

HANLA IMS is a leading company with the challenging mind.

*3B Package Solution*  
**EcoGuardian™**  
BALLAST WATER TREATMENT SYSTEM



**HANLA**  
IMS  
since 1989 **Ballast Specialist**

# INTRODUCTION

## General Information

Hanla IMS Co.,Ltd has developed eco-friendly EcoGuardian™ system for treating Aquatic Invasive Species in a ship's ballast water. Treatment method is side-Stream type which enables the system to be remotely installed away from the ballast lines. The EcoGuardian™ system can be installed separately by unit. So relocation of other equipments and additional engineering can be minimized.



| Division                     | Description  |
|------------------------------|--|
| <b>Treatment Method</b>      | <ul style="list-style-type: none"> <li>◆ Ballasting<br/>Filtration + Electrolysis (Side-stream)</li> <li>◆ De-ballasting<br/>Neutralization</li> </ul> |
| <b>Biological Efficiency</b> | Compliance with IMO D2 performance standard  |
| <b>Operation Mode</b>        | Automatic / Manual operation by remote control(option)   |
| <b>Operation H/W, S/W</b>    | Human Machine Interface(HMI), Touch Screen   |
| <b>Utility Required</b>      | <ol style="list-style-type: none"> <li>Control air (6~7kgf/cm2) for pneumatic valves</li> <li>Fresh water for rectifier cooling</li> </ol>             |
| <b>Installation type</b>     | 1. Skid mounted / 2. Containerized / 3. Separate   |

## Type and Dimention (Detail dimension will be changed on a case by case basis)

| Model     | Capacity [m³/h] | Foot print (m²) / Weight (ton) |             |           |           |           |             |
|-----------|-----------------|--------------------------------|-------------|-----------|-----------|-----------|-------------|
|           |                 | AFU                            | ECU         | NEU       | SIU       | HEU       | SUM         |
| EG0130    | 130             | 0.6 / 0.5                      | 2.7 / 1.5   | 0.9 / 0.3 | -         | 0.4 / 0.1 | 4.8 / 2.5   |
| EG0130-Ex |                 |                                |             |           | 0.6 / 0.2 |           | 5.6 / 2.8   |
| EG0250    | 250             | 0.6 / 0.6                      | 2.7 / 1.7   | 1.0 / 0.4 | -         | 0.4 / 0.1 | 4.9 / 2.9   |
| EG0250-Ex |                 |                                |             |           | 0.6 / 0.3 |           | 5.7 / 3.3   |
| EG0350    | 350             | 0.8 / 0.9                      | 2.7 / 1.7   | 1.4 / 0.5 | -         | 0.4 / 0.2 | 5.5 / 3.3   |
| EG0350-Ex |                 |                                |             |           | 0.7 / 0.3 |           | 6.4 / 3.7   |
| EG0500    | 500             | 0.9 / 1.2                      | 3.3 / 1.8   | 1.7 / 0.6 | -         | 0.6 / 0.3 | 6.2 / 3.8   |
| EG0500-Ex |                 |                                |             |           | 0.7 / 0.3 |           | 7.1 / 4.2   |
| EG0800    | 800             | 1.5 / 1.7                      | 3.9 / 2.3   | 2.1 / 0.7 | -         | 0.7 / 0.3 | 7.7 / 4.9   |
| EG0800-Ex |                 |                                |             |           | 0.8 / 0.4 |           | 8.7 / 5.4   |
| EG1000    | 1000            | 1.8 / 2.1                      | 4.1 / 3.7   | 2.1 / 0.7 | -         | 0.7 / 0.3 | 8.6 / 6.8   |
| EG1000-Ex |                 |                                |             |           | 0.8 / 0.4 |           | 9.6 / 7.3   |
| EG1500    | 1500            | 2.8 / 3.1                      | 6.2 / 4.0   | 2.1 / 0.7 | -         | 0.7 / 0.4 | 11.7 / 8.1  |
| EG1500-Ex |                 |                                |             |           | 1.0 / 0.5 |           | 12.9 / 8.7  |
| EG2000    | 2000            | 3.5 / 4.3                      | 7.2 / 4.4   | 2.1 / 0.7 | -         | 0.7 / 0.4 | 13.6 / 9.8  |
| EG2000-Ex |                 |                                |             |           | 1.3 / 0.6 |           | 15.1 / 10.5 |
| EG2600    | 2600            | 3.9 / 4.9                      | 7.2 / 5.0   | 2.1 / 0.7 | -         | 0.7 / 0.4 | 14.0 / 11.0 |
| EG2600-Ex |                 |                                |             |           | 1.3 / 0.8 |           | 15.5 / 11.9 |
| EG3000    | 3000            | 4.6 / 6.1                      | 7.6 / 5.6   | 2.1 / 0.7 | -         | 0.7 / 0.4 | 15.1 / 12.8 |
| EG3000-Ex |                 |                                |             |           | 1.7 / 0.9 |           | 17.0 / 13.8 |
| EG4000    | 4000            | 5.1 / 7.0                      | 9.3 / 7.2   | 2.1 / 0.7 | -         | 0.7 / 0.4 | 17.4 / 15.3 |
| EG4000-Ex |                 |                                |             |           | 1.9 / 1.0 |           | 19.5 / 16.4 |
| EG5200    | 5200            | 7.8 / 9.8                      | 11.6 / 9.6  | 2.1 / 0.7 | -         | 0.7 / 0.4 | 22.4 / 20.6 |
| EG5200-Ex |                 |                                |             |           | 2.0 / 1.1 |           | 24.6 / 21.8 |
| EG6000    | 6000            | 9.2 / 12.2                     | 12.8 / 10.3 | 2.1 / 0.7 | -         | 0.7 / 0.4 | 25.0 / 23.7 |
| EG6000-Ex |                 |                                |             |           | 2.8 / 1.1 |           | 28.0 / 24.9 |

