

continuous cooperation with life



# MARINE GENERATOR SETS



# Generator



TSE Quality Award



CE Certificate



K-Q TSE-ISO-EN 9000  
Quality Certificate



ISO 14001:2004  
Certificate



OHSAS 18001:2007  
Certificate



Turkish Standards  
Certificate of Conformity



TSE  
Certificate of Conformance to Criteria



Service Competence  
Certificate

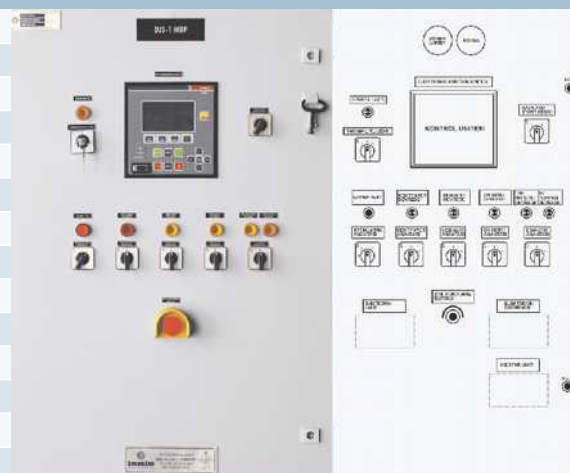


Domestic Good  
Certificate



## MEASUREMENTS

Voltage (3 Phase Separately and Totally)	Total Operation Time
Current (3 Phase Separately and Totally)	Fuel Pressure
Frequency	Oil Pressure
V/A/f Instantaneous and Demand Measurements	Cooling Water Pressure
Revolution	Seawater Pressure
Harmonic (V/I)	Cooling Water Temperature
Visible Power (kVA) (Totally)	Exhaust Temperature
Active Power (kW) (3 Phase Separately and Totally)	Oil Temperature
Reactive Power (kVAR) (3 Phase Separately and Totally)	Capsule Temperature
Power Factor (3 Phase Separately and Totally)	Seawater Temperature
kWh (Last Operation and Totally)	Front Generator Bearing Temperature
kVARh (Last Operation and Totally)	Rear Generator Bearing Temperature
Number of Starts	DC Voltage
Duration of Last Operation	



## PROTECTIONS

Speed and Voltage Control (ANSI 15)	Common Busbar Frequency Control (ANSI 81 B)
Excessive Signal Protection (ANSI 24)	Differential Protection (ANSI 87)
Automatic Synchronization (ANSI 25/A)	Short Circuit Protection (ANSI 94)
Low Voltage Protection (ANSI 27)	Emergency Stop (Switch off Air and Fuel)
Low Voltage Protection For The Common Busbar (ANSI 27 B)	Oil Pressure (Alarm/Stop)
Overload Protection (ANSI 32)	Cooling Water Heat (Alarm/Stop)
Low Current Protection (Electric Motors) (ANSI 37)	Cooling Water Pressure (Alarm)
Field Loss, Reactive Power, Impedance Protection (ANSI 40/Q)	Seawater Pressure (Alarm)
Inverse Power Protection (ANSI 46)	Water Level (Alarm)
Phase Sequence Protection (ANSI 47)	Fuel Filter Differential Pressure Difference (Shutdown)
Thermal Overload Protection (ANSI 49)	Oil Filter Differential Pressure Difference (Alarm)
Circuit Breaker Breakdown (ANSI 50 BF)	Start Air Pressure (Alarm)
Surge Ground Over current Protection (ANSI/50 G/N)	Fuel Pressure (Alarm)
Controllable Over current Protection, IDMT (6 Curve) (ANSI 51 G/N)	Fuel Leakage (Alarm)
Controllable Ground Over current Protection, IDMT (6 Curve) (ANSI 51 G/N)	Exhaust Temperature (Alarm)
Over Voltage Protection (ANSI 59)	Alternator Front Bearing (Alarm)
Common Busbar Over Voltage Protection (ANSI 64)	Alternator Rear Bearing (Alarm)
Start Blocking (Electric Motors) (ANSI 66)	Capsule Temperature (Alarm)
Directional Over current Protection, IDMT (ANSI 67)	Fire System Active (Alarm)
Directional Ground Over current Protection, IDMT (ANSI 67GS/GD)	Stop Breakdown (Alarm)
Vectorial Protection (ANSI 78)	Start Breakdown (Alarm)
Frequency Control (ANSI 81)	DC Voltage (Alarm)

