

GLAAG0001687340

Remarks in the letter to be observed

GL




Approved

hame

Hamburg

2009-02-20

Ref.-No. 09-012719

|              |              |              |         |      |  |   |        |          |
|--------------|--------------|--------------|---------|------|--|---|--------|----------|
|              |              |              |         |      | 6500DWT IMO II 油船/化学品船<br>6500DWT IMO II OIL/CHEMICAL TANKER | 详细设计<br>DETAIL DESIGN   |        | REVISION |
|              |              |              |         |      |  |   |        | 0        |
|              |              |              |         |      | 主配电板单线图<br>SINGLE LINE DIAGRAM OF<br>MAIN SWITCHBOARD        | JR555-641-01  |        |          |
| SIGN         | NUM.         | DESCRIPTION  | SIG.    | DATA |  | SIGN  | WEIGHT | SCALE    |
| DESIGNED     | Li Ji Ping   | COUNTER SIG. |         |      |  |   |        |          |
| CHECKED      | Sun Guoqiang |              |         |      |  |   |        |          |
| CHE. OF STD. |              |              |         |      | PROJECT NUMBER   | SRC516/517/518  |        |          |
| VERIFIED     |              |              |         |      | SURVEY DEPARTMENT  | GL  |        |          |
| APPROVED     | Peter Zhou   | DATA         | 2009.01 |      |  |  上海京荣船舶设计有限公司<br>SHANGHAI JINGRONG<br>MERCHANT SHIP DESIGN CO., LTD. |        |          |



## TECHNICAL ESSENTIAL

## 1. 主配电板组成:

CONSTITUTE OF MAIN SWITCHBOARD:

由主发电机屏三屏、轴带发电机屏一屏，并车屏一屏、440V负载屏二屏、220负载屏一屏、组合起动屏两屏，共十屏组成。

THREE(3) MAIN GENERATOR PANELS,ONE (1) SHAFT GENERATOR PANEL,ONE (1) SYNCHRONIZING PANEL, TWO (2) 440V FEEDER PANELS, ONE (1) 220V FEEDER PANEL,AND TWO (2) GROUP STARTING PANELS. TOTAL TEN (10) PANELS.

## 2. 主配电板的结构形式:

STRUCTURE FOR OF MSB:

主配电板的顶部防护等级为IP22，顶部配有吊环，主配电板做成前开门式，板前维修，前面设置绝缘扶手。

主配电板各屏之间均以钢板或阻燃材料相隔开。外形尺寸8310X2000X760 mm.

THE PROTECTION GRADE OF MSB SHALL BE IP22. THE HOISTING RING SHALL BE INSTALLED AT THE TOP OF MSB. IT SHALL BE MADE INTO FRONT TYPE, MAINTAINED IN FRONT AND ISOLATED HANDRAILS SHALL BE INSTALLED IN THE FRONT. EACH OF PANELS IS SEPARATED WITH STEEL OR FLAME-RETARDANT PARTITIONS. EXTERNAL DIMENSION 8310X2000X760 MM

## 3. 铭牌选用阻燃塑料，黑底白字。

NAMEPLATES SHALL BE MADE OF FLAME-RETARDANT MATERIAL, WHITE WORD WITH BLACK BACKGROUND.

## 4. 主配电板输入输出接线端应设有永久性标志，要求接线方便，便于维修。

THE INPUT AND OUTPUT CONNECTING TERMINAL OF MSB SHALL HAVE PERMANENT MARKS, IN ORDER FOR CONVENIENT CONNECTION AND MAINTAINANCE.

## 5. 主配电板的内部接线采用CBVR型绝缘软线。

THE INNER WIRES OF MSB SHALL BE ISOLATED SOFT WIRES OF CBVR TYPE.

## 6. 测量仪表选用F96系列船用仪表，电表的表面应在发电机的电压、电流、功率之额定值处画出红色标记，功率表应有15%负功率刻度，电流互感器和电压互感器的次级绕组应可靠接地。

METERS ON MSB SHALL BE MARINE TYPE OF F96 SERIES MADE RED SCALE LINE INDICATING RATED VOLTAGE, CURRENT AND POWER MUST BE MARKED IN THE FACE OF CORRESPONDING METERS. THE WATTMETER SHOULD HAVE SCALE TO INDICATE 15% NEGATIVE POWER OF GENERATOR RATE POWER. THE SECONDARY WINDING OF CURRENT/VOLTAGE INSTRUMENT TRANSFORMER SHOULD BE GROUNDED FIRMLY.

## 7. 发电机主开关选用MT施耐德开关，分路开关选用施耐德NS系列分路配电开关。

THE MAIN SWITCH OF GENERATOR SHALL BE SCHNEIDER MT AIR CIRCUIT BREAKER. THE BRANCH SWITCH SHALL BE NS SERIES BREAKER

## 8. 发电机主开关具有过载长延时、短延时、短路瞬时三段保护特性，并具有失压脱扣保护装置。

THE MAIN SWITCH OF GENERATOR SHALL HAVE THE FOLLOWING THREE (3) KINDS OF PROTECTION CHARACTERISTICS FOR GENERATOR:



LONG TIME DELAY TRIPPING WHEN OVERLOAD

SHORT TIME DELAY TRIPPING WHEN OVERLOAD

INSTANTANEOUS TRIPPING WHEN SHORTING CIRCUIT

THE MAIN SWITCH OF GENERATOR SHALL ALSO HAVE FUNCTION OF NO-VOLTAGE TRIP PROTECTION.

9. 在主配电板内设置了保护及电站管理系统装置，电站管理系统装置具有以下功能：

THE MSB IS EQUIPPED WITH A PROTECTION AND POWER MANAGEMENT SYSTEM WITH THE FOLLOWING FUNCTIONS:

失电时备用发电机启动

BLACK-OUT START OF ST-BY DIESEL GENERATOR

根据实际负载发电机启动/停止

LOAD DEPENDENT START/STOP OF DIESEL GENERATORS

均衡发电机之间负载

SYMMETRICAL LOADSHARING BETWEEN GENERATORS

发电机遥控启动输入接口

INPUT INTERFACE FOR REMOTE START OF DG

自动停止连锁接口

INPUT FOR "AUTO STOP BLOCKING"

重载控制

HEAVY CONSUMERS CONTROL

发电机超负荷非重要负荷的切断

DISCONNECTION OF NON IMPORTANT LOAD BY OVERLOAD OF GENERATOR

自动模式时电站管理系统有以下控制：

IN AUTO MODE THE POWER MANAGEMENT SYSTEM WILL CONTROL:

当发电机高/低负载时给出启动/停止备用发电机信号

START/STOP SIGNAL TO STAND-BY DIESEL AT HIGH/LOW LOAD

发电机优先管理

ADMINISTRATION OF PRIORITY OF GENERATOR

自动调频

AUTOMATIC SYNCHRONIZING

自动调载

AUTOMATIC LOADSHARING

10. 在下述情况下启动信号启动备用发电机

Start signal to stand-by diesel and connection in following condition:

当应急停车时

At emergency shut-down

当过载时

At overload

当主开关不正常脱扣时

At ACB abnormal trip

当同步故障时

At synchronizing failure

11. 主发电机均与应急发电机联锁。

THE INTERLOCK CIRCUIT BETWEEN EMERGENCY GENERATOR AND MAIN GENERATORS SHALL BE PROVIDED.



