



Woodstock Power Company

4055 Richmond Street
Philadelphia, PA 19137

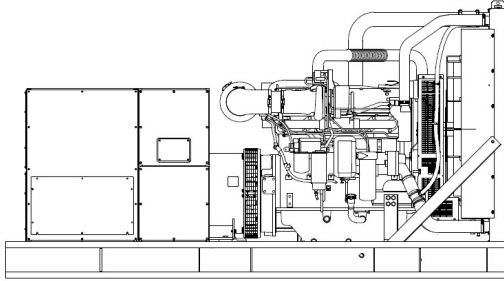
P: 610-658-3242

W: www.woodstockpower.com

E: sales@woodstockpower.com

Submittal Package

Generator



Kohler Model: 500REOZJC

This diesel generator set equipped with a 5M4028 alternator operating at 120/208 volts is rated for 510 kW/638 kVA. Output amperage: 1770

Standard Features:

- Rehlko provides one-source responsibility for the generating system and accessories.
- Approved for use with certified renewable Hydrotreated Vegetable Oil (HVO) / Renewable Diesel (RD) fuels compliant with EN15940/ASTM D975.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listings.
- The generator set accepts rated load in one step.
- The 60 Hz emergency generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A one-year limited warranty covers all systems and components. Two-and five-year extended warranties are also available.
- Tier 2 EPA-cerified for Stationary Emergency Applications
- Alternator Protection
- Battery Rack and Cables
- Customer Connection (standard with Decision-Maker 6000 controller only)
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Lit

Other Features:

- Rehlko designed controllers for guaranteed system integration and remote communication.
- The low coolant level shutdown prevents overheating (standard on radiator models)

Alternator Features:

- The pilot-excited, permanent-magnet (PM) alternator provides superior short-circuit capability.
- The brushless, rotating-field alternator has broad range reconnectability.

Qty**Description****500REOZJC Generator System**

2

500REOZJC Generator Set

Includes the following:

Literature Languages

Approvals and Listings

Engine

Nameplate Rating

Voltage

Alternator

Cooling System

Skid and Mounting

Air Intake

Controller

Enclosure Type

Enclosure Material

Fuel Tank Type

Fuel Runtime (Approx.)

Subbase Fuel Tank Capacity

Fill Pipe/Spill Fill Options

Tank Marking Options

Tank Marking Options

Tank Marking Options

Starting Aids, Installed

Electrical Accy.,Installed

Electrical Accy.,Installed

Electrical Accy.,Installed

Electrical Accy.,Installed

Electrical Accy.,Installed

Rating, LCB 1 Right

Amps, LCB 1 Right

Trip Type, LCB 1 Right

LCB 1 Right Interrupt Rating

Frame, LCB 1 Right

Position, LCB 1 Right

Fuel Lines, Installed

Exceeds LTL Shipping Height

Miscellaneous Accy,Installed

Miscellaneous Accy,Installed

English

UL2200 Listing

500REOZJC,24V,60HZ

Standby 130C Rise

60Hz, 120/208V, Wye, 3Ph, 4W

5M4028

Unit Mounted Radiator, 50C

Skid

Standard Duty

APM603

Sound

Aluminum

State

24 Hours

894 Gallons

7.5 Gal Cont,90% Shutoff,FDEP

Combust Lqds - Keep Fire Away

NFPA 704 Identification

Tank Number & Safe Fill Height

2500W,90-120V,1Ph,w/Valves

Battery, 2/12V, Wet

Battery Charger, 10A

Run Relay

Failure Relay w/Harness,1Fault

15 Relay I/O Board

100% Rated

1600

Electronic, LSI

65kA at 480V

RJ

1

Flexible Fuel Lines

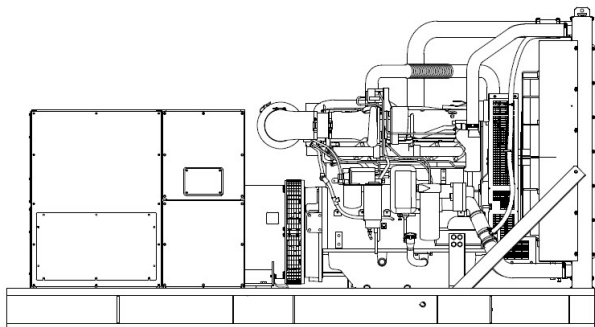
Add'l Shipping Charge Accepted

Air Cleaner Restriction Ind.

Coolant in Genset

	Warranty	5 Year Comprehensive
	Testing, Additional	Power Factor Test,0.8,3Ph Only
2	NEC Remote, E-Stop	
2	Lit Kit, General Maint., 500REOZJC	
2	RSA III, Annunciator only	

Spec Sheets



Standard Features

- Discovery Energy, LLC and its affiliates dba Rehiko provides one-source responsibility for the generating system and accessories.
- Approved for use with certified renewable Hydrotreated Vegetable Oil (HVO) / Renewable Diesel (RD) fuels compliant with EN15940/ASTM D975.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
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- Tier 2 EPA-certified for Stationary Emergency Applications
- Alternator Protection
- Battery Rack and Cables
- Customer Connection (standard with Decision-Maker 6000 controller only)
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Literature

Alternator Features

- The pilot-excited, permanent-magnet (PM) alternator provides superior short-circuit capability.
- The brushless, rotating-field alternator has broad range reconnectability.

Other Features

- Rehiko designed controllers for guaranteed system integration and remote communication.
- The low coolant level shutdown prevents overheating (standard on radiator models only). Integral vibration isolation eliminates the need for under-unit vibration spring isolators.
- An electronic, isochronous governor delivers precise frequency regulation.
- Mount up to four circuit breakers to allow circuit protection of selected priority loads.

Generator Set Rating

Alternator	Voltage	Ph	Hz	Standby 130C Rise Ratings	
				kW/kVA	Amps
5M4028	120/208	3	60	510/638	1770

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor.

Standby Ratings: The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating.
Prime Power Ratings: At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve.
Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time and continuous ratings, consult the factory.

Model: 500REOZJC, continued

Alternator Specifications

Specifications	Alternator
Alternator manufacturer	Rehlko
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Permanent-Magnet, Pilot Exciter
Leads, quantity	10/12, Reconnectable
Voltage regulator	Solid State, Volts/Hz
Insulation	NEMA MG1
Insulation: Material	Class H, Synthetic, Nonhydroscopic
Insulation: Temperature Rise	130°C, 150°C Standby
Coupling	Flexible Disc
Amortisseur windings	Full
Rotor balancing (60Hz)	125%
Voltage regulation, no-load to full-load RMS	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 down stream circuit breakers to trip without collapsing the alternator field. • Self-ventilated and dripproof construction. • Superior voltage waveform from a two-thirds pitch stator and skewed rotor. • Brushless alternator with brushless pilot exciter for excellent load response.	

Engine

Engine Specification

Engine Manufacturer	John Deere
Engine Model	6135HFG75
Engine: type	Turbocharged, Charge Air-Cooled
Cylinder arrangement	6, Inline
Displacement, L (cu. in.)	13.5 (824)
Bore and stroke, mm (in.)	132 x 165 (5.2 x 6.5)
Compression ratio	16.0:1
Piston speed, m/min. (ft./min.)	594 (1950)
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	563 (755)
Crankshaft material	Forged Steel
Valve (exhaust) material Intake	Nickel-Chromium Head
Valve (exhaust) material	Chromium-Silicone Stem
Governor: type, make/model	JDEC Electronic L15
Frequency regulation, no-load to-full load	Isochronous
Frequency regulation, steady state	±0.25%
Frequency	Fixed
Air cleaner type, all models	Dry

Model: 500REOZJC, continued

Exhaust

Exhaust System

Exhaust Manifold Type	Dry
Exhaust flow at rated kW, m3/min. (cfm)	97.2 (3433)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	524 (975)
Maximum allowable back pressure, kPa (in. Hg)	Min. 4 (1.2) Max. 9.8 (2.9)

Engine Electrical

Engine Electrical System

Battery charging alternator: Ground (negative/positive)	Negative
Battery charging alternator: Volts (DC)	24
Battery charging alternator: Ampere rating	60
Starter motor rated voltage (DC)	24
Battery, recommended cold cranking amps (CCA): Qty., CCA rating each	Two, 925
Battery voltage (DC)	12

Fuel

Fuel System

Fuel type	Diesel
Fuel supply line, min. ID, mm (in.)	13 (0.50)
Fuel return line, min. ID, mm (in.)	10 (0.38)
Max. lift, fuel pump: type, m (ft.)	Electronic 2.1 (6.8)
Max. fuel flow, Lph (gph)	180.6 (47.7)
Max. return line restriction, kPa (in. Hg)	35 (10.3)
Fuel prime pump	Electronic
Fuel Filter Secondary	2 Microns @ 98% Efficiency
Fuel Filter Primary	10 Microns
Fuel Filter Water Separator	Yes
Recommended fuel	#2 Diesel

Lubrication

Lubrication System

Type	Full Pressure
Oil pan capacity, L (qt.)	40.0 (42.3)
Oil pan capacity with filter, L (qt.)	42.0 (44.4)
Oil filter: quantity, type	1, Cartridge
Oil cooler	Water-Cooled

Model: 500REOZJC, continued

Cooling	
Radiator System	
Ambient temperature, °C (°F)	50 (122)
Engine jacket water capacity, L (gal.)	18 (4.8)
Radiator system capacity, including engine, L (gal.)	67.2 (17.8)
Engine jacket water flow, Lpm (gpm)	400 (106)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	209 (11896)
Heat rejected to charge air cooling water at rated kW, dry exhaust, Kw Btu/min.	116 (6603)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	965 (38)
Fan, kWm (HP)	18 (24)
Max. restriction of cooling air, intake and discharge side of radiator, kPA (in. H2O)	0.125 (0.5)
* Enclosure with internal silencer reduces ambient temperature capability by 5°C (9°F).	

Operation Requirements

Air Requirements	
Radiator-cooled cooling air, m3/min. (scfm) *	435 (15400)
Cooling air required for generator set when equipped with city water cooling or remote radiator, based on 14°C (25°F) rise, m3/min. rise and ambient temp. of 29°C (85°F) m3/min. (cfm)	279 (9867)
Combustion air, m3/min. (cfm)	38 (1342)
Heat rejected to ambient air: Engine, kW (Btu/min.)	38 (2163)
Heat rejected to ambient air: Alternator, kW (Btu/min.)	40 (2277)
*Air density = 1.20 kg/m3 (0.075 lbm/ft3)	

Fuel Consumption

	Rating
Standby Fuel Consumption at 100% load	134.5 Lph (35.5 gph)
Standby Fuel Consumption at 75% load	104.6 Lph (27.6 gph)
Standby Fuel Consumption at 50% load	75.3 Lph (19.9 gph)
Standby Fuel Consumption at 25% load	38.8 (10.2)
Continuous Fuel Consumption at 0% load	** Volumetric Fuel consumption is up to 4% higher when using HVO/RD than #2 ULSC.



The APM603 generator set controller provides advanced control, system monitoring, and system diagnostics for a single generator set or paralleling multiple generator sets. The APM603 interfaces the generator set to other power system equipment and network management systems using standard industry network communications. It uses a patented digital voltage regulator and unique software logic to manage alternator thermal overload protection as well as serves as an overcurrent protective relay, features normally requiring additional hardware. The APM603 controller meets NFPA 110, Level 1.

Display, Interface, and Accessibility

- A 7-inch color TFT touchscreen for easy local access to data.
 - Home screen can be customized to show critical data at a glance.
 - Create a custom favorites list for quick access to important data
- Measurements are selectable in metric or English units.
- Supports Modbus® protocol through serial bus and Ethernet networks, and supports SNMP and BACnet® through Ethernet networks.

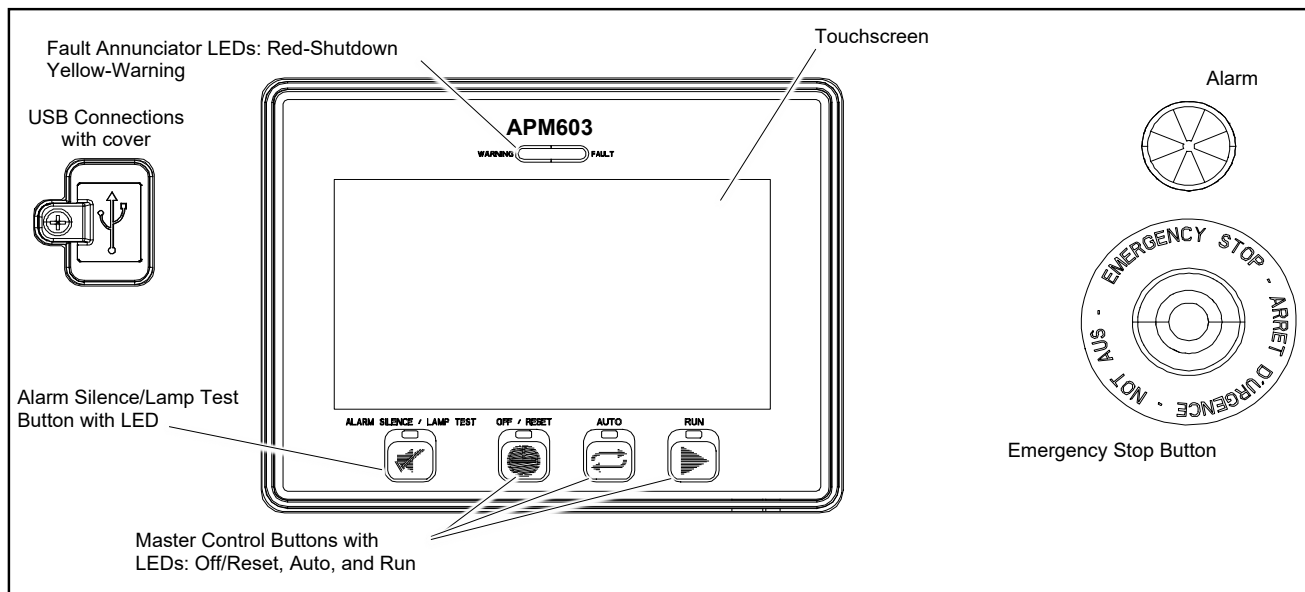
Global Support

- Sales, installation, and service support from more than 800 Rehlko and SDMO service providers around the world.

On-board Diagnostics

- Immediate visibility of warnings and faults with text description and code display.
 - 15 seconds of critical data are captured around each warning and fault
 - Critical data can be viewed on the display and downloaded
- Store up to 10,000 events locally along with historical data logging of successful starts.
 - Accurate time stamp from real-time clock
 - Event log can be downloaded
- Data logging of customized parameter list for report generation and advanced troubleshooting.
 - Store to external USB drive for easy transfer to another device

Modbus® is a registered trademark of Schneider Electric.
BACnet® is a registered trademark of ASHRAE.



Controller Features

AC Output Voltage Regulator Adjustment	Maximum of $\pm 10\%$ of the system voltage
Alarm Horn	Indicates a generator set warning or shutdown condition
Alarm Silence	For NFPA-110 application or user convenience
Alternator Protection	Generator set overload and short circuit protection
Cyclic Cranking	Provides automatic restart after a failed start attempt with programmable on/off time and number of attempts
ECU Diagnostics	Displays engine ECU fault codes and descriptions for engine troubleshooting
Emergency Stop Button	Shuts down the generator set immediately, for emergency situations
Engine Start Aid	Control for an optional engine starting aid
Environmentally Sealed Membrane Keypad	Three master control buttons with LEDs: Off/Reset, Auto, and Run
Patented High-Speed RMS Digital Voltage Regulator	$\pm 0.25\%$ no-load to full-load regulation with three-phase true RMS sensing
Lamp Test	Verifies functionality of the indicator LEDs
Real-time Clock	Includes battery back-up to retain date and time through controller power cycle
Remote Reset	Allows remote fault resets and restarting of the generator set
Remote Monitoring Panel	Compatible with the Remote Serial Annunciator
Run Time Hourmeter	Displays generator set run time
Run Relay	Indicates that the generator set is running
Time Delay Engine Cooldown (TDEC)	Time delay before the generator set shuts down
Time Delay Engine Start (TDES)	Time delay before the generator set starts

Controller Features

Emergency Battle Mode	- Allows critical emergency operation where uninterrupted power is essential. - Overrides most shutdowns and warnings except for E-Stop, Overspeed, Maintenance Mode, or shutdown faults from the ECU.
Maintenance mode	- Lowest the fault threshold which reduces fault setting times and activates a trip - Acts as a safety device like an E-Stop - Adjustable from 0-150% of rated current

Communication

USB Port	(1) Mini-USB port for PC connection (1) USB port for storage device
Serial (RS-485) Port	(1) Non-isolated for RSA III (1) Isolated for Modbus devices (1) Isolated for paralleling communication
Ethernet Port	(1) RJ45 for Modbus TCP, SNMP, and BACnet

Controller Specifications

Nominal voltage	12 or 24 VDC protected against reverse battery connection
Power	800 mAmps at 12 VDC 400 mAmps at 24 VDC
Operating Temperature	-40°C to 70°C (-40°F to 158°F)
Storage Temperature	-40°C to 85°C (-40°F to 158°F)
Humidity	5% to 95% non-condensing
Display Size, W x H	154 x 86 mm (6.0 x 3.4 inches)
Protection Index	IP65 Front

Paralleling Features

- Isochronous control with real and reactive load sharing with other APM603 controller equipped generator sets
 - Supports paralleling up to 8 generators
- Random first-on logic to prevent two or more generator sets from closing to a dead bus and provides the fastest response for a single generator online
- Automatic synchronizer with dead bus closing
- Soft loading and unloading for generator management
- Protective relay functions:
 - Synch check (25C)
 - Over current (51)
 - Over frequency (81O)
 - Over power (32O)
 - Over voltage (59)
 - Reverse power (32R)
 - Reverse reactive power (32RQ)
 - Under frequency (81U)
 - Under voltage (27)
- Generator management to allow the start and stop of generators based on load demand or state of other generators
 - Fuel level
 - Run time
 - Manual order
 - Time of day
 - Efficiency
- Simplified paralleling system view from any generator controller in the system

Overcurrent Protective Device

- Provides protection against line-to-line and line-to-neutral faults
- Uses thermal and instantaneous current limit settings for alternator protection

Load Management Features

- Programmable outputs included to command the connect and disconnect of loads based on generator or paralleling system state
 - Loads connected based on available capacity
 - Loads disconnected at system startup
 - Loads disconnected based on a maximum kW setting or underfrequency setting
- Supports up to 16 prioritized load steps per system
 - Can be used on a single generator system
 - Can be combined in a paralleling system for a total system load control capability
- Simplified load management system view from any generator controller in the system
- Requires input/output module option

Advanced Programmable I/O

- Configurable inputs and outputs can be programmed for customer specific use
- PLC-like capability for applying logic to customize generator system behavior

Troubleshooting Features

- 15 seconds of key data automatically captured around each warning and shutdown
 - Data can be exported for detailed analysis
 - Data can be viewed on controller for convenient on-site troubleshooting support
- Configurable data logger will allow you to select parameters to monitor
 - Data stored to USB device for flexibility on amount of data stored and ability to export for detailed analysis
 - Data capture controlled by user to allow capturing specific data required

NFPA 110 Requirements

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

- Engine functions:
 - Overcrank
 - Low coolant temperature warning
 - High coolant temperature warning
 - High coolant temperature shutdown
 - Low oil pressure shutdown
 - Low oil pressure warning
 - High engine speed
 - Low fuel (level or pressure) *
 - Low coolant level
 - EPS supplying load
 - High battery voltage
 - Low battery voltage
 - General functions:
 - Master switch not in auto
 - Battery charger fault *
 - Lamp test
 - Contacts for local and remote common alarm
 - Audible alarm silence button
 - Remote emergency stop *
- * Function requires optional input sensors or kits and is engine dependent, see Engine Data.

Standards

The generator set controller has been tested and verified for compliance with the following standards.

- NFPA 99
- NFPA 110, Level 1
- CSA 282-09
- UL 6200
- ASTM B117 (salt spray test)

Controller Functions

The controller displays warning, shutdown, and status messages. **All functions are available as relay outputs.**

Warning causes the yellow fault LED to show and sounds the alarm horn, signaling an impending problem.

Shutdown causes the red fault LED to show, sounds the alarm horn, and stops the generator set.

The controller communicates with the engine ECU and supports a large number of warning and shutdown events that are not listed here.

This table highlights the items required for NFPA 110.

Event	Warning	Shutdown
Alternator Thermal Protection †		•
Battery Charger Fault *	▲	
CAN Option Board1 Comm Loss	▲	
Critically Low Fuel Level (diesel) *	▲	
ECU Diagnostic Event	▲	
ECU Mismatch Shutdown †		•
Fuel Leak Alarm (diesel) *	▲	
High Battery Voltage Warning	▲	
High Coolant Temperature Shutdown †		•
High Coolant Temperature Warning	▲	
High Fuel Level Warning (diesel) *	▲	
High Oil Temperature Shutdown †		•
High Oil Temperature Warning	▲	
Local Emergency Stop Shutdown †		•
Loss ECU Comms Shutdown †		•
Loss of Signal Low Coolant Level Voltage	▲	
Low Battery Voltage Warning	▲	
Low Coolant Level Shutdown †		•
Low Coolant Temperature Warning	▲	
Low Fuel Level Shutdown (diesel) * †		•
Low Fuel Level Warning (diesel) *	▲	
Low Fuel Pressure Warning (gas) *	▲	
Low Oil Pressure Shutdown †		•
Low Oil Pressure Warning	▲	
Low RTC (clock) Battery Voltage	▲	
Maintenance Reminder1	▲	
Maintenance Reminder2	▲	
Maintenance Reminder3	▲	
Maximum Power Shutdown †		•
Maximum Power Warning	▲	
Not In Auto Alarm	▲	
Over Crank Shutdown †		•
Over Current Shutdown (L1, L2, L3) †		•
Over Current Warning (L1, L2, L3)	▲	
Over Frequency Shutdown †		•
Over Frequency Warning	▲	
Over Power Shutdown †		•
Over Power Warning	▲	
Over Speed Shutdown †		•
Over Voltage Shutdown (L-L, L-N, each phase) †		•
Over Voltage Warning (L-L, L-N, each phase)	▲	

Event	Warning	Shutdown
Remote Emergency Stop Shutdown †		•
Reverse Power Shutdown †		•
Reverse VAR Shutdown †		•
Under Frequency Shutdown †		•
Under Frequency Warning	▲	
Under Voltage Shutdown (L-L, L-N, each phase) †		•
Under Voltage Warning (L-L, L-N, each phase)	▲	
Weak Cranking Battery	▲	
Status Messages		
Auto Button Pressed		
EPS Supplying Load		
Generator Running		
Generator Started		
Generator Stopped		
GFCI Warning *		
Load Shed Overload		
Load Shed Under Frequency		
Off Button Pressed		
RSA Event Programmable Digital Inputs, 1-8		
Run Button Pressed		
* Function requires optional input sensors or kits		
† Items included with common fault shutdown 10		
‡ Shutdown overrides are designated by engine supplier and may vary between generator set models. An event, outside of Overspeed, E-stop, Maintenance Mode, and ECU-forced shutdown, may cause the generator to shutdown.		



Industrial Generator Set Accessories

Generator Set Controller

John Deere Engine-Powered Models Inputs and Outputs

Standard Dedicated User Inputs	Input Type
Auxiliary Fault (Shutdown)	Digital Input
Auxiliary Warning	
Battery Charger Fault	
Breaker Closed *	
Breaker Open *	
Excitation Over Voltage (350 kW and up)	
Fuel Leak Alarm	
Low Fuel Level Switch	
Remote Emergency Stop	
Remote Engine Start	Two-wire input
Speed Bias	Analog Voltage Input, Scalable up to +/-10 VDC
Voltage Bias	

Standard Dedicated User Outputs	Output Type
Close Breaker *	Relay Driver Output
Common Failure	
Run	
Trip Breaker/Shunt Trip *	
* Only with remote-mounted electrically operated circuit breakers.	

Optional Configurable User Inputs and Outputs	
User Configurable Inputs	2 Analog, 0-5 VDC 4 Dry Contact Digital
User Configurable Relay Outputs	14 NO/NC Relays 1 Common Fault Relay
Note: Programmable I/O is configurable by authorized technician	

JD Engine Data

The following John Deere engine data is displayed on the APM603 controller.

Parameter
Engine Model Number
Engine Serial Number
ECU Serial Number
Coolant Temperature
Engine Speed
Fuel Pressure
Fuel Consumption Rate
Oil Pressure
Run Time Hours

KD Engine-Powered Models Inputs and Outputs

Standard Dedicated User Inputs	Input Type
Auxiliary Fault (Shutdown)	Digital Input
Auxiliary Warning	
Battery Charger Fault	
Breaker Closed *	
Breaker Tripped/Open *	
Fuel Leak Alarm	
Fuel Level	
Idle Switch	
Key Switch Enable	
Low Fuel Level Switch	
Low Oil Level	
Remote Emergency Stop	
Remote Reset	
Remote Engine Start	Two-wire input
Speed Bias	Analog Voltage Input, Scalable up to +/-10 VDC
Voltage Bias	

Standard Dedicated User Outputs	Output Type
Close Breaker *	Relay Driver Output
Common Failure	
Common Warning	
EPS Supplying Load	
Generator Running	
Horn	
Low Coolant Temperature	
Not in Auto	
System Ready	
Trip Breaker/Shunt Trip *	
* Only with remote-mounted electrically operated circuit breakers.	

Optional Configurable User Inputs and Outputs	
User Configurable Inputs	16 Dry Contact Digital
User Configurable Relay Outputs	8 NO/NC Relays
Note: Programmable I/O is configurable by authorized technician.	

KD Engine Data

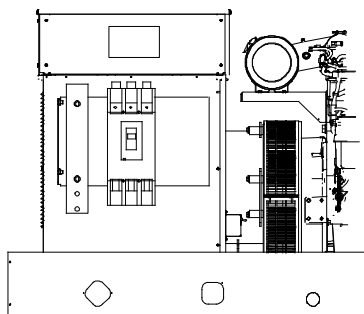
The following Diesel engine data is displayed on the APM603 controller.

Parameter
Engine Model Number
Engine Serial Number
Ambient Temperature
Charge Air Pressure
Charge Air Temperature
Common Rail Fuel Pressure
Coolant Level
Coolant Temperature
Crankcase Pressure
Engine Speed
Fuel Consumption Rate
Fuel Pressure
Fuel Temperature
Intercooler Coolant Temperature (K175 engines only)
Oil Temperature
Oil Pressure
Run Time Hours

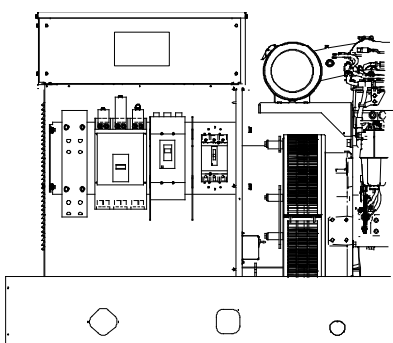
APM603 Available Options

- ❑ **Common Failure Relay** provides a relay output to signal a generator set fault.
- ❑ **Battery Charger** available with 6 amp, 10 amp, and 20 amp output for 12 and 24V DC voltage output. (Availability is generator model dependent.) The 10 amp and 20 amp models provide NFPA 110 charging and alarming capability.
- ❑ **Electrically Operated Circuit Breakers**
 - For paralleling systems
 - Available generator-mounted or remote-mounted
 - 24VDC
- ❑ **Ground Fault Relay** provides a relay output to signal a ground fault is detected.
- ❑ **Input/Output Module** for Diesel (KD) and Mitsubishi models provides:
 - 16 digital input connections with connection to ground
 - 8 relay output connections (Form C, rated 8A, 240 VAC or rated 0.5 A, 48 VDC)
- ❑ **Input/Output Module** for models other than KD or Mitsubishi provides:
 - 2 analog inputs (0-5 VDC)
 - 4 digital input connections with connection to ground
 - 14 relay output connections (Form C, rated 10A, 120V)
 - 1 common fault relay output (NO, rated 2A, 24VDC)
- ❑ **Key Switch** to allow selection of RUN, OFF and AUTO modes. Lockable in the AUTO position by removing the key.
- ❑ **Remote Emergency Stop Switch** available as a wall mounted panel to remotely shut down the generator set.
- ❑ **Remote Monitoring Panel.** The Remote Serial Annunciator (RSA) enables the operator to monitor the status of the generator set from a remote location, which may be required for NFPA 99 and NFPA 110 installations, and up to four Automatic transfer switches.
- ❑ **Shunt Trip Wiring provides** relay outputs to trip a shunt trip circuit breaker and to signal the common fault shutdowns. Contacts rated at 10 amps at 28 VDC or 120 VAC.

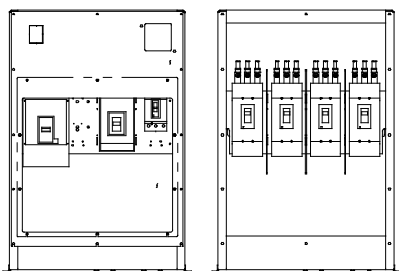
Availability is subject to change without notice. Discovery Energy, LLC and its affiliates dba Rehiko reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local authorized generator set distributor for availability.



