TENAX SERIES

DIESEL GENERATOR
GROUPE ELECTROGENE DIESEL
GRUPO ELECTROGENO DIESEL
GRUPPO ELETTROGENO DIESEL

MODEL
MODÈLE
MODELO
MODELLO

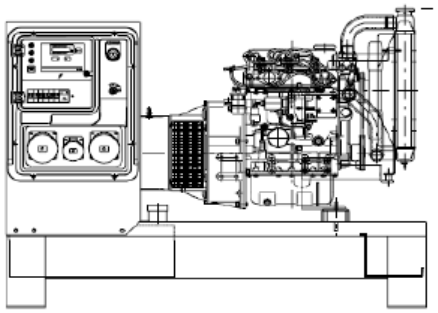
MI 12 TC

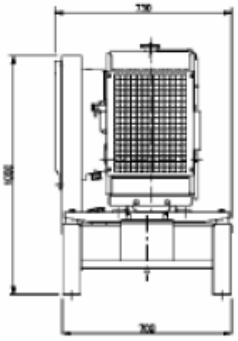
POWERED BY

MITSUBISHI HEAVY INDUSTRIES, LTD.

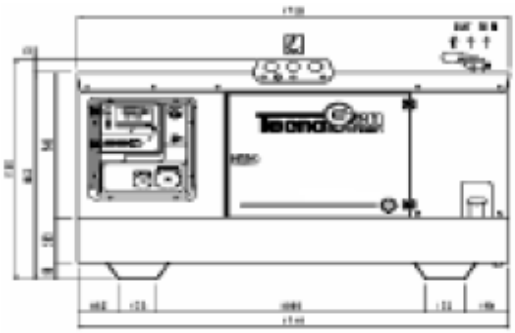
meccalte

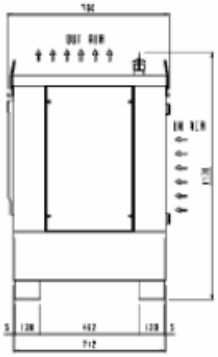
SKID





SUPER SILENT





GENERATING SET PERFORMANCE PERFORMANCES DU GROUPE PRESTACIONES DEL GRUPO PRESTAZIONI DEL GRUPPO		50 Hz		60 Hz	
Voltage Voltage Voltaje Tensione		V	400 / 230	V	220 / 127
Continuous Power Puissance service continue Potencia servicio continuo Potenza servizio continuo	PRP	kVA	**10,5**	kVA	**12,9**
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	LTP	kVA	**11,5**	kVA	**14,2**
Continuous Power Puissance service continue Potencia servicio continuo Potenza servizio continuo	PRP	kWe	8,0	kWe	10,3
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	LTP	kWe	9,0	kWe	11,4
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	2,0	l/h	2,5

TECNOGEN SpA - postal address: strada Ponteriglio, 25 – 29010 Pontenure (PC)- ITALY
Tel **+39 0523 512440** - Fax **+39 0523 504453** – E-mail: **export@tecnogen.com** - Web site: **www.tecnogen.com**

ENGINE MOTEUR MOTOR MOTORE		MITSUBISHI		S3L261SD	
PERFORMANCE PERFORMANCES PRESTACIONES PRESTAZIONI		**1500 rpm**		**1800 rpm**	
Continuous Power Puissance service continue Potencia servicio continuo Potenza servizio continuo	PRP	kWm	9,7	kWm	11,8
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	LTP	kWm	10,8	kWm	13,2
Specific fuel consumption Consommation spécifique combustible Consumo especifico de combustibile Consumo specifico combustibile		g/kWh	75 % 251	g/kWh	75 % 251
Diesel 4 Stroke – Injection type Diesel 4 temps – Type injection Diesel 4 tiempos – Tipo de inyeccion Diesel a 4 tempi – Tipo di iniezione					Indirect Indirecte Indirecta Indiretta
Aspiration type Type d'aspiration Tipo de aspiracion Tipo d'aspirazione					Natural Naturel Natural Naturale
Cooling system Refroidissement Sistema de refrigeracion Raffreddamento					Water Eau Agua Acqua
Speed governor Régulateur de tours Regulador Regolatore di giri					Mechanical Mécanique Mecanico Meccanico
Cylinders, numbers and arrangement Nombre et disposition des cylindres Cilindros, numero y disposicion Numero e disposizione dei cilindri					3 L
Total displacement Cylindrée totale Cilindrata total Cilindrata totale				cm^3	1318
Bore x stroke Alésage x course Diametro x carrera Alesaggio x corsa				mm	78 x 92
Compression ratio Rapport de compression Relación de compresión Rapporto di compressione					22 :1
Engine electric system voltage Voltage système électrique moteur Voltaje sistema eléctrico motor Voltaggio sistema elettrico motore					12 V
Derating for temperature Déclassement pour temperature Declasamiento para temperatura Declassamento per temperatura				0 ÷ 30°C > 30°C	0 2 % / 5°C
Derating for altitude Déclassement pour altitude Declasamiento para altitud Declassamento per altitudine				20°C / 0÷200 mt 20°C / 1000 mt 20°C / >1000 mt	0 10% 11%/1000 mt
Derating for relative humidity Déclassement pour humidité relative Declasamiento para humedad relativa Declassamento per umidità relativa				30°C & 50% RH 30°C&>RH 50%	0 0,45 %/ 10% RH

ALTERNATOR ALTERNATEUR ALTERNADOR ALTERNATORE			MECCALTE		
PERFORMANCE **PERFORMANCES** **PRESTACIONES** **PRESTAZIONI**		**1500 rpm**		**1800 rpm**	
Model Modèle Modelo Modello		ECO3-1LN/4		ECO3-1LN/4	
Continuous Power Puissance service continue Potencia servicio continuo Potenza servizio continuo	40 °C	kVA kWe	**11,0** 8,8	KVA kWe	**13,2** 10,6
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	40 °C	KVA kWe	**11,4** 9,1	KVA kWe	**13,7** 11,0
Stand-by Power Puissance service secours Potencia servicio emergencia Potenza servizio in emergenza	27 °C	KVA kWe	**11,8** 9,4	KVA kWe	**14,2** 11,4
Efficiency Rendement Eficienza Efficienza		2/4 3/4 4/4	84,4 % 86,4 % 85,9 %	2/4 3/4 4/4	85,4 % 87,8 % 87,7 %
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					6
Voltage accuracy 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 23
Air Volume Volume d'air Volumen de aire Volume d'aria				50 Hz 60 Hz	3,3 m^3/min 4 m^3/min
Standard AVR model Modèle AVR standard Modelo AVR standard Modello AVR standard					**SR7/2**
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 reservoir intergré Capacidad Tanque integrado Capacità Serbatoio integrato		Weight Poids Peso Peso	Dimensions Cotes d'encombrement Medidas externas Dimensioni d'ingombro		
	(L.)			(cm)		
	STD	EXTRA1	(kg)	L	W	H
OPEN SKID VERSION VERSION SUR SKID VERSION ABIERTA VERSIONE APERTA	50	ON REQUEST	375	140	75	100
SOUND PROOF VERSION VERSION INSONORISEE VERSION INSONORISADA VERSIONE INSONORIZZATA	50	ON REQUEST	490	175	77	107

