



**REQUIREMENT OF 100 KVA ROTARY FREQUENCY CONVERTER SYSTEM**

The Heavy Electricals Equipment Plant (HEEP) located in Haridwar, India is one of the major manufacturing plants of Bharat Heavy Electricals Ltd. The core business of HEEP includes design and manufacture of large steam and gas turbines, turbo generators, Defense Items and so on.

Details of items as below:

SI. NO.	MAT CODE	ITEM DISCREPTION	Quantity (Total 6 Nos)	LOT NO.	Delivery (Days)
1	W97053602044	100 KVA ROTARY FREQUENCY CONVERTER SYSTEM AS PER TECHNICAL SPECIFICATION: DPE/TS/RFC100. SIZE: RFC100KVA Item Id: BD002	1	1	300
			1	2	480
			1	3	660
			1	4	840
			1	5	1020
			1	6	1200

**SPECIAL INSTRUCTIONS:**

1. ALL VENDORS TO PROVIDE POINT WISE REPLY/CONFIRMATION ALONG WITH RELEVANT SUPPORTING DOCUMENTS TO EACH AND EVERY POINT OF **PRE-QUALIFICATION REQUIREMENT/PQR** FOR ALL ENQUIRY ITEMS. NONCOMPLIANCE OF THESE MAY LEAD TO REJECTION OF OFFER AS THESE ARE ESSENTIAL CONDITION FOR PARTICIPATING IN TENDER ENQUIRY.
2. KINDLY UPLOAD/ATTACH THE SPECIFICATION DETAILS/ CATALOGUE OF OFFERED ITEMS.
3. KINDLY ARRANGE TO SUBMIT **TECHNO-COMMERCIAL** CHECKLIST ALONG WITH YOUR OFFER.
4. SCOPE OF WORK/SUPPLY SHALL BE AS PER SPECIFICATION - DPE/TS/RFC100.
5. VENDOR HAS TO GET THE ROTARY FREQUENCY CONVERTER SYSTEM AND SPARES TESTED, INSPECTED AND CLEARED FROM BHEL / IHQ (N) NOMINATED AGENCY/ CQAE OF INDIAN NAVY BEFORE DESPATCH.
6. CONSIGNEE'S ADDRESS (TENTATIVE. SHALL BE CONFIRMED DURING AWARD OF CONTRACT):  
**THE OFFICER-IN-CHARGE**  
**WEAPON EQUIPMENT DEPOT (WED)**  
**MANKHURD, MUMBAI-400088.**  
**TEL NO.-022-25075651**
7. WARRANTY SHALL BE 36 MONTHS FROM THE DATE OF DELIVERY OF THE SYSTEM. DURING WARRANTY PERIOD THE FIRM WOULD BE LIABLE TO RECTIFY ALL DEFECTS ARISING OUT OF INFERIOR WORKMANSHIP, FAULTY MATERIAL AND DEFECTIVE DESIGN FREE OF COST & DELIVERED AT CUSTOMER. THE WARRANTY PERIOD WOULD BE EXTENDED BY ANOTHER 12 MONTHS FOR THE REPAIRED PARTS WHICH WERE REPAIRED AND REPLACED DURING THIS PERIOD.
8. WARRANTEE CERTIFICATE IS REQUIRED ALONG WITH SUPPLY.
9. SEAWORTHY PACKING IS TO BE DONE BY VENDOR.
10. DELIVERY SHALL BE IN STAGGERD MANNER AS MENTIONED ABOVE TABLE (Details of items).
11. VENDORS HAS TO CONFIRM FOR INSPECTION BY BHEL/ BHEL TPIA "M/S. TUV" AND IHQ (N) NOMINATED INSPECTION AGENCY/ CQAE OF INDIAN NAVY AS PER BHEL AND INDIAN NAVY CUSTOMER APPROVED QUALITY PLAN.

12. VENDOR HAS TO SUBMIT QUALITY PLAN AS PER ATTACHED BHEL QUALITY PLAN FORMAT FOR FURTHER BHEL AND INDIAN NAVY CUSTOMER APPROVAL.
13. VENDOR HAS TO CONFIRM TO CONCUR TERMS AND CONDITION FOR INSPECTION AS FINALLY AGREED BY INDIAN NAVY CUSTOMER.
14. VENDOR TO DESPATCH THE MATERIAL AFTER INDIAN NAVY MDCC ONLY.
15. EARLY DELIVERY IS ACCEPTABLE PRIOR APPROVAL BY BHEL.
16. SUCCESSFUL COMMISSIONING OF ROTARY CONVERTOR WILL BE CONSIDERED AFTER SIGNING OF MOM WITH END USER/ BHEL PERSONNEL AND VENDOR.
17. KINDLY ARRANGE TO SUBMIT INTEGRITY PACT DULY FILLED.
18. **KINDLY ARRANGE TO SUBMIT MAKE IN INDIA SELF CERTIFICATION.**
19. KINDLY MENTION THE GEM TENDER NO IN THE EMD NARRATION/REMARKS, WHILE SUBMITTED THE EMD THROUGH RTGS.
20. KINDLY REFER **BUYER UPLOADED ATC DOCUMENT** FOR RQUIRED DOCUMENTS.

**QUALIFYING CONDITIONS for Rotary Frequency Converter System**

Only those vendors, should quote:

1.	Who is manufacturer or authorized dealer/distributor of Original Equipment Manufacturer.	Vendor to specify and submit authorization certificate (for authorized dealer/distributor)
2.	who can manufacture and supply Rotary Frequency Converter System with Control Panel for Marine application.	Vendor to confirm
3.	who have supplied 1 or more quantity of same rating or higher in the last 5 years.	Vendor to confirm
4.	who can meet the requirements of Technical Specification DPE/TS/RFC100	Vendor to confirm



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# ROTARY FREQUENCY CONVERTOR SYSTEM

**100 KVA, 3-PHASE, 60Hz**

**FOR**

**76/62 SUPER RAPID GUN MOUNT (SRGM)**

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Defence Product Engineering  
DABG, HEEP, Haridwar

Drafted by: S. K. Singh  
Approved by: Umesh Dutt



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**REVISION HISTORY**

REV.	DATE	DESCRITION
0	September 2021	First Issue
1	July 2022	Para 18 & 19 updated for clarity



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### 1.0 PURPOSE

These specifications deals with Rotary Frequency Converter System (RFCS) to be used during assembly, manufacture and testing of Defence application equipment which require power of non-standard rating conforming to NATO standard STANAG 1008 and other applicable national/ international standards.

