

K-TEC ORIGINAL CLEANING KIT





PLATE COOLER CLEANING KIT

Contents

Air Diaphragm Pump 1

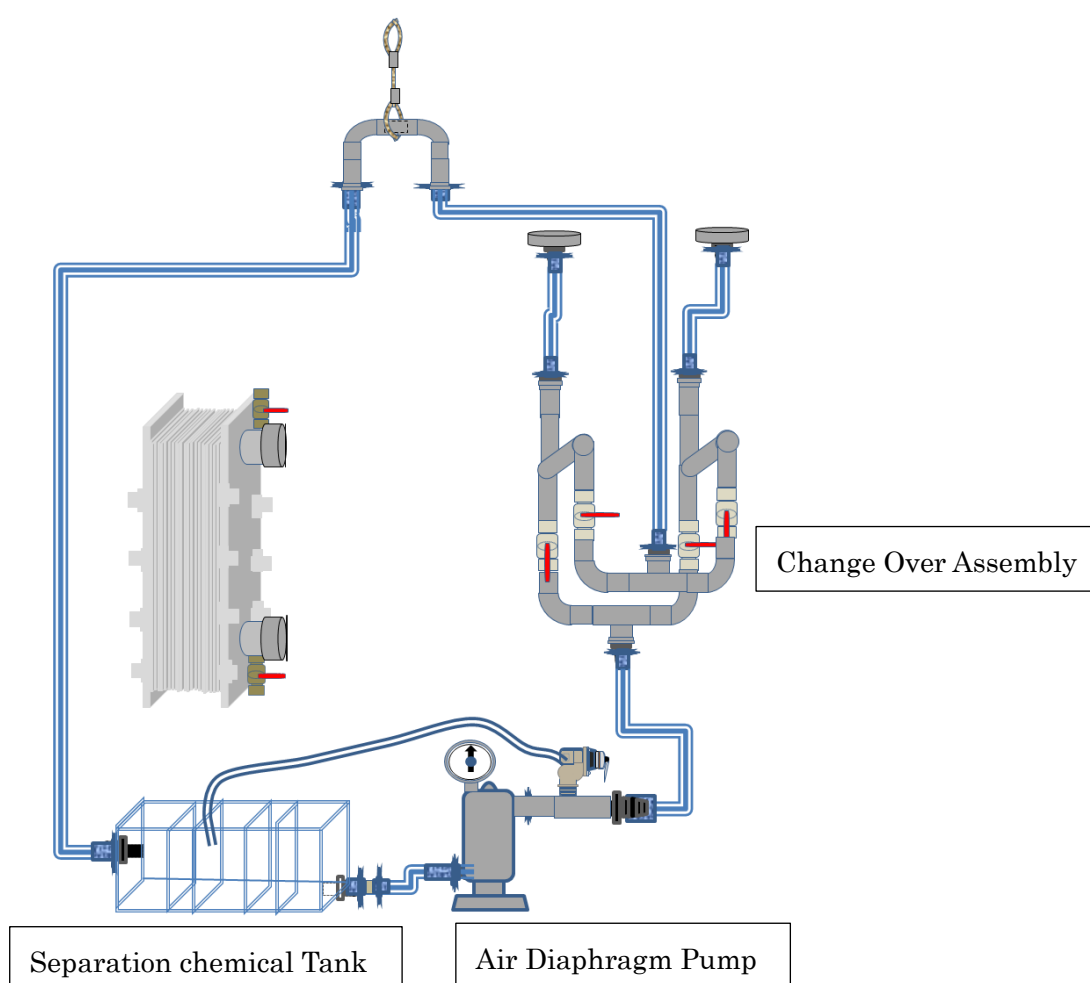
Separation chemical Tank 1

Hose 2 0 m

Change Over Assembly 1

Connection Flange 2

Connection parts 1 set



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Chemical cleaning circulation kit

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List for Accessories

1	Diaphragm Pump	1	set
2	Blade Hose 20A	15	m
3	Partition Tank	1	set
4	Cleaning Direction Change Assembly	1	set
5	Hose Band 20A	12	pc
6	Flange 5K-25A	2	pcs
7	Inverse Shaped Head	1	set

Tank Size 945W 430D 510H
Total Weight 20 kg



In order to accelerate efficacy of OCEAN 35 and also aiming safe cleaning operation, original cleaning KIT has been produced ..

