

**DATA SHEET FOR**  
**PROGRAMMABLE LOGIC CONTROLLER**  
**FOR**  
**GAS TURBINE DRIVEN CENTRIFUGAL COMPRESSOR**  
**PACKAGE**  
**(MR No:B240-910-KA-MR-5010)**

| A          | 18.04.2019 | ISSUED WITH GTC PACKAGE MR | PS       | SR      | PKS      |
|------------|------------|----------------------------|----------|---------|----------|
| Rev.<br>No | Date       | Purpose                    | Prepared | Checked | Approved |

**NOTES:**

1. Information filled-in by Consultant / Owner and the columns marked [X] specifies the minimum system requirements. Bidder shall check the same with respect to the special requirements as per this package.
2. Bidder to note that all Information in columns marked \* is to be filled by PLC vendor and furnish in the offer.
3. Bidder shall complete information against all items marked as “\*\*\*” in the data sheets.
4. Vendor to note that information provided against all items marked as “\*\*\*” and “\*\*” must be such that system performance is not degraded.
5. Vendor shall categorically confirm all items marked as “#” in the data sheets. In case no specific confirmation is indicated, it shall be considered as vendor's unconditional compliance.
6. This data sheet shall be read in conjunction with Standard Specification for Programmable Logic Controllers, 6-52-0040. Vendor shall check the filled in column accordingly.
7. PLC system shall be sized as per the loading defined in this section. The loading here refers to the use of memory, CPU time and communication capacity etc. Loading shall consider the worst case of high system capacity, during this case, no degradation of system performance is allowed. Maximum loading on various subsystems shall be as follows:
  - 80% I/O capacity and other hardware.
  - 60% Processor, including user memory.
  - 40% Communication network (for deterministic protocol).
  - 30% Number of nodes.
8. Bidder shall supply PLC's as per details below for-compressor station.
  - (i) One number PLC with console/Printer dedicated for compressor train.
9. Field mounted type remote I/O for GTC PLC can also be acceptable provided the same are field proven and certified for hazardous area application.

In addition bidder shall also supply One nos. laptop computer with all required licenced software's with printer as programming / operator console.

PLC operation shall be completely unaffected by a momentary power loss of the order of 20 msec.

**PROGRAMMABLE LOGIC CONTROLLER**

MAKE: \* \_\_\_\_\_

Model:

\* \_\_\_\_\_

**1. Functional requirement**

GTC train Start Up, Shutdown and Interlocks, [X]

GTC Train Operation monitoring and Control [X]

**2. System Configuration Type**

**2.1 # Single PLC**

a) Redundant dual processor [ ]

b) Redundant dual processor with dual I/O [ ]  
I/O auto-testing only [ ]  
for interlock & shutdown and single I/O  
for dual I/O for monitoring.

c) Redundant dual processor with single I/O [X]  
I/O auto-testing ]

d) Three processors with simultaneous logic execution (TMR) [ ] 2 of 3 vote output [ ]

I/O auto-testing [ ]

**3.0 Processor System:**

**3.1\*\*# Functional capability**

Logic Functions [X]

Timing Functions [X]

Range : 0-99,999 sec

Least count : 0.01 Seconds

Regulatory Control Function

[X]

Data Acquisition [X]

Sequencing [X]

Monitoring [X]

Data archival and retrieval [X]

\*Other available as standard \_\_\_\_\_

**3.2# Interfacing capability**

I/O Racks [X] Anti-Surge [X]

PLC Console [X] Flow Computer [X]

Capacity/Performance controller [X]

Vibration & Temperature Monitoring racks [X]

For SCADA/RTU [X] Printer [X]

Other [X]

Note: Printers shall be connected to all the PLC Consoles. Printer sharer for the same shall be supplied.

