

SYSTEM DESCRIPTION MBM COMBUSTOR DILUTION AIR SYSTEM	Respons. dept	Date	Reg.
	GRP	2004-04-15	M DB 101
Prepared		YAMAMA CEMENT	
B. Wassberg			

TABLE OF CONTENTS

TABLE OF CONTENTS	1
PURPOSE OF THE SYSTEM	2
GENERAL DESCRIPTION OF THE SYSTEM	2
MAIN COMPONENTS	3
FUNCTION	4
<i>Start up</i>	4
<i>Continuous operation</i>	4
<i>Shut down</i>	4
<i>Stand still</i>	4
DISTURBANCES	5
<i>Gas turbine trip</i>	5
<i>Generator breaker trip</i>	5
<i>Loss of power supply</i>	5
<i>System faults</i>	5
TECHNICAL SPECIFICATION	6
<i>Design criterias and standards</i>	6
<i>Dimensioning data</i>	6
<i>Engineering data</i>	6
<i>Installation</i>	6
<i>Component data</i>	6
TESTING AND SERVICE	6
<i>Testing during normal operation</i>	6
<i>Accessibility during normal operation</i>	6
INDEX OF COMPONENTS	6

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A 087 0474-B 00-03 MS Word 97

Approved 2004-05-11 Asa Johansson	Latest revision -	Archive 20	HG 9100
Checked 2004-05-11 Mathias Nilsson		No. 1CS40891	

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Purpose of the system

The dilution air system reduces the carbon monoxide (CO) emission during part load.

General description of the system

Refer to P&ID 2046 019

The variable dilution air system is used in GT10 gas turbines equipped with a dry low emission (DLE) combustion chamber and only on gaseous fuel. The system provides a controlled by-pass of air to the combustor exit thus decreasing the airflow through the burners. When less air is led into the burners the flame temperature will raise and cause a better burn out of CO.

A part of the airflow from the compressor is flowing out to a manifold on the turbine casing. The flow rate is controlled by six flap valves. The air is fed back to the combustor through 23 nozzles at the outer wall. The six valves are connected to a ring around the turbine casing. The ring is connected via a gearbox to an AC servomotor. The AC servomotor moves the ring and the six valves are all opened to same angle at the same time. The control system gets its feedback from one position transducer located on the gearbox.

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Main components

- By-pass valve
MBM10AA005
The combustion dilution air system consists of the following items:
- By-pass flap valves
MBM10AA005-KA01 - KA06
- AC-servo motor
MBM10AA005 -M01
The six flap valves are actuated by the AC-servo motor.
- Position transducer
MBM10AA005 -B01
The position transducer (RVDT-type) gives feed back to the control system.
- Limit switch
MBM10AA005 -S11
The purpose of the limit switches are to cut the voltage to the motor in order not to run into the mechanical stops in the gear.
- Limit switch
MBM10AA005 -S21
The purpose of the limit switches are to cut the voltage to the motor in order not to run into the mechanical stops in the gear.

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Function

Start up

The starting procedure is generally described in the Starting system description, MBI.
The variable dilution air passage is closed during start up.

Continuous operation

When increasing load the variable dilution air passage will start to control after "Turbine in service", and will be closed at 100% load. When decreasing load, this procedure is repeated in reverse.

Shut down

During shut down the dilution air passage is closed.

Stand still

The system is kept inactive during stand still.

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Disturbances

Gas turbine trip

Gas turbine trip will close the air dilution passage.

Generator breaker trip

Generator breaker trip does not affect the system.

Loss of power supply

Loss of AC supply trips the gasturbine.

System faults

Faults in any of the throttle valves or flow obstructions in channels may slightly affect the combustion efficiency or the formation of NO_x.

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Technical specification

Design criterias and standards

N/A

Dimensioning data

N/A

Engineering data

N/A

Installation

The system is installed on the turbine casing.

Component data

Refer to P&ID 992 877.

Testing and service

Testing during normal operation

N/A

Accessibility during normal operation

N/A

Index of components

MBM10AA005	By-pass valve	3
MBM10AA005-B01	Position transducer	3
MBM10AA005-KA01-KA06	By-pass flap valves	3
MBM10AA005-M01	AC-servo motor	3
MBM10AA005-S11	Limit switch	3
MBM10AA005-S21	Limit-switch	3

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