

GRW405V



Generator engineered and designed to work in a wide variety of applications where temporary power supply is needed. Versatility, high efficiency, high structural resistance, high degree of protection and low noise emissions together with easy-to-use and easy access for maintenance make these generator sets the ideal solution for Rental companies.

Power Rating

Frequency	Hz	50
Voltage	V	400
Phases	№	3
Power factor	cos ϕ	0.8
Standby power LTP	kVA	400.00
Standby power LTP	kW	320.00
MAX current	A	577
Prime power PRP	kVA	365.00
Prime power PRP	kW	292.00
NOMINAL current	A	527



Ratings definition (According to standard ISO8528 1:2005)

PRP - Prime Power:

It is defined as being the maximum power which a generating set is capable of delivering continuously whilst supplying a variable electrical load when operated for an unlimited number of hours per year under the agreed operating conditions with the maintenance intervals and procedures being carried out as prescribed by the manufacturer. The permissible average power output over 24 h of operation shall not exceed 70 % of the prime power.

LTP - Limited-Time running Power:

It is defined as the maximum power available, under the agreed operating conditions, for which the generating set is capable of delivering for up to 500 h of operation per year (whose no more than 300 for continuative use) with the maintenance intervals and procedures being carried out as prescribed by the manufacturers. No overload capability is available.

Power supply 60Hz 480V Three Phase (with supplement DFS)

Frequency	Hz	60
Voltage	V	480
Phase	Nº	3
Power factor	cos ϕ	0.8
Standby power LTP	kVA	441.80
Standby power LTP	kW	353.44
MAX current	A	531
Prime power PRP	kVA	404.20
Prime power PRP	kW	323.36
NOMINAL current	A	486



Engine specifications

Engine manufacturer	Volvo	
Model	TAD1352GE	
Engine cooling system	Water	
Nr. of cylinder and disposition	6 in line	
Displacement	cm ³	12780
Aspiration	Turbocharged	
Speed governor	Electronic	
Oil capacity	l	36
Lube oil consumption @ PRP (max)	%	0.1
Coolant capacity	l	24
Electric circuit	V	24
VERSION SWITCHABLE [50/60Hz]	YES	
ENGINE DATA	Hz	50
[50Hz] Operating Speed-Nominal	rpm	1500
[50Hz] Operating Speed-Nominal	rpm	1500
[50Hz] Exhaust emission level	Stage IIIA	
[50Hz] Specific fuel consumption @ 75% PRP	g/kWh	204
[50Hz] Specific fuel consumption @ 100% PRP	g/kWh	196
ENGINE DATA	Hz	60
[60Hz] Operating Speed-Nominal	rpm	1800
[60Hz] Operating Speed-Nominal	rpm	1800
[60Hz] Exhaust emission optimized for EPA tier (EPA)	Tier 3	
[60Hz] Specific fuel consumption @ 75% PRP	g/kWh	209
[60Hz] Specific fuel consumption @ 100% PRP	g/kWh	205



ENGINE EQUIPMENT

Standards

The engine performance corresponds to ISO 3046, BS 5514 and DIN 6271. Power output guaranteed within 0 to +2% at rated ambient conditions at delivery. Ratings are based on ISO 8528. Engine speed governing in accordance with ISO 8528-5.

Engine and block

- Optimized cast iron cylinder block with optimum distribution of forces
- Wet, replaceable cylinder liners
- Crankshaft induction hardened bearing surfaces and fillets with seven bearings for moderate load on main and high-end bearings
- Keystone top compression rings for long service life
- Replaceable valve guides and valve seats
- Tapered connecting rods for increased piston lifetime
- Over head camshaft and four valves per cylinder

Fuel system

- Electronic unit injectors
- Fuel prefilter with water separator and water-in-fuel indicator / alarm
- Fine fuel filter with manual feed pump and fuel pressure switch

Lubrication system

- Full flow oil cooler
- Full flow disposable spin-on oil filter, for extra high filtration
- Gear type lubricating oil pump, gear driven by the transmission

Cooling system

- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop
- Belt driven coolant pump with high degree of efficiency

Alternator Specifications

Alternator	LEROY SOMER
Model	LSA 46.3 L11
Type	Brushless
Class	H
IP protection	23
Winding insulation	Protection System 2
Poles	4
Winding leads	12
Voltage regulation system	Electronic
Standard AVR	R 450M
Voltage tolerance	% 0.5



SPECIALLY ADAPTED TO APPLICATIONS

The alternator is designed to be suitable for typical generator applications, such as: backup, marine applications, rental, telecommunications, etc.

