ADDENDUM #2

SCCOE RIDDER PARK BACKUP GENERATOR

Bid # B 03-23-24

San Jose City Permits:

Building Permit # PC22-681986

SANTA CLARA COUNTY OFFICE OF EDUCATION

Prepared by Architect
Artik Art and Architecture
394-A Umbarger Road
San Jose, CA 95127
(408) 224-9890

This Addendum forms a part of the Contract Documents and modifies the original bidding documents dated 08/24/2023.

As noted below. Bidders must acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

CHANGES IN SPECIFICATION:

Item 1. 00 41 13 Bid Form – replace Bid Form with the attached.

RESPONSES TO THE QUESTIONS:

1. In order to quote this we need to know much more about what the transfer controls entails.

Answer: Programmed Transfer Controls are provided by all the major switchboard manufacturers. Eaton or Square D may be contacted for more information about this system. For example Square D has "PLC Automatic Throwover System" Class 2700. Basically this is PLC control of the Main Utility breaker and the generator breaker.

2. Swbd #3 has an ATS existing it seems. That unit would control the throwover. So not sure what is the compartment marked transfer control.

Answer: There is an existing ATS at Bldg 3 for providing standby power to Data Center equipment. That ATS is being removed so standby power will be provided by the new generator for the entire Bldg.

The transfer control is shown on Bldg #3 sheet E-9 but it is not shown on Bldg #1 sheet E-8 since the manufacturer may locate it at his descretion.

3. Swbd #1 does not appear to have an ATS existing but same, need to know what is required for power transfer.

Answer: The same equipment is required for the Bldg#1 location as for Bldg #3 above. The only difference is that the transfer controls at this location may need to be in a cabinet outside this switchboard because switchboard space is limited.

4. This is what the specs say about transfer control. Note 2 states this can be inside or outside the SWBD's

Answer: Manufacturers will make every effort to locate the transfer equipment in the switchboards. However, manufacturers may want to locate the transfer controls in a separate cabinet especially at the Bldg #1 location where space is more limited.

5. Could you please provide an Engineers Estimate for the project?

Answer: $ 1,800,000 (generators excluded)

6. We will not be providing an updated bid form.

Please refer to Page 3 Section 9 of the Bid Document which specifies the addendum/addenda acknowledgement.

Answer: Refer to updated bid form attached.

7. Is switch boards and generators already purchased along with transfer switch?

Answer: Refer to drawings and specification for more information, including specification 01 64 00 Owner Furnished Contractor Installed

8. And is start up for generators included if they are already purchased?

Answer: Refer to specification section 26 06 22 Engine Generator and attached generator submittal.

ATTACHEMENTS

Item 1. Updated Bid Form.

Item 2. Generator Submittal "154391-Ridder Park Gen Sub.pdf"

DOCUMENT 00 41 13

BID FORM

To: Santa Clara County Office of Education

From: _____
(Proper Name of Bidder)

The undersigned declares that the Contract Documents including, without limitation, the Notice to Bidders, the Instructions to Bidders, and the Special Conditions have been read, and agrees and proposes to furnish all necessary labor, materials, and equipment to perform and furnish all work in accordance with the terms and conditions of the Contract Documents, including, without limitation, the Drawings and Specifications of Bid No. B03-23-24.

PROJECT: **SCCOE Backup Generators**

("Project" or "Contract") and will accept in full payment for that Work the following total lump sum amount, all taxes included:

Bid Item No. 1 for _____

_____

_____ **dollars** **$** _____

TOTAL BASE BID

Additive/Deductive Alternates: _ N/A

Alternate #1

_____ dollars $ _____

[ADD DESCRIPTION] Additive/Deductive:

Alternate #1

_____ dollars $ _____

[ADD DESCRIPTION] Additive/Deductive:

Alternate #3

_____ dollars $ _____

[ADD DESCRIPTION] Additive/Deductive:

Descriptions of alternates are primarily scope definitions and do not necessarily detail the full range of materials and processes needed to complete the construction.

1. **Unit Price(s).** The Bidder's Base Bid includes the following unit price(s), which the Bidder must provide and the SCCOE may, at its discretion, utilize in valuing additive and/or deductive change orders:

   [LIST ANY, IF APPLICABLE]

2. **Allowance(s).** The Bidder's Base Bid shall **NOT** include the following potential Allowance(s). The SCCOE will add some or all of the following Allowance(s) amount(s) to the successful bidder's Contract, at the SCCOE's discretion. Contractor shall be permitted to invoice for Work under an Allowance in the identical structure as a Change Order.

TEMPORARY POWER Allowance: Allowance to provide temporary power for the project per Spec Section 01 21 00, Attached in Addendum 1	**$10,000**

3. **Contract Review.** The undersigned has reviewed the Work outlined in the Contract Documents and fully understands the scope of Work required in this bid, understands the construction and project management function(s) is described in the Contract Documents, and that each Bidder who is awarded a contract shall be in fact a prime contractor, not a subcontractor, to the SCCOE, and agrees that its bid, if accepted by the SCCOE, will be the basis for the Bidder to enter into a contract with the SCCOE in accordance with the intent of the Contract Documents.

4. **Requests for Clarification.** The undersigned has notified the SCCOE in writing of any discrepancies or omissions or of any doubt, questions, or ambiguities about the meaning of any of the Contract Documents, and has contacted the Construction Manager before bid date to verify the issuance of any clarifying Addenda.

5. **Contract Time.** The undersigned agrees to commence work under this Contract on the date established in the Contract Documents and to complete all work within the time specified in the Contract Documents.

6. **Contractual Provisions.** The undersigned hereby acknowledges and agrees to be bound by following provisions and all provisions in the Contract Documents:

    - The liquidated damages clause of the General Conditions and Agreement.
    - The "Changes in the Work" provisions in the General Conditions that limit the permitted charges and mark-ups on change orders and on the amount of home office overhead that the successful bidder can receive from the SCCOE.
    - The "Disputes and Claims" provisions in the General Conditions that delineate the required process to submit and process disputes and claims.

7. **Bid Open for 90 Days.** It is understood that the SCCOE reserves the right to reject this bid and that the bid shall remain open to acceptance and is irrevocable for a period of ninety (90) days.

8. **Attachments.** The following documents are attached hereto:

    - The Bid Bond on the SCCOE's form or other security
    - The Designated Subcontractors List
    - The Site-Visit Certification, if a site visit was required.
    - The Noncollusion Affidavit
    - Iran Contracting Act Certification

9. **Addenda Acknowledgement.** Receipt and acceptance of the following addenda is hereby acknowledged:

No.____, Dated _____	No.____, Dated _____
No.____, Dated _____	No.____, Dated _____
☐ Or check here if **no** addenda were issued.	

10. **Bidder's License.**

    - Bidder acknowledges that the license required for performance of the Work is as stated in the Invitation to Bid.
    - Bidder certifies that it is, at the time of bidding, and shall be throughout the period of the contract, licensed by the State of California to do the type of work required under the terms of the Contract Documents. Bidder further certifies that it is regularly engaged in the general class and type of work called for in the Contract Documents.

11. **Labor Harmony.** The undersigned hereby certifies that Bidder is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the Work.

12. **DIR Registration.** Bidder shall ensure that it and its Subcontractors comply with the registration and compliance monitoring provisions of Labor Code section 1771.4, including furnishing its CPRs to the Labor Commissioner, and are registered pursuant to Labor Code section 1725.5.

13. **General Acknowledgement.** The Bidder represents that it is competent, knowledgeable, and has special skills with respect to the nature, extent, and inherent conditions of the Work to be performed. Bidder further acknowledges that there are certain peculiar and inherent conditions existent in the construction of the Work that may create, during the Work, unusual or peculiar unsafe conditions hazardous to persons and property. Bidder expressly acknowledges that it is aware of such peculiar risks and that it has the skill and experience to foresee and to adopt protective measures to perform the Work adequately and safely with respect to such hazards.

14. **False Claims Act.** Bidder expressly acknowledges that it is aware that if a false claim is knowingly submitted (as the terms "claim" and "knowingly" are defined in the California False Claims Act, Cal. Gov. Code, §12650 et seq.), the SCCOE will be entitled to civil remedies set forth in the California False Claim Act. It may also be considered fraud and the Contractor may be subject to criminal prosecution.

Furthermore, Bidder hereby certifies to the SCCOE that all representations, certifications, and statements made by Bidder, as set forth in this bid form, are true and correct and are made under penalty of perjury.

Dated this _____ day of _____ 20 _____

Name of Bidder _____

Type of Organization _____

Signed by _____

Title of Signer _____

Address of Bidder _____

Taxpayer's Identification No. of Bidder _____

Telephone Number _____

Fax Number _____

E-mail _____ Web page _____

Bidder's DIR Registration No.: No.:_____

Contractor's License No(s): No.: _____ Class: _____ Expiration Date: _____

No.: _____ Class: _____ Expiration Date: _____

No.: _____ Class: _____ Expiration Date: _____

If Bidder is a corporation, provide the following:

Name of Corporation: _____

President: _____

Secretary: _____

Treasurer: _____

Manager: _____

END OF DOCUMENT

Engineering Submittal

BAY CITY ELECTRIC WORKS

Ridder Park
Job # 154391

600REOZVB - Emergency Generator Set

Kohler Sales and Service Distributor:

Bay City Electric Works
866.938.8200
Fax 619.938.8217

Project Manager
Cheryl Hallmark
866.938.8200, ext 706

Kohler Sales Executive
Robert Formicola
Cell 925.748.0992

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

☒ NO EXCEPTION TAKEN ☐ MAKE CORRECTIONS NOTED
☐ REJECTED ☐ REVISE AND RESUBMIT
☐ SUBMIT SPECIFIED ITEM

Checking is only for general conformance with the design concept of the project and general conformance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for: dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades; and the satisfactory performance of the work.

Alliance Engineering Consultants, Inc.

Date Apr 27 / 23 By David W. Clow

KOHLER® POWER SYSTEMS

Date:
12-9-2022

STATEMENT OF QUALIFICATIONS

Bay City Electric Works Prospective Customer,

Bay City Electric Works has been operating in California since 1932 striving to be the premier electrical stand-by power solutions provider by aggressively delivering one stop…one company support for our customer's specification writing, engineering support, permitting, new equipment sales, service, rental, fueling, transportation, and national account service.

Our commitment to after sales support is unmatched with our factory trained field technicians' 200+ years of combined experience. All technicians operate from fully equipped/stocked service trucks that are efficiently dispatched via GPS tracking and are backed up by over $500,000 of spare parts at our service facilities. We maintain a 24-hour emergency service "hot-line" to assure a "live" response and are responsible for over 3000 installed generator systems for preventive service maintenance and trouble call support.

Our customers include electrical and general contractors, industrial plants, commercial facilities, data centers, hospitals, schools, city and county government facilities, military installations, the telecommunications industry, water and electrical utilities and our area's growing bio-technical industry.

Major product lines represented include Kohler for industrial standby, residential, and mobile generators; Honda portable generators; and we are an Authorized John Deere Engine Service Provider.

Bay City Electric Works is the premier provider of standby electrical power systems solutions in Southern California and looks forward to working with you to support your power needs.

Sincerely,

Rodney C. Lee
President & COO

Headquarters: 13625 Danielson Street, Poway, CA 92064
Phone – 866.938.8200 www.BCEW.com

Attention Contractors and End Users:

Please read the following carefully:

- **An Air Quality Permit is required for ALL generators in CA over 50BHP (for a single engine/generator). There are very few other exemptions. It is imperative that you submit an application to the local air quality jurisdiction (AQMD/APCD) immediately upon approval of submittals (or sooner) to avoid any project delays or unexpected costs/complications. Generators cannot be started or commissioned prior to the issuance of your Authority to Construct (ATC) and Startup Authorization by the governing air quality district and in most cases cannot even be delivered to the site without the permit. This can delay a project schedule a great deal. Air Quality permits typically take 2-3 months but can take longer.**
- **A Permit from the local Fire Department or AHJ (Authority Having Jurisdiction) is required for diesel fuel tanks (with very few exemptions). Check with your local AHJ to confirm permit requirements and permit conditions. BCEW as a supplier cannot comply with any specific local AHJ requirements if a permit is not pulled and a copy of the fire permit is not provided to us. If there are requirements by the local AHJ that differ from the contract documents there may be an additional charge.**
- **Anchorage of the generator is typically detailed in the Structural Plans/Contract Documents. When it is not, it is the Contractors responsibility to determine the proper anchorage. When the specification dictates, we will provide anchorage calculations and details after submittal approval. Often the anchorage will need to be done at time of delivery and will require a special inspection. Please be aware of this and plan accordingly.**
- **Large Natural Gas and LP generators require a great deal of fuel. Correct fuel piping size and pressure are the responsibility of the installing contractor. All necessary information is provided on the generator specification sheet in this submittal.**

We are here to support you and provide any assistance necessary. Please let us know if we can help with anything listed above. The purpose of this letter is to minimize the unknown installation problems and project delays for you.

KOHLER Power Systems
444 Highland Drive, MS 072, Kohler, WI 53044
Phone: 920-457-4441
Visit us at KohlerPower.com
www.kohlerpower.com

Generator

Kohler Model: 600REOZVB

This diesel generator set equipped with a 5M4032 alternator operating at 277/480 volts is rated for 600 kW/750 kVA. Output amperage: 903.

KOHLER Power Systems
444 Highland Drive, MS 072, Kohler, WI 53044
Phone: 920-457-4441
Visit us at KohlerPower.com
www.kohlerpower.com

Qty	Description
	600REOZVB Generator System
2	600REOZVB Generator Set

Includes the following:

Literature Languages	English
Approvals and Listings	UL2200 Listing
Approvals and Listings	IBC Seismic Certification
Engine	600REOZVB,24V,60Hz, EPA
Nameplate Rating	Standby 130C Rise
Voltage	60Hz, 277/480V, Wye, 3Ph, 4W
Alternator	5M4032
Cooling System	Unit Mounted Radiator, 50C
Skid and Mounting	Skid
Air Intake	Standard Duty
Controller	APM 603
Enclosure Type	Sound
Enclosure Material	Steel
Enclosure Electrical Package	Basic
Enclosure Electrical Acc.	Wire Block Heater
Enclosure Electrical Acc.	Wire Battery Charger
Enclosure Heater	Enclosure Heater, 240VAC
Enclosure Silencer	Internal Silencer
Fuel Tank Type	State
Fuel Runtime (Approx.)	24 Hours
Subbase Fuel Tank Capacity	1038 Gallons
Fill Pipe/Spill Fill Options	5 Gal Spill Cont w/95% Shutoff
Fuel Tank Vent	Emergency Vent, 5", IBC
High Fuel Switch	High Fuel Switch
Tank Marking Options	Combust Lqds - Keep Fire Away
Tank Marking Options	NFPA 704 Identification
Tank Marking Options	Tank Number & Safe Fill Height
Starting Aids, Installed	4000W,210-240V,1Ph,w/Valves
Electrical Accy.,Installed	Battery, 2/12V, Wet
Electrical Accy.,Installed	Battery Charger, 10A
Electrical Accy.,Installed	Run Relay
Electrical Accy.,Installed	2 Input/5 OutputModule
Electrical Accy.,Installed	Manual Speed Adjust
Rating, LCB 1 Right	100% Rated
Amps, LCB 1 Right	1000

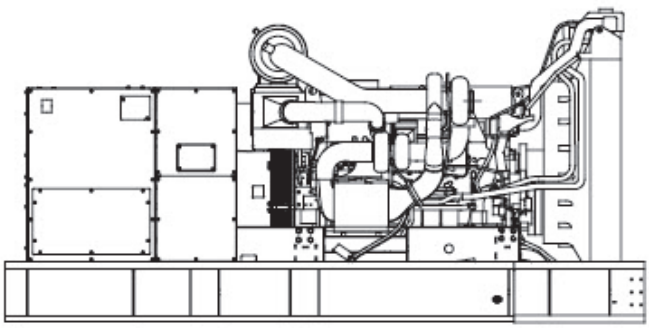
	Trip Type, LCB 1 Right	Electronic, LSIG (GFI)
	LCB 1 Right Interrupt Rating	35kA at 480V
	Aux Contact, LCB 1 Right	Auxiliary Contact, Qty. 1
	Frame, LCB 1 Right	PG
	Position, LCB 1 Right	1
	Fuel Lines, Installed	Flexible Fuel Lines
	Fuel System Acc.,Installed	Fuel Pressure Gauge
	Exceeds LTL Shipping 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
	Warranty	5 Year Comprehensive
	Testing, Additional	Power Factor Test,0.8,3Ph Only
2	Remote Emergency Stop Switch	
2	Lit. Kit, General Maintenance, 600REOZVB	
2	RSA III, Mult. ATS Annunciator	
2	Engine Start Integrity Module, ATS	
2	Engine Start Integrity Module, Generator	

KOHLER®

Spec Sheets

KOHLER®

600REOZVB
Diesel



Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A one-year limited warranty covers all systems and components. Two-, five-, and ten-year extended warranties are also available.
- Tier 2 EPA-certified for Stationary Emergency Applications
- Alternator Protection
- Battery Rack and Cables
- Customer Connection (standard with Decision-Maker 6000 controller only)
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Literature

Alternator Features

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

Other Features

- Kohler designed controllers for guaranteed system integration and remote communication.
- The low coolant level shutdown prevents overheating (standard on radiator models only).Integral vibration isolation eliminates the need for under-unit vibration spring isolators.
- An electronic, isochronous governor delivers precise frequency regulation.
- Multiple circuit breaker configurations.

Generator Set Rating

Standby 130C Rise Ratings

Alternator	Voltage	Ph	Hz	Peak kVA	kW/kVA	Amps
5M4032	277/480	3	60	2200	600/750	903

RATINGS: All three-phase units are rated at 0.8 power factor.
Standby Ratings: Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage.
There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271.
Prime Power Ratings: Prime power ratings apply to installations where utility power is unavailable or unreliable. 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, overload power in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For limited running time and base load ratings, consult the factory.
Obtain the technical information bulletin (TIB-101) on ratings guidelines for the complete ratings definitions.
The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.
GENERAL GUIDELINES FOR DERATION: Altitude: Derate 0.4% per 100 m (328 ft.) elevation above 1400 m (4593 ft.).

Model: 600REOZVB, continued

Alternator Specifications

Specifications	Alternator
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Permanent-Magnet Pilot Exciter
Leads, quantity	10, Reconnectable
Voltage regulator	Solid State, Volts/Hz
Insulation	NEMA MG1
Insulation: Material	Class H, Synthetic, Nonhydroscopic
Insulation: Temperature Rise	130 ° C, 150 ° C Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Rotor balancing (50Hz)	125%
Rotor balancing (60Hz)	125%
Voltage regulation, no-load to full-load RMS	Controller Dependent
One-Step Load Acceptance	100% of rating
Unbalanced load capability	100% of Rated Standby Current

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling down stream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.
- Digital solid-state, volts-per-hertz voltage regulator with +/-0.25% no-load to full-load regulation.
- Brushless alternator with brushless pilot exciter for excellent load response.

Engine

Engine Specification

Engine Manufacturer	Volvo
Engine Model	TWD1643GE (IBC Only), TWD1644GE (W/O IBC)
Engine: type	4-Cycle, Turbocharged, Charge Air Cooled
Cylinder arrangement	6, Inline
Displacement, L (cu. in.)	16.12 (984)
Bore and stroke, mm (in.)	144 x 165 (5.67 x 6.50)
Compression ratio	16.5:1 (IBC Only), 16.8:1
Piston speed, m/min. (ft./min.)	594 (1949)
Main bearings: quantity, type	7, Precision Half-Shell
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	674 (903)
Cylinder head material	Cast Iron
Piston: type, material	Swirl Chamber, Graphite-Coated Aluminum
Crankshaft material	Forged Steel
Valve (exhaust) material Intake	Nimonic
Governor: type, make/model	EMS 2.0 (IBC Only), EMS 2.3
Frequency regulation, no-load to-full load	Isochronous
Frequency regulation, steady state	± 0.25%
Frequency	Fixed
Air cleaner type, all models	Dry

Model: 600REOZVB, continued

Exhaust

Exhaust System

Exhaust Manifold Type	Dry
Exhaust flow at rated kW, m3/min. (cfm)	130 (4594) IBC Only, 114.5 (4044)
Exhaust temperature at rated kW, dry exhaust, ° C (° F)	461 (862) IBC Only, 495 (923)
Maximum allowable back pressure, kPa (in. Hg)	10 (2.95)
Exh. outlet size at eng. hookup, mm (in.)	See ADV drawing

Engine Electrical

Engine Electrical System

Battery charging alternator: Ground (negative/positive)	Negative
Battery charging alternator: Volts (DC)	24V, 7kW
Battery charging alternator: Ampere rating	80
Starter motor rated voltage (DC)	24
Battery, recommended cold cranking amps (CCA): Qty., CCA rating each	Two, 925
Battery voltage (DC)	12

Fuel

Fuel System

Fuel type	Diesel
Fuel supply line, min. ID, mm (in.)	10.0 (0.38)
Fuel return line, min. ID, mm (in.)	6.0 (0.25)
Max. fuel flow, Lph (gph)	210 (55.5) IBC Only, 185 (48.9)
Max. fuel pump restriction, kPa (in. Hg)	10 (3.0)
Max. return line restriction, kPa (in. Hg)	20 (5.9)
Fuel filter: quantity, type	2
Fuel Filter Secondary	5 Micron (IBC Only), 5 Micron
Fuel Filter Primary	10 Micron (IBC Only), 30 Micron
Recommended fuel	#2 Diesel

Lubrication

Lubrication System

Type	Full Pressure
Oil pan capacity, L (qt.)	42.0 (44.4)
Oil pan capacity with filter, L (qt.)	48.1 (50.8)
Oil filter: quantity, type	3, Cartridge
Oil cooler	Water-cooled

Model: 600REOZVB, continued

Cooling

Radiator System

Ambient temperature, ° C (° F)	50 (122) IBC Only, 45 (113)
Engine jacket water capacity, L (gal.)	33 (8.7) IBC Only, 25 (6.6)
Radiator system capacity, including engine, L (gal.)	166 (43.9) IBC Only, 151.1 (39.9)
Engine jacket water flow, Lpm (gpm)	360 (95.4)
Charge cooler water flow, Lpm (gpm)	150 (39.6) IBC Only, 126 (33)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	245 (13933) IBC Only, 246 (13990)
Heat rejected to charge air cooling water at rated kW, dry exhaust, Kw Btu/min.	216 (12284) IBC Only, 147 (8360)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	965 (38.0)
Fan, kWm (HP)	30 (41) IBC Only, 34 (46)
Max. restriction of cooling air, intake and discharge side of radiator, kPA (in. H20)	0.125 (0.5)

* Weather and sound enclosures with internal silencer and weather housing with external silencer reduce ambient temperature capability by 5 ° C (9 ° F).

Operation Requirements

Air Requirements

Radiator-cooled cooling air, m3/min. (scfm) *	760 (26839) IBC Only, 665 (23484)
Combustion air, m3/min. (cfm)	55 (1937) IBC Only, 48 (1649)
Heat rejected to ambient air: Engine, kW (Btu/min.)	29 (1649) IBC Only, 24 (1342)
Heat rejected to ambient air: Alternator, kW (Btu/min.)	45 (2560)

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

Fuel Consumption

Diesel, Lph (gph), at % load	Rating
Standby Fuel Consumption at 100% load	161.8 Lph (42.7 gph) IBC Only, 157.0 Lph (41.5 gph)
Standby Fuel Consumption at 75% load	117.8 Lph (31.1 gph) IBC Only, 118.4 Lph (31.3 gph)
Standby Fuel Consumption at 50% load	79.3 Lph (21.0 gph) IBC Only, 80.1Lph (21.2 gph)
Standby Fuel Consumption at 25% load	43.6 Lph (11.5 gph) IBC Only, 45.0 Lph (111.9 gph)

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

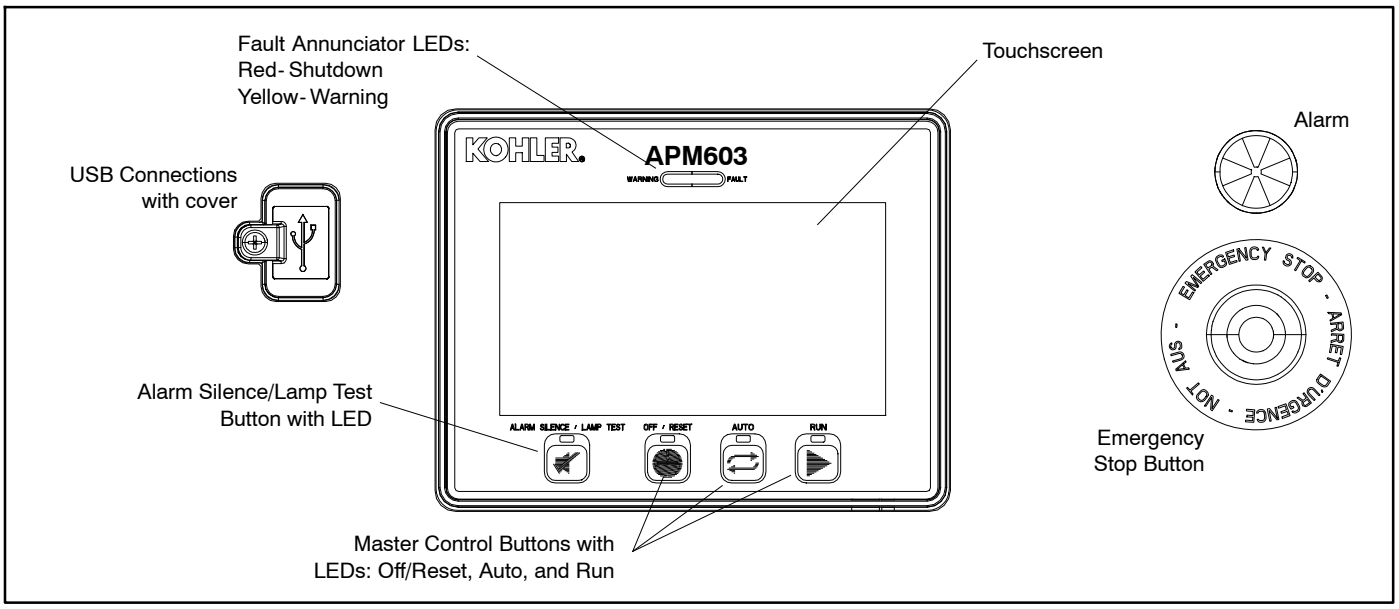
- A 7-inch color TFT touchscreen for easy local access to data.
  - Home screen can be customized to show critical data at a glance.
  - Create a custom favorites list for quick access to important data
- Measurements are selectable in metric or English units.
- Supports Modbus® protocol through serial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

Volvo 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 *	
Coolant Temperature	
Emergency Stop, Local	
Emergency Stop, Remote	
Excitation Over Voltage	
Fuel Leak Alarm	
Fuel Level	
Ground Fault Relay	
Key Switch Auto	
Key Switch Run	
Low Fuel Level Switch	
Remote Engine Start	Two-wire input
Speed Bias	Analog Voltage Input, Scalable up to +/- 10 VDC
Voltage Bias	

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

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

Volvo Engine Data

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

Parameter
Air Intake Pressure
Air Intake Temperature
Ambient Temperature
Barometric Pressure
Coolant Temperature
ECU Battery Voltage
ECU Runtime Hours
Engine Speed
Fuel Consumption Rate
Fuel Pressure
Intake Manifold Pressure
Intake Manifold Temperature
Intercooler Temperature
Mechanical Engine Load
Oil Pressure
Oil Temperature

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For the nearest sales and service outlet in the US and Canada, phone 1-800-544-2444
KOHLERPower.com

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) and Mitsubishi models provides:
  - 16 digital input connections with connection to ground
  - 8 relay output connections (Form C, rated 8A, 240 VAC or rated 0.5 A, 48 VDC)
- ✓ ❑ **Input/Output Module** for models other than KD or Mitsubishi provides:
  - 2 analog inputs (0- 5 VDC)
  - 4 digital input connections with connection to ground
  - 14 relay output connections (Form C, rated 10A, 120V)
  - 1 common fault relay output (NO, rated 2A, 24VDC)
- ❑ **Key Switch** to allow selection of RUN, OFF and AUTO modes. Lockable in the AUTO position by removing the key.
- ✓ ❑ **Remote Emergency Stop Switch** available as a wall mounted panel to remotely shut down the generator set.
- ✓ ❑ **Remote Monitoring Panel.** The 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.

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 set distributor for availability.

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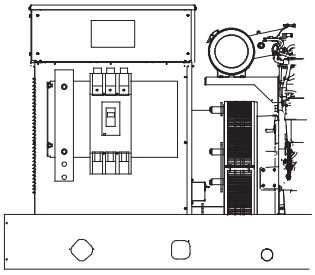
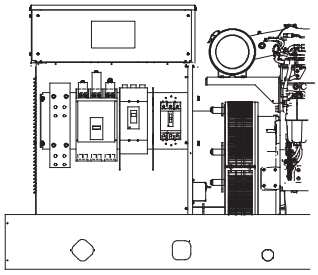
KOHLER

Industrial Generator Set Accessories

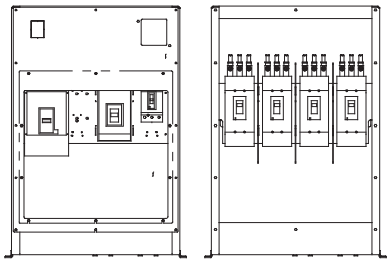
Line Circuit Breakers 15- 3250 kW



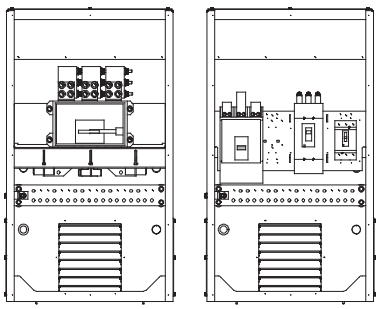
Single Circuit Breaker Kit with Neutral Bus Bar
~~**15- 300 kW Model Shown**~~



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



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



Circuit Breaker Kits with Neutral Bus Bar
800- 2500 kW KD Model Shown

Standard Features

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

Line Circuit Breaker Types

Magnetic Trip

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

Thermal Magnetic Trip

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

Electronic Trip

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

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

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

Electronic with Ground Fault Trip

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

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

80% Rated Circuit Breaker

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

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

100% Rated Circuit Breaker

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

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

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

Line Circuit Breaker Options

❑ Alarm Switch

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

☑ Auxiliary Contacts

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

❑ Breaker Separators (350- 2500 kW)

Provides adequate clearance between breaker circuits.

❑ Bus Bars

Bus bar kits offer a convenient way to connect load leads to the generator set when a circuit breaker is not present.
15- 300 kW. Bus bar kits are available on alternators with leads for connection to the generator set when circuit breakers are not ordered.
350- 2500 kW. A bus bar kit is provided when no circuit breaker is ordered. Bus bars are also available in combination with circuit breakers or other bus bars on the opposite side of the junction box. On medium voltage (3.3 kV and above) units, a bus bar kit is standard (not applicable to KD models).

❑ Field Connection Barrier

Provides installer wiring isolation from factory connections.

❑ Ground Fault Annunciation

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

❑ Lockout Device (padlock attachment)

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

❑ Lugs

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

❑ Overcurrent Trip Switch

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

❑ Shunt Trip, 12 VDC or 24 VDC

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

❑ Shunt Trip Wiring

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

❑ Undervoltage Trip, 12 VDC or 24 VDC

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

300- 2250* kW Line Circuit Breaker Specifications

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

~~80% Rating Circuit Breaker~~

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

100% Rating Circuit Breaker

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

100% Rating Electrically Operated Breakers

For use as paralleling breakers.*

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

* P-frame breakers can be used with the Decision-Maker® 6000 Controller/DPS System or APM603 controller.
NW breakers are for use with the APM603 only.

All circuit breakers listed in this table include line side bus and load side lugs, 24VDC motor operators, and 1 type C SDE overcurrent switch contact. P-frame breakers include 2 type C auxiliary contacts. NW breakers include 4 auxiliary contacts.

No second breakers are allowed in combination with these breakers.

Load Bus Rating

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

300- 2250* kW Line Circuit Breaker Specifications

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

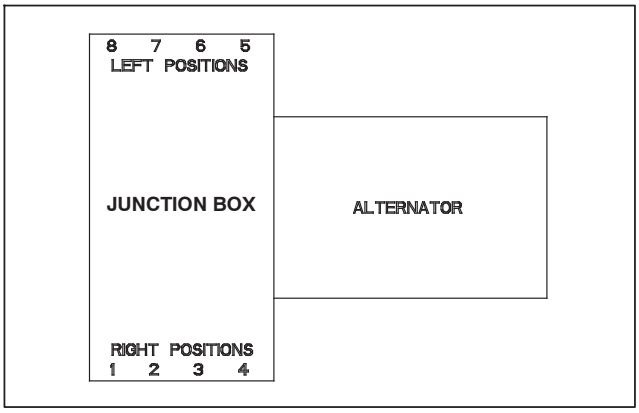
Interrupting Ratings

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

Circuit Breaker Lugs Per Phase (Al/Cu)

Frame Size	Ampere Range	Wire Range
H	15- 150	One #14 to 3/0
J	175	One 1/0 to 4/0
	200- 250	One 3/0 to 350 kcmil
LA	300- 400	One #1 to 600 kcmil or Two #1 to 250 kcmil
LG	400- 600	Two 2/0 to 500 kcmil
M	800	Three 3/0 to 500 kcmil
P	800-900	Three 3/0 to 500 kcmil
	1000-1200	Four 3/0 to 500 kcmil
RJ	1600- 2500	(8) 1/0 to 750 kcmil or (16) 1/0 to 300 kcmil
NW	1600- 3000	(10) 1/0 to 750 kcmil or (20) 1/0 to 300 kcmil

Breaker Positions



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

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

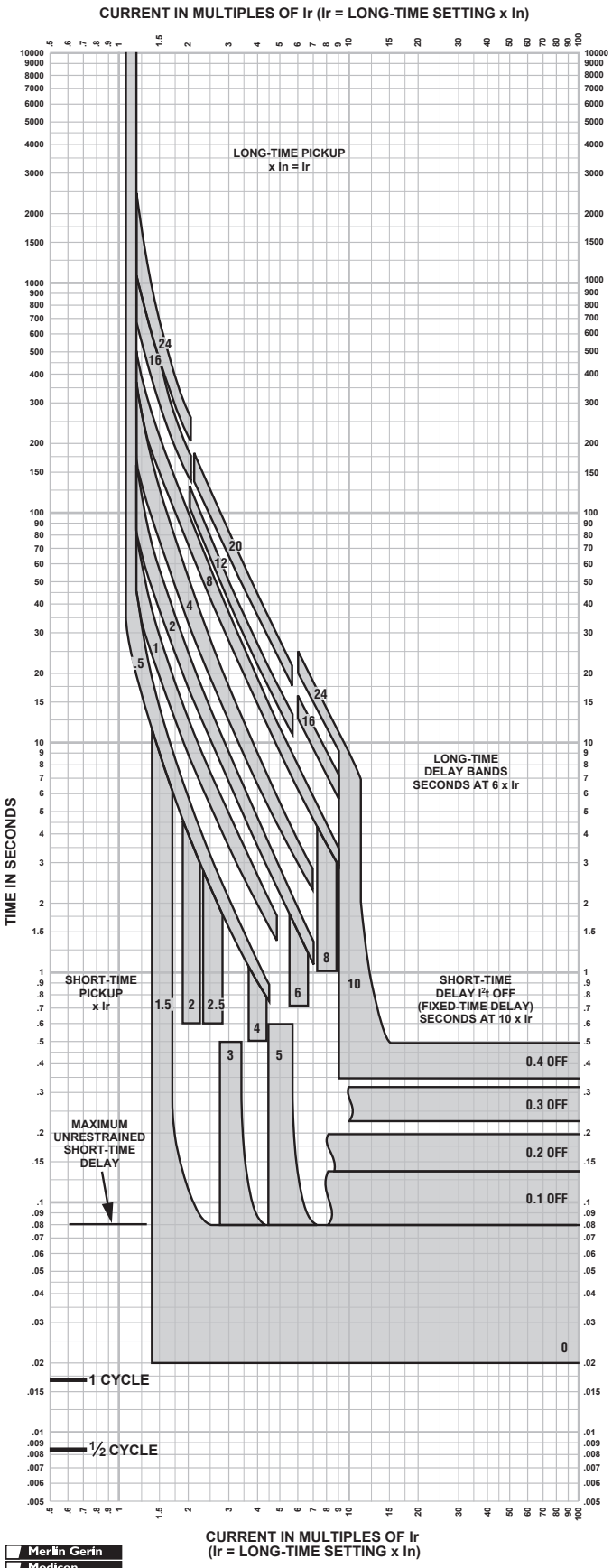
Multiple Circuit Breaker Combinations

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

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

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

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



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

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

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

Curves apply from -30°C to +60°C ambient temperature.

Notes:

1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermal-imaging effect comes into play if a current above the long-time delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in a shorter time than normal. The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload. Approximately 20 minutes is required between overloads to completely reset thermal-imaging.
2. The end of the curve is determined by the interrupting rating of the circuit breaker.
3. With zone-selective interlocking on, short-time delay utilized and no restraining signal, the maximum unrestrained short-time delay time band applies regardless of the setting.
4. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
5. For a withstand circuit breaker, instantaneous can be turned OFF. See 613-7 for instantaneous trip curve. See 613-10 for instantaneous override values.
6. Overload indicator illuminates at 100%.

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Modicon
Square D
Telemecanique
Federal Pioneer
Federal Pacific
Schneider Electric Brands

Schneider Electric

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

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

The most compact and innovative molded case circuit breakers

P-Frame 1200 A

R-Frame

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

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

Full-Featured Performance

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

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

Onboard Intelligence

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

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

MICROLOGIC® Trip Units

Choose the Model that Meets Your Needs

MICROLOGIC 3.0 and 5.0

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

MICROLOGIC 3.0A, 5.0A and 6.0A

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

MICROLOGIC 5.0P and 6.0P

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

MICROLOGIC 5.0H and 6.0H

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

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

Order Number 0612HO0201

SQUARE D
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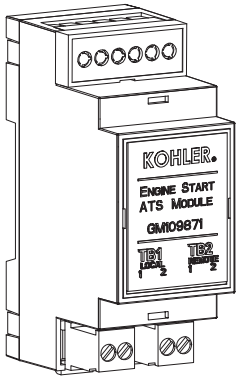
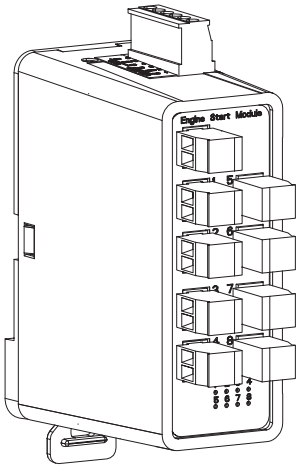
KOHLER®

Industrial Generator Set Accessories

Engine Start Circuit Monitoring System



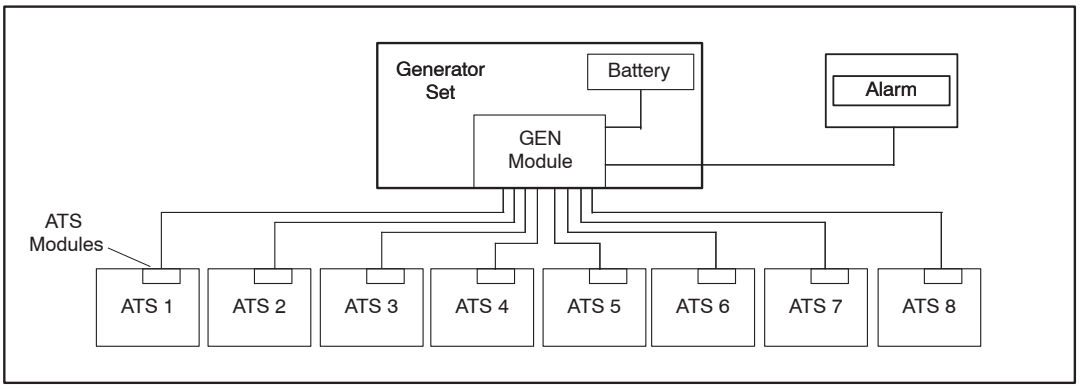
ATS Module



GEN Module

Standard Features

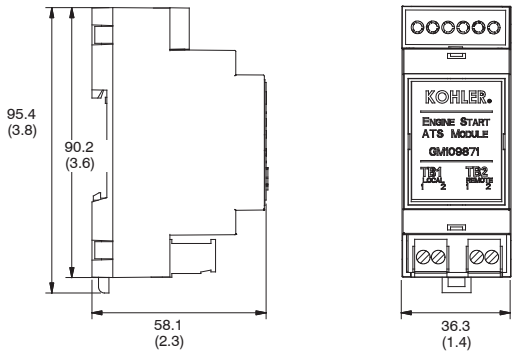
- Continually monitors the engine start circuit wiring between the generator set and automatic transfer switch (ATS) as required by NEC 2017
- UL listed
- Forwards engine start signals to the generator set during normal operation
- Detects open circuits and short circuits in the engine start wiring
- Monitors conditions, annunciates faults, and starts the generator set in accordance with Article 700.10(D)(3) of NFPA 70
  - Provides two Form C contacts, one for engine start and one for alarm
  - Communicates faults to an optional customer-supplied alarm, a Remote Serial Annunciator (RSA III), or a controller input
  - Automatically starts the generator set engine when a fault is detected
- GEN module status LEDs indicate the state of each circuit/channel:
  - Blue: Channel disabled (off)
  - Red: Wiring fault detected
  - Green: Engine start is not active, wiring is ok
  - Off: Engine start is active, wiring is ok
- Easy installation on new or existing standby power equipment
  - Use one module on the generator set
  - Use one module on each ATS, up to a maximum of 8 transfer switches per generator module
- GEN module can be powered by the generator set's engine starting battery; ATS module requires no power
- Select engine start on an open or closed contact (All Kohler® generators start on a closed contact)



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

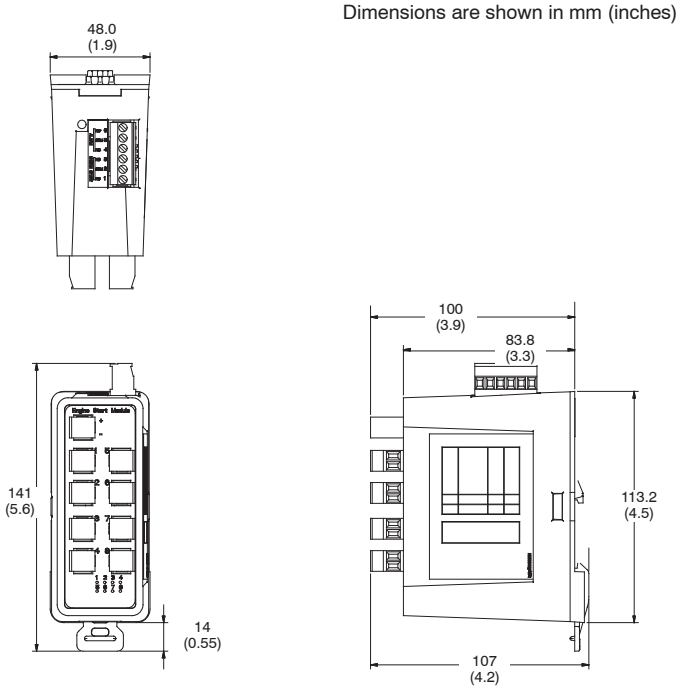
Module Dimensions

Dimensions are shown in mm (inches).



ATS Module

GM109872



GEN Module

GM109873

Specifications

Parameter	Specification
DC Power	GEN Module: 9- 27 VDC 15W maximum ATS Module: No power source required
Internal Ride Through Power	3 seconds minimum
Mounting	35 mm DIN rail
Operating Temperature Range	- 20°C to 70°C (- 4°F to 158°F)
Maximum Distance	1000 ft. (305 m) one way (2000 ft. [610 m] Loop)
Maximum Wire Loop Resistance	Less than 100 ohms
Generator Start Module Contact	1A 30 VDC Form C
Generator Alarm Module Contact	1A 30 VDC Form C
Wire Gauge	12- 30 AWG stranded

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BAY CITY ELECTRIC WORKS

Bay City Electric Works
322 Lindbergh Avenue
Livermore, CA 94551
619-938-8200
619-938-8217 fax

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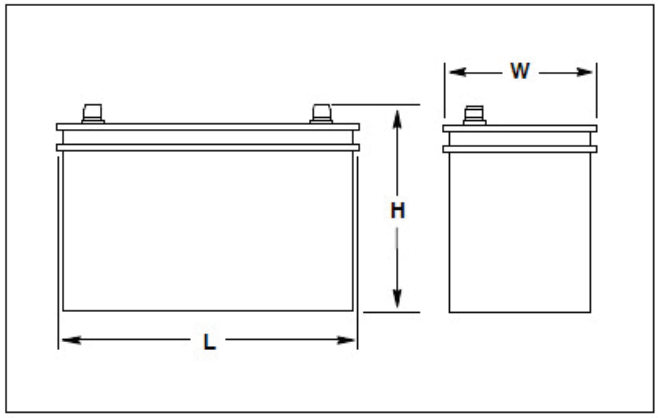
KOHLER®

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

Typical Overall Dimensions

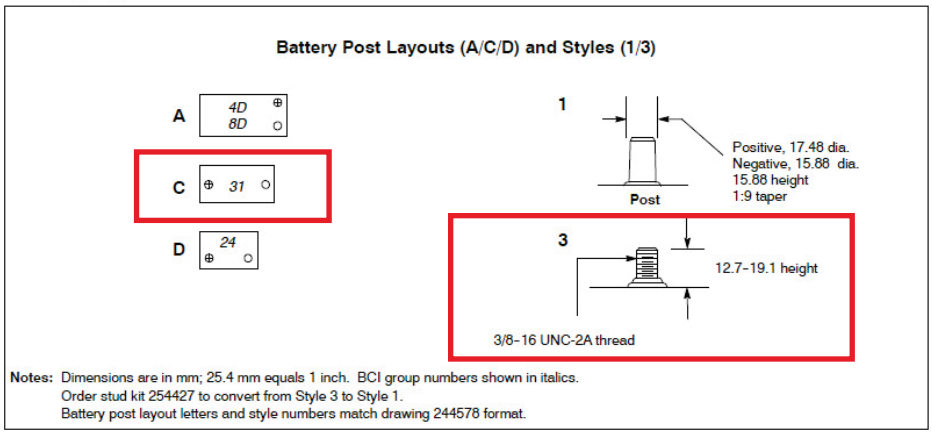


Standard Features

- 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 18°C (0°F) Min.	Reserve Capacity Minutes at 27° (80°F) Min.	Battery Post Layout and Style
				L	W	H			
Wet	324586	2	31	330.2 (13.0)	173.0 (6.8)	239.8 (9.4)	950	185	C/3

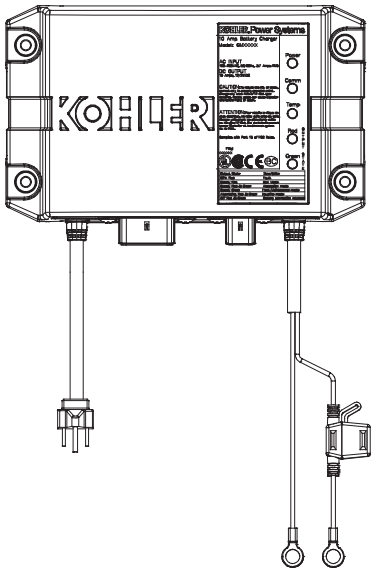
Battery Specifications



KOHLER

Industrial Generator Set Accessories

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



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

The battery charger is designed for operation with an engine cranking battery.