The cleaning kit is being consisted of Diaphragm Pump, Partition Tank, Washing Direction Changeover Circuit, Pressure Gauge, Safety Valve and Fixed Filter.

The Partition Tank has been designed to limit of recirculation of the organic substances and other solids substances to CCS Cooler that are being discharged carry out from the CCS Cooler.

In the 1st and 2nd stages of the Partition Tank, the flow speed of washing water is reduced with partition Plate, the light density substance is captured in the upper layer, the heavy density substance is precipitated and captured in the 3rd stage, and clean washing water is supplied from the 5th stage to the cooler through Diaphragm Pump.

The **Washing Direction Changeover Circuit** is effective for accelerate discharge of solid substance whose size is larger than the cooling water passage hole formed by the Cooler Plate in CCS Cooler.

Washing Direction is able to changeover easily just operate four valves built in the Changeover Circuit without disconnect and re-connect the feed hose and the return hose of CCS Cooler Cleaning Circuit .

The **Fixed filter** is effective for suppressing unnecessary exhaustion of efficacy of OCEAN 35 due to reaction of the organic substances with the OCEAN 35 in the partition Cleaning Tank..

The **Safety Valve** is being equipped to protect the cleaning circuit and the CCS Cooler against abnormal pressure rise.

The set pressure of the Safety Valve is 90 kPa for small size CCS Cooler and 190 kPa for large size CCS depending on the back pressure of diaphragm pump.

In case of Ultra-large CCS Cooler whose water holding capacity exceeding 400 liters, set pressure of the Safety Valve shall be set in accordance with the actual situation of the ship other than the above is possible.

The **Pressure Gauge** is being equipped to grasp the status of cleaning work by means of monitoring the pressure of the cleaning circuit.

Maximum Pressure of Gage is several kinds. 0.1 Mpa, 0.25 Mpa, 0.4 Mpa, 0.6 Mpa and 1.0 Mpa. The Gauge shall be supplied in accordance with the size of the CCS cooler.

1. Partitioned Cleaning Tank

A purpose of Partitioned Tank is that to suppressing of recirculation substances existing in the cleaning solution from the Cleaning Tank to the CCS Cooler through settling and cascade process by means that the flow speed of the cleaning solution is loosened by 4 pcs of partition plates. The light-specific gravity ones and foam are captured at the upper part of 1st and 2th stages, and heavy ones are collected at 3 stages.

The treated cleaning solution flows into the 4th stage where is suction space for Cleaning Pump.

Basic structure;

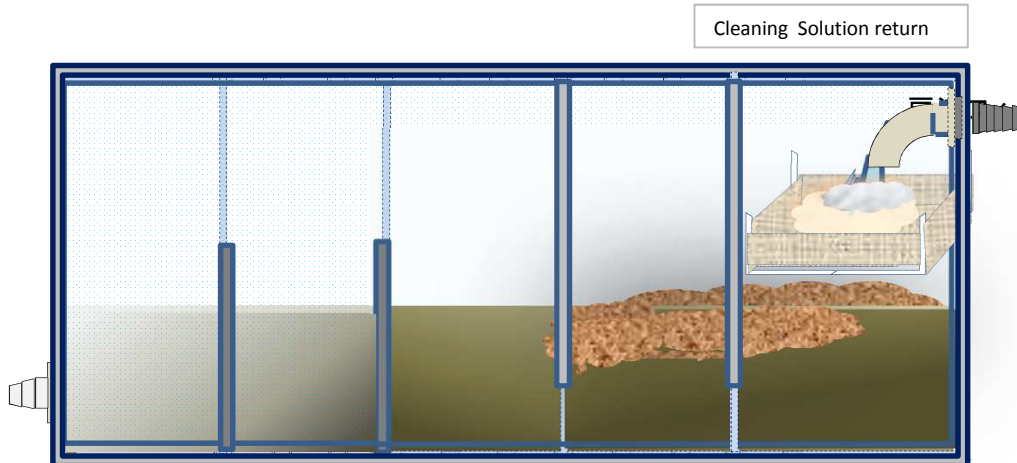


Actual Status in usage



Mechanism of capture

Specific Gravity $\gamma > 1.0$ Scoop out traits and foamy discharges at the top of 1 & 2 stage.
5th stage 4th stage 3rd stage 2nd stage 1st stage