TOP OF THE RANGE ELECTRICAL PERFORMANCE

- Class H insulation.
- Standard 12 wire re-connectable winding, 2/3 pitch, type no. 6.
- Voltage range:
 - 50 Hz: 220 V - 240 V and 380 V - 415 V
 - 60 Hz: 208 V - 240 V and 380 V - 480 V
- High efficiency and motor starting capacity.
- R 791 interference suppression conforming to standard EN 55011 group 1 class B standard for European zone (CE marking).

EXCITATION AND REGULATION SYSTEM

- Excitation system: AREP
- Voltage A.V.R.: R 450

REINFORCED MECHANICAL STRUCTURE

- Compact rigid assembly to better withstand generator vibrations.
- Steel frame
- Cast iron flanges and shields.
- single-bearing designed to be suitable for heat engines.
- Half-key balancing bearing.
- Sealed for life ball bearing.

PROTECTION SYSTEM SUITED TO THE ENVIRONMENT

- The LSA is IP 23.
- Winding Protection Standard: for clean environments with relative humidity $\leq 95\%$, including indoor marine environments.
- Winding Protection System 2: reinforced insulation for tropical environment (abrasive atmosphere), rental (except for coastal area), relative humidity $> 95\%$

COMPLIANT WITH INTERNATIONAL STANDARDS

The LSA alternator conforms to the main international standards and regulations:
- IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA / UL 1146 (UL 1004 on request), marine regulations, etc.

It can be integrated into a CE marked generator.

The LSA is designed, manufactured and marketed in an ISO 9001 environment and ISO 14001.

CANOPY

Canopy painted in RAL9016 made up of modular panels with 1000h+ tested salt spray resistant zinc metal sheet, with access doors on each side with high quality gaskets and lockable handles for easy maintenance and service.

SUPER SILENT

Soundproofing by means washable and fireproof soundproofing material. Exhaust silencer integrated in the genset shape with flat rain flap.

BASE FRAME

Heavy duty base guarantees the highest standards of durability and resistance, painted using a high quality powder coating process (1000+h tested salt spray resistance).

Fully bundled, able to retain 110% of all the sets fluids, the base frame is provided with integrated fork pockets for easy maneuverability and site positioning.

FUEL TANK

Integrated metal fuel tank complete with double fuel refiling point (one each side)

LEAK PROOF TRAY WITH DETECTOR SENSOR

Fluid leak check in the leak proof tray .

FUEL VALVE (6 WAY)

System designed for use the fuel from external tank and increase the autonomy of the generator

LUBE OIL DRAIN PUMP

Makes it easier to the engine oil change

SINGLE LIFTING POINT

Access easy by rung and handle incorporated (available on both sides)

PLASTIC BUMPER

Protections for the transport and stocking

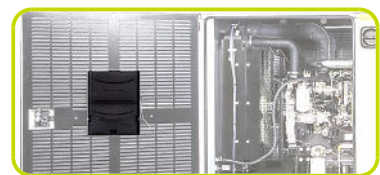
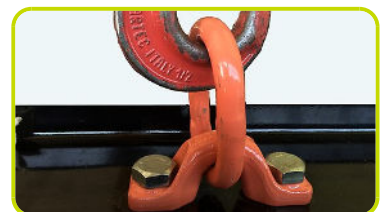
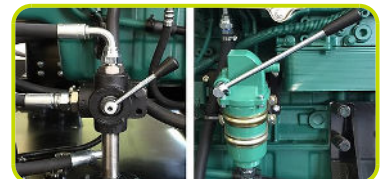
MANUAL BATTERY SWITCH

EARTH ROD

Earth stock with cable fixed inside the genset

DOCS HOLDER

Box intenal for documents, manuals and electrical drawings



Dimensional data

Length	(L) mm	4165
Width	(W) mm	1500
Height	(H) mm	2130
Dry weight	Kg	4800
Fuel tank material		Metal
Fuel tank capacity	l	1180



Autonomy

[50Hz] Fuel consumption @ 75% PRP	l/h	59.07
[50Hz] Fuel consumption @ 100% PRP	l/h	75.20
[50Hz] Running time @ 75% PRP	h	19.98
[50Hz] Running time @ 100% PRP	h	15.69
[60Hz] Fuel consumption @ 75% PRP	l/h	68.72
[60Hz] Fuel consumption @ 100% PRP	l/h	88.59
[60Hz] Running time @ 75% PRP	h	17.17
[60Hz] Running time @ 100% PRP	h	13.32



Noise level 50Hz

Guaranteed noise level (LWA)	dB(A)	97
Noise pressure level @ 1 m	dB(A)	78
Noise pressure level @ 7 m	dB(A)	67



Installation data

[50Hz] Cooling air	m ³ /min	446.80
[50Hz] Exhaust gas flow @ PRP	m ³ /min	54.8
[50Hz] Exhaust gas temperature @ LTP	°C	500
[60Hz] Cooling air	m ³ /min	522.80
[60Hz] Exhaust gas flow @ PRP	m ³ /min	62.7
[60Hz] Exhaust gas temperature @ LTP	°C	535

Control panel availability

AUTOMATIC CONTROL PANEL	ACP
MODULAR PARALLEL PANEL	MPP

ACP - Automatic Control Panel

Mounted on the genset, complete with digital control unit (AC-03) for monitoring, control and protection of the generating set, protected through doors with lockable handle.

