



Simple
Safe
Smart

BALLAST WATER TREATMENT SYSTEM

GloEn-Patrol™

ENGLISH

PANASIA

PANASIA CO.,LTD.

Global Leader in Smart & Green Technology

- Since 1989



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Establishment

Oct. 10th, 1989

Business Categories

- Ballast Water Treatment System (BWTS)
- De-SOx System
- De-NOx System
- Measurement and Control System
- Fuel Gas Supply System (FGSS)
- Hardware In the Loop (HIL) Simulation
- Marine Satellite Control System (MSCS)
- Total Engineering Service

Achievement in PANASIA

<p>2019. Apr.</p> 	<p>IR 52 Jang Young Sil award * (16week's) - De-SOx System</p> <p><small>* The award given weekly in the name of the Minister of Science and Technology is so widely recognized to be one of the highest for innovation in Korea that even the general public can approve the value of the award.</small></p>	<p>2015. Jan.</p> 	<p>Grand prize of technical commercialization from Research & development special zone</p>	<p>2012. Dec.</p> 	<p>Korean world-class Product</p>
<p>2016. Mar.</p> 	<p>IR 52 Jang Young Sil award * (11week's) - MEGA UV</p> <p><small>* The award given weekly in the name of the Minister of Science and Technology is so widely recognized to be one of the highest for innovation in Korea that even the general public can approve the value of the award.</small></p>	<p>2014. Jun.</p> 	<p>World Class 300</p>	<p>2011. Aug.</p> 	<p>IR 52 Jang Young Sil award * (32week's)</p> <p><small>* The award given weekly in the name of the Minister of Science and Technology is so widely recognized to be one of the highest for innovation in Korea that even the general public can approve the value of the award.</small></p>
		<p>2013. Dec.</p> 	<p>Gold tower order of industrial service merit at 2013 Korea Technology</p>	<p>2010. Dec.</p> 	<p>Bronze award at 2010 Korea Technology Awards</p>

GloEn-Patrol™

Ballast Water Treatment System

- Filtration & UV Irradiation



▲ Test barge

With experiences specializing in shipbuilding industries and skilled people understanding the characteristics of shipping industries, PANASIA came up and provided the **easiest, safest, and simplest solution for ballast water treatment system** based on effective filtration and UV irradiation since 2010 when acquired its type approvals. This technology has been proved and widely used to disinfect the harmful organisms in the ballast water without producing any toxic substance.

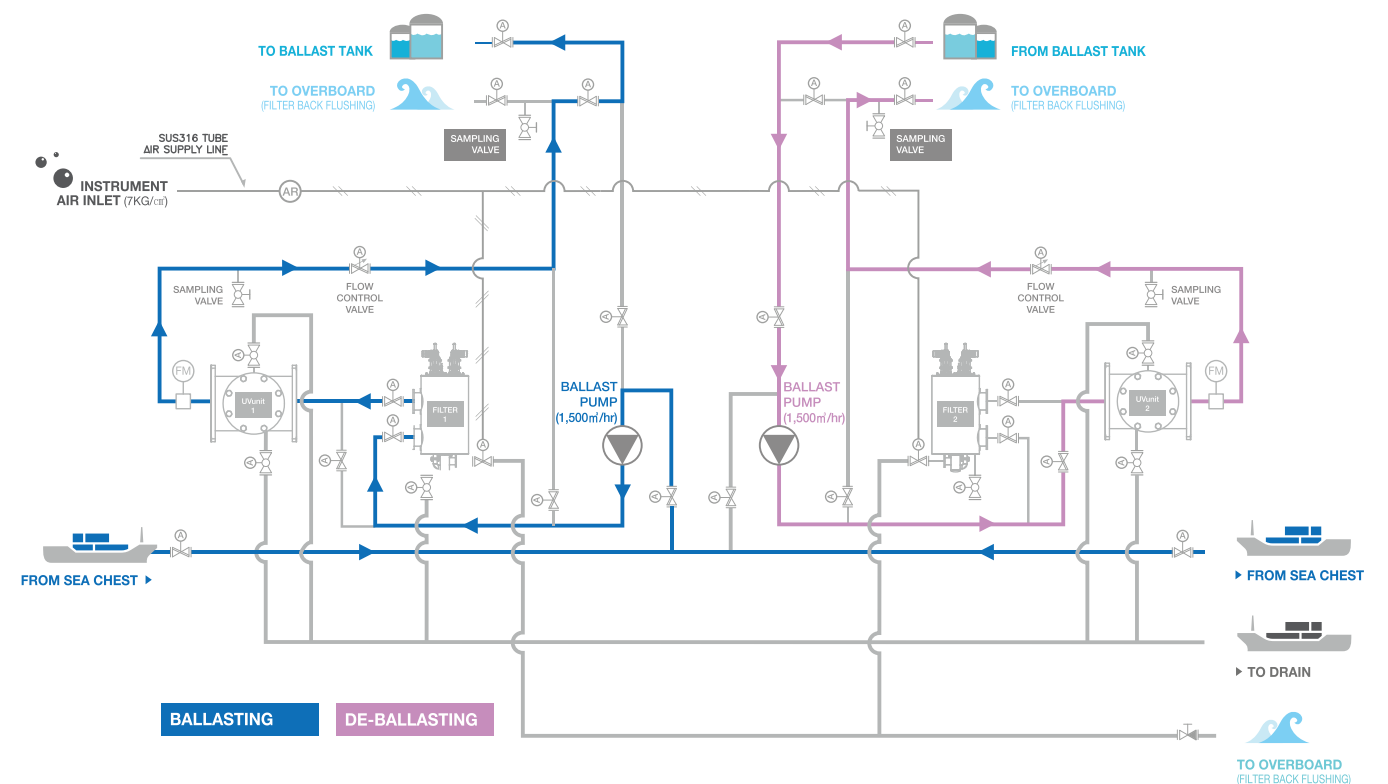
This simple configuration of GloEn-Patrol™ is combined the filtration unit with 50µm filter element which provides the most effective and efficient back flushing function than any other conventional filters can do and medium pressured UV lamps which give customers assurance to last long life to treat and disinfect the ballast water in ballasting and de-ballasting stage. In addition, this uniquely engineered and designed filter and UV lamp are manufactured by PANASIA's own technologies to provide the upmost quality, reasonable price and on time delivery to the customers.

