

GAS TURBINE COMPRESSOR CONTROL SPECIFICATION

Rev-02, 14.11.2019

(For including in RFQ to GT vendor)**FOR****GAS TURBINE DRIVEN CENTRIFUGAL COMPRESSOR PACKAGE, GAIL GANDHAR****Scope**

This specification covers the Hardware and software requirements of fully engineered, manufactured, assembled and tested GT + Compressor Control system for Gas Turbine driven compressor, including commissioning spares and mandatory spares as per contract specifications for Gandhar CPP.

B.1 Detailed scope

GT+ Compressor control Hardware and software required to meet all requirements as per contract specifications for Gandhar project.

Important contract requirements are given as follows. Major relevant extracts from specifications is also attached below.

Note: 1 Set of the following required as there is **1xGT+Compressor envisaged for this project.**

SI No	Description	Qty. (1x GT)
1	Fully engineered, Manufactured assembled and tested GT + compressor control panel including anti-surge control & protection along with Supply of all Hardware/ Software and accessories required for control, monitoring and protection of Gas Turbine and auxiliaries fully conforming to end customer specifications.	1 Set
2	Operator Workstation and Engineering workstation and its Accessories EWS and OWS, Printers and its accessories required as per contract specification. Engineering station and operator stations should be pre-loaded with package software required for control, monitoring and protection of the Gas Turbine. No of HMIs: a) 1 No. OWS & 1 No. OWS cum EWS for GT in control room. b) 1 No. A3 Laser Printer for alarm & Logger c) 1 No. A3 Laser jet color printer	1 Set (Pl refer attached schematic diagram B240-910-16-51-SK-0001-Model & B240-910-16-51-SK-0002-Model)
4	Network system Network switches and cables for interconnection of all devices and peripherals of GT Control system Network switches to be housed in freestanding / wall mount enclosures	1 Set

ANNEXURE-B

5	Vibration & temperature Monitoring System for Gas Turbine	1 Set
6	Commissioning spares * (see note 1)	1 Set
7	Mandatory spares	1 Set (As per attachment B240-910-80-42-SL-5010)
8	Recommended spares	1 Set
9	Factory Acceptance Test	
10	Training- The courses and their duration, number of attendees in each course and location where such courses will be held that the vendor would recommend OWNER to consider.	At Vendor works: 7 days for 2 person At Site works: 7 days, Two batches of 6 person
11	Documentation- To be provided for GT+ compressor control panel to BHEL, Hyderabad as part of supply.	Refer attachment B240-910-16-51-VDR-5010

Bidder to confirm additional points along with above points:

Sl. No.	Description	Qty	Remarks
1.	Cabling from existing purchaser control system to GT+Compressor control system be supplied by bidder	1 Set	Bidder to confirm point 1.1.8 (Section-C, B240-910-80-42-SS-5010, Rev-B) & 2.3 (B240-910-16-51-SP-5010)
2.	Clock Synchronization for GT+Compressor control system to be taken from existing control system by bidder. Cables also to be supplied by the bidder.	1 Set	Bidder to confirm 11.8.2 (B240-910-16-51-SP-5010)

Notes

1. All spare items required for commissioning shall be supplied by contractor *like spare fuses, lamps, terminals etc.*
2. Gas Turbine control shall be envisaged by GT vendor to meet compete operational requirement as per tender specification.
3. *For Compressor controls IO list is attached.*

B.3. General Instructions:

ANNEXURE-B

- 1) GT vendor shall be fully and solely responsible for design, engineering, procurement of materials, manufacture and assembly at shop, inspection, testing at shop, FAT, packaging and delivery of the Gas Turbine Control system and their associated systems for the project. The system shall be engineered to meet all bid specification requirements.
- 2) Although this RFQ specially outlines the scope of supplies, spares, services, technical and quality requirements, etc., the underlining intent is full-fledged responsibility of GT vendor for qualifying the model & meeting the requirement of end customer specifications.
- 3) Pertaining to GT vendor's scope of supply, GT vendor shall be responsible for providing all required details at any stage of the contract execution until the issues are resolved and closed by end customer and provide all necessary data as required within stipulated time.
- 4) GT vendor to supply any other equipment which is not explicitly mentioned as in GT vendor's scope of supply but is required for smooth and satisfactory operation of the Gas turbine and Generator package.
- 5) GT vendor shall provide detailed breakdown BOM for complete scope of supply.
- 6) GT vendor shall ensure and facilitate witness of testing of equipment as agreed and finalized with BHEL.
- 7) GT vendor shall be responsible for compliance with complete specification issued by customer including all standards as specified therein.

