

# **mitsubishi DIESEL ENGINE**

## **STANDARD INSTALLATION & START-UP REPORT GENERATOR SET**

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Revision: 1

## INTRODUCTION

### Pre-Commissioning

When start to plan installation, commissioning and start-up please study carefully the latest version of the MTEE Installation & Start-up Manual (Doc. No. MTEEDSE2026-0037).

Before initial startup verify, check and confirm the engine and installation condition is according to the applicable Specification Sheet, Installation and Operation & Maintenance Manuals.

### Test Summary

Commissioning or Installation start-up test (on-site test) means to comprehensively confirm that all equipment is installed, is functioning properly and that it has equivalent performance based on the results of the factory test.

In addition, the dealer or OEM option attached to the installation should be checked at the dealer's or OEM's responsibility.

### Commissioning or Installation Start-up Report

MTEE is aware of the extent of this document, since the form is intended to serve all types of engines, applications and authority requirements.

Fill in as much information and data as available and mandatory required, depending on the engine and application.

After completion of installation and start-up works with satisfactory results, document the results in the installation & start-up report, print page 1 to 10 and have it signed off for acceptance by all parties required.

Provide a copy of the signed report to all parties wishing to receive a copy.

A copy of the report must be retained onboard together with at least the manufacturer's engine test record (ETR), operation & maintenance manual, parts catalogue, and any certificates associated with the installation.

The installation & start-up report shall be submitted together with the registration of start-up at MTEE.

As a replacement of the MTEE installation & startup report an own company commissioning or installation test report is accepted provided the following topics are included in the report.

- Installation data/details.
- Confirmation of correct alignment.
- Test of all minimal required alarm and safety sensors and devices.
- Engine performance at 25%, 50%, 75% and 100% load.
- Confirmation of installation vibration levels at 25%, 50%, 75% and 100% load are within specified levels.

# INSTALLATION & START-UP REPORT

## A. INSTALLATION DATA

Service company:		Date:
Inspector name:		Project No.:
Harbour/City:	Country:	
Owner:	Shipyard/Contractor:	
Ship/Installation name:		IMO No.:
Ship/Installation type:		Class society:

WEATHER		LUBRICATING OIL	FUEL OIL
Fine <input type="checkbox"/>	Cloudy <input type="checkbox"/>	Barometric P: mBar	Type:
Rainy <input type="checkbox"/>	Snowy <input type="checkbox"/>	Ambient T: °C	SAE:
			Class:
			Density: g/cm <sup>3</sup>
			Temperature: °C

ENGINE SPECIFICATION			
Type:	Output: KW	Order no.:	Injection timing: °C
Serial no.:	Speed: RPM	Running hours:	Con-rod rank:
Cooling method:	Direct: LT <input type="checkbox"/> HT <input type="checkbox"/>	Keel: LT <input type="checkbox"/> HT <input type="checkbox"/>	Heat exch: LT <input type="checkbox"/> HT <input type="checkbox"/>
Starting method:	Electrical motor: <input type="checkbox"/>	Air motor: <input type="checkbox"/>	Air start: <input type="checkbox"/>
Governor Type:	Mechanical: <input type="checkbox"/>	Hydraulic: <input type="checkbox"/>	Electronic: <input type="checkbox"/>
Pre-heated:	No <input type="checkbox"/> Yes <input type="checkbox"/> °C	Pre-lubricated:	No <input type="checkbox"/> Yes <input type="checkbox"/>

GENERATOR SPECIFICATION			
Make:	Model/Type:	Serial no.:	
Bearing: Single <input type="checkbox"/> Double <input type="checkbox"/>	Coupling: Rigid <input type="checkbox"/> Flexible <input type="checkbox"/>	Ingress protection: IP	
Output: KVA	Voltage: V	Current: A	Frequency: Hz
Phase:	Poles:	Power factor:	Efficiency: %

INSTALLATION SPECIFICATION			
Mounted type:	Remote <input type="checkbox"/> Close-coupled <input type="checkbox"/>	Vibration isolation system:	Lower <input type="checkbox"/> Upper <input type="checkbox"/>
Crankshaft axial clearance:	mm	Crankshaft deflection:	mm

