Engineering Data and Proposal
This proposal has been prepared specifically for:

DS60

It contains all the necessary literature, drawings and component information for the following equipment:

4R0113 DS60 Generator

A Rolls-Royce solution

1 Generator Specification Sheets

1 Bill of Materials
2 Contractor Worksheet
3 Initial Start-Up Validation Form
4 Generator Spec Sheet
5 Generator Controller Spec Sheet
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BILL OF MATERIALS

MODEL:	MTU 4R0113 DS60
QUANTITY:	1
OUTPUT:	60kW, 75kVA, 208 Amps
RATINGS:	Emergency Standby Duty, UL 2200
VOLTAGE:	208 Volt, 3 Phase, 12 Wire, 0.8 Power Factor
ENGINE:	60 Hz, Diesel, 1800 RPM Engine Model: John Deere 4045TF280, 4I EPA Certified Single Stage Air Cleaner w/Air Restriction Indicator Electronic Isochronous Governor Vibration Isolators
ALTERNATOR:	2/3 Pitch, PMG Excitation, 130C Temperature Rise, Class H Insulation DVR 2400 Voltage Regulator
COOLING SYSTEM:	Unit Mounted Radiator, 50C/122F
CONTROL PANEL:	MGC 1520 Digital Control Panel with Microprocessor based controls. 4 Relay Package
CIRCUIT BREAKER :	200 Amp, 100% Rated, LI Trip
BATTERY:	Heavy Duty Lead Acid Battery with Rack and Cables
BATTERY CHARGER:	12 Volt, 10 Amp (Mounted and Wired AC/DC) 120V
BLOCK HEATER:	1,500 Watt with Isolation Valves, Mounted and Wired 120V 1-Phase
FUEL TANK:	24 Hour/140 Gallon Sub-Base Fuel Tank
ENCLOSURE:	Weatherproof, Sound Attenuated Enclosure, 73.4 dB(A) @ 23’ 130 MPH Wind Rated Steel, Vertical Exhaust Discharge Door Restraints
SILENCER:	Internal Critical Grade Exhaust Silencer
WARRANTY:	Two Year/3,000hr Basic Factory Warranty

CENTRAL
POWER SYSTEMS & SERVICES

mtu A Rolls-Royce solution

Generator Data Sheet

Project Name	DS60 Stock				Date:	4/29/2022
Model	4R0113 DS60					
Voltage	208	VAC				
Power Output	60	kW				
Number of Phases	3					
Dimensions & Weights	Length	Width	Height	Weight		Notes:
Base / Tank	86"	40"	20"	783	Pounds	Empty Tank Weight
Generator	87.12"	40"	42.11"	2,640		
Enclosure	101.08"	40"	76.89"	726		
Fuel				994		
Total	101.08"	40"	96.89"	5,144		
Recommended Pad Dimensions	110"	64"				
Remote Radiator	N/A	N/A	N/A	N/A		
Remote Fuel Tank	N/A	N/A	N/A	N/A		
Number of Shipped Pieces:			1			
		Volts	Phase	Ampacity	# of Circuits	
Main Breaker #1	☑	208	3	200		**Pull all Stranded Wire**
Main Breaker #2	☐					
Main Breaker #3	☐					
Load Center	☐					
Convenience Outlet	☐					
A/C Light Package	☐					
Battery Heater	☐					
Block Heater	☑	120	1	12.5	1	
Battery Charger	☑	120	1	6.6	1	
Generator Heater Strip	☐					
Powered Louvers	☐					
Generator Connected to BMS	☐	MODBUS ☐		Ethernet ☐		
Remote Generator Kill Switch	☐					
Generator Start Signal	☑	3- Wires; 14 Gauge Stranded				
Remote Annunciator Panel	☐					
Annunciator cable type / qty of conductors						
Fuel Tank Size	140	Gallons				
Fuel Required for Testing	70	Gallons				

Note: If this form does not appear with fillable fields, navigate to *Edit* > *Preferences* > *Documents* > *PDF/A View Mode*. In the **View documents in PDF/A mode** drop-down list, select **Never**. Click **OK**.

Form A - Engine Generator Set Request for Start-Up

Requested Date: _____

☐ First Visit ☐ Follow-Up Visit

Instructions

This form must be completed and signed by the customer/client to ensure proper installation of the generator set prior to scheduling a start-up date and to request start-up service from an authorized MTU distributor or regional service center.

Applicant Contact Details

Company: _____

Name: _____

Telephone: _____

Email: _____

Project Details

Project Name: _____

Project Number: _____

Site Address: _____

_____

Engine Generator Set Nameplate

Model Number: _____

Serial Number: _____

Rating: _____

Hz: _____ kW: _____

kVA: _____ Volts: _____

Phase: _____ Amps: _____

Engine

Model Number: _____

Serial Number: _____

Power: _____ RPM: _____

Fuel Type

☐ Diesel ☐ NG ☐ LP Vapor ☐ Liquid LP ☐ Other

ATS (☐ Yes ☐ No)

Manufacturer: _____

Model Number: _____

Serial Number: _____

Voltage: _____ Current: _____

Poles: _____

Utility Service

Volts: _____ Phase: _____

Phase Rotation: _____

Load Bank (☐ Yes ☐ No)

Capacity: _____

Pre-Start-Up Validation Checklist

	Yes	No	N/A
Unit set in final location	☐	☐	☐
Radiator ducted to air discharge louvers	☐	☐	☐
Intake and discharge air louvers installed and wired	☐	☐	☐
Unit filled with oil to proper level	☐	☐	☐
Unit filled with coolant to proper level	☐	☐	☐
Battery filled and fully charged	☐	☐	☐
Battery charger mounted with AC and DC wiring	☐	☐	☐
Block heater wired to correct AC power supply	☐	☐	☐
Switch gear/transfer switch connections made	☐	☐	☐
All other AC and DC electrical connections made	☐	☐	☐
Fuel inlet and return lines run between the unit and fuel storage system	☐	☐	☐
Fuel storage system filled with sufficient quantity for commissioning	☐	☐	☐
Exhaust system properly installed and supported	☐	☐	☐
Radiator and engine generator set room is free of debris	☐	☐	☐
Permission for use of site load or request load bank	☐	☐	☐
Other: _____	☐	☐	☐

NOTE: If the tasks on this checklist are not adequately completed upon arrival of the authorized MTU technician or for reasons beyond the control of MTU, an additional start-up charge may be incurred. Please resubmit this form when items are addressed.

Additional Comments/Notes:

_____

_____

_____

_____

Completed by (signature): _____

Print Name: _____

Company: _____

Date: _____

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Diesel Generator Set

mtu 4R0113 DS60

60 kWe/60 Hz/Standby/208 - 600V

System ratings

Voltage (L-L)	208V †
Phase	3
PF	0.8
Hz	60
kW	60
kVA	75
Amps	208
skVA@30% voltage dip	200
Generator model	361CSL1602
Temp rise	130 °C/40 °C
Connection	12 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 – optional (refer to *System ratings* for availability)
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045HF280 diesel engine
  - 4.5 liter displacement
  - Mechanical injection pump
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized,
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045HF280
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	74 (99)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.3)
System coolant capacity: L (gal)	16.7 (4.4)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” NPT
Fuel return connection size	3/8” NPT
Maximum fuel lift: m (ft)	1.8 (6)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	113 (29.9)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	19.3 (5.1)
At 75% of power rating: L/hr (gal/hr)	14.8 (3.9)
At 50% of power rating: L/hr (gal/hr)	10.6 (2.8)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	144 (38)
Heat rejection to coolant: kW (BTUM)	35 (1,979)
Heat rejection to air to air: kW (BTUM)	5 (278)
Heat radiated to ambient: kW (BTUM)	10.9 (619)
Fan power: kW (hp)	1.16 (1.55)

Air requirements

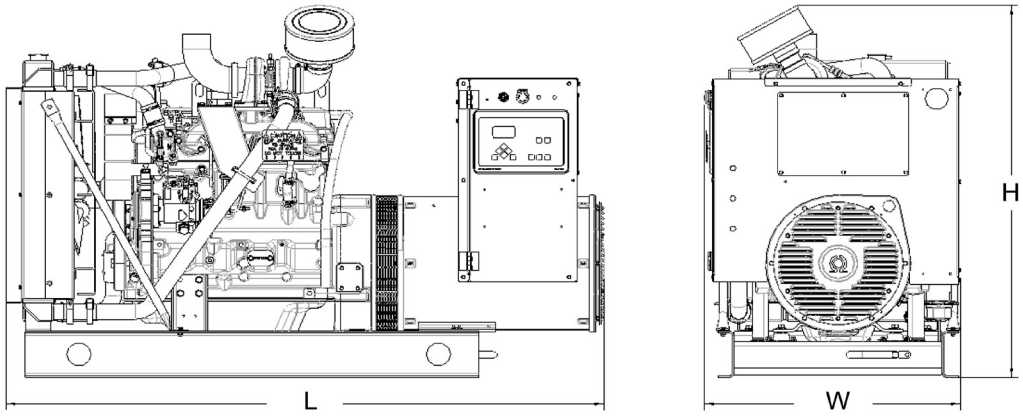
Aspirating: *m^3/min (SCFM)	5.4 (191)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	91 (3,162)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	40 (1,396)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	545 (1,013)
Gas volume at stack temperature: m^3/min (CFM)	14.4 (508)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)
Minimum allowable back pressure: kPa (in H_20)	N/A

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

Emissions data

NO_x + NMHC	CO	PM
3.5	0.97	0.32

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- 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. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Digital Generator Set Controller Data Sheet

MGC-1500 Series

The MGC-1500 Series controllers include the following models which are described throughout this document.*

— MGC-1520

MGC Series Generator Set Controllers are rugged, reliable, and easy-to-use digital generator set control systems. The MGC-1500 Series is perfectly focused, combining rugged construction and microprocessor technology to offer a product that will hold up to almost any environment and is flexible enough to meet your application's needs.

PRODUCT HIGHLIGHTS

- Three-phase generator metering
- Engine metering
- Generator set control
- Engine and generator protection
- BESTCOMS*Plus*®
  - Windows®-based software for optional remote operation (Software can be downloaded at www.mtu-solutions.com)
  - Programming and setup software
  - Intuitive and powerful
  - Remote control and monitoring
  - Programmable logic
  - USB communications
- Suitable for rental generator sets with high/low sensing, single or three phase override, wye/delta/grounded delta configurable, and alternate frequency override (50/60 Hz)
- Resistive sender inputs for oil pressure and coolant temperature
- Multilingual capability
- SAE J1939 Engine Control Unit (ECU) communications (Refer to *Configuration Options*)
- Remote annunciation with RDP-110
- Event recording (up to 30 events in non-volatile memory)
- Extremely rugged, fully potted design
- Seven programmable contact inputs with Input 1 programmed to recognize an emergency stop
- Start, run, and prestart relays with four programmable outputs
- UL recognized,
- IP56 rating per IEC 60529
- NFPA-110 compatible
- Microprocessor based
- Complete system metering
- Expandable to meet customer needs

* Please refer to the last page of this data sheet for available MGC-1500 series configuration options. The MGC Series Controller Comparison Data Sheet is a available as a reference for all MGC series configuraton options..

DIAGRAM

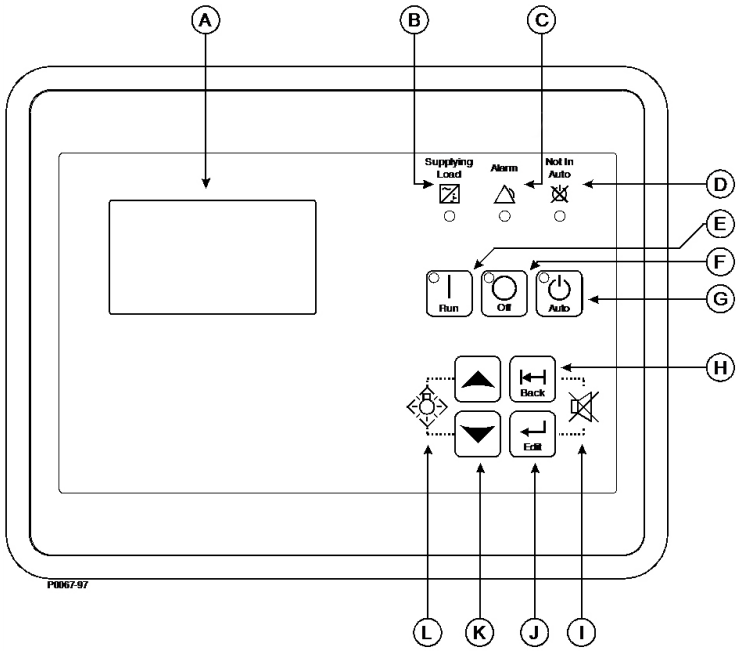


Figure 1: Front Panel Descriptions

A. Liquid crystal display
B. Supplying load indicator
C. Alarm indicator
D. Not in auto indicator
E. Run pushbutton and mode indicator
F. Off pushbutton and mode indicator
G. Auto pushbutton and mode indicator
H. Back pushbutton
I. Alarm silence pushbutton combination
J. Edit pushbutton
K. Arrow pushbuttons
L. Lamp test pushbutton combination

FUNCTIONS

Generator set protection

Generator ANSI codes
- Overvoltage (59)
- Overfrequency (81O)
- Voltage phase imbalance (47)
- Undervoltage (27)
- Underfrequency (81U)
- Overcurrent (50)

All generator set protection features are programmable as alarms, pre-alarms, status, or not used.

Alarms (shutdowns)
- Low oil pressure
- High coolant temperature
- Low coolant temperature
- Overspeed
- Overcrank
- Coolant temp sender fail (non-ECU engines)
- Oil pressure sender fail (non-ECU engines)
- Emergency stop
- Critical low fuel level (refer to *Configuration Options*)

Pre-alarms (warnings)
- Low oil pressure
- Low coolant temperature
- Weak battery voltage
- Low fuel level
- High fuel level
- High coolant temperature
- Battery overvoltage

All alarms and pre-alarms can be enabled or disabled via the BESTCOMSPlus® PC software or the front panel.
Additional custom alarms and pre-alarms are available upon request.

FUNCTIONS, continued

Generator set metering
- Generator parameters include voltage, current, real power (watts), apparent power (VA), and power factor. The view can be programmed to display up to 20 parameters using the scrolling and time delay feature.
- Engine parameters include oil pressure, coolant temperature, RPM, battery voltage, fuel level, engine runtime, and various SAE J1939 supported parameters.

Engine control
- Cranking control: cycle or continuous (quantity and duration fully programmable)
- Engine cooldown: smart cooldown function saves time and fuel
- Successful start counter: counts and records successful engine starts
- Timers:
  - Engine cooldown timer
  - Engine maintenance timer
  - Pre-alarm time delays for weak/low battery voltage
  - Alarm time delay for overspeed
  - Alarm time delay for sender failure
  - Arming time delays after crank disconnect:
    - Low oil pressure
    - High coolant temperature
  - Pre-crank delay
  - Continuous or cycle cranking time delay
  - Programmable logic timers

Event recording
The MGC-1500 Series has an event recorder that provides a record of alarms, pre-alarms, engine starts, engine runtime loaded, engine runtime unloaded, last run date, and many other events that are all date and time stamped to help the user determine the cause and effect of issues related to the generator set. Contains up to 30 event records each retaining numerous occurrences in memory. Time, date, and engine hour detail are available for the most current 30 occurrences within each event record.

Transfer switch control (Mains failure)
(Refer to *Configuration Options*)

The MGC-1500 Series has the ability to detect a mains failure via a single- or three-phase bus input. A mains failure is established when any one of the following conditions are met:
- Any phase of bus voltage falls below the dead bus threshold
- Any phase of bus voltage is unstable due to overvoltage or undervoltage
- Any phase of bus voltage is unstable due to overfrequency or underfrequency

When conditions are met, the MGC-1500 Series will start the generator set and, when ready, will send generator and mains breaker commands to apply power to the load from the generator set. The MGC-1500 Series implements open or closed breaker transitions to and from the mains. When the mains returns and is considered stable, the MGC-1500 Series will transfer the load back to the mains and stop the engine.

USB port
The USB communication port can be used with BESTCOMS*Plus*® software to quickly configure an MGC-1500 Series with the desired settings or retrieve metering values and event log records.

Programmable logic
The MGC-1500 Series offers a very powerful, yet easy-to-use, programmable logic scheme, BESTlogic™*Plus,* for custom programming of the various inputs, outputs, alarms, and pre-alarms. It allows these elements to be integrated into a complete logic scheme so that the user can meet even the most complex specification. The Programmable logic control includes the selection of logic gates and timers with drag-and-drop technology to make it fast and simple.

Remote display panel annunciation
(Refer to *Configuration Options*)

The MGC-1500 Series can communicate to a remote display panel, Model RDP-110. This requires only two wires to annunciate many of the alarms and pre-alarms required by NFPA-110 Level I and II. External power is required.

SAE J1939 communications
(Refer to *Configuration Options*)

SAE J1939 CANBus communications allows the MGC-1500 Series to communicate with the ECU to gather critical engine information like oil pressure, engine coolant temperature, RPM, battery voltage, and much more. By utilizing the ECU, the addition of analog engine senders is no longer required. This can save substantial money for the installer. It also eliminates any errors or discrepancies between the ECU data and the data displayed on the MGC-1500 Series that may be present due to analog sender inaccuracies or incompatibility. An additional benefit is access to the ECU's diagnostic troubleshooting codes (DTCs). The DTCs provide information about the engine's operating conditions and communicate these via SAE J1939 to the MGC-1500 Series, eliminating the need for hand-held service tools to diagnose simple engine issues.

SPECIFICATIONS

Operating power
- Nominal: 12 or 24 VDC
- Range: 6 to 32 VDC
- Power consumption:
  - Sleep mode: 4.5 W
  - Normal operational mode: 6.5 W - Run mode, LCD heater off, three relays energized
  - Maximum operational mode: 14 W - Run mode, LCD heater on, seven relays energized
  - Battery ride-through: Withstands cranking ride-through down to 0 V for 50 ms (typical)

Current sensing (5 Amp CT inputs)
- Continuous rating: 0.1 to 5.0 Aac
- One second rating: 25 Aac
- Burden: 1 VA

Voltage sensing
- Range: 12 to 576 V rms, line-to-line
- Frequency range: 10 to 72 Hz
- Burden: 1 VA
- One second rating: 720 V rms

Contact sensing/input contacts
Contact sensing inputs include one emergency stop input and seven programmable inputs. The emergency stop input accepts normally closed, dry contacts. The remote emergency stop is limited to 75 ft. standard. Extended runs are available with an optional relay. All programmable inputs accept normally open, dry contacts. The factory may utilize up to three of these inputs.

Engine system inputs
- Fuel level sensing resistance range: 5 to 250 Ω nominal
- Coolant temperature sensing resistance range: 5 to 2,750 Ω nominal
- Oil pressure sensing resistance range: 5 to 250 Ω nominal
- Engine speed sensing:
  - Magnetic pickup or CANBus
    - Magnetic pickup voltage range: 3 to 35 V peak (6 to 70 V peak to peak)
    - Magnetic pickup frequency range: 32 to 10,000 Hz

Output contacts
- (7) total outputs: (3) 5 A @ 28 VDC and (4) 2 A @ 28 VDC
- The factory utilizes the following on each generator set which can be reprogrammed as needed:
  - (3) 5 A @ 28 VDC for Pre-start, Start, and Run
  - (4) 2 A @ 28 VDC for general purpose

Metering
Generator voltage (rms)
- Metering range: 12 to 576 VAC (direct measurement), up to 9,999 VAC (with appropriate voltage transformer)
- Accuracy: ±1% of programmed rated voltage or ±2 VAC (subject to accuracy of voltage transformer when used)

Generator current (rms)
- Generator current is measured at the secondary windings of 5 A CTs.
- Metering range: 0 to 5,000 Aac
- CT primary range: 1-5,000 Aac, in primary increments of 1 Aac
- Accuracy: ±3% of programmed rated current or ±3 Aac (subject to accuracy of CTs)

Generator frequency
- Metering range: 10 to 72 Hz
- Accuracy: ±0.25% or 0.05 Hz

Apparent power
- Indicates total kVA and individual line kVA (four-wire, line-to-neutral or three-wire, line-to-line)
- Accuracy: ±5% of the full-scale indication or ±4 kVA

Power factor
- Metering range: 0.2 leading to 0.2 lagging
- Accuracy: ±0.02

Real power
- Indicates total kW and individual line kW (four-wire, line-to-neutral or three-wire, line-to-line)
- Accuracy: ±5% of the full-scale indication or ±4 kW

Oil pressure
- Metering range: 0 to 150 psi or 0 to 1,034 kPa
- Accuracy: ±3% of actual indication or ±2 psi or ±12 kPa (subject to accuracy of sender)

Coolant temperature
- Metering range: 0 °C to 204 °C (32 °F to 410 °F)
- Accuracy: ±3% or actual indication or ±2° (subject to accuracy of sender).

Fuel level
- Metering range: 0 to 100%
- Accuracy: ±3% (subject to accuracy of sender)

Battery voltage
- Metering range: 6 to 32 VDC
- Accuracy: ±3% of actual indication or ±0.2 VDC

Engine RPM
- Metering range: 0 to 4,500 rpm
- Accuracy: ±2% of actual indication or ±2 rpm

Engine run time
- Engine run time is retained in non-volatile memory
- Metering range: 0 to 99,999 h; update interval: 6 min
- Accuracy: ±1% of actual indication or ±12 min

SPECIFICATIONS, continued

Metering, continued

Maintenance timer
- Maintenance timer indicates the time remaining until generator set service is due. Value is retained in non-volatile memory.
- Metering range: 0 to 5,000 h; update interval: 6 min
- Accuracy: ±1% or actual indication or ±12 min

Generator protection functions

Overvoltage (59) and undervoltage (27)
- Pickup range: 70 to 576 VAC
- Activation delay range: 0 to 30 s

Overfrequency (81O) and underfrequency (81U)
- Pickup range: 45 to 66 Hz
- Pickup increment: 0.1 Hz
- Activation delay range: 0 to 30 s

Phase imbalance (47)
- Pickup range: 5 to 100 VAC
- Pickup increment: 1 VAC
- Activation delay range: 0 to 30 s
- Activation delay increment: 0.1 s

Overcurrent (51)
- Pickup range: 0.18 to 1.18 Aac (1 A current sensing)
- Time dial range: 0 to 7,200 s (fixed time curve)

Environmental
- Temperature
  - Operating: -40 °C to 70 °C (-40 °F to 158 °F)
  - Storage: -40 °C to 85 °C (-40 °F to 185 °F)
- Humidity: IEC 68-2-38
- Salt fog: ASTM B 17-73, IEC 68-2-11 (tested while operational)
- Ingress protection: IEC IP54 for front panel
- Shock: 15 G in three perpendicular planes
- Vibration: swept over the following ranges for 12 sweeps in each of three mutually perpendicular planes with each 15-minute sweep.
  - 5 to 29 to 5 Hz at 1.5 G peak for 5 min
  - 29 to 52 to 29 Hz at 0.036” DECS-A for 2.5 min
  - 52 to 500 to 52 Hz at 5 G peak for 7.5 min

Agency approvals
- UL approval: “cURus” approved to UL 6200
- NFPA Compliance: complies with NFPA Standard 110, standard for emergency and standby power

ADDITIONAL SPECIFICATIONS

Battery backup for real time clock
The MGC-1500 Series provides a real-time clock with capacitor backup that is capable of operating the clock for up to 24 hours after power is removed from the controller. As the capacitor nears depletion, an internal backup battery takes over and maintains timekeeping. The battery will maintain the clock for approximately 10 years, depending on conditions. The battery is not replaceable. The clock is used by the events recorder function to timestamp events, and the exercise timer is used to start and stop the generator set when the exercise feature is utilized.