### 2.0 GENERAL REQUIREMENTS FOR RFCS:

#### 2.1 ROTARY FREQUENCY CONVERTER SYSTEM

- a) RFCS to be designed for Indoor applications Confirming to IP23 and having 100 KVA rating.
- b) The RFCS should comprise directly coupled three phase Squirrel cage Induction / Synchronous motor and a synchronous generator.
- c) The RFCS to have selectable Input Voltage from 380V and 415V.
- d) Shaft of the Frequency convertor shall be of EN-57 / AISI 431 material. The shaft to be designed to withstand vibration that occurs at any speed within the operating range or at speed specified for over speed test.
- e) Mounting should be Horizontal on shock mounts.
- f) Final dimensions (Maximum) of the RFC to consider lifting Eye Bolts/Shock Mounts.
- g) All Electrical cables used for internal wiring will be of Low Fire Hazards (LFH) type with Certificate of Conformity.
- h) Working condition - Ambient Temperature: Up to 55 °C
- i) Permissible Temperature rise for both Motor and Generator: 110 °C with Class "H" insulation.
- j) Convertor to be fully short circuit protected and be capable of withstanding short circuit without damage until the protective devices are able to clear the output circuit breakers.
- k) The output voltage to be maintained within specified limits for all permissible values of input voltage and frequency.
- l) 3-Phase output voltage unbalance to be within specified limits.
- m) Anti-Condensation heaters suitable for operation on 230V, 50Hz, Single phase supply to be fitted inside the convertor system to prevent condensation when the convertor is not in use/working.



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### 2.2 CONTROL PANEL FOR RFC

- a) All the control and protection circuitry needed for safe and reliable operation of the RFC to be installed in the Control panel confirming to IP 54/55.
- b) Control Panel shall be Drip proof and shall be fabricated from sheet steel (14 SWG).
- c) Lifting hooks to be provided at the top to facilitate handling and transportation.
- d) The control panel to be provided with shock mounts for mounting.
- e) The Motor starter shall be of Soft Starter type.
- f) AVR (Automatic Voltage Regulator): to provide all the circuitry and tuning control to maintain the terminal voltages of the main generator within specified limits under all load conditions.
- g) All the Power Fuses are to be provided for the power circuitry in the control panel.
- h) The Control Panel to incorporate the Protection as mentioned below:
  - i. Voltage Control and Protection
  - ii. Frequency Control and Protection
  - iii. Short Circuit and Overload Protection.
  - iv. High Temperature Protection
- i) Following Indications to be provided:
  - a) Equipment ON
  - b) Equipment Supply Available
  - c) Overheating – Winding & Bearings
  - d) Anti-Condensation Heaters ON/OFF
  - e) Output ON, meters to indicate:
  - f) Output Voltage
  - g) Output Frequency
  - h) Output Power
  - i) Other Indications as per manufacturer's design
- j) Facility for Remote Control for Start, Stop, Status Indication and Voltage Adjustment. Additionally also provide a Remote Control Unit which can be mounted on a Remote Console as user requirements.
- k) Final dimensions (Maximum) of the Control Panel to consider lifting Eye Bolts/Shock Mounts and Cable glands

### 3.0 SCOPE

The scope includes design / manufacture / testing / erection & commissioning of the Rotary Converter system. The system must be designed to accept **SELECTABLE** input from **380V & 415V, 50 Hz, 3 PHASE** as per availability on board ship and to deliver the outputs as specified below –



**i) RFCS, 100 KVA**

For indoor applications and confirming to IP23.

VOLTAGE	DETAILS
INPUT	380V & 415V (SELECTABLE – 380V or 415V), 50 Hz, 3 PHASE, NOMINAL
OUTPUTS	1) 440V, 60 Hz, 70 KVA, 3 PHASES, PF (COS Ø) = 0.8 2) 115V, 60 Hz, 14 KVA, 3 PHASE 3) 115V, 60 Hz, 1.5 KVA, 1 PHASE 4) 24V, 60 Hz, 250 VA, 1 PHASE

**ii) CONTROL PANEL FOR RFC**

For indoor applications and confirming to IP54/55.

Fully Digitalized Control Panel for Frequency Converter including Starter, Control Devices, Protection Devices, and Step-Down Transformer. Switchgear Equipped for Terminations of following outputs:

- 440 V, 60 Hz, 3 PHASE
- 115V, 60 Hz, 3 PHASE
- 24V, 60 Hz, 1 PHASE

**4.0 POWER INPUT / OUTPUT SPECIFICATIONS**

**4.1 INPUT SUPPLY SPECIFICATIONS**

**4.1.1 VOLTAGE**

Rated voltage	380V & 415V (selectable – 380V or 415V), 3 – Phase, Floating Neutral
Voltage range	±10%
Maximum Unbalance	2%
Maximum Modulation	2%
Transient State	±15% of rated voltage
Recovery Time	1 second
Voltage Spikes (peak)	2.5 KV
Individual Harmonic (Maximum)	3%
Total Harmonic Distortion (Maximum)	5%



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### 4.1.2 FREQUENCY

Rated frequency	50 Hz
Frequency range	± 5%
Modulation	± 0.25%
Transients	± 3.75%
Load Tolerance	± 2.5%
Recovery Time	2 seconds

## 4.2 OUTPUT SUPPLY SPECIFICATIONS

### 4.2.1 POWER OUTPUT – 1 : 70 KVA

#### 4.2.1.1 VOLTAGE

Rated voltage	440V, 3 – phase
Load Range	±5%
Modulation	± 2%
Transients:	
Static	±5%
Dynamic (for 2 sec)	±16%
Individual Harmonic (Max.)	3%
Total Harmonic Distortion (Max.)	5%

#### 4.2.1.2 FREQUENCY

Rated frequency	60 Hz
Load Tolerance	± 3%
Modulation	± 0.25%
Transients:	
Static	±3%
Dynamic (for 2 sec)	±4%

### 4.2.2 POWER OUTPUT – 2 : 14 KVA

#### 4.2.2.1 VOLTAGE

Rated voltage	115V, 3 – phase
Load Range	±5%
Modulation	± 2%



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Transients:	
Static	±5%
Dynamic (for 2 sec)	±16%
Individual Harmonic (Max.)	3%
Total Harmonic Distortion (Max.)	5%

**4.2.2.2 FREQUENCY**

Rated frequency	60 Hz
Load Tolerance	± 3%
Modulation	± 0.25%
Transients:	
Static	±5%
Dynamic (for 2 sec)	±4%

**4.2.3 POWER OUTPUT – 2 : 1.5 KVA**

**4.2.3.1 VOLTAGE**

Rated voltage	115V, Single – phase
Load Range	±5%
Modulation	± 2%
Transients:	
Static	±5%
Dynamic (for 2 sec)	±16%
Individual Harmonic (Max.)	3%
Total Harmonic Distortion (Max.)	5%

**4.2.3.2 FREQUENCY**

Rated frequency	60 Hz
Load Tolerance	± 3%
Modulation	± 0.25%
Transients:	
Static	±5%
Dynamic (for 2 sec)	±4%

**4.2.4 POWER OUTPUT – 3 : 200 VA**

Rated voltage	24V, DC, 200 VA
Upper Limit	35V
Lower Limit	18V
Voltage Cycling, Peak	1V
Ripple, Peak	2.5V
Voltage Pulse (Peak Value)	600V



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### 4.2.5 OTHER REQUIREMENTS:

Wiring Requirements:

- For Three Phase 4 Wire System (3P+N)
- For Single Phase 1P+N

### 5.0 REMOTE OPERATION

Facility for remote Start, Stop, Status Indication and Voltage Adjustment through separate Remote Control Panel to be provided. Purpose of this panel include built-in algorithms and logic to start, stop, control, and protect the RFCS, open/close circuit breakers and mains supply monitoring with automatic changeover.