12. 在主配电板内设置带我回家功能,当3台发电机并联运行时可操作“带我回家”模式是通过同步屏选择开关进行选择,当选择“带我回家”模式时电站管理系统控制3台发电机起动和并联运行,同时电站管理系统向集控室发出起动就绪信号,起动软起动
- The switchboard is prepared for “take me home Generator” mode. All 3 aux. generators have to run in parallel during operation in “take me home” mode. “Take me home” mode is selected by means of a change-over switch in the synchronizing section and when the “take me home” mode is selected, the PMS system arranges starting-up and synchronizing of all 3 generators. When all 3 generators are running in parallel, the PMS system will transmit a start ready signal to the ECR for start of softstarter
13. 在主配电板内设置应急发电机作为“停泊发电机”的模式,“停泊发电机”的模式通过同步屏选择开关进行选择,电站管理系统控制与停泊发电机短时并车与换车
- THE EMERGENCY GENERATOR SHALL BE SET FOR “ANCHORING GENERATOR” MODE SHALL BE PROVIDED IN MSB. “ANCHORING GENERATOR” MODE IS SELECTED BY SELECTION SWITCH IN THE SYNCHRONIZING SECTION, IN WHICH PMS SYSTEM ARRANGES THE MAIN GENERATOR, EMERGENCY GENERATOR SHORT TERM SYNCHRONIZING AND CHANGE-OVER
14. 三台发电机均与岸电联锁,即当任何一台发电机的主开关合闸时,岸电先行跳闸,当主开关分闸后,岸电方可合闸供电。主发电机均与应急发电机联锁。
- THE THREE (3) GENERATORS SHALL BE INTERLOCKED WITH SHORE POWER SUPPLY. WHILE MAIN SWITCH OF ANY GENERATOR IS TURNED ON, THE SWITCH OF SHORE POWER SUPPLY SHALL BE TURNED OFF IMMEDIATELY. ONLY WHEN MAIN SWITCH OF GENERATOR IS TURNED OFF, THE SHORE POWER SUPPLY SHOULD BE USED. THE INTERLOCK CIRCUIT BETWEEN EMERGENCY AND MAIN GENERATORS IS ALSO PROVIDED
- 在主配电板上设有电网绝缘监测装置,可同时对AC440V各段电力汇流排和AC220V照明汇流排的绝缘进行监测和报警,无论主汇流条是否处于分段供电的状态。
- THE NETWORK ISOLATION TESTER SHALL BE EQUIPPED IN MSB. IT SHALL BE ABLE TO MONITOR AND TRIGGER ALARM FOR THE ISOLATION OF EACH BAR OF 440V POWER BUS-BAR AND 220V LIGHTING BUS-BAR, NO MATTER IF THE BUS-BAR IS SUPPLYING POWER BY SUBSECTION.
15. 为防止无线电干扰,在AC440V和AC220V回路中均设置滤波电容器。
- FOR AVOIDING RADIO INTERFERENCE, FILTER CAPACITORS SHALL BE PROVIDED IN AC440V AND AC220V CIRCUIT.
16. 仪表、开关、指示灯、按钮、操作手柄及熔断器等均应设有标明其用途和操作位置的耐久铭牌,自动开关和熔断器的铭牌均应刻有过载保护整定值。
- PERPATUAL NAMEPLATES OF ALL INSTRUMENTS, SWITCHES, INDICATION LAMPS, BUTTONS, HANDLES AND FUSES SHALL ALL BE PROVIDED TO INDICATE ITS FUNCTION AND OPERATION POSITION. THE SET VALUE OF OVERLOAD SHALL BE SHOWN FOR FUSES OF AUTO SWITCHES.
17. 配电板内所有励磁线圈、接触器、中间继电器、高温报警继电器的线圈,电压表和各测量仪表的电压线圈,失压线圈,接地指示灯和各种指示灯及其连接导线,均应设置熔断器保护。
- THE SHUNT TRIP COIL, UNDER VOLTAGE TRIP COIL, COILS OF CONTACTOR, AUXILIARY RELAY, HIGH TEMPERATURE ALARM RELAY, COILS OF EACH METER, VARIOUS INDICATION LAMPS AND THEIR CONNECTING WIRES IN MSB SHOULD BE PROTECTED BY FUSE.
18. 在主配电板上设有电网绝缘监测装置,可同时对AC440V各段电力汇流排和AC220V照明汇流排的绝缘进行监测和报警,无论主汇流条是否处于分段供电的状态。
- THE NETWORK ISOLATION TESTER SHALL BE EQUIPPED IN MSB. IT SHALL BE ABLE TO MONITOR AND TRIGGER ALARM FOR THE ISOLATION OF EACH BAR OF 440V POWER BUS-BAR AND 220V LIGHTING BUS-BAR, NO MATTER IF THE BUS-BAR IS SUPPLYING POWER BY SUBSECTION.
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- PERPATUAL NAMEPLATES OF ALL INSTRUMENTS, SWITCHES, INDICATION LAMPS, BUTTONS, HANDLES AND FUSES SHALL ALL BE PROVIDED TO INDICATE ITS FUNCTION AND OPERATION POSITION. THE SET VALUE OF OVERLOAD SHALL BE SHOWN FOR FUSES OF AUTO SWITCHES.



21. 当机舱发生火灾时，可以在机舱出口处将机舱的通风机和油泵集中进行遥控切断。遥控电源由被切分路所在汇流排供电。

IN CASE OF FIRE IN ENGINE ROOM, BY USING OF REMOTE SHUTDOWN BUTTONS AT THE EXIT DOOR OF ENGINE ROOM, THE VENTILATORS AND OIL PUMPS COULD BE SHUTDOWN IMMEDIATELY. THE POWER OF THIS CONTROL SYSTEM SHALL BE FED BY BUS-BAR OF SHUTDOWN BRANCH.

22. 组合起动控制屏中的各单元内所标注的，为各设备的额定电流，其保护元器件的整定值应为设备额定电流的1.05倍。

THE RATED CURRENT OF EACH EQUIPMENT IN GROUP STARTING PANEL SHALL BE MARKED, THE SET VALUE OF PROTECTIVE ELEMENTS SHALL BE 1.05 TIMES OF RATED CURRENT.

23. 配电板内所有励脱扣线圈、接触器、中间继电器、高温报警继电器的线圈，电压表和各测量仪表的电压线圈，失压线圈，接地指示灯和各种指示灯及其连接导线，均应设置熔断器保护。

THE SHUNT TRIP COIL, UNDER VOLTAGE TRIP COIL, COILS OF CONTACTOR, AUXILIARY RELAY, HIGH TEMPERATURE ALARM RELAY, COILS OF EACH METER, VARIOUS INDICATION LAMPS AND THEIR CONNECTING WIRES IN MSB SHOULD BE PROTECTED BY FUSE.

- ES1 在机舱入口处和集控台应急切断机舱风机和油泵  
EMERGENCY SHUT-OFF FOR FAN AND OIL PUMP IN THE  
E/R OUT SIDE OF ENTRANCE AND ENGINE CONTROL CONSOLE

- ES2 在驾驶室控制台应急切断空调和舱室风机泵  
EMERGENCY SHUT-OFF FOR AIR CONDITION UNIT AND ACCOMODATION  
FAN IN THE WHELL CONTROL CONSOLE

- ES3 在货控室货控台应急切断压载泵舱防爆抽风机  
EMERGENCY SHUT-OFF FOR EX-PROOF FAN OF BALLAST PUMP ROOM  
IN THE CARGO OIL CONTROL CONSOLE

- ES4 在厨房门边应急切断AC 440V 厨房设备电源  
EMERGENCY SHUT-OFF FOR POWER OF 440V KITCHEN EQUIPMENT  
IN THE OUTSIDE OF KITCHEN

- ES5 在应急发电机室外应急切断应急发电机室风机  
EMERGENCY SHUT-OFF FOR EM. G. FAN IN THE SIDE OF THE EM. G. ROOM

- ES6 在机舱入口处应急切断2号机舱风机  
EMERGENCY SHUT-OFF FOR .NO.2 FAN IN THE E/R SIDE OF ENTRANCE



## 主配电板单线图

## SINGLE LINE DIAGRAM OF MAIN SWITCHBOARD

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发电机主开关参数如下:

THE PARAMETER OF AUTOMATIC CIRCUIT BREAKER OF GENERATOR AS FOLLOWS:

| 型 号  |  |                                 |  |
|--|--|---------------------------------|--|
| TYPE   |  |                                 | NT10H1                                   |
| 发电机额定电流  |  |                                 | Ie= 721.7A                               |
| RATED CURRENT OF GENERATOR                                     |  |                                 |  |
| 控制单元<br>CONTROL UNIT<br>Micrologic 5.0A                        | 过载长延时<br>LONG TIME DELAY TRIPPING<br>WHEN OVERLOAD     | 整 定 电 流<br>SET CURRENT (Ir) (A) | Ir =1.25XIe=1.25X721.7=902.13A           |
|  |  | 整 定 时 间<br>SET TIME (Tr) (S)    | Tr=30s                                   |
|  | 过载短延时<br>SHORT TIME DELAY TRIPPING<br>WHEN OVERLOAD    | 整 定 电 流<br>SET CURRENT (Im) (A) | Im =2.5XIe=2.5X721.7=1840.25A            |
|  |  | 整 定 时 间<br>SET TIME (Tm) (S)    | Tm=0.6s                                  |
|  | 过载瞬时<br>INSTANTANEOUS TRIPPING                         | 整 定 电 流<br>SET CURRENT (Ii) (A) | A  |
|  | 失压脱扣器整定值<br>SET VOLTAGE OF LOSS VOLTAGE TRIP (U l) (V) |                                 |  |
| 过载预报警<br>SET CURRENT OF PRE-ALARM WHEN OVERLOAD (Ip) (A)       |  |                                 | P  |
| 过载预报警延迟时间<br>DELAY TIME OF PRE-ALARM WHEN OVERLOAD (T p) (min) |  |                                 | Tp=10min<br>I =1.05Ie=1.05X721.7=757.79A |

轴带发电机主开关参数如下:

THE PARAMETER OF AUTOMATIC CIRCUIT BREAKER OF SHAFT GENERATOR AS FOLLOWS:

| 型 号                                     |   |                  |                              |
|---|---|------------------|------------------------------|
| TYPE                                    |   |                  | NT20H1                       |
| 发电机额定电流                                 |   |                  | Ie= 1181A                    |
| RATED CURRENT OF GENERATOR              |   |                  |                              |
| 控制单元<br>CONTROL UNIT<br>Micrologic 5.0A | 过载长延时<br>LONG TIME DELAY TRIPPING<br>WHEN OVERLOAD  | 整 定 电 流 (Ir) (A) | Ir =1.25XIe=1.25X1181=1476A  |
|   |   | 整 定 时 间 (Tr) (S) | Tr=30s                       |
|   | 过载短延时<br>SHORT TIME DELAY TRIPPING<br>WHEN OVERLOAD | 整 定 电 流 (Im) (A) | Im =2.5XIe=2.5X1181=2952.5A  |
|   |   | 整 定 时 间 (Tm) (S) | Tm=0.6s                      |
|   | 过载瞬时<br>INSTANTANEOUS TRIPPING                      | 整 定 电 流 (Ii) (A) | A                            |
|   |   |                  |                              |
| 失压脱扣器整定值 (U l) (V)                      |   |                  | U l=0.6X440=264V             |
| SET VOLTAGE OF LOSS VOLTAGE TRIP        |   |                  |                              |
| 过载预报警 (Ip) (A)                          |   |                  | P                            |
| SET CURRENT OF PRE-ALARM WHEN OVERLOAD  |   |                  |                              |
| 过载预报警延迟时间 (T p) (min)                   |   |                  | Tp=10min                     |
| DELAY TIME OF PRE-ALARM WHEN OVERLOAD   |   |                  | I =1.05Ie=1.05X721.7=757.79A |

A 带电流表  
WITH AMMETERH 带工作小时计  
WITH RUNNING HOUR COUNTER



## 技术要点

## TECHNICAL ESSENTIAL

## 1. 主配电板组成:

CONSTITUTE OF MAIN SWITCHBOARD:

由主发电机屏三屏、并车屏一屏、440V负载屏二屏、220V负载屏一屏、组合起动屏两屏，共十一屏组成。

THREE (3) MAIN GENERATOR PANELS, ONE (1) SYNCHRONIZING TWO (2) 440V FEEDER PANELS,

ONE (1) 220V FEEDER PANEL, AND TWO (2) GROUP STARTING PANELS. TOTAL ELEVEN (11) PANELS.

## 2. 主配电板的结构形式:

STRUCTURE FORM OF MSB:

主配电板的顶部防护等级为IP22，顶部配有吊环，主配电板做成前后开门式，板后维修，前后面设置绝缘扶手。

主配电板各屏之间均以钢板或阻燃材料相隔开。外形尺寸6600x700x2100mm.

THE PROTECTION GRADE OF MSB SHALL BE IP22. THE HOISTING RING SHALL BE INSTALLED AT THE TOP

OF MSB. IT SHALL BE MADE INTO FRONT AND REAR TYPE, MAINTAINED AT REAR AND ISOLATED

HANDRAILS SHALL BE INSTALLED IN THE FRONT AND REAR. EACH OF PANELS IS SEPARATED WITH

STEEL OR FLAME-RETARDANT PARTITIONS. EXTERNAL DIMENSION 6600X700X2100 MM

## 3. 铭牌选用阻燃塑料，黑底白字。

NAMEPLATES SHALL BE MADE OF FLAME-RETARDANT MATERIAL, WHITE WORD WITH BLACK BACKGROUND.

## 4. 主配电板输入输出接线端应设有永久性标志，要求接线方便，便于维修。

THE INPUT AND OUTPUT CONNECTING TERMINAL OF MSB SHALL HAVE PERMANENT MARKS, IN ORDER FOR  
CONVENIENT CONNECTION AND MAINTAIN.

## 5. 主配电板的内部接线采用CBVR型绝缘软线。

THE INNER WIRES OF MSB SHALL BE ISOLATED SOFT WIRES OF CBVR TYPE.

## 6. 测量仪表选用上海怡泰仪表有限公司生产的F96系列船用仪表，电表的面应在发电机的电压、电流、功率之额定值处画出红色标记，功率表应有15%负功率刻度，电流互感器和电压互感器的次级绕组应可靠接地。

METERS ON MSB SHALL BE MARINE TYPE OF F96 SERIES MADE BY SHANGHAI YITAI INSTRUMENTS CO., LTD.

RED SCALE LINE INDICATING RATED VOLTAGE, CURRENT AND POWER MUST BE MARKED IN THE FACE OF

CORRESPONDING METERS. THE WATTMETER SHOULD HAVE SCALE TO INDICATE 15% NEGATIVE POWER

OF GENERATOR RATE POWER. THE SECONDARY WINDING OF CURRENT/VOLTAGE INSTRUMENT

TRANSFORMER SHOULD BE GROUNDED FIRMLY.

## 7. 发电机主开关选用MT10施耐德开关，分路开关选用施耐德NS系列分路配电开关。

THE MAIN SWITCH OF GENERATOR SHALL BE SCHNEIDER MT10 AIR CIRCUIT BREAKER. THE BRANCH  
SWITCH SHALL BE NS SERIES BREAKER

## 8. 发电机主开关具有过载长延时、短延时、短路瞬时三段保护特性，并具有失压脱扣保护装置。

THE MAIN SWITCH OF GENERATOR SHALL HAVE THE FOLLOWING THREE (3) KINDS OF PROTECTION  
CHARACTERISTICS FOR GENERATOR:



LONG TIME DELAY TRIPPING WHEN OVERLOAD

SHORT TIME DELAY TRIPPING WHEN OVERLOAD

INSTANTANEOUS TRIPPING WHEN SHORTING CIRCUIT

THE MAIN SWITCH OF GENERATOR SHALL ALSO HAVE FUNCTION OF NO-VOLT RELEASE PROTECTION.

9. 配电板内设置发电机超负荷报警环节，当发电机负荷率达到其额定值的105%并持续时间达10min之后，即发出报警信号，同时将部分次要负载卸去。

THE OVERLOAD ALARM CIRCUIT SHALL BE EQUIPPED IN MSB. WHEN THE LOAD HAS BE OVER TO 105%

AND LAST FOR 10MINS, THE ALARM SIGNAL SHALL BE SENT OUT, AND UNLOAD SOME OF THE SECONDARY LOAD.

10. 两台柴油主发电机能并联运行，采用手动准同步并车和同步脉冲并车装置自动并车二种方式。

THE TWO (2) SETS OF GENERATORS COULD PARALLEL OPERATE. THE PARALLEL OPERATION SHALL BE

ADOPTED TWO WAYS AS MANUAL QUASI-SYNCHRONOUS AND AUTO- PARALLELING BY SYNCHRO-

PULSE DEVICE.

11. 在主配电板内设置了PPU电站管理系统装置，它可以自动调整各发电机的负载分配，使之比较均衡，同时使发电机的并联运行比较稳定。

PPU POWER MANAGEMENT (PPM) SHALL BE EQUIPPED IN MSB. IT COULD BE ABLE

TO ADJUST THE LOAD DISTRIBUTION AUTOMATICALLY AND LET THE PARALLEL OPERATION MORE STEADY.

