

# Auxpac standard generating sets

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**Wärtsilä started its tradition of building reliable and innovative generating sets more than 40 years ago. Since then, intensive research and experience have resulted in a number of new power generation products that also introduce ground-breaking features.**

As the Ship Power Supplier Wärtsilä is in a unique position to offer a new range of generating sets offering absolute reliability with top performance and outstanding total economy. The Wärtsilä Auxpac is delivered as a pre-commissioned standard package that offers significant benefits to shipyards and owners including compact design, low operating and maintenance costs, and fuel versatility.

## Design targets

Over the years Wärtsilä has supplied thousands of generating sets. Learning from these installations has resulted in a commitment to a number of design solutions, all with the target of ensuring easy installation, easy operation and low operating cost.

## Easy installation

The more complete the generating set is when delivered, the easier will be its installation onboard. Auxpac sets are outfitted with all pumps and electrical systems mounted on the generating set. The fuel system is designed for the same pressure and oil quality typically used in different brands of main engines (also 2-stroke engines).

Mounting on flexible rubber elements is an initial cost in the generating set delivery but this saves time and trouble during installation. If required, maintenance platforms can be supplied as well.

## Easy operation

Starting with complete documentation, training and other services the Auxpac range is a well supported product worldwide. The engine design has earned its reputation as extremely service-friendly, providing good access to the controls and for maintenance work.

## Low operating cost

The total operating cost is the sum of all fixed (investment) and variable costs. The

selection of a standard solution is the best way to lower investment costs as it ensures that the reliability of the components is not sacrificed.

The major variable cost is fuel and lube oil consumption. Meeting emission levels is the top priority today, followed by low fuel consumption. The Auxpac design meets both requirements and continuity is ensured over the product's lifecycle with support like condition-based maintenance (CBM) and other services provided by Wärtsilä.

In short, Wärtsilä Auxpac is a highly competitive, well proven and fully supported ship power solution.

## Market fit

Wärtsilä generating sets cover a wide power range, the goal being to offer a standard generating set to fit the auxiliary power needs of ships ranging from general cargo vessels to container vessels.

## Typical ship types

### General cargo

Generating set size 520 kW - 875 kW

- Superior reliability and maintainability wherever the ship is trading in the world.

The generating sets must maintain stable voltage in all conditions.

### Container vessels

Generating sets 520 kW - 2700 kW

- Superior operating economy for powerful installations.

The low fuel and lube oil consumption enhance the overall economy of the ship.

### Product tankers

Generator capacity 520 kW - 1600 kW

- Superior safety and loadability for any demanding installation.

Reliability, economy and safety are major considerations when selecting generating sets for newbuildings.

### VLCCs

Generating set capacity 520 kW - 975 kW

- Superior performance without excessive need for spare parts.

Wärtsilä generating sets provide the required reliability for auxiliary power in VLCCs.

Auxpac generating sets also have their limitations. They are not designed for offshore or diesel-electric applications, mainly due to restrictions in the generator parameters and inclination handling. The major components on the generating set cannot be ordered separately.

But these limitations have a very specific target – they allow us to build generating sets more cost-competitively. With standardization we are able to shorten delivery times and provide accurate design information instantly.

Wärtsilä has received a considerable volume of orders for Auxpac since its launch in mid-2004, which indicates that the output range is well suited to the needs of commercial vessels now under construction.

Ship type	Generating sets	No of sets
General cargo, container vessel	4x1600 Wärtsilä 9L20	48
Chemical tanker	2x1200 Wärtsilä 8L20	2
Chemical tanker	4x875 Wärtsilä 6L20	8
Heavy lifter	2x1000 Wärtsilä 6L20	2
Cement carrier	2x760 Wärtsilä 6L20	2
Chemical tanker	3x975 Wärtsilä 6L20	6
Other	1x645 Wärtsilä 4L20	1
General cargo	3x760 Wärtsilä 6L20	18
Sum		87