### 6.0 SPARES

Complete set of Spares for RFCS to be supplied as below:

- A. **OBS:** for 2 years of trouble-free operations (**On board Spares**)
- B. **BDS:** for 5 years of trouble-free operations (**Base & Depot Spares**).

### 7.0 CABLES & CABLE ENTRY GLANDS

- a) All the cables including power cables between Rotary Frequency Converter and its Control Panel and Remote Control Panel will be in the supplier's scope. Refer [Figure-1](#)

*Minimum 15 meters of cables each to be supplied.*

Any increase in length due to layout / location during installation shall be charged additionally.

Vendor to provide the *per meter cost* of the cables with their commercial bid.

- b) Output of the system will be taken from the control panel through separate cable gland assemblies complete with nut & washers suitable for marine environment. (Preferably brass with Nickel/Chrome finish).

All the cable gland assemblies to be supplied along with the complete system for all incoming and outgoing cables.



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### 8.0 CONTROL AND PROTECTION

The control unit will be microprocessor/digitally controlled and will incorporate following protections:

#### 8.1 VOLTAGE CONTROL

- a) Over voltage and under voltage protection
- b) Manual voltage adjustment.

#### 8.2 FREQUENCY CONTROL

- a) Over frequency and under frequency protection
- b) Compensation for variations under varying ambient conditions, voltages and loads will be automatic.

#### 8.3 SHORT CIRCUIT AND OVERLOAD

- a) The converter will be designed so that it can withstand, without damage a short circuit at output terminals at any permissible input and output conditions.
- b) Overload protection setting will be at 125% of full load current and it will be adjustable up to 150%.

#### 8.4 HIGH TEMPERATURE

Temperature sensors to be provided along with over temperature shut down feature.

#### 8.5 INDICATION LAMPS

Following indications will be provided:

- a) Equipment ON
- b) Equipment Supply Available
- c) Overheating – Winding & Bearings
- d) Anti-Condensation Heaters ON/OFF
- e) Output ON, meters to indicate:
  - Output Voltage & Frequency
  - Output Power

*Other Indications as per manufacturer's design.*



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**9.0 LIMITING DIMENSIONS & WEIGHT**For RFCS (Including shock mounts) - [tolerance on values =  $\pm 10\%$ ]

FOR RFC 100 KVA	:	1200 (H) x 1600 (L) x 950 (W)
Weight	:	3000 Kg (approx.)
FOR CONTROL PANEL	:	1750 (H) x 850 (L) x 950 (W)
Weight	:	400 Kg (approx.)

*In case of variation/deviation above  $\pm 10\%$ , prior approval of BHEL is a must.***10.0 ENVIRONMENTAL CONDITIONS**

- a) RFCS for marine applications and requirement is to achieve specified output and smooth functioning under tropical conditions.

SR.	CONDITION	NORMAL	REQUIRED
1.	Temperature		
	Ambient Air	5 to 45 °C	Up to 55 °C
	Engine Room	up to 45 °C	
	Sea Water	2 to 35 °C	
2.	Relative Humidity at 38 °C	Up to 100%	Up to 100%
3.	Time	Continuous	Up to 48Hrs.

- b) Limited Environmental Tests to be performed on complete equipment as given below:

Test	Specification or Equivalent	Test Conditions/Severity
Vibration Test	JSS 55555 (Test no. 28)	5-33 Hz
High Temperature Test	JSS 55555 (Test no. 17)	55°C for 16 hours. Procedure 5, Test condition "G"
Damp Heat	JSS 55555 (Test 10)	40 deg C – 95 % RH for 16 hours
Drip Proof	JSS 55555 (Test 11)	Vertical water drip 1 m height for 15 min
Mould Growth	JSS 55555 (Test 21)	29°C 90% RH mould growth for 28 days
Bump Test	JSS 55555 (Test 5)	1000 bumps – 40 G, 6 m/sec
Shock / Impact	JSS 55555 (Test 24)	As per spec.

- c) All PCBs and Electronic modules fitted in the RFCS to be subjected to **Environmental Stress Screening (ESS)** test as per **MIL STD 2164**.
- d) The equipment should:
- Withstand air contamination through salt, oil and other contaminants associated with the marine environment.
  - Be water drip proof as a minimum requirement



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### 11.0 EMC/EMI, SHOCK, VIBRATION & NOISE REQUIREMENTS

Rotary Frequency Convertor System to conform to following:

EMI/EMC	MIL-STD-461 E/F
Shock Grade	NSS-II
Sound Pressure Level	85dBA (At 1 meter distance)

### 12.0 ROUTINE AND TYPE TESTS

#### 12.1 ROUTINE TESTS

Routine Tests be performed are listed at [Appendix-1](#).

*Product Agency to get the Routine tests witness by inspection authority and to provide certification.*

#### 12.2 TYPE TESTS

Type Tests be performed are listed at [Appendix-2](#).

*Product Agency to get the Type tests witness by inspection authority and to provide certification.*

### 13.0 PRODUCT SUPPORT

Vendor to provide product support by way of supply of spares & services for **2 years** from the date of commissioning.

### 14.0 INSTALLATION AND COMMISSIONING

Installation and commissioning On board Indian Naval vessel.is in the scope of supplier.

### 15.0 GUARANTEE / WARRANTY

The guarantee for performance of the RFCS against faulty material and workmanship shall be for a period of **36 months** from the date of dispatch (or) **12 months** from the date of commissioning of the equipment, whichever is earlier.



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The equipment supplied shall be warranted from defects, workmanship and performance for the said period and cover all the defects arising from malfunction through design faults, inappropriate material, bad Production and non- conformance to specifications.

Any expense on account of repair/supply of spares against guarantee defects is to be borne by the supplier.

**16.0 INSPECTION AND TESTING**

All the routine tests will be conducted at manufacturer’s works on RFC and its Control Panel as per [para 12.1](#)

All Type Tests as per [para 12.2](#) will be conducted at Manufacturer’s works or at an accredited Test Facility as required.

**17.0 ACCEPTANCE / REJECTION**

BHEL reserves the right under conditions of purchase to reject any consignment, which does not conform to the specifications.