The system flow has four types. In order to acquire an appropriate dose of UV lamps, system uses warming up mode in which sea water passes filter & UV but not flow into ballast tank. When system sets up, ballasting mode starts. In the mode, the ballast water from sea chest enters through the inlet pipe into the filter and flows through the cylindrical filter element from inside out. Organisms larger than 50µm are eliminated and those smaller than 50µm will pass into UV unit for disinfection. During filtration, sediments are accumulated on the surface of filter element and it is flushed out to overboard by the back-flushing function without any disturbance on filter operation. During de-ballasting mode, the ballast water from the ballast tanks passes through the UV unit to prevent reproduction of organisms and flows out to overboard. During Bypass mode, the ballast water skips filter and UV unit and simply flows out to overboard.

FEATURES

- Superior sterilizing performance (100% physical treatment type)
- Automatic control of UV intensity in 3 stages (Depending on turbidity)
- Low maintenance cost
- Automatic back flushing (Filter), auto cleaning function (UV Lamp quartz sleeves)
- Able to treat with no concerns in salinity and water temperature
- Most suitable for a variety of installation applications (Vertical/Horizontal installation and no limitation on the distance of main components)
- No use of chemical substances that induce corrosion inside the tanks
- User friendly interface




FLOW DIAGRAM (GloEn-P1500)




















GloEn-Patrol™

Simple, Safe and Smart

PRODUCT LINE UP

	GloEn-Patrol™ G I	GloEn-Patrol™ G II	GloEn-Patrol™ G III
			
Combination	Original Filter Unit Original UV Unit	MEGA Filter Unit Original UV Unit	MEGA Filter Unit MEGA UV Unit
Treatment Capacity	50 ~ 750 m³/hr	800 ~ 3,000 m³/hr	800 ~ 3,000 m³/hr
Features	Small capacity with single unit	Smaller footprint & Power consumption	High efficiency in power consumption and footprint

CERTIFICATES

 New G8 IMO Approved Aug. 2019	 USCG Type Approved Dec. 2018	 IECEX Type Approved Jan. 2015	 DNV Type Approved Sep. 2014	 CCS Type Approved Mar. 2014	 JG Type Approved Mar. 2014	 BV Type Approved May 2013	 USCG AMS Approved Apr. 2013	 ABS Type Approved Mar. 2013
 LR Type Approved Aug. 2012	 RINA Type Approved Aug. 2012	 CR Type Approved Sep. 2011	 RMRS Type Approved Sep. 2011	 Netherlands Flag Approved Aug. 2010	 EX-PROOF Type DNV ATEX Approved Jun. 2010	 G8 IMO Approved Mar. 2010	 G9 IMO Approved Mar. 2010	

INSTALLATION COMPARISON BETWEEN GI AND GIII MODEL



Treatment capacity
3,000 m³/hr

Improved
In space & Power Consumption

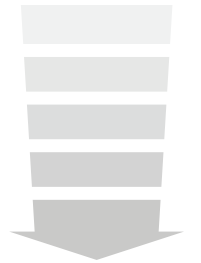


Treatment capacity 3,000 m³/hr

High Efficiency _ **40%** of power consumption is reduced.

