

Job/Serial No: C-0085 /M



OUT-GOING INSPECTION & TEST REPORT

ZHOUSHAN JIN HAI WAN SHIPYARD

Messrs : _____

Project Reference : 176000 DWT BULK CARRIER

(HULL NO. T003)

Criteria of Test/Inspection for:-

MAIN SWITCHBOARD c/w GSP

Witness by : Owner Representative : _____

Class (**ABS**) Surveyor : _____

Shipyard Representative : _____

Test Conducted By : King

QA Manager : MINAMI

Official Test Date : _____

Class Cert. No: _____

TERASAKI ELECTRIC SHANGHAI CO., LTD

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1. **General**

1.1 **Scope**

This document covers the testing and inspection items to be executed in factory for the following:-

MAIN SWITCHBOARD

And to be delivered to

ZHOUSHAN JIN HAI WAN SHIPYARD

1.2 **Applicable Rule and Regulations**

The testing will be executed in accordance to: -

ABS

1.3 **Witness Inspection**

Witness inspection will be carried out in accordance to the attached "Testing and Inspection Items".

1.4 **Inspection and Test Report**

Inspection and Testing Results shall be recorded in the attached Annexure-A.

2. Testing and Inspection Items

2.1 Visual Inspection (Verification of In-process Checklist)

The following items should conform with the applied specifications and approved drawings :

- a. Type and rating of each devices.
- b. Type and rating of each current-carrying conductors.
- c. Location and lettering of nameplates.
- d. Construction layout.
- e. Customer's comments which are given when customer inspected TERASAKI's switchboard.

The above said items can also be confirmed by the verification of the In-process Inspection Checklists.

2.2 Dimensional Inspection

Measurement of major dimensions such as the outside dimensions, installation hole pitches and cable entry opening etc., conform with the specifications below:-

<u>Dimension</u>	<u>Tolerance</u>
Below 1000 mm	+/- 3 mm
1000 mm to 2000 mm	+/- 5 mm
Above 2000 mm	+/- 10 mm

2.3 Painting Inspection

All paint finishes shall be checked for color by comparing with color sample, to the specified requirements.

Also the homogeneous of color and the minimum scratches and cracks allowable shall be checked.

The above-mentioned inspection can also be confirmed by the verification of the In-process Inspection Checklists.

2.4 Protective Device Test

All protective devices e.g. Reverse Power, Overcurrent, Preferential Trip and Undervoltage Tripping shall be tested for proper functioning either manually or by means of a dummy signal or actual conditions.

2.5 Electrical Operation Test

In accordance to the electrical schematic diagram of the measuring circuits, control circuits, protection circuits, indication circuits and other electrical circuits shall be checked for proper operation.

Any circuits controlling external devices or vice versa shall also be checked by means of dummy.

2.6 Insulation Resistance Test

It is to be confirmed that the insulation resistance between all electric circuits and the earth (except for electronic circuit) shall be more than 1 M + using a 1000V Megger.

2.7 Di-electric Withstand Voltage Test

An AC test voltage of power frequency shall be applied between the live parts together and earth or ground for one minute with the value of test voltage as specified below for each circuit voltage classification.

CLASS	RANGE	HV TEST VALUE
LRS	60<V<1000	2000V
DNV	50<V<660 1000(V) + 2V	2000V
ABS	300<V<690	2500V
GL	250<V<500	2500V
RINA	300<V<600	2500V
IEC	300<V<690	2500V
NKK	60<V 1000(V)+2V	2000V
ZC (CCS)	60<V 1000 (V) + 2V	2000V
BV	50<V<660 1000(V) + 2V	2500V

Note:- All electronic devices shall be disconnected from circuits under test.

2.8 In-process Inspection Checklists

In-process Inspection Checklists shall be enclosed for verification.

ANNEXURE A**INSPECTION AND TEST REPORTS****1.0 Visual Inspection (Verification of In-process Checklist)**

	Factory Test	Witness	Shipyard	Remark
Type and rating of each device				
Type and rating of each current-carrying conductors				
Location and lettering of nameplates				
Construction layout				
Customer's previous official memorandum(if any)				

The above said items can also be confirmed by the verification of the In-process Inspection Checklists

1.1 Dimensional Inspection

Measurement of major dimensions with the approved drawing, confirm with the specifications below:-

Dimension	Tolerance	Factory Test	Witness	Shipyard	Remark
Below 1000 mm	+/- 3 mm				
1000 mm to 2000 mm	+/- 5 mm				
Above 2000 mm	+/- 10 mm				

1.2 Painting Inspection

All paint finishes shall be checked for colour and painting thickness to the specified requirement:-

	Factory Test	Witness	Shipyard	Remark
Homogeneous color, scratches and cracks				

PROTECTIVE DEVICE TEST**1.3 Over-Current Tripping Test For Generator ACB**

It is to be confirmed that each phase of the ACB can be tripped by ACB over-current tripping device based on the following current.

