Compact and powerful solutions...

IMPORTANCE OF GENERATOR SETS FOR THE RISING VALUE OF THE CENTURY, DATA CENTRES

Data centers, which have to provide high quality, uninterrupted and fast service in order to meet the increasing data need, play an important role today as the heart of communication. It is very important to make the necessary designs and calculations meticulously in order to progress every process from the installation of an efficient system to its operation. Because a small glitch in the data center can lead to big losses. Fortunately, Teksan does not have to be left behind with reliable, high standard uninterrupted power solutions!

EVERLASTING COMPANY

TEKSAN

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Don't be scared, we have...

Reliable high performance power solutions

for data centres

Data Centre Power Solutions

TEKSAN

For more than quarter century, thanks to its solid experience and engineering know-how, Teksan has been providing tailormade power solutions that can efficiently operate even under the most challenging conditions for major international projects such as constructions, telecommunications, data centers, shopping centers, hotels, residential buildings, supermarkets, sport centers, mining facilities, hospitals, research centers, educational institutions and industrial plants all around the world.

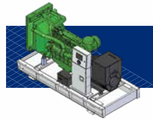
Today, thanks to its high quality generator sets approved with international quality certifications which are made of world's top engine brands coupled to well know alternators to meet projects' requirements of different output ranges, and fast and effective after-sales technical support and maintenance services in more than 130 countries,

Teksan is always your reliable power solutions partner whenever and wherever you need.

DATA CENTRE PRODUCTS

COMPREHENSIVE DATA CENTRE GENERATOR DESIGNS

Special Product Designs



Teksan R&D and Project Engineering Departments work together to produce optimal solutions that will meet your data centre requests and needs by offering products and services developed specifically for your project that exceed your expectations.

TIER I	TIER II	TIER III	TIER IV
Basic	Redundant	Active During Maintenance	Fault Tolerant

With a strong know-how and experienced engineering staff at the core of the business, Teksan has achieved huge success in the international arena for its work in the system integration of data centre projects where variable customer needs and required features have been specially designed, gaining Teksan the preferred brand position in the market.

	TIER I	TIER II	TIER III	TIER IV
GENERATOR SET	No	N	N+1	2N
UPS	N	N	N+1	2N
POWER SUPPLY	Single	Single	Double (One is active)	Double (One is active)
AIR CONDITIONING	N	N	N+1	2N

Our N, N + 1 and 2N solutions are designed in compliance with the standards of data centres as single and multiple (in parallel) according to your data centre requirements. Structural, acoustic, fluid analysis, simulation and performance tests are carried out by using advanced software and engineering methods in product design and development studies to comply with data centre needs.

NO DOWNTIME

Today, where the effect of digitalisation sees business processes getting faster, the most important need for businesses is continuity and uninterruption and therefore, the biggest expectation from the data centres is that they have a strong technical infrastructure that will not let them down. These variables are vital as they directly affect the "Uptime" rate which refers to the data centre uptime. It is also important that the components that make up the technical infrastructure comply with international standards and have the necessary certifications. At this point, TIER standards for data centres stand out.

"TIER" certificates issued by Uptime Institute show the data centre's capability and level of competence to survive and to continue to provide services even in cases involving: electricity, cooling, physical security, fire, building integrity, network structure and even in extraordinary situations such as natural disasters and so on. There are four TIER standards in total, and achieving reliability is the main goal; even when the interruption period is 26.3 minutes (99.995%) per year. Data centres are classified according to annual interruption rate or availability.

