

FUSTEQ Series

**DIESEL GENERATOR
GROUPE ELECTROGENE DIESEL
GRUPO ELECTROGENO DIESEL
GRUPPO ELETTROGENO DIESEL**

MODEL
MODELE
MODELO
MODELLO

PK 22 FQ



ULTRA SILENT VERSION



GENERATING SET PERFORMANCE PERFORMANCES DU GROUPE PRESTACIONES DEL GRUPO PRESTAZIONI DEL GRUPPO		50 Hz	60 Hz
Voltage Voltage Voltaje Tensione		V 400 / 230	V --
Continuous Power Puissance service continue Potencia servicio continuo Potenza servizio continuo	PRP	kVA 20,0	kVA --
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	LTP	kVA 22,0	kVA --
Continuous Power Puissance service continue Potencia servicio continuo Potenza servizio continuo	PRP	kWe 16,0	kWe --
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	LTP	kWe 17,6	kWe --
Power factor Facteur de puissance Factor de potencia Fattore di potenza	cos φ	0,8	--
Fuel consumption Consommation combustible Consumo de combustible Consumo combustibile	70 %	l/h 3,6	l/h --
Noise level Niveau de bruit Nivel de ruido Livello rumorosità	dB(A)@7m	52dB(A) at 0% of 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		PERKINS		404A-22G1		
PERFORMANCE PERFORMANCES PRESTACIONES PRESTAZIONI		1500 rpm		1800 rpm		
Continuous Power	PRP	kWm	18,5	kWm	--	
Puissance service continue						
Potencia servicio continuo						
Potenza servizio continuo						
Stand-by Power	LTP	kWm	20,4	kWm	--	
Puissance service secours						
Potencia servicio emergencia						
Potenza servizio in emergenza						
Specific fuel consumption	g/kWh		50 %	258	50 %	--
Consommation spécifique combustible			75 %	238	75 %	--
Consumo específico de combustible			100 %	237	100 %	--
Consumo specifico combustibile			110 %	244	110 %	--
Diesel 4 Stroke – Injection type					Indirect	
Diesel 4 temps – Type injection					Indirecte	
Diesel 4 tiempos – Tipo de inyeccion					Indirecta	
Diesel a 4 tempi – Tipo di iniezione					Indiretta	
Aspiration type					Natural	
Type d’aspiration					Naturel	
Tipo de aspiracion					Natural	
Tipo d’aspirazione					Naturale	
Cooling system					Water	
Refroidissement					Eau	
Sistema de refrigeracion					Agua	
Raffreddamento					Acqua	
Speed governor					Mechanical	
Régulateur de tours					Mécanique	
Regulador					Mecanico	
Regolatore di giri					Meccanico	
Cylinders, numbers and arrangement					4 L	
Nombre et disposition des cylindres						
Cilindros, numero y disposicion						
Numero e disposizione dei cilindri						
Total displacement					cm³	2216
Cylindrée totale						
Cilindrata total						
Cilindrata totale						
Bore x stroke					mm	84.0 x 100.0
Alésage x course						
Diametro x carrera						
Alesaggio x corsa						
Compression ratio					23.3 :1	
Rapport de compression						
Relación de compresión						
Rapporto di compressione						
Engine electric system voltage					12 V	
Voltage système électrique moteur						
Voltaje sistema eléctrico motor						
Voltaggio sistema elettrico motore						
Derating for temperature					0 ÷ 25°C	0
Déclassement pour temperature					> 25 °C	2 % / 10°C
Declasamiento para temperatura						
Declassamento per temperatura						
Derating for altitude					0 ÷ 500 m	0
Déclassement pour altitude					500 ÷ 1500 m	4 % / 500 m
Declasamiento para altitud						
Declassamento per altitudine						
					1500 ÷ 3000 m	6 % / 500 m

ALTERNATOR ALTERNATEUR ALTERNADOR ALTERNATORE		MECCALTE	
PERFORMANCE PERFORMANCES PRESTACIONES PRESTAZIONI		1500 rpm	1800 rpm
Model Modèle Modelo Modello		ECP 28 M/4	
Continuous Power Puissance service continue Potencia servicio continuo Potenza servizio continuo	40 °C	kVA 20,0 kWe 16,0	KVA -- kWe --
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	40 °C	KVA 20,5 kWe 16,4	KVA -- kWe --
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	27 °C	KVA 21,5 kWe 17,2	KVA -- kWe --
Efficiency Rendement Eficienza Efficienza		1/4 2/4 3/4 4/4	--- 87,5 % 89,5 % 89,5 %
Standard winding connections Liaison des bobinages Tipo de conexión Collegamento avvolgimenti		Y	
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 regulation Regulation Voltage Regulación voltaje Regolazione tensione		± 1 %	
Waveform distortion Taux d'harmonique Distorsión forma de onda Distorsione forma d'onda		THD	2/2
Insulation class Classe d' isolation Classe de aislamiento Classe di isolamento		H	
Enclosure Degré de protection mécanique Grado de protección mecánica Grado di protezione meccanica		IP 23	
Maximun overspeed Survitesse Régimen máximo Velocità di fuga		2250 min	
Standard AVR model Modèle AVR standard Modelo AVR standard Modello AVR standard		DSR	
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 ÷ 1500 m 1500 ÷ 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 réservoir intégré Capacidad Tanque integrado Capacità Serbatoio integrato	Weight Poids Peso Peso	Dimensions Cotes d'encombrement Medidas externas Dimensioni d'ingombro
	(L)		(cm)
	STD	EXTRA1	(kg)
SOUND PROOF VERSION VERSION INSONORISEE VERSION INSONORISADA VERSIONE INSONORIZZATA	150	ON REQUEST	1030
			L W H
			195 77 132

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

GB	F	E	I
✓ Lifting eye ✓ Fully bunded fuel tank ✓ Integrated fuel tank ✓ Vibration dampers ✓ One or more electric fans controlled by Inverter VSi ✓ Manual autostart control panel Q7310AUS with circuit breaker ✓ Battery ✓ Ultra silent canopy ✓ Residential silencer ✓ Fork lift guides	✓ Crochet de levage ✓ Bac de rétention ✓ Réservoir intégré ✓ Amortisseurs de vibration ✓ Un ou plusieurs ventilateurs électriques commandés par Inverter VSi ✓ Démarrage manuel autostart Q7310AUS avec disjoncteur de protection ✓ Batterie ✓ Capotage ultra-silencieux ✓ Silencieux résidentielle ✓ Supports pour fourches	✓ Gancho central ✓ Tanque del combustible con sistema de recolección de líquidos ✓ Tanque de combustible integrado ✓ Sistema de amortiguación anti-vibrante ✓ Uno o más ventiladores eléctricos controlados para Inverter VSi ✓ Cuadro manual autostart Q7310AUS con interruptor magnetotérmico ✓ Batería ✓ Cabina ultra-silenciosa ✓ Silenciador residencial ✓ Supportes para carretilla	✓ Gancio di sollevamento centrale ✓ Serbatoio con vasca di raccolta liquidi ✓ Serbatoio integrato ✓ Anti vibranti ✓ Una o più ventole elettriche controllate da tecnologia Inverter VSi ✓ Quadro di comando manuale autostart Q7310AUS con interruttore magnetotermico ✓ Batteria ✓ Cabina ultra silenziosa ✓ Marmitta residenziale ✓ Porta forche

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

AUS 7310

30A (400 V - 3 ph - 50Hz - 1500 rpm)