Long Time Delay Trip (LTD)**a) DG1, DG2 & DG3**

Primary Current :- (I_{CT}) : _____ A Base Current (I_N) : _____ A

Pick-Up Current (I_R) :- (I_N) x Range : _____ A x _____ % = _____ A

Operating Time Setting (t_R) : _____ sec @ I_R x _____ %

Test Current (V_T) : $\frac{0.15 \times \text{Base Current (I}_N\text{)} \times \text{Scale value for (I}_R\text{)} \times 1.2}{\text{Primary Current (I}_{CT}\text{)}}$

: $\frac{0.15 \times \text{A} \times 1.2}{\text{A}} = \text{_____ mV}$

Tripping Time: approx. 20 sec (+ - 15 % tolerance)

Description	Serial No.		R	S	T	Remark
DG1		Factory Test	Sec	Sec	Sec	
		Witness	Sec	Sec	Sec	
		Shipyard	Sec	Sec	Sec	
DG2		Factory Test	Sec	Sec	Sec	
		Witness	Sec	Sec	Sec	
		Shipyard	Sec	Sec	Sec	
DG3		Factory Test	Sec	Sec	Sec	
		Witness	Sec	Sec	Sec	
		Shipyard	Sec	Sec	Sec	

1.31 Short Time Delay Trip**a) DG1, DG2 & DG3**Primary Current (I_{cr}) : A Base Current (I_n) : APick-Up Current (I_{sd}) :- I_n x Range : A x % = AOperating Time Setting (t_{sd}) : m secTest Current (V_r): $\frac{0.15 \times \text{Base Current (I}_n\text{)} \times \text{Scale value of (I}_{sd}\text{)}}{\text{Primary Current (I}_{cr}\text{)}}$: $\frac{0.15 \times \text{A} \times \%}{\text{A}} = \text{ } \text{ mV}$ Tripping Time :- approx. m sec (+ - 15 % tolerance)

Description	Serial No.		R	S	T	Remark
DG1		Factory Test	Sec	Sec	Sec	
		Witness	Sec	Sec	Sec	
		Shipyard	Sec	Sec	Sec	
DG2		Factory Test	Sec	Sec	Sec	
		Witness	Sec	Sec	Sec	
		Shipyard	Sec	Sec	Sec	
DG3		Factory Test	Sec	Sec	Sec	
		Witness	Sec	Sec	Sec	
		Shipyard	Sec	Sec	Sec	

1.4 Preferential Tripping Test

It is to be confirmed that the selected breakers are tripped satisfactory by the external protection devices (IAS).

a). DG1, DG2 & DG3

Primary Current (I_{CT}) : A Base Current (I_N) : A

Pick-Up Current (I_R) :- $(I_N) \times \text{Range} : \underline{\hspace{1cm}} \text{ A} \times \underline{\hspace{1cm}} \% = \underline{\hspace{1cm}} \text{ A}$

Operating Time Setting (t_R) : sec @ $I_R \times \underline{\hspace{1cm}} \%$

Test Current (V_T) : $\frac{0.15 \times \text{Base Current } (I_N) \times \text{Scale value for } (I_R) \times 1.2}{\text{Primary Current } (I_{CT})}$

: $\frac{0.15 \times \underline{\hspace{1cm}} \text{ A} \times \underline{\hspace{1cm}} \times 1.2}{\underline{\hspace{1cm}} \text{ A}} = \underline{\hspace{1cm}} \text{ mV}$

Tripping Time 1 (YELLOW): approx. 10 sec (+ - 15 % tolerance)

Tripping Time 2 (BLUE): approx. 20 sec (+ - 15 % tolerance)

Description	Serial No.		1 st	2 nd	Remark
DG1		Factory Test	Sec	Sec	
		Witness	Sec	Sec	
		Shipyard	Sec	Sec	
DG2		Factory Test	Sec	Sec	
		Witness	Sec	Sec	
		Shipyard	Sec	Sec	
DG3		Factory Test	Sec	Sec	
		Witness	Sec	Sec	
		Shipyard	Sec	Sec	

Tripping Circuit

	Factory Test	Witness	Shipyard	Remark
(YELLOW) MCCB:				
(BLUE)MCCB:				

1.5 Under Voltage Tripping Tests For ACB

Tripping of CBs are based on the under-voltage and the minimum closing voltage by reducing the control voltage gradually on the condition of ACB "OPEN" and then increasing the control voltage with ACB "CLOSE".