Breaker management
The MGC-1500 Series is capable of controlling the generator breaker and the mains breaker. The status of the breakers is determined by using BESTlogic™Plus programmable logic to set up the GENBRK and MAINSBRK logic blocks. These logic blocks have outputs that can be configured to energize an output contact and control a breaker, as well as inputs for breaker control and status. The MGC-1500 Series will attempt to close a breaker only after verifying that it can be closed. If the breaker cannot be closed, the close request will be ignored. Only one breaker can be closed at a time. Synchronization is required before closing the breaker to a live bus. Closure to a dead bus can be performed after meeting dead bus threshold and timing requirements set by the user.

CONFIGURATION OPTIONS

Generator protection

	MGC-1520
Standard	
Phase Imbalance (47)	X
Overcurrent (50)	X
Overvoltage (59)	X
Undervoltage (27)	X
Underfrequency (81U)	X
Overfrequency (81O)	X
Reverse Power (32)	
Loss of Excitation (40Q)	
Enhanced	
Overcurrent (51)	
Vector Shift (78)	
Rate of Change of Frequency (81R)	
Ground Fault	

Note: Numbers in parentheses above are ANSI standard device numbers denoting which features the controllers support.

Inputs

	MGC-1520
Controller	
Digital	7
Analog (Dedicated)	-
Analog	-

Outputs

	MGC-1520
Controller	
Digital Form A, 30 Amp	-
Digital Form A, 5 Amp	3
Digital Form A, 2 Amp	4
Analog	-

Communication

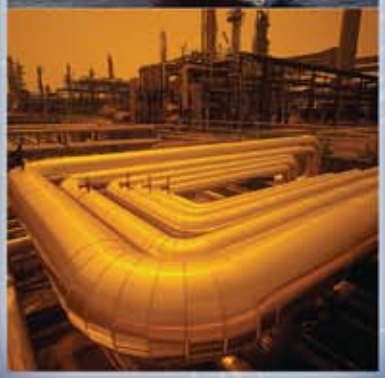
	MGC-1520
ModBus RTU (RS-485)	
ModBus TCP-IP	
RDP-110	X
CANBus	X
Modem Interface (RS-232)	
Ethernet	

Metering

	MGC-1520
Bus 1 Voltage	
Single Phase	X
Three Phase	X
Bus 2 Voltage	
Single Phase	
Three Phase	
Current Transformers	
Generator	3
Auxiliary	-

MAGNAPLUS®

Generator Ratings:
kW 5 to 430 (60 Hertz)
kVA 5 to 420 (50 Hertz)



MARATHON ELECTRIC
GENERATORS

ISO 9001:2008 Certified

MAGNAPLUS®

Innovation Performance Reliability

MAGNAPLUS® offers a field-adaptable, permanent magnet generator, coupled with the PM300 or DVR®2000E voltage regulator, for installations requiring fault current support or for applications involving non-linear loads. These regulators enhance generator performance and offer additional features, meeting the needs of the most difficult applications.

What makes the Marathon Electric approach unique?

Proven top performers in every respect, **MAGNAPLUS®** generators offer powerful performance, reliable power generation, and easy installation. With a full range of voltage regulator configurations, **MAGNAPLUS®** provides application flexibility to meet unique installation requirements. Ruggedly constructed with solid state technology, Marathon's SE350 voltage regulator, included with all standard equipment, is a solid performer.

These unique design features make **MAGNAPLUS®** the ideal general purpose generator for standby and prime power markets such as:

- **Agricultural**
- **Commercial**
- **Telecommunications**
- **Marine**
- **Construction**
- **Rental Markets**

Marathon Electric: The experts in your field

As an independent manufacturer with more than fifty years of experience as a leading supplier to the generator market, Marathon Electric is dedicated to designing and manufacturing the highest quality electrical products.

Marathon's commitment to long term customer support and an intensive product development program means you get more:

- **Design & Application Experience**
- **Advanced Testing Facilities**
- **Technical Support Staff**
- **Broad Product Line**

MARATHON ELECTRIC GENERATORS

Product Features

Choice . . . abounds with more than 34 stock models ranging from 5–430 kW (60 Hz) and 5–420 kVA (50 Hz). All three-phase generators are 12-lead reconnectable, providing voltage and phase flexibility. For applications requiring price-sensible, dedicated single-phase generators, Marathon Electric stocks 26 models. Standard and optional conduit box designs are available to meet all customer requirements and to ease installation of accessories.

Easy Mount SAE Adapters . . . provided with every generator, are designed with easy drive disc access to simplify the mounting to all popular engines. Generator foot mounting location is unaffected by adapter changes. Special adaptations for automotive engines are available.

Class H Insulation System . . . utilizes an unsaturated polyester varnish for optimal insulation life and superior moisture protection. An epoxy overcoat is added for increased environmental protection. Field windings are wet wound with epoxy and designed to withstand overspeeds of 125%. All windings are 100% copper with class H insulation.

Linkboards . . . are standard to simplify voltage reconnection and support lead termination.

SE350 Voltage Regulator . . . is encapsulated for reliable performance in all environments. The SE350 regulator provides 1% regulation, underspeed protection, stability adjustment to optimize transient performance, and EMI filtering to commercial standards.

Optimized Electrical Design . . . with four-pole, brushless features, utilizes a 2/3 pitch winding to minimize harmonic distortion. The main rotor, utilizing Marathon Electric's unirotor construction, provides exceptional waveshape and voltage balance. The unirotor construction method incorporates full amortisseur windings facilitating parallel operation and non-linear loads.

Enhanced Ventilation . . . created by a high efficiency cast aluminum fan and optimized internal air flow patterns, maximizes heat transfer and minimizes hot spot differentials for extended winding life. Durable aluminum alloy fans avoid breakage problems associated with steel weldments or plastic fans.

Fully Guarded . . . for operator safety and generator protection. No rotating or electrically energized parts are exposed. All openings are covered by louvers or screens.

Heavy Duty Bearings . . . are double shielded and pre-lubricated for the life of the bearing. This helps resist contamination and ensures a maximum bearing life.

Design Specs and Agency Approvals . . . are important at Marathon. All MAGNAPLUS® units meet NEMA MG1-32, BS5000, and IEC 34-1 requirements. **MAGNAPLUS®** generators are also CE Certified, CSA Certified and fully UL Listed. Marine versions are available to meet American Bureau of Shipping, Lloyds, Det Norske Veritas, or Nippon Kaiji Kyokai requirements.

MARATHON ELECTRIC GENERATORS

marathon™ Generators

TYPICAL SUBMITTAL DATA

MODEL: 361PSL1602 **Winding:** 1602 **Prepared by:** Mark Bartz **Date:** 02/27/17

Kilowatt ratings at	1800 RPM	60 Hertz		12 LEADS	
kW (kVA)	3 Phase	0.8 Power Factor		Dripproof or Open Enclosure	
	CONTINUOUS ①②			STANDBY ①②	
Voltage*	NEMA B / 80 °C	NEMA F / 105 °C	NEMA H / 125 °C	NEMA F / 130 °C	NEMA H / 150 °C
240/480	58 (73)	65 (81)	70 (88)	70 (88)	76 (95)
220/440	56 (70)	63 (79)	68 (85)	68 (85)	71 (89)
208/416	53 (66)	60 (75)	65 (81)	65 (81)	68 (85)
200/400	51 (64)	58 (73)	63 (79)	63 (79)	65 (81)
190/380	48 (60)	55 (69)	60 (75)	60 (75)	62 (78)

① Rise by resistance method, Mil-Std-705, Method 680.1b. ② Machine rated for Max Ambient of 40 °C, Max Altitude 3300 ft

Sumittal Data: 480 Volts*, 70 kW, 88 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase **STD. CONNECTION**

Mil-Std-705B Method	Description	Value	Units	Mil-Std-705B Method	Description	Value	Units
301.1b	Insulation Resistance	>1.5 Meg	Ohms	505.3b	Overspeed	2250	RPM
302.1a	**High Potential Test**			507.1c	Phase Sequence CCW-ODE	ABC	
	Main Stator	1480	Volts	508.1c	Voltage Balance, L-L or L-N	0.2%	
	Main Rotor	1500	Volts	601.4a	L-L Harmonic Max - Total (Distortion Factor)	3.5%	
	Exciter Stator	1500	Volts				
	Exciter Rotor	1500	Volts	601.4a	L-L Harmonic Max - Single	2.5%	
	PMG Stator	1500	Volts	601.1c	Deviation Factor	7.0%	
401.1a	Stator Resistance, Line to Line High Wye Connection	0.181	Ohms	---	TIF (1960 Weightings)	<50	
				---	THF (IEC, BS & NEMA Weightings)	<2%	
	Rotor Resistance	0.99	Ohms				
	Exciter Stator	23.5	Ohms				
	Exciter Rotor	0.12	Ohms				
	PMG Stator	2.1	Ohms				
410.1a	No Load Exciter Field Amps at 480 Volts Line to Line	0.6	A DC	**Additional Prototype Mil-Std Methods are Available on Request.**			
420.1a	Short Circuit Ratio	0.710					
421.1a	Xd Synchronous Reactance	2.011	PU	--	Generator Frame	361	
		5.298	Ohms	--	Type	MagnaPlus	
422.1a	X2 Negative Sequence React.	0.160	PU	--	Insulation	Class H	
		0.422	Ohms	--	Coupling - Single Bearing	Flexible	
423.1a	X0 Zero Sequence Reactance	0.040	PU	--	Amortisseur Windings	Full	
		0.105	Ohms	--	Excitation	Ext. Voltage Regulated, Brushless	
425.1a	X'd Transient Reactance	0.134	PU	--	Voltage Regulator	DVR2000E+	
		0.353	Ohms	--	Voltage Regulation	0.25%	
426.1a	X''d Subtransient Reactance	0.101	PU				
		0.266	Ohms				
--	Xq Quadrature Synchronous	0.000	PU	--	Cooling Air Volume	700	CFM
		0.000	Ohms	--	Heat rejection rate	449	Btu's/min
427.1a	T'd Transient Short Circuit Time Constant	0.05	Sec	--	Full load current	105.2	Amps
				--	Minimum Input hp required	104.4	HP
428.1a	T''d Subtransient Short Circuit Time Constant	0.006	Sec	--	Full load torque	305	Lb-ft
				--	Efficiency at rated load :	89.9%	
430.1a	T'do Transient Open Circuit Time Constant	0.73	Sec				
432.1a	Ta Short Circuit Time Constant of Armature Winding	0.012	Sec	--	Weight	620	lbs

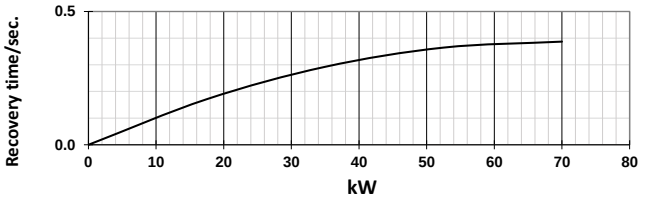
** Voltages refer to wye (star) connection, unless otherwise specified.*

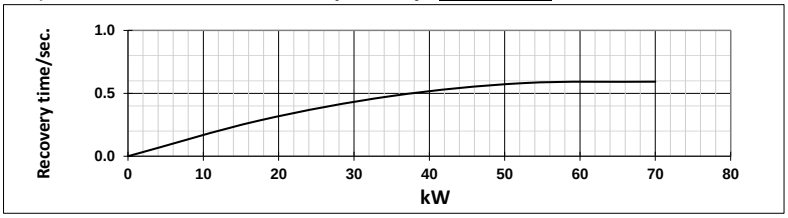
marathon™ Generators

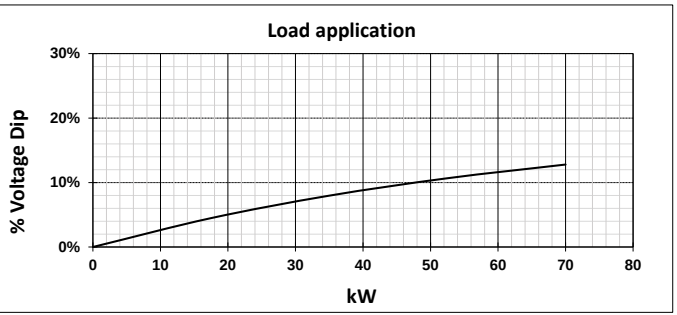
TYPICAL DYNAMIC CHARACTERISTICS

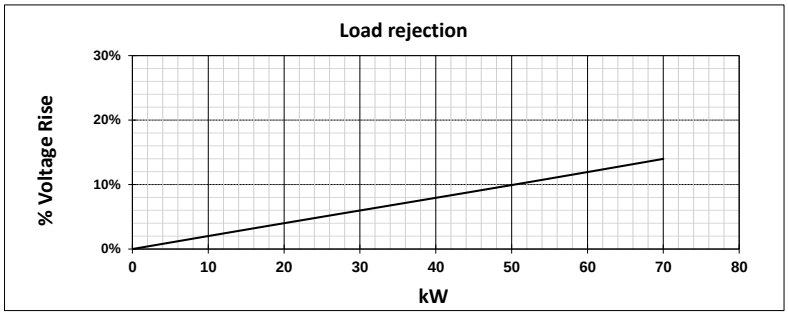
MODEL: 361PSL1602 **Date:** 02/27/17

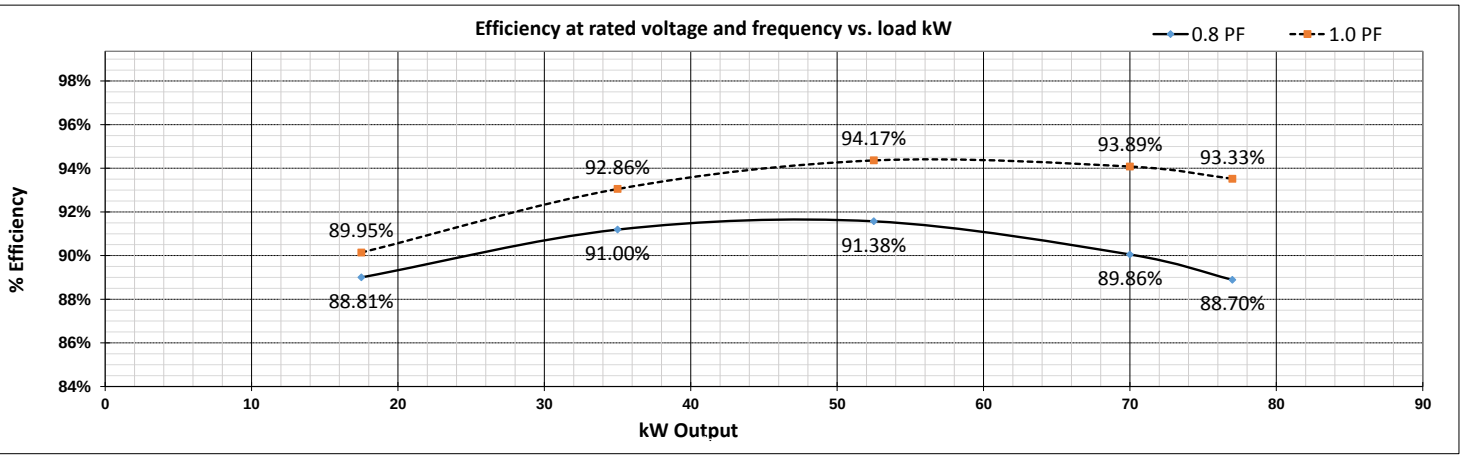
Sumittal Data: 480 Volts*, 70 kW, 88 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase **Prepared by:** Mark Bartz

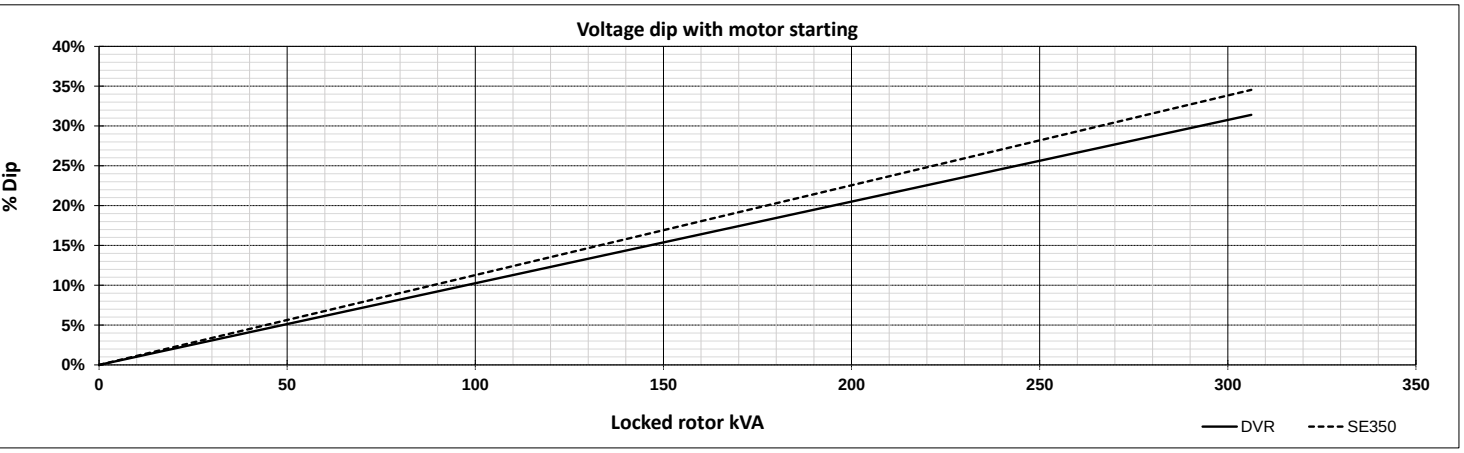












marathon™ Generators

DECREMENT CURVE

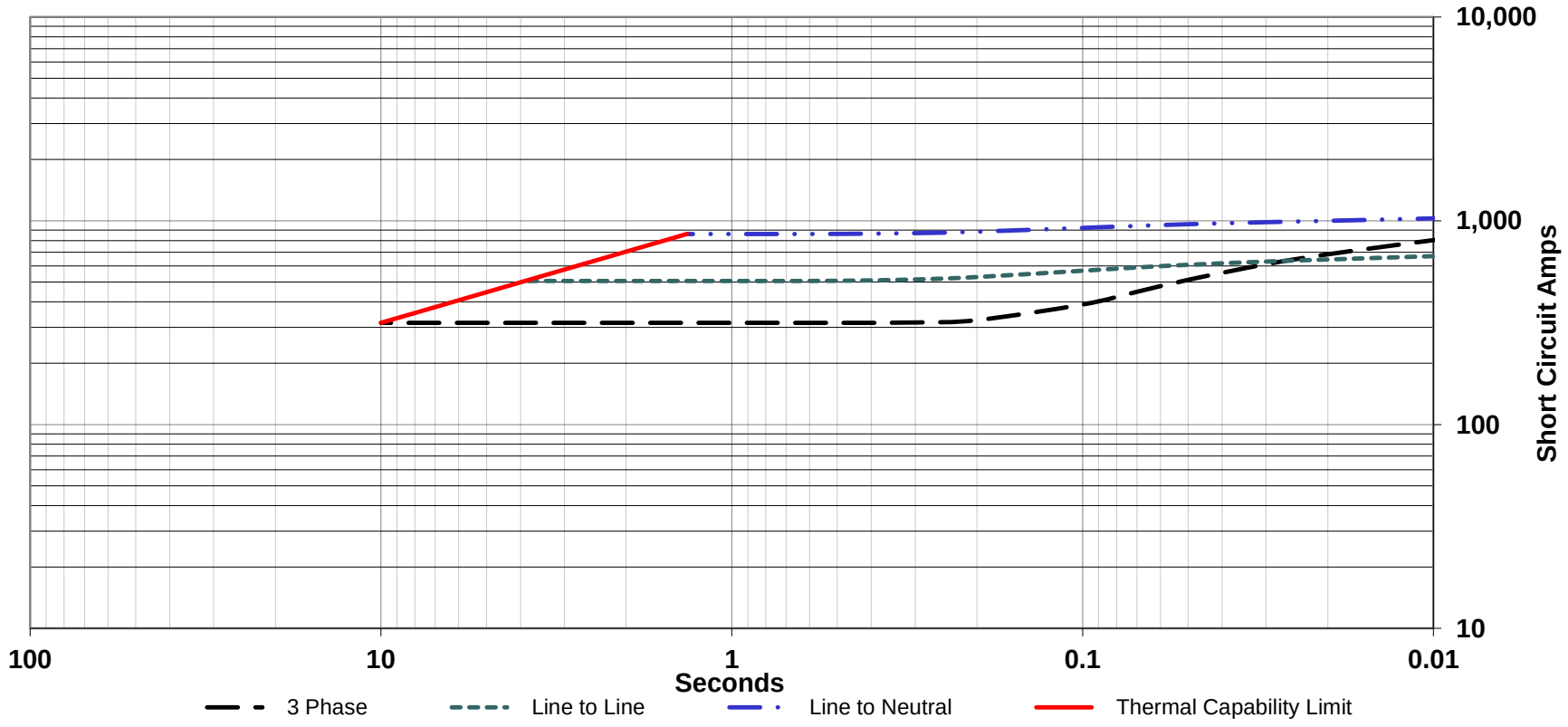
MODEL: 361PSL1602
Submittal Data: 480 Volts*, 70 kW, 88 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase

Prepared by: Mark Bartz
Date : 02/27/17

Full Load Current : 105.2 amps
Steady State S.C. Current : 315.6 amps

Max. 3 ph. Symm. S.C. Current : 1042 amps
INCLUDES EXCITATION SUPPORT (PMG)

Symmetrical Component values, Maximum Asymmetrical Values Are 1.732 Times Symmetrical Values

