

**ADDENDUM NO. 3
ELECTRICAL IMPROVEMENTS AT THE DELAWARE ARMY NATIONAL GUARD
SCANNELL READINESS CENTER
DE ARNG CONTRACT NO. 22-2013
FE&ES Comm.: 13-1116
Date of Issue: September 5, 2014**

- 1.0 This Addendum, Addendum No. 3, shall be made part of the Project Manual and Drawings dated July 25, 2014 for the Electrical Improvements at the Delaware Army National Guard Scannell Readiness Center.
- 2.0 Any provision in any of the Contract Documents which may be in conflict or be inconsistent with the contents of this Addendum shall be void to the extent of such conflicts or inconsistency.
- 3.0 Bid Date has not changed. Bids will be received by the Delaware Army National Guard at the Security Officers desk in the Main Lobby of the Armed Forces Reserve Center located at 250 Airport Road, New Castle, Delaware, 19720-1502, **until 2:00 PM local time on Thursday, September 11, 2014**. Valid driver's license will be required for site access, front desk where all visitors are required to sign in at the Security Desk. Bidder bears the risk of late delivery. Any bids received after the stated time will be returned unopened. **Allow ample time to enter the facility since the site is secure and each vehicle entering the facility will need to pass through security.**
- 4.0 Changes to prior Addenda
- 4.1. Sketch SKA-1 is being reissued since the page header obscured required information.
- 5.0 Changes to Specifications
- 5.1 Specification Section 26 32 13.
- A. Revise output circuit breaker trip from 400A to 200A. Circuit Breaker frame shall remain at 3P-400A with L, S & I electronic trip.
- A. Add Kohler Model REOZJF Generator subject to the following:
1. Output Circuit Breaker Trip Settings of Generator shall be set per the Power System Study. Frame and Breaker type shall remain as proposed.
 2. Provide specified accessories per Article 2.6, including but not limited to 10' Stack Extension guyed to generator enclosure, red and green indicating lights and accessories identified in specifications.
 3. Footprint of generator is different than the Standard of Design & Construction. Contractor to incorporate any modifications to the contract documents to facilitate the installation of this generator per Specification Section 01 25 00 1.2C.
 4. Refer to the attached documentation for this alternate manufacturer.

5.2 Specification Section 26 36 00.

A. Add Kohler Model KEP-DMTA-0400SNN Transfer Switch subject to the following:

1. Dimensions of transfer switch is different than the Standard of Design & Construction. Contractor to incorporate any modifications to the contract documents to facilitate the installation of this generator and transfer switch per Specification Section 01 25 00 1.2C.
2. This transfer switch is a two (2) circuit breaker design in lieu of the specified 3 pole, standard transfer switch design with Utility Side Service Entrance Circuit Breaker. It is likely that the Power System Study will reveal that the output circuit breaker of the generator and the emergency source circuit breaker in the transfer switch will not coordinate due to overlapping circuit breaker characteristic trip curves. In the event that this occurs, the transfer switch circuit breaker will need to be revised or replaced to coordinate with the upstream circuit breaker of the generator at no additional cost to the owner.
3. Refer to the attached documentation for this alternate manufacturer.

6.0 Changes to Drawings:

6.1 Drawing E-3

- A. Revise Type 1 Feeder from generator to transfer switch to new Type 12. Type 12 Feeder shall be 4-#300kCMIL & 1-#2 GND-3" C & 1-3" C Spare.
- B. Revise 3P-200A Circuit Breaker in MPP to Panel LPB from Thermal Magnetic to Electronic fully adjustable with L, S & I trip adjustments.
- C. Revise 3P-100A Circuit Breaker in MPP to Panel LPA from Thermal Magnetic to Electronic fully adjustable with L, S & I trip adjustments.

7.0 Questions/Clarifications

Q1 Where is the Generator Annunciator located?

A1: Annunciator shall be field located in the main Duty Office located off of the main Entrance to the Facility. Include up to 75 ft. of conduit and cabling from Electric Room to Annunciator. Wall mounted annunciator shall be installed recessed with concealed wiring. Coordinate actual location in the field with Engineer.

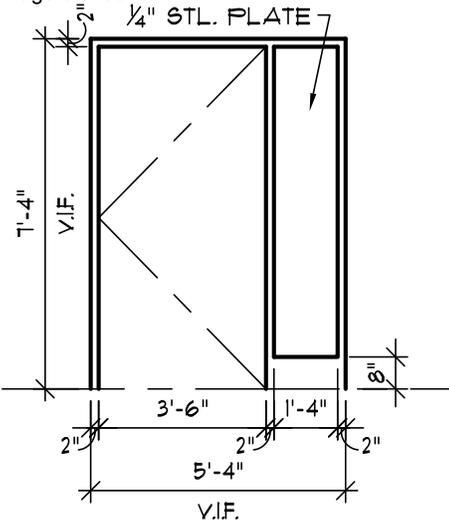
Q2: Where does the Emergency Stop Switch go?

A2: Generator Emergency Stop Station shall be located in the electric room adjacent to the emergency side of the transfer switch.

End of Addendum #3

EF/ef
13-1116 Add No 3

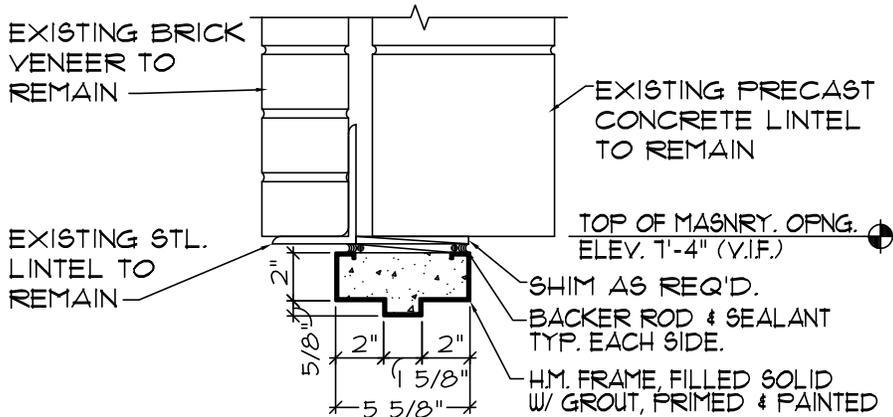
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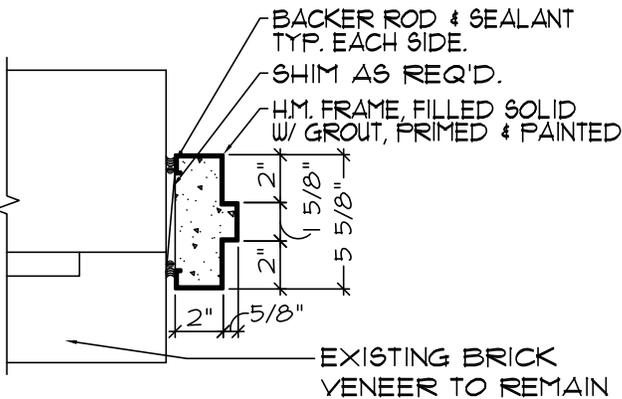
3 DOOR DETAIL ELEVATION
SCALE: 1/4"=1'-0"

**GENERAL NOTES
DOORS, FRAMES & HARDWARE**

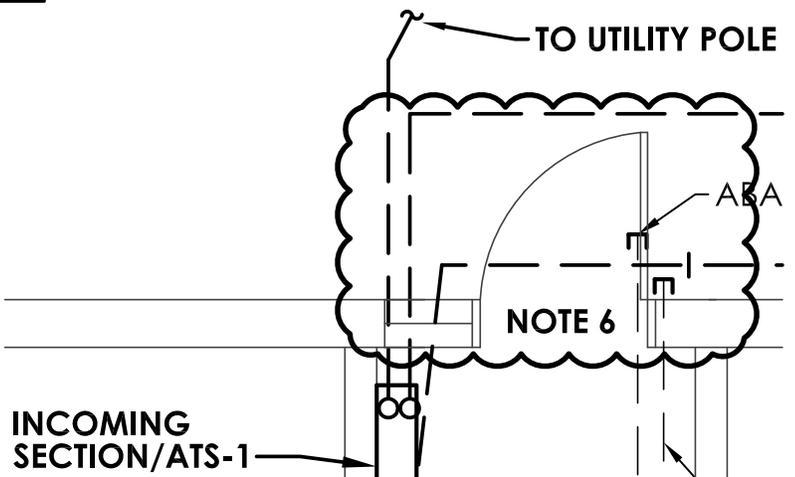
1. INTERIOR DOOR CLOSERS MUST BE SET NO HIGHER THAN 5 POUNDS OF PRESSURE TO OPERATE (TYP. FOR INTERIOR NON-RATED DOORS ONLY)
2. OPENING HARDWARE IS CENTERED A MAXIMUM OF 48" ABOVE FINISH FLOOR.
3. MINIMUM STRIKE SIDE CLEARANCE ON PULL SIDE OF DOOR:
 - A. 24" MIN. EXTERIOR DOORS.
 - B. 18" MIN. INTERIOR DOORS, FRONT APPROACH.
 - C. 36" MIN. INTERIOR DOORS, HINGE APPROACH (IF CORRIDOR IS 60" MINIMUM).
 - D. 42" MIN. INTERIOR DOORS, HINGE APPROACH (IF CORRIDOR IS LESS THAN 60", BUT GREATER THAN 54").
 - E. 24" MIN. INTERIOR DOORS, LATCH APPROACH.
4. MINIMUM STRIKE SIDE CLEARANCE ON PUSH SIDE OF DOOR:
 - A. 0", FRONT APPROACH.
 - B. 12" MIN., FRONT APPROACH W/LATCH AND CLOSER.
 - C. 54" MIN. TOTAL WIDTH, HINGE APPROACH.
 - D. 24" MIN., LATCH APPROACH.
5. DOOR CLOSERS MUST BE SET SO THAT IT TAKES AT LEAST 3 SECONDS TO CLOSE FROM AN OPEN POSITION OF 70° TO WITHIN 3" OF THE LATCH.
6. ALL WIRING CONDUIT IDENTIFIED ON THE DRAWINGS, OR REQUIRED FOR THE INSTALLATION OF ELECTRONIC COMPONENTS, THAT IS WITHIN HOLLOW METAL FRAMES SHALL BE PROVIDED AS PART OF THE HOLLOW METAL FRAME, WITH TERMINATIONS APPROPRIATE FOR EXTENSION BY OTHER TRADES. G.C. COORD
7. NEW HOLLOW METAL DOOR IS TO BE 16 GA. PRIMED & PAINTED.
8. NEW DOOR FRAMES ARE TO BE 16GA HOLLOW METAL, FULLY WELDED, PRIMED AND PAINTED.
9. DOOR HARDWARE: PROVIDE FULL ADA PACKAGE WITH LEVER, LOCK, WEATHERSTRIPPING AND CLOSER. COORDINATE AND MATCH OWNERS KEYING SYSTEM.



4 DOOR HEADER DETAIL
SCALE: 1-1/2"=1'-0"



5 DOOR JAMB DETAIL
SCALE: 1-1/2"=1'-0"



2 ELEC. RM PLAN - NEW WORK
SCALE: 1/8"=1'-0"



PRELIMINARY

SUBMITTAL FOR APPROVAL

FOR

A

KOHLER MODEL 150REOZJF GENERATOR

&

(1) KOHLER AUTOMATIC TRANSFER SWITCH

SUPPLIED BY

FIDELITY ENGINEERING CORPORATION

FOR

SCANNELL READINESS CENTER

Model: **150REOZJF**

KOHLER Power Systems

208-600 V

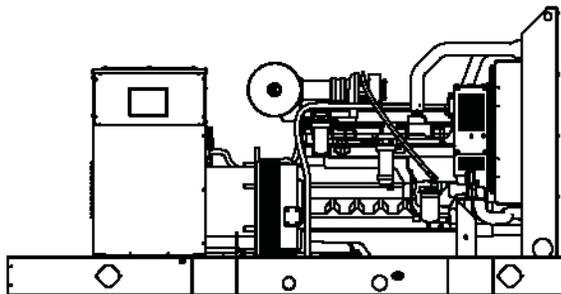
Diesel



**Tier 3 EPA-Certified for
 Stationary Emergency
 Applications**

Ratings Range

| | | 60 Hz |
|----------|-----|---------|
| Standby: | kW | 106-154 |
| | kVA | 106-193 |



Generator Set Ratings

| Alternator | Voltage | Ph | Hz | 80°C Rise Standby Rating | |
|------------|---------|----|----|-----------------------------|-----|
| | | | | Ph | kW |
| 4S13X | 277/480 | 3 | 60 | | 176 |

Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A one-year limited warranty covers all systems and components. Two- and five-year extended warranties are also available.
- Alternator features:
 - The unique Fast-Response™ X excitation system delivers excellent voltage response and short-circuit capability using a rare-earth, permanent magnet (PM)-excited alternator.
 - The brushless, rotating-field alternator has broadrange reconnectability.
- Other features:
 - Kohler designed controllers for guaranteed system integration and remote communication. See Controllers on page 3.
 - The low coolant level shutdown prevents overheating (standard on radiator models only).
 - Integral vibration isolation eliminates the need for under-unit vibration spring isolators.
 - Multiple circuit breaker configurations.

Alternator Specifications

| Specifications | Alternator |
|--|---|
| Manufacturer | Kohler |
| Type | 4-Pole, Rotating-Field |
| Exciter type | Brushless, Rare-Earth, Permanent-Magnet |
| Leads: quantity, type | 12, Reconnectable |
| Voltage regulator | Solid State, Volts/Hz |
| Insulation: | NEMA MG1 |
| Material | Class H |
| Temperature rise | 130°C, Standby |
| Bearing: quantity, type | 1, Sealed |
| Coupling | Flexible Disc |
| Amortisseur windings | Full |
| Voltage regulation, no-load to full-load | Controller Dependent |
| One-step load acceptance | 100% of Rating |
| Unbalanced load capability | 100% of Rated Standby Current |

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and drip-proof construction.
- Vacuum-impregnated windings with fungus-resistant epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.

| Specifications | Alternator |
|--------------------------|------------------------------|
| Peak motor starting kVA: | (35% dip for voltages below) |

Application Data

Engine

| Engine Specifications | |
|--|--|
| Manufacturer | John Deere |
| Engine model | 4045HF285I |
| Engine type | 4-Cycle, Turbocharged, Charge Air-Cooled |
| Cylinder arrangement | 4 Inline |
| Displacement, L (cu. in.) | 4.5 (276) |
| Bore and stroke, mm (in.) | 106 x 127 (4.19 x 5.00) |
| Compression ratio | 19:1 |
| Piston speed, m/min. (ft./min.) | 457 (1500) |
| Main bearings: quantity, type | 5, Replaceable Insert |
| Rated rpm | 1800 |
| Max. power at rated rpm, kWm (BHP) | 118 (158) |
| Cylinder head material | Cast Iron |
| Crankshaft material | Forged Steel |
| Valve material: | |
| Intake | Chromium-Silicon Steel |
| Exhaust | Stainless Steel |
| Governor: type, make/model | JDEC Electronic L16 Denso HP3 |
| Frequency regulation, no-load to full-load | Isochronous |
| Frequency regulation, steady state | ±0.25% |
| Frequency | Fixed |
| Air cleaner type, all models | Dry |

Engine Electrical

| Engine Electrical System (12/24 Volt*) | |
|--|-------------------|
| Battery charging alternator: | 12 Volt/24 Volt |
| Ground (negative/positive) | Negative |
| Volts (DC) | 12/24 |
| Ampere rating | 65/45 |
| Starter motor rated voltage (DC) | 12/24 |
| Battery, recommended cold cranking amps (CCA): | 12 Volt/24 Volt |
| Quantity, CCA rating each | One, 640/Two, 570 |
| Battery voltage (DC) | 12 |

*12-volt or 24-volt engine electrical systems are available.

Fuel

| Fuel System | |
|-------------------------------------|----------------------------|
| Fuel supply line, min. ID, mm (in.) | 11.0 (0.44) |
| Fuel return line, min. ID, mm (in.) | 6.0 (0.25) |
| Max. lift, fuel pump: type, m (ft.) | Engine-Driven, 1.8 (6.0) |
| Max. fuel flow, Lph (gph) | 74.6 (19.7) |
| Fuel prime pump | Manual |
| Fuel filter | |
| Primary | 30 Microns |
| Secondary | 2 Microns @ 98% Efficiency |
| Water Separator | Yes |
| Recommended fuel | #2 Diesel |

Exhaust

| Exhaust System | |
|---|------------|
| Exhaust manifold type | Dry |
| Exhaust flow at rated kW, m ³ /min. (cfm) | 22.8 (805) |
| Exhaust temperature at rated kW, dry exhaust, °C (°F) | 580 (1076) |
| Maximum allowable back pressure, kPa (in. Hg) | 7.5 (2.2) |
| Exhaust outlet size at engine hookup, mm (in.) | 98 (3.86) |

Lubrication

| Lubricating System | |
|---------------------------------------|---------------|
| Type | Full Pressure |
| Oil pan capacity, L (qt.) | 14.7 (15.5) |
| Oil pan capacity with filter, L (qt.) | 15.6 (16.5) |
| Oil filter: quantity, type | 1, Cartridge |
| Oil cooler | Water-Cooled |

Application Data

Cooling

Radiator System

| | |
|--|-------------|
| Ambient temperature, °C (°F) * | 50 (122) |
| Engine jacket water capacity, L (gal.) | 11.3 (3.0) |
| Radiator system capacity, including engine, L (gal.) | 25.7 (6.8) |
| Engine jacket water flow, Lpm (gpm) | 174 (46) |
| Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.) | 76.3 (4340) |
| Heat rejected to air charge cooler at rated kW, dry exhaust, kW (Btu/min.) | 31.8 (1810) |
| Water pump type | Centrifugal |
| Fan diameter, including blades, mm (in.) | 660 (26) |
| Fan, kWm (HP) | 7.7 (10.3) |
| Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H ₂ O) | 0.125 (0.5) |
| * Enclosure with enclosed silencer reduces ambient temperature capability by 5°C (9°F). | |

Operation Requirements

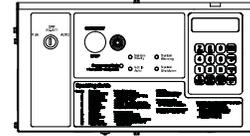
Air Requirements

| | |
|---|--------------|
| Radiator-cooled cooling air, m ³ /min. (scfm)‡ | 226.5 (8000) |
| Combustion air, m ³ /min. (cfm) | 13.6 (480) |
| Heat rejected to ambient air: | |
| Engine, kW (Btu/min.) | 35.9 (2040) |
| Alternator, kW (Btu/min.) | 12.3 (700) |
| ‡ Air density = 1.20 kg/m ³ (0.075 lbm/ft ³) | |

Fuel Consumption

| Diesel, Lph (gph) at % load | Standby Rating | |
|-----------------------------|----------------|--------|
| 100% | 44.3 | (11.7) |
| 75% | 35.1 | (9.3) |
| 50% | 26.3 | (6.9) |
| 25% | 16.2 | (4.3) |

Controllers



Decision-Maker[®] 550 Controller

Provides advanced control, system monitoring, and system diagnostics with remote monitoring capabilities.

