



Garden Reach Shipbuilders & Engineers Limited

A Government Of India Undertaking Under the Ministry Of Defence
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E- TENDER NO: CSB/PKS/LT (ND)/ORV/CCAMS/ET-3199

NOTICE INVITING TENDER

1. Offers are invited from firm in two bid system through E-Portal from the vendors for supply of item **Computerized Control, Alarm and Monitoring System (CCAMS)** for GRSE Yard No. 3041 (ORV Project) as per tender.
2. Current requirement is as mentioned in the tender, as per enclosed specification & scope.
3. Nature of Tender : **Limited Tender**
4. **Qualification Criteria (refer clause no. 1.9 of SOTR):** The authorized rep of the nominated maker (Refer Clause 4.33) for equipment in the tender are qualified to bid for the tender and are required to submit valid OEM authorization along with the offer.
5. **Pre-Bid Meeting (refer clause no. 1.9 of SOTR) :** A pre-bid meeting shall be held within 07 days of publication of tender prior submission of bid (for exact date please, refer e-portal). Firm is requested to forward their pre-bid queries along with authorization of the nominated maker, within 05 days from publication of the tender in e-portal to the following mail ID along with request for Video conferencing Link (VC link of Webex).
 - (i) Shri Ershad Syed Habibul, JM, CDO (Email ID: Ershad.SyedHabibul@grse.co.in)
 - (ii) Shri Subrata Das: Mgr, CDO (Email ID: Das.Subrata1@grse.co.in)
 - (iii) Shri Rohit Kumar: SM, CDO (Email ID: Kumar.Rohit@grse.co.in)
 - (iv) Shri P.K. Sharma, Sr. Manager (CSB) (Email ID: Sharma.PrabeenKumar@grse.co.in);
 - (v) Shri P. S. Bose., DGM (CSB) (Email ID: Bose.ParthaSarathi@grse.co.in)
6. Technical Specification & Scope of Supply : As per Annexure - II enclosed.
7. Other Commercial Terms : As per Annexure – I & X enclosed
8. Delivery/ Shipment : Earliest / staggered as per Annex-A.
9. Tender / Bid formats are to be downloaded from our e-portal (<https://eprocuregrse.co.in>) and Offers in filled in formats are to be uploaded using Digital Signature Certificate (DSC). Tender opening can be witnessed in team viewer of the web-portal.
10. GRSE reserve the right to cancel the tender at any stage, if any such situation arises in future.
11. Whether GRSE will open the tender as per schedule or extend the offer submission due date is completely under purview of GRSE.
12. GRSE reserve the right to negotiate the price with L-1 bidder, as per existing procedure of GRSE.

Sr. Manager (Materials-NCM)

M/s. Garden Reach Shipbuilders & Engineers Limited,
43/46, Garden Reach Road,
Kolkata-700 024 (INDIA)

Enclosure List:

- | | |
|---------------------|--|
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| 3. Annexure – III : | GRSE Indigenization Policy (As per E- portal) |
| 4. Annexure – IV : | Undertaking/ Declaration, To Be Furnished |
| 5. Annexure – V : | Bank Guarantee Formats & Shipping Instructions. |
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ANNEXURE : I

INSTRUCTIONS TO BIDDERS / SPECIAL TERMS AND CONDITION OF NIT

विवरण / Description: COMPUTERISED CONTROL, ALARM AND MONITORING SYSTEM (CCAMS) for GRSE Yard No. 3041 (ORV Project)

संदर्भ/ Refer: क्रय मांग सं./ Indent No.: 1000058985 dtd: 16.04.2025

Sl. No.	Terms and Conditions of GRSE tender							
1.	Qualification Criteria (refer clause no. 1.9 of SOTR): The authorized rep of the nominated maker (Refer Clause 4.33) for equipment in the tender are qualified to bid for the tender and are required to submit valid OEM authorization along with the offer.							
2.	Pre-Bid Meeting (refer clause no. 1.9 of SOTR) : A pre-bid meeting shall be held within 07 days of publication of tender prior submission of bid (for exact date please, refer e-portal). Firm is requested to forward their pre-bid queries along with authorization of the nominated maker, within 05 days from publication of the tender in e-portal to the following mail ID along with request for Video conferencing Link (VC link of Webex). (i) Shri Ershad Syed Habibul, JM, CDO (Email ID: Ershad.SyedHabibul@grse.co.in) (ii) Shri Subrata Das: Mgr, CDO (Email ID: Das.Subrata1@grse.co.in) (iii) Shri Rohit Kumar: SM, CDO (Email ID: Kumar.Rohit@grse.co.in) (iv) Shri P.K. Sharma, Sr. Manager (CSB) (Email ID: Sharma.PrabeenKumar@grse.co.in); (v) Shri P. S. Bose., DGM (CSB) (Email ID: Bose.ParthaSarathi@grse.co.in)							
3.	GRSE reserve the right to consider/ reject the offer of any participating firm based on past performance of the firm for other project.							
4.	Scope of supply & Service: Computerized Control, Alarm and Monitoring System (CCAMS) for GRSE Yard No. 3041 (ORV Project) as detailed as mentioned below. The present requirement is for GRSE yard no. 3041 (ORV Project) as mentioned in the technical bid (annexure-a). <table border="1"> <thead> <tr> <th>Sl. No.</th><th>Item Description</th><th>SOTR No./ Technical specification/ Drawing No.</th></tr> </thead> <tbody> <tr> <td>1</td><td>Computerized Control, Alarm and Monitoring System (CCAMS) for GRSE Yard No. 3041 (ORV Project)</td><td>GT42900011M, Rev. No. 0</td></tr> </tbody> </table> - Participating Firm is to quote all line items as L-1 determination is on Totality basis. - In case firm participate in and if Price of any line item is found zero, then it will be considered that item will be delivered at Zero Price and price of the same line item is included in the other line item.		Sl. No.	Item Description	SOTR No./ Technical specification/ Drawing No.	1	Computerized Control, Alarm and Monitoring System (CCAMS) for GRSE Yard No. 3041 (ORV Project)	GT42900011M, Rev. No. 0
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1	Computerized Control, Alarm and Monitoring System (CCAMS) for GRSE Yard No. 3041 (ORV Project)	GT42900011M, Rev. No. 0						
5.	Contact: Bidders may contact following with tender no and Indent no. (Indent No. 1000058985 dtd: 28.11.2024) (a) For Technical clarifications, if any, Shri Ershad Syed Habibul, JM, CDO (Email ID: Ershad.SyedHabibul@grse.co.in) Shri Subrata Das: Mgr, CDO (Email ID: Das.Subrata1@grse.co.in) Shri Rohit Kumar: SM, CDO (Email ID: Kumar.Rohit@grse.co.in) (b) For commercial queries if any, Shri P.K. Sharma, Sr. Manager (NCM) at Sharma.PrabeenKumar@grse.co.in; Shri K. Datta, DGM (NCM) at Datta.Kaustabh@grse.co.in							
6.	Tender fee and Earnest Money Deposit (EMD): (a) Tender fee: Nil and (b) EMD : Nil							
7.	Terms of price: Price quoted as FOR, GRSE, Kolkata basis including packing, forwarding and loading and Freight & Insurance charges. No price escalation will be allowed at any stage. Quoted price includes all required specifications as per technical state. Firm to ensure that firm has submitted offer for OBS, Tools and documentation, services as per SOTR/ as finalized in TNC. All Quoted Price should be in INR only. <i>Note: Firm to confirm they have submitted Price break up of each deliverable, items, OBS, Documentation, service man-days as per SOTR, along with Price bid in e-portal. (Note: Indicating price in Part I (Techno Commercial Bid) is under bid liable for rejection criteria and hence price is not to be mentioned/</i>							

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	<i>uploaded in Part I (Techno Commercial Bid)).</i> <i>Also, Firm is to confirm they have indicated the annual rate for extended preservation of equipment, in the event of expiry of preservation period (as sought in SOTR) along with Price bid in e- portal. (Note: Indicating price in Part I (Techno Commercial Bid) is under bid liable for rejection criteria and hence price is not to be mentioned/ uploaded in Part I (Techno Commercial Bid)).</i>																																																																															
8.	Delivery Schedule: Delivery period of the item shall be as mentioned in Annexure -A (Technical Offer) as mentioned below. Service engineer as and when require as per SOTR/ GRSE requirement. <table><tr><th>Enquiry Sl. No.</th><th>Yard No.</th><th>Indent Nos.</th><th>Ind. Sl. No.</th><th>Material Code</th><th>Material Description</th><th>Qty Required</th><th>UOM</th><th>Required Delivery (at Destination)</th><th>Destination/ delivery Location</th></tr><tr><td>1.</td><td>3041</td><td>1000058985</td><td>10</td><td>830306000000</td><td>COMPUTERISED CONTROL ALARM & MONITORING SYSTEM</td><td>1</td><td>ST</td><td>April 2026</td><td>GRSE, Kolkata</td></tr><tr><td>2.</td><td>3041</td><td>1000058985</td><td>20</td><td>830306950000</td><td>INSTALLATION MATERIAL&ACCESSORIES</td><td>1</td><td>ST</td><td>April 2026</td><td>GRSE, Kolkata</td></tr><tr><td>3.</td><td>3041</td><td>1000058985</td><td>30</td><td>830306970000</td><td>OBS</td><td>1</td><td>ST</td><td>July 2027</td><td>GRSE, Kolkata</td></tr><tr><td>4.</td><td>3041</td><td>1000058985</td><td>40</td><td>830306990000</td><td>DOCUMENTATION</td><td>1</td><td>ST</td><td>April 2026</td><td>GRSE, Kolkata</td></tr><tr><td>5.</td><td>3041</td><td>1000058985</td><td>50</td><td>SER10682</td><td>SERVICE OF ENGINEER</td><td>1</td><td>LS</td><td>As and when required by GRSE</td><td>GRSE, Kolkata</td></tr><tr><td>6.</td><td>3041</td><td>1000058985</td><td>60</td><td>SER10683</td><td>SERVICE OF TRAINING</td><td>1</td><td>LS</td><td>As and when required by GRSE</td><td>GRSE, Kolkata</td></tr></table> Note: a) Delivery time line for each ships is to be complied by the firm. GRSE will not accept the material before the schedule delivery date mentioned against each part supply/or any request for early delivery will not be accepted, if not consented by GRSE. b) Before supply of materials, firm to approach GRSE with consignment details (like weight, volume, No. of packing etc.) 03 days prior to delivery plan, based on the consignment volume GRSE will intimate the store number for delivery of the items. c) Service Engineer and training as per SOTR and/ or as finalized based on MOM of TNC										Enquiry Sl. No.	Yard No.	Indent Nos.	Ind. Sl. No.	Material Code	Material Description	Qty Required	UOM	Required Delivery (at Destination)	Destination/ delivery Location	1.	3041	1000058985	10	830306000000	COMPUTERISED CONTROL ALARM & MONITORING SYSTEM	1	ST	April 2026	GRSE, Kolkata	2.	3041	1000058985	20	830306950000	INSTALLATION MATERIAL&ACCESSORIES	1	ST	April 2026	GRSE, Kolkata	3.	3041	1000058985	30	830306970000	OBS	1	ST	July 2027	GRSE, Kolkata	4.	3041	1000058985	40	830306990000	DOCUMENTATION	1	ST	April 2026	GRSE, Kolkata	5.	3041	1000058985	50	SER10682	SERVICE OF ENGINEER	1	LS	As and when required by GRSE	GRSE, Kolkata	6.	3041	1000058985	60	SER10683	SERVICE OF TRAINING	1	LS	As and when required by GRSE	GRSE, Kolkata
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9.	Guarantee/ Warranty Clause: a) The equipment/materials are to be guaranteed/warranted for satisfactory performance for the period of 18 months from the date of planned delivery date of the ship by GRSE to NCPOR (indicated below) on which the equipment/materials/items are installed OR for the period of 36 months from the date of receipt and acceptance by GRSE at GRSE, whichever expires later, against improper design, defective materials and faulty workmanship. During guarantee/ warrantee period any equipment or component thereof supplied by the vendor, suffers due to defective material and or due to improper design and or due																																																																															

Sl. No.	Terms and Conditions of GRSE tender				
	to defective drawing or due to faulty workmanship the vendor will assume full responsibility of rectification of such defective equipment or component thereof including direct expenses related to removal and re-positioning of the replacement/repaired equipment or component thereof and subsequent test & trial, incurred thereon without any financial implication to GRSE. Issues/Defects related to Guarantee/Warranty shall have to be liquidated at the location of vessel and/or as desired by the Purchaser / Owner, at no extra cost. Warranty shall be applicable in accordance with scheduled delivery of items as per tender / PO. Warrantee period will be applicable on LOT basis and date of receipt of last item of LOT shall be reckoned for warrantee period. During warrantee period, firm has to confirm within 5 days of intimation, their action plan and arrange liquidation of GD within 25 days, failing which GRSE may invoke Risk Purchase and may arrange liquidation of GD from alternative source at risk and cost of firm. However, warrantee period will be remain intact as per T&C of P.O. even after liquidation of GD from alternative Source. <table border="1"> <tr> <td>Yard No.</td><td>Planned delivery date to NCPOR</td></tr> <tr> <td>3041</td><td>Dec 2027</td></tr> </table>	Yard No.	Planned delivery date to NCPOR	3041	Dec 2027
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3041	Dec 2027				
10.	Provisional Scope of Supply: Not applicable for this tender (a) Warranty extensions charges is to be quoted in Part -1 (at dedicated location in annexure-B (commercial offer) of NIT) in % of total price on PA basis and applicable for 24 months after expiry of inbuild warrantee period. Firm to ensure the same. Warranty extension charges is optional scope and P.O. will be issued initially excluding warrantee extension charges. warrantee extension will be optional scope in the P.O.. However, as this is the optional scope of the tender, GRSE will apply/invoke the same as and when required at the discretion of the GRSE. (b) Delivery postponement charges is to be quoted in Part -1 (at dedicated location in annexure-B (commercial offer) of NIT) in % of total price on PA basis and applicable for 12 months after expiry of delivery schedule (respective delivery schedule mentioned in the tender. Firm to ensure the same. Delivery postponement charges is optional scope and P.O. will be issued initially excluding delivery postponement and delivery postponement will be optional scope in the P.O.. However, as this is the optional scope of the tender, GRSE will apply/invoke the same as and when required at the discretion of the GRSE. Note: Intimation of delivery postponement, if any required, will be intimated on or before 03 month from the CDD of the P.O. placed on the firm.				
11.	Terms of Delivery: A. For Supply: (i) Delivery date mentioned in tender shall be considered for all purposes. (ii) Material is to be delivered is to be delivered on free Door Delivery basis at GRSE Store Kolkata. (iii) For delivery on FOR, GRSE, Kolkata basis: Packing, Forwarding, Freight and Insurance charge is to be borne by the supplier. Firm may be required to deliver the material at any store of GRSE, Kolkata and prior confirmation for delivery store location to be obtained from ordering department. (iv) GRSE will prefer to receive the entire deliverables as per below mentioned schedule (01 lot per ship except OBS) within the stipulated delivery period. GRSE will discourage the part delivery and part payment, unless required urgently at GRSE and instructions given to bidder for urgent part delivery. Detailed Break up Prices: Supplier on receipt of Purchase Order and by a date not later than 3 months from the date of receipt of order shall list out and confirm all deliverables including Main Equipment (Pre-launch & Post-launch), Accessories, On-board Spares, B&D Spares, Tools, Technical Documentation and other items as finalized in Technical negotiation/Price negotiation. Each item shall have the supplier's part no. and break up price. The same is required essentially for incorporating GRSE material code nos. into the Purchase Orders and Computer Systems. GRSE shall issue Purchase Orders / Amendment to the Purchase Orders incorporating the details from the firm with GRSE code numbers, individual prices etc. in advance of contractual delivery. NOTE: (i) Delivery time line for each ships is to be complied by the firm. GRSE will not accept the material before the schedule delivery date mentioned against each part supply/or any request for early delivery will not be accepted, if not consented by GRSE.				

Sl. No.	Terms and Conditions of GRSE tender
	(ii) Before supply of materials, firm to approach GRSE with consignment details (like weight, volume, No. of packing etc.) 03 days prior to delivery plan, based on the consignment volume GRSE will intimate the store number for delivery of the items. (iii) In case of non-submission of Detailed Price break up and Incorporation of same in GRSE P.O., consignment may not be accepted at the Store. (b) For Service: Service Engineer and training shall be as per SOTR (if applicable) Work should be undertaken within 3 days from intimation based on requirement projected by GRSE berth/Yard.
12.	Inspection Authority: 1. Inspection: As mentioned in the SOTR. 2. Receipt Inspection: GRSE(RIC) During receipt inspection, in case required, firm rep may be required to verify completeness of the scope of supply and intactness of the supplied equipment and firm may require to depute their rep. during receipt inspection with 02 days advance intimation by GRSE, without any additional cost to GRSE.
13.	Inspection Charges: Prices quoted Should be inclusive of inspection charges for Drawing Approval/ QAP approval /Type Test/FAT/In-process Inspection wherever applicable as per SOTR requirement. No separate inspection charges shall be paid by GRSE.
14.	Bids Evaluation Methodology & Criterion: L1 bidder shall be determined based on FOR GRSE, Kolkata basis on Total item price along with documentation, OBS, Tools, services, warrantee Charges (i.e., Inbuilt warrantee), freight and Insurance charges & other components of the tender (as applicable) on totality basis taking all item together. Ranking of bids for L1 determination shall be done as per e portal and through reverse auction. <i>Warrantee extension charges and Delivery postponement charges shall not be considered for L-1 Evaluation.</i>
15.	Polices for MSME: Benefits being accorded to the Micro & Small Enterprises (MSEs) vendors regarding implementation of policies for Micro & Small Enterprises, 2012 are as follows: a) This policy for MSEs shall apply to all the MSEs registered with District Industries Centre or Khadi & Village Industries Commission or Khadi & Village Industries Board or Coir Board or National Small Industries Corporation or Dte. Of Handicraft & Handloom or any other bodies specified by Ministry of Micro, Small & Medium Enterprises. Documents, Entrepreneurs Memorandum (EM Part-II) / NSIC certificate / UAM (Udyog Aadhar Memorandum) / UDHYAM, for manufacture/supply of concerned equipment/item, must be submitted along with the offer for such purpose to claim the benefit. b) Following facilities/benefits will be given to MSEs :- (i) Issue of Tender sets free of cost. (ii) Exemption for payment of Earnest Money Deposit. Above benefits will also be accorded to the vendors registered with NSIC under a single point vendor registration scheme. The vendors registered with NSIC under single point registration, will not be exempted from submission of SDBG. c) (i) MSEs registered with MSME authority as above, quoting prices within 15% of lowest eligible price bid of other bidder(s) shall be eligible for purchase preference for 25% of the order quantity (subject to order quantity being adequate for this purpose) provided the MSE matches the L1 landed cost at GRSE. (ii) If it happens that two or more MSEs are within L1 + 15% range, all such MSEs will be given an opportunity to accept the L1 price and to share 25% of the order value equally. d) (i) In case the MSE is owned by SC/ST owners, then the enterprise will get a share of 4% of the above 20% exclusively in addition to sharing of equal portion of balance 16% with other non-SC/ST MSEs. (ii) If more than one MSE owned by SC/ST owners are there in case of a tender, such MSEs will share 16% of the total ordered value equally with other non-SC/ST owned MSEs in addition to equally sharing 4% exclusively reserved for SC/ST owned enterprises.

Sl. No.	Terms and Conditions of GRSE tender
	e) To qualify for entitlement as SC/ST owned MSE, the SC/ST certificate issued by the District Authority must be submitted along with the offer. f) It is to be noted by all concerned that in case the participating MSE is a partnership company having one of the partner belonging to SC/ST as above, whether benefit related to SC/ST owned MSE is to be accorded or not shall be notified subsequently pending which no related benefit will be accorded at present. g) GRSE, being a public sector enterprise, endeavours to support the Micro and Small Enterprises for facilitating their promotion and development and enhancing their competitiveness. Bidders may therefore procure all such parts / components, as contained in the list available on GRSE website, required in manufacturing of the ordered equipments / products, from MSEs and a certificate to that effect (with details of the vendors, value of procurement and quantity) may be furnished with the bills.” Note: 1. The Public procurement policy for Micro & Small Enterprises (MSEs) order, 2012’ and subsequent amendments/ guidelines / press publications/ circulars to the order, as issued by ministry of MSME, shall be applicable as on date of opening of the price bids. 2. The bidders are advised to check the website of ministry of MSME for details of the amendments / circular issued by the Ministry of MSME. 3. For Tendered item, within the same class of ships and GRSE reserve the right to award full / complete supply of total tendered value to MSE firm, if quoted price of MSE firm falls within price band indicated in MSE policy and if agree to match L-1 price (subject to approval of competent authority of GRSE). To avail the same, firm has to submit the valid MSE certificate along with techno-commercial bid.
16.	Dispatch: Before dispatch, firm is to ensure submission of detailed price break up and receipt of amended P.O. from GRSE with incorporation of GRSE material code and firm Part No. While despatching, each item should be identified with GRSE Code Number properly. Packing list will also indicate GRSE Code No. against each item and respective Box No. . Item of different LOTS (i.e., Main Equipment, OBS, Documentation) is mandatorily required to be packed in separate box. Material should be packed properly to prevent any damage, rusting, ingress of water, dust etc. Each consignment is to be supplied along with the following 05 copies of documents (not for Payment):- i. GST invoices (out of 05 No. 01 No. Original) ii. Delivery challan iii. Packing list iv. Copy of Pre-Despatch Inspection clearance certificate issued by relevant inspection agency v. Copy of Warranty certificate
17.	Submission of Drawing / QAP: Submission of Drawings / QAP (Quality Assurance Plan) shall be done by supplier as per SOTRs/TNC and within the time stipulated in SOTR/ tender delivery schedule.
18.	Payment Terms: (A) For Supply: (a) 90% of order value will be paid through ECS/NEFT within 30 days against online submission of GST e-invoice through OBPS portal (Online Bill Processing System portal) with Gate in entry report and acceptance of material i.e. ICGRN as appeared in OBPS portal. (b) In case SDBG is not submitted by the supplier, payment will be processed after deduction of equivalent amount and applicable interest @ SLR plus 2% p.a. for the delayed period of submission. (c) Balance 10% payment will be made through ECS/NEFT against online submission of claim invoice /claim letter through OBPS portal supported with receipt inspection certificate (ICGRN) as appeared in OBPS portal and Performance Bank Guarantee (PBG) as applicable in GRSE format having validity till expiry of the guarantee period else balance 10% will be release after expiry of guarantee period. Note: Soft copy of all the relevant documents like, Test Reports/Certificates, Guarantee Certificate, Packing list which may require for Receipt and Acceptance

Sl. No.	Terms and Conditions of GRSE tender
	of material at GRSE Store to be forwarded to concern dealing officer of NCM dept. prior to despatch of material. Non-submission of above documents (hard and soft copy) will liable for delay in process of payment. Part Supply & Part Payment: GRSE will prefer to receive the entire deliverables as per delivery schedule mentioned in the tender/P.O.. GRSE will discourage the part delivery and part payment, unless required urgently at GRSE and instructions given to bidder for urgent part delivery. (B) For Service: 100% through ECS/NEFT within 30 days against online submission of GST e-invoice through OBPS portal with work done/completion certificate in GRSE format duly certified by GRSE/SS (whichever is applicable) for the respective services and subject to compliance of labour laws and statutory dues where ever applicable. (C) For Training: 100% through ECS/NEFT within 30 days against online submission of GST e-invoice through OBPS portal with training completion certificate in GRSE format duly certified by GRSE/SS (whichever is applicable) for the respective services and subject to compliance of labour laws and statutory dues where ever applicable. Note: (i) All Vendors having turnover above Rs.5 Crore have to mandatorily submit E-Invoice. (ii) All Vendors having turnover below Rs. 5 Crore are also to submit E- Invoice/digitally signed invoice. (Vendors having turnover under Rs.5 Crore have option to created E-Invoice). (iii) Invoice in hard copy is not desirable. (iv) Gate in entry date will be treated as gate stamped date. (v) Work Done/Completion certifying authority must be atleast at the level of Dy. Manager
19.	Submission of Bills by supplier :- Suppliers/vendors to submit bills for payment complete in all respects along with all relevant documents as required as per terms of order, to Online Bill Processing System. Note: (i) All Vendors having turnover above Rs.5 Crore have to mandatorily submit E-Invoice. (ii) All Vendors having turnover below Rs. 5 Crore are also to submit E- Invoice/digitally signed invoice. (Vendors having turnover under Rs.5 Crore have option to created E-Invoice). (iii) Invoice in hard copy is not desirable. (iv) Gate in entry date will be treated as gate stamped date. (v) Work Done/Completion certifying authority must be atleast at the level of Dy. Manager A transition fee of Rs. 500/- will be charged in case of first return of bill(s) due to inappropriate/incomplete/faulty submission of documents. A transition fee of Rs. 1000/- will be charged in case of each subsequent return of the bill(s) for the same.
20.	Payment Mode: All the payments to indigenous bidders due shall be made through Real Time Gross Settlement (RTGS) / National Electronic Fund Transfer (NEFT).
21.	Liquidated Damage (L.D): In the event of delay in supply beyond the contractual delivery period, Liquidated Damages will be imposed @ ½% per week or part thereof, subject to a maximum of 10% of the undelivered portion of the order of the delayed part. The liquidated damage would be deducted from the invoice of supplier / vendor at the time of release of the payment.
22.	Risk Purchase: For unsatisfactory progress even before contractual delivery date or delay in delivery/service, GRSE shall have the right to cancel the part order/ whole contract and procure materials & services from alternative source completely at the supplier's risk and cost.

Sl. No.	Terms and Conditions of GRSE tender
23.	Option Clause: GRSE retains the right to place order for additional quantities up to a maximum of 50% of the originally contracted quantity against this tender, at the same rate and Terms and Conditions. Such an option shall be available during the original period of contracts.
24.	Additional Information: GRSE shall not be bound by any conditions or provisions in the sellers bid form or acknowledgement of contract, invoices, packing list and any other documents which purport to impose any conditions at variance with the tender/PO terms. Wherever bidders provide additional information/requirements in their response bid/offer to this NIT, GRSE may consider the same only if these are in line with NIT requirements, discussed by bidder in TNC/CNC and recorded in relevant Minutes of Meeting.
25.	Indigenization: OEM/Suppliers while participating in bid shall clearly indicate the indigenous content in % terms in the Commercial bid of the tender (in XI Sheet). (refer ANNEXURE - B (COMMERCIAL OFFER)). Bidders shall provide details on list of items being imported, proposed indigenization content, model and plan towards indigenization in their techno-commercial offer. The proposed indigenization plan shall be formulated in such a manner that there is a progressive increase towards indigenization as well as items from first ship set to the last. Note: Both Indigenous content % and location of adding indigenous content is to be mentioned and certificate from Competent authority as mentioned in e-portal is required to be submitted by firm.
26.	Taxes & Duties: Firm to confirm that GST rate and HSN/SAC Code for the quoted items indicated in techno-commercial bid as well as price bid.
27.	Exchange Rate Variation (ERV) Clause: All quoted price should be in INR only and Exchange Rate Variation (ERV) Clause is not applicable in this case.
28.	Custom duty reimbursement: Custom duty reimbursement is not applicable for the subject tender. Firm is to quote price inclusive of charges and firm is to mention the custom duty (in %) applicable against each items.
29.	Goods and Services Tax (GST): (a) If the vendor is registered under GST, vendor shall ensure timely submission of invoice as per the provisions / requirement / timeline promulgated by GOI in relation to GST Law with all required supporting documents to enable GRSE to avail input tax credit promptly. The vendor's invoice inter alia should contain GSTIN of vendor, GSTIN of GRSE, GST tax rate separately, HSN code wise goods or services, place of supply, signature of vendor etc. Original invoice needs to be submitted to Bill Receipt Centre at GRSE and a copy of the invoice should be given to the goods receiving section (GRSE). (b) If the vendor is registered under GST, vendor shall file all applicable returns under GST Laws in the stipulated time & any losses of tax credit to GRSE arising due to delay in filing will be recovered from their invoice wherever GRSE is eligible to avail tax credit. Any default towards payment of tax and / or uploading of monthly returns by supplier / contractor, GRSE retains right to withhold payments towards tax portion until the same is corrected and complied by the supplier / contractor with the requirement of GST along with satisfactory evidence. (c) The rate sheet enclosed with the tender will indicate the rates to be entered under each head wherever applicable. Bidders must clearly mention the applicable Taxes & Duties. (d) The Supplier/Seller must submit original tax invoice or debit note to GRSE(buyer) prior to the expiry of one year from the date of issue of tax invoice relating to such supply in order to avail Input Tax Credit by GRSE(Section 18(2) of CGST Act). Notwithstanding, the Supplier/Seller must submit original tax invoice or debit note for supply of goods or services or both, before the filing of the Return under Sec 39 of CGST Act for the month of September following the financial year to which such invoice/ debit note pertains. - Section 16(4) of CGST Act. In case of default by supplier, GRSE reserves the right not to reimburse GST amount of Invoice to supplier. (e) Break up of GST shall be indicated by the Seller while raising invoice / bill. While submitting the bill / invoice Seller shall undertake that the Goods and Services Tax (GST) charged on invoice/bill is not more than what is payable under the provision on the relevant Act or the Rules made there

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	under and that the Goods on which GST are charged have not been exempted under the GST Act or the Rules made there under and the charges on account of GST on these goods are correct under the provision of that Act or the rules made there under. (f) As per Sec 51 (1) of the CGST Act deduction of tax at source @ 2% (CGST 1% + SGST 1% or IGST @2%) on the payment made or credited to the supplier where total value of supply (supply of goods or service) under a contract exceed Rs. 2,50,000.00 excluding GST. Note: These are shipbuilding items hence applicable and payable GST rate may be @ 5% for item. Note: Concessional Rate of GST applicable for shipbuilding inputs (Applicable for Goods): a) As per sr.no. 252 of Schedule I annexed to Notification no.01/2017- Integrated Tax (Rate) /Central Tax (Rate) dt.28.06.2017 issued by MoF, Shipbuilding Inputs are charged at 5% GST for "Parts of goods of heading 8901, 8902, 8904, 8905, 8906, 8907" under "Any chapter". Thus, the rate of GST shall be 5% for item/s to be supplied falling under any chapter that will become part of ship/vessels under heading 8901, 8902, 8904, 8905, 8906, 8907 irrespective of whether it is a mixed supply or composite supply. b) On availing concessional rate of GST @ 5%, the vendor to indicate in the tax invoice the respective HSN Code of each item/s to be supplied as per CTH with a clarification note of the item description as (Parts of Ship (GRSE-Yard No: 41: GST applicable under Sl. No. 252 of Schedule-I of Notification No.1/2017-Integrated Tax (Rate) / Central Tax (Rate) dated 28th June, 2017) for charging 5% GST as parts of ship).
30.	Security Deposit Bank Guarantee (SDBG): (a) Separate SDs for 5% of order value excluding taxes, duties for Supply & Service component to be submitted. (b) SD for 5% of the Supply component of PO excluding taxes, duties shall be submitted by the successful bidder within 25 days from the date of transmission of PO payable in Indian Rupees shall be submitted. SD will be returned to successful bidder without interest within 4 weeks after satisfactory completion of delivery & acceptance for all line items in all respects. Hence, SD should be kept valid till such time. (c) SD for 5% of the Service component of PO excluding taxes, duties shall be submitted by the successful bidder within 25 days from the date of completion of delivery of equipment payable in Indian Rupees. SD will be returned to successful bidder without interest within 4 weeks after planned delivery date of respective ships. Hence, SD should be kept valid till such time. (d) SDBG shall be submitted in GRSE Format. (e) SD can be remitted directly to GRSE Bank Account. You shall specifically mention the details of company name as well as nature of remittance, tender number/order number etc. in the text/narration fields of Bank's NEFT remittance in order to identify the same. (f) Security Deposit can also be in the form of Bank Guarantee in favor of GRSE and shall be submitted within 25 days from the date of transmission of this order. (g) The Bank Guarantee shall be from Nationalised / Scheduled Banks or Banks of International repute excluding Co- operative banks. (h) In case of failure to submit the Security Deposit for the supply portion within 25 days of transmission of the order, GRSE reserves the right to cancel the order invoking the risk purchase clause. (i) In case delivery / completion are likely to be delayed, the validity of the SDBG shall be extended suitably till the completion of delivery on instruction from GRSE. (j) In the event of failure to submit the Security Deposit within 25 days of transmission of the order, but commenced the work, interest will be levied for the delayed period of submission @ Base Rate/MCLR declared by RBI (Median value applicable for public sector Banks) plus 2%. Also the same shall be applicable for delayed period of extension of validity. (k) SD will be returned without interest on completion of delivery and acceptance of items at GRSE for the respective orders and on written request from the supplier. (l) In the event of failure to execute the order satisfactorily, the Security Deposit will be encashed by GRSE. (m) In case of non-extension / non-renewal as requested, GRSE shall encash the BGs before expiry of its validity period. (n) GRSE's Bank Details: BANK NAME : STATE BANK OF INDIA

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	BRANCH NAME : COMMERCIAL ADDRESS : 24, PARK STREET, KOLKATA-700016 ACCOUNT TYPE : CASH CREDIT ACCOUNT ACCOUNT NO : 10945133828 MICR CODE : 700002120 IFSC CODE : SBIN0007502 (o) Micro & Small units registered under single point vendor registration scheme with NSIC will be required to submit SDBG. Note: (a) Bank Guarantee should be executed on the non-judicial stamp paper of Rs.100/- which should be obtained in the name of the executing Banker. Bank guarantee must explicitly mention GRSE SAP PO no. else B.G. will not be accepted. In case a single stamp paper of Rs.100/- is not available, stamp paper of multiple denomination is acceptable provided serial no. of such stamp paper are consecutive and are purchased on the same date. Bank Guarantee should be executed strictly as per GRSE's format. Any alteration in the writing is required to be authenticated by the signatory executing the Bank Guarantee under official seal. Hard copy/Original B.G. must be submitted by supplier's bank in banker's sealed envelope directly to dealing officer of Commercial dept/ordering dept. BG in PDF is to be uploaded by vendor in OBPS portal. Address: Kind attn.: (name and designation of the P.O. issuing authority), 61 PARK UNIT, Garden Reach and ship builders & Engineers Ltd, 61, Garden Reach Road, Kolkata – 700 024. (b) Direct Submission of BGs by the firm instead of bank may not be accepted.
31.	Performance Bank Guarantee (PBG): (a) Separate PBGs for 'Main Equipment & Tools' and 'OBS' (In GRSE format) for 5% of each part order value excluding taxes, duties shall be submitted along with the claim for balance payment of 10%. (b) PBGs shall be kept valid till completion of respective warrantee period plus one month. In case supply of items is delayed, PBG to be extended accordingly. GRSE also reserve the right to encash the PBGs for non-compliance of contractual obligation. (c) GRSE shall release balance 10% payment against submission of PBG(s) or after expiry of respective warranty period with no pending warranty obligation certificate issued by concern berth officer of GRSE. (d) The Performance Bank Guarantee in favour of Garden Reach Shipbuilders & Engineers Limited shall be from Nationalised / Scheduled Banks or Banks of International repute excluding Co-operative banks. (e) PBG shall be submitted after completion of Delivery of Equipment. Note: (a) Bank Guarantee should be executed on the non-judicial stamp paper of Rs.100/- which should be obtained in the name of the executing Banker. Bank guarantee must explicitly mention GRSE SAP PO no. else B.G. will not be accepted. In case a single stamp paper of Rs.100/- is not available, stamp paper of multiple denomination is acceptable provided serial no. of such stamp paper are consecutive and are purchased on the same date. Bank Guarantee should be executed strictly as per GRSE's format. Any alteration in the writing is required to be authenticated by the signatory executing the Bank Guarantee under official seal. Hard copy/Original B.G. must be submitted by supplier's bank in banker's sealed envelope directly to dealing officer of Commercial dept/ordering dept. BG in PDF is to be uploaded by vendor in OBPS portal. Address: Kind attn.: (name and designation of the P.O. issuing authority), 61 PARK UNIT, Garden Reach and ship builders & Engineers Ltd, 61, Garden Reach Road, Kolkata – 700 024. (b) Direct Submission of BGs by the firm instead of bank may not be accepted.
32.	Progress Report Supplier will submit progress report/ bar chart initially within 1 months from the date of receipt of order and thereafter on monthly basis.
33.	Obsolescence / After Sales Support: Spares support for a period of 25 years from the date of commissioning of the ship is to be provided by the supplier to GRSE. In case of discontinuation of the

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	model, adequate advance notice is to be given to GRSE by Supplier. Repair/maintenance/service is to be provided by the firm at all major ports of India for a period of 25 years at extra cost from the date of delivery of the ship.
34.	Product improvement: The supplier agreed to incorporate any improvement in the equipment either during the period of manufacturing or until commissioning of the ship on which equipments are fitted and such improvement shall be incorporated in this supply, free of cost.
35.	Packing & Forwarding : Shall be arranged by Supplier at their cost. However, Supplier to ensure that all materials are properly packed (Spares in PIP in a separate box) to withstand transit damage / pilferage during transit. All OB Spares and B&D Spares are to be supplied in PIP Packing. OB Spares, B&D Spares and tools are to be supplied in separate boxes with clear identification and part numbers in metallic or plastic tag with identical description in the respective packing list(s). Each box shall have a separate packing list attached with the detailed description mentioned and marking done on it. Supplier's representative is required during receipt inspection of loose items, accessories, spares and tools for easy identification and detection of shortfall. Packing List of Supplier shall compulsorily indicate the GRSE item codes and respective Supplier Item codes for each of the supplied items.
36.	Preservation / De-preservation: Preservation/de-preservation/re-preservation, if applicable shall be conducted as per SOTRs and as agreed vide MOM of TNC.
37.	Transportation, Way Bill & Delivery of Material:- Materials are to be dispatched by road. Way bill: As per notification of GST council, online waybill has to be generated through GST waybill portal from 01.04.2018. Now supplier/ authorized transporter can generate online waybill. Invoice must incorporate value of goods, amount of taxes separately as well as GST registration no. Consignment note must incorporate relevant Invoice no./date. Transport charges will be borne by the firm. Material to be delivered in store with 4 copies invoice with MTC & GC, and Inspection release note (if applicable). Delivery Location: Before dispatching supplier to contact before 2-3 days to obtain delivery location/store.
38.	DISPUTE RESOLUTION MECHANISM (DRM):- a) Any dispute/differences between the parties arising out of and in connection with the contract shall be settled amicably by mutual negotiations. b) In case of non-settlement by (a) above, if at any time, before, during or after the contract period any unsettled claim, dispute or difference arose between the parties, upon or in relation to or in connection with or in any way touching or concerning this tender/agreement/order/contract, the same shall be referred to the concerned Functional Director. c) The Functional Director shall then nominate an Executive of the rank of General Manager whom he thinks fit and competent or a Committee of Executives who/which shall then scrutinize the claims/disputes that have been referred to the concerned functional Director and make efforts for amicable settlements by mutual discussions/negotiations. d) In case no amicable settlement is arrived by (b) above within a period of three months, then the Supplier/Contractor shall approach Public Grievance Cell and address the disputes as per the provisions made under the relevant clause of the contract. e) In case the issues/disputes do not get settled within a period of six months from the date of submission of the dispute to the Grievance Cell, then the Supplier/Contractor may invoke Arbitration Clause of the contract.
39.	Arbitration: i. If at any time, before during or after the contract period, any unsettled claim, question, dispute or difference arises between the parties, upon or in relation to or in connection with or in any way touching or concerning this order, the same shall be settled/adjudicated through Arbitration to be conducted by a Sole Arbitrator, to be appointed by the parties on mutual consent, in accordance with the provisions of the Arbitration and Conciliation Act, 1996.

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	ii. In the event the parties fail to mutually appoint a Sole Arbitrator within days from the receipt of a request by one party from the other, then either of the parties may approach the Hon'ble High Court at Calcutta under the provisions of the Arbitration and Conciliation Act, 1996 for appointment of a Sole Arbitrator by the Hon'ble Court. iii. Such arbitration shall, in all respects, be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996 and the rules framed there under or any statutory modification or re-enactment thereof for the time being in force. iv. The Award of the Sole Arbitrator shall be final, conclusive and binding upon the parties. v. In the event of the death or resignation or incapacity or whatsoever of the said Sole Arbitrator if appointed by the parties mutually the said parties may again appoint a suitable Substitute Arbitrator in place of the erstwhile Sole Arbitrator to continue with the proceedings. In the event of appointment of the Sole Arbitrator by the Hon'ble High Court at Calcutta on death or resignation or incapacity or whatsoever of the said Sole Arbitrator, either of the parties in this behalf, may make an application to the Hon'ble High Court at Calcutta for appointment of a Substitute Arbitrator and the Hon'ble Court may pass such orders as it deems fit and proper. vi. Also in the event an Arbitration award is set aside by a competent court the parties may appoint a Sole Arbitrator mutually or on failing to appoint a Sole Arbitrator mutually within the statutory period then either of the parties may file an application before the Hon'ble High Court at Calcutta under the provisions of the Arbitration and Conciliation Act, 1996 for appointment of a Sole Arbitrator by the Hon'ble Court in accordance with the provisions of the Arbitration and Conciliation Act. vii. The cost of the arbitration, fees of the arbitrator, remuneration of the stenographer and clerk, stamp paper etc. shall be shared equally by the parties, unless otherwise directed by the Sole Arbitrator. The venue of arbitration shall be at Kolkata and unless otherwise decided by the parties or by the Sole Arbitrator himself, the venue shall be the premises of Garden Reach Shipbuilders & Engineers Ltd. located at 43/46, Garden Reach Road, Kolkata 700 024. viii. The language of the proceeding shall be in English."
40.	Foreclosure: If at any time after acceptance of the order and during execution of Contract, GRSE may decide to abandon/reduce the scope of the supply for any reason whatsoever and hence not require the whole or part of the supply to be carried out, GRSE shall give notice in writing to that effect to the Supplier and the Supplier shall act accordingly in the matter. The Supplier/contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the supply in full, but which he did not derive in consequence of the foreclosure of the whole or part of the Contract/Order. The Supplier shall be paid at contract rates full amount for supply executed till the date of issue of foreclosure notice. Provided always that against any payments due to the contractor on this account or otherwise, GRSE shall be entitled to recover or be credited with any outstanding material due from the Supplier for advance paid in respect of any materials and any other sums which at the date of termination were recoverable by GRSE from the contractor under the terms of the contract.
41.	Rejection Replacement: Any equipment found defective/rejected, Supplier will collect the same from GRSE Stores, all incidental charges to be borne by them, within days from the date of intimation to Supplier of such rejection. GRSE reserves the right to dispose of the rejected items at the end of a total period of 90 days in any manner to the best advantage to GRSE & recover storage charges and any consequence damage from sale proceeds of such disposal.
42.	Individuality of Contract: This order shall be treated as an individual contract, shall not allow any general lien to the portions and shall not get any prejudice in execution due to situation arising out of some other contract that supplier may have entered into with GRSE.
43.	Governing Jurisdiction: All contracts shall be deemed to have been wholly made in Kolkata and all claims there under are payable in Kolkata City and it is the distinct condition of the order that no suit or action for the purpose of enforcing any claim in respect of the order shall be instituted in any Court other than that situated in Kolkata City, West Bengal State, India.

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44.	Order Acknowledgement: The supplier will acknowledge the Order within 7 days of its receipt by them. If no contrary advice is received within that period it will be deemed to have been accepted by you.
45.	Firm confirm whether they have registered with SSI / NSIC / MSE / GRSE / NONE. If yes, request indicate category alongwith supporting certificate Please tick (✓) is whichever is applicable 1. SSI 2. NSIC 3. Micro or Small 4. GRSE 5. NONE
46.	In case Micro or small enterprises, owned by SC/ST entrepreneurs. Request Enclose supporting certificate and tick (✓) in yes, otherwise tick (✓) in no (not owned by SC/ST entrepreneurs). Please tick (✓) is whichever is applicable 1. Yes 2. No Supporting document to be attached
47.	In case Micro or small enterprises, owned by Women entrepreneurs. Request Enclose supporting certificate and tick (✓) in yes otherwise tick (✓) in no (not owned by Women entrepreneurs). Please tick (✓) is whichever is applicable 1. Yes 2. No Supporting document to be attached
48.	Loading for Deviations in Tender Terms and Conditions. As a matter of policy deviation to tender's Terms & Conditions shall not be allowed. However, in extreme emergent cases, certain deviations to Terms and Conditions may be allowed with loading on price as per GRSE policy. The total loading on price due to deviations shall be intimated to the bidder.
49.	Bid modification: Firm will not request for modification of bids, after tender closing date & time.
50.	Revised Bid: During technical and/or commercial negotiation, in case the participating vendor indicate the need of submission of revised price bid but the same is not acceptable by the competent authority in due course, GRSE reserves the right to consider such bid to be disqualified on the ground under intimation to the relevant vendor before price bid opening.
51.	Integrity Pact: The Integrity pact essentially envisages the agreement between prospective vendors / bidders & buyers committing the person/officials of both the parties not to exercise any corrupt influence on any aspects of the contract. Only those vendors/bidders who enter into such an integrity pact with the buyer would be competent to participate in the bid. The format of integrity Pact is enclosed with tender documents. Refer Annexure-VIII. The 'Integrity pact' dully filled as per enclosed format is to be submitted along with the offer such that the ink-signed copy reaches GRSE before scheduled tender opening. Bidders are to ensure that every page of IP is ink signed and company seal/stamp is affixed on the document. Non-submission of Integrity pact in GRSE format shall lead to REJECTION of offer.
52.	Independent External Monitors (IEM): Either or both of the following Independent External Monitors (IEMs) will have the power to access the entire project document and examine any complaints received by him.