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

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

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

Standard Features

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

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

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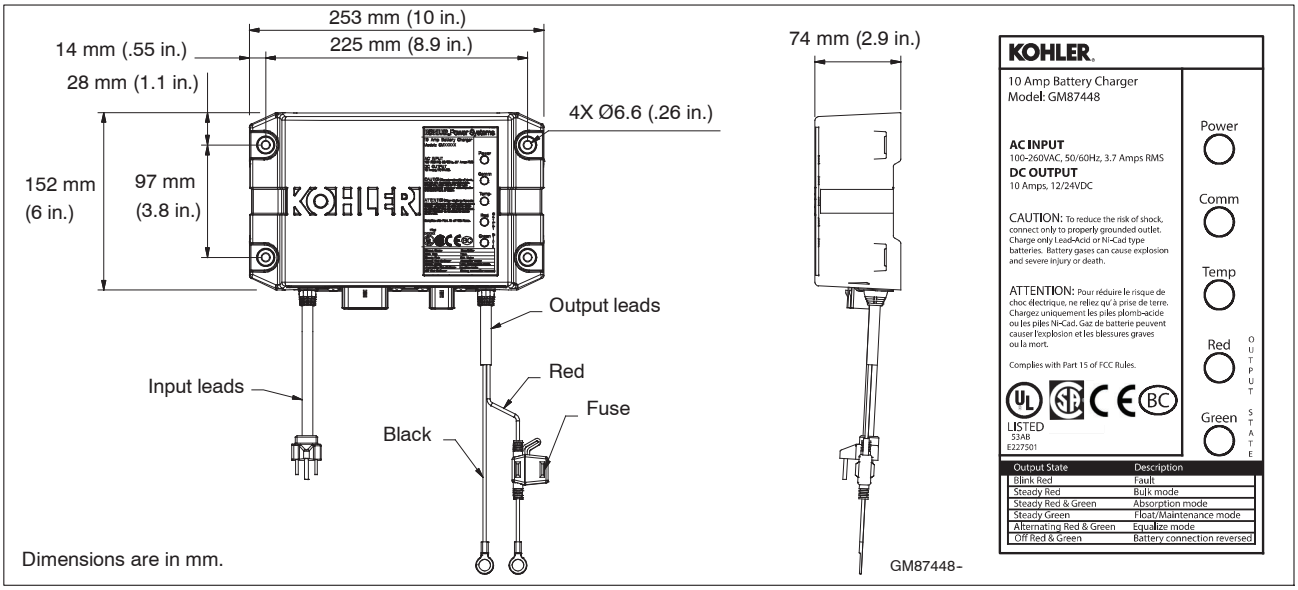

Specifications

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

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

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

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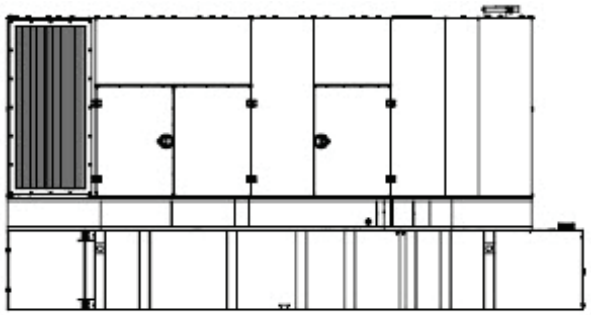
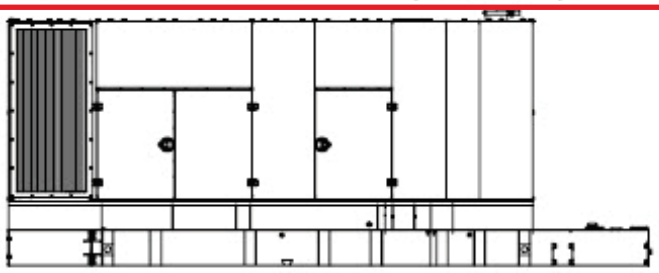
KOHLER®

Sound Enclosure with Subbase Fuel Tank Package

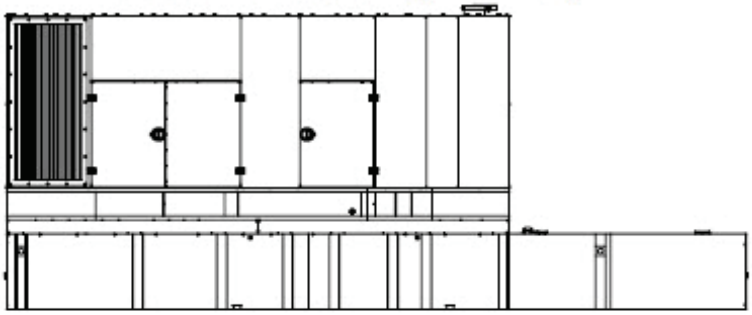
ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED



Enclosure with Standard Tank (12-48 Hour)



Enclosure with State Tank (12-48 Hour)



Enclosure with State Tank (72 Hour)

Sound Enclosure Standard Features

• Internal-mounted critical silencer, flexible exhaust connector, and rain cap.

• Skid mounted steel construction with hinged and removable doors.

• Fade-, scratch-, and corrosion-resistant Kohler® Power Armor automotive-grade textured finish.

• Enclosure has six large access doors which allow for easy maintenance.

• Lockable, flush-mounted door latches.

• Air inlet louvers reduce rain and snow entry.

• Vertical air outlet with 90 degree angles to redirect air and reduce noise.

• Acoustic insulation that meets UL94 HF1 flammability classification.

• Steel sound enclosure is designed to 150 mph (241 kph) wind load rating.

Subbase Fuel Tank Features

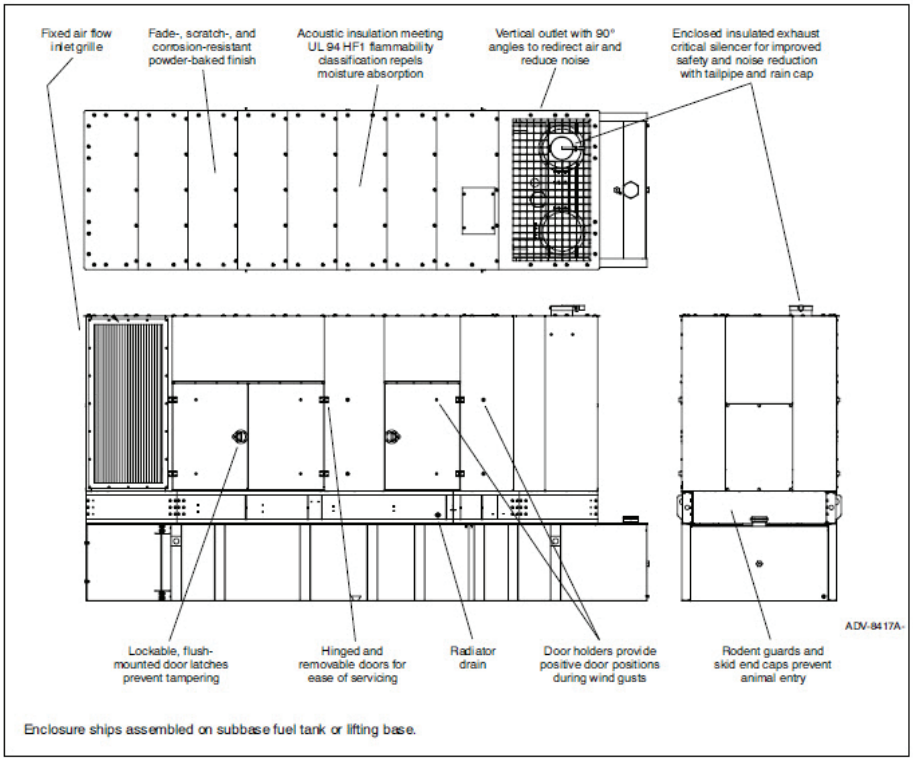
• The fuel tank has a Power Armor Plus textured epoxy-based rubberized coating.

• The above-ground rectangular secondary containment tank mounts directly to the generator set, below the generator set skid (subbase).

• Both the inner and outer tanks have emergency relief vents.

• Flexible fuel lines are provided with subbase fuel tank selection.

• The secondary containment tanks construction protects against fuel leaks or ruptures. The inner (primary) tank is sealed inside the outer (secondary) tank. The outer tank contains the fuel if the inner tank leaks or ruptures.



Sound Enclosure Features

- Available in steel (14 gauge) formed panel, solid construction. Preassembled package offering corrosion resistant (aluminum), dent resilient structure mounting directly to the lift base or fuel tank.
- Power Armor automotive-grade finish resulting in advanced corrosion and abrasion protection as well as advanced edge coverage and color retention.
- Interchangeable modular panel construction. Allows complete serviceability or replacement without compromising enclosure design.
- Internal critical exhaust silencer. Offers maximum component life, operator safety, and includes rain shield and cap.
- Note: Installing an additional length of exhaust tail pipe may increase backpressure levels. Please refer to the generator set spec sheet for the maximum backpressure value.
- Attenuated design. Acoustic insulation UL 94 HF1 listed for flame resistance.
- Service access. Multi-personnel doors for easy access to generator set control and servicing of the fuel fill, fuel gauge, oil fill, and battery.
- Cooling/Combustion Air Intake. Attenuated models offering weather protective designs using fixed air inlet louvers.
- Cooling Air Discharge. Attenuated models offering 90 degree vertical air outlet. Redirects cooling air up and above enclosures to reduce noise ambient

- Extended operation. Usable tank capacities of up to 72 hours.
- Power Armor Plus textured epoxy-based rubberized coating that creates an ultra-thick barrier between the tank and harsh environmental conditions like humidity, saltwater, and extreme temperatures, and provides advanced corrosion and abrasion protection
- UL listed. Secondary containment generator set base tank meeting UL 142 tank requirements.
- NFPA compliant. Designed to comply with the installation standards of NFPA 30 and NFPA 37.
- Integral external lift lugs. Enables crane with spreader-bar lifting of the complete package (empty tank, mounted generator set, and enclosure) to ensure safety.
- Emergency pressure relief vents. Meets UL requirements; ensures adequate venting of inner and outer tank under extreme pressure and/or emergency conditions.
- Normal vent with cap. Vent is raised above lockable fuel fill.
- Low fuel level switch. Annunciates a 50% low fuel level condition at generator set control.
- Leak detection switch. Annunciates a contained primary tank fuel leak condition at generator set control.
- Electrical stub-up.

Accessories

Battery Charger, Mounted.
Mounting, prewiring of DC output and AC input when optional BEP is selected. Battery charger located inside the enclosure and accessible through an access door.

Block Heater, Junction Box.
Factory-supplied block heater prewired to a junction box providing a convenient location for the customer wiring of the block heater.

Enclosure Heater
Heater, 5 kW Ceiling Mounted. Electrical utility heater prewired to load center inside the enclosure. Rated at 17100 Btu includes adjustable louvers offering down flow and horizontal air tuning, built-in thermostat with automatic fan delay controls.

Basic Electrical Package (BEP)
Prewired AC power distribution of all factory-installed features including block heater, two GFCI-protected internal 120-volt service receptacles, internal lighting, and commercial grade wall switch.Load center powered by building source power and protected by a main circuit breaker, rated for 100 amps (single phase) or 125 amps (three phase) with capacity and circuit positions for future expansion.AC power distribution installed in accordance with NEC and all wiring within EMT thin wall conduit. LED AC lights located within UL-listed fixtures.

KOHLER Power Systems

TIB-114

TECHNICAL INFORMATION BULLETIN

Generator Set Sound Data

Introduction

Generator Set Sound Configurations

Refer to the descriptions below and the following illustrations for typical information on how the sound data was acquired. Some variations to the testing procedure and setup do exist as a result of generator set size.

Level 2 Sound Enclosure. The level 2 sound enclosure is the premium sound enclosure for any given generator set model. It features the lowest available sound levels of all standard production enclosures. Typical features include interior acoustic foam treatment, intake and discharge sound plenums and baffles, and required silencer for the application.

Level 1 Sound Enclosure. The level 1 sound enclosure is a mid range sound enclosure that offers significant sound level reduction from an open generator set or weather enclosure unit. Typical features include economy interior acoustic foam treatment, economy intake and discharge sound plenums and baffles, and required silencer for the application. Level 1 sound enclosures are not offered on all generator set models.

Weather Enclosure. The weather enclosure is designed primarily to protect the generator set from the elements. A silencer is included with the enclosure, but no other sound reduction components are provided inside the enclosure.

Open Unit. The open unit configuration is sold for applications where the generator set is installed indoors or intended to be enclosed or sheltered by some other means. There are loose exhaust silencer and flexible exhaust kits available that provide various levels of exhaust noise attenuation.

Raw Exhaust. Raw exhaust refer specifically, and only, to the noise emitted by the engine exhaust system when no silencer is present. It does not include noise from other sources on the generator set.

Exhaust Silencer Classifications

Silencers come in various inlet/outlet configurations and levels of sound attenuation. Exhaust silencers are classified according to the sound performance that they offer. See Figure 1-1. Be aware that the exhaust noise reduction numbers cannot be considered absolute as other factors such as engine characteristics, exhaust system design, and silencer placement affect the end performance. The usefulness of this classification is limited to comparing the relative performance of one grade of silencer to the next.

Silencer Type	Exhaust Noise Reduction, dB(A)*	Attenuation Requirement
~~Hospital~~	~~32–42~~	~~Very High~~
Critical	25–35	High
Residential	18–25	Medium
Industrial	12–18	Low-Medium
*Listed exhaust noise reductions are typical, actual performance may vary.		

Figure 1-1 Silencer Types

When enclosures are designed to meet target requirements all sources of noise are considered. Exhaust noise is only one of the sources of noise in a generator, and its intensity and contribution to the overall generator set noise varies from one unit to the next. Silencers are selected to provide optimized performance in enclosures based on noise reduction and cost with no necessary correlation to the conventional terms Hospital, Critical, Residential, or Industrial.

Sound Test Data

The following references apply:

- Sound pressure levels per ANSI S1.13, ASA 118, and ISO 6798 as applicable
- Reference sound pressure is 20 μPa
- Sound pressure levels are specific to hemispherical free-field test setup, and may vary depending on-site ambient noise, instrumentation used, installation methods, objects around the generator set, and generator set variations.

Enclosed Unit Sound Test. Sound data is collected at eight location surrounding the generator set according to Figure 1-2 and Figure 1-3. The enclosed unit sound data is representative of generator sets with factory installed enclosures.

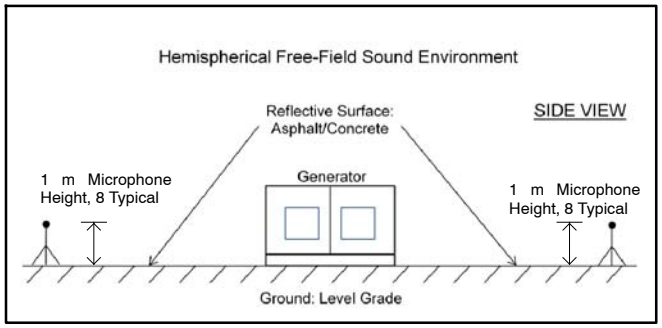


Figure 1-2 Standard Sound Test (Side View)

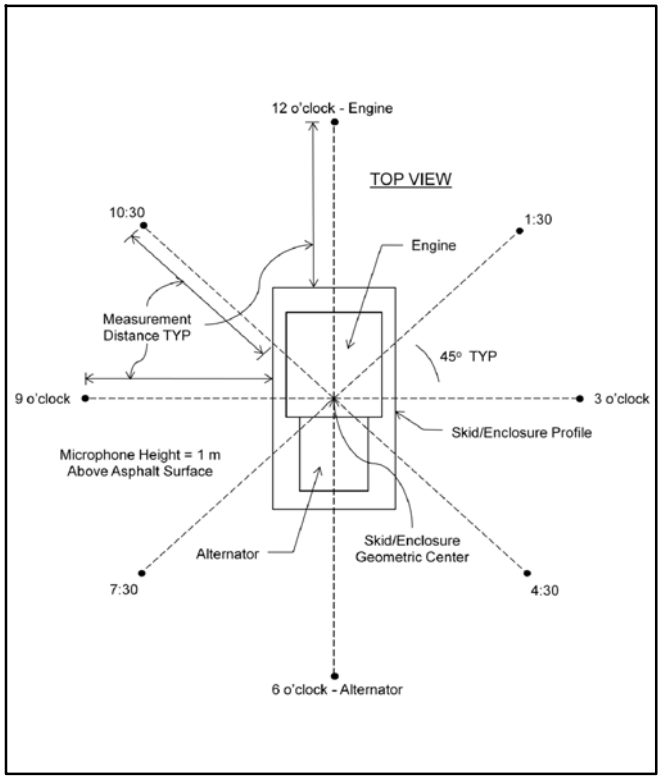


Figure 1-3 Standard Sound Test (Top View)

Open Unit, Isolated Exhaust Sound Test. Sound data is collected at eight locations surrounding the generator set similar to Figure 1-2 and Figure 1-3 while eliminating exhaust noise (and leaving all other noise) from the measurement by piping it to a remote location as indicated in Figure 1-4.

Enclosures, indoor rooms, barrier walls, shelters, and the like are devices that attenuate noise originating from all sources on a generator set, excluding the engine exhaust. The open unit, isolated exhaust data is provided as engineering data for use in sound performance design of these devices for customers purchasing an open unit generator set.

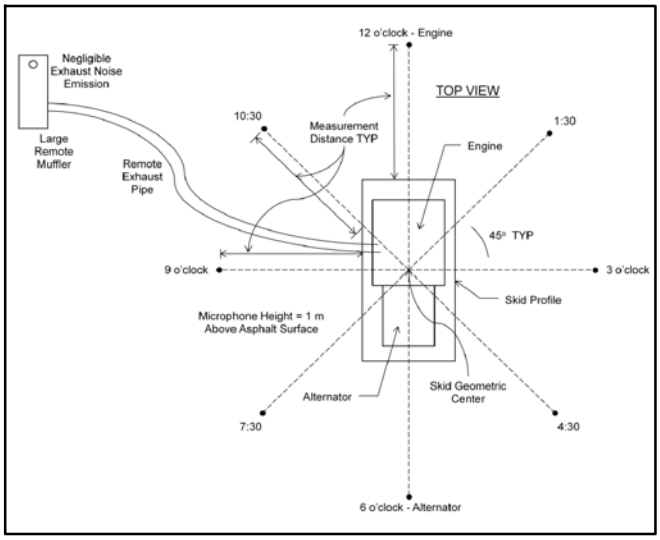


Figure 1-4 Open Unit, Isolated Exhaust Sound Test

Raw Exhaust Sound Test. Sound data is collected at one location near the mouth of a straight pipe engine exhaust as indicated in Figure 1-5. Sound data includes three-way catalyst if installed as standard equipment.

The measurement is taken at a close distance of 1 m (3.3 ft.) to ensure that only the exhaust noise is significant in the data. This measurement distance is also used because data taken at this close proximity is equally useful for design or selection of a silencer mounted near the generator set or at a remote location. The raw exhaust sound data is provided as engineering data for use in silencer design or selection for customers purchasing an open generator set.

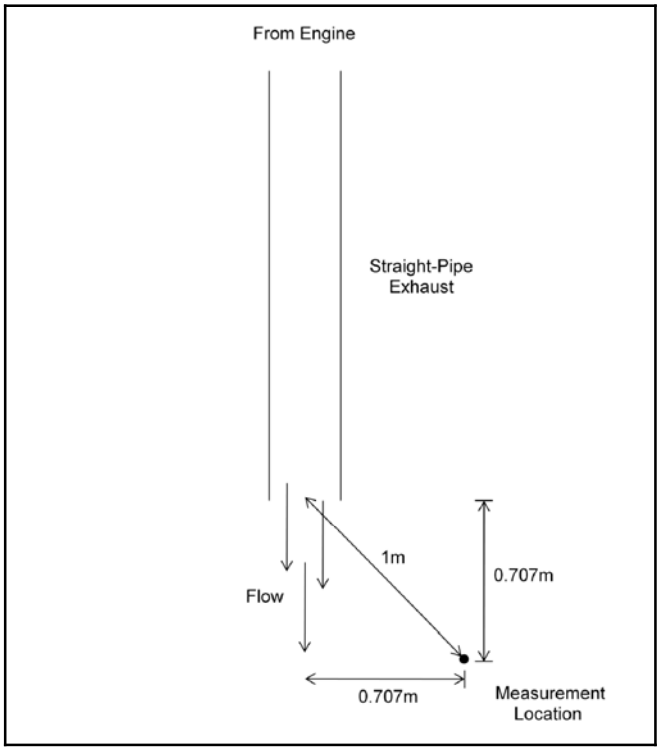
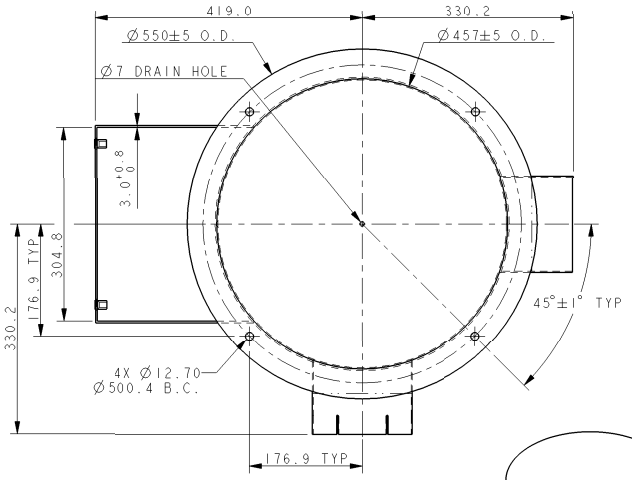
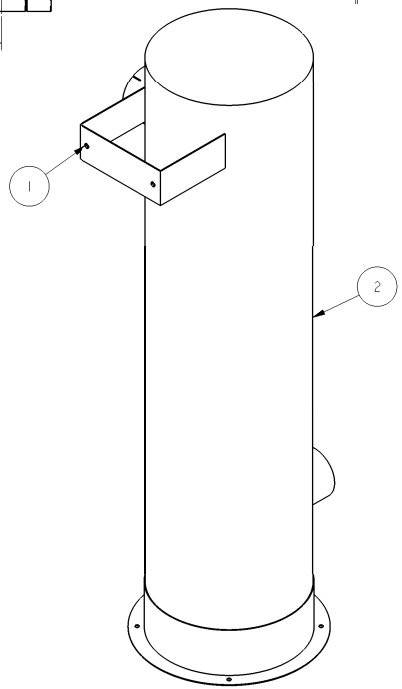


Figure 1-5 Raw Exhaust Sound Test

ITEM	PART NO	QTY	DESCRIPTION
1	GM11040-3	2	INSERT, THREADED (M8 X 1.25)
2	GM81095-1	1	SILENCER, 6IN INLET/OUTLET

THIS IS AN AUTOMATED TABLE. ALL UPDATES MUST BE MADE IN THE ASSEMBLY.





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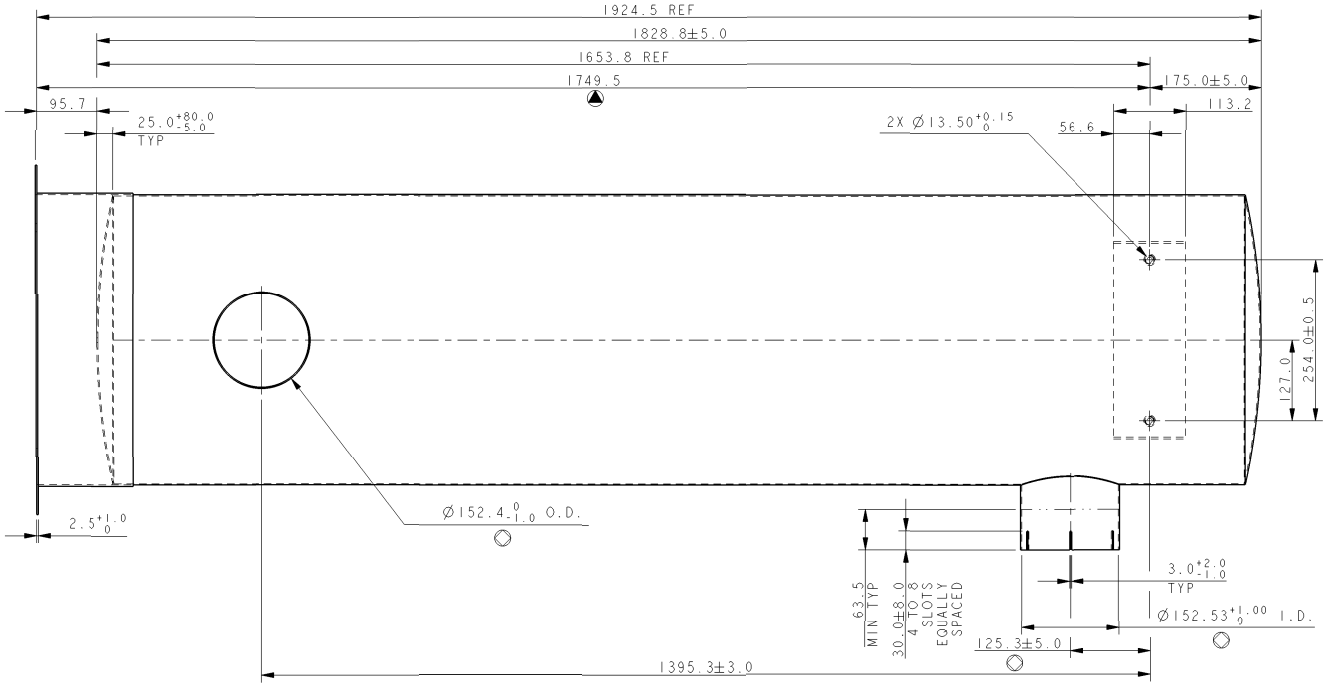


NOTE:

NOMINAL EXHAUST FLOW: 2.166 M^3/S [4594 CFM]
WEIGHT (APPROX): 59 KG [130 LBS]

MATERIAL: STEEL OR ALUMINIZED STEEL

FINISH: HEAT RESISTANT COATING
RATED TO 649°C [1200°F]. APPLIED AS NECESSARY TO PREVENT RUST FORMATION ON BARE SURFACES. SELECTIVE OR COMPLETE COVERAGE ACCEPTABLE. BLACK OR GREY COLOR AS APPROVED.

BACK PRESSURE LIMITS:

0 - 10" H2O AT 4594 CFM EXHAUST FLOW WHEN PIPED IN SERIES WITH GM81096.

BODY SEAM WELD AND SLOTS, MAY BE AT RANDOM ANGULAR ROTATION.

IDENTIFICATION: METAL STAMP OR TAG WITH DATE OF FABRICATION AND ''KOHLER GM81095'' ON SHELL.

▲◯ DENOTES KEY CHARACTERISTIC THAT MUST BE ADDRESSED IN THE PRODUCT CONTROL PLAN
KEY CHARACTERISTICS ON THIS DRAWING = 4

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	3-30-11	NEW DRAWING [91023-6]	RJS
A	5-11-11	REVISED PER SUPPLIER REQUEST [91023-10]	RJS
B	05-20-14	(B-2) NOTE FOR RUST PREVENTION UPDATED. [CT77832]	PRM

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 125 MAX. THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	RJS	3-30-11
CHECKED	RJS	3-30-11
APPROVED	JDK	3-30-11

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: SILENCER, 6IN INLET/OUTLET

SCALE 0.26 | CAD NO. | SHEET 1 of 1

DWG NO: GM81095 | D

500-600KW VOLVO SOUND ENCLOSURE

KOHLER

Industrial Generator Set Accessories

Load Center

- Part Number - SA27864
- Model - QO816L100RB
- QO Load Center
- Main Lug
- 240V, 100A, 1PH, 8SP

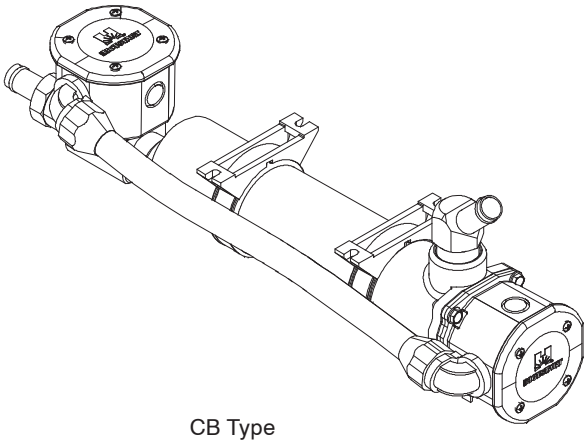
Specifications

Product	Load Center
Marketing Trade Name	QO
Load Center Type	Main Lugs
Line Rated Current	100 A
Number of Spaces	8
Short Circuit Current Rating	10 kA
Maximum Number of Single Pole Circuits	16
Maximum Number of Tandem Breakers	8
Phase	1 Phase
System Voltage	120/240 VAC
Wire Size	AWG 8...AWG 1 (Aluminum/Copper)
Enclosure Rating	NEMA 3R Outdoor
Cover Type	Surface Cover
Electrical Connection	Lugs
Grounding Bar	Grounding Bar included
Wiring Configuration	3- Wire
Busbar Material	Tin Plated Aluminum Busbar
Enclosure Material	Welded Galvannealed Steel
Cover Finish	Baked Enamel Grey
Box Number	2R
Product Certifications	UL listed
Height	12.64 in (321 mm)
Width	8.9 in (226 mm)
Package Weight (Lbs)	9.8

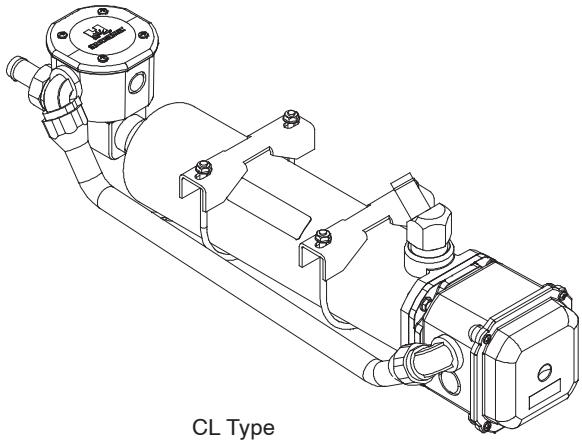
KOHLER

Industrial Generator Set Accessories

Engine Block Heater Kits



CB Type



CL Type

Block Heater Kit, Typical

Applicable Models

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

Standard Features

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

Description

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

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

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

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

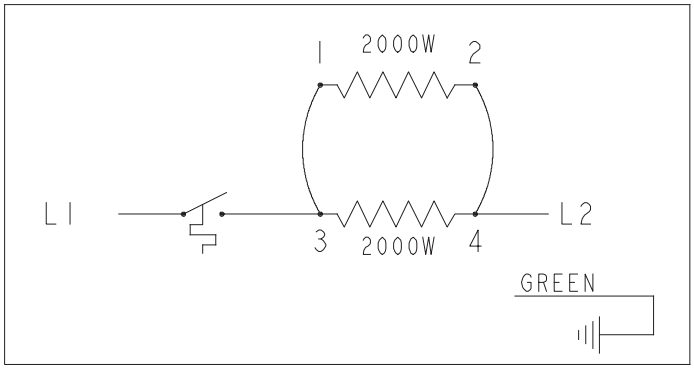
Block Heater Specifications

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

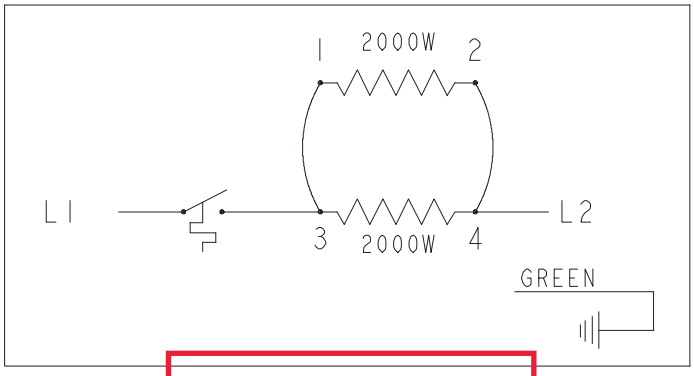
Specifications

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

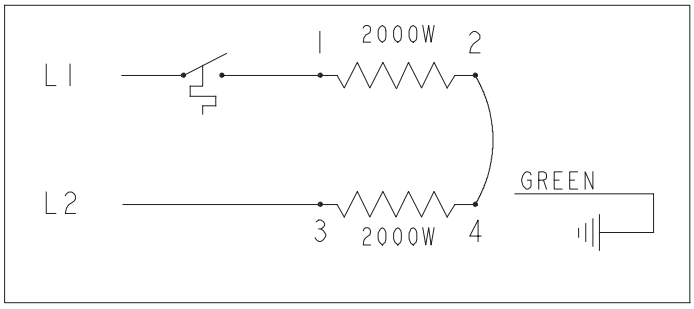
Wiring Diagram



208 VAC single phase- parallel



240 VAC single phase- parallel



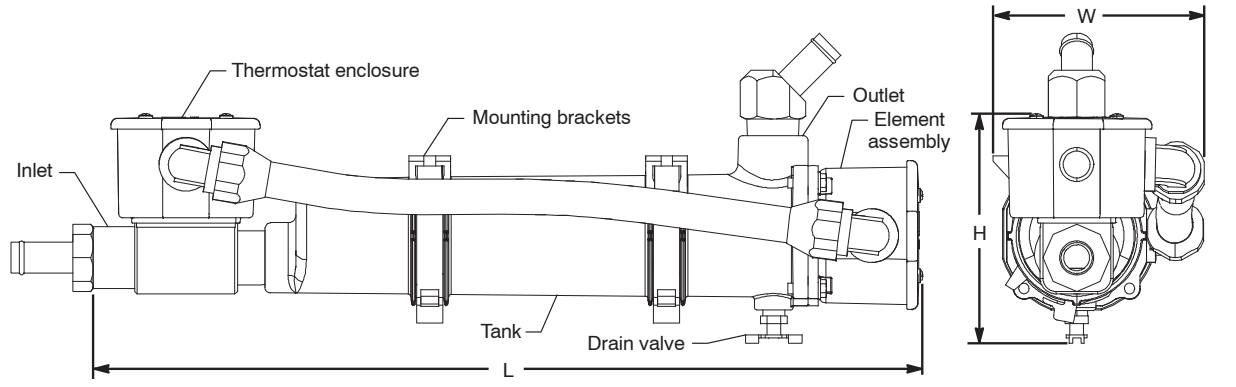
480 VAC single phase- parallel

GM79182

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

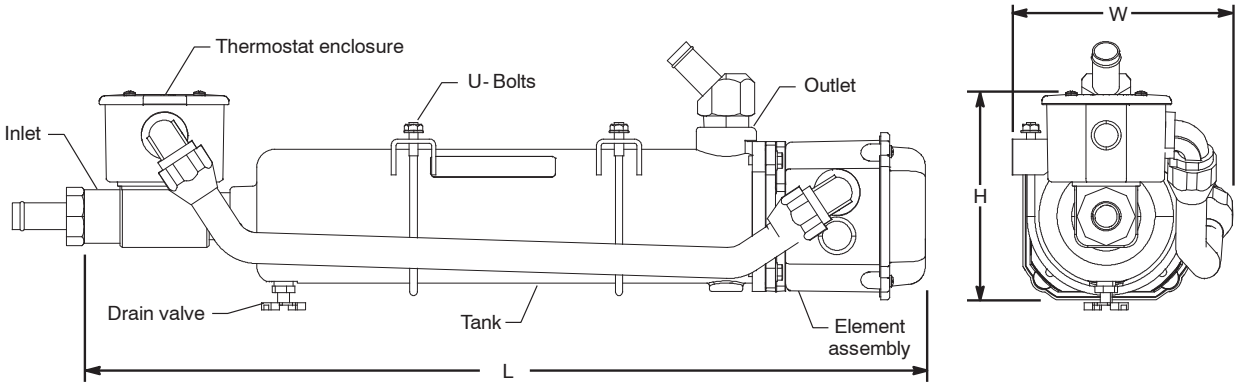
Dimensions and Weights

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



CB type

GM76113



CL type

GM79182

DISTRIBUTED BY:

BAY CITY ELECTRIC WORKS

Bay City Electric Works
322 Lindbergh Avenue
Livermore, CA 94551
619-938-8200
619-938-8217 fax

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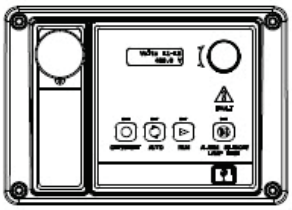
KOHLER®

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

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



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

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

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 APM402/Decision-Maker® 3000 Controllers

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

KOHLER®

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

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

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

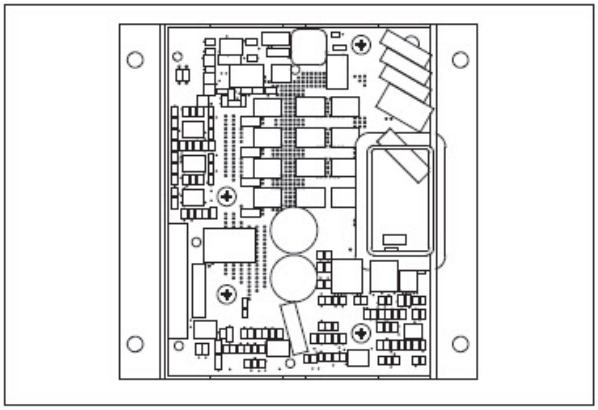
Voltage Regulator Menu

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

Jumpers

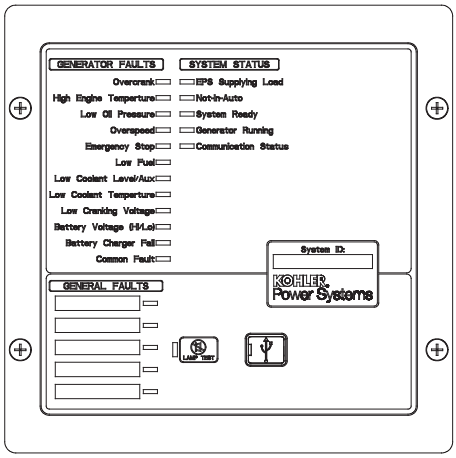
- L1-L2 volts
- L2-L3 volts (3-phase)
- L3-L1 volts (3-phase)
- L1-N volts
- L2-N volts
- L3-N volts (3-phase)

KOHLER®

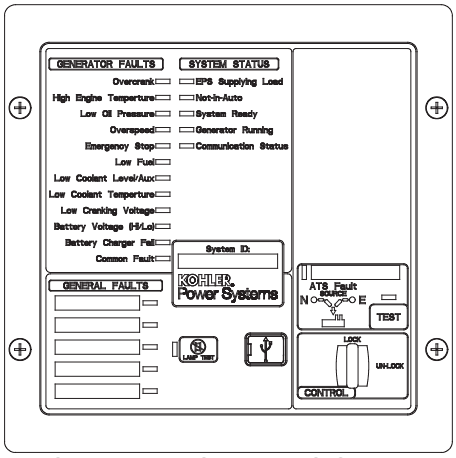


- Interfaces between the controller and alternator assembly using rotor field leads, auxiliary power windings, and optic board leads.
- Allows the Decision-Maker® controllers the ability to control a wound-field alternator using the same control signal as Fast Response™ alternator.
- Permits the generator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

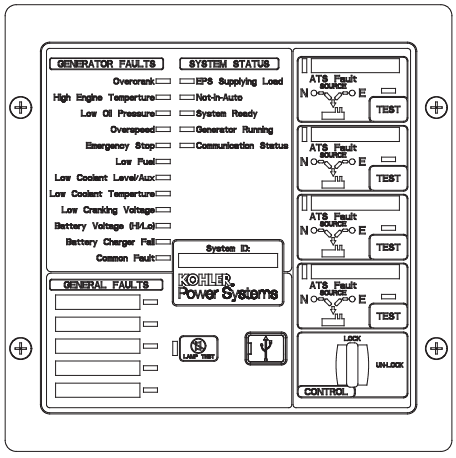
Modbus® is a registered trademark of Schneider Electric.



RSA III



RSA III with a Single ATS Control



RSA III with Four ATS Controls

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

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

APM402	Decision-Maker® 3000
APM603	Decision-Maker® 3500
APM802	Decision-Maker® 6000
Decision-Maker® 3+	Decision-Maker® 8000
Decision-Maker® 550	KPC 1000

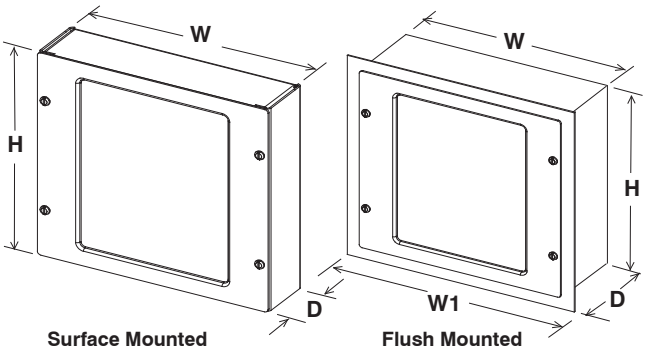
- Allows monitoring of the common alarm, remote testing of the automatic transfer switch, and monitoring of the normal/emergency source for up to four ATS with any of the following controllers:
  - Decision-Maker® MPAC® 750, 1200, and 1500
  - MPAC® 1000 and 1500
- Configuration via a personal computer (PC) software.
- Writable surfaces (white boxes in illustrations) for user-defined selections.
- Uses Modbus® RTU protocol.
- Controller connections:
  - RS-485 for serial bus network
  - USB port. Connect a personal computer and use Kohler® SiteTech™ software to view events and adjust settings. *
  - 12-/24-volt DC power supply
  - 120/208 VAC power supply (available accessory)
- Meets the National Fire Protection Association Standard NFPA 110, Level 1.

Dimensions

- Dimensions—W x H x D, mm (in.).
  - **Surface Mounted:**
    203 x 203 x 83 (8.0 x 8.0 x 3.3)
  - **Flush Mounted (Inside Wall):**
    203 x 203 x 76 (8.0 x 8.0 x 3.0)
    Flush mounting plate W1: 254 (10.0)

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

Modbus® is a registered trademark of Schneider Electric.



Surface Mounted Flush Mounted

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

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

Specifications

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

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

ATS Controls (RSA III with ATS controls only)

- ATS position LED (normal or emergency)
- Power source indicator LED (normal or emergency)
- ATS fault LED
- Key-operated lock/unlock switch for Test feature
- Test pushbutton

NFPA Requirements

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

Fault and Status LEDs and Lamp Test Switch

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

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

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

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

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

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

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

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

EPS Supplying Load. LED lights when the Emergency Power System (EPS) generator set is supplying the load (APM402, APM603, APM802, and Decision-Maker® 550, 3000, 3500, 6000, and 8000 controllers) or when transfer switch is in the emergency position (Decision-Maker® 3+ controller).

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

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

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

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

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

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

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

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

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

Not In Auto. LED lights when the generator set controller is not set to automatic mode.

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

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

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

User-Defined Digital Inputs #1-#5. Monitors five digital auxiliary inputs (can be configured as warnings or shutdowns). User-defined digital inputs are selected via the RSA III master for local or remote (generator set or ATS). The user-defined digital input can be assigned via PC using SiteTech™ setup software.

KOHLER

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

Accessories

- ❑ Power source adapter kit 120/208 VAC, 50/60 Hz.
- ✓ Modbus®/Ethernet converter GM41143-KP2 for serial to Ethernet communication.
- ❑ Communication module GM32644-KA1 or GM32644-KP1 is required with Decision-Maker® 3+ controllers.

Modbus® is a registered trademark of Schneider Electric.

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 set distributor for availability.

DISTRIBUTED BY:

BAY CITY ELECTRIC WORKS

Bay City Electric Works
322 Lindbergh Avenue
Livermore, CA 94551
619-938-8200
619-938-8217 fax

KOHLER®

Alternator Data

TECHNICAL INFORMATION BULLETIN

Alternator Data Sheet

Alternator Model: 5M4032

22-AUG-11

Kilowatt ratings at	1800 RPM			60 Hertz			10 LEADS	Standard 3 phase	
kW (kVA)	3 Phase			0.8 Power Factor			Dripproof or Open Enclosure		
	Class B	Class F					Class H		
Voltage*	80° C ① Continuous	90° C ① Lloyds	95° C ① ABS	105° C ② British Standard	105° C ① Continuous	130° C ① Standby	125° C ② British Standard	125° C ① Continuous	150° C ① Standby
480/240	570 (713)	625 (781)	645 (806)	680 (850)	680 (850)	700 (875)	695 (869)	700 (875)	765 (956)
460/230	595 (744)	645 (806)	655 (819)	700 (875)	700 (875)	730 (913)	715 (894)	730 (913)	785 (981)
440/220	595 (744)	635 (794)	640 (800)	680 (850)	680 (850)	730 (913)	715 (894)	725 (906)	765 (956)
416/208	570 (713)	600 (750)	610 (763)	645 (806)	650 (813)	700 (875)	685 (856)	685 (856)	725 (906)
380/190	525 (656)	555 (694)	560 (700)	595 (744)	595 (744)	595 (744)	595 (744)	595 (744)	595 (744)

① *Rise by resistance method, Mil-Std-705, Method 680.1b.* ② *British Standard Rating per BS 5000*

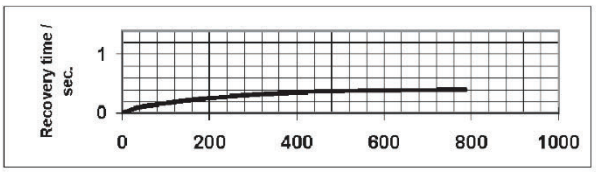
Submittal Data: 480 Volts*, 700 kW, 875 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase — **STD. CONNECTION**

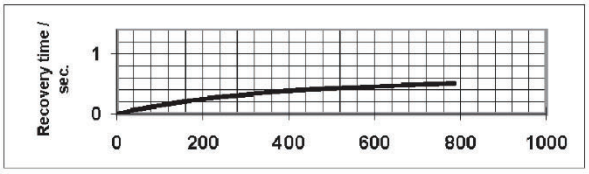
Mil-Std-705B Method	Description	Value
301.1b	Insulation Resistance	>1.5 Meg
302.1a	High Potential Test	
	Main Stator	2000 Volts
	Main Rotor	1500 Volts
	Exciter Stator	1500 Volts
	Exciter Rotor	1500 Volts
	PMG Stator	1500 Volts
401.1a	Stator Resistance, Line to Line	
	High Wye Connection	0.0074 Ohms
	Rotor Resistance	0.472 Ohms
	Exciter Stator	23 Ohms
	Exciter Rotor	0.045 Ohms
	PMG Stator	2.1 Ohms
410.1a	No Load Exciter Field Amps at 240/480 Volts Line to Line	0.65 A DC
420.1a	Short Circuit Ratio	0.489
421.1a	Xd Synchronous Reactance	3.09 pu
		0.814 ohms
422.1a	X2 Negative Sequence React.	0.217 pu
		0.057 ohms
423.1a	X0 Zero Sequence Reactance	0.058 pu
		0.015 ohms
425.1a	X'd Transient Reactance	0.153 pu
		0.04 ohms
426.1a	X"d Subtransient Reactance	0.132 pu
		0.035 ohms
--	Xq Quadrature Synchronous	1.25 pu
		0.329 ohms
427.1a	T'd Transient Short Circuit Time Constant	0.127 sec.
428.1a	T"d Subtransient Short Circuit Time Constant	0.009 sec.
430.1a	T'do Transient Open Circuit Time Constant	1.67 sec.
432.1a	Ta Short Circuit Time Constant of Armature Winding	0.015 sec.

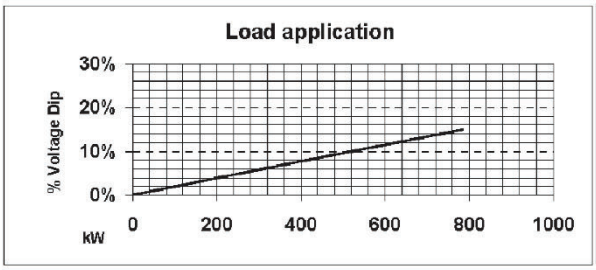
Mil-Std-705B Method	Description	Value
505.3b	Overspeed	2250 RPM
507.1c	Phase Sequence CCW-ODE	ABC
508.1c	Voltage Balance, L-L or L-N	0.20%
601.4a	L-L Harmonic Maximum - Total (Distortion Factor)	5.0%
601.4a	L-L Harmonic Maximum - Single	3.0%
601.1c	Deviation Factor	5.0%
---	TIF (1960 Weightings)	< 50
---	THF (IEC, BS & NEMA Weightings)	< 2 %
652.1a	Shaft Current	< 0.1 ma
---	Main Stator Capacitance to ground	0.03 mfd
	Additional Prototype Mil-Std Methods are Available on Request.	
--	Generator Frame	573
--	Type	MAGNAMAXDVR
--	Insulation	Class H
--	Coupling - Single Bearing	Flexible
--	Amortisseur Windings	Full
--	Excitation	Ext. Voltage Regulated, Brushless
--	Cooling Air Volume	1400 CFM
--	Heat rejection rate	2128 Btu's/min
--	Full load current	1052 amps
--	Minimum Input hp required	988.5
	Efficiency at rated load :	94.9%
--	Full load torque	2883 Lb-ft

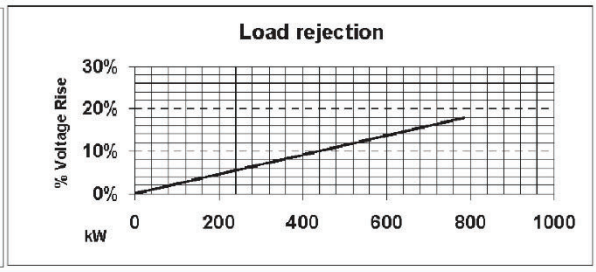
* Voltage refers to wye (star) connection, unless otherwise specified.