Specific Gravity ; $\gamma < 1.0$ The heavy emission waste is precipitated at the bottom spaces of 3 & 4.
At 5th Stage, clean water is being sucking into Diaphragm Pump.

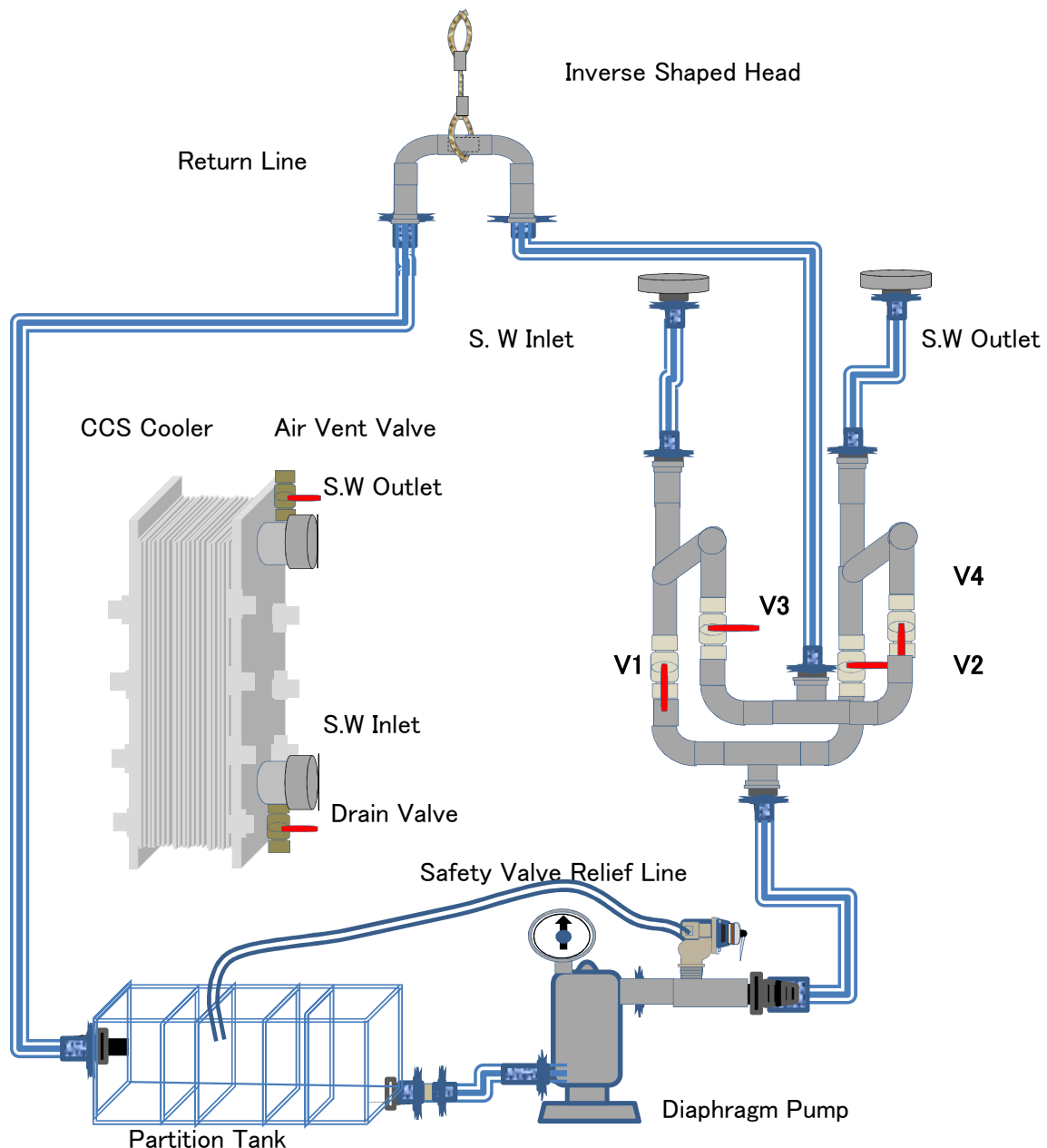
2. Cleaning Solution Feed Direction Change-Over Circuit

