Customized PCB Design

Custom Build PCB Design and Manufacturing

Our Engineering and Design Team is involved with designing of Data loggers, Data recorders, PLC’s, PAC’s, Current and voltage sensing modules and etc. We can customize our designs to suit various types of products requirements. So far we have built lighting control panel, Navigation light panel, Specific Remote IO Module, Gas Detection system module, water ingress alarm system module, Fire alarm panel and Voyage Data Recorder etc.

We are specifically working in the area of IoT, its related Hardware, Firmware and various cloud based platforms.

All the Hardware we design and engineer are using latest technology and comply with various National and International Standards.
Remote Monitoring Solution for Ships

Alpha Nodes - a building blocks for future autonomous ships

Design Dream
We Dreamed of designing a product which can provide End-to-End Solution for Remote Motoring of just anything.

These are the units which are built for rugged Industrial use also customized on the field by users to suit various applications which are complex in nature.

Multiple roles of alpha nodes
These units acts as Data logger and Data recorders, at the same time they are capable to integrate with any controller or actuators to take action. These units are capable to go even a step further and can become any controller(PLC’s, PAC’s) if required.

Work alone as well as in cluster
These units are individually capable to work alone or in cluster to provide Remote Monitoring solution using secure VPN Connection to users. Configuration of these units can be done by easy to use interface and , can be configured by user themselves.

32 digital IOS and 32 analog Ios
Universal analog input and output capability
Alpha Node 17 is Capable of Handling 32 Digital Inputs which can individually configured to become digital outputs. This configuration can be done by user at the Hardware level in the field itself. These units have 16 channels of analog inputs which are capable to handle universal type of analog signals. Alpha nodes also have 16 analog outputs which can generate universal type of analog signals and can be configured by users.

State of the Art Design
Latest series of micro controller used along with advanced IC’s and Embedded components

Dual Chip controls - Micro controller and Computers coupled together
There are two layers of Hardware coupled together to make the system future proof.

Remote Monitoring access to users and ship owners
Highly configurable systems can be provided to ship owners for Monitoring real time data of all the machinery including audio and video of every corner of the ship.

Local Intelligence, Data Analytics and Edge Computing
All the nodes in a cluster work as per the roles assigned to them. Data Analytics and machine learning is built into the system at different levels.
Overview

- 1MB on-chip flash and 128KB on-chip SRAM.
- One THREE wire RS-232
- One isolated RS-485 Master serial port
- One 10/100Mbps Ethernet port
- 19 12-bit analog input channels (internal)
- Two 12-bit analog output channels (internal)
- 12 Digital relay output (NO/NC-CONTACT RATING 230VAC/5A)
- 12 Isolated Digital inputs (5-24v as Logic High)
- One isolated CAN ports
- One SD MMC
- One USB
- Led indication for All IO’s
- Two PWM channels
- One I2C
- 15 channel isolated RS422 Receiver
Programmable Remote IO Module

These units have 16 channels of analog inputs which are capable to handle universal type of analog signals. Alpha nodes also have 16 analog outputs which can generate universal type of analog signals and can be configured by users.

Programmable Controllers

These are the units which are built for rugged Industrial use also customized on the field by users to suit various applications which are complex in nature.

Upto 32 digital IO’s and upto 32 analog IO’s Universal analog input and output capability
Controllers are Capable of Handling 32 Digital Inputs which can individually configured to become digital outputs. This configuration can be done by user at the Hardware level in the field itself.

- ARM Cortex-M4 120MHz,
- FreeRTOS Programmable Remote I/O Module,
- 1 x RS-232, 1 x isolated RS-485 Master serial port,
- 1 x 10/100Mbps Ethernet port, 1 x isolated CAN port
**Programmable Remote I/O Module**

**ARM Cortex-M4 120MHz, FreeRTOS**

**Programmable Remote I/O Module:**
- 1 x RS-232, 1 x isolated RS-485 Master serial port, 1 x 10/100Mbps Ethernet port, 1 x isolated CAN port
- SAM4E16E ARM Cortex-M4 120MHz
- 1MB on-chip flash and 128KB on-chip SRAM.
- One three-wire RS-232
- One isolated RS-485 Master serial port
- One 10/100Mbps Ethernet port
- 19 12-bit analog input channels (internal)
- Two 12-bit analog output channels (internal)
- 12 Digital relay output
- 12 Isolated Digital inputs (5-24V as Logic High)
- One isolated CAN ports
- One SD MMC
- One USB
- One JTAG/SWD Debugger
- One SPI
- LED indication for all I/Os
- Two PWM channels
- One I2C
- 15 channel isolated RS422 Receiver