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		Shri Lov Verma, IAS (Retd.), B-12, Second Floor, Green Park Extension, Near Uphar Cinema, New Delhi – 110016 Email: lov_56@yahoo.com	Shri Debashis Bandyopadhyay, Ex- Director (HR), BHEL B1001 Prateek Wisteria, Sector 77, Noida Uttar Pradesh – 201301 Email: debashis9999@gmail.com
53.	Validity of Offer: Offer is valid for 180 days from the date of tender opening.		
54.	Two Parts Bid Clause: The Offers must be submitted in two parts: (a) Part I (Techno Commercial Bid): No price should be mentioned in this bid or offer will be liable for rejection. The bidder shall ensure following to include in the Part-I bid: (i) Company Profile and Shop & Establishment registration certificate or registration certificate from local bodies for conducting business. (ii) List of equipment held by them with model / year / working status along with details of their manufacturing facilities and personnel with designation, qualification and experience to determine their capabilities. SSI/NSIC units can alternatively submit valid certificate indicating their capacity. (iii) Audited / Certified Balance sheet, Profit / Loss account for past three (03) years. (iv) Value of supplies during last three (3) years. (Order copies & work completion certificates to be attached). (v) Details of company registration with GRSE/MDL/DQA (N)/ DQA (WP), Past Experience etc. (vi) Drawing, Compliance Matrix/ Deviation format duly signed by the authorized signatory. (vii) Weight control Data sheet if applicable. (viii) Acceptance on clauses of Tender Enquiry, Special Terms and Condition and STACS in the prescribed formats duly 'Accepted OR Not Accepted' as applicable and deviations, if any, for each of the clause. (ix) Break up of prices for various components of supply/services shall be indicated in terms of percentage (%) in Part-I bid of the cost of items, if applicable. (x) Undertaking for product support if applicable. (xi) Bank details for payment by RTGS/NEFT in the format enclosed. (xii) Bidders / Suppliers should enclose the additional documents as applicable to this tender. (xiii) Techno-Commercial bid indicating quoted/not quoted against each line item and Deviation, if any. (xiv) Bidder contact details with office address, contact person name, e mail, phone no. of 3 persons including head of organization. (xv) Firm to submit the signed and stamped copy of the SOTR along with the bid and to be filled up properly. (xvi) Prices are not to be mentioned/ indicated in Part-I bid. Indication of price/Deviation will liable for rejection of bid. (xvii) Firm to submit the declaration enclosed at Annexure IV along with the bid. (xviii) It is mandatory to mention Firm's name, contact No., name of contact person, e-mail id, firm's address and offer reference in technical bid, SOTR compliance Matrix, Commercial bid, Special terms & condition matrix etc. Part-II (Price Bid): Prices for each of the listed items have to be uploaded strictly in the prescribed format provided in the e portal. Bids received other than this given format will be rejected		
55.	Bid Rejection Criteria: (a) Bids will be categorically rejected under following criteria: (i) Bid received other than through e-Portal. (ii) Bidder not agreeing to accept Integrity Pact(IP) or submitting integrity pact with deviation to GRSE format, wherever Integrity Pact is to be submitted.		

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	(iii) Bidder is not complying with Drawing and SOTR requirement. (iv) Bidder not agreeing to provide assistance wherever required for installation, commissioning, STW, HATs, SATs of equipment supplied by them and any other assistance required till successful delivery of Ships. (v) EMD & Tender fee not received for Open tender/Global tender if applicable unless specific exemption is sought for the approval of Competent Authority. (vi) If the firm is under tender Holiday by any Defense PSU/ other PSU/GOI. Bid will be rejected on receipt of such information during processing or before finalization of tender. (vii) Firm's having poor performance w.r.t to timely delivery of ordered items in last 2 years (as per opinion of GRSE) or If the firm is issued with "Risk Purchase Notice" by GRSE for any project within last 2 years or before opening of this tender for failure in delivery of similar items (as per opinion of GRSE). (viii) Bid submitted other than INR. (b) Bids are Liable for Rejection under following criteria: (i) Failure to submit sufficient or complete details for evaluation of the bids within the given period which may range in between two to three weeks depending on the deficiencies noticed in the drawings / technical data which shall not however conflict with validity period. However, over all time allowed in respect of normal procurement shall not exceed 3 weeks. (ii) Incomplete / misleading / ambiguous bids in the considered opinion of TNC/CNC. (iii) Bidder not complying with the Pre-Qualification criteria stipulated in Tender/TSP. (iv) Bidder not agreeing to supply spares (On Board spares, B&D spares) if applicable / post sale product support / post work completion support if required. (v) Bid with technical requirements and or terms not acceptable to GRSE/Customers/External agency nominated as applicable. (vi) Unreasonably longer delivery period quoted by the bidder. (vii) Validity period indicated by bidders is shorter than that specified in the tender enquiry. (viii) Bidders not agreeing to furnish required Security Deposit till validity of contract/PO or Indemnity Bond in case of PSU or variation in quantum of Security Deposit as mentioned in the tender. (ix) Bidder not agreeing to furnish required Performance Bank Guarantee for Equipment to be supplied/Services rendered or not agreeing for retention of equivalent amount by GRSE up to the period till completion of contractual & Warranty obligations or variation in quantum of PBG. (x) Bidder not agreeing for Warranty period as specified in the tender. (xi) Bid received without 'Certificate of conformity' duly filled in & signed, if applicable. (xii) If the bidder had been declared as insolvent/bankrupt/prohibited in the recent past and or is under scanner of any statutory bodies, they must confirm their present status in that respect with adequate supporting documents. Non submission of adequate document or if submitted document is not acceptable, the bidder shall be liable for rejection. (xiii) Quote received with Price Variation Clause. (xiv) Bid received without pre-qualification documents where required as per the tender. Bids not meeting the pre- qualification parameters stipulated in the tender enquiry. (xv) In case bidder has uploaded scanned image of Integrity Pact (IP) but original copies of IP are not submitted to GRSE within 07 working days from tender closing date. (xvi) Bidder does not agree to provide warranty extension. (xvii) Bidder does not quote for all line items where it is mandatory to quote as such. (xviii) Bidder not complying the GRSE's indigenization policy. (xix) The Bid received without scanned image of IP along with the Part-I offer. However, in case the bidder has prepared IP but could not upload in the e- Portal and submits original IP within seven GRSE working days from tender closing date, then such bids shall be accepted.

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	(xx) Any deviation is sought which are not acceptable to GRSE (xxi) Bidder has submitted more than one offer. (xxii) Bidder has submitted offer than their offer (xxiii) Bidder nor responding to GRSE quarries, not attending TNC/CNC/PNC meeting within the stipulated date. (xxiv) Bidder requested for modification of bid post tender closing and the same is not acceptable to GRSE. (xxv) If the firm is issued with "Risk Purchase Notice" by GRSE for any project within last 2 years or before opening of this tender for failure in delivery of similar items (as per opinion of GRSE). (xxvi) Indicating price in technical bid.
56.	<u>Instruction for New / Unregistered Vendors:-</u> New / Unregistered vendors to positively submit the following qualification criteria in Part –I bid, failing which their offer will not be consider further for tender evaluation. (a) Submission of the constitution and status of the firm. (b) Registration with GOI/PWD/PSU/and reputed organization, if any. (c) Experience of supply / manufacture during last 2/3 years of tendered item. (P.O. copy & performance certificate of reputed customers to be enclosed). (d) Submission of GST registration certificate, PAN /TIN together with copies of trade license. (e) Copy of Audited Balance Sheet and Audited Profit & Loss Account for last three years and Solvency Certificate from Banker. (f) Name, address, telephone & Fax No. of the bankers and the contact person of the firm. (g) Hierarchy of the firm (at least 3 person name to be mentioned in Commercial bid). (h) Scanned copies of the above documents are to be attached along with the techno-commercial bid. The original are to reach to the tendering authority / undersigned within the due date and time and failing which offer is liable to be rejected.
57.	<u>Instruction for All Vendors:</u> (a) Your offer should be submitted within the scheduled date and time as mentioned in this tender. (b) Techno-Commercial Bid will be opened on the scheduled date and time through e- portal. (c) Price Bid will be opened on later date, after scrutinizing the Techno-Commercial bid. Price bid of those firms will only be opened, whose offer will be found suitable after technical & commercial evaluation. (d) As a general rule price negotiation with L1 vendor(s) will not be entered into as far as possible, unless warranted by unreasonable price quoted in the opinion of GRSE. (e) To avoid any complication regarding late receipt or non-receipt of offer, it is to be clearly noted that responsibility is lying with the tendered to ensure that the offer is submitted within the due date and time. (f) This tender is being issued without any financial commitment and GRSE reserves the right to change or vary the quantity of item, at any stage during execution the order. GRSE also reserves the right to withdraw this tender, if so necessary at any stage. (g) Supplier to submit the tender fees and EMD prior to tender closing due date (if not exempted). (h) Suppliers/vendors to submit bills for payment complete in all respects along with all relevant documents as required as per terms of order, to the bill receiving counter located at the gate of each unit of GRSE. For submission, of each Bill is to be packed in sealed envelope superscribing the following details on the envelop: - Purchase Order No. - Vendor Code (As per PO) - Bill No/ Invoice No. - Name of the person/ employee to whom bill is addressed for processing - A transition fee of Rs. 500/- will be charged in case of first return of bill(s) due to inappropriate/incomplete/faulty submission of documents. A transition fee of Rs. 1000/- will be charged in case of each subsequent return of the bill(s) for the same.

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58.	<u>Miscellaneous Instruction to bidder:</u> (i) Tender document to be downloaded from e-Portal (ii) Offer in filled e-format is to be uploaded in e- Portal. Tender opening can be witnessed in e- portal . (iii) If there are any clarifications, this may be obtained online through the tender site. (iv) Bidder should take into account the corrigendum published before submitting the bid online. (v) It is construed that the bidder has read all the terms and conditions before submitting their offer. Bidder should go through the tender schedules carefully and upload the documents as asked; otherwise, the bid will be rejected. (vi) Bidder shall submit the compliance matrix, STACs & GT&C Accepted/Deviation Format properly. If any field under Accepted/Deviation columns is left blank, then it shall be considered as accepted by the bidder. (vii) If there are any clarifications, this may be obtained through the site, or during mail. Bidder should take into account the corrigendum published in GRSE web site from time to time before submitting the online bids. (viii) Bidder is requested to resolve all the tender related queries during pre bid meeting or prior to tender closing date. GRSE reserves the right to accept, clarify or reject the quarries raised by the bidder.
59.	Acceptance: The Acceptance matrix/formats are to be downloaded from the tender e-portal and after due completion the same is to be uploaded along with the e-quotation by the bidder/vendor. This is to facilitate the buyer to know at a glance the acceptance or deviation by the vendor regarding the commercial terms & conditions of the e-tender. The following is to be complied:- (a) The supplier should clearly indicate the clauses in the specification not being complied with (if any). In the absence of a clear non-compliance/non-acceptance statement, it will be assumed that the material supplied will meet the requirements in full. (b) No conditional offer and hard copy of offer will be accepted. (c) Tender must contain offers/response for all line items as sought.
60.	Purchase Preference for Make in India/Indigenisation. GRSE's Indigenization policy is enclosed with e- Tender for information and necessary action. The tendered item is non-divisible for the purpose of Purchase Preference for Make in India and within the same class of ships, GRSE reserve the right to award full / complete supply of total tendered value to class-1 local supplier, if quoted price of class-1 local supplier falls within price band indicated in Purchase preference for Make In India policy and rest as per Purchase preference for Make in India Policy.
61.	Recording of Deviations/Conditions: GRSE will consider the response to NIT Terms only. If any deviation/ additional points given by the bidder or deviation of any terms and conditions, information or clarification is furnished by the bidder has to be discussed and recorded as per mutually agreed terms in relevant PNC/CNC/TNC MoM for GRSE to consider the same at a later stage
62.	Issuance of Free Issue Material (if any) to firm: (a) Free issue material required (if any, finalized during Technical negotiation) will be supplied by GRSE against submission of Bank Guarantee of equivalent amount (shall be intimated after placement of P.O.) to remain valid upto complete return of free issued item to GRSE, Kolkata. Firm is to provide a Bank Guarantee as per GRSE format and Guidelines as security for issue of material. (b) Collection of free issue item from GRSE, Kolkata and subsequent delivery of the same to GRSE, Kolkata is to be arranged by the supplier at their risk and cost. It will be firm responsibility to arrange Way Bill (if required any). (c) After placement of P.O., minimum days in advance from the actual requirement, firm will approach GRSE (along with the Bank Guarantee in GRSE Format) for issuance of material. (d) Intimation will sent to the firm for collection of Item from GRSE and firm will collect the same within 07 days from GRSE. (e) Items issued by GRSE to the firm as a free issue material, will be returned by the firm to GRSE, Kolkata within the Contractual delivery date of the P.O.. In case firm failed to deliver the total returnable items, GRSE will be entitled to encash the bank Guarantee of amount equivalent to the undelivered items. Therefore, for reconciliation, it is imperative that all free issued material will be weighted at GRSE during collection and delivery of

Sl. No.	Terms and Conditions of GRSE tender
	the material. BG will be released after reconciliation of the order.
63.	CANCELLATION OF ORDER: a) The Purchaser reserves the right to cancel an order forthwith without any financial implications on either side, if on completion of 50% of the scheduled delivery/Completion period the progress of manufacture/Supply is not to the satisfaction of Purchaser and failure on the part of the Bidder/Supplier/Contractor to comply with the delivery schedule is inevitable. In such an event the Supplier shall repay all the advances together with interest at prevailing bank rates from the date of receipt of such advances till date of repayment. The title of any property delivered to Purchaser will be reverted to the Supplier at his cost. b) In case of breach / non-compliance of any of the agreed terms & conditions of order / contract. GRSE reserves the right to recover consequential damages from the Supplier on account of such premature termination of contract. c) In case of delay beyond agreed period for liquidated damages or 10 weeks from contractual delivery period or unsatisfactory progress before contractual delivery period, GRSE reserves the right to cancel the order and procure the order items / services from any available source at GRSE's option & discretion and entirely at your risk and cost. Extra expenditure incurred by GRSE in doing will be recoverable from Supplier.
64.	STACS: All other terms and conditions will be applicable as per GRSE's latest STACS Ref. No. GRSE STACS –PE-INDG (August – 2006).
65.	All terms and conditions of NIT has been accepted by the firm and there is no deviation/ additional comment taken from the tender.

Annexure – VII

Registration Requirement (DPIIT)

TO BE SUBMITTED IN BIDDER'S LETTER HEAD

- I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. The Competent Authority for the purpose of registration shall be the Registration Committee constituted by the Department of Promotion of Industry and Internal Trade (DPIIT).
- II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- III. "Bidder from a country which shares a land border with India" for the purpose of this order means:-
- An entity incorporated, established or registered in such a country; or
 - A subsidiary of an entity incorporated, established or registered in such a country; or
 - An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - An entity whose beneficial owner is situated in such a country; or
 - An Indian (or other) agent of such an entity; or
 - A natural person who is a citizen of such a country; or
 - A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.
- IV. The beneficial owner for the purpose of (iii) above will be as under:
- In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.
- Explanation –
- "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company;
 - "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
- In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
 - In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;
 - Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
 - In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
- V. An agent is a person employed to do any act for another, or to represent another in dealings with third person.
- VI. **The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.**
- VII. **All Bidders must submit Certificate in their letterhead as per following format.** If the Bidder is registered with Competent Authority, the Registration Certificate along with the Certificate in following format is to be submitted in their techno-commercial (Part-I) bid. The Registration Certificate shall be valid at the time of submission of bids and at the time of acceptance of bids.

Certificate in Letterhead of Bidder:

"I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this bidder is not from such a country or; if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder is not from such a country and is eligible to be considered."

TO BE SUBMITTED IN BIDDRR'S LETTER HEAD

FORMAT FOR UNDERTAKING/ DECLARATION, TO BE FURNISHED ON COMPANY LETTER HEAD WITH REGARD BLACKLISTING/ BANNED/ISSUE OF TENDER HOLIDAY/ RISK PURCHASE NOTICE

Ref: GRSE Tender No.

To

Garden Reach Shipbuilders & Engineers Ltd.

43/46 Garden Reach Road

Kolkata-700024

We hereby confirm and declare that we M/s., registered office at and factory athas not been blacklisted/ de-registered/ debarred/ under tender holiday by any Government Department/ PSU/DPSU for which we have undertaken the works/service during last 5 (five) years ending at Tender closing date.

We are also hereby declare that we have not been issued with any Risk Purchase Notice by Garden Reach Shipbuilders & Engineers Ltd, for non-fulfillment of delivery commitment of similar item for any project during last 2 years ending on (Tender Closing date)

For:

Authorised Signatory.....

Stamp.....

Date.....

Place.....

TO BE SUBMITTED IN BIDDER'S LETTER HEAD**ACCEPTANCE OF FALL CLAUSE**

Reference tender no with date	
Our offer no with date	

We , M/s **Company Name** undertakes that we have not supplied/ is not supplying similar product/systems or subsystems at a price lower than that offered in the present bid in respect of any other Ministry/Department of the Government of India or PSU and if it is found at any stage that similar product/systems or sub systems was supplied by us to any other Ministry/ Department of the Government of India or a PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the BIDDER to the BUYER, if the contract has already been concluded.

Concern person name	
Contact Details	
Contact email id	
Address of the organization	
Signature with stamp	

FORMAT NO. QS/03/0019

PROFORMA OF BANK GUARANTEE TOWARDS SATISFACTORY PERFORMANCE

THIS DEED OF GUARANTEE made thisday ofBETWEEN.....(hereinafter called " THE BANK ") which expression shall unless excluded by or repugnant to the context , be deemed to include its successors in office and assigns of the ONE Part and GARDEN REACH SHIIPBUILDERS AND ENGINEERS LIMITED , having their Head OfficeAt 43/46 , Garden Reach Road , Calcutta – 700024 (hereinafter called " THE BUYERS ") which expression shall unless excluded by or repugnant to the context be deemed to include their successors in Office and assigns of the part WHEREAS Messershaving its registered office at(hereinafter called " THE SELLER ") have accepted an Order No.for supply offrom the Buyer to manufacture and deliver the same to Buyer in good condition .

AND WHEREAS it is one of the terms of the said order that the seller shall furnish to the Buyer a Bank Guarantee comprising% of the value of the order amounting to Rs. (Rupees..... only) for the satisfactory performance of the equipments supplied against the said order at least for a period of from the date of supply i. e. fromAND WHEREAS the Buyer has agreed to accept such Bank Guarantee .

NOW THIS INDENTURE WITNESSETH THAT in consideration of the premise the Bank hereby unequivocally undertakes and agrees with the Buyer to pay to the Buyer upon demand in writing whenever required so by them to do and within a fortnight from date of such demand sum or sums not exceeding in the whole of Rs.(Rupees..... only) as may become payable to the Buyer by the seller by virtue of or arising out of the Terms and Conditions of the said Order.

Provided it is hereby expressly stipulated and agreed that if any question as to whether any sum has become payable by the seller to the buyer by virtue of or arising out of the said order, the decision of the Buyer will be final and conclusive and the Guarantee herein contained shall not be revocable by notice or by reason of dissolution or winding up of the business of the seller of any change in the constitution or composition of the seller's business and the liability of the bank under this presents shall not be impaired in any way by any extension of time or alteration made given conceded in the conditions of the said order or any other indulgence given by the buyer or by reasons of any failure on the part of the Buyer to enforce any of their remedies against the sellers and / or by reasons of failure on the part of the Buyer to observe or perform any of the stipulation contained in the said order and to be observed or performed by the sellers or by any other dealings between the Buyer and Seller whether any of the above takes place with or without the knowledge of the Bank and that the Guarantee herein contained shall remain in full force and virtue only . All claims and demands of the Buyer arising out of or in connection with the said order have been fully paid and satisfied PROVIDED ALWAYS AND IT IS HEREBY AGREED BETWEEN THE PARTIES THAT a Bank's liability under this Indenture shall remain in full force from the date of issue of the Guarantee till..... and is limited to a sum of Rs.(Rupees.....)only.

NOTWITHSTANDING anything stated above our liability under the Guarantee is restricted to Rs (Rupees..... only). Our Guarantee shall remain in force upto.....and unless a claim or demand in writing is made on the bank within 6 months from the date of expiry of the Bank Guarantee the bank shall be released and discharged from all liabilities thereunder.

Date :200

Signature of Bank's Authorised
Signatories with Code No., Name,
Designation and Bank Stamp

GARDEN REACH SHIPBUILDERS & ENGINEERS LIMITED

43/46, GARDEN REACH ROAD
KOLKATA – 700 024.

FORMAT OF BANK GUARANTEE TOWARDS SECURITY DEPOSIT.

Ref : 1. BPE Notification No. BPE/G:032/78/1(4)/Adv(F)/69 dated 24.10.78.
2. F.No.0(7)/B.O.III/75 dated 2.11.77.

GUARANTEE BOND

(to be used by all scheduled banks)

1. In consideration of M/s. Garden Reach Shipbuilders & Engineers Limited, 43/46, Garden Reach Road, Kolkata – 700 024(hereinafter called "The Buyer") having agreed to exempt M/s..... (hereinafter called "The Party") from the demand,under the terms and conditions contained in the Tender/ Purchase order no.....dated (hereinafter called "the said Tender/ Order") of security deposit for the due fulfillment by the said Party's of the terms and conditions contained in the said Tender,on production of a Bank Guarantee for Rs..... (Rupees.....only), we Bank Limited (hereinafter referred to as "the Bank") do hereby undertake to pay to the Buyer an amount not exceeding Rs..... against any loss or damage caused to or suffered by the Buyer by reasn of breach by the said Party of any of the terms or conditions contained in the said Tender.
2. We.....Bank do hereby undertake to pay the amounts due and payable under this Guarantee without any demur, merely on a demand from the Buyer stating that the amount claimed is due by way of loss or damage caused, to or would be caused to or suffered by the Buyer by reason of any breach by the said Party of any of the terms or conditions contained in the said Tender or by reason of the Party's failure to perform the said Tender. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the bank under this guarantee.
3. We.....Bank Limited further agree to the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Tender. Order and that it shall continue to be enforceable till all the dues of the Buyer under or by virtue of the said Tender/Order have been fully paid and its claims satisfied or discharged or till the Chairman & Managing Director, Garden Reach Shipbuilders & Engineers Limited, certifies that the terms & conditions of the said Tender have been fully and properly carried out by the said Party and accordingly discharges the Guarantee. Unless a demand or claim under this Guarantee is made on us in writing on or before the..... we shall be discharged from all liability under this Guarantee thereafter.
4. We.....Bank Limited further agree with the Buyer that the Buyer shall have the fullest liberty without our consent and without affecting in any manner our our obligations hereunder to vary any of the terms & conditions of the said Tender/Order or to extended time of performance by the said party from time to time or to postpone for any time or from time to time any of the powers exercisable by the Buyer against the said Party and to forbear or enforce any of terms and conditions relating to the said Tender/Order and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Party or for any for bearance, act or omission on the part of the Buyer or any indulgence by the Buyer to the said Party or by any such matter of thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.
5. We.....Bank Limited lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the Buyer in writing.
6. Notwithstanding anything contained here in above, the liability of the Guarantor under this Guarantee is restricted to Rs..... (Rupees.....only) and that this Guarantee shall remain in force until its expiry on the(date), unless a suit or action to enforce a claim under this Guarantee is made against the Guarantor within six months from the date of expiry, all the rights of the beneficiary under the said Guarantee shall b released and discharged from all liabilities thereof.

ForBank Limited.

(seal)

Dated theday of200.....

GARDEN REACH SHIPBUILDERS & ENGINEERS LTD

(A Govt. of India Undertaking)

43/46, Garden Reach Road, Calcutta- 700 024.

Fax : 033-469-8150/2020 ; Telephone : 469-8100 to 8113

STANDARD TERMS AND CONDITIONS OF SUPPLY

(INDIGENOUS EQUIPMENT / MACHINERY)REF. NO. GRSE-STACS-PE-INDG (AUGUST, 2006)**INDEX**

1. GENERAL
2. QUOTATIONS AND ORDER ACCEPTANCE TERMS
3. PACKING, SHIPPING, INSURANCE & FREIGHT DETAILS, AND DELIVERY
4. GUARANTEE / WARRANTY
5. QUALITY CERTIFICATION
6. TERMS OF PAYMENT
7. QUALITY ASSURANCE, INSPECTION, TESTING AND COMMISSIONING ASSISTANCE
8. MISCELLANEOUS

ANNEXURE:

- A. STACS ACCEPTANCE FORMAT
- B. EMD BANK GUARANTEE FORMAT & GUIDELINE
- C. SECURITY DEPOSIT BANK GUARANTEE FORMAT & GUIDELINE
- D. PERFORMANCE BANK GUARANTEE FORMAT & GUIDELINE
- E. ECS FORMAT FOR BANK PARTICULARS & PAYMENT PROCEDURE

IN-1	GENERAL	
IN-101	The word ' Purchaser ' refers to GARDEN REACH SHIPBUILDERS & ENGINEERS LIMITED, (GRSE), a Company registered under the Indian Companies Act 1913 and includes its successors or assigns.	Sub-contractor's / Supplier's / Vendor's mailing list or database or any other document maintained for dissemination of product information and the Purchaser shall be informed of the action taken in this regard. If such improvements / modifications are brought in by the Sub-contractor's / Supplier's / Vendor's Design Department in course of manufacture of equipment ordered by the Purchaser, the Sub-contractor / Supplier / Vendor shall incorporate such improved versions in the equipment without any extra cost to the Purchaser.
IN-102	The word ' Sub-contractor / Supplier / Vendor ' means the person / firm / Company who undertakes to manufacture and / or supply and / or undertake work of any nature assigned by the Purchaser from time to time and includes its successors or assigns.	
IN-103	The word ' Owner ' means the person or authority with whom Garden Reach Shipbuilders & Engineers Limited (Purchaser) has contracted to carry out work in relation to which orders are placed by the Purchaser on the Sub-contractor / Supplier / Vendor under this contract for supply or manufacture of certain items and would include Department of Defence Production & Supplies, Ministry of Defence, Government of India, the Indian Navy, the Coast Guard and any other specified authority.	IN-110 If the Purchaser be desirous of getting incorporated all post supply modifications / improvements arising out of technological developments to the original equipment supplied by the Sub-contractor / Supplier / Vendor, the Sub-contractor / Supplier / Vendor, shall quote for and carry out all such modifications to the equipment.
IN-104	The equipment / products / items to be supplied shall be strictly in accordance with the Drawings / Specifications / Requirements indicated in the Tender / Inquiry / Order with deviations, if any, as mutually accepted.	(a) Where the whole or a portion of the equipment has been specifically developed by the Sub-contractor / Supplier / Vendor for the Owner and the latter would, through the Purchaser, be bearing the entire or part of the development cost incurred by the Sub-contractor / Supplier / Vendor, the design rights for the whole or portion thereof, of the equipment as appropriate, shall vest in the Owners.
IN-105	The Sub-contractor / Supplier / Vendor shall not either wholly or partly sell, transfer, assign or otherwise dispose of the rights, liabilities and obligations under the contract between him and the Purchaser without prior consent of the Purchaser in writing.	(b) Prior approval of the Owner should be obtained before similar articles are sold / supplied to any other party other than the Owner. If such approval is given and sale is effected, the Sub-contractor / Supplier / Vendor shall pay to the Owner royalty at the rate mutually agreed to.
IN-106	The Sub-contractor / Supplier / Vendor shall hold harmless and keep the Purchaser indemnified against all claims arising as a result of infringement of any patent / copy rights on account of manufacture, sale or use of articles covered by the order. A clear & quite possession of goods should take place with the passing of the title on execution of order.	IN-111 Secrecy : All property (such as materials, drawings, documents etc) issued by the Purchaser or any other individual or firm on behalf of the Purchaser in connection with the contract shall remain confidential, being the property of the Purchaser and the Sub-contractor / Supplier / Vendor shall undertake to return all such property so issued and will be responsible for any or all loss thereof and damage thereto resulting from whatever causes and shall reimburse the Purchaser the full amount of loss and damage.
IN-107	Any letter, facsimile message, e-mail intimation or notice sent to the Sub-contractor / Supplier / Vendor at the last known address mentioned in the offer / order shall be deemed to be valid communication for the purpose of the contract.	All information given to the supplier for the execution of the order is to be treated as SECRET / CONFIDENTIAL . The Technical information, Drawings, Specification and other related Documents forming part of this Enquiry / Order are the property of the Purchaser and shall not be used for any other purpose except for the execution of order. Any information / drawing etc. shall not be copied, transcribed, traced or reproduced in any other form or otherwise in whole / part or duplicated, modified, divulged and / or disclosed to a third party, not misused, used in any other form whatsoever without Purchaser's prior consent in writing except to the extent required for the execution of this order. At the time of tendering, the tenderer has to give an undertaking in favour of GRSE that in the event of any breach of the above provisions, he would make good of any loss /cost/damage / any other claim whatsoever preferred by anybody to GRSE in this respect.
IN-108	Governing Jurisdiction and Compliance with Laws (a) All contracts shall be deemed to have been wholly made in Kolkata and all claims thereunder are payable in Kolkata City and it is the distinct condition of the order that no suit or action for the purpose of enforcing any claim in respect of the order shall be instituted in any Court other than that situated in Kolkata City, West Bengal State, India. (b) The Sub-contractor/Supplier/vendor is warranted that all goods purchased against the enquiry shall conform with all applicable city, states & central laws, ordinances and regulations. Further, the supplier shall indemnify / defend / relieve GRSE harmless from loss, cost of damage, by reason or any actual or alleged violation thereof. (c) GRSE shall not be liable under the workmen's compensation Act of 1923, in case any employee or workmen of any contractor receives injury while actually serving his employer in connection with the latter's work inside the compound of GRSE Ltd. (d) The existing Laws on employment of Child Labor shall be binding for the contract. (e) Sub-contractor/Supplier/vendor working at GRSE site , shall have ESI and PF registration no. of their own and shall ensure compliance with all provisions of ESI & PF act & rules, failing which withholding / deductions from Sub-contractor/Supplier/vendor's bills /dues as applicable or termination of the contract will be effected. Sub-contractor/Supplier/vendor working at GRSE site , are required to submit evidence showing compliance with ESI & PF formalities in respect of employees engaged in job of GRSE viz. monthly challan of ESI deposit, certified copy of half yearly returns submitted to ESIC, proof of P.F. deposition etc. (f) Sub-contractor/Supplier/vendor working at GRSE site are required to comply with all statutory obligations as per Contract Labour (R & A) Act 1970 and Contract Labour (R & A) Central Rules 1971 including obtainance /renewal of Labour Licence from Regional Labour Commissioner (Central) failing which deductions as applicable from bills / dues of contractor or termination of the contract may be effected. (g) All Sub-contractors/Suppliers/vendors engaged in shipbuilding work are required to obtain registration under the Building and Other Construction works (RE & CS) Act 1996 & Rules and are also required to maintain registers & records and submit returns.	IN-112 Preservation : A detailed procedure for long and short term preservation of the equipment and periodicity of preservation alongwith special preservatives, if required, prior to installation of the equipment shall be furnished by the Sub-contractor / Supplier / Vendor. The detailed procedure for de-preservation prior to commissioning shall also be furnished. Should any material require any additional preservation till its final installation / fitment on board the Ship, the materials should be supplied in preserved (sealed or in cocoons) condition for long duration of time as per order. Detailed procedures for subsequent de-preservation / re-preservation are to be stated by Sub-contractor / Supplier / Vendor. The preserved sealed cases / cocoons will not be opened on receipt and same will be opened when the first preservation is due or if required on board earlier. The short fall, discrepancy or damage , if any, found during the inspection after opening these cases will have to be replaced / made good by the supplier free of cost within reasonable period.
IN-109	The Sub-contractor / Supplier / Vendor shall unconditionally and free of cost to the Purchaser transfer information on technological developments / innovations / modifications which the Sub-contractor / Supplier / Vendor would evolve in future (within 3 years) in relation to the supplied equipment. To enable this, the Purchaser's address shall be added to the	IN-113 The Sub-contractor / Supplier / Vendor shall render free of cost guidance in case the Purchaser intends to set-up testing, repair / maintenance facility to overhaul the equipment supplied by the Sub-contractor / Supplier / Vendor. IN-114 The Sub-contractor / Supplier / Vendor shall continue to support the equipment for a minimum period of 20 years from the date of supply by making available spare parts and assemblies of the equipment supplied. Should the Sub-contractor / Supplier / Vendor decides to discontinue the product, for any reason whatsoever, adequate notice shall be given to the Purchaser / Owner to enable procurement of the requisite lifetime spares. IN-115 Purchase preference in respect of equipment / product and or services of Central Public Enterprises will be applicable for such / similar equipment / product / services on tender as per extant policy promulgated by Department of Public Enterprises, Government of India. IN-116 The Purchaser reserves the right to accept and or reject any or all tenders and / or to withdraw the tender in toto without assigning any reason

whatsoever.

IN-117

Registration as Approved Vendor :

- (a) The Sub-contractor/Supplier/vendor is to confirm whether they are registered with GRSE as approved Sub-contractor / Supplier / Vendor under 5-digit Supplier Code and indicate Product Group Code. If not registered, the Sub-contractor / Supplier / Vendor will have to approach GRSE's V R Cell for completion of all formalities for permanent registration with GRSE immediately after submission of any quotation/offer. Failure to comply to this requirement will result in rejection of offer and restriction of further business.
- (b) The bidder is to confirm whether they are registered with DGQA as approved vendor for supply of the category of item as tendered. If not registered, the bidder is to approach DGQA immediately for registration after complying with all formalities like capacity assessment for supply of the required category of equipment / item within a time frame of 6 weeks from placement of conditional order, if issued.

IN-118

MOU : Regular suppliers are requested to enter into Memorandum of Understanding with GRSE as regards Commercial Terms & Conditions contained in this STACS.

IN-119

Examination of price: Where the contract price has not been fixed in effective competition and the contract is not for articles whose prices are controlled, the owner reserves the right to investigate reasonableness of the price paid and negotiate directly with the sub-contractor/supplier/vendor for reduction of price where appropriate. The Owner can also ask for declaration that less basic price is not charged to other customers including Govt. and PSU.

IN-120

Individuality of contract: In the event of the offer getting converted into an order, the said order shall be treated as an individual contract, shall not allow any general lien to the parties and shall not get prejudiced in execution due to situation arising out of some other contract that the supplier may have with GRSE.

IN-2.

Quotations and Order Acceptance Terms:

IN-201

Tenderer shall pay special attention to the following points. Failure to comply with these may disqualify the tenderer.

- (a) Tender number and due date to be superscribed on all the envelopes.
- (b) Tender to be submitted on or before the due date and time.
- (c) Offer to be as per specifications and complying with tender conditions.
- (d) The envelopes to be sealed properly.

IN-202

Unless otherwise stated, the offers shall be in 'Two Bid System' only, in two separately sealed envelopes: -

- (a) PART-I - 'Techno-Commercial Bid' and marked thus. In addition, Part-I shall include-
 - (i) Proforma Price Schedule blanking the prices and indicating 'Quoted / Not Quoted' (as applicable against each item on tender).
 - (ii) Duties / Taxes, Octroi, freight charges, insurance and/or any other Statutory levies payable, specifying incidence clearly / separately against each head.
 - (iii) The cost incidence against each head clearly indicating for Door Delivery or F. O. R. or Ex-works along with charges for packing and forwarding.
 - (iv) Compliance Statement clearly highlighting deviations / exceptions, if any, to Technical Specifications, Standard Terms and Conditions of Supply and Specific Tender Conditions. Non-specifying of deviations against any or all clauses would be construed as compliance to any / all conditions of tender. Any deviations to STACS, having financial implications, would be considered suitably for loading the quoted price. (STACS Acceptance Format is placed at Annexure 5).
 - (v) Earnest Money Deposit (interest free) as stipulated in the tender by way of D.D. / Pay Order / B.G. (as per GRSE format & guide line at Annx.-1) issued by any scheduled Bank other than Co-operative Bank to be provided by the bidder / tenderer in favour of GRSE as per discretion of the Purchaser.
 - (vi) Copy of ISO 9000 or equivalent Quality System Standards certificate valid as of date.
 - (vii) Delivery Schedule.
 - (viii) IIG Form regarding Codification of Defence Equipment enclosed with SOR is to be filled in and submitted. The same is included as deliverables by the supplier.
 - (ix) Standard format for data to be provided by OEM as per ILMS requirement (Integrated Logistic Management System):- As required by Indian Navy for operation of ILMS successfully at their end, detail information regarding ILMS compatibility as per format provided in SOR is to be filled in by OEMs and

submitted to GRSE as part of their contractual obligations and to be included as deliverables.

IN-203

- (b) PART-II - 'Price Bid' - Quotes to be written in figures and words duly authenticated / signed by the authorised person and marked thus.

IN-204

- (a) Both these sealed envelopes-Part I and Part II, shall be put in a third envelope duly superscribing the Tender number and Due Date and sealed properly and deposited as specified in the enquiry in the securely locked Tender Box kept in the concerned deptt.
- (b) Outstation Bidder / Tenderer shall forward their offers addressed to concerned Authority either by courier service or by speed post so as to reach well in advance of the due date of tender or by hand delivery before due date and time of tender closing. Purchaser shall not be responsible for any postal / courier delay and it is attributable solely to the tenderer.
- (c) Offer in "Two Bid System" received by fax / e-mail and / or offers received beyond due date and time of tender is liable to be rejected.

- (a) The price per 'Ship set' shall be quoted and breakup price of individual items of equipment and its accessories must be clearly stated.
- (b) The cost incidence against each head shall be clearly indicated for
 - Door delivery
 - F. O. R.
 - Ex-Works - with charges for packing and forwarding

- (c) The offer shall indicate the discounted price, if more than one shipset is ordered.
- (d) The offer shall clearly indicate the Foreign Exchange content, if any, and base Exchange Rate and cut off date for Import. If any item/s is / are required to be imported by the Sub-contractor / Supplier / Vendor for use in the manufacture of final product, Import Licence for such product/s is to be arranged by him only.
- (e) The vendor/supplier/sub-contractor shall indicate the bill of materials for intended import for incorporation in order. The purchaser shall issue Customs Duty Exemption Certificate on receipt of request from the vendor/supplier/sub-contractor along with the copies of bill of lading and invoice. The price advantage for Customs Duty Exemption will be passed on to the purchaser.
- (f) The purchaser reserves the right to investigate the reasonableness of the price and ask the vendor/supplier/sub-contractor for detail break up of their cost.

IN-205

- (a) The offer shall be valid for 90 days for acceptance and the prices shall remain firm and fixed until delivery of the full quantity of the goods in the Purchaser's Yard. If not, the Sub-contractor / Supplier / Vendor shall indicate the period during which the quoted price shall remain valid for supply of the equipment / article contracted for.

Should the Purchaser desire postponement of delivery of the equipment / article within or beyond validity date of the offer, the Sub-contractor / Supplier / Vendor shall indicate -
(i) The date by which such communication must be received by him for deferring delivery without any financial implication to the Purchaser,

and

(ii) Terms and conditions for effecting postponement of delivery beyond the price validity period.

- (b) Purchaser reserves the right to consider placement of Purchase Order in part or in full against the tendered quantity.

IN-206

The Sub-contractor / Supplier / Vendor shall inform the Purchaser in advance in case he is unable to participate in the tender for whatsoever reason. Failure to comply with this will be viewed seriously and consecutive three failures on the part of Sub-contractor / Supplier / Vendor to do so is liable for disqualification / debarring of the Sub-contractor / Supplier / Vendor from all future tender enquiries and or delisting from the list of 'Approved Registered Vendors.'

IN-207

Spares:

- (a) Offers for Testing and tuning / commissioning spares shall be supplied along with the main equipment, as specified in the requisition.
- (b) The Sub-contractor / Supplier / Vendors offer shall include a list of manufacturer's recommended spares together with itemised prices for

	- One year uninterrupted operation – validity of offer shall be a minimum for 90 days. - Five year operation – validity of offer shall be a minimum for 180 days. (Minimum order quantity against each item, if applicable, may also be stated.)
	(c) While the spares for one year are ordered by the Purchaser, the spares for 5 years Operation will be ordered by the Owners or Purchaser. In case of 5 years operation spares, the Sub-contractor / Supplier / Vendor shall indicate a base price applicable to the year of quotation and indicate an acceptable annual escalation formula based on which prices for future requirements could be established during the life cycle of the equipment in service. (d) In the event of inability to make an offer for these spares at the time of quoting for main equipment, the Sub-contractor / Supplier / Vendor shall commit a date by which such an offer can be made and adhere to it. Non-receipt of offer as committed will render the order for main equipment liable for cancellation without notice from the purchaser and without any financial implication to the Purchaser.
IN-208	Tenders will be opened on the specified date and time in the concerned department. Only authorised representatives of tenderers are permitted to witness the Part I tender opening for Press tenders only. Tender opening shall neither be delayed nor withheld / postponed on account of absence of any one or more Tenderers. All the envelopes marked as 'PRICE BID' received at the time of Tender opening will be noted and held unopened separately.
IN-209	Authorised representatives of only technically qualified tenderers, in case of Press Tenders only, who have submitted EMD as applicable, and complied with tender terms, will only be permitted to be present and note the proceedings of the Price Bid - Part II opening in a manner as directed by the tender opening officers. Qualifying tenderers not present during price bid opening will not be furnished with information on prices at a later date. EMD of unsuccessful tenderers will be refunded / returned within days of finalisation of order on surrendering the Original copy of Money Receipt and upon instruction of Purchaser. EMD, if not claimed within one year from the date of notification to the tenderer for refund, will be forfeited.
IN-210	With the acceptance of the successful bidder's offer by the Purchaser, which is as per the Terms and Conditions of the tender, by means of LOA / Purchase Order, the Contract is concluded. The Sub-contractor / Supplier / Vendor shall, on receipt of the order, communicate his unconditional acceptance within two weeks of from the date of mailing / receipt of the same in its entirety by returning a copy of the Purchase Order duly signed by the authorised person and without any qualification. Communicating acceptance of the order subject to any other terms and conditions of the contract on the part of the Sub-contractor / Supplier / Vendor shall not bind the Purchaser in respect of these conditions which are less favourable to the Purchaser as compared with the conditions mutually agreed to and / or stipulated in the order. It shall be the responsibility of the Sub-contractor / Supplier / Vendor to enumerate specifically any error or discrepancy in the order at the time of acceptance. Failure to do so shall make the order binding on the Sub-contractor / Supplier / Vendor in all respects. Any delay in acknowledging the receipt of the Purchase Order within the specified time limit or any qualification or modification of the Purchase Order in the acknowledgement of the Purchase Order by the Sub-contractor / Supplier / Vendor shall be a breach of the contract on the part of Sub-contractor / Supplier / Vendor. Compensation for the loss caused by the breach will be recovered by the Purchaser by forfeiting the Earnest Money, given by the Sub-contractor / Supplier / Vendor. If the Sub-contractor's / Supplier's / Vendor's bid contains any condition and any correspondence which are contrary to the Notice Inviting Tender (NIT) then they shall be considered as superseded and void on the acceptance of the bid by the Purchaser. Recovery of compensation by the Purchaser from the Sub-contractor / Supplier / Vendor by forfeiting the Earnest Money shall be regarded as cancellation of the contract which has come in to existence on the acceptance of the offer by the Purchaser.
IN-211	<u>Security Deposit (Interest free):</u> The successful Tenderer shall submit a Security Deposit as specified in the tender in the form of Demand Draft / Pay Order / Bank Guarantee (as per GRSE format & guide lines at Annex-2) issued by any scheduled Bank other than Co-operative Banks in favour of Purchaser. The Security Deposit will be returned only after the successful execution of the order. In the event of failure to execute the order satisfactorily or default by the Sub-contractor / Supplier / Vendor, the Security Deposit will be forfeited.
IN-212	Unless otherwise specified in the 'Statement of Requirement' / 'Technical specifications for Procurement', the supply shall include one set of reproducible Velographs stamped 'Approved' by the Inspecting Authority, micro-films, floppies / CDs and six sets of paper prints. It shall

also include 15 sets each of the Operation / Maintenance Manuals, Part Identification List, Comprehensive Part List, Test Certificates / Shop Trial reports etc. of the article/s supplied.

IN-3.0

Packing, Shipping, Insurance & Freight details and Delivery:

IN-1

Identification of Deliverables And Penalty For Non-Compliance:

- (a) The Supplier on receipt of Purchase Order and by a date not later than 8 weeks from receipt of P.O., shall list out and confirm all deliverables including Main Equipment, Accessories, On Board Spares, Tools, Technical Documentations and other items. Each item shall have the firm's part no. and break up price. The same is required essentially for incorporating GRSE material code nos. into the Purchase Orders and computer systems. In the event of delay in submission of the required details penalty @ ½% per week or part thereof upto the maximum of 5% of total value of all deliverables, shall be levied on the Supplier.

GRSE shall issue amendment to Purchase Orders incorporating the details receipt from the Supplier with GRSE Code numbers, individual prices etc. in advance of contractual delivery. While despatching the Supplier shall identify each item with GRSE code no. and the firm's part number. Packing list should indicate all deliverable items specially mentioning/ mounted on main equipment or loose items. Each item should be identified with metallic or plastic tag indicating both GRSE code no. and firm's part no. In case of any deviation, GRSE shall not be in any way responsible for delay in issue of receipt inspection report and payment.

All OBS are to be PIP packed. OBS and tools are to be supplied in separate boxes with clear identification and part numbers in metallic or plastic tag. Supplier's rep. is required during receipt inspection of loose items, accessories, spares and tools for easy identification and detection of shortfall.

- (b) All material shall be strongly and securely packed for shipment / transportation as applicable in minimum cubic space in such a manner as to prevent damage and pilferage in transit from point of shipment to final destination. Metal parts wherever necessary shall be well slushed with preservatives to prevent rusting in transit. Should it be proved that loss and damage has arisen from inadequate packing, the losses shall be borne by Sub-contractor / Supplier / Vendor. Each packing shall be plainly marked and numbered upon four sides and the top thereof as directed in the Purchase Order. Letters and numbers shall be atleast 80 mms. high wherever possible. Packing should indicate Case No., Order No., Gross Weight in Kgs., Nett Weight in Kgs. and outside dimensions LxWxH (The information on outside dimensions and weight shall be furnished to Purchaser atleast one (1) month prior to shipment / despatch). No marking other than as directed shall be inscribed on the said packages.
- (c) Every package shall contain a packing list in triplicate and the order number, package number, number of cases in the consignment, description and quantity of each item packed shall be clearly shown in the packing list. The description and quantity of each item shall tally with that specified in the order, wherever applicable.

IN-2

Insurance:

IN-2.1

In cases where the Sub-contractor's / Supplier's / Vendor's offers are for 'Free Delivery to Purchaser's Yard,' transit Insurance charges shall be borne by the Sub-contractor / Supplier / Vendor.

IN-2.2

In case of Ex-works / Ex-Transporter's warehouse or Railway godown offers, the Sub-contractor / Supplier / Vendor shall give details of materials with despatch particulars and their value to Purchaser immediately after the despatch. The Insurance Charges will be borne by Purchaser.

IN-3

Storage and Demurrage will be claimed from the Sub-contractor / Supplier / Vendor for all shipments that reach the purchaser without proper despatch documentations, Lorry Receipts not accompanied by packing lists, invoices etc. The Sub-contractor/Supplier/ Vendor shall be responsible for fines due to errors or omissions in description, weight or measurements and for increased handling charges due to improper packing. Demurrage, if any, due to wrong/non-availability of shipping documents will borne by supplier/vendor.

IN-4

Where so stipulated in the order, the Sub-contractor / Supplier / Vendor shall render such reports from time to time as regards the progress of the contract and in such a form as may be called for by the Purchaser. The Purchaser reserves the right to cancel the order forthwith without any financial implications on either side, if on completion of 50% of the scheduled delivery period the progress of manufacture is not to the satisfaction of Purchaser / Owner and failure on the part of the Sub-contractor / Supplier / Vendor to comply with the delivery schedule is inevitable. In such an event the Sub-contractor / Supplier / Vendor shall

	repay all the advances together with interest at prevailing bank rates from the date of receipt of such advances till date of repayment. The title of any property delivered to Purchaser will be reverted to the Sub-contractor / Supplier / Vendor at his cost.	to its / their designed parameters.
IN-5	The Sub-contractor / Supplier / Vendor shall arrange despatch of goods by Rail / Road consigned to GRSE through GRSE nominated transporter.. An Advance Copy of the invoice along with copies of other relevant documents shall be forwarded to Purchaser sufficiently in advance to avoid demurrage. In case of door delivery contracts, the Transporter shall be directed to deliver the ordered equipment without insisting for consignee copy of Lorry Receipt. However, for manufacture of Naval Ships under Cost plus Contracts, GRSE is acting in the capacity of an Agent since Purchase Orders are issued by GRSE on behalf of Indian Navy under MOD, Govt. of India. Accordingly, in case of orders for supply to Naval Ships under cost plus contract, despatch document (challan / Consignment Note etc) and Invoice should be marked with the words "GRSE A/C INDIAN NAVY".	IN-404 In the event of Sub-contractor's / Supplier's / Vendor's failure to attend the Guarantee defects within a reasonable period of time, the Performance Bank Guarantee will be encashed by the Purchaser. The Purchaser's decision shall be final and binding on Sub-contractor / Supplier / Vendor in this regard. IN-405 Issues/Defects related to Guarantee/Warranty shall have to be liquidated at the location of vessel and as desired by the Purchaser / Owner. IN-5.0 <u>Quality Certification:</u> IN-501 Purchase preference will be considered in case the Sub-contractor / Supplier / Vendor is accredited with ISO 9000: 2000 or equivalent International Quality System Standards in respect of equipment / Products and or items on tender. IN-502 The Sub-contractor / Supplier / Vendor shall submit as proof, in Part-I of the bid documents, a copy of ISO 9000: 2000 or equivalent International Quality System Standards certificate valid as of date. IN-503 The Sub-contractor / Supplier / Vendor shall preferably engage sub-contractors and avail supplies from suppliers with prior approval of Purchaser and such sub-contractors and suppliers shall also be accredited with ISO 9000: 2000 or equivalent International Quality System Standards. IN-504 In the event the Sub-contractor / Supplier / Vendor is not being ISO 9000: 2000 accredited firm, the fact shall clearly be stated and the Quality Assurance / Quality Control organisation of the company be described in detail. Pursuant to scrutiny of such statement / documentation, the Purchaser may decide to accept the offer with pre-conditions specified for acceptance or reject the bid submitted.
IN-6	(a) The binding drawings called for as per the 'S. O. R.' / 'T. S. P.' or the Purchase Order shall be supplied within stipulated time frame as indicated in the Purchase Order, free of cost. Failure to comply may lead to cancellation of Purchase Order without any financial implications to the Purchaser. (b) The drawings shall be submitted to Inspecting Authority and or DGQA / NSM / GRSE / Classification Society, as appropriate, as specified in the Order. The onus of getting the drawings approved within the stipulated time frame shall lie with the supplier/vendor/sub-contractor. (c) Wherever applicable, pilot sample shall be submitted to the authorities within the stipulated time as specified in the Order. (d) In case of patternised items the vendor/supplier/sub-contractor must confirm that the relevant drawings are held by them and no waiver of contractual terms of order shall be considered for non-performance on this account. (e) For repeat orders, unless otherwise some changes in design had taken place, fresh approval of drawings will not be required if the same has already been approved. Supplier/vendor/sub-contractor shall go ahead with manufacture of the items which are already developed for same / deferment ships for Navy based on earlier approved drawings. Immediately on receipt of order, Supplier/vendor/sub-contractor shall submit 6 copies of drawings for stamping and distribution.	IN-6.0 <u>Terms of Payment:</u> IN-601 (a) Unless or otherwise mutually agreed upon and stipulated in the Purchase Order, the terms of payment shall be 90% of Order value within 45 days from the date of receipt inspection and acceptance of material and presentation of bill supported with complete set of documents as under: - (i) Seven copies of signed invoice indicating Vendor Code Number and itemwise price (indicating GRSE material code no. if in the order) alongwith packing lists. In case of orders for supplies to Naval Ships, invoice should be marked with the words "GRSE A/C INDIAN NAVY" for cost plus contract, as detailed in para IN- 5. However in case of fixed cost contract , Invoice will be in the name of GRSE. (ii) Warranty Certificate in triplicate. (iii) 3 copies of Manufacturer's Works Test Certificate. (iv) 3 copies of Certificate of Inspection and approval from LRS / IRS / ABS / DQA (WP) / DQAN / CQAE / WOT / GRSE (whichever is applicable). (v) 3 copies of GRSE's unqualifying Inspection Cum Goods Receipt Note (ICGRN) (vi) Complete set of Classification / On board spares as per the Purchase Order. (vii) Complete set of operation / Maintenance / Instruction Manuals as per the Purchase Order and also in Electronic Medium. (viii) Complete set of Parts Identification List / Comprehensive Parts List as per the Purchase Order and also in Electronic Medium. (ix) Complete set of "As fitted" drawing and reproducible drawings. (x) Quotations for B & D spares for (a) 2 years operation and (b) 5 years operation. (xi) IIG Forms duly filled in. (xii) Standard Format for data provided by OEM as per ILMS requirement (Integrated Logistic Management System). All the documents shall clearly indicate the GRSE's Purchase Order No. and date. (b) Balance 10% will be released after G.P. or against submission of PBG for equivalent amount (as per GRSE format & guidelines at Annex-3) valid till G.P. Issue of GRN : For materials received at GRSE without Inspection report of 3rd party, GRN will be issued to Local supplier for their submission of bill with GRN. But for materials received at GRSE with 3rd party Inspection report received from outstation suppliers, balance payment bill is to be submitted by suppliers with copy of clear & accepted ICGRN for further linking by Corporate Finance with GRN for processing balance payment.
IN-4.0 <u>Guarantee / Warranty</u>		
IN-401	The equipment/materials are to be guaranteed/warranted for satisfactory performance for the period of 12 months from the date of satisfactory commissioning of the vessel on which the equipment/materials/items are installed OR for the period of 36 months from the date of final dispatch, whichever expires earlier, against improper design, defective materials and faulty workmanship. During guarantee/warranty period any equipment or component thereof supplied by the vendor/sub-contractor, suffers due to defective material and or due to improper design and or due to defective drawing or due to faulty workmanship the vendor/sub contractor will assume full responsibility of rectification of such defective equipment or component thereof including direct expenses related to removal and re-positioning of the replacement/repared equipment or component thereof and subsequent test & trial, incurred thereon without any financial implication to GRSE. In the event Purchaser/Owner desires to have extension of Guarantee/Warranty period beyond the stipulated period, as above, the vendor/sub-Contractor/supplier shall quote for the same on monthly basis for the period of such extension.	
IN-402	If the defects intimated during the Guarantee period are not remedied within a reasonable / stipulated time, the Purchaser may proceed to rectify the defects at the Sub-contractor / Supplier / Vendor's risk and cost, but without prejudice to any other rights which the Purchaser may have against the Sub-contractor / Supplier / Vendor in respect of the failure of the Sub-contractor / Supplier / Vendor to remedy such defects.	
IN-403	Inspection and approval of the equipment or material by the Inspecting Authority/ies does not absolve the Sub-contractor / Supplier / Vendor of the responsibility of guarantee for the equipment / material. It will be the sole responsibility of the Sub-contractor / Supplier / Vendor to ensure that the equipment / material supplied is complete in all respects and performs	

(c) Payment may be made to the vendors through Electronic Clearing System (ECS). Vendors are to furnish requisite documents / information on receipt of the order. (ECS Format for Bank Particulars and Payment Procedure enclosed at Annex.- 6)	
(d) In special cases and /or for development equipment where advance / stage payment is specified in order, all such payments shall be made against Bank Guarantee of equivalent amount in GRSE format valid till receipt and acceptance of material. No advance payment shall, however, be claimed without submission of binding drawing to Approving Authority. The advance payment may be released in stages depending upon the progress of work and mobilization of required equipments etc.	IN-604.2 Declaration Form can be issued to suppliers in case of transit sale, i.e. transfer of documents during the period of transit of the materials to obtain Sales Tax benefit. Invoice shall clearly indicate cost incidentals against each head, as applicable: Basic Cost, Excise Duty, Packing & forwarding charges, Central / State Sales Tax, Service Tax, Freight, Insurance, etc.
(e) All advance payments should be interest bearing. Penal interest is to be charged on the advance in case of delay in delivery of supplies beyond the agreed schedule. Amount of Advance & Rate of interest will be decided by the Management / TC as appropriate.	IN-605 Payment made under one order shall not be assigned or adjusted to any other order except to the extent agreed upon in writing by the Purchaser. During the currency of the contract, if any sum of money is payable by the Sub-contractor / Supplier / Vendor the same shall be deducted from any sum then due or thereafter may become due to the Sub-contractor / Supplier / Vendor under the contract or any other contract with the Purchaser.
(f) Where order is cancelled and advance payments already released to the contractor, the contractor shall refund all such advance payments received to GRSE with prevailing Bank interests and GRSE shall also have the right to recover the amount from outstanding dues to the Contractor against any other Purchase Orders placed by GRSE.	IN-606 Works Contract Tax, wherever applicable, will have to be borne by Sub-contractor / Supplier / Vendor. In addition, Employees State Insurance premium, Provident Fund, Service Tax and other statutory dues of workers deployed at Purchaser's premises by Sub-contractor / Supplier / Vendor will have to be borne by him. In case of Works Contract Form 58 or 59 as applicable is to be submitted by the vendor/supplier/sub-contractor.
(g) Works Contract : In case of works contract following payment terms shall be followed:-	IN-607 <u>Liquidated Damages / Risk Purchase:</u>
(i) Material Portion : 75% payment against despatch document, 15% payment against receipt & acceptance of material and balance 10 % will be released after G.P. or against PBG for equivalent amount valid till G.P. (ii) Labour Portion : 90% payment on job completion and certification. Balance 10% will be released after G.P. or against PBG for equivalent amount valid till G.P. OR Where unit rate is mentioned , 90% payment progressively on job completion and Certification. Balance 10% will be released after G.P. or against PBG for equivalent amount valid till G.P.	IN-607.1 In the event that- (a) Sub-contractor / Supplier / Vendor (SELLER) fails to deliver the equipment / product or documentation meeting the requirement of the Purchase Order on or before the dates specified, or (b) the equipment / product when tested in accordance with the performance requirement of the Purchase Order, fails to meet those performance parameters, the buyer (Purchaser) will suffer damages in an amount that is not susceptible to calculation with reasonable certainty. Therefore, any Liquidated Damages set forth in the Purchase Order represent a reasonable determination of the amount of damages that the Purchaser will suffer, and are not in the way of penalties. Seller hereby waives any defence to Purchaser's recovery of such Liquidated Damages on the plea that actual damages are ascertainable or that such Liquidated Damages do not represent a reasonable determination of damages suffered by Purchaser or are penalties.
(h) If GRSE material code no. & itemised price is not incorporated in the order, supplier will submit detailed list of items (separately deliverables) and price break-up latest within 6 weeks of receipt of order to enable GRSE amend the order indicating material code no. of each item with its price. All Invoices, Packing list etc should invariably indicate GRSE material code no. against each item for recording receipt and issue of ICGRN as well as for processing payment.	IN-607.2 Sub-contractor / Supplier / Vendor (Seller) will be liable to pay Liquidated Damages for late delivery of Products, Manuals, Drawings and Documentation as stated in the Purchase Order. Unless otherwise expressly specified, the rate of Liquidated Damages for late delivery shall be at the rate of 0.5% of the total order value per week or part thereof of delay upto a maximum of 5% of the total order value. Such Liquidated Damages shall be deducted by the Purchaser from any monies due to Sub-contractor / Supplier / Vendor (Seller). Payments made by the Sub-contractor / Supplier / Vendor (Seller) of Liquidated Damages shall be in addition to any other remedies (other than any other remedy for the recovery of damages) available to the Purchaser, including without limitation the remedy of cancellation of Order for default.
IN-602.1 Octroi Duty at present is not applicable in West Bengal. However, Octroi Duty if applicable, at a later date, will be re-imbursed by Purchaser at actuals against submission of 'Original Octroi paid money receipt' and copy of Form 'B'. Octroi receipts are to be issued in the name of 'GARDEN REACH SHIP BUILDERS & ENGINEERS LTD.' only.	IN-607.3 Sub-contractor / Supplier / Vendor (Seller) will be liable to pay Liquidated Damages for late submission of Drawings for approval as agreed to by Purchaser and Sub-contractor / Supplier / Vendor (Seller) and as stated in the Purchase Order. The amount of such damages will be clearly defined in the Purchase Order and may extend upto 5% of the Order value.
IN-602.2 Way Bill – In West Bengal, Way Bill is to be issued for entry of materials from outside the state. GRSE will issue the Way Bill on submission of copy of Invoice and Consignment Note. Consignment Note should be in the name of GRSE. In case of Transit Sale, the name of the Consignors (other than seller) are to be mentioned in the P.O. and Consignment Note will be in the name of GRSE as consignee.	IN-607.3.1 Drawings submitted by the Sub-contractor / Supplier / Vendor (Seller) will be the property of Indian Navy.
IN-603 The Sales Tax Registration Number and Central Sales Tax Number, Service Tax Number, as applicable, are to be quoted on all invoices. Invoices shall be accompanied by a certificate to the effect that the Sub-contractor's / Supplier's / Vendor's registration certificate was in force on the day the sale was effected.	IN-607.4 If the equipment / article or any portion thereof be not delivered by the scheduled delivery date, the Purchaser shall be at liberty, without prejudice to the right of the Purchaser to recover Liquidated Damages / penalty as provided for in these conditions or to any other remedy for breach of contract, to terminate the contract either wholly or to the extent of such default. Amounts advanced or part thereof corresponding to the undelivered supply shall be recoverable from the Sub-contractor / Supplier / Vendor at the prevailing bank rate of interest .
IN-604 Unless otherwise stated Excise Duty, Sales Tax and any other statutory levies will be payable extra at actuals. However, the Sub-contractor / Supplier / Vendor shall submit the proof of having paid the duties / levies along with the Invoices / Bills. In case of orders for supplies to Naval vessels, Excise Duty exemption certificate issued by Indian Navy will be provided on readiness of items for despatch & GRSE is to be intimated by supplier / vendor / sub-contractor regarding readiness of items at least a month before despatch. Such exemption certificates shall be issued to Sub-contractors / Sub-vendors of Sub-contractor / Supplier / Vendor on whom Purchaser had placed a Purchase Order.	IN-607.5 The Purchaser shall be at liberty to purchase, manufacture or supply from stock as it deems fit, other articles of the same or similar description to make good such default and or in the event of the contract being terminated, the balance of the articles of the remaining to be delivered thereunder. Any excess over the purchase price, cost of manufacture or value of any articles supplied from the stock, as the case may be, over the contract price shall be recoverable from the Sub-contractor / Supplier / Vendor.
IN-604.1 For supplies from States outside the state of West Bengal, Declaration Form "C" or "D" as applicable will be issued to the supplier for concessional rate of Sales Tax . In case of sale within the state of West Bengal, W.B.S.T. Form will be issued for concessional rate of Sales Tax.	

IN-607.6	In case of unsatisfactory progress of supply at any point of time after placement of order GRSE reserve the right to cancel the order without assigning any reason and to procure the ordered material from any alternative source at your complete risk and cost. GRSE also reserves the right to cancel the order forthwith without any financial implications on either side if upon lapse of 50% of the scheduled delivery time the progress of manufacture is not up to the satisfaction of GRSE/Owner and the failure on the part of the sub-contractor/supplier/vendor to conform to the delivery schedule is inevitable.	forwarded to GRSE immediately on despatch of articles. The supplier/vendor/sub-contractor shall also provide 3 copies of weighed Weight Certificate for items supplied.
IN-608	<u>Submission of Bills to SLP Section (Corporate Finance/GRSE)</u> The bills presently submitted to SLP Section by vendors for purchase orders placed by NCM / Purchase Department in respect of "SHIP DIVISION ONLY" will now be deposited in the Box kept at the entrance of the Corporate Finance Department (in front of Pantry). All suppliers are requested to drop their bills in sealed cover in the Box earmarked for, effective from 01st April, 2002. Computer generated acknowledgement for the bills dropped during the previous day may be collected in the next working day from the Central Despatch Section, except Saturday. Corporate Finance (SLP Section) will forward the computer generated receipts to Central Despatch Department by 11-00 hrs. everyday. The supplier should ensure that all the bills are kept in a separate envelope orderwise and also mention their vendor code number for easy identification and registration. All enclosures are also be firmly fixed with the bills and no responsibility will be taken by the SLP Section for alleged missing of documents. Bank Guarantee must be submitted separately in sealed closed cover of the Bank to the SLP Section AND NOT TO BE ENCLOSED WITH BILL. For payment through ECS, bills will be deposited in the Box kept at the entrance of Corporate Finance Dept. as elaborated above. ECS Format of Bank particulars and Payment Procedure are enclosed at Annexure – 6 reference Clause IN 601(c) above.	IN-709 The decision of the inspecting authority or his agent, as the case may be, on any question of the intent, meaning and the scope of specifications / standards shall be final, conclusive and binding on the Sub-contractor / Supplier / Vendor. IN-710 <u>REPLACEMENT FOR REJECTION:</u> (a) Should the articles, or any portion thereof be rejected, the contractor shall collect the same from the purchaser's yard within 15 days from the date of intimation of such rejection to the supplier/vendor/sub-contractor and replace/rectify the same on top priority basis. Before collection of rejected items the supplier/vendor/sub-contractor shall furnish Bank Guarantee/Bank Draft of equivalent amount or accept GRSE holding back payment of their qualifying bills of equivalent amount till deficiencies are made good. The purchaser reserve the right to dispose off the rejected items at the end of a total period of 90 days in a manner to the best advantage to the purchaser and recover storage charges and any consequential damages, from sale proceeds of such disposal. Rejection of materials and also the late delivery will affect further business with GRSE. (b) The guarantee period of replaced parts /items shall however be reckoned from the date of replacement. (c) If the defects are not remedied within a reasonable/stipulated time, the purchaser may proceed to rectify the defects at the supplier/vendor/sub-contractor's risk & cost but without prejudice to any other rights which the purchaser may have against the supplier/vendor/sub-contractor in respect of their failure to remedy such defects.
IN-7.0	<u>Quality Assurance, Inspection ,Testing and Commissioning Assistance:</u>	
IN-701	The equipment will be inspected by one or more agencies indicated below and an inspection certificate(s) shall accompany the equipment. Statutory : M. M. D. or N. M. D. Regulatory : Classification Society–L.R.S./A.B.S/D.N.V/ I.R.S. etc. Specification: Survey, DQA(WP)/DQAN/CQAE, Classification Society. Others: Owners, W. P. S. (KOLKATA), GRSE	IN-711 The services of the Sub-contractor's / Supplier's / Vendor's Engineers shall be provided free of cost till Guarantee period / extended Guarantee period as required by the Purchaser to assist / supervise the installation, setting to work, commissioning of the equipment supplied by the Sub-contractor / Supplier / Vendor.
IN-702	The articles to be supplied shall be strictly in accordance with the drawings/specification/statement of requisition (SOR) / samples indicated in the order.	IN-712 The Sub-contractor / Supplier / Vendor shall provide the requisite training for the Purchaser's / Owner's Personnel at Sub-contractor's / Supplier's / Vendor's/ GRSE's premises or on board the vessel where the equipment is installed, in respect of the equipment received from the Sub-contractor / Supplier / Vendor. The cost of travelling, lodging, boarding etc. shall be borne as mutually agreed to and detailed in the order.
IN-703	The supplier /vendor/sub-contractor shall not sell, transfer, assign or otherwise dispose off the rights, liabilities and obligations under the contract without the previous consent of the purchaser in writing.	IN-713 The services of the Sub-contractor's / Supplier's / Vendor's Engineers shall be provided free of cost as required by the Purchaser to assist/supervise the installation, setting to work, commissioning, harbour and sea trials of the equipment supplied by the Sub-contractor / Supplier / Vendor for the periods as mutually agreed upon and as per the terms and conditions of the order.
IN-704	The articles shall be subject to Inspection and Quality Assurance by QA Authorities or their agents (Inspecting Officer) as specified in the order. The supplier/vendor/sub-contractor shall give days' notice for inspection and will make necessary arrangements / provide necessary facilities to inspectors / nominated agency to carry out inspection / testing during course of manufacture/final inspection and testing as required. Formal Inspection Certificates will be issued by the relevant QA Authorities /Agents.	Should the Purchaser / Owner desire to avail services beyond the free service periods available against the contract, the Sub-contractor / Supplier / Vendor shall quote for the same on hourly / daily rate basis along with other terms and conditions, if any.
IN-705	Immediately on receipt of order the supplier/vendor/sub-contractor shall get in touch with the Inspection Authority and submit Quality Assurance Plan. Exact scope, stages and parameters of inspection and test schedule shall be as per QA Plan duly approved by the QA Authority. All charges for inspection shall be borne by the suppliers/vendors/sub-contractor.	IN-714 Conditions of tests and inspection requirements, if not held by the Sub-contractor / Supplier / Vendor are to be obtained from the Inspection Authority. Any / all other technical clarifications may be obtained from Inspection Authority directly, under intimation to Purchaser.
IN-706	Receipt Inspection shall be carried out by GRSE/Indian Navy/Owner's representative at GRSE yard as applicable. Receipt Inspection of on-board spares (OBS) will be carried out by Quality Assurance (QA) dept. of GRSE and thereafter, the same will be mustered & handed over to ship as & when required. Joint inspection along with supplier/vendor's representative shall be carried out for major items. For materials supplied with long term preservation in sealed cases / cocoons, receipt inspection will be followed as per PRESERVATION at Cl. IN-112 above.	IN-715 The Sub-contractor / Supplier / Vendor shall accord all facilities to Purchaser's Inspectors / Nominated Agency to carry out Inspection / Testing during course of manufacture / final testing.
IN-707	The price should be inclusive of inspection/approval/certification cost to meet the relevant requirement of the technical specification. This should also include the cost of furnishing shock calculations and type test results wherever applicable.	IN-8.0 <u>Miscellaneous:</u>
IN-708	The supplier/vendor/sub-contractor shall furnish all relevant Inspection Certificates and Test & Guarantee Certificates along with each consignment and copies of same in triplicate shall also be mailed /	IN-801 <u>Force Majeure (as vetted by Min. of Law) :</u> - Should any force majeure circumstances arise, each of the contracting party shall be excused for the non fulfilment or for the delayed fulfilment of any of its contractual obligations, if the affected party within 15 days of its occurrence informs the other party in writing. Force majeure shall mean fires, floods, natural calamities or other acts such as war, turmoils, strikes (as not limited to be establishment of the seller), sabotage, explosions, quarantine restrictions beyond the control of either party. It is understood and agreed between the parties hereto that the rights and obligations of the parties shall be deemed to be in suspension during the continuance of the force majeure event as aforesaid and the said rights and obligations shall automatically revive upon the cessation of the intervening force majeure event. The period within which the rights and obligations of the parties shall be in suspension due to force majeure

event shall not be considered as a delay with respect to the period of delivery and / or acceptance of delivery under the contract or otherwise to the detriment of either party.

Notwithstanding the provisions of the immediately foregoing clauses it is further understood and agreed between the parties hereto that in the event of any force majeure persisting for an uninterrupted period exceeding 6 (six) months, either party hereto reserves the right to terminate this contract upon giving prior written notice of (thirty) days to the other party of the intention to terminate without any liability other than reimbursement on the terms provided in this agreement for the goods received.

IN-802 Arbitration:

Any dispute / differences between the parties arising out of and in connection with the contract shall be settled amicably by mutual negotiations. CMD/GRSE will be the Arbitrator. However Unresolved disputes/ differences, if any, shall be settled by Arbitration and the arbitration proceedings shall be conducted at Kolkata (India) in English language, under the Indian Arbitration and Conciliation Act, 1996.

If, at any time, before, during or after the contract period, any unsettled claim, question, dispute or difference arises between the parties, upon or in relation to or in connection with or in any way touching or concerning this tender / agreement / supply order (*retain whichever is applicable*) the same shall be referred to the Chairman & Managing Director (‘CMD’ in short) or the Managing Director (‘MD’ in short), as the case may be of Garden Reach Shipbuilders & Engineers Ltd. (GRSE Ltd’ in short) for adjudication of the said disputes or differences, as Sole Arbitrator, in accordance with the provisions of the Arbitration and Conciliation Act, 1996.

The CMD or MD, GRSE Ltd. if he so desires, may nominate / appoint another officer of GRSE Ltd. or a person, whom he thinks fit and competent, for adjudication of the disputes or differences, referred to him as the Sole Arbitrator.

Such arbitration shall, in all respects, be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996 and the rules framed thereunder or any statutory modification or re-enactment thereof for the time being in force.

The Award of the Sole Arbitrator shall be final, conclusive and binding upon the parties.

In the event of the death or resignation for any reason whatsoever of the said Sole Arbitrator, appointed by the said CMD or MD of GRSE Ltd., the CMD or MD of GRSE Ltd., on an application from either of the parties in this behalf, shall act himself as the Sole Arbitrator or nominate / appoint, in place of the outgoing Arbitrator, another officer of GRSE Ltd. or a person whom he thinks fit and competent to adjudicate the said disputes and differences in accordance with law.

Also in the event of an arbitration award is set aside by a competent court on an application from either party and unless otherwise ordered by the said court, the CMD or MD of GRSE Ltd., on an application from either party, shall himself act as Sole Arbitrator or nominate / appoint another officer of GRSE Ltd. or a person whom he thinks fit and competent to adjudicate the disputes and differences in accordance with law.

The cost of the arbitration, fees of the arbitrator, remuneration of the stenographer and clerk, stamp paper etc., as shall be decided by the Sole Arbitrator, shall be shared equally by the parties. The venue of arbitration, unless otherwise decided by the parties or by the Sole Arbitrator himself, shall be the premises of Garden Reach Shipbuilders & Engineers Ltd. located at 43/46, Garden Reach Road, Kolkata 700 024.

IN-803 Indemnification:

The Sub-contractor/Supplier/Vendor, his employees, licencees, agents or Sub-Vendor / Sub-contractor, while on site of the Purchaser for the purpose of this contract, shall indemnify the Purchaser against direct damage and / or injury to the property and/ or the person of the Purchaser or that of Purchaser’s employees, agents, Sub-Contractors / Suppliers occurring and to the extent caused by the negligence of the Sub-contractor / Supplier / Vendor, his employees, licencees, agents or Sub-contractor by making good such damages to the property, or compensating personal injury and the total liability for such damages or injury shall be as mutually discussed and agreed to.

IN-804 Use of Undue Influence / Corrupt Practices:

(a) The Sub-contractor / Supplier / Vendor should give an undertaking that he has not given, offered or promised to give, directly or indirectly any gift, consideration, reward, commission, fees, brokerage or inducement to any person in service of the Purchaser

or otherwise in procuring the contract or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of the Contract with the Purchaser for showing or forbearing to show favour or disfavour to any person in relation to the Contract or any other Contract with the Purchaser. Any breach of the aforesaid undertaking by the Sub-contractor / Supplier / Vendor or any one employed by him or acting on his behalf (whether with or without the knowledge of the Sub-contractor / Supplier / Vendor) or the commission of any offence by the Sub-contractor / Supplier / Vendor or any one employed by him or acting on his behalf, as defined in Chapter IX of the Indian Penal Code, 1980 or the Prevention of Corruption Act, 1947 or any other Act enacted for the prevention of corruption shall entitle the Purchaser to cancel the contract and all or any other contracts with the Sub-contractor / Supplier / Vendor and recover from the Sub-contractor / Supplier / Vendor the amount of any loss arising from such cancellation. A decision of the Purchaser or his nominee to the effect that a breach of the undertaking has been committed shall be final and binding on the Sub-contractor / Supplier / Vendor.

- (b) The Sub-contractor / Supplier / Vendor shall not offer or agree to give any person in the employment of Purchaser any gift or consideration of any kind as “Inducement” or “reward” for doing or forbearing to do or for having done or foreborne to do any act in relation to the obtaining or execution of the contract/s. Any breach of the aforesaid condition by the Sub-contractor / Supplier / Vendor or any one employed by them or acting on their behalf (whether with or without the knowledge of the Sub-contractor / Supplier / Vendor) or the commission of any offence by the Sub-contractor / Supplier / Vendor or by any one employed by them or acting on their behalf which shall be punishable under the Indian Penal Code 1980 or the Prevention of Corruption by Public Servants, shall entitle Purchaser to cancel the contract/s and all or any other contracts and then to recover from the Sub-contractor / Supplier / Vendor the amounts of any loss arising from such contracts’ cancellation, including but not limited to imposition of penal damages, forfeiture of Security Deposit, encashment of the Bank Guarantee and refund of the amounts paid by the Purchaser.
- (c) In case, it is found to the satisfaction of the Purchaser that the Sub-contractor / Supplier / Vendor has engaged an Agent or paid commission or influenced any person to obtain the contract as described in clauses relating to Agents / Agency Commission and use of undue Influence, the Sub-contractor / Supplier / Vendor, on a specific request of the Purchaser shall provide necessary information / inspection of the relevant financial document / information.

IN-805 Banned or de-listed Contractors:

The bidders shall give a declaration that they have not been banned or de-listed by any Government or quasi Government agencies or PSUs. If a bidder has been banned or de-listed by any Government or quasi Government agencies or PSUs, this fact must be clearly stated and it may not necessarily be a cause for disqualifying him.

IN-806

- a) As a general rule, price negotiation with L1 vendor(s) will not be entered into as far as possible, unless warranted by unreasonable price quoted in the opinion of GRSE.
- b) During Technical and / or commercial negotiation in case the participating vendors indicate the need of submission of revised price bid but the same is not acceptable by competent authority in due course, GRSE reserves the right to consider such bid(s) to be disqualified on this ground under intimation to the relevant vendor(s) before price bid opening.
- c) Delivery schedule as mentioned above is our essential requirement. GRSE reserves the right to cancel the bid if the delivery requirement is not met.
- d) Please forward your confirmation on all commercial points for acceptance of your offer in tender data sheet.
- e) In case your offer is not submitted in two separate given data sheet, the same is liable to be rejected.

TO BE SUBMITTED IN BIDDER'S LETTER HEAD

Garden Reach Shipbuilders & Engineers Ltd.

**STANDARD TERMS AND CONDITIONS OF SUPPLY
INDIGENOUS EQUIPMENT/MACHINERY.**

Tender No.....

Date

STACS CLAUSE NO.	BIDDER'S REMARKS	STACS CLAUSE NO.	BIDDER'S REMARKS	STACS CLAUSE NO.	BIDDER'S REMARKS	STACS CLAUSE NO.	BIDDER'S REMARKS
IN-101		IN-203		IN-501		IN-704	
IN-102		IN-204		IN-502		IN-705	
IN-103		IN-205		IN-503		IN-706	
IN-104		IN-206		IN-504		IN-707	
IN-105		IN-207				IN-708	
IN-106		IN-208		IN-601		IN-709	
IN-107		IN-209		IN-602.1		IN-710	
IN-108		IN-210		IN-602.2		IN-711	
IN-109		IN-211		IN-603		IN-712	
IN-110		IN-212		IN-604		IN-713	
IN-111				IN-605		IN-714	
IN-112		IN-1		IN-606		IN-715	
IN-113		IN-2		IN-607.1			
IN-114		IN-3		IN-607.2		IN-801	
IN-115		IN-4		IN-607.3		IN-802	
IN-116		IN-5		IN-607.4		IN-803	
IN-117		IN-6		IN-607.5		IN-804	
IN-118				IN-607.6		IN-805	
IN-119		IN-401		IN-608		IN-806	
IN-120		IN-402					
		IN-403		IN-701			
IN-201		IN-404		IN-702			
IN-202		IN-405		IN-703			

COMPANY SEAL.

SIGNATURE
NAME
DESIGNATION.....
COMPANY NAME & ADDRESS
.....
.....

NOTE:

- Bidders should read the standard terms and conditions(STACS) included in the Tender carefully prior to filling up this acceptance format.
- This format should be properly filled signed and returned along with your technical bid for considering your bid.
- Please indicate ACC- For accepted, NO – For not accepted and DEV – For deviation taken.
- Separate sheet to be attached for any deviation taken by you.
- STACS clause numbers shown in the format includes the sub clauses under them also.

Ref. Tender No. : dated

INTEGRITY PACT TO BE EXECUTED FOR HIGH VALUE ORDERS

- 1. IN FORMAT ENCLOSED.**
- 2. IN NON-JUDICIAL STAMP PAPER OF VALUE RS.110 / -.**
- 3. TO BE EXECUTED BY PERSON WITH APPROPRIATE AUTHORITY.**

INTEGRITY PACT

This Integrity Pact is made on day of (month & year) between M / s Garden Reach Shipbuilders & Engineers Limited (GRSE) having its Registered & Corporate office at GRSE Bhavan, 61, Garden Reach Road, Kolkata, West Bengal – 700024, India, hereinafter referred to as "The Principal"

and

M / s, a company / firm / individual (status of the company), PSU / Partnership / Joint Venture and having its registered office at, hereinafter referred to as "the Bidder / Contractor".

The Principal intends to award, under laid down organizational procedures, contract for The Principal values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness / transparency in its relations with its Capital Bidder(s) / or Contractors(s).

In order to achieve these goals, the Principal has appointed Independent External Monitors (IEMs) in consultation with Central Vigilance Commission, who will monitor the tender process and the execution of the contract for compliance with the principals mentioned above.

Section 1 - Commitments of the Principal

[1] The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:

- a) 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.
- b) 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.
- c) The principal will exclude from the process all known prejudiced persons.

[2] If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC / PC Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s) / Contractor(s)

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

- a) The Bidder(s) / Contractor(s) will not, directly or through any other person or firm, offer, promise or give 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 or 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.
- b) The Bidder(s) / Contractor(s) will not enter with other Bidders into any 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.
- c) The Bidder(s) / Contractor(s) will not commit any offence under the relevant IPC / PC Act. Further, the Bidder(s) / Contractor(s) will not use improperly, for purpose 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.
- d) The Bidder(s) / Contractor(s) of foreign origin shall disclose the name and address of the Agents / representatives in India, if any. Similarly, the Bidder(s) / Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. Further, details as mentioned in the "Guidelines on Indian Agents of Foreign Suppliers" shall be disclosed by the Bidder(s) / Contractor(s). Further, as mentioned in the Guidelines all the payments made to the Indian agent / representative have to be in Indian Rupees only, copy of the "Guidelines on Indian agent of foreign Supplier" is annexed and marked as annex.
- e) The Bidder(s) / Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

[2] The Bidder(s) / Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

[3] In case the Bidder(s) / Contractor(s) is a Joint Venture, then all the Partners of the Joint Venture should sign this Integrity Pact. The Bidder(s) / Contractor(s) shall ensure the compliance of the provisions of this Integrity Pact by all its Joint Venture Partners. Further, the Bidder(s) / Contractor(s) shall be held responsible for any violation / breach of the provisions of IP by any one or more of its Partners.

[4] The Bidder(s) / Contractor(s) shall ensure compliance of the provisions of this Integrity Pact by sub-contractor(s), if any. In this regard, Bidder(s) / Contractor(s) shall ensure for entering into a similar Integrity pact arrangement with their respective sub-contractor(s) before entering into any specific sub contractual arrangement, in connection with execution of main contract with Principal. The Integrity Pact shall be generally executed in all such cases where the value of sub contract works is Rs. 2 Crore and above, the content of IP can be decided by Bidder(s) / Contractor(s), which shall be in similar lines of this main Integrity Pact.

The signed Integrity Pact needs to be retained by the Bidder(s) / Seller(s) and shall be submitted to Principal, upon seeking such information. Further, the Bidder(s) / Seller(s) shall be held responsible for any violation / breach of the provisions by its sub-contractor(s).

[5] The Bidder(s) / Contractor(s) signing Integrity Pact shall not approach the any Court of Law while representing the matters to IEMs and until IEMs delivers their decision in the matter.

Section 3 – Previous Transgression

[1] The Bidder(s) / Contractor(s) declares that no previous transgressions have occurred in the last 3 years from the date of signing of this Integrity Pact 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.

[2] If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as per the Company's procedure.

Section 4 – 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 or 3 above or in any other form 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 or take action as per the extant procedure of the company.

Section 5 – Compensation for Damages

[1] If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 4, the Principal is entitled to demand and recover the damages equivalent to earnest Money Deposit / Bid Security.

[2] If the principal has terminated the contract according to Section 4, or if the Principal is entitled to terminate the contract according to Section 4, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the Contract value or the amount equivalent to Performance Bank Guarantee.

Section 6 – Equal treatment of all Bidders / Contractors / Sub-contractors

[1] The Bidder(s) / Contractor(s) undertake(s) to demand from all sub-contractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.

[2] The Principal will enter into agreements with identical conditions as this one with all Bidders, Contractors and Sub-contractors.

[3] The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7 – Criminal charges against violating Bidder(s) / Contractor(s) / Sub-contractor(s)

If the Principal obtains knowledge of conduct of a Bidder(s) / Contractor(s) or Sub-contractor(s), or of an employee or a representative or an associate of a Bidder(s) / Contractor(s) or Sub-contractor(s) which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to the Chief Vigilance Officer.

Section 8 – Independent External Monitors (IEMs)

[1] The Principal has appointed competent and credible Independent External Monitors (IEMs) for this Integrity Pact in consultation with the Central Vigilance Commission. 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.

[2] The IEMs are not subject to instructions by the representative of the parties and perform their functions neutrally and independently. IEMs reports to the Chairman and Managing Director (CMD) of the GRSE.

[3] The Bidder(s) / Contractor(s) accepts that the IEMs have the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the IEMs, upon their request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Sub-contractors. The IEMs are under contractual obligation to treat the

information and documents of the Bidder(s) / Contractor(s) / Subcontractor(s) with confidentiality.

[4] The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Project 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.

[5] As soon as the IEMs notices, or believes to notice, a violation of this Integrity Pact, they will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The IEMs can in this submit recommendations, these recommendations would be in the nature of advice would not be legally binding. Beyond this, the IEMs has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

[6] The IEMs will submit a written report to the Chairman and Managing Director of the GRSE within 8 to 10 weeks from the date of reference or intimation to them by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

[7] IEMs shall be entitled to compensation on the same terms as being extended to / provided to Independent Directors on the Board of the GRSE.

[8] If the IEMs have reported to the Chairman and Managing Director of the GRSE a substantiated suspicion of an offence under relevant IPC / PC Act, and the Chairman and Managing Director of the GRSE has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the IEMs may also transmit this information directly to the Central Vigilance Commissioner.

Section 9 – Integrity Pact Duration

[1] The validity of this Integrity Pact shall be from date of its signing and extend up to the complete execution of the contract to the satisfaction of both the BUYER and the BIDDER / SELLER, including warranty period, whichever is later. In case BIDDER is unsuccessful, this INTEGRITY Pact shall expire after six months from the date of the signing of the contract.

[2] If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this Integrity Pact as specified above, unless it is discharged / determined by CMD of GRSE.

Section 10 – Law and Place of Jurisdiction

This Integrity Pact is subject to Indian Laws. Place of performance and jurisdiction is the Registered and Corporate Office of the Principal i.e. Kolkata, India.

Section 11 – Other Legal Actions

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings.

Section 12 – Other Provisions

[1] Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

[2] If the Contractor is a partnership or a consortium or a joint venture, this pact must be signed by all partners or consortium / joint venture.

[3] Should one or several provisions of this 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.

Section 13 – Fall Clause:

The BIDDER undertakes that it has not supplied / is not supplying similar product / systems or subsystems at a price lower than that offered in the present bid in respect of any other Ministry / Department of the Government of India or PSU and if it is found at any stage that similar product / systems or sub systems was supplied by the BIDDER to any other Ministry / Department of the Government of India or a PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the BIDDER to the BUYER, if the contract has already been concluded.

The Parties hereby sign this Integrity Pact, is deemed as part of the Contract, at on and parties concerned are bound by its provisions.

(For & On behalf of the Principal)
(Office Seal)

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

Date:

Place:

Witness 1:
(Name & Address)
.....
.....

Witness 2:
(Name & Address)
.....
.....

Signature of Vendor representative

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GARDEN REACH SHIPBUILDERS AND ENGINEERS LIMITED

OCEANOGRAPHIC RESEARCH VESSEL (ORV)

SPECIFICATION OF TECHNICAL REQUIREMENTS

FOR

COMPUTERISED CONTROL, ALARM AND MONITORING SYSTEM(CCAMS)

Yard No. 3041

RECORD OF REVISION

Rev No	Date	Details	Signature	Checked By
00	24-04-2025	Issued for Purchase	Syed Habibul Ershad	T. Roy & D. Nandi

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1 CHAPTER – 1: GENERAL INFORMATION OF THE VESSEL

1.1 Out Line of the vessel

Oceanographic Research Vessel (ORV) shall be designed and built by GRSE for world-wide service as per the requirements of NCPOR. The vessel shall be multidisciplinary vessel utilized as national facility by Ministry of Earth Sciences, for Deep Sea Minerals investigations including Hydrothermal program, PMN program and other programs of MoES etc. aimed for studying all living and non-living resources and other oceanographic R&D and exploration studies in Indian Ocean region. The vessel shall be powered with two electric AC motors designed for marine propulsion.

1.2 Principal Particulars

- LOA 89.50 M
- BREADTH 18.80 M
- DRAUGHT 6 M
- DISPLACEMENT 5900 T (APPX.)
- MAX SPEED 14 KNOTS @ 90% MCR
- ENDURANCE 45 days @ 12 knots with 10% fuel reserve
- MATERIAL CLASS CERTIFIED SHIPBUILDING
- ACCOMMODATION 60 PLUS HOSPITAL

1.3 Classification

The vessel shall be classed with IRS as the primary class with following class notations,

“IRS SUL Ha(B), IY, SYJ, DP(2), IBS, EP, TCM, “Oceanographic Research Vessel”

In addition, the vessel shall be classed through dual class under ABS with the following equivalent notations, **✕ A1, ✕ AMS, ✕ ACCU, Ice Class IC, SPS, ✕ DPS-2, TCM, ENVIRO, NBLES (COS), HAB(WB), VIB-M, UWN (R).**

1.4 Technical Parameters

- Speed:
 - 14 knots at 90% MCR (with Gondola attached and drop keel retracted) at 6 M Draught, 0.5M significant wave height or less and 10 knots or less wind speed.
 - 12 knots economical
 - 3 knots minimum sustained speed
- Endurance: 45 days' transit at 12 knots.

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1.5 Other dimensions:

- Depth to tween deck 6.80 m
- Depth to main deck 9.80 m
- Depth to 1st deck 12.50 m
- Depth to 2nd deck 15.20 m
- Frame spacing 600 mm.

1.6 Environmental Condition:

- Seawater temperature : -2°C to 32°C.
- Minimum air temperature : -20°C
- Maximum air temperature : +36°C at 100% air humidity.
- Maximum air temperature : +40°C at 70% air humidity.

1.7 List and trim:

Equipment and systems to operate satisfactorily under the conditions of List & trim as specified in Class rule.

- a) Pitching $\pm 7.5^\circ$ from mean water lines.
- b) Permanently listed 15° either side.
- c) Rolling 22.5° either side of the vertical.
- d) Trim: 5° .

1.8 Electrical Power supply

415V, 3 Ph, 50 Hz. AC Supply

415V, 3 Ph, 50 Hz ship supply will be provided to CCAMS UPS as input. Firm will derive 230VAC Control voltage or any other voltage as required. Necessary power backup also to be catered by CCAMS supplier complying Class requirement. Also refer clause 4.1 for 415V AC Power supply characteristic.

1.9 Qualification Criteria:

- (a) The authorized rep of the nominated maker(Refer Clause 4.33) for equipment in the tender are qualified to bid for the tender and are required to submit valid OEM authorization along with the offer.
- (b) Pre-bid meeting will be conducted post 07 days of tender publication. Accordingly, Technical clarifications, if required by the firm, to be submitted prior pre-bid meeting.

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2 CHAPTER – 2: TECHNICAL SPECIFICATION FOR CENTRALIZED CONTROL, ALARM & MONITORING SYSTEM

2.1 Introduction

Computerized Control, Alarm and Monitoring System (CCAMS)

For control, alarm and monitoring of the machinery system on board, a dual redundant Gigabit Ethernet network & distributed microprocessor-based open architecture system shall be provided. The system shall accommodate as a minimum Control, all alarms and remote indications as specified for **unattended machinery spaces** in accordance with Class notation such as IRS: SYJ and ABS: ACCU. The system shall take care of the following tasks but not limited to:

- Alarm and monitoring
- Mimic picture presentation (a number of 50 mimic pictures shall be available)
- Power management system integration.
- Remote sounding of tank volumes with computer processing of contents etc.
- Propulsion system and its auxiliaries alarm and safety system.
- Alarm printing
- Data logging
- Condition monitoring
- Trends
- Remote control
- Level alarming.
- Maritime electronic logbooks

CCAMS system shall have external interfacing as per Indicative I/O signal list which is placed in Annexure-B. The detailed I/O List will be finalized during detailed design stage in discussion with OEMs. 20% growth margin to be provided/considered.

2.2 Regulations and standards

- Relevant ABS Guidelines.
- Relevant IRS Guidelines.
- Republications 60092-201, 60092-202.
- Cables - IEC Publication 60092-350, 60092-352, 60092-353, 60092-354, 60092-360, 60092-370, 60092-376
- IEC 60945 & 60533
- Any other relevant Marine standard / guidelines as per OEM.

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2.3 General requirements

The general features of the system should include

1. Latest Hardware and software versions
2. Fully redundant Network and control stations
3. Advance human machine interface
4. Redundant interfaces for major systems as per classification requirements
5. Hardware commonality
6. Minimal cabling
7. Ease in control transfer
8. Compliant to latest marine classification society standards.

2.4 Technical Requirements

The CCAMS system as a minimum should comprise of control/alarm/monitoring of following as applicable:

- Propulsion plant and auxiliaries – alarm, monitoring and safety
- Generator Plant and Auxiliaries - alarm, monitoring and Safety
- Main power distribution (MSB Alarms)
- Power management system interface
- Tank sounding system interface
- Bilge level alarm system
- Remote valve control system
- HVAC
- Various Pumps interface
- Deadman alarm system
- Data logging & Printing
- Engineers call system (Duty Engineers)
- Siren/sounders & flashing lights
- Control, Various Monitoring & Common fault alarm of other machineries and equipment.
- Various other Ship's Systems interface

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2.5 Scope of Supply (Main Equipment):

SL	Equipment	Qty/ ship	Remarks
1	Complete workstation with all accessories for Centralized control station –ECR	02 Nos.	Refer Clause 2.6.1.1
2	Complete workstation with all accessories for Bridge	01 No.	Refer Clause 2.6.1.2
3	Extension alarm panels (Repeater alarm panels)	11 Nos.	Refer Clause 2.6.1.3
4	Processing Parts – Controller Cabinets	As required	Refer Clause 2.6.2.1
5	Field Stations (I/O Cabinets)	As required	Refer Clause 2.6.2.2
6	UPS with sealed maintenance free batteries	02 Sets	Refer Clause 2.6.3.1 & 2.6.3.2
7	UPS Distribution Board	As required	Refer Clause 2.6.3.3
8	Network switch box/Network Equipment	As required	Refer Clause 2.6.4
9	Audio Visual Control cabinet	01 No.	Refer Clause 2.6.5.1
10	Alarm Columns along with flashing lights and horn	07 Nos.	Refer Clause 2.6.5.2
11	Alarm Sirens	02 Nos.	Refer Clause 2.6.5.3
12	Pager	05 Nos.	Refer Clause 2.6.6
13	CCAMS Event and alarm printers	02 Nos.	Refer Clause 2.6.7
14	A4 Hardcopy printer	02 Nos.	Refer Clause 2.6.7
15	Any other equipment, Special interconnecting cables, accessories etc. as per OEM standard.	As required	For achieving: (i) smooth system configuration, interfacing/ integrations etc. (ii) Control, alarm & monitoring requirements in CCAMS System.
16	Dead man alarm system ON /OFF Panel	02 Nos.	Refer 2.6.8
17	Dead man alarm reset box	05 Nos.	Refer 2.6.8
18	Load And Trim Computer	01 No	Refer 2.6.9

Note: The proposed CCAMS system must have an outstanding track record of performance in the Marine field. The bidder must furnish a “Reference List” in support of track record. Any other item not mentioned above/ in this but required for successful completion of the system is also required to be quoted.