\* N : Normal condition (20 °C, 30 PSU)

# COMPONENT

## AFU Auto Filter Unit

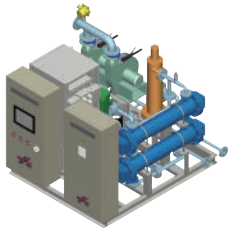
Basket Screen Type  
Capacity : 130 ~ 4,000m³/hr  
Differential pressure



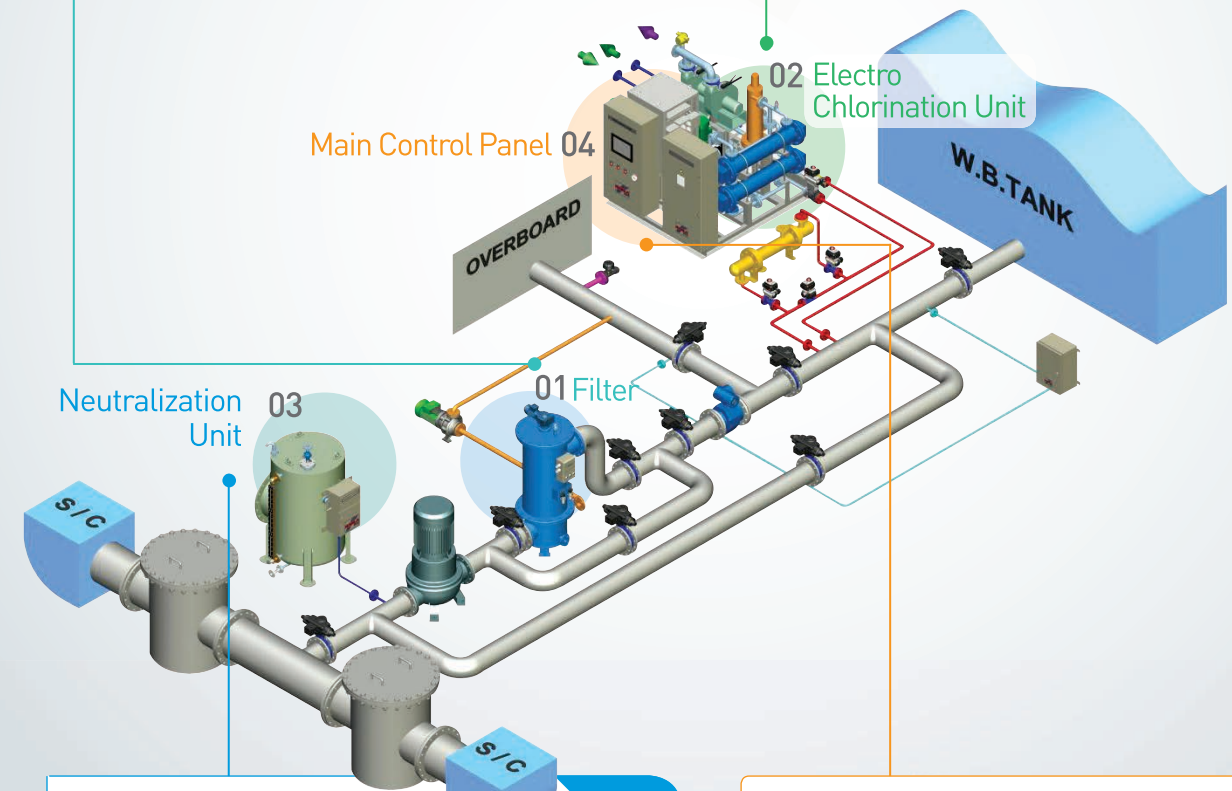
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## ECU Electro Chlorination Unit

Solution :  
Sodium hypochlorite (NaOCl)  
Capacity : 130 ~ 6,000m³/hr  
H2 Treatment :  
Separate by degassing system



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## NEU Neutralization Unit

The de-ballast water is neutralized by the NEU prior to discharging overboard with the least amount of sodium thiosulfate through monitoring of TRO unit.