**COMMENTS****VESSEL/SITE PICTURES**

## B. INSTALLATION SURVEY

**Note 1:** "!" Additional items in cases of long-time storage or uncontrolled storage environment conditions.

**Note 2:** "\*" Additional items applicable in cases where the condition monitoring maintenance program is in effect.

### 1. Check visual engine external

- Check for corrosion & leakage OK ☐ NOK ☐
- Check for external damages, special care for high pressure fuel pipes OK ☐ NOK ☐

### 2. Fuel system

- Free movement of fuel linkage including fuel rack of fuel pump OK ☐ NOK ☐
- Check ball joints for grease levels and corrosion OK ☐ NOK ☐
- ! Remove injectors and test for proper operation OK ☐ NOK ☐

### 3. Camshaft

- ! Check for corrosion (special attention for the bearings and tappets) OK ☐ NOK ☐

### 4. Crankshaft

- Check for corrosion (special attention bearings) OK ☐ NOK ☐
- ! Remove some connecting rod bearing caps on each side to have a proper inspection OK ☐ NOK ☐

### 5. Gears

- ! Check condition of idler and/or camshaft gears by removing the plates on the flywheel housing OK ☐ NOK ☐

### 6. Starter engines

- Check movement of each starter engine (individually) OK ☐ NOK ☐

### 7. Cooling water system

- ! Check for corrosion (cooling water pump) OK ☐ NOK ☐

### 8. Cylinder head

- Pre-lubricate and check rocker arms for corrosion and normal movement OK ☐ NOK ☐
- Check valve clearance OK ☐ NOK ☐
- \* Valve sinkage measured and recorded OK ☐ NOK ☐

### 9. Cylinder liner

- ! Check liner, valves and piston (by endoscope) OK ☐ NOK ☐
- \* Combustion pressure or leak-down test preformed and recorded OK ☐ NOK ☐

### 10. Turbochargers

- ! Check silencer or air intake filter is clean and free of obstructions OK ☐ NOK ☐
- ! Check turbochargers for corrosion (turbine and compressor side) OK ☐ NOK ☐
- ! Check for free movement OK ☐ NOK ☐
- ! Check turbocharger clearances (radial & axial) OK ☐ NOK ☐

### C. ALARM AND SAFETY TEST

Fuel oil system	High pressure pipe leakage	A		MPa
	Pressure at engine inlet	LA		MPa
	Temperature at engine inlet	HA		°C
HT-Cooling water system	Engine inlet pressure	LA		MPa
	Engine outlet temperature	HA		°C
		SH+A		°C
	Stand-by pump	AS		MPa
LT/Sea-water cooling water system	Air cooler inlet temperature	HA		°C
	Air cooler inlet pressure	LA		MPa
Lubricating oil system	Inlet pressure	LA		MPa
		SH+A		MPa
	Stand-by pump	AS		MPa
	Filter high differential pressure	A		MPa
	Engine inlet temperature	HA		°C
Combustion air system	Charge air pressure	A		MPa
	Charge air temperature	HA		°C
Exhaust	Temperature before T/C l/h bank	HA		°C
		LR+A		°C
	Temperature before T/C r/h bank	HA		°C
		LR+A		°C
	After engine	LR+A		°C
	Deviation between cylinders	HA		°C
Starting and control air system	Receiver pressure	LA		MPa
	Receiver temperature	LA		°C
Engine speed	Overspeed protection	SH+A		RPM
Crankcase explosive condition	Oil mist detection	HA	Yes <input type="checkbox"/>	No <input type="checkbox"/>
		SH+A	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	Crankcase pressure	HA	Yes <input type="checkbox"/>	No <input type="checkbox"/>
		SH+A	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Generator	Over current	BT		A
	Short Circuit	BT		A
	Under voltage	BT		V
	Over voltage	BT		V
	Under frequency	A		Hz
	Over frequency	A		Hz
	Reverse power	BT		KVA
	Bearing temperature	A		°C