3.3\* Memory capacity \_\_\_\_\_ MB

3.4\* Memory used \_\_\_\_\_ MB

|                                                                                                                    |                                                                  |                                                                                                                                                                             |               |                           |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------|
| 3.5*                                                                                                               | Spare memory available                                           | _____ MB (also refer Spares Philosophy specified in std. Specification 6-52-40)                                                                                             |               |                           |
| 3.6#                                                                                                               | Memory type                                                      | Retentive                                                                                                                                                                   | [X]           | Volatile [X]              |
|                                                                                                                    | If Retentive                                                     | Erasive                                                                                                                                                                     | [X]           | Non-erasive [ ]           |
|                                                                                                                    |                                                                  | *Erasing by _____                                                                                                                                                           |               |                           |
|                                                                                                                    | If Volatile                                                      | Battery back-up                                                                                                                                                             |               | [X]                       |
|                                                                                                                    |                                                                  | *Battery type _____                                                                                                                                                         | *Battery life | <u>One</u>                |
| <u>year</u>                                                                                                        |                                                                  | Chargeable                                                                                                                                                                  |               | [X]                       |
|                                                                                                                    |                                                                  | Continuous trickle charge                                                                                                                                                   |               | [X]                       |
|                                                                                                                    |                                                                  | Configuration protection time 72 hours                                                                                                                                      |               | [X]                       |
|                                                                                                                    |                                                                  | Battery drain indication                                                                                                                                                    |               | [X]                       |
|                                                                                                                    |                                                                  | Retentive memory back-up                                                                                                                                                    |               | [X]                       |
| Note: Battery type shall be size 'D' Lithium battery. Also spare battery shall be provided for one-year operation. |                                                                  |                                                                                                                                                                             |               |                           |
| 3.7.**                                                                                                             | Maximum Scan Time(shutdown & interlock)                          | 100 ms [X]                                                                                                                                                                  |               | Actual _____ ms           |
|                                                                                                                    | Maximum Scan Time (closed loops)                                 | 500 ms [X]                                                                                                                                                                  | Actual _____  | * _____ ms                |
|                                                                                                                    | Maximum Scan Time (open loops--analog/digital) 01 sec            | [X]                                                                                                                                                                         | Actual _____  | * _____ ms                |
| 3.8.*                                                                                                              | Power supply redundancy                                          | Redundant Floating                                                                                                                                                          |               | [ ]                       |
|                                                                                                                    |                                                                  | Redundant per individual Processor & individual Rack                                                                                                                        |               | [X]                       |
| 3.9.#                                                                                                              | Outputs on processor system failure                              | Freeze                                                                                                                                                                      | [*]           | Open [*]                  |
|                                                                                                                    |                                                                  | Close                                                                                                                                                                       | [*]           | Engineer Configurable [*] |
|                                                                                                                    |                                                                  | Flunk                                                                                                                                                                       | [*]           |                           |
| 3.10.*                                                                                                             | Maximum distance between processor & console<br><u>m approx)</u> | As per control room layout (20<br>Allowable _____ * _____ m                                                                                                                 |               |                           |
| 4.0**                                                                                                              | <b>Algorithms</b>                                                |                                                                                                                                                                             |               |                           |
|                                                                                                                    | Arithmetic Functions                                             | Add / subtract, multiply, division, summation square root, average, bias, ramp function, rate of change, difference, absolute value, square, exponential, Logarithm.<br>[X] |               |                           |
|                                                                                                                    | Logic Functions                                                  | AND/OR/NOR/NOT/XNOR/ON/OFF- DELAY/FLIP-FLOP/ PULSE<br>[X]                                                                                                                   |               |                           |

|                         |                                                                                                                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Comparison Functions    | Greater than, less than, greater equal to, lesser or equal to, equal, not equal [X]                                                                                                     |
| Selector Functions      | Low selector, High selector, Mean Value selector, Auto ranging for Dual transmitter, over ride mean value selector [X]                                                                  |
| Control Algorithms      | PI, PID, Ratio control, PID with dead band, Error square PID, Adaptive gain, Proportional control [X]                                                                                   |
| Basic Functions         | Manual Loader, Cascade, Hi alarm limit, Ex high alarm limit, Low alarm limit, Ex low alarm limit, Rate of change alarm, deviation alarm [X]                                             |
| Limiter Functions       | Low output limiter, HI out put limiter, Alarm limiter, set point limiter [X]                                                                                                            |
| Dynamic Functions       | Lead/ Lag, Dead time, Timer, Feed Forward, Velocity limit, Totalise [X]                                                                                                                 |
| PID Functions           | PID basic controller, PID cascade, PID bias, PID differential gap, PID non –liner, PID self tuning, External output, racking, Reset limiting [X]                                        |
| Linearisation           | Square root Extraction, Flow Computation (Pr. & Temp compensation), Thermocouple, Linearisation & cold junction compensation, RTD linearisation, Polynomial [X]                         |
| Sequence Functions      | Set block On/Off- Auto manual, Set alarm limit, Set points, Set ramp rates-ramp On/Off, Get/Set block parameter, Active/Abort sequences, Open/Close valves, Start/Stop pumps/motors [X] |
| Miscellaneous Functions | Bump less transfer between all control modes, ramp to set point, ramp to output, Ramp to calculated value, Direct or Reverse output [X]                                                 |
| AI Function             | Logic function [X]                                                                                                                                                                      |

