FAYDA ENGINEERING & ENERGY SOLUTIONS, LLC

ADDENDUM NO. 2
EMERGENCY GENERATOR AT THE DELAWARE ARMY NATIONAL GUARD
DAGSBORO READINESS CENTER
29757 ARMORY ROAD, DAGSBORO, DE 19939
DE ARNG CONTRACT NO. 2017-003

1.0 This addendum, Addendum No. 2, shall be made part of the Project Manual and Drawings dated November 08, 2017 for the Emergency Generator at the Delaware Army National Guard Dagsboro Readiness Center.

2.0 Sealed bids for DEARNG Contract No. 2017-003 – Dagsboro Readiness Center Emergency Generator, will be received by the Delaware Army National Guard at the Security Officers desk in the Main Lobby of the Biden National Guard/Reserve Center, One Vavala Way, New Castle, Delaware, 19720 until **2:00 PM local time on December 14, 2017,** at which time they will be publicly opened and read aloud in the Multi-Purpose Room. Allow ample time to enter the facility since the site is secure and each vehicle entering the facility will need to pass through security.

3.0 Changes to Specifications

3.1 Section 26 32 14 Emergency/Standby Generator

1. Article 2.6.B.1: CHANGE 3 pole, 200 ampere, mounted main line circuit breaker to 3P-800AF/600AT with LI Adjustable Trip.
2. Article 2.6.B.1: CHANGE average sound level maximum from 69dBA to 75dBA.
3. Article 2.6.B.3: CHANGE to "Enclosure shall be constructed of Aluminum in lieu of Steel."

4.0 Changes to Drawings

4.1 No changes to drawings.

5.0 Substitution Requests

5.1 There was one substitution request from Fidelity Engineering to provide a Kohler generator and automatic transfer switch package. The documentation submitted for review is complete and complies with the specification requirements. As a result, the product substitution shall be considered approved for bidding. A copy of the approved documentation is attached for reference.

6.0 Questions/Clarifications

6.1 No questions or clarifications.

Matthew Galinskie, C.E.A.

MG/mg
17-1251A Dagsboro Generator Addendum #2

Attachments: Kohler Generator Submittal

cc: All Registered Plan Holders

VOSB Veteran Owned Small Business cVE

801 W. Newport Pike, Wilmington, DE 19804
Tel.: 302-999-1060 • Fax: 302-999-1053
www.FaydaEES.com

Model: 150REOZJF

KOHLER. Power Systems

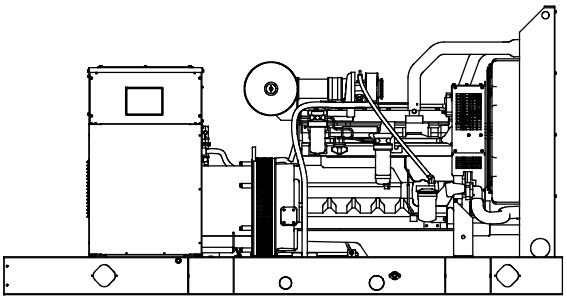
208–600 V **Diesel**

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

Tier 3 EPA-Certified for Stationary Emergency Applications

Ratings Range

		60 Hz
Standby:	**kW**	106–154
	kVA	106–193



Generator Set Ratings

				105°C Rise Standby Rating	
Alternator	**Voltage**	**Ph**	**Hz**	**kW/kVA**	**Amps**
4S13X	120/208	3	60	154/193	534

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 generator set systems and components. Two- and five-year extended limited 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	
4RX, 4SX	12, Reconnectable
4TX	4, 120/240
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 dripproof construction.
- Windings are vacuum-impregnated with 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)
480 V 4S13X (12 lead)	570

Application Data

Engine

Engine Specifications	
Manufacturer	John Deere
Engine model	6068HF285
Engine type	4-Cycle, Turbocharged, Charge Air-Cooled
Cylinder arrangement	6 Inline
Displacement, L (cu. in.)	6.8 (415)
Bore and stroke, mm (in.)	106 x 127 (4.19 x 5.00)
Compression ratio	17.0:1
Piston speed, m/min. (ft./min.)	457 (1500)
Main bearings: quantity, type	7, Replaceable Insert
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	177 (237)
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

Exhaust

Exhaust System	
Exhaust manifold type	Dry
Exhaust flow at rated kW, m^3/min. (cfm)	33.9 (1197)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	510 (950)
Maximum allowable back pressure, kPa (in. Hg)	7.5 (2.2)
Exhaust outlet size at engine hookup, mm (in.)	98 (3.86)

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.)	Electronic, 1.8 (6.0)
Max. fuel flow, Lph (gph)	96.9 (25.6)
Max. return line restriction, kPa (in. Hg)	20 (5.9)
Fuel prime pump	Manual
Fuel filter	
Primary	30 Microns
Secondary	2 Microns @ 98% Efficiency
Water Separator	Yes
Recommended fuel	#2 Diesel

Lubrication

Lubricating System	
Type	Full Pressure
Oil pan capacity, L (qt.)	27.0 (28.5)
Oil pan capacity with filter, L (qt.)	27.9 (29.5)
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_2O)	0.125 (0.5)

* Enclosure with enclosed silencer reduces ambient temperature capability by 5°C (9°F).
Snow package enclosure with enclosed silencer reduces ambient temperature capability by 10°C (18°F).

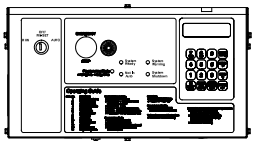
Operation Requirements

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.

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	(See separate 600 volt data sheet.)						

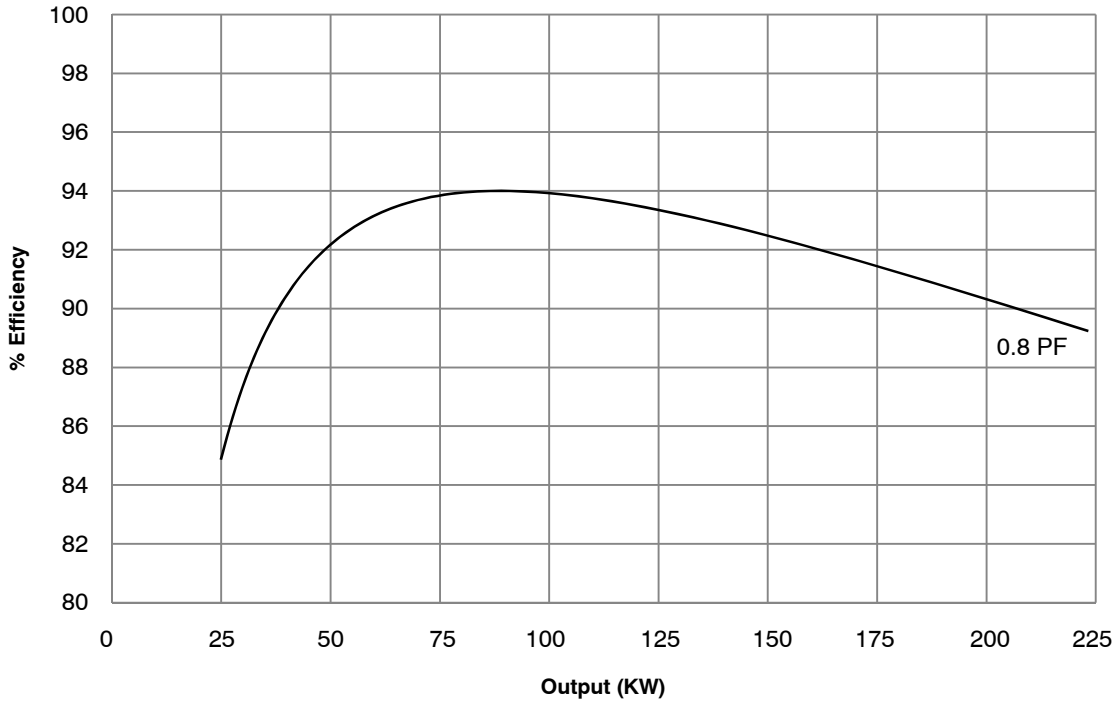
* All data tested in accordance with IEEE Standard 115. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

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

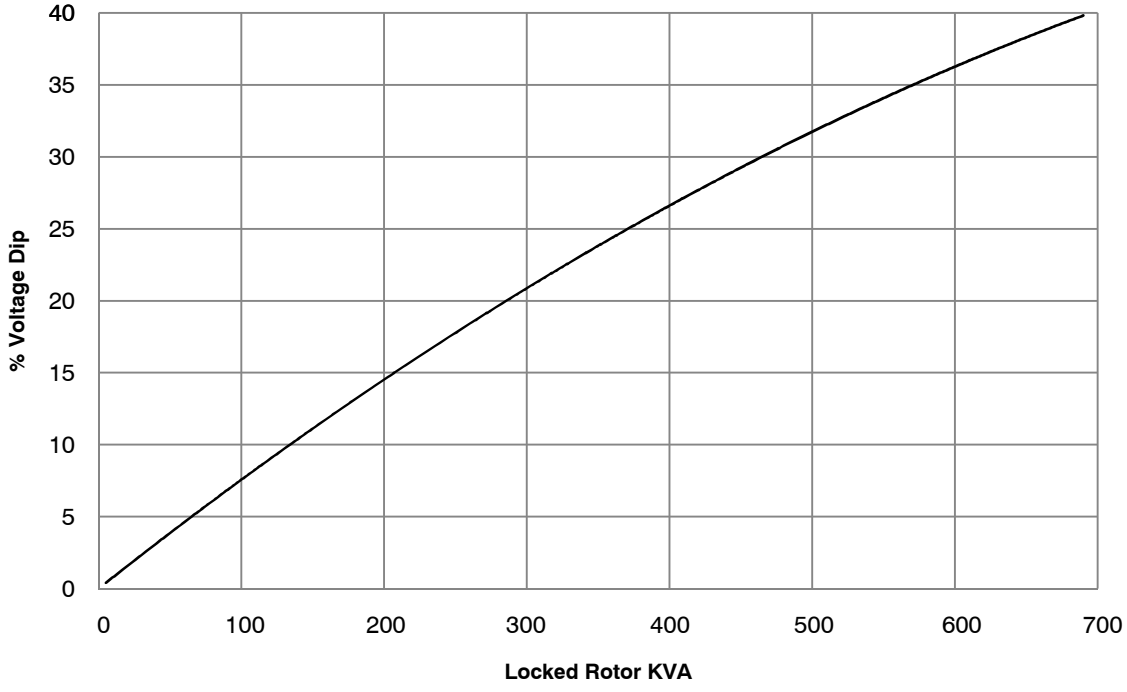
	Symbol	PerUnit	Ohms
Typical Cold Resistances			
Phase Resistance		0.032	0.007
Rotor Resistance		26.43	5.774
Typical Reactances			
Synchronous			
Direct	X_d	4.926	1.076
Quadrature	X_q	2.428	0.530
Transient			
Unsaturated	X'_{du}	0.474	0.104
Saturated	X'_d	0.417	0.091
Subtransient			
Direct	X''_d	0.144	0.031
Quadrature	X''_q	0.143	0.031
Negative Sequence	X_2	0.143	0.031
Zero Sequence	X_0	0.012	0.003

	Symbol	Value
Typical Time Constants		
Armature Short Circuit	T_a	0.011 sec.
Transient Short Circuit	T'_d	0.149 sec.
Transient Open Circuit	T'_{do}	1.759 sec.
Typical Field Current		
Full Load	If_{FL}	21.6 amps
No Load	If_{NL}	3.9 amps
Typical Short Circuit Ratio		0.203
Harmonic Distortion		
RMS Total Harmonic Distortion		3.59%
Max. Single Harmonic		5th
Deviation Factor (No Load, L-L)		<5%
Telephone Influence Factor		<50
Insulation Class		
per NEMA MG1-1.66		H
Phase Rotation		ABC

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

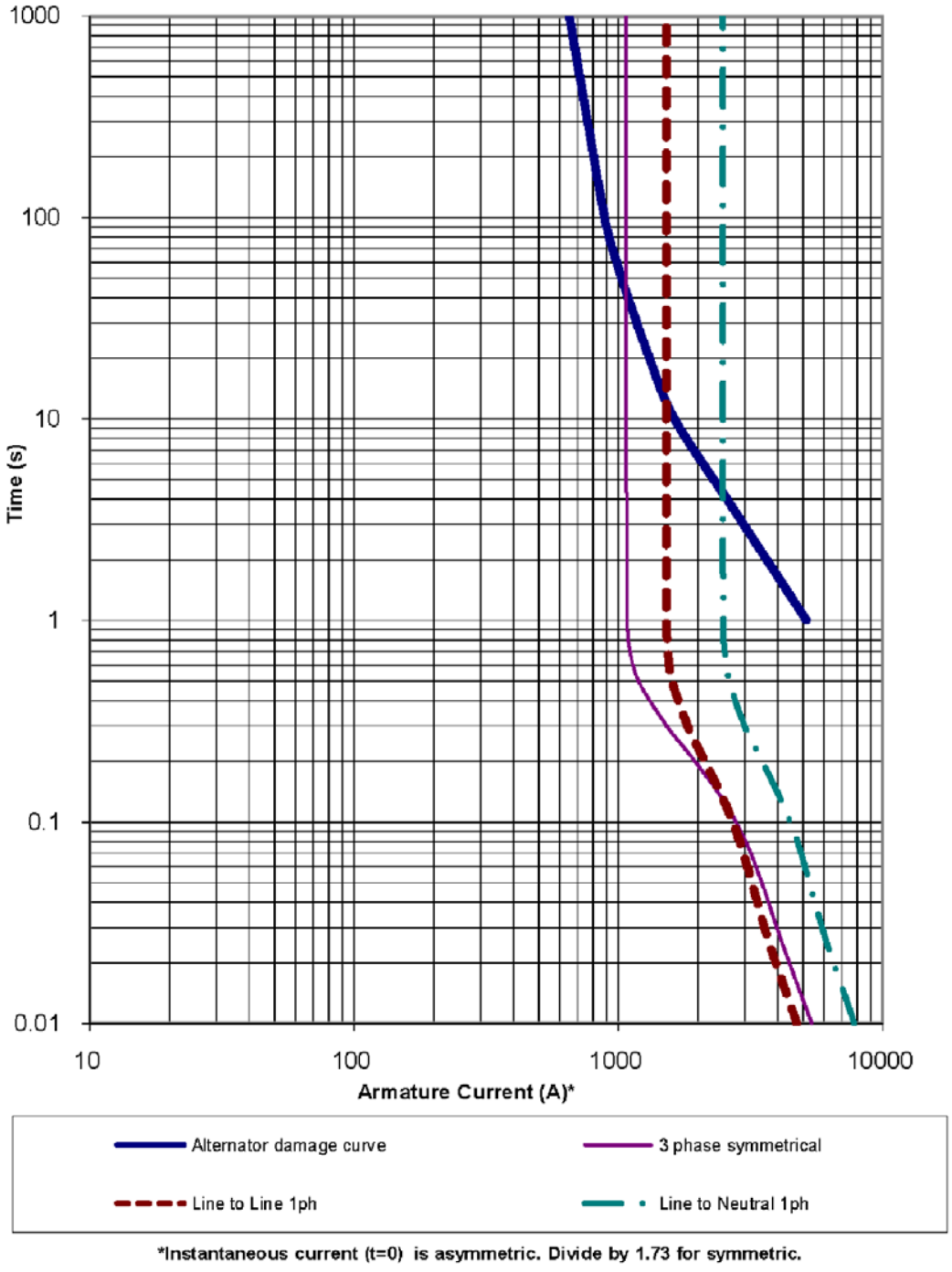


4S13X, 60 Hz, 139/240, 277/480 Volts, Wye
TYPICAL MOTOR STARTING CHARACTERISTICS*



* 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, Low Wye or Delta Connection
SHORT CIRCUIT DECREMENT CURVE