03

## MCP Main Control Panel

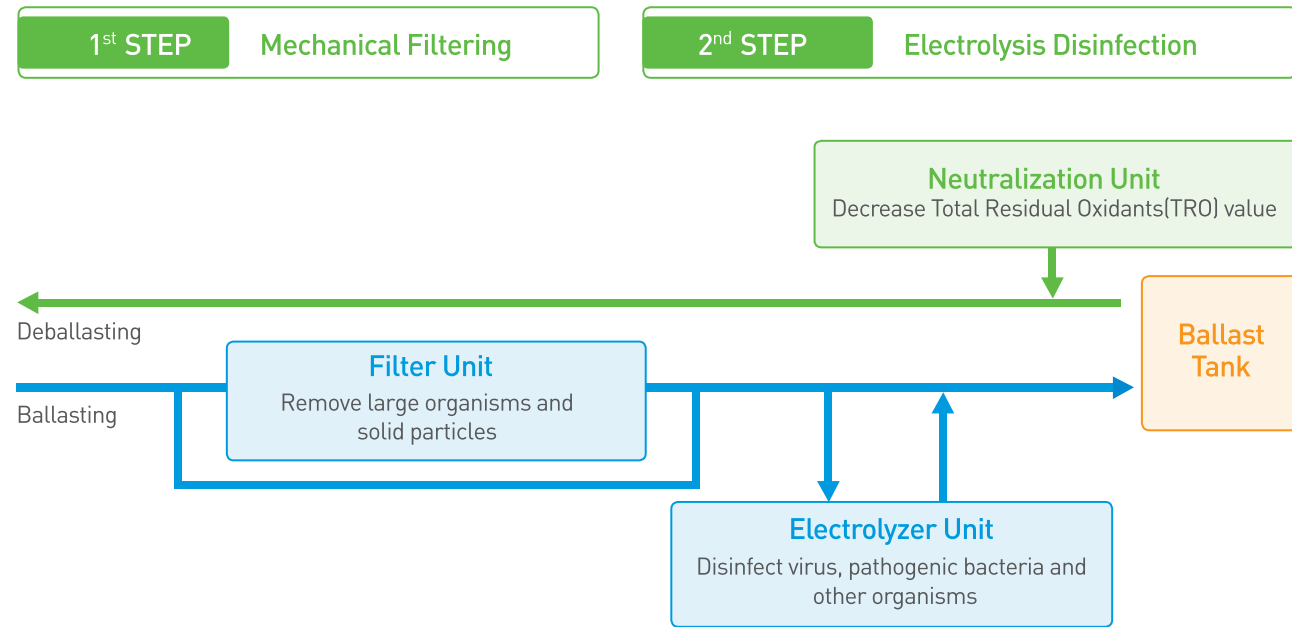
A control system consists of a main control panel and Human Machine Interface (HMI). It helps a user operate and control EcoGuardian™ in an easy and simple way.



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# PROCESS

EcoGuardian™ is based on the principles of pre-filtration and electrolysis.



## Advantage

- 1/ Simple & Easy Installation
- 2/ Minimum modification of existing ballasting main line
- 3/ Effective even in the turbid water
- 4/ No corrosion to hulls & pipings
- 5/ No stock of dangerous chemicals
- 6/ Cost-effective by Hanla package solution
- 7/ Effective disinfection
- 8/ Low maintenance cost



- ✦ **Ballasting**  
Precise Filtration  
; Filtration + Electrolysis (Side-Stream)
- ✦ **Deballasting**  
Reliable Neutralization  
; Real-time monitoring by TRO sensor through Hanla Integrated ballast control system.

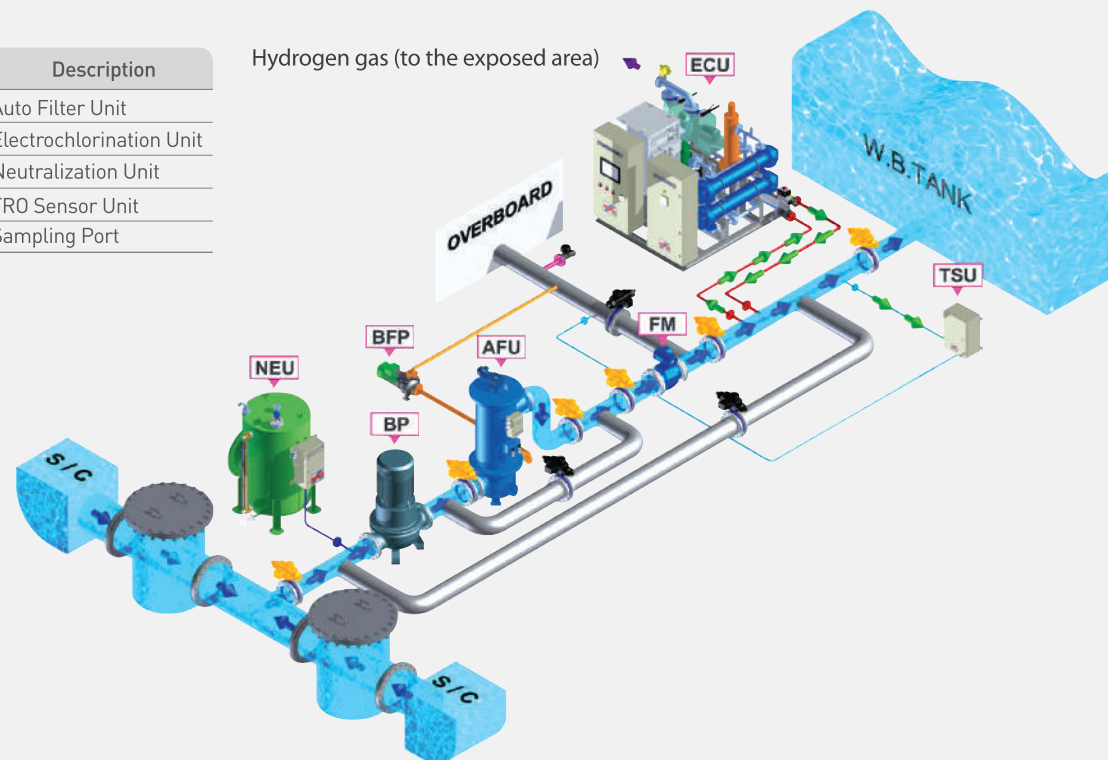
## EcoGuardian™ Key Features

- Automatic backflushing filter unit removes large organisms
- Automatic backflushing operation starts when the pressure difference between the water inlet and outlet reaches a certain value;
- The side stream of the ballasting water goes through the electrolysis unit that generates the high concentration of TRO (Total Residual Oxidants). The concentrated stream is then injected back to the main ballasting line;
- Electrolysis unit (including electrolytic cells, rectifier/transformer, booster pumps, conductivity sensor and degassing devices) produces sodium hypochlorite solution in situ which disinfects the residual planktons, pathogens, larva or spores;
- Neutralization unit adds sodium thiosulfate solution into the treated ballast water to neutralize the residual TRO during de-ballasting;
- Control system including PLC, HMI and auxiliary equipment

