return to the normal source.

4. After retransfer to normal, the engine generator shall be allowed to operate at no load for a programmable period of 0-9999 seconds, factory set at 350 seconds.

E. Automatic Transfer Switch Accessories

1. Programmable three phase sensing of the normal source set to pickup at 90% and dropout at 80% of rated voltage and overvoltage to pickup at 120% and dropout out at 110% of rated voltage. Programmable frequency pickup at 95% and dropout at 90% and over frequency to pickup at 110% and dropout at 105% of rated frequency. Programmable voltage differential between phases, set at 20%, and phase sequence monitoring.

2. Programmable three phase sensing of the emergency source set to pickup at 90% and dropout at 80% of rated voltage and overvoltage to pickup at 120% and dropout

out at 110% of rated voltage programmable frequency pickup at 95% and dropout at 90% and over frequency to pickup at 110% and dropout at 105% of rated frequency. Programmable voltage differential between phases set at 20%, and phase sequence monitoring.

3. Time delay for override of momentary normal source power outages (delays engine start signal and transfer switch operation). Programmable

   0-9999 seconds. Factory set at 3 seconds, if not otherwise specified.

4. Time delay to control contact transition time on transfer to either source. Programmable 0-9999 seconds, factory set at 3 seconds.

5. Time delay on retransfer to normal, programmable 0-9999 seconds, factory set at 350 seconds if not otherwise specified, with overrun to provide programmable 0-9999 second time delay, factory set at 350 seconds, unloaded engine operation after retransfer to normal.

6. Time delay on transfer to emergency, programmable 0-9999 seconds, factory set at 3 seconds.

7. A maintained type load test switch shall be included to simulate a normal power failure, keypad initiated.

8. A remote type load test switch shall be included to simulate a normal power failure, remote switch initiated.

9. A time delay bypass on retransfer to normal shall be included. Keypad initiated.

10. Contact, rated 10 Amps 30 volts DC, to close on failure of normal source to initiate engine starting.

11. Contact, rated 10 Amps 30 volts DC, to open on failure of normal source for customer functions.

12. Light emitting diodes shall be mounted on the microprocessor panel to indicate switch is in normal position, switch is in emergency position and controller is running.

13. A plant exerciser shall be provided with (10) 7 day events, programmable for any day of the week and (24) calendar events, programmable for any month/day, to automatically exercise generating plant programmable in one minute increments. Also include selection of either "no load" (switch will not transfer) or "load" (switch will transfer) exercise period. Keypad initiated.

14. Provision to select either "no commit" or "commit" to transfer operation in the event of a normal power failure shall be included. In the "no commit position," the load will transfer to the emergency position unless normal power returns before the emergency source has reach 90% of its rated values (switch will remain in normal). In the "commit position" the load will transfer to the emergency position after any normal power failure. Keypad initiated.

15. Two auxiliary contacts rated 10 Amp, 120 volts AC (for switches 100 to 800 amps) 15 amp, 120 volts AC (for switches 1000 to 4000 amps), shall be mounted on the main shaft, one closed on normal, the other closed on emergency. Both contacts will be wired to a terminal strip for ease of customer connections.

16. A three phase digital LCD voltage readout, with 1% accuracy shall display all three separate phase to phase voltages simultaneously, for both the normal and emergency source.

17. A digital LCD frequency readout with 1% accuracy shall display frequency for both normal and emergency source.

18. An LCD readout shall display normal source and emergency source availability.

19. Include (2) time delay contacts that open simultaneously prior to transfer In either direction. These contacts close after a time delay upon transfer. Programmable 0-9999 seconds after transfer.

20. Two position selector to provide either automatic or manual retransfer operation (with pushbutton).

F. Approval

1. As a condition of approval, the manufacturer of the automatic transfer switches shall verify that their switches are listed by Underwriters Laboratories, Inc., Standard UL-1008 with 3 cycle short circuit closing and withstand as follows:

	RMS Symmetrical Amperes 480 VAC Current Limiting	
Amperes	Closing and Withstand	Fuse Rating
100-400	42,000	200,000
600-800	65,000	200,000
1000-1200	85,000	200,000
1600-4000	100,000	200,000

2. During the 3 cycle closing and withstand tests, there shall be no contact welding or damage. The 3 cycle tests shall be performed without the use of current limiting fuses. The test shall verify that contacts separation has not occurred, and there is contact continuity across all phases. Test procedures shall be in accordance with UL-1008, and testing shall be certified by Underwriters' Laboratories, Inc.

3. When conducting temperature rise tests to UL-1008, the manufacture shall include post-endurance temperature rise tests to verify the ability of the transfer switch to carry full rated current after completing the overload and endurance tests.

4. The microprocessor controller shall meet the following requirements:

- Storage conditions - 25 degrees C to 85 degrees C
- Operation conditions - 20 degrees C to 70 degrees C ambient
- Humidity 0 to 99% relative humidity, noncondensing

- Capable of withstanding infinite power interruptions
- Surge withstand per ANSI/IEEE C-37.90A-1978

5. Manufacturer shall provide copies of test reports upon request.

G. Manufacturer

1. The transfer switch manufacturer shall employ a nationwide factory-direct, field service organization, available on a 24-hour a day, 365 days a year, call basis.

2. The manufacture shall include an 800 telephone number, for field service contact, affixed to each enclosure.

3. The manufacturer shall maintain records of each transfer switch, by serial number for a minimum 20 years.

1.2 EXTERIOR GENERATOR DOCKING STATION

A. Furnish and install TryStar Co. or approved equal series DBDS-08-5-WL-MFC-K2-NEMA 4X-(2)400A-LOAD BANK docking station with quick connects and load bank connection.

B. Unit is to be wall mounted, NEMA 4X, powder coated, enclosure.

C. Unit is to be rated for 800 ampere, 480/277 volt, 3 pole, 4 wire. Unit to be provided with two 100% rated 400 ampere, 480 volt, 3 pole circuit breakers connected to kirk key interlocks. Unit to come with a load bank testing capability.

D. Furnish to the owner, two sets of cable assemblies (ten cables total – L1, L2, L3, N, G). Cable lengths shall be 50’-0”. Powertron Co/TryStar Co. model number TBQC20-W-XX-50-COLOR. Cable colors shall correspond to 480Y/277 volt configuration.

END OF SECTION

The following documents are provided for clarification of the basis of design indicated in the Specifications

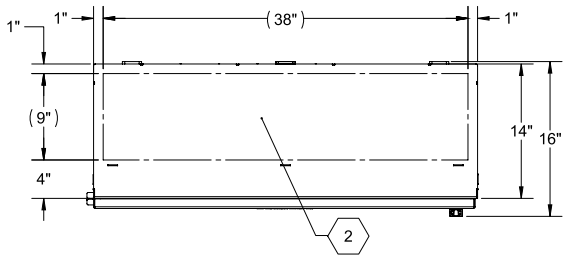
800A DOCKING STATION

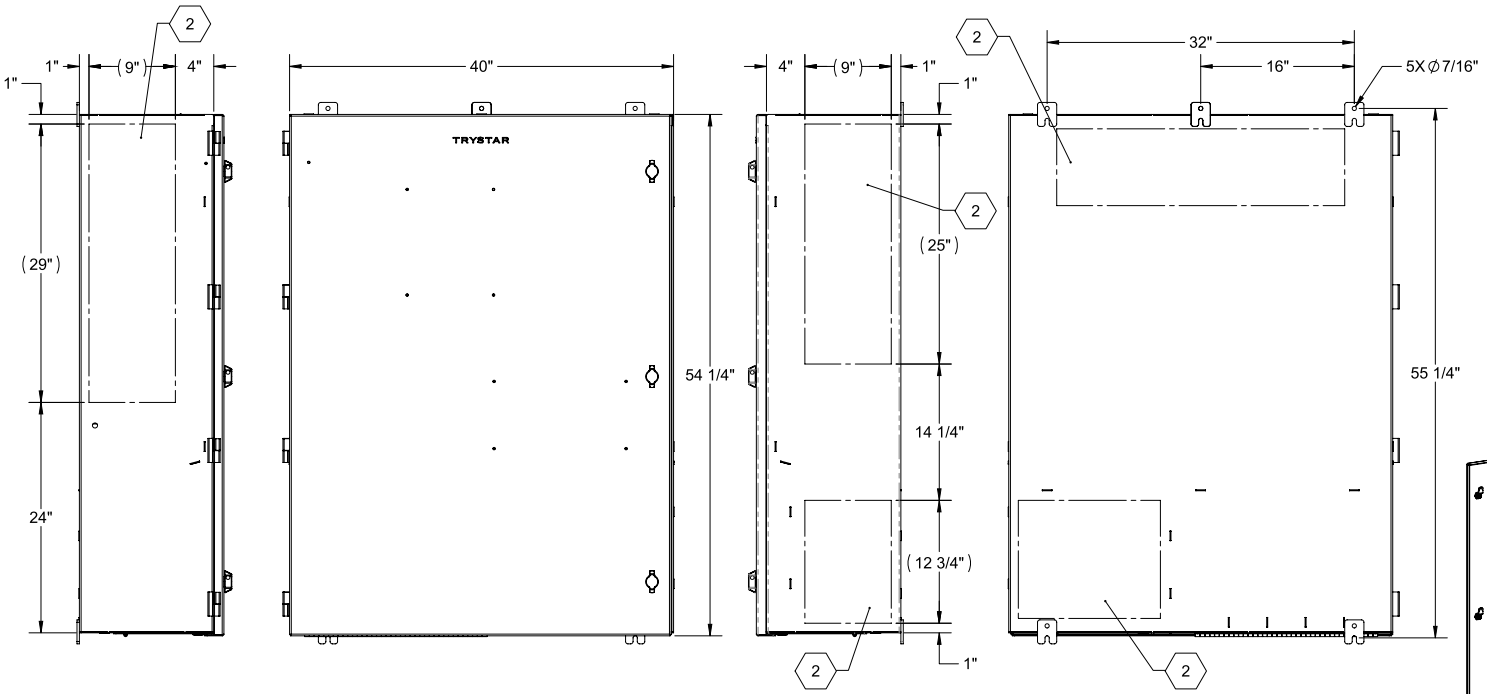
REVISION HISTORY				
REV	DESCRIPTION	ECO	BY	DATE
-01	FIRST REV FOR MFG	N/A	NDA	1/1/2019

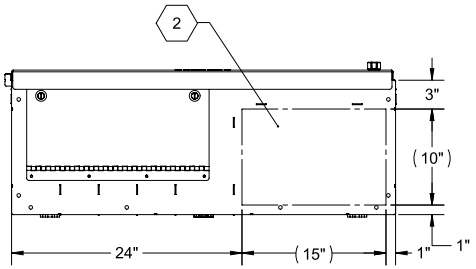
Medium 19 Series

Wall Mount

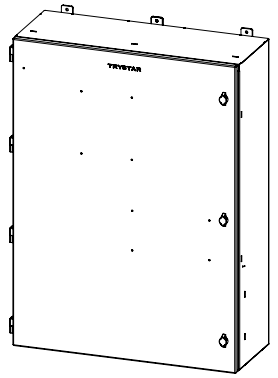
ONE-LINES AVAILABLE UPON REQUEST



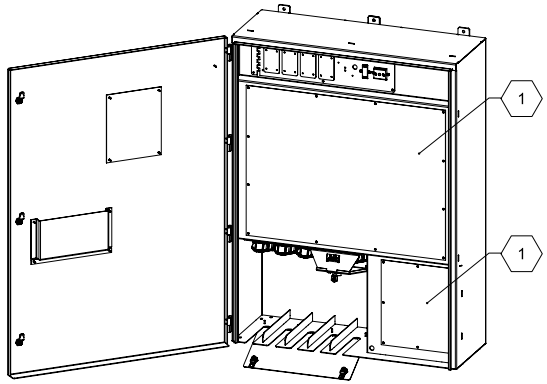




NOTES:
1. REMOVABLE ACCESS PANEL
2. CONDUIT ENTRY AREA - SIZE & LOCATION SUBJECT TO CHANGE WITH ADDITION OF FEATURES



DIMETRIC VIEW CLOSED
1:16 SCALE



DIMETRIC VIEW OPEN
1:16 SCALE

MATERIAL

FINISH

UNLESS OTHERWISE SPECIFIED
DIM ARE IN INCHES
TOL ON ANGLE ± 1° FRACTION ± 1/16
1 PL ± 1/32 2 PL ± .015 3 PL ± .010
INTERPRET DIM AND TOL PER ASME Y14.5M-1994

