FUSTEQ Series

DIESEL GENERATOR
GROUPE ELECTROGENE DIESEL
GRUPO ELECTROGENO DIESEL
GRUPPO ELETTROGENO DIESEL

MODEL
MODELE
MODELO
MODELLO

CU901FQ

POWERED BY

Cummins

mecc alte

ULTRA SILENT SERIES

GENERATING SET PERFORMANCE PERFORMANCES DU GROUPE PRESTACIONES DEL GRUPO PRESTAZIONI DEL GRUPPO		50 Hz		60 Hz	
Voltage Voltage Voltaje Tensione		V	400 / 230	V	480/277
Continuous Power Puissance service continue Potencia servicio continuo Potenza servizio continuo	PRP	kVA	**800**	kVA	**910**
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	LTP	kVA	**880**	kVA	**1000**
Continuous Power Puissance service continue Potencia servicio continuo Potenza servizio continuo	PRP	kWe	640	kWe	728
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	LTP	kWe	704	kWe	800
Power factor Facteur de puissance Factor de potencia Fattore di potenza	cos φ		0,8		0,8
Fuel consumption Consommation combustible Consumo de combustible Consumo combustibile	70 %	l/h	108,3	l/h	121
Noise level Niveau de bruit Nivel de ruido Livello rumorosità	dB(A)@7m	61dB(A) without load			
Limit ambient temperature Limite de la température ambiante Limite de la temperatura ambiente Limite di temperatura ambientale		55°C minimum			

ENGINE MOTEUR MOTOR MOTORE		CUMMINS			QSK23G3		
PERFORMANCE PERFORMANCES PRESTACIONES PRESTAZIONI		**1500 rpm**			**1800 rpm**		
Continuous Power Puissance service continue Potencia servicio continuo Potenza servizio continuo	PRP	kWm	693,4		kWm	796,2	
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	LTP	kWm	750,4		kWm	877,2	
Specific fuel consumption Consommation spécifique combustible Consumo especifico de combustibile Consumo specifico combustibile		g/kWh	25 % 50 % 75 % 100 %	223 206 196 195	g/kWh	25 % 50 % 75 % 100 %	236 204 195 199
Derating for temperature Déclassement pour temperature Declasamiento para temperatura Declassamento per temperatura		0÷40°C/1200 m >40°C	0 20%/10°C		0÷40°C/600 m >40°C	0 7%/10°C	
Derating for altitude Déclassement pour altitude Declasamiento para altitud Declassamento per altitudine		0÷3100 m/25°C >3100 m	0 3,4%/300 m		0÷1450 m/25°C >1450 m	0 5%/300 m	
Diesel 4 Stroke – Injection type Diesel 4 temps – Type injection Diesel 4 tiempos – Tipo de inyeccion Diesel a 4 tempi – Tipo di iniezione							Direct Directe Directa Diretta
Aspiration type Type d'aspiration Tipo de aspiracion Tipo d'aspirazione							Turbocharged Suralimentée Sobrealimentado Sovralimentata
Cooling system Refroidissement Sistema de refrigeracion Raffreddamento							Water Eau Agua Acqua
Speed governor Régulateur de tours Regulador Regolatore di giri							Electronic Electronique Electronico Elettronico
Cylinders, numbers and arrangement Nombre et disposition des cylindres Cilindros, numero y disposicion Numero e disposizione dei cilindri							6 L
Total displacement Cylindrée totale Cilindrata total Cilindrata totale					cm^3		23.100
Bore x stroke Alésage x course Diametro x carrera Alesaggio x corsa					mm		170 x 170
Compression ratio Rapport de compression Relación de compresión Rapporto di compressione							16.0 :1
Engine electric system voltage Voltage système électrique moteur Voltaje sistema eléctrico motor Voltaggio sistema elettrico motore							24 V

ALTERNATOR ALTERNATEUR ALTERNADOR ALTERNATORE		MECCALTE		
PERFORMANCE **PERFORMANCES** **PRESTACIONES** **PRESTAZIONI**		**1500 rpm**		**1800 rpm**
Model Modèle Modelo Modello		ECO43-1SN/4		ECO43-1SN/4
Continuous Power Puissance service continue Potencia servicio continuo Potenza servizio continuo	40 °C	kVA **800** kWe 640		KVA **960** kWe 768
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	40 °C	KVA **840** kWe 672		KVA **1008** kWe 806
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	27 °C	KVA **874** kWe 699		KVA **1050** kWe 840
Efficiency Rendement Eficienza Efficienza		2/4 93,9 % 3/4 95,3 % 4/4 95,1 %		2/4 94,4 % 3/4 95,6 % 4/4 95,3 %
Standard winding connections Liaison des bobinages Tipo de conexiòn Collegamento avvolgimenti		Y		YY
Exciter Eccitatrice Excitador Eccitatrice	**brushless** rotating exciter design with solid state pivotante **sans brosses** avec pont de diodes pivotants puente de diodos **sin escobillas** rotantes rotante **senza spazzole** con ponte di diodi rotanti			
Poles Poles Polos Poli				4
Phases Phases Fases Fasi				3 + N
Wires Fils Hilos Morsetti				12
Voltage reguletion Regulation Voltage Regulación voltaje Regolazione tensione				± 1%
Insulation class Classe d' isolation Classe de aislamiento Classe di isolamento				H
Enclosure Degré de protection mécanique Grado de protecciòn mecanica Grado di protezione meccanica				IP 21
Air Volume Volume d'air Volumen de aire Volume d'aria			50 Hz 60 Hz	90 m^3/min 108 m^3/min
Standard AVR model Modèle AVR standard Modelo AVR standard Modello AVR standard				**DER-1**
Derating for temperature Déclassement pour temperature Declasamiento para temperatura Declassamento per temperatura			0 ÷ 40°C > 40 °C	0 3 % / 5°C
Derating for altitude Déclassement pour altitude Declasamiento para altitud Declassamento per altitudine			0 ÷ 1000 m 1000 ÷ 2500 m 2500 ÷ 3000 m	0 3% / 500 m 4% / 500 m