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

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

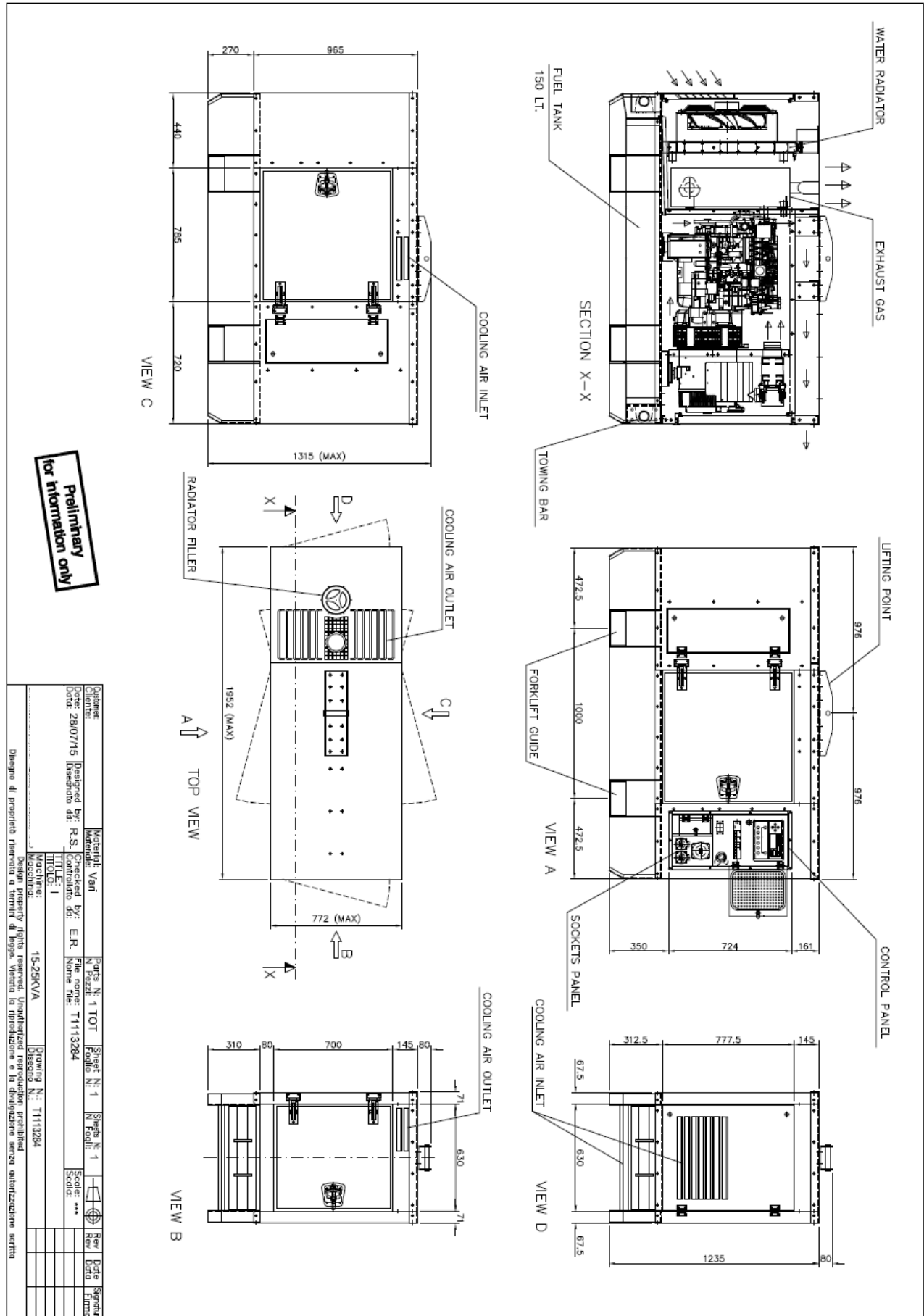
PROTECTIONS	PROTECTIONS	PROTECCIONES	PROTEZIONI
Low oil pressure High engine temperature Low fuel level Fail to start Fail to stop Emergency stop Over/under generator frequency Over/under generator voltage Over/under speed Fuel level Belt breakage Over current Over/under battery voltage	Basse pression huile moteur Haute température moteur Basse niveau combustible Non démarrage Non arrêt Arrêt d'urgence Sur/sous générateur fréquence Sur/sous générateur voltage Sur/sous vitesse Niveau de combustible Rupture courroie Surcoursant Sur/sus la tension de batterie	Baja presión aceite Elevada temperatura motor Baja nivel carburante Falta de arranque Falta de parada Parada de emergencia Sobre/bajo generatore frecuencia Sobre/bajo generatore voltaje Sobre/bajo velocidad nivel de combustible Ruptura correa Corriente maxima Sobre/bajo voltaje de la batería	Bassa pressione olio Alta temperatura motore Basso livello di carburante Mancato avviamento Mancato arresto Stop d'emergenza Sovra/sotto frequenza generatore Sovra/sotto voltaggio generatore Sovra/sotto velocità Livello del carburante Rottura cinghia Sovracorrente Sovra/sotto tensione della batteria
DIGITAL METERS	VOYANT NUMERIQUE POUR	VISOR DIGITAL PARA	MISURATORE DIGITALE PER
Generator volts (3 phases) Generator amperes (3 phases) Generator frequency KW-meter KVA-meter Cos φ-meter Rpm meter Gen set hours counter Battery Volts	Voltmètre générateur (3 phases) Ampèremètre générateur (3 phases) Fréquencemètre générateur KW-mètre KVA- mètre Cos φ- mètre Tm mètre Totalisateur d'heures de marche Voltmètre batterie	Voltmetro (3 fases) Amperimetro (3 fases) Frecuencimetro KW- metro KVA- metro Cos φ-metro Revoluciones por minuto metro Medida horas de marcha Voltmetro batería	Voltmetro tensione generatore (3 fasi) Amperometro generatore (3 fasi) Frequenzimetro generatore KW- metro KVA- metro Cos φ-metro Gm metro Contaore di funzionamento gruppo 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 SEPARÉ 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 TELECOMUTAZIONE 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 SEPARÉ Equipement : carte électronique de contrôle, disjoncteur de protection, chargeur de batterie, inverseur de source séparé, 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 TELECOMUTAZIONE 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 arrancar 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/restart – Auto – Manual – Start LCD display scroll Event log view Acoustic alarm	Fiche électronique de contrôle DSE7320 Disjoncteur de protection Chargeur de batterie Bouton poussoir arrête d'urgence	Ficha electrónica de control DSE7320 Interruptor magnetotermico Cargador de batería Botón de parada de emergencia	Scheda elettronica di controllo DSE7320 Interruttore magnetotermico Carica batteria Pulsante stop emergenza
DIGITAL MEASURING	MESURES NUMERIQUES	MEDIDAS DIGITALES	MISURAZIONI DIGITALI
Generator volts (3 phases) Generator amperes (3 phases) Generator frequency KW-meter KVA-meter Cos φ-meter Rpm meter Water temperature (optional) Oil pressure (optional) Gen set hours counter Mains volts Battery volts Mains frequency Charging voltage Start-counter Fuel level %	Voltmètre générateur (3 phases) Ampèremètre générateur (3 phases) Fréquencemètre générateur KW-mètre KVA- mètre Cos φ- mètre Tm mètre Température eau (facultatif) Pression huile (facultatif) Totalisateur d'heures de marche Voltmètre secteur Voltmètre batterie Fréquence réseau Tension de charge Compteur démarrages Niveau combustible %	Voltmetro (3 fases) Amperimetro (3 fases) Frecuencimetro KW- metro KVA- metro Cos φ-metro Revoluciones por minuto metro Termometro agua (opcional) Presión aceite (opcional) Medida horas de marcha Voltmetro tensión de red Voltmetro batería Frecuencia red Tensión de carga Numero de arranques Nivel carburante %	Voltmetro tensione generatore (3 fasi) Amperometro generatore (3 fasi) Frequenzimetro generatore KW- metro KVA- metro Cos φ-metro Gm metro Temperatura acqua (facoltativo) Pressione olio (facoltativo) Contaore di funzionamento gruppo Voltmetro tensione rete Voltmetro batteria Frequenza rete Tensione di carica Contavviamanti Livello carburante %
INDICATORS	INDICATEURS	INDICADORES	INDICATORI
Mains live Generator live Mains contactor closed Generator contactor closed Engine running	Présence secteur Présence tension générateur Inverseur secteur fermé Inverseur générateur fermé Moteur en marche	Presencia tensión de red Presencia tensión grupo Transferencial red cerrado Transferencial grupo cerrado Motor en marcha	Presenza tensione di rete Presenza tensione generatore Erogazione da rete Erogazione da gruppo Motore avviato
PROTECTIONS	PROTECTIONS	PROTECCIONES	PROTEZIONI
Low oil pressure High engine temperature Low fuel level Fail to start Fail to stop Emergency stop Over/under frequency Over/under voltage Over/under speed Fuel level Belt breakage Over current Over/under battery voltage	Bas pression huile moteur Haute température moteur Bas niveau combustible Non démarrage Non arrêt Arrêt d'urgence Sur/sous fréquence Sur/sous voltage Sur/sous vitesse Niveau de combustible Rupture courroie Surcoursant Sur/sus la tension de batterie	Baja presión aceite Elevada temperatura motor Baja nivel carburante Falta de arranque Falta de parada Parada de emergencia Sobre/bajo frecuencia Sobre/bajo voltaje Sobre/bajo velocidad nivel de combustible Ruptura correa Corriente maxima Sobre/bajo voltaje de la batería	Bassa pressione olio Alta temperatura motore Basso livello di carburante Mancato avviamento Mancato arresto Stop d'emergenza Sovra/sotto frequenza Sovra/sotto voltaggio Sovra/sotto velocità Livello del carburante Rottura cinghia Sovracorrente Sovra/sotto tensione della batteria

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



Technical Data

400 Series

404A-22G1

Electropak

1500 rpm

Basic technical data

Number of cylinders 4
 Cylinder arrangement Vertical in-line
 Cycle four stroke
 Induction system Naturally aspirated
 Compression ratio 23.3:1
 Bore 84 mm
 Stroke 100 mm
 Cubic capacity 2.216 litres
 Direction of rotation anti-clockwise when viewed from flywheel
 Firing order 1, 3, 4, 2
 Estimated total weight (dry) 242 kg

Overall dimensions

-height 841 mm
 -length 946 mm
 -width 497 mm

Moments of inertia (mk²)

-engine rotational components 0.44 kg m²
 -flywheel 2.55 kg m²

Centre of gravity

-forward from rear of block TBA mm
 -above centre line of block TBA mm
 -offset to RHS of centre line TBA mm

Performance

Note: All data based on operation to ISO 3046-1:2002 standard reference conditions

Steady state speed stability at constant load $\pm 0.75\%$
 Cyclic irregularity
 -at 110% stand-by power TBA

Test conditions

-air temperature 25°C
 -barometric pressure 100 kPa
 -relative humidity 31.5%
 -air inlet restriction at maximum power (nominal) 3 kPa
 -exhaust back pressure at maximum power (nominal) 10.2 kPa
 -fuel temperature (inlet pump) 40°C