12. 一台发电机运行，另一台发电机备用。当运行的发电机因故障退出运行时，备用的发电机可以在小于45s内自动起动并投入运行，向电网供电。

ONE (1) GENERATOR IS RUNNING AND ANOTHER SET SHALL BE SPARE. IN CASE OF THE RUNNING SET

IS FAILURE AND TRIP FROM POWER NET, THE SPARE SET SHALL START AUTOMATICALLY AND SUPPLY

POWER WITHIN 45S.

13. 当两台发电机并联运行，正在运行的一台发电机因故障退出运行时，主配电板内的优先自动卸载环节可将一些次要负载立即从电网中退出，以保证正在运行的一台发电机向本船安全航行时必须的设备和系统的供电；同时发出声光报警信号，表明两台发电机并联运行发生故障，提醒值班人员注意。

WHEN TWO (2) SETS RUNNING IN PARALLEL, IN CASE OF ONE (1) SET OF THEM TRIPS OFF SUDDENLY,

SOEM OF THE SECONDARY LOAD SHALL BE UNLOADED BY AUTOMATIC UNLOAD UNIT IN MSB. SO THE NORMAL

POWER SUPPLY FROM RUNNING GENERATOR TO NECESSARY EQUIPMENTS AND SYSTEMS SHALL BE

ENSURED IN STATUS OF SAFETY NAVIGATION. AT THE SAME TIME, AN AUDIBLE AND VISUAL ALARM SIGNAL

SHALL BE SENT OUT TO SHOW FAILURE OF PARALLEL OPERATION FOR TWO (2) GENERATORS AND AND

AROUSE ON-DUTY ATTENTION.

14. 每台主柴油发电机均采用NGJ-2逆功率继电器一台，并整定在发电机额定功率的-15%处，延时4s使主开关脱扣。

THE REVERSE-POWER RELAY TYPE NGJ-2 FOR EACH SET OF GENERATOR SHALL BE PROVIDED. THE

SET VALUE SHALL BE -15% OF GENERATOR RATED POWER AND MAKE MAIN SWITCH TRIP OFF DELAY 4S.

15. 三台发电机均与岸电联锁，即当任何一台发电机的主开关合闸时，岸电先行跳闸，当主开关分闸后，岸电方可合闸供电。

THE THREE (3) GENERATORS SHALL BE INTERLOCKED WITH SHORE POWER SUPPLY. WHILE MAIN SWITCH OF ANY GENERATOR IS TURNED ON, THE SWITCH OF SHORE POWER SUPPLY SHALL BE TURNED OFF IMMEDIATELY. ONLY WHEN MAIN SWITCH OF GENERATOR IS TURNED OFF, THE SHORE POWER SUPPLY COULD BE USED.



|  |   |                                     |  |              |                  |
|--|---|-------------------------------------|--|--------------|------------------|
|  | 主配电板单线图                                 |                                     |  | JR555-641-01 | PAGE             |
|  | SINGLE LINE DIAGRAM OF MAIN SWITCHBOARD |                                     |  |              | 9/16             |
|  |   |                                     |  |              |                  |
| 15   | HZ/HZ                                   | 双频率表                                | F96D-HZ 60Hz                                 | 1            |                  |
|  |   | DOUBLE FREQUENCY METER              |  |              |                  |
| 14   | 1-4H                                    | 计时器                                 | F96-HC 60Hz                                  | 3            |                  |
|  |   | CALCULAGRAPH                        |  |              |                  |
| 13   | 1-4kW                                   | 功率表                                 | F96-kW -62.5-0-750KW                         | 3            |                  |
|  |   | POWER METER                         |  |              |                  |
| 12   | 1-4Hz                                   | 频率表                                 | F96-Hz 55-60-65Hz<br>AC440V R:60Hz           | 3            |                  |
|  |   | FREQUENCY METER                     |  |              |                  |
| 11   | 6A                                      | 交流电流表( 220V 汇流排)                    | F96-AC 0-200A/5A                             |              |                  |
|  |   | AC AMPERE METER(220V BUSBAR)        |  |              |                  |
| 10   | 5A                                      | 交流电流表( 岸电)                          | F96AC-A 0-300A/5A                            | 1            |                  |
|  |   | AC AMPERE METER(SHORE POWER SUPPLY) |  |              |                  |
| 9  | 1A 2A 3A 4A                             | 交流电流表( 发电机)                         | F96-AC 0-1000A/5A                            | 3            |                  |
|  |   | AC AMPERE METER(GENERATOR)          |  |              |                  |
| 8  | 6V                                      | 交流电压表( 220V汇流排)                     | F96AC-V 0-300V<br>直接接入 DIRECT-ON-LINE        | 1            |                  |
|  |   | AC VOLTMETER(220V BUSBAR)           |  |              |                  |
| 7  | 5V                                      | 交流电压表( 岸电)                          | F96AC-V 0-600V<br>直接接入 DIRECT-ON-LINE        | 3            |                  |
|  |   | AC VOLTMETER(SHORE POWER SUPPLY)    |  |              |                  |
| 6  | 1V 2V 3V 4V                             | 交流电压表( 发电机)                         | F96-AC 0-600V<br>直接接入 DIRECT-ON-LINE         | 1            |                  |
|  |   | AC VOLTMETER(GENERATOR)             |  |              |                  |
| 5  | 69-104QF                                | AC220V 分路开关                         | C65 AC220V 60Hz                              | 36           | 施耐德<br>SCHNEIDER |
|  |   | AC220V BRANCH SWITCH                |  |              |                  |
| 4  | 11-58QF                                 | AC440V 分路开关                         | NS AC440V 60Hz<br>配电保护型<br>power-protect     | 48           | 施耐德<br>SCHNEIDER |
|  |   | AC440V BRANCH SWITCH                |  |              |                  |
| 3  | 1-10QF<br>59-68QF                       | AC440V 分路开关                         | NS/MD AC440V 60Hz<br>电动机保护型<br>motor-protect | 20           | 施耐德<br>SCHNEIDER |
|  |   | AC440V BRANCH SWITCH                |  |              |                  |
| 2  | GACB                                    | 空气断路器                               | NT20H1 Micrologic5.0                         | 1            | 施耐德<br>SCHNEIDER |
|  |   | AIR CIRCUIT BREAKER                 |  |              |                  |
| 1  | 1-3ACB                                  | 空气断路器                               | NT10H1 Micrologic5.0                         | 3            | 施耐德<br>SCHNEIDER |
|  |   | AIR CIRCUIT BREAKER                 |  |              |                  |
| 序号   | 符号和代号                                   | 名 称                                 | 型 号 和 规 格                                    | 数 量          | 附 注              |
| NO.  | SYMBOL                                  | NAME                                | TYPE AND STANDARD                            | QTY.         | REMARKS          |

