



POWER GENERATOR OUTLINE DRAWING

J00320-GA-PG


**2019023 (09-15) / 2019024 (a-5-G) / 2019025 (a-38-I) /
2019027 (b-100-B) / 2019026 (a-62-I)**

INSTRUMENT AIR CONVERSION

VDR CODE: B02-GAD

TAG #: GEN-352 / GEN-822

PO #: PO83938 / PO83939 / PO83921 / PO83936 / PO83940

VENDOR'S DRAWING REVIEW	
This review does not relieve the vendor of its responsibility for errors in design and detailing of connections, dimensions or sizes.	
1. <input checked="" type="checkbox"/>	Work may proceed
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5. <input type="checkbox"/>	Certified/As-Built
By: 	Date: 2020.03.02
RANGELAND ENGINEERING	Project No: ENC2019023

DATE	REV	ISSUE PURPOSE	PREP	CHECK	APP'D
21-Feb-20	0	Issued for Information	WV	SK	SK

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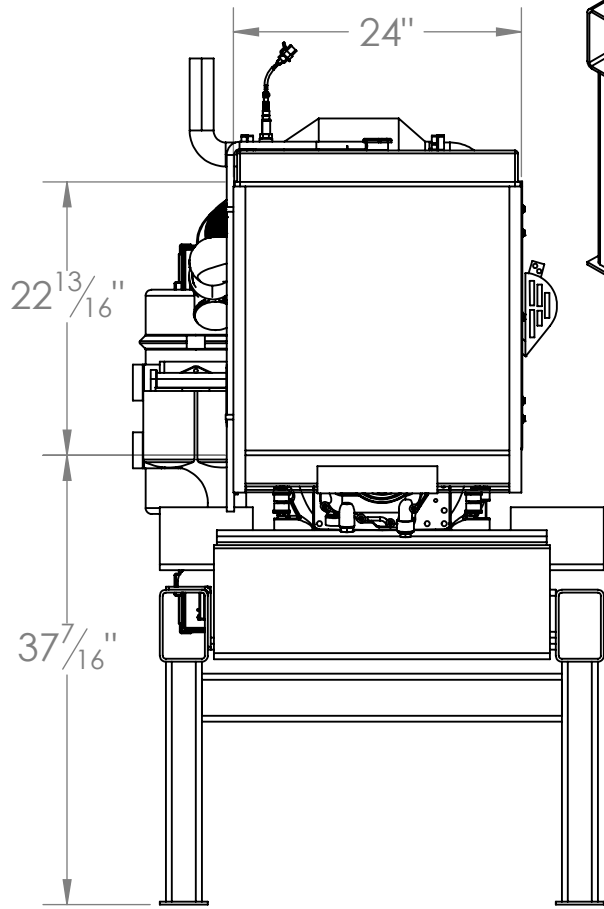
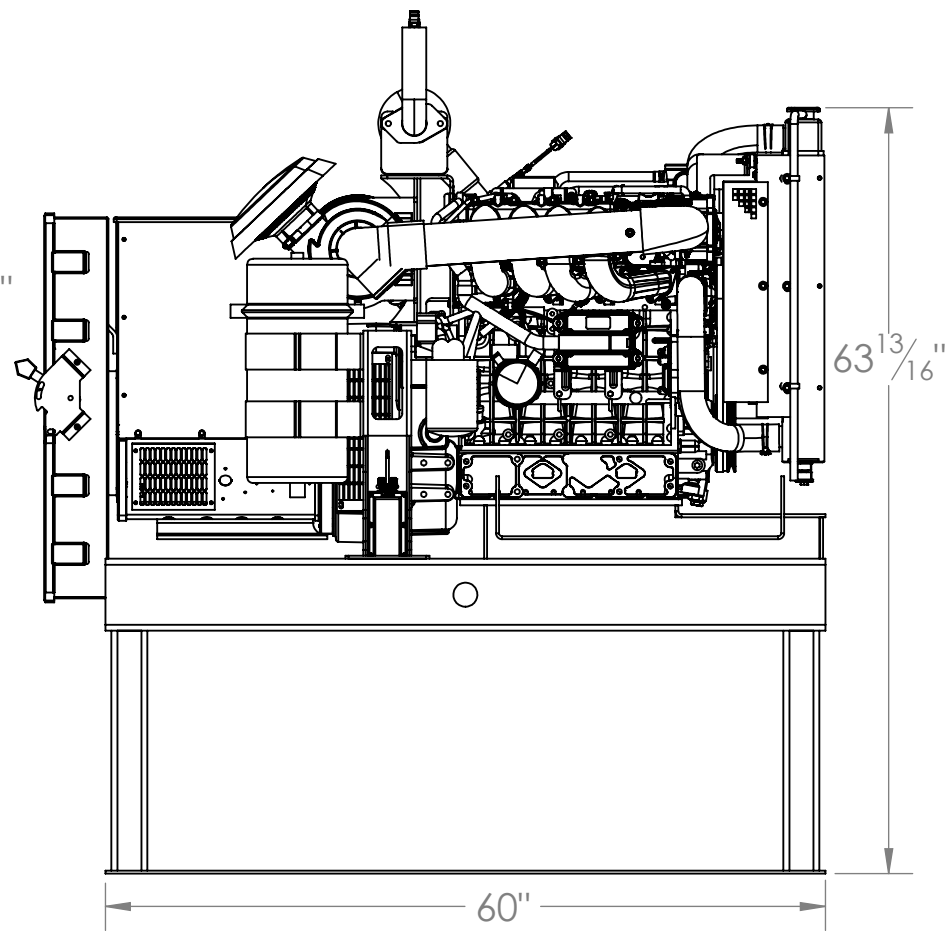
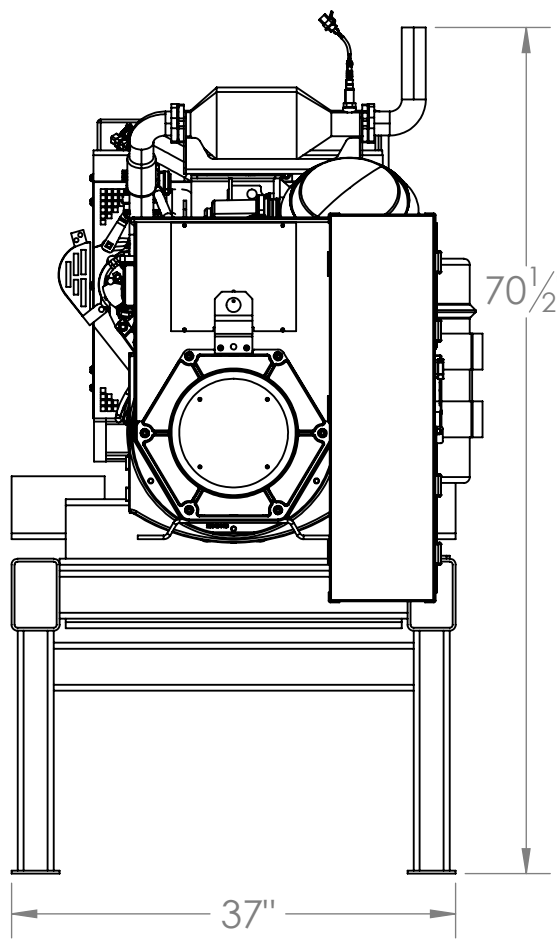
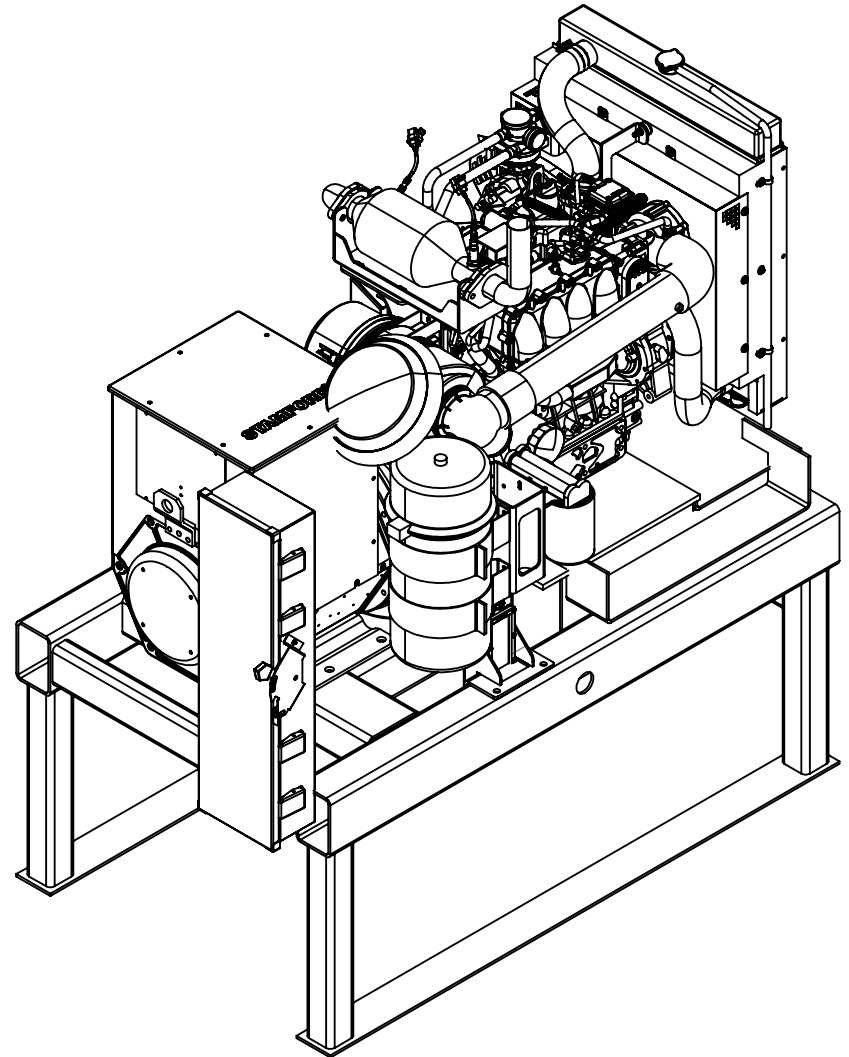
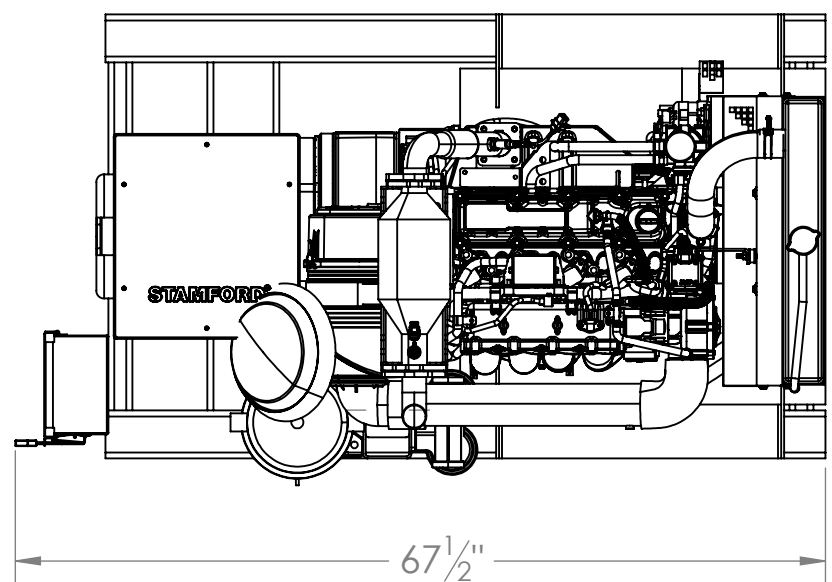
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2