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2.6 Scope of Supply (Descriptions):

The CCAMS System shall be divided in following parts:

- Display and control workstations
- Processing Part
- Power distribution
- Network
- AV Alarm control stations
- Software
- Any other Miscellaneous Items to meet complete functionality of the System.

2.6.1 Display and control Workstations

The control and monitoring shall be achieved from two locations

- | | | |
|---|---|---------|
| - Centralized control station i.e. ECR | - | 02 Nos. |
| - Navigation Bridge | - | 01 Nos. |
| - Repeater alarm panels (Only Monitoring) | - | 11 Nos. |

2.6.1.1 Centralized control station –ECR: Work Stations - 2 Nos

(i) Drop-in panels for Marine operator console for installation in control room environments. Each workstation should include following:

- (a) Minimum 19" display VDU Screen.
- (b) Operator alphanumeric Keypad including programmable keypad function keys
- (c) Pointing device/Mouse
- (d) Latest windows operating system
- (e) Processor and other miscellaneous items.

(ii) Watch/ responsibility panel LCD Type - 1 No. (Flush type) (Note: Only 1 no. Panel to be provided against 2 Nos. ECR Work stations.

(iii) Hardcopy printer – 1 No. (Note: Only 1 no. Printer to be provided against 2 Nos. ECR Work stations. (Also refer Clause 2.6.7)

(iv) Alarm printer – 1 No. (Note: Only 1 no. Printer to be provided against 2 Nos. ECR Work stations. (Also refer Clause 2.6.7)

ECR Consoles/Carcass is not in CCAMS supplier's scope. All equipment which are to be fitted on the ECR Consoles, should be of drop in type with optimized dimensions and same are to be indicated in the technical offer as the same has to be shared with the Console OEM to design ECR console.

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2.6.1.2 Workstation for Navigation Bridge: Work Stations - 1 No

(i) Drop-in panels for Marinized operator console for installation in control room environments.

Workstation should include following:

- (a) Minimum 19" display VDU Screen.
- (b) Operator alphanumeric Keypad including programmable keypad function keys
- (c) Pointing device/Mouse
- (d) Latest windows operating system
- (e) Processor and other miscellaneous items.
- (ii) Watch/ responsibility panel LCD Type - 1 No. (Flush Type)
- (iii) Alarm printer – 1 No. (Also refer Clause 2.6.7)
- (iv) Hardcopy printer – 1 No. (Also refer Clause 2.6.7)

Navigation Bridge Console/Carcass is not in CCAMS supplier's scope. All equipment which are to be fitted on the Navigation Bridge Console, should be of drop in type with optimized dimensions and same are to be indicated in the technical offer as the same has to be shared with the Console OEM to design ECR console.

2.6.1.3 Repeater alarm panels (Extension alarm panels): Quantity – 11 Nos.

(a) The extension alarm system is an extension of the CCAMS concerning the display of the alarms in public areas and engineer cabins. The purpose of this system is to display the alarms managed by the CCAMS when there is no operator in the ECR and/or in Bridge

(b) The alarms will be sorted depending on their source (generator, Propulsion or fire) and sent to the extension alarm panel defined in the CCAMS.

(c) This system displays urgent alarms and indicates the engineer on duty.

(d) Total 11 Nos. Extension Alarm Panels along with buzzer are to be provided for installation in:

- Chief engineer's cabin with additional buzzer in bedroom, LCD Type
- 1ST Engineers cabin with additional buzzer in bedroom. LED Type
- Electrician cabin with additional buzzer in bedroom. LED Type
- Mess room-LED Type
- Mechanical Workshop-LED Type
- Electrical Workshop – LED Type
- Machinery room – LED type
- Propulsion room – LED type
- Switchboard Room– LED type
- Separator room – LED type
- Bow Thruster room – LED type

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(e) The CCAMS will transfer the ECR alarms to wheelhouse and or accommodation area during unmanned engine room operation. Note that final alarm acknowledgement will always perform from ECR /Local control panel.

(f) Each Extension Alarm Panel shall have:

- Approx. 12 Group alarm displays (Indicative)
- Approx. 8-line LCD for display for latest alarms (Indicative)
- Dedicated LED for – Duty engineer, Dead man alarm, unattended operation and engineer's call
- Alarm contacts available to interface with pager system or external buzzer.
- Link between panels and CCAMS workstations
- Flush wall mounted in Accommodation and wall mounted with enclosure for
- machinery Room environments

(g) Alarm Groups (For Extension alarm panels)

The machinery alarms are to be grouped in following alarms

1. Generator alarms
2. Propulsion alarms
3. PMS/MSB alarms
4. Flooding/Bilge alarms
5. Fire detection system alarm
6. Boiler alarm
7. Thruster alarm
8. Engineer's call
9. CCAMS Fault
10. Miscellaneous alarms
11. Spare
12. Spare

Above grouping are indicative. Same will be finalised during detail design in consultation with OEM.

(h) Engineer's call

- The CCAMS system shall also be used for engineer assist call system from ECR.
- When operator selects one or more *CALL ENGINEER* from the mimic *EXTENSION ALARM SYSTEM ENGINEER*, the light *ENGINEER CALL* and the buzzer on the panels selected should be activated.

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- The light and buzzer on officer's mess and machinery room shall also to be activated. The select push button on the mimic will flashing until such the called engineer has stop the buzzer on his panel. The operator stops the call from the mimic by pushing on selected engineers call.

(j) Extension Alarm System EAS Functions

	Workstations		Extension alarm panels				
	ECR	Wheelhouse	mess	1 st engineer cabin	Chief engineer cabin	Electrician cabin	7 x machinery compt
Integrated in CCAMS operator station (for console fitment)	x	x					
Flush mounting EAS Panel (for modular compmts.)			x	x	x	x	
Wall mounting EAS panel (for non-modular compmts.)							x
Selection of engineer on duty	x						
Indication of engineer on duty	x	x					
On duty indication				x	x	x	x
Transfer to unmanned mode	x						
Buzzer for transfer indication	x	x					
Accepted unmanned transfer	x	x					
Indication of Machinery alarms groups			x	x	x	x	x
Buzzer alarm			x	x	x	x	x
Buzzer acknowledge			x	x	x	x	x
Test lamps and buzzer			x	x	x	x	x
Engineer call system	x	x					

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2.6.2 Processing part

Microprocessor-based System to be provided. System configuration with line diagram indicating quantity of IO Field Stations, Control Cabinets etc to be provided as part of Firm's offer. Same will be finalised during detailed design.

2.6.2.1 Controller cabinets

- Provides interface with various ship's Systems as per OEM design
- Compact and light weight design
- IP-44
- Cable entry bottom with undrilled gland plate
- I/O Channels (Hardwire, Serial Link) as per OEM Design.
- Dual Ethernet interface with HMI as per OEM standard

2.6.2.2 Field stations (I/O Cabinets)

Each field station has following features as a minimum

- Provides interface with various ship's Systems as per OEM design
- I/O Channels (Hardwire, Serial Link) as per OEM Design.
- IP-44
- Compact and light weight design
- Bulkhead mounting
- Watch call interface

2.6.3 Power Distribution

2.6.3.1 UPS: Quantity -2 Nos.

- UPS is to be fed from two feeders 3Ph, 415V, 50 Hz (Main & Emergency Ship's Supply). Towards this, Automatic change over Switch with DB, if required, shall be provided by the firm.
- Capacity of each UPS is considered as 3.2 KW. UPS Capacity and Power supply architecture to be submitted with Firm's offer as part of Line Diagram.
- COTS type Marine Grade UPS with batteries to be supplied for providing continuous power during loss of ship's power for a minimum period of 30 minutes. CCAMS vendor to ensure adequacy of uninterrupted power for the CCAMS sub units.
- UPS shall prevent power transients as ship service power is lost and restored such that no loss of control or mal-operation of the CCAMS units results from these transitions. Battery charging shall be automatic and shall not affect normal unit operation. Battery charging circuits shall be design as per

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as Class Rules & Regulations. Battery charger circuits shall be capable of recharging the battery from 40% capacity to 80% capacity within 8 Hours.

- Alarms via dry contact and interfaced to the nearest Field Station
- IP22 Protection
- Compact design

2.6.3.2 UPS Batteries

- UPS batteries shall be maintenance-free Absorbed Glass Mat (AGM), Valve Regulated Lead-Acid (VRLA) type against each UPS as refereed clause 2.6.3.1.
- Batteries shall be supplied prior to setting to work (STW) of the system.

2.6.3.3 UPS Distribution board

- Distribution board(s) with feeders as per System requirement to be provided. Same to be indicated in line diagram to be submitted as part of firm's offer.
- Construction, protection devices, meters shall be as per class requirement.

2.6.4 Network Equipment/ Network switch box

- Network Components to cater dual redundant Gigabit Ethernet network, to be provided.
- Network architecture to be submitted with firm's offer as part of Line Diagram.

2.6.5 AV Alarm control stations

2.6.5.1 Alarm column Control cabinet: Quantity – 1 No.

The control cabinet provides interface between alarm signals and alarm columns & Sirens.

2.6.5.2 Alarm Column: Quantity – 7 Nos.

- Each alarm column shall tentatively cover following functionality, as required by Class:
 - General emergency alarm
 - Fire alarm
 - Machinery alarm
 - Local FIFI system Alarm (Water mist)
 - Telephone call
 - CO2 FF Alarm
 - ER/DG Room announcement
 - Dead Man Alarm

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- Each column shall have following physical features
 - IP44
 - 1 x column mounted red flashing light
 - 1 x column mounted amber flashing light
 - 1 x column mounted multi-tonal horn (118dB(A) max.)
- Alarm column shall be provided at
 - Engine room
 - Propulsion room
 - Switchboard room
 - Harbour generator room
 - Separator room
 - Engine store
 - Bow thruster room
- The acoustic signal shall have a loudness that can be heard in the machinery rooms when the machineries are in service/operation.

2.6.5.3 Alarm Siren - 2 Nos.

Location – Mechanical workshop, Electrical Workshop

2.6.6 Pager

- The system also shall be connected to personal pagers of marine type, with working range all over the Vessel.
- Five (5) off pagers with integration facility shall be delivered with shipset.

2.6.7 Data Logging & Printing

- Logging of alarms and events
- The system to register all occurring and acknowledged alarms on a printer in chronological order.
- The chronological listing shall always include substantial mode events like e.g. start, stop of diesel engines etc., date and time.
- Further it shall be possible to print a list of existing alarms, both activated with fixed time intervals and activated by the operator.
- Following printers to be provided
 1. CCAMS Event /alarm printer (80 column dot matrix, B&W, A4) as per Class/OEM recommendation – 2Nos.
 2. A4 Colour inkjet Hardcopy printer – 2 Nos.

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2.6.8 Deadman alarm system

- Dead Man Alarm System to monitor presence of personnel in machinery spaces by providing remote warning at CCAMS HMI. Boxes shall cover following locations:
 - ON/OFF Panel – 2 off (ECR for Aft entry, Bow Thruster Area for Fwd Entry)
 - Reset Box – 5 off (Propulsion Rm, DG Rm, Bow Thruster Rm, STP Rm & AC/Chiller Plant)
- Each box shall have the following features:
 - Hardwired interface with nearest Field Station Unit
 - IP44 Protection
 - Bulkhead Mounted
- Dead Man System set up and activation shall be via dedicated mimic on CCAMS HMI.

2.6.9 Load/trim Computer: Quantity – 01 no.

Approved load/trim computer (COTS PC) with basic stability parameters including loading and trim conditions to be provided. Same to be supplied at drop-in for fitment in Wheelhouse Console.

2.7 INTERFACE REQUIREMENTS

2.7.1 Firm shall provide all information required for integration of the equipment onboard. Total equipment integration with other systems shall be firm's responsibility. Tentative list of I/O signals is provided at Annexure-B. Same will be finalized during detail design in discussion with OEMs. The following information per signal must be included in the said 'List' as a minimum:

Signal Type:	E.g., 4-20mA, RTD (Pt100), +/-10V, relay
Field Input or Output:	contact, serial data word, etc.
Field Station Reference:	E.g., 4-20mA input to CCAMS
System Identification:	E.g., FS-04
Signal Function:	E.g., Fore-peak Water Ballast Tank
Unit (if applicable):	E.g., Level Indication, Alarm High/Low
Signal Scale/Range:	(LIAHL)
(if applicable)	E.g., Metres
	E.g., 4-20mA)

2.7.2 Integration with PMS (Power management system)

- PMS will be supplied by Switchboard supplier.
- CCAMS shall have Control of various DGs START/STOP and Breakers ON/OFF through the

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CCAMS mimic in SEMI-AUTO/Slave mode.

- Further processing such as parallel operations and load sharing, will be managed automatically by the PMS in the main switchboard.
- In addition, PMS, Switch Board & DGs, various Alarms & monitoring Statuses shall be available in CCAMS displays.
- Control transfer priority in between ECR & Bridge Console shall be as per Class as applicable.

2.7.3. Integration with other Ship's System

Further to Annexure-B, interface with electrical systems such as Voyage data recorder, Master clock system, CCTV, Ship's Telephone, ER/DG Room Announcement etc. to be catered to comply applicable Class requirements.

2.7.4 Special functional requirements

- o The alarm system shall give visual and audible alarm in case of failures to the system.
- o Alarms shall be shown on 19" VDU engineering workstations. The alarm can only be acknowledged from the station on watch and not until the sound transmitter has been set off.
- o Alarms which are not acknowledged within a certain time limit must release a general alarm.
- o The workstation on the watch shall be permanently indicated on all VDU-work stations.
- o Alarms shall be shown both on special alarm-list pictures and at their approximate location on the related color graphic mimic picture.
- o On the alarm list and the color graphic mimic picture the status of the alarms (alarm / not acknowledged / acknowledged) shall be shown. Flashing for not acknowledged, change of color for alarm/not alarm.
- o The first up alarm not acknowledged as well as the total number of existing alarms shall be permanently indicated on all VDU-work stations.
- o In the system it shall be possible to suppress automatically alarms when these are non-essential- for example low pressure alarms from engines shall be suppressed when these are stopped.
- o All alarms shall have a filtering function (i.e. time delay) preventing alarms under normal operation conditions. This applies for tank level alarms which shall have a delay which is greater than the natural rolling time.
- o The alarm system shall have a facility for alarm monitoring of exhaust temperatures of diesel engines based on deviation from average.
- o Maneuvering alarm shall be indicated by means of flashing and sound. Maneuvering alarms shall be specified on the display of the operating panels.
- o The transfer of control between the navigating bridge and machinery spaces is to be possible

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only in the main machinery space or in the main machinery control room. Changeover between control locations is to be arranged so that it may be affected with the acceptance of the location taking control. The system is to be provided with interlocks or other suitable means to ensure effective transfer of control. The system is to include means to prevent mal function/undesirable situations during transferring control from one location to another.

- o The alarm system is to be able to indicate at the same time more than one fault and the acceptance of any alarm is not to inhibit another alarm.
- o The alarm system is to be capable of being tested during normal machinery operation.
- o Any alarm condition in the engine room is to activate an alarm in the watch-keeping engineer officer's cabin and dayroom. Acknowledgement in the cabin is to be indicated on the bridge when the engine room is unattended.
- o Firm shall prepare and submit FMEA (Failure modes and effect analysis) report to Class. Any other drawing/document required for obtaining Class notation shall be submitted by the firm.
- o Where a system is provided with remote connectivity for monitoring, and /or for remote, maintenance following requirements are to be complied with, as a minimum:
 - o A detailed risk assessment is to be carried out by vendor before implementing normal protection through devices such as fire walls, antivirus etc.
- o Networking between Sensors wherever specified is to have no latency for data transfer.
- o Automation and instrumentation shall be designed to comply with the Class requirements for an unmanned engine room.
- o Centralised microprocessor-based controls, instrumentation and monitoring equipment shall be arranged suitably in console in control room and with VDU in wheelhouse console.
- o System arrangements shall be such that no single fault, failure of power supply or system malfunction will prevent effective plant control being retained.
- o Control systems design to allow the operation of plant under automatic control across the full operating range with variables maintained at their set values.
- o Cabling from sensors to output services (such as valve actuators) shall be continuously monitored to detect both open and short circuits and defects in the field components.
- o Any fault condition in a microprocessor-based system shall initiate an alarm, giving both the nature and location of the fault.
- o Where possible, safety systems shall be designed as NO-circuits with loop monitoring (normally open) and alarm systems as NC-circuits (normally closed).

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- o Consideration shall be given in the design of all equipment to the environmental conditions of shipboard service and proven marine components shall be employed. Particular emphasis shall be placed on corrosion, temperatures, vibrations, shock effects, power supplied and electrical interference effects.
- o The automation and instrumentation plant shall be based on a system with separate sensors for alarm circuits, safety systems and control loops.

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3 CHAPTER- 3: OTHER REQUIREMENTS

3.1 On Board Spares (OBS) – 1 Set per Ship

- Manufacturer recommended spares for period of 02 years to be supplied as part of the scope.
- Item wise price for on board spares to be indicated in offer.
- The vendor required to include class recommended OBS, as applicable.

3.2 Special Tools and Test Equipment - 1Set per Ship

- The Firm shall supply one set of special tools/Test Equipment and the same shall be furnished along with the offer.

3.3 Language:

- For all equipment, the display panels, functional menus, software inputs / outputs, functions and all manuals shall be in English.

3.4 Documentation:

- Documentations shall be supplied as detailed below: -

SL.	ITEM	QTY
1	Manuals (included with As Made drawings) Consists of - Installation manual - Operator manual - Maintenance manual - Software Documentation	Hardcopy - 03 sets 03 Sets on CD/latest digital media per ship
2	As Made drawings (approved by Inspection Authority)	
3	3D model of all equipment/sensor to be provided in .stp format	
4	HAT/SAT Schedules (Approved)	
5	Type Approval Certificate, Shop Test Report & Inspection Certificate (IRS & ABS).	
6	Calibration Data/ Certificate	
7	On-board spares list	

- All documentations must be in English.
- All documents must be legible and user friendly.
- All drawings and documents shall contain dimensions and other parameters in metric units (SI Units).
- The manuals also should cover all aspects of the system like calibration, post-processing, servicing

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and troubleshooting, etc.

(e) **Electronic manual-** OEM is to give all the data/document (operation & instruction manual, installation manual, CPIL/PIL, Maintenance manual, system drawing, FAT report, and spare part list) in searchable PDF (scanned copy not acceptable) in a separate CD/DVD.

3.5 Service Engineer

The Supplier shall provide the necessary service of engineers to carry out the following activities:

- (a) Installation, if required
- (b) Check wire and Connectorisation
- (c) Setting to Work
- (d) Harbour and Sea Acceptance Trials

Service Engineers shall bring their own test equipment/ calibration kit, tools and adequate spares for installation, setting to work and commissioning at their own cost. OB spares shall not be used for this purpose.

The Supplier shall indicate total cost (In Price Bid) for executing all technical activities in the offer. Supplier need to give activity wise cost break-up along with Man-days in the price bid. No extra man-days/ payment on this account shall be admissible or considered on completion of total technical assistance.

The Supplier shall undertake Installation inspection/ checking of Connectorisation/ STW/ HAT/ SAT as per time schedule finalized in discussion with Berth officer.

In case of any irregularities in the operation/ performance of the system or non- conformance to specified parameters observed on integration with ship's system, the OEM is bound to rectify the defect. The Supplier shall ensure complete responsibility of satisfactory operation of the system on board.

3.6 Training

The OEM shall provide an operational and maintenance training course to the crew on-board. A detailed training package for on board exploitation, maintenance and repair activities along with tools and test kits that would be required for such maintenance shall be offered in connection with STW activities.

Training aids comprising of audio - visual / CBT packages (on operation, maintenance and repair activities) are to be provided. The training material will be provided in hard/ soft copies to the participants. The duration and number of personnel recommended for training needs to be indicated in offer.

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3.7 Binding Drawings and documents:

The manufacturers shall submit as made drawings sufficiently detailed to show the manner of construction and operation, the method of assembling and dismantling for each item. The following binding drawing/documents shall be submitted to Shipyard for comments within 4 weeks of placement of the LOA/PO. During this detail design period, exhaustive design review meetings will be conducted with the Firm towards system finalization. Post incorporation of shipyard comments, final Binding Data to be submitted by the firm to Class for approval.

- Installation drawings indicating overall and principal dimensions (in metric units), C.G., weight, maintenance envelope, IP rating, Power ratings, ventilation port, lifting points, door opening, shock/ vibration mount details, mounting hole dimensions, gland plate & cable entry details etc. of each unit. Detailed foundation drawing including bolting plan shall be included.
Necessary drawings showing hole to hole distance, cut-out dimension etc. to be provided against drop-in items which is required to be shared with Console/Carcass supplier.
- Mounting arrangement drawings with installation instructions.
- Heat Dissipation of individual units in compartment & in close loop ventilation system, as required for the system. Other interface requirements from ship viz. air, water, cooling etc. to be indicated.
- Material list indicating Model/ Type, Part No., Quantity, Material, Makers name etc.
- Block diagram of the system including interfaces with other systems. Power supply scheme for the system.
- Comprehensive list of cables required for the system with cable length limitation etc., if any.
- Recommended arrangement of devices in nominated compartments.
- Inter unit cable diagrams including interfaces with cables specifications/ data sheets, cable schedules, Circuit/ wiring diagrams, terminal connection and core connection details
- Tally details.
- Firm to furnish the binding dimensions of the equipment within the tolerance limit of 2%, which should be strictly maintained during delivery of the equipment. However, no change in footprint dimensions will be accepted.
- All information related to installation of equipment/ item on board the ship.
- GRSE shall prepare ship's related production drawings based on OEM's drawings. OEM shall provide binding drawings in 2D (AutoCAD) / 3D(STP) format.
- Vendor shall ensure that equipment is manufactured and delivered to the shipyard without any deviation from approved drawing of the equipment.

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3.8 QAP

OEM is required to submit QAP covering all stage inspection, alignment check at shop/on board, calibration of sensors/ gauges prior to kick start, HAT. QAP is to be prepared by OEM complying the Class & SOTR requirement and same is to be submitted to Class within 02 months of Purchase Order for approval, with copy to shipyard. Final approved QAP is to be handed over to GRSE(QA).

3.9 Quality Assurance:

The quality of the equipment/stores delivered according to this SOTR shall correspond to the technical conditions and standards valid for the deliveries of the same equipment in OEM's country or specifications and shall also include therein minor modification to the equipment suggested by the BUYER without any commercial implication. Such modifications will be mutually agreed to. The OEM confirms that the equipment/stores to be supplied under this contract shall be new i.e. not manufactured before (Year of Contract) and shall incorporate all the latest improvements and modifications thereto and spares of improved and modified equipment are backward integrated and interchangeable with same equipment supplied by the seller in the past if any. The seller shall supply an interchangeability certificate along with the changed part numbers wherein it should be mentioned that item would provide as much life as the original item.

The item should be of the latest manufacture, conforming to the current production standard and having 100% defined life at the time of commissioning of the ship.

3.10 Test and Trials

- On-board Trial, HATs/ SATs Schedule shall be prepared by vendor and the same need to be forwarded to Classification agency for approval within 06 (six) months of Purchase Order, with copy to shipyard. Approved HATs/ SATs schedules to be forwarded to GRSE.

3.11 Factory Acceptance Trials (FATs):

- FAT will be carried out at OEM premises by Classification Agency, shipyard/owner reps may attend. Vendors need to submit FAT procedure/document to Classification Agency for approval within 03 (three) months of placement of order, with copy to shipyard. Final FAT procedure & Report shall be submitted by the firm to GRSE within one month after FAT.

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3.12 Harbour Acceptance Test (HAT):

- Vendors need to submit HAT procedure/document to Classification Agency for approval within 06 months of placement of order, with copy to shipyard. Approved HATs procedure to be submitted to GRSE.
- All the equipment and systems shall be commissioned and tried out at Harbor in floating condition.

3.13 Sea Acceptance Test (SAT):

- Vendors need to submit SAT procedure/document to Classification Agency for approval within 06 months of placement of order, with copy to shipyard. Approved SATs procedure to be submitted to GRSE. Sea Acceptance test (SAT) shall be conducted to qualify the system for its functionality and application and to comply with the specification in total. All services, spares, consumables will be OEM scope.

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4 CHAPTER-4: TECHNICAL REQUIREMENTS

4.1 Power supply characteristics of ships main AC supply

- 415V, 3 Ph, 50 Hz.

Voltage	Normal Voltage	415V
	Load range tolerance	
	Average Line to Line value of 3 phase system	±5%
	Line to Line voltage of 1 phase of 3Ph system	±6%
	➤ Maximum Unbalance ➤ Maximum Modulation • Transients (Excluding Spikes) - Frequent Transients - High Limit - Low Limit - Recovery time	±2% ±2% ±9% -13% 0.5 Sec
Wave Form	➤ Maximum Individual Harmonic	3.5%
	➤ Maximum Total Harmonic	6%
Frequency	➤ Nominal Frequency	50 Hz
	➤ Load range Tolerance	±2.5%
	➤ Constant Load Tolerance	±0.5%
	➤ Modulation	±0.25%

4.2 Design

- The Equipment and other associated components shall be designed, manufactured and tested for continuous operation with standing ship's motion, vibration, and ambient conditions. The size and weight shall be kept to minimum consistent electrical and mechanical requirements. High Quality of work man ship shall be employed in manufacturing equipment.

4.3 Enclosure

- The enclosures of electrical and electronic devices and control panels shall be fabricated from 14 SWG mild steel sheets conforming to IS-2062. The equipment shall be designed so that all components may be removed from the front of the cubicles with the front cover only removed. There shall be no hidden connection. All the components of the equipment should have easy access for removal/ refit.

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4.4 Noise/Vibration

- All the equipment will be marine type, robust in construction and will meet the ship vibration, The equipment shall be designed with the requirements of the specified Classification Society.
- Adequate vibration mount shall be provided meeting the seaway conditions, as per OEM requirement.

4.5 Internal Wiring

- Internal wiring of the equipment shall be carried out with LFH (Limited Fire Hazard) cables suitable for marine application.

4.6 Terminal

A bolted type /WAGO type terminal and crimped socket of electrolytic copper are to be provided for all incoming and outgoing cables. An adequate spare terminal strip is to be provided for provision of additional control and indication facilities. Adequate space is to be provided inside the equipment for bending and termination of incoming and outgoing cables.

4.7 System cables supply & connectorisation

- Complete cable requirement and specifications to be provided by the firm immediately post placement of order. Accordingly, shipyard will arrange standard power supply cable, TP cables, CAT cables from existing stock. Any other cable, if required, to be supplied by firm.
- Manpower required for connectorisation work on board ships shall be arranged by the Firm. All materials & tools required for connection will be in the scope of OEM. Connectors suitable for Yard supply cable shall be supplied by the OEM wherever necessary. The OEM is also required to carry out measurement of insulation resistance of the cables and same is to be offered for inspection to inspecting agency. OEM to specifically indicate if any of the system cable is required to run in separate route away from power supply cables. However, laying of cables and termination of cables to the shipyard supplied equipment/ items are not in the scope of the Firm.

4.8 Installation Material

- One set of installation material that includes special tools if any, plugs, adapters, mating flanges, sockets (with accessories), pins and cable lugs, shock/vibration mounts etc. as required for satisfactory completion of system installation on board ship should be supplied. All materials

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required for connectorisation shall be in the scope of the vendor.

4.9 Components

All components shall be of an approved Marine type. Standard specification and grade of material of each component used shall be indicated in the binding drawings. Make and type of components are to be listed in the binding drawings. Necessary Approved Certificates /Documents/ Reports need to be submitted along with equipment binding data.

4.10 EMI/ EMC

All equipment / systems being fitted onboard are to be EMI/ EMC compliant with the electromagnetic environment where it will be installed onboard, and requirements in IEC 60533 concerning EMC, "Electromagnetic Compatibility of Electrical and Electronic Installations in Ships", to be fulfilled as a minimum. COTS equipment's are to comply with IEC 60533 or equivalent EMC standards, and the supplies shall document/declare what EMC standard(s) are valid for their scope of supply.

All equipment shall have the provision of grounding, bonding and shielding to have properties according to the declared EMC standard. The system should not induce any EM interference in other systems. The supplier should also clarify if rf-bonding of the equipment is required and indicate if any additional precaution/measure is necessary for the Yard to take during installation/ cable laying.

The Vendor is required to implement recommendations as provided by EMI / EMC Manager (Refer Annexure A).

Each system supplier must supply the following information as described below (more details are included in Annexure A):

1. OEM shall designate a point of contact responsible for addressing EMC-related issues and the same to be made available within one month of contract signing.
2. The EMC standard per component/equipment type must be specified as different parts of the vessel may use various components from the same system. The project EMC manager will check the provided information and confirm that the EMC properties are acceptable for critical combinations of equipment and location onboard.
3. EMC-related information as requested in Annexure A should preferably be included as part of proposal. As a minimum, EMC standard shall be specified in the proposal. Any deviation to be discussed during TNC.

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4. OEM is to develop a cable list for their system. This list shall be delivered after contract, but early enough to ensure that cable types and cable screen termination details can be verified, refer Ch 4.3 of Annexure A for more details.

OEM to fill in a table in excel format with necessary information for each and every equipment/ component in their scope and to be attached along with the offer as shown below. Additional description is found in Annexure A.

Component/ equipment name	Location	EMC zone	EMC properties, i.e. EMC standard	Screened cables required (Yes or No)	If relevant, cable screen termination principle.	Equipment is prepared for rf bonding. (Yes or No)

Sample excel format

4.11 ESD Protection

- The system design will take into account adequate measures for Electro Static Discharge (ESD) control and protection at PCB/module/assembly and unit level. Each Electro Static Discharge sensitive part/assembly will be duly marked with a symbol/warning. The OEM will use ESD protective materials for handling, packaging storage and transport.

4.12 Cable Entry Glands

- Cable entry glands shall be suitable for marine use conforming to specification BS6121 / EN 62444-2013 for incoming and outgoing cables. Cable glands are to be fitted with the equipment on detachable gland plate. Cable entry shall preferably be from bottom of the panel.

4.13 Tally and Diagram Plates

- Engraved circuit diagram tally, component tally, name tally in English shall be provided of anodized aluminum/ Brass/ flame retardant type material. Circuit diagram tally plate indicating details of connection and terminal marking as on the equipment shall be fitted on the backside of the front cover of the panel. OEM's Tally giving OEM's Name, Description of the item including serial number, power output, rating, weight, year of manufacturing etc. are to be provided.

4.14 Lifting Arrangement

- Equipment weighing more than 40 Kg shall be provided with collar eyebolts or suitable lifting lugs/ arrangements. If the eyebolts cannot remain in situ after the equipment has been installed in the ship, provision is to be made for their securing arrangement on the equipment.

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4.15 Painting

- Painting shall be suitable for Marine use. The equipment / chassis shall be degreased and cleaned prior to applying etching primer. The equipment shall be painted with rust proof paint and finishing paint as per approved painting specifications/procedures/ OEM requirements. In addition, suitable peel of coating to be provided for all panels prior to dispatch.

4.16 Calibration

- All Instrumentations/ sensors including sensors integrated with main systems shall be calibrated prior to delivery and Calibration certificates need to be submitted with a validity of one (01) year from delivery of vessel. OEM needs to recalibrate all Instrumentations / Sensors in GRSE premises during commissioning stage in case of expiry of Calibration certificates.
 - Established maintenance schedules, calibration schedules for each sensor/equipment (if applicable) as per OEM are to be provided.

4.17 Warranty

As per GRSE STAC

Extension of warranty: As per GRSE STAC.

4.18 Product Support

Supplier shall confirm product support for 35 years from commissioning of the equipment on board ship excluding electronic equipment for which minimum period would be 10 (ten) years.

Firms supplying imported equipment's/ systems are to ensure that product support and after-sales service in India are available for all assemblies/ modules/ software including third party supplies prior commencement of trials. Adequate Personnel shall be trained in local support center by the OEM.

4.19 Upgrades and Obsolescence

The latest version of the equipment/ system manufactured by the OEMs at the time of tendering complying with the essential equipment/ system parameters indicated in the SOR shall be supplied. However, the equipment during trials shall be supported by the OEM with latest updates and upgrades incorporated including spares as required and valid warranty/guarantee as applicable without any additional cost implication.

All upgrades and modifications thereafter in the hardware and software of the system need to be communicated to NCPOR or the complete support life. Obsolescence of sub-system, components,

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parts and assemblies need to be communicated to Owner at least two years in advance with recommended remedial action.

4.20 Maintenance Schedule

- Data required for planned maintenance system, as applicable, to be provided by vendor.

4.21 Safety Standards

Equipment should offer total safety to personnel from moving parts and other associated equipment from shock.

4.22 Inspection:

- a) Plan Approval & Unit Certifications : Dual Class (IRS+ABS)
- b) Binding Drawing approval : Dual Class (IRS+ABS)
- c) QAP Approval : Dual Class (IRS+ABS)
- d) FAT (Unit Certificate) - Document approval & witness FAT: Dual Class (IRS+ABS)
- e) Pre-Dispatch Inspection - : Dual Class (IRS+ABS)
- f) Receipt Inspection : GRSE(QA)
- g) Production Drawing Approval : Class
- h) Trial (HAT, SAT) -Documents approval & witness trial : Dual Class (IRS+ABS)

4.23 Responsibility

- Firm shall confirm that all the deliverables listed in the offer/supplied is complete and sufficient for satisfactory performance of the equipment/ system. The Firm shall ensure complete responsibility of satisfactory performance of the equipment/ system on board. Additional items if required for proving the system/equipment on board shall be supplied by the Firm without any commercial implication.

4.24 Transportation

- All equipment shall be adequately packed and protected with supports to ensure adequate protection during all modes of transportation. Each unit within a package/container shall be clearly marked for identification. The container shall clearly indicate the item description with caution marks, quantity, weight, size, etc.

4.25 Preservation

- Initial preservation/Packing shall be made suitable for tropical conditions and protect against high humidity.
- A separate document giving complete details and instructions for storage, preservation, handling

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and transportation after delivery is to be supplied. The OEM shall indicate the delivery schedule, transport, packing, preservation, insurance, etc.

- Vendor to ensure Preservation for equipment in such way that there will be no deterioration of electronics during prolonged storage time. Details of the preservatives used and the preservation and de-preservation procedure while in store & also onboard preservation procedure will be submitted by OEM. Requisite preservatives (with proven valid shelf life) will be supplied for carrying out re-preservation work by GRSE, when necessary, as per procedure provided by OEM.

4.26 Price

- Quoted price is to include itemized price list of major components of the equipment, spares and other activities included in the scope such as services of engineers as required for installations, testing, commissioning and training etc.

4.27 Packing List

- The OEM will provide a complete list of deliverables/complete packing list indicating all units, sub units, cables, installation materials, OB spares, documentation etc. at least one month prior to delivery for codification purpose and to incorporate the same in order copy or amendment of the Purchase Order as applicable.

4.28 Weight Data:

- The equipment/ item is to be weighed in the presence of Inspecting Authority and a Weight Certificate is to be submitted at the time of delivery of the equipment duly signed by Inspecting Authority. The specified Weight of Equipment / Item is to be strictly maintained. However, if the actual weight of the equipment varies by more than 1%, then the same should be intimated to GRSE.

4.29 Scope of offer:

- The following information applicable for equipment/ system shall be supplied with the initial offer:
 - System overview and proposed system configuration
 - System description with Block diagram, System components, System operation including interfaces with other on-board systems.
 - Outline drawings of the equipment indicating overall dimensions, weight, CG and maintenance envelope.
 - Inter unit cable diagram with cable specification including interfaces.
 - Power supply scheme for the system indicating power consumption of individual units.

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- f) Heat dissipation of the main equipment, devices and sub-units
- g) Details of other ship services required.
- h) Tools required for installation and maintenance.
- i) Complete Installation recommendation
- j) OEM's list of spares for installation
- k) Delivery time from receipt of order
- l) Trial and commissioning time for complete system on board
- m) Part identification list at subunits level
- n) List of main equipment included in the standard scope of supply.
- o) List of accessories included/ not included in the standard scope of supply.
- p) List of installation materials and system cables included/ not included in the standard scope of supply.
- q) List of optional units and accessories not included in the standard scope of supply.
- r) List of equipment required for installation and operation of the equipment and not supplied by the OEM.
- s) Un-priced bid.
- t) GA Diagrams/Schematic diagrams/Block Diagram with clear demarcation of scope.
- u) Technical specification /Write up on system operation.
- v) Bill of material/ Scope of supply list
- w) Any other information as indicated in the SOTR

4.30 Security:

- The information about the ship and the requirements mentioned in the SOTR are not to be communicated to any third party without prior approval of GRSE/ NCPOR.

4.31 Compliance matrix

Clause –wise compliance matrix for clauses and sub-clauses to be forwarded along with the technical offer:

Para ref No.	Clause	Compliance/Non- compliance	Remarks

4.32 Annexures

1. Annexure A - EMC-note no.1. EMC Control Document
2. Annexure B – Tentative I/O signal list.

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4.33 Makers List

BjorgeSteinco www.steinco.no

Norcontrol www.norcontrolit.com

Autronica www.autronica.no

Simrad

Rolls-Royce Umas www.rolls-royce.com

Lyngs

Siemens www.siemens.com

Kongsberg www.kongsberg.com

ValMarine www.valmarine.com

IMTECH www.imtech.eu

Stadt AS www.stadt.no

L-3 Mapps www.mappsL-3.com

L&T

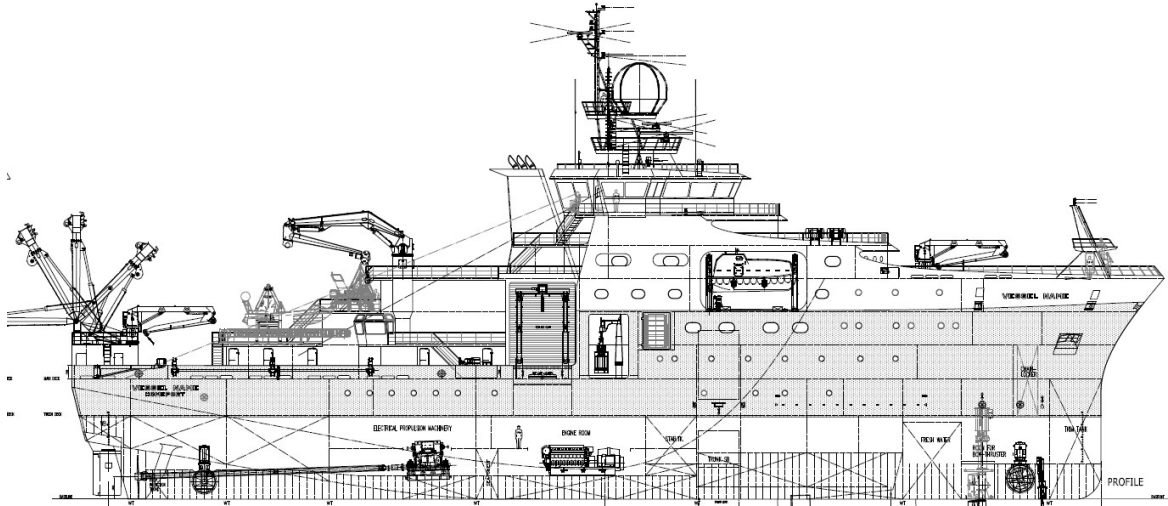
BHEL

Marine Electricals

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EMC-note no. 1

Information to possible system suppliers; Preliminary installation guidelines and required EMC-related information.



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Distribution		Possible system suppliers Vedam GRSE
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1. Introduction

The NCPOR 89m Ocean Research Vessel project will have focus on some specific EMC-related issues:

- Large frequency converters are used in the propulsion system and for other motors as winches. The frequency converters will cause harmonics on the power distribution system. The amount of harmonics and immunity levels for connected equipments must be controlled to avoid functional problems and unwanted stress on components.
- Large frequency converters will also be significant EMI sources at higher frequencies. The emissions from these must be controlled to avoid that other equipment is significantly influenced, especially radio receivers and sensors located topside.
- Below water sensors and installations may be susceptible to electromagnetic noise (EMI). The electromagnetic environment in relevant spaces and practical installation work must be controlled to avoid reduced sensitivity due to electromagnetic effects.
- Top deck will include radio receivers and sensors in addition to intended EMI sources as radio and radar transmitters. Equipment locations, installation principles and equipment properties must be controlled to establish a well-balanced top deck design ensuring best possible performance related to functional priorities. This includes to control conducted EMI between topside areas and areas below deck.

To ensure a successful process to handle the issues listed above it will be important

- to have relevant EMC-related information available for equipment to be installed onboard
- that equipment is prepared for installation according to relevant principles for EMI control
- that the installation is done according to suitable principles to avoid EMI problems

This note is written to clarify for possible equipment/system suppliers the main installation principles and what type of information that will be required inside a possible contract for the NCPOR 89m Ocean Research Vessel. The EMC-note will typically be used towards possible suppliers of top deck equipment (4. deck and above), bridge type equipment and large Power Drive Systems and UPS's.

2. Background

The EMI control process will require that relevant information from system suppliers is available and that relevant installation principles are implemented.

The following actions are taken to ensure efficient and useful communication between system suppliers and the EMC manager:

- This EMC-note is written early in the project and can be used as input to the contract establishment process to clarify what type of information that will be required.
- Each system supplier shall appoint one person (EMC representative) that will be the interface between the EMC manager and own organization to ensure that EMC-relevant issues can be communicated and clarified in an efficient way. (This person may also have other functions in the project.) The term system supplier is used to separate suppliers of non-critical equipments and components from suppliers of larger packages that are complete systems that are of great importance for the operation of the vessel. Suppliers of functional packages as engines, propulsion system, winches, electrical plant, navigation, communications, scientific equipment are examples of system suppliers, while suppliers of outfitting and accommodation equipments are normally not defined as systems suppliers.
- An EMC Control Document (EMCCD) will be established. This document will be a dynamic document (updated when relevant) to communicate and document the EMI control process and technical issues discussed/clarified between personnel involved in EMC related issues.

The NCPOR 89m Ocean Research Vessel is based on use of standard equipment and systems (COTS). However, to ensure that a high level of EMC is achieved, EMC standards and installation principles must be considered. It may be relevant to take specific actions to resolve identified EMI risks/problems. Typical measures may be relocation of equipments or additional EMI shielding to reduce field coupling, and/or additional cable segregation, cable screening and filtering to reduce galvanic coupling and other EMI coupling via cables.

For a best possible end product and an efficient process, it is important that system suppliers give Vedam/GRSE necessary information related to good installation practice for their systems.

Some of the requested information should be included as part of a proposal, while other information is to be supplied as part of documentation developed during detail engineering. Section 4 of this EMC-note identifies/clarifies required information, and also specifies when this information must be available.

3. Preliminary installation guidelines

In addition to clarification of EMC properties (EMC standard) for the different equipment, the main installation related issues to ensure a high level of EMC on the vessel are

1. De-coupling (rf grounding) of conductive elements in EMI barriers, i.e. interfaces between areas with different electromagnetic environment.
2. Use of screened cables for (at least) EMI significant (disturbing or sensitive) connections.
3. Proper termination of cable screens to achieve efficient EMI de-coupling
4. Proper equipment bonding (radio frequency grounding; also called rf bonding) of EMI relevant equipment

5. Separation of cables with different EMI properties.

The different issues are shortly described below, while more detailed information will be included in the EMC Control Document. In most cases, section 4 will clarify how possible system suppliers shall respond to the specified principles for their equipment.

3.1 De-coupling of conductive elements in EMI barriers

The most important EMI barrier on the vessel will be between top deck areas (EMC zone T) and below deck areas.

All cables to top deck be screened and all cable screens shall be 360 ° terminated (grounded) when penetrating the superstructure from 4. deck and above. Termination will typically be in an EMI gland or an EMI Multi Cable transit, e.g. Roxtec.

Other conductive elements like metallic tubes will also be decoupled 360 ° in the EMI barrier.

It will be relevant to use the same principles to rooms with equipment that is very sensitive to EMI, e.g. rooms containing bottom sensor equipment.

3.2 Use of screened cables

As principle, equipment shall be prepared for connection to the same cable types as used when doing EMC testing as basis for type/class approval or CE marking/issuance of Declaration of Conformity to one or more EMC standards. In most cases this means that EMI sensitive and EMI generating equipment is prepared for use of screened cables, and screened cables shall be used.

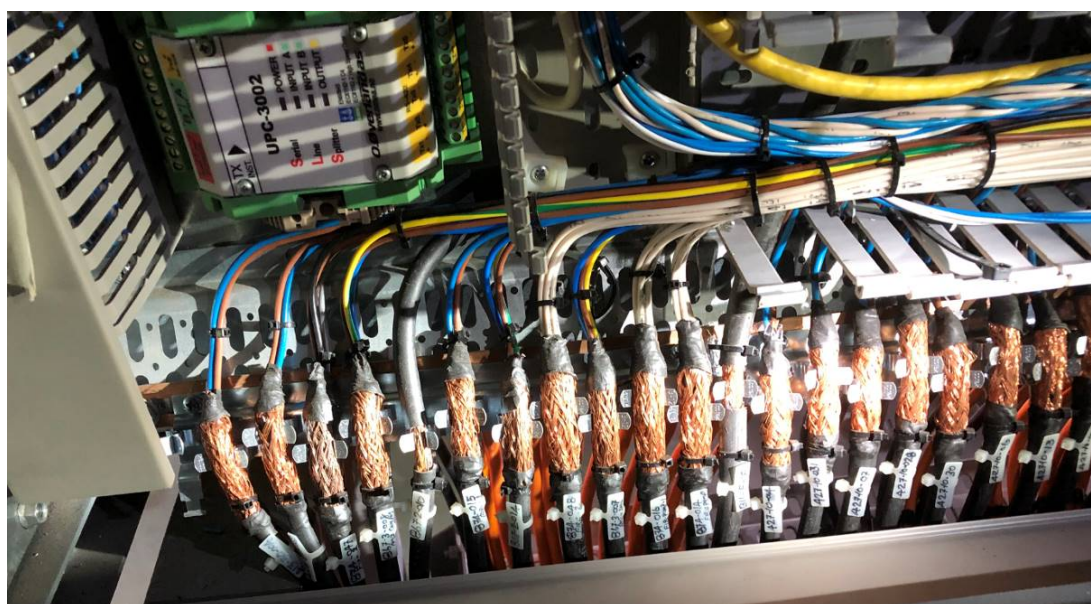
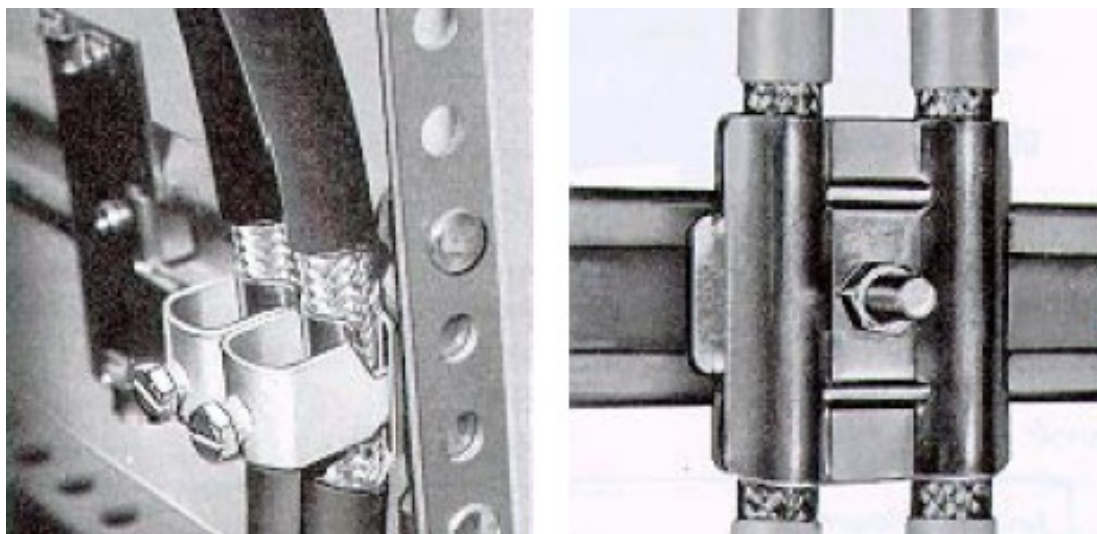
The system suppliers will specify cable type to be used for their systems, ref. section 4. Where no specific requirements are valid, single screen braided cables will be the preferred cable types.