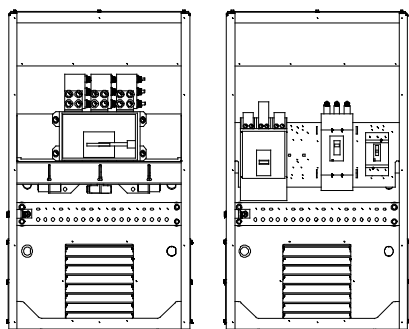
Single Circuit Breaker Kit with Neutral Bus Bar 15-300 kW Model Shown



Multiple Circuit Breaker Kit with Neutral Bus Bar 180-300 kW Model Shown



**Multiple Circuit Breaker Kits with Neutral Bus Bar 350-2250 kW Model Shown
(also applies to some 300 kW models)**



**Circuit Breaker Kits with Neutral Bus Bar
700-3250 kW KD Model Shown**

Standard Features

- The line circuit breaker interrupts the generator set output during a short circuit and protects the wiring when an overload occurs. Use the circuit breaker to manually disconnect the generator set from the load during generator set service.
- Circuit breaker kits are mounted to the generator set and are provided with load-side lugs and neutral bus bar.
- Rehlko offers a wide selection of molded-case line circuit breaker kits including single, dual, and multiple configurations for each generator set.
- Four types of line circuit breakers are available: (see page 2 for definitions and pages 3 and 4 for application details)
 - Magnetic trip
 - Thermal magnetic trip
 - Electronic trip
 - Electronic with ground fault (LSIG) trip
- In addition, line circuit breakers are offered with 80% and 100% ratings.
- Single line circuit breaker kits allow circuit protection of the entire electrical system load.
- Dual line circuit breaker kits allow circuit protection of selected priority loads from the remaining electrical system load.
- Multiple line circuit breaker kits with field connection barrier allow circuit protection for special applications (350-2500 kW models and selected 80-300 kW models).
- Up to four line circuit breakers can be used on 350-2500 kW models.
- Line circuit breakers comply with the following codes and standards unless otherwise stated.
 - UL 489 Molded Case Circuit Breakers
 - UL 1077 Supplementary Protectors
 - UL 2200 Stationary Engine Generator Assemblies

Line Circuit Breaker Types

Magnetic Trip

The magnetic trip features an electromagnet in series with the load contacts and a moveable armature to activate the trip mechanism. When a sudden and excessive current such as a short circuit occurs, the electromagnet attracts the armature resulting in an instantaneous trip.

Thermal Magnetic Trip

Thermal magnetic trip contains a thermal portion with a bimetallic strip that reacts to the heat produced from the load current. Excessive current causes it to bend sufficiently to trip the mechanism. The trip delay is dependent on the duration and excess of the overload current. Elements are factory-calibrated. A combination of both thermal and magnetic features allows a delayed trip on an overload and an instantaneous trip on a short circuit condition.

Electronic Trip

These line circuit breakers use electronic controls and miniature current transformers to monitor electrical currents and trip when preset limits are exceeded.

LI breakers are a combination of adjustable trip functions including long-time ampere rating, long-time delay, and instantaneous pickup. LSI breakers have all of the LI breaker features plus short-time pickup, short-time delay, and defeatable instantaneous pickup. LSIG breakers have all of the LSI breaker features plus ground-fault pickup and delay.

NOTE: MG-frame does not have a long-time delay when selected with LI breakers.

Electronic with Ground Fault Trip

The ground fault trip feature is referred to as LSIG in this document. Models with LSIG compare current flow in phase and neutral lines, and trip when current unbalance exists.

Ground fault trip units are an integral part of the circuit breaker and are not available as field-installable kits. The ground fault pickup switch sets the current level at which the circuit breaker will trip after the ground fault delay. Ground fault pickup values are based on circuit breaker sensor plug only and not on the rating plug multiplier. Changing the rating plug multiplier has no effect on the ground fault pickup values.

80% Rated Circuit Breaker

Most molded-case circuit breakers are 80% rated devices. An 80% rated circuit breaker can only be applied at 80% of its rating for continuous loads as defined by NFPA 70. Circuit conductors used with 80% rated circuit breakers are required to be rated for 100% of the circuit breaker's rating.

The 80% rated circuit breakers are typically at a lower cost than the 100% rated circuit breaker but load growth is limited.

100% Rated Circuit Breaker

Applications where all UL and NEC restrictions are met can use 100% rated circuit breakers where 100% rated circuits can carry 100% of the circuit breaker and conductor current rating.

The 100% rated circuit breakers are typically at a higher cost than the 80% rated circuit breaker but have load growth possibilities.

When applying 100% rated circuit breakers, comply with the various restrictions including UL Standard 489 and NEC Section 210. If any of the 100% rated circuit breaker restrictions are not met, the circuit breaker becomes an 80% rated circuit breaker.

Line Circuit Breaker Options

❑ Alarm Switch

The alarm switch indicates that the circuit breaker is in a tripped position caused by an overload, short circuit, ground fault, the operation of the shunt trip, an undervoltage trip, or the push-to-trip pushbutton. The alarm resets when the circuit breaker is reset.

❑ Auxiliary Contacts

These switches send a signal indicating whether the main circuit breaker contacts are in the open or closed position.

❑ Breaker Separators (350-2500 kW)

Provides adequate clearance between breaker circuits.

❑ Bus Bars

Bus bar kits offer a convenient way to connect load leads to the generator set when a circuit breaker is not present. **15-300 kW.** Bus bar kits are available on alternators with leads for connection to the generator set when circuit breakers are not ordered.

350-2500 kW. A bus bar kit is provided when no circuit breaker is ordered. Bus bars are also available in combination with circuit breakers or other bus bars on the opposite side of the junction box. On medium voltage (3.3 kV and above) units, a bus bar kit is standard (not applicable to KD models).

❑ Field Connection Barrier

Provides installer wiring isolation from factory connections.

❑ Ground Fault Annunciation

A relay contact for customer connection indicates a ground fault condition and is part of a ground fault alarm.

❑ Lockout Device (padlock attachment)

This field-installable handle padlock attachment is available for manually operated circuit breakers. The attachment can accommodate three padlocks and will lock the circuit breaker in the OFF position only.

❑ Lugs

Various lug sizes are available to accommodate multiple cable sizes for connection to the neutral or bus bar.

❑ Overcurrent Trip Switch

The overcurrent trip switch indicates that the circuit breaker has tripped due to overload, ground fault, or short circuit and returns to the deenergized state when the circuit breaker is reset.

❑ Shunt Trip, 12 VDC or 24 VDC

A shunt trip option provides a solenoid within the circuit breaker case that, when momentarily energized from a remote source, activates the trip mechanism. This feature allows the circuit breaker to be tripped by customer-selected faults such as alternator overload or overspeed. The circuit breaker must be reset locally after being tripped. Tripping has priority over manual or motor operator closing.

❑ Shunt Trip Wiring

Connects the shunt trip to the generator set controller. (standard on KD models with the APM802 controller)

❑ Undervoltage Trip, 12 VDC or 24 VDC

The undervoltage trips the circuit breaker when the control voltage drops below the preset threshold of 35%-70% of the rated voltage.

300-2250* kW Line Circuit Breaker Specifications

* Includes models 300REZXB and 300RZXB. For models 300REOZJ and 300REZXC, see the 15-300 kW section.
For KD model generator sets, see pages 8 and 9.

80% Rating Circuit Breaker

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
4M 5M 7M	15-150	Thermal Magnetic	HD
	60-150	Electronic LI	HD
		Electronic LSI	
		Electronic LSIG	
	175-250	Thermal Magnetic	JD
	250	Electronic LI	
		Electronic LSI	
		Electronic LSIG	
	60-150	Electronic LI	HG
		Electronic LSI	
		Electronic LSIG	
	250	Electronic LI	JG
		Electronic LSI	
		Electronic LSIG	
	30	9-325 A. Mag. Trip	HJ
	50	84-546 A. Mag. Trip	
	100	180-1040 A. Mag. Trip	
	150	348-1690 A. Mag. Trip	JJ
	250	684-2500 A. Mag. Trip	
	300-400	Thermal Magnetic	LA
	400	500-1000 A. Mag. Trip	
		750-1600 A. Mag. Trip	
		1000-2000 A. Mag. Trip	
		1125-2250 A. Mag. Trip	
		1250-2500 A. Mag. Trip	
		1500-3000 A. Mag. Trip	
		1750-3500 A. Mag. Trip	
		2000-4000 A. Mag. Trip	
	400-600	Electronic LI	LG
		Electronic LSI	
		Electronic LSIG	
	800	Electronic LI	MG
	1000-1200	Thermal Magnetic	PG
	800-1200	Electronic LSI	
		Electronic LSIG	PJ
	1200	Thermal Magnetic	
		Electronic LSI	
		Electronic LSIG	
	1600-2500	Thermal Magnetic	RJ
		Electronic LSI	
		Electronic LSIG	

100% Rating Circuit Breaker

Alt. Model	Ampere Range	Trip Type	C. B. Frame Size
4M 5M 7M	15-150	Thermal Magnetic	HD
	60-150	Electronic LI	
		Electronic LSI	
		Electronic LSIG	JD
	175-250	Thermal Magnetic	
	250	Electronic LI	
		Electronic LSI	
		Electronic LSIG	HG
	60-150	Electronic LI	
		Electronic LSI	
		Electronic LSIG	JG
	250	Electronic LI	
		Electronic LSI	
		Electronic LSIG	LG
	400	Electronic LI	
		Electronic LSI	
		Electronic LSIG	PG
	600-1200	Electronic LSI	
		Electronic LSIG	PJ
	1200	Electronic LSI	
	1600-2500	Electronic LSIG	RJ
		Electronic LSI	NW
	1600-3000	Electronic LSI	
		Electronic LSIG	

100% Rating Electrically Operated Breakers

For use as paralleling breakers.*

Alt. Model	Amps	Trip Unit	Frame
4M 5M 7M	250, 400, 600, 800, 1000, 1200	3.0 LI	PJ
		5.0 LSI	PJ
		3.0 LI	PL
		5.0 LSI	PL
	1600, 2000, 2500, 3000	Electronic LSI	NW
		Electronic LSIG	NW

* P-frame breakers can be used with the Decision-Maker® 6000 Controller/DPS System or APM603 controller.
NW breakers are for use with the APM603 only.
All circuit breakers listed in this table include line side bus and load side lugs, 24VDC motor operators, and 1 type C SDE overcurrent switch contact. P-frame breakers include 2 type C auxiliary contacts. NW breakers include 4 auxiliary contacts.
No second breakers are allowed in combination with these breakers.

Load Bus Rating

Gen. Set kW	Alt. Model	Rating, Amperes	Type
350-2250 kW	4M/5M/7M	3000	Load Bus



Industrial Generator Set Accessories

Line Circuit Breakers 15-3250 kW

300-2250* kW Line Circuit Breaker Specifications

* Includes models 300REZXB and 300RZXB. For models 300REOZJ and 300REZXC, see the 15-300 kW section. For KD model generator sets, see pages 8 and 9.

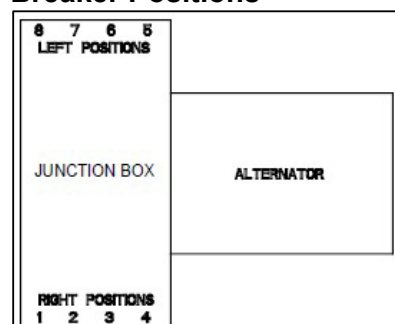
Interrupting Ratings

Circuit Breaker Frame Size	240 Volt, kA	480 Volt, kA	600 Volt, kA
HD	25	18	14
HG	65	35	18
HJ	100	65	25
JD	25	18	14
JG	65	35	18
JJ	100	65	25
LA	42	30	22
LG	65	35	18
MG			
NW	100	100	85
PG	65	35	18
PJ	100	65	25
PL	125	65	25
RJ	100	65	25

Circuit Breaker Lugs Per Phase (Al/Cu)

Frame Size	Ampere Range	Wire Range
H	15-150	One #14 to 3/0
J	175	One 1/0 to 4/0
	200-250	One 3/0 to 350 kcmil
LA	300-400	One #1 to 600 kcmil or Two #1 to 250 kcmil
LG	400-600	Two 2/0 to 500 kcmil
M	800	Three 3/0 to 500 kcmil
P	600-800	Three 3/0 to 500 kcmil
	1000-1200	Four 3/0 to 500 kcmil
RJ	1600-2500	(8) 1/0 to 750 kcmil or (16) 1/0 to 300 kcmil
NW	1600-3000	(10) 1/0 to 750 kcmil or (20) 1/0 to 300 kcmil

Breaker Positions



NOTE: Breaker and load bus phasing on right positions is A-B-C and on left positions is C-B-A.

NOTE: H, HG, J, JG, and LG-frames when selected with LSIG trip require two mounting spaces (one space for the breaker and one space for the LSIG neutral). These combinations are not reflected in the Multiple Circuit Breaker Combinations table on this page.

Multiple Circuit Breaker Combinations

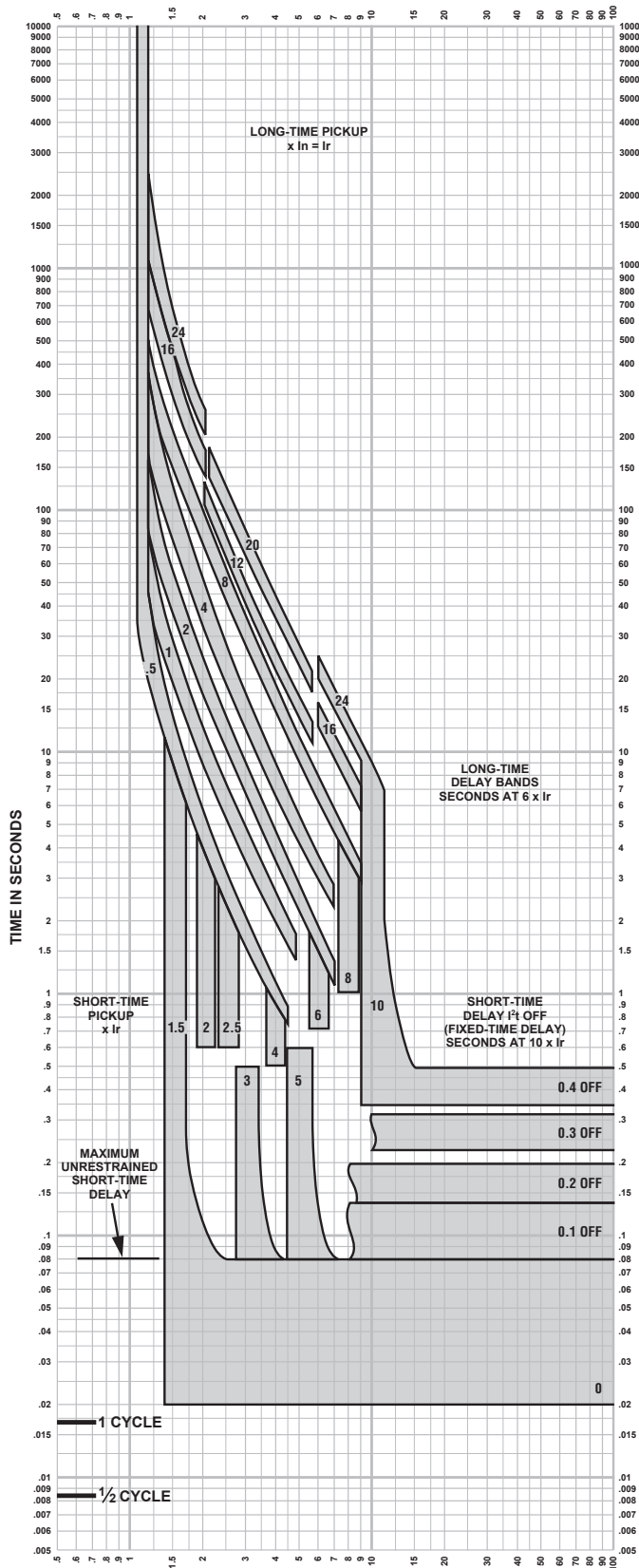
Alternator Model	Positions			
	1 or 5	2 or 6	3 or 7	4 or 8
4M/ 5M/ 7M	H/J			
	H/J	H/J		
	H/J	H/J	H/J	
	H/J	H/J	H/J	H/J
	LA			
	LA	H/J		
	LA	LA		
	LA	H/J	H/J	
	LA	LA	H/J	
	LA	LA	LA	
	LA	H/J	H/J	H/J
	LA	LA	H/J	H/J
	LA	LA	LA	H/J
	LA	LA	LA	LA
	LG			
	LG	H/J		
	LG	LA		
	LG	LG		
	LG	H/J	H/J	
	LG	LA	H/J	
	LG	LA	LA	
	LG	LG	H/J	
	LG	LG	LA	
	LG	LG	LG	
	LG	H/J	H/J	H/J
	LG	LA	H/J	H/J
	LG	LA	LA	H/J
	LG	LA	LA	LA
	LG	LG	H/J	H/J
	LG	LG	LA	H/J
	LG	LG	LA	LA
	LG	LG	LG	H/J
	LG	LG	LG	LA
	LG	LG	LG	LG †
	M/P			
	M/P		H/J	
	M/P		LA	
	M/P		LG	
	M/P	M/P ‡		
	M/P	H/J		H/J
	M/P	LA		H/J
	M/P	LA		LA
	M/P	LG		H/J
	M/P	LG		LA
	M/P	LG		LG †
	R §			
	NW §			
	LOAD BUS KIT §			

† Frame size LG is not available in position 4 with 1219 mm (48 in.) junction box.

‡ Frame sizes M/P are not available in position 3 or 4 with 1219 mm (48 in.) junction box.

§ R breakers, NW breakers, and the load bus kit occupy all four positions on a side.

CURRENT IN MULTIPLES OF I_r (I_r = LONG-TIME SETTING $\times I_n$)



MICROLOGIC® 5.0/6.0 A/P/H TRIP UNIT CHARACTERISTIC TRIP CURVE NO. 613-4

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

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

Curves apply from -30°C to +60°C 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 20 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 the current.
5. For a withstand circuit breaker, instantaneous can be turned OFF. See 613-7 for instantaneous trip curve. See 613-10 for instantaneous override values.
6. Overload indicator illuminates at 100%.

Merlin Gerin
Modicon
Square D
Telemecanique
Federal Pioneer
Federal Pacific
Schneider Electric Brands

Schneider
Electric

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Curve No. 0613TC0004
December 2000
Drawing No. B48095-613-04

POWERPACT® P- and R-Frame Molded Case Circuit Breakers (Standard or 100% rated up to 2500 A)

The most compact and innovative molded case circuit breakers



P-Frame 1200 A



R-Frame

POWERPACT Molded Case Circuit Breakers lead the industry with proven, reliable protection and innovative design. Providing unparalleled performance and control, this generation of P- and R-frame circuit breakers features exclusive MICROLOGIC® Trip Units, which allow for a range of sophisticated applications for metering and monitoring. In addition, units can be interchanged to allow for maximum flexibility and are field-installable for easy upgrades as needed.

The compact P- and R-frame circuit breakers permit smaller footprint and higher density installations using I-LINE® Panelboards and Switchboards. These circuit breakers are available in 100% rated construction up to 2500 A to meet a broad range of commercial and industrial application needs.

Full-Featured Performance

- P-frame – 1200 A available in both standard and 100% ratings with sensor sizes 250–1200 A. Interrupting ratings (AIR) G-35kAIR, J-65kAIR and L-100kAIR at 480 VAC
- R-frame – 2500 A available in both standard and 100% ratings with sensor sizes 600–2500 A. Interrupting ratings (AIR) G-35kAIR, J-65kAIR and L-100kAIR at 480 VAC
- Compact breaker size allows for smaller footprint installations using I-LINE Panelboards and Switchboards. 9" width on P-frame designs and 15" width on R-frame designs provide increased density installations
- Most field-installable accessories are common to all frame sizes for easier stocking and installation
- Selection of four interchangeable MICROLOGIC Trip Units with POWERLOGIC® power metering and monitoring capabilities available in advanced trip units
- Compatible with POWERLOGIC® systems and high amperage power circuit breakers
- Built-in MODBUS® protocol provides an open communications platform and eliminates the need to purchase additional, proprietary network solutions
- Connection options include bus, cable or I-Line for installation flexibility
- Additional options are available for 5-cycle closing, stored energy mechanisms and draw-out mounting of 1200 A breakers

POWERPACT® P- and R-Frame Molded Case Circuit Breakers (Standard or 100% rated up to 2500 A)

Onboard Intelligence

For “smarter breakers,” a range of MICROLOGIC® Trip Units provides advanced functionality, such as a communications interface, and power metering and monitoring capabilities. With the appropriate MICROLOGIC Trip Unit, you can communicate with breakers, gather power information, monitor events and remotely control breakers based on predetermined conditions, leading to substantial savings in electrical system operating costs.

These interchangeable, microprocessor-controlled, plug-in devices provide the next generation of protection, measurement and control functions, delivering not only greater electrical system safety but also improved system integration and coordination.



MICROLOGIC® Trip Units

Choose the Model that Meets Your Needs

MICROLOGIC 3.0 and 5.0

- Basic circuit protection including long-time, instantaneous and optional short-time adjustments

MICROLOGIC 3.0A, 5.0A and 6.0A

- Long-time, instantaneous and optional short-time adjustments
- Integrated ammeter and phase loading bar graph
- LED trip indicator
- Zone selective interlocking with downstream and upstream breakers
- Optional ground-fault protection
- Optional MODBUS® communications interface

MICROLOGIC 5.0P and 6.0P

- Long-time, instantaneous and optional short-time adjustments
- Advanced relay protection (current imbalance, under/over voltage, etc.)
- Inverse Definite Minimum Time Lag (IdmtL) long-time delay curve shaping for improved coordination
- Basic power metering and monitoring functions
- Standard MODBUS communications interface compatibility with POWERLOGIC® installations
- Standard GF alarm on 5.0P. 6.0P has equipment ground-fault tripping protection

MICROLOGIC 5.0H and 6.0H

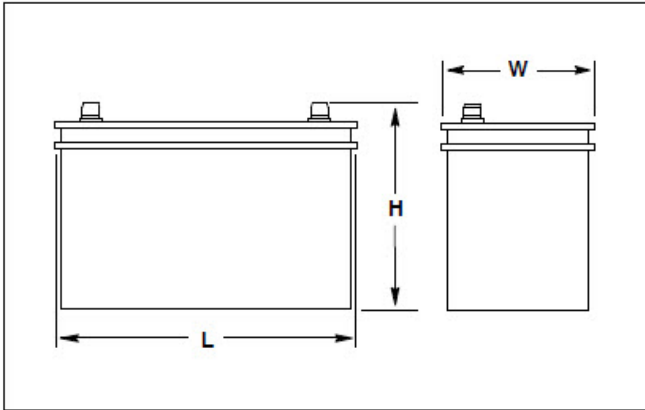
- All 5.0P and 6.0P functions
- Enhanced POWERLOGIC power metering and monitoring capabilities
- Basic power quality (harmonic) measurement
- Waveform capture

Contact your Square D sales representative for additional information. Or, visit www.SquareD.com.





Typical Overall Dimensions

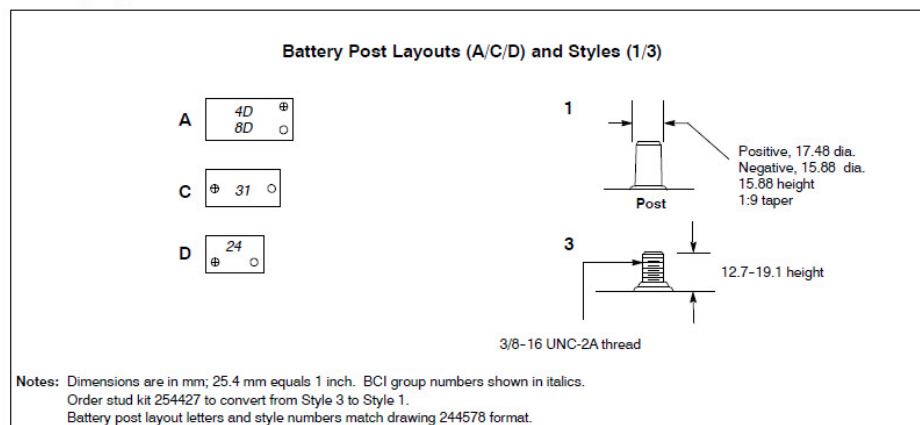


Standard Features

- Rehko 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.
- Tough polypropylene cases protect against life-shortening vibration and impact damage.
- Batteries are rated according to SAE standard J-537.
- All batteries are 12-volts. Kits that contain two or four batteries are available for 24-volt systems and/or systems with redundant starters.
- Wet- and dry-charged batteries have lead-calcium or lead-antimony plates and use sulfuric acid electrolyte. Removable cell covers allow checking of electrolyte specific gravity.
- Absorbant glass mat (AGM) batteries are sealed and maintenance free.
- Batteries are for applications below and above 0°C (32°F).

Charge Type*	Battery Part Number	Battery Qty. per Size	BCI Group Size	Battery SAE Dimension, mm (in.)			Cold Cranking Amps at 18°C (0°F) Min.	Reserve Capacity Minutes at 27° (80°F) Min.	Battery Post Layout and Style
				L	W	H			
Wet	GM106375	2	31	330.2 (13.0)	171.0 (6.8)	239.8 (9.4)	925	180	C/3

Battery Specifications





Industrial Generator Set Accessories

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



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 designed for operation with an engine cranking battery.

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

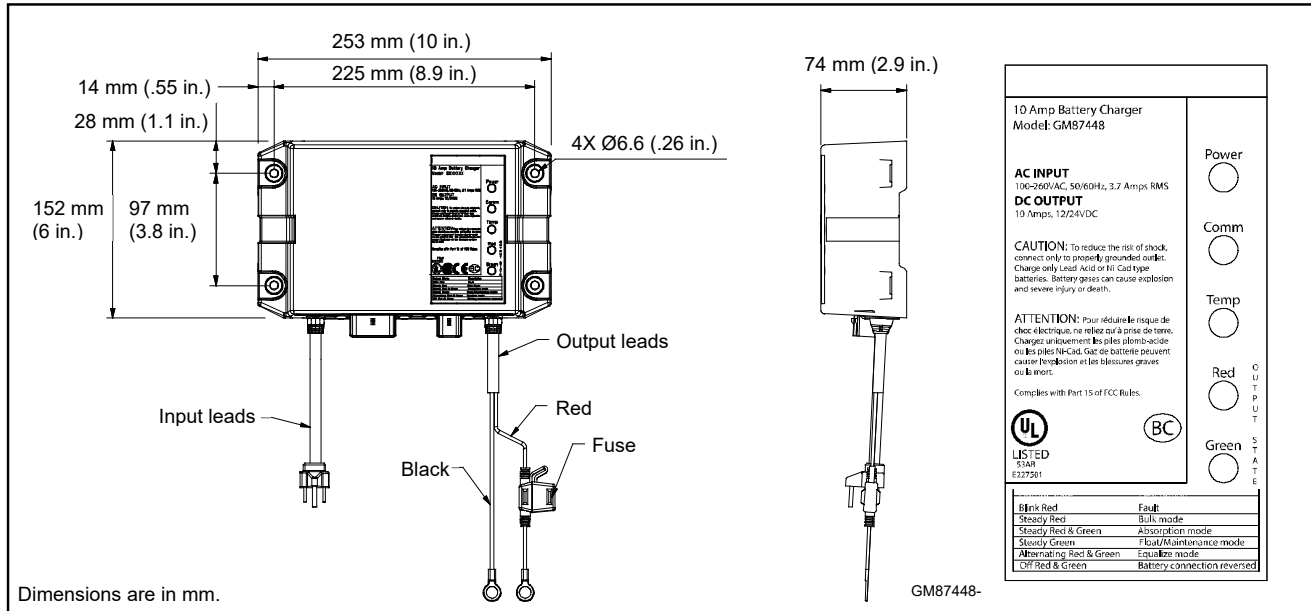
- 12 or 24 VDC output
 - Automatic voltage detection
- Automatic multi-stage charging modes
 - Recovery charge
 - Bulk charge
 - Absorption charge
 - Float charge
 - Equalize charge
- Charges the following type batteries:
 - Flooded lead acid (FLA)
 - AGM
 - Gel cell
 - High performance AGM
 - Nickel-cadmium (NiCad)
- 5 LED status indicators
- Durable potted assembly for waterproofing and vibration resistance
- Reverse-polarity protection
- Short-circuit protection
- Electronically limited output current
- 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 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		Overall Dimensions W x D x H	Shipping Weight	
Volts (Nominal)	Amps	Volts (Nominal)	Amps		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



Industrial Generator Set Accessories

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

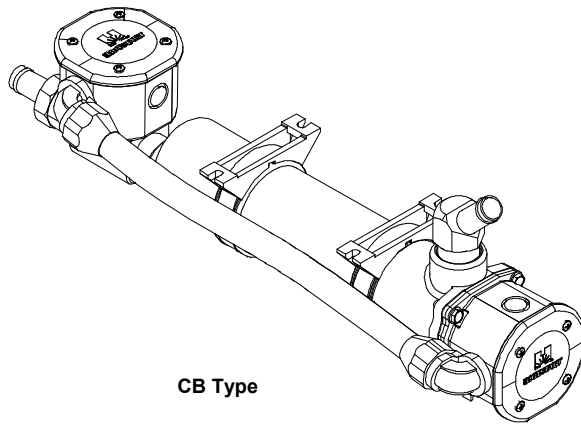
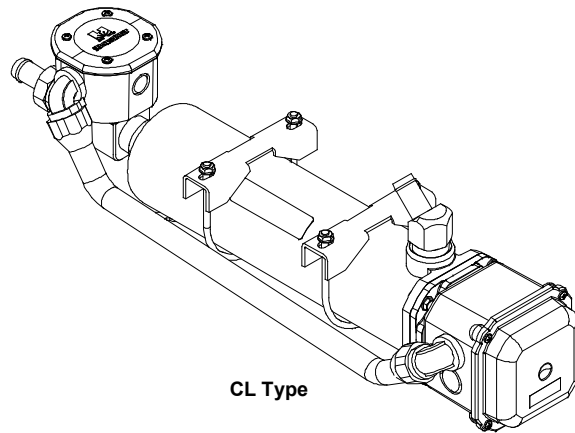


Specifications

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 $\pm 1\%$; current is electronically limited)
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 Storage Relative Humidity Salt Spray Testing Corrosion Resistant	-20° to 70°C (-4° to 158° F) -40° to 85°C (-40° to 185° F) 5 to 95% (non-condensing) ASTM B117 From battery gases

Enclosure Environmental Resistant	From rain, snow, dust, and dripping water (IP-64)
Battery Connections Lead Length Battery Connections	1.8 m (6 ft.) red and black leads 9.5 mm (3/8 in.) ring terminals
AC Power Connections Lead Length Storage	1.8 m (6 ft.) Standard US style 3-prong AC plug
Available Options Temperature compensation	

Availability is subject to change without notice. Discovery Energy, LLC and its affiliates dba Rehiko reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local authorized generator set distributor for availability.

**CB Type****CL Type****Block Heater Kit, Typical****Applicable Models**

- KD230-KD300
- 180-200RZXB
- 180-200REZXB
- 230-275REOZJE
- 300-500REOZJ
- 350-500REOZJB
- 350-500REOZJC
- 350-400REOZJD
- 500REOZVC
- 550-600REOZVB

Standard Features

- UL-C/US listed
- CE compliant
- Controls for automatic operation
- Compact design
- Easy to install

Description

The engine block heater kit heats the engine coolant in cold ambient, warming the cylinders, oil, and charge air circuit which all help to give a faster starting time. The engine block heater uses thermosiphon action to circulate warm coolant into the engine and supplies constant heating to the engine. The engine block heater helps to extend element life and gives a significant reduction in electrical consumption.