Description		Tripping Voltage	Minimum Closing	Remark
DG1	Factory Test	V	V	
	Witness	V	V	
	Shipyard	V	V	
DG2	Factory Test	V	V	
	Witness	V	V	
	Shipyard	V	V	
DG3	Factory Test	V	V	
	Witness	V	V	
	Shipyard	V	V	

1.6 Governor Motor Control Test

These circuits are to be confirmed by a phase sequence meter (or lamps), instead of the governor motor.

Description		Raise (Clockwise)	Lower (Counter Clockwise)	Remark
DG1	Factory Test			
	Witness			
	Shipyard			
DG2	Factory Test			
	Witness			
	Shipyard			
DG3	Factory Test			
	Witness			
	Shipyard			

1.7 Earth Lamp and Earth Meter Circuit Test for 440 V and 220 V feeder.

	Factory Test	Witness	Shipyard	Remark
The rated voltage is to be supplied to main bus.				
One out of the three phases is to be connected to earth in turn.				
The corresponding phase lamp should be darkened and the others brighten.				
The earth meter should indicate point 0.				
Low insulation alarm.				

1.8 Emergency Stop Circuit Test

It is to be confirmed that the selected breakers are tripped satisfactory by closing or opening signal instead of the emergency push button switch.

		Factory Test	Witness	Shipyard	Remark
1st (RED)	MCCB:				
2ND (PINK)	MCCB:				
3RD (ORANGE)	MCCB:				
4TH (PURPLE)	MCCB:				

1.9 Interlocking Test

	Factory Test	Witness	Shipyard	Remark
It is to be confirmed that the interlocking between generator ACB and shore breaker circuit is satisfactory in accordance with drawing.				

1.10 Alarm Circuit

It is to be confirmed that following circuits are satisfactory in accordance with the drawing connection or flow chart:-

Alarm Point	Set Point	Time	Factory Test		Witness		Shipyard		Remarks
			PMS	AMS	PMS	AMS	PMS	AMS	
NO.1 DG FAILURE	-	-							
NO.1 REVERSE POWER TRIP	-	-							
NO.1 CB OVERLOAD SHORT CIRCUIT TRIP	-	-							
NO.1 BB VOLTAGE LOW	-	-							
NO.1 BB VOLTAGE HIGH	-	-							
NO.1 BB FREQUENCY LOW	-	-							
NO.1 BB FREQUENCY HIGH	-	-							
NO.1 CB NON-CLOSE/SYNC FAIL	-	-							
NO.1 STAND BY START	-	-							
NO.2 DG FAILURE	-	-							
NO.2 REVERSE POWER TRIP	-	-							
NO.2 CB OVERLOAD SHORT CIRCUIT TRIP	-	-							
NO.2 BB VOLTAGE LOW	-	-							
NO.2 BB VOLTAGE HIGH	-	-							
NO.2 BB FREQUENCY LOW	-	-							
NO.2 BB FREQUENCY HIGH	-	-							
NO.2 CB NON-CLOSE/SYNC FAIL	-	-							
NO.2 STAND BY START	-	-							
NO.3 DG FAILURE	-	-							
NO.3 REVERSE POWER TRIP	-	-							
NO.3 CB OVERLOAD SHORT CIRCUIT TRIP	-	-							
NO.3 BB VOLTAGE LOW									
NO.3 BB VOLTAGE HIGH									
NO.3 BB FREQUENCY LOW									
NO.3 BB FREQUENCY HIGH									
NO.3 CB NON-CLOSE/SYNC FAIL									
NO.3 STAND BY START									
MSB AC 440V LOW INSULATION	o								
MSB AC 220V LOW INSULATION	o								
PREF TRIP	o								

EMERG STOP CTRL SORUCE FAIL	○						
MSB FAULT	○						
EMERG STOP PB WIRE BREAK	○	-					

*○ INDICATING LAMP

1.11 Pump Control Circuit

It is to be confirmed that following circuits are satisfactory in accordance with the drawing connection or flow chart:-