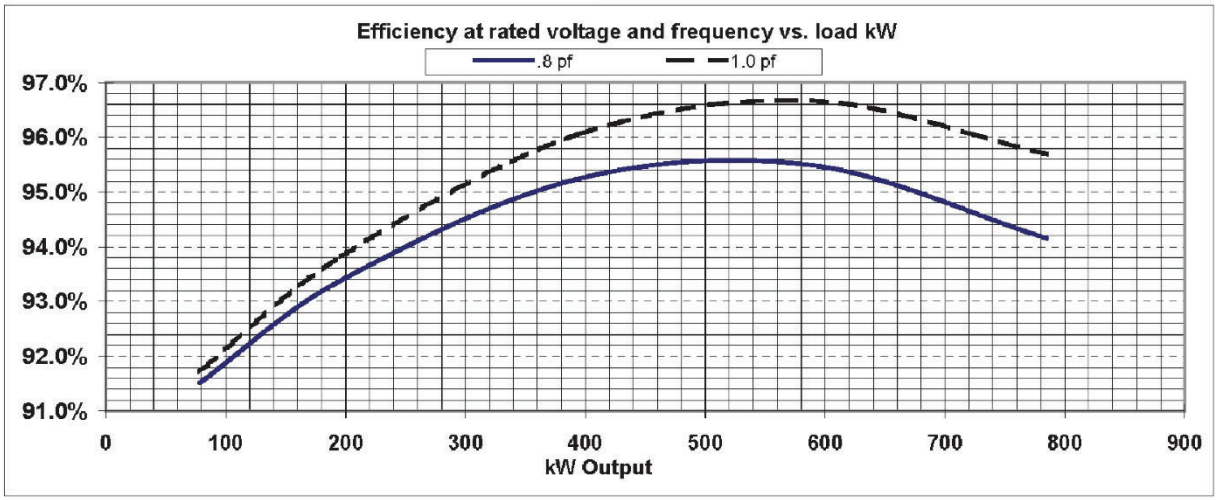
TYPICAL DYNAMIC CHARACTERISTICS

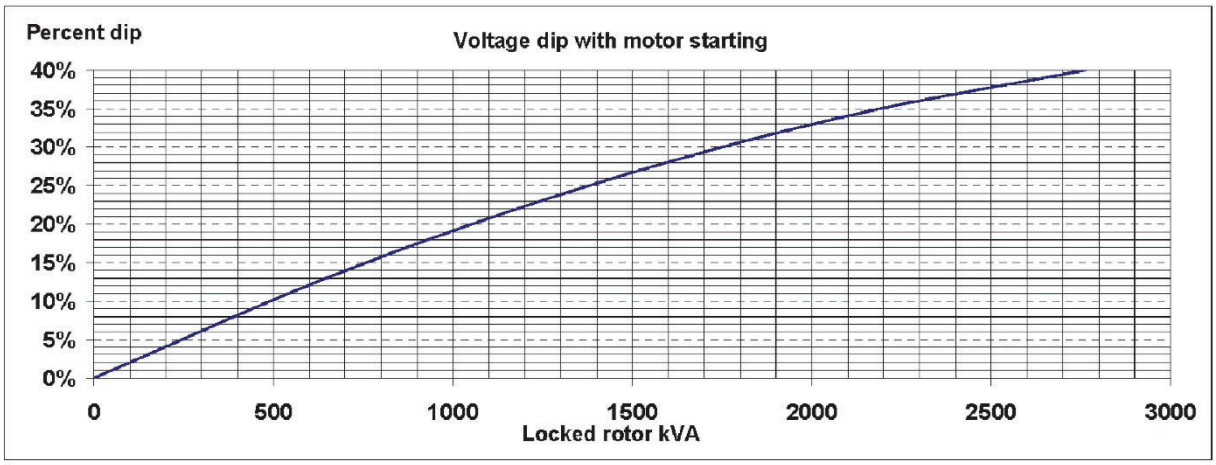








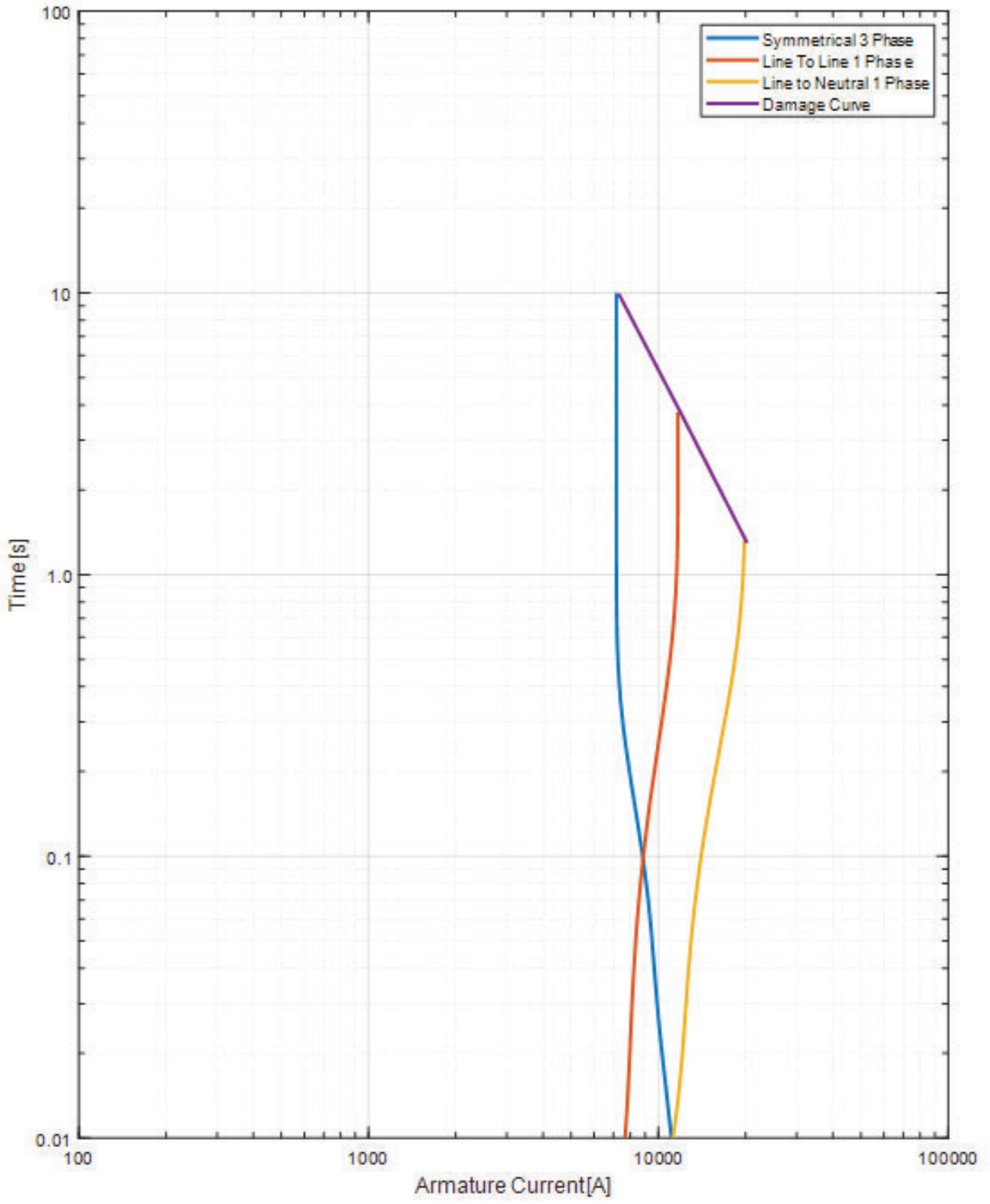




Voltage refers to wye (star) connection, unless otherwise specified..

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

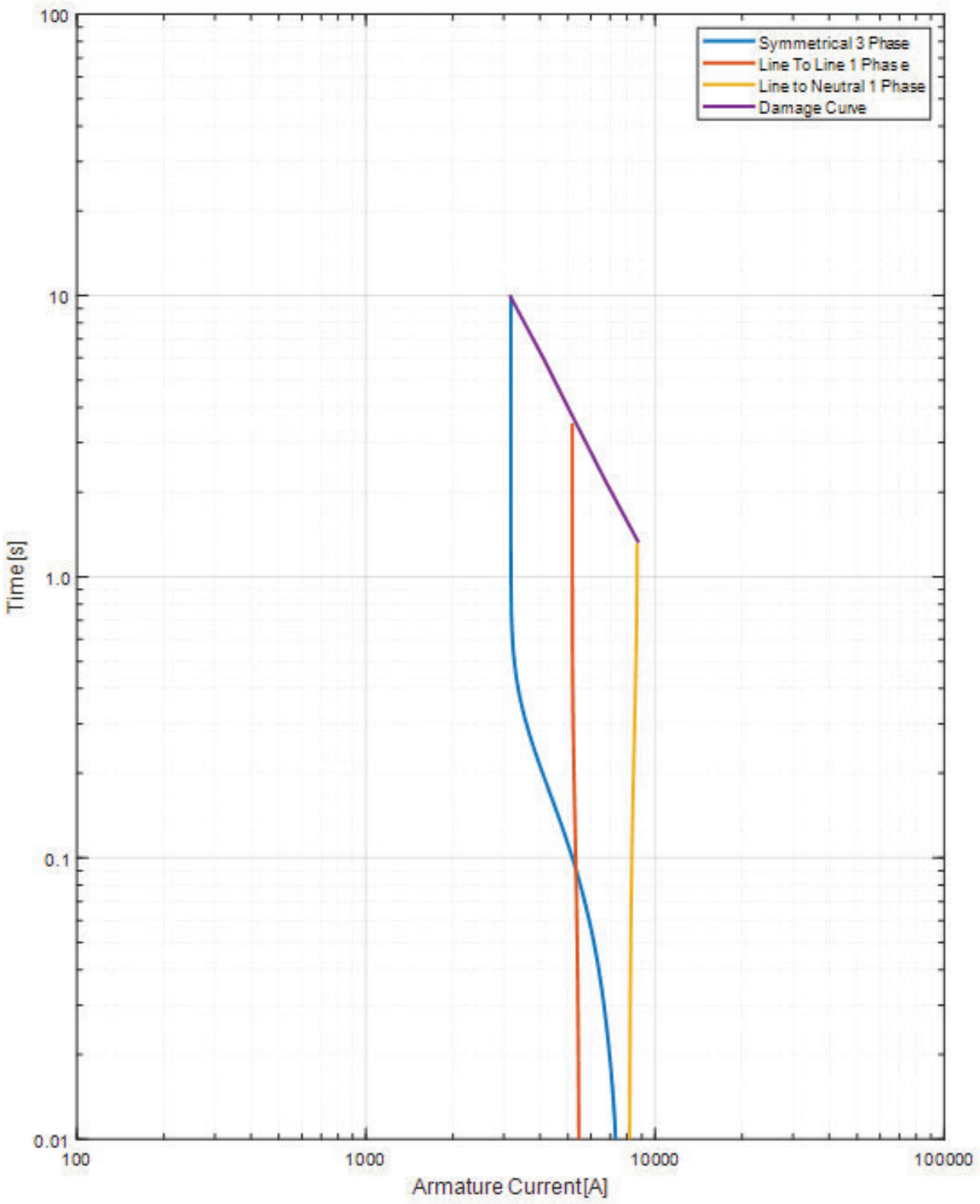
Full Load Current: 2429 Amps **Steady State S.C. Current:** 7287 Amps **Max. 3 ph. Symm. S.C. Current:** 13723 Amps



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

SHORT CIRCUIT DECREMENT CURVE
60 Hz, High Wye Connection

Full Load Current: 1052 Amps **Steady State S.C. Current:** 3156 Amps **Max. 3 ph. Symm. S.C. Current:** 7970 Amps



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

KOHLER®

Cooling Data

TECHNICAL INFORMATION BULLETIN

Generator Set Cooling System Data Sheet

600REOZVB 60Hz, TWD1643GE (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)*	53 (127)	50 (122)	49 (120)	48 (118)	46 (115)	NA (NA)	45 (113)
	Cooling system airflow	m^3/min *(ft^3/min)*	790 (27900)	750 (26500)	730 (25800)	715 (25200)	700 (24700)	NA (NA)	NA (NA)

600REOZVB 60Hz, TWD1644GE (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)*	55 (131)	54 (129)	53 (127)	52 (126)	50 (122)	49 (120)	49 (120)
	Cooling system airflow	m^3/min *(ft^3/min)*	798 (28200)	780 (27500)	768 (27100)	752 (26600)	735 (26000)	717 (25300)	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®

Sound Data

TECHNICAL INFORMATION BULLETIN

Generator Set Sound Data Sheet

			Sound Pressure Data in dB(A)			
Generator Set Model	**Hz**	**Load**	**Raw Exhaust**	**Open Unit, Isolated Exhaust**	**Weather Enclosure**	**Sound Enclosure**
600REOZVB	60	100% Load	122.4	93.8	91.9	76.0
		No Load	107.8	90.9	89.0	73.8

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.

600REOZVB **60 Hz**

				Sound Pressure Levels dB(A)								
				Octave Band Center Frequency (Hz)								Overall Level
Load	Distance, m (ft.)	Enclosure	Measurement Position	63	125	250	500	1000	2000	4000	8000	
100% Load	7 (23)	Sound	Right	57.1	66.9	70.6	71.0	66.4	64.5	60.7	55.3	75.8
			Front-Right	59.5	69.9	68.2	67.9	67.5	64.7	58.9	52.8	75.2
			Front	56.6	66.5	69.8	69.8	68.3	64.3	59.9	52.3	75.4
			Front-Left	58.5	66.8	73.0	72.7	69.1	65.9	58.7	55.1	77.6
			Left	58.0	67.4	70.3	71.1	67.3	66.3	59.6	58.5	76.1
			Back-Left	54.1	65.6	72.1	72.3	70.0	67.2	60.1	55.5	77.3
			Back	59.3	64.7	68.5	66.9	64.8	63.3	57.0	48.6	73.3
			Back-Right	56.3	68.3	70.1	68.5	68.4	66.1	58.6	57.5	75.7
			8-pos. log avg.	57.7	67.3	70.6	70.5	68.0	65.5	59.3	55.3	76.0

				Sound Pressure Levels dB(A)								
Load	Distance, m (ft.)	Enclosure	Measurement Position	Right	Front-Right	Front	Front-Left	Left	Back-Left	Back	Back-Right	8-pos. log avg.
100% Load	7 (23)	Weather	Overall Levels	93.1	92.7	84.3	90.9	92.1	91.5	91.1	94.4	91.9

				Sound Pressure Levels dB(A)								
				Octave Band Center Frequency (Hz)								Overall Level
Load	Distance, m (ft.)		Measurement Position	63	125	250	500	1000	2000	4000	8000	
100% Load	7 (23)	Open Unit, Isolated Exhaust	Right	71.3	76.6	87.5	83.7	86.5	87.6	85.0	89.6	95.0
			Front-Right	68.1	72.2	80.2	82.3	86.0	88.0	86.4	90.3	94.6
			Front	61.9	68.5	80.3	75.7	78.9	79.7	77.2	75.5	86.2
			Front-Left	60.1	71.2	80.5	82.3	87.9	88.0	84.0	80.2	92.8
			Left	66.3	73.0	84.4	82.7	87.3	89.8	85.8	81.7	94.0
			Back-Left	65.9	73.6	84.4	83.1	87.2	88.2	84.6	81.9	93.4
			Back	71.7	76.9	88.9	81.4	83.6	85.3	83.5	82.8	93.0
			Back-Right	62.3	75.9	86.4	83.1	88.1	89.5	87.5	91.1	96.3
			8-pos. log avg.	67.7	74.3	85.2	82.3	86.4	87.8	85.0	86.9	93.8

			Sound Pressure Levels dB(A)								
			Octave Band Center Frequency (Hz)								Overall Level
Load	Distance, m (ft.)	Exhaust	63	125	250	500	1000	2000	4000	8000	
100% Load	1 (3.3)	Raw Exhaust (No Silencer)	99.3	106.9	110.7	111.1	113.6	116.4	115.3	115.3	122.4

600REOZVB	60 Hz

Load	Distance, m (ft.)	Enclosure	Measurement Position	Sound Pressure Levels dB(A)								
				Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
No Load	7 (23)	Sound	Right	55.3	62.0	67.3	69.4	66.5	61.9	55.4	46.8	73.5
			Front-Right	51.4	65.0	66.2	66.3	67.2	61.5	56.3	46.5	72.8
			Front	52.7	65.1	68.3	68.8	68.3	62.7	57.4	48.8	74.3
			Front-Left	54.2	63.4	70.3	70.6	68.3	63.1	55.9	47.1	75.3
			Left	52.2	61.7	69.3	69.6	66.4	63.8	55.8	47.8	74.2
			Back-Left	48.2	61.7	69.2	70.0	68.5	65.2	54.9	45.9	74.9
			Back	56.2	63.1	64.7	65.1	64.5	58.4	51.6	41.5	70.9
			Back-Right	50.7	63.3	66.8	67.8	67.6	63.3	53.5	45.1	73.3
			8-pos. log avg.	53.3	63.4	68.1	68.8	67.3	62.8	55.4	46.6	73.8

Load	Distance, m (ft.)	Enclosure	Measurement Position	Sound Pressure Levels dB(A)								
				Right	Front-Right	Front	Front-Left	Left	Back-Left	Back	Back-Right	8-pos. log avg.
No Load	7 (23)	Weather	Overall Levels	89.5	88.5	86.7	89.3	90.6	88.8	87.7	89.9	89.0

Load	Distance, m (ft.)		Measurement Position	Sound Pressure Levels dB(A)								
				Octave Band Center Frequency (Hz)								Overall Level
				63	125	250	500	1000	2000	4000	8000	
No Load	7 (23)	Open Unit, Isolated Exhaust	Right	54.7	71.4	85.2	81.8	85.9	85.8	80.0	73.8	91.4
			Front-Right	58.8	65.1	80.2	78.9	84.3	86.9	80.7	73.5	90.4
			Front	56.4	65.6	82.4	78.6	83.0	82.6	79.0	71.6	88.6
			Front-Left	52.6	69.3	82.8	79.1	86.2	86.7	81.5	73.6	91.2
			Left	55.7	70.5	86.3	81.3	86.0	87.3	83.6	75.2	92.5
			Back-Left	63.6	71.2	84.3	80.4	85.6	84.8	80.3	72.7	90.7
			Back	62.3	70.1	87.5	78.9	79.3	81.5	74.1	66.9	89.6
			Back-Right	57.3	71.8	86.4	80.3	85.6	86.5	81.0	74.9	91.8
			8-pos. log avg.	59.1	69.9	84.9	80.1	84.9	85.7	80.6	73.3	90.9

Load	Distance, m (ft.)	Exhaust	Sound Pressure Levels dB(A)								
			Octave Band Center Frequency (Hz)								Overall Level
			63	125	250	500	1000	2000	4000	8000	
No Load	1 (3.3)	Raw Exhaust (No Silencer)	94.8	100.6	102.3	96.1	99.2	100.5	95.9	90.4	107.8

KOHLER®

Emissions Data

KOHLER®

600REOZVB

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

ENGINE INFORMATION

Model:	TWD1643GE,TWD1644GE	Bore:	144mm (5.67 in.)
Nameplate kW @ 1800 RPM:	674	Stroke:	165mm (6.50 in.)
Type:	4-Cycle, 6 Cylinder, Inline	Displacement:	16.12 L (984 cu. in.)
Aspiration:	Turbocharged, Charge Air-Cooled	EPA Family:	NVPXL16.1ACW
Compression Ratio:	16.5:1	EPA Certificate:	NVPXL16.1ACW-021
Emission Control Device:	Electronic Control		

EXHAUST EMISSION DATA (g/kWh):	**EPA D2 Cycle 5-mode weighted**	
	TWD1643GE	TWD1644GE
HC	0.11	0.11
NOx (Oxides of Nitrogen as NO_2)	5.63	5.59
CO (Carbon Monoxide)	0.41	0.39
PM (Particulate Matter)	0.076	0.04

TEST METHODS AND CONDITIONS

The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and there is no guarantee that every production engine will have identical test results. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, alternate test methods, or other conditions.

Data and specifications subject to change without notice.

1/2022
rev. -

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2022 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: AB Volvo Penta (U.S. Manufacturer or Importer) **Certificate Number:** NVPXL16.1ACW-021	**Effective Date:** 12/30/2021 **Expiration Date:** 12/31/2022	Byron J. Bunker, Division Director Compliance Division	**Issue Date:** 12/30/2021 **Revision Date:** N/A

Model Year: 2022 **Manufacturer Type:** Original Engine Manufacturer **Engine Family:** NVPXL16.1ACW	**Mobile/Stationary Indicator:** Stationary **Emissions Power Category:** 560<kW<=2237 **Fuel Type:** Diesel **After Treatment Devices:** No After Treatment Devices Installed **Non-after Treatment Devices:** Electronic Control

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.

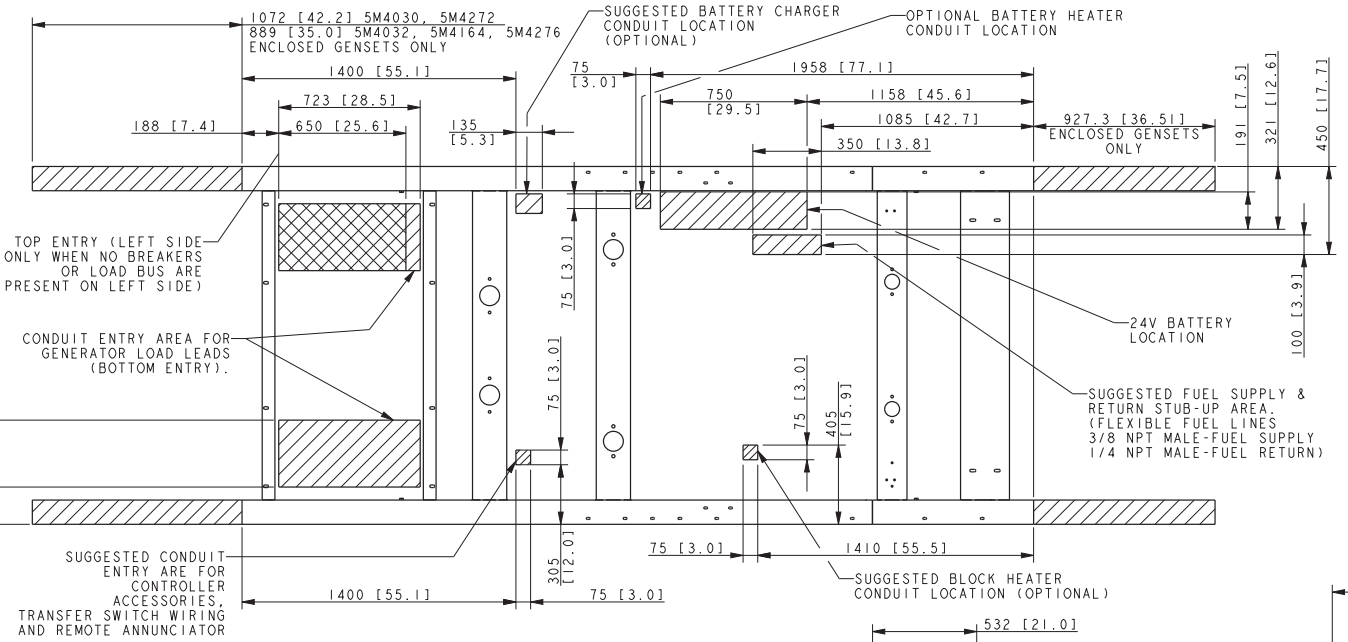
This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate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

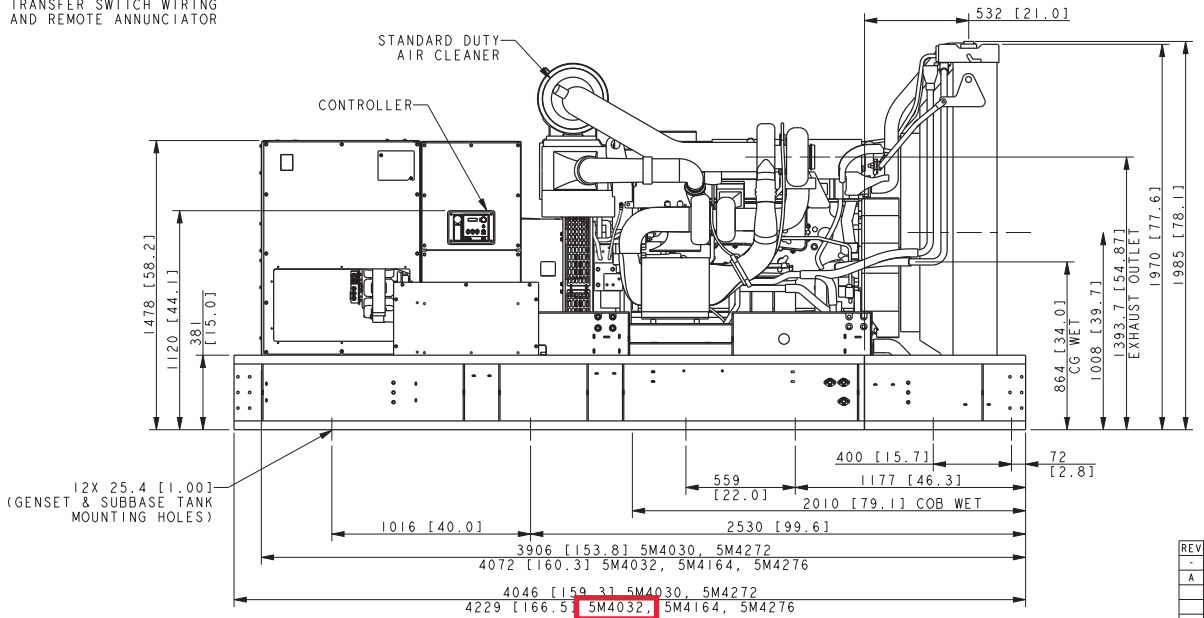
KOHLER®

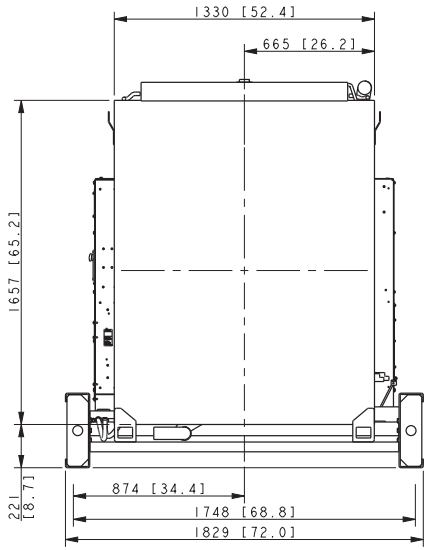
Dimensional Drawings



MODEL	ALTERNATOR FRAME	CONNECTION	GENSET WEIGHT (WET)
600 60 HZ	5M4030	10 LEAD	4627 KG [10,200 LBS]
	5M4032	10 LEAD	4785 KG [10,550 LBS]
	5M4164	4 LEAD	4785 KG [10,550 LBS]
	5M4272	4 LEAD	4627 KG [10,200 LBS]
	5M4276	4 LEAD	4885 KG [10,770 LBS]

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





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 CERTIFICATION IS REQUIRED SEE SEISMIC ADV FOR INSTALLATION INSTRUCTIONS.

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	9-16-14	NEW DRAWING [CT92986]	SAM
A	20AUG2021	(A,B-8) 1120[44.1] ADDED [CT214162]	RNN

600 MODEL 60 HZ
5M4030, 5M4032, 5M4164, 5M4272, 5M4276
RECONN., 380V, 600V ALTERNATORS
VOLVO

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X ± .XX ± .X ± ANGLES ±
SURFACE FINISH MAX.
THIRD ANGLE PROJECTION

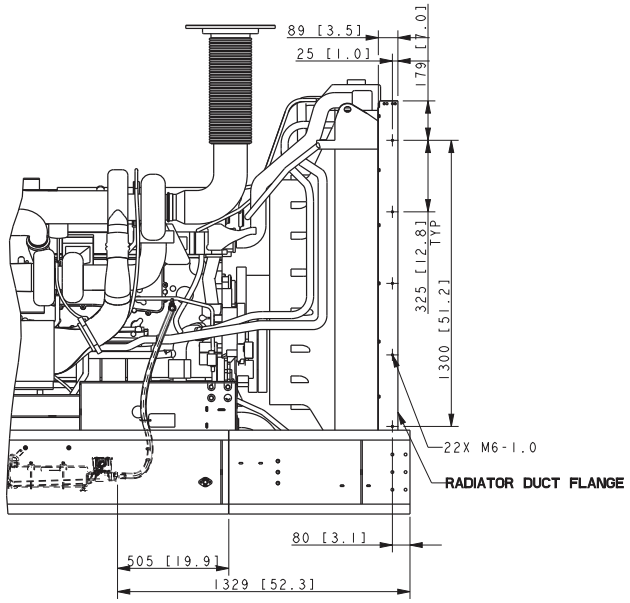
APPROVALS		DATE
DRAWN	SAM	9-16-14
CHECKED	SAM	9-16-14
APPROVED	PBT	9-16-14

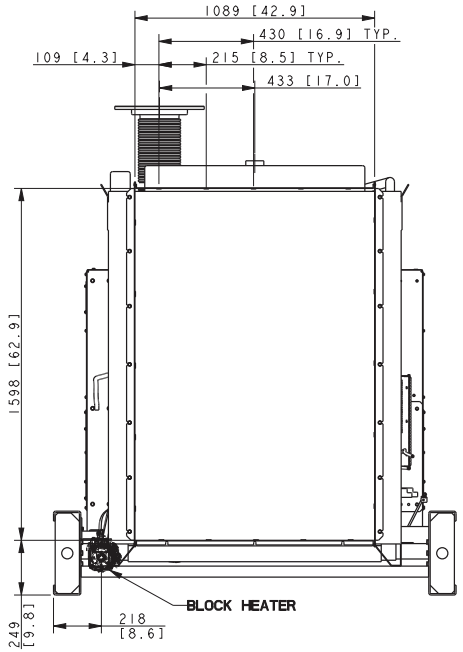
KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DIMENSION PRINT, 600 KW VOLVO

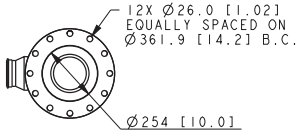
SCALE 0.08 | CAD NO. | SHEET 1 of 2

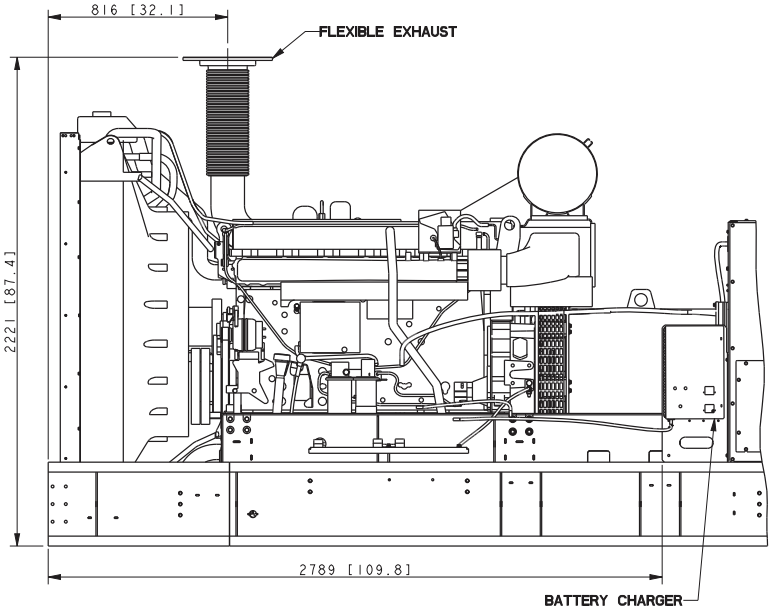
DWG NO. ADV-8743 | D





Block Heater
4000W 240V 1PH





Battery Charger 24V-10Amp

600 VOLVO MODEL
RECONNECTABLE
380V & 600V ALTERNATORS

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	6-7-11	NEW DRAWING [91684-3]	DJV
A	1-10-12	VIEWS UPDATED [CT03561]	DJV
B	3-27-12	(B-4) 221 [87.4] ADDED [CT08774]	DJV
C	12-18-17	(C-6) 1598 [62.9] WAS 1511 [59.51]; (D-5) 1089 [42.9] WAS 1289 [59.7], 109 [4.3] WAS 107 [4.2]; (B-6) 249 [9.8] WAS 277 [10.9]; (C-7) 179 [7.0] WAS 106 [4.2] [CT182383]	MVT

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X .XX ±
X.X ±
X ±
ANGLES ±
SURFACE FINISH MAX.
THIRD ANGLE PROJECTION

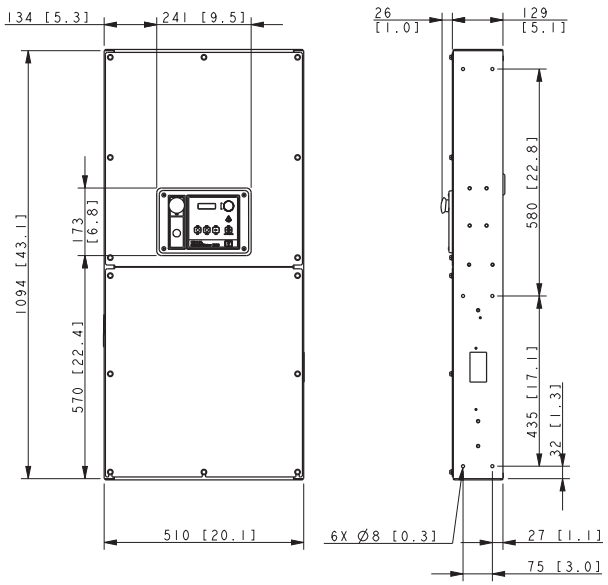
APPROVALS		DATE
DRAWN	DJV	6-7-11
CHECKED	DJV	6-7-11
APPROVED	JDZ	6-7-11

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

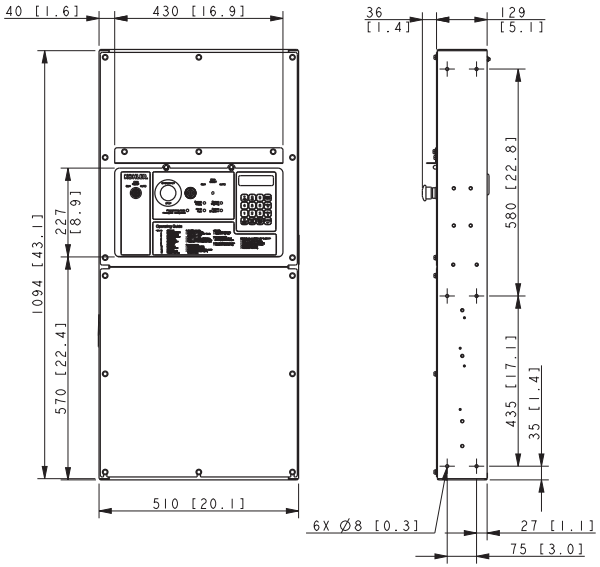
TITLE
DIMENSION PRINT, 600 VOLVO ACCESSORIES

SCALE 0.09 | CAD NO. | SHEET 1 of 1

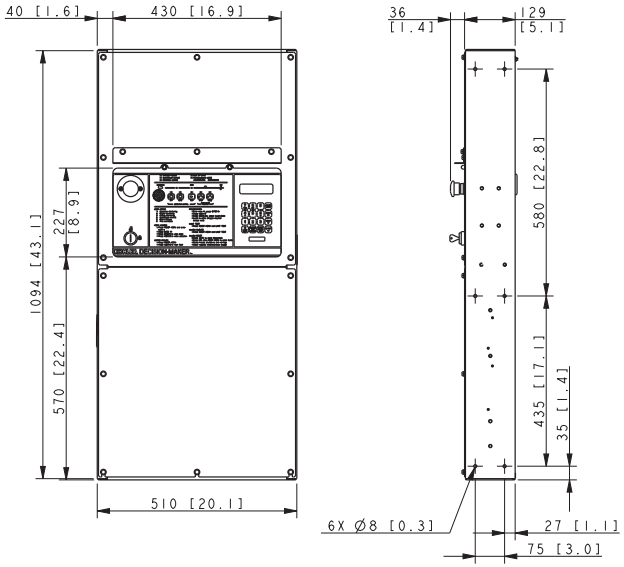
DWG NO. ADV-8231 | D



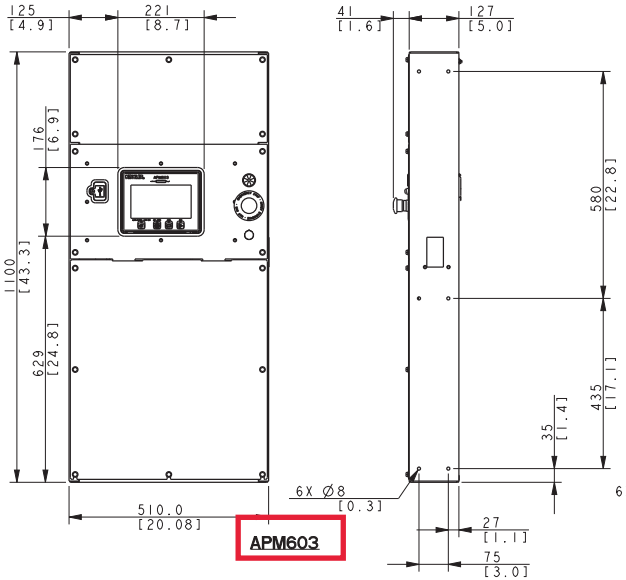
DEC 3000/APM402

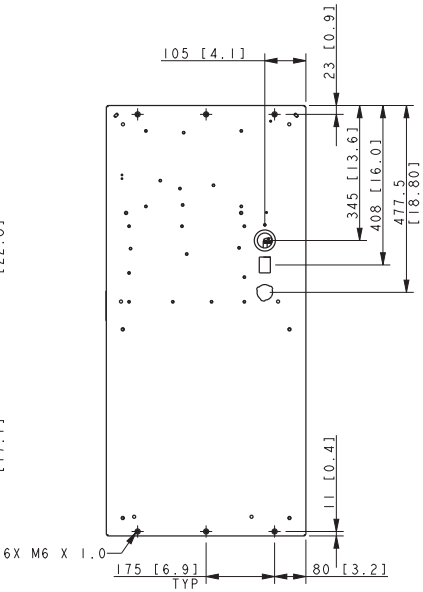


DEC 550



DEC 6000





REAR VIEW OF CONTROLLER
(DEC 3000/APM402, APM603, DEC 550 & DEC 6000)

300-2250KW CONTROLLER

DIMENSIONS IN [] ARE ENGLISH EQUIVALENTS

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	1-26-11	NEW DRAWING [90647-3]	DJV
A	2-22-12	(D-2/3) 430 [1.6] WAS 445 [17.5], 40 [1.6]	
		WAS 33 [1.3], (D-5/6) 430 [16.9] WAS 400	
		[15.7], 40 [1.6] WAS 55 [2.2] (CT07212)	KJB
B	10-30-18	(B-7) DEC 3000/APM402 WAS DEC 3000;	
		(B-8,7,6) VIEW ADDED; (B-6) DEC 3000/APM402,	
		APM603, DEC 550 & DEC 6000 WAS DEC 3000, DEC	
		550 & DEC 6000 [CT19436]	DS

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0°30'
SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

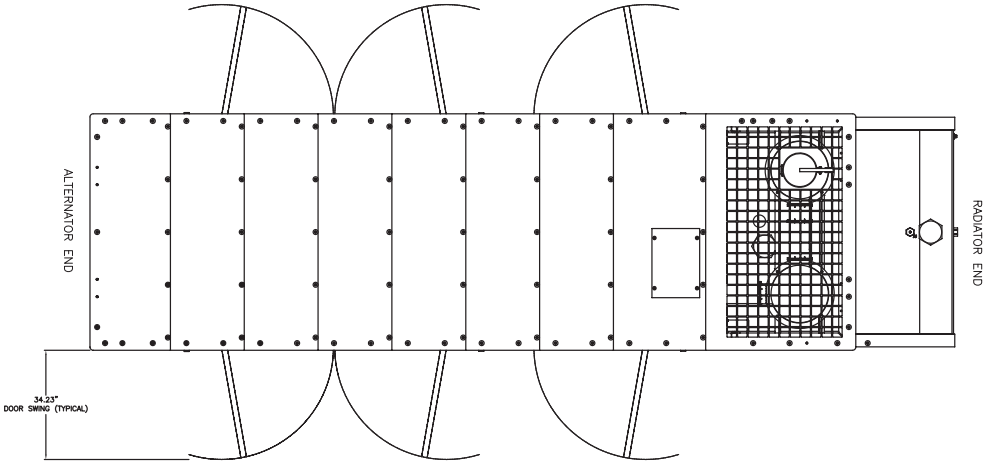
APPROVALS		DATE
DRAWN	DJV	10-31-18
CHECKED	DJV	10-31-18
APPROVED	JDZ	10-31-18

KOHLER.
KOHLER, WISCONSIN 53044

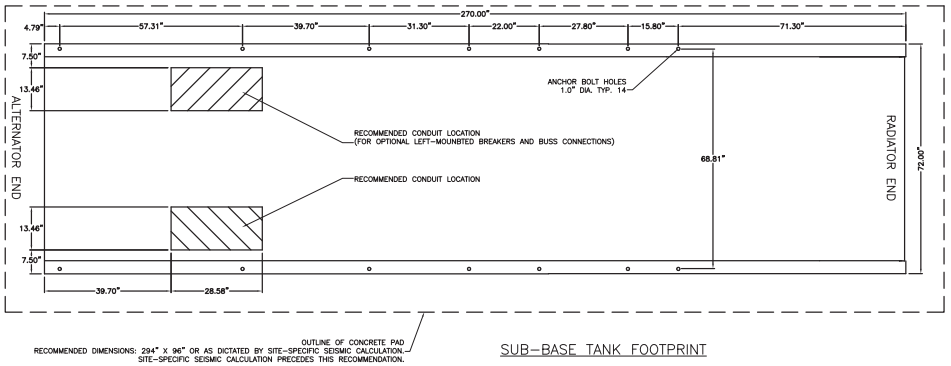
TITLE: DIMENSION PRINT, CONTROLLER

SCALE 0.16 | CAD NO. | SHEET 1 of 1

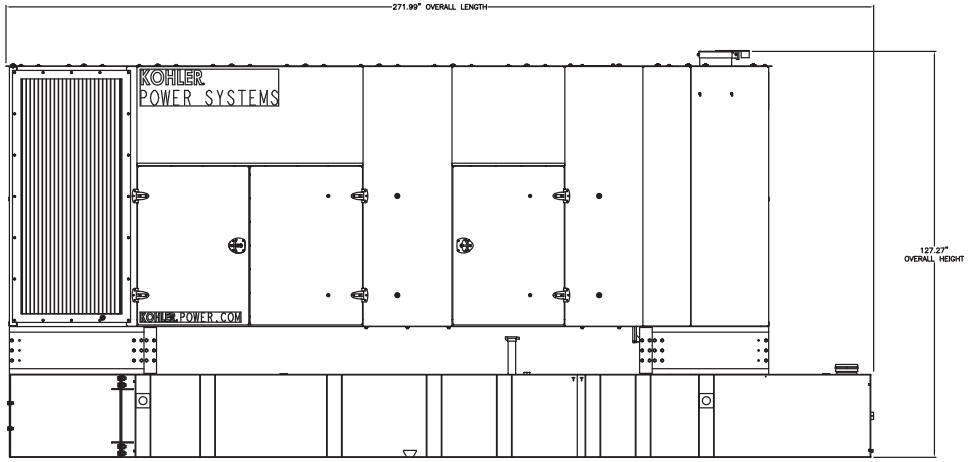
DWG NO. ADV-7985 | D



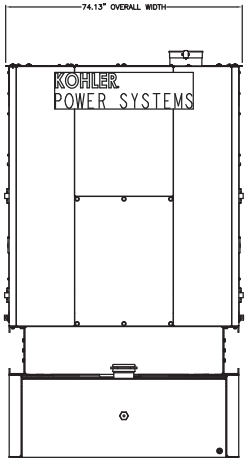
TOP VIEW



SUB-BASE TANK FOOTPRINT



SIDE VIEW



RADIATOR END VIEW

MAJOR COMPONENTS:

GENERATOR:	600REOZVB
ENCLOSURE:	SOUND L2 STEEL ENCLOSURE
TANK:	1038g SUBBASE STATE TANK

WIEGHT:	DRY	WET
GENERATOR:	10550 LBS.	10550 LBS.
ENCLOSURE:	3270 LBS.	3270 LBS.
TANK:	4173 LBS.	11958 LBS.
TOTAL:	17993 LBS.	25778 LBS.

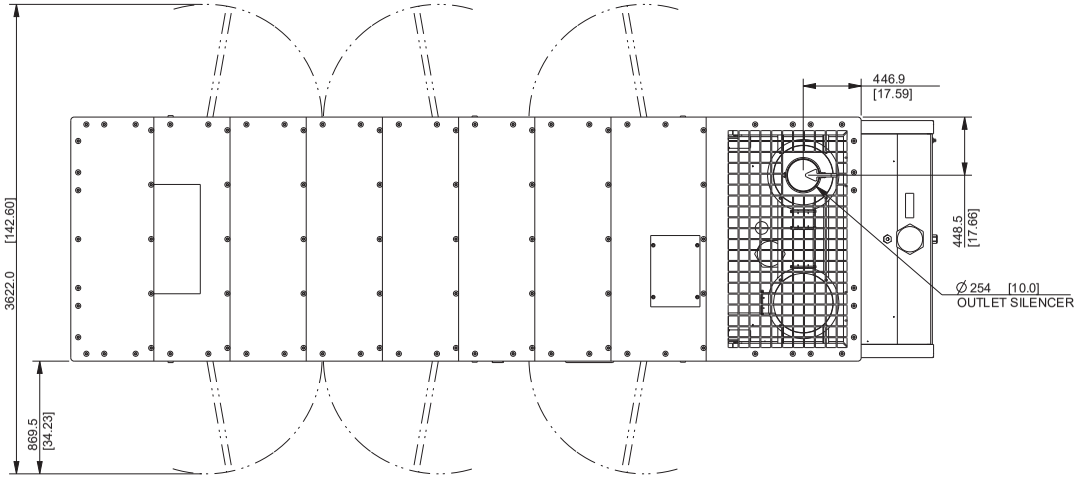
INT REF:

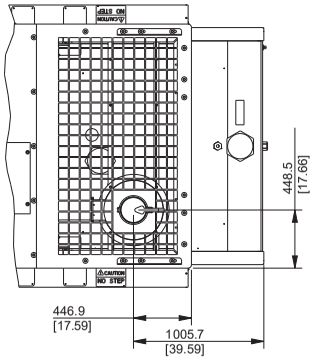
GENERATOR:	ADV-8743 REV. - SHT(1/2)
ALTERNATOR:	5M4032
ENCLOSURE:	ADV-8417 REV. C SHT(1/7)
TANK:	ADV-8417 REV. C SHT(5/7)

BAY CITY ELECTRIC WORKS
13625 Danielson St
Poway, CA 92064
P 619-938-8200
F 619-938-8217
D OFRIA
KOHLER
IN POWER. SINCE 1920.

