MAN dual-fuel GenSets

MAN Energy Solutions
Future in the making

MAN dual-fuel GenSets,
L23/30DF and L28/32DF
Flexible dual-fuel power technology is becoming increasingly important in a marine market where oil prices are fluctuating and emission legislation is becoming ever more stringent. As shipping route and operation vary, every ship has different requirements in terms of dual-fuel design and time frame for installation. This demands careful planning and consideration of the liquefied natural gas (LNG) systems available in order to find the most beneficial solution for your particular needs.

An alternative to dual-fuel engines is pure gas engines, but dual-fuel engines have several advantages over pure gas engines. Most importantly, if gas operation is interrupted, or a shortage of gas occurs, the system switches seamlessly to fuel operation.

MAN Energy Solutions has developed a reliable and cost-effective concept for MAN dual-fuel GenSets providing the flexibility and freedom to install now or be prepared for dual-fuel running. The dual-fuel GenSets running on gas can be delivered as new-building, ready for dual-fuel operation as most dual-fuel components can be pre-installed on the engine and the remaining delivered with the engine for later installation or as a retrofit solution. The control and safety system and sensors necessary for gas operation are installed and prepared for gas operation.

The dual-fuel GenSets running on gas possess inherent advantages in terms of reducing emissions and offer full fuel flexibility and high efficiency regardless of price fluctuations in the fuel market. MAN dual-fuel GenSets also offer low operational and maintenance costs.
Engine advantages

L23/30DF and L28/32DF

MAN Energy Solutions’ dual-fuel generating sets form part of a complete marine solution with the low-speed MAN B&W ME-GI main engines. MAN L23/30DF and MAN L28/32DF are designed to complement the two-stroke dual-fuel ME-GI engine as part of a complete power package.

The inherent advantages of the dual-fuel design are:

- a high reliability, since the dual-fuel GenSet is based on the best-selling marine engine type ever with more than 16,000 engines in service worldwide
- a competitive first-cost price is achieved by using the same fuel injection system in gas mode and fuel mode
- spare parts with high availability
- simple and easy operation
- long time between overhaul (TBO)
- low maintenance cost
- retrofit packages available
- available as dual-fuel ready concept.
Dual-fuel operation
Based on proven classic GenSet designs

L23/30DF and L28/32DF are based on the proven classic GenSet designs L28/32H and L23/30H, recognised worldwide as ultra-reliable and robust gensets with long TBOs.

MAN dual-fuel GenSets have already become the relied power source on board ships and have gained recognition among international shipowners. Based on several thousand running hours in gas operation, the reliability of the dual-fuel GenSets has been established. Especially on container vessels, the L28/32DF has proven its reliability.

A flexible engine room layout is possible thanks to the properties of the gas valve regulator. The regulator ensures a constant gas pressure at the gas valve injectors, see Fig. 1.

A competitive first-cost is achieved through the unique fuel injection system, see Fig. 2.

In fuel mode, the oil (MGO) is injected through the main oil valve, and the same valve is used for injection of pilot oil (MGO) when the GenSets are running in gas mode. This means that a separate fuel oil injection system with injectors, pumps and pipes for running in gas mode is not required.

Further, the injection design enables a cost-effective and easy retrofit as no additional pilot oil system is needed.
Flexible installation
LNG supply system

An LNG supply system is shown in Fig. 4, where the GenSets can combust boil-off gas. The gas valve regulator mounted on the MAN dual-fuel GenSets ensures a constant gas pressure at the engine and allows a flexible installation of the gas valve units (GVUs), see Fig. 4.

If limited space is available in the engine room this is an advantage as it can be designed in various ways. The GVUs can be placed either separately or in a designated GVU room up to 100 m from the GenSets.

Plug and play
Easy installation of the engine series L23/30

The new monocoque design is a cost-down initiative that simplifies the installation of the engine series L23/30 including the new L23/30DF. The improved base frame concept offers several technical advantages, a reduction of the overall weight of the GenSet and a stiffer construction that reduces the level of vibration.

The key economic benefits of the redesigned base frame are reduced engineering and installation costs. The new design has made the traditional welded steel foundation with support towers and subsequent levelling superfluous. The installation of the GenSet now only requires three mounting points for the 3-conical support, see Fig. 5.
Online service
CoCoS-EDS engine system

Greater protection for your engines

In the modern global economy, the rapid transmission of information for engine evaluation plays a decisive role, particularly in the field of transportation and power generation. Thanks to the internet, MAN Energy Solutions can receive/transmit important engine and installation information from/to anywhere in the world, making the know-how of experts available in real time.