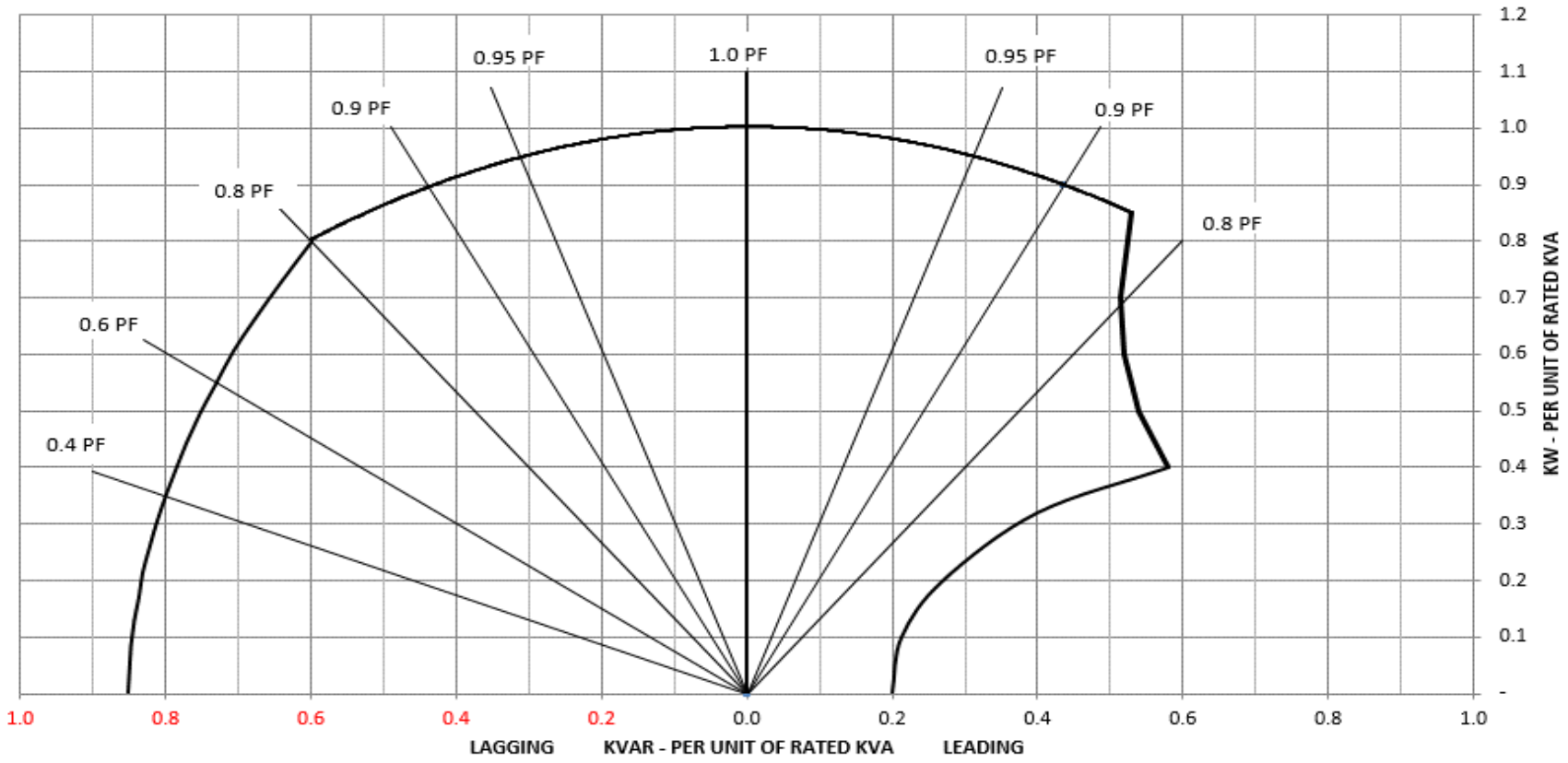


marathon™ Generators

Typical Reactive Capability Curve

MODEL: 361PSL1602
Submittal Data: 480 Volts*, 70 kW, 88 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase

Prepared by: Mark Bartz
Date : 02/27/17



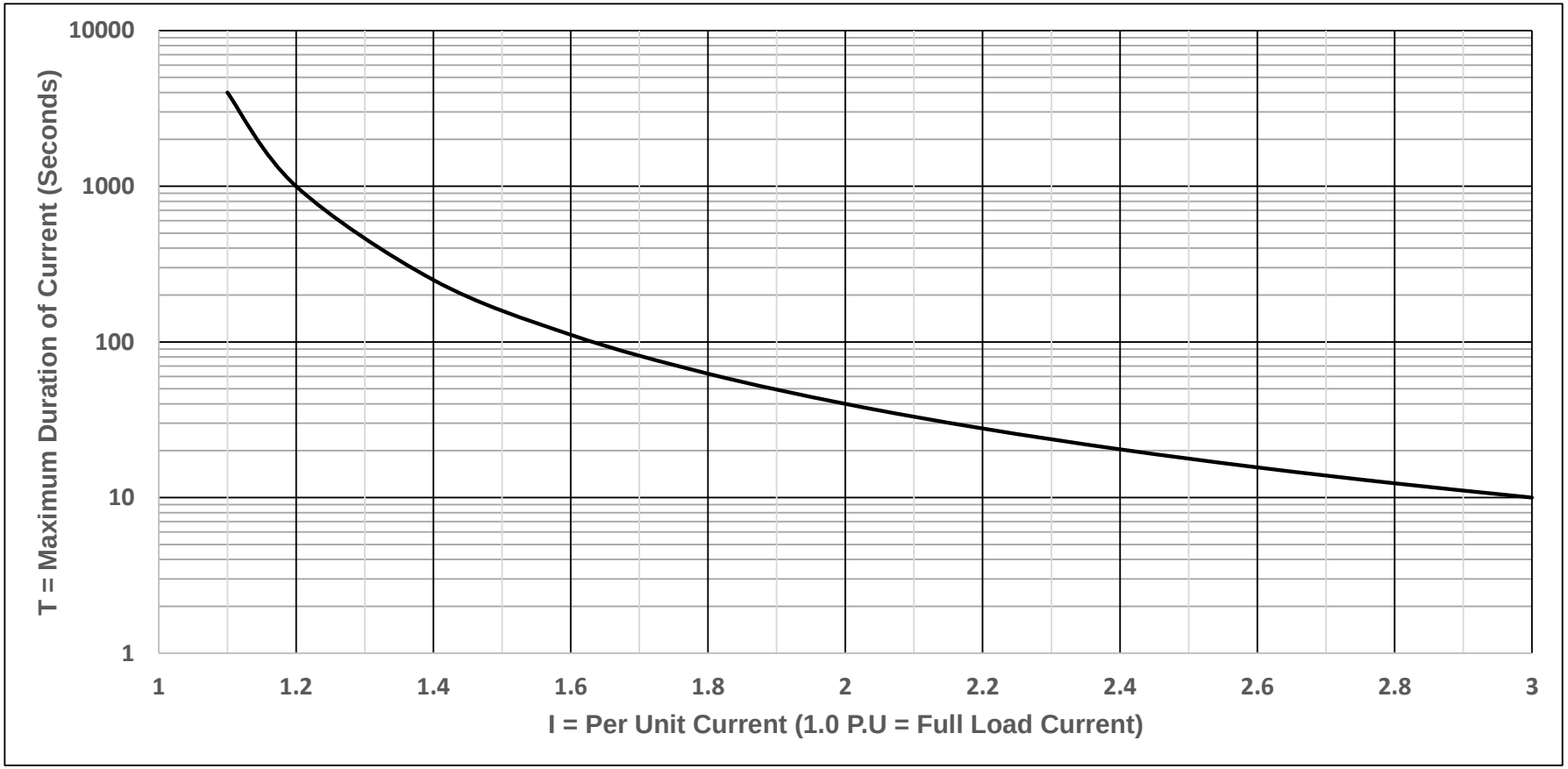
marathon™ Generators

THERMAL DAMAGE CURVE

MODEL: 361PSL1602
Submittal Data: 480 Volts*, 70 kW, 88 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase
Full Load Current : 105.2 amps

Prepared by: Mark Bartz
Date : 02/27/17

Base is 3.0 P.U. current for 10 seconds from T = 40/(I-1)^2
Windings at operating temperature



marathon®
Generators

DVR® 2400
DIGITAL VOLTAGE REGULATOR

NEW FEATURES
- USB 2.0 access through front panel
- Euro style connector for low voltage connections
- Event Logging
- PMG voltage metering
- Polarity configuration for external inputs
- Configurable cut-in and cut-out frequencies
- Retain/reset configuration of remote adjust

FOUR DIGIT HMI DISPLAY
From intial setup to monitoring regulator status, this display provides innovative, fast and easy setup.

REGULATION MODES
Single and Three phase (AVR), Manual Field Current Regulation (FCR), Reactive Power Regulation (VAR) and Power Factor Regulation (PF). All modes compatible with control by external devices.

GENERATOR SOFT START
Controlled increase to rated voltage limits overshoot during voltage build-up in AVR modes.

TRUE RMS VOLTAGE SENSING - SINGLE OR THREE PHASE
Directly sense 100 to 600 Volts at 50/60 Hz. Circuitry senses true RMS voltage for superior regulation.

SINGLE PHASE POWER METERING

FRAME SIZE SPECIFIC PID SELECTION
Simply select the appropriate frame size and your gains are set.

ROBUST GENERATOR PROTECTION FEATURES
9 different Alarm and Shutdown protection features, many are customizable for your application including:
- Field Over & Under Excitation
- Instantaneous Field Over Current
- Generator Over & Under Voltage
- Generator Voltage Imbalance
- Generator Loss of Sensing

REGAL®

DVR®2400 DIGITAL VOLTAGE REGULATOR

SPECIFICATIONS

Voltage Regulation - 0.25% over load range at rated power factor and constant generator frequency.

Output Power - 100 Vdc, 4.0 Adc continuous rating and 190 Vdc, 7.5 Adc forcing capability for one minute.

Exciter Field DC Resistance - 18 to 25Ω Range

Remote Voltage Adjustment - ±30% of nominal via analog input, ±15% via external contacts.

Input Power - 180 to 240 Vac, 250 to 300 Hz PMG power supply

Regulator Sensing - 100 to 600 Vac, 50/60 Hz, 1-phase/3phase

Operating Temperature - From -40˚C to +70˚C (-40˚F to + 158˚F)

Storage Temperature - From -40˚ C to +85˚C (-40˚F to +185˚F)

Ingress Protection - IP52 (front side mounted in conduit box along with swing cover); IP10 (rear side with protective cover)

Shock - 20G in 3 perpendicular planes

Vibration - 2.5G at 5 to 26 Hz; 0.050" double amplitude (27 to 52 Hz); 7G at 53 to 500 Hz

Weight - 3.5 lb. (1361 g)

Humidity Testing - Per MIL-STD-705B, Method 711-D

Salt Fog Testing - Per MIL-STD-810E

EMI Compatibility

Immunity

Meets EN 61000-6-2: 2005 Electromagnetic compatibility (EMC) -Part 6-2: Generic standards- immunity for industrial environments.

Emission

- Meets EN 61000-6-4: 2007 Electromagnetic compatibility (EMC) - Part 6-4: Generic Standards - emmission standard for industrial environments

EMI Compatibility Tests

Immunity

- Electrostatic Discharge (ESD): IEC 61000-4-2
- Radiated RF: IEC 61000-4-3
- Electrical Fast Transient (EFT) /Burst: IEC 61000-4-4
- Conducted RF: IEC 61000-4-6
- Power Frequency and Magnetic Field: IEC 61000-4-8

Emission

- Radiated RF: EN 61000-6-4: 2007, 30 MHz to 1000 MHz

marathon® Generators

Regal Beloit America, Inc.
100 East Randolph Street
Wausau, WI 54402-8003
PH: 715-675-3359

www.marathonelectric.com

REGAL®

Product data sheet
Characteristics

JDL36200CLC
PowerPact J Circuit Breaker,ThermMagn,200A,3P,600V,14kA,CU Lugs

Main

Product or component type	Circuit breaker
Range of product	PowerPact J
Trip unit technology	Thermal-magnetic
Breaking capacity code	D

Complementary

Line Rated Current	200 A
Number of poles	3
Poles description	3P
Breaking capacity	25 kA 240 V AC 18 kA 480 V AC 14 kA 600 V AC 20 kA 250 V DC
System Voltage	250 V DC 600 V AC
[Ics] rated service short-circuit breaking capacity	100 %
Mounting mode	Unit mount
Electrical connection	Copper cable lug line Copper cable lug load
AWG gauge	AWG 1/0...300 kcmil (copper)
Magnetic hold current	1000 A
Magnetic tripping current	2000 A
Height	7.52 in
Width	4.12 in
Depth	5 in

Environment

Product certifications	CCC UL listed IEC
Ambient air temperature for operation	104 °F (40 °C)

Ordering and shipping details

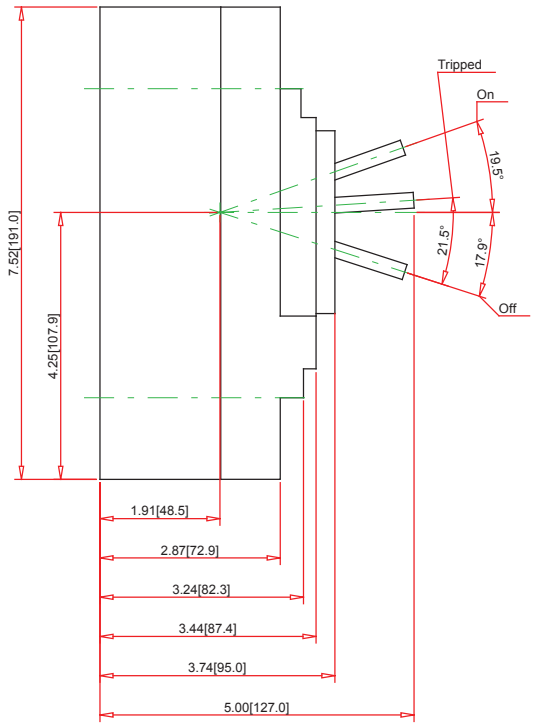
Category	01110 - HD,JD UNIT MT BREAKER/SWITCH
Discount Schedule	DE2
GTIN	00785901599937
Nbr. of units in pkg.	1
Package weight(Lbs)	5
Returnability	N
Country of origin	US

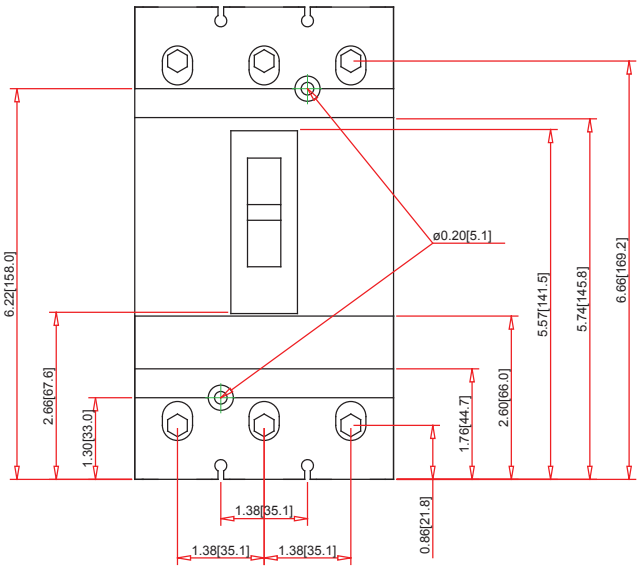
Offer Sustainability

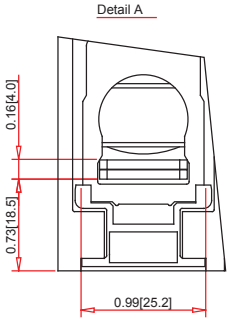
Sustainable offer status	Green Premium product
RoHS (date code: YYWW)	Compliant - since 0832 - Schneider Electric declaration of conformity Schneider Electric declaration of conformity
REACh	Reference not containing SVHC above the threshold Reference not containing SVHC above the threshold
Product environmental profile	Available
Product end of life instructions	Need no specific recycling operations

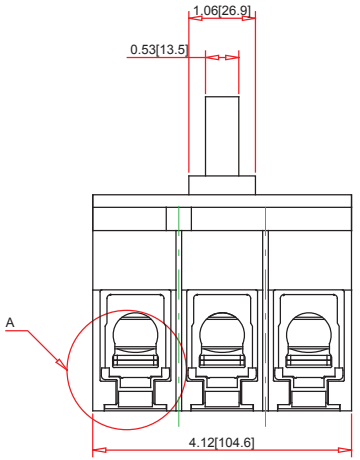
Contractual warranty

Warranty period	18 months









Note:
- Drawings Not To Scale
- Drawings Subject to Change Without Notice
- Dimensions are inches next to [Millimeters]

Part No.:

JDL36200CLC

SQUARE D by Schneider Electric

United States Corporate Headquarters
Schneider Electric USA
1415 South Roselle Road
Palatine, IL 60067
Customer Care Center : 1-888-778-2733
Web : www.schneider-electric.us

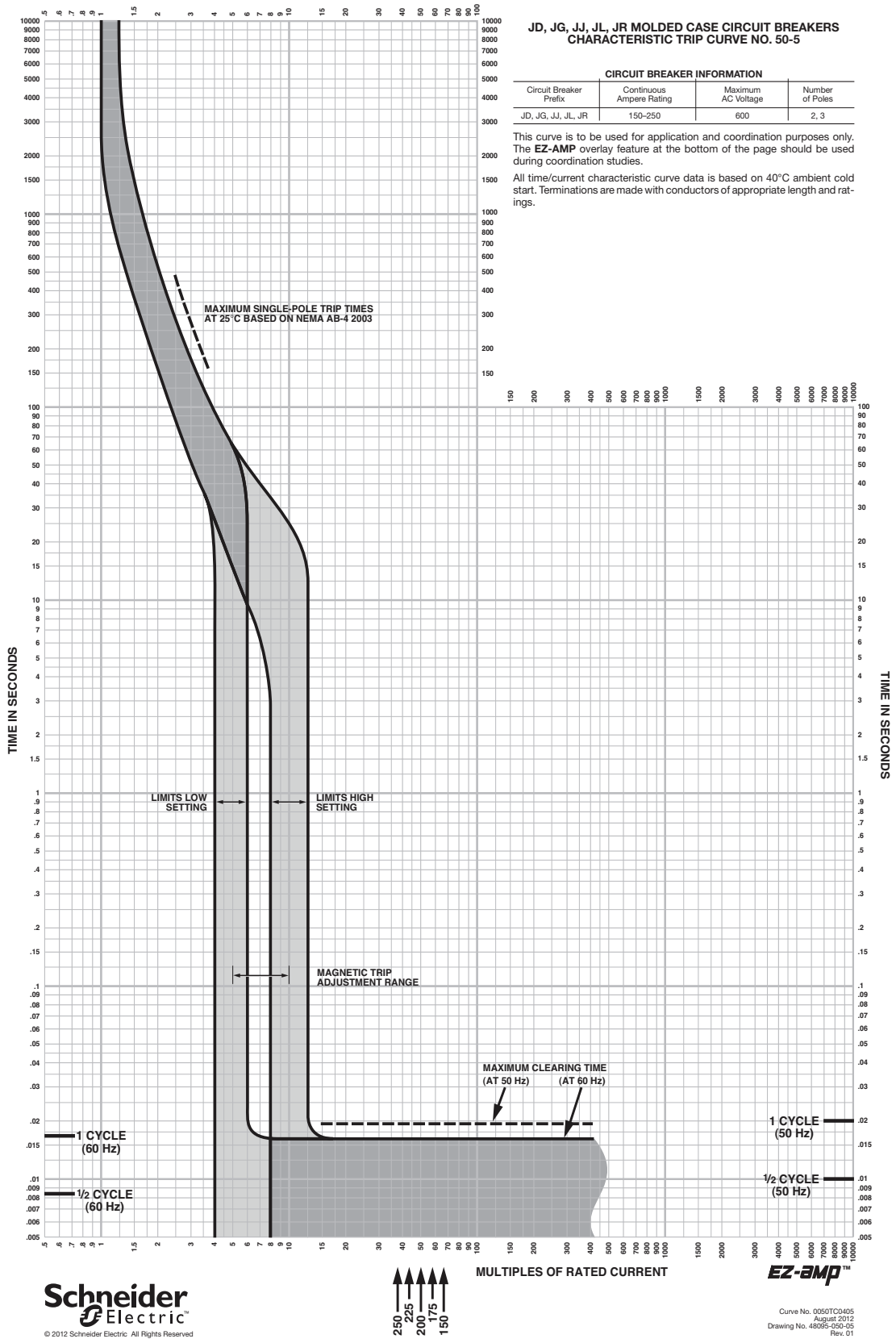
Technical Information:

General Application:	Provides overload and short circuit protection
For Use With:	Industrial Enclosures and Switchboards
Approvals:	UL Listed IEC Rated
Mounting Type:	Unit Mount
Terminal Type:	Line: Lug - Load: Lug
Wire Size:	#3/0-350 AWG/kcmil(Al/Cu)
Weight:	5 Pounds
Depth:	5.00 Inches
Height:	7.52 Inches
Width:	4.12 Inches

Specification:

Description:	PowerPact J-frame Thermal Magnetic Circuit Breaker
Number of Poles:	3-Pole
Ampere Rating:	200A
Voltage Rating:	600VAC/250VDC
Interrupting Rating:	25kA at 240VAC - 18kA at 480VAC - 14kA at 600VAC - 20kA at 250VDC
Circuit Breaker Rating:	100% Rated
Fixed AC Magnetic Trip:	Low: 1000A - High: 2000A

Figure 77: J-Frame 150–250 A (JD, JG, JJ, JL, and JR) Thermal-Magnetic Trip



Circuit Breaker Enclosure Data Sheet - Diesel

55-60 kW

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 4R0113 DS55 and ***mtu*** 4R0113 DS60 circuit breakers. The dimensional drawings will govern and should be referenced for installation.

360 FRAME ENCLOSURE

- Supplied with all 360 frame alternator applications.
- Right side breakers shown. Left side breakers optional.
- Reference Figure 2 for breaker mounting positions.