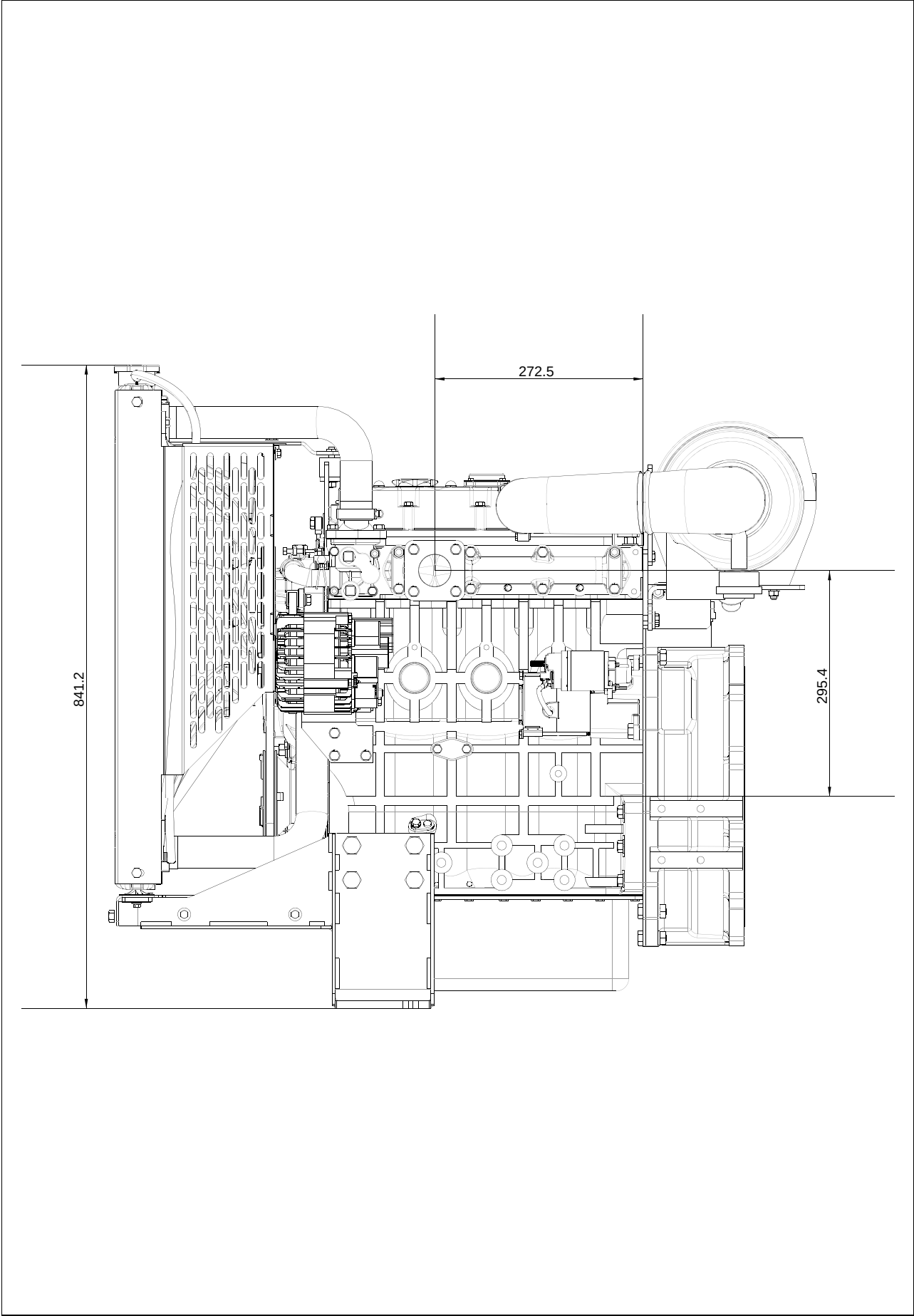
Sound level

Average sound pressure level for bare engine (without inlet and exhaust) at 1 metre 76.4 dB(A)
 -all ratings certified to within $\pm 5\%$
 If the engine is to operate in ambient conditions other than those of the test conditions, suitable adjustments must be made for these changes. For full details, contact Perkins Technical Service Department.

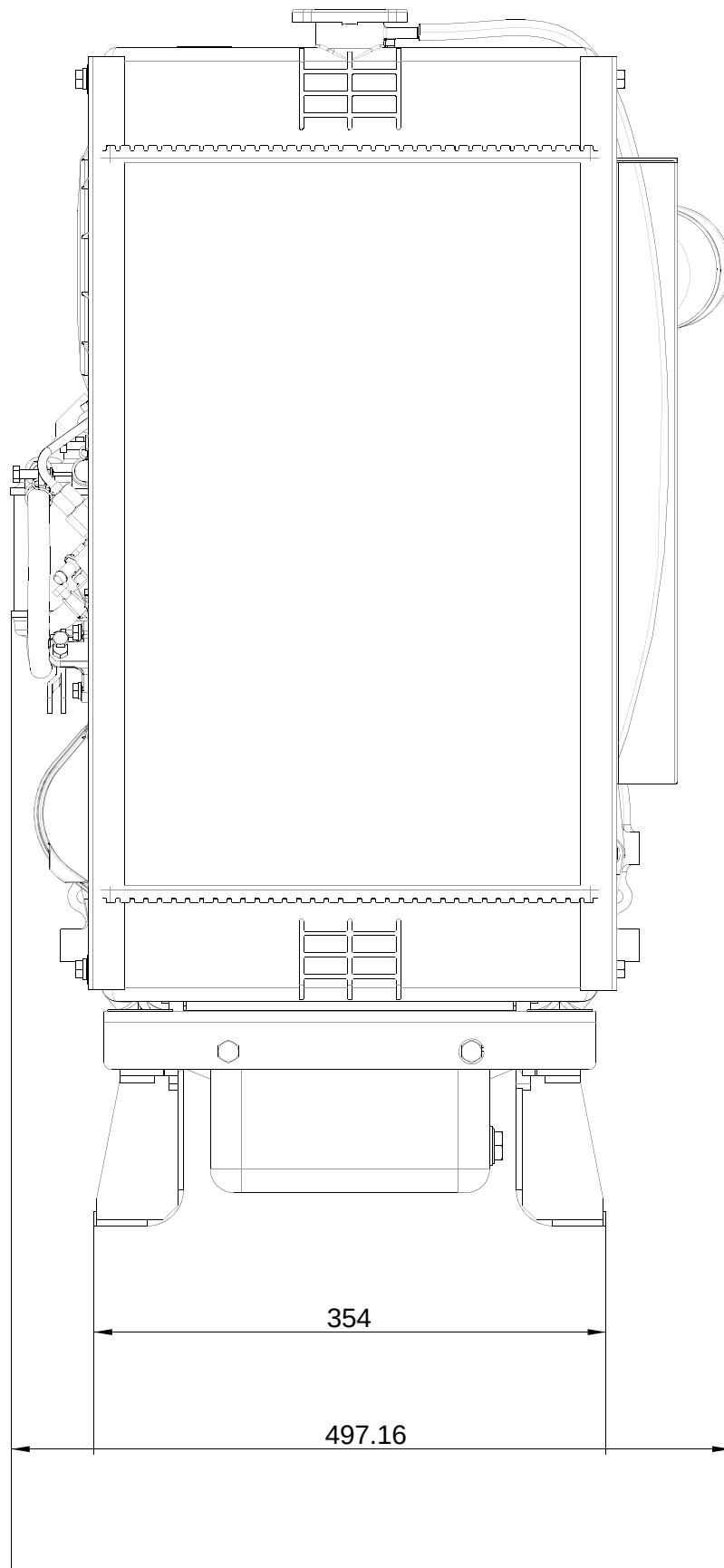
General installation - 404A-22G1 @ 1500 rev/min

Designation	Units	Type of operation and application	
		Prime	Stand-by
		50Hz	50Hz
Gross engine power	kWb	18.7	20.6
Brake mean effective pressure	kPa	669	650
Mean piston speed	m/s	5	
Engine coolant flow (coolant pump ratio 1:25:1)	l/min	40.3	
Combustion air flow	m³/min	1.45	
Exhaust gas flow (max)	m³/min	3.64	3.94
Exhaust gas temperature (max)	°C	445	505
Overall thermal efficiency (nett)	%	35	33
Typical genset electrical output (0.8 pf 25°C)	kWe	16.0	17.7
	kVA	20.0	22.1
Assumed alternator efficiency	%	87	
Energy balance			
Energy in fuel (heat of combustion)	kWt	53.0	61.2
Energy in power output (gross)	kWb	18.7	20.6
Energy to cooling fan	kWt	0.3	
Energy in power output (nett)	kWm	18.4	20.3
Energy to coolant and lubricating oil	kWt	17.0	19.6
Energy to exhaust	kWt	14.0	16.6
Energy to radiation	kWt	3.3	4.4

