DEAR CUSTOMER

Inverter Control System for Main Cooling SW Pump

ESICS

Energy Saving by Inverter Control System

Since 2014

TAIKO KIKAI INDUSTRIES CO., LTD.

How to Reduce Fuel Costs

Large Scale Action

- Change in energy-saving main engine
- Reduce wind resistance by changing hull form
- Reduce water resistance by generating micro bubbles in ship's bottom

- **Difficult to act this in Existing Ship**
- **High initial cost**

Energy Saving by Crew's Efforts

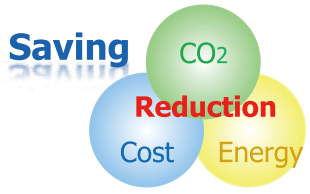
- Take care to always turn off the inboard power supply

- **Difficult to act this in 24h-365d**

Feature of ESICS

Reduce power consumption of the Main CSW Pump to 70%!

1 Energy Saving by Inverter



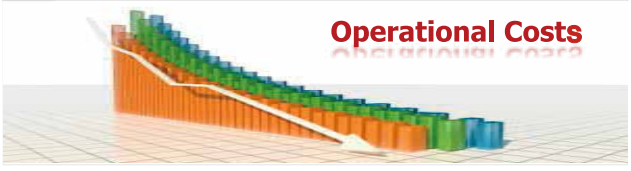
2 Management System for Safety

3 Installable for both new and existing ship

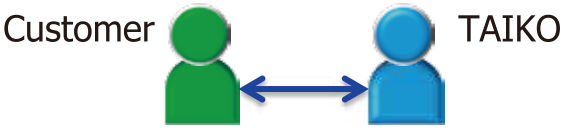
New Ship

Existing Ship

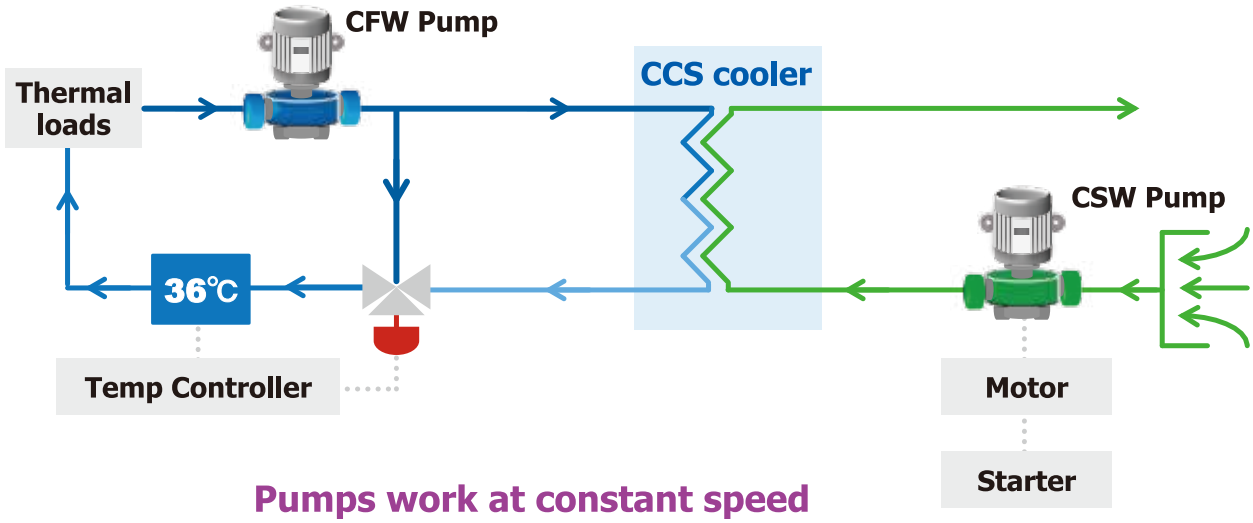
4 Cost reduction effect



5 One-stop Support by Pump Maker



Central Cooling System without ESICS

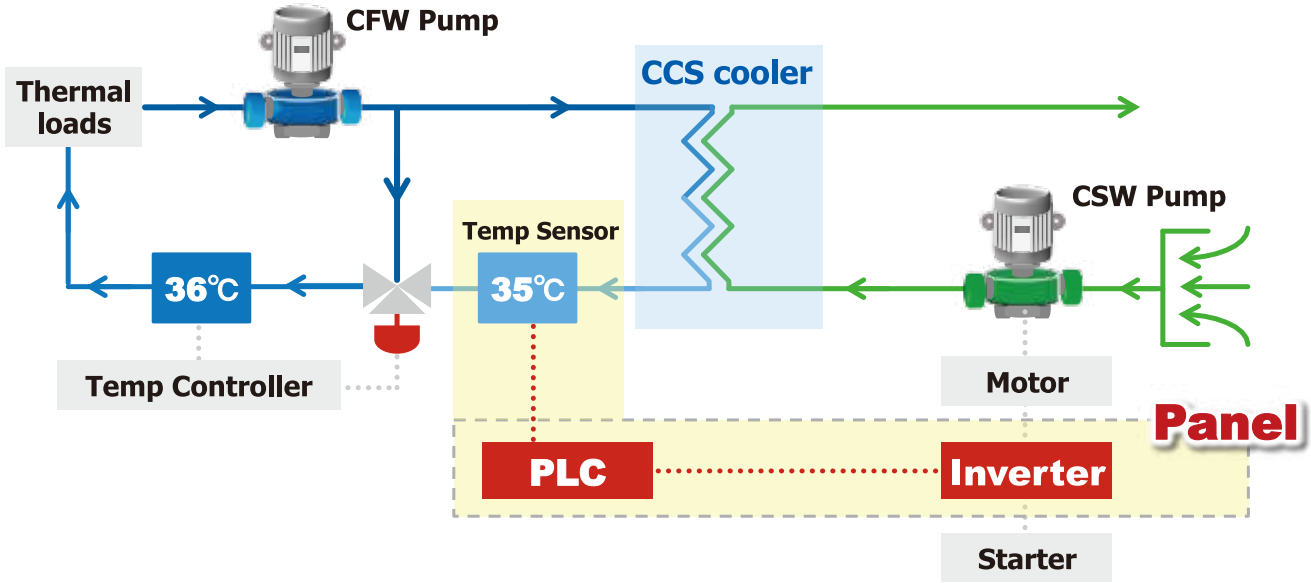


Pumps work at constant speed

3-way temp. control valve controls temperature

Electrical power is consumed wastefully by bypass a cooler

Central Cooling System with ESICS



CSW Pump speed is controlled automatically by inverter

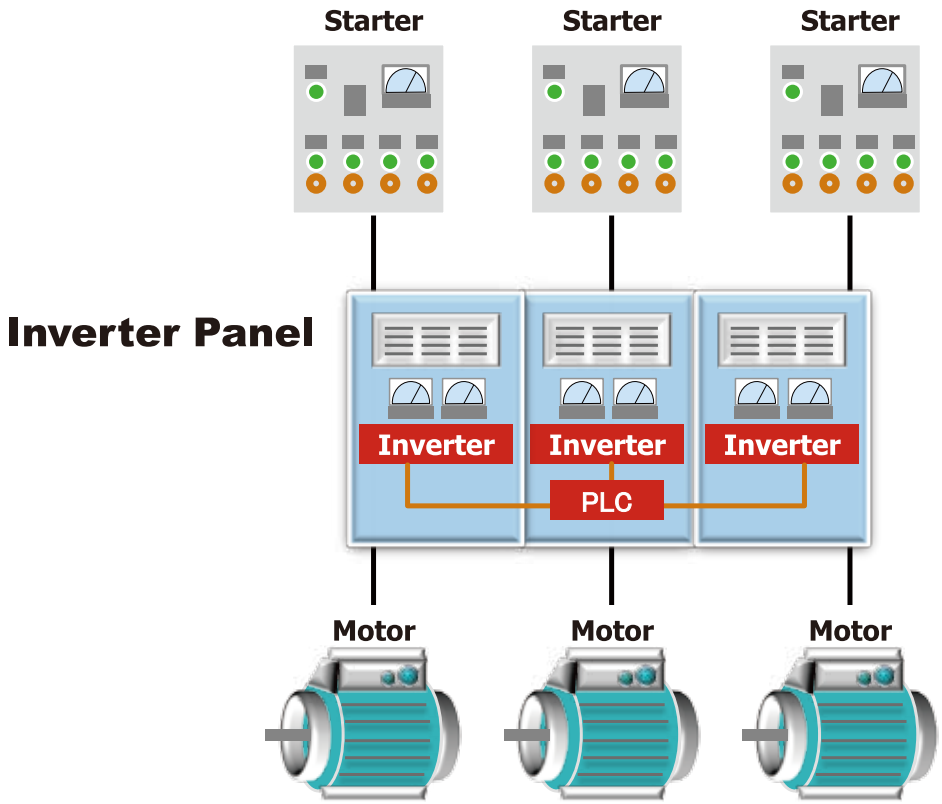
CSW Pump speed is controlled according to fresh water temp.