Alarm Point	Set Point	Time	Factory Test	Witness	Shipyard	Remark
			AMS	AMS	AMS	
HABOR LT,COOUNG F.W.						
NO.1LT.C.F.W PUMP AUTO	-	-				
NO.1LT.C.F.W PUMP RUN	-	-				
NO.1LT.C.F.W PUMP FALURE	-	-				
NO.1LT.C.F.W PUMP RESS SW	-	-				
NO.1M/E COOLING.SW PUMP AUTO	-	-				
NO.1M/E COOLING.SW PUMP RUN	-	-				
NO.1M/E COOLING.SW PUMP FALURE	-	-				
NO.1M/E COOLING.SW PUMP PRESS SW	-	-				
NO.1M/E JACKET C.F.W.PUMP AUTO	-	-				
NO.1M/E JACKET C.F.W.PUMP RUN	-	-				
NO.1M/E JACKET C.F.W.PUMP FALURE	-	-				
NO.1M/E JACKET C.F.W.PUMP RESS SW	-	-				
No.1M/E LO PUMP AUTO	-	-				
No.1M/E LO PUMP RUN	-	-				
No.1M/E LO PUMP FALURE	-	-				
No.1M/E LO PUMP PRESS SW	-	-				
NO.2LT.C.F.W PUMP AUTO	-	-				
NO.2LT.C.F.W PUMP RUN	-	-				
NO.2 LT.C.F.W PUMP FALURE	-	-				
NO.2LT.C.F.W PUMP PRESS SW	-	-				
NO.2M/E COOLING.SW PUMP AUTO						
NO.2M/E COOLING.SW PUMP RUN						
NO.2M/E COOLING.SW PUMP FALURE						
NO.2M/E COOLING.SW PUMP PRESS SW						
NO.2M/E JACKET C.F.W.PUMP AUTO						
NO.2M/E JACKET C.F.W.PUMP						

RUN						
NO.2M/E JACKET C.F.W.PUMP FLURE						
NO.2M/E JACKET C.F.W.PUMP PRESS						
No.2M/E LO PUMP AUTO						
No.2M/E LO PUMP RUN						
No.2M/E LO PUMP FALURE						
No.21M/E LO PUMP PRESS SW						
NO.3LT.C.F.W PUMP AUTO	-	-				
NO.3LT.C.F.W PUMP RUN	-	-				
NO.3 LT.C.F.W PUMP FALURE	-	-				
NO.3LT.C.F.W PUMP PRESS SW	-	-				
NO.3M/E COOLING.SW PUMP AUTO						
NO.3M/E COOLING.SW PUMP RUN						
NO.3M/E COOLING.SW PUMP FALURE						
NO.3M/E COOLING.SW PUMP PRESS SW						
NO.3M/E JACKET C.F.W.PUMP AUTO						
NO.3M/E JACKET C.F.W.PUMP RUN						
NO.3M/E JACKET C.F.W.PUMP FALURE						
NO.3M/E JACKET C.F.W.POMP PRESS						
No.3M/E LO PUMP AUTO						
No.3M/E LO PUMP RUN						
No.3M/E LO PUMP FALURE						
No.3M/E LO PUMP PRESS SW						

1.12 Parallel Running Test (Manual)

It is to be confirmed that parallel operation of generators CBs is satisfactory by the following steps:

	Factory Test	Witness	Shipyard	Remark
One generator is to be connected manually to main busbar through ACB.				
Another one is to be synchronized by ACB, in manual operation, operating the synchroscope by controlling synchroscope starting switch, governor motor control switch				
In automatic operation, operating the automatic synchronizing device.				

1.16 Generator Automatic Control Circuit and Other Circuit Test

	Factory Test	Witness	Shipyard	Remark
Automatic Generator Engine start and ACB closure onto the dead bus due to black-out.				
Automatic Generator Engine start and ACB closure onto the dead bus due to bus abnormal.				
Automatic Generator Engine start and synchronization due to ACB abnormal or overload.				
Power Management.				

	Factory Test	Witness	Shipyard	Remark
Standby Generator auto start and auto synchronization due to heavy load at 90%.				
Standby Generator auto load shift and ACB disconnection at light load of 35%. Generator auto stops after 600 Seconds.				
Large motor start block control				

Description		Black-out	Bus Abnormal	Overload/ Abnormal trip During parallel running	Heavy Load Start Request	Light Load Shift	Remark
DG1	Factory Test						
	Witness						
	Shipyard						
DG2	Factory Test						
	Witness						
	Shipyard						
DG3	Factory Test						
	Witness						
	Shipyard						

1.13 Automatic Load Sharing Test

	Factory Test	Witness	Shipyard	Remark
When parallel running, it is to be confirmed that the automatic sharing devices operate satisfactorily.				

1.14 Space Heater Circuit Test

Space heater circuits are to be confirmed correct by a lamp instead of space heater, which is to extinguish with ACB "ON" and a light with ACB "OFF".

Description		Manual On, Off	Auto Cut Off When Breaker Closed	Remark
DG1	Factory Test			
	Witness			
	Shipyard			
DG2	Factory Test			
	Witness			
	Shipyard			
DG3	Factory Test			
	Witness			
	Shipyard			

1.15 Fluorescent Light Circuit

It is to be confirmed that fluorescent light circuit is satisfactory in accordance with the drawing connection.

	Factory Test	Witness	Shipyard	Remark
It is to be confirmed that fluorescent light circuit is satisfactory in accordance with the drawing connection.				