THIRD ANGLE PROJECTION

APPROVALS		
DRAWN:	NDA	DRAWN DATE: 12/4/2018
CHECKED:		CHECKED DATE:
ENG:		DATE:
MFG:		DATE:
QA:		DATE:

TRYSTAR, INC.
2917 INDUSTRIAL DRIVE, FARIBAULT, MN 55021
(507) 333-3990 - (866) TRYSTAR - TRYSTAR.COM

TITLE: MEDIUM 19 SERIES; WALL MOUNT; DIMENSIONS & CONDUIT ENTRY AREA

SIZE	CAGE CODE	DWG. NO.	REV
C	1N5J6	Md19 xXX-aavW-xx(x)	-01

SCALE: 1:10 | WEIGHT: | SHEET 1 OF 1

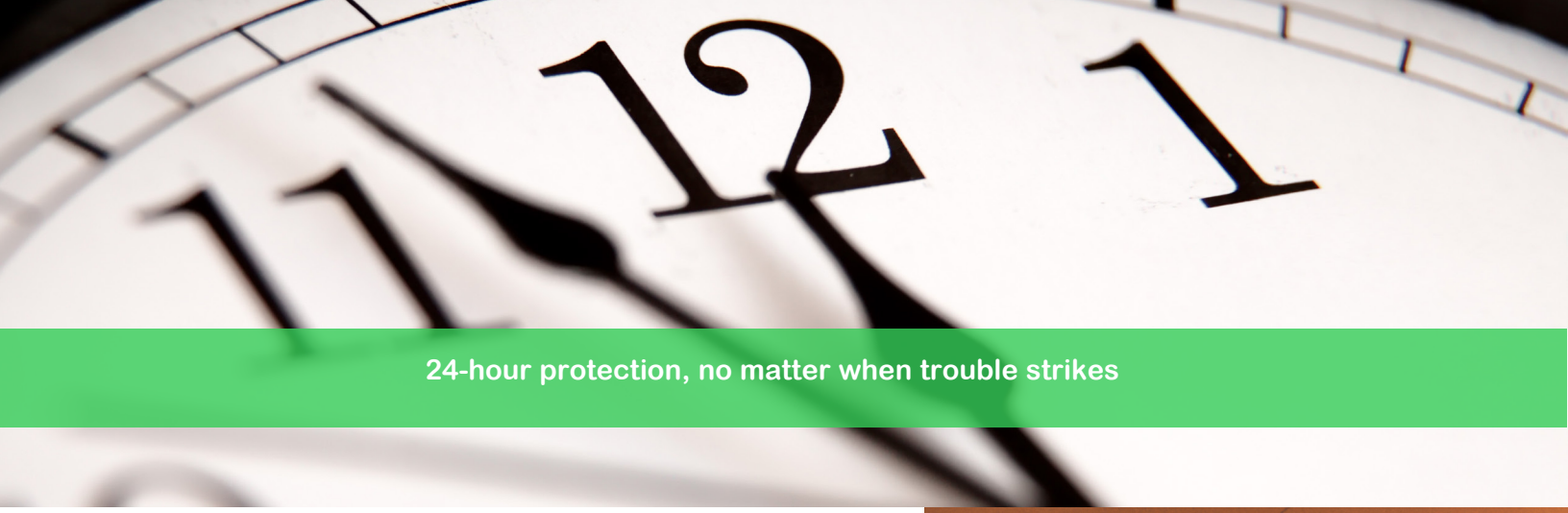
ASCO SERIES 300 ATS PUB 1195 R17 R3

ASCO Power Technologies™

ASCO SERIES 300
Power Transfer Switches

ascopower.com

Life Is On Schneider Electric



24-hour protection, no matter when trouble strikes

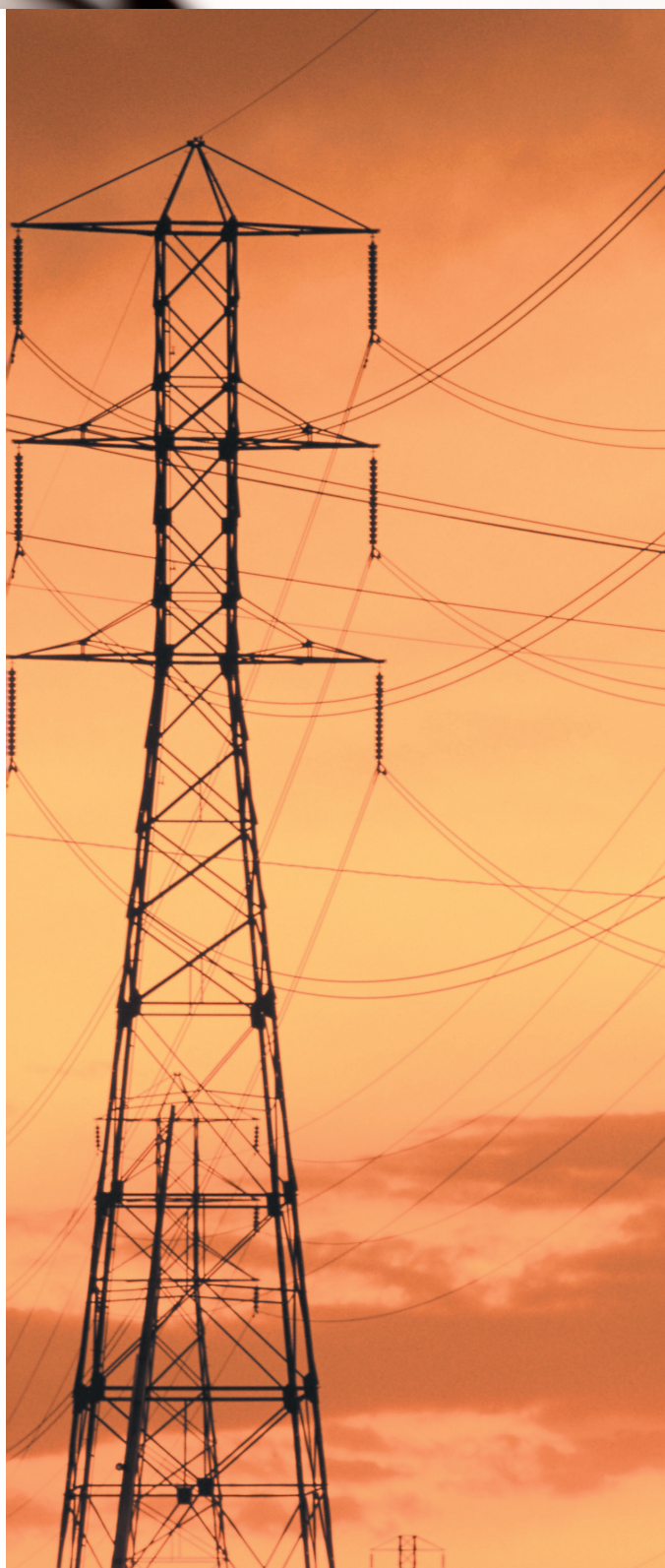
ASCO SERIES 300 Power Transfer Switches for Power Outage Protection

Where would you be without a constant flow of electrical power? We often take for granted that power will always be around when we need it.

In reality, power failures are common, and when the power goes out, your business suffers. Power failures are unpredictable. They can occur at any time and for any number of reasons — a bolt of lightning, a power surge, a blackout, an accident or even equipment failure. They come without warning and often at the most inconvenient times.

It's for this reason that many businesses and other entities have invested in emergency power backup systems. Typically, the system consists of an engine generator and an automatic transfer switch (ATS) that transfers the load from the utility to the generator.

An ATS with built-in control logic monitors your normal power supply and senses interruptions and unacceptable abnormalities. When the utility power fails, the ATS automatically starts the engine generator and transfers the load after the generator has reached proper voltage and frequency. This happens in a matter of seconds after the power failure occurs. When the utility power has been restored, the ATS will automatically switch the load back and, after a time delay, shut down the engine generator. With an ATS, you are protected 24 hours a day, seven days a week.



TYPICAL APPLICATIONS

TELECOM

In the telecommunication industry, providing a high level of service and dependability is crucial. Lost power means an interruption in service for your customers and lost business for your company. For instance, with cell sites scattered across a wide geographical region and in many remote areas, the chances of an interruption in power are increased, making an ATS valuable resource at each location.

To maintain dependable service, each cell site must be monitored 24 hours a day. This can be very difficult without some type of remote monitoring and testing capability. The Series 300 Transfer Switch, combined with ASCO's monitoring and control management system, is a cost-effective, packaged solution that can achieve both of these challenging objectives without a major investment at each cell site. With ASCO's connectivity solutions, you can remotely monitor and control numerous sites from around the corner or across the world.

AGRICULTURE

Maintaining electrical power is vital to an agriculture operation. If the flow of power is interrupted, your operation will be at risk unless the backup generator is quickly activated. A prolonged power outage can affect numerous aspects of the operation, from housing and feeding livestock to processing and producing the end product.

With an ASCO Series 300 Transfer Switch, power will automatically be transferred over to your backup generator, eliminating the need to manually switch from utility to generator. When power is restored, the ASCO Series 300 Transfer Switch will, after an adjustable time delay to allow for utility stabilization, automatically switch the load back to the utility service.

COMMERCIAL/RETAIL, LIGHT INDUSTRIAL

The retail industry is very competitive. An electrical power failure can have a dramatic impact on a retailer's bottom line. If power is interrupted during peak shopping times, the effect can be extremely damagin to present and future business.

A power interruption will not only suspend shopping, it can also create safety problems, result in lost transaction data, lost account information and possible damage to data collection equipment. In addition, retailers who rely on controlled climates to protect valuable inventory could suffer even greater losses, especially if the power failure occurs at a time when no one is available to rectify the situation. To avoid any of these power outage problems, simply install a backup generator with an ASCO Series 300 Transfer Switch, and your power outage concerns will be a thing of the past.

MUNICIPAL

The ASCO Series 300 Transfer Switch can be a critical component of a municipal government's emergency power backup system. Residents of townships, cities and counties rely on police, fire, ambulance/first aid and other critical public sector services.

An interruption in power can affect the ability of emergency services to effectively respond to the needs of the community. When time is a critical factor, such as when responding to a fire alarm or an emergency call, an ASCO Series 300 Transfer Switch can be a lifesaver, by automatically switching to power from the backup generator. While not all municipal services are a matter of life and death, they are always expected to be there.

SERIES 300 POWER TRANSFER SWITCHES

MAXIMUM RELIABILITY & EXCELLENT VALUE

With a SERIES 300 Transfer Switch, you get a product backed by ASCO Power Technologies, the industry leader responsible for virtually every major technological advance in the Transfer Switch industry.

The ASCO SERIES 300 was designed for one purpose–to automatically transfer critical loads in the event of a power outage. Each and every standard component was designed by ASCO engineers for this purpose.

The SERIES 300 incorporates the Group G controller with enhanced capabilities for dependable operation in any environment. A user-friendly control interface with a 128x64 graphical LCD display and intuitive symbols allow for ease of operation while visual LED indicators display the transfer switch status. Operating parameters and feature settings can be adjusted without opening the enclosure door.