**ALL ALGORITHMS SHALL BE AVAILABLE AS STANDARD FIRM WARE BLOCK IN THE OFFERED PROCESSOR.**

|                                           |                                                                   |     |                                |     |
|-------------------------------------------|-------------------------------------------------------------------|-----|--------------------------------|-----|
| <b>5.#</b>                                | <b>Input/ Output System</b>                                       |     |                                |     |
| 5.1.# Type                                | Discrete                                                          | [X] | Other_____                     |     |
|                                           | Analog                                                            | [X] |                                |     |
|                                           | <b>(I/O module shall be with self- diagnostic functionality).</b> |     |                                |     |
| 5.2.# Mounting                            | 19" Rack                                                          | [X] | Other <u>DIN Rail Mounting</u> |     |
| 5.3 Single I/O Configuration              |                                                                   |     |                                |     |
| 5.3.1.# Online replacement of I/O modules | Required                                                          | [X] |                                |     |
| 5.3.2.# I/O status Indication             | Required                                                          | [X] | Local level                    | [X] |
|                                           | PLC Console                                                       | [X] |                                |     |
| 5.3.3.# Input Isolation                   | Required                                                          | [X] | Optical                        | [X] |

Output Isolation Required [X] Other [ ] Relay [X]

5.3.4.\* a) I/O Requirement : Other [ ] Relay [X]

Inputs : \_ \* \_\_\_\_\_ No.

Outputs : \_ \* \_\_\_\_\_ No.

I/O Capability: : \_ \* \_\_\_\_\_

| Type of Module | Model No           | Analog   |          | Digital  |          |
|----------------|--------------------|----------|----------|----------|----------|
| Input          | As Per Requirement | Capacity | I/O Used | Capacity | I/O used |
|                |                    | *        | *        | *        | *        |
| Output         | As Per Requirement | *        | *        | *        | *        |

5.3.5 .# Input Type Intrinsic safe [ ] Non-Intrinsic Safe [X]

Intrinsic safe with external barriers [X]

Weather proof [X]

5.3.6.\* Maximum distance between I/O rack & processor As per control room layout [X]

Allowable \_\_\_\_\_ m

5.3.7.# Single I/O Required [X] Not required [ ]

Auto-testing of I/O's Required [ ] Not required [X]

5.3.8.\* Power Supply/ I/O rack Individual [ ] Dual Redundant [X]

5.3.9.\* I/O Rack to processor link Individual [ ] Dual Redundant [X]

5.3.10 Input Module

a)# Input Type

i. Potential free contact with interposing relay rated for 24V DC, 2A [X]

MCC Input [X]

ii. 4-20 mA Intrinsically safe (two wire) and

Analog 4-20 mA with HART protocol intrinsically safe (Two wire) [X]

iii. Other As required

b)# Maximum number of Inputs per module (digital)



- Dual I/O Eight [ ] Offered\_\_\_\_\_

d)\* Output Contact Rating 24 V DC, 2A [X]

230 V AC, 5A [X]

Other\_\_\_\_\_

**Note: Interposing Relays are required for all output contacts.**

e)\* Number of Output points :

- Digital By GTC vendor as per Package requirement

- Analog By GTC vendor as per Package requirement

f)\*

| Output Contact Rating | Model No | Number of Outputs/Modules |
|-----------------------|----------|---------------------------|
|                       |          |                           |
|                       |          |                           |

Note1: Interposing relays (with 24 V DC, 2.0 A rating) are required for all the outputs. Rating for the contact to the MCC shall be 230 V AC, 5A as per std. Spec for PLC (6-52-40)

## 6. PLC Console (PROGRAMMING TERMINAL AS WELL AS FOR UNIT OPERATION / DIAGNOSTICS)

(PLC console along with its printer shall be located at control room)

(PLC console computer shall be supplied from Original Equipment suppliers OEM)