MAN Energy Solutions’ dedicated engine-diagnostics system – CoCoS-EDS – offers owners and operators an integrated system for data analysis. It helps system users with fault finding, in the process minimising damage and failures.

CoCoS-EDS diagnostic capabilities derive from MAN Energy Solutions’ century-long experience and expertise in the design, manufacture and maintenance of two- and four-stroke diesel engines.

CoCoS-EDS work areas

Trend analysis. With CoCoS-EDS, operators can observe engine performance over time, compared to both measured and reference values, thus allowing early detection of abnormalities. In this way, CoCoS-EDS can detect combustion problems, component wear, contamination and other negative conditions that can lead to decreased engine performance.

Monitoring

The CoCoS-EDS monitoring function allows operators to survey engine operation through a set of dedicated displays showing, for example, engine-performance curves, characteristic maps and load diagrams. Any abnormal engine behaviour is indicated accordingly at an early stage, allowing operators to take appropriate action.

Data logging

Engine data can be obtained online and data stored for the lifetime of the engine.

Online Service advantages

- Optimised plant reliability and availability
- Faster troubleshooting and fault elimination
- Improved support for operators
- Necessary spare parts identified and dispatched swiftly
- Travel-cost savings as a result of remote support
- No costs incurred for deployment of additional experts
- Clear and comprehensive documentation

Reporting

An overview of engine performance data, from any period of time, can be produced from plant-specific, customised displays and reports.
### MAN L23/30DF

**Engine specifications**

- **Free passage between the engines, width 600 mm and height 2,000 mm**
- **Min. distance between centre of engines: ~2,250 mm (without gallery), ~2,600 mm (with gallery)**

**Dimensions**

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<thead>
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<th>Cyl. No.</th>
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| A (mm) | 3,469 | 3,839 | 3,939 | 4,399 | 4,779 | 4,579 | 4,896 |
| B (mm) | 2,202 | 2,252 | 2,252 | 2,302 | 2,352 | 2,352 | 2,352 |
| C (mm) | 5,671 | 6,091 | 6,091 | 6,511 | 6,578 | 6,931 | 7,241 |
| H (mm) | 2,749 | 2,749 | 2,749 | 2,749 | 2,749 | 2,749 | 2,749 |
| Dry Mass (t) | 17.3 | 19.0 | 19.2 | 21.4 | 21.4 | 23.3 | 23.4 |

*Based on nominal generator efficiencies of 95%*

### MAN L28/32DF

**Engine specifications**

- **Free passage between the engines, width 600 mm and height 2,000 mm**
- **Min. distance between centre of engines: ~2,655 mm (without gallery), ~2,850 mm (with gallery)**

**Dimensions**

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| A (mm) | 4,321 | 4,801 | 5,281 | 5,761 | 6,241 |
| B (mm) | 2,400 | 2,510 | 2,680 | 2,770 | 2,680 |
| C (mm) | 6,721 | 7,311 | 7,961 | 8,531 | 8,931 |
| H (mm) | 2,835 | 3,009 | 3,009 | 3,009 | 3,009 |
| Dry Mass (t) | 32.8 | 39.3 | 39.4 | 40.7 | 47.1 |

*Based on nominal generator efficiencies of 95%*
MAN PrimeServ world-class service

The MAN PrimeServ offering

The MAN Energy Solutions group offers worldwide, round-the-clock service, 365 days a year. In addition to MAN Energy Solutions’ service headquarters in Augsburg, Copenhagen, Frederikshavn, Saint-Nazaire, Hamburg and Stockport, service centers on all continents provide comprehensive and continuous support.

Marine propulsion, gensets, and stationary plants

MAN Energy Solutions’ engines are renowned for their quality and durability. We are a global organisation with a strong local presence, delivering exceptional field service management, tailor-made solutions, and first-class technical support.

MAN PrimeServ provides advice and assistance to customers throughout the product life cycle, from delivery to resale. With our far-reaching network of service centers, we respond rapidly to customer needs. Furthermore, we offer outstanding service and unrivalled technical expertise. Plus, we only use genuine spare parts - safeguarding the longevity of your engine.

MAN PrimeServ’s aim is to provide:

- Prompt delivery of high-demand OEM spare parts within 24 hours
- Fast, reliable and competent customer support
- Individually tailored O&M contracts
- Ongoing training and qualification of operators and maintenance staff
- Global service, 24 hours a day, 365 days a year
- Diagnosis and troubleshooting with our high-performance online service.

The academy in Holeby offers comprehensive hands-on courses in operation and maintenance of MAN dual-fuel GenSets.
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