- Digital display and keypad provide easy local data access
- Measurements are selectable in metric or English units
- Remote communication thru a PC via network or modem configuration
- Controller supports Modbus[®] protocol
- Integrated voltage regulator with ±0.25% regulation
- Built-in alternator thermal overload protection
- NFPA 110 Level 1 capability

Refer to G6-46 for additional controller features and accessories.



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2014 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT OF 1990**

**OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105**

Certificate Issued To: Deere & Company
(U.S. Manufacturer or Importer)
Certificate Number: EJDXL06.8120-010

Effective Date:
09/10/2013
Expiration Date:
12/31/2014


Byron J. Bunker, Division Director
Compliance Division

Issue Date:
09/10/2013
Revision Date:
N/A

Original on

Model Year: 2014
Manufacturer Type: Original Engine Manufacturer
Engine Family: EJDXL06.8120

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 130<=kW<225
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Non-standard Non-After Treatment Device Installed, Electronic Control, Smoke Puff Limiter, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

The actual engine power may lie outside the limits of the Emissions Power Category shown above. See the certificate application for details.



150REOZJF

60 HZ. DIESEL INDUSTRIAL GENERATOR SET EMISSION DATA SHEET

| ENGINE INFORMATION | | | |
|---------------------------|---------------------------------|------------------|----------------------|
| Model: | John Deere, 6068HF285K | Bore: | 106mm (4.19 in.) |
| Nameplate BHP @ 1800 RPM: | 237 | Stroke: | 127mm (5.00 in.) |
| Type: | 4-Cycle, 6 Cylinder, Inline | Displacement: | 6.79 L (414 cu. in.) |
| Aspiration: | Turbocharged, Charge Air-cooled | EPA Family: | EJDXL06.8120 |
| Compression Ratio | 17.0:1 | EPA Certificate: | EJDXL06.8120-010 |

| PERFORMANCE DATA: | Table 1 | | | |
|--|----------------|----------------|----------------|-----------------|
| | 1/4 Standby | 1/2 Standby | 3/4 Standby | Full Standby |
| Engine bkW @ Stated Load | 44.25 | 88.50 | 132.75 | 177.00 |
| Fuel Consumption (g/kWh) | 249.60 | 243.50 | 222.00 | 214.40 |
| Exhaust Gas Flow (m ³ /min) | | | | 33.90 |
| Exhaust Temperature (°C) | | | | 510.00 |

| Table 2 EPA CERTIFICATE DATA | |
|--|------|
| HC (Total Unburned Hydrocarbons) | 0.1 |
| NOx (Oxides of Nitrogen as NO ₂) | 3.8 |
| CO (Carbon Monoxide) | 1.2 |
| PM (Particular Matter) | 0.12 |

Values are in g/kWh unless otherwise noted

| TEST METHODS AND CONDITIONS |
|--|
| The EPA Certificate Data in Table 2 is a weighted average value per ISO 8528 D2. |

Data and specifications subject to change without notice
 For further information, please contact Todd Loes at John Deere Power Systems, 319-292-6050

Industrial Generator Set Accessories

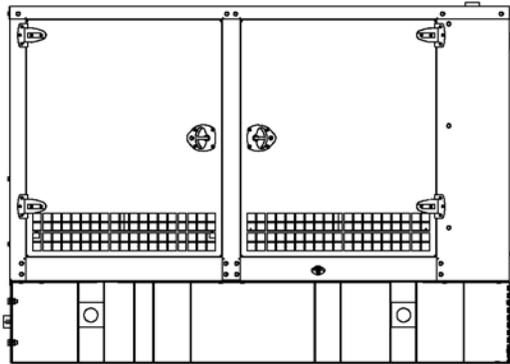
KOHLER Power Systems

Sound Enclosure and Subbase Fuel Tank Package



Applicable to the following:

150REOZJF



Enclosure with Standard Subbase Fuel Tank

Weather Enclosure Standard Features

- Internal-mounted critical silencer and flexible exhaust connector.
- Lift base or tank-mounted, steel construction with hinged doors.
- Fade-, scratch-, and corrosion-resistant Kohler® Power Armor™ cream beige automotive-grade textured finish.
- Lockable, flush-mounted door latches.
- Vertical air inlet and outlet discharge to redirect air and reduce noise.
- Certified to withstand 241 kph (150 mph) wind load rating.

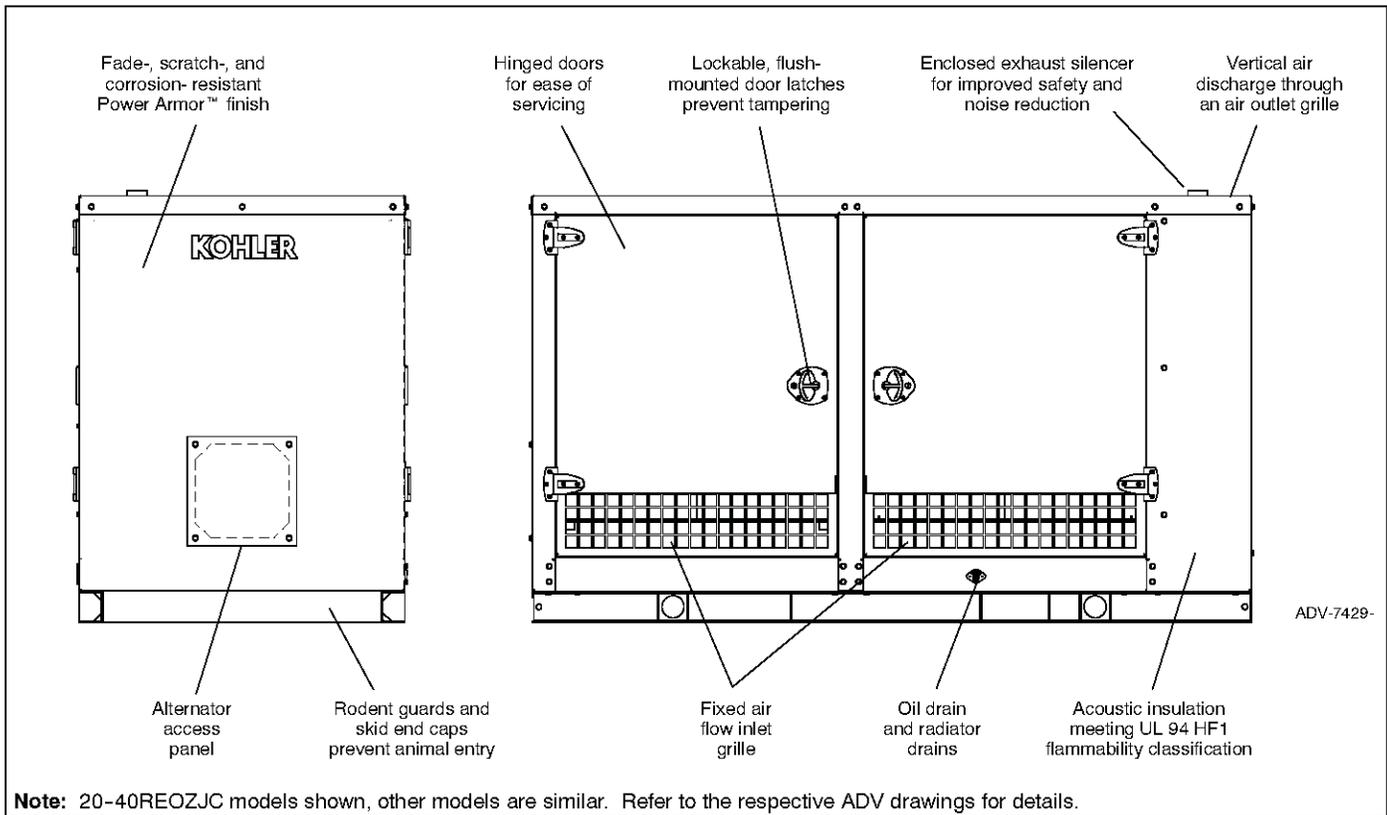
Sound Enclosure Standard Features

- Includes all of the weather enclosure features with the addition of acoustic insulation material.
- Lift base or tank-mounted, steel or aluminum construction with hinged doors. Aluminum enclosures are recommended for high humidity and/or high salt/coastal regions.
- Acoustic insulation that meets UL 94 HF1 flammability classification and repels moisture absorption.
- Sound attenuated enclosure that uses up to 51 mm (2 in.) of acoustic insulation.

Subbase Fuel Tank Features

- The fuel tank has a Power Armor Plus™ textured epoxy-based rubberized coating.
- The above-ground rectangular secondary containment tank mounts directly to the generator set, below the generator set skid (subbase).
- Both the inner and outer tanks have emergency relief vents.
- Flexible fuel lines are provided with subbase fuel tank selection.
- The secondary containment generator set base tank meets UL 142 tank requirements. The inner (primary) tank is sealed inside the outer (secondary) tank. The outer tank contains the fuel if the inner tank leaks or ruptures.

Sound Enclosure



Enclosure Features

- Available in steel (14 gauge) formed panel, solid construction. Preassembled package offering corrosion resistant, dent resilient structure mounting directly to lift base or fuel tank.
- Power Armor™ automotive-grade finish resulting in advanced corrosion and abrasion protection as well as enhanced edge coverage and color retention.
- Internal critical exhaust silencer offering maximum component life and operator safety.
- NOTE: Installing an additional length of exhaust tail pipe may increase backpressure levels. Please refer to the generator set spec sheet for the maximum backpressure value.
- Interchangeable modular panel construction. Allows complete serviceability or replacement without compromising enclosure design.
- Cooling/combustion air intake with a horizontal air inlet. Sized for maximum cooling airflow.
- Service access. Multi-personnel doors for easy access to generator set control and servicing of the fuel fill, fuel gauge, oil fill, and battery.
- Cooling air discharge. Weather protective design featuring a vertical air discharge outlet grille. Redirects cooling air up and above enclosure to reduce ambient noise.

Additional Sound Enclosure Features

- Available in steel (14 gauge) or aluminum 3.2 mm (0.125 in.) formed panel, solid construction.
- Attenuated design. Acoustic insulation UL 94 HF1 listed for flame resistance offering up to 51 mm (2 in.) mechanically restrained acoustic insulation.
- Cooling air discharge. The sound enclosures include acoustic insulation with urethane film.



TECHNICAL INFORMATION BULLETIN

Alternator Data Sheet

Alternator Model: 4S13X
Frequency: 60 Hz
Speed: 1800 RPM
Leads: 12 (6 Lead, 600 Volt)

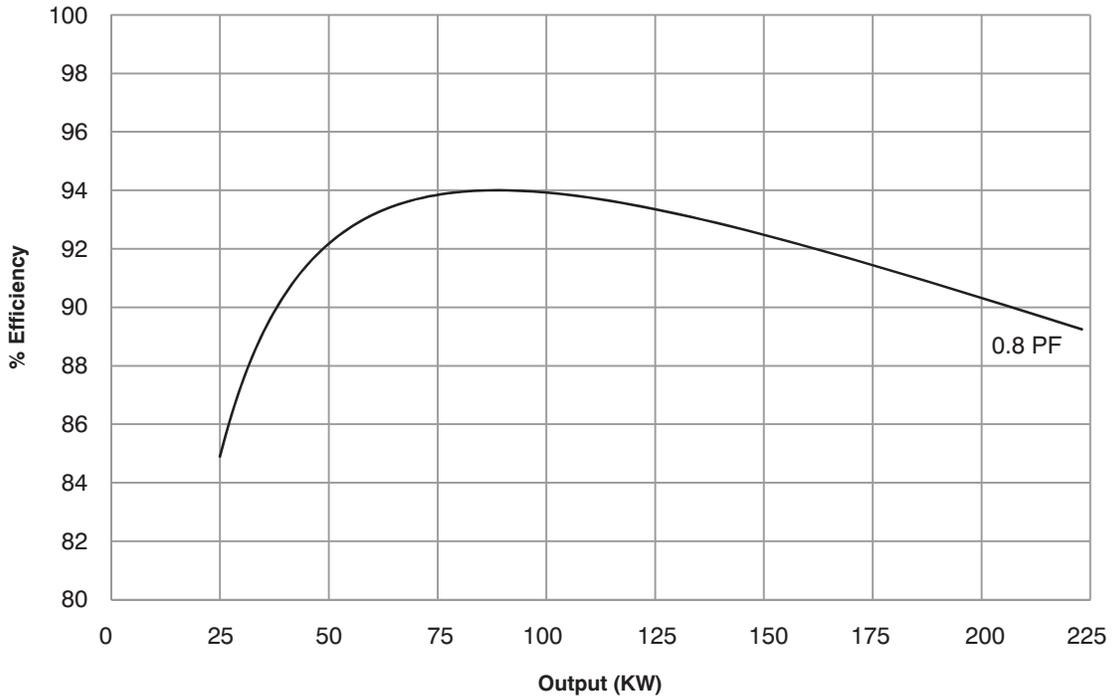
| Voltage L-N/L-L | Phase | Power Factor | Connection | kW* (kVA) | | | | | | | |
|--------------------|-------|-----------------|------------|--------------------|------------------|------------------|---------------------|------------------|---------------------|------------------|--|
| | | | | Class B | Class F | | | | Class H | | |
| | | | | 80°C Continuous | 90°C Lloyds | 95°C ABS | 105°C Continuous | 130°C Standby | 125°C Continuous | 150°C Standby | |
| 139/240 277/480 | 3 | 0.8 | Wye | 176.0 (220.0) | 184.5 (230.5) | 189.5 (236.5) | 197.5 (246.5) | 211.0 (263.5) | 208.5 (260.5) | 221.0 (276.0) | |
| 127/220 254/440 | 3 | 0.8 | Wye | 162.5 (203.0) | 170.0 (212.5) | 174.0 (217.5) | 182.0 (227.5) | 194.0 (242.5) | 191.5 (239.0) | 203.0 (253.5) | |
| 120/208 240/416 | 3 | 0.8 | Wye | 154.5 (193.0) | 162.0 (202.5) | 165.5 (206.5) | 173.5 (216.5) | 184.0 (230.0) | 182.0 (227.5) | 192.5 (240.5) | |
| 110/190 220/380 | 3 | 0.8 | Wye | 141.0 (176.0) | 147.5 (184.0) | 151.0 (188.5) | 158.0 (197.5) | 168.0 (210.0) | 166.0 (207.5) | 175.5 (219.0) | |
| 120/240 | 3 | 0.8 | Delta | 154.5 (193.0) | 162.0 (202.5) | 165.5 (206.5) | 173.5 (216.5) | 184.0 (230.0) | 182.0 (227.5) | 192.5 (240.5) | |
| 120/240 | 1 | 1.0 | Dogleg | 109.0 (109.0) | 111.0 (111.0) | 112.5 (112.5) | 113.0 (113.0) | 113.0 (113.0) | 113.0 (113.0) | 113.0 (113.0) | |
| 347/600 | 3 | 0.8 | Wye | 142.0 (177.0) | 150.0 (187.0) | 154.0 (192.0) | 162.0 (202.0) | 181.0 (226.0) | 177.0 (221.0) | 194.0 (242.0) | |

* All data tested in accordance with IEEE Standard 115. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

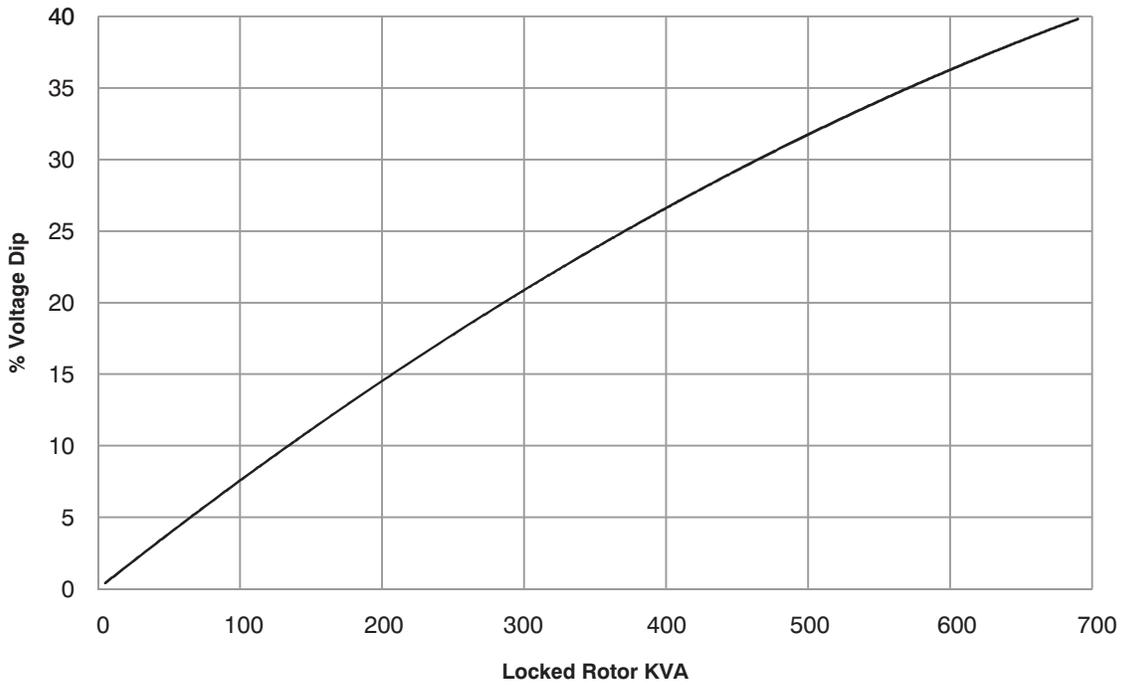
Submittal Data: 139/240 Volts, 0.8 PF, 1800 RPM, 60 Hz, 3 Phase, 130°C Rise

| | Symbol | PerUnit | Ohms | | Symbol | Value |
|---------------------------------|------------------|---------|-------|------------------------------------|------------------|------------|
| Typical Cold Resistances | | | | Typical Time Constants | | |
| Phase Resistance | | 0.032 | 0.007 | Armature Short Circuit | T _a | 0.011 sec. |
| Rotor Resistance | | 26.43 | 5.774 | Transient Short Circuit | T' _d | 0.149 sec. |
| Typical Reactances | | | | Transient Open Circuit | T' _{do} | 1.759 sec. |
| Synchronous | | | | Typical Field Current | | |
| Direct | X _d | 4.926 | 1.076 | Full Load | I _{fFL} | 21.6 amps |
| Quadrature | X _q | 2.428 | 0.530 | No Load | I _{fNL} | 3.9 amps |
| Transient | | | | Typical Short Circuit Ratio | | 0.203 |
| Unsaturated | X' _{du} | 0.474 | 0.104 | Harmonic Distortion | | |
| Saturated | X' _d | 0.417 | 0.091 | RMS Total Harmonic Distortion | | 3.59% |
| Subtransient | | | | Max. Single Harmonic | | 5th |
| Direct | X'' _d | 0.144 | 0.031 | Deviation Factor (No Load, L-L) | | <5% |
| Quadrature | X'' _q | 0.143 | 0.031 | Telephone Influence Factor | | <50 |
| Negative Sequence | X ₂ | 0.143 | 0.031 | Insulation Class | | |
| Zero Sequence | X ₀ | 0.012 | 0.003 | per NEMA MG1-1.66 | | H |
| | | | | Phase Rotation | | ABC |