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

GB	F	E	I
• Steel base frame • Vibration dampers • Integrated bunded fuel tank • Silencer **industrial** type for open version • Battery • Manual autostart control panel With **DSE6110** • Engine with original tropical radiator • Emergency stop button • Sound proof canopy of galvanized steel with **residential** silencer	• Châssis acier • Amortisseurs de vibrations • Réservoir intégré avec bac de retention • Silencieux **industriel** pour la version ouverte • Batterie • Coffret de contrôle manuel autostart avec **DSE6110** • Moteur avec radiateur tropical • Bouton arrêt d'émergence • Capote d'insonorisation d'acier galvanisé avec silencieux **résidentiel**	• Telar de acero • Apagadores de vibracion • Tanque combustible con bandeja para la recogida de líquidos • Silenciador industrial para la versión abierta • Bateria • Cuadro electrico manual autostart **con DSE6110** • Motor con radiador orginal tropical • Botón parada de emergencia • Cabina de insonorización de acero cincado con silenciador **residencial**	• Basamento in acciaio • Antivibranti • Serbatoio integrato con vasca raccolta liquidi • Silenziatore **industriale** per versione aperta • Batteria • Quadro elettrico manuale autostart con **DSE6110** • Motore con radiatore originale tropicalizzato • Pulsante arresto di emergenza • Cabina di insonorizzazione di acciaio zincato con marmitta **residenziale**

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

ACP 6110 AUS

30 A (400 V - 3 ph - 50Hz – 1500 rpm)
40 A (220 V - 3 ph - 60Hz – 1800 rpm)

STANDARD EQUIPMENT:	**EQUIPEMENT STANDARD:**	**EQUIPAMIENTO STANDARD:**	**EQUIPAGGIAMENTO STANDARD:**
4 poles circuit breaker Electronic control board **DSE6110** Emergency Stop button	Disjoncteur de protection 4 pôles Fiche électronique **DSE6110** Interrupteur d'arrêt d'émergence	Interruptor magnetotermico 4 polos Carta electronica **DSE6110** Botón de parada de emergencia	Interruttore magnetotermico 4 poli Scheda elettronica **DSE6110** Pulsante di arresto di emergenza

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 de aceite	Bassa pressione olio
High engine temperature	Haute température moteur	Alta temperatura agua	Alta temperatura acqua
Low fuel level	Basse niveau combustible	Bajo nivel combustible	Basso livello carburante
Fail to start	Non démarrage	Fallido start	Mancato avviamento
Fail to stop	Non arrêt	Fallido stop	Mancato arresto
Over/under voltage	Sur/sous voltage	Sovra/baja tensión	Sovra/sotto frequenza
Over/under speed	Sur/sous survitesse	Sovra/baja frecuencia	Sovra/sotto voltaggio
Fuel level	Niveau de combustible	Nivel de combustible	Livello di combustibile
Belt breakage	Rupture courroie	Rotura de la correa	Rottura cinghia
Over current	Surcourant	Sobre intensidad	Sovracorrente
Over/under battery voltage	Sur/sous tension batterie	Sobre/baja tension batería	Sovra/sotto voltaggio batterie
DIGITAL METERS	**VOYANT NUMERIQUE POUR**	**VISOR DIGITAL PARA**	**MISURATORE DIGITALE PER**
Generator volts (3 phases)	Voltmètre générateur (3 phases)	Voltios del generador (3 fases)	Volt generatore (3 fasi)
Generator amperes (3 phases)	Ampèremètre générateur (3 phases)	Amperios del generador (3 fases)	Ampere generatore (3 fasi)
Generator frequency	Fréquencemètre générateur	Frecuencia del generador	Frequenza del genratore
KW-meter	KW-mètre	kW	kW
kVA-meter	kVA- mètre	kVA	kVA
Cos φ- meter	Cos φ- mètre	Cosφ	Cosφ
Rpm meter	Tr/min mètre	RPM	RPM
Gen set hour counter	Totalisateur d'heures de marche	Horas de funcionamiento del grupo	Ore di funzionamento del gruppo
Battery Volts	Voltmètre batterie	Tensión baterís	Volt batteria

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

ACP 0411 ATS

COMPLETE CONTROL PANEL FREE STANDING TYPE
Equipment: control unit, frequency and voltage indicators, genset/mains supply contanctors, automatic battery charger.

COFFRET ELECTRIQUE COMPLET TYPE ARMOIRE SEPARE DU GROUPE
Equipement : unité de contrôle, indicateurs fréquence et tension, inverseur de source, chargeur de batterie automatique.

CUADRO ELECTRICO COMPLETO EN ARMARIO SEPARADO DEL GRUPO
Equipamiento: ficha de control, indicadores frecuencia y tensión, contactores grupo/red, cargador de batería automático.

QUADRO ELETTRICO COMPLETO SEPARATO DAL GRUPPO
Equipaggiamento: unità di controllo, indicatori di frequenza e tensione, contattori gruppo/rete, carica batteria automatico.