1

B

B



GEN-352 / GEN-822

A

A

UNLESS OTHERWISE SPECIFIED:

UNITS: INCHES
TOLERANCES:

X ± 0.1
 X.X ± 0.05
 X.XX ± 0.01
 X.XXX ± 0.005
 X/X ± 1/32
 ANGULAR ± 1°

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TITLE: WG3800 LR GENSET

DWG. NO. KS3500 - LN - ASSEMBLY

REV 1

DRAWN: DATE: 2020-01-20

CHECKED: DATE:

APPROVED: DATE:

WEIGHT: LBS SCALE: 1:24 SHEET: 1/1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
1	INITIAL RELEASE	2018-01-06	

SAVE DATE: January 20, 2020 2:35:57 PM (RafaelR)

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1



POWER GENERATOR DATA SHEET

J00320-DS-PG


2019023 (09-15) / 2019024 (a-5-G) / 2019025 (a-38-I) / 2019027 (b-100-B) / 2019026 (a-62-I)

INSTRUMENT AIR CONVERSION

VDR CODE: D01-EDS

TAG #: Q-350 / Q-820

PO #: PO83938 / PO83939 / PO83921 / PO83936 / PO83940

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5. <input type="checkbox"/> Certified/As-Built	
By : 	Date: 2020.01.30
RANGELAND ENGINEERING	Project No: ENC2019023 09-15

DATE	REV	ISSUE PURPOSE	PREP	CHECK	APP'D
24-Jan-20	0	Issued for Information	WV		WV



Frontier Power 40 kWe Natural Gas Generator

General Information

- Generator set rating of 40kWe Stand-by/35kWe prime power output. These ratings are based upon standard rating conditions. It may be necessary to derate the set's output for altitudes above 1000' (305 meters) or for ambient temperatures above 77 F (25 C).
- The engine and form wound four pole AC generator are directly coupled and mounted on a rugged steel base frame. All components are suitable for prime power usage
- The generator set is thoroughly load tested prior to shipment

Standard Engine

- Kubota Natural Gas model WG3800 Inline 4 engine with full flow, replaceable lube oil, fuel and air filters. Electronic speed governing provides 0.5% speed regulation, no load to full load. EPA certified with catalysts.
- Liquid cooled with industrial grade radiator and belt driven blower fan

Standard Generator

- Newage Stamford form wound, Brushless, four pole (1800 rpm) generator
- Solid state, +/- 1% automatic voltage regulation
- PMG excitation
- CSA approved construction

Standard Controls and Accessories

- Deep Sea DSE4510 Standard controller c/w 4 output relays
- Safety shutdowns, electrical protections included
- Four anti-vibration mounts between generator set and base frame

Technical Information

Engine

Manufacturer	Kubota
Model	WG3800
Displacement (L)	3.769 L
Configuration	Inline 4
Bore and Stroke (mm)	100 x 120
Rated Speed	1800 rpm
Compression Ratio	10:1
Engine Weight (Dry)	268 kg
Flywheel Housing	SAE 3

Fuel System

Fuel type	Natural gas
Fuel Requirements -100% Load	2161 SCFH (Based on a LHV of 1015 BTU/scf. Actual fuel consumption varies with site conditions and fuel energy content)
Fuel Pressure	.98 – 3.45 kPa
Fuel Connection	1.5" NPT

Oil System

Grade	SAE 10W-30 Low Ash
Motor Oil Capacity	12.2 L
Filter	Full Flow Spin on

Cooling System

Radiator	Finned Tube
Material	Copper core, soldered
Fan Type	30" blower
Recommended coolant	50/50
Cooling Air flow	1765 cfm
Coolant Capacity (Inc. Rad)	9 L

Air Intake

Filter	Replaceable element
Combustion Air Flow	2.6 m3/min

Exhaust System

Exhaust flow at rated kWe	8.2 m3/min
Exhaust temperature at rated kWe	1420°F

DC Electrical System

Starter	12V, 2.5kW
Alternator	12V, 100 Amp
Battery Required	12V, 650CCA min

Alternator

Manufacturer	Newage Stamford
Model	UCI224D
Construction	Form wound, Four pole, Brushless Single Bearing

60 Hz Voltages and Ratings (3 phase)

- 40 kWe, 480V @ 0.8 PF

Voltage Regulator (standard)	MX341 AVR +/- 1.0%
Temperature Rise	80C (40C ambient)
Telephone Interference	THF < 2%
Winding Pitch	Two thirds
Control System	PMG excited
Weight	307 kg
Cooling Air Flow	0.216 m3/sec

Ancillary Equipment

Mounting	Steel Base with Mounting Holes
Isolators	Four composite mounts



Engine Specification Sheets

Technical Specification Sheet

Engine Model:	WG3800-LN-E3C-KEA-4	
Engine Code:	EG508-07000	
Cylinders	4	
Type	Vertical, Water Cooled 4-Cycle LPG / Natural Gas Engine	
Bore x Stroke, mm (in)	100.0 x 120.0 (3.937 x 4.724)	
Displacement, L (in ³)	3.769 (230.0)	
Aspiration	Naturally Aspirated	
Emissions Certification	CARB Tier 3	
Emissions Family Name	TBD	
RoHS2 Compliance	Not Compliant	
Aftertreatment Device	Three Way Catalyst	
Fuel	Commercial LPG, Equivalent to HD-5 of GPA Standard	Natural Gas, Lower Heating Value 9699 kcal/m ³ (1090 BTU/ft ³), Supply Pressure between 0.98 and 3.45 kPa.
Rated Power (SAE J1995) - Gross	53.4 kW (71.6 hp) @ 1800 rpm	49.6 kW (66.5 hp) @ 1800 rpm
Peak Torque (SAE J1995) - Gross	290.0 Nm (213.9 ft-lbs) @ 1200 rpm	269.0 Nm (198.4 ft-lbs) @ 1200 rpm
Fuel Consumption at Rated Power, g/kWh (lb/HPh)***	240 (0.395)	231 (0.380)
Max Air Intake Restriction, kPa (inAq)	4.58 (18.5)	
Max Exhaust Backpressure, kPa (inHg)	15.8 (4.7)	
Heat Rejection to Coolant, kW (kCal/h)	36.7 (31620)	37.2 (32000)
Combustion Air Requirements, m ³ /min (ft ³ /min)	2.6 (90)	2.6 (91)
Exhaust Gas Volume, m ³ /min (ft ³ /min)	8.2 (291)	8.1 (285)
No Load Max Speed, rpm	1800 ±25	
No Load Min Idling Speed, rpm	1500 ±25	
Combustion Chamber Type	Re-entrant Type (Direct Injection)	
Direction of Crankshaft Rotation	Counter Clockwise (Viewed from Flywheel)	
Firing Order	1-3-4-2	
Compression Ratio	10.0:1	
Engine Oil Type	SAE 10W-30 (SL Class or Better)	
Engine Oil Capacity, L (US Gal.)*	12.2 (3.22)	
Engine Oil+Filter Change Interval, hr*	200	
Max Allowable Oil Temp, °C**	120	
Max Allowable Coolant Temp, °C**	110	
Length x Width x Height, mm (in)*	745.4 x 599.0 x 780.7 (29.35 x 23.58 x 30.74)	
Dry Weight, kg (lb)*	268 (591)	
Electrical System Voltage	12 V	
Max Inclination Angle	Continuous: 20 deg Intermittent: 30 deg	

*Measurements are for standard engine configuration

**Consult Application Engineering for details

***Fuel Consumption is Net Int. rating. The chart shows gross value.

Note: the engine performance curve shown is for a standard spec engine

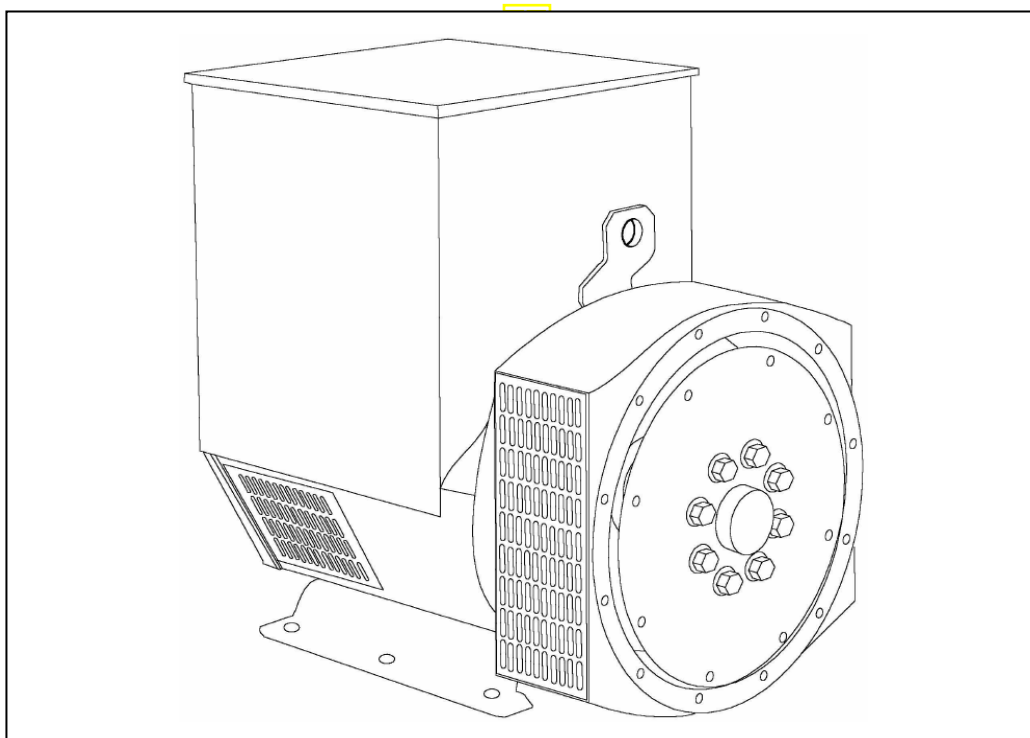


Alternator Specification Sheets

STAMFORD®

UCI224D - Winding 311

Technical  Data Sheet



UCI224D

SPECIFICATIONS & OPTIONS

STAMFORD

STANDARDS

Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359.