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

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

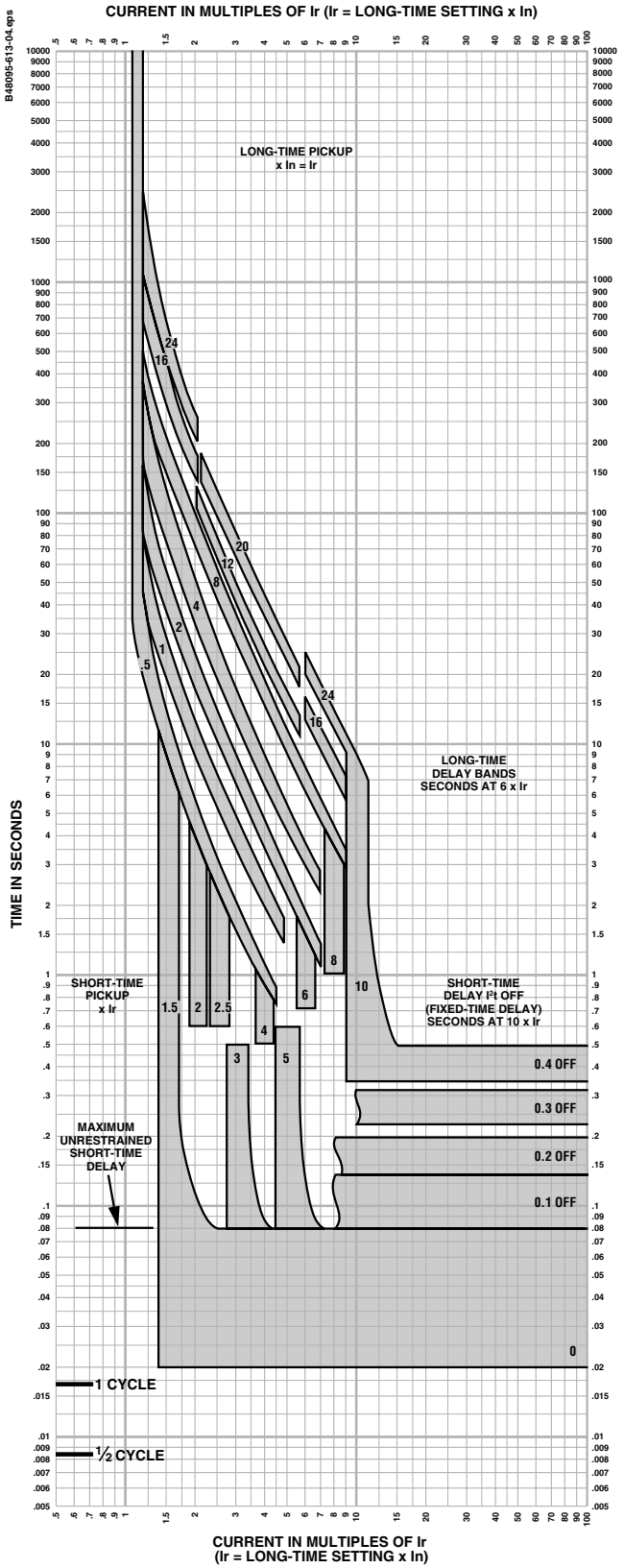
This generator is configured the following circuit breakers manufactured by Square D:

(1) 800 amp – Model: PGP36080CU33A

100% Rated w/ Micrologic 5.0 Electronic Trip Unit

WIRE RANGE: Three 3/0 to 500 kcmil

Micrologic 5.0/6.0 A/P/H Trip Unit Characteristic Trip Curve



Micrologic 5.0/6.0 A/P/H Trip Units

Long-time Pickup and Delay
Short-time Pickup and I^2t OFF Delay

Characteristic Trip Curve No. 613-4

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

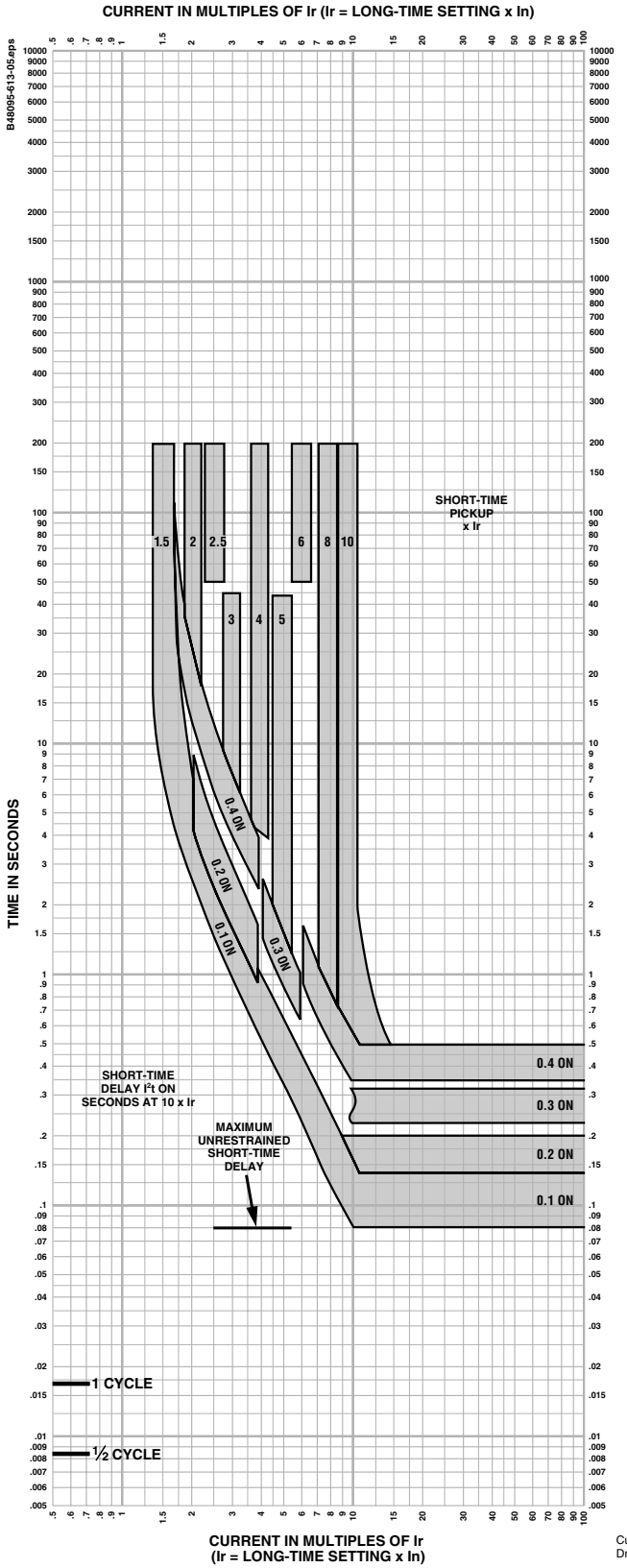
Curves apply from -30°C to +60°C (-22°F to +140°F) ambient temperature.

Notes:

6. 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 twenty minutes is required between overloads to completely reset thermal-imaging.
7. The end of the curve is determined by the interrupting rating of the circuit breaker.
8. With zone-selective interlocking ON, short-time delay utilized, and no restraining signal, the maximum unrestrained short-time delay time band applies regardless of the setting.
9. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
10. For a withstand circuit breaker, instantaneous can be turned OFF. See trip curve 613-7 on page 113 for instantaneous trip curve. See table on page 116 for instantaneous override values.
11. Overload indicator illuminates at 100%.

Curve No. 0613TC0004
Drawing No. B48095-613-04

Micrologic 5.0/6.0 A/P/H Trip Units Characteristic Trip Curve



Micrologic 5.0/6.0 A/P/H Trip Units

Short-time Pickup and I^2t ON Delay

Characteristic Trip Curve No. 613-5

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

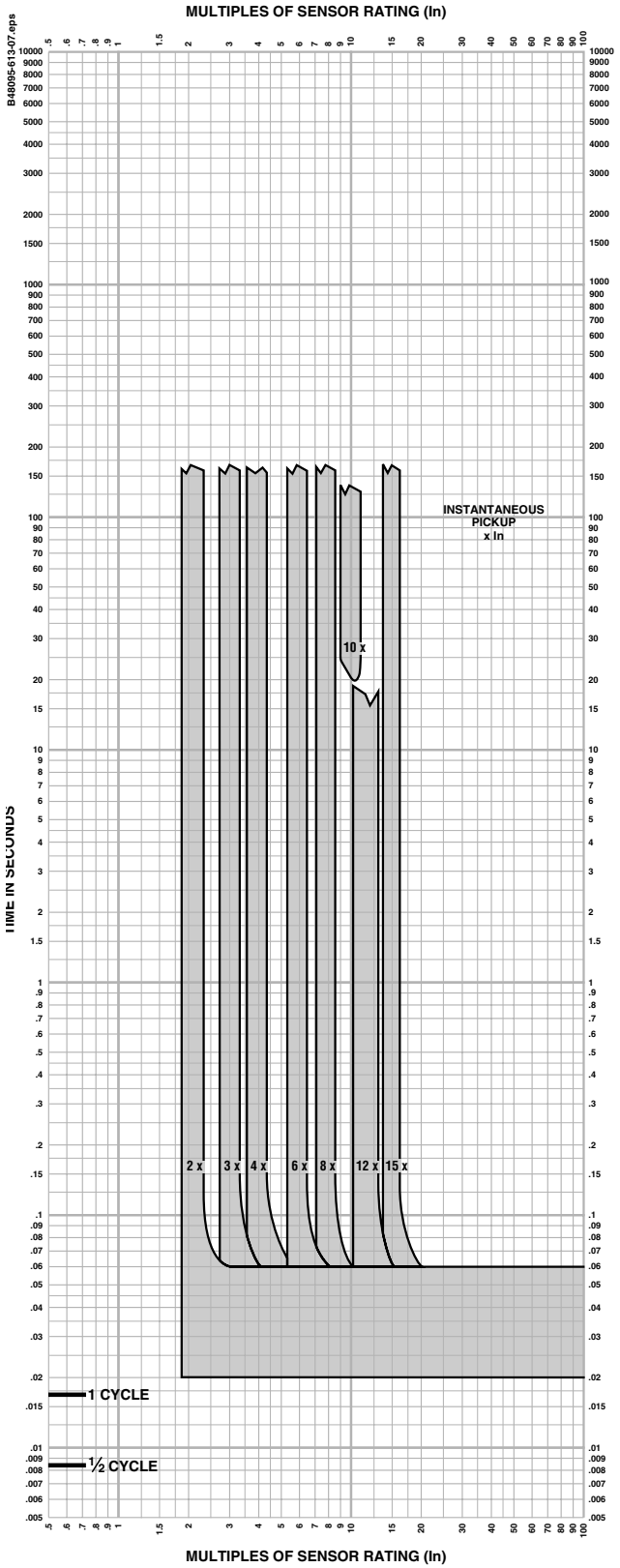
Curves apply from -30°C to +60°C (-22°F to +140°F) ambient temperature.

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 twenty minutes is required between overloads to completely reset thermal-imaging.
2. The end of the curve is determined by the interrupting rating of the circuit breaker.
3. With zone-selective interlocking ON, short-time delay utilized, and no restraining signal, the maximum unrestrained short-time delay time band applies regardless of the setting.
4. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of current.
5. For withstand circuit breaker, instantaneous can be turned OFF. See trip curve 613-7 on page 113 for instantaneous trip curve. See table on page 116 for instantaneous override values.
6. See Trip Curve 613-4 on page 110 for long-time pickup and delay trip curve.

Curve No. 0613TC0005
Drawing No. B48095-613-05

Micrologic 5.0/6.0 Trip Units Characteristic Trip Curve



Micrologic 5.0/6.0 Trip Units

Instantaneous Pickup, 2X to 15X and OFF

Characteristic Trip Curve No. 613-7

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

Curves apply from -30°C to +60°C (-22°F to +140°F) ambient temperature.

Notes:

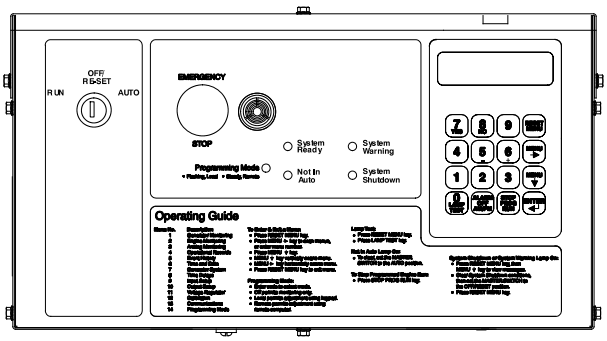
1. The end of the curve is determined by the interrupting rating of the circuit breaker.
2. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of current.
3. The instantaneous region of the trip curve shows maximum total clearing times. Actual clearing times in this region can vary depending on the circuit breaker mechanism design and other factors. The actual clearing time can be considerably faster than indicated. Contact your local sales office for additional information.
4. For a withstand circuit breaker, instantaneous can be turned OFF. See trip curve 613-7 on page 113 for the instantaneous trip curve. See table on page 116 for the instantaneous override values.
5. See trip curve 613-4 on page 110 and trip curve 613-5 on page 111 for long-time pickup, long-time delay, short-time pickup and short-time delay trip curves.

Curve No. 0613TC0007
Drawing No. B48095-613-07

KOHLER. Power Systems

Generator Set Controller

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED



Decision-Maker® 550

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).

