



**Woodstock Power Company**  
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## SUBMITTAL ACCEPTANCE

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I hereby authorize Woodstock Power Company to use this form as confirmation of acceptance in regard to the equipment shown on aforementioned submittal, which clearly establishes definite specifications of material presented.

### Accepted by:

Company            Woodstock Power Company

Print Name:

Title:

Signature: \_\_\_\_\_

Date: \_\_\_\_\_



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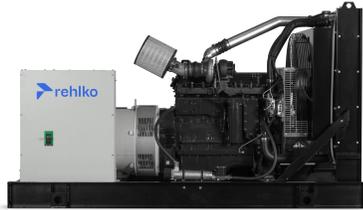
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## Generator

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### Kohler Model: **KD250**

This diesel generator set equipped with a KH01722TO4D alternator operating at 120/208 volts is rated for 250 kW/313 kVA. Output amperage: 868



### Standard Features:

- One source responsibility for the generating system and accessories.
- Approved for use with certified renewable Hydrotreated Vegetable Oil (HVO) / Renewable Diesel for temperature rise and motor starting. (RD) fuels compliant with EN15940/ASTM D975.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The generator set offers a cULus listing (UL 2200 and CSA C22.2 No. 100).
- The generator set accepts rated load in one step.
- The generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A 2-year, 1000-hour limited warranty covers all generator set systems and components.
- Extendable to a five-year, 2500-hour comprehensive warranty with a registered service contract through a distributor, dealer, or authorized service representative.
- Five-year basic, five-year comprehensive, and 10-year comprehensive limited warranties are also available for purchase in some jurisdictions.
- Mount up to two circuit breakers to allow circuit protection of selected priority loads.

### Alternator Features:

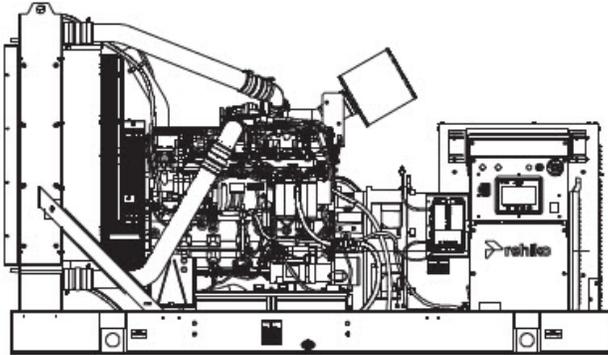
- The pilot-excited, permanent magnet (PM) alternator provides superior short-circuit capability.
- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and drip-proof construction.
- Windings are vacuum-impregnated with epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.

### Other Features:

- Rehlko designed controllers for one-source system integration and remote communication. See Controllers on page 3.

Qty	Description																																																										
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# Spec Sheets



### Other Features

- Rehlko designed controllers for one-source system integration and remote communication. See Controllers on page 3.
- The low coolant level and high coolant temperature sensors protect the generator set from overheating. Integral vibration isolation eliminates the need for under-unit vibration spring isolations.

### Standard Features

- 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.
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### Alternator Features

- The pilot-excited, permanent magnet (PM) alternator provides superior short-circuit capability.
- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Windings are vacuum-impregnated with epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.

### Generator Set Rating

#### Standby 130C Rise Ratings

Alternator	Voltage	Ph	Hz	kW/kVA	Amps
<b>KH01722TO4D</b>	<b>120/208</b>	<b>3</b>	<b>60</b>	<b>250/313</b>	<b>868</b>

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. Continuous Ratings: At constant or nonvarying load, the number of generator set operating hours is unlimited.  
 There is no overload capability for this rating. Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time ratings, consult the factory.  
 Obtain technical information bulletin (TIB-101) for ratings guidelines, complete ratings definitions, and site condition derates.  
 The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

## Model: KD250, continued

### Alternator Specifications

Specifications	Alternator
Alternator manufacturer	Rehiko
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Auxiliary Winding
Voltage regulator	Solid State, Volts/Hz
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Unbalanced load capability	See alternator datasheet, TIB-102
<ul style="list-style-type: none"><li>• The pilot-excited, permanent magnet (PM) alternator provides superior short-circuit capability.<ul style="list-style-type: none"><li>• NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.</li></ul></li><li>• Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator filed.</li></ul>	

### Engine

#### Engine Specification

Engine Manufacturer	Rehiko
Engine Model	KD09L06T-6DDS
Engine: type	4-Cycle, Turbocharged, Charge Air Cooled
Cylinder arrangement	6 Inline
Displacement, L (cu. in.)	8.9 (543)
Bore and stroke, mm (in.)	114 x 145 (4.48 x 5.7)
Compression ratio	16.1:1
Piston speed, m/min. (ft./min.)	522 (1712)
Main bearings: quantity, type	7, Replaceable Insert
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	346 (464)
Governor: type, make/model	Electronic
Frequency regulation, no-load to-full load	Isochronous
Frequency regulation, steady state	±0.25%
Frequency	Fixed
Air cleaner type, all models	Dry

### Exhaust

#### Exhaust System

Exhaust Manifold Type	Dry
Exhaust flow at rated kW, m <sup>3</sup> /min. (cfm)	66 (2342)
Exhaust temperature at rated kW, dry exhaust, EPA certified, °C (°F)	525 (977)
Maximum allowable back pressure, kPa (in. Hg)	10.2 (3)

## Model: KD250, continued

### Engine Electrical

#### Engine Electrical System

Battery charging alternator	24
Ignition system	Compression Ignition
Battery charging alternator: Ground (negative/positive)	Negative
Battery charging alternator: Volts (DC)	24
Battery charging alternator: Ampere rating	70
Starter motor rated voltage (DC)	1 @ 8 kW
Battery, recommended cold cranking amps (CCA): Qty., CCA rating each	Two, 750
Battery voltage (DC)	12

### Fuel

#### Fuel System

Fuel type	Diesel
Fuel supply line, min. ID, mm (in.)	15.9 (0.62)
Fuel return line, min. ID, mm (in.)	15.9 (0.62)
Max. fuel flow, Lph (gph)	159.0 (42.1)
Min./max. fuel pressure at engine supply connection, kPa (in. Hg)	-20 (-5.9), 69 (20.3)
Max. return line restriction, kPa (in. Hg)	34 (10)
Fuel filter: quantity, type	One
Fuel Filter Water Separator	One

### Lubrication

#### Lubrication System

Type	Full Pressure
Oil pan capacity, L (qt.)	23.8 (25.1)
Oil pan capacity with filter, L (qt.)	26.5 (28)
Oil filter: quantity, type	1, Spin-on

### Cooling

#### Radiator System

Ambient temperature, °C (°F)	50 (122)
Engine jacket water capacity, L (gal.)	11 (3)
Radiator system capacity, including engine, L (gal.)	37.0 (9.8)
Engine jacket water flow, Lpm (gpm)	273 (72)
Heat rejected to air charge cooler at rated kW, dry exhaust, kW (Btu/min.)	89 (5062)
Charge cooler air inlet temperature, °C (°F)	228 (442)
Turbocharger boost (abs) bar (psi)	376 (55)
Water pump type	Vane
Fan diameter, including blades, mm (in.)	765 (30.2)
Fan, kWm (HP)	6.5 (9)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H2O)	See TIB-118

\* Enclosure with internal silencer reduces ambient temperature capability by 5°C (9°F).

## Model: KD250, continued

### Operation Requirements

#### Air Requirements

Radiator-cooled cooling air, m3/min. (scfm) *	345 (12200)
Combustion air, m3/min. (cfm)	24.6 (869)
Heat rejected to ambient air: Engine, kW (Btu/min.)	31.5 (1792)
Heat rejected to ambient air: Alternator, kW (Btu/min.)	16.1 (916)
Max. air intake restriction, kPa (in. Hg)	6.2 (25.0)

\*Air density = 1.20 kg/m<sup>3</sup> (0.075 lbm/ft<sup>3</sup>)

#### Fuel Consumption

Diesel, Lph (gph), at % load

Rating

**Standby Fuel Consumption at 100% load**

**72.5 Lph (19.2 gph)**

Standby Fuel Consumption at 75% load

59.4 Lph (15.7 gph)

Standby Fuel Consumption at 50% load

43.7 Lph (11.6 gph)

Standby Fuel Consumption at 25% load

22.0 Lph (5.9 gph)

Continuous Fuel Consumption at 0% load

\*\*Volumetric Fuel consumption is up to 4% higher when using HVO/RD than #2 ULSD



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<sup>®</sup> protocol through serial bus and Ethernet networks, and supports SNMP and BACnet<sup>®</sup> through Ethernet networks.

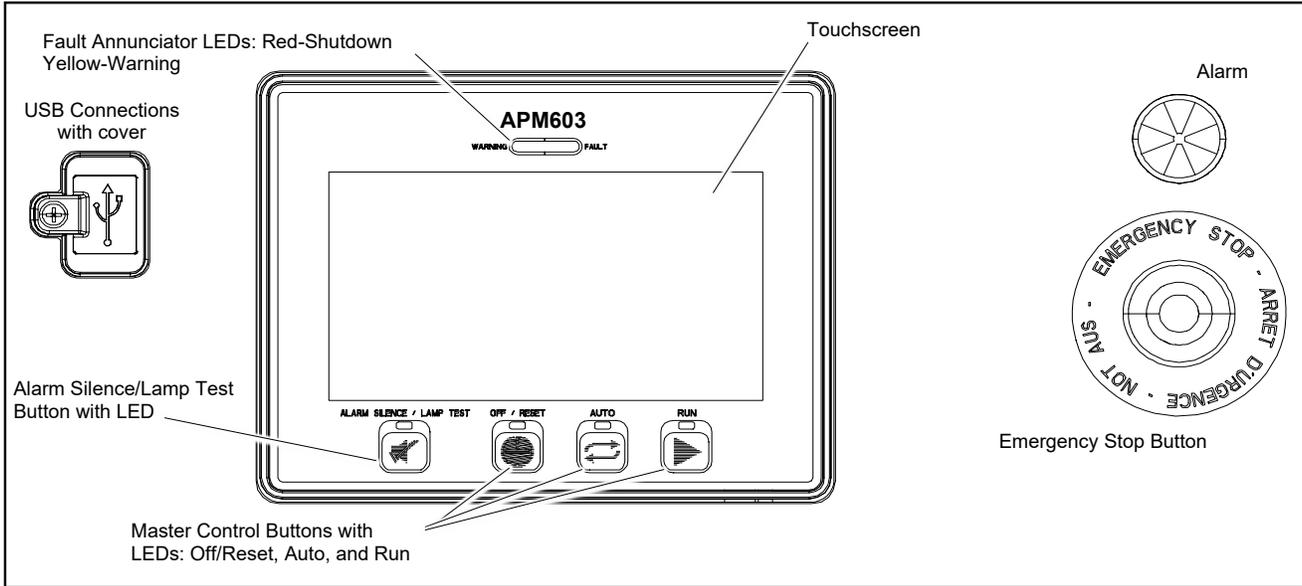
### Global Support

- 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<sup>®</sup> is a registered trademark of Schneider Electric.  
BACnet<sup>®</sup> 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	<ul style="list-style-type: none"> <li>Allows critical emergency operation where uninterrupted power is essential.</li> <li>Overrides most shutdowns and warnings except for E-Stop, Overspeed, Maintenance Mode, or shutdown faults from the ECU.</li> </ul>
Maintenance mode	<ul style="list-style-type: none"> <li>Lowers the fault threshold which reduces fault setting times and activates a trip</li> <li>Acts as a safety device like an E-Stop</li> <li>Adjustable from 0-150% of rated current</li> </ul>

### 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)



# Industrial Generator Set Accessories

## Generator Set Controller

### 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	▲	
<b>Status Messages</b>		
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	
Speed Bias	Two-wire input
Voltage Bias	Analog Voltage Input, Scalable up to +/-10 VDC

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
<b>Note:</b> 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
<b>Note:</b> Programmable I/O is configurable by authorized technician.	

### KD Engine Data

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

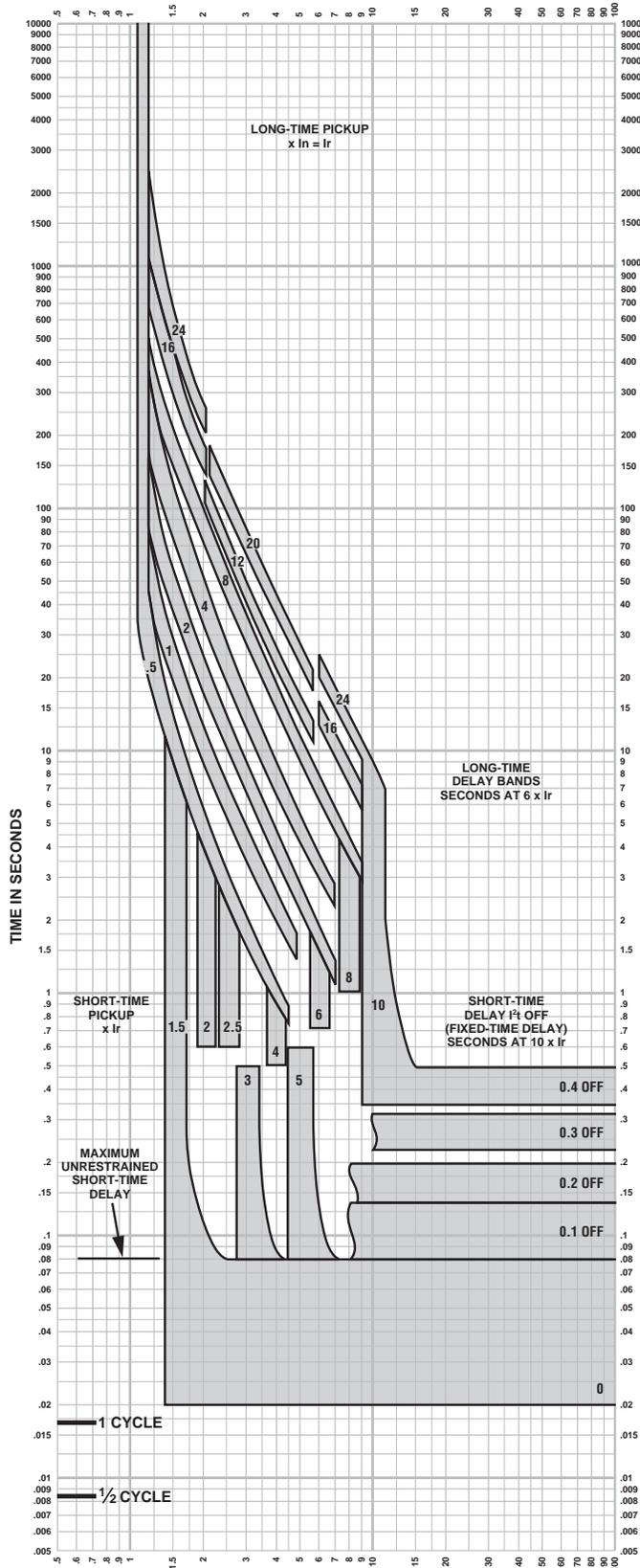
Parameter
Engine Model Number
Engine Serial Number
Ambient Temperature
Charge Air Pressure
Charge Air Temperature
Common Rail Fuel Pressure
Coolant Level
Coolant Temperature
Crankcase Pressure
Engine Speed
Fuel Consumption Rate
Fuel Pressure
Fuel Temperature
Intercooler Coolant Temperature (K175 engines 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.

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



**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  $-30^\circ\text{C}$  to  $+60^\circ\text{C}$  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



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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 – 1200A available in both standard and 100% ratings with sensor sizes 250–1200A. Interrupting ratings (AIR) G-35kAIR, J-65kAIR and L-100kAIR at 480 VAC
- R-frame – 2500A available in both standard and 100% ratings with sensor sizes 600–2500A. 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

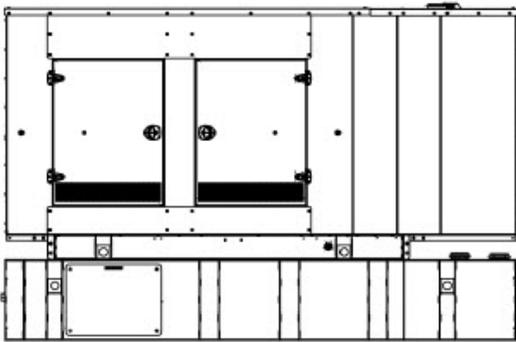
- Long-time, instantaneous and optional short-time adjustments
- Advanced relay protection (current imbalance, under/over voltage, etc.)
- Inverse Definite Minimum Time Lag (IdmtL) long-time delay curve shaping for improved coordination
- Basic power metering and monitoring functions
- Standard MODBUS 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

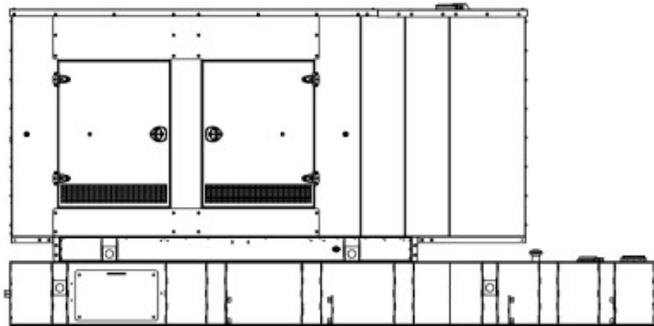
- All 5.0P and 6.0P functions
- Enhanced POWERLOGIC power metering and monitoring capabilities
- Basic power quality (harmonic) measurement
- Waveform capture

Contact your Square D sales representative for additional information. Or, visit [www.SquareD.com](http://www.SquareD.com).





Enclosure with Standard Subbase Fuel Tank



Enclosure with State Code Subbase Fuel Tank

## Sound Enclosure Standard Features

- Internal-mounted silencer and flexible exhaust connector.
- Skid-mounted, steel construction with hinged doors.
- Fade-, scratch-, and corrosion-resistant Power Armor automotive-grade textured finish.
- Enclosure has four access doors which allow for easy maintenance.
- Lockable, flush-mounted door latches.
- Vertical air outlet discharge to redirect air and reduce noise.
- Skid-mounted, aluminum construction with hinged doors.

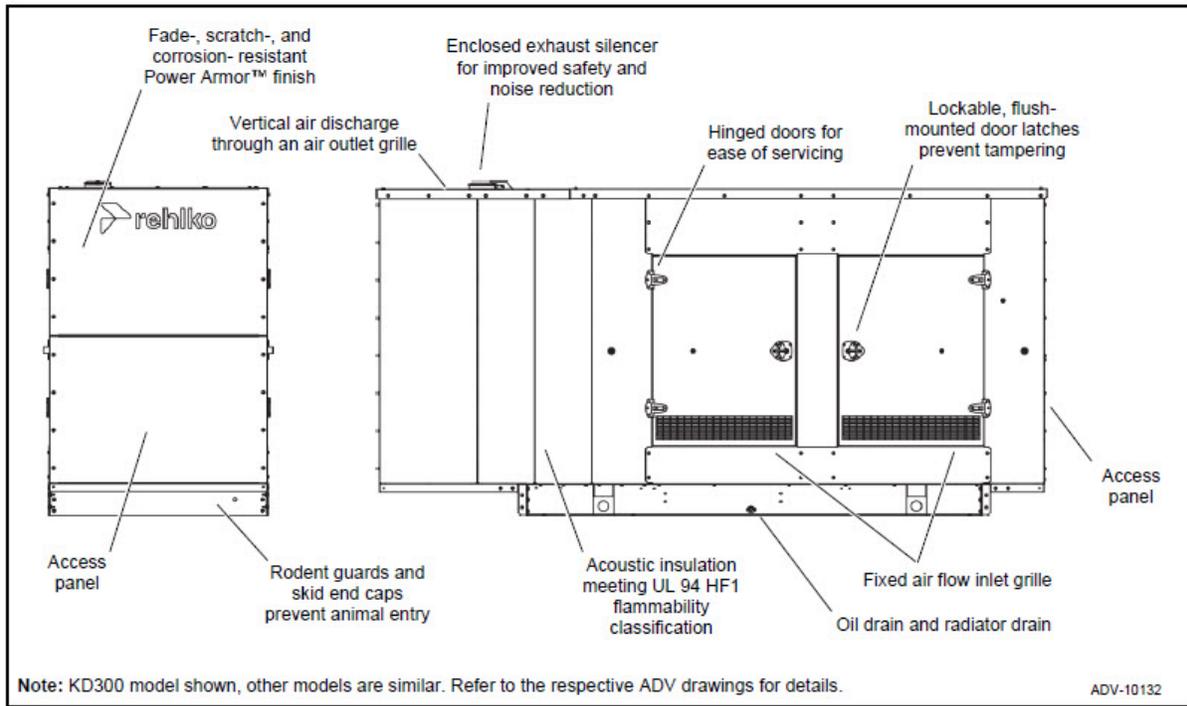
Aluminum enclosures are recommended for high humidity and/or high salt/ coastal regions.

- Acoustic insulation that meets UL 94 HF1 flammability classification and repels moisture absorption.
- Sound attenuated enclosure that uses up to 51 mm (2 in.) of acoustic insulation, acoustic-lined air inlet duct, and acoustic-lined air discharge duct.
- Aluminum sound enclosure is certified to 200 mph (322 kph) wind load rating.

## Subbase Fuel Tank Features

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

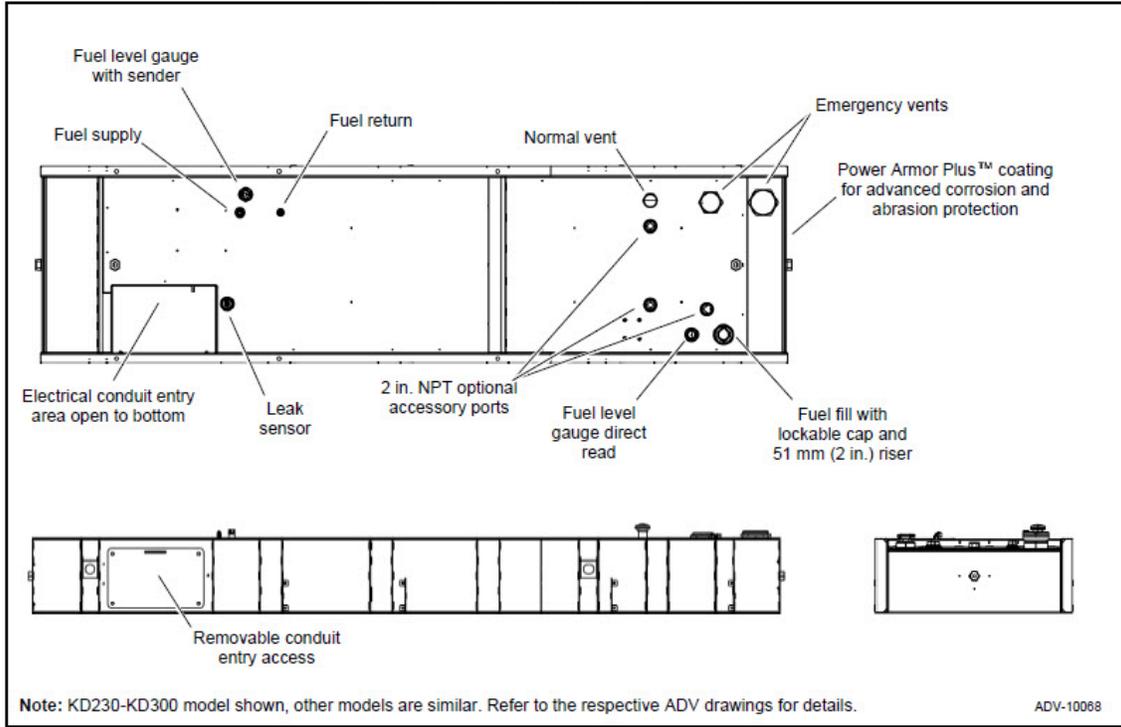
## Weather and Sound Enclosure



## Sound Enclosure Features

- Power Armor automotive-grade finish resulting in advanced corrosion and abrasion protection as well as enhanced edge coverage and color retention.
- Internal exhaust silencer offering maximum component life and operator safety.
- NOTE: Installing an additional length of exhaust tail pipe may increase backpressure levels. Please refer to the generator set spec sheet for the maximum backpressure value.
- Interchangeable modular panel construction. Allows complete serviceability or replacement without compromising enclosure design.
- Cooling/combustion air intake with a horizontal air inlet. Sized for maximum cooling airflow.
- Service access. Multi-personnel doors for easy access to generator set control and servicing of the fuel fill, fuel gauge, oil fill, and battery.
- Cooling air discharge. Weather protective design featuring a vertical air discharge outlet grille. Redirects cooling air up and above enclosure to reduce ambient noise
- Cooling air discharge. The sound enclosures include acoustic insulation with urethane film.