Other standards and certifications can be considered on request.

VOLTAGE REGULATORS

SX460 AVR - STANDARD

With this self excited control system the main stator supplies power via the Automatic Voltage Regulator (AVR) to the exciter stator. The high efficiency semiconductors of the AVR ensure positive build-up from initial low levels of residual voltage.

The exciter rotor output is fed to the main rotor through a three phase full wave bridge rectifier. This rectifier is protected by a surge suppressor against surges caused, for example, by short circuit.

AS440 AVR

With this self-excited system the main stator provides power via the AVR to the exciter stator. The high efficiency semiconductors of the AVR ensure positive build-up from initial low levels of residual voltage.

The exciter rotor output is fed to the main rotor through a three-phase full-wave bridge rectifier. The rectifier is protected by a surge suppressor against surges caused, for example, by short circuit or out-of-phase paralleling.

The AS440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

MX341 AVR

This sophisticated AVR is incorporated into the Stamford Permanent Magnet Generator (PMG) control system.

The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.

An engine relief load acceptance feature can enable full load to be applied to the generator in a single step.

If three-phase sensing is required with the PMG system the MX321 AVR must be used.

We recommend three-phase sensing for applications with greatly unbalanced or highly non-linear loads.

MX321 AVR

The most sophisticated of all our AVRs combines all the features of the MX341 with, additionally, three-phase rms sensing, for improved regulation and performance.

Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

WINDINGS & ELECTRICAL PERFORMANCE

All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th ...) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches, when in parallel with the mains. A fully connected damper winding reduces oscillations during paralleling. This winding, with the 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

TERMINALS & TERMINAL BOX

Standard generators are 3-phase reconnectable with 12 ends brought out to the terminals, which are mounted on a cover at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS

All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation.

INSULATION/IMPREGNATION

The insulation system is class 'H'.

All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE

Generators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

DE RATES

All values tabulated on page 8 are subject to the following reductions

5% when air inlet filters are fitted.

3% for every 500 metres by which the operating altitude exceeds 1000 metres above mean sea level.

3% for every 5°C by which the operational ambient temperature exceeds 40°C.

Note: Requirement for operating in an ambient exceeding 60°C must be referred to the factory.

NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing typical of product range.

APPROVED DOCUMENT

UCI224D



WINDING 311

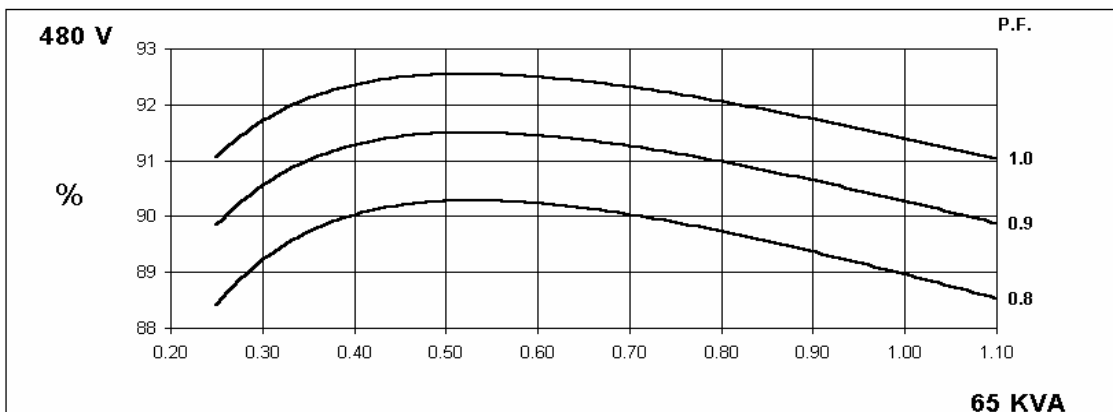
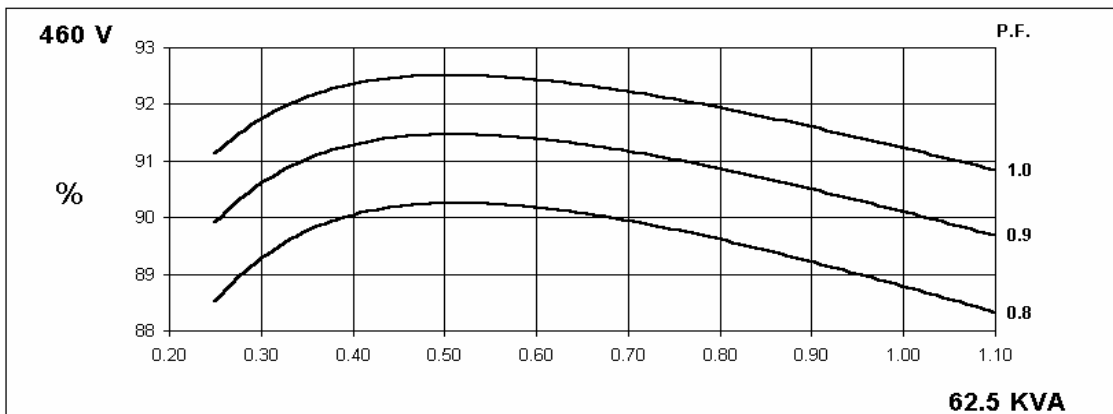
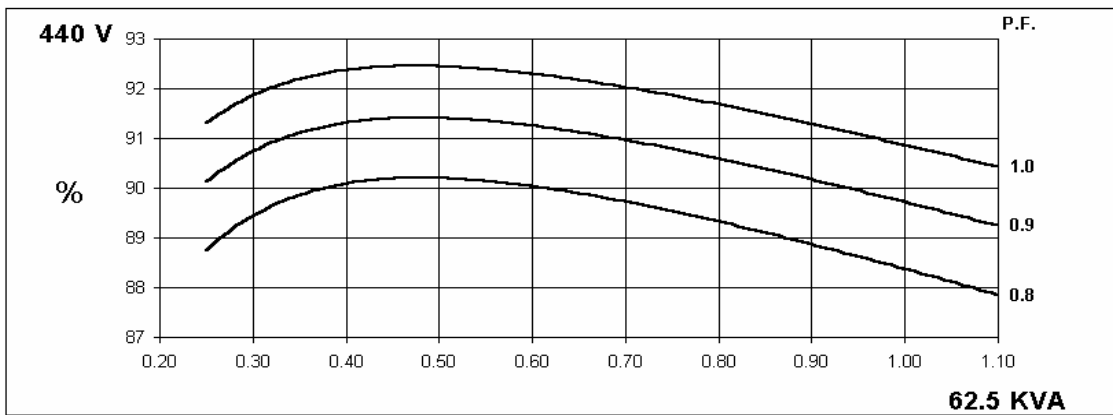
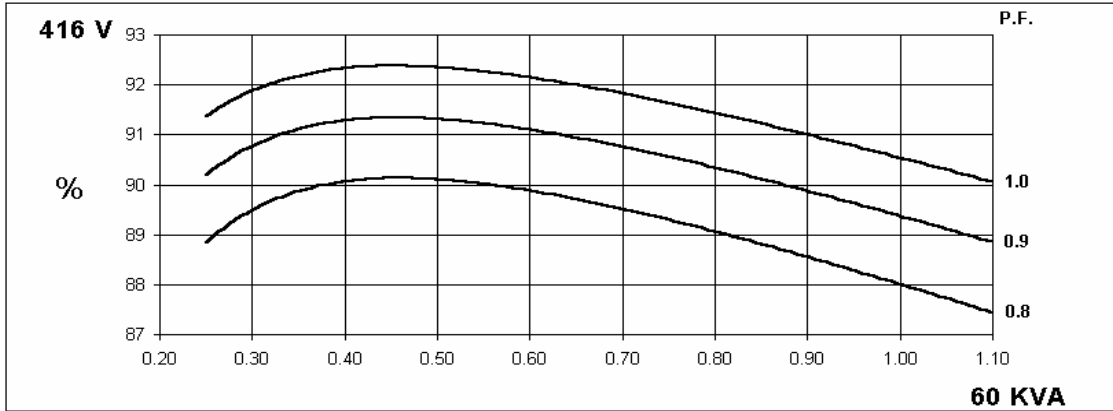
CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.							
A.V.R.	MX321	MX341						
VOLTAGE REGULATION	± 0.5 %	± 1.0 %	With 4% ENGINE GOVERNING					
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)							
CONTROL SYSTEM	SELF EXCITED							
A.V.R.	SX460	AS440						
VOLTAGE REGULATION	± 1.0 %	± 1.0 %	With 4% ENGINE GOVERNING					
SUSTAINED SHORT CIRCUIT	SERIES 4 CONTROL DOES NOT SUSTAIN A SHORT CIRCUIT CURRENT							
INSULATION SYSTEM	CLASS H							
PROTECTION	IP23							
RATED POWER FACTOR	0.8							
STATOR WINDING	DOUBLE LAYER CONCENTRIC							
WINDING PITCH	TWO THIRDS							
WINDING LEADS	12							
STATOR WDG. RESISTANCE	0.129 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED							
ROTOR WDG. RESISTANCE	0.64 Ohms at 22°C							
EXCITER STATOR RESISTANCE	21 Ohms at 22°C							
EXCITER ROTOR RESISTANCE	0.071 Ohms PER PHASE AT 22°C							
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4, VDE 0875G, VDE 0875N. refer to factory for others							
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%							
MAXIMUM OVERSPEED	2250 Rev/Min							
BEARING DRIVE END	BALL. 6312-2RS (ISO)							
BEARING NON-DRIVE END	BALL. 6309-2RS (ISO)							
	1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR	285 kg				290 kg			
WEIGHT WOUND STATOR	86 kg				86 kg			
WEIGHT WOUND ROTOR	86.28 kg				77.9 kg			
WR ² INERTIA	0.4216 kgm ²				0.4198 kgm ²			
SHIPPING WEIGHTS in a crate	307 kg				311 kg			
PACKING CRATE SIZE	97 x 57 x 96(cm)				97 x 57 x 96(cm)			
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	0.216 m ³ /sec 458 cfm				0.281 m ³ /sec 595 cfm			
VOLTAGE SERIES STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE PARALLEL STAR	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
VOLTAGE SERIES DELTA	220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138
KVA BASE RATING FOR REACTANCE VALUES	50	50	50	37.5	60	62.5	62.5	65
X _d DIR. AXIS SYNCHRONOUS	2.33	2.10	1.95	1.30	3.04	2.83	2.59	2.47
X' _d DIR. AXIS TRANSIENT	0.18	0.16	0.15	0.10	0.22	0.20	0.19	0.18
X'' _d DIR. AXIS SUBTRANSIENT	0.12	0.11	0.10	0.07	0.15	0.14	0.13	0.12
X _q QUAD. AXIS REACTANCE	1.07	0.97	0.90	0.60	1.40	1.30	1.19	1.14
X'' _q QUAD. AXIS SUBTRANSIENT	0.14	0.13	0.12	0.08	0.14	0.13	0.12	0.11
X _L LEAKAGE REACTANCE	0.07	0.06	0.06	0.04	0.09	0.08	0.08	0.07
X ₂ NEGATIVE SEQUENCE	0.13	0.12	0.11	0.07	0.14	0.13	0.12	0.11
X ₀ ZERO SEQUENCE	0.08	0.08	0.07	0.05	0.09	0.08	0.08	0.07
REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED								
T' _d TRANSIENT TIME CONST.	0.027 s							
T'' _d SUB-TRANSTIME CONST.	0.006 s							
T' _{do} O.C. FIELD TIME CONST.	0.7 s							
T _a ARMATURE TIME CONST.	0.0055 s							
SHORT CIRCUIT RATIO	1/X _d							