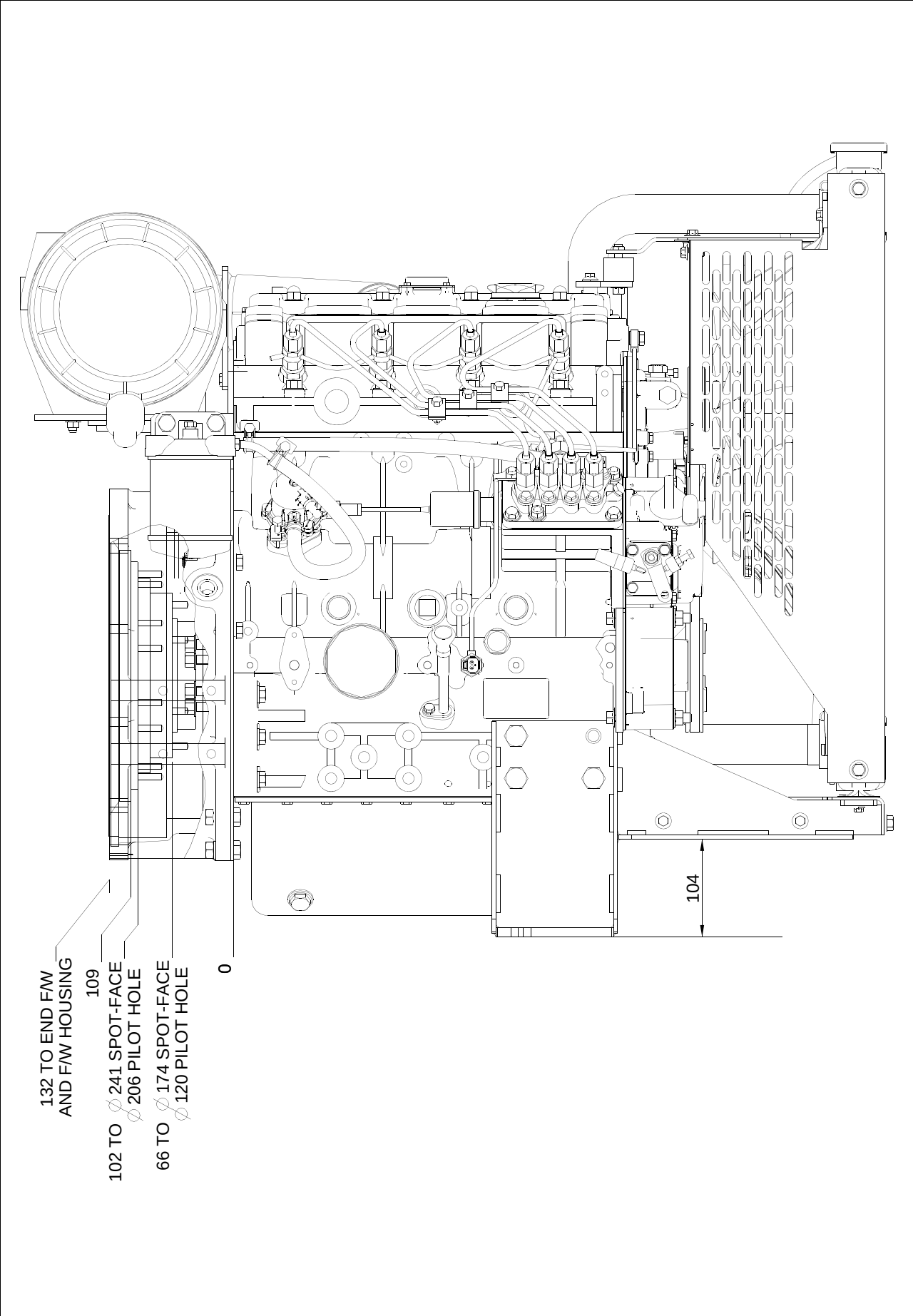
404A-22G1 ElectropaK, left side view



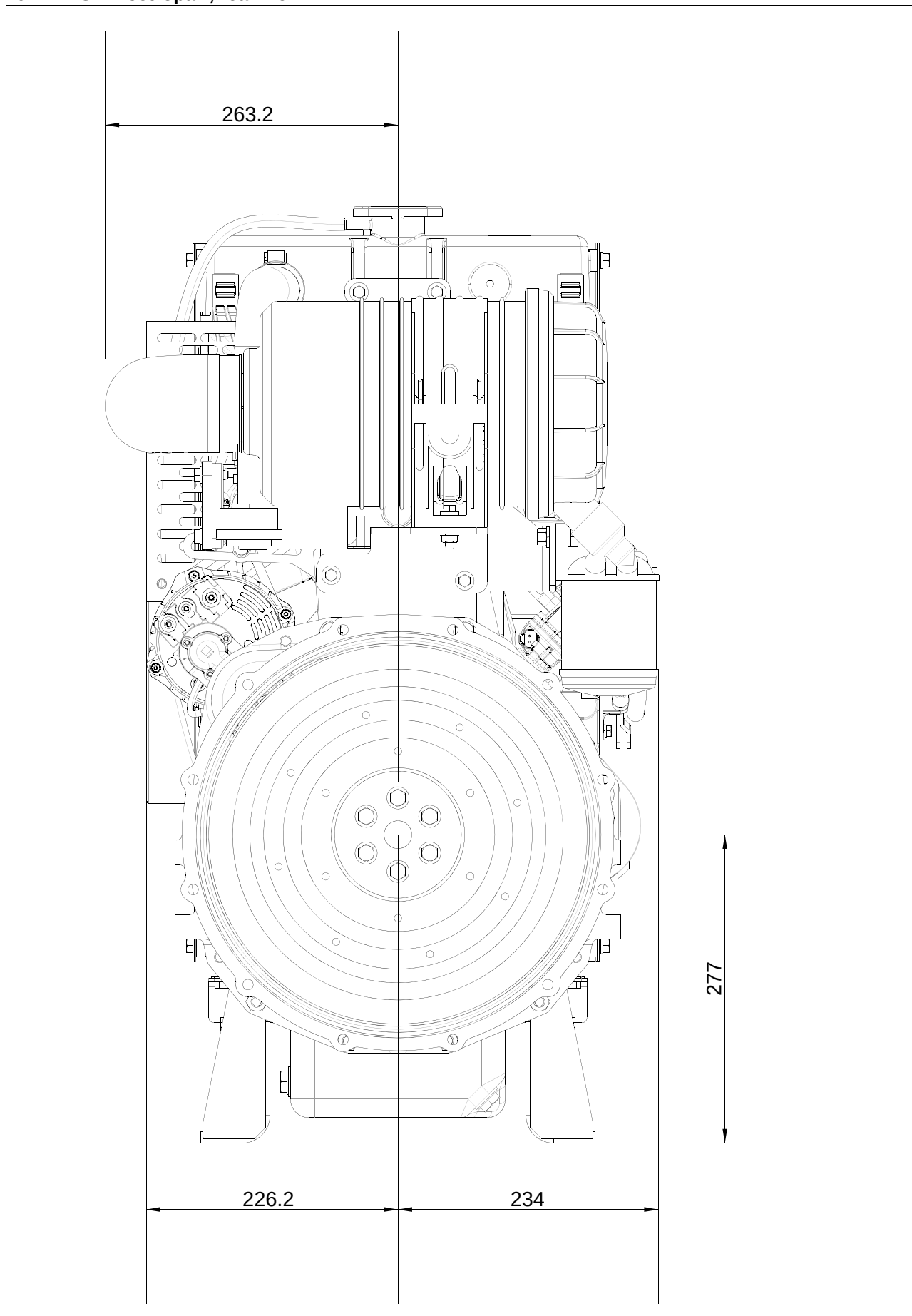
404A-22G1 ElectropaK, front view



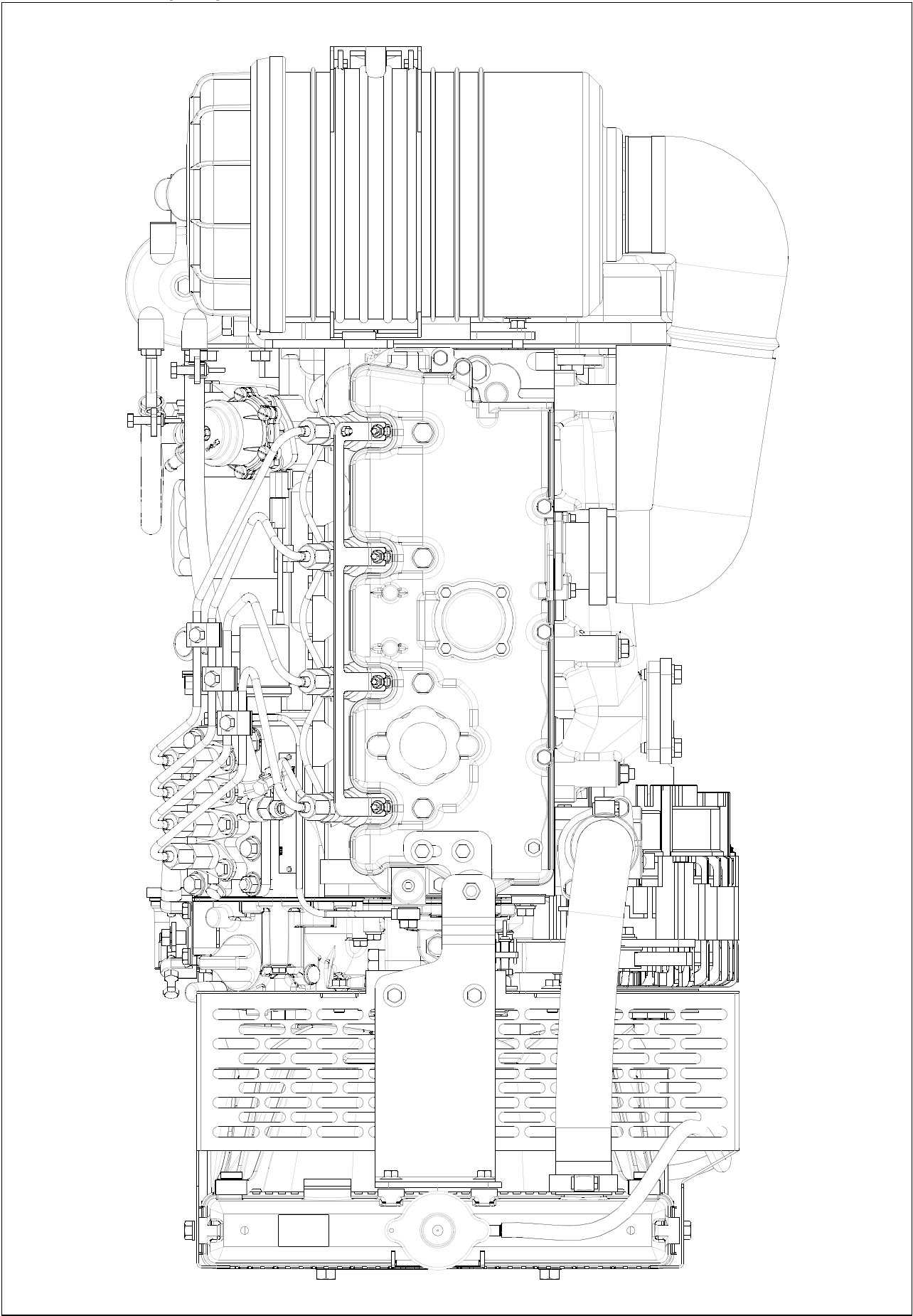
404A-22G1 ElectropaK, right side view



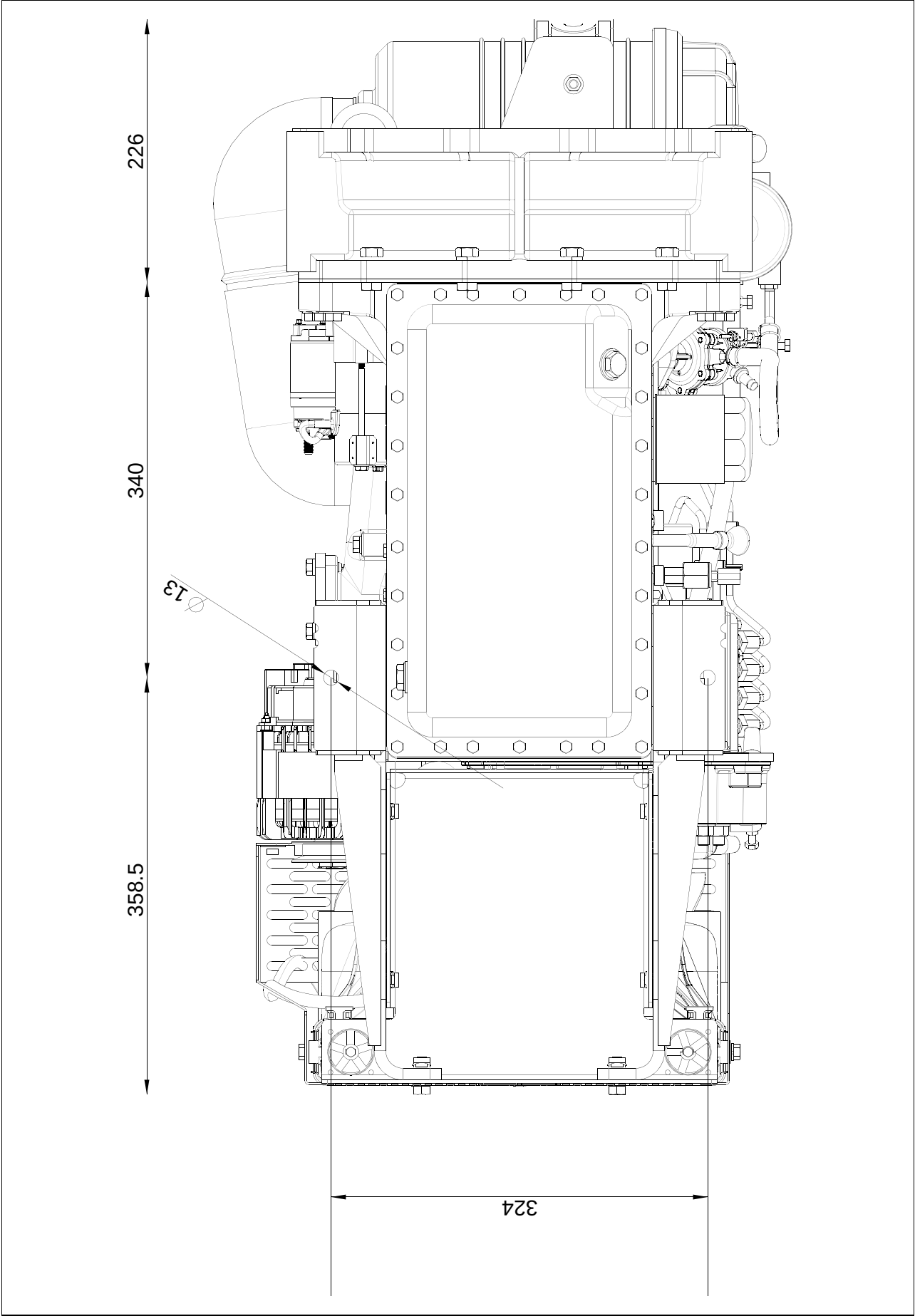
404A-22G1 ElectropaK, rear view



404A-22G1 ElectropaK, plan view



404A-22G1 ElectropaK, underneath view



Cooling system

Radiator

- face area... ..0.167 m²
- rows and materials2 rows, Aluminium
- matrix density and material... ..14.5 fins per inch, Aluminium
- width of matrix... ..334.2 mm
- height of matrix500.0 mm
- pressure cap setting90 kPa
- Estimated cooling air flow reserve0.125 kPa

Fan

- diameter320 mm
- drive ratio1.25:1
- number of blades... ..6
- materialPlastic
- typePusher

Coolant

- Total system capacity
- with radiator7.0 litres
- without radiator3.6 litres
- Maximum top tank temperature112°C
- Temperature rise across engine7.5°C
- Max. permissible external system resistanceTBA kPa
- Thermostat operation range... ..82 - 95°C
- Recommended coolant:
- Recommended coolant: 50% anti freeze / 50% water. For complete details of recommended coolant specifications, refer to the Operation and Maintenance Manual for this engine model.

Duct allowance

Maximum additional restriction (duct allowance) to cooling airflow and resultant minimum airflow		
Ambient clearance 50% Glycol	Duct allowance Pa	m³/sec
53°C	0	0.67
46°C	125	0.49

Electrical system

- alternator... ..15 amps, 12V
- starter motor2 kW, 12V

Cold start recommendations

Minimum cranking speed150 rev/min

Minimum starting temperature	Grade of engine lubricating oil	Battery specifications			