### State Code Subbase Fuel Tank



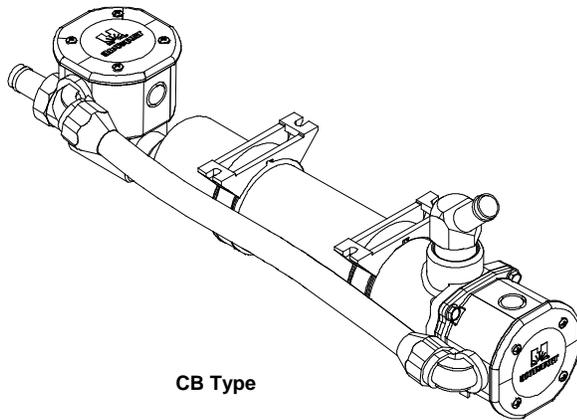
- Extended operation. Usable tank capacity offers full load standby operation of up to 24 and 48 hours.
- Power Armor Plus textured epoxy-based rubberized coating that creates an ultra-thick barrier between the tank and harsh environmental conditions like humidity, saltwater, and extreme temperatures, and provides advanced corrosion and abrasion protection.
- UL listed. Secondary containment generator set base tank meeting UL 142 tank requirements.
- NFPA compliant. Designed to comply with the installation standards of NFPA 30 and NFPA 37.
- Integral external lift lugs. Enables crane with spreader-bar lifting of the complete package (empty tank, mounted generator set, and enclosure) to ensure safety.
- Emergency pressure relief vents. Vents ensure adequate venting of inner and outer tank under extreme pressure and/or emergency conditions.
- Normal vent cap. Vent is raised above lockable fuel fill.
- Leak detection switch. Annunciates a contained primary tank fuel leak condition at generator set control.
- Electrical conduit entry. NOTE: For IBC Seismic Certification and/or Calification and
- State tank designed to comply with the installation standards of the Florida Dept. of Environmental Protection (FDEP) File No. EQ-634.

Fuel Tank Capacity, L (gal.)	Est. Fuel Supply Hours at 60 Hz with Full Load	Enclosure and Fuel Tank Length, mm (in.)	Enclosure and Fuel Tank Width, mm (in.)	Enclosure and Fuel Tank Weight, kg (lb.)	Enclosure and Fuel Tank Height, mm (in.)	Fuel Tank Height (H), mm (in.)	Sound Pressure Level, dB(A)
Lift base	0	4121 (162.2)	1350 (53.2)	2600 (5735)	2056 (81.0)	200 (7.9)	75
1854 (490)	30/26	5131 (202.0)	1350 (53.2)	3980 (8775)	3436 (101.0)	508 (20.0)	75

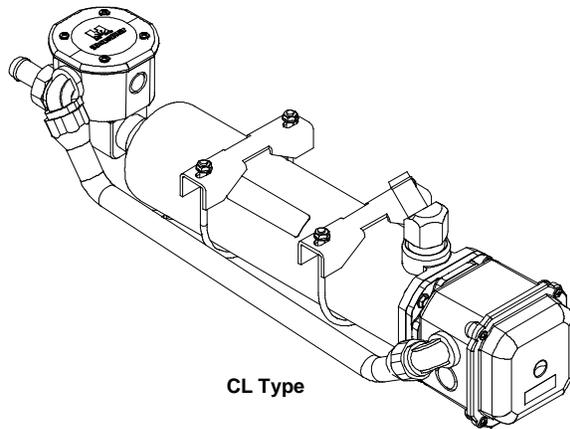
Note: Data in table is for reference only. Height includes enclosure, lift base, and tank (if equipped). Refer to your authorized Kohler distributor for enclosure and subbase fuel tank specification details.

Max. weight includes the generator set (wet), enclosure, silencer, lift base, and tank (no fuel).

Enclosed generator set sound data for these models was not available at time of print



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

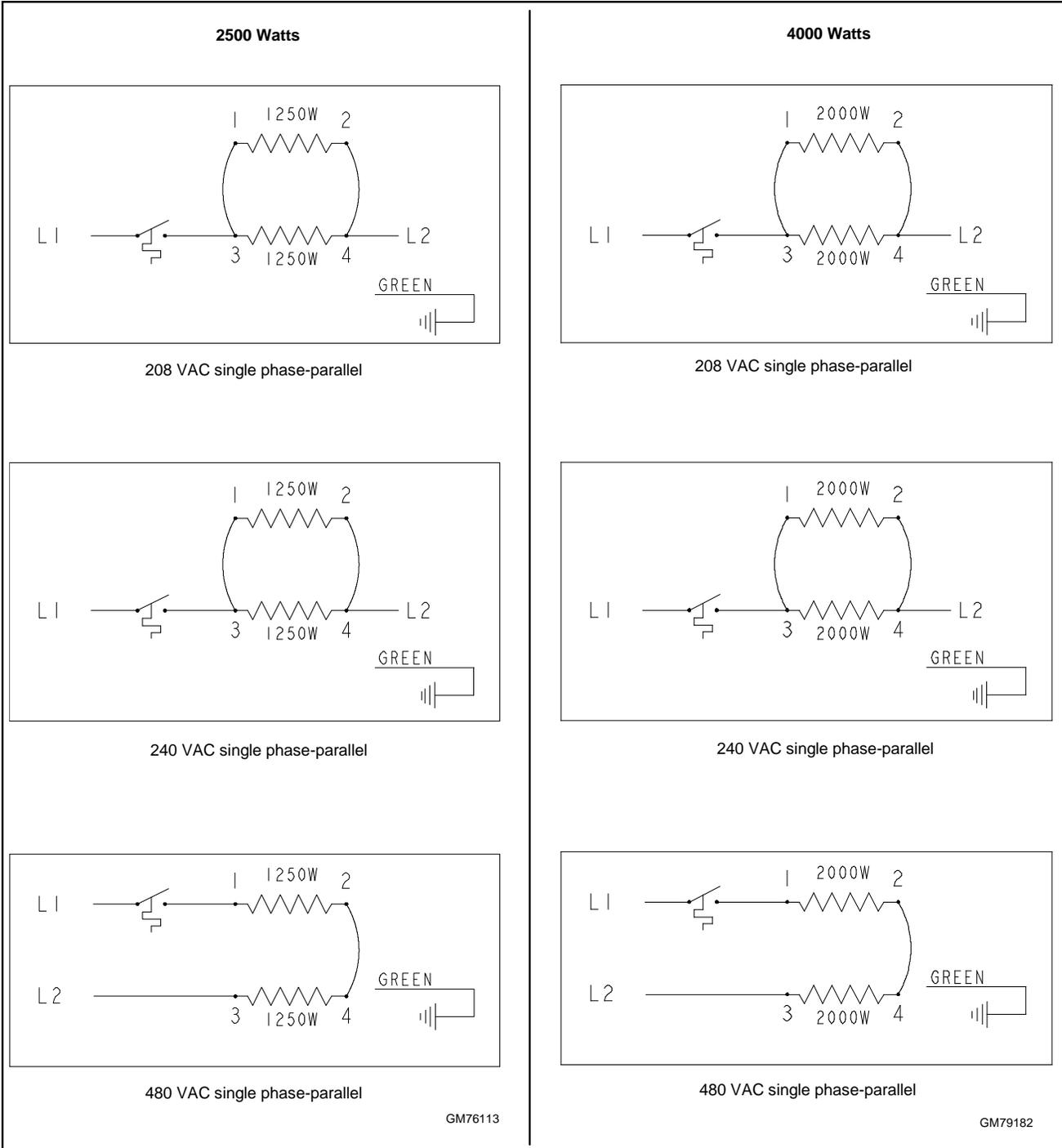
### Block Heater Specifications

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

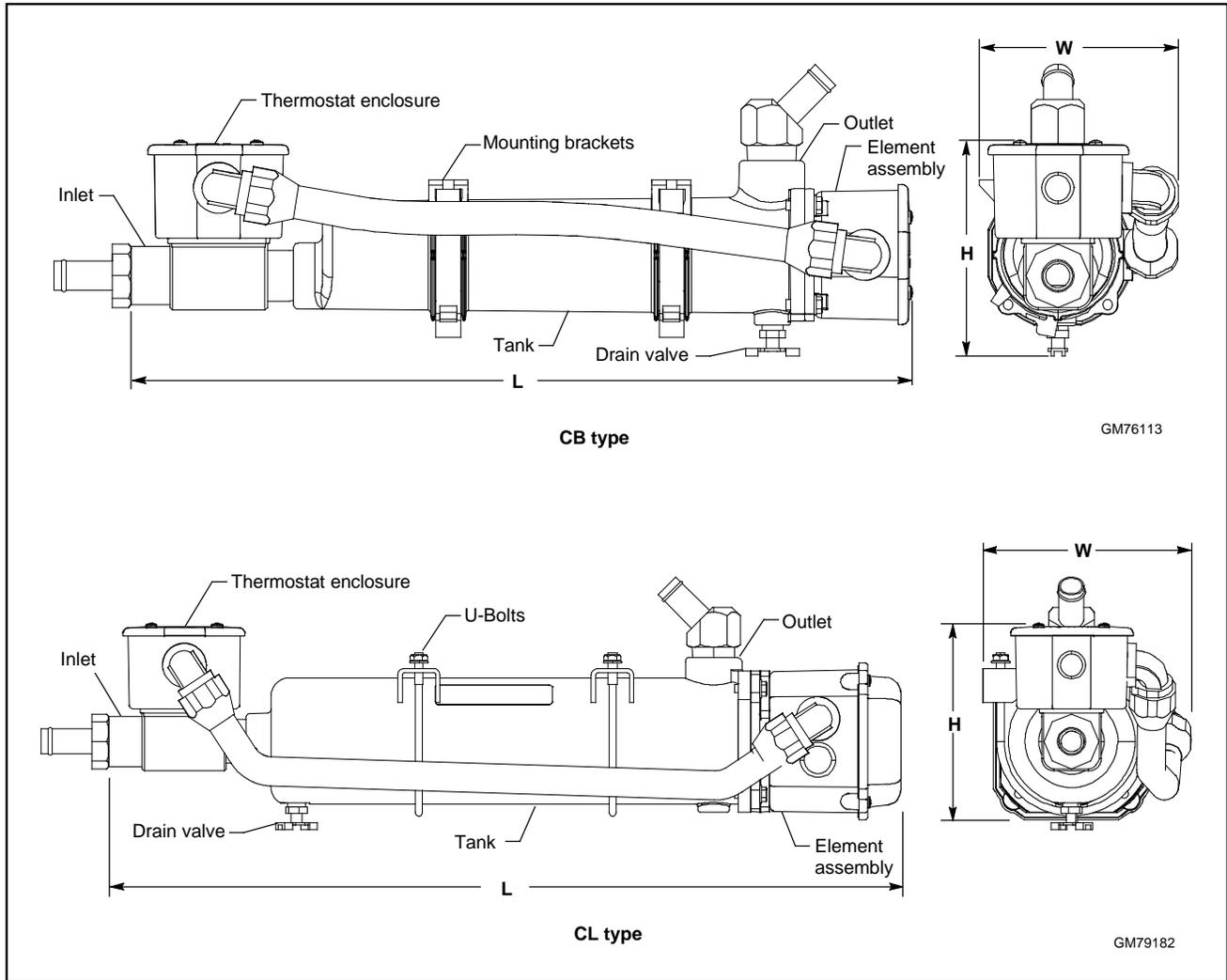
Block Heater Kit Number	Component	Watts	Voltage	Phase
<b>GM75809-KA1</b>	<b>GM76113</b>	<b>2500</b>	<b>90-120</b>	1
GM75809-KA2	GM76114	2500	190-208	
GM75809-KA3	GM76115	2500	210-240	
GM75809-KA4	GM76116	2500	380-480	
GM76120-KA1	GM76113	2500	90-120	
GM76120-KA2	GM76114	2500	190-208	
GM76120-KA3	GM76115	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**

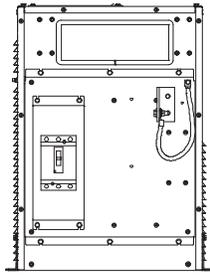


### Dimensions and Weights

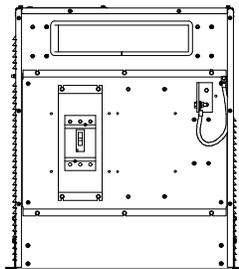
CB type block heater size, L x H x W, mm (in):	510 x 132 x 129 (20.1 x 5.2 x 5.1)
CL type block heater size, L x H x W, mm (in):	597 x 147 x 158 (23.5 x 5.8 x 6.2)
CB type block heater weight, kg (lb):	3 (6.9)
CL type block heater weight, kg (lb):	4.5 (10)



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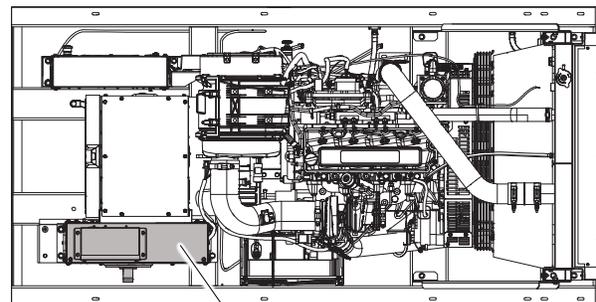
**600 A Power Box**  
(See page 2)



**1200 A Power Box**  
(See page 3)

### Standard Features

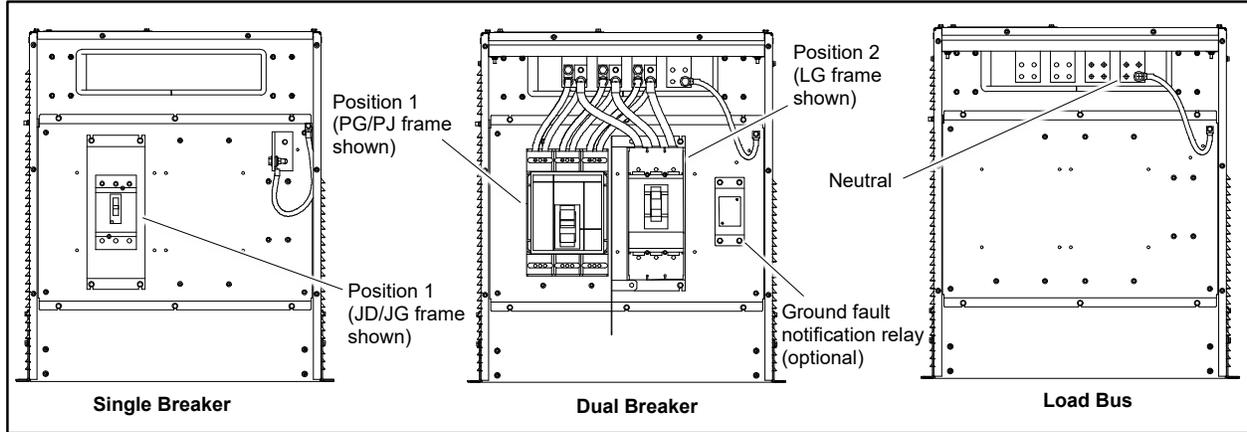
- A dedicated power box location on one side of the generator set provides easy access for load connections.
- The power box can be configured with load bus bars for connection to alternator terminals without overcurrent protection or with circuit breakers for downstream circuit protection.
- Standard circuit breakers with various sizes and ratings are available.
  - Short circuit rating
    - ◆ 480 V: 18 kA or 35 kA
    - ◆ 240 V: 25 kA or 65 kA
  - Duty Ratings: 80% or 100%
  - Trip: Thermal magnetic or Electronic (LSI or LSI<sup>G</sup>)
- Electrically operated circuit breaker for paralleling application.
  - Short circuit rating
    - ◆ 480 V: 65 kA or 100 kA
    - ◆ 240 V: 100 kA or 125 kA
  - Duty rating: 100%
  - Trip: Electronic (LSI)
- Available power box accessories
  - Ground fault monitor and notification relay
  - Convenience receptacle
  - Electrically operated breaker accessory box
  - Breaker barrier for multi-breaker configuration
- Available circuit breaker accessories
  - Auxiliary contacts
  - Alarm switch
  - Overcurrent switch
  - Shunt trip
  - Undervoltage trip
  - Padlock provision for the handle



Power Box

**Location of the Power Box**

### 1200 A Power Box

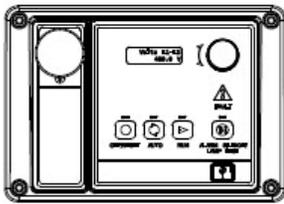


Used on Generator Set Model
KD150
KD180
KD200
KD230
KD250
KD275
KD300

1200 A Powerbox Breaker Selection					
Position 1: 1200 A Max.					
Position 2: 600 A Max.					
Short Circuit Rating	Duty Cycle	Ampere Range	Trip Type	Frame	Lugs
18 kA	80%	15-150	Thermal Mag	HD	(1) #14 – #3/0
		60-150	Electronic LSI	HD	(1) #14 – #3/0
		175	Thermal Mag	JD	(1) #1/0 – #4/0
	100%	200-250	Electronic LSI	JD	(1)#3/0 –350 kcmil
		15-150	Thermal Mag	HD	(1) #14 –3/0
		60-150	Electronic LSI	HD	(1) #14 –3/0
		175	Thermal Mag	JD	(1) #1/0 – #4/0
35 kA	80%	200-250	Electronic LSI	JD	(1)#3/0 –350 kcmil
		60-150	Electronic LSI	HG	(1) #14 – #3/0
		250	Electronic LSI	JG	(1)#3/0 –350 kcmil
		400-600	Electronic LSI	LG	(2) #2/0 –500 kcmil
	100%	1000-1200	Thermal Mag	PG	(4) #3/0 –500 kcmil
		800-1200	Electronic LSI	PG	(3) #3/0 –500 kcmil for 800 A (4) #3/0 –500 kcmil for 1000 A
		60-150	Electronic LSI	HG	(1) #14 – #3/0
		250	Electronic LSI	JG	(1) #3/0 –350 kcmil
65 kA	100%	400	Electronic LSI	LG	(2) #2/0 –500 kcmil
		600-1200	Electronic LSI	PG	(3) #3/0 –500 kcmil for 800 A (4) #3/0 –500 kcmil for 1000 A
1200	Electronic LSI	PJ	(4) #3/0 –500 kcmil		
1200 A Powerbox Electrically Operated Breaker Selection for Paralleling Operation					
Position 1: 1200 A Max.					
Position 2: Not available for paralleling operation					
65 kA	100%	800-1200	Electronic LSI	PJ	(3) #3/0 – 500 kcmil for 800 A (4) #3/0 – 500 kcmil for 1000 A
100 kA	100%	800-1200	Electronic LSI	PL	(3) #3/0 – 500 kcmil for 800 A (4) #3/0 – 500 kcmil for 1000 A



**Integral Voltage Regulator with Kohler® APM402/ Voltage Regulators  
Decision-Maker® 3000 and Menu-Driven  
Selections (15-1000 kW Generator Set Models)**



**APM402 and Decision-Maker® 3000 Controller  
with Integral Voltage Regulator**

The following information provides general features, specifications, and functions of available voltage regulators.

This information generally applies to a single generator set and multiple generator sets with paralleling applications. Refer to the respective generator set specification sheet and see your authorized distributor for information regarding specific voltage regulator applications and availability.

The voltage regulator is integral to the controller and uses patented hybrid voltage regulator design providing  $\pm 0.5\%$  no-load to full-load regulation using root-mean-square (RMS) voltage sensing. The voltage regulator features three-phase sensing and is available for 12- or 24-volt engine electrical systems.

**Integral Voltage Regulators with APM402/Decision-Maker® 3000 Controllers**

Calibration	Digital Display	Range Settings	Default Selection
Voltage Adjustment	Volt Adj	$\pm 10\%$ of System Voltage	System Voltage
Underfrequency Unload or Frequency Setpoint	Frequency Setpoint	42 to 62 Hz	2.5 Hz Below Nominal Frequency
Underfrequency Unload Slope	Slope	0-10% of System Voltage (Volts per Cycle)	5% of System Voltage



Specification/Feature	Integral with APM402/Decision-Maker® 3000
Generator Set Availability	15-1000 kW
Type	Patented Hybrid Design
Status and Shutdown Indicators	LEDs and Text LCD Display
Operating Temperature	-40°C to 70°C (-40°F to 158°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5-95% Non-Condensing
Circuit Protection	Solid-State, Redundant Software and Fuses
Sensing, Nominal	100-240 Volts (L-L), 50-60 Hz
Sensing Mode	RMS, Single- or 3-Phase
Input Requirements	8-36 VDC
Continuous Output	5 VDC @ 100mA max. 5.0 ADC with GM88453 Activator Board
Maximum Output	5 VDC @ 100mA max. 5.0 ADC with GM88453 Activator Board
Transition Frequency	42.0-62.0Hz
Exciter Field Resistance	4-30 Ohms with GM88453 Activator Board
No-Load to Full-Load Voltage Regulation	±0.5%
Thermal Drift	<0.5% (-40°C to 70°C) [-40°F to 158°F] Range
Response Time	Less than 5µS
System Voltage Adjust.	±10%
Voltage Adjustment	Controller Menu Knob
Remote Voltage Adjustment	not available
Paralleling Capability	not available
VAR/PF Control Input	not available

### Integral Voltage Regulator with APM402/Decision-Maker® 3000 Controller

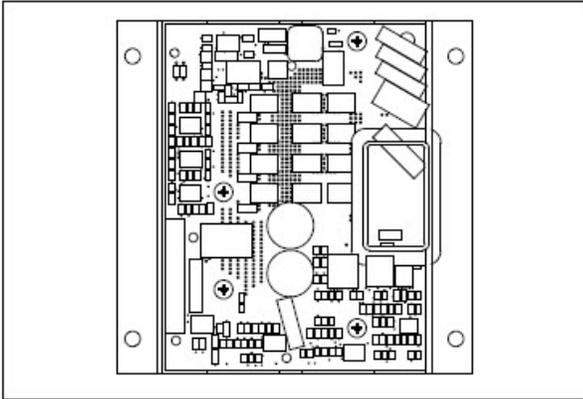
- The APM402/Decision-Maker® 3000 digital display and pushbutton/rotary dial provide access to data. A two-line LCD display provides complete and concise information. A two-line vacuum fluorescent display provides complete and concise information.
- The Decision-Maker® 3000 graphical display and pushbutton/rotary dial provide access to data. A five-line, 35-characters per line LCD display provides complete and concise information include gain, ramp rate, reactive droop, VAR control (P, I, D gains) and PF control (P, I, D gains).
- The controllers provide ISO 8528-5, Class G3, compliance for transient response on some 20-300 kW generator set models. Both controllers support Modbus®.
- These controllers can control Fast Response™ II, Fast Response™ X, and wound field alternators using the GM88453 activator board.

#### Voltage Regulator Menu

- Voltage adjustment, ±10% of system voltage
- V/Hz cut-in, 42-62 Hz
- Underfrequency unload slope, 0-10% of system voltage

#### Jumpers

- L1-L2 volts
- L2-L3 volts (3-phase)
- L3-L1 volts (3-phase)
- L1-N volts
- L2-N volts
- L3-N volts (3-phase)



- Interfaces between the controller and alternator assembly using rotor field leads, auxiliary power windings, and optic board leads.
- Allows the Decision-Maker® controllers the ability to control a wound-field alternator using the same control signal as Fast Response™ alternator.
- Permits the generator set controller to control the current to the exciter field of a wound-field excited alternator.
- Contains two isolated relay driver outputs (RDO) rated at 250 mA. Provides RDO outputs indicating a field over-excitation condition and that the alternator is supplying voltage to the activator.

