

WASTE OIL INCINERATOR UNIT

TYPE : MAXI T150 SL WS

OWNER Messrs	
USED FOR Messrs	HYUNDAI SAMHO HEAVY INDUSTRIES CO., LTD
SHIP NO.	8014
CLASS	LR



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LICENSED by ATLAS A/S

DRAWING LIST		FOR APPROVAL	2019. 11. 06.	
		FOR WORKING		
		FOR FINISHED		
NO.	N A M E	DWG NO.	PAGE	REMARK
1	SPECIFICATION	VHS –8014– 0~7	1~8	
2	PIPE DIAGRAM	HID – TP1502010	9	
3	WASTE OIL INCINERATOR	HID – T152003	10	
4	OUTLINE OF PRIMARY BLOWER	AT – ABB1500	11	
5	EXPANSION JOINT	HIE – I00048	12	
6	TEMPERATURE SENSOR (FOR EXH. GAS)	HCE – I00036	13	
7	MAIN CONTROL PANEL (CP-1)	HIF – NGTSTD001~503	14~37	
8	JUNCTION BOX FOR W.O. TANK	HIF-WJBSTD001-001~501	38~41	
9	ACCESSORIES PART	-	42~45	
10	M.G.O. SUPPLY PUMP R.P.B.	HCD – WONI00043	46	
11	M.G.O. SUPPLY PUMP FOR LAYOUT	HMTP-3M-400-091022	47	
12	LIST OF SPARE PART	LSP-T150-PLC-1Y-01~02	48~50	

PLAN HISTORY

REV. NO.	REV. DATE	DESCRIPTION	REMARK
0	19. 11. 06.	ORIGINALLY PREPARED APPROVAL DRAWING	K.J.Oh

1. GENERAL SPECIFICATION

1.1 RULE	: LR, IMO TYPE APPROVAL CERTIFICATE [GUIDELINES FOR THE IMPLEMENTATION of ANNEX V OF MARPOL 73/78, RESOLUTION MEPC 244(66).] EUROPEAN COUNCIL DIRECTIVE 96/98 EC ON MARINE EQUIPMENT("MED")
1.2 POWER AND CONTROL SOURCE	: AC440V, 60Hz, 3 ϕ / AC220V, 60Hz, 1 ϕ
1.3 UNIT	: METRIC SYSTEM
1.4 NAME PLATE AND WARNING PLATE	: ENGLISH
1.5 PAINTING COLOR	
1) CONTROL PANEL	: RAL7032
2) ELECTRIC MOTOR	: Munsell no.7.5 BG 7/2
3) INCINERATOR BODY	: HEAT RESISTANT SILVER

2. TECHNICAL DATA

2.1 TYPE	: MAXI T150SL WS
2.2 CALORY CAPACITY	: 850,000 Kcal/H (988 Kw)
2.3 SOLID WASTE (2,400 Kcal/Kg)	: MAX. 150 Kg/H
2.4 LIQUID WASTE (8,600 Kcal/Kg)	: MAX. 99 Kg/H
2.5 RETENTION TIME FOR EXH. GAS	: 1 SEC
2.6 TOTAL AIR CONSUMPTION	: 6,600 m ³ /H at 15 °C
2.7 EXH. GAS OUTLET FLANGE MIN. DIAMETER	: 550A
2.8 EXH. GAS TEMPERATURE	: 350 °C
2.9 EXH. GAS VOLUME	: 16,700 m ³ /H at 350 °C
2.10 MAX. COUNTER PRESSURE (INCLUDING OUTLET LOSS)	: 490 Pa (50 mmAq)
2.11 CONTROL AIR CONSUMTION (W.O BURNER)	: MAX. 32.2 m ³ /H
2.12 CONTROL AIR PRESSURE	: 0.7 MPa (7 Bar)
2.13 WORKING STEAM PRESSURE	: 0.7 MPa (7 Bar)
2.14 FUEL OIL	: M.G.O. (2 CST at 40 °C)
2.15 INSIDE DIAMETER OF DIESEL OIL PIPE	: 8 mm
2.16 FEEDING DOOR ACTUAL OPENING	: 350 x 350 mm
2.17 FUEL OIL CONSUMPTION MAX. (WHEN PREHEATING THE INCINERATOR)	: APPORX. 43.0 L

3. TECHNICAL DATA FOR COMPONENTS.

3.1 CONTROL PANEL (CP-1) IS MADE WITH A SPLASH-PROOF CABINET (IP44)

- | | |
|---------------------------|---------------------------|
| 1) INSTALLED MOTOR OUTPUT | : 22.71 Kw |
| 2) DEMAND FACTOR | : 1 |
| 3) ALARM | : NORMALLY CLOSED CIRCUIT |

3.2 PRIMARY BLOWER (VH) - COOLING SYSTEM IS A HIGH PRESSURE CENTRIFUGAL FAN OF THE WELDED DESIGN WITH A TOTAL DIRECT DRIVE

- | | |
|---------------------------------------|--|
| 1) CAPACITY | : 6,600 m ³ /H |
| 2) STATIC PRESSURE | : 7,150 Pa (715 mmAq) |
| 3) MOTOR SPECIFICATION AND REVOLUTION | : 22 Kw x 2P (IP55, 45 °C) / 3,520 RPM |
| 4) MOTOR INSULATION AND WEIGHT | : "F" CLASS / 161 Kg |
| 5) RATING CURRENT | : 34.94 A |

3.3 W.O DOSING PUMP (PU3) - IS A SELF-PRIMING POSITIVE DISPLACEMENT PUMP WITH GEAR MOTOR

- | | |
|--------------------------------|------------------------------|
| 1) TYPE | : HMD 025-6L |
| 2) CAPACITY | : MAX. 233 L/H at 243 RPM |
| 3) HEAD (DISCHARGE) | : MAX. 0.2 MPa |
| 4) WORKING PRESSURE | : MAX. 0.05 MPa |
| 5) PUMP TYPE | : DISCO-VARIABLE |
| 6) MOTOR SPECIFICATION | : 0.45 Kw x 4P (IP55, 45 °C) |
| 7) MOTOR INSULATION AND WEIGHT | : "F" CLASS / 21 Kg |
| 8) RATING CURRENT | : 1.89 A |

3.4 PRIMARY/SECONDARY M.D.O BURNER(ST1/2) - IS A FULLY AUTOMATIC HIGH PRESSURE BURNER

- | | |
|---------------------------------|---|
| 1) TYPE OF BURNER | : DH 160 E2 |
| 2) FUEL OIL CONSUMPTION (ST1/2) | : 17 l/h / 34.0 l/h (MARINE DIESEL OIL) |
| 3) MOTOR SPECIFICATION (ST1/2) | : 0.25 Kw x 2P / 0.15 Kw x 2P |
| 4) MOTOR INSULATION AND WEIGHT | : "F" CLASS (IP44, 45 °C) / 15 Kg |
| 5) RATING CURRENT (ST1/2) | : 0.7A / 0.5 A |

3.5 W.O BURNER - IS A SPECIAL BURNER FOR IMPURITIES OF MAX. 8 mm OF THE COMPRESSED AIR ATOMIZING TYPE MADE OF HEAT-RESISTANT STEEL

3.6 EXH. GAS DAMPER - IT IS INSTALLED ON EXH. GAS OUTLET AND ADJUST BY MANUAL

3.7 EXPANSION JOINT

- | | |
|---------|--------|
| 1) SIZE | : 550A |
|---------|--------|

3.8 TEMPERATURE SENSOR FOR EXH. GAS

- | | |
|----------------------|----------------------|
| 1) MODEL AND FITTING | : "K" TYPE / PF 1/2" |
|----------------------|----------------------|

3.9 EMERGENCY STOP SWITCH

- | | |
|---------|-----------------|
| 1) SIZE | : 110 x 70 x 80 |
|---------|-----------------|

4. TECHNICAL DATA FOR TANK COMPONENTS

4.1 TANK UNIT	: 1 SET
4.2 MILL PUMP	
1) MODEL	: HMP-26M3
2) FITTING (IN/OUTLET)	: JIS 10K-65A / 10K-50A
3) CAPACITY	: 26 m ³ /H
4) HEAD (DISCHARGE)	: 0.04 MPa
5) MOTOR SPECIFICATION AND REVOLUTION	: 2.2 Kw x 2P (IP44, 45 °C)
6) MOTOR INSULATION AND WEIGHT	: "F" CLASS / 25 Kg
7) RATING CURRENT	: 4.3 A
8) PRESSURE GAUGE WITH COCK V/V	: 1/4" 1 SET
4.4 THERMO COUPLE WITH THERMOWELL	
1) TYPE / FITTING	: PT-100Ω / 3/4"
2) RANGE	: 0 ~ 500 °C
4.5 LEVEL SWITCH (LOW LEVEL)	
1) TYPE	: SIDE MOUNTING
2) FITTING	: JIS 5K-65A
4.5 M.G.O. SUPPLY PUMP	: 1 SET
1) TYPE	: HMTP-3M-400-204HAVB
2) FITTING	: JIS 5K-20A
3) MOTOR	: 0.4 Kw x 4 P
4) PUMP CAPACITY	: MAX. 450L/H
5) WORKING PRESSURE	: 0.3 MPa
6) RATING CURRENTS	: 1.1A
7) PRESSURE GAUGE WITH COCK VALVE	: 0 ~ 0.6 MPa
8) COMPOUND GAUGE WITH COCK VALVE	: -0.075 ~ 0.3 MPa
4.6 R.P.B FOR M.G.O. SUPPLY PUMP	
1) SIZE	: 80 x 180 x H70

5. SPARE PART

ACCORDING TO THE "SPARE PARTS LIST"

RECOMMENDATION/REQUIREMENT FOR INSTALLATION OF INCINERATOR.

A. THE INCINERATOR EXHAUST PIPE HAS TO BE SO SIZED THAT THE BACK PRESSURE SHALL BE LESS THAN 50mmAq.

B. IF THE INCINERATOR IS INSTALLED IN THE ENCLOSED ROOM, THE FOLLOWINGS MUST BE COMPLIED WITH THE SUPPLY AIR DUCT HAS TO BE SO SIZED THAT THE QUANTITY OF AIR SUPPLY SHALL NOT BE LESS THAN AIR CONSUMPTION OF INCINERATOR, THAT IS 6,600m³/h(at 15°C).

DAMPERS, IF ANY, IN THE AIR SUPPLY DUCT HAS TO BE KEPT OPEN AT THE TIME OF INCINERATOR OPERATION. THE ATTACHMENT OF NAME PLATE SAYING "DAMPER TO BE KEPT ALWAYS " TO BE RECOMMEND ANY RESTRICTION OF AIR SUPPLY TO INCINERATOR DUE TO EITHER LACK OF AIR SUPPLY QUANTITY OR OPEATION WITH DAMPERS IN CLOSED CONDITION WILL LEAD TO THE DANGEROUS BACK FIRE.

LIST OF CONTROL / SAFETY / AUTOMATION

VHS – 8014 - 6

NO.	I T E M	DISPLAY ON	FUEL CUT	Primary Blower RUN	EXT. SIG.	LIMITER	SET POINT	OPERATION RANGE	REMARK
1	PREPURGE TIME	-	-	X	-	-	-	60 SEC	
2	EXHAUST GAS TC. SENSOR FAIL	X	X	X	X	24D7(24B12)	-	-	
3	PRIMARY CHAMBER TC SENSOR FAIL	X	X	X	X	24D7(24B8)	-	-	
4	SECONDARY CHAMBER TC SENSOR FAIL	X	X	X	X	24D7(24B10)	-	-	
5	EXH GAS TEMP. HIGH	X	X	X	X	24D7(24B12)	350 °C	0 ~ 1200 °C	
6	PRIMARY CHAMBER TEMP. HIGH	X	X	X	X	24D7(24B8)	1050 °C	0 ~ 1200 °C	
7	SECONDARY CHAMBER TEMP. HIGH	X	X	X	X	24D7(24B10)	1050 °C	0 ~ 1200 °C	
8	ASH DOOR OPEN	X	X	-	X	15D3(19Y2)	100 °C	0 ~ 1200 °C	
9	CHAMBER NEGATIVE PRESSURE LOW	X	X	X	X	15D3(15S7)	0.5 mbar	0.4 ~ 6 mbar	
10	COMBUSTION AIR PRESSURE LOW	X	X	X	X	15D3(15S8)	18 mbar	5 ~ 50 mbar	
11	PRIMARY BLOWER OVERLOAD	X	X	-	X	15D3(5Q4)	34.94A	30 ~ 40A	
12	PRIMARY M.G.O BURNER OVERLOAD	X	X	X	X	17D12(5Q8)	0.7A	0.63 ~ 1.0A	
13	SECONDARY M.G.O BURNER OVERLOAD	X	X	X	X	17D12(5Q10)	0.5A	0.4 ~ 0.63A	
14	W.O DOSING PUMP OVERLOAD	X	X	X	X	15D3(7U2)	2.0 A	-	
15	PRIMARY CHAMBER FLAME FAIL	X	X	X	X	15D3(24K1)	-	-	
16	SECONDARY CHAMBER FLAME FAIL	X	X	X	X	15D3(24K4)	-	-	
17	ATOMIZING AIR PRESSURE LOW	X	X	X	X	15D3(15S13)	0.1 MPa	0~0.8 MPa	
18	SLUICE-FEED DOOR OPEN	X	X	X	X	15D2(20Y2)	30 SEC	-	
19	SLUICE-INSIDE DOOR NOT CLOSED	X	X	X	X	15D2(16S2)	12 SEC	-	
20	EM'CY STOP (CONTROL VOLTAGE FAIL)	-	X	X	X	8K12/8S12	-	-	
21	PCL FAILURE	-	X	X	X	21K11	-	-	
*22	W.O TANK LEVEL LOW	X	X	X	X	17D12(17S13)	5 SEC	-	JUNCTION BOX
*24	W.O TANK TEMP. HIGH	X	X	X	X	17D12(25T10)	100 °C	80 ~150 °C	JUNCTION BOX
*25	W.O TANK TEMP. LOW	X	X	X	X	17D12(25T10)	60 °C	50 ~ 100 °C	JUNCTION BOX
*26	MILL PUMP OVERLOAD	X	X	X	X	16D7(6Q2)	6.7 A	6 ~ 10 A	JUNCTION BOX
*27	M.G.O. SUPPLY PUMP OVERLOAD	X	X	X	X	16D7(6Q5)	1.1 A	1 ~ 1.6A	JUNCTION BOX

NOTE::

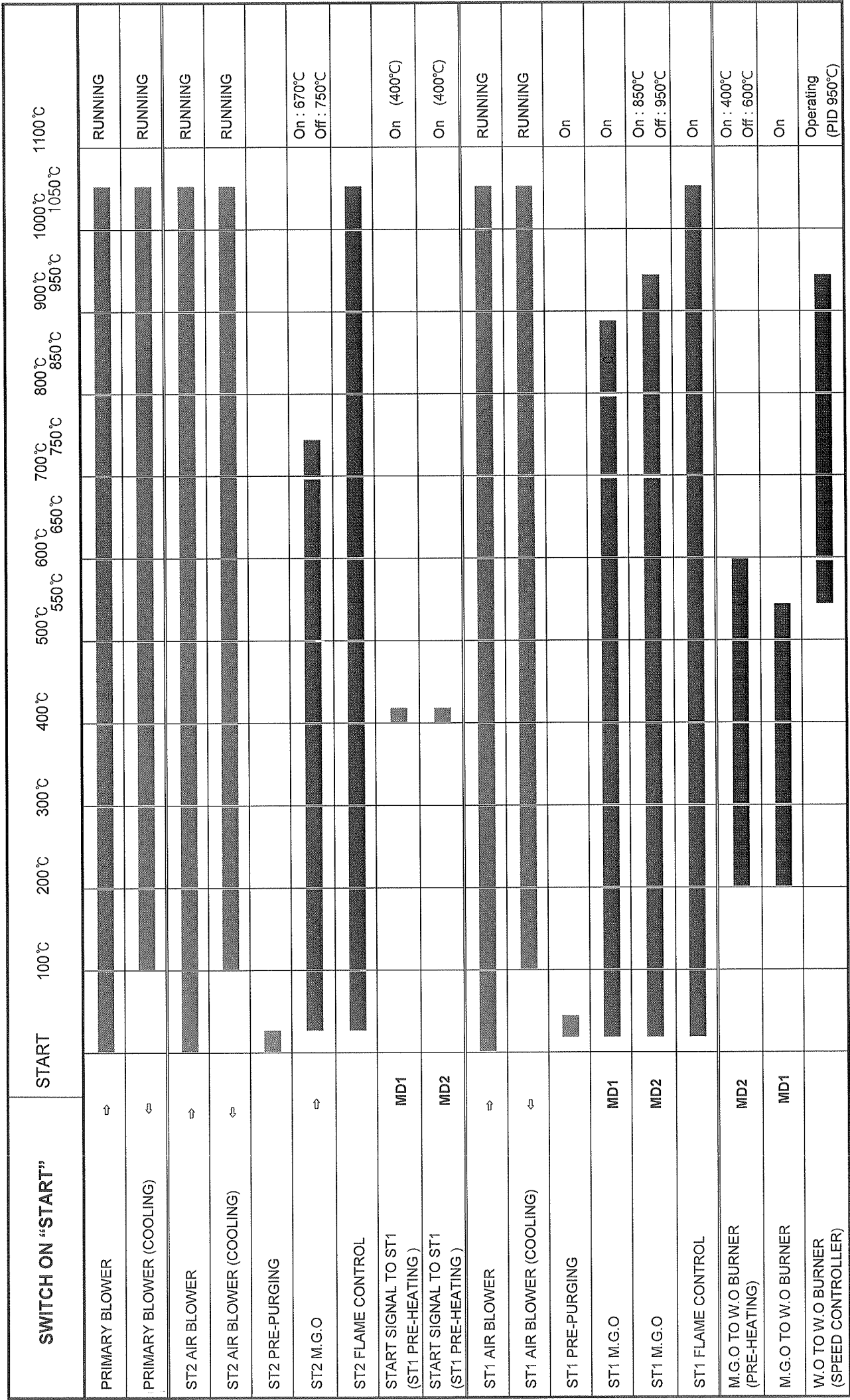
1. MONITORING (STATED BY ×)

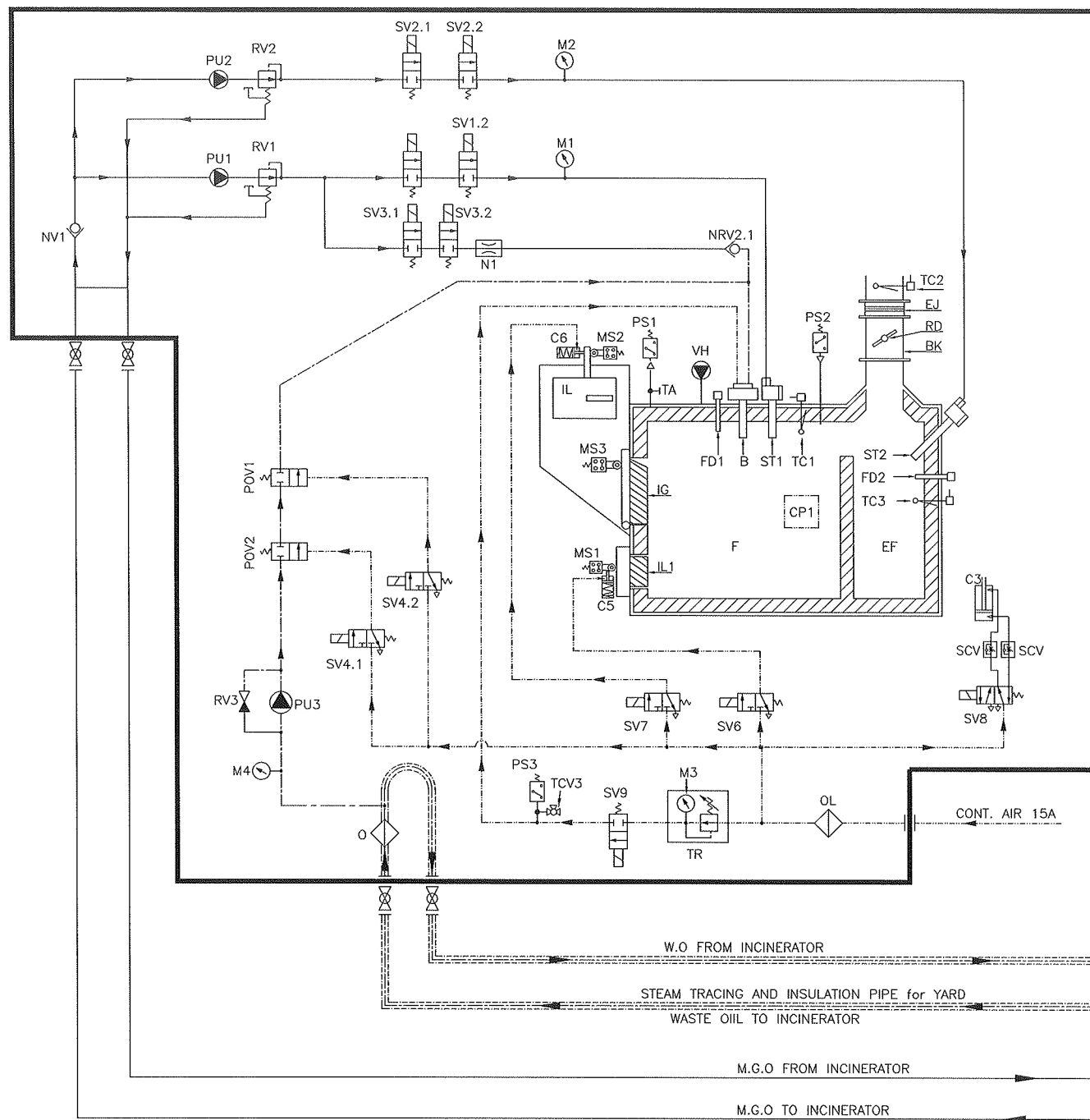
2. SYMBOL * TANK FUNCTION.

3. PRIMARY BLOWER RUNNING ≥ 100 °C

PROCESS DIAGRAM INCINERATOR for TYPE MAXI T150SL WS

VHS – 8014 - 7

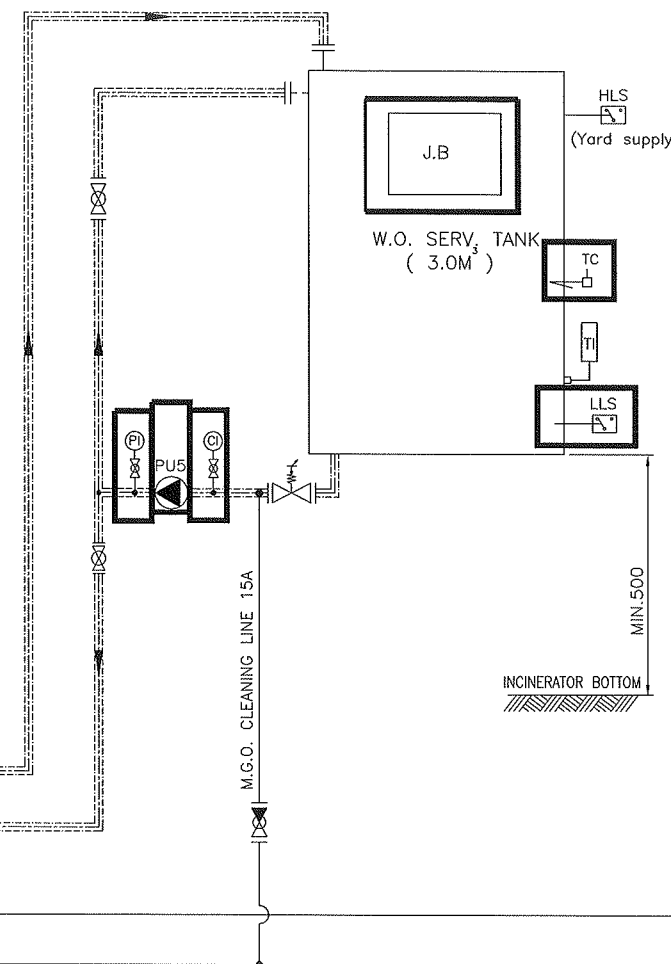




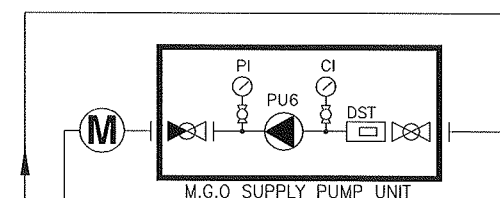
ITEM	RANGE	SETTING
M1/M2	0 ~ 1.6 MPa	0.7~1.2 MPa
M3	0 ~ 0.6 MPa	0.2~0.3 MPa
M4	-0.076 ~ 0.3 MPa	0.05 MPa
PS1	5 ~ 50 mBar	18 mBar
PS2	0.4 ~ 3 mBar	0.5 mBar
PS3	0 ~ 0.75 MPa	0.1 MPa
C5	-	100 °C
CONT. AIR	-	5~8 MPa

NOTE

- PARTS INSIDE ARE SUPPLIED BY HMMCO EXCEPT STEAM TRACING & INSULATION TO BE SUPPLIED BY YARD
- PIPING SYMBOL LEGEN
M.G.O. LINE :
W.O LINE :
AIR LINE :
STEAM LINE :
- POSITION of MILL P/P(PU5) SUCTION TO BE BELOW 150mm THAN W.O TANK LOW LEVEL SWITCH.
- IN ORDER TO PREVENT DRY RUNNING of D.O BURNER P/P(PU1/PU2), WE STRONGLY RECOMMEND THAT YOU INSTALL A LOW LEVEL SWITCH FOR D.O TANK.



NO.	DESCRIPTION	SPEC.
(M)	M.G.O SUPPLY PUMP	JIS 5K-20A



LIST OF INCINERATOR UNIT

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
B	W.O BURNER	NRV2.1	NON RETURN V/V (TO B)	SV3.1	SOLENOID V/V for B(M.G.O.)
BK	MIXING CHAMBER	NV1	NON RETURN V/V FOR ST1/ST2	SV3.2	SOLENOID V/V for B(M.G.O.)
C3	FLAME DETECTOR for 1st COMBUSTION CHAMBER	N1	NOZZLE (TO B)	SV4.1	SOLENOID V/V for B(W.O)
C4	AIR CYLINDER for INSIDE DOOR	O	W.O STRAINER	SV4.2	SOLENOID V/V for B(W.O)
C5	DOOR BLOCKING for ASH DOOR	OL	AIR STRAINER		
C6	DOOR BLOCKING for FEEDING DOOR	POV1	PNEUMATIC AIR V/V	SV6	SOLENOID V/V for ASH DOOR
CP1	CONTROL PANEL	POV2	PNEUMATIC AIR V/V	SV7	SOLENOID V/V for FEEDING DOOR
EF	SECONDARY COMBUSTION CHAMBER	PS1	PRESSURE SWITCH for COMBUSTION AIR	SV8	SOLENOID V/V for C3/C4
EJ	EXPANSION JOINT	PS2	PRESSURE SWITCH for COMBUSTION CHAMBER	SV9	SOLENOID V/V for PS3
F	PRIMARY COMBUSTION CHAMBER	PS3	PRESSURE SWITCH for ATOMIZING AIR	ST1	PRIMARY M.G.O. BURNER (PU1,RV1,MV1.1,MV1.2)
FD1	FLAME DETECTOR for 1st COMBUSTION CHAMBER	PU1	M.G.O. P/P for ST1	ST2	SECONDARY M.G.O. BURNER (PU2,RV2,MV2.1,MV2.2)
FD2	FLAME DETECTOR for 2nd COMBUSTION CHAMBER	PU2	M.G.O. P/P for ST2	TA	TEST ADAPTOR
IG	INSIDE DOOR for SLUICE	PU3	W.O DOSING P/P	TC1	TEMP. SENSOR for PRIMARY CHAMBER
IL	FEEDING DOOR	RD	REGULATION DAMPER for EXHAUST	TC2	TEMP. SENSOR for EXH. GAS
IL1	ASH DOOR	RV1	PRESSURE CONTROL for ST1	TC3	TEMP. SENSOR for SECONDARY CHAMBER
M1	PRESS. GAUGE for ST1	RV2	PRESSURE CONTROL for ST2	TCV3	3-WAY TEST COCK V/V
M2	PRESS. GAUGE for ST2	RV3	PRESSURE V/V for PU3	TR	PRESSURE REGULATOR
M3	PRESS. GAUGE for TR	SCV	SPEED CONTROL V/V	VH	PRIMARY BLOWER
M4	PRESS. GAUGE for PU-3	SV1.1	SOLENOID V/V for ST1	PU6	M.G.O SUPPLY PUMP
MS1	MICRO SWITCH for ASH DOOR	SV1.2	SOLENOID V/V for ST1		
MS2	MICRO SWITCH for FEEDING DOOR	SV2.1	SOLENOID V/V for ST2		
MS3	MICRO SWITCH for INSIDE DOOR	SV2.2	SOLENOID V/V for ST2		

* NOTE *

Position of mill pump(PU5) suction to be below 150mm than low level switch.