\*Model i7 OR LATEST VERSION PROCESSOR

6.1.# Number of TFTs - LCD One [X] Two [ ]

Type Colour [X] Monochromatic [ ]

Size Min 21" Diagonal [X]

Other

\*Character Size \_\_\_\_\_

\*Screen Capacity \_\_\_\_\_

6.2.# Dual Redundant Link between processor system & PLC console Required through redundant local area network [X]

6.3\* Number of Keyboards One per TFT/LCD [X]

Type Membrane [ ]

QWERTY [X]

6.4\*\* Printer Required [X] Model

\*\*Paper width Approx. 381 mm [X] Offered

\*Printing speed 300 cps or better [X] Offered

\*\*Number of copies Three [X] Offered

Note: Printer shall print alarm & shutdown report.

6.5.\*\* Programme storage Required [X] On CD [X]  
Hard Disk [X]  
Capacity \_\_\_\_\_ MB Access time \_\_\_\_\_ ms  
Other \_\_\_\_\_

6.6.# System Boot-up on power-on Auto [X]

**7.0# Interface with Station PLC/RTU (SCADA), Anti-Surge/Performance/master Controllers, Vibration & Temperature Monitoring racks:  
(Refer attached system configuration diagram)**

a) Interface Required for:

Anti-Surge/Performance/ master Controllers,  
Vibration & Temperature Monitoring racks [X]

Dual serial link to Station PLC /RTU (SCADA) . [X]

b) Type of Interface:-

Model No. : \_\_\_\_\_ \*

Serial : [X]

RS 485: [X] For Station PLC/ SCADA (RTU) with necessary converter

RS 232 / 485: [X] For Other Systems (as per distance required)

Any Other

c) Protocol Type: -

MODBUS ASCII or RTU [X] For Station PLC/SCADA (RTU)

(Shall be user selectable)

MODBUS [X] For others

d) Module Details

| Configuration                | Interface Module Model No. | Number of Modules | Number of Adapter per module |
|------------------------------|----------------------------|-------------------|------------------------------|
| Dual processor configuration |                            |                   |                              |

e) Total time taken to display alarm generated by PLC on common facility operator console

\_\_\_\_\_ \*

**8.0.# Software features:**

a) Online Programming Required [X]

b) Online Programme modification Required [X]

|    |                                                |          |     |  |
|----|------------------------------------------------|----------|-----|--|
| c) | Disable/Force facility                         | Required | [X] |  |
| d) | Power flow on Ladder/ logic                    | Required | [X] |  |
| e) | First out alarm Capability                     | Required | [X] |  |
| f) | Self diagnostics                               | Required | [X] |  |
| g) | I/O mapping                                    | Required | [X] |  |
| h) | Plant operation                                | Required | [X] |  |
| i) | Alarm Printing                                 | Required | [X] |  |
| j) | Documentation                                  | Required | [X] |  |
| k) | Ladder Logic Monitoring                        | Required | [X] |  |
| l) | Process display and Overview                   | Required | [X] |  |
| m) | Shutdown report                                | Required | [X] |  |
| n) | Alarm summary                                  | Required | [X] |  |
| o) | Alarm History                                  | Required | [X] |  |
| p) | History and Real Time trend                    | Required | [X] |  |
| q) | Real Time graphic trend for all Analog signals | Required | [X] |  |
| r) | Graphic capability (Dynamic)                   | Required | [X] |  |
| s) | Log Reports                                    | Required | [X] |  |
| t) | First out sequence                             | Required | [X] |  |
| u) | Multiple watch dog timers                      | Required | [X] |  |

v)\* Additional special software offered :

- i) \_\_\_\_\_
- ii) \_\_\_\_\_
- iii) \_\_\_\_\_

#### 9.0.# Power Supply

|    |                                               |                     |     |
|----|-----------------------------------------------|---------------------|-----|
| a) | System                                        | 110 V AC, 50 Hz UPS | [X] |
| b) | Input interrogation voltage for Fields switch | 24 V DC,            | [X] |
| c) | Output contact rating for contact to MCC      | 230 V AC, 5A        | [X] |
| d) | AC Voltage Distribution                       | Vendor's Scope      | [X] |
| e) | 24 V DC Voltage distribution                  | Vendor's Scope      | [X] |
| f) | Power supply for SOV's                        | 24V DC              | [X] |