	Factory Test	Witness	Shipyard	Remark
According to PMS Flow chart The PMS all function				

1.17 Group Starters Functional Test

	Factory Test	Witness	Shipyard	Remark
Manual and Auto START/STOP				
Auto-changeover System				
Sequential Starting				
Space Heater Circuit				

1.18 Insulation Resistance Test

It is to be confirmed that the insulation resistance between all electric circuit and earth, except electronic circuits are more than 1.0 M-ohm using a 500 Vdc Megger.

Between Phase	Before HVT			After HVT			Remarks
	Factory Test	Witness	Shipyard	Factory Test	Witness	Shipyard	
R – S (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
S – T (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
T – R (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
R – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
S – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
T – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
TOTAL – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	

1.19 Dielectric Strength Test

- a) It is to be confirmed that the di-electric strength test of the above-mentioned circuit is satisfactory by applying the voltage of 2500 V for 1 minutes.

Job/Serial No. : C- 0085 /E



OUT-GOING INSPECTION & TEST REPORT

Messrs : ZHOUSHAN JIN HAI WAN SHIPYARD

Project Reference : 176000 DWT BULK CARRIER

(HULL NO. T003)

Criteria of Test/Inspection for :-

**EMERGENCY
SWITCHBOARD**

Witness by : Owner Representative : _____

Class (**ABS**) Surveyor : _____

Shipyard Representative : _____

Test Conducted By : King

QA Manager : MINAMI

Official Test Date : _____

Class Cert. No: _____

TERASAKI ELECTRIC SHANGHAI CO., LTD

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- 2.4 Electrical Operation Test
- 2.5 Protective Device Test
- 2.6 Insulation Resistance Test
- 2.7 Dielectric Withstand Voltage Test
- 2.8 In-process Inspection Checklists

1. General**1.1 Scope**

This document covers the testing and inspection items to be executed in factory for the following:-

EMERGENCY SWITCHBOARD

And to be delivered to

ZHOUSHAN JIN HAI WAN SHIPYARD

1.2 Applicable Rule and Regulations

The testing will be executed in accordance to :-

ABS

1.3 Witness Inspection

Witness inspection will be carried out in accordance to the attached "Testing and Inspection Items".

1.4 Inspection and Test Report

Inspection and Testing Results shall be recorded in the attached Annexure-A.

2. Testing and Inspection Items

2.1 Visual Inspection (Verification of In-process Checklist)

The following items should conform with the applied specifications and approved drawings :

1. Type and rating of each devices.
2. Type and rating of each current-carrying conductors.
3. Location and lettering of nameplates.
4. Construction layout.
5. Customer's comments which are given when customer inspected TERASAKI's switchboard.

The above said items can also be confirmed by the verification of the In-process Inspection Checklists.

2.2 Dimensional Inspection

Measurement of major dimensions such as the outside dimensions, installation hole pitches and cable entry opening etc., conform with the specifications below:-

<u>Dimension</u>	<u>Tolerance</u>
Below 1000 mm	+/- 3 mm
1000 mm to 2000 mm	+/- 5 mm
Above 2000 mm	+/- 10 mm

2.3 Painting Inspection

All paint finishes shall be checked for colour by comparing with colour sample, to the specified requirements.

Also the homogeneous of colour and the minimum scratches and cracks allowable shall be checked.

2.4 Protective Device Test

All protective devices shall be tested for proper functioning either manually or by means of a dummy signal or actual conditions

2.5 Electrical Operation Test

In accordance to the electrical schematic diagram of the measuring circuits, control circuits, protection circuits, indication circuits and other electrical circuits shall be checked for proper operation.

Any circuits controlling external devices or vice versa shall also be checked by means of dummy.

2.6 Insulation Resistance Test

It is to be confirmed that the insulation resistance between all electric circuits and the earth (except for electronic circuit) shall be more than 1 M + using a 1000V Megger.

2.7 Di-electric Withstand Voltage Test

An AC test voltage of power frequency shall be applied between the live parts together and earth or ground for one minute with the value of test voltage as specified below for each circuit voltage classification.

CLASS	RANGE	HV TEST VALUE
LRS	60<V<1000	2000V
DNV	50<V<660 1000(V) + 2V	2000V
ABS	300<V<690	2500V
GL	250<V<500	2500V
IEC	300<V<690	2500V
NKK	60<V 1000(V)+2V	2000V
ZC (CCS)	60<V 1000 (V) + 2V	2000V
RINA	300<V<600	2500V
BV	300<V<600	2500V

Note: All electronic devices shall be disconnected from circuits under test.

2.8 In-process Inspection Checklists

In-process Inspection Checklists shall be enclosed for verification.