The engine block heater has a fixed setting thermostat that turns ON when the engine coolant temperature reaches 27°C (80°F) and turns OFF when the engine coolant temperature reaches 38°C (100°F).

The engine block heater kit is recommended for ambient temperatures below 10°C (50°F).

The engine block heater kits are available in 120 V, 208 V, 240 V, and 480 V versions.



Industrial Generator Set Accessories

Engine Block Heater Kits

Block Heater Specifications

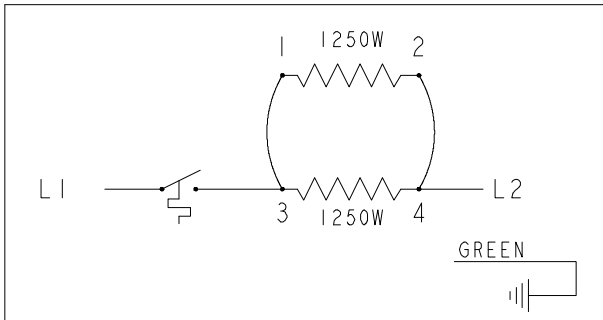
Heating Fluid	Water, Coolant Mix (50% Glycol/50% Water)
Thermostat Temperature Range	27°-38°C (80°-100°F)
Temperature High Limit	96°C (205°F)
Max. Pressure	125 psi (860 kPa)
Inlet/Outlet Plumbing	1 in. NPT
System Ingress	NEMA 4

Specifications

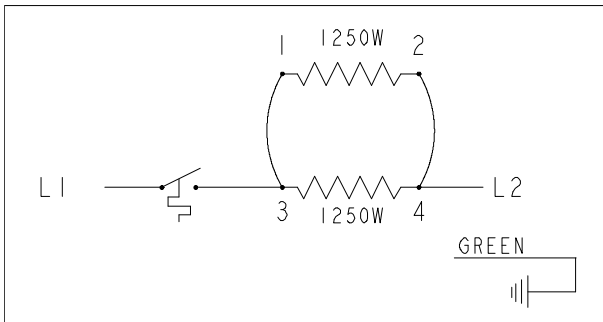
Block Heater Kit Number	Component	Watts	Voltage	Phase
GM75809-KA1	GM76113	2500	90-120	1
GM75809-KA2	GM76114	2500	190-208	
GM75809-KA3	GM76115	2500	210-240	
GM75809-KA4	GM76116	2500	380-480	
GM76120-KA1	GM76113	2500	90-120	
GM76120-KA2	GM76114	2500	190-208	
GM76120-KA3	GM76115	2500	210-240	
GM76120-KA4	GM76116	2500	380-480	
GM79186-KA1	GM79182	4000	190-208	
GM79186-KA2	GM79183	4000	210-240	
GM79186-KA3	GM79184	4000	380-480	
GM79186-KP1	GM79182	4000	190-208	
GM79186-KP2	GM79183	4000	210-240	
GM79186-KP3	GM79184	4000	380-480	
GM79187-KA1	GM79182	4000	190-208	
GM79187-KA2	GM79183	4000	210-240	
GM79187-KA3	GM79184	4000	380-480	
GM79187-KP1	GM79182	4000	190-208	
GM79187-KP2	GM79183	4000	210-240	
GM79187-KP3	GM79184	4000	380-480	
GM84820-KA1	GM76113	2500	90-120	
GM84820-KA2	GM76114	2500	190-208	
GM84820-KA3	GM76115	2500	210-240	
GM84820-KA4	GM76116	2500	380-480	
10305011701-KA1	GM76113	2500	90-120	
10305011701-KA2	GM76114	2500	190-208	
10305011701-KA3	GM76115	2500	210-240	

Wiring Diagram

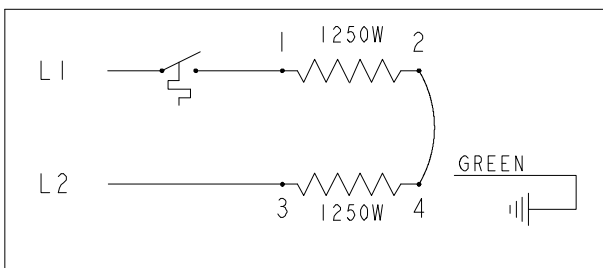
2500 Watts



208 VAC single phase-parallel



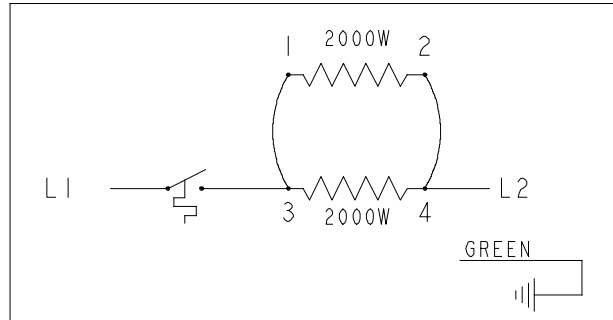
240 VAC single phase-parallel



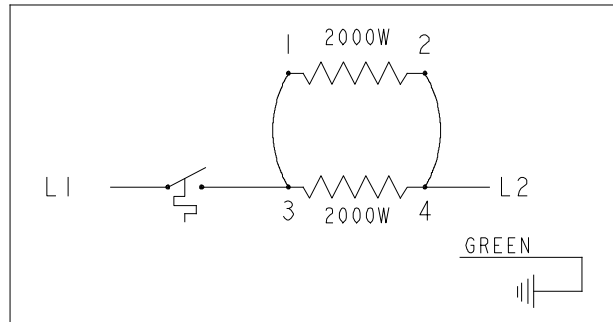
480 VAC single phase-parallel

GM76113

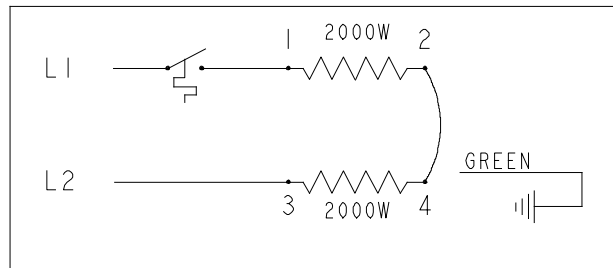
4000 Watts



208 VAC single phase-parallel



240 VAC single phase-parallel



480 VAC single phase-parallel

GM79182

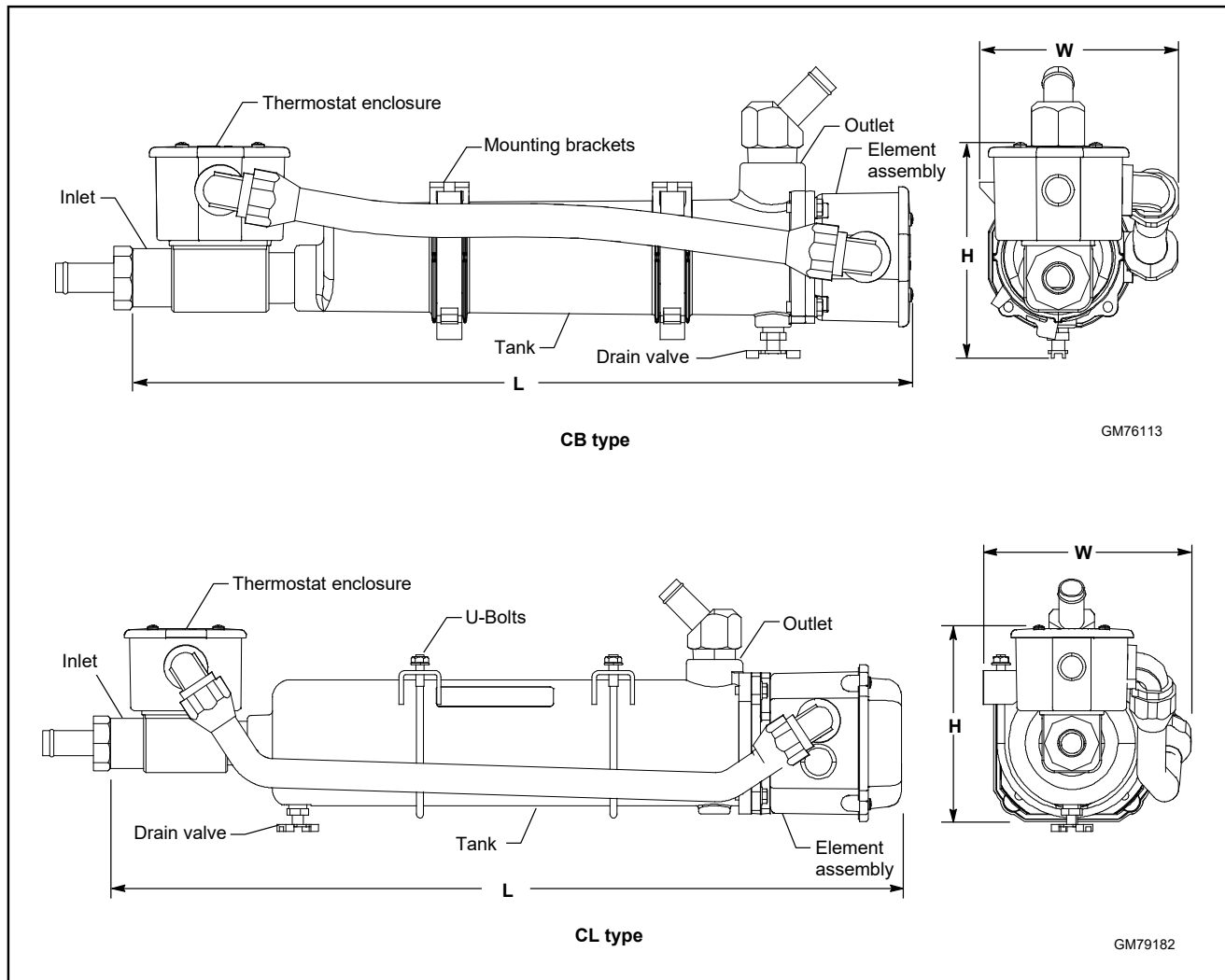
Dimensions and Weights

CB type block heater size, L x H x W, mm (in): 510 x 132 x 129 (20.1 x 5.2 x 5.1)

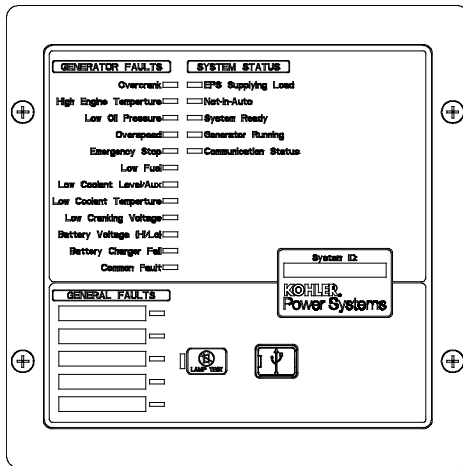
CL type block heater size, L x H x W, mm (in): 597 x 147 x 158 (23.5 x 5.8 x 6.2)

CB type block heater weight, kg (lb): 3 (6.9)

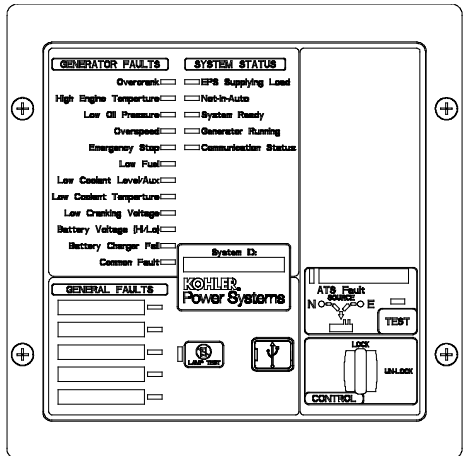
CL type block heater weight, kg (lb): 4.5 (10)



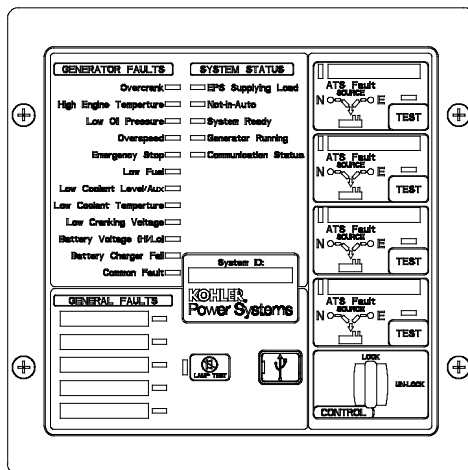
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RSA III



RSA III with a Single ATS Control



RSA III with Four ATS Controls

Remote Serial Annunciator III (RSA III) for Rehlko Controllers

- Monitors the generator set equipped with one of the following controllers:

APM402	Decision-Maker® 3000
APM603	Decision-Maker® 3500
APM802	Decision-Maker® 6000
Decision-Maker® 3+	Decision-Maker® 8000
Decision-Maker® 550	KPC 1000
 - Allows monitoring of the common alarm, remote testing of the automatic transfer switch, and monitoring of the normal/emergency source for up to four ATS with any of the following controllers:

Decision-Maker® MPAC® 750, 1200, and 1500
MPAC® 1000 and 1500
 - 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 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)

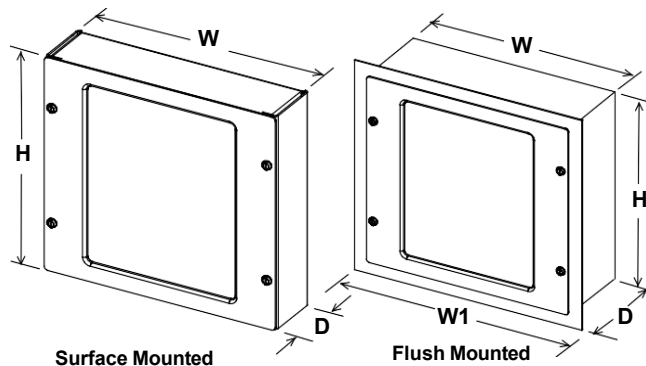
Flush Mounted (Inside Wall):

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 authorized distributors and dealers.

Modbus® is a registered trademark of Schneider Electric.



Surface Mounted

Flush Mounted



Industrial Generator Set Accessories

Remote Serial Annunciator III (RSA III)

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/Yellow	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 (common warning) LEDs slow flash when activated except steady on with EPS supplying load and high battery voltage.
Red (common fault) LEDs slow flash when activated except fast flash with loss of communication and not-in-auto.



Industrial Generator Set Accessories

Remote Serial Annunciator III (RSA III)

Specifications

- LED indicating lights for status, warning, and/or shutdown.
- Power source with circuit protection: 12- or 24-volt DC
- Power source with 120/208 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
 - EN611-4-4 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 the load (APM402, APM603, APM802, and Decision-Maker® 550, 3000, 3500, 6000, and 8000 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 the generator set controller is not set to automatic mode.

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 (can be configured as warnings or shutdowns). 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 via PC using SiteTech™ setup software.

Availability is subject to change without notice. Discovery Energy, LLC and its affiliates dba Rehiko reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local authorized generator set distributor for availability.

Alternator Data

TECHNICAL INFORMATION BULLETIN

Alternator Data Sheet

Alternator Model: 5M4028
14-APR-20

Kilowatt ratings at	1800 RPM	60 Hertz	10 Leads
kW (kVA)	3 Phase	0.8 Power Factor	Dripproof or Open Enclosure
	CONTINUOUS ^{1, 2}		STANDBY ^{1, 2}
Voltage*	NEMA B / 80 °C	NEMA F / 105 °C	NEMA H / 125 °C
240/480	445 (556)	535 (669)	560 (700)
220/440	470 (588)	535 (669)	560 (700)
208/416	450 (563)	510 (638)	525 (656)
200/400	434 (543)	492 (615)	500 (625)
190/380	415 (519)	470 (588)	470 (588)

^① Rise by resistance method, Mil-Std-705, Method 680.1b.

^② Machine rated for Max Ambient of 40 °C, Max Altitude 3300 ft

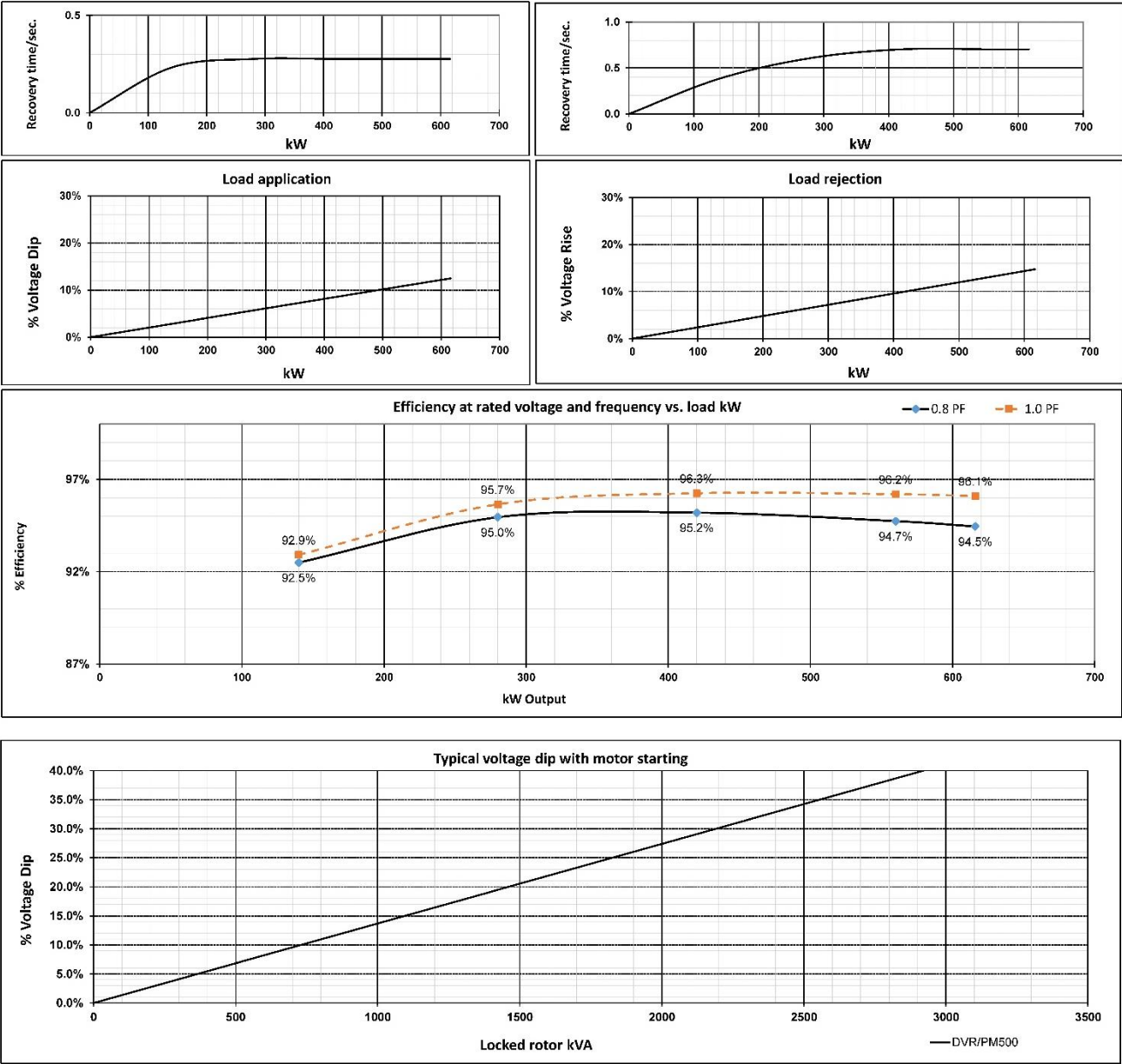
Submittal Data: 480 Volts*, 560 kW, 700 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase
High Wye CONNECTION

Mil-Std-705B Method	Description	Value	Units	Mil-Std-705C Method	Description	Value	Units
301.1b	Insulation Resistance	>1.5 Meg	Ohms	505.3b	Overspeed	2250	RPM
	High Potential Test			507.1c	Phase Sequence CCW-ODE	ABC	
302.1a	Main Stator	1960	Volts	508.1c	Voltage Balance, L-L or L-N	0.2%	
	Main Rotor	1500	Volts	601.4a	L-L Harmonic Max - Total (Distortion Factor)	5.0%	
	Exciter Stator	1500	Volts		L-L Harmonic Max - Single	3.0%	
	Exciter Rotor	1500	Volts	601.4a	Deviation Factor	5.0%	
	PMG Stator	1500	Volts	601.1c			
401.1a	Stator Resistance, Line to Line High Wye Connection	0.00920	Ohms	---	TIF (1960 Weightings)	<50	
	Rotor Resistance	0.423	Ohms	---	THF (IEC, BS & NEMA Weightings)	<2%	
	Exciter Stator	23	Ohms	---	Winding Pitch	2/3	
	Exciter Rotor	0.045	Ohms				
	PMG Stator	2.1	Ohms				
410.1a	No Load Exciter Field Amps at 480 Volts Line to Line	0.73	A DC	Additional Prototype Mil-Std Methods are Available on Request.			
420.1a	Short Circuit Ratio	0.653					
421.1a	Xd Synchronous Reactance	2.680	PU	--	Generator Frame	572	
		0.882	Ohms	--	Type	MagnaMax	
422.1a	X2 Negative Sequence React.	0.213	PU	--	Insulation	Class H	
		0.070	Ohms	--	Coupling - Single Bearing	Flexible	
423.1a	X0 Zero Sequence Reactance	0.051	PU	--	Amortisseur Windings	Full	
		0.017	Ohms	--	Excitation	Ext. Voltage Regulated, Brushless	
425.1a	X'd Transient Reactance	0.144	PU	--	Voltage Regulator	DVR2400	
		0.047	Ohms	--	Voltage Regulation	0.25%	
426.1a	X''d Subtransient Reactance	0.121	PU				
		0.040	Ohms				
--	Xq Quadrature Synchronous Reactance	1.080	PU	--	Cooling Air Volume	1480	CFM
		0.355	Ohms	--	Heat rejection rate	1769	Btu's/min
427.1a	T'd Transient Short Circuit Time Constant	0.12	Sec	--	Full load current	842	Amps
				--	Minimum Input hp required	792.3	HP
428.1a	T''d Subtransient Short Circuit Time Constant	0.009	Sec	--	Full load torque	2311	Lb-ft
				--	Efficiency at rated load :	94.7%	
430.1a	T'do Transient Open Circuit Time Constant	1.95	Sec				
432.1a	Ta Short Circuit Time Constant of Armature Winding	0.021	Sec	--	Weight	3050	lbs

* Voltage refers to wye (star) connection, unless otherwise specified.

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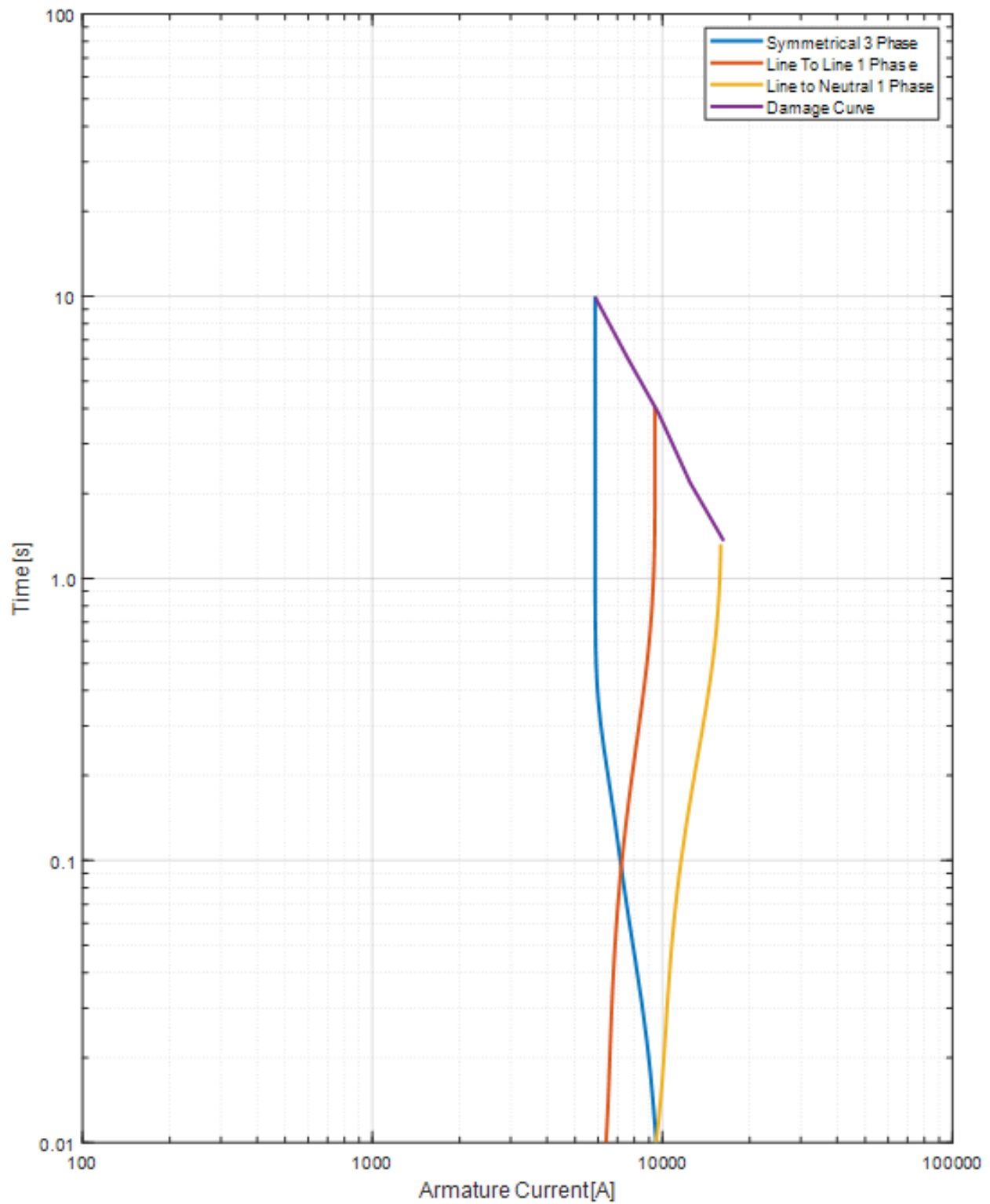
TYPICAL DYNAMIC CHARACTERISTICS



Voltage refers to wye (star) connection, unless otherwise specified..

SHORT CIRCUIT DECREMENT CURVE 60 Hz, Low Wye or Delta Connection

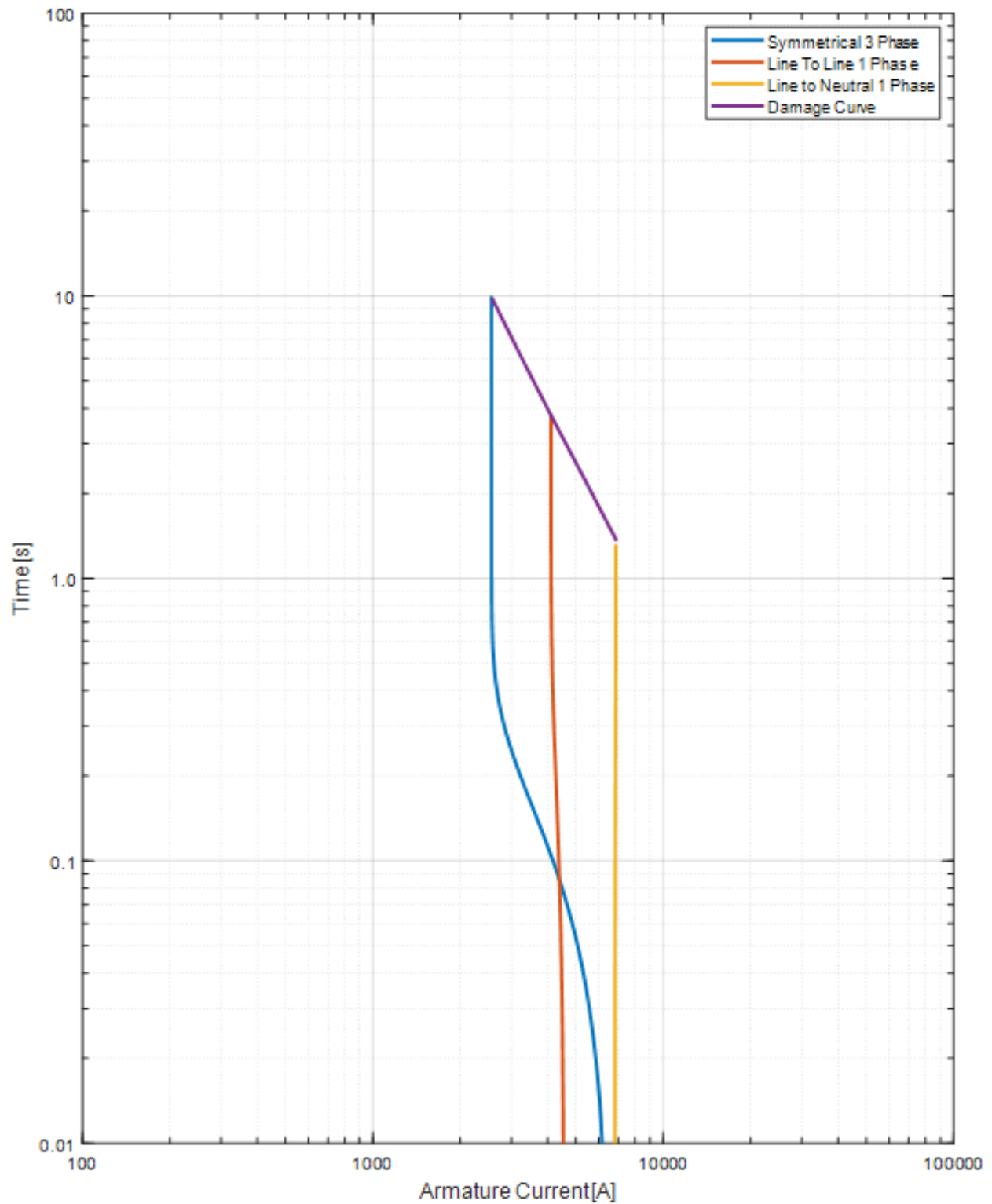
Full Load Current: 1943 Amps Steady State S.C. Current: 5829 Amps Max. 3 ph. Symm. S.C. Current: 11994 Amps



NOTE: Symmetrical component values are shown, maximum asymmetrical values are 1.732 times the symmetrical values.

