PANASIA EM
ECO & MATERIAL

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AMP

Alternative
Maritime
Power System

ENG

Panasia Group _

We are heading to the future with eco-friendly solutions

WATER SOLUTIONS

- Ballast Water Treatment System (UV type)
- Measurement Control System
- WTS for Exhaust Gas System (Chemical / Membrane)

AIR SOLUTIONS

- De-SOx System (Scrubber)
- De-NOx System (SCR)
- Engine Exhaust Recycling System (iCER)

ENERGY SOLUTIONS

- Hydrogen Generation System
- Carbon Capture and storage System(CCS/OCCS)
- Fuel Supply System (LNG/Ammonia/Methanol)

Major Port AMP Installation and Regulation Status

NORTH AMERICA

Regulation Implementation

- January 1, 2021 New Regulation took effect
- December 1, 2022 Published Interim Evaluation Report
- **January 1, 2023** New requirements took effect for **container/reefer/cruise vessels**
- **January 1, 2025** New requirements take effect for **ro-ro** and **Southern California tanker terminals**
- **January 1, 2027** New requirement take effect for **Nothern California tanker terminals**

EU

EU Commission proposes new guidelines for mandatory use of onshore power supplying by ships docked in the existing EU Directive (Directive 2014/94/EU) in October 2021 - **OPS will be established at TEN-T(Trans-European Transport Network) ports by end of 2025, Container Ships will be equipped with AMP facilities by January 2030**

CHINA

The Air Pollution Prevention Act stipulates that new dock planning, design and construction should be equipped with an AMP system, already developed docks should be gradually converted into an AMP system, and ships entering the port should use AMP first.

It is mandatory that the vessel installed AMP is called at the port which has onshore power supply system.

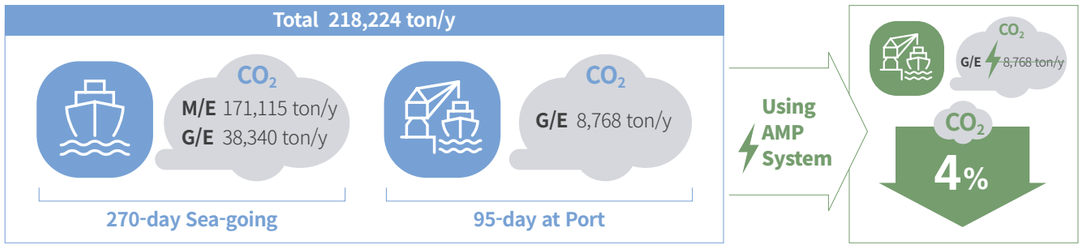
Source : GreenVoyage2050 OPS Workshop

ADDITIONAL EFFECTIVENESS

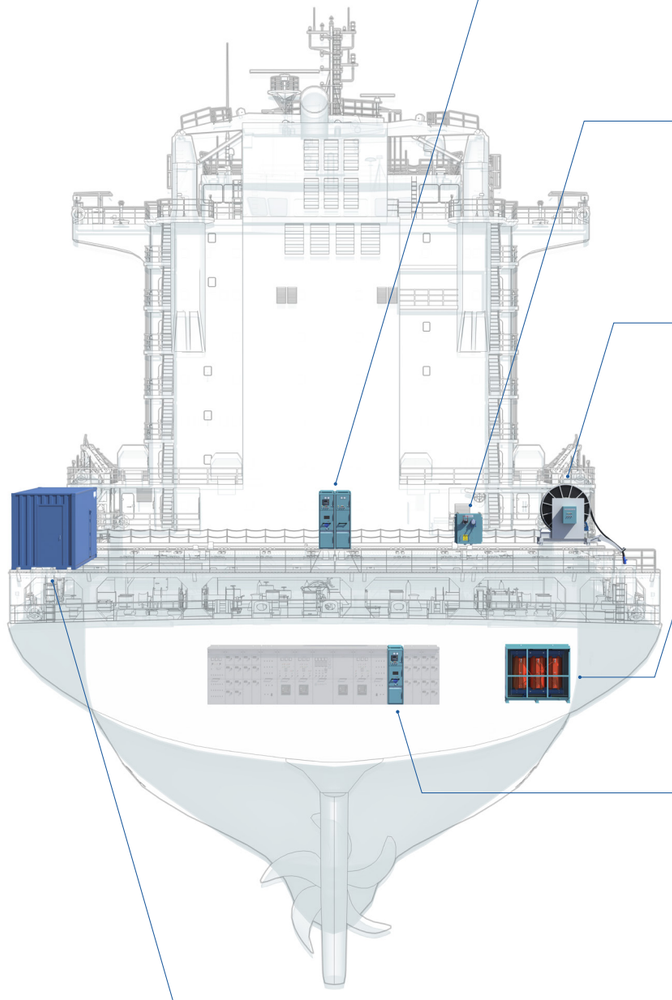
*CII (Carbon Intensity Indicator) Regulatory aspects : Expected to reduce CO_2 emissions

Ex) 24,000 TEU simple calculation of CO_2 emissions

* Calculated by PANASIA



AMP System General Arrangement



Shore Conn. Panel

The panel that receives shore power first on the ship, and it checks the connection status and electrical specifications of shore power, connects and disconnects shore power.