		BS3911 Cold start amps	SAEJ537 Cold cranking amps	Number of batteries needed	Commercial ref number
0	20W	540	740	1	647
-15	10W	540	740	1	647
-20	5W	600	780	1	655

Note: Additional information for battery and cable limits can be found in Chapter 6 of the 400 Engine Sales Manual..

Exhaust system

- Maximum back pressure10.2 kPa
- Exhaust outlet size42 mm

Fuel system

- Type of injectionIndirect injection
- Fuel injection pumpCassette type
- Fuel injector.Pintle nozzle
- Nozzle opening pressure14.7 MPa
- Max. particle size.25 microns

Fuel lift pump

- typemechanical (camshaft driven)
- flow/hour.63 litres/hr
- pressure10 kPa
- Maximum suction head0.8 m
- Maximum static pressure head3.0 m
- Governor type..Mechanical

Fuel specification

- USA Fed Off Highway - EPA2D 89.330-96
- Europe Off Highway - CEC RF-06-99
- Note:** For further information on fuel specifications and restrictions, refer to the OMM Fuels section for this engine model.

Fuel consumption

Power rating%			
g/kWh (litres/hr)			
110	100	75	50
244 (6.1)	237 (5.3)	238 (4.0)	258 (2.9)

Induction system

Maximum air intake restriction

-clean filter. 3.0 kPa
-dirty filter 6.4 kPa
-air filter type Dry element type

Lubrication system

Lubricating oil capacity

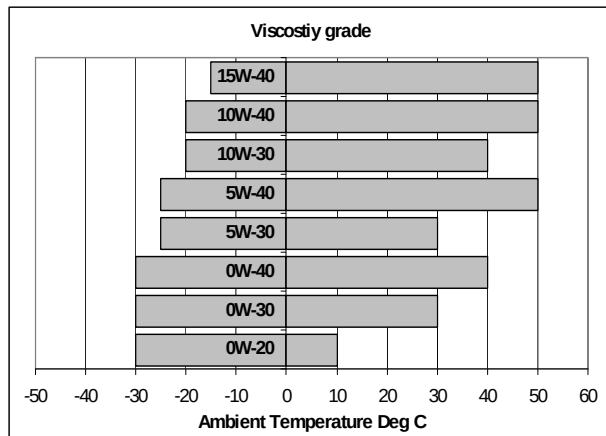
Max. sump capacity 10.6 litres
Min. sump capacity 8.9 litres
Maximum engine operating angles
-front up, front down, right side or left side 35° continuous

Lubricating oil pressure

-relief valve opens. 352 - 448kPa
Min. oil pressure 120 kPa
-at maximum no-load speed.. ... TBA
Oil flow at rated speed 109 litres/min
Normal oil temperature.. ... 125°C

Recommended SAE viscosity

A single or multigrade oil must be used which conforms API-CH-4 or ACEA E5.