EXTRACTS FROM THE BID SPECIFICATION FOR GT+ Compressor CONTROL SYSTEM

Note: These are the minimum requirements that has to be complied by GT vendor for all applicable clauses for GT +Compressor control system & GT VMS.

Sl. No.	Document No/Page No/Clause No	Description of requirement	Remarks
1.	B240-910-80-42-SS-5010_Scope of supply	SECTION-C: INSTRUMENTATION (as applicable for GT+ compressor controls & GT VMS)	Vendor to confirm.
2.	Final Inst-Job Specification rev 2 B240 (B240-910-KA-MR-5010)	JOB SPECIFICATION INSTRUMENTATION (as applicable for GT+ compressor controls & GT VMS)	Vendor to confirm.
3.	B240 Data Sheet PLC (B240-910-YE-DS-5010)	DATA SHEET FOR PROGRAMMABLE LOGIC CONTROLLER	Vendor to confirm.
4.	B240-910-80-42-SL-5010	List of Mandatory spares for GT PLC, compressor controls & GT Vibration Monitoring system	Vendor to confirm & quote for spares.
5.	B240-910-16-51-SK-0001	Overall System configuration & interface schematic for Gas Turbine driven Compressor package	Vendor to confirm.

ANNEXURE-B

6.	B240-910-16-51-SK-0002	Capacity Control System Configuration for Gas Turbine driven Compressor package.	Vendor to confirm.
7.	B240-910-16-51-MD-5010	Vendor List-Instrumentation	Vendor to confirm.
8.	B240-910-16-51-VDR-5010	Vendor Data Requirement	Vendor to confirm.

NOTES:

Logic Diagram / Control Narrative / IO List etc. for BHEL scope instruments shall be provided to vendor for implementation in PLC during detail engineering.

IO COUNT for PLC							
SR. NO.	SYSTEM	SIG TYP	IS N-IS	IO COUNT	20% INSTL SPARE	TOTAL	REMARKS
1	COMP+BOP PLC	AI	IS	175	35	210	
2	COMP+BOP PLC	AI	NIS	8	2	10	
3	COMP+BOP PLC	AO	IS	55	11	66	
4	COMP+BOP PLC	AO	NIS	8	2	10	
5	COMP+BOP PLC	DI	IS	177	36	213	
6	COMP+BOP PLC	DI	NIS	48	10	58	
7	COMP+BOP PLC	DO	IS	94	19	113	
8	COMP+BOP PLC	DO	NIS	32	7	39	
9		AI	IS	4	1	5	
10		DI	IS	2	1	3	

IO COUNT for Compressor MMS							
<u>IO COUNT FOR COMPRESSOR MMS</u>		SIG TYP	IS N-IS	Main	Installed spare	Total	
1	COMP MMS Vibration	-	IS	4	1	5	
2	COMP MMS Axial Displacement	-	IS	2	1	3	
3	COMP MMS Bearing Temperature	-	IS	11	3	14	
4	COMP MMS	DO	NIS	*	*	*	* Two DO'S (Trip & Alarm) for each Measurement

GT OEM to consider the following in addition to Vibration/ Axial/ Bearing temperature measurement on Gearbox

- 1) Key Phasor(One on HSS Side and other on LSS Side) shall be considered on Gear box. Total Quantity : 3 No's (2 Main + 1 Installed Spare).
- 2) Casing Accesleration Measurement shall be considered on Gearbox.Total Quantity : 3 No's (2 Main + 1 Installed Spare).