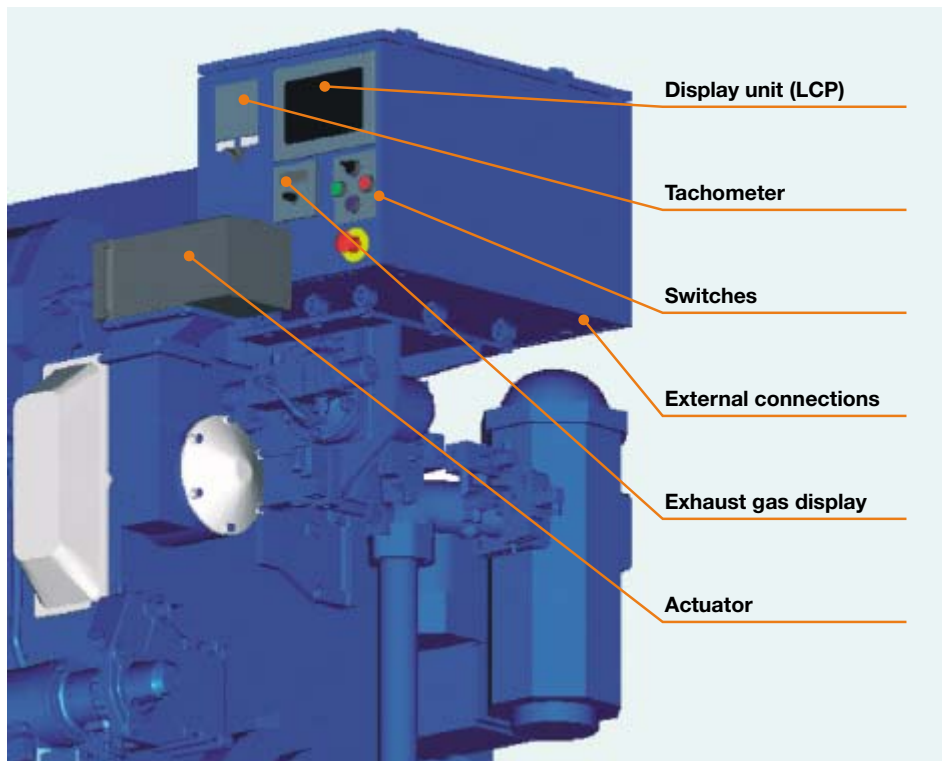
All orders follow the standard scope of supply available for Auxpac. Wärtsilä can also meet requirements outside the design and scope of the Auxpac range with its traditional Wärtsilä 20 or Wärtsilä 26 generating sets.

## Scope of supply

### Engines

Auxpac generating sets are based on the Wärtsilä 20 and 26 engine types, both of which are well proven in heavy fuel driven shipboard auxiliary service. Both engine types have extensive operating records on heavy fuel; more than 1600 Wärtsilä 20 engines are currently in auxiliary service and have accumulated about 20 million running hours. The average spare parts cost for this engine type is about 1 euro/kWe.

Operation safety fulfils the most stringent Solas requirements and the emission levels of the engines are well below



The UNIC modular control unit mounted on the generating set has the following functions: start, stop and speed control of the engine, engine safety functions, signal interface with the external system, and the operator interface including switches and local displays.

the present IMO Annex VI to MarPol 73/78. Auxpac is supplied with an EIAPP certificate of compliance.

### Generators and common baseframe

A major challenge when designing a standard range of generating sets is to optimize the range to market needs and the engine configurations available.

Wärtsilä decided to build Auxpac based on two major makes of generator: these are of the air-cooled, high-efficiency, brushless, heavy-duty alternator marine design. Auxpac is available in the low voltage range (400 – 690 V) at 50 and 60 Hz. An IP44 design with water-cooled generator is optional.

### Automation

The control system used on the Auxpac generating sets is the UNIC-C1 embedded automation system. This system, with its rugged design, is specifically intended for the demanding environment on the engine, and therefore special attention has been paid to temperature and vibration endurance in the design.

As an engine-mounted system, UNIC-C1 is accordingly very compact and needs no components mounted in dispersed external cabinets or panels. This approach also allows the engine to be delivered fully tested from factory. The number of inputs and outputs is

determined to optimally suit this application, and the galvanic signal isolation is also made to match these needs.

The system is a combination of the traditional approach of point-to-point wiring of sensor signals to an external alarm system, and a modern system that handles fundamental engine safety, engine start/stop management and speed control.

To ensure best loading capabilities the speed control is electronically controlled by an electrical actuator.

### Resilient mounting

All Wärtsilä generating sets are designed to be mounted resiliently to the ship's hull. This method enables easy installation and alignment of the generating set in the ship. Compared to traditional mounting methods, resilient-mounting gives a clear advantage in the reduction of structure-borne noise transmitted from the generating sets to the ship's hull, which improves onboard comfort.

The resilient installation method with conical rubber mounts has proven its safety and reliability through years of operation in the field.

### The ideal choice for yards and owners

Wärtsilä generating sets are the most compact and lightweight generating sets available on the market. Their compact

dimensions simplify engine room design and allow for easy location of the generating sets in the engine room.

The compact design also releases valuable space in the ship for other purposes. The low weight of the generating set simplifies the installation and saves valuable weight in the ship.