Socket Box

A device in which a cable for using shore power is leaded in from port to a ship.

AMP Cable Reel

A device for transferring cables from a ship to port for the use of shore power.

Transformer

A device that converts voltage for low-voltage ships.

MSBD (AMP Incoming Panel)

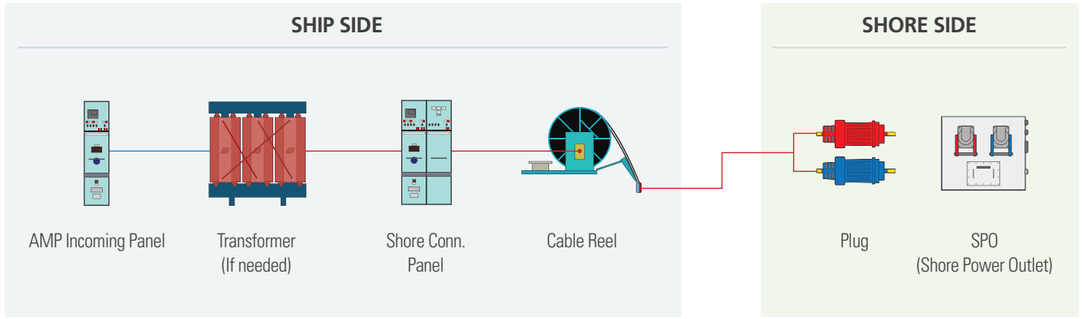
A device that checks the connection status of shore power and the electrical specifications of shore power, synchronizes and changes between ship generators and shore power.

Container Type AMP

Cable Reel System and Shore Conn. Panel are installed in 40ft H/C container.

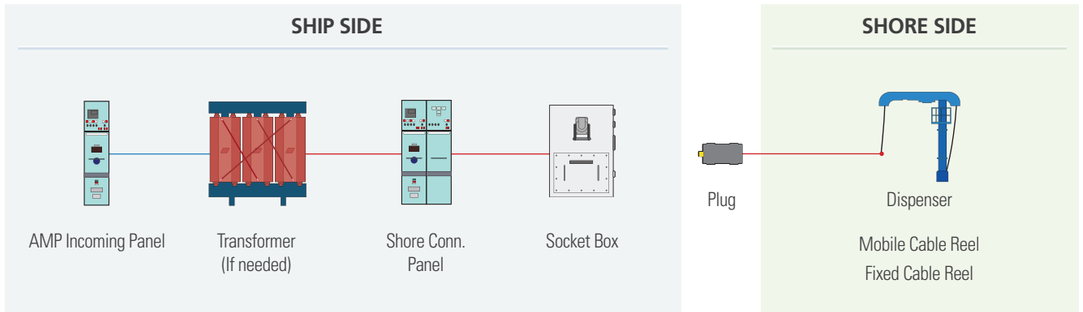
AMP System Application

1. Cable Reel Type



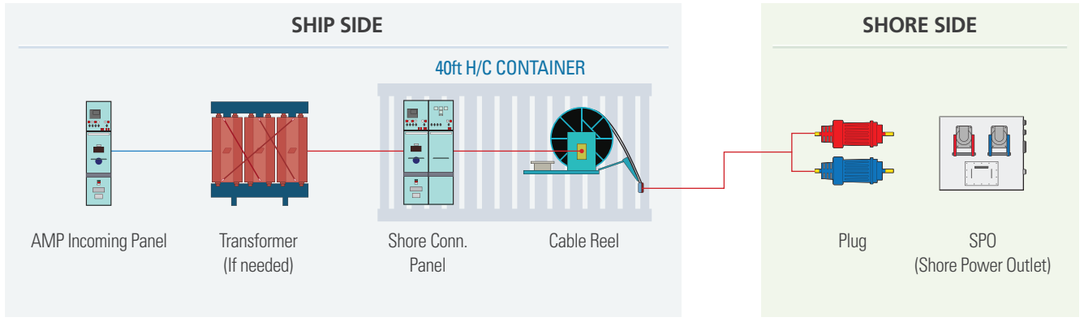
- **Generally applied to Container vessel**
- The AMP cable management system (Cable Reel) is located onboard ship.
- Two parallel cables with three pilot conductors each shall be used for HVSC systems up to a maximum power demand of 7.5 MVA.
- Nominal voltage : 6.6kV