LOGISTIC INFORMATION
INFORMATIONS LOGISTIQUES
INFORMATION LOGISTICA
INFORMAZIONI LOGISTICHE

	Integrated fuel tank capacity Capacité reservoir intergré Capacidad Tanque integrado Capacità Serbatoio integrato		Weight Poids Peso Peso	Dimensions Cotes d'encombrement Medidas externas Dimensioni d'ingombro		
	STD	*EXTRA1*	(kg)	(cm)		
	(L.)			L	W	H
SOUND PROOF VERSION VERSION INSONORISEE VERSION INSONORISADA VERSIONE INSONORIZZATA	1700	ON REQUEST	11960	585	228	255

GENSET STANDARD EQUIPMENT
EQUIPEMENT STANDARD GROUPE ELECTROGENE
EQUIPAMIENTO STANDARD GRUPO ELECTROGENO
EQUIPAGGIAMENTO STANDARD GRUPPO ELETTROGENO

GB	F	E	I
✓ Cummins engine ✓ Cooling system with electric fans controlled by Inverter ✓ Fully bunded fuel tank ✓ Vibration dampers ✓ Manual autostart control panel **ACP7310AUS** with circuit breaker and hardwire busbars ✓ Air filter ✓ Fork lift guides ✓ Residential silencer	✓ Moteur Cummins ✓ Système de refroidissement avec ventilateurs électriques commandés par Inverter ✓ Bac de rétention ✓ Amortisseurs de vibration ✓ Démarrage manuel autostart **ACP7310AUS** avec disjoncteur de protection et bornier de puissance ✓ Filtre à air ✓ Supports pour fourches ✓ Silencieux résidentielle	✓ Motor Cummins ✓ Sistema de refrigeración con Ventiladores eléctricos controlados para Inverter ✓ Tanque del combustible con sistema de recolección de líquidos ✓ Sistema de amortiguación anti-vibrante ✓ Cuadro manual autostart **ACP7310AUS** con interruptor magnetotérmico y borne de potencia ✓ Filtre de aire ✓ Supportes para carrettilla ✓ Silenciador residencial	✓ Motore Cummins ✓ Sistema di raffreddamento con ventole elettriche controllate da tecnologia Inverter ✓ Serbatoio con vasca di raccolta liquidi ✓ Anti vibranti ✓ Quadro di comando manuale autostart **ACP7310AUS** con interruttore magnetotermico e morsettiera di potenza ✓ Filtro aria ✓ Porta forche ✓ Marmitta residenziale

MANUAL AUTOSTART CONTROL PANEL
COFFRET ELECTRIQUE MANUEL AUTOSTART
CUADRO ELECTRICO MANUAL AUTOSTART
QUADRO ELETTRICO MANUALE AUTOSTART

ACP 7310 AUS

1250 A (400 V - 3 ph - 50Hz - 1500 rpm)
1250 A (480 V - 3 ph - 60Hz - 1800 rpm)

STANDARD EQUIPMENT:	EQUIPEMENT STANDARD:	EQUIPAMIENTO STANDARD:	EQUIPAGGIAMENTO STANDARD:
4 poles circuit breaker	Disjoncteur de protection 4 pôles	Interruptor magnetotermico 4 polos	Interruttore magnetotermico 4 poli
Electronic control board **DSE 7310**	Fiche électronique **DSE 7310**	Carta electronica **DSE 7310**	Scheda elettronica **DSE 7310**
Control panel box key	Clé pour serrure du coffret	Llave cuadro	Chiave quadro
Emergency Stop button	Interrupteur d'arrêt d'émergence	Botón de parada de emergencia	Pulsante di arresto di emergenza

DSE 7310

CONTROL BOARD
CARTE ELECTRONIQUE DE CONTROL
CARTA ELECTRONICA DE CONTROL
SCHEDA ELETTRONICA DI CONTROLLO

PROTECTIONS	PROTECTIONS	PROTECCIONES	PROTEZIONI
Low oil pressure	Basse pression huile moteur	Baja presión aceite	Bassa pressione olio
High engine temperature	Haute température moteur	Elevada temperatura motor	Alta temperatura motore
Low fuel level	Basse niveau combustible	Baja nivel carburante	Basso livello di carburante
Fail to start	Non démarrage	Falta de arranque	Mancato avviamento
Fail to stop	Non arrêt	Falta de parada	Mancato arresto
Emergency stop	Arrêt d'urgence	Parada de emergencia	Stop d'emergenza
Over/under generator frequency	Sur/sous génératéu fréquence	Sobre/bajo generatore frecuencia	Sovra/sotto frequenza generatore
Over/under generator voltage	Sur/sous génératéu voltage	Sobre/bajo generatore voltaje	Sovra/sotto voltaggio generatore
Over/under speed	Sur/sourvitesse	Sobre/bajo velocitad	Sovra/sotto velocità
Fuel level	Niveau de combustible	nivel de combustibile	Livello del carburante
Belt breakage	Rupture courroie	Ruptura correa	Rottura cinghia
Over current	Surcourant	Corriente maxima	Sovracorrente
Over/under battery voltage	Sur/sus la tension de batterie	Sobre/bajo voltaje de la batería	Sovra/sotto tensione della batteria
DIGITAL METERS	**VOYANT NUMERIQUE POUR**	**VISOR DIGITAL PARA**	**MISURATORE DIGITALE PER**
Generator volts (3 phases)	Voltmètre générateur (3 phases)	Voltimetro (3 fases)	Voltmetro tensione generatore (3 fasi)
Generator amperes (3 phases)	Ampèremètre générateur (3 phases)	Amperimetro (3 fases)	Amperometro generatore (3 fasi)
Generator frequency	Fréquencemètre générateur	Frecuencimetro	Frequenzimetro generatore
KW-meter	KW-mètre	KW- metro	KW- metro
kVA-meter	kVA- mètre	kVA- metro	kVA- metro
Cos φ- meter	Cos φ- mètre	Cos φ-metro	Cos φ-metro
Rpm meter	Tm mètre	Revolutiones por minuto metro	Gm metro
Gen set hours counter	Totalisateur d'heures de marche	Medida horas de marcha	Contaore di funzionamento gruppo
Battery Volts	Voltmètre batterie	Voltimetro batería	Voltmetro batteria

AUTOMATIC CONTROL PANEL
COFFRET ELECTRIQUE AUTOMATIQUE
CUADRO ELECTRICO AUTOMATICO
QUADRO ELETTRICO AUTOMATICO

1) **ACP 7320 ATS**

COMPLETE CONTROL PANEL FREE STANDING TYPE
Equipment: control board, circuit breaker, battery charger, transfer switch, box key.