Standard Features

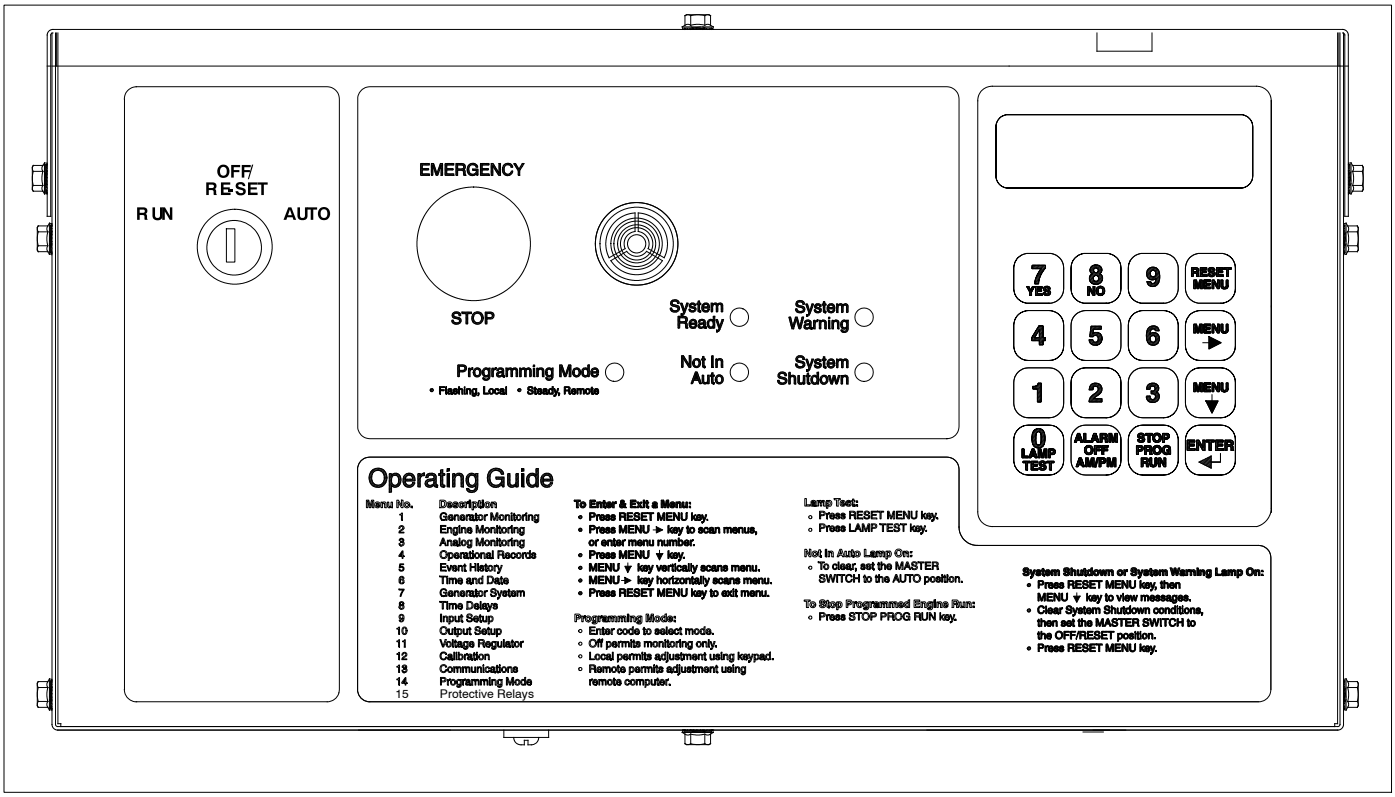
- A digital display and keypad provide access to data. The display provides complete and understandable information, and the keypad allows easy local access.
- Measurements selectable in metric or English units.
- The controller can communicate directly with a personal computer via a network or via a modem configuration.
- The controller supports Modbus® protocol. Use with serial bus or Ethernet networks. (Ethernet requires an external Modbus®/Ethernet converter module.)
- Integrated voltage regulator providing ±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

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 ±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 ±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.

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
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

NOTE: 40–60REOZK (Kohler KDI engines) do not include an ECM as standard equipment. REOZMD/ROZMC (Mitsubishi engines) have an ECM but do not send signals to the generator set controller.

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), ±0.25% accuracy
  - Frequency, ±0.5% accuracy
  - Kilowatts, total per phase (L1, L2, L3), ±0.5% accuracy
  - KVA, total per phase (L1, L2, L3), ±0.5% accuracy
  - KVAR, total absorbing/generating per phase (L1, L2, L3), ±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), ±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 on page 4.

† See Controller Displays as Provided by the Engine ECM on page 4 for display availability.

Modbus® is a registered trademark of Schneider Electric.

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

Weights & Dimensions

Kohler Model 150REOZJF outdoor equipped with a custom sound housing and a 700 gallon sub-base fuel tank

Drawings are not available as the specifications require a custom housing. The custom housing and fuel tank bill of materials has been included after this page.

PRITCHARD BROWN, LLC

QUOTATION

6501 Erdman Avenue
Baltimore, MD 21205
410-483-5600
800-231-2258
Fax 410-483-5695
www.pritchardbrown.com

Customer: FIDELITY ENGINEERING CORP
Address: 25 LOVETON CIRCLE
P.O. BOX 2500
SPARKS, MD 21152
Attention: Lisa Nichols
Email: lnichols@fidelityengineering.com

Reference: DAGSBORO

Quantity: 1
Enclosure Use: Generator 150REOZJF, 150 KW, 208 V
Total Airflow required: 8480 CFM

ENCLOSURE DETAILS

Construction: Per P.B. Specification no. 2130
Dimensions: 156" O.A.L. x 84" O.A.W. x 84" I.H.
Color: Refer to P-B. color chart

Air Intake: 1-Hood, overhung approximately 3 feet
1-Motor Operated Damper

Air Discharge: 1-Hood, overhung approximately 3 feet
1-Gravity Operated Damper

Doors: 2 - Single Door - Padlockable With Panic Hardware

Insulation: 3" Thermal Acoustic

Lining: Mill-Finish Perforated Aluminum

Roof: Muffler Hardware for INTERNAL Exhaust:

- Muffler Brackets
- Muffler Supports
- Rain Shield
- Rain Collar

1 - 6" Diameter Radiator Access Cap

Other:
1 - Removable End Wall
1 - PB Standard Warranty Extended to 5 Years

BASE AND LIFT DETAILS

Base Type:
700 Gallon Capacity Fuel Tank
770 Gallon Rupture Basin
Diamond Plate Finished Floor

Lift Provisions: 4 - Pt. Base Lift Plates

Other:
1 - U.L. 142 Listed Fuel Tank
1 - Tank Vent
1 - U.L. Listed Emerg. Tank Vent
(Pressure Relief Type, Internal)
1 - Cable Stub-Up Opening
1 - External Fuel Fill W/5 Gallon Spill Containment,
Drain, Fuel Gauge, Tank Full Light & Lockable Cover

ELECTRICAL PACKAGE

PRITCHARD-BROWN FURNISHED AND WIRED:

1 - All Wiring in Surface Mounted EMT
1 - Junction Box
1 - Digital Fuel Gauge, High, Low & Rupture Contacts
1 - 4 to 20ma Output Card
1 - Fuel Alarm Annunciator, High/Low Fuel Alarms, #PB-NHS
1 - Inlet Damper Wired to J-Box
1 - LED Red / Green Exterior Indicating Light (Genset Running - Genset Ready)

CUSTOMER FURNISHED, PRITCHARD BROWN WIRED:

1 - Battery Charger A.C. and D.C.
1 - Battery Charger Alarms to J-Box OR Genset
1 - Generator Strip Heater
1 - Jacket Water Heater

SYSTEMS INTEGRATION DETAILS

PRITCHARD-BROWN FURNISHED EQUIPMENT AND SERVICES:

1 - Silencer, 5" Low Profile Super Crit. Cool Series
1 - Exhaust Flex / Elbow
1 - Exhaust Elbow
1 - Exhaust Raincap

1 - Extend Coolant Drain to Exterior
1 - Extend Crankcase Breather Tube to Duct Adapter
1 - Extend Lube Oil Drain to Exterior
1 - Pipe Fuel Tank to Genset
1 - Insulation Blanket for Exhaust Flex / Elbow
1 - Insulation Blanket For Exhaust Elbow

CUSTOMER FURNISHED EQUIPMENT INSTALLED BY PRITCHARD-BROWN:

1 - Genset
1 - Vibration Isolators/Pads
1 - Batteries, Rack, and Cables
1 - Battery Charger

REMARKS

- This quotation is based on specification 26 32 14-3,-5,-10,-16 through -18 and as instructed by our customer. Exceptions have been taken where Pritchard Brown's construction and materials differ from those specified.
- Refer to this quotation and Pritchard Brown (PB) Specification 2130 for general construction, materials and items offered.
- PB’s specifications can be found on our website at: www.pritchardbrown.com
- The enclosure is designed to reduce source noise by an average of 20 dB(A) @ 1 meter to achieve approximately 69 dB(A) @ 7 meters based on a maximum genset source noise of 89 dB(A) @ 7 meters under free-field conditions.
- Inlet damper will be wired for power close/spring open.
- Includes bird/rodent screen on air inlet and discharge openings.

EXCEPTIONS/CLARIFICATIONS

- Enclosure framing members will be 14 gauge; not 12 gauge.
- Exterior skin will be .040", 18 gauge mill prepainted aluminum; not 14 gauge steel.
- Door hardware will be aluminum; not stainless steel.

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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.

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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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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.***

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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.**

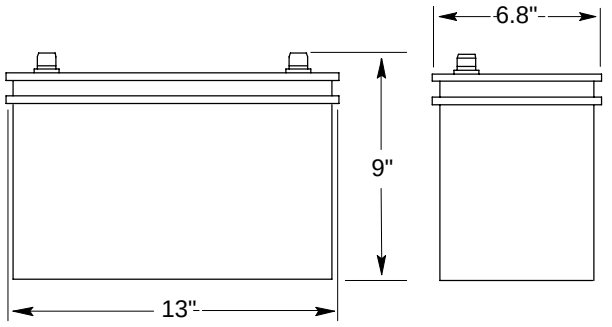
KOHLER POWER SYSTEMS

System Batteries

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

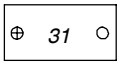
- Kohler Co. selects batteries to meet the engine manufacturer's specifications and to comply with NFPA requirements for engine-cranking cycles.
- Heavy-duty starting batteries are the most cost-effective means of engine cranking and provide excellent reliability in generator set applications.
- Batteries 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.

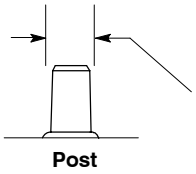
Typical Overall Dimensions



Battery Specifications

Battery Post Layouts





Post

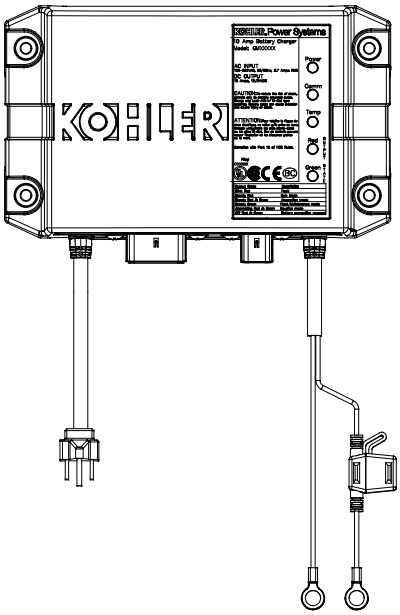
Positive, 17.48 dia.
Negative, 15.88 dia.
15.88 height
1:9 taper

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

KOHLER. Power Systems

12/24 Volt, 10 Amp Automatic Multi-Stage Battery Charger

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED



The battery charger is a fully-automatic, high efficiency battery charger that charges batteries rapidly and safely. The battery charger is designed for an industrial environment.

The battery charger is universal voltage input capable, comes with a standard 120 V/60 Hz AC plug, and charges 12 VDC or 24 VDC battery systems.

Five LED lights indicate power, communication status, temperature compensation status, charge curve, and charger status.

With the optional battery temperature sensor connected, the battery charger can adjust output voltages for optimal charging.

Standard Features

- 12 or 24 VDC output
  - Automatic voltage detection
- Automatic multi-stage charging modes
  - Recovery charge
  - Bulk charge
  - Absorption charge
  - Float charge
  - Equalize charge
- Charges the following type batteries:
  - Flooded lead acid (FLA)
  - AGM
  - Gel cell
  - High performance AGM
  - Nickel-cadmium (NiCad)
- 5 LED status indicators
- Durable potted assembly for waterproofing and vibration resistance
- Reverse-polarity protection
- Short-circuit protection
- Optional temperature compensation (FLA only)
- User adjustable parameters to support optimal manufacturer recommended charge curve.
- Code compliance:
  - UL 1236 Listed
  - NFPA 110, Level 1 compatible (when used with Kohler controller and connected to engine harness)
  - CSA - C22.2 No. 107.2-01
  - FCC - Title 47, Part 15 Class A
  - CE
  - IBC 2015
  - OSHPD

DC Output		AC Input			Shipping Weight	
Volts (Nominal)	Amps	Volts (Nominal)	Amps	**Overall Dimensions** W x D x H	kgs	lbs
12/24	10	100-260	3.7	253 mm x 152 mm x 74 mm (10.0 in x 6.0 in x 2.9 in)	3.6	7.9