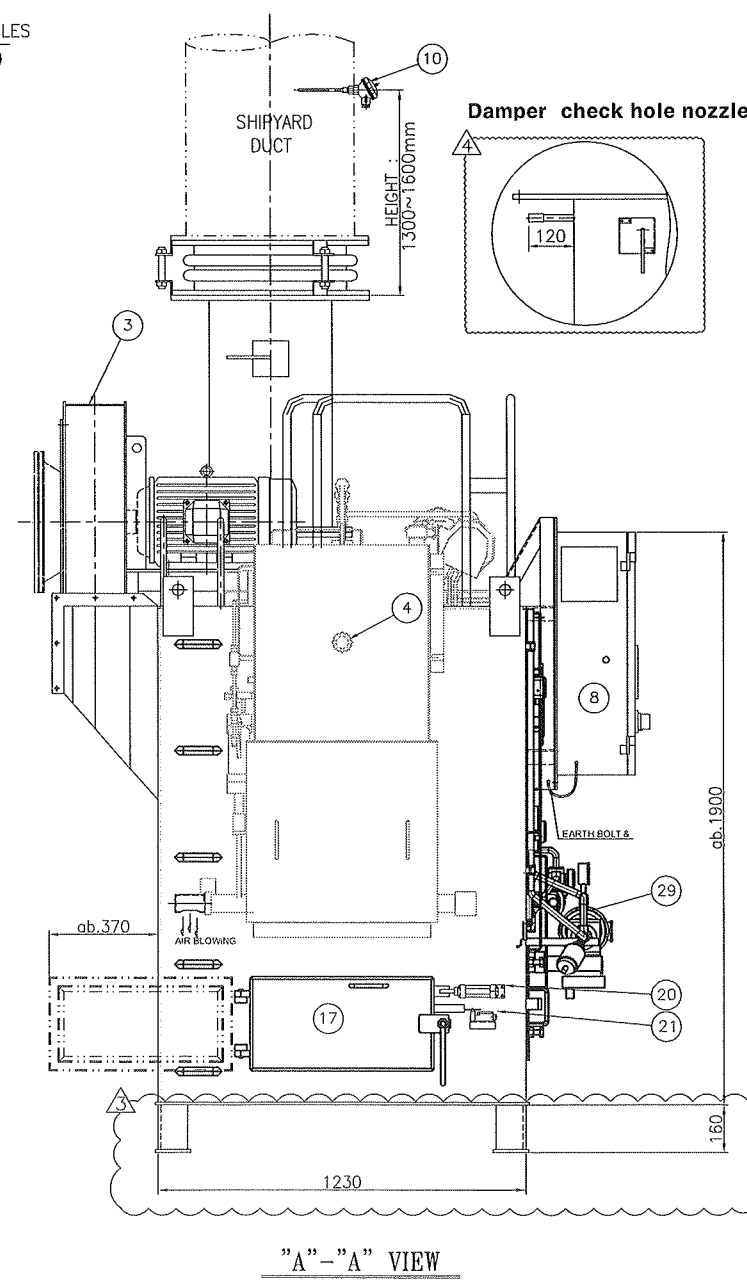
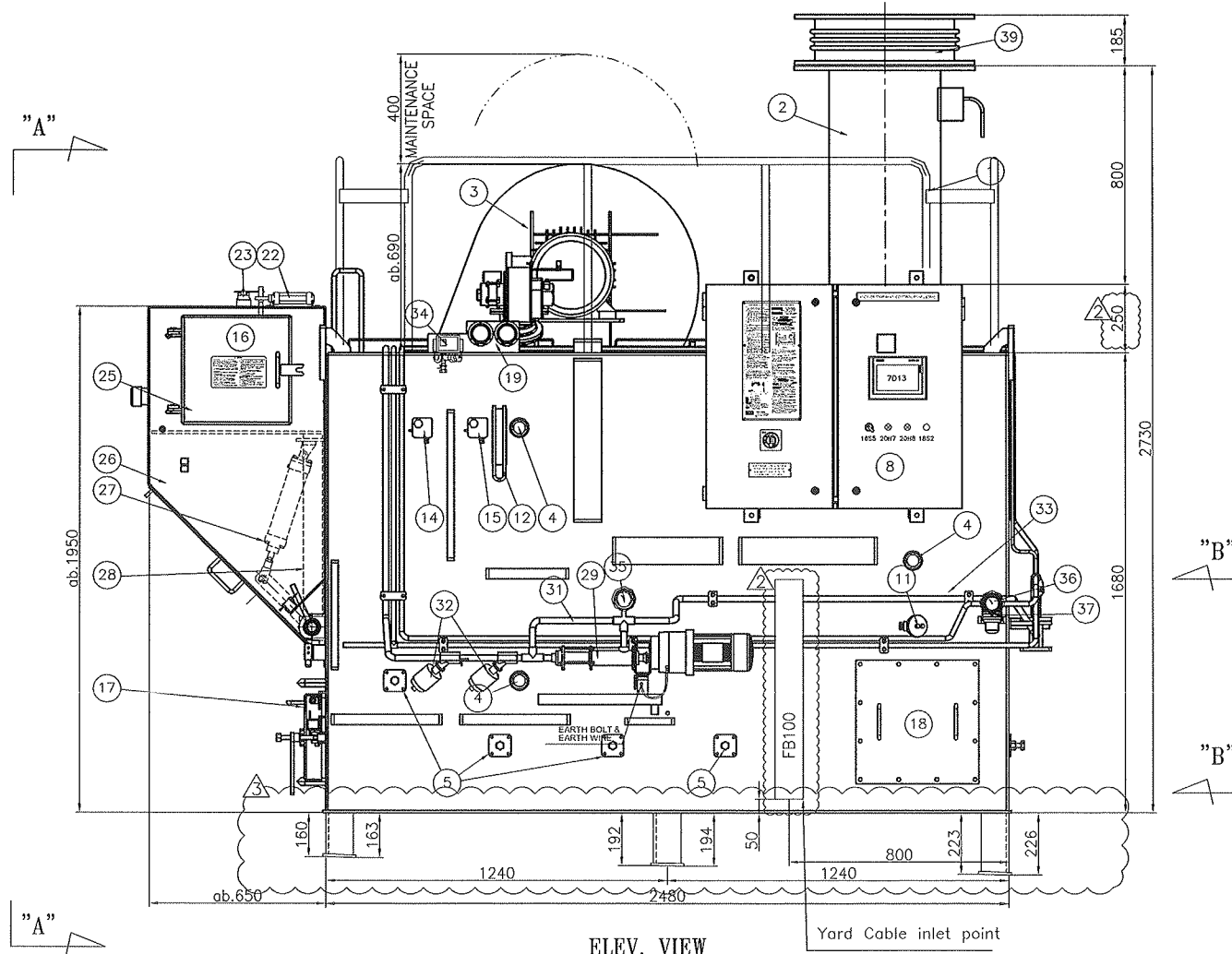
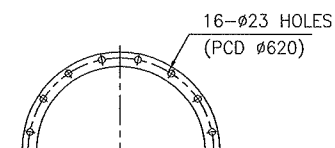
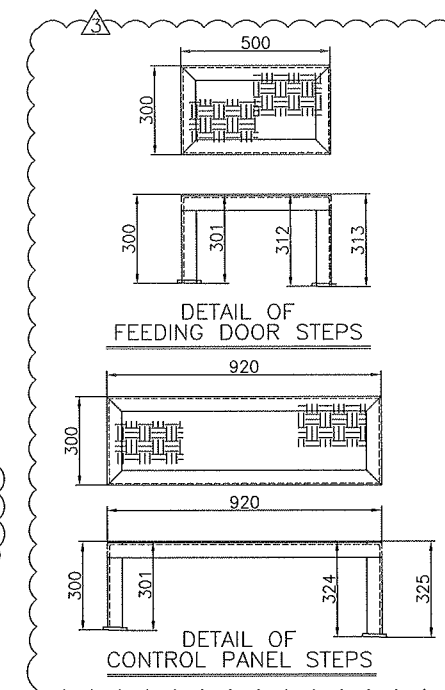
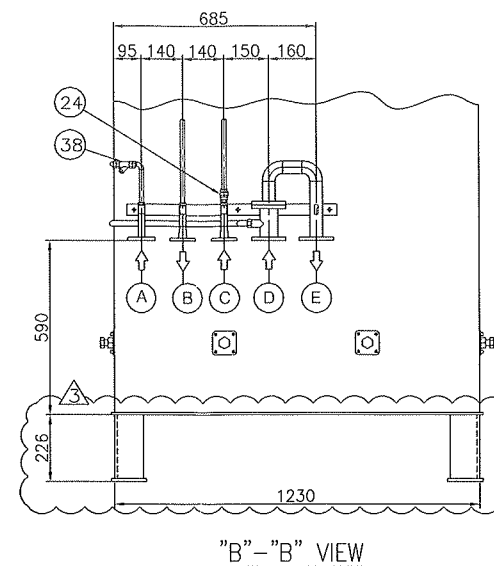
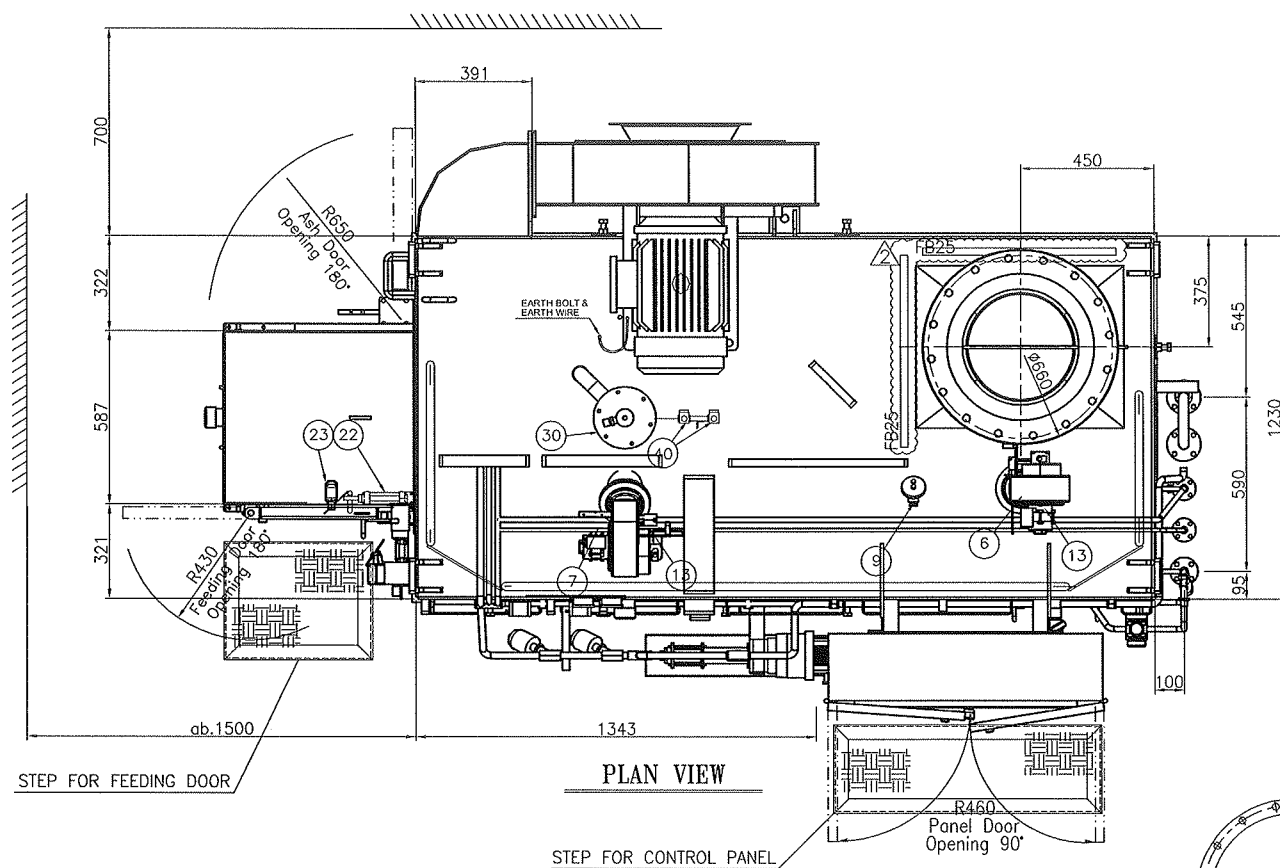
LIST OF TANK UNIT

TC	TEMP. SENSOR FOR HIGH/LOW TEMP.	TI	THERMO METER
LLS	LOW LEVEL SWITCH	QCV	QUICK CLOSING VALVE
HLS	HIGH LEVEL SWITCH	CI	COMPOUND GAUGE
PU5	MILL PUMP	PI	PRESSURE GAUGE
J.B	JUNCTION BOX	SCDV	SELF CLOSING DRAIN VALVE
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION

Type	MAXI T150SL WS	Scale	Non	Name	PIPING DIAGRAM
Project No.	8014				
Approved	2019.11.06	B.U.Park			
Check	2019.11.06	B.U.Park			
Check	2019.11.06	B.U.Park			
Drawn	2019.11.06	K.J.Oh			

HMMCO
Hyundai Marine Machinery Co., Ltd.
<http://www.hmmco.co.kr>

Drawing number
HIE - TP1502010 - R0



A M E N D	DATE	CODE	M E M O	SIGN
	2019.12.26	<u>1</u>	BY YARD COMMENT	K.J.Oh
	2020.03.02	<u>2</u>	BY YARD COMMENT	K.J.Oh
	2020.03.24	<u>3</u>	BY YARD COMMENT	K.J.Oh
	2020.05.04	<u>4</u>	BY YARD COMMENT	K.J.Oh

REMARK

1. Item No. 2,39 will be supply loosely for overland transport height.
(Work scope of installation : Shipyard)
2. Please note that the exhaust gas pipe must be used 45° T-Branch for draining.

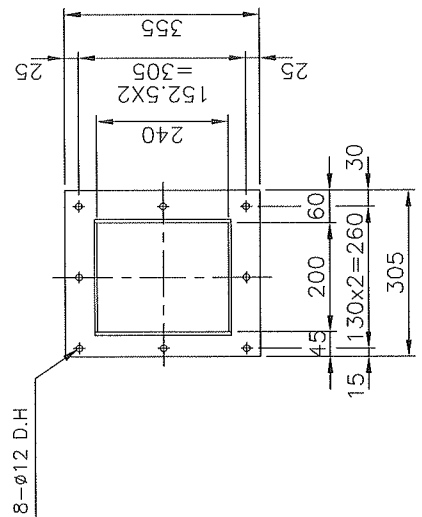
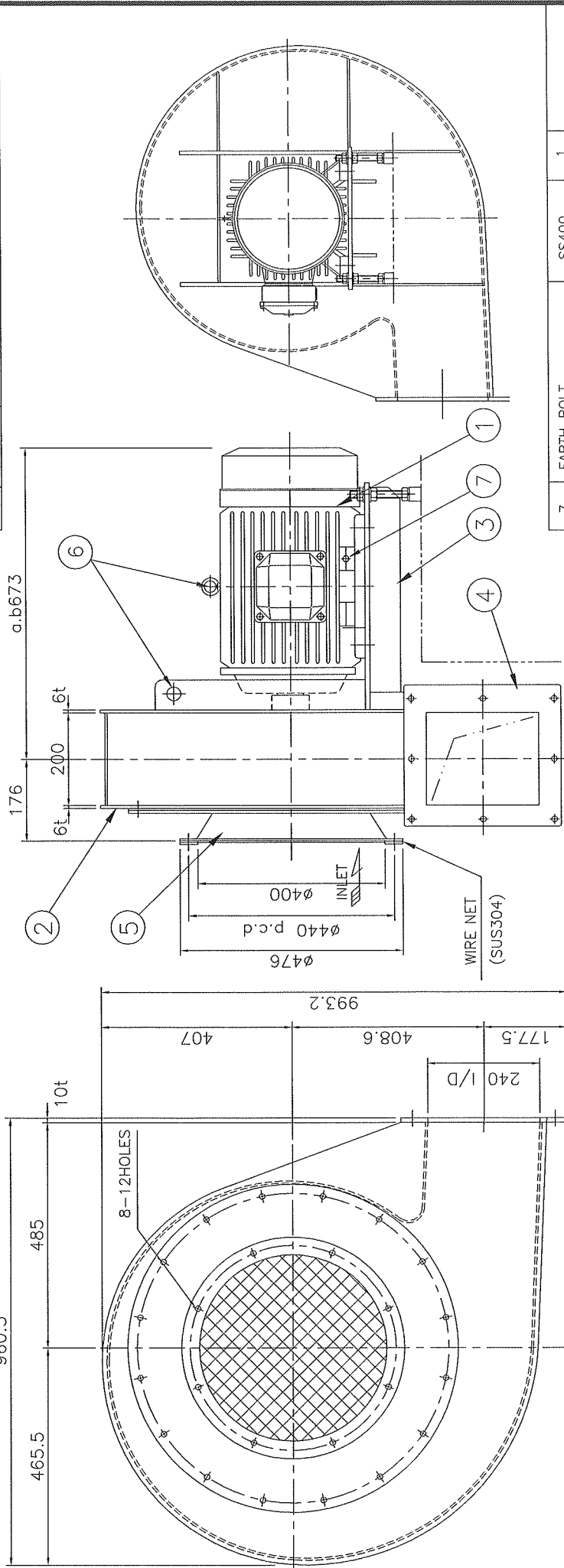
SYMBOL	U S E	YARD CONNECTION	MAKER PIPING
A	CONTROL AIR INLET	JIS 10K-15A	
B	M.G.O. OUTLET	JIS 5K-25A	
C	M.G.O. INLET	JIS 5K-25A	
D	W.O. INLET	JIS 5K-40A	
E	W.O. OUTLET	JIS 5K-40A	

TOTAL WEIGHT : (abt.) 6100 Kg

40	SOLENOID V/V (M.G.O FEEDING TO B)	2	SV3.1/3.2
39	EXPANSION JOINT(INSTALLATION BY YARD)	1	EJ
38	AIR STRAINER	1	OL
37	PRESSURE REGULATOR	1	TR
36	PRESSURE GAUGE for TR	1	M3
35	PRESSURE GAUGE for PU3	1	M4
34	PRESSURE SWITCH for ATOMIZING AIR	1	PS3
33	SOLENOID V/V for PS3	1	SV9
32	PNEUMATIC AIR V/V + SOLENOID V/V	1	P0V1/2+SV4.1/4.2
31	PRESSURE V/V for PU3	1	RV3
30	W.O BURNER	1	B
29	W.O DOSING PUMP	1	PU3
28	INSIDE DOOR for SLUICE	1	604x692
27	AIR CYLINDER for INSIDE DOOR	1	C3
26	CLEANING COVER for SLUICE	1	683x822
25	TRAP DOOR	1	614x580
24	NON RETURN V/V for ST1/ST2	1	NV1
23	MICRO SWITCH for FEEDING DOOR	1	MS2
22	DOOR BLOCKING for FEEDING DOOR	1	C6
21	MICRO SWITCH for ASH DOOR	1	MS1
20	DOOR BLOCKING for ASH DOOR	1	C5
19	PRESSURE GAUGE for ST1/ST2	2	M1/M2
18	CLEANING COVER	1	410x410
17	ASH DOOR	1	615x315
16	FEEDING DOOR	1	400x400
15	PRESSURE SWITCH for COMBUSTION CHAMBER	1	PS2
14	PRESSURE SWITCH for COMBUSTION AIR	1	PS1
13	FLAME DETECTOR	2	QRB
12	U-TYPE VAC. METER	1	UM
11	TEMP. SENSOR FOR SECONDARY CHAMBER	1	TC3
10	TEMP. SENSOR EXH. GAS	1	TC2
9	TEMP. SENSOR FOR PRIMARY CHAMBER	1	TC1
8	CONTROL PANEL FOR INCINERATOR	1	CP1
7	PRIMARY M.G.O. BURNER	1	ST1
6	SECONDARY M.G.O. BURNER	1	ST2
5	AIR INLET NOZZLE	4	ø20
4	SIGHT GLASS	4	ø50
3	PRIMARY BLOWER	1	VH
2	EXH. DAMPER (INSTALLATION BY YARD)	1	RD/550A
1	MIXING CHAMBER	1	BK/400A
NO.	DESCRIPTION	Q'TY	REMARKS

Type		Scale		Name	
MAXI T150SL WS		Non		WASTE OIL INCINERATOR	
Project No.				 HMMCO Hyundai Marine Machinery Co., Ltd. http://www.hmmco.co.kr	
8014					
Approved	2019.11.06	B.U.Park			
Check	2019.11.06	B.U.Park			
Check	2019.11.06	B.U.Park			
Drawn	2019.11.06	K.J.Oh		Drawing number	
				HID - T152003 - R0	

DATE	CODE	MEMO	SIGN
A	1		
M	2		
E	3		
N			
D			



NO.	NAME	MATERIAL	QTY	REMARK
7	EARTH BOLT	SS400	1	
6	LIFTING LUG	SS400	2	
5	INLET CONE	SS400	1	
4	FLANGE	SS400	1	
3	MOTOR BED	SS400	1	
2	CASING	SS400	1	
1	MOTOR	SS400	1	

Type	Scale	Name
HTF-#3.5	N/S	OUTLINE OF PRIMARY BLOWER ON MAXI T100 and T150

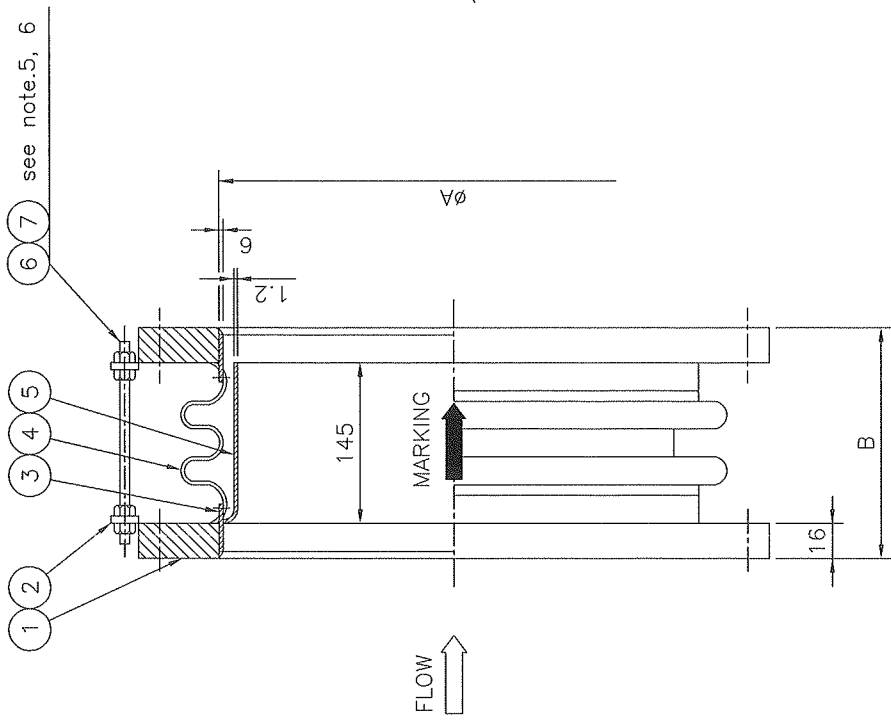
Project No.	8014	Project Name
Approved	2019.11.06.	B.U.Park
Check	2019.11.06.	B.U.Park
Check	2019.11.06.	B.U.Park
Drawn	2019.11.06.	K.J.Oh

Company	Logo	Website
HMMCO		http://www.hmmco.co.kr

Drawing number	AT-ABB1500
----------------	------------

USE :	PRIMARY BLOWER
AIR VOLUME :	6600 m ³ /Hr
STATIC PRESSURE :	7150 PA (715 mmAq)
MOTOR CAPACITY :	22 Kw x 2P
POWER SOURCE :	440V, 3Ø, 60Hz
MOTOR MAKER :	ABB
TOTAL WEIGHT:	About 300 Kg

A	DATE	CODE	MEMO	SIGN
M		1		
E		2		
N		3		
D				



DIMENSION TABLE

STD. NO.	SIZE	ϕA (I/D)	ϕD	$\phi d1$ (p.c.d)	N	ϕd	B	REMARK
HEJ-550-A	550A	558.8	660	620	16	23	185	

NOTE

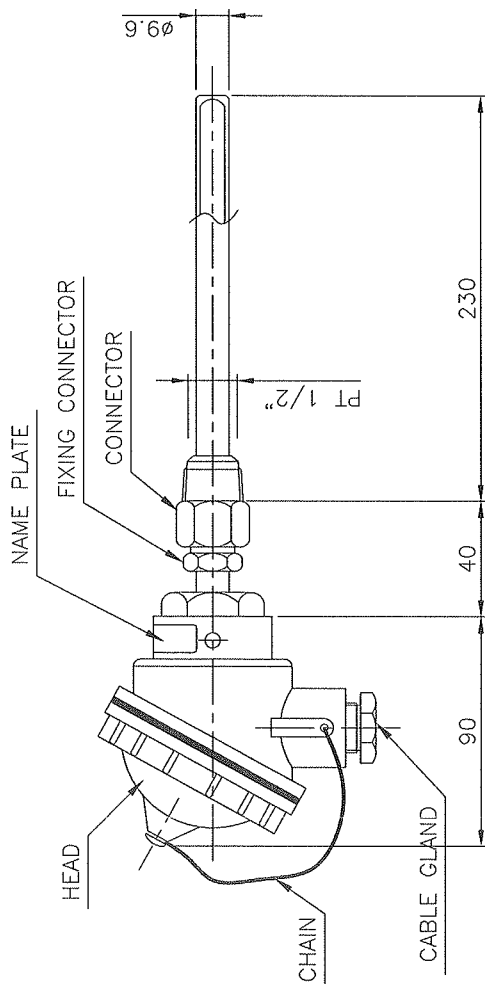
1. TEMPERATURE : MAX. 480°C
2. SHRINKAGE : 23mm(MAX. 51mm)
3. MOVEMENT LATERAL : X=1.5mm, Y=1.5mm
4. BELLOWS/INNER PIPE MATERIAL : SUS304
5. SHRINKAGE CAN BE USEFUL WITHIN BRACKETED DIMENSION BY ADJUSTING INSTALLING LENGTH SHIPPING BOLTS.
6. AFTER PIPING WORK SHIPPING BOLTS MUST BE REMOVED.