Conventional chemical cleaning method generally adopts a circuit that is tube feed cleaning solution to seawater inlet side and it returns from the sea water outlet to the Cleaning Tank.

Feed Direction change-over Circuit is providing for changeover Feed Direction in order to accelerate discharging the substances being existing in the CCS Cooler.

Changeover can be done any time when operator intend to do so by means of changeover 4pcs of Ball Valves built in Changeover Assembly without complicate process such replacing . hose connection for change over cleaning direction. Furthermore rinsing and disposing dirty water in the CCS Cooler and Cleaning Tank can be done easily without any affect by means of drain off to draining hopper and or tank top

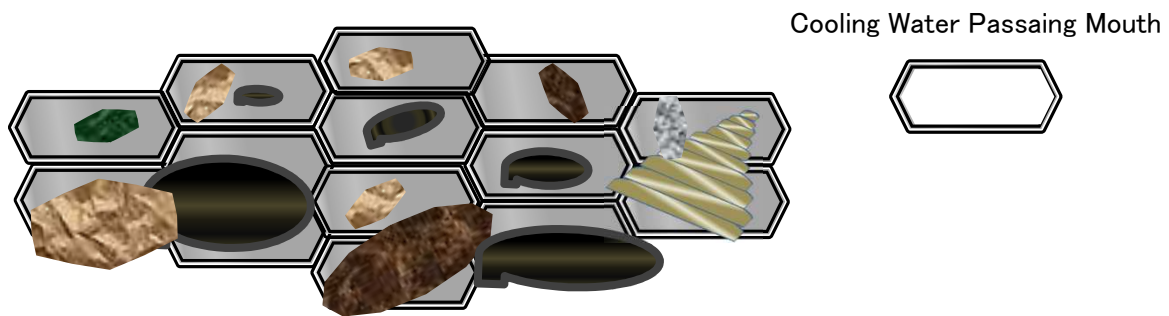
OCEAN 35- CCS Cooler Cleaning – Cleaning Direction Changeover Circuit



Feed Direction Chang Over Table

	V1	V2	V3	V4
	FM Pump to SW Inlet Flange	Fm Pump to SW Outlet Flange	Fm SW Inlet Flange to Tank	Fm SW Outlet Flange to Tank
Bottom Feed (From Seawater Inlet)	OPEN	CLOSE	CLOSE	OPEN
Top Feed (From Sea Water Outlet)	CLOSE	OPEN	OPEN	CLOSE

Image for Cleaning Direction Changeover



* Substance whose size is larger than the passage mouth of cooling water and formed by the Cooler Plate cannot pass through and those are being caught at the said passage mouth.