KOHLER CO., Kohler, Wisconsin 53044 USA
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
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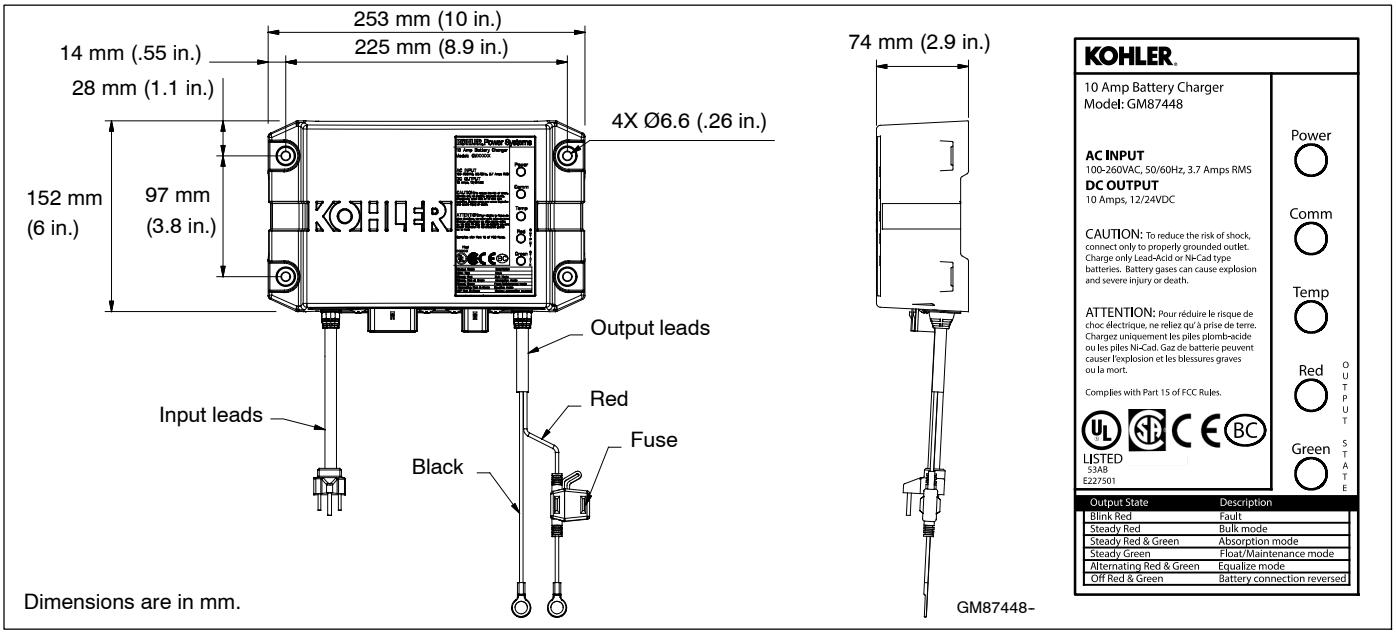

Specifications

AC Input	100–260 VAC
Frequency Input	50/60 Hz
DC Output	10 Amps @ 12 VDC or 10 Amps @ 24 VDC (On battery voltage regulation ±1%)
Fuse Protection	15 amps ATC
Battery Types	Flooded Lead Acid (FLA) AGM Gel Cell High Performance AGM Nickel–Cadmium (NiCad)
Monitoring	
LED Indications	Power Communication Temperature compensation Output charger curve and charger status: ○ Red ○ Green
Environmental	
Operating	–20° to 70°C (–4° to 158° F)
Storage	–40° to 85°C (–40° to 185° F)
Relative Humidity	5 to 95% (non-condensing)
Salt Spray Testing	ASTM B117
Corrosion Resistant	From battery gases

Enclosure	
Environmental Resistant	From rain, snow, dust, and dripping water
Battery Connections	
Lead Length	1.8 m (6 ft.) red and black leads
Battery Connections	9.5 mm (3/8 in.) ring terminals
AC Power Connections	
Lead Length	1.8 m (6 ft.)
Storage	Standard US style 3-prong AC plug
Available Options	
Temperature compensation	

DISTRIBUTED BY:

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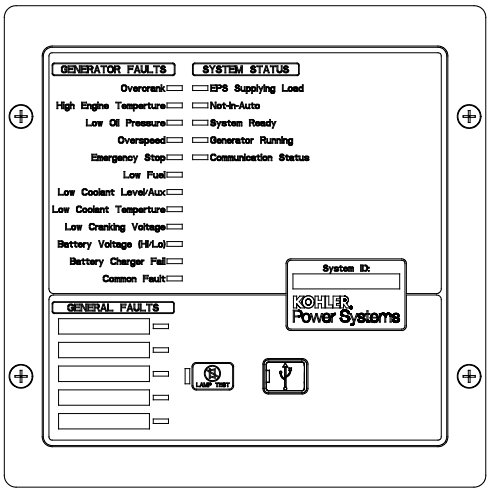
KOHLER. Power Systems

Remote Serial Annunciator III (RSA III)

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED



RSA III

Remote Serial Annunciator III (RSA III) for Kohler® Controllers

- Monitors the generator set equipped with one of the following controllers:
  - KPC 1000
  - Decision-Maker® 3+
  - Decision-Maker® 550
  - Decision-Maker® 3000
  - Decision-Maker® 3500
  - Decision-Maker® 6000
- Configuration via a personal computer (PC) software.
- Writable surfaces (white boxes in illustrations) for user-defined selections.
- Uses Modbus® RTU protocol.
- Controller connections:
  - RS-485 for serial bus network
  - USB port. Connect a personal computer and use Kohler® SiteTech™ software to view events and adjust settings. *
  - 12-/24-volt DC power supply
  - 120/208 VAC power supply (available accessory)
- Meets the National Fire Protection Association Standard NFPA 110, Level 1.

Dimensions

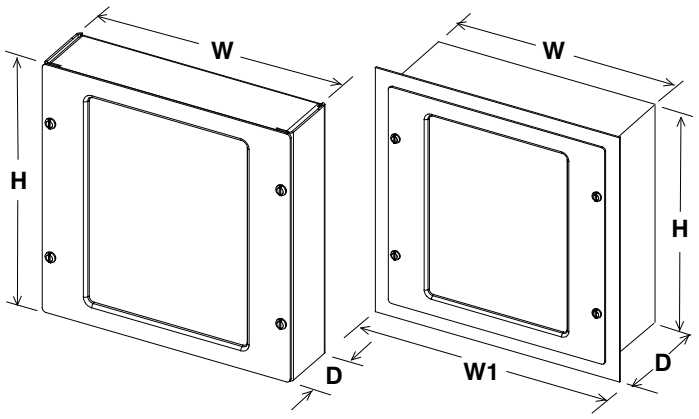
- Dimensions—W x H x D, mm (in.).

  Surface Mounted:
  203 x 203 x 83 (8.0 x 8.0 x 3.3)

  Flush Mounted (Inside Wall):
  203 x 203 x 76 (8.0 x 8.0 x 3.0)
  Flush mounting plate W1: 254 (10.0)

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

Modbus® is a registered trademark of Schneider Electric.



Surface Mounted **Flush Mounted**

Fault and Status Conditions	Fault LEDs	Fault Horn	System Ready LED	Generator Running LED	Communication Status LED
Overcrank Shutdown	Red	On	Red	Off	Green
High Engine Temperature Warning *	Yellow	On	Red	Green	Green
High Engine Temperature Shutdown	Red	On	Red	Off	Green
Low Oil Pressure Warning *	Yellow	On	Red	Green	Green
Low Oil Pressure Shutdown	Red	On	Red	Off	Green
Overspeed Shutdown	Red	On	Red	Off	Green
Emergency Stop *	Red	On	Red	Off	Green
Low Coolant Level/Aux. Shutdown	Red	On	Red	Off	Green
Low Coolant Temperature *	Yellow	On	Red	Off	Green
Low Cranking Voltage	Yellow	On	Red	Off	Green
Low Fuel—Level or Pressure *	Yellow	On	Red	Green or Off	Green
Not-In-Auto	Red	On	Red	Green or Off	Green
Common Fault	Red	On	Green	Green or Off	Green
Battery Charger Fault (1) *	Yellow	On	Red	Green or Off	Green
Battery Charger Fault (2) *	Yellow	On	Green	Green or Off	Green
High Battery Voltage *	Yellow	Off	Green	Green or Off	Green
Low Battery Voltage *	Yellow	Off	Green	Green or Off	Green
User Input #1 (Warning)	Yellow	Off	Green	Green or Off	Green
User Input #1 (Shutdown)	Red	On	Green	Off	Green
User Input #2 (Warning)	Yellow	Off	Green	Green or Off	Green
User Input #2 (Shutdown)	Red	On	Green	Off	Green
User Input #3 (Warning) (1) †	Yellow	Off	Green	Green or Off	Green
User Input #3 (Shutdown) (1) †	Red	On	Green	Off	Green
User Input #4 (Warning) (1)	Yellow	Off	Green	Green or Off	Green
User Input #4 (Shutdown) (1)	Red	On	Green	Off	Green
User Input #5 (Warning) (1)	Yellow	Off	Green	Green or Off	Green
User Input #5 (Shutdown) (1)	Red	On	Green	Off	Green
EPS Supplying Load	Yellow	Off	Green	Green	Green
Communications Status (Fault mode)	—	Off	Green or Red	Green or Off	Red
ATS Fault (RSA III with ATS Controls only)	Red	On	Red or Yellow	Green or Off	Green

Green LEDs appear as steady on when activated.
Yellow LEDs slow flash when activated except steady on with EPS supplying load and high battery voltage.
Red LEDs slow flash when activated except fast flash with loss of communication and not-in-auto.

Specifications

- LED indicating lights for status, warning, and/or shutdown.
- Power source with circuit protection: 12- or 24-volt DC
- Power source with120/208 VAC, 50/60 Hz adapter (option)
- Power draw: 200 mA
- Humidity range: 0% to 95% noncondensing
- Operating temperature range: -20°C to +70°C (-4°F to +158°F)
- Storage temperature range: -40°C to +85°C (-40°F to +185°F)
- Standards:
  - NFPA 110, level 1
  - UL 508 recognized
  - CE directive
  - NFPA 99
  - ENS 61000-4-4
  - EN6II-4-4 fast transient immunity
- RS-485 Modbus® isolated port @ 9.6/19.2/38.4/57.6 kbps (default is 19.2 kbps)
- USB device port
- NEMA 1 enclosure

(1) All generator set controllers except Decision-Maker® 3+ controller.
(2) Decision-Maker® 3+ controller only.
* May require optional kit or user-provided device to enable function and LED indication.
† Digital input #3 is factory-set for high battery voltage on the Decision-Maker® 3+ controller.
Modbus® is a registered trademark of Schneider Electric.

NFPA Requirements

- NFPA 110 compliant
- Engine functions:
  - High battery voltage warning *
  - High engine temperature shutdown
  - High engine temperature warning *
  - Low battery voltage warning *
  - Low coolant level/aux. shutdown
  - Low coolant temperature warning *
  - Low cranking voltage
  - Low fuel warning (level or pressure) *
  - Low oil pressure shutdown
  - Low oil pressure warning *
  - Overcrank shutdown
  - Overspeed shutdown
- General functions:
  - Audible alarm silence
  - Battery charger fault *
  - Lamp test
  - Master switch not-in-auto

Fault and Status LEDs and Lamp Test Switch

Alarm Horn. Horn sounds giving a minimum 90 dB at 0.1 m (0.3 ft.) audible alarm when a warning or shutdown fault condition exists except on high/low battery voltage or EPS supplying load.

Alarm Silenced. Red LED on lamp test switch lights when alarm horn is deactivated by alarm silence switch.

Alarm Silence Switch. Lamp test switch quiets the alarm during servicing. The horn will reactivate upon additional faults.

ATS Fault. Red LED lights when ATS fails to transfer.

Battery Charger Fail. LED lights if battery charger malfunctions. Requires battery charger with alarm contact.

Battery Voltage Hi/Lo. LED flashes if battery or charging voltage drops below preset level. LED lights steady if battery voltage exceeds preset level.

Common Fault. LED lights when a single or multiple common faults occur.

Communication Status. Green LED lights indicating annunciator communications functional. Red LED indicates communication fault.

EPS Supplying Load. LED lights when the Emergency Power System (EPS) generator set is supplying output current (Decision-Maker® 550, 3000, 3500, and 6000 controllers) or when transfer switch is in the emergency position (Decision-Maker® 3+ controller).

Emergency Stop. LED lights and engine stops when emergency stop is made. May require a local emergency stop switch on some Decision-Maker® 3+ controllers.

Generator Running. LED lights when generator set is in operation.

High Engine Temperature. Red LED lights if engine has shut down because of high engine coolant temperature. Yellow LED lights if engine coolant temperature approaches shutdown range. Requires warning sender on some models.

Lamp Test (Switch). Switch tests all the annunciator indicator LEDs and horn.

Low Coolant Level/Aux. LED lights when engine coolant level is below acceptable range on radiator-mounted generator sets only. When used with a Decision-Maker® 3+ controller, the LED indicates low coolant level or an auxiliary fault shutdown. Requires user-supplied low coolant level switch on remote radiator models.

Low Coolant Temperature. LED lights if optional engine block heater malfunctions and/or engine coolant temperature is too low. Requires prealarm sender on some models.

Low Cranking Voltage. LED lights if battery voltage drops below preset level during engine cranking.

Low Fuel (Level or Pressure). LED lights if fuel level in tank approaches empty with diesel models or fuel pressure is low on gas models. Requires customer-supplied switch.

Low Oil Pressure. Red LED lights if generator set shuts down because of insufficient oil pressure. Yellow LED lights if engine oil pressure approaches shutdown range. Requires warning sender on some models.

Not In Auto. LED lights when generator set master switch is in RUN or OFF/RESET position.

Overcrank. LED lights and cranking stops if engine does not start in either continuous cranking or cyclic cranking modes.

Overspeed. LED lights if generator set shuts down because of overspeed condition.

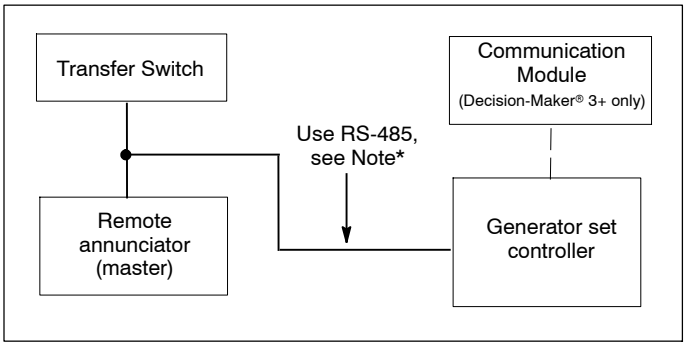
System Ready. Green LED lights when generator set master switch is in AUTO position and the system senses no faults. Red LED indicates system fault.

User-Defined Digital Inputs #1–#5. Monitors five digital auxiliary inputs (warnings or shutdowns). Individual red LEDs flash when a fault occurs or the status changes. User-defined digital inputs are selected via the RSA III master for local or remote (generator set or ATS). The user-defined digital input can be assigned at the controller or via PC using SiteTech™ setup software.

Communications (Shown with RSA III with ATS Controls)

Local Single (Master) Connection

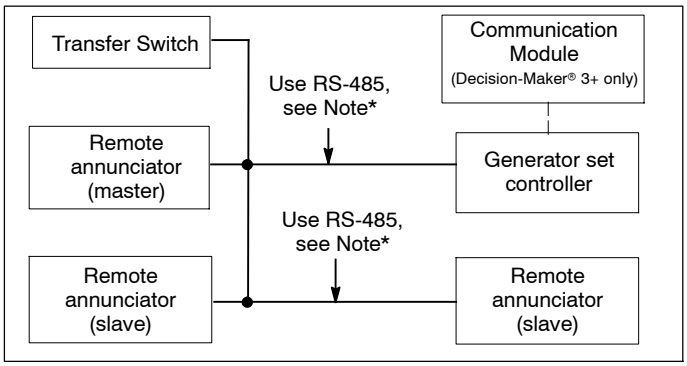
A single RSA III connects directly to the controller's communication port with an RS-485 cable.