Modbus® is a registered trademark of Schneider Electric.

# Alternator Data

# DATASHEET ALTERNATOR

KH01722T  
KH01722TO4D



Alternator Type

## - GENERAL CHARACTERISTICS -

Voltage Type (V)	208/120	Altitude (m)	0-1000
Number of Phases	Three phase	AVR Regulation	Yes
Number of Poles	4	Indication of Protection	IP23
Winding Type	Standard		
Winding Pitch	2/3		

Capacity for Maintaining Short Circuit at 300% of Rated Current for 10 s Yes

Insulation Adapted for :

- Clean air / Humidity > 95% (excepted Seafront)
- This choice of reinforced protection can affect the nominal power for some models of alternators.

## Efficiency & Power

Frequency (Hz) 60 Hz Nominal Voltage (V) 208

Insulation System	CLASS H					
	Class H				Class F	Class B
Class Temp Rise						
Rated Temp Rise (K) / Ambient Temp (°C)	125K / 40°C Continuous	130K / 25°C Standby (*)	150K / 40°C Standby	163K / 27°C Standby	105K / 40°C Continuous	80K / 40°C Continuous
Nominal Rating (kVA)	325	331	341	358	300	260
Nominal Rating (kW)	260	265	273	286	240	208
Efficiency 100%	94	93.9	93.9	93.7	94.3	94.6

(\*) UL

## - ELECTRICAL CHARACTERISTICS -

Voltage Regulation at Established Rating (+/- %)	0.5
T° Class (H/125K), Continuous 40°C	H / 125°K
T° Class (H/163K), Standby 27°C	H / 163°K
Wave Form : NEMA=TIF	<40
Unbalanced Load Acceptance Ratio (%)	8
Number of Wires	12
Total Harmonic Distortion in No-Load DHT (%)	2.6
Wave Form : CEI=FHT	<2
Total Harmonic Distortion, on Linear Load DHT (%)	3.0
Technology	Brushless
Power Factor (Cos Phi)	0.8
L-L Harmonic Maximum - Single (%)	<3
Deviation Factor (%)	6
Shaft Current	<80
Main Stator Capacitance to Ground (mfd)	0.005

# DATASHEET ALTERNATOR



Alternator Type

KH01722T  
KH01722TO4D

## Reactances

	Saturated	Unsaturated
Direct Axis Synchro Reactance ( $X_d$ ) (%)	215.8	260
Direct Axis Transient Reactance ( $X'd$ ) (%)	15.9	19.1
Direct Axis Subtransient Reactance ( $X''d$ ) (%)	8.4	10.1
Quadra Axis Synchro Reactance ( $X_q$ ) (%)	124.5	150
Quadra Axis Subtransient Reactance ( $X''q$ ) (%)	21.6	26
Zero Sequence Reactance ( $X_0$ ) (%)	2.87	2.87
Negative Sequence Reactance ( $X_2$ ) (%)	16.7	20.1
Reactance Desaturation coef	1.23	

(\*) Reactances provided for Class H 125°C/40°C PRIME

## Short Circuit Ratio

Short Circuit Ratio ( $K_{cc}$ )	0.32
Exciter Time Constant ( $T_e$ )	0.018
Subtransient Time Constant ( $T''d$ ) (ms)	12
Short Circuit Transient Time Constant ( $T'd$ ) (ms)	91
Open Circuit Time Constant ( $T'do$ ) (ms)	1400
Subtransient Time Constant ( $T''q$ ) (ms)	20
Leakage Stator Reactance ( $X_a$ ) (%)	4.5
Stator Resistance ( $R_a$ ) (%)	0.021
Armature Time Constant ( $T_a$ ) (ms)	16
No Load Excitation Current ( $I_o$ ) (A)	0.4
Full Load Excitation Current ( $I_c$ ) (A)	3.2
Full Load Excitation Voltage ( $u_c$ ) (V)	43.1
Heat Rejected to Ambient Air (kW)	16.6
No Load Losses (W)	3520.96
Stator Resistance (for 20°C ambient) ( $\Omega$ )	0.006
Rotor Resistance (for 20°C ambient) ( $\Omega$ )	5.604
Exciter Resistance - Stator/Inductor (for 20° ambient) ( $\Omega$ )	13.47
Exciter Resistance - Rotor/Armature (for 20° ambient) ( $\Omega$ )	0.719
Recovery Time ( $\Delta U = 20\%$ transient) (ms)	200
Engine Start ( $\Delta U = 20\%$ perm. or 30% trans.) (kVA)	620.3
Transient Dip (4/4 load) - PF : 0.8 AR (%)	18.3

# DATASHEET ALTERNATOR



Alternator Type KH01722T  
KH01722TO4D

## - ADDITIONAL ELECTRICAL CHARACTERISTICS -

Winding X1, X2 Auxiliary Resistance (for 20° ambient) ( $\Omega$ )	0.751
Auxiliary Winding X1, X2 Excitation Voltage at No Load (V)	176
Auxiliary Winding X1, X2 Excitation Voltage on Load (V)	191
Heat Rejected to Ambient Air (kW)	16.6

## - MECHANICAL CHARACTERISTICS -

Number of Bearing	1
Overspeed (rpm)	2250
Coupling	Direct
Air Flow ( $m^3/s$ )	0.65
Heat Rejected to Ambient Air (kW)	16.6

# DATASHEET ALTERNATOR

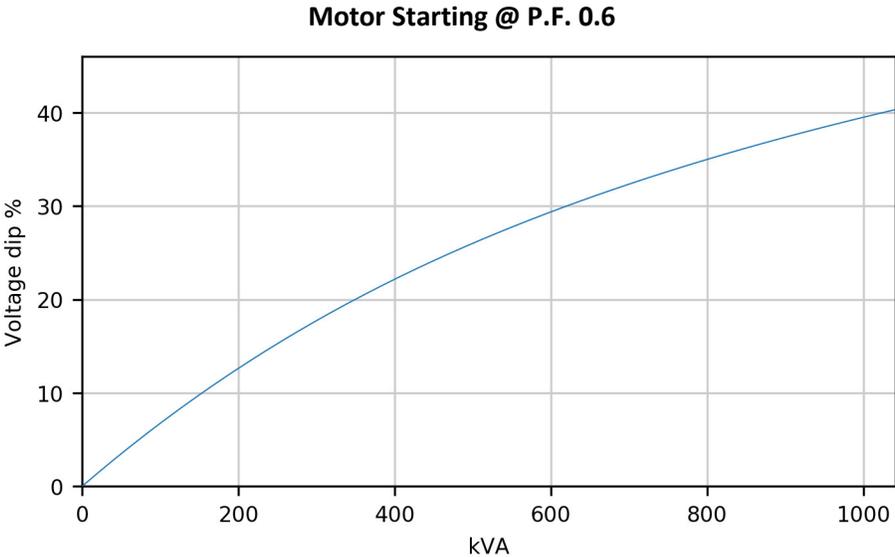


Alternator Type

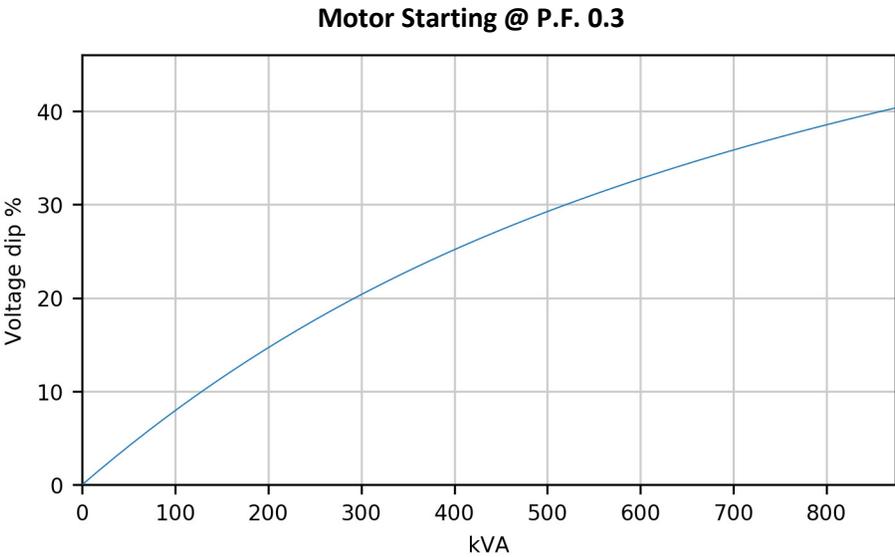
KH01722T  
KH01722TO4D

## - TECHNICAL CURVES -

Motor Starting Curve Locked Rotor (0.6PF)



Motor Starting Curve Locked Rotor (0.3PF)



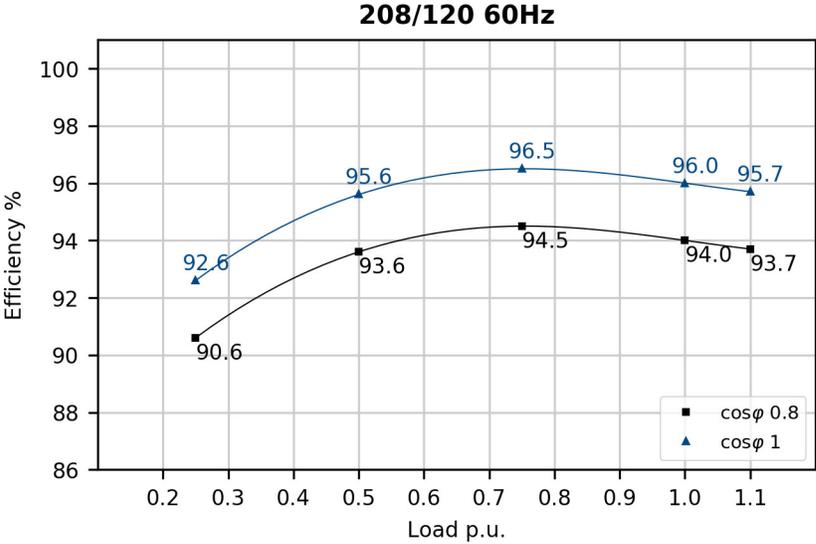
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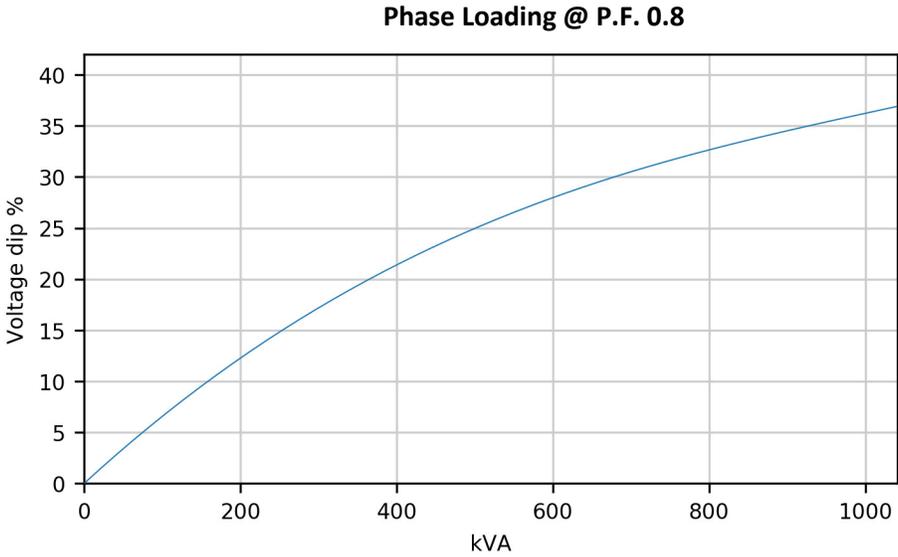
Alternator Type

KH01722T  
KH01722TO4D

## Efficiency Curve (by excitation system)



## Loading Curve (by excitation system)



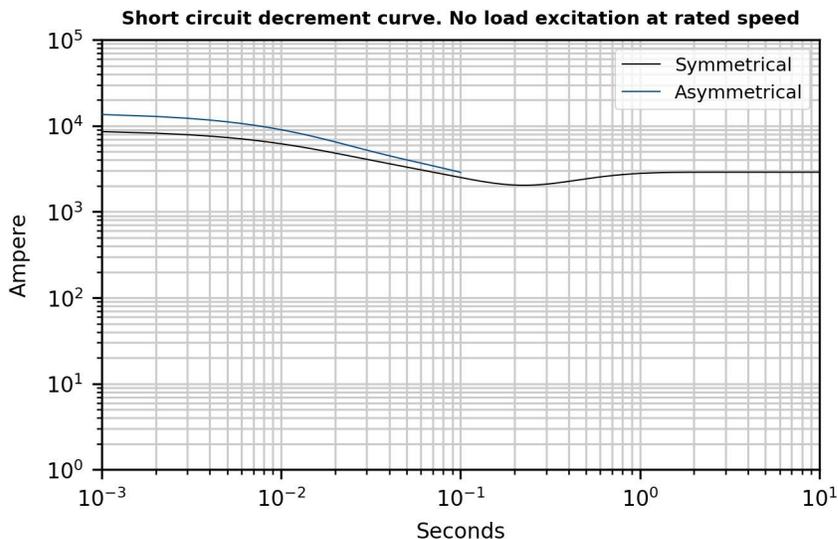
# DATASHEET ALTERNATOR



Alternator Type

KH01722T  
KH01722TO4D

## Short Circuit Curve at No Load and Rated Speed



### Influence due to Connection

Curves shown are for star (Y) connection

For other connections, use the following multiplication factors:

- Series to Parallel star: current value x 2
- Series to Series delta: current value x 1.72
- Series star to Parallel delta: current value x 3.44

### Influence due to Short-circuit

The indicated coefficient have to be used to correct the three phase short circuit curves values as a function of the type of short circuit voltage.

	3-phase	2-phase L/L	1-phase L/N
Instantaneous (max)	1x	0.87x	1.3x
Minimum	1x	1.8x	3.2x
Sustained / Permanent	1x	1.5x	2.5x
Maximum duration (*)	20 sec.	10 sec.	4 sec.

# DATASHEET ALTERNATOR



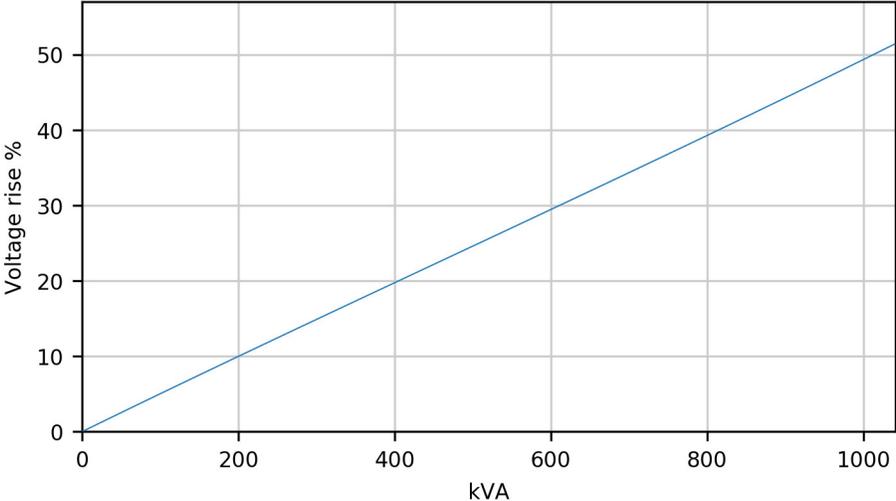
Alternator Type

KH01722T  
KH01722TO4D

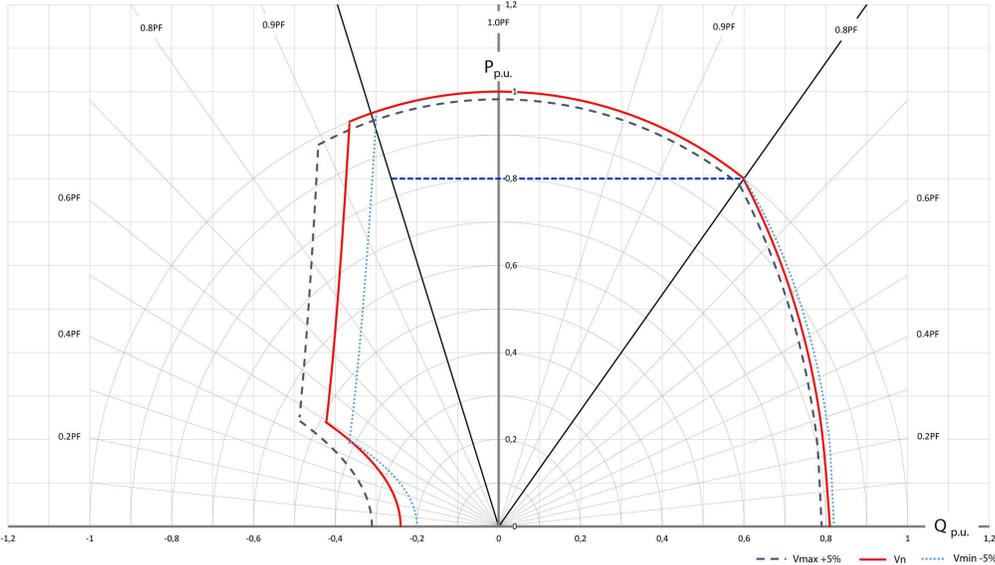


## Rejection Curve (by excitation system)

Load Shedding @ P.F. 0.8



## Capability Curve (PQ Diagram)



# DATASHEET ALTERNATOR

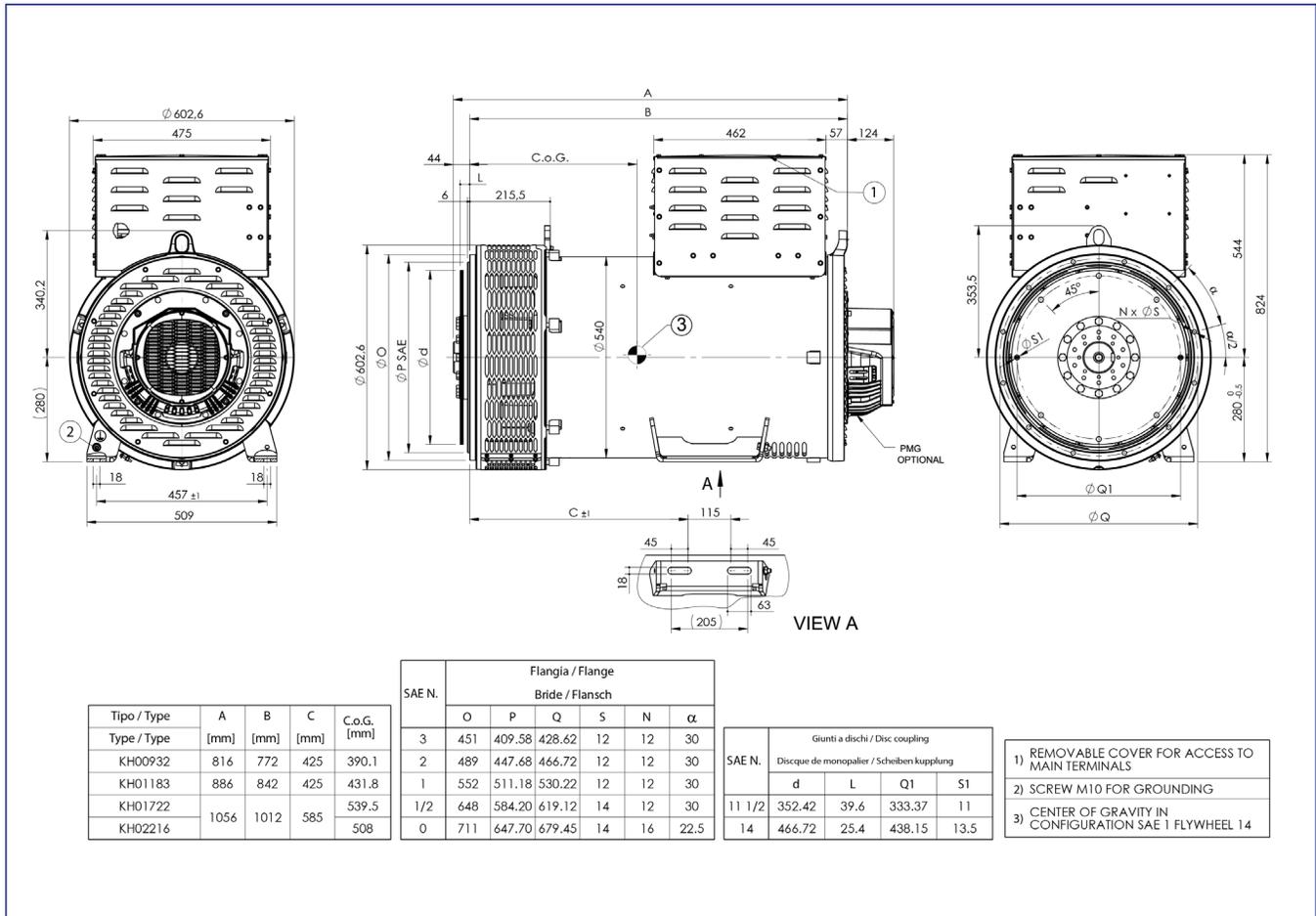
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Alternator Type

## - DIMENSIONS -

### Overall Dimension Drawing (Single Bearing)



Tipo / Type	A	B	C	C.o.G.
Type / Type	[mm]	[mm]	[mm]	[mm]
KH00932	816	772	425	390.1
KH01183	886	842	425	431.8
KH01722	1056	1012	585	539.5
KH02216				508

SAE N.	Flangia / Flange					
	Bride / Flansch					
	O	P	Q	S	N	$\alpha$
3	451	409.58	428.62	12	12	30
2	489	447.68	466.72	12	12	30
1	552	511.18	530.22	12	12	30
1/2	648	584.20	619.12	14	12	30
0	711	647.70	679.45	14	16	22.5

SAE N.	Giunti a dischi / Disc coupling			
	Disque de monopalerie / Scheibenkupplung			
	d	L	Q1	S1
11 1/2	352.42	39.6	333.37	11
14	466.72	25.4	438.15	13.5

- 1) REMOVABLE COVER FOR ACCESS TO MAIN TERMINALS
- 2) SCREW M10 FOR GROUNDING
- 3) CENTER OF GRAVITY IN CONFIGURATION SAE 1 FLYWHEEL 14

# DATASHEET ALTERNATOR

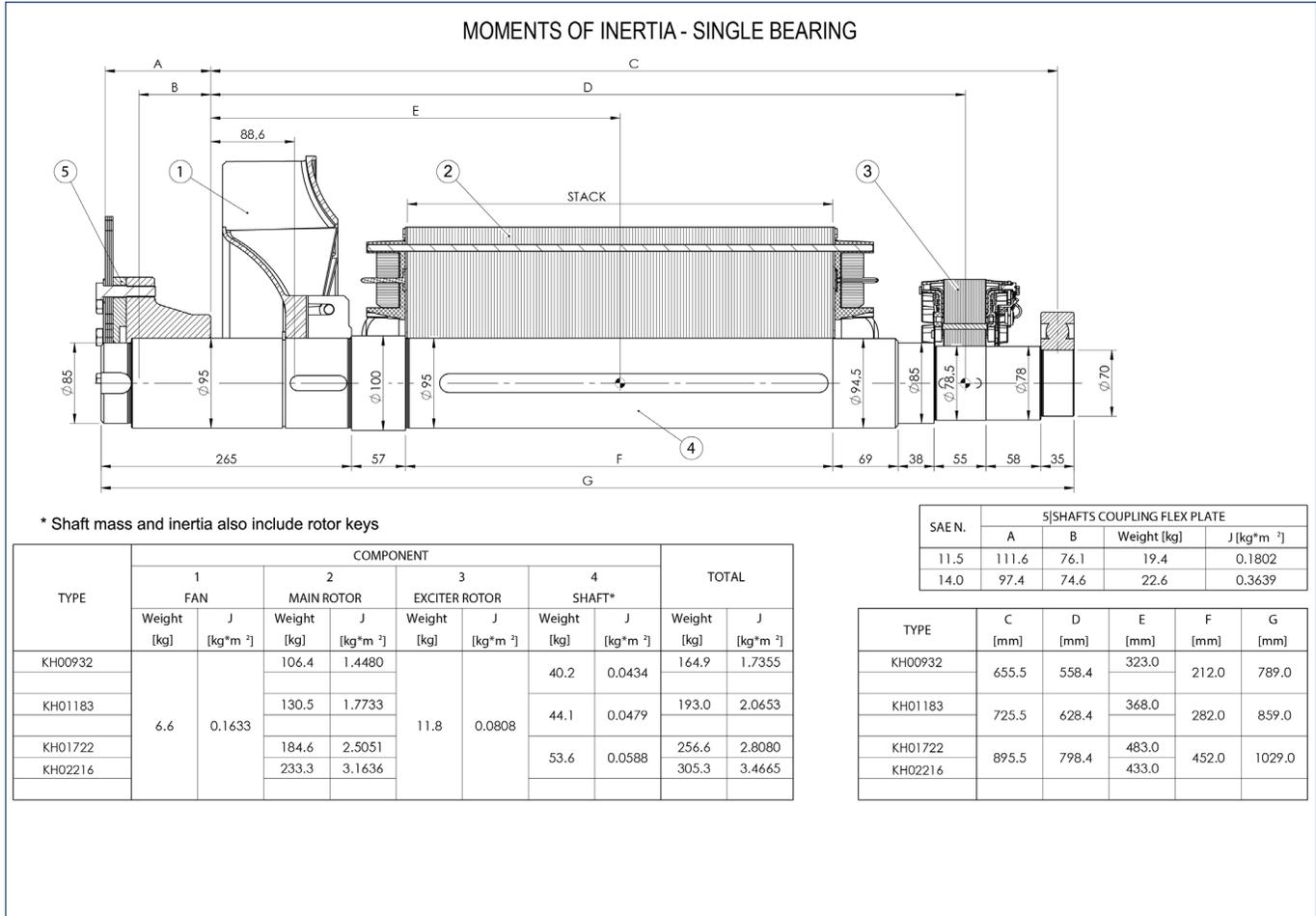
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Alternator Type

## - TORSIONAL ANALYSIS DATA -

### Rotation Part Drawing for Torsional Vibration Calculation (Single Bearing)



# 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 2 Sound Enclosure
KD250	60	100% Load	119.4	89.5	87.6	75.1
		No Load	101.9	85.5	83.6	71.4

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.