|  |   |   |                               |              |             |
|--|---|---|-------------------------------|--------------|-------------|
|  | 主配电板单线图                                 |   |                               | JR555-641-01 | PAGE        |
|  | SINGLE LINE DIAGRAM OF MAIN SWITCHBOARD |   |                               |              | 10/16       |
|  |   |   |                               |              |             |
| 30   | H12-42                                  | 空间加热器加热指示灯  | XB2-BV AC220V                 | 3            | 黄<br>YELLOW |
|  |   | SPACE HEATER ON INDICATION                        |                               |              |             |
| 29   | SB10-40                                 | 空气断路器分断按钮   | LA42P-20                      | 3            | 红<br>RED    |
|  |   | ACB OPEN BUTTON                                   |                               |              |             |
| 28   | H10-14                                  | 空气断路器分断指示灯  | XB2-BV AC220V                 | 3            | 红<br>RED    |
|  |   | ACB OPEN INDICATION LAMP                          |                               |              |             |
| 27   | SB11-41                                 | 空气断路器合闸按钮   | LA42P-20                      | 3            | 绿<br>GREEN  |
|  |   | ACB CLOSE BUTTON                                  |                               |              |             |
| 26   | H11-41                                  | 空气断路器合闸指示灯  | XB2-BV AC220V                 | 3            | 绿<br>GREEN  |
|  |   | ACB CLOSE INDICATION LAMP                         |                               |              |             |
| 25   | SA13-33                                 | 单机操作模式选择开关  | LW42A2                        | 3            |             |
|  |   | SWITCH OF MODE CHOICE OF SINGLE MACHINE OPERATION |                               |              |             |
| 24   | SA12-32                                 | 电流表转换开关   | LW42A2                        | 6            |             |
|  | SA41 SA61                               | CHANGE-OVER SWITCH OF AMMETER                     |                               |              |             |
| 23   | SA11-31                                 | 发电机组调速开关  | LW42A2                        | 3            |             |
|  |   | SWITCH OF ADJUST SPEED OF GENERATOR               |                               |              |             |
| 22   | SA10-40                                 | 电压表转换开关   | LW42A2                        | 6            |             |
|  | SA50 SA60                               | CHANGE-OVER SWITCH OF VOLTMETER                   |                               |              |             |
| 21   | U50                                     | PPU电站管理单元操作板                                      | DEIF                          | 1            |             |
|  |   | PPU POWER MANAGEMENT OPERATOR PANEL               |                               |              |             |
| 20   | U10 U20 U30                             | PPU电站管理单元发电机板                                     | DEIF                          | 3            |             |
|  | U40                                     | PPU POWER MANAGEMENT GENERATOR PANEL              |                               |              |             |
| 19   | 2M Ω                                    | 绝缘监测仪 (220V)                                      | F96-BMΩ 0-5M Ω<br>AC220V 60Hz | 1            |             |
|  |   | INSULATION MONITORING INSTRUMENT                  |                               |              |             |
| 18   | 1M Ω                                    | 绝缘监测仪 (440V)                                      | F96-BMΩ 0-5M Ω<br>AC440V 60Hz | 1            |             |
|  |   | INSULATION MONITORING INSTRUMENT                  |                               |              |             |
| 17   | SYS                                     | 同步表   | F96-S 440/100V 60HZ           | 1            |             |
|  |   | SYNCHRONOUS METER(                                |                               |              |             |
| 16   | V/V                                     | 双交流电压表  | F96D-AC                       | 1            |             |
|  |   | DOUBLE VOLT METER                                 |                               |              |             |
| 序号   | 符号和代号                                   | 名 称   | 型号和规格                         | 数量           | 附 注         |
| NO.  | SYMBOL                                  | NAME  | TYPE AND STANDARD             | QTY.         | REMARKS     |

|  |   |  |                   |              |            |
|--|---|--|-------------------|--------------|------------|
|  | 主配电板单线图                                 |  |                   | JR555-641-01 | PAGE       |
|  | SINGLE LINE DIAGRAM OF MAIN SWITCHBOARD |  |                   |              | 11/16      |
|  |   |  |                   |              |            |
| 45   | SB51                                    | 消声按钮                                     | LA42PD-11         | 1            |            |
|  |   | BUTTON OF SILENCE                        |                   |              |            |
| 44   | SB50                                    | 测试按钮                                     | LA42PD-11         | 1            |            |
|  |   | BUTTON OF TEST                           |                   |              |            |
| 43   | SA51                                    | 系统模式选择开关                                 | CA10 FT2          | 1            |            |
|  |   | SWITCH OF SYSTEM MODE CHOICE             |                   |              |            |
| 42   | BZ                                      | 报警器                                      | AD17-22SM/R DC24V | 1            | 红<br>RED   |
|  |   | ALARM BUZZER                             |                   |              |            |
| 41   | H54                                     | 重载问询指示灯                                  | AD17-22/W DC24V   | 1            | 白<br>WHITE |
|  |   | LARGE MOTOR ASK INDICATION               |                   |              |            |
| 40   | H53                                     | 应急发电机供电指示灯                               | AD17-22/W DC24V   | 1            | 绿<br>GREEN |
|  |   | EMERGENCY GENERATOR RUNNING INDICATION   |                   |              |            |
| 39   | H52                                     | 应急发电机运行指示灯                               | AD17-22/W DC24V   | 1            | 白<br>WHITE |
|  |   | EMERGENCY GENERATOR RUNNING INDICATION   |                   |              |            |
| 38   | H51                                     | 系统自动指示灯                                  | AD17-22/W DC24V   | 1            | 白<br>WHITE |
|  |   | SYSTEM AUTO INDICATION                   |                   |              |            |
| 37   | H50                                     | DC 24V 电源指示灯                             | AD17-22/W DC24V   | 1            | 白<br>WHITE |
|  |   | DC24V SOURCE INDICATION                  |                   |              |            |
| 36   | SA50                                    | 同步转换开关                                   | LW42A2 AC440V     | 1            |            |
|  |   | SWITCH OF SYNCHRONOUS                    |                   |              |            |
| 35   | SB16-36                                 | 发电机停止按钮                                  | LA42P-20          | 3            | 红<br>RED   |
|  |   | BUTTON OF ENGINE START                   |                   |              |            |
| 34   | SB15-35                                 | 发电机起动按钮                                  | LA42P-20          | 3            | 绿<br>GREEN |
|  |   | BUTTON OF ENGINE START                   |                   |              |            |
| 33   | SB14-34                                 | 发电机自动解列及分闸按钮                             | LA42P-20          | 3            | 红<br>RED   |
|  |   | BUTTON OF GEN. AUTO UNLOAD AND ACB OPEN  |                   |              |            |
| 32   | SB13-33                                 | 发电机自动并车及负载分配按钮                           | LA42P-20          | 3            | 绿<br>GREEN |
|  |   | BUTTON OF GEN. AUTO SYN.AND LOAD SHARING |                   |              |            |
| 31   | 1SW 2SW 3SW 4SW                         | 空间加热器电源开关                                | ZB2-BD AC220V     | 3            |            |
|  |   | SPACE HEATER SOURCE SWITCH               |                   |              |            |
| 序号   | 符号和代号                                   | 名 称                                      | 型号和规格             | 数量           | 附 注        |
| NO.  | SYMBOL                                  | NAME                                     | TYPE AND STANDARD | QTY.         | REMARKS    |

|  |   |                                     |  |              |                               |
|--|---|-------------------------------------|--|--------------|-------------------------------|
|  | 主配电板单线图                                 |                                     |  | JR555-641-01 | PAGE                          |
|  | SINGLE LINE DIAGRAM OF MAIN SWITCHBOARD |                                     |  |              | 12/16                         |
| 60   |   |                                     |  |              |                               |
| 59   |   |                                     |  |              |                               |
| 58   | VRE                                     | 发电机电压调整电位器                          |  | 3            | 随机组配套<br>SUPPLIED<br>WITH SET |
|  |   | POTENTIOMETER OF D/G VOLTAGE ADJUST |  |              |                               |
| 57   | KA1、KA2、KA5                             | 热继电器                                | LR2-F5369C                             | 3            |                               |
|  |   | THERMORELAY                         |  |              |                               |
| 56   | 1T 2T                                   | 主变压器                                | CSD-80        80kVA<br>AC440/230V 50Hz | 2            |                               |
|  |   | MAIN TRANSFORMER                    |  |              |                               |
| 55   | 1KM 2KM                                 | 接触器                                 | LC1 AC220V 250A                        | 2            |                               |
|  |   | CONTACTOR                           |  |              |                               |
| 54   | SB60                                    | 绝缘检查按钮                              | LA42P-11                               | 1            |                               |
|  |   | BUTTON OF INSULATION CHECK          |  |              |                               |
| 53   | H60                                     | 绝缘检查灯                               | XB2-BVD1C                              | 3            |                               |
|  |   | INSULATION CHECK                    |  |              |                               |
| 52   | KWH                                     | 电度表                                 |  | 1            |                               |
|  |   | WATT HOUR METER                     |  |              |                               |
| 51   | H41                                     | 岸电合闸指示                              | XB2-BV AC220V                          | 1            | 绿<br>GREEN                    |
|  |   | SHORE POWER ACB CLOSE INDICATION    |  |              |                               |
| 50   | H40                                     | 岸电电源指示                              | XB2-BV AC220V                          | 1            | 白<br>WHITE                    |
|  |   | SHORE POWER SOURCE INDICATION       |  |              |                               |
| 49   | SB53                                    | 绝缘检查按钮                              | LA42P-11                               | 1            |                               |
|  |   | BUTTON OF INSULATION CHECK          |  |              |                               |
| 48   | H56                                     | 绝缘检查灯                               | XB2-BVD1C                              | 3            |                               |
|  |   | INSULATION CHECK                    |  |              |                               |
| 47   | H55                                     | 同步指示灯                               | AD17-22/W DC24V                        | 2            |                               |
|  |   | SYN. INDICATION                     |  |              |                               |
| 46   | SB52                                    | 复位按钮                                | LA42PD-11                              | 1            |                               |
|  |   | BUTTON OF RESET                     |  |              |                               |
| 序号   | 符号和代号                                   | 名 称                                 | 型号和规格                                  | 数量           | 附 注                           |
| NO.  | SYMBOL                                  | NAME                                | TYPE AND STANDARD                      | QTY.         | REMARKS                       |



