



Action code: **COMMERCIAL**

Fees for Technical Assistance and Advisory Work

MAN PrimeServ, Copenhagen

SL2017-642/HRP

March 2017

Concerns

Owners and operators of MAN B&W two-stroke low speed MC/MC-C/MC-S, ME/ME-C/ME-B and ME-GI engines.

Dear Sirs

This service letter informs MAN B&W engine owners and operators of PrimeServ's prices on service rendered from Denmark and from our service centres around the world.

The fees are valid from March 2017 for assistance rendered by personnel based in Denmark.

Any questions regarding our fees for technical service can be directed to PrimeServ, dept. DT-CPH, at PrimeServ-Cph@mandieselturbo.com

Yours faithfully

Michael Petersen
Vice President
PrimeServ Two-stroke

Henrik Birkegård
Senior Manager
Technical Service

Encl.:
PrimeServ flyers and brochure
General Terms & Conditions



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German Reg.No.: HRB 22056
Amtsgericht Augsburg



Fees in Euro for Technical Service

Superintendent engineer for advisory work, testing, trouble-shooting, and waiting

Weekdays (within normal working hours, 07-17.00)			Saturday, Sunday, and local holidays			Waiting and travelling time
Full day (4-8 hrs)	½ weekday (0-4 hrs)	Hourly rate after normal working hours	Full day (4-8 hrs)	½ day (0-4 hrs)	Hourly rate after 8-hour working day	Per hour
1390	760	250	1995	1145	315	165

Technician for attending repair jobs, erecting new engines, overhaul work, etc., travelling and waiting, per service call

Weekdays (within normal working hours)			Saturday, Sunday, and local holidays			Waiting and travelling time
Full day (4-8 hrs)	½ weekday (0-4 hrs)	Hourly rate after normal working hours	Full day (4-8 hrs)	½ day (0-4 hrs)	Hourly rate after 8-hour working day	Per hour
1110	605	200	1590	835	250	135

Terms and conditions

Charges

For work up to 4 hours, half a day will be charged. For hours worked in excess of 4 hours up to 8 hours, a full day will be charged. Work carried out before and after normal working hours (07:00 – 17:00) and in excess of 8 hours per day will be charged as overtime hours. 12 hours per day are charged when our personnel are requested to sail with the vessel/stay on site. Meal break hours are not to be deducted from the attendance as these have been provided for in the fees.

In addition to the service fees, customers will be invoiced for travel expenses (train, bus, taxi, ferry, mileage).

For service rendered outside the home base of the respective service personnel, a per diem charge of EUR 95 will be added, together with expenses for hotels and transportation. A 10% administration fee will be added to our outlays (hotel, air ticket, taxi, train, ferry, etc.).

Working hours

As a guiding principle, the duties of our engineers cannot be extended beyond 12 working hours a day excluding travelling, transport and breaks. No deductions for transport or breaks are to be made in the service fees as these have already been provided for in the fees. To comply with international rules, it is required for jobs extending beyond two weeks that our engineers have a weekly day of rest. This day will be charged as a waiting day

Supporting documents

Hotels and flight tickets will be booked by MAN Diesel &

Turbo. Supporting documents, i.e. documentation for flight tickets and hotel accommodation, will only be made available if this is requested when the service visit is ordered. If such documents are ordered after the service attendance, a fee of EUR 350 will be charged.

Expenses in connection with special visa requirements, as regards the ISPS Code, etc., will be added on an actual cost basis + 10%.

Indemnity

Please note that our personnel is not authorized to sign any forms releasing the customer, ship, or power plant from its responsibility towards our representative. In case any doubt occurs, our representative will be entitled to leave the site, and the customer will be invoiced in accordance with our normal fee, including travelling expenses.

In general

The exchange rate will be fixed on the date of issue of the order. On overseas flights our engineers will be travelling on lowest fare business class. Inside Europe, travelling will be on economy if available.

Invoices are exclusive of local taxes, such as VAT and sales tax (e.g. in China). Each service call will be followed up by a report covering the service rendered.

We reserve the right for our engineers to decline boarding/disembarking a vessel due to the weather conditions, poor boarding facilities, seaworthiness of the launch boat or if other safety issues warrant it. Service will be rendered



in accordance with our General Terms and Conditions, a copy of which is enclosed. When ordering, please provide the exact invoicing address. The invoice will be forwarded in PDF-format. An administration fee of EUR 20 will be added on the invoice if a paper copy is required.