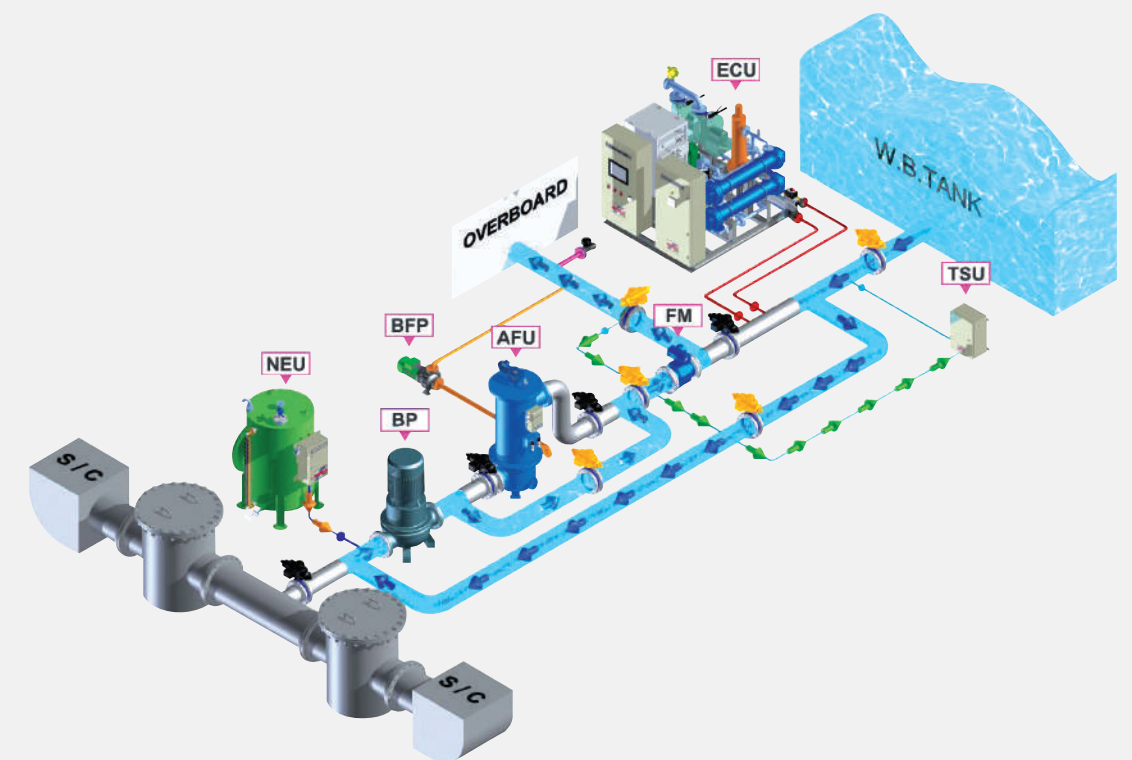
## BALLASTING

| Abbr. | Description              |
|-------|--------------------------|
| AFU   | Auto Filter Unit         |
| ECU   | Electrochlorination Unit |
| NEU   | Neutralization Unit      |
| TSU   | TRO Sensor Unit          |
| SP    | Sampling Port            |

Hydrogen gas (to the exposed area)



