City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

BURKE ELECTRIC
POWER GENERATION, SUBSTATIONS & HIGH VOLTAGE DISTRIBUTION

Job# 9005
Centeris Voltage Park
Puyallup, WA

☒ Submittal ☐ Transmittal

☐ For Review ☐ For Approval ☒ For Information/Records ☐ As Requested

Centeris Voltage Park and ScaleMatrix

Puyallup, Washington

See Slab Construction permits for Building, Planning and Engineering review

2500KW GENERATORS

Kohler

Record Submittal

1/25/24

City of Puyallup
Building
REVIEWED FOR COMPLIANCE
RayC
05/31/2024
5:15:23 PM

THE APPROVED CONSTRUCTION PLANS AND ALL ENGINEERING MUST BE POSTED ON THE JOB AT ALL INSPECTIONS IN A VISIBLE AND READILY ACCESSIBLE LOCATION.

Prepared and Submitted by

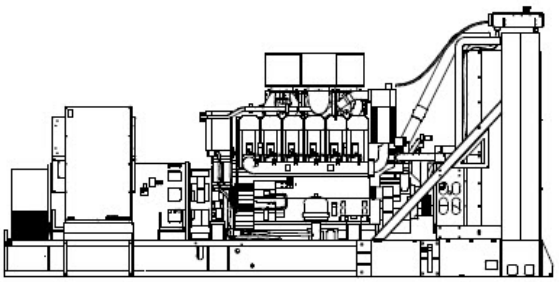
Burke Electric LLC

Separate approval by L & I is required for factory built eFRAME Enclosures. Contact L & I Factory Assembled Structures and provide verification for inspections.

Approval of submitted plans is not an approval of omissions or oversight by this office or noncompliance with any applicable regulations of local government. The contractor is responsible for making sure that the building complies with all applicable building codes and regulations of the local government.

BURKE ELECTRIC
12065 44th Place S, Tukwila, WA 98178
(425) 644-0351
Sr Project Manager: Pete Kelly
pkelly@burkeelectric.com

Generator



Kohler Model: KD2500

This diesel generator set equipped with a KH08430TO4D alternator operating at 277/480 volts is rated for 2500 kW/ 3125 kVA. Output amperage: 3759

Standard Features:

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A standard three-year or 1000-hour limited warranty for standby applications. Five-yare basic, five-year comprehensive, and ten-year extended limited warranties are also available.
- A standard two-year 8700-hour limited warranty for prime power applications.
- Tier 2 EPA-certified for Stationary Emergency Applications
- Closed Crankcase Ventilation (CCV) Filters
- Customer Connection
- Fan Bearing Grease Extension
- Fuel/Water Separator

Other Features:

- Self-ventilated and dripproof construction.
- Superior voltage waveform from two-thirds pitch windings and skewed stator.Brushless alternator with brushless pilot exciter for excellent load response.
- Kohler designed controllers for one-source system integration and remote communication.
- The low coolant level shutdown prevents overheating (standard on radiator models only).

Alternator Features:

- Generator Heater
- Local Emergency Stop Switch
- Oil Drain and Coolant Drain Extension
- Operation and Installation Literature
- Spring Isolation Under the Skid
- 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 of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.

Description

KD2500 Generator Set

Includes the following:

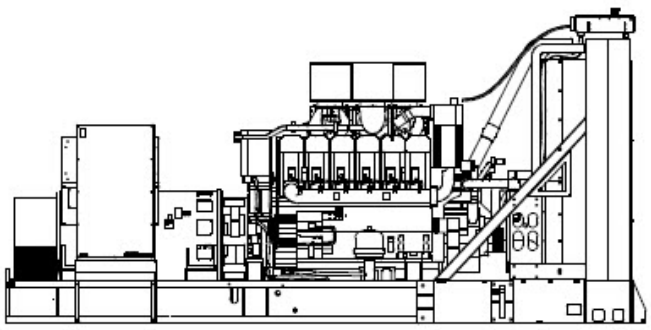
ES Smart Number 01	103RA111
ES Description 01	Dual Fuel/Water Sep w/valves
ES Smart Number 02	11AOP107
ES Description 02	RTD Bearing LS (100PT)
ES Description 03	Thermocouple Brd for RTDs
ES Smart Number 04	11AOP108
ES Description 04	RTD Winding LS (100 Ohm)
ES Smart Number 05	11MOP126
ES Description 05	80KA TVSS Surge Supprs,LV Only
Literature Languages	English
Approvals and Listings	UL2200 Listing
Engine	KD2500, 60Hz, EPA Tier 2
Engine Accessories, Installed	Redundant Electrical Starter
Nameplate Rating	Standby 130C Rise
Voltage	60Hz, 277/480V, Wye, 3Ph, 4W
Alternator	KH08430TO4D
Cooling System	Unit Mounted Radiator, 50C
Skid and Mounting	Skid
Air Intake	Standard Duty
Controller	APM603
Controller Accy, Installed	Digital I/O
Starting Aids, Installed	9000W,208V,1Ph,w/Valves
Electrical Accy.,Installed	Battery, 4/12V, AGM
Electrical Accy.,Installed	Batt. Rack & Cables
Electrical Accy.,Installed	Battery Charger, 24V-20AMP
Rating, LCB 1 Right	4000A Bus Bar
LCB Accy. Installed	Ground Fault Relay Indication
Fuel System Acc.,Installed	Fuel/Water Separator
Exceeds LTL Shipping Height	Add'l Shipping Charge Accepted
Miscellaneous Accy,Installed	Air Cleaner Restriction Ind.
Miscellaneous Accy,Installed	Coolant in Genset
Miscellaneous Accy,Installed	Oil in Genset
Miscellaneous Accy,Installed	Auto. Oil Replenishment System
Miscellaneous Accy,Installed	Centrifugal Oil Filter

Miscellaneous Accy,Installed	Air Intake Transit Cap
Warranty	Standard
Testing, Additional	Power Factor Test,0.8,3Ph Only

- 85dba Sound Enclosures w/ 48hr Sub-base Fuel Tanks
- Spring Isolators
- 4000A Breaker Assembly w/ Portable and Load Bank Connections
- Fuel Polishing System
- Fuel Consumption Monitoring

KOHLER®

KD2500
Diesel



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- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
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Other Features

- Self-ventilated and dripproof construction.
- Superior voltage waveform from two-thirds pitch windings and skewed stator.Brushless alternator with brushless pilot exciter for excellent load response.
- Kohler designed controllers for one-source system integration and remote communication.
- The low coolant level shutdown prevents overheating (standard on radiator models only).

Generator Set Ratings

Standby 130C Rise Ratings

Alternator	Voltage	Ph	Hz	Peak kVA	kW/kVA	Amps
KH08430TO4D	277/480	3	60	9908	2500 / 3125	3759

RATINGS: All three-phase units are rated at 0.8 power factor.
Standby Ratings: The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating.
Prime Power Ratings: At varying load, the number of generator set operating hours is unlimited.
A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time and continuous ratings, consult the factory.

Model: KD2500, continued

Alternator Specifications

Specifications	Alternator
Alternator manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Permanent-Magnet Pilot Exciter
Voltage regulator	Solid State, Volts/Hz
Insulation	NEMA MG1, UL 1446, Vacuum Pressure Impregnated (VPI)
Insulation: Material	Class H, Synthetic, Nonhygroscopic
Insulation: Temperature Rise	130°C, 150°C Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible disc
Amortisseur windings	Full
Rotor balancing (60Hz)	125%
Alternator winding type	< 600 Random Wound, > 600 Form Wound
Voltage regulation, no-load to full-load RMS	+/-0.25%
Unbalanced load capability	100% of Rated Standby Current

- The pilot-excited, permanent magnet (PM) alternator provides superior short-circuit capability.
- All models are brushless, rotating-field alternators.
- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Superior voltage waveform from two-thirds pitch windings and skewed stator.
- Brushless alternator with brushless pilot exciter for excellent load response.

Engine

Engine Specification

Engine Manufacturer	Kohler Diesel
Engine Model	KD62V12
Engine: type	4-Cycle, Turbocharged Intercooled
Cylinder arrangement	12-V
Displacement, L (cu. in.)	62 (3783)
Bore and stroke, mm (in.)	175 x 215 (6.89 x 8.46)
Compression ratio	16.0:1
Piston speed, m/min. (ft./min.)	774 (2539)
Main bearings: quantity, type	7, Precision Half-Shell
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	2700 (3621)
Cylinder head material	Cast Iron
Crankshaft material	Steel
Valve (exhaust) material	Steel
Governor: type, make/model	KODEC Electronic Control
Frequency regulation, no-load to-full load	Isochronous
Frequency regulation, steady state	±0.25%
Frequency	Fixed
Air cleaner type, all models	Dry

Model: KD2500, continued

Exhaust

Exhaust System

Exhaust flow at rated kW,m3/min. (cfm)	579 (20447)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	500 (932)
Maximum allowable back pressure, kPa (in. Hg)	8.5 (2.5)
Exh. outlet size at eng. hookup, mm (in.)	See ADV Drawing

Engine Electrical

Engine Electrical System

Starter motor qty. at starter motor power rating, rated voltage (DC)	Standard: 2 @ 9 kW, 24
Battery charging alternator: Ground (negative/positive)	Negative
Battery charging alternator: Volts (DC)	24
Battery charging alternator: Ampere rating	140
Quantity, CCA rating each, type (with standard starters)	4, 1110, AGM
Battery voltage (DC)	12

Fuel

Fuel System

Fuel type	Diesel
Fuel supply line, min. ID, mm (in.)	25 (1.0)
Fuel return line, min. ID, mm (in.)	19 (0.75)
Max. fuel flow, Lph (gph)	881 (232.7)
Min./max. fuel pressure at engine supply connection, kPa (in. Hg)	-30/30 (-8.8/8.8)
Max. return line restriction, kPa (in. Hg)	30 (8.9)

Lubrication

Lubrication System

Type	Full Pressure
Oil pan capacity with filter, L (qt.)	335 (354)
Oil filter: quantity, type	6, Cartridge
Oil cooler	Water-Cooled

Cooling

Radiator System

Ambient temperature, °C (°F)	50 (122)
Engine jacket water flow, Lpm (gpm)	2082 (550)
Engine jacket water capacity, L (gal.)	356 (94)
Radiator system capacity, including engine, L (gal.)	643 (170)
Charge cooler water flow, Lpm (gpm)	662 (174)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	870 (49476)
Heat rejected to charge air cooling water at rated kW, dry exhaust, Kw Btu/min.	760 (43220)
Fan diameter, including blades, mm (in.)	2434 (96)
Fan, kWm (HP)	90 (120.7)
Max. restriction of cooling air, intake and discharge side of radiator, kPA (in. H20)	0.125 (0.5)

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

Model: KD2500, continued

Air Requirements

Radiator-cooled cooling air, m3/min. (scfm) *	2549 (90000)
Cooling air required for generator set when equipped with city water cooling or remote radiator, based on 14°C (25°F) rise, m3/min. rise and ambient temp. of 29°C (85°F) m3/min. (cfm)	1116 (39398)
Combustion air, m3/min. (cfm)	208 (7345)
Heat rejected to ambient air: Engine, kW (Btu/min.)	150 (8530)
Heat rejected to ambient air: Alternator, kW (Btu/min.)	160 (9099)

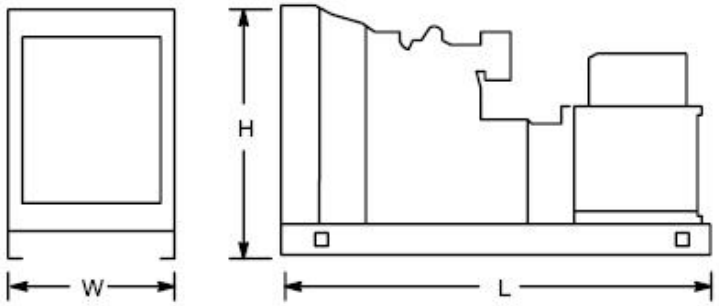
*Air density = 1.20 kg/m3 (0.075 lbm/ft3)

Fuel Consumption

Diesel, Lph (gph), at % load	Rating
Standby Fuel Consumption at 100% load	651 Lph (172.0 gph)
Standby Fuel Consumption at 75% load	572 Lph (151.0 gph)
Standby Fuel Consumption at 50% load	389 Lph (102.8 gph)
Standby Fuel Consumption at 25% load	222 Lph (58.7 gph)

Dimensions and Weights

Dim Weight Spec	Dim Weight Value
Fuel	Diesel
Engine Manufacturer	Kohler
Overall Size, L x W x H, mm (in.):	6957 x 2852 x 3307 (273.9 x 112.3 x 130.2)
Weight (radiator model), wet, kg (lb.):	27033 (59598)

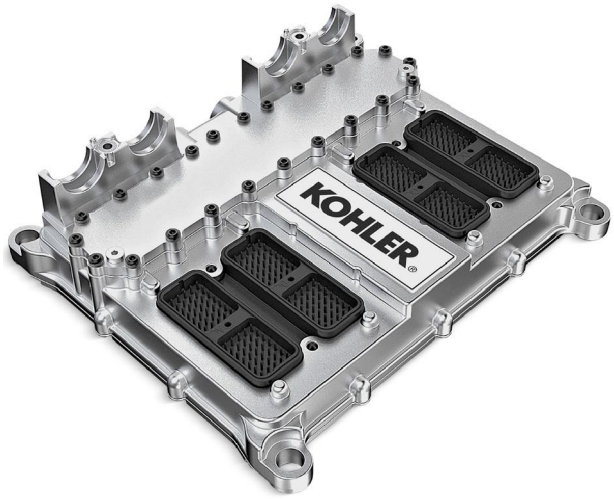


NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

KOHLER. Power Systems

800–3250 kW Industrial Generator Set Engine Control Unit (ECU)

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED



Applicable to the following:

KD800 to KD3250
KD800-YF to KD3250-YF

The ECU2-HD, rated I6K9K, can be used under harsh conditions with connected or disconnected cable harness. The control is suitable for diesel engines with up to 12 cylinders.

In a cascaded configuration, it controls up to 20 cylinders. The ECU is compatible with the common rail system found on the KD Series Kohler engine. The control unit also fulfills functional safety requirements of international safety standards. Due to the integrated diagnostics, the ECU can do self-checks, facilitating maintenance. Integrated fuel cooling ensures safe and reliable operation of the ECU.

Features

- Combined control of engine and exhaust gas treatment.
- Twelve power outputs for injector evaluation.
- Control of up to 20 cylinders in a cascaded configuration.
- Suitable for direct mounting on the engine.
- High performance, self-diagnostics for safe operation.
- Standardized communication interfaces J1939, UDS.
- Functional safety features according to EN ISO 13849.
- Temperature range from -40°C to 125°C (-40°F to 257°F).
- Reliable operation in harsh conditions.
- Platform for EU Stage IV/V, Euro V/VI, and EPA Tier 4f.

KOHLER CO., Kohler, Wisconsin 53044 USA
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the
US and Canada, phone 1-800-544-2444
KOHLERPower.com

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

Specifications and Features

Specification/Feature	
Generator Set Availability	KD800–3250
Microcontroller	Freescale SPC56xx Family
Frequency	256 MHz
Housing	Diecast aluminum
Dimensions	334 X 296 X 85.9 mm (13.1 x 11.7 x 3.4 in.) without strain relief clamp
Weight	5.4 kg (11.9 lbs.)
Rated voltage	+24 VDC
Operating temperature	–40°C to +80°C (–40°F to 176°F) with air cooling, –40°C to max +125°C (–40°F to max. 257°F) with fuel cooling
Flammability	UL 94 V–0
IP rating	IP6K9K with and without connected cable harness
Memory	4 MB Flash, 256 kB RAM internal, 4 MB RAM external (optional), 128 kB EEPROM external
Digital inputs	10 x configurable logic levels
Analog inputs	2 x configurable 0–5 V/0–25 mA, 17 x 0–5 V, 14 x 0–33 V
Resistance inputs	19 x resistance 0–50 kOhms
Frequency inputs	2 x Hall speed sensor, 8 x universal frequency measurement range 0.5 Hz to 10 kHz
Constant voltage outputs	12 x 5 V, 2 x 12 V, 11 x UBATT
Pulse Width Modulation (PWM) outputs	10 x half-bridge configuration with current measurement
Digital outputs	12 x high-side, 8 x low-side
Controlled analog outputs	1
Communication interfaces	4 x CAN according to ISO 11898-2, thereof one galvanically isolated
Power outputs for injectors	12 x split into four stages
Plug	Deutsch DRC 280 Pins (4 x 70)

DISTRIBUTED BY:

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

Generator Set Controller

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

Display, Interface, and Accessibility

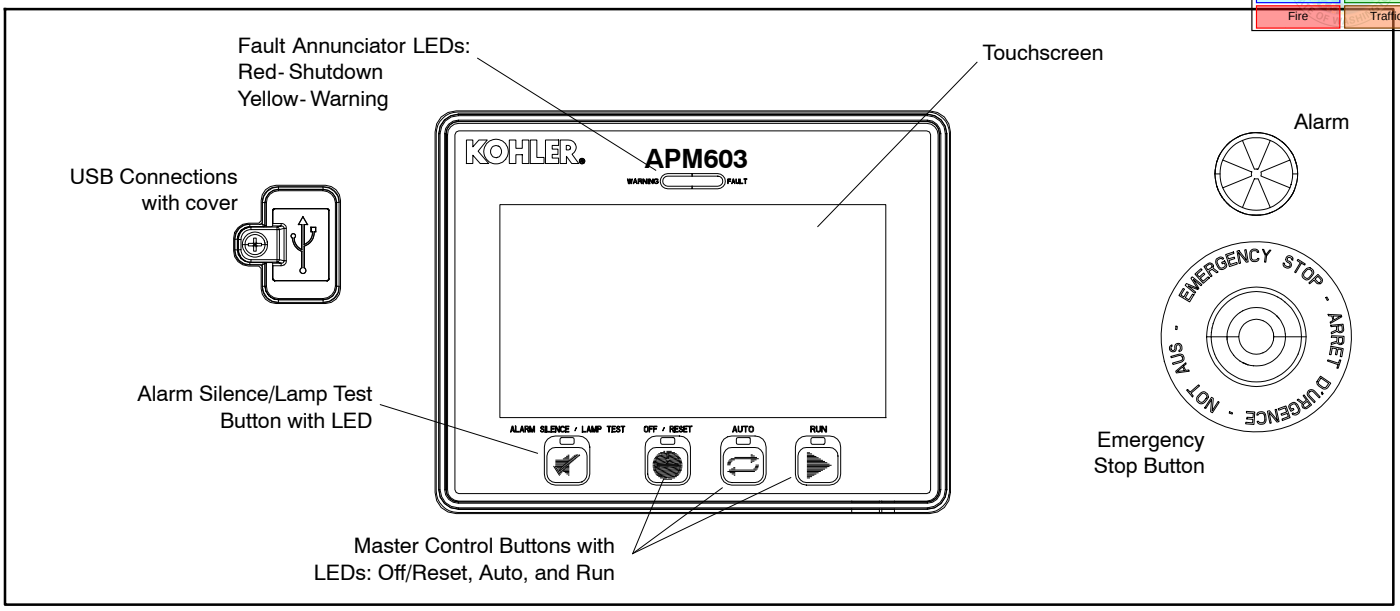
- A 7-inch color TFT touchscreen for easy local access to data.
  - Home screen can be customized to show critical data at a glance.
  - Create a custom favorites list for quick access to important data
- Measurements are selectable in metric or English units.
- Supports Modbus® protocol through serial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

Global Support

- Sales, installation, and service support from more than 800 Kohler 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



Controller Features

AC Output Voltage Regulator Adjustment	Maximum of ±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	±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 Kohler® 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

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 185°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
- Includes a maintenance mode for arc flash reduction per NEC 240.87

Load Management Features

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

Advanced Programmable I/O

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

Troubleshooting Features

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

NFPA 110 Requirements

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

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

* Function requires optional input sensors or kits and is engine dependent, see Engine Data.

Standards

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

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

Controller Functions

The controller displays warning, shutdown, and status messages. **All functions are available as relay outputs.**
Warning causes the yellow fault LED to show and sounds the alarm horn, signaling an impending problem.
Shutdown causes the red fault LED to show, sounds the alarm horn, and stops the generator set.

The controller communicates with the engine ECU and supports a large number of warning and shutdown events that are not listed here. This table highlights the items required for NFPA 110.

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

Event	Warning	Shutdown
Remote Emergency Stop Shutdown †		●
Reverse Power Shutdown †		●
Reverse VAR Shutdown †		●
Under Frequency Shutdown †		●
Under Frequency Warning	▲	
Under Voltage Shutdown (L-L, L-N, each phase) †		●
Under Voltage Warning (L-L, L-N, each phase)	▲	
Weak Cranking Battery	▲	
Status Messages		
Auto Button Pressed		
EPS Supplying Load		
Generator Running		
Generator Started		
Generator Stopped		
GFCI Warning *		
Load Shed Overload		
Load Shed Under Frequency		
Off Button Pressed		
RSA Event Programmable Digital Inputs, 1-8		
Run Button Pressed		

* Function requires optional input sensors or kits
† Items included with common fault shutdown 10

Kohler KD Engine-Powered Models
Inputs and Outputs

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

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

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

KD Engine Data

The following Kohler 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

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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 Kohler Diesel (KD) 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 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 Kohler® 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.

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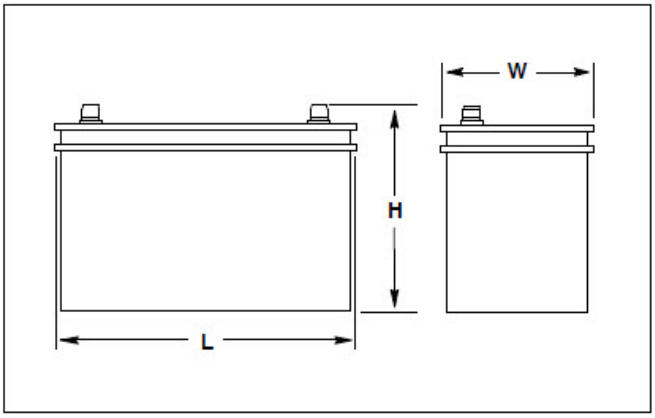
KOHLER®

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

Typical Overall Dimensions

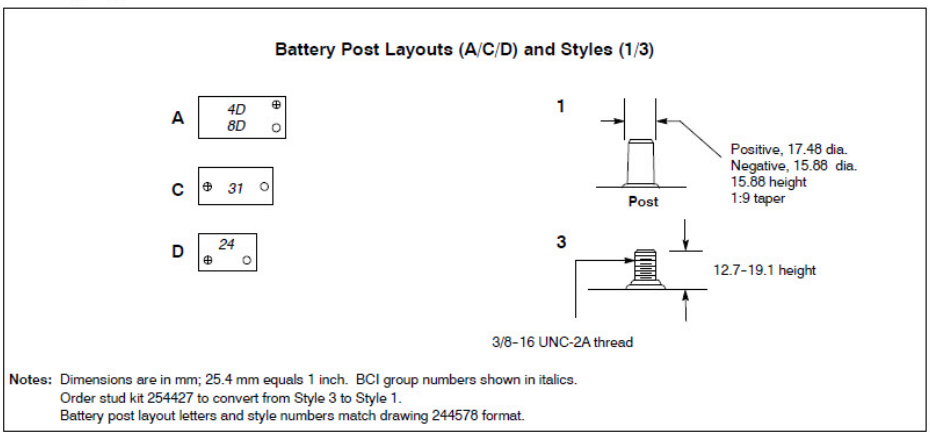


Standard Features

- Kohler Co. selects batteries to meet the engine manufacturer's specifications and to comply with NFPA requirements for engine-cranking cycles.
- Heavy-duty starting batteries are the most cost-effective means of engine cranking and provide excellent reliability in generator set applications.
- Tough polypropylene cases protect against life-shortening vibration and impact damage.
- Batteries are rated according to SAE standard J-537.
- All batteries are 12-volts. Kits that contain two or four batteries are availabe for 24-volt systems and/or systems with redundant starters.
- Wet- and dry-charged batteries have lead-calcium or lead-antimony plates and use sulferic acide electrolyte. Removable cell covers allow checking of electrolyte specific gravity.
- Absorbant glass mat (AGM) batteries are sealed and maintenance free.
- Batteries are for applications below and above 0°C (32°F).

Charge Type*	Battery Part Number	Battery Qty. per Size	BCI Group Size	Battery SAE Dimension, mm (in.)			Cold Cranking Amps at 18ºC (0ºF) Min.	Reserve Capacity Minutes at 27º (80ºF) Min.	Battery Post Layout and Style
				L	W	H			
AGM	10702001800	4	4D	527.1 (20.8)	216.0 (8.5)	258.0 (10.2)	1110	380	A/1

Battery Specifications



24V, 20A Battery Charger

Applicable to the following:
KD Model Generator Sets

Standard Features

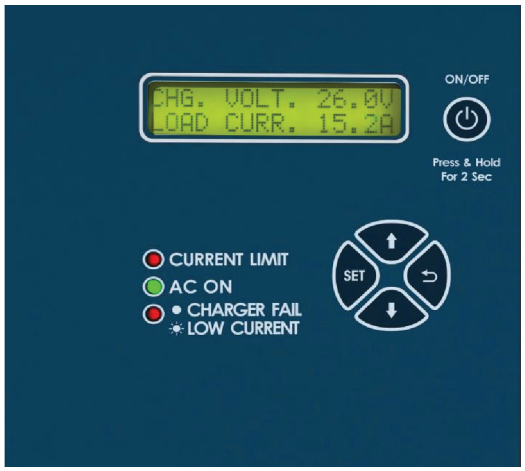
- Microprocessor Controlled High Frequency Charging Technology
- Single Phase AC Input 105- 264VAC, 45- 65Hz
- LCD Display
- Charger Failure Alarm with LED Indicator and Form “C” Dry Type Relay Contact
- Adjustable Float Voltage
- AC to DC Isolation
- Filtering Suitable for VRLA Batteries
- Internal Temperature Compensation with Disable Option
- Input and Output Fuses
- Adjustable Current Limiting
- Meets NFPA 110 and C62.41A
- UL/cUL 1236 Listed

The battery charger uses High Frequency charging technology. The battery charger incorporates Power Factor Correction Circuitry to achieve high efficiency and a wide input range.

This filtered output unit is designed and built to charge VRLA (Gel- Cell, AGM), Flooded Lead Acid, and Nickel Cadmium batteries.

The battery charger is equipped with an LCD display showing DC Volts, DC Amps, and three status LEDs. Integrated Battery Charge Divider / Isolator provides connections for charging up to three independent batteries simultaneously.

Front Panel Display



DC Output		AC Input			Shipping Weight	
Volts (Nominal)	Amps	Volts (Nominal)	Amps	Overall Dimensions W x D x H	kgs	lbs
24	20	105/264	5.0/2.45	243 x 116.1 x 403 mm 9.63 x 4.58 x 16.25 in	5.05	11.14

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Specifications

AC Input	105- 264 VAC, 45- 65 HZ, Single Phase
Nominal DC Output	20A @ 24 V
Regulation - Power Stage Only	
Line:	± 10%
Load:	<± 0.5%
Protection	
Input:	Fuse with surge and transient protection
Output:	Fuse with surge protection
	Reverse current polarity
	Short circuit protection
Thermal:	Shuts down when overheated
AC Over Voltage	
Output Current Limit	Factory set at 100%
	Adjustable from 50- 105%
Metering	LCD DC Output Digital Voltmeter and Ammeter (1%)
Adjustable Voltage Range (Per Cell)	2.15- 2.35 volts/cell (Lead)
	1.39- 1.49 volts/cell (NiCad)
Alarm Contacts	Charger Failure (Form “C” Contact for Charger Failure)
Monitoring	
LCD Display:	Volts
	Amps
LED Indications:	Current Limit (Red)
	AC ON (Green)
	Charger Fail (Red)
	Low Current (Red- Blinking)
Environmental	
Operating:	- 20°C to 50°C (- 4°F to 122°F) (Derated up to 70°C (158°F))
Storage:	- 40°C to 85°C (- 40°F to 185°F)
Relative Humidity:	0% to 95% non condensing
Enclosure	
Structural Design:	Wall Mounting / Powder coat finish
Cable Entry:	Bottom
Standards	USCG requirements
	ANSI C62- 41
	cUL
	NFPA 110

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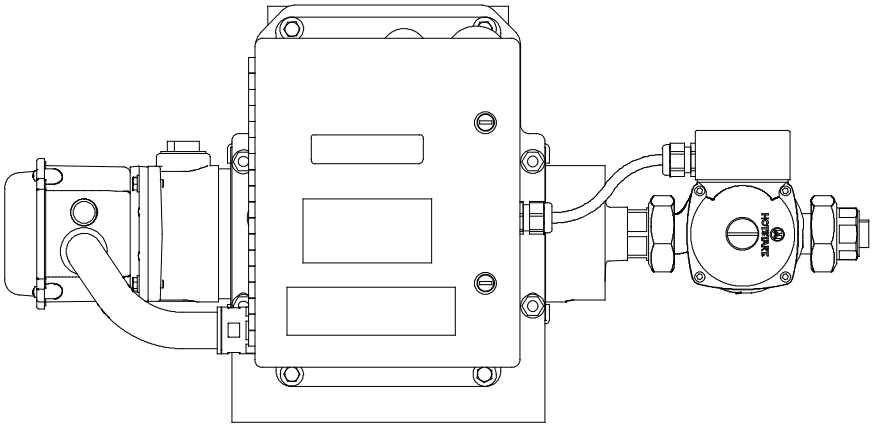
Engine Block Heater Kits



Block Heater Kit, Typical

Applicable Models

- KD800- KD1750
- KD2000- KD3250
- KD3500- KD4000

Standard Features

- UL- C/US listed (60 Hz Models) - E250789CE
- 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 has a thermostat, pump, and temperature control system. The pump circulates warm coolant into the engine and supplies constant heating to the engine. The engine block heater kit 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 49°C (120°F) and turns OFF when the engine coolant temperature reaches 60°C (140°F).

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

The engine block heater kits are available in 208 V, 240 V, 380 V, and 480 V versions.

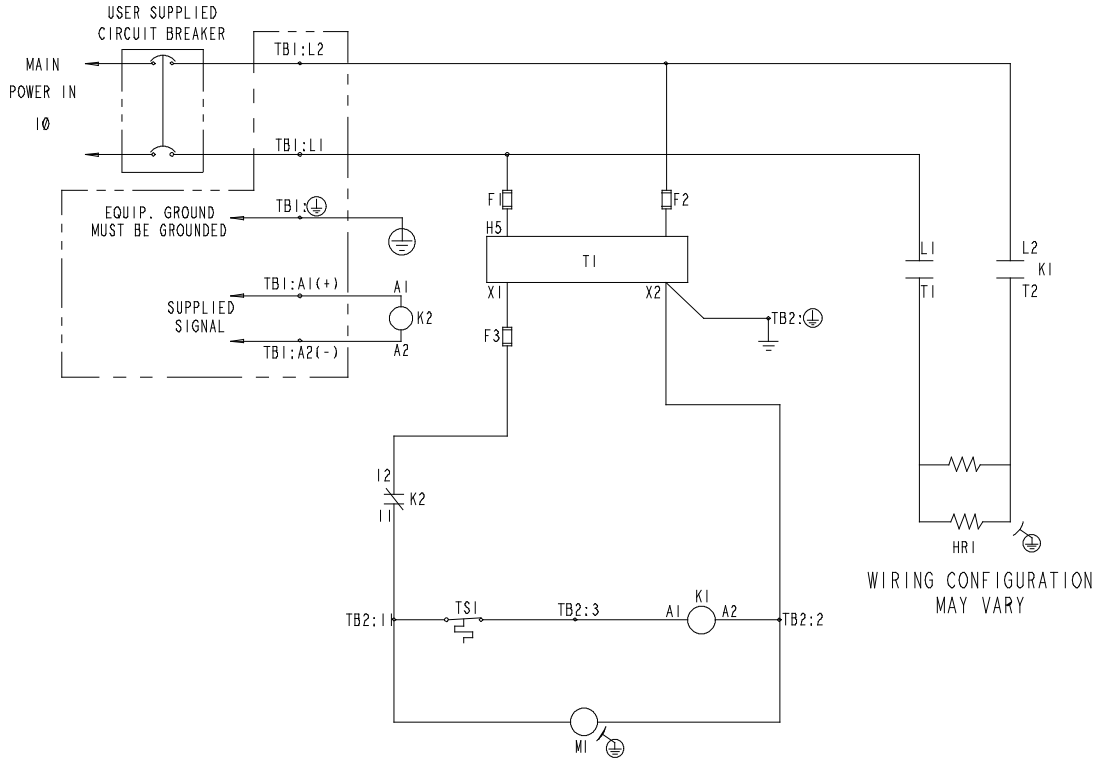
Block Heater Specifications

Heating Fluid	Engine Coolant (50% Glycol/50% Water)
Fixed Thermostat	49°- 60°C (120°- 140°F)
Flow	10 GPM (2.2m^3/hr) @ 10 ft head (3 mWc)
Pump Power	70W (50 Hz), 97W (60 Hz)
Max. Pressure	125 psi (860 kPa)
Pressure Loss	0.2 psi (1.5 kPa)
Inlet Plumbing	1.0 in NPT
Outlet Plumbing	1.0 in NPT
Main Control Box Ingress Protection	NEMA 4 (IP66)
Motor Ingress Protection	IP44 (50 Hz), NEMA 2 (60 Hz)

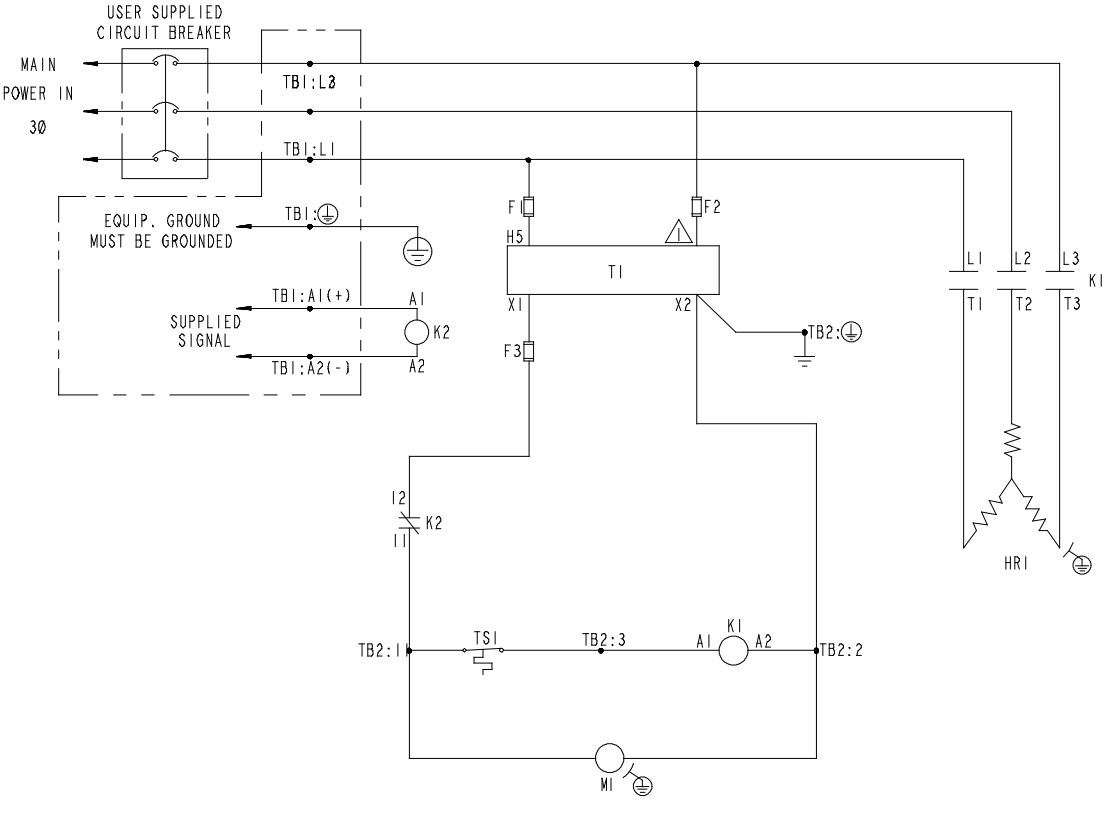
Specifications

Block Heater Kit Number	Component	Watts	Voltage	Phase
10305000145- KA1	10305000200	6000	480	3
10305000145- KA2	10305000300	6000	240	1
10305000145- KA3	10305000400	6000	480	1
10305000145- KA4	10305000500	6000	240	3
10305000145- KA5	10305000600	6000	380	3
10305000145- KA6	10305000700	6000	208	1
10305000145- KA7	10305003100	6000	208	3
10305001400- KA1	10305001500	9000	480	3
10305001400- KA2	10305001600	9000	240	1
10305001400- KA3	10305001700	9000	480	1
10305001400- KA4	10305001800	9000	240	3
10305001400- KA5	10305001900	9000	380	3
10305001400- KA6	10305002000	9000	208	1
10305001400- KA7	10305003300	9000	208	3
10305002800- KA1	10305001800	9000	240	3
10305002800- KA2	10305001500	9000	480	3
10305002800- KA3	10305001600	9000	240	1
10305002800- KA4	10305001700	9000	480	1
10305002800- KA5	10305001900	9000	380	3
10305002800- KA6	10305002000	9000	208	1
10305002800- KA7	10305003300	9000	208	3
10305003501- KA1	10305001500	9000	480	3
10305003501- KA2	10305001600	9000	240	1
10305003501- KA3	10305001700	9000	480	1
10305003501- KA4	10305001800	9000	240	3
10305003501- KA5	10305001900	9000	380	3
10305003501- KA6	10305002000	9000	208	1
10305003501- KA7	10305003300	9000	208	3
10305003601- KA1	10305003804	12000	240	3
10305003601- KA2	10305003807	12000	480	3
10305003601- KA3	10305003803	12000	240	1
10305003601- KA4	10305003806	12000	480	1
10305003601- KA5	10305003805	12000	380	3
10305003601- KA6	10305003801	10500	208	1
10305003601- KA7	10305003802	12000	208	3
10305004001- KA1	10305003804	12000	240	3
10305004001- KA2	10305003807	12000	480	3
10305004001- KA3	10305003803	12000	240	1
10305004001- KA4	10305003806	12000	480	1
10305004001- KA5	10305003801	10500	208	1
10305004001- KA6	10305003802	12000	208	3

Wiring Diagram



1 PHASE



3 PHASE

GM62498V-4

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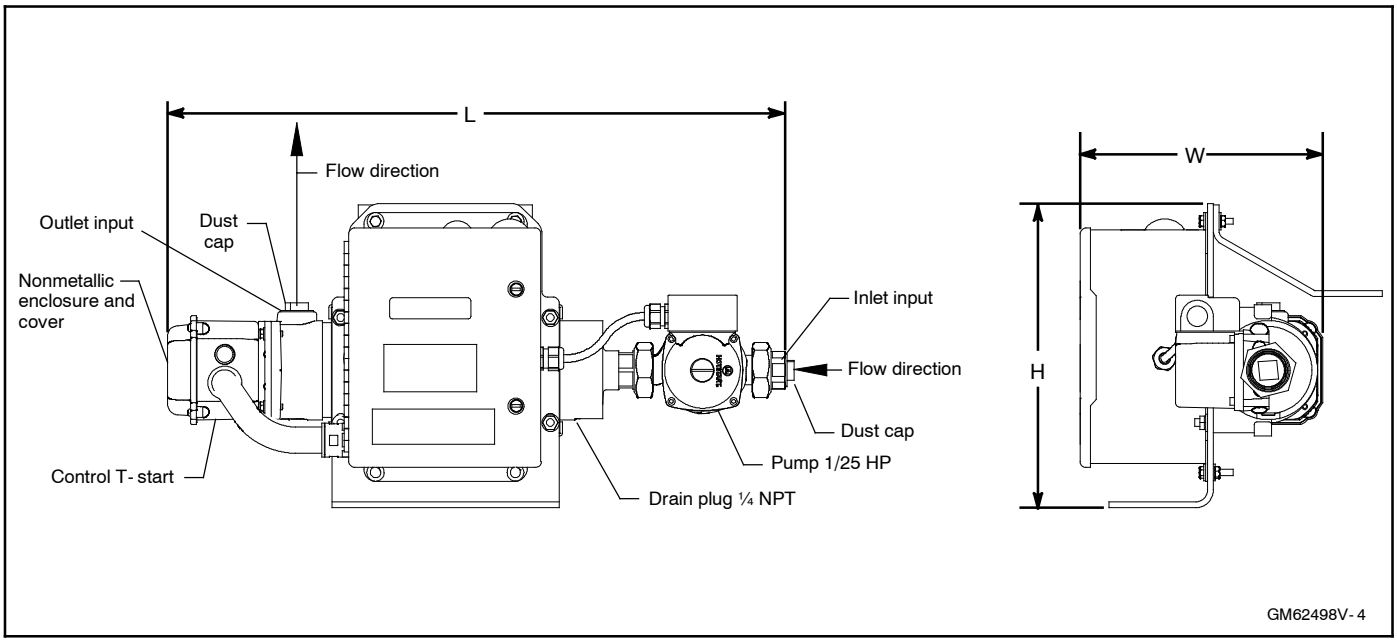
Dimensions and Weights

Overall Size, L x W x H, mm (in): 674 x 264 x 330 (26.53 x 10.4 x 12.9)
Weight, wet, kg (lb): 16.8 (37)



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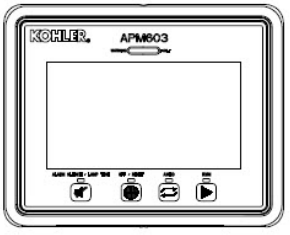
KOHLER®

Integral Voltage Regulator with Kohler® APM603 Controllers and Menu-Driven Selections (80-4000 kW Generator Set Models)



APM603 Controller with Integral Voltage Regulator

The voltage regulator is integral to the controller and uses patented high speed digital voltage regulator design providing ±0.25% no-load to full-load regulation using root-mean-square (RMS) voltage sensing.

Voltage Regulators

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.

Integral Voltage Regulators with APM603

Calibration	Range Settings	Default Selection
Voltage Adjustment	±10% of System Voltage	System Voltage
Controller Gain	40 to 70 Hz	P: 1.3 I: 1.0 D: 0.25
Underfrequency Unload or Frequency Setpoint	40 to 70 Hz	0.5 Hz Below System Frequency (ECM)
Underfrequency Unload Scope	0-10% of Rated Voltage (Volts per Cycle)	15 Volts per Cycle at 480 Volts (3.1%)
Reactive Dropp	0-10% of System Voltage	4% of System Voltage
VAR Control	-50% to 110%	0 kVAR
PF Adjust Control	-0.50 to 1.0 to 0.50	0.8 Lagging
VAR/PF Gain Adjustment	P: 0.3 to 3.00 I: 0.3 to 3.00 D: 0.3 to 3.00	P: 1.0 I: 1.0 D: 0.25

KOHLER®

Specification/Feature	Integral with APM603
Generator Set Availability	80-4000 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	100-600 Volts (L-L), 50-60 Hz
Sensing Mode	RMS, Single- or 3-Phase
Input Requirements	8-36 VDC
Continuous Output	5.0 ADC with GM88453 Activator Board
Maximum Output	7.8 ADC with GM88453 Activator Board
Transition Frequency	50-70 Hz
Exciter Field Resistance	4-30 Ohms with GM88453 Activator Board
No-Load to Full-Load Voltage Regulation	±0.25%
Thermal Drift	<0.5% (-40°C to 70°C) [-40°F to 158°F] Range
Response Time	3-phase: 1 mS 1-phase: 5 mS
System Voltage Adjust.	±10%
Voltage Adjustment	Controller Display
Remote Voltage Adjustment	Analog 0-5 VDC (±10%) Input Optional
Paralleling Capability	Full Load Share and Control plus Reactive Droop
VAR/PF Control Input	VAR Control Mode, PF Control Mode, System VAR Control, System PF Control

Integral Voltage Regulator with APM603 Controller

- A 7.5-inch color TFT touchscreen provides access to data.
- The controller provides an interface between the generator set and switchgear for paralleling applications incorporating multiple generator set and/or utility feeds.
- The controller can control Fast Response™ II, Fast Responset™X, and PMG alternators using the GM88453 activator board.

Voltage Regulator Settings, APM603 Controller

- Voltage Regulator Configuration
  - Under Frequency Unload Settings
  - Single and Three Phase Sensing
  - Voltage Target
  - Voltage Regulator Gains

Paralleling Settings, APM603

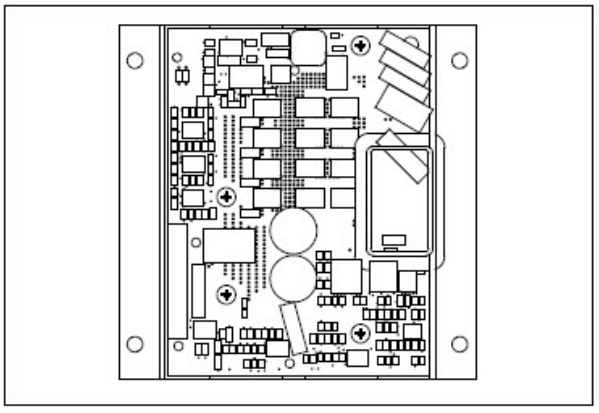
- Synchronizing parameters setup
  - Voltage matching
  - Frequency matching
  - Phase matching
  - Time delay

- Load sharing
  - kW sharing
  - kVAR sharing
  - Baseload settings
  - Droop

Paralleling Metering, APM603

- Paralleling State
  - Paralleling Mode
  - System Voltage
  - System Frequency
  - Connected Generators
  - Sync Status
  - Engine Speed

Activator Board GM88453



- 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.

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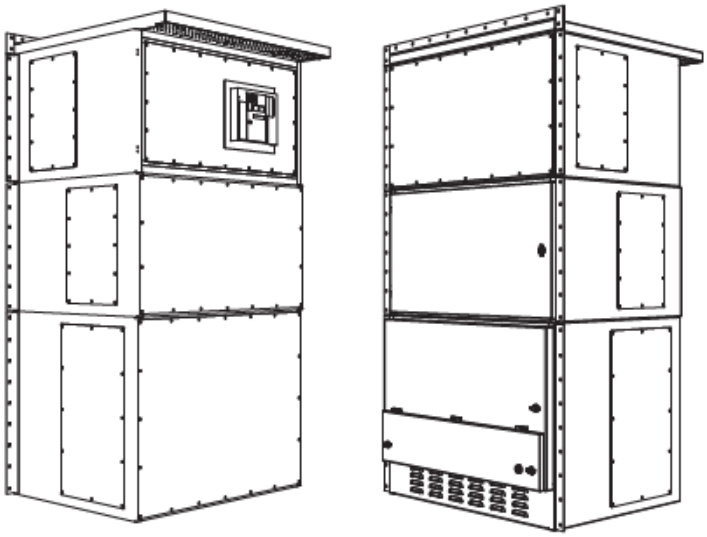
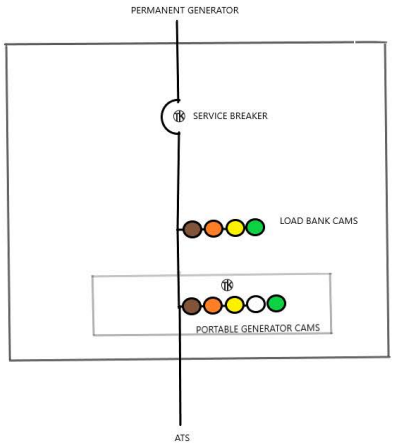
4000A DUAL PURPOSE FLANGED SERVICE QUICK CONNECT PAD MOUNT

QCPM40H2MFTKASER40FLG

480/277V 3 PH
4000A DUAL PURPOSE FLANGED
QUICK CONNECT PAD MOUNT WITH
SERVICE BREAKER AND
TRAPPED KEY INTERLOCK





Material: Nema 3RX Powder Coated Aluminum Texture ANSI Grey Corrosion Resistant

Description: 000A Dual Purpose Flanged Modular Pad Mount Quick Connect
000A 3 Pole LSIG Ser ice tilit Breaker with ERMS and Trapped e Interlock (Breaker Facing Inside of Gen)
Male Cam Lok Inputs with Trapped e Access
Pad Lockable and Tamper Resistant While in Use
Female Load Bank Cam-Loks with Flip Covers and Pad Locka le oor
kA Plated Copper Smart T Slot Buss with Mechanical Lugs
Phase Rotation Monitor
Feed Through Lugs
Load Dump Receptacle
Castell ero Maintenance Trapped e Interlock Lock (Located on Male Cam Access oor)
Castell ero Maintenance Trapped e Interlock FS Lock (Located on the Ser ice Breaker)
Side and Back Access Plates
Flow Through Bottom to Top Air Circulation
cETLus Listed Conforms to L ST

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CL 16 Series Bus Bar Mount Receptacle (400A / 600V) Female Offset - Black (A)
Part # CL40FR-OFFSET-A

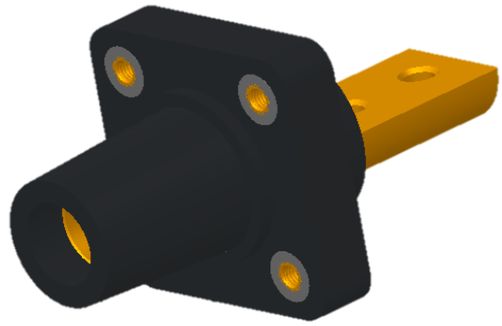
CL 16 Series Bus Bar Mount Inlet (400A / 600V) Male Offset - Black (A)
Part # CL40MR-OFFSET-A

product specifications for:

CLS 40 Panel Mounts

Item #: CLS40FRB-BB2

Description
CAM CLS 40 Two hole bus bar 5/16"-18 thread Female Panel Mount



Electrical Specifications
Max. Amperage: 400A
Max. Voltage: 600V AC/DC

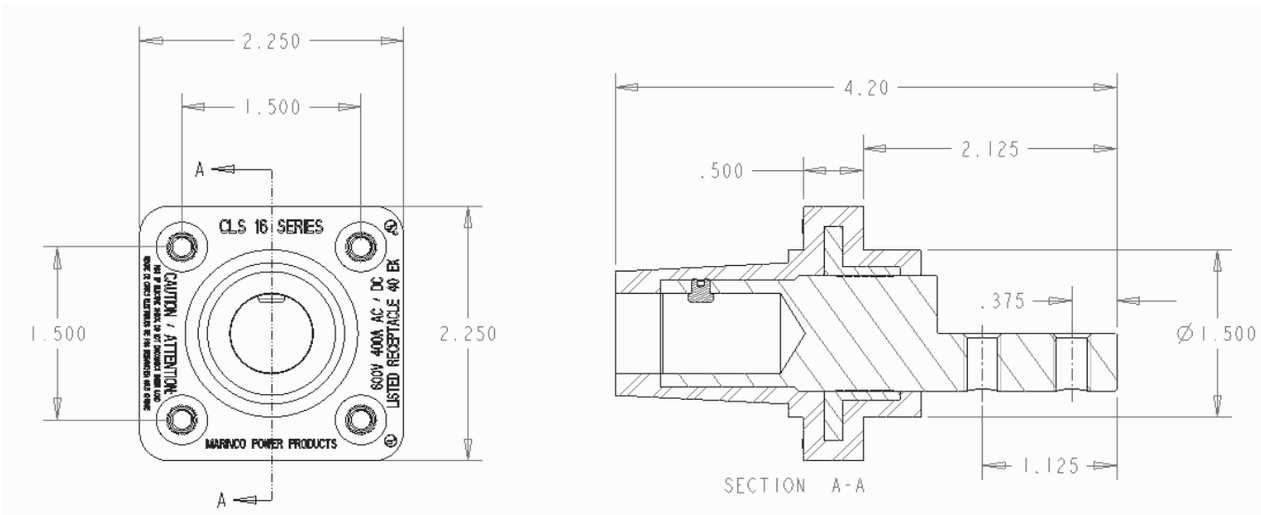
Material Specifications
Housing Material: Santoprene TPV
Contact Material: One piece solid Brass
Temperature Rating: -40°C to 105°C

Mechanical Specification
Gender: Female
Connection Type: Two holes 5/16"-18 thread bus bar
(Torque to 100 in.-lbs., do not over tighten)
Mounting: Brass eyelet for #10-32 through bolt
(Bolts Not Provided)

Standards and Certifications
UL Listed: File E471676
CSA Certified: 0812900000
Environmental Rating: Type 3R & 4

Example: **CLS40FRB-BB2 +** **A** **= CLS40FRB-BB2-A**

A B C D E F G H



MARINCO power products

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product specifications for:

Cam Protective Covers

Item #: CLL3RN

Description
CAM NEMA 3R Enclosure with Gasket

Material Specifications
Housing Material: UV Resistant Polycarbonate
Spring & Hinge Material: Stainless Steel
Temperature Rating: 90°C

Mechanical Specification
Fits 16 and 18 Series Panel Mounts (Male and Female)
Use #8 Plastite Screw or #10-32 Screw for Mounting (not provided)

Standards and Certifications
UL Listed: File E471676
Environmental Rating: Type 3R

c UL us LISTED

Example: **CLL3RN +** **A** **= CLL3RN-A**

A	B	C	D	E	F	G	H	Z
CLEAR								

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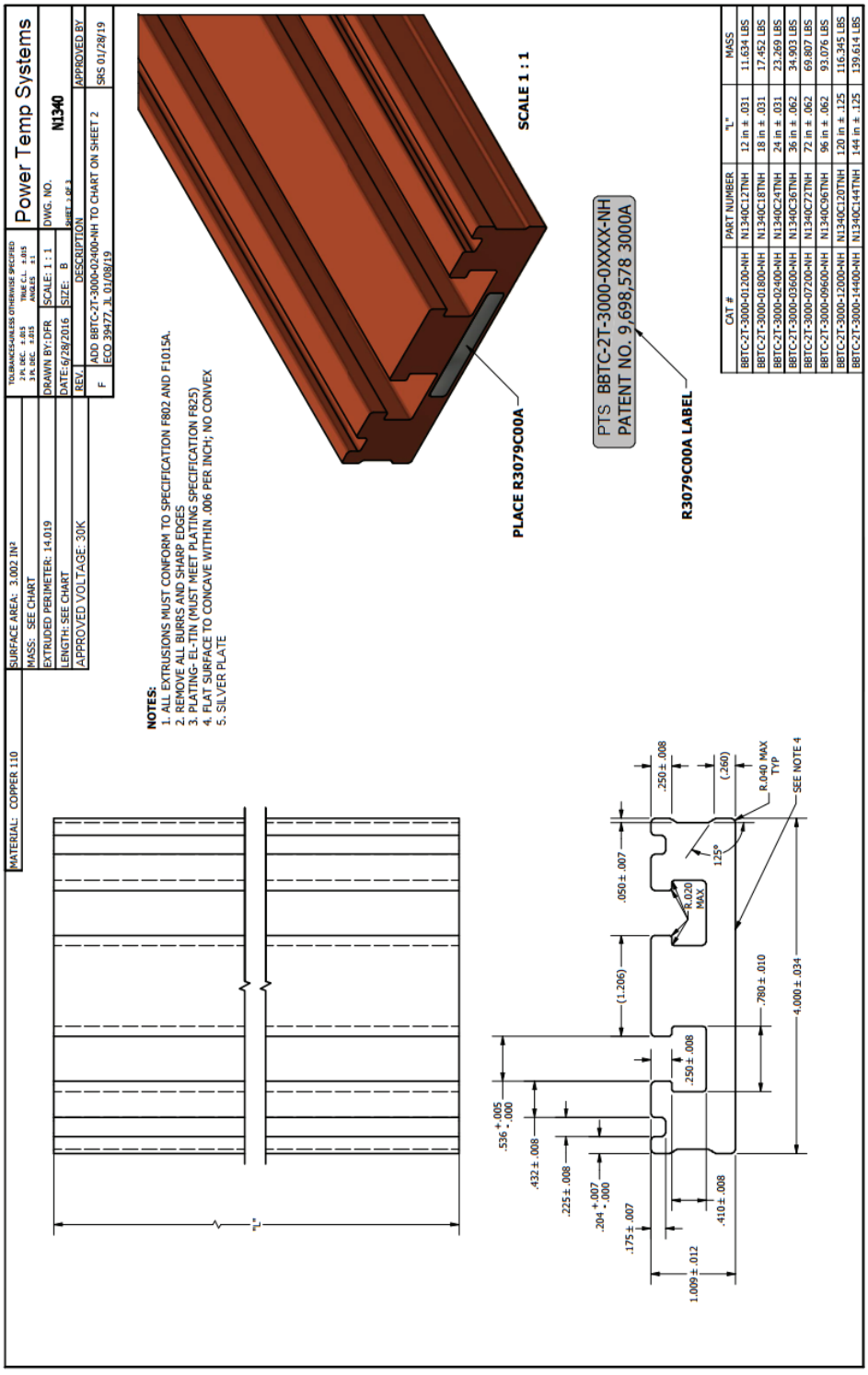
SMART T-SLOT BUSS - 100 KA SILVER PLATED COPPER



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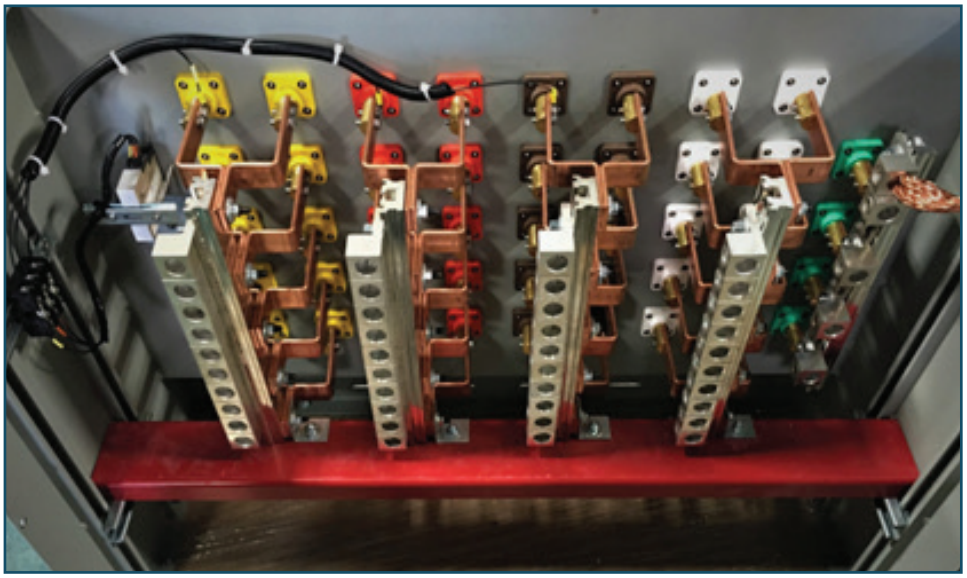
SMART BUSS SYSTEM

- Heat Dissipation Jumpers
- T-Slot Adjustable Plated Copper Main Buss
- 100 kAIC Rated



1646 Rankin Road. Suite 300 | Houston, TX 77073 | Office 281.286.3303 | Fax 281.286.3393 | www.powertemp.com

power temp systems INC.
WE PUT THE POWER WHERE YOU NEED IT™

Product data sheet
Characteristics

RM17TG00
phase control relay RM17-T range 183..528 V AC

Main

Range of product	Zelio Control
Product or component type	Modular measurement and control relays
Relay type	Control relay
Product specific application	For 3-phase supply
Relay name	RM17TG
Relay monitored parameters	Phase sequence Phase failure detection
Time delay	Without
Switching capacity in VA	1250 VA
Measurement range	208...480 V voltage AC

Complementary

Maximum switching voltage	250 V AC 250 V DC
Minimum switching current	10 mA 5 V DC
Supply voltage limits	183…528 V AC
Control circuit voltage limits	- 12 % + 10 % Un
Power consumption in VA	0…22 VA 400 V AC 50 Hz
Voltage detection threshold	< 100 V AC
Control circuit frequency	50...60 Hz +/- 10 %
Output contacts	1 C/O
Nominal output current	5 A
Measurement voltage limits	183…528 V AC
Delay at power up	650 ms
Voltage range	183...528 V
Response time	<= 130 ms in the event of a fault)
Marking	CE
Overvoltage category	III IEC 60664-1
Insulation resistance	> 500 MOhm 500 V DC IEC 60255-5 > 500 MOhm 500 V DC IEC 60664-1
[Ui] rated insulation voltage	400 V IEC 60664-1
Supply frequency	50/60 Hz +/- 10 %
Operating position	Any position without
Connections - terminals	Screw terminals, 1 x 0.5...1 x 4 mm² AWG 20...AWG 11) solid without cable end Screw terminals, 2 x 0.5...2 x 2.5 mm² AWG 20...AWG 14) solid without cable end Screw terminals, 1 x 0.2...1 x 2.5 mm² AWG 24...AWG 12) flexible with cable end Screw terminals, 2 x 0.2...2 x 1.5 mm² AWG 24...AWG 16) flexible with cable end
Tightening torque	5.31…8.85 lbf.in (0.6…1 N.m) IEC 60947-1
Housing material	Self-extinguishing plastic
Local signalling	Relay ON LED yellow)
Mounting support	35 mm symmetrical DIN rail EN/IEC 60715
Electrical durability	100000 cycles
Mechanical durability	30000000 cycles
Operating rate	<= 360 operations/hour full load

LEVITON®

7535

15 Amp, 125-Volt, 2-Pole, 2-Wire, Nema L1-15R, Non-Grounding, Single Receptacle - BLACK

Leviton's Industrial Grade Locking Devices are built to provide unparalleled quality and superior performance in the most severe industrial settings. Leviton combines the best materials available with superior production standards to produce a broad selection of Locking Devices of unmatched flexibility and dependability.