COFFRET ELECTRIQUE COMPLET TYPE ARMOIRE SEPARE DU GROUPE
Equipement : carte électronique de contrôle, disjoncteur de protection, chargeur de batterie, inverseur de source, clé coffret.

CUADRO ELECTRICO COMPLETO EN ARMARIO SEPARADO DEL GRUPO
Equipamiento: carta electronica de controllo, interruptor magnetotermico, cargador de bateria, transferencial, llave quadro.

QUADRO ELETTRICO COMPLETO SEPARATO DAL GRUPPO
Equipaggiamento: scheda elettronica di controllo, interruttore magnetotermico, carica batteria, telecommutazione e chiave quadro.

2) **ACP 7320 AMF**

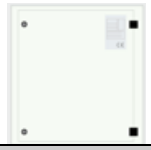
AMF CONTROL PANEL FITTED ON THE GEN-SET WITHOUT TRANSFER SWITCH
Equipment: control board, circuit breaker, battery charger, box key.

COFFRET ELECTRIQUE MONTE SUR LE GROUPE SANS INVERSEUR DE SOURCE
Equipement : carte électronique de contrôle, disjoncteur de protection, chargeur de batterie, clé coffret.

CUADRO ELECTRICO MONTADO SOBRE EL GRUPO SIN TRANSFERENCIAL
Equipamiento: carta electronica de controllo, interruptor magnetotermico, cargador de bateria, llave quadro.

QUADRO ELETTRICO MONTATO SUL GRUPPO ELETTROGENO SENZA TELECOMMUTAZIONE
Equipaggiamento: scheda elettronica di controllo, interruttore magnetotermico, carica batteria, chiave quadro.

3) **ACP 7320 STS**



CONTROL PANEL FITTED ON THE GEN-SET WITH TRANSFER SWITCH SUPPLIED IN A SEPARATED BOX
Equipment: control board, circuit breaker, battery charger, box key, separate transfer switch.

COFFRET ELECTRIQUE MONTE SUR LE GROUPE + INVERSEUR DE SOURCE FOURNI DANS UN COFFRET SEPARE
Equipement : carte électronique de contrôle, disjoncteur de protection, chargeur de batterie, inverseur de source separé, clé coffret.

CUADRO ELECTRICO MONTADO SOBRE EL GRUPO CON TRANSFERENCIAL SEPARADO
Equipamiento: carta electronica de controllo, interruptor magnetotermico, cargador de bateria, llave quadro, transferencial separado.

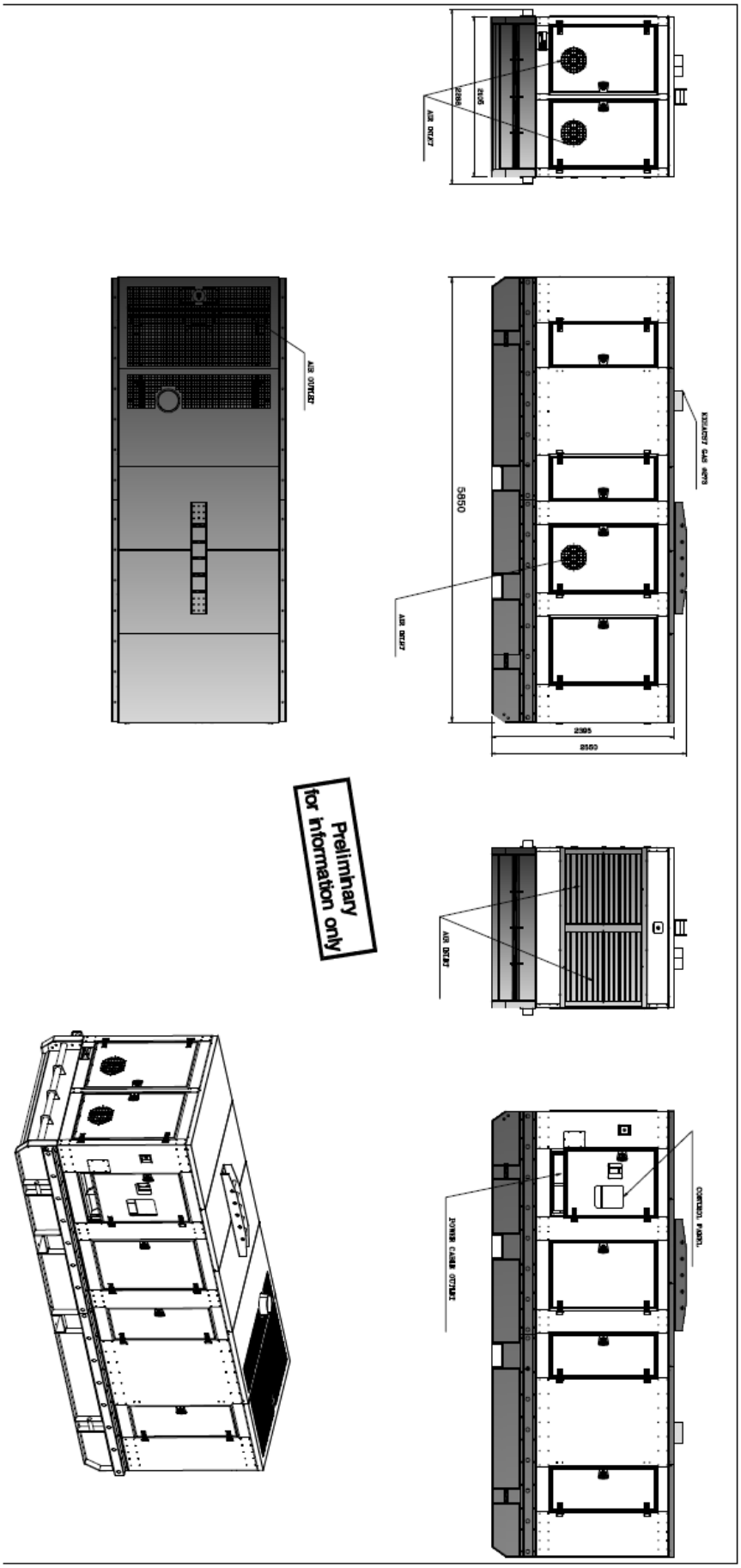
QUADRO ELETTRICO MONTATO SUL GRUPPO ELETTROGENO CON TELECOMMUTAZIONE SEPARATA
Equipaggiamento: scheda elettronica di controllo, interruttore magnetotermico, carica batteria, chiave quadro, telecommutazione in armadio separato.

DSE 7320

CONTROL BOARD
CARTE ELECTRONIQUE DE CONTROL
CARTA ELECTRONICA DE CONTROL
SCHEDA ELETTRONICA DI CONTROLLO

GB	F	E	I
The DSE7320 is an Automatic Mains Failure Control Module designed to automatically start and stop diesel generating sets that include electronic and non electronic engines. The module also provides excellent genset monitoring and protection features.	La DSE7320 est une carte de contrôle projetée pour démarrer et arrêter automatiquement groupes électrogènes diesels avec moteurs électroniques et non électroniques. La carte représente un système excellent de contrôle et de protection du groupe électrogène.	La DSE7320 es una carta de control para arranquar y parar automáticamente grupos electrógenos diesel con motores electrónicos y no electrónicos. La carta constituye un excelente sistema de control y protección del grupo electrógeno.	La DSE7320 è una scheda di controllo progettata per avviare e arrestare automaticamente gruppi elettrogeni diesel con motori elettronici e non elettronici. La scheda costituisce un eccellente sistema di controllo e di protezione del gruppo elettrogeno.
FEATURES	**EQUIPEMENT**	**EQUIPMENT**	**EQUIPAGGIAMENTO**
Stop/reste – Auto – Manual – Start	Fiche électronique de contrôle DSE7320	Ficha electrónica de control DSE7320	Scheda elettronica di controllo DSE7320
LCD display scroll	Disjoncteur de protection	Interruptor magnetorermico	Interruttore magnetotermico
Event log view	Chargeur de batterie	Cargador de batería	Carica batteria
Acustic alarm	Bouton poussoir arrête d'émergence	Boton de parada de emergencia	Pulsante stop emergenza
DIGITAL MEASURING	**MESURES NUMERIQUES**	**MEDIDAS DIGITALES**	**MISURAZIONI DIGITALI**
Generator volts (3 phases)	Voltmètre générateur (3 phases)	Voltimetro (3 fases)	Voltmetro tensione generatore (3 fasi)
Generator amperes (3 phases)	Ampèremètre générateur (3 phases)	Amperimetro (3 fases)	Amperometro generatore (3 fasi)
Generator frequency	Fréquencemètre générateur	Frecuencimetro	Frequenzimetro generatore
KW-meter	KW-mètre	KW- metro	KW- metro
kVA-meter	kVA- mètre	kVA- metro	kVA- metro
Cos φ- meter	Cos φ- mètre	Cos φ-metro	Cos φ-metro
Rpm meter	Tm mètre	Revolutiones por minuto metro	Gm metro
Water temperature (optional)	Température eau (facultatif)	Termometro agua (opcional)	Temperatura acqua (facoltativo)
Oil pressure (optional)	Pression huile (facultatif)	Presión aceite (opcional)	Pressione olio (facoltativo)
Gen set hours counter	Totalisateur d'heures de marche	Medida horas de marcha	Contaore di funzionamento gruppo
Mains volts	Voltmètre secteur	Voltimetro tensión de red	Voltmetro tensione rete
Battery volts	Voltmètre batterie	Voltimetro batería	Voltmetro batteria
Mains frequency	Fréquence réseau	Frequencia red	Frequenza rete
Charging voltage	Tension de charge	Tensión de carga	Tensione di carica
Start-counter	Compteur démarrages	Numero de arranques	Contavviamenti
Fuel level %	Niveau combustible %	Nivel carburante %	Livello carburante %
INDICATORS	**INDICATEURS**	**INDICADORES**	**INDICATORI**
Mains live	Présence secteur	Presencia tensión de red	Presenza tensione di rete
Generator live	Présence tension générateur	Presencia tensión grupo	Presenza tensione generatore
Mains contactor closed	Inverseur secteur fermé	Transferencial red cerrado	Erogazione da rete
Generator contactor closed	Inverseur générateur fermé	Transferencial grupo cerrado	Erogazione da gruppo
Engine running	Moteur en marche	Motor en marcha	Motore avviato
PROTECTIONS	**PROTECTIONS**	**PROTECCIONES**	**PROTEZIONI**
Low oil pressure	Bas pression huile moteur	Baja presión aceite	Bassa pressione olio
High engine temperature	Haute température moteur	Elevada temperatura motor	Alta temperatura motore
Low fuel level	Bas niveau combustible	Baja nivel carburante	Basso livello di carburante
Fail to start	Non démarrage	Falta de arranque	Mancato avviamento
Fail to stop	Non arrêt	Falta de parada	Mancato arresto
Emergency stop	Arrêt d'urgence	Parada de emergencia	Stop d'emergenza
Over/under frequency	Sur/sous fréquence	Sobre/bajo frecuencia	Sovra/sotto frequenza
Over/under voltage	Sur/sous voltage	Sobre/bajo voltaje	Sovra/sotto voltaggio
Over/under speed	Sur/sous vitesse	Sobre/bajo velocitad	Sovra/sotto velocità
Fuel level	Niveau de combustible	nivel de combustibile	Livello del carburante
Belt breakage	Rupture courroie	Ruptura correa	Rottura cinghia
Over current	Surcourant	Corriente maxima	Sovracorrente
Over/under battery voltage	Sur/sus la tension de batterie	Sobre/bajo voltaje de la batería	Sovra/sotto tensione della batteria