SHORT CIRCUIT DECREMENT CURVE 60 Hz, High Wye Connection

Full Load Current: 842 Amps Steady State S.C. Current: 2526 Amps Max. 3 ph. Symm. S.C. Current: 6959 Amps



NOTE: Symmetrical component values are shown, maximum asymmetrical values are 1.732 times the symmetrical values.

Cooling Data

TECHNICAL INFORMATION BULLETIN

Generator Set Cooling System Data Sheet

500REOZJC 60Hz (Standby Duty)	50°C Ambient Temperature Cooling System								
	Total external restriction on open unit ⁷	Pa <i>(in.H₂O)</i>	0 (0)	125 (0.5)	187 (0.75)	250 (1)	312 (1.25)	375 (1.5)	Enclosed Units
	Maximum allowable ambient temperature	°C <i>(°F)</i>	50 (122)	47 (117)	45 (113)	43 (109)	42 (108)	NA (NA)	45 (113)
	Cooling system airflow	m³/min <i>(ft³/min)</i>	435 (15400)	410 (14500)	395 (13900)	380 (13400)	365 (12900)	NA (NA)	NA (NA)

1. The data shown above is the anticipated cooling performance for a typical generator set when following proper installation techniques.
2. Cooling performance is based on operation at 100 m (328 ft.) above sea level. For elevations higher than 100 m (328 ft.), typical cooling performance derate is 1°C (1.8°F) per 250 m (820 ft.).
3. For high ambient conditions, check TIB-101 for the generator set power output derate schedule.
4. Incorrect installation, improper operation, fouling of the cooling system, and other variable conditions may reduce cooling performance.
5. The company-manufactured sound-enclosed models are rated in free air with no additional restriction. Consult factory for other variants or conditions such as additional ducting or hoods.
6. Performance is based on a 50/50 water and ethylene glycol mixture.
7. Total external restriction includes restriction upstream and downstream of the unit – any ducting supplying intake air to the unit and any ducting for the discharge.

Sound Data

TECHNICAL INFORMATION BULLETIN

Generator Set Sound Data Sheet

			Sound Pressure Data in dB(A)				
Generator Set Model	Hz	Load	Raw Exhaust	Open Unit, Isolated Exhaust	Weather Enclosure	Level 1 Sound Enclosure	Level 2 Sound Enclosure
500REOZJC	60	100% Load	119.5	94.8	92.9	84.7	76.0
		No Load	102.6	90.3	88.4	76.8	70.9

Note: Sound pressure data is the logarithmic average of eight perimeter measurement points at a distance of 7 m (23 ft.), except Raw Exhaust data which is a single measurement point at 1 m (3.3 ft.) from the mouth of a straight pipe exhaust.

500REOZJC		60 Hz		Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
100% Load	7 (23)	Level 2 Sound	3:00	56.0	69.5	65.4	67.1	68.6	65.1	56.3	48.4	74.6
			1:30	54.8	69.0	67.0	69.5	70.7	66.4	58.5	50.8	76.0
			12:00-Engine	56.0	65.7	68.6	71.5	69.5	69.8	64.8	55.7	76.7
			10:30	52.9	69.3	67.4	70.7	70.3	68.3	62.2	53.5	76.6
			9:00	56.0	70.4	69.6	68.6	68.8	68.3	60.7	51.9	76.4
			7:30	56.1	72.3	68.0	67.8	68.2	66.6	56.4	54.5	76.2
			6:00-Alternator	59.4	69.9	69.7	70.3	64.9	66.1	58.9	57.5	75.9
			4:30	54.6	72.1	67.2	66.0	68.1	65.8	54.2	50.0	75.6
			8-pos. log avg.	56.1	70.2	68.1	69.3	68.9	67.3	60.2	53.7	76.0

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Octave Band Center Frequency (Hz)							Overall Level	
				63	125	250	500	1000	2000	4000		8000
100% Load	7 (23)	Level 1 Sound	3:00	62.4	72.4	68.8	74.6	75.4	74.4	71.2	64.5	81.3
			1:30	60.8	70.3	72.4	78.2	80.9	78.7	74.8	68.5	85.2
			12:00-Engine	64.8	73.1	70.3	80.1	82.8	81.1	76.9	69.9	87.1
			10:30	59.0	71.5	72.3	78.3	81.2	79.4	75.5	68.7	85.6
			9:00	63.4	73.0	72.2	76.5	79.7	77.7	74.4	67.4	84.3
			7:30	61.9	74.5	71.0	77.6	79.3	77.0	72.7	67.2	84.1
			6:00-Alternator	63.9	73.7	71.8	77.0	79.7	79.9	70.5	65.2	84.7
			4:30	62.4	74.9	72.4	75.9	76.9	75.1	70.3	63.0	82.6
			8-pos. log avg.	62.6	73.1	71.6	77.6	80.0	78.4	73.9	67.3	84.7

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	3:00	1:30	12:00 Eng.	10:30	9:00	7:30	6:00 Alt.	4:30	8-pos. log avg.
100% Load	7 (23)	Weather	Overall Levels	93.8	92.5	92.0	94.1	94.5	93.8	87.6	92.0	92.9

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)		Measurement Clock Position	Octave Band Center Frequency (Hz)							Overall Level	
				63	125	250	500	1000	2000	4000		8000
100% Load	7 (23)	Open Unit, Isolated Exhaust	3:00	60.2	71.0	81.2	84.3	88.3	91.6	86.9	87.8	95.7
			1:30	57.6	69.6	86.6	86.9	87.5	87.9	83.9	85.1	94.4
			12:00-Engine	66.3	73.5	87.1	83.0	88.7	88.7	82.6	77.5	93.9
			10:30	64.9	74.7	87.5	85.1	90.3	91.3	86.4	81.8	96.0
			9:00	66.1	75.4	85.3	85.3	89.3	93.2	86.3	84.5	96.4
			7:30	64.1	73.4	86.1	82.8	89.1	92.2	85.8	82.3	95.7
			6:00-Alternator	64.5	73.7	82.8	82.9	81.2	84.0	77.5	74.3	89.5
			4:30	60.9	70.8	79.9	82.4	87.6	89.9	85.3	83.7	93.9
			8-pos. log avg.	63.9	73.1	85.3	84.4	88.3	90.6	85.0	83.6	94.8

				Sound Pressure Levels, dB(A)							
Load	Distance, m (ft)	Exhaust	Octave Band Center Frequency (Hz)								Overall Level
			63	125	250	500	1000	2000	4000	8000	
100% Load	1 (3.3)	Raw Exhaust (No Silencer)	94.7	101.9	106.7	107.4	109.4	114.1	114.4	111.1	119.5

500REOZJC		60 Hz		Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
No Load	7 (23)	Level 2 Sound	3:00	52.5	61.6	63.0	62.3	63.5	56.8	47.8	40.9	69.1
			1:30	50.9	63.5	64.8	62.6	66.3	58.0	48.1	41.4	70.8
			12:00-Engine	52.2	62.4	65.6	62.2	64.2	57.6	48.8	39.3	70.2
			10:30	50.8	63.4	63.3	63.2	63.8	57.8	47.9	40.7	69.8
			9:00	53.2	62.3	67.6	61.2	62.1	59.1	48.6	41.4	70.6
			7:30	52.9	63.4	67.5	60.9	63.6	61.0	49.3	43.3	71.1
			6:00-Alternator	56.8	66.0	70.5	64.7	63.6	60.8	54.7	49.6	73.5
			4:30	52.9	64.8	64.8	60.8	64.2	59.9	47.1	42.1	70.4
8-pos. log avg.			53.2	63.6	66.6	62.4	64.1	59.1	49.8	43.7	70.9	

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
No Load	7 (23)	Level 1 Sound	3:00	53.4	65.3	69.2	69.1	67.5	61.8	53.9	47.1	74.4
			1:30	53.7	66.4	70.8	69.6	71.1	63.0	55.5	49.4	76.1
			12:00-Engine	53.6	65.0	66.8	70.5	67.4	62.6	56.1	47.3	74.3
			10:30	55.4	67.2	69.6	69.8	69.5	63.9	56.5	49.8	75.6
			9:00	56.6	67.1	70.3	66.7	67.0	63.0	54.8	47.0	74.5
			7:30	54.4	68.7	71.3	69.3	71.0	66.6	59.3	53.9	76.8
			6:00-Alternator	58.2	70.8	70.6	72.3	77.5	75.0	65.2	57.7	81.2
			4:30	56.7	69.0	70.2	70.1	70.6	66.3	58.6	50.9	76.6
			8-pos. log avg.	55.6	67.8	70.0	69.9	71.7	68.0	59.2	52.1	76.8

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Enclosure	Measurement Clock Position	3:00	1:30	12:00 Eng.	10:30	9:00	7:30	6:00 Alt.	4:30	8-pos. log avg.
No Load	7 (23)	Weather	Overall Levels	88.0	89.5	89.6	90.3	88.3	88.2	83.6	86.4	88.4

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)		Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
No Load	7 (23)	Open Unit, Isolated Exhaust	3:00	55.4	66.8	80.9	81.4	85.2	84.4	79.6	70.8	89.9
			1:30	50.7	66.0	86.3	85.9	84.3	83.2	77.6	71.1	91.4
			12:00-Engine	57.2	68.7	87.2	80.3	86.9	83.3	77.6	71.5	91.5
			10:30	57.5	68.8	87.5	81.0	87.0	85.2	80.4	73.0	92.2
			9:00	56.9	70.3	84.4	80.3	84.4	84.4	78.8	71.0	90.2
			7:30	55.8	68.4	85.6	78.1	84.2	83.9	77.8	69.5	90.1
			6:00-Alternator	56.4	67.4	82.4	77.1	78.4	76.8	69.3	60.0	85.5
			4:30	56.6	68.4	79.6	78.9	83.0	83.7	77.4	67.9	88.3
			8-pos. log avg.	56.2	68.3	85.0	81.2	84.8	83.6	78.1	70.4	90.3

				Sound Pressure Levels, dB(A)							
Load	Distance, m (ft)	Exhaust	Octave Band Center Frequency (Hz)								Overall Level
			63	125	250	500	1000	2000	4000	8000	
No Load	1 (3.3)	Raw Exhaust (No Silencer)	80.2	87.3	95.1	95.3	95.3	97.2	92.7	84.2	102.6

Emissions Data

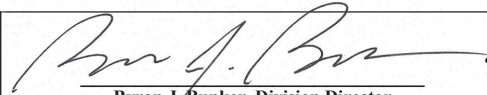


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2025 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: Deere & Company
(U.S. Manufacturer or Importer)
Certificate Number: SJDXL13.5132-009

Effective Date:
06/17/2024
Expiration Date:
12/31/2025


Byron J. Bunker, Division Director
Compliance Division

Issue Date:
06/17/2024
Revision Date:
N/A

Model Year: 2025
Manufacturer Type: Original Engine Manufacturer
Engine Family: SJDXL13.5132

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 560<kW<=2237
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Electronic Control, Smoke Puff Limiter, Engine Design
Modification, Non-standard Non-After Treatment Device Installed

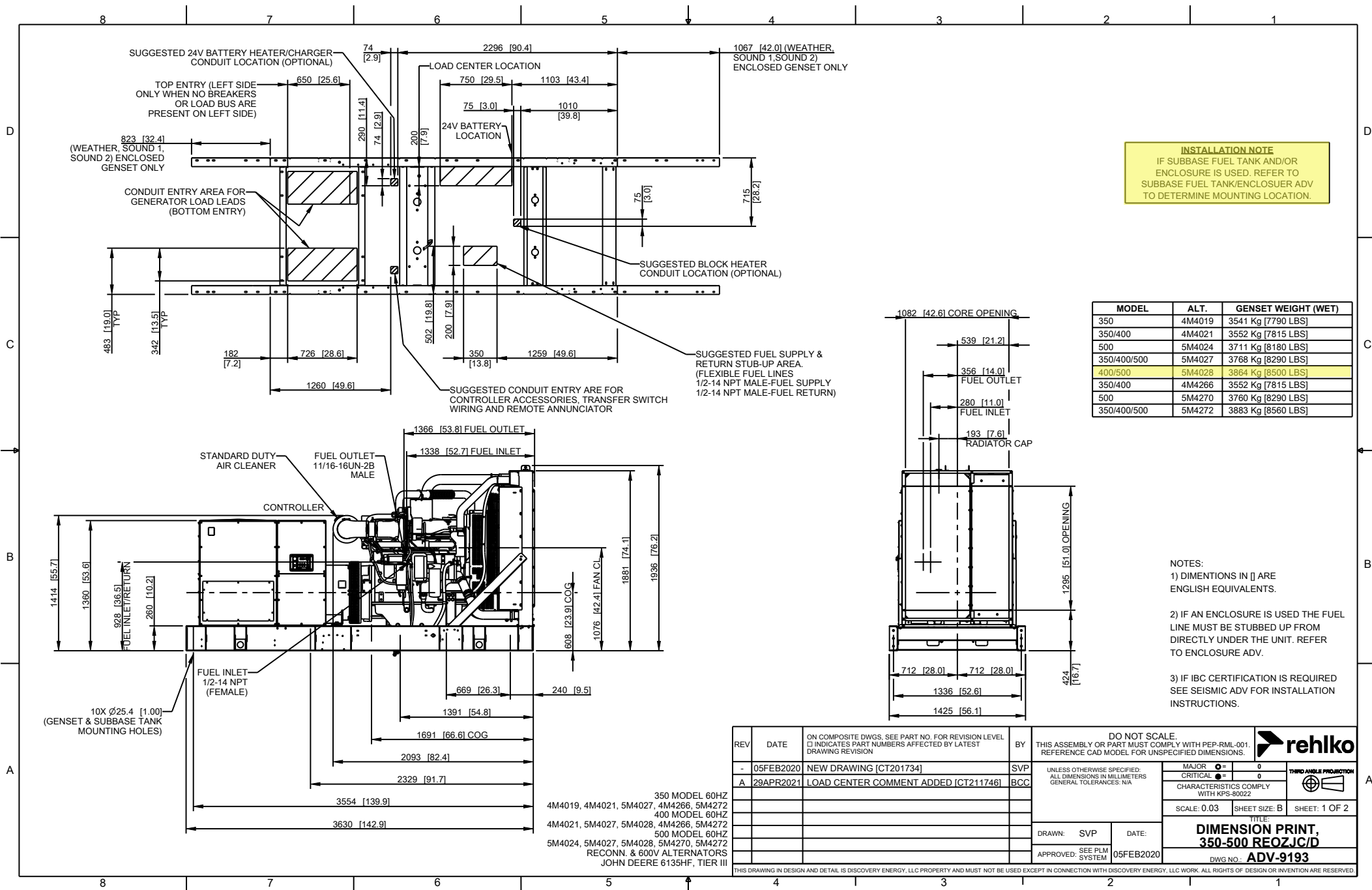
Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform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

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

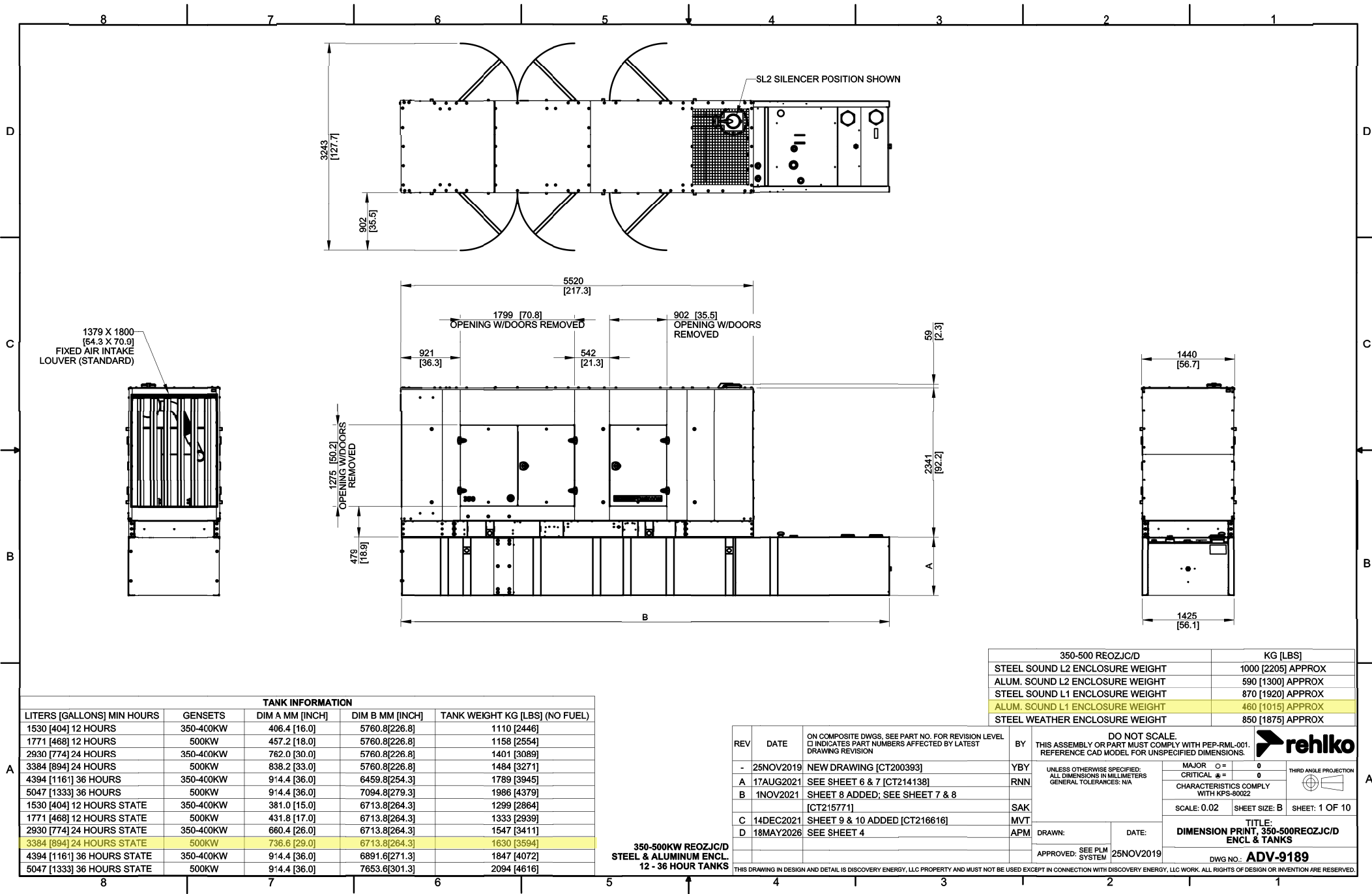
It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified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

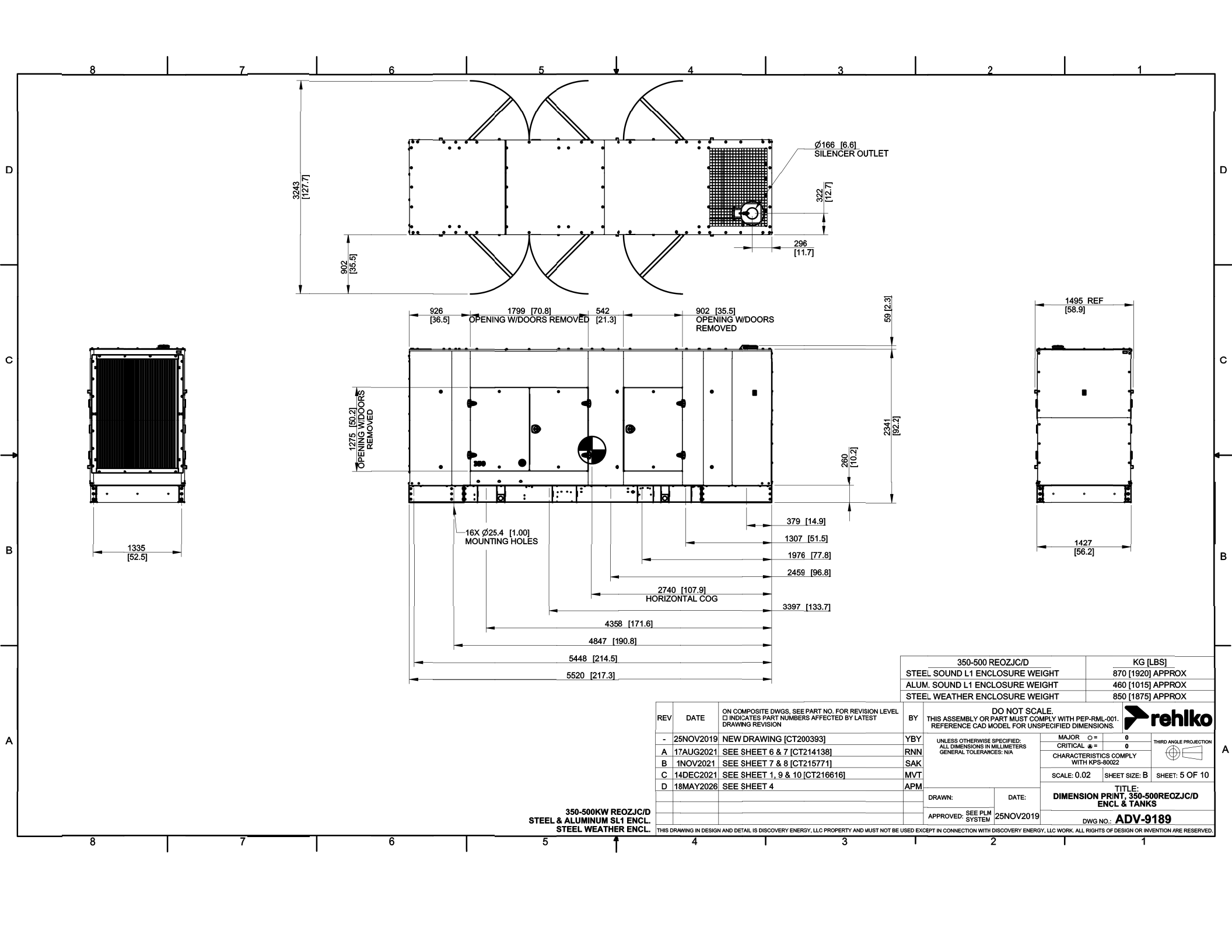
This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Dimensional Drawings

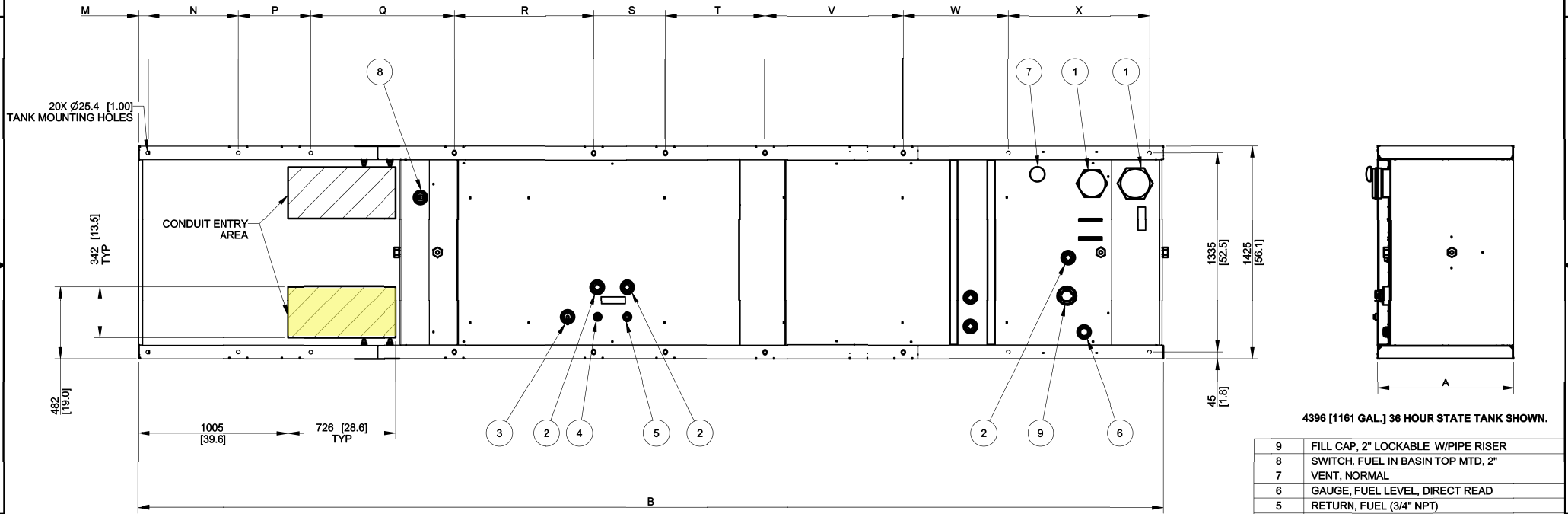


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TANK INFORMATION													
LITERS [GALLONS] MIN HOURS	GENSETS	DIM A MM [INCH]	DIM B MM [INCH]	M	N	P	Q	R	S	T	V	W	X
1530 [404] 12 HOURS	350-400KW	406.4 [16.0]	5780.8 [226.8]										
1771 [468] 12 HOURS	500KW	457.2 [18.0]	5780.8 [226.8]										
2930 [774] 24 HOURS	350-400KW	762.0 [30.0]	5780.8 [226.8]									931.5 [36.67]	523.9 [20.63]
3384 [894] 24 HOURS	500KW	838.2 [33.0]	5780.8 [226.8]										
4394 [1161] 36 HOURS	350-400KW	914.4 [36.0]	6459.8 [254.3]									574.6 [22.62]	648.3 [25.52]
5047 [1333] 36 HOURS	500KW	914.4 [36.0]	7094.8 [279.3]									577.0 [22.72]	576.6 [22.70]
1530 [404] 12 HOURS STATE	350-400KW	381.0 [15.0]	6713.8 [264.3]									664.2 [26.15]	812.7 [32.00]
1771 [468] 12 HOURS STATE	500KW	431.8 [17.0]	6713.8 [264.3]										
2930 [774] 24 HOURS STATE	350-400KW	660.4 [26.0]	6713.8 [264.3]									704.3 [27.73]	772.6 [30.42]
3384 [894] 24 HOURS STATE	500KW	736.6 [29.0]	6713.8 [264.3]										
4394 [1161] 36 HOURS STATE	350-400KW	914.4 [36.0]	6891.6 [271.3]									950.4 [37.42]	
5047 [1333] 36 HOURS STATE	500KW	914.4 [36.0]	7653.6 [301.3]									891.3 [35.09]	821.1 [32.33]



ITEM	DESCRIPTION
9	FILL CAP, 2\" LOCKABLE W/PIPE RISER
8	SWITCH, FUEL IN BASIN TOP MTD, 2\"
7	VENT, NORMAL
6	GAUGE, FUEL LEVEL, DIRECT READ
5	RETURN, FUEL (3/4\" NPT)
4	SUPPLY, FUEL (1/2\" NPT)
3	GAUGE, FUEL LEVEL, W/ SENDER
2	PLUG, PIPE (2\" NPT)
1	CAP, EMERGENCY VENT

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL □ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY	DO NOT SCALE. THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001. REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS.			
-	25NOV2019	NEW DRAWING [CT200393]	YBY	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A			
A	17AUG2021	(C-8) 20X Ø25.4 [1.00] ADDED, SEE SHEET 7 [CT214138]	RNN				
B	1NOV2021	SEE SHEET 7 & 8 [CT215771]	SAK				
C	14DEC2021	SEE SHEET 1, 9 & 10 [CT216616]	MVT				
D	18MAY2026	SEE SHEET 4	APM				
				DRAWN:	DATE:	25NOV2019	
				APPROVED: SEE PLM SYSTEM			
				DWG NO.: ADV-9189			

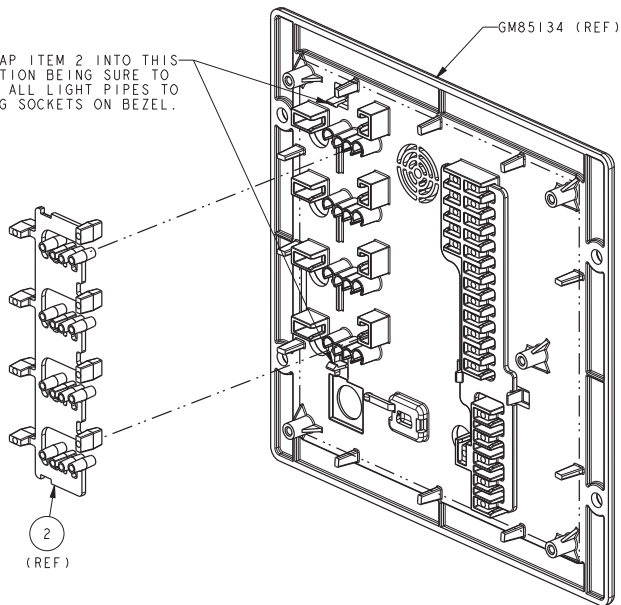
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350-500KW REOZJC/D ENCLOSED
12 - 36 HOUR TANKS

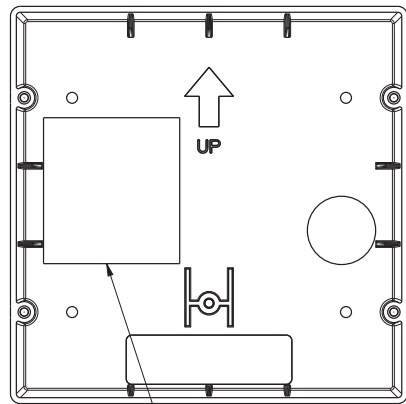
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8 7 6 5 4 3 2 1

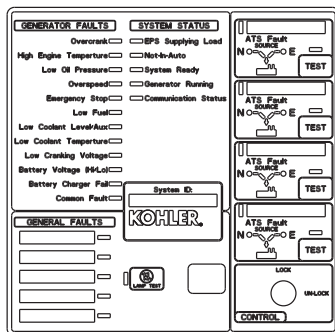
SNAP ITEM 2 INTO THIS LOCATION BEING SURE TO LINE-UP ALL LIGHT PIPES TO MATCHING SOCKETS ON BEZEL.