**4S13X, 60 Hz, 139/240, 277/480 Volts, Wye
 TYPICAL ALTERNATOR EFFICIENCY***

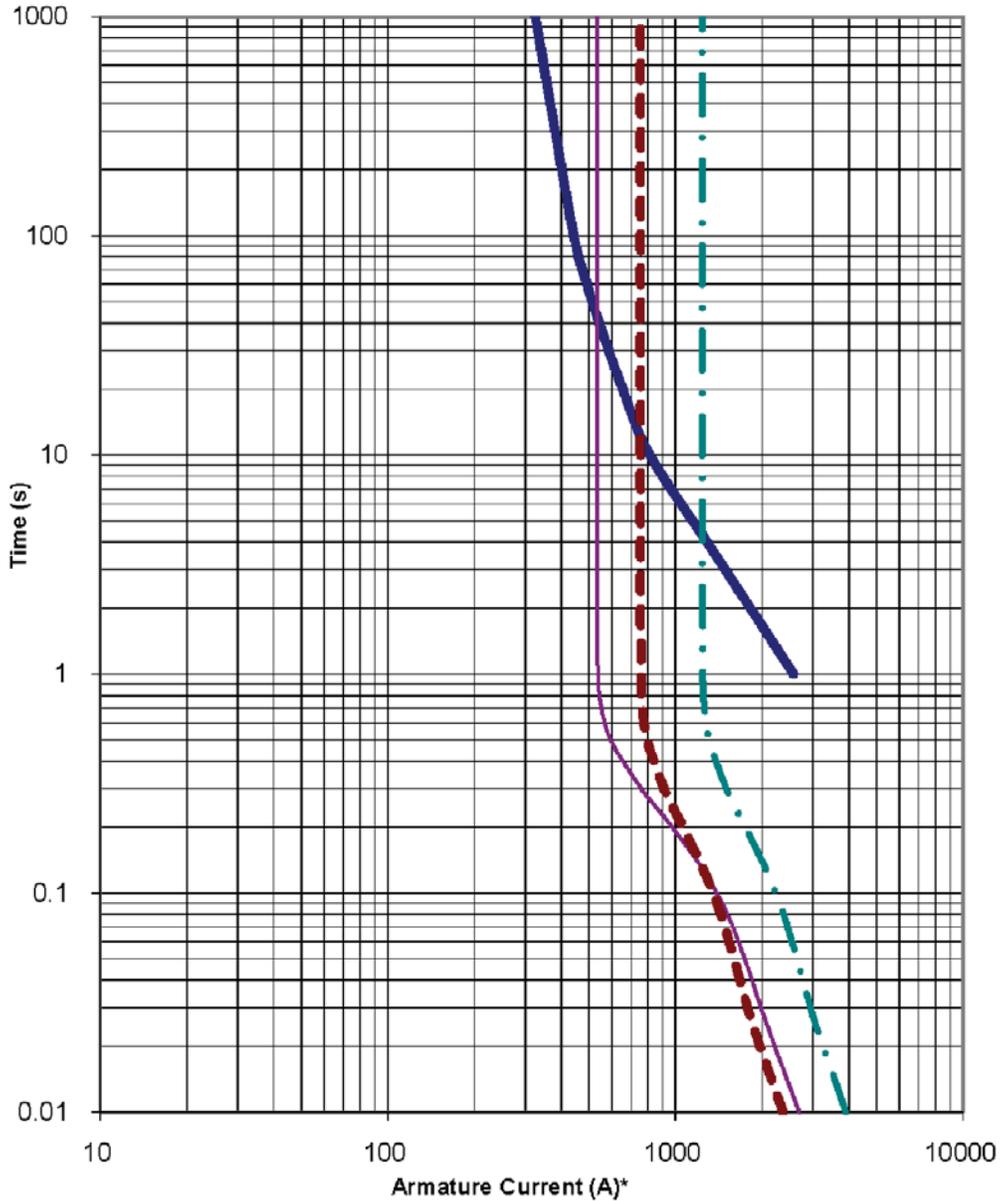


**4S13X, 60 Hz, 139/240, 277/480 Volts, Wye
 TYPICAL MOTOR STARTING CHARACTERISTICS***



* All data tested in accordance with IEEE Standard 115. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

**4S13X, 60 Hz, High Wye Connection
 SHORT CIRCUIT DECREMENT CURVE**



*Instantaneous current (t=0) is asymmetric. Divide by 1.73 for symmetrical.

FIDELITY ENGINEERING CORPORATION

KOHLER GENERATOR DIVISION · 25 Loveton Circle · P.O. Box 2500 · Sparks, Maryland 21152 · Telephone 1.800.787.6000 · Fax 410.771.9412

Circuit Breakers

**This generator is configured the following circuit
breakers manufactured by Square D:**

(1) 400 amp – Model: LGP36400CU33X

100% Rated w/ Adjustable Micrologic 3.3S Electronic Trip Unit

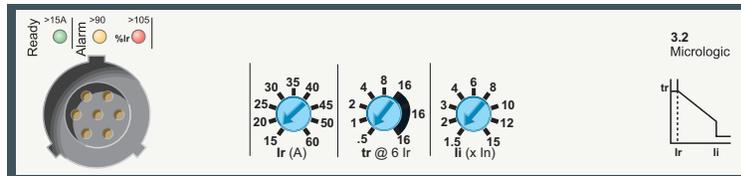
With Shunt Trip

WIRE RANGE: (2) 2/0 to 500 kcmil

PowerPact™ H-, J-, and L-Frame Circuit Breakers Trip Units

Micrologic™ 3 Trip Units

Micrologic 3 trip units can be used on PowerPact H-, J-, and L-Frame circuit breakers with performance levels D/G/J/L.



They provide:

- standard protection of distribution cables
- indication of:
 - overloads (using LEDs)
 - overload tripping (using the SDx relay module).

Circuit breakers equipped with Micrologic 3 trip units can be used to protect distribution systems supplied by transformers.

Protection

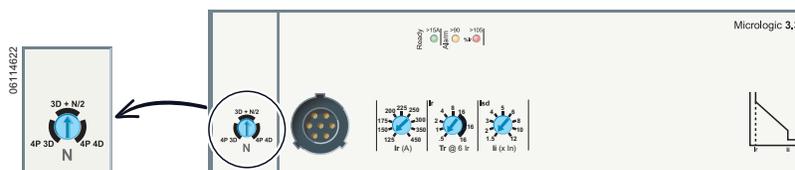
Settings are made using the adjustment rotary switches.

Overloads: Long time protection (I_r)

Inverse time protection against overloads with an adjustable current pick-up I_r set using a rotary switch and an adjustable time delay t_r .

Neutral protection

- On 3-pole L-frame circuit breakers, neutral protection is not possible.
- On four-pole L-frame circuit breakers, neutral protection may be set using a three-position switch:
 - switch position 4P 3D: neutral unprotected
 - switch position 4P 3D + N/2: neutral protection at half the value of the phase pick-up, ($0.5 \times I_r$)
 - switch position 4P 4D: neutral fully protected at I_r



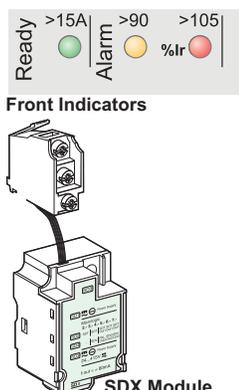
Indicators

Front indicators

- The green “Ready” LED blinks slowly when the electronic trip unit is ready to provide protection. It indicates the trip unit is operating correctly.
- Orange overload pre-alarm LED: steady on when $I > 90\% I_r$
- Red overload LED: steady on when $I > 105\% I_r$

Remote indicators

An overload trip signal can be remotely checked by installing an SDx relay module inside the circuit breaker. This module receives the signal from the Micrologic electronic trip unit through an optical link and makes it available on the terminal block. The signal is cleared when the circuit breaker is reclosed. See page 94.



PowerPact™ H-, J-, and L-Frame Circuit Breakers Trip Units

Table 50: Micrologic™ 3 Trip Unit

| Ratings | I_n at 104°F (40°C) ¹ | 60 A | 100 A | 150 A | 250 A | 400 A | 600 A |
|-----------------|------------------------------------|------|-------|-------|-------|-------|-------|
| Circuit Breaker | H-frame | X | X | X | | | |
| | J-frame | | | | X | | |
| | L-frame | | | | X | X | X |

Micrologic 3.2 / 3.3 trip units

L Long-time protection

| | I_r | | Value depending on sensor rating (I_n) and setting on rotary switch | | | | | | | | | |
|--------------------------------------|--|------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|----|
| | Pick-Up (A) Tripping between 1.05 and 1.20 I_r | $I_n = 60$ A | $I_r =$ | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 60 |
| $I_n = 100$ A | | $I_r =$ | 35 | 40 | 45 | 50 | 60 | 70 | 80 | 90 | 100 | |
| $I_n = 150$ A | | $I_r =$ | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 125 | 150 | |
| $I_n = 250$ A | | $I_r =$ | 70 | 80 | 100 | 125 | 150 | 175 | 200 | 225 | 250 | |
| $I_n = 400$ A | | $I_r =$ | 125 | 150 | 175 | 200 | 225 | 250 | 300 | 350 | 400 | |
| $I_n = 600$ A | | $I_r =$ | 200 | 225 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | |
| Time Delay (s) Accuracy 0 to -20% | t_r | | 0.5 | 1 | 2 | 4 | 8 | 16 | | | | |
| | $1.5 \times I_r$ | | 15 | 25 | 50 | 100 | 200 | 400 | | | | |
| | $6 \times I_r$ | | 0.5 | 1 | 2 | 4 | 8 | 16 | | | | |
| | | $7.2 \times I_r$ | 0.35 | 0.7 | 1.4 | 2.8 | 5.5 | 11 | | | | |
| Thermal memory | | | 20 minutes before and after tripping | | | | | | | | | |

I Instantaneous

| | | | | | | | | | | | |
|---|--------------|----------------------------------|-----|---|---|---|---|---|----|----|----|
| Pick-up (A) accuracy \pm 15% | $I_i \times$ | 60 A | 1.5 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 15 |
| | | 100 A | 1.5 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 15 |
| | | 150 A | 1.5 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 15 |
| | | 250 A | 1.5 | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 |
| | | 400 A | 1.5 | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 |
| | | 600 A | 1.5 | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 11 |
| Non-tripping time Maximum break time | | 10 ms 50 ms for $I > 1.5 I_i$ | | | | | | | | | |

Micrologic 3.2S / 3.3S trip units

L Long-time protection

| | I_r | | Value depending on sensor rating (I_n) and setting on rotary switch | | | | | | | | | |
|--------------------------------------|--|------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|----|
| | Pick-Up (A) Tripping between 1.05 and 1.20 I_r | $I_n = 60$ A | $I_r =$ | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 60 |
| $I_n = 100$ A | | $I_r =$ | 35 | 40 | 45 | 50 | 60 | 70 | 80 | 90 | 100 | |
| $I_n = 150$ A | | $I_r =$ | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 125 | 150 | |
| $I_n = 250$ A | | $I_r =$ | 70 | 80 | 100 | 125 | 150 | 175 | 200 | 225 | 250 | |
| $I_n = 400$ A | | $I_r =$ | 125 | 150 | 175 | 200 | 225 | 250 | 300 | 350 | 400 | |
| $I_n = 600$ A | | $I_r =$ | 200 | 225 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | |
| Time Delay (s) Accuracy 0 to -20% | t_r | | non-adjustable | | | | | | | | | |
| | $1.5 \times I_r$ | | 400 | | | | | | | | | |
| | $6 \times I_r$ | | 16 | | | | | | | | | |
| | | $7.2 \times I_r$ | 11 | | | | | | | | | |
| Thermal memory | | | 20 minutes before and after tripping | | | | | | | | | |

S Short-time protection

| | | | | | | | | | | | |
|-----------------------------------|---|----------------|---|---|---|---|---|---|---|----|--|
| Pick-up (A) accuracy \pm 10% | $I_{sd} - I_r \times \dots$ | 1.5 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | |
| Time delay (ms) | t_{sd} | non-adjustable | | | | | | | | | |
| | Non-tripping time Maximum break time | 20 80 | | | | | | | | | |

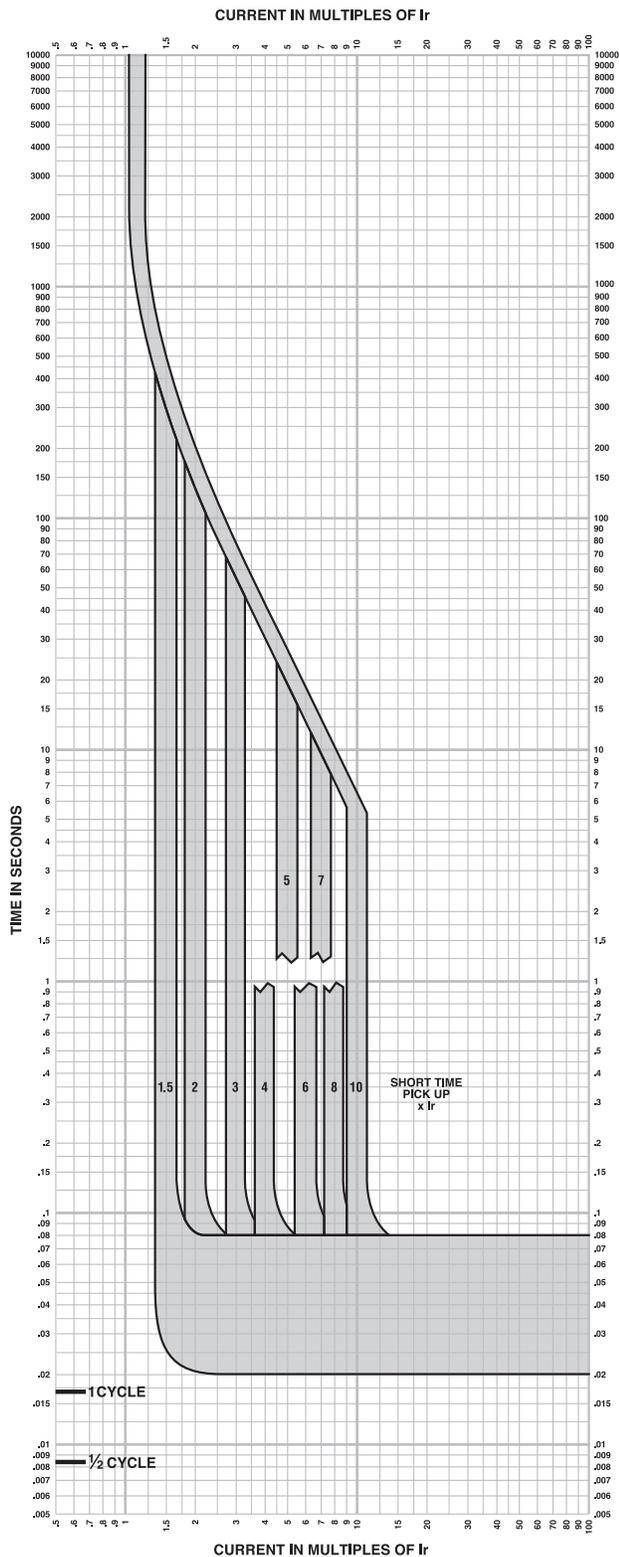
I Instantaneous

| | | | | | | | | | | | |
|---|------------------|----------------------------------|---|---|---|---|---|----|----|----|--|
| Pick-up (A) accuracy \pm 15% | $I_i \times I_n$ | 1.5 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 15 | |
| Non-tripping time Maximum break time | | 10 ms 50 ms for $I > 1.5 I_i$ | | | | | | | | | |

¹ If the trip units are used in high-temperature environments, the Micrologic trip unit setting must take into account the thermal limitations of the circuit breaker. See the temperature derating information on page 126.

PowerPact™ H-, J-, and L-Frame Circuit Breakers Trip Curves

Figure 97: Micrologic™ 3.3S Electronic Trip Unit Long Time/Short Time Trip Curve



MICROLOGIC™ ELECTRONIC TRIP UNITS Micrologic™ 3.3S Long Time/ Short Time Trip Curve 250A, 400A L-Frame

The time-current curve information is to be used for application and coordination purposes only.