UPC Code : 078477835692

Country Of Origin : Please Contact Customer Service.

NEMA :  L1-15R

Technical Information

Electrical Specifications

Amperage : 15 A

Current Interrupting : Certified for current interrupting at full rated current

Dielectric Voltage : Withstands 2000V per UL498

Grounding : Non-Grounding

Pole : 2

Temperature Rise : Max 30C after 250 cycles OL at 200 percent rated current

Voltage : 125 VAC

Wire : 2

Environmental Specifications

Environment : Dry

Operating Temperature : -40°C to 75°C

Material Specifications

Base Material : RTP

Clamp Nuts : Brass

Color : Black

Contact - Spring Value : .031" Brass

Cover Material : Nylon

Ground Contacts : Brass

Grounding Screw : Brass

Mounting Screws : Zinc-Plated Steel 8-32

Strap Material : Zinc-Plated Steel

Terminal Screws : Brass 8-32

Mechanical Specifications

Product ID : Ratings are permanently marked on device

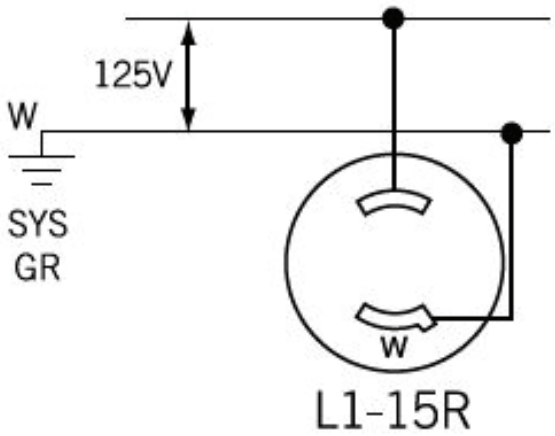
Terminal Accom. : 18-10 AWG

Terminal ID : Brass-Hot, Silver-Neutral

Product Features

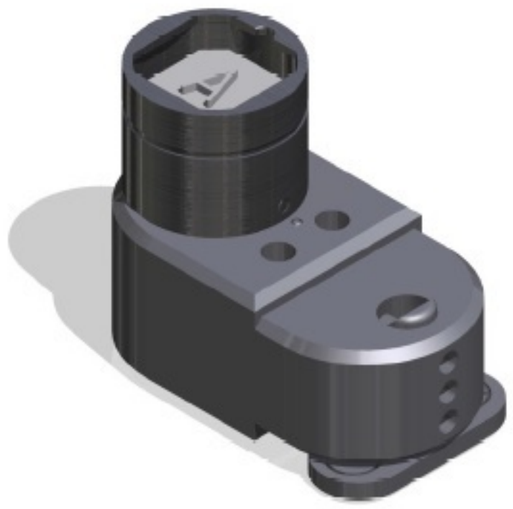
Color : Black

NEMA : L1-15R



D Panel Door Interlock

User Manual - Original Language Version



D-FSS-RE-STD-2 (Form 2)

The D type lock is a two-part interlock, comprising of a lock body and rear or front entry mounted catch. Typically, the D lock is used for interlocking electrical control cubicles and distribution panels. It is also suitable for use on light access doors or hatches. The catch is available in two options, one suited to well aligned doors, the other suited to poor, misaligned doors. The D lock is available as F style (figure style) or Q style of lock portions.The lock is manufactured in brass or stainless steel making it ideal for use in harsh or corrosive environments.

Operation

The D lock range is used for interlocking electrical control cubicles and distribution panels.

D Panel Door Interlock, Form 2

① **Key is free, catch is trapped**

② **Insert and turn key to release catch**

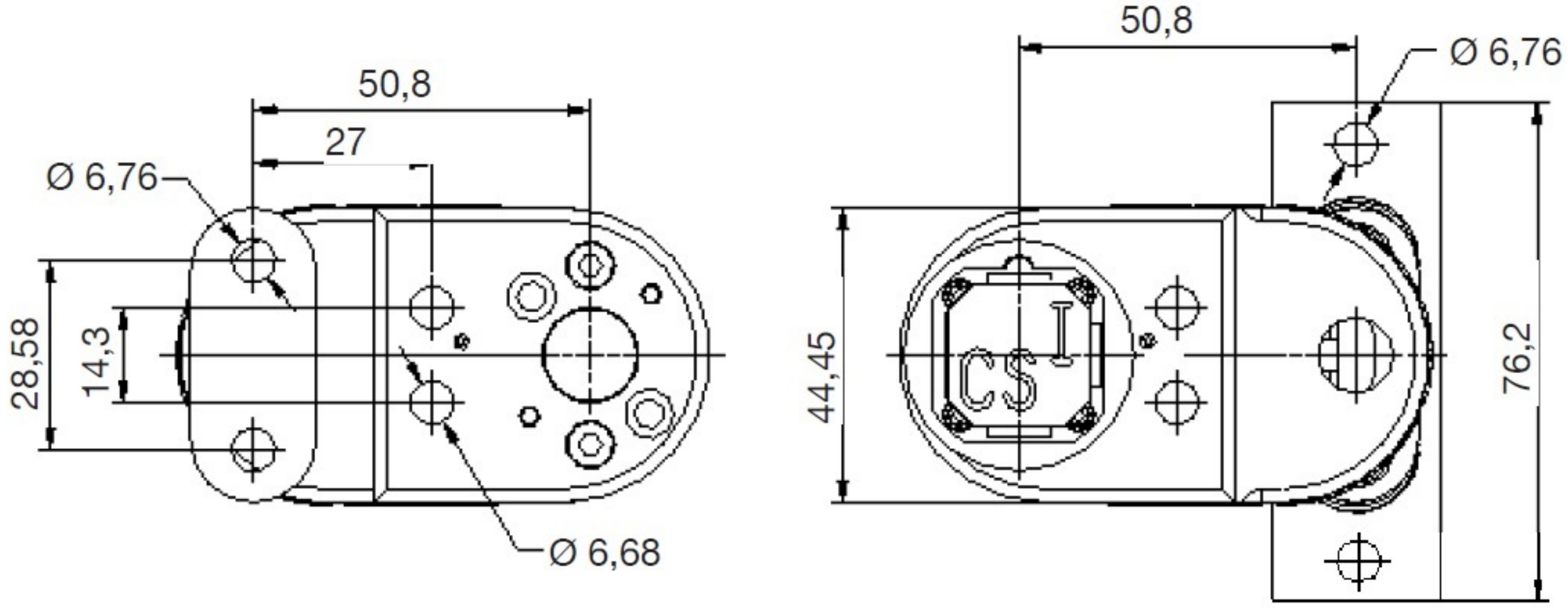
③ **Key is trapped, catch is free**

1. **While the catch is trapped, the key is free. The mechanism is locked keeping the door locked closed.**
2. **By inserting and turning the key in the D lock, you can release the catch. This will trap the key into the lock.**
3. **The key stays trapped while the catch is released and door opened.**

Drawing

Dimensions:
in mm

Note: *For safe mounting, use security screws*

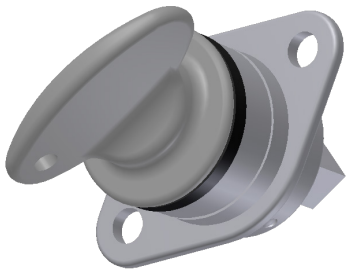


FS/Q

Switchgear Interlock

User Manual - Original Language Version

Castell



F1S-ACW-65-9.5-22

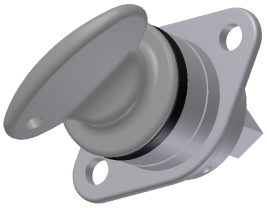
The FS and Q Interlocks are designed for use as a mechanical interlock for electrical switchgear. This is done through a mechanical connection to the isolation equipment. The standard unit is fitted with a 9.5mm square x 22mm spigot that can be used to operate an isolator. Inserting and turning the key moves the spigot through a predetermined angular position (45°/65°/90° clock or anti clock wise) moving the isolator to closed. Rotating the key in the opposite direction will open the isolator and will release the key. The free key can then be transferred to operate a parallel supply stream or an access interlock. The FS and Q locks are manufactured in brass or stainless steel making it ideal for harsh or corrosive environments.

Operation

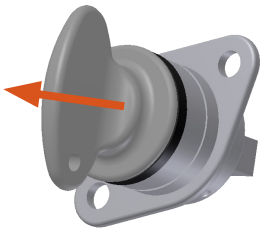
The FS/Q switchgear interlocks are designed to control the operation of HV/LV switchgear.

FS/Q switchgear interlock

1. **Key is trapped, HV/LV circuit is closed.**



2. **Turn and release key to open the HV/LV circuit.**



3. **Key is free and the HV/LV circuit is open.**

1. **While the key is trapped, the isolator is closed providing the power supply.**
2. **Turning the key opens the isolator. The key can then be released.**
3. **The free key can be used to operate either a parallel supply stream or an access interlock.**

The FS/Q switchgear interlocks are available in a 45° clockwise or in a 45° anti clockwise mounting position.
A set range of rotational movement and spigot lengths are available (see page 5 for ordering details).

Product data sheet
Characteristics

LV848543SP
OFF position locking - Castell adaptation kit + padlock - for MTZ2/MTZ3 - sp

Main

Range	Masterpact
Product or component type	Locking kit
Locking position	In off position
Accessory / separate part category	Locking accessory
Range compatibility	Masterpact MTZ2 Masterpact MTZ3
Device short name	Adaptation kit

Complementary

Keylock destination	Switch disconnector Circuit breaker
Type of keylock	Castell
Key locking position	Off
Locking options description	Without keylocks
Provided equipment	1 instruction sheet
Offer type	Spare part

Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Weight	375 G
Package 1 Height	12.4 Cm
Package 1 width	12.4 Cm
Package 1 Length	12.4 Cm
Unit Type of Package 2	S04
Number of Units in Package 2	24
Package 2 Weight	9.5 Kg
Package 2 Height	30 Cm
Package 2 width	40 Cm
Package 2 Length	60 Cm

Offer Sustainability

REACh Regulation	REACh Declaration
EU RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS Declaration

Contractual warranty

Warranty	18 months

Product Life Status : Commercialised

MasterPact MTZ Molded Case Circuit Breakers

		MasterPact MTZ1 800–1600 A					MasterPact MTZ2 800–6000 A				MasterPact MTZ3 4000–6000 A			
														
Circuit Breaker Type		MTZ1-N	MTZ1-H	MTZ1-L1	MTZ1-L	MTZ1-LF *[55]*	MTZ2-N	MTZ2-H	MTZ2-L	MTZ2-LF *[55]*	MTZ2-H	MTZ2-L	MTZ3-H	MTZ3-L
Number of Poles		3 , 4	3, 4	3	3	3	3 , 4	3, 4	3	3	3 , 4	3	3 , 4	3
Current Range		400–1200	400–1200	400–1200	400–1200	400–1200	400–2000	400–2000	400–2000	400–2000	1200–3000	1200–3000	2000–6000	2000–6000
Interrupting Ratings														
UL/CSA Rating (kA RMS) (50/60 Hz)	240 Vac	50	65	100	200	200	65	100	200	200	100	200	100	200
	480Y/277 Vac	50	50	65	100	100	65	100	150	150	100	150	100	150
	480 Vac	50	50	65	100	100	65	100	150	150	100	150	100	150
	600Y/347 Vac	35	50	—	—	—	50	85	100	100	85	100	85	100
	600 Vac	35	50	—	—	—	50	85	100	100	85	100	85	100
DC Ratings	250 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
	500 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
IEC *[56]* (kA RMS) Icu/ Ics	240 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—
	415 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—
Special Ratings														
CCC		—	—	—	—	—	—	—	—	—	—	—	—	—
Fed. Specs W-C-375B/GEN		—	—	—	—	—	—	—	—	—	—	—	—	—
HACR (2P, 3P)		—	—	—	—	—	—	—	—	—	—	—	—	—
Connections/Terminations														
Unit Mount		X	X	X	X	X	X	X	X	X	X	X	X	X
I-Line™		—	—	—	—	—	—	—	—	—	—	—	—	—
Rear Connection		X	X	X	X	X	X	X	X	X	X	X	X	X
Drawout		X	X	X	X	X	X	X	X	X	X	X	X	X
Optional Lugs		—	—	—	—	—	—	—	—	—	—	—	—	—
Accessories and Modifications														
Shunt Trip		X	X	X	X	X	X	X	X	X	X	X	X	X
Undervoltage Trip		X	X	X	X	X	X	X	X	X	X	X	X	X
Auxiliary Switches		X	X	X	X	X	X	X	X	X	X	X	X	X
Alarm Switch		X	X	X	X	X	X	X	X	X	X	X	X	X
Motor Operator		X	X	X	X	X	X	X	X	X	X	X	X	X
Handle Operators		—	—	—	—	—	—	—	—	—	—	—	—	—
Mechanical Interlocks		X	X	X	X	X	X	X	X	X	X	X	X	X
Padlock Attachment		X	X	X	X	X	X	X	X	X	X	X	X	X
Optional GF Protection		X	X	X	X	X	X	X	X	X	X	X	X	X
Trip System Type														
Thermal-magnetic		—	—	—	—	—	—	—	—	—	—	—	—	—
Instantaneous-only (MCP)		—	—	—	—	—	—	—	—	—	—	—	—	—
Electronic		X	X	X	X	X	X	X	X	X	X	X	X	X
Enclosures														
General Purpose (NEMA 1)		—	—	—	—	—	—	—	—	—	—	—	—	—
Raintight (NEMA 3R)		—	—	—	—	—	—	—	—	—	—	—	—	—
Dust-tight (NEMA 12)		—	—	—	—	—	—	—	—	—	—	—	—	—
Watertight (NEMA 4, 4X, 5)		—	—	—	—	—	—	—	—	—	—	—	—	—
Explosion Proof (NEMA 7, 9)		—	—	—	—	—	—	—	—	—	—	—	—	—
Dimensions (3P Drawout) in. (mm)	Height	12.67 (322)					17.28 (439)				17.28 (439)		17.28 (439)	
	Width	11.25 (286)					17.74 (450)				17.74 (450)		30.94 (786)	
	Depth	13.54 (344)					18.50 (470)				18.50 (470)		18.50 (470)	
Pages		MasterPact™ Power Circuit Breakers, page 7-66 and Catalog 0614CT1701												

NOTE: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

[55] Tested to show arc flash hazard risk category as reference by NFPA70E.
[56] See Catalog 0614CT1701 for additional ratings and other information.

Masterpact MTZ Selection

Introduction to Masterpact MTZ Devices

Masterpact™ MTZ circuit breakers bring smart connectivity and remote monitoring to power distribution systems:

- Smartphone connectivity allows easy access to device information.
- A Class 1 power meter is built in for energy-saving capabilities.
- Can be customized by adding digital modules.
- Has the new Micrologic™ X control unit.
- Integrates seamlessly with building and energy management systems.

Masterpact MTZ Circuit Breaker Overview

Masterpact MTZ circuit breakers are available in three sizes.

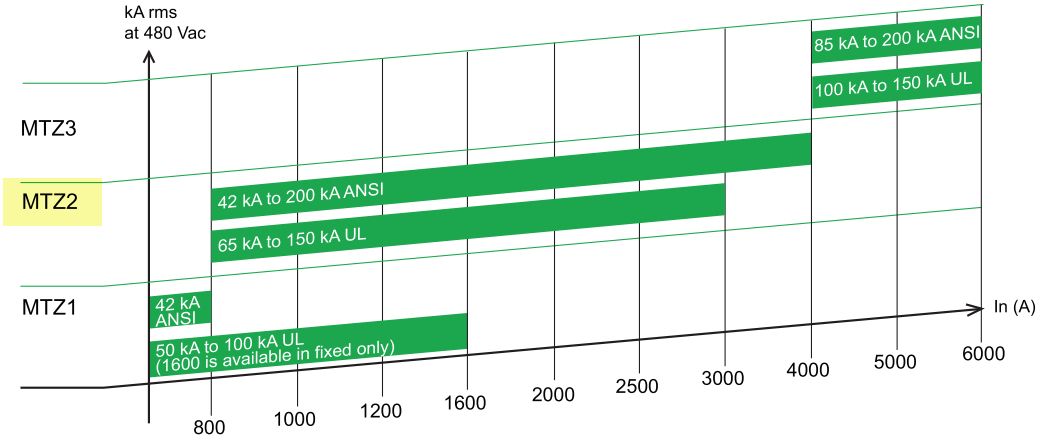
Masterpact MTZ1
800–1600 A

Masterpact MTZ2
800–4000 A

Masterpact MTZ3
4000–6000 A

Masterpact MTZ circuit breakers provides a full range of different breaking ratings.

- Insulated case devices are listed to UL489 and CSA C22.2 No 5.
- Power circuit breakers are certified to ANSI C37 (UL1066) and CSA C22.2 No 268.



Selecting Masterpact MTZ3 Circuit Breakers

Ratings for UL489 Masterpact MTZ3 Circuit Breakers

Frame Rating		4000/5000/6000 A	
Number of Poles		3/4	
Interrupting Rating Code		H	L
Interrupting Current (kAIR)	240 Vac 50/60 Hz	100	200
	480 Vac 50/60 Hz	100	150
	600 Vac 50/60 Hz	85	100
Short-Time Withstand Current (kA)	Vac 50/60 Hz, 0.5 s	85	100
Built-In Instantaneous Override (Peak kA ±10%)		170	170
Close and Latch Ratings (Peak kA)	Vac 50/60 Hz	90	90
Tested to show arc flash hazard risk category (NFPA70E)		—	—
Breaking Time		25 to 30 ms (with no intentional delay) 9 ms for L	
Closing Time		70 ms	
Sensor Rating		2000–4000 A 2500–5000 A 3000–6000 A	
Endurance Rating (C/O Cycles) (with no maintenance)	Mechanical	5000	5000
	Electrical	1000	—

Ratings for ANSI C37 Certified Masterpact MTZ3 Circuit Breakers

Frame Rating				
Interrupting Rating Code		H2	H3	L1[8] [9]
Interrupting Current (kAIR) (50/60 Hz)	254 Vac	85	100	200
	508 Vac	85	100	200
	635 Vac	85	85	130
Short-Time Withstand Current (kA) (50/60 Hz)	Vac, 0.5 s	85	85	100
Built In Instantaneous Override (Peak kA ±10%)		—	—	270
Close and Latch Ratings (Peak kA) (50/60 Hz)	Vac	170	170	90
Tested to show arc flash hazard risk category (NFPA70E)		—	—	—
Breaking Time		25 to 30 ms (with no intentional delay) 9 ms for L1		
Closing Time		70 ms		
Sensor Rating		2000–4000 A 2500–5000 A 3000–6000 A		
Endurance Rating (C/O Cycles) (with no maintenance)	Mechanical	5000		
	Electrical	1000		

8. Interrupting ratings (kAIR) at 50 Hz: 200 kA (254 Vac), 150 kA (508 Vac), 100 kA (635 Vac).
9. The interrupting ratings L1 are available only in 3P, drawout construction.

Ratings for IEC60947–2 Rated Masterpact MTZ3 Circuit Breakers

Frame Rating			4000B/5000/6300 A	
Interrupting Rating Code			**H1**	**H2**
Ultimate Breaking Capacity (kA) 50/60 Hz	Icu	220/415 Vac	100	150
		440 Vac	100	150
		525 Vac	100	130
		690 Vac	100	100
		1150 Vac	—	—
Service Breaking Capacity	Ics	%Icu	100%	100%
Short-Time Withstand Current (kA)	Icw	Vac 50/60 Hz, 1 s	100	100
		Vac 50/60 Hz, 3 s	100	100
Built-In Instantaneous Override (Peak kA ±10%)			—	117
Rated making Current (Peak kA) 50/60 Hz	Icm	220/415 Vac	220	330
		440 Vac	220	330
		525 Vac	187	286
		690 Vac	187	220
		1150 Vac	—	—
Breaking Time			25 ms	
Closing Time		ms	< 80	
Sensor Rating			2000–4000 A 2500–5000 A 3000–6000 A	
Endurance Rating (with no maint.) (C/O Cycles x 1000)		Mechanical	5	
		Electrical 440 V	1.5	1.5
		Electrical 1150 V	—	—

Selecting Masterpact MTZ3 Switches

Ratings for ANSI C37 Certified Masterpact MTZ3 Non-Automatic Switches

Frame Rating		4000 A	5000/6300 A
Withstand Rating Code		HA	HA
Breaking Capacity with External Relay (kA), 50/60 Hz	254 Vac	85	85
	508 Vac	85	85
	635 Vac	85	85
Short-Time Withstand Current (kA) Vac 50/60 Hz, 0.5 s		85	85

Ratings for IEC 60947-3 Rated Masterpact MTZ3 Non-Automatic Switches

Frame Rating			4000B/5000/6300 A
Withstand Rating Code			HA
Rated Making Current (Peak kA)	Icm	220/415 Vac, 50/60 Hz	187
		440 Vac, 50/60 Hz	187
		500/690 Vac, 50/60 Hz	187
		1150 Vac, 50/60 Hz	—
Short-Time Withstand Current (kA)	Icw	Vac 50/60 Hz, 1 s	85
Ultimate Breaking Capacity (with external protection relay) (kA)	Icu	Maximum Delay 400 ms	85

Product data sheet
Characteristics

LV847288
Micrologic 6.0 X control unit, for Masterpact MTZ circuit breakers, fixed, LSIG protections

Green Premium™

Main

Range	Masterpact
Device short name	Micrologic 6.0 X
Product or component type	Control unit
Device application	Equipment protection, monitoring and control
Circuit breaker application	Distribution IEC standard
Range compatibility	Masterpact MTZ1 circuit breaker Masterpact MTZ2 circuit breaker Masterpact MTZ3 circuit breaker
Poles	3P 4P
Protected poles	3P 3d 4P 3d 4P 4d 4P 3d + OSN 4P 3d + N/2
[Ue] rated operational voltage	690 V AC, +/- 10 %
Network type	AC
Network frequency	50/60 Hz
Trip unit technology	Electronic
Trip unit protection functions	LSIG
Protection type	Overload protection (long time) conforming to ANSI 49 Instantaneous short-circuit protection conforming to ANSI 50 Short time short-circuit protection conforming to ANSI 51 Earth fault conforming to ANSI 51N
Trip unit rating	1000 A 5000 A 2500 A 3200 A 630 A 1250 A 400 A 4000 A

	800 A 6300 A 1600 A 2000 A

Complementary

Mounting mode	Fixed
[Ir] long time pick-up adjustment range	0.4...1 x In adjustable in step of 1 A
Long time delay adjustment type	Adjustable in step of 0.5 s
[Tr] long-time delay adjustment range	12.5…600 s 1.5 x Ir 0.5…24 s 6 x Ir 0.7…16.6 s 7.2 x Ir
Thermal memory	Yes
[Isd] short-time pick-up adjustment range	1.5...10 x Ir adjustable in step of 0.5 x Ir with embedded HMI 1.5...10 x Ir adjustable in step of 0.1 x Ir with Ecoreach software or Masterpact MTZ mobile app
Short-time delay adjustment type	Adjustable
[Tsd] short-time delay adjustment range	0.1…0.4 s I²t=on 0…0.4 s I²t=off
Instantaneous pick-up adjustment type Ii	Adjustable
[Ii] instantaneous pick-up adjustment range	2...15 x In adjustable in step of 0.5 x In with embedded HMI 2...15 x In adjustable in step of 0.1 x In with Ecoreach software or Masterpact MTZ mobile app Ii enable on/off
[Li mode] instantaneous delay adjustment range	0 ms in fast 20 ms in standard
Ground-fault pick-up adjustment type	Adjustable
[Ig] ground-fault pick-up adjustment range	In > 400 A 0.2...1 x In adjustable in step of 10 A In <= 400 A 0.3...1 x In adjustable in step of 10 A Ig enable on/off
Ground-fault time delay adjustment type	Adjustable
[Tg] ground-fault time delay adjustment range	0.1…0.4 s I²t=on 0…0.4 s I²t=off
Zone selective interlocking ZSI	With
Network and machine diagnosis type	System (HMI) health state overview: circuit breaker health state standard) Contacts state: circuit breaker health state standard) Micrologic service life: circuit breaker health state standard) Tripping cause indication: circuit breaker tripping cause standard) Identification card: diagnostic data standard) Configured alarms synthesis: diagnostic data standard) Monitored function: diagnostic data standard) Operation: diagnostic data standard) Micrologic test: test standard) Protection test: test standard) Selectivity test: test standard) Trip context information: crisis management standard) Operation: advanced diagnostic standard) Breaker service life: circuit breaker health state standard)
Type of measurement	Power meter
Energy management	Measurement ,active, reactive and apparent energy (standard) Measurement ,electrical network (standard) Measurement ,energy (standard)
Metering type	Current I1, I2, I3, In, Ig: maximum standard) Average voltage Vavg standard) Active power P, P1, P2, P3 standard) Reactive power Q, Q1, Q2, Q3 standard) Apparent power S, S1, S2, S3 standard) Power factor standard) Frequency standard) Total current harmonic distortion THD (I): inst, avg, avg min, avg max fundamental voltage standard) Total current harmonic distortion THD (I): inst, avg, avg min, avg max RMS voltage standard) Voltage V21, V32, V13, V1, V2, V3: instantaneous standard) Voltage V21, V32, V13, V1, V2, V3: minimum standard) Voltage V21, V32, V13, V1, V2, V3: maximum standard) Total voltage harmonic distortion THD (V): inst, avg, avg min, avg max fundamental voltage standard)

	Total voltage harmonic distortion THD (V): inst, avg, avg min, avg max RMS voltage standard) Demand current I1, I2, I3, In, Iavg standard) Demand power P, Q, S standard)
Measurement voltage	145.6…828 V AC 50/60 Hz per phase
Frequency measurement range	45…250 Hz
Measurement accuracy	Power factor: +/- 1 % Active energy Ep IN/OUT/tot: +/- 1 % - 10...10 GWh Reactive energy Ep IN/OUT/tot: +/- 2 % - 10...10 GVARh Apparent energy Es IN/OUT/tot: +/- 1 % - 10...10 GVAh Unbalance current: +/- 0.5 % Frequency: +/- 0.005 Hz Voltage V21, V32, V13, VLLavg: +/- 0.5 % 208...690 x 1.2 V Voltage V21, V32, V13, VLNavg: +/- 0.5 % 120...400 x 1.2 V Apparent power S, S1, S2, S3, Sdemand: +/- 1 % Active power P, P1, P2, P3, Pdemand: +/- 1 % Reactive power Q, Q1, Q2, Q3, Qdemand: +/- 2 % Current I1, I2, I3, Iavg, Idemand for MTZ1: +/- 0.5 % 40...1600 x 1.2 A Current I1, I2, I3, Iavg, Idemand for MTZ2: +/- 0.5 % 40...4000 x 1.2 A Current I1, I2, I3, Iavg, Idemand for MTZ3: +/- 0.5 % 80...6300 x 1.2 A
Accuracy class	Class 5: total current harmonic distortion THD (I) Class 0.5: unbalance voltage Class 1: active and reactive energy by pulse counting (+/- W.h, +/- VAR.h) Class 2: total voltage harmonic distortion THD (V)
Display type	LCD display - 128 x 96 pixels
Communication port protocol	Bluetooth 4.0 LE peer to peer 30 kbit/s NFC peer to peer conforming to ISO 15963 USB peer to peer 115 kbauds
Data recording	Maintenance logs Data logs Min/max of instantaneous values Alarm logs Event logs Time stamping

Environment

Standards	EN/IEC 60092-202 EN/IEC 60255-1 EN/IEC 60947-2 EN/IEC 60947-1 EN/IEC 61010-1
Mounting location	Indoor use only
Environmental characteristic	Wet location not approved for use conforming to IEC 61010-1
Electromagnetic compatibility	Electrostatic discharge immunity test IEC 61000-4-2 Susceptibility to electromagnetic fields IEC 61000-4-3 Electrical fast transient/burst immunity test IEC 61000-4-4 1.2/50 µs shock waves immunity test IEC 61000-4-5 Conducted RF disturbances IEC 61000-4-6 Conducted and radiated emissions A conforming to CISPR 22
Overvoltage category	IV conforming to IEC 61010-1
Measurement category	Category IV conforming to IEC 61010-2-30
Pollution degree	3 conforming to IEC 60947-1
Ambient air temperature for operation	-13…158 °F (-25…70 °C) operating) -31 °F (-35 °C) for start-up of product)
Relative humidity	95 % 131 °F (55 °C) IEC 60068-2-30
Operating altitude	<= 6561.68 ft (2000 m) without derating <= 4000 m with operational voltage derating 600 V AC <= 5000 m with operational voltage derating 560 V AC

Ordering and shipping details

GTIN	03606480811265

Offer Sustainability

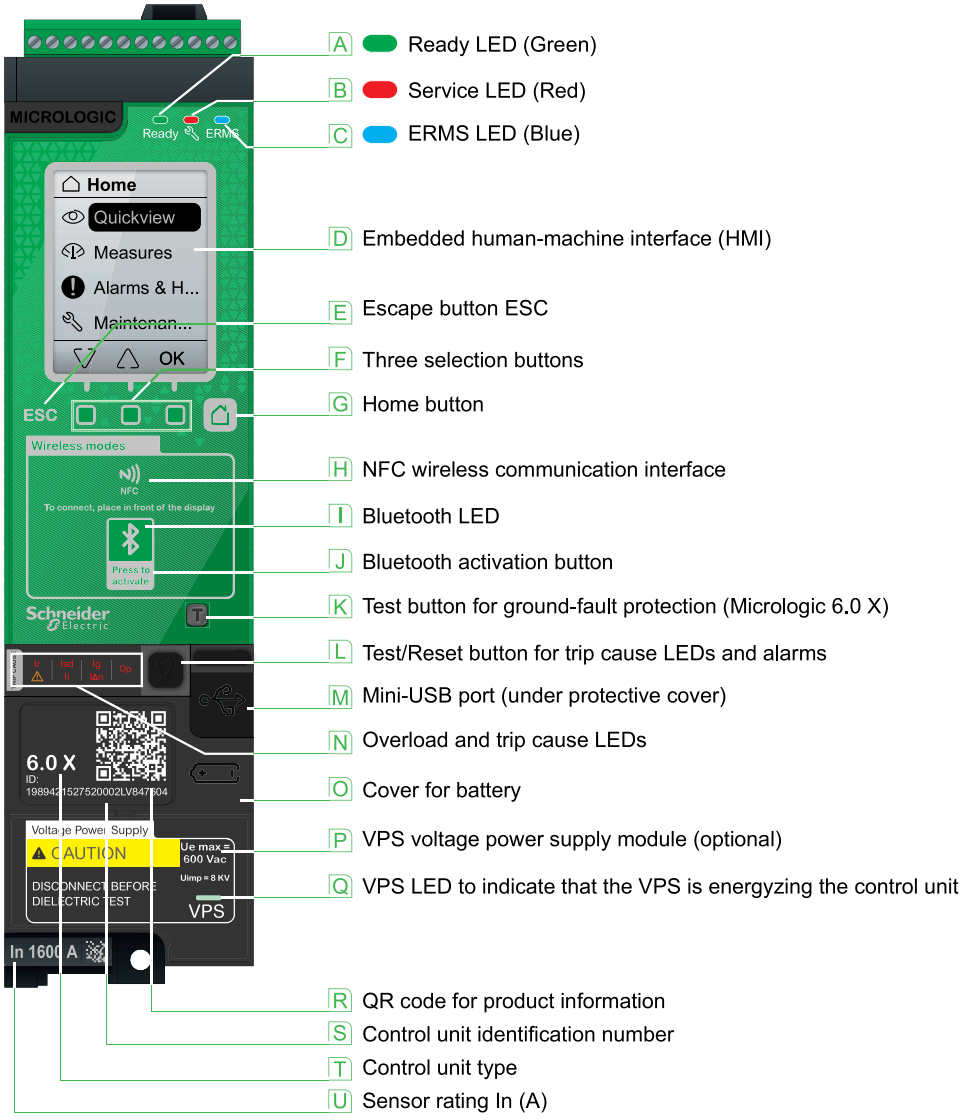
Sustainable offer status	Green Premium product

California proposition 65	WARNING: This product can expose you to chemicals including: DINP, which is known to the State of California to cause cancer, and DIDP, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov
REACh Regulation	REACh Declaration
EU RoHS Directive	Compliant EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration Product out of China RoHS scope. Substance declaration for your information.
Environmental Disclosure	Product Environmental Profile
Circularity Profile	End of Life Information
PVC free	Yes
Halogen content performance	Halogen free plastic parts product

Contractual warranty

Warranty	18 months

Layout of the Micrologic X Control Unit



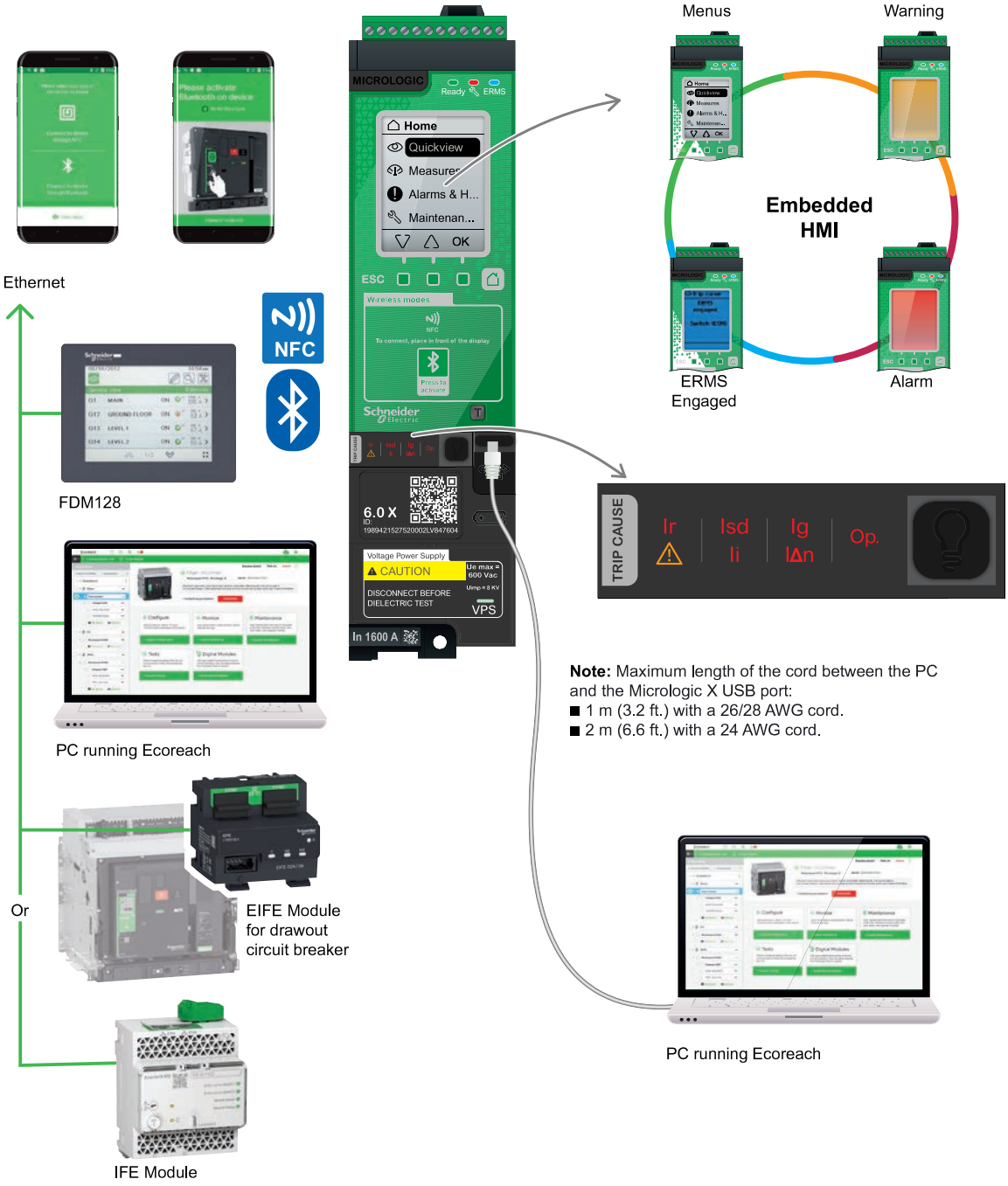
The Micrologic X control unit's basic protection functions are on a dedicated circuit and processor that is protected from disturbances.

In-depth diagnostics allows users to follow the status and operating condition of the circuit breaker in real time.

The backlit display will change colors for various states, providing a clear indication when attention is needed.

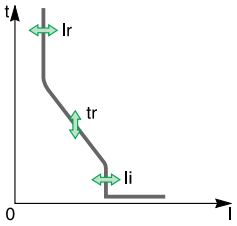
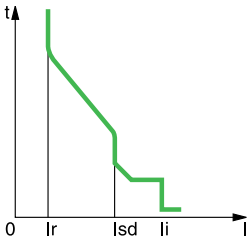
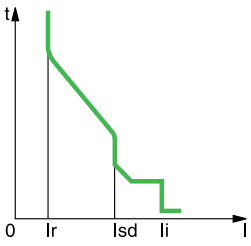
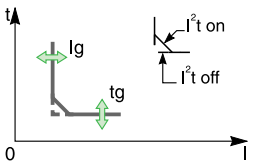
Information processed by the Micrologic X control unit can be displayed on the embedded HMI, a smart device through Bluetooth technology or NFC, local front display (FDM128), communications such as Ethernet, and a PC through the USB connection.

Micrologic configuration is easily made through the Ecoreach tool.



Micrologic X Control Unit Protection Functions

The Micrologic X control unit is suitable for different systems of voltage, three or four wires up to 600 Vac, 50/60 Hz and for grounded systems.

Micrologic 3.0 X	**LI:** Long time + Instantaneous	
Micrologic 5.0 X	**LSI:** Long-time + Short-time + Instantaneous	
Micrologic 6.0 X	**LSIG:** Long-time + Short-time + Instantaneous + Ground-fault	 

Long-Time Overload Protection (ANSI 49RMS/51)

Long-time protection protects the conductors against overload currents. It is based on the true RMS current and is implemented independently for each phase and the neutral.

Thermal imaging is integrated into the long-time protection that models the heating and cooling cycles of the conductors.

Short-Time Short Circuit Protection (ANSI 50TD/51)

Short-time protection protects the installation against phase-to-phase, phase-to-neutral and phase-to-ground short circuits.

It is based on the true RMS current. It includes two characteristics depending on the status of the I^2t setting:

- When I^2t is OFF, a definite time characteristic is selected.
  The protection trips with the time delay tsd as soon as the setting current Isd is exceeded.
- When I^2t is ON, an inverse time characteristic is selected.
  The protection operates with the inverse time characteristic up to 10 x Ir and with a definite time characteristic above 10 x Ir.

Short-time adjustment may be used to improve selective coordination for the electrical system. Zone-selective interlocking (ZSI) interconnects multiple trip units to provide total coordination for short-time protection.

Instantaneous Short Circuit Protection (ANSI 50)

Instantaneous protection protects the installation against phase-to-phase, phase- to-neutral and phase-to-ground short circuits.

The protection operates with a definite time characteristic.

It trips without additional time delay when the setting current Ii is exceeded. The protection offers two selectable tripping times:

- Standard tripping time: 50 ms for applications requiring selectivity. Selectivity requires correctly sizing another circuit breaker installed downstream of the Masterpact circuit breaker.
- Fast tripping time: 30 ms (used when selectivity is not required).

Ground-Fault Protection (ANSI 50N-TD/51N)

Ground-fault protection can be achieved in two ways:

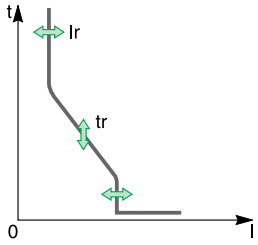
- By performing the summation of the three phases and neutral currents.
- By means of an external sensor (Source Ground Protection [SGR][10]) installed around the cable connecting the transformer neutral point to ground. The SGR sensor is connected to the Micrologic 6.0 X control unit through an MDGF interface module.

10. For SGR option please consult Schneider Electric.

Protective Function Ratings

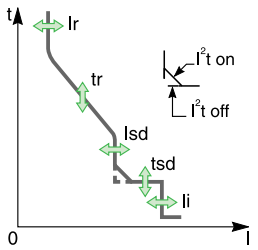
Protection Functions

Micrologic 3.0 X Control Unit



Long-Time	**ANSI Code 49RMS/51**									
Current setting (A)	**Ir** = In x …	**Ir** = 0.4 In to In, 1 A increments								
		Tripping between 1.05 and 1.2 x Ir								
Time setting		**tr** = 0.5 s to 24 s, step 0.5 s for 6 x Ir								
Time setting example: Time delay (s)	1.5 x Ir (+0/-30%)	12.5	25	50	100	200	300	400	500	600
	6 x Ir (+0/-30%)	0.5[11]	1	2	4	8	12	16	20	24
	7.2 x Ir (+0/-20%)	0.7[12]	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory		After tripping based on thermal imaging model								
Instantaneous	**ANSI Code 50**									
Pick-up (A) (±10%)	**Ii**= In x …	**Ii** = 1.5 In to 12 In, 0.5 In increments[13]								
Operating time	Max. resettable time:	20 ms					0 ms			
	Max breaking time:	50 ms					30 ms			

Micrologic 5.0 X / 6.0 X Control Unit

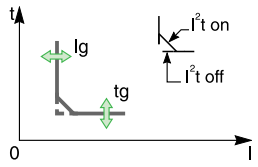


Long-Time	**ANSI Code 49RMS/51**									
Current setting (A)	**Ir** = In x …	**Ir** = 0.4 In to In, step 1 A								
		Tripping between 1.05 and 1.20 Ir								
Time setting		**tr** = 0.5 s to 24 s, 0.5 s increments for 6 Ir								
Time setting example: Time delay (s)	1.5 x Ir (+0/-30%)	12.5	25	50	100	200	300	400	500	600
	6 x Ir (+0/-30%)	0.5[11]	1	2	4	8	12	16	20	24
	7.2 x Ir (+0/-20%)	0.7[12]	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory		After tripping based on thermal imaging model								
Short-Time	**ANSI Code 50TD/51**									
Pick-up (A) (±10%)	**Isd** = Ir x …	**Isd** = 1.5 Ir to 10 Ir, 0.5 Ir increments[13]								
Time setting tsd (s)	Settings	I²t Off	0	0.1	0.2	0.3	0.4			
		I²t On	—	0.1	0.2	0.3	0.4			
Operating time at 10 x Ir I²t Off or I²t On	Max resettable time	20	80	140	230	350				
	Max break time	80	140	200	320	500				
Instantaneous	**ANSI Code 50**									
Pick-up (A) (±10%)	**Ii** = In x …	**Ii** = 2 to 15 In, 0.5 In increments, OFF protection[13]								
Operating time	Max resettable time:	20 ms					0 ms			
	Max breaking time	50 ms					30 ms			

11. +0/-40%
12. +0/-60%
13. Finer resolution settings are possible with Ecoreach software and Masterpact MTZ mobile App.

Protection Functions

Micrologic 6.0 X Control Unit



Ground Fault	Ground Fault ANSI Code 50N-TD/51N						
Pick-up (A) (±10%)	**Ig** = In x …		**Ig** = 0.2 In to 1200 A[14], 0.1 In increments[15]				
Time setting tg (s)	Settings	I²t Off	0	0.1	0.2	0.3	0.4
		I²t On	-	0.1	0.2	0.3	0.4
Operating time (ms)	Non-tripping time		20	80	140	230	350
	Max breaking time		80	140	200	320	500

Additional Micrologic X Control Unit Functions

Neutral Overload Protection on Four-Pole Circuit Breakers

A four-pole circuit breaker neutral protection is set remotely:

- Neutral protection set at unprotected.
- Neutral protection set at 0.5 x Ir.
- Neutral protection set at Ir.
  Neutral protection is greater than Ir, but lower than In and limited at 1.6 Ir phase.

For a three-pole circuit breaker used in a 4-wire circuit, the protection of the neutral requires an additional external neutral CT (ENCT). A long-time overcurrent characteristic is dedicated to the neutral protection.

Trip Coil Supervision (ANSI 74)

The Micrologic X control unit continuously monitors the electrical continuity of the circuit breaker tripping coil. It generates an alarm if a problem is detected.

Lock-Out Function (ANSI 86)

If the circuit breaker is tripped from an overcurrent event or from one of the protective functions the circuit breaker is locked in the open position until it is reset manually or electrically. Masterpact MTZ circuit breakers are also equipped with an interlocking function (see *Masterpact MTZ Locking and Interlocking Accessories, page 91*).

Overcurrent Trip Indication (ANSI 94)

If the circuit breaker trips due to an overcurrent trip event or from a protection setting, the SDE contact will change state and signal the event. The SDE contact will stay closed until the circuit breaker is reset (see *Overcurrent Trip Indication Contacts (SDE), page 68* and *Remote Reset After Overcurrent Trip, page 88*).

14. 0.3 In to In for In ≤ 400 A
15. Finer resolution settings are possible with Ecoreach software and Masterpact MTZ mobile App.