The rugged construction and proven performance of the ASCO SERIES 300 assure the user of many years of complete reliability. The SERIES 300 is even designed to handle the extraordinary demands placed on the switch when switching stalled motors and high inrush loads.

ASCO's SERIES 300 modular, compact design makes it easy to install, inspect and maintain. All parts are accessible from the front so switch contacts can be easily inspected.

FEATURES

- The SERIES 300 is listed to UL 1008 standard for total system loads for automatic transfer switches.
- Meets NFPA 110 for Emergency and Standby Power Systems and the National Electrical Code (NEC) Articles 700, 701 and 702.

UL 1008 WITHSTAND AND CLOSE-ON RATINGS FOR ASCO SERIES 300 GROUP G PRODUCTS [1,2] (RMS Symmetrical Amperes)

FRAME	SWITCH RATINGS (AMPERES)	CURRENT LIMITING FUSES				SPECIFIC BREAKER		
	TRANSFER SWITCHES	480V MAX.	600V MAX.	MAX. SIZE, A	CLASS	240V MAX.	480V MAX.	600V MAX.
D	30	100kA	-	60	J	22kA	22kA	10kA
D	70-104	35kA	35kA	200	RK1	42kA	22kA	10kA
		200kA	35kA	200	J			
D	150	35kA	35kA	200	RK1	65kA	25kA	10kA
		200kA	35kA	200	J			
D	200	200kA	-	200	J	65kA	25kA	10kA
D	230	100kA	-	300	J	65kA	25kA	10kA
J	150[4], 200[4], 230[4], 260, 400	200kA	200kA	600	J	50kA	50kA	42kA
J	600	200kA	200kA	800	L	50kA	50kA	42kA
H	800-1200	200kA	200kA	1600	L	65kA[3]	65kA	65kA
G	1600-2000[3]	200kA	200kA	2500	L	85kA	85kA[3]	85kA[3]
G	2600-3000	200kA	200kA	4000	L	100kA	100kA	100kA

Notes:
1. All WCR values indicated are tested in accordance with the requirements of UL 1008, 7th Edition. See ASCO Pub. 1128 for more WCR information.
2. Application requirements may permit higher WCR for certain switch sizes.
3. Front connected only.
4. J150, 200, 230 Amperes available in 3ADTS and 3NDTS only.

Fig. 1: ASCO Power Transfer Switch rated 200 Amps

- Restriction of Hazardous Substances (RoHS) compliant controller.
- 30 through 3000 amperes in a compact design.
- Switch operating temperature range of 0 to +40° C.
- Available to 600 VAC, single or three phase.
- True double-throw operation: The single solenoid design is inherently inter-locked and prevents connections to both sources at the same time.
- No danger of the SERIES 300 ATS transferring loads to a dead source because the unique ASCO single-solenoid operator derives power to operate from the source to which the load is being transferred.
- Easy-to-navigate 128x64 graphical LCD display with keypad provides LED indicators for switch position, source availability, not in auto mode, and alert condition.
- Integrated multilingual user interface for configuration and monitoring.
- Delayed transition operation is now available (Dual Operator Configuration).
- Non-automatic operation can be selected using the key pad without opening enclosure door.
- Relay expansion module with extra relays for accessory outputs (optional).
- Includes soft keys for test function and time delay bypass as standard features.
- Emergency source failure alert indication.
- Historical event log (optional).
- Statistical ATS system monitoring information.
- Diagnostic functions.
- Password protection to prevent unauthorized tampering of settings.
- Adjustable time-delay feature prevents switch from being activated due to momentary utility power outages and generator dips.
- Auxiliary contacts to indicate position of main contacts. Two (2) for normal and two (2) emergency position
- Supplied with solid neutral termination.
- Optional switched neutral pole available.
- Field modification accessory kits available.
- Available for immediate delivery.

SERIES 300 POWER TRANSFER SWITCHES

DESIGNED TO FIT ANYWHERE

The ASCO SERIES 300 product line represents the most compact design of automatic power transfer switches in the industry. With space in electrical closets being at a premium, the use of wall- or floor-mounted ASCO Power Transfer Switches assure designers optimum utilization of space.

All transfer switches through 2000 amperes are designed to be completely front accessible. This permits the enclosures to be installed flush against the wall and still allow installation of all power cabling and connections from the front of the switch. Cable entrance plates are also standard on the 1600 and 2000 amperes units to install optional side-mounted pull boxes for additional cable bending space.

Fig. 2: ASCO Power Transfer Switch rated 200 Amps

Fig. 3: ASCO Power Transfer Switch rated 600 Amps

Fig. 4: ASCO Power Transfer Switch rated 1000 Amps

Fig. 5: ASCO Power Transfer Switch rated 2000 Amps shown in Type 3R enclosure

Fig. 6: ASCO Power Transfer Switch rated 3000 Amps

SERIES 300 GROUP G CONTROLLER

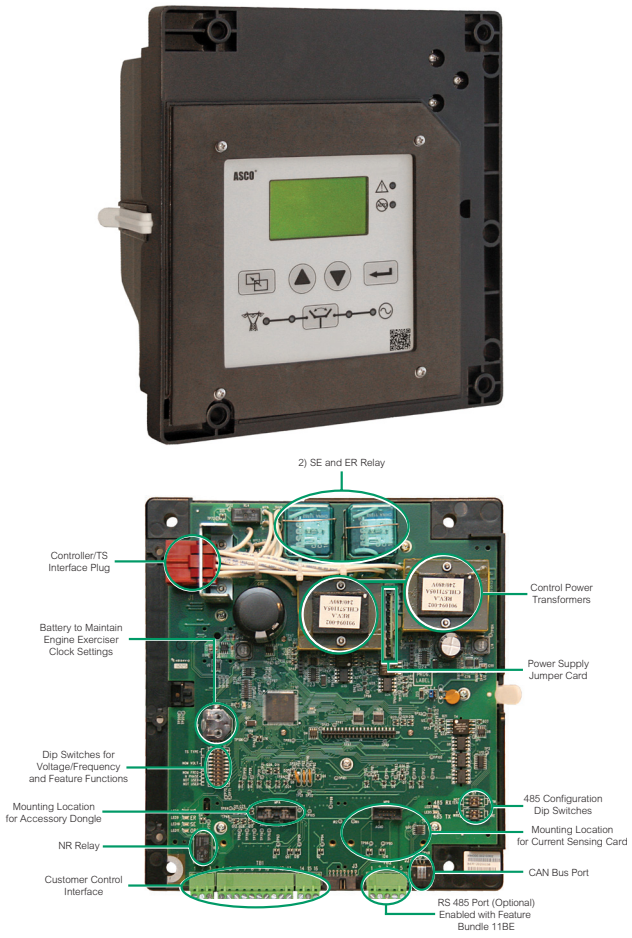


Fig. 7: ASCO SERIES 300 Group G Controller

CONTROL AND DISPLAY PANEL

- Easy-to-navigate 128x64 graphical LCD display with keypad provides LED indicators for switch position, source availability, not in auto mode, and alert condition. It also includes test and time delay bypass soft keys.

VOLTAGE, FREQUENCY & CURRENT SENSING

- 3 phase sensing on the Normal source and single phase sensing on the Emergency Source (3 phase Emergency sensing optional).
- Under and over voltage and frequency settings on normal and emergency.
- True RMS voltage sensing with +/-1% accuracy.
- Frequency sensing accuracy is +/- 0.1Hz.
- Voltage and frequency parameters adjustable in 1% increments.
- Selecting settings: single or three phase voltage sensing on normal, and single phase sensing on emergency; 50 or 60Hz. 3-phase voltage unbalance on normal (Emergency unbalance optional).
- Load current sensing card (optional).

The SERIES 300 incorporates the group "G" controller with enhanced capabilities for dependable operation in any environment.

TIME DELAYS

- Engine start time delay – delays engine starting signal to override momentary normal source outages, adjustable from 0 to 6 seconds (Feature 1C).
- Emergency source stabilization time delay to ignore momentary transients during initial generator set loading, adjustable from 0 to 4 seconds (Feature 1F).
- Re-transfer to normal time delay with two settings (Feature 3A).
    - Power failure mode – 0 to 60 minutes
    - Test mode – 0 to 10 hours
- Unloaded running time delay for engine cooldown, adjustable from 0 to 60 minutes (Feature 2E).
- Pre- and post-signal time delay for selective load disconnect with a programmable bypass on source failures, adjustable from 0 to 5 minutes (specify ASCO optional accessory 31Z).
- Delayed transition load disconnect time delay, adjusable from 0 to 5 mi-nutes (3ADTS/3NDTS configuration only).

STANDARD SELECTABLE FEATURES

- Inphase monitor to transfer motor loads, without any intentional off time, to prevent inrush currents from exceeding normal starting levels.
- Engine exerciser to automatically test backup generator each week, with or without load 20 minutes not adjustable (Advanced multi-schedule exerciser available as part of optional 11BE bundle).
- Commit to transfer.
- Selective load disconnect circuit to provide a pre-transfer and/or post-transfer signal when transferring from emergency to normal and/or normal to emergency.
- Re-transfer to normal through soft keys on user interface permits selection of "manual" or "automatic" operation.
- 60Hz or 50Hz selectable switch. Three-/single- phase selectable switch.

REMOTE CONTROL FEATURES

- External inputs for connecting:
- Remote test switch.
- Remote contact for test or peak shaving applications. If emergency source fails, switch will automatically transfer back to normal source if acceptable.
- Inhibit transfer to emergency.
- Remote time delay bypass switch emergency to normal.

SERIES 300 GROUP G OFFERS SOPHISTICATED FUNCTIONALITY

The new Group G controller offers an intuitive, easy-to-navigate 128*64 graphical LCD display with soft keypad and provides six (6) LED indicators.

- Switch Position (green for normal, red for emergency LED)
- Source Availability (green for normal, red for emergency LED)
- “Not In Auto” (amber LED)
- Common Alarm (amber LED)

The ASCO group “G” controller is self-contained with an integrated display (no other components are required for efficient operation).

The controller allows for open or delayed transition transfer operation (both automatic, and non-automatic configurations).

An integrated multilingual user interface for configuration and monitoring (this design approach allows greater application flexibility).

Multiple source-sensing capabilities of voltage, frequency (under frequency sensing on normal and emergency sources), and optional current card, single and three phase (does not require an external metering device).