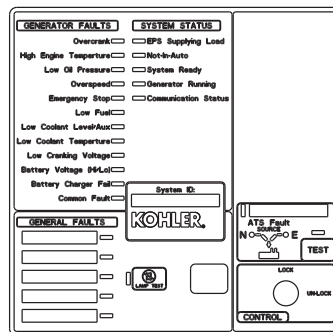
BACK VIEW OF BEZEL
SCALE 1.000



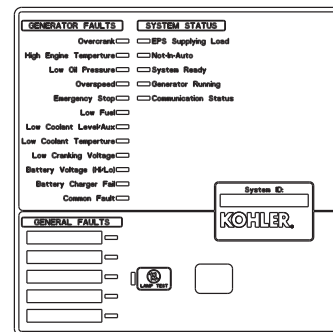
VIEW B
FRONT OF BOX



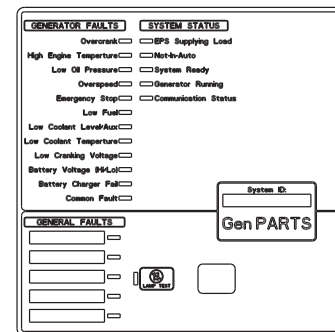
ITEM 1
(P/N: GM85127 REF)



ITEM 1
(P/N: GM85131 REF)



ITEM 1
(P/N: GM85132 REF)



ITEM 1
(P/N: GM85133 REF)

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED:	1) DIMENSIONS ARE IN MILLIMETERS	2) TOLERANCES ARE:	3) SURFACE FINISH	4) MAX. ANGLE IS 0° 30'	5) TITLE	6) SCALE	7) C&D NO.	8) SHEET	9) OF	10) D
-	7-30-12	NEW DRAWING [CT19745]	BTW											
A	5-28-13	(A-8) GM88463 (REF) WAS GM13213 (REF); [CT48047]	BTW											
B	10-30-13	SEE SHEET 1 [CT62772]	BTW											
C	8-29-14	VIEW A REMOVED; [CT91680]	BTW											
D	12-22-16	VIEWS UPDATED; SEE SHEET 1 [CT168423]	SDB											
			BTW											
			BTW											
			MTL											

KOHLER CO. [METRIC] [PRO-E]

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

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TITLE

Dwg. RSA III Assy

SCALE 0.80

C&D NO.

DWG NO.

GM85123

SHEET 2 of 2

8 7 6 5 4 3 2 1

Wiring Schematics

RS-485 NETWORK CONNECTIONS

REV	DATE	REVISION	BY	W
-	8-16-19	NEW DRAWING. REPLACES ADV-6990 [CT198499]	TLK	F
A	5-27-22	(B-1-3) CONNECT TO ENGINE START TERMINALS ON ATS (TBF 1&2) WAS CONNECT TO POSITION CONTACTS ON ATS (CLOSED IN EMERGENCY); SEE SHEET 2 [CT220029]		
B	11MAR2026	BRANDING UPDATED	BCC	PSC

DC POWER REQUIREMENTS FOR EACH RSA:
 12/24 VOLT, 1A DC POWER
 IF MULTIPLE RSA'S ARE USED, RESIZE
 2 POWER WIRES AS REQUIRED.
 0-450 FT. [0-138 m], 22 GA.
 450-700 FT. [138-214 m], 20 GA.
 700-1125 FT. [214-344 m], 18 GA.
 1125-1800 FT. [344-550 m], 16 GA.
 1800-2800 FT. [550-856 m], 14 GA.
 (SEE NOTE 4)

GENERATOR SET OUTLINE

GENERATOR
BATTERY
12 OR 24 VDC

ON 550/6000 CONTROLLER, CONNECT TO P20,
 ON APM402 CONTROLLER, CONNECT TO P21,
 ON 8000 CONTROLLER, CONNECT TO RS485(2) BLOCK,
 ON APM802 CONTROLLER, CONNECT TO TB10,
 ON 3500 CONTROLLER, CONNECT TO TB12,
 ON APM603 CONTROLLER, CONNECT TO TB10 OR TB12

BATTERY CHARGE LEADS
 2 WIRES 10 GA. MINIMUM
 (NOT REQUIRED ON GENSET
 MOUNTED BATTERY CHARGERS)

(SEE SHEET 2 FOR
 MASTER/S�AVE NOTE)

RSA
 REMOTE SERIAL
 ANNUNCIATOR
 (MASTER)

RS-485
 (MODBUS RTU)
 (SEE NOTE 5)

RSA
 REMOTE SERIAL
 ANNUNCIATOR
 (SLAVE)

RSA
 REMOTE SERIAL
 ANNUNCIATOR
 (SLAVE)

RSA
 REMOTE SERIAL
 ANNUNCIATOR
 (SLAVE)

(SEE SHEET 2 WHEN USED
 WITH AN ETHERNET NETWORK)

GENSET
 CONTROLLER

BATTERY CHARGER
 W/ FAULT ALARMS

BATTERY CHARGER ALARMS (NON-COMMUNICATION STYLE CHARGER):
 550/6000/APM402/8000/APM802/APM603: 2 WIRES 18-20 GA.
 (NOT REQUIRED ON GENSET MOUNTED BATTERY CHARGERS)

BATTERY CHARGER ALARMS: (COMMUNICATION STYLE CHARGER):
 550/6000/APM402/APM603/3500: FACTORY WIRED CAN COMMUNICATION

ENGINE START WIRES.
 2 WIRES 18-20 GA.
 CONNECT TO ENGINE START TERMINALS ON ATS (TBF 1&2).
 FOR MULTIPLE ATS INSTALLATION, CONNECT START SIGNAL WIRING FROM ALL ATS IN PARALLEL

ATS (AUTOMATIC
 TRANSFER SW.)

ATS (AUTOMATIC
 TRANSFER SW.)

ATS (AUTOMATIC
 TRANSFER SW.)

ATS (AUTOMATIC
 TRANSFER SW.)

RSA III WITH ATS OPTION:
 RS-485 TO ATS REQUIRED
 (MODBUS RTU) (SEE NOTE 5)

NOTES:

1. TYPICAL CUSTOMER WIRING SHOWN DASHED.
2. CUSTOMER RESPONSIBLE FOR ADDITIONAL WIRING SHOWN IF COMPONENTS ARE SHIPPED LOOSE (BATTERY CHARGER, DRY-CONTACT BOX, ETC.)
3. IF BATTERY CHARGER IS SHIPPED LOOSE ADDITIONAL WIRES MAY BE REQUIRED FOR PROPER VOLTAGE SENSING. REFERENCE DRAWING ADV-5971 FOR INTERCONNECT.
4. DC VOLTAGE FOR EACH RSA REMOTE ANNUNCIATOR MAY ALSO BE SUPPLIED BY A LOCALLY MOUNTED 12 OR 24 VDC, 200 mA MIN., AC ADAPTER KIT (GM62466-KP1).
5. USE BELDEN #9841 OR EQUIVALENT. MAXIMUM DISTANCE = 4000 FT. [1219 m]

REFER TO WIRING DIAGRAM GM62554
 (NETWORK COMMUNICATIONS) FOR
 CONNECTION DETAIL.
 INTERCONNECTION DIAGRAM
 CONTROLLER
 WITH RSA ANNUNCIATOR

DIMENSIONS IN [] ARE METRIC EQUIVALENTS.

UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: HOLE: .010 ANGLES $\pm$ 1/2° 301 $\pm$.030 SURFACE FINISH 3. $\pm$.080 FRACTIONS $\pm$ ☒ MAX.		THIS DRAWING, IN DESIGN AND DETAIL, IS DISCOVERY ENERGY, LLC PROPERTY AND MUST NOT BE LOANED, REPRODUCED, COPIED, OR USED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF DISCOVERY ENERGY, LLC. WORK AND INVENTS OF DESIGN OR INVENTION ARE RESERVED.	
APPROVALS	DATE	TITLE DIAGRAM, RSA INTERCONNECTION	
DRAWN TLK	8-16-19	SCALE	SHEET 1-2
CHECKED TLK	8-16-19	PLOTTED	
APPROVED MD	8-16-19	DWG. NO.	ADV-9169 C



RSA III:

A MAXIMUM OF 5 SLAVES CAN BE CONNECTED TO A MASTER RSA III, INCLUDING SLAVES CONNECTED THROUGH THE ETHERNET NETWORK. IF ANY RSA II ANNUNCIATORS ARE ON THE SAME NETWORK AS AN RSA III ANNUNCIATOR, THE RSA II ANNUNCIATORS MUST BE CONFIGURED AS SLAVES. RSA1000 CAN'T BE ON THE SAME NETWORK AS RSAIII. UPGRADE TO RSAIII IF REQUIRED.

RSA III MASTER:

AN RSA SLAVE CONNECTED THROUGH THE ETHERNET NETWORK, REQUIRES AN RSA MASTER BE CONNECTED THROUGH THE ETHERNET NETWORK. THE MASTER REQUIRES A MODBUS/ETHERNET CONVERTER DEDICATED EXCLUSIVELY TO IT.

ETHERNET NETWORK CONNECTIONS

SEE SHEET 1 FOR REQUIRED DC POWER VOLTAGE TO EACH RSA.

RSA
REMOTE SERIAL
ANNUNCIATOR
(SLAVE)

RSA
REMOTE SERIAL
ANNUNCIATOR
(SLAVE)

MODBUS/
ETHERNET
CONVERTER

RS-485
(MODBUS RTU)
(SEE NOTE 5)

SEE SHEET 1 FOR CONTROLLER
CONNECTION POINTS

GENSET CONTROLLER

(SEE SHEET 1 FOR
BATTERY CHARGER
CONNECTIONS)

ON APM802 OR APM603 CONTROLLER,
CONNECT TO ETHERNET MODULE

ON MPAC750, MPAC1200, MPAC1500,
CONNECT TO P13

RSA III SUPPORTED ATS'S:
MPAC750, MPAC1000,
MPAC1200, OR MPAC1500.
SUPPORTS ONE OR UP TO
FOUR ATS'S.

ATS (AUTOMATIC
TRANSFER SWITCH)

ATS (AUTOMATIC
TRANSFER SWITCH)

ATS (AUTOMATIC
TRANSFER SWITCH)

ATS (AUTOMATIC
TRANSFER SWITCH)

SEE SHEET 1 FOR
GENERAL NOTES.

RSA
REMOTE SERIAL
ANNUNCIATOR
(MASTER)

RS-485
(MODBUS RTU)
(SEE NOTE 5)

MODBUS/
ETHERNET
CONVERTER

RS-485
(MODBUS RTU)
(SEE NOTE 5)

MODBUS/
ETHERNET
CONVERTER

RSA
REMOTE SERIAL
ANNUNCIATOR
(SLAVE)

RSA
REMOTE SERIAL
ANNUNCIATOR
(SLAVE)

SEE SHEET 1 FOR REQUIRED
DC POWER VOLTAGE TO
EACH RSA.

ETHERNET
(MODBUS TCP/IP)
CATEGORY 5
OR EQUIVALENT

ETHERNET
(MODBUS TCP/IP)
CATEGORY 5
OR EQUIVALENT

ETHERNET
(MODBUS TCP/IP)
CATEGORY 5
OR EQUIVALENT

ETHERNET
(MODBUS TCP/IP)
CATEGORY 5
OR EQUIVALENT

ETHERNET NETWORK
(CUSTOMER SUPPLIED)

MODBUS/
ETHERNET
CONVERTER

RSA
REMOTE SERIAL
ANNUNCIATOR
(SLAVE)

RSA
REMOTE SERIAL
ANNUNCIATOR
(SLAVE)

SEE SHEET 1 FOR REQUIRED
DC POWER VOLTAGE TO
EACH RSA.

ETHERNET
(MODBUS TCP/IP)
CATEGORY 5
OR EQUIVALENT

RS-485
(MODBUS RTU)
(SEE NOTE 5)

RS-485
(MODBUS RTU)
(SEE NOTE 5)

RS-485
(MODBUS RTU)
(SEE NOTE 5)

RS-485
(MODBUS RTU)
(SEE NOTE 5)

REQUIRED FOR
RSA III WITH
ATS OPTION ONLY

INTERCONNECTION DIAGRAM
CONTROLLER
WITH RSA ANNUNCIATOR

UNLESS OTHERWISE SPECIFIED -
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES ARE:
X.XXX ± .010 ANGLES ±
X.X ± .030 SURFACE FINISH
X ± .000 MAX.
FRACTIONS ±

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TITLE
DIAGRAM,
RSA INTERCONNECTION

APPROVALS
DATE
DRAWN TLK 8-16-19
CHECKED TLK 8-16-19
APPROVED MD 8-16-19

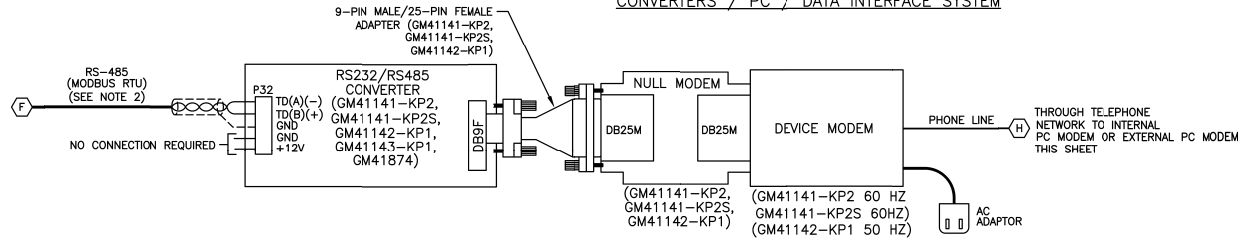
SCALE
PLOTTED

DWG. NO. ADV-9169
SHEET 2-2
C

CONVERTERS / PC / DATA INTERFACE SYSTEM

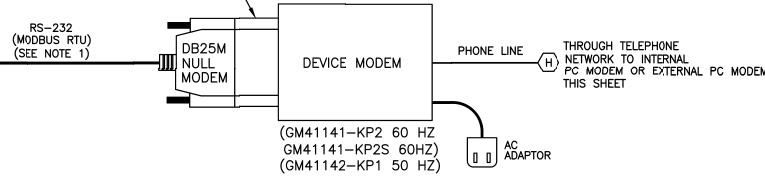
REV	DATE	REVISION	BY
D	9-29-09	SEE SHEET 1 [88186]	TLK
E	12-1-09	SEE SHEET 9 [88773]	TLK
F	4-22-10	DRAWING COMPLETELY REVISED [89745]	TLK
G	4-27-11	(D,B-7) DEC 3000 ADDED TO "I" & "O" CONNECTIONS; (B-8) SERIES 1500 ADDED TO "J" CONNECTION [91516]	TLK
H	4-02-13	ALL REFERENCES TO SHIT, 6 OR 7 WERE SHIT, 5, SHIT, 4 WERE SHIT, 3, (C-5) DEC-3500 ADDED TO "J" & "N"; (B-5) (B-5,7) 750 & 1200 ADDED TO SERIES 1500 ATS; (B-5) CONFIGURE AS MASTER	TLK
J	3-06-14	NOTE ADDED TO MODBUS/ETHERNET [C164476]	TLK
K	12-07-16	SEE SHEET 1 [C174427]	TLK
L	3-09-18	(C-8, B-6) P19 ON 550 ADDED TO NOTES; (C-2) "K" CONNECTIONS FOR DIS ADDED [C164506]	TLK
M	10-30-18	(A-1) SHEET 10-8 WAS 5-7 [C185399]	TLK
N	5-30-19	APM603 REFERENCES ADDED [C191583]	TLK
P	6-24-20	SHEET 2-16 WAS 10-12 [C197795]	TLK
R	28APR2022	SEE SHEETS 1, 6, AND 12 [C204963]	TLK
		SEE SHEET 1 & 15 [C212805]	CLN

FROM P20 ON 550 CONTROLLER,
P21 ON 16-LIGHT CONTROLLER,
SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER,
SHEET 4
P20 ON 6000 CONTROLLER,
SHEET 5
TB1 ON SERIES 1000 ATS CONTROLLER,
SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER,
SHEET 14



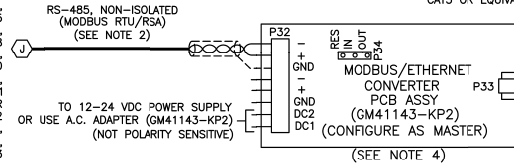
OPTO ISOLATOR (GM41141-KP2,
GM41141-KP2S,
GM41142-KP1)

FROM P18 ON 550 CONTROLLER
SHEET 3
P18 ON 6000 CONTROLLER
SHEET 5
P19 ON MODBUS/KBUS MODULE
SHEET 13
(GM41141-KP2, -KP2S, GM41142-KP1,
NULL MODEM CABLE)

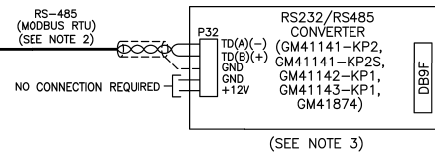


FROM P19 OR P20 ON 550 CONTROLLER,
P21 ON 16-LIGHT CONTROLLER,
J9 ON KPC 1000 CONTROLLER
SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER,
SHEET 4
P19 ON 6000 CONTROLLER,
SHEET 5
TB12, TB10, OR TX1 FOR APM603 CONTROLLER,
SHEET 6, SHEET 7, OR SHEET 8
TB10 FOR APM 802 CONTROLLER,
SHEET 10
RS485(2) ON DEC 8000 CONTROLLER,
SHEET 11
TB12 FOR DEC-3500 CONTROLLER
SHEET 12
TB1 ON SERIES 1000 ATS CONTROLLER,
SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER
SHEET 14

FROM P19 OR P20 ON 550 CONTROLLER,
P21 ON 16-LIGHT CONTROLLER,
J9 ON KPC 1000 CONTROLLER
SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER,
SHEET 4
P19 ON 6000 CONTROLLER,
SHEET 5
TB12, TB10, OR TX1 FOR APM603 CONTROLLER,
SHEET 6, SHEET 7, OR SHEET 8
TB10 FOR APM 802 CONTROLLER,
SHEET 10
RS485(2) ON DEC 8000 CONTROLLER,
SHEET 11
TB12 FOR DEC-3500 CONTROLLER
SHEET 12
TB1 ON SERIES 1000 ATS CONTROLLER,
SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER,
SHEET 14

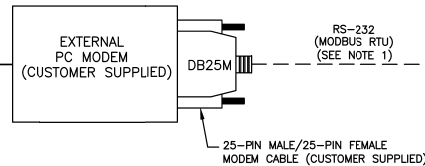


FROM P19 OR P20 ON 550 CONTROLLER,
P21 ON 16-LIGHT CONTROLLER,
SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER,
SHEET 4
P19 ON 6000 CONTROLLER,
SHEET 5
TB1 ON SERIES 1000 ATS CONTROLLER,
SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER,
SHEET 14

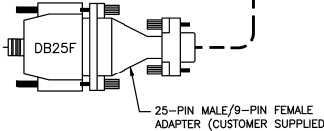


FROM P18 ON 550 CONTROLLER
SHEET 3
P18 ON 6000 CONTROLLER
SHEET 5
P19 ON MODBUS/KBUS MODULE
SHEET 13
(GM41141-KP1, -KP1S, GM41144-KP1,
NULL MODEM CABLE)

FROM TELEPHONE NETWORK
THIS SHEET



RS-232
(MODBUS RTU)
(SEE NOTE 1)



RS-232
(MODBUS RTU)
(SEE NOTE 1)



PC (MONITOR II) (MASTER)
PC (SITETECH) (MASTER)
DATA INTERFACE SYSTEM (MASTER)
(CUSTOMER SUPPLIED)
(SEE NOTE 5)

TO DATA INTERFACE SYSTEM (DIS)

TO THE PC'S INTERNAL MODEM
(MONITOR II) OR TO
DATA INTERFACE SYSTEM

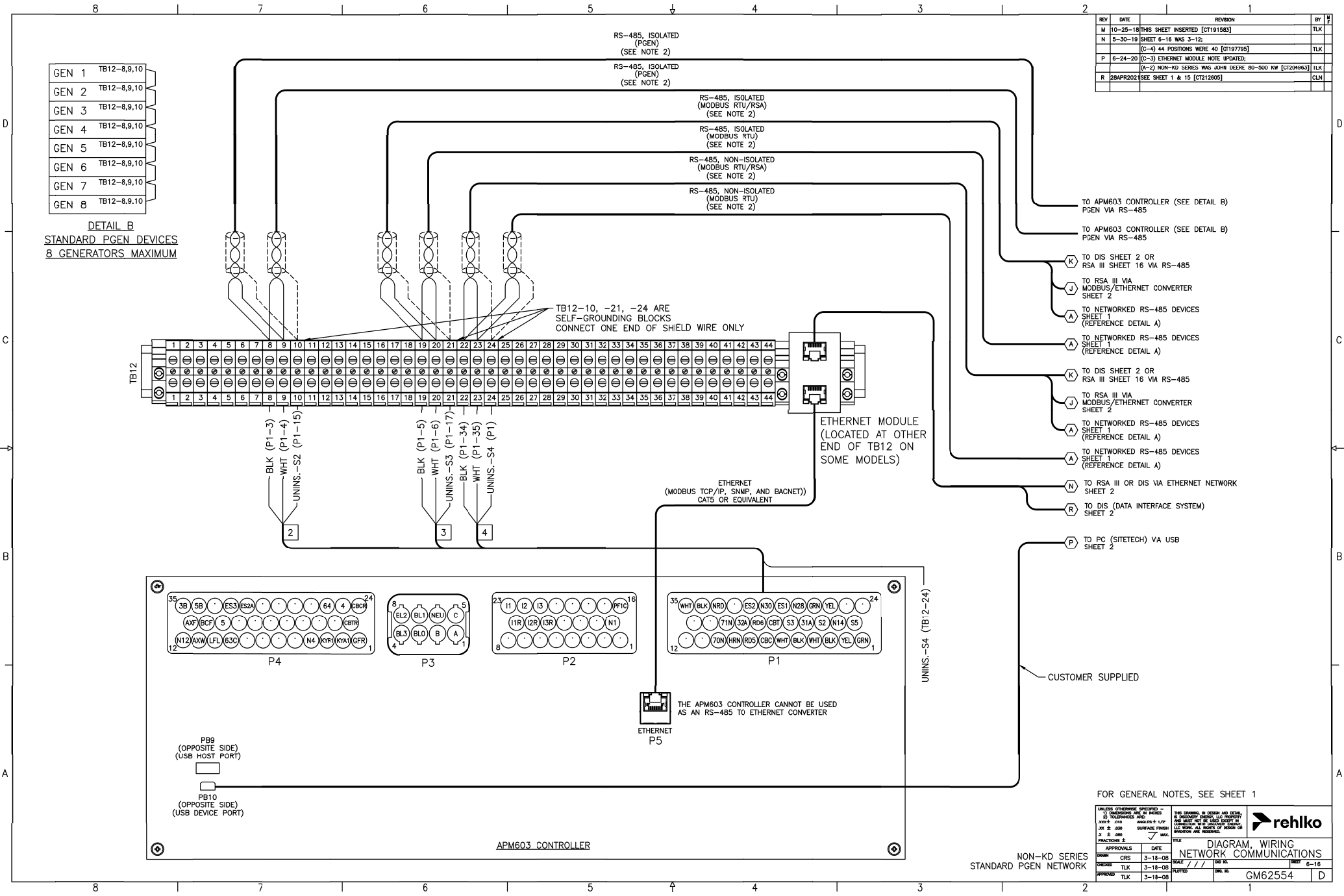
TO THE PC'S RJ45 ETHERNET
CONNECTOR (MONITOR II) OR TO
DATA INTERFACE SYSTEM (DIS)

TO THE PC'S
USB PORT
(MONITOR III OR
SITETECH)

TO THE PC'S 9-PIN SERIAL PORT
(MONITOR III), SITETECH (550/6000 ONLY),
OR DATA INTERFACE SYSTEM

FOR GENERAL NOTES, SEE SHEET 1

UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: DIM. 0.005 0.010 0.015 0.020 0.030 0.040 0.050 0.060 0.070 0.080 0.090 0.100 0.125 0.150 0.1875 0.250 0.3125 0.375 0.500 0.625 0.750 0.875 1.000 1.250 1.500 1.875 2.000 2.500 3.000 3.500 4.000 5.000 6.000 7.000 8.000 9.000 10.000 12.000 15.000 18.000 20.000 25.000 30.000 35.000 40.000 45.000 50.000 60.000 70.000 80.000 90.000 100.000 125.000 150.000 180.000 200.000 250.000 300.000 350.000 400.000 450.000 500.000 600.000 700.000 800.000 900.000 1000.000 1250.000 1500.000 1800.000 2000.000 2500.000 3000.000 3500.000 4000.000 4500.000 5000.000 6000.000 7000.000 8000.000 9000.000 10000.000 12500.000 15000.000 18000.000 20000.000 25000.000 30000.000 35000.000 40000.000 45000.000 50000.000 60000.000 70000.000 80000.000 90000.000 100000.000 125000.000 150000.000 180000.000 200000.000 250000.000 300000.000 350000.000 400000.000 450000.000 500000.000 600000.000 700000.000 800000.000 900000.000 1000000.000 1250000.000 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REV	DATE	REVISION	BY
M	10-25-18	THIS SHEET INSERTED [C1191583]	TLK
N	5-30-19	SHEET 6-16 WAS 3-12;	
		(C-4) 44 POSITIONS WERE 40 [C1197795]	TLK
P	6-24-20	(C-3) ETHERNET MODULE NOTE UPDATED;	
		(A-2) NON-KD SERIES WMS JOHN DEERE 80-500 KW [C1204963]	TLK
R	28APR2022	SEE SHEET 1 & 15 [C1212805]	CLN

GEN 1	TB12-8,9,10
GEN 2	TB12-8,9,10
GEN 3	TB12-8,9,10
GEN 4	TB12-8,9,10
GEN 5	TB12-8,9,10
GEN 6	TB12-8,9,10
GEN 7	TB12-8,9,10
GEN 8	TB12-8,9,10

DETAIL B
STANDARD PGEN DEVICES
8 GENERATORS MAXIMUM

TB12-10, -21, -24 ARE
SELF-GROUNDING BLOCKS
CONNECT ONE END OF SHIELD WIRE ONLY

ETHERNET MODULE
(LOCATED AT OTHER
END OF TB12 ON
SOME MODELS)

ETHERNET
(MODBUS TCP/IP, SNMP, AND BACNET)
CAT5 OR EQUIVALENT

ETHERNET
P5
THE APM603 CONTROLLER CANNOT BE USED
AS AN RS-485 TO ETHERNET CONVERTER

PB9
(OPPOSITE SIDE)
(USB HOST PORT)

PB10
(OPPOSITE SIDE)
(USB DEVICE PORT)

APM603 CONTROLLER

NON-KD SERIES
STANDARD PGEN NETWORK

FOR GENERAL NOTES, SEE SHEET 1

UNLESS OTHERWISE SPECIFIED -		THIS DRAWING IS DESIGNED AND DETAIL	
1) DIMENSIONS ARE IN MILLIMETERS		AND TOLERANCES ARE	
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APPROVALS		DATE	
DESIGN	CHK	3-16-08	
DRAWN	TLK	3-16-08	
APPROVED	TLK	3-16-08	
SCALE		SHEET	
GM62554		6-16	

REV	DATE	REVISION	BY
M	10-25-18	THIS SHEET INSERTED [C1191583]	TLK
N	5-30-19	SHEET 8-16 WAS 5-12 [C1197795]	TLK
P	6-24-20	SEE SHEETS 1, 6, AND 12 [C1204963]	TLK
R	28APR2021	SEE SHEET 1 & 15 [C1212605]	CLN

GEN 1	TX1-10,11,12
GEN 2	TX1-10,11,12
GEN 3	TX1-10,11,12
GEN 4	TX1-10,11,12
GEN 5	TX1-10,11,12
GEN 6	TX1-10,11,12
GEN 7	TX1-10,11,12
GEN 8	TX1-10,11,12

DETAIL D
STANDARD PGEN DEVICES
8 GENERATORS MAXIMUM

RS-485, NON-ISOLATED
(MODBUS RTU/RSA)
(SEE NOTE 2)

RS-485, NON-ISOLATED
(MODBUS RTU)
(SEE NOTE 2)

RS-485, ISOLATED
(PGEN)
(SEE NOTE 2)

RS-485, ISOLATED
(PGEN)
(SEE NOTE 2)

RS-485, ISOLATED
(MODBUS RTU/RSA)
(SEE NOTE 2)

RS-485, ISOLATED
(MODBUS RTU)
(SEE NOTE 2)

TO APM603 CONTROLLER (SEE DETAIL D)
PGEN VIA RS-485

TO APM603 CONTROLLER (SEE DETAIL D)
PGEN VIA RS-485

TO DIS SHEET 2 OR
RSA III SHEET 16 VIA RS-485

TO RSA III VIA
MODBUS/ETHERNET CONVERTER
SHEET 2

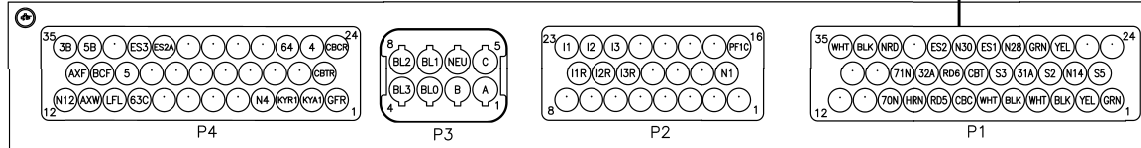
TO NETWORKED RS-485 DEVICES
SHEET 1
(REFERENCE DETAIL A)

TO NETWORKED RS-485 DEVICES
SHEET 1
(REFERENCE DETAIL A)

ETHERNET
MODULE

WHT (P1-35)
BLK (P1-34)
UNINS.-S4 (P1)

BLK (P1-3)
WHT (P1-4)
UNINS.-S2 (P1-15)
BLK (P1-5)
WHT (P1-6)
UNINS.-S3 (P1-17)



THE APM603 CONTROLLER CANNOT BE USED
AS AN RS-485 TO ETHERNET CONVERTER

ETHERNET
P5

PB9
(OPPOSITE SIDE)
(USB HOST PORT)