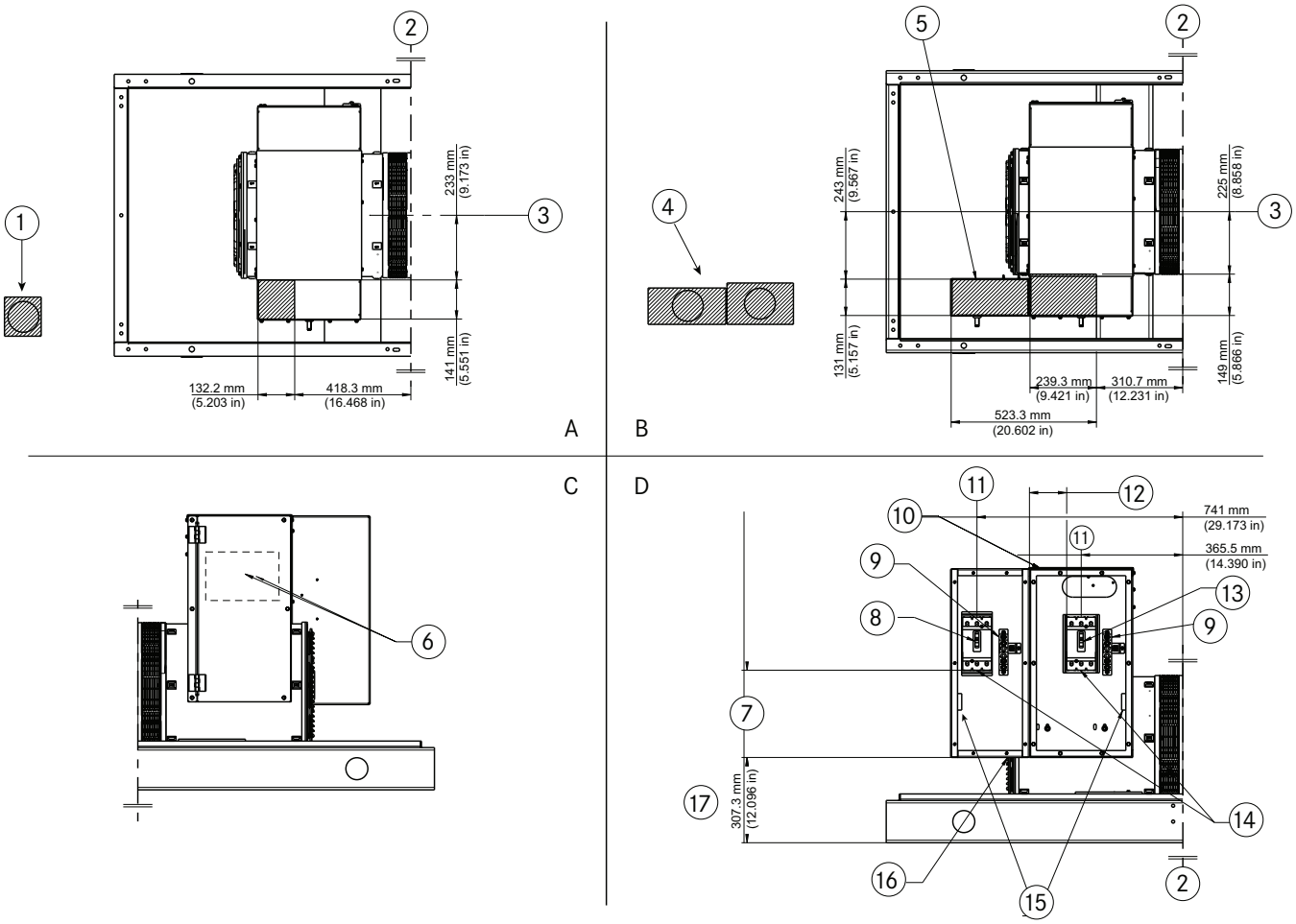


Figure 1: 360 Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Possible top entry conduit locations
2. Rear face of flywheel housing
3. Generator centerline
4. Possible bottom entry conduit locations
5. Optional secondary breaker enclosure
6. Optional control panel location
7. Dimension A
8. Optional second breaker
9. Neutral ASM (torque to 275 in/lbs)
10. Top entry conduit area
11. Breaker centerline
12. Dimension B
13. Primary breaker
14. Customer connect end (recommended torque on label)
15. Equipment ground terminal (torque to 275 in/lbs)
16. Bottom entry conduit area
17. Add 177.8 mm (7 in) for bases with integrated single wall fuel tank

A Rolls-Royce solution

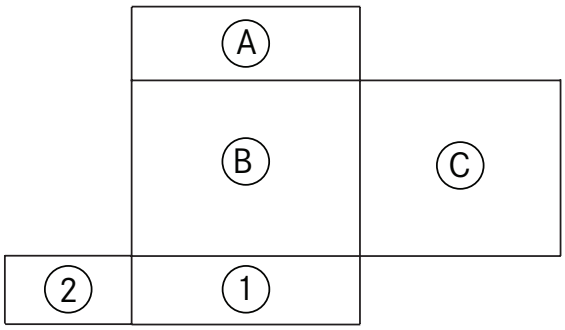
Circuit Breaker Enclosure Data Sheet - Diesel
55-60 kW

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
J-Frame	200-250	(1) 3/0-350	314 (12.36)	134 (5.27)	1	3

[1] Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
[2] Top entry only available for single breaker applications
[3] Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 3/0 AWG

Table 1: 360 Frame Enclosure Data



Top View - Right Side Breaker

Figure 2: 360 Frame Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2

Battery Charger Data Sheet

MicroGenius Battery Charger

BENEFITS AND FEATURES

Designed for mission-critical applications, the MicroGenius® battery charger packs advanced technology charging into a small, lightweight, and rainproof package. MicroGenius® is the only charger that delivers high-performance charging while prolonging useful life of batteries and significantly reducing risk of sudden battery failure. Rigorous worst-case analysis design processes and extensive abuse testing ensure reliable operation in adverse environments.

- Dynamic Boost™ Charge safely recharges batteries faster than competing products
- HELIX™ technology increases battery life and cuts risk of sudden battery failure
- Field-selectable 12/24 volt output
- Hardened switchmode powertrain delivers first-class abuse resistance and state-of-the-art energy efficiency
- Small, lightweight, water-resistant, and rugged
- Standard J-1939 and Modbus communications

SPECIFICATIONS

AC Input	MicroGenius 2		
VAC, Hz	90-265 VAC, 47-63 Hz When set for 24-volt output, full 15A output of 450W available above 170 VAC input, 12A output current max between 100 VAC and 170 VAC input.		

Protection	Supplementary overcurrent protection fuse, transient protected to EN61000-4-5 level 4		
Power factor and efficiency	PF > 0.95 typical; efficiency to 93%; meets CEC Title 20 Efficiency Regulations; standby AC draw < 3W		

A Rolls-Royce solution

SPECIFICATIONS, continued

DC Output	MicroGenius 2
Volts	12V / 24V nominal
Amps	**MicroGenius 180:** 10A/6A
Charging modes	Multi-stage, including float, boost, and commissioning charge modes
Current limit	Factory set at 100% of rating. Field adjustable w/optional keypad or from PC.[1]
Charging characteristic	Constant voltage, current limited; patented Dynamic Boost control
Line and load regulation	±0.5%
Output ripple	< 30 mVrms with or without battery. Delivers fast-responding, stable, well-filtered DC without battery.
Output protection	Current limit, supplementary overcurrent protection fuse, transient protected
Dead battery charge	Starts into and recharges zero volt battery without user intervention
Parallel operation	Two or more chargers operate with all modes synchronized for increased current or fault tolerance[3]

Adjustment and Controls	MicroGenius 2
Charge mode control	Fully automatic patented Dynamic Boost system. Manual boost and battery commissioning available from keypad.
Adjustments	12 or 24 volt; battery type program; fine voltage setting, alarm setpoints; alarm relay mapping
Battery type programs	Flooded lead-acid, Ni-Cd, VRLA, ultracapacitor, lithium[4]
Field voltage adjustment	Three methods: jumper pins, from front panel keypad (requires that digit 12 of the model number be F), or from PC[1]

Status Display	MicroGenius 2
LEDs	Two multi-color front panel status LEDs
Metering and status display	Voltmeter accurate to +2%; ammeter to +5%. 20-character display of status and alarm messages.

Alarms	MicroGenius 2
Alarms	Factory set and field reconfigurable. Standard genset configuration includes summary, AC fail, charger fail, high DC volts, low DC volts, low cranking volts.
Alarms: Form C contacts	**MicroGenius 180:** N/A

SPECIFICATIONS, continued

Networking	MicroGenius 2
J-1939 communications	CAN 2.0 extended ID on RJ-45 port
Modbus communications	Modbus RS-485 on RJ-45 port or Modbus TCP/IP on RJ-45 port.
SENSbus	Proprietary bus for connection of paralleled chargers and SENS accessories

Environmental	MicroGenius 2
Operating temp[5] (convection cooled)	-40 °C to +70 °C (-40 °F to +158 °F) **MicroGenius 180:** Meets full specification from -40 °C to +60 °C (-40 °F to +140 °F)
Humidity	5% to 95%, non-condensing
Ingress protection	IP 22; NEMA 3R; UL Listed "Rainproof"
Vibration	Swept Sine (EN60068-2-6); 4G, 18-500 Hz, 3 axes. Random: 20-500 Hz, 0.01G2/Hz
Shock	EN 60068-2-27 (15G)
Electrical transient	ANSI/IEEE C62.41 and EN 61000-4-12 on power terminals

Abuse Protection	MicroGenius 2
Reverse polarity	Charger self-protects without fuse clearing. Indication via LED and optional LCD.
Wrong voltage battery	Charger-battery voltage mismatch shuts down charger. Indication via LED and LCD
Overvoltage shutdown	Selective: Shutdown only operates if charger causes the overvoltage condition
Overtemp protection	Gradual output power reduction if heatsink temperature becomes excessive

Regulatory Compliance	MicroGenius 2
North America	UL Listed for US: UL 1236 categories BBGQ, BBHH, BBJY and QWIR[6]. Certified to UL 1236 supplements SB (marine), SC (fire pump) and SE (emergency generator)
	NFPA-70, NFPA-110[7] **Note:** X00A42500005 meets NFPA-70 only.
	FCC Part 15, Class B
	American Bureau of Shipping, type approved

SPECIFICATIONS, continued

Construction	MicroGenius 2		
Housing/Configuration	Die-cast aluminum heatsink base with stainless steel covers and fasteners		
Connections	AC and DC terminal blocks: 20 to 10 AWG. J-1939 and Modbus-485: RJ-45. Form C alarms: 28 to 16 AWG		

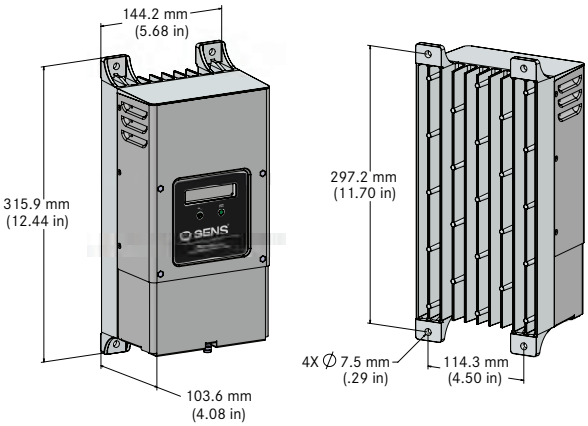
[1] Requires optional computer-to-charger adapter. To order, contact ***mtu*** Parts Department.
[2] Remote battery temp sensor is optional. To order, contact ***mtu*** Parts Department.
[3] Requires standard RJ-45 network cable to connect paralleling bus. To order, contact ***mtu*** Parts Department.
[4] Contact factory to determine compatibility with the battery management system (BMS) of your lithium battery.
[5] At 65 **°C (149 °F)** and above, the LCD display may be unreadable and display life will be reduced.
[6] Except 180 W unit in 24 V configuration, which is not listed to QWIR
[7] All chargers equipped with an alarm/display board meet NFPA-110 requirements. For chargers without an alarm/display board to meet NFPA-110, charger performance and alarm data available on the J-1939 port must be annunciated by the generator set control panel.

MICROGENIUS ORDERING INFORMATION

Battery Charger	***mtu*** Part #	Output Volts	Output Amps
MicroGenius 2 180**	XG3042500013	12 Volts	10 Amps

*Meets NFPA-70 only.
Includes ***mtu*-specific programming

DIAGRAMS AND DIMENSIONS



MicroGenius 2 Dimensions

Subject to change. | WT00038096 | 2021-03

Water Heater Data Sheet

TPS Series

DESCRIPTION

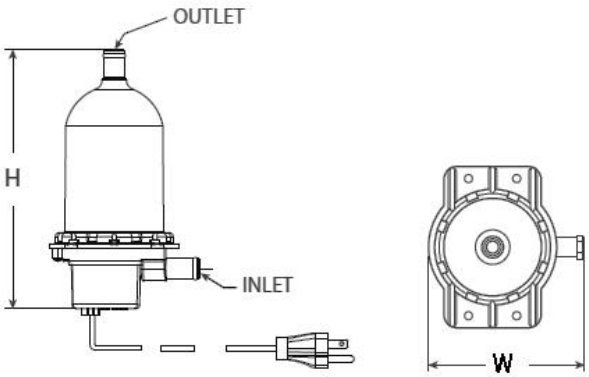
The TPS engine preheater is designed to preheat diesel and gas engines in generator set applications. Simple to install and very lightweight, the TPS engine preheater features a built-in thermostat and heats engines with up to 12 L displacement. Thermosiphon circulation of the coolant delivers heat throughout the entire engine.

CERTIFICATIONS AND STANDARDS

— c-UL-us Listed

SPECIFICATIONS

Height:	200 mm (7.9 in)
Width:	117 mm (4.6 in)
Weight:	771 g (1.7 lb)
Heating fluid:	Engine coolant (50% glycol/50% water)
Power:	0.5, 1, 1.5, 1.8, and 2 kW
Voltage range:	120 to 240 V
Tank material:	Polyphenylene sulfide (PPS)
Heating element:	Incoloy 800
Enclosure:	IP41
Fluid capacity:	416 cm^3 (0.11 gal)
Max pressure:	6.2 bar (90 psi)
Inlet / outlet:	15.9 mm (0.625 in)
Thermostat range:	
On	38 °C (100 °F)
Off	49 °C (120 °F)



Model Number	*mtu* Part Number	Watts	Volts	Phase	Hz	Amps
TPS151GT10-000	SUA52748	1,500	120	1	60	12.5

Subject to change. | WT00032343 | 2021-04

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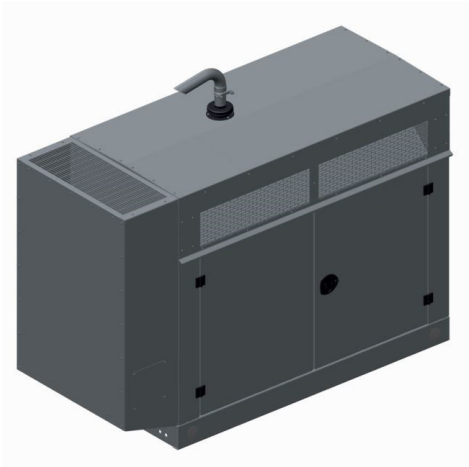
Enclosure and Sound Data Sheet - Diesel, Open Field

60 Hz: 30-60 kW Standby



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Basic weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 190 mph wind load rating. Skid-mounted enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Enhanced weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 190 mph wind load rating. Skid-mounted enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of enclosure. UL 94 HF-1 compliant,1.5" thick sound attenuated foam insulation installed inside enclosure walls where applicable.
Level 3	Level 2 enclosure with air exhaust scoop with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed where applicable.

CERTIFICATIONS AND STANDARDS

— UL 2200

STANDARD FEATURES FOR ALL LEVELS

— Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
— 190 mph wind rating
— Service access
  - Double door access gives ease of service to all components
— Pitched roof
— Rain collar
— Rodent barriers
— Exhaust scoop access panel and drain
— Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
— Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
— Internal silencer
  - Internally-insulated space saver design
  - Level 1: Industrial Grade
  - Level 2/3: Hospital Grade

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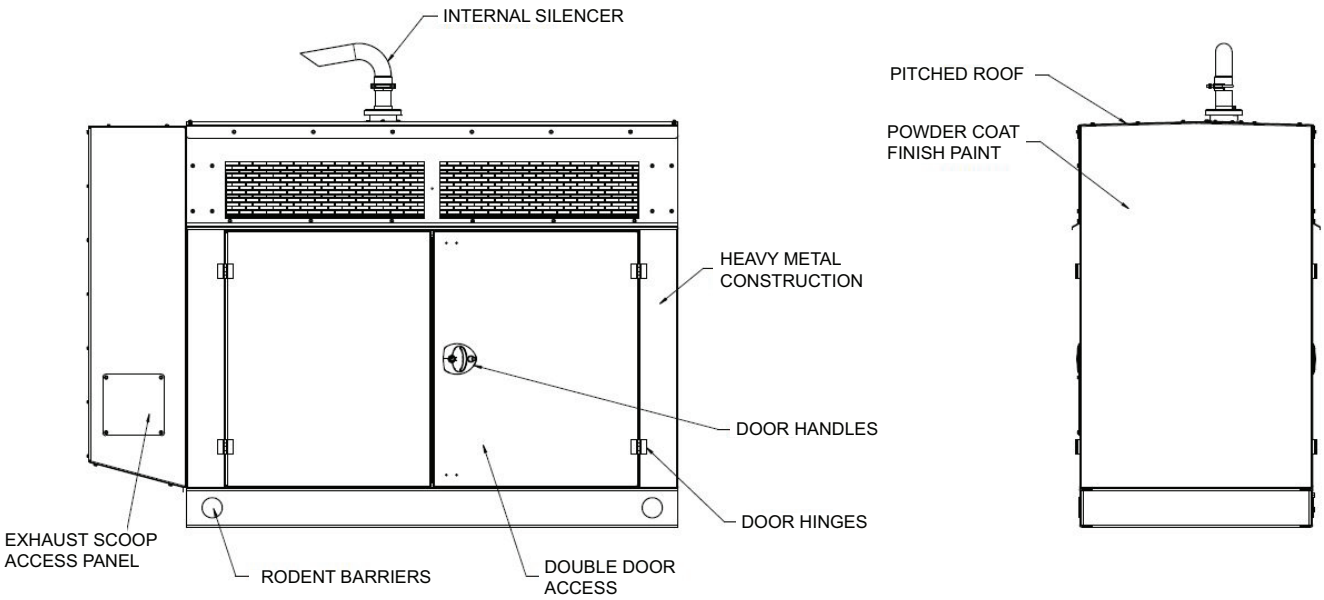

Level 3 Enclosure (pictured)*

OPTIONAL FEATURES (LEVEL 2 AND LEVEL 3 ONLY)

— Door restraints

ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

				7 Meters
Application	Model	Power Node		Level 3
60 Hz Standby	***mtu*** 4R0113 DS60	60 kW		73.4

[1] Undampened engine exhaust noise
[2] Measurement with infinite exhaust connection

NOTE:
- Measurements include exhaust noise
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability
- Generator set is tested on level ground without spring isolators installed
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

C/F = Consult Factory

* Note: Visual appearance may differ between power nodes.

Subject to change. | WT00043042 | 2021-12

Diesel Fuel System Data Sheet

Sub-Base Tank

DESCRIPTION

The sub-base fuel tanks used with ***mtu*** generator sets are manufactured and listed per UL142 and ULC-S601 standards for steel above-ground tanks. These certifications ensure that our tanks meet the structural and mechanical integrity requirements for mounting generator sets directly on top, providing our customers with a safe and efficient fuel storage system. These tanks are suitable for above-ground storage of non-corrosive, stable, flammable, or combustible liquids that have a specific gravity not exceeding that of water. They are intended for installation and use in accordance with the codes referenced in the *Certifications and Standards* section. The secondary containment construction consists of a steel tank within a closed steel containment dike that is capable of being monitored for leakage.

STANDARD FEATURES

- Normal vent
- Emergency vent
- Manual fill
- Cam lockable fill cap
- Basin drain (plugged)
- Removable supply and return dip tubes
- Leak detection
- Black paint finish
- Secondary containment
- Electrical stub-up area: Provides space for generator set electrical connections and internal wiring capabilities
- Baffles: Separate cold engine supply fuel from hot returning fuel (additional baffling as required for structural integrity)
- Fuel level gauge: A direct-reading fuel level gauge with electric sender

CERTIFICATIONS AND STANDARDS

United States
UL 142

In addition, this equipment is compatible with the following certifications when properly installed in accordance with all applicable codes, standards, regulations, and laws pertaining to the installation and application of the product. Reference the prevailing codes for installation requirements.

United States
NFPA 30
NFPA 37
NFPA 110
International Fire Code

Power Generation

PERFORMANCE ASSURANCE CERTIFICATION

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TESTING PROCEDURES

Prototype

We have been producing superior generator sets for more than six decades. Understanding the importance of reliable, cost-effective products, we have developed industry-leading test procedures to ensure we exceed this criteria. Our testing program confirms that our customers will receive products of the highest quality.

Our Performance Assurance Certification (PAC) certifies that every MTU generator set undergoes rigorous prototype testing including the following:

Prototype Test Procedures

- **Rated Load (NFPA 110)**
  All generator set models will produce the nameplate-rated load within the design tolerance of the generator set.
- **Extended-run Testing**
  All generator set prototypes have been subjected to extended run-time testing.
- **Transient Response Analysis (ISO 8528-5)**
  All new generator set models have undergone transient response analysis per ISO 8528-5.
- **Torsional Analysis**
  All generator set models have undergone torsional stress analysis.
- **Engine Cooling System**
  All generator set models will cool sufficiently within the ambient design conditions per each model.
- **Anticipatory Alarms and Shutdowns**
  The pre-alarms and alarms function appropriately to protect the generator set from any foreseen unnecessary failures.
- **Vibrational Analysis (ISO 8528-9)**
  All new generator set models have undergone vibration analysis to ensure that each engine-generator coupling is balanced and that there is no destructive resonant vibration.
- **Noise Analysis (ISO 8528-10)**
  All generator sets undergo airborne noise analysis using the enveloping surface method.

Prototype Test Standards

MTU generator sets are compliant with many different codes and standards. Our validation philosophy and performance are regularly reviewed to ensure continuity with these codes and standards: *UL2200, CSA, EPA, NFPA 99—Health Care Facilities, NFPA 70—National Electrical Code, NFPA 110—Standard for Emergency and Standby Power Systems, Department of Labor and Industry, NEMA MG 1—Motors and Generators, and MIL-STD-705-c.*

Factory Acceptance

Our factory testing is performed with the same extreme diligence and attention to detail that is given to the prototype testing process. Every MTU generator set receives a complete factory acceptance test that certifies and ensures the system will function in accordance to every specific application.

Test metering has an accuracy of 1.3% or better. This metering is calibrated a minimum of once per year and is directly traceable to the Bureau of Standards.

Factory acceptance testing procedures

- **Insulation Resistance Inspection** (301.1c)*
- **High Potential Test** (302.1b)*
- **Alternator Overspeed** (1 min.)*
- **Engine Inspection**
- **Generator Inspection**
- **Resistances Inspection** (401.1b)
  - Exciter Field Stator
  - Alternator Armatures
- **Mounting and Coupling Inspection**
- **Engine Fuel Oil System Inspection**
- **Engine Lube Oil System Inspection**
- **Engine Cooling System Inspection**
- **DC Charging System Inspection**
- **Circuit Breaker Inspection**
- **Anticipatory Alarms and Shutdowns Inspection** (505.2b, 515.1b, 515.2b)
- **Optional Equipment Inspection** (513.2a)
- **Load Test Inspection**
  - Full Nameplate-Rated Load
  - No-Load Inspection
  - MAX Load @ 1.0 P.F. (640.1d)
  - MAX Load @ 0.8 P.F.
  - Block Loads @ 0–25%, 0–50%, 0–75%, 0–100%
- **Phase Balance and Sequence Inspection** (507.1d, 508.1d, 516.1a)

** Performed by Alternator OEM*

Prototype Test Summary (PTS)

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Prototype testing is administered to validate the electrical and mechanical design integrity of the generator set. The results indicated below summarize testing performed on the prototype of the specified generator set model. This form of testing is only conducted on standard factory prototype generator sets. *Results may vary.*

GENERATOR SET MODEL(S):	***mtu*** 4R0113 DS60

Rep. Prototype Model:	***mtu*** 4R0113 DS60	**Test Date:**	12/12/2013
kW:	63	**kVA:**	78
Voltage:	208	**Hz:**	60

ENGINE/GENERATOR

Engine Manufacturer:	John Deere	**Engine Model:**	4045HF280
Engine Fuel:	Diesel		
Generator Manufacturer:	Marathon	**Generator Model:**	361CSL1602
Voltage Regulator Model:	MAVC63-4D	**PMG Equipped:**	☐ Yes ☒ No

OPTIONS

Enclosure Level:	Level 3	**Silencer:**	Hospital
Air Filtration:	Standard		

TEST SUMMARY

TEST	TEST RESULT
Transient Performance *Certifies that the engine generator-set model has undergone transient response analysis per ISO 8528-5*	**NFPA-110 One Step:** ☒ 100% ☐ Other. Specify: ____ % **Full Load Acceptance:** Voltage Dip: 30.8 % Recovery Time: 1.32 seconds Frequency Dip: 4.5 % Recovery Time: 1.67 seconds
Steady State Performance *Certifies that voltage deviation and harmonics are within acceptance tolerance range per ISO-8528-5 at full load*	**Frequency Regulation:** 0.17 +/- % Regulation Overall 60.2 Maximum Hz 59.99 Minimum Hz **Voltage Regulation:** 0.18 +/- % Regulation Overall 208.37 Maximum AC Volts 207.63 Minimum AC Volts
Torsional Analysis *Certifies that the generator set has undergone torsional stress analysis and is not subjected to torsional stresses that could be harmful to the unit*	☒ Complete
Cooling System *Certifies that all generator set models will cool sufficiently within the ambient design conditions per each model at referenced enclosure level*	50 °C (122 °F) Maximum Ambient Temperature 90 m^3/min (3,162 SCFM) Radiator Air Flow
Sound Data *Certifies that sound data is within the acceptable tolerance range per ISO 8528-10 at referenced enclosure level*	67.8 dBA @ 7 m (23 ft) at full rated load *The sound value is representative of the specified prototype at the time of testing and is subject to alteration due to technological advances. Please contact your **mtu** representative for the most recent enclosure and sound data.*
Vibrational Analysis *Certifies that new generator set models have undergone vibration analysis to ensure that each generator coupling is balanced and there is no destructive resonant vibration per ISO 8528-9*	☒ Complete

JOHN DEERE EMISSION TEST DATA 4045HF280 74kW@1800rpm*

ENGINE SPEED - RPM	1801	1801	1801	1800	1800
EXH ELBOW - C	543.7	486.8	406.1	276.6	191.5
OBSV TORQUE - Nm	390.3	293.3	194.9	98.1	39.5
OBSV BRAKE POWER - kW	73.59	55.31	36.74	18.49	7.45
WET EXH FLOW @ ELBOW -m^3/min	14.35	12.14	9.54	0	0
CBM CO2 - kg/h	52	40.1	28.2	15.7	9.5
CBM CO2 - g/kWh	707	725.6	767.6	847.3	1275.1
CBM CO - g/h	96.9	31.4	31.9	27.3	22.5
CBM CO - g/kWh	1.32	0.57	0.87	1.48	3.01
CBM HC - g/h	9.2	9.2	8.7	6.8	6.7
CBM HC - g/kWh	0.12	0.17	0.24	0.37	0.9
CBM NOX - g/h	341.5	213.4	137.3	93.4	86.7
CBM NOX - g/kWh	4.64	3.86	3.74	5.05	11.64
CBM NOX+HC - g/h	350.6	222.5	145.9	100.2	93.4
CBM NOX+HC - g/kWh	4.76	4.02	3.97	5.42	12.54
PM MFM TOTAL - g/h	32.4	11.73	5.34	10.77	8.77
PM MFM TOTAL - g/kWh	0.44	0.212	0.145	0.583	1.177

* 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 we do not guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, or other conditions beyond our control.

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: **Deere & Company**
(U.S. Manufacturer or Importer)

Certificate Number: NJDXL04.5141-005

Effective Date: 08/09/2021

Expiration Date: 12/31/2022

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 08/09/2021

Revision Date: N/A

Model Year: 2022
Manufacturer Type: Original Engine Manufacturer
Engine Family: NJDXL04.5141

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 56<=kW<75
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Smoke Puff Limiter, Non-standard Non-After Treatment Device Installed, Engine Design Modification

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.

CERTIFICATE OF COMPLIANCE

Certificate Number	AU3559
Report Reference	AU3559- 20020610
Issue Date	2019-DECEMBER-02
Issued to:	MTU America Inc 100 Power Dr, Mankato MN 56001-4790
This certificate confirms that representative samples of	ENGINE GENERATORS See addendum Page
	Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	UL 2200 Standard for Safety for Stationary Engine Generator Assemblies
Additional Information:	See the UL Online Certifications Directory at https://iq.ulprospector.com for additional information.

This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.

Bruce Mahrenholz, Director North American Certification Program

UL LLC

CERTIFICATE OF COMPLIANCE

Certificate Number	AU3559
Report Reference	AU3559- 20020610
Issue Date	2019-DECEMBER-02

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Stationary engine generator assemblies (diesel fueled) for outdoor use and Indoor Use, models as follows:

Model Series 25 – 415, followed by any of the following letters (R,P,J,N,G,D), followed by J, followed by C or S, followed by 6, followed by D, followed by T, followed by 3 or 4. May have additional prefix or suffix letters or numbers.

Model Series D, followed by S or P, may be followed by two or three zeroes, followed by a number ranging from 20-415, followed by D, followed by 6, followed by C or S, followed by one of the following letters (R,P,J,N,G,D), followed by A, W, N, or T, followed by K, followed by 0, followed by 57 or 66, followed by 3 or 4. May have additional prefix or suffix letters or numbers.

Models D, followed by G, followed by 04, 05, or 06, followed by R, followed by J, followed by a three digit number. May be have additional prefix or suffix letters or numbers.

Models 4, 5, or 6, followed by R, followed by a four digit number, followed by D, followed by S, followed by a number ranging from 25 to 415. May have additional prefix or suffix letters or numbers

Bruce Mahrenholz, Director North American Certification Program

UL LLC

MTU AMERICA INC.

Two (2) Year / 3,000 Hour Basic Limited Warranty
Standby (3D) / Prime (3B) / Data Center Continuous Power (3F)

MTU America Inc. issues the following express Limited Warranty subject to the following terms, conditions, and limitations:

An original consumer ("Owner") who purchases an MTU engine generator set ("Product") is entitled to coverage under this Limited Warranty. MTU America Inc. warrants to the Owner that the Product is free of defects in material and workmanship and will perform under normal use and service from valid start-up performed by MTU America Inc. Any nonconformity to the foregoing is defined as a Warrantable Defect. This Limited Warranty applies to Product shipped by MTU America Inc. after January 1, 2014.

1. Limited Warranty Periods

Limited Warranty Period. The Limited Warranty Period for a Warrantable Defect in the Product is twenty-four (24) months after the first commissioning of the Product. In all cases, the Limited Warranty period will expire not later than thirty-six (36) months from the date of shipment from the MTU America Inc. Mankato, MN facility or after 3,000 operation hours, whichever occurs first.

Accessories Coverage Period. The Accessories Coverage Period for a Warrantable Defect in cords, receptacles, cord reels, gas flex pipes, housing lights, space heaters, and associated equipment ("Accessories") is twelve (12) months from the date of shipment from MTU America Inc. Mankato, MN facility.

MTU America Inc. warranty obligations under this Limited Warranty are contingent upon distributor completing the following:

(a) The MTU America Inc. warranty and the *Start-Up Validation and Pre-Inspection Form*. Return both to MTU America Inc. within sixty (60) days of the start-up date; and
(b) The engine registration form (when applicable). Return to the manufacturer as stated in the engine registration form instructions.

2. MTU America Inc. Responsibilities

If a Warrantable Defect is found during the Limited Warranty Period and/or the Accessories Coverage Period, and provided the Owner has complied with its obligations under Section 3, MTU America Inc. will, during normal working hours, through an MTU authorized distributor, dealer, or service outlet, perform some or all of the following:

(a) Repair or replace, at the sole election of MTU America Inc., the defective part with a new or remanufactured replacement part;
(b) Provide reasonable or customary labor needed to correct the Warrantable Defect;
(c) Provide technician travel time of 400 miles to and from the closest MTU authorized distributor, dealer, or service outlet to the Product location;
(d) Part removal and re-installation, if necessary and as solely determined by MTU America Inc.

The obligation to repair or replace defective parts by MTU America Inc. does not include responsibility for reimbursement of incidental or consequential costs. If MTU America Inc. repairs or replaces an Accessory, part, or Product under this Limited Warranty, the repaired or replaced Accessory, part, or Product assumes the unexpired portion of the warranty period remaining from the original Accessory, part, or Product. Repair or replacement of an Accessory, part, or Product will not extend the term of the original Limited Warranty Period or Accessories Coverage Period. Parts or Product replaced shall become the property of MTU America Inc.

Failure of MTU America Inc. to enforce any of the terms or conditions stated herein shall not be construed as a waiver of such provision or of any other terms and conditions of this Limited Warranty.

3. Owner Responsibilities

During the Limited Warranty Period and Accessories Coverage Period, the Owner is responsible for, and MTU America Inc. will not reimburse for the following:

(a) Battery;
(b) Premium or overtime labor costs;
(c) Labor and material costs for Product removal and reinstallation;
(d) Any special access fees required to gain access to MTU equipment, without limitation, training or safety policy requirement to gain access;
(e) Transportation costs or travel expenses related to delivery of the Product to the designated distributor, dealer, or service outlet;
(f) Incidental and consequential costs, damages, or administrative expenses of whatever nature;
(g) Non-Product repairs, vehicle damage, "downtime" expenses, cargo damage, fines, lost income, any business costs of any kind, Owner's travel expenses, and other losses resulting from a Warrantable Defect;
(h) Shipping charges for replacement parts/Products in excess of those which are usual and customary; or
(i) Local taxes, if applicable.

In addition, Owner must:

(a) Operate, use, and maintain the Product in accordance with the applicable Owner's manual and/or any other manuals specified by MTU America Inc., including without limitation handling, inspection, servicing, or operating instructions;
(b) Promptly notify MTU America Inc. or its authorized representative of a Warrantable Defect and make the Product available for repair;
(c) Comply with MTU America Inc. or its authorized representative's reasonable directions regarding the timing, sequence, and location of warranty repairs and make the Product available for inspection;
(d) Perform all required maintenance and maintain and provide proof that all required maintenance has been performed;
(e) Use MTU specified parts, components, and consumables;
(f) Promptly return to MTU America Inc. all parts replaced under this Limited Warranty;
(g) Comply with MTU America Inc. long term storage guidelines, if applicable, and maintain and provide proof of compliance;
(h) Routinely exercise the Product in accordance with operating instructions;
(i) Install the Product in accordance with the installation guide provided; and
(j) Reimburse MTU America Inc. for all costs incurred in providing warranty service where, following examination, the request or claim for warranty coverage proves to be unfounded or excluded, as well as all incidental costs including those incurred investigating the claim.

4. Limitations

MTU America Inc. is not responsible, and this Limited Warranty is not available under any circumstances, for any of the following:

(a) Failure of Owner to fulfill its obligations under Section 3;
(b) Failure of Owner to follow MTU America Inc. instructions for Product stored by Owner longer than 180 days from date of shipment from the MTU America Inc. Mankato, MN facility;
(c) Defects caused by adjustments made by Owner to the fuel system or governor system;

(d) Defects which were obvious or capable of being identified by reasonable inspection and were not reported to MTU America Inc. within a reasonable time;
(e) Rental equipment used during warranty work;
(f) Defects caused or potentially caused by service work performed by non-MTU authorized service providers and/or the use of non-genuine MTU parts;
(g) Defects resulting from natural wear and tear, external action, negligence, natural disasters, accidents, incorrect use, improper handling or storage, inadequate corrosion-proofing, incorrect assembly or installation, or modification of the Product;
(h) Defects resulting from abuse or neglect, including unauthorized modifications to the Product;
(i) Repair or any use or installation which MTU America Inc., in its sole discretion, determines to be improper;
(j) Defects caused by incorrect maintenance;
(k) Defects resulting from Owner's delay in making the Product available after being notified of a potential problem or Owner's failure to take immediate measures to avoid or mitigate damage;
(l) Damage caused by shipping;
(m) Repair of parts sold by MTU America Inc. that are warranted directly to the Owner by the respective part's manufacturer;
(n) Misapplication of the Product;
(o) Diesel engine "wet stacking" due to lightly loaded diesel engines;
(p) Acts of nature or acts of God;
(q) Any failure, other than those resulting from a defect in material or factory workmanship of the Product;
(r) Use of the Product for purposes other than those for which it was intended, including without limitation use of the Product under extraordinary operating conditions not made known to MTU America Inc. in writing at the time of the order; or
(s) Material provided by or a design specified by the Owner.

5. **Software Warranty.** Where software is included in the Product, MTU America Inc. warrants to the Owner that 1) the software will be substantially free from material program errors and material defects in material and workmanship, and that 2) it shall function substantially in accordance with MTU America Inc. specification at the time of dispatch from the MTU America Inc. manufacturing facility. MTU America Inc. does not warrant that the software is error-free or free from "bugs" as commonly categorized by the computer industry. MTU America Inc. shall, during the Limited Warranty Period, endeavor to remedy at its cost, in its sole discretion, by repair or replacement of any material program errors or material defects of which Owner has promptly notified MTU America Inc. MTU America Inc., at its option, may elect to provide the most current software at no cost, and in such case MTU America Inc. will not cover the cost to install the applicable updated software. MTU America Inc. shall have no obligation with respect to any nonconformities resulting from unauthorized modifications to the software or any Owner interfacing.

6. **Emissions Warranty.** The Product may be covered under an emissions warranty specified by the U.S. Environmental Protection Agency and/or the California Air Resources Board. The terms of the warranty, if applicable, may be accessed by following the link: https://www.mtu-solutions.com/eu/en/technical-information/emissions-warranty.html. Any such Emissions Warranty is incorporated herein by reference in its entirety to the extent and with the same force as if fully set forth herein. The Product, if certified, may only be certified to comply with the required country or region-specific emission regulations. Where applicable, the Product is only certified to those specific emission regulations/standards which are clearly stated in the respective MTU America Inc. defined technical specifications. IT IS THE OWNER'S SOLE RESPONSIBILITY TO ENSURE THAT THE EXPORT/IMPORT, INSTALLATION, AND USE OF THE PRODUCT(S) COMPLIES WITH THE APPLICABLE EMISSION REGULATIONS IN THE COUNTRY OR REGION WHERE THE PRODUCT(S) WILL BE USED.

7. Disclaimers

LIMITATION OF WARRANTIES: THIS LIMITED WARRANTY IS GIVEN EXPRESSLY AND IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, FREEDOM FROM INFRINGEMENT OR THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR USAGE OF TRADE. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS, OR WARRANTIES NOT SPECIFIED HEREIN.

THIS LIMITED WARRANTY, THE OBLIGATIONS OF MTU AND THE RIGHTS AND REMEDIES OF THE OWNER SET FORTH IN THIS LIMITED WARRANTY ARE EXCLUSIVE AND ARE EXPRESSLY IN LIEU OF, AND THE OWNER HEREBY WAIVES AND RELEASES ALL OTHER OBLIGATIONS, WARRANTIES (INCLUDING WARRANTY AGAINST REDHIBITORY DEFECTS), REPRESENTATIONS OR LIABILITIES, EXPRESS OR IMPLIED, ARISING BY LAW IN CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY CLAIMS ARISING OUT OF, CONNECTED WITH OR RESULTING FROM THE PERFORMANCE OF THIS LIMITED WARRANTY OR FROM THE DESIGN, MANUFACTURE, SALE, REPAIR, LEASE OR USE OF THE PRODUCT, ANY COMPONENT THEREOF AND SERVICES DELIVERED OR RENDERED HEREUNDER OR OTHERWISE.

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, ALLEGED NEGLIGENCE, OR OTHERWISE, SHALL MTU BE SUBJECT TO LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION, DAMAGE TO THE PRODUCT, OR OTHER PROPERTY, COMMERCIAL LOSSES, LOST PROFITS, LOSS OF USE, INCONVENIENCE, LOSS OF TIME, COST OF CAPITAL, COST OF SUBSTITUTE EQUIPMENT, DOWNTIME, OR CLAIMS OF CUSTOMERS.

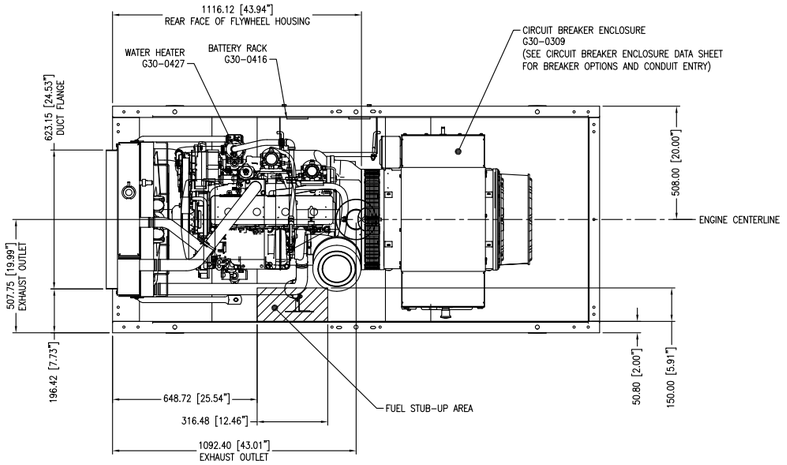
MTU AMERICA INC. SHALL NOT BE LIABLE FOR ANY CLAIM GREATER IN AMOUNT THAN THE PURCHASE PRICE OF THE PRODUCT.

8. The Owner is entitled to rectify the defect or to have it rectified by third parties only in urgent cases where operational safety is at risk or in order to prevent disproportionately extensive damage; provided that Owner has informed MTU America Inc. and obtained prior written consent from MTU America Inc. In such cases, MTU America Inc. shall, in its sole discretion, reimburse the costs incurred by the Owner up to an amount equivalent to the costs MTU America Inc. would have incurred had it remedied the defect itself.

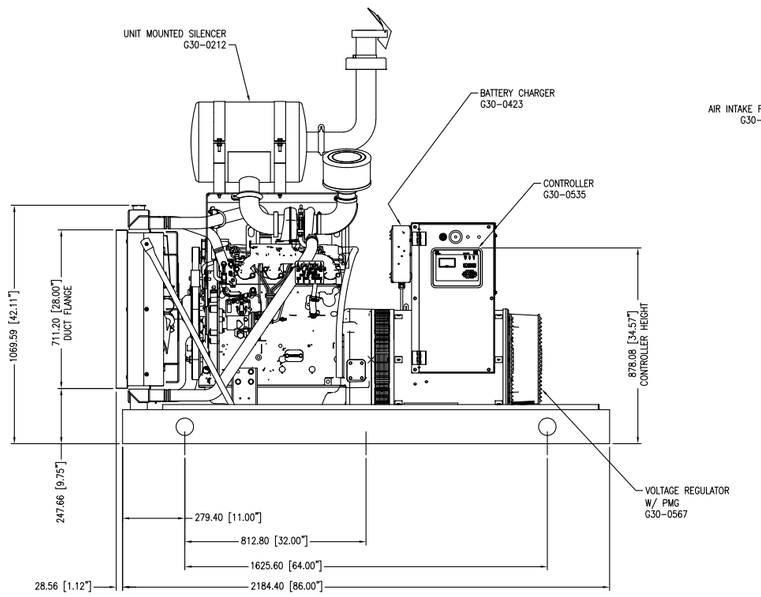
9. This Limited Warranty gives the Owner specific legal rights, and the Owner may also have other rights, which vary from state to state. Some states do not allow warranty duration limitations and/or certain exclusions or limitation of incidental or consequential damages. Therefore, the previously expressed exclusion(s) may not apply to Owner. If any one or more of the provisions contained in this Limited Warranty shall be invalid, illegal, or unenforceable in any respect, the validity, legality, or enforceability of the remaining provisions contained therein shall not in any way be affected or impaired thereby.

10. This Limited Warranty is governed by the laws of the State of Minnesota without regard to its conflicts of law principles and excluding the United Nations Convention for the International Sale of Goods.

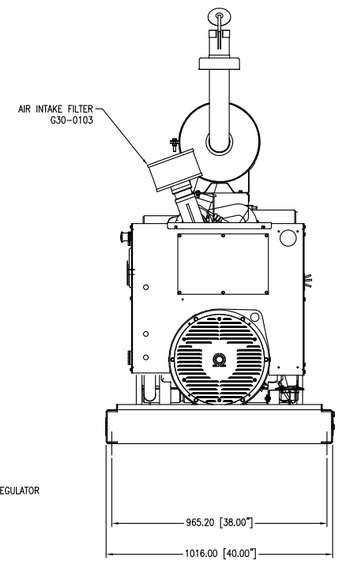
11. In order to obtain performance of an MTU America Inc. warranty obligation, the Owner should contact the nearest MTU authorized distributor, dealer, or service outlet for instructions. To find the location of the nearest MTU authorized distributor, dealer, or service outlet call 800-325-5450 or write to: MTU America Inc. Warranty Department, 100 Power Drive, Mankato, MN 56001.