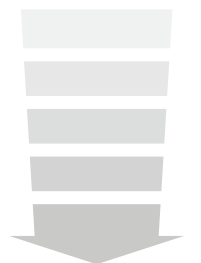
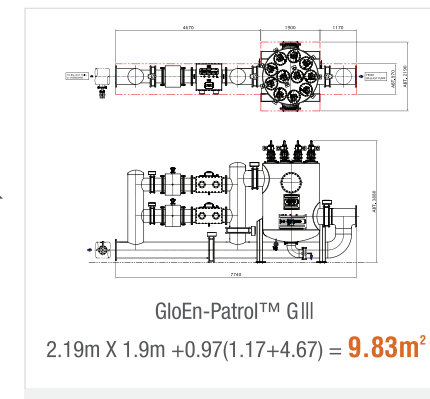
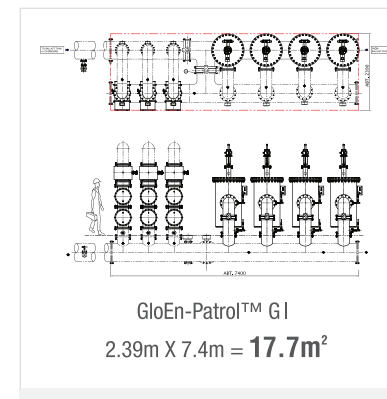
cf. GloEn-Patrol™ G I

Model	Treatment Capacity	Power Consumption		Reduced by
		GloEn-Patrol™ III		
		Min.	Max.	
P1000	1,000 m³/hr	56kW	77kW	36%
P1200	1,200 m³/hr	65kW	90kW	44%
P1500	1,500 m³/hr	80kW	110kW	37%
P2000	2,000 m³/hr	113kW	155kW	35%
P2500	2,500 m³/hr	131kW	180kW	44%
P3000	3,000 m³/hr	164kW	225kW	38%