60
Hz

UCI224D
Winding 311

STAMFORD

THREE PHASE EFFICIENCY CURVES

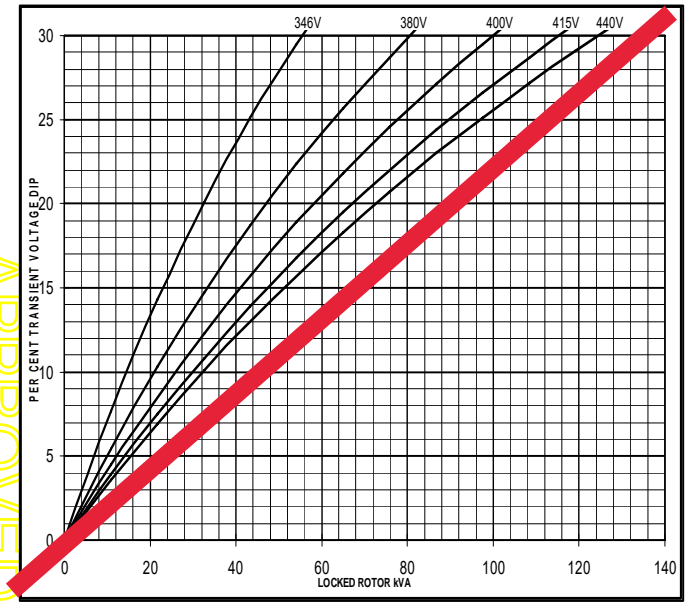
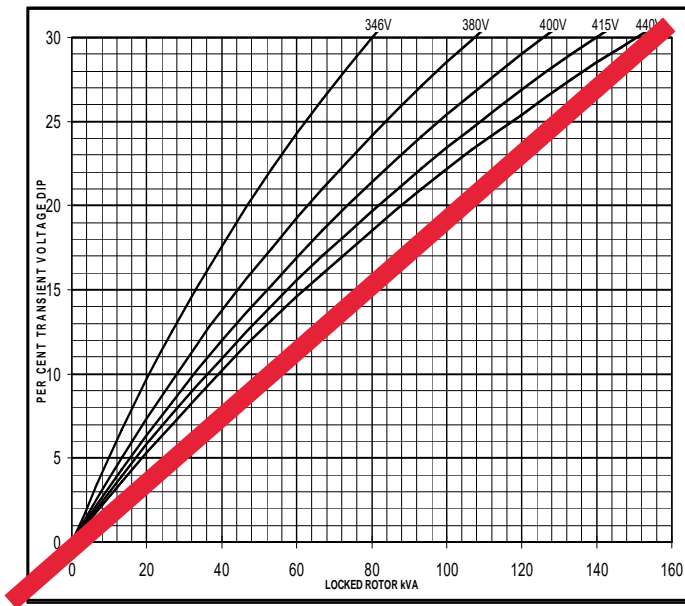


Locked Rotor Motor Starting Curve

50
Hz

MX

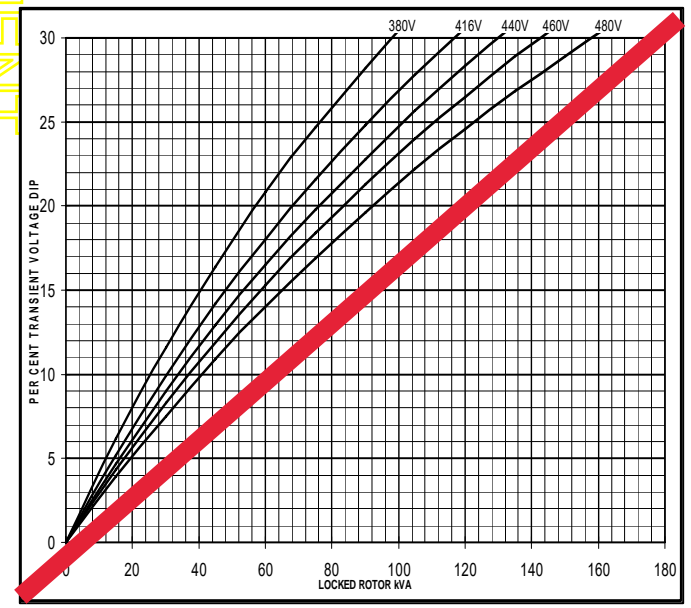
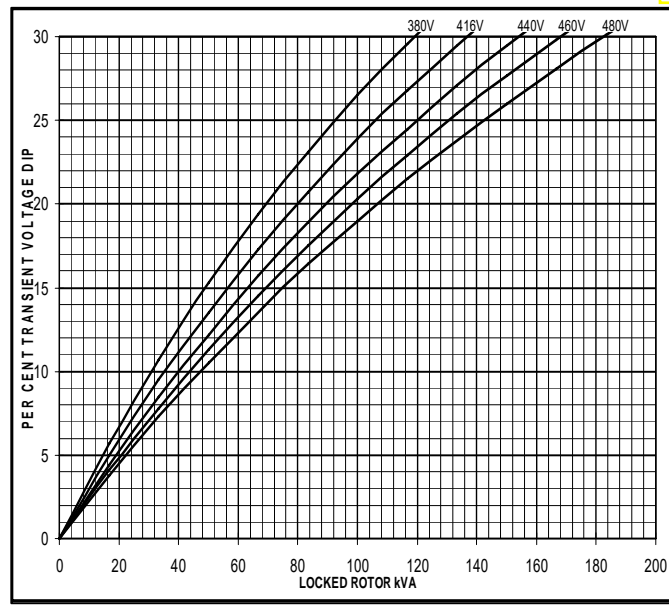
SX



60
Hz

MX

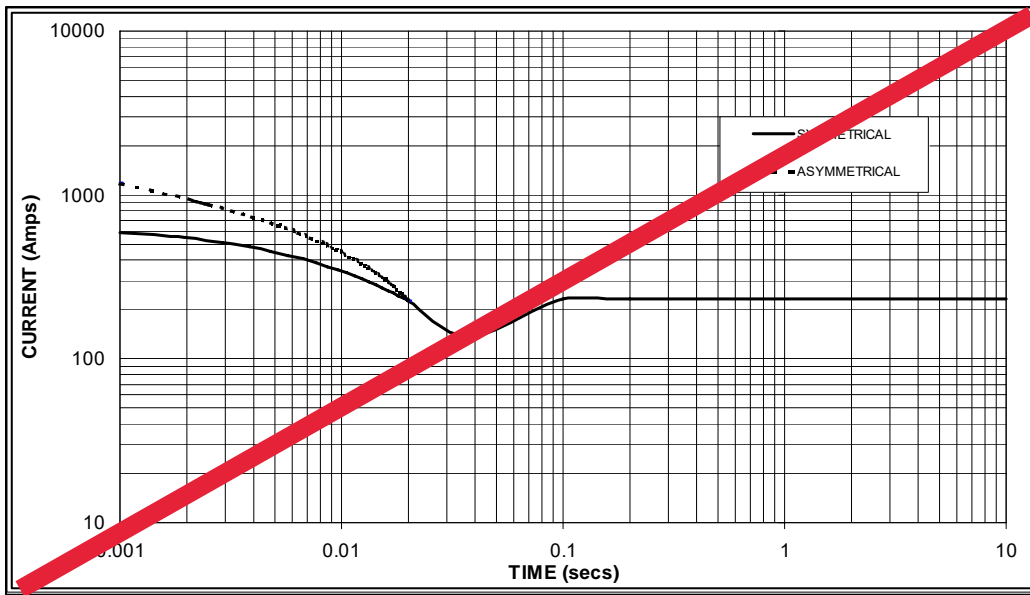
SX



APPROVED DOCUMENT

**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed
Based on star (wye) connection.**

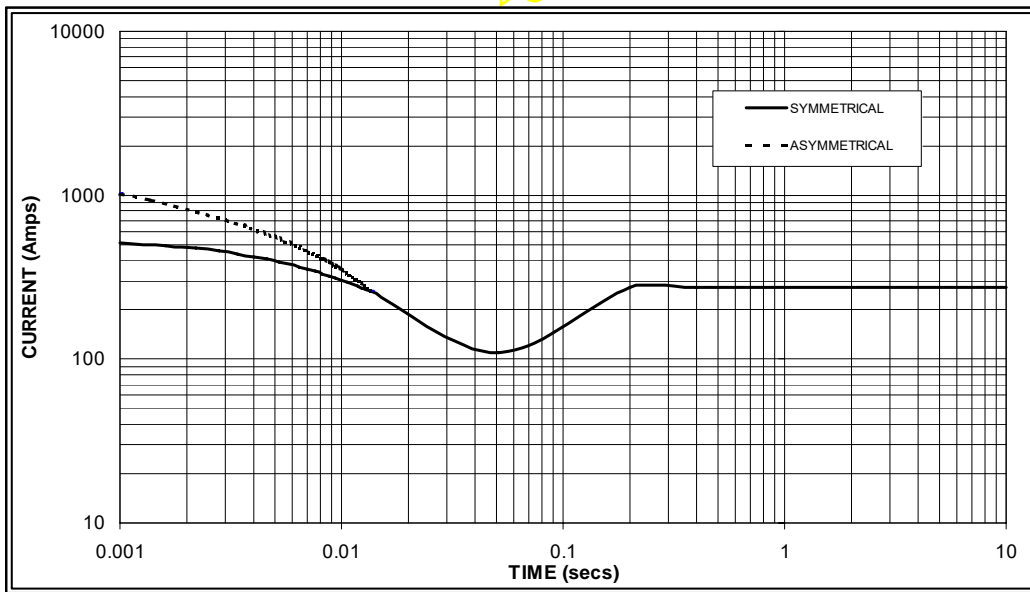
50
Hz



Sustained Short Circuit = 230 Amps



60
Hz



Sustained Short Circuit = 275 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	X 1.00	416v	X 1.00
400v	X 1.07	440v	X 1.06
415v	X 1.12	460v	X 1.12
440v	X 1.18	480v	X 1.17