We recommend liaising with the nearest PrimeServ Centre in order to reduce travelling time and cost. However, attendance is always subject to competence, availability and capability. The contact details of the nearest PrimeServ Centre can be found at www.primeserv.man.eu

Safety when boarding

In accordance with our focus on safety, we underline the importance of checking and confirming the following five items when boarding a vessel from a launch boat:

1. SOLAS approved life jacket must be available for use when entering the pilot ladder/gangway and returned after arriving safely on the main deck of the vessel.
2. The launch boat must have a crew of minimum two members, who will assist during the transfer to the vessel or in case of an unlikely rescue operation.
3. The vessel pilot ladder and/or gangway must be arranged in accordance with SOLAS Regulation V/23 and IMO Resolution A.1045(27).
4. Vessel crew member must be posted at the access point to the vessel.
5. SOLAS survival suit must be available if the seawater temperature is below 10 degrees C.

We reserve the right for our attending personnel to evaluate the equipment made available and decide whether or not to board the vessel based on this evaluation.

Other services

Services	Euro
Engine Performance Evaluation The data necessary for a performance evaluation is described in our service letter SL2014-590.	1,350
Pre-docking Inspection Unit price. Details see brochure enclosed.	1,000
Crankshaft Alignment Calculation	740
Cylinder Liner Measuring Unit price. Including liner photo inspection.	750 1,100
Analysis of Replica, Basic Price per unit of replica received in connection with cylinder condition inspections due to suspicion of catfines. Only a basic evaluation of the presence of catfines.	740
Analysis of Replica, Extended Includes count of cat fines per square and a report.	2,700
Sweep Test Evaluation Evaluation of sweep test data in order to establish correct setting for cylinder lubrication.	740
Torsional Vibration Calculation To determine restriction when running with units cut out (e.g. connecting rod removed).	7,500
Annual Service Package, Basic Unit price. Details see flyer enclosed.	700
Annual Service Package, Extended Unit price. Details see flyer enclosed. Maximum 4 days.	1,200
Material Analysis Minimum Analysis of parts forwarded to MAN PrimeServ for mechanical properties, chemical composition, etc.	9,000
Advanced ME Remote Assistance Involving CoCoS and HCU Event File.	740



Services	Euro
Data Disk PMI/ECS/CoCoS	480
<p>Shaft Alignment Calculation 1 Direct-coupled propulsion plant with a maximum of two intermediate shafts.</p> <p>A shaft alignment calculation comprises instructions (with instruction drawings) for installation of:</p> <ul style="list-style-type: none"> ▪ shafting ▪ bearing reactions ▪ data for checking of alignment ▪ data for possible realignment of shafting. <p>Delivery time: 10 weeks.</p>	13,750
<p>Shaft Alignment Calculation 2 Direct-coupled propulsion plant with more than two intermediate shafts and geared plants.</p> <p>A shaft alignment calculation comprises instructions (with instruction drawings) for installation of:</p> <ul style="list-style-type: none"> ▪ shafting ▪ bearing reactions ▪ data for checking of alignment ▪ data for possible realignment of shafting. <p>Delivery time: 10 weeks.</p>	15,750
<p>Torsional Vibration Measurement Measurements performed at sea or shop trials. Total duration of trials max. 48 hours.</p> <p>Extended duration of trials, per person: Waiting/travel days.</p>	9,750
<p>Engine Power Limitation – Parent Vessel</p> <p>Delivery time: 4 weeks.</p>	25,000
<p>Engine Power Limitation – Sister Vessel</p> <p>Delivery time: 4 weeks.</p>	10,000
<p>Performance Calculation – SO_x Scrubber The effects of added back-pressure in the exhaust gas system is evaluated with respect to:</p> <ul style="list-style-type: none"> ▪ exhaust gas amount ▪ exhaust gas temperature ▪ SFOC ▪ possible requirement for exhaust gas blower. <p>Requirements: Calculation of design back-pressure on current system. Calculation of design back-pressure on system with SO_x scrubber.</p> <p>Delivery time: 6 weeks.</p>	5,000
<p>Emission NO_x Measurements “Simplified” Onboard NO_x measurements. IMO Chapter 6. Working time, waiting time, travel and board will be charged according to service letter prices.</p> <p>Delivery time: 20 weeks.</p>	31,500
<p>Derating Study</p> <p>Delivery time: 6-8 weeks.</p>	10,000
<p>NO_x Documentation for TCCO Based on simplified measurements or, in case of K98, “common documentation”.</p> <p>Delivery time: 6 weeks.</p>	9,500