**1.2 Specification**
- CPU: SAM4E16E Cortex-M4
- 120 MHz

**Serial port:**
- RS-485 2500 Vrms isolated Master
- One RS-232 three wires
- Baud rate: 1200 to 921600 bps
- Data bit: 5 to 8
- Stop bit: 1 to 2
- Protection: 15KV ESD

**Ethernet:**
- 10/100Mbps, RJ45
- Protection: 1500V Magnetic isolation

**Mass Storage:**
- microSD socket inside x 1

**1.3 Packing List**
- Alfa Node: Programmable remote I/O module
- Manager Utility (download from MMPL web)

**External I/O module:**
- 1. NMEA
- 2. Digital IO module
- 3. Analog IO Module
- 2. IO Modules // expansion modules for stand-alone CPU Module //

**Isolation analog output:**
- No of channel: 16
- Output mode: Voltage / current
- Resolution: 12-bit
- Output range:
  - Unipolar: 0–5V, 0–10V
  - Bipolar: +/-5V, +/-10V
  - Current: 0–20mA, 4–20mA, 0–24mA
- Accuracy: +/-0.25% FSR (Voltage), +/-0.2% FSR (Current)
- Load resistance: 0–1K Ohm
- Isolation: 1500 Vrms

**Isolation digital input:**
- Channel number: 16
- Opto isolation: 2500 Vrms
- Logical High: 5–24Vdc
- Logical Low: 0–1.5Vdc

**Isolation digital output:**
- Channel number: 16
- Opto isolation: 3750 Vrms
- Logical High: 5–24Vdc
- Logical Low: 0–1.5Vdc

**Relay output:**
- Channel number: 16
- Contact rating: 24 Volt/1 A rating

**Power:** 9–48VDC power jack and terminal block
- Dimension: 107 mm x 150mm (WxD)
- Operating Temperature: 0–70°C
- Storage Temperature: -20–85°C

**Isolation PWM:**
- 2 PWM Channel
Fixed Gas detection System

Application
We have Designed state of the art product which is capable of monitoring various types of gases from various locations on-board ships at one centralized Hub. It is a smart and Highly flexible system where different gas sensors and pumps can be configured to suit owners requirements. We can integrate any type of gas sensors with our system.

Functionalities and Benefits
System can be configured to monitor one sampling point to more than N number as required by the ship owner. Usual application involves monitoring of ballast tanks, void spaces and other specific areas like pump room, accommodations, CCR, Foam room and bunker stations. System can be configured for all types of gas sensors and their specific scanning intervals. Gas alarms will be displayed on local HMI as well as Remote Monitoring stations. Additional functionalities are below,
- Monitoring Ballast Tanks, Void Spaces
- Monitoring dangerous areas for gas leakage
- Manual / Automatic Tank lines scanning
- %L.E.L. measuring and displaying with set point check.
- Gas alarms displaying and alarms acknowledgement
- High flow rate sampling pump
- Auto test at start-up
- Flow Fault alarm
- Pipelines purging feature
- Sensor cleaning/zeroing feature.
- Gas detectors calibration facility.
- Inhibition of wet sampling points.
**Integration with Existing systems**

System can also be configured for communication with SCADA or any alarm monitoring system on board. This system can also be customized to work as add-on to existing systems.

Real time Remote Monitoring as well as historical data with web access. Remote Access of the system for trouble shooting and maintenance.
### Technical Specifications

