

Operation Instruction

Doc. No. 1CS50854 Rev. ind.

Operation Statistics

Techn. Area / DCC E /& DC104

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Operation Statistics

for YAMAMA GT6 – GT9

SE-612 83 FINSPONG, Sweden

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Siemens Industrial Turbomachinery AB

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1 Introduction

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 and its auxiliary systems.
- Human-Machine Interface (HMI) Describes the basic principles in working with the computerised control system.

1.2 Purpose of this document

The document contains a chapter describing operating statistics for availability and reliability.

The major part to this is registration of the gas turbine performance.

Performance data should be registered by the end of each month in either of the following two ways:

1. By feeding data into our web based Operation Statistics tool, whereby an immediate feed-back is given in the form of an automatically generated report.

This option is open to any customer after having applied for authorisation to access "customers only" information on the Siemens Industrial Turbomachinery AB (SIT) web portal, as specified for his Order no.

Please, use the following web address: <u>www.powergeneration.siemens.com</u>. Choose: /Service Solutions /Industrial power & compression services /E-Service 15 to 50MW and then download the Registration Extraned PDF. This contains both instructions and an application form.

2. By entering data on log sheets - paper copies or electronic templates - and sending them by mail /fax or e-mail to the appointed SIT contact person. For reporting by e-mail a template can be made available.

Attached to this document is a hard copy template: *Operating statistics – gas turbine monthly report* (Appendix A).

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2 **Operating Statistics**

A base for SIT's development of the gas turbine and its service program is the feedback information from our customers. This information makes it possible for us to:

- Direct our development activities to improve availability and reliability.
- Evaluate the operating availability and reliability and in specific cases determine and propose what improving actions should be taken.

The information SIT receives will be evaluated and compiled for a number of purposes:

- Reported problems and failures will be analysed. Severe problems will be detected and actions can be proposed to reduce the risk of reoccurrence.
- Evaluation of each unit's availability and reliability, forced outage factor and scheduled outage factor is done on monthly basis. These figures make it possible for us to follow the outcome of performed availability and reliability improvements in the long term.

Reported problems and malfunctions will be registered in an existing database. The database contains all types of reported failures or other non-conformance events. This data is used in the engineering work for developing the service programs as well as new designs.

Reports on availability and reliability for the unit, including comparison with the main values of the product type, are available on the SIT web-portal.

SIT's comments and recommendations are updated every third month.

For the customer without access to the web-portal, paper copies of the web-portal information for unit, will be sent to the customer every third month.



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REVISION

Rev.	Page (P) Chapt, (C)	Description	Date Dept. / Init.

OPERATING STATISTICS GAS TURBINE MONTHLY REPORT

(Definitions on next page)

Comm						
Comp Unit	any:	Order No:				
	Period (Year-Month):					
i chicu						
Opera	tional data from counters:	Accumulated this month (A)	d by the end of last month (B)	Total this month (A-B)		
Operat	ting hours total	h	- h] = h		
Equiva	alent hours total	h	- h] = h		
Total I	No of starts		-	=		
Total I	No of fast starts (SGT-500)		-] =		
Total _I	production of MWh	MWh	- MWh	= MWh		
		````				
	ional information (compulso					
No of	start attempts during this perio	od (Note 1)				
No of	successful starts during this pe	eriod (Note 2)				
No of	failed starts during this period	(Note 3)				
Note 1	A start attempt shall be counted v operation. Repeated failed start at					
Note 2	A start shall be counted as succes	sful if the gas turbine is sta	arted for commercial oper	ation and the drive shaft		
Note 3	reaches synchronous speed in Pov If a start fails, please specify if po					
Note 5	start sequence the start was interr					
	required etc.	FICATION OF FAIL	FD STARTS			
Date	Description					

## By occurrence of outage, please fill in the form on next page

Ap	pendix	А

T.	LOG OF OUTAGE HOURS Turbine Related Outage Non Turbine				
Date	Forced (h)	ted Outage Planned (h)	Non Turbine Related Outage (h)	Comments/Cause	
-					

#### **Definitions:**

#### **Operating Hours**

Total number of hours the gas turbine set was actually operated and producing power.

#### **Turbine related Outage Hours**

Number of hours that the gas turbine set was not available for operation due to a fault of the gas turbine set or it's auxiliary systems included in Siemens Industrial Turbomachinery's supply. The gas turbine set include any gear but not other driven equipment such as generators, compressors etc. Shut downs of the gas turbine set due to external disturbances (driven equipment, boilers, gas & power supply ...) shall be reported as non turbine related outage (OH-N) even though the consequence was a shut down of the gas turbine set.

Execution of maintenance work that normally do not require a shut down but is performed at a planned outage and thus extending the outage shall not be included in the time for correction.

#### Forced Outage (FOH)

Turbine related outage due to conditions that require an immediate shut down (most likely gas turbine set was tripped by the safety system).

#### Planned Outage (POH)

Outage due to an inspection or overhaul, planned and scheduled well in advance. Other operation maintenance activities like compressor cleanings, filter replacement etc. shall also be considered as planned outage. Only outage hours due to activities that require a shut down of the gas turbine set shall be reported as Planned outage Hour.

#### Non-Turbine Related Outage Hours (OH-N)

Number of hours the plant was not available for operation due to conditions not directly related to the gas turbine set (see def. Turbine Related above) or due to external influences.

#### Please send this to your regular contact person at Siemens Industrial Turbomachinery. 2004-10-19

## OPERATING STATISTICS GAS TURBINE MONTHLY REPORT

(Definitions on next page)

	Company	y:					
Unit <u>"Catchword"</u>			Order N	o: _	B000XXX		
	Period (Y	fear-Month): 99-06					
	Operatio	onal data from counters:	Accumulated this month (A)	l by	the end of last month (B)		Total this month (A-B)
	Operating	g hours total	17 452 h	-	16 784 h	=	668 h
	Equivale	nt hours total	19 189 h	-	18 509 h	=	680 h
	Total No	of starts	405	-	401	=	4
	Total No	of fast starts (SGT-500)		-		=	
	Total pro	duction of MWh	217 348 MWh	-	216 145 MWh	=	1 203 MWh
	Addition	al information (compulsory	y):				
	No of sta	rt attempts during this period	(Note 1)				4
	No of suc	ccessful starts during this per-	iod (Note 2)				3
	No of fai	led starts during this period (	Note 3)				1
No		A start attempt shall be counted wh					
No		operation. Repeated failed start atte A start shall be counted as successi					
No		reaches synchronous speed in Powe If a start fails, please specify if pos					
140	5	start sequence the start was interrup					
	1	required etc.	CATION OF FAIL	FD	STARTS		
-	Date	Description	CATION OF FAIL	ĽD	STARTS		
	12/6	2/6   1 x Failed start T7 max. (Gas)					

## By occurrence of outage, please fill in the form on next page

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Turbine Related Outage				OF OUTAGE HOUKS
Date	Forced (h)	Planned (h)	Related Outage (h)	Comments/Cause
5/6		8.1		Compressor wash
12/6	2.8			Repair leakage bleed-valve #2
25/6			28.1	Rep. pipes boiler #1

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