Note*: Use RS-485 for a total of up to 1220 m (4000 ft.) maximum from the first device to the last device.

Local Multiple (Master/Slave) Connections

A single RSA III master connects directly to the controller's communication port with an RS-485 cable. Additional RSA III slaves can connect to the single master RSA III. Status of the RSA III master is annunciated on the RSA III slave panel.



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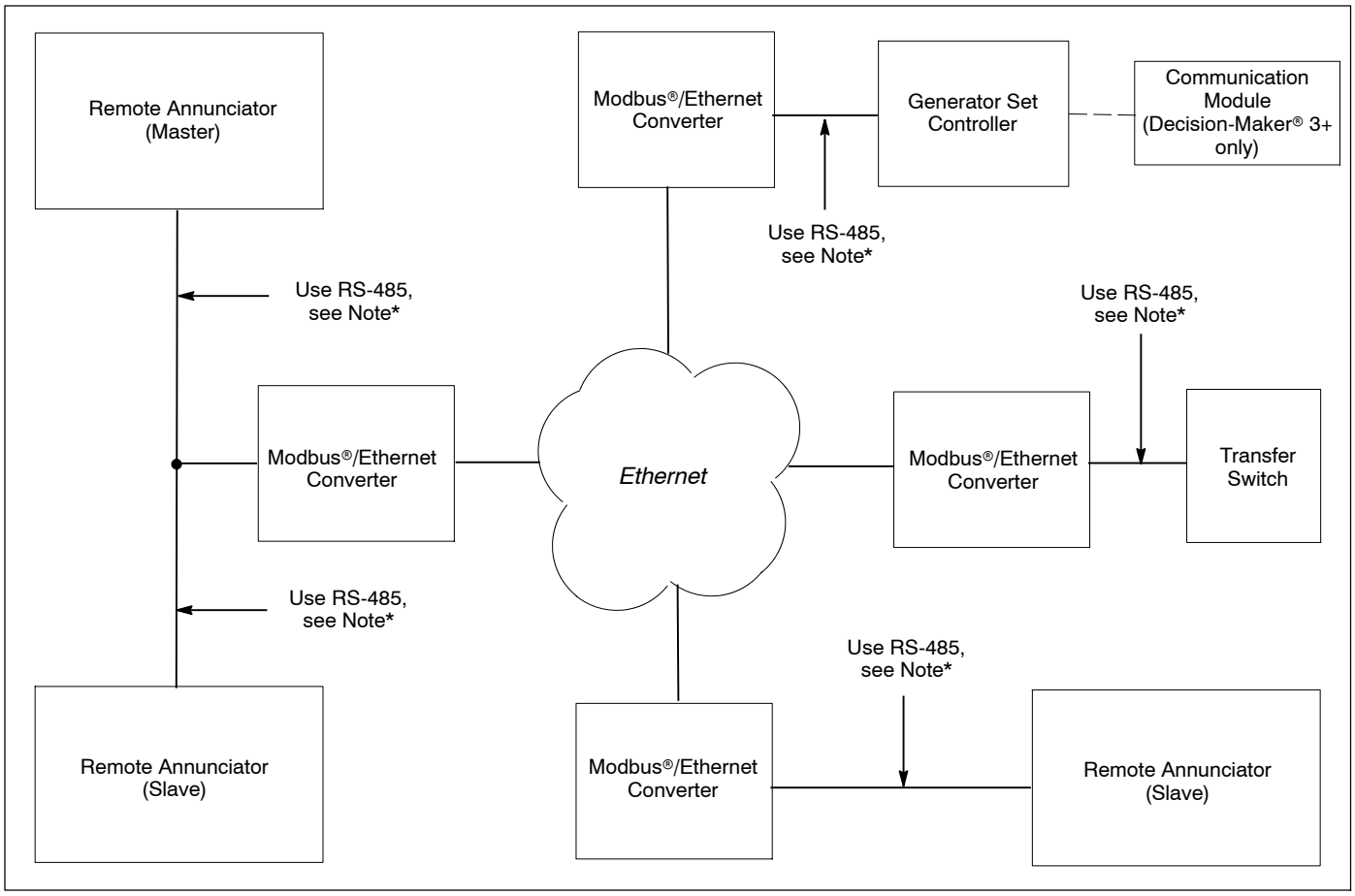
Modbus®/Ethernet, Single Master or Multiple Master/Slave Connections (Shown with RSA III with ATS Controls)

An RSA III master communicates with a controller and RSA III slaves through an Ethernet network. A Modbus®/Ethernet converter is required for each RSA III and controller. RS-485 cable connects the RSA III to the converter. Category 5e (Cat 5e) network cable connects the Modbus®/Ethernet converter to the Ethernet.

Note: Combining RSA III remote annunciators with the RSA II and RSA 1000 is permissible provided that the master remote annunciator is an RSA III remote annunciator.

Note*: Use RS-485 for a total of up to 1220 m (4000 ft.) maximum from the first device to the last device.



KOHLER® POWER SYSTEMS

Converter Modbus®/Ethernet

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

Applicable to the Following Kohler® Controllers:

Generator Set Controllers:
- Decision-Maker® 3+
- Decision-Maker® 340*
- Decision-Maker® 550
- Decision-Maker® 3000
- Decision-Maker® 6000

Automatic Transfer Switch Controllers:
- M340/M340+*
- MPAC™ 1000
- MPAC™ 1500†

RSA II (Remote Serial Annunciator)

RSA 1000 (Remote Serial Annunciator) version 2.00 or higher

PM340 Power Monitor *

* Series 340 devices also require Modbus®/KBUS converter kit GM41143-KP3

† M/E converter is required on the MPAC™ 1500 for SNMP only

Standard Features and Functions

- Converts Modbus® RTU protocol to Modbus® TCP/IP for communication via an Ethernet network
- A single converter can support one or more controllers in an RS-485 network
- Software (included) programs IP address and configures communication parameters
- LEDs indicate status:
  - Power
  - Data received
  - Data transmitted
- NEMA type 1 enclosure
- Standard RJ45 jack for Ethernet connection
- Terminal block for RS-485 Modbus® connection
- Baud rate:
  - Selectable 9600 or 19200 on Modbus® RTU side
  - Standard 10/100 Ethernet
- 12 VDC power required:
  - Universal AC power adapter included
  - Can be powered through the generator set battery
- FCC Class A compliant
- Converter allows connection of RSA 1000 (version 2.00 and higher) or RSA II master and slave devices to an Ethernet network
- Converter allows Simple Network Management Protocol (SNMP) users to poll or issue trap commands for the controllers listed on page 2.

Ethernet Networks

Many facilities use Ethernet networks to connect computers and equipment. The Modbus®/Ethernet converter can be used to connect a single power system device* or network of devices to an existing Ethernet network. Any remote PC connected to that Ethernet network can then monitor the device(s).

A single converter can provide an Ethernet connection to an RS-485 network. See Figure 1. Multiple devices are connected together using RS-485 connections and connected to the Ethernet network through the Modbus®/Ethernet converter. The converter is assigned a unique IP address to identify the connected device or network of devices.

The PC can be located anywhere the site's Ethernet network can be accessed. The PC used to monitor the device(s) must be equipped with a network interface card (NIC). Setting up the Ethernet network and connected computers is the responsibility of the user.

Alternatively, multiple converters can be used to connect individual devices or multiple device networks to the Ethernet. See Figure 2.

Modbus®/Ethernet converters can be used to allow the RSA 1000 or RSA II Remote Serial Annunciators to monitor Decision-Maker® 3+, 550, 3000, or 6000 generator set controllers over an Ethernet network. Use one converter to connect the RSA to the Ethernet network, and a second converter to connect the controller. The converter can also be used to connect RSA slave devices through the Ethernet network.

SNMP Support

Simple Network Management Protocol is used by some network management systems to monitor and/or control managed devices. The Modbus®/Ethernet converter is a managed device that supports SNMP trap commands. This results in reporting faults and events communicated by the following controllers:

- Decision-Maker® 3+ generator set controller
- Decision-Maker® 550 generator set controller
- Decision-Maker® 3000 generator set controller
- Decision-Maker® 6000 generator set controller
- MPAC™ 1000 automatic transfer switch controller
- MPAC™ 1500 automatic transfer switch controller

The network management system can then manage and send this data to an e-mail address or a phone number to alert selected personnel that action may be required.

* A device is any of the generator set controllers, transfer switch controllers, or monitoring devices listed on the first page of this document.

DeviceInstaller Software

DeviceInstaller software is provided with the Modbus®/Ethernet converter kit. Use the software to set the converter's IP address and baud rate at installation. The program also allows configuration of the converter for an RSA 1000 master or slave. Complete instructions are provided with the converter kit.

Converter Specifications

Environmental Specifications	
Operating Temperature:	
Converter module	-40° to 70° C (-40° to 158° F)
Optional AC adapter	0° to 40° C (32° to 104° F)
Storage temperature:	
Converter module	-40° to 85° C (-40° to 185° F)
Optional AC adapter	-20° to 85° C (-4° to 185° F)
Humidity	5% to 95% non-condensing

Application Data	
Connections:	
Modbus RTU	Terminal block †
Ethernet	Standard RJ45 jack ‡
Power:	
Supply voltage	10-30 VDC or 120 VAC §
Maximum power draw	2 W

† Belden #9841 or equivalent shielded twisted-pair cable recommended, not supplied.

‡ Mating connector and cable not supplied

§ Universal AC adapter provided.

Dimensions and Weight			
Dimensions mm (in.)	L *	W	H
	111.1 (4.4)	78.8 (3.1)	31.8 (1.25)
Weight kg (lb.)	0.45 (1 lb.)		