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged

Note 3

Curves are drawn for Star (Wye) connected machines. For other connection the following multipliers should be applied to current values as shown :

Parallel Star = Curve current value X 2

Series Delta = Curve current value X 1.732

UCI224D

STAMFORD

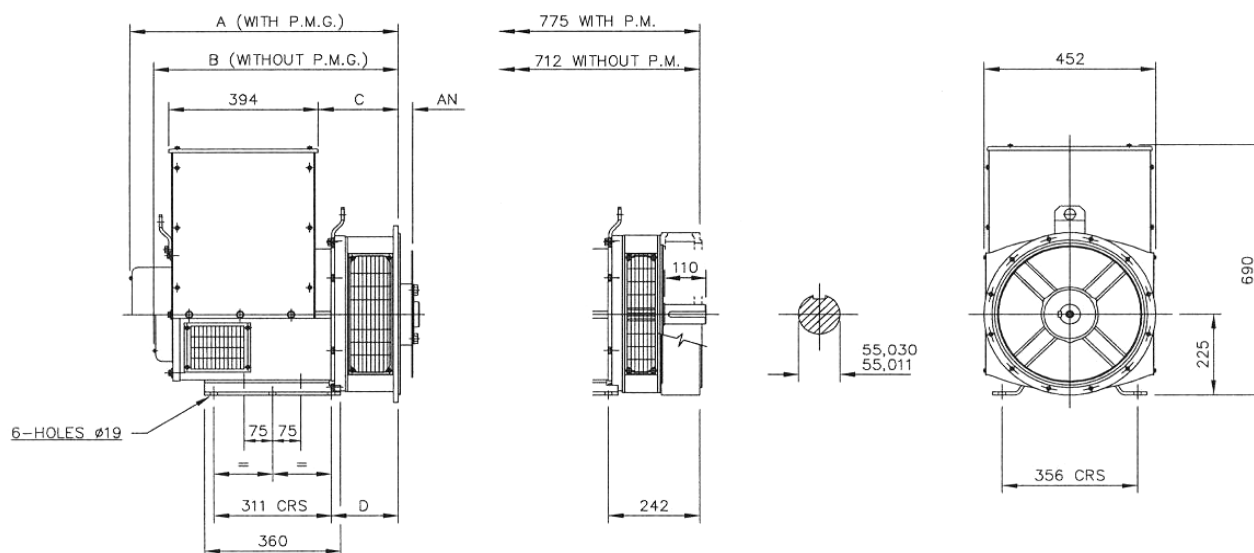
Winding 311 / 0.8 Power Factor

RATINGS

Class - Temp Rise	Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C				
50 Hz	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel Star (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
kVA	45.0	45.0	45.0	33.6	50.0	50.0	50.0	37.5	53.0	53.0	53.0	39.1	55.0	55.0	55.0	41.2	
kW	36.0	36.0	36.0	26.9	40.0	40.0	40.0	30.0	42.4	42.4	42.4	31.3	44.0	44.0	44.0	33.0	
Efficiency (%)	88.3	88.6	88.9	89.7	87.7	88.2	88.5	89.6	87.4	87.9	88.2	89.5	87.2	87.7	88.0	89.4	
kW Input	40.8	40.6	40.5	30.0	45.6	45.4	45.2	33.5	48.5	48.2	48.1	35.0	50.5	50.2	50.0	36.9	

60 Hz	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Parallel Star (V)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
	Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
kVA	52.5	55.0	56.0	58.0	60.0	62.5	62.5	65.0	62.5	65.0	65.0	68.8	65.0	66.3	66.3	71.3	
kW	42.0	44.0	44.8	46.4	48.0	50.0	50.0	52.0	50.0	52.0	52.0	55.0	52.0	53.0	53.0	57.0	
Efficiency (%)	88.7	89.0	89.2	89.4	88.0	88.4	88.8	89.0	87.8	88.2	88.6	88.7	87.5	88.1	88.5	88.5	
kW Input	47.4	49.4	50.2	51.9	54.5	56.6	56.3	58.4	56.9	59.0	58.7	62.1	59.4	60.2	59.9	64.5	

DIMENSIONS



SINGLE BEARING MACHINES ONLY						
ADAPTOR	A	B	C	D	COUPLING DISCS	AN
SAE 1	724,3	661,3	224,3	191,3	SAE 8	61,90
SAE 2	710	647	210	177	SAE 10	53,98
SAE 3	710	647	210	177	SAE 11,5	39,68
SAE 4	710	647	210	177	SAE 14	25,40



Generator Controller Specification Sheets

DSE4510/20 MKII

AUTO START AND AUTO MAINS FAILURE CONTROL MODULES

(ALTERNATOR FREQUENCY & CAN SPEED SENSING)

DSE4510 MKII

DSE4520 MKII

KEY FEATURES

- Auto Start and AMF mode in one module (DSE4520 MKII only)
- J1939-75 support and CAN alarm ignore function
- Alternator frequency & CAN speed sensing in one variant
- Largest back-lit icon display in its class
- Heated display option
- Real time clock provides accurate event logging
- Fully configurable via the fascia or PC using USB communication
- Extremely efficient power save mode
- 3 phase generator sensing
- 3 phase mains (utility) sensing (DSE4520 MKII only)
- Compatible with 600 V ph to ph nominal systems
- Generator/load power monitoring (kW, kV A, kV Ar, pf)
- Accumulated power monitoring (kW h, kVA h, kVAr h)
- Generator overload protection (kW)
- Generator/load current monitoring and protection
- Fuel and start outputs (configurable when using CAN)
- 4 configurable DC outputs
- 3 configurable analogue/digital inputs
- 4 configurable digital inputs
- Configurable staged loading outputs

- 3 engine maintenance alarms
- Engine speed protection
- Engine hours counter
- Engine pre-heat
- Engine run-time scheduler
- Engine idle control for starting & stopping
- Tier 4 engine instrumentation screens
- Battery voltage monitoring
- Start on low battery voltage
- Configurable remote start input
- 1 alternative configuration
- Comprehensive warning, electrical trip or shutdown protection upon fault condition
- LCD alarm indication
- Event log (50)
- Fuel solenoid pulling circuit
- On-screen line diagram on/off functionality
- Configurable CAN instrumentation (10)
- Water in fuel digital input
- Tank bund alarm digital input
- Generator at rest output
- ECU periodic wake-up for information retrieval
- Back-light power-save mode
- Adjustable delay crank timer
- Pre/post heat functionality
- Overload protection
- Mains/generator A/C system selection
- Output timer for external audible alarm

KEY BENEFITS

- Ultimate size to feature ratio
- Automatically transfers between mains (utility) and generator (DSE4520 MKII only)
- Hours counter provides accurate information for monitoring and maintenance periods
- User-friendly set-up and button layout for ease of use
- Multiple parameters are monitored simultaneously which are clearly displayed on the largest back-lit icon display in its class
- The module can be configured to suit a wide range of applications
- Uses DSE Configuration Suite PC Software for simplified configuration
- Compatible with a wide range of CAN engines including Tier 4
- Licence-free PC software
- IP65 rating (with optional gasket) offers increased resistance to water ingress

RELATED MATERIALS
TITLE

DSE4510/20 MKII Installation Instructions
 DSE4510/20 MKII Operator Manual
 DSE4510/20 MKII Configuration Suite PC Manual

PART NO.

053-190
 057-260
 057-258

DEEP SEA ELECTRONICS PLC UK

Highfield House, Hunmanby Industrial Estate, Hunmanby YO14 0PH
TELEPHONE +44 (0) 1723 890099 **FACSIMILE** +44 (0) 1723 893303
EMAIL sales@deepseapl.com **WEBSITE** www.deepseapl.com

DEEP SEA ELECTRONICS INC USA

3230 Williams Avenue, Rockford, IL 61101-2668 USA
TELEPHONE +1 (815) 316 8706 **FACSIMILE** +1 (815) 316 8708
EMAIL sales@deepseausa.com **WEBSITE** www.deepseausa.com

SPECIFICATIONS
DC SUPPLY

CONTINUOUS VOLTAGE RATING
 8 V to 35 V Continuous

CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

MAXIMUM OPERATING CURRENT
 85 mA at 12 V, 96 mA at 24 V

MAXIMUM STANDBY CURRENT
 51 mA at 12 V, 47 mA at 24 V

MAXIMUM SLEEP CURRENT
 35 mA at 12 V, 32 mA at 24 V

MAXIMUM DEEP SLEEP CURRENT
 <10 uA at 12 V, <10 uA at 24 V

MAINS (UTILITY) DSE4520 MKII ONLY

VOLTAGE RANGE
 15 V to 415 V AC (Ph to N)
 26 V to 719 V AC (Ph to Ph)

FREQUENCY RANGE
 3.5 Hz to 75 Hz

OUTPUTS
OUTPUT A (FUEL)

10 A short term, 5 A continuous, at supply voltage

OUTPUT B (START)

10 A short term, 5 A continuous, at supply voltage

AUXILIARY OUTPUTS C, D, E & F

2 A DC at supply voltage

GENERATOR
VOLTAGE RANGE

15 V to 415 V AC (Ph to N)
 26 V to 719 V AC (Ph to Ph)

FREQUENCY RANGE

3.5 Hz to 75 Hz

DIMENSIONS
OVERALL

140 mm x 113 mm x 43 mm
 5.5" x 4.4" x 1.7"

PANEL CUT-OUT

118 mm x 92 mm
 4.6" x 3.6"

MAXIMUM PANEL THICKNESS

8 mm
 0.3"

STORAGE TEMPERATURE RANGE

-40 °C to +85 °C
 -40 °F to +185 °F

OPERATING TEMPERATURE RANGE

-30 °C to +70 °C
 -22 °F to +158 °F

-40 °C to +70 °C (for heated display variant)
 -40 °F to +158 °F (for heated display variant)

OPTIONAL PARTS

PART	PART NUMBER
IP65 Gasket	020-282

DSE4510/20 MKII

AUTO START AND AUTO MAINS FAILURE CONTROL MODULES

(ALTERNATOR FREQUENCY & CAN SPEED SENSING)

The DSE4510 MKII Auto Start Control Module and the DSE4520 MKII Auto Mains (Utility) Failure Control Module are suitable for a wide variety of single gen-set applications.