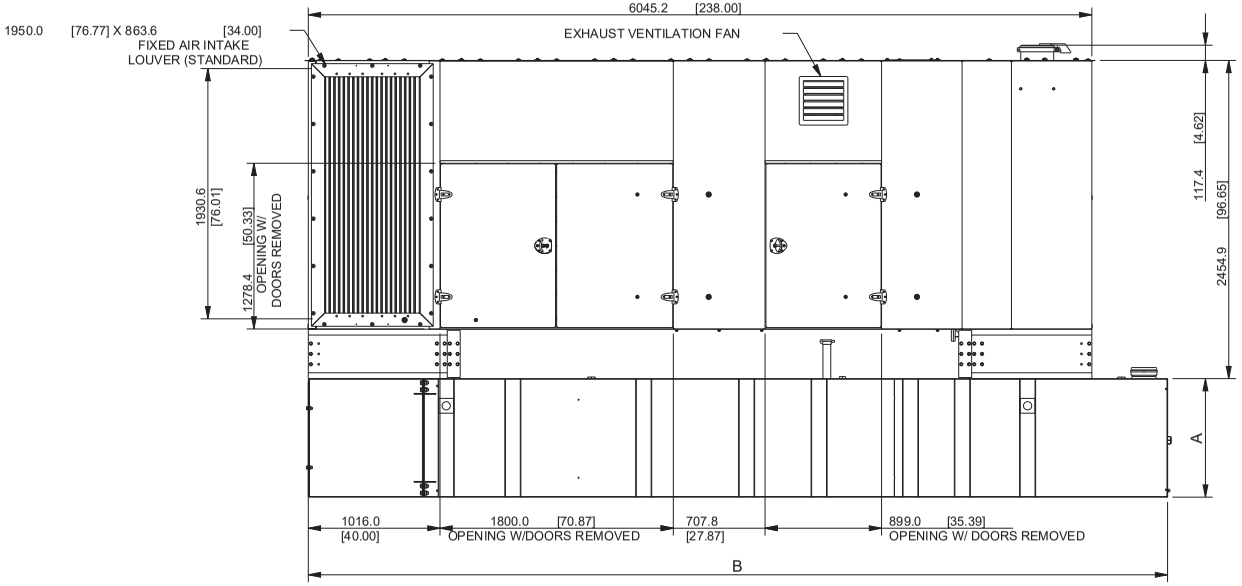
EMERGENCY GENERATOR
600REOZVB

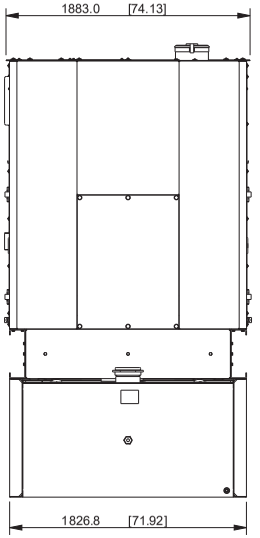
SIZE	DWG NO.	REV
B	600REOZVB-5M4032-SAEL2-1038GST	00
SCALE NONE	DATE 10/01/2019	SHEET 1 OF 1





WEATHER ENCLOSURE





TANK INFORMATION				
LITERS [GALLONS] MIN HOURS	GENSETS	DIM A MM [INCH]	DIM B MM [INCH]	TANK WEIGHT KG [LBS] (NO FUEL)
2049 [541] 12 HOURS	500-600KW	406.4 [16.0]	6045.2 [238.0]	1444 [3183]
3910 [1033] 24 HOURS		736.6 [29.0]		1793 [3952]
5730 [1513] 36 HOURS		914.4 [36.0]	6629.4 [261.0]	2201 [4853]
7645 [2019] 48 HOURS			8026.4 [316.0]	2665 [5876]
2039 [538] 12 HOURS STATE		381.0 [15.0]		1691 [3508]
3930 [1038] 24 HOURS STATE		660.4 [26.0]	6858.0 [270.0]	1893 [4173]
5757 [1520] 36 HOURS STATE		914.4 [36.0]		2177 [4800]
7658 [2023] 48 HOURS STATE			8458.2 [333.0]	2680 [5908]

500-600 REOZVB	KG [LBS]
STEEL SOUND L2 ENCLOSURE WEIGHT	1483 [3270]
ALUM SOUND L2 ENCLOSURE WEIGHT	859 [1895]
STEEL WEATHER ENCLOSURE WEIGHT	1326 [2925]
ALUM WEATHER ENCLOSURE WEIGHT	703 [1550]

NOTES:

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

500-600KW REOZVB/C
STEEL/ALUM ENCL & TANKS
SOUND & WEATHER

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	6-27-11	NEW DRAWING [91023-12]	RJS
A	3-19-12	(A-8) SEE SHEETS 5-6 [CT08748]	DJV
B	1-10-13	SHEET 7 ADDED [CT34883]	SDS
C	8/10/17	(D-4) ADD DIM Ø 254.0 SEE SHEETS 2,4,5,6	
		[CT172496]	RMJ
D	11-25-19	(C-5) SA11185 EXHAUST VENT FAN ADDED	
		[CT199135]	SRB

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X .XX ±
X .XX ±
X ANGLES ±
SURFACE FINISH: MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	RJS	6-27-11
CHECKED	RJS	6-27-11
APPROVED	AJD	6-27-11

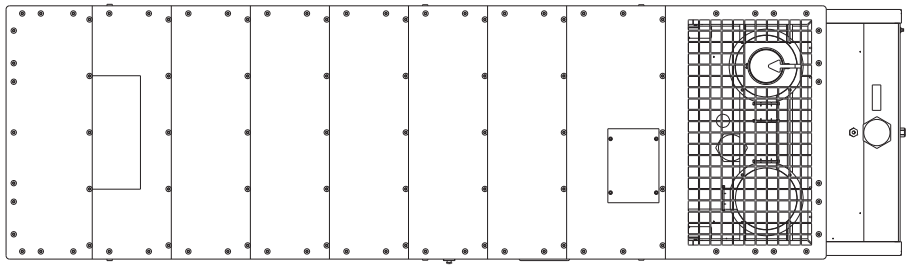
KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

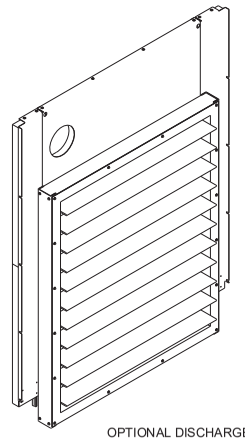
METRIC | PRO-E

TITLE: DIMENSION PRINT, 500-600KW ENCLS & TANKS

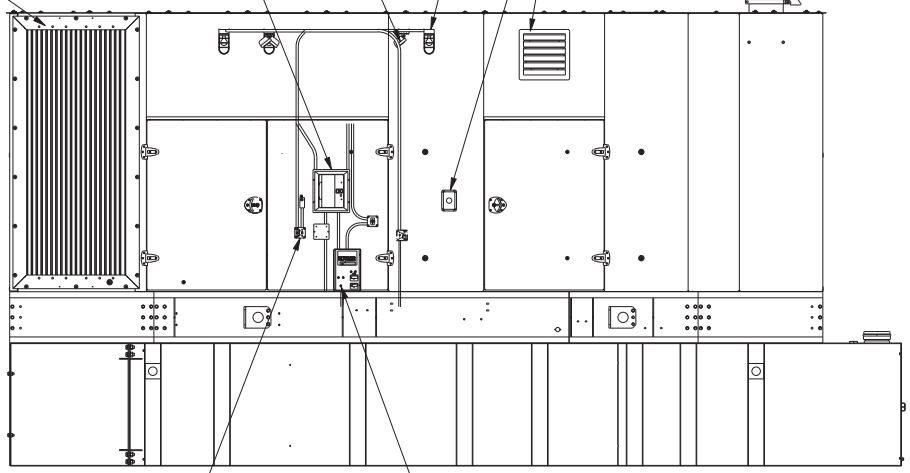
SCALE 0.05 | CAD NO | SHEET 1 of 7

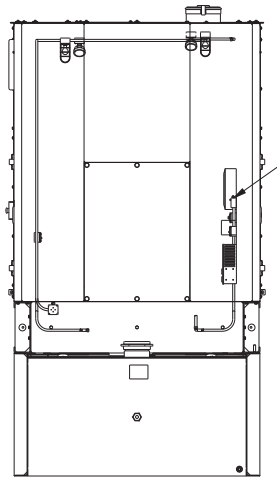
DWG NO: ADV-8417 | D





OPTIONAL DISCHARGE DAMPER
(MOUNTED INSIDE DISCHARGE PLENUM)





REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	6-27-11	NEW DRAWING [91023-12]	RJS
A	3-19-12	(A-8)SEE SHEETS 5-6 [CT08748]	DJV
B	1-10-13	SEE SHEET 1 [CT34883]	SDS
C	8-10-17	SEE SHEET 1,2,4,5,6 [CT172496]	RMJ
D	11-25-19	(B-5)EXHAUST VENT FAN & E-STOP ADDED[CT199135]	SRB

UNLESS OTHERWISE SPECIFIED -
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ±
X.X ±
X ±
ANGLES ±
SURFACE FINISH
MAX.
THIRD ANGLE PROJECTION

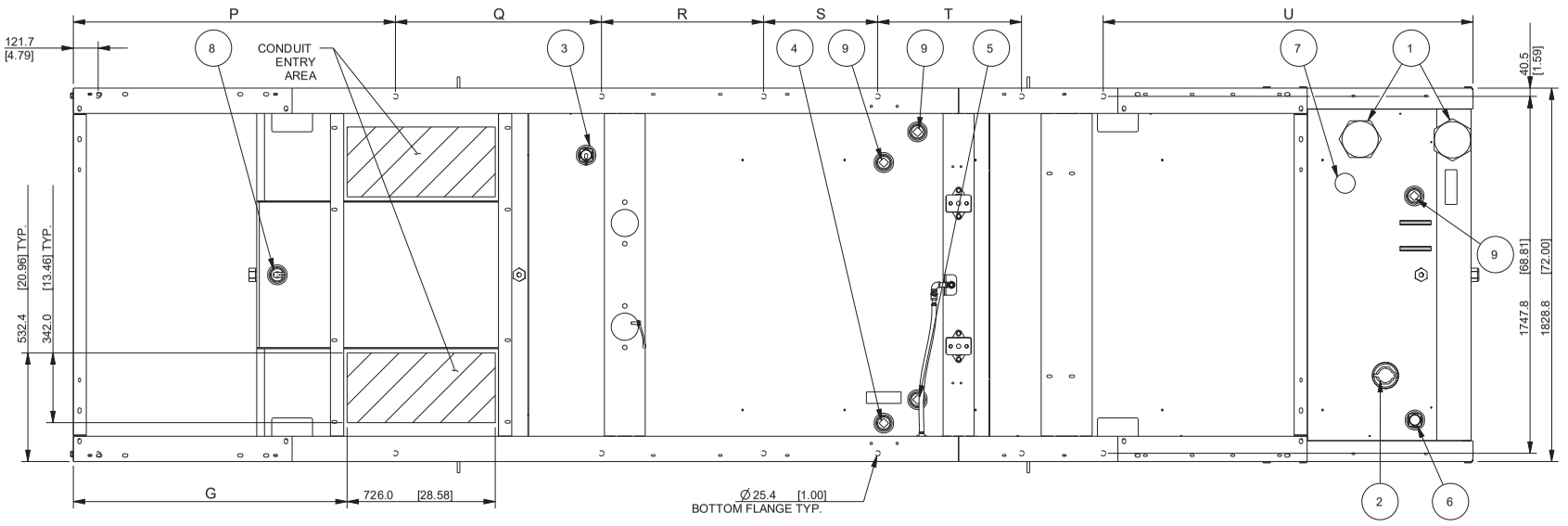
APPROVALS		DATE
DRAWN	RJS	6-27-11
CHECKED	RJS	6-27-11
APPROVED	AJD	6-27-11

KOHLER CO. | METRIC | PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

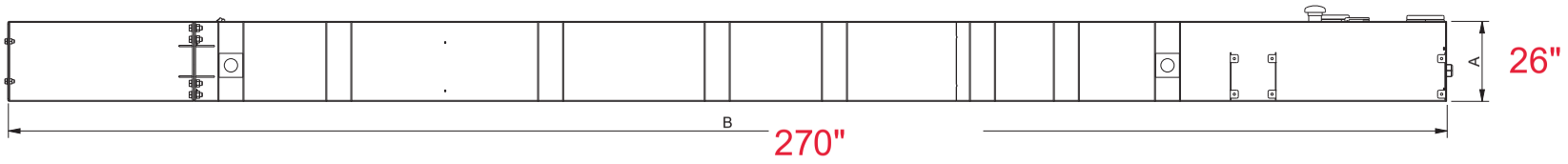
TITLE
DIMENSION PRINT, 500-600KW ENCLS & TANKS

SCALE 0.40 | CAD NO | SHEET 3 of 7
DWG NO. ADV-8417 | D

STATE TANK



12 HOUR STATE TANK SHOWN



2039 L [538 GAL.] 12 HOUR TANK SHOWN.

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

REFER TO SEISMIC ADV FOR IBC/OSHPD SEISMIC MOUNTING LOCATIONS

TANK INFORMATION										JUNCTION BOX G			
										500-550 KW		600 KW	
LITERS [GALLONS] MIN HOURS	A	B	P	Q	R	S	T	U	WEIGHT KG [LBS]	5M4024, 5M4027 5M4028, 5M4030 5M4162, 5M4270 5M4272	5M4032 5M4164	5M4030 5M4272	5M4032 5M4164 5M4276
2039 [538] 12 HOURS	381.0 [15.0]	6858.0 [270.0]	1578.2 [62.1]	1009.5 [39.7]	794.0 [31.3]	559.0 [22.0]	705.2 [27.8]	1812.1 [71.3]	1591 [3508]	1341.3 [52.8]	1176.2 [46.3]	1174.2 [46.2]	1009.1 [39.7]
3930 [1038] 24 HOURS	660.4 [26.0]								1893 [4173]				
5757 [1520] 36 HOURS	914.4 [36.0]								2177 [4800]				
7658 [2023] 48 HOURS		8458.2 [333.0]						3412.3 [134.3]	2680 [5908]				

12 - 48 HOUR 500-600KW REOZVB/C GENSET & STATE TANKS WITH SOUND OR WEATHER ENCLOSURE

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	6-29-11	NEW DRAWING [91023-12]	JB2
A	3-19-12	(A-8) SEISMIC NOTE ADDED [CT08748]	DJV
B	1-10-13	SEE SHEET 1 [CT34883]	SDS
C	8-10-17	(B-5) ADD NOTE, SEE SHEET 1,2,4,6 [CT172496]	RMJ
D	11-25-19	SEE SHEET 1 & 3 [CT199135]	SRB

UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X .XX ±
X .X ±
ANGLES ±
SURFACE FINISH: MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	RJS	6-29-11
CHECKED	RJS	6-29-11
APPROVED	AJD	6-29-11

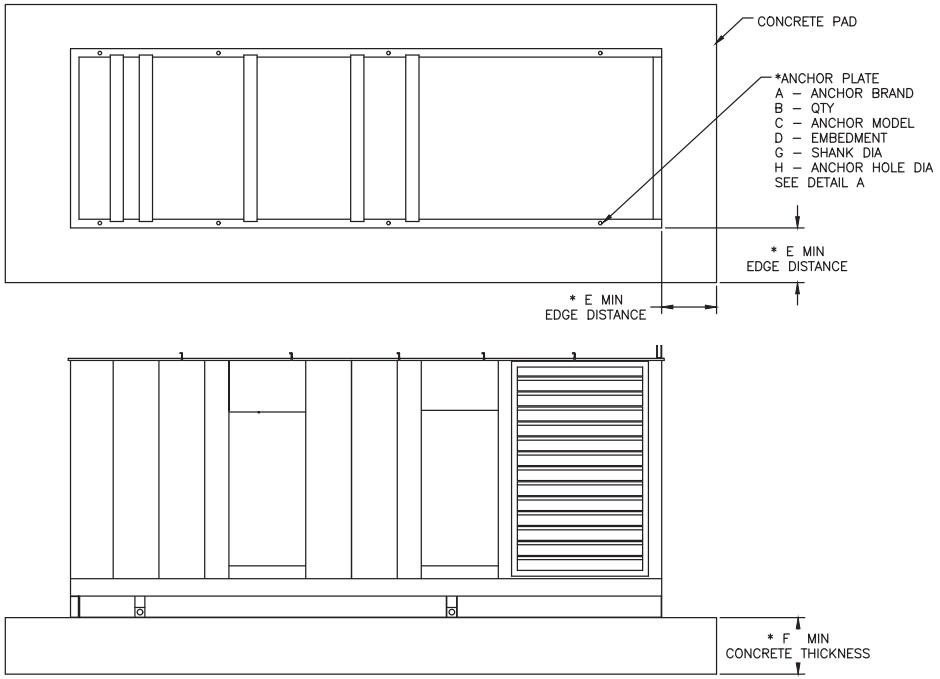
KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

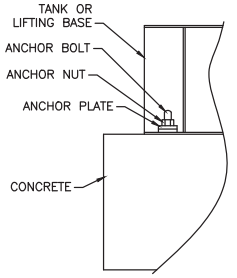
TITLE: DIMENSION PRINT, 500-600KW ENCLS & TANKS

SCALE 1.00 CAD NO SHEET 6 of 7
DWG NO. ADV-8417 D

MAXIMUM SEISMIC DESIGN RATING APPLIES AS A SYSTEM TO GENSET, TANKS, ENCLOSURES AND ACCESSORIES				MAXIMUM IBC SEIMIC DESIGN ACCELERATION FOR ACHORING SYSTEM	ANCHORING SYSTEM								
GENSET MODELS	ENCLOSURE	FUEL TANK CAPACITY LITERS	FUEL TANK CAPACITY GAL		ANCHORING PLACEMENT LOCATIONS	A ANCHOR BRAND	B QTY	C ANCHOR MODEL	D EMBEDMENT	E MIN	F MIN.	G SHAFT DIA	H ANCHOR HOLE DIA
500REOZVC 550–600REOZVB	WEATHER ENCLOSURE	–		S_{ds} = 1.93, z/H = 0.0	FOR MTG. HOLES ON LIFTING BASE UNITS SEE SHEET 7 ON ADV–8417	HILTI	14	KWIK BOLT TZ–CS POST–INSTALLED ANCHORS	95.3 [3.75]	254.0 [10.0]	152.4 [6.0]	19.05 [.75]	22.2 [.875]
	SOUND ENCLOSURE	–					14						
	SOUND & WEATHER ENCLOSURE	2037	538		FOR MTG. HOLES FOR TANK MOUNTED UNITS SEE SHEET 2		14	KWIK BOLT HDA–P POST–INSTALLED ANCHORS	250.0 [9.84]	254.0 [10.0]	355.6 [14.0]	20.0 [.787]	
		3929	1038							304.8 [12.0]			
		5754	1520				16						
		7658	2023				18			254.0 [10.0]			
		11553	3052										

REV	DATE	REVISION	BY
–	3–14–12	NEW DRAWING [CT08748]	DJV
A	6–28–12	(C–7) LITERS AND GAL CORRECTED [CT16995]	SAM
B	1–11–13	(D–5) ANCHARING LOCATION NOTES CORRECTED, DRAWING SHEETS 1–3 WAS 1–4, SEE SHEET 2 [CT34883]	KMP
C	2–19–13	SEE SHEET 2 [CT38589]	KMP





DETAIL A

NOTE:
1) SPECIAL INSPECTION PER IBC SECTION 1704 IS REQUIRED ON ALL INSTALLATIONS. ALL ANCHORS MUST BE INSTALLED TO MEET COMPLIANCE

2) NO OTHER ANCHORS ARE ALLOWED WITHIN MINIMUN SPACING DISTANCE WITHOUT ADVANCED APPROVAL OF THE STRUCTURAL PROJECT ENGINEER OF RECORD.

3) *SEE NOTES ON SHEET 4

METRIC CAD FILE

DIMENSIONS IN [ ] ARE INCH EQUIVALENT

2000/2003/2006/2009/2012
SEISMIC INSTRUCTION
500–600 VOLVO

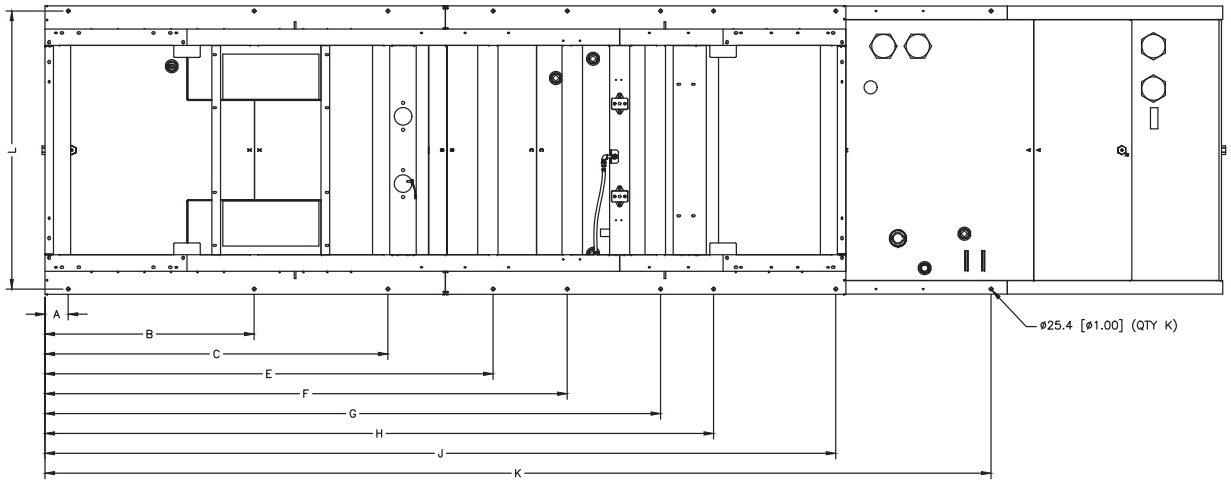
UNLESS OTHERWISE SPECIFIED –
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ± SURFACE FINISH
X.X ± MAX.
X ±
ANGLES ±
THIRD ANGLE PROJECTION

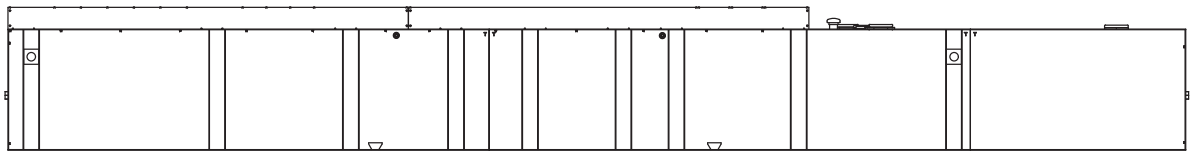
APPROVALS	DATE
DRAWN DJV	3–14–12
CHECKED DJV	3–14–12
APPROVED BMK	3–14–12

TITLE: DIMENSION PRINT SEISMIC INSTRUCTION
SCALE
CAD NO.
SHEET 1–3
DWG. NO. ADV–8488 D
PLOTTED DATE

GENSET MODELS	FUEL TANK CAPACITY		L	A	B	C	E	F	G	H	J	K	M QTY
	LITERS	GAL											
500–600 REOZVB/C	2037 3929 5754	538 1038 1520	1747.52 [68.80]	689.1 [27.13]	1698.5 [66.87]	2492.5 [98.13]	3051.3 [120.13]	3756.4 [147.89]	4157.0 [163.66]	4762.5 [187.50]	–	–	14
	7658	2023		689.1 [27.13]	1698.5 [66.87]	2492.5 [98.13]	3051.3 [120.13]	3756.4 [147.89]	4157.0 [163.66]	4762.5 [187.50]	5867.4 [231.00]	–	16
	11553	3052	2098.04 [82.60]	175.0 [6.89]	1578.1 [62.13]	2587.5 [101.87]	3381.5 [133.13]	3940.6 [155.14]	4645.7 [182.90]	5046.0 [198.66]	5969.0 [235.00]	7137.4 [281.00]	18

REV	DATE	REVISION	BY
–	3–14–12	NEW DRAWING [CT08748]	DJV
A	6–28–12	SEE SHEET 1 [CT16995]	SAM
B	1–11–13	VIEW REPLACED WITH NEW TANK, TABLE UPDATED ACCORDINGLY [CT34883]	KMP
C	2–19–13	(D–8) 3929 [1038] ADDED. [CT38589]	KMP





NOTE:
1) SPECIAL INSPECTION PER IBC SECTION 1704 IS REQUIRED ON ALL INSTALLATIONS. ALL ANCHORS MUST BE INSTALLED TO MEET COMPLIANCE

2) NO OTHER ANCHORS ARE ALLOWED WITHIN MINIMUM SPACING DISTANCE WITHOUT ADVANCED APPROVAL OF THE STRUCTURAL PROJECT ENGINEER OF RECORD.

3) *SEE NOTES ON SHEET 3

METRIC CAD FILE

DIMENSIONS IN [ ] ARE INCH EQUIVALENT

2000/2003/2006/2009/2012
SEISMIC INSTRUCTION
500–600 VOLVO

UNLESS OTHERWISE SPECIFIED
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ±
X.X ±
X ±
ANGLES ±
SURFACE FINISH
THIRD ANGLE PROJECTION

APPROVALS	DATE
DRAWN DJV	3–14–12
CHECKED DJV	3–14–12
APPROVED BMK	3–14–12
PLOTTED DATE	

TITLE: DIMENSION PRINT
SEISMIC INSTRUCTION

SCALE | DWG NO. | SHEET 2–3

DRW. NO. ADV–8488 D

REV	DATE	REVISION	BY
–	3-14-12	NEW DRAWING [CT08748]	DJV
A	6-28-12	SEE SHEET 1 [CT16995]	SAM
B	1-11-13	SEE SHEET 1 & 2 [CT34883]	KMP
C	2-19-13	SEE SHEET 2 [CT38589]	KMP

SEISMIC INSTALLATION REQUIREMENTS:

The following are requirements for seismic installation:

1. The design of post–installed anchors in concrete used for the component anchorage is pre–qualified for seismic applications in accordance with ADI 355.2 and documented in a report by a reputable testing agency. (ex. The Evaluation Service Report issued by the International code Council)
2. Anchors must be installed to an embedment depth as recommended in the pre–qualification test report as defined in Note 1.
3. Anchors must be installed in minimum 4000 psi compressive strength normal weight concrete. Concrete aggregate must comply with ASTM C33. Installation in structural lightweight concrete is not permitted unless otherwise approved by the structural engineer of record.
4. Anchors must be installed to the torque specification as recommended by the anchor manufacturer to obtain maximum loading
5. Anchors must be installed in the locations specified the Kohler ADV dimension print.
6. Anchor bolt design loads or specific anchors are specified on seismic Kohler ADV.
7. Anchor plates from Kohler must be installed at each anchor location between anchor head and equipment to tension load distribution.
8. Concrete floor slab and concrete housekeeping pads must be designed and rebar reinforced for seismic applications in accordance with ACI 318.
9. All housekeeping pad thickness must be designed in accordance with pre–qualification test report as defined in Note 1 or a minimum of 1.5x the anchor embedment depth, whichever is largest
10. All housekeeping pads must be doweled or cast into the building structural floor slab and designed for seismic application per ACI 318 and as approved by the structural engineer of record
11. Wall mounted equipment must be installed to a rebar reinforced structural concrete wall that is seismically designed and approved by the engineer of record to resist the added seismic loads from the components being anchored to the wall.
12. Floor mounted equipment (with or without housekeeping pad) must be installed to a rebar reinforced structural concrete floor that is seismically designed and approved by the engineer of record to resist the added seismic loads from components being anchored to the floor.
13. When installing to a floor or wall, rebar interference must be considered.
14. Attaching seismic certified equipment to any floor or wall other than those constructed of structural concrete and designed to accept the seismic loads form said equipment is not permitted by this specification and beyond the scope of this certification.
16. Attaching seismic certified equipment to any concrete block walls or cinder block walls is not permitted by this specification and beyond the scope of this certification.
17. For installations upon rooftop, steel dunnage shall be coordinated with the Structural Engineer of Record.
18. Installation upon only rooftop curb shall be coordinated with the curb manufacturer and the Structural Engineer of Record. Any curb or concrete pad that supports the RTU unit is beyond the scope of this certification.
19. Anchor locations, size, type and load requirements are specified on the installation drawing. Mounting requirements details such as brand, type, embedment depth, edge spacing, anchor spacing, concrete strength, wall bracing, and special inspection must be outlined and approved by the project Structural Engineer of Record to withstand the seismic anchor loads as defined on the seismic installation drawing. The installing contractor is responsible for the proper installation of all anchors and mounting hardware, observing the mounting requirement details outlined by the Engineer of Record. Contact Kohler if a detail Seismic Installation Calculation Package is required.
20. Electrical wiring, piping, duct and other connections to the equipment is the responsibility of the installing contractor. It is necessary that these remain in tact, functional and do not inhibit the functionality of the generator set after a seismic event. Adequate slack shall be allowed cable and piping to allow for motions of set during a seismic event.

*21. Concrete pad dimensions are minimum values to satisfy only the anchor bolt requirements. The pad must be designed by the project structural engineer of record.

*22 Anchor bolt and concrete recommendations are for the maximum seismic design levels shown. If the specific application has a lower level, thinner concrete or alternate anchors may be acceptable. Consult Kohler.

METRIC CAD FILE

DIMENSIONS IN [ ] ARE INCH EQUIVALENT

2000/2003/2006/2009/2012
SEISMIC INSTRUCTION
500–600 VOLVO

UNLESS OTHERWISE SPECIFIED –
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X.XX ± SURFACE FINISH
X.X ± MAX.
X ±
ANGLES ±
THIRD ANGLE PROJECTION

APPROVALS	DATE
DRAWN DJV	3-14-12
CHECKED DJV	3-14-12
APPROVED BMK	3-14-12

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

TITLE: DIMENSION PRINT
SEISMIC INSTRUCTION

SCALE | CAD NO. | SHEET 3-3

DWG. NO. ADV-8488 D

PLOTTED DATE

KOHLER®

Wiring Schematics

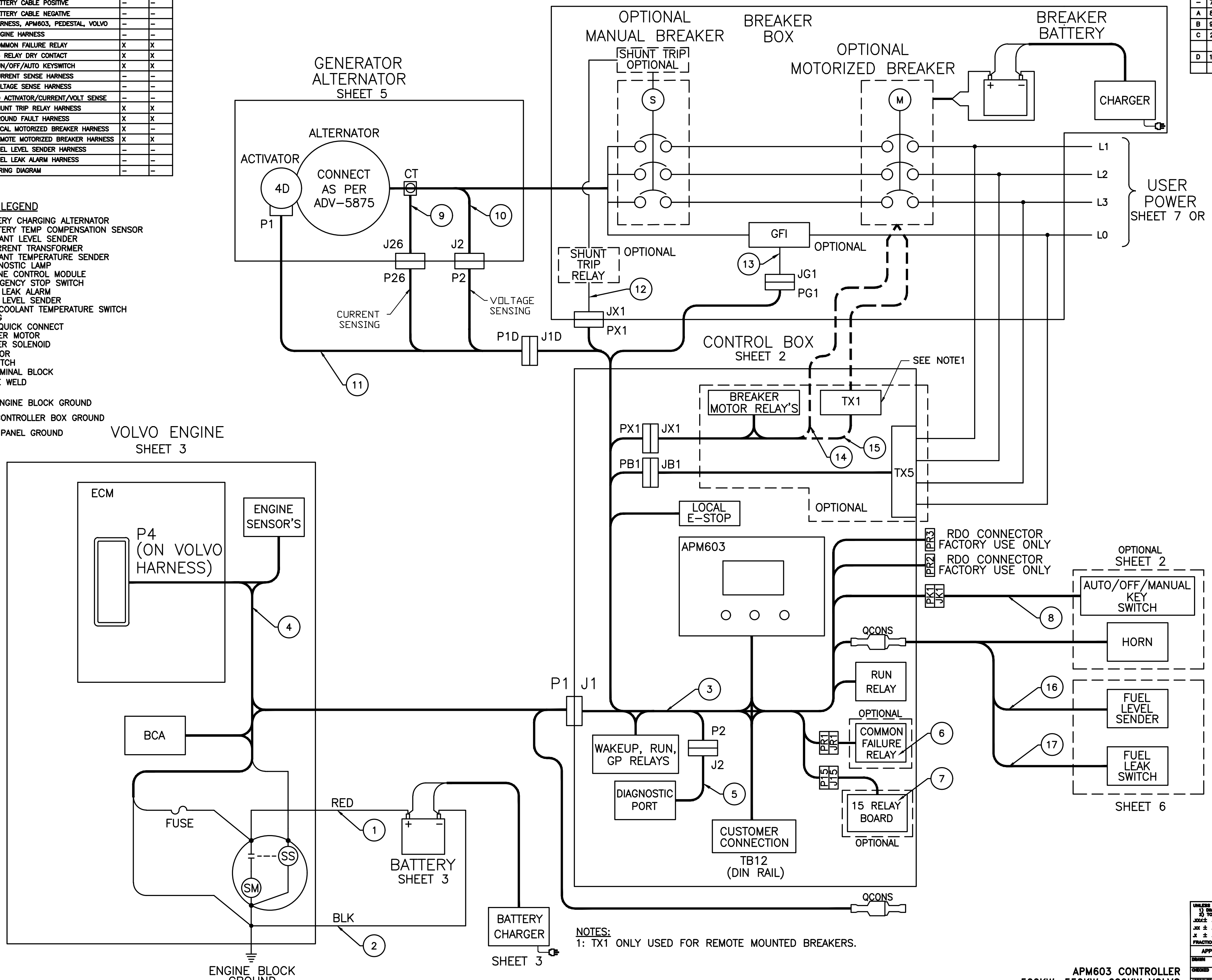
SR. NO.	PART NO.	DESCRIPTION	OPTION	FIELD
1	XXXXXX	BATTERY CABLE POSITIVE	–	–
2	XXXXXX	BATTERY CABLE NEGATIVE	–	–
3	GM114916	HARNESS, APM603, PEDESTAL, VOLVO	–	–
4	GM110260	ENGINE HARNESS	–	–
5	GM105367	COMMON FAILURE RELAY	X	X
6	GM105366	15 RELAY DRY CONTACT	X	X
7	GM105663	RUN/OFF/AUTO KEYSWITCH	X	X
8	GM11501	CURRENT SENSE HARNESS	–	–
9	GM105377	VOLTAGE SENSE HARNESS	–	–
10	GM105845	4D ACTIVATOR/CURRENT/VOLT SENSE	–	–
11	GM105378	SHUNT TRIP RELAY HARNESS	X	X
12	GM105379	GROUND FAULT HARNESS	X	X
13	GM105380	LOCAL MOTORIZED BREAKER HARNESS	X	–
14	GM105382	REMOTE MOTORIZED BREAKER HARNESS	X	X
15	XXXXXX	FUEL LEVEL SENDER HARNESS	–	–
16	XXXXXX	FUEL LEAK ALARM HARNESS	–	–
17	GM114915	WIRING DIAGRAM	–	–

REV	DATE	REVISION	BY	M F
–	7–31–20	NEW DRAWING [CT205670]	SBR	
A	8–17–20	ADDED DRAWING [CT205833]	SBR	
B	9–16–20	SEE SHEET 3 [CT206820]	TEV	
C	2–08–21	(A–5) WAKEUP WAS CRANK, (A–2) 500KW 550KW ADDED		
		[CT209821]	TEV	
D	1–11–22	(B–7) ON VOLVO HARNESS WAS ON J.D. HARNESS,		
		SEE SHEETS 2 & 3 [CT217081]	TEV	

LEGEND

BCA – BATTERY CHARGING ALTERNATOR
BTCS – BATTERY TEMP COMPENSATION SENSOR
CLS – COOLANT LEVEL SENDER
CT(#) – CURRENT TRANSFORMER
CTS – COOLANT TEMPERATURE SENDER
DIAG – DIAGNOSTIC LAMP
ECM – ENGINE CONTROL MODULE
ESS – EMERGENCY STOP SWITCH
FLA – FUEL LEAK ALARM
FLS – FUEL LEVEL SENDER
LCT – LOW COOLANT TEMPERATURE SWITCH
P(#) – PLUG
QCON(#) – QUICK CONNECT
SM – STARTER MOTOR
SS – STARTER SOLENOID
STAT – STATOR
SW(#) – SWITCH
TB(#) – TERMINAL BLOCK
W(#) – WIRE WELD

EBG – ENGINE BLOCK GROUND
GND – CONTROLLER BOX GROUND
PGND – PANEL GROUND



TB12 CONNECTION CHART			
FUNCTION	POS	SIGNAL DESCRIPTION	
REMOTE E–STOP	1	REMOTE EMERGENCY STOP	
	2		
REMOTE START	3	REMOTE START SIGNAL	
	4		
CUSTOMER INTERFACE	5	FUSED BATTERY POWER	
	6	BATT VOLTS WHEN RUNNING	
	7	BATTERY NEGATIVE	
CUSTOMER INTERFACE	8	A (–)	ISOLATED RS–485 #2 (PGEN)
	9	B (+)	
	10	SHIELD	
LOW FUEL	11	LOW FUEL LEVEL SWITCH	
RES IN RETURN	12	LOW FUEL LEVEL SWITCH RETURN	
BAT CHRG FLT	13	BATTERY CHARGER FAULT	
RES IN RETURN	14	BATTERY CHARGER FAULT RETURN	
AUX WARNING	15	AUXILIARY WARNING	
RES IN RETURN	16	AUXILIARY WARNING RETURN	
AUX FAULT	17	AUXILIARY FAULT	
RES IN RETURN	18	AUXILIARY FAULT RETURN	
CUSTOMER INTERFACE	19	A (–)	ISOLATED RS–485 #3 (MODBUS/PGEN)
	20	B (+)	
	21	SHIELD	
CUSTOMER INTERFACE	22	A (–)	NON–ISOLATED RS–485 #4 (MODBUS RSA)
	23	B (+)	
	24	SHIELD	
RUN RELAY	25	COMMON CONTACT	
	26	NORMALLY OPEN CONTACT	
	27	NORMALLY CLOSED CONTACT	
SPEED BIAS	28	SPEED BIAS (+)	
	29	SPEED BIAS (–)	
	30	SHIELD	
VOLTAGE BIAS	31	VOLTAGE BIAS (+)	
	32	VOLTAGE BIAS (–)	
	33	SHIELD	
SPARE	34	SPARE	
SPARE	35	SPARE	
DROOP SELECT	36	SPARE	
		SPARE	
ANALOG THROTTLE CONTROL	37	SPARE	
	38	SPARE	
	39	SPARE	
IDLE MODE	40	SPARE	
	41		
SPARE	42	SPARE	
SPARE	43	SPARE	
SPARE	44	SPARE	

* REMOVE RESISTORS IF PARALLELING

NOTES:
1: TX1 ONLY USED FOR REMOTE MOUNTED BREAKERS.

APM603 CONTROLLER
500KW, 550KW, 600KW VOLVO

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	SBR	7–29–20
CHECKED	DJY	7–29–20
APPROVED	JLS	7–29–20

KOHLER.
KOHLER, WI 53044

TITLE: DIAGRAM, SCHEMATIC APM603, VOLVO

SCALE N/A | SHEET 1–8
PLOTTED | DWG. NO. ADV–9221 | D

REV	DATE	REVISION	BY	W.F.
–	7-31-20	NEW DRAWING [CT205670]	SBR	
A	8-17-20	ADDED DRAWING [CT205833]	SBR	
B	9-16-20	SEE SHEET 3 [CT206820]	TEV	
C	2-08-21	(C-3) WAKEUP WAS CRANK, (A-2) 500KW 550KW ADDED [CT209821]	TEV	
D	1-11-22	(B-1) WAKEUP WAS IGNITION, SEE SHEET 1 & 3 [CT217081]	TEV	

TB12 CUSTOMER CONNECTION (SEE CHART ON SHEET 1)

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

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

JP1 **

OPTIONAL REMOTE ESTOP

REMOTE START

SHIELDED WIRE RECOMMENDED

SHLD

SELF–GROUNDING BLOCK

SELF–GROUNDING BLOCK

SELF–GROUNDING BLOCK

SELF–GROUNDING BLOCK

GROUND STRAP

PGND PGND

TO JG1 GFI CONTROL SHEET 6

PG1

+24V F3 W(B)

+24V F1 W(A)

+VBAT F3 W(B)

+VBAT (RUN) W(L)

F2 10 AMP

70S

70A

PF3E

NG

GFR

W(K)

W(J)

PF1C

N1

ES1B

ES2A

ES2

W(R)

3

4

PF3B

W(T)

7N

BLK

WHT

UNINS.–S2

2

LFL

N8

BCF

N7

AXW

N6

W(I)

AXF

N5

W(K)

UNINS.–S3

3

UNINS.–S4

4

RRCOM

RRNO

RRNC

T TO SHEET 4

UNINS.–S8

5

UNINS.–7

6

RUN/OFF/AUTO KEY SWITCH OPTIONAL

NAUT KYA NRUN KYR NKS

JK1 PK1

KYA1

KYR1

NKS1

W(T)

JUNCTION BOX

APM603 CONTROLLER

P2-16 V_BAT1
P2-17 V_BAT2
P2-9 GND

P2-1 CTNEU_P
P2-2 CTNEU_N
P2-8 CT1_N
P2-7 CT1_P
P2-6 CT2_N
P2-5 CT2_P
P2-4 CT3_N
P2-3 CT3_P

P2

P1

I1R P2-15 VOLT_INPUT_1N
I1 P2-23 VOLT_INPUT_1P
I2R P2-14 VOLT_INPUT_2N
I2 P2-22 VOLT_INPUT_2P
I3R P2-13 VOLT_INPUT_3N
I3 P2-21 VOLT_INPUT_3P
P2-12 VOLT_INPUT_4N
P2-20 VOLT_INPUT_4P
P2-11 VOLT_INPUT_5N
P2-19 VOLT_INPUT_6N
P2-18 VOLT_INPUT_6P

5 S8
6 S7

EOV P4-27 DIGITAL_IN1 EXCITATION OVER VOLTAGE
64 P4-26 DIGITAL_IN2 FUEL LEAK ALARM
4 P4-25 DIGITAL_IN3 REMOTE START
CBCR P4-24 DIGITAL_IN4 BREAKER CLOSED
CBTR P4-13 DIGITAL_IN5 BREAKER TRIPPED
GFR 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
63C P4-9 RESISTIVE_IN_1 FUEL LEVEL
35A P4-21 RESISTIVE_IN_2 COOLANT TEMP SENSOR
LFL P4-10 RESISTIVE_IN_3 LOW FUEL LEVEL SW.
BCF P4-22 RESISTIVE_IN_4 BATT CHARGER FAULT
AXW P4-11 RESISTIVE_IN_5 AUXILIARY WARNING
AXF P4-23 RESISTIVE_IN_6 AUXILIARY FAULT
N12 P4-12 RESISTIVE_IN_RETURN

W(K)

P4-5 +5V_RM1
P4-6 RM1_IN
P4-17 GND_RM1
P4-7 +5V_RM2
P4-8 RM2_IN
P4-19 GND_RM2

P4

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

P5 (ETHERNET)

P3

GEN_L1 P3-1 A
GEN_L2 P3-2 B
GEN_L3 P3-5 C
GEN_L0 P3-6 NEU

BUS_L1 P3-7 BL1
BUS_L2 P3-8 BL2
BUS_L3 P3-4 BL3
BUS_L0 P3-3 BL0

PB1

A FROM JB1 BUS VOLTAGE SENSE SHEET 7 OR 8

I/O BOARD CAN_L P1-1 GRN
I/O BOARD CAN_H P1-2 YEL
I/O BOARD CAN_GND P1-13 UNINS.–S5

P15

YEL 1
GRN 2
UNINS.–S5 3
+24V F3, W(B) 4
PF3D 5
N15R 6

D TO J15 RELAY OPTIONS SHEET 4

W(J)

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
PGEN–RS485_GND_2 P1-15 UNINS.–S2
2

MODBUS–RS485_A–3 P1-5 BLK
MODBUS–RS485_B+3 P1-6 WHT
MODBUS–485_GND_3 P1-17 UNINS.–S3
3

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)
ESTOP LOCAL
PF1E 1 2 ES1A W(S)

ESTOP_SW_LOCAL P P1-29 ES1 ES1 ES1B
ESTOP_SW_REMOTE P P1-31 ES2 ES2
ESTOP_SW_LOCAL N P1-28 N28
ESTOP_SW_REMOTE N P1-30 N30

W(I)

RUN/FUEL–RDO1 P1-10 70N
CRANK–RDO2 P1-21 71N
HORN–RDO3 P1-9 HRN
FAILURE–RDO4 P1-20 32A
RDO5 P1-8 RD5
RDO6 P1-19 RD6
CLOSE CB–RDO7 P1-7 CBC
TRIP CB–RDO8 P1-18 CBT
RDO RETURN P1-33 NRD

MAG– P1-24
MAG+ P1-25

LCL IN P1-16
LCL RETURN P1-14 N14

W(I)

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

P24 (RUN)

70N ES3A

+24V F1 W(A)
+24V (RUN) W(L)

P24

PF1R 5 70H 1 4

P23 (WAKEUP)

71N ES3B ES3

W(P)

+24V F1 W(A)

P23

P6 5 70B 1 4

+24V F1 W(A)

HORN

P9 + – HRN

+24V F1 W(A)
F1 15 AMP
P5 PF1A
F3 10 AMP
P4 PF3
W(E)
P

+24V F3 W(B)

32A J
RD5 N
RD6 P
NRD R
RELAY DRIVERS SEE SHEET 4

J1

64 1
63C 2
P 3 +24V
4
5
6
N18 7
N17 8
9
10
11
12
13
14
15
16
17
18
35A 19 CTS
20
21
22
70B 23 WAKEUP
24
25
26
27
28
29
30
14N1 31 GND
UNINS.–S6 32
GRN 33 CAN
YEL 34

W(J)

WJ3 WJ2 WJ1
W(K) W(T) W(I) W(J)

N20 W TO SHEET 4

W(T)

E FROM ALTERNATOR SHEET 5

N4D

W(T)

+VBAT F3 W(B)

PX1

PF3X 1
NX 2
CBC 3
CBT 4
CBCR 5
CBTR 6
K

TO JX1 BREAKER CONTROL SHEET 6, 7 OR 8

W(K)

NO CONNECTION TO PX1

CONNECT TO P1, SHEET 3

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

APPROVALS	DATE
DRAWN SBR	7-29-20
CHECKED DJY	7-29-20
APPROVED JLS	7-29-20

KOHLER. KOHLER, WI 53044

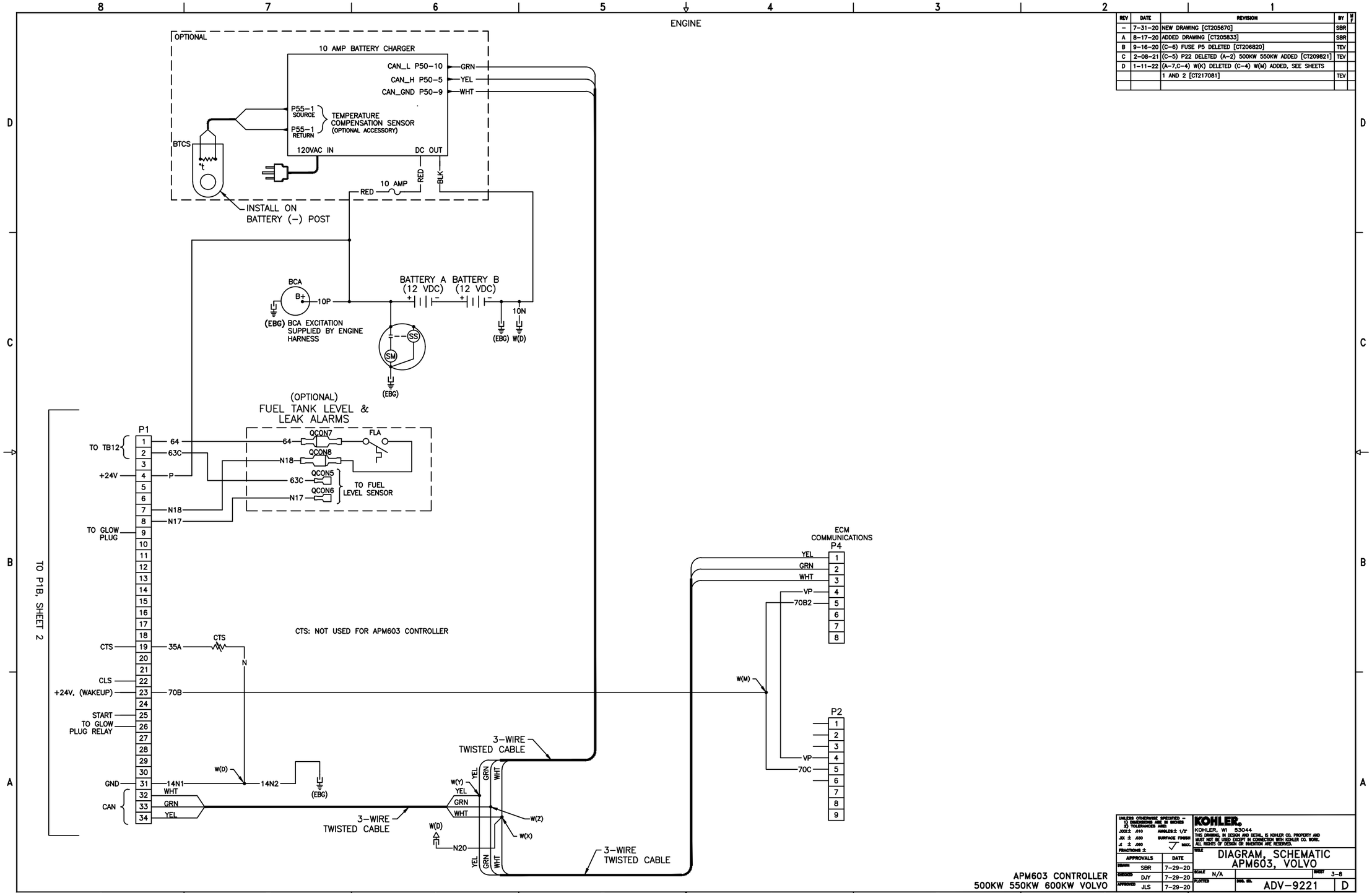
TITLE: DIAGRAM, SCHEMATIC APM603, VOLVO

SCALE N/A SHEET 2–8

PLOTTED DWG. NO. ADV–9221 D

APM603 CONTROLLER
500KW 550KW 600KW VOLVO

REV	DATE	REVISION	BY	N/F
–	7-31-20	NEW DRAWING [CT205670]	SBR	
A	8-17-20	ADDED DRAWING [CT205833]	SBR	
B	9-16-20	(C-6) FUSE P5 DELETED [CT206820]	TEV	
C	2-08-21	(C-5) P22 DELETED (A-2) 500KW 550KW ADDED [CT209821]	TEV	
D	1-11-22	(A-7,C-4) W(K) DELETED (C-4) W(M) ADDED, SEE SHEETS		
		1 AND 2 [CT217081]	TEV	



UNLESS OTHERWISE SPECIFIED: 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE:		
.XXX ± .010	ANGLES ± 1/2°	
.XX ± .020	SURFACE FINISH	
.X ± .060	MAX.	
FRACTIONS ±		

APPROVALS	DATE
DRAWN SBR	7-29-20
CHECKED DJY	7-29-20
APPROVED JLS	7-29-20

KOHLER.
KOHLER, WI 53044

TITLE: DIAGRAM, SCHEMATIC APM603, VOLVO

SCALE N/A | SHEET 3-8

PLOTTED | DWG. NO. ADV-9221 | D

APM603 CONTROLLER
500KW 550KW 600KW VOLVO

REV	DATE	REVISION	BY	WIF
–	7-31-20	NEW DRAWING [CT205670]	SBR	
A	8-17-20	ADDED DRAWING [CT205833]	SBR	
B	9-16-20	SEE SHEET 3 [CT206820]	TEV	
C	2-08-21	(A-2) 500KW 550KW ADDED [CT209821]	TEV	
D	1-11-22	SEE SHEETS 1,2 & 3 [CT217081]	TEV	

JUNCTION BOX

FROM P15 SHEET 2 (D)

J15
1 YEL
2 GRN
3 UNINS. (S5)
4
5 P15R
6 N15R

(OPTIONAL)
15 RELAY DRY CONTACT KIT
W/ NO & NC CONTACTS

P15R, UNINS. (S5), YEL, GRN, N15R

RELAYS K1–K14
12VDC, 10A, SPDT
RELAY K15
5VDC, 2A, DPDT

TB5: 42A 42A 42A C NO (+) (–) CAN 2 2 2

K15

DIGIN RETURNS
P35
TB6
D11 D12 D13 D14 (DIGITAL INPUT)
GND VNE VP2 +5V GND VNE VP1 +5V
P36 (ANALOG INPUT)

K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 K13 K14

TB7 (K1, K2) TB8 (K3, K4) TB9 (K5, K6) TB10 (K7, K8) TB11 (K9, K10) TB12 (K11, K12) TB13 (K13, K14)
VNE SINK
NO C NC

CUSTOMER CONNECTIONS

FROM SHEET 2
J 32A
N RD5
P RD6
R NRD

+24V F3 W(B)
PF3C
32A
1
W(K)

PR1 JR1
32A 1 1 32A
NR1 2 2 NR1
PF3C 3 3 PF3C
4 4

1 RELAY BOARD
C–294301
TB1: K1, 2, 42A
TB2: C, NC, NO

CUSTOMER CONNECTION

COMMON FAULT RELAY
(OPTIONAL)

+24V F3 W(B)
PF3F
RD5
NRD2
2
NRD
W(AE)
NRD3

PR2
RD5 1
NRD2 2
PF3F 3
4

RDO PLUG
(FACTORY USE ONLY)

+24V F3 W(B)
PF3G
RD6
NRD3
3

PR3
RD6 1
NRD3 2
PF3G 3
4

RDO PLUG
(FACTORY USE ONLY)

AUXILIARY RUN RELAY
291309=24VDC
248363=12VDC

RELAY
1 2 3
4 5 6
7 8 9
A B

+24V (RUN) W(L)

FROM TB12 SHEET 2 (T)
RRNC 1
RRNO 4
RRCOM 7

FROM SHEET 2 (W)
70K A
N20 B

2 5 8
3 6 9

APM603 CONTROLLER
500KW 550KW 600KW VOLVO

UNLESS OTHERWISE SPECIFIED –
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES ARE:
.XX ± .010
.XXX ± .005
.X ± .080
FRACTIONS ±
ANGLES ± 1/2°
SURFACE FINISH 125 MAX.