**18.0 TECHNICAL DOCUMENTATION**

Following documents to be supplied with RFCS along with softcopy in CD:

DOCUMENT	FOR BHEL	FOR CUSTOMER
a) Technical and Operating Instruction Manual	03	02
b) On-Board Maintenance Manual	03	02
c) Field and Depot Maintenance Manual	03	02
d) Installation and Testing Manual	03	02
e) Installation and As fitted Drawings	03	02
f) Certified Test Reports	05	N.A.
g) Soft copy of above in CD	01	01

**19.0 DELIVERABLES**

The RFCS to be supplied with following equipment, accessories and Spares:

Sl	Description	Unit	Qty	Remarks
1	Rotary Frequency Converter	NO	01	100 KVA
2	Control Panel for RFC	NO	01	
3	Auto Voltage Regulator	NO	01	Installed inside CP for RFC



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Sl	Description	Unit	Qty	Remarks
4	Remote Control Panel	NO	01	
5	Shock Mounts	NO	AR	With RFC & CP
6	Cables between RFC and its CP	SET	01	Min. 15 mtr each
7	On Board Spares (OBS)	SET	01	For 2 Years
8	Base & Depot Spares (BDS)	SET	01	For 5 Years
9	Documentation	SET	05	Along with soft copy in CD

AR = As Required.

### 20.0 PACKING

The items should be suitably packed for safe transportation and handling and storage giving full protection required under normal transport conditions to prevent from damages and deterioration. Adequate protection should be provided against rain and other transit risks.

Each packing in addition to aligning position { ↑ } should be provided with identification tallies.

Case Marking:

CONSIGNEE ADDRESS  
NET WEIGHT  
GROSS WEIGHT  
OUTSIDE DIMENSION

Packing list to be kept inside the case as well as secured & pasted outside, duly protected by plastic sheet. Items not listed in the packing list would be deemed as not supplied.

In case of pipes/conduits/cables, size wise bundles should be made for easy handling and identification for proper storage.

The packing material shall be environmental friendly/biodegradable. Supplier shall provide procedure for disposal of packing material, if environmental friendly / biodegradable material cannot be used due to nature of the equipment.

SELLER should not use Restricted Hazardous banned substance (RHBs). If any such substance is detected, the supplier/Vendor should replace the RHBs and should bear the cost incurred for disposal of the RHBs.

### 21.0 APPLICABLE DOCUMENTS AND STANDARDS

The RFCS to be manufactured and supplied to meet the requirements specified in this specification.

The documents and standards applicable are listed at [Appendix-3](#) for reference only.

***In case of variance, vendor to spell out in their offer, the equivalent documents and standards used for manufacturing and supply of RFCS as per this specification.***



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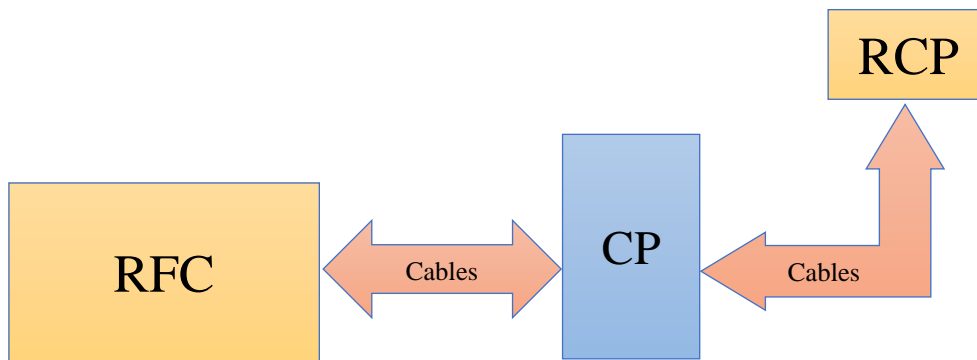
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**FIGURE-1**

**CONFIGURATION OF RFCS**





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### APPENDIX-1

#### LIST OF ROUTINE TESTS

SL.NO.	DESCRIPTION OF ROUTINE TESTS
1	DIMENSIONAL AND WEIGHT CHECK
2	MEASUREMENT OF INSULATION RESISTANCE (COLD)
3	MEASUREMENT OF WINDING RESISTANCE (COLD)
4	MEASUREMENT OF THERMISTER RESISTANCE (COLD)
5	OPERATION OF SPACE HEATERS
6	DIRECTION OF ROTATION TEST
7	VOLTAGE RANGE TEST
8	VOLTAGE BALANCE TEST
9	LOAD TEST & VOLTAGE REGULATION TEST
10	FREQUENCY REGULATION TEST
11	EARTH BONDING TEST AS PER NES-511
12	OVERSPEED TEST
13	TEMPERATURE RISE TEST (HOT WINDING RESISTANCE)
14	HIGH VOLTAGE WITHSTAND TEST (IN HOT CONDITION)
15	INSULATION RESISTANCE TEST (AFTER HIGH VOLTAGE)
16	VOLTAGE TRANSIENT RESPONSE TEST
17	OPERATION OF RELAYS & PROTECTIVE DEVICES
18	MOTOR THERMAL PROTECTION UNIT OPERATION
19	HAND VOLTAGE REGULATION TEST
20	SELF – GENERATED NOISE AND VIBRATION TEST
21	OPEN CIRCUIT TEST
22	SHORT CIRCUIT CHARACTERISTICS TEST
23	OPERATION OF INDICATING LAMPS
24	OVER LOAD CAPACITY TEST
25	5% OVER & UNDER VOLTAGE TEST (ON MOTOR ONLY)
26	BEARING CONDITION TEST
27	EARTH FAULT INDICATION
28	ESS TEST FOR PCB'S
29	OPERATION OF E – STOP PUSH BUTTON



DPE-DABG

DEFENCE AND AEROSPACE BUSINESS GROUP

## TECHNICAL SPECIFICATIONS

No: DPE/TS/RFCS100  
Rev. 01

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### APPENDIX-2

#### LIST OF TYPE TESTS

SL.NO.	DESCRIPTION OF TYPE TESTS
1	OVER VOLTAGE TEST
2	EFFICIENCY TEST
3	STARTING CURRENT AND RUN UP TIME TEST
4	VOLTAGE WAVEFORM AND HARMONIC DISTORTION TEST
5	SUDDEN SHORT CIRCUIT TEST
8	VIBRATION TEST FOR CONVERTOR AND CONTROL PANEL
9	HIGH TEMPERATURE TEST
10	DAMP HEAT TEST FOR CONVERTOR AND CONTROL PANEL
11	VERTICAL WATER DRIP TEST
13	MOULD GROWTH TEST FOR CONVERTOR AND CONTROL PANEL
14	BUMP TEST FOR CONVERTOR AND CONTROL PANEL
15	SHOCK / IMPACT FOR CONVERTOR AND CONTROL PANEL
16	TILT / INCLINATION
17	EMI / EMC