0411

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

GB	F	E	I
With a generating set wired to ACP 0411 ATS control panel, the power can be switched automatically to electrical services within few seconds (15-20) after activation of the signal indicating a cut in the mains supply.	Un groupe électrogène équipé avec un coffret électrique ACP 0411 ATS peut être démarré automatiquement dans quelques seconds (15-20) à partir de l'activation du signal d'arrêt dans la fourniture du secteur.	Un grupo electrógeno equipado con un cuadro electric ACP 0411 ATS puede ser arrancado automaticamente dentro de algunos segundos (15-20) de la activación de la señal de falta de la erogación de la red eléctrica.	Un gruppo elettrogeno collegato con un quadro automatico ACP 0411 ATS può essere avviato automaticamente entro pochi secondi (15-20) dall'attivazione del segnale che indica un arresto nella fornitura della linea principale.
MAIN PERFORMANCES	**PERFORMANCES**	**PRESTACIONES**	**PRESTAZIONI**
• 4 impulses automatic start • Immediate or delayed start after mains failure • Genset unit automatic anomaly surveillance • Weekly autotest • Immediate or delayed stop after mains voltage return • Engine protections • Current and voltage controlled battery recharging • Clock for programming the start up or stopping of the genset	• Démarrage automatique à 4 impulsions • Démarrage immediate ou retardé après manqué tension réseau • Surveillance automatique des anomalies • Autotest hebdomadaire • Arrêt immediate ou retardé au retour de la tension réseau • Protections moteur • Recharge batterie contrôlée en courant et en tension • Horloge pour la programmation de le démarrage et de l'arrêt	• Arranque automático a 4 impujados • Arranque inmediato o retrasado después falta red eléctrica • Monitorización automática faltas grupo • Autotest semanal • Parada inmediata o retrasada depués de la vuelta del voltaje red • Protecciones motor • Cargamiento batería con control de corriente y de voltaje • Reloj para la programación del arranque o de la parada del generador	• Avviamento automatico con 4 impulsi • Avviamento immediato o ritardato dopo mancanza rete • Sorveglianza automatica anomalie gruppo elettrogeno • Autotest settimanale • Arresto immediato o ritardato al ritorno tensione rete • Protezioni del motore • Ricarica batteria controllata in corrente e in voltaggio • Orologio per la programmazione dell'avviamento o dello spegnimento del generatore
INDICATORS	**INDICATEURS**	**INDICADORES**	**INDICATORI**
Mains voltmeter Generator voltmeter (1 phase) Generator ammeter (as option) Generator frequency meter Hour meter Battery voltmeter Fuel level indicator	Voltmètre secteur Voltmètre génerateur (1 phase) Ampèremètre génerateur (en option) Fréquencemètre génerateur Compteur horaire Voltmètre batterie Niveau combustible	Voltimetro red Voltimetro generador (1 fase) Amperimetro generador (como opción) Frecuencimetro generador Medidas horas de marcha Voltimetro batería Nivel carburante	Indicatore tensione rete Indicatore tensione generatore (1 fase) Amperometro generatore (in opzione) Indicatore frequenza generatore Contaore Indicatore tensione batteria Livello carburante
PROTECTIONS	**PROTECTIONS**	**PROTECCIONES**	**PROTEZIONI**
Generator failure High engine temperature (as option) Overfrequency Low oil pressure Overcrank Battery not charged Low fuel level	Anomalie générateur Haute temperature moteur (en option) Surfréquence Basse pression huile moteur Surcharge groupe Batterie non chargée Bas niveau carburant	Anomalía grupo Elevada temperature motor (como opción) Sobrefrecuencia Baja presión aceite Sobrecarga Batería sin carga Bajo nivel combustible	Anomalie generatore Alta temperatura motore (in opzione) Sovrafrequenza Bassa pressione olio Sovraccarico Batteria non carica Livello di carburante basso

SOUNDPROOF CANOPY
CAPOTE D'INSONORISATION
CAPOTA DE INSONORIZACION
CABINA INSONORIZZATA

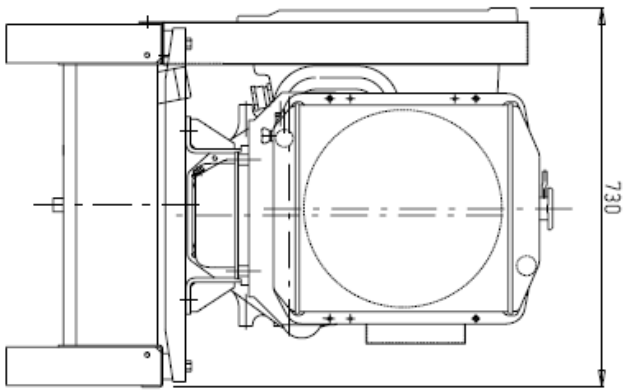
GB	F	E	I
The TecnoGen Super Silent soundproof canopy has been designed with the aim of achieving the maximum noise level reduction and to provide a perfect cooling of the engine. The cooling airflow is forced through fixed circuits. The canopy is suitable for tropical ambient application. The exhaust gas silencer is residential type internally mounted. The canopy is completely built of hot galvanized carbon sheet steel. The sheets have a thickness 20/10. The structure is fully bolted, fixed by a special polyethylene sealing, completely free from electrical installation. All the panels can be easily removed. The cab is provided with doors of wide opening for easy access to generating set for the maintenance operations. The soundproofing materials are highly fire resistant and self-extinguishing.	La capote insonorisée TecnoGen Super Silent à été conçue pour atteindre le niveau de bruit le mineur possible et un refroidissement du moteur parfait. Le souffle d'air refroidissant est canalisé en circuits fixes. La capote est apte à être utilisée dans les ambiances tropicales. Le silencieux des gaz d'échappement, de type résidentiel, est mis à l'intérieur de la capote. La cabine est construite en acier galvanisé à chaud. Les tôles ont une épaisseur de 20/10. La structure est complètement boulonnée et fixée à travers des garnitures spéciales au polyéthylène. Tous les panneaux sont facilement amovibles. La cabine est dotée de portes avec grandes ouvertures qui permettent un accès facile au groupe électrogène pour les opérations de manutention. Les matériaux d'insonorisation sont fortement résistant au feu et auto-extinguibles.	La capota insonorizada TecnoGen Super Silent tiene sido planeada con el objetivo de alcanzar el menor nivel de rumorosidad posible y un perfecto enfriamiento del motor. El soplo de aire es canalizado en circuitos fijos. La cabina es apta a ser utilizada en ambientes tropicales. El silenciador de los gases de descargue, de tipo residencial, es colocado dentro de la cabina. La cabina es construida en acero cincado. Las chapas tienen un espesor de 20/10. La estructura es completamente bullonata y montada con sellos especiales de polietilene. Todos los paneles son fácilmente removibles. La cabina es dotada con puertas con amplias aberturas que permiten el fácil acceso al grupo electrógeno por las operaciones de manutención. Los materiales insonorizantes son muy resistentes al fuego y auto-exinguentes.	La cabina insonorizzata TecnoGen Super Silent è stata progettata allo scopo di raggiungere il minor livello di rumorosità possibile e un perfetto raffreddamento del motore. Il soffio d'aria raffreddante è canalizzato in circuiti fissi. La cabina è adatta ad essere utilizzata in ambienti tropicali. Il silenziatore dei gas di scarico, di tipo residenziale, è collocato all'interno della cabina. La cabina è costruita in acciaio zincato a caldo. Le lamiere hanno uno spessore di 20/10. La struttura è completamente bullonata e fissata tramite speciali sigilli al polietilene. Tutti i pannelli sono facilmente rimovibili. La cabina è dotata di porte con ampie aperture che consentono il facile accesso al gruppo elettrogeno per le operazioni di manutenzione. I materiali insonorizzanti sono altamente resistenti al fuoco e autoestinguenti.