* Length includes 13 mm (1/2 in.) mounting tabs

Ethernet Connections

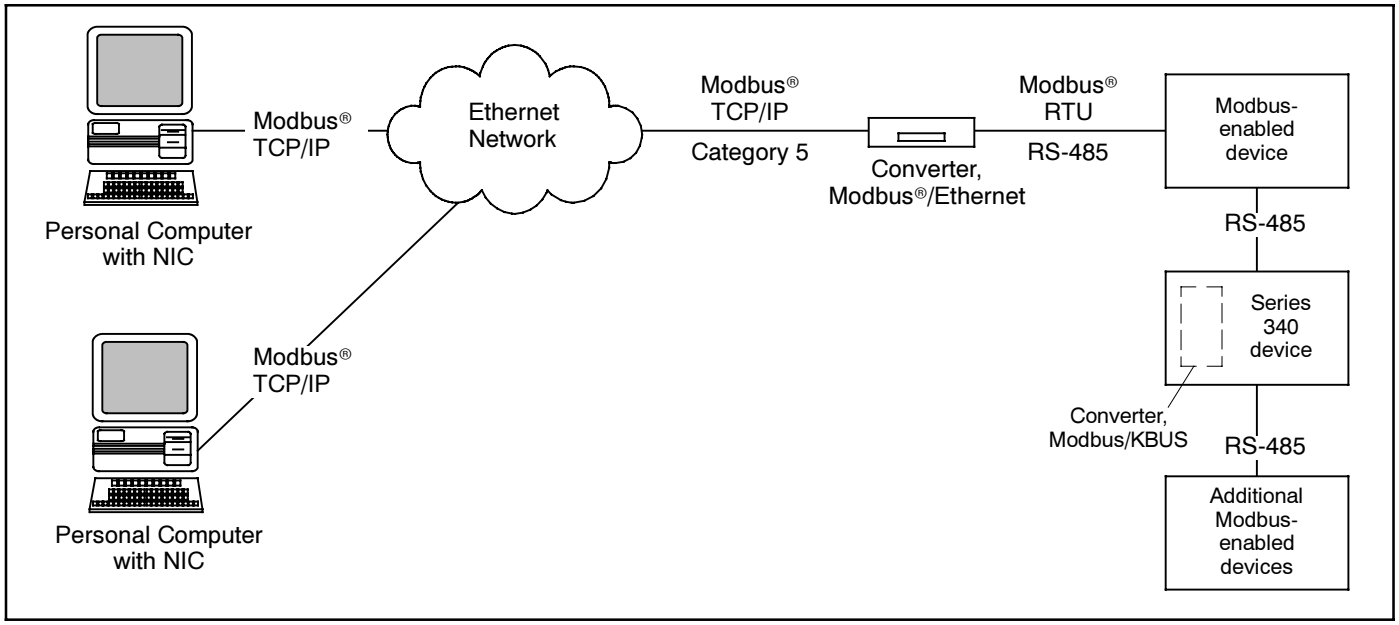


Figure 1 Single Converter Connected to an RS-485 Network

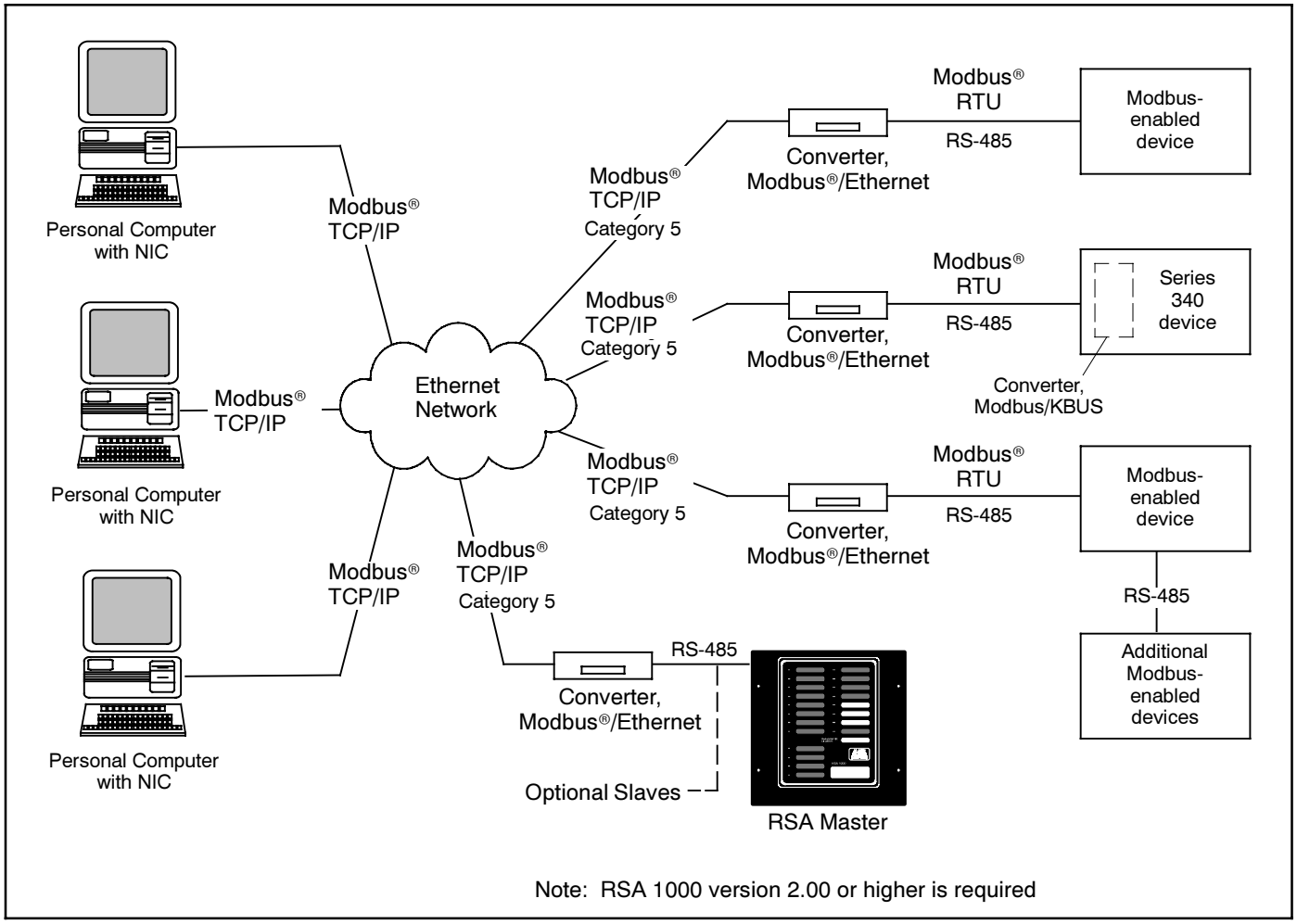


Figure 2 Multiple Converters

KOHLER. Power Systems

Automatic Transfer Switches Service Entrance Rated

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

Controller

- Decision-Maker® MPAC 1500

Ratings

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

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 in accordance with UL 1008
- 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.
- Padlockable service disconnect control switch
- Status indicators
- Two-position control circuit isolation switch disconnects utility power to the transfer switch controller.
- Load shed (Forced transfer from Emergency to OFF). (Customer-supplied signal [contact closure] is required for the forced transfer to OFF function.)
- NEMA 1, 3R, 4X and 12 enclosures are available.

Service Disconnect Switch

- Service disconnect to OFF position
- Two-position switch with padlockable cover disconnects the normal and emergency sources.
- Controller display shows Service Disconnected and the NOT IN AUTO LED flashes.
- Lamp illuminates to indicate that the switch is in the DISCONNECT position.

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 (one programmable input and one programmable output are used for factory connections on these models and are not available for customer connection)
- 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:

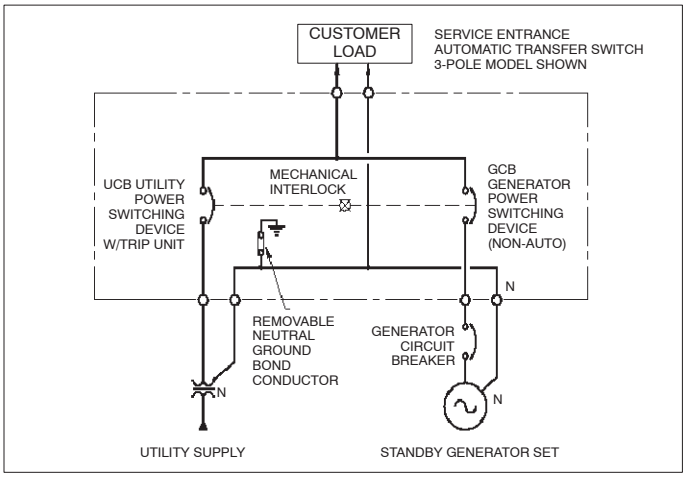
- EN61000-4-4 Fast Transient Immunity Severity Level 4
- EN61000-4-5 Surge Immunity Class 4 (voltage sensing and programmable inputs only)
- IEC Specifications for EMI/EMC Immunity:
  - CISPR 11, Radiated Emissions
  - IEC 1000-4-2, Electrostatic Discharge
  - IEC 1000-4-3, Radiated Electromagnetic Fields
  - 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

Withstand Current Ratings in RMS Symmetrical Amperes *
(No upstream circuit breaker protection required)

Power Switching Device	Switch Rating, Amps	Voltage, Max.	Amps RMS @ 240 V	Amps RMS @ 480 V
Molded case	100	600	65,000	25,000
	150			
	200	**240**	100,000	NA
	250	600	65,000	65,000
	400	600	65,000	50,000
	600			
	800			
Insulated case	800	600	100,000	100,000
	1000			
	1200			
	1600			
	2000			
	2500			
	3000			
	4000			

* With molded case/insulated case switching devices equipped with integral overcurrent protection. (UL 1008 WCR)

KOHLER. Power Systems

Decision-Maker® MPAC 1500

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Model KBS with Decision-Maker® MPAC 1500 Controller

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 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.

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

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

***** 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.

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.	
Transfer, off to standby	1 sec.	1 sec. – 60 min.
Transfer, off to preferred	1 sec.	
Fail to synchronize	60 sec.	10 sec – 15 min.
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.	

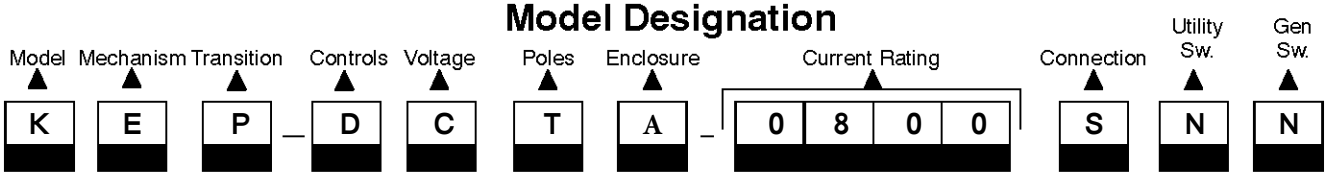
Note: Time delays are adjustable in 1 second increments, except as noted.

† Engine start time delay can be extended to 60 minutes with an External Battery Supply Module Kit.

KOHLER CO., Kohler, Wisconsin 53044 USA
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

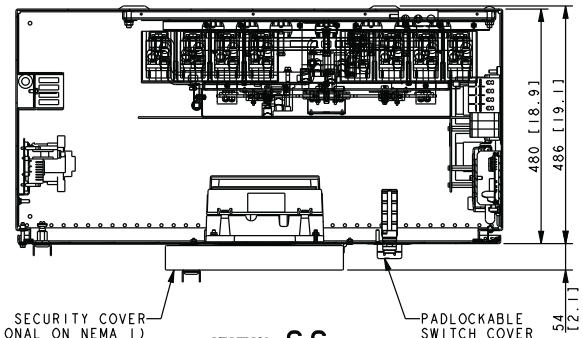
Weights and dimensions are shown for NEMA type 1 enclosures. Consult the factory for other enclosure types. Weights and dimensions are shown for reference only. Refer to the transfer switch dimension drawing for planning and installation.

Molded Case Circuit Breaker (MCCB) Models								
		Dimensions, mm (in.)				Weight, kg (lb.)		
Model	Amps	Poles	Height	Width	Depth	2P	3P	4P
KEP, MCCB	800	2,3,4	1231 (48.4)	995 (39.2)	486 (19.1)	200 (441)	200 (441)	200 (441)

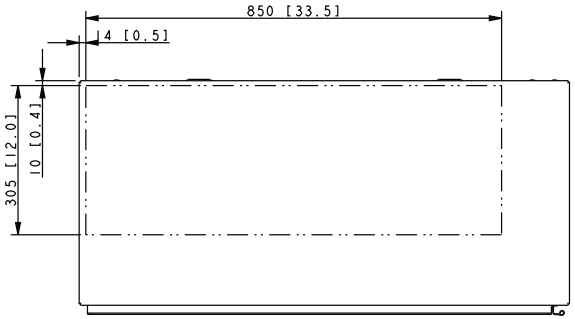
Cable Sizes

		Cable Sizes, Al/Cu Wire		
Model	Amps	Circuit Breaker (per Phase)	Neutral	Ground
KEP, MCCB	800	(3) 2/0 - 500 KCMIL	(9) 2/0 - 500 KCMIL	(3) #6 - 350 KCMIL

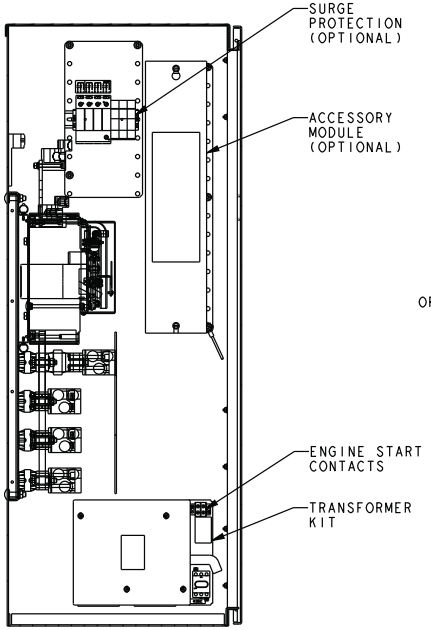
NOTES:
1. DIMENSION IN [ ] ARE INCHES.
2. FINISH:
   NEMA 1 & 3R: ANSI 49 GRAY
3. REFER TO OPERATOR'S MANUAL PRIOR TO INSTALLING SWITCH & OPERATION OF SWITCH.
4. OMIT CENTER POLE ON 2 POLE SWITCHES.
5. FOR SEISMIC CERTIFIED UNITS, REFER TO ADV-7456 AND INSTALLATION INSTRUCTIONS.



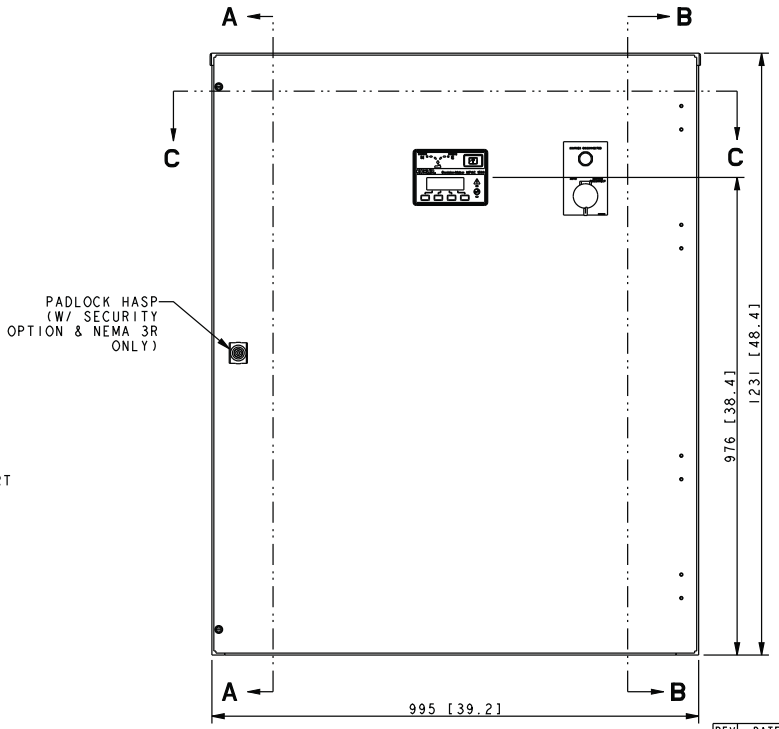
SECTION C-C



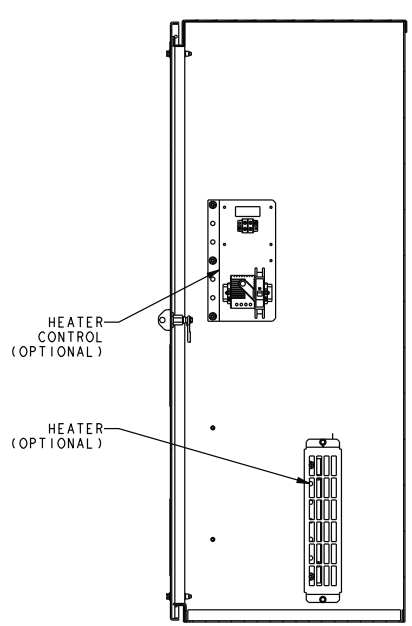
RECOMMENDED ENTRANCE AREA
TOP & BOTTOM



SECTION B-B



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



SECTION A-A

SEE ADV-8565 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	SOLID,SW	1,3R	400,600,800	STANDARD

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	8-27-13	NEW DRAWING [CT54441]	BTW

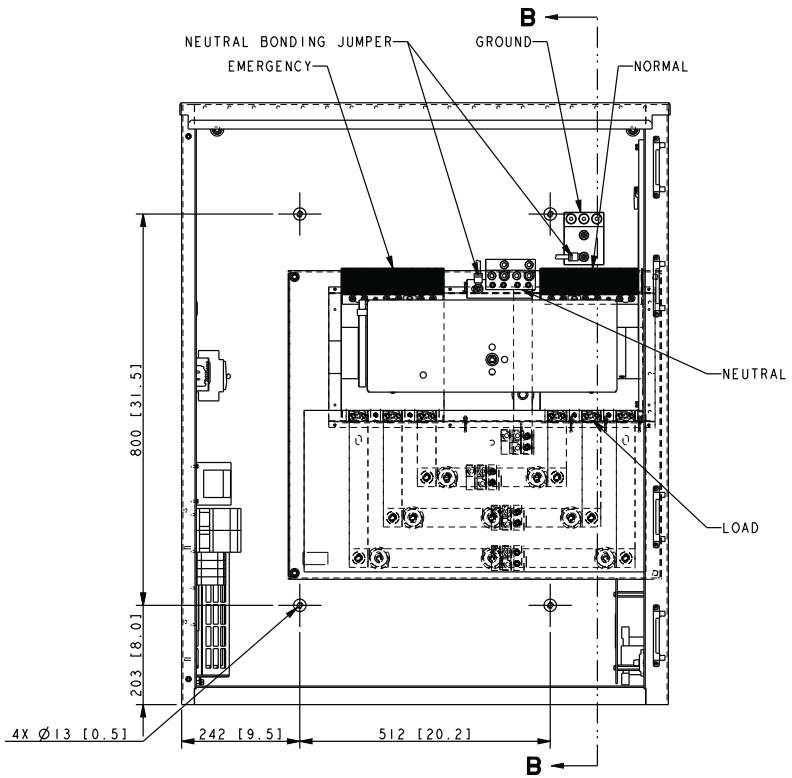
UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30'
SURFACE FINISH √ MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	BTW	8-27-13
CHECKED	BTW	8-27-13
APPROVED	MTL	8-27-13