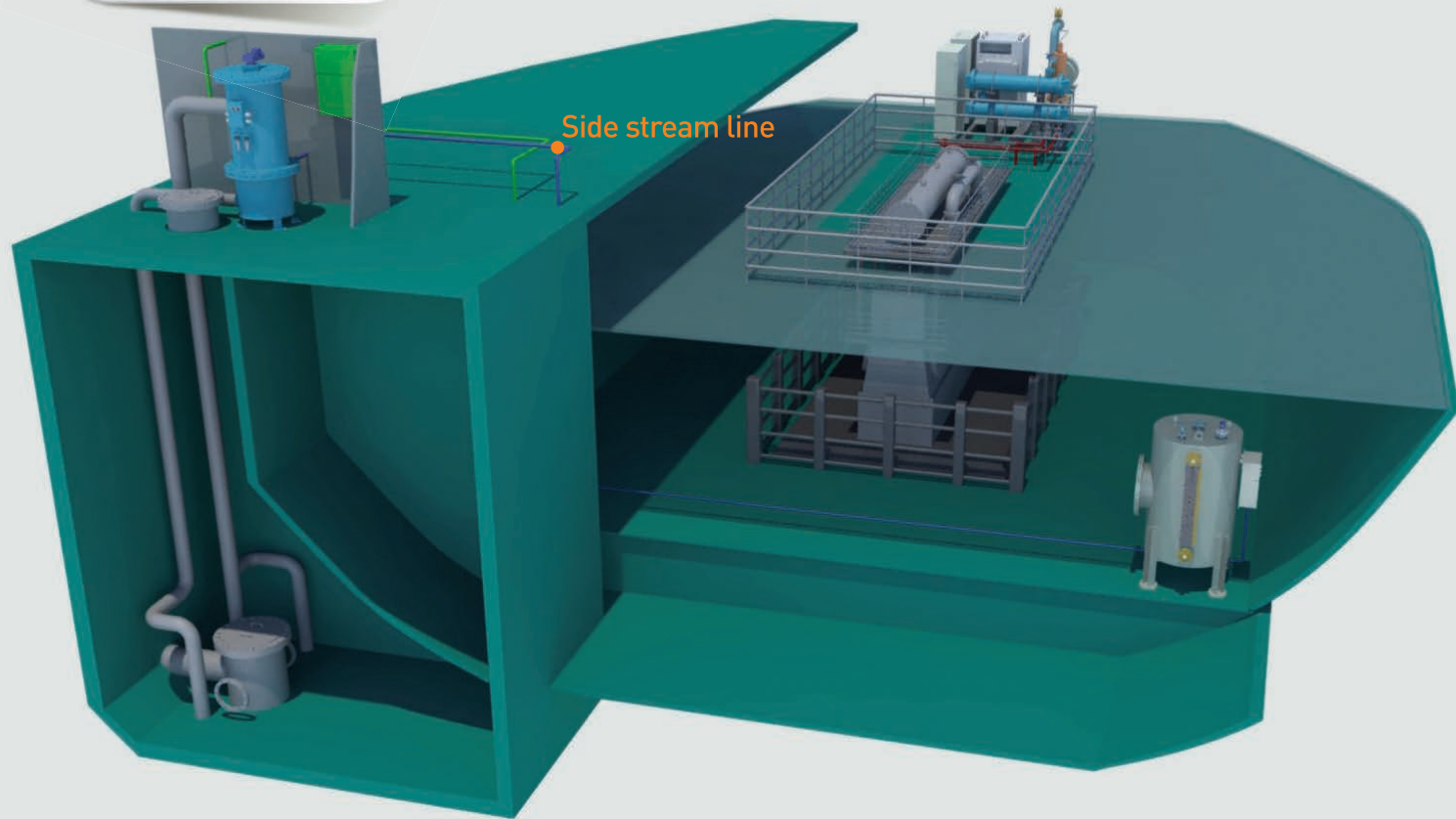
## DE-BALLASTING



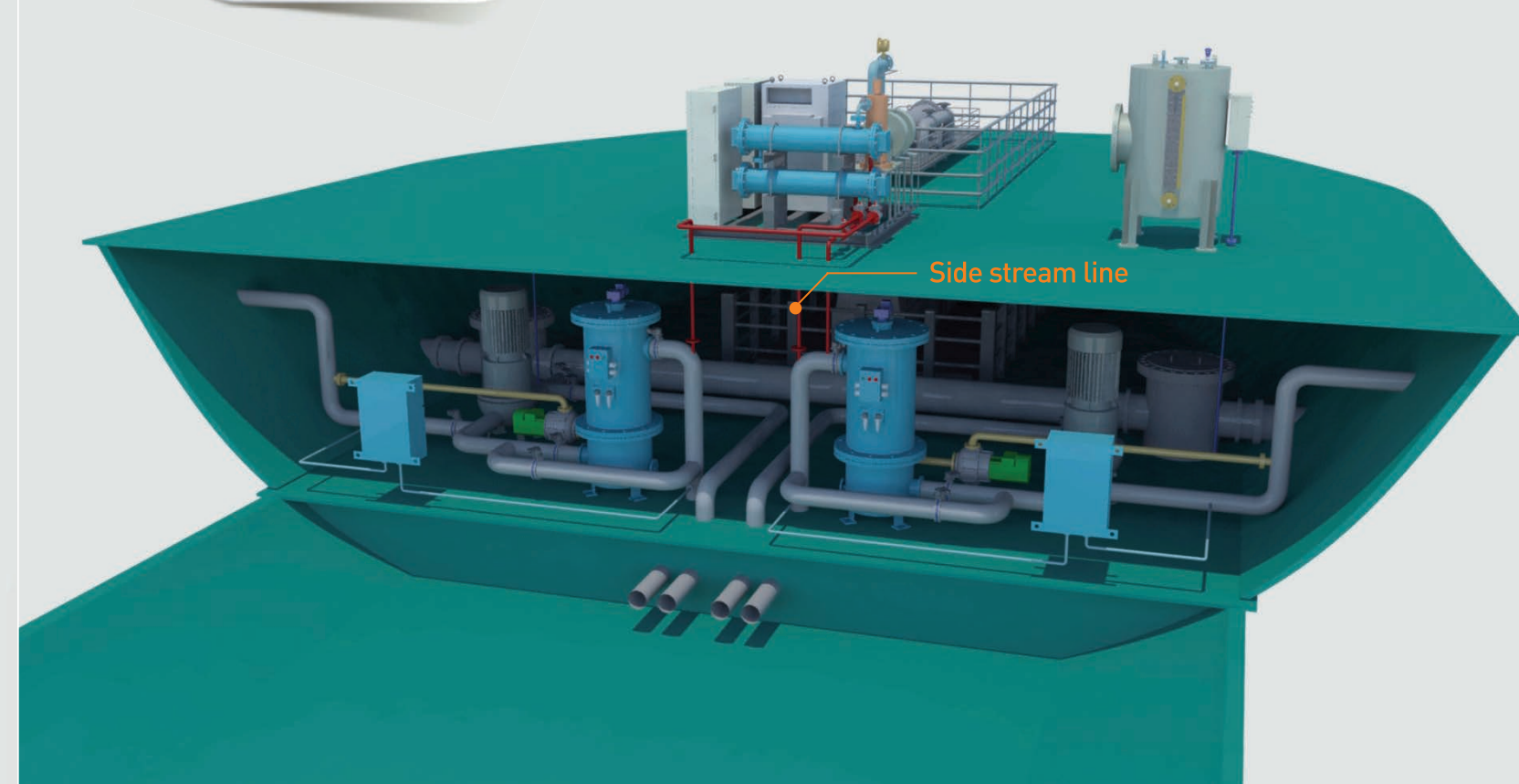
# INSTALLATION SOLUTION

This sideline type electrolysis system can be constructed in a small size. Also due to the characteristics of system which uses active substance as disinfectant, our system can be easily modularized and scalable. So our system can be installed easily with low cost even in retrofit. In some cases if needed, our system can be seated on the skid mount or containerized for easy transportation and installation.