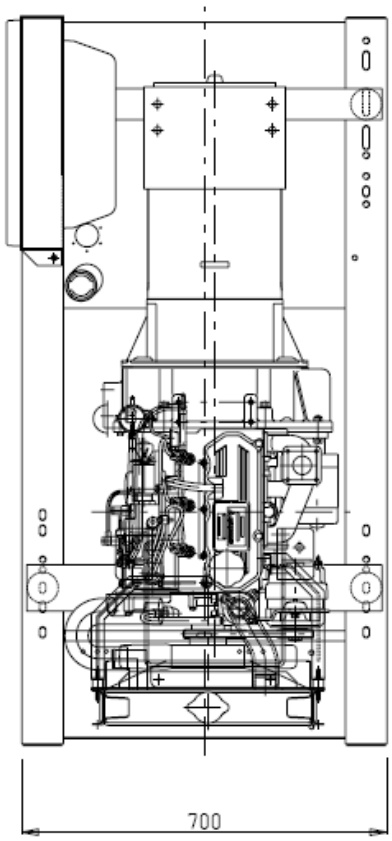
Our quality in 10 points
Notre qualité résumée en 10 points
Nuestra calidad en 10 puntos
La nostra qualità in 10 punti

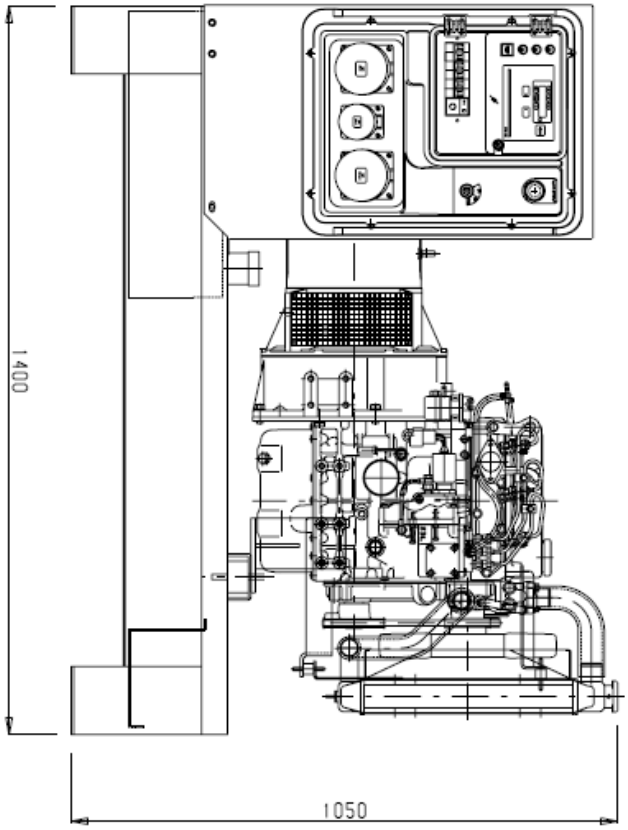
1		Internal residential silencer for lower sound levels Silencieux interne pour un niveau bas de bruit Silenciador interno para un nivel de rumorosidad más bajo Silenziatore interno per un livello di rumorosità piú basso
2		Integrated fuel tank of different sizes Réservoirs de combustible disponibles, sur demande, de capacité supérieure Tanques integrados disponibles, como opción, de capacidad superior Serbatoi integrati disponibili, su richiesta, di capacità superiore
3		Control panel viewing window to easily check status of generating set Fenêtre de visualisation du panneau de contrôle pour un contrôle plus facile du status opérationnel du groupe Ventana de visualización del panel de control por un más fácil control del estatus operativo del grupo Finestra di visualizzazione del pannello di controllo per un piú facile controllo dello status operativo del gruppo
4		Lockable access doors for extra safety and security Porte d'accès avec serrure pour une sûreté majeure Puertas de acceso con cerradura para una mayor seguridad Porte di accesso con serratura per una maggiore sicurezza
5		Galvanized bolts Boulons galvanisés Pernos cincados Bulloni zincati
6		Emergency stop button Interrupteur d'arrêt d'urgence Botón parada de emergencia Pulsante arresto di emergenza
7		Doors location convenient to controls and service area Placement des portes pour rendre les contrôles plus faciles Colocación de las puertas para facilitar los controles Collocazione delle porte per facilitare i controlli
8		High serviceability level Haut niveau d'accessibilité pour la manutention Alto nivel de accesibilidad para la manutención Alto livello di accessibilità per la manutenzione
9		Central lifting hook Crochet central d'enlèvement Gancho de elevación Gancio di sollevamento centrale
10		Galvanized metal steel sheet pre-treated prior to powder coating Tôles en acier galvanisé pré-traitées avant le vernissage à poudre Chapas de acero cincado pre-tratadas antes de la pintura a polvo Lamiere di acciaio zincato pre-trattate prima della verniciatura a polvere