DPE-DABG

DEFENCE AND AEROSPACE BUSINESS GROUP

## TECHNICAL SPECIFICATIONS

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### APPENDIX-3

#### LIST OF APPLICABLE DOCUMENTS AND STANDARDS

*(For Reference only)*

BS-5424, Part 1	- Control Gear Voltages up to and including 1000 VAC for Contactors.
DGS -251	- Painting.
EED-Q-071 (R3)	- Requirement of AC Motor and Starters.
EED-Q-242 (R2)	- Requirements of AC generators
EED-Q-267	- Pertaining to the frequency converter chapters only
EED-S-806 (R1)	- Requirement of ship – borne frequency converter.
IS 12063	- Degree of protection provided by enclosure for rotating electrical machinery
IS 12075	- Self- generated vibration
IS-2147	- Starter enclosure.
ISO 1940/1	- Rotor dynamic balancing
JSS-0251-01 & EED-S-048	- Documentation.
JSS-55555	- Environmental test methods for Electrical and Electronics equipment.
MIL-STD-461 E/F	- Electromagnetic Compatibility.
NES – 629	- Testing of Rotating Machinery.
NES - 723	- Tally plates.
NES-501	- General requirement for the design of Electro-technical equipment.
NES-514 AND DGS/EED/VI/1535/R6	- Cable Glands.
NES-536, NES-537 & NES-538	- Requirement of static conversion equipment
NES-581	- Guide to electronic components and practice.
NES-627	-Requirements for general application to rotating electrical machinery
NES-632	- Requirements for A.C. & D.C. Motors.
NES-634	- Requirements for Motor Generators and associated Control gears

MANUFACTURER'S NAME AND ADDRESS			QUALITY PLAN				TO BE FILLED BY BHEL		TO BE FILLED BY BHEL					
BHEL	VENDOR'S NAME	ITEM			QP NO.									
					REV									
		DRG. NO.	AS PER PO											
		SPEC.	AS PER PO											
	REV			Page 1 of 1										
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS	
1	2	3	4	5	6	7	8	9	D	M	B	N	10	11


		LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER	FOR CUSTOMER USE	
MANUFACTURER/SUBCONTRACTOR				APPROVED BY

## TECHNO-COMMERCIAL CHECKLIST

SL. NO.	TERMS & CONDITION	VENDOR CONFIRMATION /REMARKS / REPLY
<b>ITEM DESCRIPTION- 100 KVA ROTARY FREQUENCY CONVERTER SYSTEM</b>		
1	BIDDER NAME	
2	GEM BID NO	
3	ALL VENDORS TO PROVIDE POINT WISE REPLY/CONFIRMATION ALONG WITH RELEVANT SUPPORTING DOCUMENTS TO EACH AND EVERY POINT OF <b>PRE-QUALIFICATION REQUIREMENT/PQR</b> FOR ALL ENQUIRY ITEMS. NONCOMPLIANCE OF THESE MAY LEAD TO REJECTION OF OFFER AS THESE ARE ESSENTIAL CONDITION FOR PARTICIPATING IN TENDER ENQUIRY.	
4	KINDLY UPLOAD/ATTACH THE SPECIFICATION DETAILS/ CATALOGUE OF OFFERED ITEMS.	
5	SCOPE OF WORK/SUPPLY SHALL BE AS PER SPECIFICATION - DPE/TS/RFCS100	
6	VENDOR HAS TO GET THE ROTARY FREQUENCY CONVERTER SYSTEM AND SPARES TESTED, INSPECTED AND CLEARED FROM BHEL / IHQ (N) NOMINATED AGENCY/ CQAE OF INDIAN NAVY BEFORE DESPATCH	
7	WARRANTY SHALL BE 36 MONTHS FROM THE DATE OF DELIVERY OF THE SYSTEM(REF.SN-10). DURING WARRANTY PERIOD THE FIRM WOULD BE LIABLE TO RECTIFY ALL DEFECTS ARISING OUT OF INFERIOR WORKMANSHIP, FAULTY MATERIAL AND DEFECTIVE DESIGN FREE OF COST & DELIVERED AT CUSTOMER.THE WARRANTY PERIOD WOULD BE EXTENDED BY ANOTHER 12 MONTHS FOR THE REPAIRED PARTS WHICH WERE REPAIRED AND REPLACED DURING THIS PERIOD.	
8	WARRANTEE CERTIFICATE REQUIRED IS REQUIRED ALONG WITH SUPPLY.	
9	SEAWORTHY PACKING IS TO BE DONE BY VENDOR.	
10	DELIVERY SHALL BE IN STAGGERD MANNER AS MENTIONED IN ENQUIRY	
11	VENDORS HAS TO CONFIRM FOR INSPECTION BY BHEL/ BHEL TPIA "M/S. TUV" AND IHQ (N) NOMINATED INSPECTION AGENCY/ CQAE OF INDIAN NAVY AS PER BHEL AND INDIAN NAVY CUSTOMER APPROVED QUALITY PLAN.	
12	VENDOR HAS TO SUBMIT QUALITY PLAN AS PER ATTACHED BHEL QUALITY PLAN FORMAT FOR FURTHER BHEL AND INDIAN NAVY CUSTOMER APPROVAL.	
13	VENDOR HAS TO CONFIRM TO CONCUR TERMS AND CONDITION FOR INSPECTION AS FINALLY AGREED BY INDIAN NAVY CUSTOMER.	
14	VENDOR TO DESPATCH THE MATERIAL AFTER INDIAN NAVY MDCC ONLY.	
15	SUCCESSFUL COMMISSIONING OF ROTARY CONVERTOR WILL BE CONSIDERED AFTER SIGNING OF MOM WITH END USER/ BHEL PERSONNEL AND VENDOR.	
16	KINDLY ARRANGE TO SUBMIT INTEGRITY PACT DULY FILLED.	
17	<b>KINDLY ARRANGE TO SUBMIT MAKE IN INDIA SELF CERTIFICATION.</b>	
18	ARE YOU REGISTERED UNDER MSMED ACT-2006 AS SMALL OR MICRO (KINDLY UPLOAD UAM/UDYAM, WITH CA CERTIFICATE)	
19	<b>RISK PURCHASE:</b> IN CASE OF ABNORMAL DELAYS (BEYOND THE MAXIMUM LATE DELIVERY PERIOD AS PER LD CLAUSE) IN SUPPLIES / DEFECTIVE SUPPLIES OR NONFULFILLMENT OF ANY OTHER TERMS AND CONDITIONS GIVEN IN PURCHASE ORDER, BHEL MAY CANCEL THE PURCHASE ORDER IN FULL OR PART THEREOF, AND MAY ALSO MAKE THE PURCHASE OF SUCH MATERIAL FROM ELSEWHERE / ALTERNATIVE SOURCE AT THE RISK AND COST OF THE SUPPLIER. BHEL WILL TAKE ALL REASONABLE STEPS TO GET THE MATERIAL FROM ALTERNATE SOURCE AT OPTIMUM COST. IF BIDDER DOES NOT AGREE TO THE ABOVE RISK PURCHASE CLAUSE, BHEL RESERVES THE RIGHT TO REJECT THE OFFER. IN CASE FOR COMPELLING REASONS BHEL ACCEPTS THE OFFER WITHOUT ACCEPTANCE OF THIS CLAUSE BY THE BIDDER AND IN THE EVENTUALITY OF RISK PURCHASE, APPROPRIATE ACTION WILL BE TAKEN AS PER BHEL EXTANT RULES. THIS WILL BE WITHOUT PREJUDICE TO ANY OTHER RIGHT OF BHEL UNDER THE CONTRACT OR UNDER GENERAL LAW.	
20	ACTION AGAINST BIDDERS / VENDOR / SUPPLIER / CONTRACTOR IN CASE OF DEFAULT: IN ORDER TO PROTECT THE COMMERCIAL INTERESTS OF BHEL, BHEL SHALL TAKE ACTION AGAINST SUPPLIES / CONTRACTORS BY WAY OF SUSPENSION OF BUSINESS DEALINGS, WHO EITHER FAIL TO PERFORM OR ARE IN DEFAULT WITHOUT ANY REASONABLE CAUSE, CAUSE LOSS OF BUSINESS/ MONEY/ REPUTATION, INDULGE IN MALPRACTICES, CHEATING, BRIBERY, FRAUD OR ANY OTHER MISCONDUCT OR FORMATION OF CARTELS SO AS TO INFLUENCE THE BIDDING PROCESS OR INFLUENCE THE PRICE ETC. SUSPENSION OF BUSINESS DEALINGS COULD BE IN THE FORM OF "HOLD" OR "BANNING" A SUPPLIER/ CONTRACTOR OR A BIDDER AND SHALL BE AS PER "GUIDELINES FOR SUSPENSION OF BUSINESS DEALINGS WITH SUPPLIERS/ CONTRACTORS" AVAILABLE AT BHEL'S WEBSITE "https://www.bhel.com/guidelines-suspension-business-dealings-supplierscontractors"	
21	REST GENERAL TERMS AND CONDITIONS (GTC) AS PER GeM	