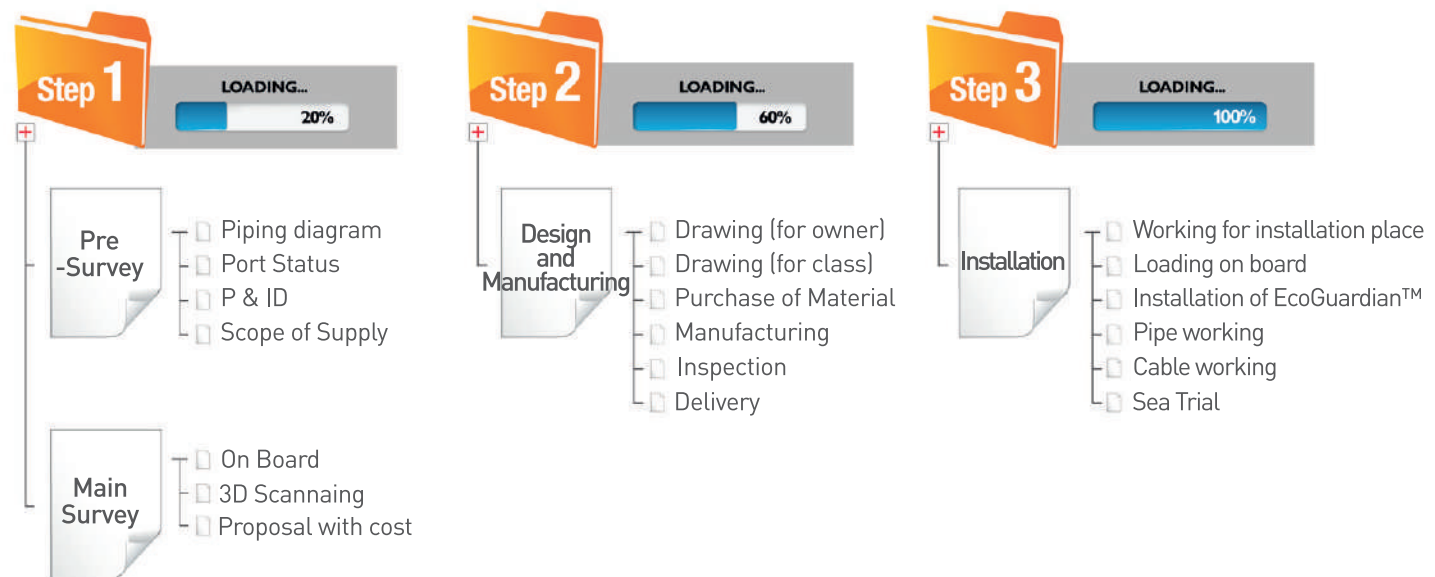
## Submerged pumps



## Pump room



## Retrofit Solution



## Approval Status

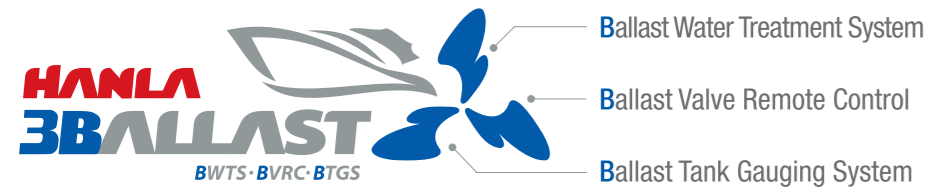


(under progressing)



**HANLA** is the only company which can provide "Integrated Triple Ballast Package Solution" developed by our own technologies throughout the world