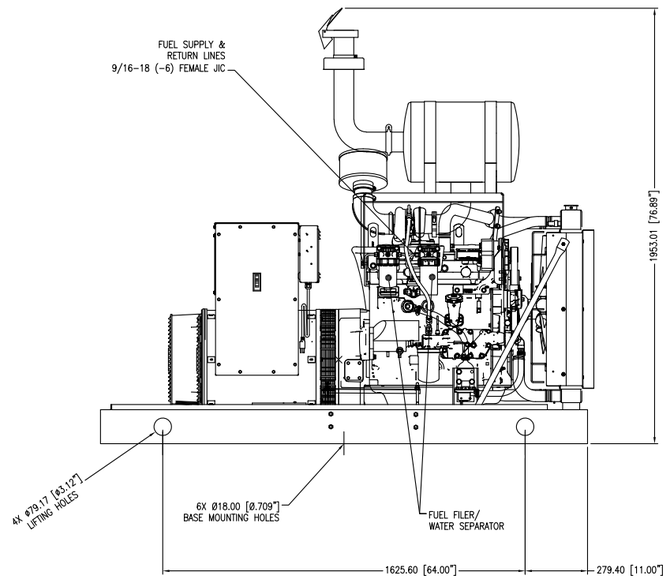
TOP VIEW



LEFT VIEW



REAR VIEW



RIGHT VIEW

REVISION	DATE	DESCRIPTION
A	2020-04-07	UPDATED TITLE BLOCK

A Rolls-Royce solution

APPLICABLE MODELS:

MTU 4R0113 DS60

THIRD ANGLE PROJECTION

DRAWN TO SCALE
DIMENSIONS: MM [INCH]

DATE CREATED: 2015-09-22

DIMENSIONAL LAYOUT

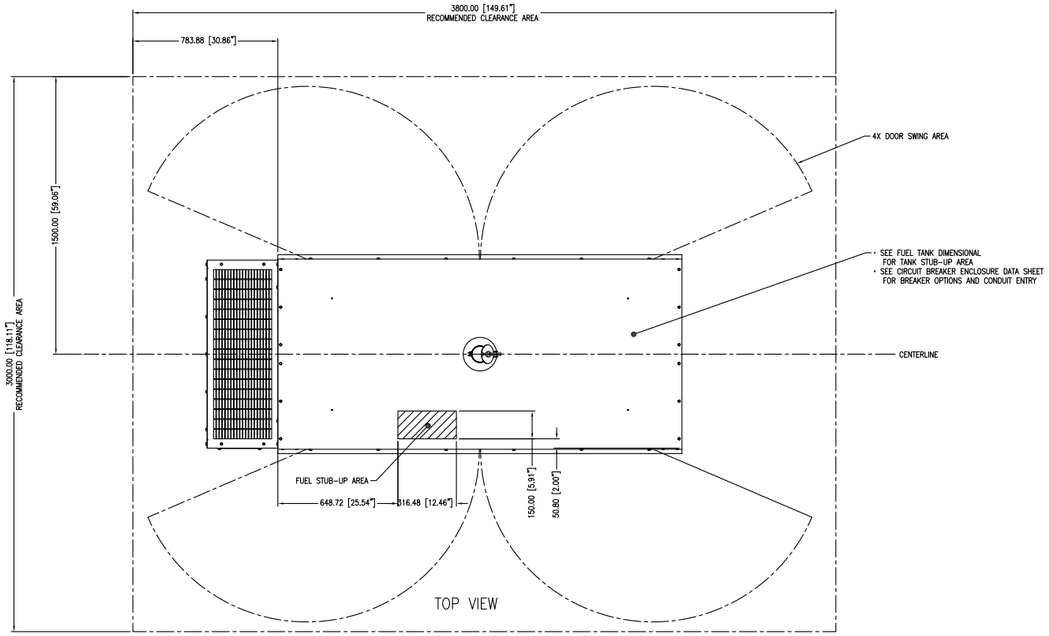
DESCRIPTION: 60 kW Genset, Housed Base

ENGINE: John Deere, 4045HF

WEIGHT (MIN-MAX): 1118-1363 KG 2465-3004 LB

DRAWING NUMBER: XZG3000100104

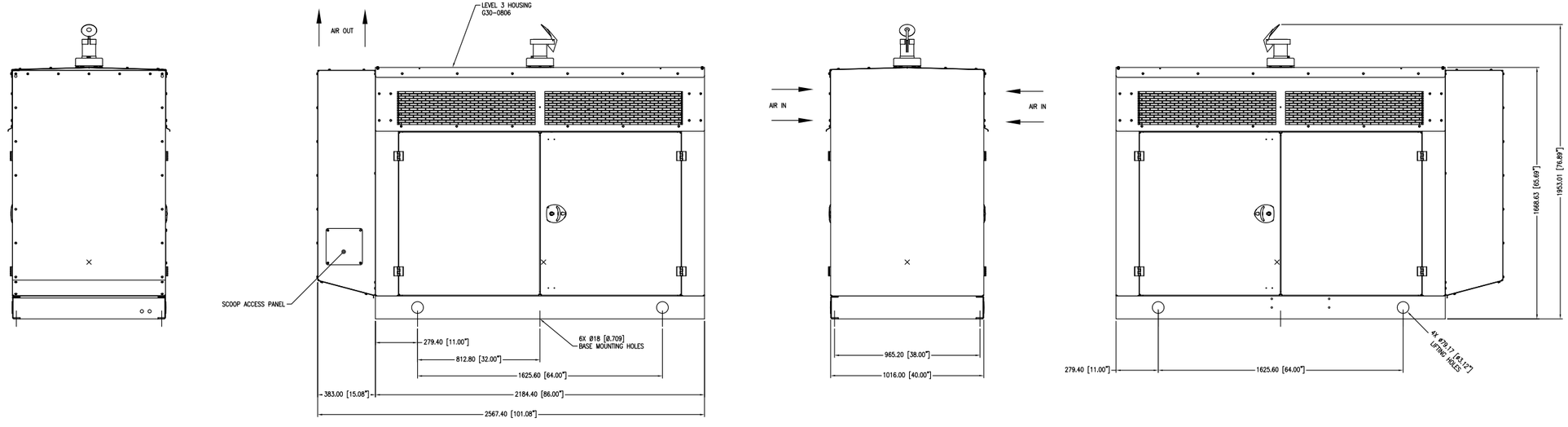
SHEET: 1 of 2



DRAWING OPTIONS 60 kW JD4045HF		
Group	Drawing Code	Description
Housing Options, Exterior	G30-0805	Level 2 Housing
	G30-0806	Level 3 Housing w/ Exhaust Scoop
	G30-0808	Air Exhaust Gravity Louver
	G30-0810	Level 1 Housing
Housing Options, Interior	G30-0904	Air Intake Motorized Louver
	G30-0905	Interior Housing Light
	G30-0906	Heater

Reference the Drawing Options table and within the Layer Properties and turn on/off the Drawing Codes that may or may not apply to your configuration.

Note: Some options may not be referenced. Only options which visibly change the drawing are selectable.



FRONT VIEW

LEFT VIEW

REAR VIEW

RIGHT VIEW

REVISION	DATE	DESCRIPTION
B	2020-04-07	UPDATED TITLE BLOCK
A	2018-12-27	CHANGED WEIGHT TO BE CUMULATIVE GENSET W/ HOUSING

A Rolls-Royce solution

APPLICABLE MODELS:
MTU 4R0113 DS60

THIRD ANGLE PROJECTION

DRAWN TO SCALE
DIMENSIONS: MM [INCH]

DATE CREATED: 2015-09-25

DIMENSIONAL LAYOUT

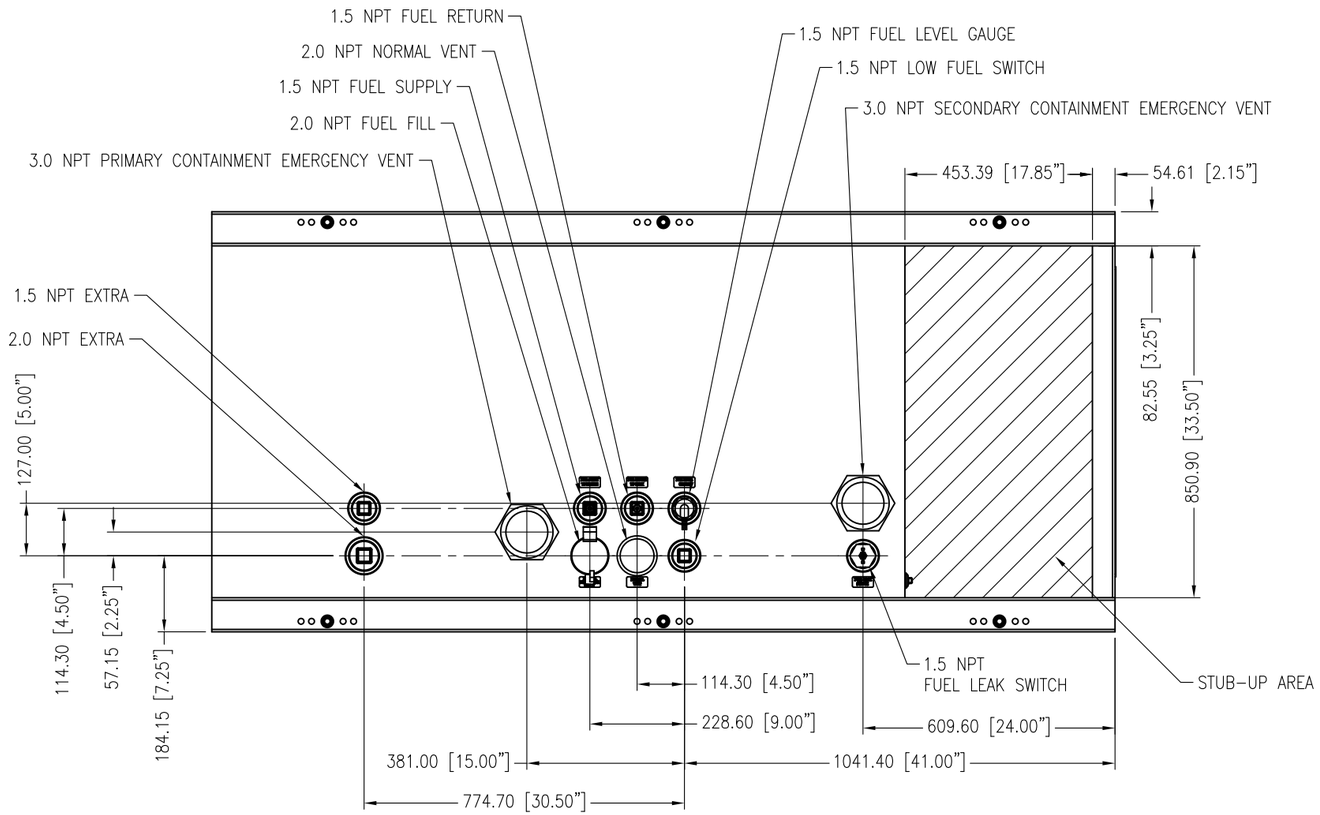
DESCRIPTION: 60 kW Genset, Housing

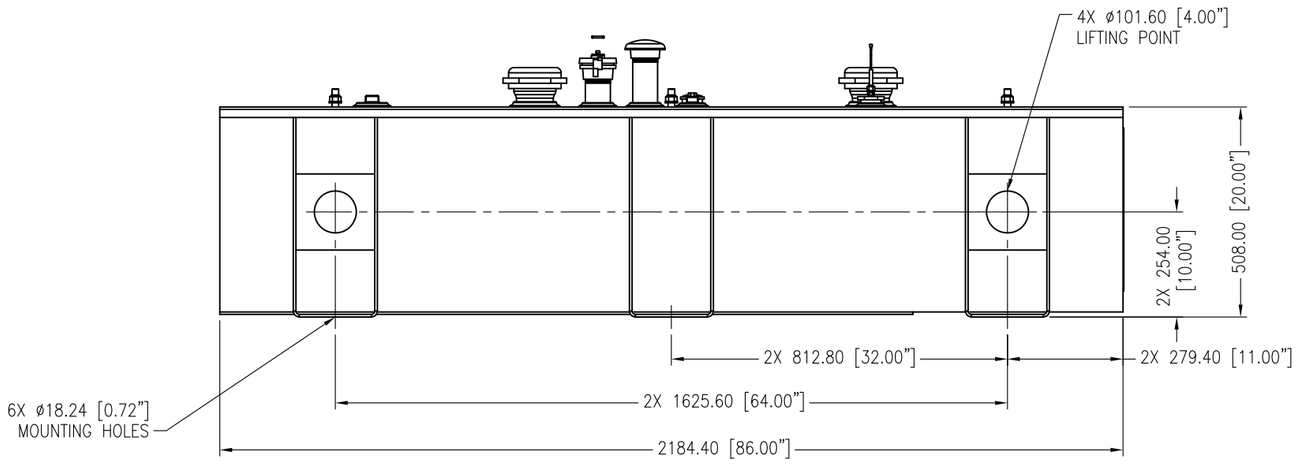
ENGINE: John Deere, JD4045HF

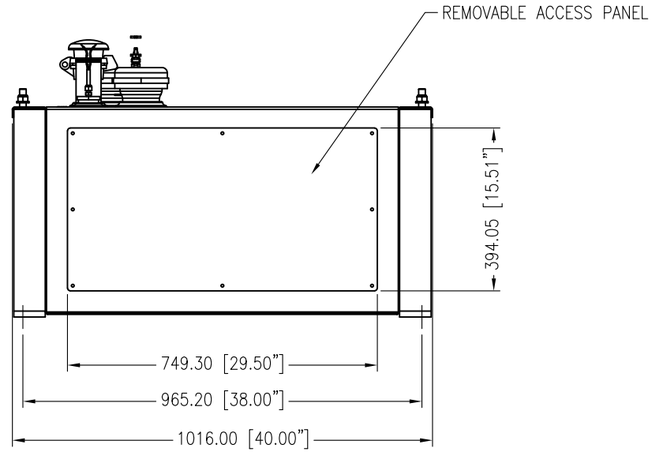
WEIGHT (MIN-MAX): 1188-1865 KG 2619-4113 LB

DRAWING NUMBER: XZG3000100106

SHEET: 1 of 1







A	2020-04-07	UPDATED TITLE BLOCK
REVISION	DATE	DESCRIPTION

A Rolls-Royce solution

APPLICABLE MODELS:

- MTU 4R0113 DS40
- MTU 4R0113 DS44
- MTU 4R0113 DS50
- MTU 4R0113 DS55
- MTU 4R0113 DS60

THIRD ANGLE PROJECTION

DRAWN TO SCALE

DIMENSIONS: MM [INCH]

DATE CREATED: 2018-02-08

DIMENSIONAL LAYOUT

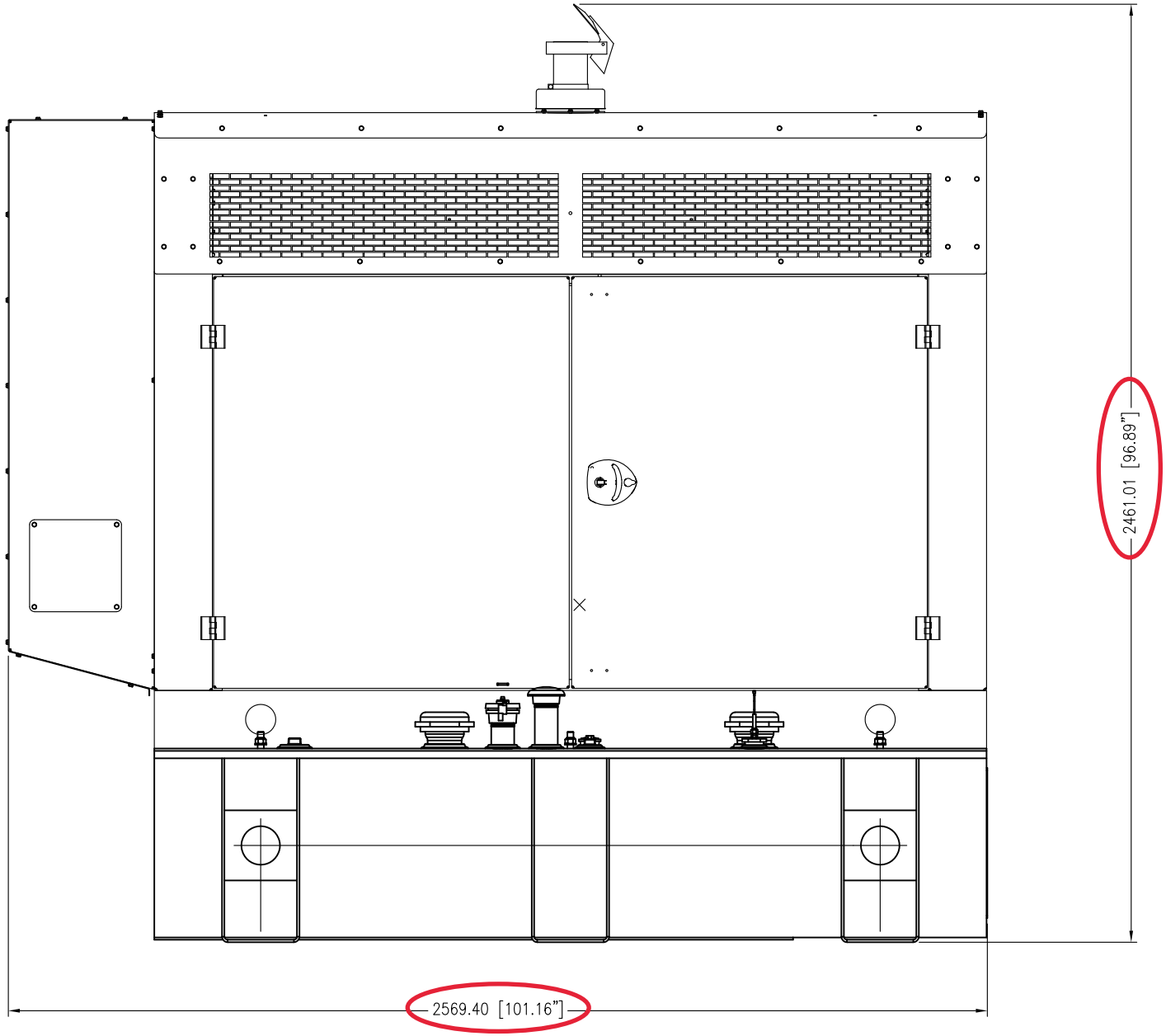
DESCRIPTION: 40-60 kW 24 Hr 140 Gal Standard Tank

ENGINE: JD4045TF/HF

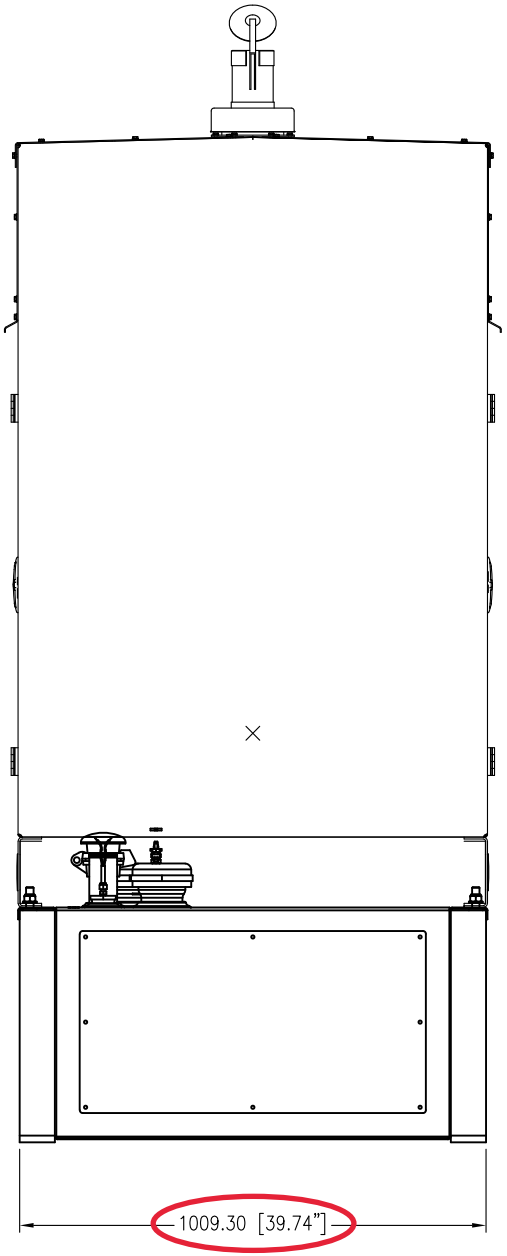
WEIGHT (MIN-MAX): 300 KG [660 LB]