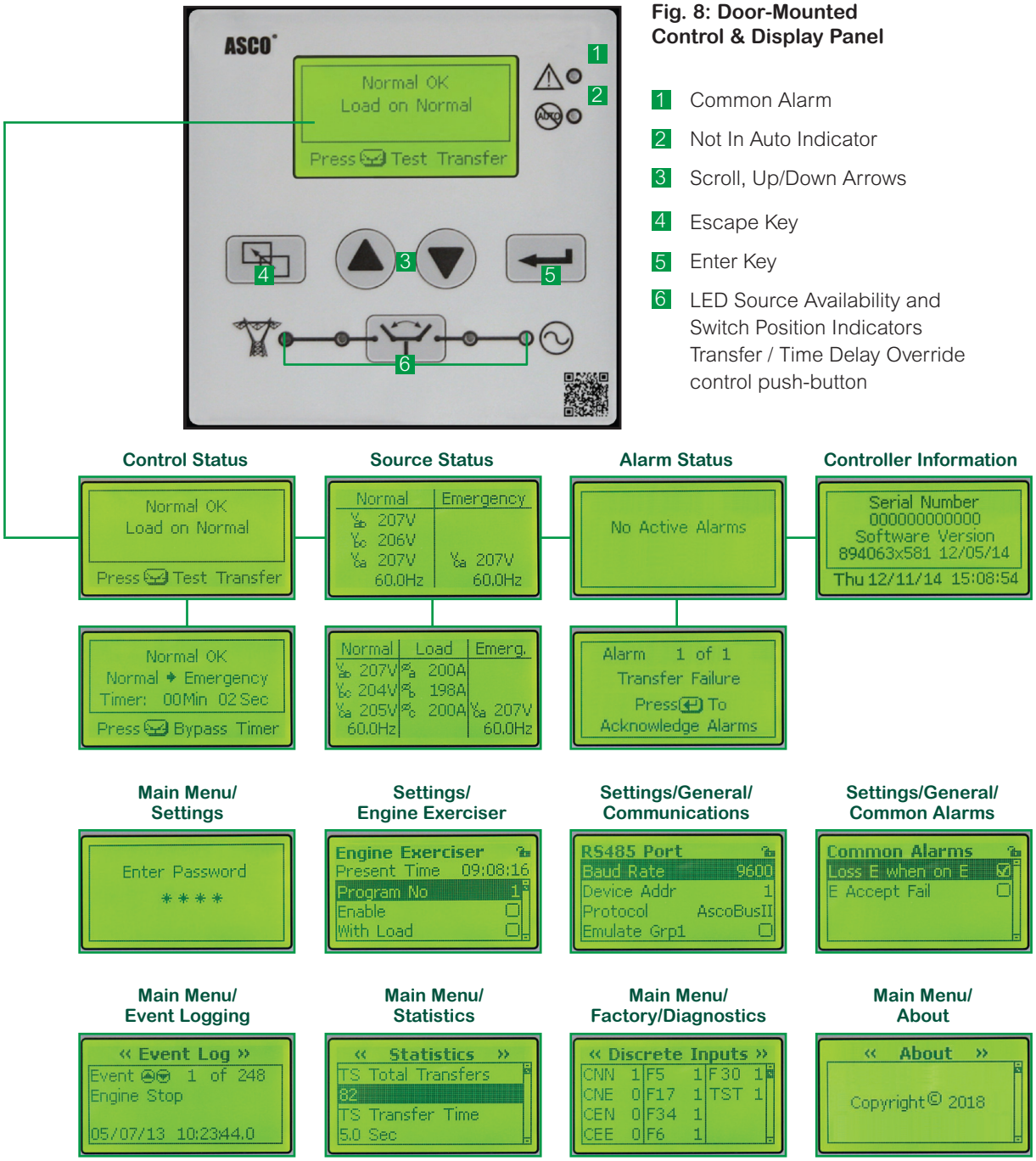


Fig. 8: Door-Mounted Control & Display Panel

1. Common Alarm
2. Not In Auto Indicator
3. Scroll, Up/Down Arrows
4. Escape Key
5. Enter Key
6. LED Source Availability and Switch Position Indicators Transfer / Time Delay Override control push-button

SERIES 300 ATS OPTIONAL ACCESSORIES

ACCESSORY 1UP

UPS back up power to allow controller to run with LCD display for 30 seconds without AC power.

ACCESSORY 11BE FEATURE BUNDLE

A fully programmable engine exerciser with seven independent routines to exercise the engine generator with or without loads, on a daily, weekly, bi-weekly or monthly basis. Engine exerciser setting can be displayed and changed from the user interface keypad.

Event Log display shows the event number, time and date of event, event type, and event reason (if applicable).

A maximum of 300 events can be stored. RS 485 Communications Port Enabled Common Alarm Output Contact

On three phase systems 11BE also enables line to line voltage unbalance and three phase sensing capability for the Emergency Source as well as Phase Rotation Checking for both sources.

ACCESSORY 18RX

Relay expansion module (REX) provides for some commonly used accessory relays, includes one form C contact for source availability of normal (18G), and one form C contact for availability of emergency (18B) (contact rating 5 amperes @ 30Vdc or @125 VAC resistive) (100 ma, 5Vdc min). Additional output relay is provided, the default is to indicate a common alarm. (See operator's manual for configurable options.)

ACCESSORY 23GA[1] (SINGLE PHASE) AND 23GB (THREE PHASE)

Load current metering card measures either single or three phase load current.

Note 1: This feature is not available with a Power Meter Option (135L).

ACCESSORY 44A

Strip Heater with thermostat for extremely cold areas to prevent condensation and freezing of this condensation. External 120 volt power source required.

ACCESSORY 44G

Strip Heater with thermostat, wired to load terminals: 208-240, 360-380, 460-480, 550-600 volts. Contains wiring harnesses for all transfer switch sizes.

ACCESSORY 72EE

Connectivity Module enabling remote monitoring and control capabilities includes accessory 11BE featured bundle (pages 12-14).

ACCESSORY 73

Surge Suppressor (TVSS) Rated 65kA.

ACCESSORY 62W

Audible alarm with silencing feature to signal each time switch transfers to emergency (may require oversize enclosure depending on accessory combination for "D" frame only).

ACCESSORY 37B

6' Extension harness for units shipped open type to accommodate customer mounting of controls and switch.

ACCESSORY 37C

9' Extension harness for units shipped open type to accommodate customer mounting of controls and switch.

ACCESSORY 135L[2]

Power Meter on load side (includes shorting block and CTs) Note 2: This feature is not available with Load Current Metering Option (23GA or 23GB).

ACCESSORY 30A[3]

Shedding circuit initiated by opening of a customer-supplied contact.

ACCESSORY 30B*[3]

Load-shedding circuit initiated by removal of customer-supplied voltage. (*Specify Voltage)

ACCESSORY 30AA[3]

Load-shedding circuit initiated by opening of a customer-supplied contact.

ACCESSORY 30BA*[3]

Load-shedding circuit initiated by removal of customer-supplied voltage. (*Specify Voltage)

Note 3: Accessory 30A and 30B* are only available for 3ATS only;

accessory 30AA and 30BA* are only available for 3ADTS.

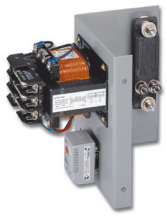


Fig. 9: Strip Heater Kit (Accessory 44G)

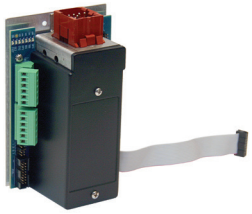


Fig. 10: Relay Expansion Module (Accessory 18RX)

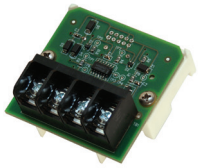


Fig. 11: Load Current Card (Accessory 23GA/GB)

Fig. 12: Programmable Engine Exerciser

Fig. 13: Accessory 1UP UPS Backup Power

FIELD CONVERSION KITS FOR SERIES 300 TRANSFER SWITCHES

KIT NO.	DESCRIPTION
935147	Advanced Function Bundle Retrofit Kit (11BE) - See above accessory 11BE description for details.
935148	REX Module with Source Availability Contacts (Acc. 18RX)
935149	UPS to allow controller to run for 30 seconds minimum without AC Power (Acc. 1UP)
935150	1/3 Phase load current sensing card only (Acc. 23GA/GB)
K613127-001	Strip Heater (125 watt) 120 volt (Acc. 44A)
K613127-002	Strip Heater (125 watt) 208-480 volt (Acc. 44G)
948551	Quad-Ethernet Module (Acc. 72EE)
K609027	Cable Pull Box (1600-2000 amperes)

SERIES 300 POWER TRANSFER SWITCHES

SERIES 300 NON-AUTOMATIC TRANSFER SWITCHING (3NTS)

ASCO non-automatic transfer switches are generally used in applications in which operating personnel are available and the load is not an emergency type requiring automatic transfer of power. They can also be arranged for remote control via ASCO's connectivity products.

Fig. 14: ASCO 3NTS 400 Amps Type 1 Enclosure

3NTS FEATURES

- ASCO Non-Automatic Transfer Switches are manually initiated via soft keys on the user interface panel.
- Sizes range from 30 through 3000 amperes.
- Group G controller provides for addition of optional accessories.
- Controller prevents inadvertent operation under low voltage condition.
- Source acceptability lights inform operator if sources are available to accept load.
- Source inphase monitor to transfer motor loads between live sources.
- Two auxiliary contacts closed when transfer switch is connected to normal and two closed on emergency standard feature 14AA/14BA.

Fig. 15: ASCO 3ADTS/3NDTS 400 Amps Type 1 Enclosure

SERIES 300 DELAYED TRANSITION TRANSFER SWITCHING (3ADTS/3NDTS)

ASCO Delayed Transition Transfer Switches are designed to provide transfer of loads between power sources with a timed load disconnect position for an adjustable period of time.

3ADTS/3NDTS FEATURES

- Sizes from 150 through 3000 amperes.
- Reliable field proven dual solenoid operating mechanisms.
- Mechanical interlocks to prevent direct connection of both sources.
- Adjustable time delay for load disconnect (0 to 5 minutes).
- Available in manual operation configuration (3NDTS).
- Available with optional load shed feature for (3ADTS).

SERIES 300 TRANSFER SWITCH ORDERING INFORMATION

To order an ASCO SERIES 300 Power Transfer Switch, complete the following catalog number:

J	+ 03ATS	+ A	+ 3	+ 0600	+ N	+ GX	+ C
Frame	Transition Type	Neutral Code	Phase Poles	Amperes	Voltage Code	Group Code	Enclosure
Open Transition D = 30A - 230A **Open/Delayed Transition** J = 150A - 600A H = 800A - 1200A G = 1600A - 3000A	**Automatic** 03ATS Open Transition 3ADTS Delayed Transition **Non Automatic** 03NTS Open Transition 3NDTS Delayed Transition	A = Solid Neutral B = Switched Neutral	2 3	0030[1] 0070[1] 0104[1] 0150[1, 5] 0200[1, 3, 4] 0230[1, 3, 4] 0260[1, 4] 0400[1, 4] 0600[1, 4] 0800[4] 1000[4] 1200[4, 5] 1600[4, 5] 2000[4, 5] 2600[4, 5] 3000[4, 5]	A[3] = 115 B[3] = 120 C = 208 D = 220 E = 230 F = 240 H = 380 J = 400 K = 415 L = 440 M = 460 N = 480 P = 550 Q = 575 R = 600	G0 No Optional Accessories GX Optional Accessories	0 = Open Type (zero) C = Type 1 Enclosure F = Type 3R[1] Enclosure G = Type 4[1] Enclosure H = Type 4X[1] Enclosure (304 Stainless Steel) L = Type 12[1] Enclosure M = Type 3R[3] Secure Double Door Enclosure N = Type 4 Secure Double Door Enclosure Q = Type 12 Secure Double Door Enclosure R = Type 3RX[7,8] Secure Double Door Enclosure (304 Stainless Steel)

Notes:

1. Switch sizes 30-600 amperes supplied in non-secure enclosures as standard.
2. 115-120 volt available for 30-400 amperes only. For other voltages contact ASCO.
3. 200 and 230 amperes rated switches for use with copper cable only.
4. Switch sizes 800-3000 amperes, and 150-400 amperes 3ADTS/3NDTS provided in secure type outdoor enclosures when required.
5. Use Type 3R secure for 1200, 2000, 2600, and 3000.
6. Type 304 stainless steel is standard. Suitable for indoor or outdoor use where there may be caustic or alkali chemicals in use. To provide an improved reduction in corrosion of salt and some chemicals, optional type 316 stainless steel is recommended. This is the preferred choice for marine environments.
7. Available on switches rated 1200, 2000, 2600, and 3000 amperes.
8. When temperatures below 32°F can be experienced, special precautions should be taken, such as the inclusion of strip heaters, to prevent condensation and freezing of this condensation. This is particularly important when environmental (Type 3R, 4) are ordered for installation outdoors.
9. Type 3R enclosures are not suitable for installations subject to wind blown rain or snow. Use type 4 enclosures where available or install supplemental shelter protection around the 3R enclosure.