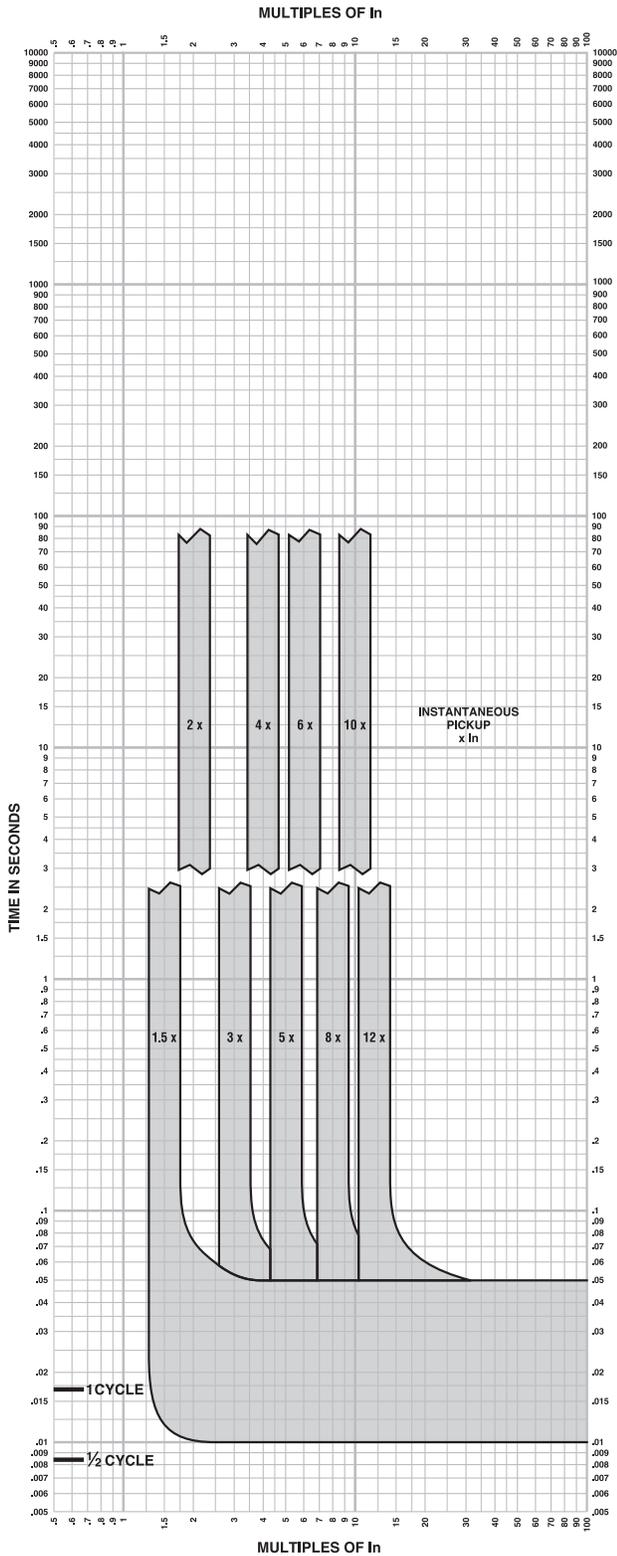
Notes:

1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermal imaging effect comes into play if a current above the long-time delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in a shorter time than normal. The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload. Approximately 20 minutes is required between overloads to completely reset thermal-imaging.
2. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.

Curves apply from -35°C to +70°C (-31°F to +158°F) ambient temperature.

PowerPact™ H-, J-, and L-Frame Circuit Breakers Trip Curves

Figure 99: Micrologic™ 3.3/3.3S/5.3A/5.3E/6.3A/6.3E Electronic Trip Unit Instantaneous Trip Curve



MICROLOGIC™ ELECTRONIC TRIP UNITS Micrologic™ 3.3/3.3S/5.3A or E/6.3A or E Instantaneous Trip Curve 400A L-Frame

The time-current curve information is to be used for application and coordination purposes only.

Notes:

1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermal imaging effect comes into play if a current above the long-time delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in a shorter time than normal. The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload. Approximately 20 minutes is required between overloads to completely reset thermal-imaging.
 2. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
 3. In = Maximum dial setting of Ir.
400A L-Frame: In = 400A = Max Ir setting
- Curves apply from -35°C to +70°C (-31°F to +158°F) ambient temperature.

Thermal-Magnetic / Magnetic Only Molded Case Circuit Breakers Accessories

■ Field Installable Accessories

Field installable accessories can be installed, interchanged or replaced in the field without affecting the circuit breaker's UL listing or interrupting ratings. Field installable accessories cannot be used in a mounting location or a pole that has a factory installed only accessory. Field installable electrical accessories and circuit breakers are shipped separately. The following thermal-magnetic circuit breakers, magnetic only circuit breakers and molded case switches accept UL Listed, Square D® field installable accessories:

- Q4, LA, and LH Series 4 and higher
- LI and LC Series 1 and higher
- MA and MH Series 2 and higher
- PA, PH, and PC Series 4 and higher
- NA and NC Series 1 and higher

Shunt Trip

The shunt trip accessory is used to trip the circuit breaker from a remote location by using a trip coil energized from a separate circuit. When energized by a push button or other pilot device, the shunt trip causes the circuit breaker to trip. The trip coil has coil clearing contacts to break the coil circuit when the circuit breaker opens.

Shunt trips are available for 2- and 3-pole thermal-magnetic circuit breakers, magnetic only circuit breakers and molded case switches with standard control voltage ratings to 480 Vac or 24 Vdc. Additional ac control voltage ratings to 600 Vac are supplied with a 120 Vac rated coil and a control voltage transformer for user mounting. Control voltages above 480 Vac are not UL Listed. A 120 Vac shunt trip operates at 55% or more of rated voltage and all other shunt trips operate at 75% or more of rated voltage.

Figure 22: Shunt Trip Wiring Diagram

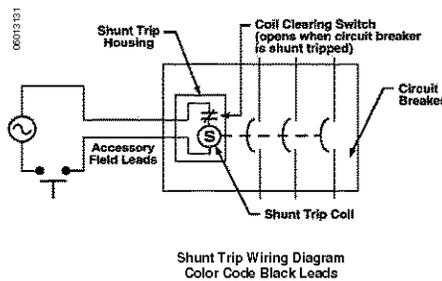


Table 56: Shunt Trip & Undervoltage Trip Clearing Times

| Circuit Breaker | Average Clearing Time, Milliseconds |
|-----------------|-------------------------------------|
| LA, Q4 | 25 |

Industrial Generator Set Accessories

KOHLER Power Systems

Generator Set Controller

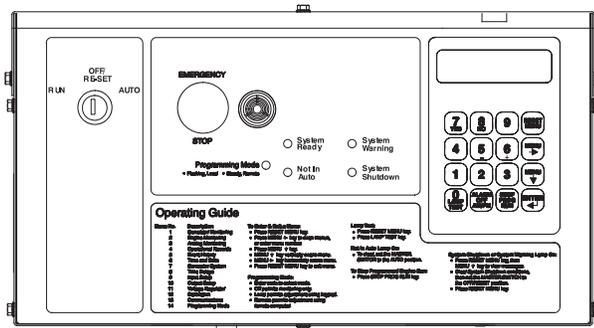


Kohler® Decision-Maker® 550 Controller

General Description and Function

The Decision-Maker® 550 generator set controller provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility with selected engine Electronic Control Modules (ECM).

ECM models only: The Decision-Maker® 550 controller directly communicates with the ECM to monitor engine parameters and diagnose engine problems (see Controller Diagnostics for details).



Decision-Maker® 550

Standard Features

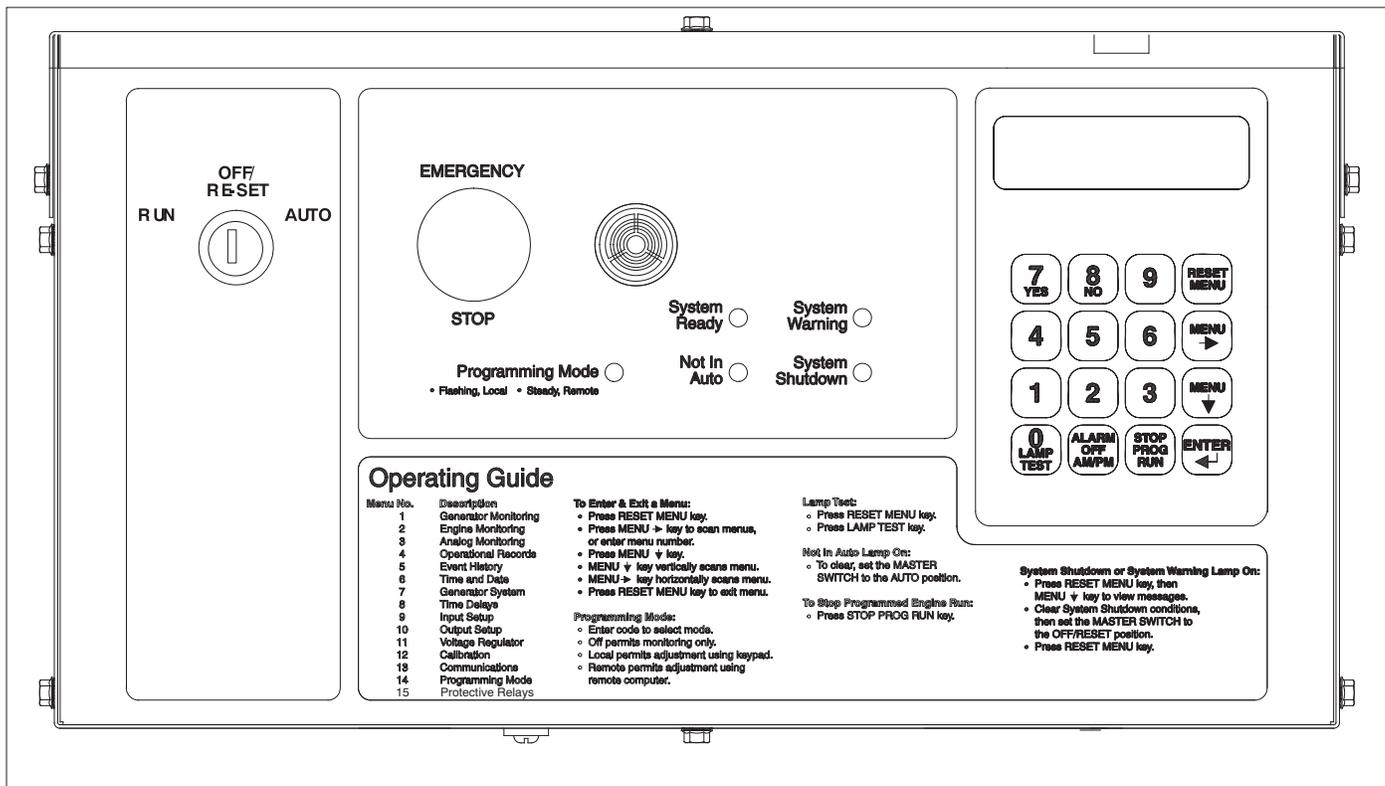
- A digital display and keypad provide access to data. The display provides complete and understandable information, and the keypad allows easy local access.
- Measurements selectable in metric or English units.
- The controller can communicate directly with a personal computer via a network or via a modem configuration.
- The controller supports Modbus® protocol. Use with serial bus or Ethernet networks.
- Integrated voltage regulator providing $\pm 0.25\%$ regulation.
- Built-in alternator thermal overload protection.
- A lockout keyswitch meets appropriate local code requirements.

Optional Features

- Monitor III, an optional menu-driven Windows®-based PC software, monitors engine and alternator parameters and also provides control capability. See G6-76 spec sheet for more information.
- Menu 15 (Protective Relays) is required for optional protective functions and is only available with the Kohler PD-Series switchgear.

Modbus® is a registered trademark of Schneider Electric.

Windows® is a registered trademark of Microsoft Corporation.



Decision-Maker® 550

Controller Features

Decision-Maker® 550—Software Version 2.70 or higher

Specifications

- Power source with circuit protection: 12- or 24-volt DC
- Power drain: 700 milliamps (or 400 milliamps without panel lamps)
- Humidity range: 5% to 95% noncondensing
- Operating temperature range: -40°C to +70°C (-40°F to +158°F)
- Storage temperature range: -40°C to +85°C (-40°F to +185°F)
- Standards:
 - NFPA 99
 - NFPA 110, Level 1
 - CSA 282-09
 - UL 508

Hardware Features

- Vacuum fluorescent display
- Environmentally sealed 16-button membrane keypad
- LED status indicating lights
- Three-position (run, off/reset, auto) keyswitch
- Latch-type emergency stop switch with International Electromechanical Commission (IEC) yellow ring identification
- Alarm horn
- Fuse-protected battery circuits
- Controller mounts locally or remotely up to a distance of 12 m (40 ft.) and viewed from one of four positions
- Dimensions—W x H x D,
460 x 275 x 291 mm (18.15 x 10.8 x 11.47 in.)

NFPA Requirements

In order to meet NFPA 110, Level 1 requirements, the generator set controller monitors the engine/generator functions and faults shown below.

NFPA 110 Common Alarm

- Engine functions:
 - Overcrank
 - Low coolant temperature warning
 - High coolant temperature warning
 - High coolant temperature shutdown
 - Low oil pressure shutdown
 - Low oil pressure warning
 - Overspeed
 - Low fuel (level or pressure) *
 - Low coolant level
 - EPS supplying load
 - High battery voltage *
 - Low battery voltage *
 - Air damper indicator
- General functions:
 - Master switch not in auto
 - Battery charger fault *
 - Lamp test
 - Contacts for local and remote common alarm
 - Audible alarm silence switch
 - Remote emergency stop

* Function requires optional input sensors or kits and is engine dependent, see Controller Displays as Provided by the Engine ECM.

Controller Functions

The control functions apply to both the ECM and non-ECM equipped models unless noted otherwise.

- **AC Output Voltage Adjustment**
The voltage adjustment provides keypad adjustment in 0.1 volt increments of the average line-to-line AC output voltage with a maximum adjustment of $\pm 10\%$ of the system voltage.
- **Alternator Protection**
The controller firmware provides generator set overload and short circuit protection matched to each alternator for the particular voltage/phase configuration.
- **Automatic Restart**
The controller automatic restart feature initiates the start routine and recrank when the generator set slows to less than 390 rpm after a failed start attempt.
- **Battleswitch (Fault Shutdown Override Switch)**
The *battleswitch* input provides the ability to override the fault shutdowns except emergency stop and overspeed shutdown in emergency situations and during generator set troubleshooting.
- **Clock and Calendar**
Real-time clock and calendar functions time stamp shutdowns for local display and remote monitor. Also use these functions to determine the generator set start date and days of operation.
- **Cooldown Temperature Override**
This feature provides the ability to bypass (override) the cooldown temperature shutdown and force the generator set to run for the full engine cooldown time delay. Also see Time Delay Engine Cooldown (TDEC).
- **Cyclic Cranking**
The controller has programmable cyclic cranking. The customer selects the number of crank cycles (1-6) and the crank time from 10 to 30 seconds. The crank disconnect depends upon the speed sensor input information or the generator frequency information. The default cyclic crank setting is 15 seconds on, 15 seconds off for three cycles.
- **Digital Voltage Regulator**
The digital voltage regulator provides $\pm 0.25\%$ no-load to full-load regulation.
- **Display Power Shutdown**
To conserve battery power, the display turns off after 5 minutes of inactivity. Pressing any keypad button activates the display.
- **ECM Communication**
The controller monitors ECM communication links and provides fault detection for oil pressure signal loss, coolant temperature signal loss, and ECM communication loss. Each of these faults provides local display, alarm horn ON, and relay driver output (RDO) on ECM models only. See Controller Diagnostics following for additional information.
- **Idle Speed Function**
Idle speed function provides the ability to start and run the engine at idle speed for a selectable time period. The engine will go to normal speed should the temperature reach warm-up before the time delay is complete.
- **Lamp Test**
Keypad switch verifies functionality of the indicator LEDs, alarm horn, and digital display.
- **Load Shed**
The load shed function provides a load control output (RDO) with user-selectable load shed level.
- **Master Switch Fault**
The generator set master switch has fault detection at four levels: 1) master switch to off, 2) master switch open, 3) master switch error, and 4) master switch not in auto. Each of these faults/warnings provides local display, alarm horn on, and activates a relay driver output (RDO). By placing the master switch to the off/reset position, all generator set faults can be reset.
- **Modbus® Interface**
The Modbus® interface provides industry standard open protocol for communication between the generator set controller and other devices or for network communications.
- **Number of Starts**
Total number of generator set successful starts is recorded and displayed on the local display and remote PC monitor. This information is a resettable and total record.
- **Programming Access**
The setup access and programming information is password protected. When locally accessing programming information, the PM (programming mode) LED flashes. When remotely accessing programming information, the PM LED is steady.
- **Programmed Run**
The programmed run function provides user-selectable time for a one-time exercising of the generator set. The controller does not provide weekly scheduled exercise periods.
- **Remote Reset**
The remote reset function resets faults and allows restarting of the generator set without going to the master switch off/reset position. The remote reset function is initiated via the remote reset digital input.
- **Running Time Hourmeter**
The running time hourmeter function is available on the local display and remote monitor. The information displayed uses real time loaded and unloaded run time as an actual and resettable record.
- **Self-Test**
The controller has memory protection and a microprocessor self-test.
- **Starting Aid**
The starting aid feature provides control for an ether injection system. This setup has adjustable *on* time before engine crank from 0 to 10 seconds. This feature is also part of the remote communication option.
- **Time Delay Engine Cooldown (TDEC)**
The TDEC provides a user-selectable time delay before the generator set shuts down. If the engine is *above* the preset temperature and unit is signalled to shut down, unit will continue to run for the duration of the TDEC. If the engine is *at or below* the preset temperature and unit is signalled to shut down or the TDEC is running, unit will shut down without waiting for the time delay to expire. Also see Cooldown Temperature Override.
- **Time Delay Engine Start (TDES)**
The TDES provides a user-selectable time delay before the generator set starts.

Modbus® is a registered trademark of Schneider Electric.

Controller Diagnostics

The controller features warnings and shutdowns as text messages on the vacuum fluorescent display. See the table below.

Warnings show yellow LED and signal an impending problem.
Shutdowns show red LED and stop the generator set.

Note: Menu 15 features are available by purchasing the paralleling switchgear option.

Note: The available user inputs are dependent on factory reserved inputs for specific engine types, engine controls, and paralleling applications.