## D. LOAD TEST

	Time	h:m				
	Load	%	25	50	75	100
	Generator load	KVA				
	Power factor (PF)					
	Generator efficiency ( $\rho_{gen.}$ )	%				
	Engine output ( $[(KVA \times PF) \div \rho_{gen.}]$ )	KW				
	Rotational speed ( $[(120 \times HZ) \div poles]$ )	RPM				
Fuel	Consumption	l/h				
	Temperature at engine inlet	°C				
	Pressure before filter	MPa				
HT-Cooling water	Temperature at engine inlet	°C				
	Temperature at engine outlet	°C				
	Pressure	MPa				
LT/Sea-water cooling water	Temperature at engine inlet	°C				
	Temperature at engine outlet	°C				
	Pressure	MPa				
Lubricating oil	Temperature	°C				
	Pressure	MPa				
Combustion air	Intake temperature l/h bank	°C				
	Intake temperature r/h bank	°C				
	Charging air temperature	°C				
	Charging air pressure l/h bank	MPa				
	Charging air pressure r/h bank	MPa				
Exhaust	Before turbo charger l/h bank	°C				
	Before turbo charger r/h bank	°C				
	After engine	°C				
	Back pressure	MPa				
Generator	Voltage L1	V				
	Voltage L2	V				
	Voltage L3	V				
	Current L1	A				
	Current L2	A				
	Current L3	A				
	Bearing temperature front	°C				
	Bearing temperature rear	°C				

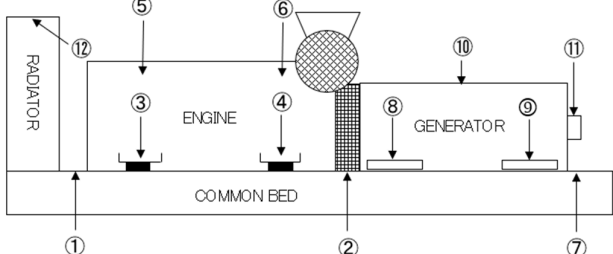
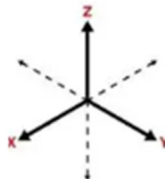
Idle engine speed no load		RPM	Maximum engine speed no load		RPM
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Governor setting:	Droop:	Gain:	I:	D:
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	Time	h:m				
	Load	%				
Exhaust	Cylinder temperature no. 1	°C				
	Cylinder temperature no. 2	°C				
	Cylinder temperature no. 3	°C				
	Cylinder temperature no. 4	°C				
	Cylinder temperature no. 5	°C				
	Cylinder temperature no. 6	°C				
	Cylinder temperature no. 7	°C				
	Cylinder temperature no. 8	°C				
	Cylinder temperature no. 9	°C				
	Cylinder temperature no. 10	°C				
	Cylinder temperature no. 11	°C				
	Cylinder temperature no. 12	°C				
	Cylinder temperature no. 13	°C				
	Cylinder temperature no. 14	°C				
	Cylinder temperature no. 15	°C				
	Cylinder temperature no. 16	°C				
Combustion peak pressure	Cylinder no. 1	MPa				
	Cylinder no. 2	MPa				
	Cylinder no. 3	MPa				
	Cylinder no. 4	MPa				
	Cylinder no. 5	MPa				
	Cylinder no. 6	MPa				
	Cylinder no. 7	MPa				
	Cylinder no. 8	MPa				
	Cylinder no. 9	MPa				
	Cylinder no. 10	MPa				
	Cylinder no. 11	MPa				
	Cylinder no. 12	MPa				
	Cylinder no. 13	MPa				
	Cylinder no. 14	MPa				
	Cylinder no. 15	MPa				
	Cylinder no. 16	MPa				