SERIES 300 EXTERNAL POWER CONNECTIONS

Size UL-Listed Solderless Screw-Type Terminals

SWITCH RATING (AMPERES)	RANGES OF AL-CU WIRE SIZES (UNLESS SPECIFIED COPPER ONLY)
30-230[2] ATS and NTS only	One #14 to 4/0 AWG
150*, 260, 400	Two 1/0 AWG to 250 MCM or One #4 AWG to 600 MCM
600	Two 2/0 AWG to 600 MCM
800, 1000, 1200	Four 1/0 to 600 MCM
1600, 2000	Six 1/0 to 600 MCM
2600, 3000	Twelve 1/0 to 750 MCM

Notes:

1. All SERIES 300 switches are furnished with a solid neutral plate (unless switched neutral configuration is specified) and terminal lugs.
2. 200 and 230 amperes rated switches for use with copper cable only. Refer to paragraph 310.15 of the NEC for additional information.
3. Use wire rated 75°C minimum for all power connections.

* 150 for DTS only

EXTENDED WARRANTIES FOR SERIES 300 TRANSFER SWITCHES (3ATS/3NTS/3ADTS/3NDTS)

DESCRIPTION
1 Year Extension (Total of 3 Years)
2 Year Extension (Total of 4 Years)
3 Year Extension (Total of 5 Years)

Notes:

1. Standard warranty is (24) months, 2 years from date of shipment, extended warranty is in addition to the two years, for a total of, 3, 4, or 5 years.
2. Refer to Publication 3223 for warranty terms and conditions.

SERIES 300 Transfer Switch Dimensions and Shipping Weights

UL TYPE 1 ENCLOSURE[1,2,3,4]

SWITCH RATING AMPS	PHASE POLES	NEUTRAL CODE	DIMENSIONS, IN. (MM)			APPROX. SHIPPING WEIGHT LB. (KG)
			WIDTH	HEIGHT	DEPTH	
30[3],70[3],104[3] 150[3], 200[3]	2	A	18 (457)	31 (787)	13 (330)	69 (32)
	2	B	18 (457)	31 (787)	13 (330)	72 (33)
	3	A	18 (457)	31 (787)	13 (330)	72 (33)
	3	B	18 (457)	31 (787)	13 (330)	75 (34)
230	2	A	18 (457)	48 (1219)	13 (330)	117 (53)
	2	B	18 (457)	48 (1219)	13 (330)	125 (57)
	3	A	18 (457)	48 (1219)	13 (330)	125 (57)
	3	B	18 (457)	48 (1219)	13 (330)	133 (61)
260, 400	2	A	24 (610)	56 (1422)	14 (356)	250 (113)
	2	B	24 (610)	56 (1422)	14 (356)	260 (118)
	3	A	24 (610)	56 (1422)	14 (356)	260 (118)
	3	B	24 (610)	56 (1422)	14 (356)	270 (123)
150, 200, 230 SERIES 3ADTS/3NTS only	2	A	24 (610)	56 (1422)	14 (356)	250 (113)
	2	B	24 (610)	56 (1422)	14 (356)	260 (118)
	3	A	24 (610)	56 (1422)	14 (356)	260 (118)
	3	B	24 (610)	56 (1422)	14 (356)	270 (123)
600	2	A	24 (610)	63 (1600)	17 (432)	300 (137)
	2	B	24 (610)	63 (1600)	17 (432)	320 (146)
	3	A	24 (610)	63 (1600)	17 (432)	320 (146)
	3	B	24 (610)	63 (1600)	17 (432)	320 (151)
800, 1000	2	A	34 (864)	72 (1829)	20 (508)	431 (196)
	2	B	34 (864)	72 (1829)	20 (508)	460 (209)
	3	A	34 (864)	72 (1829)	20 (508)	460 (209)
	3	B	34 (864)	72 (1829)	20 (508)	489 (222)
1200	2	A	38 (965)	87 (2210)	23 (584)	581 (264)
	2	B	38 (965)	87 (2210)	23 (584)	611 (277)
	3	A	38 (965)	87 (2210)	23 (584)	611 (277)
	3	B	38 (965)	87 (2210)	23 (584)	639 (290)
1600, 2000	3	A	38 (965)	87 (2210)	23 (584)	1160 (525)
	3	B	38 (965)	87 (2210)	23 (584)	1160 (525)
2600, 3000	3	A	38 (965)	91 (2311)	72 (1829)	1430 (649)
	3	B	38 (965)	91 (2311)	72 (1829)	1495 (679)

Notes:

1. Unit is designed for top cable entry of emergency and load, and bottom entry of normal. A cable pull box is also available for all top or bottom cable access when required (optional accessory kit #K609027). Not required for type 3R, 4X and 12 enclosures where available.
2. Enclosures for 2600, 3000 amperes are free-standing with removable top, sides and back.
3. Dimensions for 30-200 amperes when furnished with accessory 135L power meter, 18"W - 41"H - 13"D
4. Dimensional data is approximate and subject to change. Certified dimensions available upon request.

UL TYPE 3R, 4 OR 12 ENCLOSURE[1,2,3,4]

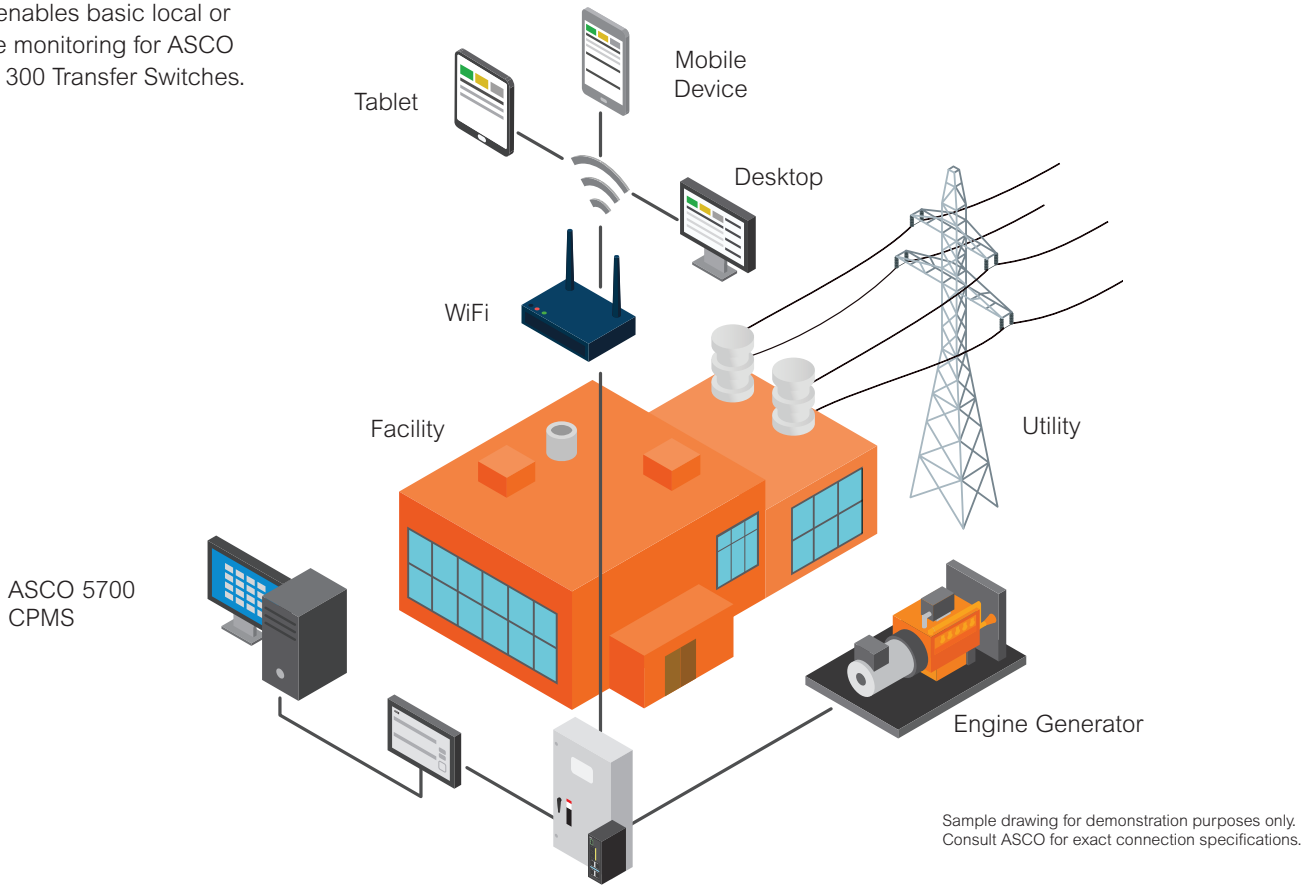
SWITCH RATING AMPS	PHASE POLES	NEUTRAL CODE	DIMENSIONS, IN. (MM)			APPROX. SHIPPING WEIGHT LB. (KG)
			WIDTH	HEIGHT	DEPTH	
30[2],70[2],104[2] 150[2], 200[2] (Non-Secure Enclosure)	2	A	17.5 (445)	35 (886)	11.625 (295)	84 (38)
	2	B	17.5 (445)	35 (886)	11.625 (295)	87 (40)
	3	A	17.5 (445)	35 (886)	11.625 (295)	87 (40)
	3	B	17.5 (445)	35 (886)	11.625 (295)	90 (41)
230 (Non-Secure Enclosure)	2	A	18 (458)	50.5 (1284)	14.33 (364)	90 (41)
	2	B[3] or C	18 (458)	50.5 (1284)	14.33 (364)	132 (60)
	3	A	18 (458)	50.5 (1284)	14.33 (364)	140 (63)
	3	B[3] or C	18 (458)	50.5 (1284)	14.33 (364)	148 (67)
260, 400	2	A	24 (610)	63 (1600)	18.2 (462)	320 (146)
	2	B	24 (610)	63 (1600)	18.2 (462)	340 (155)
	3	A	24 (610)	63 (1600)	18.2 (462)	340 (155)
	3	B	24 (610)	63 (1600)	18.2 (462)	350 (160)
150, 200, 230 SERIES 3ADTS/3NTS only (Non-Secure Enclosure)	2	A	24 (610)	63 (1600)	18.2 (462)	320 (146)
	2	B	24 (610)	63 (1600)	18.2 (462)	340 (155)
	3	A	24 (610)	63 (1600)	18.2 (462)	340 (155)
	3	B	24 (610)	63 (1600)	18.2 (462)	350 (160)
600 (Non-Secure Enclosure)	2	A	24 (610)	63 (1600)	18.2 (462)	320 (146)
	2	B	24 (610)	63 (1600)	18.2 (462)	340 (155)
	3	A	24 (610)	63 (1600)	18.2 (462)	340 (155)
	3	B	24 (610)	63 (1600)	18.2 (462)	350 (160)
800, 1000	2	A	34 (859)	72 (1821)	20 (508)	519 (236)
	2	B	34 (859)	72 (1821)	20 (506)	543 (246)
	3	A	34 (859)	72 (1821)	20 (506)	543 (246)
	3	B	34 (859)	72 (1821)	20 (506)	565 (257)
1200 (Secure Enclosure)	2	A	41 (1037)	95.5 (2415)	33.5 (848)	1131 (513)
	2	B	41 (1037)	95.5 (2415)	33.5 (848)	1160 (526)
	3	A	41 (1037)	95.5 (2415)	33.5 (848)	1160 (526)
	3	B	41 (1037)	95.5 (2415)	33.5 (848)	1189 (539)
1600, 2000 (Secure Enclosure)	3	A	42.5 (1074)	95.5 (2529)	47 (1189)	1705 (775)
	3	B	42.5 (1074)	95.5 (2529)	47 (1189)	1830 (832)
2600, 3000 (Secure Enclosure)	3	A	41 (1037)	95.5 (2529)	74 (1872)	2150 (976)
	3	B	41 (1037)	95.5 (2529)	74 (1872)	2230 (1012)

Notes:

1. When climate conditions at installation site present condensation risk, special precautions should be taken, such as the inclusion of space heaters, to prevent interior condensation and freezing of this condensation.
2. Dimensions for 30-200 amperes when furnished with a power meter 18"W - 48"H - 13"D
3. 30-1000 amperes switches are available in secure type enclosures, contact ASCO for details.
4. Dimensional data is approximate and subject to change. Certified dimensions available upon request.