2. Soket Box Type



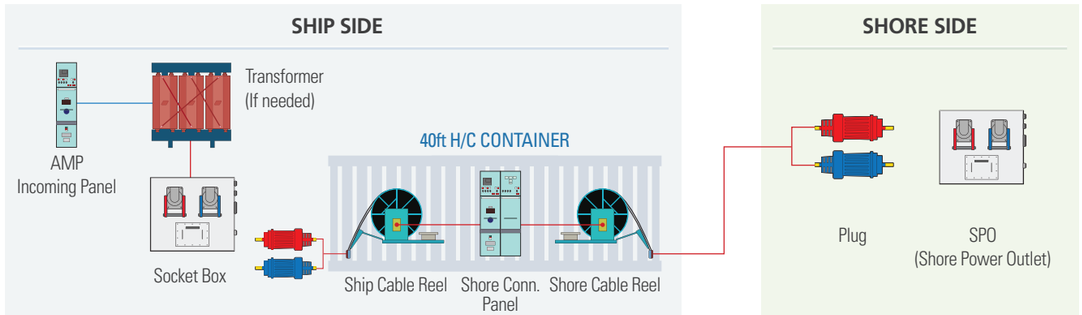
- **Generally applied to Ro-Ro, Tanker, LNGC, Cruise**
- The AMP cable management system is located ashore.
- The number and specifications of AMP cable sockets shall be applied differently for each type of ship.
- In case of LNGC, means shall be provided to facilitate emergency physical disconnection of the HVSC cables in the event of ESD-2 (movement of the ship away from the dock) being detected.
- Nominal voltage : 6.6kV or 11kV

3. Fixed Container Type



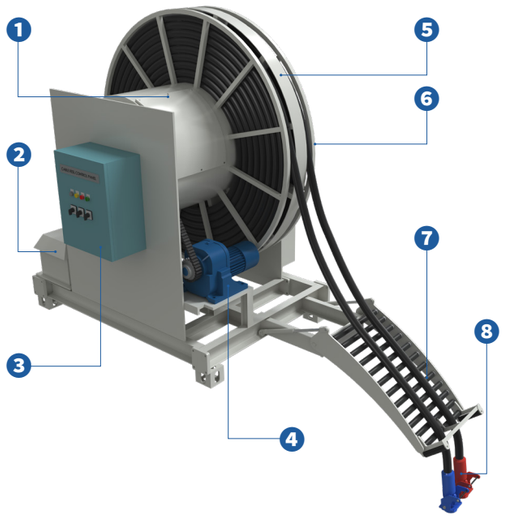
- **Generally applied to Container vessel**
- The AMP cable management system (Cable Reel) and the Shore Connection Panels are installed in a 40ft H/C container which will be installed fixedly on the port or st'bd side of the ship.
- Two parallel cables with three pilot conductors each shall be used for HVSC systems up to a maximum power demand of 7.5 MVA.
- Nominal voltage : 6.6kV

4. Movable Container Type



- **Generally applied to Container vessel**
- The AMP cable management system (Shore Cable Reel and Ship Cable Reel) and the Shore Connection Panels are installed in a 40ft H/C container which will be located on the port or st'bd side of the ship as a movable type.
- Two parallel cables with three pilot conductors each shall be used for HVSC systems up to a maximum power demand of 7.5 MVA.
- Nominal voltage : 6.6kV

AMP Cable Reel (Cable Management System)



1 Slip Ring Case
- 6.6kV 800A x 4P + AC220V 20A x 8P
- Material : Galvanized SS275

2 Resistor · Galvanized SS275

3 Control Panel · Galvanized SS275, IP56

4 Motor & Reducer · AC440V, 3PH, 60Hz, 7.5kW x 6P

5 Cable Drum
- Ø 2650 (2 rows, 2 cables) based on winding length of 60 m
- Material : Galvanized SS275

6 Power Junction Box · Galvanized SS275, IP56

7 Guide Roller · Galvanized SS275, Hydraulic cylinder

8 Plug for AMP cable

Specification	
Winding length	60m (45m+2 Dead turn+1 spare turn)
Hoisting length	45m
Winding speed	max. 12m/min
Winding torque	600kg·m
Protection class	IP56
Painting color	MUNSELL No. 7.5BG 6/1.5, 175μm

Features

- Encoder + inverter control enables more precise cable automatic tension control in real time.
- No periodic replaceable parts for easy maintenance.
- When adjusting the **Torque value**, it can be modified immediately through the **Control panel HMI** without the need for additional equipment.