\*ANSI: American National Standards Institute

## GENERAL PROPERTIES

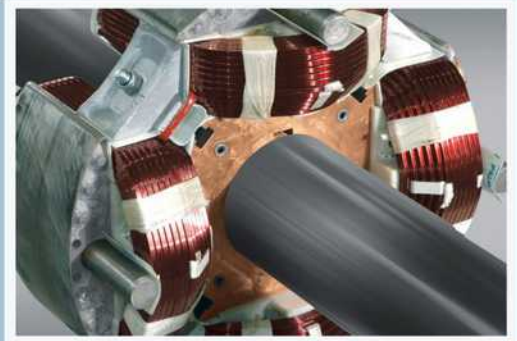
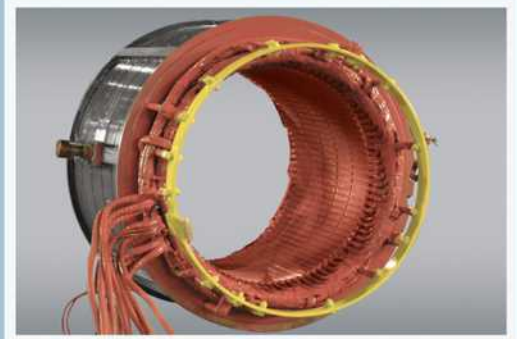
- In Accord with Military Ship Classification Rules,
- Generator control and protection,
- Engine control (Start/Stop)
- Communication with Engine
- Communication with SCADA System (Modbus/Profibus/Fiber-optic)
- Programmable Logical Controller
- Automatic and Manual Synchronization
- Peace / War State Controller
- Alternator Humidity Receiver Controller
- Air / Electricity Start Controller
- Capsule Air conditioner controller
- Air and fuel cutter controller incase of emergency
- Language Choice, Alarm observation
- Old breakdown observation (5000 times)
- Detailed Protection Observation (1000 times)
- Protection between IP23/66
- Observing all functions on LCD monitor



## İŞBİR Generator

Type	: Marine
Nominal Power	: 10-2250 kVA
Nominal Voltage	: 110/500 VAC, 1/3 phase, 50/60/400 Hz
Revolution	: 1500/1800 rpm
Phase Connection Style	: Star [with three wires(without neutral)]
Operating Class	: S1 (continuous)
Isolation Class	: H or F
Insulation Class	: IP23 (connection box IP44)
Temperature Protection	: Via thermistor under each phase windings
Humidity Protector	: Operating with External Voltage / Automatic
Bearing	: One or Double
Cooling System	: Air, Water, Fresh water being fed by cooling sys.
Excitation Style	: Self excited, Statically Excited
RFI Suppression Degree	: N (VDE 0875)
Voltage Produced	: STANAG-1008 Ed-9

*Production of marine generator is designed by İşbir Engineers*



## ACOUSTICAL CAPSULE

- Acoustical Capsule production is designed by İşbir Engineers
- Modular structure, maintenance and repair availability, removable style covered production
- Sound level under 80 dBA
- Hermetical pressure and air ambient (acoustical capsule)
- Negatively pressured and operating ambient
- Air conditioning according to operate system with full performance
- Durable and stainless structure
- Lighting hardware for inside acoustical capsule
- Smoke and heat increase sensor fitted automatic fire perception and fire extinguisher
- Internal (inside capsule) cooling with sea water
- Minimum structural sound with double flexible connection
- Connection to ship with Vibration damper
- Vibration damper set according to ISO 1940-1
- Exact regularity to military classification rules
- Necessary amount of Lifting eyebolt according to the structure for carrying the generator set