KOHLER. Power Systems

TECHNICAL INFORMATION BULLETIN

Alternator Model: KH08430TO4D (60 Hz, 480 V, 0.8 PF, 130°C Rise)

KW	KVA	PF	PITCH	RPM	POLES	HZ	RATED TEMP. RISE IN °C	
3000	3750	0.8	0.6667	1800	4	60		
VOLTAGE	**AMPS**	**BASE Z**	**PHASE**	**CONNECTION**	**INS. CLASS**	**AMB. °C**	**STATOR (RTD)**	**FIELD (BY RES.)**
480	4511	0.061	3	WYE	H	40	130	130

PREDICTED GENERATOR PERFORMANCE CHARACTERISTICS

REACTANCES (% AT KVA RATING)*		SAT.	UNSAT.
SYNCHRONOUS			
DIRECT AXIS	Xd	190.2	198.7
QUADRATURE AXIS	Xq	96.7	119.4
TRANSIENT			
DIRECT AXIS	X'd	18.2	20.7
QUADRATURE AXIS	X'q	96.7	119.4
SUBTRANSIENT			
DIRECT AXIS	X"d	14.9	17.6
QUADRATURE AXIS	X"q	20.8	24.5
NEGATIVE SEQUENCE	X2	17.9	21
ZERO SEQUENCE	X0	2.3	2.7
LEAKAGE REACTANCE	XL	7.2	8.2

* p.u. values calculate by dividing (%) by 100

MOTOR STARTING (0.0 PF) SKVA @ GENERATOR TERMINALS		
VOLTAGE DIP	INRUSH (SKVA)	MOTOR HP (CODE F)
10%	2012.9	359
15%	3196.9	571
20%	4529.0	809
25%	6038.6	1078
30%	7764.0	1386
35%	9754.7	1742

MOTOR STARTING (0.3 PF) SKVA @ GENERATOR TERMINALS		
VOLTAGE DIP	INRUSH (SKVA)	MOTOR HP (CODE F)
10%	2044.7	365
15%	3247.4	580
20%	4600.5	822
25%	6134.1	1095
30%	7886.7	1408
35%	9908.9	1769

TIME CONSTANTS (SECONDS)		
DIRECT AXIS O.C. TRANSIENT	T'do	2.844
DIRECT AXIS S.C. TRANSIENT	T'd	0.273
DIRECT AXIS O.C. SUBTRANSIENT	T"do	0.028
DIRECT AXIS S.C. SUBTRANSIENT	T"d	0.023
ARMATURE SHORT CIRCUIT	Ta	0.037

ADDITIONAL TIME CONSTANTS (SECONDS)		
D-AXIS L-N S.C. TRANSIENT	T'd2	0.407
D-AXIS L-L S.C. TRANSIENT	T'd1	0.429
Q-AXIS 3-PHASE S.C.TRANSIENT	T'q3	0.569
Q-AXIS O.C. TRANSIENT	T'q0	0.569
D-AXIS L-N S.C. SUBTRANSIENT	T"d2	0.026
D-AXIS L-L S.C. SUBTRANSIENT	T"d1	0.026
Q-AXIS 3-PHASE S.C. SUBTRANSIENT	T"q3	0.002
Q-AXIS O.C. SUBTRANSIENT	T"q0	0.014

RESISTANCES (OHMS) @ 25°C			PER UNIT
DC ARMATURE	RDCa	0.00038	0.00623
DC GENERATOR FIELD	RDCf	1.2141	19.90328
ZERO SEQUENCE	R0	0.0011	0.01803
POSITIVE SEQUENCE	R1	0.0005	0.00820
NEGATIVE SEQUENCE	R2	0.002	0.03279

MISCELLANEOUS CALCULATIONS		
3-PH CAPACITANCE-GROUND	0.2	MICRO-FARAD
BIL	3465	VOLTS
X/R RATIO	19.6	
INERTIA CONSTANT MULTIPLIER	0.0002	ICM
SHORT CIRCUIT RATIO	0.526	SCR
POTIER REACTANCE	6.66	%
SATURATION FACTOR	0.27	S120

EFFICIENCY (%)			HEAT REJECT.
% LOAD	@ 0.8 PF	@ 1.0 PF	BTU/HR
100%	96.3	97.2	516012
75%	96.2	97.1	398455
50%	95.5	96.6	306431
25%	92.9	94.4	239237

SHORT CIRCUIT CURRENT	INSTANTANEOUS SYMMETRICAL FAULT CURRENT		INSTANTANEOUS ASYMMETRICAL FAULT CURRENT	
TYPE	P.U.	(AMPS)	P.U.	(AMPS)
3-PH	6.69	30177	11.59	52269
L-L	5.27	23795	9.14	41215
L-N	8.53	38482	14.78	66654

SEGREGATED LOSSES (KW)		
	LOAD (0.8 PF)	NO LOAD
CORE	24.8	24.8
F&W	24.0	24.0
STRAY LOAD	10.1	0.0
I^2R STATOR	33.5	0.0
I^2R ROTOR	21.1	2.8
EXCITER	3.2	0.5
TOTAL	**116.7**	**52.1**

THREE PHASE SHORT CIRCUIT TORQUE (FT-LBS)	98055	N.m	132945
L-L SHORT CIRCUIT TORQUE (FT-LBS)	115976	N.m	157242
THREE PHASE OUT OF PHASE W/INFINITE BUS TORQUE (FT-LBS)*	254753.7	N.m	345400
SINGLE PHASE OUT OF PHASE W/INFINITE BUS TORQUE (FT-LBS)*	249893.1	N.m	338810

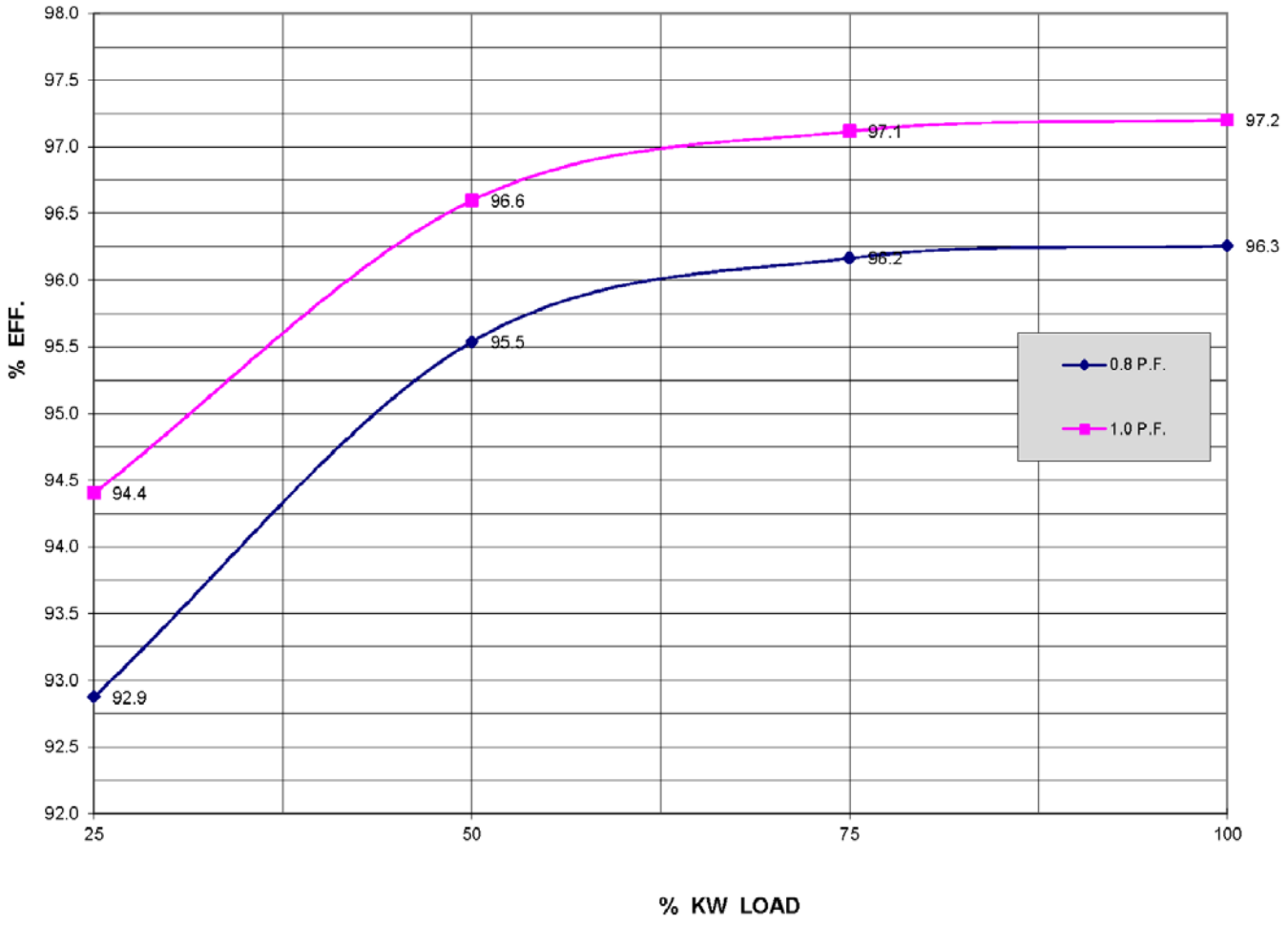
TIF (1960 WEIGHTING) MAX.	BALANCED	RESIDUAL
	100	75
WAVEFORM DEVIATION FACTOR (%)		10
TOTAL HARMONIC CONTENT (%)		5
SINGLE HARMONIC CONTENT (%)		3

STEP LOADS (0.8 PF)	APPLIED LOAD		VOLTAGE DIP
	%	KVA	%
	25%	937.5	3.8
	50%	1875	7
	100%	3750	12.5

*A SYNCHRONIZING FAULT MAY DAMAGE THE GENERATOR

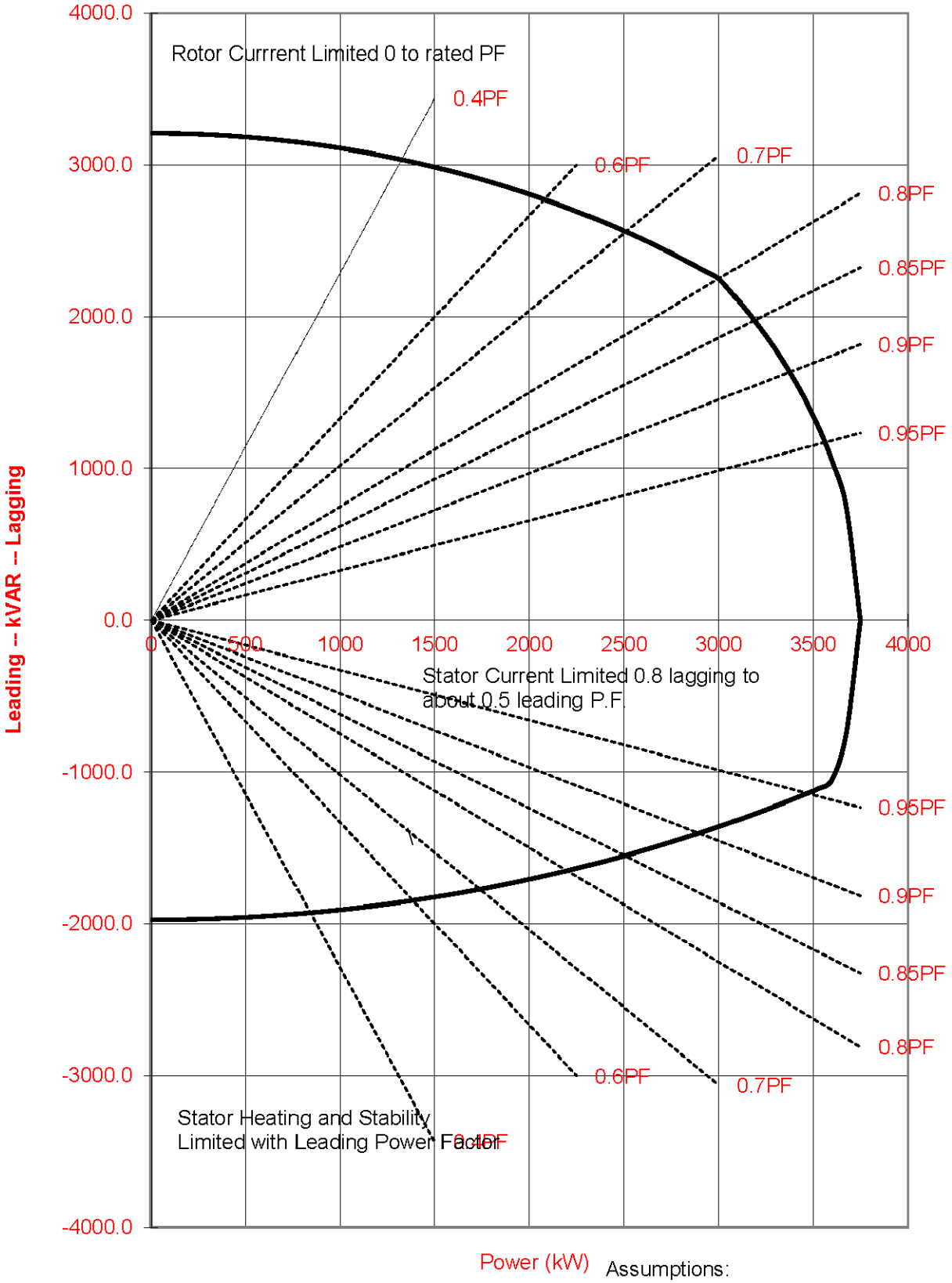
Alternator Model: KH08430TO4D (60 Hz, 480 V, 0.8 PF, 130°C Rise)

EFFICIENCY CURVES



Alternator Model: KH08430TO4D (60 Hz, 480 V, 0.8 PF, 130°C Rise)

REACTIVE CAPABILITY CURVE

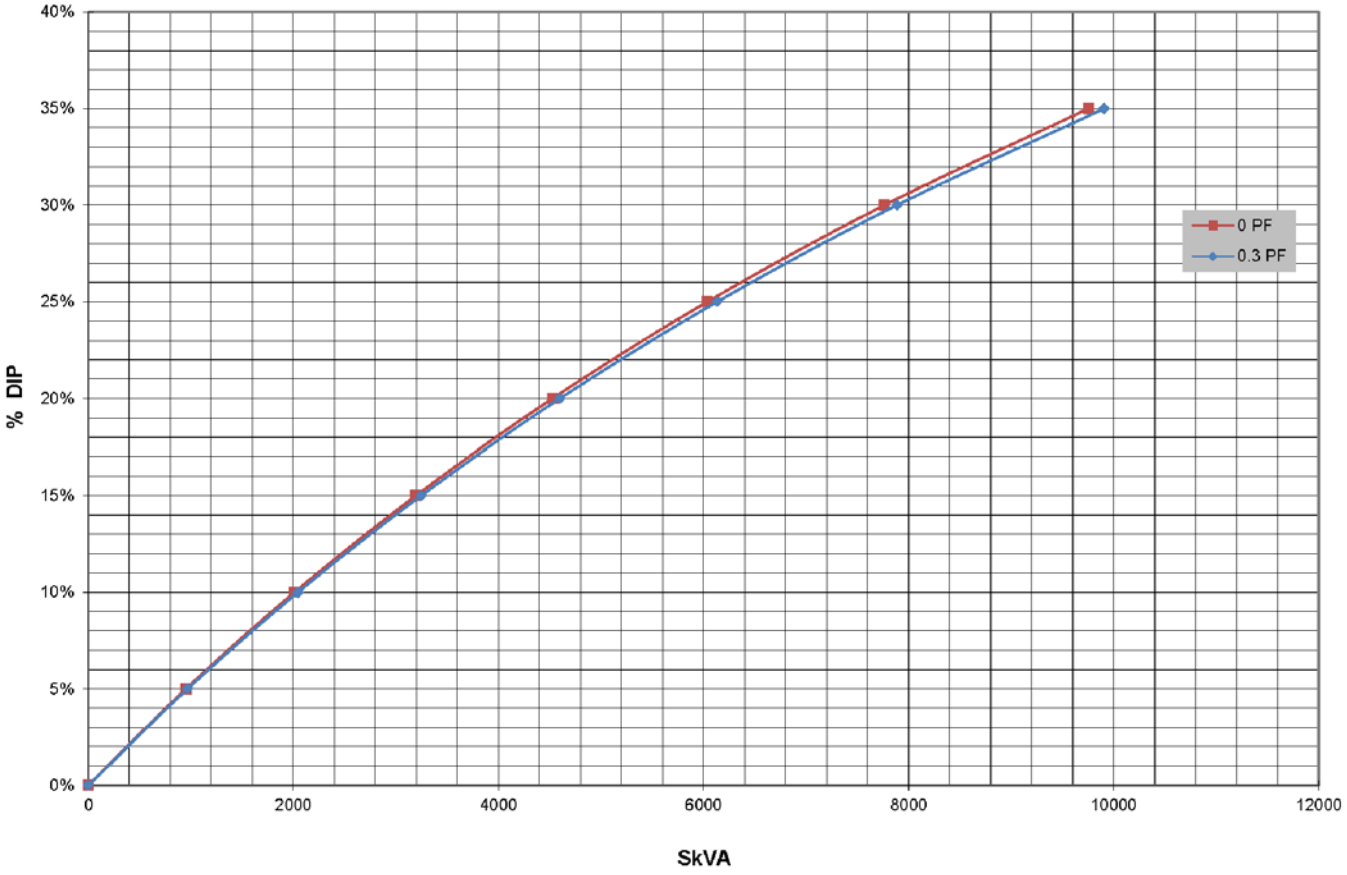


Assumptions:

1. System reactance is 0.4 P.U.
2. Regulator stability limit is not included
3. Curve is based on linear reactive loading

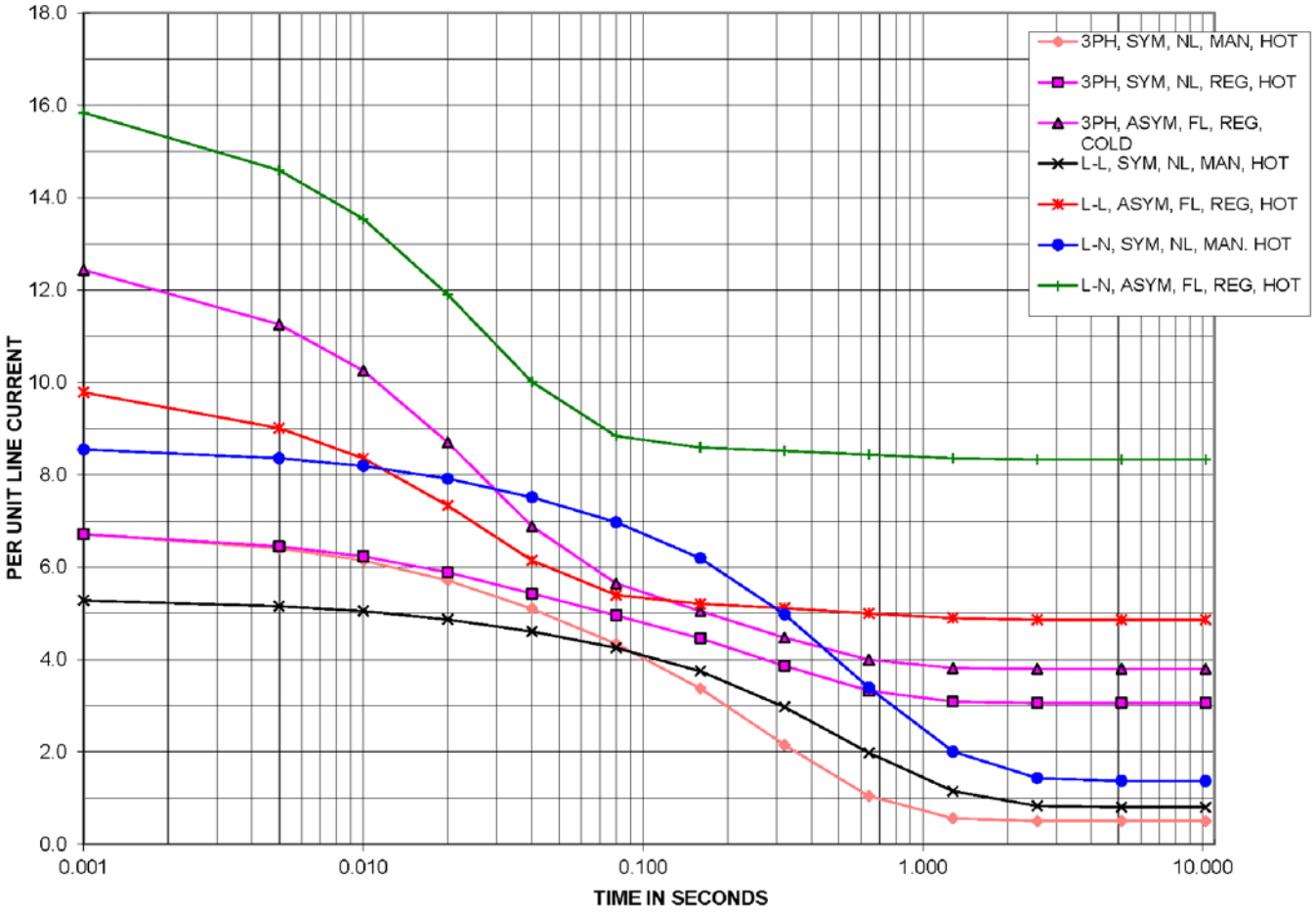
Alternator Model: KH08430TO4D (60 Hz, 480 V, 0.8 PF, 130°C Rise)

VOLTAGE DIP CURVE



Alternator Model: KH08430TO4D (60 Hz, 480 V, 0.8 PF, 130°C Rise)

SHORT CIRCUIT DECREMENT CURVE



KOHLER®

TIB-118

TECHNICAL INFORMATION BULLETIN

Generator Set Cooling System Data Sheet

KD2500 60Hz (Standby Duty)	**50°C Ambient Temperature Cooling System**								
	Total external restriction on open unit[7]	Pa *(in.H_2O)*	0 (0)	125 (0.5)	187 (0.75)	250 (1)	312 (1.25)	375 (1.5)	**Enclosed Units**
	Maximum allowable ambient temperature	°C *(°F)*	50 (122)	49 (120)	48 (118)	47 (117)	46 (115)	45 (113)	45 (113)
	Cooling system airflow	m^3/min *(ft^3/min)*	2640 (93200)	2550 (90100)	2513 (88700)	2472 (87300)	2425 (85600)	2370 (83700)	NA (NA)

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

KOHLER. Power Systems

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**		
KD2500	60	100% Load	129.7	97.4		
		No Load	114.0	96.7		

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.

				Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)		Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
100% Load	7 (23)	Open Unit, Isolated Exhaust	3:00	64.6	85.6	92.0	90.9	90.6	89.6	85.7	82.6	97.6
			1:30	63.4	78.0	88.9	90.7	89.5	88.7	86.0	82.7	96.3
			12:00 - Engine	68.1	86.4	92.2	94.0	93.6	88.4	84.0	78.2	99.0
			10:30	63.2	84.0	89.4	93.7	91.9	90.3	85.9	83.6	98.3
			9:00	66.0	84.1	88.4	92.0	90.6	89.0	84.6	82.2	96.9
			7:30	63.4	84.9	90.3	91.6	91.7	90.6	86.2	81.8	97.8
			6:00 - Alternator	65.7	85.5	87.1	90.0	87.9	86.8	81.5	76.7	95.0
			4:30	65.3	83.2	89.0	91.8	91.5	89.2	86.2	83.2	97.3
				65.3	84.5	90.0	92.0	91.2	89.2	85.2	81.9	97.4

			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)	93.1	106.6	116.8	120.4	121.5	122.4	122.4	123.0	129.7

Load	Distance, m (ft)		Measurement Clock Position	Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
No Load	7 (23)	Open Unit, Isolated Exhaust	3:00	63.2	83.6	89.9	91.1	90.8	88.2	83.0	74.5	96.6
			1:30	62.0	76.8	87.8	90.3	89.7	88.3	83.3	76.6	95.6
			12:00 - Engine	66.6	85.2	91.9	94.3	93.6	87.9	83.1	76.0	98.9
			10:30	63.4	82.9	88.3	92.8	91.2	89.2	83.7	76.8	97.2
			9:00	63.9	82.7	87.9	91.8	90.4	88.4	82.1	74.7	96.3
			7:30	62.3	82.5	90.0	92.0	91.6	89.5	83.7	74.9	97.3
			6:00 - Alternator	64.3	81.7	85.4	89.2	86.7	84.6	78.1	70.0	93.3
			4:30	63.2	82.3	88.3	91.4	90.0	88.8	83.0	75.6	96.3
			8-pos. log avg.	63.8	82.7	89.1	91.9	90.9	88.3	82.8	75.3	96.7

			Sound Pressure Levels, dB(A)								
Load	Distance, m (ft)	Exhaust	Octave Band Center Frequency (Hz)								Overall Level
			63	125	250	500	1000	2000	4000	8000	
No Load	1 (3.3)	Raw Exhaust (No Silencer)	79.4	96.4	108.9	108.7	106.0	104.9	101.7	97.9	114.0

KOHLER®

KD2500

60 Hz. Diesel Generator Set
Tier 2 EPA Certified for Stationary Emergency Applications
EMISSION OPTIMIZED DATA SHEET

ENGINE INFORMATION

Model:	KD62V12	Bore:	175 mm (6.89 in.)
Nameplate kW @ 1800 RPM:	2700	Stroke:	215 mm (8.46 in.)
Type:	4-Cycle, 12-V Cylinder	Displacement:	62 L (3783 cu. in.)
Aspiration:	Turbocharged, Intercooled	EPA Family:	MLHAL103.ESP
Compression ratio:	16:0:1	EPA Certificate:	MLHAL103.ESP-001
Emission Control Device:	Direct Diesel Injection, Engine Control Module, Turbocharger, Charge Air Cooler		

EXHAUST EMISSION DATA:		**EPA D2 Cycle 5-mode weighted**
HC		0.17 g/kWh
NO_x	(Oxides of Nitrogen as NO_2)	5.28 g/kWh
CO	(Carbon Monoxide)	1.22 g/kWh
PM	(Particulate Matter)	0.14 g/kWh

TEST METHODS AND CONDITIONS

Test Methods:
Steady-State emissions recorded per EPA CFR 40 Part 89, and ISO8178-1 during operation at rated engine speed (+/-2%) and stated constant load (+/-2%) with engine temperatures, pressures and emission rates stabilized.

Fuel Specification:
40-48 Cetane Number, 0.05 Wt. % max. Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.

Reference Conditions:
25 °C (77 °F) Air Inlet Temperature, 40 °C (104 °F) Fuel Inlet Temperature, 100 kPa (29.53 in Hg) Barometric Pressure; 10.7 g/kg (75 grains H2O/lb.) of dry air Humidity (required for NOx correction); Intake Restriction set to maximum allowable limit for clean filter; Exhaust Back pressure set to maximum allowable limit.

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.

KOHLER®

KD2500

60 Hz. Diesel Generator Set
Tier 2 EPA Certified for Stationary Emergency Applications
EMISSION OPTIMIZED DATA SHEET

ENGINE INFORMATION

Model:	KD62V12	Bore:	175 mm (6.89 in.)
Type:	4-Cycle, 12-V Cylinder	Stroke:	215 mm (8.46 in.)
Aspiration:	Turbocharged, Intercooled	Displacement:	62 L (3783 cu. in.)
Compression ratio:	16:0:1		
Emission Control Device:	Direct Diesel Injection, Engine Control Module, Turbocharger, Charge Air Cooler		

NOMINAL EMISSION DATA

Cycle point	100% ESP	75% ESP	50% ESP	25% ESP
Power [kW]	2700	2025	1350	675
Speed [rpm]	1800	1800	1800	1800
Exhaust Gas Flow [kg/h]	15085	15390	10714	6183
Exhaust Gas Temperature [C]	456	464	447	464
NO_X [g/kWh]	9.5	4.5	4.9	5.0
CO [g/kWh]	0.3	1.2	0.7	2.6
HC [g/kWh]	0.12	0.10	0.18	0.29
PM [g/kWh]	0.06	0.16	0.12	0.34

NOT TO EXCEED EMISSION DATA

Cycle point	100% ESP	75% ESP	50% ESP	25% ESP
NO_X [g/kWh]	11.2	5.3	5.7	5.9
CO [g/kWh]	1.0	3.5	1.9	7.4
HC [g/kWh]	0.14	0.12	0.21	0.34
PM [g/kWh]	0.10	0.20	0.15	0.40

TEST METHODS AND CONDITIONS

Test Methods:
Steady-State emissions recorded per EPA CFR 40 Part 89, and ISO8178-1 during operation at rated engine speed (+/-2%) and stated constant load (+/-2%) with engine temperatures, pressures and emission rated stabilized.

Fuel Specification:
40-48 Cetane Number, 0.05 Wt. % max. Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.

Reference Conditions:
25 °C (77 °F) Air Inlet Temperature, 40 °C (104 °F) Fuel Inlet Temperature, 100 kPa (29.53 in Hg) Barometric Pressure; 10.7 g/kg (75 grains H2O/lb.) of dry air Humidity (required for NOx correction); Intake Restriction set to maximum allowable limit for clean filter; Exhaust Back pressure set to maximum allowable limit.

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
2021 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Liebherr Machines Bulle SA**
(U.S. Manufacturer or Importer)

Certificate Number: MLHAL103.ESP-001

Effective Date: 09/30/2020

Expiration Date: 12/31/2021

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 09/30/2020

Revision Date: N/A

Model Year: 2021
Manufacturer Type: Original Engine Manufacturer
Engine Family: MLHAL103.ESP

Mobile/Stationary Indicator: Stationary
Emissions Power Category: kW>560
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Electronic Control

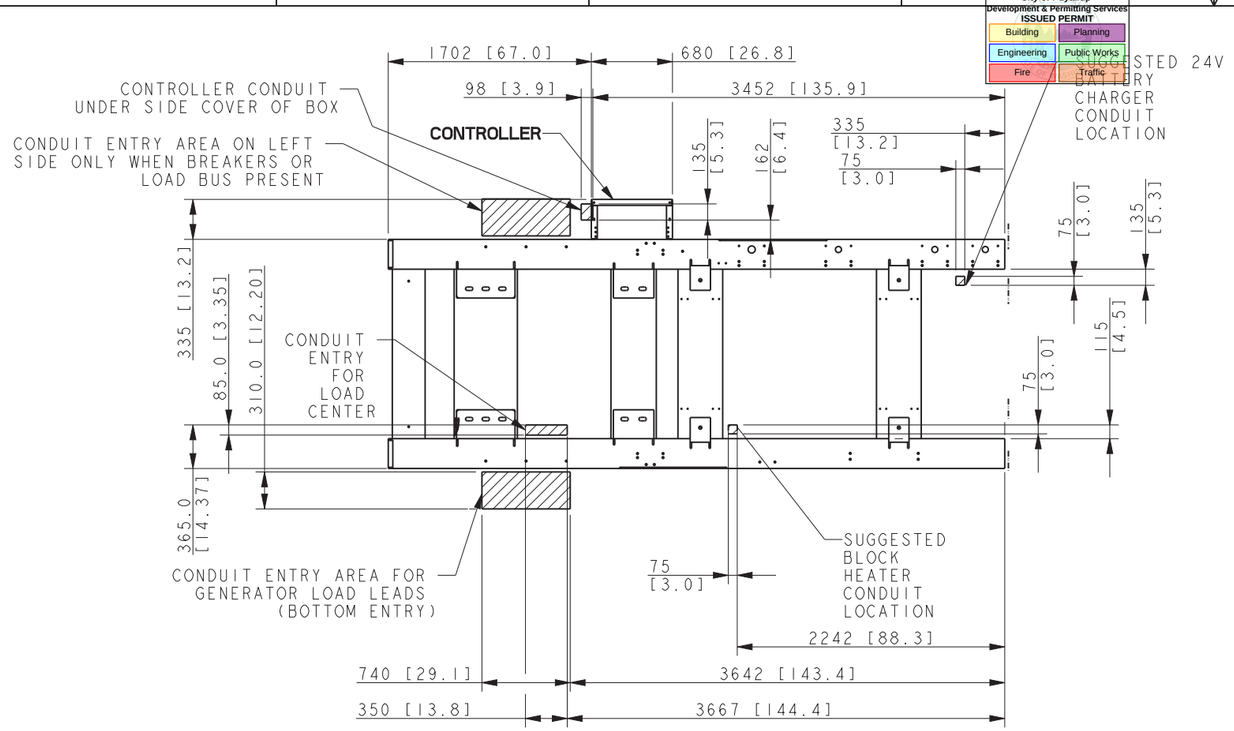
Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform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

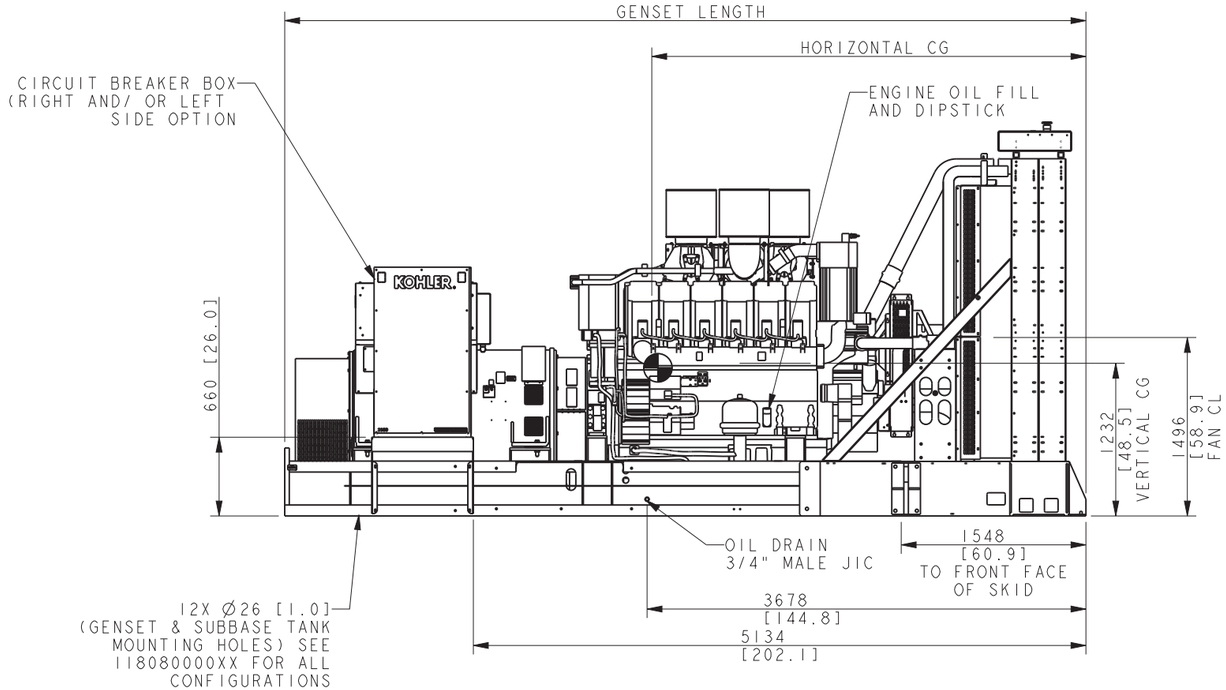
This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate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

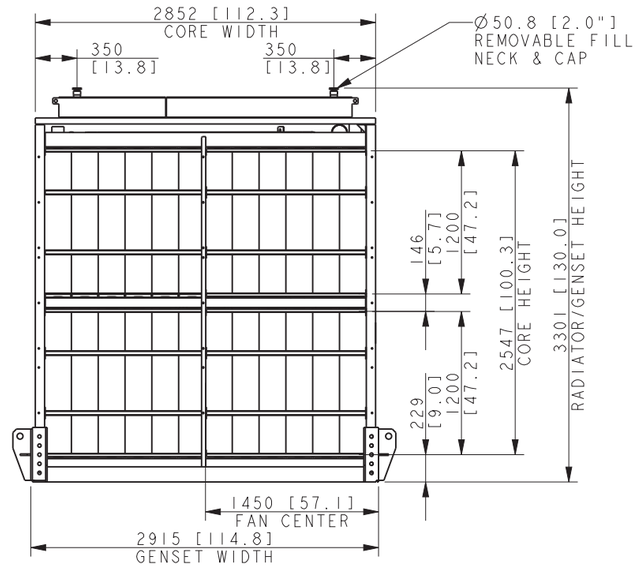
It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified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

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

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







MODEL	ALTERNATOR	GENSET MAXIMUM WEIGHT (WET) KG [LB]	HORIZONTAL CG (WET) MM [IN]	GENSET LENGTH MM [IN]
KD2000	KH04970TO4D	22417 [49422]	3114 [122.6]	6215 [244.7]
KD2000	KH07080TO4D	25447 [56101]	3439 [135.4]	6958 [273.9]
KD2000/ KD2250	KH05790TO4D	22940 [50574]	3171 [124.9]	6215 [244.7]
KD2000/ KD2250	KH06220TO4D	22936 [50565]	3202 [126.1]	6715 [264.4]
KD2000/ KD2250	KH07630TO4D	25859 [57010]	3472 [136.7]	6715 [264.4]
KD2250/ KD2500	KH08100TO4D	26883 [59266]	3567 [140.4]	6958 [273.9]
KD2000/ KD2250/ KD2500	KH06930TO4D	23471 [51744]	3222 [126.8]	6215 [244.7]
KD2000/ KD2250/ KD2500	KH07000TO4D	23486 [51778]	3257 [128.2]	6715 [264.4]
KD2000/ KD2250/ KD2500	KH07770TO4D	23881 [52648]	3326 [130.9]	6715 [264.4]
KD2000/ KD2250/ KD2500	KH09270TO4D	27033 [59598]	3597 [141.6]	6958 [273.9]
KD2000/ KD2250/ KD2500	KH08430TO4D	24205 [53363]	3362 [132.4]	6715 [264.4]

ALL VIEWS REPRESENTED WITH 50C RADIATOR

NOTES:
1) DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

2) IF AN ENCLOSURE IS USED THE FUEL LINE MUST BE STUBBED UP FROM DIRECTLY UNDER THE UNIT. REFER TO ENCLOSURE ADV.

3) IF IBC OR OSHPD CERTIFICATION IS REQUIRED SEE SEISMIC ADV FOR INSTALLATION INSTRUCTIONS.

4) IF SUBBASE FUEL TANK AND/OR ENCLOSURE IS USED, REFER TO SUBBASE FUEL TANK/ENCLOSURE ADV TO DETERMINE MOUNTING LOCATIONS.

KD2000, KD2250, KD2500
KD62V12

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
K	9APR2019	(A-2) TOLERANCES REMOVED; (C-3)REDUNDANT	
		RADIATOR LINES REMOVED [CT194818]	SUD
L	12-20-19	(C-3,2,1) RADIATOR DIMENSIONS TABLE REMOVED;	
		(D-4,3) 50C RADIATOR NOTE ADDED; SHEET 2 ADDED;	
		CONTENT FROM SHEET 2,3,4,5,6,7 & 8 MOVED TO	
		3,4,5,6,7,8 & 9 RESPECTIVELY; SEE SHEET 2 & 3	
		[CT200775]	SLR
M	19MAY2020	(D-8,-7,-6) CONTROLLER CALLOUT, 1702 [67.0], 680	
		[26.8] & 335 [13.2] ADDED; SEE SHEET 3 [CT204162]	PAR
N	10AUG2021	SHEET 10 ADDED; SEE SHEET 5 [CT213945]	RVM

DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A

THIRD ANGLE PROJECTION

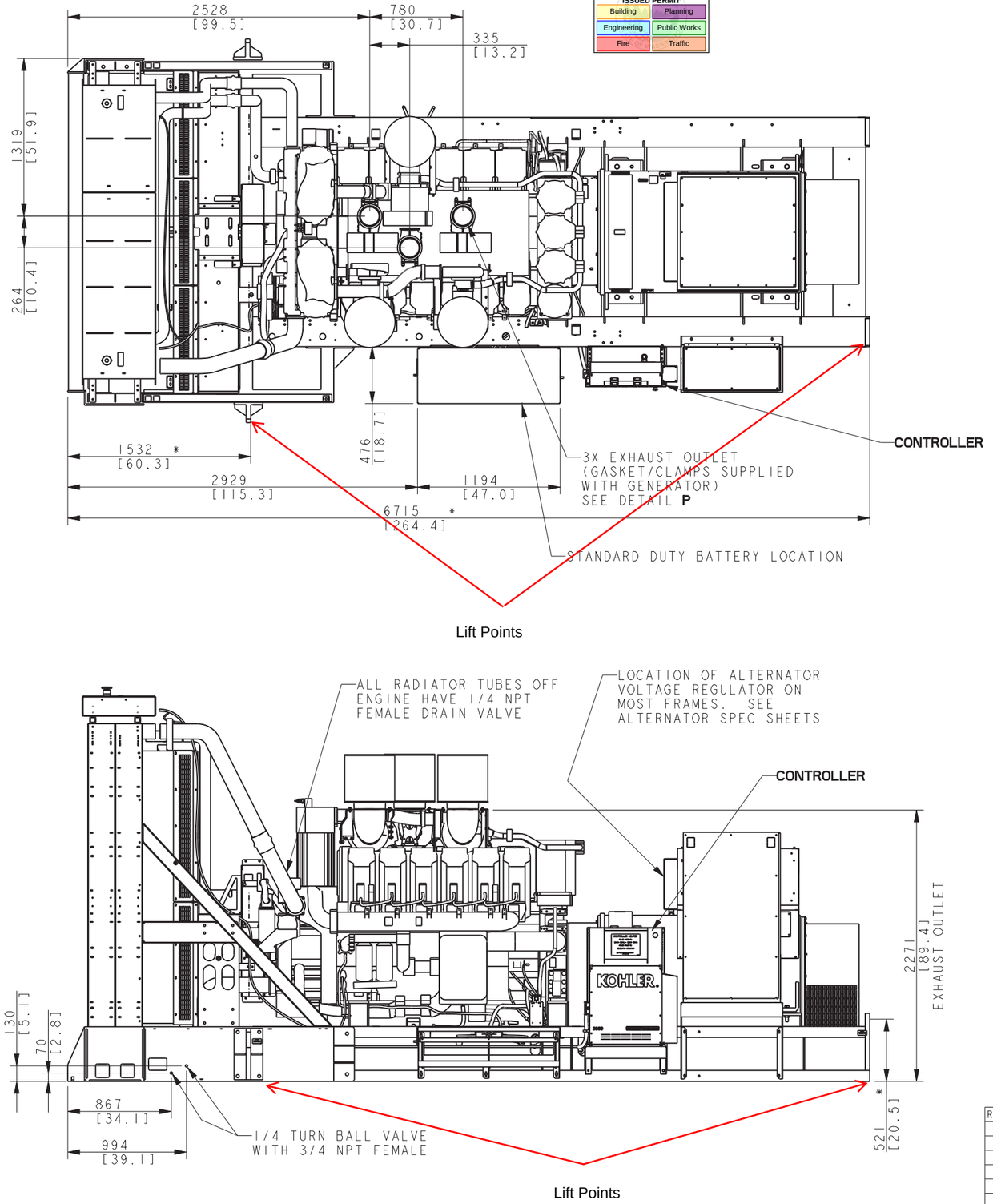
APPROVALS		DATE
DRAWN	BGW	11-29-16
CHECKED	WDG	11-29-16
APPROVED	WDG	11-29-16

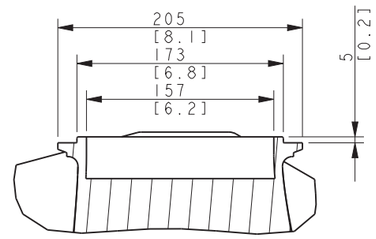
KOHLER.
KOHLER, WISCONSIN 53044

TITLE: DIMENSIONAL PRINT, KD2000-2500

SCALE 0.04 | CAD NO. | SHEET 1 of 10

DWG NO. ADV-8925 | D





DETAIL P
SCALE 0.40

**VIEWS SHOWN WITH 50C RADIATOR
· 50C GENERATOR RADIATOR LIFT POINTS**

**KD2000, KD2250, KD2500
KD62V12**

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
G	4-4-18	SEE SHEET 4 & 5 [CT186192]	SSS
H	12-5-18	SEE SHEET 3 [CT192176]	ADP
J	1-17-19	SEE SHEET 1 & 3 [PR07774]	BGW
K	9APR2019	(A-2) TOLERANCES REMOVED [CT194818]	SUD
L	12-20-19	CONTENTS OF SHEET 2 MOVED TO THIS SHEET, (A-2) 50C	
		RADIATOR NOTE ADDED; (C-4,3) GENERATOR LIFT POINTS	
		NOTE REMOVED; SEE SHEET 1 & 2 [CT200775]	SLR
M	19MAY2020	(B,C-4) CONTROLLER CALLOUT ADDED; SEE SHEET	
		1 [CT204162]	PAR
N	10AUG2021	SEE SHEET 5 [CT213945]	RVM

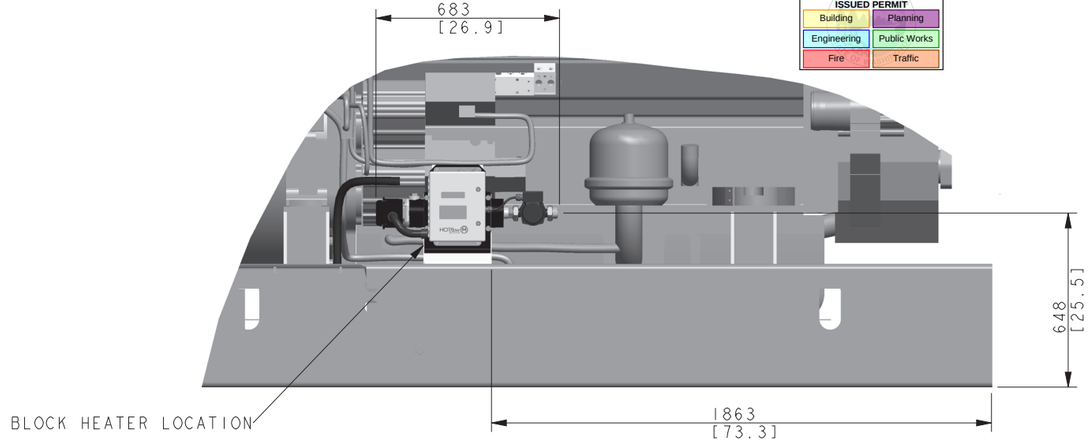
DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS
UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: N/A
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	BGW	11-29-16
CHECKED	WDG	11-29-16
APPROVED	WDG	11-29-16

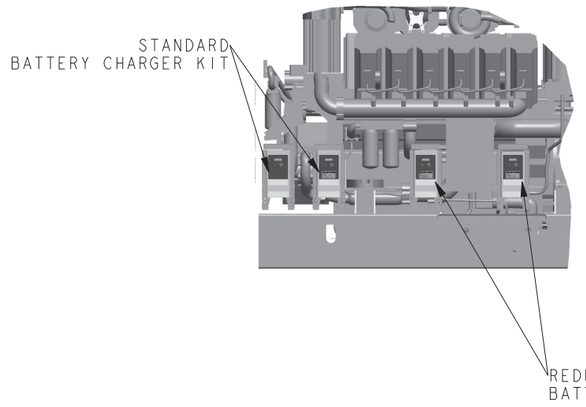
TITLE: **DIMENSIONAL PRINT, KD2000-2500**

SCALE 0.05 | CAD NO. | SHEET 3 of 10

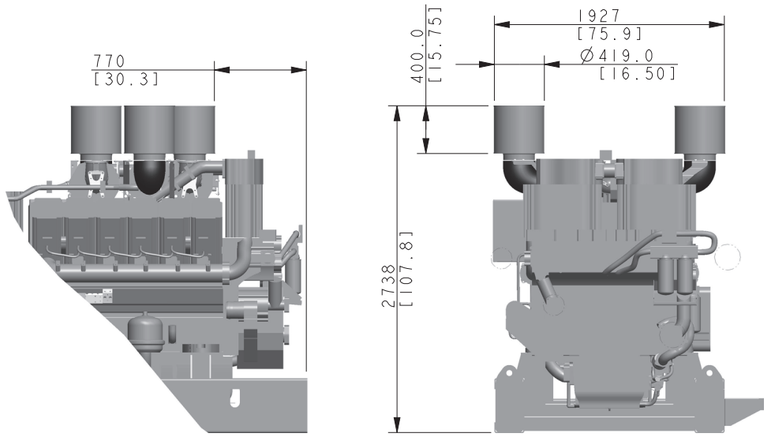
DWG NO. **ADV-8925** | **D**



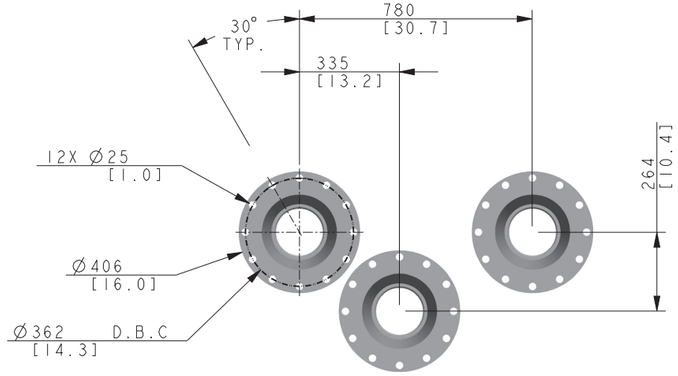
BLOCK HEATER

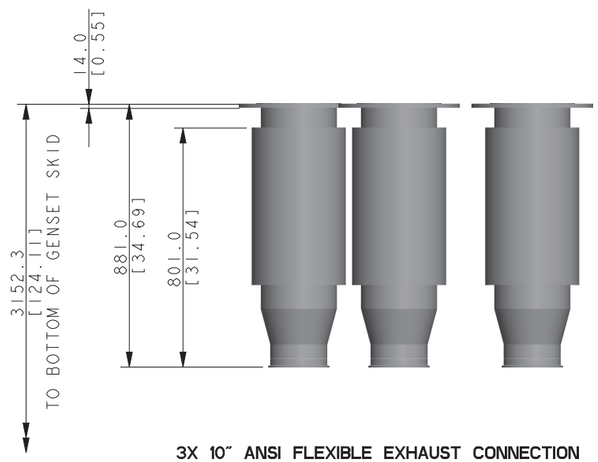


BATTERY CHARGER KITS



STANDARD DUTY AIR CLEANER





3X 10" ANSI FLEXIBLE EXHAUST CONNECTION

NOTE:
FLEXIBLE EXHAUST TO BE FULLY SUPPORTED BY EXTERNAL STRUCTURE (*ALLOWED BENDING MOMENT AT EXHAUST FLANGE INTERFACE LESS THAN 75Nm*)

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
G	4-4-18	CONTENTS OF SHEET 5 MOVED TO THIS SHEET, SEE	
		SHEET 4 & 5 [CT186192]	SSS
H	12-5-18	SEE SHEET 3 [CT192176]	ADP
J	1-17-19	SEE SHEET 1 & 3 [PR07774]	BGW
K	9APR2019	(A-2) TOLERANCES REMOVED [CT194818]	SUD
L	12-20-19	CONTENTS OF SHEET 7 MOVED TO THIS SHEET, SEE	
		SHEET 1, 2 & 3 [CT200775]	SLR
M	19MAY2020	SEE SHEET 1 & 3 [CT204162]	PAR
N	10AUG2021	ALL CONTENT MOVED TO SHEET 9; SEE SHEET 5 [CT213945]	RVM

DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: N/A

THIRD ANGLE PROJECTION

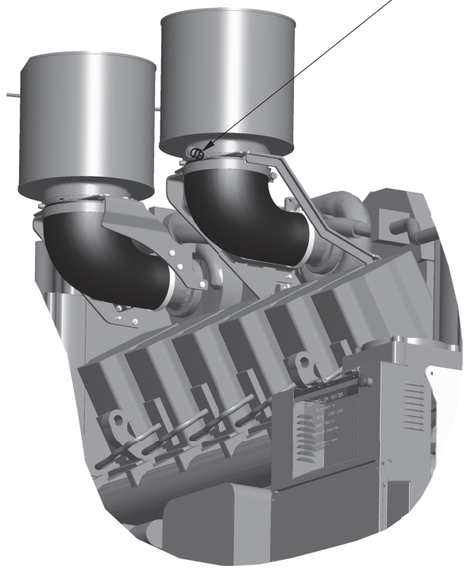
APPROVALS		DATE
DRAWN	BGW	11-29-16
CHECKED	WDG	11-29-16
APPROVED	WDG	11-29-16

TITLE: **DIMENSIONAL PRINT, KD2000-2500**

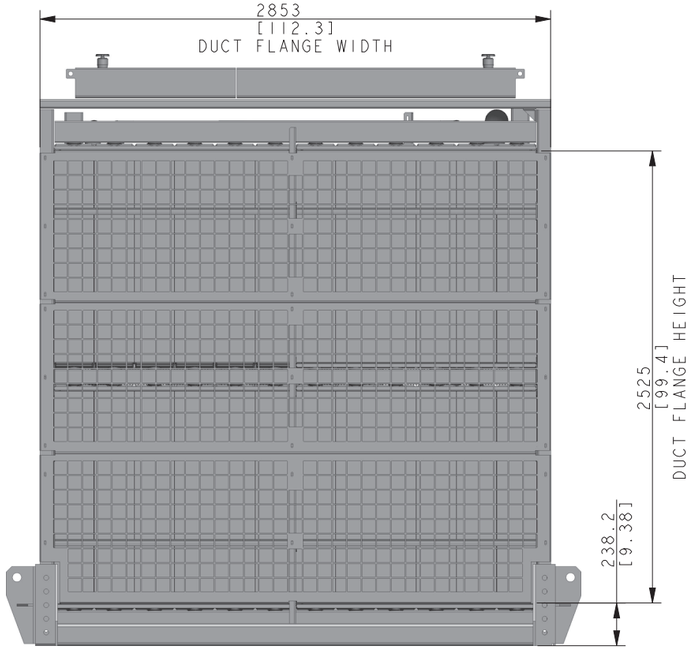
SCALE 0.04 | CAD NO. | SHEET 8 of 10

DWG NO. **ADV-8925** | **D**

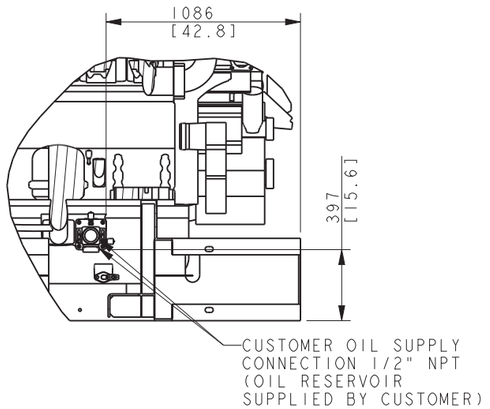
KD2000, KD2250, KD2500
KD62V12



AIR FILTER RESTRICTION INDICATOR

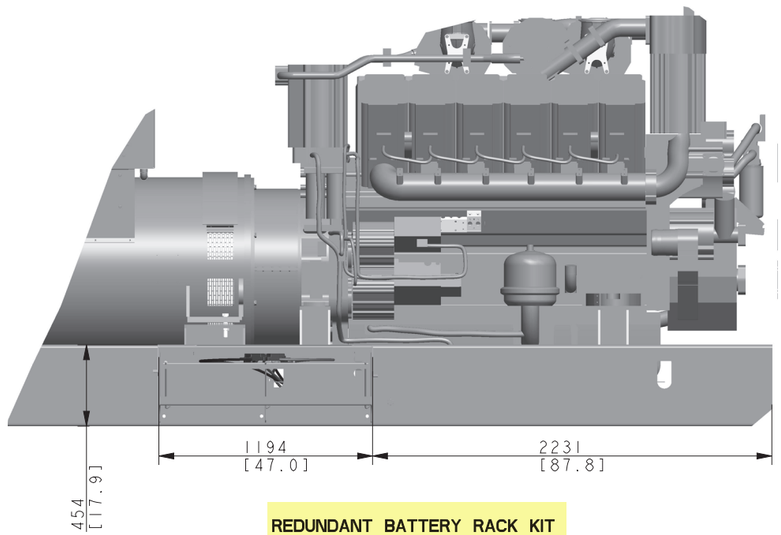


DUCT FLANGE AND STONE GUARD



AUTOMATIC OIL REPLENISHMENT SYSTEM

SECTION OIL-REG-OIL-REG



REDUNDANT BATTERY RACK KIT

KD2000, KD2250, KD2500
KD62V12

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
G	4-4-18	CONTENTS OF SHEET 6 MOVED TO THIS SHEET, SEE	
		SHEET 4 & 5 [CT186192]	SSS
H	12-5-18	SEE SHEET 3 [CT192176]	ADP
J	1-17-19	SEE SHEET 1 & 3 [PR07774]	BGW
K	9APR2019	(A-2) TOLERANCES REMOVED [CT194818]	SUD
L	12-20-19	CONTENTS OF SHEET 8 MOVED TO THIS SHEET, SEE	
		SHEET 1, 2 & 3 [CT200775]	SLR
M	19MAY2020	SEE SHEET 1 & 3 [CT204162]	PAR
N	10AUG2021	ALL CONTENT MOVED TO SHEET 10; SEE SHEET 5	
		[CT213945]	RVM

DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: N/A

THIRD ANGLE PROJECTION

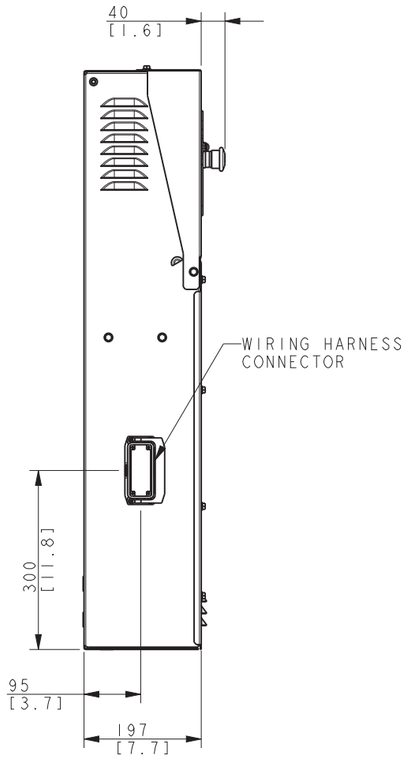
APPROVALS		DATE
DRAWN	BGW	11-29-16
CHECKED	WDG	11-29-16
APPROVED	WDG	11-29-16

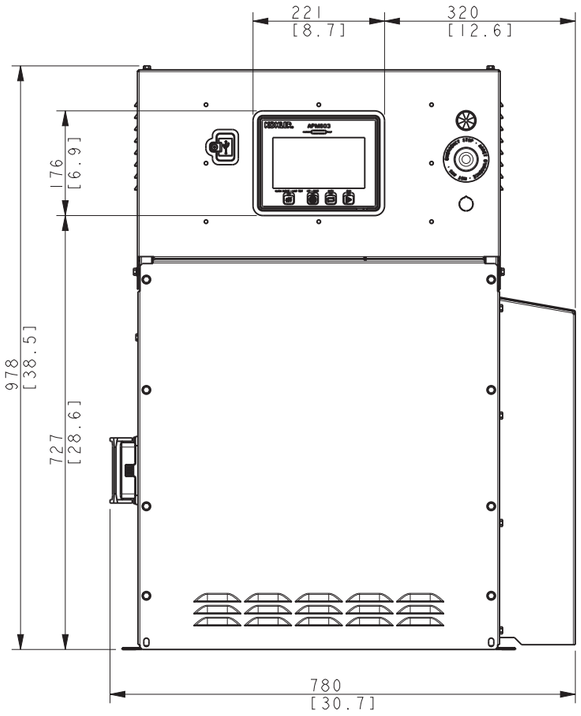
TITLE: **DIMENSIONAL PRINT, KD2000-2500**

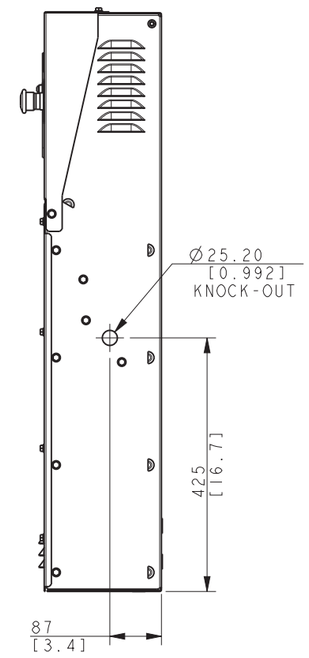
SCALE 0.06 | CAD NO. | SHEET 9 of 10

DWG NO. **ADV-8925** | **D**

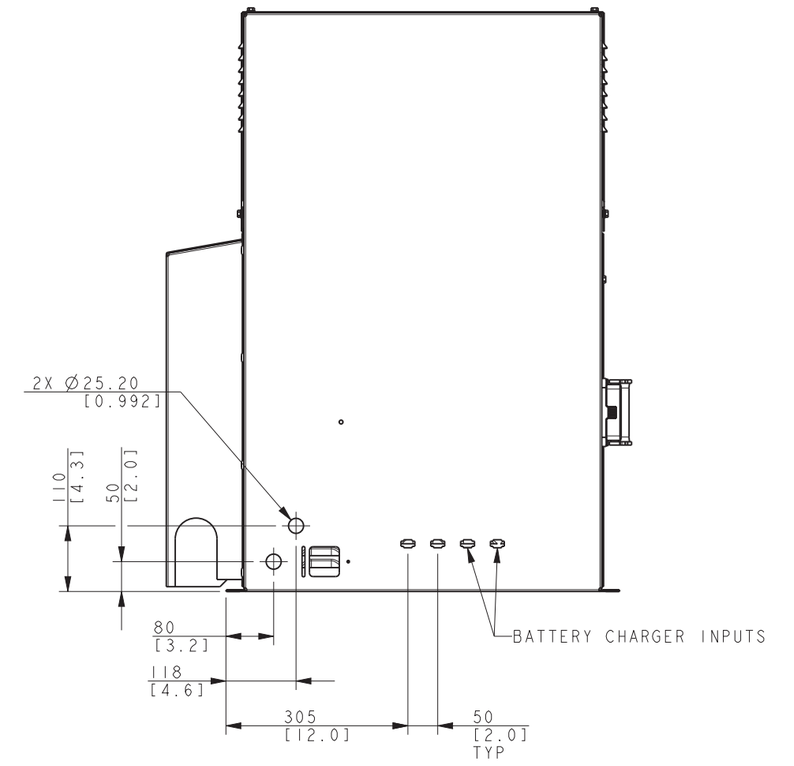
APM603

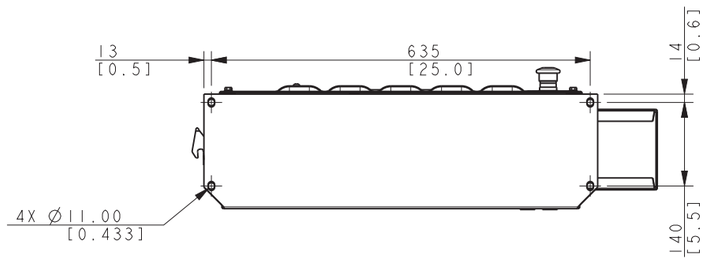






RIGHT SIDE VIEW WITH
WIRING CHUTE REMOVED





NOTE: 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
A	4-1-19	VIEWS ADDED FOR APM603 [CT194757]	YBY
B	8-2-19	SEE SHEET 1 [CT197629]	SMH

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

THIRD ANGLE PROJECTION

APPROVALS		DATE (M-D-Y)
DRAWN	YBY	4-1-19
CHECKED	DJV	4-1-19
APPROVED	LAC	4-1-19

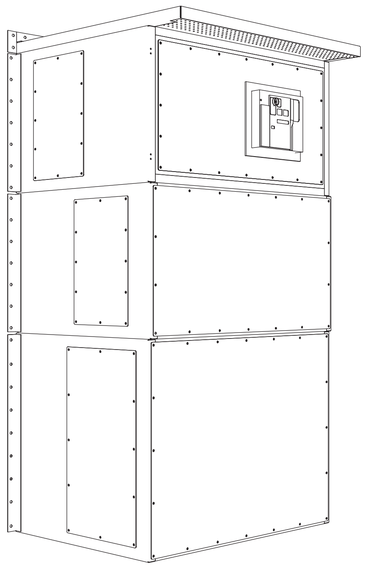
KOHLER CO. SDMO
KOHLER POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
SDMO, CS 92648, 29228 BREST CEDEX 2, FRANCE

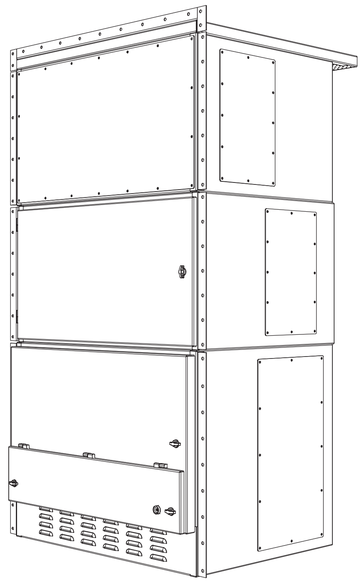
METRIC
PRO-E

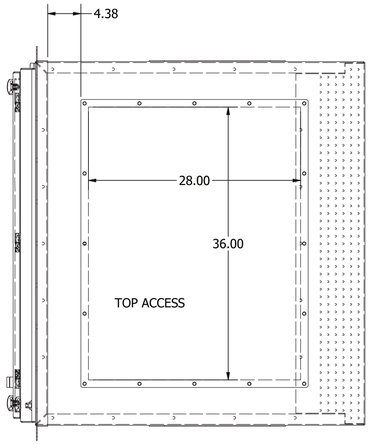
TITLE
DIMENSION PRINT, CONTROLLER

SCALE 0.20 | CAD NO. | SHEET 2 of 2
DWG NO. ADV-8869 | D

KDI 800-4000KW
CONTROLLER



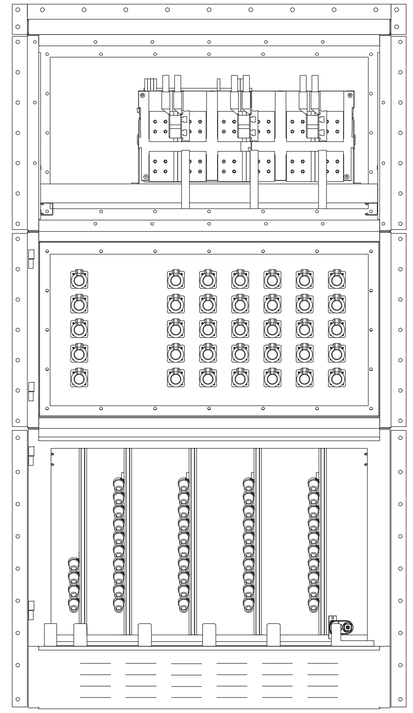


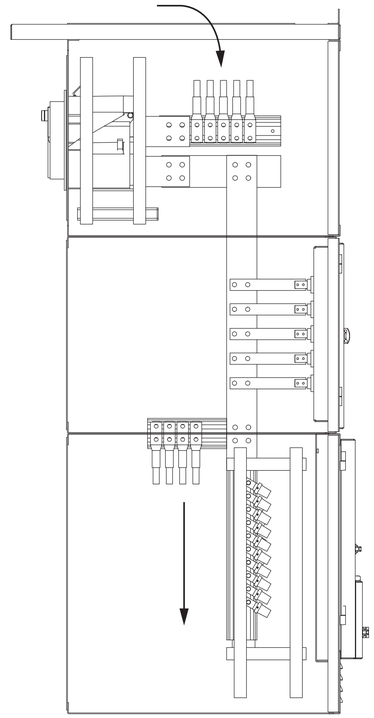


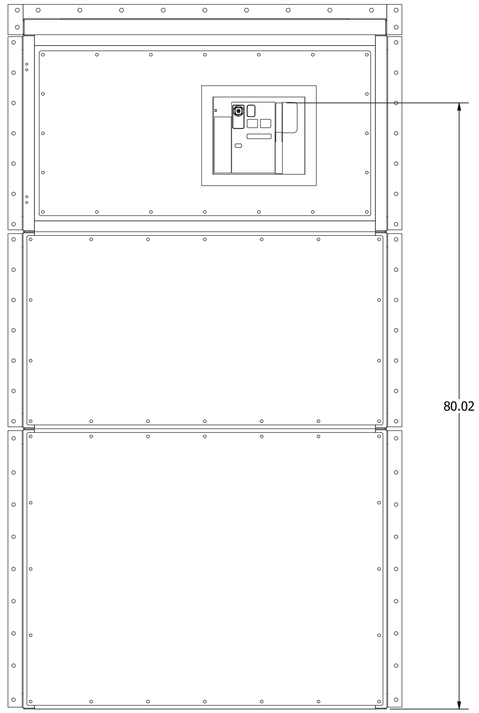
4000A GENERATOR MAIN
WITH TRAPPED KEY

LOAD BANK SECTION

TRAPPED KEY
ACCESSIBLE PORTABLE
GENERATOR CAMS







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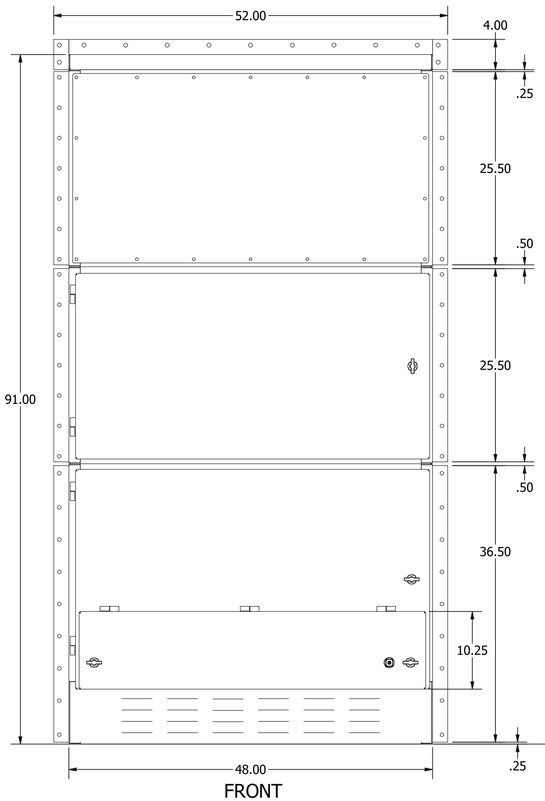

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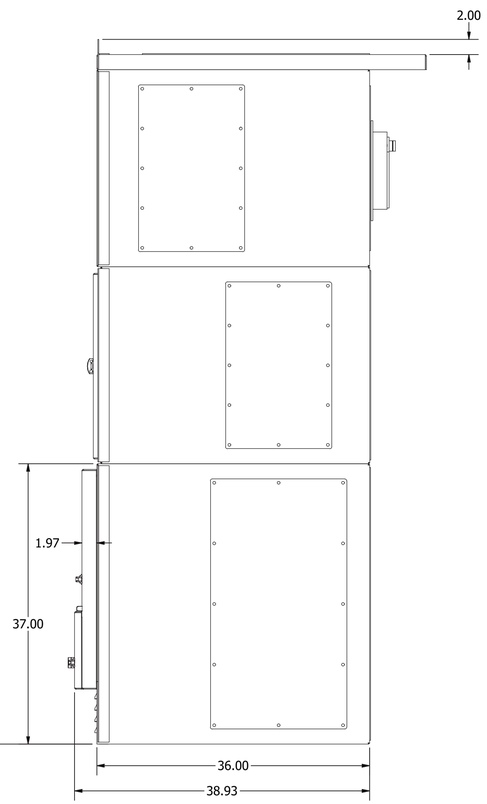
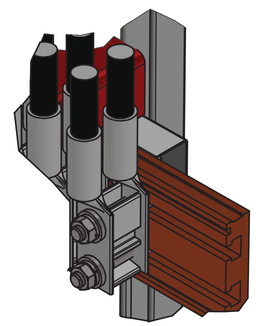




TYPICAL STACKED COMPRESSION LUG ASSY

power temp systems INC.

DRAWN	milkom	10/20/2020
CHECKED		
QA		
MFG		
APPROVED		

TITLE
4000A DUAL BREAKER W/ TRAPPED KEY
QUICK CONNECT DOCKING PANEL - FLANGED

SIZE	DWG NO	REV
D	PTSENC483691-QCDP-FLG-TKA	

SCALE .1 SHEET 1 OF 1

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

TANK NOTES:

1. ALL FITTINGS TO BE CARBON STEEL WELD FLANGES (UNLESS OTHERWISE NOTED)
2. EXTERIOR FINISH: "BLACK" - TKP – STANDARD TANK/BASE PAINT, MARINE INLAND
3. INNER TANK DIMENSIONS: 450.50"L x 137.875"W x 37.742"H
4. APPROXIMATE USEABLE TANK CAPACITY: 8,300 GALLONS @ 90 %
5. ACTUAL TANK VOLUME (100%): 9,458 GALLONS
6. APPROXIMATE TANK WEIGHT: 22,000 LBS

NOTES:

1. GENERATOR, KOHLER KD2500 OPEN, ALT: KH08430TO4D
   DIMENSIONS: 264.4"L X 114.8"W X 130.0"H
   WEIGHT: 53,363 LBS
   DRAWING # : ADV-8925
2. TOTAL AIRFLOW REQUIRED: 97345 CFM
3. SOUND ATTENUATION LEVEL: 15 dB(A) REDUCTION AT 23 FEET
4. INSULATION: 2" MAT-FACED MICRO-AIRE DUCT BOARD
5. LINING: MILL-FINISH PERFORATED ALUMINUM
6. ENCLOSURE WALLS: 4" ALUMINUM TUBE WELDED FRAME
7. ENCLOSURE ROOF: 2" ALUMINUM TUBE WELDED FRAME
8. ENCLOSURE DIMENSIONS: 556"L x 158"W x 161"H
9. ENCLOSURE WEIGHT (APPROX.): 12,000 LBS
10. ENCLOSURE COLOR: 1302 "INDUSTRIAL GREY"
11. ENCLOSURE SHALL BE PROVIDED w / 4-POINT LIFTING LUGS
12. TOTAL PACKAGE WEIGHT:87,363 LBS

Sheet List Table

Sheet Number	Sheet Title
1	COVER SHEET
2	SPECIAL INSTRUCTIONS
3	ASSEMBLY
4	SA LVL 1 ENCLOSURE RIGHT VIEW
5	SA LVL 1 ENCLOSURE END VIEW
6	ELECTRICAL PLAN
7	UL 142 DIESEL FUEL TANK
8	INSIDE PLATFORM
9	SUGGESTED PAD LAYOUT
10	ANCHOR DETAIL
11	E1
12	E2
13	E3
14	E4
15	E5

REVISIONS:

REVISION LEVEL	REVISION DESCRIPTION	SHEET OF CHANGE(S)	ENGINEER	DATE
00	INITIAL RELEASE (QUOTE # 94802REV1)		JAL	10/8/2021
01	REVISED TO REFLECT QUOTE# 94802REV3		JAL	10/26/2021
02				
03				
04				

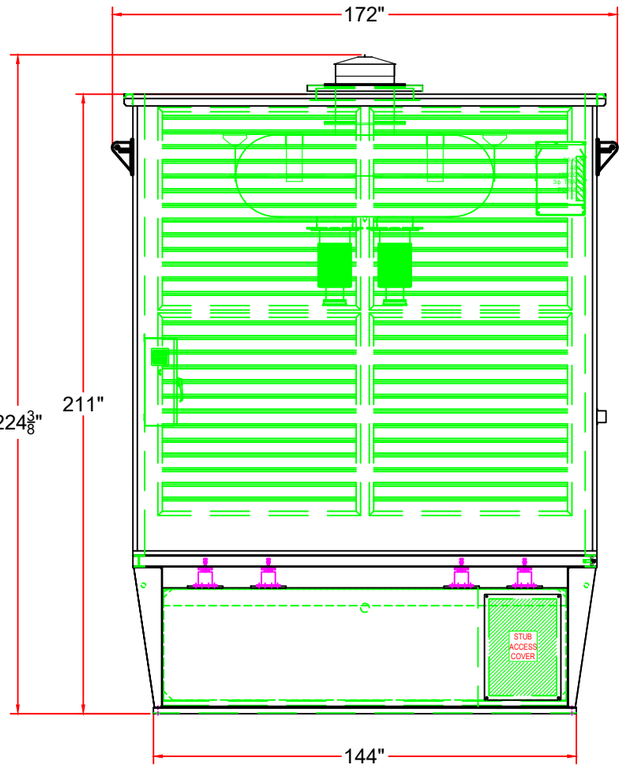
DRAWING ACCEPTED FOR PRODUCTION	
SIGNATURE	
PRINT NAME-TITLE	DATE / /

1	ENCLOSURE WIND-LOAD RATED AT 120 MPH
2	ENCLOSURE DOORS TO HAVE PAD LOCKABLE PANIC HARDWARE (CRASH BARS), KASON DOOR HANDLE UPGRADE 316SS. INCLUDES HOLD OPEN BRACKETS
3	FUMES DISPOSAL TUBE TO BE ROUTED INTO DISCHARGE PLENUM
4	MOTORIZED INTAKE LOUVERS AND GRAVITY EXHAUST LOUVERS
5	SILENCER, EXHAUST FLANGES, AND EXHAUST FLEXES TO BE WRAPPED IN THERMAL WRAP INSULATION BLANKETS WITH SPRINGS
6	ENCLOSURE ELECTRICAL PACKAGE OPTION THAT INCLUDES A 100 AMP MAIN 3 PHASE PANEL BOARD, UP TO (6) LED LIGHTS, (2) 20A GFCI OUTLETS, AND (2) SWITCHES. ALSO INCLUDES GENERATOR ACCESSORY CONNECTIONS FOR JACKET WATER HEATER, BATTERY CHARGER, AND ALTERNATOR HEATER. INCLUDES INSTALL OF CUSTOMER SUPPLIED BATTERY CHARGER (IF SHIPPED LOOSE).
7	
8	EMERGENCY STOP BUTTON BREAK GLASS STATION INSTALLED ON ENCLOSURE EXTERIOR, NEMA 4X NON-METALLIC
9	TWO 5KW SPACE HEATER WITH THERMOSTAT INSTALLED IN ENCLOSURE
10	TWO EXHAUST FANS AND THERMOSTAT INSTALLED IN ENCLOSURE
11	PROVIDE AND INSTALL TRANSFORMER, 30 KVA 3 PHASE WITH A 60AMP FUSED DISCONNECT
12	ROOF-MOUNTED (2) HEAVY DUTY STEEL D-RINGS WITH STAINLESS STEEL PLATE
13	2" AIR GAP UNDERNEATH FUEL TANK FOR VISUAL INSPECTION
14	INSTALL CUSTOMER SUPPLIED OIL LEVELER. INCLUDES TANK BRACKET AND LABOR TO INSTALL. DOES NOT INCLUDE OIL OR FINAL ENGINE RUNNING ADJUSTMENTS
15	7-1/2 GALLON FILL/SPILL BUCKET W/ PAD LOCKABLE LID
16	OVERFILL PREVENTION VALVE (2" CAMLOK CONNECTOR) INSTALLED IN FILL/SPILL BUCKET SET @ 90%
17	FUEL FILL EXTENSION FOR STATIC DISCHARGE (FUEL FILL EXTENDED TO 6" FROM BOTTOM OF TANK). USE DROP TUBE ON OPV

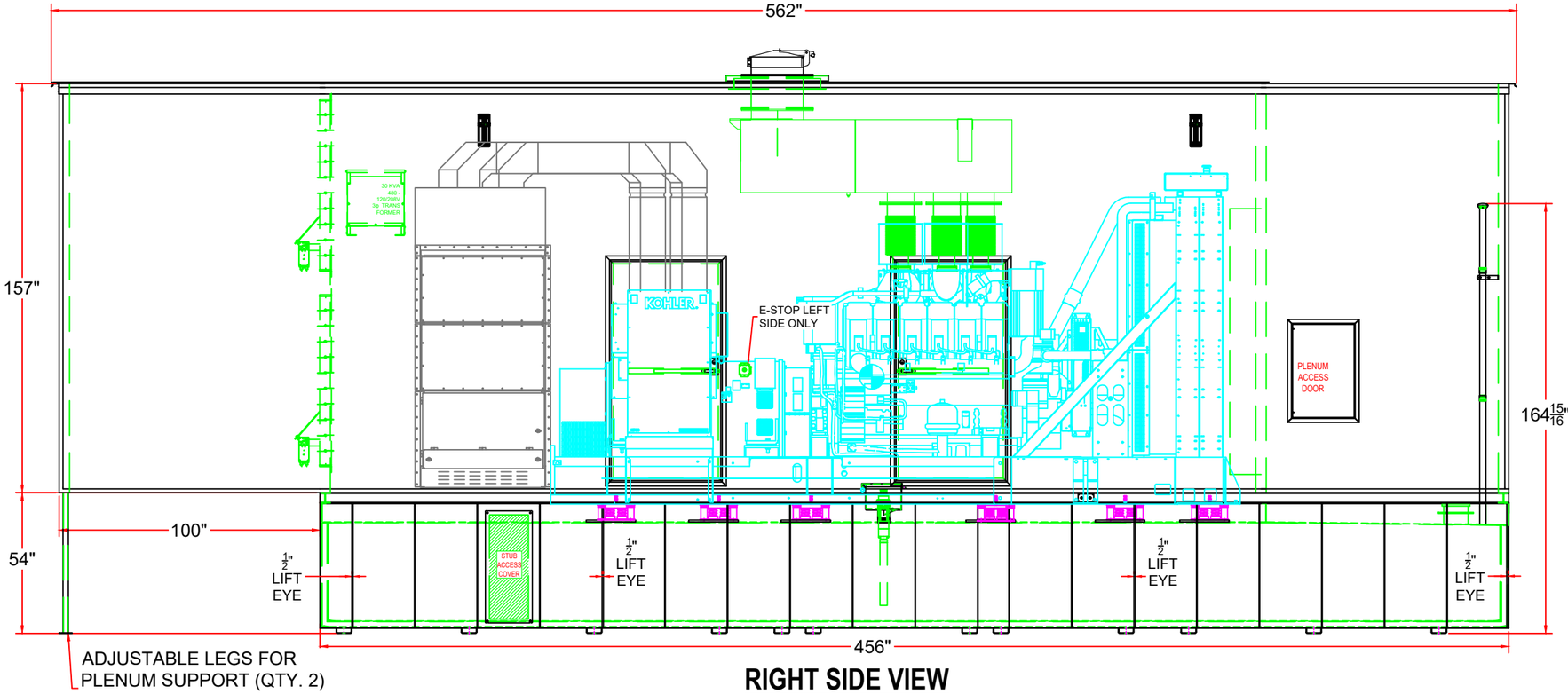
18	-LOW FUEL SWITCH (STAINLESS) AT 25% -HIGH FUEL SWITCH (STAINLESS) AT 85% -CRITICAL HIGH FUEL SWITCH (STAINLESS) AT 90% -CRITICAL LOW FUEL SWITCH (STAINLESS) AT 10%
19	INSTALL CUSTOMER SUPPLIED FUEL POLISHER SYSTEM ON FUEL TANK. INCLUDES MOUNTING BRACKET, PIPING, HOSES, ELECTRICAL CONNECTION TO PANEL BOARD
20	NORMAL VENT EXTENSION, 2" NPT X 12' ABOVE GRADE, EXTERIOR TO HOUSING
21	
22	REMOTE ANNUNCIATOR - 5 RED LIGHT (24 VDC) UL LISTED NEMA4 ENCLOSURE STANDARD WITH AUDIBLE ALARM HORN AND SILENCE/RESET BUTTON. TYPICAL ARRANGEMENT FOR CRITICAL HIGH FUEL LEVEL (90%), HIGH FUEL LEVEL (85%) (CITY OF DENVER), LOW FUEL LEVEL (25%), CRITICAL LOW FUEL LEVEL (10%) AND RUPTURE BASIN ALARM POINTS
23	MOUNT GENSET AND INSTALL FUEL LINES. BALL VALVES INSTALLED IN THE SUPPLY/RETURN LINE TO/FROM THE ENGINE
24	ENCLOSURE TO BE PREPPED FOR SHIPMENT BY CLOSING OFF PLENUM OPENINGS AND EXPOSED ENCLOSURE SIDES THAT WILL OVERHANG FREIGHT CARRIER TRAILER
25	KD SERIES OPTIONS: - NO BARIUM, CALCIUM, COPPER, LEAD, MAGNESIUM, PHOSPHOROUS, POTASSIUM, SODIUM, OR ZINC IN FUEL LINE SYSTEM. - STANDARD LOW FUEL SWITCH UPGRADED TO STAINLESS STEEL. - TO USE FACTORY SUPPLIED FUEL LINES TO CONNECT TO TANK. - IF MULTIPLE FUEL LINES ARE NEEDED MFG TO SUPPLY FLEX LINES WITH A STAINLESS STEEL CONNECTION FITTING (JIC).
26	COATING FOR INSIDE OF INNER TANK. (ITL). INCLUDES NEAR-WHITE SAND BLAST
27	SS FUEL LINES IN LIEU OF STANDARD FUEL LINES, 36" PER
28	CHECK VALVE INSTALLED IN ENGINE FUEL SUPPLY LINE. 1" FNPT
29	PROVIDE AND INSTALL 240-30 OHM SENDER, WIRE TO CONTROL PANEL FOR CUSTOMER TO CONNECT
30	ONE ALUMINUM PLATFORM WITH MOLDED FIBERGLASS GRATING

31	MFG TO SUPPLY FACTORY WITNESS TESTING AT MFG LOCATION PER SPEC (FOR THE 1ST UNIT ONLY) STORAGE IN THE TANK FOR THIS PROJECT) -MFG TO SUPPLY LOAD BANK, TRANSFORMER, CABLING, AND CONNECTIONS FOR TESTING TO BE COMPLETED
32	STAMPED PE DRAWINGS AND CALCULATIONS FOR WIND/SEISMIC CERTIFICATION FOR ENCLOSURE DESIGN TO BE SUPPLIED BY A STATE OF CO PROFESSIONAL ENGINEER
33	THREE YEAR WARRANTY

PLEASE NOTE THAT THE FOLLOWING ITEMS WILL SHIP LOOSE AND REQUIRE ON-SITE ASSEMBLY BY OTHERS	
1	NORMAL VENT PIPING
2	EXHAUST ELBOW AND RAIN CAP
3	FUEL TANK
4	GENERATOR
5	ENCLOSURE
6	ONE ALUMINUM PLATFORM



REAR VIEW



RIGHT SIDE VIEW

ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

DESCRIPTION ASSEMBLY

THIRD-ANGLE PROJECTION

DESIGNATION: DL3

USEABLE GALLONS / dBA REDUCTION

8,300 AT 90% / 15

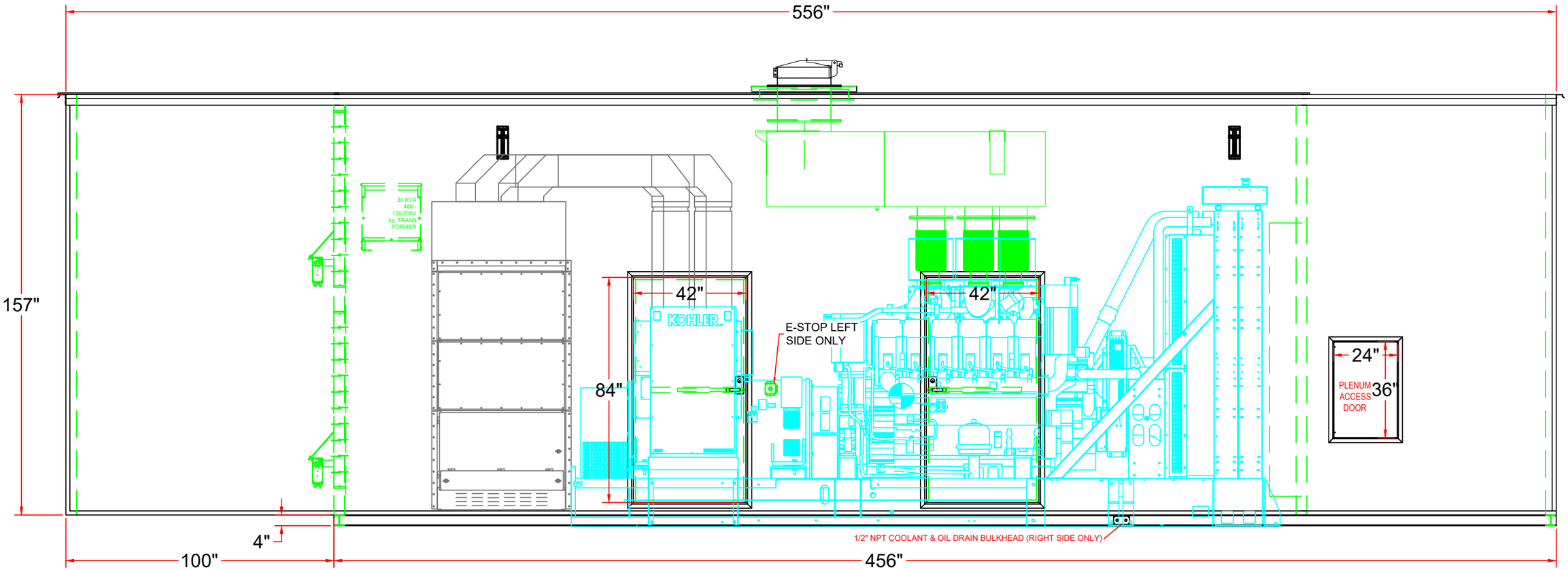
DRW.	JAL
CHK.	SH
APP.	-
DATE	10/26/2021

SCALE:

SHEET 3 OF 15

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic



RIGHT SIDE VIEW

EXHAUST LIST		
QTY.	PART	PART #
1	18" RAINCAP	
1	20" EXHAUST STACK, 20" ANSI FLANGE O.E., 7.25" OAL	
1	20" EXHAUST STACK, 20" ANSI FLANGE O.E., 20" FLOATING ANSI FLANGE O.E., 12.75" OAL	
1	20" O-SERIES CRITICAL GRADE SILENCER	
1	INSULATION BLANKET W/ SPRINGS FOR SILENCER	
1	20" ANSI FLANGE GASKET	
2	20" ANSI NUT, BOLT, GASKET KIT	
3	10" ANSI NUT, BOLT, GASKET KIT	
1	INSULATION BLANKET W/ SPRINGS FOR 20" ANSI FLANGE	
3	INSULATION BLANKET W/ SPRINGS FOR 10" ANSI FLANGE	
3	6" CUSTOM FLARED FLANGE / 10" ANSI FLOATING FLANGE 26" FLEX ASSEMBLY	
3	INSULATION BLANKET W/ SPRINGS FOR FLEX	

NOTE: DRAIN BULKHEAD FOR REFERENCE ONLY. ACTUAL LOCATION TO BE DETERMINED BY TECHNICIAN.

ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

DESCRIPTION SA LVL 1 ENCLOSURE RIGHT VIEW

THIRD-ANGLE PROJECTION

DESIGNATION DL3

dBA REDUCTION
15

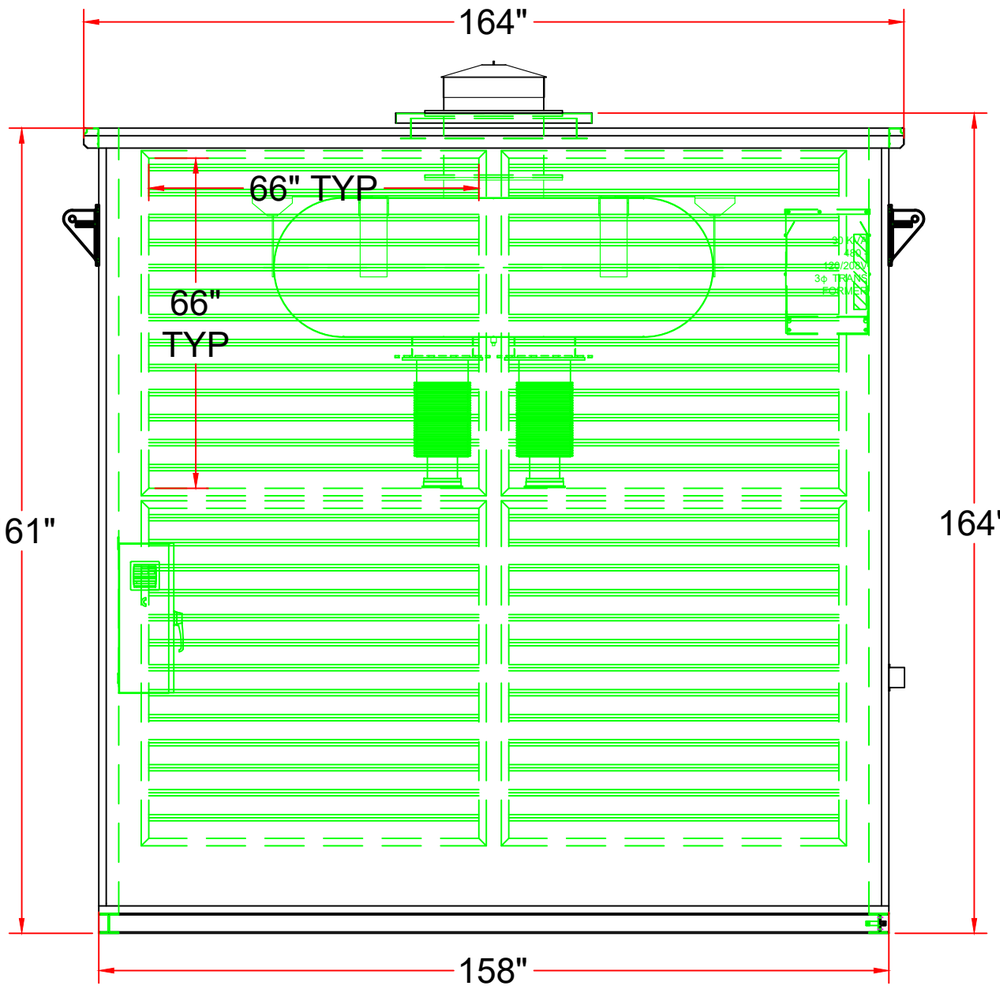
DRW.	JAL
CHK.	SH
APP.	-
DATE	10/26/2021

SCALE:

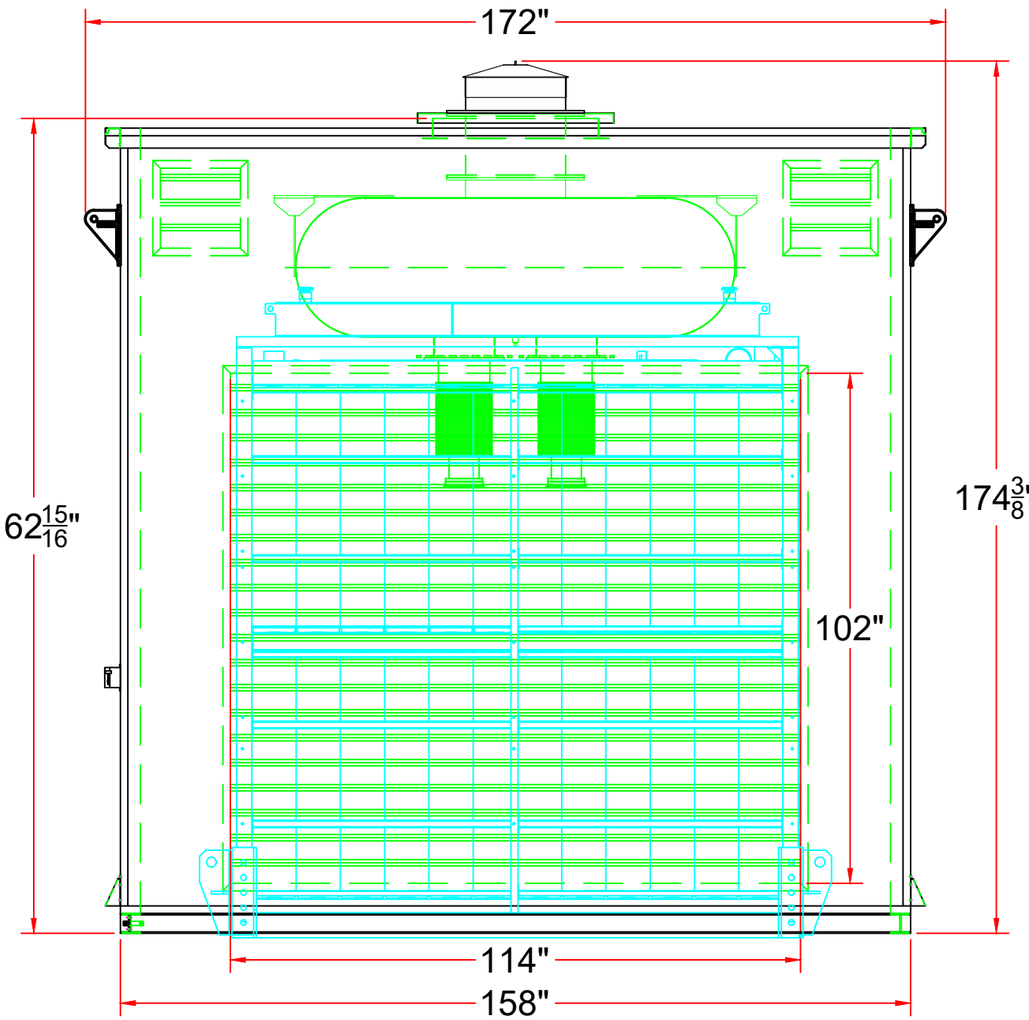
SHEET 4 OF 15

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic



REAR VIEW



FRONT VIEW

ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

DESCRIPTION SA LVL 1 ENCLOSURE END VIEW

THIRD-ANGLE PROJECTION

DESIGNATION DL3

dBA REDUCTION

15

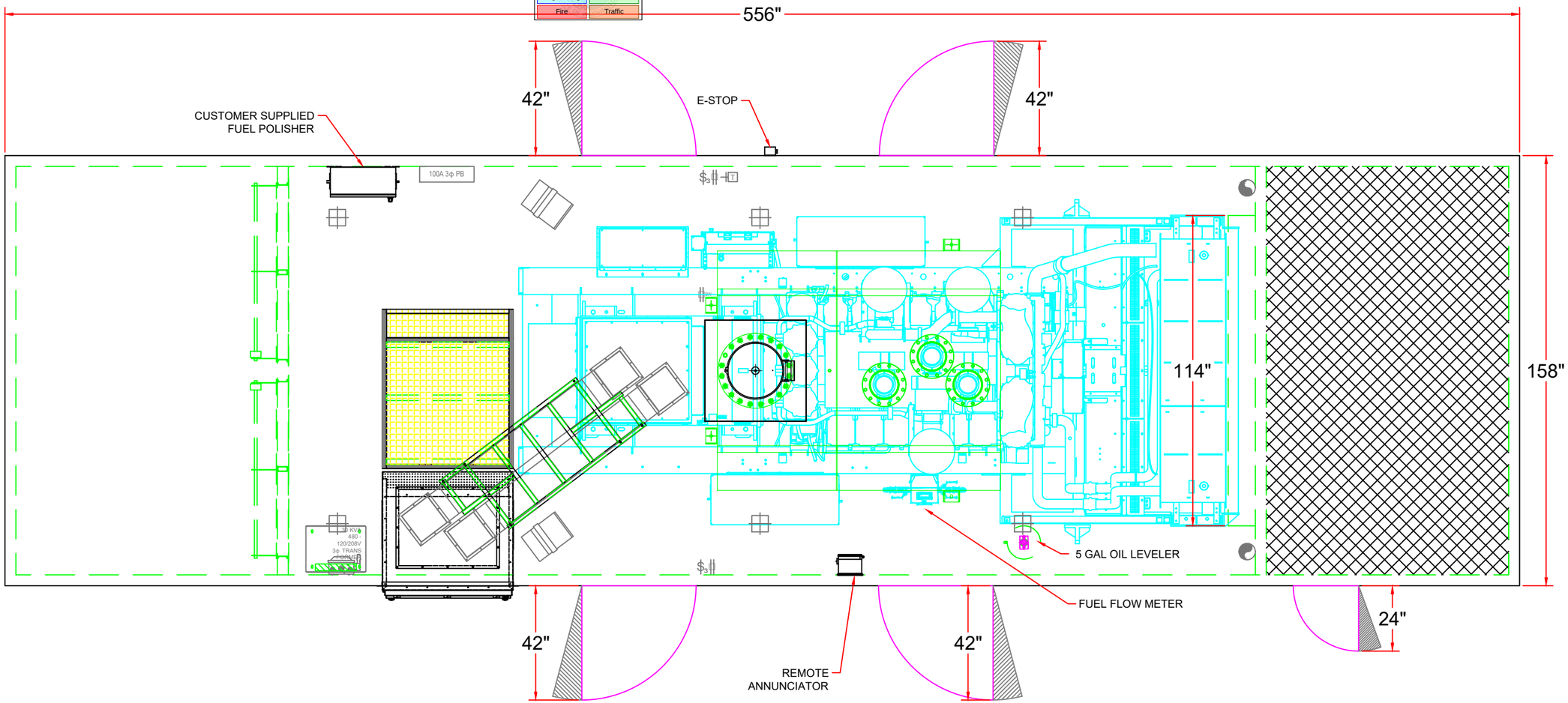
DAMPER LIST		
QTY.	DIMENSIONS	PART #
4	66"W X 66"H	CD-101 (MOTOR IN AIRSTREAM) 552-317
1	114"W X 102"H	CB-601 551-563
2	16"W X 16"H	CB-600 551-053

DRW.	JAL
CHK.	SH
APP.	-
DATE	10/26/2021

SCALE:

SHEET 5 OF 15

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic



PANEL DESIGNATION	EG1	AIC RATING	10,000
VOLTAGE AND PHASE	208/120VAC 3 PHASE	ENCLOSURE	NEMA 1
PANEL BUS SIZE	250A	MANUFACTURER	SIEMENS
MAIN TYPE	MAIN BREAKER		
MAIN AMPS	100		

CKT #	CB TRIP	LOAD AMPS	FEED	LOAD IN AMPS A PH	LOAD IN AMPS B PH	LOAD IN AMPS C PH	FEED	LOAD AMPS	CB TRIP	CKT #
1	20	10	GFCI	33.3			5KW SPACE HEATER	23.3	30	2
3	20	3	INTERIOR LIGHTS		26.3			23.3		4
5	20	6	BATTERY CHARGER #1			29.3	5KW SPACE HEATER	23.3	30	6
7	20	6	BATTERY CHARGER #2	29.3				23.3		8
9	20	6	BATTERY CHARGER #3		35		6KW COOLANT HEATER	29	40	10
11	20	6	BATTERY CHARGER #4			35		29	40	12
13	20	10	EXHAUST FAN/LOUVERS	10						14
15	20	10	FUEL POLISHER		10					16
17						0				18
19				0						20
21					0					22
23						0				24
25				0						26
27					0					28
29						0				30
			PHASE AMPS TOTAL	72.6	71.3	64.3				
			PANEL AMPS MAX PHASE	72.6						
			MINIMUM PANEL SIZE AT 80% LOADING	= 90.75 AMPS						

- SURFACED MOUNTED LED LIGHT FIXTURE
- GROUND FAULT INTERRUPTED DUPLEX OUTLET
- $_3$ — 3-WAY SWITCH
- T — THERMOSTAT
- 5KW CEILING MOUNT HEATER WITH THERMOSTAT (240V)
- EXHAUST FAN - VENTED TO OUTSIDE
- 100A 3ϕ PB — 100A 3 PHASE PANEL BOARD

NOTE: THE LIGHTING FIXTURES SHOWN ARE REPRESENTATIVE OF QUANTITY ONLY. ACTUAL LOCATION WILL BE DETERMINED AT TIME OF INSTALLATION FOR MAXIMUM ILLUMINATION OF THE ENCLOSURE.

ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

DESCRIPTION ELECTRICAL PLAN

THIRD-ANGLE PROJECTION

DESIGNATION

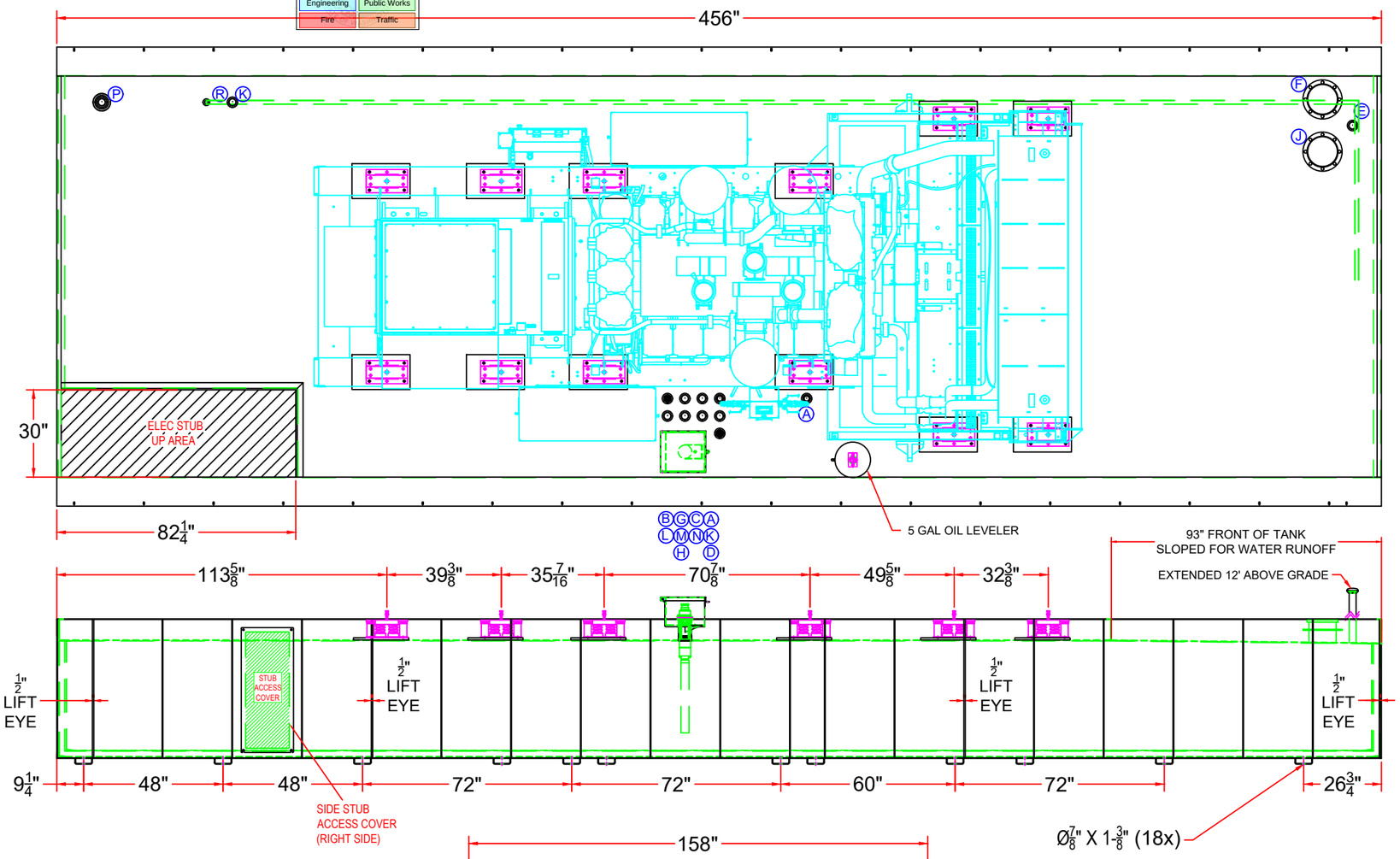
DL3

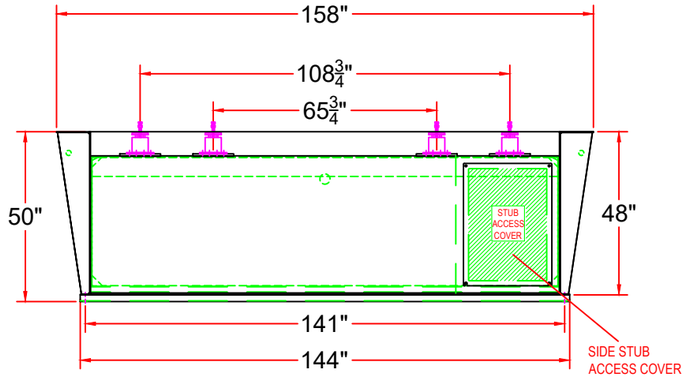
DRW.	JAL
CHK.	SH
APP.	-
DATE	10/26/2021

SCALE:

SHEET 6 OF 15

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic





FITTING	DESCRIPTION	LENGTH
A	2" X 1" NPT FUEL PORT DROP TUBE W/ BALL VALVE (QTY: 2) W/ CHECK VALVE ON FUEL SUPPLY LINE (QTY. 1)	36-7/8"
B	1-1/2" NPT 240-30 OHM FUEL SENDER	35-1/5"
C	2" NPT STAINLESS LOW FUEL SWITCH AT 25%	28-1/8"
D	1-1/2" NPT FUEL GAUGE	35-1/5"
E	2" NPT NORMAL VENT, EXTENDED 12' ABOVE GRADE	
F	8" ANSI FLANGE EMERGENCY VENT (PRIMARY)	
G	2" NPT TOP MOUNT LEAK DETECTION SWITCH & DRAIN PORT	
H	4" NPT 7-1/2 GALLON FILL SPILL BUCKET W/ OVERFILL PREVENTION VALVE (2" CAMLOK CONNECTION) AT 90% W/ STATIC DISCHARGE	
J	8" ANSI FLANGE EMERGENCY VENT (SECONDARY)	
K	2" NPT SPARE FITTINGS (QTY 2)	
L	2" NPT STAINLESS HIGH FUEL SWITCH AT 85%	5-5/8"
M	2" NPT STAINLESS CRITICAL LOW FUEL SWITCH AT 10%	33-3/4"
N	2" NPT STAINLESS CRITICAL HIGH FUEL SWITCH AT 90%	3-3/4"
P	2" NPT WITH 2" X 1" DOUBLE TAP BUSHING AND DROP TUBE WITH 1" IN-LINE CHECK VALVE FOR CONNECTION OF FUEL POLISHER SYSTEM	36-7/8"
R	1" NPT DROP TUBE FOR CONNECTION OF FUEL POLISHER SYSTEM (INTERNALLY PIPE TO OPPOSITE END OF TANK)	

ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

THIRD-ANGLE PROJECTION

DESCRIPTION UL 142 DIESEL FUEL TANK

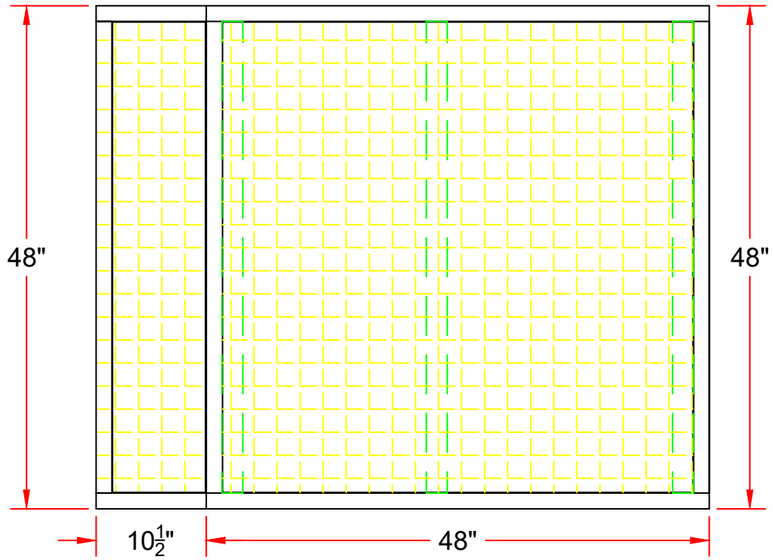
DESIGNATION DL3

USEABLE GALLONS / ACTUAL GALLONS

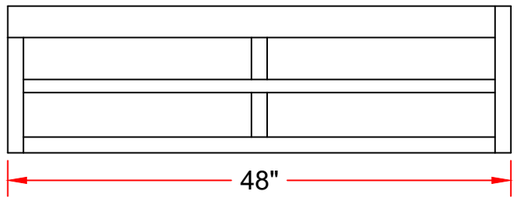
8,300 AT 90% / 9,458

DRW.	JAL
CHK.	SH
APP.	-
DATE	10/26/2021
SCALE:	
SHEET	7 OF 15

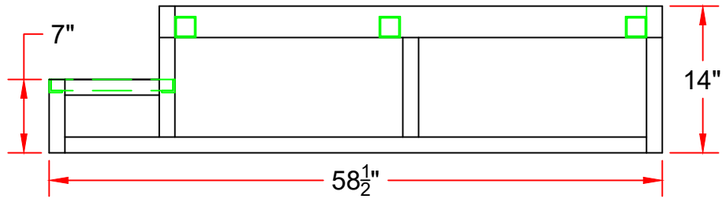
City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic



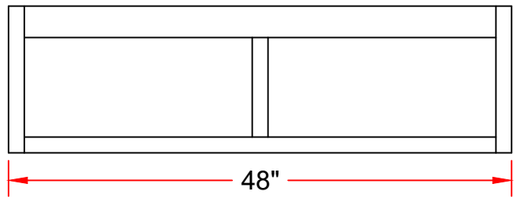
TOP VIEW



FRONT VIEW



SIDE VIEW



REAR VIEW

ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

DESCRIPTION: INSIDE PLATFORM

THIRD-ANGLE PROJECTION

DESIGNATION: DL3

STAIR AND PLATFORM WEIGHT

130 LBS.

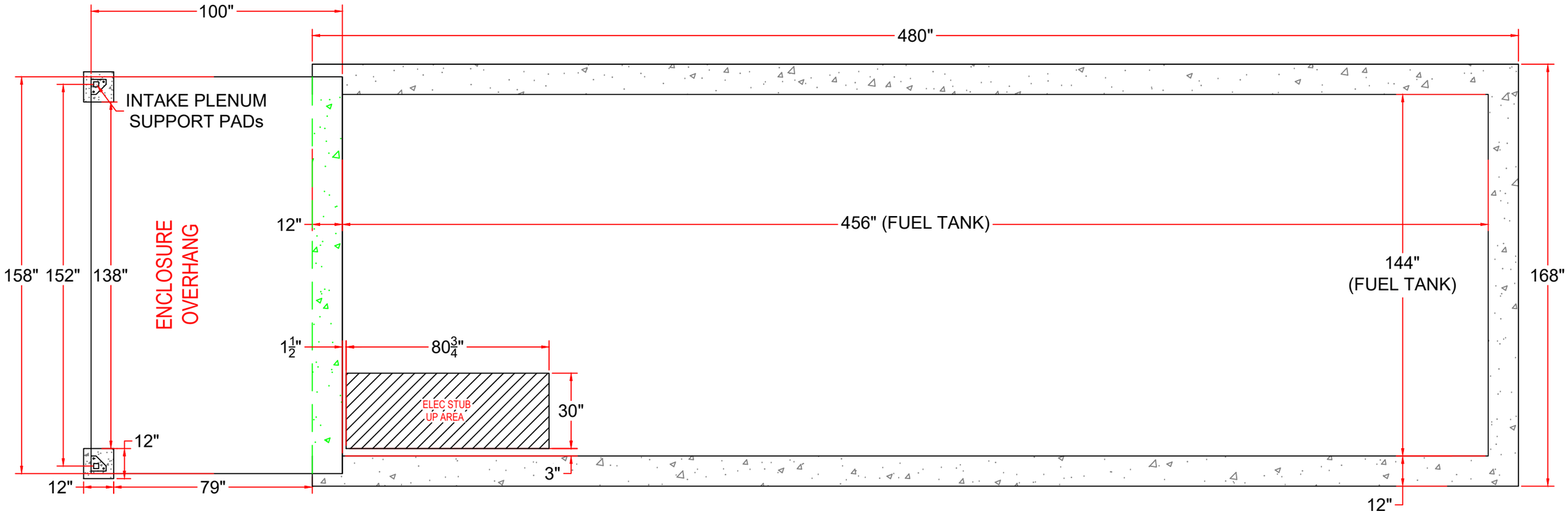
QUANTITY 1
PLATFORM WEIGHS 130 LBS

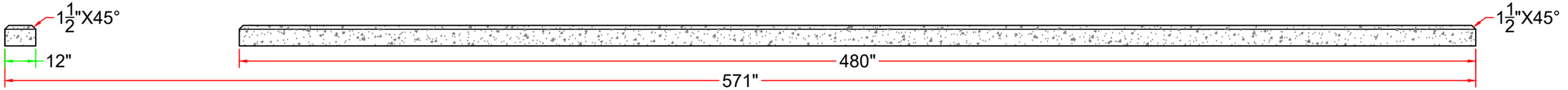
DRW.	JAL
CHK.	SH
APP.	-
DATE	10/26/2021

SCALE:

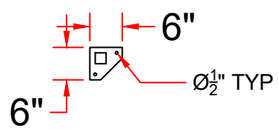
SHEET 8 OF 15

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic





SUPPORT FOOT DETAIL



ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

DESCRIPTION SUGGESTED PAD LAYOUT

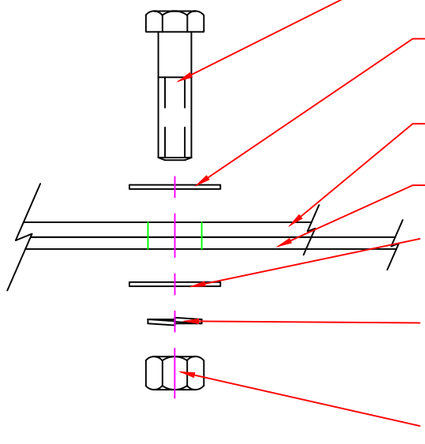
THIRD-ANGLE PROJECTION

DESIGNATION DL3

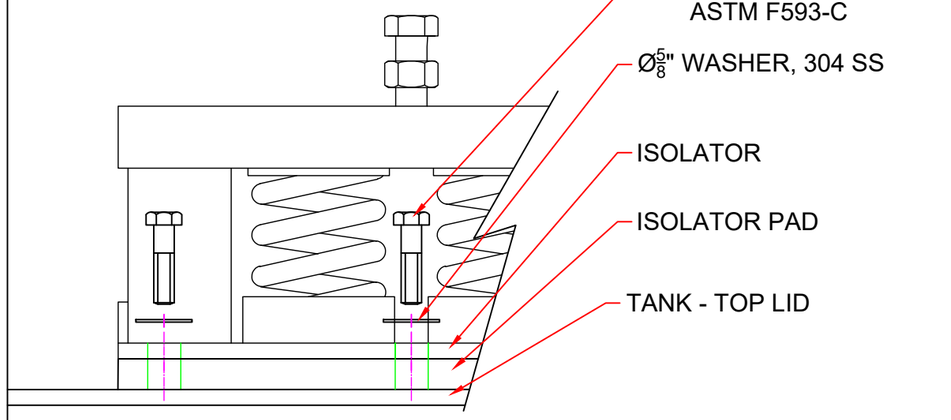
SUGGESTED PAD LAYOUT DRAWING IS FOR STUB-UP LOCATION REFERENCE ONLY. TO OBTAIN FULL FUEL CAPACITY PAD SHOULD BE SLOPED NO MORE THAN 1/4". ACTUAL PAD DESIGN IS TO BE ACCORDING TO PLANS, SPECS, & APPLICABLE JURISDICTIONAL AUTHORITIES.

DRW.	JAL
CHK.	SH
APP.	-
DATE	10/26/2021
SCALE:	
SHEET	9 OF 15

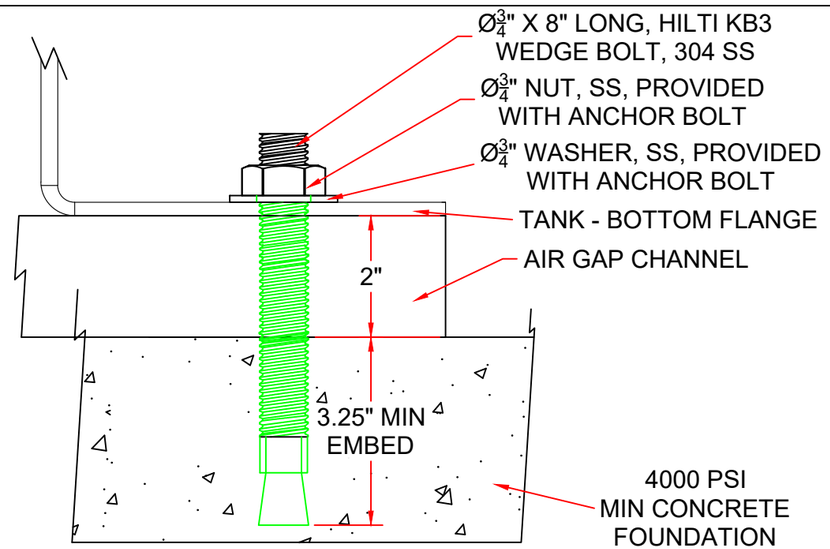
City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic



ENCLOSURE TO TANK | BOLT DETAIL



GENSET WITH ISOLATORS TO TANK | BOLT DETAIL



TANK TO CONCRETE FOUNDATION | BOLT DETAIL

ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

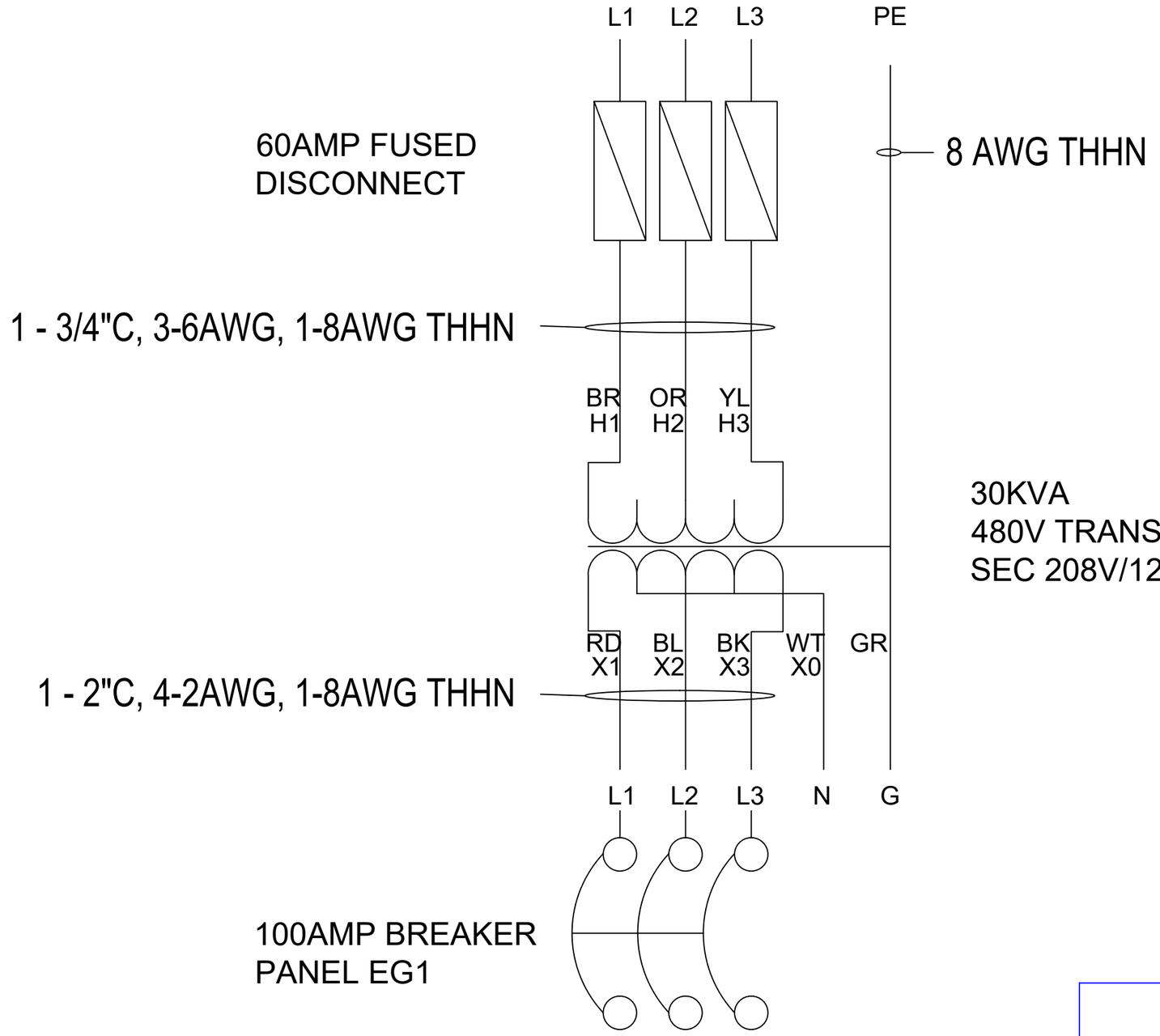
DESCRIPTION ANCHOR DETAIL

THIRD-ANGLE PROJECTION

DESIGNATION
DL3

DRW. JAL
CHK. SH
APP. -
DATE 10/26/2021
SCALE:
SHEET 10 OF 15

480V 3PH SUPPLIED BY OTHERS



ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

DESCRIPTION E1

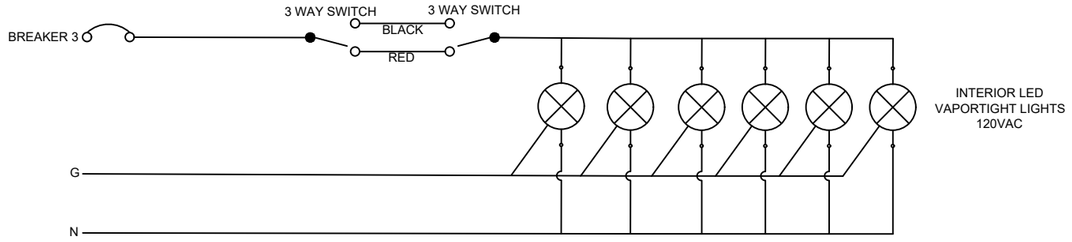
THIRD-ANGLE PROJECTION

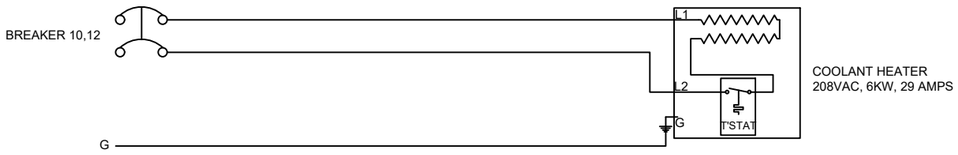
DESIGNATION
DL3

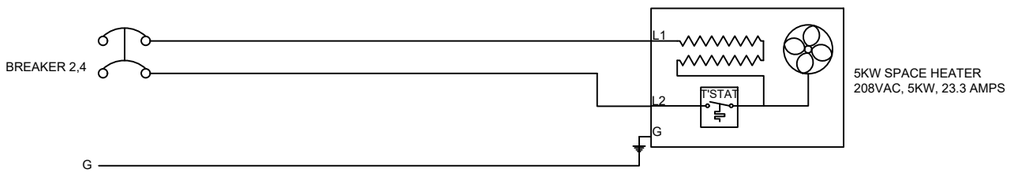
DRW. JAL
CHK. SH
APP. -
DATE 10/26/2021

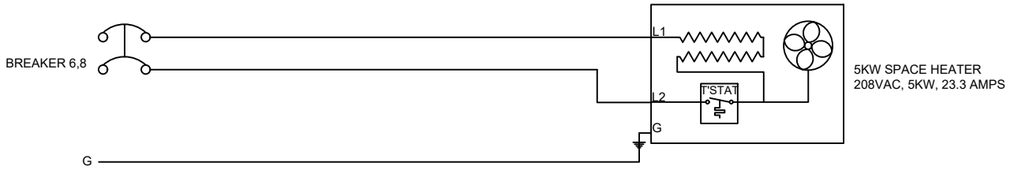
SCALE:

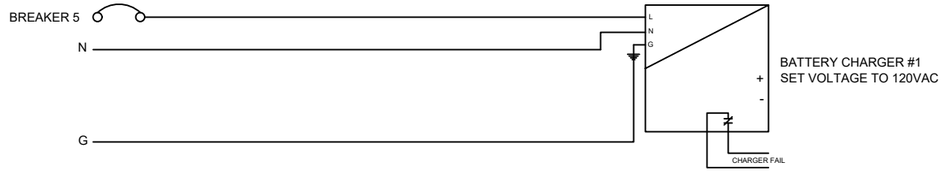
SHEET 11 OF 15

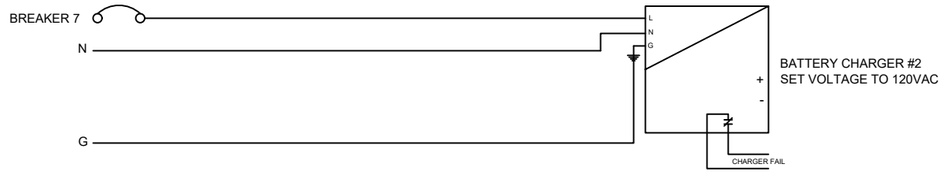


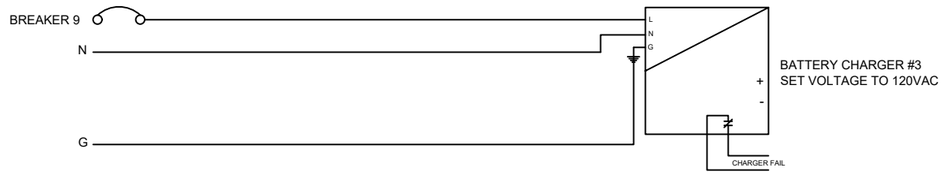


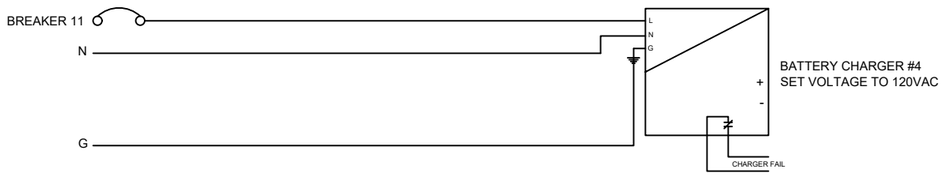












ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

DESCRIPTION E2

THIRD-ANGLE PROJECTION

DESIGNATION

DL3

DRW.	JAL
CHK.	SH
APP.	-
DATE	10/26/2021

SCALE:

SHEET 12 OF 15

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

EXHAUST FANS

FAN CONTACTS CLOSE ON TEMP RISE

T'STAT
BLK
BLU
RED

LOUVER/FAN RELAY
7
1
4
8
2
5
A2
A1

BREAKER 13

GRR

24VDC+

24VDC-

N

G

LM
LM

JUNCTION BOX

LM
LM

LOUVER MOTORS

JUNCTION BOX

LM
LM

BREAKER 15

N

G

FUEL POLISHER
120VAC

BREAKER 1

N

G

20 AMP GFCI RECEP
LOAD
LINE

20 AMP GFCI RECEP
LOAD
LINE

ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

DESCRIPTION E3

THIRD-ANGLE PROJECTION

DESIGNATION
DL3

DRW. JAL
CHK. SH
APP. -
DATE 10/26/2021
SCALE:
SHEET 13 OF 15

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

NFPA 30 PANEL

CRITICAL HIGH FUEL LEVEL
- 39 5
24 40 1

HIGH FUEL LEVEL
- 33 5
22 34 2

LOW FUEL LEVEL
- 30 5
21 31 3

CRITICAL LOW FUEL LEVEL
- 42 5
25 43 3

RUPTURE BASIN ALARM
- 36 5
23 37 4

240-30 OHM SENDER
6
7

GEN CONTROL

E-STOP
TB10-1
4 3
TB10-2

FUEL FLOW METER
BTRY+
BTRY-

ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	***87,363 LBS.***

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

DESCRIPTION E4

THIRD-ANGLE PROJECTION

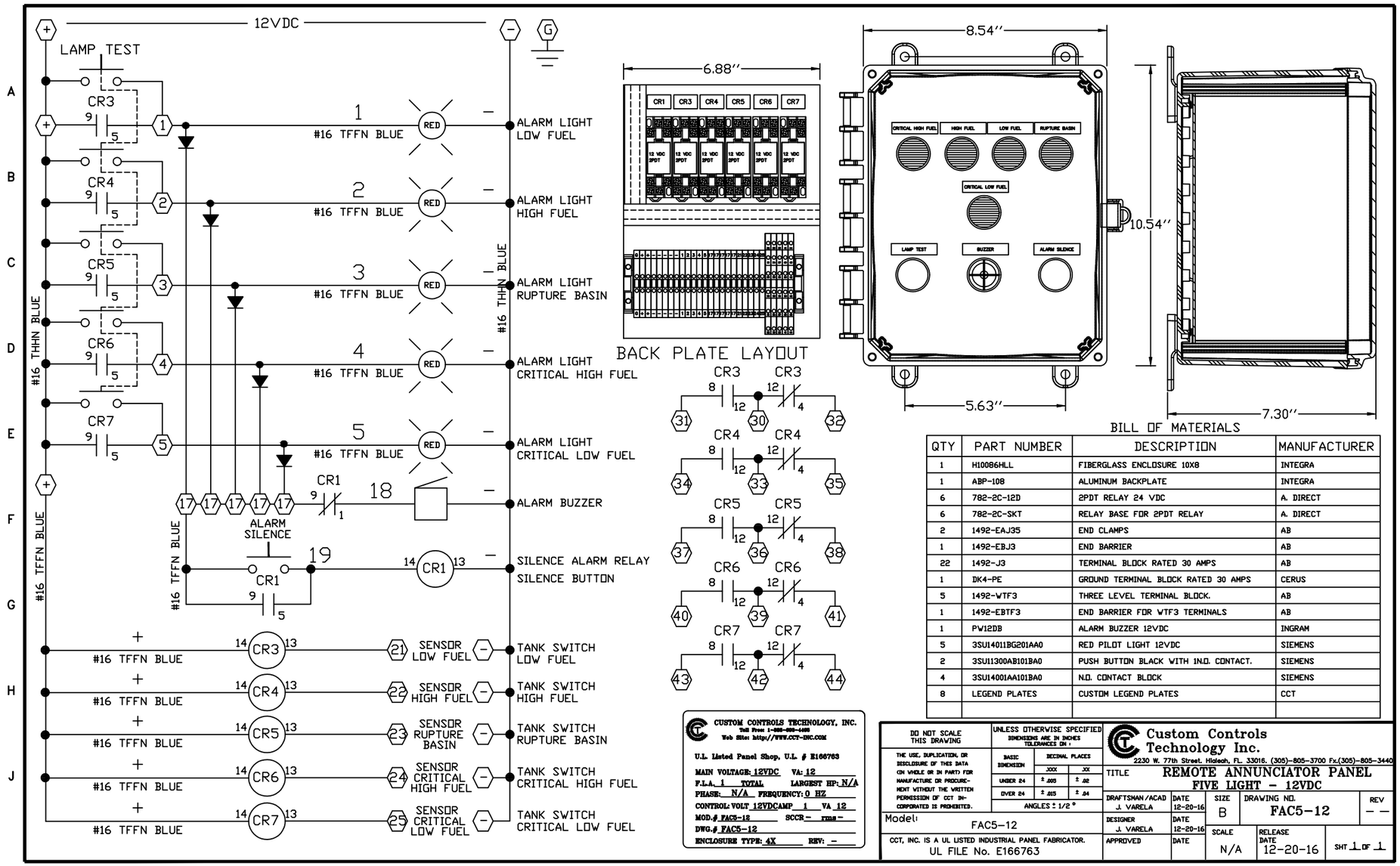
DESIGNATION
DL3

DRW.	JAL
CHK.	SH
APP.	-
DATE	10/26/2021

SCALE:

SHEET 14 OF 15

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic



BACK PLATE LAYOUT

BILL OF MATERIALS

QTY	PART NUMBER	DESCRIPTION	MANUFACTURER
1	H10086HLL	FIBERGLASS ENCLOSURE 10X8	INTEGRA
1	ABP-108	ALUMINUM BACKPLATE	INTEGRA
6	782-2C-12D	2PDT RELAY 24 VDC	A. DIRECT
6	782-2C-SKT	RELAY BASE FOR 2PDT RELAY	A. DIRECT
2	1492-EAJ35	END CLAMPS	AB
1	1492-EBJ3	END BARRIER	AB
22	1492-J3	TERMINAL BLOCK RATED 30 AMPS	AB
1	DK4-PE	GROUND TERMINAL BLOCK RATED 30 AMPS	CERUS
5	1492-WTF3	THREE LEVEL TERMINAL BLOCK.	AB
1	1492-EBTF3	END BARRIER FOR WTF3 TERMINALS	AB
1	PW12DB	ALARM BUZZER 12VDC	INGRAM
5	3SU14011BG201AA0	RED PILOT LIGHT 12VDC	SIEMENS
2	3SU11300AB101BA0	PUSH BUTTON BLACK WITH 1N.O. CONTACT.	SIEMENS
4	3SU14001AA101BA0	N.O. CONTACT BLOCK	SIEMENS
8	LEGEND PLATES	CUSTOM LEGEND PLATES	CCT

CUSTOM CONTROLS TECHNOLOGY, INC.
Toll Free 1-888-888-4488
Web Site: http://WWW.CCT-INC.COM

U.L. Listed Panel Shop, U.L. # E166763

MAIN VOLTAGE: 12VDC VA: 12
F.L.A. 1 TOTAL LARGEST HP: N/A
PHASE: N/A FREQUENCY: 0 HZ
CONTROL VOLT 12VDCAMP 1 VA 12
MOD.# FAC5-12 SCCR - rms -
DWG.# FAC5-12
ENCLOSURE TYPE: 4X REV: -

DO NOT SCALE THIS DRAWING

THE USE, DUPLICATION, OR DISCLOSURE OF THIS DATA (IN WHOLE OR IN PART) FOR MANUFACTURE OR PROCUREMENT WITHOUT THE WRITTEN PERMISSION OF CCT IS PROHIBITED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON :

BASIC DIMENSION	DECIMAL PLACES .XXX	.XX
UNDER 24	± .005	± .02
OVER 24	± .015	± .04

ANGLES ± 1/2 °

Model: FAC5-12

CCT, INC. IS A UL LISTED INDUSTRIAL PANEL FABRICATOR.
UL FILE No. E166763

Custom Controls Technology Inc.
2230 W. 77th Street. Hialeah, FL. 33016. (305)-805-3700 Fx.(305)-805-3440

TITLE: REMOTE ANNUNCIATOR PANEL
FIVE LIGHT - 12VDC

DRAFTSMAN/ACAD	DATE	SIZE	DRAWING NO.	REV
J. VARELA	12-20-16	B	FAC5-12	- -
DESIGNER J. VARELA	DATE 12-20-16			
APPROVED	DATE	SCALE N/A	RELEASE DATE 12-20-16	SHT 1 OF 1

ENCL. WEIGHT	TANK WEIGHT	GEN. WEIGHT	TOTAL WEIGHT
12,000 LBS.	22,000 LBS.	53,363 LBS.	*87,363 LBS.*

CUSTOMER:

KOHLER KD2500 OPEN, ALT: KH08430TO4D

DESCRIPTION E5

THIRD-ANGLE PROJECTION

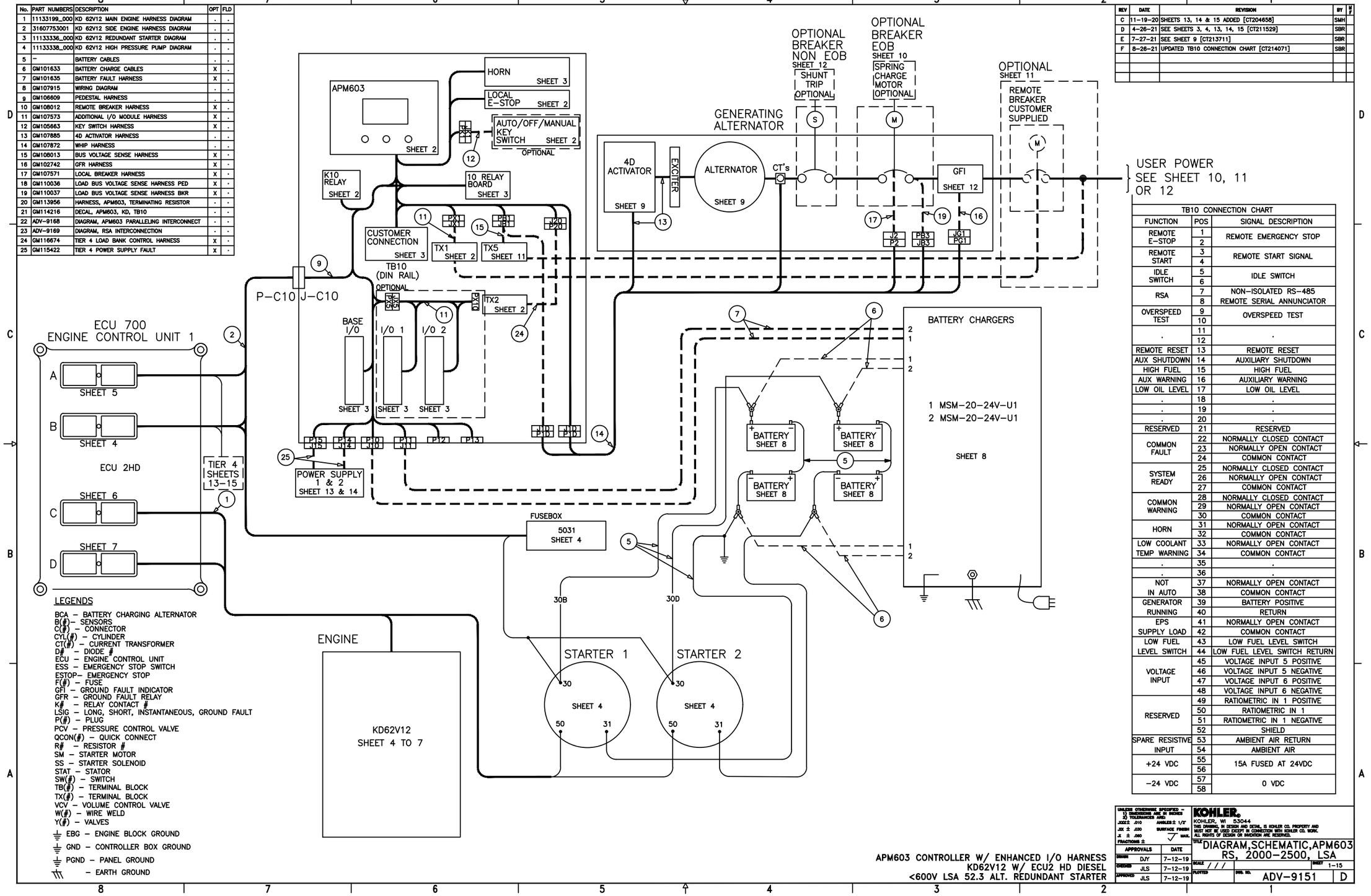
DESIGNATION DL3

DRW.	JAL		
CHK.	SH		
APP.	-		
DATE	10/26/2021	SCALE:	SHEET 15 OF 15

created using AutoCAD

No.	PART NUMBERS	DESCRIPTION	OPT	FLD
1	11133199_000	KD 62V12 MAIN ENGINE HARNESS DIAGRAM	.	.
2	31607753001	KD 62V12 SIDE ENGINE HARNESS DIAGRAM	.	.
3	11133336_000	KD 62V12 REDUNDANT STARTER DIAGRAM	.	.
4	11133338_000	KD 62V12 HIGH PRESSURE PUMP DIAGRAM	.	.
5	–	BATTERY CABLES	.	.
6	GM101633	BATTERY CHARGE CABLES	X	.
7	GM101635	BATTERY FAULT HARNESS	X	.
8	GM107915	WIRING DIAGRAM	.	.
9	GM106609	PEDESTAL HARNESS	.	.
10	GM108012	REMOTE BREAKER HARNESS	X	.
11	GM107573	ADDITIONAL I/O MODULE HARNESS	X	.
12	GM105663	KEY SWITCH HARNESS	X	.
13	GM107885	4D ACTIVATOR HARNESS	.	.
14	GM107872	WHIP HARNESS	.	.
15	GM108013	BUS VOLTAGE SENSE HARNESS	X	.
16	GM102742	GFR HARNESS	X	.
17	GM107571	LOCAL BREAKER HARNESS	X	.
18	GM110036	LOAD BUS VOLTAGE SENSE HARNESS PED	X	.
19	GM110037	LOAD BUS VOLTAGE SENSE HARNESS BKR	X	.
20	GM113956	HARNESS, APM603, TERMINATING RESISTOR	.	.
21	GM114216	DECAL, APM603, KD, TB10	.	.
22	ADV-9168	DIAGRAM, APM603 PARALLELING INTERCONNECT	.	.
23	ADV-9169	DIAGRAM, RSA INTERCONNECTION	.	.
24	GM116674	TIER 4 LOAD BANK CONTROL HARNESS	X	.
25	GM115422	TIER 4 POWER SUPPLY FAULT	X	.

REV	DATE	REVISION	BY	MFG
C	11-19-20	SHEETS 13, 14 & 15 ADDED [CT204658]	SMH	
D	4-26-21	SEE SHEETS 3, 4, 13, 14, 15 [CT211529]	SBR	
E	7-27-21	SEE SHEET 9 [CT213711]	SBR	
F	8-26-21	UPDATED TB10 CONNECTION CHART [CT214071]	SBR	



LEGENDS

BCA – BATTERY CHARGING ALTERNATOR
B(#)– SENSORS
C(#) – CONNECTOR
CYL(#) – CYLINDER
CT(#) – CURRENT TRANSFORMER
D# – DIODE #
ECU – ENGINE CONTROL UNIT
ESS – EMERGENCY STOP SWITCH
ESTOP– EMERGENCY STOP
F(#) – FUSE
GFI – GROUND FAULT INDICATOR
GFR – GROUND FAULT RELAY
K# – RELAY CONTACT #
LSIG – LONG, SHORT, INSTANTANEOUS, GROUND FAULT
P(#) – PLUG
PCV – PRESSURE CONTROL VALVE
QCON(#) – QUICK CONNECT
R# – RESISTOR #
SM – STARTER MOTOR
SS – STARTER SOLENOID
STAT – STATOR
SW(#) – SWITCH
TB(#) – TERMINAL BLOCK
TX(#) – TERMINAL BLOCK
VCV – VOLUME CONTROL VALVE
W(#) – WIRE WELD
Y(#) – VALVES
EBG – ENGINE BLOCK GROUND
GND – CONTROLLER BOX GROUND
PGND – PANEL GROUND
– EARTH GROUND

TB10 CONNECTION CHART		
FUNCTION	POS	SIGNAL DESCRIPTION
REMOTE E-STOP	1	REMOTE EMERGENCY STOP
	2	
REMOTE START	3	REMOTE START SIGNAL
	4	
IDLE SWITCH	5	IDLE SWITCH
	6	
RSA	7	NON-ISOLATED RS-485 REMOTE SERIAL ANNUNCIATOR
	8	
OVERSPEED TEST	9	OVERSPEED TEST
	10	
.	11	.
	12	
REMOTE RESET	13	REMOTE RESET
AUX SHUTDOWN	14	AUXILIARY SHUTDOWN
HIGH FUEL	15	HIGH FUEL
AUX WARNING	16	AUXILIARY WARNING
LOW OIL LEVEL	17	LOW OIL LEVEL
.	18	.
.	19	.
.	20	.
RESERVED	21	RESERVED
COMMON FAULT	22	NORMALLY CLOSED CONTACT
	23	NORMALLY OPEN CONTACT
	24	COMMON CONTACT
SYSTEM READY	25	NORMALLY CLOSED CONTACT
	26	NORMALLY OPEN CONTACT
	27	COMMON CONTACT
COMMON WARNING	28	NORMALLY CLOSED CONTACT
	29	NORMALLY OPEN CONTACT
	30	COMMON CONTACT
HORN	31	NORMALLY OPEN CONTACT
	32	COMMON CONTACT
LOW COOLANT	33	NORMALLY OPEN CONTACT
TEMP WARNING	34	COMMON CONTACT
.	35	.
.	36	.
NOT IN AUTO	37	NORMALLY OPEN CONTACT
	38	COMMON CONTACT
GENERATOR RUNNING	39	BATTERY POSITIVE
	40	RETURN
EPS SUPPLY LOAD	41	NORMALLY OPEN CONTACT
	42	COMMON CONTACT
LOW FUEL LEVEL SWITCH	43	LOW FUEL LEVEL SWITCH
	44	LOW FUEL LEVEL SWITCH RETURN
VOLTAGE INPUT	45	VOLTAGE INPUT 5 POSITIVE
	46	VOLTAGE INPUT 5 NEGATIVE
	47	VOLTAGE INPUT 6 POSITIVE
	48	VOLTAGE INPUT 6 NEGATIVE
RESERVED	49	RATIOMETRIC IN 1 POSITIVE
	50	RATIOMETRIC IN 1
	51	RATIOMETRIC IN 1 NEGATIVE
	52	SHIELD
SPARE RESISTIVE INPUT	53	AMBIENT AIR RETURN
	54	AMBIENT AIR
+24 VDC	55	15A FUSED AT 24VDC
	56	
–24 VDC	57	0 VDC
	58	

APM603 CONTROLLER W/ ENHANCED I/O HARNESS
KD62V12 W/ ECU2 HD DIESEL
<600V LSA 52.3 ALT. REDUNDANT STARTER

UNLESS OTHERWISE SPECIFIED – DIMENSIONS ARE IN INCHES – TOLERANCES ARE: XXX± .010, XX ± .030, X ± .060, FRACTIONS ±, ANGLES± 1/2°, SURFACE FINISH MAX.

APPROVALS	DATE
DRAWN DJY	7-12-19
CHECKED JLS	7-12-19
APPROVED JLS	7-12-19

KOHLER CO.
KOHLER, WI 53044
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TITLE: DIAGRAM,SCHEMATIC,APM603 RS, 2000-2500, LSA
SCALE: /// SHEET 1-15
PLOTTED
DWG. NO. ADV-9151 D

REV	DATE	REVISION	BY
C	11-19-20	SHEETS 13, 14 & 15 ADDED [CT204658]	SMH
D	4-26-21	SEE SHEETS 3, 4, 13, 14, 15 [CT211529]	SBR
E	7-27-21	SEE SHEET 9 [CT213711]	SBR
F	8-26-21	SEE SHEET 1 [CT214071]	SBR

APM603 CONTROLLER

TO APM603 THIS SHEET U 3 — UNINS.-S3 WHT BLK
TO APM603 THIS SHEET T 2 — UNINS.-S2 WHT BLK
FOR CONNECTIONS SEE SHEET 11
TX1: REMOTE BREAKER CONTROLS | GENERATOR PARALLELING ISOLATED RS-485 | MODBUS ISOLATED RS-485

+24V F1 W(A) — PF1C
P2-16 V_BAT1
P2-17 V_BAT2
N1 — W(J) — P2-9 GND
P2-1 CTNEU_P
P2-2 CTNEU_N
S11R — P2-8 CT1_N
S11 — P2-7 CT1_P
S21R — P2-6 CT2_N
S21 — P2-5 CT2_P
S31R — P2-4 CT3_N
S31 — P2-3 CT3_P
P2-15 VOLT_INPUT_1N
P2-23 VOLT_INPUT_1P
P2-14 VOLT_INPUT_2N
P2-22 VOLT_INPUT_2P
P2-13 VOLT_INPUT_3N
P2-21 VOLT_INPUT_3P
P2-12 VOLT_INPUT_4N
P2-20 VOLT_INPUT_4P
VI5N — P2-11 VOLT_INPUT_5N
VI5P — P2-19 VOLT_INPUT_5P
VI6N — P2-10 VOLT_INPUT_6N
VI6P — P2-18 VOLT_INPUT_6P

P2: 16 17 18 19 20 21 22 23 / 9 10 11 12 13 14 15 8 / 1 2 3 4 5 6 7 8
P1: 24 25 26 27 28 29 30 31 / 13 14 15 16 17 18 19 20 21 22 23 / 1 2 3 4 5 6 7 8 9 10 11 12

TO TB10 SEE SHEET 3 — Y

20 — P4-27 DIGITAL_IN1 IDLE SWITCH
115 — P4-26 DIGITAL_IN2 FUEL LEAK ALARM
4 — P4-25 DIGITAL_IN3 REMOTE START
CBCR1 — P4-24 DIGITAL_IN4 BREAKER CLOSED
CBTR1 — P4-13 DIGITAL_IN5 BREAKER TRIPPED
21 — P4-1 DIGITAL_IN6 GND FAULT RELAY
KYA1 — P4-2 DIGITAL_IN7 KEY SWITCH AUTO
KYR1 — P4-3 DIGITAL_IN8 KEY SWITCH RUN
N4 — P4-4 GND_FIN DIGITAL INPUT RETURN
178 — P4-9 RESISTIVE_IN_1 FUEL LEVEL
80 — P4-21 RESISTIVE_IN_2 AMBIENT AIR TEMP
LFL — P4-10 RESISTIVE_IN_3 LOW FUEL LEVEL SW.
2806 — P4-22 RESISTIVE_IN_4 BATT CHARGER FAULT
RES5 — P4-11 RESISTIVE_IN_5 AUXILIARY WARNING
RES6 — P4-23 RESISTIVE_IN_6 AUXILIARY FAULT
N12 — P4-12 RESISTIVE_IN_RETURN

RED — P4-5 +5V_RM1
WHT — P4-6 RM1_IN
BLK — P4-17 GND_RM1
RED — P4-7 +5V_RM2
WHT — P4-8 RM2_IN
BLK — P4-19 GND_RM2
UNINS.-S1
UNINS.-S7
5B — P4-34 LED-
3B — P4-35 LED+
P4-14 NO CONNECTION
P4-15 NO CONNECTION
P4-16 NO CONNECTION
P4-18 NO CONNECTION
P4-20 NO CONNECTION
P4-28 NO CONNECTION
P4-29 NO CONNECTION
P4-30 NO CONNECTION
ES2A — P4-31 HEARTBEAT_COM
HEARTBEAT CONTACTS: 2A AT 30VDC
ES3 — P4-32 HEARTBEAT_NO
P4-33 NO CONNECTION

P4: 24 25 26 27 28 29 30 31 32 33 34 35 / 13 14 15 16 17 18 19 20 21 22 23 / 1 2 3 4 5 6 7 8 9 10 11 12

P5 (ETHERNET)

P3: 5 6 7 8 / 1 2 3 4

I/O BOARD CAN_L P1-1 — GRN — R2 120 OHM — TO BASE DIOM SEE SHEET 3 P
I/O BOARD CAN_H P1-2 — YEL
I/O BOARD CAN_GND P1-13 — UNINS.-S5

ENGINE-CAN_L P1-27 — GRN
ENGINE-CAN_H P1-26 — YEL — UNINS.-S6

PGEN-RS485_A-2 P1-3 — BLK
PGEN-RS485_B+2 P1-4 — WHT — UNINS.-S2 — 2 T — TO TX1 THIS SHEET
PGEN-RS485_GND_2 P1-15

MODBUS-RS485_A-3 P1-5 — BLK
MODBUS-RS485_B+3 P1-6 — WHT — UNINS.-S3 — 3 U — TO TX1 THIS SHEET
MODBUS-485_GND_3 P1-17

RSA-RS485_A-4 P1-34 — BLK
RSA-RS485_B+4 P1-35 — WHT — UNINS.-S4 — 4

FACTORY-RS485_A-1 P1-23
FACTORY-RS485_B+1 P1-12

+24V F1 W(A) — PF1E — A1 A2 ESTOP LOCAL ES1A — W(S)

ESTOP_SW_LOCAL P P1-29 — ES1 — ES1 — ES1B
ESTOP_SW_REMOTE P P1-31 — ES2 — ES2 — ES2B — ES2B
ESTOP_SW_LOCAL N P1-28 — N28
ESTOP_SW_REMOTE N P1-30 — N30 — W(R) — ES2A
W(J1)

TO 10 RELAY SEE SHEET 3 AB

RUN/FUEL-RDO1 P1-10 — 70N
RESERVED-RDO2 P1-21 — RDO2 — 85 86 RDO2N — W(J4)
HORN-RDO3 P1-9 — HRN
COMMON FAULT-RDO4 P1-20 — CF
COMMON WARNING-RDO5 P1-8 — CW
ECU RESET-RDO6 P1-19 — ECUR — RDO2P 30 87 RDO2NO
CLOSE CB-RDO7 P1-7 — CBC — 87A RDO2NC
TRIP CB-RDO8 P1-18 — CBT
RDO RETURN P1-33 — NRDO — W(J1)

MAG- P1-24
MAG+ P1-25

LCL IN P1-16
LCL RETURN P1-14

NO CONNECTION P1-11
NO CONNECTION P1-22
NO CONNECTION P1-32

GEN_L1 P3-1 — 1A
GEN_L2 P3-2 — 2A
GEN_L3 P3-5 — 3A
GEN_L0 P3-6 — 4A

BUS_L1 P3-7 — BL1
BUS_L2 P3-8 — BL2
BUS_L3 P3-4 — BL3
BUS_L0 P3-3 — BL0
PB1: 1 2 3 4 5 6 — M FROM JB1 BUS VOLTAGE SENSE SHEET 10 OR 11

TO ALTERNATOR SEE SHEET 9 N

TO APM603 THIS SHEET F — ES3 — A1 K10 A2 — N2 — W(J1)
21 22 K10
+24V F1 W(A) — F1 15 AMP — 30H — PF1A
31 32 K10
W(E) — 30C — 30G — F2 10 AMP W(H) — PF2B — PF2 — 03 04 K10 — 30B10 — R TO 10 RELAY SEE SHEET 3
PF2A — 13 14 K10 — 261A — AK TO 10 RELAY SEE SHEET 3
+24V F3 W(B) — F3 10 AMP — 30J — PF3
43 44 K10

J-C10
30C — 1 +24V (20A FUSED)
2 + BATTERY
3
31C — 4 - BATTERY
5 - BATTERY
6
7
8
9
10
TO 10 RELAY SEE SHEET 3 W — 261 — 11 IGNITION
12 START SWITCH 1
13 START SWITCH 2
14 IDLE SWITCH
15 SHUTDOWN OVERRIDE
49 — 16 OVER SPEED TEST
17 DROOP ACTIVATION
TO 10 RELAY SEE SHEET 3 AA — 61A — R1 200 OHM 3W — 61B — D1 — 61 — 18 BCA EXCITATION
19 A1
20 A2
21
22
23
24
25
26
27
28
29 ALARM FAULT
30 ALARM FAULT
31 OS SHUTDOWN
178 — 32 FUEL LEVEL
115 — 33 TANK LEAK ALARM
34
35 SPEED ADJUST
36 SPEED ADJUST
37 SPEED ADJUST
38 SHIELD
39
40
41 SHIELD
42 CAN L
43 CAN H
44
45
46

WJ5 WJ4 WJ3 WJ2 WJ1 — W(J5) W(J4) W(J3) W(J2) W(J1) W(J)
W(J5) — UNINS.-S6 — WJ5 — S6
GRN — GRN
YEL — YEL
W(K) W(L) W(J)

CONNECT TO P-C10, SHEET 4

TO JG1 GFI CONTROL SHEET 12 AJ
PG1: 1 PF3E — 2 NG — 3 21 — 4 — +24V F3 W(B) — W(J3)

RUN/OFF/AUTO KEY SWITCH OPTIONAL
NAUT — KYA — NRUN — KYR — NKS — W(AF)
JK1: 1 2 3 — PK1: 1 KYA1 — 2 KYR1 — 3 NKS1 — W(J1)

P10 TO J10: 1 2806A — 2 31L1
P11 TO J11: 1 2806B — 2 31L2
P12 TO J12: 1 2806C — 2 31L3
P13 TO J13: 1 2806D — 2 31L4
BATTERY FAULT SIGNALS SEE SHEET 8
NOT CONNECTED
W(G) — W(J5) — W(J3)

6

RDO2P RDO2NO RDO2NC RES5 RES5R RES6 RES6R RED WHT BLK UNINS-S7 12 12R1
J20: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
P20: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
TO K10 COIL THIS SHEET

TX2: 1 2 3 4 5 6 7 8 9 10 11 12 13 / 1 2 3 4 5 6 7 8 9 10 11 12 13
RDO2 LOAD BANK CONTROL | RESISTIVE 5 LOAD BANK FAULT | RESISTIVE 6 LOAD BANK FAULT | RATIO 2 | +PS2F | -PS2FR — BB
TO POWER SUPPLY 2 SEE SHEET 13

RJ45-RJ45 PATCH PANEL F
CUSTOMER TO USE CAT-6A, RJ45 SHIELDED CABLE

APM603 CONTROLLER W/ ENHANCED I/O HARNESS
KD62V12 W/ ECU2 HD DIESEL
<600V LSA 52.3 ALT. REDUNDANT STARTER

UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XXX ± .010 ANGLES ± 1/2° .XX ± .030 SURFACE FINISH .X ± .060 MAX FRACTIONS ±

APPROVALS	DATE
DRAWN DJY	7-12-19
CHECKED JLS	7-12-19
APPROVED JLS	7-12-19

KOHLER.
KOHLER, WI 53044

TITLE: DIAGRAM,SCHEMATIC,APM603 RS, 2000-2500, LSA
SCALE: /// SHEET 2-15
PLOTTED DWG. NO. ADV-9151 D

REV	DATE	REVISION	BY	M E
C	11-19-20	SHEETS 13, 14 & 15 ADDED [CT204658]	SMH	
D	4-26-21	(C-6 TO 8) TB10 21 IS RESERVED; BASE DIOM 10 AND 11		
		ARE PS FAULTS; SEE SHEETS 4, 13, 14, 15 [CT211529]	SBR	
E	7-27-21	SEE SHEET 9 [CT213711]	SBR	
F	8-26-21	SEE SHEET 1 [CT214071]	SBR	

** REMOVE JP1 JUMPER, IF REMOTE EMERGENCY STOP IS CONNECTED

TB10 CUSTOMER CONNECTION (SEE CHART ON SHEET 1)

JP1** OPTIONAL REMOTE ESTOP

REMOTE START

SHIELD WIRE RECOMMENDED

IDLE SWITCH — ES1B, ES2B, 3, 4, 31N

RSA — UNINS.-S4, 20, BLK, WHT

OVERSPEED TEST — 30B3, 49

TO POWER SUPPLY 1 SEE SHEET 14 (BA) — PS1F, PS1FR, 11, 11R1

REMOTE RESET — 13

AUX SHUTDOWN — 14

HIGH FUEL — 15

AUX WARNING — 16

LOW OIL LEVEL — 17, 18

RESERVED — 23

COMMON FAULT — RB32, RB31, RB30

SYSTEM READY — 35, 34, 33

COMMON WARNING — RB38, RB37, RB36

HORN — RB43, RB42

LOW COOLANT TEMP WARNING — 45, 44

NOT IN AUTO — 41, 48

GENERATOR RUNNING — RB52, RB31M

EPS SUPPLY LOAD — 55, 54

LOW FUEL LEVEL SWITCH — LFL, LFLN

VOLTAGE INPUTS — VI5P, VI5N, VI6P, VI6N

RESERVED — RED, WHT, BLK

SHLD — UNINS.-S1

SELF-GROUNDING BLOCK

SPARE RESISTIVE INPUT — 81, 80

+24 VDC — DCP

-24 VDC — DCN

W(J), W(J2)

GROUND STRAP — PGND PGND

Y — TO APM603 SEE SHEET 2

+24V F1 W(A)

W(J5)

W(J2)

TO APM603 SHEET 2 (P) — YEL, GRN, UNINS.-S5

W(BC), W(BD), W(BE)

PX5 JX5 — YEL, GRN, UNINS.-S8, BP3, BN3

W(BH), W(BJ), W(BK), W(BG), W(BF)

PX10 JX15 — YEL, GRN, WHT, BP7, BN7

R3 120 OHM — YEL, GRN

(AX) OR TO PX5 (THIS SHEET) OR PX15 (SHEET 10) CONNECT TO END OF CAN BUS

W(J) +24V F1 W(A)

BASE DIOM (DIGITAL I/O MODULE)

24V, POWER SUPPLY, H, GND, L, CAN BUS, SPEED, ADRESS CAN

PX3 — BN2, BP2

PX4 — YEL, UNINS.-S7, GRN

INPUTS

PS1 FAULT — 11, 11R

PS2 FAULT — 12, 12R

REMOTE RESET — 13, 13R

AUX SHUTDOWN — 14, 14R

HIGH FUEL WARNING — 15, 15R

AUX WARNING — 16, 16R

LOW OIL LEVEL — 17, 17R

RESERVED — 23, 23R

W(J4)

OUTPUTS

OUT #0 — 33 SYSTEM READY

OUT #1 — 44 LOW COOLANT TEMP, 45

OUT #2 — 48 NOT IN AUTO, 41

OUT #3 — 54 EPS SUPPLYING LOAD, 55

OPTIONAL DIOM 1 (DIGITAL I/O MODULE)

PX6 — BN5, BP5

PX7 — YEL, WHT, GRN

OPTIONAL DIOM 2 (DIGITAL I/O MODULE)

PX8 — BN6, BP6

PX9 — YEL, WHT, GRN

TO J1D SEE SHEET 9 (V)

CB — W(F)

OB, ST — W(D)

W(M) CBCR CBTR — CBCR1, CBTR1 — W(N)

+24V F3 W(B)

PX1 — BV2, NX2, CB2, OB2, CBCR2, CBTR2

(AL) TO JX1 BREAKER CONTROL SHEET 11

W(J3)

HORN — P9, 28

TO K10 RELAY SEE SHEET 2 (AK) — 261A

TO J-C10-MOT SEE SHEET 2 (W) — 261

CB1, CBP, OB1, OBP, RB31M, RB52, 28, N1D

W(J1)

(R) 30B10 TO K10 SEE SHEET 2

(AA) 61A TO J-C10-MOT SEE SHEET 2

TB2 — 1 NO, 2 NC, 3 C, 4 NO, 5 NC, 6 C, 7 NO, 8 NC, 9 C, 10 NO, 11 NC, 12 C, 13 NO, 14 NC, 15 C, 16 NO, 17 NC, 18 C, 19 NO, 20 NC, 21 C, 22 NO, 23 NC, 24 C, 25 NO, 26 NC, 27 C, 28 NO, 29 NC, 30 C

DUT K1, DUT K2, DUT K3, DUT K4, DUT K5, DUT K6, DUT K7, DUT K8, DUT K9, DUT K10

TB1 — 42A, 2, K1, K2, K3, K4, K5, K6, K7, K8, K9, K10

+24V F1 W(A) — 42A

2N — W(J1)

70N2 — 70N — W(BB)

70N3

70N1 — HRNA — HRN — W(C)

CF, CW, ECUR, CBC, CBT, 70N1, HRNB

TO APM603 SEE SHEET 2 (AB)

10 RELAY BOARD D-294303-P

NOTE: TB1-K2 - ADDITIONAL RUN CONTACT RESERVED FOR CUSTOMER USE.