SOUND PROOF VERSION DRAWING
DESSIN VERSION INSONORIZEE
DIBUJO VERSION INSONORISADA
DISEGNO VERSIONE INSONORIZZATA



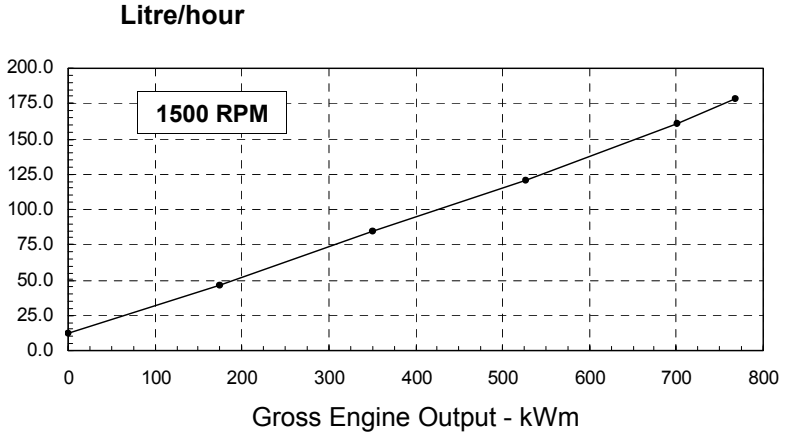
Cummins Inc.	Basic Engine Model: QSK23-G3 NR1	Curve Number: FR-50011	G-DRIVE QSK 1
Columbus, Indiana 47201	Engine Critical Parts List: CPL: 8352	Date: 5May03	
Engine Data Sheet			

Displacement : **23.15** litre (**1413** in^3)	Bore : **170** mm (**6.69** in.) Stroke : **170** mm (**6.69** in.)
No. of Cylinders : **6**	Aspiration : **Turbocharged and Air to Air Aftercooled**

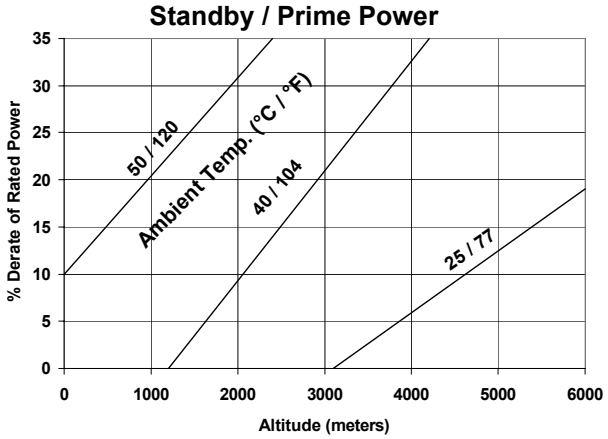
Engine Speed	Standby Power		Prime Power		Continuous Power	
RPM	kWm	BHP	kWm	BHP	kWm	BHP
1500	768	1030	701	940	537	720
1800	895	1200	809	1085	652	875

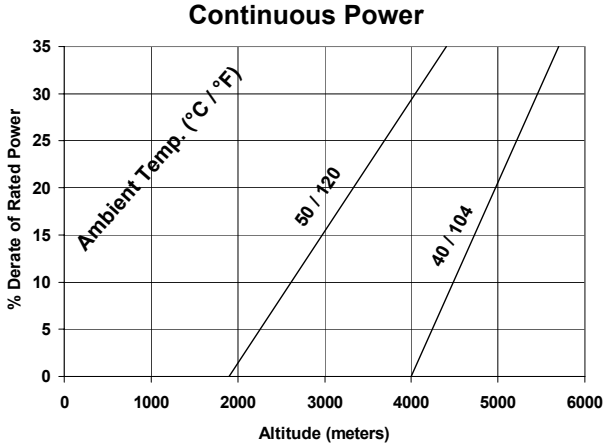
Engine Performance Data @ 1500 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm·h	lb/ BHP·h	litre/ hour	U.S. Gal/ hour
STANDBY POWER						
100	768	1030	0.197	0.323	178	46.9
PRIME POWER						
100	701	940	0.195	0.321	161	42.5
75	526	705	0.196	0.322	121	32.0
50	351	470	0.206	0.338	85	22.4
25	175	235	0.223	0.370	46	12.2
CONTINUOUS POWER						
100	537	720	0.198	0.326	125	33.1



Power Derate Curves @ 1500 RPM





Operation At Elevated Temperature And Altitude:

For sustained operation above these conditions, derate by an additional 3.4% per 300 m (1000 ft), and 20% per 10° C (18° F).

CONVERSIONS:(litres = U.S. Gal x 3.785) (U.S.Gal = litres x 0.2642)

Data Subject to Change Without Notice

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. **STANDBY POWER RATING:** Applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the Standby Power rating. This rating should be applied where reliable utility power is available. A Standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency. **PRIME POWER RATING:** Applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories:**UNLIMITED TIME RUNNING PRIME POWER:** Prime Power is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours. The total operating time at 100% Prime Power shall not exceed 500 hours per year. A 10% overload capability is available for a period of 1 hour within a 12-hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year. **LIMITED TIME RUNNING PRIME POWER:** Limited Time Prime Power is available for a limited number of hours in a non-variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating.**CONTINUOUS POWER RATING**: Applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

Reference AEB 10.47 for determining Electrical Output.

Data shown above represent gross engine performance capabilities obtained and corrected in accordance with ISO-3046 conditions of 100 kPa (29.53 in Hg) barometric pressure [110 m (361 ft) altitude], 25 °C (77 °F) air inlet temperature, and relative humidity of 30% with No. 2 diesel or a fuel corresponding to ASTM D2.
Derates shown are based on 15 in H_20 air intake restriction and 2 in Hg exhaust back pressure.