APPROVALS		DATE
DRAWN	SBR	7-29-20
CHECKED	DJY	7-29-20
APPROVED	JLS	7-29-20

TITLE: DIAGRAM, SCHEMATIC
APM603, VOLVO

SCALE N/A SHEET 4–8
PLOTTED DWG. NO. ADV-9221 D

REV	DATE	REVISION	BY	W F
–	7-31-20	NEW DRAWING [CT205670]	SBR	
A	8-17-20	ADDED DRAWING [CT205833]	SBR	
B	9-16-20	SEE SHEET 3 [CT206820]	TEV	
C	2-08-21	(A-2) 500KW 550KW ADDED [CT209821]	TEV	
D	1-11-22	SEE SHEETS 1,2 & 3 [CT217081]	TEV	

ALTERNATOR

J1D P1D

A 1 1 A
B 2 2 B
C 3 3 C
NEU 4 4 NEU
5 5
6 6
7 7
8 8
I1 9 9 I1
I1R 10 10 I1R
I2 11 11 I2
I2R 12 12 I2R
I3 13 13 I3
I3R 14 14 I3R
15 15
16 16
17 17
18 18
19 19
EOV 20 20 EOV
3B 21 21 3B
5B 22 22 5B
N4D 23 23 N4D
24 24

(E) TO CONTROLLER SHEET 2

P2D J2D

A 1 1 A
B 2 2 B
C 3 3 C
NEU 4 4 NEU

4D ACTIVATOR BOARD (P1)

BAT+ P1–8
BAT GND P1–7
GND P1–9
BUS, VOLTAGE VALID+ P1–10
BUS, VOLTAGE VALID– P1–11
3B → LED+ P1–6
5B → LED1 P1–1
EOV → OVER EXCITATION V+ P1–12
N4D → OVER EXCITATION V– P1–13
PMG2 → AC1 P1–4
PMG1 → AC3 P1–3
AC2 P1–2
F2 → FN P1–5
F1 → FP P1–14

∘10 ∘6 1∘
∘11 ∘7 2∘
∘12 ∘8 3∘
∘13 ∘9 4∘
∘14 5∘

F1 QCONF1
F2 QCONF2
F2 F1
EXCITER STATOR
EXCITER ROTOR
RECTIFIER MODULE
AC AC AC F– F+
PMG STATOR
PMG ROTOR
PMG1 QCONPMG PMG
PMG2 QCONPMG PMG
CAPACITOR

7 10 8 11 9 12
MAIN FIELD
STAT (12 LEAD)
1 4 2 5 3 6

NOTE: FOR GENERATOR CONNECTIONS SEE SEE ADV–5875 THREE PHASE.

70 70 7N TB10
CT BURDEN RESISTOR BOARD

I1 P26–1 I1
I1R P26–2 I1R
I2 P26–3 I2
I2R P26–4 I2R
I3 P26–5 I3
I3R P26–6 I3R

TB11
70 7N I1 I1R I2 I2R I3 I3R

I1 I1R I2 I2R I3 I3R
BLK WHT BLK WHT BLK WHT
•CT1 •CT2 •CT3

NEU C B A

L0 –
L1 –
L2 –
L3 –
(H) TO BREAKERS SHEET 6

NOTE:
CURRENT TRANSFORMER DOT OR "H1" TOWARD GENERATOR.

ALTERNATOR SIDE
APM603 CONTROLLER
500KW 550KW 600KW VOLVO

UNLESS OTHERWISE SPECIFIED –
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES ARE:
.XXX ± .010 ANGLES ± 1/2°
.XX ± .020 SURFACE FINISH
.X ± .080 MAX.
FRACTIONS ±

APPROVALS	DATE
DRAWN SBR	7-29-20
CHECKED DJY	7-29-20
APPROVED JLS	7-29-20

KOHLER.
KOHLER, WI 53044

TITLE: DIAGRAM, SCHEMATIC APM603, VOLVO

SCALE N/A SHEET 5–8

PLOTTED SHEET NO. ADV–9221 D

REV	DATE	REVISION	BY
–	7-29-20	NEW DRAWING [CT205670]	SBR
A	8-17-20	ADDED DRAWING [CT205833]	SBR
B	9-16-20	SEE SHEET 3 [CT206820]	TEV
C	2-08-21	(C–4) WAKEUP WAS CRANK (A–2) 500KW 550KW ADDED	
		[CT209821]	TEV
D	7-26-21	SEE SHEET 4 [CT213571]	TEV
E	1-11-22	(C–4) WAKEUP WAS CRANK, SEE SHEET 3 [CT217081]	TEV

J1D CONNECTIONS

PIN					
#1	A	(P3–1)	13	I3	(P2–21)
2	B	(P3–2)	14	I3R	(P2–13)
3	C	(P3–5)	15	N/C	.
4	NEU	(P3–6)	16	N/C	.
5	N/C	.	17	N/C	.
6	N/C	.	18	N/C	.
7	N/C	.	19	N/C	.
8	N/C	.	20	EOV	(P4–27)
9	I1	(P2–23)	21	3B	(P4–35)
10	I1R	(P2–15)	22	5B	(P4–34)
11	I2	(P2–22)	23	N4D	(W(T))
12	I2R	(P2–14)	24	N/C	.

P4 CONNECTIONS

PIN					
#1	GFR	(PG1–3)	18	N/C	.
2	KYA1	(PK1–1)	19	N/C	.
3	KYR1	(PK1–2)	20	N/C	.
4	N4	(W(K))	21	35A	(J1–19)
5	N/C	.	22	BCF	(TB12–13)
6	N/C	.	23	AXF	(TB12–17)
7	N/C	.	24	CBCR	(PX1–5)
8	N/C	.	25	4	(TB12–4)
9	63C	(J1–2)	26	64	(J1–1)
10	LFL	(TB12–11)	27	EOV	(J1D–20)
11	AXW	(TB12–15)	28	N/C	.
12	N12	(W(K))	29	N/C	.
13	CBTR	(PX1–6)	30	N/C	.
14	N/C	.	31	ES2A	(W(R))
15	N/C	.	32	ES3	(W(P))
16	N/C	.	33	N/C	.
17	N/C	.	34	5B	(J1D–22)
			35	3B	(J1D–21)

P3 CONNECTIONS

PIN		
#1	A	(J1D–1)
2	B	(J1D–2)
3	BL0	(PB1–4)
4	BL3	(PB1–3)
5	C	(J1D–3)
6	NEU	(J1D–4)
7	BL1	(PB1–1)
8	BL2	(PB1–2)

P2 CONNECTIONS

PIN					
#1	N/C	.	13	I3R	(J1D–14)
2	N/C	.	14	I2R	(J1D–12)
3	N/C	.	15	I1R	(J1D–10)
4	N/C	.	16	PF1C	(W(A))
5	N/C	.	17	N/C	.
6	N/C	.	18	BLK	(TB12–31)
7	N/C	.	19	BLK	(TB12–28)
8	N/C	.	20	N/C	.
9	N1	(W(J))	21	I3	(J1D–13)
10	WHT	(TB12–32)	22	I2	(J1D–11)
11	WHT	(TB12–29)	23	I1	(J1D–9)
12	N/C	.			

P1 CONNECTIONS

PIN					
#1	GRN	(P15–2)	18	CBT	(PX1–4)
2	YEL	(P15–1)	19	RD6	(PR3–1)
3	BLK	(TB12–8)	20	32A	(PR1–1)
4	WHT	(TB12–9)	21	71N	(P23–2)
5	BLK	(TB12–19)	22	N/C	.
6	WHT	(TB12–20)	23	N/C	.
7	CBC	(PX1–3)	24	N/C	.
8	RD5	(PR2–1)	25	N/C	.
9	HRN	(HORN –)	26	YEL	(J1–34)
10	70N	(P24–2)	27	GRN	(J1–33)
11	N/C	.	28	N2B	(W(I))
12	N/C	.	29	ES1	(W(S))
13	S5	(P15–3)	30	N30	(W(J))
14	N14	(W(I))	31	ES2	(W(R))
15	S2	(TB12–10)	32	N/C	.
16	N/C	.	33	NRD	(W(AE))
17	S3	(TB12–21)	34	BLK	(TB12–22)
			35	WHT	(TB12–23)

APM603 CONTROLLER

PK1 CONNECTIONS

PIN		
#1	KYA1	(P4–2)
2	KYR1	(P4–3)
3	NKS1	(W(T))

LEGEND

- BCA – BATTERY CHARGING ALTERNATOR
- BTCS – BATTERY TEMP COMPENSATION SENSOR
- CAS – CAM SENSOR
- CLS – COOLANT LEVEL SENDER
- CRS – CRANK SENSOR
- CT(#) – CURRENT TRANSFORMER
- CTS – COOLANT TEMPERATURE SENDER
- D(#) – DIODE
- DIAG – DIAGNOSTIC LAMP
- ECM – ENGINE CONTROL MODULE
- ESS – EMERGENCY STOP SWITCH
- FIC – FUEL INJECTOR CONTROLLER
- FLA – FUEL LEAK ALARM
- FLS – FUEL LEVEL SENDER
- FTS – FUEL TEMP SENDER
- LCT – LOW COOLANT TEMPERATURE SWITCH
- MAT – MANIFOLD AIR TEMP SENSOR
- OPS – OIL PRESSURE SENDER
- P(#) – PLUG
- PCV – POSITIVE CRANKCASE VENTILATION VALVE
- QCON(#) – QUICK CONNECT
- RPS – RAIL PRESSURE SENSOR
- SLB – STATIONARY LED BOARD
- SM – STARTER MOTOR
- SS – STARTER SOLENOID
- STAT – STATOR
- SW(#) – SWITCH
- TB(#) – TERMINAL BLOCK
- W(#) – WIRE WELD
- WFS – WATER IN FUEL SENSOR
- EBG – ENGINE BLOCK GROUND
- GND – CONTROLLER BOX GROUND
- PGND – PANEL GROUND

PEDESTAL UPPER SECTION

AUXILIARY RUN RELAY
291309=24VDC
241600=12VDC

CONNECTIONS

PIN		
#A	70K	(W(L))
B	N20	(W(T))
1	RRNC	(TB12–27)
2	N/C	.
3	N/C	.
4	RRNO	(TB12–26)
5	N/C	.
6	N/C	.
7	RRCOM	(TB12–25)
8	N/C	.
9	N/C	.

P23 CONNECTIONS

PIN		
#1	P6	(W(A))
2	71N	(P1–21)
3	ES3B	(W(P))
4	N/C	.
5	70B	(J1–23)

P24 CONNECTIONS

PIN		
#1	PF1R	(W(A))
2	70N	(P1–10)
3	ES3A	(W(P))
4	N/C	.
5	70H	(W(L))

J1 CONNECTIONS

PIN					
#1	64	(P4–26)	18	N/C	.
2	63C	(P4–9)	19	35A	(P4–21)
3	N/C	.	20	N/C	.
4	P	(W(E))	21	N/C	.
5	N/C	.	22	N/C	.
6	N/C	.	23	70B	(P23–5)
7	N18	.	24	N/C	.
8	N17	.	25	N/C	.
9	N/C	.	26	N/C	.
10	N/C	.	27	N/C	.
11	N/C	.	28	N/C	.
12	N/C	.	29	N/C	.
13	N/C	.	30	N/C	.
14	N/C	.	31	14N1	(W(J))
15	N/C	.	32	S6	(P1)
16	N/C	.	33	GRN	(J1–33)
17	N/C	.	34	YEL	(J1–34)

PG1 CONNECTIONS

PIN		
#1	PF3E	(W(B))
2	NG	(W(K))
3	GFR	(P4–1)
4	N/C	

PR3 CONNECTIONS

PIN		
#1	RD6	(P1–19)
2	NRD3	(W(AE))
3	PF3G	(W(B))
4	N/C	.

PR2 CONNECTIONS

PIN		
#1	RD5	(P1–8)
2	NRD2	(W(AE))
3	PF3F	(W(B))
4	N/C	

PR1 CONNECTIONS

PIN		
#1	32A	(P1–20)
2	NR1	(W(K))
3	PF3C	(W(B))
4	N/C	.

PX1 CONNECTIONS

PIN		
#1	PF3X	(W(B))
2	NX	(W(K))
3	CBC	(P1–7)
4	CBT	(P1–18)
5	CBCR	(P4–24)
6	CBTR	(P4–13)

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	.

P15 CONNECTIONS

PIN		
#1	YEL	(P1–2)
2	GRN	(P1–1)
3	S5	(P1–13)
4	N/C	.
5	PF3D	(W(B))
6	N15R	(W(J))

ETHERNET MODULE

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

OPTIONAL REMOTE ESTOP

REMOTE START

SHIELDED WIRE RECOMMENDED

SHLD

SELF–GROUNDING BLOCKS

GROUND STRAP

PGND

TO JG1 GFR CONTROL SHEET 4

RDO PLUG (FACTORY USE ONLY)

RDO PLUG (FACTORY USE ONLY)

TO JR1 (FAULT RELAY) SHEET 4

TO JX1 (BREAKER CONTROL) SHEET 4, 5 OR 6

FROM JB1 (BUS VOLTAGE SENSE) SHEET 5 OR 6

TO J15 15 RELAY (OPTIONAL) SHEET 4

(WAKEUP)

(RUN)

(BREAKER OPEN) SHEET 5 OR 6

(BREAKER CLOSE) SHEET 5 OR 6

ESTOP (LOCAL)

HORN

PEDESTAL LOWER SECTION

FOR SCHEMATIC SEE ADV–9221

APM603 CONTROLLER
500KW 550KW 600KW VOLVO

KOHLER, WI 53044

APPROVALS	DATE
DRAWN SBR	7-29-20
CHECKED DJY	7-29-20
APPROVED JLS	7-29-20

TITLE: DIAGRAM, WIRING
APM603, VOLVO

SCALE N/A | SHEET 1–6

PLOTTED | DWG. NO. GM114915 | D

REV	DATE	REVISION	BY	CHK
–	7-29-20	NEW DRAWING [CT205670]	SBR	
A	8-17-20	ADDED DRAWING [CT205833]	SBR	
B	9-16-20	SEE SHEET 3 [CT206820]	TEV	
C	2-08-21	(A-2) 500KW 550KW ADDED [CT209821]	TEV	
D	7-26-21	SEE SHEET 4 [CT213571]	TEV	
E	1-11-22	SEE SHEET 1 & 3 [CT217081]	TEV	

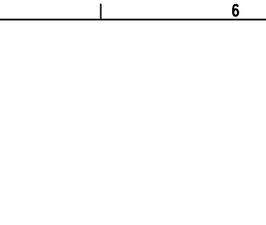
JUNCTION BOX

P1D CONNECTIONS

PIN #1	A	(P2D-1)
2	B	(P2D-2)
3	C	(P2D-3)
4	NEU	(P2D-4)
5	N/C	.
6	N/C	.
7	N/C	.
8	N/C	.
9	I1	(P26-1)
10	I1R	(P26-2)
11	I2	(P26-3)
12	I2R	(P26-4)
13	I3	(P26-5)
14	I3R	(P26-6)
15	N/C	.
16	N/C	.
17	N/C	.
18	N/C	.
19	N/C	.
20	EOV	(P1-12)
21	3B	(P1-6)
22	5B	(P1-1)
23	N4D	(P1-13)
24	N/C	.

P1 CONNECTIONS

PIN #1	5B	(P1D-22)
2	N/C	.
3	PMG1	(QCONPMG1)
4	PMG2	(QCONPMG2)
5	F2	(QCONF2)
6	3B	(P1D-21)
7	N/C	.
8	N/C	.
9	N/C	.
10	N/C	.
11	N/C	.
12	EOV	(P1D-20)
13	N4D	(P1D-23)
14	F1	(QCONF1)

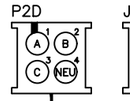


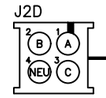
P2D CONNECTIONS

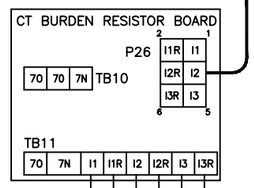
PIN #1	A	(P1D-1)
2	B	(P1D-2)
3	C	(P1D-3)
4	NEU	(P1D-4)

J2D CONNECTIONS

PIN #1	A	(L1)
2	B	(L2)
3	C	(L3)
4	NEU	(L0)

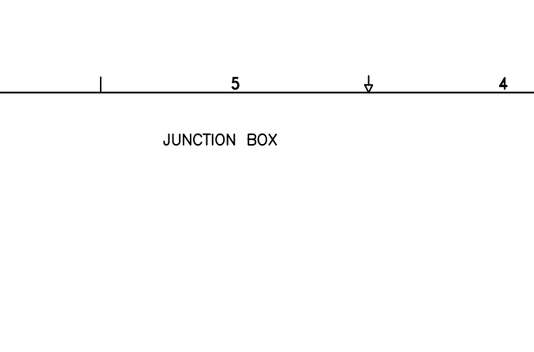




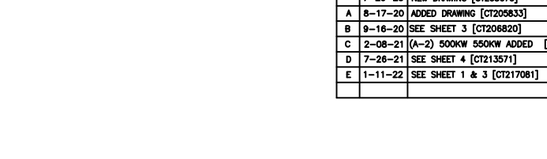


P26 CONNECTIONS

PIN #1	I1	(P1D-9)
2	I1R	(P1D-10)
3	I2	(P1D-11)
4	I2R	(P1D-12)
5	I3	(P1D-13)
6	I3R	(P1D-14)



NOTE: FOR GENERATOR CONNECTIONS SEE SEE ADV-5875 THREE PHASE.



NOTE: CURRENT TRANSFORMER DOT OR "H1" TOWARD GENERATOR.

APM603 CONTROLLER
500KW 550KW 600KW VOLVO

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

APPROVALS	DATE
DRAWN SBR	7-29-20
CHECKED DJY	7-29-20
APPROVED JLS	7-29-20

KOHLER.
KOHLER, WI 53044

TITLE: DIAGRAM, WIRING APM603, VOLVO

SCALE: N/A SHEET: 2-6

PLOTTED: DWG. NO. GM114915 D

REV	DATE	REVISION	BY	CHK
–	7-29-20	NEW DRAWING [CT205670]	SBR	
A	8-17-20	ADDED DRAWING [CT205833]	SBR	
B	9-16-20	(C-1) FUSE P5 DELETED [CT206820]	TEV	
C	2-08-21	(B-3) P22 DELETED (A-2) 500KW 550KW ADDED [CT209821]	TEV	
D	7-26-21	SEE SHEET 4 [CT213571]	TEV	
E	1-11-22	(C-4) W(M) WAS W(K) [CT217081]	TEV	

FUEL TANK (OPT)

N17 (P1-8) — QCON6 — N2
63C (P1-2) — QCON5 — 63C
N18 (P1-7) — QCON8 — N
64 (P1-1) — QCON7 — 64

FUEL LEVEL SENDER (OPTIONAL)
FUEL LEAK ALARM (OPTIONAL)

10 AMP BATTERY CHARGER(S) (OPT)
(FOR BATTERY CHARGER CONNECTIONS SEE DWG GM99439)

P50

P50 CONNECTIONS

PIN		
#1	N/C	.
2	N/C	.
3	N/C	.
4	N/C	.
5	YEL	(W(Y))
6	N/C	.
7	N/C	.
8	N/C	.
9	WHT	(W(X))
10	GRN	(W(Z))

P1

P1 CONNECTIONS

PIN			PIN		
#1	64	(QCON7)	18	N/C	.
2	63C	(QCON5)	19	35A	(TO CTS)
3	N/C	.	20	N/C	.
4	P	(SS)	21	N/C	.
5	N/C	.	22	N/C	.
6	N/C	.	23	70B	(W(M))
7	N18	(QCON8)	24	N/C	.
8	N17	(QCON6)	25	N/C	.
9	N/C	.	26	N/C	.
10	N/C	.	27	N/C	.
11	N/C	.	28	N/C	.
12	N/C	.	29	N/C	.
13	N/C	.	30	N/C	.
14	N/C	.	31	14N1	(W(D))
15	N/C	.	32	WHT	(W(X))
16	N/C	.	33	GRN	(W(Z))
17	N/C	.	34	YEL	(W(Y))

GRN (P1-33) — W(Z) — GRN (P50-10)
YEL (P1-34) — YEL (P50-5)
WHT (P1-32) — WHT (P50-9)
GRN (P4-2)
WHT (P4-3)
W(Y) — YEL (P4-1)
W(X)
N20 (W(D))

P4

P4 CONNECTIONS

PIN		
#1	YEL	(W(Y))
2	GRN	(W(Z))
3	WHT	(W(X))
4	VP	(P2-4)
5	70B2	(W(M))
6	70D	.
7	N/C	.
8	N/C	.

P2

P2 CONNECTIONS

PIN		
#1	N/C	.
2	N/C	.
3	N/C	.
4	VP	(P4-4)
5	70C	(W(M))
6	N/C	.
7	N/C	.
8	N/C	.
9	N/C	.

70B (P1-23) — W(M) — 70B2 (P4-5)
70C (P2-5)

35A (P1-19) — ((W(M)))
CTS

NOTE:
CTS: NOT USED FOR APM603 CONTROLLER

N (CTS)
14N1 (P1-31)
N20 (W(X))
W(D)
14N2 (EBG)

EBG — 14N2 (W(D))
P (P1-4)

10P
B+
BCA
EBG
SS
SM
BATTERY 12 VDC
BATTERY 12 VDC
EBG
EBG

APM603 CONTROLLER
500KW 550KW 600KW VOLVO

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

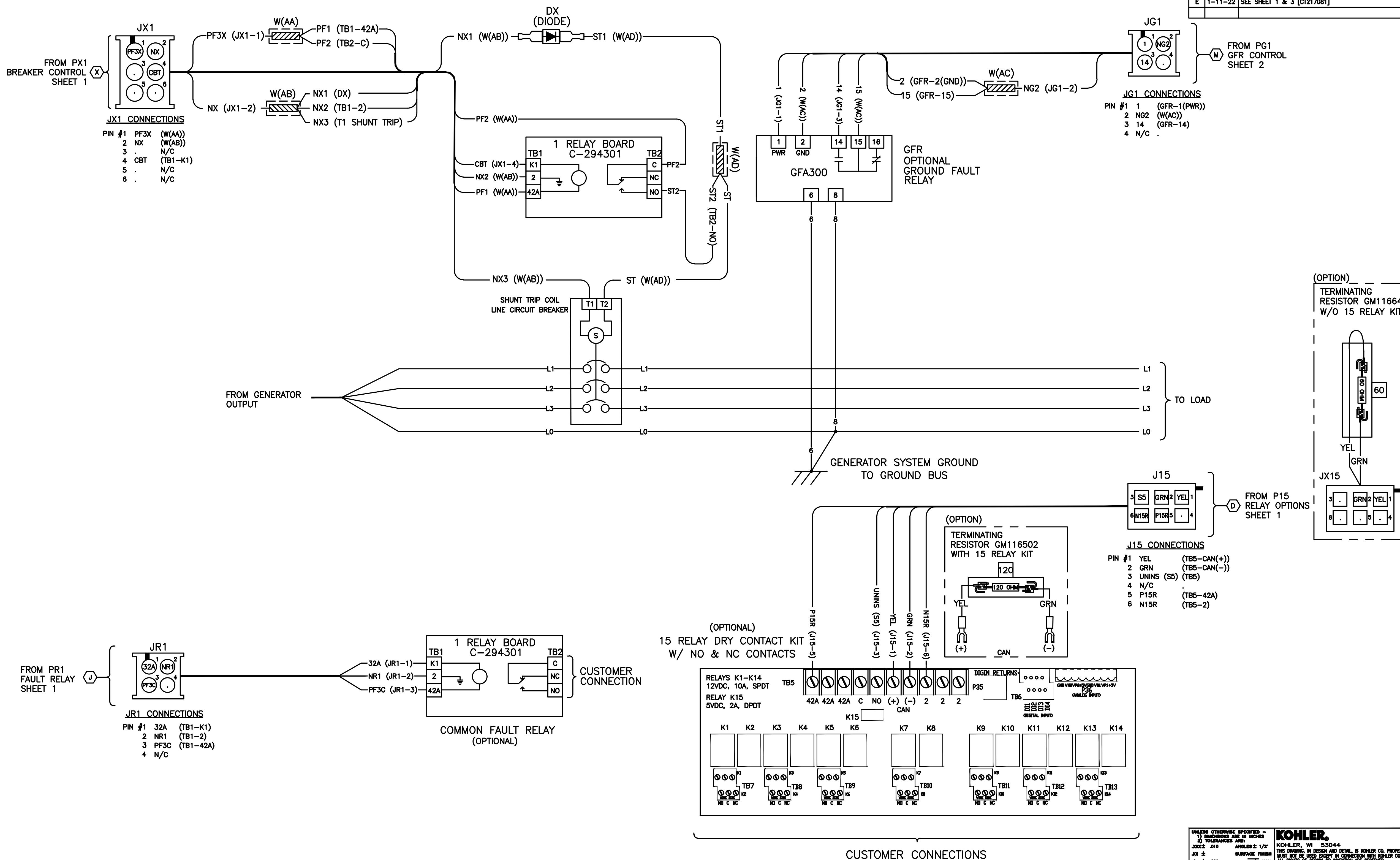
APPROVALS	DATE
DRAWN SBR	7-29-20
CHECKED DJY	7-29-20
APPROVED JLS	7-29-20

KOHLER.
KOHLER, WI 53044

TITLE: DIAGRAM, WIRING
APM603, VOLVO

SCALE N/A | SHEET 3-6
PLOTTED | DWG. NO. GM114915 | D

REV	DATE	REVISION	BY	MF
–	7–29–20	NEW DRAWING [CT205670]	SBR	
A	8–17–20	ADDED DRAWING [CT205833]	SBR	
B	9–16–20	SEE SHEET 3 [CT206820]	TEV	
C	2–08–21	(A–2) 500KW 550KW ADDED [CT209821]	TEV	
D	7–26–21	(B–1,3) TERMINATING RESISTOR KITS ADDED [CT213571]	TEV	
E	1–11–22	SEE SHEET 1 & 3 [CT217081]	TEV	



JX1
FROM PX1 BREAKER CONTROL SHEET 1
PF3X (JX1–1)
W(AA)
PF1 (TB1–42A)
PF2 (TB2–C)
NX (JX1–2)
W(AB)
NX1 (DX)
NX2 (TB1–2)
NX3 (T1 SHUNT TRIP)
JX1 CONNECTIONS
PIN #1 PF3X (W(AA))
2 NX (W(AB))
3 . N/C
4 CBT (TB1–K1)
5 . N/C
6 . N/C
DX (DIODE)
NX1 (W(AB))
ST1 (W(AD))
PF2 (W(AA))
1 RELAY BOARD C–294301
TB1
TB2
CBT (JX1–4)
NX2 (W(AB))
PF1 (W(AA))
ST1
W(AD)
ST2
ST
ST2 (TB2–NO)
NX3 (W(AB))
ST (W(AD))
SHUNT TRIP COIL LINE CIRCUIT BREAKER
FROM GENERATOR OUTPUT
L1
L2
L3
L0
TO LOAD
GENERATOR SYSTEM GROUND TO GROUND BUS
1 (JG1–1)
2 (W(AC))
14 (JG1–3)
15 (W(AC))
2 (GFR–2(GND))
15 (GFR–15)
W(AC)
NG2 (JG1–2)
GFA300
PWR
GND
GFR OPTIONAL GROUND FAULT RELAY
JG1
FROM PG1 GFR CONTROL SHEET 2
JG1 CONNECTIONS
PIN #1 1 (GFR–1(PWR))
2 NG2 (W(AC))
3 14 (GFR–14)
4 N/C .
(OPTION)
TERMINATING RESISTOR GM116648 W/O 15 RELAY KIT
60 OHM
YEL
GRN
JX15
J15
FROM P15 RELAY OPTIONS SHEET 1
J15 CONNECTIONS
PIN #1 YEL (TB5–CAN(+))
2 GRN (TB5–CAN(–))
3 UNINS (S5) (TB5)
4 N/C .
5 P15R (TB5–42A)
6 N15R (TB5–2)
(OPTION)
TERMINATING RESISTOR GM116502 WITH 15 RELAY KIT
120 OHM
CAN
P15R (J15–5)
UNINS (S5) (J15–3)
YEL (J15–1)
GRN (J15–2)
N15R (J15–6)
(OPTIONAL)
15 RELAY DRY CONTACT KIT W/ NO & NC CONTACTS
RELAYS K1–K14 12VDC, 10A, SPDT
RELAY K15 5VDC, 2A, DPDT
TB5
42A 42A 42A C NO (+) (–) 2 2 2
CAN
DIGIN RETURNS
P35
TB6
P36
K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 K13 K14 K15
TB7 TB8 TB9 TB10 TB11 TB12 TB13
NO C NC
CUSTOMER CONNECTIONS
JR1
FROM PR1 FAULT RELAY SHEET 1
JR1 CONNECTIONS
PIN #1 32A (TB1–K1)
2 NR1 (TB1–2)
3 PF3C (TB1–42A)
4 N/C
32A (JR1–1)
NR1 (JR1–2)
PF3C (JR1–3)
1 RELAY BOARD C–294301
CUSTOMER CONNECTION
COMMON FAULT RELAY (OPTIONAL)

APM603 CONTROLLER
500KW 550KW 600KW VOLVO

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

APPROVALS		DATE
DRAWN	SBR	7–29–20
CHECKED	DJY	7–29–20
APPROVED	JLS	7–29–20

KOHLER®
KOHLER, WI 53044

TITLE: DIAGRAM, WIRING APM603, VOLVO

SCALE N/A — SHEET 4–6

PLOTTED — DWG. NO. GM114915 — D

REV	DATE	REVISION	BY	CHK
–	7-29-20	NEW DRAWING [CT205670]	SBR	
A	8-17-20	ADDED DRAWING [CT205833]	SBR	
B	9-16-20	SEE SHEET 3 [CT206820]	TEV	
C	2-08-21	(A-2) 500KW 550KW ADDED [CT209821]	TEV	
D	7-26-21	SEE SHEET 4 [CT213571]	TEV	
E	1-11-22	SEE SHEET 1 & 3 [CT217081]	TEV	

P31 (BREAKER OPEN)

P31 CONNECTIONS
PIN #1 BV4 (W(G))
2 CBT (JX1-4)
3 PX1 (W(F))
4 OB (EOB-A4)
5 N/C .

P30 (BREAKER CLOSE)

P30 CONNECTIONS
PIN #1 BV5 (W(G))
2 CBC (JX1-3)
3 PX2 (W(F))
4 N/C .
5 CB (EOB-A2)

PX1 (P31-3) W(F) PF3X (JX1-1)
PX2 (P30-3)
BV4 (P31-1) W(G) BV (F4-B)
BV5 (P30-1) BV3 (EOB-+24V)

BL1 (PB1-1) BL2 (PB1-2) BL3 (PB1-3) BL0 (PB1-4)

DIN RAIL TX5

F4 10A

JX1 CONNECTIONS
PIN #1 PF3X (W(F))
2 NX (W(AH))
3 CBC (P30-2)
4 CBT (P31-2)
5 CBCR (EOB-14)
6 CBTR (EOB-84)

JX1 (PF3X, NX, CBC, CBT, CBCR, CBTR)

FROM PX1 BREAKER CONTROL SHEET 1

NX1 (EOB-11) W(AH) NX (JX1-2)
NX2 (EOB-81)

JB1

TO PB1 BUS VOLTAGE SENSE SHEET 1

JB1 CONNECTIONS
PIN #1 BL1 (TX5-1)
2 BL2 (TX5-2)
3 BL3 (TX5-3)
4 BL0 (TX5-4)
5 N/C .
6 N/C

BGND (BATTERY2) CB (P30-5) OB (P31-4) BV3 (W(G))

A1 GND A2 CLOSE A4 OPEN B4 +24V

EOB (ELECTRICALLY OPERATED BREAKER)

OVERCURRENT TRIP
81 NX2 (W(AH))
82
84 CBTR (JX1-6)

AUXILLARY SWITCH
11 NX1 (W(AH))
12
14 CBCR (JX-5)

M

FROM GENERATOR OUTPUT SHEET 2

L1 L2 L3 L0

TO LOAD

BL0 BL3 BL2 BL1

BATP (F4-A) BGND (EOB-A1)

BATTERY1 12 VDC BATTERY2 12 VDC

BREAKER CONTROL BATTERIES

APM603 CONTROLLER
500KW 550KW 600KW VOLVO

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 SBR	7-29-20
CHECKED DJY	7-29-20
APPROVED JLS	7-29-20

TITLE: DIAGRAM, WIRING APM603, VOLVO

SCALE N/A SHEET 5-6

PLOTTED DWG. NO. GM114915 D

REV	DATE	REVISION	BY	CHK
–	7-29-20	NEW DRAWING [CT205670]	SBR	
A	8-17-20	ADDED DRAWING [CT205833]	SBR	
B	9-16-20	SEE SHEET 3 [CT206820]	TEV	
C	2-08-21	(A-2) 500KW 550KW ADDED [CT209821]	TEV	
D	7-26-21	SEE SHEET 4 [CT213571]	TEV	
E	1-11-22	SEE SHEET 1 & 3 [CT217081]	TEV	

P31 (BREAKER OPEN)

P30 (BREAKER CLOSE)

P31 CONNECTIONS
PIN #1 BV4 (W(G))
2 CBT (JX1-4)
3 PX1 (W(F))
4 OB (TX1-1)
5 N/C .

P30 CONNECTIONS
PIN #1 BV5 (W(G))
2 CBC (JX1-3)
3 PX2 (W(F))
4 N/C .
5 CB (TX1-4)

PX1 (P31-3) W(F) PF3X (JX1-1)
PX2 (P30-3)
BV4 (P31-1) W(G) BV2 (TX1-2)
BV5 (P30-1) BV3 (TX1-3)

DIN RAIL TX5: BL1 (PB1-1), BL2 (PB1-2), BL3 (PB1-3), BL0 (PB1-4)

DIN RAIL TX1: OB (P31-4), BV2 (W(G)), BV3 (W(G)), CB (P30-5), BN1 – CBTR (JX1-6), CBCR (JX1-5), NX2 (W(AH)), NX1 (W(AH))

JX1 CONNECTIONS
PIN #1 PF3X (W(F))
2 NX (W(AH))
3 CBC (P30-2)
4 CBT (P31-2)
5 CBCR (TX1-7)
6 CBTR (TX1-6)

JX1: PF3X, NX, CBC, CBT, CBCR, CBTR

X FROM PX1 BREAKER CONTROL SHEET 1

NX1 (TX1-9) W(AH) NX (JX1-2)
NX2 (TX1-8)

JB1: BL1, BL0, BL2, BL3

B TO PB1 BUS VOLTAGE SENSE SHEET 1

JB1 CONNECTIONS
PIN #1 BL1 (TX5-1)
2 BL2 (TX5-2)
3 BL3 (TX5-3)
4 BL0 (TX5-4)
5 N/C .
6 N/C

BN1, CB, OB, BV1

A1 GND, A2 CLOSE, A4 OPEN, B4 +24V

EOB (ELECTRICALLY OPERATED BREAKER)

OVERCURRENT TRIP: 81 NX2, 82, 84 CBTR

AUXILLARY SWITCH: 11 NX1, 12, 14 CBCR

M

FROM GENERATOR OUTPUT SHEET 2 H

L1, L2, L3, L0 TO LOAD

BV, BN

BATTERY1 12 VDC, BATTERY2 12 VDC

BREAKER CONTROL BATTERIES

BL0, BL3, BL2, BL1

NOTE:
DASHED LINES ARE WIRES/COMPONENTS PROVIDED BY CUSTOMER WHEN BREAKER IS REMOTE MOUNTED.

APM603 CONTROLLER
500KW 550KW 600KW VOLVO

UNLESS OTHERWISE SPECIFIED – 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: XXDEC ± .010, XXX ± .030, X ± .060, FRACTIONS ±; ANGLES ± 1/2°; SURFACE FINISH 125 MAX.

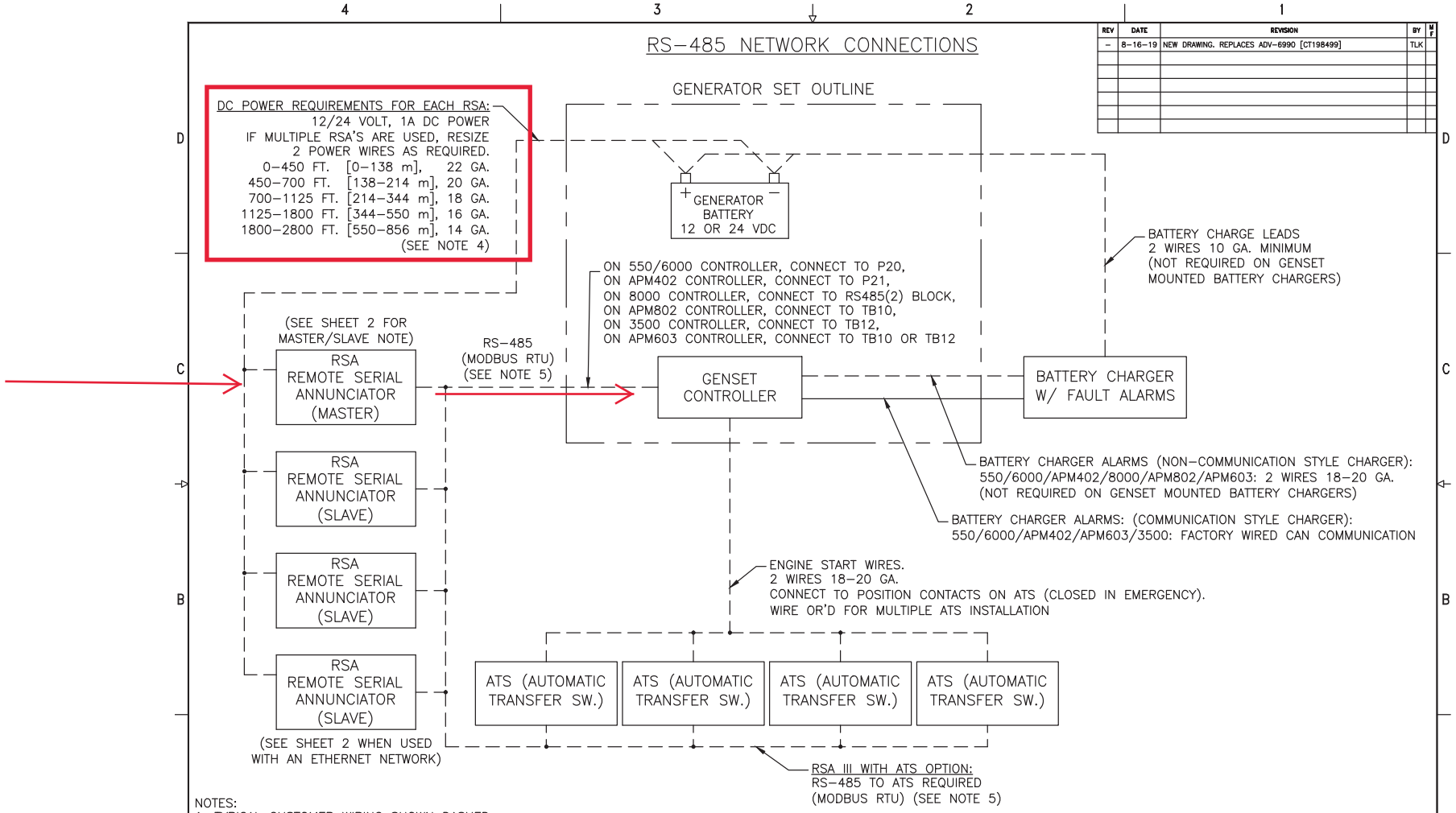
APPROVALS	DATE
DRAWN SBR	7-29-20
CHECKED DJY	7-29-20
APPROVED JLS	7-29-20

TITLE: DIAGRAM, WIRING APM603, VOLVO

SCALE N/A | SHEET 6-6 | PLOTTED | DRG. NO. GM114915 | D

RS-485 NETWORK CONNECTIONS

REV	DATE	REVISION	BY	M F
–	8-16-19	NEW DRAWING. REPLACES ADV-6990 [CT198499]	TLK	



NOTES:
1. TYPICAL CUSTOMER WIRING SHOWN DASHED.
2. CUSTOMER RESPONSIBLE FOR ADDITIONAL WIRING SHOWN IF COMPONENTS ARE SHIPPED LOOSE (BATTERY CHARGER, DRY-CONTACT BOX, ETC.)
3. IF BATTERY CHARGER IS SHIPPED LOOSE ADDITIONAL WIRES MAY BE REQUIRED FOR PROPER VOLTAGE SENSING. REFERENCE DRAWING ADV-5971 FOR INTERCONNECT.
4. DC VOLTAGE FOR EACH RSA REMOTE ANNUNCIATOR MAY ALSO BE SUPPLIED BY A LOCALLY MOUNTED 12 OR 24 VDC, 200 mA MIN. AC ADAPTER KIT (GM62466-KP1).
5. USE BELDEN #3841 OR EQUIVALENT. MAXIMUM DISTANCE = 4000 FT. [1219 m]

REFER TO WIRING DIAGRAM GM62554 (NETWORK COMMUNICATIONS) FOR CONNECTION DETAIL.

INTERCONNECTION DIAGRAM CONTROLLER WITH RSA ANNUNCIATOR

DIMENSIONS IN [ ] ARE METRIC EQUIVALENTS.

UNLESS OTHERWISE SPECIFIED – 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XXX± .010 ANGLES± 1/2° .XX ± .030 SURFACE FINISH .X ± .080 FRACTIONS ± MAX.