Whilst maintaining functions included within higher end controllers, such as generator or load power monitoring, the DSE45xx MKII range of especially compact controllers provide the user with the ultimate size to feature ratio.

Monitoring engine speed, oil pressure, coolant temperature, frequency, voltage, current, power and fuel level, the modules will give comprehensive engine and alternator protection. This will be indicated on the largest back-lit LCD icon display in its class via an array of warning, electrical trip and shutdown alarms.

Electronic J1939 (CAN) and non-electronic (alternator frequency sensing) engine support for diesel, gas and petrol engines all in one variant. With a number of flexible inputs, outputs and protections, the module can be easily adapted to suit a wide range of applications.

Through USB Communication both modules can be easily configured using the DSE Configuration Suite PC Software or can be fully configured through the module's front panel editor.

All DSE products are supported by the DSE global technical support team which gives our customers and end users access to 24 hour system help and advice.

* AVAILABLE VARIANTS

4510-05	Auto start with real time clock
4510-06	Auto start with real time clock & heated display
4520-05	Auto Mains Failure with real time clock
4520-06	Auto Mains Failure with real time clock & heated display

ENVIRONMENTAL TESTING STANDARDS

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1
Ab/Ae Cold Test -30 °C
BS EN 60068-2-2
Bb/Be Dry Heat +70 °C

VIBRATION

BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz at +/-7.5 mm,
8 Hz to 500 Hz at 2 gn

HUMIDITY

BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 °C
at 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40 °C
at 93% RH 48 Hours

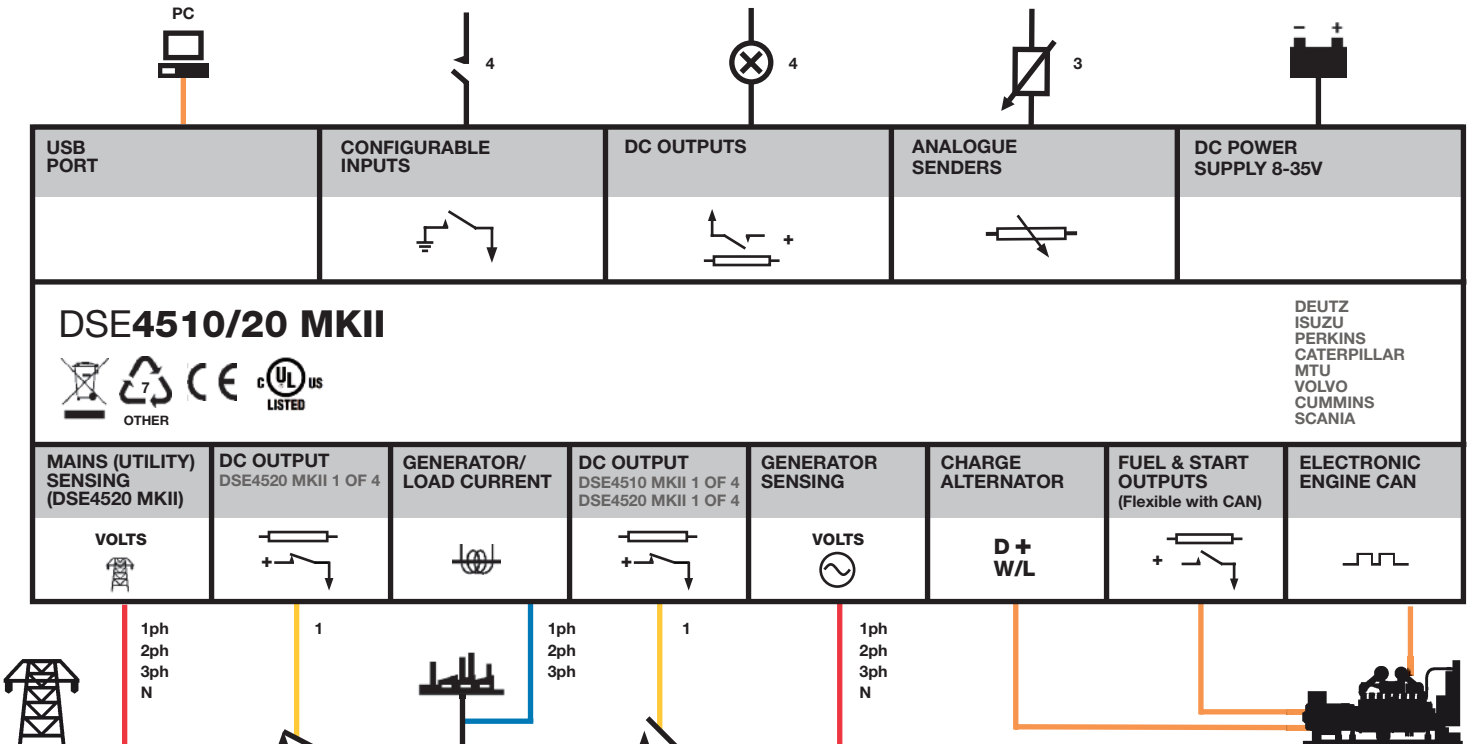
SHOCK

BS EN 60068-2-27
Three shocks in each of three major axes
15 gn in 11 mS

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES

BS EN 60529
IP65 - Front of module when installed into the control panel with the optional sealing gasket.

COMPREHENSIVE FEATURE LIST TO SUIT A WIDE VARIETY OF GEN-SET APPLICATIONS





Main Circuit Breaker Specification Sheets

HDL36060

POWERPACT H-FRAME, CIRCUIT BREAKER, THERMAL-MAGNETIC, 60A, 3P, 600V, 14kA

Product availability : Stock - Normally stocked in distribution facility



Main

Product or component type	Circuit breaker
Range of product	PowerPact H
Trip Unit Type	Thermal-magnetic
Breaking capacity code	D

Complementary

Line Rated Current	60 A
Number of Poles	3P
Interrupt Rating	25 kA 240 V AC 18 kA 480 V AC 14 kA 600 V AC 20 kA 250 V DC
[Ue] rated operational voltage	250 V DC 600 V AC
Continuous current rating	80 %
Mounting mode	Unit mount
Electrical connection	Lugs load Lugs line
Wire Gauge	AWG 14...AWG 3/0 aluminium/copper
Magnetic hold current	800 A
Magnetic tripping current	1450 A
Height	162.56 mm (6.4 in)
Width	104.65 mm (4.12 in)
Depth	110.74 mm (4.36 in)
Tightening torque	44.25 lbf.in (5 N.m) 0.00...0.15 in ² (2.5...95 mm ²) AWG 14...AWG 3/0

Disclaimer: This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications

Environment

Product certifications	CE UL listed IEC CSA
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	00785901577959
Package weight(Lbs)	1.88 kg (4.15 lb(US))
Returnability	Yes
Country of origin	MX

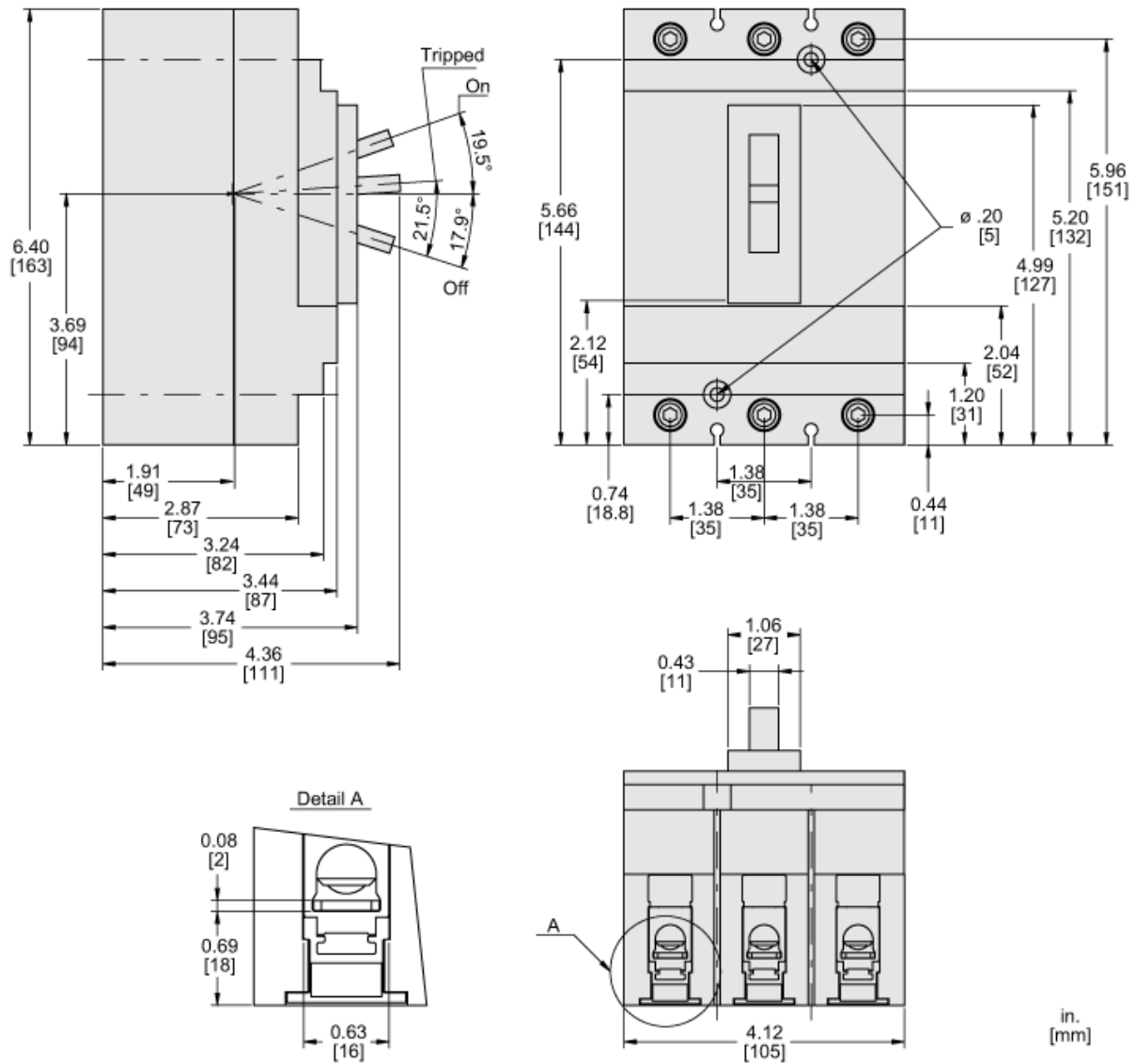
Offer Sustainability

Sustainable offer status	Green Premium product
California proposition 65	WARNING: This product can expose you to chemicals including: DINP and DIDP which is known to the State of California to cause Carcinogen and Reproductive harm. For more information go to www.p65warnings.ca.gov
REACH Regulation	REACH Declaration
EU RoHS Directive	Compliant EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration Product out of China RoHS scope. Substance declaration for your information.
Environmental Disclosure	Product Environmental Profile
Circularity Profile	No need of specific recycling operations