SERIES 300 72EE MONITORING AND CONTROL

72EE enables basic local or remote monitoring for ASCO Series 300 Transfer Switches.



Sample drawing for demonstration purposes only. Consult ASCO for exact connection specifications.

72EE FEATURES

CONTROL FEATURES

- ATS Transfer/Re-transfer
- ATS Timer Bypass
- Generator Start
- Generator Test

MONITORING FEATURES

- ATS and Generator Stats
- Alarms
- Voltage and Frequency
- Statistics and Activity
- Email Notifications
- Event Log (300 Events)
- Optional Monitoring Features
  - — Energy Consumption, Acc 135L Required
  - — Power Demand, Acc 135L Required

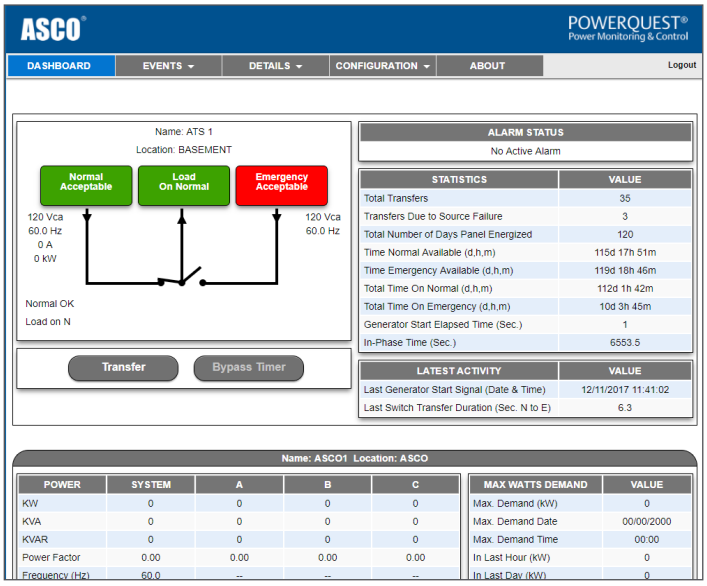
CONNECTIVITY FEATURES

- Modbus TCP/IP (over Ethernet or Serial) SNMP Protocol
- AES 128 Bit Encryption
- Four Port Ethernet Switch

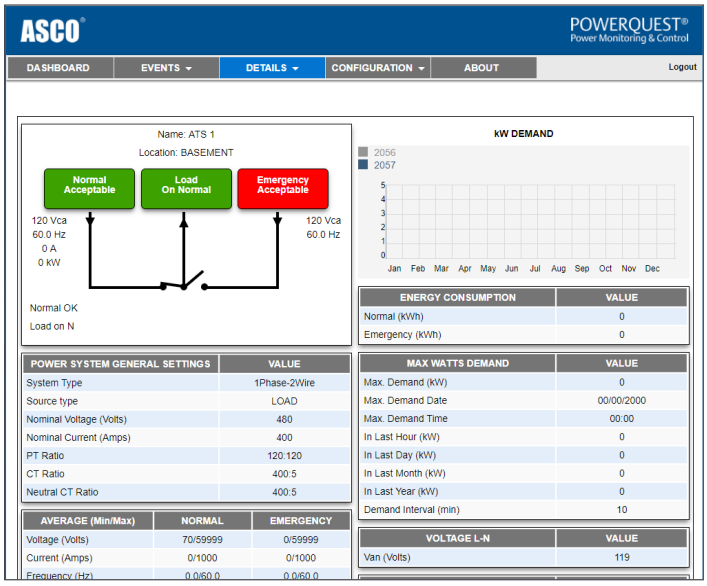
72EE ALSO ENABLES ENHANCED POWER*QUEST* CPMS FUNCTIONALITY

- 5310 Series Single Channel Annunciator
- 5350 Series Eight Channel Annunciator
- 5700 Critical Power Management Systems
- 5705 8-Device Annunciator

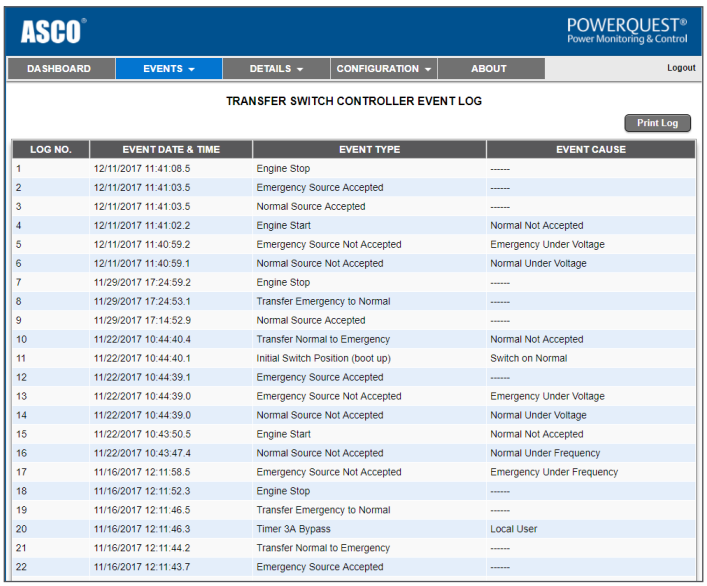
SERIES 300 72EE MONITORING SCREENS



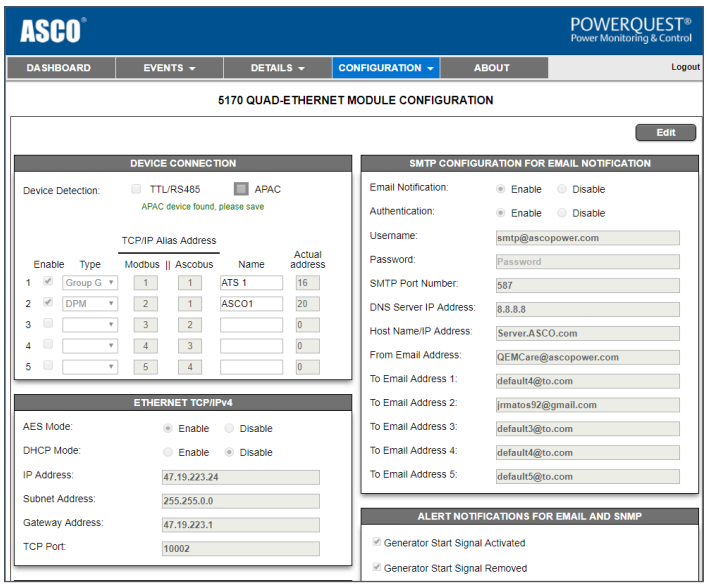
Dashboard



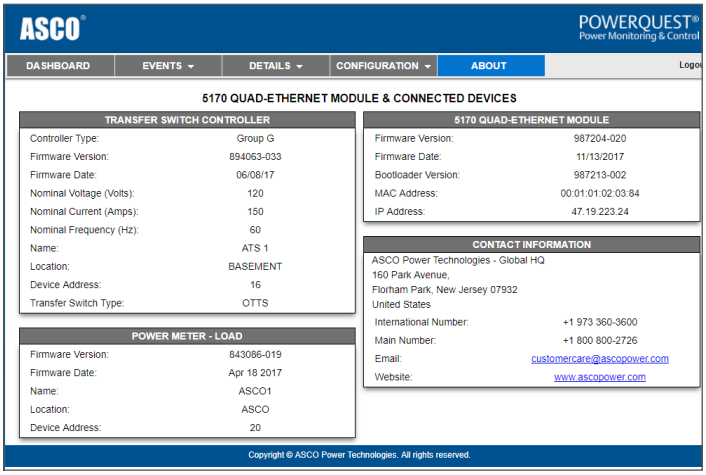
Power Metering



Events



Configuration



About

Content-rich monitoring screens enable real-time information for power metering, event logs, voltages, time delays and alerts. The 72EE also allows for remote switch transfer.

SERIES 300 72EE CONNECTIVITY MODULE

The ASCO 72EE Connectivity Module offers remote monitoring for SERIES 300 ATSs and 5210 Power Meter. For the ATS, the optional accessory 72EE provides remote ATS and generator control, monitoring and connectivity features via integrated web page dashboards. Once connected to an Ethernet, WiFi or cellular connection, the dashboards can easily be pulled up by any mobile or desktop device on the network by multiple users.

CONTROL

The control capabilities allows remote transfer and re-transfer of the ATS while allowing you to view time delays and bypass functions. The generators can also be called to start and stop for emergency situations as well as for testing and maintenance. Running the generator periodically ensures that the battery is charged for power anomalies and increases reliability. Generator pick-up and drop-out set points are also viewable for comprehensive understanding of control events.

MONITORING

Monitor transfer switch and generator health, system state, metering and review calculated transfer statistics and activity. Active control timer information allows the operator to anticipate an automated control action such as generator start or ATS transfer. The device can also interface with an email server to keep users up-to-date on alarms and critical power events with alerts. In addition the 72EE can interface to an optional 5210 Power Meter, (stand-alone or with the ATS Acc. 135L) for enhanced monitoring features such as power metering, demand and energy usage.

CONNECTIVITY

Connect and extract ATS and metering data using industry-standard open protocols such as Modbus and SNMP. An integrated four-port Ethernet switch maximizes connectivity options and flexibility. Embedded password protection will only allow access to appropriate users while utilizing AES 128-bit encryption for enhanced data security per National Institute of Standards and Technology (NIST).

Fig. 22: Accessory 72EE

ADDITIONAL OPTIONAL POWER*QUEST* COMPONENTS

5160 Connectivity Module

ASCO 5160 Remote Connectivity Unit (RCU) provides 10 Ethernet and Dual-Fiber Optic connections in a NEMA 3R enclosure.

5210 Power Meter

ASCO 5210 Power Meters measure, displays and provides single- or 3-phase Energy and Power information

---

5310, 5350 Annunciators

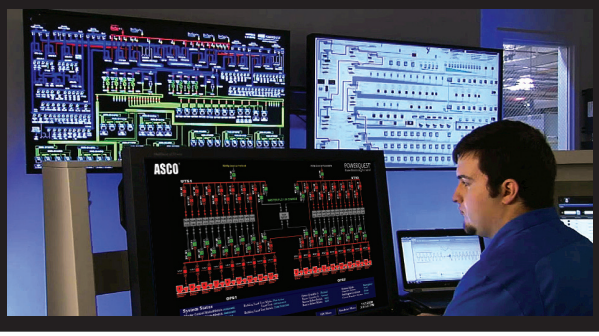
ASCO 5310 (Left) and 5350 (Right) ATS Remote Annunciators provide distributed monitoring of transfer switch position and source availability as well as transfer test and re-transfer control.

5710, 5750, 5790 Display Terminals

5700 Critical Power Management Systems (5790 Shown)provide various levels of monitoring, control and management capability of power equipment. It seamlessly monitors ASCO transfer switches as well as generators, breakers, paralleling busses, panel boards and other power equipment via a 5221 PMU. It consists of servers and touch-screen interfaces.

FULFILL YOUR NEED

Drill down for a closer look - Each transfer switch, generator, breaker and any other power equipment has its own dedicated screens.