KD250		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	53.7	69.7	70.1	69.0	63.7	64.0	65.0	63.7	75.9
			1:30	48.0	65.7	71.0	67.8	63.4	65.4	66.3	61.1	75.3
			12:00-Engine	52.2	66.9	67.7	69.0	65.6	65.0	66.8	59.5	75.0
			10:30	51.5	66.8	70.2	70.3	65.0	63.6	62.9	58.8	75.3
			9:00	52.4	67.7	66.9	66.7	61.4	59.0	59.1	59.0	72.9
			7:30	53.8	65.0	69.0	65.9	64.7	61.4	60.3	59.9	73.4
			6:00-Alternator	55.4	70.8	72.9	66.9	65.8	64.8	61.8	65.1	76.9
			4:30	52.0	68.3	71.7	65.7	65.0	62.4	60.8	60.8	75.2
8-pos. log avg.			52.8	68.0	70.3	67.9	64.5	63.6	63.7	61.6	75.1	

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	88.1	86.7	85.5	87.3	87.7	87.7	87.5	89.4	87.6

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)	Open Unit, Isolated Exhaust	3:00	49.7	73.5	78.9	81.5	82.2	82.6	79.9	84.3	90.0
			1:30	45.8	74.4	80.0	78.9	79.8	78.1	77.6	84.4	88.6
			12:00-Engine	52.4	75.0	79.8	79.9	81.6	80.6	75.1	74.2	87.4
			10:30	51.1	74.0	79.8	80.2	84.5	82.5	78.1	78.9	89.2
			9:00	50.5	73.5	80.6	79.8	83.4	83.8	79.1	80.9	89.6
			7:30	49.4	74.6	81.6	80.2	82.4	83.4	77.9	82.3	89.6
			6:00-Alternator	51.7	77.2	81.5	79.1	79.7	77.4	74.0	86.2	89.4
			4:30	50.3	73.3	81.0	78.4	81.3	81.9	77.1	88.8	91.3
8-pos. log avg.			50.5	74.6	80.5	79.8	82.1	81.8	77.7	84.2	89.5	

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)	69.8	96.6	108.7	113.6	113.0	114.1	109.9	101.1	119.4

KD250		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	(23)	Level 2 Sound	3:00	51.4	66.1	65.2	64.1	56.3	53.7	50.6	45.7	70.4
			1:30	46.3	63.9	66.9	64.7	54.2	56.6	50.5	42.5	70.5
			12:00-Engine	50.9	64.2	67.0	64.4	61.3	58.1	50.5	42.6	71.0
			10:30	50.3	65.6	65.1	66.6	59.7	57.1	50.9	43.2	71.2
			9:00	51.2	63.5	65.0	62.3	57.4	53.4	50.2	45.2	69.1
			7:30	51.7	64.3	67.2	62.5	60.4	56.2	51.4	43.3	70.6
			6:00-Alternator	54.0	71.0	70.9	63.4	61.9	59.8	55.4	48.2	74.8
			4:30	51.2	66.7	66.1	61.5	60.8	56.3	50.8	44.2	70.8
8-pos. log avg.			51.3	66.4	67.1	64.0	59.6	56.8	51.7	44.8	71.4	

				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	83.9	81.9	84.1	84.8	84.0	83.9	82.7	82.8	83.6

				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)	Open Unit, Isolated Exhaust	3:00	49.5	73.5	79.0	80.2	78.6	78.4	74.1	67.8	85.8
			1:30	45.5	73.6	79.0	76.9	77.0	73.5	70.1	63.1	83.8
			12:00-Engine	52.2	75.2	79.7	78.3	79.7	79.5	71.9	63.0	86.0
			10:30	50.4	73.9	78.6	78.8	82.7	79.2	73.6	66.8	86.7
			9:00	48.6	73.7	79.2	78.6	79.9	79.1	74.0	67.1	85.9
			7:30	48.9	74.4	80.4	77.9	79.2	78.6	73.0	67.3	85.8
			6:00-Alternator	51.1	77.9	80.1	76.4	77.1	73.1	66.9	60.1	84.6
			4:30	49.5	73.1	79.5	76.5	78.1	77.7	71.7	65.2	84.7
8-pos. log avg.			49.8	74.7	79.5	78.1	79.4	77.9	72.4	65.7	85.5	

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Exhaust	Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
No Load	1 (3.3)	Raw Exhaust (No Silencer)		55.1	92.9	95.2	94.9	95.8	92.5	90.5	86.2	101.9

# Emissions Data



# KD250

60Hz Diesel Generator Set  
Tier 3 EPA Certified for Stationary Emergency Applications

## ENGINE INFORMATION

Model:	KD09L06T-6DDS	Bore:	114 mm (4.48 in.)
Nameplate kW @ 1800 RPM:	346	Stroke:	145 mm (5.70 in.)
Type:	4-Cycle, 6 Cylinder	Displacement:	8.9 L (543 cu. in.)
Aspiration:	Turbocharged, Charge Air Cooled	EPA Family:	TCEXL0540AAB
Compression Ratio:	16.1:1	EPA Certificate:	TCEXL0540AAB-037
Emission Control Device:	Direct Diesel Injection, Engine Control Module, Turbocharger, Charge Air Cooler		

## EXHAUST EMISSION DATA

## EPA D2 5-MODE WEIGHTED

NMHC (Non-Methane Hydrocarbons)	0.37 g/kWh
NOx (Oxides of Nitrogen as NO <sub>2</sub> )	3.43 g/kWh
CO (Carbon Monoxide)	2.5 g/kWh
PM (Particulate Matter)	0.19 g/kWh

## NOMINAL EMISSION DATA

Cycle Point	100% ESP	75% ESP	50% ESP	25% ESP
Power [kW]	346	260	173	87
Speed [rpm]	1800	1800	1800	1800
Exhaust Gas Flow [kg/h]	1734	1719	1588	1079
Exhaust Gas Temperature [C]	525	478	405	343
NOx [g/kWh]	4.06	1.95	1.23	0.94
CO [g/kWh]	0.22	0.54	2.36	0.81
HC [g/kWh]	0.04	0.04	0.16	0.44
PM [g/kWh]	0.03	0.04	0.13	0.19

## TEST METHODS AND CONDITIONS

### Test Methods:

Steady-State emissions recorded per EPA CFR 40 Part 1065, and ISO8178-1 during operation at rated engine speed (+/-2%) and stated constant load (+/-2%) with engine temperatures, pressures and emission rates stabilized using Ramped Mode Cycle.

### Fuel Specification:

46.5 Cetane Number, 0.035 Wt.% Sulfur, ASTM D975 No. 2-D or 40 CFR Part 86.1313-98 Type 2-D Petroleum Diesel Fuel.

### Reference Conditions:

25 °C (77 °F) Air Inlet Temperature, 37 °C (99 °F) Fuel Inlet Temperature, 100 kPa (29.6 in Hg) Barometric Pressure; 10.7 g/kg (75 grains H<sub>2</sub>O/lb.) of dry air Humidity (required for NO<sub>x</sub> correction), 10 in H<sub>2</sub>O Intake restriction, 2 in Hg exhaust backpressure.

Data was taken from a single engine test according to the test methods, fuel specification and reference conditions stated above and is subjected to instrumentation and engine-to-engine variability. Tests conducted with alternate test methods, instrumentation, fuel or reference conditions can yield different results.

Data and specifications subject to change without notice.

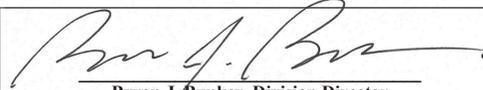


**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2026 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT**

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

**Certificate Issued To:** Cummins Inc.  
(U.S. Manufacturer or Importer)  
**Certificate Number:** TCEXL0540AAB-037

**Effective Date:**  
11/12/2025  
**Expiration Date:**  
12/31/2026

  
Byron J. Bunker, Division Director  
Compliance Division

**Issue Date:**  
11/12/2025  
**Revision Date:**  
N/A

**Model Year:** 2026  
**Manufacturer Type:** Original Engine Manufacturer  
**Engine Family:** TCEXL0540AAB

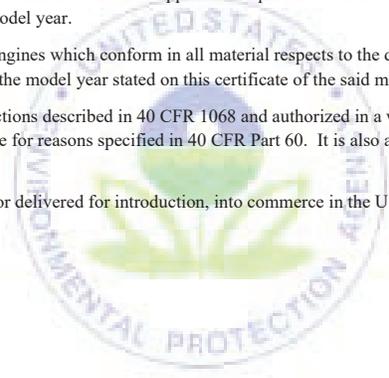
**Mobile/Stationary Indicator:** Stationary  
**Emissions Power Category:** 225<=kW<450  
**Fuel Type:** Diesel  
**After Treatment Devices:** No After Treatment Devices Installed  
**Non-after Treatment Devices:** No Non-After Treatment Devices Installed

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.

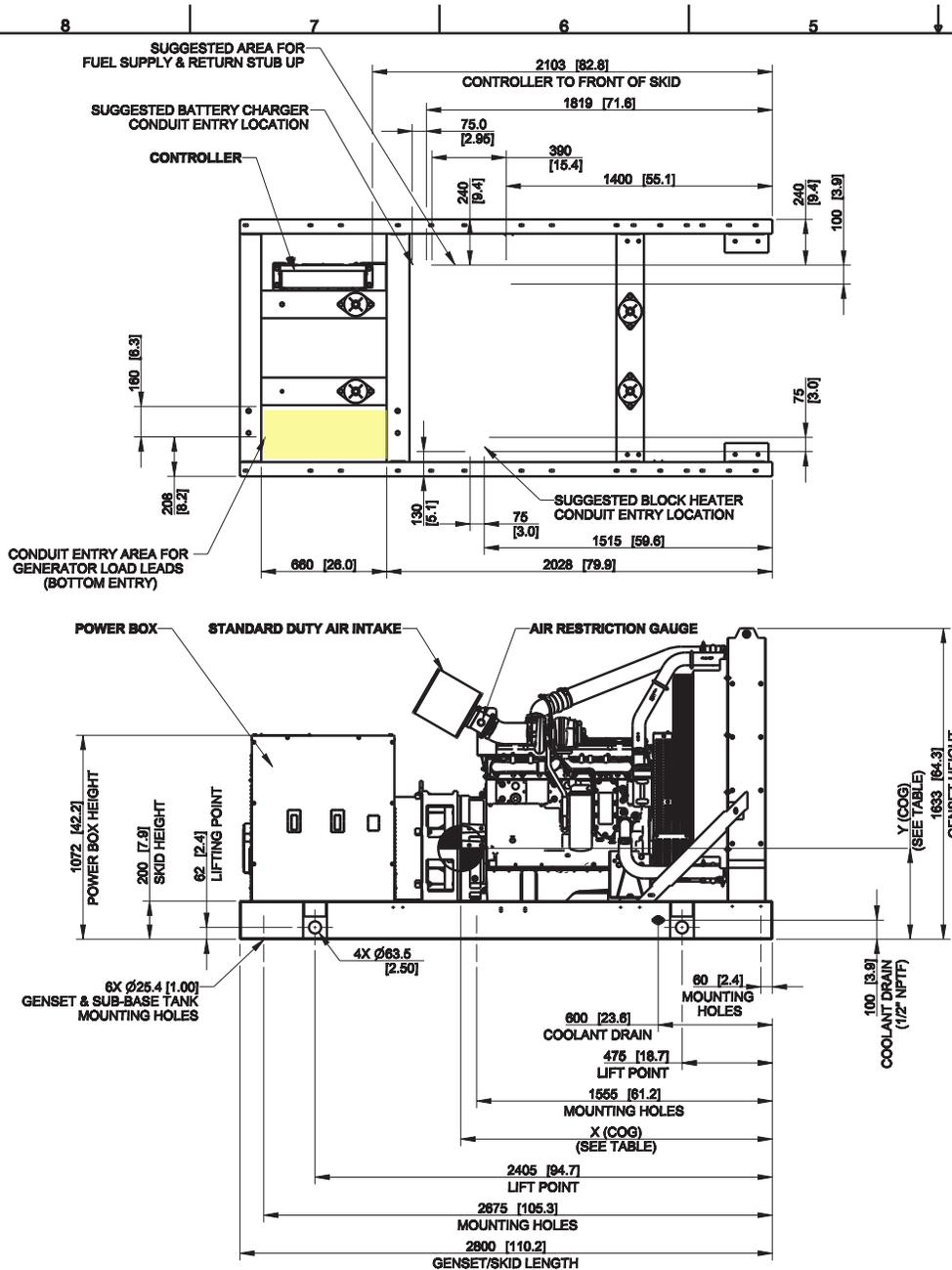
This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate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

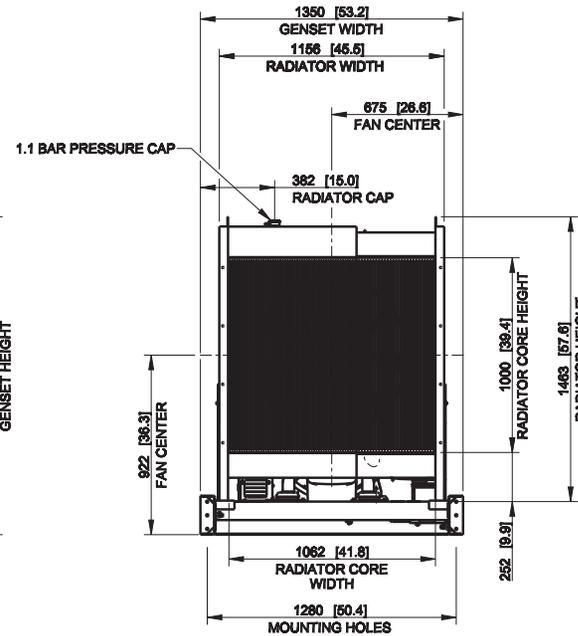


# Dimensional Drawings



MODEL	ALTERNATOR	GENSET WEIGHT (WET) kg [LB]	CENTER OF GRAVITY (WET) mm [IN]	
			X	Y
KD230	KH01722MO4D	2050 [4520]	1510 [59.4]	575 [22.6]
KD230	KH01722TO4D	2050 [4520]	1510 [59.4]	575 [22.6]
KD250	KH01722TO4D	2050 [4520]	1510 [59.4]	575 [22.6]
KD250	KH02216MO4D	2170 [4785]	1530 [60.2]	570 [22.4]
KD275	KH02216TO4D	2170 [4785]	1530 [60.2]	570 [22.4]
KD300	KH02216TO4D	2170 [4785]	1530 [60.2]	570 [22.4]

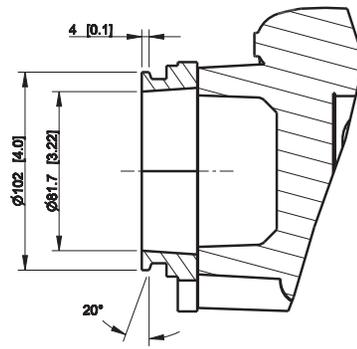
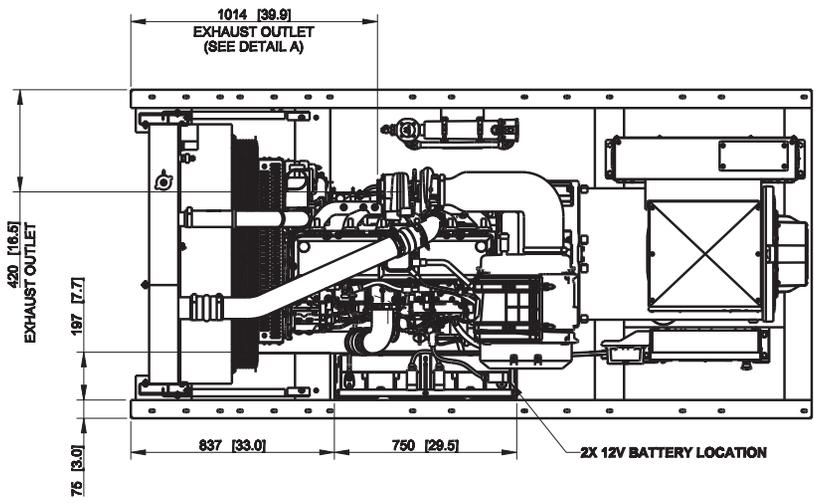
WOOD BASE IS AN ADDITIONAL 170 kg [375 LB]



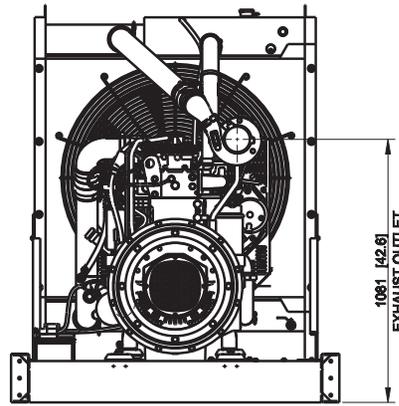
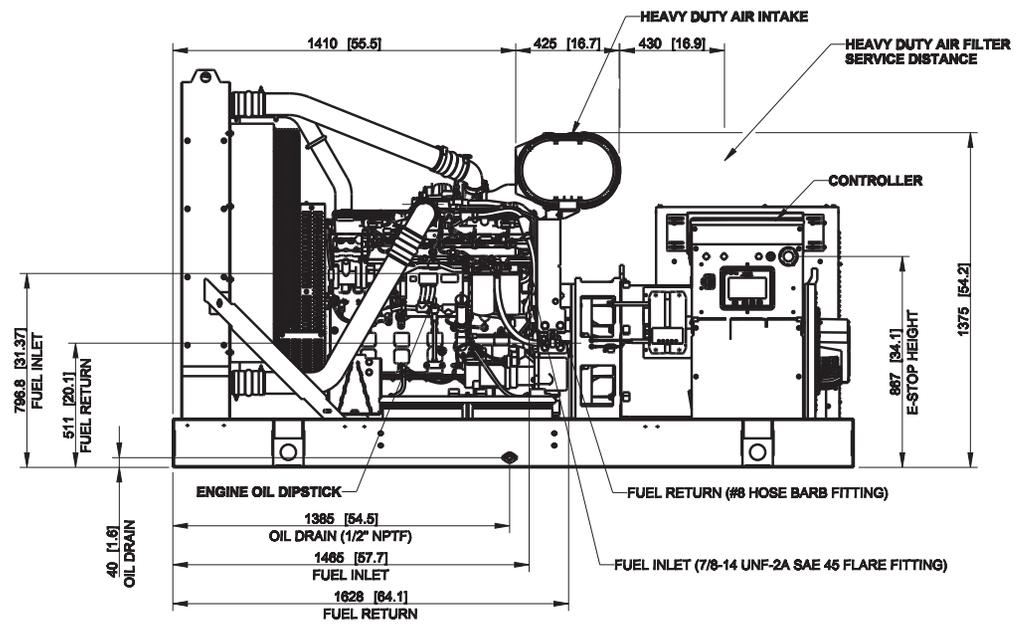
- NOTES:
- 1) IF SUB-BASE FUEL TANK AND/OR SOUND HOUSING IS USED, REFER TO SUB-BASE FUEL TANK ADV TO DETERMINE MOUNTING LOCATIONS.
  - 2) DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.
  - 3) IF AN ENCLOSURE IS USED, THE FUEL LINE MUST BE STUBBED UP DIRECTLY UNDER THE GENSET, REFER TO ENCLOSURE ADV.
  - 4) IF SEISMIC CERTIFICATION IS REQUIRED, SEE SEISMIC ADV FOR INSTALLATION INSTRUCTIONS.
  - 5) LIFT POINTS NOT TO BE USED WITH TANKS.

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.	reihko
-	11NOV2025	RELEASE FOR PRODUCTION	DEW		
				UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A	THIRD ANGLE PROJECTION
				MAJOR $\phi$ = 0 CRITICAL $\phi$ = 0	
				CHARACTERISTICS COMPLY WITH H KPS-80022	
				SCALE: 0.04	SHEET SIZE: B SHEET: 1 OF 4
				DRAWN: DEW	DATE: 11NOV2025
				APPROVED: SEE PLAN SYSTEM	
				TITLE: <b>DIMENSION PRINT, KD230-300</b>	
				DWG NO.: <b>ADV-10083</b>	

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.



DETAIL A  
SCALE: 0.50

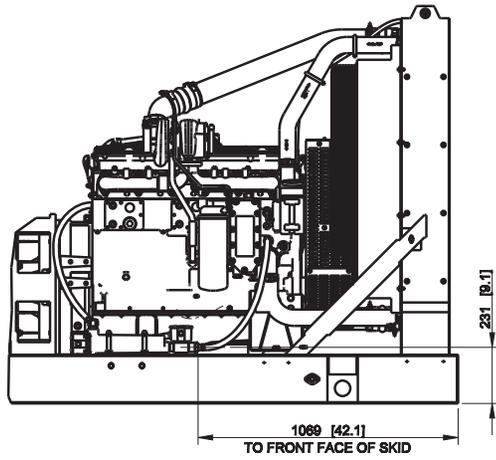


NOTE: FUEL SYSTEM MATERIAL SELECTION IS CRITICAL. SEE INSTALLATION MANUAL FOR DETAILS.

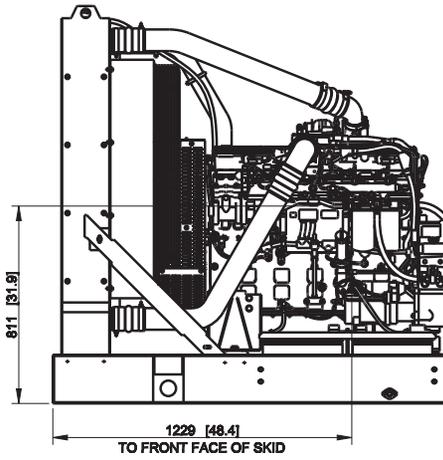
DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

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.	MAJOR ○ = 0		THIRD ANGLE PROJECTION
					CRITICAL ● = 0		
-	11NOV2025	RELEASE FOR PRODUCTION	DEW		CHARACTERISTICS COMPLY WITH KPS-80022		
					SCALE: 0.05	SHEET SIZE: B	SHEET: 2 OF 4
					TITLE: <b>DIMENSION PRINT, KD230-300</b>		
					DWG NO.: <b>ADV-10083</b>		
					DRAWN: DEW DATE: 11NOV2025		
					APPROVED: SEE PLM SYSTEM		

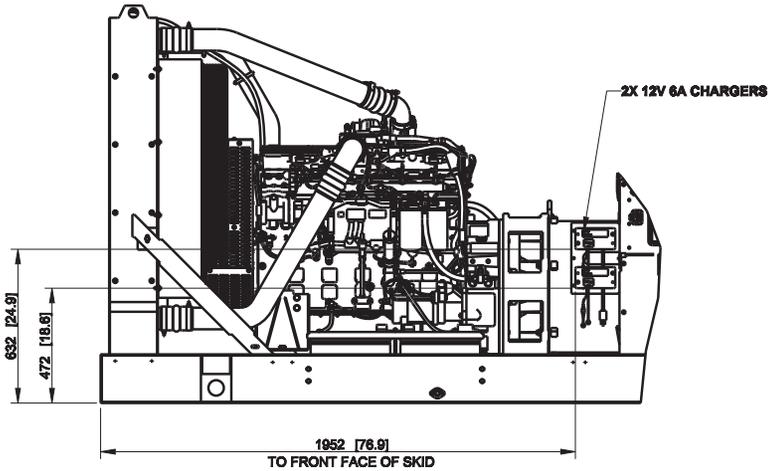
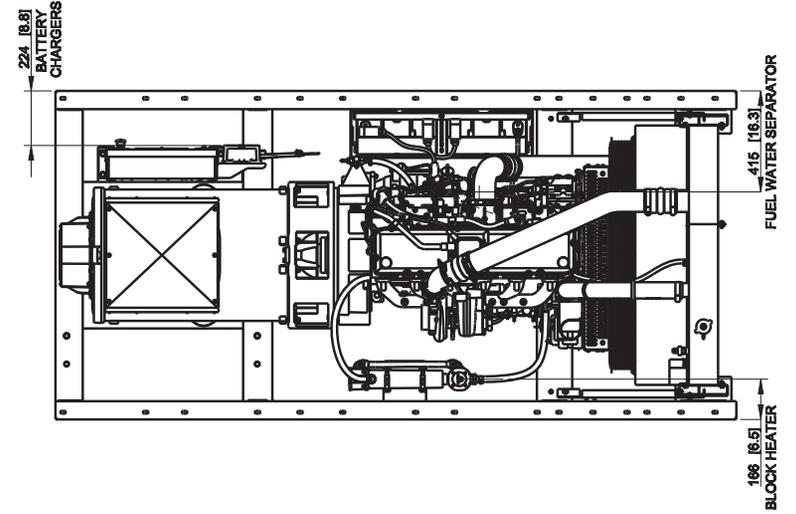
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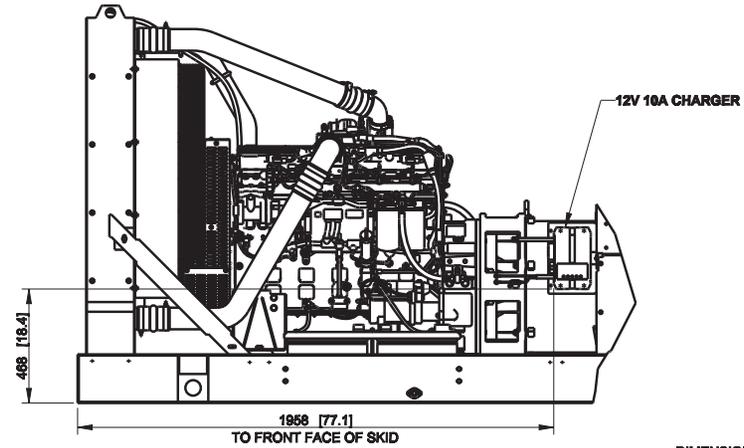
**BLOCK HEATER (OPTIONAL)  
RIGHT SIDE OF GENSET**



**FUEL WATER SEPARATOR  
LEFT SIDE OF GENSET**

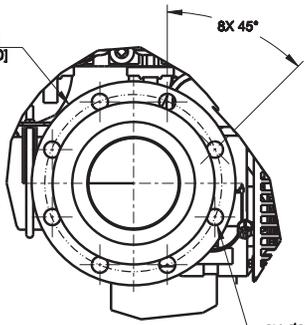


**BATTERY CHARGERS (OPTIONAL)  
LEFT SIDE OF GENSET**



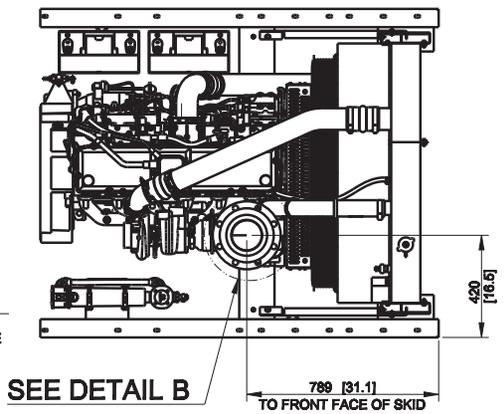
DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

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.		MAJOR ○ = 0	THIRD ANGLE PROJECTION
-	11NOV2025	RELEASE FOR PRODUCTION	DEW	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: NA		CRITICAL ● = 0	CHARACTERISTICS COMPLY WITH KPS-80022
				DRAWN: DEW	SCALE: 0.05	SHEET SIZE: B	SHEET: 3 OF 4
				APPROVED: SEE PLM SYSTEM	DATE: 28AUG2025	<b>TITLE:</b> <b>DIMENSION PRINT,          KD230-300</b>	
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.					<b>DWG NO.: ADV-10083</b>		

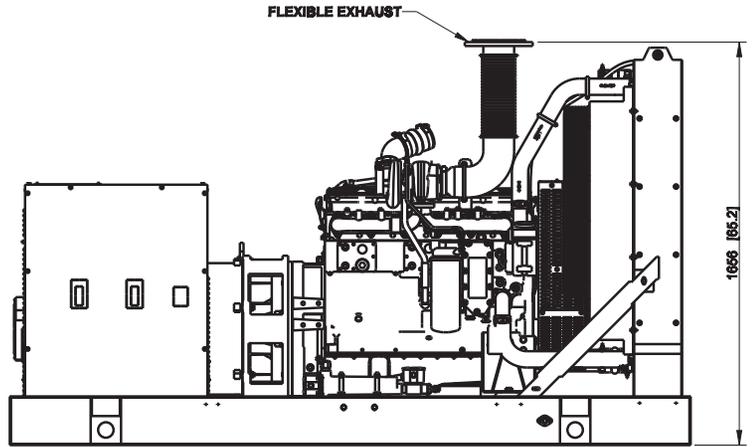


**DETAIL B**  
SCALE 0.150  
6" ANSI FLANGE

8X  $\phi 22.4$  [0.88]  
EQUALLY SPACED ON  
 $\phi 241.3$  [9.5] BOLT CIRCLE



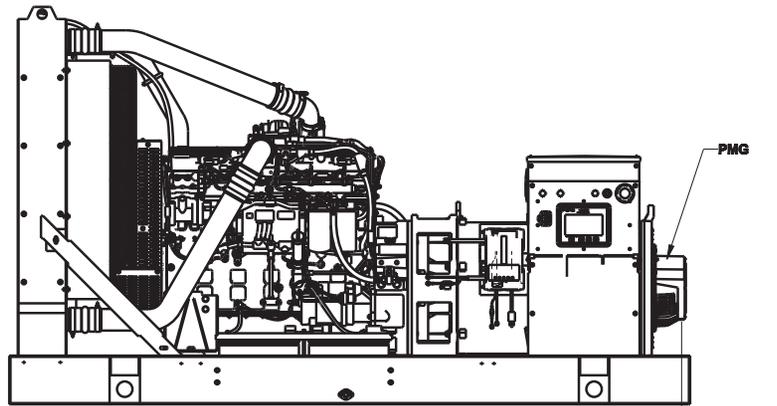
SEE DETAIL B



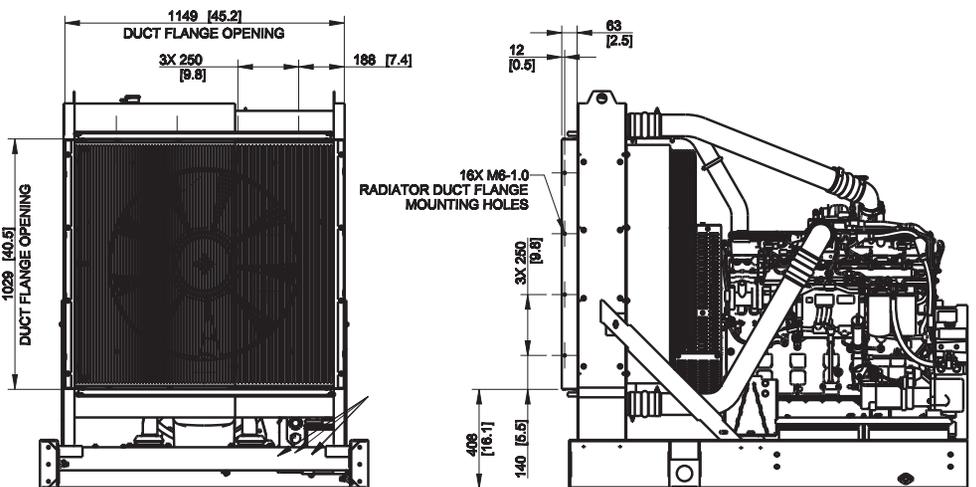
**OPEN UNIT EXHAUST (OPTIONAL)**  
**RIGHT SIDE OF GENSET**

NOTE:  
FLEXIBLE EXHAUST MUST BE FULLY SUPPORTED BY EXTERNAL STRUCTURE  
(ALLOWED BENDING MOMENT AT EXHAUST FLANGE INTERFACE LESS THAN 144 Nm)

DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.



**PMG (OPTIONAL)**

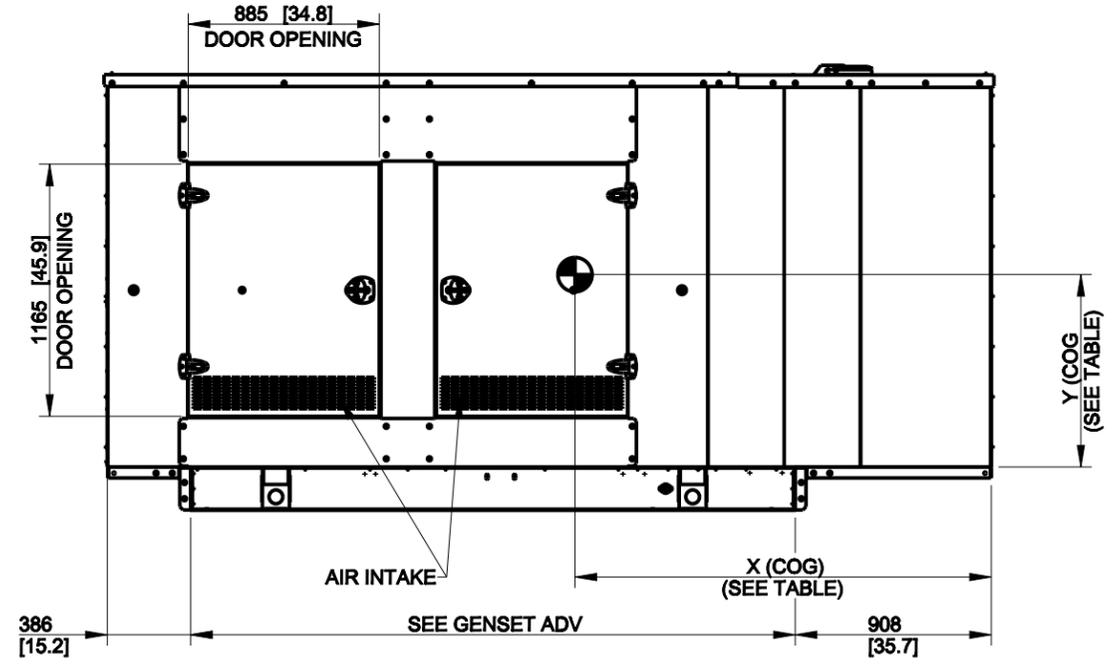
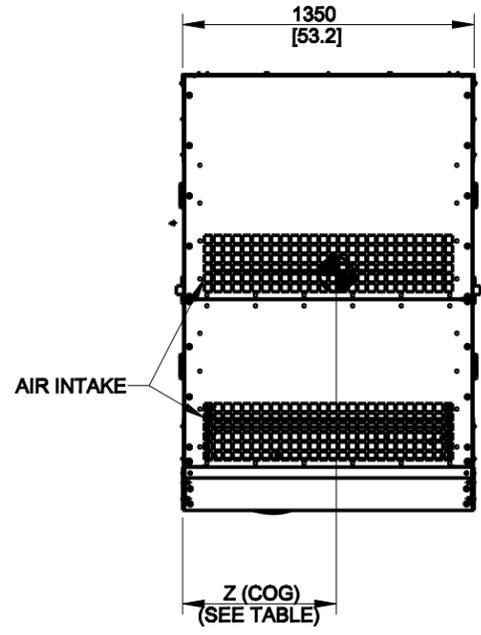
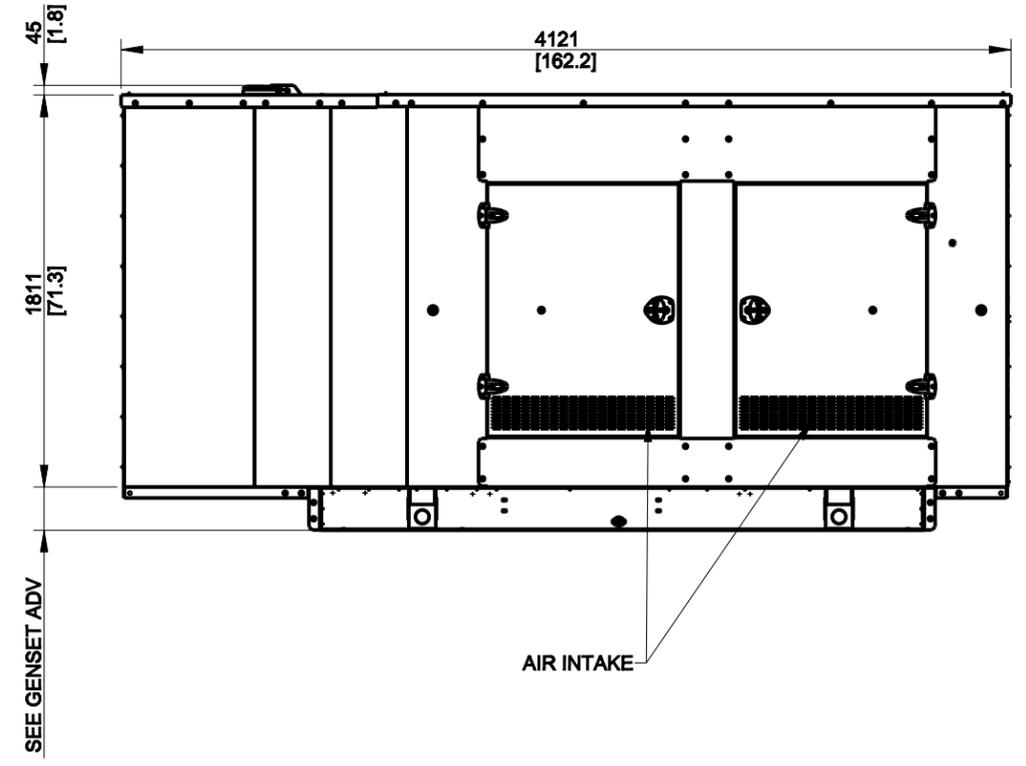
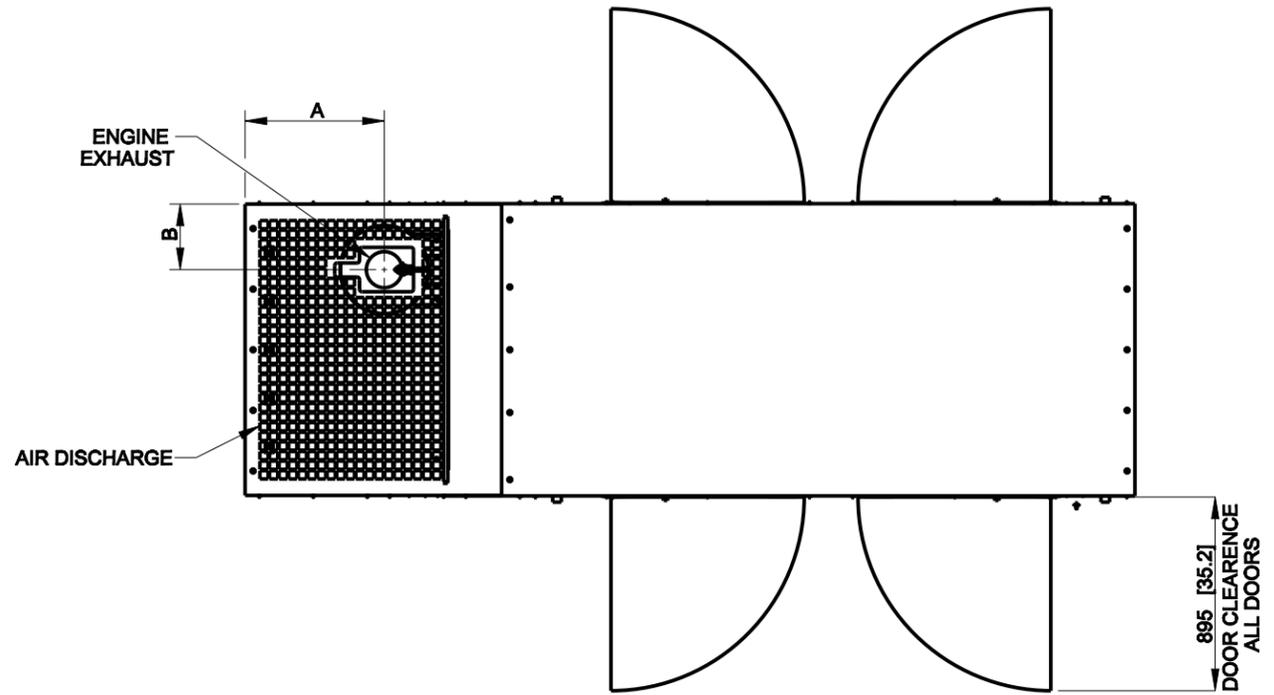


**RADIATOR DUCT FLANGE (OPTIONAL)**

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.			
		- 12NOV2025			RELEASE FOR PRODUCTION	DEW	MAJOR ○ = 0 CRITICAL ● = 0 THIRD ANGLE PROJECTION CHARACTERISTICS COMPLY WITH KFS-80022 SCALE: 0.05 SHEET SIZE: B SHEET: 4 OF 4 TITLE: <b>DIMENSION PRINT, KD230-300</b> DWG NO.: <b>ADV-10083</b>
					UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: NA		
				DRAWN: DEW	DATE:		
				APPROVED: SEE PLM SYSTEM	12NOV2025		

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DESCRIPTION	MODELS	WEIGHT		CENTER OF GRAVITY mm [in]			EXHAUST LOCATION mm [in]		SILENCER OUTLET DIAMETER mm [in]
		kg	LBS	X	Y	Z	A	B	
SOUND, STEEL	KD230, KD250, KD275, KD300	650	1435	1905 [75.0]	930 [36.6]	705 [27.8]	644 [25.4]	303 [11.9]	152 [6.0]
WEATHER, STEEL	KD230, KD250, KD275, KD300	630	1390	1905 [75.0]	930 [36.6]	705 [27.8]	644 [25.4]	303 [11.9]	152 [6.0]
SOUND, ALUM	KD230, KD250, KD275, KD300	430	950	1950 [76.8]	945 [37.2]	720 [28.3]	644 [25.4]	303 [11.9]	152 [6.0]

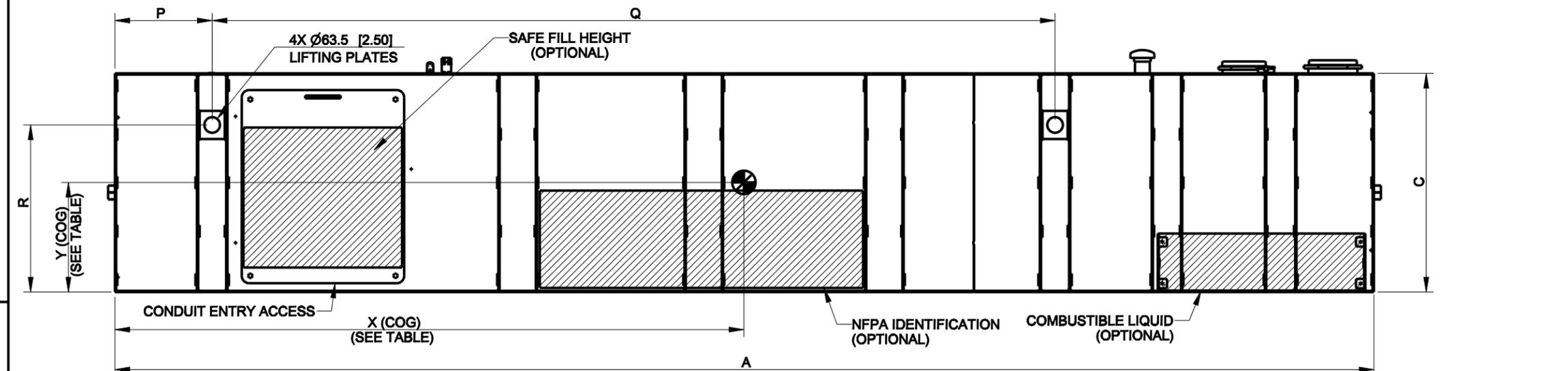
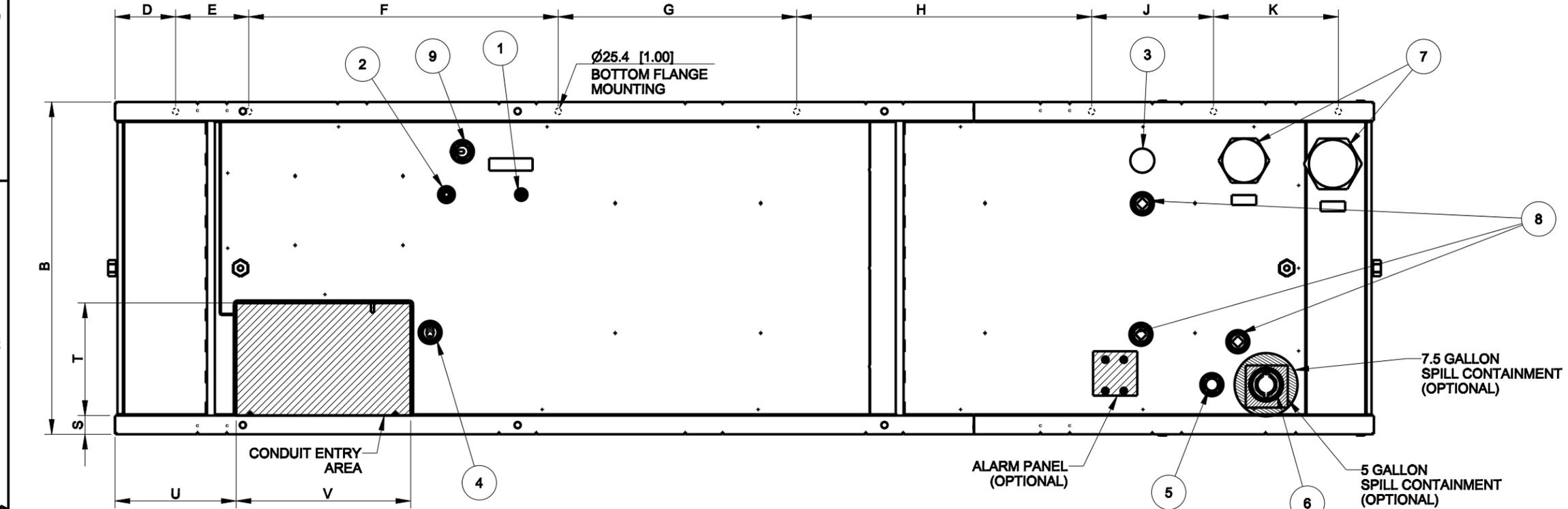


