# GSW650V

| Main Features | | |
|---|---|---|
| Frequency | Hz | 50 |
| Voltage | V | 400 |
| Power factor | cos ϕ | 0.8 |
| Phase | | 3 |

| Power Rating | | |
|---|---|---|
| Standby power LTP | kVA | 657.87 |
| Standby power LTP | kW | 526.30 |
| Prime power PRP | kVA | 597.31 |
| Prime power PRP | kW | 477.85 |

**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.

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| Engine specifications | | |
|---|---|---|
| Engine manufacturer | | Volvo |
| Model | | TAD1642GE |
| [50Hz] Exhaust emission level | | Stage II |
| Engine cooling system | | Water |
| Nr. of cylinder and disposition | | 6 in line |
| Displacement | cm³ | 16120 |
| Aspiration | | Turbocharged intercooled |
| Speed governor | | Electronic |
| Prime gross power PRP | kW | 514 |
| Maximum gross power LTP | kW | 565 |
| Oil capacity | l | 48 |
| Lube oil consumption @ PRP (max) | % | 0.1 |
| Coolant capacity | l | 93 |
| Fuel | | Diesel |
| Specific fuel consumption @ 75% PRP | g/kWh | 195 |
| Specific fuel consumption @ PRP | g/kWh | 198 |
| Starting system | | Electric |
| Starting engine capability | kW | 7 |
| Electric circuit | V | 24 |

**ENGINE EQUIPMENT**

**Standards**

The engine performance corresponds to ISO 3046, BS 5514 and DIN 6271.Ratings are based on ISO 8528. Engine speed governing in accordance with ISO 3046/IV, class A1 and ISO 8528-5 class G3

**Engine and block**

• Optimized cast iron cylinder block with optimum distribution of forces
• Tapered connecting rods to reduce risk of piston cracking
• Piston cooling for low thermal load on pistons and reduced ring temperature
• Replaceable valve guides and valve seats
• Overhead camshaft and four valves per cylinder
• Keystone top compression rings for long service life

**Fuel system**

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

**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, maintenance-free coolant pump with high degree of efficiency

**Lubrication system**

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

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| Alternator Specifications | | |
|---|---|---|
| Alternator | | Mecc Alte |
| Model | | ECO40 1.5L |
| Voltage | V | 400 |
| Frequency | Hz | 50 |
| Power factor | cos ϕ | 0.8 |
| Type | | Brushless |
| Poles | | 4 |
| Standard AVR | | DER1 |
| Voltage tolerance | % | 1 |
| Efficiency @ 75% load | % | 95.1 |
| Class | | H |
| IP protection | | 23 |

**Mechanical structure**
Robust mechanical structure which permits easy access to the connections and components during routine maintenance check-ups.

**Voltage regulator**

Voltage regulation with DER 1. The digital DER 1 is a Digital controlled regulator, based on DSP (Digital Signal Processor) that combines function as Voltage Regulation and Alternator Protections and Diagnostic into a very small single board.
Voltage supply: 40Vac÷270Vac
Maximum continuous output current: 4Adc
Frequency range: 12Hz÷72Hz
Single phase sensing automatic recognition
Average value of voltage regulation
Voltage regulation range (sensing) from 75Vac to 300Vac
Precision of voltage regulation: ± 1% from no-load to nominal load in static condition, with any power factor and for frequency variations ranging from -5% to +20% of the nominal value.
Precision of voltage regulation: ± 0,5% in stabilized conditions (load, temperature).
Transient voltage drop and overvoltage within ± 15%
Voltage recovery time within ± 3% of the value set, in less than 300 msec.
Underspeed protection with adjustable threshold and slope
Overvoltage and undervoltage alarms
Excitation overcurrent protection with delayed intervention
Alarm conditions storage (type of alarm, number of events, duration of the last event, total time)
Memorization of the regulator operation time

**Windings / Excitation system**
Generator stator is wound to 2/3 pitch. This eliminates triple (3rd, 9th, 15th …) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches. MAUX (Standard): The MAUX MeccAlte Auxiliary Winding is a separate winding within the main stators that feeds the regulator. This winding enables to take an overload of 300% forced current (short circuit maintenance) for 20 seconds. This is ideal for motor starting requirements. PMAUX (optional): Alternator can be equipped with the optional PMAUX (Permanent Magnet Generator) which matches the performance and is capable of supporting both linear and distorted loads.

**Insulation / Impregnation**
Insulation is of class H standard. Impregnation is made with premium tropicalised epoxy resins by dipping and dripping. High voltage parts are impregnated by vacuum, so the insulation level is always very good. In the high-power models, the stator windings undergo a second insulation process. Grey protection is applied on the main and exciter stator to give enhanced protection.