Services	Euro
<p>Emission NO_x Measurements "Full" On-board NO_x measurements. IMO Chapter 5. Including:</p> <ul style="list-style-type: none"> ▪ five persons ▪ travel and living ▪ five days at sea (14 hours per day) ▪ two days in port for preparations ▪ departure and arrival port to be the same. <p>Classification supervisor not included.</p> <p>Delivery time: 20 weeks.</p>	<p>205,000</p>
<p>Technical File New technical file based on IMO Chapter 5 measurements.</p> <p>Delivery time: 20 weeks.</p>	<p>38,500</p>

Scan the QR-code with your smartphone to gain quick access to the below listed websites:



Service Worldwide Handbook



PrimeServ

Pre-docking Inspection

Get a head start on dry-docking



Pre-docking Inspection

Two-stroke engines



MAN PrimeServ now offers a pre-docking inspection to provide you with the insight you need to avoid unforeseen findings during dry docking.

As an engine designer and developer, MAN Diesel & Turbo can provide you with knowledge and expertise across engine types, designs and licensees.

Based on the pre-docking inspection, MAN PrimeServ provides recommendations for the upcoming dry-docking based on the actual engine condition.

Knowing the actual engine condition is knowing the actual scope of work, thereby enabling diligent planning. Planning ensures that the right parts are available on time, thereby reducing downtime and costs.

In short: pre-docking inspections give valuable input to your dry-docking planning.



Benefits:

- Overview of engine condition
- Recommended work scope during dry-dock
- Optimised planning
- Required parts available on time
- Reduced time and costs

Price: EUR 1,000/cylinder unit.

The price includes two superintendent engineers for up to 48 hours regardless of engine size. A written report and a quotation with recommended spare parts.

Travel and living expenses will be invoiced separately.

Scope of Work

Two-stroke engines

MC/MC-C series

Carried out by MAN PrimeServ superintendent engineers

Visual inspection of the following:

- Ball joints for pull rods to governor, fuel rack and manoeuvring gear
- Surfaces of all cams/rollers through the inspection hole in the camshaft housing
- Exhaust high-pressure piping
- Chain drive and guide bars
- Moment compensator
- Water mist catcher
- Thrust bearing
- Earthing device
- Cylinder lubricating system
- Critical spare parts



Inspection and measurement of the following:

- Cylinder liners, pistons, piston rings (port inspection)
- VAK measuring of cylinder liners and combustion chambers ¹⁾
- Video inspection of cylinder liners and combustion chambers as required ¹⁾

1) Only possible for engines with a cylinder bore of 50 cm or larger

To be carried out by vessel crew

Tasks to be completed within three months before inspection:

- Engine performance test ²⁾
- Crankcase inspection, including checks of bearing clearance, guide rails and piston rods ³⁾
- Crankshaft deflection ³⁾

2) According to Service Letter SL2014-590

3) Spot checks may be carried out by the attending MAN superintendent engineers in order to validate or compare results found by the crew.



Supplied by crew during attendance

- Running hours of various components to be collected (list will be provided by the attending superintendent engineers).

ME/ME-C series

Carried out by MAN PrimeServ superintendent engineers

Visual inspection of the following:

- Exhaust high-pressure piping
- Fuel oil boosters
- Hydraulic pumps
- Chain drive and guide bars
- Moment compensator
- Thrust bearing
- Water mist catcher
- Earthing device
- Cylinder lubricating system
- Tacho system
- Critical spare parts



Inspection and measuring of the following:

- Cylinder liners, pistons, piston rings (port inspection)
- VAK measuring of cylinder liners and combustion chambers ¹⁾
- Video inspection of cylinder liners and combustion chambers as required ¹⁾

1) Only possible for engines with a cylinder bore of 50 cm or larger

To be carried out by vessel crew

Tasks to be completed within three months before inspection:

- Engine performance test ²⁾
- Crankcase inspection, including checks of bearing clearance, guide rails and piston rods ³⁾
- Crankshaft deflection ³⁾

2) According to Service Letter SL2014-590

3) Spot checks may be carried out by the attending MAN superintendent engineers in order to validate or compare results found by the crew.



Supplied by crew during attendance

- Running hours of various components to be collected (list will be provided by the attending superintendent engineers).