	TIER I	TIER II	TIER III	TIER IV
UPTIME/YEAR	% 99,671	% 99,749	% 99,982	% 99,995
DOWNTIME/YEAR	28,8 Hours	22 Hours	1,6 Hours	26,3 Minutes
REDUNDANCY	Not Redundant	Partially redundancy in energy and air conditioning	N+1 (Fault Tolerant) 72 hours resistant to power cut	2N+1 (Fully Redundant) 96 hours resistant to power cut

The generator output voltage regulation is adjusted with an auxiliary winding excitation system and optional PMG* solutions for sensitive data centre loads. In order to provide the required uptime, the possibility of switching from a failed AVR card to redundancy is offered with dual AVR card solutions. Alternators manufactured in accordance with Class F Temperature Rise are offered to eliminate harmonics and capacitive(leading) impacts due to the nature of the data centre loads. Generator set startings can be secured with a redundant starter system by:

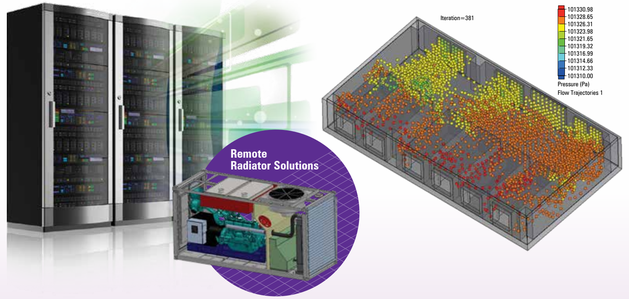
- Redundant Electric Starter
- Special battery applications (Ni-Cad, AGM etc.)
- Redundant battery group with battery selection system
- Redundant battery rectifier
- Redundant air system(compressor, air tanks etc) and hydraulic system (oil tank, pump, valves etc) are offered for Air(pneumatic) or Hydraulic Starting System.

* PMG (Permanent Magnet Generator) is used to keep the alternator output voltage constant.

The fuel systems of Teksan generators are specially designed to avoid interruptions by having:

- Underground main fuel tank (double skinned)
- Above ground main fuel tank (double,single skinned or single skinned with bund)
- Daily fuel tank (double,single skinned or single skinned with bund)
- Automatic fuel filling system with redundant fuel pumps and accessories
- Leak detection system in the fuel system
- Fuel maintenance and fuel polishing system
- Automation system for fuel system (monitoring fuel level, leakage, pump malfuctioning, etc.)

In case of any malfunction that may occur, the redundant (standby or hot standby) control system waiting in reserve is put into operation and the working continuity of the generator set is ensured. Teksan's expert engineers also provide solutions for data centre generators which are suitable for very cold and hot environments, as well as canopies with special paint solutions according to customer needs. In addition; canopy designs provide ease of maintenance and use of generator sets in data centre applications. These canopies are specially designed according to the sound level desired by the customers. Optionally, some protective parts such as fire detection and extinguishing system can be added inside the canopies. For projects where there is limited ventilation in buildings or limited generator area applications; besides remote radiator systems, reducing sound level with special air inlet and outlet buffers, special exhaust mufflers and indoor acoustic solutions are provided. Before these solutions are provided, cooling system performance is simulated by air flow analysis under specified ambient conditions and production is initiated if appropriate.

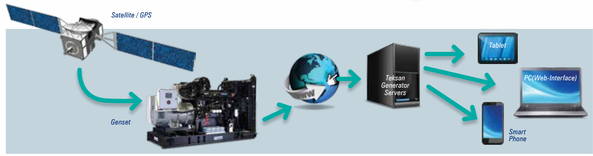


ALWAYS READY, STANDARDS COMPLIANT

Producing high quality solutions with proper price that meet continously-changing customer needs beyond expectations and delivering timely solutions are the most important objectives of Teksan's Quality Policy." In line with this aim, Teksan, which carries out all its activities with international standarts, as well as Teksan Production System, Quality Management System, Environmental Management, Occupational Health and Safety system are established by Teksan, has lots of international certificates and documents as 2000/14/EC Noise Emission Certificate, ISO 9001, ISO 140001, SONCAP Product Certificate, OHSAS 18001, CE Certificate, GOST-R Certificate, TSE Service Competency Certificate and Turkish Standart Compliance Certificates, takes part among most reliable and most preferrable companies of sector in power solutions with providing uninterruptedly pre-sales and after sales technical support. Generators designed by Teksan in compliance with the Data Centres meet the standards of Generator set first step loading ISO 8528-5: 2018 G2 class in temporary state and ISO 8528-5: 2018 G3 class (using electronic governor and AVR) in steady state. According to ISO 8528-5 and ISO 8528-12 standards; In order for the generator set to operate in a short time and feed the loads, block water heater and other heaters suitable for the ambient conditions are used. Teksan offers DCP ratings for Data center applications which are compliant to ISO 8528-1:2018 standard and Uptime Tier III/IV rated data centres.