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

KOHLER CO.
KOHLER, WI 53044

TITLE: DIAGRAM, RSA INTERCONNECTION

SCALE: / / / SHEET 1-2

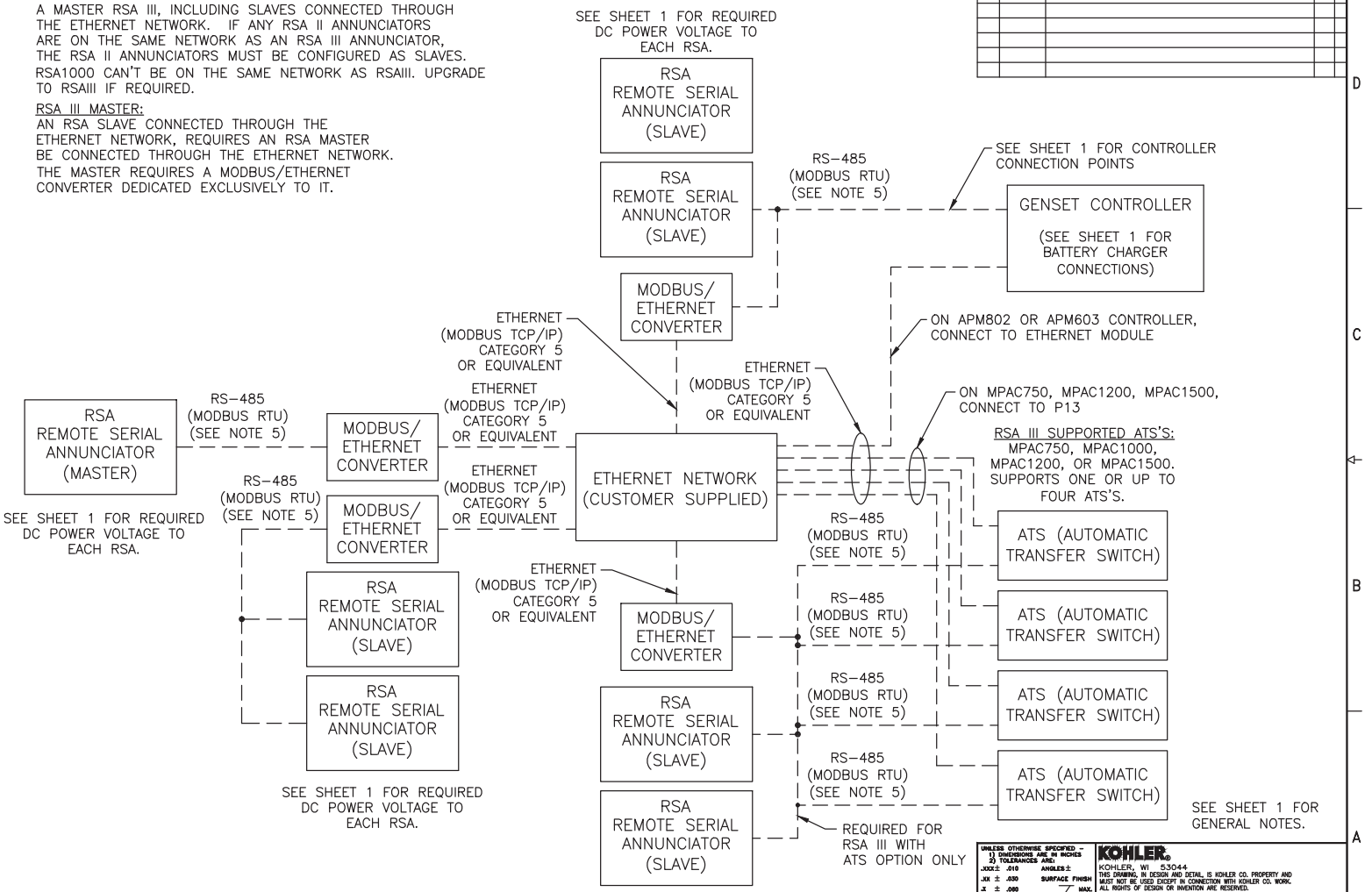
PLOTTED DWG. NO. ADV-9169 C

ETHERNET NETWORK CONNECTIONS

REV	DATE	REVISION	BY	M F
–	8–16–19	NEW DRAWING. REPLACES ADV–6990 [CT198499]	TLK	

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

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



INTERCONNECTION DIAGRAM CONTROLLER WITH RSA ANNUNCIATOR

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

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

KOHLER CO.
KOHLER, WI 53044

TITLE: DIAGRAM, RSA INTERCONNECTION

SCALE / / / SHEET 2–2

PLOTTED DWG. NO. ADV–9169 C

Drawing Sheet Reference	
Sheet	Description
1	Networked Devices, General Notes, This Sheet
2	Converters, Ethernet Network, PC, Data Interface System
3	16-Light (DEC3+), 550 (DEC550), KPC 1000 Legacy Genset Controllers
4	DEC3000 / APM402 Genset Controller
5	DEC6000 Genset Controller
6	APM603 Genset Controller for non-KD series, Standard PGEN Network
7	This Sheet Reserved for Future Features
8	APM603 Genset Controller for KD Series, Standard PGEN Network
9	This Sheet Reserved for Future Features
10	APM802 Genset Controller
11	DEC8000 Genset Controller
12	DEC3500 Genset Controller, Towable 10 Position Customer Terminal Block
13	Series 1000 (MPAC1000), 340 (M340/M340+), Power Monitor Legacy ATS (Automatic Transfer Switch Controllers)
14	MPAC1500, MPAC-DM 750/1200/1500 ATS (Automatic Transfer Switch Controllers)
15	Legacy RSAII (Remote Serial Annunciator)
16	RSAIII (Remote Serial Annunciator)

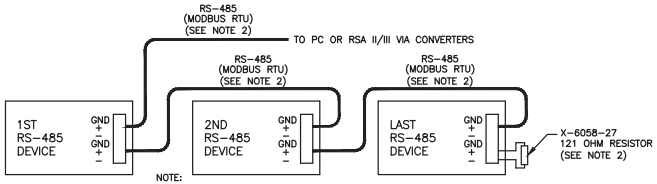
REV	DATE	REVISION	BY	☑
N	5-30-19	THIS SHEET ADDED; COMPATIBILITY CHART, STANDARD NOTES,		
		AND NETWORKED DEVICES MOVED TO THIS SHEET; ISOLATED/		
		NON-ISOLATED RS-485 IDENTIFIED ON ALL SHEETS [CT197795]	TLK	
P	6-24-20	(D-8) SHEET 6 NOTE: NON-KD SERIES WAS JOHN DEERE		
		80-500 KW, SHEET 12 NOTE: ADDED		
		TOWABLE 10 POSITION CUSTOMER TERMINAL BLOCK [CT204963]	TLK	

Controller/Annunciator Compatibility Chart

	Monitor III	SiteTech	RSA2	RSA3
550 Genset	X	X	X	X
16-Light Genset	X		X	X
DEC 3000 / APM402 Genset	X	X	X	X
KPC 1000 Genset			X	X
6000 Genset	X	X	X	X
8000 Genset				4
APM802				X
APM603		X		X
DEC-3500 Genset		X		X
MPAC 1500	X		X	X
MPAC-DM 750, 1200, 1500		X	X	X
Series 1000 ATS	X		X	X
340 ATS	X			
340 Power Monitor	X			

"X" Designates supported devices. "4" Designates RS-485 Only.

DETAIL A (EXAMPLE OF)
NETWORKED RS-485 DEVICES



NOTE:
SIX TERMINAL CONNECTION SHOWN. FOR THREE TERMINAL CONNECTION, USE TWO WIRES PER TERMINAL STRIP SCREW.

NOTES:

1.) MAXIMUM CABLE LENGTH FOR RS-232 IS 50 FEET. USE RS-485 IF LONGER THAN 50 FEET IS REQ'D.

2.) CUSTOMER SUPPLIED WIRE. USE BELDEN #9841 OR EQUIVALENT CABLE. USE A MAXIMUM CABLE LENGTH OF 1219 METERS (4000 FT.) FROM THE RS-485 CONVERTER TO THE LAST RS-485 DEVICE IN THE NETWORK. THE "LAST DEVICE" IS THE DEVICE FURTHEST FROM THE CONTROLLER. CONNECT "+" TO "+", "-" TO "-". CONNECT THE CABLE SHIELD TO "GND" AT ONE END OF CABLE ONLY, LEAVE OTHER END DISCONNECTED. IF OPERATING OVER 19.2 K BAUD RATE AND WIRE LENGTH > 305 METERS (1000 FT.), CONNECT 121 OHM TERMINATING RESISTOR (X-6058-27) TO "+" AND "-" ON THE LAST DEVICE ON THE NETWORK. IF ONLY ONE DEVICE IS USED, IT IS THE LAST DEVICE. THE TERMINATING RESISTOR IS SELECTABLE INSIDE THE MODBUS/ETHERNET CONVERTER AND REMOTE SERIAL ANNUNCIATOR2 (RSA2) VIA P34. PLACE THE P34 JUMPER ON THE "IN" PINS IF THE MODBUS/ETHERNET CONVERTER, RSA2, OR RSA3 IS THE LAST DEVICE IN THE NETWORK. IF NOT THE LAST DEVICE, PLACE THE P34 JUMPER ON THE "OUT" PINS.

3.) THE 550 & 6000 CONTROLLER CAN BE USED AS A RS-232/RS-485 CONVERTER. CONNECT THE 9-PIN SERIAL PORT ON THE PC TO P18 ON THE 550 OR 6000 CONTROLLER AS SHOWN. THEN CONNECT P20 ON THE 550 OR 6000 CONTROLLER TO THE OTHER RS-485 DEVICES IN THE NETWORK.

4.) EACH MODBUS/ETHERNET CONVERTER CAN COMMUNICATE WITH UP TO 4 ETHERNET NETWORK DEVICES SIMULTANEOUSLY. IF A MODBUS/ETHERNET CONVERTER IS ATTACHED TO A SLAVE REMOTE SERIAL ANNUNCIATOR, A MODBUS/ETHERNET CONVERTER CONNECTED TO A MASTER REMOTE SERIAL ANNUNCIATOR IS REQUIRED. SEE NOTE 2 FOR P34 (TERMINATING RESISTOR) SETTING.

5.) ONLY ONE MASTER IS ALLOWED PER RS-485 NETWORK. ANY COMBINATION OF MASTERS IS ALLOWED IF COMMUNICATING VIA MODBUS/ETHERNET CONVERTERS.

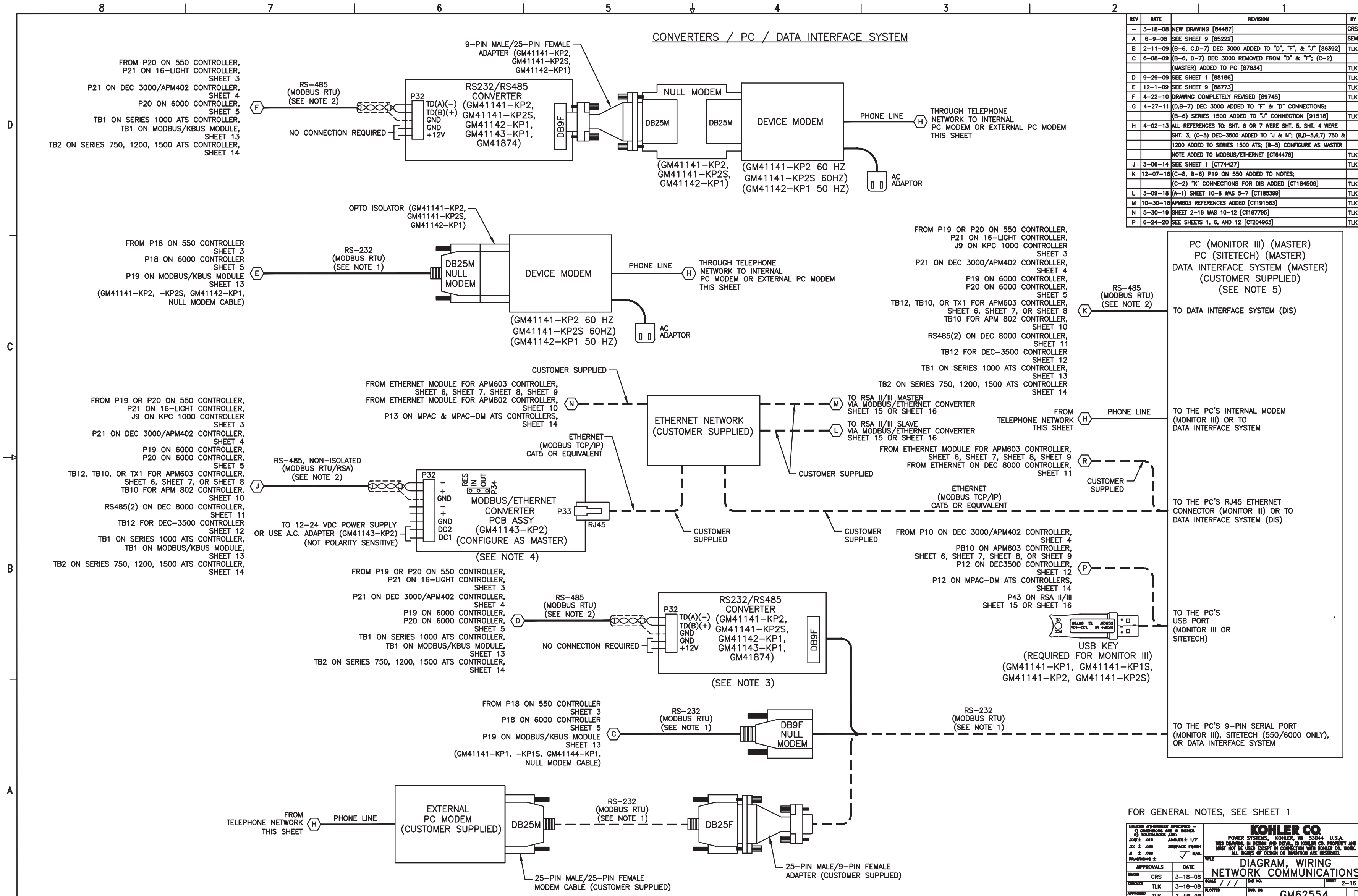
UNLESS OTHERWISE SPECIFIED — DIMENSIONS ARE IN INCHES — TOLERANCES ARE: .XX ± .010, .XXX ± .005, ANGLES ± 1/2°, SURFACE FINISH, FRACTIONS ±

APPROVALS	DATE
DRAWN TLK	5-30-19
CHECKED TLK	5-30-19
APPROVED MD	5-30-19

TITLE: DIAGRAM, WIRING
NETWORK COMMUNICATIONS

SCALE: / / / | DWG NO. GM62554 | SHEET 1-16 | PLOTTED | DWG. NO. D

CONVERTERS / PC / DATA INTERFACE SYSTEM



FROM P20 ON 550 CONTROLLER, P21 ON 16-LIGHT CONTROLLER, SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER, SHEET 4
P20 ON 6000 CONTROLLER, SHEET 5
TB1 ON SERIES 1000 ATS CONTROLLER, TB1 ON MODBUS/KBUS MODULE, SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER, SHEET 14
F
RS-485 (MODBUS RTU) (SEE NOTE 2)
NO CONNECTION REQUIRED
P32
TD(A)(-)
TD(B)(+)
GND
GND
+12V
RS232/RS485 CONVERTER (GM41141-KP2, GM41141-KP2S, GM41142-KP1, GM41143-KP1, GM41874)
DB9F
9-PIN MALE/25-PIN FEMALE ADAPTER (GM41141-KP2, GM41141-KP2S, GM41142-KP1)
NULL MODEM
DB25M
DB25M
(GM41141-KP2, GM41141-KP2S, GM41142-KP1)
DEVICE MODEM
(GM41141-KP2 60 HZ GM41141-KP2S 60HZ) (GM41142-KP1 50 HZ)
PHONE LINE
H
THROUGH TELEPHONE NETWORK TO INTERNAL PC MODEM OR EXTERNAL PC MODEM THIS SHEET
AC ADAPTOR
FROM P18 ON 550 CONTROLLER SHEET 3
P18 ON 6000 CONTROLLER SHEET 5
P19 ON MODBUS/KBUS MODULE SHEET 13
(GM41141-KP2, -KP2S, GM41142-KP1, NULL MODEM CABLE)
E
RS-232 (MODBUS RTU) (SEE NOTE 1)
OPTO ISOLATOR (GM41141-KP2, GM41141-KP2S, GM41142-KP1)
DB25M NULL MODEM
DEVICE MODEM
(GM41141-KP2 60 HZ GM41141-KP2S 60HZ) (GM41142-KP1 50 HZ)
PHONE LINE
H
THROUGH TELEPHONE NETWORK TO INTERNAL PC MODEM OR EXTERNAL PC MODEM THIS SHEET
AC ADAPTOR
CUSTOMER SUPPLIED
FROM ETHERNET MODULE FOR APM603 CONTROLLER, SHEET 6, SHEET 7, SHEET 8, SHEET 9
FROM ETHERNET MODULE FOR APM802 CONTROLLER, SHEET 10
P13 ON MPAC & MPAC-DM ATS CONTROLLERS, SHEET 14
N
ETHERNET NETWORK (CUSTOMER SUPPLIED)
M
TO RSA II/III MASTER VIA MODBUS/ETHERNET CONVERTER SHEET 15 OR SHEET 16
L
TO RSA II/III SLAVE VIA MODBUS/ETHERNET CONVERTER SHEET 15 OR SHEET 16
CUSTOMER SUPPLIED
FROM P19 OR P20 ON 550 CONTROLLER, P21 ON 16-LIGHT CONTROLLER, J9 ON KPC 1000 CONTROLLER SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER, SHEET 4
P19 ON 6000 CONTROLLER, P20 ON 6000 CONTROLLER, SHEET 5
TB12, TB10, OR TX1 FOR APM603 CONTROLLER, SHEET 6, SHEET 7, OR SHEET 8
TB10 FOR APM 802 CONTROLLER, SHEET 10
RS485(2) ON DEC 8000 CONTROLLER, SHEET 11
TB12 FOR DEC-3500 CONTROLLER SHEET 12
TB1 ON SERIES 1000 ATS CONTROLLER, TB1 ON MODBUS/KBUS MODULE, SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER, SHEET 14
J
RS-485, NON-ISOLATED (MODBUS RTU/RSA) (SEE NOTE 2)
TO 12-24 VDC POWER SUPPLY OR USE A.C. ADAPTER (GM41143-KP2) (NOT POLARITY SENSITIVE)
P32
-
+
GND
-
+
GND
DC2
DC1
RES IN OUT
MODBUS/ETHERNET CONVERTER PCB ASSY (GM41143-KP2) (CONFIGURE AS MASTER)
P33
RJ45
(SEE NOTE 4)
ETHERNET (MODBUS TCP/IP) CAT5 OR EQUIVALENT
CUSTOMER SUPPLIED
CUSTOMER SUPPLIED
FROM P19 OR P20 ON 550 CONTROLLER, P21 ON 16-LIGHT CONTROLLER, SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER, SHEET 4
P19 ON 6000 CONTROLLER, P20 ON 6000 CONTROLLER, SHEET 5
TB1 ON SERIES 1000 ATS CONTROLLER, TB1 ON MODBUS/KBUS MODULE, SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER, SHEET 14
D
RS-485 (MODBUS RTU) (SEE NOTE 2)
NO CONNECTION REQUIRED
P32
TD(A)(-)
TD(B)(+)
GND
GND
+12V
RS232/RS485 CONVERTER (GM41141-KP2, GM41141-KP2S, GM41142-KP1, GM41143-KP1, GM41874)
DB9F
(SEE NOTE 3)
FROM P18 ON 550 CONTROLLER SHEET 3
P18 ON 6000 CONTROLLER SHEET 5
P19 ON MODBUS/KBUS MODULE SHEET 13
(GM41141-KP1, -KP1S, GM41144-KP1, NULL MODEM CABLE)
C
RS-232 (MODBUS RTU) (SEE NOTE 1)
DB9F NULL MODEM
RS-232 (MODBUS RTU) (SEE NOTE 1)
FROM TELEPHONE NETWORK THIS SHEET
H
PHONE LINE
EXTERNAL PC MODEM (CUSTOMER SUPPLIED)
DB25M
RS-232 (MODBUS RTU) (SEE NOTE 1)
DB25F
25-PIN MALE/25-PIN FEMALE MODEM CABLE (CUSTOMER SUPPLIED)
25-PIN MALE/9-PIN FEMALE ADAPTER (CUSTOMER SUPPLIED)
FROM P19 OR P20 ON 550 CONTROLLER, P21 ON 16-LIGHT CONTROLLER, J9 ON KPC 1000 CONTROLLER SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER, SHEET 4
P19 ON 6000 CONTROLLER, P20 ON 6000 CONTROLLER, SHEET 5
TB12, TB10, OR TX1 FOR APM603 CONTROLLER, SHEET 6, SHEET 7, OR SHEET 8
TB10 FOR APM 802 CONTROLLER, SHEET 10
RS485(2) ON DEC 8000 CONTROLLER, SHEET 11
TB12 FOR DEC-3500 CONTROLLER SHEET 12
TB1 ON SERIES 1000 ATS CONTROLLER, SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER SHEET 14
RS-485 (MODBUS RTU) (SEE NOTE 2)
K
PC (MONITOR III) (MASTER)
PC (SITETECH) (MASTER)
DATA INTERFACE SYSTEM (MASTER)
(CUSTOMER SUPPLIED)
(SEE NOTE 5)
TO DATA INTERFACE SYSTEM (DIS)
FROM TELEPHONE NETWORK THIS SHEET
H
PHONE LINE
TO THE PC'S INTERNAL MODEM (MONITOR III) OR TO DATA INTERFACE SYSTEM
FROM ETHERNET MODULE FOR APM603 CONTROLLER, SHEET 6, SHEET 7, SHEET 8, SHEET 9
FROM ETHERNET ON DEC 8000 CONTROLLER, SHEET 11
R
CUSTOMER SUPPLIED
ETHERNET (MODBUS TCP/IP) CAT5 OR EQUIVALENT
TO THE PC'S RJ45 ETHERNET CONNECTOR (MONITOR III) OR TO DATA INTERFACE SYSTEM (DIS)
FROM P10 ON DEC 3000/APM402 CONTROLLER, SHEET 4
PB10 ON APM603 CONTROLLER, SHEET 6, SHEET 7, SHEET 8, OR SHEET 9
P12 ON DEC3500 CONTROLLER, SHEET 12
P12 ON MPAC-DM ATS CONTROLLERS, SHEET 14
P43 ON RSA II/III SHEET 15 OR SHEET 16
P
USB KEY (REQUIRED FOR MONITOR III) (GM41141-KP1, GM41141-KP1S, GM41141-KP2, GM41141-KP2S)
TO THE PC'S USB PORT (MONITOR III OR SITETECH)
RS-232 (MODBUS RTU) (SEE NOTE 1)
TO THE PC'S 9-PIN SERIAL PORT (MONITOR III), SITETECH (550/6000 ONLY), OR DATA INTERFACE SYSTEM

REV	DATE	REVISION	BY	MF
–	3-18-08	NEW DRAWING [84487]	CRS	
A	6-9-08	SEE SHEET 9 [85222]	SEM	
B	2-11-09	(B-6, C,D-7) DEC 3000 ADDED TO "D", "F", & "J" [86392]	TLK	
C	6-08-09	(B-6, D-7) DEC 3000 REMOVED FROM "D" & "F"; (C-2)		
		(MASTER) ADDED TO PC [87834]	TLK	
D	9-29-09	SEE SHEET 1 [88186]	TLK	
E	12-1-09	SEE SHEET 9 [88773]	TLK	
F	4-22-10	DRAWING COMPLETELY REVISED [89745]	TLK	
G	4-27-11	(D,B-7) DEC 3000 ADDED TO "F" & "D" CONNECTIONS;		
		(B-6) SERIES 1500 ADDED TO "J" CONNECTION [91518]	TLK	
H	4-02-13	ALL REFERENCES TO: SHT. 6 OR 7 WERE SHT. 5, SHT. 4 WERE		
		SHT. 3, (C-5) DEC-3500 ADDED TO "J & N"; (B,D-5,6,7) 750 &		
		1200 ADDED TO SERIES 1500 ATS; (B-5) CONFIGURE AS MASTER		
		NOTE ADDED TO MODBUS/ETHERNET [CT64476]	TLK	
J	3-06-14	SEE SHEET 1 [CT74427]	TLK	
K	12-07-16	(C-8, B-6) P19 ON 550 ADDED TO NOTES;		
		(C-2) "K' CONNECTIONS FOR DIS ADDED [CT164509]	TLK	
L	3-09-18	(A-1) SHEET 10-8 WAS 5-7 [CT185399]	TLK	
M	10-30-18	APM603 REFERENCES ADDED [CT191583]	TLK	
N	5-30-19	SHEET 2-16 WAS 10-12 [CT197795]	TLK	
P	6-24-20	SEE SHEETS 1, 6, AND 12 [CT204963]	TLK	

FOR GENERAL NOTES, SEE SHEET 1

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	CRS	3-18-08
CHECKED	TLK	3-18-08
APPROVED	TLK	3-18-08

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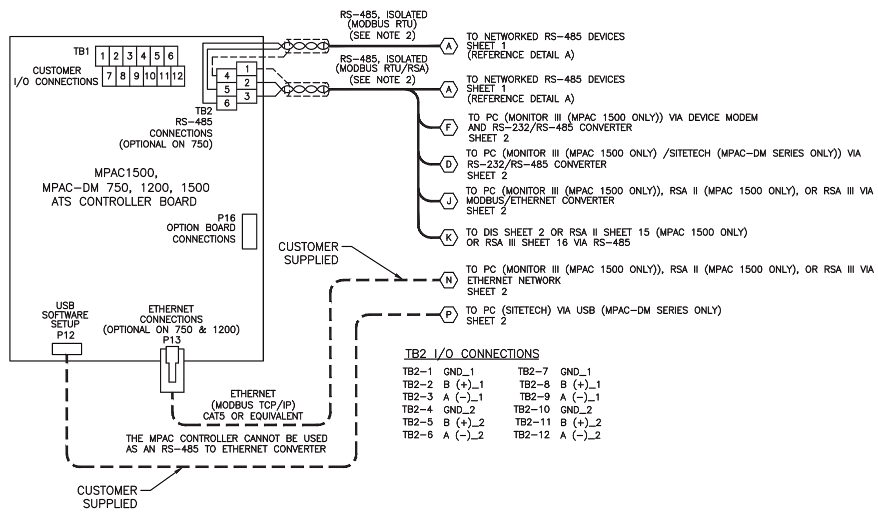
TITLE: DIAGRAM, WIRING NETWORK COMMUNICATIONS

SCALE / / / CAD NO. SHEET 2-16

PLOTTED DWG. NO. GM62554 D

MPAC ATS CONTROLLERS

REV	DATE	REVISION	BY
N	5-30-19	THIS SHEET ADDED; MPAC MOVED TO THIS SHEET [CT197795]	TLK
P	6-24-20	SEE SHEETS 1, 6, AND 12 [CT204963]	TLK



TB1
1 2 3 4 5 6
7 8 9 10 11 12
CUSTOMER I/O CONNECTIONS
TB2
RS-485 CONNECTIONS (OPTIONAL ON 750)
MPAC1500, MPAC-DM 750, 1200, 1500 ATS CONTROLLER BOARD
P16 OPTION BOARD CONNECTIONS
USB SOFTWARE SETUP P12
ETHERNET CONNECTIONS (OPTIONAL ON 750 & 1200) P13
RS-485, ISOLATED (MODBUS RTU) (SEE NOTE 2)
RS-485, ISOLATED (MODBUS RTU/RSA) (SEE NOTE 2)
TO NETWORKED RS-485 DEVICES SHEET 1 (REFERENCE DETAIL A)
TO NETWORKED RS-485 DEVICES SHEET 1 (REFERENCE DETAIL A)
TO PC (MONITOR III (MPAC 1500 ONLY)) VIA DEVICE MODEM AND RS-232/RS-485 CONVERTER SHEET 2
TO PC (MONITOR III (MPAC 1500 ONLY) /SITETECH (MPAC-DM SERIES ONLY)) VIA RS-232/RS-485 CONVERTER SHEET 2
TO PC (MONITOR III (MPAC 1500 ONLY)), RSA II (MPAC 1500 ONLY), OR RSA III VIA MODBUS/ETHERNET CONVERTER SHEET 2
TO DIS SHEET 2 OR RSA II SHEET 15 (MPAC 1500 ONLY) OR RSA III SHEET 16 VIA RS-485
CUSTOMER SUPPLIED
TO PC (MONITOR III (MPAC 1500 ONLY)), RSA II (MPAC 1500 ONLY), OR RSA III VIA ETHERNET NETWORK SHEET 2
TO PC (SITETECH) VIA USB (MPAC-DM SERIES ONLY) SHEET 2
ETHERNET (MODBUS TCP/IP) CAT5 OR EQUIVALENT
THE MPAC CONTROLLER CANNOT BE USED AS AN RS-485 TO ETHERNET CONVERTER
CUSTOMER SUPPLIED

TB2 I/O CONNECTIONS

TB2-1	GND_1	TB2-7	GND_1
TB2-2	B (+)_1	TB2-8	B (+)_1
TB2-3	A (-)_1	TB2-9	A (-)_1
TB2-4	GND_2	TB2-10	GND_2
TB2-5	B (+)_2	TB2-11	B (+)_2
TB2-6	A (-)_2	TB2-12	A (-)_2

FOR GENERAL NOTES, SEE SHEET 1

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	TLK	5-30-19
CHECKED	TLK	5-30-19
APPROVED	MD	5-30-19

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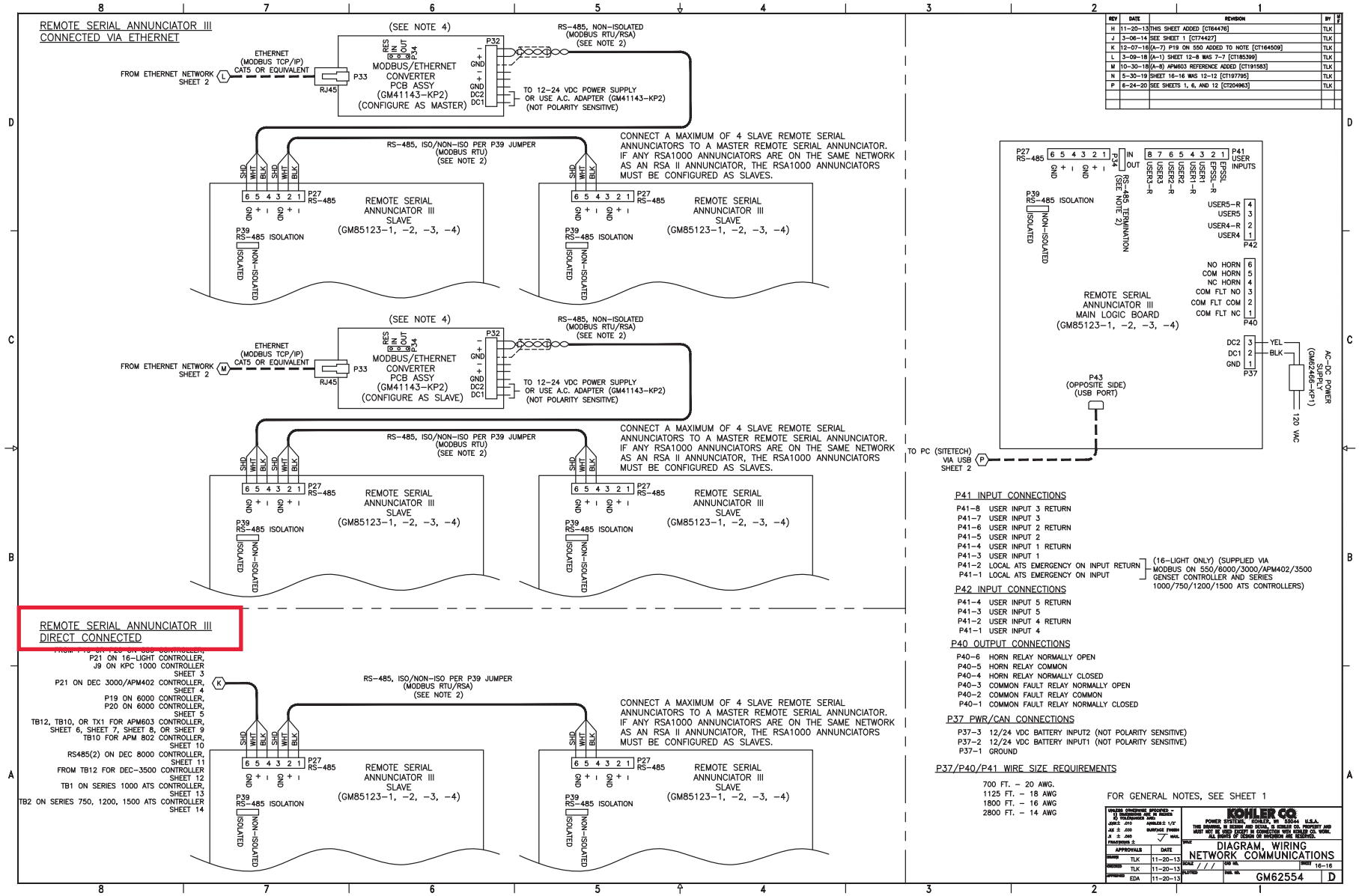
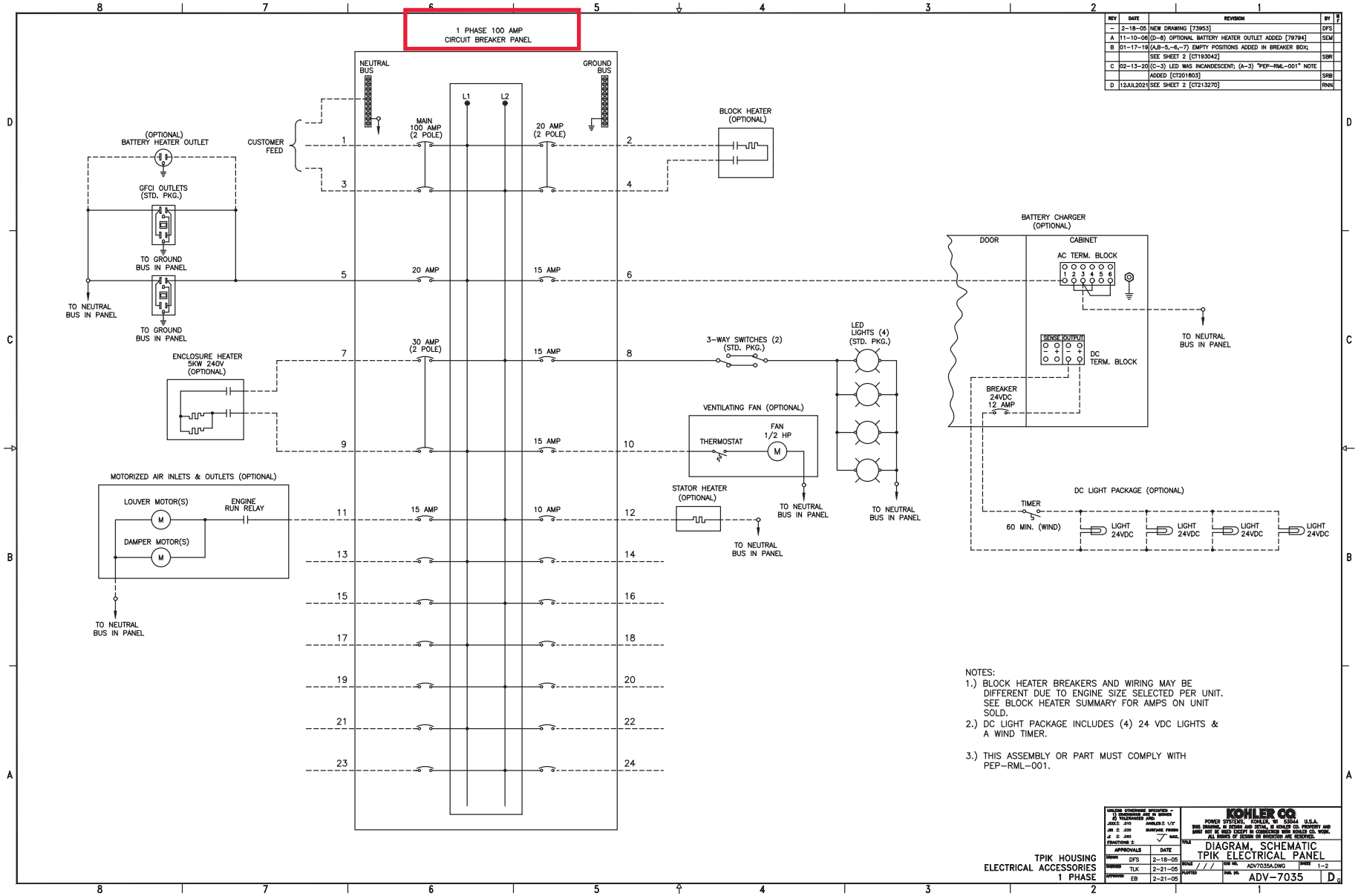
TITLE DIAGRAM, WIRING NETWORK COMMUNICATIONS

SCALE / / / SHEET 14-16

DWG. NO. GM62554 D


REMOTE SERIAL ANNUNCIATOR III
CONNECTED VIA ETHERNET
(SEE NOTE 4)
ETHERNET
(MODBUS TCP/IP)
CAT5 OR EQUIVALENT
FROM ETHERNET NETWORK
SHEET 2
RJ45
P33
MODBUS/ETHERNET
CONVERTER
PCB ASSY
(GM41143-KP2)
(CONFIGURE AS MASTER)
P32
RS-485, NON-ISOLATED
(MODBUS RTU/RSA)
(SEE NOTE 2)
TO 12-24 VDC POWER SUPPLY
OR USE A.C. ADAPTER (GM41143-KP2)
(NOT POLARITY SENSITIVE)
RS-485, ISO/NON-ISO PER P39 JUMPER
(MODBUS RTU)
(SEE NOTE 2)
CONNECT A MAXIMUM OF 4 SLAVE REMOTE SERIAL
ANNUNCIATORS TO A MASTER REMOTE SERIAL ANNUNCIATOR.
IF ANY RSA1000 ANNUNCIATORS ARE ON THE SAME NETWORK
AS AN RSA II ANNUNCIATOR, THE RSA1000 ANNUNCIATORS
MUST BE CONFIGURED AS SLAVES.
P27
RS-485
P39
RS-485 ISOLATION
ISOLATED
NON-ISOLATED
REMOTE SERIAL
ANNUNCIATOR III
SLAVE
(GM85123-1, -2, -3, -4)
REMOTE SERIAL
ANNUNCIATOR III
DIRECT CONNECTED
P21 ON 16-LIGHT CONTROLLER,
J9 ON KPC 1000 CONTROLLER
SHEET 3
P21 ON DEC 3000/APM402 CONTROLLER,
SHEET 4
P19 ON 6000 CONTROLLER,
P20 ON 6000 CONTROLLER,
SHEET 5
TB12, TB10, OR TX1 FOR APM603 CONTROLLER,
SHEET 6, SHEET 7, SHEET 8, OR SHEET 9
TB10 FOR APM 802 CONTROLLER,
SHEET 10
RS485(2) ON DEC 8000 CONTROLLER,
SHEET 11
FROM TB12 FOR DEC-3500 CONTROLLER
SHEET 12
TB1 ON SERIES 1000 ATS CONTROLLER,
SHEET 13
TB2 ON SERIES 750, 1200, 1500 ATS CONTROLLER
SHEET 14
P34
IN
OUT
RS-485 TERMINATION
(SEE NOTE 2)
P41
USER
INPUTS
USER3-R
USER3
USER2-R
USER2
USER1-R
USER1
EPSS1-R
EPSS1
P42
USER5-R
USER5
USER4-R
USER4
REMOTE SERIAL
ANNUNCIATOR III
MAIN LOGIC BOARD
(GM85123-1, -2, -3, -4)
P40
NO HORN
COM HORN
NC HORN
COM FLT NO
COM FLT COM
COM FLT NC
P37
DC2
DC1
GND
YEL
BLK
AC-DC POWER
SUPPLY
(GM62466-KP1)
120 VAC
P43
(OPPOSITE SIDE)
(USB PORT)
TO PC (SITETECH)
VIA USB
SHEET 2
P41 INPUT CONNECTIONS
P41-8 USER INPUT 3 RETURN
P41-7 USER INPUT 3
P41-6 USER INPUT 2 RETURN
P41-5 USER INPUT 2
P41-4 USER INPUT 1 RETURN
P41-3 USER INPUT 1
P41-2 LOCAL ATS EMERGENCY ON INPUT RETURN
P41-1 LOCAL ATS EMERGENCY ON INPUT
(16-LIGHT ONLY) (SUPPLIED VIA
MODBUS ON 550/6000/3000/APM402/3500
GENSET CONTROLLER AND SERIES
1000/750/1200/1500 ATS CONTROLLERS)
P42 INPUT CONNECTIONS
P41-4 USER INPUT 5 RETURN
P41-3 USER INPUT 5
P41-2 USER INPUT 4 RETURN
P41-1 USER INPUT 4
P40 OUTPUT CONNECTIONS
P40-6 HORN RELAY NORMALLY OPEN
P40-5 HORN RELAY COMMON
P40-4 HORN RELAY NORMALLY CLOSED
P40-3 COMMON FAULT RELAY NORMALLY OPEN
P40-2 COMMON FAULT RELAY COMMON
P40-1 COMMON FAULT RELAY NORMALLY CLOSED
P37 PWR/CAN CONNECTIONS
P37-3 12/24 VDC BATTERY INPUT2 (NOT POLARITY SENSITIVE)
P37-2 12/24 VDC BATTERY INPUT1 (NOT POLARITY SENSITIVE)
P37-1 GROUND
P37/P40/P41 WIRE SIZE REQUIREMENTS
700 FT. - 20 AWG.
1125 FT. - 18 AWG
1800 FT. - 16 AWG
2800 FT. - 14 AWG
FOR GENERAL NOTES, SEE SHEET 1
REV DATE REVISION BY
H 11-20-13 THIS SHEET ADDED [CT64476] TLK
J 3-06-14 SEE SHEET 1 [CT74427] TLK
K 12-07-16 (A-7) P19 ON 550 ADDED TO NOTE [CT164509] TLK
L 3-09-18 (A-1) SHEET 12-8 WAS 7-7 [CT185399] TLK
M 10-30-18 (A-8) APM603 REFERENCE ADDED [CT191583] TLK
N 5-30-19 SHEET 16-16 WAS 12-12 [CT197795] TLK
P 6-24-20 SEE SHEETS 1, 6, AND 12 [CT204963] TLK
KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.
APPROVALS DATE
DRAWN TLK 11-20-13
CHECKED TLK 11-20-13
APPROVED EDA 11-20-13
DIAGRAM, WIRING
NETWORK COMMUNICATIONS
SCALE NONE
SHEET 16-16
GM62554
D



REV	DATE	REVISION	BY	APP'D
–	2-18-05	NEW DRAWING [73953]	DFS	
A	11-10-06	(D-8) OPTIONAL BATTERY HEATER OUTLET ADDED [78794]	SEM	
B	01-17-19	(A,B-5,-6,-7) EMPTY POSITIONS ADDED IN BREAKER BOX; SEE SHEET 2 [CT193042]	SBR	
C	02-13-20	(C-3) LED WAS INCANDESCENT; (A-3) "PEP-RML-001" NOTE ADDED [CT201803]	SRB	
D	12JUL2021	SEE SHEET 2 [CT213270]	RNN	

NOTES:
1.) BLOCK HEATER BREAKERS AND WIRING MAY BE DIFFERENT DUE TO ENGINE SIZE SELECTED PER UNIT. SEE BLOCK HEATER SUMMARY FOR AMPS ON UNIT SOLD.
2.) DC LIGHT PACKAGE INCLUDES (4) 24 VDC LIGHTS & A WIND TIMER.
3.) THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001.

TPIK HOUSING
ELECTRICAL ACCESSORIES
1 PHASE

UNLESS OTHERWISE SPECIFIED – 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XX±.03 ANGLES± 1/2° .XXX ± .005 SURFACE FINISH .# ± .00# MAX. FRACTIONS ±

APPROVALS	DATE
DRAWN DFS	2-18-05
CHECKED TLK	2-21-05
APPROVED EB	2-21-05

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TITLE: DIAGRAM, SCHEMATIC
TPIK ELECTRICAL PANEL

SCALE: / / / | DWG NO. ADV7035A.DWG | SHEET 1-2
PLOTTED | DWG. NO. ADV-7035 | D

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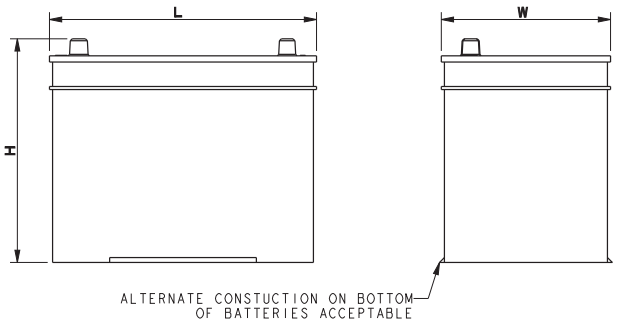
Miscellaneous

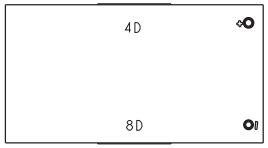
PART NO.	REV		SAE DIMENSION L	SAE DIMENSION W	SAE DIMENSION H	VOLTAGE	COLD CRANKING AMPS AT 0°F MINIMUM	RESERVE CAP MINUTES AT 80°F MINIMUM	POST LAYOUT /STYLE	CHARGE TYPE	BATTERY CONSTRUCTION	BCI GROUP	INTERNAL RESISTANCE (MΩ)
~~244578~~	~~AF~~		~~333.5 [13.13]~~	~~181.1 [7.13]~~	~~238.5 [9.39]~~	~~6~~	~~700~~	~~275~~	~~B/1~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~244750~~	~~AD~~		~~342.9 [13.50]~~	~~173.2 [6.82]~~	~~238.3 [9.38]~~	~~12~~	~~600~~	~~165~~	~~D/1~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~239102~~	~~AK~~		~~198.1 [7.80]~~	~~133.4 [5.25]~~	~~187.5 [7.38]~~	~~12~~	~~200~~	~~32~~	~~D/2~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~289515~~	~~AC~~		~~539.8 [21.25]~~	~~282.7 [11.13]~~	~~276.4 [10.88]~~	~~12~~	~~1150~~	~~450~~	~~A/1~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~291918~~	~~AC~~		~~333.2 [13.12]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~700~~	~~150~~	~~C/3~~	~~WET~~	~~SEE NOTE 1~~	~~~~	-
~~299981~~	~~AD~~		~~333.2 [13.12]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~700~~	~~150~~	~~C/3~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~254425~~	~~AD~~		~~333.2 [13.12]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~1000~~	~~200~~	~~C/3~~	~~WET~~	~~SEE NOTE 1~~	~~~~	-
~~299982~~	~~AC~~		~~333.2 [13.12]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~950~~	~~200~~	~~C/3~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~324367~~	~~BM~~		~~208.0 [8.19]~~	~~179.4 [7.06]~~	~~196.9 [7.75]~~	~~12~~	~~675~~	~~90~~	~~C/1~~	~~WET~~	~~SEE NOTE 1~~	~~~~	-
~~324368~~	~~AC~~		~~206.5 [8.13]~~	~~166.9 [6.57]~~	~~205.2 [8.08]~~	~~12~~	~~675~~	~~90~~	~~C/1~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
~~324586~~	~~BU~~	☐	~~330.2 [13.00]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~950~~	~~185~~	~~C/3~~	~~WET~~	~~SEE NOTE 2~~	~~31~~	-
324587	BT		330.2 [13.00]	173.0 [6.81]	239.8 [9.44]	12	950	200	C/3	DRY	SEE NOTE 2	31	-
~~256984~~	~~BT~~	☐	~~273.0 [10.75]~~	~~173.0 [6.81]~~	~~228.6 [9.00]~~	~~12~~	~~650~~	~~120~~	~~D/1~~	~~WET~~	~~SEE NOTE 1~~	~~24~~	-
225289	BR		273.0 [10.75]	173.0 [6.81]	228.6 [9.00]	12	650	130	D/1	DRY	SEE NOTE 1	24	-
~~345197~~	~~BS~~		~~273.0 [10.75]~~	~~173.0 [6.81]~~	~~228.6 [9.00]~~	~~12~~	~~510~~	~~80~~	~~E/1~~	~~WET~~	~~SEE NOTE 2~~	~~24F~~	-
354147	BT		330.2 [13.00]	173.0 [6.81]	239.8 [9.44]	12	700	170	C/3	WET	SEE NOTE 2	31	-
~~354148~~	~~BU~~		~~330.2 [13.00]~~	~~173.0 [6.81]~~	~~239.8 [9.44]~~	~~12~~	~~700~~	~~150~~	~~C/3~~	~~DRY~~	~~SEE NOTE 2~~	~~31~~	-
345309	BR		219.2 [8.63]	153.9 [6.06]	212.9 [8.38]	12	525	-	E/1	WET	SEE NOTE 1	55	-
~~GM22348~~	~~AC~~		~~525.3 [20.68]~~	~~220.5 [8.68]~~	~~251.0 [9.88]~~	~~12~~	~~1000~~	~~320~~	~~A/1~~	~~DRY~~	~~SEE NOTE 1~~	~~~~	-
GM22349	BR		527.1 [20.75]	282.4 [11.12]	276.4 [10.88]	12	1150	400	A/1	DRY	SEE NOTE 1	8D	-
~~GM34399~~	~~BT~~	☐	~~527.1 [20.75]~~	~~282.4 [11.12]~~	~~276.4 [10.88]~~	~~12~~	~~1400~~	~~430~~	~~A/1~~	~~WET~~	~~SEE NOTE 1~~	~~8D~~	-
~~GM48784~~	~~BT~~	☐	~~208.0 [8.19]~~	~~173.0 [6.81]~~	~~196.9 [7.75]~~	~~12~~	~~525~~	~~70~~	~~D/1~~	~~WET~~		~~26~~	-
~~GM75512~~	~~BT~~	☐	~~238.0 [9.38]~~	~~129.0 [5.06]~~	~~223.0 [8.81]~~	~~12~~	~~500~~	~~85~~	~~D/1~~	~~WET~~	~~-~~	~~51~~	-
10702000701	A		527.1 [20.75]	216.0 [8.50]	258.0 [10.16]	12	1050	290	A/1	WET	-	4D	-
10702001800	A		527.1 [20.75]	216.0 [8.50]	254.0 [10.0]	12	1110	380	A/1	AGM	SEE NOTE 3	4D	-
~~GM106681~~		☐	~~260.0 [10.25]~~	~~171.0 [6.75]~~	~~260.0 [8.19]~~	~~12~~	~~650~~	~~105~~	~~D/1~~	~~WET~~		~~34~~	~~4.20~~
GM106375	-	☐	330.2 [13.00]	171.0 [6.75]	239.8 [9.44]	12	925	180	C/3	WET	SEE NOTE 2	31	3.31
~~GM106373~~	~~-~~	☐	~~260.0 [10.25]~~	~~171.0 [6.75]~~	~~229.0 [9.00]~~	~~12~~	~~650~~	~~95~~	~~D/1~~	~~WET~~	~~SEE NOTE 1~~	~~24~~	~~4.71~~
GM106377	-	☐	527.1 [20.75]	279.0 [11.0]	254.0 [10.00]	12	1400	380	A/1	WET	SEE NOTE 1	80	2.53
GM106369	-	☐	208.0 [8.19]	172.0 [6.77]	200.0 [7.87]	12	500	95	D/1	WET	-	26	5.85
GM106374	-	☐	237.0 [9.32]	125.0 [4.94]	220.0 [8.66]	12	500	70	D/1	WET	-	51	5.00

NOTE: DIMENSIONS IN [ ] ARE ENGLISH EQUIVALENTS.