NO.	N A M E	MATERIAL	Q'TY	REMARK
7	SHIPPING BOLT	SS400	3	M22
6	SHIPPING NUT & WASHER	SS400	12	M22
5	SLEEVE	SUS304	1	1.2t
4	BELLOWS	SUS304	1	1.2t x P45
3	END PIPE	SUS304	2	6t
2	BRACKET	SS400	6	12t x FB50
1	FLANGE	SS400	2	

Type	Scale	Name	EXPANSION JOINT
8014	Non		
Project No.			
Approved	2019.11.06.	B.U.Park	
Check	2019.11.06.	B.U.Park	
Check	2019.11.06.	B.U.Park	
Drawn	2019.11.06.	K.J.Oh	

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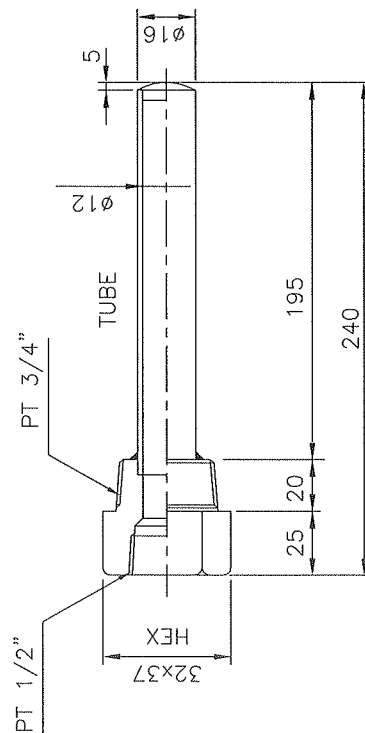
Drawing number
HIE - 100048



THERMO COUPLE

■ SPECIFICATION

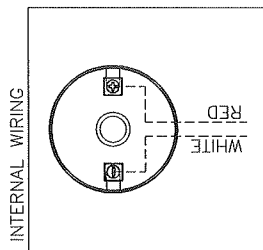
TYPE	RANGE	CLASS	MATERIAL		CABLE GLAND
			HEAD	PROTECTION TUBE	
K-TYPE	0 - 1200°C	0.5	ALUMINUM ALLOY	SUS304	15b



THERMOWELL

■ SPECIFICATION

- * MODEL : SS-5093A
- * TYPE : CLOSED END TUBE AND ATTACHMENT WELDED.
- * MATERIAL : SUS304.



A	DATE	CODE	M E M O	SIGN
M		1		
E		2		
N		3		
D				

Type	Scale	Name
	Non	THERMO COUPLE FOR EXHAUST GAS PIPE
Project No. 8014		
Approved	2019.11.06.	B.U.Park
Check	2019.11.06.	B.U.Park
Check	2019.11.06.	B.U.Park
Drawn	2019.11.06.	K.J.Oh
HMMCO Hyundai Marine Machinery Co., Ltd. http://www.hmmco.co.kr		
Drawing number HCE - 100036		

INCINERATOR MAIN CONTROL PANEL (CP-1)

SHIP NO. : 8014

1. THIS INCINERATOR IS DESIGNED AND MANUFACTURED IN ACCORDANCE WITH MEPC 76/40 ANNEX 8.
2. THIS INCINERATOR DOES NOT PROVIDE LOW OIL FUEL PRESSURE ALARM BECAUSE THE NORMAL FUEL OIL PRESSURE IS VERY LOW AND IT IS CONTROLLED BY ATOMIZING AIR PRESSURE AND ALSO PUMP FOR M.G.O. IS AN INTEGRAL PART OF THE BURNER
; REFER TO MEPC 76/40 ANNEX 8 5.3.2.6

INDEX LIST

PAGE	DESIGNATION	PAGE	DESIGNATION	REMARKS
001	TITLE			
002	INDEX LIST			
004	CONTROL PANEL LAYOUT/FRONT			
005	MAIN CURRENT			
006	MAIN CURRENT			
007	MAIN CURRENT			
008	CONTROL SOURCE			
015	CONTROL CIRCUIT DIAGRAM (DI)			
016	CONTROL CIRCUIT DIAGRAM (DI)			
017	CONTROL CIRCUIT DIAGRAM (DI)			
018	CONTROL CIRCUIT DIAGRAM (DI)			
019	CONTROL CIRCUIT DIAGRAM (DQ)			
020	CONTROL CIRCUIT DIAGRAM (DQ)			
021	CONTROL CIRCUIT DIAGRAM (DQ)			
022	CONTROL CIRCUIT DIAGRAM (DQ)			
024	CONTROL CIRCUIT DIAGRAM (AI/AQ)			
025	CONTROL CIRCUIT OPTION			
030	EXTERNAL SIGNAL			
040	LIST OF PARTS			
041	LIST OF PARTS			
042	LIST OF PARTS			
501	TERMINAL STRIP X1			
502	TERMINAL STRIP X1			
503	TERMINAL STRIP X1			

Name		CONTROL PANEL LAYOUT/FRONT		Project No.		8014	
Rev. 4		Page :		Approval	2019.11.06	B.U.Park	
Rev. 3				Check	2019.11.06	B.U.Park	
Rev. 2			002	Design	2019.11.06	B.U.Park	
Rev. 1				Drawing	2019.11.06	K.J.Oh	


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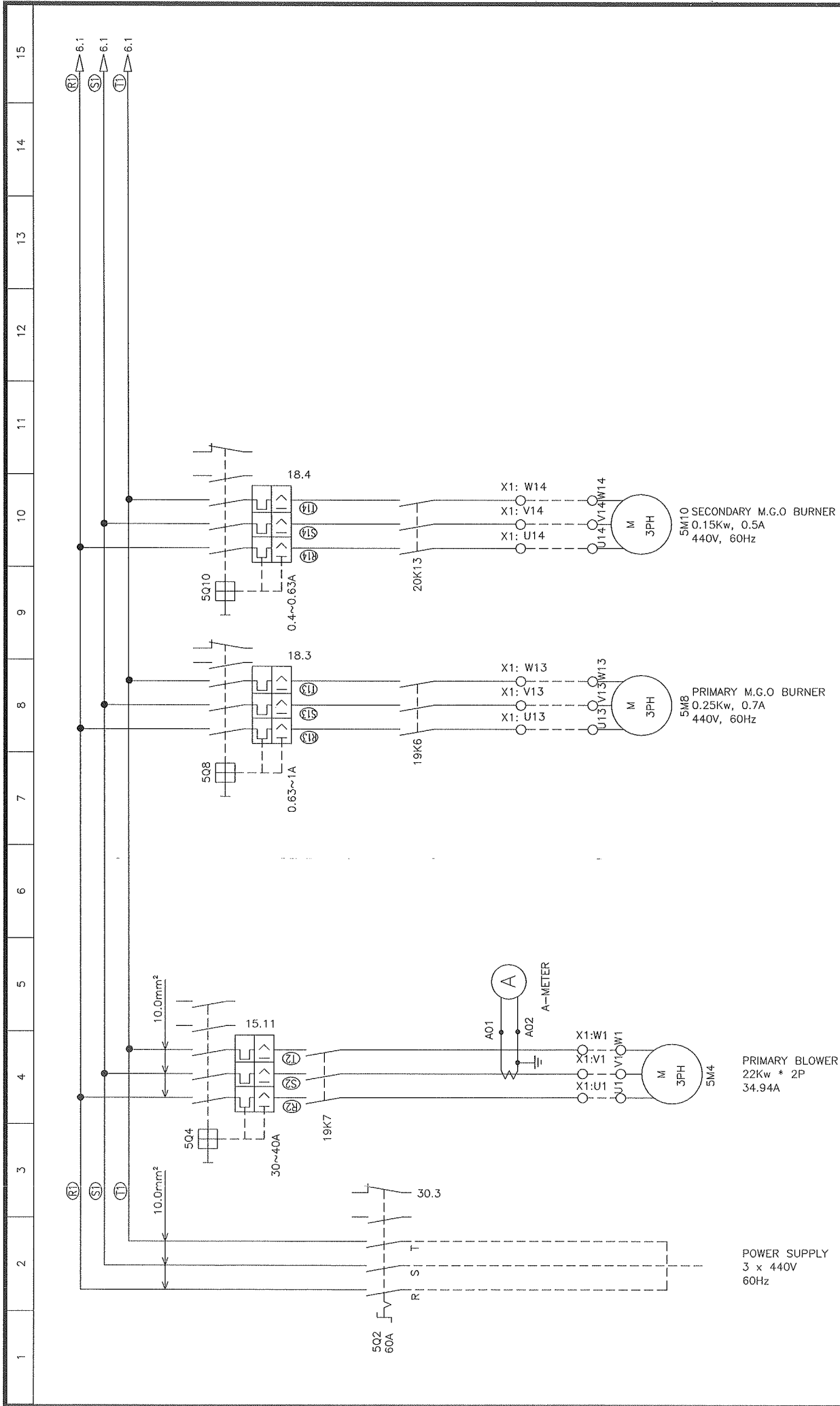
Drawing number
 HIF-NGTSTD002-R0



CONTROLLED BY A PLC UNIT

Name	CONTROL PANEL LAYOUT/FRONT	Project No.	8014
Rev. 4		Page :	2019.11.06 B.U.Park
Rev. 3		Check	2019.11.06 B.U.Park
Rev. 2		Design	2019.11.06 B.U.Park
Rev. 1		Drawing	2019.11.06 K.J.Oh

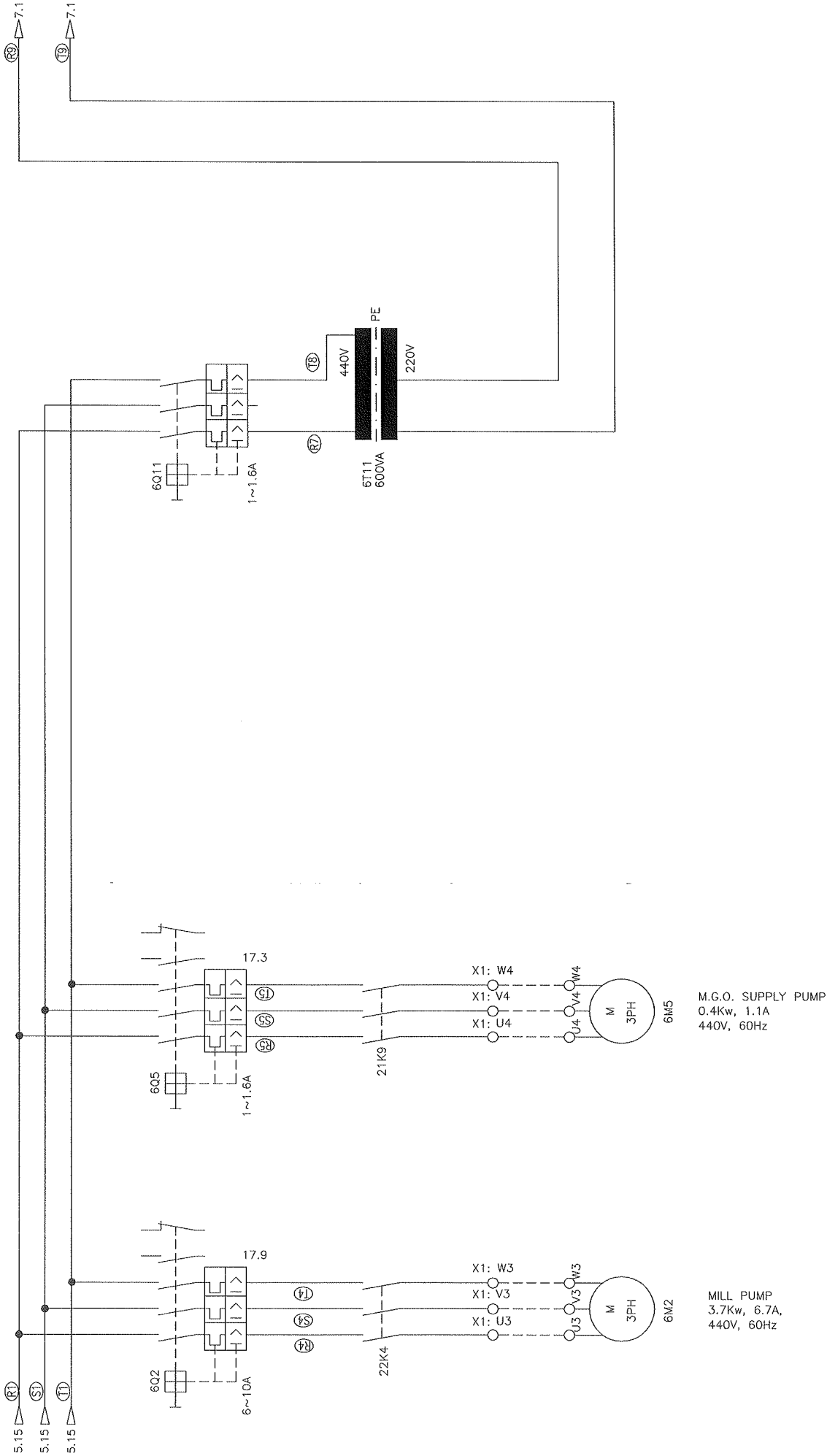
HIF-NGTSTD004-RO



HMMCO Hyundai Marine Machinery Co., Ltd. http://www.hmmco.co.kr Drawing number HIF-NGTSTD005-R0														
Name MAIN CURRENT Project No. 8014														
Rev. 4	Rev. 3	Rev. 2	Rev. 1	Page : 005				Approval	2019.11.06	B.U.Park				
								Check	2019.11.06	B.U.Park				
								Design	2019.11.06	B.U.Park				
								Drawing	2019.11.06	K.J.Oh				

* NOTE *

* Power cable type is "HFX-PSW"



Name				Project No.			
MAIN CURRENT				8014			
Rev. 4				Page :	Approval	2019.11.06	B.U.Park
Rev. 3					Check	2019.11.06	B.U.Park
Rev. 2					Design	2019.11.06	B.U.Park
Rev. 1					Drawing	2019.11.06	K.J.Oh



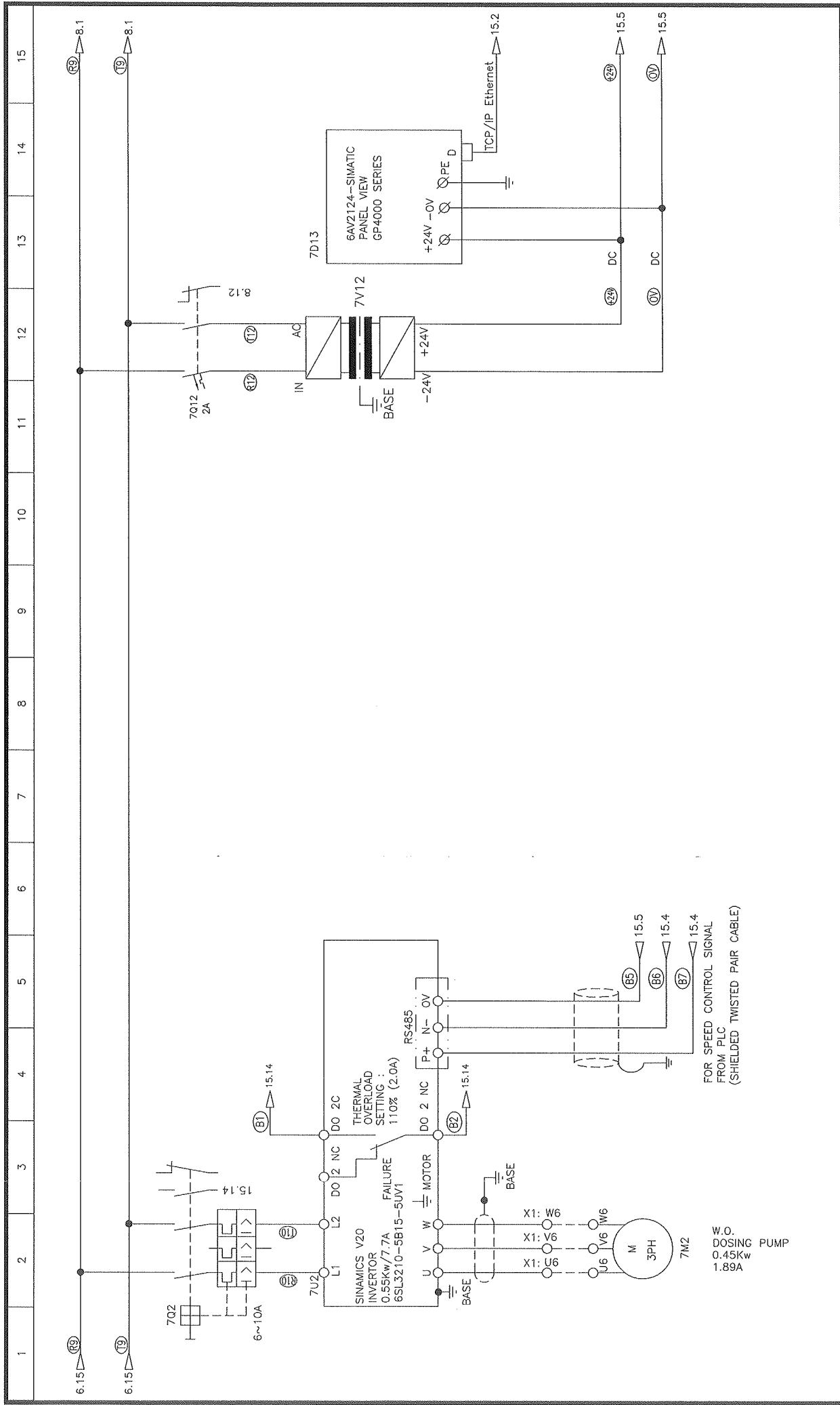
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Drawing number

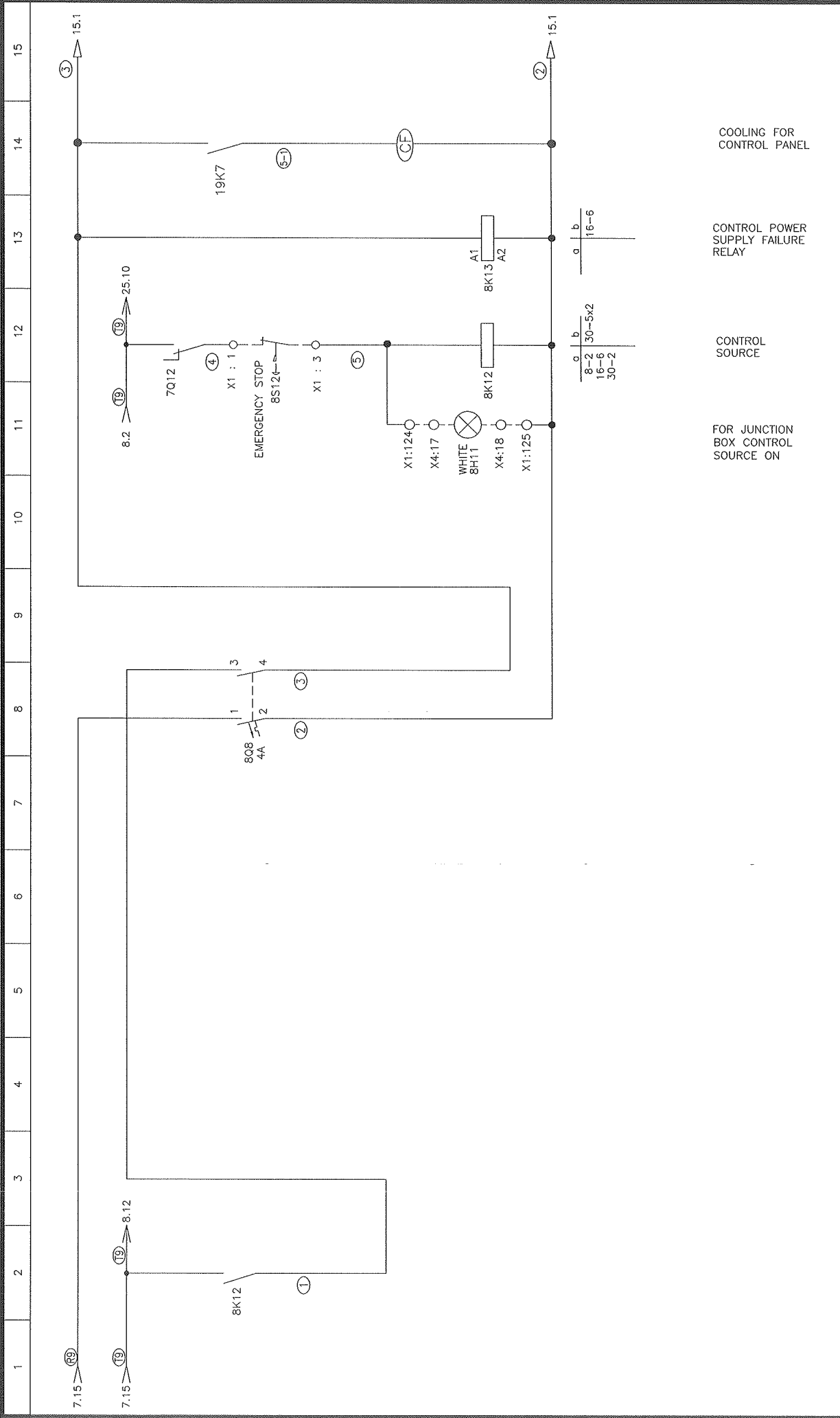
HIF-NGTSTD006-R0



Name				MAIN CURRENT				Project No.				8014			
Rev. 4								Approval	2019.11.06	B.U.Park					
Rev. 3								Check	2019.11.06	B.U.Park					
Rev. 2								Design	2019.11.06	B.U.Park					
Rev. 1								Drawing	2019.11.06	K.J.Oh					

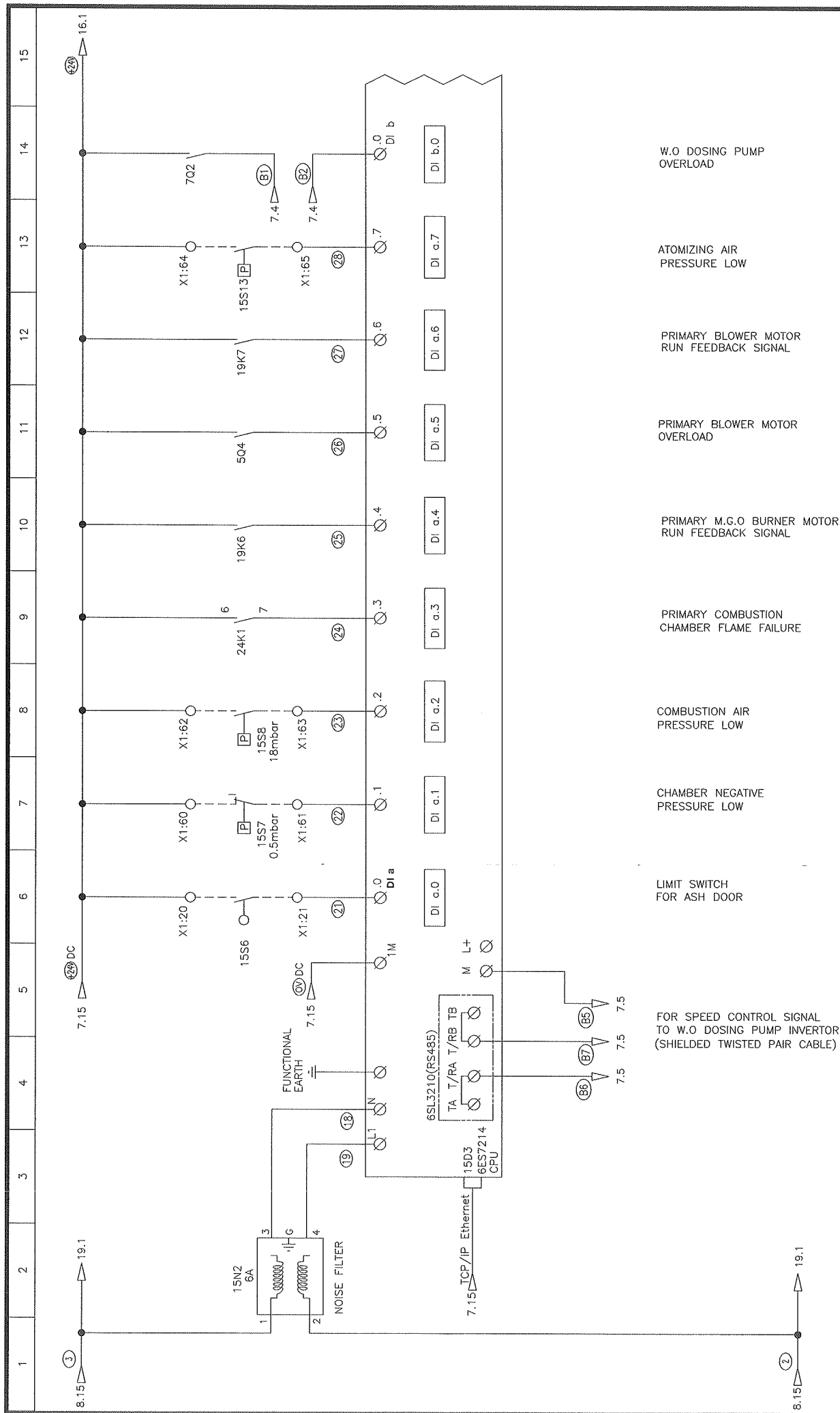
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Drawing number
 HIF-NGTSTD007-R0



Name		Project No.		8014	
CONTROL SOURCE		Approval		2019.11.06	
Rev. 4		Check		2019.11.06	
Rev. 3		Design		2019.11.06	
Rev. 2		Drawing		2019.11.06	
Rev. 1		K.J.Oh		K.J.Oh	

HMMCO		Hyundai Marine Machinery Co., Ltd.	
http://www.hmmco.co.kr		Drawing number	
HIF-NGTSTD008-R0		Project No.	