ANNEXURE A**INSPECTION AND TEST REPORTS****1.0 Visual Inspection (Verification of In-process Checklist)**

The following items should confirm with the applied specifications and approved drawing:

	Factory Test	Witness	Shipyard	Remark
Type and rating of each device				
Type and rating of each current-carrying conductors				
Location and lettering of nameplates				
Construction layout				
Customer's previous official memorandum(if any)				

The above said items can also be confirmed by the verification of the In-process Inspection Checklists

1.1 Dimensional Inspection

Measurement of major dimensions with the approved drawing, confirm with the specifications below:-

Dimension	Tolerance	Factory Test	Witness	Shipyard	Remark
Below 1000 mm	+/- 3 mm				
1000 mm to 2000 mm	+/- 5 mm				
Above 2000 mm	+/- 10 mm				

1.2 Painting Inspection

All paint finishes shall be checked for colour and painting thickness to the specified requirement:-

	Factory Test	Witness	Shipyard	Remark
Homogeneous color, scratches and cracks				

PROTECTIVE DEVICE TEST**1.3 Overcurrent Tripping Test for Generator ACB**

It is to be confirmed that each phase of the ACB can be tripped by ACB over-current tripping device based on the following current.

LONG TIME DELAY TRIP (LTD)

Setting : _____ A (Rated Current) x _____ % = _____ A

Operating Current : _____ A (Setting Current) x _____ % = _____ A

C.T. Ratio : /0.05A

Tripping Time: **approx.** _____ **sec** (+ - 15 % tolerance)

Serial No.		R	S	T	Remark
	Factory Test	Sec	Sec	Sec	
	Witness	Sec	Sec	Sec	
	Shipyard	Sec	Sec	Sec	

SHORT TIME DELAY TRIP (STD)

Tripping Time: **approx.** _____ **msec** (+ - 15 % tolerance)

Serial No.		R	S	T	Remark
	Factory Test				
	Witness				
	Shipyard				

1.4 Under Voltage Tripping Test for Generator CB

Tripping Voltage of CB based on the under-voltage and minimum closing voltage are to be confirmed by reducing voltage gradually on the condition of ACB "CLOSE" and then increasing voltage with CB "OPEN".

Description	E Gen.			Remarks
	Factory Test	Witness	Shipyard	
Tripping Voltage	V	V		
Minimum Closing	V	V		

1.5 Emergency Stop Circuit Test

It is to be confirmed that the selected breakers are tripped satisfactory by closing or opening signal instead of the emergency push button switch.

		Factory Test	Witness	Shipyard	Remark
1 st (RED)	MCCB:				
2 ND (PINK)	MCCB:				
3 RD (ORANGE)	MCCB:				

1.6 Interlocking Test

It is to be confirmed that the interlocking between Emergency generator and Bus-tie breaker circuit is satisfactory in accordance with drawing.

	Factory Test	Witness	Shipyard	Remark
EG automatic start due to blackout and EG CB closure onto the dead bus.				
Changeover to normal power supply due to MSB power restoration.				
Emergency generator engine test start CB closure via blackout.				

1.7 Earth Lamp and Earth Meter Circuit Test for 440 V and 220 V Feeder.

	Factory Test	Witness	Shipyard	Remark
The rated voltage is to be supplied to main bus.				
One out of the three phases is to be connected to earth in turn.				
The corresponding phase lamp should be darkened and the others brighten.				
The earth meter should indicate point 0.				
Low insulation alarm.				

1.8 Alarm Circuit

It is to be confirmed that following circuits are satisfactory in accordance with the drawing connection or flow chart:-

Alarm Point		Set Point	Time	Remark
AC 440V LOW INSULATION	Factory Test			
	Witness			
	Shipyard			
AC 220V LOW INSULATION	Factory Test			
	Witness			
	Shipyard			
E STOP SOURCE FAILURE	Factory Test			
	Witness			
	Shipyard			
ACB ABNORMAL TRIP	Factory Test			
	Witness			
	Shipyard			
WIRE BREAK ALARM	Factory Test			
	Witness			
	Shipyard			

1.9 Space Heater Circuit Test

Space heater circuits are to be confirmed correct by a lamp instead of space heater, which is to extinguish with ACB "ON" and a light with ACB "OFF".

Description	EG			Remark
	Factory Test	Witness	Shipyard	
Manual On, Off				
Auto Cut Off When Breaker Closed				

1.10 Fluorescent Light Circuit

	Factory Test	Witness	Shipyard	Remark
It is to be confirmed that fluorescent light circuit is satisfactory in accordance with the drawing connection.				

1.11 Generator Automatic Control Circuit and Other Circuit Test

	Factory Test	Witness	Shipyard	Remark
Manual START/STOP				
Space Heater Circuit				

1.12 Insulation Resistance Test

It is to be confirmed that the insulation resistance between all electric circuit and earth, except electronic circuits are more than 1.0 M-ohm using a 500 Vdc Megger.