## 主配电板单线图

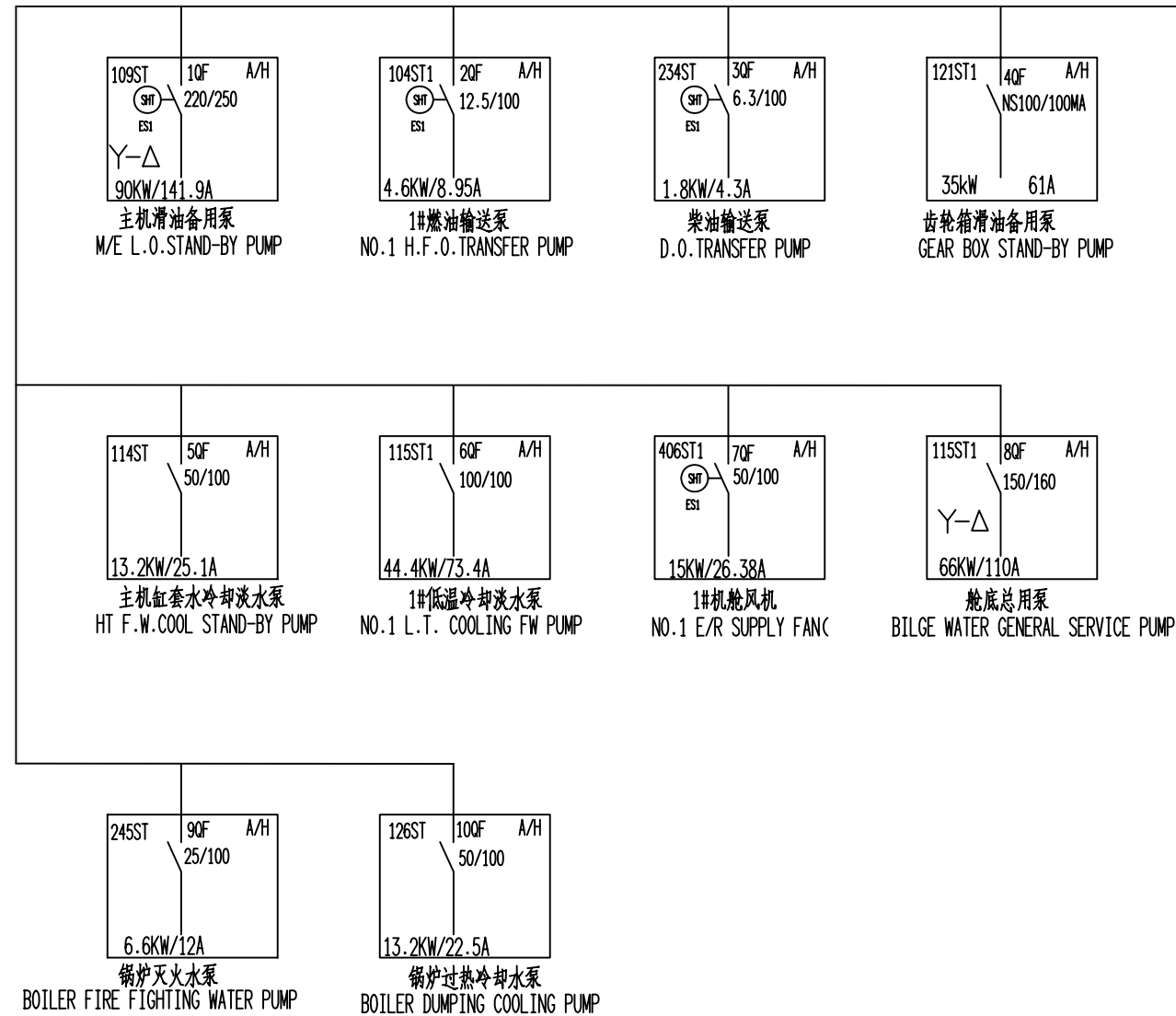
SINGLE LINE DIAGRAM OF MAIN SWITCHBOARD

JR555-641-01

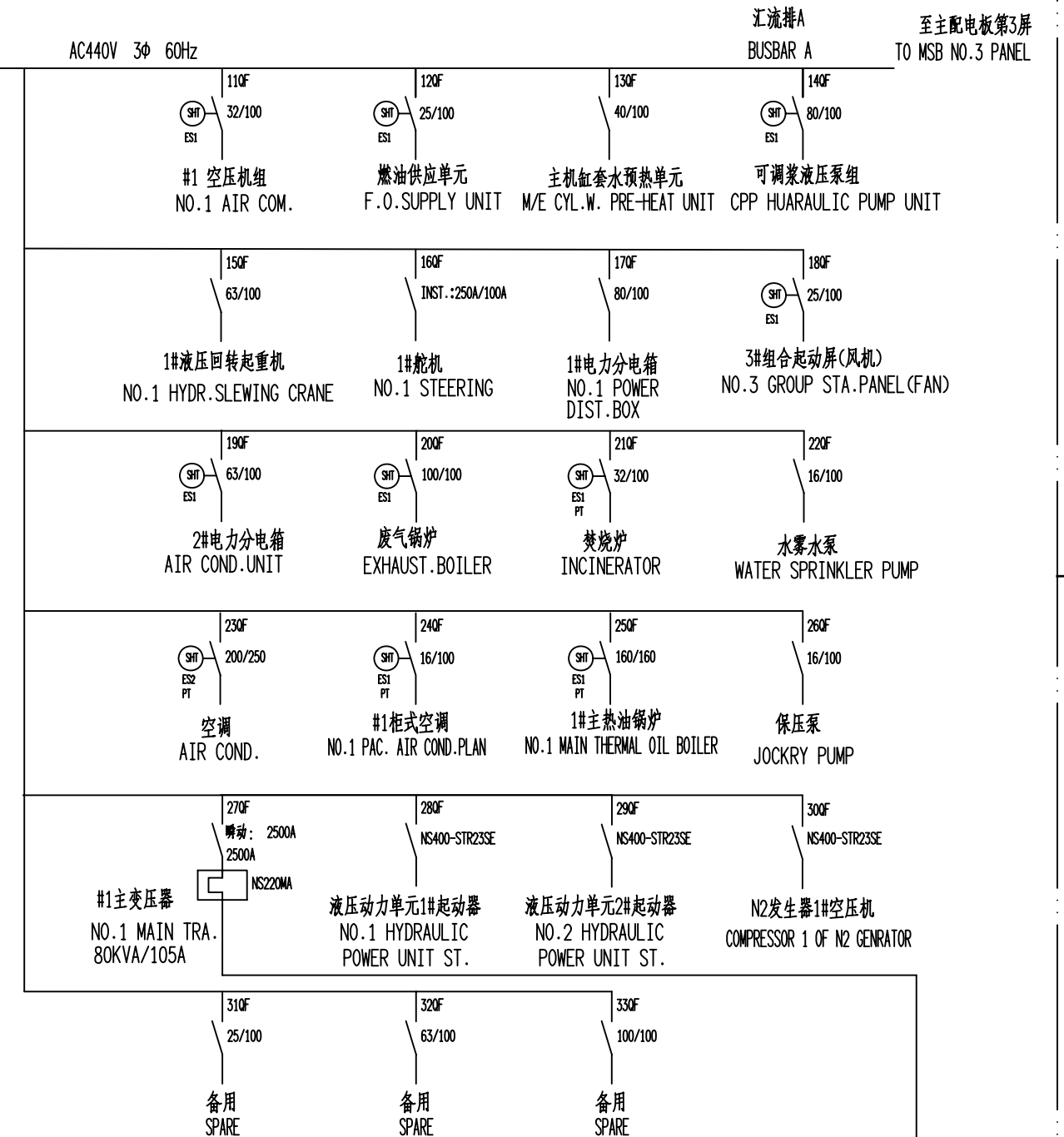
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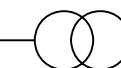
#1组合起动屏 (NO.1 GROUP STARTER PANEL)

