
Operation Maintenance Schedule

for

YAMAMA GT6 - GT9

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1 Introduction



Warning! Maintenance of the gas turbine unit is only allowed to authorized personnel

1.1 Before reading this document

Make sure that you are familiar with the following documents in this manual:

- Operating Safety
Deals with the safety precautions concerning the Gas Turbine (GT) and its auxiliary systems.

1.2 Definition of Operation Maintenance and Routine Readings

Operation Maintenance are all the tasks carried out by the operator, mainly consisting of daily attendance and routine maintenance activities.

Routine readings are the readings performed by the operator, using *log sheets* from the document *Periodic Checks* in the Operation Instructions.

1.3 Purpose of the document

This document contains recommendations about operation maintenance and tells *when* a certain maintenance action is to be performed. Instructions *how* to perform the maintenance can be found in the Component Documentation.

The time intervals are given either as calendar periods, 2 weeks, 3 months etc., or as a number of GT operating hours; 500 h, 1000 h, etc. When a period is stated in relation to both a calendar period and to operating hours, naturally the one reached first applies.

"When required" is used as an interval when a component is equipped with an indicating device (e.g. diff. pressure indicator). Maintenance of a specific component shall of course be performed when an alarm or trip occurs (see Fault Procedures).

This document also tells you which actions should be performed only at standstill.

Due to different local operating conditions, such as type of climate and mode of operation, some intervals can be altered according to local experience and after agreement between the customer and Siemens Industrial Turbomachinery AB.

1.4 Abbreviations

The abbreviations used for the schedule are:

| | |
|--|-----------|
| Daily action | D |
| Weekly action | W |
| Monthly action | M |
| Action every second month | 2M |
| Action every sixth month | 6M |
| Yearly action | Y |
| Action every second year | 2Y |
| ----- | |
| Action needed when required | Re |
| Action possible during standstill only | St |

2 General checks

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|-----|---|---|---|----|----|---|----|----|----|
| Check for the following behaviour on each system and component: leakages, abnormal noises and vibrations, abnormal levels and abnormal values. | - | X | | | | | | | | |
| Reading and recording of all local gauges for proper equipment operation (see the document <i>Routine Readings</i>) | | X | | | | | | | | |
| Lamp test | - | | X | | | | | | | |
| If the unit is out of service: Start it and put it into operation at idling for at least 10 minutes. | - | | | X | | | | | | X |
| If the unit is out of service: Test run stand-by pumps, fans, oil system and barring to prevent binding. | - | | X | | | | | | | X |
| Check earthing of pipes visually, replace cords if required. | - | | X | | | | | | | |
| Compare logg pages with the week before. | | | | | | | | | | |

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3 BRA UPS



Warning! Before starting any maintenance, establish a state of no-voltage according to the national regulations. See sub suppliers' documentation.

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|-----|---|---|---|----|----|---|----|----|----|
| Check the voltage and currency of the rectifier. | BRA | | | | | X | | | | |

4 BTA/BTL Auxiliary power



Warning! Before starting any maintenance, establish a state of no-voltage according to the national regulations. See sub suppliers' documentation.

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|---|-----|---|---|---|----|----|---|----|----|----|
| Check the voltage of the battery- and cell voltage. Record the results in a battery log book. | BTA | | | | X | | | | | |
| Cleaning of battery and rack. Greasing of connections. | BTA | | | | | | X | | | |
| Check the voltage and currency of the rectifier. | BTL | | | | | | X | | | |

5 CHA Control cubicles



Warning! DANGEROUS VOLTAGE! Opening of control cubicles is allowed only by authorized personnel.

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|-----|---|---|---|----|----|---|----|----|----|
| Change memory back-up batteries every third year. | CHA | | | | X | | | > | | |
| Check and remove dust from filters, apparatus etc. | | | | | | | X | | | |

6 MBH Cooling- / Sealing- / Purge air system

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|---|--|---|---|---|----|----|---|----|----|----|
| Perform a General Inspection -Check the seal air temperature MBH10CT005. If the temperature is elevated compared to last check, cooler might need cleaning of the tubes. | MBH10 | | | X | | | | | | X |
| Replace seals and gaskets in valves | MBH20AA010 MBH20AA015 MBH20AA020 MBH20AA215 | | | | | | | X | X | X |

7 MBK Gear System

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|-------|---|---|---|----|----|---|----|----|----|
| Visual examination of the gearing. | MBK10 | | | | | | X | | | X |
| Check for leaks of the oil piping to the gear box. | | X | | | | | | | | |