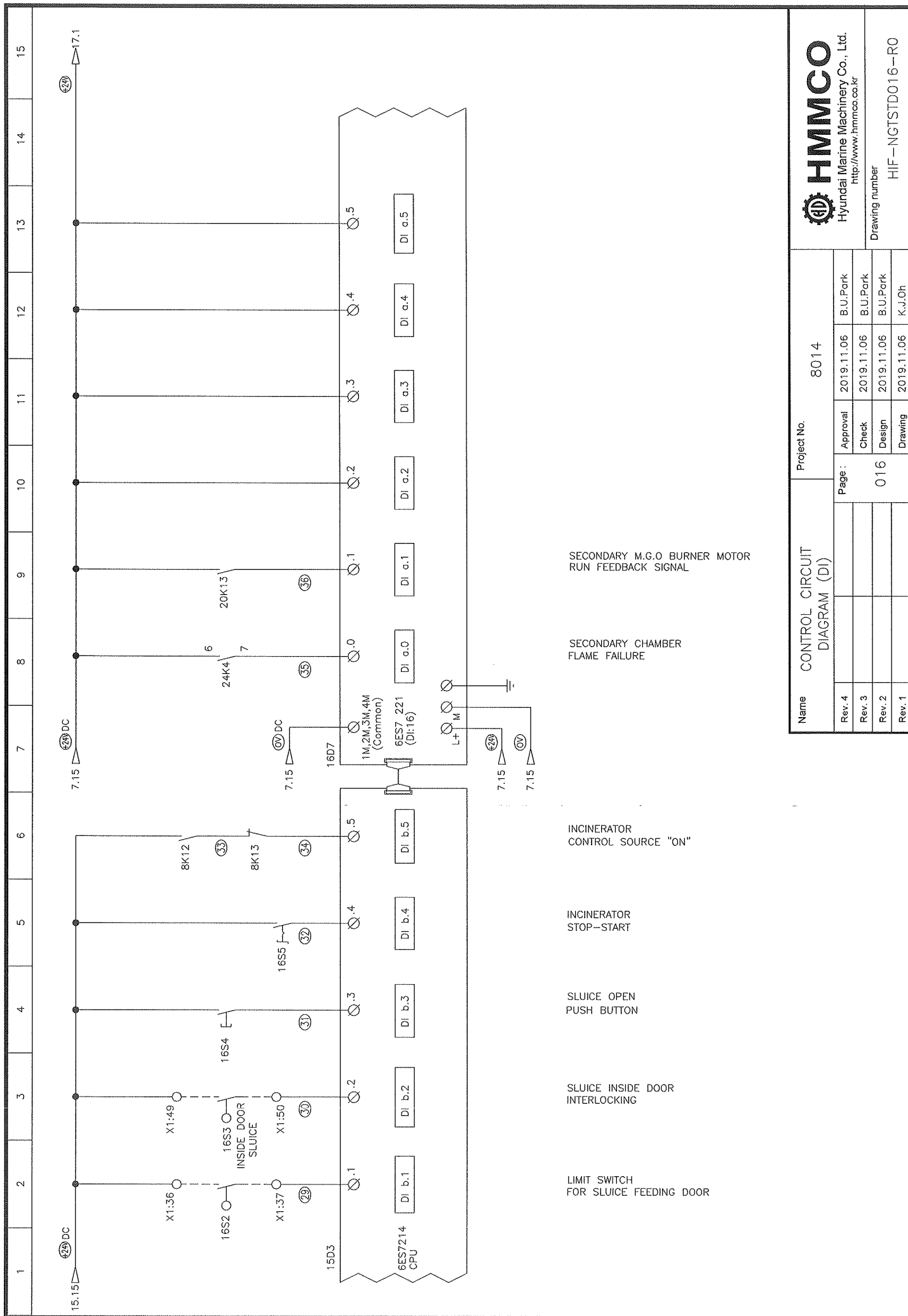


Name				Project No.				8014			
CONTROL CIRCUIT				DI				015			
Rev. 4	Rev. 3	Rev. 2	Rev. 1	Approval	Check	Design	Drawing	2019.11.06	2019.11.06	2019.11.06	2019.11.06
				Page :				B.U.Park			
								B.U.Park			
								B.U.Park			
								K.J.Oh			

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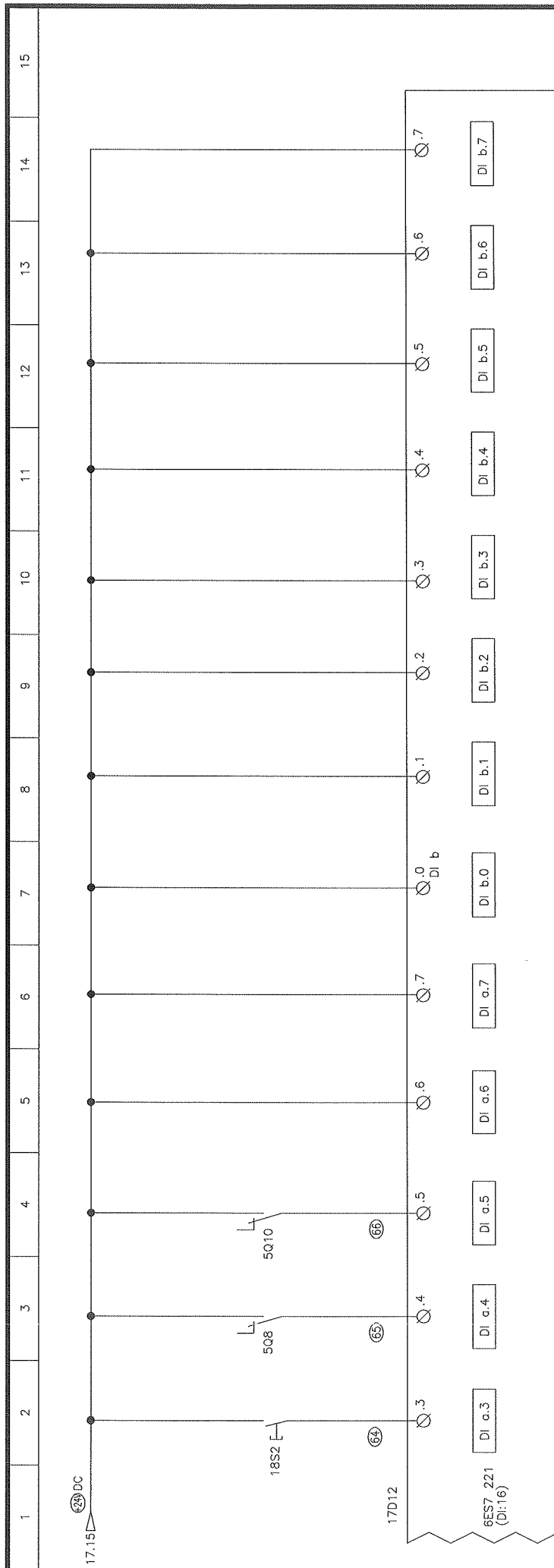
Drawing number

HIF-NGTSTD015-R0



Name	Project No.	8014
Rev. 4	Approval	B.U.Park
Rev. 3	Check	B.U.Park
Rev. 2	Design	B.U.Park
Rev. 1	Drawing	K.J.Oh

Name	CONTROL CIRCUIT DIAGRAM (DI)
Rev. 4	Page: 016
Rev. 3	2019.11.06
Rev. 2	2019.11.06
Rev. 1	2019.11.06

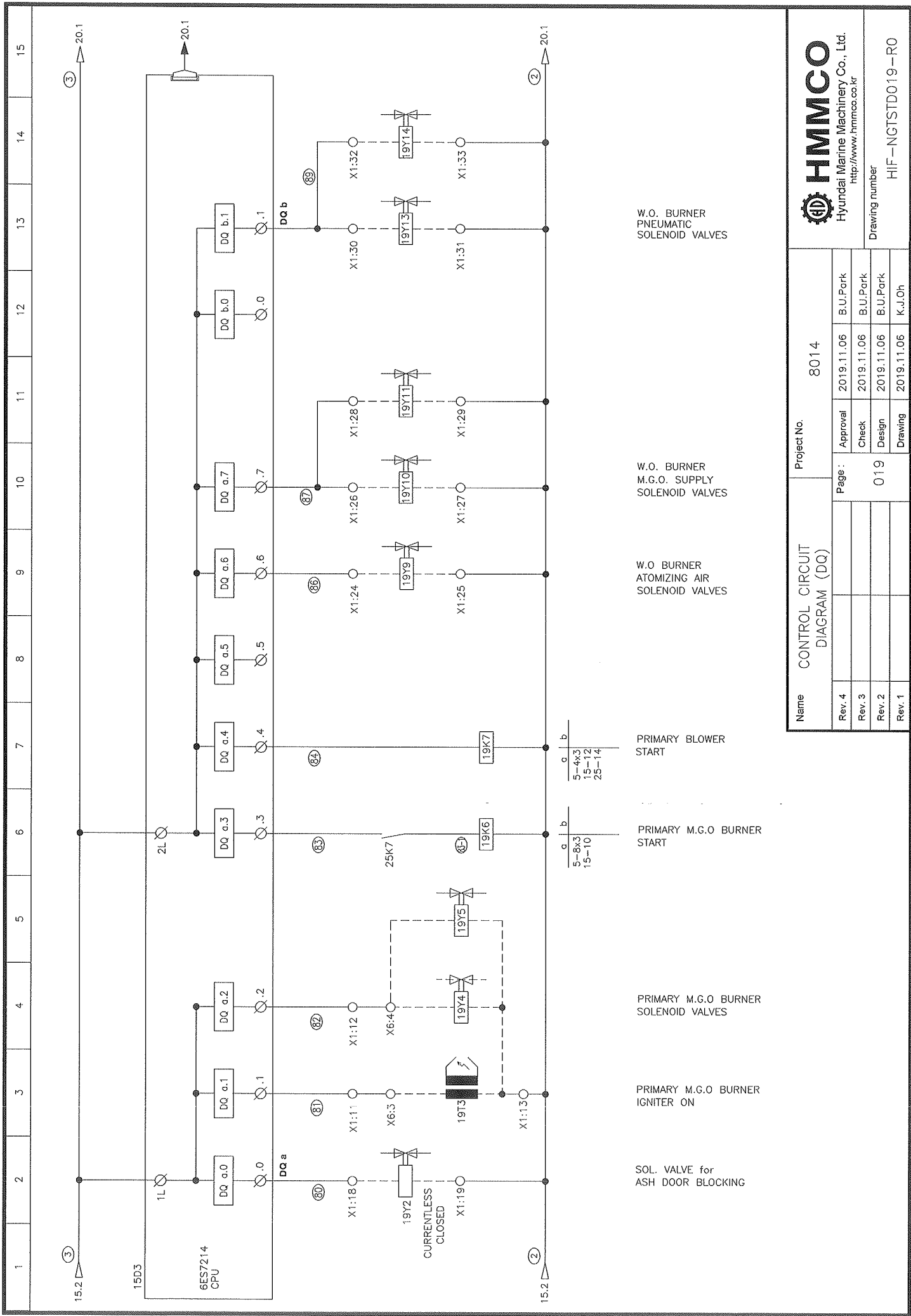


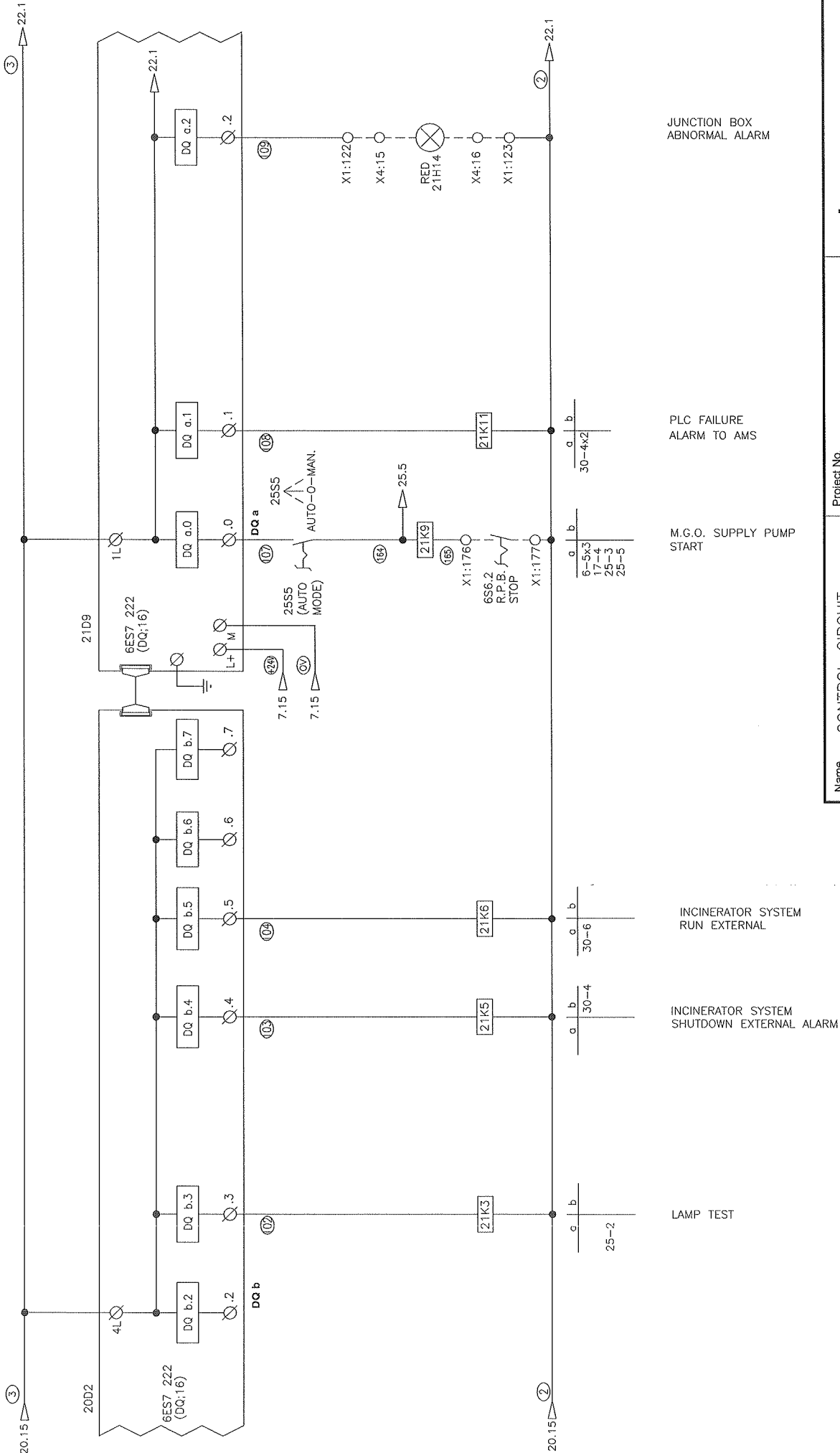
SECONDARY M.G.O BURNER
OVERLOAD

PRIMARY M.G.O BURNER
OVERLOAD

INCINERATOR SYSTEM ABNORMAL
ALARM RESET PUSH BUTTON

Name		Project No.		8014			
CONTROL CIRCUIT DIAGRAM (DI)		Page :		018			
Rev. 4		Approval	2019.11.06	B.U.Park			
Rev. 3		Check	2019.11.06	B.U.Park			
Rev. 2		Design	2019.11.06	B.U.Park			
Rev. 1		Drawing	2019.11.06	K.J.Oh			



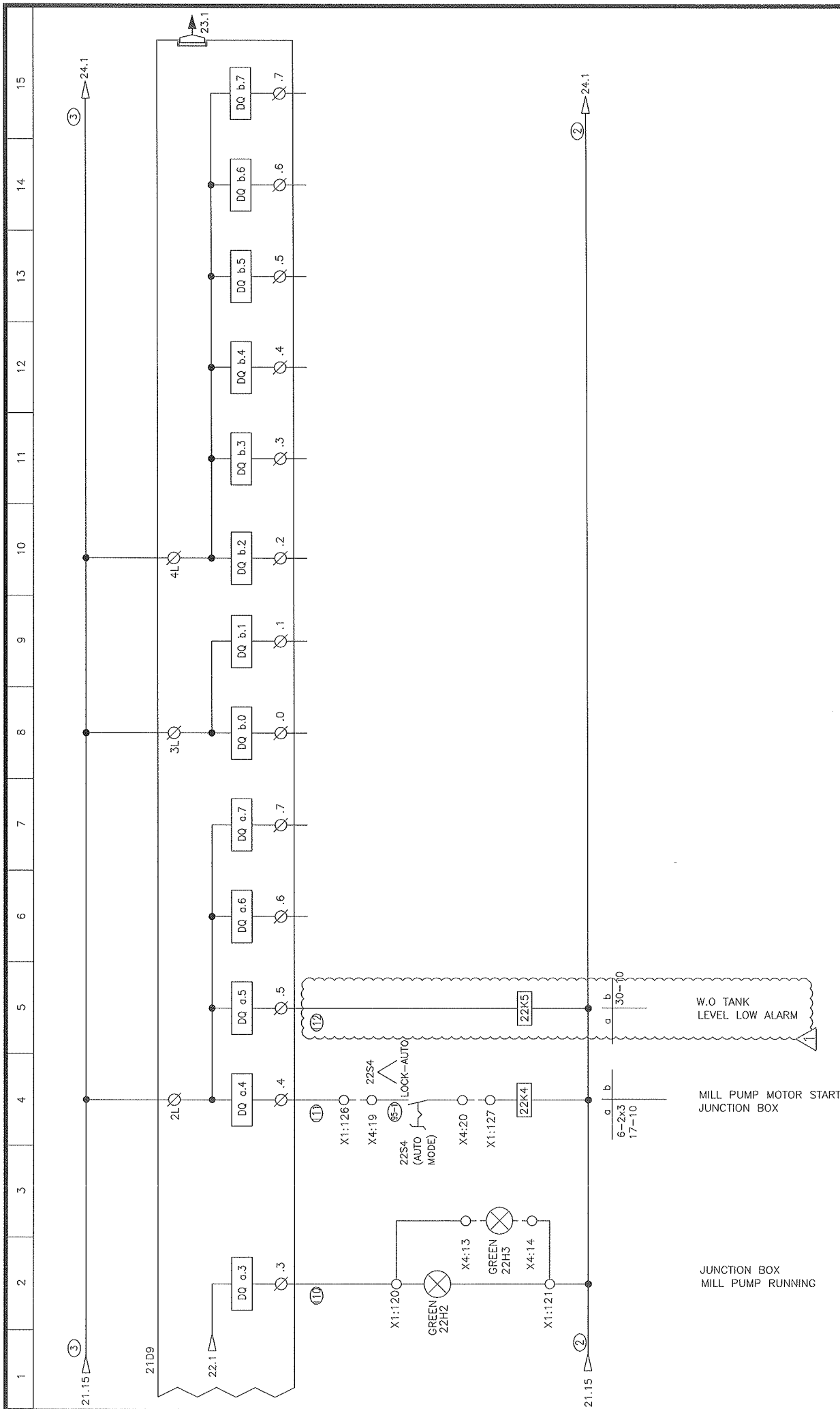


Name				Project No.			
CONTROL CIRCUIT DIAGRAM (DQ)				8014			
Rev. 4				Approval	2019.11.06	B.U.Park	
Rev. 3				Check	2019.11.06	B.U.Park	
Rev. 2				Design	2019.11.06	B.U.Park	
Rev. 1				Drawing	2019.11.06	K.J.Oh	

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Drawing number

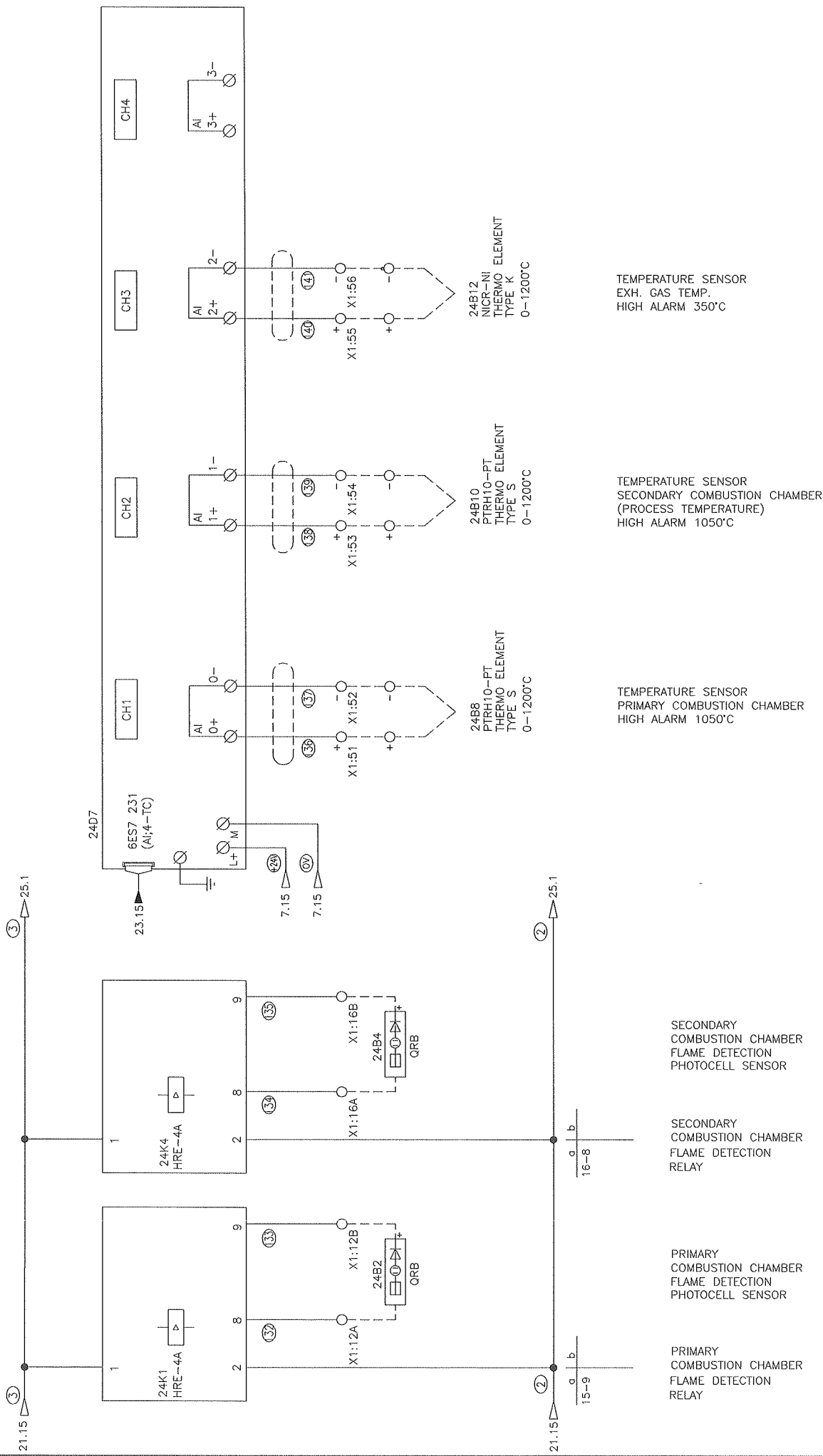
HIF-NGTSTD021-R0



Name		CONTROL CIRCUIT DIAGRAM (DQ)		Project No.		8014	
Rev. 4				Page:	Approval	2019.11.06	B.U.Park
Rev. 3					Check	2019.11.06	B.U.Park
Rev. 2				022	Design	2019.11.06	B.U.Park
Rev. 1					Drawing	2019.11.06	K.J.Oh


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Drawing number
 HIF-NGTSTD022-R1

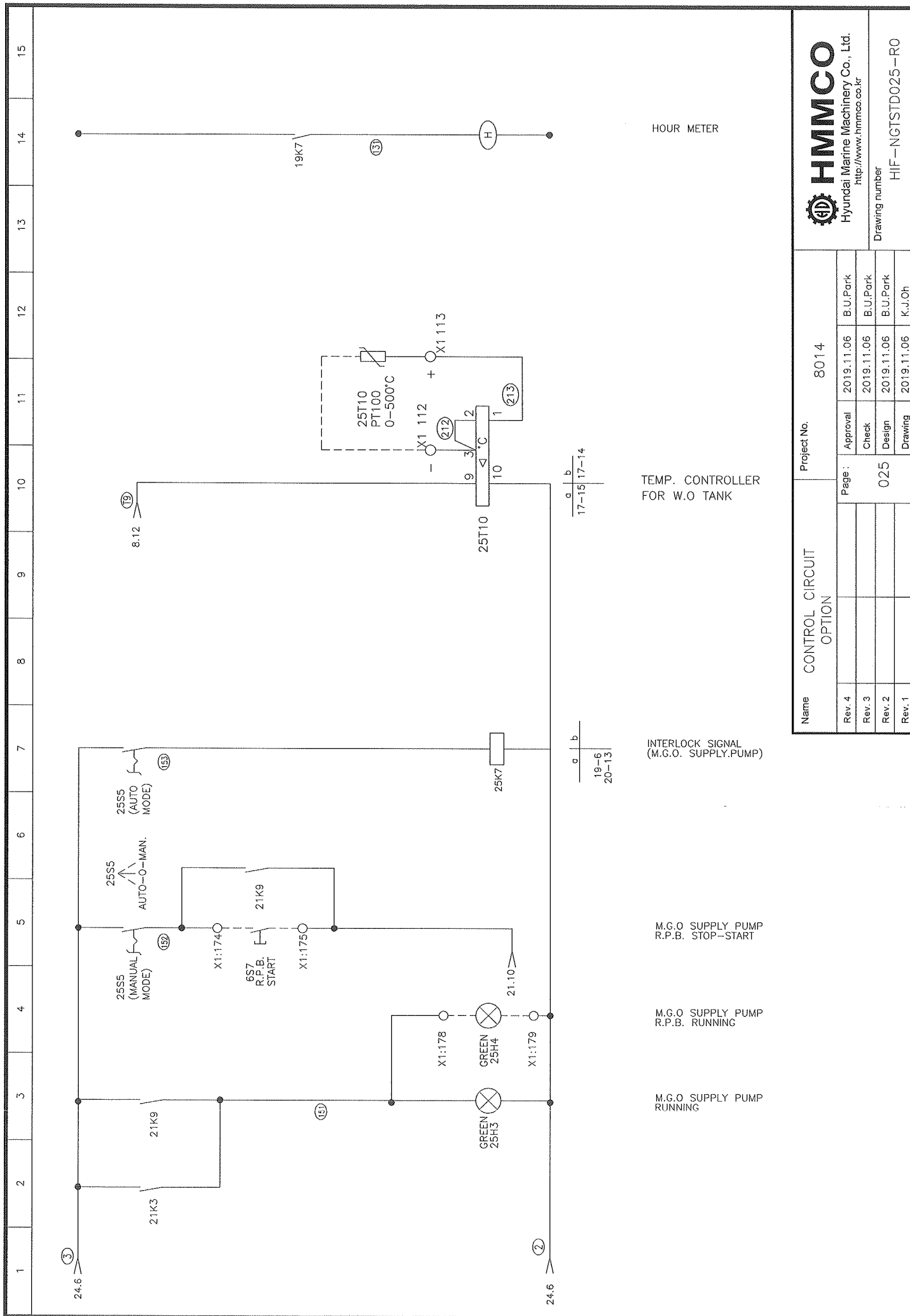


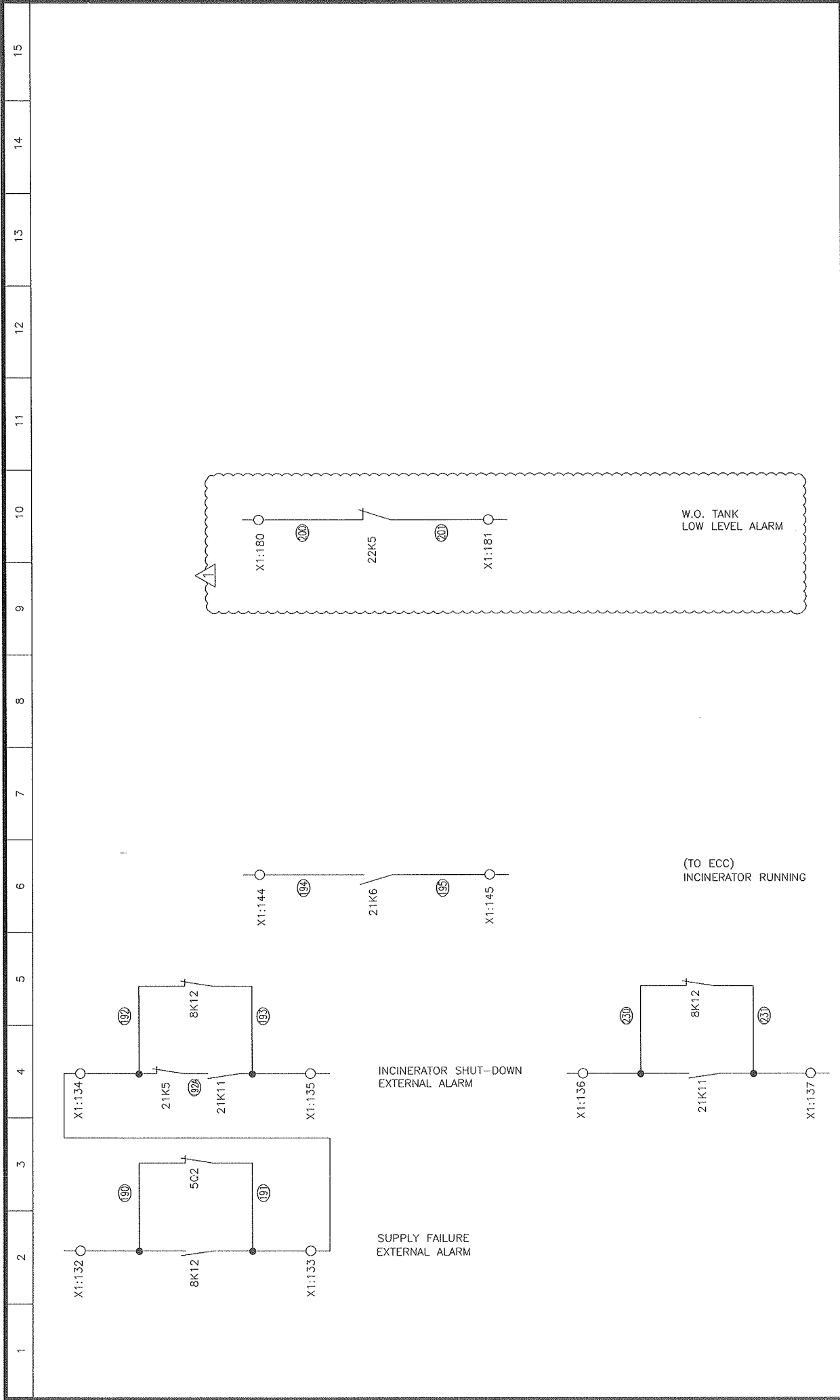
Name				Project No.			
CONTROL CIRCUIT DIAGRAM (AI/AQ)				8014			
Rev. 4				Approval	2019.11.06	B.U.Park	
Rev. 3				Check	2019.11.06	B.U.Park	
Rev. 2				Design	2019.11.06	B.U.Park	
Rev. 1				Drawing	2019.11.06	K.J.Oh	