Shore Conn. Panel

Rated Voltage	7.2kV / 12kV
Rated Current	630~2000A
Rated Frequency	60Hz
Short-time Current R.M.S	25kA x 3s
Protection Degree	IP42

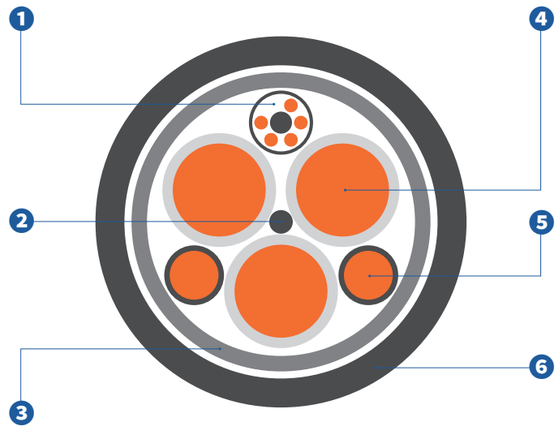
AMP Incoming Panel

Rated Voltage	450V / 7.2kV
Rated Current	~6300A / ~2000A
Rated Frequency	50 or 60Hz
Protection Degree	IP42
AMP Control	Semi-auto

Socket Box

Rated Voltage	7.2kV / 12kV
Rated Current	350A x 2 / 500A x 1
Material	SUS316L
Space Heater	AC220V, 200W
Protection Degree	IP56
Weight	Approx. 250kg

AMP Cable (6/10kV)



1 Pilot element cores (5x2.5mm²)
- Conductor : Tinned copper wire (Class 5)

2 Center filler
- Semi-conductive strength filler core

3 Inner sheath
- Thermoplastic compound

4 Power cores (3x185mm²)
- Conductor : Tinned copper wire (Class 5)

5 Grounding cores (2x50mm²)
- Conductor : Tinned copper wire (Class 5)

6 Outer sheath
- Thermoplastic polyurethane (TPU)

Characteristic	
Working voltage	6/10(12)kV
Temp.range	-40~80
Resistant	oil, **sea air & sea water**, UV and Ozone, non-hygroscopic
Overall diameter(max.) & weight	74.9mm, 9.951kg/m
Tensile stress(N)	**11,100**

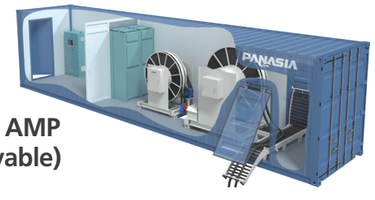
Features

- It has resistance to **sea air and sea water**, which are difficult to confirm in other company specifications, which increases the life expectancy of AMP cable, which requires resistance to the external environment.
- **AMP Cable tensile strength is 11,100N**, about 1,000~2,000N higher than other companies, and a more stable relaxation system can be implemented.
- **Use TPU (Thermoplastic Polyurethane) for AMP cable outer sheath material**, which is twice as long as other rubber products. (assuming the same usage environment)

Transformer

Rated Voltage	6.6kV or 11kV / 440V
Rated Power	Customizable
Insulation Class	F
Space Heater	AC220V, 100W
Protection Degree	IP23
Winding Material	AL

Container Type AMP (Fixed and Movable)



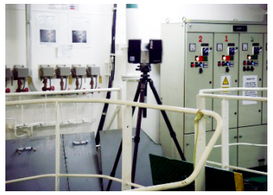
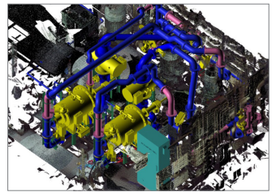
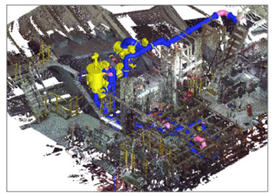
Container	40ft H/C
Component	· Shore cable reel · Ship cable reel · Shore connection panel · Reel control panel · Smoke detectors etc.
Certification	CSC (International Convention for Safe Containers)

Retrofit Process

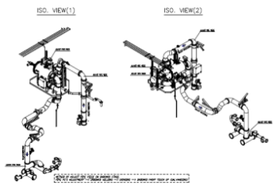
Contract

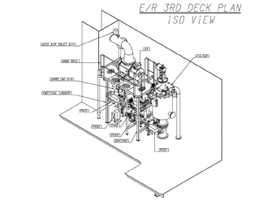
Questionnaire → **On-board Survey & 3D Laser Scanning** → Final Quotation → **Engineering Drawing** → Purchasing & Pre Fabrication → **Installation** → **Commissioning** → Service Demo Education

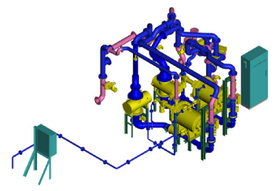
On-board Survey & 3D Laser Scanning

Engineering Drawing







Installation



Commissioning



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47 Global Service Networks in 37 Countries




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To reflect PANASIA's corporate philosophy of seeking eco-friendly and sustainable value,
this booklet was printed with naturally biodegradable soy ink that makes paper recycling easier.

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