User-Defined Common Fault and Status. The user customizes outputs through a menu of warnings, shutdowns, and status conditions. User defines up to 31 relay driver outputs (**RDOs**) (relays not included).

| | Warning Function | Shutdown Function | User-Defined | User RDOs |
|---|------------------|-------------------|--------------|-----------|
| Engine Protection | | | | |
| Air damper control, if equipped | | | X | X |
| Air damper indicator, if equipped | | X | X | X |
| Coolant temp. signal loss | | X | X | X |
| High battery voltage | X | | X | X |
| High coolant temperature | X | X | X | X |
| High oil temp. shutdown | | X | X | X |
| Low battery voltage | X | | X | X |
| Low coolant level | | X | X | X |
| Low coolant temperature | X | | X | X |
| Low fuel level (diesel) * | X | | X | X |
| Low fuel pressure (gas) * | X | | X | X |
| Low oil pressure | X | X | X | X |
| Oil pressure signal loss | | X | X | X |
| Overcrank | | X | X | X |
| Overspeed | | X | X | X |
| Speed sensor fault | X | | X | X |
| Starting aid | | | X | X |
| Weak battery | X | | X | X |
| General Protection | | | | |
| Auxiliary inputs 0-5 VDC—up to 7 analog | X | X | X | X |
| Auxiliary inputs—up to 21 digital | X | X | X | X |
| Battery charger fault * | X | | X | X |
| Defined common fault † | | | X | X |
| EEPROM write failure | | X | X | X |
| Emergency stop | | X | X | X |
| Engine cooldown delay | | | X | X |
| Engine start delay | | | X | X |
| EPS supplying load | X | | X | X |
| Internal fault | | X | X | X |
| Load shed kW overload | X | | X | X |

| | Warning Function | Shutdown Function | User-Defined | User RDOs |
|--|------------------|-------------------|--------------|-----------|
| Load shed underfrequency | X | | X | X |
| Master switch error | | X | X | X |
| Master switch not in auto | X | | X | X |
| Master switch open | | X | X | X |
| Master switch to off | | X | X | X |
| NFPA 110 common alarm | | | X | X |
| SCRDO's 1-4 (software controlled RDOs) | | | X | X |
| System ready (status) | | | X | X |
| Alternator Protection | | | | |
| AC sensing loss | X | X | X | X |
| Critical overvoltage | | X | X | X |
| Generator running | | | X | X |
| Ground fault * | X | | X | X |
| Locked rotor | | X | X | X |
| AC Protection (includes Menu 15 Enabled Enhancements) | | | | |
| Alternator protection (short circuit and overload) | | X | X | X |
| Breaker trip | | | ‡ | X |
| Common protective relay output | | | X | X |
| In synchronization | | | ‡ | X |
| Loss of field (reverse VAR) | | X | X | X |
| Overcurrent | X | X | X | X |
| Overfrequency | | X | X | X |
| Overpower | | X | X | X |
| Overvoltage | | X | X | X |
| Reverse power | | X | X | X |
| Underfrequency | | X | X | X |
| Undervoltage | | X | X | X |

* Function requires optional input sensors or kits and is engine dependent, see Controller Displays as Provided by the Engine ECM.

† Factory default settings for the defined common fault are emergency stop, high coolant temperature shutdown, low oil pressure shutdown, overcrank, and overspeed.

‡ Factory set inputs that are fixed and not user changeable.

| Controller Displays as Provided by the Engine ECM (availability subject to change by the engine manufacturer) | | | | | | |
|---|--------|--------|-------------------|----------------|-----------------|---------------|
| Display | GM/PSI | Doosan | John Deere (JDEC) | Volvo (EMS II) | Volvo (EDC III) | DD/MTU (ADEC) |
| Ambient temperature | | X | | | | |
| Charge air pressure | X | X | | X | X | X |
| Charge air temperature | X | X | X | X | X | |
| Coolant level | | | | X | X | X |
| Coolant pressure | | | | X | X | |
| Coolant temperature | X | X | X | X | X | X |
| Crankcase pressure | | | | X | X | |
| ECM battery voltage | X | X | | | | X |
| ECM fault codes | X | X | X | X | X | X |
| ECM serial number | | | | | | X |
| Engine model number | | | X | | | X |
| Engine serial number | | | X | | | X |
| Engine speed | X | X | X | X | X | X |
| Fuel pressure | | | | X | X | |
| Fuel rate | X | X | X | X | X | X |
| Fuel temperature | | | X | X | X | X |
| Oil level | | | | | X | |
| Oil pressure | X | X | X | X | X | X |
| Oil temperature | | | | X | X | X |
| Trip fuel | | | | X | X | X |

Controller Monitoring Standard Equipment and Features

- Alarm horn
- Indicators:
 - Not in auto (yellow)
 - Program mode (yellow)
 - System ready (green)
 - System shutdown (red)
 - System warning (yellow)
- Switches and standard features:
 - Keypad, 16-button multi-function sealed membrane
 - Lamp test
 - Keyswitch, auto, off/reset, run (engine start)
 - Switch, emergency stop (normally closed contacts)
- Vacuum fluorescent display with two lines of 20 characters

Displays

Some engine displays are dependent upon enhanced electronic engine control availability.

- Engine monitoring data (metric or English units):
 - Battery voltage
 - Engine model number †
 - Engine serial number †
 - Engine speed
 - Engine start countdown
 - ECM—battery voltage †
 - ECM—fault codes
 - ECM—serial number †
 - Fuel rate
 - Level—coolant †
 - Level—oil †
 - Pressure—crankcase †
 - Pressure—charge air †
 - Pressure—coolant †
 - Pressure—fuel
 - Pressure—oil
 - Rpm
 - Temperature—ambient †
 - Temperature—charge air †
 - Temperature—coolant
 - Temperature—fuel †
 - Temperature—oil †
 - Trip fuel †
- Engine setpoints
 - Coolant—high temperature shutdown and warning setpoints
 - Oil—low pressure shutdown and warning setpoints
 - Temperature—engine cooled down setpoint
 - Temperature—engine warmed up setpoint
- Generator monitoring data:
 - Current (L1, L2, L3), $\pm 0.25\%$ accuracy
 - Frequency, $\pm 0.5\%$ accuracy
 - Kilowatts, total per phase (L1, L2, L3), $\pm 0.5\%$ accuracy
 - KVA, total per phase (L1, L2, L3), $\pm 0.5\%$ accuracy
 - KVAR, total absorbing/generating per phase (L1, L2, L3), $\pm 0.5\%$ accuracy
 - Percent alternator duty level (actual load kW/standby kW rating)
 - Power factor per phase, leading/lagging
 - Voltage (line-to-line, line-to-neutral for all phases), $\pm 0.25\%$ accuracy
- Operational records:
 - Event history (stores up to 100 system events)
 - Last start date
 - Number of starts
 - Number of starts since last maintenance
 - Operating days since last maintenance
 - Operating mode—standby or prime power
 - Run time (total, loaded and unloaded hours, and total kW hours)
 - Run time since maintenance (total, loaded, and unloaded hours and total kW hours)
 - System shutdowns
 - System warnings
 - Time, date, and day of week
- Time delays—general:
 - Crank cycles for on/pause
 - Crank cycles for overcrank shutdown
 - Engine cooldown
 - Engine start
 - Load shed
 - Voltage, over- and under-
 - Starting aid

- Time delays—paralleling relays (PR) for optional switchgear applications:
 - Current—over (PR)
 - Current—over shutdown
 - Frequency—over- and under- (PR and shutdown)
 - Loss of field (PR and shutdown)
 - Loss of field shutdown (PR)
 - Power—over (PR)
 - Power—over shutdown
 - Reverse power (PR)
 - Reverse power shutdown
 - Synch matching—frequency, phase, voltage
 - Voltage—over- and under- (PR and shutdown)
- System parameters:
 - Alternator number
 - Current, rated (based on kW, voltage, connection settings)
 - Frequency
 - Generator set model number
 - Generator set serial number
 - Generator set spec number
 - Rating, kW
 - Phase, single and three (wye or delta)
 - Voltage, AC
 - Voltage configuration, wye or delta

Inputs

- Customer and remote inputs:
 - Analog inputs 0-5 VDC (up to 7 user-defined analog inputs with multiple shutdown and warning levels)
 - Digital contact inputs (up to 21 user-defined digital inputs with shutdown or warning levels)
 - Ground fault detector *
 - Remote emergency stop
 - Remote reset
 - Remote 2-wire start
- Digital inputs (standard):
 - Air damper fault, if equipped
 - Battery charger fault *
 - Battleswitch
 - Emergency stop
 - Field overvoltage (350 kW and higher)
 - High oil temperature
 - Idle mode active (ECM models only) *
 - Low coolant level
 - Low coolant temperature
 - Low fuel warning *
 - Low fuel shutdown *
- Switchgear inputs in Menu 15 (to interface with switchgear system):
 - Circuit breaker closed
 - Enable synch
 - Lockout shutdown
 - Remote reset
 - Remote shutdown
 - VAR/PF mode selection
 - Voltage—raise/lower (or VAR/PF raise/lower in VAR/PF mode)

Outputs

See the Fault Diagnostics section for a breakdown of the available shutdown and warning functions.

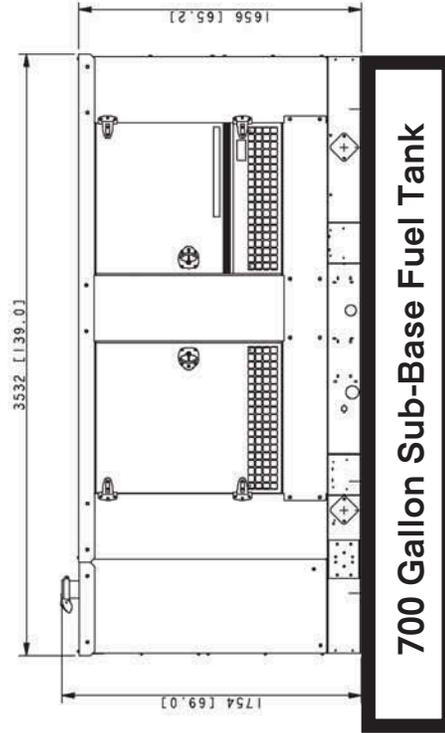
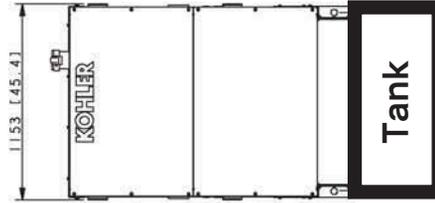
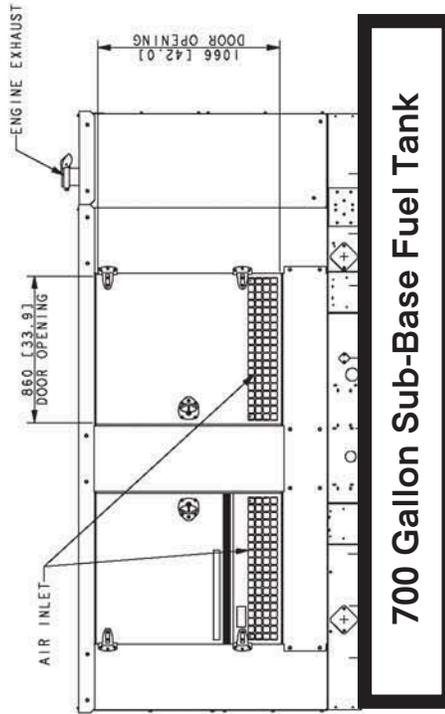
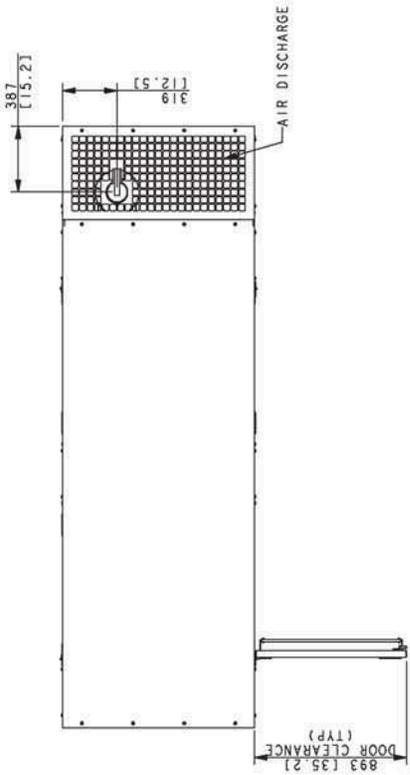
- Thirty-one user-defined relay driver outputs (relays not included)
 - Fifteen NFPA 110 faults
 - Defined common faults

Communication

- RS-485 connector for Modbus® RTU communication port
- RS-232 connector for a PC or modem (optional software required)
- SAE J1939 connector for the engine ECM (engine control module)

* Function requires optional input sensors or kits and is engine dependent, see Controller Displays as Provided by the Engine ECM.

Modbus® is a registered trademark of Schneider Electric.



700 Gallon Sub-Base Fuel Tank

700 Gallon Sub-Base Fuel Tank

Tank

| REV# | DATE | DESCRIPTION | BY | DATE | APPROVALS | DATE | SCALE | PROJ# |
|------|---------|------------------------------------|-----|---------|-----------|---------|-------|----------|
| | 11-5-09 | NEW DRAWING (87805-93) | MRS | 11-5-09 | MRS | 11-5-09 | 1:1 | ADV-7825 |
| A | 3-9-10 | (C-4) NOTE ADDED (88197) | PAO | 3-9-10 | PAO | 3-9-10 | 1:1 | ADV-7825 |
| B | 7-29-10 | (A-6) 6X 17.5 NOTE ADDED (90041) | SAM | 7-29-10 | SAM | 7-29-10 | 1:1 | ADV-7825 |
| C | 9-28-10 | (A-5) 12X Ø17.5 NOTE ADDED (90301) | SAM | 9-28-10 | SAM | 9-28-10 | 1:1 | ADV-7825 |

| DATE | BY | DESCRIPTION |
|---------|-----|------------------------|
| 11-5-09 | MRS | ISSUE FOR CONSTRUCTION |
| 3-9-10 | PAO | ISSUE FOR CONSTRUCTION |
| 7-29-10 | SAM | ISSUE FOR CONSTRUCTION |
| 9-28-10 | SAM | ISSUE FOR CONSTRUCTION |

| DATE | BY | DESCRIPTION |
|---------|-----|------------------------|
| 11-5-09 | MRS | ISSUE FOR CONSTRUCTION |
| 3-9-10 | PAO | ISSUE FOR CONSTRUCTION |
| 7-29-10 | SAM | ISSUE FOR CONSTRUCTION |
| 9-28-10 | SAM | ISSUE FOR CONSTRUCTION |

| DATE | BY | DESCRIPTION |
|---------|-----|------------------------|
| 11-5-09 | MRS | ISSUE FOR CONSTRUCTION |
| 3-9-10 | PAO | ISSUE FOR CONSTRUCTION |
| 7-29-10 | SAM | ISSUE FOR CONSTRUCTION |
| 9-28-10 | SAM | ISSUE FOR CONSTRUCTION |

| DATE | BY | DESCRIPTION |
|---------|-----|------------------------|
| 11-5-09 | MRS | ISSUE FOR CONSTRUCTION |
| 3-9-10 | PAO | ISSUE FOR CONSTRUCTION |
| 7-29-10 | SAM | ISSUE FOR CONSTRUCTION |
| 9-28-10 | SAM | ISSUE FOR CONSTRUCTION |

125-150 JOHN DEERE

FIDELITY ENGINEERING CORPORATION 
KOHLER GENERATOR DIVISION • 25 Loveton Circle • P.O. Box 2500 • Sparks, Maryland 21152 • Telephone 1.800.787.6000 • Fax
410.771.9412

Generator Loading and Transport

- **Do not lift the entire generator assembly by the lifting eye attached to the engine or alternator.**
- **The mounting skid of each generator has four holes strategically placed for attaching a lifting device.**
- **A four point lifting device, properly sized for the total weight of the unit, is necessary to lift the generator set.**
- **The use of spreader bars is necessary to avoid damage to the set during the lifting procedures.**
- **Fork lifts of the proper capacity may be used. Forks should be placed below the steel skid base, with the load properly centered and spread across the forks.**
- **During transport, the generator should be properly secured utilizing the four lifting holes for straps or chain tie downs.**
- **Indoor or separately housed units must be covered during transport to protect them from adverse weather.**

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IMPORTANT !

If this generator set is to be installed on the roof, the following precautions must be taken:

Petroleum based products are extremely detrimental to all modern roofing materials-especially the rubberized membrane types.

It is a normal occurrence for any internal combustion engine, at some point in its operational life, to drip or leak lube oil and/or diesel fuel onto the surface beneath it. Also-any mechanical device such as a fuel or oil line, daytank float switch etc has a potential to fail.

A drip pan or other spill containment device must be installed between the generator and the roof, and between any fuel tanks and the roof. This drip pan/spill containment device is not part of the generator package furnished by Fidelity Engineering Corporation or Kohler Company.

Neither Fidelity Engineering nor any of its vendors including Kohler Company will be held responsible for any damage that occurs to the roof that is a result of normal generator operation, improper installation, or equipment failure.

Location and Support

- **The recommended mounting surface is a level concrete pad.**
- **The mounting pad should extend a minimum of 12" beyond the mounting base dimension.**
- **Construction of concrete pad should be per Local and State building code based on total weight of generator and accessories, i.e.: weather housing, sub-base fuel tank with fuel.**
- **Vibration isolators are installed internally by the manufacturer between the engine and the mounting skid.**
- **A minimum of 3' clearance should be maintained on all sides of the generator to allow for servicing.**

Caution - the generator must be placed far enough away from the building, or the exhaust piped in such a manner as to avoid carbon monoxide fumes from entering the fresh air intakes.

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Vibration Isolators

**This generator is equipped with integral neoprene
type installed vibration isolators.**

**Additional isolators are not recommended and
not provided with the generator.**

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410.771.9412

Fuel System

- **This generator is equipped with a 700 gallon U.L. 142 listed double wall sub-base fuel tank.**
- **The tank is complete with all required vents, fill cap, level gauge, low fuel level alarm sensor and fuel-in-basin-alarm sensor**
- **The fuel supply and return lines will be piped from the generator to the fuel tank.**
- **The fuel tank must be filled with a good grade of # 2 diesel fuel prior to start up.**

Note: Fuel is not provided by Fidelity Engineering.