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Drawing number

HIF-NGTSTD024-R0





Name		Project No.		8014	
EXTERNAL SIGNAL		Approval		2019.11.06	
Rev. 4		Check		2019.11.06	
Rev. 3		Design		2019.11.06	
Rev. 2		Drawing		2019.11.06	
Rev. 1		Page :		030	
		B.U.Park		B.U.Park	
		B.U.Park		B.U.Park	
		K.J.Oh		K.J.Oh	

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 Drawing number
 HIF-NGTSTD030-R1

PART LIST for CONTROL PANEL

DESIGN	PC.	COMPONENT	FUNCTION	RANGE	ADJUSTM'T	TYPE	MAKER
	1	CONTROL PANEL					HMMCO
	2	COOLING FILTER 204 x 204					
5Q2	1	MAIN SWITCH		60A		ABN63c(60A) +E35S	LS
5Q4	1	CIRCUIT BREAKER	PRIMARY BLOWER	30~40A	34.94A	GV3-P40	TELEMECANIQUE
5Q4	1	AUXILIARY BLOCK FOR CIRCUIT BREAKER 1 ON - 1 NC	PRIMARY BLOWER			GV3-A02	TELEMECANIQUE
7Q2	1	CIRCUIT BREAKER	W.O. DOSING PUMP	6~10A		MMS-32S	LS
7Q2	1	AUXILIARY BLOCK FOR CIRCUIT BREAKER 1 ON - 1 NC	W.O. DOSING PUMP			FX(MMS)	LS
6Q11	1	CIRCUIT BREAKER	SUPPLYFORMER	1~1.6A		MMS-32S	LS
7Q12	1	MINI CIRCUIT BREAKER	CONTROL SOURCE	2A 2POLE		C60N 2P 2A	SCHNEIDER
7Q12	1	AUXILIARY BLOCK 1NO - 1NC	CONTROL SOURCE			MG NO. 26924	SCHNEIDER
5Q8	1	CIRCUIT BREAKER	PRIMARY M.G.O BURNER	0.63~1A		MMS-32S	LS
5Q10	1	CIRCUIT BREAKER	SECONDORY M.G.O BURNER	0.4~0.63A		MMS-32S	LS
8Q8	1	MINI CIRCUIT BREAKER	CONTROL SOURCE	4A 2POLE		C60N 2P 4A	SCHNEIDER
8K13	1	ELECTRIC UNDER SOURCE RELAY	CONTROL SOURCE SUPPLY FAILURE	220V		EUVR-220R7	SCHNEIDER
19K6	1	CONTACTOR	PRIMARY M.G.O BURNER	4KW 220V		MC-12b	DEARUK
20K13	1	CONTACTOR	SECONDARY M.G.O BURNER	4KW 220V		MC-12b	DEARUK
19K7	1	CONTACTOR	PRIMARY BLOWER	22Kw 220V		MC-50a	DEARUK
7U2	1	VARIABLE SPEED CONTROLLER	W.O. DOSING PUMP	0.65Kw 220V		6LS3210_ SNAMICS V20	SIMENS
8K12	1	AUXILIARY RELAY 3NO - 1NC WITH AUX. BLOCK 4NC	CONTROL SOURCE EMERGENCY STOP	220V COIL		MR-4 AND AU-4	LS
21K5	1	AUXILIARY RELAY 2 POLE AND SOCKET	EXTERNAL ALARM INCINERATOR ERROR	220V COIL		KH-103-2CL	KOINO
21K6	1	AUXILIARY RELAY 2 POLE AND SOCKET	INCINERATOR RUNING SIGNAL	220V COIL		KH-103-2CL	KOINO
21K3	1	AUXILIARY RELAY 2 POLE AND SOCKET	LAMP TEST	220V COIL		KH-103-2CL	KOINO
21K11	1	AUXILIARY RELAY 2 POLE AND SOCKET	PLC FAILURE TO AMS	220V COIL		KH-103-4CL	KOINO
6T11	1	SUPPLYFORMER		P:440V S:24V&220V-600VA		BHTB-DB600V	SJ ELECTRIC
7V12	1	POWER SUPPLY	TO PLC	220V/24V 2A		LRS50S-24	
15N2	1	NOISE FILTER	TO PLC	6.0A		MYF-S06A2	WOON YOUNG

Name LIST of PART			Project No. 8014		
Rev. 4			Page : 040	Approval	2019.11.06 B.U.Park
Rev. 3				Check	2019.11.06 B.U.Park
Rev. 2				Design	2019.11.06 B.U.Park
Rev. 1				Drawing	2019.11.06 K.J.Oh
			 HMMCO Hyundai Marine Machinery Co., Ltd. http://www.hmmco.co.kr		
			Drawing number HIF-NGTSTD040-R0		

PART LIST for CONTROL PANEL

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Name LIST of PART			Project No. 8014			 HMMCO Hyundai Marine Machinery Co., Ltd. http://www.hmmco.co.kr	
Rev. 4			Page : 041	Approval	2019.11.06		B.U.Park
Rev. 3				Check	2019.11.06		B.U.Park
Rev. 2				Design	2019.11.06		B.U.Park
Rev. 1				Drawing	2019.11.06		K.J.Oh
						Drawing number HIF--NGTSTD041--R0	

PART LIST for CONTROL PANEL

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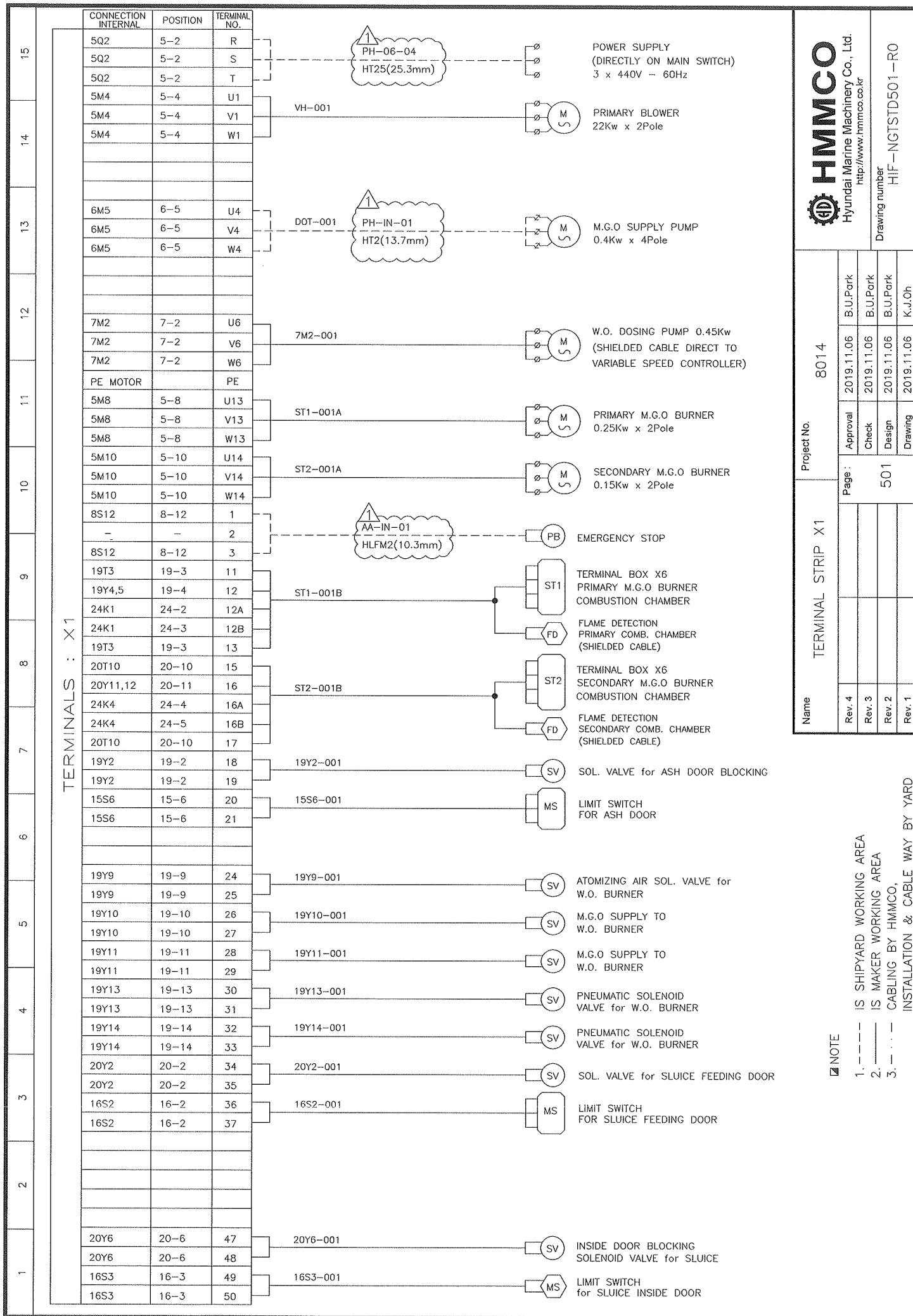
Name LIST of PART			Project No. 8014			
Rev. 4			Page : 042	Approval	2019.11.06	B.U.Park
Rev. 3				Check	2019.11.06	B.U.Park
Rev. 2				Design	2019.11.06	B.U.Park
Rev. 1				Drawing	2019.11.06	K.J.Oh

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Drawing number

HIF-NGTSTD042-R1

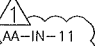


Name		Project No.		Page :		Approval		Check		Design		Drawing	
TERMINAL STRIP X1		8014		501		2019.11.06		2019.11.06		2019.11.06		2019.11.06	
Rev. 4													
Rev. 3													
Rev. 2													
Rev. 1													

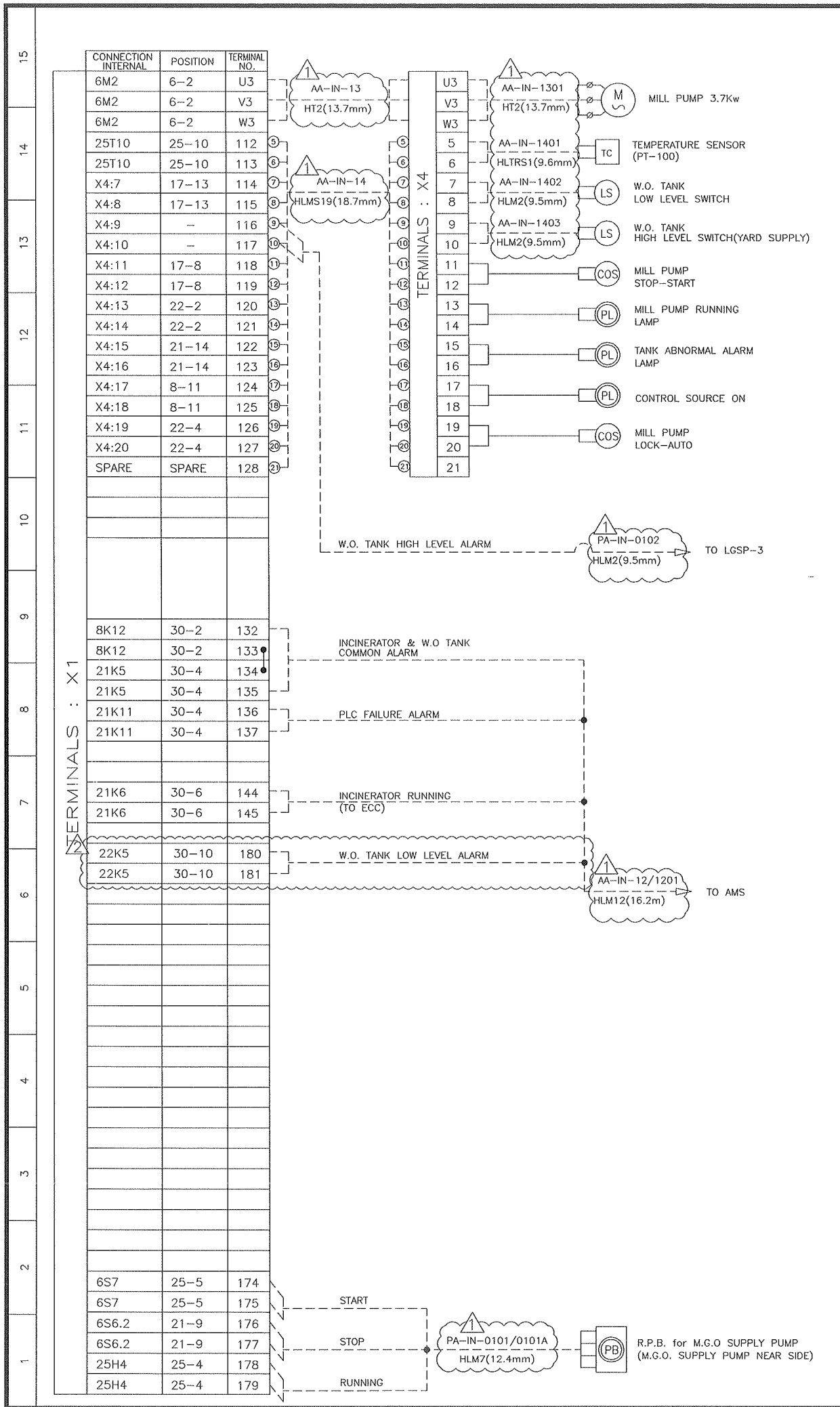
NOTE

1. --- IS SHIPYARD WORKING AREA
2. --- IS MAKER WORKING AREA
3. --- CABLING BY HMMCO, INSTALLATION & CABLE WAY BY YARD

TERMINALS : X1

TC1-001		TEMPERATURE SUPPLYMITTER PRIMARY COMB. CHAMBER (SHIELDED CABLE)
TC3-001		TEMPERATURE SUPPLYMITTER SECONDARY COMB. CHAMBER (SHIELDED CABLE)
TC2-001	 	TEMPERATURE SUPPLYMITTER EXH. GAS (SHIELDED CABLE)
15S7-001		COMBUSTION CHAMBER LOW NEGATIVE PRESSURE SWITCH
15S8-001		COMBUSTION AIR LOW PRESSURE SWITCH
15S13-001		ATOMIZING AIR LOW PRESSURE SWITCH

PAGE()



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Drawing number
HIF-NGTSTD503-R2

Name	Project No.		8014				
	TERMINAL STRIP X1		Page :	Approval	Check	Design	Drawing
			503				
			2019.11.06	2019.11.06	2019.11.06	2019.11.06	
			B.U.Park	B.U.Park	B.U.Park	K.J.Oh	

NOTE

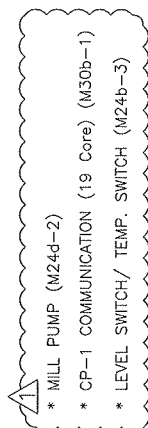
- IS SHIPYARD WORKING AREA
- IS MAKER WORKING AREA
- CABLING BY HMMCO.

INSTALLATION & CABLE WAY BY YARD

JUNCTION BOX for W. O. TANK

SHIP NO. : 8014

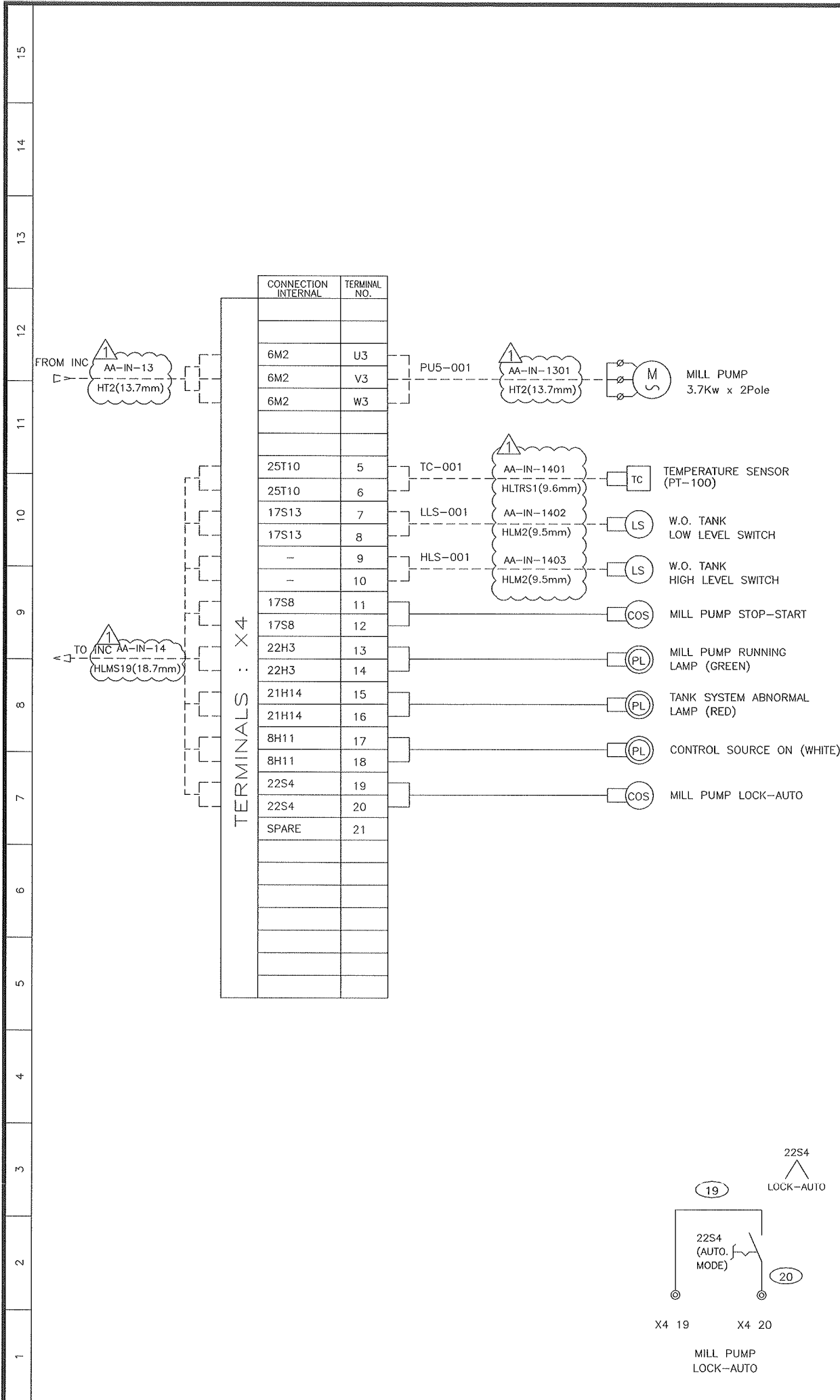
CABLE GLAND



PART LIST for CONTROL PANEL

[illegible]

Name LIST of PART			Project No. 8014			 HMMCO Hyundai Marine Machinery Co., Ltd. http://www.hmmco.co.kr	
Rev. 4			Page : 004	Approval	2019.11.06		B.U.Park
Rev. 3				Check	2019.11.06		B.U.Park
Rev. 2				Design	2019.11.06		B.U.Park
Rev. 1				Drawing	2019.11.06		K.J.Oh
						Drawing number HIF-WJBSTD101-RO	



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<http://www.hmmco.co.kr>

Drawing number
HIF-WJBSTD501-R0

Project No. 8014	
Approval	2019.11.06
Check	2019.11.06
Design	2019.11.06
Drawing	2019.11.06

Name: TERMINAL STRIP X4

Rev. 4	Rev. 3	Rev. 2	Rev. 1

Page: 501

NOTE

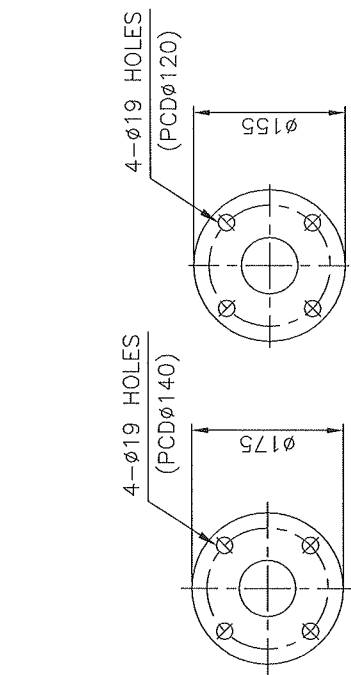
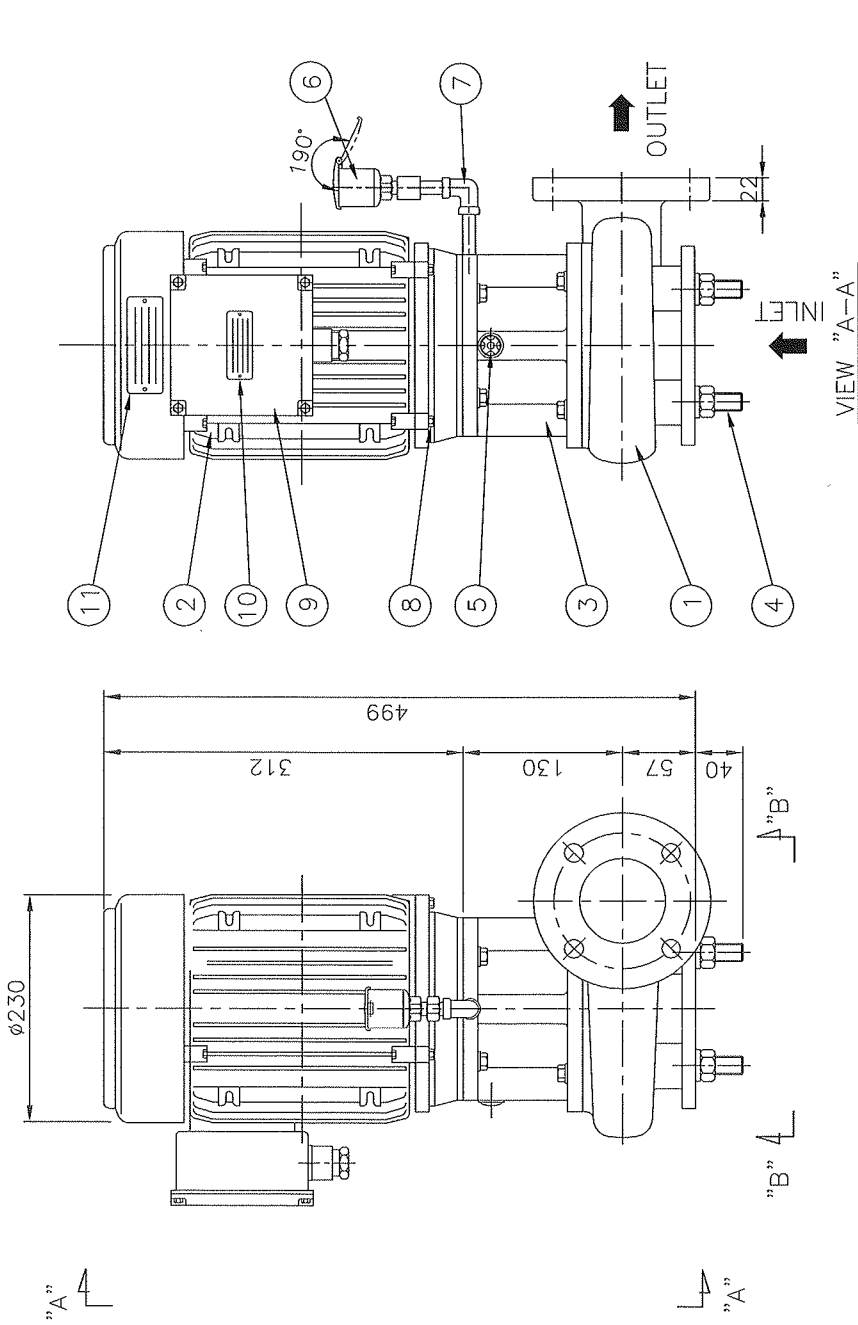
1. --- IS SHIPYARD WORKING AREA

2. --- IS MAKER WORKING AREA

X4 19 X4 20

MILL PUMP
LOCK-AUTO

A	DATE	CODE	MEMO	SIGN
M		①		
E		②		
N		③		
D				



INLET FLANGE DETAIL
(JIS 10K-65A)

OUTLET FLANGE DETAIL
(JIS 10K-50A, 22t)

SPECIFICATION

TYPE	: Centrifugal pump	WEIGHT	: about. 35 Kg
CAPACITY	: 26 M ³ /Hr	ENCLOSURE	: IP44
HEAD	: 0.4 bar	CABLE GLAND	: 20c
MOTOR	: 3.7Kw x 2P	RATING CURRENT	: 6.7 A
POWER	: 440V, 3ø, 60Hz		

* NOTE *

1. Mill pump should be installation vertically.
2. Position of mill pump suction to be below 150mm than low level switch.