DRAWING NUMBER: XZG3000100129

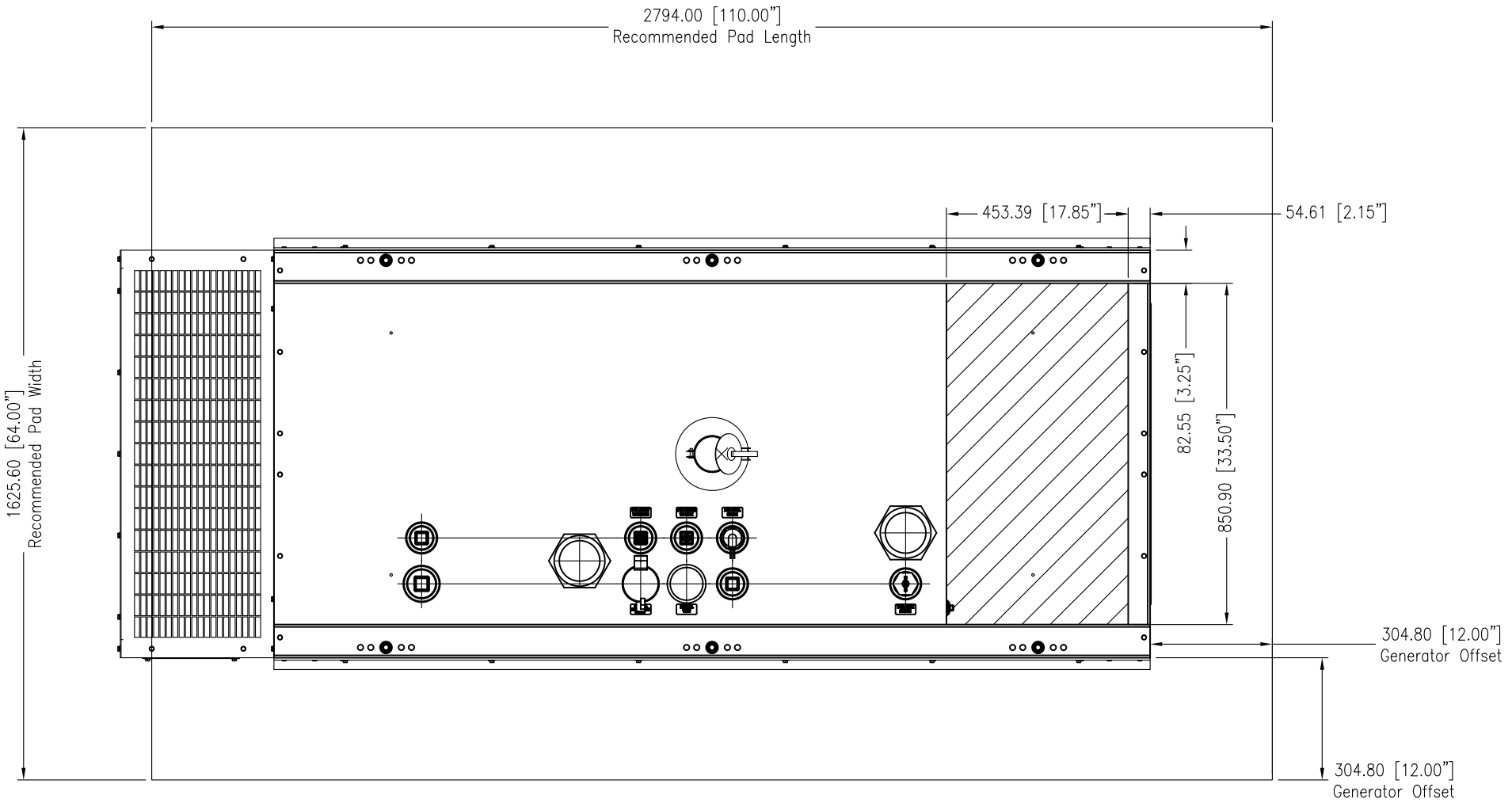
SHEET: 3 of 10



LEFT VIEW

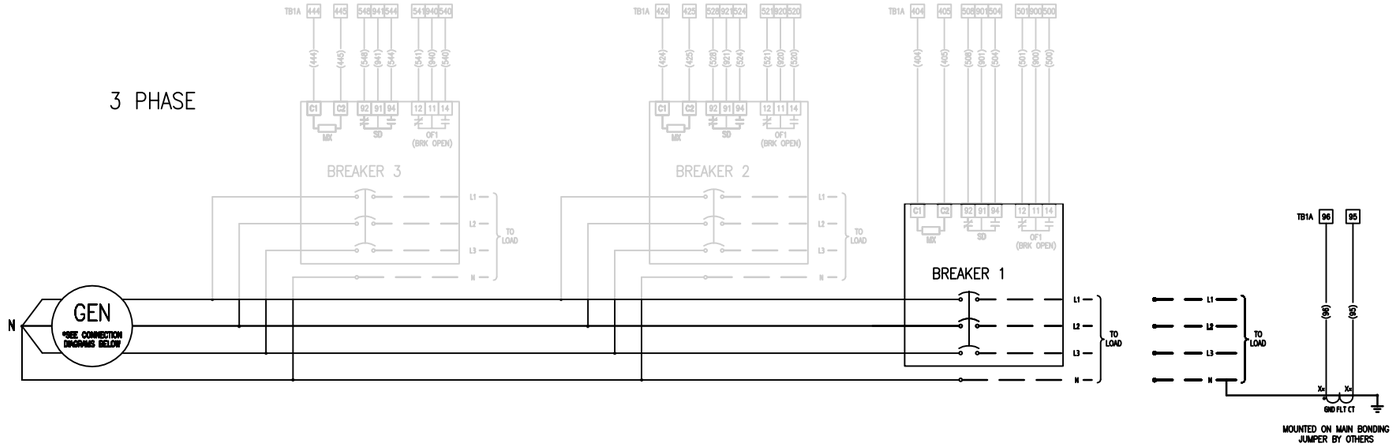


REAR VIEW


2794.00 [110.00"]
Recommended Pad Length
1625.60 [64.00"]
Recommended Pad Width
453.39 [17.85"]
54.61 [2.15"]
82.55 [3.25"]
850.90 [33.50"]
304.80 [12.00"]
Generator Offset
304.80 [12.00"]
Generator Offset

GENERATOR OUTLET BOX

3 PHASE



NOTE:

1. WIRE NUMBERS ARE IN PARENTHESIS
2. SHORT DASHED LINES (--------) INDICATE CUSTOMER CONNECTION
3. BREAKER ACCESSORIES ARE SHOWN IN THE TRIPPED OR OPEN POSITION

LEGEND

A	AMMETER
AEM	ANALOG EXPANSION MODULE
CP	CONTROL PANEL
MCC	MTU GENERATOR CONTROLLER
DVR	DIGITAL VOLTAGE REGULATOR
FT-3	KTK-10 OR JC-10 10A
GFM	GROUND FAULT MONITOR
GGS	GENERATOR GROUND STUD
Hz	FREQUENCY METER
KB	LOUVER MOTOR RELAY
M	LOUVER MOTOR
MN	UNDERVOLTAGE TRIP
MX	SHUNT TRIP
OF1	AUXILIARY SWITCH 1
SD	ALARM SWITCH
TB1	TERMINAL BLOCK 1 (PANEL BACK)
TB1A	TERMINAL BLOCK 1A (PANEL BACK)
TB3	TERMINAL BLOCK 3 (GEN OUTLET BOX)
TB4	TERMINAL BLOCK 4 (HANDY BOX)
V	VOLTMETER

GROUND FAULT CT WIRING CONNECTIONS

CB RATING	CT RATIO	*CT CONNECTIONS
30-230A	50:5	X2-X3
250-450A	100:5	X1-X2
500-700A	150:5	X1-X3
750-900A	200:5	X4-X5

Aenderungsbeschreibung/Description of revision	kommt vor/Frequency
RESTORE LAYERS	

Buchst./Rev.Ltr.	Aenderungs-Nr./Revision Notice No.	Bearbeitungsstatus/Lifecycle
a.2	-----	Under Review

Passmass Fit | Abmass in Deviation µm

Allgemeintoleranzen / General Tolerances ISO 2768-mK	
Tolerierung / Tolerancing ISO 8015	Masse / Size ISO 14405
Ausfuehrung u. Lieferung Tech. Characteristics -----	Oberflaechenangaben nach MTN5033 Surface Specification per MTN5033
Oberflaechenschutz Surface Protection -----	
Verwendbar fuer Typ Applicable to Model -----	Allgemeine Fertigungsvorschriften nach MMN 332 Production Specification per MMN 332
Projekt-/Auftrags-Nr. Project/Order No. -----	
Referenz-Nr./Ref.No. -----	Emission ID -----

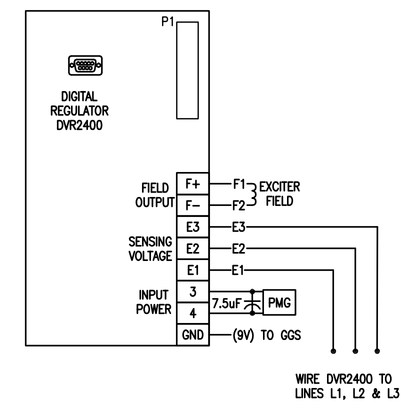
	Datum/Date	Name
ACAD		
Ersteller Drawn	16.10.2017	witte dohn
Bearb. Change	16.10.2017	witte dohn
Norm. Std.	-----	-----
Gepr. Checked	----	----

Massstab/Scale	Masse/Mass kg: 0.000000
	Format/Size: C
Werkstoff Material	###----
Halbzeug,Modell,Gesenk Semifinished Product, Pattern,Die	-----
Material-Nr./Material-No.	XZG30K0000019
Benennung/Title	SM Schematics
	######### SYSTEM
	F.LEISTUNGSSCHALTER SYSTEM DRAWING
	30-60 JD SYSTEM DRAWING
Zeichnungs-Nr./Drawing No.	FDH00000000001193445
Beschreibung/Description	BREAKER OPTIONS
Blatt Sheet	1/1

onsite energy

DVR2400

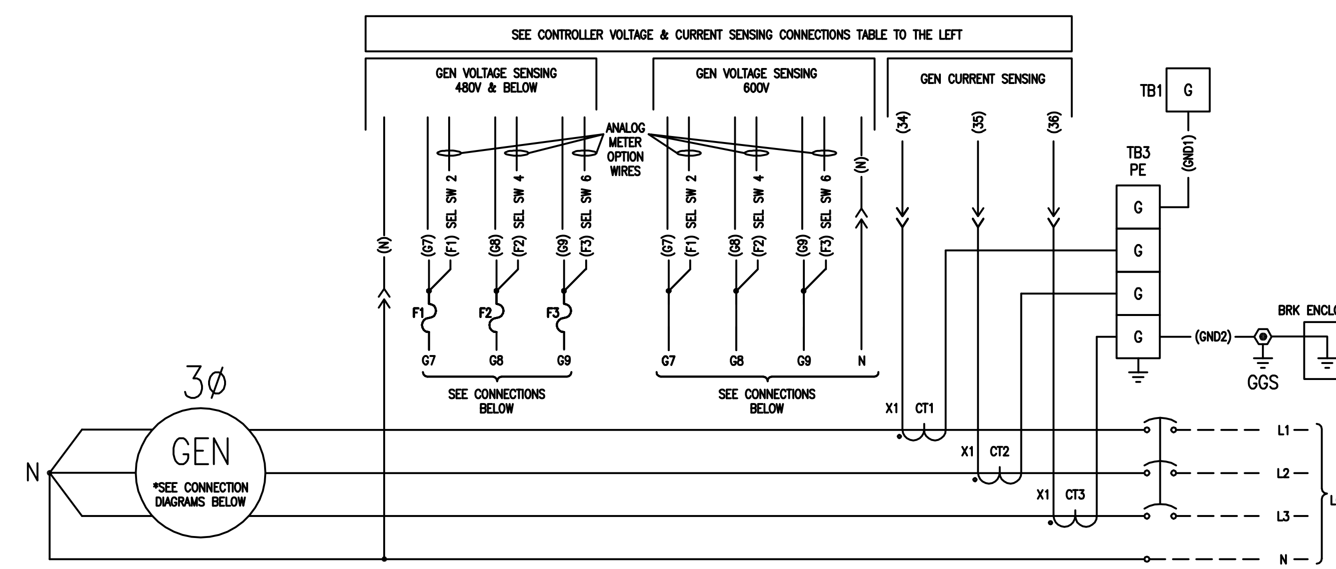
3ø



DVR2400 P1 CONNECTOR		
Terminal	Name	Description
P1-1	IB1	Generator Phase B CT - terminal 1
P1-2	IB2	Generator Phase B CT - terminal 2
P1-3	A_L	Auxiliary current loop (DVR2500 only)
P1-4	AU+	Auxiliary input positive
P1-5	AU-	Auxiliary input negative
P1-6	EXC	Excitation disable contact input (active closed)
P1-7	UP	UP contact input (active closed)
P1-8	DN	DOWN contact input (active closed)
P1-9	DRP	Droop disable contact input (active closed)
P1-10	QRP	VAR/PF mode disable (active closed)
P1-11	DG	Digital ground
P1-12	NO	Contact output normally open
P1-13	COM	Contact output common
P1-14	NC	Contact output normally closed

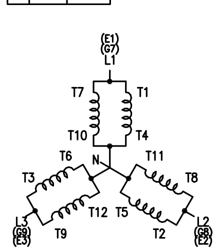
CONTROLLER VOLTAGE & CURRENT SENSING CONNECTIONS

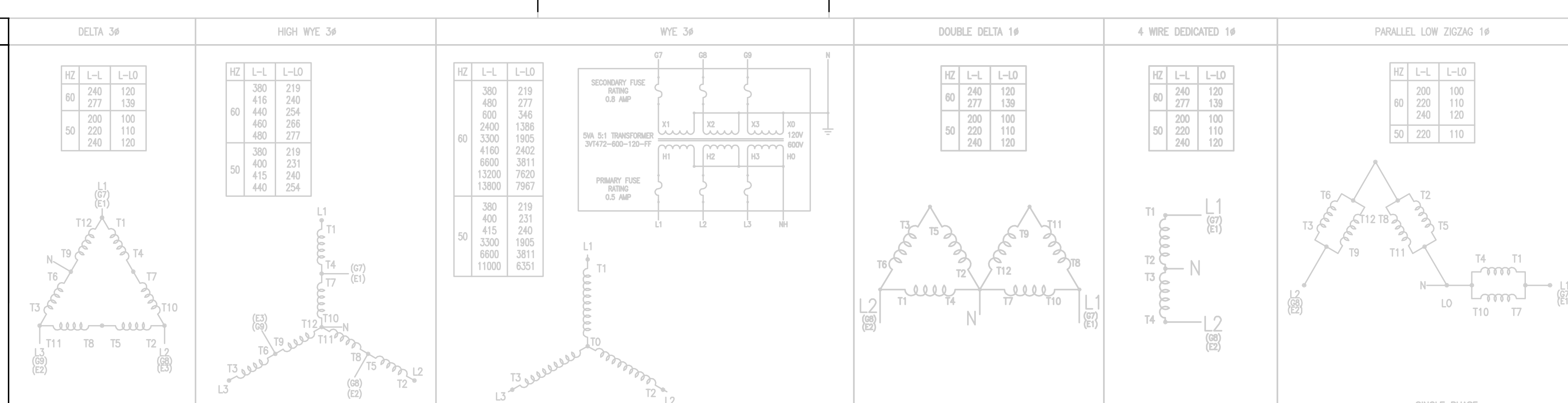
WIRE #	MGC & PIN # 1500	2000	3000
G7	45	41	86
G8	43	39	88
G9	41	37	90
N	40	35	91
34	38	69	1
35	36	72	3
36	34	75	5



LOW WYE 3ø

HZ	L-L	L-LO
60	190 208 220 230	110 120 127 133
50	190 200 208 220	110 115 120 127





Aenderungsbeschreibung/Description of revision	kommt vor/Frequency
Buchst./Rev.Ltr: -2	Aenderungs-Nr./Revision Notice No.: PR040714
Bearbeitungsstatus/Lifecycle	Released

Allgemeintoleranzen / General Tolerances	ISO 2768-mK
Tolerierung / Tolerancing	ISO 8015
Masse / Size	ISO 14405
Ausfuehrung u. Lieferung Tech. Characteristics	----
Oberflaechenangaben nach MTN5033 Surface Specification per MTN5033	
Oberflaechenschutz Surface Protection	----
Verwendbar fuer Typ Applicable to Model	----
Allgemeine Fertigungsvorschriften nach MMN 332 Production Specification per MMN 332	
Projekt-/Auftrags-Nr. Project/Order No.	----
Referenz-Nr./Ref.No.	----
Emission ID	----
Massstab/Scale	
Masse/Mass kg	----
Format/Size	A
Werkstoff Material	
Halbzeug,Modell,Gesenk Semifinished Product, Pattern,Die	
Material-Nr./Material-No.	XZG30K0000049

ACAD	Datum/Date	Name
Ersteller Drawn	15.03.2019	jayanath v
Bearb. Change	15.03.2019	jayanath v
Norm. Std.	20.03.2019	carsten ja
Gepr. Checked	20.03.2019	carsten ja

Benennung/Title ---- ----

ARRANGEMENT DRAWING
ARRANGEMENT DWG GEN JD 30-60KW
ARRANGEMENT DWG GEN JD 30-60KW

Zeichnungs-Nr./Drawing No. CAD03858507

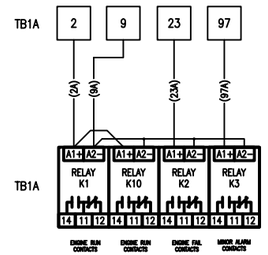
Beschreibung/Description GENERATOR ARRANGEMENT DRAWING

Blatt Sheet 1/1

LEGEND

D1	DIODE 1
D2	DIODE 2
F4	FUSE ATO 3A
F5	FUSE ATO 3A
MGC	MTU GENERATOR CONTROLLER
TB1	TERMINAL BLOCK 1 (PANEL BACK)
TB1A	TERMINAL BLOCK 1A (PANEL BACK)

4 RELAY OPTION



Aenderungsbeschreibung/Description of revision			kommt vor/Frequency
UPDATES TO XZG30K0000025-1			
Buchst./Rev.Ltr.	Aenderungs-Nr./Revision Notice No.		Bearbeitungsstatus/Lifecycle
c.3	----		Under Review

Passmass Fit	Abmass in Deviation µm

Allgemeintoleranzen / General Tolerances ISO 2768-mK

Tolerierung / Toleranzing ISO 8015	
Ausfuehrung u. Lieferung Tech. Characteristics	----
Oberflaechenschutz Surface Protection	----
Verwendbar fuer Typ Applicable to Model	----
Projekt-/Auftrags-Nr. Project/Order No.	----
Referenz-Nr./Ref.No.	----
Emission ID	----

Masse / Size ISO 14405

Oberflaechenangaben nach MTN5033 Surface Specification per MTN5033

Allgemeine Fertigungsvorschriften nach MMN 332 Production Specification per MMN 332

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---- —

ACAD	Datum/Date	Name
Ersteller Drawn	20.12.2017	witte dohn
Bearb. Change	21.12.2017	witte dohn
Norm. Std.	----	----
Gepr. Checked	----	----

Massstab/Scale

Masse/Mass 0.000000 kg

Format/Size C

Werkstoff Material ####----

Halbzeug,Modell,Gesenk Semifinished Product, Pattern,Die ----

Material-Nr./Material-No. XZG30K0000025

Benennung/Title SM Schematics

##########
SYSTEM
WAHLW.AUSFUEHRUNGEN
30-60KW JD

SYSTEM DRAWING
SYSTEM DRAWING

onsite energy

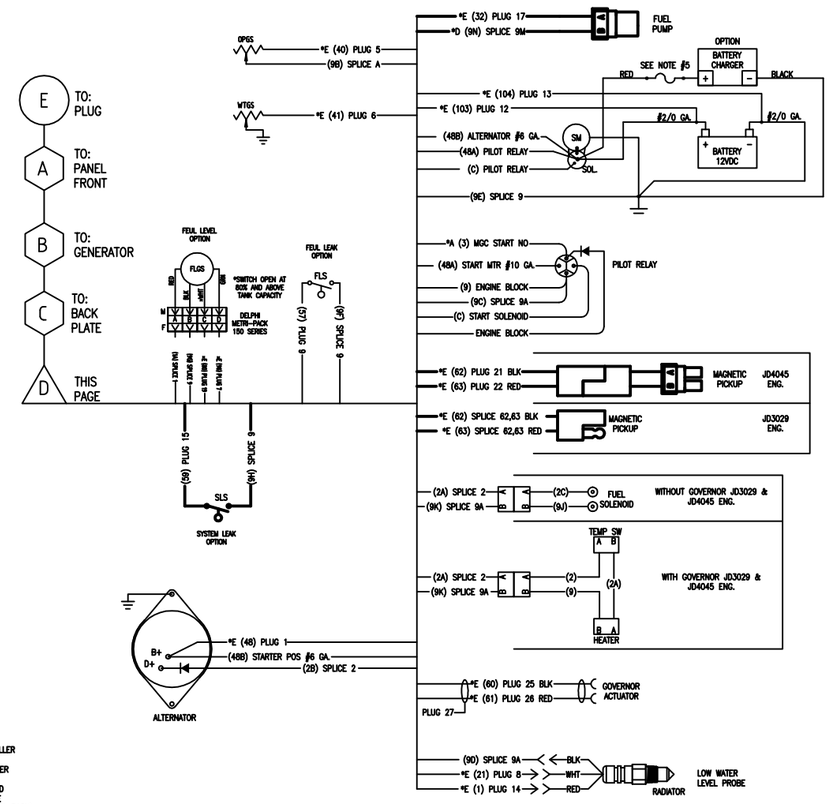
Zeichnungs-Nr./Drawing No. FDH00000000001193444

Beschreibung/Description OPTIONS SHEET

Blatt Sheet 1/2

MGC 1500

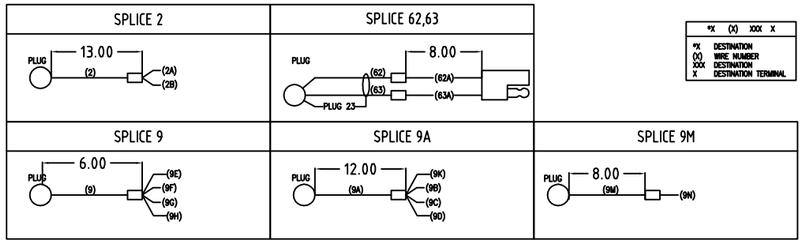
PANEL SIDE PLUG		ENGINE SIDE PLUG	
*C (48) TB1 48	1	1	(48) ALTERNATOR
*C (9E) TB1 9	2	2	(9) SPLICE
*C (9F) TB1 9	3	3	(9A) SPLICE
*C (9G) TB1 9	4	4	(9M) SPLICE
*A (40) MGC 52	5	5	(40) OPGS
*A (41) MGC 53	6	6	(41) WTGS
*A (98) MGC 1	7	7	(98) FLGS
*A (21) MGC 4	8	8	(21) LWL
*A (57) MGC 5	9	9	(57) FLS
*C (2A) TB1 2	10	10	(2) SPLICE
*A (3) MGC 20	11	11	(3) PILOT RELAY
*C (103) TB1 FUSE	12	12	(103) BATT +
	13	13	(104) BATT –
*C (1D) TB1 1	14	14	(1) LWL
*A (59) MGC 7	15	15	(59) SLS
*C (100A) TB1 100	16	16	
*A (32) MGC 23	17	17	(32) FUEL PUMP A
*C (SP1) TB1 SP1	18	18	
*C (80) TB1A IN6	19	19	(80) FUEL LEVEL GAUGE
*C (SP2) TB1 SP2	20	20	
*C (62A) TB1 62	21	21	(62) MPU
*C (63A) TB1 63	22	22	(63) MPU
*C (S) TB1 S	23	23	(S) MPU
*C (SP3) TB1 SP3	24	24	
*C (60) TB1 60	25	25	(60) GOV ACTUATOR
*C (61) TB1 61	26	26	(61) GOV ACTUATOR
*C (S) TB1 S	27	27	(S) GOV ACTUATOR
*C (101A) TB1 101	28	28	
*C (S) TB1 S	29	29	



LEGEND

BC	BATTERY CHARGER
BPS	BACK PLATE STUD
MGC	MTU GENERATOR CONTROLLER
DGS	DOOR GROUND STUD
FLGS	FUEL LEVEL GAUGE SENDER
FLS	FUEL LEAK SWITCH
GGS	GENERATOR GROUND STUD
LWL	LOW WATER LEVEL PROBE
TB1	TERMINAL BLOCK 1 (PANEL BACK)
TB1A	TERMINAL BLOCK 1A (PANEL BACK)
TB3	TERMINAL BLOCK 3 (GEN OUTLET BOX)
TB6	DC LIGHT HANDY BOX
SM	STARTER MOTOR
SMS	START MOTOR SOLENOID

NOTES:
1. WIRE NUMBERS ARE IN PARENTHESIS.
2. SHORT DASHED LINES (-------) INDICATE CUSTOMER CONNECTION OR OPTIONAL EQUIPMENT.
3. BATTERY CHARGER FUSE ONLY WHEN REQUIRED OR SUPPLIED BY CHARGER MANUFACTURER.
4. FUEL LEVEL GUAGE SENDER REQUIREMENTS
   33 OHMS = FULL
   240 OHMS = EMPTY
5. BATTERY CHARGER FUSE ONLY WHEN SUPPLIED OR REQUIRED BY CHARGER MANUFACTURER.