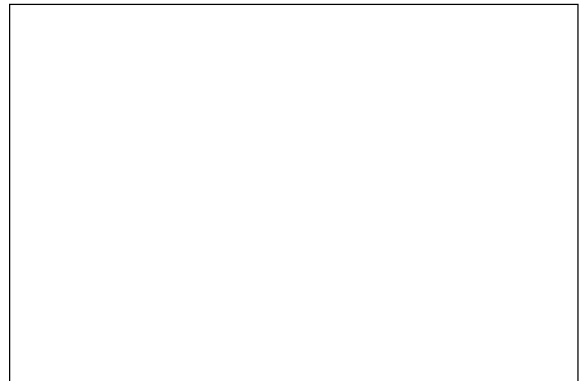
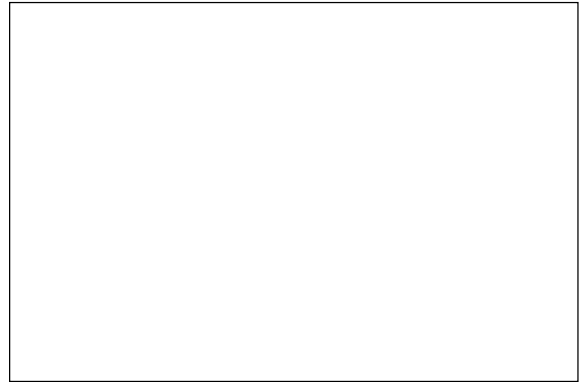
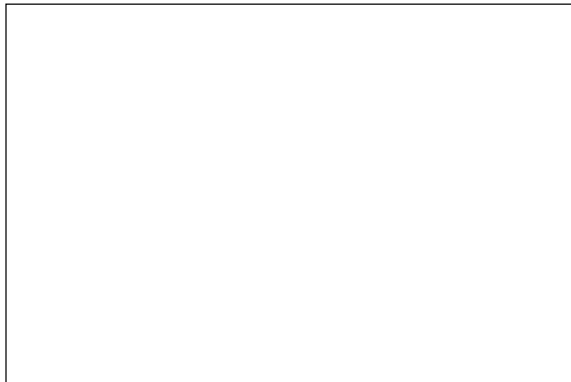
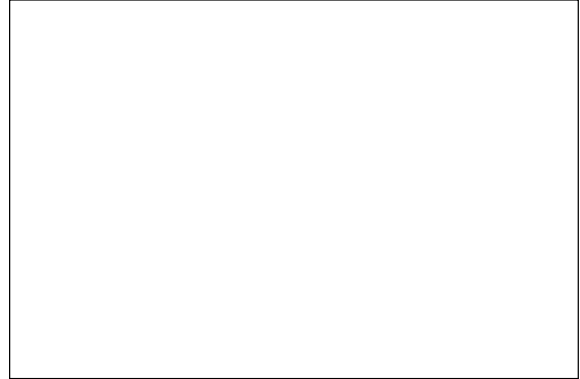
## E. VIBRATION MEASUREMENT

Measuring points		Unit	Limit
		Peak to Peak	$\leq 0.300 \text{ mm}$
		<b>Directions</b> X = Axial Y = Radial-H Z = Radial-V 	
①	Common bed engine front	⑦	Common bed generator rear
②	Common bed flywheel	⑧	Generator feed front
③	Engine feed front	⑨	Generator feed rear
④	Engine feed rear	⑩	Generator upper body
⑤	Engine block upper front	⑪	Generator rear bearing
⑥	Engine block upper rear	⑫	Radiator upper

			Load (%)				
			Idle 0%	25	50	75	100
①	X	mm					
	Y	mm					
	Z	mm					
②	X	mm					
	Y	mm					
	Z	mm					
③	X	mm					
	Y	mm					
	Z	mm					
④	X	mm					
	Y	mm					
	Z	mm					
⑤	X	mm					
	Y	mm					
	Z	mm					
⑥	X	mm					
	Y	mm					
	Z	mm					

			Load (%)				
			Idle 0%	25	50	75	100
⑦	X	mm					
	Y	mm					
	Z	mm					
⑧	X	mm					
	Y	mm					
	Z	mm					
⑨	X	mm					
	Y	mm					
	Z	mm					
⑩	X	mm					
	Y	mm					
	Z	mm					
⑪	X	mm					
	Y	mm					
	Z	mm					
⑫	X	mm					
	Y	mm					
	Z	mm					

## F. INSTALLATION PICTURES



**G. NOTES****SIGNED FOR ACCEPTANCE**

Shipyard	Owner	Class society	Service company
Signature:	Signature:	Signature:	Signature:
Name:	Name:	Name:	Name:

