

CUMMINS GENERATOR

**STANDBY POWER:
1000 KVA (800 KW)**

**PRIME POWER:
909 KVA (727 KW)**



QSK23-G3



> Specification sheet



Our energy working for you.™

Description

The QSK23 is an in-line 6 cylinder engine with a 23 litre displacement. This Quantum series utilizes sophisticated electronics and premium engineering to provide outstanding performance levels, reliability and versatility for Standby, Prime and Continuous Power applications.



This engine has been built to comply with CE certification.



This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

The QSK23 uses the Cummins High Pressure Injection (HPI) PT full authority electronic fuel system. The HPI PT fuel system is managed by a G-Drive Governor Control System (GCS) controller, which is provided for off-engine mounting in the genset control panel. The Quantum Control has a specific fuel system board to interface with the HPI-PT fuel system and provides an Engine Protection package giving greater customer flexibility and cost effective alternatives in the control design and the benefits of Full Authority electronic control

CTT (Cummins Turbo Technologies) HX82 turbo-charging utilizes exhaust energy with greater efficiency for improved emissions and fuel consumption.

Charge Air Cooling - QSK23 engine requires the use of an Air-to-Air heat exchanger or Charge-Air-Cooler (CAC) to reduce intake manifold temperature and to meet the lower emissions requirements

CoolPac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
768/1030	701/940	537/720	739/991	682/915	517/693	720	900	648	810	491	614

1800 rpm (60 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
895/1200	809/1085	652/875	857/1149	776/1041	621/833	800	1000	727	909	583	729

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General Engine Data

Type	4 cycle, Turbocharged		
Bore mm	170		
Stroke mm	170		
Displacement Litre	23.1		
Cylinder Block	Cast iron, 6 cylinder		
Battery Charging Alternator	35A		
Starting Voltage	24V		
Fuel System	Direct injection Cummins HPI		
Fuel Filter	Spin on fuel filters with water separator		
Lube Oil Filter Type(s)	Spin on full flow filter		
Lube Oil Capacity (l)	103		
Flywheel Dimensions	SAE 0		

Coolpac Performance Data

Cooling System Design	Air-air charge cooled		
Coolant Ratio	50% ethylene glycol; 50% water		
Coolant Capacity (l)	57		
Limiting Ambient Temp (°C)**	46.0 (50Hz)	50.5 (60Hz)	
Fan Power (kWm)	17.3 (50Hz)	26.1 (60Hz)	
Cooling System Air Flow (m ³ /s)**	14.7 (50Hz)	23.6 (60Hz)	
Air Cleaner Type	Dry replaceable element with restriction indicator		

** @ 13 mm H₂O

Ratings Definitions

Emergency Standby Power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):

Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weight & Dimensions

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
2885	1656	2029	3185

Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	768	1030	178	46.9
Prime Power				
100	701	940	161	42.5
75	526	705	121	32.0
50	351	470	85	22.4
25	175	235	46	12.2
Continuous Power				
100	537	720	125	33.1

Fuel Consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	895	1200	212	56.1
Prime Power				
100	809	1085	189	49.8
75	607	814	139	36.7
50	405	543	97	25.7
25	202	271	56	14.7
Continuous Power				
100	653	875	149	39.4

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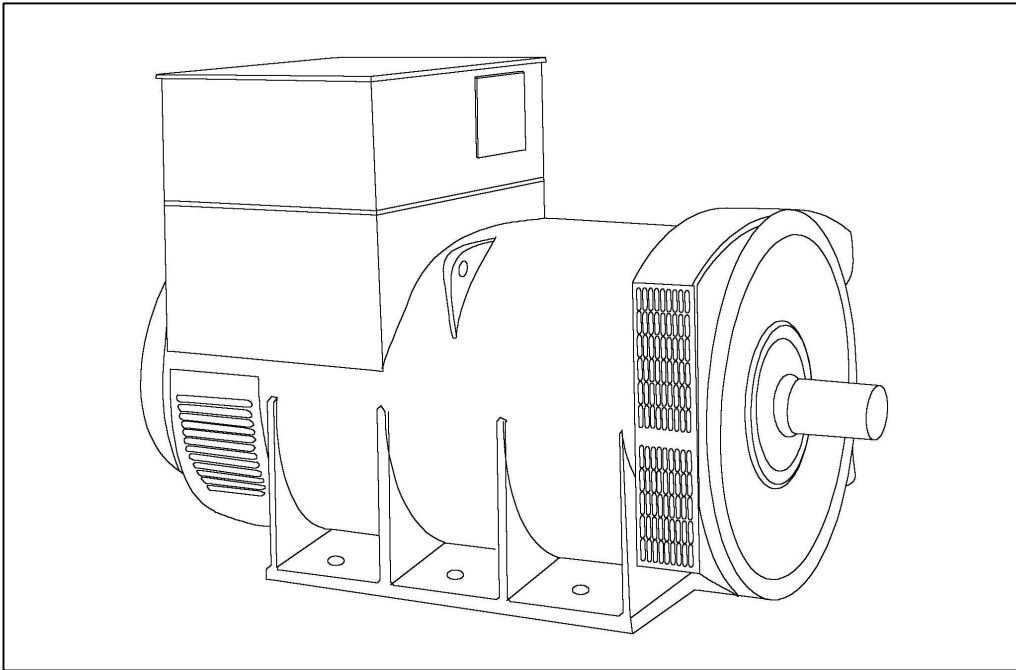
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HCI634G - Technical Data Sheet



HCI634G

SPECIFICATIONS & OPTIONS



STANDARDS

Newage 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

MX321 AVR - STANDARD

This sophisticated Automatic Voltage Regulator (AVR) is incorporated into the Stamford Permanent Magnet Generator (PMG) system and is fitted as standard to generators of this type.

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.

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 feature a main stator with 6 ends brought out to the terminals, which are mounted on the frame 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. Two bearing generators are balanced with a half key.

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%.

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.

HCI634G
WINDING 312

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.		
A.V.R.	MX321		
VOLTAGE REGULATION	± 0.5 %	With 4% ENGINE GOVERNING	
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)		

INSULATION SYSTEM	CLASS H
PROTECTION	IP23
RATED POWER FACTOR	0.8
STATOR WINDING	DOUBLE LAYER LAP
WINDING PITCH	TWO THIRDS
WINDING LEADS	6
STATOR WDG. RESISTANCE	0.003 Ohms PER PHASE AT 22°C STAR CONNECTED
ROTOR WDG. RESISTANCE	1.75 Ohms at 22°C
EXCITER STATOR RESISTANCE	17 Ohms at 22°C
EXCITER ROTOR RESISTANCE	0.079 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. 6224 (ISO)
BEARING NON-DRIVE END	BALL. 6317 (ISO)

	1 BEARING	2 BEARING
WEIGHT COMP. GENERATOR	1965 kg	1989 kg
WEIGHT WOUND STATOR	934 kg	934 kg
WEIGHT WOUND ROTOR	814 kg	766 kg
WR ² INERTIA	18.3482 kgm ²	17.8009 kgm ²
SHIPPING WEIGHTS in a crate	2023kg	2029kg
PACKING CRATE SIZE	183 x 92 x 140(cm)	183 x 92 x 140(cm)

	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	1.614 m ³ /sec 3420 cfm				1.961 m ³ /sec 4156 cfm			
VOLTAGE STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE DELTA	220	230	240	254	240	254	266	277
kVA BASE RATING FOR REACTANCE VALUES	800	800	800	800	875	925	963	1000
X _d DIR. AXIS SYNCHRONOUS	3.14	2.83	2.63	2.34	3.53	3.34	3.18	3.03
X' _d DIR. AXIS TRANSIENT	0.25	0.23	0.21	0.19	0.28	0.26	0.25	0.24
X'' _d DIR. AXIS SUBTRANSIENT	0.18	0.16	0.15	0.13	0.21	0.20	0.19	0.18
X _q QUAD. AXIS REACTANCE	1.88	1.70	1.58	1.40	2.10	1.98	1.89	1.80
X' _q QUAD. AXIS SUBTRANSIENT	0.21	0.19	0.18	0.16	0.24	0.23	0.22	0.21
X _L LEAKAGE REACTANCE	0.10	0.09	0.08	0.07	0.12	0.11	0.10	0.10
X ₂ NEGATIVE SEQUENCE	0.22	0.20	0.19	0.17	0.24	0.23	0.22	0.21
X ₀ ZERO SEQUENCE	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03