APM603 CONTROLLER W/ ENHANCED I/O HARNESS
KD62V12 W/ ECU2 HD DIESEL
<600V LSA 52.3 ALT. REDUNDANT STARTER

UNLESS OTHERWISE SPECIFIED - 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XXX± .010 ANGLES± 1/2° .XX ± .030 SURFACE FINISH .X ± .060 FRACTIONS ± — MAX

KOHLER, WI 53044

APPROVALS		DATE
DRAWN	DJY	7-12-19
CHECKED	JLS	7-12-19
APPROVED	JLS	7-12-19

TITLE: DIAGRAM,SCHEMATIC,APM603 RS, 2000-2500, LSA

SCALE: /// SHEET 3-15

PLOTTED DWG. NO. ADV-9151 D

REV	DATE	REVISION	BY	M T
C	11-19-20	SHEETS 13, 14 & 15 ADDED [CT204658]	SMH	
D	4-26-21	(A-4) ADDED FAN WIRES; (C-3,4) ADDED BD REFERENCE;		
		ADDED C8; SEE SHEETS 3, 13, 14, 15 [CT211529]	SBR	
E	7-27-21	SEE SHEET 9 [CT213711]	SBR	
F	8-26-21	SEE SHEET 1 [CT214071]	SBR	

P-CODE B
ECU1 CONTROLLER CONNECTOR B

01-CONTROLLER POWER	ECU1B-01
02-SPEED ADJUST	ECU1B-W3-35
03-.	.
04-LOW COOLANT LEVEL LT	ECU1B-04
05-LOW COOLANT LEVEL	ECU1B-05
06-START SWITCH 1	ECU1B-06
07-.	.
08-.	ECU1B-08
09-CAN 1	ECU1B-09
10-CAN 2	.
11-DIAGNOSIS CAN L	ECU1B-W1-11
12-.	ECU1B-W5-12
13-BATTERY-	ECU1B-13
14-.	.
15-SUPPLY	ECU1B-15
16-SPEED ADJUST	ECU1B-W3-49
17-.	.
18-LOW COOLANT LEVEL LT	ECU1B-18
19-LOW COOLANT LEVEL	ECU1B-19
20-IDLE SWITCH	ECU1B-20
21-START SWITCH 2	ECU1B-21
22-.	.
23-CAN L	ECU1B-W2-23
24-DIAG 2	ECU1B-W5-24
25-DIAG 2	ECU1B-W5-25
26-DIAGNOSIS CAN H	ECU1B-W1-26
27-BATTERY+ ECU POWER	ECU1B-27
28-.	.
29-OIL PRE-LUBE	ECU1B-29
30-IGNITION	ECU1B-30B
31-SPEED ADJUST	ECU1B-W3-57
32-GND	BLUE
33-LOW COOLANT LEVEL	ECU1B-33B
34-.	.
35-SHUTDOWN OVERRIDE	ECU1B-35
36-.	.
37-CAN H	ECU1B-W2-37
38-.	.
39-.	.
40-BATTERY-	ECU1B-40
41-BATTERY+ ECU POWER	ECU1B-41
42-.	.
43-OIL PRE-LUBE	ECU1B-43
44-ALARM FAULT	ECU1B-44
45-LOW COOLANT LEVEL LT	ECU1B-45
46-OVER SPEED SHUTDOWN	ECU1B-46
47-.	ECU1B-47
48-.	.
49-OVER SPEED TEST	ECU1B-49
50-ECU STATUS INDICATOR	ECU1B-50
51-.	.
52-.	.
53-.	.
54-.	.
55-BATTERY+ ECU POWER	ECU1B-55
56-.	.
57-DROOP ACTIVATION	ECU1B-57
58-ALARM FAULT	ECU1B-58
59-.	.
60-OIL PRE-LUBE	ECU1B-60X2
61-OIL PRE-LUBE	ECU1B-61X2
62-.	.
63-.	.
64-.	.
65-.	.
66-.	.
67-.	.
68-.	ECU1B-68
69-BATTERY-	ECU1B-69
70-.	.

FUSEBOX
ECU1B-27 — 15A F1A
30C — 20A F2A
ECU1B-41 — 15A F3A
30A — 15A F4A
ECU1B-55 — 15A F5A
ECU1B-01 — 5A F6A
RED — 20A F1B
RED — 10A F2B
F3B
F4B
F5B
F6B
31

31 — GROUND SEE SHEET 8 (B)

BLK
31C
31CH-1
31CH-2
ECU1B-69
ECU1B-40
31A
ECU1B-15
ECU1B-13
BLACK
31D

C-BPV
TO BYPASS VALVE — 1 RED, 2 BLACK

C-DIAG2*
1 FOR STANDARD UNITS
2 ECU1B-24
3
4 ECU1B-24

C-DIAG2
ECU1B-W5-12 — 1
ECU1B-W5-25 — 2
ECU1B-W5-32 — 3
ECU1B-W5-24 — 4
AM FOR TIER 4 UNITS SEE SHEET 13

C8
1 261
2
3 ECU1B-30B — TO ECU1B THIS SHEET
4

BD TO FDS JB TS1 SEE SHEET 13

FERRITE 2
FERRITE 1

P-C10

30C	1	+24V (20A FUSED)
30CH-1	2	+ BATTERY
30CH-2	3	+ BATTERY
31C	4	- BATTERY
31CH-1	5	- BATTERY
31CH-2	6	- BATTERY
	7	
	8	
	9	
	10	
261	11	IGNITION
ECU1B-06	12	START SWITCH 1
ECU1B-21	13	START SWITCH 2
ECU1B-20	14	IDLE SWITCH
ECU1B-35	15	SHUTDOWN OVERRIDE
ECU1B-49	16	OVER SPEED TEST
ECU1B-57	17	DROOP ACTIVATION
61	18	BCA EXCITATION
A1	19	A1
A2	20	A2
	21	
	22	
	23	
	24	
	25	
	26	
	27	
	28	
ECU1B-44	29	ALARM FAULT
ECU1B-58	30	ALARM FAULT
ECU1B-46	31	OS SHUTDOWN
	32	
	33	
	34	
ECU1B-W3-35	35	SPEED ADJUST
ECU1B-W3-49	36	SPEED ADJUST
ECU1B-W3-57	37	SPEED ADJUST
	38	SHIELD
	39	
	40	
	41	SHIELD
ECU1B-W2-23	42	CAN L
ECU1B-W2-37	43	CAN H
	44	
	45	
	46	

TWISTED TRIPLE CABLE
TWISTED PAIR CABLE
CONNECT TO J-C10, SHEET 2

DIAGNOSTIC CONNECTOR C-DIAG
31A — A (BATT-)
30A — B (BATT+)
ECU1B-W1-26 — C (CAN H)
ECU1B-W1-11 — D (CAN L)
SHIELD

TWISTED PAIR CABLE
SPLICE 3
LOW COOLANT LEVEL HT
ECU1B-05 — A
ECU1B-33B — B
ECU1B-19 — C
C3

TWISTED TRIPLE CABLE
LOW COOLANT LEVEL LT
ECU1B-04 — A
ECU1B-45 — B
ECU1B-18 — C
C2

TO C8 THIS SHEET

STATUS-M
GRN — 31D
SILVER TERM

OIL PRE-LUBRICATION C4
ECU1B-43 — 1
ECU1B-60x2 — 2
ECU1B-29 — 3
ECU1B-61x2 — 4

J2-ROOF
ECU1B-47 — 1
ECU1B-68 — 2
AN TO ROOF JB SEE SHEET 14

C-CAN1
ECU1B-08 — 1
ECU1B-09 — 2
SHIELD4 — 3
TO FDS JB SEE SHEET 13

U02
30 — 30CH-1 — 30CH-2
30B — D3 D4

U01
56A — D1 D2

BCA
A1 61 A2
D+ B+ B — 31B
56 — 56B

30B
X810.1<>K704.88A — K708 88A 88 — X808.1<>X2 — F1YL 20A (X2 WELD) (X1 WELD) — X816.1<>X1 — A BATTERY SEE SHEET 8

STARTER1
50 SS SM R A
30 — SS SS SS — 31 — 31
X814.1<>X815.1

X813.1<>X812.1 — K709 88A 88 — X811.1<>X4 — F2YL 20A (X4 WELD) (X3 WELD) 20A — X817.1<>X3 — UU BATTERY+ SEE SHEET 8

30D
STARTER2
50 SS SM R A
30 — SS SS SS — 31 — 31
X814.1<>X815.1
RED — AR TO ENCLOSURE FAN SEE SHEET 13
BLACK
TT GROUND SEE SHEET 8

CONTACTS-C4 — 86+ K708 85- — 86+ K709 85- CONTACTS-B4

X803
X803.1<>K708.86+ — 1
X803.2<>K709.86+ — 2
X803.3<>K709.85- — 3
X803.4<>K709.85- — 4
G X800 SEE SHEET 7

APM603 CONTROLLER W/ ENHANCED I/O HARNESS
KD62V12 W/ ECU2 HD DIESEL
<600V LSA 52.3 ALT. REDUNDANT STARTER

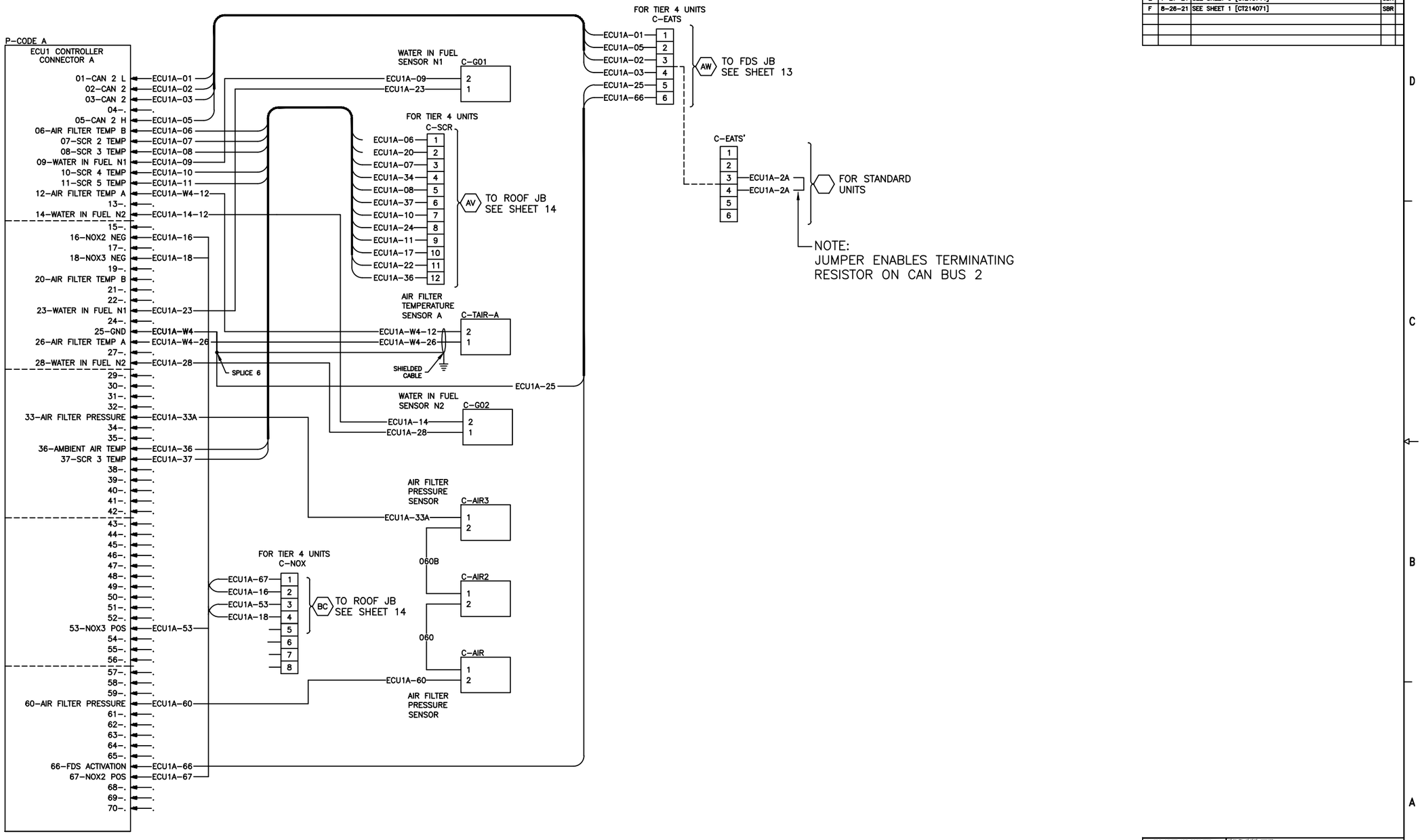
UNLESS OTHERWISE SPECIFIED — 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XXX ± .010, .XX ± .030, .X ± .060, FRACTIONS ± — ANGLES ± 1/2° — SURFACE FINISH MAX

APPROVALS		DATE
DRAWN	DJY	7-12-19
CHECKED	JLS	7-12-19
APPROVED	JLS	7-12-19

KOHLER Co.
KOHLER, WI 53044

TITLE: DIAGRAM,SCHEMATIC,APM603 RS, 2000-2500, LSA
SCALE: /// — SHEET 4-15
PLOTTED — DWG. NO. ADV-9151 — D

REV	DATE	REVISION	BY	MT
C	11-19-20	SHEETS 13, 14 & 15 ADDED [CT204658]	SMH	
D	4-26-21	SEE SHEETS 3, 4, 13, 14, 15 [CT211529]	SBR	
E	7-27-21	SEE SHEET 9 [CT213711]	SBR	
F	8-26-21	SEE SHEET 1 [CT214071]	SBR	



APM603 CONTROLLER W/ ENHANCED I/O HARNESS
KD62V12 W/ ECU2 HD DIESEL
<600V LSA 52.3 ALT. REDUNDANT STARTER

APPROVALS	DATE
DRAWN DJY	7-12-19
CHECKED JLS	7-12-19
APPROVED JLS	7-12-19

KOHLER, WI 53044

TITLE: DIAGRAM,SCHEMATIC,APM603 RS, 2000-2500, LSA

SCALE: /// SHEET 5-15

PLOTTED DWG. NO. ADV-9151 D

REV	DATE	REVISION	BY	M F
C	11-19-20	SHEETS 13, 14 & 15 ADDED [CT204658]	SMH	
D	4-26-21	SEE SHEETS 3, 4, 13, 14, 15 [CT211529]	SBR	
E	7-27-21	SEE SHEET 9 [CT213711]	SBR	
F	8-26-21	SEE SHEET 1 [CT214071]	SBR	

P-CODE C
ECU1 CONTROLLER CONNECTOR C

01-EGT CAN H	A700.X3:01<>W(X33)
02-EGT CAN L	A700.X3:02<>W(X32)
03-.	.
04-.	.
05-.	.
06-.	.
07-HP PUMP 1 VCV	A700.X3:07<>X801.4
08-HP PUMP 1 PCV	A700.X3:08<>X801.1
09-.	.
10-.	.
11-.	.
12-.	.
13-.	.
14-CRANKCASE OIL PRESS	A700.X3:14<>B7923.X3
15-.	.
16-.	.
17-OIL PRESSURE	A700.X3:17<>B701.XB
18-CHARGING AIR	A700.X3:18<>B703.X1
19-FUEL PRESSURE	A700.X3:19<>B702.XB
20-.	.
21-HP PUMP 1 VCV	A700.X3:21<>X801.3
22-HP PUMP 1 PCV	A700.X3:22<>X801.2
23-.	.
24-EGT CAN PS+	A700.X3:24<>B7811.X1
25-.	.
26-FUEL LEAKAGE	A700.X3:26<>X4
27-.	.
28-.	.
29-CRANKCASE OIL PRESS	A700.X3:29<>B7923.X1
30-.	.
31-.	.
32-CHARGING AIR	A700.X3:32<>B703.X4
33-FUEL PRESSURE	A700.X3:33<>B702.XC
34-RAIL PRESSURE1	A700.X3:34<>X801.5
35-RAIL PRESSURE2	A700.X3:35<>X802.5
36-.	.
37-FUEL LEAKAGE	A700.X3:37<>X3
38-.	.
39-.	.
40-.	.
41-.	.
42-CRANKCASE OIL PRESS	A700.X3:42<>B7923.X2
43-COOLANT TEMP	A700.X3:43<>B708.X1
44-.	.
45-OIL PRESSURE	A700.X3:45<>B701.XC
46-CHARGING AIR	A700.X3:46<>B703.X2
47-.	.
48-RAIL PRESSURE1	A700.X3:48<>X801.7
49-RAIL PRESSURE2	A700.X3:49<>X802.7
50-.	.
51-CHARGE AIR TEMP	A700.X3:51<>B707.X1
52-FUEL TEMP	A700.X3:52<>B709.X1
53-.	.
54-.	.
55-.	.
56-COOLANT TEMP	A700.X3:56<>B718.X1
57-.	.
58-.	.
59-OIL PRESSURE	A700.X3:59<>B701.XA
60-FUEL PRESSURE	A700.X3:60<>B702.XA
61-.	.
62-RAIL PRESSURE1	A700.X3:62<>X801.6
63-RAIL PRESSURE2	A700.X3:63<>X802.6
64-.	.
65-CHARGE AIR TEMP	A700.X3:65<>B707.X2
66-FUEL TEMP	A700.X3:66<>B709.X2
67-COOLANT TEMP	A700.X3:67<>B708.X2
68-.	.
69-.	.
70-COOLANT TEMP	A700.X3:70<>B718.X2

TWISTED TRIPLE CABLE

X801	X804	
1	1	X804.1<>Y707.X2
2	2	X804.2<>Y727.X2
3	3	X804.3<>Y703.X1
4	4	X804.4<>Y703.X2
5	5	B704.X2<>X804.5
6	6	B704.X3<>X804.6
7	7	B704.X1<>X804.7
8	8	

HP PUMP PUMP 1 PCV 1 — Y707.X
X804.1<>Y707.X2 (2 PINS)
Y707.X1<>Y727.X1 (1 PINS)

HP PUMP PUMP 1 PCV 2 — Y727.X
X804.2<>Y727.X2 (2 PINS)
Y707.X1<>Y727.X1 (1 PINS)

HP PUMP PUMP 1 VCV — Y703.X
X804.4<>Y703.X2 (2 PINS)
X804.3<>Y703.X1 (1 PINS)

RAIL PRESSURE SENSOR 1 — B704.X (0-2850bar/g, p, U, 0.5-4.5)
B704.X1<>X804.7 (1 OUT)
B704.X2<>X804.5 (2 GND)
B704.X3<>X804.6 (3 +8V)

0.0bar/g=0.5V
200bar/g=0.78V
800bar/g=1.62V
1200bar/g=2.18V
1600bar/g=2.74V
1800bar/g=3.02V
2400bar/g=3.86V
2850bar/g=4.5V

NOTE:
CAN BUS 2 ALSO USED FOR OPTIONAL TIER 4 AFTER TREATMENT SYSTEM.

OIL PRESSURE SENSOR OUTPUT ENGINE FILTER — B701.X (0.0-12.0bar/g, p, U, 0.5-4.5)
A700.X3:59<>B701.XA (A +8V)
A700.X3:17<>B701.XB (B GND)
A700.X3:45<>B701.XC (C OUT)
TWISTED TRIPLE CABLE

0.0bar/g=0.5V
2.0bar/g=1.167V
6.0bar/g=2.5V
8.0bar/g=3.167V
12.0bar/g=4.5V

FUEL PRESSURE SENSOR — B702.X (0.0-12.0bar/g, p, U, 0.5-4.5)
A700.X3:60<>B702.XA (A +8V)
A700.X3:19<>B702.XB (B GND)
A700.X3:33<>B702.XC (C OUT)
TWISTED TRIPLE CABLE

0.0bar/g=0.5V
2.0bar/g=1.167V
6.0bar/g=2.5V
8.0bar/g=3.167V
12.0bar/g=4.5V

COOLANT TEMPERATURE SENSOR POST ENGINE — B708.X (Tmax 150C, T, R)
A700.X3:43<>B708.X1 (1 GND)
A700.X3:67<>B708.X2 (2 SIG R)
TWISTED PAIR CABLE

-40C=44297ohms
-20C=14687ohms
0C=5623.4ohms
20C=2427.4ohms
40C=1158.4ohms
60C=601.48ohms
100C=198.77ohms
150C=66.47ohms

FUEL TEMPERATURE SENSOR — B709.X (Tmax 150C, T, R)
A700.X3:52<>B709.X1 (1 GND)
A700.X3:66<>B709.X2 (2 SIG R)
TWISTED PAIR CABLE

-40C=44297ohms
-20C=14687ohms
0C=5623.4ohms
20C=2427.4ohms
40C=1158.4ohms
60C=601.48ohms
100C=198.77ohms
150C=66.47ohms

CHARGING AIR PRESSURE SENSOR — B703.X (0.0-4.0bar/g, p, U)
A700.X3:18<>B703.X1 (1 GND)
A700.X3:46<>B703.X2 (2 +8V)
A700.X3:32<>B703.X4 (4 OUT)
TWISTED TRIPLE CABLE

0.0bar/g=0.5V
1.5bar/g=1.7V
2.5bar/g=2.5V
3.5bar/g=3.3V
5bar/g=4.5V
.
.
.

DD TO X802 SEE SHEET 7

OIL PRESSURE SENSOR CRANKCASE — B7923.X (-100mb/+100mb, p, U, 0.5-4.5)
A700.X3:29<>B7923.X1 (1 +8V)
A700.X3:42<>B7923.X2 (2 GND)
A700.X3:14<>B7923.X3 (3 OUT)
TWISTED TRIPLE CABLE

-100mb=4.5V
-60mb=3.7V
-30mb=3.1V
0mb=2.5V
30mb=1.9V
60mb=1.3V
100mb=0.5V

CHARGE AIR TEMPERATURE SENSOR — B707.X (Tmax 150C, T, R)
A700.X3:51<>B707.X1 (1 GND)
A700.X3:65<>B707.X2 (2 SIG R)
TWISTED PAIR CABLE

-40C=44297ohms
-20C=14687ohms
0C=5623.4ohms
20C=2427.4ohms
40C=1158.4ohms
60C=601.48ohms
100C=198.77ohms
150C=66.47ohms

COOLANT TEMPERATURE SENSOR PRE INTER COOLER — B718.X (Tmax 150C, T, R)
A700.X3:56<>B718.X1 (1 GND)
A700.X3:70<>B718.X2 (2 SIG R)
TWISTED PAIR CABLE

-40C=44297ohms
-20C=14687ohms
0C=5623.4ohms
20C=2427.4ohms
40C=1158.4ohms
60C=601.48ohms
100C=198.77ohms
150C=66.47ohms

FUEL LEAKAGE SENSOR A — B7921.X (amount, U, I=1A)
W(X3) W(X4)
A700.X3:37<>X3 (A +8V)
A700.X3:26<>X4 (B GND)
A700.X4:60<>B7921.XC (C OUT)
TWISTED TRIPLE CABLE

FUEL LEAKAGE SENSOR B — B7922.X (amount, U, I=1A)
X3<>B7922.XA (A +8V)
X4<>B7922.XB (B GND)
A700.X4:63<>B7922.XC (C OUT)
TWISTED TRIPLE CABLE

OHNE MEDIUM:
U=0V
IM MEDIUM:
U=24V
.
.

A700.X4:63<>B7922.XC — D — LEAK SIDE B SIGNAL SEE SHEET 7
A700.X4:60<>B7921.XC — E — LEAK SIDE A SIGNAL SEE SHEET 7

W(X33) W(X32)
AY TO W(X26) SEE SHEET 7
AZ TO W(X25) SEE SHEET 7
AW TO W(X40) SEE SHEET 7
AX TO W(X41) SEE SHEET 7

TERMINATING RESISTOR X33
X33.A<>W(X21) (A, 120)
X33.B<>W(X22) (B)
C N/C

EXHAUST GAS TEMP GYL A6 — B7856.X (T, CAN)
B7856.X1<>W(X38) (1 V)
B7856.X2<>W(X39) (2 GND)
B7856.X3<>W(X36) (3 CAN-H)
B7856.X4<>W(X37) (4 CAN-L)

EXHAUST GAS TEMP GYL A5 — B7855.X (T, CAN)
B7855.X1<>W(X38) (1 V)
B7855.X2<>W(X39) (2 GND)
B7855.X3<>W(X36) (3 CAN-H)
B7855.X4<>W(X37) (4 CAN-L)
W(X38) W(X39) W(X37) W(X36)

EXHAUST GAS TEMP GYL A4 — B7854.X (T, CAN)
B7854.X1<>W(X38) (1 V)
B7854.X2<>W(X39) (2 GND)
B7854.X3<>W(X36) (3 CAN-H)
B7854.X4<>W(X37) (4 CAN-L)

EXHAUST GAS TEMP GYL A3 — B7853.X (T, CAN)
B7853.X1<>W(X42) (1 V)
B7853.X2<>W(X43) (2 GND)
B7853.X3<>W(X44) (3 CAN-H)
B7853.X4<>W(X45) (4 CAN-L)

EXHAUST GAS TEMP GYL A2 — B7852.X (T, CAN)
B7852.X1<>W(X42) (1 V)
B7852.X2<>W(X43) (2 GND)
B7852.X3<>W(X44) (3 CAN-H)
B7852.X4<>W(X45) (4 CAN-L)
W(X42) W(X43) W(X45) W(X44)

EXHAUST GAS TEMP GYL A1 — B7851.X (T, CAN)
B7851.X1<>W(X42) (1 V)
B7851.X2<>W(X43) (2 GND)
B7851.X3<>W(X44) (3 CAN-H)
B7851.X4<>W(X45) (4 CAN-L)

EXHAUST GAS TEMP TURBINE 1&2 — B7811.X (T, CAN)
A700.X3:24<>B7811.X1 (1 V)
A700.X4:22<>B7811.X2 (2 GND)
B7811.X3<>W(X32) (3 CAN-H)
B7811.X4<>W(X33) (4 CAN-L)
. (5 SHIELD)
. (6 N/C)

CC TO ECU1D SEE SHEET 7

UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XXX ± .010 ANGLES ± 1/2° .XX ± .030 SURFACE FINISH .X ± .060 FRACTIONS ± MAX

KOHLER.
KOHLER, WI 53044

APPROVALS		DATE
DRAWN	DJY	7-12-19
CHECKED	JLS	7-12-19
APPROVED	JLS	7-12-19

TITLE: DIAGRAM,SCHEMATIC,APM603 RS, 2000-2500, LSA
SCALE: / / / SHEET 6-15
PLOTTED DWG. NO. ADV-9151 D

APM603 CONTROLLER W/ ENHANCED I/O HARNESS
KD62V12 W/ ECU2 HD DIESEL
<600V LSA 52.3 ALT. REDUNDANT STARTER

REV	DATE	REVISION	BY	M E
C	11-19-20	SHEETS 13, 14 & 15 ADDED [CT204658]	SMH	
D	4-26-21	SEE SHEETS 3, 4, 13, 14, 15 [CT211529]	SBR	
E	7-27-21	SEE SHEET 9 [CT213711]	SBR	
F	8-26-21	SEE SHEET 1 [CT214071]	SBR	

P-CODE D
ECU1 CONTROLLER
CONNECTOR D

01-.	.
02-.	.
03-EGT CAN PS+	A700.X4:03<>W(X40)
04-HP PUMP2 PCV	A700.X4:04<>X802.1
05-STARTER RELAY 2	A700.X4:05<>X800.2
06-.	.
07-HP PUMP2 PCV	A700.X4:07<>X802.2
08 OIL PRESSURE-	A700.X4:08<>B744.XB
09-INJECTOR CYLA3	A700.X4:09<>X733.1
10-INJECTOR CYLA6	A700.X4:10<>X736.1
11-INJECTOR CYLA2	A700.X4:11<>X732.1
12-INJECTOR CYLB4	A700.X4:12<>X744.2
13-INJECTOR CYLB5	A700.X4:13<>X745.2
14-INJECTOR CYLB1	A700.X4:14<>X741.2
15-.	.
16-.	.
17-.	.
18-OIL PRESSURE-	A700.X4:18<>B744.XC
19-.	.
20-.	.
21-.	.
22-EGT CAN GND	A700.X4:22<>B7811.X2
23-INJECTOR CYLB1	A700.X4:23<>X741.1
24-INJECTOR CYLB5	A700.X4:24<>X745.1
25-INJECTOR CYLB4	A700.X4:25<>X744.1
26-INJECTOR CYLA2	A700.X4:26<>X732.2
27-INJECTOR CYLA6	A700.X4:27<>X736.2
28-INJECTOR CYLA3	A700.X4:28<>X733.2
29-OIL TEMPERATURE	A700.X4:29<>B751.X1
30-OIL TEMPERATURE	A700.X4:30<>B751.X2
31-STARTER RELAY2	A700.X4:31<>X800.3
32-STARTER RELAY1	A700.X4:32<>X800.4
33-EGT CAN EGT GND	A700.X4:33<>W(X41)
34-SPEED SENSOR	A700.X4:34<>B711.X1
35-SPEED SENSOR	A700.X4:35<>B711.X3
36-.	.
37-.	.
38-.	.
39-.	.
40-.	.
41-.	.
42-.	.
43-.	.
44-OIL PRESSURE	A700.X4:44<>B744.XA
45-.	.
46-.	.
47-SPEED SENSOR	A700.X4:47<>B713.X1
48-HP PUMP2 VCV	A700.X4:48<>X802.4
49-HP PUMP2 VCV	A700.X4:49<>X802.3
50-.	.
51-INJECTOR CYLA5	A700.X4:51<>X735.1
52-INJECTOR CYLA4	A700.X4:52<>X734.1
53-INJECTOR CYLA1	A700.X4:53<>X731.1
54-INJECTOR CYLB2	A700.X4:54<>X742.2
55-INJECTOR CYLB6	A700.X4:55<>X746.2
56-INJECTOR CYLB3	A700.X4:56<>X743.2
57-SPEED SENSOR	A700.X4:57<>B713.X2
58-.	.
59-SPEED SENSOR	A700.X4:59<>B711.X2
60-FUEL LEAK SIDE A	A700.X4:60<>B7921.XC
61-STARTER RELAY 1	A700.X4:61<>X800.1
62-SPEED SENSOR	A700.X4:62<>B713.X3
63-FUEL LEAK SIDE B	A700.X4:63<>B7922.XC
64-.	.
65-INJECTOR CYLB3	A700.X4:65<>X743.1
66-INJECTOR CYLB6	A700.X4:66<>X746.1
67-INJECTOR CYLB2	A700.X4:67<>X742.1
68-INJECTOR CYLA1	A700.X4:68<>X731.2
69-INJECTOR CYLA4	A700.X4:69<>X734.2
70-INJECTOR CYLA5	A700.X4:70<>X735.2

TWISTED TRIPLE CABLE
A700.X4:04<>X802.1
A700.X4:07<>X802.2
A700.X4:49<>X802.3
A700.X4:48<>X802.4
A700.X3:35<>X802.5
A700.X3:63<>X802.6
A700.X3:49<>X802.7
X802 X805
1 1 X805.1<>Y708.X2
2 2 X805.2<>Y728.X2
3 3 X805.3<>Y704.X1
4 4 X805.4<>Y704.X2
5 5 B705.X2<>X805.5
6 6 B705.X3<>X805.6
7 7 B705.X1<>X805.7
8 8
DD TO ECU1C SEE SHEET 6

TWISTED CABLE
A700.X4:61<>X800.1
A700.X4:05<>X800.2
A700.X4:31<>X800.3
A700.X4:32<>X800.4
X800
1
2
3
4
G TO X803 SEE SHEET 4

OIL PRESSURE SENSOR PISTON COOLING SET
B744.X
0.0-12.0bar/g
A+5V
B GND U
C OUT p
0.5-4.5V
A700.X4:44<>B744.XA
A700.X4:08<>B744.XB
A700.X4:18<>B744.XC
TWISTED TRIPLE CABLE

0.0bar/g=0.5V
2.0bar/g=1.167V
6.0bar/g=2.5V
8.0bar/g=3.167V
12.0bar/g=4.5V

HP PUMP PUMP 2 PCV 1
Y708.X
X805.1<>Y708.X2
Y708.X1<>Y728.X1
HP PUMP PUMP 2 PCV 2
Y728.X
X805.2<>Y728.X2
Y708.X1<>Y728.X1
HP PUMP PUMP 2 VCV
Y704.X
X805.4<>Y704.X2
X805.3<>Y704.X1
PWM+

RAIL PRESSURE SENSOR 2
B705.X
0-2850bar/g
1 OUT
2 GND U
3 +5V p
0.5-4.5V
B705.X1<>X805.7
B705.X2<>X805.5
B705.X3<>X805.6
TWISTED TRIPLE CABLE

0.0bar/g=0.5V
200bar/g=0.78V
800bar/g=1.62V
1200bar/g=2.18V
1600bar/g=2.74V
1800bar/g=3.02V
2400bar/g=3.86V
2850bar/g=4.5V

CC TO B7811 SEE SHEET 6

OIL TEMPERATURE SENSOR
B751.X
Tmax 150C
1 SIG T
2 GND R
A700.X4:29<>B751.X1
A700.X4:30<>B751.X2
TWISTED PAIR CABLE

-40C=44297ohms
-20C=14687ohms
0C=5623.4ohms
20C=2427.4ohms
40C=1158.4ohms
60C=601.48ohms
100C=198.7ohms
150C=66.47ohms

SPEED SENSOR FLYWHEEL
B711.X
1 GND n
2 0-5V
3 +12V
A700.X4:34<>B711.X1
A700.X4:59<>B711.X2
A700.X4:35<>B711.X3
TWISTED TRIPLE CABLE

Umax : 20V
Umin : 5V
Unom : 12V
10-10000 Hz

SPEED SENSOR CAMSHAFT
B713.X
1 GND n
2 0-5V
3 +12V
A700.X4:47<>B713.X1
A700.X4:57<>B713.X2
A700.X4:62<>B713.X3
TWISTED TRIPLE CABLE

Umax : 20V
Umin : 5V
Unom : 12V
10-10000 Hz

A700.X4:60<>B7921.XC E LEAK SIDE A SIGNAL SEE SHEET 6
A700.X4:63<>B7922.XC D LEAK SIDE B SIGNAL SEE SHEET 6

INJECTOR CLYA1 X731
A700.X4:53<>X731.1
A700.X4:68<>X731.2
INJECTOR CLYA2 X732
A700.X4:11<>X732.1
A700.X4:26<>X732.2
INJECTOR CLYA3 X733
A700.X4:09<>X733.1
A700.X4:28<>X733.2
INJECTOR CLYA4 X734
A700.X4:52<>X734.1
A700.X4:69<>X734.2
INJECTOR CLYA5 X735
A700.X4:51<>X735.1
A700.X4:70<>X735.2
INJECTOR CLYA6 X736
A700.X4:10<>X736.1
A700.X4:27<>X736.2
INJECTOR CLYB1 X741
A700.X4:23<>X741.1
A700.X4:14<>X741.2
INJECTOR CLYB2 X742
A700.X4:67<>X742.1
A700.X4:54<>X742.2
INJECTOR CLYB3 X743
A700.X4:65<>X743.1
A700.X4:56<>X743.2
INJECTOR CLYB4 X744
A700.X4:25<>X744.1
A700.X4:12<>X744.2
INJECTOR CLYB5 X745
A700.X4:24<>X745.1
A700.X4:13<>X745.2
INJECTOR CLYB6 X746
A700.X4:66<>X746.1
A700.X4:55<>X746.2
1 PWM+ 2 GND
TWISTED PAIR CABLE

NOTE:
CAN BUS 2 ALSO USED FOR OPTIONAL TIER 4 AFTER TREATMENT SYSTEM.

W(X40) AW TO W(X38) SEE SHEET 6
W(X41)
AX TO W(X39) SEE SHEET 6
AZ TO W(X32) SEE SHEET 6
AY TO W(X33) SEE SHEET 6

EXHAUST GAS TEMP GYL B6 B7866
B7866.X1<>W(X48)
B7866.X2<>W(X49)
B7866.X3<>W(X50)
B7866.X4<>W(X51)
1 V 2 GND T 3 CAN-H 4 CAN-L CAN

EXHAUST GAS TEMP GYL B5 B7865
B7865.X1<>W(X48)
B7865.X2<>W(X49)
B7865.X3<>W(X50)
B7865.X4<>W(X51)

EXHAUST GAS TEMP GYL B4 B7864
B7864.X1<>W(X48)
B7864.X2<>W(X49)
B7864.X3<>W(X50)
B7864.X4<>W(X51)

EXHAUST GAS TEMP GYL B3 B7863
B7863.X1<>W(X52)
B7863.X2<>W(X53)
B7863.X3<>W(X54)
B7863.X4<>W(X55)

EXHAUST GAS TEMP GYL B2 B7862
B7862.X1<>W(X52)
B7862.X2<>W(X53)
B7862.X3<>W(X54)
B7862.X4<>W(X55)

EXHAUST GAS TEMP GYL B1 B7861
B7861.X1<>W(X52)
B7861.X2<>W(X53)
B7861.X3<>W(X54)
B7861.X4<>W(X55)

W(X48) W(X49) W(X50) W(X51) W(X52) W(X53) W(X54) W(X55)

APM603 CONTROLLER W/ ENHANCED I/O HARNESS
KD62V12 W/ ECU2 HD DIESEL
<600V LSA 52.3 ALT. REDUNDANT STARTER

UNLESS OTHERWISE SPECIFIED -
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES ARE:
.XXX ± .010 ANGLES ± 1/2°
.XX ± .030 SURFACE FINISH
.X ± .060 MAX
FRACTIONS ±

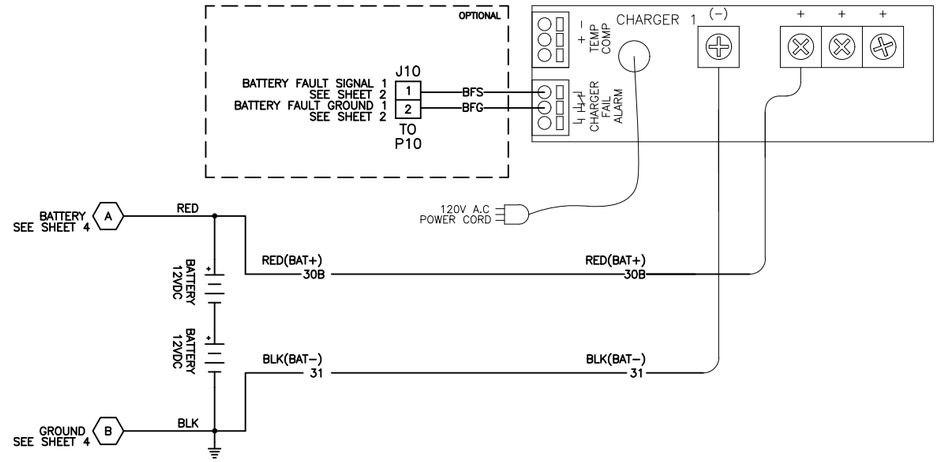
APPROVALS	DATE
DRAWN DJY	7-12-19
CHECKED JLS	7-12-19
APPROVED JLS	7-12-19

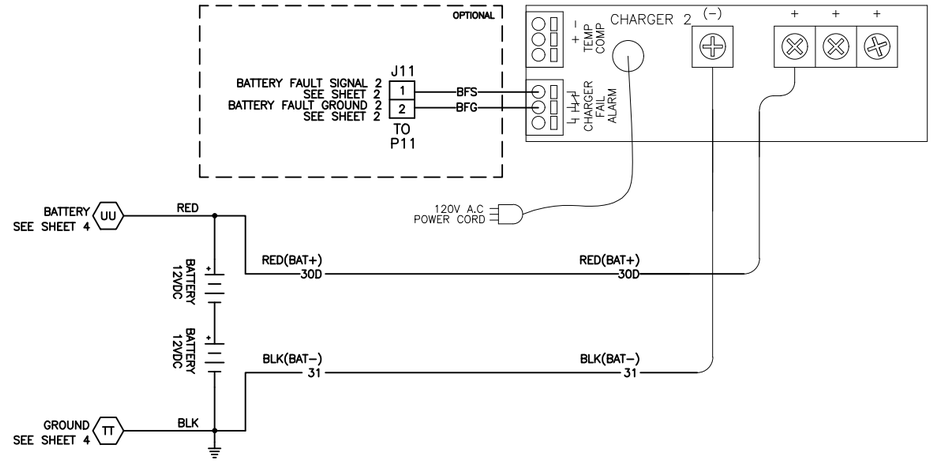
KOHLER Co.
KOHLER, WI 53044

TITLE: DIAGRAM,SCHEMATIC,APM603 RS, 2000-2500, LSA
SCALE: / / /
SHEET 7-15
PLOTTED
DWG. NO. ADV-9151 D

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

REV	DATE	REVISION	BY	M E
C	11-19-20	SHEETS 13, 14 & 15 ADDED [CT204658]	SMH	
D	4-26-21	SEE SHEETS 3, 4, 13, 14, 15 [CT211529]	SBR	
E	7-27-21	SEE SHEET 9 [CT213711]	SBR	
F	8-26-21	SEE SHEET 1 [CT214071]	SBR	





APM603 CONTROLLER W/ ENHANCED I/O HARNESS
KD62V12 W/ ECU2 HD DIESEL
<600V LSA 52.3 ALT. REDUNDANT STARTER

UNLESS OTHERWISE SPECIFIED – DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
.XXX ± .010 ANGLES ± 1/2°
.XX ± .030 SURFACE FINISH
.X ± .060 MAX.
FRACTIONS ±

APPROVALS	DATE
DRAWN DJY	7-12-19
CHECKED JLS	7-12-19
APPROVED JLS	7-12-19

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TITLE DIAGRAM,SCHEMATIC,APM603 RS, 2000-2500, LSA
SCALE ///
SHEET 8-15
PLOTTED
DWG. NO. ADV-9151 D

REV	DATE	REVISION	BY	M T
C	11-19-20	SHEETS 13, 14 & 15 ADDED [CT204658]	SMH	
D	4-26-21	SEE SHEETS 3, 4, 13, 14, 15 [CT211529]	SBR	
E	7-27-21	(C,D-2 TO 4) UPDATED ALTERNATOR JUNCTION BOX		
		CONNECTIONS [CT213711]	SBR	
F	8-26-21	SEE SHEET 1 [CT214071]	SBR	

NOTE:
DASHED LINES FROM ALTERNATOR TO ALTERNATOR CONNECTION BOX INDICATE PRE-WIRED CONNECTIONS MADE BY ALTERNATOR MANUFACTURER

ALTERNATOR

ALTERNATOR JUNCTION BOX

PEDESTAL

GENERATOR SPACE HEATER

240HZ PMG

ROTATING EXCITATION CIRCUITRY

MAIN FIELD ROTOR

EXCITER ARMATURE (ROTATING)

EXCITER FIELD (STATIONARY)

4D ACTIVATOR BOARD (P1)

BAT+ P1-8
BAT GND P1-7
GND P1-9
BUS, VOLTAGE VALID+ P1-10
BUS, VOLTAGE VALID- P1-11
LED+ P1-6
LED1 P1-1
OVER EXCITATION V+ P1-12
OVER EXCITATION V- P1-13
AC1 P1-4
AC3 P1-3
AC2 P1-2
FN P1-5
FP P1-14

TO LOAD IF NO EOB SEE SHEET 12
TO EOB SEE SHEET 10 OR 11

TO J2 SHEET 10

TO BREAKER SHEET 12

TO APM603 SHEET 2

TO 10 RELAY SHEET 3

CUSTOMER WIRED

APM603 CONTROLLER W/ ENHANCED I/O HARNESS
KD62V12 W/ ECU2 HD DIESEL
<600V LSA 52.3 ALT. REDUNDANT STARTER

KOHLER, CO.
KOHLER, WI 53044
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APPROVALS		DATE
DRAWN	DJY	7-12-19
CHECKED	JLS	7-12-19
APPROVED	JLS	7-12-19

TITLE: DIAGRAM,SCHEMATIC,APM603 RS, 2000-2500, LSA
SCALE: /// SHEET 9-15
PLOTTED: DWG. NO. ADV-9151 D

REV	DATE	REVISION	BY	CT
C	11-22-20	(D-2,-3) UPDATED KEY SWITCH VIEW; SEE SHEETS 2, 3, 10 AND 12; SHEETS 13 TO 17 ADDED [CT204658]	SMH	
D	4-19-21	SEE SHEETS 2, 3, 4, 13, 14, 15, 16 [CT211529]	SBR	

P4 CONNECTIONS

PIN			PIN		
#1	21	(PG1-3)	18	N/C	.
2	KYA1	(PK1-1)	19	BLK	(J20-10)
3	KYR1	(PK1-2)	20	N/C	.
4	N4	(W(J1))	21	80	(TB10-54)
5	RED	(TB10-49)	22	2806	(W(G))
6	WHT	(TB10-50)	23	RES6	(J20-6)
7	RED	(J20-8)	24	CBCR1	(W(M))
8	WHT	(J20-9)	25	4	(TB10-4)
9	178	(J-C10-32)	26	115	(J-C10-33)
10	LFL	(TB10-43)	27	20	(TB10-6)
11	RES5	(J20-4)	28	N/C	.
12	N12	(W(J1))	29	N/C	.
13	CBTR1	(W(N))	30	N/C	.
14	N/C	.	31	ES2A	(W(R))
15	N/C	.	32	ES3	(K10-A1)
16	N/C	.	33	N/C	.
17	BLK	(TB10-51)	34	5B	(J1D-22)
			35	3B	(J1D-21)

P3 CONNECTIONS

PIN		
#1	1A	(J1D-1)
2	2A	(J1D-2)
3	BLO	(PB1-4)
4	BL3	(PB1-3)
5	3A	(J1D-3)
6	4A	(J1D-4)
7	BL1	(PB1-1)
8	BL2	(PB1-2)

P2 CONNECTIONS

PIN			PIN		
#1	N/C	.	13	N/C	.
2	N/C	.	14	N/C	.
3	S31	(J1D-13)	15	N/C	.
4	S31R	(J1D-14)	16	PF1C	(W(A))
5	S21	(J1D-11)	17	N/C	.
6	S21R	(J1D-12)	18	VI6P	(TB10-47)
7	S11	(J1D-9)	19	VI5P	(TB10-45)
8	S11R	(J1D-10)	20	N/C	.
9	N1	(W(J))	21	N/C	.
10	VI6N	(TB10-48)	22	N/C	.
11	VI5N	(TB10-46)	23	N/C	.
12	N/C	.			

P1 CONNECTIONS

PIN			PIN		
#1	GRN	(W(BD))	18	CBT	(TB1-K8)
2	YEL	(W(BC))	19	ECUR	(TB1-K6)
3	BLK	(TX1-10)	20	CF	(TB1-K4)
4	WHT	(TX1-11)	21	RD02	(P21-85)
5	BLK	(TX1-13)	22	N/C	.
6	WHT	(TX1-14)	23	N/C	.
7	CBC	(TB1-K7)	24	N/C	.
8	CW	(TB1-K5)	25	N/C	.
9	HRN	(W(C))	26	YEL	(W(L))
10	70N	(W(BB))	27	GRN	(W(K))
11	N/C	.	28	N28	(W(J1))
12	N/C	.	29	ES1	(W(S))
13	S5	(W(BE))	30	N30	(W(J1))
14	N/C	.	31	ES2	(W(R))
15	S2	(TX1-12)	32	N/C	.
16	N/C	.	33	NRDO	(W(J1))
17	S3	(TX1-12)	34	BLK	(TB10-7)
			35	WHT	(TB10-8)

APM603 CONTROLLER

ETHERNET P5

YEL (P1-2) — R2 120 OHM — GRN (P1-1)

UNINS-S4 (TB10-5) · UNINS-S6 (W(J5)) · UNINS-S1 (TB10-52)

PK1 CONNECTIONS

PIN #1 KYA1 (P4-2)
2 KYR1 (P4-3)
3 NKS1 (W(J1))

PK1 (KYA1, KYR1, NKS1) — JK1 (KYA, KYR, NKS)

KEY SWITCH: KYR, KYA, NKS; 3 2 4 / PNK BLU PNK / 4 1 3; W(AF); NRUN, NAUT

ES1 (P1-29) — W(S) — ES1A (ESTOP A2) — ES1B (TB10-1)

ES2A (P4-31) — ES2 (P1-31) — W(R) — ES2B (TB10-2)

ETHERNET MODULE

ES1A (W(S)) — OA2 — ESTOP (LOCAL) — OA1

PF1E (W(A))

28 (TB2-28) — HORN — P9 (W(A))

B — TO SHEET 2

LEGEND

BCA – BATTERY CHARGING ALTERNATOR
CT# – CURRENT TRANSFORMER #
ECU – ENGINE CONTROL UNIT
ESS – EMERGENCY STOP SWITCH
D# – DIODE #
GFR – GROUND FAULT RELAY
HMI – HUMAN MACHINE INTERFACE
K# – RELAY CONTACT #
R# – RESISTOR #
SM – STARTER MOTOR
SS – STARTER SOLENOID
TB# – TERMINAL BLOCK #
– ENGINE BLOCK GROUND
– EARTH GROUND

NOTE:
TB1–K2 – ADDITIONAL RUN CONTACT RESERVED FOR CUSTOMER USE.

42A (W(A)) · 2N (W(J1)) · 70N2 (W(BB)) · 70N3 (W(BB)) · HRNA (W(C)) · CF (P1-20) · CW (P1-8) · ECUR (P1-19) · CBC (P1-7) · CBT (P1-18) · 70N1 (W(BB)) · HRNB (W(C))

HRNB (TB1-K10) — W(C) — HRNA (TB1-K3) — HRN (P1-9)

70N1 (TB1-K9) — W(BB) — 70N2 (TB1-K1) — 70N3 (TB1-K2) — 70N (P1-10)

42A | 2 | K1 | K2 | K3 | K4 | K5 | K6 | K7 | K8 | K9 | K10 TB1

10 RELAY BOARD D-294303-P

OUT K1 … OUT K10

NO NC C | NO NC C | NO NC C | NO NC C | NO NC C | NO NC C | NO NC C | NO NC C | NO NC C | NO NC C TB2

30B10 (K10-04) · 61A (R1) · RB43 (TB10-31) · RB42 (TB10-32) · RB31 (TB10-23) · RB32 (TB10-22) · RB30 (TB10-24) · RB37 (TB10-29) · RB38 (TB10-28) · RB36 (TB10-30) · 261A (K10-14) · 261 (J-C10-11) · CB1 (W(F)) · CBP (W(B)) · OB1 (W(D)) · OBP (W(B)) · RB31M (TB10-40) · RB52 (TB10-39) · 28 (HORN –) · N1D (W(J1))

30C (J-C10-1) · NRDO (P1-33) · 2N (TB1-2) · N28 (P1-28) · N30 (P1-30) · W1 (W(J)) · N12 (P4-12) · N4 (P4-4) · NKS1 (PK1-3) · CB2 (PX1-3) · CB (J1D-17) · OB2 (PX1-4) · OB (J1D-18) · ST (J1D-23)

W(E) · W(J1) · W(F) · W(D)

30J (F3) · 30G (F2) · 30H (F1) · N2 (K10-A2) · N1D (TB2-30) · CB1 (TB2-19) · OB1 (TB2-23)

P21 — RELAY

P21 CONNECTIONS

PIN		
#30	RD02P	(J20-1)
85	RD02	(P1-21)
86	RD02N	(W(B))
87	RD02NO	(J20-2)
87a	RD02NC	(J20-3)

PB1 CONNECTIONS

PIN		
#1	BL1	(P3-7)
2	BL2	(P3-8)
3	BL3	(P3-4)
4	BL0	(P3-3)
5	N/C	.
6	N/C	.