MGS Inc.
 178 Muddy Creek Church Rd
 Denver, PA 17517

Phone: 717-336-7528
Fax: 717-336-4071
www.mgsincorporated.com

| | |
|---|---|
| <p>Quote To: Lisa Nichols Fidelity Engineering Corp. 25 Loveton Circle PO Box 2500 Sparks MD 21152 USA</p> <p>Phone: 800-787-6000 x2535 Fax: 410-891-1516</p> | <p>Date: 8/19/2014 Expires: 09/18/2014 Terms: Net 30 Days Ship Via: Customer Pick Up</p> <p>Sales Person: Brian Ross</p> <p>bross@mgsmail.com</p> |
|---|---|

F.O.B. Denver, PA Job: Scannell

U. S. Dollars

| Line | Part Number | Description | Rev | Drawing |
|------|-------------|--------------------------|-----|---------|
| 1 | CTDGBT | UL CLOSED TOP DIKED TANK | | |

*MGS Closed Top Dike Generator Base Tank (UL142)
 700 Gallon Capacity, 26" Stub Up with a Removable end plate
 Low Level Switch, High Level Switch, Critical High Level Switch, Leak Detection Switch
 6" Emergency Vent, 2" Mushroom Vent
 Fittings for Fuel Suction and Return, 1/2" NPT Drain for Exterior Tank
 2" Lockable Fuel Fill, Mechanical Fuel Gauge
 Digital Panel Meter and Float System w/ 4-20mA Output
 -Digital Panel Meter and Box Shipped Loose for Customer Installation/Calibration; Probe Mounted in Tank
 Remote Fuel Panel (as per Pryco 230-22)
 -Low, high and critical high alarms built-in
 -7.5 gallon spill containment built-in
 -120vac normally open 2" solenoid valve
 -Remote panel and solenoid valve shipped loose for customer installation/plumbing on-site*

Mounting Provisions: Standard, No Isolators
Paint Color: Gloss Black

**Note: Various government agencies may have their own codes. The installing party should check local ordinances, regulations and consult with the AHJ to ensure compliance of tank specifications. MGS, Inc. generator base tanks are not seismically tested. MGS Inc. offers a standard 1-year warranty on its products.
 Customer to mount and plumb generator at their facility

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Exhaust System

- **Critical grade silencer will be mounted on the inside of the generator enclosure.**
- **All exhaust connections will be completed prior to shipment to the job site.**
- **Exhaust outlets are equipped with a tail pipe and rain cap.**

Industrial Generator Set Accessories

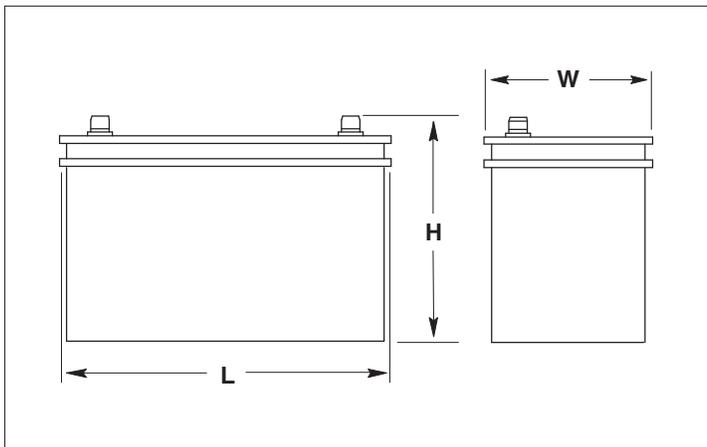
KOHLER POWER SYSTEMS

System Batteries



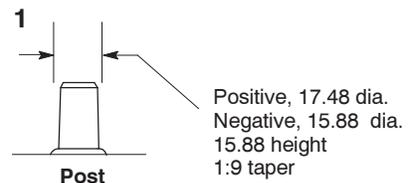
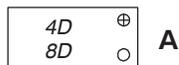
- Kohler Co. selects batteries to meet the engine manufacturer's specifications and to comply with NFPA requirements for engine-cranking cycles.
- Heavy-duty starting batteries are the most cost-effective means of engine cranking and provide excellent reliability in generator set applications.
- Batteries are rated according to SAE standard J-537. All batteries are 12-volt and have lead-calcium or lead-antimony plates with sulfuric acid electrolyte.
- Most generator set battery kits offer dry-charged or wet-charged batteries.
- Tough polypropylene cases protect against life-shortening vibration and impact damage.
- Removable cell covers allow checking of electrolyte specific gravity.

Typical Overall Dimensions



Battery Specifications

Battery Post Layouts A–D and Style 1



Notes: Dimensions are in mm; 25.4 mm equals 1 inch.
 BCI group numbers shown in italics.

Industrial Generator Set Accessories

KOHLER POWER SYSTEMS

12 Volt 6 Amp
 Float/Equalize Battery Charger



Standard Features

- 12 VDC output. * Use two battery chargers for 24-volt electrical systems
- Automatic 3-stage float/equalize battery charger
- Charges both lead-acid and gel-cell type batteries
- Indicator lamps: red and green LEDs indicate bulk charge, absorption, and float charge stages
- Durable potted assembly for full waterproofing and shockproofing
- Reverse-polarity protection
- Short-circuit protection
- UL 1236 listed
- UL 2200 compliant
- UL 991 compliant for vibration and shock
- UL listed to Canadian safety standards
- UL rated inline fuse
- FCC Class B-compliant for EMI/RFI†
- 1-year warranty
- Easy installation:
 - Integral mounting flanges
 - Ring terminals for battery connection
 - Standard US style 3-prong AC plug

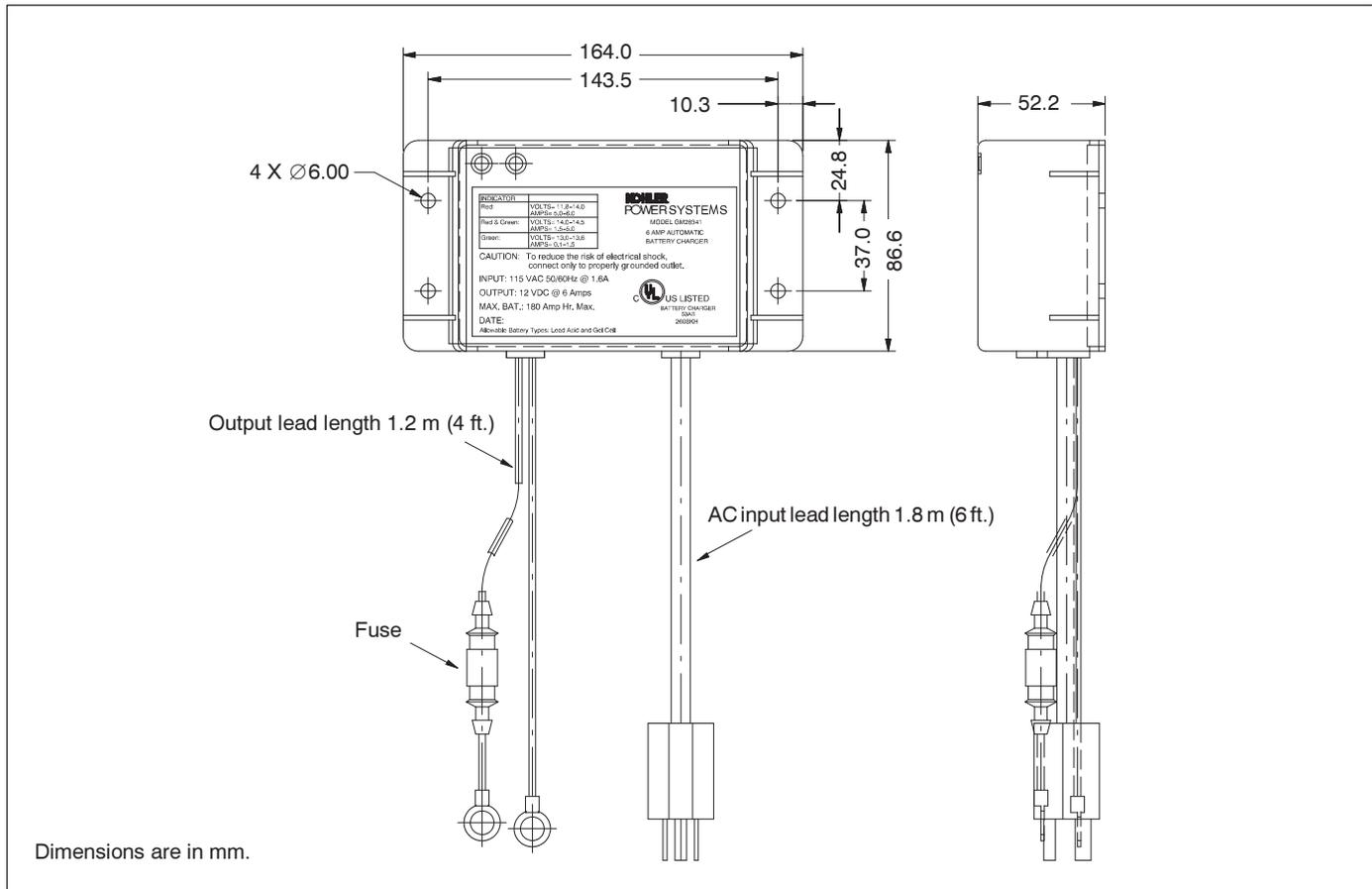
† Date code 8/26/04 or later

Specifications

| | |
|--|---|
| Battery Charger Kits | GM28688-KA1/KP1, KA2/KP2 GM28569-KA1/KP1, KA2/KP2, KA3/KP3 |
| Input Voltage | 90-135 VAC |
| Input Frequency | 50/60 Hz |
| DC Output: | |
| Bulk | 11.8-14.0 VDC @ 5.0-6.0 amps |
| Absorption | 14.0-14.5 VDC @ 1.5-5.0 amps |
| Float | 13.3-14.5 VDC @ 0.1-1.5 amps |
| Steady Full-Load Output Current | 6 amps |
| Current Limit | 7 amps |
| Output Power Limit | 70 +2/-5 watts |
| Line Regulation Across Input Voltage Range | 1% |
| Isolation, Input to Output | 2500 V |
| Dimensions (L x W x D) | 164 x 87 x 53 mm (6.4 x 3.5 x 2.1 in) |
| Weight | 1.6 kg (3.5 lb.) |
| Temperature Range, Operating and Storage | -40° to 70°C (-40° to 158° F) |
| Humidity | 0 to 100% (condensing) |

KOHLER CO., Kohler, Wisconsin 53044 USA
 Phone 920-565-3381, Fax 920-459-1646
 For the nearest sales and service outlet in the
 US and Canada, phone 1-800-544-2444
 KohlerPowerSystems.com

Kohler Power Systems
 Asia Pacific Headquarters
 7 Jurong Pier Road
 Singapore 619159
 Phone (65) 6264-6422, Fax (65) 6264-6455



Battery Connections

Lead Length 1.2 m (4 ft.)
 Battery Connections 9.5 mm (3/8 in.) ring terminals

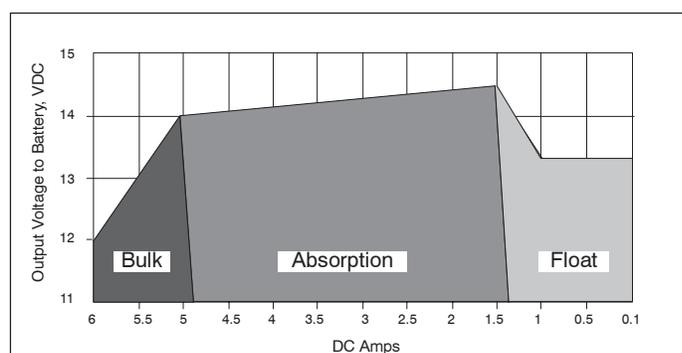
AC Power Connections

Lead Length 1.8 m (6 ft.)
 Connection Standard US style 3-prong AC plug

Shipping Information

Carton Size 254 x 152 x 89 mm (10 x 6 x 3.5 in.)
 Shipping Weight 1.8 kg (4 lb.)

Charging Curves



DISTRIBUTED BY:

Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator distributor for availability.

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THE SMART MONITORING SOLUTION: "KNOW BEFORE YOU GO!"

G8500 SINGLE GENERATOR SYSTEM



RELIABLE CONNECTION

The OMNIMETRIX G8500 wireless remote monitor is the reliable, cost-effective solution for backup power monitoring. It connects to **all major brands of generators**, and is Modbus compatible for access to diagnostic information directly from the genset and transfer switch controls. This unit has the ability to monitor key items that lead to generator system "Fail-to-Start" events including, but not limited to:

- Battery Voltage
- Fuel Status
- Coolant Status
- Unhandled System Alarms
- Missed Exercise
- Plus Many More!

All OMNIMETRIX monitors feature our patented over-the-air remote programmability for auto-updating in the field. Users can view system data and alarm status through our Data Management Center, OmniView™.

FAST AND SIMPLE INSTALLATION AND SUPPORT

- Fast – Most installs completed in less than 30 minutes
- Simple – Includes pre-designed cables, antenna, and magnetic mount
- No software to upload
- Over-the-air programming and updates at no additional charge
- Remote configuration via Technical Support

OMNIVIEW™ AND SECURE DATA

OmniView™ is the real power of the system, connecting you instantly from anywhere to real-time and historical information on an entire fleet, or you may view complete diagnostic data on one site. OmniView™ features include:

- Interactive 24/7 Access
- Instant Alarm Notification via Email or SMS Text
- Detailed Alarm / Fault Display & History
- Informative Standard and Custom Reports
- T2 – Trouble Ticket & Escalation Program
- Secure & Redundant Service with Data Archiving
- Ability for Remote Diagnostics (Start and Stop)

T2 - TROUBLE TICKETS

For escalating service issues, the system can be customized to include T2 – Trouble Tickets. This system allows customers to determine what type of alerts are sent to service personnel, administrators, and/or management and helps manage resolution of the issue.

OMNIMETRIX ELIMINATES 95% OF FAIL-TO-START SITUATIONS



G8500

PRODUCT TECHNICAL DETAILS & OPTIONS



COMMUNICATION TYPES:

- ▣ Cellular (GSM 4G) – US & International Coverage
- ▣ Cellular (CDMA 4G) – US Coverage
- ▣ Iridium Satellite – Global Coverage
- ▣ LAN (Ethernet) – Coverage Based on Site Access

COMMUNICATION CONNECTIONS:

- ▣ Modbus (RS485 or RS232) or Hardwire

MODBUS CONNECTIONS:

- ▣ Up to 128 Alarm Conditions
- ▣ Up to 128 Analog Parameters
- ▣ Up to 8 Hardwire Alarm Inputs
- ▣ Up to 2 Analog Inputs
- ▣ 2 Output Relays

HARDWARE CONNECTIONS:

- ▣ Up to 8 Alarm Inputs
- ▣ Up to 2 Analog Inputs
- ▣ 2 Output Relays

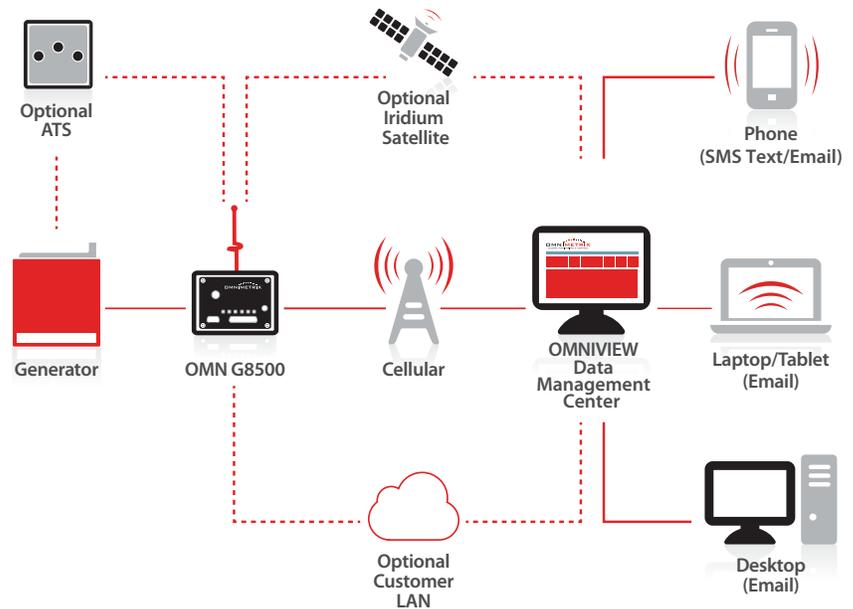
ANALOG INPUTS:

- ▣ (1) 0 - 50 Vdc
- ▣ (1) 4-20 mA

OPTIONAL ACCESSORIES

- ▣ GPS Service Locator
- ▣ Power Meter Kit
- ▣ Analog Fuel Level Kit
- ▣ Power Supply
- ▣ Backup Battery
- ▣ Expansion Module
- ▣ Communication Cable Extensions
- ▣ Antenna Cable Extensions

OMNIMETRIX DATA PATHWAY



DEVICE DETAILS:

- ▣ **Display:** 6 Status LED's
- ▣ **Size:** 6" x 4" x 3"
- ▣ **Weight:** 2 lbs.
- ▣ **Temperature Range:** -20 F to +120 F
- ▣ **Power Input:** 8 – 36 Vdc
- ▣ **Current (Typical):** 30 mA
- ▣ **Current (Max):** 2A
- ▣ **Cellular Antenna:** 3 db Magnetic Mount
- ▣ **FCC:** Radio Meets FCC Part 90 & Part 15



Fidelity Power Systems is a distributor of the OmniMetrix Remote Monitoring Device

The OmniMetrix Remote Monitoring Device dramatically increases generator system reliability, while increasing owner confidence in the generator, the equipment brand, and the servicing dealer. It provides the most capable monitoring system in the industry at the best overall value for the owner and servicing dealer. We provide a cost effective, easy-to-install solution, while providing high quality data and instant alarm notification for significantly improved proactive service response.

What OmniMetrix Does:

- Increases the Reliability of Generator System
- Prevent 95% of Generator “Fail to Start” events
- Time and date stamped Detailed Alarm/Fault Display & History
- Provides cost-effective, proactive, and predictive monitoring solutions that track:
 - Engine Running
 - Battery Voltage
 - Fuel*
 - Coolant
 - Oil
 - Unaddressed System Alarms (Not in Auto, Emergency Stop)
 - Missed Exercise Cycles
 - Plus Many More!

Not only do we at Fidelity Power Systems have someone monitoring your generators, but also OMNIMETRIX provides a 24/7 tech support line with their state-of-the-art call center. OMNIMETRIX provides an Interactive 24/7 Secure Access to a powerful data management control center that is easily accessed anywhere in the world through a secure, password protected website. Instant alarm/fault notification with a detailed time and date stamped history is sent directly to you through E-mail, text message, or both with an unlimited number of recipients to whom you delegate.

*Generic fuel alarm (to receive a detailed capacity percentage, external equipment is necessary).