**Reference standards**
Alternator manufactured according to , and complies with , the most common specification such as CEI 2-3, IEC 34-1, EN 60034-1, VDE 0530, BS 4999-5000, CAN/ CSA-C22.2 No14-95-No100-95

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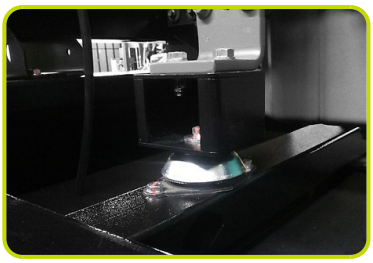
## Genset equipment

**BASE FRAME MADE OF WELDED STEEL PROFILE, COMPLETE WITH:**



• Anti-vibration mountings properly sized

• Screwed support legs.

**PLASTIC FUEL TANK WITH THE FOLLOWING COMPONENT:**

• Filler neck

• Air breather (ventilation pipe)

• Minimum fuel level sensor

**MANUAL OIL DRAININ PUMP**:

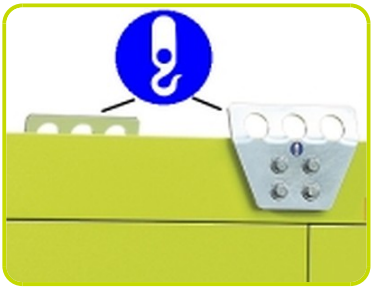
• Oil draining facilities

**ENGINE COMPLETE WITH:**

• Battery

• Liquids (no fuel)

**CANOPY**:



• Soundproof canopy made up of modular panels, realized with zinced steel as treatment against corrosion and aggressive conditions, properly fixed and sealed allowing a full weatherproof enclosure.
• Easy access to the genset for maintenance purposes thanks to: Wide lateral access doors fixed by stainless steel hinges and provided with plastic lockable handles and internal perforated galvanized steel-sheet; Detachable panels, with screws holes protected by rubber tap.
• Control panel protection door provided with suitable window and lockable handle.
• Lateral air inlet opening properly protected and soundproofed. Exhaust air outlet from the roof, trough wet section protected by proper grid.
• Double lifting points frame structure.

**SOUNDPROOF**:

• Noise attenuation thanks to soundproofing material

• Efficient residential silencer placed inside the canopy

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| Dimensional data | | |
|---|---|---|
| Length | (L) mm | 4400 |
| Width | (W) mm | 1560 |
| Height | (H) mm | 2250 |
| Dry weight | Kg | 4945 |
| Fuel tank capacity | l | 636 |
| Fuel tank material | | Plastic |

| Autonomy | | |
|---|---|---|
| Fuel consumption @ 75% PRP | l/h | 90.04 |
| Fuel consumption @ 100% PRP | l/h | 121.16 |
| Running time @ 75% PRP | h | 7.06 |
| Running time @ 100% PRP | h | 5.25 |

| Noise level | | |
|---|---|---|
| Guaranteed noise level (LWA) | dB(A) | 105 |
| Noise pressure level @ 7 m | dB(A) | 75 |

dB GUARANTEE

| Installation data | | |
|---|---|---|
| Exhaust gas flow @ PRP | m³/min | 94.4 |
| Exhaust gas temperature @ LTP | °C | 482 |

| Electrical Data | | |
|---|---|---|
| Battery capacity | Ah | 180 |
| MAX current | A | 949.59 |
| Circuit breaker | A | 1000 |

| Control panel availability | |
|---|---|
| AUTOMATIC CONTROL PANEL | ACP |
| MODULAR PARALLEL PANEL | MPP |

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## ACP - Automatic control panel

Mounted on the genset, complete with digital control unit AC03 for monitoring, control and protection of the generating set, protected through door with lockable handle

### DIGITAL INSTRUMENTATION
• Generating set voltage (3 phases)
• Mains voltage
• Generating set frequency
• Generating set current (3 phases)
• Battery voltage
• Power (kVA - kW - kVAr)
• Power factor Cos φ
• Hours-counter
• Engine speed r.p.m.
• Fuel level (%)
• Engine temperature (depending on model)

### COMMANDS 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
• Remote starting availability
• DC system disconnection switch
• Acoustic alarm
• Automatic battery charger
• RS232 Communication port
• Settable PASSWORD for protection level

### PROTECTIONS WITH ALARM
• 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

### PROTECTIONS WITH SHUTDOWN
• Engine protections: low fuel level, low oil pressure, high engine temperature
• Genset protection: under/over voltage, overload, under/over battery voltage, battery charger failure
• Circuit breaker protection: III poles
• Earth Fault included in the control unit

### OTHERS PROTECTIONS
• Emergency stop button
• Panel protected through door with lockable handle

### OUT PUT PANEL ACP

| | |
|---|---|
| Predisposed for remote control optional: | RCG |
| External Terminal Board (ETB) | Standard |
| Socket kit | Optional |

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## MPP - Modular parallel panel

Mounted on the genset, complete with digital control unit InteliVision5 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).