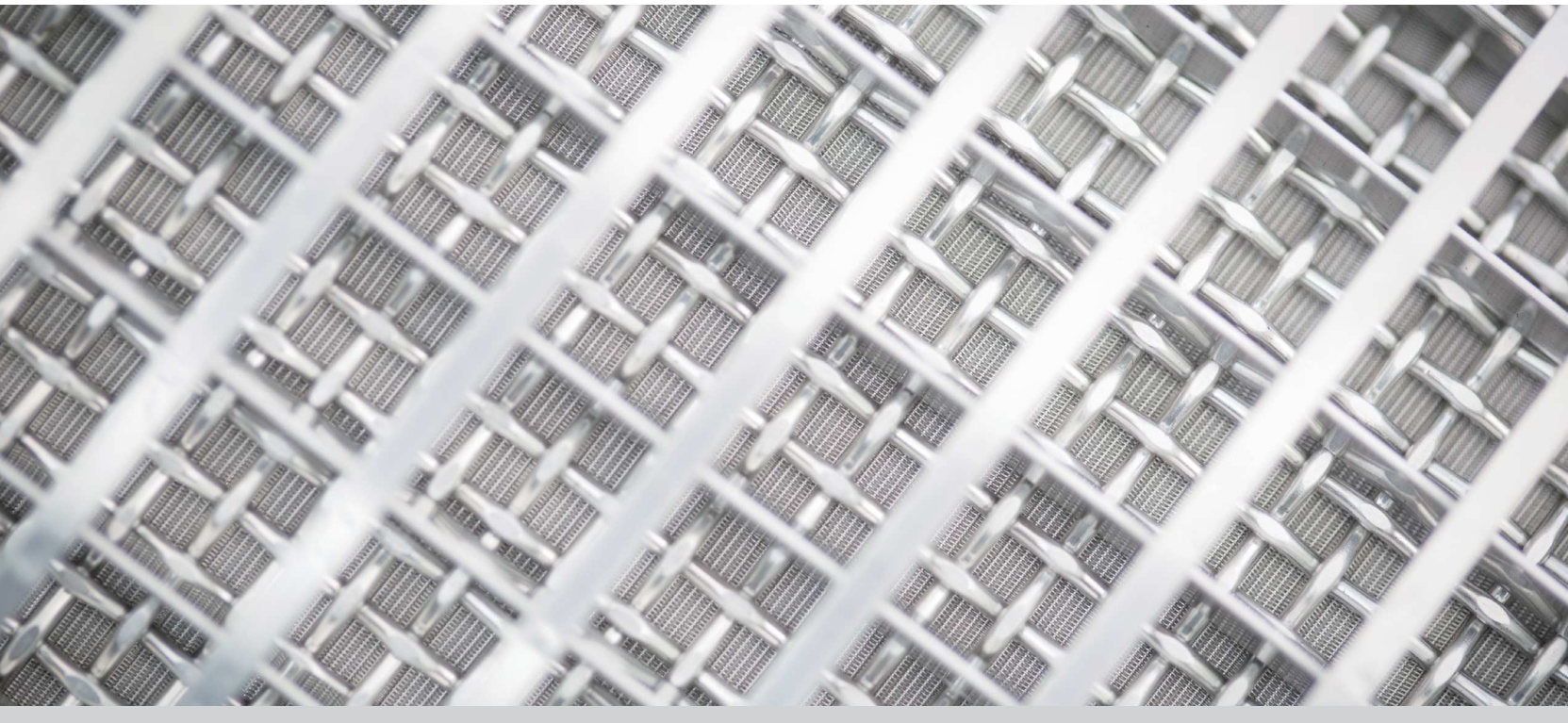
Power Consumption
40%

Minimized Footprint _ **44.5%** of installation area is reduced.



Minimized Footprint
44.5%

Simple Configuration Filter Unit



SCREEN TYPE FILTER

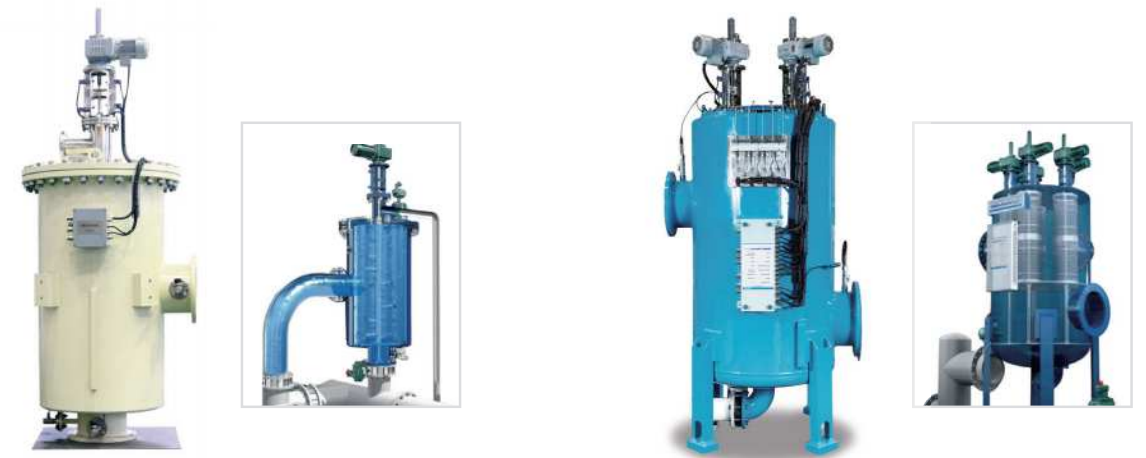
The ballast water enters into the filter and flows through the cylindrical filter element from inside out. The filtration cake accumulating on the filter element surface causes pressure difference to develop across the filter element. The back-flushing begins when the pre-set pressure difference between inlet and outlet on the filter is reached or pre-determined lapse of time is met. During the back-flushing cycle, the filtering is not interrupted and continues to flow downstream of the filter in the normal manner.

Regardless of this outstanding technology, Original Filter has met challenges when pump capacity gets bigger, the number of filter units increase simultaneously, requiring more footprint reluctantly. As a solution to this concern, we've developed MEGA Filter Unit to appropriately apply for bigger capacity (from 900m³/hr up to 3,000m³/hr), providing multi-cylindrical filter elements to maximize the performance for the filter unit with less footprint (approx. 44.5%) compared to Original Filter.