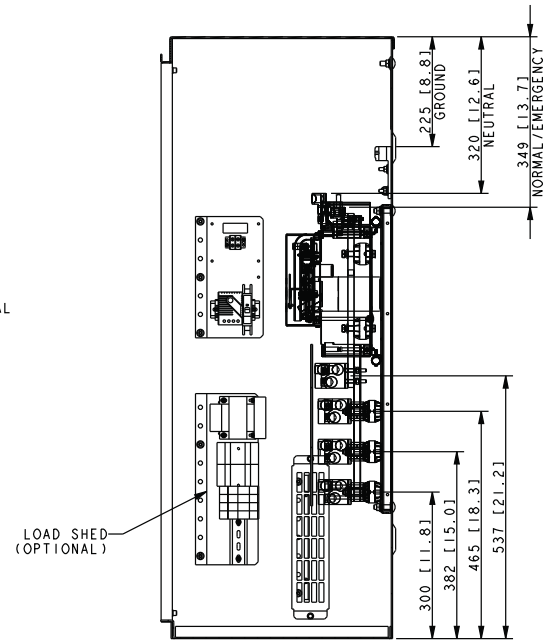
TITLE: DIMENSION PRINT

SCALE 0.20 | CAD NO. | SHEET 1 of 2

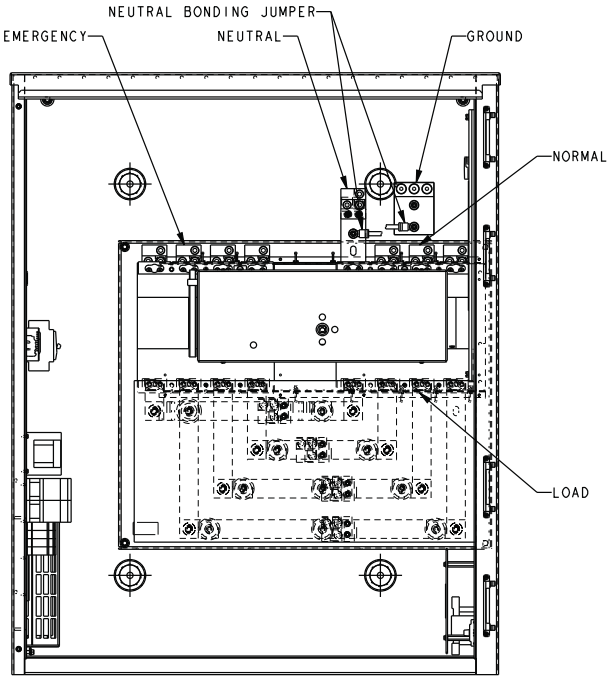
DWG NO. ADV-8614 | D



800 AMP 3 POLE SHOWN
(DOOR REMOVED TO SHOW INTERNAL COMPONENTS)
NOTE: OMIT CENTER POLE ON 2 POLES SWITCHES.



SECTION B-B



800 AMP 4 POLE SHOWN
(DOOR REMOVED TO SHOW INTERNAL COMPONENTS)

SEISMIC MOUNTING NOTE:
FOR SEISMIC CERTIFIED UNITS,
MOUNT WITH THE FOLLOWING HARDWARE:
WALL MOUNTED (STEEL)
Ø9.53 [.375] Dia. SAE GRADE 1/ ASTM A307 BOLTS.
WALL MOUNTED (CONCRETE)
Ø9.53 [.375] Dia. HILTI KWIK BOLT TZ-CS WITH MIN. EMBEDMENT 50.8 [2.00]; EDGE DISTANCE OF 101.6 [4.00] ON A 101.6 [4.00] THICK 4000 PSI CONDRETE WALL. HARDWARE TO COMPLY WITH SPECIFICATIONS ON ADV-7456.

SERVICE DISCONNECT BREAKERS ARE 80% RATED. CONTINUOUS LOAD CURRENT IS NOT TO EXCEED 80% OF BREAKER RATING.

SCREW TYPE TERMINALS FOR EXTERNAL POWER CONNECTIONS			
SWITCH RATING (AMPS)	RANGE OF AL/CU WIRE SIZE		
	CIRCUIT BREAKER PER PHASE	NEUTRAL	GROUND
400	(2) 2/0-500 KCMIL	(6) 2/0-500 KCMIL	(3) #6-350 KCMIL
600	(2) 2/0-500 KCMIL	(6) 2/0-500 KCMIL	(3) #6-350 KCMIL
800	(3) 2/0-500 KCMIL	(9) 2/0-500 KCMIL	(3) #6-350 KCMIL

APPROX. WEIGHTS KG (LBS)			
AMPS	2 POLE	3 POLE	4 POLE
400	195 [430]	195 [430]	195 [430]
600	200 [441]	200 [441]	200 [441]
800	200 [441]	200 [441]	200 [441]

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	8-27-13	NEW DRAWING [CT54441]	BTW

UNLESS OTHERWISE SPECIFIED: [1] DIMENSIONS ARE IN MILLIMETERS [2] TOLERANCES ARE: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0° 30' MAX. SURFACE FINISH. THIRD ANGLE PROJECTION

APPROVALS	DATE
DRAWN BTW	8-27-13
CHECKED BTW	8-27-13
APPROVED MTL	8-27-13

TITLE: **DIMENSION PRINT**

SCALE 0.20 | CAD NO. | SHEET 2 of 2

DWG NO. **ADV-8614** | **D**

ENCLOSURE BACK PANEL

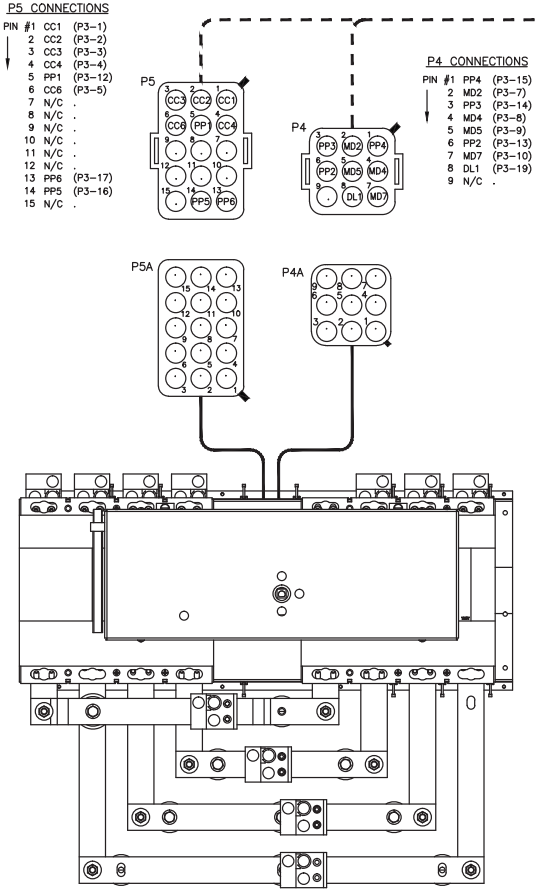
REV	DATE	REVISION	BY
–	12-4-13	NEW DRAWING [CT70293]	DFS

P5 CONNECTIONS

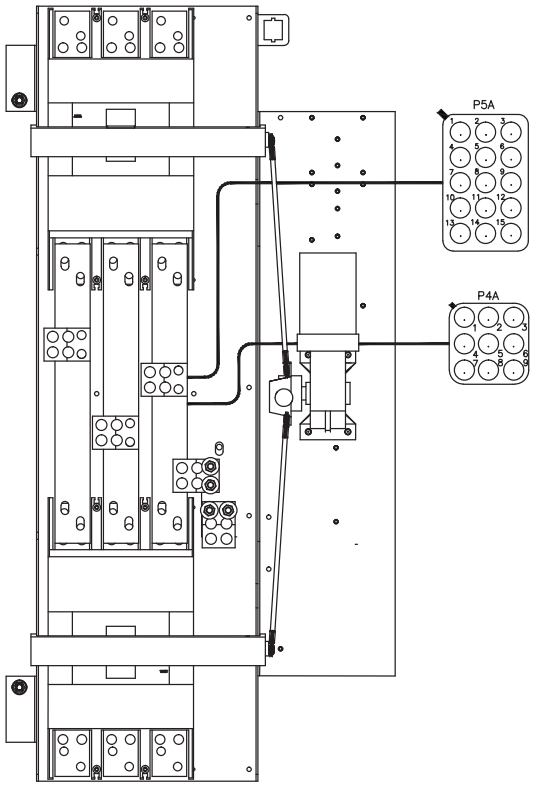
PIN		
#1	CC1	(P3-1)
2	CC2	(P3-2)
3	CC3	(P3-3)
4	CC4	(P3-4)
5	PP1	(P3-12)
6	CC6	(P3-5)
7	N/C	.
8	N/C	.
9	N/C	.
10	N/C	.
11	N/C	.
12	N/C	.
13	PP6	(P3-17)
14	PP5	(P3-16)
15	N/C	.

P4 CONNECTIONS

PIN		
#1	PP4	(P3-15)
2	MD2	(P3-7)
3	PP3	(P3-14)
4	MD4	(P3-8)
5	MD5	(P3-9)
6	PP2	(P3-13)
7	MD7	(P3-10)
8	DL1	(P3-19)
9	N/C	.



100–800 AMP MECHANISM
(4P, 800A UNIT SHOWN)



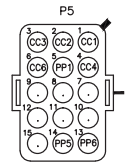
1000–1200 AMP MECHANISM

P4 CONNECTIONS

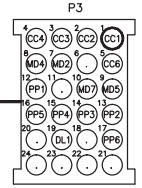
PIN		
#1	PP4	(P3-15)
2	MD2	(P3-7)
3	PP3	(P3-14)
4	MD4	(P3-8)
5	MD5	(P3-9)
6	PP2	(P3-13)
7	MD7	(P3-10)
8	DL1	(P3-19)
9	N/C	.

P5 CONNECTIONS

PIN		
#1	CC1	(P3-1)
2	CC2	(P3-2)
3	CC3	(P3-3)
4	CC4	(P3-4)
5	PP1	(P3-12)
6	CC6	(P3-5)
7	N/C	.
8	N/C	.
9	N/C	.
10	N/C	.
11	N/C	.
12	N/C	.
13	PP6	(P3-17)
14	PP5	(P3-16)
15	N/C	.



GM71484 HARNESS REF.



(TO TRANSFORMER PANEL SHEET 2)

P3 CONNECTIONS

PIN		
#1	CC1	(P5-1)
2	CC2	(P5-2)
3	CC3	(P5-3)
4	CC4	(P5-4)
5	CC6	(P5-6)
6	N/C	.
7	MD2	(P4-2)
8	MD4	(P4-4)
9	MD5	(P4-5)
10	MD7	(P4-7)
11	N/C	.
12	PP1	(P5-5)
13	PP2	(P4-6)
14	PP3	(P4-3)
15	PP4	(P4-1)
16	PP5	(P5-14)
17	PP6	(P5-13)
18	N/C	.
19	DL1	(P4-8)
20	N/C	.
21	N/C	.
22	N/C	.
23	N/C	.
24	N/C	.

MODEL KEP
100–1200A
SERVICE ENTRANCE
PROGRAMMED TRANSITION
FOR SCHEMATIC DIAGRAM SEE GM89725

UNLESS OTHERWISE SPECIFIED – DIMENSIONS ARE IN INCHES – TO TOLERANCES AS: .XX ± .010, .XXX ± .005, FRACTIONS ± 1/64, ANGLES ± 1/2°, SURFACE FINISH 125 MAX

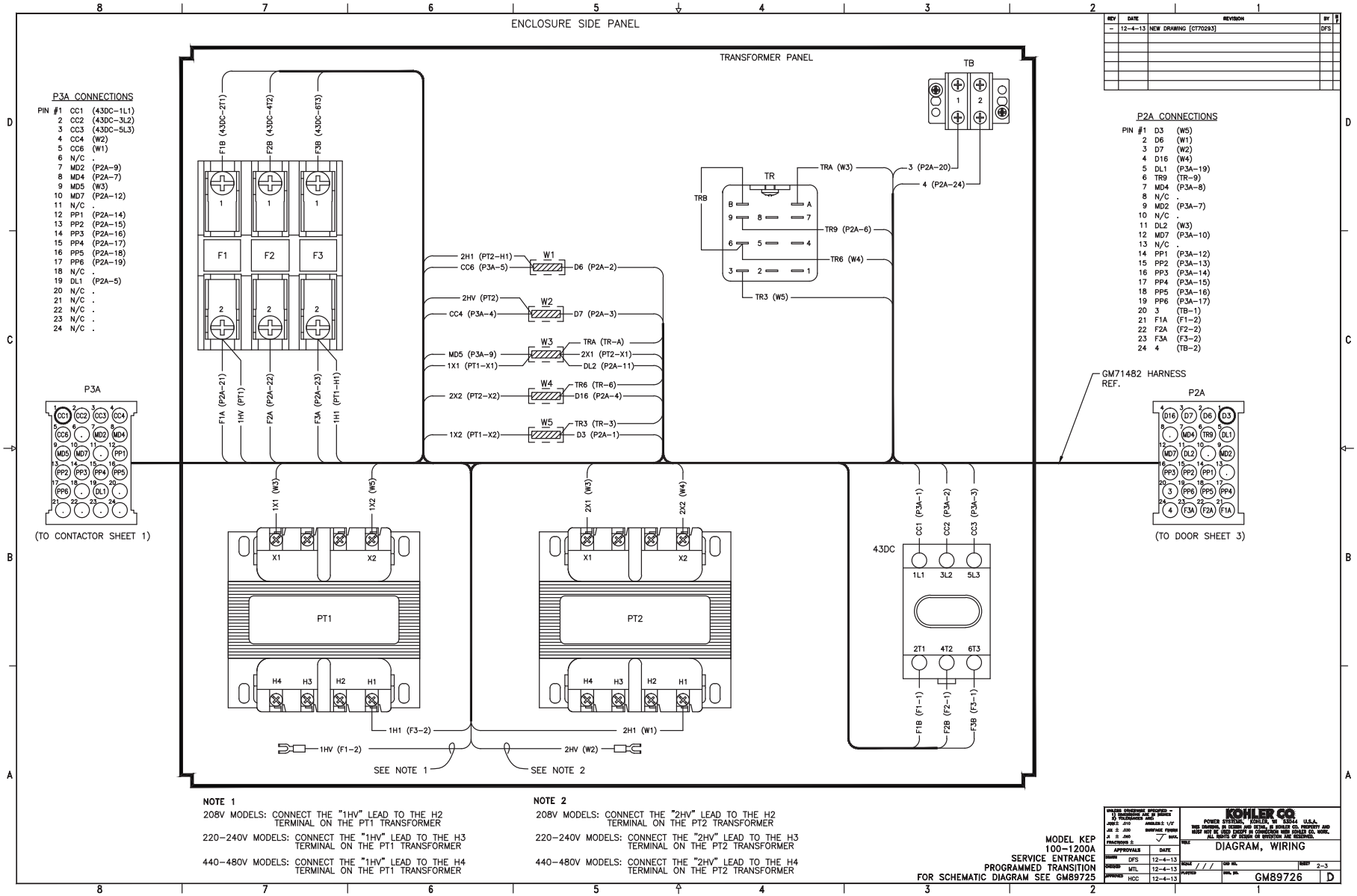
APPROVALS		DATE
DRAWN	DFS	12-4-13
CHECKED	MTL	12-4-13
APPROVED	HCC	12-4-13

KOHLER CO.
POWER SYSTEMS KOHLER, WI 53044 U.S.A.