Preferably, cable screens of EMI relevant connections and equipment are terminated to ground with good rf connection in both ends. The only exceptions to this principle as the preferred solution are single-phase AC conductors and DC conductors with significant ripple because high currents may cause heat problems when the screen is terminated in both ends. (To reduce loss and voltage drop, such cables should also be distributed at least 50 mm from the hull or other magnetic material).

3.3 Proper cable screen termination

When screened cables are used, the general principle is to have the cable screen decoupled (terminated) to the equipment enclosure in both sides.

Proper cable screen termination normally means to terminate the cable screen either in an EMI gland or an EMI Multi Cable Transit. Some equipment is prepared for termination of the cable screen by clamping it to a bracket to maintain the surface area of the screen to the enclosure.



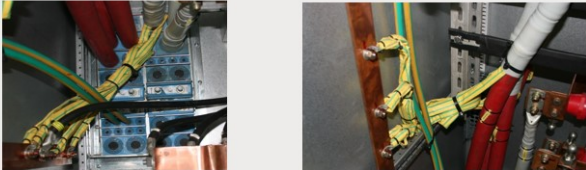
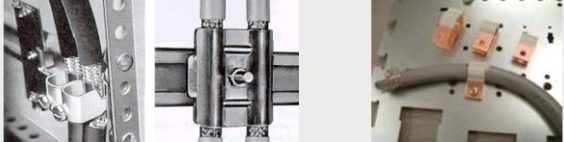
Below, typical example of installation of cables in bridge consoles; Cable screens individually clamped to springs on a bracket well bonded to the enclosure which is bonded to the main ground system.

This will be an acceptable solution if this is how the equipment was installed when tested for type approval/CE-marking. This type of cable screen termination is acceptable for decoupling, but less efficient for EMI shielding since there will be an opening to the cabinet.

A pig-tail termination of the cable screen can be acceptable when grounding for safety, but is not efficient for high frequency decoupling for EMI control.

Proper cable screen termination of all cable screens is recommended/preferred, and the only acceptable solution topside, on the bridge and for EMI relevant equipment as frequency converters and UPSs. See examples and properties of different screen termination principles below.

Properties of screen term. wrt EMC.

Performance	Solution	Examples
Bad	Pig-tail (OK for safety by not if necessary with EMI protection.)	
Medium (depends on length)	Braids between screen and enclosure/earth point.	
Good	Clamping to earth (OK for medium high frequencies)	
Excellent	Perfect 360 ° cable screen termination (MCT or gland)	

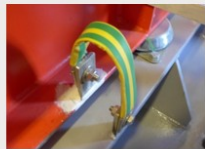
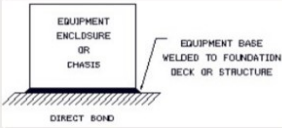
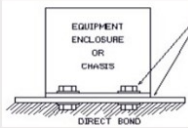
3.4 Proper equipment bonding (rf bonding)

EMI relevant equipment will normally be prepared for bonding (rf bonding) to the main ground system. Rf bonding means to provide a low impedance path (efficient for higher frequencies) between two metallic structures. A bond strap in this context is a connection with a large surface area, e.g. a braid or a wide plate. See example below.



It is important that the surface area on both the equipment and the hull to avoid a high impedance connection between these areas and the braid (bond strap). See examples and properties of different principles for grounding and bonding below.

Properties of bonding wrt EMC.

Performance	Solution	Examples	
Bad	<u>Pig-tail</u> (OK for safety by not EMC)		
Medium	Long <u>braid</u> or <u>flat metallic profile</u>		
Good	Short <u>braid</u> or <u>flat metallic profile</u> (e.g. with <u>shock mount</u>)		
Excellent	<u>Direct galvanic connection</u> , e.g. <u>welded</u>	 	

As described in section 4, the equipment supplier/manufacture shall specify if the equipment is prepared for rf bonding. This may be required for equipment topside and on bridge, and for other equipment that is either EMI sensitive (navigation, communication and ship control systems) or equipment that may represent a risk as EMI source (large propulsion system equipment, electrical distribution equipment, large motors, UPS's and frequency converters).

3.5 Separation of cables with different EMI properties

EMI can couple in different ways: e.g. via air (electric and magnetic fields) and cables and other conductive structures (galvanically, capacitive and inductive).

To avoid unwanted EMI coupling between cables (= conductive structures) the cables will be defined as belonging to one of several cable categories according to disturbance level and sensitivity. The coupling depends on cable characteristics, distance between the cables, how long they are routed along the same path, and the distance to the ground system.

Cable trays/ladders that are well connected to the main ground structure will be installed, and minimum distances are defined for distribution of the different cable types. Section 4 describes the different cable categories. The suppliers/manufacturers shall specify cable category for their cables. This information will be used by the shipyard to avoid that cables with different EMI properties are routed together.

4. Required information

Each system supplier must be prepared to supply information as described below.

4.1 Contact information EMC representative

Each system supplier shall appoint one person that will be the contact point for EMC-related issues.
 Due time: one month after contract.

Information as shown in the examples below will be requested.

Position	Name	Contact information
EMC manager	Jan Rune Pedersen	Applica Test & Certification as Pb. 303, 4503 Mandal, Norway ☎: (+47) 90 10 80 23 ✉: jrp@applica.no
Shipyard electrical engineering representative		Company Address xxx, yyyy City, Country. ☎: ✉: nn@company.com
System supplier X EMC representative		Company Address xxx, yyyy City, Country. ☎: ✉: nn@company.com

4.2 Equipment information

4.2.1 EMI emission and immunity characteristics (EMC properties)

IEC 60533 Electrical and electronic installations in ships – Electromagnetic Compatibility is used as basis for the EMC engineering and installation. In addition, IEC 60533 specifies limit values (both susceptibility and emissions) based on location of equipments onboard the vessel.

Each (possible) system supplier is requested to specify EMC standard for their equipment. This is necessary to be able to evaluate compatibility between different equipment, especially between significant EMI sources and sensors and antennas. Based on clarified EMC-properties it will be possible to take necessary actions to solve possible EMI risks/problems. The most relevant commercial EMC-standards are:

- a. IEC 60533 Electrical and electronic installations in ships – Electromagnetic compatibility.

- b. IEC 60945 Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results (2002-08).
- c. IEC 61800-3 Adjustable speed electrical power drive systems – Electromagnetic compatibility (2004-08).
- d. IEC 61000-6-1 Generic emission standard for Residential, commercial and light industrial environment (2005-03).
- e. IEC 61000-6-2 Generic emission standard for Industrial environment (2005-01).
- f. IEC 61000-6-3 Generic immunity standard for Residential, commercial and light industrial environment (2006-07).
- g. IEC 61000-6-4 Generic immunity standard for Industrial environment (2006-07).
- h. IEC 62040-2 Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements (2016)

Other comparable standards may also be used, e.g. when equipment belong to other product categories. Equipment to be installed topside and on bridge should meet the requirements of IEC 60945 or IEC 60533 Above deck and bridge zone.

In cases where the standards specify several sets of requirements based on environment/application, it will be necessary to identify what set of requirements that are used/valid. E.g. IEC 61800-3 specifies 4 categories with different emission limits and therefor evaluation of emission characteristics can only be done when category is known.

Since different components/equipments of the same system may be used in different parts of the vessel it is enough to specify EMC standard per component/equipment type. The EMC manager will then check that the EMC properties are acceptable to the most critical location.

4.2.2 EMC zone

The vessel will be divided into different EMC zones based on electromagnetic environment in the different parts of the vessel and EMC equipment characteristics in these areas.

The following EMC zones are defined:

- EMC zone T, (Top deck) including open deck and other areas not EMI shielded from antennas/sensors in mast and bridge roof. Only areas from 4. deck and above are defined as EMC zone T since areas lower will not be defined as “area in close proximity to receiving and/or transmitting antennas”
- Zone BB: Bridge area (Below deck). The requirements for bridge and deck zone are equal according to IEC 60533 and IEC 60945.

- Zone BG: Areas Below deck that are partly shielded by the hull structure. This is related to Typical General power distribution zone (IEC 60533) where equipment emission limits are specified in table 3 of IEC 60533. Since these areas are relatively well shielded from sensitive equipment it will be acceptable with non-critical equipment complying with also generic EMC standards.
- Zone BS: Areas Below deck (well shielded from sensitive equipment) allowing installation of EMI generating equipment. This EMC zone is defined to allow installation of very EMI generating equipment, e.g. categories C3 and C4 according to IEC 61800-3. It will allow use of equipment having EMC properties according to generic standard for Industrial environment, and also equipment with characteristics according to Special power distribution zone (IEC 60533). Equipment properties and arrangements/installation in these areas will be assessed to ensure sufficient decoupling.
- EMC zone S: Shielded areas below deck. This is areas that are designed with focus on EMI shielding, either to protect sensitive equipment from equipment installed in the vicinity outside this zone, or to avoid EMI generated by equipment in this zone from disturbing equipment installed in the vicinity, outside the zone. Some areas are initially defined as S, but may be redefined to e.g. BG when it has been documented that equipment properties does not require special shielding.

Living spaces and accommodation areas will to a large degree be equipped with equipments having EMC properties for Residential, commercial and light industrial environment. However, equipments with Industrial environment properties can also be accepted in these areas. Most of these areas are therefore defined as EMC zone BG.

The following EMC zones areas are tentatively defined. The definition may be changed if the detail engineering process results in equipment placement that makes this necessary/relevant.

- EMC zone T: Weather exposed areas from 4. deck and above.
- EMC zone BB*: Wheelhouse and bridge electronics room
- EMC zone BS: Bow thruster rooms, Winch drive room and Propulsion room.
- EMC zone S: Converters room wheelhouse, HVAC bridge room; Acc Ventilation (due to risk of disturbing radio communications) Transducer rooms.

Other areas are EMC zone BG.

* One of the reasons for defining different EMC zones for wheelhouse (bridge) (BB) and top deck (T) is to define an EMI barrier between these areas to require cable screen termination (bonding) when penetrating this barrier. (As a principle it will not be necessary to implement an EMI barrier between areas defined as the same EMC zone.)

4.2.3 Cable screen termination principles

Screened cables will be used to improve immunity and reduce emissions where this is regarded as necessary.

The possible system supplier shall specify if screened cable is recommended and shall also specify how the cable screen shall be terminated (earthed) to the equipment.

Since different components/equipments of the same system may be designed for different types of cable termination principles it is necessary to clarify use of screened cable and specify cable screen termination principle per component/equipment type.

As part of cable database development during detail engineering, the supplier shall specify a specific cable screen termination detail for each cable to/from equipment.

4.2.4 EMC-related equipment data

The following EMC-related information should preferably be included as part of proposal. If this is not possible, it should be established during preparations for a delivery contract.

Field name	Field description
Comp. name	Component name, i.e. a unique name that identifies the type of equipment.
Location	Identification of location for the equipment, i.e. room and deck
EMC zone	Identification of EMC zone where the equipment will be installed.
Test specification	Specification of EMC test standard that has been/will be used for EMC qualification (type testing).
Screened cable required?	Answer Y (=Yes) if screened cables shall be used to the equipment. Else, answer N (=No).
Cable screen termination principle	Answer one of the following alternatives: • N = No cable screen termination to equipment • G = Grounded, i.e. cable screen shall be grounded to equipment, but 360° termination (EMI gland, EMI Multi Cable Transit) not required/fitted. • B = Bonded, i.e. cable screen shall be terminated 360° to the equipment (enclosure). This is normally done by use of EMI gland or EMI Multi Cable Transit (EMI MCT). A solution where cable is clamped to a bar and screen has 360° connection to the clamp can be regarded as alternative B. (Surface area of the screen maintained in the bonding.)
Prepared for rf bonding?	Answer Y (=Yes) if the enclosure is prepared for rf bonding. Else, answer N (=No).

Example for structure of Excel sheet for EMC-related equipment data:

Comp. name	Location	EMC zone	Test specification	Screened cables? (Yes or No)	Cable screen term. principle	Prepared for rf bonding? (Yes or No)
Equipment xxx	Pilothouse	BB	IEC 60945	Y	G	Y
Antenna x	Top deck	T	IEC 60945	Y	B	Y
Equipment zzz	Drive room	BS	IEC 61800-3 category 4	Y	B	Y

4.3 Cabling information

Some cabling information is required for EMC purposes. Each system supplier is requested to develop a cable list for their system. This list is to be delivered after contract, but early enough to ensure that cable types and cable screen termination details can be correct in the practical installation.

4.3.1 Cable screen

For each cable with an interface to the relevant system, the system supplier shall specify the type of cable with respect to required/recommended screening. Braided cables (not foil) will be used where screening is required. (Foil in addition to braid will be accepted for special cables if specified by equipment manufacturer.)

The following alternatives exist:

- **None**, i.e. the cable does not include screen.
- **Single**, i.e. single screen
- **Double**, i.e. two separate screens insulated from each other
- **Quasi-double**, i.e. two screens not insulated from each other
- **Multiple**, i.e. individual screens for pairs of conductors in the cable in addition to an overall cable screen.

For EMC-relevant equipments, most cables are assumed to be specified with single screen.

4.3.2 Cable category

Cable segregation is one measure to ensure electromagnetic compatibility. Each cable shall be defined to a cable category, and specific cable segregation rules will be defined to ensure sufficient decoupling between sensitive and disturbing cables.

Each cable shall be categorized to a cable category based on the following definitions:

Category	Characteristics	IEC 60533 description, table C.1
3	Highly EMI sensitive	Radio receiver signals, TV receiver signals Video signals Level: 0.1- 500 mV
4	Highly EMI generating cables	High-power transmission signals Pulsed high-power signals High power semiconductor converter
1	EMI-generating, not EMI-susceptible cables	Power supply Lighting Level: 10 - 1000V
2	Moderately EMI-generating and EMI-susceptible cables	Analogue and digital signals Loudspeaker signals Control signals Alarm signals Level 0.1 – 115 V
5	Special cables that need special treatment	
F	Not relevant	Fibre cables are not relevant with respect to EMC and can be routed together with all categories (no conductive parts in the fibre cable)

The numbers for cable categories are taken from IEC 60533 and shall be used in the cable database.

4.3.3 Cable screen termination details

A set of cable screen termination details will be developed and described in the EMC Control Document (EMCCD) distributed to all system suppliers.

The system suppliers shall specify the termination principle that is to be used on cables that have interface(s) to their system.

The alternative details will typically include:

- single screen cable with screen terminated in EMI Multi Cable Transit (MCT) and screen cut (BC)
- single screen cable with screen terminated in EMI gland and screen cut (BC)
- single screen cable with screen terminated in EMI MCT and screen connected to PE-bar inside enclosure (BG)
- single screen cable with screen terminated in EMI gland and screen connected to PE-bar inside enclosure (BG)
- single screen cable termination detail where the HF characteristics of the screen is maintained through non-conductive equipment enclosures BSM (Bonded and SM= screen maintained).

4.3.4 EMC-related information in cable list

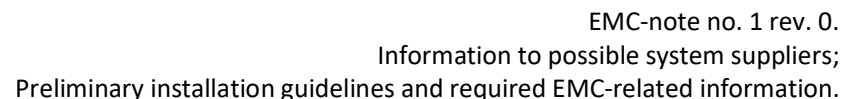
The system suppliers shall establish a cable list containing all cables between equipments/components of their systems, and cables with interfaces to other systems. The following information fields shall be included:

Field name	Field description
Cable identity	Input from system supplier or shipyard A unique combination of numbers and characters that identifies the specific cable.
Cable type	Input from system supplier or shipyard The identification code defined by the cable manufacturer to uniquely describe each cable type.
Cable screen	Input from system supplier
Cable category	Input from system supplier Each cable shall be categorized to a cable category It will be the system suppliers responsibility to define correct category for own cables.
Electrical characteristics	Input from system supplier The type(s) of electrical signal/energy distributed in the cable, e.g. voltage level if the cable is a power cable, 4-20 mA, 0-10 V if signal cable, ...
From EMC zone	Input from system supplier (verified by shipyard) Identification of the zone from which the cable is distributed.
To EMC zone	Input from system supplier or shipyard Identification of the zone where the «destination» equipment is located.
From room	Input from system supplier (verified by shipyard) Identification of the room from which the cable is distributed.
To room	Input from system supplier (verified by shipyard) Identification of the room where the «destination» equipment is located.
From equipment	Input from system supplier (verified by shipyard) Identification of the equipment from which the cable is distributed.
To equipment	Input from system supplier (verified by shipyard) Identification of the «destination» equipment.
Term. detail source side (from equipment)	Input from system supplier (checked by shipyard) The Termination detail description defines how the cable is terminated to the equipment.
Term. detail destination side (to side)	Input from system supplier (checked by shipyard) A set of standardized termination details will be described in the EMC Control Document.

Where cables go between different systems, coordination will be necessary to finalize the cable database.

A table as shown below shall be established as part of detail engineering, and shall be available before electrical installation in machinery and technical spaces. Since cables will be distributed according to cable category it is necessary to know the number of cables per category in different spaces to be able to design cable trays/routes with sufficient capacity (number of cables) and separation.

Cable identity	Cable type	Cable screen	Cable category	Electrical char.	Source end				Destination end			
					EMC zone	Room	Equip.	Term. detail	EMC zone	Room	Equip.	Term. detail
xxx		S	1	230 VAC	BB	Pilothouse	xx Console	BC	BB	Bridge	Power switch-board xxx	BC
yyy		S	3	0-10V	T	Outside bridge	Search light	BG	BB	Bridge	Light controller	BG
zzz		S	2	4-20 mA	BS	Drive room	Drive system x	BC	BG	Engine Control Room	Control desk	BC



Date	06.03.2015												
Document Number	RH318794EMC												
Rev	0	Document status: Draft for discussion	* = Connection below deck which not require EMC shield										
			Source end							Destination end			
Cable identity	Cable type	Cable screen	Cable category	Electrical char.	EMC zone	Room	Equip.	Term. Detail	EMC zone	Room	Equip.	Term. Detail	
A	MPRXCX FLEXISHIP 3x10	Y	1	400VAC	BS	Winch Drive Room	Winch Drive unit 1	BG	BS	Winch Drive Room	Winch Drive unit 2	BG	
B	MPRXCX FLEXISHIP 2x4	Y	1	24VDC	BS	Winch Drive Room	Winch Drive unit 1	BG	BS	Winch Drive Room	Winch Drive unit 2	BG	
C	TCX @ 10x2x0,75	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 1	BG	BS	Winch Drive Room	Winch Drive unit 2	BG	
D	BELDEN 3082A 2x15AWG+2X18AWG	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 1	BG	BS	Winch Drive Room	Winch Drive unit 2	BG	
101	MPRXCX FLEXISHIP 3x1,5	Y	1	400VAC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	M36	*	
102	MPRXCX FLEXISHIP 3x1,5	Y	1	400VAC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	M37	*	
103	TCX @ 4x2x0,75	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	BX006	*	
104	MPRXCX FLEXISHIP 3x1,5	Y	1	400VAC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	M38	*	
105	MPRXCX FLEXISHIP 3x1,5	Y	1	400VAC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	M39	*	
106	MPRXCX FLEXISHIP 4x1,5	Y	1	24VDC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	BX007	*	
107	TCX @ 4x2x0,75	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	BX007	*	
108	MPRXCX FLEXISHIP 3x1,5	Y	1	400VAC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	M44	*	
109	MPRXCX FLEXISHIP 3x1,5	Y	1	400VAC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	M45	*	
110	MPRXCX FLEXISHIP 4x1,5	Y	1	24VDC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	BX008	*	
111	TCX @ 4x2x0,75	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	BX008	*	
112	MPRXCX FLEXISHIP EMC 3x50	Y	4	690VAC	BS	Winch Drive Room	Winch Drive unit 1	BG	BS	Aft Winch Room	M01	BG	
113	FLEX-PU-EF-CY(TP) 4x2x0,25	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 1	BC	BS	Aft Winch Room	M1	BC	
114	MPRXCX FLEXISHIP EMC 3x50	Y	4	690VAC	BS	Winch Drive Room	Winch Drive unit 1	BG	BS	Aft Winch Room	M2	BG	
115	FLEX-PU-EF-CY(TP) 4x2x0,25	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 1	BC	BS	Aft Winch Room	M2	BC	
116	MPRXCX FLEXISHIP EMC 3x50	Y	4	690VAC	BS	Winch Drive Room	Winch Drive unit 1	BG	BS	Aft Winch Room	M3	BG	
117	FLEX-PU-EF-CY(TP) 4x2x0,25	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 1	BC	BS	Aft Winch Room	M3	BC	
118	FD CP(TP) PLUS 10x2x0,75	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 1	*	BS	Aft Winch Room	PB001	*	
119	MPRXCX FLEXISHIP 2x1,5	Y	1	230VAC	BS	Winch Drive Room	Winch Drive unit 1	*	BS	Aft Winch Room	PB001	*	
120	MPRXCX FLEXISHIP 4x1,5	Y	1	24VDC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	TWE001	*	
121	FD CP(TP) PLUS 10x2x0,75	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	TWE001	*	
122	MPRXCX FLEXISHIP 4x1,5	Y	1	24VDC	BS	Winch Drive Room	Winch Drive unit 2	*	BS	Aft Winch Room	M11	*	
123	MPRXCX FLEXISHIP EMC 3x2,5	Y	4	400VAC	BS	Winch Drive Room	Winch Drive unit 2	BG	BS	Aft Winch Room	M11	BG	
124	FLEX-PU-EF-CY(TP) 4x2x0,25	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 2	BC	BS	Aft Winch Room	ENC11	BC	
125	MPRXCX FLEXISHIP EMC 3x50	Y	4	690VAC	BS	Winch Drive Room	Winch Drive unit 2	BG	BS	Aft Winch Room	M4	BG	
126	FLEX-PU-EF-CY(TP) 4x2x0,25	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 2	BC	BS	Aft Winch Room	M4	BC	
127	MPRXCX FLEXISHIP EMC 3x50	Y	4	690VAC	BS	Winch Drive Room	Winch Drive unit 2	BG	BS	Aft Winch Room	M5	BG	
128	FLEX-PU-EF-CY(TP) 4x2x0,25	Y	2	24VDC	BS	Winch Drive Room	Winch Drive unit 2	BC	BS	Aft Winch Room	M5	BC	
129	MPRXCX FLEXISHIP EMC 3x50	Y	4	690VAC	BS	Winch Drive Room	Winch Drive unit 2	BG	BS	Aft Winch Room	M6	BG	
130	FLEX-PU-EF-CY(TP) 4x2x0,25	Y	2	24VDC	BS	Winch Drive Room	Win						

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	FUEL OIL SYSTEM - FUEL OIL AFTER FILTER (ENGINE INLET), PRESSURE	AI	SERIAL LINK					X				X				
2		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	FUEL OIL SYSTEM - FUEL OIL AFTER FILTER (ENGINE INLET), PRESSURE LOW - ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
3		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	FUEL OIL SYSTEM - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
4		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	FUEL OIL SYSTEM- FUEL OIL BEFORE INJECTION PUMPS, TEMP. - HIGH(OR VISCOSITY - LOW)	DI	SERIAL LINK				X				X					Whether DG Engine is heavy fuel oil burning Engine. Is this signal applicable accordingly? Same to be discussed during detail design.
5		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	FUEL OIL SYSTEM-FUEL OIL BEFORE INJECTION PUMPS, TEMP. - LOW (OR VISCOSITY - HIGH)	DI	SERIAL LINK				X				X					Whether DG Engine is heavy fuel oil burning Engine. Is this signal applicable accordingly? Same to be discussed during detail design.
6		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	FUEL OIL SYSTEM - LEAKAGE FROM HIGH PRESSURE PIPES -ALARM	DI	SERIAL LINK				X				X					
7		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	FUEL OIL SYSTEM - FUEL OIL SERVICE TANK, LEVEL - LOW	DI	SERIAL LINK				X				X					
8		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	FUEL OIL SYSTEM - FUEL OIL SERVICE TANK, LEVEL -HIGH	DI	SERIAL LINK				X				X					
9		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	FUEL OIL SYSTEM -FUEL OIL PRESSURE – LOW - ALARM	DI	SERIAL LINK				X				X					
10		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	FUEL OIL SYSTEM -COMMON RAIL OIL PRESSURE,LOW	DI	SERIAL LINK				X				X					
11		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM -LUBE OIL TO MAIN BEARING(ENGINE SIDE), PRESSURE – VALUE	AI	SERIAL LINK					X				X				
12		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM -LUBE OIL TO MAIN BEARING (ENGINE SIDE), PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
13		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM -LUBE OIL TO THRUST BEARING, PRESSURE – VALUE	AI	SERIAL LINK					X				X				
14		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM -LUBE OIL TO THRUST BEARING, PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					. If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
15		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM - STND BY PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
16		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM PUMP AUTO SHUTING DOWN ALARM DUE TO MAIN BEARING & THRUST BEARING PRESSURE LOW	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto shutting down information(as alarm) will be available from DG System to CCAMS HMI. Same to be discussed during detail design.
17		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM -LUBE OIL FILTER DIFFERENTIAL, PRESSURE – VALUE	AI	SERIAL LINK					X				X				
18		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM -LUBE OIL FILTER DIFFERENTIAL, PRESSURE – HIGH ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
19		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM LUBE OIL INLET, TEMP. – VALUE	AI	SERIAL LINK					X				X				
20		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM LUBE OIL INLET, TEMP. – HIGH, ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
21		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-1 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Is it per cylinder or combined 1 no. signal against 1 no. Generator?
22		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-2 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
23		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-3 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
24		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-4 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
25		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-5 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
26		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-6 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
27		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-7 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
28		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-8 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
29		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-9 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
30		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-10 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
31		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-11 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
32		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-12 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
33		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-13 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
34		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-14 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
35		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-15 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
36		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB. OIL SYSTEM- CYLINDER-16 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
37		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ENGINE AUTO SLOWING DOWN ALARM DUE TO CYLINDER LUBRICATOR FLOW RATE LOW	DI	SERIAL LINK				X				X					
38		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	LUB OIL COMMON RAIL SERVO OIL PRESSURE - LOW	DI	SERIAL LINK				X				X					
39		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	SEA WATER COOLING SYSTEM PRESSURE – DISPLAY	AI	SERIAL LINK					X				X				
40		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	SEA WATER COOLING SYSTEM PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
41		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	SW COOLING PUMP - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
42		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	SW COOLING PUMP - PUMP AUTO SHUT DOWN	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto shutting down information(as alarm) will be available from DG System to CCAMS HMI. Same to be discussed during detail design.
43		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	TEMPERATURE OF COOLING WATER OR COOLING AIR, HIGH	DI	SERIAL LINK				X				X					Is it as per IRS/ABS requirement? If so, please refer Clause & Table no.
44		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	CYLINDER FRESHWATER COOLING WATER INLET, PRESSURE OR FLOW – DISPLAY	AI	SERIAL LINK					X				X				Is it per cylinder or combined 1 no. signal against 1 no. Generator?
45		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	CYLINDER FRESHWATER COOLING WATER INLET, PRESSURE OR FLOW – LOW ALARM	DI	SERIAL LINK				X				X					Is it per cylinder or combined 1 no. signal against 1 no. Generator? If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
46		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ENGINE SLOWING DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER INLET PRESSURE OR FLOW LOW	DI	SERIAL LINK				X				X					
47		MAIN GENERATOR NO. 1/ GENERATING PLANT-2	Generator LCP-1	ENGINE SHUT DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER INLET PRESSURE OR FLOW LOW	DI	SERIAL LINK				X				X					
48		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	CYLINDER FRESHWATER COOLING WATER - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
49		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – DISPLAY	AI	SERIAL LINK					X				X				
50		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – HIGH ALARM	DO	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
51		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ENGINE SLOWING DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – HIGH	DI	SERIAL LINK				X				X					
52		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	CYLINDER FRESHWATER COOLING WATER EXPANSION TANK, LEVEL – LOW ALARM	DI	SERIAL LINK				X				X					
53		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-1, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Nos of cylinder and nos of signal? However 4 nos. Cylinder considered as example.
54		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-2, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
55		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-3, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
56		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-4, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
57		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-5, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
58		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-6, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
59		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-7, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
60		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-8, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
61		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-9, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
62		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-10, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
63		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-11, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
64		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-12, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
65		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-13, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
66		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-14, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
67		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-15, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
68		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EXHAUST GAS AFTER CYLINDER-16, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
69		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ENGINE SLOWING DOWN ALARM DUE TO EXHAUST GAS CYLINDER TEMP HIGH	DI	SERIAL LINK				X				X					
70		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	TURBOCHARGER OIL INLET PRESSURE - DISPLAY	AI	SERIAL LINK					X				X				
71		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	TURBOCHARGER OIL INLET PRESSURE - LOW ALARM	DI	SERIAL LINK				X				X					
72		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	TURBOCHARGER OIL OUTLET TEMP., BEARING-1, - HIGH	DI	SERIAL LINK				X				X					Bearing qty's considered as 2 nos. OEM to confirm the same.
73		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	TURBOCHARGER OIL OUTLET TEMP., BEARING-2, - HIGH	DI	SERIAL LINK				X				X					Bearing qty's considered as 2 nos. OEM to confirm the same.
74		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	SPEED OF TURBOCHARGER	AI	SERIAL LINK					X				X				
75		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	SPEED OF TURBOCHARGER - HIGH/OVER SPEED	DO	SERIAL LINK				X				X					
76		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ENGINE SPEED	AI	SERIAL LINK					X				X				
77		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ENGINE OVERSPEED ALARM	DI	SERIAL LINK				X				X					
78		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ENGINE AUTO SHUTTING DOWN ALARM DUE TO ENGINE OVERSPEED	DI	SERIAL LINK				X				X					
79		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	MAIN (24VDC CONTROL?) POWER SUPPLY AVAILABLE INDICATION	DI	SERIAL LINK					X				X				
80		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	MAIN (24VDC CONTROL?) SUPPLY FAILURE	DI	SERIAL LINK				X				X					

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					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
81		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	EMERGENCY (24VDC CONTROL?) SUPPLY FAILURE	DI	SERIAL LINK				X				X					
82		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	GENERATOR BEARING(ALTERNATOR SIDE) LUB OIL INLET PRESSURE -DISPLAY	AI	SERIAL LINK					X				X				
83		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	GENERATOR BEARING(ALTERNATOR SIDE) LUB OIL INLET PRESSURE -LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
84		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	FAILURE OF GENERATOR COOLING PUMP OR FAN MOTOR	DI	SERIAL LINK				X				X					
85		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	GENERATOR COOLING MEDIUM TEMPERATURE - VALUE	AI	SERIAL LINK					X				X				
86		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	GENERATOR COOLING MEDIUM TEMPERATURE - HIGH ALARM	DI	SERIAL LINK				X				X					
87		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	MSB	STATIONARY WINDING(R PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
88		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	MSB	STATIONARY WINDING(Y PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
89		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	MSB	STATIONARY WINDING(B PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
90		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	MSB	STATIONARY WINDING(R PHASE) TEMPERATURE - HIGH	DI	SERIAL LINK				X				X					
91		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	MSB	STATIONARY WINDING(Y PHASE) TEMPERATURE -HIGH	DI	SERIAL LINK				X				X					
92		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	MSB	STATIONARY WINDING(B PHASE) TEMPERATURE -HIGH	DI	SERIAL LINK				X				X					
93		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ACTIVATION OF OIL MIST DETECTION	DI	SERIAL LINK				X				X					
94		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	PRIME MOVER SHUTTING DOWN DUE TO ACTIVATION OF OIL MIST DETECTION	DI	SERIAL LINK				X				X					
95		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G1 ABNORMAL	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
96		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G1 AUTO START	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
97		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G1 AUTO STOP	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
98		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G1 RUN INDICATION	DI	SERIAL LINK					X				X				Is these signals from LCP or through Starter?
99		MAIN GENERATOR NO. 1/ GENERATING PLANT-1	Generator LCP-1	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G1 POWER SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				Is these signals from LCP or through Starter?
100		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	FUEL OIL SYSTEM - FUEL OIL AFTER FILTER (ENGINE INLET), PRESSURE	AI	SERIAL LINK					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
101		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	FUEL OIL SYSTEM - FUEL OIL AFTER FILTER (ENGINE INLET), PRESSURE LOW - ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
102		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	FUEL OIL SYSTEM - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
103		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	FUEL OIL SYSTEM- FUEL OIL BEFORE INJECTION PUMPS, TEMP. - HIGH(OR VISCOSITY - LOW)	DI	SERIAL LINK				X				X					Whether DG Engine is heavy fuel oil burning Engine. Is this signal applicable accordingly? Same to be discussed during detail design.
104		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	FUEL OIL SYSTEM-FUEL OIL BEFORE INJECTION PUMPS, TEMP. - LOW (OR VISCOSITY - HIGH)	DI	SERIAL LINK				X				X					Whether DG Engine is heavy fuel oil burning Engine. Is this signal applicable accordingly? Same to be discussed during detail design.
105		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	FUEL OIL SYSTEM - LEAKAGE FROM HIGH PRESSURE PIPES -ALARM	DI	SERIAL LINK				X				X					
106		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	FUEL OIL SYSTEM - FUEL OIL SERVICE TANK, LEVEL - LOW	DI	SERIAL LINK				X				X					
107		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	FUEL OIL SYSTEM - FUEL OIL SERVICE TANK, LEVEL -HIGH	DI	SERIAL LINK				X				X					
108		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	FUEL OIL SYSTEM -FUEL OIL PRESSURE – LOW - ALARM	DI	SERIAL LINK				X				X					
109		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	FUEL OIL SYSTEM -COMMON RAIL OIL PRESSURE,LOW	DI	SERIAL LINK				X				X					
110		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM -LUBE OIL TO MAIN BEARING(ENGINE SIDE), PRESSURE – VALUE	AI	SERIAL LINK					X				X				
111		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM -LUBE OIL TO MAIN BEARING (ENGINE SIDE), PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
112		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM -LUBE OIL TO THRUST BEARING, PRESSURE – VALUE	AI	SERIAL LINK					X				X				
113		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM -LUBE OIL TO THRUST BEARING, PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
114		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM - STND BY PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
115		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM PUMP AUTO SHUTING DOWN ALARM DUE TO MAIN BEARING & THRUST BEARING PRESSURE LOW	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto shutting down information(as alarm) will be available from DG System to CCAMS HMI. Same to be discussed during detail design.
116		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM -LUBE OIL FILTER DIFFERENTIAL, PRESSURE – VALUE	AI	SERIAL LINK					X				X				
117		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM -LUBE OIL FILTER DIFFERENTIAL, PRESSURE – HIGH ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
118		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM LUBE OIL INLET, TEMP. – VALUE	AI	SERIAL LINK					X				X				
119		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM LUBE OIL INLET, TEMP. – HIGH, ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
120		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-1 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
121		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-2 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
122		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-3 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
123		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-4 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
124		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-5 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
125		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-6 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
126		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-7 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
127		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-8 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
128		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-9 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
129		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-10 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
130		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-11 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
131		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-12 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
132		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-13 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
133		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-14 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
134		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-15 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
135		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB. OIL SYSTEM- CYLINDER-16 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					
136		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ENGINE AUTO SLOWING DOWN ALARM DUE TO CYLINDER LUBRICATOR FLOW RATE LOW	DI	SERIAL LINK				X				X					
137		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	LUB OIL COMMON RAIL. SERVO OIL PRESSURE - LOW	DI	SERIAL LINK				X				X					
138		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	SEA WATER COOLING SYSTEM PRESSURE – DISPLAY	AI	SERIAL LINK					X				X				
139		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	SEA WATER COOLING SYSTEM PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
140		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	SW COOLING PUMP - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
141		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	SW COOLING PUMP - PUMP AUTO SHUT DOWN	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto shutting down information(as alarm) will be available from DG System to CCAMS HMI. Same to be discussed during detail design.
142		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	TEMPERATURE OF COOLING WATER OR COOLING AIR, HIGH	DI	SERIAL LINK				X				X					Is it as per IRS/ABS requirement? If so, please refer Clause & Table no.
143		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	CYLINDER FRESHWATER COOLING WATER INLET, PRESSURE OR FLOW – DISPLAY	AI	SERIAL LINK					X				X				Is it per cylinder or combined 1 no. signal against 1 no. Generator?
144		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	CYLINDER FRESHWATER COOLING WATER INLET, PRESSURE OR FLOW – LOW ALARM	DI	SERIAL LINK				X				X					Is it per cylinder or combined 1 no. signal against 1 no. Generator? If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
145		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ENGINE SLOWING DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER INLET PRESSURE OR FLOW LOW	DI	SERIAL LINK				X				X					
146		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ENGINE SHUT DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER INLET PRESSURE OR FLOW LOW	DI	SERIAL LINK				X				X					
147		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	CYLINDER FRESHWATER COOLING WATER - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
148		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – DISPLAY	AI	SERIAL LINK					X				X				
149		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – HIGH ALARM	DO	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
150		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ENGINE SLOWING DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – HIGH	DI	SERIAL LINK				X				X					
151		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	CYLINDER FRESHWATER COOLING WATER EXPANSION TANK, LEVEL – LOW ALARM	DI	SERIAL LINK				X				X					
152		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-1, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Nos of cylinder and nos of signal? However 4 nos. Cylinder considered as example.
153		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-2, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
154		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-3, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
155		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-4, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
156		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-5, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
157		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-6, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
158		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-7, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
159		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-8, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
160		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-9, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
161		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-10, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qtys. Same to be discussed during detail design.
162		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-11, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qtys. Same to be discussed during detail design.
163		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-12, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qtys. Same to be discussed during detail design.
164		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-13, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qtys. Same to be discussed during detail design.
165		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-14, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qtys. Same to be discussed during detail design.
166		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-15, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qtys. Same to be discussed during detail design.
167		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EXHAUST GAS AFTER CYLINDER-16, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qtys. Same to be discussed during detail design.
168		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ENGINE SLOWING DOWN ALARM DUE TO EXHAUST GAS CYLINDER TEMP HIGH	DI	SERIAL LINK				X				X					
169		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	TURBOCHARGER OIL INLET PRESSURE - DISPLAY	AI	SERIAL LINK					X				X				
170		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	TURBOCHARGER OIL INLET PRESSURE - LOW ALARM	DI	SERIAL LINK				X				X					
171		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	TURBOCHARGER OIL OUTLET TEMP., BEARING-1, - HIGH	DI	SERIAL LINK				X				X					Bearing qtys considered as 2 nos. OEM to confirm the same.
172		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	TURBOCHARGER OIL OUTLET TEMP., BEARING-2, - HIGH	DI	SERIAL LINK				X				X					Bearing qtys considered as 2 nos. OEM to confirm the same.
173		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	SPEED OF TURBOCHARGER	AI	SERIAL LINK					X				X				
174		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	SPEED OF TURBOCHARGER - HIGH/OVER SPEED	DO	SERIAL LINK				X				X					
175		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ENGINE SPEED	AI	SERIAL LINK					X				X				
176		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ENGINE OVERSPEED ALARM	DI	SERIAL LINK				X				X					
177		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ENGINE AUTO SHUTTING DOWN ALARM DUE TO ENGINE OVERSPEED	DI	SERIAL LINK				X				X					
178		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	MAIN (24VDC CONTROL?) POWER SUPPLY AVAILABLE INDICATION	DI	SERIAL LINK					X				X				
179		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	MAIN (24VDC CONTROL?) SUPPLY FAILURE	DI	SERIAL LINK				X				X					
180		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	EMERGENCY (24VDC CONTROL?) SUPPLY FAILURE	DI	SERIAL LINK				X				X					

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
181		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	GENERATOR BEARING(ALTERNATOR SIDE) LUB OIL INLET PRESSURE -DISPLAY	AI	SERIAL LINK					X				X				
182		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	GENERATOR BEARING(ALTERNATOR SIDE) LUB OIL INLET PRESSURE -LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
183		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	FAILURE OF GENERATOR COOLING PUMP OR FAN MOTOR	DI	SERIAL LINK				X				X					
184		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	GENERATOR COOLING MEDIUM TEMPERATURE - VALUE	AI	SERIAL LINK					X				X				
185		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	GENERATOR COOLING MEDIUM TEMPERATURE - HIGH ALARM	DI	SERIAL LINK				X				X					
186		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	MSB	STATIONARY WINDING(R PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
187		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	MSB	STATIONARY WINDING(Y PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
188		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	MSB	STATIONARY WINDING(B PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
189		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	MSB	STATIONARY WINDING(R PHASE) TEMPERATURE - HIGH	DI	SERIAL LINK				X				X					
190		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	MSB	STATIONARY WINDING(Y PHASE) TEMPERATURE -HIGH	DI	SERIAL LINK				X				X					
191		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	MSB	STATIONARY WINDING(B PHASE) TEMPERATURE -HIGH	DI	SERIAL LINK				X				X					
192		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ACTIVATION OF OIL MIST DETECTION	DI	SERIAL LINK				X				X					
193		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	PRIME MOVER SHUTTING DOWN DUE TO ACTIVATION OF OIL MIST DETECTION	DI	SERIAL LINK				X				X					
194		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G2 ABNORMAL	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
195		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G2 AUTO START	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
196		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G2 AUTO STOP	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
197		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G2 RUN INDICATION	DI	SERIAL LINK					X				X				Is these signals from LCP or through Starter?
198		MAIN GENERATOR NO. 2/ GENERATING PLANT-2	Generator LCP-2	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G2 POWER SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				Is these signals from LCP or through Starter?
199		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	FUEL OIL SYSTEM - FUEL OIL AFTER FILTER (ENGINE INLET), PRESSURE	AI	SERIAL LINK					X				X				
200		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	FUEL OIL SYSTEM - FUEL OIL AFTER FILTER (ENGINE INLET), PRESSURE LOW - ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
201		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	FUEL OIL SYSTEM - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
202		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	FUEL OIL SYSTEM- FUEL OIL BEFORE INJECTION PUMPS, TEMP. - HIGH(OR VISCOSITY - LOW)	DI	SERIAL LINK				X				X					Whether DG Engine is heavy fuel oil burning Engine. Is this signal applicable accordingly? Same to be discussed during detail design.
203		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	FUEL OIL SYSTEM-FUEL OIL BEFORE INJECTION PUMPS, TEMP. - LOW (OR VISCOSITY - HIGH)	DI	SERIAL LINK				X				X					Whether DG Engine is heavy fuel oil burning Engine. Is this signal applicable accordingly? Same to be discussed during detail design.
204		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	FUEL OIL SYSTEM - LEAKAGE FROM HIGH PRESSURE PIPES -ALARM	DI	SERIAL LINK				X				X					
205		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	FUEL OIL SYSTEM - FUEL OIL SERVICE TANK, LEVEL - LOW	DI	SERIAL LINK				X				X					
206		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	FUEL OIL SYSTEM - FUEL OIL SERVICE TANK, LEVEL -HIGH	DI	SERIAL LINK				X				X					
207		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	FUEL OIL SYSTEM -FUEL OIL PRESSURE – LOW - ALARM	DI	SERIAL LINK				X				X					
208		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	FUEL OIL SYSTEM -COMMON RAIL OIL PRESSURE,LOW	DI	SERIAL LINK				X				X					
209		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM -LUBE OIL TO MAIN BEARING(ENGINE SIDE), PRESSURE – VALUE	AI	SERIAL LINK					X				X				
210		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM -LUBE OIL TO MAIN BEARING (ENGINE SIDE), PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
211		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM -LUBE OIL TO THRUST BEARING, PRESSURE – VALUE	AI	SERIAL LINK					X				X				
212		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM -LUBE OIL TO THRUST BEARING, PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
213		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM - STND BY PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
214		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM,PUMP AUTO SHUTING DOWN ALARM DUE TO MAIN BEARING & THRUST BEARING PRESSURE LOW	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto shutting down information(as alarm) will be available from DG System to CCAMS HMI. Same to be discussed during detail design.
215		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM -LUBE OIL FILTER DIFFERENTIAL, PRESSURE – VALUE	AI	SERIAL LINK					X				X				
216		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM -LUBE OIL FILTER DIFFERENTIAL, PRESSURE – HIGH ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
217		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM LUBE OIL INLET, TEMP. – VALUE	AI	SERIAL LINK					X				X				
218		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM LUBE OIL INLET, TEMP. – HIGH, ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
219		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-1 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Is it per cylinder or combined 1 no. signal against 1 no. Generator?
220		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-2 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
221		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-3 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
222		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-4 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
223		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-5 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
224		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-6 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
225		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-7 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
226		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-8 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
227		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-9 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
228		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-10 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
229		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-11 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
230		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-12 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
231		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-13 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
232		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-14 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
233		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-15 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
234		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB. OIL SYSTEM- CYLINDER-16 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
235		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ENGINE AUTO SLOWING DOWN ALARM DUE TO CYLINDER LUBRICATOR FLOW RATE LOW	DI	SERIAL LINK				X				X					
236		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	LUB OIL COMMON RAIL SERVO OIL PRESSURE - LOW	DI	SERIAL LINK				X				X					
237		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	SEA WATER COOLING SYSTEM PRESSURE – DISPLAY	AI	SERIAL LINK					X				X				
238		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	SEA WATER COOLING SYSTEM PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
239		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	SW COOLING PUMP - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
240		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	SW COOLING PUMP - PUMP AUTO SHUT DOWN	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto shutting down information(as alarm) will be available from DG System to CCAMS HMI. Same to be discussed during detail design.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
241		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	TEMPERATURE OF COOLING WATER OR COOLING AIR, HIGH	DI	SERIAL LINK				X				X					Is it as per IRS/ABS requirement? If so, please refer Clause & Table no.
242		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	CYLINDER FRESHWATER COOLING WATER INLET, PRESSURE OR FLOW – DISPLAY	AI	SERIAL LINK					X				X				Is it per cylinder or combined 1 no. signal against 1 no. Generator?
243		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	CYLINDER FRESHWATER COOLING WATER INLET, PRESSURE OR FLOW – LOW ALARM	DI	SERIAL LINK				X				X					Is it per cylinder or combined 1 no. signal against 1 no. Generator? If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
244		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ENGINE SLOWING DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER INLET PRESSURE OR FLOW LOW	DI	SERIAL LINK				X				X					
245		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ENGINE SHUT DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER INLET PRESSURE OR FLOW LOW	DI	SERIAL LINK				X				X					
246		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	CYLINDER FRESHWATER COOLING WATER - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
247		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – DISPLAY	AI	SERIAL LINK					X				X				
248		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – HIGH ALARM	DO	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
249		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ENGINE SLOWING DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – HIGH	DI	SERIAL LINK				X				X					
250		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	CYLINDER FRESHWATER COOLING WATER EXPANSION TANK, LEVEL – LOW ALARM	DI	SERIAL LINK				X				X					
251		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-1, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Nos of cylinder and nos of signal? However 4 nos. Cylinder considered as example.
252		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-2, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
253		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-3, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
254		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-4, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
255		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-5, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
256		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-6, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
257		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-7, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
258		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-8, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
259		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-9, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
260		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-10, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
261		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-11, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
262		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-12, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
263		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-13, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
264		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-14, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
265		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-15, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
266		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EXHAUST GAS AFTER CYLINDER-16, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
267		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ENGINE SLOWING DOWN ALARM DUE TO EXHAUST GAS CYLINDER TEMP HIGH	DI	SERIAL LINK				X				X					
268		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	TURBOCHARGER OIL INLET PRESSURE - DISPLAY	AI	SERIAL LINK					X				X				
269		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	TURBOCHARGER OIL INLET PRESSURE - LOW ALARM	DI	SERIAL LINK				X				X					
270		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	TURBOCHARGER OIL OUTLET TEMP., BEARING-1, - HIGH	DI	SERIAL LINK				X				X					Bearing qty's considered as 2 nos. OEM to confirm the same.
271		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	TURBOCHARGER OIL OUTLET TEMP., BEARING-2, - HIGH	DI	SERIAL LINK				X				X					Bearing qty's considered as 2 nos. OEM to confirm the same.
272		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	SPEED OF TURBOCHARGER	AI	SERIAL LINK					X				X				
273		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	SPEED OF TURBOCHARGER - HIGH/OVER SPEED	DO	SERIAL LINK				X				X					
274		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ENGINE SPEED	AI	SERIAL LINK					X				X				
275		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ENGINE OVERSPEED ALARM	DI	SERIAL LINK				X				X					
276		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ENGINE AUTO SHUTTING DOWN ALARM DUE TO ENGINE OVERSPEED	DI	SERIAL LINK				X				X					
277		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	MAIN (24VDC CONTROL?) POWER SUPPLY AVAILABLE INDICATION	DI	SERIAL LINK					X				X				
278		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	MAIN (24VDC CONTROL?) SUPPLY FAILURE	DI	SERIAL LINK				X				X					
279		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	EMERGENCY (24VDC CONTROL?) SUPPLY FAILURE	DI	SERIAL LINK				X				X					
280		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	GENERATOR BEARING(ALTERNATOR SIDE) LUB OIL INLET PRESSURE -DISPLAY	AI	SERIAL LINK					X				X				