**Fixed Gas Detection System**

<table>
<thead>
<tr>
<th>Scanning</th>
<th>Scanning Suction method for the ballast tanks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring Gas</td>
<td>Hydro Carbons, Oxygen Detection Hydrogen Sulphide. (As per Application)</td>
</tr>
<tr>
<td>Measuring Range</td>
<td>0-100% LEL, 0-25% VOL</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Within ±5% of full scale</td>
</tr>
<tr>
<td>Alarm Setting</td>
<td>Adjustable (As per application)</td>
</tr>
<tr>
<td>Alarm Method</td>
<td>Lamp and buzzer, Alarm History (Optional)</td>
</tr>
<tr>
<td>Response Time</td>
<td>Approx. 30 sec from gas inlet of gas alarm panel</td>
</tr>
<tr>
<td>Gas alarm accuracy</td>
<td>±25% of alarm set point</td>
</tr>
<tr>
<td>Power Source</td>
<td>230V AC, 50/60Hz</td>
</tr>
<tr>
<td>Alarm contact output</td>
<td>Alarm and failure Contact</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0 to 60°C</td>
</tr>
<tr>
<td>Installation</td>
<td>Wall mount</td>
</tr>
<tr>
<td>Dimension</td>
<td>600(W)*300(H)*250(D)mm (Electrical), 600(W)*1050(H)*300(D)mm (Piping Arrangement)</td>
</tr>
<tr>
<td>Power consumption</td>
<td>10W</td>
</tr>
<tr>
<td>Standard Accessories</td>
<td>Valves, Pumps, Sensor are Standards.</td>
</tr>
<tr>
<td>Sampling Point scanning</td>
<td>Automatic and Manual.</td>
</tr>
</tbody>
</table>

### Sensor Specification

<table>
<thead>
<tr>
<th>Junction box material</th>
<th>Corrosion resistant alloy with polyester powder coating 316 Stainless Steel (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>156 x 166 x 111 mm (6.1 x 6.5 x 4.3 inches)</td>
</tr>
<tr>
<td>Weight</td>
<td>1 kg (2.2 lbs) Stainless Steel: 3.1 kg (6.8lbs) approx.</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>10-30 V dc</td>
</tr>
<tr>
<td>Current consumption</td>
<td>100 mA @ 10 V 50 mA @ 24 V</td>
</tr>
<tr>
<td>Output</td>
<td>4-20 mA Sink or Source (Selected by Links)</td>
</tr>
<tr>
<td>Fault signal</td>
<td>&lt; 3 mA</td>
</tr>
<tr>
<td>Maximum cable resistance:</td>
<td>40 Ohms @ 18 V (power) +ve terminal</td>
</tr>
<tr>
<td></td>
<td>450 Ohms @ 18 V (signal) sig terminal Relative to -ve terminal (common)</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40°C to +55°C (-40°F to +131°F)</td>
</tr>
<tr>
<td>Explosion protection</td>
<td>Flameproof</td>
</tr>
</tbody>
</table>
Overview
Sequence of Operation
1. Warm up Test: System will be in Idle State for 180 sec.
2. Purging Mode: All Valves Open for Fresh Air to Clean all the Pipelines for periodic cycle.
3. Sampling Mode: All the consecutive valves open and suck the gas from respective tanks through pump. Displays the percentage of gas concentration.
4. Calibration Mode: Span gas is applied to the sensor to calibrate the gas sensor.
Smart Diesel/Fuel Change Over System
For Marine Application

Application
Maritime Regulations imposed by IMO, National & Regional authorities Call for ships to burn low sulphur distilled fuel oils in emission controlled areas. Since this change over of fuel requires control on lubricity, viscosity, temperature, filtration and purification etc, this posses lot of operational challenges & difficulties during the change over.

One of the operational difficulties for ship staff & ship owners/managers is to decide the exact time of change over which will ensure compliance to various regulations & ensure engine manufactures recommendations for keeping the engines in safe operating condition.

This process posses compliance difficulties for ship owner & ship staff is to remember various emission controlled areas & its exact Geo-fenced location. Records of complete change over process & its various stages are difficult to record & are prone to errors.

Automated and Smart fuel change over system from Marine Mechanics. Smart & Automated Fuel change over system is a reliable system which can be fitted on any type of ship. This can be configured as a fully automated system, semi-automated system or completely manual change over system having functionality like on-board decision support system & Remote monitoring system.

Safety of Equipment & systems
This system takes care of Manufactures Recommendations & provides control over variations of fuel temperatures and viscosity. This saves the engine from thermal shock, vapor locks & various other problems arising due to incorrect change over procedure.

Integration with existing system
In the completely automated system advanced calculations are done with the help of GPS feed, Geo-fencing, voyage data, fuel consumption, fuel in-use & type of fuel to be used etc. Using this data system decides and provides notification to preparing the system for change over, after system is ready it gives notifications for actual change over to be initiated.

In a completely automated system actual change over are done with the help of actuators which are optional in semi-automated systems.