OPEN SKID VERSION DRAWING
DESSIN VERSION SUR SKID
DIBUJO VERSION ABIERTA
DISEGNO VERSIONE APERTA

DIMENSIONI SENZA SILENZIATORE

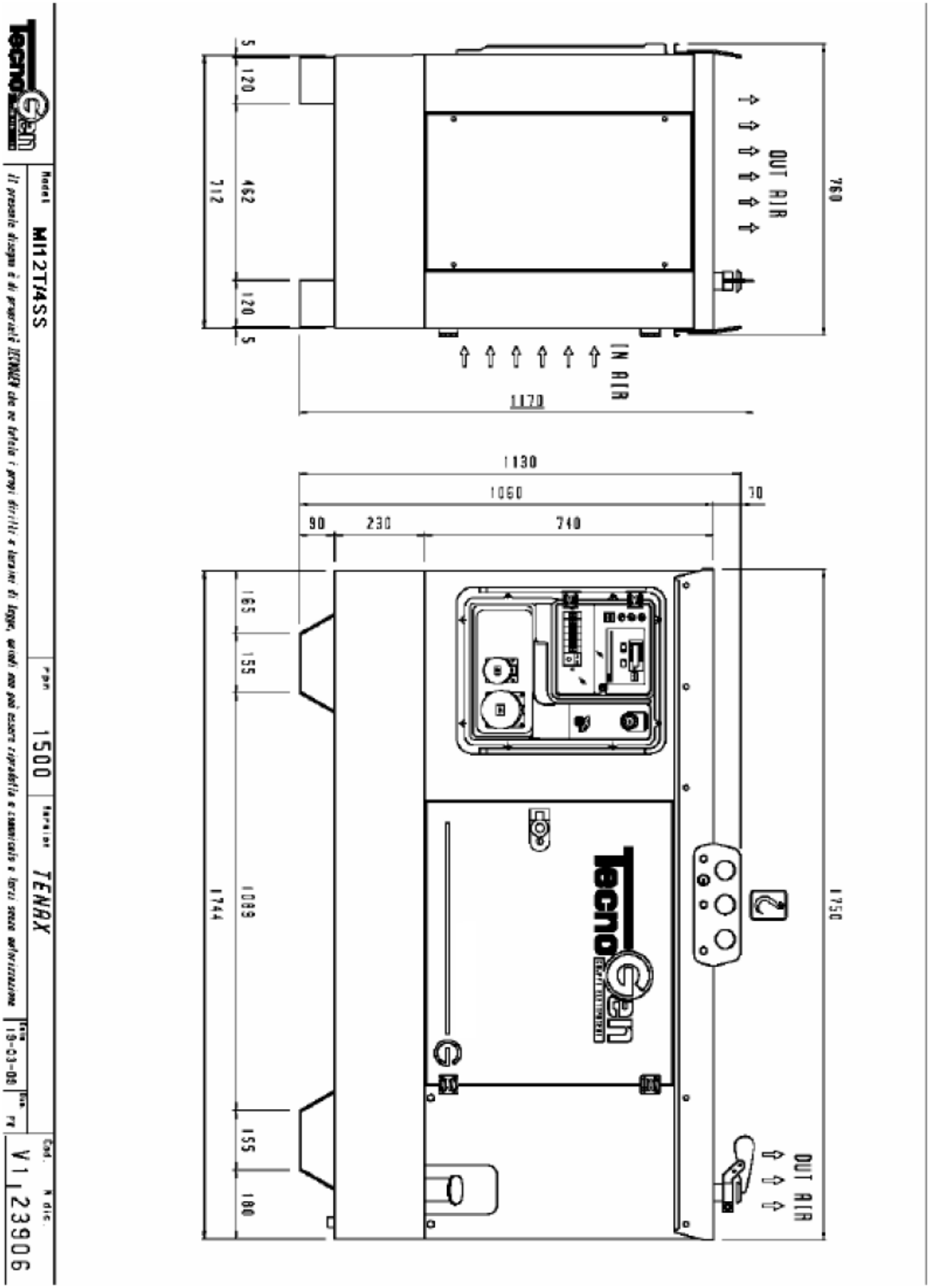






Modello	MI 12 T/4
Motore	MITSUBISHI S3L2
Alternatore	MECC-ALTE ECO3-1L
Kg	
rpm	1500
Data	10-05-09
Versione	APERTA
Firma	Pagani V
Cod N dis	V1-24000

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



1. Principal Particulars of Diesel Engine

General Specification

Standard	All items, unless otherwise specified, are in accordance with JIS and maker's standards
Model	Mitsubishi S3L2 S3L2-61SD (MHI No. 31B00-00240 1/2-CHG2,2/2-CHG2)
Type	4 cycle water-cooled, vertical overhead valve, cylinder in line, swirl chamber type
Number of cylinders	3
Bore × Stroke	78mm × 92mm
Piston displacement	1.318 liters
Compression ratio	22 : 1
Rotation	Anti-Clockwise rotation as viewed from flywheel side
Firing order	1-3-2
Engine weight(Dry)	Approx. 150kg
Dimensions(Length)	Approx. 581mm
(Width)	Approx. 452mm
(Height)	Approx. 573mm
Inclination(Continuous)	15°
(Temporary)	30°(Max. 30 min.)
Fuel	ASTM diesel fuel oil No.2-D(JIS K2204 gas oil specification No.2 or 3)
Lubricating oil	API classification service CD class
Output(Without fan)	Spec.Rating / Rating at delivery Breaking in around 50hr / Breaking in around 0.25hr St-by;11.0kW{14.9PS}/1485rpm / St-by;10.5kW{14.2PS}/1485rpm Prime;9.9kW{13.5PS}/1485rpm / Prime;9.4kW{12.8PS}/1485rpm (With Fan St-by;10.8kW{14.7PS}/1485rpm) (With Fan Prime,9.7kW{13.2PS}/1485rpm)
Tolerance	±5% of nominal
Idling engine speed	1560(+30,0)rpm
Speed regulation	Steady state speed regulation at rated speed, within 5%
Rating conditions	ISO 3046 Total barometric pressure : 100kPa Air temperature : 298K Relative humidity : 30%
Fuel consumption	Approx. 251g/kW-h{185g/PS-h}at Prime output
Tolerance	±8%
Oil consumption	Within 2.7g/kW-h{2.0g/PS-h}
Fuel injection timing	17°BTDC
Mean effective pressure	0.67MPa{6.8kgf/cm2} at Prime output
Piston speed	4.6m/s at 1485rpm

Fuel system

Fuel injection pump	BOSCH type
Fuel injection nozzle	Throttle type
Governor	Mechanical centrifugal type
Fuel filter	Filtering paper type
Min. required fuel feeding head	100mm
Max.static head of leak	200mmHg

Lubricating system

Lubricating system	Forced circulation by gear pump
Lubricating oil filter	Filtering paper type, full flow
Oil pressure	0.29MPa~0.39MPa{3~4kgf/cm2} at duty run 0.098MPa{1.0kgf/cm2} min. at low idling
Oil capacity	Approx. 4.2 liters (Oil pan high level 3.7 liters,Oil filter etc. Approx. 0.5 liters,High ~ Low Approx. 1.3 liters)
Oil dipstick	Standard dipstick
Oil pressure switch	Yes

Cooling system

Cooling system	Forced circulation of fresh water by centrifugal pump with thermostat
Engine water capacity	Approx. 1.8 liters
Cooling fan	320mm diameter, 6 blades, pusher
Water pump pulley	PCD 87mm
Pulley ratio	1.33 (Crankpulley : Water pump pulley = 116:87)
Fan spacer	no
Water temp. switch	yes
Thermo. Unit	no
Thermostat	Open at 82deg.C - full open at 95deg.C

Electrical system

Alternator	12V - 50A
Voltage regulator	IC type (Built in alternator)
Ragulator set voltage	14.7±0.3V
Alternator pulley	PCD 65mm
Starting system	Electric starting
⚠3 Starter motor	12V-1.7kW
Glow plug	10.5V,9.7A x 3
Engine shut off system	Electric solenoid (ETR)