CONTROL SECTION

- ON/OFF selector switch
- Emergency push button
- Differential protection with internal switch
- 5A Battery charger.
- Potentiometer for voltage adjustment (internal)
- Alternator AVR (single plug wiring)

Control unit (AC-03)

- Generating set: Voltage, Current, Frequency.
- Generating set Power (kVA - kW - kVAr - Cos φ).
- Mains: voltage.
- Hours-counter.
- Battery voltage.
- Engine speed r.p.m.
- Fuel level (%), Engine temperature, Oil Pressure

Command and others:

- Four operation modes: OFF - Manual starting - Automatic starting - Automatic test.
- Pushbutton for forcing Mains contactor or Genset contactor.
- Push-buttons: start/stop, fault reset, up/down/page/enter selection.
- Acoustic alarm.
- RS232 Communication port.

Protections:

- Engine protections: low fuel level, low oil pressure, high engine temperature,
- Genset protection: under/over voltage, overload, under/over battery voltage, battery charger failure.

Extra Instrumentation (analogue)

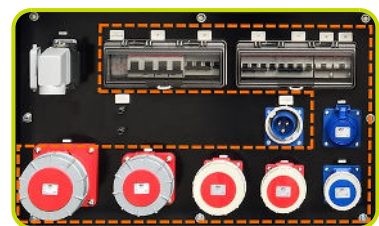
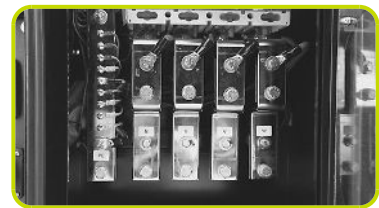
- Fuel level meter
- Mechanical hour counter

POWER SECTION

- It integrates 4 poles modular circuit breaker suitably rated with thermal and magnetic overloads.
- Large and robust busbar with cables passage opening from the bottom for easy power cable connection.
- Provided with safety switch to trip circuit breaker if operator open the power section door to operate on the bus bar.

SOCKET SECTION

Two wires facility for remote start/stop		√
• Plug for auxiliary power supply		√
• Multipin connector for LTS		√
SUPPLEMENT - Only available when order		:
Socket Kit	Type	SPKB1
3P+N+T CEE 400V 125A	n	1
3P+N+T 400V 63A	n	1
3P+N+T CEE 400V 32A	n	1
3P+N+T CEE 400V 16A	n	1
2P+T CEE 230V 16A	n	1
230V 16A SCHUKO	n	1
Each socket with its own circuit breaker		•
Common differential protection for three phase sockets		•
Each single phase provided with earth fault protection		•
Other Kit Socket combinations available		√



MPP - Modular Parallel Panel

Mounted on the genset, complete with digital control unit IntelliVision5 for monitoring, control, protection and load sharing for both single and multiple gen-sets operating in standby or parallel modes (up to 32 gen-sets in island).

CONTROL SECTION

- ON/OFF selector switch
- Emergency push button
- Differential protection with internal switch
- 5A Battery charger.
- Potentiometer for voltage adjustment (internal)
- Alternator AVR (single plug wiring)

Control Unit IntelliVision5 (5,7" Colour TFT display 320×240 pixels)

Majors Measures Available:

- Generating set: Voltage, Current, Frequency, Hours-counter
- Generating set Power: kVA, kW, kVAr, Cos φ, kWh, kVAh.
- Mains: Voltage, Current, Frequency, kW, kVAr, Cos φ.
- Engine: Speed (r.p.m.), Temperature, Oil Pressure
- Fuel level, Battery voltage

Comand and Others:

- Operation modes: OFF, AMF function, Single Parallel to mains Island application, Single Parallel to Mains AMF application, Multiple parallel genset Island application.
- Pushbuttons: start/stop, fault reset, up/down/page/enter selection.
- Acoustic alarm.

Protection:

- Engine protections: low fuel level, low oil pressure, high engine temperature.
- Genset protections: under/over voltage, overload, under/over frequency, starting failure, under/over battery voltage
- Others: overcurrent, short circuit, reverse power, Earth fault.