PB10
(OPPOSITE SIDE)
(USB DEVICE PORT)

APM603 CONTROLLER

ETHERNET
(MODBUS TCP/IP, SNMP, AND BACNET)
CAT5 OR EQUIVALENT

TO RSA III OR DIS VIA ETHERNET NETWORK
SHEET 2

TO DIS (DATA INTERFACE SYSTEM)
SHEET 2

TO PC (SITETECH) VIA USB
SHEET 2

CUSTOMER SUPPLIED

FOR GENERAL NOTES, SEE SHEET 1

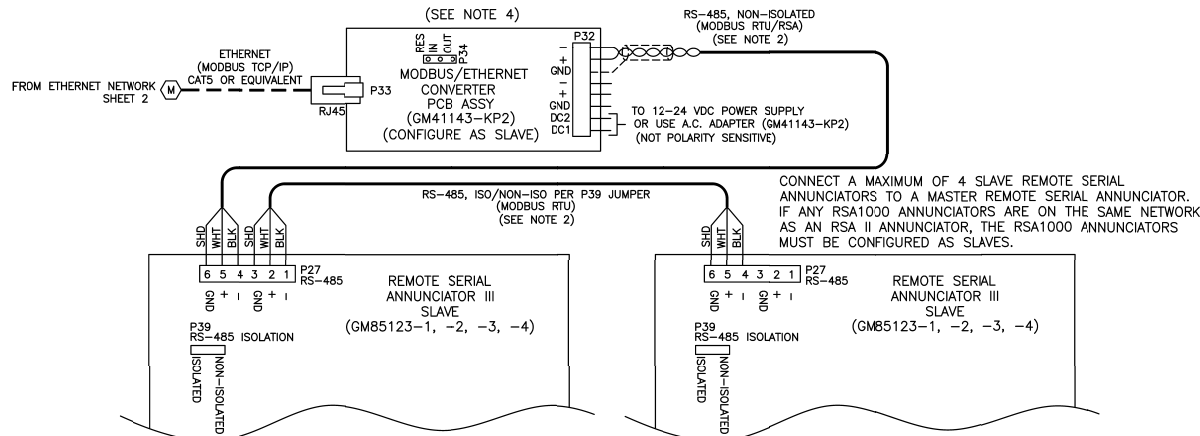
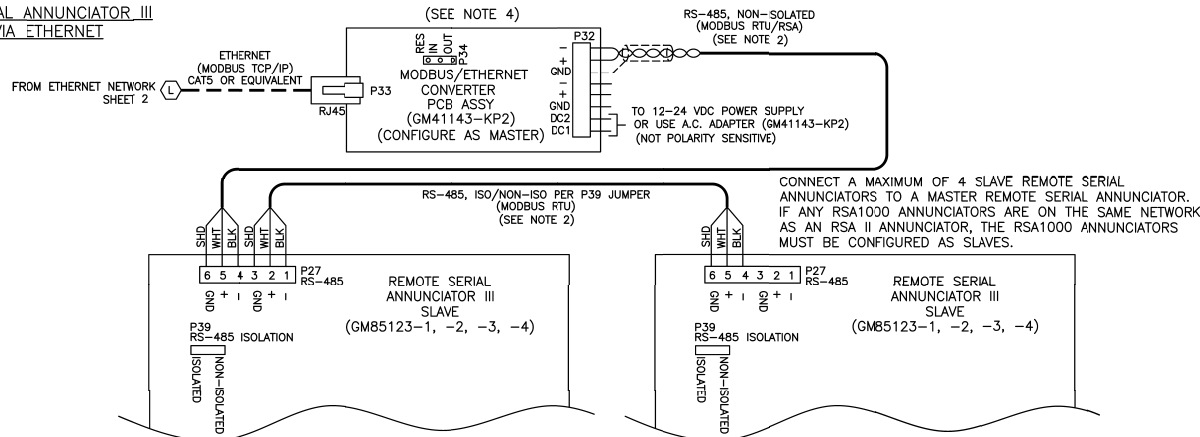
UNLESS OTHERWISE SPECIFIED -		THIS DRAWING IS DESIGNED AND DETAIL		rehlko	
1) DIMENSIONS ARE IN INCHES		AND MUST NOT BE USED WITHOUT THE		REHLKO LOGO	
2) TOLERANCES ARE:		AND MUST NOT BE USED WITHOUT THE		REHLKO LOGO	
3) DIMENSIONS ARE IN INCHES		AND MUST NOT BE USED WITHOUT THE		REHLKO LOGO	
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KD SERIES
STANDARD PGEN NETWORK

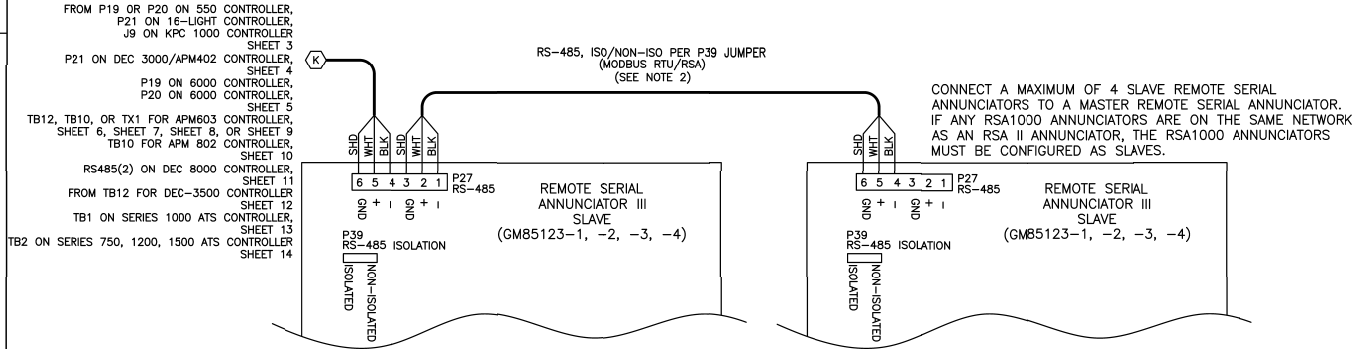
DIAGRAM, WIRING
NETWORK COMMUNICATIONS

GM62554

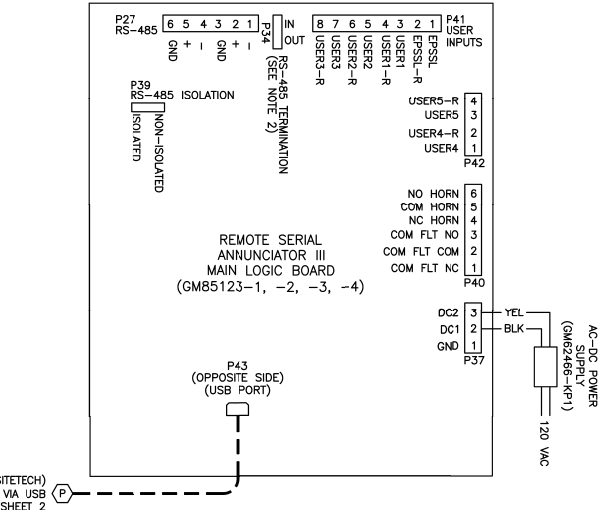
REMOTE SERIAL ANNUNCIATOR III CONNECTED VIA ETHERNET



REMOTE SERIAL ANNUNCIATOR III DIRECT CONNECTED



REV	DATE	REVISION	BY
H	11-20-13	THIS SHEET ADDED [C764476]	TLK
J	3-06-14	SEE SHEET 1 [C774427]	TLK
K	12-07-16	(A-7) P19 ON 550 ADDED TO NOTE [C7164509]	TLK
L	3-09-18	(A-1) SHEET 12-8 WAS 7-7 [C7185399]	TLK
M	10-30-18	(A-9) APM603 REFERENCE ADDED [C7191563]	TLK
N	5-30-19	SHEET 16-16 WAS 12-12 [C7197793]	TLK
P	6-24-20	SEE SHEETS 1, 6, AND 12 [C7204963]	TLK
R	28APR2021	SEE SHEET 1 & 15 [C7212605]	CLN



P41 INPUT CONNECTIONS

- P41-8 USER INPUT 3 RETURN
- P41-7 USER INPUT 3
- P41-6 USER INPUT 2 RETURN
- P41-5 USER INPUT 2
- P41-4 USER INPUT 1 RETURN
- P41-3 USER INPUT 1
- P41-2 LOCAL ATS EMERGENCY ON INPUT RETURN (16-LIGHT ONLY) (SUPPLIED VIA MODBUS ON 550/6000/3000/APM402/3500 GENSET CONTROLLER AND SERIES 1000/750/1200/1500 ATS CONTROLLERS)
- P41-1 LOCAL ATS EMERGENCY ON INPUT

P42 INPUT CONNECTIONS

- P41-4 USER INPUT 5 RETURN
- P41-3 USER INPUT 5
- P41-2 USER INPUT 4 RETURN
- P41-1 USER INPUT 4

P40 OUTPUT CONNECTIONS

- P40-6 HORN RELAY NORMALLY OPEN
- P40-5 HORN RELAY COMMON
- P40-4 HORN RELAY NORMALLY CLOSED
- P40-3 COMMON FAULT RELAY NORMALLY OPEN
- P40-2 COMMON FAULT RELAY COMMON
- P40-1 COMMON FAULT RELAY NORMALLY CLOSED

P37 PWR/CAN CONNECTIONS

- P37-3 12/24 VDC BATTERY INPUT2 (NOT POLARITY SENSITIVE)
- P37-2 12/24 VDC BATTERY INPUT1 (NOT POLARITY SENSITIVE)
- P37-1 GROUND

P37/P40/P41 WIRE SIZE REQUIREMENTS

- 700 FT. - 20 AWG
- 1125 FT. - 18 AWG
- 1800 FT. - 16 AWG
- 2800 FT. - 14 AWG

FOR GENERAL NOTES, SEE SHEET 1

UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: DIMENSIONS < 1" .010 DIMENSIONS 1" - 10" .015 DIMENSIONS > 10" .020 FRACTIONS ± .005 DECIMALS ± .005		THIS DRAWING IS DESIGNED AND DETAIL BY REHLKO ENGINEERING, INC. (REHLKO) AND SHALL NOT BE USED WITHOUT THE WRITTEN PERMISSION OF REHLKO ENGINEERING, INC. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE REHLKO STANDARD SPECIFICATIONS.		DATE: 11-20-13 SCALE: 1" = 1'-0"		SHEET 16-16	
APPROVALS	DATE	DESIGN	DATE	CHK. BY	DATE	DIAGRAM, WIRING NETWORK COMMUNICATIONS	
DESIGNED: TLK	11-20-13	PLANNED	11-20-13	CHK. BY	11-20-13	GM62554	
APPROVED: EDA	11-20-13						

Miscellaneous

OVERVIEW:
THE AUTOMATIC MULTI-LEVEL FLOAT/ EQUALIZE CHARGER SPECIFIED BELOW IS INTENDED TO CHARGE ENGINE STARTING BATTERIES EITHER INDEPENDENT OR IN CONJUNCTION WITH AN ENGINE DRIVEN CHARGING SYSTEM.

BATTERY TYPES TO BE CHARGED:
LEAD ACID
AGM
GEL CELL
HIGH PERFORMANCE AGM
FLOODED
NICKEL CADMIUM (NiCd)

INPUT AC:
INPUT VOLTAGE: 90-265V SINGLE PHASE
INPUT FREQUENCY: 47-63 Hz

INPUT LEAD:
APPROXIMATELY 2.5M (98") (REF) TYPE SJTOW -40 °C TO 105°C UL RATED WIRE AND INSULATION. TERMINATED IN PRE-MOLDED UL RATED 3 PRONG NEMA 5-15 MALE AC PLUG.

DC OUTPUT:
10A @ 12V
10A @ 24V
VOLTAGE REGULATION: +/-1% (VOLTAGE AT EACH STAGE IS TOPOLOGY DEPENDENT)

OUTPUT LEAD:
APPROX. 2.5M (98") (REF) TYPE SJTOOW -40 °C TO 105°C UL RATED WIRE WITH RED AND BLACK WIRE INSULATION. TERMINATED IN 9.5 mm (REF) RING STYLE TERMINALS.

FUSES:
THE FUSE MUST BE LOCATED APPROXIMATELY 6" FROM RING TERMINAL ON RED OUTPUT LEAD. 15A ATC

ENVIRONMENTAL:
STORAGE TEMPERATURE RANGE: -40 TO +85 °C (-40 TO +185°F)
OPERATING TEMPERATURE RANGE: -20 TO +70 °C (-4 TO +158°F)
HUMIDITY: 5 TO 95% (NON-CONDENSING)
SALT SPRAY TESTING - ASTM B117
CORROSIN RESISTANT FROM GASSING OF BATTERIES

REVERSE POLARITY PROTECTION:
THE CHARGER SHALL SUSTAIN NO DAMAGE WHEN INCORRECTLY CONNECTED TO THE BATTERY IN REVERSE ORIENTATION.

MOUNTING:
4 NON-THREADED THROUGH HOLES FOR M6 FASTENERS TO PASS THOUGH

ENCLOSURE:
SHALL PROTECT THE CHARGER COMPONENTS FROM RAIN, SNOW, DUST AND DRIPPING WATER AND UNINTENTIONAL IMPACTS. ALL INTERNAL COMPONENTS PROTECTED FROM WATER DROPLETS.

INDICATORS:
POWER: INDICATES THE ACCEPTABILITY OF AC INPUT TO THE CHARGER
COMMUNICATION: INDICATES THE STATE OF THE COMMUNICATION SYSTEM
TEMPERATURE COMPENSATION: INDICATES THE STATE OF THE TEMPERATURE COMPENSATION SUBSYSTEM WHEN INSTALLED
VOLTAGE OUTPUT: INDICATES THE STATE OF THE BATTERY AND CERTAIN FAULT CONDITIONS.

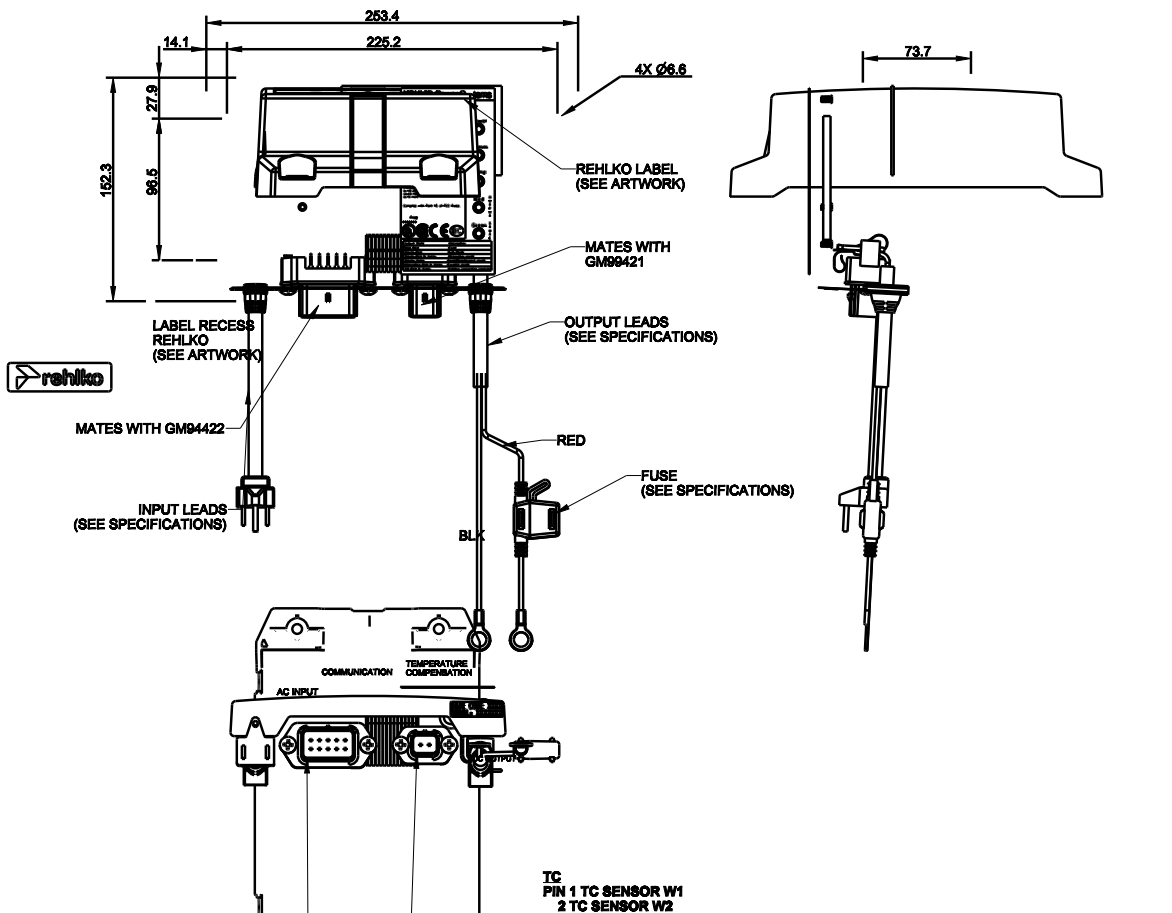
DOCUMENTATION:
THERE SHALL BE AN INSTALLATION / OPERATIONAL MANUAL SUPPLIED WITH EACH CHARGER. PER REHLKO SUPPLIED ARTWORK.

CERTIFICATIONS (US AND CANADA):
UL1236
CSA - C22.2 NO 107.2-01
FCC- TITLE 47, PART 15 CLASS A
CE
EN 61000-6-2
CEC AND DOE
NFPA-110 LEVEL1 (WHEN SUPPORTED WITH APPLICABLE REHLKO CONTROLLER)
IBC

PRODUCT LABELING:
THE LABEL ATTACHED TO THE CHARGER SHALL HAVE THE FOLLOWING INFORMATION:
UL LISTING
REHLKO PART NUMBER
DESCRIPTION OF ALL INDICATOR
OUTPUT CURRENT AND VOLTAGE
INPUT VOLTAGE AND FREQUENCY

PACKAGING LABEL:
THE PACKAGING LABEL SHALL CONTAIN THE FOLLOWING INFORMATION:
REHLKO P/N
DESCRIPTION - BATTERY CHARGER
MFG. MODEL NO.
MFG. PART NUMBER
DATE CODE

WARRANTY:
2 YEAR FROM DATE OF PURCHASE FROM MANUFACTURE.

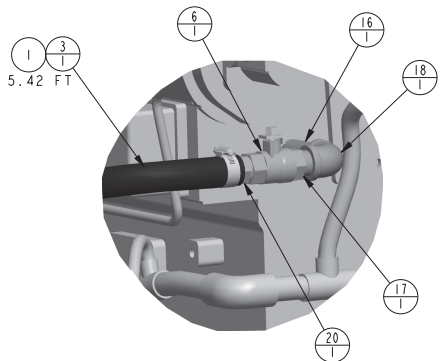
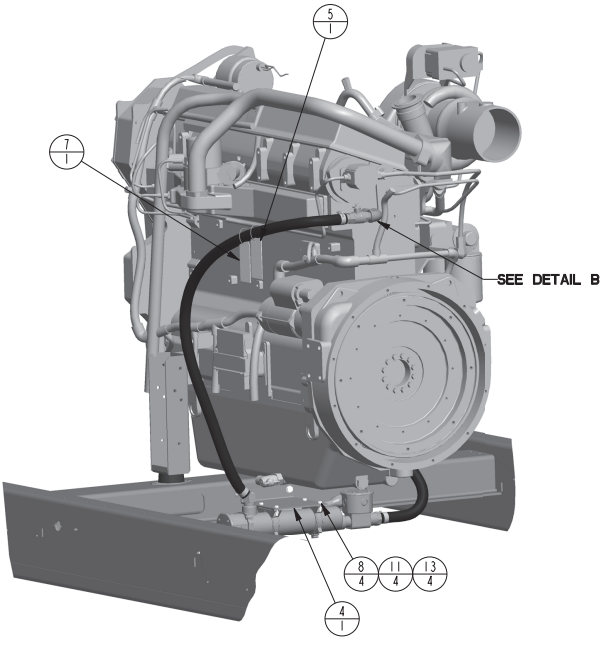
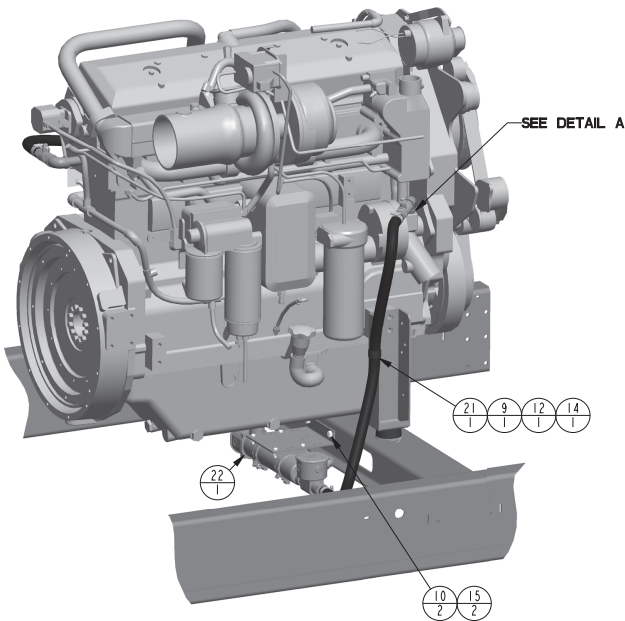


COM PINS:
1 N/C
2 ID SEL 1
3 ID SEL 2
4 N/C
5 CAN-H
6 N/C
7 ID SEL 1 RTN
8 ID SEL 2 RTN
9 CAN-GND
10 CAN-L

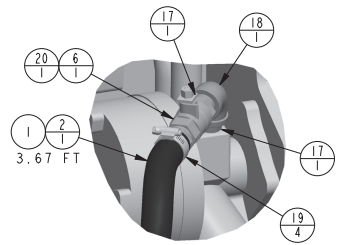
REV	DATE	ON COMPOSITE PAGES, SEE PART NO. FOR REVISION LEVEL □ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY	THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001. REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS.	DO NOT SCALE.
A	5-9-17	(C-4.2) MATING NOTE ADDED (A-2, 4) PIN (C-8) 20A WAS 15A	SAM	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: XX ± 0.25 X ± 1.0 X ± 1.5 ANGLES 45° BY BEND ANGLES ± 1°	MAJOR DIMENSIONS CRITICAL DIMENSIONS THIRD ANGLE PROJECTION
B	06SEP2025	(C-8) 20A WAS 15A	PBR	SURFACE FINISH MAX.	CHARACTERISTICS COMPLY WITH KPS-80022
	30OCT2025	(C&D-8) 2.5M (98") WAS 1.8M (72")	PSC		SCALE: 0.30 SHEET SIZE: B SHEET: 1 OF 1
				DRAWN: SAM	TITLE: CHARGER, BATTERY 10 AMP
				APPROVED: SEE PLM SYSTEM	DWG NO.: GM87448
				DATE: 22JAN2025	

THIS DRAWING IN DESIGN AND DETAIL IS DISCOVERY ENERGY, LLC PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH DISCOVERY ENERGY, LLC WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.

KIT NO.	ITEM	PART NO	QTY	DESCRIPTION
GM75809-KB	1	25452-00075	9.09FT	BASE GROUP, BLOCK HEATER
	2	X-6367-1 (REF)	1	HOSE, COOLANT
	3	X-6367-9 (REF)	1	HOSE, COOLANT 44"
	4	274431	1	HOSE, COOLANT 65"
	5	279047	1	BRACKET, SUPPORT
	6	GM19666	2	TAG, INSTRUCTION
	7	GM39752	1	VALVE, SHUTOFF (3/4-14NPT)
	8	M125A-06-80	1	TAG, HANG
	9	M125A-08-80	4	WASHER, PLAIN 6.4 ID X 12.0 OD
	10	M125A-10-80	1	WASHER, PLAIN 8.4 ID X 16.0 OD
	11	M6923-06-80	2	WASHER, PLAIN 10.5 ID X 20.0 OD
	12	M6923-08-80	4	NUT, HEX 6MM
	13	M933-06025-60	1	NUT, HEX 8MM
	14	M933-08025-60	4	SCREW, HEX CAP
	15	M933-10025-60	1	SCREW, HEX CAP
	16	X-206-6	2	SCREW, HEX CAP
	17	X-206-9	1	PIPE (3/4"NPT X 3.50")
	18	X-215-2	3	PIPE (3/4"NPT X 1.38") (KM)
	19	X-426-12	2	ELBOW, PIPE (90 DEG X 3/4"NPT)
	20	X-582-8	4	CLAMP, HOSE, .69/1.25 IN.
	21	X-672-20	2	CONNECTOR, HOSE + VIBRA SEAL
	22	X-672-20	1	CLAMP, INSULATED, 1.25 IN.
GM75809-KA1	22	GM76113	1	BLOCK HEATER, 2500W, 90/120V 1PH
GM75809-KA2	22	GM76113	1	BLOCK HEATER
GM75809-KA3	22	GM76114	1	BLOCK HEATER, 2500W,190/208V 1PH
GM75809-KA4	22	GM76115	1	BLOCK HEATER
GM75809-KA4	22	GM76115	1	BLOCK HEATER, 2500W,210/240V 1PH
GM75809-KA4	22	GM76116	1	BLOCK HEATER, 2500W,380/480V 1PH
THIS IS AN AUTOMATED TABLE. ALL UPDATES MUST BE MADE IN THE ASSEMBLY. ITEMS 1-3 & 26 ARE FIXED. ITEM 1 IS A MANUAL BALLOONS.				



DETAIL B
SCALE 0.40



DETAIL A
SCALE 0.40

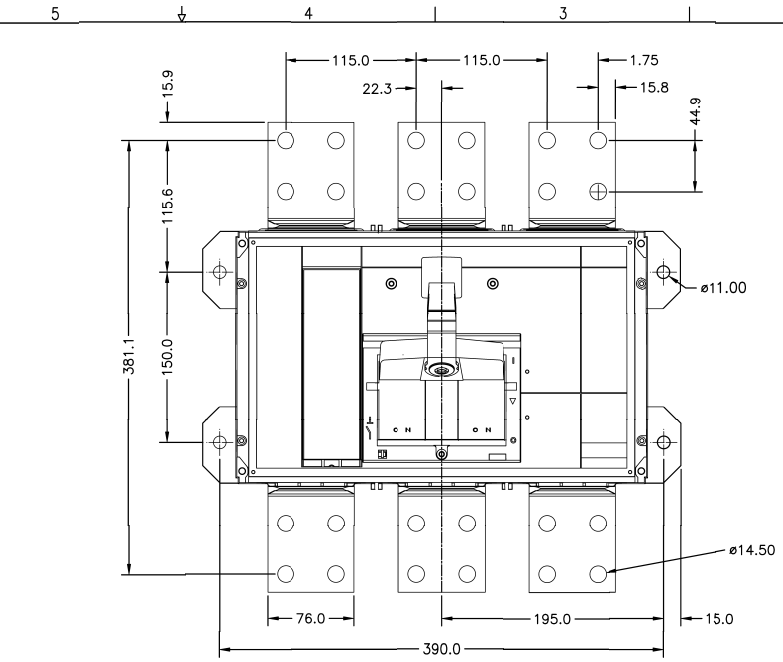
BLOCK HEATER KITS
350-500 MODELS
JOHN DEERE

NOTE: FOR PROPER ASSEMBLY METHOD OF HARDWARE, USE G-585 AS A GUIDELINE.