## GENERAL PROPERTIES

Production of diesel generator set is designed by İşbir Engineers

### Operating Conditions

Environmental Conditions	Related Standard/Criteria
Tests according to environmental effects (Shock, Vibration, Humidity)	MIL-STD-810F
Operating Temperature Tests	MIL-STD-810F 501.4
Temperature Shock Criterias	MIL-STD-810F 503.4
Operating at humidity Criterias	MIL-STD 810F 507.4
Water Protection	MIL-STD 810F 507.4
Inside ship components	IEC 529 IP23
Components on ship board	IEC 529 IP66
Operating under salt mist / Spray conditions criterias	MIL-STD 810F 509.4
Full performance operating under lightning	MIL-STD 464
Operating with vibration	MIL-STD 810F
Sound degree at human manned location	MIL-STD 1474D

### Angular Ship Movements

- Slope:  $\pm 15^\circ$ , Trim:  $\pm 5^\circ$
- Roll:  $\pm 30^\circ$  Pitch:  $\pm 10^\circ$
- Designed to operate full capacity at these values
- $1,96 \leq X \leq 2,51$  ;  $2,85 \leq Y \leq 5,59$  ;  $10,97 \leq Z \leq 14,98$  “
- Designed as making all functions completely under the axially occurred dynamic loads ( $m/s^2$ )
- Full performance operating at 0,4 Q intensity vertical direction deck acceleration
- Full performance operating at ship's pitch  $\pm 10^\circ$  (max 3 sec.)
- Full performance operating at ship's portside-starboard roll  $\pm 30^\circ$  (max 5 sec.)

### Structurebone Noise

Diesel Generator Sets (DGS) are being mounted with a special vibration and strike, absorber onto main chassis and main frame of ship, with double flexible, for reducing structural noises. Acceptability tests are done.

### Airborne Noise

%100 load 80 dB(A) (+5 dB tolerance/1 for octave band) not to exceed

### Underwater bursting shock strength

Acceleration: 1250  $m/s^2$   
Speed: 3,5 m/s  
Displacement: 35 mm

### Strength to center of mass acceleration with vibration dampers

Vertical acceleration value :  $< 50 m/s^2$   
Vertical speed value :  $< 2 m/s^2$

### Generator Set Properties:

Nominal power : 10 to 2250 KVA (optional)  
Nominal voltage : 110/500 VAC, 1/3 phase 50/60/400 Hz  
Nominal speed : 1500/1800 rpm  
Suitable for classification rules of military ships  
Absorbing elastic coupling  
Marin type alternator  
Control Board  
Acoustic capsule (optional)  
Automatic Fire Fighting System (optional)  
Exchanger  
Cooling Fan  
Warning and Danger Signals

### Rapid Loading

%50 to %110 Load : In Accord with STANAG -1008Ed-9  
%110 to %50 Load : In Accord with STANAG -1008Ed-9

### Diesel Motor

In Accord with ISO-3601-1  
In Accord with NATO F76 Diesel Fuel System for Marine Type Engines  
Pressured Air and/or air and electrical starter  
Mechanical or Electrical/Electronically type governor  
In Accord with Turkish Lloyd Military Ship Classification Rule

## OPTIONAL FEATURES

- Certification with optional Lloyd
- Required documentation for the system
- Preservation (Protection and maintenance)
- Integration
- Required design for application area
- Tests and experiments [Factory (FAT), Coast (SAT), Sea (HAT)]
- Required measurement equipments for test.
- Equipments and tools for maintenance and repair.
- Ship spares for 30/60/90 day periods.
- Coast spares of system for 2 years (or more).
- Painting according to selected RAL code.
- The marine alternators produced by İşbir are applicable for all technical tests at the advanced test laboratory inside the İşbir facilities.



Integrating its experience with modern technology; unique and the biggest establishment at its existing geography as a solution (business) partner for Naval Forces, Coast Guard, many state institutions and private shipyards . . .

Lloyd approved Ship type panel, alternator and generator set applications which are designed and produced by İşbir engineers and technicians, has proved itself with signing its successes on maritime business.

Production of Communication, Training, Tactical (Strategically) and Defense Systems of Naval Forces with national sources, and providing maritime security of many state institutions,

- MİLGEM (The first national battleship of Turkey)
- New Type Patrol Boats
- Coast guard boats, Salvage vessels belong to the Directorate of General of Coastal Safety General Management

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# GERMAREL GmbH

Corporate Overview  
“power supply to supply best power”

[www.germarel.de](http://www.germarel.de)