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
281		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	GENERATOR BEARING(ALTERNATOR SIDE) LUB OIL INLET PRESSURE -LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
282		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	FAILURE OF GENERATOR COOLING PUMP OR FAN MOTOR	DI	SERIAL LINK				X				X					
283		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	GENERATOR COOLING MEDIUM TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
284		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	GENERATOR COOLING MEDIUM TEMPERATURE -HIGH ALARM	DI	SERIAL LINK				X				X					
285		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	MSB	STATIONARY WINDING(R PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
286		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	MSB	STATIONARY WINDING(Y PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
287		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	MSB	STATIONARY WINDING(B PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
288		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	MSB	STATIONARY WINDING(R PHASE) TEMPERATURE - HIGH	DI	SERIAL LINK				X				X					
289		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	MSB	STATIONARY WINDING(Y PHASE) TEMPERATURE -HIGH	DI	SERIAL LINK				X				X					
290		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	MSB	STATIONARY WINDING(B PHASE) TEMPERATURE -HIGH	DI	SERIAL LINK				X				X					
291		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ACTIVATION OF OIL MIST DETECTION	DI	SERIAL LINK				X				X					
292		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	PRIME MOVER SHUTTING DOWN DUE TO ACTIVATION OF OIL MIST DETECTION	DI	SERIAL LINK				X				X					
293		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G3 ABNORMAL	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
294		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G3 AUTO START	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
295		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G3 AUTO STOP	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
296		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G3 RUN INDICATION	DI	SERIAL LINK					X				X				Is these signals from LCP or through Starter?
297		MAIN GENERATOR NO. 3/ GENERATING PLANT-3	Generator LCP-3	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G3 POWER SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				Is these signals from LCP or through Starter?
298		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	FUEL OIL SYSTEM - FUEL OIL AFTER FILTER (ENGINE INLET), PRESSURE	AI	SERIAL LINK					X				X				
299		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	FUEL OIL SYSTEM - FUEL OIL AFTER FILTER (ENGINE INLET), PRESSURE LOW - ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
300		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	FUEL OIL SYSTEM - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
301		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	FUEL OIL SYSTEM- FUEL OIL BEFORE INJECTION PUMPS, TEMP. - HIGH(OR VISCOSITY - LOW)	DI	SERIAL LINK				X				X					Whether DG Engine is heavy fuel oil burning Engine. Is this signal applicable accordingly? Same to be discussed during detail design.
302		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	FUEL OIL SYSTEM-FUEL OIL BEFORE INJECTION PUMPS, TEMP. - LOW (OR VISCOSITY - HIGH)	DI	SERIAL LINK				X				X					Whether DG Engine is heavy fuel oil burning Engine. Is this signal applicable accordingly? Same to be discussed during detail design.
303		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	FUEL OIL SYSTEM - LEAKAGE FROM HIGH PRESSURE PIPES -ALARM	DI	SERIAL LINK				X				X					
304		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	FUEL OIL SYSTEM - FUEL OIL SERVICE TANK, LEVEL - LOW	DI	SERIAL LINK				X				X					
305		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	FUEL OIL SYSTEM - FUEL OIL SERVICE TANK, LEVEL -HIGH	DI	SERIAL LINK				X				X					
306		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	FUEL OIL SYSTEM -FUEL OIL PRESSURE – LOW - ALARM	DI	SERIAL LINK				X				X					
307		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	FUEL OIL SYSTEM -COMMON RAIL OIL PRESSURE,LOW	DI	SERIAL LINK				X				X					
308		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM -LUBE OIL TO MAIN BEARING(ENGINE SIDE), PRESSURE – VALUE	AI	SERIAL LINK					X				X				
309		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM -LUBE OIL TO MAIN BEARING (ENGINE SIDE), PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
310		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM -LUBE OIL TO THRUST BEARING, PRESSURE – VALUE	AI	SERIAL LINK					X				X				
311		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM -LUBE OIL TO THRUST BEARING, PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
312		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM - STND BY PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
313		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM PUMP AUTO SHUTING DOWN ALARM DUE TO MAIN BEARING & THRUST BEARING PRESSURE LOW	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto shutting down information(as alarm) will be available from DG System to CCAMS HMI. Same to be discussed during detail design.
314		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM -LUBE OIL FILTER DIFFERENTIAL, PRESSURE – VALUE	AI	SERIAL LINK					X				X				
315		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM -LUBE OIL FILTER DIFFERENTIAL, PRESSURE – HIGH ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
316		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM LUBE OIL INLET, TEMP. – VALUE	AI	SERIAL LINK					X				X				
317		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM LUBE OIL INLET, TEMP. – HIGH, ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
318		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-1 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Is it per cylinder or combined 1 no. signal against 1 no. Generator?
319		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM-CYLINDER-2 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
320		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-3 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
321		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-4 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
322		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-5 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
323		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-6 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
324		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-7 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
325		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-8 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
326		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-9 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
327		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-10 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
328		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-11 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
329		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-12 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
330		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-13 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
331		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-14 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
332		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-15 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
333		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB. OIL SYSTEM- CYLINDER-16 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
334		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ENGINE AUTO SLOWING DOWN ALARM DUE TO CYLINDER LUBRICATOR FLOW RATE LOW	DI	SERIAL LINK				X				X					
335		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	LUB OIL COMMON RAIL SERVO OIL PRESSURE - LOW	DI	SERIAL LINK				X				X					
336		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	SEA WATER COOLING SYSTEM PRESSURE – DISPLAY	AI	SERIAL LINK					X				X				
337		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	SEA WATER COOLING SYSTEM PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
338		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	SW COOLING PUMP - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
339		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	SW COOLING PUMP - PUMP AUTO SHUT DOWN	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto shutting down information(as alarm) will be available from DG System to CCAMS HMI. Same to be discussed during detail design.
340		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	TEMPERATURE OF COOLING WATER OR COOLING AIR, HIGH	DI	SERIAL LINK				X				X					Is it as per IRS/ABS requirement? If so, please refer Clause & Table no.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
341		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	CYLINDER FRESHWATER COOLING WATER INLET, PRESSURE OR FLOW – DISPLAY	AI	SERIAL LINK					X				X				Is it per cylinder or combined 1 no. signal against 1 no. Generator?
342		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	CYLINDER FRESHWATER COOLING WATER INLET, PRESSURE OR FLOW – LOW ALARM	DI	SERIAL LINK				X				X					Is it per cylinder or combined 1 no. signal against 1 no. Generator? If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
343		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ENGINE SLOWING DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER INLET PRESSURE OR FLOW LOW	DI	SERIAL LINK				X				X					
344		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ENGINE SHUT DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER INLET PRESSURE OR FLOW LOW	DI	SERIAL LINK				X				X					
345		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	CYLINDER FRESHWATER COOLING WATER - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
346		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – DISPLAY	AI	SERIAL LINK					X				X				
347		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – HIGH ALARM	DO	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
348		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ENGINE SLOWING DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – HIGH	DI	SERIAL LINK				X				X					
349		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	CYLINDER FRESHWATER COOLING WATER EXPANSION TANK, LEVEL – LOW ALARM	DI	SERIAL LINK				X				X					
350		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-1, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Nos of cylinder and nos of signal? However 4 nos. Cylinder considered as example.
351		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-2, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
352		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-3, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
353		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-4, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
354		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-5, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
355		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-6, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
356		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-7, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
357		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-8, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
358		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-9, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
359		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-10, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
360		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-11, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
361		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-12, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
362		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-13, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
363		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-14, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
364		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-15, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
365		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EXHAUST GAS AFTER CYLINDER-16, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
366		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ENGINE SLOWING DOWN ALARM DUE TO EXHAUST GAS CYLINDER TEMP HIGH	DI	SERIAL LINK				X				X					
367		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	TURBOCHARGER OIL INLET PRESSURE - DISPLAY	AI	SERIAL LINK					X				X				
368		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	TURBOCHARGER OIL INLET PRESSURE - LOW ALARM	DI	SERIAL LINK				X				X					
369		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	TURBOCHARGER OIL OUTLET TEMP., BEARING-1, - HIGH	DI	SERIAL LINK				X				X					Bearing qty's considered as 2 nos. OEM to confirm the same.
370		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	TURBOCHARGER OIL OUTLET TEMP., BEARING-2, - HIGH	DI	SERIAL LINK				X				X					Bearing qty's considered as 2 nos. OEM to confirm the same.
371		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	SPEED OF TURBOCHARGER	AI	SERIAL LINK					X				X				
372		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	SPEED OF TURBOCHARGER - HIGH/OVER SPEED	DO	SERIAL LINK				X				X					
373		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ENGINE SPEED	AI	SERIAL LINK					X				X				
374		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ENGINE OVERSPEED ALARM	DI	SERIAL LINK				X				X					
375		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ENGINE AUTO SHUTTING DOWN ALARM DUE TO ENGINE OVERSPEED	DI	SERIAL LINK				X				X					
376		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	MAIN (24VDC CONTROL?) POWER SUPPLY AVAILABLE INDICATION	DI	SERIAL LINK					X				X				
377		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	MAIN (24VDC CONTROL?) SUPPLY FAILURE	DI	SERIAL LINK				X				X					
378		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	EMERGENCY (24VDC CONTROL?) SUPPLY FAILURE	DI	SERIAL LINK				X				X					
379		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	GENERATOR BEARING(ALTERNATOR SIDE) LUB OIL INLET PRESSURE -DISPLAY	AI	SERIAL LINK					X				X				
380		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	GENERATOR BEARING(ALTERNATOR SIDE) LUB OIL INLET PRESSURE -LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
381		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	FAILURE OF GENERATOR COOLING PUMP OR FAN MOTOR	DI	SERIAL LINK				X				X					
382		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	GENERATOR COOLING MEDIUM TEMPERATURE - VALUE	AI	SERIAL LINK					X				X				
383		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	GENERATOR COOLING MEDIUM TEMPERATURE - HIGH ALARM	DI	SERIAL LINK				X				X					
384		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	MSB	STATIONARY WINDING(R PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
385		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	MSB	STATIONARY WINDING(Y PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
386		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	MSB	STATIONARY WINDING(B PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
387		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	MSB	STATIONARY WINDING(R PHASE) TEMPERATURE - HIGH	DI	SERIAL LINK				X				X					
388		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	MSB	STATIONARY WINDING(Y PHASE) TEMPERATURE -HIGH	DI	SERIAL LINK				X				X					
389		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	MSB	STATIONARY WINDING(B PHASE) TEMPERATURE -HIGH	DI	SERIAL LINK				X				X					
390		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ACTIVATION OF OIL MIST DETECTION	DI	SERIAL LINK				X				X					
391		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	PRIME MOVER SHUTTING DOWN DUE TO ACTIVATION OF OIL MIST DETECTION	DI	SERIAL LINK				X				X					
392		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G4 ABNORMAL	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
393		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G4 AUTO START	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
394		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G4 AUTO STOP	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
395		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G4 RUN INDICATION	DI	SERIAL LINK					X				X				Is these signals from LCP or through Starter?
396		MAIN GENERATOR NO. 4/ GENERATING PLANT-4	Generator LCP-4	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-G4 POWER SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				Is these signals from LCP or through Starter?
397		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	FUEL OIL SYSTEM - FUEL OIL AFTER FILTER (ENGINE INLET), PRESSURE	AI	SERIAL LINK					X				X				
398		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	FUEL OIL SYSTEM - FUEL OIL AFTER FILTER (ENGINE INLET), PRESSURE LOW - ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
399		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	FUEL OIL SYSTEM - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
400		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	FUEL OIL SYSTEM- FUEL OIL BEFORE INJECTION PUMPS, TEMP. - HIGH(OR VISCOSITY - LOW)	DI	SERIAL LINK				X				X					Whether DG Engine is heavy fuel oil burning Engine. Is this signal applicable accordingly? Same to be discussed during detail design.

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
401		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	FUEL OIL SYSTEM-FUEL OIL BEFORE INJECTION PUMPS, TEMP. - LOW (OR VISCOSITY - HIGH)	DI	SERIAL LINK				X				X					Whether DG Engine is heavy fuel oil burning Engine. Is this signal applicable accordingly? Same to be discussed during detail design.
402		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	FUEL OIL SYSTEM - LEAKAGE FROM HIGH PRESSURE PIPES -ALARM	DI	SERIAL LINK				X				X					
403		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	FUEL OIL SYSTEM - FUEL OIL SERVICE TANK, LEVEL - LOW	DI	SERIAL LINK				X				X					
404		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	FUEL OIL SYSTEM - FUEL OIL SERVICE TANK, LEVEL -HIGH	DI	SERIAL LINK				X				X					
405		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	FUEL OIL SYSTEM -FUEL OIL PRESSURE – LOW - ALARM	DI	SERIAL LINK				X				X					
406		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	FUEL OIL SYSTEM -COMMON RAIL OIL PRESSURE,LOW	DI	SERIAL LINK				X				X					
407		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM -LUBE OIL TO MAIN BEARING(ENGINE SIDE), PRESSURE – VALUE	AI	SERIAL LINK					X				X				
408		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM -LUBE OIL TO MAIN BEARING (ENGINE SIDE), PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
409		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM -LUBE OIL TO THRUST BEARING, PRESSURE – VALUE	AI	SERIAL LINK					X				X				
410		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM -LUBE OIL TO THRUST BEARING, PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
411		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM - STND BY PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
412		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM PUMP AUTO SHUTING DOWN ALARM DUE TO MAIN BEARING & THRUST BEARING PRESSURE LOW	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto shutting down information(as alarm) will be available from DG System to CCAMS HMI. Same to be discussed during detail design.
413		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM -LUBE OIL FILTER DIFFERENTIAL, PRESSURE – VALUE	AI	SERIAL LINK					X				X				
414		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM -LUBE OIL FILTER DIFFERENTIAL, PRESSURE – HIGH ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
415		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM LUBE OIL INLET, TEMP. – VALUE	AI	SERIAL LINK					X				X				
416		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM LUBE OIL INLET, TEMP. – HIGH, ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
417		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-1 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Is it per cylinder or combined 1 no. signal against 1 no. Generator?
418		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-2 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
419		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-3 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
420		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-4 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRIPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
421		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-5 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
422		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-6 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
423		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-7 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
424		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-8 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
425		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-9 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
426		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-10 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
427		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-11 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
428		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-12 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
429		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-13 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
430		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-14 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
431		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-15 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
432		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB. OIL SYSTEM- CYLINDER-16 LUBRICATOR, FLOW RATE – LOW ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
433		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ENGINE AUTO SLOWING DOWN ALARM DUE TO CYLINDER LUBRICATOR FLOW RATE LOW	DI	SERIAL LINK				X				X					
434		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	LUB OIL COMMON RAIL SERVO OIL PRESSURE - LOW	DI	SERIAL LINK				X				X					
435		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	SEA WATER COOLING SYSTEM PRESSURE – DISPLAY	AI	SERIAL LINK					X				X				
436		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	SEA WATER COOLING SYSTEM PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
437		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	SW COOLING PUMP - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
438		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	SW COOLING PUMP - PUMP AUTO SHUT DOWN	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto shutting down information(as alarm) will be available from DG System to CCAMS HMI. Same to be discussed during detail design.
439		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	TEMPERATURE OF COOLING WATER OR COOLING AIR, HIGH	DI	SERIAL LINK				X				X					Is it as per IRS/ABS requirement? If so, please refer Clause & Table no.
440		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	CYLINDER FRESHWATER COOLING WATER INLET, PRESSURE OR FLOW – DISPLAY	AI	SERIAL LINK					X				X				Is it per cylinder or combined 1 no. signal against 1 no. Generator?

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					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
441		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	CYLINDER FRESHWATER COOLING WATER INLET, PRESSURE OR FLOW – LOW ALARM	DI	SERIAL LINK				X				X					Is it per cylinder or combined 1 no. signal against 1 no. Generator? If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
442		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ENGINE SLOWING DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER INLET PRESSURE OR FLOW LOW	DI	SERIAL LINK				X				X					
443		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ENGINE SHUT DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER INLET PRESSURE OR FLOW LOW	DI	SERIAL LINK				X				X					
444		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	CYLINDER FRESHWATER COOLING WATER - PUMP AUTO STARTED	DI	SERIAL LINK				X				X					Pump is Engine skid mounted. Auto Started information(as alarm) will be available from DG System to CCAMS HMI. Is it alarm or indication? Same to be discussed during detail design.
445		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – DISPLAY	AI	SERIAL LINK					X				X				
446		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – HIGH ALARM	DO	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
447		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ENGINE SLOWING DOWN ALARM DUE TO CYLINDER FRESHWATER COOLING WATER - WATER OUTLET (GENERAL), TEMP. – HIGH	DI	SERIAL LINK				X				X					
448		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	CYLINDER FRESHWATER COOLING WATER EXPANSION TANK, LEVEL – LOW ALARM	DI	SERIAL LINK				X				X					
449		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-1, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Nos of cylinder and nos of signal? However 4 nos. Cylinder considered as example.
450		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-2, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
451		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-3, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
452		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-4, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
453		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-5, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
454		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-6, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
455		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-7, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
456		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-8, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
457		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-9, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
458		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-10, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
459		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-11, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
460		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-12, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
461		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-13, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
462		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-14, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
463		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-15, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
464		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EXHAUST GAS AFTER CYLINDER-16, TEMP. – HIGH ALARM	DI	SERIAL LINK				X				X					Depends on Cylinder qty's. Same to be discussed during detail design.
465		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ENGINE SLOWING DOWN ALARM DUE TO EXHAUST GAS CYLINDER TEMP HIGH	DI	SERIAL LINK				X				X					
466		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	TURBOCHARGER OIL INLET PRESSURE - DISPLAY	AI	SERIAL LINK					X				X				
467		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	TURBOCHARGER OIL INLET PRESSURE - LOW ALARM	DI	SERIAL LINK				X				X					
468		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	TURBOCHARGER OIL OUTLET TEMP., BEARING-1, - HIGH	DI	SERIAL LINK				X				X					Bearing qty's considered as 2 nos. OEM to confirm the same.
469		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	TURBOCHARGER OIL OUTLET TEMP., BEARING-2, - HIGH	DI	SERIAL LINK				X				X					Bearing qty's considered as 2 nos. OEM to confirm the same.
470		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	SPEED OF TURBOCHARGER	AI	SERIAL LINK					X				X				
471		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	SPEED OF TURBOCHARGER - HIGH/OVER SPEED	DO	SERIAL LINK				X				X					
472		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ENGINE SPEED	AI	SERIAL LINK					X				X				
473		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ENGINE OVERSPEED ALARM	DI	SERIAL LINK				X				X					
474		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ENGINE AUTO SHUTTING DOWN ALARM DUE TO ENGINE OVERSPEED	DI	SERIAL LINK				X				X					
475		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	MAIN (24VDC CONTROL?) POWER SUPPLY AVAILABLE INDICATION	DI	SERIAL LINK					X				X				
476		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	MAIN (24VDC CONTROL?) SUPPLY FAILURE	DI	SERIAL LINK				X				X					
477		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	EMERGENCY (24VDC CONTROL?) SUPPLY FAILURE	DI	SERIAL LINK				X				X					
478		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	GENERATOR BEARING(ALTERNATOR SIDE) LUB OIL INLET PRESSURE -DISPLAY	AI	SERIAL LINK					X				X				
479		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	GENERATOR BEARING(ALTERNATOR SIDE) LUB OIL INLET PRESSURE -LOW ALARM	DI	SERIAL LINK				X				X					If the alarm is not available from DG System, CCAMS vendor to generate the same based on input value and corresponding setting.
480		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	FAILURE OF GENERATOR COOLING PUMP OR FAN MOTOR	DI	SERIAL LINK				X				X					

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					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
481		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	GENERATOR COOLING MEDIUM TEMPERATURE - VALUE	AI	SERIAL LINK					X				X				
482		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	GENERATOR COOLING MEDIUM TEMPERATURE - HIGH ALARM	DI	SERIAL LINK				X				X					
483		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	MSB	STATIONARY WINDING(R PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
484		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	MSB	STATIONARY WINDING(Y PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
485		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	MSB	STATIONARY WINDING(B PHASE) TEMPERATURE -VALUE	AI	SERIAL LINK					X				X				
486		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	MSB	STATIONARY WINDING(R PHASE) TEMPERATURE - HIGH	DI	SERIAL LINK				X				X					
487		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	MSB	STATIONARY WINDING(Y PHASE) TEMPERATURE -HIGH	DI	SERIAL LINK				X				X					
488		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	MSB	STATIONARY WINDING(B PHASE) TEMPERATURE -HIGH	DI	SERIAL LINK				X				X					
489		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ACTIVATION OF OIL MIST DETECTION	DI	SERIAL LINK				X				X					
490		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	PRIME MOVER SHUTTING DOWN DUE TO ACTIVATION OF OIL MIST DETECTION	DI	SERIAL LINK				X				X					
491		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-HG-5 ABNORMAL	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
492		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-HG-5 AUTO START	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
493		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-HG-5 AUTO STOP	DI	SERIAL LINK				X				X					Is these signals from LCP or through Starter?
494		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-HG-5 RUN INDICATION	DI	SERIAL LINK					X				X				Is these signals from LCP or through Starter?
495		HARBOUR GENERATOR NO.5/ GENERATING PLANT-5	Generator LCP-5	ELECTRICALLY DRIVEN LUBRICATING OIL PRIMING PUMP-HG-5 POWER SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				Is these signals from LCP or through Starter?
496		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	STARTING, PARALLELING AND PUTTING GENERATOR ON LINE	DO	HARD WIRE						X				X			Is it only to start the DG? Once it is started whether PMS automatically activated for paralleling. Same to be confirmed/discussed.
497		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	GENERATOR RUNNING	DI	SERIAL LINK					x				x				
498		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	VOLTAGE R PHASE - VALUE	AI	SERIAL LINK					x				x				
499		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	VOLTAGE Y PHASE - VALUE	AI	SERIAL LINK					x				x				
500		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	VOLTAGE B PHASE - VALUE	AI	SERIAL LINK					x				x				

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
501		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	VOLTAGE HIGH ALARM	DI	SERIAL LINK				x				x					
502		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	VOLTAGE LOW ALARM	DI	SERIAL LINK				x				x					
503		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	CURRENT R PHASE - VALUE	AI	SERIAL LINK					x				x				
504		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	CURRENT Y PHASE - VALUE	AI	SERIAL LINK					x				x				
505		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	CURRENT B PHASE - VALUE	AI	SERIAL LINK					x				x				
506		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	CURRENT HIGH ALARM	DI	SERIAL LINK				X				X					
507		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	FREQUENCY - VALUE	AI	SERIAL LINK					x				x				
508		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	FREQUENCY - HIGH ALARM	DI	SERIAL LINK				x				x					
509		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	FREQUENCY - LOW ALARM	DI	SERIAL LINK				x				x					
510		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	FAILURE OF ONLINE GENERATOR	DI	SERIAL LINK				x				x					
511		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	GENERATOR COOLING INLET PUMP OR FAN MOTOR - FAILS	DI	SERIAL LINK				x				x					
512		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	GENERATOR COOLING MEDIUM TEMP. - VALUE	AI	SERIAL LINK					x				x				
513		ELECTRIC POWER MAIN GENERATING PLANT-1 / PMS	MSB/PMS	GENERATOR COOLING MEDIUM TEMP. - HIGH ALARM	DI	SERIAL LINK				x				x					
514		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	STARTING, PARALLELING AND PUTTING GENERATOR ON LINE	DO	HARD WIRE						X				X			Is it only to start the DG? Once it is started whether PMS automatically activated for paralleling. Same to be confirmed/discussed.
515		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	GENERATOR RUNNING	DI	SERIAL LINK					x				x				
516		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	VOLTAGE R PHASE - VALUE	AI	SERIAL LINK					x				x				
517		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	VOLTAGE Y PHASE - VALUE	AI	SERIAL LINK					x				x				
518		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	VOLTAGE B PHASE - VALUE	AI	SERIAL LINK					x				x				
519		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	VOLTAGE HIGH ALARM	DI	SERIAL LINK				x				x					
520		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	VOLTAGE LOW ALARM	DI	SERIAL LINK				x				x					

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
521		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	CURRENT R PHASE - VALUE	AI	SERIAL LINK					x				x				
522		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	CURRENT Y PHASE - VALUE	AI	SERIAL LINK					x				x				
523		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	CURRENT B PHASE - VALUE	AI	SERIAL LINK					x				x				
524		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	CURRENT HIGH ALARM	DI	SERIAL LINK				X				X					
525		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	FREQUENCY - VALUE	AI	SERIAL LINK					x				x				
526		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	FREQUENCY - HIGH ALARM	DI	SERIAL LINK				x				x					
527		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	FREQUENCY - LOW ALARM	DI	SERIAL LINK				x				x					
528		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	FAILURE OF ONLINE GENERATOR	DI	SERIAL LINK				x				x					
529		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	GENERATOR COOLING INLET PUMP OR FAN MOTOR - FAILS	DI	SERIAL LINK				x				x					
530		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS	MSB/PMS	GENERATOR COOLING MEDIUM TEMP. - VALUE	AI	SERIAL LINK					x				x				
531		ELECTRIC POWER MAIN GENERATING PLANT-2 / PMS		GENERATOR COOLING MEDIUM TEMP. - HIGH ALARM	DI	SERIAL LINK				x				x					
532		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	STARTING, PARALLELING AND PUTTING GENERATOR ON LINE	DO	HARD WIRE						X				X			Is it only to start the DG? Once it is started whether PMS automatically activated for paralleling. Same to be confirmed/discussed.
533		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	GENERATOR RUNNING	DI	SERIAL LINK					x				x				
534		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	VOLTAGE R PHASE - VALUE	AI	SERIAL LINK					x				x				
535		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	VOLTAGE Y PHASE - VALUE	AI	SERIAL LINK					x				x				
536		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	VOLTAGE B PHASE - VALUE	AI	SERIAL LINK					x				x				
537		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	VOLTAGE HIGH ALARM	DI	SERIAL LINK				x				x					
538		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	VOLTAGE LOW ALARM	DI	SERIAL LINK				x				x					
539		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	CURRENT R PHASE - VALUE	AI	SERIAL LINK					x				x				
540		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	CURRENT Y PHASE - VALUE	AI	SERIAL LINK					x				x				

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
541		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	CURRENT B PHASE - VALUE	AI	SERIAL LINK					x				x				
542		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	CURRENT HIGH ALARM	DI	SERIAL LINK				X				X					
543		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	FREQUENCY - VALUE	AI	SERIAL LINK					x				x				
544		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	FREQUENCY - HIGH ALARM	DI	SERIAL LINK				x				x					
545		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	FREQUENCY - LOW ALARM	DI	SERIAL LINK				x				x					
546		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	FAILURE OF ONLINE GENERATOR	DI	SERIAL LINK				x				x					
547		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	GENERATOR COOLING INLET PUMP OR FAN MOTOR - FAILS	DI	SERIAL LINK				x				x					
548		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	GENERATOR COOLING MEDIUM TEMP. - VALUE	AI	SERIAL LINK					x				x				
549		ELECTRIC POWER MAIN GENERATING PLANT-3 / PMS	MSB/PMS	GENERATOR COOLING MEDIUM TEMP. - HIGH ALARM	DI	SERIAL LINK				x				x					
550		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	STARTING, PARALLELING AND PUTTING GENERATOR ON LINE	DO	HARD WIRE						X				X			Is it only to start the DG? Once it is started whether PMS automatically activated for paralleling. Same to be confirmed/discussed.
551		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	GENERATOR RUNNING	DI	SERIAL LINK					x				x				
552		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	VOLTAGE R PHASE - VALUE	AI	SERIAL LINK					x				x				
553		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	VOLTAGE Y PHASE - VALUE	AI	SERIAL LINK					x				x				
554		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	VOLTAGE B PHASE - VALUE	AI	SERIAL LINK					x				x				
555		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	VOLTAGE HIGH ALARM	DI	SERIAL LINK				x				x					
556		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	VOLTAGE LOW ALARM	DI	SERIAL LINK				x				x					
557		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	CURRENT R PHASE - VALUE	AI	SERIAL LINK					x				x				
558		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	CURRENT Y PHASE - VALUE	AI	SERIAL LINK					x				x				
559		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	CURRENT B PHASE - VALUE	AI	SERIAL LINK					x				x				
560		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	CURRENT HIGH ALARM	DI	SERIAL LINK				X				X					

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
561		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	FREQUENCY - VALUE	AI	SERIAL LINK					x				x				
562		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	FREQUENCY - HIGH ALARM	DI	SERIAL LINK				x				x					
563		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	FREQUENCY - LOW ALARM	DI	SERIAL LINK				x				x					
564		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	FAILURE OF ONLINE GENERATOR	DI	SERIAL LINK				x				x					
565		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	GENERATOR COOLING INLET PUMP OR FAN MOTOR - FAILS	DI	SERIAL LINK				x				x					
566		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	GENERATOR COOLING MEDIUM TEMP. - VALUE	AI	SERIAL LINK					x				x				
567		ELECTRIC POWER MAIN GENERATING PLANT-4 / PMS	MSB/PMS	GENERATOR COOLING MEDIUM TEMP. - HIGH ALARM	DI	SERIAL LINK				x				x					
568		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	STARTING, PARALLELING AND PUTTING GENERATOR ON LINE	DO	HARD WIRE						X				X			Is it only to start the DG? Once it is started whether PMS automatically activated for paralleling. Same to be confirmed/discussed.
569		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	GENERATOR RUNNING	DI	SERIAL LINK					x				x				
570		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	VOLTAGE R PHASE - VALUE	AI	SERIAL LINK					x				x				
571		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	VOLTAGE Y PHASE - VALUE	AI	SERIAL LINK					x				x				
572		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	VOLTAGE B PHASE - VALUE	AI	SERIAL LINK					x				x				
573		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	VOLTAGE HIGH ALARM	DI	SERIAL LINK				x				x					
574		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	VOLTAGE LOW ALARM	DI	SERIAL LINK				x				x					
575		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	CURRENT R PHASE - VALUE	AI	SERIAL LINK					x				x				
576		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	CURRENT Y PHASE - VALUE	AI	SERIAL LINK					x				x				
577		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	CURRENT B PHASE - VALUE	AI	SERIAL LINK					x				x				
578		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	CURRENT HIGH ALARM	DI	SERIAL LINK				x				x					
579		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	FREQUENCY - VALUE	AI	SERIAL LINK					x				x				
580		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	FREQUENCY - HIGH ALARM	DI	SERIAL LINK				x				x					

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
581		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	FREQUENCY - LOW ALARM	DI	SERIAL LINK				x				x					
582		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	FAILURE OF ONLINE GENERATOR	DI	SERIAL LINK				x				x					
583		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	GENERATOR COOLING INLET PUMP OR FAN MOTOR - FAILS	DI	SERIAL LINK				x				x					
584		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	GENERATOR COOLING MEDIUM TEMP. - VALUE	AI	SERIAL LINK					x				x				
585		ELECTRIC POWER HARBOUR GENERATING PLANT-5 / PMS	MSB/PMS	GENERATOR COOLING MEDIUM TEMP. - HIGH ALARM	DI	SERIAL LINK				x				x					
586		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.1 REMOTE (CCAMS)	DI	SERIAL LINK					X				X				
587		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.1 CONTROL "CCAMS"	DI	SERIAL LINK					X				X				
588		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.1 READY TO START	DI	SERIAL LINK					X				X				
589		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.1 ACB CLOSED	DI	SERIAL LINK					X				X				
590		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.1 ACB OPENED	DI	SERIAL LINK					X				X				
591		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.1 ACB CLOSE COMMOND	DO	HARD WIRED						X				X			
592		POWER MANAGEMENT SYSTEM	MSB/PMS	690VAC BUS BLACK OUT	DI	SERIAL LINK				X				X					
593		POWER MANAGEMENT SYSTEM	MSB/PMS	SHORT CIRCUIT	DI	SERIAL LINK				X				X					
594		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.1 ENG. SAFETY SHUT DOWN	DI	SERIAL LINK				X				X					
595		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.1 ACB ABNORMAL TRIP	DI	SERIAL LINK				X				X					
596		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.1 RESET(AKNOWL.)	DI	SERIAL LINK					X				X				
597		POWER MANAGEMENT SYSTEM	MSB/PMS	PT SIGNAL	DI	SERIAL LINK					X				X				
598		POWER MANAGEMENT SYSTEM	MSB/PMS	BUS-TIE OPEN	DI	SERIAL LINK					X				X				
599		POWER MANAGEMENT SYSTEM	MSB/PMS	BUS-TIE CLOSE	DI	SERIAL LINK					X				X				
600		POWER MANAGEMENT SYSTEM	MSB/PMS	BUS-TIE CLOSE	DO	HARD WIRED						X				X			

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
601		POWER MANAGEMENT SYSTEM	MSB/PMS	BOW THR. 1 STARTER POWER REQUEST	DI	SERIAL LINK					X				X				
602		POWER MANAGEMENT SYSTEM	MSB/PMS	BOW THR. 1 STARTER POWER AVAILABLE	DO	HARD WIRED						X				X			
603		POWER MANAGEMENT SYSTEM	MSB/PMS	BOW THR. 1 STARTER RUN	DI	SERIAL LINK					X				X				
604		POWER MANAGEMENT SYSTEM	MSB/PMS	(NO.1 PMS) BOW THR. 1 CURRENT	AI	HARD WIRED					X				X				
605		POWER MANAGEMENT SYSTEM	MSB/PMS	NO.1 GEN. ENG. START	DO	HARD WIRED						X				X			
606		POWER MANAGEMENT SYSTEM	MSB/PMS	NO.1 GEN. ENG. STOP	DO	HARD WIRED						X				X			
607		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.1 ACB CLOSE(SYNCHRO. ON)	DO	SERIAL LINK						X				X			
608		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.1 ACB OPEN	DO	SERIAL LINK						X				X			
609		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 REMOTE	DI	SERIAL LINK					X				X				
610		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 CONTROL "CCAMS"	DI	SERIAL LINK					X				X				
611		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 READY TO START	DI	SERIAL LINK					X				X				
612		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 ACB CLOSED	DI	SERIAL LINK					X				X				
613		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 ACB OPENED	DI	SERIAL LINK					X				X				
614		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 ACB CLOSE COMMOND	DO	HARD WIRED						X				X			
615		POWER MANAGEMENT SYSTEM	MSB/PMS	SHORT CIRCUIT	DI	SERIAL LINK				X				X					
616		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 ENG. SAFTY SHUT DOWN	DI	SERIAL LINK				X				X					
617		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 ACB ABNORMALORMAL TRIP	DI	SERIAL LINK				X				X					
618		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 RESET(ACKNOWL.)	DI	SERIAL LINK					X				X				
619		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 GEN. ENG. START	DO	HARD WIRED						X				X			
620		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 GEN. ENG. STOP	DO	HARD WIRED						X				X			

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
621		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 ACB CLOSE(SYNCHRO. ON)	DO	HARD WIRED						X				X			
622		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.2 ACB OPEN	DO	HARD WIRED						X				X			
623		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.,3 REMOTE	DI	SERIAL LINK					X				X				
624		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.3 CONTROL "CCAMS"	DI	SERIAL LINK					X				X				
625		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.3 READY TO START	DI	SERIAL LINK					X				X				
626		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.3 ACB CLOSED	DI	SERIAL LINK					X				X				
627		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.3 ACB OPENED	DI	SERIAL LINK					X				X				
628		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.3 ACB CLOSE COMMOND	DO	HARD WIRED						X				X			
629		POWER MANAGEMENT SYSTEM	MSB/PMS	690VAC BUS BLACK OUT	DI	SERIAL LINK				X				X					
630		POWER MANAGEMENT SYSTEM	MSB/PMS	SHORT CIRCUIT	DI	SERIAL LINK				X				X					
631		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.3 ENG. SAFTY SHUT DOWN	DI	SERIAL LINK				X				X					
632		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.3 ACB ABNORMALORMAL TRIP	DI	SERIAL LINK				X				X					
633		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.3 GEN. ENG. START	DO	HARD WIRED						X				X			
634		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.3 GEN. ENG. STOP	DO	HARD WIRED						X				X			
635		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.3 ACB CLOSE(SYNCHRO. ON)	DO	HARD WIRED						X				X			
636		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.3 ACB OPEN	DO	HARD WIRED						X				X			
637		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.4 CONTROL "PMS"	DI	SERIAL LINK					X				X				
638		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.4 READY TO START	DI	SERIAL LINK					X				X				
639		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.4 ACB CLOSED	DI	SERIAL LINK					X				X				
640		POWER MANAGEMENT SYSTEM	MSB/PMS	(NO.4 PMS) NO.4 ACB OPENED	DI	SERIAL LINK					X				X				

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
641		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.4 ACB CLOSE COMMOND	DO	HARD WIRED						X				X			
642		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.4 SHORT CIRCUIT	DI	SERIAL LINK				X				X					
643		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.4 ENG. SAFTY SHUT DOWN	DI	SERIAL LINK				X				X					
644		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.4 ACB ABNORMALORMAL TRIP	DI	SERIAL LINK				X				X					
645		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.4 GEN. ENG. START	DO	HARD WIRED						X				X			
646		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.4 GEN. ENG. STOP	DO	HARD WIRED						X				X			
647		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.4 ACB CLOSE(SYNCHRO. ON)	DO	HARD WIRED						X				X			
648		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN GENERATOR NO.4 ACB OPEN	DO	HARD WIRED						X				X			
649		POWER MANAGEMENT SYSTEM	MSB/PMS	HARBOUR GENERATOR NO.5 REMOTE	DI	SERIAL LINK					X				X				
650		POWER MANAGEMENT SYSTEM	MSB/PMS	HARBOUR GENERATOR NO.5 CONTROL "CCAMS"	DI	SERIAL LINK					X				X				
651		POWER MANAGEMENT SYSTEM	MSB/PMS	HARBOUR GENERATOR NO.5 READY TO START	DI	SERIAL LINK					X				X				
652		POWER MANAGEMENT SYSTEM	MSB/PMS	HARBOUR GENERATOR NO.5 ACB CLOSED	DI	SERIAL LINK					X				X				
653		POWER MANAGEMENT SYSTEM	MSB/PMS	HARBOUR GENERATOR NO.5 ACB OPENED	DI	SERIAL LINK					X				X				
654		POWER MANAGEMENT SYSTEM	MSB/PMS	HARBOUR GENERATOR NO.5 ACB CLOSE COMMOND	DO	HARD WIRED						X				X			
655		POWER MANAGEMENT SYSTEM	MSB/PMS	SHORT CIRCUIT	DI	SERIAL LINK				X				X					
656		POWER MANAGEMENT SYSTEM	MSB/PMS	HARBOUR GENERATOR NO.5 ENG. SAFTY SHUT DOWN	DI	SERIAL LINK				X				X					
657		POWER MANAGEMENT SYSTEM	MSB/PMS	ACB ABNORMALORMAL TRIP	DI	SERIAL LINK				X				X					
658		POWER MANAGEMENT SYSTEM	MSB/PMS	(NO.5 PMS) SHORE BREAKER CLOSED	DI	SERIAL LINK					X				X				
659		POWER MANAGEMENT SYSTEM	MSB/PMS	HARBOUR GENERATOR NO.5 GEN. ENG. START	DO	HARD WIRED						X				X			
660		POWER MANAGEMENT SYSTEM	MSB/PMS	HARBOUR GENERATOR NO.5 GEN. ENG. STOP	DO	HARD WIRED						X				X			

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
661		POWER MANAGEMENT SYSTEM	MSB/PMS	HARBOUR GENERATOR NO.5 ACB CLOSE(SYNCHRO. ON)	DO	HARD WIRED						X				X			
662		POWER MANAGEMENT SYSTEM	MSB/PMS	HARBOUR GENERATOR NO.5 ACB OPEN	DO	HARD WIRED						X				X			
663		POWER MANAGEMENT SYSTEM	MSB/PMS	BOW THR. 2 STARTER POWER REQUEST	DI	SERIAL LINK					X				X				
664		POWER MANAGEMENT SYSTEM	MSB/PMS	BOW THR. 2 STARTER POWER AVAILABLE	DO	HARD WIRED						X				X			
665		POWER MANAGEMENT SYSTEM	MSB/PMS	BOW THR. 2 STARTER RUN	DI	SERIAL LINK					X				X				
666		POWER MANAGEMENT SYSTEM	MSB/PMS	BOW THR. 2 CURRENT	AI	HARD WIRED					X				X				
667		POWER MANAGEMENT SYSTEM	MSB/PMS	STERN THR. 3 STARTER POWER REQUEST	DI	SERIAL LINK					X				X				
668		POWER MANAGEMENT SYSTEM	MSB/PMS	STERN THR. 3 STARTER POWER AVAILABLE	DO	HARD WIRED						X				X			
669		POWER MANAGEMENT SYSTEM	MSB/PMS	STERN THR. 3 STARTER RUN	DI	SERIAL LINK					X				X				
670		POWER MANAGEMENT SYSTEM	MSB/PMS	STERN THR. 3 CURRENT	AI	HARD WIRED					X				X				
671		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN PROPELLER THR. 4 STARTER POWER REQUEST	DI	SERIAL LINK					X				X				
672		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN PROPELLER THR. 4 STARTER POWER AVAILABLE	DO	HARD WIRED						X				X			
673		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN PROPELLER THR. 4 STARTER RUN	DI	SERIAL LINK					X				X				
674		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN PROPELLER THR. 5 CURRENT	AI	HARD WIRED					X				X				
675		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN PROPELLER THR. 5 STARTER POWER REQUEST	DI	SERIAL LINK					X				X				
676		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN PROPELLER THR. 5 STARTER POWER AVAILABLE	DO	HARD WIRED						X				X			
677		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN PROPELLER THR. 5 STARTER RUN	DI	SERIAL LINK					X				X				
678		POWER MANAGEMENT SYSTEM	MSB/PMS	MAIN PROPELLER THR. 5 CURRENT	AI	HARD WIRED					X				X				
679		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.1 CURRENT R PHASE - VALUE	AI	HARD WIRED					X				X				
680		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.1 CURRENT Y PHASE - VALUE	AI	HARD WIRED					X				X				

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
681		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.1 CURRENT B PHASE - VALUE	AI	HARD WIRED					X				X				
682		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.2 CURRENT R PHASE - VALUE	AI	HARD WIRED					X				X				
683		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.2 CURRENT Y PHASE - VALUE	AI	HARD WIRED					X				X				
684		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.2 CURRENT B PHASE - VALUE	AI	HARD WIRED					X				X				
685		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.3 CURRENT R PHASE - VALUE	AI	HARD WIRED					X				X				
686		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.3 CURRENT Y PHASE - VALUE	AI	HARD WIRED					X				X				
687		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.3 CURRENT B PHASE - VALUE	AI	HARD WIRED					X				X				
688		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.4 CURRENT R PHASE - VALUE	AI	HARD WIRED					X				X				
689		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.4 CURRENT Y PHASE - VALUE	AI	HARD WIRED					X				X				
690		MAIN SWITCH BOARD	MSB	MAIN GENERATOR NO.4 CURRENT B PHASE - VALUE	AI	HARD WIRED					X				X				
691		MAIN SWITCH BOARD	MSB	HARBOUR GENERATOR NO.5 CURRENT R PHASE - VALUE	AI	HARD WIRED					X				X				
692		MAIN SWITCH BOARD	MSB	HARBOUR GENERATOR NO.5 CURRENT Y PHASE - VALUE	AI	HARD WIRED					X				X				
693		MAIN SWITCH BOARD	MSB	HARBOUR GENERATOR NO.5 CURRENT B PHASE - VALUE	AI	HARD WIRED					X				X				
694		MAIN SWITCH BOARD	MSB	FAILURE OF ONLINE GENERATOR	DI	HARD WIRED				X				X					
695		MAIN SWITCH BOARD	MSB	VOLTAGE R PHASE - VALUE	AI	SERIAL LINK					x				x				
696		MAIN SWITCH BOARD	MSB	VOLTAGE Y PHASE - VALUE	AI	SERIAL LINK					x				x				
697		MAIN SWITCH BOARD	MSB	VOLTAGE B PHASE - VALUE	AI	SERIAL LINK					x				x				
698		MAIN SWITCH BOARD	MSB	VOLTAGE HIGH ALARM	DI	SERIAL LINK				x				x					
699		MAIN SWITCH BOARD	MSB	VOLTAGE LOW ALARM	DI	SERIAL LINK				x				x					
700		MAIN SWITCH BOARD	MSB	FREQUENCY - VALUE	AI	SERIAL LINK					x				x				