1. ALL VENDORS TO PROVIDE POINT WISE REPLY/CONFIRMATION ALONG WITH RELEVANT SUPPORTING DOCUMENTS TO EACH AND EVERY POINT OF **PRE-QUALIFICATION REQUIREMENT/PQR** FOR ALL ENQUIRY ITEMS. NONCOMPLIANCE OF THESE MAY LEAD TO REJECTION OF OFFER AS THESE ARE ESSENTIAL CONDITION FOR PARTICIPATING IN TENDER ENQUIRY.
2. KINDLY UPLOAD/ATTACH THE SPECIFICATION DETAILS/ CATALOGUE OF OFFERED ITEMS.
3. KINDLY ARRANGE TO SUBMIT **TECHNO-COMMERCIAL** CHECKLIST ALONG WITH YOUR OFFER.
4. SCOPE OF WORK/SUPPLY SHALL BE AS PER SPECIFICATION - DPE/TS/RFC100.
5. VENDOR HAS TO GET THE ROTARY FREQUENCY CONVERTER SYSTEM AND SPARES TESTED, INSPECTED AND CLEARED FROM BHEL / IHQ (N) NOMINATED AGENCY/ CQAE OF INDIAN NAVY BEFORE DESPATCH.
6. CONSIGNEE'S ADDRESS (TENTATIVE. SHALL BE CONFIRMED DURING AWARD OF CONTRACT)-:

**THE OFFICER-IN-CHARGE**  
**WEAPON EQUIPMENT DEPOT (WED)**  
**MANKHURD, MUMBAI-400088.**  
**TEL NO.-022-25075651**

7. WARRANTY SHALL BE 36 MONTHS FROM THE DATE OF DELIVERY OF THE SYSTEM(REF.SN-10). DURING WARRANTY PERIOD THE FIRM WOULD BE LIABLE TO RECTIFY ALL DEFECTS ARISING OUT OF INFERIOR WORKMANSHIP, FAULTY MATERIAL AND DEFECTIVE DESIGN FREE OF COST & DELIVERED AT CUSTOMER.THE WARRANTY PERIOD WOULD BE EXTENDED BY ANOTHER 12 MONTHS FOR THE REPAIRED PARTS WHICH WERE REPAIRED AND REPLACED DURING THIS PERIOD.
8. WARRANTEE CERTIFICATE IS REQUIRED ALONG WITH SUPPLY.
9. SEAWORTHY PACKING IS TO BE DONE BY VENDOR.
10. DELIVERY SHALL BE IN STAGGERD MANNER AS PER BELOW TABLE.

SI. NO.	MAT CODE	ITEM DISCREPTION	Quantity (Total 6 Nos)	LOT NO.	Delivery (Days)
1	W97053602044	100 KVA ROTARY FREQUENCY CONVERTER SYSTEM AS PER TECHNICAL SPECIFICATION: DPE/TS/RFC100. SIZE: RFC100KVA Item Id: BD002	1	1	300
			1	2	480
			1	3	660
			1	4	840
			1	5	1020
			1	6	1200

11. VENDORS HAS TO CONFIRM FOR INSPECTION BY BHEL/ BHEL TPIA "M/S. TUV" AND IHQ (N) NOMINATED INSPECTION AGENCY/ CQAE OF INDIAN NAVY AS PER BHEL AND INDIAN NAVY CUSTOMER APPROVED QUALITY PLAN.
12. VENDOR HAS TO SUBMIT QUALITY PLAN AS PER ATTACHED BHEL QUALITY PLAN FORMAT FOR FURTHER BHEL AND INDIAN NAVY CUSTOMER APPROVAL.
13. VENDOR HAS TO CONFIRM TO CONCUR TERMS AND CONDITION FOR INSPECTION AS FINALLY AGREED BY INDIAN NAVY CUSTOMER.
14. VENDOR TO DESPATCH THE MATERIAL AFTER INDIAN NAVY MDCC ONLY.
15. EARLY DELIVERY IS ACCEPTABLE PRIOR APPROVAL BY BHEL.
16. SUCCESSFUL COMMISSIONING OF ROTARY CONVERTOR WILL BE CONSIDERED AFTER SIGNING OF MOM WITH END USER/ BHEL PERSONNEL AND VENDOR.
17. KINDLY ARRANGE TO SUBMIT INTEGRITY PACT DULY FILLED.
18. **KINDLY ARRANGE TO SUBMIT MAKE IN INDIA SELF CERTIFICATION.**