TITLE: DIAGRAM, WIRING

SCALE: /// | DWG NO. | SHEET 1-3

PLANNED | DWG. NO. GM89726 | D



REV	DATE	REVISION	BY
–	12-4-13	NEW DRAWING [CT70293]	DFS

NOTE 1

208V MODELS: CONNECT THE "1HV" LEAD TO THE H2 TERMINAL ON THE PT1 TRANSFORMER

220–240V MODELS: CONNECT THE "1HV" LEAD TO THE H3 TERMINAL ON THE PT1 TRANSFORMER

440–480V MODELS: CONNECT THE "1HV" LEAD TO THE H4 TERMINAL ON THE PT1 TRANSFORMER

NOTE 2

208V MODELS: CONNECT THE "2HV" LEAD TO THE H2 TERMINAL ON THE PT2 TRANSFORMER

220–240V MODELS: CONNECT THE "2HV" LEAD TO THE H3 TERMINAL ON THE PT2 TRANSFORMER

440–480V MODELS: CONNECT THE "2HV" LEAD TO THE H4 TERMINAL ON THE PT2 TRANSFORMER

MODEL KEP
100–1200A
SERVICE ENTRANCE
PROGRAMMED TRANSITION
FOR SCHEMATIC DIAGRAM SEE GM89725

UNLESS OTHERWISE SPECIFIED – DIMENSIONS ARE IN INCHES. TO FOLLOWINGS ARE: .XX ± .010, .XXX ± .005, ANGLES ± 1/2°, SURFACE FINISH 125 MAX., FRACTIONS ±

APPROVALS	DATE
DRAWN DFS	12-4-13
CHECKED MTL	12-4-13
APPROVED HCC	12-4-13

KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

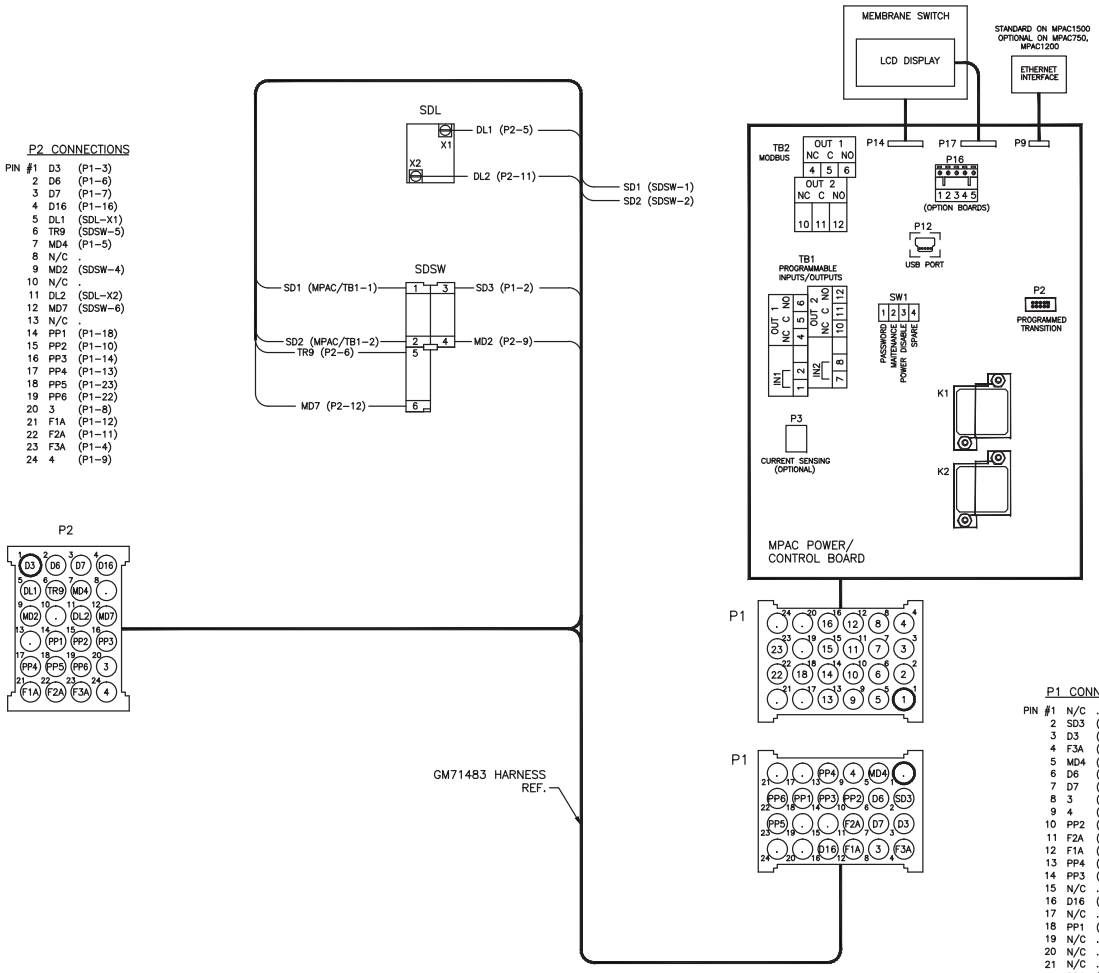
TITLE: DIAGRAM, WIRING

SCALE: NONE | DWG NO. GM89726 | SHEET 2–3 | SIZE D

PLOTTED: | DWG. NO. GM89726 | D

REV	DATE	REVISION	BY
–	12-4-13	NEW DRAWING [CT70293]	DFS

ENCLOSURE DOOR (REAR VIEW)



P2 CONNECTIONS

PIN		
#1	D3	(P1-3)
2	D6	(P1-6)
3	D7	(P1-7)
4	D16	(P1-16)
5	DL1	(SDL-X1)
6	TR9	(SDSW-5)
7	MD4	(P1-5)
8	N/C	.
9	MD2	(SDSW-4)
10	N/C	.
11	DL2	(SDL-X2)
12	MD7	(SDSW-6)
13	N/C	.
14	PP1	(P1-18)
15	PP2	(P1-10)
16	PP3	(P1-14)
17	PP4	(P1-13)
18	PP5	(P1-23)
19	PP6	(P1-22)
20	3	(P1-8)
21	F1A	(P1-12)
22	F2A	(P1-11)
23	F3A	(P1-4)
24	4	(P1-9)

P1 CONNECTIONS

PIN		
#1	N/C	.
2	SD3	(SDSW-3)
3	D3	(P2-1)
4	F3A	(P2-23)
5	MD4	(P2-7)
6	D6	(P2-2)
7	D7	(P2-3)
8	3	(P2-20)
9	4	(P2-24)
10	PP2	(P2-15)
11	F2A	(P2-22)
12	F1A	(P2-21)
13	PP4	(P2-17)
14	PP3	(P2-16)
15	N/C	.
16	D16	(P2-4)
17	N/C	.
18	PP1	(P2-14)
19	N/C	.
20	N/C	.
21	N/C	.
22	PP6	(P2-19)
23	PP5	(P2-18)
24	N/C	.

MODEL KEP
100-1200A
SERVICE ENTRANCE
PROGRAMMED TRANSITION
FOR SCHEMATIC DIAGRAM SEE GM89725

UNLESS OTHERWISE SPECIFIED – 1) DIMENSIONS ARE IN INCHES 2) TOLERANCE ARE: .XX± .010 .XXX ± .005 .X ± .060 FRACTIONS ± ANGLES ± 1/2° SURFACE FINISH MACH.

APPROVALS	DATE
DRAWN DFS	12-4-13
CHECKED MTL	12-4-13
APPROVED HCC	12-4-13

KOHLER CO.
POWER SYSTEMS KOHLER WI 53044 U.S.A.

TITLE DIAGRAM, WIRING

SCALE /// DWG NO. SHEET 3-3

FILENAME DWG. NO. GM89726 D

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.
- 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.

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.

KOHLER®
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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
KohlerPowerSystemscom

G18-56 12/05a

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

Your Kohler product has been manufactured and inspected with care by experienced craftsmen. If you are the original end user, Kohler Co. warrants, for the period indicated below, each product to be free from defects in materials and workmanship. In the event of a defect in materials or workmanship, Kohler Co. will repair, replace, or make appropriate adjustment at Kohler Co.'s option if the product, upon Kohler Co.'s inspection, is found to be properly installed, maintained, and operated in accordance with Kohler Co.'s instruction manuals. A Kohler distributor, dealer, or authorized service representative must perform startup.

Kohler Product	**Warranty Coverage**
Stationary Standby Generator Set & Accessories	Five (5) years from registered startup or three thousand (3000) hours (whichever occurs first).

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 registered startup. The extended warranty start date is determined by the standard warranty requirements and runs concurrent with the standard warranty during the first year. To receive extended warranty coverage, the provisions of the standard warranty registration must be met.

The following will **not** be covered by the 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 Kohler 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 quantity of 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 regularly exercise the generator set under load (stationary applications only).
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. Additional expenses for repair after normal business hours, i.e. overtime or holiday labor rates.
9. Rental of equipment during performance of warranty repairs.
10. Removal and replacement of non-Kohler-supplied options and equipment.
11. Replacement of a failed Kohler part with a non-Kohler part voids the warranty on that part.
12. Radiators replaced rather than repaired.
13. Fuel injection pumps not repaired by an authorized Kohler service representative.
14. Non-Kohler-authorized repair shop labor without prior approval from Kohler Co. Warranty Department.
15. Engine fluids such as fuel, oil, or coolant/antifreeze.
16. Shop supplies such as adhesives, cleaning solvents, and rags.
17. Expenses incurred investigating performance complaints unless the problem is caused by defective Kohler materials or workmanship.
18. Maintenance items such as fuses, lamps, filters, spark plugs, loose or leaking clamps, and adjustments.
19. Travel time and mileage exceeding 300 miles round trip.

To obtain warranty service, call 1-800-544-2444 for your nearest authorized Kohler service representative or write Kohler Co., Kohler Power Systems Service Department, MS072, Kohler, WI 53044 USA.

KOHLER CO. SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, AND/OR CONSEQUENTIAL DAMAGES OF ANY KIND including, but not limited to, incidental and/or 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 on our behalf.

ANY IMPLIED OR STATUTORY WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, 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 and/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.

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KOHLER CO. Kohler, Wisconsin 53044
Phone 920-457-4441, Fax 920-459-1646
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KOHLERPower.com

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Transfer Switch Extended Five-Year Comprehensive Limited Warranty

Your Kohler product has been manufactured and inspected with care by experienced craftsmen. If you are the original end user, Kohler Co. warrants, for the period indicated below, each product to be free from defects in materials and workmanship. In the event of a defect in materials or workmanship, Kohler Co. will repair, replace, or make appropriate adjustment at Kohler Co.'s option if the product, upon Kohler Co.'s inspection, is found to be properly installed, maintained, and operated in accordance with Kohler Co.'s instruction manuals. A Kohler distributor, dealer, or authorized service representative must perform startup.

Kohler Product	**Warranty Coverage**
Transfer switch and factory-supplied transfer switch accessories	Five (5) years from registered startup date.
Transfer switch main contacts	Ten (10) years from the registered startup date.

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 registered startup. The extended warranty start date is determined by the standard warranty requirements and runs concurrent with the standard warranty during the first year. To receive extended warranty coverage, the provisions of the standard warranty registration must be met.

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

1. Normal wear, periodic service, and routine adjustments.
2. Damage, including but not limited to damage caused by accidents, improper installation or handling, faulty repairs not performed by an authorized Kohler service representative, improper storage, or acts of God.
3. Damage caused by:
   a. Operation above or below rated capacity, voltage, or frequency.
   b. Modifications.
   c. Installation contrary to published specifications and codes.
4. 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 parts and/or procedures other than factory-supplied or -approved replacement parts and/or procedures.
5. Non-Kohler replacement parts. Replacement of a failed Kohler part with a non-Kohler part voids the warranty on that part.
6. Original installation charges and startup costs.
7. Additional expenses for repair after normal business hours, i.e. overtime or holiday labor rates.
8. Rental of equipment during performance of warranty repairs.
9. Removal and replacement of non-Kohler-supplied options and equipment.
10. Non-Kohler-authorized repair shop labor without prior approval from Kohler Co. Warranty Department.
11. Expenses incurred investigating performance complaints unless the problem is caused by defective Kohler materials or workmanship.
12. Maintenance items such as fuses, lamps, and adjustments.
13. Labor and travel charges after the fifth year of the transfer switch main contacts warranty period.
14. Travel time and mileage exceeding 300 miles round trip.

To obtain warranty service, call 1-800-544-2444 for your nearest authorized Kohler service representative or write Kohler Co., Kohler Power Systems Service Department, MS072, Kohler, WI 53044 USA.

KOHLER CO. SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, AND/OR CONSEQUENTIAL DAMAGES OF ANY KIND including, but not limited to, incidental and/or 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 on our behalf.

ANY IMPLIED OR STATUTORY WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, 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 and/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.

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TP-6087 4/15c

FIDELITY ENGINEERING CORPORATION
KOHLER GENERATOR DIVISION • 25 Loveton Circle • P.O. Box 2500• Sparks, Maryland 21152 • Telephone 1.800.787.6000 • Fax 410.891.1516

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, etc. 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.