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
701		MAIN SWITCH BOARD	MSB	FREQUENCY - HIGH ALARM	DI	SERIAL LINK				X				X					
702		MAIN SWITCH BOARD	MSB	FREQUENCY - LOW ALARM	DI	SERIAL LINK				X				X					
703		MAIN SWITCH BOARD	MSB	DISCONNECTION OF NON-ESSENTIAL CONSUMERS / PREFERENCIAL TRIP	DI	SERIAL LINK				X				X					
704		MAIN SWITCH BOARD	MSB	TRANSFER OF STANDBY GENERATOR	DO	SERIAL LINK				X				X					Functionality of command?
705		MAIN SWITCHBOARD	MSB	MSBD BB-1 ABNORMAL	DI	HARDWIRED				X				X					
706		MAIN SWITCHBOARD	MSB	MSBD BB-2 ABNORMAL	DI	HARDWIRED				X				X					
707		MAIN SWITCHBOARD	MSB	MSBD CONTROL SOURCE FAIL	DI	HARDWIRED				X				X					
708		MAIN SWITCHBOARD	MSB	PREFERENTIAL TRIP	DI	HARDWIRED				X				X					
709		EMERGENCY GENERATOR	ESB/EDG LCP	EDG COMMON ALARM	DI	HARDWIRED				X				X					
710		EMERGENCY SWITCHBOARD	ESB	ESBD ABNORMAL	DI	HARDWIRED				X				X					
711		EMERGENCY SWITCHBOARD	ESB	ESBD CONTROL SOURCE FAIL	DI	HARDWIRED				X				X					
712		PROPULSION SYSTEM PORT	PORT SIDE	PROPELLER SPEED VALUE	AI	SERIAL LINK					X				X				
713		PROPULSION SYSTEM PORT	PORT SIDE	PROPELLER SPEED ABNORMAL ALARM	DI	SERIAL LINK				X				X					
714		PROPULSION SYSTEM PORT	PORT SIDE	PROPELLER DIRECTION	DI	SERIAL LINK					X				X				
715		PROPULSION SYSTEM PORT	PORT SIDE	TELEGRAPH	DI	HARD WIRE					X				X				
716		PROPULSION SYSTEM PORT	PORT SIDE	TELEGRAPH ALARM	DI	HARD WIRE				X				X					
717		PROPULSION SYSTEM PORT	PORT SIDE	STORED STARTING ENERGY LEVEL -VALUE	AI	SERIAL LINK					X				X				
718		PROPULSION SYSTEM PORT	PORT SIDE	STORED STARTING ENERGY LEVEL -LOW	DI	SERIAL LINK				X				X					
719		PROPULSION SYSTEM PORT	PORT SIDE	INHIBITION OF STARTING OF PROPULSION ENGINE/MOTOR ALARM	DI	SERIAL LINK				X				X					
720		PROPULSION SYSTEM PORT	PORT SIDE	AUTOMATIC SHUTDOWN ACTIVATED	DI	SERIAL LINK				X				X					

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
721		PROPULSION SYSTEM PORT	PORT SIDE	AUTOMATIC SLOWDOWN ACTIVATED	DI	SERIAL LINK				X				X					
722		PROPULSION SYSTEM PORT	PORT SIDE	SAFETY SYSTEM OVERRIDE	DI	SERIAL LINK					X				X				
723		PROPULSION SYSTEM PORT	PORT SIDE	SAFETY SYSTEM OVERRIDE ALARM	DI	SERIAL LINK				X				X					
724		PROPULSION SYSTEM PORT	PORT SIDE	SHAFT TURNING GEAR ENGAGED ALARM	DI	SERIAL LINK				X				X					
725		PROPULSION SYSTEM PORT	PORT SIDE	OPERATING IN BARRED SPEED RANGE ALARM	DI	SERIAL LINK				X				X					
726		PROPULSION SYSTEM PORT	PORT SIDE	THRESHOLD WARNING FOR SAFETY SYSTEMS ACTIVATIONS	DI	SERIAL LINK				X				X					
727		PROPULSION SYSTEM PORT	PORT SIDE	SYSTEM MAIN POWER SUPPLY FEEDER STATUS	DI	SERIAL LINK					X				X				
728		PROPULSION SYSTEM PORT	PORT SIDE	SYSTEM MAIN POWER SUPPLY FAILURE	DI	SERIAL LINK				X				X					
729		PROPULSION SYSTEM PORT	PORT SIDE	SYSTEM EMERGENCY POWER SUPPLY FEEDER STATUS	DI	SERIAL LINK					X				X				
730		PROPULSION SYSTEM PORT	PORT SIDE	SYSTEM EMERGENCY POWER SUPPLY FAILURE	DI	SERIAL LINK				X				X					
731		PROPULSION SYSTEM PORT	PORT SIDE	PROPULSION UNIT ABNORMAL ALARM	DI	SERIAL LINK				X				X					
732		PROPULSION SYSTEM PORT	PORT SIDE	REMOTE CONTROL FAILURE ALARM	DI	SERIAL LINK				X				X					
733		PROPULSION SYSTEM PORT	PORT SIDE	INDIVIDUAL POWER SUPPLY TO CONTROL, MONITORING AND SAFETY SYSTEMS -AVAILABLE	DI	SERIAL LINK					X				X				
734		PROPULSION SYSTEM PORT	PORT SIDE	INDIVIDUAL POWER SUPPLY TO CONTROL, MONITORING AND SAFETY SYSTEMS -FAILS ALARM	DI	SERIAL LINK				X				X					
735		PROPULSION SYSTEM PORT	PORT SIDE	ALARM SYSTEM -DISCONNECTED	DI	SERIAL LINK				X				X					
736		PROPULSION SYSTEM PORT	PORT SIDE	INTEGRATED COMPUTER-BASED SYSTEM: DATA HIGHWAY ABNORMALORMAL CONDITIONS	DI	SERIAL LINK				X				X					
737		PROPULSION SYSTEM PORT	PORT SIDE	INTEGRATED COMPUTER-BASED SYSTEM: DUPLICATED DATA LINK -FAILURE OF ONE LINK	DI	SERIAL LINK				X				X					
738		PROPULSION SYSTEM PORT	PORT SIDE	CONTROL IN LOCAL STATION	DI	SERIAL LINK					x				x				
739		PROPULSION SYSTEM PORT	PORT SIDE	CONTROL IN REMOTE STATION	DI	SERIAL LINK					x				x				
740		PROPULSION SYSTEM STBD	STBD SIDE	PROPELLER SPEED VALUE	AI	SERIAL LINK					X				X				

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
741		PROPULSION SYSTEM STBD	STBD SIDE	PROPELLER SPEED ABNORMAL ALARM	DI	SERIAL LINK				X				X					
742		PROPULSION SYSTEM STBD	STBD SIDE	PROPELLER DIRECTION	DI	SERIAL LINK					X				X				
743		PROPULSION SYSTEM STBD	STBD SIDE	TELEGRAPH	DI	HARD WIRE					X				X				
744		PROPULSION SYSTEM STBD	STBD SIDE	TELEGRAPH ALARM	DI	HARD WIRE				X				X					
745		PROPULSION SYSTEM STBD	STBD SIDE	STORED STARTING ENERGY LEVEL -VALUE	AI	SERIAL LINK					X				X				
746		PROPULSION SYSTEM STBD	STBD SIDE	STORED STARTING ENERGY LEVEL -LOW	DI	SERIAL LINK				X				X					
747		PROPULSION SYSTEM STBD	STBD SIDE	INHIBITION OF STARTING OF PROPULSION ENGINE/MOTOR ALARM	DI	SERIAL LINK				X				X					
748		PROPULSION SYSTEM STBD	STBD SIDE	AUTOMATIC SHUTDOWN ACTIVATED	DI	SERIAL LINK				X				X					
749		PROPULSION SYSTEM STBD	STBD SIDE	AUTOMATIC SLOWDOWN ACTIVATED	DI	SERIAL LINK				X				X					
750		PROPULSION SYSTEM STBD	STBD SIDE	SAFETY SYSTEM OVERRIDE	DI	SERIAL LINK					X				X				
751		PROPULSION SYSTEM STBD	STBD SIDE	SAFETY SYSTEM OVERRIDE ALARM	DI	SERIAL LINK				X				X					
752		PROPULSION SYSTEM STBD	STBD SIDE	SHAFT TURNING GEAR ENGAGED ALARM	DI	SERIAL LINK				X				X					
753		PROPULSION SYSTEM STBD	STBD SIDE	OPERATING IN BARRED SPEED RANGE ALARM	DI	SERIAL LINK				X				X					
754		PROPULSION SYSTEM STBD	STBD SIDE	THRESHOLD WARNING FOR SAFETY SYSTEMS ACTIVATIONS	DI	SERIAL LINK				X				X					
755		PROPULSION SYSTEM STBD	STBD SIDE	SYSTEM MAIN POWER SUPPLY FEEDER STATUS	DI	SERIAL LINK					X				X				
756		PROPULSION SYSTEM STBD	STBD SIDE	SYSTEM MAIN POWER SUPPLY FAILURE	DI	SERIAL LINK				X				X					
757		PROPULSION SYSTEM STBD	STBD SIDE	SYSTEM EMERGENCY POWER SUPPLY FEEDER STATUS	DI	SERIAL LINK					X				X				
758		PROPULSION SYSTEM STBD	STBD SIDE	SYSTEM EMERGENCY POWER SUPPLY FAILURE	DI	SERIAL LINK				X				X					
759		PROPULSION SYSTEM STBD	STBD SIDE	PROPULSION UNIT ABNORMAL ALARM	DI	SERIAL LINK				X				X					
760		PROPULSION SYSTEM STBD	STBD SIDE	REMOTE CONTROL FAILURE ALARM	DI	SERIAL LINK				X				X					

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
761		PROPULSION SYSTEM STBD	STBD SIDE	INDIVIDUAL POWER SUPPLY TO CONTROL, MONITORING AND SAFETY SYSTEMS -AVAILABLE	DI	SERIAL LINK					X				X				
762		PROPULSION SYSTEM STBD	STBD SIDE	INDIVIDUAL POWER SUPPLY TO CONTROL, MONITORING AND SAFETY SYSTEMS -FAILS ALARM	DI	SERIAL LINK				X				X					
763		PROPULSION SYSTEM STBD	STBD SIDE	ALARM SYSTEM -DISCONNECTED	DI	SERIAL LINK				X				X					
764		PROPULSION SYSTEM STBD	STBD SIDE	INTEGRATED COMPUTER-BASED SYSTEM: DATA HIGHWAY ABNORMALORMAL CONDITIONS	DI	SERIAL LINK				X				X					
765		PROPULSION SYSTEM STBD	STBD SIDE	INTEGRATED COMPUTER-BASED SYSTEM: DUPLICATED DATA LINK -FAILURE OF ONE LINK	DI	SERIAL LINK				X				X					
766		PROPULSION SYSTEM STBD	STBD SIDE	CONTROL IN LOCAL STATION	DI	SERIAL LINK					x				x				
767		PROPULSION SYSTEM STBD	STBD SIDE	CONTROL IN REMOTE STATION	DI	SERIAL LINK					x				x				
768		PROPULSION MOTOR PORT	VFD/MOTOR(P)	BEARING, LUB OIL IN LET PRESSURE PRESSURE - VALUE	AI	SERIAL LINK					X				X				
769		PROPULSION MOTOR PORT	VFD/MOTOR(P)	BEARING, LUB OIL IN LET PRESSURE PRESSURE - LOW ALARM	DI	SERIAL LINK				X				X					
770		PROPULSION MOTOR PORT	VFD/MOTOR(P)	AUTO SHUTDOWN ALARM DUE TO BEARING, LUB OIL IN LET PRESSURE PRESSURE LOW	DI	SERIAL LINK				X				X					
771		PROPULSION MOTOR PORT	VFD(P)	ARMATURE VOLTAGE -VALUE	AI	SERIAL LINK					X				X				
772		PROPULSION MOTOR PORT	VFD(P)	ARMATURE VOLTAGE OFF-LIMITS-ALARM	DI	SERIAL LINK				X				X					
773		PROPULSION MOTOR PORT	VFD(P)	FIELD VOLTAGE-VALUE	DI	SERIAL LINK					X				X				
774		PROPULSION MOTOR PORT	VFD(P)	FREQUENCY -VALUE	AI	SERIAL LINK					X				X				
775		PROPULSION MOTOR PORT	VFD(P)	FREQUENCY OFF LIMITS-ALARM	DI	SERIAL LINK				X				X					
776		PROPULSION MOTOR PORT	VFD(P)	ARMATURE CURRENT-VALUE	AI	SERIAL LINK					X				X				
777		PROPULSION MOTOR PORT	VFD(P)	FIELD CURRENT-VALUE	AI	SERIAL LINK					X				X				
778		PROPULSION MOTOR PORT	VFD(P)	GROUND LIGHTS OR SIMILER	DI	SERIAL LINK					X				X				
779		PROPULSION MOTOR PORT	VFD/MOTOR(P)	STATIONARY WINDINGS TEMPARATURE -VALUE	AI	SERIAL LINK					X				X				
780		PROPULSION MOTOR PORT	VFD/MOTOR(P)	STATIONARY WINDINGS TEMPARATURE HIGH- AL	DI	SERIAL LINK				X				X					

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
781		PROPULSION MOTOR PORT	VFD(P)	MOTOR CIRCUIT BREAKERS OPEN/CLOSE STATUS	DI	SERIAL LINK					X				X				
782		PROPULSION MOTOR PORT	VFD(P)	MOTOR RUNNING	DI	SERIAL LINK					X				X				
783		PROPULSION MOTOR PORT	VFD(P)	TRANSFER OF ONLINE MOTOR-ALARM	DI	SERIAL LINK				X				X					
784		PROPULSION MOTOR PORT	VFD(P)	TRANSFER OF STBY MOTOR-ALARM	DI	SERIAL LINK				X				X					
785		PROPULSION MOTOR PORT	COOLING PUMP(P)	MOTOR COOLING MEDIUM TEMPERATURE- VALU	AI	SERIAL LINK					X				X				
786		PROPULSION MOTOR PORT	COOLING PUMP(P)	MOTOR COOLING MEDIUM TEMPERATURE HIGH-	DI	SERIAL LINK				X				X					
787		PROPULSION MOTOR PORT	COOLING PUMP/FAN(P)	FAILURE OF COOLING PUMP OR FAN MOTOR ALAR	DI	SERIAL LINK				X									
788		PROPULSION MOTOR PORT (SCR)	VFD(P)	VOLTAGE-VALUE	AI	SERIAL LINK					X				X				
789		PROPULSION MOTOR PORT (SCR)	VFD(P)	CURRENT-VALUE	AI	SERIAL LINK					X				X				
790		PROPULSION MOTOR PORT (SCR)	VFD(P)	OVERLOAD (HIGH CURRENT)- ALARM	DI	SERIAL LINK				X				X					
791		PROPULSION MOTOR PORT (SCR)	VFD(P)	OPEN/CLOSE POSITION FOR ASSIGNMENT SWITCHES	DI	SERIAL LINK					X				X				
792		PROPULSION MOTOR PORT (SCR)	VFD(P)	SCR COOLING MEDIUM TEMPERATURE - VALUE	AI	SERIAL LINK					X				X				
793		PROPULSION MOTOR PORT (SCR)	VFD(P)	SCR COOLING MEDIUM TEMPERATURE - HIGH-ALARM	DI	SERIAL LINK				X				X					
794		PROPULSION MOTOR PORT (SCR)	VFD(P)	FAILURE OF SCR COOLING PUMP OR FAN MOTOR-ALARM	DI	SERIAL LINK				X				X					
795		PROPULSION MOTOR PORT (SCR)	VFD(P)	INTER-PHASE REACTOR TEMPERATURE-VALUE	AI	SERIAL LINK					X				X				
796		PROPULSION MOTOR PORT (SCR)	VFD(P)	INTER-PHASE REACTOR TEMPERATURE, HIGH-ALARM	DI	SERIAL LINK				X				X					
797		PROPULSION MOTOR STBD	VFD/MOTOR(S)	BEARING, LUB OIL IN LET PRESSURE PRESSURE – VALUE	AI	SERIAL LINK					X				X				
798		PROPULSION MOTOR STBD	VFD/MOTOR(S)	BEARING, LUB OIL IN LET PRESSURE PRESSURE – LOW ALARM	DI	SERIAL LINK				X				X					
799		PROPULSION MOTOR STBD	VFD/MOTOR(S)	AUTO SHUTDOWN ALARM DUE TO BEARING, LUB OIL IN LET PRESSURE PRESSURE LOW	DI	SERIAL LINK				X				X					
800		PROPULSION MOTOR STBD	VFD(S)	ARMATURE VOLTAGE -VALUE	AI	SERIAL LINK					X				X				

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
801		PROPULSION MOTOR STBD	VFD(S)	ARMATURE VOLTAGE OFF-LIMITS-ALARM	DI	SERIAL LINK				X				X					
802		PROPULSION MOTOR STBD	VFD(S)	FIELD VOLTAGE-VALUE	DI	SERIAL LINK					X				X				
803		PROPULSION MOTOR STBD	VFD(S)	FREQUENCY -VALUE	AI	SERIAL LINK					X				X				
804		PROPULSION MOTOR STBD	VFD(S)	FREQUENCY OFF LIMITS-ALARM	DI	SERIAL LINK				X				X					
805		PROPULSION MOTOR STBD	VFD(S)	ARMATURE CURRENT-VALUE	AI	SERIAL LINK					X				X				
806		PROPULSION MOTOR STBD	VFD(S)	FIELD CURRENT-VALUE	AI	SERIAL LINK					X				X				
807		PROPULSION MOTOR STBD	VFD(S)	GROUND LIGHTS OR SIMILER	DI	SERIAL LINK					X				X				
808		PROPULSION MOTOR STBD	VFD/MOTOR(S)	STATIONARY WINDINGS TEMPARATURE -VALUE	AI	SERIAL LINK					X				X				
809		PROPULSION MOTOR STBD	VFD/MOTOR(S)	STATIONARY WINDINGS TEMPARATURE HIGH- AL	DI	SERIAL LINK				X				X					
810		PROPULSION MOTOR STBD	VFD(S)	MOTOR CIRCUIT BREAKERS OPEN/CLOSE STATUS	DI	SERIAL LINK					X				X				
811		PROPULSION MOTOR STBD	VFD(S)	MOTOR RUNNING	DI	SERIAL LINK					X				X				
812		PROPULSION MOTOR STBD	VFD(S)	TRANSFER OF ONLINE MOTOR-ALARM	DI	SERIAL LINK				X				X					
813		PROPULSION MOTOR STBD	VFD(S)	TRANSFER OF STBY MOTOR-ALARM	DI	SERIAL LINK				X				X					
814		PROPULSION MOTOR STBD	COOLING PUMP(S)	MOTOR COOLING MEDIUM TEMPERATURE- VALU	AI	SERIAL LINK					X				X				
815		PROPULSION MOTOR STBD	COOLING PUMP(S)	MOTOR COOLING MEDIUM TEMPERATURE HIGH-	DI	SERIAL LINK				X				X					
816		PROPULSION MOTOR STBD	COOLING PUMP/FAN(S)	FAILURE OF COOLING PUMP OR FAN MOTOR ALAR	DI	SERIAL LINK				X									
817		PROPULSION MOTOR STBD (SCR)	VFD(S)	VOLTAGE-VALUE	AI	SERIAL LINK					X				X				
818		PROPULSION MOTOR STBD (SCR)	VFD(S)	CURRENT-VALUE	AI	SERIAL LINK					X				X				
819		PROPULSION MOTOR STBD (SCR)	VFD(S)	OVERLOAD (HIGH CURRENT)- ALARM	DI	SERIAL LINK				X				X					
820		PROPULSION MOTOR STBD (SCR)	VFD(S)	OPEN/CLOSE POSITION FOR ASSIGNMENT SWITCHES	DI	SERIAL LINK					X				X				

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
821		PROPULSION MOTOR STBD (SCR)	VFD(S)	SCR COOLING MEDIUM TEMPERATURE - VALUE	AI	SERIAL LINK					X				X				
822		PROPULSION MOTOR STBD (SCR)	VFD(S)	SCR COOLING MEDIUM TEMPERATURE - HIGH-ALARM	DI	SERIAL LINK				X				X					
823		PROPULSION MOTOR STBD (SCR)	VFD(S)	FAILURE OF SCR COOLING PUMP OR FAN MOTOR-ALARM	DI	SERIAL LINK				X				X					
824		PROPULSION MOTOR STBD (SCR)	VFD(S)	INTER-PHASE REACTOR TEMPERATURE-VALUE	AI	SERIAL LINK					X				X				
825		PROPULSION MOTOR STBD (SCR)	VFD(S)	INTER-PHASE REACTOR TEMPERATURE; HIGH-ALARM	DI	SERIAL LINK				X				X					
826		SHAFT PORT	LCP	TEMPERATURE, THRUST BEARING, HIGH	DI	SERIAL LINK				X				X					
827		SHAFT PORT	LCP	TEMPERATURE, SHAFT BEARING, HIGH	DI	SERIAL LINK				X				X					
828		SHAFT PORT	LCP	TEMPERATURE, STERN TUBE BEARING, HIGH	DI	SERIAL LINK				X				X					
829		SHAFT PORT	LCP	SHAFTING ROLL OVER STOPPED	DI	SERIAL LINK				X				X					
830		SHAFT STBD	LCP	TEMPERATURE, THRUST BEARING, HIGH	DI	SERIAL LINK				X				X					
831		SHAFT STBD	LCP	TEMPERATURE, SHAFT BEARING, HIGH	DI	SERIAL LINK				X				X					
832		SHAFT STBD	LCP	TEMPERATURE, STERN TUBE BEARING, HIGH	DI	SERIAL LINK				X				X					
833		SHAFT STBD	LCP	SHAFTING ROLL OVER STOPPED	DI	SERIAL LINK				X				X					
834		GEARBOX PORT	LCP	PRESSURE, LUBRICATING OIL INLET, LOW	DI	SERIAL LINK													
835		GEARBOX PORT	LCP	PRESSURE, LUBRICATING OIL INLET, LOW-AUTOSTART STBY PUMP	DI	HARD WIRE				X		X		X		X			Command to be given from CCAMS or Auto Started information is required to CCAMS?
836		GEARBOX PORT	LCP	TEMPERATURE, LUBRICATING OIL, HIGH	DI	SERIAL LINK				X				X					
837		GEARBOX PORT	LCP	HYDRAULIC COUPLING PRESSURE, OIL, LOW	DI	SERIAL LINK				X				X					
838		GEARBOX PORT	LCP	HYDRAULIC COUPLING PRESSURE, OIL, LOW-AUTOSTART OF STBY PUMP	DI					X		X		X		X			Command to be given from CCAMS or Auto Started information is required to CCAMS?
839		GEARBOX STBD	LCP	PRESSURE, LUBRICATING OIL INLET, LOW	DI	SERIAL LINK													
840		GEARBOX STBD	LCP	PRESSURE, LUBRICATING OIL INLET, LOW-AUTOSTART STBY PUMP	DI	HARD WIRE				X		X		X		X			Command to be given from CCAMS or Auto Started information is required to CCAMS?

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
841		GEARBOX STBD	LCP	TEMPERATURE, LUBRICATING OIL, HIGH	DI	SERIAL LINK				X				X					
842		GEARBOX STBD	LCP	HYDRAULIC COUPLING PRESSURE, OIL, LOW	DI	SERIAL LINK				X				X					
843		GEARBOX STBD	LCP	HYDRAULIC COUPLING PRESSURE, OIL, LOW - AUTOSTART OF STBY PUMP	DI	HARD WIRE				X		X		X		X			Command to be given from CCAMS or Auto Started information is required to CCAMS?
844		STEERING GEAR	PORT SIDE	N01 S/G STEERING FAILURE/COMMON ALARM	DI	SERIAL LINK				X				X					
845		STEERING GEAR	PORT SIDE	N01 S/G ELECTRIC MOTORS STOPPED	DI	SERIAL LINK				X				X					
846		STEERING GEAR	PORT SIDE	N01 S/G MOTOR STARTED AS STAND BY	DI	SERIAL LINK				X				X					
847		STEERING GEAR	PORT SIDE	N01 S/G RUDDER POSITION	AI	SERIAL LINK					X				X				
848		STEERING GEAR	PORT SIDE	N01 S/G POWER UNIT FAILUE - HPU	DI	SERIAL LINK				X				X					
849		STEERING GEAR	PORT SIDE	N01 S/G POWER SUPPLY UNIT FAILUE - 415VAC	DI	SERIAL LINK				x				x					
850		STEERING GEAR	PORT SIDE	N01 S/G MOTORS RUN	DI	SERIAL LINK					X				X				
851		STEERING GEAR	PORT SIDE	N01 S/G OVERLOAD	DI	SERIAL LINK				X									
852		STEERING GEAR	PORT SIDE	N01 S/G SINGLE PHASE FAIL	DI	SERIAL LINK				X									
853		STEERING GEAR	PORT SIDE	N01 S/G CONTROL SOURCE FAIL	DI	SERIAL LINK				X									
854		STEERING GEAR	PORT SIDE	N01 S/G HYD OIL TK LEVEL LOW	DI	SERIAL LINK				X									
855		STEERING GEAR	PORT SIDE	N01 S/G HYDRALIC LOCKING	DI	SERIAL LINK				X				X					
856		STEERING GEAR	STBD SIDE	N02 S/G STEERING FAILURE/COMMON ALARM	DI	SERIAL LINK				X				X					
857		STEERING GEAR	STBD SIDE	N02 S/G ELECTRIC MOTORS STOPPED	DI	SERIAL LINK				X				X					
858		STEERING GEAR	STBD SIDE	N02 S/G RUDDER POSITION	AI	SERIAL LINK					X				X				
859		STEERING GEAR	STBD SIDE	N02 S/G POWER UNIT FAILUE - HPU	DI	SERIAL LINK				X				X					
860		STEERING GEAR	STBD SIDE	N02 S/G POWER SUPPLY UNIT FAILUE - 415VAC	DI	SERIAL LINK				X				X					

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
861		STEERING GEAR	STBD SIDE	NO2 S/G MOTORS RUN	DI	SERIAL LINK					X								
862		STEERING GEAR	STBD SIDE	NO2 S/G OVERLOAD	DI	SERIAL LINK				X									
863		STEERING GEAR	STBD SIDE	NO2 S/G SINGLE PHASE FAIL	DI	SERIAL LINK				X									
864		STEERING GEAR	STBD SIDE	NO2 S/G CONTROL SOURCE FAIL	DI	SERIAL LINK				X									
865		STEERING GEAR	STBD SIDE	NO2 S/G HYD OIL TK LEVEL LOW	DI	SERIAL LINK				X									
866		STEERING GEAR	STBD SIDE	NO2 S/G HYDRALIC LOCKING	DI	SERIAL LINK				X									
867		STEERING GEAR	STBD SIDE	S/G GREASE PUMP ABN	DI	SERIAL LINK				X									
868		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK FWD (P) - LOW	DI	SERIAL LINK				X				X					
869		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK FWD (P) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
870		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK FWD (P)	AI	SERIAL LINK					X				X				
871		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK FWD (S) - LOW	DI	SERIAL LINK				X				X					
872		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK FWD (S) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
873		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK FWD (S) - VALUE	AI	SERIAL LINK					X				X				
874		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK FWD (C) - LOW	DI	SERIAL LINK				X				X					
875		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK FWD (C) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
876		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK FWD (C) - VALUE	AI	SERIAL LINK					X				X				
877		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK AFT (C) - LOW	DI	SERIAL LINK				X				X					
878		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK AFT (C) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
879		TANK SOUNDING SYSTEM	TBD	FRESH WATER TK AFT (C) -VALUE	AI	SERIAL LINK					X				X				
880		TANK SOUNDING SYSTEM	TBD	LO FOR BOW THRUSTER - LOW	DI	SERIAL LINK				X				X					

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
881		TANK SOUNDING SYSTEM	TBD	LO FOR BOW THRUSTER -VALUE	AI	SERIAL LINK					X				X				
882		TANK SOUNDING SYSTEM	TBD	LUB OIL TK AFT (P) - LOW	DI	SERIAL LINK				X				X					
883		TANK SOUNDING SYSTEM	TBD	LUB OIL TK AFT (P) - VALUE	AI	SERIAL LINK					X				X				
884		TANK SOUNDING SYSTEM	TBD	LUB OIL TK AFT (S) - LOW	DI	SERIAL LINK				X				X					
885		TANK SOUNDING SYSTEM	TBD	LUB OIL TK AFT (S) - VALUE	AI	SERIAL LINK					X				X				
886		TANK SOUNDING SYSTEM	TBD	LUB OIL TK (INTERMEDIATE) (P) - LOW	DI	SERIAL LINK				X				X					
887		TANK SOUNDING SYSTEM	TBD	LUB OIL TK (INTERMEDIATE) (P) - VALUE	AI	SERIAL LINK					X				X				
888		TANK SOUNDING SYSTEM	TBD	LUB OIL TK AFT (P) - LOW	DI	SERIAL LINK				X				X					
889		TANK SOUNDING SYSTEM	TBD	LUB OIL TK AFT (P) - VALUE	AI	SERIAL LINK					X				X				
890		TANK SOUNDING SYSTEM	TBD	HYDRAULIC OIL TK -	DI	SERIAL LINK					X				X				
891		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD MOST (P) - LOW	DI	SERIAL LINK				X				X					
892		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD MOST (P) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
893		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD MOST (P) - VALUE	AI	SERIAL LINK					X				X				
894		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD MOST (S) - LOW	DI	SERIAL LINK				X				X					
895		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD MOST (S) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
896		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD MOST (S) - VALUE	AI	SERIAL LINK					X				X				
897		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD (P) - LOW	DI	SERIAL LINK				X				X					
898		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD (P) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
899		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD (P) - VALUE	AI	SERIAL LINK					X				X				
900		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD (S) - LOW	DI	SERIAL LINK				X				X					

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
901		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD (S) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
902		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK FWD (S) - VALUE	AI	SERIAL LINK					X				X				
903		TANK SOUNDING SYSTEM	TBD	F.O. DAY/SETTLING TK (P) - LOW	DI	SERIAL LINK				X				X					
904		TANK SOUNDING SYSTEM	TBD	F.O. DAY/SETTLING TK (P) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
905		TANK SOUNDING SYSTEM	TBD	F.O. DAY/SETTLING TK (P) - VALUE	AI	SERIAL LINK					X				X				
906		TANK SOUNDING SYSTEM	TBD	MDO DAY TK (P) - LOW	DI	SERIAL LINK				X				X					
907		TANK SOUNDING SYSTEM	TBD	MDO DAY TK (P) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
908		TANK SOUNDING SYSTEM	TBD	MDO DAY TK (P) - VALUE	AI	SERIAL LINK					X				X				
909		TANK SOUNDING SYSTEM	TBD	FO EMERGENCY GEN.TK - LOW	DI	SERIAL LINK				X	X			X	X				
910		TANK SOUNDING SYSTEM	TBD	FO EMERGENCY GEN.TK - VALUE	AI	SERIAL LINK					X				X				
911		TANK SOUNDING SYSTEM	TBD	FO HARBOUR GEN. DAY TK - LOW	DI	SERIAL LINK				X				X					
912		TANK SOUNDING SYSTEM	TBD	FO HARBOUR GEN. DAY TK - VALUE	AI	SERIAL LINK					X				X				
913		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT (P) - LOW	DI	SERIAL LINK				X				X					
914		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT (P) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
915		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT (P) -VALUE	AI	SERIAL LINK					X				X				
916		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT (S) - LOW	DI	SERIAL LINK				X				X					
917		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT (S) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
918		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT (S) - VALUE	AI	SERIAL LINK					X				X				
919		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT MOST (P) - LOW	DI	SERIAL LINK				X				X					
920		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT MOST (P) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
921		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT MOST (P) - VALUE	AI	SERIAL LINK					X				X				
922		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT MOST (S) - LOW	DI	SERIAL LINK				X				X					
923		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT MOST (S) - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
924		TANK SOUNDING SYSTEM	TBD	MDO STORAGE TK AFT MOST (S) - VALUE	AI	SERIAL LINK					X				X				
925		TANK SOUNDING SYSTEM	TBD	BILGE SETTling TK - HIGH	DI	SERIAL LINK				X				X					
926		TANK SOUNDING SYSTEM	TBD	BILGE SETTling TK -VALUE	AI	SERIAL LINK					X				X				
927		TANK SOUNDING SYSTEM	TBD	SLUDGE SETTling TK - HIGH	DI	SERIAL LINK				X				X					
928		TANK SOUNDING SYSTEM	TBD	SLUDGE SETTling TK - VALUE	AI	SERIAL LINK					X				X				
929		TANK SOUNDING SYSTEM	TBD	BILGE WATER TK - HIGH	DI	SERIAL LINK				X				X					
930		TANK SOUNDING SYSTEM	TBD	BILGE WATER TK - VALUE	AI	SERIAL LINK					X				X				
931		TANK SOUNDING SYSTEM	TBD	USED OIL TK (P) - HIGH	DI	SERIAL LINK				X				X					
932		TANK SOUNDING SYSTEM	TBD	USED OIL TK (P) - VALUE	AI	SERIAL LINK					X				X				
933		TANK SOUNDING SYSTEM	TBD	USED OIL TK (S) - HIGH	DI	SERIAL LINK				X				X					
934		TANK SOUNDING SYSTEM	TBD	USED OIL TK (S) -VALUE	AI	SERIAL LINK					X				X				
935		TANK SOUNDING SYSTEM	TBD	FO OVERFLOW TK - HIGH	DI	SERIAL LINK				X				X					
936		TANK SOUNDING SYSTEM	TBD	FO OVERFLOW TK) -VALUE	AI	SERIAL LINK					X				X				
937		TANK SOUNDING SYSTEM	TBD	FO DRAIN TK - HIGH	DI	SERIAL LINK				X				X					
938		TANK SOUNDING SYSTEM	TBD	FO DRAIN TK - VALUE	AI	SERIAL LINK					X				X				
939		TANK SOUNDING SYSTEM	TBD	COOLING WATER DROP TK - HIGH	DI	SERIAL LINK				X				X					
940		TANK SOUNDING SYSTEM	TBD	COOLING WATER DROP TK - VALUE	AI	SERIAL LINK					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRIPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
941		TANK SOUNDING SYSTEM	TBD	CROSS OVER TK - VALUE	DI	SERIAL LINK					X				X				
942		TANK SOUNDING SYSTEM	TBD	BLACK WATER TK - HIGH	DI	SERIAL LINK				X				X					
943		TANK SOUNDING SYSTEM	TBD	BLACK WATER TK - VALUE	AI	SERIAL LINK					X				X				
944		TANK SOUNDING SYSTEM	TBD	GREY WATER TK (INNER SIDE) - HIGH	DI	SERIAL LINK				X				X					
945		TANK SOUNDING SYSTEM	TBD	GREY WATER TK (INNER SIDE) - VALUE	AI	SERIAL LINK					X				X				
946		TANK SOUNDING SYSTEM	TBD	GREY WATER TK (SHELL SIDE) - HIGH	DI	SERIAL LINK				X				X					
947		TANK SOUNDING SYSTEM	TBD	GREY WATER TK (SHELL SIDE) - VALUE	AI	SERIAL LINK					X				X				
948		TANK SOUNDING SYSTEM	TBD	SLUDGE TK MIDSHIP (P) - HIGH	DI	SERIAL LINK				X				X					
949		TANK SOUNDING SYSTEM	TBD	SLUDGE TK MIDSHIP (P) - VALUE	AI	SERIAL LINK					X				X				
950		TANK SOUNDING SYSTEM	TBD	WB FORE PEAK TK - HIGH	DI	SERIAL LINK				X				X					
951		TANK SOUNDING SYSTEM	TBD	WB FORE PEAK TK - VALUE	AI	SERIAL LINK					X				X				
952		TANK SOUNDING SYSTEM	TBD	WB TK FWD (C) - HIGH	DI	SERIAL LINK				X				X					
953		TANK SOUNDING SYSTEM	TBD	WB TK FWD (C) - VALUE	AI	SERIAL LINK					X				X				
954		TANK SOUNDING SYSTEM	TBD	WB TK (C) - HIGH	DI	SERIAL LINK				X				X					
955		TANK SOUNDING SYSTEM	TBD	WB TK (C) - VALUE	AI	SERIAL LINK					X				X				
956		TANK SOUNDING SYSTEM	TBD	WB ANTI ROLLING TK - ALARM	DI	SERIAL LINK				X				X					
957		TANK SOUNDING SYSTEM	TBD	WB ANTI ROLLING TK - VALUE	AI	SERIAL LINK					X				X				
958		TANK SOUNDING SYSTEM	TBD	ANTI-HEELING TK FWD (P) - HIGH	DI	SERIAL LINK				X				X					
959		TANK SOUNDING SYSTEM	TBD	ANTI-HEELING TK FWD (P) - VALUE	AI	SERIAL LINK					X				X				
960		TANK SOUNDING SYSTEM	TBD	ANTI-HEELING TK FWD (S) - HIGH	DI	SERIAL LINK				X				X					