Scope of Work

Two-stroke engines

ME-B series

Carried out by MAN PrimeServ superintendent engineers

Visual inspection of the following:

- Exhaust high-pressure piping
- Surfaces of all cams/rollers through the inspection hole in the camshaft housing
- Fuel oil boosters
- Hydraulic pumps
- Chain drive and guide bars
- Moment compensator
- Water mist catcher
- Thrust bearing
- Earthing device
- Cylinder lubricating system
- Tacho system
- Critical spare parts



Inspection and measuring of the following:

- Cylinder liners, pistons, piston rings (port inspection)
- VAK measuring of cylinder liners and combustion chambers ¹⁾
- Video inspection of cylinder liners and combustion chambers as required ¹⁾

1) Only possible for engines with a cylinder bore of 50 cm or larger

To be carried out by vessel crew

Tasks to be completed within three months before inspection:

- Engine performance test ²⁾
- Crankcase inspection, including checks of bearing clearance, guide rails and piston rods ³⁾
- Crankshaft deflection ³⁾

2) According to Service Letter SL2014-590

3) Spot checks may be carried out by the attending MAN superintendent engineers in order to validate or compare results found by the crew.



Supplied by crew during attendance

- Running hours of various components to be collected (list will be provided by the attending superintendent engineers).

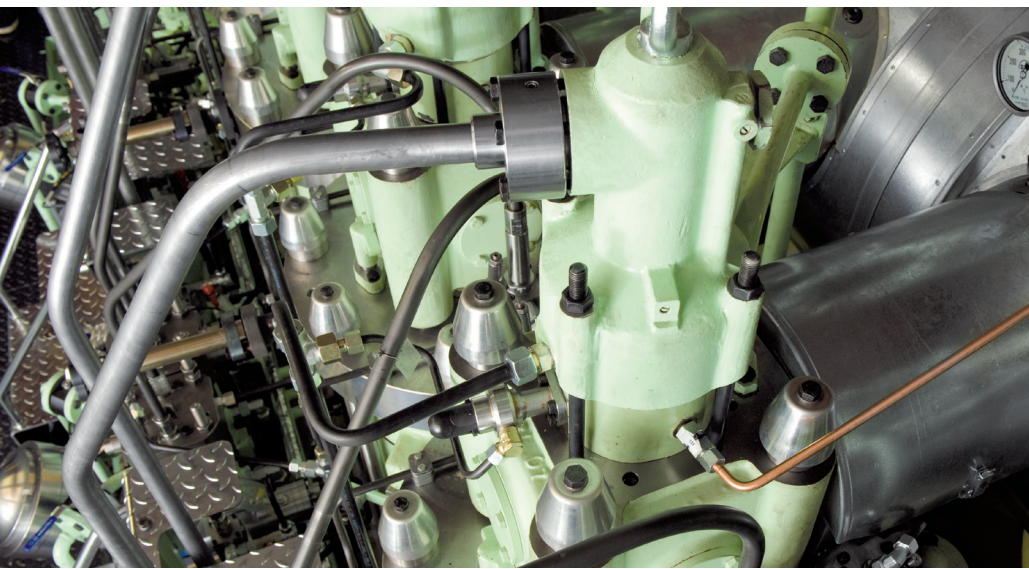


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www.mandieselturbo.com

Annual Service Package – Basic

MC and MC-C engines



Visual inspection of the following

- Ball joints for pull rods to governor, fuel rack and manoeuvring gear
- Surfaces of all cams/rollers through the inspection hole in the camshaft housing
- Cylinder liners, pistons, piston rings (Port inspection)
- Crankcase inspection, including all bearings, guide rails and piston rods
- Crankshaft deflection
- Chain drive and guide bars
- Moment compensator
- Scavenge air receiver
- Water mist catcher
- Thrust bearing
- Earthing device

Price: EUR 700 / Cylinder unit and from 8 units up attendance will be by two superintendent engineers.

The price includes one or two superintendent engineers from PrimeServ Copenhagen for approximately two days followed by a written report. Travelling and living expenses will be invoiced separately.

Please contact Technical Service in Copenhagen for further information using dt-cph@mandieselturbo.com



Annual Service Package – Extended

MC and MC-C engines



Visual inspection of the following

- Ball joints for pull rods to governor, fuel rack and manoeuvring gear
- Surfaces of all cams/rollers through the inspection hole in the camshaft housing
- Cylinder liners, pistons, piston rings (Port inspection)
- Crankcase inspection, including all bearings, guide rails and piston rods
- Crankshaft deflection
- Chain drive and guide bars
- Moment compensator
- Scavenge air receiver
- Water mist catcher
- Thrust bearing
- Earthing device
- Performance check during the ship's operation compared with the original sea trial/shop trial observation at about 50, 75 and 100% load, followed by a written evaluation.
- Visual inspection of the exhaust pipe system

Price: EUR 1000 / Cylinder unit and from 8 units up attendance will be by two superintendent engineers.