COMPONENT LINE-UP

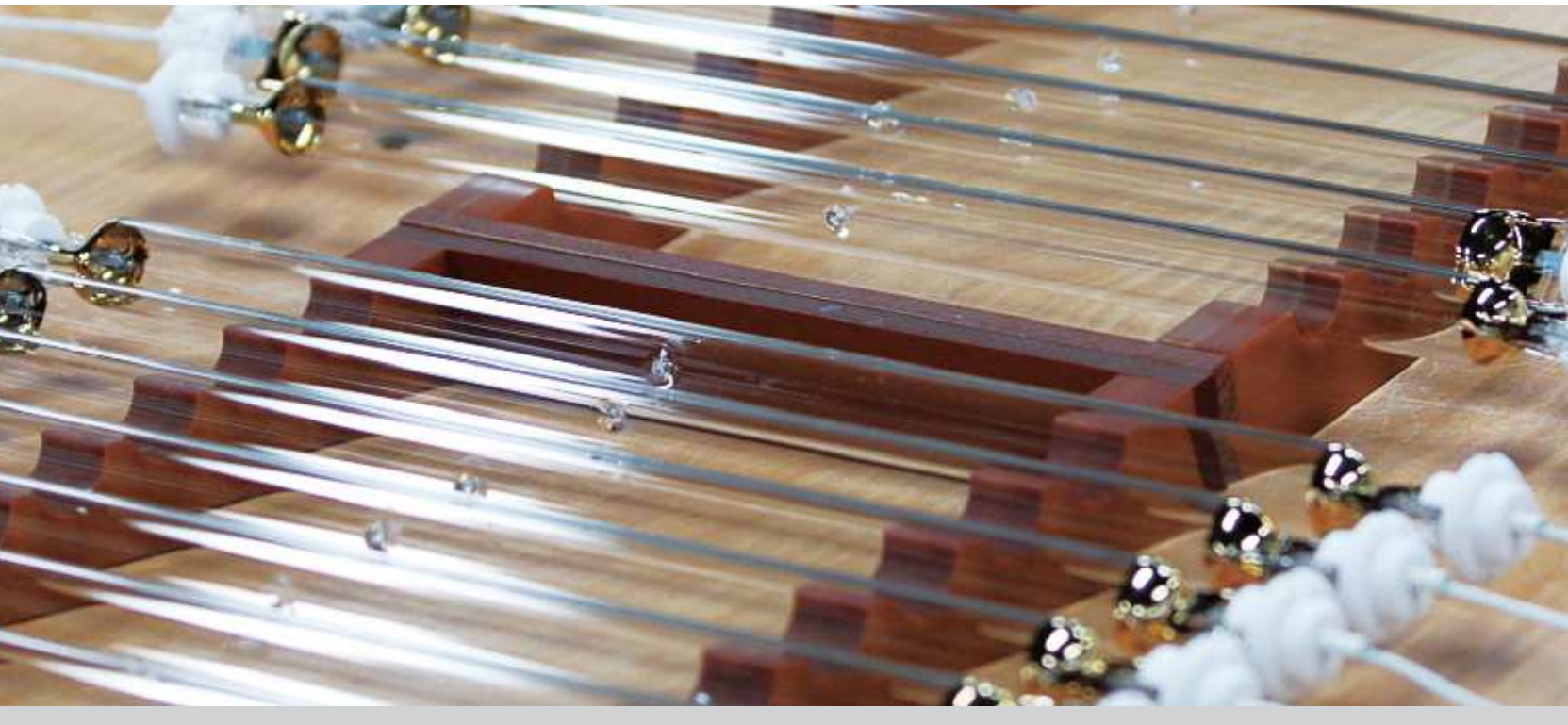
	Model	Treatment Capacity
Original Filter Unit	PF 50	50m ³ /h
	PF 250	250m ³ /h
	PF 500	500m ³ /h
	PF 750	750m ³ /h
MEGA Filter Unit	PF 900	900m ³ /h
	PF 1200	1,200m ³ /h
	PF 1500	1,500m ³ /h
	PF 2000	2,000m ³ /h
	PF 2500	2,500m ³ /h
	PF 3000	3,000m ³ /h

Original Filter Unit	MEGA Filter Unit
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Type	Single screen type	Type	Multi cage screen type
Capacity	50 ~ 750m ³ /hr	Capacity	900 ~ 3,000m ³ /hr
Max. Operating Pressure	10 bar	Max. Operating Pressure	10 bar
Grade of filtration	50μm	Grade of filtration	50μm
Filter Element Material	SUS 316L / Hastelloy	Filter Element Material	SUS 316L / Hastelloy
Backflushing control	Differential Pressure - dependent	Backflushing control	Differential Pressure - dependent

Simple Configuration UV Unit



Most important part of the system for the filtration and UV technology, is to have excellent performances of UV lamps to maximize the disinfection of the micro-organisms in ballast waters.

GloEn-Patrol™ uses UV lamps that are especially engineered, designed and manufactured by special automation robots at PANASIA's advanced Smart Factory, the facility that is formed of IoT(Internet of Things) based on ICT(Information and Communications Technologies). By this revolutionary facility, PANASIA has successfully increased the quality of the lamps and defect rate of lamps have dramatically decreased on the contrary. Of course, with this change, PANASIA can meet huge demand in terms of quantity-wise so that on-time delivery on spares parts can be the benefit for the customers. The intensity of UV lamps is automatically adjusted by three

levels according to flow rate, and transmittance to assure stable UV lamps performance. GloEn-Patrol™ uses medium pressure UV lamps that output a variety of wavelength and enables to treat more various micro-organisms compared to any other UV lamps. To maintain the cleaned quartz sleeve condition, automatic wiping function is adopted that cleans the quartz sleeve by wiper's back and forth movement. Although this excellent performance is guaranteed, there's no harmful and toxic chemical neither required nor produced for running our system. basically it is 100% safe treatment method. With the attitude of listening customer's thoughtful comments, we have developed, treating even bigger capacity with less footprint by reducing the power consumption of approx. 40% compared with original UV unit so that GloEn-Patrol™ can be confidently supplied for bigger ships.