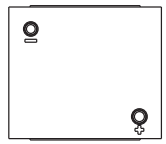
☐ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION



LAYOUT A



LAYOUT B



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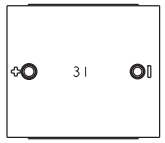
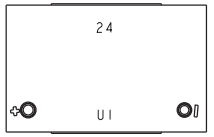
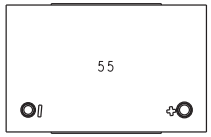


LAYOUT D



LAYOUT E



REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
BY	5-6-16	(C-6) 10702001800: COLD CRANKING AMPS 1110	
		WAS 1100 [CTI46053]	BGW
CA	4-15-19	(C-8) GM106681, GM106375, GM106373,	
		GM106377, GM106369 & GM106374 ADDED; (D-3)	
		INTERNAL RESISTANCE (MΩ) COLUMN ADDED;	
		(D-8) 324586 & 256984 VOIDED; (C-8)	
		GM34399, GM48784, GM75512	
		VOIDED;(A,B-8,7,6,5,4) VIEWS & NOTES MOVED	
		TO SHEET 2, SHEET 2 ADDED [CTI94425]	DS

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: X.XX ± 0.25, X.X ± 1.0, X ± 1.5, ANGLES ± 0°30'
SURFACE FINISH 125 MAX.
THIRD-ANGLE PROJECTION

APPROVALS		DATE
DRAWN	SLR	4-15-19
CHECKED	EB	4-15-19
APPROVED	RAD	4-15-19

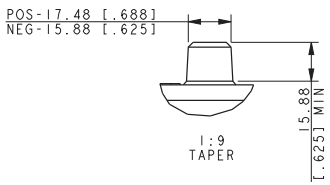
KOHLER.
KOHLER, WISCONSIN 53044

TITLE: DWG, BATTERY, DRY CHARGED

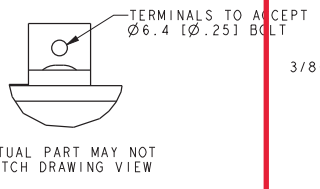
SCALE 0.30 | CAD NO. | SHEET 1 of 2

DWG NO. 244578-CMP | D

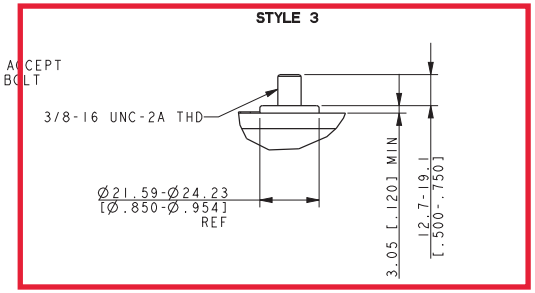
STYLE 1



STYLE 2



STYLE 3



NOTES:
1) STYLE 3 CAN BE CONVERTED TO STYLE 1 BY INSTALLATION OF 254427 STUD CONVERTION KIT.
2) BATTERIES USING ``STYLE 3'' STUDS MUST HAVE EITHER THE ``POS'' OR ``NEG'' STUD CLEARLY IDENTIFIED.
3) STYLE 3 TERMINAL TORQUE 10 Nm [15 FT LBS].
4) "POS" & "NEG" IDENTIFICATION MUST BE MARKED AS SHOWN ON THE PART LAYOUT AND WITHIN 5mm OF THE STUD.

NOTES: (APPLIES TO ALL BATTERIES)
SAE J537 DIMENSIONS ARE MAX ALLOWABLE DIMENSIONS.
COLD CRANKING AMPS ARE MINIMUM ACCEPTABLE VALUES.
HOLD DOWN DESIGN IN COMPLIANCE WITH SAE STANDARDS.
BATTERY WARNING LABEL TO BE LOCATED ON TAP OF BATTERY. (BETWEEN TERMINALS ON LAYOUT D)
MANUFACTURER MUST PROVIDE A CERTIFICATE CONTAINING MFGRS. NAME, MFGRS. PART NUMBER,
AND KOHLER PART NUMBER CERTIFYING THAT THE BATTERY WAS BUIT TO INDUSTRY STANDARDS.
SEE N.F.P.A.-110 FOR SPECIFIC DETAILS. CERTIFICATE REQUIRED ONLY ONCE PER BATTERY PART NUMBER.
MAY NOT BE CALCIUM-CALCIUTYPE.

NOTES: (CHARGE TYPE)
ALL DRY CHARGED BATTERIES MUST BE SUPPLIED WITH ACTIVATION INSTRUCTIONS ADHERED TO BATTERY
AND LOOSE. BATTERY MUST ALSO BE IDENTIFED ON TOP AS: ``DRY CHARGED, MUST ADD BATTERY GRADE
ELECTROLYTE, SEE ACTIVATION INSTRUCTIONS''.
BATTERIES SHOULD BE RECEIVED APPROPRIATELY MARKED AS DRYCHARGED OR WET STORAGE.
ONE OF THE BATTERY POSTS MUST BE SHIELDED WHEN BATTERIES ARE WET CHARGED.
BATTERIES WHEN SHIPPED DRY - DO NOT REQUIRE POST PROTECTORS.

NOTES: (BATTERY CONSTRUCTION)
1) MUST BE LEAD-CALCIUM HYBRID OR LEAD-ANTIMONY TYPE.
2) LEAD-CALCIUM GRID.
3) ABSORBED GLASS MAT. (AGM)

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
CA	4-15-19	NEW DRAWING; SEE SHEET 1 [CT194425]	DS

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES:
X.XX ± 0.25
X.X ± 1.0
X ± 1.3
ANGLES ± 0°30'
SURFACE FINISH 63 MAX.
THIRD-ANGLE PROJECTION

APPROVALS		DATE
DRAWN	DS	4-15-19
CHECKED	GFR	4-15-19
APPROVED	AMM	4-15-19

KOHLER.
KOHLER, WISCONSIN 53044

TITLE
DWG, BATTERY, DRY CHARGED

SCALE 0.30 | CAD NO. | SHEET 2 of 2

DWG NO. 244578-CMP | D

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

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

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

INPUT LEAD:
APPROXIMATELY 1.8M (72") (REF) TYPE SJTOW -40°C TO 105°C UL RATED WIRE AND INSULATION. TERMINATED IN PRE-MOLDED UL RATED 3 PRONG NEMA 5-15 MALE AC PLUG.

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

OUTPUT LEAD:
APPROX. 1.8M (72") (REF) TYPE SJTOOW -40°C TO 105°C UL RATED WIRE WITH RED AND BLACK WIRE INSULATION. TERMINATED IN 9.5 mm (REF) RING STYLE TERMINALS.

FUSES:
THE FUSE MUST BE LOCATED APPROXIMATELY 6" FROM RING TERMINAL ON RED OUTPUT LEAD.
20A ATC

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

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

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

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

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

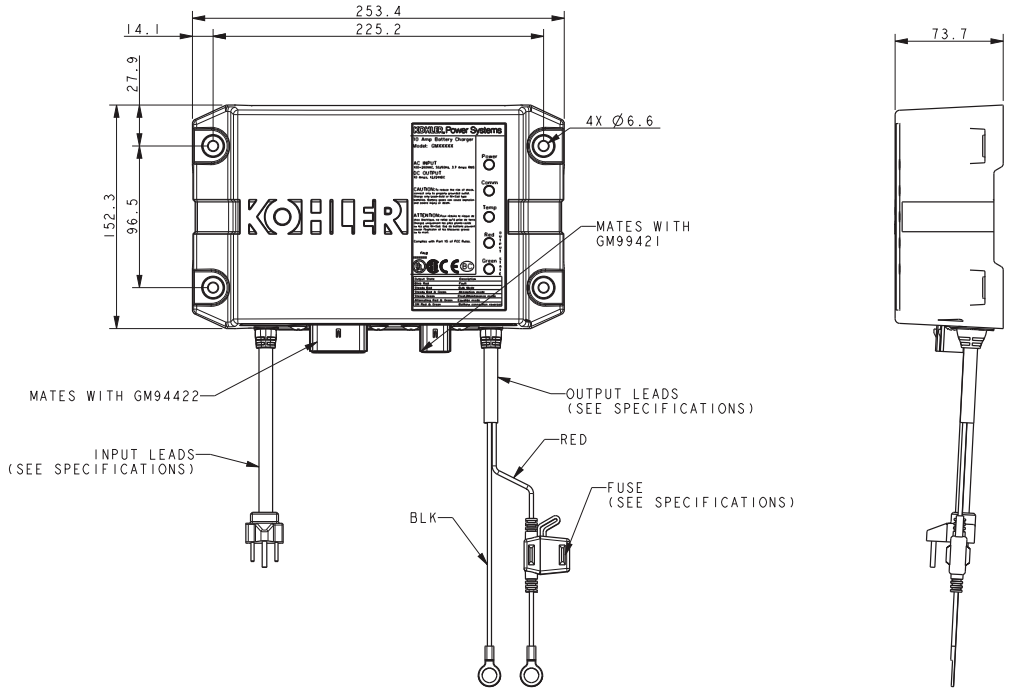
DOCUMENTATION:
THERE SHALL BE AN INSTALLATION / OPERATIONAL MANUAL SUPPLIED WITH EACH CHARGER. PER KOHLER SUPPLIED ARTWORK.

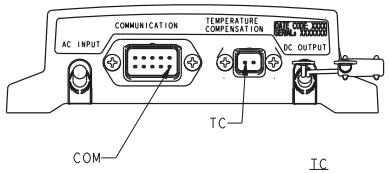
CERTIFICATIONS (US AND CANADA):
- UL1236
- CSA - C22.2 NO 107.2-01
- FCC- TITLE 47, PART 15 CLASS A
- CE
- EN 61000-6-2
- CEC AND DOE
- NFPA-110 LEVEL1 (WHEN SUPPORTED WITH APPLICABLE KOHLER CONTROLLER)
- IBC

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

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

WARRANTY:
2 YEAR FROM DATE OF PURCHASE FROM MANUFACTURE.





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

TC
PIN 1 TC SENSOR W1
2 TC SENSOR W2

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	9-22-14	NEW DRAWING [CT91634]	SAM
A	5-9-17	(C-4,2) MATING NOTE ADDED (A-2, 4) PIN CONNECTIONS ADDED [CT174256]	SAM

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 125 MAX.
THIRD ANGLE PROJECTION

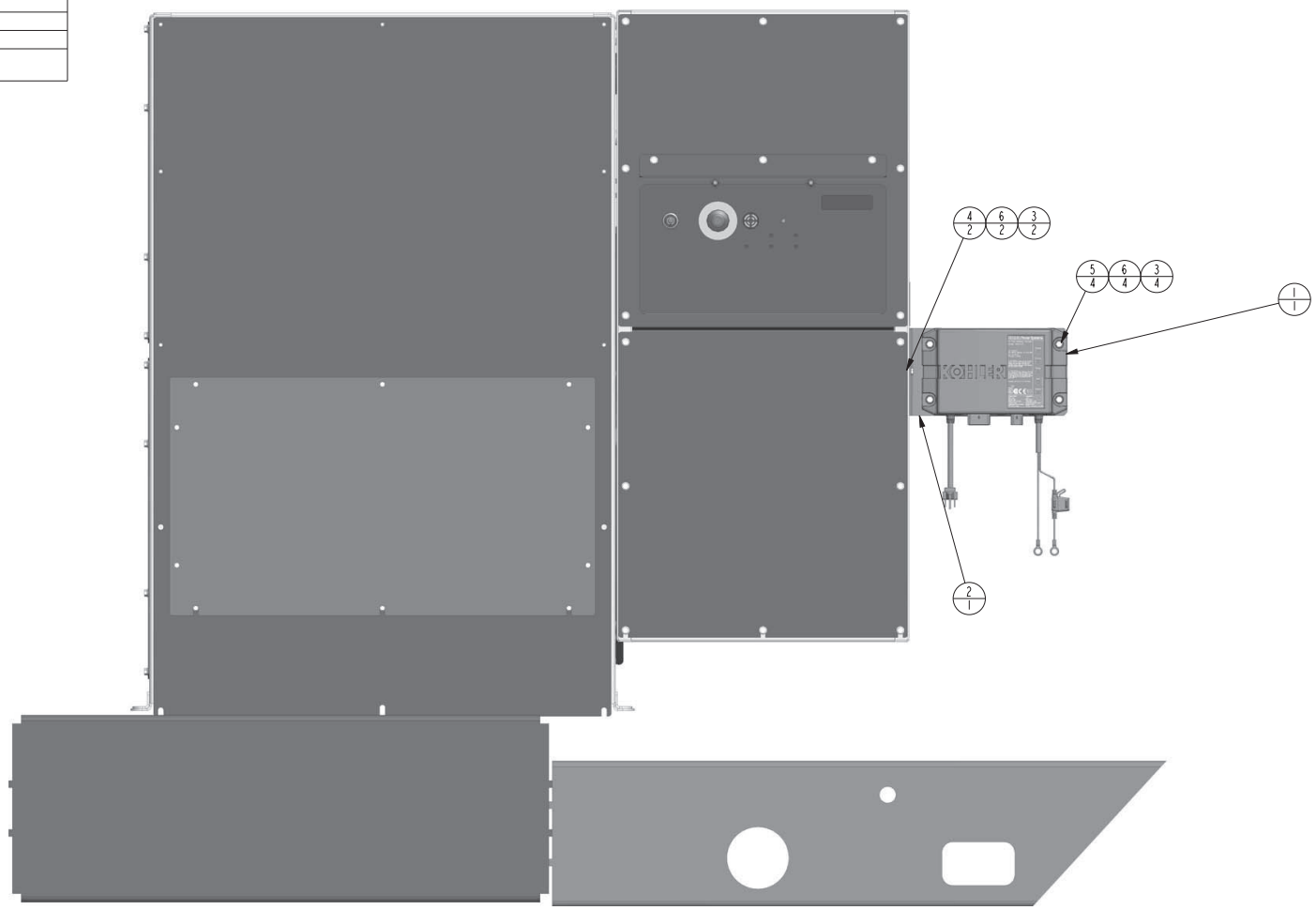
APPROVALS		DATE
DRAWN	SAM	9-22-14
CHECKED	SAM	9-22-14
APPROVED	AGT	9-22-14

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE
CHARGER, BATTERY 10 AMP

SCALE 0.50 CAD NO. SHEET 1 of 1
DWG NO. GM87448 D

ITEM	PART NO	QTY	DESCRIPTION
1	GM87448	1	CHARGER, BATTERY
2	GM95113	1	BRACKET, 10 AMP BATTERY CHARGER
3	M125A-06-80	6	WASHER, PLAIN 6.4 ID X 12.0 OD
4	M933-06016-60	2	SCREW, HEX CAP
5	M933-06030-60	4	SCREW, HEX CAP
6	M934-06-60	6	NUT, HEX 6MM
THIS IS AN AUTOMATED TABLE. ALL UPDATES MUST BE MADE IN THE ASSEMBLY.			



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

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	10-28-14	NEW DRAWING [CT97299]	SAM

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	SAM	10-28-14
CHECKED	SAM	10-28-14
APPROVED	AGT	10-28-14

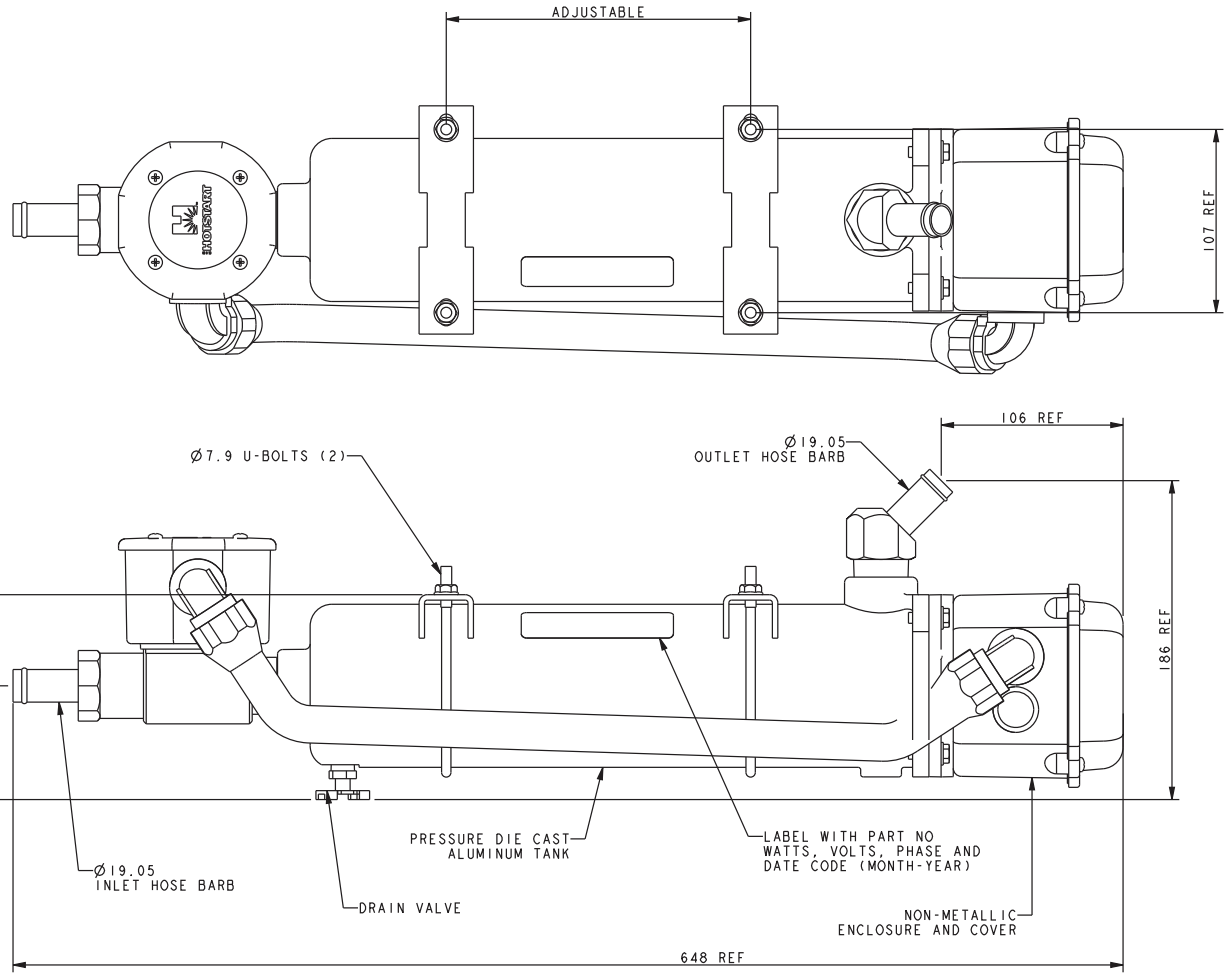
KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE
DWG, ASSY BATTERY CHARGER

SCALE 0.25 | CAD NO. | SHEET 1 of 1
DWG NO. GM95114 | D

GM95114-KAI
750-1000KW MITS

PART NO	REV	WATTS	VOLTS	AMPS	TEMP RANGE	REPLACEMENT ELEMENT
GM79182	-	4000	208	19.2	27/38° C [80/100° F]	GM29480
GM79183	-		240	14.4		GM29481
GM79184	-		480	8.3		GM29482



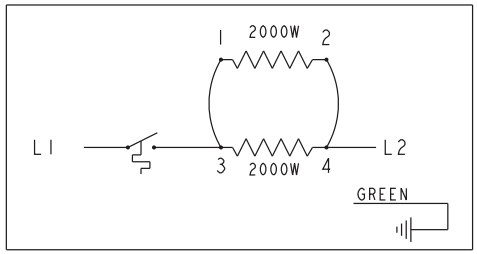


DIAGRAM ``A''
(208VAC SINGLE PHASE - PARALLEL)

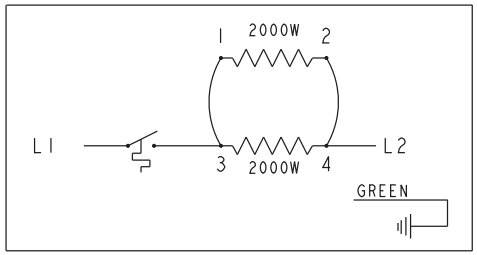


DIAGRAM ``B''
(240VAC SINGLE PHASE - PARALLEL)

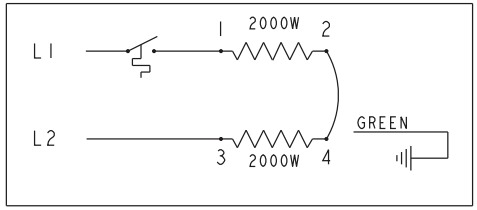


DIAGRAM ``C''
(480VAC SINGLE PHASE - SERIES)

NOTES:
1. BYPASS VALVE IS LOCATED INTERNALLY
2. MOUNTING HDW (U-BOLTS) ARE SHIPPED LOOSE

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	1-5-11	NEW DRAWING [90801-1]	SAM

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	SAM	1-5-11
CHECKED	JMS	1-5-11
APPROVED	WRD	1-5-11

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

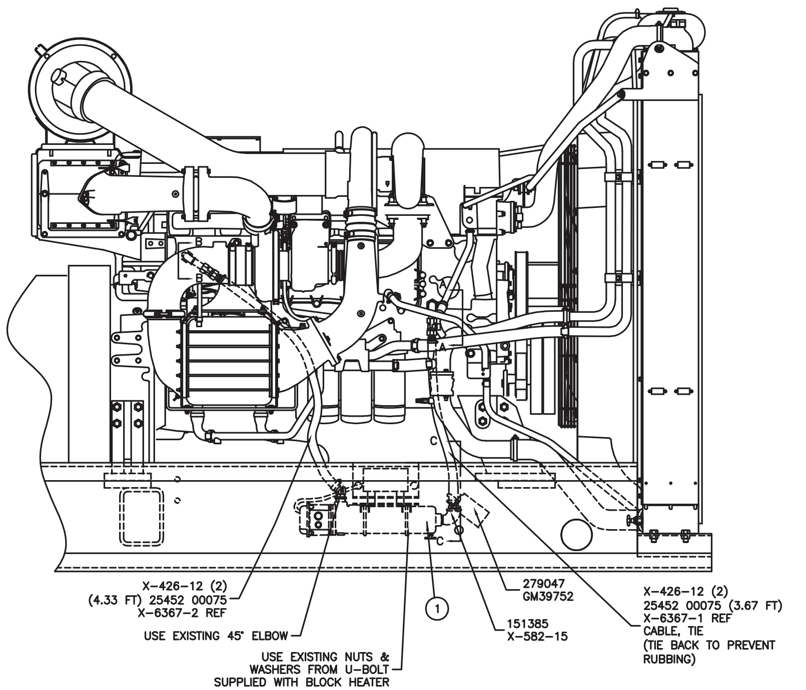
TITLE: HEATER, BLOCK WEATHER PROOF

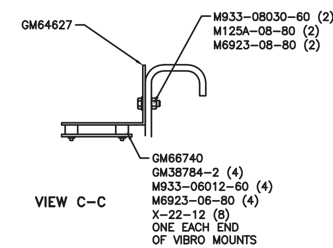
SCALE 0.70 | CAD NO. | SHEET 1 of 1

DWG NO. GM79182 | D

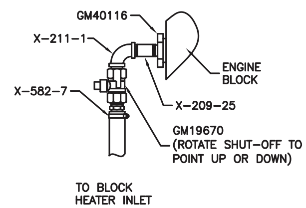
BLOCK HEATER KIT	BASE GRP	ITEM 1 BLOCK HEATER	ITEM 2 ELECTRICAL RATING
GM79187-KA1	GM79187-KB	GM79182	4000W, 190/208V, 1PH
GM79187-KA2		GM79183	4000W, 210/240V, 1PH
GM79187-KA3		GM79184	4000W, 380/480V, 1PH

REV	DATE	REVISION	BY
–	1-5-11	NEW DRAWING [80801-1]	SAM
A	4-25-11	(A-8) REF ADDED TO X-6367-2 (A-5) REF ADDED TO X-6367-1 [91537]	SAM

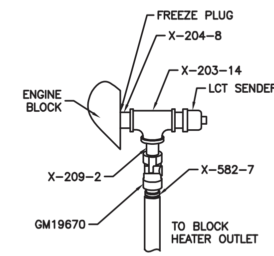




VIEW C-C



VIEW A-A



VIEW B-B

METRIC CAD FILE

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

BLOCK HEATER KIT
600 KW VOLVO

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

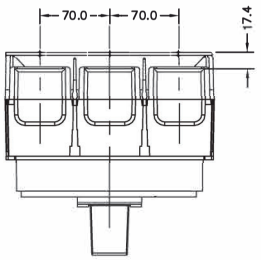
UNLESS OTHERWISE SPECIFIED – 1) DIMENSIONS ARE IN MILLIMETERS

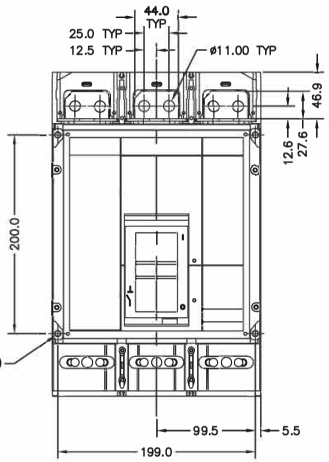
APPROVALS		DATE
DRAWN	SAM	1-5-11
CHECKED	JMS	1-6-11
APPROVED	WRD	1-7-11

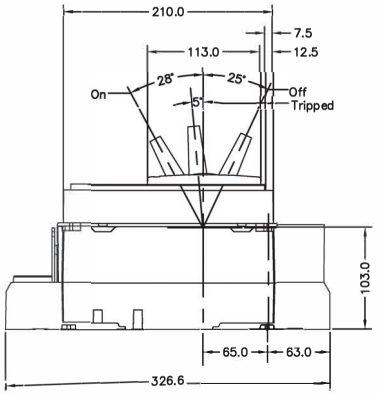
TITLE: DWG, ASSY BLOCK HEATER
SCALE .15X
SHEET 1-1
GM79187 D

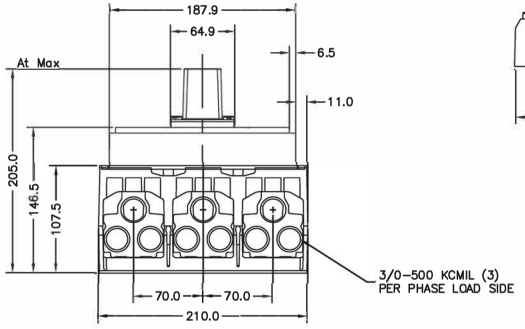
PART NO.	REV	AMPS	% RATING	GFI	INT@480V	TRIP	VENDOR NO.
GM24181-1	C	600	100	NO	35kA	5.0 LSI	PGP36060CU33A
GM24181-2	C	600	100	YES	35kA	6.0A LSIG	PGP36060CU44A
GM24181-3	C	800	80	NO	35kA	5.0 LSI	PGP36080U33A
GM24181-4	C	800	80	YES	35kA	6.0A LSIG	PGP36080U44A
GM24181-5	C	800	100	NO	35kA	5.0 LSI	PGP36080CU33A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

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





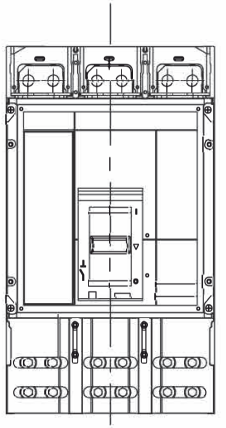


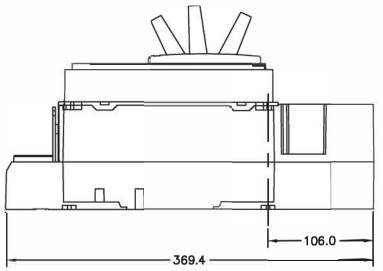


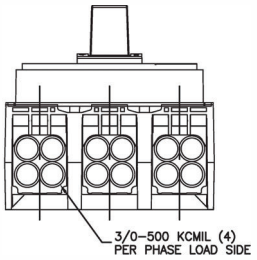
600-800A

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

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







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

METRIC CAD FILE

REV	DATE	REVISION	BY
-	3-22-02	NEW DRAWING [98246]	WSD
A	8-12-03	(D-4) THREADED BAR NOTE ADDED. [70090]	SRL
B	11-12-03	(D-7) GM24181-13 GFI NO WAS YES [70985]	WSD
C	2-23-07	(D-3) KOHLER NOTE ADDED [78285]	GFR
D	1-10-11	(D-8) GM24181-15 THRU -18 ADDED [90647-15]	WSD

SQUARE D P-FRAME CIRCUIT BREAKER
3 POLE ELECTRONIC TRIP

UNLESS OTHERWISE SPECIFIED -
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
.X,XX ± 0.25
.XX ± 1.0
X ± 1.0
ANGLES ± 0°30'
SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	WSD	3-22-02
CHECKED	WSD	3-22-02
APPROVED	AJH	3-22-02

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

TITLE: BREAKER, CIRCUIT

SCALE: .5XP | SIZE: | DWG NO. GM24181.DWG | SHEET 1-1

DWG. NO. GM24181 | D

PLOTTED DATE

STANDARD BREAKERS

RATING	AMPS	TRIP TYPE	FRAME	MAG TRIP
80% OR 100%	15	THERMAL MAGNETIC	HD	NA
	20			
	25			
	30			
	35			
	40			
	45			
	50			
	60			
	70			
	80			
	90			
	100			
	110			
	125			
	150			
	175		JD	
	200			
	225			
	250			
80%	60	ELECTRONIC LI OR LSI	HD/HG	
	100			
	150			
	250		JD/JG	
	60	ELECTRONIC LSIG	HD/HG	
	100			
	150			
	250		JD/JG	
100%	60	ELECTRONIC LI OR LSI	HD/HG	
	100			
	150			
	250		JD/HG	
	60	ELECTRONIC LSIG	HD/HG	
	100			
	150			
	250		JD/JG	
80%	30	MAGNETIC ONLY	HJ	9-325
	50			84-546
	100			180-1040
	150			348-1690
	250		JJ	684-2500
	300	THERMAL MAGNETIC	LA	NA
	350			
	400			
	400	MAGNETIC ONLY	LA	500-1000
				750-1600
				1000-2000
				1125-2250
				1250-2500
				1500-3000
				1750-3500
				2000-4000

ELECTRICALLY OPERATED BREAKERS FOR DEC6000 DPS OR APM603 PARALLELING ONLY NO ADDITIONAL BREAKERS ARE ALLOWED

RATING	AMPS	TRIP TYPE	FRAME
100%	600	ELECTRONIC LI OR LSI	PJ OR PL
	800		
	1000		
	1200		
	1600	ELECTRONIC LSI OR LSIG	NW
	2000		
	2500		
	3000		

STANDARD BREAKERS CONTINUED

RATING	AMPS	TRIP TYPE	FRAME
80%	400	ELECTRONIC LI OR LSI	LG
		ELECTRONIC LSIG	
	600	ELECTRONIC LI OR LSI	
		ELECTRONIC LSIG	
	800	ELECTRONIC LI	MG
	1000	ELECTRONIC I	PG
	1200		
	800	ELECTRONIC LSI	
	1000		
	1200		
	800	ELECTRONIC LSIG	
	1000		
	1200		
	1200	ELECTRONIC I	PJ
		ELECTRONIC LSI	
		ELECTRONIC LSIG	
100%	400	ELECTRONIC LI OR LSI	LG
		ELECTRONIC LSIG	
	600	ELECTRONIC LSI	PG
	800		
	1000		
	1200		
	600	ELECTRONIC LSIG	
	800		
	1000		
	1200	ELECTRONIC LSI	PJ
		ELECTRONIC LSIG	
80%	1600	ELECTRONIC I	RJ
	2000		
	2500		
80% OR 100%	1600	ELECTRONIC LSI	
	2000		
	2500		
	1600	ELECTRONIC LSIG	
	2000		
	2500		
100%	1600	ELECTRONIC LSI OR LSIG	NW
	2000		
	2500		
	3000		

ELECTRONIC TRIP UNITS

FRAME	TRIP UNIT	
H	LI	MICROLOGIC 3.2
	LSI	MICROLOGIC 3.2S
	LSIG	MICROLOGIC 6.2A
J	LI	MICROLOGIC 3.2
	LSI	MICROLOGIC 3.2S
	LSIG	MICROLOGIC 6.2A
LG	LI	MICROLOGIC 3.3
	LSI	MICROLOGIC 3.3S
	LSIG	MICROLOGIC 6.3A
M	LI	ET 1.0
P	I	ET 1.01
	LI	MICROLOGIC 3.0
	LSI	MICROLOGIC 5.0
	LSIG	MICROLOGIC 6.0A
R	I	ET 1.01
	LSI	MICROLOGIC 5.0
	LSIG	MICROLOGIC 6.0A
NW	LSI	MICROLOGIC 5.0
	LSIG	MICROLOGIC 6.0A

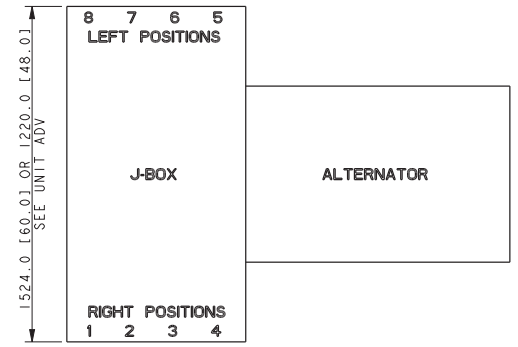
AL/CU MECHANICAL LOAD LUGS PER PHASE

BREAKER FRAME	AMPS	WIRE RANGE	WIRE BENDING SPACE 4M/5M	WIRE BENDING SPACE 7M
H	15-150	(1) #14 TO 3/0	653 [25.7]	785 [30.9]
J	175	(1) 1/0 TO 4/0	639 [25.1]	771 [30.3]
	200-250	(1) 3/0 TO 350 KCMIL		
LA	300-400	(1) #1 TO 600 KCMIL OR (2) #1 TO 250 KCMIL	551 [21.6]	683 [26.8]
LG	400-600	(2) 2/0 TO 500 KCMIL AL/CU	559 [22.0]	691 [27.2]
M	800	(3) 3/0 TO 500 KCMIL	523 [20.5]	655 [25.7]
P	250-800			
P	1000-1200	(4) 3/0 TO 500 KCMIL	480 [18.9]	612 [24.0]
R	1600-2500	(8) 1/0-750 KCMIL OR (16) 1/0-300 KCMIL	483 [19.0]	615 [24.2]
NW	3000	(10) 1/0-750 KCMIL OR (20) 1/0-300 KCMIL	510 [20.0]	642 [25.2]

WIRE BENDING SPACE DIMENSIONS ARE FROM BOTTOM OF LOAD LUGS TO TOP OF ENTRANCE PANEL

UL INTERRUPT RATINGS

BREAKER	kA ∘ 240V	kA ∘ 480V	kA ∘ 600V
HD	25	18	14
HG	65	35	18
HJ	100	65	25
JD	25	18	14
JG	65	35	18
JJ	100	65	25
LA	42	30	22
LG	65	35	18
MG	65	35	18
PG	65	35	18
PJ	100	65	25
PL	125	100	25
RJ	100	65	25
NW	100	100	85



NOTES:

1) SEE UNIT DIMENSION PRINT (ADV-XXXX) FOR ADDITIONAL DIMENSIONS, JUNCTION BOX AND STUB-UP LOCATION.

2) CONSULT FACTORY FOR BREAKER COMBINATIONS NOT SHOWN ON THIS PRINT.

3) MECHANICAL LUGS ARE AVAILABLE FOR NEUTRAL AND LOAD BUS KIT. SEE ADV-7376.

4) UNITS ARE SHIPPED WITH NEUTRAL BUS ASSEMBLIES THAT ARE NOT BONDED TO GROUND. IF A GROUND FAULT CIRCUIT BREAKER OR GROUND FAULT RELAY IS PROVIDED THE NEUTRAL WILL BE BONDED TO GROUND. CONSULT NEC AND/OR LOCAL ELECTRICAL CODES FOR THE PROPER INSTALLATION REQUIREMENTS.

5) CIRCUIT BREAKER FRAMES REFER TO STANDARD SCHNEIDER PRODUCT.

6) STANDARD NEUTRALS PROVIDED ARE SIZED FOR MAXIMUM UNIT AMPS. GFI NEUTRALS ARE MATCHED TO THEIR CIRCUIT BREAKER AMPS.

7) DIMENSIONS ARE MM, DIMENSIONS IN [ ] ARE INCHES.

8) SEE IB49 FOR PART NUMBER CROSS REFERENCE.

9) BREAKER AND LOAD BUS PHASING ON RIGHT IS A-B-C, ON LEFT IS C-B-A.

10) 48" WIDE JUNCTION BOXES ARE NOT AVAILABLE WITH M OR P FRAMES IN POSITION 3 & 4, OR LG FRAME BREAKERS IN POSITION 4.

STANDARD BREAKER COMBINATIONS

POSITIONS (SEE DIAGRAM)			
1 OR 5	2 OR 6	3 OR 7	4 OR 8
H/J			
H/J	H/J		
H/J	H/J	H/J	
H/J	H/J	H/J	H/J
LA			
LA	H/J		
LA	LA		
LA	H/J	H/J	
LA	LA	H/J	
LA	LA	LA	
LA	H/J	H/J	H/J
LA	LA	H/J	H/J
LA	LA	LA	H/J
LA	LA	LA	LA
LG			
LG	H/J		
LG	LA		
LG	LG		
LG	H/J	H/J	
LG	LA	H/J	
LG	LA	LA	
LG	LG	H/J	
LG	LG	LA	
LG	LG	LG	
LG	H/J	H/J	H/J
LG	LA	H/J	H/J
LG	LA	LA	H/J
LG	LA	LA	LA
LG	LG	H/J	H/J
LG	LG	LA	H/J
LG	LG	LA	LA
LG	LG	LG	H/J
LG	LG	LG	LA
LG	LG	LG	LG
M/P			
M/P		H/J	
M/P		LA	
M/P		LG	
M/P		M/P	
M/P		H/J	H/J
M/P		LA	H/J
M/P		LA	LA
M/P		LG	H/J
M/P		LG	LA
M/P		LG	LG
R			
NW			
LOAD BUS			

NOTE:
H, J AND LG-FRAMES WITH LSIG TRIP REQUIRE (2) SPACES. (ONE FOR BREAKER, ONE FOR LSIG NEUTRAL). THESE COMBINATIONS ARE NOT REFLECTED IN THE CHART ABOVE.

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
C	11-7-12	(A-5) NOTE 10 ADDED; (C-4) J-BOX WIDTH DIMS ADDED; SHEET 6 ADDED [CT281281]	WSD
D	11-2-16	(D-5) REMOVED SEPARATE LINES FOR H & J 100% LUGS; ADDED DATA FOR H, J & LG LSI TRIPS [CT1114236]	WSD
E	4-26-18	(D-4) NW:(10)OR(20) WAS (8)OR(16) [CT186966]	WSD
F	3-25-19	(A-8) EOB TABLE ADDED [CT194577]	WSD
G	11-11-19	(A-8) NW EOBS ADDED, NOTE 10 UPDATED TO ALLOW NW'S ON 48" BOXES; SEE SHT 3 [CT199840]	WSD
H	6-23-21	(D-6) M 800A WAS 700 & 800,LI WAS I [CT212837]	WSD

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

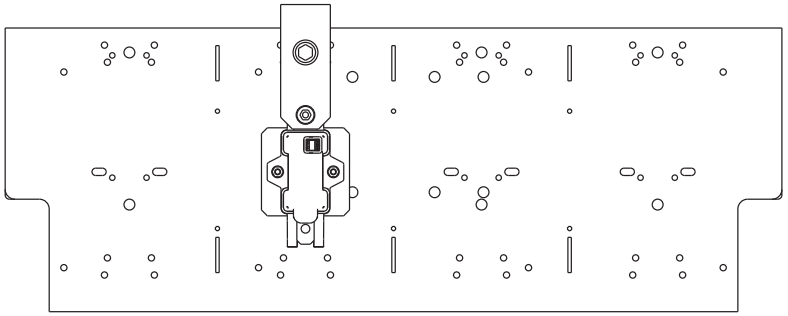
APPROVALS		DATE
DRAWN	WSD	4-29-11
CHECKED	WSD	4-29-11
APPROVED	AJH	4-29-11

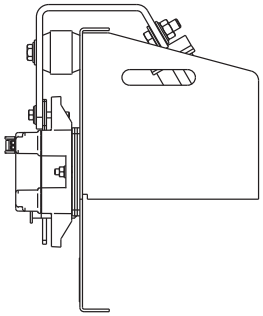
TITLE: DIMENSION PRINT

SCALE | CAD NO. | SHEET 1 of 6

DWG NO. ADV-8030 | D

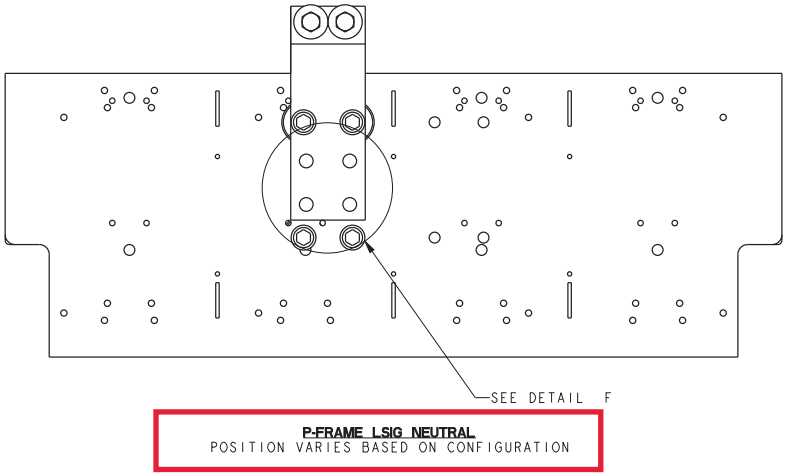
4M/5M/7M GENSETS



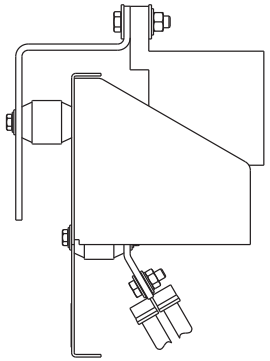


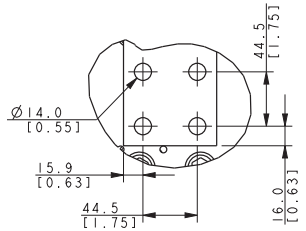
H, J OR LG-FRAME LSIG NEUTRAL
250A J SHOWN
POSITION VARIES BASED ON CONFIGURATION

MECHANICAL LOAD LUGS INCLUDED WITH H, J & LG LSIG NEUTRALS		
BREAKER FRAME	**AMPS**	**WIRE RANGE**
H	60-150	(1) #14 TO 3/0 AWG AL/CU
J	250	(1) 3/0 TO 350 KCMIL AL/CU
LG	400-600	(2) 4/0 TO 500 KCMIL AL/CU



P-FRAME LSIG NEUTRAL
POSITION VARIES BASED ON CONFIGURATION





DETAIL F
SCALE 0.500

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	4-29-11	NEW DRAWING [91732]	WSD
A	12-12-11	SEE SHEETS 1 & 5 [CN00646]	WSD
B	10-3-12	SEE SHEETS 1 & 3 [CT26372]	WSD
C	11-7-12	SEE OTHER SHEETS [CT28128]	WSD
D	11-2-16	SEE SHEETS 1 & 2 [CT114236]	WSD
E	4-26-18	SEE SHEET 1 [CT186966]	WSD
F	3-25-19	SEE SHEET 1 [CT194577]	WSD
G	11-11-19	SEE SHEETS 1 & 3 [CT199840]	WSD
H	6-23-21	SEE SHEET 1 [CT212837]	WSD

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

THIRD-ANGLE PROJECTION

APPROVALS		DATE
DRAWN	WSD	4-29-11
CHECKED	WSD	4-29-11
APPROVED	AJH	4-29-11

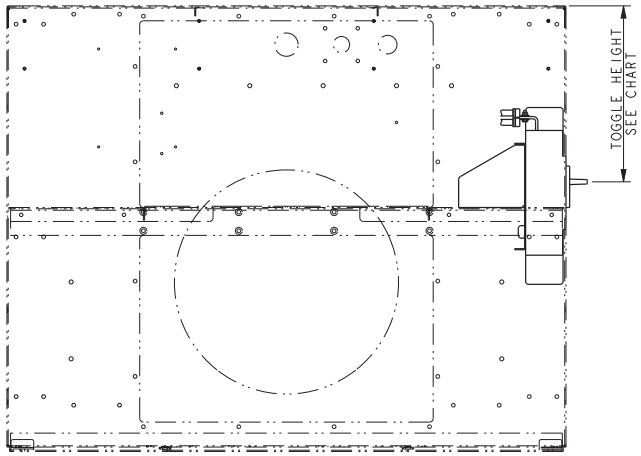
KOHLER
KOHLER, WISCONSIN 53044

TITLE: **DIMENSION PRINT**

SCALE | CAD NO. | SHEET 4 of 6

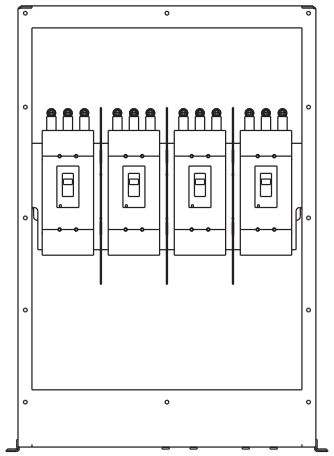
DWG NO. **ADV-8030** | **D**

BREAKER AND LOAD BUS PHASING		
RIGHT		
A	B	C
LEFT		
C	B	A

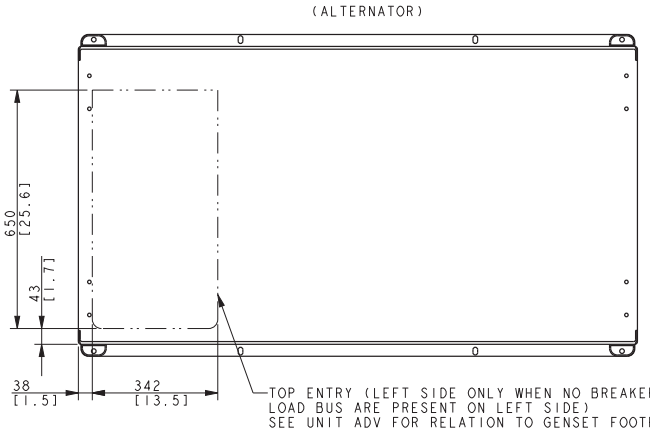


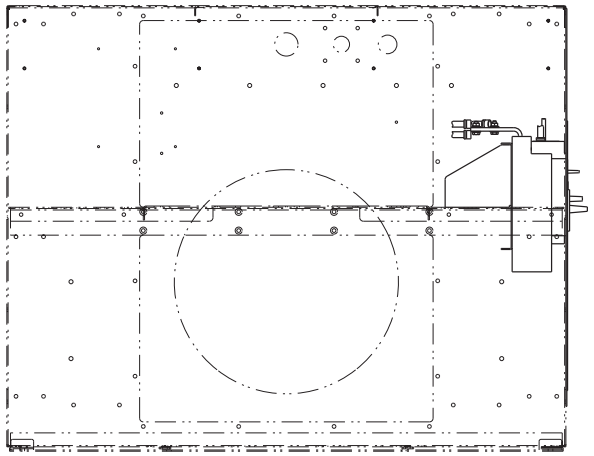
BREAKER	TOGGLE HEIGHT
J/H	453 [17.8]
LA	527 [20.7]
LG	480 [18.9]
P/M	555 [21.8]
RJ	530 [20.9]
NW	228 [9.0]

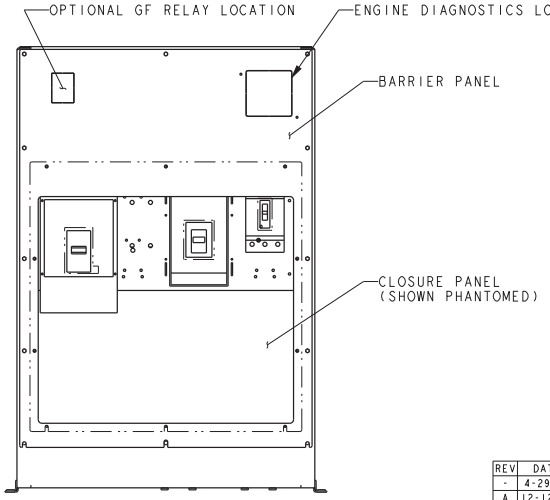
NOTE: TOGGLE HEIGHTS ARE FROM TOP OF J-BOX TO CENTER POSITION. NW DIMENSION IS TO TOP OF CHARGING HANDLE. TO CALCULATE HEIGHT FROM FLOOR, USE THESE HEIGHTS IN COMBINATION WITH DIMENSIONS FROM UNIT ADV'S.