The price includes one or two superintendent engineer from PrimeServ Copenhagen for approximately three days followed by a written report. Travelling and living expenses will be invoiced separately.

Please contact Technical Service in Copenhagen for further information using dt-cph@mandieselturbo.com

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Annual Service Package – Basic

ME engines



The basic annual service package ME (for electronic engines) consists of

- A crankcase inspection, including main bearing top clearances and wire feeler inspection, guide rails and piston rods
- An evaluation of the oil history to determine whether water/Pb is present
- A quick function test of the ME system via the MOP, including a cyclic test of the hydraulic valves and a test of the exhaust valve seals by a “drop down” test
- An inspection of the Bender insulation unit and the current insulation level.

The basic annual service package also includes a visual inspection of

- The cylinder liners, the pistons, the piston rings (a full scavenge port inspection including flaps)
- The crankshaft deflection, if necessary, and evaluation and spot check of the recent records made by the crew
- The chain drive and the guide bars, the moment compensator, the scavenge air cooler and the water mist catcher
- The condition of the shaft earth grounding device
- The condition of the general cabling, including random inspections of relevant junction boxes and MPC cabinets for the condition of the general cabling.

Price: EUR 700 per cylinder unit.

The price includes one superintendent engineer from PrimeServ Copenhagen for approximately two days and a written report. Travelling and living expenses will be invoiced separately.

Please contact Technical Service in Copenhagen for further information at dt-cph@mandieselturbo.com



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Annual Service Package – Basic

ME engines

General conditions and recommendations

For 8-cylinder engines and up, the inspections require two attending engineers, who are included in the price.

It is expected that the installed turning gear and other safety gear are in good working condition. If for instance the turning gear of the blockage of the main starting valve, etc., is found defective, we reserve the right not to conduct inspections, which may be deemed to pose a security risk to our attending engineer.

We recommend that the on board electrician participates in the inspections mentioned above relevant for his tasks on board.

In general, we expect the on board crew to assist in preparing access to the parts and confined spaces relevant for the inspections. If we only have one superintendent engineer on board, one of the vessel's engineers must stand by and perhaps participate in the inspections for safety reasons. We will not accept that our superintendent engineers work on their own in any of the confined spaces mentioned and relevant for the above inspections.

We also recommend and support that crankcase inspections, deflection and main bearing clearance readings are conducted as a joint venture with the on board engineers in order to align future recordings/measurement.

We often observe relatively large differences in clearances recorded by the on board crew when comparing the actual measurements made by our attending superintendent engineers. In order to avoid confusion and discussions caused by differences in the obtained measurements, the clearances/deflections should be made by an appointed on board engineer, supervised and spot checked by our attending superintendent engineer.

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Annual Service Package – Extended

ME engines

The extended annual service package ME (electronic engines) consists of

- An evaluation of the oil history to determine whether water/Pb is present
- A crankcase inspection, including main bearing top clearances and a wire feeler inspection, guide rails and piston rods
- A quick function test of the ME system via the MOP, including a cyclic test of the hydraulic valves and a test of the exhaust valve seals by a “drop down” test
- A performance check during sailing at possible loads, aiming at three observations at different loads.



The extended annual service package also includes a visual inspection of

- The cylinder liners, the pistons, the piston rings (a full scavenge port inspection including flaps)
- The crankshaft deflection, if necessary, and evaluation and spot check of recent records made by the crew
- The chain drive and the guide bars
- The moment compensator
- The scavenge air cooler
- The water mist catcher
- The condition of the shaft earth grounding device
- The general cabling condition and the current insulation level, including random inspections of relevant junction boxes and MPC cabinets for general condition
- The Bender insulation unit and the current insulation level
- The functionality of the PMI Auto-tuning, if installed
- A performance evaluation report is included.

Price: EUR 1,200 per cylinder unit.

The price includes one or two superintendent engineers from our Copenhagen Service Centre for approximately three to four days and a written report. Travelling and living expenses will be invoiced separately.

Please contact Technical Service in Copenhagen for further information at dt-cph@mandieselturbo.com



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Annual Service Package – Extended

ME engines

General conditions and recommendations

For 8-cylinder engines and up, the inspections require two attending engineers, who are included in the price.

It is expected that the installed turning gear and other safety gear are in good working condition. If for instance the turning gear of the blockage of the main starting valve, etc., is found defective, we reserve the right not to conduct inspections, which may be deemed to pose a security risk to our attending engineers.

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