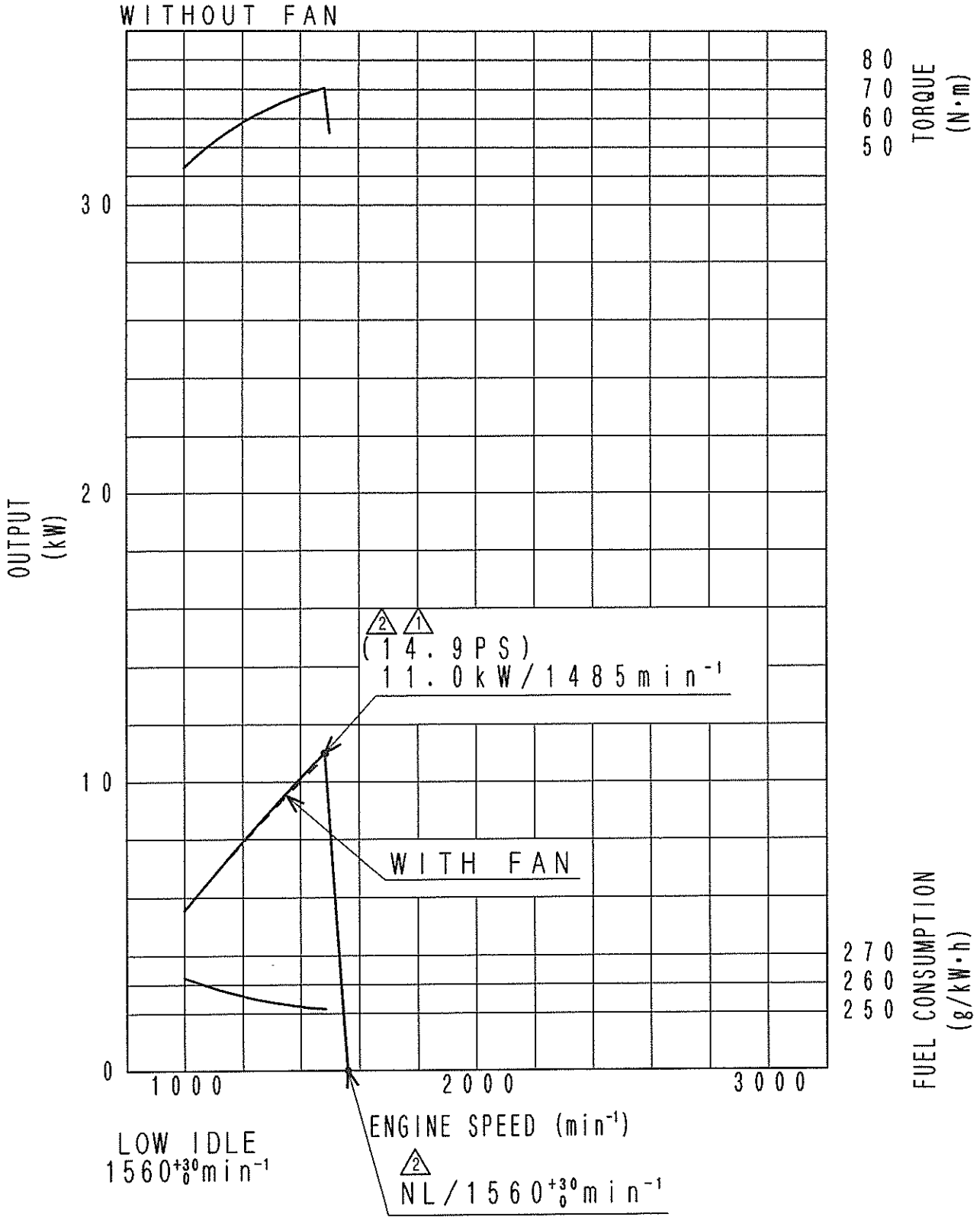
Intake and Exhaust system

Intake manifold(cover)	Side way
Exhaust manifold	Upper side way
Induction Resistance	Max 1.96kPa{0.2m$H_2$0}
Exhaust Back Pressure	Max 6.57kPa{0.67m$H_2$0}

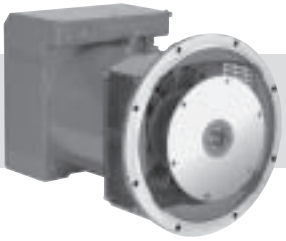
<Remarks>

Engine color	Black(MHI standard color)
Flywheel	SAE #7-1/2
Flywheel housing	SAE #5

MITSUBISHI DIESEL ENGINE
MODEL S3L2-61SD
PERFORMANCE CURVE



ISO 3046 Total barometric pressure : 100kPa
Air temperature : 298K
Relative humidity : 30%



mecc alte

COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
ISO 9001

ECO3N

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

4 POLE

CARATTERISTICHE / CHARACTERISTICS / CARACTERISTIQUES / TECNISCHE MERKMALE / CARACTERISTICAS

INDUSTRIAL RATINGS

ambient 40° C

Type	KVA - cosφ 0.8 - 3 Phase continuous							RENDIMENTI - EFFICIENCY - RENDEMENT WIRKUNGSGRAD - RENDIMIENTOS			1 Phase KVA
50 Hz	CL. H (Δ T= 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	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	COSφ = 1 CL. H (ΔT = 125°C) DELTA
ECO3-1SN/4	6,5	**6,5**	6,5	5,5	6	**6**	6	78,9	82,4	81,8	4,4
ECO3-2SN/4	8	**8**	8	6,5	7,5	**7,5**	7,5	80,4	84,7	83,7	5,5
ECO3-1LN/4	11	**11**	11	9	10	**10**	10	84,4	86,4	85,9	7,5
ECO3-2LN/4	13,5	**13,5**	13,5	11	12,5	**12,5**	12,5	85,1	86,7	86,1	9
ECO3-3LN/4	15	**15**	15	12	14	**14**	14	85,4	86,9	86,3	10

60 Hz	CL. H (ΔT= 125°C)				CL. F (ΔT= 105°C)			RENDIMENTI - EFFICIENCY - RENDEMENT WIRKUNGSGRAD - RENDIMIENTOS			1 Phase KVA
								η % CL. H (ΔT= 125°C)			
Series Star Y Parallel Star YY Series Delta Δ Parallel Delta ΔΔ	440 220 254 127	460 230 265 133	480 240 277 138	IP45 480 V	440 220 254 127	460 230 265 133	480 240 277 138	2/4	3/4	4/4	COSφ =1 CL. H (ΔT = 125°C) DELTA
ECO3-1SN/4	7,8	7,8	**7,8**	6,6	6,5	7,2	**7,2**	80,4	83,9	83,3	5,3
ECO3-2SN/4	9,6	9,6	**9,6**	7,8	8	9	**9**	81,9	86,3	85,4	6,6
ECO3-1LN/4	13,2	13,2	**13,2**	10,8	11	12	**12**	85,4	87,8	87,7	9
ECO3-2LN/4	16,2	16,2	**16,2**	13,2	13,5	15	**15**	86,1	88	87,9	10,8
ECO3-3LN/4	18	18	**18**	14,7	15	16,5	**16,5**	86,4	88,4	88,2	12

MARINE RATINGS ΔT = 90°C

ambient 45° C

Type	50 Hz 3 Phase continuous						60 Hz 3 Phase continuous					
	KVA - cosφ 0.8			RENDIMENTI - EFFICIENCY - RENDEMENT WIRKUNGSGRAD - RENDIMIENTOS η %			KVA - cosφ 0.8			RENDIMENTI - EFFICIENCY - RENDEMENT WIRKUNGSGRAD - RENDIMIENTOS η %		
Series Star Y Parallel Star YY Series Delta Δ Parallel Delta ΔΔ	380 190 220 110	400 200 230 115	415 208 240 120	2/4	3/4	4/4	440 220 254 127	460 230 265 133	480 240 277 138	2/4	3/4	4/4
ECO3-1SN/4	6	**6**	6	78,3	81,9	82,1	6,5	7,2	**7,2**	79,8	83,4	83,8
ECO3-2SN/4	7	**7**	7	79,2	83,4	84,5	7,5	8,4	**8,4**	80,6	85	86,2
ECO3-1LN/4	10	**10**	10	84	86	86,2	11	12	**12**	84,9	87,3	87,8
ECO3-2LN/4	12	**12**	12	84,7	86,3	86,5	13	14,4	**14,4**	85,6	87,5	88
ECO3-3LN/4	13	**13**	13	84,9	86,5	86,7	14	15,6	**15,6**	85,9	87,7	88,2