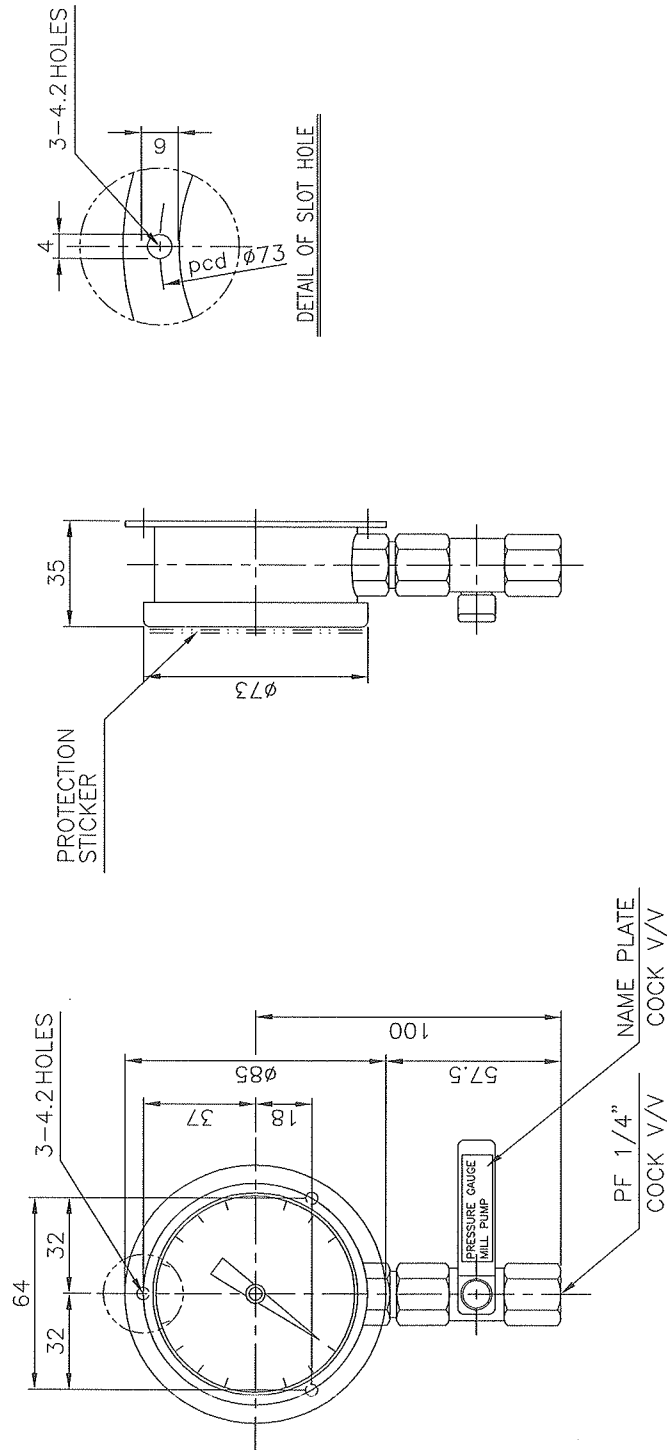
NO.	DESCRIPTION	MATERIAL	Q'TY	REMARK
11	PUMP NAME PLATE	-	1	
10	MOTOR NAME PLATE	-	1	
9	TERMINAL BOX	-	1	
8	EARTH	-	1	M5 TAP
7	ELBOW	-	1	
6	OIL HOPPER	-	1	
5	OIL GAUGE	-	1	
4	STUD BOLT, NUT, S/W	SS 400	4	M16
3	MOTOR BRACKET	GC 200	1	
2	MOTOR	-	1	
1	PUMP CASING	GC 200	1	

Type	Scale	Non	Project No.	8014	Scale	Non	Project No.	8014
CENTRIFUGAL	TYPE							
TITLE								
MILL PUMP								
Approved	2019.11.06	B.U.Park	Check	2019.11.06	B.U.Park	Check	2019.11.06	B.U.Park
Drawn	2019.11.06	K.J.Ch						

HMMCO
Hyundai Marine Machinery Co., Ltd.
<http://www.hmmco.co.kr>

Drawing number
HIE - OUT026M3

A	DATE	CODE	MEMO	SIGN
M		1		
E		2		
N		3		
D				



■ SPECIFICATION

1. TYPE : BOURDON TUBE
2. ACCURACY CLASS : 1.6(EN 837-1-6)
3. LIQUID FILLING : GLYCERINE 99.7%

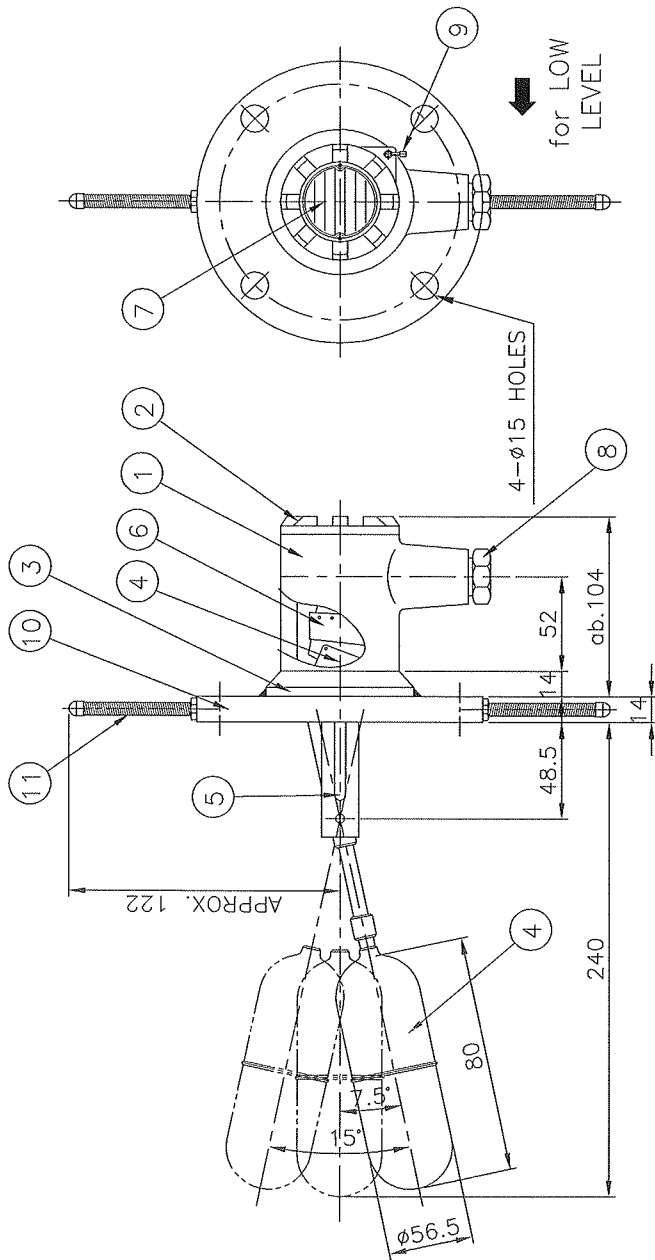
DESCRIPTION	RANGE	UNIT	TYPE	Q'TY	REMARK
PRESSURE GAUGE	0 ~ 4.0 0 ~ 0.4 MPa	Kg/Cm ² MPa	"B"	1	
COMPOUND GAUGE	-0.76 ~ 1.0 -0.076 ~ 0.1 MPa	Kg/Cm ² MPa	"B"	1	
PRESSURE GAUGE	0 ~ 4.0	bar	"B"	1	
COMPOUND GAUGE	-0.76 ~ 1.0	bar	"B"	1	

Type	Scale	5/1	TITLE	PRESSURE GAUGE FOR MILL PUMP
Project No.	8014			
Approved	2019.11.06	B.U.Park		
Check	2019.11.06	B.U.Park		
Check	2019.11.06	B.U.Park		
Drawn	2019.11.06	K.J.Oh		

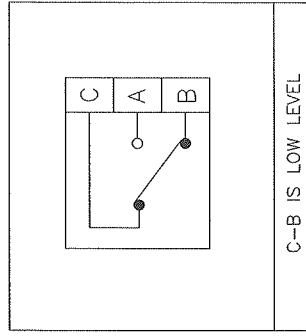


Hyundai Marine Machinery Co., Ltd.
http://www.hmmco.co.kr

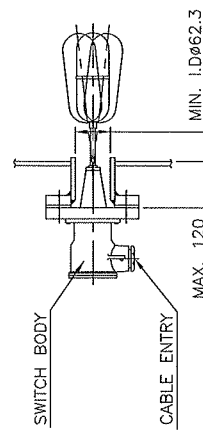
Drawing number
HIE - GB040506D



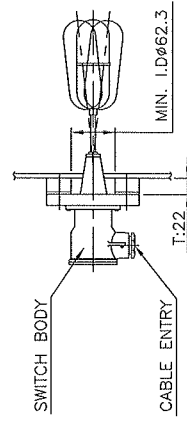
WIRING DIAGRAM



■ INSTALLATION



SLIP-ON FLANGE MOUNTING



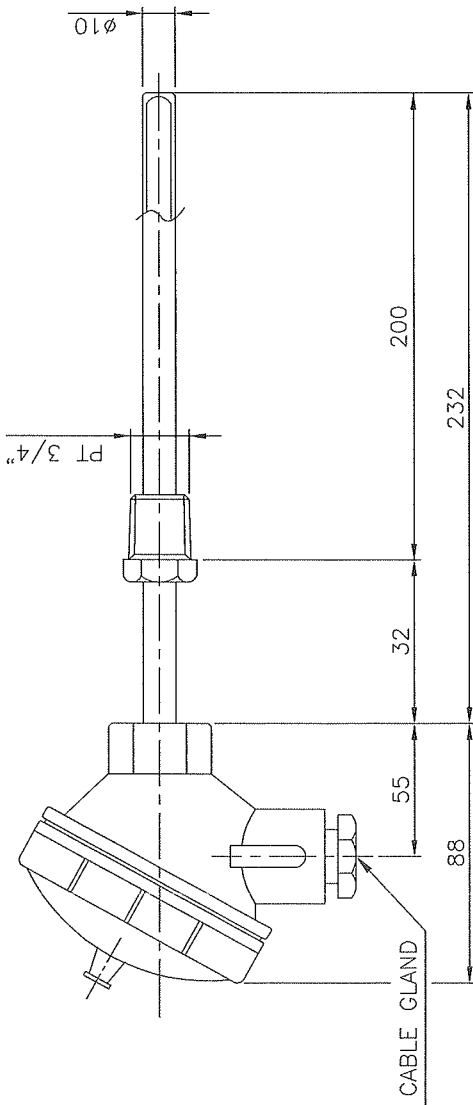
SET-ON FLANGE MOUNTING

■ SPECIFICATION

- INSTALLATION : SIDE MOUNTING
- MAX. WORKING PRESS. : 1 MPa
- MAX. WORKING TEMP. : 180°C
- PERMISSIBLE AMB. TEMP. : -10~60°C
- PERMISSIBLE SPECIFIC GRAVITY : 0.75~1.3
- SWITCH TYPE : MICRO SWITCH
- CONTACT FORM : SPDT
- CONTACT RATING : 15A 125V, 3A 250V AC
- ENCLOSURE : WEATHER PROOF (IP56)

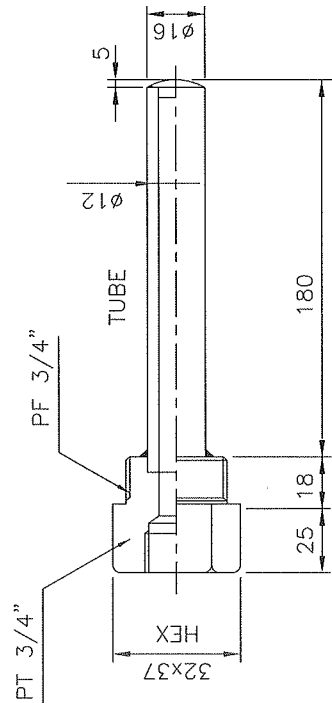
NO.	TEST DEVICE	SUS304/BS	1		REMARK
11	FLANGE	SS41	1		5K-65A
10	EARTH TERMINAL	AL	1		1.25sq
9	CABLE GLAND	BS	1		
8	NAME PLATE	BS	1		
7	SWITCH BOX	-	1		
6	MAGNET	FERRITE/ND	1		
5	FLANGE	SUS304	1		
4	COVER	SS41	1		
3	BODY	ADC	1		
2		ADC	1		
1					
REV. NO.	DESCRIPTION	MATERIAL	Q'TY	WEIGHT	REMARK
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
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98	98	98	98	98	98
99	99	99	99	99	99
100	100	100	100	100	100

MODEL Pt-100Ω



DIMENSION TABLE

TYPE	RANGE	CLASS	PIPE MATERIAL	CABLE GLAND
Pt-100Ω	0 - 500°C	0.3	SUS316L	15b



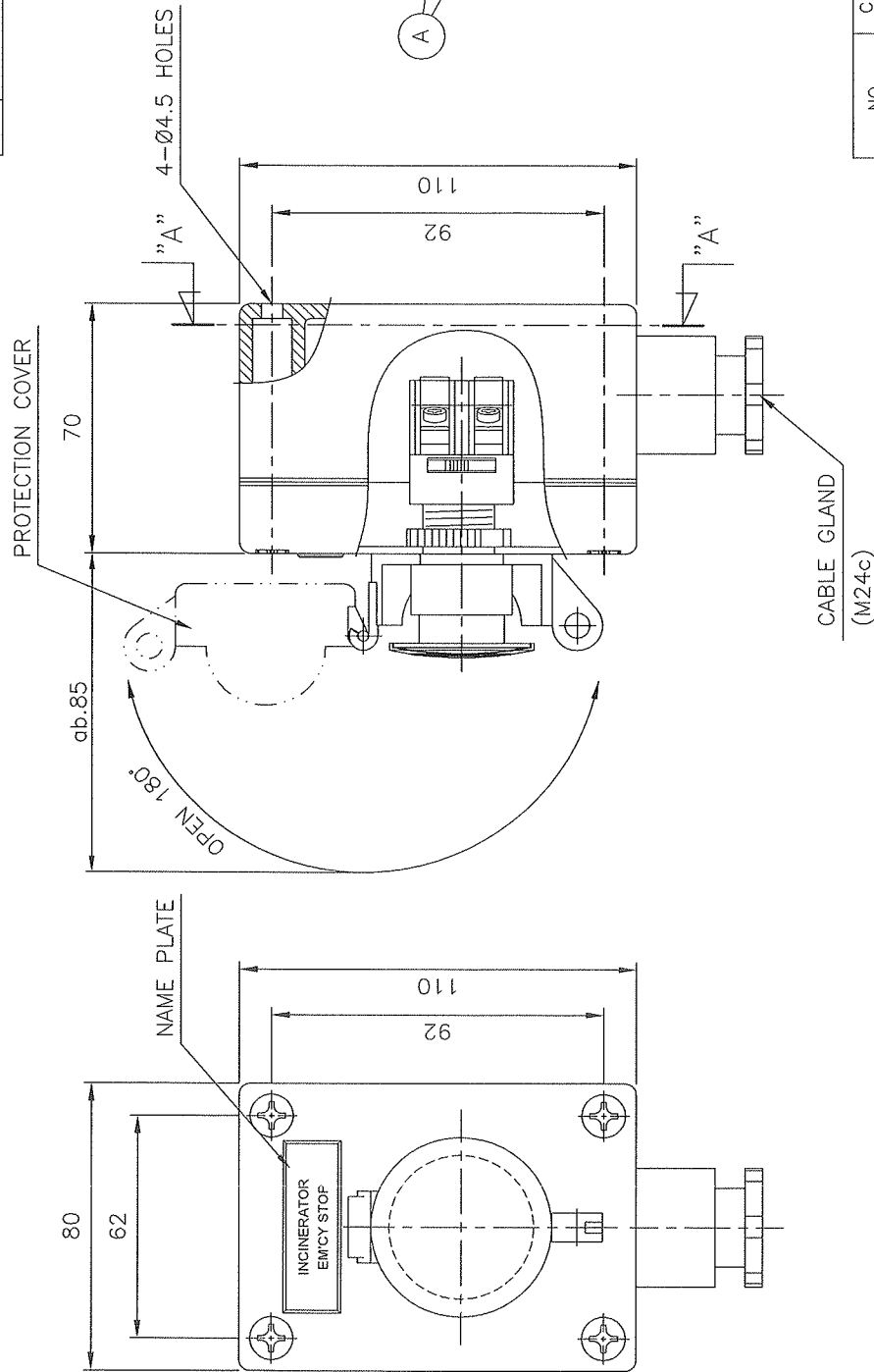
THERMOWELL

- * MODEL : SS-5093A
- * TYPE : CLOSED END TUBE AND ATTACHMENT WELDED.
- * MATERIAL : SUS304.

* MEIYO PRODUCT.

Type	Pt-100Ω	Scale	Non	Name	TEMP. SENSOR
Project No.	8014				
Approved	2019.11.06	B.U.Park			
Check	2019.11.06	B.U.Park			
Check	2019.11.06	B.U.Park			
Drawn	2019.11.06	K.J.Oh			
HMMCO Hyundai Marine Machinery Co., Ltd. http://www.hmmco.co.kr					Drawing number HCE - 100036

A	DATE	CODE	MEMO	SIGN
M		1		
E		2		
N		3		
D				



"A"- "A" OF SECTION DWG.

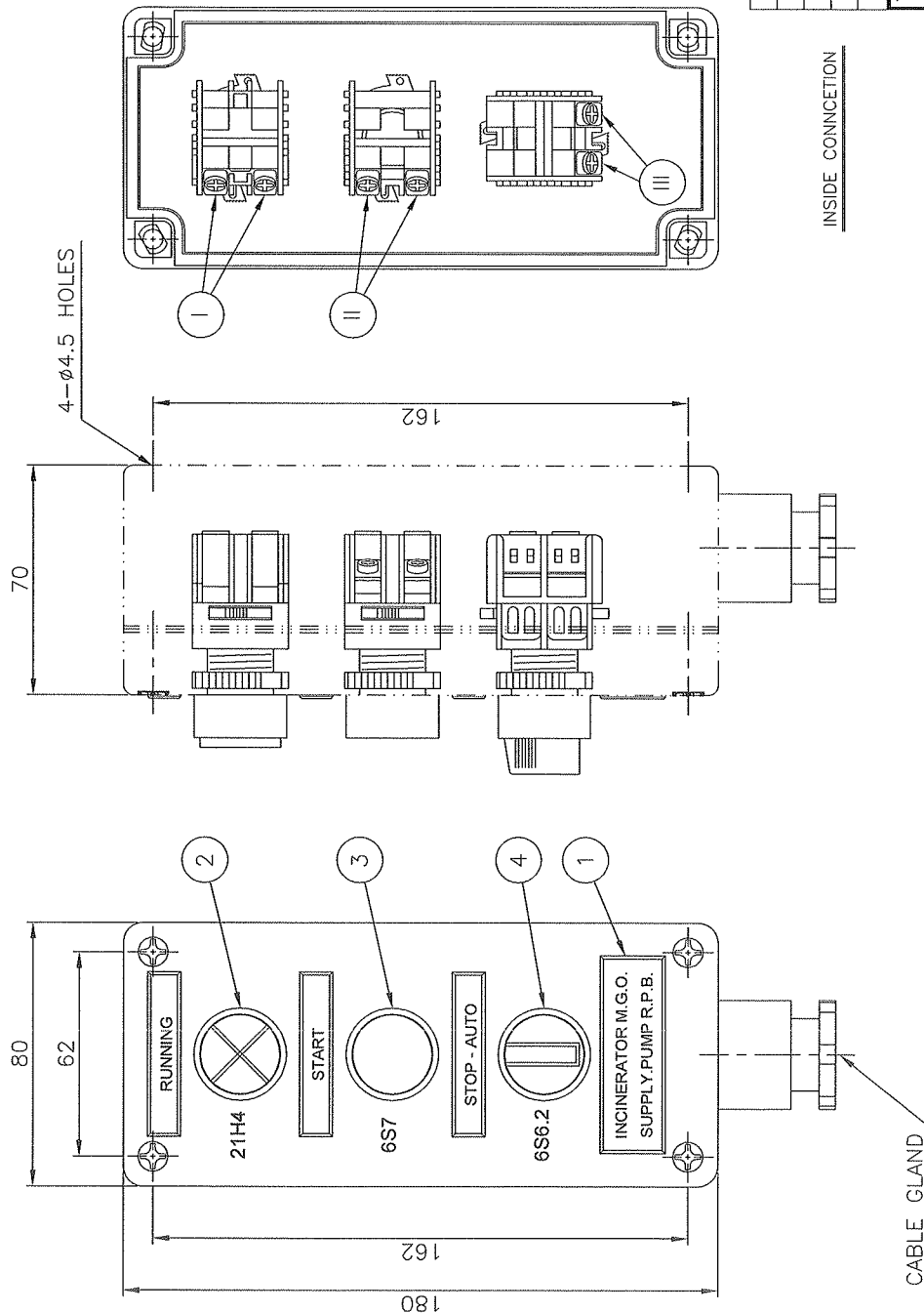
NO.	CP-1. CONTROL PANEL TERMINAL NO.	CONTACT	REMARK
A	X1 1 / X1 3	"A"	

■ SPECIFICATION

1. MATERIAL : ABS
2. PROTECTION : IP56
3. AMBIENT TEMPERATURE : 50°
4. Q'TY : 1 SET/SHIP
5. PUSH BUTTON COLOR : RED
6. TOTAL WEIGHT : 1kg.

Type	LOCK TYPE	Scale	Name
8014	Non		EM'CY STOP SWITCH
HMMCO Hyundai Marine Machinery Co., Ltd. http://www.hmmco.co.kr			
Project No.	8014		
Approved	2019.11.06	B.U.Park	
Check	2019.11.06	B.U.Park	
Check	2019.11.06	B.U.Park	
Drawn	2019.11.06	K.J.Oh	
Drawing number HCD - 100043			

A	DATE	CODE	MEMO	SIGN
M		1		
E		2		
N		3		
D				



SPECIFICATION

1. MATERIAL : ABS
2. PROTECTION : IP56
3. AMBIENT TEMPERATURE : 50°
4. Q'TY : 1 SET/SHIP
5. PUSH BUTTON COLOR : BLACK
6. LAMP COLOR : GREEN
7. TOTAL WEIGHT : 1kg.

INSIDE CONNECTION

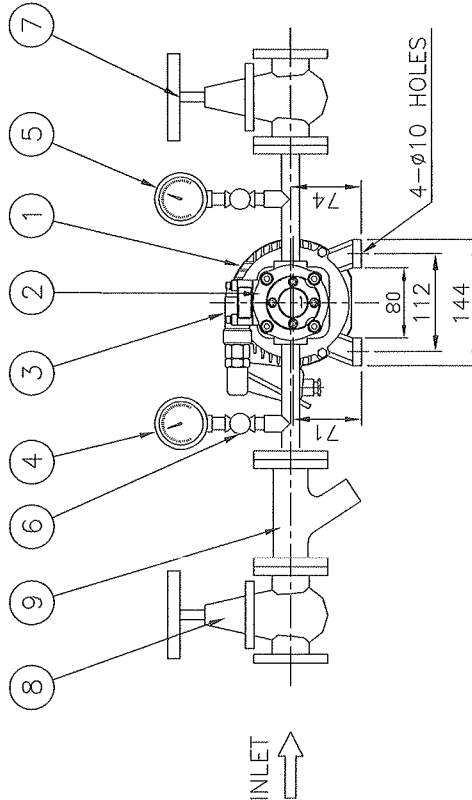
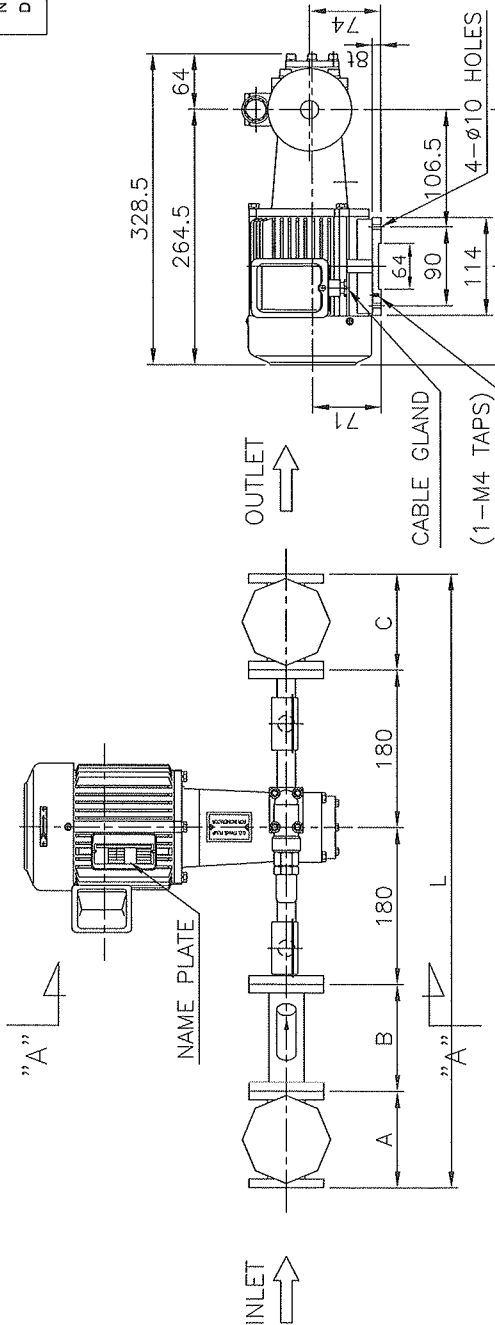
NO.	CONTROL PANEL TERMINAL NO.	CONTACT	CONTROL VOLTAGE	REMARK
I	X1 178 / X1 179	-	220V	
II	X1 174 / X1 175	"A"	220V	
III	X1 176 / X1 177	"B"	220V	AT AUTO

Type	NO.	N A M E	Scale	Name	MATERIAL	Q'TY	REMARK
4	STOP SELECTION SWITCH	-	1				
3	START PUSH BUTTON	-	1				
2	RUNNING LAMP	-	1				
1	NAME PLATE	-	1				
M.G.O. SUPPLY PUMP R.P.B.							
Project No. 8014							
Approved	2019.11.06.	B.U.Park					
Check	2019.11.06.	B.U.Park					
Check	2019.11.06.	B.U.Park					
Drawn	2019.11.06.	K.J.Oh					

HMMCO
Hyundai Marine Machinery Co., Ltd.
<http://www.hmmco.co.kr>

Drawing number
HCD - WONI00043

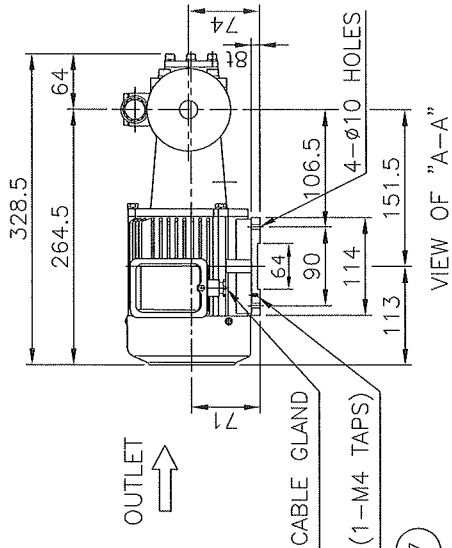
MODEL HMTp-3M-400-204HAVB



DIMENSION TABLE							UNIT : mm	
SIZE	RATING	A	B	C	L	REMARK		
15A	JIS-5K	100	120	100	680			
15A	JIS-10K,16K	110	125	110	705			
20A	JIS-5K	110	122	110	702			
20A	JIS-10K,16K	120	130	120	730			
25A	JIS-5K	120	142	120	742			
25A	JIS-10K,16K	130	140	130	760			

SPECIFICATION

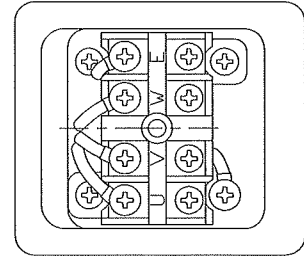
1. USE : M.G.O. SUPPLY PUMP
2. PUMP CAPACITY : Max. 450L/Hr
3. WORKING PRESSURE : 0.3 MPa
4. RELIEF VALVE SET PRESSURE : 0.45 MPa
5. MOTOR SPEC. : 0.4 Kw x 4P (440V/60Hz)
6. CABLE GLAND : 20c
7. MOTOR DATA
 - 1) FRAME NO : 71
 - 2) RPM : 1720
 - 3) RATING CURRENT : 1.1A
 - 4) POWER FACTOR : 70%
 - 5) PROTECTION : IP44
 - 6) INSULATION CLASS : F
 - 7) BEARING NO. : 6204ZZ / 6202ZZ
8. TOTAL WEIGHT : ab. 25Kg
 - 1) MOTOR WEIGHT : 11Kg
 - 2) SUCTION HEAD : 0.05 MPa



NO.	NAME	Q'TY	SPECIFICATION	REMARK
9	M.D.O. STRAINER	1	-	
8	INLET VALVE	1	GLOBE VALVE	
7	OUTLET VALVE	1	CHECK GLOBE VALVE	
6	COCK VALVE FOR GAUGE	2	PF 1/4"	
5	PRESSURE GAUGE	1	0.0~0.6 MPa	
4	COMPOUND GAUGE	1	-0.075~0.3 MPa	
3	RELIEF VALVE	1	HRV-A1	
2	PUMP	1	HTP-204HA(VB)	
1	MOTOR	1	0.4Kw x 4P	