8 MBL Air Intake System (jet-pulse)

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|--|---|---|---|----|----|---|----|----|----|
| Inspect the air intake filter system. Check that there is no air passing unfiltered. | MBL20 MBL30 | | | X | | | | | | |
| Replace any damaged or blocked filter elements as required. | | | | | | | | | X | X |
| Check all surfaces for corrosion. | MBL20 | | | | | | X | | | |
| Check the system for leakages. | MBL20 MBL30 | | | | X | | | | | |
| Inspect the filter elements for holes and/or leakages. | MBL21AT005 MBL21AT010 MBL22AT005 MBL22AT010 MBL23AT005 MBL23AT010 MBL24AT005 MBL24AT010 | | | | X | | | | | |
| Check the warning system. Make sure that the pressure switches have the correct setting. | MBL20CP005 MBL20CP015 | | | | X | | | | | |

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9 MBN 10 Liquid fuel System

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|---|------------|---|---|---|----|----|---|----|----|----|
| Change filters (See Liquid fuel filter change instruction) | MBN10AT005 | | | | | | X | | X | |
| Check for water in fuel oil tank by draining valve MBN10AA205 | MBN10BB005 | | | | | | | | | X |
| Check for fuel leaks of the pipes, manifolds and burners. | | X | | | | | | | | |
| Take a fuel sample for analysis of ash sticking temperature. | MBN10AA405 | | | | | X | | | | |

10 MBP Gas fuel system

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|--|---|---|---|----|----|---|----|----|----|
| Check for gas leakage by using a gas detector. | MBP | | X | | | | | | | |
| Visual check for damages. | MBP | | X | | | | | | | |
| Check for liquid in fuel gas filter drain pipes. | MBP05CL020 MBP05CL025 | | X | | | | | | | |
| Change filter elements (See Gas Fuel Filter Change Instruction) | MBP05AT015 MBP05AT025 | | | | | | X | | | |
| Replace seals and gaskets in valves | MBP05AA005 MBP05AA015 MBP10AA025 MBP10AA030 MBP10AA205 MBP10AA230 | | | | | | | X | X | X |

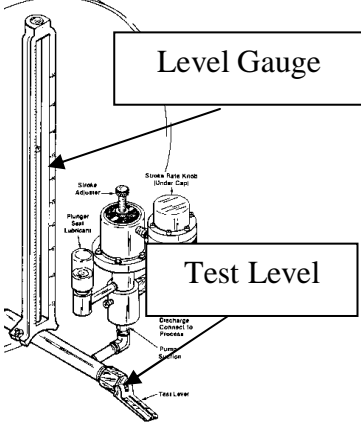
11 MBQ Ignition fuel system

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|--|---|---|---|----|----|---|----|----|----|
| Check for gas leakage by using a gas detector. | MBQ | | X | | | | | | | |
| Visual check for damages. | MBQ | | X | | | | | | | |
| Replace valves. | MBQ10AA040 MBQ10AA045 MBQ20AA010 MBQ20AA015 MBQ20AA020 | | | | | | | X | X | X |

12 MBT Gas Generator System

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|---|--------------------------|---|---|---|----|----|---|----|----|----|
| Perform compressor washing according to the document Compressor Washing Instructions. | MBT | | | X | | | | | X | X |
| Check bleed valve 1 and 2, for air leaks. For cleaning and lubrication of bleed valves see sub suppliers recommendation in document operation and maintenance instructions. | MBT10AA005 MBT10AA010 | | | | | | | | | X |

13 MBU10 Dosage System

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|------------|---|---|---|----|----|---|----|----|----|
| <p>Check flow at dosage pump. The flow should be 30 ppm (Turbotect 153) which gives approximately 6 litres per 24 hours at full load, ISO conditions. The flow can be tested by depressing the test lever (see figure) in 60 sec, while reading the level change, 6 ltrs, on the level gauge.</p>  <p>For further instructions, see sub suppliers documentation.</p> | | | | | | | | | | |
| Check level in tank. Refill if required. | MBU10BB405 | | x | | | | | | | |
| Fill silicagel in dehydrating breather. | MBU10AT405 | | | | | | | | x | |
| Check colour of silicagel and change when red. | MBU10AT405 | x | | | | | | | | |

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14 MBV Lubricating oil system

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|---|--|---|---|---|----|----|---|----|----|----|
| Check lube oil tank level. | MBV10BB005 | | X | | | | | | | |
| Check for leaks of the oil pipes to and from the tank. | MBV10 | X | | | | X | | | | |
| Take a lubricating oil sample for analysis. See Lube Oil Test Instruction. | MBV40AA020 | | | | | X | | | | |
| After switch-over to the clean filter element, the dirty filter element(s) must be replaced. See Lube Oil Filter Change Instructions. | MBV40AT005 MBV40AT010 | | | | | | | | X | |
| Lube oil cooler: General inspection. | MBV30AC015 MBV30AC020 MBV30AC025 | | | X | | | | | X | |
| Lube oil pumps: Check for shaft leakage, abnormal noise etc. | MBV21AP005 MBV22AP005 MBV23AP005 MBV51AP005 MBV52AP005 MBV53AP005 | | | X | | | | | | |
| Check the function of the regulating valve. | MBV54AA005 | | | | | X | | | | |

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15 MK Generator System



Warning! Before starting any maintenance, establish a state of no-voltage according to the national regulations.