The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/U.S. gal). Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

Data Status: Limited Production

Data Tolerance: ± 5%

Chief Engineer:

D K. Trueblood

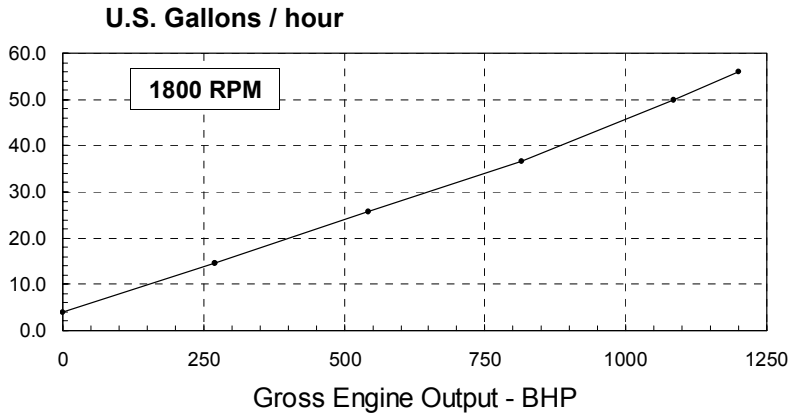
Cummins Inc.	Basic Engine Model: QSK23-G3 NR1	Curve Number: FR-50011	G-DRIVE QSK 2
Columbus, Indiana 47201	Engine Critical Parts List: CPL: 8352	Date: 5May03	
Engine Data Sheet			

Displacement : **23.15** litre (**1413** in^3)	Bore : **170** mm (**6.69** in.) Stroke : **170** mm (**6.69** in.)
No. of Cylinders : **6**	Aspiration : **Turbocharged and Air to Air Aftercooled**

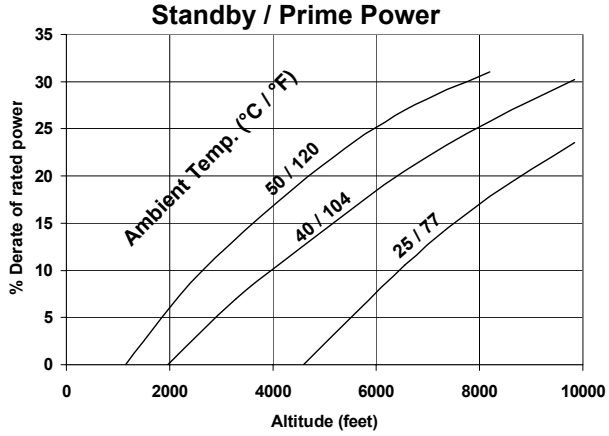
Engine Speed	Standby Power		Prime Power		Continuous Power	
RPM	kWm	BHP	kWm	BHP	kWm	BHP
1500	768	1030	701	940	537	720
1800	895	1200	809	1085	652	875

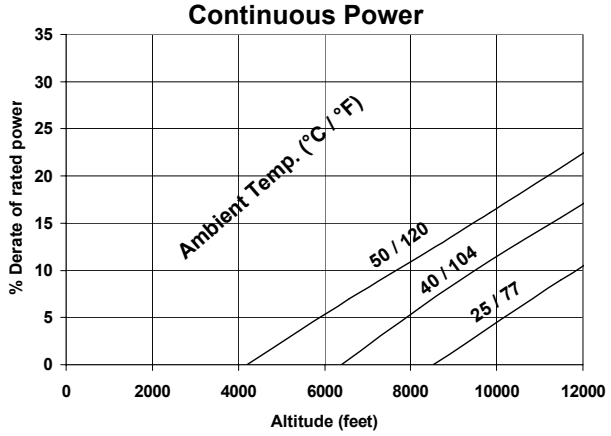
Engine Performance Data @ 1800 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm·h	lb/ BHP·h	litre/ hour	U.S. Gal/ hour
STANDBY POWER						
100	895	1200	0.201	0.332	212	56.1
PRIME POWER						
100	809	1085	0.199	0.326	189	49.8
75	607	814	0.195	0.320	139	36.7
50	405	543	0.204	0.336	97	25.7
25	202	271	0.236	0.385	56	14.7
CONTINUOUS POWER						
100	653	875	0.194	0.320	149	39.4



Power Derate Curves @ 1800 RPM





Operation At Elevated Temperature And Altitude:

For sustained operation above these conditions, derate by an additional 5.0% per 300 m (1000 ft), and 7% per 10^o C (18^o F).

CONVERSIONS:(litres = U.S. Gal x 3.785) (U.S.Gal = litres x 0.2642)

Data Subject to Change Without Notice

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. **STANDBY POWER RATING:** Applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the Standby Power rating. This rating should be applied where reliable utility power is available. A Standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency. **PRIME POWER RATING:** Applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories:**UNLIMITED TIME RUNNING PRIME POWER:** Prime Power is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours. The total operating time at 100% Prime Power shall not exceed 500 hours per year. A 10% overload capability is available for a period of 1 hour within a 12-hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year. **LIMITED TIME RUNNING PRIME POWER:** Limited Time Prime Power is available for a limited number of hours in a non-variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating.**CONTINUOUS POWER RATING**: Applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

Reference AEB 10.47 for determining Electrical Output.

Data shown above represent gross engine performance capabilities obtained and corrected in accordance with ISO-3046 conditions of 100 kPa (29.53 in Hg) barometric pressure [110 m (361 ft) altitude], 25 °C (77 °F) air inlet temperature, and relative humidity of 30% with No. 2 diesel or a fuel corresponding to ASTM D2.
Derates shown are based on 15 in H_20 air intake restriction and 2 in Hg exhaust back pressure.