Option: OmniMetrix Generator Remote Monitoring System

Installation, Monitoring Hardware, & Annual Monitoring Service for the Trial Period is:

Annual Monitoring Service after the 1st Year is:

KOHLER Power Systems

Automatic Transfer Switches Service Entrance Rated



Transfer Switch Standard Features Enclosed Contact Power Switching Units

- Service entrance automatic transfer switches incorporate an isolating mechanism and overcurrent protection on the utility supply, eliminating the need to have a separate, upstream utility source circuit breaker/disconnect switch.
- UL 1008 listed, file #58962
- IBC seismic certification available
- Fully enclosed silver alloy contacts provide high withstand rating.
- 3-cycle short circuit current withstand-tested
- Completely separate utility and generator set power switching units provide redundancy (no common parts) and are easy to service.
- Utility disconnect power switching units have overcurrent protection; generator disconnect is available with or without overcurrent protection:
 - Molded case circuit breakers (MCCB) include thermal-magnetic or electronic trip overcurrent protection (80% rated)
 - Molded case switches (MCSW) do not include overcurrent protection (100% rated) (available on generator disconnect only)
 - Insulated case circuit breakers (ICCB) include electronic trip overcurrent protection (100% rated).
 - Insulated case switches (ICSW) do not include overcurrent protection (100% rated) (available on generator disconnect only)
- Inherent stored-energy design prevents damage if manually switched while in service.
- Heavy duty brushless gear motor and operating mechanism provide mechanical interlocking and extreme long life with minimal maintenance.
- Safe manual operation permits easy operation even under adverse conditions.
- All mechanical and control devices are visible and readily accessible.
- NEMA 1, 3R, 4X and 12 enclosures available
- Padlockable service disconnect control switch
- Status indicators
- Two-position control circuit isolation switch disconnects utility power to the transfer switch controller.

Controller

- Decision-Maker® MPAC 1500

Ratings

| Power Switching Device | Current | Voltage, Frequency |
|------------------------|----------|--------------------|
| Molded case (MCCB) | 200 | 208-240 VAC, 60 Hz |
| | 100-1200 | 208-480 VAC, 60 Hz |
| Insulated Case (ICCB) | 800-4000 | 208-480 VAC, 60 Hz |

Service Disconnect Switch

- Two-position switch with padlockable cover disconnects the normal source and inhibits transfer during maintenance or service.
- Controller display shows SERVICE DISCONNECT.
- Lamp illuminates to indicate that the switch is in the DISCONNECT position.
- Further transfer is inhibited after transfer to Emergency.

Automatic Transfer Switch Controller

The Decision-Maker® MPAC 1500 Automatic Transfer Switch Controller is used on service entrance transfer switch models.

Decision-Maker® MPAC 1500 Controller



- LCD display, 4 lines x 20 characters, backlit
- Complete programming and viewing capability at the door using the keypad and LCD display
- LED indicators: Source available, transfer switch position, service required (fault), and “not in auto”
- Modbus communication is standard
- Programmable voltage and frequency pickup and dropout settings
- Programmable time delays
- Programmable generator exerciser
- Time-based load control
- Current-based load control (current sensing kit required)
- Two programmable inputs and two programmable outputs
- Up to four I/O extension modules available
- RS-485 communication standard
- Ethernet communication standard
- Three-source system
- Prime power

For more information about Decision-Maker® MPAC 1500 features and functions, see specification sheet G11-128.

Codes and Standards

The ATS meets or exceeds the requirements of the following specifications:

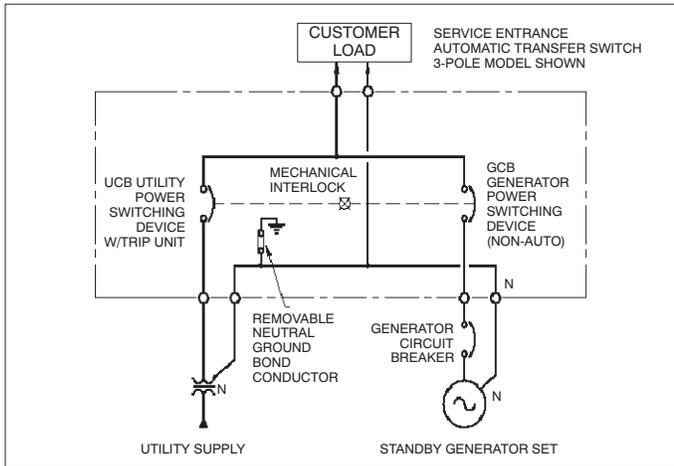
- EN61000-4-4 Fast Transient Immunity Severity Level 4
- EN61000-4-5 Surge Immunity Class 4 (voltage sensing and programmable inputs only)
- IEC Specifications for EMI/EMC Immunity:
 - CISPR 11, Radiated Emissions
 - IEC 1000-4-2, Electrostatic Discharge
 - IEC 1000-4-3, Radiated Electromagnetic Fields
 - IEC 1000-4-4, Electrical Fast Transients (Bursts)
 - IEC 1000-4-5, Surge Voltage
 - IEC 1000-4-6, Conducted RF Disturbances
 - IEC 1000-4-8, Magnetic Fields
 - IEC 1000-4-11, Voltage Dips and Interruptions
- IEC 60947-6-1, Low Voltage Switchgear and Control Gear; Multifunction Equipment; Automatic Transfer Switching Equipment
- IEEE Standard 446, IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
- IEEE 472 (ANSI C37.90A) Ring Wave Test
- NEMA Standard ICS 10-2005, Electromechanical AC Transfer Switch Equipment
- NFPA 70, National Electrical Code
- NFPA 99, Essential Electrical Systems for Health Care Facilities
- NFPA 110, Emergency and Standby Power Systems
- Underwriters Laboratories UL 1008, Standard for Automatic Transfer Switches for Use in Emergency Standby Systems file #58962

Application Data

| Environmental Specifications | |
|------------------------------|-------------------------------|
| Operating Temperature | -15°C to 50°C (5°F to 122°F) |
| Storage Temperature | -20°C to 70°C (-4°F to 158°F) |
| Humidity | 95% noncondensing |

| Auxiliary Position-Indicating Contacts | |
|--|--|
| MCCB Models | Use programmable digital outputs |
| ICCB Models | 3 Normal, 2 Emergency Rated 2.5 A @ 24/48 VDC, 6 A @ 480VAC |

Typical Single-Line Diagram



Ratings

| Interrupting Capacity Current Rating With Integral Overcurrent Protection * | | | | |
|--|---------------------|---------------|----------|---------|
| (No upstream circuit breaker protection required) | | | | |
| Power Switching Device | Switch Rating, Amps | Voltage, Max. | Amps RMS | |
| | | | @ 240 V | @ 480 V |
| Molded case | 100 | 600 | 65,000 | 25,000 |
| | 150 | 600 | | |
| | 200 | 240 | 65,000 | NA |
| | 250 | 600 | 65,000 | 35,000 |
| | 400 | 600 | 65,000 | 50,000 |
| | 600 | | | |
| | 800 | | | |
| | 1000 | | | |
| Insulated case | 1200 | 600 | 100,000 | 100,000 |
| | 800 | | | |
| | 1000 | | | |
| | 1200 | | | |
| | 1600 | | | |
| | 2000 | | | |
| | 2500 | | | |
| 3000 | | | | |
| 4000 | | | | |

* With molded case/insulated case switching devices equipped with integral overcurrent protection.

Automatic Transfer Switch Controller

KOHLER Power Systems

Decision-Maker® MPAC 1500



Model KBS with Decision-Maker® MPAC 1500 Controller

Decision-Maker® MPAC 1500 Controller Standard Features

- Microprocessor-based controller
- Environmentally sealed user interface
- LCD display, 4 lines x 20 characters, backlit
- Dynamic function keypad with tactile feedback pushbuttons allows complete programming and viewing capability at the door
- LED indicators: Source available, transfer switch position, service required (fault), and not in auto
- Broadrange voltage sensing (208-600 VAC) on all phases
- Phase-to-phase sensing and monitoring with 0.5% accuracy on both sources
- Frequency sensing with 0.5% accuracy on both sources
- Anti-single phasing protection
- Phase rotation sensing for three-phase systems
- Real-time clock with automatic adjust for daylight saving time and leap year
- Run time clock and operation counter
- Time-stamped event log
- Fail-safe transfer for loaded test and exercise functions
- DIP switches: password disable and maintenance
- Isolated RS-485 ports for Modbus connections (9.6, 19.2, and 57.6 kbps)
- Standard Ethernet communications with RJ45 connector for 10/100 ethernet connection
- Modbus® RTU and Modbus® TCP/IP protocols (Modbus® register map available)
- USB port. Connect a personal computer and use Kohler® SiteTech™ software to view events and adjust settings *
- Available in automatic and non-automatic versions; see supervised transfer control switch on page 5

Programmable Features

- Programming and monitoring methods:
 - Monitoring and password-protected programming at the door using the keypad and display
 - Program using a PC with Kohler SiteTech software *
- Over/undervoltage and over/underfrequency for all phases of the normal and emergency sources
- Adjustable time delays
- Load/no load/auto-load test and load/no-load exercise functions
- Programmable inputs and outputs
- Load bank control for exercise or test
- Time-based and current-based† load control, nine individual time delays for selected loads
- In-phase monitor (3-phase only)
- Password protection, three security levels

* SiteTech software is available to Kohler-authorized distributors and dealers.

† Requires current sensing kit.

Modbus is a registered trademark of Schneider Electric.

Applicable Models

| Model | Description |
|--|--|
| KCS | Standard-Transition Any Breaker ATS ‡ |
| KCP | Programmed-Transition Any Breaker ATS ‡ |
| KCC | Closed-Transition Any Breaker ATS § |
| KBS | Standard-Transition Bypass/Isolation ATS § |
| KBP | Programmed-Transition Bypass/Isolation ATS § |
| KBC | Closed-Transition Bypass/Isolation ATS § |
| KGS | Standard-Transition Bypass/Isolation ATS § |
| KGP | Programmed-Transition Bypass/Isolation ATS § |
| KEP | Service Entrance ATS § |
| ‡ Available with automatic or non-automatic controller | |
| § Available with automatic controller only | |

Decision-Maker® MPAC 1500 Controller Features

User Interface LED Indicators

- Contactor position: source N and source E
- Source available: source N and source E
- Service required (fault indication)
- Not in automatic mode

LCD Display

- System status
- Line-to-line voltage
- Line-to-neutral voltage
- Active time delays
- Source frequency
- Preferred source selection
- System settings
- Common alarms
- Load current, each phase (current sensing kit required)
- Inputs and outputs
- Faults
- Time/date
- Address
- Event history
- Maintenance records
- Exerciser schedule
- Exerciser mode
- Time remaining on active exercise

Dynamic Function Tactile Keypad Operations

- Scroll up/down/forward/back
- Increase/decrease/save settings
- End time delay
- Start/end test or exercise
- Reset fault
- Lamp test

DIP Switches

- Maintenance mode
- Password disable

Event History

- View time and date-stamped events on the display or on a personal computer equipped with Kohler® SiteTech™ software. *
- Download complete event history files using Kohler SiteTech software and a PC connected to the USB port. *

Main Logic Board Inputs and Outputs

- Two (2) programmable inputs
- Two (2) programmable outputs

* SiteTech software is available to Kohler-authorized distributors and dealers.

† System parameters are factory-set per order.

Modbus is a registered trademark of Schneider Electric.

Communications

- Ethernet communications with RJ-45 connector for 10/100 ethernet connection
- Isolated RS-485 ports for Modbus communications
- Modbus® RTU and Modbus® TCP/IP protocols (Modbus® register map available)
- USB Port. Use SiteTech software to upload or download files and adjust transfer switch settings *
 - Application software
 - Event history files
 - Language files
 - Parameter settings
 - Usage reports
 - Feature configuration

Programmable Features

- System voltage, 208–600 VAC †
- System frequency, 50/60 Hz †
- Single/three-phase operation †
- Standard/programmed/closed-transition operation †
- Bypass/isolation enable/disable †
- Service entrance enable/disable †
- Preferred source selection allows the normal or emergency source to be used when both sources are available (alarm module required)
- Phase rotation: ABC/BAC/none selection with error detection
- Voltage and frequency pickup and dropout settings
- Voltage unbalance, enable/disable
- In-phase monitor: enable/disable and phase angle
- Transfer commit/no commit
- Source/source mode: utility/gen, gen/gen, utility/utility, or utility/gen/gen for 3-source systems
- Passwords, system and test
- Three-source system setup allows the use of one utility source and two generator sets
- Time, date, automatic daylight saving time enable/disable
- Time delays (see table)
- Exerciser: calendar mode, loaded/unloaded up to 21 events
- Test: loaded/unloaded/auto load (1–60 minutes)
- Remote test: loaded/unloaded
- Automatic override on generator failure (loaded test and exercise)
- Peak shave delay enable/disable
- Current monitoring (current sensing kit required)
- Load control pre/post-transfer delays, 9 individual time delays for selected loads
- Current-based load control settings: high/low current levels and load add/remove priority for 9 separate loads (current sensing kit required)
- Prime power sequence alternates between two generator sets with adjustable generator set runtimes
- Resettable historical data

Decision-Maker® MPAC 1500 Controller Features, Continued

Programmable Inputs

- Bypass contactor disable (for bypass/isolation switches)
- Forced transfer to OFF (programmed-transition models only; requires load shed accessory)
- Inhibit transfer
- Low battery voltage (external battery supply module required)
- Peak shave/area protection input
- Remote common fault
- Remote test
- Remote end time delay
- Remotely monitored inputs, four (4) available
- Service disconnect (for service entrance models)
- Three-source system disable

Programmable Outputs

- Alarm silenced
- Audible alarm
- Chicago alarm control
- Common alarm events
- Contactor position
- Exercise active
- Fail to open, source 1/source 2 (service entrance models)
- Fail to close, source 1/source 2 (service entrance models)
- Failure to acquire preferred source
- Failure to acquire standby source
- Failure to transfer
- Generator engine start, source N and E
- I/O module faults
- In-phase monitor synch
- Load bank control
- Load control active (pre/post transfer delay, up to 9 outputs)
- Loss of phase fault, source N and E
- Low battery fault (external battery supply module required)
- Maintenance mode
- Non-emergency transfer
- Not in automatic mode
- Over/underfrequency faults, source N and E (generator)
- Over/undervoltage faults, source N and E
- Peak shave/area protection active
- Phase rotation error, source N and E
- Preferred source supplying load
- Software-controlled relay outputs (four maximum)
- Source available, preferred and standby
- Standby source supplying load
- Test active
- Three-source system disable
- Transfer switch auxiliary contact fault
- Transfer switch auxiliary contact open
- Voltage unbalance, source N and E

| Voltage and Frequency Sensing | | |
|-------------------------------|------------------|------------------|
| Parameter | Default | Adjustment Range |
| Undervoltage dropout | 90% of pickup | 75%-98% |
| Undervoltage pickup | 90% of nominal | 85%-100% |
| Overvoltage dropout * | 115% of nominal* | 106%-135% |
| Overvoltage pickup | 95% of dropout | 95%-100% |
| Unbalance enable | Disable | Enable/Disable |
| Unbalance dropout | 20% | 5%-20% |
| Unbalance pickup | 10% | 3%-18% |
| Voltage dropout time | 0.5 sec. | 0.1-9.9 sec. |
| Underfrequency dropout | 99% of pickup | 95%-99% |
| Underfrequency pickup | 90% of nominal | 80%-95% |
| Overfrequency dropout | 101% of pickup | 101%-115% |
| Overfrequency pickup | 110% of nominal | 105%-120% |
| Frequency dropout time | 3 sec. | 0.1-15 sec. |

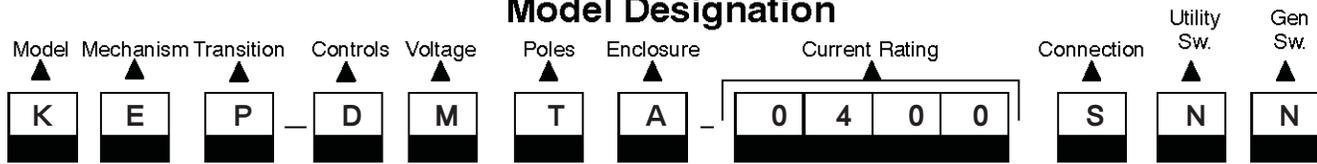
* 690 volts, maximum. Default = 110% for 600 volt applications.

| Adjustable Time Delays | | |
|---|---------|--|
| Time Delay | Default | Adjustment Range |
| Engine start, Source S2 | 3 sec. | 0-6 sec. † |
| Engine start, Source S1 (gen/gen) | 3 sec. | |
| Engine cooldown, Source S2 | 5 min. | 0-60 min. |
| Engine cooldown, S1 (gen/gen) | 5 min. | |
| Fail to acquire standby source | 1 min. | |
| Fail to acquire preferred source | 1 min. | |
| Transfer, preferred to standby | 3 sec. | |
| Transfer, standby to preferred | 15 min. | 1 sec. - 60 min. |
| Transfer, off to standby | 1 sec. | |
| Transfer, off to preferred | 1 sec. | 10 sec - 15 min. |
| Fail to synchronize | 60 sec. | |
| Auto load test termination after transfer | 1 sec. | 1 sec.-60 min. |
| Prime power run duration | 6 min. | 6 min. - 100 days (6 min. increments) |
| Load Control Time Delays: | | |
| Pretransfer to preferred | 0 sec. | 0-60 min. |
| Post-transfer to preferred | 0 sec. | |
| Pretransfer to standby | 0 sec. | |
| Post-transfer to standby | 0 sec. | |
| Load add Source1/Source2 | 0 sec. | |
| Load remove Source1/Source2 | 0 sec. | |
| Note: Time delays are adjustable in 1 second increments, except as noted. | | |
| † Engine start time delay can be extended to 60 minutes with an External Battery Supply Module Kit. | | |

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 Phone 920-457-4441, Fax 920-459-1646
 For the nearest sales and service outlet in the
 US and Canada, phone 1-800-544-2444
 KOHLERPower.com

Kohler Power Systems
 Asia Pacific Headquarters
 7 Jurong Pier Road
 Singapore 619159
 Phone (65) 6264-6422, Fax (65) 6264-6455

Model Designation



Record the transfer switch model designation in the boxes. The transfer switch model designation defines characteristics and ratings as explained below.