Extra Instrumentation (analogue)

- Fuel level meter
- Mechanical hour counter

POWER SECTION

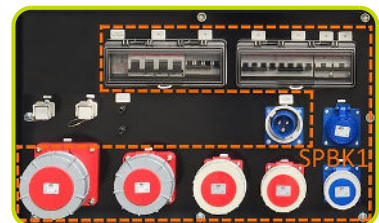
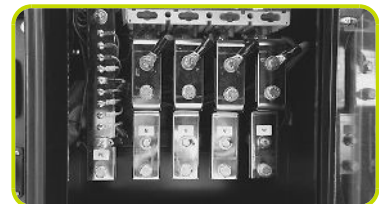
- It integrates 4 poles motorized moulded case circuit breaker suitably rated with thermal and magnetic overloads
- Large and robust busbar with cables passage opening from the bottom for easy power cable connection.
- Provided with safety switch to trip circuit breaker if operator open the power section door to operate on the bus bar.

SOCKET SECTION

- Multi-pin connectors for paralle running ✓
- Two wires facility for remote start/stop ✓
- Plug for auxiliary power supply ✓

SUPPLEMENT - Only available when order :

Socket Kit	Type	SPKB1
3P+N+T CEE 400V 125A	n	1
3P+N+T 400V 63A	n	1
3P+N+T CEE 400V 32A	n	1
3P+N+T CEE 400V 16A	n	1
2P+T CEE 230V 16A	n	1
230V 16A SCHUKO	n	1
Each socket with its own circuit breaker		•
Common differential protection for three phase sockets		•
Each single phase provided with earth fault protection		•
Other Kit Socket combinations available		✓



Supplements:

To be ordered with the equipment :

GENSET CONTROL EQUIPMENT

Dual Frequency Switch (50/60Hz)	Y400/230V 50Hz Y480/277V 60Hz	DFS
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ELECTRICAL OPTION

Remote control trough IL-NT-GPRS + ANTENNA Available for	(ACP)	RCG 16
Free Voltage Contacts with module IL-NT-EFCPM2 + IR-B8 relay board	(ACP)	TLP 6
Remote control trough with InternetBridge-NT	(only with MPP)	RCG 13
Free Voltage Contacts with module IGS-PTM +IR-B8 relay board	(only with MPP)	TLP 4
Differential Protection type B		ADI-B
Insulation Monitoring Device (Replace standard differential protection)		IMD
Socket Section Customized		SPKS
Control section internal lighting (automatic with door switch)		CLS
Internal Canopy Lighting system with manual switch		ICL
Engine analogue gauges (water temp / oil pressure)		EAG



MECHANICAL OPTION

Pre-heating system		PHS
Quick Fit Fuel connectors		QFC
Quick Fit Connectors inside the canopy		QFC1
Water Separator Filter		WSP
Heavy-Duty Air Filter		HDF
Hot Parts Protections		HPP
Exhaust Spark Arestor ATEX certified		ESA
Air Shut-Off Valve		ASV
Galvanized Sliding Skid		GGs
Baseframe Bumpers		BFB



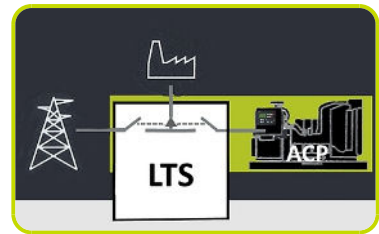
LTS - Load Transfer Switch [Accessories for ACP Automatic Control Panel]

The Load Transfer Switch (LTS) panel operates the power supply changeover between the generator and the Mains in backup applications, guarantying the feeding to the load within a short period of time.

It consists of a standalone cabinet which can be installed separate from the generating set. The logic control of the power supply changeover is operated by means of the Automatic Control Panel (ACP) mounted on the generating set, so therefore none logic device is required on the LTS panel.

LTS Type ATyS_D:

- Box type: steel enclosures
- Installation mode: Wall mounted <400A; Floor Standing =>630A
- Door: Hinged door closed with double barb locking.
- Ingress Protection: IP43
- Gland Plates: Removable on the top & bottom side
- Connections: Bottom/Bottom
- Motor unit
- Gland Plates: Removable on the top & bottom side
- Connections: Bottom/Bottom
- Motor unit
- Switch position indicator
- Auto/Manual cover selector
- Housing for manual handle
- Padlocking mechanism
- Two side by side mounted load break switches
- Poles 4
- Double coils self-powered
- Voltage (coils): 208/277VAC (Tolerance+/-20% 166/333VAC)
- Frequency 50 & 60HZ
- Interface ATyS D10, fixed on the door for the status indication: Two lights to indicate the voltage presence of the grid and the diesel generator; Two lights for the switch position; Functionality mode (auto/manual) and cover protection IP65.
- Compliant with IEC 60947-3, EN 61439-6-1 and GB 14048-11



LTS SUPPLEMENTS AVAILABLE ON REQUEST:

- **ESB** - Emergency Stop Button (installed on the panel front)
- **APP** - Additional IPXXB Protection (internal plexiglass)

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