On a completely manual systems only the notifications & data logging is provided.

Functionalities & Benefits
Compliance with new regulations various emission controlled areas can be fed into the system remotely by means of Geo-fencing application. Based on the GPS feed to the system & destination, local notification for the ship staff & Remote notification for ship owner/Manager can be provided at preset intervals.
Key Components
We can custom build system for automatic change over with remote monitoring for any ship or systems. Following components will be selected as per the requirements.

Control systems and its components like Industrial grade PLC’s, HMI, Remote IO Module, Temperature Sensors, Mixing valve, Valve position sensors and Change over valves etc.

Self-learning system with user configurable settings
Initially settings will be provided as default values which can be configured to suit various types of ships and systems, depending on the usage and actual conditions recommendations for the new settings will be provided from remote.

Bio-metric Authentication (optional) for initializing the operation on board. Monitoring of complete logs like GPS Records, valve positions, authentication for initiations etc will be available in historical records for review.

Real time Remote Monitoring as well as historical data with web access Remote Access of the system for trouble shooting and maintenance.
Our Project team work with various sensor manufacturers to find most suited sensor for required application. We have recently built water in oil sensor with remote login, viewing and monitoring system for main engine, aux diesel engine, compressors, purifiers, storage tanks and various other machinery where water ingress poses threat to continuous operation.

Customization units can be built with or without local displays optional remote displays and optional remote viewing and data logging options.

Various configurations can be made by users for data logging interval alarm generating settings and historical logs.

All the units are built using industrial grade automation controllers and displays these are designed for rugged use and long service life.

Sensors to be identified in discussion with owners, makers and sensors manufactures to suit the required applications.

**Typical Sensor Overview**

Water In Oil Monitoring System

Capacitive Sensors provide the value of water activity without temperature corrections or oil-type calibrations.

A membrane of the sensor absorbs water molecules, which change its dielectric constant (i.e. a measure of the ability of a material to resist the formation of an electric field within it).

The absorption is proportional to the equilibrium relative humidity of oil, thus indicating the margin to saturation.

The Water In Oil Monitoring System generates an alarm at a Pre Alarm Value (PAV) of 0.5 aw or a Main Alarm Value (MAV) of 0.9 aw.
## Technical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td>PLC-Siemens S7 200/ any other PLC or Data Loggers</td>
</tr>
<tr>
<td>HMI Display</td>
<td>TFT color Siemens Display (optional)</td>
</tr>
<tr>
<td>I/O Module</td>
<td>Digital Input: 12 DI, Digital Output: 8 DO</td>
</tr>
<tr>
<td>Analog Input</td>
<td>6 AI,</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>230 VAC</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>5W (Typical Control system)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-15 C to +/- 70 C</td>
</tr>
<tr>
<td>Dimensions (WXHXD) mm</td>
<td></td>
</tr>
</tbody>
</table>
This is a Unique Product for Monitoring water ingress in Cargo Holds. We build complete control system with Remote viewing capability.

Sensor used in our system is of Hydrostatic type and designed to work in Harsh Environment. Units are designed for Pre-alarm as well as Main alarms.

Audio and Visual alarms are provided for each sensors discriminating between main and pre-alarm conditions. Further touch screen HMI’s (optional) can be integrated for ease of control.

Separate alarm for fault and power failures are provided.

Water Ingress Sensors can be remotely tested from Deck or Duct Keel using vacuum pressure procedure in case the hold is full with cargo and port state controls require testing.
Technical Specification

Controller : PLC - GE Versamax (IC200UDR064)
HMI Display : TFT color Siemens Display (optional)
Analog Input : 2 AI
Supply Voltage : 230 VAC
Power Consumption : 5W (Typical Control system)
Operating Temperature : -15°C to +/- 70°C
Dimensions (WXHXD) mm: 500mmX400mmX210mm
Barrier Boards (Type 1) : for isolation between hazardous and safe zone
Barrier Boards (Type 2) : configuration for prealarm and main alarm

Sensor Specification

Water Ingress Sensor : Hydrostatic Pressure Sensor
Power supply : 24 VDC nom
Output signal : 4 to 20 mA/Digital
Load : 0 to 600 Ohm (24 V)
Type of protection : Ip68
Operating temperature : -40 to +85 °C
Sensor housing Steel pipe : AISI 304, Ø = 60 mm, L = 190 m
Navigation Lights Panel

**Applications**
Navigational Light Control Panel is able to control and Monitor both AC and DC Navigational lamps. Units can be custom built to suit any type and size of marine vessel.