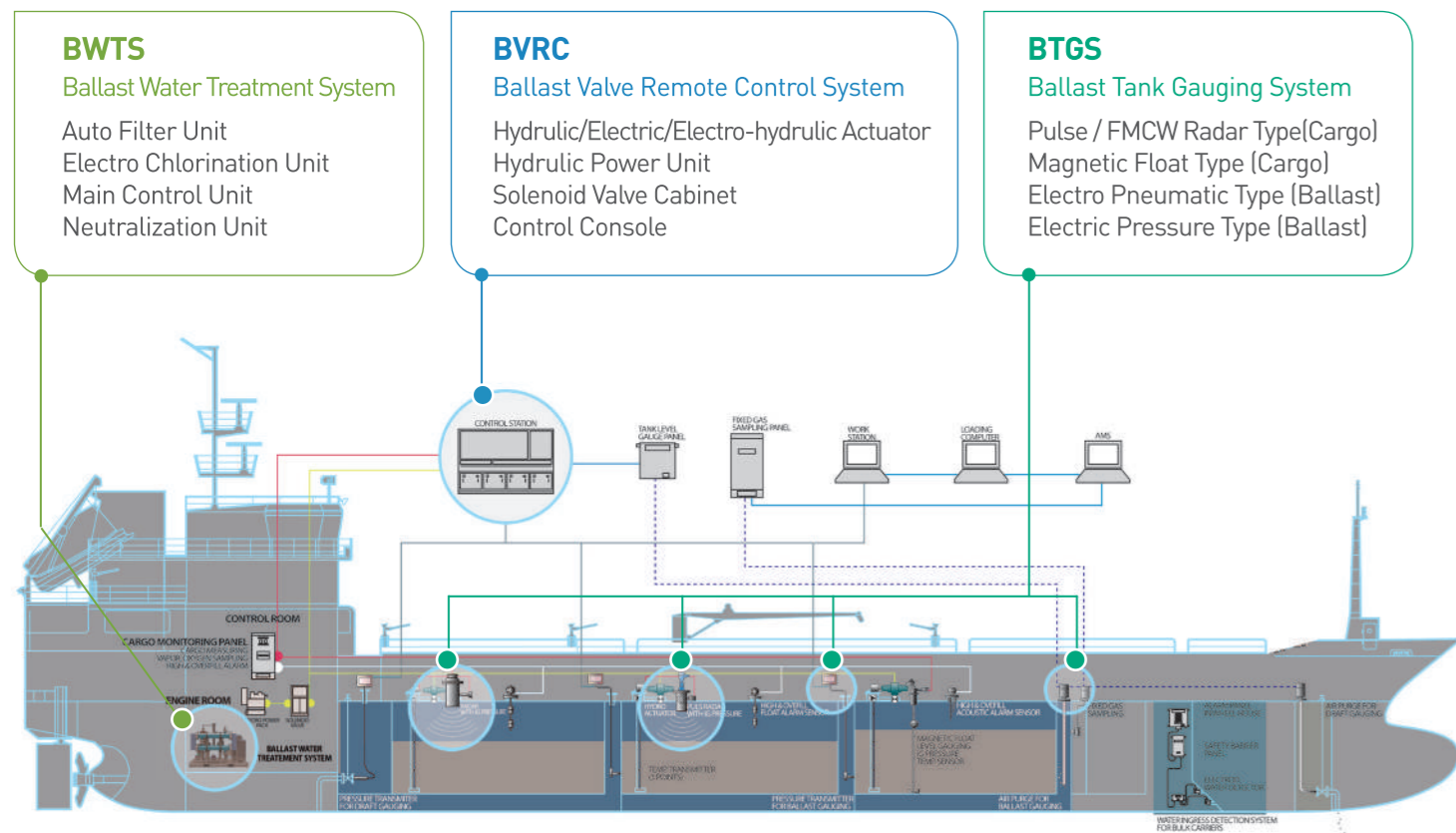
World Best



- Ballast Water Treatment System
- Ballast Valve Remote Control
- Ballast Tank Gauging System



Optimized process solution that integrates a wide range of marine systems based on Hanla's advanced technologies



# 3BALLAST™ PACKAGE SOLUTION

Since starting a business in marine equipment industry in 1989, we "HANLA IMS" have supplied reliable products to customers for over 26 years. Based on these 26 years experiences, Loading Computer, Tank Monitoring System, Valve Remote Control System, Ballast Water Treatment System (BWTS), LED Lighting have been developed by our own technologies and we have been continuously growing up to become the best company in this field.

Now, as a specialist of Total Ballast System Line Up, all of our staff are going to run more faster with the 3B in their mind. This 3B is our new campaign logo to introduce that we "HANLA IMS" is a specialist of Total Ballast System Line Up.

3B ballast package solution has been created based on the highest customer satisfaction and we are committed to providing the best service to our customers with cost-effective optimal system. The 3B means not only Ballast Water Treatment System, Ballast Valve Remote Control System, and Ballast Tank Gauging System but also Best quality, Best technology and Best service.

## How can the Hanla 3BALLAST™ package solution operate systematically?

Each of 3B System communicates through an integrated ballast control console by Dynamic-A.

### 1B BWTS - BVRC

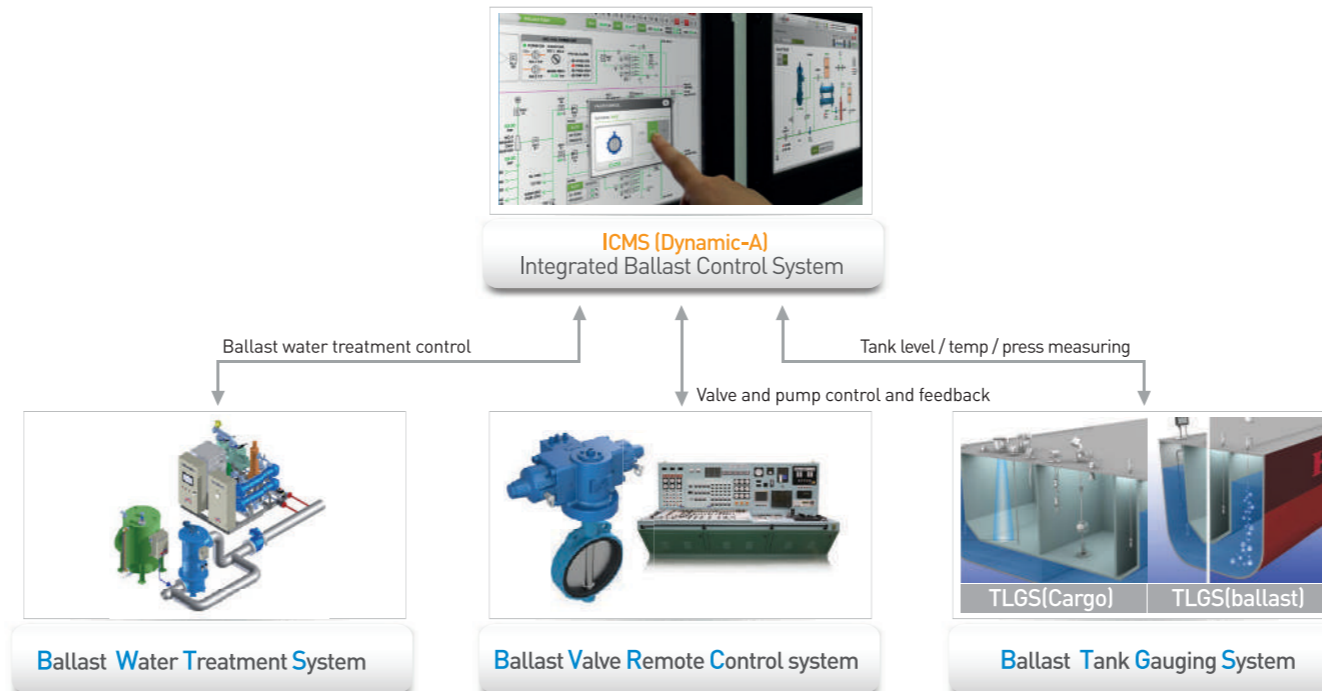
When ballast water treatment system (BWTS) operates, a ballast control console displays operating status of BWTS. During the treatment, all of the valves can be controlled by the ballast valve control system in accordance with progression of BWTS.