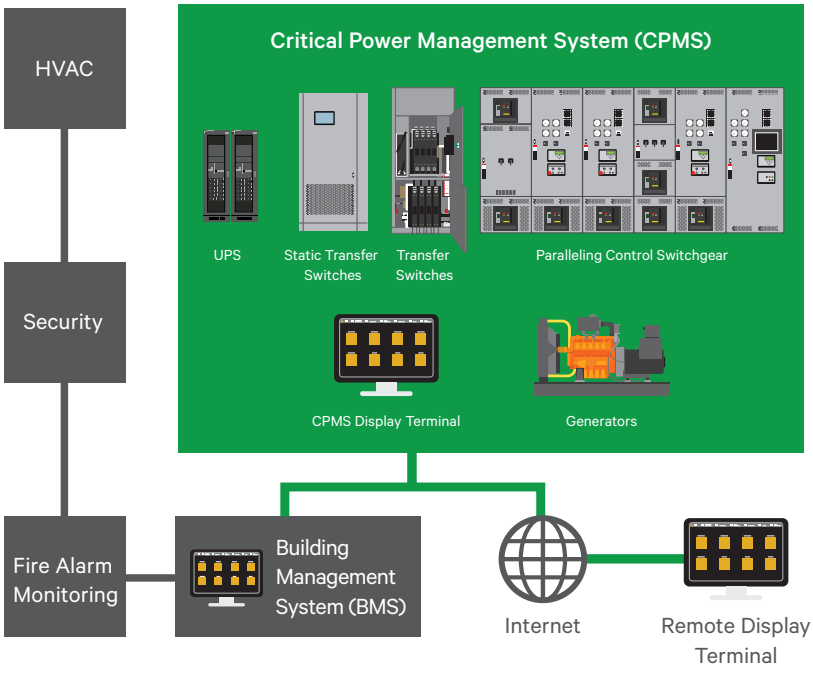
ASCO POWERQUEST® POWER MONITORING AND CONTROL SYSTEMS

The Power*Quest*® family is the most comprehensive communication, monitoring and control solution ever offered by ASCO Power Technologies. It empowers you. It provides the ability to test, manage loads, optimize the bus bar, remotely monitor and be aware of the status of your facility's utility source and on-site power. It provides reports for events, tests, energy use or settings, and gets data directly from generators and transfer switches.

Whether users require standard monitoring and control or a comprehensive Critical Power Management System, Power*Quest* can satisfy your needs.

Hardware. Software. Installation and testing. Service. And upgrades and technology refreshes. A truly complete solution for all your communication, monitoring and control needs.

This web-enabled management system is based on open protocols. As communications among equipment improve, so does the performance of critical power systems.



Power*Quest* provides monitoring, alarming and control of Critical Power Management Systems, which comprise transfer switches, paralleling control switchgear, gensets, circuit breakers, UPSs, load banks, distribution and other gear. It also integrates with building management systems.

BE EMPOWERED POWERQUEST CAN ENABLE YOU TO:

- **Monitor and control power transfer switches, paralleling control switchgear, gensets, breakers, UPS, bus bars and other equipment.**
- **Monitor normal and emergency voltages and frequency and their settings.**
- **Know transfer switch position and source availability.**
- **Transfer and re-transfer loads for system testing.**
- **View and adjust transfer switch time-delay settings.**
- **Receive automatic alerts or selected system alarms on system operation via email or pager.**
- **View transfer switch event log and know the transfer switch test schedule.**
- **Generate reports for alarms, energy consumption,settings, historical logs and code-mandated tests.**

*For more Power*Quest* product information see publication 3245

Life Is On | Schneider Electric™

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C13, C15, C18 LEHE0465-09

Picture shown may not reflect actual configuration

C13/C15/C18 SOUND ATTENUATED ENCLOSURES

US Sourced
Diesel Generator Set
350 - 750 ekW 60 Hz

Features

Robust/Highly Corrosion Resistant Construction

- Factory installed on skid base
- Environmentally friendly, polyester powder baked paint
- 14 gauge steel
- Interior zinc plated fasteners
- Exterior stainless steel fasteners
- Internally mounted exhaust silencing system
- Designed and tested to comply with UL 2200 Listed generator set package
- Compression door latches providing solid door seal

Excellent Access

- Large cable entry area for installation ease
- Accommodates side mounted single or multiple breakers
- Three doors on both sides
- Vertically hinged allow 180° opening rotation and retention with door stays
- Lube oil and coolant drains piped to the exterior of the enclosure base
- Radiator fill cover

Security and Safety

- Lockable access doors which give full access to control panel and breaker
- Cooling fan and battery charging alternator fully guarded
- Fuel fill, oil fill and battery can only be reached via lockable access
- Externally mounted emergency stop button
- Designed for spreader bar lifting to ensure safety
- Stub-up area is rodent proof

Transportability

These enclosures are of extremely rugged construction to withstand outdoor exposure and rough handling common on many construction sites.

Options

- Enclosure constructed with 14 gauge steel
- Enclosure constructed with 12 gauge aluminum (5052 grade)
- Caterpillar yellow or white paint
- Control panel viewing window
- UL Listed integral fuel tank with 670, 400, and 300 gallon capacities
- UL Listed sub base fuel tank with 660, 1000, 1900, and 2200 gallon capacities.
- Seismic certification per applicable building codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, IBC 2012, IBC 2015 CBC 2007, CBC 2010
- IBC Certification for 150 mph wind loading
- AC/DC lighting package
- 5 kW Canopy space heater to facilitate compliance with NFPA 110
- Motorized louvers and gravity discharge damper
- 125A Load Center
- GFCI outlets

*Not available with aluminum enclosures.

Level 1 Sound Attenuated Enclosure (Steel) Sound Levels

Model	Standby eKW	Cooling Air Flow Rate		Ambient Capability*		Sound Pressure Levels (dBA) at 7m (23 ft)
		m^3/s	cfm	˚C	˚F	100% Load
C13	350	8.5	18010	57	135	74
	400	8.5	18010	56	133	75
C15	350	10.4	22072	59	138	73
	400	10.4	22072	51	124	73
	450	10.4	22072	46	115	74
	500	12.5	26415	48	118	75
C18	550	8.1	17234	45	113	75
	600	8.1	17234	43	109	75
	650	12.7	26909	51	123	75
	700	12.7	26909	48	118	75
	750	12.7	26909	48	118	75

Sound Attenuated Enclosure (Aluminum) Sound Levels

Model	Standby eKW	Cooling Air Flow Rate		Ambient Capability*		Sound Pressure Levels (dBA) at 7m (23 ft)
		m^3/s	cfm	˚C	˚F	100% Load
C13	350	8.5	-	57	135	75
	400	8.5	-	56	133	75
C15	350	10.4	22072	59	138	72
	400	10.4	22072	51	124	73
	450	10.4	22072	46	115	74
	500	12.5	26415	48	118	75
C18	550	8.1	17234	45	113	76
	600	8.1	17234	43	109	76
	650	12.7	26909	51	123	76
	700	12.7	26909	48	118	76
	750	12.7	26909	48	118	76

Level 2 Sound Attenuated Enclosure (Steel) Sound Levels

Model	Standby eKW	Cooling Air Flow Rate		Ambient Capability*		Sound Pressure Levels (dBA) at 7m (23 ft)
		m^3/s	cfm	˚C	˚F	100% Load
C13	350	7.2	15256	50	122	70
	400	7.2	15256	50	122	70
C15	350	10.4	22071	50	122	72
	400	10.4	22071	50	122	72
	450	10.4	22071	50	122	72
	500	12.5	26415	50	122	72

*Cooling system performance at sea level. Consult your Cat® dealer for site specific ambient and altitude capabilities.

Note: Sound level measurements are subject to instrumentation, installation and manufacturing variability, as well as ambient site conditions.

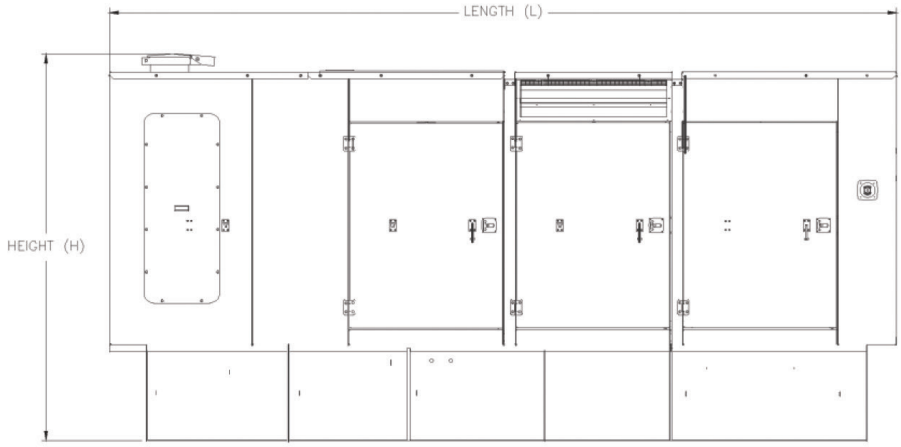
Component Weights to Calculate Package Weight

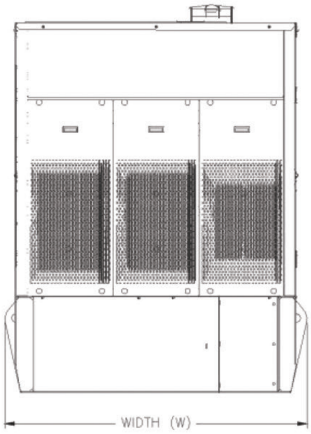
Model	Standby eKW	Narrow Skid Base		Wide Skid Base		Sound Attenuated Enclosure (Steel)		Sound Attenuated Enclosure (Aluminum)	
		kg	lb	kg	lb	kg	lb	kg	lb
C13	350	253	578	579	1276	1245	2745	765	1687
	400								
C15	350	273	602	465	1025	1245	2745	765	1687
	400								
	450								
	500								
C18	550	301	664	466	1027	1301	2868	817	1801
	600								
	650	286	630	637	1404	1393	3071	887	1955
	700								
	750								

Sound Attenuated Enclosure on Skid Base

Model	Standby eKW	Length "L"		Width "W"		Height "H"	
		mm	in	mm	in	mm	in
C13	350	4948	194.8	2014	79.3	2320	91.3
	400						
C15	350	4948	194.8	2014	79.3	2320	91.3
	400						
	450						
	500						
C18	550	5183	204.0	2014	79.3	2262	89.0
	600						
	650	5230	205.9	2315	91.1	2253	88.7
	700						
	750						

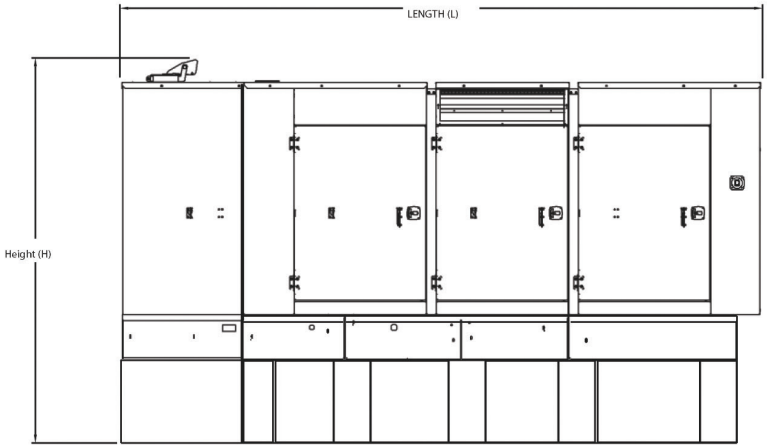
Sound Attenuated Enclosure on a UL Listed Integral Fuel Tank Base