*X	(X)	XXX	X
*X	DESTINATION		
(X)	WIRE NUMBER		
XXX	DESTINATION		
X	DESTINATION TERMINAL		

Aenderungsbeschreibung/Description of revision	kommt vor/Frequency
ADDED MTU FUEL PANEL.	

Buchst./Rev.Ltr.	Aenderungs-Nr./Revision Notice No.	Bearbeitungsstatus/Lifecycle
b.4	-----	Under Review

Passmass Fit	Abmass in Deviation µm

Allgemeintoleranzen / General Tolerances ISO 2768-mK	
Tolerierung / Toleracncing ISO 8015	
Ausfuehrung u. Lieferung Tech. Characteristics	-----
Oberflaechenschutz Surface Protection	-----
Verwendbar fuer Typ Applicable to Model	-----
Projekt-/Auftrags-Nr. Project/Order No.	-----
Referenz-Nr./Ref.No.	-----
Emission ID	-----

Masse / Size ISO 14405	
Oberflaechenangaben nach MTN5033 Surface Specification per MTN5033	
Allgemeine Fertigungsvorschriften nach MMN 332 Production Specification per MMN 332	
	---- —
	---- —

ACAD	Datum/Date	Name
Ersteller Drawn	20.12.2017	witte dohn
Bearb. Change	21.12.2017	witte dohn
Norm. Std.	-----	-----
Gepr. Checked	-----	-----

Massstab/Scale		Masse/Mass kg	Format/Size
		0.000000	C

Werkstoff / Material: ###----

Halbzeug,Modell,Gesenk / Semifinished Product, Pattern,Die: -----

Material-Nr./Material-No.: XZG30K0000020

Benennung/Title: SM Schematics

SYSTEM: ##########

FUER DIESELMOTOR 3029/4045 JD

SYSTEM DRAWING ENG SYSYTEM

Zeichnungs-Nr./Drawing No.: FDH00000000001193455

Beschreibung/Description: 3029/4045 ENGINE

Blatt / Sheet: 1/1

onsite energy

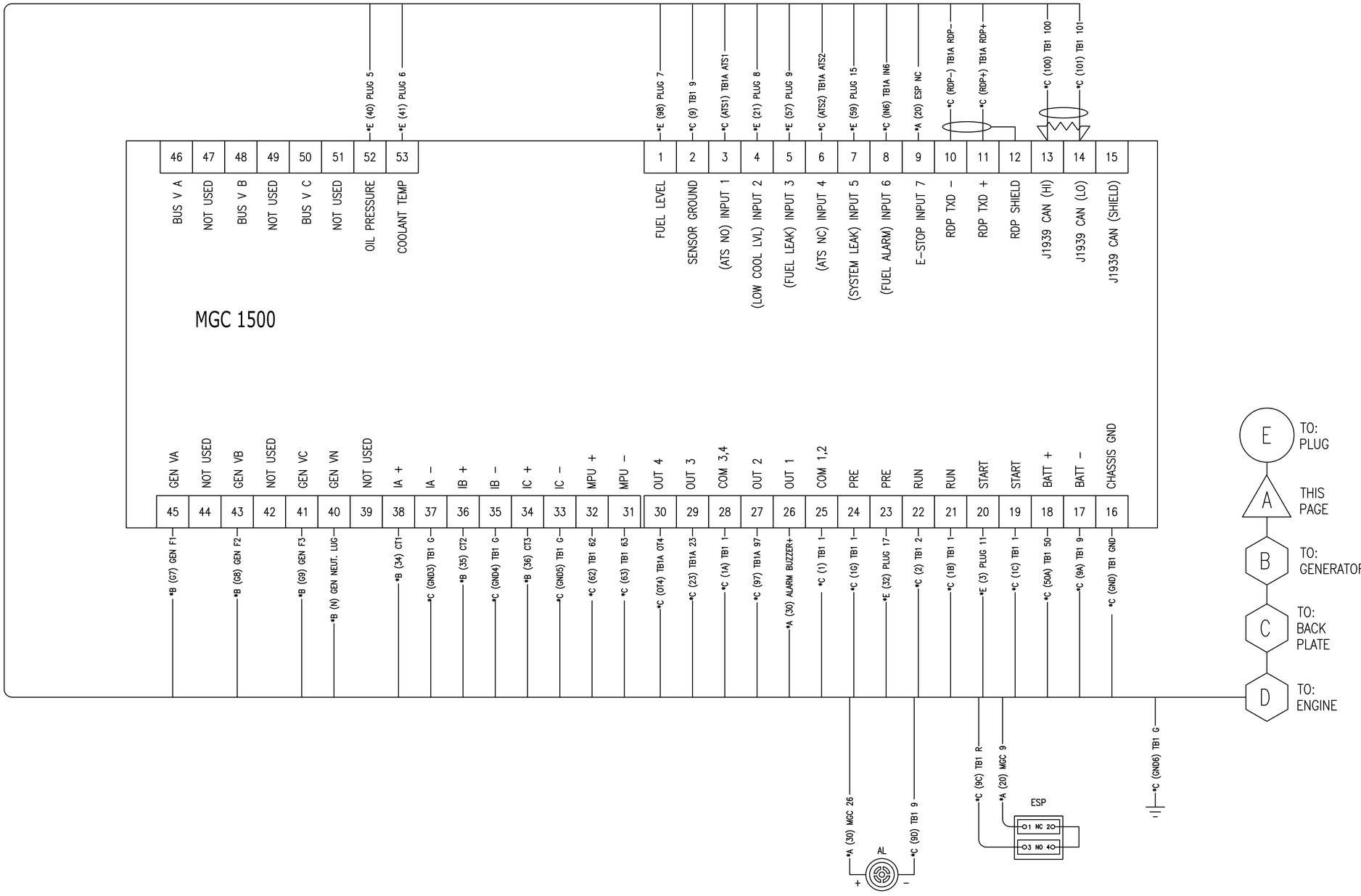
NOTES:

1. WIRE NUMBERS ARE IN PARENTHESIS.
2. SHORT DASHED LINES (-------) INDICATE CUSTOMER CONNECTION OR OPTIONAL EQUIPMENT.

LEGEND

AL	ALARM BUZZER
AEM	ANALOG EXPANSION MODULE
ATS	AUTOMATIC TRANSFER SWITCH
BPS	BACK PLATE STUD
CEM	CONTACT EXPANSION MODULE
DGS	DOOR GROUND STUD
ESP	EMERGENCY STOP BUTTON
F1	PANEL FUSE ATO 5A
F2	PANEL FUSE ATO 10A
F3	PANEL FUSE ATO 15A
FLGS	FUEL LEVEL GAUGE SENDER
FLS	FUEL LEAK SWITCH
GGS	GENERATOR GROUND STUD
GSA	GOVERNOR SPEED ADJUST
K6	LOUVER MOTOR RELAY
K8	REMOTE EMERGENCY STOP RELAY
LWL	LOW WATER LEVEL PROBE
MGC	MTU GENERATOR CONTROLLER
MEC	MODBUS/ETHERNET CONVERTER
R1	120 OHM ⅛ 1% RESISTOR
TB1	TERMINAL BLOCK 1 (PANEL BACK)
TB1A	TERMINAL BLOCK 1A (PANEL BACK)
VAR	VOLTAGE ADJUST RHEOSTAT
VAT	VOLTAGE ADJUST TOGGLE

*X (X) XXX X	
*X	DESTINATION
(X)	WIRE NUMBER
XXX	DESTINATION
X	DESTINATION TERMINAL



Aenderungsbeschreibung/Description of revision	kommt vor/Frequency
INITIAL RELEASE	

Buchst./Rev.Ltr	Aenderungs-Nr./Revision Notice No.	Bearbeitungsstatus/Lifecycle
–.5	PR067401	Released

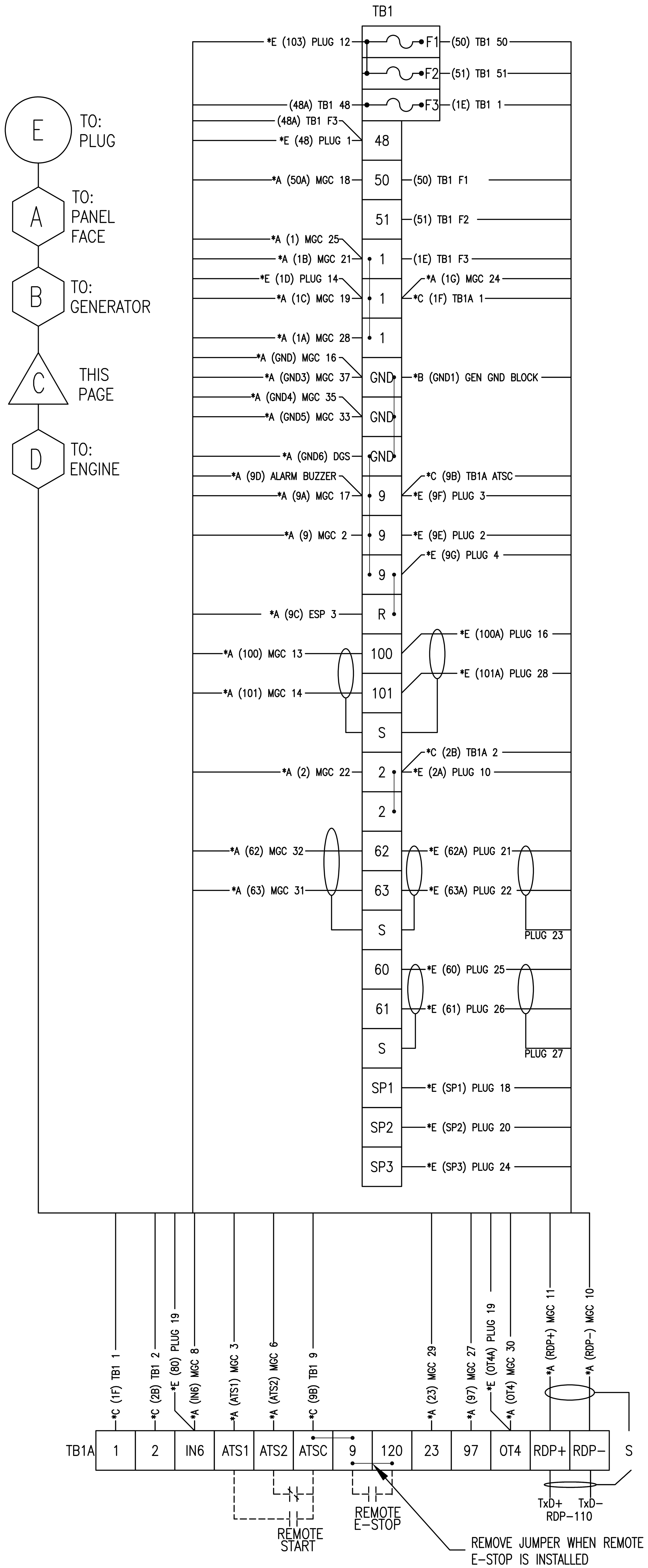
Passmass Fit / Abmass in Dimension µm

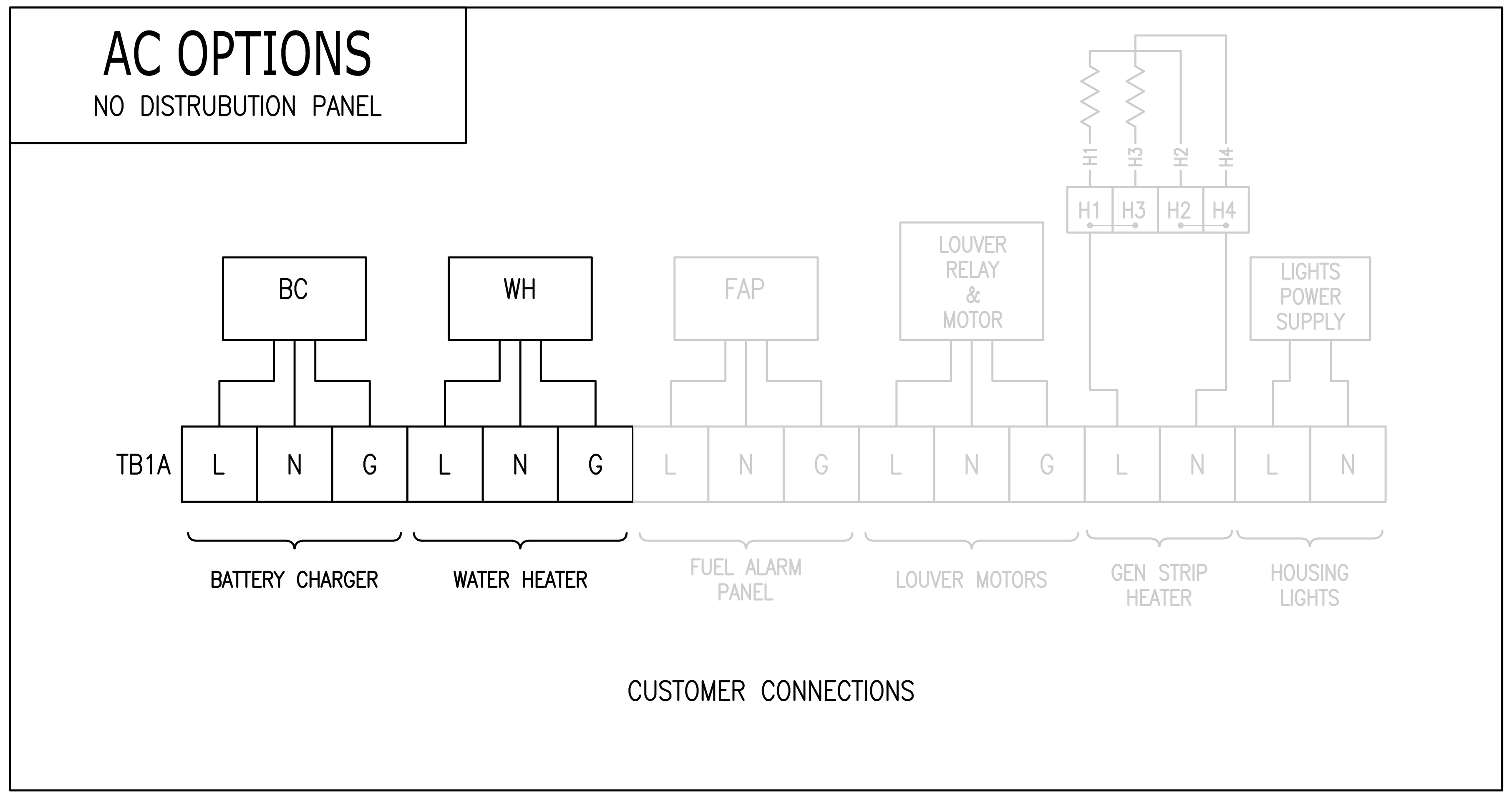
Allgemeintoleranzen / General Tolerances ISO 2768–mK
Tolerierung / Tolerancing ISO 8015
Ausführung u. Lieferung Tech. Characteristics: ----
Oberflächenschutz Surface Protection: ----
Verwendbar fuer Typ Applicable to Model: ----
Projekt-/Auftrags-Nr. Project/Order No.: ----
Referenz-Nr./Ref.No.: ----
Emission ID: ----

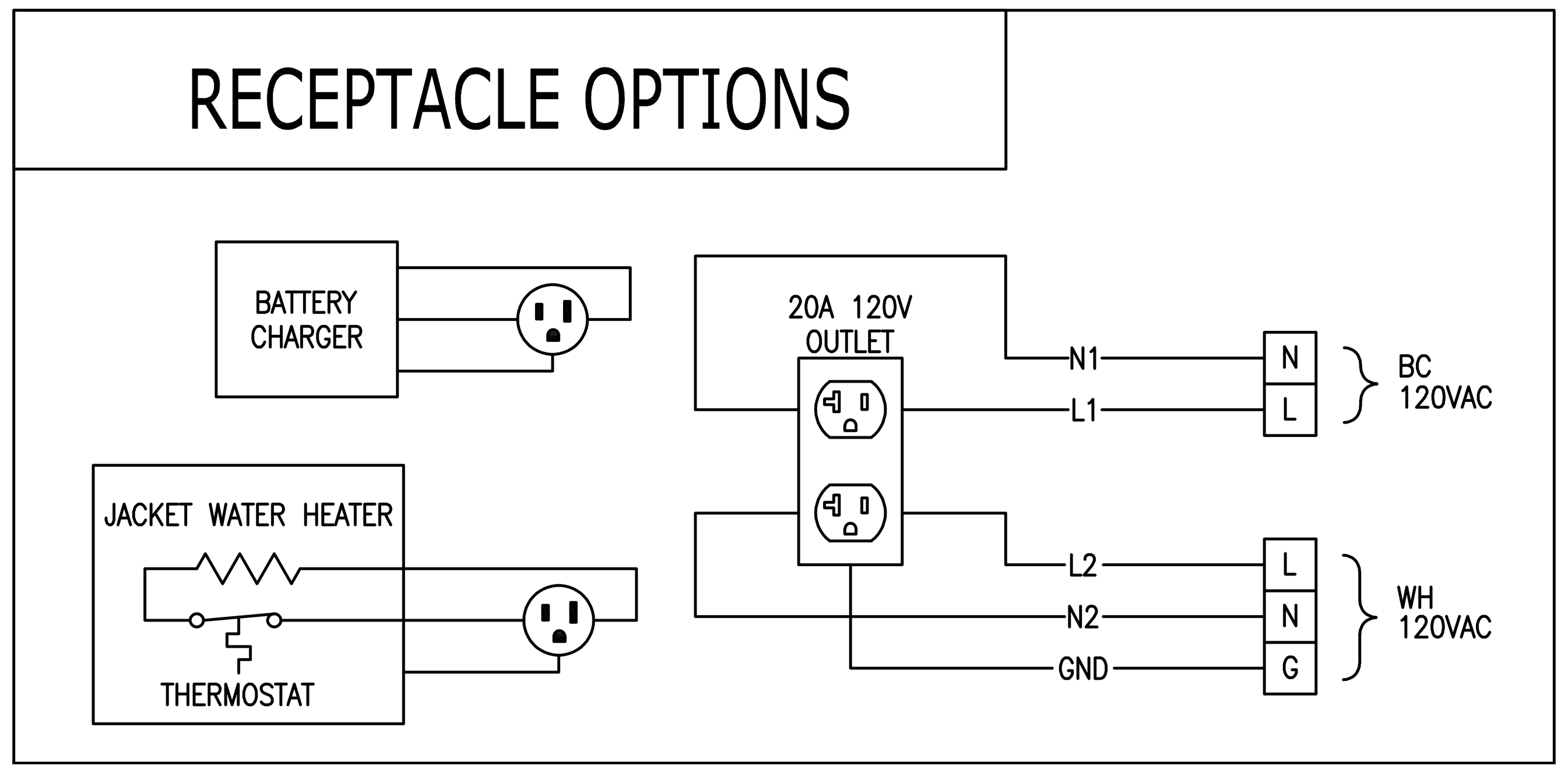
Masse / Size ISO 14405
Oberflächenangaben nach MTND033 Surface Specification per MTND033
Allgemeine Fertigungsvorschriften nach MAN 332 Production Specification per MAN 332

ACAD	Datum/Date	Name
Ersteller Creator	07.12.2020	witte dohn
Bearb. Change	15.12.2020	witte dohn
Gepr. Approved	10.02.2021	siebert jo
Gepr. Checked	10.02.2021	siebert jo

Massstab/Scale: ----
Masse/Mass: ----
kg
Format/Size: A
Werkstoff Material: ----
Holzmog.Modell,Gesenk Semifinished Product, Pattern,Die: ----
Material-Nr./Material-No.: black kevi 10.02.2021
XZG3064400016
Benennung/Title: ----
ARRANGEMENT DRAWING
MGC 1500 JD 30-60
SYSTEM DRAWING
Zeichnungs-Nr./Drawing No.: CAD07123787
Blatt Sheet: 1/2
Beschreibung/Description: PANEL FACE







NOTES:

1. WIRE NUMBERS ARE IN PARENTHESIS.
2. SHORT DASHED LINES (------) INDICATE CUSTOMER CONNECTION OR OPTIONAL EQUIPMENT.

LEGEND:

AEM	ANALOG EXPANSION MODULE
BPS	BACK PLATE STUD
CEM	CONTACT EXPANSION MODULE
MGC	MTU GENERATOR CONRTOLLER
DGS	DOOR GROUND STUD
F1	PANEL FUSE ATO 5A
F2	PANEL FUSE ATO 10A
F3	PANEL FUSE ATO 15A
K1	ENGINE RUN RELAY
K2	ENGINE FAIL RELAY
K3	MINOR ALARM RELAY
K6	LOUVER MOTOR RELAY
K8	REMOTE ESTOP RELAY
K10	ENGINE RUN RELAY
LVR	LOUVER MOTOR RELAY
MEC	MODBUS/ETHERNET CONVERTER
R1	RESISTOR 120 OHM 1/8 W
TB1	TERMINAL BLOCK 1 (PANEL BACK)
TB1A	TERMINAL BLOCK 1 (PANEL BACK)

*X (X) XXX X

*X	DESTINATION
(X)	WIRE NUMBER
XXX	DESTINATION
X	DESTINATION TERMINAL

Aenderungsbeschreibung/Description of revision: INITIAL RELEASE
Aenderungs-Nr./Revision Notice No.: PR067401
Buchst./Rev.Ltr.: -.7
Bearbeitungsstatus/Lifecycle: Released
Allgemeintoleranzen / General Tolerances ISO 2768-mK
Material-Nr./Material-No.: XZG3064400016
Benennung/Title: ARRANGEMENT DRAWING
Zeichnungs-Nr./Drawing No.: CAD07123788
Beschreibung/Description: BACK PLATE
Erstellt/Drawn: 07.12.2020 witte dohn
Bearb./Changed: 09.02.2021 witte dohn
Norm.: 10.02.2021 siebert jo
Gepr./Checked: 10.02.2021 siebert jo
Blatt/Sheet: 2/2

MGC 1500 JD 30-60
SYSTEM DRAWING