A — TO JB1 BUS VOLTAGE SENSE SHEET 11 OR 12

30H (W(E)) · 30G (W(E)) · 30J (W(E))

F1 15A · F2 10A · F3 10A

PF1A (W(A)) · PF2B (W(H)) · PF3 (W(B))

W(H) — PF2B (F2) — PF2 (K10-03) — PF2A (K10-13)

K10

PF2A (W(H)) · PF2 (W(H)) · ES3 (P4-32) · N2 (W(J1)) · 30B10 (TB2-1) · 261A (TB2-17)

FOR SCHEMATIC SEE ADV-9146

APM603 CONTROLLER W/ENHANCED I/O HARNESS
KD62V12 W/ECU2HD DIESEL
<600V REDUNDANT STARTER

KOHLER, WI 53044
THIS DRAWING IS DESIGN AND DETAIL IS KOHLER CO. PROPERTY AND MAY NOT BE USED EXCEPT IN CONNECTION WITH KOHLER CO. WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.

APPROVALS	DATE
DRAWN SMH	7-12-19
DESIGNED DJY	7-12-19
APPROVED JLS	7-12-19

TITLE: DIAGRAM, WIRING, APM603 RS 2000–2500
SCALE N/A · SHEET 1–17
PLOTTED · DWG. NO. GM107910 · D

REV	DATE	REVISION	BY	CHK'D
C	11-22-20	SEE SHEETS 1, 2, 3, 10 AND 12; SHEETS 13 TO 17 ADDED [CT204658]	SMH	
D	4-19-21	SEE SHEETS 2, 3, 4, 13, 14, 15, 16 [CT211529]	SBR	

ALTERNATOR

ALTERNATOR INTERCONNECTION BOX

NOTE:
DASHED LINES FROM ALTERNATOR TO ALTERNATOR CONNECTION BOX INDICATE PRE-WIRED CONNECTIONS MADE BY ALTERNATOR MANUFACTURER

CT1 xxx:5 CCCT
CT2 xxx:5 CCCT
CT3 xxx:5 CCCT
12
11
10
9
8
7
6
5

SPACE HEATER
H1
H2
H3
H4

NOTE:
OPTB1 & OPTB2 ARE OPTIONAL TERMINAL; BLOCK FOR SERVICE USE

PMG STATOR
240 HZ
OPTB1
PM1
PM2
PM3

SHIELDED

ROTATING RECTIFIER ASSEMBLY
ROTOR
EXCITER ARMATURE
EXCITER FIELD
OPTB2
EF1
EF2
EF3
EF4

ALTERNATOR
4
5
6
1
2
3
N
ØA
ØB
ØC
TO LOAD

RTDTB
GND
BGC2
BGW2
BGR2
BGC1
BGW1
BGR1
C6
W6
R6
C5
W5
R5
C4
W4
R4
C3
W3
R3
C2
W2
R2
C1
W1
R1

P1 CONNECTIONS

PIN #1	5B	(ATB2-27)
2	16	(ATB2-F7)
3	17	(ATB2-F8)
4	15	(ATB2-F6)
5	19	(ATB2-F2)
6	3B	(ATB2-26)
7	N/C	.
8	N/C	.
9	N/C	.
10	N/C	.
11	N/C	.
12	N/C	.
13	N/C	.
14	18	(ATB2-F1)

ACTIVATOR BOARD
P1
1
5
10
14
5B
16
17
15
19
3B
18

P2 CONNECTIONS

PIN #1	BV1	(P1D-15)
2	NX1	(P1D-16)
3	CB	(P1D-17)
4	OB	(P1D-18)
5	CBCR	(P1D-19)
6	CBTR	(P1D-20)

P2
BV1
OB
NX1
CBCR
CB
CBTR
P
TO J2 Sheet 11

P1D
4A
3A
2A
1A
S21R
S21
S11R
S11
NX1
BV1
S31R
S31
CBTR
CBCR
OB
CB
STN
ST
5B
3B
FROM J1D SHEET 3
L
R
TO SHUNT TRIP Sheet 13

P1D CONNECTIONS

PIN #1	1A	(ATB2-21)	13	S31	(ATB1-11)
2	2A	(ATB2-22)	14	S31R	(ATB1-12)
3	3A	(ATB2-23)	15	BV1	(P2-1)
4	4A	(ATB2-24)	16	NX1	(P2-2)
5	N/C	.	17	CB	(P2-3)
6	N/C	.	18	OB	(P2-4)
7	N/C	.	19	CBCR	(P2-5)
8	N/C	.	20	CBTR	(P2-6)
9	S11	(ATB1-7)	21	3B	(ATB2-26)
10	S11R	(ATB1-8)	22	5B	(ATB2-27)
11	S21	(ATB1-9)	23	ST	(C1 OR T1)
12	S21R	(ATB1-10)	24	STN	(C2 OR T2)

ATB1
H3 H1 11 9 7 5
H4 H2 12 10 8 6
GND H4 H3 H2 H1 12 11 10 9 8 7 6 5
S31R (P1D-14)
S31 (P1D-13)
S21R (P1D-12)
S21 (P1D-11)
S11R (P1D-10)
S11 (P1D-9)

ATB2
EF2 EF4
EF1 EF3
1 2 3 4
PM1 PM2 PM3
F5
F6 F7 F8
10A 10A 10A
GND 14 15 (P1-4) 16 (P1-2) 17 (P1-3) GND F1 F2 F3 F4 GND 18 (P1-14) 19 (P1-5) 21 1A (P1D-1) 22 2A (P1D-2) 23 3A (P1D-3) 24 4A (P1D-4) 25 3B (P1D-21) 26 5B (P1D-22) 27 GND
3B (P1-6)
5B (P1-1)

FOR SCHEMATIC SEE ADV-9146

APM603 CONTROLLER W/ENHANCED I/O HARNESS
KD62V12 W/ECU2HD DIESEL
<600V REDUNDANT STARTER

UNLESS OTHERWISE SPECIFIED -
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES ARE:
.XXX ± .010 ANGLES ± 1/2°
.XX ± .030 SURFACE FINISH
.X ± .060 MAX.
FRACTIONS ±

APPROVALS	DATE
DRAWN SMH	7-12-19
CHECKED DJY	7-12-19
APPROVED JLS	7-12-19

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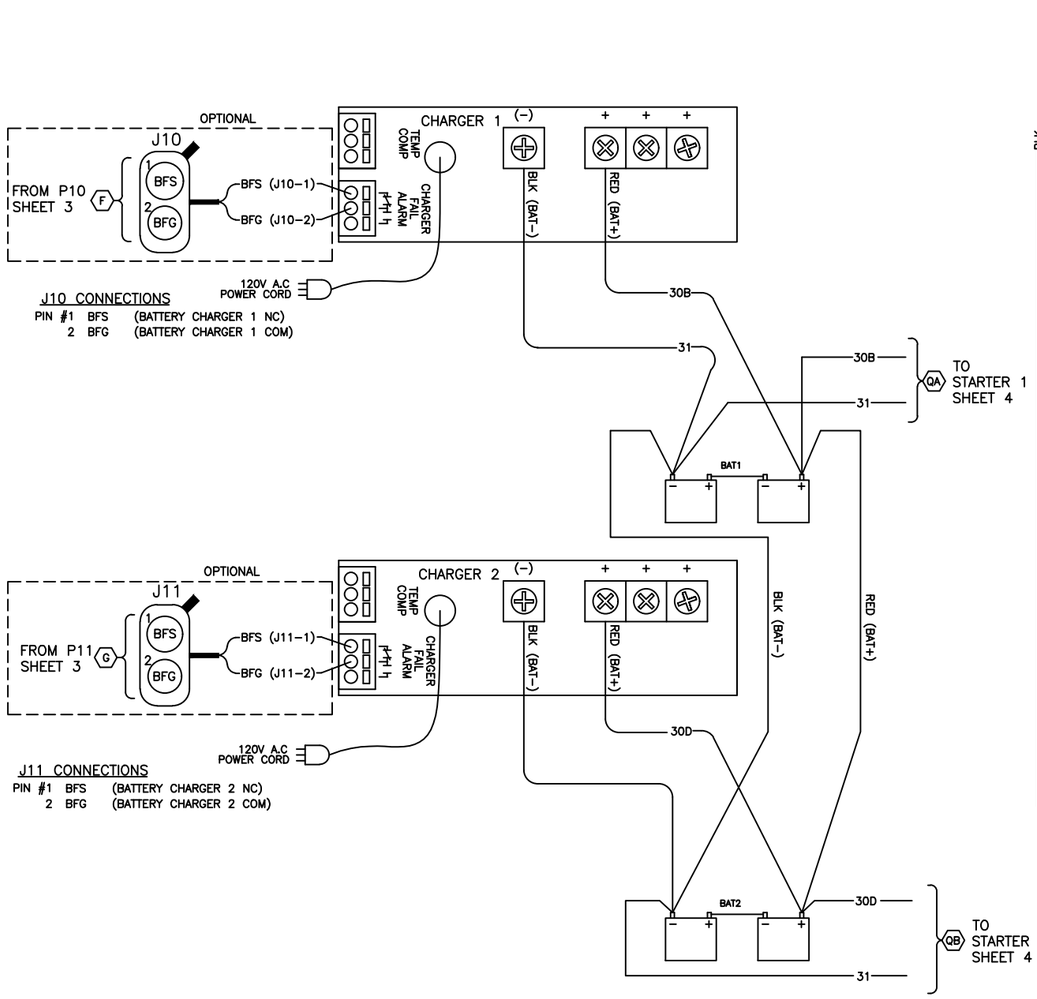
KOHLER, WI 53044

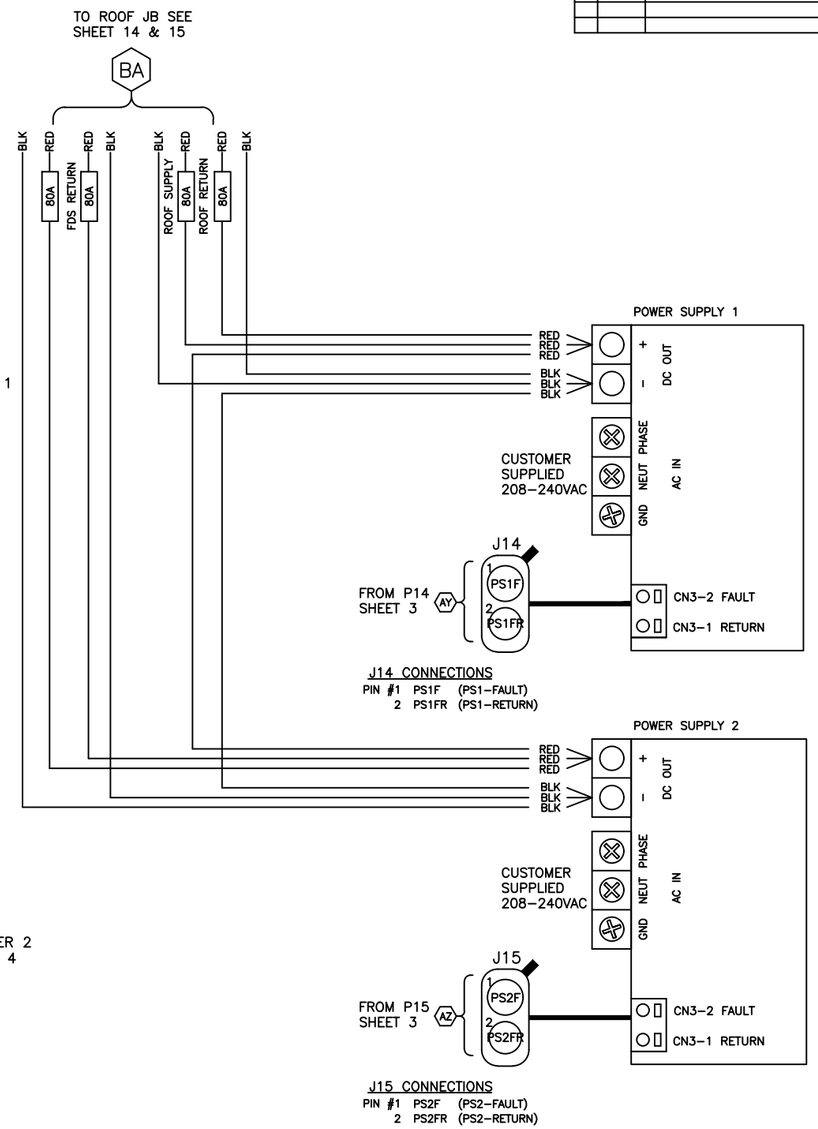
TITLE: DIAGRAM, WIRING, APM603 RS 2000-2500

SCALE N/A SHEET 10-17

PLOTTED DWG. NO. GM107910 D

REV	DATE	REVISION	BY	CHK'D
C	11-22-20	SEE SHEETS 1, 2, 3, 10 AND 12; SHEETS 13 TO 17 ADDED		
		[CT204658]	SMH	
D	4-19-21	SEE SHEETS 2, 3, 4, 13, 14, 15, 16 [CT211529]	SBR	





FOR SCHEMATIC SEE ADV-9146

APM603 CONTROLLER W/ENHANCED I/O HARNESS
KD62V12 W/ECU2HD DIESEL
<600V REDUNDANT STARTER

KOHLER, WI 53044

APPROVALS	DATE
DRAWN SMH	7-12-19
CHECKED DJY	7-12-19
APPROVED JLS	7-12-19

TITLE: DIAGRAM, WIRING, APM603 RS 2000-2500
SCALE N/A
SHEET 9-17
PLOTTED
DWG. NO. GM107910 D

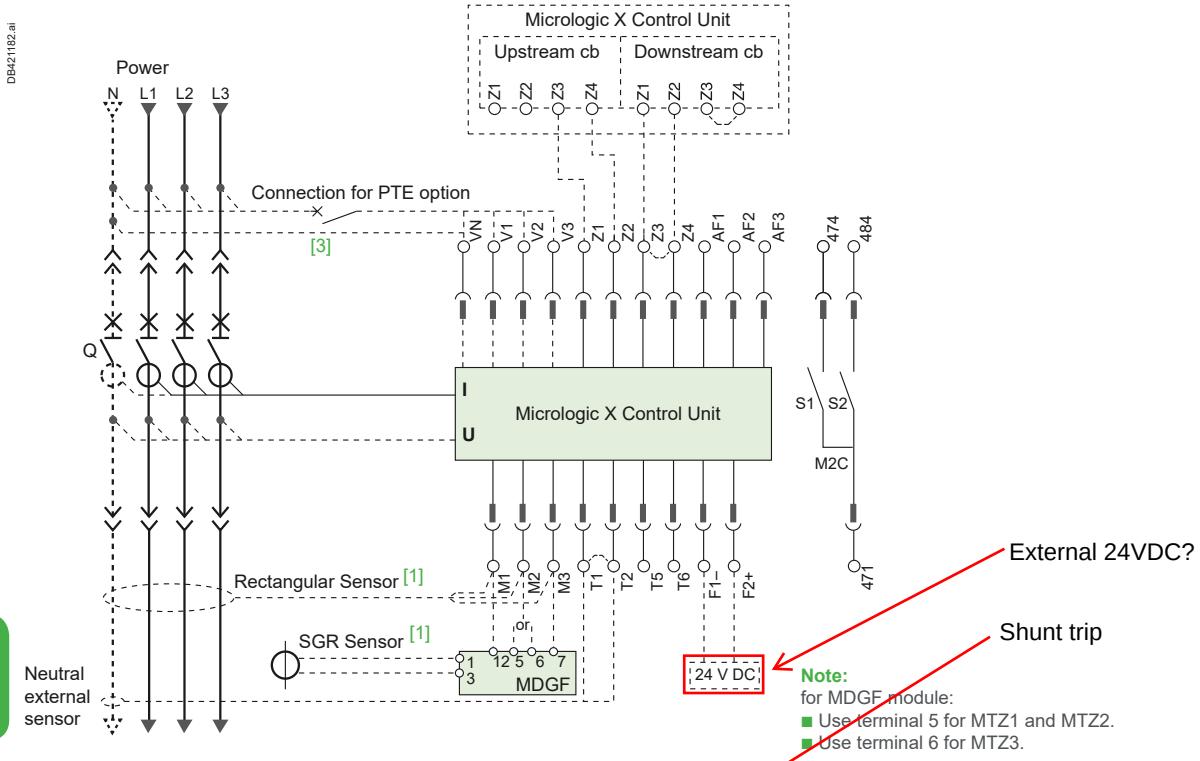
Electrical diagrams

Masterpact MTZ2/MTZ3 Fixed and drawout devices

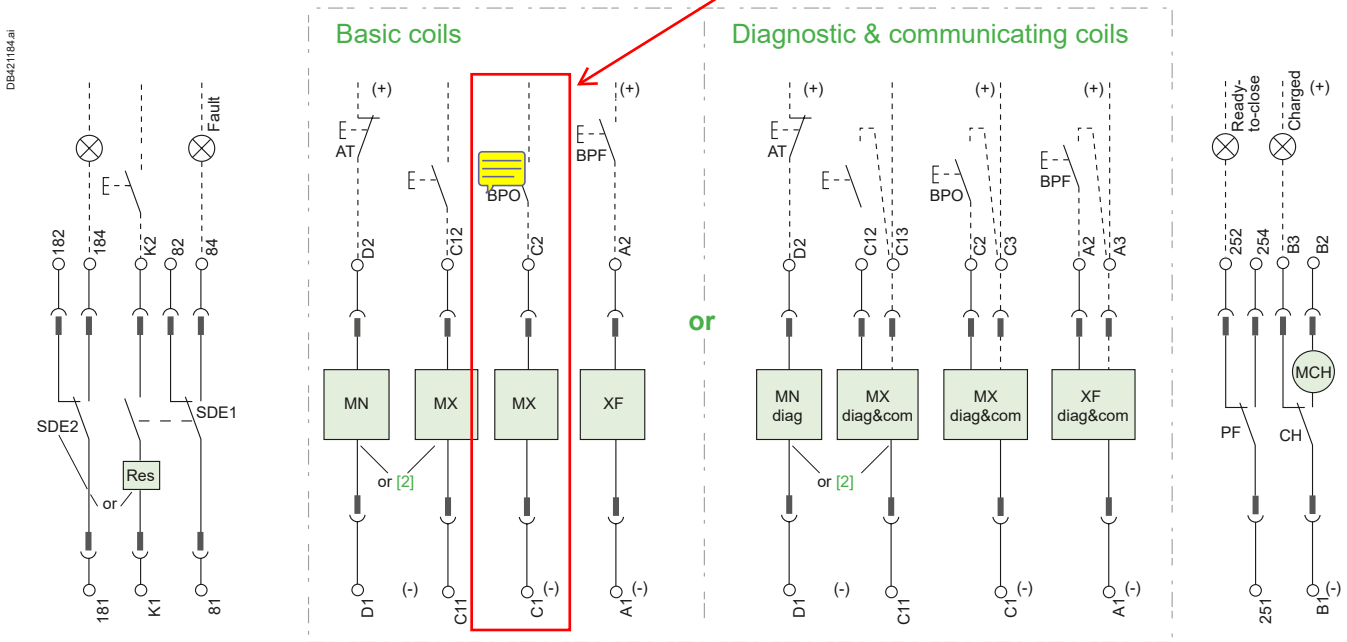
The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in normal position.

Power

Control unit



Remote operation



Note: Maximum length of the two wires cables between A2-A3 / C2-C3 / C12-C13: 5 m.
The maximum lengths of the wiring between the AC/DC power supply and coil terminals A1-A3 / C1-C3 / C11-C13 /D1-D2 are given page D-18.

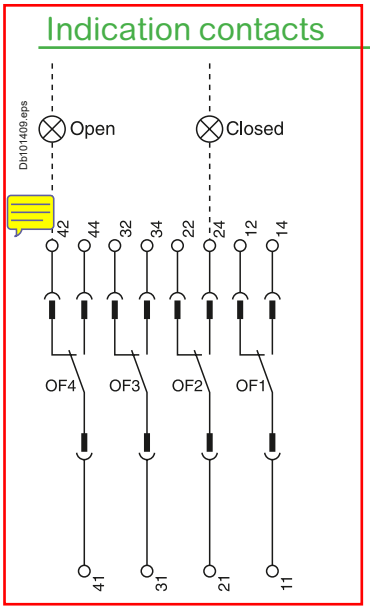
[1] Rectangular sensor or SGR sensor.

[2] Possibility to add a second MX/MX diag&com or a MN/MN diag coil.The second MX diag&com coil can only be installed after the delivery of the circuit breaker. this is an after sale adaptation.

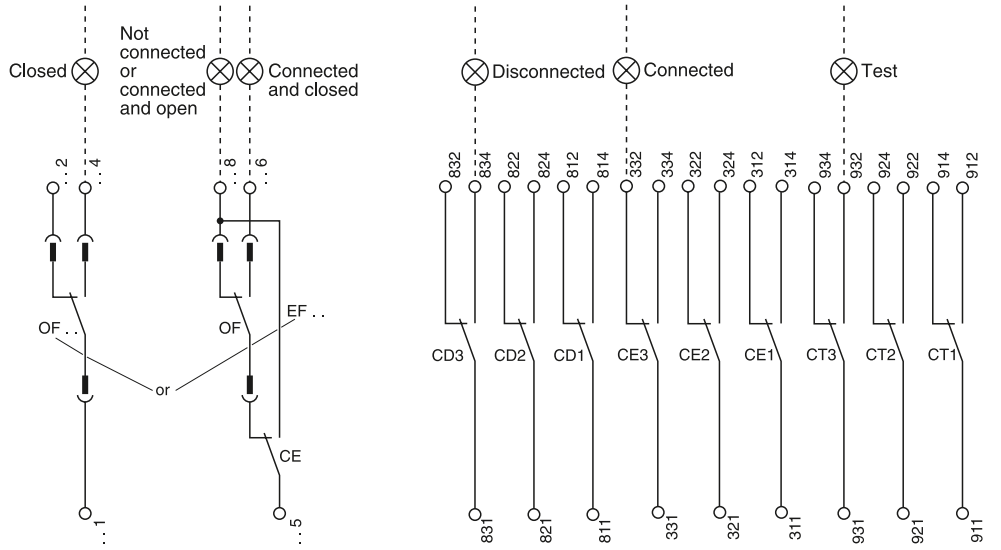
[3] For 3 poles Masterpact MTZ circuit breaker in power system with neutral distributed, the neutral shall be connected to the Vn terminal of Micrologic X and ENVT configured to "Yes" to ensure the quality of power measurement.

Open and closed Contacts

Indication contacts



Chassis contacts



Control unit terminal block

Com : ULP communication

UC1 : Z1-Z4 zone selective interlocking

M1 = rectangular sensor (Micrologic 7.0 X)
or MDGF module input

UC2 : T1, T2 = neutral external sensors
M2, M3 = rectangular sensor (Micrologic 7.0 X)
or MDGF module input

UC3 : voltage connector (must be connected to the neutral with a 3P circuit breaker)

UC4 : External Voltage Connector (PTE option)
or
M2C : 2 programmable contacts (external relay)
ext. 24 V DC power supply required

Remote operation terminal block

SDE2: **or** **Res:**	fault-trip indication contact remote reset
SDE1:	fault-trip indication contact (supplied as standard)
MN /MN diag:	undervoltage release standard or diagnostic
MX/MX diag&com:	opening voltage release standard or diagnostic & communicating
2nd MX/MX diag&com:	opening voltage release standard or diagnostic
XF/XF diag&com:	closing voltage release standard or diagnostic & communicating
PF:	ready-to-close contact
MCH:	electric motor

Note: when communicating MX com or XF com releases are used, the third wire (C3,A3, C13) must be connected even if the communication module is not installed.

Indication contacts

OF4 : **OF3** **OF2** **OF1**	ON/OFF indication contacts OF	**OF24 or EF24** **OF23 or EF23** **OF22 or EF22** **OF21 or EF21** **OF14 or EF14** **OF13 or EF13** **OF12 or EF12** **OF11 or EF11**	ON/OFF indication contacts OF or connected/closed contacts EF

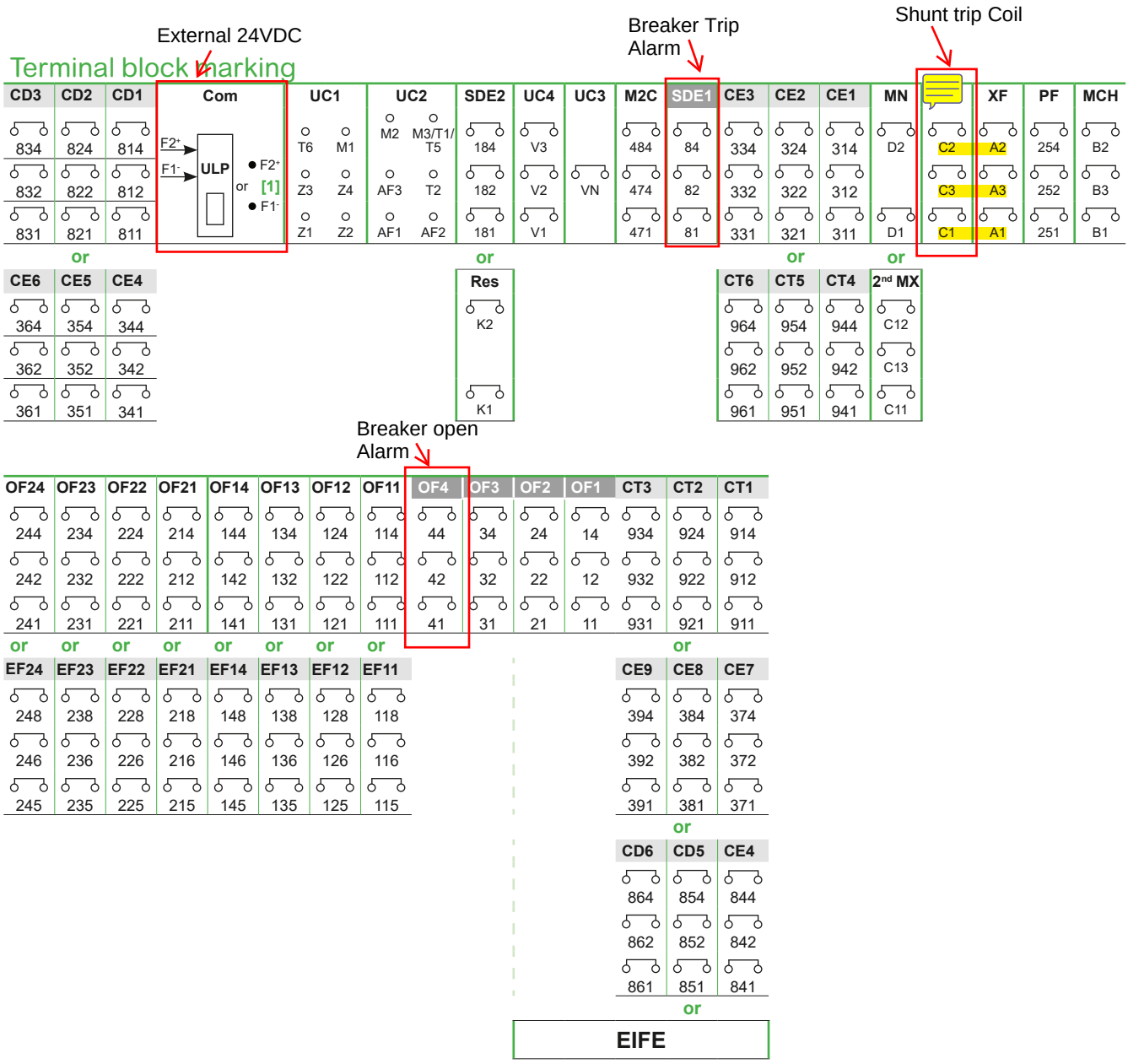
Chassis contacts

CD3 **CD2** **CD1**	disconnected position contacts	**CE3** **CE2** **CE1**	connected position contacts	**CT3** **CT2** **CT1**	test position contacts
or		**or**		**or**	
CE6 **CE5** **CE4**	connected position contacts	**CT6** **CT5** **CT4**	test position contacts	**CE9** **CE8** **CE7**	connected position contacts
				or	
				CD6 **CD5** **CD4**	disconnected position contacts

F

Electrical diagrams

Masterpact MTZ2/MTZ3 Fixed and drawout devices



Drawout device only.

SDE1, OF1, OF2, OF3, OF4 supplied as standard.

interconnected connections
(only one wire per connection point).

[1] The connection of the +/- of the power supply either on terminals F1/F2 of Micrologic X or on the +/- terminals of the ULP port must be strictly respected. Crossing the polarities may damage the device.

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic

Items shown in this diagram are examples only and are not true depictions of equipment ordered. Enclosures, colors, and styles may vary

KOHLER GENERATOR
APM603 CONTROLLER

BUILDING MANAGEMENT SYSTEM
BMS/EPMS

AUTOMATIC SWGR / TANSFER SWITCH

Ethernet
Cat 5/6

CONTROL WIRES
4ea. THHN 16ga.

REMOTE START
4ea. THHN 12-14ga.

COMMUNICATION DRAWING

AS BUILT DRAWINGS FOR EPSS COMMUNICATION SYSTEM

KOHLER®
IN POWER. SINCE 1920.

APM802 MODBUS Map

Register	Access	Data Type	Description	Limitations
5893	Read	Word	Base Box Digital Input 0 (Remote Start)	Bit 0
5894	Read	Word	Base Box Digital Input 1 (Low Fuel Level Switch)	Bit 0
5895	Read	Word	Base Box Digital Input 2 (Breaker Open Status)	Bit 0
5896	Read	Word	Base Box Digital Input 3 (Remote Reset)	Bit 0
5897	Read	Word	Base Box Digital Input 4 (Aux Shutdown)	Bit 0
5898	Read	Word	Base Box Digital Input 5 (High Fuel Level Switch)	Bit 0
5899	Read	Word	Base Box Digital Input 6 (Aux Warning)	Bit 0
5900	Read	Word	Base Box Digital Input 7 (Low Oil Level)	Bit 0
5901	Read	Word	Base Box Digital Input 8 (Battery Charger Fault)	Bit 0
5902	Read	Word	Base Box Digital Input 9 (Fuel Leak Alarm)	Bit 0
5903	Read	Word	Base Box Digital Input 10 (Idle Mode)	Bit 0
5904	Read	Word	Base Box Digital Input 11 (GFCI Tripped)	Bit 0
5905	Read	Word	Base Box Digital Input 12 (Remote Speed Adjust Enable)	Bit 0
5906	Read	Word	Base Box Digital Input 13 (Key Switch Enable)	Bit 0
5907	Read	Word	Base Box Digital Input 14 (Load Shed Enable)	Bit 0
5908	Read	Word	Base Box Digital Input 15 (Overcrank Test)	Bit 0
5909	Read	Word	Base Box Digital Input 16 (Reserved for Factory Use)	Bit 0
5910	Read	Word	Base Box Digital Input 17 (Emergency Stop)	Bit 0
6212	Read	Word	Digital I/O Expansion Module Input 0	Bit 0
6213	Read	Word	Digital I/O Expansion Module Input 1	Bit 0
6214	Read	Word	Digital I/O Expansion Module Input 2	Bit 0
6215	Read	Word	Digital I/O Expansion Module Input 3	Bit 0
6216	Read	Word	Digital I/O Expansion Module Input 4	Bit 0
6217	Read	Word	Digital I/O Expansion Module Input 5	Bit 0
6218	Read	Word	Digital I/O Expansion Module Input 6	Bit 0
6219	Read	Word	Digital I/O Expansion Module Input 7	Bit 0
10631	Read	Word	Frequency	Hz x 100
10632	Read	Word	L1-L0 Voltage	
10633	Read	Word	L2-L0 Voltage	
10634	Read	Word	L3-L0 Voltage	
10635	Read	Word	L1-L2 Voltage	
10636	Read	Word	L2-L3 Voltage	
10637	Read	Word	L3-L1 Voltage	
10638	Read	Word	L1 Current	
10639	Read	Word	L2 Current	
10640	Read	Word	L3 Current	
10642	Read	Word	L1 kW	
10643	Read	Word	L2 kW	
10644	Read	Word	L3 kW	
10645	Read	Word	Total kW	
10646	Read	SWord	L1 kVAR	
10647	Read	SWord	L2 kVAR	
10648	Read	SWord	L3 kVAR	
10649	Read	SWord	Total kVAR	
10650	Read	SWord	L1 Power Factor	PF x 100
10651	Read	SWord	L2 Power Factor	PF x 100
10652	Read	SWord	L3 Power Factor	PF x 100
10653	Read	SWord	Total Power Factor	PF x 100

10655	Read	Word	Total kVA	
12392	Read	Word	Total Run Time	Hours
12395	Read	Word	Engine Speed	RPM
12398	Read	SWord	Coolant Temperature	Degrees C x 100
12400	Read	SWord	Fuel Temperature	Degrees C x 100
12401	Read	SWord	Oil Temperature	Degrees C x 100
12402	Read	Word	Intake Air Temperature	Degrees C x 100
12409	Read	Word	Oil Pressure	Bar x 100
12410	Read	Word	Fuel Pressure	Bar x 100
12420	Read	Word	Battery Voltage	V x 100
33069	Read	Word	Fuel Rate	L/Hr x 10
12521	Read	SWord	Active ECU Fault Code(s) SPN	
12522	Read	SWord	Active ECU Fault Code(s) FMI	
37067	Read	Word	Common Fault	Bit 9
37068	Read	Word	Common Warning	Bit 0
37068	Read	Word	GFCI Tripped	Bit 1
37068	Read	Word	Over Frequency Fault	Bit 2
37068	Read	Word	Under Frequency Fault	Bit 3
37068	Read	Word	Over Voltage Fault	Bit 4
37068	Read	Word	Under Voltage Fault	Bit 5
37068	Read	Word	Overload Active Power Warning	Bit 6
37068	Read	Word	Reverse Active Power Fault	Bit 8
37068	Read	Word	Overload Reactive Power Warning	Bit 9
37068	Read	Word	Reverse Reactive Power Fault	Bit 10
37068	Read	Word	Over Current Fault	Bit 11
37068	Read	Word	Thermal Overload Fault	Bit 13
37068	Read	Word	Low Cranking Voltage	Bit 14
37068	Read	Word	Low Controller Temperature	Bit 15
37069	Read	Word	Genset Output Greater than 80% of Rated	Bit 10
37069	Read	Word	Load Shed 1 Active	Bit 11
37069	Read	Word	Load Shed 2 Active	Bit 12
37069	Read	Word	Load Shed 3 Active	Bit 13
37069	Read	Word	Load Shed 4 Active	Bit 14
37070	Read	Word	Idle Mode Cancelled Before Idle Timeout	Bit 15
37071	Read	Word	Alternator Winding Temperature Warning	Bit 2
37071	Read	Word	Alternator Winding Temperature Fault	Bit 3
37071	Read	Word	Alternator Bearing Temperature Warning	Bit 4
37071	Read	Word	Alternator Bearing Temperature Fault	Bit 5
37071	Read	Word	Not in Auto Warning	Bit 12
37071	Read	Word	Power Plant out of Service	Bit 13
37072	Read	Word	Emergency Stop Active	Bit 0
37073	Read	Word	Under Speed Fault	Bit 11
37073	Read	Word	Over Speed Fault	Bit 12
37073	Read	Word	Speed Detection Fault	Bit 13
37074	Read	Word	Low Engine Coolant Level Fault	Bit 1
37074	Read	Word	Engine Coolant Temperature Warning	Bit 4
37074	Read	Word	Engine Coolant Temperature Fault	Bit 5
37074	Read	Word	Low Coolant Temperature Warning	Bit 12
37075	Read	Word	Low Oil Level Warning	Bit 0
37075	Read	Word	Low Oil Pressure Warning	Bit 4

37075	Read	Word	Low Oil Pressure Fault	Bit 5
37075	Read	Word	High Oil Temperature Warning	Bit 6
37075	Read	Word	High Oil Temperature Fault	Bit 7
37075	Read	Word	First Starter Speed Detection Warning	Bit 14
37075	Read	Word	Second Starter Speed Detection Warning	Bit 15
37076	Read	Word	Low Fuel Level	Bit 9
37076	Read	Word	Fuel Level Critically Low	Bit 10
37076	Read	Word	High Fuel Level	Bit 11
37076	Read	Word	Very High Fuel Level	Bit 12
37076	Read	Word	Fuel Leak Alarm	Bit 14
37079	Read	Word	First Starter Warning	Bit 0
37079	Read	Word	Over Crank	Bit 1
37079	Read	Word	Battery Charger Fault	Bit 6
37079	Read	Word	Low Battery Voltage	Bit 8
37079	Read	Word	High Battery Voltage	Bit 9
37080	Read	Word	APM Internal Battery Warning	Bit 4
37101	Read	Word	Engine CAN Bus Communication Fault	Bit 6
37101	Read	Word	Regulation Module 1 Communication Fault	Bit 9
37102	Read	Word	APM802 Watchdog	Bit 7
37112	Read	Word	Analog Sensor Input AI0 Fault	Bit 0
37112	Read	Word	Analog Sensor Input AI1 Fault	Bit 1
37112	Read	Word	Analog Sensor Input AI3 Fault	Bit 2
43657	Read	Word	Base Box Digital Output 0 (Common Fault)	Bit 0
43658	Read	Word	Base Box Digital Output 1 (System Ready)	Bit 0
43659	Read	Word	Base Box Digital Output 2 (Common Warning)	Bit 0
43660	Read	Word	Base Box Digital Output 3 (Reserved for Factory Use)	Bit 0
43661	Read	Word	Base Box Digital Output 4 (Horn)	Bit 0
43662	Read	Word	Base Box Digital Output 5 (Low Coolant Temp Warning)	Bit 0
43663	Read	Word	Base Box Digital Output 6 (Shunt Trip)	Bit 0
43664	Read	Word	Base Box Digital Output 7 (Not in Auto)	Bit 0
43665	Read	Word	Base Box Digital Output 8 (BCA Excitation)	Bit 0
43666	Read	Word	Base Box Digital Output 9 (Generator Running)	Bit 0
43667	Read	Word	Base Box Digital Output 10 (EPS supplying Load)	Bit 0
43668	Read	Word	Base Box Digital Output 11 (ECU Fault Reset)	Bit 0
43669	Read	Word	Base Box Digital Output 12 (Low Oil Pressure)	Bit 0
43670	Read	Word	Base Box Digital Output 13 (High Coolant Temp)	Bit 0
43671	Read	Word	Base Box Digital Output 14 (Low Coolant Level Fault)	Bit 0
43672	Read	Word	Base Box Digital Output 15 (Low Fuel Level)	Bit 0
43673	Read	Word	Base Box Digital Output 16 (Start Button Illuminate)	Bit 0
43945	Read	Word	Digital I/O Expansion Module Output 0	Bit 0
43946	Read	Word	Digital I/O Expansion Module Output 1	Bit 0
43947	Read	Word	Digital I/O Expansion Module Output 2	Bit 0
43948	Read	Word	Digital I/O Expansion Module Output 3	Bit 0
49999			Device ID	APM802 = 69

Model: KD2500 (60 Hz) and KD2500-F (60 Hz)

Altitude: See table for altitude derate.

Temperature: See table for temperature derate.

Alternator Air Filter: Derate an additional 5% if equipped.

			Altitude									
		m	300	600	900	1200	1500	1800	2100	2400	2700	3000
		ft	984	1969	2953	3937	4921	5906	6890	7874	8858	9843
	C	F										
Intake Air Temperature	0	32	1.000	1.000	1.000	1.000	1.000	0.979	0.959	0.938	0.903	0.862
	5	41	1.000	1.000	1.000	1.000	1.000	0.979	0.959	0.938	0.903	0.862
	10	50	1.000	1.000	1.000	1.000	1.000	0.979	0.959	0.938	0.903	0.862
	15	59	1.000	1.000	1.000	1.000	1.000	0.979	0.959	0.938	0.903	0.862
	20	68	1.000	1.000	1.000	1.000	1.000	0.979	0.959	0.938	0.903	0.862
	25	77	1.000	1.000	1.000	0.993	0.983	0.962	0.941	0.921	0.886	0.845
	30	86	1.000	1.000	1.000	0.986	0.966	0.945	0.924	0.903	0.869	0.828
	35	95	1.000	1.000	1.000	0.972	0.931	0.910	0.886	0.855	0.824	0.793
	40	104	1.000	1.000	1.000	0.959	0.897	0.876	0.848	0.807	0.779	0.759
	45	113	0.962	0.945	0.934	0.903	0.862	0.831	0.800	0.769	0.745	0.724
	50	122	0.924	0.890	0.869	0.848	0.828	0.786	0.752	0.731	0.710	0.690
	55	131	0.890	0.855	0.834	0.814	0.793	0.752	0.717	0.697	0.676	0.655

KOHLER SDMO	Spring Isolator Kit Placement	
Identification Number:	118080000XX	PAGE **1/3**

IND	DATE	MODIFICATION	WRITER	CT	CHECKED BY
-	09-26-16	First issue	BGW	CT159806	WDG
A	10-27-16	Updated embedded XLSX sheet for: pre-pro calibrated weights. Removed LSA 52.3 L11 references. Removed external references for weight data. Updated Formatting. Changed LS842 L75 50C setup to 4 1095 and 2 940 isolators. Changed LS842 L75 remrad setup to 1 630 and 5 940 isolators. Changed LS842 M70 50C to 1 1095 and 5 940 isolators. Changed LS842 M70 remote radiator to 1 630 and 5 940 isolators. Added native weight/cg spreadsheet for reference. Updated reference genset models in table.	WDG	CT163585	JDZ
B	11-08-16	Updated per finalized ratings configuration. Strike-through LS641 VL75 and LSA52.3 L9 on 2MW (not offered standard). Added KH alternator naming to “6 spot summary” tab. Updated “6 spot summary” tab to include alternator selection for each node per finalized ratings. Created calculation tabs for LS852 VL85 / KH08430TO4D alternator. Added LS842 VL85 to cg summary tab. No additional combinations required. Rebuilt TT summary tab. Rebuilt Isolator Spec Summary tab	WDG	CT164685	JDZ
C	05-01-16	Isolator Table updated, new spreadsheet attached.	BGW	CT173797	BGW
D	06-26-18	Corrected -KA5 KH08430TO4D with 11301002001-MA1 & 50C Radiator position 4 from D to F	WDG	CT188669	JDZ
E	01-15-19	Corrected KH07630TO4D 50C and Remote Radiator setup’s incorrect callout of -MA2 skid. Adjusted remote radiator setup to use -KA2 in place of -KA1 and 50C setup to use position E in place of position A.	WDG	PR07774	JDZ
F	09-05-19	Added KH05790TO4D. Organized table by alternator model #	WDG	CT198431	JDZ
G	1-10-20	KH07770TO4D (rad) and KH08430TO4D (rad): Position 6 isolator location updated from "-" to "J"	AJW	CT201131	WDG

1. Purpose

This document is for reference to place specified isolator sets relative to *Figure’s 1 and 2* below. The positions will have holes dedicated on skid for spring isolators. Radiator is shown below in pictures slightly transparent because these positions are dedicated only if customer wants a radiator assembled. For editing in table, please use excel spreadsheet attached, *Spring Isolator Sizing Sheet.*

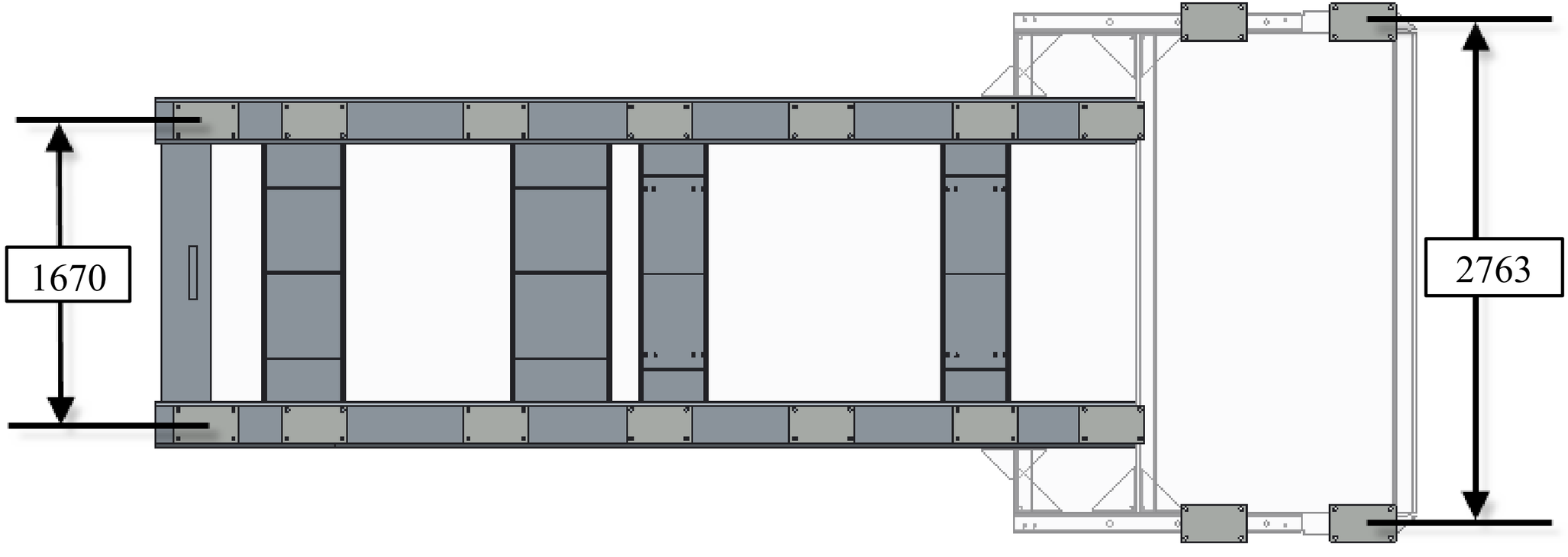
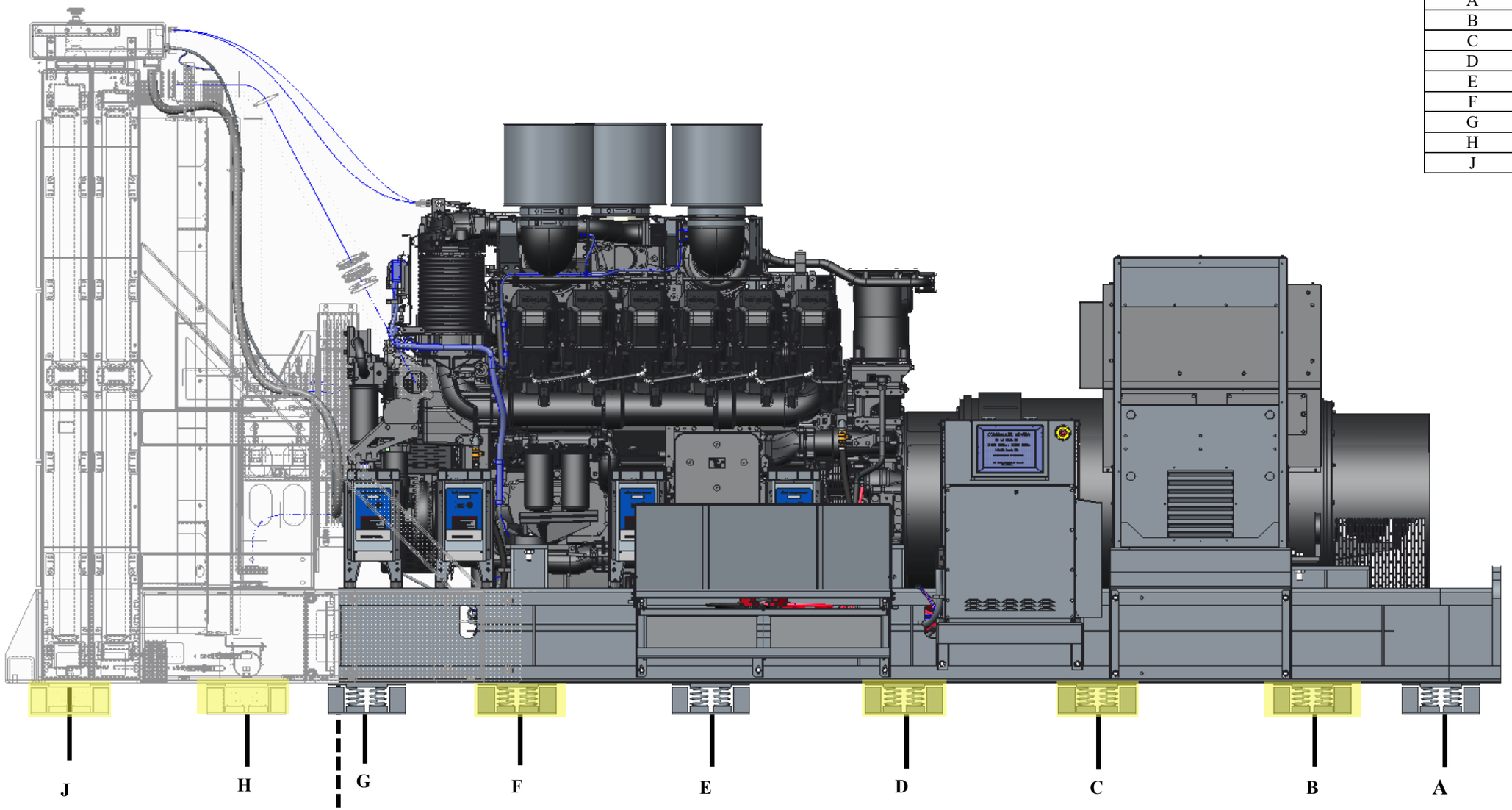


Figure 1- Spring Isolator Dimensional Layout



All dimensions are in millimeters.

Dimension	Referenced from Front of Skid
A	5132
B	4532
C	3532
D	2632
E	1732
F	832
G	132
H	-428
J	-1251

Genset Model	Alternator	Kit #	Skid	Radiator	Isolator 1 Part Numbers	Position 1	Isolator 2 Part Numbers	Position 2	Isolator 3 Part Numbers	Position 3	Isolator 4 Part Numbers	Position 4	Isolator 5 Part Numbers	Position 5	Isolator 6 Part Numbers	Position 6
KD2000	KH04970TO4D	-KA1	11301002001-MA3	50C	11808000100	B	11808000200	C	11808000100	D	11808000100	F	11808000100	H	11808000100	J
KD2000	KH04970TO4D	-KA2	11301002001-MA3	Remote	11808000200	B	11808000200	C	11808000100	D	11808000100	E	11808000100	F	11808000100	G
KD2250	KH05790TO4D	-KA3	11301002001-MA3	50C	11808000100	B	11808000100	C	11808000100	D	11808000100	F	11808000100	H	11808000100	J
KD2250	KH05790TO4D	-KA2	11301002001-MA3	Remote	11808000100	B	11808000200	C	11808000200	D	11808000100	E	11808000100	F	11808000100	G
KD2000, KD2250	KH06220TO4D	-KA3	11301002001-MA1	50C	11808000100	B	11808000100	C	11808000100	D	11808000100	F	11808000100	H	11808000100	J
KD2000, KD2250	KH06220TO4D	-KA2	11301002001-MA1	Remote	11808000100	B	11808000200	C	11808000200	D	11808000100	E	11808000100	F	11808000100	G
KD2000, KD2250, KD2500	KH06930TO4D	-KA3	11301002001-MA3	50C	11808000100	B	11808000100	C	11808000100	D	11808000100	F	11808000100	H	11808000100	J
KD2000, KD2250, KD2500	KH06930TO4D	-KA2	11301002001-MA3	Remote	11808000100	B	11808000200	C	11808000200	D	11808000100	E	11808000100	F	11808000100	G
KD2000, KD2250, KD2500	KH07000TO4D	-KA4	11301002001-MA1	50C	GM84038	B	GM84038	C	GM84038	D	GM84038	F	GM84038	H	11808000100	J
KD2000, KD2250, KD2500	KH07000TO4D	-KA1	11301002001-MA1	Remote	11808000100	B	11808000100	C	11808000200	D	11808000100	E	11808000100	F	11808000100	G
KD2000	KH07080TO4D	-KA5	11301002001-MA2	50C	GM84038	B	GM84038	C	GM84038	D	11808000100	F	11808000100	H	11808000100	J
KD2000	KH07080TO4D	-KA2	11301002001-MA2	Remote	11808000100	B	11808000100	C	11808000100	D	11808000200	E	11808000200	F	11808000100	G
KD2000, KD2250	KH07630TO4D	-KA4	11301002001-MA1	50C	GM84038	B	GM84038	C	GM84038	D	GM84038	F	GM84038	H	11808000100	J
KD2000, KD2250	KH07630TO4D	-KA2	11301002001-MA1	Remote	11808000100	B	11808000100	C	11808000100	D	11808000200	E	11808000100	F	11808000200	G
KD2000, KD2250, KD2500	KH07770TO4D	-KA5	11301002001-MA1	50C	GM84038	B	GM84038	C	GM84038	D	11808000100	F	11808000100	H	11808000100	J
KD2000, KD2250, KD2500	KH07770TO4D	-KA1	11301002001-MA1	Remote	11808000100	B	11808000100	C	11808000100	D	11808000200	E	11808000100	F	11808000100	G
KD2250, KD2500	KH08100TO4D	-KA4	11301002001-MA2	50C	GM84038	A	GM84038	B	GM84038	D	GM84038	F	GM84038	H	11808000100	J
KD2250, KD2500	KH08100TO4D	-KA3	11301002001-MA2	Remote	11808000100	A	11808000100	B	11808000100	D	11808000100	E	11808000100	F	11808000100	G
KD2000, KD2250, KD2500	KH08430TO4D	-KA5	11301002001-MA1	50C	GM84038	B	GM84038	C	GM84038	D	11808000100	F	11808000100	H	11808000100	J
KD2000, KD2250, KD2500	KH08430TO4D	-KA1	11301002001-MA1	Remote	11808000100	B	11808000100	C	11808000100	D	11808000200	E	11808000100	F	11808000100	G
KD2000, KD2250, KD2500	KH09270TO4D	-KA4	11301002001-MA2	50C	GM84038	A	GM84038	B	GM84038	D	GM84038	F	GM84038	H	11808000100	J
KD2000, KD2250, KD2500	KH09270TO4D	-KA3	11301002001-MA2	Remote	11808000100	A	11808000100	B	11808000100	D	11808000100	E	11808000100	F	11808000100	G

Isolator Sizing Calculation Spreadsheet

APPROVED BY: _____

ISSUED: _____

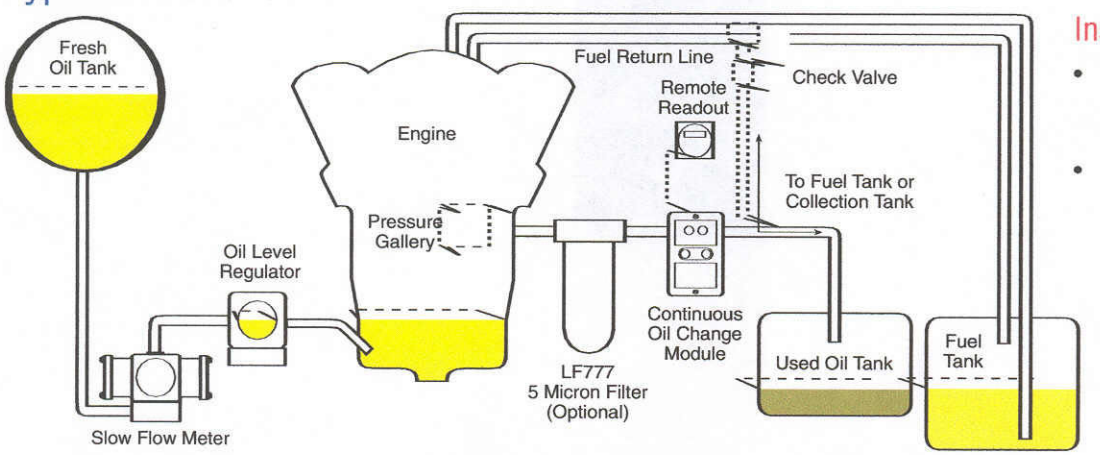
Oil Supply Reservoirs

5, 15 and 30 Gallon Oil Supply Reservoirs (18.9, 56.8 and 113.6 Liter)

REN™ Oil Supply Reservoirs are used with REN™ Oil Level Regulators and are installed as close as convenient to the regulator. No more than 10 feet (3.1 meters) of hose full of fluid attached to the Oil Supply Reservoir should precede the REN™ Oil Level Regulator.