Contractual warranty

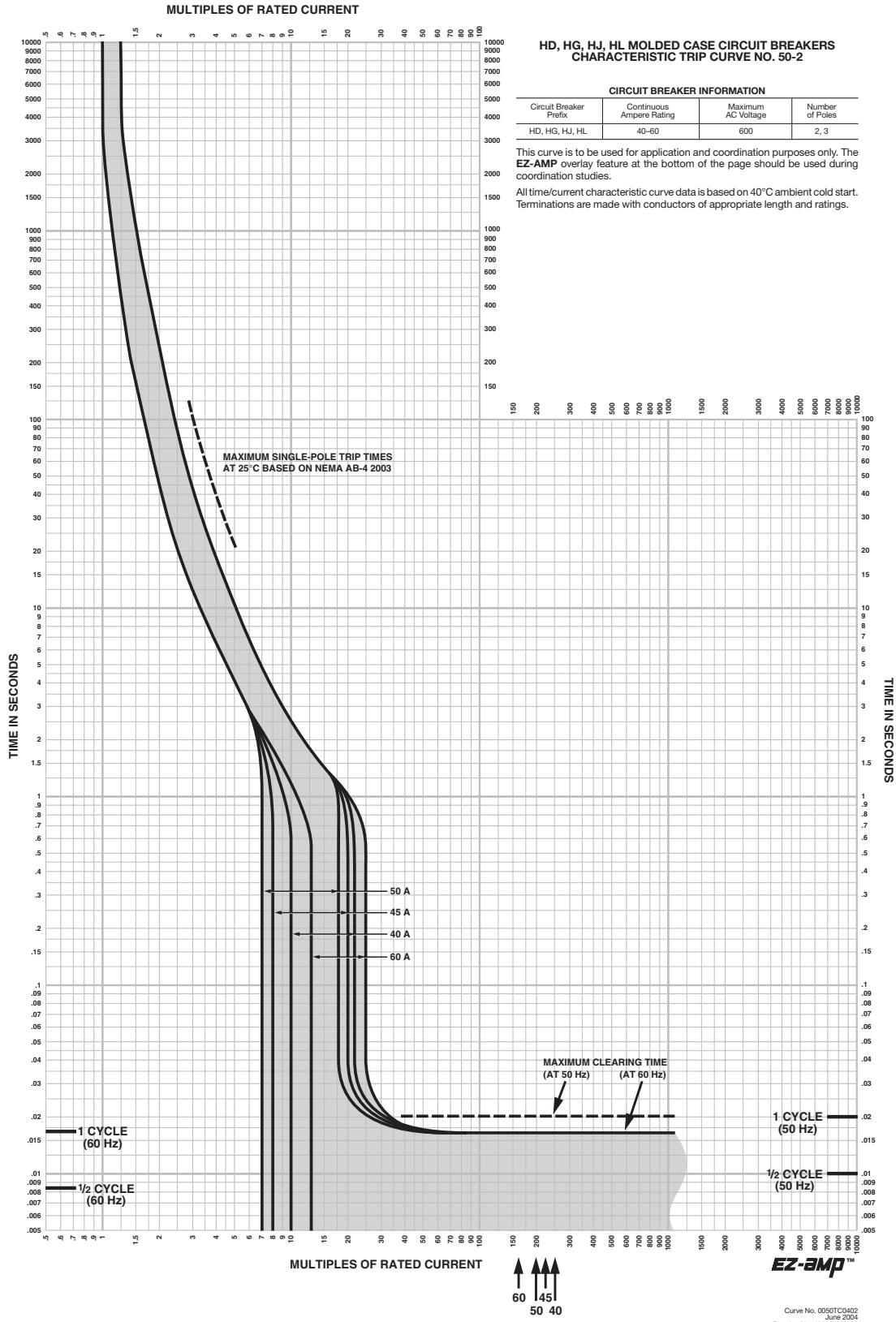
Warranty	18 months
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Approximate Dimensions



PowerPact H-, J-, and L-Frame Circuit Breakers Trip Curves

Figure 71: H-Frame 40–60 A (HD, HG, HJ, and HL) Thermal-Magnetic Trip





Miscellaneous Specification Sheets

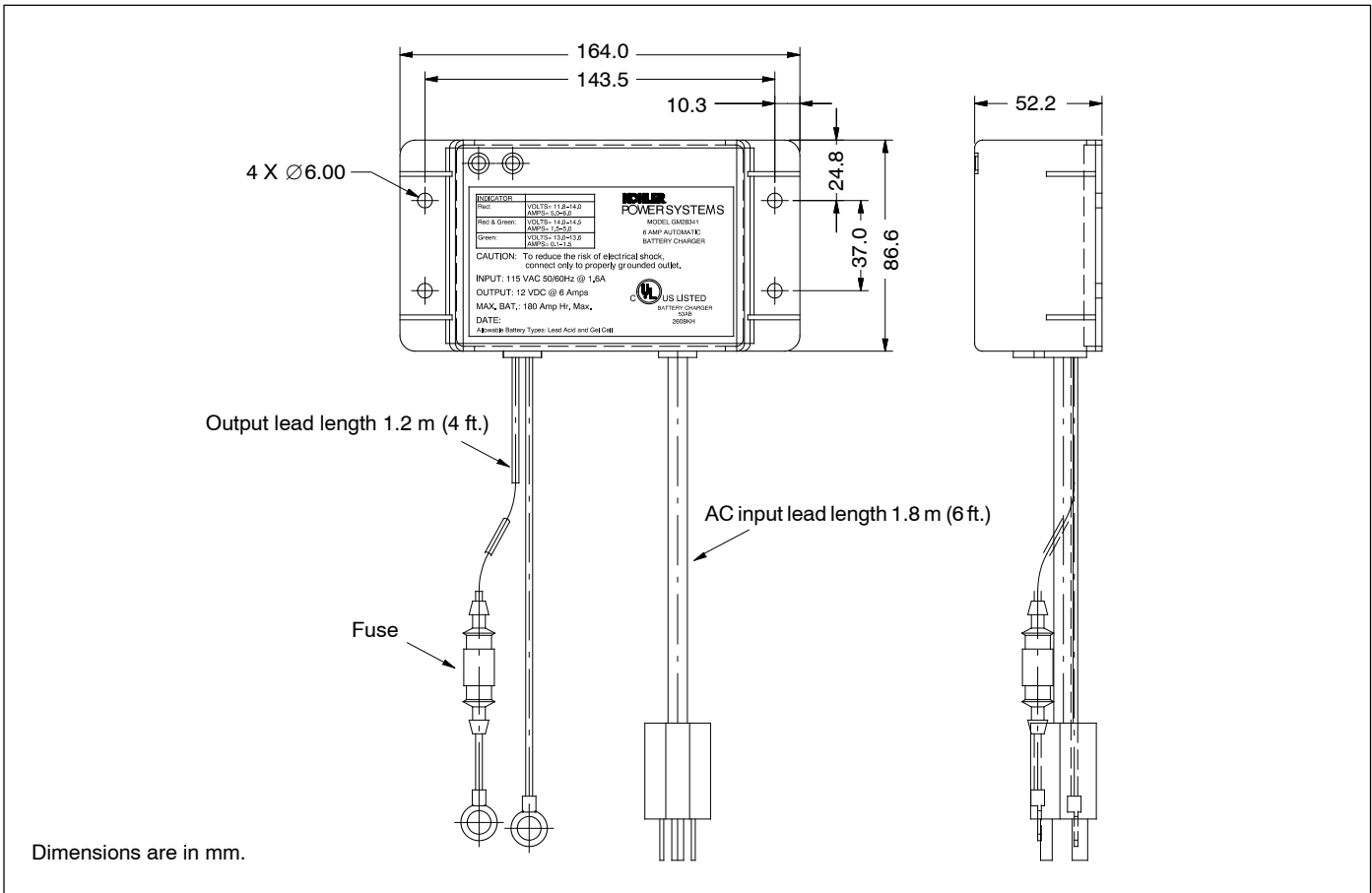


Standard Features

- 12 VDC output. * Use two battery chargers for 24-volt electrical systems
- Automatic 3-stage float/equalize battery charger
- Charges both lead-acid and gel-cell type batteries
- Indicator lamps: red and green LEDs indicate bulk charge, absorption, and float charge stages
- Durable potted assembly for full waterproofing and shockproofing
- Reverse-polarity protection
- Short-circuit protection
- UL 1236 listed
- UL 2200 compliant
- UL 991 compliant for vibration and shock
- UL listed to Canadian safety standards
- UL rated inline fuse
- FCC Class B-compliant for EMI/RFI (Date code 8/26/04 or later)
- One-year warranty
- Easy installation:
 - Integral mounting flanges
 - Ring terminals for battery connection
 - Standard US style 3-prong AC plug

Specifications

Input Voltage	90-135 VAC
Input Frequency	50/60 Hz
DC Output: Bulk Absorption Float	11.8-14.0 VDC @ 5.0-6.0 amps 14.0-14.5 VDC @ 1.5-5.0 amps 13.3-14.5 VDC @ 0.1-1.5 amps
Steady Full-Load Output Current	6 amps
Current Limit	7 amps
Output Power Limit	70 +2/-5 watts
Line Regulation Across Input Voltage Range	1%
Isolation, Input to Output	2500 V
Dimensions (L x W x D)	164 x 87 x 53 mm (6.4 x 3.5 x 2.1 in)
Weight	1.6 kg (3.5 lb.)
Temperature Range, Operating and Storage	-40° to 70°C (-40° to 158° F)
Humidity	0 to 100% (condensing)



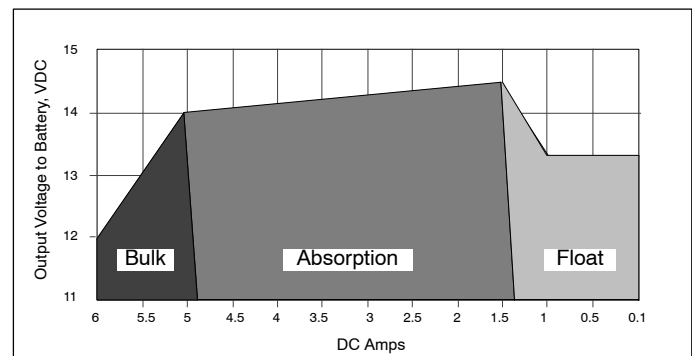
Battery Connections

Lead Length 1.2 m (4 ft.)
 Battery Connections 9.5 mm (3/8 in.) ring terminals

AC Power Connections

Lead Length 1.8 m (6 ft.)
 Connection Standard US style 3-prong AC plug

Charging Curves



DISTRIBUTED BY:

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

Thermosiphon Heating System TPS



GENERATOR



HEAVY
EQUIPMENT



TRUCK
& BUS



MARINE

HOTSTART's TPS thermosiphon heating system is a coolant preheater, developed to maintain optimal temperatures for diesel and gas engines in stationary land power, marine, construction equipment, and truck applications.