COMPONENT LINE-UP

	Model	Treatment Capacity
Original UV Unit	PU 50	50m ³ /hr
	PU 250	150m ³ /hr
		250m ³ /hr
		350m ³ /hr
PU 500	500m ³ /h	
	700 m ³ /hr	
MEGA UV Unit	PU 1000	1,000m ³ /h
	PU 1250	1,250m ³ /h
	PU 1500	1,500m ³ /h

Original UV Unit	MEGA UV Unit
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Capacity	50 ~ 700m ³ /hr	Capacity	750 ~ 1,500m ³ /hr
Max.Operating Pressure	10 bar	Max.Operating Pressure	10 bar
Automatic cleaning wiper		Automatic cleaning wiper	
Explosion Proof Type (option)		Explosion Proof Type (option)	

Simple Configuration Panels

CONTROL PANEL



The monitor & control panel is PLC based and configured to activate and deactivate UV lamps via UV power supply panels in order to maintain the sufficient UV dose while conserving power.

The monitor & control panel offers a real time monitoring of the status of system operation while logging the data required by the convention at the same time.

- Smart HMI system
- Data logging for 24 months
- Main data real time display (Position, Pressure, Flow, Temperature, etc)
- Alarm function (Interface with AMS or Load master)
- Controller: Siemens PLC
- Touch screen
- Operation Temperature: 0 ~ 55°C

UV POWER SUPPLY PANEL



The major function of Power Supply Panel is to operate the medium pressure UV lamps UV. It controls the strength of UV lamps with the capacitors mounted in the Panel. Also it detects whether the UV lamps are functioning properly or not. The temperature sensor is mounted inside to monitor temperature in order to give an alarm to an operator and shut down the system in case of overheating.

- Operation Temperature: 0 ~ 55°C
- Prevent high heat dissipation

Retrofit Service



We thrive to be the best partner in system retrofitting on existing ships.

We provide a specialized retrofit service, which provides engineering and services for our products (BWTS, SOx Scrubber, Level Measurement System).

PANASIA is becoming a leader in the industry, providing advanced engineering and outstanding service, recognized for its technology, not only in Korea, but worldwide.

We guarantee to become the most reliable partner for existing ships in the field of BWTS retrofit construction, by providing the best solution for our clients' vessels.

Total Solution for Retrofit

FEATURES

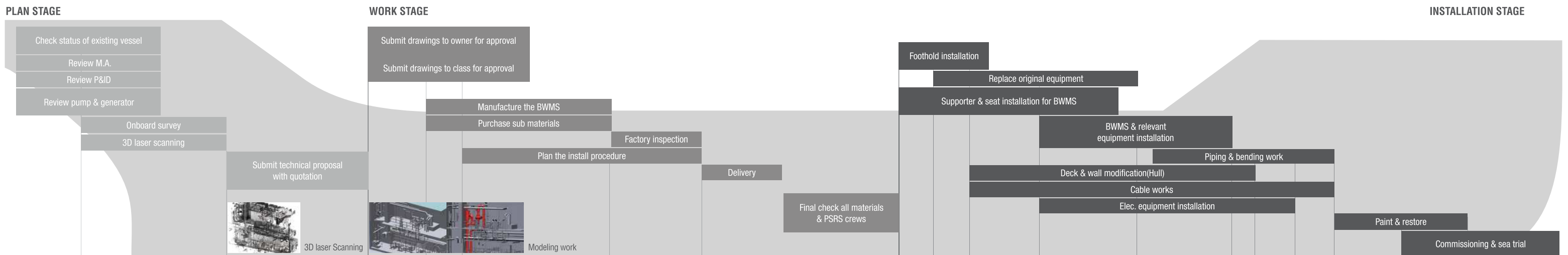


- Comprehensive turn-key proposal
- Highly experienced Engineer with qualified technical skills
- Time, cost saving
- On board Survey & 3D laser scanning for the accurate work
- Certification and Class

SERVICE SCOPE

CASE I	Equipment + Construction Supervision
CASE II	Equipment + Engineering + Construction Supervision
CASE III	Equipment + Engineering + Materials for Installation (pipes, steel outfitting, electrical cable) + Construction Supervision
CASE IV	Equipment + Engineering + Materials for Installation (pipes, steel outfitting, electrical cable) + Installation work + Construction Supervision