**Features**
MIMIC and Control Panel
With the help of switch user can turn the Navigational light ON/OFF. Control Panel generates alarm in the systems in case of lamp failures and system faults.

Customized MIMIC Panel
Fully Customizable MIMIC Panel can be made to suit project requirement.

**Additional Features**
Dual Power supply with auto change over option
Dimmer lamp test and buzzer stop functions.

**Modular Design for Maintenance and troubleshooting**
Serial communication port as optional
Custom Build Projects

Custom build Boiler control panel
We have been designing & building Boiler control Panels for various ships. As the project requires we integrate various Industrial grade PLC’s, PAC’s, Data Recorders, Sensors, Actuators and other electrical components. We also build & Repair the complete electrical panels as per maker specified electrical drawings. So far we have completed many projects for boiler control panels which requires partial or complete re-build of units.

Custom build IGG control system
We have been involved in repairs & maintenance of IGG Systems. We are capable to program various PLC units their troubleshooting, re-writing the ladder-logic programs and investigating false in the system. Team is also capable to work on various automation system related to IGG like automatic valve control, time-pressure monitoring system, combustion control & other electrical panels.

Custom Build Starter Panel
We Build Starter Panels for various Machinery and Applications, this involves the use of completely electrical panels as well as VFD Installation and configurations. We Build Compressor starter panels for upto three compressors with Start,Stop, Stand-by and Auto start functionality. It also includes various alarms and trips like High air temperature, low lube oil pressure and over-load. Auto stand-by is selectable along with lead/lag configurations.

Our Custom build panel are,
- DOL Starter
- Star Delta Panel
- AC/DC Soft starters
- VFD control panel
- Compressor Starter Panel
- PLC based control starter Panel
Bilge High Level Alarm

Application
These units can be fitted at any locations on board to monitor bilge level. Bilge Level Sensors can be of float type as well as vibration type. These level sensors can be fitted in fore peak store, paint store, Engine room bilges, Emergency fire pumps and steering gear room bilges etc. Control system can be customized to be installed in any locations. These units have options for alarm acknowledgement and alarm reset switches.

Further customization can be done to integrate one bilge sensor to many. Alarm customization can be done for individual bilge sensor to all sensors as a grove. The sensors and control system are designed to withstand the extreme environmental conditions in cargo hold, pump room and engine room.

Technical Specification
Principle: Electronics of LSV excites the piezo-electric-crystals inside tuning fork, which makes the fork tines vibrate at their natural resonance frequency in free air.
Accuracy: Within ±5mm
Alarm Display: Red Led and Hooter
Alarm Set level: High level
Alarm Function: When liquid level exceeds the set point which produce alarm and buzzer will come on
Other Alarm: Power alarm
Alarm Output: External relay contact
Power Source: 220V Ac,50/60Hz
Power Consumption: 6W max power

Sensor Specification (Vibration type)
1. Fast Switching Response 2 sec (0.8 sec and 1.5 sec available on demand)
2. "T" threaded mountings available
3. High pressure 15 bar forks
4. High Temperature up-to 250 °C available
5. Calibration-less operation
6. Remote electronics with std 10 meters cable length
7. Tropicalized & potted electronics module
8. Threaded & Flanged Mountings
9. Electronic Inserts support all requirements
10. Ingress protection: IP 68/66 (as per IS-13947)
11. Ex-proof (Ex d T6 IP-66 IIC ) - Flameproof as per IS/IEC 60079-1:2007 - Weatherproof (IP-66) as per IS/IEC 60529:2001 - Suitable for Gas Group : IIC - Suitable for Zone 1 & 2 atmospheres
Marine Mechanics is approved by all major classification societies (Class NK, ABS, BV, LR, IRS) to carry out GMDSS Radio surveys. Our Radio Inspectors are well experienced & can handle Installation, commissioning and maintenance of all Bridge Equipment and automation systems.
We carry out Installation, Commissioning, Maintenance & Repairs of all Marine Navigation & Communication systems.

We work with all makers and major distributors for sourcing of Equipments and spare parts.