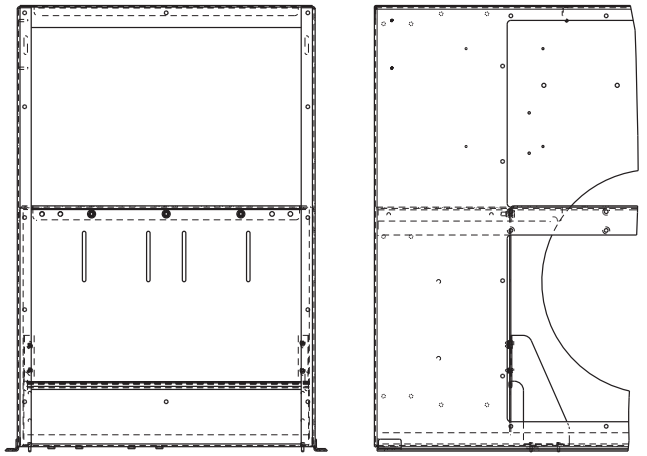
SMALL CIRCUIT BREAKERS
(4) LG-FRAMES SHOWN WITH SEPARATORS
RIGHT-FACING SHOWN, LEFT FACING AVAILABLE
SEE CHARTS ON PAGE 1 FOR LUGS AND BENDING SPACE







SMALL CIRCUIT BREAKERS
P, LA & J-FRAMES SHOWN
RIGHT-FACING SHOWN, LEFT FACING AVAILABLE
SEE CHARTS ON PAGE 1 FOR LUGS AND BENDING SPACE



LOWER COMPARTMENT SEPARATOR
SHOWN ON LEFT SIDE, EITHER SIDE OR BOTH AVAILABLE

4M/5M/7M GENSETS

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	4-29-11	NEW DRAWING [91732]	WSD
A	12-12-11	(C-7) TOGGLE HEIGHT CHART ADDED; (B-2) LOWER COMPARTMENT SEPARATOR ADDED [CN00646]	WSD
B	10-3-12	SEE SHEETS 1 & 3 [CT26372]	WSD
C	11-7-12	SHEET 6 ADDED [CT28128]	WSD
D	11-2-16	SEE SHEETS 1 & 2 [CT114236]	WSD
E	4-26-18	SEE SHEET 1 [CT186966]	WSD
F	3-25-19	SEE SHEET 1 [CT194577]	WSD
G	11-11-19	SEE SHEETS 1 & 3 [CT199840]	WSD
H	6-23-21	SEE SHEET 1 [CT212837]	WSD

DO NOT SCALE, REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

THIRD-ANGLE PROJECTION

APPROVALS		DATE
DRAWN	WSD	4-29-11
CHECKED	WSD	4-29-11
APPROVED	AJH	4-29-11

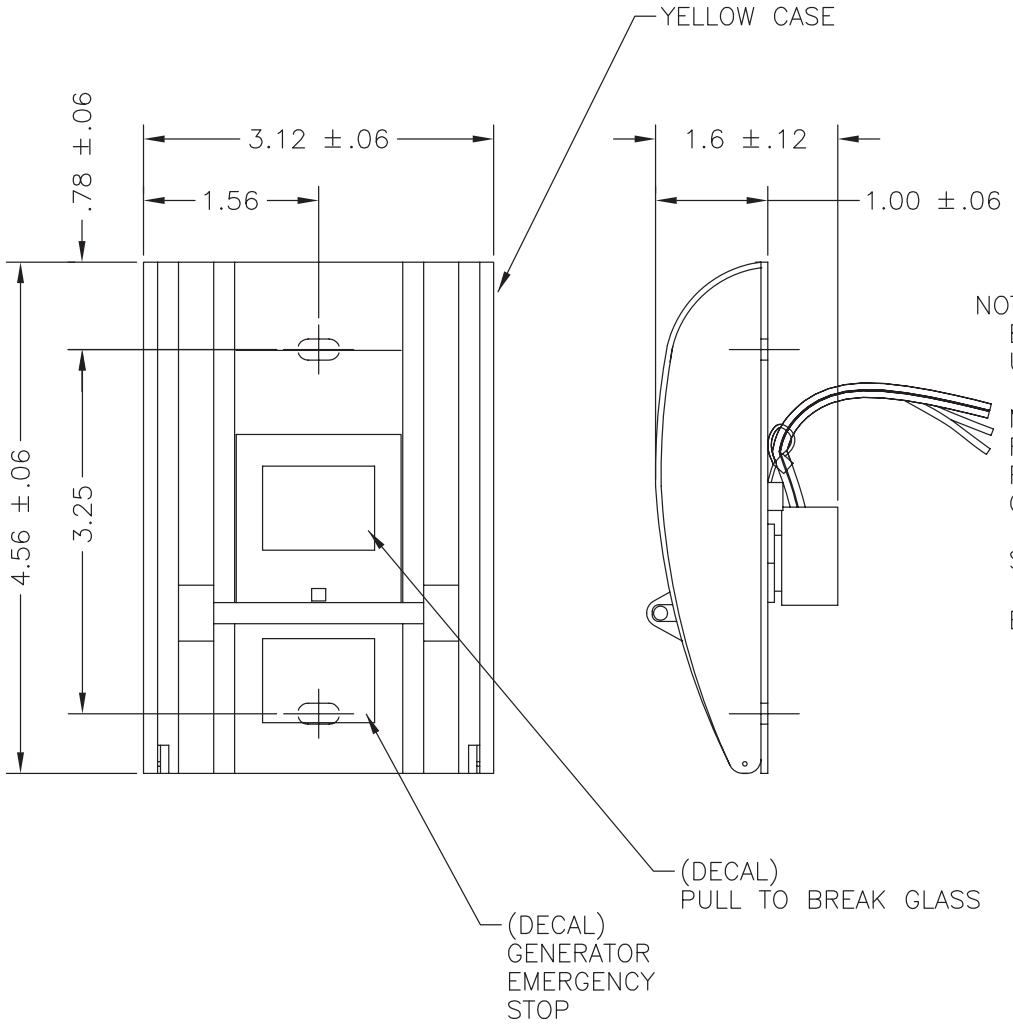
TITLE: DIMENSION PRINT

SCALE | CAD NO. | SHEET 6 of 6

DWG NO. ADV-8030 | D

PART NO.	DESCRIPTION
222655	REPLACEMENT GLASS ROD

REV	DATE	REVISION	BY	M F
A	9-1-93	(B-2) SWITCHING NORMALLY CLOSED WAS SWITCHING		
		NORMALLY OPEN (CAN BE CONVERTED TO N.C.)	SJV	X
B	3-7-94	GENERIC TITLEBLOCK ADDED	PWH	



NOTE:
BREAKGLASS TYPE FOR CLOSED CIRCUIT OPERATION UP TO 48 VOLTS.

MOUNTING INSTRUCTIONS:
FOR WALL MOUNTING USE #6 ROUND HEAD WOOD SCREWS. FOR MOUNTING ON GEM BOX OR SINGLE GANG PLASTER COVER, USE MACHINE SCREWS IN ENVELOPE.

SWITCHING NORMALLY CLOSED.

EXTRA PIECE OF GLASS TO BE SUPPLIED WITH SWITCH.

MATERIAL: METAL (STEEL)

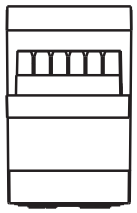
UNLESS OTHERWISE SPECIFIED –
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES ARE:
.XXX± .010 ANGLES± 1/2°
.XX ± .030 SURFACE FINISH
.X ± .060 √ MAX.
FRACTIONS ±

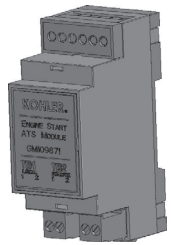
APPROVALS	DATE
DRAWN KDW	8-12-92
CHECKED EB	9-9-92
APPROVED RLD	9-9-92

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

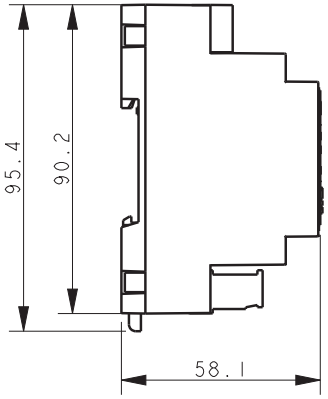
TITLE: SWITCH, EMERGENCY STOP

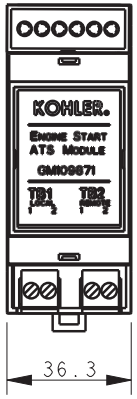
SCALE	CAD NO.	SHEET
FULL	A222654.dwg	1-1
PLOTTED	DWG. NO. A-222654	B G





SCALE 0.50





NOTES:

1) OPERATING TEMP: -20°C TO 70°C
2) STORAGE TEMP: -40°C TO 85°C
3) MOUNTING: 35mm DIN RAIL
4) WIRE GAUGE: 12 - 30 AWG STRANDED
5) MAX DISTANCE: CONNECTION BETWEEN ATS MODULE AND GEN MODULE SHALL NOT EXCEED 1000'
6) MAX RESISTANCE DROP: 100Ω (COMPLETE LOOP)
7) THIS PART TO BE USED ON A LISTED MODEL AND CANNOT BE CHANGED WITHOUT PRIOR LISTING SERVICE APPROVAL, UL LISTED
8) PRODUCT MUST ADHERE TO KOHLER PRODUCT ENVIRONMENTAL POLICY PEP-RML-001
9) SEE SHEET 2 FOR KOHLER BRAND LABEL ARTWORK

WEIGHT: .07kg [.15 LB.]

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	12-4-19	NEW DRAWING [CT199085]	ZHK

DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0°30'
SURFACE FINISH MAX.

THIRD ANGLE PROJECTION

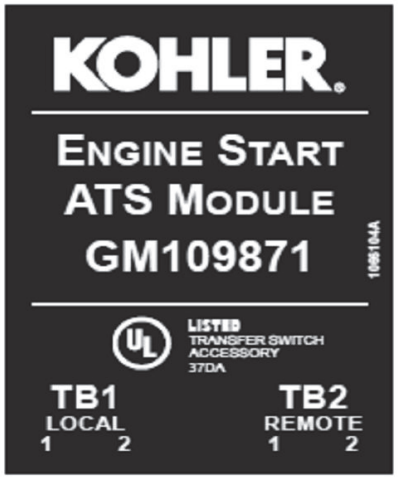
APPROVALS		DATE
DRAWN	ZHK	9-27-19
CHECKED	MTL	9-27-19
APPROVED	MTL	9-27-19

KOHLER.
KOHLER, WISCONSIN 53044

TITLE
ENGINE START INTEGRITY, ATS MODULE

SCALE	CAD NO.	SHEET
0.70		1 of 2

DWG NO. GM109871 B



KOHLER BRANDING

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	12-4-19	NEW DRAWING [CT199085]	ZHK

DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES:
X.XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0°30'
SURFACE FINISH √ MAX.

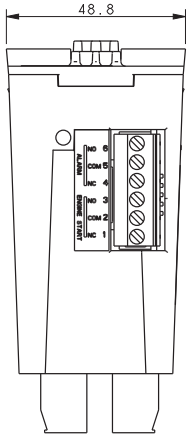
THIRD ANGLE PROJECTION

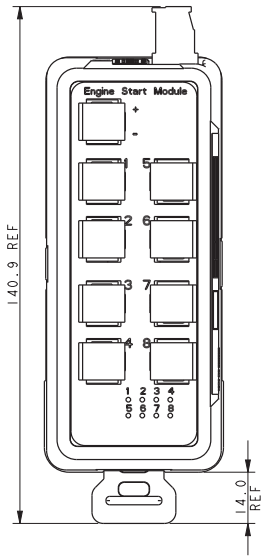
APPROVALS		DATE
DRAWN	ZHK	9-27-19
CHECKED	MTL	9-27-19
APPROVED	MTL	9-27-19

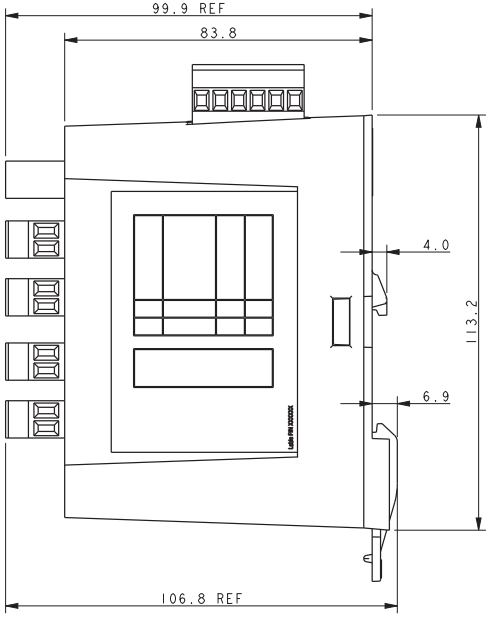
TITLE
ENGINE START INTEGRITY, ATS MODULE

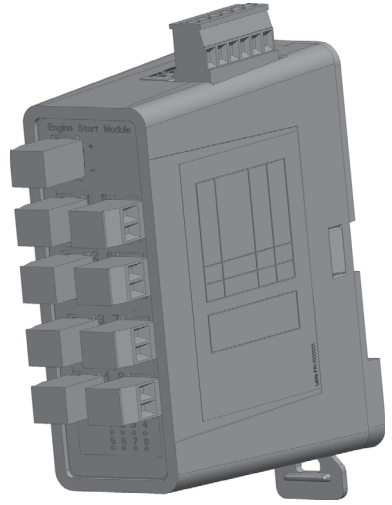
SCALE	CAD NO.	SHEET
0.70		2 of 2

DWG NO. GM109871 B









SCALE 1.50

NOTES:

1) INPUT: 9 - 27V DC, 15W (MAX 33W)
2) OPERATING TEMP: -20°C TO 70°C
3) STORAGE TEMP: -40°C TO 85°C
4) MOUNTING: 35mm DIN RAIL
5) WIRE GAUGE: 12 - 30 AWG STRANDED
6) ENGINE START RELAY CONTACT: 1A 30VDC (FORM C)
7) ALARM RELAY CONTACT: 1A 30VDC (FORM C)
8) MAX DISTANCE: CONNECTION BETWEEN ATS MODULE AND GEN MODULE SHALL NOT EXCEED 1000'
9) MAX RESISTANCE DROP: 100Ω (COMPLETE LOOP)
10) THIS PART TO BE USED ON A LISTED MODEL AND CANNOT BE CHANGED WITHOUT PRIOR LISTING SERVICE APPROVAL, UL LISTED
11) PRODUCT MUST ADHERE TO KOHLER PRODUCT ENVIRONMENTAL POLICY PEP-RML-001
12) SEE SHEET 2 FOR KOHLER BRAND LABEL ARTWORK

WEIGHT: .2kg [.45 LB.]

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	12-4-19	NEW DRAWING [CT199085]	ZHK

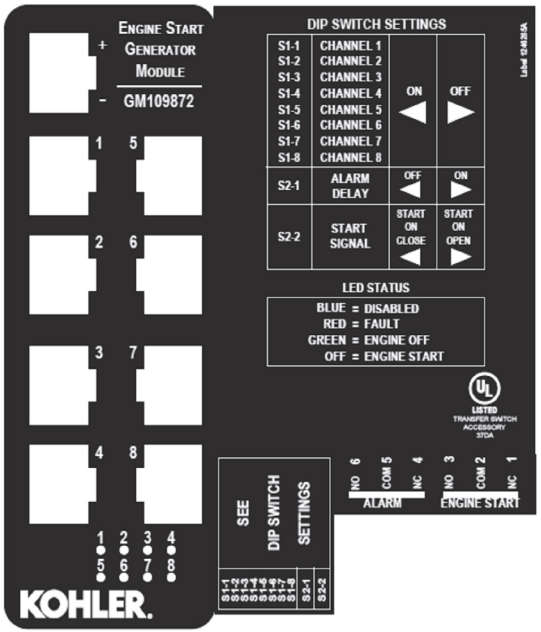
UNLESS OTHERWISE SPECIFIED:
1) DIMENSIONS ARE IN MILLIMETERS
2) TOLERANCES ARE:
X .XX ± 0.25
X.X ± 1.0
X ± 1.5
ANGLES ± 0° 30'
SURFACE FINISH 125 MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	ZHK	9-24-19
CHECKED	MTL	9-24-19
APPROVED	MTL	9-24-19

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: ENGINE START INTEGRITY, GEN MODULE

SCALE 1.50 | CAD NO. | SHEET 1 of 2
DWG NO. GM109872 | D



KOHLER BRANDING

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	12-4-19	NEW DRAWING [CTI99085]	ZHK

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

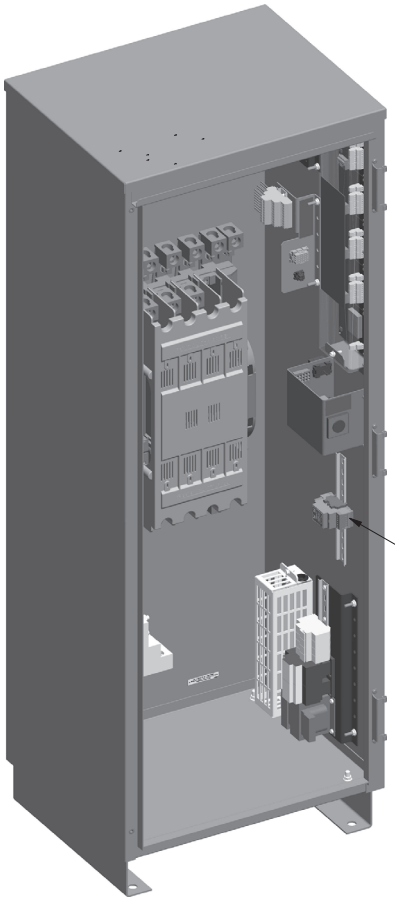
APPROVALS		DATE
DRAWN	ZHK	9-24-19
CHECKED	MTL	9-24-19
APPROVED	MTL	9-24-19

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: ENGINE START INTEGRITY, GEN MODULE

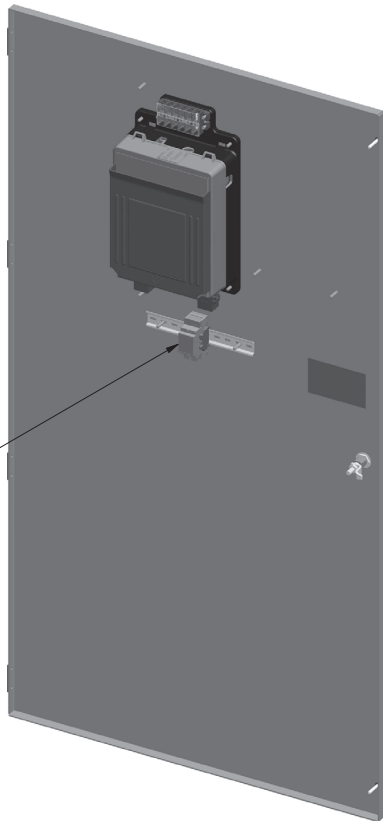
SCALE 1.50 | CAD NO. | SHEET 2 of 2

DWG NO. GM109872 | D



GM23502
GM109871
GM105838 (2)
VHB TAPE

TYPICAL MOUNTING
LOCATION, ALTERNATELY
THE DIN RAIL CAN BE
MOUNTED ON ANY
UNUSED ACCESSORY
MOUNTING STUD USING
X-6210-2 (2)



GM23502
GM109871
GM105838 (2)
X-6210-2 (2) OR
VHB TAPE

ALTERNATE MOUNTING LOCATION ON DOOR

NOTE:
THIS ASSEMBLY OR PART MUST
COMPLY WITH PEP-RML-001

WIRING DIAGRAM: GM109876

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	10-7-19	NEW DRAWING [CT199086]	ZHK

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	ZHK	10-1-19
CHECKED	MTL	10-1-19
APPROVED	MTL	10-1-19

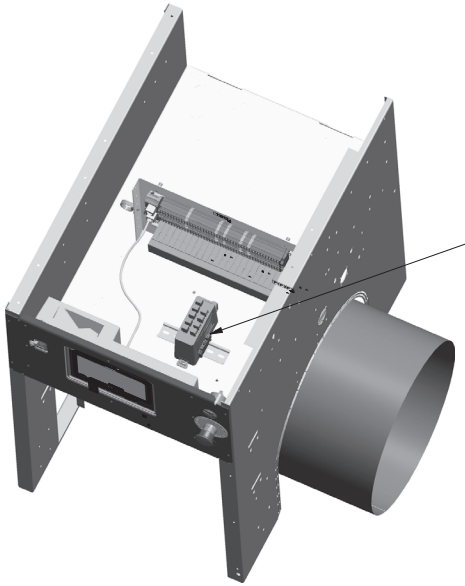
KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: **ENGINE START INTEGRITY MODULE, ATS**

SCALE 0.20 | CAD NO. | SHEET 1 of 1

DWG NO. **GM109873** | **D**

GM109873-KP1



GM47488
GM109872
GM105838 (2)
VHB TAPE OR
SAI1939 (2)

TYPICAL MOUNTING
LOCATION IN J-BOX
STYLE CONTROLS
SECTION.

GM47488
GM109872
GM105838 (2)
VHB TAPE OR
SAI1939 (2)

TYPICAL MOUNTING
LOCATION IN PEDESTAL
STYLE CONTROLS
SECTION.

NOTE:
THIS ASSEMBLY OR PART MUST
COMPLY WITH PEP-RML-001

WIRING DIAGRAM: GM109876

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	10-7-19	NEW DRAWING [CT199086]	ZHK

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 32 MAX.
THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	ZHK	10-3-19
CHECKED	MTL	10-3-19
APPROVED	MTL	10-3-19

KOHLER CO. METRIC PRO-E
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: **ENGINE START INTEGRITY MODULE, GEN**

SCALE 0.30 | CAD NO. | SHEET 1 of 1

DWG NO. **GM109874** | **D**

GM109874-KP1

KOHLER®

Warranty

Stationary Standby and Prime Power Industrial Generator Set One-Year or Two Thousand (2000)-Hour Limited Warranty

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

Kohler Product	**Warranty Coverage**
Stationary Standby Generator Set & Accessories	One (1) year from registered startup or two thousand (2000) hours (whichever occurs first). In any event, the warranty period will expire not later than thirty (30) months from the date of shipment from Kohler Co.'s factory.
Stationary Prime Power Generator Set & Accessories	One (1) year from registered startup or two thousand (2000) hours (whichever occurs first). In any event, the warranty period will expire not later than thirty (30) months from the date of shipment from Kohler Co.'s factory.

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

1. Normal wear, routine tuneups, tuneup parts, adjustments, and periodic service.
2. Damage, including but not limited to damage caused by accidents, improper installation or handling, faulty repairs not performed by an authorized Kohler service representative, improper storage, or acts of God.
3. Damage caused by operation at speeds, or with fuel, loads, conditions, modifications or installation contrary to published specifications.
4. Damage caused by negligent maintenance such as:
   a. Failure to provide the specified type and sufficient quantity of lubricating oil.
   b. Failure to keep the air intake and cooling fin areas clean.
   c. Failure to service the air cleaner.
   d. Failure to provide sufficient coolant and/or cooling air.
   e. Failure to perform scheduled maintenance as prescribed in supplied manuals.
   f. Failure to regularly exercise the generator set under load (stationary applications only).
5. Original installation charges and startup costs.
6. Starting batteries and the following related expenses:
   a. Labor charges related to battery service.
   b. Travel expenses related to battery service.
7. Additional expenses for repairs performed after normal business hours, i.e. overtime or holiday labor rates.
8. Rental of equipment during the performance of warranty repairs.
9. Removal and replacement of non-Kohler-supplied options and equipment.
10. Non-Kohler replacement parts. Replacement of a failed Kohler part with a non-Kohler part voids the warranty on that part.
11. Radiators replaced rather than repaired.
12. Fuel injection pumps not repaired by an authorized Kohler service representative.
13. Non-Kohler-authorized repair shop labor without prior approval from Kohler Co. Warranty Department.
14. Engine fluids such as fuel, oil, or coolant/antifreeze.
15. Shop supplies such as adhesives, cleaning solvents, and rags.
16. Expenses incurred investigating performance complaints unless the problem is caused by defective Kohler materials or workmanship.
17. Maintenance items such as fuses, lamps, filters, spark plugs, loose or leaking clamps, and adjustments.
18. Travel time and mileage exceeding 300 miles round trip.

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

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

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

ANY IMPLIED OR STATUTORY WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IS EXPRESSLY LIMITED TO THE DURATION OF THIS WARRANTY. Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental and/or consequential damages, so the above limitation or exclusion may not apply to you.

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

KOHLER®

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

TP-5374 12/15f

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

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

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

This warranty is effective only upon Kohler Co.'s receipt of an extended warranty registration form and warranty fee within one year of registered startup. The comprehensive limited warranty start date is determined by the standard limited warranty requirements and runs concurrent with the standard limited warranty during the first year. To receive extended comprehensive limited warranty coverage, the provisions of the standard limited warranty registration must be met.

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

1. Normal wear, routine tuneups, tuneup parts, adjustments, and periodic service.
2. Damage, including but not limited to damage caused by accidents, improper installation or handling, faulty repairs not performed by an authorized Kohler service representative, improper storage, or acts of God.
3. Damage caused by operation at speeds, or with fuel, loads, conditions, modifications or installation contrary to published specifications.
4. Damage caused by negligent maintenance such as:
   a. Failure to provide the specified type and sufficient quantity of lubricating oil.
   b. Failure to keep the air intake and cooling fin areas clean.
   c. Failure to service the air cleaner.
   d. Failure to provide sufficient coolant and/or cooling air.
   e. Failure to perform scheduled maintenance as prescribed in supplied manuals.
   f. Failure to regularly exercise the generator set under load (stationary applications only).
5. Original installation charges and startup costs.
6. Starting batteries and the following related expenses:
   a. Labor charges related to battery service.
   b. Travel expenses related to battery service.
7. Engine coolant heaters, heater controls, and circulating pumps after the first year of the warranty period.
8. Additional expenses for repairs performed after normal business hours, i.e. overtime or holiday labor rates.
9. Rental of equipment during the performance of warranty repairs.
10. Removal and replacement of non-Kohler-supplied options and equipment.
11. Non-Kohler replacement parts. Replacement of a failed Kohler part with a non-Kohler part voids the warranty on that part.
12. Radiators replaced rather than repaired.
13. Fuel injection pumps not repaired by an authorized Kohler service representative.
14. Non-Kohler-authorized repair shop labor without prior approval from Kohler Co. Warranty Department.
15. Engine fluids such as fuel, oil, or coolant/antifreeze.
16. Shop supplies such as adhesives, cleaning solvents, and rags.
17. Expenses incurred investigating performance complaints unless the problem is caused by defective Kohler materials or workmanship.
18. Maintenance items such as fuses, lamps, filters, spark plugs, loose or leaking clamps, and adjustments.
19. Travel time and mileage exceeding 300 miles round trip.

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

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

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

ANY IMPLIED OR STATUTORY WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IS EXPRESSLY LIMITED TO THE DURATION OF THIS WARRANTY. Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental and/or consequential damages, so the above limitation or exclusion may not apply to you.

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

KOHLER®

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

TP-5561 8/16f

KOHLER®

Certification

THE VMC GROUP
The Power of Together™

KOHLER Power Systems

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certification No.

VMA-47444-01C (REVISION 04)

Expiration Date: 04/30/2021

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are CERTIFIED[1] FOR SEISMIC APPLICATIONS in accordance with the following building code[2] releases.

IBC 2006, 2009, 2012, 2015

The following model designations, options, and accessories are included in this certification. Reference report number **VMA-47444-01** as issued by The VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

Kohler Diesel Generator Sets
REOZVC and REOZVB Series 500-600 kW

The above referenced equipment is **APPROVED** for seismic application when properly installed[3], used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance[4]. As limited by the tabulated values, below grade, grade, and roof-level installations, installations in essential facilities, for life safety applications, and/or of equipment containing hazardous contents are permitted and included in this certification with an Equipment Importance Factor assigned as I_P=1.5. The equipment is qualified by code compliant comparative analysis based off of successful shake table testing at the nationally recognized University of California, Berkeley Pacific Earthquake Engineering Research Center under the witness of the ISO Accredited Product Certification Agency, The VMC Group.

Certified Seismic Design Levels

Certified **IBC**	**Importance $I_P \le 1.5$** Soil Classes A-E Risk Categories I-IV Design Categories A-F	**$S_{DS} \le 1.930$ g**	**$S_{DS} \le .643$ g**
		z/h = 0.0	**z/h ≤ 1.0**
		Horizontal Design[5] $\frac{F_p}{W_p} = 0.4 S_{DS} I_p \frac{a_p}{R_p}\left(1 + 2\frac{z}{h}\right) \le$ **1.447 g**	
Analysis Datum AC156	Code Compliant Comparative Analysis ISO 17025 Laboratory Pre/Post-Shake Functionality Tri-axial, 5% Damping SRS	**$A_{FLEX\text{-}H} \le 1.930$ g**	**$A_{FLEX\text{-}V} \le 1.287$ g**
		$A_{RIG\text{-}H} \le 0.772$ g	**$A_{RIG\text{-}V} \le 0.515$ g**
		$ZPA_H \le 0.695$ g	**$ZPA_V \le 0.463$ g**

Certified Seismic Installation Methods

Rigid mounting from fuel tank to rigid structure	External isolation mounting from unit base to rigid structure

THE VMC GROUP
The Power of Together™

KOHLER Power Systems

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certified Product Table:

Model	Max. Rating [kW]	Max. Dimensions [in]			Max. Weight [lbs.]	Enclosure Options	Fuel Tank Capacities [gal]
		Length	Width	Height			
500REOZVC	515	350	86	137	21,540	Aluminum or Steel Weather Aluminum or Steel Sound Level 2	538-3052
550REOZVB	550	350	86	137	22,240		538-3052
600REOZVB	600	350	86	137	23,310		538-3052

This certification **includes** the generator installed with or without an enclosure and fuel tank as limited by the table above. The generator and any included options shall be a catalogue design and factory supplied. The generator and applicable options shall be installed and attached to the building structure per the manufacturer supplied seismic installation instructions. This certificate **excludes** all non-factory supplied accessories, including but not limited to mufflers, isolation/restraint devices and electrical components.

IBC CERTIFIED THE VMC GROUP

VMA-47444-01C (Revision 04)
Issue Date: February 07, 2012
Revision Date: April 09, 2018
Expiration Date: April 30, 2021

THE VMC GROUP
The Power of Together™

KOHLER Power Systems

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Notes and Comments:

1. All equipment listed herein has been comparatively analyzed to similar models that successfully passed the seismic acceptance criteria for shake testing non-structural components and systems as set forth in the ICC AC-156. The Test Response Spectrum (TRS) enveloped the Required Response Spectrum (RRS) for all units tested. The units cited in this certification were comparatively analyzed to representative sample(s) of a contingent of models that remained captive and structurally sound after the seismic shake simulation. The tested units also remained functionally operational after the simulation testing as functional testing was completed by the equipment manufacturer before and after the seismic simulations. Although a seismic qualified unit inherently contains some wind resisting capacity, that capacity is undetermined and is excluded from this certification. Snow/Ice loads have been neglected and thus limit the unit to be installed both indoors (covered by an independent protective structure) and out of doors (exposed to accumulating snow/ice) for ground snow loads no greater than 30 psf for all applications.

2. The following building codes are addressed under this certification:
   IBC 2015 – referencing ASCE7-10 and ICC AC-156
   IBC 2012 – referencing ASCE7-10 and ICC AC-156
   IBC 2009 – referencing ASCE7-05 and ICC AC-156
   IBC 2006 – referencing ASCE7-05 and ICC AC-156

3. Refer to the manufacturer supplied installation drawings for anchor requirements and mounting considerations for seismic applications. Required anchor locations, size, style, and load capacities (tension and shear) may be specified on the installation drawings or specified by a 3rd party. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection, wall design, and attachment to non-building structures must be outlined and approved by the Engineer of Record for the project or building. Structural walls, structural floors, and housekeeping pads must also be seismically designed and approved by the project or building Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for observing the installation detailed in the seismic installation drawings and the proper installation of all anchors and mounting hardware.

4. For this certificate and certification to remain valid, this certificate must correspond to the “Seismic Certification Label” found affixed to the unit by the factory. The label ensures the manufacturer built the unit in conformance to the IBC seismic design criteria set forth by the Certified Seismic Qualification Agency, The VMC Group, and meets the seismic design levels claimed by this certificate.

5. Mechanical, Electrical, and Plumbing connections to the equipment must be flexibly attached as to not transfer load through the connection. The structural integrity of any conduit, cable trays, piping, ductwork and/or flexible connections is the responsibility of others. This certification does not guarantee the equipment will remain compliant to NEMA, IP, UL, or CSA standards after a seismic event.

6. This certificate applies to units manufactured at:
   Kohler Power Systems, N7650 Lakeshore Road, Sheboygan, WI 53083

7. This project follows The VMC Group’s ISO-17065 Scheme for Product Certification of Nonstructural Components.

John P. Giuliano, PE
President, The VMC Group

VMA-47444-01C (Revision 04)
Issue Date: February 07, 2012
Revision Date: April 09, 2018
Expiration Date: April 30, 2021

IBC CERTIFIED THE VMC GROUP

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Kohler Power Systems
N7650 Lakeshore Road
Sheboygan
Wisconsin
53083
USA

Holds Certificate No: **FM 727336**

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

Design, manufacture, and distributor support for electrical generators, alternators, fuel tanks, automatic transfer switches and switchgear.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 1995-02-28
Effective Date: 2021-11-07
Latest Revision Date: 2021-10-29
Expiry Date: 2024-11-06

...making excellence a habit.™

Certificate No: **FM 727336**

Location	Registered Activities
Kohler Power Systems - GK 900 Highland Drive Bldg 604 Kohler Wisconsin 53004 USA	Manufacture of leads and harness, automatic transfer switches and switchgear. Distribution of generator sets.
Kohler Power Systems N7650 Lakeshore Road Sheboygan Wisconsin 53083 USA	Design, manufacture, and distributor support for electrical generators, automatic transfer switches and switchgear.
Kohler Power Systems 300 N Dekora Woods Blvd Saukville Wisconsin 53080 USA	Manufacture of fuel tanks, skids, fabricated components and generators.
Kohler Power Systems Muth Warehouse 2821 Muth Court Sheboygan Wisconsin 53083 USA	The distribution of generator sets.
Kohler Power Systems KWIP Warehouse 4327 County EE Sheboygan Wisconsin 53081 USA	Receiving, sequencing and warehousing of generator components.

Original Registration Date: 1995-02-28

Latest Revision Date: 2021-10-29

Effective Date: 2021-11-07

Expiry Date: 2024-11-06

PROTOTYPE TEST REPORT

KOHLER

Models Covered: **600REOZVB**
Model Tested: **600REOZVB**
Cooling System Tested: **50C**

Alternator Tested: **5M4030**
Engine Tested: **TWD1643GE**
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

± 0.50 % Voltage Deviation

Transient load tests per NEMA MG1-32.18, and ISO 8528 to verify specifications of transient voltage regulation, voltage dip, voltage overshoot, recovery voltage, and recovery time. Values shown for model tested above. Please contact factory for additional details.

Full Load Acceptance	Full Load Rejection
36.5 % Voltage Dip	**18.3** % Voltage Overshoot
2.60 Seconds of Recovery Time	**1.00** Seconds of Recovery Time
22.5 % Frequency Dip	**6.40** % Frequency Overshoot
3.70 Seconds of Recovery Time	**0.70** Seconds of Recovery Time

G2 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: **600REOZVB**
Model Tested: **600REOZVB**
Cooling System Tested: **50C**

Alternator Tested: **5M4030**
Engine Tested: **TWD1643GE**
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)

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

KOHLER®

PreStartup Checklist

OPERATING INSTRUCTIONS

SAFETY PRECAUTIONS

Safety is built into every engine driven generator; however, like any other electro-mechanical device it can present serious threat to life and limb if imprudently operated and maintained. Remember that the best safeguards against accidents are to keep ever mindful of the potential dangers and to always use good common sense. In the interest of safety, some general precautions are presented below - keep these in mind!

Warning - High Voltage: Remember that the function of a generator set is to produce electricity and wherever electrical energy is present, there is the potential danger of electrocution. Keep everyone, especially children, away from the set while it is running and take precautions to prevent unqualified personnel from tampering with or attempting to operate your generator set. Have the set and electrical circuits serviced only by qualified technicians. Wiring should be inspected frequently - replace leads that are frayed or in poor condition. Be especially careful not to come in contact with electrical equipment when standing in water or on wet ground or when your hands are wet.

Warning - Lethal Exhaust Gas: The engine powering your generator discharges deadly carbon monoxide as part of the exhaust gas when operating. Carbon monoxide is particularly dangerous in that it is odorless but keep in mind that it can cause death if inhaled for even a short period of time. Never operate the generator set inside a building unless the exhaust gas is piped safely outside or operate in any area where exhaust gas could accumulate and seep back inside an occupied building. Avoid breathing exhaust fumes when working on or near the generator set.

Warning - Dangerous Fuels: Use extreme caution when handling, storing and using fuels - they are highly volatile and explosive in vapor state.

Warning - Automatic Transfer Switch: This system is equipped with an automatic transfer switch and will start automatically. Before working on the generator, or equipment connected to generator, the generator must be disabled. Move the generator control switch to the “Off” position; open the generator line circuit breaker; and move the automatic transfer switch operator disconnect switch to the “Off” position.

OPERATING INSTRUCTIONS

1. Check all fluid levels of engine coolant and lubricating oil. (Caution: Do not remove radiator cap while system is hot.)

2. If any failure lights are lit, correct problem and reset by moving the generator control switch to the "Oft/Reset" position.

3. Automatic Operation: With the generator control switch in the "Auto" position the system will respond to remote start/stop signals from the automatic transfer switch.

4. Test - without load transfer: Placing the generator control switch in the "Run" position will cause the engine generator to start and run unloaded. To stop the unit, move the control switch to either the "Off/Reset" or the "Auto" position.

5. Test - with load transfer: With the generator control switch in the "Auto" position, push and hold the automatic transfer switch "Test" switch for a period exceeding the setting for "Time Delay Engine Start" time delay (normally set at 3 seconds). The generator set will start, reach operating speed, and the load will transfer to emergency. The system will operate on emergency for the time period of the "Time Delay Return to Normal" time delay (normally set at 15 minutes). At the end of this time period, the load will automatically transfer to "Normal" and the generator set will run approximately 5 minutes unloaded for a cool-down period and then automatically stop.

Caution: Always reset the generator control switch to the "Auto" position at the completion of testing or maintenance work. For further information, refer to the detailed Operating Instructions provided with the system.

STARTUP REQUEST AND CHECKLIST FORM

Generator system startups are typically quoted for Normal working hours and are limited to a single trip to the job site. Please help us avoid the need to invoice for supplemental visits by insuring that the system is ready for startup on the initial trip. BCEW is not an installation Contractor. Any wiring, terminations or other additional work will be billed at our current labor rate in full 1 hour increments.

Please allow at least 10 working days for scheduling of onsite startup and training services. Please fax completed checklist to BCEW at (619) 938-8217 or email it to startupgroup@bcew.com. Dispatch will call you to schedule the startup after this form is received. If you need startup sooner than the next 2 weeks, please call Dispatch at 866-938-8200 to make arrangements.

PROJECT NAME:	STARTUP CONTACT NAME/PHONE NUMBER:
JOB SITE ADDRESS:	BCEW JOB #:
PRINT NAME:	SIGNATURE:

ELECTRICAL:

- ❑ The AC circuit for the battery charger is installed and terminated. (DO NOT ENERGIZE).
- ❑ The AC circuit for block heater is installed and terminated. (DO NOT ENERGIZE).
- ❑ The engine start signal wires are pulled and terminated from the generator controller to each ATS(s).
- ❑ If applicable, the remote annunciator is installed and wires are pulled and terminated.
- ❑ If applicable, the remote emergency stop switch is installed and wires are pulled and terminated.
- ❑ All AC power cables are properly terminated at the generator and ATS.

NOTE: AC and DC wires must be in separate conduits. The control wiring should be stranded. BCEW technician can help identify the wires and terminate to our generator controller only. Please ensure that the wires are pulled, properly labeled, and that there is enough slack to reach the terminals. Please contact your BCEW PM if you need assistance identifying and terminating wires to our controller prior to startup.

FUEL:

- ❑ All fuel lines are connected. (Ignore this question if the generator is equipped with only diesel sub-base tank).
- ❑ The fire inspection was completed.
- ❑ The fire extinguishers and required placards were installed at locations approved by the fire inspector.
- ❑ The sub-base tank has been filled with fuel.
- ❑ For NG or LPG only: Fuel source is available and all required pressure regulators are installed. Ignore if you have diesel fuel.

NOTE: If required, the fire extinguishers and required placards are provided by others. If you want BCEW to provide these items, please let us know so that we can provide you with a quote.

AIR QUALITY PERMIT:

- ❑ The local Air Quality District (AQMD/APCD) has approved startup of the generator. (Please provide a copy of the approval with this request to ensure startup on requested date).

NOTE: For certain jurisdictions, this approval document is in the form of a permit to operate (PTO) or authority to construct (ATC). Certain jurisdictions (like SDAPCD) also require a construction completion notice (CCN) sent to them prior to startup.

ACCESS:

How close can our technician and testing equipment get to the generator? Keep in mind that our testing equipment may include oversized/trailerized load bank and may be limited by the length of cables available for the technician (typically 100' total length).

_____

Will there be ongoing activities that may be in the way of our technician during startup (road paving, tree cutting, etc.)_____

Are there any requirements for access?_____

Is this an indoor or outdoor installation?_____

Is the generator located on the ground level? If not, provide floor location_____

NOTE: Any extreme access restriction not reported or not anticipated during startup may cause multiple trips to the job site. Unless previously arranged, additional trips will be billed at our current labor rate in 1-hour increments.

TRANSFER SWITCH:

- ❑ Utility power is energized at the new ATS(s).
- ❑ The power can be shut down for power transfers for testing. (Please verify and ensure that facility personnel are aware of the transfer).
- ❑ I want the generator to automatically exercise per setting below:

ATS Exerciser Time and Duration – Please complete the section below ONLY if you want the generator system to exercise automatically. Leave blank for manual exercise.

Day of week:	
Time of day to start:	
Duration:	
With load (transfer) or without load (run engine only):	

NOTE: The section above must be completed prior to startup. If left blank, the startup technician will not program the ATS exerciser. Unless previously arranged, a separate trip to program the ATS will be billed at our current labor rate in 1 hour increments.

TRAINING:

- ❑ Personnel will need to be trained. (Please ensure that all personnel requiring training are available for training on startup date)

NOTE: Unless previously arranged, training is provided on the same day as startup, otherwise additional trip for the training will be billed at our current labor rate in 1-hour increments.

GENERAL STARTUP POLICY:

1. It is the installing contractor or owner's responsibility to complete the checklist. Items that are not completed, but reported completed will result in additional charges to our customer. Any overtime or additional trips required to finish the startup due to incomplete installation will be billed at our current labor rates in 1 hour increments.
2. Additional charges will apply to services that will need to be performed outside BCEW's normal working hours. BCEW's normal working hours are Monday through Friday from 7am to 4pm.
3. Service work performed on other equipment not supplied by BCEW will be billed accordingly.
4. It is the installing contractor or owner's responsibility to comply with all applicable codes and standards.

BY INITIALLING BELOW, YOU INDICATE THAT YOU UNDERSTAND AND AGREE TO THE ABOVE STATEMENTS AND ACCEPT RESPONSIBILITY FOR ADDITIONAL CHARGES THAT MAY ARISE FROM ITEMS MENTIONED ON THIS FORM._____

NOTES:

_____

_____

_____

_____

_____

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IN POWER. SINCE 1920.

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

Yes / Does Not Apply

- ❑ ❑ 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.

Generator and ATS Training

Duration:	1-2 hours (Approx.).
Format:	Informal, hands-on training.
Location:	Ideal location is at the Generator and ATS.
Date and Time:	Typically performed during generator startup unless previously arranged.
Training Materials:	None required/provided unless specifically requested.
NOTE:	1.) Video service is not provided, however, the end user may chose to videotape the training using their own equipment and operator. 2.) If applicable, training outline for the switchgear is provided separately.

1. **Equipment Familiarization: 15-30 minutes**
   - Brief overview of major components of the generator.
   - Overview of the generator control panel primary features.
   - Overview of the fuel tank/system.
   - Demonstrate how to lock/unlock the doors (if equipped with enclosure).
   - Locate:
     1. Batteries.
     2. Radiator fill.
     3. Oil dipstick and fill.
     4. Fuel fill.
     5. Fuel gauge.
     6. Locate emergency stop (if equipped).
     7. Circuit breaker.

2. **Safety: 15-30 minutes**
   - Review safety shutdowns and alarms (and annunciator if equipped).
   - Discuss precautions and safety measures when operating the unit.

3. **Operation: 15-30 minutes**
   - Demonstrate how to start and stop the unit.
   - Overview of ATS operation.
     - Automatic transfer
     - Manual transfer
     - Exercise timer

4. **Preventive Maintenance: 15-30 minutes**
   - Overview of recommended maintenance and common easily fixed problems.

5. **Q & A**

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