Image diagram when there are shellfish and other solid Substances

SW Outlet Side

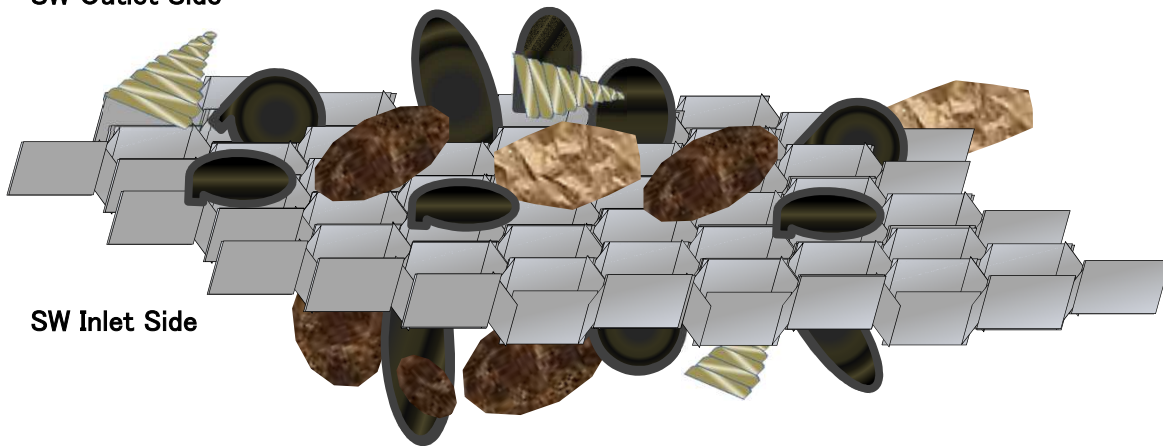
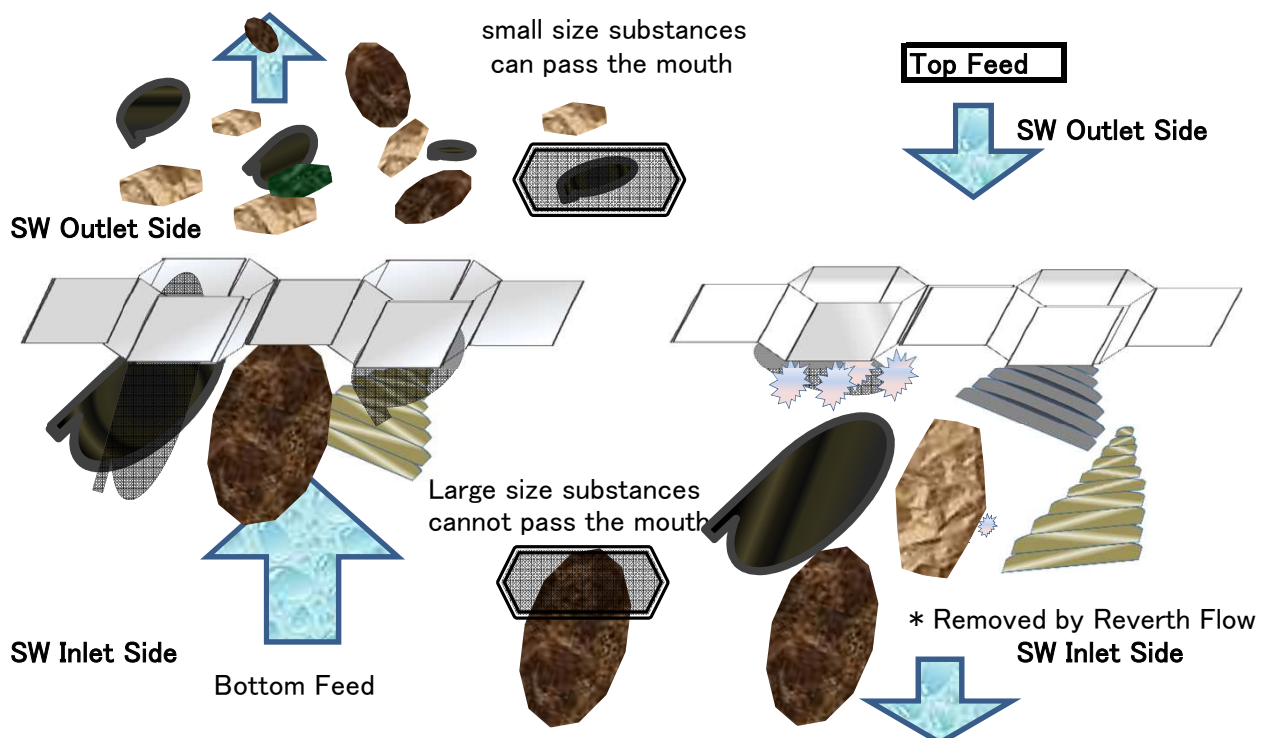


Image of removal of large size Shell and Solid by Reverse Feed



3. Cleaning Circuit Safety Valve

Air Driven Diaphragm Pump is being adopted as Cleaning Pump because it is adjustable pumping rate valuably and also it no necessary priming in order to obtain suction head. On the other hand, if there is a clogging internal CCS Cooler and or Cleaning Circuit during cleaning operation which caused from the substances and or abnormal situation such "kink" on the cleaning hoses and miss-operation of the Ball Valves, the pressure of the CCS cooler and the washing circuit rises excessively rapidly. In the worst case There is a possibility of inducing troubles such as water leakage from CCS Cooler due to damage of packing, burst of cleaning circuit and deformation of the CCS Cooler Plate.