**24x7 Technical Support Center for Remote troubleshooting**

On Agreement between Marine Mechanics & ship owners, Team will assign Relationship manager & will provide 24x7 Technical support. Team is well experienced and are in direct touch with various makers globally. In case of problem is reported Case-ID is created in the system and assigned to global service support team. In our Experience, more than 40% of reported problems have been resolved on E-Mail & Phone communications, resulting in substantial savings for ship owners.

**On-Board Attendance**

During the work, field engineers are in constant touch with our Control Center. This Control center continuously monitors the work and support them in all technical aspects. Spares and other required arrangements are mobilized on round the clock basis.

**Real Time Updates to Ship Owners**

We Establish a strong & prompt communication channel with ship owners to provide Real time updates for the work in hand.

Shortest turnaround Time Of Vessel Control center also liaise with ship owners, managers, agents and other stack holders for quick turn around time of vessel.

**Navigation & Communication System Health Check report**

Upon the request of shipowner, surveyors will review the health of all the bridge equipment during radio survey and separate report can be provided.

**GMDSS Shore-Based Maintenance Certificate**

Shore Based Maintenance Contracts (SBM) as required by SOLAS chapter IV reg.15. These are available for an annual fee and will include the following services:
- Database kept with details of each vessels equipment
- After hours service telephone contact 365 days/year.
- Emails monitored after hours.
- Database of global service stations for all major marine electronic manufacturers.

**New installations, Repairs and Maintenance**

We carry out installation, repairs and maintenance of bridge equipment and related automation systems.

Below is the list of Equipments,
- AIS
- AUTOMATIC BATTERY CHARGERS
- AUTOPILOTS
- BILGE ALARM SYSTEM
- ECHO SOUNDERS
- EPIRB
- GPS / CHART PLOTTERS
- GYRO COMPASS
- INMARSAT C
- INTERCOM / PA SYSTEMS
- LRIT
- MAGNETIC COMPASS
- MF / HF (SSB) RADIOS
- NAVTEX RECEIVER
- RADAR
- RUDDER ANGLE INDICATOR
- SART
- SATELLITE COMMUNICATIONS
- SHIP SECURITY ALERT SYSTEMS (SSAS)
- SIMPLIFIED VOYAGE DATA RECORDER (SVDR)
- SPEED LOG
- VHF RADIOS
- WALKIE TALKIES (HAND HELD RADIOS)
- WIND SPEED INDICATORS
Marine Mechanics engineers are trained to handle bridge equipments, various automation systems, repairs & calibration. Engineers ensure the products are working and calibrated to manufactures specifications and in accordance with relevant standards.

Upon completion of Test, Repairs and calibration, a calibration certificate is issued. We maintain extensive stock of spare parts to make one-stop solution provider for ships.
Majority of our work done in Maritime field involves below mentioned Systems,
- Boiler Panels
- IGG Systems
- Engine Remote Control
- Bridge Control
- Alarm Monitoring systems
- Safety Systems
- Rudder and Propeller controls
- Cargo Control systems
- Lift controls
- Fire alarm systems
- Switchboards
- Voltage regulators

We Deal with various types of system integration and automation projects. We work with various types of PLC, PAC, SCADA, Data Recorders and all types of Electrical systems. We undertake custom built projects. Our Capabilities include troubleshooting repairs, Installations and system integration.

**Custom build Boiler control panel**
We have been designing & building Boiler control Panels for various ships. As the project requires we integrate various Industrial grade PLC’s, PAC’s, Data Recorders, Sensors, Actuators and other electrical components. We also build & Repair the complete electrical panels as per maker specified electrical drawings. So far we have completed many projects for boiler control panels which requires partial or complete re-build of units.

**Custom build IGG control system**
We have been involved in repairs & maintenance of IGG Systems. We are
capable to program various PLC units their troubleshooting, re-writing the ladder-logic programs and investigating false in the system. Team is also capable to work on various automation system related to IGG like automatic valve control, time-pressure monitoring system, combustion control & other electrical panels.

Programming of PLC’s (Programmable Logic Controllers), PAC’s (Programmable Automation Controller)
Team is well-versed in programming and Troubleshooting various PLC’s & PAC’s like AB (Allen Bradley), Siemens, Mitsubishi, GE (General Electric), Omron & Delta etc.