Power consumption of CSW Pump is reduced

ESICS Contents

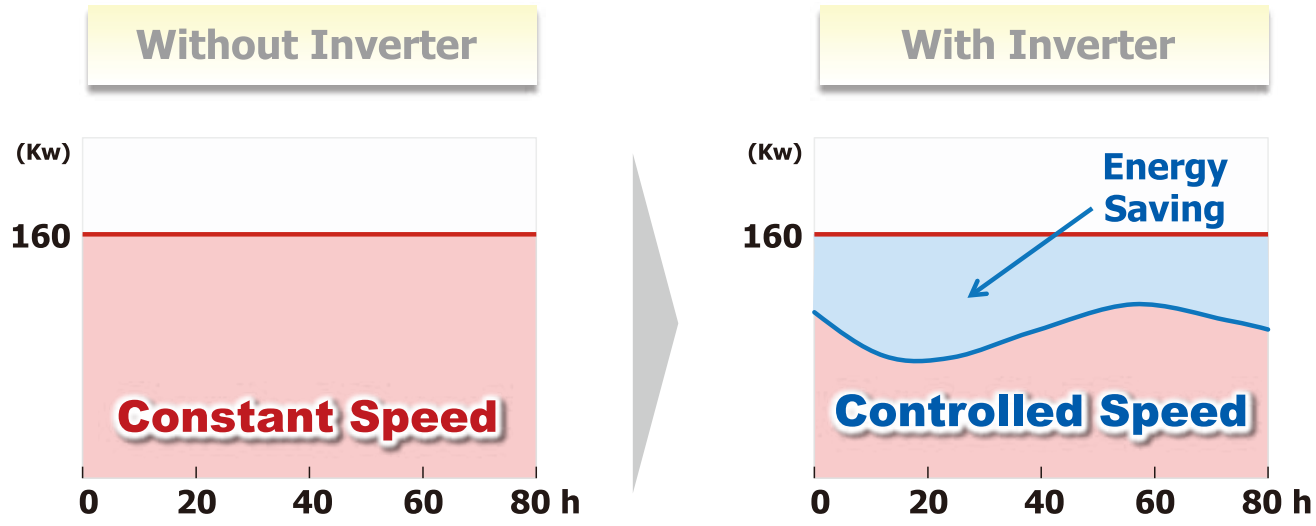
- Inverter Panel (PLC, Inverter)
- Temp Sensor

ESICS: Structure of Motors



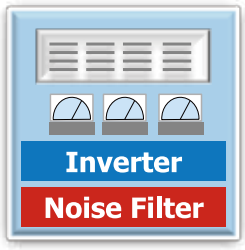
1 Energy Saving by Inverter

Controlled Pump Speed by Inverter

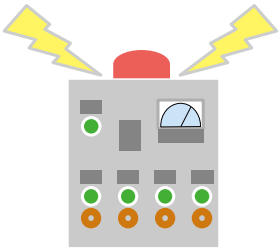


2 Management System for Safety

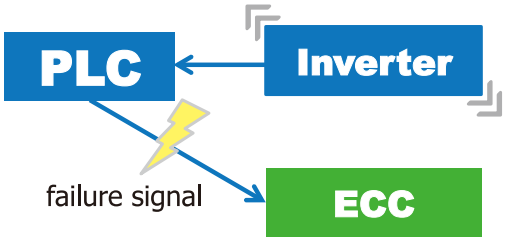
1 Noise Filter



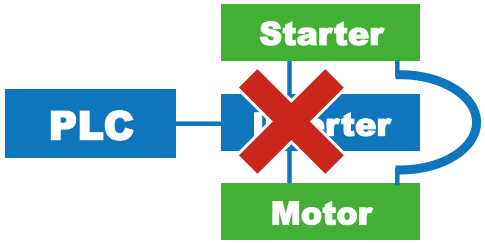
2 Audible Visual Alarms



3 Failure Signal



4 Normal Operation is possible



3 Installable for both new and existing ship

New Ship: 8 Ships

Existing Ship: 2 Ships

*It can be combined with installed motor

Shorten construction time by direct experience with system installation for existing ship