The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/U.S. gal). Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

Data Status: Limited Production

Data Tolerance: ± 5%

Chief Engineer:

D K. Trueblood

Cummins Inc.
Engine Data Sheet

ENGINE MODEL : **QSK23-G3 NR1** **CONFIGURATION NUMBER :** D893001GX03

DATA SHEET : LP-50011
DATE : 5May03
PERFORMANCE CURVE : FR-50011

INSTALLATION DIAGRAM
• Fan to Flywheel : 3170553

CPL NUMBER
• Engine Critical Parts List : 8352

GENERAL ENGINE DATA

Type		Inline 6-Cylinder Diesel	
Aspiration		Turbocharged and Low Temperature Aftercooled	
Bore x Stroke	— mm x mm (in x in)	170 x 170 (6.69 x 6.69)	
Displacement	— litre (in^3)	23.15 (1413)	
Compression Ratio		16.0:1	
Dry Weight			
Fan to Flywheel Engine	— kg (lb)	2755	(6060)
Wet Weight			
Fan to Flywheel Engine	— kg (lb)	2805	(6170)
Moment of Inertia of Rotating Components			
• with (SAE 0)	— kg • m^2 (lb_m • ft^2)	11.6	(270)
Center of Gravity from Front Face of Block	— mm (in)	725	(28.5)
Center of Gravity Above Crankshaft Centerline	— mm (in)	240	(9.5)
Maximum Static Loading at Rear Main Bearing	— kg (lb)	990	(2160)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	— N • m (lb • ft)	3205	(2340)

EXHAUST SYSTEM

Maximum Back Pressure	— mm Hg (in Hg)	76.2	(3)

AIR INDUCTION SYSTEM

Maximum Intake Air Restriction:			
• with Dirty Filter Element	— mm H_2O (in H_2O)	635	(25)
• with Clean Filter Element	— mm H_2O (in H_2O)	381	(15)

COOLING SYSTEM

Coolant Capacity — Engine Only	— litre (US gal)	46.5	(12.3)
Minimum Pressure Cap	— kPa (psi)	69	(10)
Jacket Water Circuit Requirements			
Maximum Static Head of Coolant Above Engine Crank Centerline	— m (ft)	18.3	(60)
Standard Thermostat (Modulating) Range	— °C (°F)	82 - 95	(180 - 203)
Maximum Top Tank Temperature for Standby . Prime Power	— °C (°F)	104 - 100	(220 - 212)
Maximum Coolant Friction Head External to the Engine - 1800 RPM	— kPa (psi)	48	(7)
-1500 RPM	— kPa (psi)	34	(5)
Air-to-Air Core Requirements			
Maximum Temp. Rise Between Engine Air Intake and Intake Manifold —1500 / 1800 rpm	— °C (°F)	33	(60)
Maximum Air Press. Drop from Turbo Air Outlet to Intake Manifold — 1500 / 1800 rpm	— mm Hg (in Hg)	102	(4)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed	— kPa (psi)	145	(21)
@ Governed Speed	— kPa (psi)	345 - 448	(50 - 65)
Maximum Oil Temperature	— °C (°F)	120	(248)
Oil Capacity with OP TBD Oil Pan : Low - High	— litre (US gal)	66 - 95	(17 - 25)
Total System Capacity (With Combo Filters)	— litre (US gal)	74 - 103	(19 - 27)

FUEL SYSTEM

Type Injection System		Cummins HPI-PT	
Maximum Restriction at Fuel Injection Pump	— with Clean Fuel Filter — mm Hg (in Hg)	120	(4.0)
	— with Dirty Fuel Filter — mm Hg (in Hg)	203	(8.0)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head)	— mm Hg (in Hg)	229	(9.0)
Maximum Inlet Temperature	— °C (°F)	70	(160)
Maximum Fuel Flow to Injection Pump	— litre / hr (US gph)	684	(181)
Maximum Drain Flow	— litre / hr (US gph)	662	(175)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement)	— volt	24
Battery Charging System, Negative Ground	— ampere	35
Maximum Allowable Resistance of Cranking Circuit	— ohm	0.002
Minimum Recommended Battery Capacity		
• Cold Soak @ 10 °C (50 °F) and Above	— 0°F CCA	1200
• Cold Soak @ 0 °C to 10 °C (32 °F to 50 °F)	— 0°F CCA	1280
• Cold Soak @ -18 °C to 0 °C (0 °F to 32 °F)	— 0°F CCA	1800

COLD START CAPABILITY

Minimum Ambient Temperature for Cold Start with 1500 watt Coolant Heater to Rated Speed	— °C (°F)	-30	(-22)
Minimum Ambient Temperature for Unaided Cold Start to Idle Speed	— °C (°F)	0	(32)
Minimum Ambient Temperature for NFPA 110 Cold Start (90° F Minimum Coolant Temperature)	— °C (°F)	10	(50)

PERFORMANCE DATA

All data is based on:

- Engine operating with fuel system, water pump, lubricating oil pump, air cleaner and exhaust silencer; not included are battery charging alternator, fan, and optional driven components.
- Engine operating with fuel corresponding to grade No. 2-D per ASTM D975.
- ISO 3046, Part 1, Standard Reference Conditions of:

Barometric Pressure : 100 kPa (29.53 in Hg)		Air Temperature : 25 °C (77 °F)	
Altitude : 110 m (361 ft)		Relative Humidity : 30%	
Air Intake Restriction : 381 mm H_2O (15 in H_2O)		Exhaust Restriction : 51 mm Hg (2 in Hg)	

Steady State Stability Band at any Constant Load	— %	+/- 0.25	
Estimated Free Field Sound Pressure Level of a Typical Generator Set; Excludes Exhaust Noise; at Rated Load and 7.5 m (24.6 ft); @1500 rpm	— dBA	TBD	
Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45°	— dBA	TBD	