SCADA (Supervisory Control And Data Acquisition)
Team is well-versed in Designing and integrating SCADA systems with various types of PLC, PAC and other controller for centralized PC based monitoring and controls. We primarily work with Wonderware Intouch and Cimplicity (GE) SCADA Systems.

Data loggers / Data Recorders programming and Installations
We Do Programming for various Data loggers and Data recorders which includes Eurotherm, ABB and Fuji etc.

PCB Repairs
We have Team of competent professionals who are involved in various types of PCB Repairs.

Custom Build PCB Design and Manufacturing
Our Engineering and Design Team is involved with designing of Data loggers, Data recorders, PLC’s, PAC’s, Current and voltage sensing modules and etc. We can customize our designs to suit various types of products requirements. So far we have built lighting control panel, Navigation light panel, Specific Remote I/O Module, Gas Detection system module, water Ingress alarm system module, Fire alarm panel and Voyage Data Recorder etc.
We are Importers, Suppliers, Stockist and Exporters of all types of Marine Spare parts. We have a strong trading team who can source spares from all over the Manufactures and suppliers across the globe. Our Team is Specialized for Marine Diesel Engine, Auxiliary engine, Engine room auxiliary machinery, Purifiers, Compressor, Marine Boilers and Deck Machinery Equipment. As per the Customer Requirement team can propose genuine and under licensed(OEM) in Japan, Korea, China, Europe and India. We have a strong network for spare sourcing, logistics and Delivery.

This Team is supported by a team of engineers who do the regular work in the field of Navigation and Automation. In case of requirement team can propose complete end to end solution for Marine projects.

Our office is located at India, UAE, Korea, China, Japan and Singapore. We are supplying numerous ship-owners as well as ship management companies worldwide with various spare parts related ship's stores.

Our long-term association with most reputed and reliable suppliers, manufacturers across the globe helps us in sourcing the best quality goods at the most economical prices.