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
961		TANK SOUNDING SYSTEM	TBD	ANTI-HEELING TK FWD (S) - VALUE	AI	SERIAL LINK					X				X				
962		TANK SOUNDING SYSTEM	TBD	ANTI-HEELING TK AFT (P) - HIGH	DI	SERIAL LINK				X				X					
963		TANK SOUNDING SYSTEM	TBD	ANTI-HEELING TK AFT (P) - VALUE	AI	SERIAL LINK					X				X				
964		TANK SOUNDING SYSTEM	TBD	ANTI-HEELING TK AFT (S) - HIGH	DI	SERIAL LINK				X				X					
965		TANK SOUNDING SYSTEM	TBD	ANTI-HEELING TK AFT (S) - VALUE	AI	SERIAL LINK					X				X				
966		TANK SOUNDING SYSTEM	TBD	WB TK DB AFT (P) - HIGH	DI	SERIAL LINK				X				X					
967		TANK SOUNDING SYSTEM	TBD	WB TK DB AFT (P) - VALUE	AI	SERIAL LINK					X				X				
968		TANK SOUNDING SYSTEM	TBD	WB TK DB AFT (S) - HIGH	DI	SERIAL LINK				X				X					
969		TANK SOUNDING SYSTEM	TBD	WB TK DB AFT (S) - VALUE	AI	SERIAL LINK					X				X				
970		TANK SOUNDING SYSTEM	TBD	WB TK AFT (P) - HIGH	DI	SERIAL LINK				X				X					
971		TANK SOUNDING SYSTEM	TBD	WB TK AFT (P) - VALUE	AI	SERIAL LINK					X				X				
972		TANK SOUNDING SYSTEM	TBD	WB TK AFT (S) - HIGH	DI	SERIAL LINK				X				X					
973		TANK SOUNDING SYSTEM	TBD	WB TK AFT (S) - VALUE	AI	SERIAL LINK					X				X				
974		TANK SOUNDING SYSTEM	TBD	WB TK AFT MOST (P) - HIGH	DI	SERIAL LINK				X				X					
975		TANK SOUNDING SYSTEM	TBD	WB TK AFT MOST (P) -VALUE	AI	SERIAL LINK					X				X				
976		TANK SOUNDING SYSTEM	TBD	WB TK AFT MOST (S) - HIGH	DI	SERIAL LINK				X				X					
977		TANK SOUNDING SYSTEM	TBD	WB TK AFT MOST (S) - VALUE	AI	SERIAL LINK					X				X				
978		TANK SOUNDING SYSTEM	TBD	UREA TK - LOW	DI	SERIAL LINK				X				X					
979		TANK SOUNDING SYSTEM	TBD	UREA TK - HIGH (DUPLICATE)	DI	SERIAL LINK				X				X					
980		TANK SOUNDING SYSTEM	TBD	UREA TK - VALUE	AI	SERIAL LINK					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
981		TANK SOUNDING SYSTEM	TBD	VOID FOR SHAFT S - VALUE	DI	SERIAL LINK					X				X				
982		TANK SOUNDING SYSTEM	TBD	VOID FOR SHAFT P - VALUE	DI	SERIAL LINK					X				X				
983		TANK SOUNDING SYSTEM	TBD	VOID TK C - VALUE	DI	SERIAL LINK					X				X				
984		TANK SOUNDING SYSTEM	TBD	VOID TK S - VALUE	DI	SERIAL LINK					X				X				
985		TANK SOUNDING SYSTEM	TBD	VOID TK P - VALUE	DI	SERIAL LINK					X				X				
986		TANK SOUNDING SYSTEM	TBD	VOID TK C - VALUE	DI	SERIAL LINK					X				X				
987		TANK SOUNDING SYSTEM	TBD	FRESH WATER EXPANSION TANK	DI	SERIAL LINK				X				X					
988		TANK SOUNDING SYSTEM	TBD	CHILLED WATER EXPANSION TANK	DI	SERIAL LINK				X				X					
989		TANK SOUNDING SYSTEM	TBD	LEVEL, STERN TUBE PORT LUBRICATING OIL GRAVITY TANK, LOW	DI	SERIAL LINK				X				X					
990		TANK SOUNDING SYSTEM	TBD	LEVEL, STERN TUBE STBD LUBRICATING OIL GRAVITY TANK, LOW	DI	SERIAL LINK				X				X					
991		AIR & VENTILATION SYSTEM	TBD	FAN COIL 1 FOR PROPULSION-ROOM (ABNORMALORMAL ALARM)	DI	HARDWIRED				X				X					
992		AIR & VENTILATION SYSTEM	TBD	FAN COIL 2 FOR PROPULSION-ROOM (ABNORMALORMAL ALARM)	DI	HARDWIRED				X				X					
993		AIR & VENTILATION SYSTEM (INCL. REF PLANT)	TBD	HVAC SYSTEM (COMMON ALARM)	DI	HARDWIRED				X				X					
994		AC SYSTEM	TBD	AIR CONDITIONING SYSTEM -FAILS	DI	HARDWIRED				x				x					
995		CONTROL AIR DRYER	TBD	CONTROL AIR DRYER ABNORMAL	DI	HARDWIRED				X				X					
996		BILGE SYSTEM	TBD	PROPELLER INSPECTION TRUNK FR 03 - 05(C) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
997		BILGE SYSTEM	TBD	STERN THRUSTER ROOOM FR 13 -15(C) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
998		BILGE SYSTEM	TBD	C/D FR 21 - 22 (P) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
999		BILGE SYSTEM	TBD	VOID FR 27 - 28 (P) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1000		BILGE SYSTEM	TBD	VOID FR 27 - 28 (S) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1001		BILGE SYSTEM	TBD	ENGINE ROOM FR 50 - 52 (P) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1002		BILGE SYSTEM	TBD	ENGINE ROOM FR 50 - 52 (S) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1003		BILGE SYSTEM	TBD	ENGINE ROOM FR 53 - 55 (C) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1004		BILGE SYSTEM	TBD	ENGINE ROOM FR 71 - 73 (C) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1005		BILGE SYSTEM	TBD	SEPARATOR ROOM FR 85 - 87 (P) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1006		BILGE SYSTEM	TBD	SEPARATOR ROOM FR 80 - 82 (S) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1007		BILGE SYSTEM	TBD	SEWAGE TREATMENT ROOM FR 95 - 97 (C) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1008		BILGE SYSTEM	TBD	ROOM FOR BOW THRUSTER FR 116 - 118 (C) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1009		BILGE SYSTEM	TBD	CHAIN LOCKER (P) FR 124 - 126 (P) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1010		BILGE SYSTEM	TBD	CHAIN LOCKER (S) FR 124 - 126 (S) BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1011		BILGE SYSTEM	TBD	VOID FR 16 - 18 (C) DOUBLE BOTTOM BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1012		BILGE SYSTEM	TBD	PROPULSION ROOM FR 43 - 45 (P) DOUBLE BOTTOM BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1013		BILGE SYSTEM	TBD	PROPULSION ROOM FR 43 - 45 (S) DOUBLE BOTTOM BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1014		BILGE SYSTEM	TBD	TRUNK FOR POS. UNIT FR 46 - 48 (S) DOUBLE BOTTOM BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1015		BILGE SYSTEM	TBD	VOID FR 65 - 67 (P) DOUBLE BOTTOM BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1016		BILGE SYSTEM	TBD	VOID FR 65 - 67 (S) DOUBLE BOTTOM BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1017		BILGE SYSTEM	TBD	C/D FR 68 - 69 (C) DOUBLE BOTTOM BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1018		BILGE SYSTEM	TBD	VOID FR 93 -95 (P) DOUBLE BOTTOM BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1019		BILGE SYSTEM	TBD	VOID FR 93 -95 (C) DOUBLE BOTTOM BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1020		BILGE SYSTEM	TBD	VOID FR 106 - 108 (C) DOUBLE BOTTOM BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1021		BILGE SYSTEM	TBD	SONAL TRUNCK FR 124 - 126 (C) DOUBLE BOTTOM BILGE WELL LEVEL HIGH	DI	SERIAL LINK				X				X					
1022		VALVE REMOTE CONTROL SYSTEM	TBD	MONITORING OF CABLING FROM VALVE ACTUATORS TO DETECT BOTH OPEN AND SHORT CIRCUIT	DI	SERIAL LINK				X				X					
1023		VALVE REMOTE CONTROL SYSTEM	TBD	VALVE REMOTE CONTROL SYSTEM ABNORMAL	DI	SERIAL LINK				X				X					
1024		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-1 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1025		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-1 ABNORMAL	DI	SERIAL LINK				X				X					
1026		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-1 OPEN	DI	SERIAL LINK					X				X				
1027		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-1 CLOSE	DI	SERIAL LINK					X				X				
1028		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-2 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1029		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-2 ABNORMAL	DI	SERIAL LINK				X				X					
1030		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-2 OPEN	DI	SERIAL LINK					X				X				
1031		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-2 CLOSE	DI	SERIAL LINK					X				X				
1032		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-13 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1033		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-3 ABNORMAL	DI	SERIAL LINK				X				X					
1034		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-3 OPEN	DI	SERIAL LINK					X				X				
1035		REMOTE VALVE CONTROL SYSTEM	TBD	ANTI ROLLING TANKS - VALVE-3 CLOSE	DI	SERIAL LINK					X				X				
1036		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.1 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1037		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.1 ABNORMAL	DI	SERIAL LINK				X				X					
1038		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.1 OPEN	DI	SERIAL LINK					X				X				
1039		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.1 CLOSE	DI	SERIAL LINK					X				X				
1040		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.2 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1041		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.2 ABNORMAL	DI	SERIAL LINK				X				X					
1042		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.2 OPEN	DI	SERIAL LINK					X				X				
1043		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.2 CLOSE	DI	SERIAL LINK					X				X				
1044		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.3 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1045		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.3 ABNORMAL	DI	SERIAL LINK				X				X					
1046		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.3 OPEN	DI	SERIAL LINK					X				X				
1047		REMOTE VALVE CONTROL SYSTEM	TBD	CENTRAL HEATING SYSTEM - VALVE NO.3 CLOSE	DI	SERIAL LINK					X				X				
1048		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.1 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1049		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.1 ABNORMAL	DI	SERIAL LINK				X				X					
1050		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.1 OPEN	DI	SERIAL LINK					X				X				
1051		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.1 CLOSE	DI	SERIAL LINK					X				X				
1052		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.2 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1053		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.2 ABNORMAL	DI	SERIAL LINK				X				X					
1054		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.2 OPEN	DI	SERIAL LINK					X				X				
1055		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.2 CLOSE	DI	SERIAL LINK					X				X				
1056		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.3 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1057		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.3 ABNORMAL	DI	SERIAL LINK				X				X					
1058		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.3 OPEN	DI	SERIAL LINK					X				X				
1059		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.3 CLOSE	DI	SERIAL LINK					X				X				
1060		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARV SUPPLV SVSTEMS - VALVE NO.4 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1061		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARY SUPPLY SYSTEMS - VALVE NO.4 ABNORMAL	DI	SERIAL LINK				X				X					
1062		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARY SUPPLY SYSTEMS - VALVE NO.4 OPEN	DI	SERIAL LINK					X				X				
1063		REMOTE VALVE CONTROL SYSTEM	TBD	SANITARY SUPPLY SYSTEMS - VALVE NO.4 CLOSE	DI	SERIAL LINK					X				X				
1064		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.1 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1065		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.1 ABNORMAL	DI	SERIAL LINK				X				X					
1066		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.1 OPEN	DI	SERIAL LINK					X				X				
1067		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.1 CLOSE	DI	SERIAL LINK					X				X				
1068		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.2 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1069		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.2 ABNORMAL	DI	SERIAL LINK				X				X					
1070		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.2 OPEN	DI	SERIAL LINK					X				X				
1071		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.2 CLOSE	DI	SERIAL LINK					X				X				
1072		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.3 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1073		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.3 ABNORMAL	DI	SERIAL LINK				X				X					
1074		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.3 OPEN	DI	SERIAL LINK					X				X				
1075		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.3 CLOSE	DI	SERIAL LINK					X				X				
1076		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.4 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1077		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.4 ABNORMAL	DI	SERIAL LINK				X				X					
1078		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.4 OPEN	DI	SERIAL LINK					X				X				
1079		REMOTE VALVE CONTROL SYSTEM	TBD	FUEL OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.4 CLOSE	DI	SERIAL LINK					X				X				
1080		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.1 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISRIPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1081		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.1 ABNORMAL	DI	SERIAL LINK				X				X					
1082		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.1 OPEN	DI	SERIAL LINK					X				X				
1083		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.1 CLOSE	DI	SERIAL LINK					X				X				
1084		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.2 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1085		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.2 ABNORMAL	DI	SERIAL LINK				X				X					
1086		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.2 OPEN	DI	SERIAL LINK					X				X				
1087		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.2 CLOSE	DI	SERIAL LINK					X				X				
1088		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.3 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1089		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.3 ABNORMAL	DI	SERIAL LINK				X				X					
1090		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.3 OPEN	DI	SERIAL LINK					X				X				
1091		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.3 CLOSE	DI	SERIAL LINK					X				X				
1092		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.4 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1093		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.4 ABNORMAL	DI	SERIAL LINK				X				X					
1094		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.4 OPEN	DI	SERIAL LINK					X				X				
1095		REMOTE VALVE CONTROL SYSTEM	TBD	LUBRICATING OIL TRANSFER AND DRAIN SYSTEM - VALVE NO.4 CLOSE	DI	SERIAL LINK					X				X				
1096		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.1 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1097		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.1 ABNORMAL	DI	SERIAL LINK				X				X					
1098		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.1 OPEN	DI	SERIAL LINK					X				X				
1099		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.1 CLOSE	DI	SERIAL LINK					X				X				
1100		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.2 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1101		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.2 ABNORMAL	DI	SERIAL LINK				X				X					
1102		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.2 OPEN	DI	SERIAL LINK					X				X				
1103		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.2 CLOSE	DI	SERIAL LINK					X				X				
1104		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.3 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1105		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.3 ABNORMAL	DI	SERIAL LINK				X				X					
1106		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.3 OPEN	DI	SERIAL LINK					X				X				
1107		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.3 CLOSE	DI	SERIAL LINK					X				X				
1108		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.4 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1109		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.4 ABNORMAL	DI	SERIAL LINK				X				X					
1110		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.4 OPEN	DI	SERIAL LINK					X				X				
1111		REMOTE VALVE CONTROL SYSTEM	TBD	SEA WATER COOLING SYSTEM - VALVE NO.4 CLOSE	DI	SERIAL LINK					X				X				
1112		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.1 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1113		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.1 ABNORMAL	DI	SERIAL LINK				X				X					
1114		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.1 OPEN	DI	SERIAL LINK					X				X				
1115		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.1 CLOSE	DI	SERIAL LINK					X				X				
1116		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.2 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1117		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.2 ABNORMAL	DI	SERIAL LINK				X				X					
1118		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.2 OPEN	DI	SERIAL LINK					X				X				
1119		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.2 CLOSE	DI	SERIAL LINK					X				X				
1120		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.3 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1121		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.3 ABNORMAL	DI	SERIAL LINK				X				X					
1122		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.3 OPEN	DI	SERIAL LINK					X				X				
1123		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.3 CLOSE	DI	SERIAL LINK					X				X				
1124		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.4 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1125		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.4 ABNORMAL	DI	SERIAL LINK				X				X					
1126		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.4 OPEN	DI	SERIAL LINK					X				X				
1127		REMOTE VALVE CONTROL SYSTEM	TBD	GENERAL PURPOSE AIR SVSTEM (LOW PRESSURE) - VALVE NO.4 CLOSE	DI	SERIAL LINK					X				X				
1128		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.1 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1129		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.1 ABNORMAL	DI	SERIAL LINK				X				X					
1130		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.1 OPEN	DI	SERIAL LINK					X				X				
1131		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.1 CLOSE	DI	SERIAL LINK					X				X				
1132		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.2 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1133		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.2 ABNORMAL	DI	SERIAL LINK				X				X					
1134		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.2 OPEN	DI	SERIAL LINK					X				X				
1135		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.2 CLOSE	DI	SERIAL LINK					X				X				
1136		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.3 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				
1137		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.3 ABNORMAL	DI	SERIAL LINK				X				X					
1138		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.3 OPEN	DI	SERIAL LINK					X				X				
1139		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.3 CLOSE	DI	SERIAL LINK					X				X				
1140		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.4 SUPPLY AVAILABLE	DI	SERIAL LINK					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1141		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.4 ABNORMAL	DI	SERIAL LINK				X				X					
1142		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.4 OPEN	DI	SERIAL LINK					X				X				
1143		REMOTE VALVE CONTROL SYSTEM	TBD	HYDRAULIC SYSTEM - VALVE NO.4 CLOSE	DI	SERIAL LINK					X				X				
1144		CENTRAL HEATING RECOVERING SYSTEM (AUXILIARY BOILER)	TBD	CENTRAL HEATING RECOVERING SYSTEM COMMON ALARM	DI	HARDWIRED				X				X					
1145		STARTING AIR COMPRESSOR	TBD	STARTING AIR COMPRESSOR-1 (COMMON ALARM)	DI	HARDWIRED				X				X					
1146		STARTING AIR COMPRESSOR	TBD	STARTING AIR COMPRESSOR-1 STARTING AIR BEFORE SHUT OFF VALVE PRESSURE VALUE	AI	HARDWIRED					X				X				
1147		STARTING AIR COMPRESSOR	TBD	STARTING AIR COMPRESSOR-1 STARTING AIR BEFORE SHUT OFF VALVE PRESSURE VALUE - LOW ALARM	DI	HARDWIRED				X				X					
1148		STARTING AIR COMPRESSOR	TBD	STARTING AIR COMPRESSOR-2 (COMMON ALARM)	DI	HARDWIRED				X				X					
1149		STARTING AIR COMPRESSOR	TBD	STARTING AIR COMPRESSOR-2 STARTING AIR BEFORE SHUT OFF VALVE PRESSURE VALUE	AI	HARDWIRED					X				X				
1150		STARTING AIR COMPRESSOR	TBD	STARTING AIR COMPRESSOR-2 STARTING AIR BEFORE SHUT OFF VALVE PRESSURE VALUE - LOW ALARM	DI	HARDWIRED				X				X					
1151		STARTING AIR COMPRESSOR	TBD	CONTROL AIR PRESSURE- VALUE	DI	HARDWIRED					X				X				
1152		STARTING AIR COMPRESSOR	TBD	CONTROL AIR PRESSURE- VALUE LOW ALARM	DI	HARDWIRED				X				X					
1153		WORKING AIR COMPRESSOR	TBD	WORKING AIR COMPRESSOR-1 (COMMON ALARM)	DI	HARDWIRED				X				X					
1154		WORKING AIR COMPRESSOR	TBD	WORKING AIR COMPRESSOR-1 WORKING AIR BEFORE SHUT OFF VALVE PRESSURE VALUE	DI	HARDWIRED					X				X				
1155		WORKING AIR COMPRESSOR	TBD	WORKING AIR COMPRESSOR-1 WORKING AIR BEFORE SHUT OFF VALVE PRESSURE VALUE - LOW ALARM	DI	HARDWIRED				X				X					
1156		STARTING/WORKING AIR RECEIVER	TBD	STARTING/WORKING AIR RECEIVER-1 PRESSURE VALUE	DI	HARDWIRED					X				X				
1157		STARTING/WORKING AIR RECEIVER	TBD	STARTING/WORKING AIR RECEIVER-1 PRESSURE ABNORMAL ALARM	DI	HARDWIRED				X				X					
1158		STARTING/WORKING AIR RECEIVER	TBD	STARTING/WORKING AIR RECEIVER-2 PRESSURE VALUE	DI	HARDWIRED					X				X				
1159		STARTING/WORKING AIR RECEIVER	TBD	STARTING/WORKING AIR RECEIVER-2 PRESSURE ABNORMAL ALARM	DI	HARDWIRED				X				X					
1160		STARTING/WORKING AIR RECEIVER	TBD	STARTING/WORKING AIR RECEIVER-3 PRESSURE VALUE	DI	HARDWIRED					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1161		STARTING/WORKING AIR RECEIVER	TBD	STARTING/WORKING AIR RECEIVER-3 PRESSURE ABNORMAL ALARM	DI	HARDWIRED				X				X					
1162		STARTING/WORKING AIR RECEIVER	TBD	STARTING/WORKING AIR RECEIVER-4 PRESSURE VALUE	DI	HARDWIRED					X				X				
1163		STARTING/WORKING AIR RECEIVER	TBD	STARTING/WORKING AIR RECEIVER-4 PRESSURE ABNORMAL ALARM	DI	HARDWIRED				X				X					
1164		INCINERATOR	TBD	INCINERATOR ABNORMAL	DI	HARDWIRED				X				X					
1165		PURIFIER	CP	SELF-CLEANING FUEL OIL PURIFIERS - WATER SEAL, LOSS	DI	HARDWIRED +SERIAL LINK				X				X					
1166		PURIFIER	CP	SELF-CLEANING FUEL OIL PURIFIERS - ALARM AND SAFETY SYSTEMS, POWER FAILURE (ELECTRIC, PNEUMATIC)	DI	HARDWIRED +SERIAL LINK				X				X					
1167		PURIFIER	CP	SELF-CLEANING FUEL OIL PURIFIERS - REMOTE CONTROL SYSTEMS, POWER FAILURE (ELECTRIC, PNEUMATIC, HYDRAULIC)	DI	HARDWIRED +SERIAL LINK				X				X					
1168		PURIFIER	CP	SELF-CLEANING FUEL OIL PURIFIERS - STAND-BY START	DI	HARDWIRED +SERIAL LINK				X				X					
1169		PURIFIER	CP	SELF-CLEANING FUEL OIL PURIFIERS - RE-START	DI	HARDWIRED +SERIAL LINK					X			X					
1170		PURIFIER	CP	FUEL OIL ELECTRIC PRE- HEATER FOR FO PURIFIER - TEMPERATURE HIGH	DI	HARDWIRED +SERIAL LINK				X				X					
1171		PURIFIER	CP	SELF-CLEANING LUBRICATING OIL PURIFIERS - WATER SEAL, LOSS	DI	HARDWIRED +SERIAL LINK				X				X					
1172		PURIFIER	CP	SELF-CLEANING LUBRICATING OIL PURIFIERS - ALARM AND SAFETY SYSTEMS, POWER FAILURE (ELECTRIC, PNEUMATIC, HYDRAULIC)	DI	HARDWIRED +SERIAL LINK				X				X					
1173		PURIFIER	CP	SELF-CLEANING LUBRICATING OIL PURIFIERS - ALARM AND SAFETY SYSTEMS, POWER FAILURE (ELECTRIC, PNEUMATIC, HYDRAULIC)	DI	HARDWIRED +SERIAL LINK				X				X					
1174		PURIFIER	CP	SELF-CLEANING LUBRICATING OIL PURIFIERS - STAND-BY START	DI	HARDWIRED +SERIAL LINK				X				X					
1175		PURIFIER	CP	SELF-CLEANING LUBRICATING OIL PURIFIERS - RE-START	DI	HARDWIRED +SERIAL LINK					X			X					
1176		PURIFIER	CP	LUB OIL ELECTRIC PRE- HEATER FOR LO PURIFIER - TEMPERATURE HIGH	DI	HARDWIRED +SERIAL LINK				X				X					
1177		PUMP CONTROL & ALARM SYSTEM	STARTER	MDO TRANSFER PUMP-1 ABNORMAL 701.006.001	DI	HARD WIRE				X				X					
1178		PUMP CONTROL & ALARM SYSTEM	STARTER	MDO TRANSFER PUMP-1 AUTO START 701.006.001	DI	HARD WIRE				X				X					
1179		PUMP CONTROL & ALARM SYSTEM	STARTER	MDO TRANSFER PUMP-1 AUTO STOP 701.006.001	DI	HARD WIRE				X				X					
1180		PUMP CONTROL & ALARM SYSTEM	STARTER	MDO TRANSFER PUMP-1 RUN INDICATION 701.006.001	DI	HARD WIRE					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1181		PUMP CONTROL & ALARM SYSTEM	STARTER	MDO TRANSFER PUMP-1 POWER SUPPLY AVAILABLE 701.006.001	DI	HARD WIRE					X				X				
1182		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY FW COOLING PUMP-1 ABNORMAL 722.005.001	DI	HARD WIRE				X				X					
1183		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY FW COOLING PUMP-1 AUTO START 722.005.001	DI	HARD WIRE				X				X					
1184		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY FW COOLING PUMP-1 RUN INDICATION 722.005.001	DI	HARD WIRE				X				X					
1185		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY FW COOLING PUMP-1 AUTO STOP 722.005.001	DI	HARD WIRE					X				X				
1186		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY FW COOLING PUMP-1 POWER SUPPLY AVAILABLE 722.005.001	DI	HARD WIRE					X				X				
1187		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY SEWATER PUMP-1 ABNORMAL 721.003.001	DI	HARD WIRE				X				X					
1188		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY SEWATER PUMP-1 AUOT START 721.003.001	DI	HARD WIRE				X				X					
1189		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY SEWATER PUMP-1 AUTO STOP 721.003.001	DI	HARD WIRE				X				X					
1190		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY SEWATER PUMP-1 RUN INDICATION 721.003.001	DI	HARD WIRE					X				X				
1191		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY SEWATER PUMP-1 POWER SUPPLY AVAILABLE 721.003.001	DI	HARD WIRE					X				X				
1192		PUMP CONTROL & ALARM SYSTEM	STARTER	MDO TRANSFER PUMP-2 ABNORMAL 701.006.002	DI	HARD WIRE				X				X					
1193		PUMP CONTROL & ALARM SYSTEM	STARTER	MDO TRANSFER PUMP-2 AUTO START 701.006.002	DI	HARD WIRE				X				X					
1194		PUMP CONTROL & ALARM SYSTEM	STARTER	MDO TRANSFER PUMP-2 AUTO STOP 701.006.002	DI	HARD WIRE				X				X					
1195		PUMP CONTROL & ALARM SYSTEM	STARTER	MDO TRANSFER PUMP-2 RUN INDICATION 701.006.002	DI	HARD WIRE					X				X				
1196		PUMP CONTROL & ALARM SYSTEM	STARTER	MDO TRANSFER PUMP-2 PUMP SUPPLY AVAILABLE 701.006.002	DI	HARD WIRE					X				X				
1197		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY FW COOLING PUMP-2 ABNORMAL 722.005.002	DI	HARD WIRE				X				X					
1198		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY FW COOLING PUMP-2 AUTO START 722.005.002	DI	HARD WIRE				X				X					
1199		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY FW COOLING PUMP-2 AUTO STOP 722.005.002	DI	HARD WIRE				X				X					
1200		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY FW COOLING PUMP-2 RUN INDICATION 722.005.002	DI	HARD WIRE					X				X				

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1201		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY FW COOLING PUMP-2 PUMP SUPPLY AVAILABLE 722.005.002	DI	HARD WIRE					X				X				
1202		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY SEWATER PUMP- 2 ABNORMAL 721.003.002	DI	HARD WIRE				X				X					
1203		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY SEWATER PUMP- 2 AUTO START 721.003.002	DI	HARD WIRE				X				X					
1204		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY SEWATER PUMP- 2 AUTO STOP 721.003.002	DI	HARD WIRE				X				X					
1205		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY SEWATER PUMP- 2 RUN INDICATION 721.003.002	DI	HARD WIRE					X				X				
1206		PUMP CONTROL & ALARM SYSTEM	STARTER	AUXILIARY SEWATER PUMP- 2 POWER SUPPLY AVAILABLE 721.003.002	DI	HARD WIRE					X				X				
1207		PUMP CONTROL & ALARM SYSTEM	STARTER	FRESH WATER TRANSFER PUMP-1 ABNORMAL 581.060.001	DI	HARDWIRED				X				X					
1208		PUMP CONTROL & ALARM SYSTEM	STARTER	FRESH WATER TRANSFER PUMP-1 AUTO START 581.060.001	DI	HARDWIRED				X				X					
1209		PUMP CONTROL & ALARM SYSTEM	STARTER	FRESH WATER TRANSFER PUMP-1 AUTO STOP 581.060.001	DI	HARDWIRED				X				X					
1210		PUMP CONTROL & ALARM SYSTEM	STARTER	FRESH WATER TRANSFER PUMP-1 RUN INDICATION 581.060.001	DI	HARDWIRED					X				X				
1211		PUMP CONTROL & ALARM SYSTEM	STARTER	FRESH WATER TRANSFER PUMP-1 SUPPLY AVAILABLE 581.060.001	DI	HARDWIRED					X				X				
1212		PUMP CONTROL & ALARM SYSTEM	STARTER	LUBRICATING OIL TRANSFER PUMP FOR GENSETS ABNORMAL 711.001.001	DI	HARDWIRED				X				X					
1213		PUMP CONTROL & ALARM SYSTEM	STARTER	LUBRICATING OIL TRANSFER PUMP FOR GENSETS RUN IND. 711.001.001		HARDWIRED					X				X				
1214		PUMP CONTROL & ALARM SYSTEM	STARTER	LUBRICATING OIL TRANSFER PUMP FOR GENSETS SUPPLY AVAILABLE 711.001.001		HARDWIRED					X				X				
1215		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE CUM BALLAST PUMP-1 ABNORMAL 801.007.001	DI	HARDWIRED				X				X					
1216		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE CUM BALLAST PUMP-1 RUN 801.007.001	DI	HARDWIRED					X				X				
1217		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE CUM BALLAST PUMP-1 SUPPLY AVAILABLE 801.007.001	DI	HARDWIRED					X				X				
1218		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE PUMP ABNORMAL 803.032.002	DI	HARDWIRED				X				X					
1219		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE PUMP RUN IND. 803.032.002	DI	HARDWIRED					X				X				
1220		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE PUMP SUPPLY AVAILABLE 803.032.002	DI	HARDWIRED					X				X				

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1221		PUMP CONTROL & ALARM SYSTEM	STARTER	FIRE/WASH DECK PUMP-1 ABNORMAL 813.003.001	DI	HARDWIRED				X				X					
1222		PUMP CONTROL & ALARM SYSTEM	STARTER	FIRE/WASH DECK PUMP-1 AUTO START 813.003.001	DI	HARDWIRED				X				X					
1223		PUMP CONTROL & ALARM SYSTEM	STARTER	FIRE/WASH DECK PUMP-1 AUTO STOP 813.003.001	DI	HARDWIRED				X				X					
1224		PUMP CONTROL & ALARM SYSTEM	STARTER	FIRE/WASH DECK PUMP-1 RUN INDICATION 813.003.001	DI	HARDWIRED					X				X				
1225		PUMP CONTROL & ALARM SYSTEM	STARTER	FIRE/WASH DECK PUMP-1 SUPPLY AVAILABLE 813.003.001	DI	HARDWIRED					X				X				
1226		PUMP CONTROL & ALARM SYSTEM	STARTER	HOT WATER CIRCULATION PUMP-1 ABNORMAL 581.023.001	DI	HARDWIRED				X				X					
1227		PUMP CONTROL & ALARM SYSTEM	STARTER	HOT WATER CIRCULATION PUMP-1 AUTO START 581.023.001	DI	HARDWIRED				X				X					
1228		PUMP CONTROL & ALARM SYSTEM	STARTER	HOT WATER CIRCULATION PUMP-1 AUTO STOP 581.023.001	DI	HARDWIRED				X				X					
1229		PUMP CONTROL & ALARM SYSTEM	STARTER	HOT WATER CIRCULATION PUMP-1 RUN IND. 581.023.001	DI	HARDWIRED					X				X				
1230		PUMP CONTROL & ALARM SYSTEM	STARTER	HOT WATER CIRCULATION PUMP-1 SUPPLY AVAILABLE 581.023.001	DI	HARDWIRED					X				X				
1231		PUMP CONTROL & ALARM SYSTEM	STARTER	FRESH WATER TRANSFER PUMP-2 STBY ABNORMAL 581.060.002	DI	HARDWIRED				X				X					
1232		PUMP CONTROL & ALARM SYSTEM	STARTER	FRESH WATER TRANSFER PUMP-2 STBY AUTO START 581.060.002	DI	HARDWIRED				X				X					
1233		PUMP CONTROL & ALARM SYSTEM	STARTER	FRESH WATER TRANSFER PUMP-2 STBY AUTO STOP 581.060.002	DI	HARDWIRED				X				X					
1234		PUMP CONTROL & ALARM SYSTEM	STARTER	FRESH WATER TRANSFER PUMP-2 STBY RUN INDICATION 581.060.002	DI	HARDWIRED					X				X				
1235		PUMP CONTROL & ALARM SYSTEM	STARTER	FRESH WATER TRANSFER PUMP-2 STBY PUMP SUPPLY AVAILABLE 581.060.002	DI	HARDWIRED					X				X				
1236		PUMP CONTROL & ALARM SYSTEM	STARTER	FUEL OIL FILLING PUMP (HARBOUR GENERATOR) ABNORMAL 665.012.001	DI	HARDWIRED				X				X					
1237		PUMP CONTROL & ALARM SYSTEM	STARTER	FUEL OIL FILLING PUMP (HARBOUR GENERATOR) AUTO START 665.012.001	DI	HARDWIRED				X				X					
1238		PUMP CONTROL & ALARM SYSTEM	STARTER	FUEL OIL FILLING PUMP (HARBOUR GENERATOR) AUTO STOP 665.012.001	DI	HARDWIRED				X				X					
1239		PUMP CONTROL & ALARM SYSTEM	STARTER	FUEL OIL FILLING PUMP (HARBOUR GENERATOR) RUN IND. 665.012.001	DI	HARDWIRED					X				X				
1240		PUMP CONTROL & ALARM SYSTEM	STARTER	FUEL OIL FILLING PUMP (HARBOUR GENERATOR) SUPPLY AVAILABLE 665.012.001	DI	HARDWIRED					X				X				

I/O PRELIMINARY SIGNAL LIST FOR CCAMS

ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1241		PUMP CONTROL & ALARM SYSTEM	STARTER	LUBRICATING OIL TRANSFER PUMP FOR THRUSTERS ABNORMAL 711.021.001	DI	HARDWIRED				X				X					
1242		PUMP CONTROL & ALARM SYSTEM	STARTER	LUBRICATING OIL TRANSFER PUMP FOR THRUSTERS RUN IND. 711.021.001	DI	HARDWIRED					X				X				
1243		PUMP CONTROL & ALARM SYSTEM	STARTER	LUBRICATING OIL TRANSFER PUMP FOR THRUSTERS SUPPLY AVAILABLE 711.021.001	DI	HARDWIRED					X				X				
1244		PUMP CONTROL & ALARM SYSTEM	STARTER	FUEL OIL SERVICE PUMP FOR INCINERATOR SYSTEM ABNORMAL 703.079.001	DI	HARDWIRED				X				X					
1245		PUMP CONTROL & ALARM SYSTEM	STARTER	FUEL OIL SERVICE PUMP FOR INCINERATOR SYSTEM SUPPLY AVAILABLE 703.079.001	DI	HARDWIRED					X			X	X				
1246		PUMP CONTROL & ALARM SYSTEM	STARTER	FUEL OIL SERVICE PUMP FOR INCINERATOR SYSTEM RUN IND. 703.079.001	DI	HARDWIRED					X			X	X				
1247		PUMP CONTROL & ALARM SYSTEM	STARTER	SLUDGE / DIRTY OIL PUMP ABNORMAL 712.035.001	DI	HARDWIRED				X				X					
1248		PUMP CONTROL & ALARM SYSTEM	STARTER	SLUDGE / DIRTY OIL PUMP SUPPLY AVAILABLE 712.035.001	DI	HARDWIRED					X				X				
1249		PUMP CONTROL & ALARM SYSTEM	STARTER	SLUDGE / DIRTY OIL PUMP SUPPLY RUN IND. 712.035.001	DI	HARDWIRED					X				X				
1250		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE CUM BALLAST PUMP-2 ABNORMAL 801.007.002	DI	HARDWIRED				X				X					
1251		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE CUM BALLAST PUMP-2 SUPPLY AVAILABLE 801.007.002	DI	HARDWIRED					X				X				
1252		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE CUM BALLAST PUMP-2 SUPPLY RUN IND. 801.007.002	DI	HARDWIRED					X				X				
1253		PUMP CONTROL & ALARM SYSTEM	STARTER	FIRE/WASH DECK PUMPS-2 STBY ABNORMAL 813.003.002	DI	HARDWIRED				X				X					
1254		PUMP CONTROL & ALARM SYSTEM	STARTER	FIRE/WASH DECK PUMPS-2 STBY AUTO START 813.003.002	DI	HARDWIRED				X				X					
1255		PUMP CONTROL & ALARM SYSTEM	STARTER	FIRE/WASH DECK PUMPS-2 STBY AUTO STOP 813.003.002	DI	HARDWIRED				X				X					
1256		PUMP CONTROL & ALARM SYSTEM	STARTER	FIRE/WASH DECK PUMPS-2 STBY RUN INDICATION 813.003.002	DI	HARDWIRED					X				X				
1257		PUMP CONTROL & ALARM SYSTEM	STARTER	FIRE/WASH DECK PUMPS-2 STBY PUMP SUPPLY AVAILABLE 813.003.002	DI	HARDWIRED					X				X				
1258		PUMP CONTROL & ALARM SYSTEM	STARTER	HOT WATER CIRCULATION PUMP-2 ABNORMAL 581.023.002	DI	HARDWIRED				X				X					
1259		PUMP CONTROL & ALARM SYSTEM	STARTER	HOT WATER CIRCULATION PUMP-2 RUN IND. 581.023.002	DI	HARDWIRED					X				X				
1260		PUMP CONTROL & ALARM SYSTEM	STARTER	HOT WATER CIRCULATION PUMP-2 SUPPLY AVAILABLE 581.023.002	DI	HARDWIRED					X				X				

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1261		PUMP CONTROL & ALARM SYSTEM	STARTER	HOT WATER CIRCULATION PUMP-2 AUTO START 581.023.002	DI	HARDWIRED					X				X				
1262		PUMP CONTROL & ALARM SYSTEM	STARTER	HOT WATER CIRCULATION PUMP-2 AUTO STOP 581.023.002	DI	HARDWIRED					X				X				
1263		PUMP CONTROL & ALARM SYSTEM	STARTER	STATIONARY WASHING MACHINE ABNORMAL	DI	HARDWIRED				X				X					
1264		PUMP CONTROL & ALARM SYSTEM	STARTER	STATIONARY WASHING MACHINE SUPPLY AVAILABLE	DI	HARDWIRED					X				X				
1265		PUMP CONTROL & ALARM SYSTEM	STARTER	STATIONARY WASHING MACHINE RUN IND.	DI	HARDWIRED					X				X				
1266		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE PUMP ABNORMAL 803.032.001	DI	HARDWIRED				X				X					
1267		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE PUMP RUN IND. 803.032.001	DI	HARDWIRED					X				X				
1268		PUMP CONTROL & ALARM SYSTEM	STARTER	BILGE PUMP SUPPLY AVAILABLE 803.032.001	DI	HARDWIRED					X				X				
1269		PUMP CONTROL & ALARM SYSTEM	STARTER	ELECTRICALLY DRIVEN EMG. FIRE PUMP ABNORMAL 813.031.001	DI	HARDWIRED				X				X					
1270		PUMP CONTROL & ALARM SYSTEM	STARTER	ELECTRICALLY DRIVEN EMG. FIRE PUMP RUN 813.031.001	DI	HARDWIRED					X				X				
1271		PUMP CONTROL & ALARM SYSTEM	STARTER	ELECTRICALLY DRIVEN EMG. FIRE PUMP START 813.031.001	DO	HARDWIRED						X				X			
1272		PUMP CONTROL & ALARM SYSTEM	STARTER	ELECTRICALLY DRIVEN EMG. FIRE PUMP STOP 813.031.001	DO	HARDWIRED						X				X			
1273		PUMP CONTROL & ALARM SYSTEM	STARTER	ELECTRICALLY DRIVEN EMG. FIRE PUMP SUPPLY AVAILABLE 813.031.001	DO	HARDWIRED					X				X				
1274		PUMP CONTROL & ALARM SYSTEM	STARTER	FUEL OIL FILLING PUMP (EMG. GENERATOR & MOB/WORKING BOAT) ABNORMAL 665.011.001	DI	HARDWIRED				X				X					
1275		PUMP CONTROL & ALARM SYSTEM	STARTER	FUEL OIL FILLING PUMP (EMG. GENERATOR & MOB/WORKING BOAT) RUN IND. 665.011.001	DI	HARDWIRED					X				X				
1276		PUMP CONTROL & ALARM SYSTEM	STARTER	FUEL OIL FILLING PUMP (EMG. GENERATOR & MOB/WORKING BOAT) SUPPLY AVAILABLE 665.011.001	DI	HARDWIRED					X				X				
1277		PUMP CONTROL & ALARM SYSTEM	STARTER	L.O TRANSFER PUMP FOR STERN TUBE HEADER TK. ABNORMAL 713.027.001	DI	HARDWIRED				X				X					
1278		PUMP CONTROL & ALARM SYSTEM	STARTER	L.O TRANSFER PUMP FOR STERN TUBE HEADER TK. SUPPLY AVAILABLE 713.027.001	DI	HARDWIRED					X				X				
1279		PUMP CONTROL & ALARM SYSTEM	STARTER	L.O TRANSFER PUMP FOR STERN TUBE HEADER TK. RUN IND. 713.027.001	DI	HARDWIRED					X				X				
1280		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDRAULIC OIL TRANSFER PUMP FOR HPU'S ABNORMAL 831.028.001	DI	HARDWIRED				X				X					

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ANNEXURE B TO SOR FOR CCAMS(SOR NO. GT42900011M)

SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1281		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDRAULIC OIL TRANSFER PUMP FOR HPU'S AUTO START 831.028.001	DI	HARDWIRED				X				X					
1282		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDRAULIC OIL TRANSFER PUMP FOR HPU'S AUTO STOP 831.028.001	DI	HARDWIRED				X				X					
1283		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDRAULIC OIL TRANSFER PUMP FOR HPU'S SUPPLY AVAILABLE 831.028.001	DI	HARDWIRED					X				X				
1284		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDRAULIC OIL TRANSFER PUMP FOR HPU'S RUN IND. 831.028.001	DI	HARDWIRED					X				X				
1285		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDRAULIC OIL TRANSFER PUMP FOR STEERING GEAR ABNORMAL 831.030.001	DI	HARDWIRED				X				X					
1286		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDRAULIC OIL TRANSFER PUMP FOR STEERING GEAR RUN IND. 831.030.001	DI	HARDWIRED					X				X				
1287		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDRAULIC OIL TRANSFER PUMP FOR STEERING GEAR SUPPLY AVAILABLE 831.030.001	DI	HARDWIRED					X				X				
1288		PUMP CONTROL & ALARM SYSTEM	STARTER	SEAWATER PUMP FOR RSW-PLANT FOR LABORATORIES ABNORMAL 721.040.001	DI	HARDWIRED				X				X					
1289		PUMP CONTROL & ALARM SYSTEM	STARTER	SEAWATER PUMP FOR RSW-PLANT FOR LABORATORIES RUN IND. 721.040.001	DI	HARDWIRED					X				X				
1290		PUMP CONTROL & ALARM SYSTEM	STARTER	SEAWATER PUMP FOR RSW-PLANT FOR LABORATORIES SUPPLY AVAILABLE 721.040.001	DI	HARDWIRED					X				X				
1291		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDROPHORE PUMP-1 RUN IND. 581.002.001	DI	HARDWIRED					X				X				
1292		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDROPHORE PUMP-2 RUN IND. 581.002.002	DI	HARDWIRED					X				X				
1293		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDROPHORE POWER ON/OFF 581.004.001	DI	HARDWIRED					X				X				
1294		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDROPHORE COMMON ALARM 581.004.001	DI	HARDWIRED				X				X					
1295		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDROPHORE SUCTION PRESSURE 581.004.001	AI	HARDWIRED					X				X				
1296		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDROPHORE DISCHARGE PRESSURE 581.004.001	AI	HARDWIRED					X				X				
1297		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDROPHORE EMERGENCY STOP 581.004.001	DI	HARDWIRED				X				X					
1298		PUMP CONTROL & ALARM SYSTEM	STARTER	HYDROPHORE LOCAL/REMOTE 581.004.001	DI	HARDWIRED					X				X				
1299		FIRE DETECTION	TBD	FIRE ALARM(COMMON) ACTIVATED	DI	HARDWIRED				X				X					
1300		FIRE DETECTION	TBD	FIRE DETECTION ALARM SYSTEM - ABNORMAL	DI	HARDWIRED / SERIAL LINK				X				X					

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1301		FIRE DETECTION	TBD	FIRE DETECTION, ALARM SYSTEM - POWER FAILURE	DI	HARDWIRED / SERIAL LINK				X				X					
1302		FIRE DETECTION	TBD	PROPULSION MACHINERY SPACE FIRE DETECTED	DI	HARDWIRED / SERIAL LINK				X				X					
1303		FIRE DETECTION	TBD	GENERAL ALARM ACTIVATED DUE TO FIRE DETECTION	DI	HARDWIRED / SERIAL LINK				X				X					
1304		FIRE FIGHTING SYSTEM	TBD	WATER SPRINKLER SYSTEM ABNORMAL	DI	HARDWIRED				X				X					
1305		FIRE FIGHTING SYSTEM	TBD	WATER SPRINKLER SYSTEM RELEASE ALARM	DI	HARDWIRED				X				X					
1306		FIRE FIGHTING SYSTEM	TBD	LAS MIST SYSTEM ABNORMAL	DI	HARDWIRED				X				X					
1307		FIRE FIGHTING SYSTEM	TBD	LAS MIST SYSTEM -WARNING ALARM	DI	HARDWIRED				X				X					
1308		FIRE FIGHTING SYSTEM	TBD	LAS MIST SYSTEM -RELEASE ALARM	DI	HARDWIRED				X				X					
1309		FIRE FIGHTING SYSTEM	TBD	GALLEY FIRE FIHTING SYSTME ABNORMAL	DI	HARDWIRED				X				X					
1310		FIRE FIGHTING SYSTEM	TBD	GALLEY FIRE FIHTING SYSTME RELEASE ALARM	DI	HARDWIRED				X				X					
1311		FIRE FIGHTING SYSTEM (CO2)	TBD	INERT GAS FIRE FIHTING SYSTME ABNORMAL	DI	HARDWIRED				X				X					
1312		FIRE FIGHTING SYSTEM (CO2)	TBD	INERT GAS FIRE FIHTING SYSTME RELEASE ALARM	DI	HARDWIRED				X				X					
1313		FIRE FIGHTING SYSTEM (CO2)	TBD	INERT GAS FIRE FIHTING SYSTME LEAKAGE ALARM	DI	HARDWIRED				X				X					
1314		ER DEAD MAN ALARM (PART OF CCAMS)	PART OF CCAMS SYSTEM	ER DEAD MAN ALARM	NA	NA				X				X					
1315		ICCP	TBD	ICCP ABNORMAL/MAL FUNCTION	DI	SERIAL LINK				X				X					
1316		ICCP	TBD	INDICATION OF HULL POTENTIAL READING		SERIAL LINK					X				X				
1317		ICCP	TBD	INDICATION OF PRESET POTENTIAL		SERIAL LINK					X				X				
1318		ICCP	TBD	AUTO OR MANUAL MODE STATUS		SERIAL LINK					X				X				
1319		ICCP	TBD	CURRENT IN EACH ANODE-1		SERIAL LINK					X				X				
1320		ICCP	TBD	CURRENT IN EACH ANODE-2		SERIAL LINK					X				X				

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1321		ICCP	TBD	CURRENT IN EACH ANODE-3		SERIAL LINK					X				X				
1322		ICCP	TBD	CURRENT IN EACH ANODE-4		SERIAL LINK					X				X				
1323		BOW-THRUSTER 1	TBD	BOW-THRUSTER 1 ABNORMAL	DI	SERIAL LINK				X				X					
1324		BOW-THRUSTER 2	TBD	BOW-THRUSTER 2 ABNORMAL	DI	SERIAL LINK				X				X					
1325		STERN-THRUSTER 3	TBD	STERN-THRUSTER 3 ABNORMAL	DI	SERIAL LINK				X				X					
1326		TRU 1	TRANSRECTIFIER UNIT-1	TRU 1 BATT. CHARGE & DISCHARGE BOARD POWER FAILURE / ABNORMAL	DI	HARDWIRED				X				X					
1327		TRU 2	TRANSRECTIFIER UNIT-2	TRU 2 BATT. CHARGE & DISCHARGE BOARD POWER FAILURE / ABNORMAL	DI	HARDWIRED				X				X					
1328		TRU 3	TRANSRECTIFIER UNIT-3	TRU 3 BATT. CHARGE & DISCHARGE BOARD POWER FAILURE / ABNORMAL	DI	HARDWIRED				X				X					
1329		TRU 4	TRANSRECTIFIER UNIT-4	TRU 4 BATT. CHARGE & DISCHARGE BOARD POWER FAILURE / ABNORMAL	DI	HARDWIRED				X				X					
1330		AUTO PILOT	TBD	AUTO PILOT POWER FAIL	DI	SERIAL LINK				X				X					
1331		AUTO PILOT	TBD	AUTO PILOT FAILURE	DI	SERIAL LINK				X				X					
1332		BNWAS	TBD	BRIDGE WATCH ALARM SYSTEM ABNORMAL	DI	HARDWIRED				X				X					
1333		WT SLIDING DOOR	TBD	WATER TIGHT DOOR POWER FAIL	DI	HARDWIRED				X				X					
1334		COLD CHAMBER EM'CY CALL	TBD	COLD CHAMBER EM'CY CALL	DI	HARDWIRED				X				X					
1335		HOSPITAL CALL	TBD	HOSPITAL CALL	DI	HARDWIRED				X				X					
1336		MGPS	TBD	MGPS ABNORMAL ALARM	DI	HARDWIRED				X				X					
1337		STP	TBD	SEWAGE TREATMENT ABNORMAL	DI	HARDWIRED				X				X					
1338		STP	TBD	SEWAGE TREATMENT HOLDING TANK - HIGH LEVEL	DI	HARDWIRED				X				X					
1339		ANTI-ROLLING SYSTEM	TBD	ANTI-ROLLING SYSTEM ABNORMAL	DI	HARDWIRED				X				X					
1340		ANTI-ROLLING SYSTEM	TBD	ANTI-ROLLING SYSTEM VENT VALVE OPEN	DI	HARDWIRED					X								

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1341		ANTI-ROLLING SYSTEM	TBD	ANTI-ROLLING SYSTEM VENT VALVE CLOSED	DI	HARDWIRED					X								
1342		CCAMS	PART OF CCAMS SYSTEM	CCAMS NO1 UPS POWER FAIL	NA	NA				X				X					
1343		CCAMS	PART OF CCAMS SYSTEM	CCAMS NO2 UPS POWER FAIL	NA	NA				X				X					
1344		CCAMS	PART OF CCAMS SYSTEM	CCAMS DC BATTERY POWER FAIL	NA	NA				X				X					
1345		CCAMS	PART OF CCAMS SYSTEM	CCAMS PSU ABNORMAL	NA	NA				X				X					
1346		CCAMS	PART OF CCAMS SYSTEM	CCAMS PSU AC SOURCE FAIL	NA	NA				X				X					
1347		CCAMS	PART OF CCAMS SYSTEM	CCAMS CONTROL VOLTAGE LOW INSULATION	NA	NA				X				X					
1348		OILY WATER SEPARATOR	CP	OWS ABNORMAL	DI	HARDWIRED				X				X					
1349		OILY WATER SEPARATOR	CP	OWS PUMP RUNNING	DI	HARDWIRED					X				X				
1350		OILY WATER SEPARATOR	CP	OWS PPM ALARM	DI	HARDWIRED				X				X					
1351		REVERSE OSMOSIS PLANT	CP	REVERSE OSMOSIS PLANT -1 ABNORMAL	DI	HARDWIRED				X				X					
1352		REVERSE OSMOSIS PLANT	CP	REVERSE OSMOSIS PLANT -2 ABNORMAL	DI	HARDWIRED				X				X					
1353		REVERSE OSMOSIS PLANT	CP	REVERSE OSMOSIS PLANT -1 START/ RUN	DI	HARDWIRED					X				X				
1354		REVERSE OSMOSIS PLANT	CP	REVERSE OSMOSIS PLANT -2 START/RUN	DI	HARDWIRED					X				X				
1355		BALLAST WATER TREATMENT SYSTEM	TBD	BALLAST WATER TREATMENT SYSTEM ABNORMAL	DI	HARDWIRED					X			X					
1356		MARINE CLOCK SYSTEM	TBD	MARINE CLOCK SYSTEM ABNORMAL	DI	HARDWIRED / SERIAL LINK				X				X					
1357		MARINE CLOCK SYSTEM	TBD	MARINE CLOCK SYSTEM INTERFACE	AI	HARDWIRED / SERIAL LINK					X				X				
1358		IP-TELEPHONE SYSTEM	TBD	IP-TELEPHONE SYSTEM - POWER FAILURE	DI	HARDWIRED / SERIAL LINK				X				X					
1359		PUBLIC ADDRESS SYSTEM	TBD	PUBLIC ADDRESS SYSTEM - POWER FAILURE	DI	HARDWIRED / SERIAL LINK				X				X					
1360		ETHERNET-LAN SYSTEM	TBD	ETHERNET-LAN SYSTEM POWER FAILURE/ABNORMAL	DI	HARDWIRED / SERIAL LINK				X				X					

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SL.	IO SIGNAL TAG	SYSTEM/EQUIPMENTS	SUB-EQUIPMENT	SERVICE DISCRPTION	SIGNAL TYPE					ECR				BRIDGE					REMARKS
					I/O	TYPE	RANGE	UNIT	SETTING	AV ALARM	INDICATION	CONTROL	DELAY	AV ALARM	INDICATION	CONTROL	DELAY	COMMON GROUP ALARM AS PER OEM DESIGN	
1361		CLEAN POWER EQUIPMENT - UPS 1	TBD	CLEAN POWER EQUIPMENT - UPS ABNORMAL	DI	HARDWIRED				X				X					
1362		CLEAN POWER EQUIPMENT - UPS 1	TBD	CLEAN POWER EQUIPMENT - UPS REMOTE EMERGENCY SHUTDOWN	DI	HARDWIRED				X				X					
1363		CLEAN POWER EQUIPMENT - UPS 2	TBD	CLEAN POWER EQUIPMENT - UPS ABNORMAL	DI	HARDWIRED				X				X					
1364		CLEAN POWER EQUIPMENT - UPS 2	TBD	CLEAN POWER EQUIPMENT - UPS REMOTE EMERGENCY SHUTDOWN	DI	HARDWIRED				X				X					
1365		CLEAN POWER EQUIPMENT - UPS 3	TBD	CLEAN POWER EQUIPMENT - UPS ABNORMAL	DI	HARDWIRED				X				X					
1366		CLEAN POWER EQUIPMENT - UPS 3	TBD	CLEAN POWER EQUIPMENT - UPS REMOTE EMERGENCY SHUTDOWN	DI	HARDWIRED				X				X					
1367		CLEAN POWER EQUIPMENT - UPS 4	TBD	CLEAN POWER EQUIPMENT - UPS ABNORMAL	DI	HARDWIRED				X				X					
1368		CLEAN POWER EQUIPMENT - UPS 4	TBD	CLEAN POWER EQUIPMENT - UPS REMOTE EMERGENCY SHUTDOWN	DI	HARDWIRED				X				X					
1369		DYNAMIC POSITIONING SYSTEM	TBD	DYNAMIC POSITIONING SYSTEM (AUTOMATIC) ABNORMAL	DI	HARDWIRED				X				X					
1370		DYNAMIC POSITIONING SYSTEM	TBD	DYNAMIC POSITIONING SYSTEM -IJS ABNORMAL	DI	HARDWIRED				X				X					
1371		FRESH WATER CALORIFIER	TBD	FRESH WATER CALORIFER(500L?) -1 ABNORMAL	DI	HARDWIRED				X				X					
1372		FRESH WATER CALORIFIER	TBD	FRESH WATER CALORIFER(500L?) -2 ABNORMAL	DI	HARDWIRED				X				X					
1373		CCTV	TBD	CCTV INTERFACING	DI	SERIAL LINK					X				X				
1374		CCTV	TBD	CCTV INTERFACING	DI	SERIAL LINK				X				X					
Notes- (i) This I/O List is indicative. No of I/Os, type of signals will be finalised during detail design. (ii) Alarm Grouping against above Systems & signals shall be done be as per OEM Design for Repeater Alarm Panels. Same will be finalised during detail design.																			