WORKING PLAN

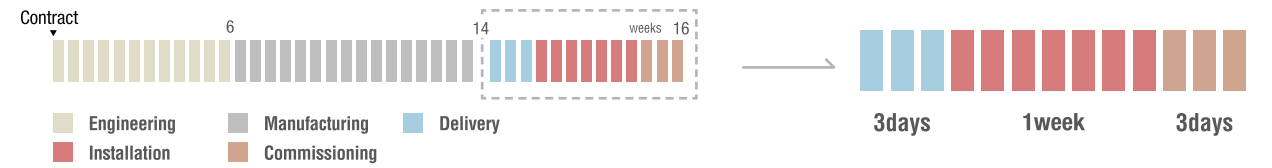


RETROFITTING SCHEDULE

In Drydock or Quay *Asian Naga Project* **1 Week**



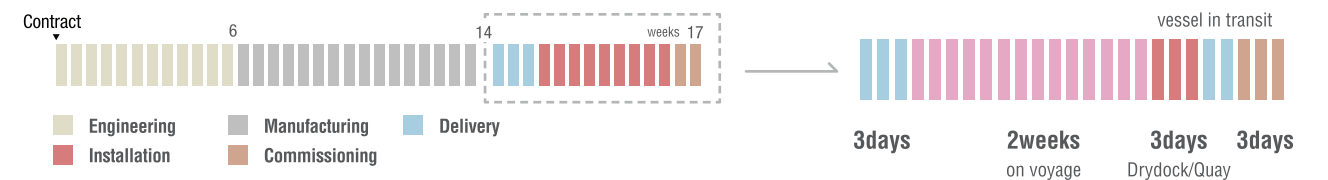
Ship's Type	10K Bulk Carrier
Capacity	150m ³ /hr
Model	GloEn-Patrol™ 150 x 1 set
Installation Location	Engine room
Retrofit method	Drydock(Sanwa Dock Japan)



On Voyage *MV Floriana Project* **2 Weeks**



Ship's Type	34K Bulk Carrier
Capacity	700m ³ /hr
Model	GloEn-Patrol™ 700 x 1 set
Installation Location	Engine room
Retrofit method	On Voyage(Europe)



* Actual Installation period might differ by vessel's condition

Advanced services are added on well-proven BWTS system

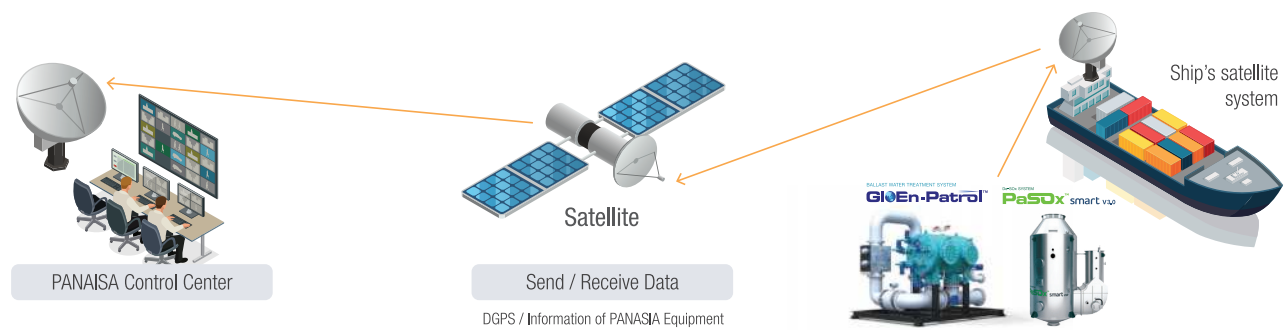
PANASIA provides not only reliable Ballast Water Treatment System, but also provides great services such as Training centers, CBT(Computer Based Training) and IoT(Internet of Things) based MSCS(Marine Satellite Control System) to effectively operate over 900 BWTS(Ballast Water Treatment System) that has already been supplied to global customers. Most supervisors and crewmen are unfamiliar with BWTS operation because BWTS is newly installed equipment due to IMO and USCG's regulation.

Considering upcoming burden in BWTS operation and complexity of regulations, having proper education and reliable services is highly recommended for ship operators as a preparation.

PANASIA considers those factors very importantly and thinks what to develop to meet customer's satisfaction as a market leader.

Marine Satellite Control System **Pan MSCS™**

Pan-MSCS™ can collect and monitor the operational status of PANASIA's products installed on the ship at any time, regardless of location in real time via satellite. It is an ICT-based control system developed to enable crew members to easily solve problems by diagnosing problems and reporting solutions to the vessel. In addition, it helps to maintain the equipment by informing in advance when parts should be replaced.



PSC response
Sending product operational information and immediately respond role.



Diagnosing product
Monitoring the status and operating conditions, and inform the diagnosis and solutions.