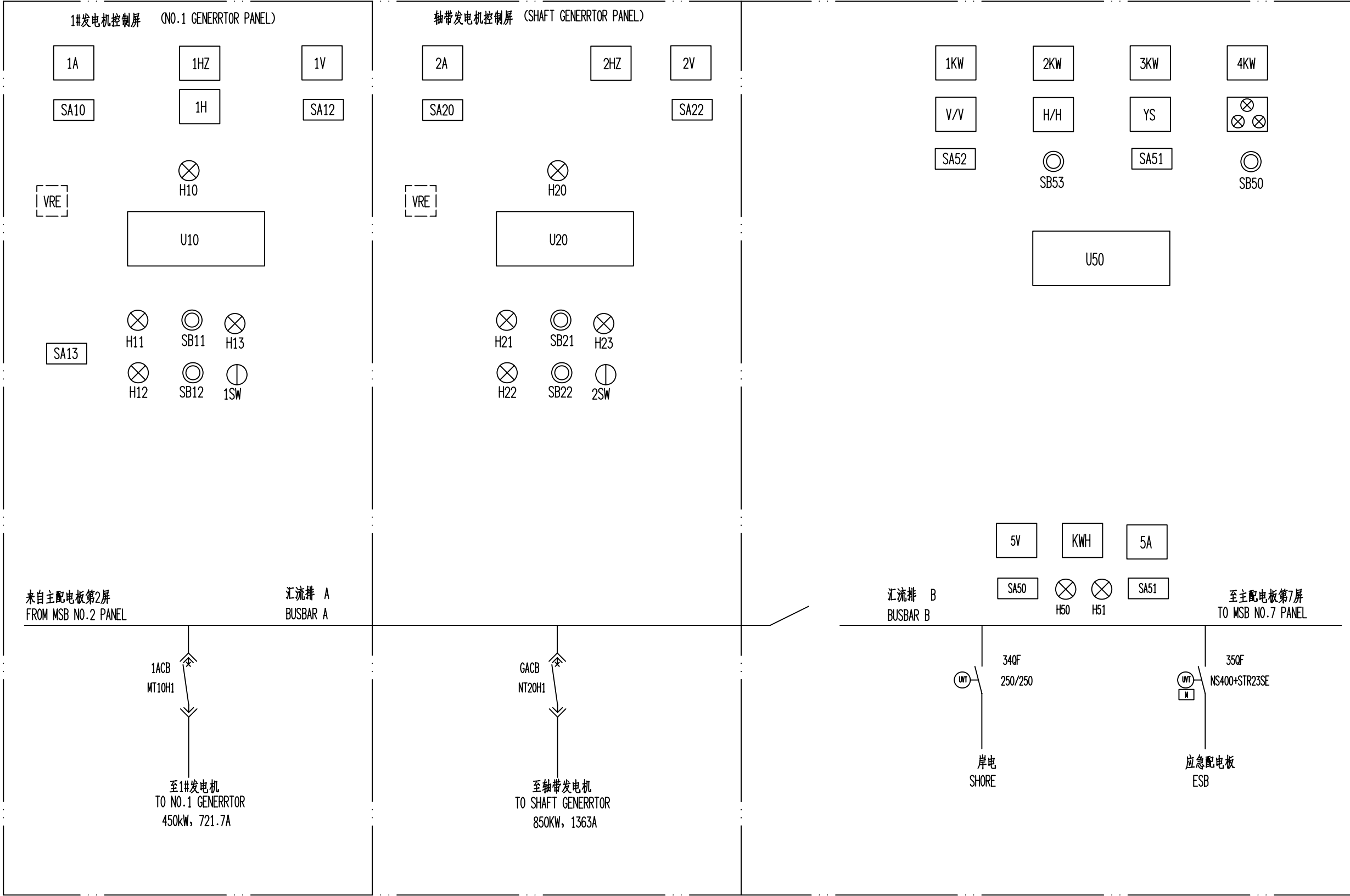


#1AC440V负载屏 (NO.1AC440V FEEDER PANEL)



AC400/230V 80kVA

#1主变压器1T  
NO.1 MAIN TRANSFORMER至主配电板220V馈电屏  
TO MSB 220V FEEDER PANELAREA: 0.125m<sup>2</sup>