**DIGITAL INSTRUMENTATION**
- Mains: voltage, Intensity, Frequency.
- Mains kW - kVAr -Power factor Cos f.
- Generating set voltage (3 phases).
- Generating set frequency.
- Generating set current (3 phases).
- Generating set Power (kVA - kW - kVAr).
- Generating set Power factor Cos f.
- Generating set kWh and kVAh.
- Battery voltage.
- Hours-counter.
- Engine speed r.p.m.
- Fuel level (%).
- Engine temperature (depending on model).
- Oil pressure (depending on model).

**COMMAND AND OTHERS**
- Graphical display 320x240 pixels.
- Operation modes: OFF - AMF function - Single Parallel to mains Island application - Single Parallel to Mains AMF application - Multiple parallel genset Island application.
- Pushbutton for forcing Mains Breaker/contactor or Genset Breaker/contactor.
- Push-buttons: start/stop, fault reset, up/down/page/enter selection.
- Multiple parallel and Power Management operation with digital load AVR sharing.
- Automatic synchronizing and power control (via speed goveroner or ECU)
- Baseload Import/Export and Peak shaving
- Voltage and PF control (AVR).
- Configurable digital I/O (12/12) and analogue inputs (3).
- Integrate PLC programmable functions.
- Event-based history (up to 500records).
- Selectable measurement range 120/277V and 0-1/0-5A.
- Remote starting and Blocking signal availability.
- DC system disconnection switch.
- Acoustic alarm.
- Automatic battery charger.
- 2xRS232/RS485/USB Comunication ports.
- Settable PASSWORD for protection level.

**PROTECTION WITH ALARM AND SHUTDOWN**
- 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, shortcircuit, reverse power, Earth fault

**OTHERS PROTECTION**:
- Circuit breaker protection: IV poles Motorized.
- Emergency stop button.
- Panel protected through door with lochetable handle

**OUT PUT PANEL MPP**

| | | |
|---|---|---|
| Multi-pin connectors (in and out ) for parallel with other generators | n | 2 |
| Connecting cable with 2 connectors multipin (length 10m) | n | 1 |
| External terminal board | | ETB |

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## Supplements:

| To be ordered with the equipment | : |
|---|---|

### CONTROL PANEL SUPPLEMENT

| | |
|---|---|
| RCG - Various supplements for remote controls - available for models: | ACP MPP |
| TLP - Various supplements for remote signals - available for models: | ACP MPP |
| ADI - Adjustable Differential Intensity - available only for models: | ACP |
| TIF - IV Poles Circuit Breaker instead of III - available for models: | ACP |

### Socket kit

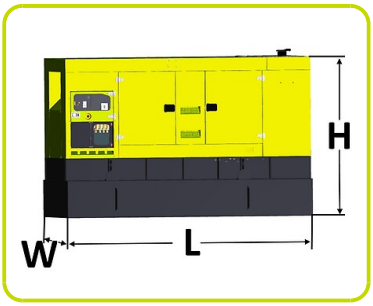
| | | |
|---|---|---|
| Kit SKB or Kit SKC (for total n. 4 socket) - available for model: | | ACP |
| Individual CB and Earth Fault protection | | |
| 3P+N+T 400V 63A | n | 1 |
| 3P+N+T CEE 400V 32A | n | 1 |
| 230V/16A SCHUKO | n | 1 |
| With version SKB: | | |
| 3P+N+T CEE 400V 16A | n | 1 |
| With version SKC: | | |
| 400V/125A 3P+N+T CEE | n | 1 |

### GENSET EQUIPMENT

| | |
|---|---|
| LPT - Leak Proof Tray | • |
| AFP - Automatic Fuel Pump | • |
| KRT- Kit Rental for HEI gensets which includes: 3-way fuel valve, battery switch | • |

### Extended Fuel Tank

| | | |
|---|---|---|
| Fuel tank capacity | l | 4180 |
| Length (Genset) | (L) mm | 4426 |
| Width (Genset) | (W) mm | 1726 |
| Height (Genset) | (H) mm | 2786 |




### ENGINE SUPPLEMENTS

| | |
|---|---|
| PHS - Coolant Pre-Heating System - available for models: | ACP MPP |

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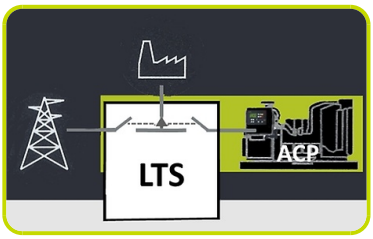
## Accessories

Items available as accessory equipment

**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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