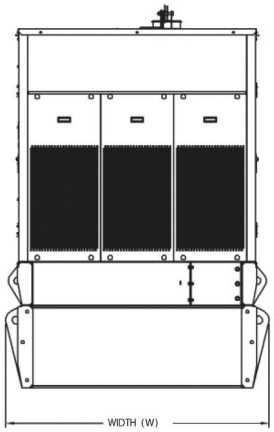




Model	Standby eKW	Length "L"		Width "W"		Height "H"	
		mm	in	mm	in	mm	in
C13	350	5461	215.0	2014	79.3	2743	108.0
	400						
C15	350	4948	194.8	2014	79.3	2619	103.0
	400						
	450						
	500						
C18	550	5187	204.2	2014	79.3	2561	101.0
	600						
	650	6977	274.7	2315	91.1	2675	105.3
	700						
	750						

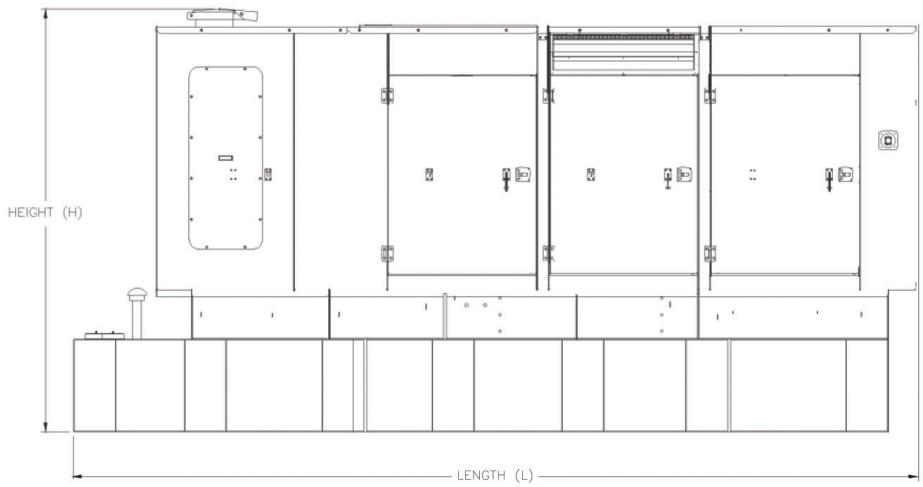
Sound Attenuated Enclosure on a UL Listed 660 Gallon Sub-Base Fuel Tank Base

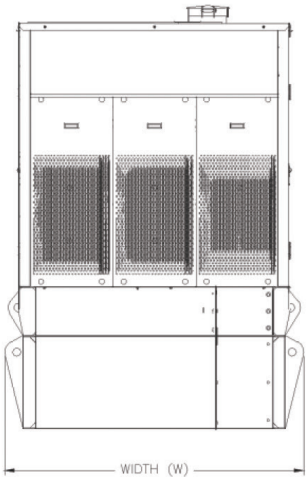




Model	Standby eKW	Length "L"		Width "W"		Height "H"	
		mm	in	mm	in	mm	in
C13	350	4948	194.8	2056	80.9	2955	116.3
	400						
C15	350	4948	194.8	2056	80.9	2955	116.3
	400						
	450						
	500						
C18	550	5184	204.1	2056	80.9	2897	114.1
	600						

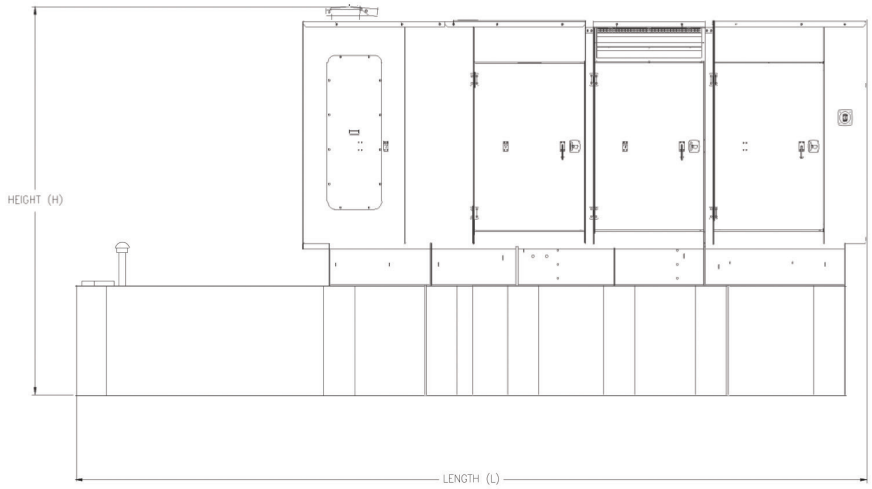
Sound Attenuated Enclosure on a UL Listed 1000 Gallon Sub-Base Fuel Tank Base

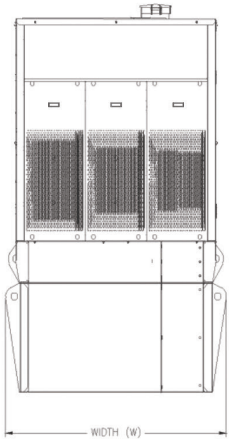




Model	Standby eKW	Length "L"		Width "W"		Height "H"	
		mm	in	mm	in	mm	in
C13	350	5751	226.4	2056	80.9	2955	116.3
	400						
C15	350	5751	226.4	2056	80.9	2955	116.3
	400						
	450						
	500						
C18	550	5747	226.3	2056	80.9	2897	114.1
	600						

Sound Attenuated Enclosure on a UL Listed 1900 & 2200 Gallon Sub-Base Fuel Tank Base





Model	Standby eKW	Length "L"		Width "W"		Height "H"	
		mm	in	mm	in	mm	in
C13	350	6382	251.2	2056	80.9	3209	126.3
	400						
C15	350	6382	251.2	2056	80.9	3209	126.3
	400						
	450						
	500						
C18	550	7271	286.2	2056	80.9	3151	124.1
	600						

LET'S DO THE WORK.™

C15, 500 kW LEHE1577-03

Cat® C15 DIESEL GENERATOR SETS

Standby & Prime: 60Hz

Image shown might not reflect actual configuration

Engine Model	Cat® C15 ACERT™ In-line 6, 4-cycle diesel
Bore x Stroke	137mm x 171mm (5.4in x 6.8in)
Displacement	15.2 L (928 in³)
Compression Ratio	16.1:1
Aspiration	Turbocharged Air-to-Air Aftercooled
Fuel Injection System	MEUI
Governor	Electronic ADEM™ A4

Model	Standby	Prime	Emission Strategy
C15	**500 ekW, 625 kVA**	**455 ekW, 569 kVA**	**TIER II Non-Road**

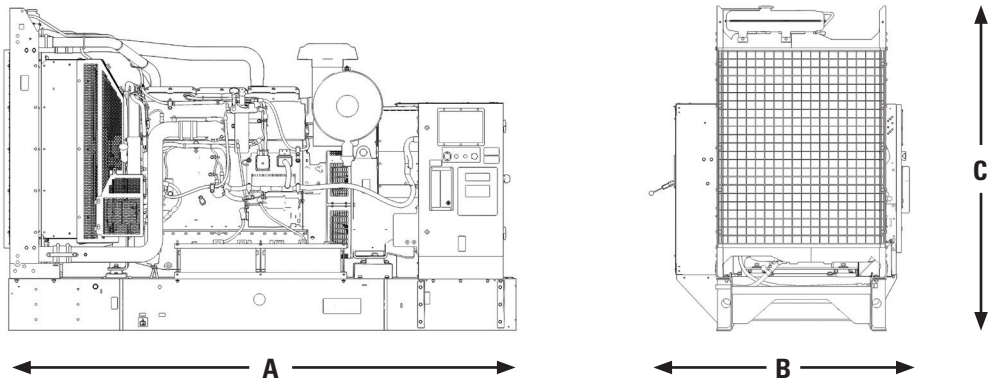
PACKAGE PERFORMANCE

Performance	Standby	Prime
Frequency	60 Hz	
Genset Power Rating	625 kVA	569 kVA
Genset power rating with fan @ 0.8 power factor	500 ekW	455 ekW
Emissions	TIER II Non-Road	
Performance Number	DM8155-04	DM8154-05
Fuel Consumption		
100% load with fan, L/hr (gal/hr)	137.0 (36.2)	129.8 (34.3)
75% load with fan, L/hr (gal/hr)	110.5 (29.2)	99.9 (26.4)
50% load with fan, L/hr (gal/hr)	71.3 (18.8)	65.6 (17.3)
25% load with fan, L/hr (gal/hr)	41.9 (11.1)	39.3 (10.4)
Cooling System[1]		
Radiator air flow restriction (system), kPa (in. Water)	0.12 (0.48)	0.12 (0.48)
Radiator air flow, m3/min (cfm)	720 (25426)	720 (25426)
Engine coolant capacity, L (gal)	20.8 (5.5)	20.8 (5.5)
Radiator coolant capacity, L (gal)	54 (14)	54 (14)
Total coolant capacity, L (gal)	75 (20)	75 (20)
Inlet Air		
Combustion air inlet flow rate, m³/min (cfm)	38.2 (1347.7)	38.2 (1349.2)
Max. Allowable Combustion Air Inlet Temp, °C (°F)	49 (120)	49 (120)
Exhaust System		
Exhaust stack gas temperature, °C (°F)	531.1 (988.0)	524.4 (975.9)
Exhaust gas flow rate, m³/min (cfm)	102.1 (3605.5)	101.2 (3573.4)
Exhaust system backpressure (maximum allowable) kPa (in. water)	10.0 (40.0)	10.0 (40.0)
Heat Rejection		
Heat rejection to jacket water, kW (Btu/min)	182 (10375)	172 (9792)
Heat rejection to exhaust (total) kW (Btu/min)	493 (28039)	483 (27453)
Heat rejection to aftercooler, kW (Btu/min)	121 (6860)	120 (6827)
Heat rejection to atmosphere from engine, kW (Btu/min)	91 (5182)	87 (4936)

Cat® C15 DIESEL GENERATOR SETS

Emissions (Nominal)[2]	Standby		Prime	
NOx, mg/Nm³ (g/hp-hr)	2129.1 (4.6)		1554.5 (3.6)	
CO, mg/Nm³ (g/hp-hr)	301.5 (0.6)		362.9 (0.8)	
HC, mg/Nm³ (g/hp-hr)	8.8 (0.03)		12.2 (0.04)	
PM, mg/Nm³ (g/hp-hr)	9.5 (0.03)		11.9 (0.03)	
Alternator[3]				
Voltages	480V	600V	480V	600V
Motor starting capability @ 30% Voltage Dip	1428 skVA	1714 skVA	1428 skVA	1714 skVA
Current	752 amps	601 amps	684 amps	547 amps
Frame Size	LC6114F	LC6124F	LC6114F	LC6124F
Excitation	SE	AR	SE	AR
Temperature Rise	130 ° C	130 ° C	105 ° C	105 ° C

WEIGHTS & DIMENSIONS



Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Dry Weight kg (lb)
3476 (137)	**1628 (64)**	**2128 (84)**	**4365 (9623)**

APPLICABLE CODES AND STANDARDS:

AS1359, CSA C22.2 No100-04, UL142, UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22, NEMA MG1-33, 2006/95/EC, 2006/42/EC, 2004/108/EC.
Note: Codes may not be available in all model configurations. Please consult your local Cat Dealer representative for availability.

STANDBY: Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

PRIME: Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand is 100% of prime rated ekW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year

RATINGS: Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

DEFINITIONS AND CONDITIONS

[1] For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

[2] Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77° F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 BTU/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

[3] UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40° C ambient per NEMA MG1-32.

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LEHE1577-03 (05/20)