Maximum static bending moment

at rear face of block 1400 Nm

Load acceptance

The below complies with the requirements of classification 3 and 4 of ISO 8528-12 and G2 operating limits stated in ISO 8528-5

Initial load application: When engine reaches rated speed (15 seconds maximum after engine starts to crank)		
Descriptor	Units	50 Hz
% of prime power	%	TBA
Transient frequency deviation	%	TBA
Frequency recovery	Seconds	TBA

The above figures were obtained under the following test conditions:

-minimum engine block temperature TBA°C
-ambient temperature 25°C
-governing mode 5%
-alternator inertia TBA kgm²
-under frequency roll off (UFRO) point set to 2% Volt / 1% frequency
-UFRO rate set to 1 Hz below rated speed
LAM on/off off

All tests were conducted using an engine which was installed and serviced to Perkins Engines Company Limited recommendations.

Derate Curves

Derate curves for altitude and humidity can be found in Chapter 6 of the 400 Series Engine Sales Manual.

The general arrangement drawings shown in this data sheet are for guidance only. For installation purposes, latest versions should be requested from the Applications Dept., Perkins Engines Stafford, ST16 3UB United Kingdom.

Notes

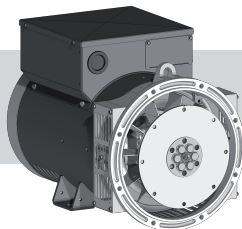


Perkins Engines Company Limited
Peterborough PE1 5NA United Kingdom
Telephone +44 (0) 1733 583000
Fax +44 (0) 1733 582240
www.perkins.com

All information in the document is substantially correct at the time of printing but may be subsequently altered by the company.

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ECP28

MECCALTE spa - Via Roma, 20 - 36051 CREAZZO (VI) ITALIA
Tel. +39 0444/396111 - Fax +39 0444/396166 - e-mail : info@meccalte.it
web site: www.meccalte.com

4 POLE A

CHARACTERISTICS

INDUSTRIAL RATINGS

ambient 40 ° C

Type	kVA - cos φ 0.8 - 3 Phase continuous							Efficiency			1 Phase
50 Hz	CL. H (ΔT= 125 °C)				CL. F (ΔT= 105 °C)			η %	CL. H (ΔT= 125 °C)		kVA
Series Star Y Parallel Star YY Series Delta Δ Parallel Delta ΔΔ	380 190 220 110	400 200 230 115	415 208 240 120	IP45 400 V	380 190 220 110	400 200 230 115	415 208 240 120	2/4	3/4	4/4	COS φ 1 CL. H (ΔT= 125 °C) DELTA
ECP28-1VS/4	7,8	7,8	7,8	6,6	7	7	7	83,5	86,0	85,8	5
ECP28-2VS/4	11	11	11	9,3	10	10	10	83,8	86,5	86,2	7
ECP28-0S/4	13,5	13,5	13,5	11,5	12,5	12,5	12,5	84,4	86,9	86,6	8,5
ECP28-S/4	17	17	17	14,5	16	16	16	85,4	87,4	87,2	11,5
ECP28-M/4	20	20	20	17	18,5	18,5	18,5	85,6	87,8	87,4	13,5
ECP28-2L/4	25	25	25	21	23	23	23	86,1	88,1	87,8	16,5
ECP28-VL/4	30	30	30	24	26	26	26	86,5	88,5	88,1	19

60 Hz	CL. H (ΔT= 125 °C)				CL. F (ΔT= 105 °C)			Efficiency			1 Phase kVA COS φ 1 CL. H (ΔT= 125 °C) DELTA	
	Series Star Y Parallel Star YY Series Delta Δ Parallel Delta ΔΔ	440 220 254 127	460 230 265 133	480 240 265 138	IP45 480 V	440 220 254 127	460 230 265 133	480 240 277 138	η % CL. H (ΔT= 125 °C)			
									2/4	3/4		4/4
ECP28-1VS/4	8,8	9,4	9,4	8	7,8	8,5	8,5	84,5	87,0	86,9	6,3	
ECP28-2VS/4	12,4	13,2	13,2	11	11	12	12	84,8	87,6	87,3	8,8	
ECP28-0S/4	15	16,2	16,2	13,5	13,5	15	15	85,5	88,0	87,7	10,8	
ECP28-S/4	18,6	20,4	20,4	17,5	17,5	19	19	86,2	88,6	88,7	13,5	
ECP28-M/4	23	24	24	20,5	20	22	22	87,5	89,5	89,5	16	
ECP28-2L/4	27,5	30	30	25	25,5	27,5	27,5	88	90	89,7	20	
ECP28-VL/4	36	36	36	29	32	32	32	88.4	90.3	89.8	23	

STANDBY RATINGS

Type	kVA Temp. Rise / Ambient °C			kVA Temp. Rise / Ambient °C		
	50 Hz			60 Hz		
	163° / 27°	150° / 40°	125° / 27°	163° / 27°	150° / 40°	125° / 27°
ECP28-1VS/4	8,4	8	8	10	9,7	9,7
ECP28-2VS/4	11,7	11,3	11,3	14	13,6	13,6
ECP28-0S/4	14,6	14	14	17,5	16,7	16,7
ECP28-S/4	18	17,5	17,5	21,6	21	21
ECP28-M/4	21,5	20,5	20,5	25,8	24,6	24,6
ECP28-2L/4	26,5	25,5	25,5	31,8	30,6	30,6
ECP28-VL/4	32,5	30,5	30,5	38,4	36,6	36,6

Type	J (kgm ²) B3/B14 FORM	Weight SAE (kg)	Air Volume		Noise dB(A)			
			50 Hz		50 Hz		60 Hz	
			50 Hz (m ³ /min)	60 Hz (m ³ /min)	1m	7m	1m	7m
ECP28-1VS/4	0,0711	79	5,3	5,8	68	57	71	61
ECP28-2VS/4	0,0821	86						
ECP28-0S/4	0,0904	96						
ECP28-S/4	0,1041	104						
ECP28-M/4	0,1182	115						
ECP28-2L/4	0,1421	136						
ECP28-VL/4	0,1636	162						