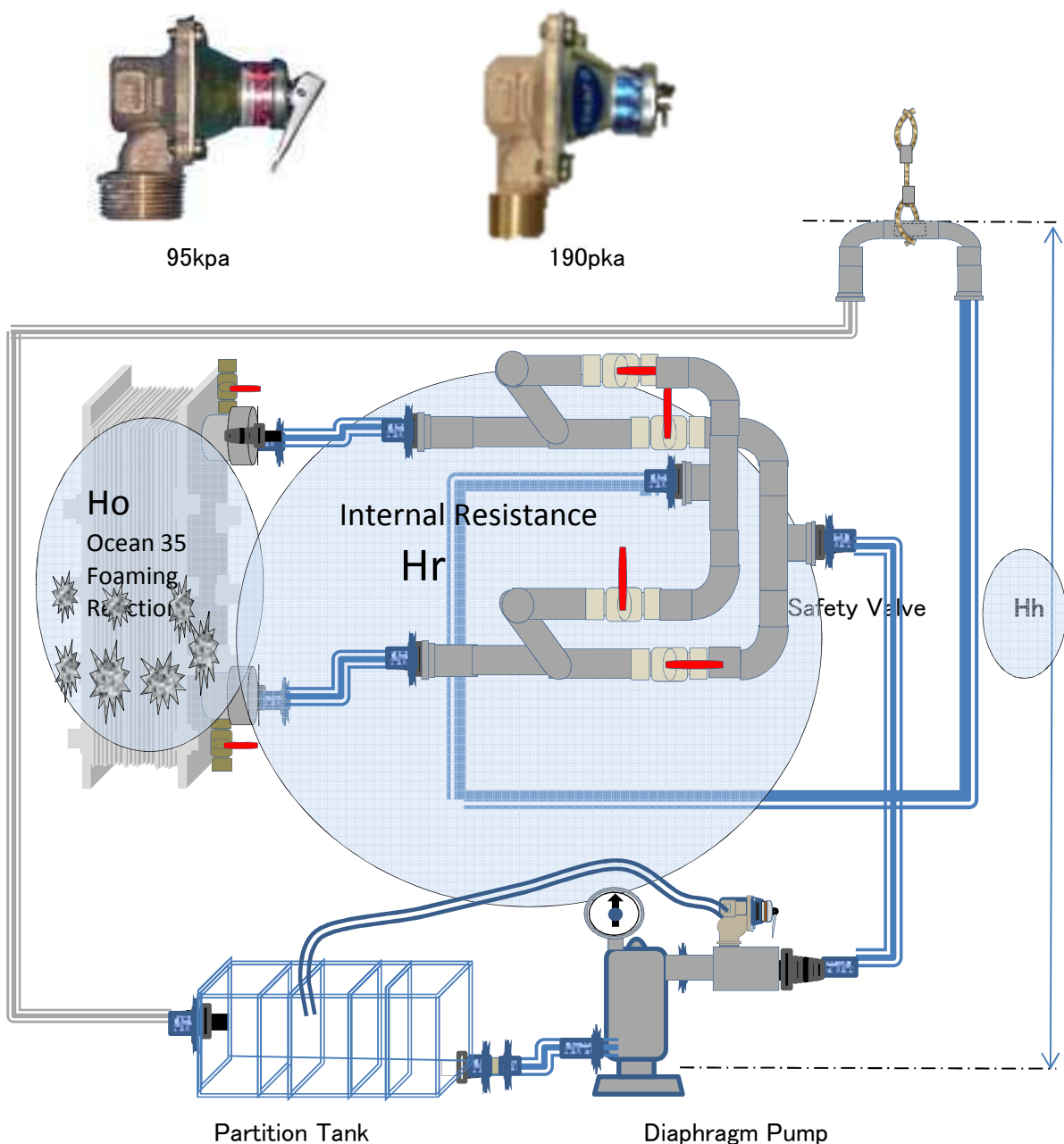
On the other hand, an internal pressure of CCS Cooler Cleaning Circuit is being influenced by fluctuation caused by foaming phenomenon when the OCEAN 35 reacts with the organic substances. Further, a pressure fluctuation due to the reaction of OCEAN 35 is different for each ship, its depending on the internal contamination situation of each CCS cooler and the kind of deposits.