4 Cost reduction effect

New Ship: 8 Ships

Existing Ship: 2 Ships

*It can be combined with installed motor

Verified data by ship with inverter

Ex.) CSW annual fuel consumption costs

Before 150,000US$

After 50,000US$

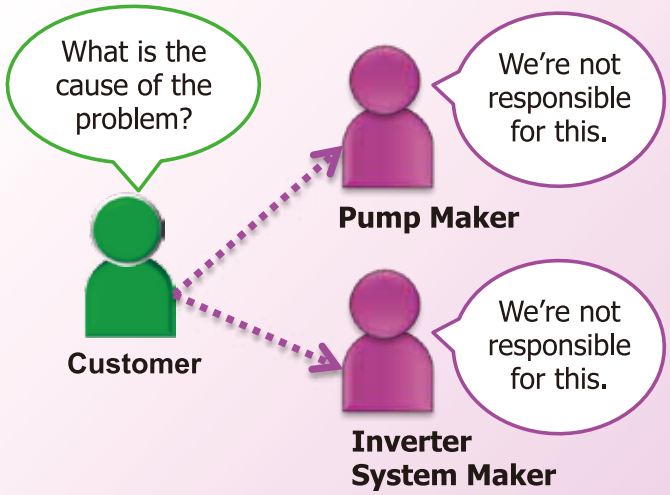
-100,000 US$/year

*CSW Pump: 150kW 3Sets

Calculation Condition
C heavy oil price: 700US$

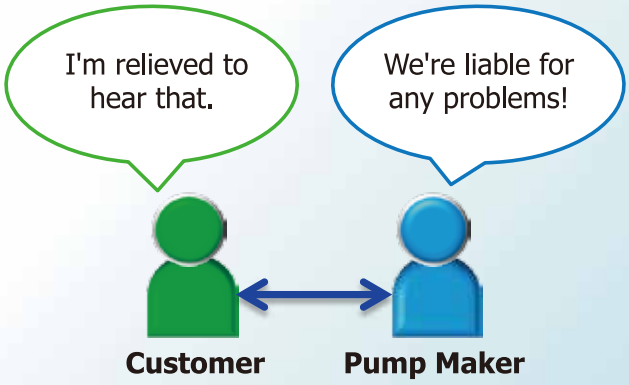
5 One-stop Support by Pump Maker

Usual Case



To be confused as multiple contacts

Pump Maker



To provide One-stop Support

Cost Reduction Case: Bulker

Sea water temp.	Main engine loads	Pumping operation frequency	Cost reduction (60kW)		Cost reduction (75kW)	
			Day(US$)	Year(US$)	Day(US$)	Year(US$)
32℃	85 %	55 Hz	22	8,030	28	10,220
	70 %	50 Hz	52	18,980	72	26,280
	50 %	41 Hz	103	37,595	129	47,085
	30 %	35 Hz	123	44,895	159	58,035
	0 %	30 Hz	140	51,100	176	64,240
20℃	85 %	30 Hz	140	51,100	140	64,240
	70 %	30 Hz	140	51,100	140	64,240
	50 %	30 Hz	140	51,100	140	64,240
	30 %	30 Hz	140	51,100	140	64,240
	0 %	30 Hz	140	51,100	140	64,240

Exchange rate: 1US$=100JPY

Cost Reduction Case: Container Ship

Sea water temp.	Main engine loads	Pumping operation frequency	Cost reduction (90kW)		Cost reduction (150kW)	
			Day(US$)	Year(US$)	Day(US$)	Year(US$)
32℃	85 %	57 Hz	23	8,395	64	23,360
	70 %	50 Hz	99	36,135	202	73,730
	50 %	44 Hz	152	55,480	252	91,980
	30 %	37 Hz	199	72,635	318	116,070
	0 %	30 Hz	229	83,585	359	131,035
20℃	85 %	50 Hz	99	36,135	202	73,730
	70 %	44 Hz	152	55,480	252	91,980
	50 %	37 Hz	199	72,635	318	116,070
	30 %	30 Hz	229	83,585	359	131,035
	0 %	30 Hz	229	83,585	359	131,035