Type	J (Kgm²)			Peso/Weight Poids/Gewicht (Kg)			Vol. d'aria/Air Vol./Vol. d'air Luftmenge/Vol. de aire (m³/min)		Rumore - Noise - Bruit Geräusch - Ruido dB(A)			
									50 Hz		60 Hz	
	B3/B14	B3/B9	MD35	B3/B14	B3/B9	MD35	50 Hz	60 Hz	1m	7m	1m	7m
ECO3-1SN/4	0,05357	0,0552	0,0534	59	57	63	3,5	3,9	72	58	78	60
ECO3-2SN/4	0,0623	0,0626	0,0626	66	64	70	3,5	4,1				
ECO3-1LN/4	0,0757	0,0753	0,0755	78	76	82	3,3	4				
ECO3-2LN/4	0,0907	0,0903	0,0905	87,5	85,5	91,5	3	3,5				
ECO3-3LN/4	0,0947	0,0923	0,0945	92	90	96	3	3,5				

Giunto a dischi / Coupling discs Disque de monopalier / Scheibenkupplung Junta a discos	
SAE N°	J (kgm²)*
6½	0,0067
7½	0,0103
8	0,0171
10	0,0319
11½	0,0481

*Il valore J della forma MD35 si ottiene sommando il J della forma MD35 con quello del giunto a dischi SAE prescelto.
The J value of form MD35 is obtained by summing the J of the MD35 form with the J of the chosen SAE coupling discs.
La valeur de la forme MD35 est obtenue en sommant le J de la forme MD35 avec celui du disque de monopalier SAE.
Der Wert J der Form MD35 wird durch die Summe von J der Form MD35 und J der ausgewähiten SAE Scheibenkupplung erreicht.
El valor J de la forma MD35 se obtiene sumando el J forma MD35 con la de la junta a discos SAE seleccionada.

Dati di targa / Rating / Données pour plaque
Angaben auf dem Schild / Caraterísticas nominales

CE

cULus INSULATION SYSTEM

DATI ELETTRICI TIPICI / TYPICAL ELECTRICAL DATA / DONNEES ELECTRIQUES
TYPISCHE ELEKTRISCHE DATEN / DATOS GENERALES ELECTRICOS

TIPO / TYPE / TYPE / TYP / TIPO		ECO3-1SN/4	ECO3-2SN/4	ECO3-1LN/4	ECO3-2LN/4	ECO3-3LN/4
Potenza classe “F” / Rating “F” class Puissance class “F” / Leistung klasse “F” Potencia clase “F”	kVA 50 Hz	6	7,5	10	12,5	14
	kVA 60 Hz	7,2	9	12	15	16,5
Reattanza sincrona diretta / Direct - axis synchronous reactance / Reactance longitudinale synchrone / Direkte Synchronreaktanz / Reactancia sincrónica directa	Xd %	169,2	182	215	138,8	140
Reattanza transitoria diretta / Direct - axis transient reactance / Reactance longitudinale transitoire / Direkte vorübergehende Reaktanz / Reactancia transitoria directa	X’d %	16,6	16,4	21,5	13,9	14,2
Reattanza subtransitoria diretta / Direct - axis subtransient reactance / Reactance longitudinale subtransitoire / Direkte momentane Reaktanz / Reactancia subtransitoria directa	X”d %	14,1	11,8	15,2	9,8	9,8
Reattanza sincrona in quadratura diretta / Quadrature - axis synchronous reactance / Reactance transversale synchrone / Um 90° verschoben Synchronreaktanze / Reactancia sincrónica en cuadratura	Xq %	59,4	60,1	68,8	69,3	78
Reattanza transitoria in quadratura / Quadrature- axis transient reactance / Reactance transversale transitoire / Um 90° verschobene vorubergehende Reaktanz / Reactancia transitoria en cuadratura	X’q %	59,4	60,1	68,8	69,3	78
Reattanza subtransitoria in quadratura / Quadrature-axis subtransient reactance / Reactance transversale subtransitoire / Um 90° verschoben momentane Reaktanz / Reactancia subtransitoria en cuadratura	X”q %	68,1	64,3	79,9	51,6	52
Reattanza di sequenza inversa / Negative - sequence reactance / Reactance inverse / Gegenereaktanz / Reactancia de sequencia inversa	X_2 %	15,48	16,2	18,3	16,6	17,1
Reattanza di sequenza zero / Zero sequence reactance / Reactance homopolaire / Null - Phasenfolge Reaktanz / Reactancia de secuencia cero	Xo %	6,1	5,7	6	5,5	5,4
Costante di tempo transitoria / Transient time constant / Constante de temps transitoire / Vorübergehende Zeitkostante / Constante de tiempo transitoria	T’d (ms)	26	17	36	44	42
Costante di tempo subtransitoria / Subtransient time constant / Constante de temps subtransitoire / Momentane Zeitkostante / Constante de tiempo subtransitoria	T”d (ms)	25	11	13	9	10,5
Costante di tempo unidirezionale / Armature time costant / Constante de temps d’armature / Einseitig gerichtete Zeitkostante / Constante de tiempo unidireccional	T α (ms)	11	12	46	10	11,2
Costante di tempo a vuoto / Open circuit time costant / Constante de temps transitoire à vide / Leerlauf - Zeitkostante / Constante de tiempo en vacio	T’do (s)	0,71	0,73	0,79	0,84	0,84
Rapporto di cortocircuito / Short - circuit ratio / Rapport de court circuit / Kurzschlussverhätnis / Relación de cortocircuito	Kcc	1	0,8	0,9	0,98	1,1
Resistenza di avvolgimento statore / Stator winding resistance / Rèsistance de bobinage du stator Wicklungswiederstand Resistencia de bobinado estator	Ω 1-2 20°C	1,938	1,272	0,914	0,732	0,628

REGULATOR		PARALLEL DEVICE	THERMAL PROTECTION			HEATERS	MECHANICAL PROTECTION			
SR7/2	UVR6		PTC	BIMET DEVICE.	PT100		IP21	IP23	IP45	IP55
●	□		□	□	□	□		●	□	□

● = Standard □ = Optional

DSEGenset

DSE

DSE6110/20

AUTO START & AUTO MAINS FAILURE CONTROL MODULES

FEATURES

The DSE6110 is an Auto Start Control Module and the DSE6120 is an Auto Mains (Utility) Failure Control Module suitable for a wide variety of single gen-set applications.

Monitoring speed, frequency, voltage, current, oil pressure, coolant temperature and fuel level, the modules will display warnings, shutdown and engine status information on the back-lit LCD screen and illuminated LED.