- Air Compressor
- Anchors & Chains
- Boiler
- Deck Crane & Grab
- Davits
- DIESEL ENGINES
- Electric motor
- Electrical Instrument and Automation
- Filters
- Fire Alarm Detector
- Fresh Water Generator
- Galley Equipment
- Gangway Ladder & Winch
- GENERATORS
- GOVERNORS
- Hatch Cover
- Heat Exchanger
- Incinerator
- Life-saving Apparatus
- M/E Auxiliary Blower
- Main Engine & Auxiliary Engine
- MGPS/ICCP/Anti-fouling/Shaft Earthing Device
- Navigation & Communication Equipment
- Oily-water Separator
- Pumps
- Purifier
- Refrigeration and Air Conditioning
- Sewage Water Treatment Plant
- Steering Gear
- Turbocharger
- Valves
- Water Ingress Alarm System
- Windlass & Mooring Winch
Aalborg Industries Co., Ltd.
Akasa Diesel
Alfa-Laval
Atlas Copco Energas GMBH
Bauer Kompressoren GMBH/ITS Ltd.
Boll & Kirch
Carrier Air Conditioning Ltd.
Caterpillar
Daeho Flow Instruments Co., Ltd.
Daeyeang Electric
Daeyeang Electric Supply Co., Ltd.
Daihatsu Diesel
DaKIN Kogyo Co., Ltd.
Daio Pump Kogyo
Desmi
Dongwha Entec
Ebara
Fuji Diesel
Fuji Electric
Fujita Iron Works, Ltd.
Fujita Seisakusho
Fukushima Ltd.
Hamworthy Engineering Ltd.
Hanshin Diesel Works
Hatapa Uetersener Maschinenfabrik
Heishin Engineering & Equipment
Heishin Pump Works
Hi - PRES Korea Co., Ltd.
Hisaka Works
Hitachi Shipbuilding & Engineering
Hitachi Zosen Diesel Service Corp.
HSD Engine
Hyundai Engin
Hyundai Precision & Engrg Co., Ltd.
Ingersoll-Rand, Ltd.
Ishii Machinery Works
Ishikawajima-Harima Heavy Industries
Japan Steel Works Ltd.
Jonghap Compressors
Jowa Marine Groups AB
Kamui
Kangrim Industries Co., Ltd.
Kashiwa
Kawasaki Heavy Industries Ltd.
Keystone Valve
Keystone Valve Korea
Kitagawa Iron Works Co., Ltd.
Kobe Diesel
Kobe Steel Ltd.
Kokosha
Kosaka Laboratory
Kumata Industry
Kyungwon Century Co., Ltd.
MacGregor-Kayaba, Ltd.
Makita Diesel
Matsubara Iron Works, Ltd.
Meiyo Electric
Mitsubishi Electric
Mitsubishi Heavy Industries Ltd.
Mitsubishi Kakoki Kaisha
Mitsui Deutz Diesel Engine Co., Ltd.
Mitsui Engineering & Shipbuilding Co., Ltd.
Miura
MRC (Merine Radio Co., Ltd.)
Musashino Engineering Works
Nakakita Seisakusho
Namiire
Naniwa Pump
Niigata Engineering Co., Ltd.
Nippon Controls Co., Ltd.
Nippon Pumps Co., Ltd.
Nippon Sabroe Co., Ltd.
Nishinsha Electric
Nissin Refrigeration & Engineering
Nitto Valve Co., Ltd.
NK Co., Ltd.
Ohama Iron Works Co., Ltd.
Oriental Precision & Engrg Co., Ltd.
Osaka Blower Mfg. Co., Ltd.
Osaka Boiler
Peiner Maschinen Und Schraubwerk
Saacke Japan Tratec Ltd.
Sabroe Marine
Saginomiya Seisakusho
Samgong Co., Ltd.
Samgun Century Co., Ltd.
Sasakura Engineering Co., Ltd.
Sauer, J.P. & Sohn Maschinenbau GMBH
 Sekigahara Seisakusho
 Shin Nippon Machinery Co., Ltd.
 Shin Shin Machinery
 Shinko Electric Co., Ltd.
 Shinkokinzu Industries
 Shin-Nippon Air Conditioning Ltd.
 Sihl GMBH & Co. KG
 Sperre MeK Verkedt A/S
 STX Man B&W Engine
 Suction Gas Engine Mfg. Co., Ltd.
 Sumitomo Heavy Industries
 Sunflame Co., Ltd.
 Taiko Kidai Industries
 Taiyo Electric
 Tanabe Pneumatic Machinery Co., Ltd.
 Teikoku Machinery Works Ltd.
 Thune Eureka A/S
 Tobu Juko K.K.
 Tokyo Kikai Service Co., Ltd.
 Tokyo Sensen Kikai Seisakusho Co., Ltd.
 Tortoise Engineering
 Toyo Engineering Works, Ltd.
 Tsujl Industries Co., Ltd.
 Ueda Iron Works
 Ushio Reinetsu
 Utsuki Keiki
 Volcano Co., Ltd.
 Wartsila Diesel
 Wilden Pumps
 Woodward Governor
 Yamashina Seiki Co., Ltd.
 Yamatake Honeywell
 Yammar Diesel Engine Co., Ltd.
 Yokogawa Hokushin Electric
 York Division, Borg-Warner Ltd.

**Personal Protective Equipment**

Our In-house Team is sourcing PPE of Highest Standard which are approved and Certified to be used on all type of vessels including dangerous cargo carriers. Our Team maintains strict control on quality.

Safety shoes of S3 Standards involves shock absorbent Heel, Steel toe cap, water repellent upper, Padded collar, Low ankle, HI-Viscosity tape on sides, water proof leather upper, Anti slip sole, Steel Mid-sole, Oil/fuel, grease and Weak acids/alkali resistant sole. Heat resistant 120°C for 1 minute and Anti-static properties.

Boiler Suit Standard custom color options, Composition of Fabric: High quality 2x2 100% Cotton Fabric, Fabric will be pre-washed at 40Degr to reduce shrinkage. Allowance in stitching shall be provided to ensure that minimal effect on the sizing of the boiler suit. Hemming and Double stitching, Velcro tape on pockets, Collar Hook Loops, Bar Tagging at stress points in Black Colour, Logo: as agreed, High Grade Zippers, Anti-static boiler suits with label, Washing instructions label will be stitched near the Collar Hook loop, RR Tapes as required.
Innovation, Engineering and Design Centre

We Work with ...
Anyone who wants to contribute. They are Industry Experts, Technology companies, Maritime professionals, Manufactures, Designers, Engineers and Subject matter Experts.

We Design Products with...
Human & Environment Centric approach

we work to ...
Solve Real life problems
Make the Ships Safer

All in all, we are a group of passionate people who are Redefining the Maritime Industry.