Effectively manage spare part
Alarm service to replace parts by analyzing operational data



UV Lamp monitoring
By analyzing running time and intensity of the lamps. Determining and informing the time for replacement lamps.



Fleet monitoring
Monitor current location of fleet and vessels with PANASIA's installation

CBT(Computer Based Training) Software

With a concept of 'Challenge toward new creations', PANASIA has brought a new service to customers that didn't exist in Ballast Water Treatment System market.

CBT is in general window based training software in a form of CD or USB with which operators can have repetitive lectures regarding BWTS. This is developed for owners to prevent from shortage of knowledge through frequent crew change-over. Though general trouble shooting cases are introduced, crews are required to be familiar with as many unexpected cases as possible so that crews can cope with a variety kinds of situations. It contains intensive and detailed information that has a total length of over 6 hours of education time.

Followings are the benefits of CBT program :

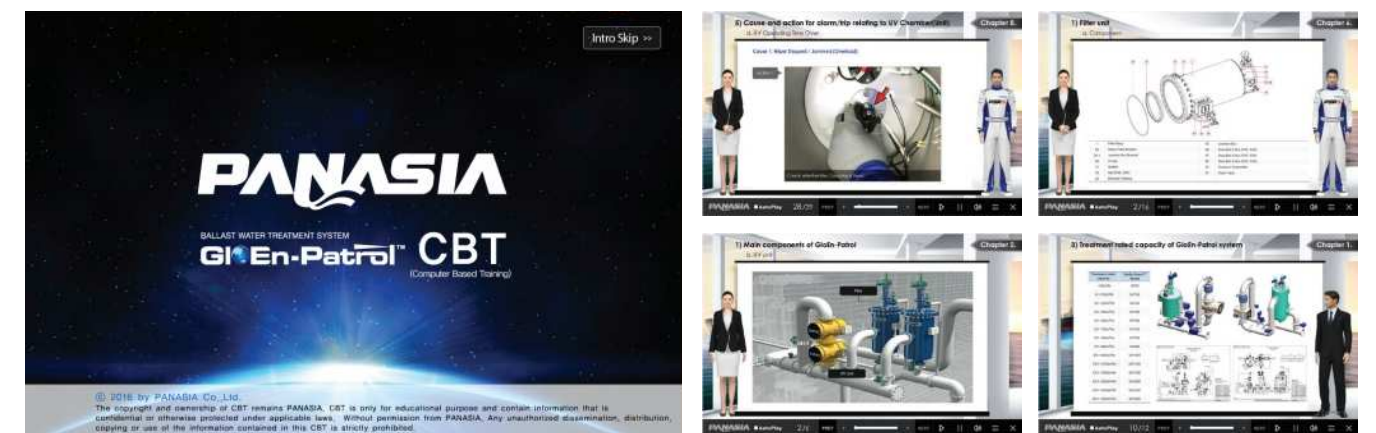
- Crew training for the new equipment to enhance the service capability of crews
- Actual operational training system consists of operating procedure, maintenance, trouble-shooting etc.
- Each chapter has its estimation to know whether crew has fully trained

Training center is supporting materials for hands-on parts, while CBT is more like supporting knowledge parts.

In order not to face difficulties such as detention of a vessel, it is the duty for the vessel owners or operators to select the right BWTS supplier with the right training services.



Computer Based Training software



TRAINING CENTER

PANASIA's BWTS is popular as simple operation, however crews who are dealing with BWTS must know the system in detail when PSC is on a ship to check. As most of ships have frequent crew changes every 3 to 6 months, proper crew training is a must factor. PANASIA has a solution with well-established training centers and its program.

Training Center is a regional educational complex where the vessel owners or operators can access for training with minimum expenses. Training Center is in general composed of educator, real equipment and educational materials. At the center, followings shall be dealt with.

1) Theoretical Part includes: Component explanation; BWTS operation; Installation & Commissioning; Trouble Shooting (alarm & trip condition); Maintenance & Calibration; BWTS System settings

2) Practical Part includes: Practice on BWTS operation through computer based simulation; Practice on overhaul on each component; Practice on hands-on maintenance & calibration; Practice on trouble shootings (alarm & trip condition)

Currently, there are 4 training centers(Greece, Estonia, the United States and Korea) actively used and more training centers are under review to be located globally, while many of customers are already in use with high satisfaction.

Training Center



No.	Country	Location	Company	Contact	E-mail
T/C-01	U.S.A	TEMPA	C&C PANASIA Inc..	Mr.Ernie Chang	echang@ccpanox.com
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Worldwide Service Network

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- THAILAND
- TAIWAN
- CHINA

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- BRAZIL
- ECUADOR
- PANAMA
- VENEZUELA
- U.S.A
- CHILE
- NIGERIA

MIDDLE EAST

- U.A.E
- OMAN
- QATAR



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