BENEFITS & FEATURES

PROVEN DESIGN

Depend on consistent, reliable heating with the proven design of the TPS Thermosiphon heater. Heated coolant rises through the engine block, maintaining critical fluid temperatures for easy engine starts when needed.

VERSATILE & ADAPTABLE

The TPS can be configured for almost any weather-protected application. Multiple options and voltages are available, including UL/C-US listed and CE-compliant models.

EASY INSTALLATION

The TPS's inlet and outlet positions allow for quick and simple installations, reducing complicated plumbing requirements. Each heater comes with a mounting kit for optimized installations.



Thermosiphon Heating System TPS



GENERATOR



HEAVY
EQUIPMENT



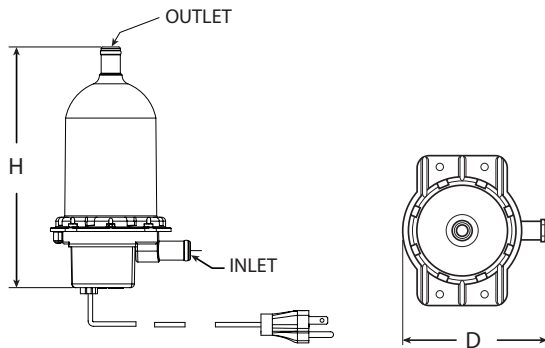
TRUCK
& BUS



MARINE

ORDERING INFORMATION

TPS



Height (H)	Depth (D)	Weight
7.9"	4.6"	1.7 lbs
200 mm	117 mm	771 g

TPS System	
Phase	single-phase (1 Ø)
Voltage	120V 240V 277V
Ingress	IP41
Tank Material	Polyphenylensulfid PPS
Heating Element Material	Incoloy 800
Min./Max. Ambient Temp.	-4–104 °F (-20–40 °C)
Certification	UL/C-US listed, CE-compliant

TPS Coolant	
Fluid Type	Water Coolant mix (50% water/50% glycol)
Heat Power*	0.5kW 1kW 1.5kW 1.8kW 2kW
Temp. Control	Fixed, 100–120 °F (38–49 °C)
Max. Pressure	90 psi (620 kPa)
Inlet/Outlet	0.625" hose barb (15.9 mm)

Temperature Range		Numerical Code
ON	OFF	
80 °F (27 °C)	100 °F (38 °C)	8
100 °F (38 °C)	120 °F (49 °C)	10
120 °F (49 °C)	140 °F (60 °C)	12

Options shown represent typical tested or certified configurations. Additional options or configurations may be available. For assistance with your heating system application, contact HOTSTART at 509.600.3700 or sales@hotstart.com.

* – 2 kW available in 240 V only, 1.8 kW available in 120 V only.

Engine Displacement	Power Supply			Heating System		
	V	Ø	Hz	kW	Amps	Model Number
150 CID 2.5 L	120	1	60	0.5	4.2	TPS051GT8-000
	120	1	60	0.5	4.2	TPS051GT10-000
	120	1	60	0.5	4.2	TPS051GT12-000
	240	1	60	0.5	2.1	TPS052GT8-000
	240	1	60	0.5	2.1	TPS052GT10-000
	240	1	60	0.5	2.1	TPS052GT10-013
	240	1	60	0.5	2.1	TPS052GT12-000
350 CID 5.7 L	120	1	60	1	8.4	TPS101GT8-000
	120	1	60	1	8.4	TPS101GT10-000
	120	1	60	1	8.4	TPS101GT12-000
	240	1	60	1	4.2	TPS102GT8-000
	240	1	60	1	4.2	TPS102GT10-000
	240	1	60	1	4.2	TPS102GT10-013
350–500 CID 5.7–8.2 L	120	1	60	1.5	12.5	TPS151GT8-000
	120	1	60	1.5	12.5	TPS151GT10-000
	120	1	60	1.5	12.5	TPS151GT12-000
	240	1	60	1.5	6.3	TPS152GT8-000
	240	1	60	1.5	6.3	TPS152GT10-000
	240	1	60	1.5	6.3	TPS152GT10-013
	240	1	60	1.5	6.3	TPS152GT12-000
500–700 CID 8.2–11.5 L	120	1	60	1.8	15	TPS181GT8-000
	120	1	60	1.8	15	TPS181GT10-000
	120	1	60	1.8	15	TPS181GT12-000
	240	1	60	2	8.3	TPS202GT8-000
	240	1	60	2	8.3	TPS202GT10-000
	240	1	60	2	8.3	TPS202GT10-013
	240	1	60	2	8.3	TPS202GT12-000

Power cord length on all models – 48" (1219 mm)

TPS engine preheaters include a fixed setting thermostat. A single or double digit numeral at the end of the model number prefix designates the temperature range.

Example: TPS101GT10-000

TPS heaters are available with in-line adjustable and remote thread-in fixed thermostat. Please reference HOTSTART's product catalog for part numbers.

-013 Engine preheater features 2 meter round cord & Schuko plug - CE compliant



POWER GENERATOR CROSS-SECTIONAL DRAWING / EXPLODED VIEW DIAGRAM AND BILL OF MATERIALS

J00320-DD-PG


**2019023 (09-15) / 2019024 (a-5-G) / 2019025 (a-38-I) /
2019027 (b-100-B) / 2019026 (a-62-I)**

INSTRUMENT AIR CONVERSION

VDR CODE: G01-DTL

TAG #: GEN-352 / GEN-822

PO #: PO83938 / PO83939 / PO83921 / PO83936 / PO83940

VENDOR'S DRAWING REVIEW	
This review does not relieve the vendor of its responsibility for errors in design and detailing of connections, dimensions or sizes	
1. <input checked="" type="checkbox"/>	Work may proceed
2. <input type="checkbox"/>	Revise and resubmit. Work may proceed subject to incorporation of changes indicated
3. <input type="checkbox"/>	Revise and resubmit. Work may not proceed
4. <input type="checkbox"/>	Accepted for information only
5. <input type="checkbox"/>	Certified/As-Built
By: 	Date: 2020.03.05
RANGELAND ENGINEERING	Project No: ENC2019023

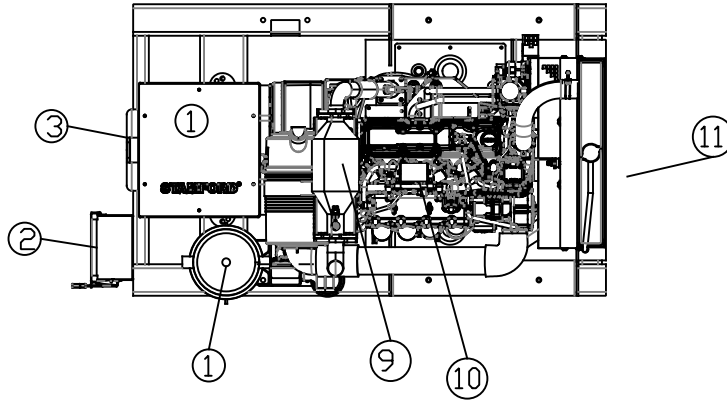
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21-Feb-20	0	Issued for Information	WV	SK	SK

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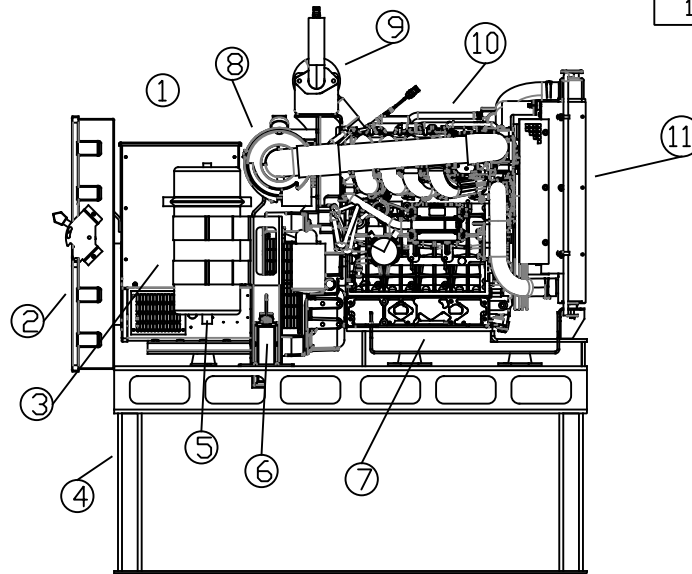
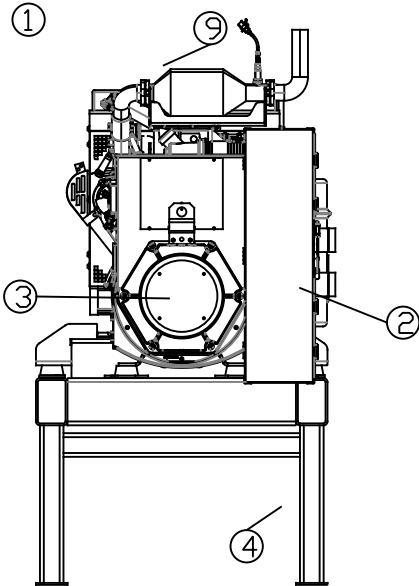
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1



#	Item
1	Control Panel
2	Main Breaker
3	AC Alternator
4	Sub Skid
5	Extended Run Filters
6	Oil Level Indication
7	Long Run Oil Sump
8	Air Cleaner
9	Catalyst/Muffler
10	WG3800 NG Engine
11	Radiator



UNLESS OTHERWISE SPECIFIED:	Information in the document is proprietary and is not to be reproduced, distributed, or disclosed except as specifically authorized in writing by Frontier Power Products Ltd.	TITLE: WG3800 LR ASSEMBLY	
		DWG. NO. FGA-162306	REV 1
UNITS: INCHES		DRAWN:	DATE: 2020-01-20
TOLERANCES:		CHECKED:	DATE:
X ± 0.1		APPROVED:	DATE:
X.X ± 0.05		WEIGHT: LBS	SCALE: 1:24 SHEET: 1/1
X.XX ± 0.01			
X.XXX ± 0.005			
X/XX ± 1/32			
ANGULAR ± 1°			

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
1	INITIAL RELEASE	2018-01-06	

SAVE DATE: February 19, 2020 12:15:52 PM (RafaelR)

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