Between Phase	Before HVT			After HVT			Remarks
	Factory Test	Witness	Shipyard	Factory Test	Witness	Shipyard	
R – S (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
S – T (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
T – R (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
R – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
S – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
T – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
TOTAL – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	

1.13 Dielectric Strength Test

- a) It is to be confirmed that the di-electric strength test of the above-mentioned circuit is satisfactory by applying the voltage of 2500 V for 1 minutes.

Job/Serial No. : C-0085 /G



OUT-GOING INSPECTION & TEST REPORT

Messrs : ZHOUSHAN JIN HAI WAN SHIPYARD

Project Reference : 176000 DWT BULK CARRIER

(HULL NO. T003)

Criteria of Test/Inspection for :-

GROUP STARTER PANEL

Witness by : Owner Representative : _____

Class (**ABS**) Surveyor : _____

Shipyard Representative : _____

Test Conducted By : King

QA Manager : MINAMI

Official Test Date : _____

Class Cert. No: _____

TERASAKI ELECTRIC SHANGHAI CO., LTD

Building 5&7, No. 399 Xuanzhong Rd.

Nanhui Industrial Zone, Shanghai, China 201314

Tel No.:86-21-58186340 Fax No: 86-21-58186350

Email : tsc@terasaki.com.cn

Contents :

1. General

- 1.1 Scope
- 1.2 Applicable Rule and Regulation
- 1.3 Witness Inspection
- 1.4 Inspection and Test Report

2. Test and Inspection Items

- 2.1 Visual Inspection
- 2.2 Dimensional Inspection
- 2.3 Painting Inspection
- 2.4 Electrical Operation Test
- 2.5 Insulation Resistance Test
- 2.6 Dielectric Withstand Voltage Test
- 2.7 In-process Inspection Checklists

1. General**1.1 Scope**

This document covers the testing and inspection items to be executed in factory for the following:-

GROUP STARTER PANEL

And to be delivered to

ZHOUSHAN JIN HAI WAN SHIPYARD

1.2 Applicable Rule and Regulations

The testing will be executed in accordance to :-

ABS

1.3 Witness Inspection

Witness inspection will be carried out in accordance to the attached "Testing and Inspection Items".

1.4 Inspection and Test Report

Inspection and Testing Results shall be recorded in the attached Annexure-A.

2. Testing and Inspection Items

2.1 Visual Inspection (Verification of In-process Checklist)

The following items should conform with the applied specifications and approved drawings :

1. Type and rating of each devices.
2. Type and rating of each current-carrying conductors.
3. Location and lettering of nameplates.
4. Construction layout.
5. Customer's comments which are given when customer inspected TERASAKI's switchboard.

The above said items can also be confirmed by the verification of the In-process Inspection Checklists.

2.2 Dimensional Inspection

Measurement of major dimensions such as the outside dimensions, installation hole pitches and cable entry opening etc., conform with the specifications below:-

<u>Dimension</u>	<u>Tolerance</u>
Below 1000 mm	+/- 3 mm
1000 mm to 2000 mm	+/- 5 mm
Above 2000 mm	+/- 10 mm

2.3 Painting Inspection

All paint finishes shall be checked for colour by comparing with colour sample, to the specified requirements.

Also the homogeneous of colour and the minimum scratches and cracks allowable shall be checked.

The above-mentioned inspection can also be confirmed by the verification of the In-process Inspection Checklists.

2.4 Insulation Resistance Test

It is to be confirmed that the insulation resistance between all electric circuits and the earth (except for electronic circuit) shall be more than 1 M + using a 1000V Megger.

2.5 Di-electric Withstand Voltage Test

An AC test voltage of power frequency shall be applied between the live parts together and earth or ground for one minute with the value of test voltage as specified below for each circuit voltage classification.

CLASS	RANGE	HV TEST VALUE
LRS	$60 < V < 1000$	2000V
DNV	$50 < V < 660 \quad 1000(V) + 2V$	2000V
ABS	$300 < V < 690$	2500V
GL	$250 < V < 500$	2500V
IEC	$300 < V < 690$	2500V
NKK	$60 < V \quad 1000(V) + 2V$	2000V
ZC (CCS)	$60 < V \quad 1000 (V) + 2V$	2000V
RINA	$300 < V < 600$	2500V
BV	$300 < V < 600$	2500V

Note: All electronic devices shall be disconnected from circuits under test.

2.6 In-process Inspection Checklists

In-process Inspection Checklists shall be enclosed for verification.