Exchange rate: 1US$=100JPY

Standard Model & Panel Size

PUMP MOTER CAPACITY		30kW	45kW	55kW	75kW	90kW	132kW	160kW
1	MODEL (1 Motor)	ESICS1-30	ESICS1-45	ESICS1-55	ESICS1-75	ESICS1-90	ESICS1-132	ESICS1-160
	Panel Size (L×H×D/mm)	600 × 2000 × 600		600 × 2000 × 640	600 × 2100 × 640	800 × 2100 × 640	950 × 2100 × 640	
2	MODEL (2 Motors)	ESICS2-30	ESICS2-45	ESICS2-55	ESICS2-75	ESICS2-90	ESICS2-132	ESICS2-160
	Panel Size (L×H×D/mm)	1200 × 2000 × 600		1200 × 2000 × 640	1200 × 2100 × 640	1600 × 2100 × 640	1900 × 2100 × 640	
3	MODEL (3 Motors)	ESICS3-30	ESICS3-45	ESICS3-55	ESICS3-75	ESICS3-90	ESICS3-132	ESICS3-160
	Panel Size (L×H×D/mm)	1800 × 2000 × 600		1800 × 2000 × 640	1800 × 2100 × 640	2400 × 2100 × 640	2850 × 2100 × 640	

Our Strength

Engineering

To provide a Engineering Plan while considering arrangement of attached facilities

Instrumentation Products Arrangement

<Example>

- Sea water pumps
- Bulbs etc.

Construction Coordination

To provide not only Equipment Supply but Work and Supervision of Construction

Installation Schedule

New Ship

Existing Ship

Constitutive Parts

1 Inverter Panel

Model:ESICS3-45
Slight dimention changel adjustment is applicable as per customer request.

Constitutive Parts

2 Temperature Sensor (Pt100)

Usage:

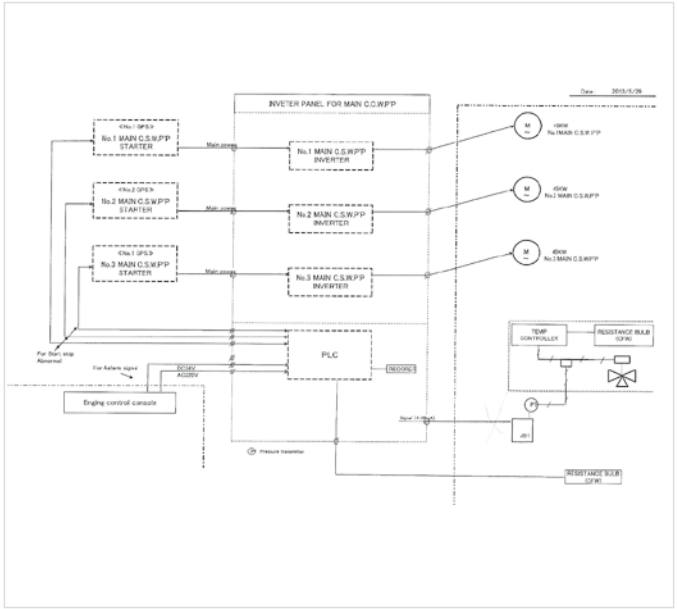
- Temperature sensing for cool FW from CCS cooler

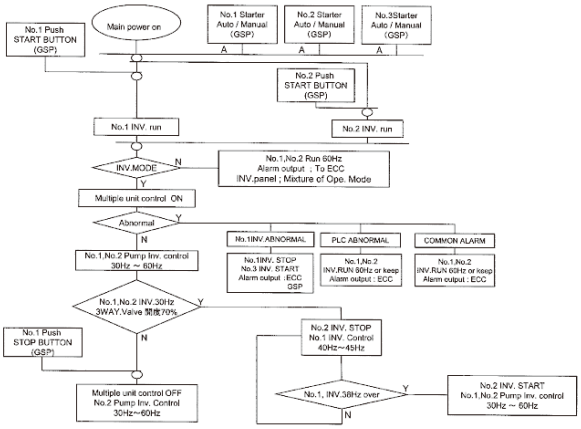
3 PT for 3-Way Temp. Control Valve

Usage:

- Opening sensing for temp. control valve
- Cooling by inverter controlling
- Controlling the number of CSW Pump

Appendix





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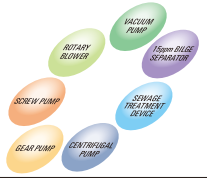

● ISO9001 Certification office

2015/11 FUJIMOTO