NOTE :  
 1. IF SEISMIC CERTIFICATION IS APPLICABLE OR REQUIRED, SEE SEISMIC ADV FOR INSTALLATION INSTRUCTION  
 2. DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS  
 3. ENCLOSURE WEIGHT + GENERATOR SET WEIGHT (REFERENCE FROM GENERATOR SET ADV) = TOTAL WEIGHT

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.				
-	13AUG2025	RELEASE FOR PRODUCTION	AVD	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A			MAJOR ○ = 0	THIRD ANGLE PROJECTION
							CRITICAL ● = 0	
				SCALE: 0.03			SHEET SIZE: B	SHEET: 1 OF 1
				DRAWN: AVD			DATE: 13AUG2025	
				APPROVED: SEE PLM SYSTEM			TITLE: DIMENSION PRINT, KD230-300	
							DWG NO.: ADV-10132	

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		TANK INFORMATION																			
LITERS [GALLONS]	MODELS	A	B	C	TANK WEIGHT kg [LB] (NO FUEL)	BOTTOM FLANGE MOUNTING						LIFTING PLATES			COG		S	T	U	V	
		mm [INCH]	mm [INCH]	mm [INCH]		D	E	F	G	H	J	K	P	Q	R	X	Y	mm [INCH]	mm [INCH]	mm [INCH]	mm [INCH]
1855 [490]	KD230, KD250,	5131 [202.0]	1350 [53.2]	508 [20.0]	1380 [3040.0]	245 [9.7]	300 [11.8]	859 [33.8]	1364 [53.7]	903 [35.6]	929 [36.6]	302 [11.9]	396 [15.6]	3424 [134.8]	298 [11.7]	2685 [106.0]	225 [8.8]	76 [3.0]	457 [18.0]	494 [19.4]	711 [28.0]
3595 [950]	KD275, KD300	5131 [202.0]	1350 [53.2]	889 [35.0]	1820 [4010.0]	247 [9.7]	298 [11.7]	1261 [49.7]	972 [38.3]	1202 [47.3]	497 [19.6]	509 [20.0]	396 [15.6]	3436 [135.3]	679 [26.7]	2655 [104.8]	405 [16.0]	76 [3.0]	457 [18.0]	494 [19.4]	711 [28.0]



### STATE TANK 950 GALLON SHOWN

ITEM	DESCRIPTION
1	FUEL RETURN 1/2" NPT
2	FUEL SUPPLY 3/4" NPT
3	NORMAL VENT
4	LEAK SENSOR
5	GAUGE, FUEL LEVEL, DIRECT READ
6	FILL CAP, 2" LOCKABLE W/PIPE RISER
7	EMERGENCY VENT
8	OPTIONAL ACCESSORY PORT (2" NPT)
9	GAUGE, FUEL LEVEL, W/ SENDER

NOTES:  
 TANK WEIGHT + ENCLOSURE WEIGHT + GENSET WEIGHT (REFERENCE FROM ENCLOSURE + GENSET ADVS) = TOTAL WEIGHT  
 GENSET + ENCLOSURE MOUNTS FLUSH WITH STUB-UP END OF TANK  
 REFER TO SEISMIC ADV FOR IBC/OSHPD SEISMIC MOUNTING LOCATIONS

REV	DATE	ON COMPOSITE DWGS, 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.	
-	18NOV2025	RELEASE FOR PRODUCTION	AVD		
A	09DEC2025	(C-7, 8) ADDED S, T, U, V; (D-1, 2) ADDED COLUMNS S, T, U, V; SEE SHEET 1, 3	BLK		UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A
				MAJOR ○ = 0 CRITICAL ● = 0	THIRD ANGLE PROJECTION
				SCALE: 0.40	SHEET SIZE: B
				DRAWN: AVD	DATE: 18NOV2025
				APPROVED: SEE PLM SYSTEM	
				TITLE: <b>DIMENSION PRINT, KD230-300 TANKS</b> DWG NO.: <b>ADV-10068</b>	
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# Wiring Schematics



PART NUMBER	DESCRIPTION	OPTION
11607055900	CONTROL PEDESTAL, KD80-300, APM003	-
11607056100	ENGINE, KD150-200	-
11607056200	CONTROL PEDESTAL, KD80-300, APM402	-
11607056300	FED TO ALT, KD80-300, APM003APM402	-
11607056400	BREAKER ACCESSORY BOX	X
11607056500	GF1	X
11607056600	KEY SWITCH	X
11607056900	ALT, 4D ACTIVATOR, AUX WINDING	-
11607057000	ALT, 4D ACTIVATOR, PMG	X
11607057100	1S RELAY BOARD	X
11607057200	SHUNT TRIP	X
11607057300	RUN RELAY, APM402	X
11607057400	LOCAL MOTOR BREAKER	X

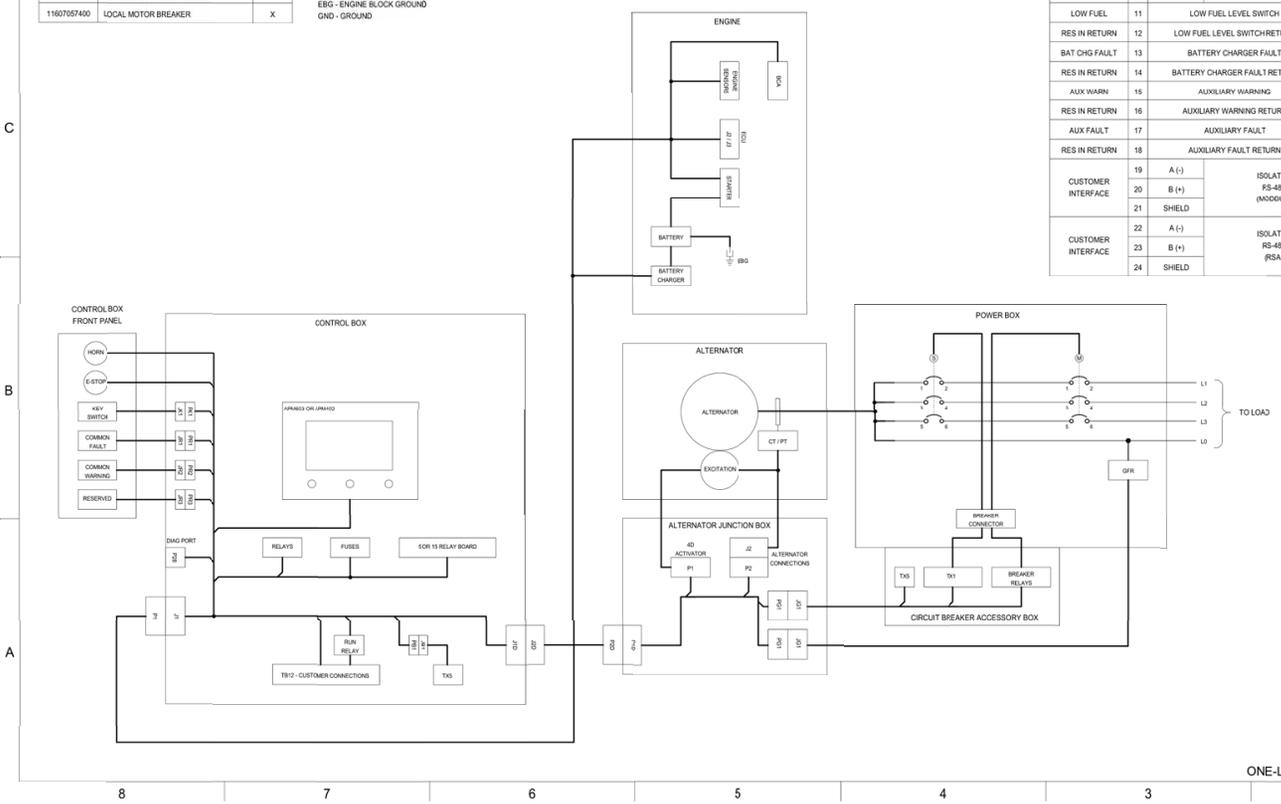
**LEGEND**  
 BCA - BATTERY CHARGING ALTERNATOR  
 BTCS - BATTERY TEMP COMPENSATION SENSOR  
 CLS - COOLANT LEVEL SENDER  
 CT(N) - CURRENT TRANSFORMER  
 CTS - COOLANT TEMPERATURE SENDER  
 DIAG - DIAGNOSTIC LAMP  
 ECU - ENGINE CONTROL UNIT  
 ESS - EMERGENCY STOP SWITCH  
 FLA - FUEL LEAK ALARM  
 FL5 - FUEL LEVEL SENDER  
 FWS - FUEL WATER SEPARATOR  
 LCT - LOW COOLANT TEMPERATURE SWITCH  
 P(NG) - PLUG  
 QCON - QUICK CONNECT  
 SM - STARTER MOTOR  
 SS - STARTER SOLENOID  
 STAT - STATOR  
 SW(N) - SWITCH  
 TB(N) - TERMINAL BLOCK  
 W(N) - WIRE WELD  
 EBG - ENGINE BLOCK GROUND  
 GND - GROUND

CUSTOMER INTERFACE	1	FUSED BATTERY POWER
	2	BATT VOLTS WHEN RUNNING
	3	BATTERY NEGATIVE
FUEL SELECTION	4	FUEL SELECTION
GROUND	5	FUEL SELECTION GROUND
LP FUEL	6	LP FUEL
GROUND	7	ECU FUEL SELECTION GROUND
COMMON FAULT	8	COMMON FAULT - FUSED BATTERY POWER
GROUND FAULT	8	GROUND FAULT RELAY SIGNAL

FUNCTION	POS	SIGNAL DESCRIPTION
REMOTE E-STOP	1	REMOTE EMERGENCY STOP
REMOTE START	3	REMOTE START SIGNAL
CUSTOMER INTERFACE	4	FUSED BATTERY POWER
	5	BATT VOLTS WHEN RUNNING
	7	BATTERY NEGATIVE
CUSTOMER INTERFACE	8	A (-)
	9	B (+)
	10	SHIELD
LOW FUEL	11	LOW FUEL LEVEL SWITCH
RES IN RETURN	12	LOW FUEL LEVEL SWITCH RETURN
BAT CHG FAULT	13	BATTERY CHARGER FAULT
RES IN RETURN	14	BATTERY CHARGER FAULT RETURN
AUX WARN	15	AUXILIARY WARNING
RES IN RETURN	16	AUXILIARY WARNING RETURN
AUX FAULT	17	AUXILIARY FAULT
RES IN RETURN	18	AUXILIARY FAULT RETURN
CUSTOMER INTERFACE	19	A (-)
	20	B (+)
	21	SHIELD
CUSTOMER INTERFACE	22	A (-)
	23	B (+)
	24	SHIELD

REV	DATE	REVISION	BY
1	4/29/2005	NEW SCHEMATIC	JAB
A	10/9/2005	ADDED SHEET 12	JAB

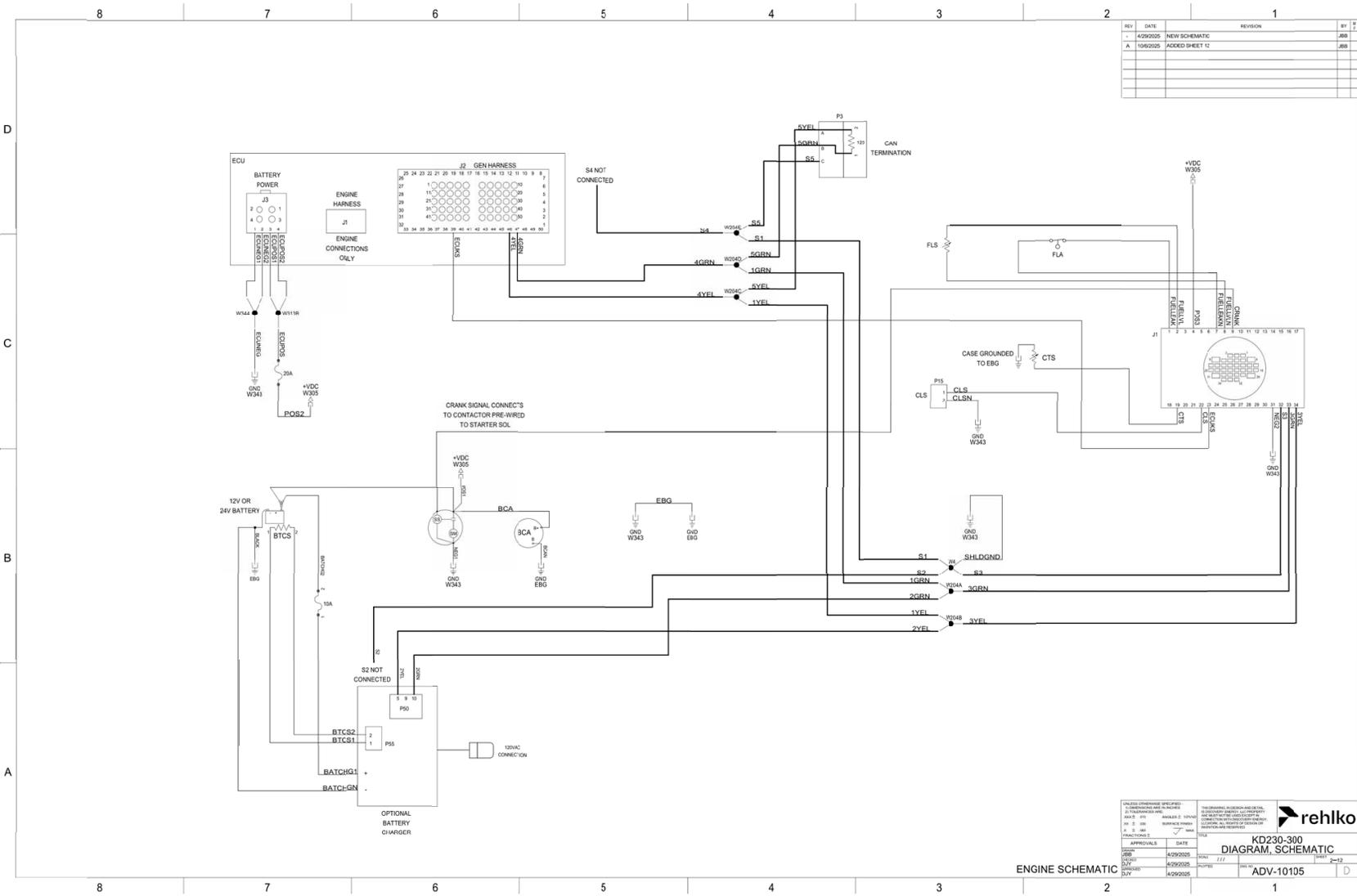
FUNCTION	POS	SIGNAL DESCRIPTION
RUN RELAY	25	COMMON CONTACT
	26	NORMALLY OPEN CONTACT
	27	NORMALLY CLOSED CONTACT
SPEED BIAS	28	SPEED BIAS (+)
	29	SPEED BIAS (-)
	30	SHIELD
VOLTAGE BIAS	31	VOLTAGE BIAS (+)
	32	VOLTAGE BIAS (-)
	33	SHIELD
RESERVED DIFFERENTIAL VOLTAGE	34	RESERVED DIF VOLT (+)
	35	RESERVED DIF VOLT (-)
	36	SHIELD
RATIO SIGNAL	37	RATIO POS (+5V)
	38	RATIO SIGNAL
	39	RATIO NEG (GND)
RATIO SIGNAL	40	RATIO POS (+5V)
	41	RATIO SIGNAL
	42	RATIO NEG (GND)
FUEL SELECTION	43	FUEL SELECTION
GROUND	44	FUEL GROUND
LP FUEL	45	LP FUEL
GROUND	46	ECU FUEL SELECTION GROUND
SPARE	47	SPARE
COMMON FAULT	48	COMMON FAULT - FUSED BATTERY POWER
GROUND	49	COMMON FAULT GROUND



<p>PLEASE CONSULT THE SPECIFIC INSTRUCTIONS FOR THE EQUIPMENT TO WHICH THIS DIAGRAM APPLIES. ALWAYS USE THE LATEST REVISION OF THIS DIAGRAM. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.</p> <p>INSTRUCTIONS 2</p>	<p>THIS DIAGRAM, INCLUDING ALL DETAILS, IS UNCLASSIFIED UNLESS OTHERWISE INDICATED. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.</p>	<p><b>reihlo</b></p> <p><b>KD230-300</b>  <b>DIAGRAM, SCHEMATIC</b></p> <p>ADV-10105</p>
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ONE-LINE DIAGRAM

D

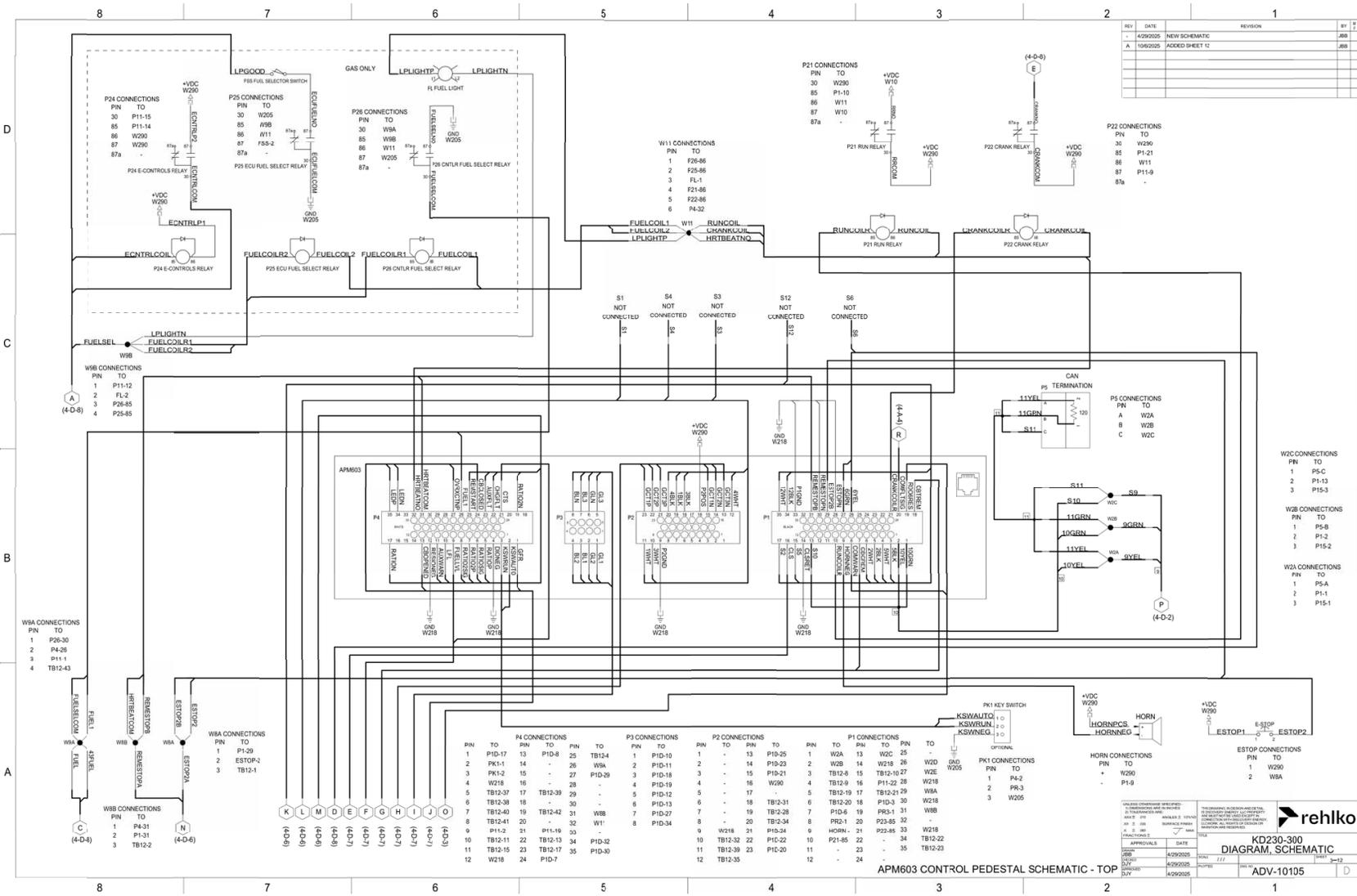


REV	DATE	REVISION	BY
1	4/29/2005	NEW SCHEMATIC	JAB
A	10/9/2005	ADDED SHEET 12	JAB

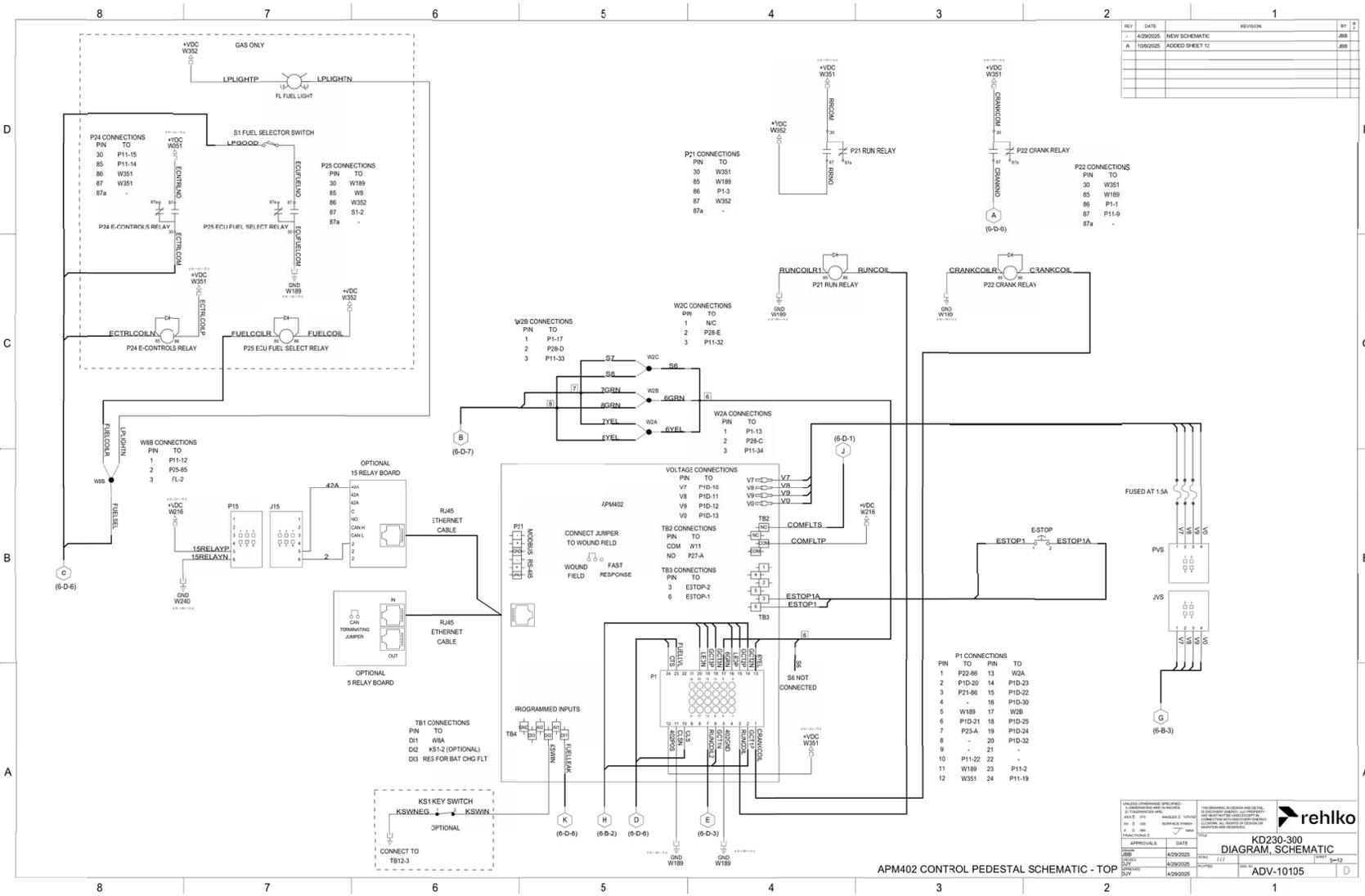
<p>UNLESS OTHERWISE SPECIFIED:          DIMENSIONS ARE IN INCHES          AND MILLIMETERS (IN PARENTHESES)          OR .5 DIA. UNLESS NOTED          OR .8 DIA. UNLESS NOTED          FINISHES: F = FREE          Z = ZINC PLATE</p>	<p>THE COMPANY, INCLUDING ALL RIGHTS,          RESERVED. NO PART OF THIS DOCUMENT          MAY BE REPRODUCED OR TRANSMITTED          IN ANY FORM OR BY ANY MEANS          WITHOUT PERMISSION IN WRITING FROM          THE COMPANY.</p>	<p><b>rehlko</b></p>
<p>APPROVALS</p> <p>DATE</p> <p>DATE</p> <p>DATE</p> <p>DATE</p>	<p>DATE</p> <p>DATE</p> <p>DATE</p> <p>DATE</p>	<p><b>KD230-300</b></p> <p><b>DIAGRAM, SCHEMATIC</b></p> <p>ADV-10105</p>