Sample Model Designation: KEP-DMTA-0400S-NK

Model

K: Kohler

Mechanism

E: Service Entrance Rated

Transition

P: Programmed

Controller

D: Decision-Maker® MPAC 1500, Automatic

Voltage/Frequency

C: 208 Volts/60 Hz M: 480 Volts/60 Hz
 F: 240 Volts/60 Hz R: 220 Volts/60 Hz
 K: 440 Volts/60 Hz

Number of Poles/Wires

N: 2 Poles/3 Wires, Solid Neutral
 T: 3 Poles/4 Wires, Solid Neutral
 V: 4 Poles/4 Wires, Switched Neutral

Enclosure

A: NEMA 1 C: NEMA 3R
 B: NEMA 12 F: NEMA 4X

Current, Amps

| | | |
|------|------|------|
| 0100 | 0600 | 2000 |
| 0150 | 0800 | 2500 |
| 0200 | 1000 | 3000 |
| 0250 | 1200 | 4000 |
| 0400 | 1600 | |

Connections

S: Standard

Utility Switching Device

M: MCCB w/thermal magnetic trip 100–200 A
 N: MCCB w/electronic trip 250–800 A
 P: MCCB w/electronic trip and GF 1000–1200 A
 R: ICCB w/electronic trip 800 A
 T: ICCB w/electronic trip and GF 1000–4000 A

Generator Switching Device

K: MCSW 100–1200 A
 M: MCCB w/thermal magnetic trip 100–200 A
 N: MCCB w/electronic trip 250–1200 A
 Q: ICSW 800–4000 A
 R: ICCB w/electronic trip 800–4000 A

Note: Some selections are not available for every model.
 Contact your Kohler distributor for availability.

DISTRIBUTED BY:

Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator distributor for availability.

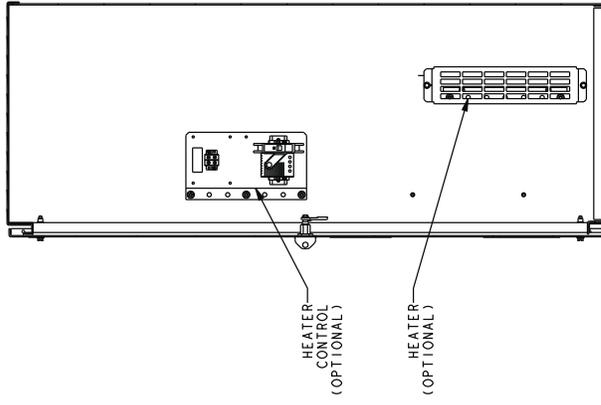
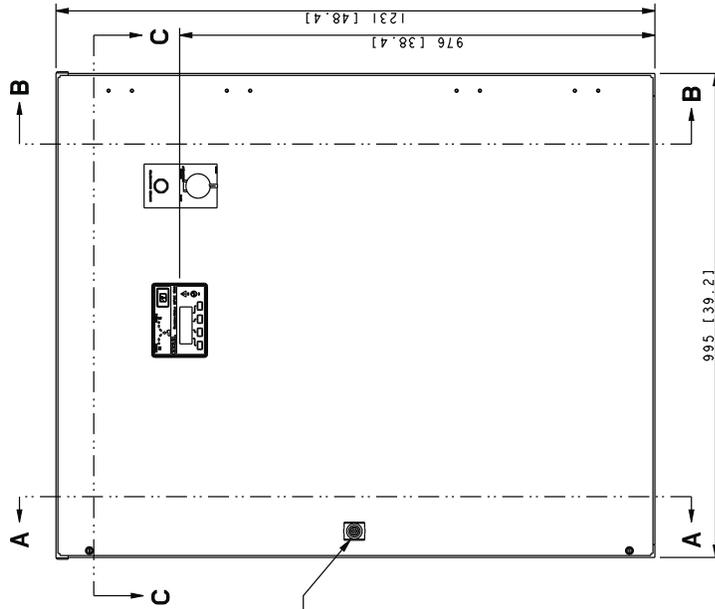
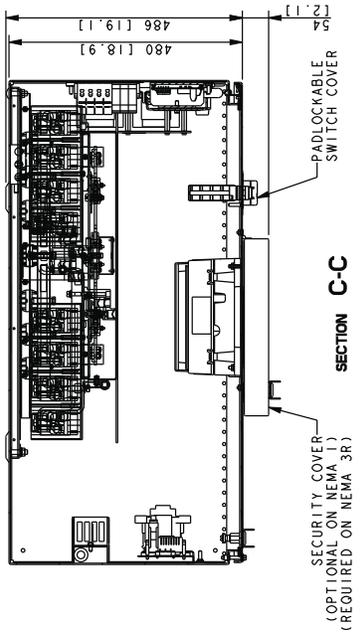
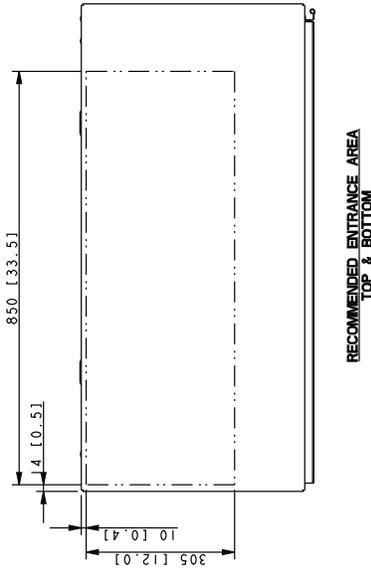
Weights and Dimensions

Weights and dimensions are shown for NEMA type 1 enclosures. Consult the factory for other enclosure types. Weights and dimensions are shown for reference only. Refer to the transfer switch dimension drawing for planning and installation.

| Molded Case Circuit Breaker (MCCB) Models | | | | | | | | |
|--|-------------|-----------------------------|---------------|--------------|--------------|-------------------------|-----------|-----------|
| Model | Amps | Dimensions, mm (in.) | | | | Weight, kg (lb.) | | |
| | | Poles | Height | Width | Depth | 2P | 3P | 4P |
| KEP, MCCB | 400 | 2,3,4 | 1231 (48.4) | 995 (39.2) | 486 (19.1) | 195 (430) | 195 (430) | 195 (430) |

Cable Sizes

| Model | Amps | Cable Sizes, Al/Cu Wire | | |
|--------------|-------------|--|---------------------|--------------------|
| | | Circuit Breaker (per Phase) | Neutral | Ground |
| KEP, MCCB | 400 | (2) 2/0 - 500 KCMIL | (6) 2/0 - 500 KCMIL | (3) #6 - 350 KCMIL |



- NOTES:
1. DIMENSION IN [] ARE INCHES.
 2. FINISH: NEMA 1 & 3R: ANSI 49 GRAY
 3. REFER TO OPERATOR'S MANUAL PRIOR TO INSTALLING SWITCH & OPERATION OF SWITCH.
 4. OMIT CENTER POLE ON 2 POLE SWITCHES.
 5. FOR SEISMIC CERTIFIED UNITS, REFER TO ADV-7456 AND INSTALLATION INSTRUCTIONS.

NOTE:
ALLOW FOR MINIMUM DOOR SWING CLEARANCE OF 1032 [40.7] IN FRONT OF CABINET.

SECTION A-A

SECTION B-B

| REV# | DATE | BY | DESCRIPTION | SCALE | DATE | BY | DESCRIPTION |
|------|---------|-----|-----------------------|-------|---------|-----|-------------|
| 1 | 8-27-13 | NEW | NEW DRAWING (C154441) | | 8-27-13 | MTL | 8-27-13 |
| 2 | | | | | 8-27-13 | MTL | 8-27-13 |

| STYLE | MECHANISM | TRANSITION | MPAC LOGIC | VOLTS | POLES | NEUTRAL | ENCLOSURE | AMPS | CONNECTION |
|----------|-------------|------------|------------|---------|-------|-----------|-----------|---------------|------------|
| KEP MCCB | SERVICE ENT | PROGRAMMED | 1500 | 208-480 | 2-3-4 | SOL ID SW | 1-3R | 400, 600, 800 | STANDARD |

| SEE ADV-8665 FOR FULL MODEL CODE DEFINITION | | | | | | | | | |
|---|-------------|------------|------------|---------|-------|-----------|-----------|---------------|------------|
| STYLE | MECHANISM | TRANSITION | MPAC LOGIC | VOLTS | POLES | NEUTRAL | ENCLOSURE | AMPS | CONNECTION |
| KEP MCCB | SERVICE ENT | PROGRAMMED | 1500 | 208-480 | 2-3-4 | SOL ID SW | 1-3R | 400, 600, 800 | STANDARD |

| KOHLER CO. METRIC PROE | | | | | | | | | |
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| POWER SYSTEMS, KOHLER, WI 53044 U.S.A. | | | | | | | | | |
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| DESIGN OR INVENTION ARE RESERVED. ALL RIGHTS OF | | | | | | | | | |
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Kohler Standby/Prime Generator Set Test Program

Testing is an integral part of quality assurance. In keeping with our uncompromising commitment to quality, safety, and reliability, every Kohler Standby/Prime power generator set undergoes an extensive series of prototype and production testing.

Prototype Testing

Prototype testing includes the potentially destructive tests necessary to verify design, proper function of protective devices and safety features, and reliability expectations. Kohler's prototype testing includes the following:

- Alternator temperature rise test per NEMA MG1-32.6. Standby and prime ratings of the alternator are established during this test.
- Maximum power test to assure that the prime mover and alternator have sufficient capacity to operate within specifications.
- Alternator overload test per NEMA MG1-32.8.
- Steady-state load test to ensure voltage regulation meets or exceeds ANSI C84.1, NEMA MG1-32.17 requirements and to verify compliance with steady-state speed control specifications.
- Transient test to verify speed controls meets or exceeds specifications.
- Transient load tests per NEMA MG1-32.18, and ISO 8528 to verify specifications of transient voltage regulation, voltage dip, voltage overshoot, recovery voltage, and recovery time.
- Motor starting tests per NEMA MG1-32.18.5 to evaluate capabilities of generator, exciter, and regulator system.
- Three-phase symmetrical short-circuit test per NEMA MG1-32.13 to demonstrate short circuit performance, mechanical integrity, ability to sustain short-circuit current.
- Harmonic analysis, voltage waveform deviation per NEMA MG1-32.10 to confirm that the generator set is producing clean voltage within acceptable limits.

Torsional analysis data, to verify torsional effects are not detrimental and that the generator set will provide dependable service as specified, is available upon request.

Kohler offers other testing at the customer's request at an additional charge. These optional tests include power factor testing, customized load testing for specific application, witness testing, and a broad range of MIL-STD-705c testing. A certified test report is also available at an additional charge.

- Generator set cooling and air flow tests to verify maximum operating ambient temperature.
- Reliability tests to demonstrate product durability, followed by root cause analysis of discovered failures and defects. Corrective action is taken to improve the design, workmanship, or components.
- Acoustical noise intensity and sound attenuation effects tests.

Production Testing

In production, Kohler Standby/Prime generator sets are built to the stringent standards established by the prototype program. Every Kohler Generator set is fully tested prior to leaving the factory. Production testing includes the following:

- Stator and exciter winding high-potential test on all generators. Surge transient tests on stators for generators 180 kW or larger. Continuity and balance tests on all rotors.
- One-step, full-load pickup tests to verify that the performance of each generator set, regulator, and governor meets published specifications.
- Regulation and stability of voltage and frequency are tested and verified at no load, 1/4 load, 1/2 load, 3/4 load, and full-rated load.
- Voltage, amperage, frequency and power output ratings verified by full-load test.
- The proper operation of controller logic circuitry, prealarm warnings, and shutdown functions is tested and verified.
- Any defect or variation from specification discovered during testing is corrected and retested prior to approval for shipment to the customer.

KOHLER[®]
POWER SYSTEMS

KOHLER CO. Kohler, Wisconsin 53044
Phone 920-565-3381, Fax 920-459-1646
For the nearest sales/service outlet in the
US and Canada, phone 1-800-544-2444
KohlerPowerSystems.com

Extended Five-Year or Three Thousand (3000)-Hour Comprehensive Stationary Standby Limited Warranty

This Kohler Standby Generator System has been manufactured and inspected with care by experienced craftsmen. If you are the original purchaser, Kohler Co. warrants for five years or three thousand (3000) hours, whichever occurs first, that the system will be free from defects in material and workmanship if properly installed, maintained, and operated in accordance with Kohler Co.'s instruction manuals. A Kohler distributor, dealer, or authorized representative must perform startup.

This warranty is not effective unless a proper extended warranty registration form and warranty fee have been sent to Kohler Co. within one year of supervised startup.

During the warranty period, repair or replacement at Kohler Co.'s option will be furnished free of charge for parts, provided an inspection to Kohler Co.'s satisfaction discloses a defect in material and workmanship, and provided that the part or parts are returned to Kohler Co. or an authorized service station, if requested. This extended warranty expires five full years after date of startup or after 3000 hours of operation, whichever occurs first.

This warranty does not apply to malfunctions caused by damage, unreasonable use, misuse, or normal wear and tear while in your possession.

The following will **not** be covered by this warranty:

1. Normal engine wear, routine tuneups, tuneup parts, adjustments, and periodic service.
2. Damage caused by accidents, improper installation or handling, faulty repairs not performed by an authorized service representative, or improper storage.
3. Damage caused by operation with improper fuel or at speeds, loads, conditions, modifications, or installation contrary to published specifications or recommendations.
4. Damage caused by negligent maintenance such as:
 - a. Failure to provide the specified type and sufficient lubricating oil.
 - b. Failure to keep the air intake and cooling fin areas clean.
 - c. Failure to service the air cleaner.
 - d. Failure to provide sufficient coolant and/or cooling air.
 - e. Failure to perform scheduled maintenance as prescribed in supplied manuals.
 - f. Failure to exercise with load regularly.
5. Original installation charges and startup costs.
6. Starting batteries and the following related expenses:
 - a. Labor charges related to battery service.
 - b. Travel expense related to battery service.
7. Engine coolant heaters, heater controls, and circulating pumps after the first year.
8. Rental of equipment during performance of warranty repairs.
9. Non-Kohler-authorized repair shop labor without prior approval from the Kohler Co. Warranty Department.
10. Parts purchased from sources other than Kohler. Replacement of a failed Kohler part with a non-Kohler part voids warranty on that part.
11. Radiators replaced rather than repaired.
12. Fuel injection pumps not repaired locally by an authorized servicing dealer.
13. Engine fluids such as fuel, oil, or coolant/antifreeze.
14. Shop supplies such as adhesives, cleaning solvents, and rags.
15. Expenses incurred investigating performance complaints unless the problem is caused by defective Kohler materials or workmanship.
16. Maintenance items such as fuses, filters, spark plugs, loose/leaking clamps, and adjustments.

A Startup Notification form must be on file at Kohler Co. A Startup Notification form must be completed by Seller and received at Kohler Co. within 60 days after the date of initial startup. Standby systems not registered within 60 days of startup will automatically be registered by Kohler Co. using the Kohler Co. ship date as the startup date.

To obtain warranty service, call 1-800-544-2444 for your nearest authorized Kohler service representative, or write Kohler Co., Generator Service Department, Kohler, WI 53044 USA.

KOHLER CO. SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND including, but not limited to, incidental consequential labor costs, installation charges, telephone charges, or transportation charges in connection with the replacement or repair of defective parts.

This is our exclusive written warranty. We make no other express warranty, nor is anyone authorized to make any in our behalf.

ANY IMPLIED OR STATUTORY WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS OF PURCHASE, is expressly limited to the duration of this warranty.

Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

KOHLER[®]
POWER SYSTEMS

KOHLER CO. Kohler, Wisconsin 53044
Phone 920-565-3381, Fax 920-459-1646
For the nearest sales/service outlet in the
US and Canada, phone 1-800-544-2444
KohlerPowerSystems.com

Extended Five-Year Comprehensive Transfer Switch Limited Warranty

This Kohler product has been manufactured and inspected with care by experienced craftsmen. If you are the original purchaser, Kohler Co. warrants for five years that the system will be free from defects in material and workmanship if properly installed, maintained, and operated in accordance with Kohler Co. instruction manuals. A Kohler distributor, dealer, or authorized representative must perform startup.

This warranty is not effective unless a proper extended warranty registration form and warranty fee have been sent to Kohler Co. within one year of supervised startup.

During the warranty period, repair or replacement at Kohler Co.'s option will be furnished free of charge for parts, provided an inspection to Kohler Co.'s satisfaction discloses a defect in material and workmanship, and provided that the part or parts are returned to Kohler Co. or an authorized service station, if requested. This extended warranty expires five full years after date of startup.

This warranty does not apply to malfunctions caused by damage, unreasonable use, misuse, or normal wear and tear while in your possession.

The following will **not** be covered by the warranty:

1. Normal wear, periodic service, and routine adjustments.
2. Damage caused by accidents, improper installation or handling, faulty repairs not performed by an authorized service representative, or improper storage.
3. Damage caused by operation above or below rated capacity, voltage, or frequency; modifications; or installation contrary to published specifications, codes, recommendations, and accepted industry practices.
4. Original installation charges and startup costs.
5. Damage caused by negligent maintenance such as:
 - a. Failure to provide a clean, dry environment.
 - b. Failure to perform recommended exercising.
 - c. Failure to perform scheduled maintenance as prescribed in supplied manuals.
 - d. Use of other than factory-supplied or -approved repair parts and/or procedures.
6. Rental of equipment during performance of warranty repairs.
7. Non-Kohler-authorized repair shop labor without prior approval from the Kohler Co. Warranty Department.
8. Expenses incurred investigating performance complaints unless the problem is caused by defective Kohler materials or workmanship.
9. Maintenance items such as fuses, lamps, and adjustments.
10. Transfer switch main contacts.

A Startup Notification form must be on file at Kohler Co. A Startup Notification form must be completed by Seller and received at Kohler Co. within 60 days after the date of initial startup. Product not registered within 60 days of startup will automatically be registered by Kohler Co. using the Kohler Co. ship date as the startup date.

To obtain warranty service, call 1-800-544-2444 for your nearest authorized Kohler service representative or write Kohler Co., Generator Service Department, Kohler, WI 53044 USA.

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FIDELITY ENGINEERING CORPORATION 
KOHLER GENERATOR DIVISION • 25 Loveton Circle • P.O. Box 2500 • Sparks, Maryland 21152 • Telephone 1.800.787.6000 • Fax 410.771.9412

Start-up Procedure

- **Please allow two weeks notice to schedule start up.**
- **Please contact Kim Schnell to schedule start-up:
410-771-9400 or 1-800-787-6000**
- **The fuel tank must be filled with #2 diesel fuel.**
- **All electrical connections to automatic transfer switch, block heater, battery charger, remote annunciator, ect. must be completed prior to start-up.**
- **Engine starting battery (s) will be installed at start up.**

Should you have any questions or require additional assistance please contact Kim Schnell at the above referenced numbers.