### 2B BVRC - BTGS

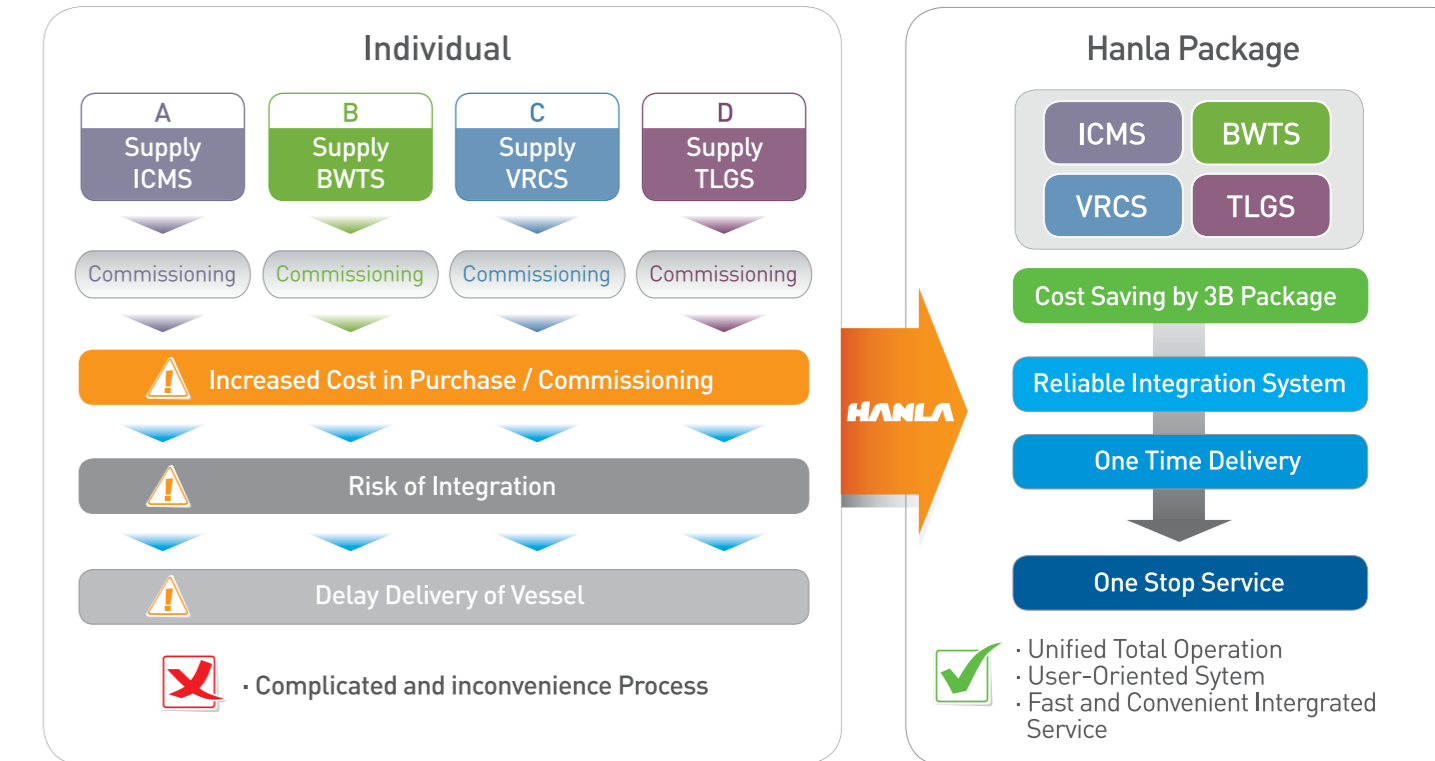
When treated ballast water flows into ballast tanks, the level of ballast tanks is measured and monitored by the ballast gauging system. And then, its signal goes to the ballast control console. It helps a decision by the signal to open or close of valves.

### 3B BTGS - BWTS

When the level of ballast tanks becomes maximum height, ballast control console transfers a signal to BWTS for a stop. Before BWTS starts, ballast gauging system monitors the level of ballast tank.



## What is the difference of the HANLA's 3BALLAST™ ?



Optimized 3BALLAST™ Solution is the answer and we provides the most perfect integrated system.

### VRCS

- Hydraulic type
- Pneumatic type
- Electric motor type
- Electro-Hydraulic type
- Control Console
- PLC Control
- I.S. Type Sol.valve Cabinet

### TLGS

- Cargo Monitoring System
- Ballast & Draft Gauging System
- Gas Sampling/Detection System
- Independent High Level Alarm System
- Vapour Emission Control System
- Water Ingress Detection System
- Loading computer & ICMS
- Instruments



### BWTS

- Electrolysis type
- Side-Stream type
- Neutralization unit