ENGINE SCHEMATIC

ADV-10105







REV	DATE	REVISION	BY
1	4/29/2005	NEW SCHEMATIC	JAB
A	10/9/2005	ADDED SHEET 12	JAB

PIN	TO
30	W351
85	W189
87	P11-9
87a	-

PIN	TO
1	W189
2	P28-E
3	P11-32

PIN	TO
1	P1-13
2	P28-C
3	P11-34

PIN	TO
1	P22-86
2	P1D-20
3	P21-86
4	-
5	W189
6	P1D-21
7	P23-A
8	-
9	-
10	P11-22
11	W189
12	W351

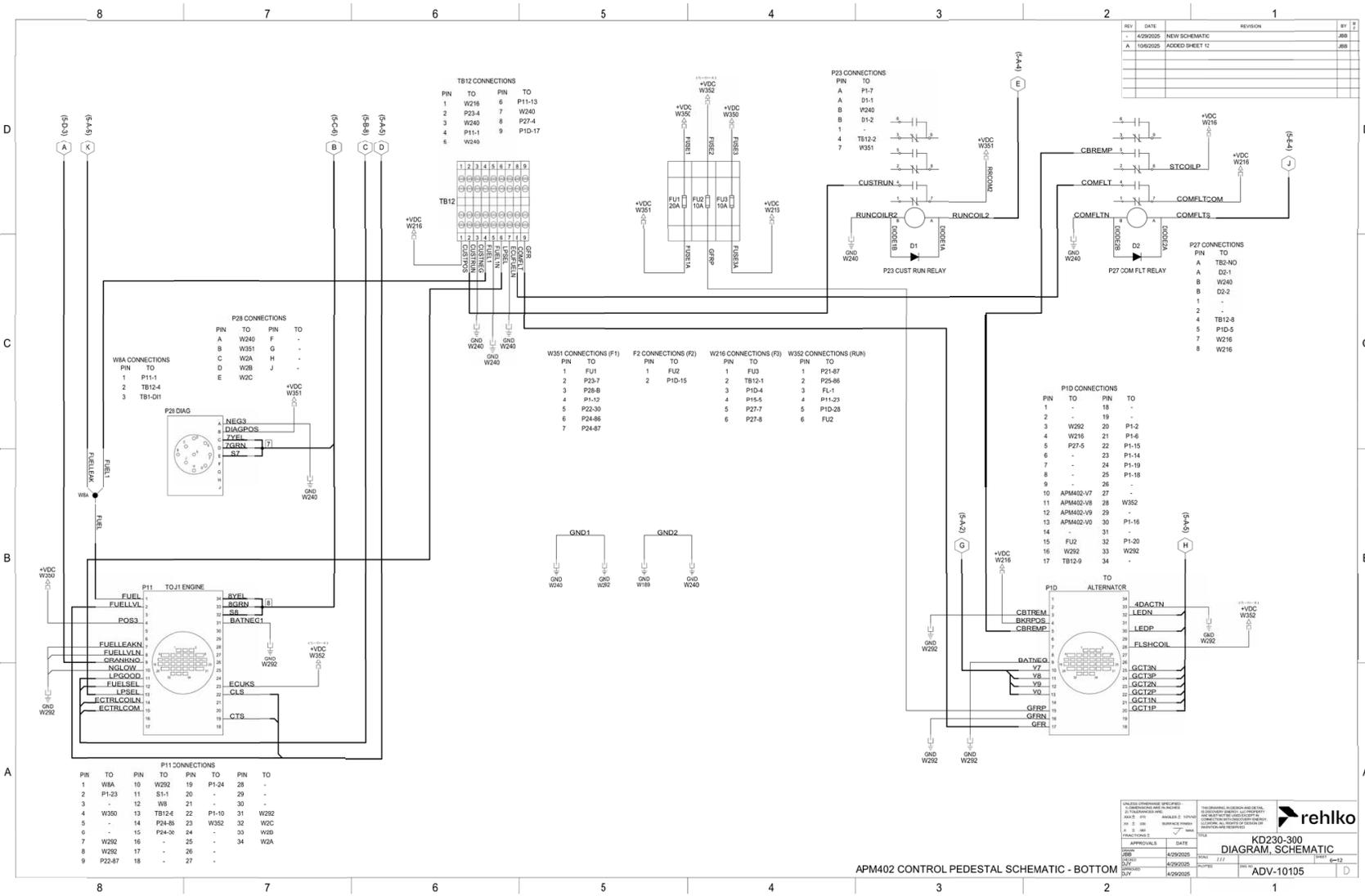
PIN	TO
1	P15-12
2	P25-85
3	FL-2

APM402 CONTROL PEDESTAL SCHEMATIC - TOP

reihlo

KD230-300  
DIAGRAM, SCHEMATIC

ADV-10105



REV	DATE	REVISION	BY
1	4/20/20	NEW SCHEMATIC	JAB
2	10/20/25	ADDED SHEET 12	JAB

**P23 CONNECTIONS**

PIN	TO	PIN	TO
A	W240	F	-
B	W351	G	-
C	W2A	H	-
D	W2B	J	-
E	W2C	-	-

**P27 CONNECTIONS**

PIN	TO	PIN	TO
A	TB2-NO	-	-
B	D2-1	-	-
C	W240	-	-
D	D2-2	-	-
E	-	-	-
F	TB12-4	-	-
G	PID-5	-	-
H	W216	-	-
I	W216	-	-

**P11 CONNECTIONS**

PIN	TO	PIN	TO
1	W8A	10	W292
2	P1-23	11	S1-1
3	-	12	W8
4	W350	13	TB12-4
5	-	14	P24-26
6	-	15	P24-26
7	W292	16	-
8	W292	17	-
9	P22-47	18	-

**P12 CONNECTIONS**

PIN	TO	PIN	TO
1	W216	6	P11-13
2	P23-4	7	W240
3	W240	8	P27-4
4	P11-1	9	P1D-17
5	W240	-	-

**P28 CONNECTIONS (F1)**

PIN	TO	PIN	TO
1	FU1	-	-
2	P23-7	-	-
3	P28-8	-	-
4	P1-13	-	-
5	P22-30	-	-
6	P24-46	-	-
7	P24-47	-	-

**P29 CONNECTIONS (F2)**

PIN	TO	PIN	TO
1	FU2	-	-
2	P1D-15	-	-

**P30 CONNECTIONS (F3)**

PIN	TO	PIN	TO
1	FU3	-	-
3	P1D-4	-	-
4	P15-5	-	-
6	P27-8	-	-

**P31 CONNECTIONS (RUN)**

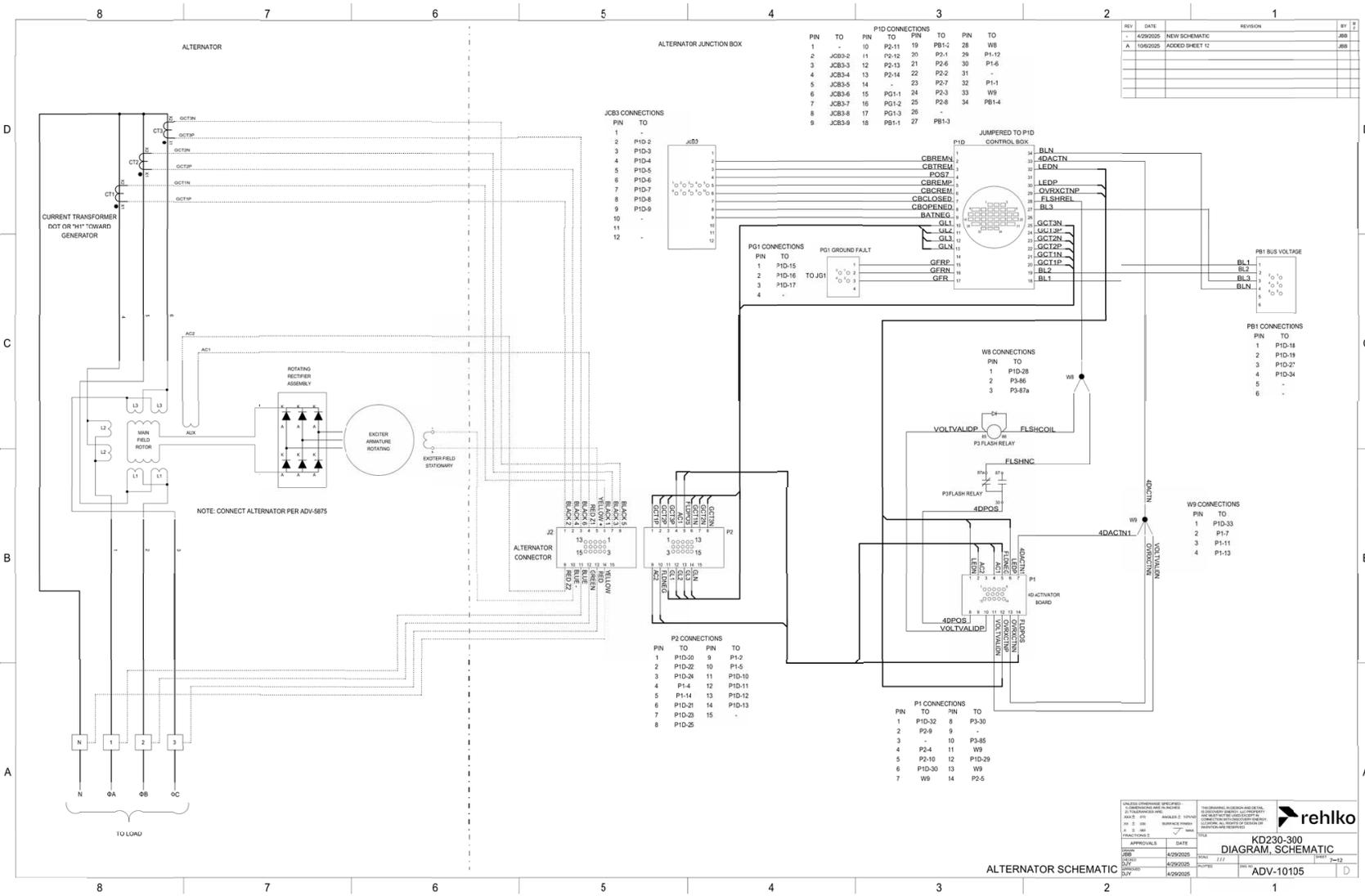
PIN	TO	PIN	TO
1	P21-47	-	-
2	P25-46	-	-
3	FL-1	-	-
4	P11-23	-	-
5	P1D-28	-	-
6	FU2	-	-

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**KD230-300**  
**DIAGRAM, SCHEMATIC**

ADV-10105

APM402 CONTROL PEDESTAL SCHEMATIC - BOTTOM



REV	DATE	DESCRIPTION	REVISION	BY
1	4/29/2005	NEW SCHEMATIC		JAB
A	10/9/2005	ADDED SHEET 12		JAB

ALTERNATOR JUNCTION BOX

PIN	TO	PIN	TO	PIN	TO
1	-	10	P2-11	19	PB1-4
2	JCB3-2	11	P2-12	20	P2-1
3	JCB3-3	12	P2-13	21	P2-6
4	JCB3-4	13	P2-14	22	P2-2
5	JCB3-5	14	-	23	P2-7
6	JCB3-6	15	PG1-1	24	P2-3
7	JCB3-7	16	PG1-2	25	P2-8
8	JCB3-8	17	PG1-3	26	-
9	JCB3-9	18	PB1-1	27	PB1-3

JCB3 CONNECTIONS

PIN	TO
1	-
2	P1D-3
3	P1D-3
4	P1D-4
5	P1D-5
6	P1D-6
7	P1D-7
8	P1D-8
9	P1D-9
10	-
11	-
12	-

PG1 CONNECTIONS

PIN	TO
1	P1D-15
2	P1D-16
3	P1D-17
4	-

JUMPED TO PID CONTROL BOARD

PIN	TO
1	CBREM1
2	CBREM2
3	CBREM3
4	CBREM4
5	CBREM5
6	CBREM6
7	CBREM7
8	CBREM8
9	CBREM9
10	CBREM10
11	CBREM11
12	CBREM12
13	CBREM13
14	CBREM14
15	CBREM15
16	CBREM16
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92	CBREM92
93	CBREM93
94	CBREM94
95	CBREM95
96	CBREM96
97	CBREM97
98	CBREM98
99	CBREM99
100	CBREM100

PBI BUS VOLTAGE

PIN	TO
1	BL1
2	BL2
3	BL3
4	BLN
5	-
6	-

PBI CONNECTIONS

PIN	TO
1	P1D-18
2	P1D-19
3	P1D-27
4	P1D-34
5	-
6	-

W8 CONNECTIONS

PIN	TO
1	P1D-28
2	P3-86
3	P3-87a

W9 CONNECTIONS

PIN	TO
1	P1D-33
2	P1-7
3	P1-15
4	P1-13

P1 CONNECTIONS

PIN	TO	PIN	TO
1	P1D-32	8	P3-30
2	P2-9	9	-
3	-	10	P3-85
4	P2-4	11	W9
5	P2-10	12	P1D-29
6	P1D-30	13	W9
7	W9	14	P2-5

P2 CONNECTIONS

PIN	TO	PIN	TO
1	P1D-30	9	P1-2
2	P1D-22	10	P1-5
3	P1D-24	11	P1D-10
4	P1-4	12	P1D-11
5	P1-14	13	P1D-12
6	P1D-21	14	P1D-13
7	P1D-28	15	-
8	P1D-5	-	-

ALTERNATOR SCHEMATIC

**reihlo**

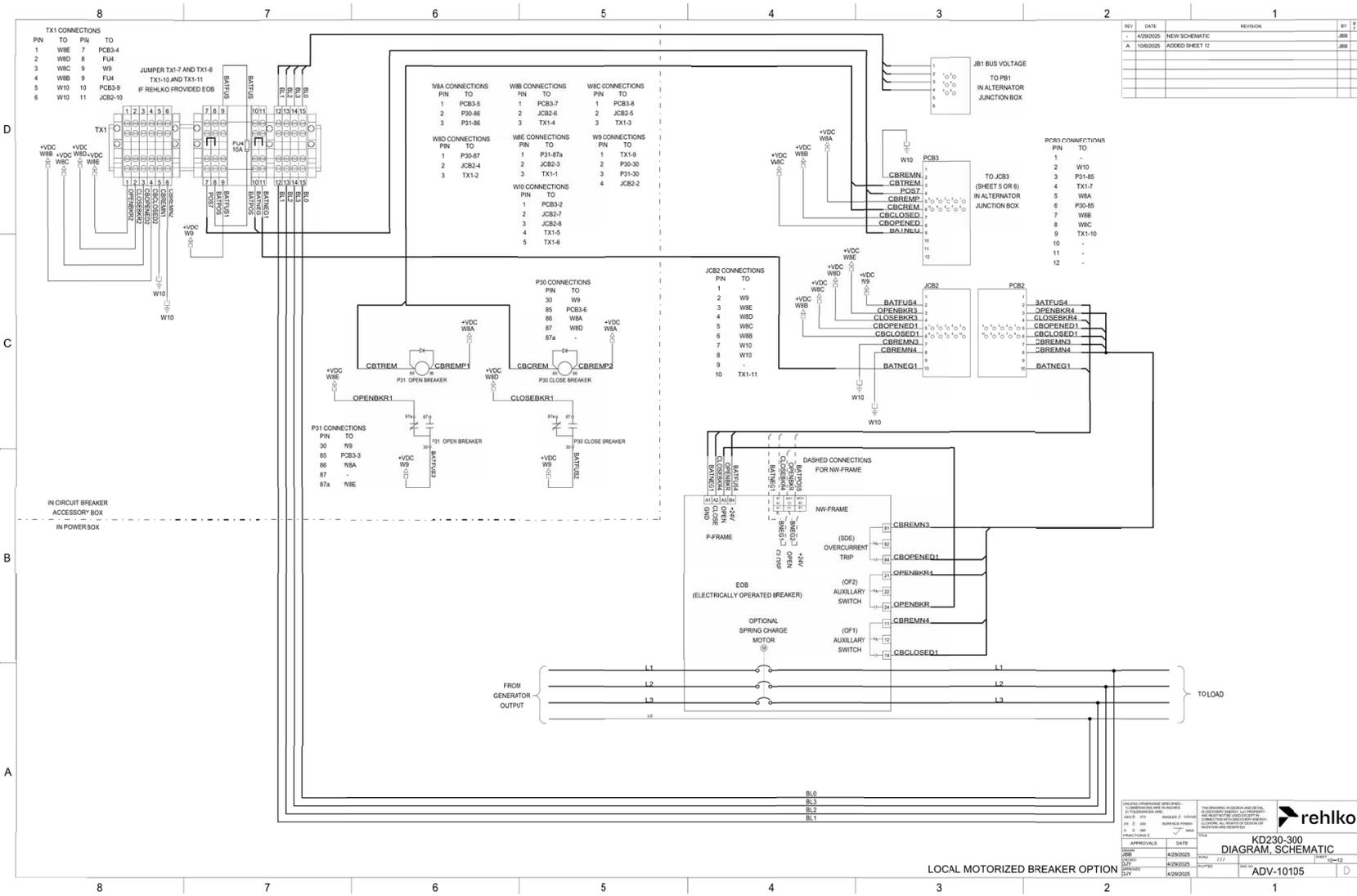
KD230-300  
DIAGRAM, SCHEMATIC

ADV-10105

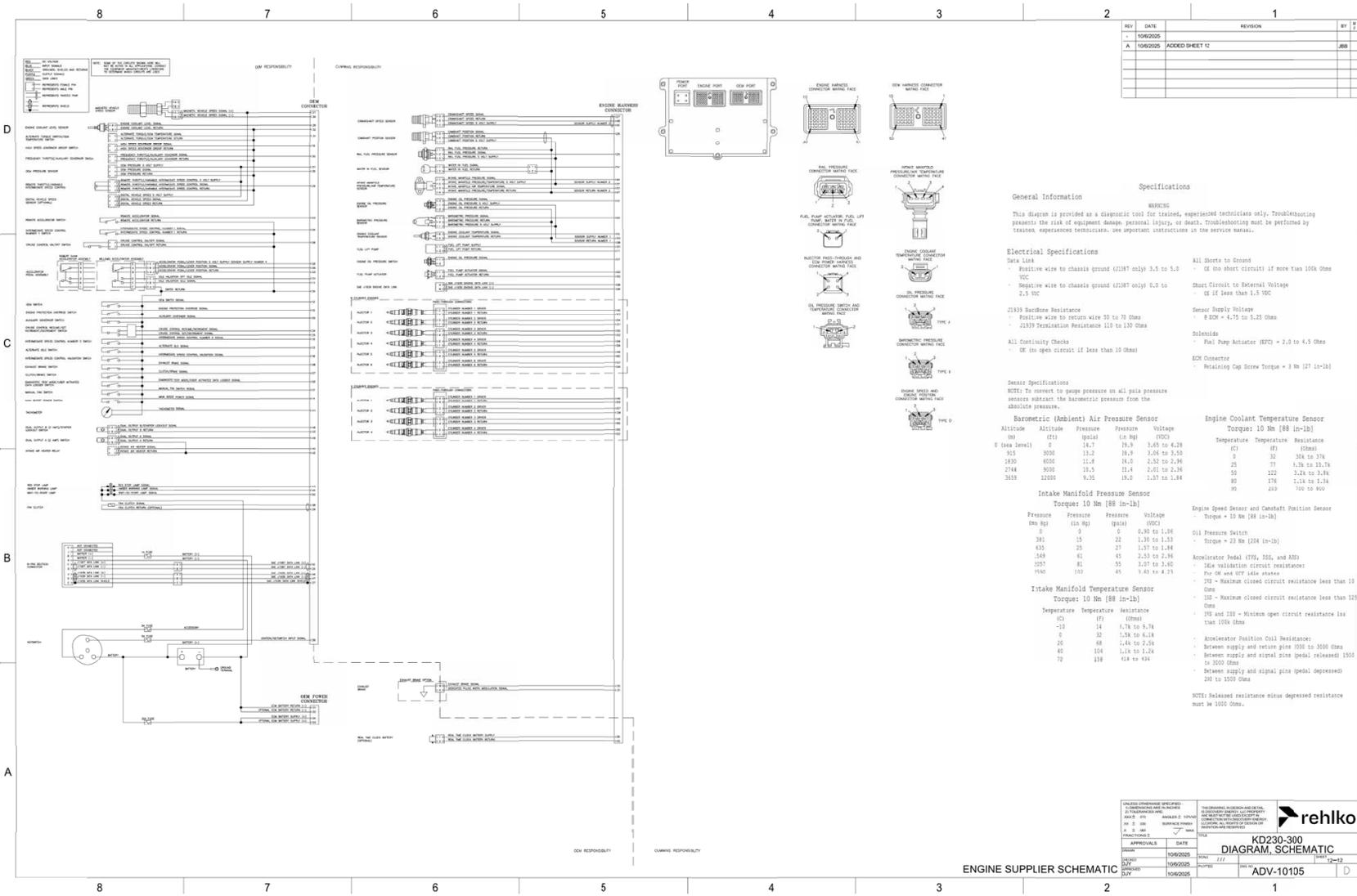
DATE: 11/12











REV	DATE	REVISION	BY
1	10/02/05		
A	10/02/05	ADDED SHEET 12	ABB

**General Information**

This diagram is provided as a diagnostic tool for trained, experienced technicians only. Troubleshooting presents the risk of equipment damage, personal injury, or death. Troubleshooting must be performed by trained, experienced technicians; see upstream instructions in the service manual.

**Electrical Specifications**

- Data Link
  - Positive wire to chassis ground (417M\* only) 3.3 to 5.0 VDC
  - Negative wire to chassis ground (418T only) 0.2 to 2.5 VDC
- 21339 Switch Resistance
  - Positive wire to return wire 50 to 70 Ohms
  - 21339 Termination Resistance 110 to 130 Ohms
- All Continuity Checks
  - OK (no open circuit if less than 10 Ohms)

**Specifications**

- All Shorts to Ground
  - OK (no short circuit) if more than 10k Ohms
- Short Circuit to External Voltage
  - OK if less than 1.5 VDC
- Motor Supply Voltage
  - 8 BCM = 4.75 to 5.25 Ohms
- Solenoid
  - Fuel Pump Actuator (BPC) = 2.0 to 4.5 Ohms
- ECM Connector
  - Retaining Cap Screw Torque = 3 Nm (27 in-lb)

**Sensor Specifications**

NOTE: To convert to gauge pressure on all pair pressure sensors subtract the barometric pressure from the absolute pressure.