REV	DATE	ON COMPOSITE DWGS. SEE PART NO. FOR REVISION LEVEL	BY	UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN MILLIMETERS 2) TOLERANCES ARE: X .XX ± 0.25 Z .P ± 1.5 ANGLES A 0° 30' MAX. SURFACE FINISH MAX.
-	8-10-10	NEW DRAWING [90056-3]	DJV	
A	12-1-10	(D-8) M125A-08-80 QTY 1 WAS 2, M6923-08-80 QTY 1 WAS 2; X-672-4 QTY 1 WAS 2; (C/D-1:2) COOLANT HOSE ROUTING UPDATED [90686-3]	DJV	
B	3-31-11	(C-8) X-672-20 WAS X-672-4; (D-8) M125A-06-80 WAS X-22-11; X-206-9 WAS X-206-2 [91353-3]	DJV	
C	9-14-11	274431 WAS GM51263 [92293-3]	DJV	
			APPROVED	DATE
			DRWN	DATE
			CHECKED	DATE
			APPROVED	DATE

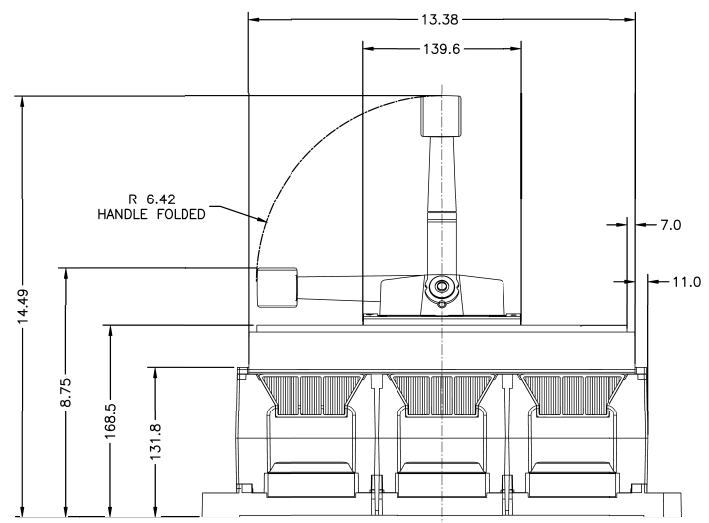
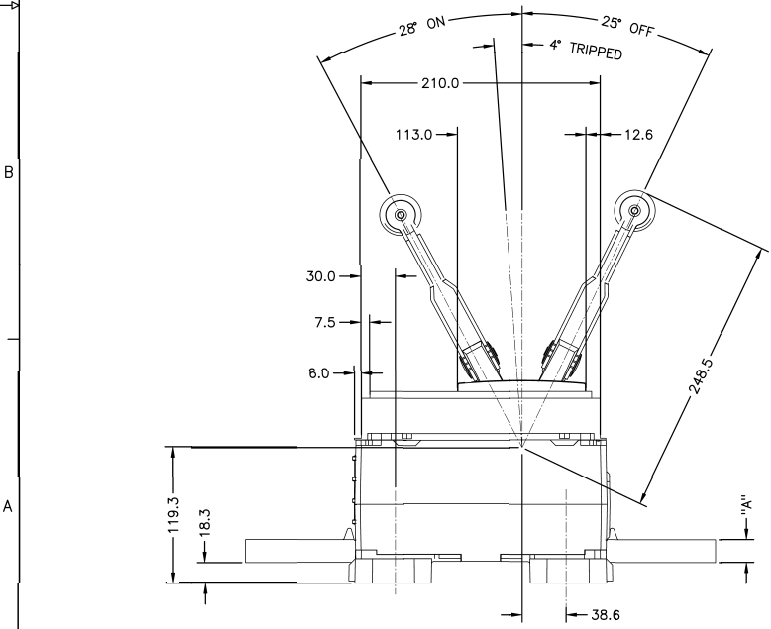
KOHLER CO. **METRIC** **PRO-E**
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
THIS DRAWING IN DESIGN AND DETAIL IS KOHLER CO. PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH KOHLER CO. WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.
TITLE: **DWG, ASSY BLOCK HEATER**
SCALE: 0.14 CAD NO.: SHEET 1 of 1
DWG NO.: **GM75809** D

MICROLOGIC CIRCUIT BREAKERS						
PART NO.	REV	DIM "A"	AMPS	% RATING	GFI	VENDOR NO.
GM48156-1	A				NO	RJF36160U33A
GM48156-2	A			80	YES	RJF36160U44A
GM48156-3	A			100	NO	RJF36160CU33A
GM48156-4	A				YES	RJF36160CU44A
GM48156-17	-	12.7	1600	80	YES	RLF36160U44A
GM48156-18	-			100	YES	RLF36160CU44A
GM48156-23	-			80	YES	RLF36160U63AE1
GM48156-24	-			100	YES	RLF36160CU63AE1
GM48156-29	-			80	YES	RLF36160U64AE1
GM48156-30	-			100	YES	RLF36160CU64AE1
GM48156-5	A			80	NO	RJF36200U33A
GM48156-6	A				YES	RJF36200U44A
GM48156-7	A			100	NO	RJF36200CU33A
GM48156-8	A				YES	RJF36200CU44A
GM48156-19	-	16.0	2000	80	YES	RLF36200U44A
GM48156-20	-			100	YES	RLF36200CU44A
GM48156-25	-			80	YES	RLF36200U63AE1
GM48156-26	-			100	YES	RLF36200CU63AE1
GM48156-31	-			80	YES	RLF36200U64AE1
GM48156-32	-			100	YES	RLF36200CU64AE1
GM48156-9	A			80	NO	RJF36250U33A
GM48156-10	A				YES	RJF36250U44A
GM48156-11	A				NO	RJF36250CU33A
GM48156-12	A				YES	RJF36250CU44A
GM48156-21	-	20.0	2500	100	YES	RLF36250CU44A
GM48156-27	-				YES	RLF36250CU63AE1
GM48156-33	-				YES	RLF36250CU64AE1
GM48156-22	-				YES	RLF36300CU44A
GM48156-28	-	20.1	3000	100	YES	RLF36300CU63AE1
GM48156-34	-				YES	RLF36300CU64AE1
GM48156-13	A				YES	RJF36120U44A
GM48156-14	B	12.7	1200	80	NO	RJF36120U33A
GM48156-15	B				NO	RJF36120CU33A
GM48156-16	B			100	YES	RJF36120CU44A



REV	DATE	REVISION	BY
-	1-31-06	NEW DRAWING [77272]	RAC
A	2-23-07	[A-1] NOTE ADDED [78285]	GFR
B	8-1-07	[D-8], GM48156-14, -15 & -16 ADDED; [79677]	BTW
C	6-19-23	[C-D-6-8] ADDED GM48156-17 THRU -28; ADDED COLUMNS	ZWK
D	3-5-25	[C-D-8] ADDED GM48156-29 THRU -34	ZWK

REVISION BLOCK INDICATES REVISION LEVEL OF DRAWING NOT PART REVISION. SEE PART REVISION LEVEL BEHIND PART NUMBER FOR CURRENT PART REVISION LEVEL.

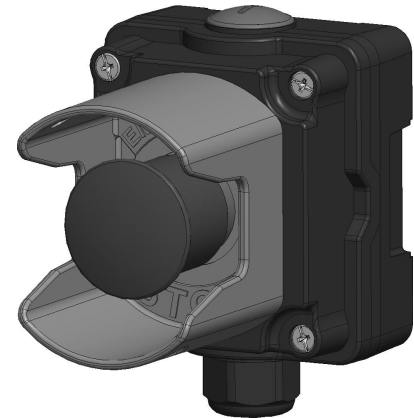
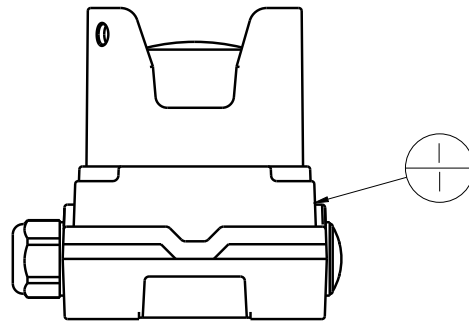
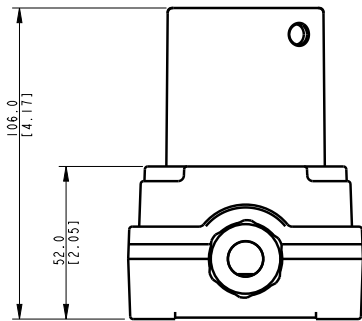
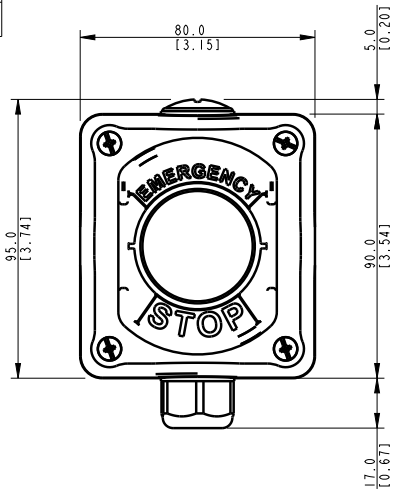


SQUARE D R-FRAME CIRCUIT BREAKER
3 POLE ELECTRONIC TRIP

NOTE:
KOHLER PART # TO BE CLEARLY VISIBLE ON
CIRCUIT BREAKER AND ON INDIVIDUAL PACKAGING.

UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: SIZE: .010 FRACTIONS ± 1/32 XLT ± .005 SURFACE FINISH A ± .000		THIS DRAWING IS DESIGN AND DETAIL OF PROPERTY OF REHLKO, LLC. PROPERTY OF REHLKO, LLC. NO PART OF THIS DRAWING IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF REHLKO, LLC.		rehlko	
APPROVALS		DATE		DWG, CIRCUIT BREAKER	
DESIGN	RAC	1-31-06	SCALE	.5	SHEET 1-1
CHECKED	WSD	2-1-06	PLotted		
APPROVED	AJT	2-1-06	DRG. NO.	GM48156	D

KIT NO.	ITEM	PART NO	QTY	DESCRIPTION
GM103743				E-STOP, NEC REMOTE
	1	GM103743-1	1	E-STOP W/ YELLOW SHROUD, LOTO
	2	GM103743-2	4	#10 X 1.25 Sheetmetal Screw
	3	GM103743-3	1	TERMINAL, FAST-ON, MALE, 18-22 AWG
	4	GM103743-4	1	TERMINAL, FAST-ON, FEMALE, 18-22 AWG
	5	GM103743-5	2	TERMINAL, SPADE, 22-16 AWG
	6	GM103743-6	1	LITERATURE, TT-1736
THIS IS AN AUTOMATED TABLE. ALL UPDATES MUST BE MADE IN THE ASSEMBLY.				



SCALE 0.75

NOTE:
DIMENSIONS IN [] ARE IN INCH EQUIVALENTS.
SCREWS AND TERMINALS ARE TO BE BAGGED

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL □ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY	DO NOT SCALE. AND PLACED IN THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001. REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS.	BOX
-	2-12-18	NEW DRAWING [CT176728]	CCL	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: X.XX ± 0.25 X.X ± 1.0 SURFACE FINISH X.XX ± 1.5 BEND RADIUS ± 1" MAX.	reihko
				DRAWN: BTW DATE: 2-12-18	THIRD ANGLE PROJECTION
				APPROVED: SEE PLM SYSTEM	MAJOR ○ = 0 CRITICAL ● = 0
					CHARACTERISTICS COMPLY WITH NPS-80022
					SCALE: 0.60 SHEET SIZE: B SHEET: 1 OF 1
					TITLE: E-STOP, NEC REMOTE
					DWG NO.: GM103743

THIS DRAWING IN DESIGN AND DETAIL IS DISCOVERY ENERGY, LLC PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH DISCOVERY ENERGY, LLC WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.

Warranty

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

Your product has been manufactured and inspected with care by experienced craftsmen. If you are the original end user, Discovery Energy, LLC and its affiliates dba Rehlko -hereafter referred to as "the manufacturer"- 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, the manufacturer will repair, replace, or make appropriate adjustment at the manufacturer's option if the product, upon the manufacturer's inspection, is found to be properly installed, maintained, and operated in accordance with the manufacturer's instruction manuals. A distributor, dealer, or authorized service representative must perform startup.

Product

Stationary Standby Generator Set & Accessories

Warranty Coverage

Five (5) years from registered startup or three thousand (3000) hours (whichever occurs first).

Extended warranty purchase must take place prior to expiration of standard warranty. Extended warranty is effective upon submission of purchase order in the online warranty system.

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

1. Normal wear, routine tuneups, tuneup parts, adjustments, and periodic service.
2. Damage, including but not limited to damage caused by accidents, improper installation or handling, faulty repairs not performed by an authorized service representative, improper storage, or acts of God.
3. Damage caused by operation at speeds, or with fuel, loads, conditions, modifications or installation contrary to published specifications.
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. Damage to exterior or interior components resulting from extreme environmental conditions, including but not limited to heat, cold, humidity, flooding, salt, and high winds.
6. Damage caused by operation when emergency battle mode is enabled.
7. Original installation charges and startup costs.
8. Starting batteries and the following related expenses:
 - a. Labor charges related to battery service.
 - b. Travel expenses related to battery service.
9. Engine coolant heaters, heater controls, and circulating pumps after the first year of the warranty period.
10. Additional expenses for repairs performed after normal business hours, i.e. overtime or holiday labor rates.
11. Rental of equipment during the performance of warranty repairs.
12. Removal and replacement of non-Rehlko-supplied options and equipment.
13. Non-Rehlko replacement parts. Replacement of a failed part with a non-Rehlko part voids the warranty on that part.
14. Radiators replaced rather than repaired.
15. Fuel injection pumps not repaired by an authorized service representative.
16. Non-Rehlko-authorized repair shop labor without prior approval from the manufacturer Warranty Department.
17. Engine fluids such as fuel, oil, or coolant/antifreeze.
18. Shop supplies such as adhesives, cleaning solvents, and rags.
19. Expenses incurred investigating performance complaints unless the problem is caused by defective materials or workmanship.
20. Maintenance items such as fuses, lamps, filters, spark plugs, loose or leaking clamps, and adjustments.
21. Travel time and mileage exceeding 300 miles round trip.

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

THE MANUFACTURER 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.



Discovery Energy, LLC
200 Twin Oaks Road, Kohler, WI 53044 USA
For the nearest sales and service outlet in the
US and Canada, phone 1-800-544-2444
powersystems.rehlko.com

TP-5561 6/25i

Certification

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Discovery Energy
Rehko
N7650 Lakeshore Road
Sheboygan
Wisconsin
53083
USA

Holds Certificate No:

FM 727336

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

Design, manufacture, and distributor support for electrical generators, alternators, fuel tanks, automatic transfer switches and switchgear, including the manufacture of leads and harness, skids, and fabricated components with distribution of generator sets supported by warehouse operations.

For and on behalf of BSI:



Jessica Patel, Senior Vice President, Assurance Americas

Original Registration Date: 1995-02-28

Latest Revision Date: 2025-12-03

Effective Date: 2024-11-07

Expiry Date: 2027-11-06

Page: 1 of 2



...making excellence a habit.™

Certificate No: **FM 727336**

Location	Registered Activities
Discovery Energy Rehlko - GK 200 Twin Oaks Road Kohler Wisconsin 53004 USA	Manufacture of leads and harness, automatic transfer switches and switchgear. Distribution of generator sets.
Discovery Energy Rehlko N7650 Lakeshore Road Sheboygan Wisconsin 53083 USA	Design, manufacture, and distributor support for electrical generators, automatic transfer switches and switchgear.
Discovery Energy Rehlko 300 N Dekora Woods Blvd Saukville Wisconsin 53080 USA	Manufacture of fuel tanks, skids, fabricated components and generators.
Discovery Energy Rehlko Muth Warehouse 2821 Muth Court Sheboygan Wisconsin 53083 USA	The distribution of generator sets.
Discovery Energy Rehlko KWIP Warehouse 4327 County EE Sheboygan Wisconsin 53081 USA	Receiving, sequencing and warehousing of generator components.

Original Registration Date: 1995-02-28

Latest Revision Date: 2025-12-03

Effective Date: 2024-11-07

Expiry Date: 2027-11-06

Page: 2 of 2

This certificate remains the property of BSI and shall be returned immediately upon request.

An electronic certificate can be authenticated [online](https://www.bsigroup.com/ClientDirectory). Printed copies can be validated at www.bsigroup.com/ClientDirectory

To be read in conjunction with the scope above or the attached appendix.

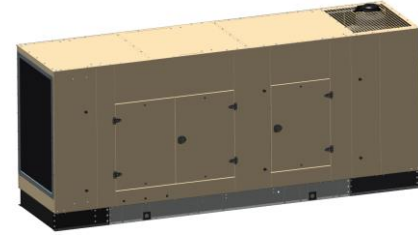
Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP. Tel: + 44 345 080 9000

BSI Assurance UK Limited, registered in England under number 7805321 at Seventh and Eighth Floors, The Acre, 90 Long Acre, London, WC2E 9RA, UK.

A Member of the BSI Group of Companies.

EVALUATION SUBJECT: 350-500REOZJC/D Sound Level 2 Aluminum Enclosure

TER-20-25965.1

REPORT HOLDER:KOHLER POWER SYSTEMS
7650 LAKESHORE ROAD
SHEBOYGAN, WI 53083 USA
(920) 457-4441 | KOHLERPOWER.COM**KOHLER®**Florida Building Code Sixth & Seventh Editions (2017 & 2020)
International Building Code (2012, 2015 & 2018)**SCOPE OF EVALUATION (compliance with the following codes):****THIS IS A STRUCTURAL (WIND) PERFORMANCE EVALUATION ONLY. NO ELECTRICAL OR TEMPERATURE PERFORMANCE RATINGS OR CERTIFICATIONS ARE OFFERED OR IMPLIED HEREIN.**

This Product Evaluation Report is being issued in accordance with the requirements of the **International Building Code (2012, 2015, & 2018)** and the **Florida Building Code Sixth & Seventh Editions (2017 & 2020)** per ASCE 7, FBC Building Ch. 16, FBC Building Sections 104.11 and 453.25.5, FBC Existing Building Sections 707.1 and 707.2, FBC Residential M1202.1 and M1301.1, FMC 301.15, and FS 471.025. The product noted on this report has been tested and/or evaluated as summarized herein.

IN ACCORDANCE WITH THESE CODES EACH OF THESE REPORTS MUST BEAR THE ORIGINAL SIGNATURE & RAISED SEAL OF THE EVALUATING ENGINEER.**SUBSTANTIATING DATA:****• Product Evaluation Documents**

Substantiating documentation has been submitted to provide this TER and is summarized in the sections below.

• Structural Engineering Calculations

Structural engineering calculations have been prepared which evaluate the product based on rational analysis to qualify the following design criteria:

- Maximum rated wind pressures via Components & Cladding methodology.
- Structural component connection integrity, verified by a unity check between tension and shear.
- Anchorage integrity for unit and tank mounts.

Calculation summary is included in this TER and appears below. NOTE: No 33% increase in allowable stress has been used in the design of this product.

INSTALLATION:

The product(s) listed above shall be installed in strict compliance with this TER & manufacturer-provided enclosure model specifications.

The product components shall be of the material specified in the manufacturer-provided product specifications. All screws, bolts and rivet must be installed in accordance with the applicable provisions & anchor manufacturer's published installation instructions.

LIMITATIONS & CONDITIONS OF USE:

Use of this product shall be in strict accordance with this TER as noted herein. Adjustment factors noted herein and the applicable codes must be considered, where applicable. Installation shall conform to the minimum standards stated in the referenced building code(s) in addition to tie-down details and limitations stated herein.

See final page for complete limitations & conditions of use.

UNIT CASING MATERIAL:

1/8" Al 5052-H32 top and side panels and 1/4" steel ASTM A36 for bottom skids, secured with 3/16" Ø SS GR. 50, M6 low carbon steel drill screws, M6 class 4.8 machine screws, 5/16" A2-70 SS bolts and M12 bolts class 8.8. (see enclosure, component drawings per manufacturer for specific locations).

TERMINOLOGY:

See list of abbreviations on the final page of this report.

NOTE: THE GRAPHICAL DEPICTIONS IN THIS REPORT ARE FOR ILLUSTRATIVE PURPOSES ONLY AND MAY DIFFER IN APPEARANCE.**OPTIONS:**

This evaluation is valid for KOHLER 350-500REOZJC/D Sound Level 2 Aluminum Enclosures described herein.

This evaluation includes standard product only. Contact the manufacturer for Engineering Special (ES) orders. Any structural changes outside of the design as described herein would void this certification.

STRUCTURAL PERFORMANCE:

Models referenced herein are subject to the following design limitations:

**Maximum Rated Wind Pressure*:
+/- 65 psf**

- Required design pressures shall be determined on a site-specific basis in accordance with ASCE 7 and applicable sections of the building code(s) being referenced in accordance with ASD methodology.
- Required design pressures shall be less than or equal to the maximum pressures listed herein.
- *Maximum Rated Wind Pressures indicate the maximum pressures that all units listed herein are approved for. Valid for at-grade applications only. See limitations herein.
- Site-specific wind analysis may produce alternate limitations provided maximum rated wind pressures stated herein are not exceeded.

VISIT [ECALC.IO/259651](https://ecalculator.io/259651)

FOR ENGINEER CERTIFIED ORIGINALS & MORE
INFORMATION ABOUT THIS DOCUMENT OR SCAN
THE QR CODE TO THE RIGHT >

VISIT [ENGINEERINGEXPRESS.COM/STORE](https://engineeringexpress.com/store) FOR
ADDITIONAL PLANS, REPORTS & RESOURCES

**ORIGINAL SIGNATURE AND RAISED SEAL
OR DIGITAL SEAL REQUIRED TO BE VALID PER CODE:****PE SEAL REQUIRED**

August 21, 2020

Frank Bennardo, P.E., SECB

ENGINEERING EXPRESS®

FL PE #0046549

FLCA #9885

☐ If Checked, Certifying
Engineer and PE #

Appear Above

DIGITAL SEAL NOTICE: IF THIS DOCUMENT IS DIGITALLY SIGNED, THIS SHEET IS PART OF A DIGITALLY SIGNED FILE. IT SHALL REMAIN IN DIGITAL FORMAT, SHALL BE VERIFIED BY ELECTRONIC MEANS, & **PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED.** VISIT [ECALC.IO/DS](https://ecalculator.io/ds) FOR MORE INFORMATION.

PRINTED DOCUMENT NOTICE: IF THIS DOCUMENT IS PRINTED & DOES NOT CONTAIN AN ENGINEER'S ORIGINAL SIGNATURE & SEAL, THIS DOCUMENT IS VOID & NOT VALID FOR USE. PHOTOCOPIES ARE NOT PERMITTED FOR USE.

SECTION 1 SUMMARY

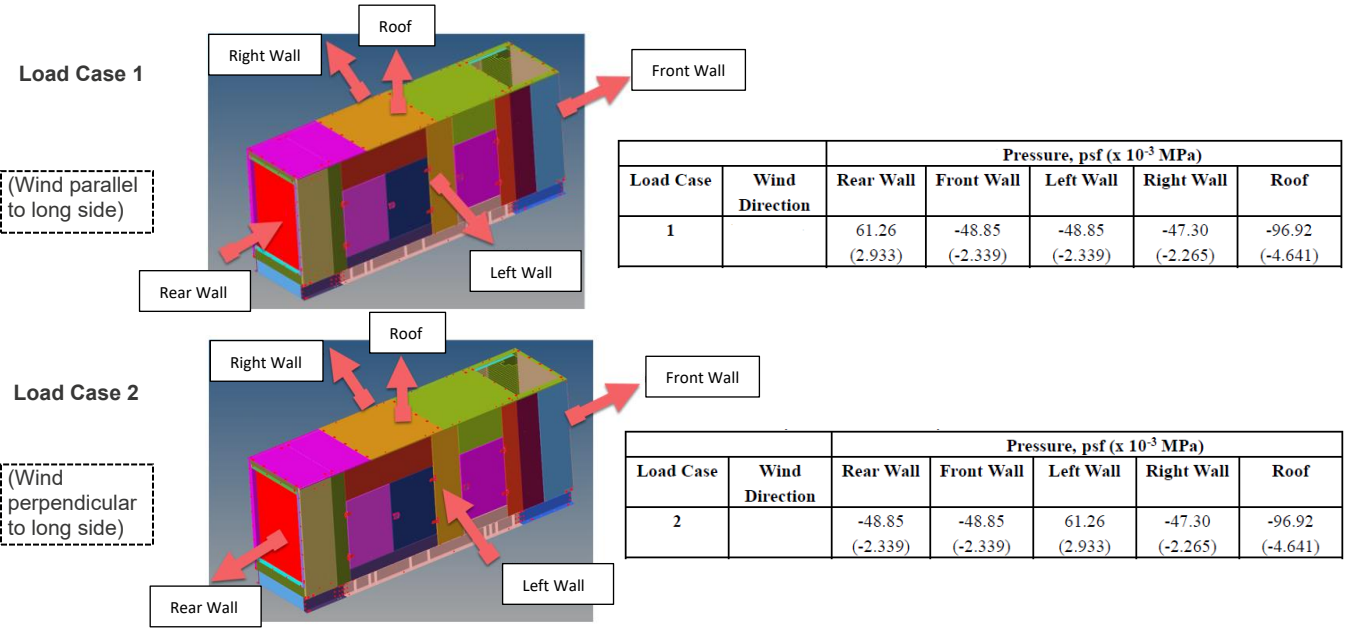
Engineering Express has reviewed the design requirements per the Florida Building Code Sixth & Seventh Editions (2017 & 2020) and ASCE 7 for the structural integrity of the Kohler aluminum housing units with steel skid to withstand the maximum rated wind pressures stated herein. This TER certifies the enclosures listed herein for maximum uniform static wind loading pressures stated herein and anchorage integrity only. Our analysis includes the unit framing and housing only and requires a permanent near-grade (non-rooftop) attachment to a concrete, metal, or wood host structure as certified/verified by others. Steel skid tie-down anchor locations shall conform to Section 3 of this TER. Additionally, the unit shall not be installed in a location susceptible to channeling effects from upwind obstacles. It shall be the installer's responsibility to ensure that the criteria for the unit housing integrity, as listed above, is applicable for use at the location of installation and the mounting method meets or exceeds the requirements of the local code and it is approved by the appropriate local authority before installation.

This certification is intended to certify the structural capacity and integrity of the structural framing members, wall and roof sheet metal skins, generator skid and internal structural connections only for the sound aluminum enclosures listed herein to resist the stated maximum rated uniform wind pressures. Design of the generator itself, mechanical designs, energy/electrical criteria, generator slab support, anchorage and tie-down method accompanying components and all non-structural items shall be verified by others and outside the scope of this certification. Upon analysis of the aluminum housing unit vs. the critical ultimate design loads illustrated below, this engineer has concluded that the aluminum housing enclosure provides adequate resistance to the specified ultimate design loads.

Structural Engineering Calculations

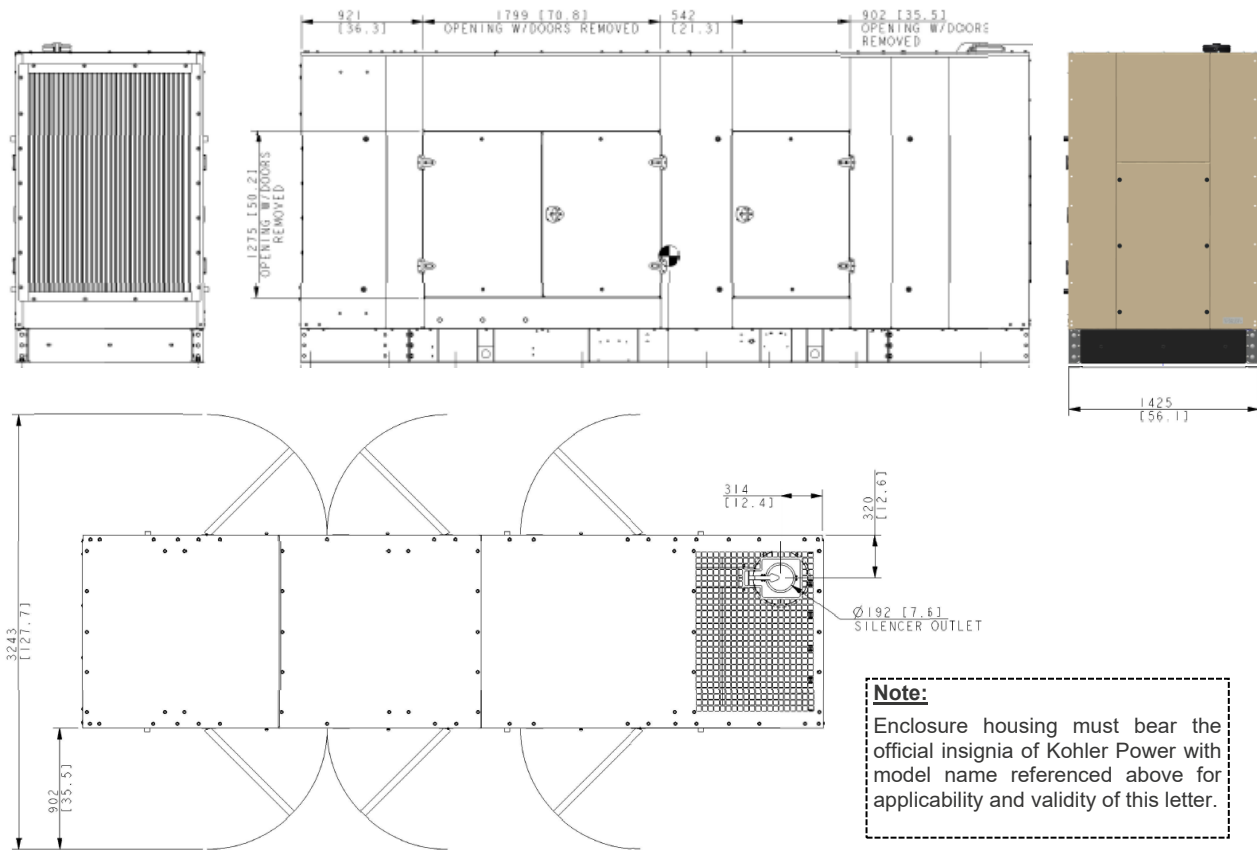
Structural engineering calculations have been prepared which evaluate the aluminum unit housing based on rational analysis using Finite Element Analysis to qualify the following design criteria:

- 1. Maximum ultimate design pressures as evaluated below:

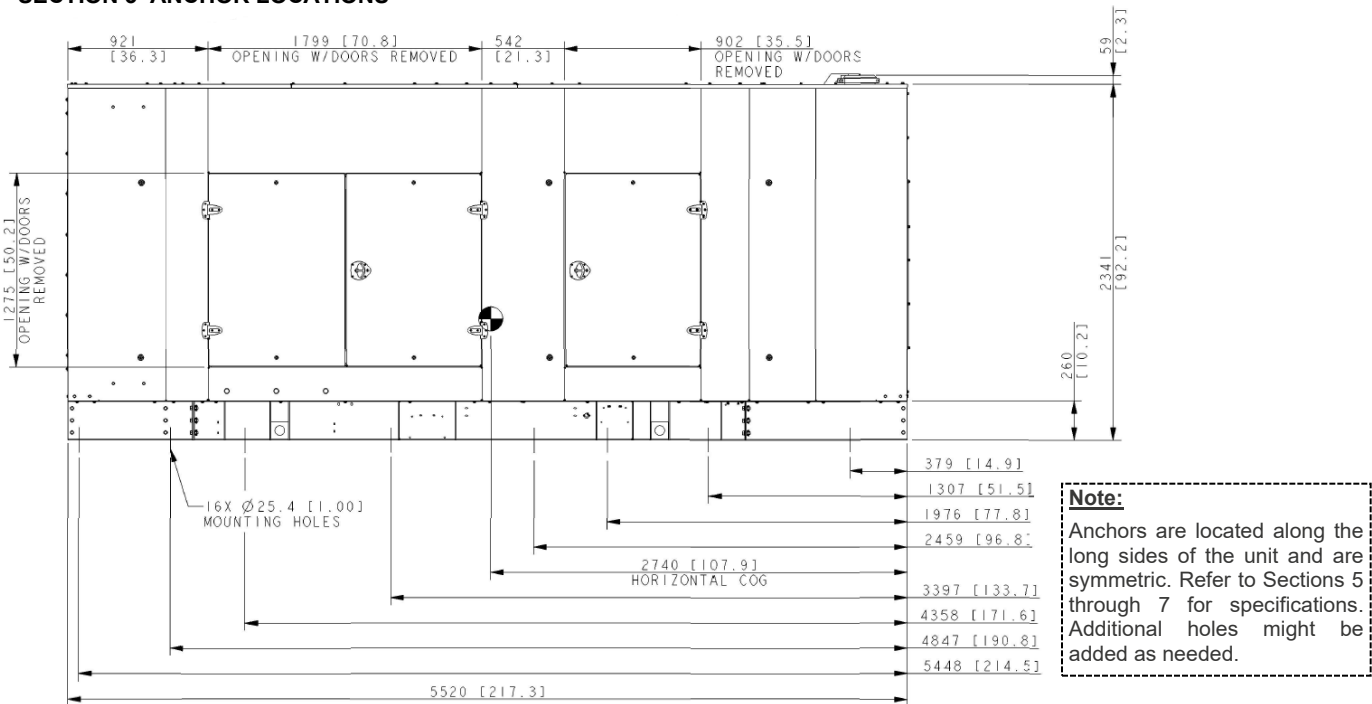


- 2. Supplemental FEA has been performed to evaluate the front and left walls of the enclosure to +/- 65 psf. Upon thorough review of the results, it is the opinion of this engineer that the results, coupled with the FEA above, satisfactorily indicate the enclosure and skid stresses remain below ultimate tensile stress and thus, provide adequate resistance to the maximum wind pressures stated herein.
- 3. Maximum housing unit dimensions: 218" L x 57" W x 93" H. For exact enclosure dimensions, see ADV-9189. Enclosure weight shall be between 1000 lb and 2000 lb. Weights outside of this range shall be approved by this office.
- 4. Enclosure materials have been analyzed for yield and ultimate tensile stresses using Von Mises stress criteria in accordance with the 2015 Aluminum Design Manual & AISC Steel Construction Manual 14th Edition. For both load cases, Von Mises stresses were below the ultimate tensile stresses of the respective materials; therefore, the sound aluminum enclosure will provide enough structural capacity to resist wind pressures shown.
- 5. All internal connection capacities, including bolted and welded components, have been checked for applicable tension and shear by applying a unity interaction equation where applicable and have been approved by this office.