REACTANCES ARE SATURATED

VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED

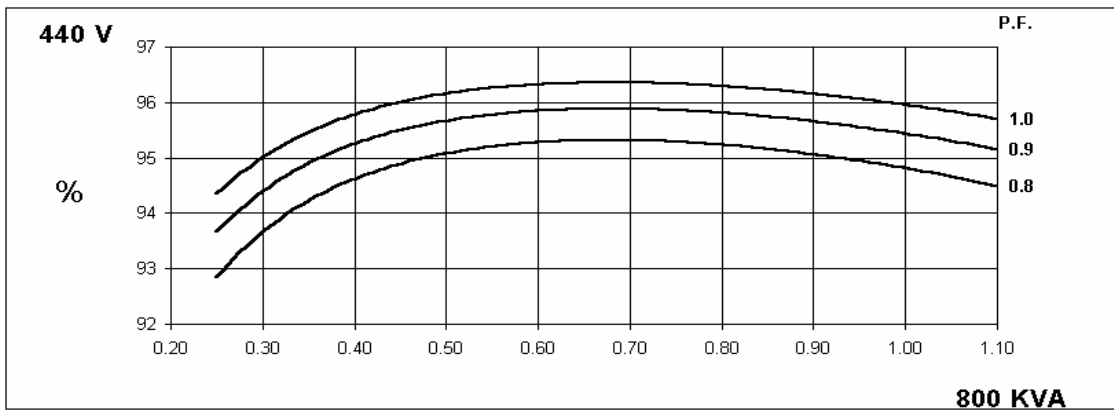
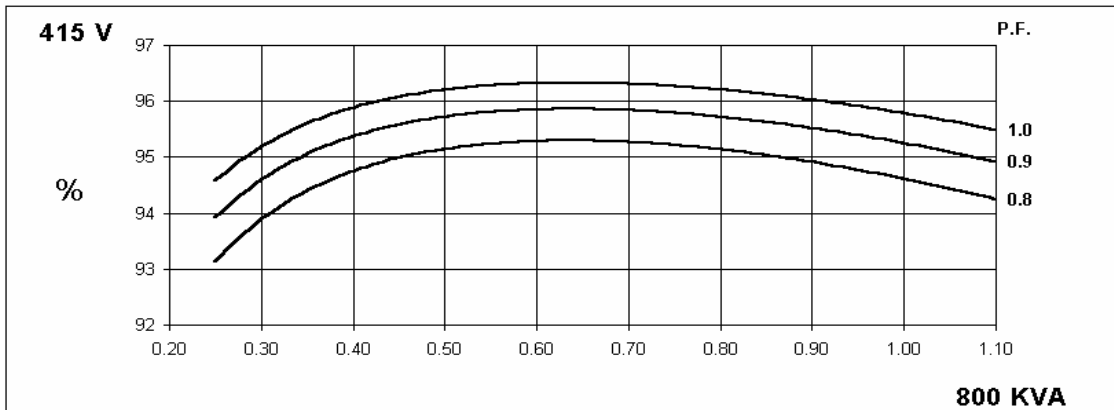
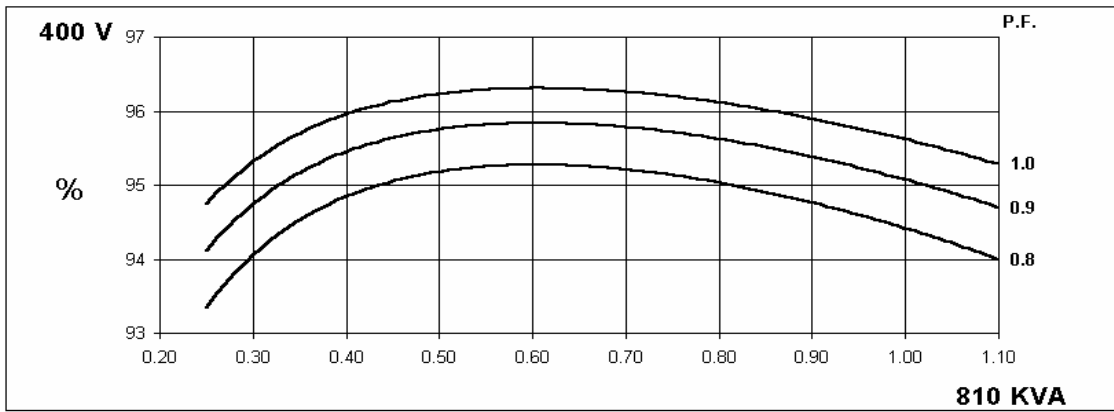
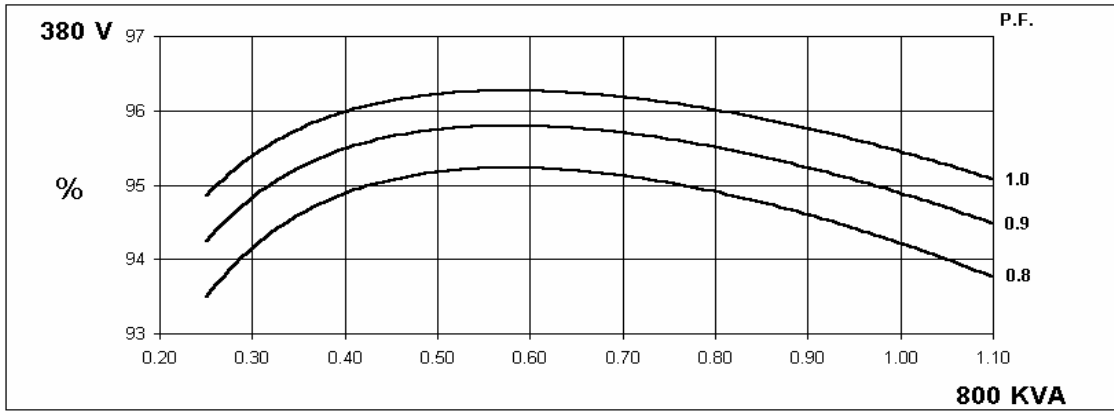
T' _d TRANSIENT TIME CONST.	0.185
T'' _d SUB-TRANSTIME CONST.	0.025
T' _{do} O.C. FIELD TIME CONST.	2.35
T _a ARMATURE TIME CONST.	0.04
SHORT CIRCUIT RATIO	1/X _d