### Benefits to owners

- A reliable HFO design operating in numerous ships – high reliability
- Low fuel consumption – low operating cost
- Low lube oil consumption – low operating cost
- Very maintenance friendly – saves time
- Long maintenance intervals – less outage
- Minimal need for consumables – saves cost
- Installed flexible – higher comfort in the ship
- Fulfils the IMO legislation for NO<sub>x</sub>.

### Benefits to yards

- The compact design offers the best power-to-space ratio on the market. The Wärtsilä generating sets are the most compact in their class, enabling compact engine room design.
- A high power-to-weight ratio – easy to install and saves valuable weight in the ship
- Flexible mounting – fast and easy installation
- Built-on automation, factory tested – less cabling and fast commissioning
- Simple cooling system with less connections – saves cost and installation time
- Common fuel system with main engines – saves cost and installation time
- Good motor starting capability – simpler electrical system in the ship
- Accepts a wide variety of fuels – can be used on different ship types
- Generating sets are parallel run at the factory – saves commissioning time.

### Wärtsilä services

#### Installation planning

Wärtsilä as the supplier, and the shipyard as the contractor, need to exchange installation specific information to build an installation that is both reliable and economical in use. Every delivery of a generating system built on Wärtsilä Auxpac generating sets is supported by a project-specific Installation Planning Instruction (IPI).

Due to the high degree of pre-engineering of the Auxpac, the first version of the IPI can be delivered immediately, in electronic or paper format,

the moment technical clarification of the order is received.

The typical content of the IPI covers:

- Project scope and delivery limits
- Generating set main data and performance characteristics
- Recommendations for functional design of all related systems
- Component main data for delivered components and recommendations for selecting other components
- Installation instructions and test and commissioning procedures.

#### **Engineering support**

Design collaboration is one of the key success factors for shipbuilding projects. The full series of Auxpac generating sets is available in the common Tribon format as well as other 2D and 3D formats.

Tribon Solutions have taken several steps towards the next generation of shipbuilding systems and continues to strengthen its position as the leading integrated design, information and manufacturing system for the shipbuilding and offshore industries. Wärtsilä wants to support shipbuilders using this system by providing its information online.

#### **Factory Acceptance Test**

Auxpac generating sets are built from components of proven and well tested design. In addition to the original type tests, every single delivery is tested in a Factory Acceptance Test (FAT) under the surveillance of a class representative, as required.

Factory testing can be performed as a parallel test to ensure that all controls and settings are checked before dispatch. The

complete factory testing guarantees simplified commissioning. Agreed commissioning instructions are part of the complete delivery scope and included in the project documentation.

#### **During commissioning**

Wärtsilä commissioning services include:

- Planning of the complete commissioning process, including training of the commissioning teams
- Commissioning supervision by certified service engineers
- Commissioning service including installation pre-checks, first start, tests and sea trial support
- Commissioning report including the performance test and evaluations. This report (like all reports from Wärtsilä) can also be obtained online.

Wärtsilä global service is trained to do the commissioning and start-up of the Auxpac generating sets. However, special training can be provided to the yards to do all or a major part of the commissioning using their own commissioning staff.

In any case Auxpac is supported by a detailed commissioning plan issued before delivery of the generating sets. This plan consists of a number of well established procedures for carrying out the commissioning work.

#### **During operation**

##### **Global service**

From the smallest component to total ship power solutions, all Wärtsilä products come with global support. The Wärtsilä total service organization – with 6000 highly trained service professionals worldwide – enables us to provide unsurpassed field service support anywhere, at anytime.

Our philosophy is proactive, involving operation support, and predictive and preventive maintenance. Remote monitoring, diagnostics and condition-based maintenance (CBM) can also be incorporated in our technical support solutions.

#### **Maintenance planning**

Good lifecycle support starts with user-oriented manuals and global availability of spare parts information. Wärtsilä Auxpac generating sets are supported by complete generating set manuals and spare parts books, all of which can be delivered both in traditional paper format and in state-of-the-art interactive Eldoc™ format. Maintenance planning information can be delivered in the Mama™ format which is compatible with the Amos® PMS data.

#### **Online services**

Wärtsilä also provides support through its advanced online (e-business) services. The complete spare parts order process can be handled through the Spares OnLine™ web-based service available anywhere, anytime and always up-to-date for the installation it is supporting.

#### **Condition-based maintenance**

Wärtsilä's CBM concept has been developed by experts to support users in daily operation to ensure safety and lowest possible operation costs. All the measured values from the generating set are processed regularly using specially developed analysis tools and the report with recommendations is delivered through the online service Reports OnLine™. The Auxpac generating sets are designed to support CBM with a minimum of additional investment. ■