UNDER CONTROL!

By transferring generator set and equipment information to both the Power Management System (PMS) and Building Management System (BMS); generator sets and their equipment (fuel system, automatic air inlet-outlet louvers etc.) can be observed from the operator panel thanks to PLC and HMI panels.



Teksan Remote Monitoring and Management System, supported by GSM and internet technologies, is a highly useful and cost-effective web-based solution that allows remote generator monitoring and intervention when needed. This system, which has the latest technologies, sends the working data of the generator on the field via the control panel to a remote device such as a computer, tablet or smartphone and allows the generator to be managed via this device.

TEST CENTERS & TESTING CAPABILITIES

Teksan Generator, which has high technology test centers in its both factories, has test capabilities such as low and high voltage tests, emission tests, fuel consumption tests, thermal analysis tests, static and dynamic analysis tests, vibration tests.

Istanbul Factory Test Center

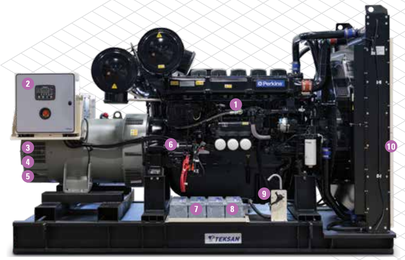
- Tests with 3200kW stable load factor
- Tests with 6,3kV, 11kV voltage,
- Automatical recording system for the tests,
- Eco-friendly testing cycle through exhaust filtration and feed water recycling,
- Special Fueled GenSet tests.

Kocaeli Factory Test Center

- Tests with 4800kW-3600 kVA variable load factor,
- Tests with 690V, 6,3kV, 11kV and 13.8kV voltage,
- Automatical recording system for the tests,
- Simultaneous testing up to 8 GenSets,
- Online load tracking ,
- Container Type GenSets tests,
- Eco-friendly testing cycle through exhaust filtration and feed water recycling,
- Special Fueled GenSets tests,
- Test observation room.

DIFFERENCES OF THE GENERATOR SET DESIGNED FOR DATA CENTRES

1. Engine Electronic Governor
2. Redundant Control System
3. Dual AVR Card
4. PMG
5. Class F Alternator
6. Redundant Electric Starter
7. Redundant Battery Group
8. AGM Battery
9. Heater for Cold Enviroments
10. Tropical Radiator



GLOBAL SERVICE NETWORK

... in more than 130 countries!

One of the strengths of our Technical Service Team is in providing preliminary research studies to identify: energy needs, project designs, purchasing and engineering services; including the selection of suitable locations for generator sets in all sectors, especially data centres. In all sectors, with the commissioning of generator sets is the 'General Maintenance Schedule' which is determined by the manufacturer. Checks are carried out to ensure the proper maintenance of generator sets and to identify any need to change consumables. Teksan products are guaranteed after the shipment for 2 years or 1000 hours of operation whichever comes first after the first start up against installation and manufacturing defects. A certificate of Warranty is delivered with generator sets and the guarantee process is initiated. The product information and serial number can be found on the generator identification label that is on the generator sets. In order to get the best service from the generator set, the original spare parts recommended by our Technical Services Team should be used. Should any spare parts be required, Teksan offers the best service by meeting customer needs with sufficient stock levels. Additionally, Teksan's Service Centre can offer technical training support to all companies within our Teksan Academy by organising and conducting essential training upon the request of the partner company with "beginner" or "advanced" content in accordance with their required needs.