Type	Scale	Name	REMARK
Project No.	8014	M.G.O. PUMP FOR LAYOUT DRAWING	
Approved	2019.11.06.	B.U.Park	
Check	2019.11.06.	B.U.Park	
Check	2019.11.06.	B.U.Park	
Drawn	2019.11.06.	K.J.Oh	

TERMINAL BLOCK CONNECTION



LIST of SPARE PART
WASTE OIL INCINERATOR UNIT
TYPE : MAXI T150 SL WS

OWNER Messrs	
USED FOR Messrs	HYUNDAI SAMHO HEAVY INDUSTRIES CO., LTD
SHIP NO.	8014
CLASS	LR

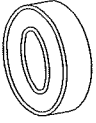
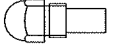
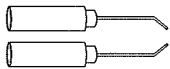
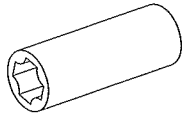
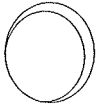
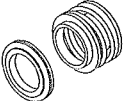
**HMMCO****Hyundai Marine Machinery Co., Ltd.****22, 117BEON-GIL WONDANG-DAERO, Seo-Gu, Incheon City Korea**

Tel : (032)583 - 0671

Fax : (032)583 - 0674

1 YEAR SPARE PART'S FOR W. O. INCINERATOR UNIT

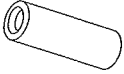
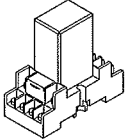
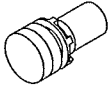
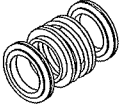
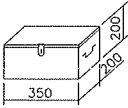
TYPE : MAXI T150SL WS

NO.	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP		REMARKS
			TYPE or PART NO.	WORKING	SPARE	
S201	BEARING		6209 ZZ	2	2	PRIMARY BLOWER MOTOR
			6306ZZ	2	2	MILL PUMP MOTOR
S202	OIL NOZZLE FOR M.G.O.. BURNER		64F4013 (6.0G)	1	1	PRIMARY M.G.O. BURNER
			64S4007 (11.0G)	1	1	SECONDARY M.G.O. BURNER
S203	ELECTRODE UNIT		77M4008	1	1	PRIMARY M.G.O. BURNER
			77M4062	1	1	SECONDARY M.G.O. BURNER
S204	COUPLING		77S4055	1	1	PRIMARY M.G.O. BURNER
				1	1	SECONDARY M.G.O. BURNER
S205	COUPLING SLEEVE FOR PUMP		77S4056	1	1	PRIMARY M.G.O. BURNER
				1	1	SECONDARY M.G.O. BURNER
S206	COUPLING SLEEVE FOR MOTOR		77S4057	1	1	PRIMARY M.G.O. BURNER
				1	1	SECONDARY M.G.O. BURNER
S207	IGNITION CABLE		77S4050	1	1	PRIMARY M.G.O. BURNER
				1	1	SECONDARY M.G.O. BURNER
S208	SIGHT GLASS		68A4002 Ø55	4	1	INCINERATOR
S209	DOOR PACKING		Ø25, 5M	1	1	INCINERATOR
S210	MECHANICAL SEAL		POS.330	1	1	W.O. DOSING PUMP

Type	—		Scale	Non		Name	SPARE PARTS	
Project No.	8014				 HMMCO Hyundai Marine Machinery Co., Ltd. http://www.hmmco.co.kr			
Approved	2019.11.06	S.G.Kim						
Check	2019.11.06	S.G.Kim	Drawing number			LSP-T150-ALL-1Y-01-R0		
Check	2019.11.06	S.G.Kim						
Drawn	2019.11.06	K.J.Oh						

1 YEAR SPARE PART'S FOR W. O. INCINERATOR UNIT

TYPE : MAXI T150SL WS

NO.	NAME	SKETCH	MATERIAL	SUPPLY PER SHIP		REMARKS
			TYPE or PART NO.	WORKING	SPARE	
S211	STATOR		POS.601	1	1	W.O. DOSING PUMP
S212	AUX. RELAY(220V)		KH-103-2CL	6	1	CP-1
S213	PILOT LAMP		220V, RED	1	1	CP-1
			220V, GREEN	1	1	
S214	MECHANICAL SEAL		POS.106	1	1	MILL PUMP
S250	SPARE PART BOX (TOTAL WEIGHT : ab.15Kg)		-	-	1	WITH KEY & LOCK

Type —		Scale Non	Name SPARE PARTS
Project No. 8014			 HMMCO Hyundai Marine Machinery Co., Ltd. http://www.hmmco.co.kr
Approved	2019.11.06	S.G.Kim	Drawing number LSP-T150-ALL-1Y-02-R0
Check	2019.11.06	S.G.Kim	
Check	2019.11.06	S.G.Kim	
Drawn	2019.11.06	K.J.Oh	

MAXI TYPE W.O. INCINERATOR

FINAL TEST REPORT

Type MAXI : ☐T50 / ☐T100 / ☒T150 / ☒SL / ☒WS

Purchaser	HYUNDAI SAMHO HEAVY IND. CO., LTD.
Ship no.	8014
Serial no.	HMR-19IA23770101
Declaration of Conformity no.	HMDOC-19IA2377
Date of test	14. July. 2020
DWG No	HSHI-INC-8014



Q.M DEPT
HYUNDAI MARINE MACHINERY CO., LTD.

22, WONDANG-DAERO 117 BEON-GIL, SEO-GU, INCHEON, KOREA.

TEL : +82-32-583-0671

FAX : +82-32-583-0674



TESTED BY	APPROVED BY	SHIPYARD HYUNDAI SAMHO HEAVY IND. CO., LTD	OWNER	SURVEYOR	RESULT
Y.S. You <i>[Signature]</i> 14-July-2020	X. K. Goh <i>[Signature]</i>	☒ REVIEWED ☒ WITNESSED S.W. LEE Q.M. DEPT <i>[Signature]</i>			Accepted

2020.07.15

Test Result For Control Panel

Customer	HYUNDAI SAMHO HEAVY IND. CO., LTD.	Ship No.	8014
Use	W.O. INCINERATOR	MFG. No.	HMR-19IA23770101
Main Source	AC440V, 60Hz, 3Ph	Cont. Source	AC220V, 60Hz, 1Ph
Standard(Rule)	LR	Date of Test	2020. 07. 15
C/P DWG No.	HIF-NGTSTD-8014	Type	MAXI T150SL WS
PLC Program tool and version		TIA portal version 13	
Display panel program tool and version		GP-Pro EX V4.02	

Content of test & result	GOOD	BAD
(1) Visual		
1-1 Appearance	☒	☐
1-2 Paint	☒	☐
1-3 Arrangement	☒	☐
1-4 Dimension	☒	☐
1-5 Wiring	☒	☐
1-6 Mechanical operation	☒	☐
(2) Insulation test		
2-1 Insulation resistance test with DC500v megger		
a) Between main circuit and earth case	1.000	MΩ
b) Between control circuit and earth case	1.000	MΩ
c) Test equipment		
Name : Insulation tester, s/n : 17K0332, next term cal. date 2020.10.28		
2-2 High potential test		
a) Between main circuit and earth case	☒	☐
AC2000V 60Hz for 1 min.		
b) Between control circuit and earth case	☒	☐
AC1500V 60Hz for 1 min.		
c) Test equipment		
Name : Puncture tester, s/n : 09H1204, next term cal. date 2020.10.28		
(3) Sequence & Operation test		
3-1 Main circuit	☒	☐
3-2 Control circuit	☒	☐
3-3 Protective circuit	☒	☐
3-4 Alarm indication and lamp test	☒	☐
(4) Other test		

TESTED BY	CHECKED BY	SURVEYOR
Y. S. You		SE02050763 Lloyd's Register Asia Seoul Port Office

Test of components and functions

부품 및 기능시험

Incinerator type : MAXI T150SL WS
소각기 형식Serial no : HMR-19IA23770101
제조번호Date of test : 2020. 07. 14.
검사일Tested by : Y. S. You
검사자Remarks LR
기타

Control of components

부품의 제어

Before start up of the incinerator, the incinerator equipments is checked in accordance with the order specification.

소각기를 시동하기 전에 소각기 장비가 사양서에 따라 설치 되었는지 확인한다.

Preparations before starting the incinerator for the first time

소각기의 처음 작동전의 준비사항

- ☒ 01. Open all inlet and outlet valves of the incinerator for waste oil, diesel oil and air.
폐유, 경유, 공기용 소각기의 모든 입.출구의 밸브를 열 것.
- ☒ 02. Check that the holes in the refractory lining are open for air nozzles and sight glass.
내화벽에 있는 공기 노즐과 점검용 유리구멍이 열려 있는지 확인.
- ☒ 03. Check that the inside lining of the combustion chamber is not damaged.
연소실의 내부벽이 손상 되지 않았는지 확인.
- ☒ 04. Check that the feeding door opens and closes
공급문의 개.폐를 확인.
- ☒ 05. Fill oil into W.O dosing pump.
도싱 펌프에 기름을 채울것.
- ☒ 06. Check the rotation of the primary blower and W.O dosing pump.
송풍기 및 도싱 펌프의 회전 방향을 확인.
- ☒ 07. Check the adjustment of the air pressure (atomizing air for W.O burner 2.5 – 3.5 bar).
공기압력 조정 확인 (폐유 버너용 분사공기 압력 2.5 – 3.5 bar).
- ☒ 08. Check the micro switches.
마이크로 스위치 확인.
- ☒ 09. Check leakage in the pipe system.
배관 계통의 누유 확인.



Adjustment of thermo relays

열 계전기의 조정

	Relay no.: 계전기 번호	Adjustment 조정	MAXI 1200	MAXI 1500
☒	5Q4 (Primary Blower)	As indicated on the ID-plate ID 판에 표시된대로	54.1A	
☒	7Q2 (W.O dosing pump)	As indicated on the ID-plate ID 판에 표시된대로	7.7A	
☒	3Q4/3Q6(Mill pump)	As indicated on the ID-plate ID 판에 표시 된 대로	6.7A	

Adjustment of control PLC (SIEMENS)

제어 PLC 의 조정

	Touch button	Adjustment (temp. °C) 조정	Function 기능
☒	PID set	950 °C P(Kp):0.3, I(TI):900, D(TD):1.0	W.O dosing pump delivery control 폐유 펌프 토출 제어
☒	Temp. set	350 °C	High temperature exhaust gas 배출가스 최고온도
☒	Temp. set – ST1 (MD1 W.O.)	730 < t < 880 °C	Combustion temp' primary D.O. burner.(MD1-ST1) 1 차 연소실 온도(MD1 MODE-ST1)
☒	Temp. set – ST1 (MD2 SOLID.)	850 < t < 950 °C	Combustion temp' primary D.O. burner.(MD2-ST1) 1 차 연소실 온도(MD2 MODE-ST1)
☒	Temp. set – ST2	670 < t < 750 °C	Combustion temperature secondary Chamber.(ST2) 2 차 연소실 온도(ST2)
☒	Temp. set	100 °C < t	Cooling down & Blocking ash door 냉각 & Ash door 의 블록 킴
☒	Temp. set	1050 °C < t	Combustion chamber high temperature alarm. 연소실 고온 경보

Control pressure

압력 제어

	Component 부품명	Adjustment 조정	Function 기능
☒	15S8(Pressure switch)	18 mbar	Low pressure of combustion air 연소공기 저압
☒	15S7(Pressure switch)	-0.5 mbar	Low pressure of combustion chamber 연소실내의 저압
☒	15S13(Pressure switch)	1 bar	Low pressure of atomizing air 분사공기 저압



Start up of the incinerator

소각기 시동

Function test : The operator-panel must be in "Select function" : MD2 SOLID

기능 시험 : 운전 판의 선택 기능을 "MD2 SOLID" 상태로 한다.

- ☒ 01. Check that the feeding door is tight.
공급문이 잘 닫혔는지 확인.
- ☒ 02. Start the incinerator.
소각기 시동
- ☒ 03. Check that the pre-ventilation time is 60 seconds.
환기 시간이 60 초인지 확인 (프리퍼지).
- ☒ 04. Check the blocking condition by door locking device.
도어 잠금장치에 의한 블록킹 상태 확인.
- ☒ 05. At the secondary burner burning, adjust the pressure of the secondary oil pump to approx. 10 bar.
세컨드리 버너가 연소 시, 세컨드리 오일 펌프의 압력을 10 bar 로 조정.
- ☒ 06. Check that the primary burner starts when the temperature in the secondary combustion chamber has reached to 400°C.
2차 연소실 내의 온도가 400°C에 도달하면 1차 연소실 프라이머리 버너가 작동 하는지 확인.
- ☒ 07. At the primary burner burning, adjust the pressure of the primary oil pump to approx. 10 bar.
프라이머리 버너가 연소 시, 프라이머리 오일 펌프의 압력을 10 bar 로 조정.

Function test : The operator-panel must be in "Select function" : MD1 WASTE OIL

기능 시험 : 운전 판의 선택 기능을 "MD1 waste OIL" 상태로 한다.

- ☒ 01. Same as solid mode No.1 ~ No.7
Solid mode No.1 ~No.7 과 같음
- ☒ 02. Check the D.O. burning through the sludge burner when the temperature in the primary combustion chamber has reached to 200°C.
1차 연소실 내의 온도가 200°C에 도달하면 폐유버너를 통해 경유가 연소 되는지 확인.
- ☒ 03. Check the D.O. stop for the sludge burner when the temperature in the primary combustion chamber has reached to 600°C and then the sludge burner start together W.O. dosing pump.
1차 연소실 내의 온도가 600°C에 도달하면 폐유버너를 위한 D.O.가 차단되고, 이후 폐유펌프와 함께 폐유버너가 운전 된다.

Control of component and alarm functions

부품 및 경보 기능의 제어

Alarm for ash door open

Ash door 열림 경보

- ☒ 01. Ash door opening.
Ash door 를 연다.
- ☒ 02. Start the incinerator
소각기 시동
- ☒ 03. Check that the "ASH DOOR OPEN" alarm message on display panel.
Ash door 열림 경보 메시지가 화면에 나타나는지 확인.
- ☒ 04. Reset the alarm
경보 리셋



Alarm for combustion air pressure failure (15S8)

연소공기 압력 경보

- ☒ 01. Start the incinerator
소각기 시동
- ☒ 02. Adjust the cooling chamber air pressure to 18mbar or less.
냉각실의 공기압력을 18mbar 이하로 조정.
- ☒ 03. Check that the flame goes out after 12 second
불꽃이 12 초 후에 꺼지는지 확인.
- ☒ 04. Check that the "COMBUSTION AIR PRESSURE LOW" alarm message on display panel.
연소공기 압력 저하 경보 메시지가 화면에 나타나는지 확인.
- ☒ 05. Check that the incinerator is cooling down
소각기가 냉각되는지 확인.
- ☒ 06. Reset the alarm
경보 리셋

Alarm for the combustion chamber negative pressure failure(15S7)

연소실내 압력저하 경보

- ☒ 01. Start the incinerator
소각기 시동
- ☒ 02. Adjust the combustion chamber air pressure to more than -0.5mbar.
연소실 공기압력을 -0.5mbar 이상으로 조정.
- ☒ 03. Check that the flame goes out after 12 second
12 초후에 불꽃이 꺼지는지 확인.
- ☒ 04. Check that the "CHAMBER NEGATIVE PRESSURE LOW" alarm message on display panel
연소실내 압력저하 경보 메시지가 화면에 나타나는지 확인.
- ☒ 05. Check that the incinerator is cooling down
소각기가 냉각되는지 확인.
- ☒ 06. Reset the alarm
경보 리셋

Alarm for atomizing air pressure low

분사공기 압력저하 경보

- ☒ 01. Start the incinerator
소각기 시동
- ☒ 02. Adjust the pressure to 1.0 bar or less.
압력을 1.0 bar 이하로 조정.
- ☒ 03. Check that the flame goes out
불꽃이 꺼지는지 확인.
- ☒ 04. Check that the "W.O BURNER ATOMIZING AIR PRESS. LOW" alarm message on display panel
분사공기 압력저하 경보 메시지가 화면에 나타나는지 확인
- ☒ 05. Check that the incinerator is cooling down
소각기가 냉각되는지 확인.
- ☒ 06. Readjust the pressure: 2.5 – 3.5 bar.
압력을 2.5 – 3.5 bar 로 조정.
- ☒ 07. Reset the alarm
경보 리셋



Alarm for temperature Primary combustion chamber temperature high

1 차 연소실 고온경보

- ☒ 01. Start the incinerator
소각기 시동
- ☒ 02. Activated the primary combustion chamber temperature manually by adjust low temperature the control panel.
제어판의 1 차 연소실의 온도를 낮춘다.
- ☒ 03. Check that the flame goes out.
불 꽃이 꺼지는지 확인.
- ☒ 04. Check that the "PRIMARY CHAMBER TEMP. HIGH" alarm message on display panel.
1 차 연소실 고온 경보 메시지가 화면에 나타나는지 확인.
- ☒ 05. Check that the incinerator is cooling down
소각기가 냉각되는지 확인.
- ☒ 06. Adjust the temperature of the primary combustion chamber to 1050℃
1 차 연소실의 온도를 1050℃로 지정.
- ☒ 07. Reset the alarm
경보 리셋

Alarm for primary D.O burner flame failure

1 차 버너 착화 실패 경보

- ☒ 01. Start the incinerator
소각기 시동
- ☒ 02. Remove the flame detector during burning.
불 꽃 감지기 분리하여 옮긴다..
- ☒ 03. Check that the flame goes out (3 sec)
불 꽃이 꺼지는지 확인. (3 SEC)
- ☒ 04. Check that the "PRIMARY D.O BURNER FLAME FAILURE" alarm message on display panel.
착화실패 경보 메시지가 화면에 나타나는지 확인.
- ☒ 05. Check that the incinerator is cooling down
소각기가 냉각 되는지 확인.
- ☒ 06. Remount the flame detector.
불 꽃 감지기 재설치.
- ☒ 07. Reset the alarm
경보 리셋

**Alarm for exhaust gas temperature high**

배기가스 고온 경보

- ☒ 01. Start the incinerator
소각기 시동
- ☒ 02. Activated the exhaust gas temperature manually by adjust low temperature the control panel.
제어판의 배기가스 온도를 낮춘다.
- ☒ 03. Check that the flame goes out
불꽃이 꺼지는지 확인.
- ☒ 04. Check that the "EXH. GAS TEMP. HIGH" .alarm message on display panel
배기가스 고온 경보 메시지가 화면에 나타나는지 확인
- ☒ 05. Check that the incinerator is cooling down
소각기가 냉각되는지 확인.
- ☒ 06. Reset the alarm
경보 리셋

Alarm for Secondary combustion chamber temperature high

2 차 연소실 고온경보

- ☒ 01. Start the incinerator
소각기 시동
- ☒ 02. Activated the secondary combustion chamber temperature manually by adjust low temperature the control panel. 제어판의 2 차 연소실의 온도를 낮춘다.
- ☒ 03. Check that the flame goes out.
불 꽃이 꺼지는지 확인.
- ☒ 04. Check that the "SECONDARY CHAMBER TEMP. HIGH " alarm message on display panel.
2 차 연소실 고온 경보 메시지가 화면에 나타나는지 확인.
- ☒ 05. Check that the incinerator is cooling down
소각기가 냉각되는지 확인.
- ☒ 06. Adjust the temperature of the secondary combustion chamber to 1050℃.
2 차 연소실의 온도를 1050℃로 지정.
- ☒ 07. Reset the alarm
경보 리셋

Alarm for secondary D.O burner flame failure

2 차 버너 착화 실패 경보

- ☒ 01. Start the incinerator
소각기 시동
- ☒ 02. Remove the flame detector during burning.
불 꽃 감지기 분리하여 옮긴다.
- ☒ 03. Check that the flame goes out
불 꽃이 꺼지는지 확인.
- ☒ 04. Check that the "SECONDARY D.O BURNER FLAME FAILURE" alarm message on display panel. 착화실패 경보 메시지가 화면에 나타나는지 확인.
- ☒ 05. Check that the incinerator is cooling down
소각기가 냉각 되는지 확인.
- ☒ 06. Remount the flame detector
불 꽃 감지기 재설치.
- ☒ 07. Reset the alarm
경보 리셋

**Alarm for feeding door open**

Feeding door 열림 경보

- ☒ 01. Start the incinerator
소각기 시동
- ☒ 02. Feeding door opening
Feeding door 를 연다.
- ☒ 03. Check that the "FEEDING DOOR OPEN" alarm message on display panel as time goes by 30 second after feeding door open.
Feeding door 를 열고 30 초 후에 경보 메시지가 화면에 나타나는지 확인..
- ☒ 04. Check that the incinerator is cooling down
소각기가 냉각 되는지 확인.
- ☒ 05. Feeding door closed.
Feeding door 를 닫는다.
- ☒ 06. Reset the alarm
경보 리셋

Alarm for motor overload (5Q4, 5Q8, 5Q10, 7Q2)

전동기 과부하 경보 (5Q4, 5Q8, 5Q10, 7Q2)

All circuit breaker with a test-button must be checked after cooling down separately.

모든 차단기의 시험 버튼을 소각기 냉각 후에 확인 한다.

- ☒ 01. Start the incinerator
소각기 시동
- ☒ 02. Activate the test button on the circuit breaker
차단기에 있는 시험 버튼 작동.
- ☒ 03. Check that the flame goes out at once.
곧바로 불 꽃이 꺼지는지 확인.
- ☒ 04. Check that the circuit breaker is activated and alarm message on display panel.
차단기가 작동하고 제어판에 경보 메시지가 나타나는지 확인.
- ☒ 05. Check that the incinerator is cooling down
소각기가 냉각 되는지 확인.
- ☒ 06. Reset the alarm
경보 리셋

Alarm for sluice inside door not close

쓰레기 자동투입장치 열림 경보

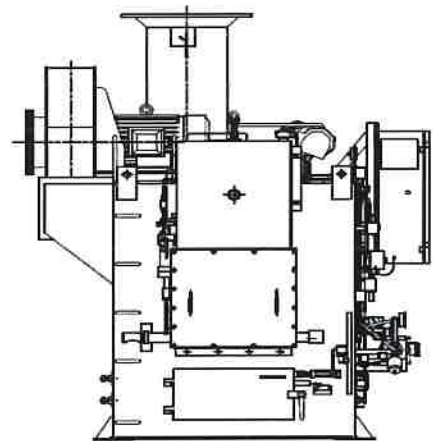
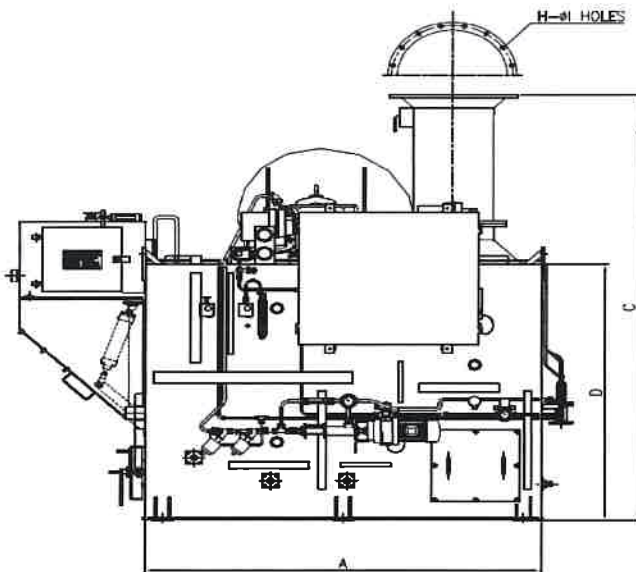
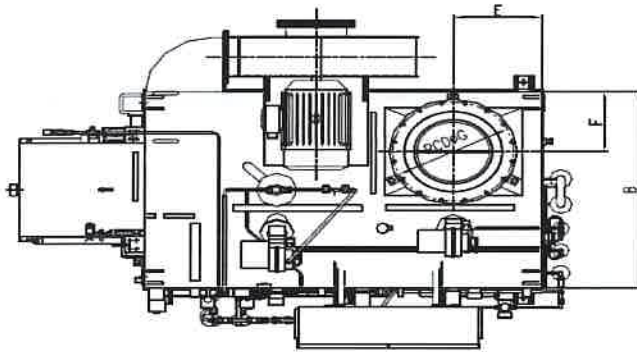
- ☒ 01. Start the incinerator
소각기 시동
- ☒ 02. Force the inside door in the sluice open by means of the solenoid valve
자동투입장치의 INSIDE DOOR 을 솔레노이드 밸브를 작동시켜 열러라
- ☒ 03. Check that the the flame goes out after 12 sec.
불꽃이 12 초 후에 꺼지는지 확인.
- ☒ 04. Check that the " SLUICE INSIDE DOOR OPEN " alarm message on display panel
"SLUICE INSIDE DOOR OPEN " 경보 메시지가 화면에 나타나는지 확인.
- ☒ 05. Check that the incinerator is cooling down
소각기가 냉각되는지 확인.
- ☒ 06. Close the inside door in the sluice by means of the solenoid valve
자동투입장치 INSIDE DOOR 를 솔레노이드 밸브를 작동시켜 닫을 것.
- ☒ 07. Reset the alarm
경보 리셋



DIMENSION CHECK SHEET

DATE : 2020-07-14

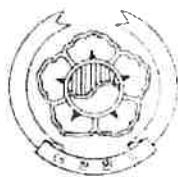
CUSTOMER	HSHI		PROJECT NO.		8014		MFG. NO.		HMR-19IA23770101		
EQUIPMENT	WASTE OIL INCINERATOR				MODEL		MAXI T150SL WS				
SYMBOL	A	B	C	D	E	F	PCDØG	H-ØI			
SPEC.	2480	1230	2730	1680	450	375	620	16-23			
ACTUAL	2480	1230	2730	1680	450	375	620	16-23			



RESULT	SURVEYOR	SURVEYOR	MEASURED BY	CHECKED BY
Accepted			Y. S. You	

Cert. No. : IMO-INC-67

CERTIFICATE OF SHIPBOARD INCINERATOR



**Ministry of Oceans and Fisheries,
Republic of Korea**

This is to certify that the shipboard incinerator listed has been examined and tested in accordance with the requirements of the Standard for Shipboard Incinerators for disposing of ship-generated waste appended to the Guidelines for the Implementation of Annex V of MARPOL 73/78 as amended by resolution MEPC.244(66) and referenced by regulation 16 of Annex VI to MARPOL 73/78.

Incinerator-manufactured by	Hyundai Marine Machinery Co., Ltd.
Type for the incinerator	MAXI T150SL WS (IMO Type)

	850,000	kcal/h
Max. capacity	150	kg/h of specific waste
	99	kg/h per burner
O ₂ Average in combustion chamber/zone	10	%
Co Average in flue gas	115	mg/MJ
Soot number average	1	Bacharach
Combustion chamber flue gas outlet temperature average	920	°C
Amount of unburned components in ashes	7.1	% by weight

A copy of this certificate should be carried on board a vessel fitted with this equipment at all times.

Official stamp



Signed

Director General of Incheon Regional Office of
Oceans and Fisheries, Republic of Korea

Dated this 21st day of Dec 2015

DNV GL

Certificate No:
MEDB00001J8

EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

Application of: Council Directive 96/98/EC of 20 December 1996 on Marine Equipment as amended by directive (EU) 2015/559, issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Authority. This Certificate is issued by DNV GL AS under the authority of the Government of the Kingdom of Norway.

This is to certify:

That the Shipboard incinerators

with type designation(s)
MAXI T50SL WS, T100SL WS, T150SL WS

Issued to

Hyundai Marine Machinery Co., Ltd.
Seo-gu Incheon,

is found to comply with the requirements in the following Regulations/Standards:

Annex A.1, item No. A.1/2.7 and Annex B, Module B in the Directive. Marpol 73/78 as amended, Annex VI Regulation 16, IMO Res. MEPC.244(66)

Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2021-07-08**.