19. KINDLY MENTION THE GEM TENDER NO IN THE EMD NARRATION/REMARKS, WHILE SUBMITTED THE EMD THROUGH RTGS.
20. VENDOR WITH REGISTRATION CODE 23131 REGISTERED WITH BHEL-HEEP, HARIDWAR IN PMD (PRODUCT MATERIAL DIRECTORY) DF125 ARE EXEMPTED FROM SUBMISSION OF EMD.
21. VENDOR NOT SUBMITTING EMD WILL BE OUT RIGHTLY REJECTED EXCEPT THOSE EXEMPTED UNDER POINT NO 19.
22. BIDDERS CAN ALSO SUBMIT THE EMD WITH PAYMENT ONLINE THROUGH RTGS / INTERNET BANKING IN BENEFICIARY NAME BHEL HEEP HARIDWAR ACCOUNT NO. 1 0 6 6 7 9 9 5 4 5 8 IFSC CODE SBIN0000586 BANK NAME STATE BANK OF INDIA BRANCH ADDRESS SECTOR-5 RANIPUR HARIDWAR BIDDER TO INDICATE BID NUMBER AND NAME OF BIDDING ENTITY IN THE TRANSACTION DETAILS FIELD AT THE TIME OF ONLINE TRANSFER. BIDDER HAS TO UPLOAD SCANNED COPY / PROOF OF THE ONLINE PAYMENT TRANSFER ALONG WITH BID.
23. **KINDLY ARRANGE TO SUBMIT MAKE IN INDIA SELF CERTIFICATION.**
24. MSE/MII: THE SUPPLIER NEEDS TO SUBMIT/UPDATE MSE/MII CREDENTIALS ON GEM PORTAL DURING PROFILE UPDATION/ OFFER SUBMISSION STAGE. THE MSE DATA SUBMITTED IS CROSS VERIFIED BY GEM WITH GOVT. OF INDIA UDYAM/NSIC DATABASE THROUGH API INTEGRATION ON REAL TIME BASIS AND FOR MII, A SELF DECLARATION IS BEING GIVEN AND AUTHENTICATED BY AADHAR OTP. IF THE SELLER FAILS TO CLAIM MSE/MII PROVISION ON GEM PORTAL AT PROFILE UPDATION/BID SUBMISSION STAGE, THE SAID SELLER WILL BECOME INELIGIBLE FOR GETTING THE MSE/MII BENEFITS FOR THAT BID AUTOMATICALLY. THE VENDOR CAN ALWAYS CONTACT THE GEM HELPDESK, IN CASE OF ANY ISSUES.
25. THE PRICE QUOTE BY BIDDER SHOULD BE INCLUSIVE OF GST & SHOULD BE ON BHEL HEEP HARIDWAR STORES BASIS.
26. BIDDER'S OFFER IS LIABLE TO BE REJECTED IF THEY DON'T UPLOAD ANY OF THE CERTIFICATES / DOCUMENTS SOUGHT IN THE BID DOCUMENT, ATC AND CORRIGENDUM IF ANY.
27. **RISK PURCHASE:** IN CASE OF ABNORMAL DELAYS (BEYOND THE MAXIMUM LATE DELIVERY PERIOD AS PER LD CLAUSE) IN SUPPLIES / DEFECTIVE SUPPLIES OR NONFULFILLMENT OF ANY OTHER TERMS AND CONDITIONS GIVEN IN PURCHASE ORDER, BHEL MAY CANCEL THE PURCHASE ORDER IN FULL OR PART THEREOF, AND MAY ALSO MAKE THE PURCHASE OF SUCH MATERIAL FROM ELSEWHERE / ALTERNATIVE SOURCE AT THE RISK AND COST OF THE SUPPLIER. BHEL WILL TAKE ALL REASONABLE STEPS TO GET THE MATERIAL FROM ALTERNATE SOURCE AT OPTIMUM COST. IF BIDDER DOES NOT AGREE TO THE ABOVE RISK PURCHASE CLAUSE, BHEL RESERVES THE RIGHT TO REJECT THE OFFER. IN CASE FOR COMPELLING REASONS BHEL ACCEPTS THE OFFER WITHOUT ACCEPTANCE OF THIS CLAUSE BY THE BIDDER AND IN THE EVENTUALITY OF RISK PURCHASE, APPROPRIATE ACTION WILL BE TAKEN AS PER BHEL EXISTANT RULES. THIS WILL BE WITHOUT PREJUDICE TO ANY OTHER RIGHT OF BHEL UNDER THE CONTRACT OR UNDER GENERAL LAW.
28. **ACTION AGAINST BIDDERS / VENDOR / SUPPLIER / CONTRACTOR IN CASE OF DEFAULT:**  
IN ORDER TO PROTECT THE COMMERCIAL INTERESTS OF BHEL, BHEL SHALL TAKE ACTION AGAINST SUPPLIES / CONTRACTORS BY WAY OF SUSPENSION OF BUSINESS DEALINGS, WHO EITHER FAIL TO PERFORM OR ARE IN DEFAULT WITHOUT ANY REASONABLE CAUSE, CAUSE LOSS OF BUSINESS/ MONEY/ REPUTATION, INDULGE IN MALPRACTICES, CHEATING, BRIBERY, FRAUD OR ANY OTHER MISCONDUCT OR FORMATION OF CARTELS SO AS TO INFLUENCE THE BIDDING PROCESS OR INFLUENCE THE PRICE ETC.  
SUSPENSION OF BUSINESS DEALINGS COULD BE IN THE FORM OF "HOLD" OR "BANNING" A SUPPLIER/ CONTRACTOR OR A BIDDER AND SHALL BE AS PER "GUIDELINES FOR SUSPENSION OF BUSINESS DEALINGS WITH SUPPLIERS/ CONTRACTORS" AVAILABLE AT BHEL'S WEBSITE <https://www.bhel.com/guidelines-suspension-business-dealings-supplierscontractors>

29. BIDDERS ARE ADVISED TO CHECK APPLICABLE GST ON THEIR OWN BEFORE QUOTING. BUYER WILL NOT TAKE ANY RESPONSIBILITY IN THIS REGARDS. GST REIMBURSEMENT WILL BE AS PER ACTUALS OR AS PER APPLICABLE RATES (WHICHEVER IS LOWER), SUBJECT TO THE MAXIMUM OF QUOTED GST %.
30. BIDDER SHALL SUBMIT THE FOLLOWING DOCUMENTS ALONG WITH THEIR BID FOR VENDOR CODE CREATION:  
**A. COPY OF PAN CARD B. COPY OF GSTIN C. COPY OF MSE CERIFICATE**
31. DEDICATED /TOLL FREE TELEPHONE NO. FOR SERVICE SUPPORT: BIDDER/OEM MUST HAVE DEDICATED/TOLL FREE TELEPHONE NO. FOR SERVICE SUPPORT.
32. DATA SHEET OF THE PRODUCT(S) OFFERED IN THE BID, ARE TO BE UPLOADED ALONG WITH THE BID DOCUMENTS. BUYERS CAN MATCH AND VERIFY THE DATA SHEET WITH THE PRODUCT SPECIFICATIONS OFFERED. IN CASE OF ANY UNEXPLAINED MISMATCH OF TECHNICAL PARAMETERS, THE BID IS LIABLE FOR REJECTION.
33. SCOPE OF SUPPLY (BID PRICE TO INCLUDE ALL COST COMPONENTS): ONLY SUPPLY OF GOODS AS PER ENQUIRY.
34. PRODUCTS SUPPLIED SHALL BE NONTOXIC AND HARMLESS TO HEALTH. IN THE CASE OF TOXIC MATERIALS, MATERIAL SAFETY DATA SHEET MAY BE FURNISHED ALONG WITH THE MATERIAL.
35. WHILE GENERATING INVOICE IN GEM PORTAL, THE SELLER MUST UPLOAD SCANNED COPY OF GST INVOICE AND THE SCREENSHOT OF GST PORTAL CONFIRMING PAYMENT OF GST.