15.1 Generator

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|-------|---|---|---|----|----|---|----|----|----|
| Check earthing and earth fault indication brushes. Replace brushes if their length is less than the minimum. | MKA10 | | | X | | | | | | |

15.2 Enclosure of line and neutral point terminals

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|-----|---|---|---|----|----|---|----|----|----|
| Check the busbar and tee-off connections. Be sure that washers are not damaged. Tighten up the hexagonal screws and nuts. | | | | | | | X | | | |
| Check that the fixing-screws for the apparatus are not loose. | | | | | | | X | | | |
| Check the screws of secondary terminal support. | | | | | | | X | | | |
| Check and remove the dust from insulators, supports apparatus etc. | | | | | | | X | | | |
| Painted surfaces on the enclosure are to be cleaned with a wet sponge (motor-car shampoo and water). Do no spray the enclosure with water. | | | | | | | X | | | |
| Check that screws and nuts on the enclosure are tightened. | | | | | | | X | | | |
| Check the function of the generator protections. | | | | | | | | X | | |
| Check cover sealings | | | | | | | X | | | |

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16 QFA Instrument air system

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|---------------------------------|-----|---|---|---|----|----|---|----|----|----|
| See sub supplier documentation. | QFA | | | | | | | | | |

17 SAA/SAG/SAE/SAC Ventilation system

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|--|---|---|---|----|----|---|----|----|----|
| Inspect the ventilation air intake filters. The filters must be well fitted in their frames to prevent leakage. | SAG10AT015 | | | | X | | | | X | |
| If equipped with optional stand-by fans: Start the stand-by fan and stop the fan in operation. For further instructions, see Operating instructions. | SAG10AN005 SAG10AN010 SAA10AN005 SAA10AN010 | | | X | | | | | | |
| Check function of the shut-off dampers. | SAG10AB005 SAG10AB010 SAG10AB020 SAA10AB005 SAA10AB010 | | | | | | | | | X |
| Weather seal Control room / enclosure | SAC | | | | X | | | | X | |
| Air conditioning unit (See operating introduction for air conditioning unit) | SAC10 SAC20 | | | | | | | | | |
| Inspect the air intake filter system. Check that there is no air passing unfiltered. | SAE40 | | | X | | | | | | |
| Replace any damaged or blocked filter elements as required. | | | | | | | | | X | X |
| Check all surfaces for corrosion. | SAE40 | | | | | | X | | | |
| Check the system for leakages. | SAE40 | | | | X | | | | | |
| Inspect the filter elements for holes and/or leakages. | SAE40AT035 SAE40AT045 | | | | X | | | | | |

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Operation Maintenance Schedule

| | | | | | | | | | | |
|--|------------|--|--|--|---|--|--|--|--|--|
| Check the warning system. Make sure that the pressure switches have the correct setting. | SAE40CP015 | | | | X | | | | | |
|--|------------|--|--|--|---|--|--|--|--|--|

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18 SDB Compressor Washing System

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|--|--|---|---|---|----|----|---|----|----|----|
| Clean the strainer | SDB10AT005 | | | | | X | | | | |
| Change of oil, see Sub supplier's documentation for instructions | SDB10AP005 | | | | | X | | | | |
| Check the filter and clean with compressed air if necessary | SDB30BP005 SDB30BP010 SDB30BP015 SDB30BP020 | | | | | X | | | | |
| Check the pressure and temperature settings at each wash | SDB10CT010 SDB10CT020 SDB10CP010 | | | | | | | | | |

19 SFY Gas Detection System

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|---|--------------------------|---|---|---|----|----|---|----|----|----|
| Make a warning lamp test | | | | | X | | | | | |
| Check the calibration of the gas detectors. | SFY10CQ005 SFY10CQ010 | | | | | X* | | | | |

* First year every 3rd month.

20 SGJ Fire extinguishing system CO2

| Action | KKS | D | W | M | 2M | 6M | Y | 2Y | Re | St |
|---|--------------------------|---|---|---|----|----|---|----|----|----|
| Check the weighing device for the CO2 bottles | SGJ10CG005 SGJ10CG010 | | X | | | | | | | |
| Check the alarm system | SGJ10EA SGJ10EG | | | X | | | | | | |
| Inspect the system for damages | SGJ10 | | X | | | | | | | |
| Check the function of the blocking device | SGJ10AA004 | | X | | | | | | | |
| Regular check | SGJ10 | | X | | | | | | | |

Note! For further maintenance instructions, please see the subsupplier documentation.

21 Preservation

If a unit is taken out of service for a long period, certain actions must be taken to limit corrosion attack on unprotected surfaces. Please read the document *GT Storage and Preservation*.