**50
Hz**

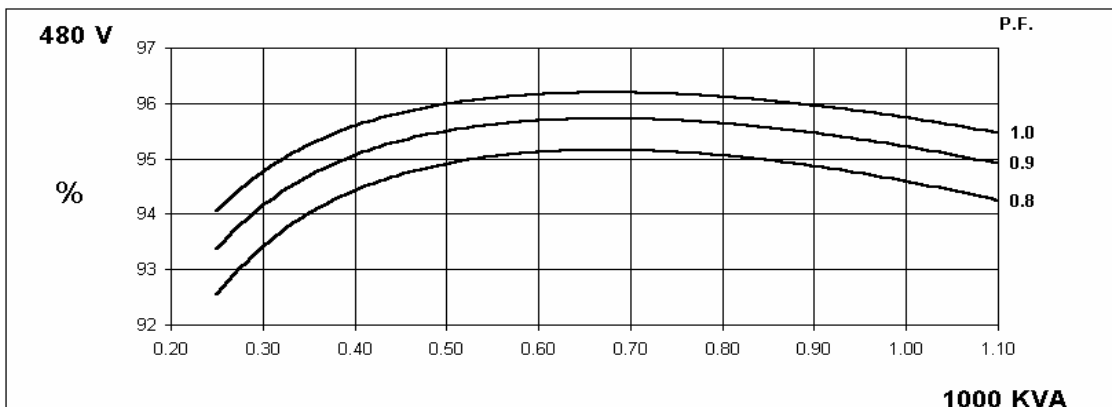
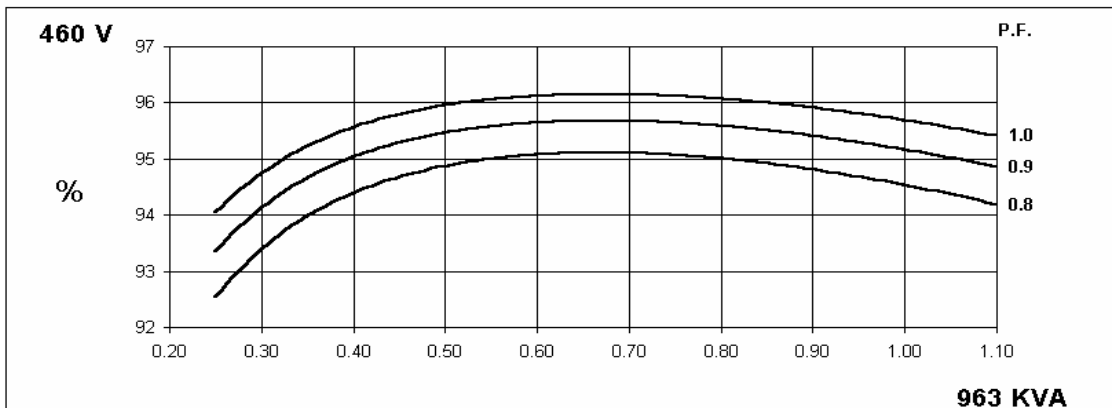
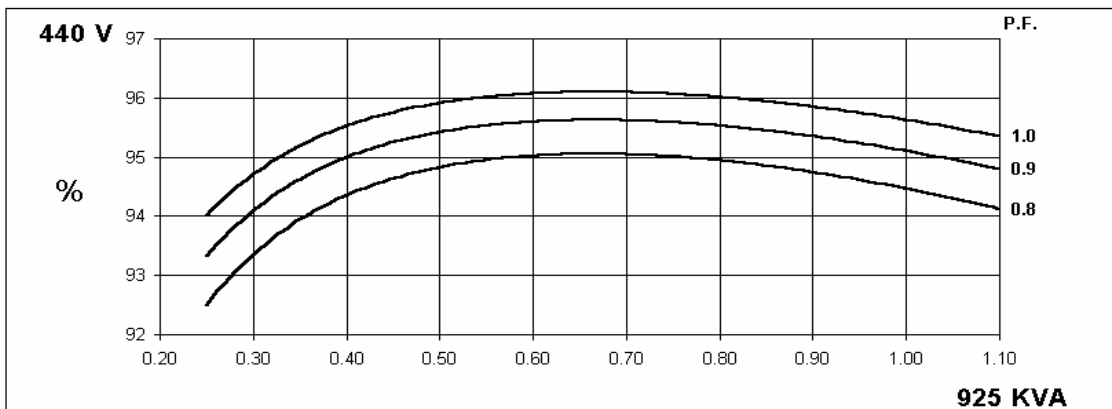
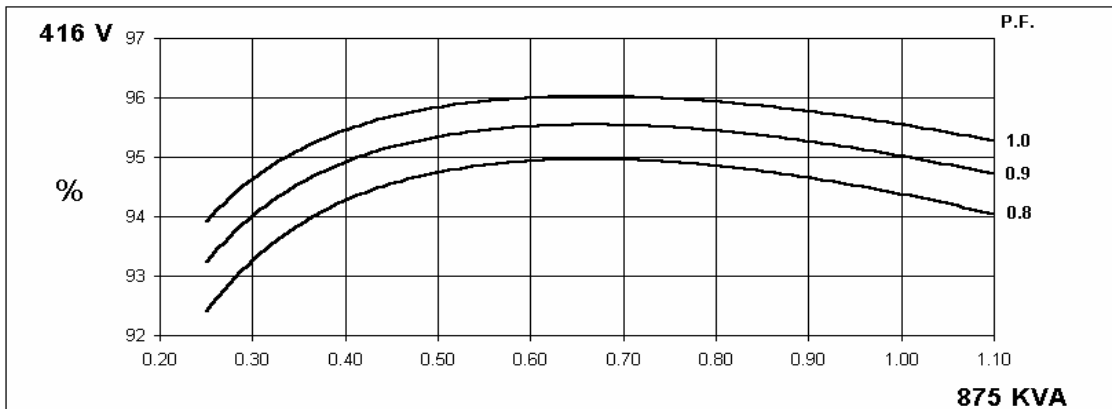
HCI634G
Winding 312



THREE PHASE EFFICIENCY CURVES



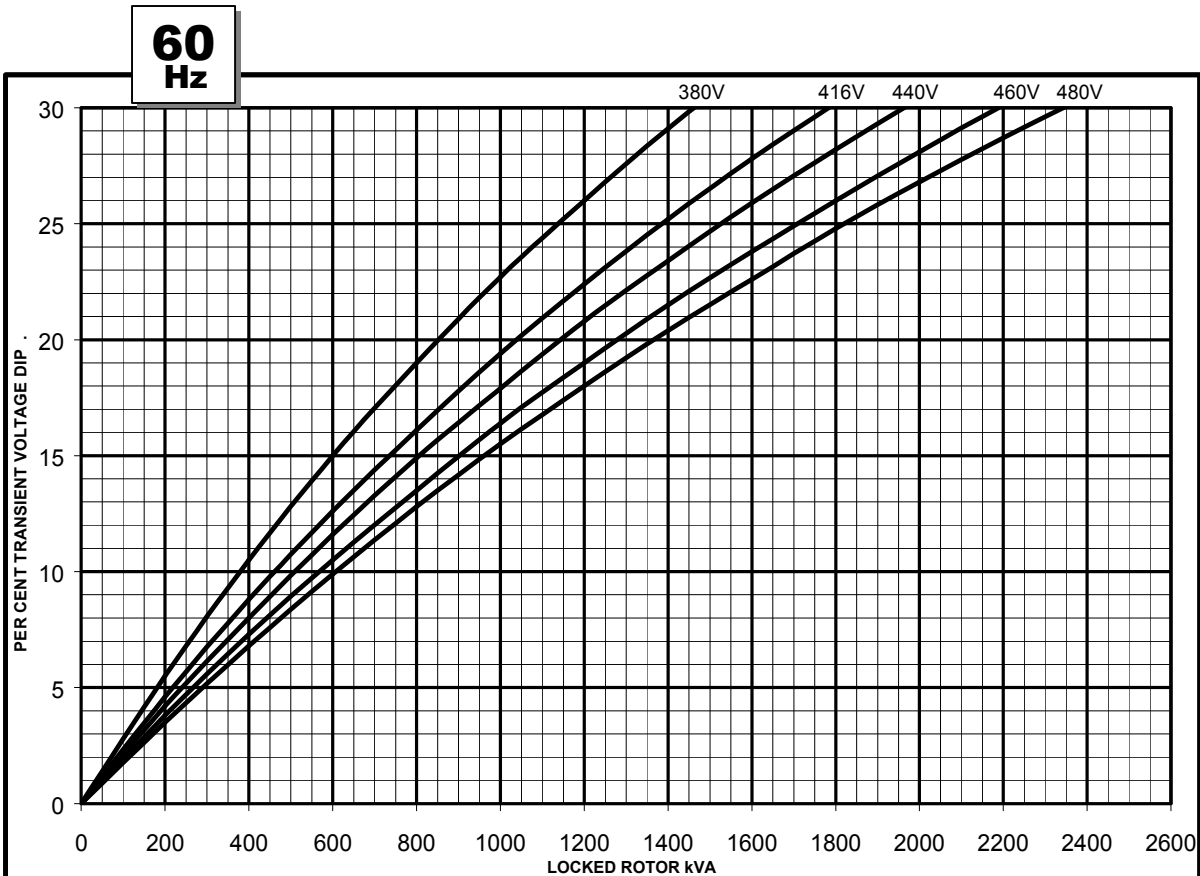
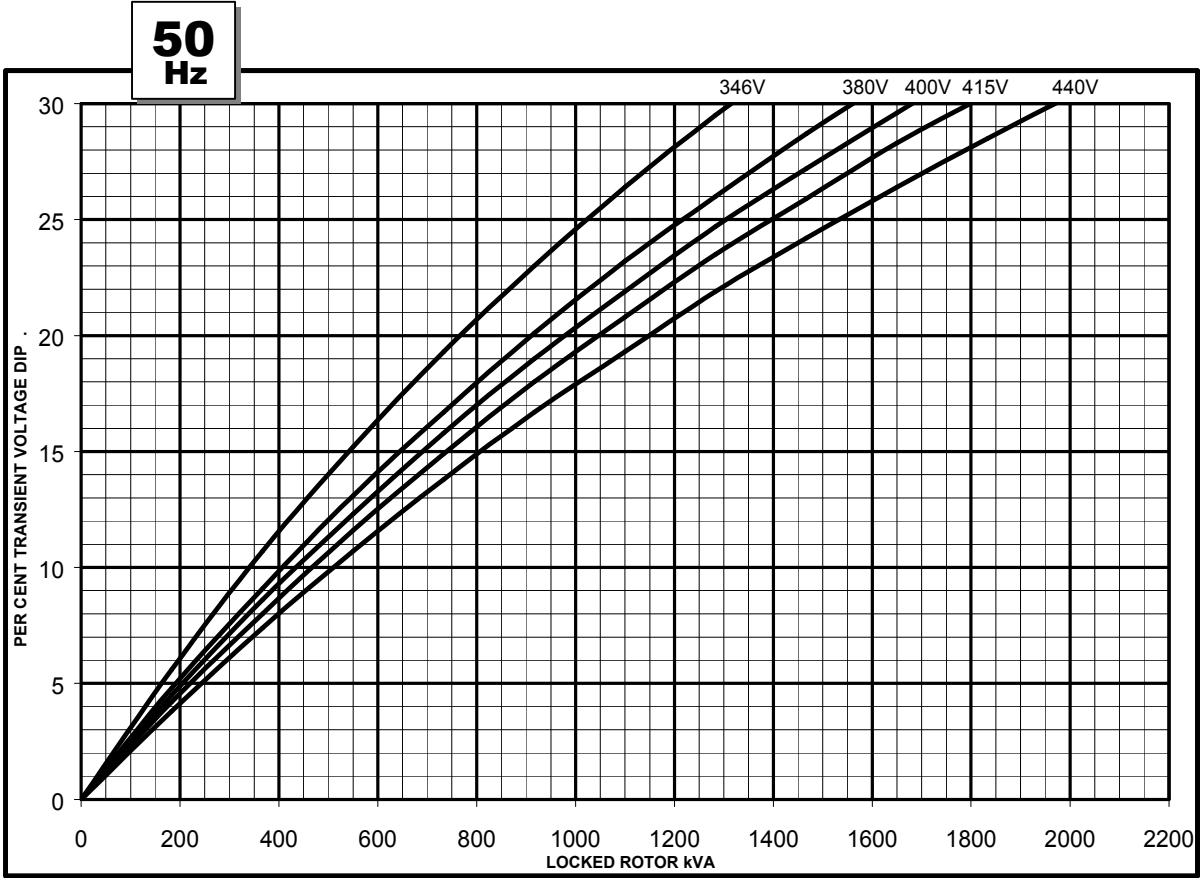
THREE PHASE EFFICIENCY CURVES



HCI634G
Winding 312

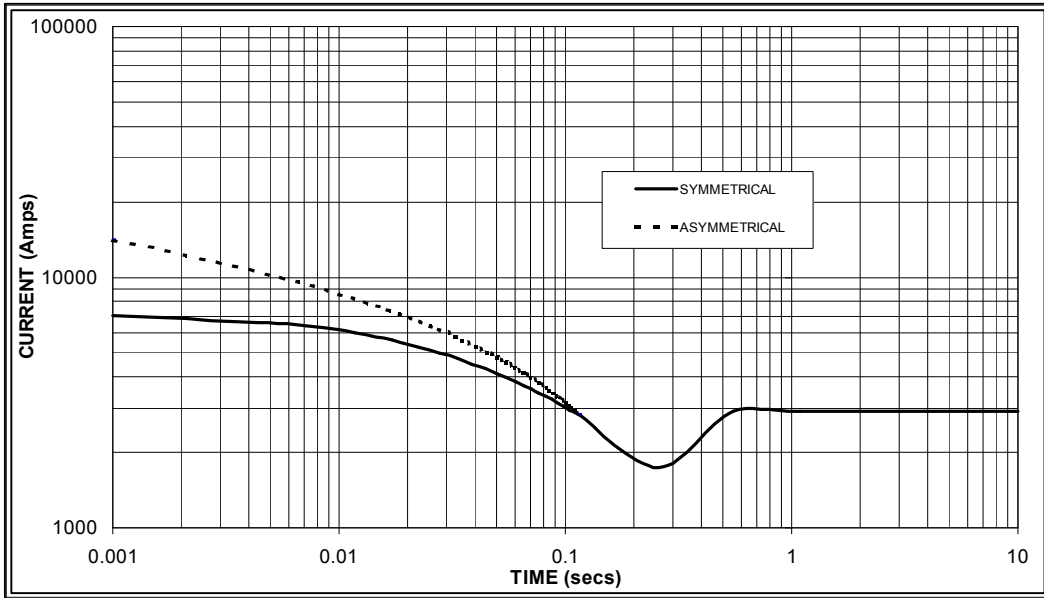


Locked Rotor Motor Starting Curve



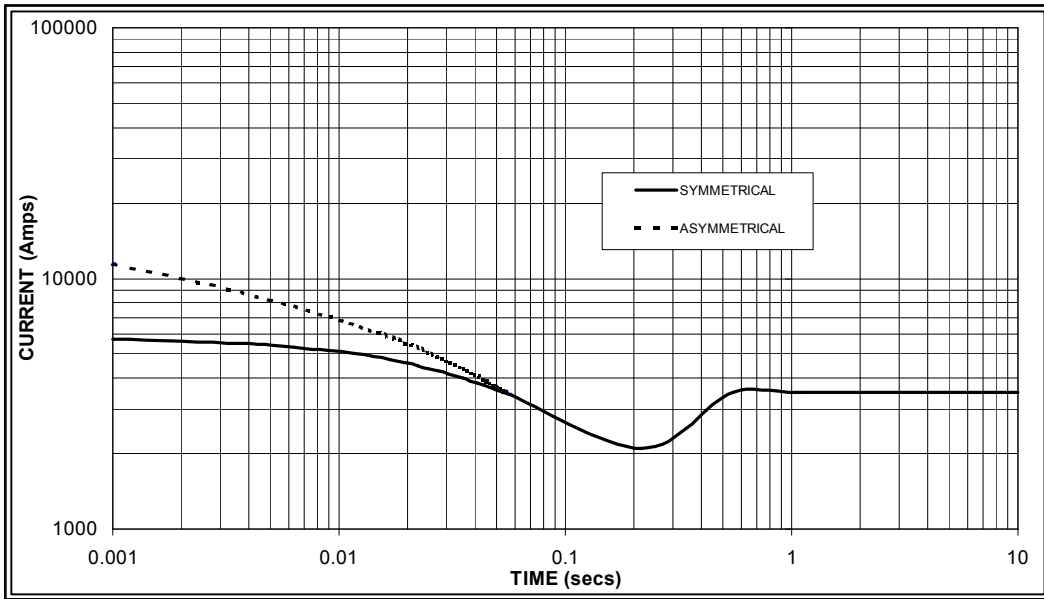
**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed
Based on star (wye) connection.**

**50
Hz**



Sustained Short Circuit = 2,900 Amps

**60
Hz**



Sustained Short Circuit = 3,500 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 Delta connection multiply the Curve current value by 1.732

HCI634G

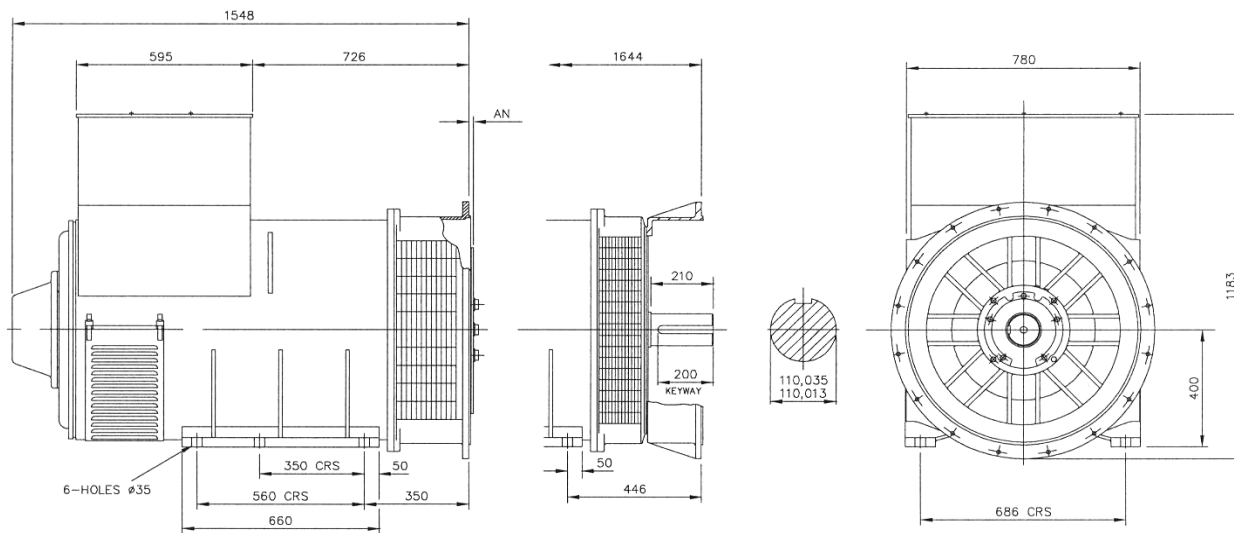
Winding 312 0.8 Power Factor



RATINGS

Class - Temp Rise		Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
50Hz	Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	750	760	750	750	800	810	800	800	820	830	820	820	850	860	850	850
	kW	600	608	600	600	640	648	640	640	656	664	656	656	680	688	680	680
	Efficiency (%)	94.5	94.6	94.8	95.0	94.2	94.4	94.6	94.8	94.1	94.3	94.5	94.7	93.9	94.2	94.4	94.6
	kW Input	635	643	633	632	679	686	677	675	697	704	694	693	724	730	720	719
60Hz	Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	813	844	888	913	875	925	963	1000	913	969	1008	1046	950	1000	1044	1088
	kW	650	675	710	730	700	740	770	800	730	775	806	837	760	800	835	870
	Efficiency (%)	94.6	94.7	94.8	94.8	94.4	94.5	94.5	94.6	94.2	94.3	94.4	94.4	94.1	94.2	94.3	94.3
	kW Input	688	713	749	770	742	783	815	846	775	822	854	886	808	849	886	923

DIMENSIONS



SAE	14	18	21	24
AN	25.4	15.87	0	0



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DSE7310/20

AUTO START & AUTO MAINS FAILURE CONTROL MODULES

FEATURES



The DSE7310 is an Auto Start Control Module and the DSE7320 is an Auto Mains (Utility) Failure Control Module suitable for a wide variety of single, diesel or gas, gen-set applications.

Monitoring an extensive number of engine parameters, the modules will display warnings, shutdown and engine status information on the back-lit LCD screen, illuminated LEDs, remote PC and via SMS text alerts (with external modem).

The DSE7320 will also monitor the mains (utility) supply. The modules include USB, RS232 and RS485 ports as well as dedicated DSENet® terminals for system expansion.

Both modules are compatible with electronic (CAN) and non-electronic (magnetic pick-up/alternator sensing) engines and offer an extensive number of flexible inputs, outputs and extensive engine protections so the system can be easily adapted to meet the most demanding industry requirements.

The extensive list of features includes enhanced event and performance monitoring, remote communications, PLC functionality and dual mutual standby (DSE7310 only) to reduce engine wear.

The modules can be easily configured using the DSE Configuration Suite PC software. Selected front panel editing is also available.

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 @ +/-7.5 mm,
8 Hz to 500 Hz @ 2 gn

HUMIDITY

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

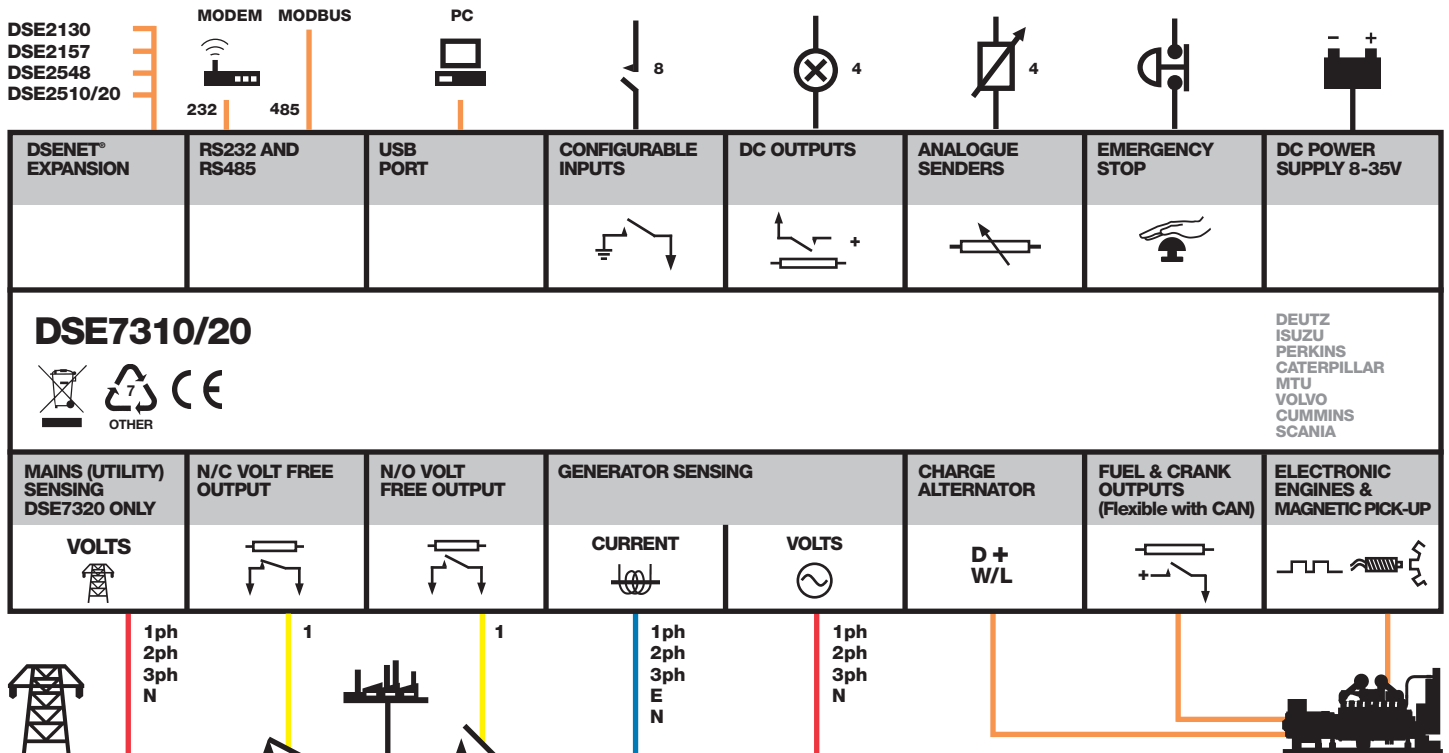
SHOCK

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 supplied sealing gasket.

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



DSE7310/20

AUTO START & AUTO MAINS FAILURE CONTROL MODULES

FEATURES



DSE7310



KEY FEATURES

- 4-Line back-lit LCD text display
- Five key menu navigation
- Front panel editing with PIN protection
- Customisable status screens
- Power save mode
- Support for up to three remote display units
- 9 configurable inputs
- 8 configurable outputs
- Flexible sender inputs
- Configurable timers and alarms
- 3 configurable maintenance alarms
- Multiple date and time scheduler
- Configurable event log (250)
- Tier 4 CAN engine support
- Integral PLC editor
- Easy access diagnostic page
- CAN and Magnetic Pick-up/Alt. sensing
- Fuel usage monitor and low fuel alarms
- Charge alternator failure alarm
- Manual speed control (on compatible CAN engines)
- Manual fuel pump control
- Engine exerciser
- "Protections disabled" feature
- kW & kV Ar protection

DSE7320



- Reverse power (kW & kV Ar) protection
- LED and LCD alarm indication
- Power monitoring (kW h, kV Ar, kV A h, kV Ar h)
- Load switching (load shedding and dummy load outputs)
- Automatic load transfer (DSE7320)
- Unbalanced load protection
- Independent Earth Fault trip
- True dual mutual standby with load balancing timer (DSE7310 only)
- USB connectivity
- Backed up real time clock
- Fully configurable via DSE Configuration Suite PC software
- Configurable display languages
- Remote SCADA monitoring via DSE Configuration Suite PC software
- User selectable RS232 and RS485 communications
- Configurable Gencomm pages
- Advanced SMS messaging (additional external modem required)
- Start & stop capability via SMS messaging
- Additional display screens to help with modem diagnostics
- Idle control for starting & stopping.
- DSENet® expansion compatible

KEY BENEFITS

- 132 x 64 pixel ratio display for clarity
- Real-time clock provides accurate event logging
- Multiple date and time scheduler
- Set maintenance periods can be configured to maintain optimum engine performance
- Ethernet communications (via DSE860/865 modules), provides advanced remote monitoring at low cost
- Modules can be integrated into building management systems (BMS)
- Increased input and output expansion capability via DSENet®
- Licence-free PC software
- IP65 rating (with supplied gasket) offers increased resistance to water ingress
- PLC editor allows user configurable functions to meet specific application requirements

SPECIFICATION

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

340 mA at 12 V, 160 mA at 24 V

MAXIMUM STANDBY CURRENT

160 mA at 12 V, 80 mA at 24 V

CHARGE FAIL/EXCITATION RANGE

0 V to 35 V

MAINS (UTILITY) DSE7320 ONLY

VOLTAGE RANGE
15 V - 333 V AC (L-N)

FREQUENCY RANGE

3.5 Hz to 75 Hz

OUTPUTS

OUTPUT A (FUEL)

15 A DC at supply voltage

OUTPUT B (START)

15 A DC at supply voltage

OUTPUTS C & D

8 A 250 V (Volt free)

AUXILIARY OUTPUTS E,F,G,H

2 A DC at supply voltage

GENERATOR

VOLTAGE RANGE

15 V - 333 V AC (L-N)

FREQUENCY RANGE

3.5 Hz to 75 Hz

MAGNETIC PICK UP

VOLTAGE RANGE

+/- 0.5 V to 70 V

FREQUENCY RANGE

10,000 Hz (max)

DIMENSIONS

OVERALL

240 mm x 181 mm x 42 mm
9.4" x 7.1" x 1.6"

PANEL CUT-OUT

220 mm x 160 mm
8.7" x 6.3"

MAXIMUM PANEL THICKNESS

8 mm
0.3"

RELATED MATERIALS

TITLE

DSE7310 Installation Instructions
DSE7320 Installation Instructions
DSE7200/7300 Quick Start Guide
DSE7200/7300 Operator Manual
DSE7200/7300 Configuration Suite PC Manual

PART NO'S

053-028
053-029
057-101
057-074
057-077

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