ACCESSORIES

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

● = Standard

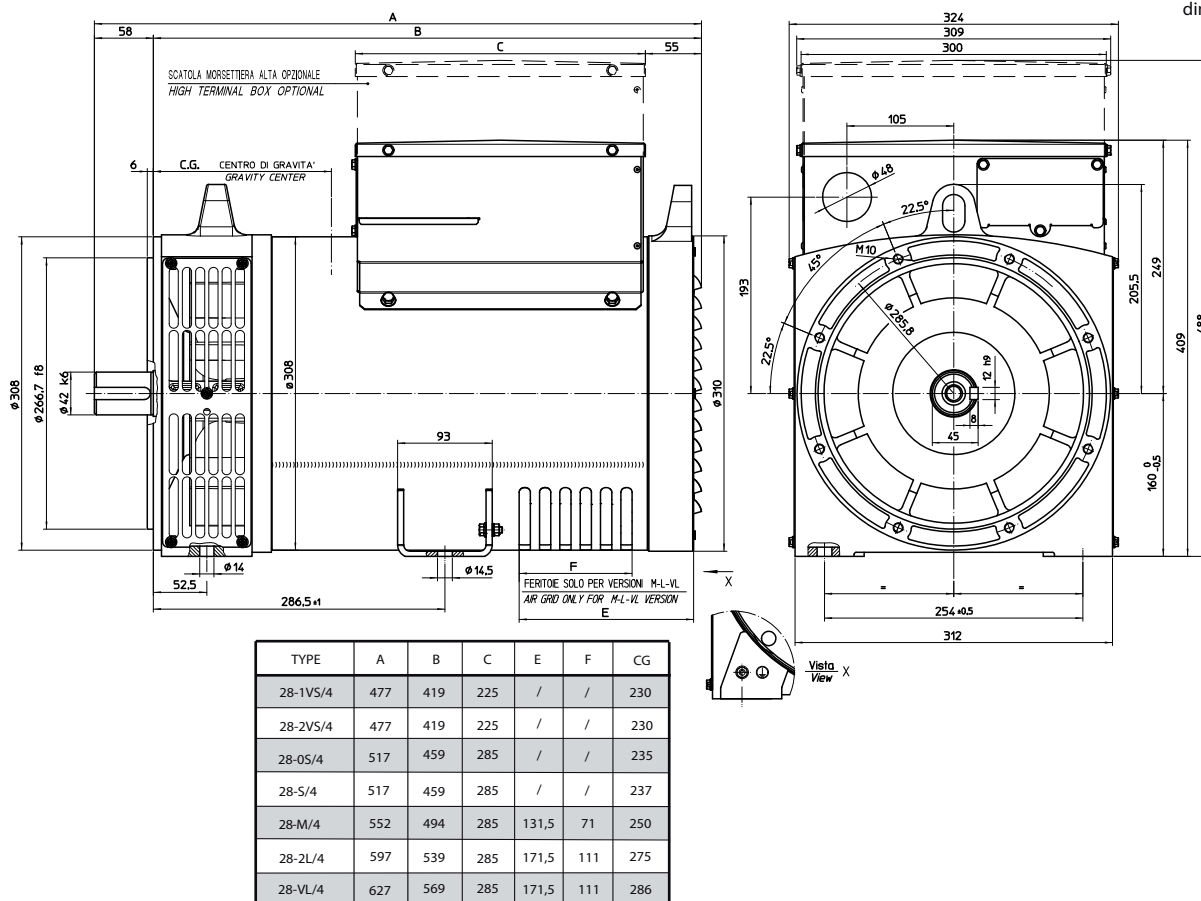
□ = Optional

* available if requested when placing the order

 Rating

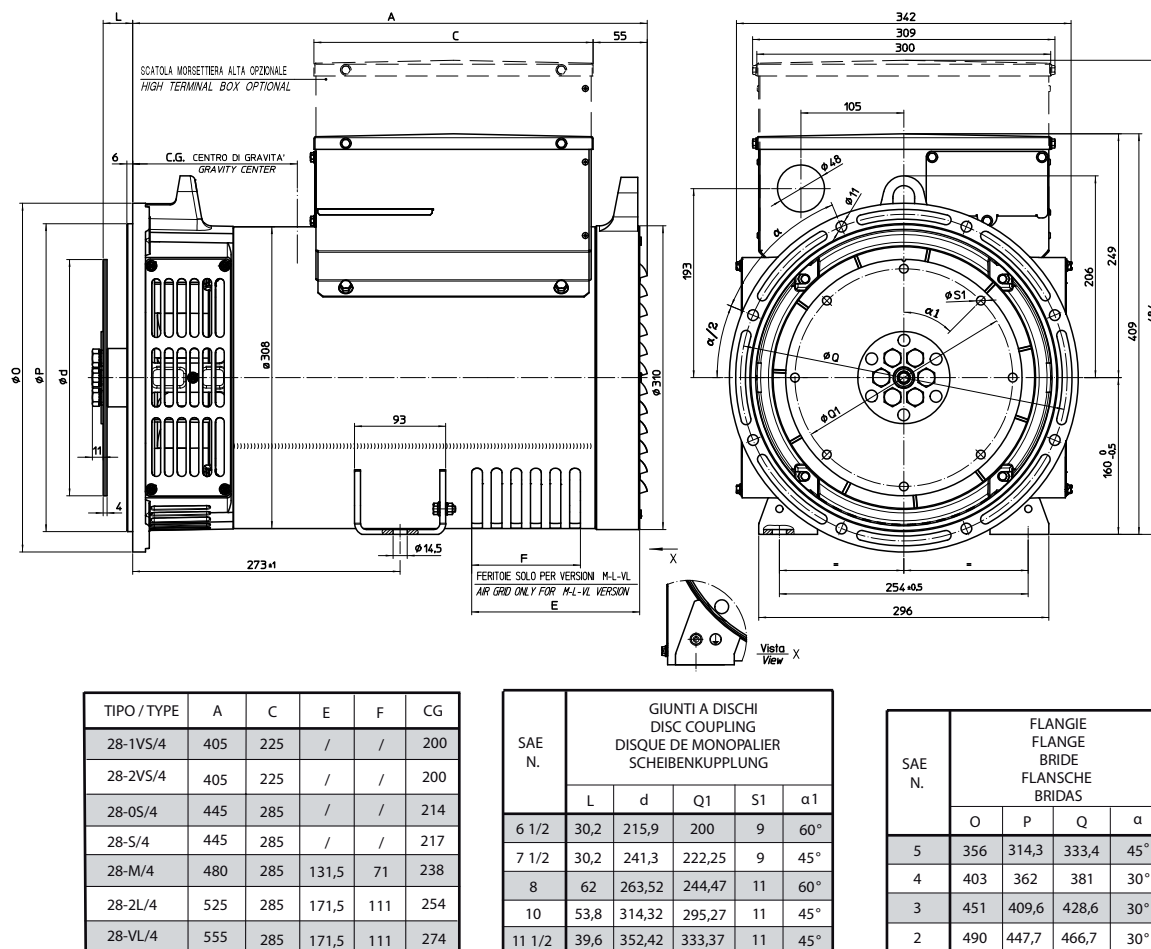

OVERALL DIMENSIONS B3-B14 FORM

dimensions in mm



OVERALL DIMENSIONS MD35 FORM

dimensions in mm



DSECONTROL[®] MONITORING WITH INTELLIGENCE.



DSE7310 & DSE7320

AUTO START & AUTO MAINS FAILURE CONTROL MODULES (COMMUNICATIONS & EXPANSION)



The DSE7310 and DSE7320 are control modules for single gen-set applications. The modules have been developed from the successful DSE5310 and DSE5320 Series and incorporate a number of advanced features to meet the most demanding on-site applications.

The DSE7310 is an Automatic Start Control Module and the DSE7320 is an Auto Mains (Utility) Failure Control Module. Both modules have been designed to start and stop diesel and gas generating sets that include electronic and non-electronic engines. The DSE7320 includes the additional capability of being able to monitor a mains (utility) supply.

Both modules include USB, RS232 and RS485 ports as well as dedicated DSENet[®] terminals for expansion device connectivity.

The modules are simple to operate and feature a user-friendly menu layout for improved clarity. Enhanced features include a real time clock for enhanced event and performance monitoring, ethernet communications for low cost monitoring, mutual standby (DSE7310 only) to reduce engine wear and tear and preventative maintenance features to detect engine part faults prior to a major problem occurring.

FEATURES

- Backed up real time clock
- 132 x 64 pixel LCD display
- Configurable display languages
- Five-key menu navigation
- Fully configurable via PC software
- LED and LCD alarm indication
- Engine exercise mode
- Configurable start & fuel outputs
- kWh monitoring
- Automatic load transfer
- Eight configurable digital inputs
- Six configurable outputs
- Configurable timers and alarms
- Modbus RTU
- Magnetic pick-up
- Selected front panel programming
- Multiple date and time exercise scheduler
- SMS messaging (additional external modem required)
- Power save mode
- User selectable RS232 & RS485 communications
- DSENet[®] compatible
- Ethernet communications via DSE860/865
- Multiple date and time maintenance scheduler
- Configurable display pages
- Programmable load shedding/acceptance
- Preventative maintenance
- kW overload protection
- Unbalanced load protection
- Flexible sender input
- Configurable SCADA output page
- True dual mutual standby with load balancing timer (DSE7310 only)
- Fan control for additional cooling
- 'Protections Disabled' facility
- Fuel usage monitoring and low fuel alarm
- Support for up to three remote display units
- Automatic sleep mode
- Easy access, configurable diagnostics page shows summary of output states
- Improved programmable event log (250) showing date and time
- Manual fuel pump control
- 3 alternative configurations
- Multiple date and time scheduler
- 3 Programmable Maintenance alarms with comms alert
- Customisable status screens
- Low fuel level alarm delay
- Charge alternator fail warning and shutdown alarms with user programmable delay
- Independent Earth fault trip
- Sleep mode
- Load switching (Load shedding and dummy load outputs)
- Manual speed trim (on CAN engines that support this feature)
- Additional display screens to help with modem diagnostics
- Security levels – PC software has password system to control access to PC software features
- Operator configurable virtual LEDs visible in SCADA

NEW FEATURES

- Additional programmable logic
- Improved modem diagnostics
- Remote control sources (10) can be accessed via SCADA
- Additional electrical trip options
- Additional start delay functions
- Oil pressure values from additional engines
- Front panel editing of scheduler
- Displays kW as % of rated kW setting

SPECIFICATION

DC SUPPLY

CONTINUOUS VOLTAGE RATING
8V to 35V Continuous

CRANKING DIP PROTECTION
Able to survive 0V for 50mS, providing supply was at least 10V before dropout and supply recovers to 5V. This is achieved without the need for internal batteries

CHARGE FAIL/ EXCITATION
0V to 35V fixed power source 2.5W

MAXIMUM STANDBY CURRENT
160mA at 12V 80mA at 24V

MAXIMUM OPERATING CURRENT
340mA at 12V 160mA at 24V

ALTERNATOR INPUT

RANGE
15V - 333V (L-N) 50Hz - 60Hz
(Minimum 15V AC Ph-N)

ACCURACY
1% of full scale true RMS sensing

SUPPORTED TOPOLOGIES
3 phase 4 wire
3 phase 3 wire
3 phase 4 wire Delta
Single phase 2 wire
2 phase 3 wire L1 & L2
2 phase 3 wire L1 & L3

MAINS/UTILITY INPUT (DSE7320 ONLY)

RANGE
15V - 333V (L-N) 50Hz - 60Hz
(Minimum 15V AC Ph-N)

ACCURACY
1% of full scale true RMS sensing

SUPPORTED TOPOLOGIES
3 phase 4 wire
3 phase 3 wire
3 phase 4 wire Delta
Single phase 2 wire
2 phase 3 wire L1 & L2
2 phase 3 wire L1 & L3

CT'S

BURDEN
0.5VA

PRIMARY RATING
1A - 8000A (user selectable)

SECONDARY RATING
1A or 5A secondary (user selectable)

ACCURACY OF MEASUREMENT
1% of full load rating

RECOMMENDATIONS
Class 1 required for instrumentation
Protection class required if using for protection

SPECIFICATION

MAGNETIC PICKUP

VOLTAGE RANGE

+/- 0.5V minimum (during cranking) to 70V peak

FREQUENCY RANGE

10,000 Hz (max)

OUTPUTS

OUTPUT A (FUEL)

15 Amp DC at supply voltage

OUTPUT B (START)

15 Amp DC at supply voltage

OUTPUTS C & D

8 Amp 250V (Volt free)

AUXILIARY OUTPUTS E,F,G,H

2 Amp DC at supply voltage

DIMENSIONS

OVERALL

240mm x 181.1mm x 41.7mm
9.4" x 7.1" x 1.6"

PANEL CUT-OUT

220mm x 160mm
8.7" x 6.3"
Max panel thickness 8mm (0.3")

ENVIRONMENTAL TESTING STANDARDS

ELECTRICAL SAFETY

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

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

TEMPERATURE (OPERATING)

BS EN 60068
Test Ab to +70°C 60068-2-2 Hot
Test Ab to -30°C 60068-2-1 Cold

VIBRATION

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

HUMIDITY

BS 2011 part 2.1 60068-2-30
Test Cb Ob Cyclic
93% RH @ 40°C for 48 hours

SHOCK

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

BENEFITS

- 132 x 64 pixel ratio makes information easy to read
- Real time clock provides accurate event logging
- PC software is license free
- Set maintenance periods can be configured to maintain optimum engine performance
- Ethernet communications provides advanced remote monitoring at low cost
- Modules can be integrated into building management systems
- Preventative maintenance avoids expensive engine down time
- Advanced PCB layout ensures high reliability
- Robust design
- Extensive performance monitoring

OPERATION

The modules are operated via the START, STOP, AUTO and MANUAL soft touch membrane buttons on the front panel. The DSE7320 also has a TEST button. Both modules include load switch buttons. The main menu system is accessed using the five navigation buttons to the left of the LCD display.