SECTION 2 DIMENSIONS & ELEVATIONS



SECTION 3 ANCHOR LOCATIONS



IN ALL CONDITIONS IT IS THE RESPONSIBILITY OF THE PERMIT HOLDER TO ENSURE THE HOST STRUCTURE IS CAPABLE OF WITHSTANDING THE RATED GRAVITY, LATERAL, AND UPLIFT FORCES BY SITE-SPECIFIC DESIGN. NO WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED, IS OFFERED BY ENGINEERING EXPRESS AS TO THE INTEGRITY OF THE HOST STRUCTURE TO CARRY DESIGN FORCE LOADS INCURRED BY THIS UNIT.

SECTION 4 ENCLOSURE MODELS INCLUDED

GENERATOR	ENCLOSURE TYPE	ENCLOSURE DRAWING NUMBER	REVISION & DATE	RETROFIT DRAWING NUMBER	REVISION & DATE
350-500REOZJC 350-400REOZJD	350-500REOZJC/D Sound Level 2 Aluminum Enclosure	GM110077	Rev A - 1/17/20	GM109392	Rev - 2/4/20

SECTION 5 ANCHOR DIRECTIVE

GENSET MODELS	FUEL TANK		A - ANCHOR			B - EMBEDMENT (in.)	C - MIN. EDGE DISTANCE (in.)	D - MIN. CONCRETE THICKNESS (in.)	# OF ANCHORS FOR TANK TO CONCRETE*	# OF THRU-BOLTS FOR SKID TO TANK
	LITERS	GAL	ANCHOR BRAND	MODEL	DIAMETER (IN.)					
350REOZJC/D 400REOZJC/D 500REOZJC	NO TANK		HILTI	KWIK BOLT 3 (CARBON STEEL) ESR-2302	0.75	4.75	6	8	16**	-
	1529-5047	404-1333							18	16***
	5042-9993	1332-2640							18	12****
	11602-13325	3065-3520							24	12****

ANCHOR DIRECTIVE NOTES

- Refer to ADV-9189 and Section 7 for additional specifications. NOTE: Only anchorage integrity is being certified for I-beams and tanks.

*For tank anchorage to concrete, it is allowed for ground I-beams to be used as an intermediary between tank and concrete as opposed to mounting the tank directly to concrete. See Ground I-Beam Directive below for the required minimum number of I-beams for this condition. I-beams shall have a min. spacing of 18", typ. (Note: I-beams and tank flanges shall be 3/16" min. thick and Fy = 36 ksi min. steel.

GROUND I-BEAM DIRECTIVE			
FUEL TANK		I-BEAMS REQUIRED	
LITERS	GAL	ALONG LENGTH OF ENCLOSURE	ALONG REMAINING TANK LENGTH
1529-5047	404-1333	7	1 FOR EVERY 48" IN TANK LENGTH BEYOND ENCLOSURE LENGTH
5042-9993	1332-2640	6	
11602-13325	3065-3520	5	

- For each I-beam top connection to tank, employ (2) M20 UNC GR. 8.8 steel thru-bolts with 2" min. OD washers top and bottom, (1) thru-bolt per side, typ. Position thru-bolt no more than 6" away from the end of the I-beam, typ. Provide 1.5" min. edge distance between the thru-bolt and any edge of the members in contact (tank flange and I-beam flange).

- For each I-beam bottom connection to concrete, employ (2) 3/4" Ø HILTI KWIK BOLT 3 Carbon Steel Expansion Anchors with 4-3/4" embedment and 18" min. spacing from neighboring anchors, (1) anchor per side, typ. Provide 6" min. edge distance between the anchor and any edge of the concrete, typ. Provide 1.5" min. edge distance between the anchor and any edge of I-beam flange. Position anchor no more than 6" away from the end of the I-beam, typ. Provide 8" min. thick 4 ksi concrete (concrete by others).

**For the case in which no tank is used, the genset skid shall mount directly to the concrete using the starred number of anchors with the specifications stated in the directive. Skid flange shall be 3/16" min. thick and Fy = 36 ksi min. steel.

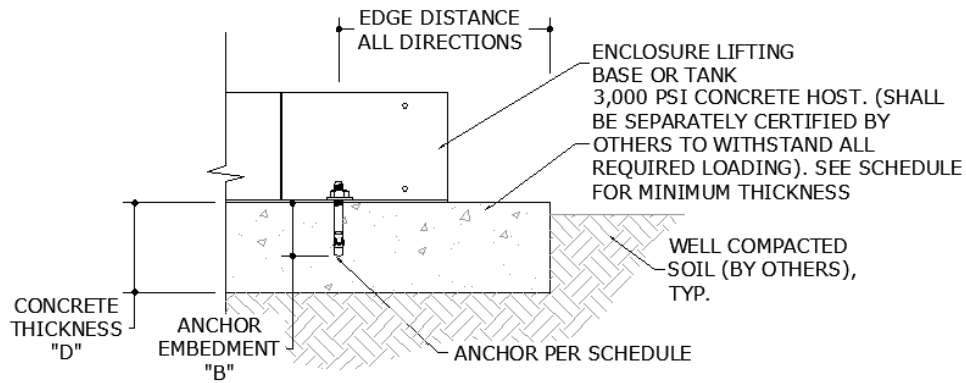
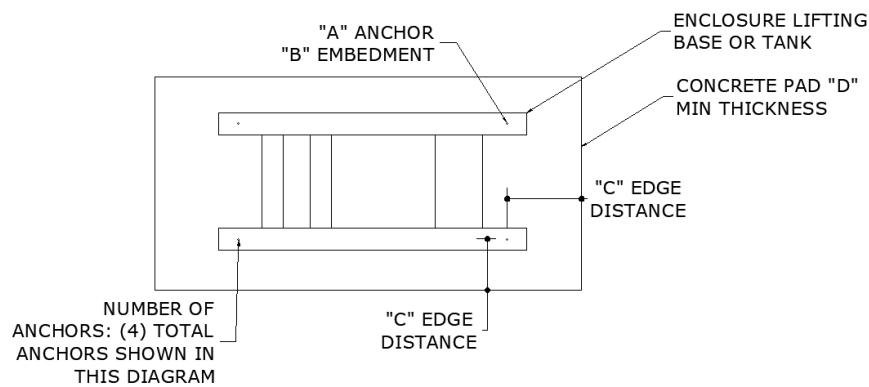
***The unit skid shall mount directly to the tank with the specified number of M20 UNC GR.8.8 thru-bolts with 2" min. OD washers top and bottom, typ. Provide 1.5" min. edge distance from edge of members in contact (skid flange and tank flange). Members in contact shall be 3/16" min. thick Fy = 36 ksi min. steel.

****For skid anchorage to tank, it is allowed for I-beams to be used as an intermediary between skid and tank as opposed to mounting the tank directly to concrete for the associated starred cases only, in which the width of the tank exceeds the width of the unit. A minimum of (6) I-beams with 18" min. spacing shall be implemented for this condition. Skid flange, tank flange, and I-beams shall be 3/16" min. thick Fy = 36 ksi min. steel.

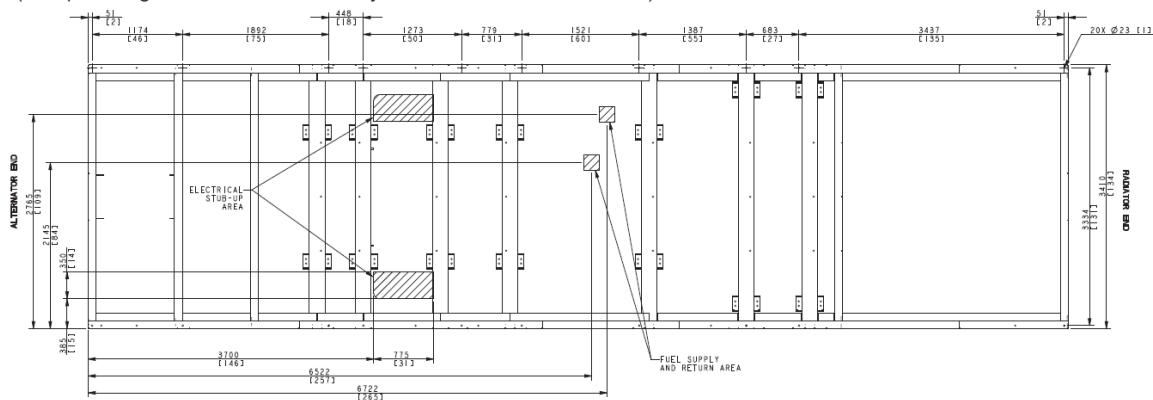
- For each I-beam top connection to skid, employ (2) M20 UNC GR. 8.8 steel thru-bolts with 2" min. OD washers top and bottom, (1) thru-bolt per side, typ. Position thru-bolt no more than 6" away from the end of the I-beam, typ. Provide 1.5" min. edge distance between the thru-bolt and any edge of the members in contact (skid flange and I-beam flange). (12) total thru-bolts min., (6) min. per long side.

- For each I-beam bottom connection to tank, employ (2) M20 UNC GR. 8.8 steel thru-bolts with 2" min. OD washers top and bottom, (1) thru-bolt per side, typ. Position thru-bolt no more than 6" away from the end of the I-beam, typ. Provide 1.5" min. edge distance between the thru-bolt and any edge of the members in contact (I-beam flange and tank flange). (12) total thru-bolts min., (6) min. per long side.

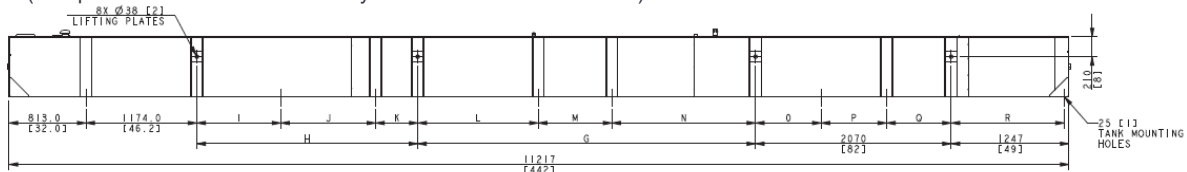
SECTION 6 ANCHOR ILLUSTRATIONS

**DETAIL A****ANCHORAGE PLAN VIEW ILLUSTRATION****Instructions:**

- For enclosures anchored directly to host without fuel tank, go to ADV-9189 and place the specified anchors using the mounting locations. See below example for a sample lifting base's mounting holes:
- (Sample lifting base for illustration only. Not included in certification)



- For enclosures mounted on fuel tanks and anchored to host, go to ADV-9189 and place the specified anchors using the mounting locations. See below example for fuel tank's mounting holes:
(Sample fuel tank for illustration only. Not included in certification)



- Refer to KOHLER ADV-9189 for additional installation instruction directives.

CORP. OFC: 160 SW 12TH AVENUE SUITE 106, DEERFIELD BEACH, FLORIDA 33442

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(954) 354-0660 | (866) 396-9999 | TEAM@ENGINEERINGEXPRESS.COM | ENGINEERINGEXPRESS.COM

SECTION 7: WIND INSTALLATION REQUIREMENTS:

The following are requirements for wind-rated installation:

1. The design of post-installed anchors in concrete used for the component anchorage has been evaluated by this engineer for wind applications in accordance with ASCE 7 as reference herein.
2. Anchors must be installed in minimum 4000 psi compressive strength normal weight concrete. Concrete aggregate must comply with ASTM C33. Installation in structural lightweight concrete is not permitted unless otherwise approved by the structural engineer of record.
3. Anchors must be installed to the torque specification as recommended by the anchor manufacturer to obtain maximum loading.
4. Anchors must be installed in the locations specified in the Kohler ADV-9189 dimension print in correlation with signed and sealed engineering herein. The more stringent requirement from either document shall apply in cases of uncertainty.
5. Anchor plates from Kohler must be installed at each anchor location between anchor head and equipment for tension load distribution.
6. Concrete floor slab and concrete housekeeping pads must be designed, and rebar reinforced for wind applications in accordance with ACI 318 and ASCE 7 as referenced herein.
7. All housekeeping pad thicknesses must be designed in accordance with pre-qualification test report or a minimum of 1.5x the anchor embedment depth, whichever is largest.
8. All housekeeping pads must be doweled or cast into the building structural floor slab and designed for wind application per appropriate code requirements for the subject jurisdiction and as approved by the structural engineer of record.
9. Wall mounted equipment must be installed to a rebar reinforced structural concrete wall that is designed for wind applications and approved by the engineer of record to resist the added wind loads from the components being anchored to the wall.
10. Floor mounted equipment (with or without housekeeping pad) must be installed to a rebar reinforced structural concrete floor that is designed for wind applications and approved by the engineer of record to resist the added wind loads from components being anchored to the floor.
11. When installing to a floor, rebar interference must be considered.
12. Attaching equipment to any floor other than those constructed of structural concrete and designed to accept the wind loads from said equipment is not permitted by this specification and beyond the scope of this certification.
13. Attaching equipment to any concrete block walls or cinder block walls is not permitted by this specification and beyond the scope of this certification.
14. Rooftop installations are not permitted by this evaluation and is beyond the scope of this certification.
15. Installation upon rooftop curbs shall be coordinated with the curb manufacturer and the Structural Engineer of Record. Any curb or concrete pad that supports the RTU unit is beyond the scope of this certification.
16. Anchor locations, size, type and load requirements shall be as specified on the certified installation specification. Mounting requirements details such as brand, type, embedment depth, edge spacing, anchor spacing, concrete strength, wall bracing, and special inspection must be outlined and approved by the project Structural Engineer of Record to withstand the wind anchor loads as defined on the certified installation specification. The installing contractor is responsible for the proper installation of all anchors and mounting hardware, observing the mounting requirement details outlined by the Engineer of Record. Contact Kohler if a detailed Wind Installation Calculation Package is required.
17. Electrical wiring, piping, duct and other connections to the equipment is the responsibility of the installing contractor. It is necessary that these remain intact, functional and do not inhibit the functionality of the generator set after a wind event.
18. Concrete pad dimensions are minimum values to satisfy only the anchor bolt requirements. The pad must be designed by the project structural engineer of record.

TERMINOLOGY (CONTINUED):

The following abbreviations may appear in this report: "ASCE" for "American Society of Civil Engineers", "ASD" for "Allowable Stress Design", "FBC" for "Florida Building Code", "FLCA" for "Florida Certificate of Authorization", "FMC" for "Florida Mechanical Code", "GR." For "grade", "HVAC" for "heating, ventilation, and air conditioning", "max." for "maximum", "min." for "minimum", "NTS" for "not to scale", "OD" for "outer diameter", "PE" for "Professional Engineer", "psf" for "pounds per foot squared (lb/ft²)", "SAE" for "Society of Automotive Engineering", "SECB" for "Structural Engineering Certification Board", "SMS" for "sheet metal screws", "SS" for "stainless steel", "TER" for "Technical Evaluation Report", "typ." For "typical", "U.N.O." for "unless noted otherwise", "w/o" for "without", "#" for "number", and "Ø" for "diameter". For additional abbreviation/terminology clarifications, please contact this office.

LIMITATIONS & CONDITIONS OF USE (CONTINUED):Host Structure:

The supporting host structure shall be designed to resist all superimposed loads as determined by others on a site-specific basis as may be required by the Authority Having Jurisdiction. No evaluation is offered for the host supporting structure by use of this document;

Production Drawings:

The following drawings shall be accessible if required for a full permit application to be submitted to the Authority Having Jurisdiction in conjunction with this TER:

- Electrical schematic(s)
- Final assembly drawings and parts lists sufficient to detail primary components, operator controls, and their locations
- Complete set of mechanical drawings for all machined parts
- Complete part specifications (including manufacturer's model numbers, size, ratings, etc.) for all purchased parts
- Specification sheets for all parts/components
- Drawings showing all construction details
- Product label drawing(s) showing all required marking information. The label drawing shall show the proposed label location on the equipment and artwork showing the manufacturer's name, address, model and serial numbers, equipment ratings, warning markings.

Drawing and Change Control:

The manufacturer shall establish a system of product configuration control that shall allow no unauthorized changes to the product. Changes to critical documents, identified in this Technical Evaluation Report, must be reported to, and authorized by, this office prior to implementation for production.

Survivability:

This evaluation report is valid for a newly installed unit and does not include certification of the product beyond a design event if impacted. Inspections shall be implemented during annual equipment maintenance or after a named storm; all fasteners and cabinet components are to be verified, and all damaged, loose, corroded and/or broken fasteners and cabinet components shall be replaced to ensure structural integrity against hurricane wind forces. Contact this office for any reevaluation needs as designated by the Authority Having Jurisdiction.

Durability:

Components or component assemblies shall not deteriorate, crack, fail, or lose functionality due to galvanic corrosion or weathering. All supporting components which are permanently installed shall be protected against corrosion, contamination, and other such damage at all times. Each component or component assembly shall be supported and oriented in its intended installation position. All exposed plastic components shall be certified to resist sunlight exposure as specified by ASTM B117, or ASTM G155 in Broward or Miami Dade counties.

Extent of Certification:

As described above, this certification pertains to the structural integrity of the unit components listed herein, subject to the limitations and criteria stated herein. Operability and water infiltration are outside the bounds of this certification. No other certifications are intended.

This evaluation alone does not offer any evaluation for large missile impact debris or cyclic wind requirements; see TER-20-25965.2 for these evaluations.

Remarks	Drawn	Checked	Date
Initial Issue	EPR	RWN	7/29/20
Amend Anchor Directive	EPR	RWN	8/7/20



Kohler Standby/Prime Generator Set Test Program

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

Prototype Testing

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

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

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

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

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

Production Testing

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

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

KOHLER®

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

PreStartup Checklist

Generator Set/Transfer Switch Installation Checklist

This document has generic content and some items may not apply to some applications. Check only the items that apply to the specific application. Read and understand all of the safety precautions found in the Operation and Installation Manuals. Make the following installation checks before performing the Startup Checklist.

Note: Use this form as a general guide, along with any applicable codes or standards. Comply with all applicable codes and standards. Improper installation voids the warranty.

Equipment Room or Weather Housing		Does Not Apply	
	Yes	No	Apply
☐	☐	☐	☐
1.	Is the equipment installed in a fire-resistant room (made of non-combustible material) or in an outdoor weather housing?		
☐	☐	☐	☐
2.	Is there adequate clearance between the engine and floor for service maintenance?		
☐	☐	☐	☐
3.	Is there emergency lighting available at the equipment room or weather housing?		
☐	☐	☐	☐
4.	Is there adequate heating for the equipment room or outdoor weather housing?		
☐	☐	☐	☐
5.	Is the equipment room clean with all materials not related to the emergency power supply system removed?		
☐	☐	☐	☐
6.	Is the equipment room protected with a fire protection system?		
Engine and Mounting			
☐	☐	☐	☐
7.	Is the mounting surface(s) properly constructed and leveled?		
☐	☐	☐	☐
8.	Is the mounting surface made from non-combustible material?		
☐	☐	☐	☐
9.	Was the generator-to-engine alignment performed after attaching the skid to the mounting base? Generator sets with two-bearing generators require alignment.		
Lubrication			
☐	☐	☐	☐
10.	Is the engine crankcase filled with the specified oil?		
Cooling and Ventilation			
☐	☐	☐	☐
11.	Is the cooling system filled with the manufacturer's specified coolant/antifreeze and purged of air?		
☐	☐	☐	☐
12.	Is there adequate inlet and outlet air flow (electric louvers adjusted and ventilation fan motor(s) connected to the corresponding voltage)?		
☐	☐	☐	☐
13.	Is the radiator duct properly sized and connected to the air vent or louver?		
☐	☐	☐	☐
14.	Are flexible sections installed in the cooling water lines?		
Fuel			
☐	☐	☐	☐
15.	Is there an adequate/dedicated fuel supply?		
☐	☐	☐	☐
16.	Are the fuel filters installed?		
☐	☐	☐	☐
17.	Are the fuel tanks and piping installed in accordance with applicable codes and standards?		
☐	☐	☐	☐
18.	Is there adequate fuel transfer tank pump lift capacity and is the pump motor connected to the corresponding voltage?		
☐	☐	☐	☐
19.	Is the fuel transfer tank pump connected to the emergency power source?		
☐	☐	☐	☐
20.	Are flexible fuel lines installed between the engine fuel inlet and fuel piping?		
☐	☐	☐	☐
21.	Is the specified gas pressure available at the fuel regulator inlet?		
☐	☐	☐	☐
22.	Does the gas solenoid valve function?		
☐	☐	☐	☐
23.	Are the manually operated fuel and cooling water valves installed allowing manual operation or bypass of the solenoid valves?		
Exhaust			
☐	☐	☐	☐
24.	Is the exhaust line sized per guidelines and does it have flexible connector(s)? Is the flexible connector(s) straight?		
☐	☐	☐	☐
25.	Is there an exhaust line condensate trap with a drain installed?		
☐	☐	☐	☐
26.	Is the specified silencer installed and are the hanger and mounting hardware tightened?		
☐	☐	☐	☐
27.	Is a heat-isolating thimble(s) installed at points where exhaust lines pass through combustible wall(s) or partition(s)?		
☐	☐	☐	☐
28.	Is the exhaust line free of excessive bends and restrictions? Is the backpressure within specifications?		
☐	☐	☐	☐
29.	Is the exhaust line installed with a downward pitch toward the outside of the building?		
☐	☐	☐	☐
30.	Is the exhaust line protected from entry by rain, snow, and animals?		
☐	☐	☐	☐
31.	Does the exhaust system outlet location prevent entry of exhaust gases into buildings or structures?		
☐	☐	☐	☐
32.	Are individuals protected from exposure to high temperature exhaust parts and are hot parts safety decals present?		
AC Electrical System			
☐	☐	☐	☐
33.	Does the nameplate voltage/frequency of the generator set and transfer switch match normal/utility source ratings?		
☐	☐	☐	☐
34.	Do the generator set load conductors have adequate ampacity and are they correctly connected to the circuit breakers and/or the emergency side of the transfer switch?		
☐	☐	☐	☐
35.	Are the load conductors, engine starting cables, battery charger cables, and remote annunciator leads installed in separate conduits?		
☐	☐	☐	☐
36.	Is the battery charger AC circuit connected to the corresponding voltage?		
Transfer Switch, Remote Control System, Accessories			
☐	☐	☐	☐
37.	Is the transfer switch mechanism free of binding? Note: Disconnect all AC sources and operate the transfer switch manually.		
☐	☐	☐	☐
38.	Are the transfer switch AC conductors correctly connected? Verify lead designations using the appropriate wiring diagrams.		
☐	☐	☐	☐
39.	Is all other wiring connected, as required?		
Batteries and DC Electrical System			
☐	☐	☐	☐
40.	Does the battery(ies) have the specified CCA rating and voltage?		
☐	☐	☐	☐
41.	Is the battery(ies) filled with electrolyte and connected to the battery charger?		

Generator Set/Transfer Switch Startup Checklist

This document has generic content and some items may not apply to some applications. Check only the items that apply to the specific application. Read and understand all of the safety precautions found in the Operation and Installation Manuals. Complete the Installation Checklist before performing the initial startup checks. Refer to Service Bulletin 616 for Warranty Startup Procedure Requirements regarding generator set models with ECM-controlled engines.

☐ Does Not Apply ☐ Yes	☐ Does Not Apply ☐ Yes
☐ ☐ 1. Verify that the engine is filled with oil and the cooling system is filled with coolant/antifreeze.	☐ ☐ 29. Close the normal source circuit breaker or replace fuses to the transfer switch.
☐ ☐ 2. Prime the fuel system.	☐ ☐ 30. Check the normal source voltage, frequency, and phase sequence on three-phase models. The normal source must match the load.
☐ ☐ 3. Open all water and fuel valves. Temporarily remove the radiator cap to eliminate air in the cooling system. Replace radiator cap in step 21.	☐ ☐ 31. Open the normal source circuit breaker or remove fuses to the transfer switch.
☐ ☐ 4. Place the generator set master switch in the OFF/RESET position. Observe Not-in-Auto lamp and alarm, if equipped, on the controller.	☐ ☐ 32. Manually transfer the load to the normal source.
☐ ☐ 5. Press the lamp test, if equipped on controller. Do all the alarm lamps on the panel illuminate?	☐ ☐ 33. Close the generator set main line circuit breakers, close the safeguard breaker, and/or replace the fuses connected to the transfer switch.
☐ ☐ 6. Open the main line circuit breakers, open the safeguard breaker, and/or remove fuses connected to the generator set output leads.	☐ ☐ 34. Place the generator set master switch in the RUN position.
☐ ☐ 7. Turn down the speed control (electronic governor) or speed screw (mechanical governor).*	☐ ☐ 35. Check the generator set voltage, frequency, and phase sequence on three-phase models. The generator set must match normal source and load.
☐ ☐ 8. Verify the presence of lube oil in the turbocharger, if equipped. See the engine and/or generator set operation manual.	☐ ☐ 36. Place the generator set master switch in the OFF/RESET position.
☐ ☐ 9. Place the generator set master switch in the RUN position. Allow the engine to start and run for several seconds.	☐ ☐ 37. Open the generator set main line circuit breakers, open the safeguard breaker, and/or remove the fuses connected to the transfer switch.
☐ ☐ 10. Verify that the day tank, if equipped, is energized.	☐ ☐ 38. Reconnect the power switching device and logic controller wire harness at the inline disconnect plug at the transfer switch.
☐ ☐ 11. Place the generator set master switch in the OFF/RESET position. Check for oil, coolant, and exhaust leaks.	☐ ☐ 39. Close the normal source circuit breaker or replace fuses to the transfer switch. Place the generator set master switch to the AUTO position.
☐ ☐ 12. Turn on the water/oil heaters and fuel lift pumps.	☐ ☐ 40. Close the generator set main line circuit breakers, close the safeguard breaker, and/or replace the fuses connected to the transfer switch.
☐ ☐ 13. Check the battery charger ammeter for battery charging indication.	☐ ☐ 41. Place the transfer switch in the TEST position (load test or open normal source circuit breaker). NOTE: Obtain permission from the building authority before proceeding. This procedure tests transfer switch operation and connects building load to generator set power.
☐ ☐ 14. Place the generator set master switch in the RUN position. Verify whether there is sufficient oil pressure. Check for oil, coolant, and exhaust leaks.	☐ ☐ 42. Readjust frequency to 50 or 60 Hz with total building loads.*
☐ ☐ 15. Close the safeguard circuit breaker. Adjust the engine speed to 50/60 Hz if equipped with an electronic governor or to 52.8/63 Hz if equipped with a mechanical governor.*	☐ ☐ 43. Verify that the current phase is balanced for three phase systems.
☐ ☐ 16. If the speed is unstable, adjust according to the appropriate engine and/or governor manual.*	☐ ☐ 44. Release the transfer switch test switch or close the normal circuit breaker. The transfer switch should retransfer to the normal source after appropriate time delay(s).
☐ ☐ 17. Adjust the AC output voltage to match the load voltage using the voltage adjusting control. See the generator set/controller operation manual.	☐ ☐ 45. Allow the generator set to run and shut down automatically after the appropriate cool down time delay(s).
☐ ☐ 18. Allow the engine to reach normal operating coolant temperature.	☐ ☐ 46. Set the plant exerciser to the customer's required exercise period, if equipped.
☐ ☐ 19. Check the operating temperature on city water-cooled models and adjust the thermostatic valve as necessary.	☐ ☐ 47. Verify that all options on the transfer switch are adjusted and functional for the customer's requirements.
☐ ☐ 20. Manually overspeed the engine to cause an engine shutdown (68-70 Hz on 60 Hz models and 58-60 Hz on 50 Hz models). Place the generator set master switch in the OFF/RESET position.*	☐ ☐ 48. If possible, run the building loads on the generator set for several hours or perform the load bank test if required.
☐ ☐ 21. Check the coolant level, add coolant as necessary, and replace the radiator cap. Verify that all hose clamps are tight and secure.	☐ ☐ 49. Verify that all the wire connections from the generator set to the transfer switch and optional accessories are tight and secure.
☐ ☐ 22. Place the generator set master switch in the RUN position.	☐ ☐ 50. Verify that the customer has the appropriate engine/generator set and transfer switch literature. Instruct the customer in the operation and maintenance of the power system.
☐ ☐ 23. Verify the engine low oil pressure and high coolant temperature shutdowns.*	☐ ☐ 51. Fill out the startup notification at this time and send the white copy to the Generator Warranty Dept. Include the warranty form if applicable.
☐ ☐ 24. Check the overcrank shutdown.*	
☐ ☐ 25. Place the generator set master switch in the OFF/RESET position.	
☐ ☐ 26. Open the normal source circuit breaker or remove fuses to the transfer switch.	
☐ ☐ 27. Disconnect the power switching device and logic controller wire harness at the inline disconnect plug at the transfer switch.	
☐ ☐ 28. Manually transfer the load to the emergency source.	

* Some models with an Engine Electronic Control Module (ECM) may limit or prohibit adjusting the engine speed or testing shutdowns. Refer to appropriate documentation available from the manufacturer.