Both modules offer electronic (CAN) and non-electronic (magnetic pick-up/alternator sensing) engine versions and offer a number of flexible inputs, outputs and engine protections so the system can be easily adapted to suit a wide range of application demands.

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

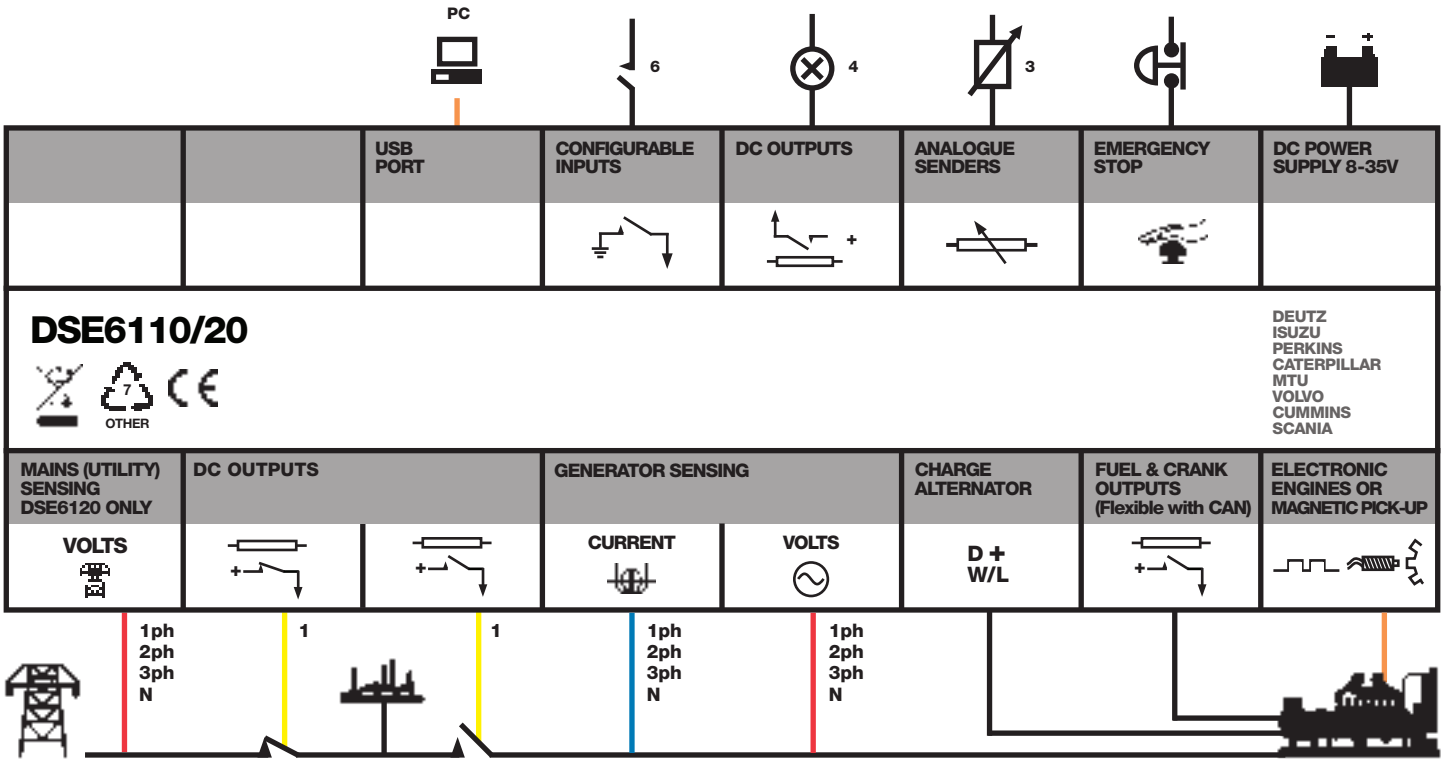
VIBRATION
BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm,
8 Hz to 500 Hz @ 2 gn

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 optional sealing gasket.

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



ISSUE 2

DSEGenset

DSE

DSE**6110/20**

AUTO START & AUTO MAINS FAILURE CONTROL MODULES

FEATURES

DSE**6120**

DSE**6110**

KEY FEATURES

- Back-lit text LCD display
- Front panel editing
- LED and LCD alarm indication
- Power Save mode
- CAN and Magnetic Pick-up/Alt. versions available (specify on ordering)
- PC and front panel configuration
- 6 Digital inputs
- 3 Analogue inputs
- 6 Outputs (4 configurable on Magnetic Pick-up/Alt., 6 configurable on CAN version)
- Configurable timers and alarms
- Alternative configuration
- Event Log (10)
- Remote Start input
- 3 Phase generator monitoring
- Current Monitoring and protection
- 3 Phase Mains (Utility) monitoring (DSE6120 only)
- Test button (DSE6120 only)
- Battery voltage monitoring
- Engine pre-heat
- Hours counter
- Comprehensive shutdown or warning on fault condition

KEY BENEFITS

- Automatically transfers between mains (utility) and generator power (DSE6120 only)
- Hours counter provides accurate information for monitoring and maintenance periods
- User-friendly set-up and button layout
- Multiple engine parameters are monitored simultaneously
- Module can be configured to suit individual applications
- Compatible with a wide range of CAN engines
- Uses DSE Configuration Suite PC software for simplified configuration
- IP65 rating (with optional gasket) offers increased resistance to water ingress
- Licence-free PC software

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
178 mA at 12 V, 95 mA at 24 V

MAXIMUM STANDBY CURRENT
88 mA at 12 V, 50 mA at 24 V

CHARGE FAIL/EXCITATION RANGE
0 V to 35 V

MAINS (UTILITY) DSE6120 ONLY

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

FREQUENCY RANGE
3.5 Hz to 75 Hz

OUTPUTS

OUTPUT A (FUEL)
2 A DC at supply voltage

OUTPUT B (START)
2 A DC at supply voltage

AUXILIARY OUTPUTS C,D,E & F
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
215 mm x 158 mm x 42 mm
8.5” x 6.2” x 1.6”

PANEL CUT-OUT
182 mm x 137 mm
7.2” x 5.4”

MAXIMUM PANEL THICKNESS
8 mm
0.3”

RELATED MATERIALS

TITLE	PART NO’S
DSE6110 Installation Instructions	053-059
DSE6120 Installation Instructions	053-060
DSE6100 Quick Start Guide	057-102
DSE6100 Operator Manual	057-095
DSE6100 Configuration Suite PC Manual	057-096

DEEP SEA ELECTRONICS PLC UK
Highfield House, Hunmanby Industrial Estate, Hunmanby YO14 0PH
TELEPHONE +44 (0) 1723 890099 **FACSIMILE** +44 (0) 1723 893303
EMAIL sales@deepseaplc.com **WEBSITE** www.deepseaplc.com

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