CONFIGURATION

The modules can be configured using the front panel buttons or by using the DSE Configuration Suite PC software and a USB lead.

COMMUNICATIONS

The DSE7310 & DSE7320 have a number of different communication capabilities.

SMS Messaging

When the module detects an alarm condition, it has the ability to send an SMS message to a dedicated mobile number (s), notifying an engineer of the exact time, date and reason why the engine failed (GSM Modem and SIM Card required).

Remote Communications

When the module detects an alarm state, it dials out to a PC notifying the user of the condition (Modem required).

Remote Control

The module can be controlled remotely using either a GSM Modem, Ethernet via DSE860/865 or via RS485. Using a modem allows the module to be controlled from any distance. Using RS485 limits the distance to 1km (0.6 miles).

Building Management

The module has been designed to be integrated into new and existing building management systems, using RS485.

PC Software

The module has the ability to be configured and monitored from a remote PC, using the PC software and a USB lead.

INPUTS & OUTPUTS

Analogue inputs are provided for oil pressure, coolant temperature and fuel level. These connect to conventional engine mounted resistive sensor units to provide accurate monitoring and protection facilities. They can also be configured to interface with digital switch type inputs for low oil pressure and high coolant temperature shutdowns. Eight user configurable digital inputs are also included, plus one flexible sender.

Outputs are provided for fuel solenoid, start solenoid and six additional configurable outputs. On these configurable outputs a range of different functions, conditions or alarms can be selected.

INSTRUMENTATION

The modules provide advanced metering facilities, displaying the information on the LCD display. The information can be accessed using the five-key menu navigation to the left of the display.

DSENET®

DSENet® is a collection of expansion modules that have been created to work with DSENet® compatible control modules. DSENet® allows up to 20 different expansion devices to be used at a time. The expansion modules available are:

- DSE2157 Relay Output Expansion Module
- DSE2130 Input Expansion Module
- DSE2548 Annunciator Module Remote Display Module
- DSE2510 Remote Display
- DSE2520 Remote Display

EVENT LOG

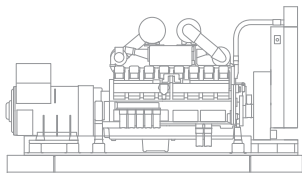
The module includes a comprehensive event log that shows the most recent 250 alarm conditions and the date and time that they occurred. This function assists the user when fault finding and maintaining a generating set.

ELECTRONIC ENGINE COMPATABILITY

- CAT
- Cummins
- Deutz
- John Deere
- MTU
- Perkins
- Scania
- Volvo
- IVECO
- Generic
- Plus additional manufacturers

RELATED MATERIALS

TITLE	PART NO'S
DSE7xxx Manual	057-074
DSE72xx/73xx PC Software Manual	057-077
DSE2130 Data Sheet	053-060
DSE2157 Data Sheet	053-061
DSE2548 Data Sheet	053-062
DSE860/865 Data Sheet	055-071
DSE2510/20 Data Sheet	055-074



ELECTRONIC ENGINE CAPABILITY

7310

Generator Instruments

Volts, Hz, Amps, kW, kVA, Pf, kWh, kVAr, kVArh, KVAh

Engine Instruments

RPM, Oil Pressure, Coolant Temperature, Hours Run, Charging Voltage, Battery Volts.

Electronic Engines

Enhanced Instrumentation and Engine ECU diagnostics via electronic engine interface.

7320

Generator Instruments

Volts, Hz, Amps, kW, kVA, Pf, kWh, kVAr, kVArh, KVAh

Engine Instruments

RPM, Oil Pressure, Coolant Temperature, Hours Run, Charging Voltage, Battery Volts.

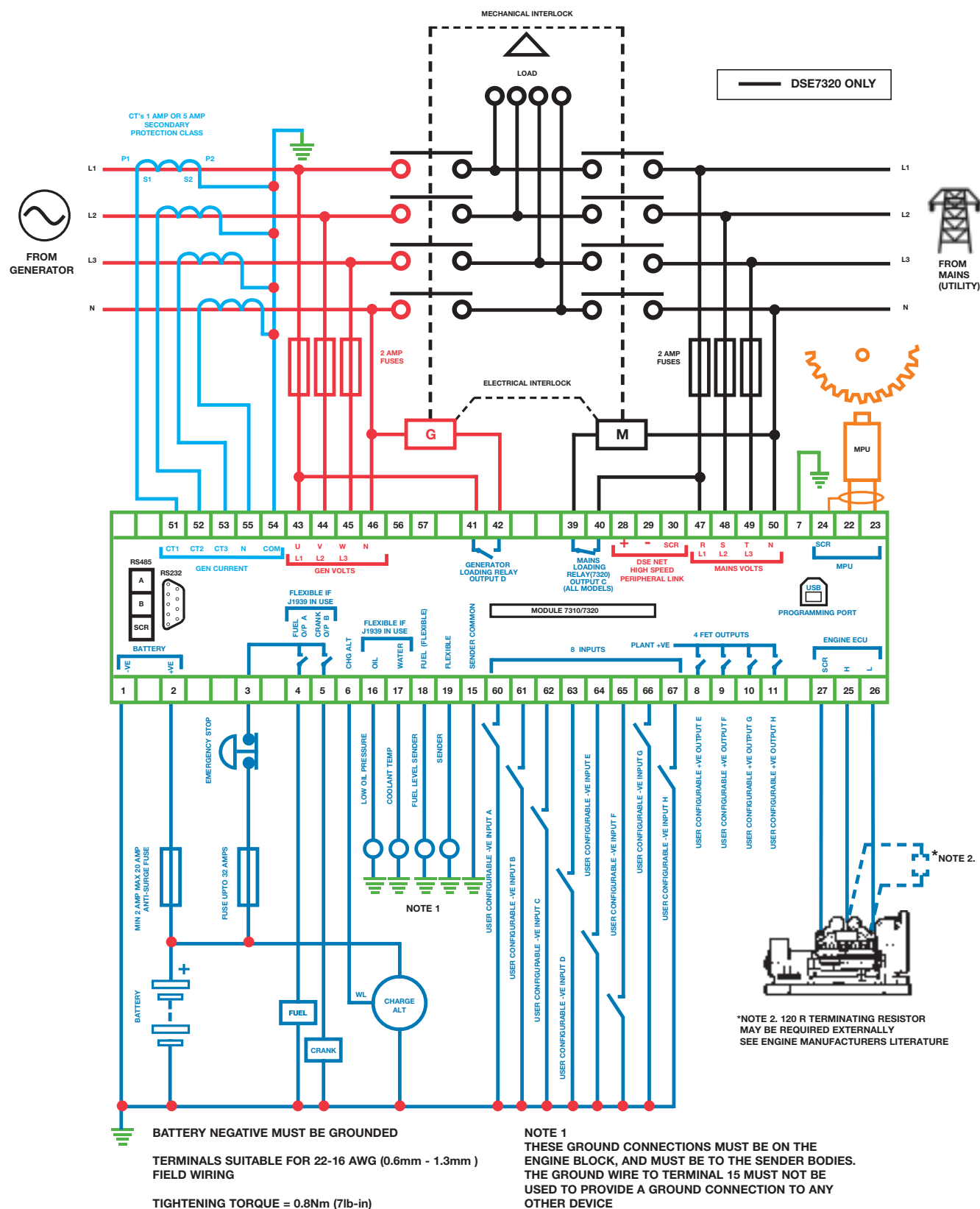
Electronic Engines

Enhanced instrumentation and Engine ECU diagnostics via electronic engine interface.

Mains/Utility Instruments

Volts, Frequency, Amps (optional when CT's are fitted load side of the line)

DSE7310 & DSE7320



DEEP SEA ELECTRONICS PLC

Highfield House
Hunmanby Industrial Estate
Hunmanby, North Yorkshire
YO14 0PH England

Registered in England & Wales No.01319649

DEEP SEA ELECTRONICS INC

3230 Williams Avenue
Rockford
IL 61101-2668 USA

TELEPHONE

+44 (0)1723 890099

FACSIMILE

+44 (0)1723 893303

VAT No.316923457

TELEPHONE

+1 (815) 316 8706

FACSIMILE

+1 (815) 316 8708

EMAIL

sales@deepseapl.com

WEBSITE

www.deepseapl.com

EMAIL

sales@deepseausa.com

WEBSITE

www.deepseausa.com



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