Barometric (Ambient) Air Pressure Sensor					Engine Coolant Temperature Sensor				
Altitude (sea level)	Altitude (ft)	Pressure (kPa)	Pressure (in Hg)	Voltage (VDC)	Temperature (°C)	Temperature (°F)	Resistance (Ω)	Torque: 10 Nm (88 in-lb)	Temperature Resistance (Ω)
0	0	101.3	29.92	5.00 ± 0.25	135	275	100 ± 5	10 Nm (88 in-lb)	100 ± 5
300	984	101.3	29.92	5.00 ± 0.25	135	275	100 ± 5	10 Nm (88 in-lb)	100 ± 5
600	1968	101.3	29.92	5.00 ± 0.25	135	275	100 ± 5	10 Nm (88 in-lb)	100 ± 5
900	2952	101.3	29.92	5.00 ± 0.25	135	275	100 ± 5	10 Nm (88 in-lb)	100 ± 5
1200	3936	101.3	29.92	5.00 ± 0.25	135	275	100 ± 5	10 Nm (88 in-lb)	100 ± 5

**Intake Manifold Pressure Sensor**

Torque: 10 Nm (88 in-lb)				
Pressure (m Hg)	Pressure (in Hg)	Pressure (kPa)	Pressure (psi)	Voltage (VDC)
0	0	0	0	0.50 to 1.00
381	15	5.2	0.75	1.50 to 1.53
435	25	9.0	1.30	1.84
549	41	14.7	2.14	2.36
1057	81	29.4	4.28	3.40
1640	100	34.5	5.00	4.23

**Intake Manifold Temperature Sensor**

Torque: 10 Nm (88 in-lb)				
Temperature (°C)	Temperature (°F)	Resistance (Ω)	Torque: 10 Nm (88 in-lb)	Resistance (Ω)
-10	14	1.78 to 2.78	10 Nm (88 in-lb)	1.78 to 2.78
0	32	1.58 to 2.18	10 Nm (88 in-lb)	1.58 to 2.18
20	68	1.44 to 2.04	10 Nm (88 in-lb)	1.44 to 2.04
40	104	1.38 to 1.98	10 Nm (88 in-lb)	1.38 to 1.98
70	158	1.4 to 2.0	10 Nm (88 in-lb)	1.4 to 2.0

**Engine Speed Sensor and Camshaft Position Sensor**

Torque = 10 Nm (88 in-lb)

**Oil Pressure Switch**

Torque = 20 Nm (174 in-lb)

**Accelerator Pedal (APS), IIS, and ABS**

- 15k validation circuit resistance
- Per OM and OVP (late status)
- IIS - Maximum closed circuit resistance less than 10 Ohms
- IIS - Maximum open circuit resistance less than 120 Ohms
- Accelerator Position Coil Resistance:
  - Between supply and return pins (ISS to 3500 Ohms)
  - Between supply and signal pins (pedal released) 1500 to 1000 Ohms
  - Between supply and signal pins (pedal depressed) 200 to 1500 Ohms

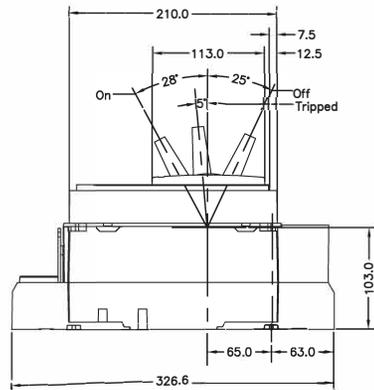
NOTE: Released resistance minus depressed resistance must be 1000 Ohms.

<p>UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS (INCHES ARE IN PARENTHESES). DIMENSIONS ARE GIVEN TO UNLESS OTHERWISE SPECIFIED.</p>	<p>UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS (INCHES ARE IN PARENTHESES). DIMENSIONS ARE GIVEN TO UNLESS OTHERWISE SPECIFIED.</p>	
<p>DATE: 10/02/05</p>	<p>DATE: 10/02/05</p>	<p>DATE: 10/02/05</p>
<p><b>KD230-300</b></p> <p><b>DIAGRAM, SCHEMATIC</b></p>		
<p>ADV-10105</p>		

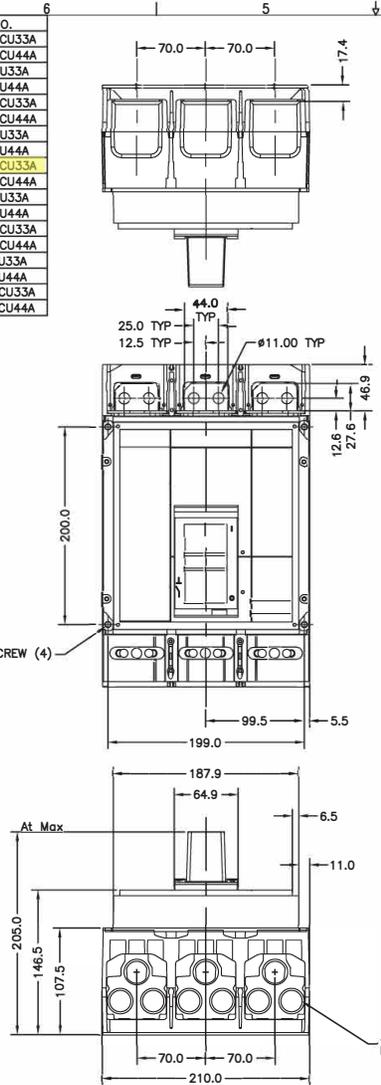
# Miscellaneous

PART NO.	REV	AMPS	% RATING	GF1	INT@480V	TRIP	VENDOR NO.
GM24181-1	C	600	100	NO	35kA	5.0 LSI	PGP36060CU33A
GM24181-2	C	600	100	YES	35kA	6.0A LSIG	PGP36060CU44A
GM24181-3	C	800	80	NO	35kA	5.0 LSI	PGP36080U33A
GM24181-4	C	800	80	YES	35kA	6.0A LSIG	PGP36080U44A
GM24181-5	C	800	100	NO	35kA	5.0 LSI	PGP36080CU33A
GM24181-6	C	800	100	YES	35kA	6.0A LSIG	PGP36080CU44A
GM24181-7	C	1000	80	NO	35kA	5.0 LSI	PGP36100U33A
GM24181-8	C	1000	80	YES	35kA	6.0A LSIG	PGP36100U44A
GM24181-9	C	1000	100	NO	35kA	5.0 LSI	PGP36100CU33A
GM24181-10	C	1000	100	YES	35kA	6.0A LSIG	PGP36100CU44A
GM24181-11	C	1200	80	NO	35kA	5.0 LSI	PGP36120U33A
GM24181-12	C	1200	80	YES	35kA	6.0A LSIG	PGP36120U44A
GM24181-13	C	1200	100	NO	35kA	5.0 LSI	PGP36120CU33A
GM24181-14	C	1200	100	YES	35kA	6.0A LSIG	PGP36120CU44A
GM24181-15	D	1200	80	NO	65kA	5.0 LSI	PJP36120U33A
GM24181-16	D	1200	80	YES	65kA	6.0A LSIG	PJP36120U44A
GM24181-17	D	1200	100	NO	65kA	5.0 LSI	PJP36120CU33A
GM24181-18	D	1200	100	YES	65kA	6.0A LSIG	PJP36120CU44A

NOTE: (4) #10-32 X 4.5 INCH MOUNTING SCREWS INCLUDED.



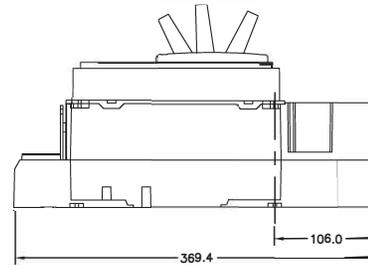
CLEARANCE FOR #10 SCREW (4)



600-800A

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

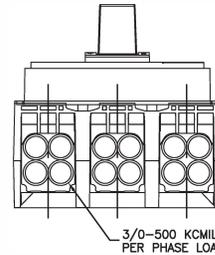
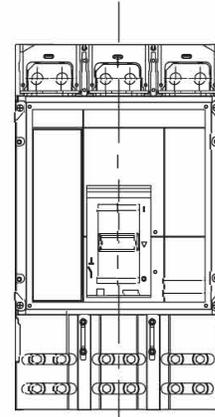
NOTE:  
THREADED BAR SUPPLIED WITH BREAKER IS USED WITH LUGS OR WHEN  
BUS BARS ARE INSTALLED WITH BOLTS INSERTED FROM THE FRONT.  
REMOVE AND DISCARD BAR WHEN BOLTS ARE INSTALLED FROM THE REAR  
OF BREAKER.



1000-1200A  
DIMENSIONS SAME AS 600-800A  
EXCEPT WHERE NOTED

METRIC CAD FILE

REV	DATE	REVISION	BY
1	3-22-02	NEW DRAWING [8634E]	MSD
A	8-12-03	(D-5) THREADED BAR NOTE ADDED [70080]	MSL
B	11-12-03	(D-7) GM24181-13 GFI: NO WAS YES [70080]	MSD
C	2-23-07	(D-3) KOHLER NOTE ADDED [78285]	GFR
D	1-10-11	(D-5) GM24181-15 THRU -18 ADDED [80647-15]	MSD



THESE CHANGES APPLIED - (1) TOLERANCES PER ASME Y14.5 UNLESS OTHERWISE SPECIFIED SURFACE FINISH R 0.8 R 1.6 UNLESS OTHERWISE SPECIFIED		<b>KOHLER CO</b> POWER SYSTEMS, KOHLER, WI 53044 U.S.A. THE COMPANY OR ITS AFFILIATES, AGENTS OR CONTRACTORS SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF THE PROJECT. ALL RIGHTS OF INVENTION ARE RESERVED.	
TITLE AND NUMBER SQUARE D P-FRAME CIRCUIT BREAKER 3 POLE ELECTRONIC TRIP		<b>BREAKER, CIRCUIT</b> PART NO. GM24181.DWG SHEET 1-1	
APPROVALS DESIGNED BY: MSD CHECKED BY: MSD DRAWN BY: A.H.	DATE 3-22-02 3-22-02 3-22-02	SCALE 1:1	PLANT USE GM24181

SQUARE D P-FRAME CIRCUIT BREAKER  
3 POLE ELECTRONIC TRIP

# 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

# 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

Effective Date: 2024-11-07

Latest Revision Date: 2025-12-03

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](http://www.bsigroup.com/ClientDirectory). Printed copies can be validated at [www.bsigroup.com/ClientDirectory](http://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

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# PROTOTYPE TEST REPORT



Models Covered: **KD250**  
Model Tested: **KD300**  
Cooling System Tested: **45C**

Alternator Tested: **KH2216TO4D**  
Engine Tested: **KD09L06T-6DDS**  
Voltage Tested: **208V**

## GENSET

**Maximum power test** to assure that the prime mover and alternator have sufficient capacity to operate within specifications.

### Meets Rated Load

**Steady-state load** test to ensure voltage stability meets or exceeds ISO8528-5 requirements and to verify compliance with steady state speed control specifications.

**±0.25** % Frequency Band                      **±0.25** % Voltage Deviation

**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. Values shown for model tested above. Please contact factory for additional details.

### Full Load Acceptance

**27.7** % Voltage Dip  
**2.62** Seconds of Recovery Time  
**10.30** % Frequency Dip  
**2.49** Seconds of Recovery Time

### Full Load Rejection

**19.3** % Voltage Overshoot  
**0.95** Seconds of Recovery Time  
**6.09** % Frequency Overshoot  
**0.55** Seconds of Recovery Time

**G3** ISO8528-5 Class (G1, G2, G3)

**NFPA 110 one step testing** to determine the amount of time required for the generator set to reach 90% voltage and frequency to allow the ATS to transfer.

**Complies with NFPA 110 Type 10**

**Vibrational analysis** to verify that generator vibrations are within acceptable limits per ISO 8528-9.  
**Complies**

**Torsional analysis** data to verify torsional effects are not detrimental and that the generator set will provide dependable service as specified.

**Complies**

**Generator set cooling and air flow tests** to verify maximum operating ambient temperature. (Cooling system test results are available on TIB-118)

**Acoustical noise intensity and sound attenuation effects tests** (Acoustical noise results are available on TIB-114 &115)

**Exhaust Back Pressure test** completed to demonstrate within engine limitation (Exhaust back pressure test results are available on TIB-119)

# PROTOTYPE TEST REPORT



Models Covered: **KD250**  
Model Tested: **KD300**  
Cooling System Tested: **45C**

Alternator Tested: **KH2216TO4D**  
Engine Tested: **KD09L06T-6DDS**  
Voltage Tested: **208V**

## ALTERNATOR

**Alternator temperature rise test** per NEMA MG1-32.6. Standby and prime ratings of the alternator are established during this test.

**Alternator overload test** per NEMA MG1-32.8. 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.

(Alternator detailed test results are available on TIB-102)

G18-611

# 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**<sup>®</sup>

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For the nearest sales/service outlet in the  
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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.

<b>Equipment Room or Weather Housing</b>			
Does Not Apply Yes	Does Not Apply Yes		
<input type="checkbox"/>	<input type="checkbox"/>	1.	Is the equipment installed in a fire-resistant room (made of non-combustible material) or in an outdoor weather housing?
<input type="checkbox"/>	<input type="checkbox"/>	2.	Is there adequate clearance between the engine and floor for service maintenance?
<input type="checkbox"/>	<input type="checkbox"/>	3.	Is there emergency lighting available at the equipment room or weather housing?
<input type="checkbox"/>	<input type="checkbox"/>	4.	Is there adequate heating for the equipment room or outdoor weather housing?
<input type="checkbox"/>	<input type="checkbox"/>	5.	Is the equipment room clean with all materials not related to the emergency power supply system removed?
<input type="checkbox"/>	<input type="checkbox"/>	6.	Is the equipment room protected with a fire protection system?
<b>Engine and Mounting</b>			
<input type="checkbox"/>	<input type="checkbox"/>	7.	Is the mounting surface(s) properly constructed and leveled?
<input type="checkbox"/>	<input type="checkbox"/>	8.	Is the mounting surface made from non-combustible material?
<input type="checkbox"/>	<input type="checkbox"/>	9.	Was the generator-to-engine alignment performed after attaching the skid to the mounting base? Generator sets with two-bearing generators require alignment.
<b>Lubrication</b>			
<input type="checkbox"/>	<input type="checkbox"/>	10.	Is the engine crankcase filled with the specified oil?
<b>Cooling and Ventilation</b>			
<input type="checkbox"/>	<input type="checkbox"/>	11.	Is the cooling system filled with the manufacturer's specified coolant/antifreeze and purged of air?
<input type="checkbox"/>	<input type="checkbox"/>	12.	Is there adequate inlet and outlet air flow (electric louvers adjusted and ventilation fan motor(s) connected to the corresponding voltage)?
<input type="checkbox"/>	<input type="checkbox"/>	13.	Is the radiator duct properly sized and connected to the air vent or louver?
<input type="checkbox"/>	<input type="checkbox"/>	14.	Are flexible sections installed in the cooling water lines?
<b>Fuel</b>			
<input type="checkbox"/>	<input type="checkbox"/>	15.	Is there an adequate/dedicated fuel supply?
<input type="checkbox"/>	<input type="checkbox"/>	16.	Are the fuel filters installed?
<input type="checkbox"/>	<input type="checkbox"/>	17.	Are the fuel tanks and piping installed in accordance with applicable codes and standards?
<input type="checkbox"/>	<input type="checkbox"/>	18.	Is there adequate fuel transfer tank pump lift capacity and is the pump motor connected to the corresponding voltage?
<input type="checkbox"/>	<input type="checkbox"/>	19.	Is the fuel transfer tank pump connected to the emergency power source?
<input type="checkbox"/>	<input type="checkbox"/>	20.	Are flexible fuel lines installed between the engine fuel inlet and fuel piping?
<input type="checkbox"/>	<input type="checkbox"/>	21.	Is the specified gas pressure available at the fuel regulator inlet?
<input type="checkbox"/>	<input type="checkbox"/>	22.	Does the gas solenoid valve function?
<input type="checkbox"/>	<input type="checkbox"/>	23.	Are the manually operated fuel and cooling water valves installed allowing manual operation or bypass of the solenoid valves?
<b>Exhaust</b>			
<input type="checkbox"/>	<input type="checkbox"/>	24.	Is the exhaust line sized per guidelines and does it have flexible connector(s)? Is the flexible connector(s) straight?
	Does Not Apply Yes		
	Does Not Apply Yes		
	Does Not Apply Yes	25.	Is there an exhaust line condensate trap with a drain installed?
	Does Not Apply Yes	26.	Is the specified silencer installed and are the hanger and mounting hardware tightened?
	Does Not Apply Yes	27.	Is a heat-isolating thimble(s) installed at points where exhaust lines pass through combustible wall(s) or partition(s)?
	Does Not Apply Yes	28.	Is the exhaust line free of excessive bends and restrictions? Is the backpressure within specifications?
	Does Not Apply Yes	29.	Is the exhaust line installed with a downward pitch toward the outside of the building?
	Does Not Apply Yes	30.	Is the exhaust line protected from entry by rain, snow, and animals?
	Does Not Apply Yes	31.	Does the exhaust system outlet location prevent entry of exhaust gases into buildings or structures?
	Does Not Apply Yes	32.	Are individuals protected from exposure to high temperature exhaust parts and are hot parts safety decals present?
<b>AC Electrical System</b>			
<input type="checkbox"/>	<input type="checkbox"/>	33.	Does the nameplate voltage/frequency of the generator set and transfer switch match normal/utility source ratings?
<input type="checkbox"/>	<input type="checkbox"/>	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?
<input type="checkbox"/>	<input type="checkbox"/>	35.	Are the load conductors, engine starting cables, battery charger cables, and remote annunciator leads installed in separate conduits?
<input type="checkbox"/>	<input type="checkbox"/>	36.	Is the battery charger AC circuit connected to the corresponding voltage?
<b>Transfer Switch, Remote Control System, Accessories</b>			
<input type="checkbox"/>	<input type="checkbox"/>	37.	Is the transfer switch mechanism free of binding? <b>Note:</b> Disconnect all AC sources and operate the transfer switch manually.
<input type="checkbox"/>	<input type="checkbox"/>	38.	Are the transfer switch AC conductors correctly connected? Verify lead designations using the appropriate wiring diagrams.
<input type="checkbox"/>	<input type="checkbox"/>	39.	Is all other wiring connected, as required?
<b>Batteries and DC Electrical System</b>			
<input type="checkbox"/>	<input type="checkbox"/>	40.	Does the battery(ies) have the specified CCA rating and voltage?
<input type="checkbox"/>	<input type="checkbox"/>	41.	Is the battery(ies) filled with electrolyte and connected to the battery charger?
<input type="checkbox"/>	<input type="checkbox"/>	42.	Are the engine starting cables connected to the battery(ies)?
<input type="checkbox"/>	<input type="checkbox"/>	43.	Do the engine starting cables have adequate length and gauge?
<input type="checkbox"/>	<input type="checkbox"/>	44.	Is the battery(ies) installed with adequate air ventilation?
<input type="checkbox"/>	<input type="checkbox"/>	45.	Are the ends of all spark plug wires properly seated onto the coil/distributor and the spark plug?
<b>Special Requirements</b>			
<input type="checkbox"/>	<input type="checkbox"/>	46.	Is the earthquake protection adequate for the equipment and support systems?
<input type="checkbox"/>	<input type="checkbox"/>	47.	Is the equipment protected from lightning damage?

## 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<br>Not<br>Yes Apply                          |  | Does<br>Not<br>Yes Apply                          |
|---|--|---|
| <input type="checkbox"/> <input type="checkbox"/> | 1.   | <input type="checkbox"/> <input type="checkbox"/> |
|   | Verify that the engine is filled with oil and the cooling system is filled with coolant/antifreeze.  | 29.   |
| <input type="checkbox"/> <input type="checkbox"/> | 2.   | <input type="checkbox"/> <input type="checkbox"/> |
|   | Prime the fuel system.   | 30.   |
| <input type="checkbox"/> <input type="checkbox"/> | 3.   | <input type="checkbox"/> <input type="checkbox"/> |
|   | 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.   |
| <input type="checkbox"/> <input type="checkbox"/> | 4.   | <input type="checkbox"/> <input type="checkbox"/> |
|   | Place the generator set master switch in the OFF/RESET position. Observe Not-in-Auto lamp and alarm, if equipped, on the controller.   | 32.   |
| <input type="checkbox"/> <input type="checkbox"/> | 5.   | <input type="checkbox"/> <input type="checkbox"/> |
|   | Press the lamp test, if equipped on controller. Do all the alarm lamps on the panel illuminate?  | 33.   |
| <input type="checkbox"/> <input type="checkbox"/> | 6.   | <input type="checkbox"/> <input type="checkbox"/> |
|   | Open the main line circuit breakers, open the safeguard breaker, and/or remove fuses connected to the generator set output leads.  | 34.   |
| <input type="checkbox"/> <input type="checkbox"/> | 7.   | <input type="checkbox"/> <input type="checkbox"/> |
|   | Turn down the speed control (electronic governor) or speed screw (mechanical governor).*   | 35.   |
| <input type="checkbox"/> <input type="checkbox"/> | 8.   | <input type="checkbox"/> <input type="checkbox"/> |
|   | Verify the presence of lube oil in the turbocharger, if equipped. See the engine and/or generator set operation manual.  | 36.   |
| <input type="checkbox"/> <input type="checkbox"/> | 9.   | <input type="checkbox"/> <input type="checkbox"/> |
|   | Place the generator set master switch in the RUN position. Allow the engine to start and run for several seconds.  | 37.   |
| <input type="checkbox"/> <input type="checkbox"/> | 10.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | Verify that the day tank, if equipped, is energized.   | 38.   |
| <input type="checkbox"/> <input type="checkbox"/> | 11.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | Place the generator set master switch in the OFF/RESET position. Check for oil, coolant, and exhaust leaks.  | 39.   |
| <input type="checkbox"/> <input type="checkbox"/> | 12.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | Turn on the water/oil heaters and fuel lift pumps.   | 40.   |
| <input type="checkbox"/> <input type="checkbox"/> | 13.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | Check the battery charger ammeter for battery charging indication.   | 41.   |
| <input type="checkbox"/> <input type="checkbox"/> | 14.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | 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.   |
| <input type="checkbox"/> <input type="checkbox"/> | 15.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | 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.   |
| <input type="checkbox"/> <input type="checkbox"/> | 16.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | If the speed is unstable, adjust according to the appropriate engine and/or governor manual.*  | 44.   |
| <input type="checkbox"/> <input type="checkbox"/> | 17.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | Adjust the AC output voltage to match the load voltage using the voltage adjusting control. See the generator set/controller operation manual.                                       | 45.   |
| <input type="checkbox"/> <input type="checkbox"/> | 18.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | Allow the engine to reach normal operating coolant temperature.  | 46.   |
| <input type="checkbox"/> <input type="checkbox"/> | 19.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | Check the operating temperature on city water-cooled models and adjust the thermostatic valve as necessary.  | 47.   |
| <input type="checkbox"/> <input type="checkbox"/> | 20.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | 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.   |
| <input type="checkbox"/> <input type="checkbox"/> | 21.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | Check the coolant level, add coolant as necessary, and replace the radiator cap. Verify that all hose clamps are tight and secure.   | 49.   |
| <input type="checkbox"/> <input type="checkbox"/> | 22.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | Place the generator set master switch in the RUN position.   | 50.   |
| <input type="checkbox"/> <input type="checkbox"/> | 23.  | <input type="checkbox"/> <input type="checkbox"/> |
|   | Verify the engine low oil pressure and high coolant temperature shutdowns.*  | 51.   |
| <input type="checkbox"/> <input type="checkbox"/> | 24.  |   |
|   | Check the overcrank shutdown.*   |   |
| <input type="checkbox"/> <input type="checkbox"/> | 25.  |   |
|   | Place the generator set master switch in the OFF/RESET position.   |   |
| <input type="checkbox"/> <input type="checkbox"/> | 26.  |   |
|   | Open the normal source circuit breaker or remove fuses to the transfer switch.   |   |
| <input type="checkbox"/> <input type="checkbox"/> | 27.  |   |
|   | Disconnect the power switching device and logic controller wire harness at the inline disconnect plug at the transfer switch.  |   |
| <input type="checkbox"/> <input type="checkbox"/> | 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.