ANNEXURE A**INSPECTION AND TEST REPORTS****1.1 Visual Inspection (Verification of In-process Checklist)**

The following items should confirm with the applied specifications and approved drawing:

	Factory Test	Witness	Shipyard	Remark
Type and rating of each device				
Type and rating of each current-carrying conductors				
Location and lettering of nameplates				
Construction layout				
Customer's previous official memorandum(if any)				

The above said items can also be confirmed by the verification of the In-process Inspection Checklists

1.2 Dimensional Inspection

Measurement of major dimensions with the approved drawing, confirm with the specifications below:-

Dimension	Tolerance	Factory Test	Witness	Shipyard	Remark
Below 1000 mm	+/- 3 mm				
1000 mm to 2000 mm	+/- 5 mm				
Above 2000 mm	+/- 10 mm				

1.3 Painting Inspection

All paint finishes shall be checked for colour and painting thickness to the specified requirement:-

	Factory Test	Witness	Shipyard	Remark
Homogeneous color, scratches and cracks				

1.4 Protective Device Test

	Factory Test	Witness	Shipyard	Remark
All protective devices shall be tested for proper functioning either manually or by means of a dummy signal or actual conditions				

1.5 Electrical Operation Test

In accordance to the electrical schematic diagram of the measuring circuits, control circuits, protection circuits, indication circuits and other electrical circuits shall be checked for proper operation.

Any circuits controlling external devices or vice versa shall also be checked by means of dummy.

NO. 1 BALLAST PUMP

Description	Factory Test	Witness	Shipyard	Remark
CB Close/Open (CB Local)				
Control Source Available (WL)				
Running Light (Green)				
Space Heater On/Off				
Remote Controls				
Remote Start/Stop				

NO. 2 BALLAST PUMP

Description	Factory Test	Witness	Shipyard	Remark
CB Close/Open (CB Local)				
Control Source Available (WL)				
Running Light (Green)				
Space Heater On/Off				
Remote Controls				
Remote Start/Stop				

JOB:

C-0085 /G

1.6 Insulation Resistance Test

It is to be confirmed that the insulation resistance between all electric circuit and earth, except electronic circuits are more than **1.0** M-ohm using a **500** Vdc Megger.

NO. 1 BALLAST PUMP

Between Phase	Before HVT			After HVT			Remarks
	Factory Test	Witness	Shipyard	Factory Test	Witness	Shipyard	
R – S (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
S – T (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
T – R (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
R – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
S – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
T – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
TOTAL – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	

NO. 2 BALLAST PUMP

Between Phase	Before HVT			After HVT			Remarks
	Factory Test	Witness	Shipyard	Factory Test	Witness	Shipyard	
R – S (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
S – T (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
T – R (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
R – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
S – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
T – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	
TOTAL – E (MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	

1.7 Dielectric Strength Test

- a) It is to be confirmed that the di-electric strength test of the above-mentioned circuit is satisfactory by applying the voltage of 2500 V for 1 minutes.

采购入库单 1 (5290.23)

入库日期 2009-01-01 仓库 R-加工贸易库 入库单号 0000004814

到货日期 订单号 到货单号

供货单位 TJCB 采购类型 国外采购-加工贸易 币种 美元

业务员 入库类别 材料入/汇率 6.8397

备注 nsr8611-i0804039-m 审核日期 2009-01-01 税率 0.00

存货编码	存货名称	规格型号	主计量单位	数量	本币单价	原币含税单价	原币价税合计	税率	项目大类编码	项目编码	项目名称
002.0010860	Terasaki MCCB	H100NF 3P PM 100A	台	6.00	775.553333	113.390000	680.34	0.0097		J-8611-M	新时代 73400DWT MSB
002.00108712	Terasaki MCCB	H100NF 3P PM SHT 100A	台	6.00	855.783333	125.120000	750.72	0.0097		J-8611-M	新时代 73400DWT MSB
002.0010869	Terasaki MCCB	H100NF 3P PM 75A	台	1.00	775.550000	113.390000	113.39	0.0097		J-8611-M	新时代 73400DWT MSB
004.0040026	Terasaki附件 MOUNTING BASE	T2PM25B3	台	36.00	240.689167	35.190000	1266.84	0.0097		J-8611-M	新时代 73400DWT MSB
002.0010864	Terasaki MCCB	H100NF 3P PM 30A	台	7.00	775.554286	113.390000	793.73	0.0097		J-8611-M	新时代 73400DWT MSB
002.0010877	Terasaki MCCB	H225NF 3P PM 225A	台	2.00	1390.650000	203.320000	406.64	0.0097		J-8611-M	新时代 73400DWT MSB
002.0010877	Terasaki MCCB	H225NF 3P PM 225A	台	1.00	1390.650000	203.320000	203.32	0.0097		J-8611-M	新时代 73400DWT MSB
002.00108773	Terasaki MCCB	H225NF 3P PM SHT 225A	台	5.00	1470.878000	215.050000	1075.25	0.0097		J-8611-M	新时代 73400DWT MSB
页小计:											
合计:				64.00			5290.23				

审核人 输单员 制单人 输单员

现存量