- All steel construction with industrial enamel finish
- Reike 2" (50.80 mm) filler cap
- Dust-proof vent
- Brass 1/2" NPT shut-off valve
- Sight gauge with calibrated scale
- Provides a complete fluid replenishment system
- Mounting stands available for 15 and 30 gallon (56.8 and 113.6 liter) reservoirs
- Pedestal 12" (304.80 mm) pipe mount for 5 gallon (18.9 liter) reservoir
- Universal Mounting Brackets available (at additional cost) for 15 and 30 gallon (56.8 and 113.6 liter) reservoirs to mount tanks to structural members, walls or other surfaces
- Used in conjunction with the REN™ Oil Level Regulator, Slow Flow Meter and Continuous Oil Change Module

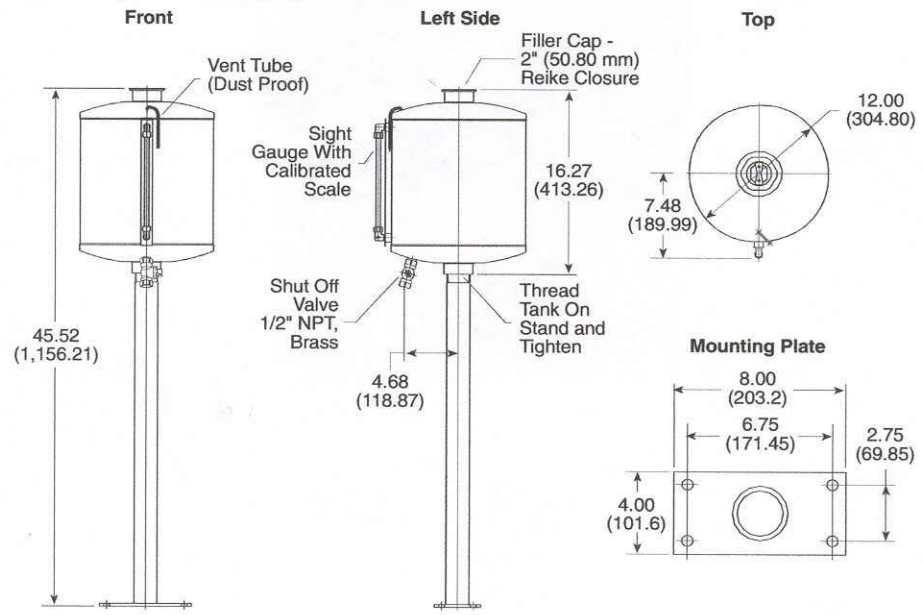
Typical Installation



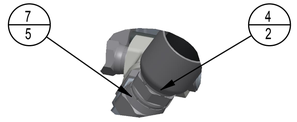
Installation Notes

- Install away from possible sparks or flames
- Install on level ground only

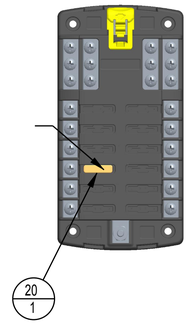
5 Gallon (18.9 Liter) Oil Supply Reservoir

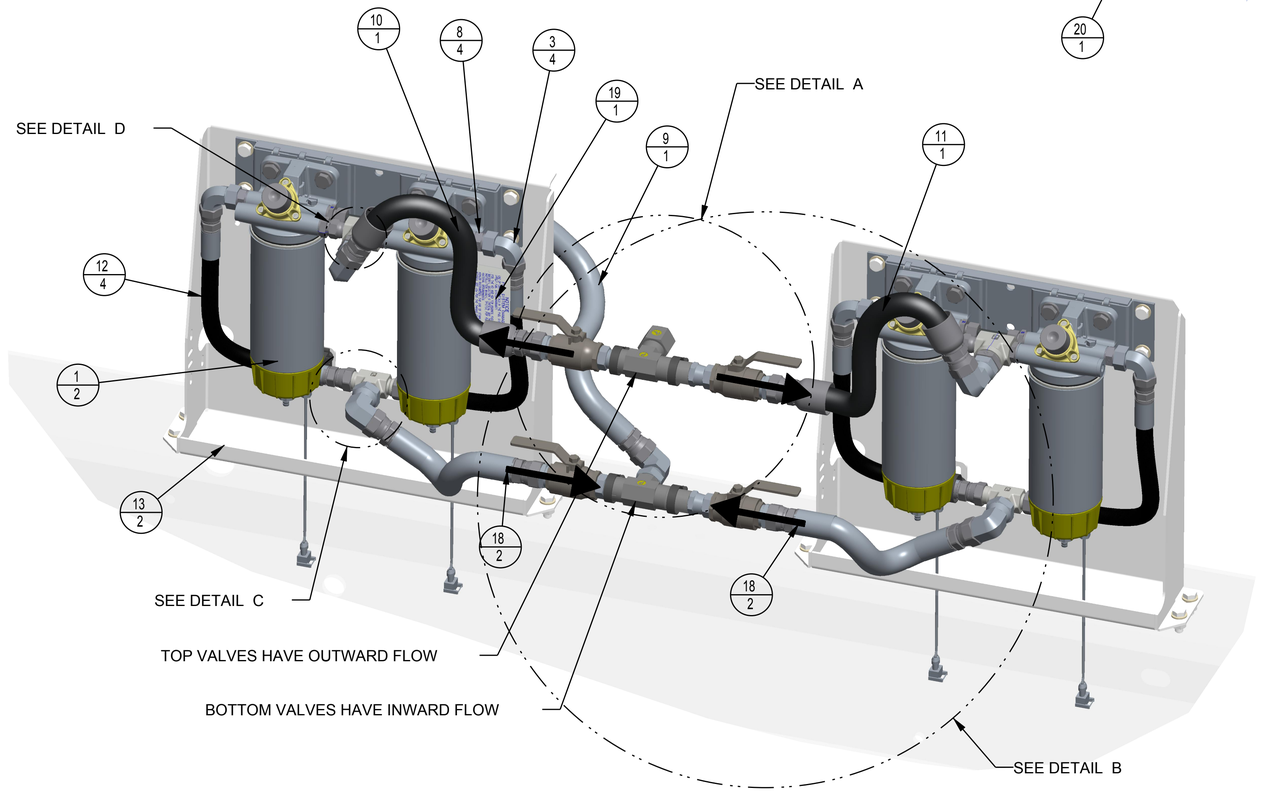


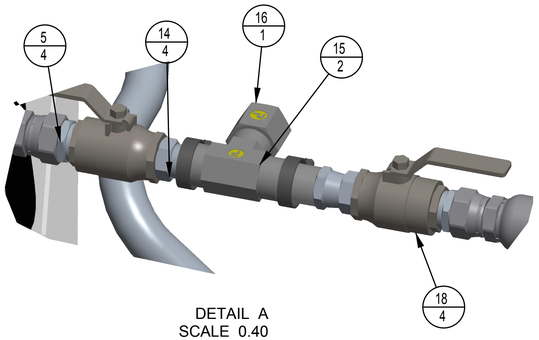
KIT NO.	ITEM	PART NO	QTY	DESCRIPTION	COLOR DEPENDENT
ES-85952-MA1				FUEL/ WATER SEPARATOR	+
	1	10501000500	2	FUEL/WATER SEPARATOR, DLDP160	
	2	11613000101	8	TIE, CABLE, FIR TREE, 13W X 20-100mm DIA	
	3	11802000300	4	ELBOW, SWIVEL NUT 3/4IN	
	4	11802001300	2	ADAPTER, M33 – 1IN	
	5	11802001600	4	ADAPTER, MALE 1 JIC TO 1 - 11 1/2 NPT	
	6	11802003301	2	Adapter, JIC, Union Tee, 12-12-16	
	7	11802003401	5	Elbow, Swivel Nut 1IN	
	8	11802004601	4	Adapter, M22 x1.5 (ISO 6149-1) x 3/4 JIC	
	9	11810001501	1	11810001501_es-84683-ma1.asm	
	10	11810002101	1	Hose: F10-16C-1310-AF8-06-16-06-16	
	11	11810002101	1	Hose: F10-16C-1310-AF8-06-16-06-16	
	12	11810003301	4	Hose: F10-12C-457-AF8-06-12-06-12	
	13	305012803XX	2	SUPP-PREFILT-RACCOR-DBLE	++
	14	ES-84719	4	ADAPTER, FEMALE 1 JIC-MALE 1 NPT	
	15	ES-84720	2	ADAPTER, FEMALE	
	16	ES-84721	1	FEMALE, CONNECTOR	
	17	ES-84934	2.00	Hose: F10-16C-300-AF8-06-16-06-16	
	18	GM101541	4	VALVE, BALL, (1" NPT), SS	
	19	GM103261	1	Tag,Instruction	
	20	GM58258	1	FUSE, 5 AMP ATC	
	21	M125A-12-80	32	WASHER, PLAIN	
	22	M933-12030-60	16	SCREW, HEX CAP	
	23	M934-12-60	16	NUT, HEX 12MM	
THIS IS AN AUTOMATED TABLE. ALL UPDATES MUST BE MADE IN THE ASSEMBLY.					



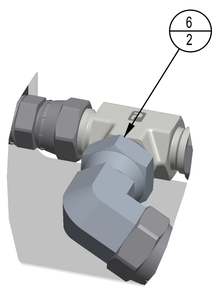
DETAIL D
SCALE 0.40



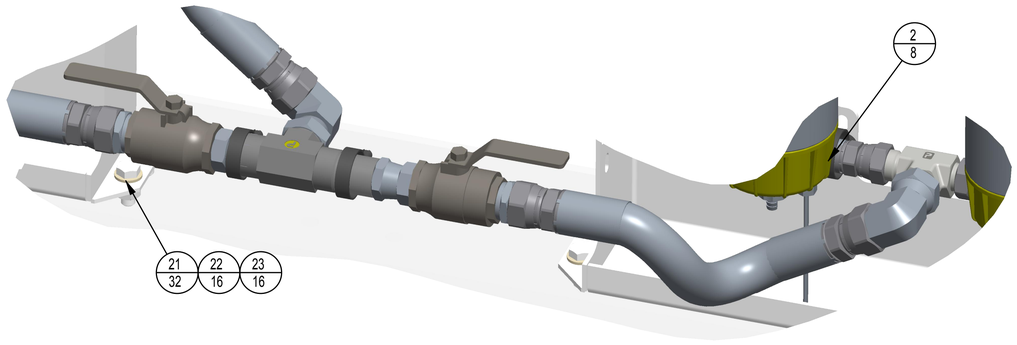




DETAIL A
SCALE 0.40



DETAIL C
SCALE 0.60



DETAIL B
SCALE 0.40

+ ASSEMBLIES DENOTED WITH A + ARE COLOR DEPENDENT. REFER TO THE ASSEMBLY SUFFIX IN SAP FOR THE COLOR CODE PER G-702

++ REFER TO ASSEMBLY BILL OF MATERIALS IN SAP FOR PAINT COLOR CODE SUFFIX FOR ALL PARTS WITH THE ++ DESIGNATION PER G-702

PART IS COLOR DEPENDENT: REFER TO SAP FOR PART COLOR SUFFIX.
FOR COLOR DEPENDENT SUFFIX CODES REFER TO G-702.

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

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL ☐ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY
-	7-19-18	NEW DRAWING [CT]	JB2

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

APPROVALS	DATE (M-D-Y)
DRAWN JB2	7-19-18
CHECKED LBD	7-19-18
APPROVED LBD	9-22-17

KOHLER CO. SDMO
KOHLER POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
SDMO, CS 92848, 29228 BREST CEDEX 2, FRANCE

METRIC
PRO-E

TITLE: DWG, FUEL/WATER SEPARATOR

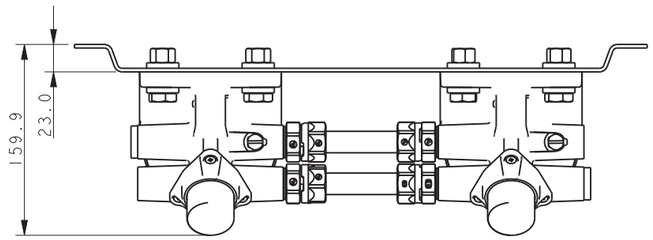
SCALE 0.50 | CAD NO. | SHEET 1 of 1

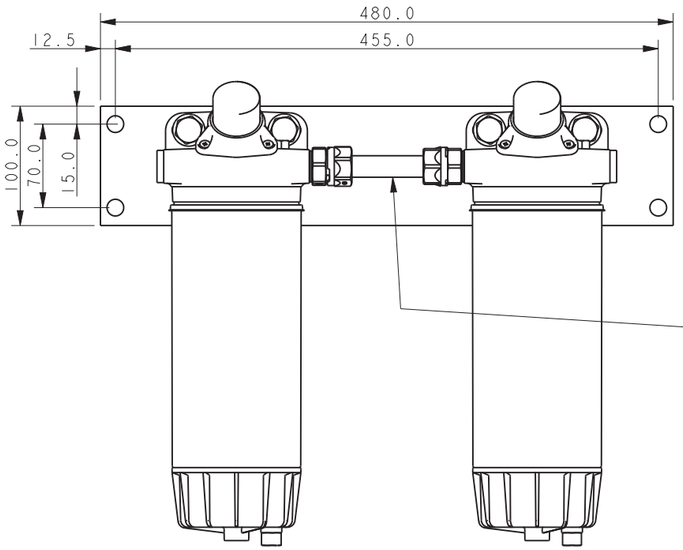
DWG NO. ES-85952 | D

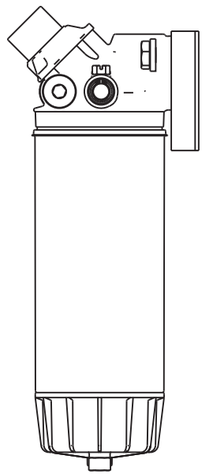
PART NO.	REV.
10501000500	A ☐

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic







NOTE:
1. ALL DIMENSIONS ARE FOR REFERENCE ONLY
2. INLET AND OUTLET PORTS
SEAL FEATURE MACHINED TO ISO 6149-1
OUTLET THREAD M22 X 1.5-6H↧16MM
INLET THREAD M33 X 2.0
4. WATER IN FUEL SENSOR - 12KΩ INTERNAL RESISTER
TYCO AMP 282189-1 CONNECTOR
5. BOWL ORIENTATION WILL VARY
6. 2 OFF M22 PORT PLUGS TO BE SUPPLIED IN PACKAGING BOX
7. ALLOW 50MM MIN CLEARANCE BELOW
FUEL FILTER FOR REMOVAL OF ELEMENT DURING SERVICE

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL ☐ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION	BY
A	3-17-16	NEW DRAWING [CT141934]	BGW

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

THIRD ANGLE PROJECTION

APPROVALS	DATE (M-D-Y)
DRAWN BGW	3-17-16
CHECKED DJV	3-17-16
APPROVED JDZ	3-17-16

KOHLER CO. / SDMO — METRIC / PRO-E

KOHLER POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
SDMO, CS 92848, 29228 BREST CEDEX 2, FRANCE

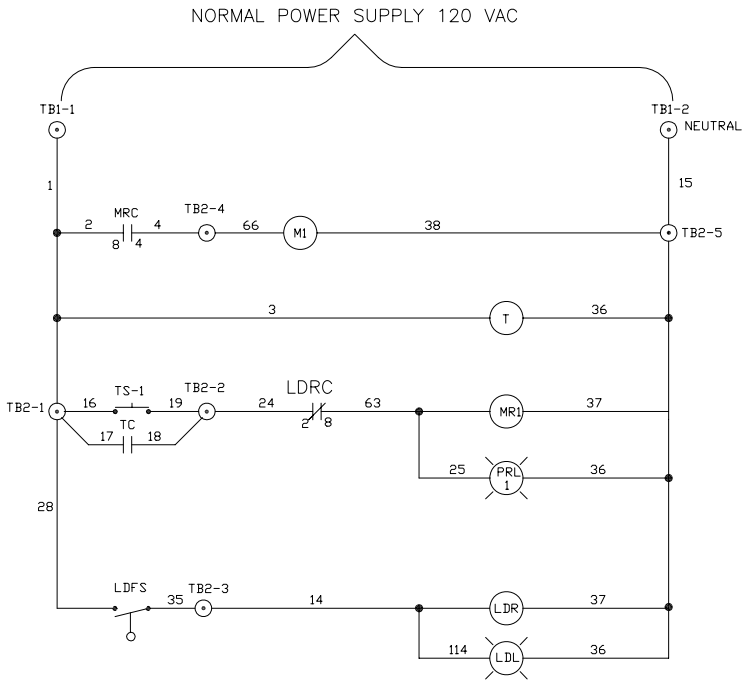
TITLE: DWG, FUEL/WATER SEPARATOR

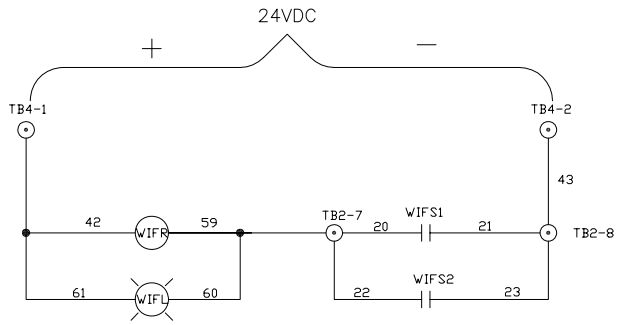
SCALE 0.40 | CAD NO. | SHEET 1 of 1

DWG NO. 105010005XX | D

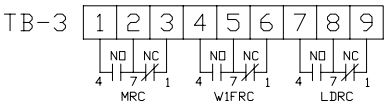
K175 V12

FPS4 - FUEL POLISHING SYSTEM





CUSTOMER REMOTE RELAY CONTACTS
RATED 10 AMPS AT 120 VAC



M - MOTOR
MR - MOTOR RELAY
MRC - MOTOR RELAY CONTACT
T - TIMER
TB - TERMINAL BOARD
TS - TEST SWITCH
TC - TIMER CONTACT
PRL - PUMP RUNNING LIGHT
WIFR - WATER IN FILTER RELAY
WIFS - WATER IN FILTER SWITCH
WIRC - WATER IN RELAY CONTACT
WIFL - WATER IN FILTER LIGHT
LDFS - LEAK DETECTOR FLOAT SWITCH
LDR - LEAK DETECTOR RELAY
LDRC - LEAK DETECTOR RELAY CONTACT

MODEL NUMBER _____
PROPOSAL NUMBER _____
CUSTOMER NAME _____
P.O. # _____

REV	DATE	DESCRIPTION	BY
2	07-09	CORRECTIONS AND NUMBERS	JMR
1	10-06	TB CORRECTION	JCA

E & C A

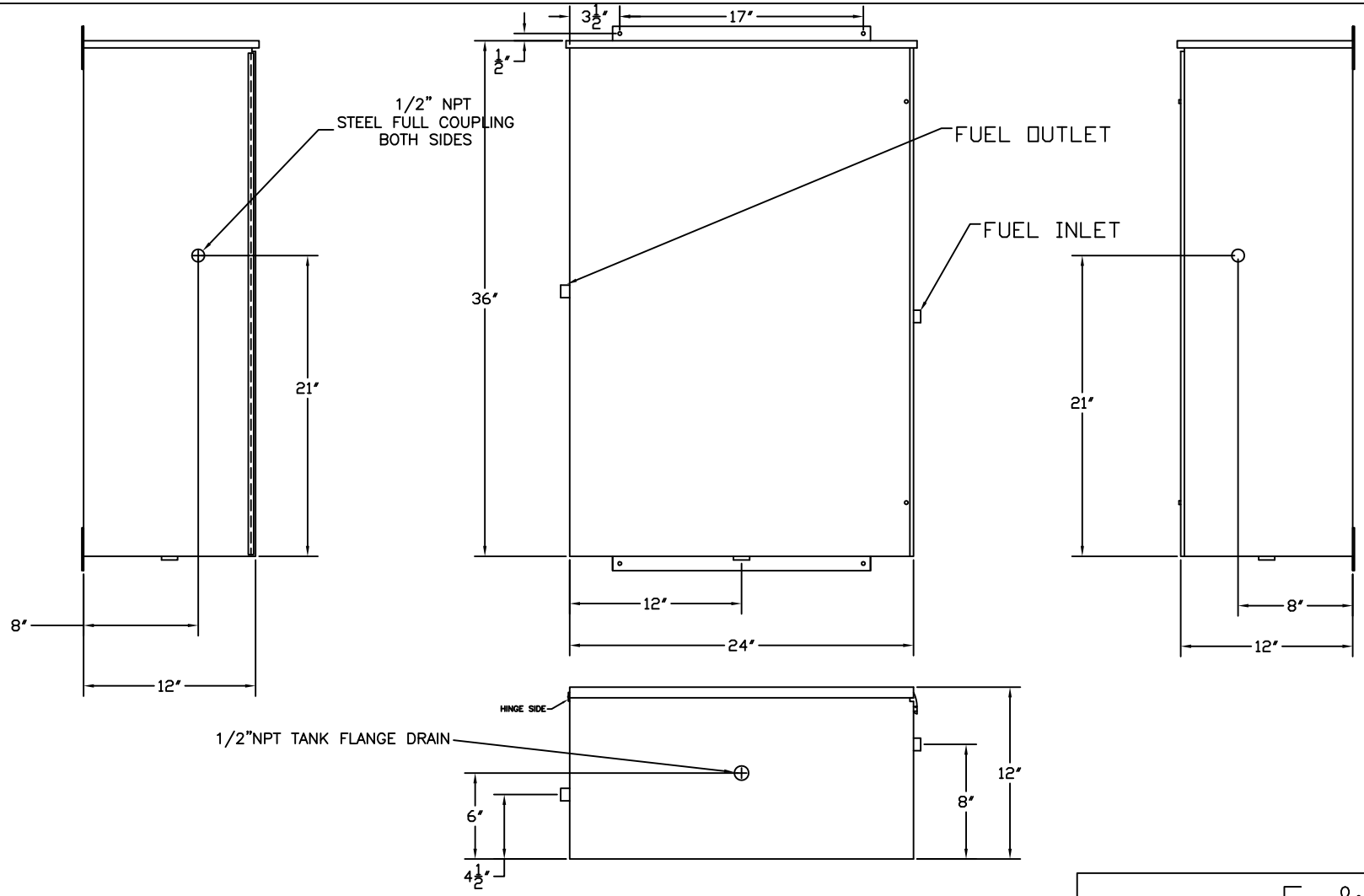
SCALE NONE
DATE 08-10-05
APPROVED BY RLL '09

WIRING SCHEMATIC

FUEL POLISHING SYSTEM

DRAWING NUMBER 0333-99

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Fire
Engineering
Building
Traffic
Public Works
Planning



2	2/12	moved fittings	JMR
1	10/11	1/2" fittings	wfp
REV	DATE	DESCRIPTION	BY

E & C A

SCALE NONE	APPROVED BY RLL	DRAWN BY KNA
DATE 4-22-09		REVISED

ENCLOSURE

FUEL POLISHING SYSTEM

DRAWING NUMBER 06750

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Fire
Traffic
Engineering
Public Works
Building
Planning

Fuel/Water
Filter Test Report

Fuel filter water efficiency test report according to: SAE J1839

Test Identification

Test Date: 06/02/10	Test Location: Parker Hannifin - Racor Div.	Test Identification 100602-01
Test Time: 8:15:00	Operator: Alex Woodmansee	Project: 052510-0003

Filter Identification

Filter Identification: 120R-GD-05	Fabrication Integrity (ISO 2942): kPa
Housing Type:	Manufaturing Date: 1/0/1900

Operating Conditions

Test Fuel	Type: # 2Diesel	Batch-No.: MSEP 91
	Water Separability y: y≤ ml	IFT (Fuel/Water): 27.0 dynes/cm
	Density: 827.0 kg/m³	Basic H2O Concentratior 110.0 ppm
	Kinematic Viscosity: 1.0 mm²/s	Saturation Point: 110.0 ppm
		MSEP Rating:
Test Water	Surface Tension: 72.8 dynes/cm	±2 dynes/cm
Test System	Flow Rate Q: 1.0 L/min	Volume: 38.0 L
		Test Temperature 26.0 ºC
	Mean Droplet Size = 180 - 260 µm	
Injection System	Injection Flow Rate Q_{ia}: 2.5 ml/min	H2O Concentration (calc) 2610.0 ppm
	Injection Block: 1/4 x 0.035	H2O Concentration
	Injection Needle: 33Gauge	(Initial upstream sample): 2610.0 ppm

Water Separation Efficiency Report

Test Results

Test Time	Test filter Δp	Downstream H2O Concentration C_i	Upstream H2O Concentration C_i	H2O Separation Efficiency
min	kPa	ppm	ppm	%
0	0.08			
5		102.9	2610.0	100.0
15		27.2	2610.0	100.0
25		151.2	2610.0	98.4
35		29.2	2610.0	100.0
45		29.6	2610.0	100.0
55		24.9	2610.0	100.0
65		26.1	2610.0	100.0
75		30.9	2610.0	100.0
85		18.2	2610.0	100.0
95		20.6	2610.0	100.0
105		22.7	2610.0	100.0
115		81.2	2610.0	100.0
125		38.3	2610.0	100.0
135		30.1	2610.0	100.0
145		26.0	2610.0	100.0

Total Test Time:	150.0	min
Average Downstream H2O Concentration:	43.9	ppm
Average Water Separation Efficiency:	99.9	%
Total Volume of H2O Drained from Test Filter:	0.5	L
Total Volume of H2O Drained from Cleanup Filters:		L

Comments: _____

ESI TOTAL FUEL MANAGEMENT™
WHEN CONFIDENCE COUNTS
ASHBURN, VIRGINIA • HANNOVER, GERMANY

iFUEL™ Diesel Consumption Monitoring System with Data Collection Analysis

iFUEL consumption monitoring system tracks and reports engine supply & return flow rates to give instantaneous consumption rates while performing data collection and analytics. It is one component of ESI's Ecosystem™; significantly enhancing fuel management and reporting capabilities. iFUEL empowers facility managers to make informed decisions and maintain peak operating system performance prior to, during, and after an emergency event.

iFUEL Highlights:

- Multi-function Consumption Monitoring System with consolidation of components on a tight foot print frame and is delivered fully assembled, programmed and calibrated.
- Stand alone units capable of network communication via Modbus.
- Optional central data management system tracks, logs, and displays all consumption information from each consumption monitor in one location with customizable reporting capabilities.
- Enables full compliance with all consumption reporting requirements for Federal and Local air quality permits. (i.e., NOx emmision reporting, etc.)
- 7 point calibration process ensures high accuracy across full engine load range.
- Positive displacement flow meter design with temperature compensation eliminates inaccuracies created by vibration, viscosity, temperature and flow pulsation.
- Installation Kit includes all required hoses and fittings

Information the Local Controller Tracks and Reports:

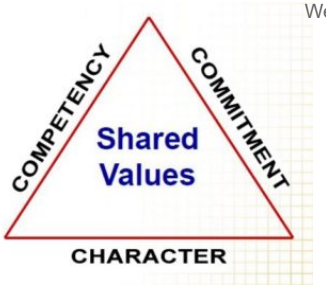
- Engine Supply and Return Flow Rates
- Engine Supply and Return Fuel Temperature
- Engine Supply and Return Flow Pulsation
- Instantaneous Consumption Rate
- Non Resettable totals for: Consumption, Supply Flow, and Return Flow
- Accuracy Verification: 3 years or 300 hours

KEY DATA	CMS-2M-SA
Maximum Engine Supply Flow Rate:	10 GPM
Minimum Engine Return Flow Rate:	3 GPM
Power Requirements	24 VDC; 2 A

Controller	Local Controller with Read Out/ Network Compatible via Modbus
Configuration	Free-standing
Material / Finish	Aluminum Body Meters; Powder Coated Steel Frame
Dimensions (L x W x H, Inches / mm)	12” Deep: 8” Wide’ 36” Tall

How can we serve you? Contact ESI

Website by AIM Custom Media



ESI Total Fuel Management
20099 Ashbrook Place, Suite 170,
Ashburn, VA 20147
Phone: 800-411-3284

About
Emergency Fuel Delivery
Contact

RK32036 and RK32037
Vacuum Restriction Indicators
Installation and Service Instructions

Instruction Part Number 12933 Rev A

Vacuum restriction indicators monitor filter condition as the filter slowly becomes clogged with contaminants. As the filter gets dirty, restriction increases and less fuel is delivered to the engine causing the engine to lose power and eventually stall. By installing a vacumm indicator in your fuel system, visual monitoring of filter condition is possible at a glance, increasing fuel system troubleshooting efficiency, eliminating guess work, and lengthening filter changeout intervals.

CAUTION! Do not use this restriction indicator in gasoline applications.

Use a 16 mm open-end wrench to install or remove the filter indicator *(do not tighten by hand)*

Contact Information

Parker Hannifin Corporation
Racor Division
P.O. Box 3208
3400 Finch Road
Modesto, CA 95353

phone 800 344 3286
209 521 7860
fax 209 529 3278
racor@parker.com

www.racorcustomers.com
www.parker.com/racorproducts

Specifications	**RK32036**	**RK32037**
Accuracy	± 10%	± 10%
Calibrations	10 inHg (34 kPa) at red zone	10 inHg (34 kPa) at red zone
Material	Chemical Resistant Nylon	Chemical Resistant Nylon
Length	2.5 in. (6.4 cm)	2.5 in. (6.4 cm)
Diameter	1.3 in. (3.3 cm)	1.3 in. (3.3 cm)
Port Thread	3/8” SAE	1/8” NPT
Operating Temp	-40° to +250°F (-40° to +121°C)	

Parker | Racor

ENGINEERING YOUR SUCCESS.

Installation Instructions

Installation of the vacuum indicator could vary greatly on different applications. The following is a list of recommendations for proper installation.

- Install the indicator on the outlet side of the fuel filter. This could be threaded directly into a vent plug port or in an unused outlet port on the filter mounting head.
- An adapter fitting that goes between the vacuum indicator and the outlet filter port may be required (customer supplied) depending on your port size.
- The vacuum indicator can be installed in any orientation.
- Stay away from heat sources and/or anything that could rub against the indicator.
- Use a 16 mm open-end wrench to install or remove the filter indicator (do not tighten by hand).
- Thread sealant is recommended on the RK32037 with the 1/8" NPT threads. Do not use thread **tapes** as loose particles could work their way into the fuel system. The RK32036 with 3/8" SAE threads requires a coat of motor oil on the o-ring before installation.

This is an example of a Racor 490R1210 fuel filter assembly with a restriction indicator installed in the vent port on the mounting head.

Service Instructions

- As the filter gets dirty, a yellow plunger will move towards the red service area on the indicator.
- To reset the indicator, simply press the button on the top.
- The actual reading at which you should change your filter will depend on many factors as fuel systems vary so greatly. As a rule, many pumps have trouble delivering fuel to the engine when restriction reaches 7 to 10 inches of mercury (inHg). Some falter earlier, some later.

  To find the maximum restriction level for your application, install a new filter and the indicator. Run the filter until you begin to have performance problems and note the indicator reading at that point. Service the filter and reset the indicator. From that point on, you can watch the indicator to see how much filter life remains.
- Note the restriction level on the gauge when you service your filter for the first time after the indicator installation. This will give you a good idea of when future servicing will be needed.
- To reset the indicator, press the yellow button on the top. The yellow plunger inside should completely disappear from view.
- Always carry extra replacement elements as one tankful of excessive dirty fuel can clog a filter.

PART NO	REV	
105010010011	-	☐

NOTES:
ACCURACY: ±10%
CALIBRATIONS: 10 inHg (34 kPa) AT RED ZONE
MATERIAL: CHEMICAL RESISTANT NYLON
LENGTH: 2.5 IN [6.4cm]
DIAMETER: 1.3 IN [3.3cm]
PORT THREAD: 3/8" SAE
OPERATING TEMP: -40° TO +250°F
(-40° TO +121°C)

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	6-30-16	NEW DRAWING [CT152609]	CEK

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

THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	CEK	6-30-16
CHECKED	CEK	6-30-16
APPROVED	TAS	6-30-16

KOHLER CO. SDMO
KOHLER POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
SDMO, CS 92848, 29228 BREST CEDEX 2, FRANCE

METRIC
PRO-E

TITLE
DWG, GAUGE, FUEL RESTRICTION

SCALE 1.00 | CAD NO. | SHEET 1 of 1

DWG NO. 105010010XX | B

20W Vapor Tight LED Jelly Jar Light - 1,800 Lumens - Caged Wall Mount Light - 5000K/4000K - Natural White 4000K

Part Number: VTWJ-NW20

Product Details

- Integrated LED vapor-proof light
- Durable die cast aluminum housing and caged lens
- Wall mount w/ built-in junction box
- UL Listed - Wet and damp locations
- 100-277 VAC

View more details

Specifications

Beam Angle	175 degree	**LED Quantity**	1 LED (COB)
CRI	80 CRI	**Lens Type**	Glass
Comparable Wattage	150 Watt Incandescent, 70 Watt Metal-Halide	**Material**	Aluminum
Dimensions	View Dimensional Drawings	**Operating Temperature**	-40~+40 °C (-40~+104 °F)
Efficacy	120 lm/w	**Operating Voltage**	100~277 VAC
Finish	Silver	**Power Consumption**	20 Watts
IP Rating	Weatherproof IP65	**Raw Lumen**	1800 Lumen
LED Lifetime	50000 Hours	**Standards And Certifications**	UL Listed

Package Weight: 4lb 6oz (1.98kg)

Package Dimensions: 8" (20cm) x 6" (15cm) x 12" (30cm)

All specifications are subject to change without notice.

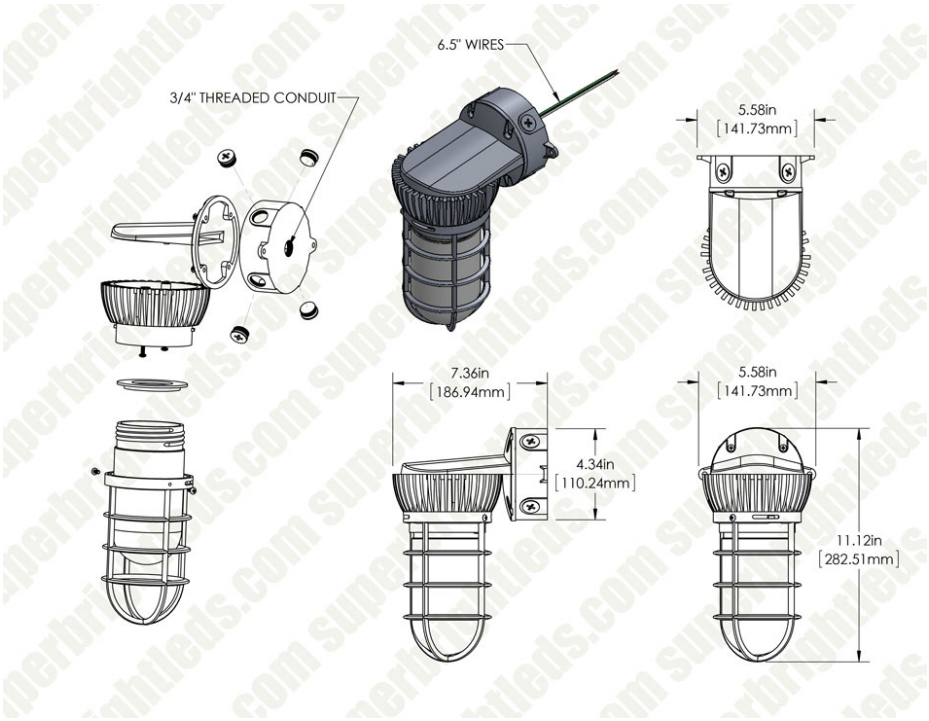
Part NO	Type	CCT / Wavelength	Current Draw @ Operating Voltage	Price	Lumen Per Dollar
VTWJ-CW20	LED Integrated/Jelly Jar Light	5000	0.08A	22.51 lumen/dollar	
VTWJ-NW20	LED Integrated/Jelly Jar Light	4000	0.08/0.17A	22.51 lumen/dollar	

All specifications are subject to change without notice.

Documents

Download VTWJ-x20 User Manual

VTWJ-x20 - LED Vapor Proof Jelly Jar Light Fixture - Caged Wall Mount Light - 1,800 Lumens



LED Vapor Proof Jelly Jar Light Fixture - Caged Wall Mount Light - 1,800 Lumens

superbrightleds.com

User Manual

Part Number:

**VTWJ-xW20,
VTPJ-xW20,
VTCJ-xW20**

Important: Read all instructions prior to installation.

Jelly Jar Vapor Proof Lights

Warnings

- To avoid the risk of fire, explosion, or electric shock, this product should be installed by a qualified electrician only, in accordance with all applicable electrical codes.
- Be certain electrical power is OFF before and during the installation
- Make sure the supply voltage is the same as the rated luminaire voltage.
- Do not operate in ambient temperatures above those indicated in spec table
- Do not use with dimmer

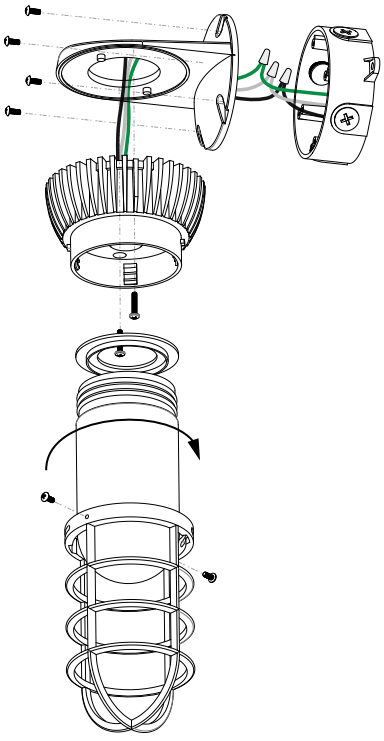
VTWJ-xW20

VTPJ-xW20

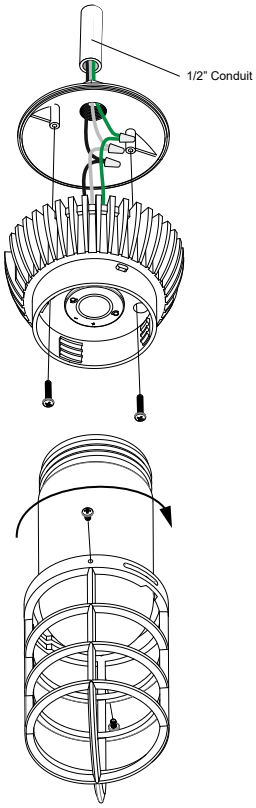
VTCJ-xW20

Installation Instructions

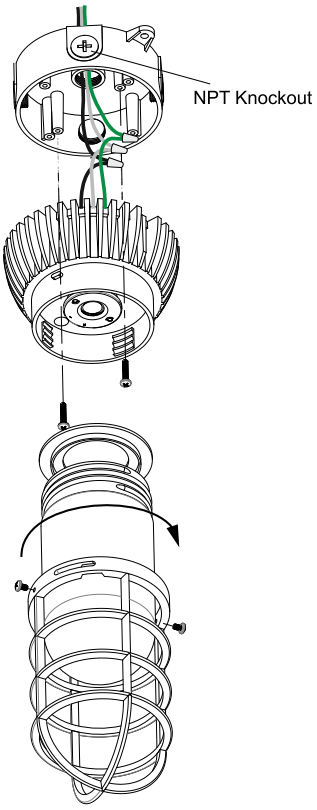
VTWJ-xW20
Junction Box Jelly Jar
(FIG 1)



VTPJ-xW20
Pendant Mount Jelly Jar
(FIG 2)



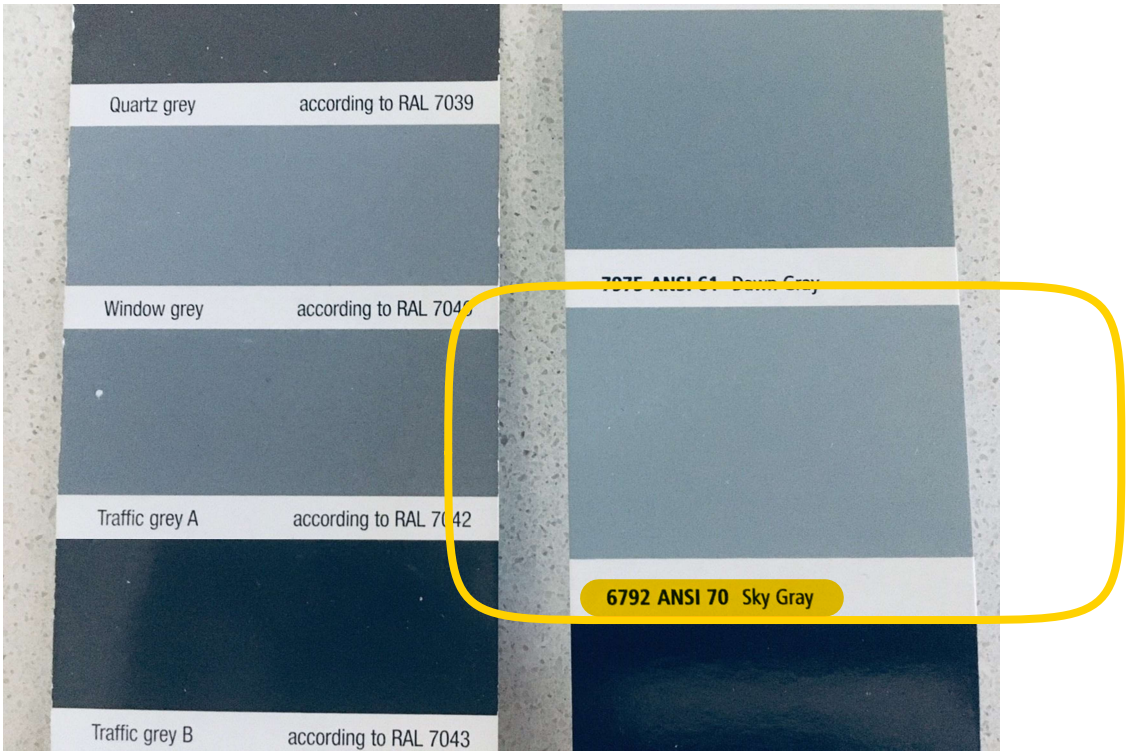
VTCJ-xW20
Ceiling Box Jelly Jar
(FIG 3)



Ceiling Mount (Junction Box flush in ceiling)
In order to remove luminaire's junction box, first remove the guard, glass, and heat sink. Make wire connections.

Pendant Mount
In order to access luminaire's junction plate, first remove the guard, glass, and heat sink.
Thread 1/2" conduit into top of fixture. Make wire connections.

Wall Mount
In order to remove luminaire's junction box, first remove the guard, glass, and heat sink. Make wire connections.



PROTOTYPE TEST REPORT

KOHLER

Models Covered:	**KD2000, KD2250, KD2500, KD2500-4**	Alternator Tested:	**KH07770TO4D**
Model Tested:	**KD2500**	Engine Tested:	**KD62V12**
Cooling System Tested:	**50C**	Voltage Tested:	**480V**

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 Devation

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		Full Load Rejection	
-44.8	% Voltage Dip	**13.7**	% Voltage Overshoot
11.02	Seconds of Recovery Time	**4.18**	Seconds of Recovery Time
-15.30	% Frequency Dip	**7.05**	% Frequency Overshoot
11.01	Seconds of Recovery Time	**1.19**	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:	**KD2000, KD2250, KD2500, KD2500-4**	Alternator Tested:	**KH07770TO4D**
Model Tested:	**KD2500**	Engine Tested:	**KD62V12**
Cooling System Tested:	**50C**	Voltage Tested:	**480V**

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)

G18-473

Kohler Standby/Prime Generator Set Test Program

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

Prototype Testing

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

- Alternator temperature rise test per NEMA MG1-32.6. Standby and prime ratings of the alternator are established during this test.
- Maximum power test to assure that the prime mover and alternator have sufficient capacity to operate within specifications.
- Alternator overload test per NEMA MG1-32.8.
- Steady-state load test to ensure voltage regulation meets or exceeds ANSI C84.1, NEMA MG1-32.17 requirements and to verify compliance with steady-state speed control specifications.
- Transient test to verify speed controls meets or exceeds specifications.
- Transient load tests per NEMA MG1-32.18, and ISO 8528 to verify specifications of transient voltage regulation, voltage dip, voltage overshoot, recovery voltage, and recovery time.
- Motor starting tests per NEMA MG1-32.18.5 to evaluate capabilities of generator, exciter, and regulator system.
- Three-phase symmetrical short-circuit test per NEMA MG1-32.13 to demonstrate short circuit performance, mechanical integrity, ability to sustain short-circuit current.
- Harmonic analysis, voltage waveform deviation per NEMA MG1-32.10 to confirm that the generator set is producing clean voltage within acceptable limits.
- Generator set cooling and air flow tests to verify maximum operating ambient temperature.
- Reliability tests to demonstrate product durability, followed by root cause analysis of discovered failures and defects. Corrective action is taken to improve the design, workmanship, or components.
- Acoustical noise intensity and sound attenuation effects tests.

Production Testing

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

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

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

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

KOHLER®

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

G18-56 12/05b

The below testing is for each unit that will be produced for this project. The first of kind to be witnessed by the owner or owner representatives.

KOHLER
IN POWER. SINCE 1920.

10/14/2019
Revised: 1/31/2020

IB-21 Additional Factory Testing Calculator

Customer Name		Date:	
Quote/Sales Order Number			
Special Test Number (Kohler Internal Use Only)			

Input Information

Please select the cell and choose the appropriate information from the drop down menu.

Generator kW	2500-3250 kW	Power Factor	0.8
Generator Fuel Type	Diesel		
Weeks Notice	9 Wks	Qty	1

Choose Your Test

Please type an "X" in the appropriate boxes below to indicate which tests are desired.

X	**Initial Setup**				$
	Non-Witnessed Test				$ -
		Extended Factory Test		**Special Factory Test**	$ -
x	**Witnessed Test**				$
		Extended Factory Test	X	**Special Factory Test**	$

Special Factory Testing Options - Selections Listed Below

	302.1a High Potential Test	$	-
	503.1b Start & Stop	$	-
	503.2b Remote Start & Stop	$	-
	505.1a Overspeed (Not available with ECM equipped engines)	$	-
	507.1c Phase Sequence	$	-
	508.1c Phase Balance (Voltage)	$	-
	509.1a Circulating Current	$	-
	511.2b Frequency Range Adjust	$	-
x	515.1a Low Oil Pressure Protective Device	$	
x	515.2a High Water Temperature Protective Device	$	
	516.1 Controls, Direction of Rotation	$	-
	602.1a Voltage Modulation	$	-
x	608.1a Regulation Stability & Transient Response	$	
x	610.1 Voltage & Frequency Droop	$	
x	614.1a Voltage & Frequency Regulation	$	
x	619.2b Voltage Dip & Rise @ Rated Load	$	
	640.1c Maximum Power	$	-
	670.1a Fuel Consumption	$	-
	680.2a Temperature Rise R'qs 4 Hr Ext. Run and Fuel charges	$	-
	Record SPT Data and Supply Copy to Customer	$	-
	3 Point Vibration Test	$	-
	Exhaust temperature measurement	$	-

Total Special Factory Testing - Selections Listed Above		$
Fuel Charges		$ -

Please enter the appropriate information into the boxes below for Extended Factory Testing

No. of Running Hours		
Genset Size kW		$

Load/Runtime Requirements:

*These charges cover the actual test and time to prepare for testing. $

$

ADDITIONAL TESTING REQUIREMENTS:

Generator Set/Transfer Switch Installation Checklist

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

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

Equipment Room or Weather Housing

Yes	Does Not Apply		
❑	❑	1.	Is the equipment installed in a fire-resistant room (made of non-combustible material) or in an outdoor weather housing?
❑	❑	2.	Is there adequate clearance between the engine and floor for service maintenance?
❑	❑	3.	Is there emergency lighting available at the equipment room or weather housing?
❑	❑	4.	Is there adequate heating for the equipment room or outdoor weather housing?
❑	❑	5.	Is the equipment room clean with all materials not related to the emergency power supply system removed?
❑	❑	6.	Is the equipment room protected with a fire protection system?

Engine and Mounting

❑	❑	7.	Is the mounting surface(s) properly constructed and leveled?
❑	❑	8.	Is the mounting surface made from non-combustible material?
❑	❑	9.	Was the generator-to-engine alignment performed after attaching the skid to the mounting base? Generator sets with two-bearing generators require alignment.

Lubrication

❑	❑	10.	Is the engine crankcase filled with the specified oil?

Cooling and Ventilation

❑	❑	11.	Is the cooling system filled with the manufacturer's specified coolant/antifreeze and purged of air?
❑	❑	12.	Is there adequate inlet and outlet air flow (electric louvers adjusted and ventilation fan motor(s) connected to the corresponding voltage)?
❑	❑	13.	Is the radiator duct properly sized and connected to the air vent or louver?
❑	❑	14.	Are flexible sections installed in the cooling water lines?

Fuel

❑	❑	15.	Is there an adequate/dedicated fuel supply?
❑	❑	16.	Are the fuel filters installed?
❑	❑	17.	Are the fuel tanks and piping installed in accordance with applicable codes and standards?
❑	❑	18.	Is there adequate fuel transfer tank pump lift capacity and is the pump motor connected to the corresponding voltage?
❑	❑	19.	Is the fuel transfer tank pump connected to the emergency power source?
❑	❑	20.	Are flexible fuel lines installed between the engine fuel inlet and fuel piping?
❑	❑	21.	Is the specified gas pressure available at the fuel regulator inlet?
❑	❑	22.	Does the gas solenoid valve function?
❑	❑	23.	Are the manually operated fuel and cooling water valves installed allowing manual operation or bypass of the solenoid valves?

Exhaust

❑	❑	24.	Is the exhaust line sized per guidelines and does it have flexible connector(s)? Is the flexible connector(s) straight?
❑	❑	25.	Is there an exhaust line condensate trap with a drain installed?
❑	❑	26.	Is the specified silencer installed and are the hanger and mounting hardware tightened?
❑	❑	27.	Is a heat-isolating thimble(s) installed at points where exhaust lines pass through combustible wall(s) or partition(s)?
❑	❑	28.	Is the exhaust line free of excessive bends and restrictions? Is the backpressure within specifications?
❑	❑	29.	Is the exhaust line installed with a downward pitch toward the outside of the building?
❑	❑	30.	Is the exhaust line protected from entry by rain, snow, and animals?
❑	❑	31.	Does the exhaust system outlet location prevent entry of exhaust gases into buildings or structures?
❑	❑	32.	Are individuals protected from exposure to high temperature exhaust parts and are hot parts safety decals present?

AC Electrical System

❑	❑	33.	Does the nameplate voltage/frequency of the generator set and transfer switch match normal/utility source ratings?
❑	❑	34.	Do the generator set load conductors have adequate ampacity and are they correctly connected to the circuit breakers and/or the emergency side of the transfer switch?
❑	❑	35.	Are the load conductors, engine starting cables, battery charger cables, and remote annunciator leads installed in separate conduits?
❑	❑	36.	Is the battery charger AC circuit connected to the corresponding voltage?

Transfer Switch, Remote Control System, Accessories

❑	❑	37.	Is the transfer switch mechanism free of binding? **Note:** Disconnect all AC sources and operate the transfer switch manually.
❑	❑	38.	Are the transfer switch AC conductors correctly connected? Verify lead designations using the appropriate wiring diagrams.
❑	❑	39.	Is all other wiring connected, as required?

Batteries and DC Electrical System

❑	❑	40.	Does the battery(ies) have the specified CCA rating and voltage?
❑	❑	41.	Is the battery(ies) filled with electrolyte and connected to the battery charger?
❑	❑	42.	Are the engine starting cables connected to the battery(ies)?
❑	❑	43.	Do the engine starting cables have adequate length and gauge?
❑	❑	44.	Is the battery(ies) installed with adequate air ventilation?
❑	❑	45.	Are the ends of all spark plug wires properly seated onto the coil/distributor and the spark plug?

Special Requirements

❑	❑	46.	Is the earthquake protection adequate for the equipment and support systems?
❑	❑	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.

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

* 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.