**36. PAYMENT TERMS SHALL BE AS PER FOLLOWINGS:**

- i. **FOR NON-MSES BIDDER:** 80% of total order value along with 100% taxes, freight & insurance will be made after receipt and acceptance of material and within 90 days from the date of invoice subject to submission of non-discrepant documents within 15 days of supply as per terms and conditions of Purchase Order.
- ii. **FOR MICRO & SMALL ENTERPRISES:** For MSEs (covered under MSME Act) which are registered and periodically renewed with BHEL, the 80% of total order value along with 100% taxes, freight & insurance will be made after receipt and acceptance of material and within 45 days or as prescribed in the relevant act. Benefits of MSE (such as EMD Waiver, Tender fee exemption, Price preference, Payment preference etc.) will be given only to those MSE Vendors who are manufacturers of offered items against the NIT. No MSE benefits shall be provided to Agents / Stockists /Dealers / Traders etc. for the items offered but not manufactured by themselves.”
- iii. **FOR MEDIUM ENTERPRISES:** 80% of total order value along with 100% taxes, freight & insurance will be made after receipt and acceptance of material and within 60 days from the date of invoice subject to submission of non-discrepant documents within 15 days of supply as per terms and conditions of Purchase Order.
- iv. Balance 20% of total order value supply shall be paid after successful Erection & Commissioning and against submission of 10% PBG (performance bank guarantee) valid until the completion of warranty period plus two months.
- v. Please note that vendor to adhere to the payment terms as per above. No deviation in payment terms shall be accepted. Vendor to submit their offer accordingly.

**MAKE IN INDIA SELF CERTIFICATION**

As per Government Public procurement order no. P-45021/2/2017-BE-II dt.15.06.2017 & P45021/2/2017-PP(BE-II) dated 28.05.2018,29.5.2019, 04.6.2020 and amendment dated 16.09.2020, it is hereby certifying that we

.....  
..... (supplier name) are .....(Class-I/Class-II)  
local supplier and will meet the requirement of minimum local content of .....  
(50%/20%) as defined in public procurement order dated 04.6.2020 for material against Enquiry no.  
..... Details of  
location at which local value addition will be made is as follows: -  
.....  
.....  
.....

We also understand, false declarations will be in breach of the code of integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the general financial rules along with such other actions as may be permissible under law.

**Note:**

As per office order P-45021/102/2019-BE-II-Part (1) (E-50310) Dated 04/03/2021, Bidders can't claim itself as "Class-I local supplier/Class-II local suppliers" by claiming the service such as transportation, insurance, installation, commissioning, training & after sales service support like AMC/CMC etc. as local value addition. Bidder offering imported product will fall under the category of Non-Local supplier.

**Certificate by Chartered Accountant on letter head**

This is to Certify that M/S .....  
(hereinafter referred to as 'company') having its registered office at  
..... is registered under MSMED Act 2006, (Entrepreneur  
Memorandum No (Part-II) ..... dtd:.....,  
Category: ..... (Micro/Small)). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as on  
date..... as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No.S.O.1722(E) dated October 5, 2006 :  
Rs.....Lacs
2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED Act, 2006:  
Rs.....Lacs

The above investment of Rs.....Lacs is within permissible limit of  
Rs.....Lacs for .....Micro / Small (Strike off which is not applicable)  
Category under MSMED Act 2006.

Date:

(Signature)

Name -

Membership number -

Seal of Chartered Accountant



**INTEGRITY PACT****Between**

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi - 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

**and**

\_\_\_\_\_, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

**Preamble**

The Principal intends to award, under laid-down organizational procedures, contract/s for \_\_\_\_\_

\_\_\_\_\_ (hereinafter referred to as "Contract"). The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint panel of Independent External Monitor(s) (IEMs), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

**Section 1- Commitments of the Principal**

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles: -
  - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
  - 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
  - 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

**Section 2 - Commitments of the Bidder(s)/ Contractor(s)**

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. The Bidder(s)/ Contractor(s) commits himself to observe the following principles during participation in the tender process and during the contract execution.

- 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and shall await their decision in the matter.

### **Section 3 - Disqualification from tender process and exclusion from future contracts**

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process, terminate the contract, if already awarded, exclude from future business dealings and/ or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

### **Section 4 - Compensation for Damages**

- 4.1 If the Principal has disqualified the Bidder (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above, the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.

**Section 5 - Previous Transgression**

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

**Section 6 - Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)**

- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity Pact or violate its provisions.

**Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors**

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

**Section 8 -Independent External Monitor(s)**

- 8.1 The Principal appoints competent and credible panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.
- 8.2 The IEMs are not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the IEMs the option to participate in such meetings.

- 8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a Bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some Bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- 8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the Principal should be looked into by the CVO of the Principal.
- 8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.

## **Section 9 - Pact Duration**

- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact is signed by both the parties till the final completion of contract for successful Bidder, and for all other Bidders 6 months after the Contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, the same shall be binding and continue to be valid despite the lapse of this Pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

**Section 10 - Other Provisions**

- 10.1 This Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.
- 10.2 Changes and supplements as well as termination notices need to be made in writing.
- 10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.
- 10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those bidders / contractors who have entered into this Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.
- 10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as the terms & conditions of the Contract. The fees/expenses on dispute resolution through mediation shall be shared by both the parties. Further, the mediation proceedings shall be confidential in nature and the parties shall keep confidential all matters relating to the mediation proceedings including any settlement agreement arrived at between the parties as outcome of mediation. Any views expressed, suggestions, admissions or proposals etc. made by either party in the course of mediation shall not be relied upon or introduced as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the dispute that is the subject of mediation proceedings. Neither of the parties shall present IEMs as witness in any Alternative Dispute Resolution or judicial proceedings in respect of the dispute that was subject of mediation.

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 For & On behalf of the Principal  
 (Office Seal)

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 For & On behalf of the Bidder/ Contractor  
 (Office Seal)

Place \_\_\_\_\_  
 Date \_\_\_\_\_

Witness: \_\_\_\_\_  
 (Name & Address) \_\_\_\_\_  
 \_\_\_\_\_

Witness: \_\_\_\_\_  
 (Name & Address) \_\_\_\_\_  
 \_\_\_\_\_

Clause on IP in the tender

**Integrity Pact (IP)**

- (a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

SI	IEM	Email
1.	Shri Otem Dai, IAS (Retd.)	<a href="mailto:iem1@bhel.in">iem1@bhel.in</a>
2.	Shri Bishwamitra Pandey, IRAS (Retd.)	<a href="mailto:iem2@bhel.in">iem2@bhel.in</a>
3.	Shri Mukesh Mittal, IRS (Retd.)	<a href="mailto:iem3@bhel.in">iem3@bhel.in</a>

- (b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.
- (c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

Note:

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below:

Details of contact person(s):

(1) Chirag  
 Name: CHIRAG GOEL  
 Deptt: PPX-DABG  
 Address: BHEL  
 Phone: (Landline/ Mobile) 01334-285462  
 Email: chirag@bhel.in  
 Fax: \_\_\_\_\_

(2) Rajan Kumar  
 Name: RATAN KUMAR  
 Deptt: PPX-DABG  
 Address: BHEL, HEEP  
 Phone: (Landline/ Mobile) 01334-285462  
 Email: rajankumar@bhel.in  
 Fax: \_\_\_\_\_