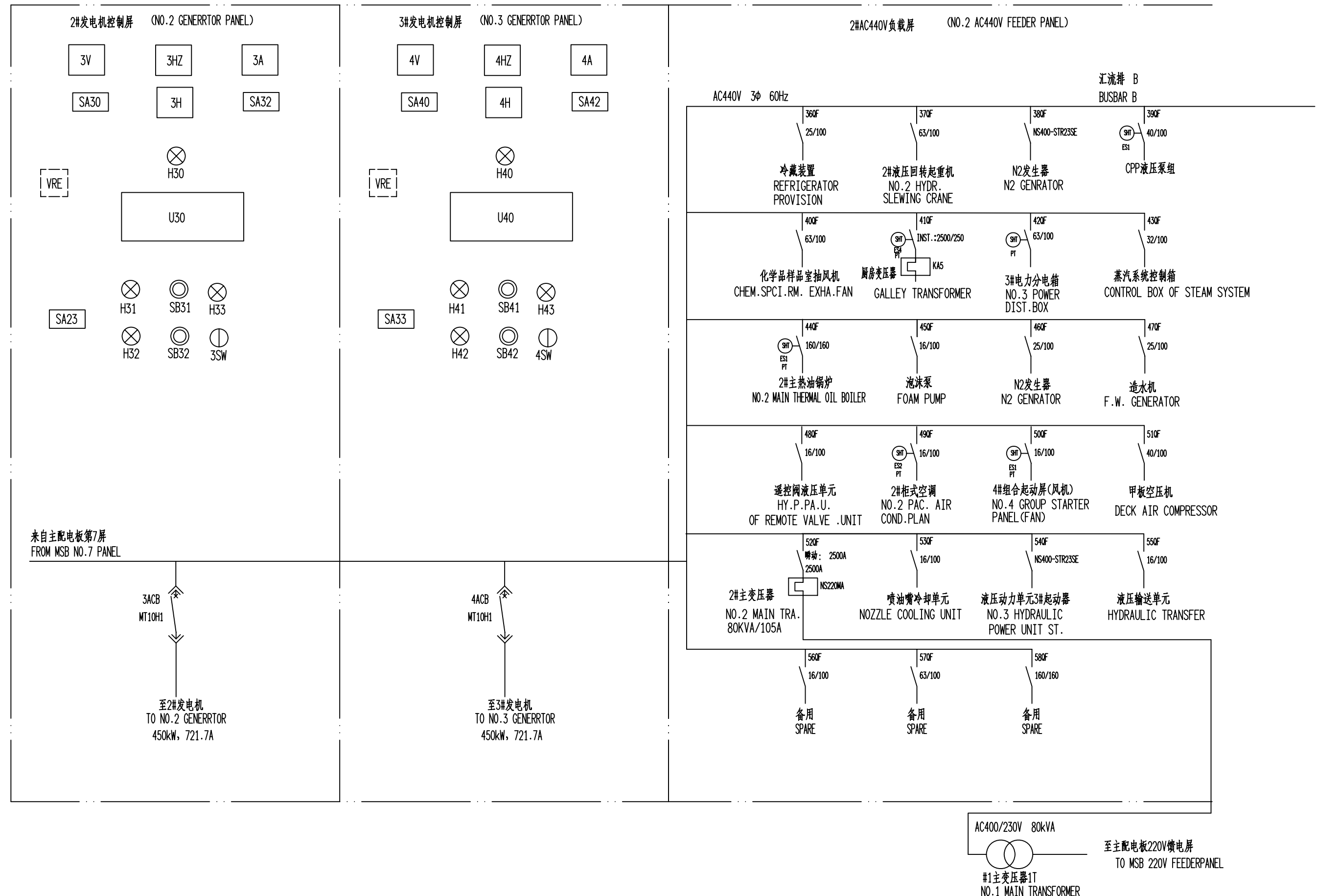
主配电板单线图

SINGLE LINE DIAGRAM OF MAIN SWITCHBOARD

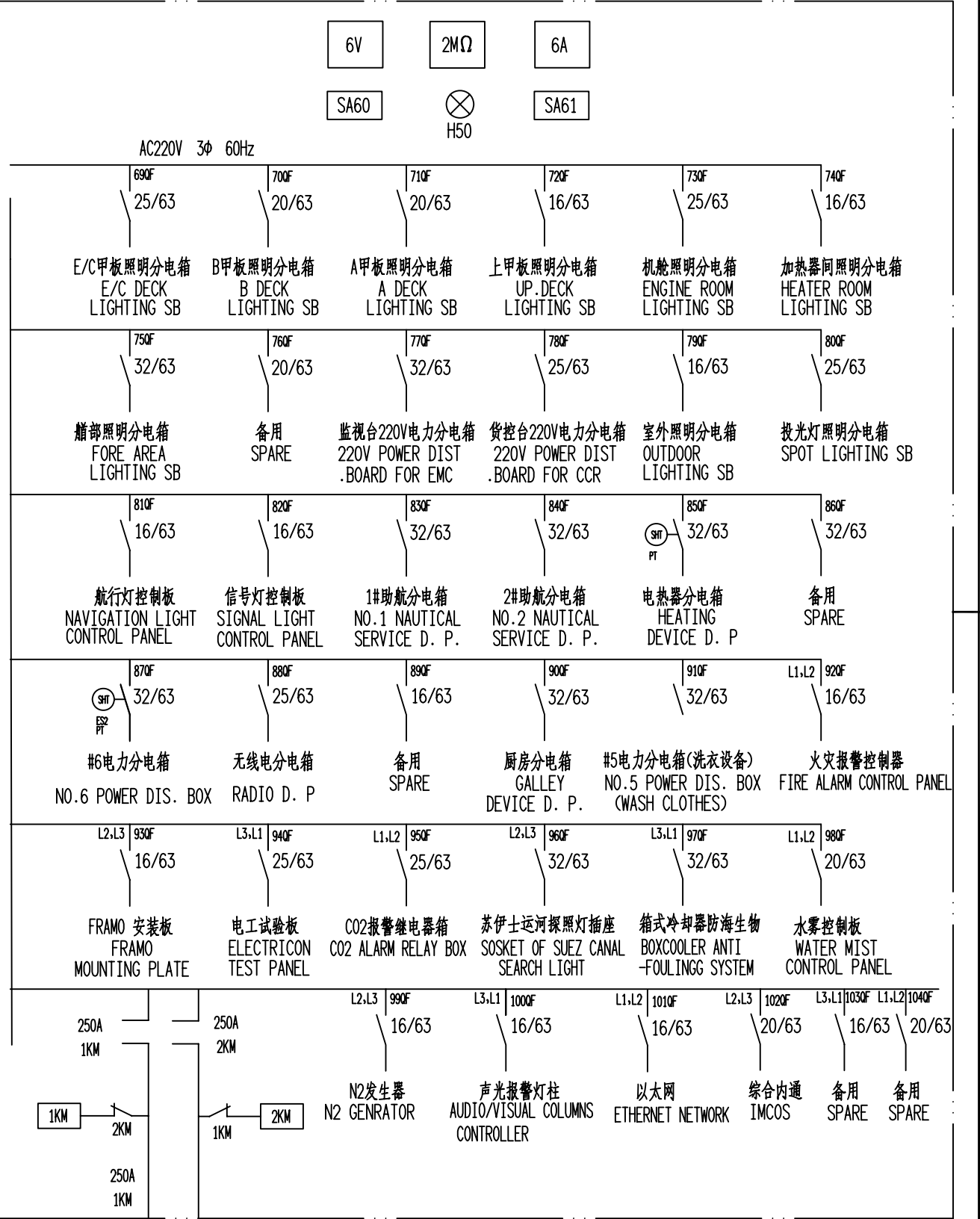
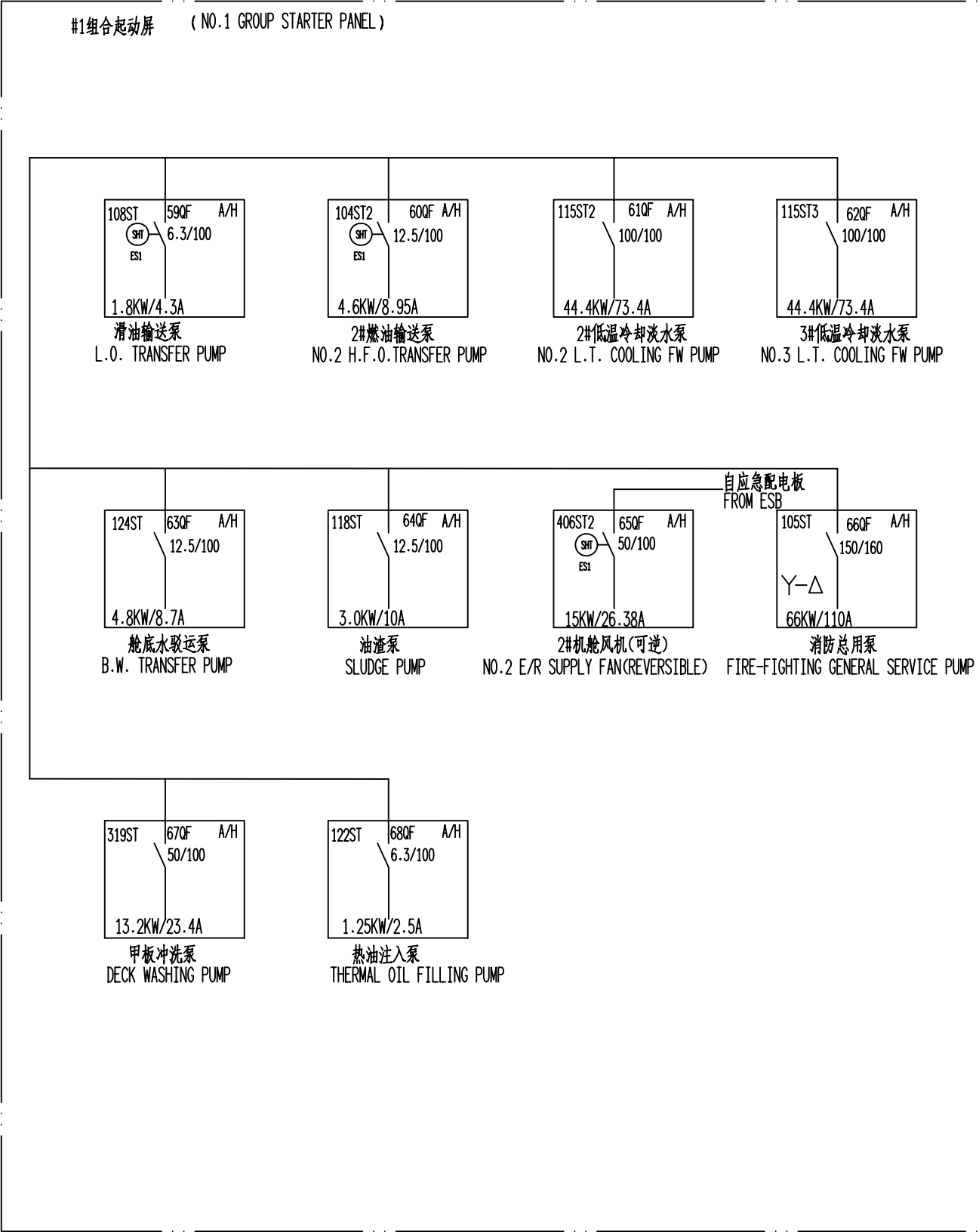
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AREA: 0.125m<sup>2</sup>



来自#1主变压器次级  
FROM SECONDARY OF 1T

来自#2主变压器次级  
FROM SECONDARY OF 2T