	STANDBY POWER 60 hz		STANDBY POWER 50 hz		PRIME POWER 60 hz		PRIME POWER 50 hz	
Governed Engine Speed — rpm	1800		1500		1800		1500	
Engine Idle Speed — rpm	750		750		750		750	
Gross Engine Power Output — kW_m (BHP)	895	(1200)	768	(1030)	809	(1085)	701	(940)
Brake Mean Effective Pressure — kPa (psi)	2600	(377)	2675	(388)	2350	(341)	2441	(354)
Piston Speed — m / s (ft / min)	10.3	(2010)	8.6	(1675)	10.3	(2010)	8.6	(1675)
Friction Horsepower — kW_m (HP)	93	(124)	72	(96)	93	(124)	72	(96)
Engine Jacket Water Flow at Stated Friction Head External to Engine:								
• 3 psi Friction Head — litre / s (US gpm)	10.4	(165)	7.6	(120)	10.4	(165)	7.9	(126)
• Maximum Friction Head — litre / s (US gpm)	10.1	(160)	7.6	(120)	10.1	(160)	7.6	(120)
Engine Data								
Intake Air Flow — litre / s (cfm)	1132	(2398)	888	(1882)	1094	(2318)	815	(1720)
Exhaust Gas Temperature — °C (°F)	514	(957)	543	(1010)	467	(872)	532	(990)
Exhaust Gas Flow — litre / s (cfm)	3056	(6475)	2463	(5218)	2773	(5875)	2259	(4786)
Air-to-Fuel Ratio — air : fuel	25.5 : 1		23.8 : 1		27.6 : 1		25.3 : 1	
Radiated Heat to Ambient — kW_m (BTU / min)	85	(4862)	71	(4058)	76	(4313)	65	(3682)
Heat Rejection to Jacket Water Coolant — kW_m (BTU / min)	269	(15305)	222	(12636)	235	(13358)	215	(12252)
Heat Rejection to Exhaust — kW_m (BTU / min)	656	(37334)	570	(32417)	569	(32392)	507	(28877)
Heat Rejection to Fuel* — kW_m (BTU / min)	9.1	(520)	6.8	(387)	9.1	(520)	6.8	(387)
Charge Air Cooler Heat Rejection — kW_m (BTU / min)	223	(12673)	146	(8329)	198	(11270)	122	(6944)
Turbo Compressor Outlet Temperature — °C (°F)	227	(440)	199	(390)	209	(408)	182	(360)
Turbo Compressor Outlet Pressure — kPa (psi)	283	(41)	248	(36)	269	(39)	214	(31)

* This is the maximum heat rejection to fuel, which is at low load

N.A. - Not Available
N/A - Not Applicable to this Engine
TBD - To Be Determined

ENGINE MODEL : **QSK23-G3 NR1**
DATA SHEET : DS-50011-LP
DATE : 5May03
CURVE NO. : FR-50011

ECO43N

4 POLE

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CHARACTERISTICS

INDUSTRIAL RATINGS

ambient 40°C

Type	KVA - cosΦ0.8 - 3 Phase continuous							Efficiency		
50 Hz	CL. H (ΔT= 125°C)				CL. F (ΔT= 105°C)			η % CL H(ΔT= 125°C)		
Series Star Y Parallel Star YY Series Delta Δ Parallel Delta ΔΔ	760 380 440 220	800 400 460 230	830 415 480 240	IP45 400 V	760 380 440 220	800 400 460 230	830 415 480 240	2/4	3/4	4/4
ECO43-1SN/4	800	**800**	800	620	730	**730**	730	93,9	95,3	95,1
ECO43-2SN/4	930	**930**	930	730	850	**850**	850	94,4	95,7	95,4
ECO43-1LN/4	1100	**1100**	1100	850	1000	**1000**	1000	94,8	96	95,8
ECO43-2LN/4	1300	**1300**	1300	1000	1200	**1200**	1200	95	96,2	96
ECO43-VL/4	1400	**1400**	1330	1070	1280	**1280**	1210	95,3	96,4	96,2

60 Hz	CL. H (ΔT= 125°C)				CL. F (ΔT= 105°C)			Efficiency η % CL. H (ΔT= 125°C)		
Series Star Y Parallel Star YY Series Delta Δ Parallel Delta ΔΔ	880 440 508 254	920 460 530 265	960 480 554 277	IP45 480 V	880 440 508 254	920 460 530 265	960 480 554 277	2/4	3/4	4/4
ECO43-1SN/4	960	960	**960**	750	870	870	**870**	94,4	95,6	95,3
ECO43-2SN/4	1060	1116	**1116**	876	969	1020	**1020**	94,7	95,8	95,8
ECO43-1LN/4	1260	1320	**1320**	1020	1145	1200	**1200**	95,1	96,1	96
ECO43-2LN/4	1482	1560	**1560**	1200	1368	1440	**1440**	95,2	96,5	96,4
ECO43-VL/4	1700	1700	**1700**	1290	1540	1540	**1540**	95,4	96,7	96,6

STANDBY RATINGS

Type	KVA Temp. Rise / Ambient °C 50 Hz			KVA Temp. Rise / Ambient °C 60 Hz		
	163° / 27°	150° / 40°	125° / 27°	163° / 27°	150° / 40°	125° / 27°
ECO43-1SN/4	874	840	840	1050	1008	1008
ECO43-2SN/4	1016	975	975	1220	1170	1170
ECO43-1LN/4	1201	1150	1150	1442	1380	1380
ECO43-2LN/4	1420	1358	1358	1704	1630	1630
ECO43-VL/4	1520	1470	1470	1824	1765	1765

Type	J (Kgm^2) B3-B14 Form	Weight (Kg)	Air Volume 50 Hz (m^3/min)	Air Volume 60 Hz (m^3/min)	Noise dB(A) 50 Hz 1m	Noise dB(A) 50 Hz 7m	Noise dB(A) 60 Hz 1m	Noise dB(A) 60 Hz 7m
ECO43-1SN/4	17,019	1870	90	108	95	84	99	89
ECO43-2SN/4	18,666	2090						
ECO43-1LN/4	21,521	2395						
ECO43-2LN/4	25,111	2660						
ECO43-VL/4	26,101	2950						

ACCESSORIES

REGULATOR				PARALLEL DEVICE	THERMAL PROTECTION			HEATERS	MECHANICAL PROTECTION		
DSR	DER-1	SR7/2	UVR6		PTC	BIMET. DEVICE	PT100		IP21	IP23	IP45
☐	●	☐	☐	●	☐	☐	☐	☐	●	☐	☐

● = Standard
☐ = Optional

Rating

Available for models SN and LN

INSULATION SYSTEM