Suitable Recirculation Pressure = $H_C + H_R + H_O$

Hh : Height which is from cleaning pump to the Return-Header set on top of CCS Cooler

Hr : Internal resistance

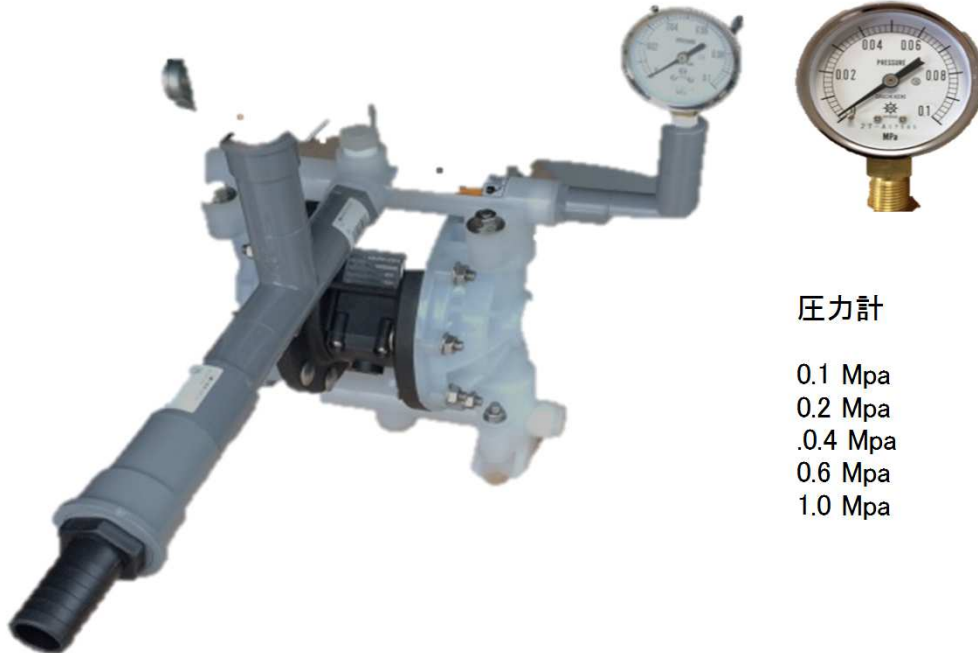
Ho : Pressure rise Set Pressure



4 Cleaning Line Pressure Gauge

Equipped with pressure gauge to grasp internal pressure of CCS Cooler and cleaning and its fluctuation visually.

Pressure Gauge will contribute to determine the timing of adding additional solution to maintain suitable chemical concentration by means grasp the internal pressure, and also perform cleaning work safely .



圧力計

0.1 Mpa
0.2 Mpa
.0.4 Mpa
0.6 Mpa
1.0 Mpa

5. Return Filter

The substance carried out from the CCS Cooler along with the Solution is being reacting with the OCEAN 35 again even in the tank too and wastefully consuming the chemical efficacy of OCEAN 35.

In order to minimize such meaningless reaction in the Cleaning Tank Net-Filter is being equipped on the first stage of the partitioned Tank to suppress the reaction of solution efficacy with the removed organic substances at the Cleaning Tank.



6.. Filter for return check

Check the kind and amount of substances in the return solution during cleaning operation. It is also used for cleaning the surface layer of the solution in the partitioned Tank.