Issued at **Høvik** on **2016-07-09**

DNV GL local station:
Seoul

Approval Engineer:
Pål Evang Nundal



Notified Body
No.: **0575**



for **DNV GL AS**

Digitally Signed By: Sæle-Nilsen, Dag
Location: DNV GL Høvik, Norway
Signing Date: 2016-08-11, on behalf of

Vidar Dolonen
Head of Notified Body



The mark of conformity may only be affixed to the above type approved equipment and a Manufacturer's Declaration of Conformity issued when the production-surveillance module (D, E or F) of Annex B of the MED is fully complied with and controlled by a written inspection agreement with a Notified Body. The product liability rests with the manufacturer or his representative in accordance with Council Directive 96/98/EC, as amended.

This certificate is valid for equipment, which is conform to the approved type. The manufacturer shall inform DNV GL AS of any changes to the approved equipment.

Should the specified regulations or standards be amended during the validity of this certificate, the product is to be re-approved before being placed on board a vessel to which the amended regulations or standards apply.

Job Id: **344.1-005408-3**
Certificate No: **MEDB00001J8**

Product description

Waste Oil Incinerators MAXI T50SL WS, T100SL WS and T150SL WS are multi chamber incinerators consisting of a primary combustion chamber for burning oil and solid waste and a secondary combustion chamber and an after-burning chamber for burning out uncombusted exhaust gases. The combustion chambers are equipped with diesel oil burners. The sluice is automatically operated. The equipment is intended for installation onboard ships.

Application/Limitation

Model	T50SL WS	T100SL WS	T150SL WS
Calorific capacity kW(kcal/h)	465 (400,000)	768 (660,000)	989 (850,000)
Solid waste (kg/h)	100	100	150
Liquid waste (kg/h)	47	77	99
Bilge injection (kg/h)	60 (bilge water 159 l/h)	100 (bilge water 200 l/h)	128 (bilge water 225 l/h)

When the approved software is revised (affecting all future deliveries) DNV GL is to be informed by forwarding updated software version documentation. If the changes are judged to affect functionality for which rule requirements apply a new functional type test may be required and the certificate may have to be renewed to identify the new software version.

Combustion Chamber and Flue Gas Records

Parameters	Solid waste and sludge
O ₂ average in combustion chamber/zone	6-12 %
CO average in flue gas	200 mg/MJ
Soot number average	Ringelman 1/Bacharach 3
Combustion chamber flue gas outlet temperature average	850-1200 °C
Amount of unburned components in ashes	Max. 10 % by weight

Hardware and Software

Hardware: PLC: Allen-Bradley or Siemens
HMI: Allen-Bradley or Proface

Software: PLC: RS Logix 500 V8.XX or TIA portal V13.XX
HMI: FT View Studio V7.XX or GP-proEX V4.XX

Type Examination documentation

DWG. No.:	Rev.	Date	Name	Model
VHS-T050SL WS-1 ~ 3	R0	2016.04.12	Main specification	MAXI T50SL WS
VHS-T100SL WS-1 ~ 3	R0	2016.04.12	Main specification	MAXI T100SL WS
VHS-T150SL WS-1 ~ 3	R0	2016.04.12	Main specification	MAXI T150SL WS
HIE-WT052004	R2	2016.03.24	Piping diagram	MAXI T50SL WS

Job Id: **344.1-005408-3**
 Certificate No: **MEDB00001J8**

HID-VMT052002	R2	2016.03.24	Outline dimension drawing	MAXI T50SL WS
HID-BOD05203	R7	2013.04.30	Assembly drawing of Basis part	MAXI T50SL WS
HMW-WT052001 ~ 5	R1	2013.04.30	Assembly drawing of Refractory Lining	MAXI T50SL WS
HIE-WT102004	R2	2016.03.24	Piping diagram	MAXI T100SL WS
HID-VMT102005	R2	2016.03.24	Outline dimension drawing	MAXI T100SL WS
HID-BOD100203	R7	2013.04.30	Assembly drawing of Basis part	MAXI T100SL WS
HMW-WT102001 ~ 5	R1	2013.04.30	Assembly drawing of Refractory Lining	MAXI T100SL WS
HIE-WT152004	R2	2016.03.24	Piping diagram	MAXI T150SL WS
HID-VMT152005	R2	2016.03.24	Outline dimension drawing	MAXI T150SL WS
HID-BOD15203	R5	2013.04.30	Assembly drawing of Basis part	MAXI T150SL WS
HMW-WT152001 ~ 5	R1	2013.04.30	Assembly drawing of Refractory Lining	MAXI T150SL WS
AT-ABBT0500	R1	2008.01.01	Outline of primary blower	MAXI T50SL WS
AT-ABBT1500	R1	2008.01.01	Outline of primary blower	MAXI T100SL WS
AT-ABBT1500	R1	2008.01.01	Outline of primary blower	MAXI T150SL WS
VHS-LOCSA-STD-1	R0	2016.04.12.	List of control /Safety / Automation	All Model
VHS-PROCEDIA-STD-1	R0	2016.04.12.	Process diagram incinerator	All Model
HID-VM1502210	R0	2013.04.30.	Detail drawing of Cleaning cover	All Model
HID-S12002010	R1	2013.04.30.	Assembly drawing of Waste sluice	All Model
HIF-NGTSTD002 ~ 4	R2	2016.03.24.	ELECTRIC PANEL-LAYOUT/FRONT	All Model
HIF-NGTSTD005 ~ 7	R2	2016.03.24.	ELECTRIC PANEL-LAYOUT/FRONT	All Model
HIF-NGTSTD008	R2	2016.03.24.	ELECTRIC PANEL-CONTROL SOURCE	All Model
HIF-NGTSTD015 ~ 24	R2	2016.03.24.	ELECTRIC PANEL-CIRCUIT DIAGRAM	All Model
HIF-NGTSTD025	R2	2016.03.24.	ELECTRIC PANEL-CIRCUIT OPTION	All Model
HIF-NGTSTD030	R2	2016.03.24.	ELECTRIC PANEL-EXTERNAL SIGNAL	All Model
HIF-NGTSTD040 ~ 43	R2	2016.03.24.	ELECTRIC PANEL-PART LIST	All Model
HIF-NGTSTD501 ~ 3	R2	2016.03.24.	ELECTRIC PANEL-TERMINAL STRIP	All Model
HNP-MAXINC-EPA7	R7	2011.11.26.	MAIN NAME PLATE	All Model
NP-SIMENS-OPAPLC-NGT	R7	2014.09.11.	OPERATION INSTRUCTION PLATE	All Model
NP-WNPLC	R9	2014.09.11.	WARNING PLATE	All Model
HINC-PGM-MAXIJAL	R0	2015.09.11.	PLC LADDER SYSTEM SOFTWARE QUALITY PLAN	All Model
V13-TDO(PLC_SIMENS)	R13	2015.06.03.	INSTRUCTION MANUAL (MAXI T50 ~ T150)	All Model
HINC-PGM-MAXIJAL-R0	R0	2015-09-11	PLC Ladder System Software Quality Plan	All Model

Job Id: **344.1-005408-3**
Certificate No: **MEDB00001J8**

Tests carried out

Test Report HTTR-1314 dated 26 May 2000;
Test Report HTTR-1259 dated 25 April 2000;
Test Report HTTR-S3617 dated 28 May 2008
from Hyundai Marine Machinery Co., Ltd, Rep. of Korea.

Marking of product

For traceability to this type approval, each incinerator is to be marked with;

- Manufacturer's name or trade mark
- Type designation
- Serial No.
- Capacity (net design heat release)
- Revision information, as applicable, for all firmware or software modules installed per hardware unit, necessary to identify the equipment, permanently marked somewhere on the final product.

INSTRUCTION BOOK
FOR
INSTALLATION, OPERATION AND MAINTENANCE
OF INCINERATOR
Type MAXI T50/T100/T150SL WS



Manufactured by :

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INSTRUCTION BOOK FOR INSTALLATION, OPERATION AND MAINTENANCE OF INCINERATOR

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Update : V12-TDO(PLC_SIMENS)-20150402

1. INSRALLATION INSTRUCTIONS

1.1 REFERENCES

For capacity, dimensions and connections we refer to:

- a) - Technical data
- b) - Data, components
- c) - Dimension drawing
- d) - Pipe diagram

Arrangement for control panel and diagrams:

- a) - Electrical diagram (See final drawing)

1.2 INCINERATOR

- a) Installation of incinerator: No special tools or instruments required.

The incinerator should be installed and placed according to the rules of the Classification Societies and to the National Shipping Boards.

When installing the following must be accessible from outside the room in which the incinerator is placed:

- a) It must be possible to stop the operation of the incinerator from an external emergency stop
- b) Stationary placed fire-fighting equipment must be available for the room in which the incinerator is installed.

When installing the Incinerator the following points has to be considered:

- When welding on the incinerator, REMEMBER to DISCONNECT connections to the electrical control panel as well as the flame control units.
- DO NOT connect welding electrodes to the electrical control panel.
- As few vibrations as possible.
- Transportation of the solid waste
- Lay-out of the funnel giving minimum of counter pressure
- In case a EXH. gas fan is to be installed, this has to be installed as far as possible from the EXH. gas outlet of the incinerator.

In front of the feeding door a space of app. 1.5 m must be foreseen for feeding of refuse bags. In front of the feeding door it must be possible to remove the ashes. HMMCO recommends floor plates around the incinerator rather than grids due to the risk of spillage of refuse and ashes.

Service area is required for handling the door of the control panel, to inspect and maintain the primary and secondary burner, the W.O pump and the valves. Free space on the top of the incinerator is required for dismounting the burners. (approx. 700 mm from top of burner)

In the rear, it must be possible to adjust the air nozzles. The free space at the air intake for the main-blower must not decrease the area for the air intake to the blower.

In order to obtain a proper operation of the Incinerator it is important to have this air-flow available.

1.3 W.O TANK, W.O SUPPLY AND CIRCULATION PIPE

For supply and return piping for oil W.O between the incinerator and the W.O tank, see pipe diagram (final drawing). Check pressure loss conditions. The piping must be flushed carefully before initial start-up of incinerator.

The W.O tank for waste oil has to be provided with a mill pump (PU5) for agitation and comminution of the contents of the tank.

The tank must be designed with a view to securing an effective homogenization; irregular shapes and webs should be avoided.

The W.O tank is provided with:

- a. Heating elements
- b. Level switch for "low level" for stopping of incinerator when the tank is empty.
Level switch for "High level" and "Low level" as alarm function on the main panel of the ship should also be installed.
- c. Mill pump.
- d. Electric heating and temperature controller. **< Option item >**
- e. Thermostat for "Alarm – high/low W.O temperature".
- f. Quick closing valve

1.4 COMPRESSED AIR SUPPLY

For supply of compressed air to W.O burner, sluice(and quick closing valve on W.O tank) see pipe diagram and technical data. To avoid any blocking of the air pipe a strainer is needed in the air supply piping system. The pressure vessel on the compressor is to be drained frequently.

1.5 EXH. GAS FUNNEL

For the dimensioning of the funnel connection, see technical data of incinerator, and dimension drawing.

Max. counter pressure in the funnel, incl. outlet loss, is to be NOT more than 490 Pa (50 mm WG).

To obtain sufficient draught in the incinerator, it is recommended to avoid too many sharp bends in the funnel.

The dimension of funnel is NOT to be less than indicated in "Technical data of incinerator".

Temperature sensor (TC3) in funnel is supplied loose for mounting in funnel, see dimensions drawing.

1.6 ELECTRICAL CABLE CONNECTION TO CONTROL PANEL

The power cable is connected directly to the control panel of the incinerator. For cable entry, see arrangement for control panel (el-diagrams). The following connections are to be connected with the terminal row in the control panel:

- Emergency stop
- Power supply
- Remote alarm
- Thermocouple in funnel (high EXH. gas temperature)
- Low level/high level switch on W.O tank
- Mill pump, circulation pump and alarm thermostat on W.O tank
- Low level switch on diesel oil tank
- For the data of the control panel, we refer to the el-diagram

1.7 ADDITIONAL INFORMATION

Fire Extinguishing Systems and Fixed Fire Detection Fire Alarm Systems:

Must be installed and placed in accordance with the applicable S.O.L.A.S. regulations.

Protection against Low Voltage:

It is the responsibility of the customer to ensure that no abnormal operation of the incinerator occurs due to low voltage. In general, a ship's generator system is secured against low voltage. However, if this is not the case, the customer must design their electrical system so that the incinerator will not shut down at periods of low voltage. The tolerance of the voltage is $\pm 5\%$.

Emergency Shut-Off Valve:

The pipe system for supply and return of diesel oil and W.O to incinerator and tanks has to be provided with emergency shut-off valve operated outside the room, in accordance with the rules of the classification societies.



1.8 STORAGE INSTRUCTIONS FOR INCINERATORS

Incinerators standard and the storage environmental conditions must be as follows:

1. Air temperature: 0°C to + 50°C, temp. drop max. 10°C/h
2. Humidity: 0-75% relative
3. Wind: Below 10 m/sec.
4. Shocks: Below 1 g. acceleration in all directions

El-panel must be stored in airtight packing. Before packing the el-panel must be equipped with some bags "Silica gel" inside in order to absorb possible humidity.

The pumps are not to be turned

After elapse of storage period, all bolted gaskets must be tightened up.

The Incinerator must only be handled by fork, truck or by the lifting beam, and must not be exposed to mechanical damages.

Storage period: According to agreement.

The surface must not be heated to above 50°C by solar radiation or other sources.

The Incinerator must not be exposed prolonged by sea water spray or rain and must not be hosed down or similarly exposed. **Care to be taken for storage under roof.**

After 12 month storage the lining has to be heated up and dried-up acc. to Incinerators Instructions.



2. DESCRIPTION

2.1 THE INCINERATOR

The Incinerator is controlled by a PLC-unit, which by a speed control unit automatically adjusts the W.O feeding capacity.

The incinerator is designed with a primary combustion chamber for burning W.O oil and solid waste, and a secondary combustion chamber and an after-burning chamber for burning un-combusted exhaust gases. The combustion chambers are equipped with diesel oil burners, called primary burner and secondary burner respectively.

The inner sluice door is automatically operated.

2.2 PRIMARY COMBUSTION CHAMBER

The incinerator is designed to combust solid waste and W.O oil. The heat from the primary burner will start burning the solid waste and the burner flame ignites the W.O oil. The very large heat transmission area in the combustion chamber optimizes the drying and burning of the solid waste.

2.3 SECONDARY COMBUSTION CHAMBER

The primary and secondary chambers are separated by a wall made of ceramic heavy duty refractory. In the secondary combustion chamber and after-burning chamber, any gases or particles not completely burned from the primary combustion chamber will be combusted definitively.

2.4 BASIC PRINCIPLES

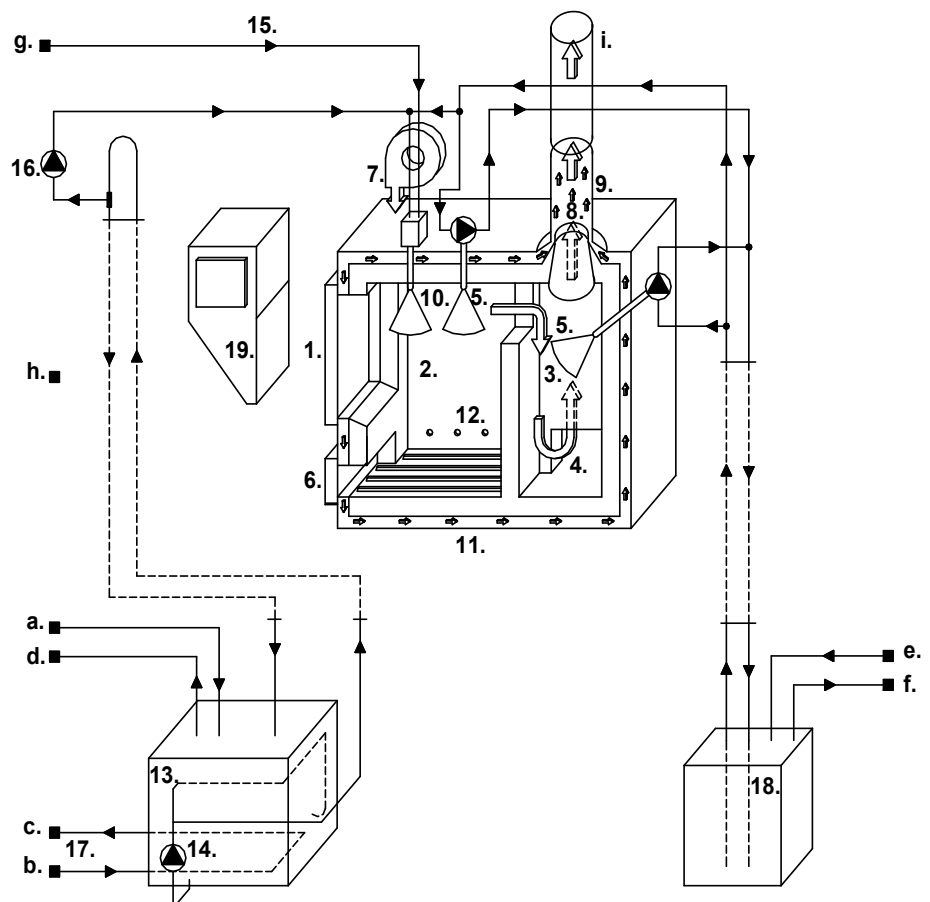
COMPONENTS:

1. Charging Door
2. Combustion Chamber
3. Afterburning Chamber
4. Second After burning Chamber
5. Oil Burner with Built In Pump
6. Ash Cleaning Door
7. Air blower
8. Induced Draught Air Ejector
9. Damper
10. W.O burner
11. Double Wall for Air Cooling
12. Air Inlet nozzle
13. W.O supply tank
14. Mill pump
15. Compressed Air
16. W.O Dosing Pump
17. Heating Element
18. Diesel Oil tank
19. Sluice

CONNECTION

- a. W.O Oil Inlet
- b. Steam Inlet
- c. Steam Outlet
- d. W.O Oil Ventilation Outlet
- e. Diesel Oil Inlet
- f. Diesel Oil Ventilation Outlet
- g. Compressed Air Inlet
- h. Electric Power Supply
- i. EXH. gas outlet
- j. Drain W.O tank
- k. Drain Diesel oil tank

----- yard pipe connection



The incinerator is designed to incinerate solid waste and all types of combustible non-explosive oil W.O with a flash point of min. 60°C, without being a nuisance to the surroundings. The incinerator is made as a compact plant of the multi-chamber design.

The incinerator is delivered with the following built-on main components:

- Air blower, supplying air for the induced draught air ejector, cooling air and combustion air.
- W.O burner
- W.O. dosing pump
- Primary D.O. burner for primary combustion chamber
- Secondary D.O. burner for secondary combustion chamber
- Control panel(CP1).
- Thermocouples for detecting primary and secondary combustion chamber temperatures and registering high temperature alarm
- Internal electric-cable, oil, air pipes and valves are factory installed
- Automatic built-on non-fire back sluice
- Supplied loose for installation in funnel:
- Thermocouple for detecting high EXH. gas temperature and alarm

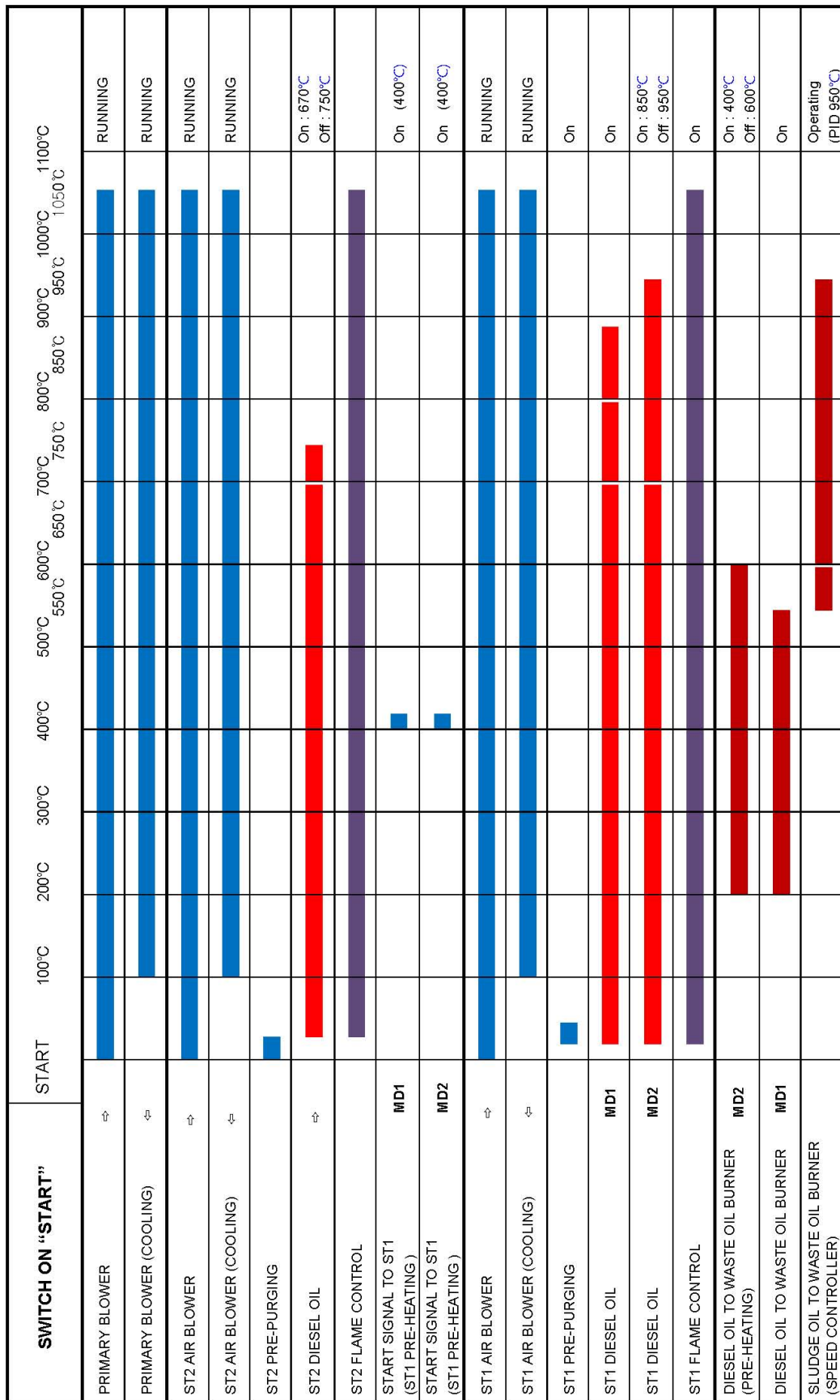
As a guide to understanding the function of the incinerator, see process diagram and pipe diagram in this instruction book.

Dimension drawing is see Final drawing.

Piping diagram is see Final drawing.



2.5 PROCESS DIAGRAM and DESCRIPTION



2.5.1 MD2 : SOLID EASTE

POS. 1 – START OF INCINERATOR

Primary blower, Secondary D.O burner blower and integrated process timer start.

POS. 2 – STOP OF COMBUSTION

Stop of combustion stops the supply of diesel oil to Primary and Secondary D.O burner.
Primary blower, Primary and Secondary D.O burner blower, are working on cooling program.

POS. 3 – STOP OF INCINERATOR

The cooling program stops when the temperature in the incinerator is below 100°C (212°F).
When the incinerator has stopped, switch off the main switch on the control panel after the blower has been off for 30 minutes.

POS. 4 – START OF PREHEATING

After START OF THE INCINERATOR and 60 sec. pre-purging time, the Secondary D.O burner (8M6) in the secondary combustion chamber will start.

POS. 5 – START OF COMBUSTION

When the temperature in the secondary combustion chamber has reached 400°C(752°F) the Primary D.O burner in the primary combustion chamber ignite the starts to burn diesel oil. The Secondary D.O burner continues to burn. The Primary and Secondary D.O burner are equipped with flame control which is continuously activated.

Activation of the sluice by pushing the button on the sluice panel will lock the outside feeding door, unlock the inside door and feed the waste.

POS. 6 – FLAME CONTROL

The flame control is activated during first ignition after start-up. After this period the burner is ignited or turned off according to the temperature in the chamber

POS.7 - STOP OF PREHEATING IN THE SECONDARY COMBUSTION CHAMBER

When the temperature in the secondary combustion chamber has reached 750°C (1,382°F) the ignition of the Secondary D.O burner will stop and the solenoid valve on the diesel oil pipe is closed. The burner blower will operate continuously.

POS.8 - RE-START HEATING IN THE SECONDARY COMBUSTION CHAMBER

When the temperature drops below 670°C (1,238°F) the secondary burner restart after pre-purging



2.5.2 MD1 : WASTE OIL

POS. 1 – START OF INCINERATOR

Process timer, primary blower and Secondary D.O burner blower start.

POS. 2 – STOP OF COMBUSTION

STOP OF COMBUSTION stops the supply of diesel oil to Primary and Secondary D.O burner and stops the waste oil to the W.O burner.

Primary blower, Primary and Secondary D.O burner blower are working on cooling program.

POS. 3 – STOP OF INCINERATOR

The cooling program stops when the temperature in the incinerator is below 100°C (212°F).

When the incinerator has stopped, switch off the main switch on the control panel when the blower has stopped for 30 minutes.

POS. 4 – START OF PREHEATING

After START OF THE INCINERATOR and 60sec. pre-purging time, the Secondary D.O burner(8M6) in the secondary combustion chamber will start.

POS. 5 – START OF COMBUSTION

When the temperature in the secondary combustion chamber has reached 400°C(752°F) the Primary D.O burner in the primary combustion chamber will ignite and start to burn diesel oil. When the temperature has reached 600°C(1112°F) W.O is supplied to the W.O burner which automatically adjusts to maintain optimal temperature. W.O burning is P.I.D. auto control temperature 950°C(1,742°F).

POS. 6 – FLAME CONTROL

The flame control is activated during first ignition after start-up. After this period the burner is ignited or turned off according to the temperature in the chamber

POS.7 - STOP OF PREHEATING IN THE SECONDARY COMBUSTION CHAMBER

When the temperature in the secondary combustion chamber has reached 750°C(1,382°F) the Secondary D.O burner will stop and the solenoid valve on the diesel oil pipe will close. The burner blower operates continuously.

POS.8 - RE-START HEATING IN THE SECONDARY COMBUSTION CHAMBER

When the temperature drops below 670°C(1,238°F) the Secondary D.O burner will re-start after pre-purging.

POS.9 - RE-START HEATING IN THE PRIMARY COMBUSTION CHAMBER

When the temperature drops below 730°C(1,346 °F) the Primary D.O burner will restart and ignite.



2.6 MAIN DATA & TECHNICAL DATA

Type : MAXI T50SL WS

CAPACITY

Capacity based on IMO specification

Calorific capacity	: 465 kW (400,000 kcal/h)
Solid waste	: 100 kg/h at 2,400kcal/kg
Waste oil	: 47 kg/h at 8,600kcal/kg

DIMENSION BASIS FOR AIR AND OIL PIPE CONNECTION

Total air consumption incinerator	: 4,300 m ³ /h
EXH. gas temperature	: 350 °C
EXH. gas volume	: 9,300 m ³ /h at 350 °C
Max. counter pressure in funnel, incl. outlet loss	: 490 Pa (50 mm W.G.)
Compressed air consumption- sluice	: max. 0,2 m ³ /h
Compressed air consumption W.O burner : max. 32 m ³ /h	
Compressed air pressure	: 7 ~ 10 Kg/cm ²
Fuel oil	: Marine diesel oil Max. 14 cSt at 40 °C
Inside diameter of diesel oil pipe	: 8 mm.

The consumption of diesel oil depends on the heat value of the solid waste.
Stack diameter to be calculated according to maximum counter pressure

Type : MAXI T100SL WS

CAPACITY

Capacity based on IMO specification

Calorific capacity : 768 kW (660,000 kcal/h)

Solid waste : 100 kg/h at 2,400 kcal/kg

Waste oil : 78 kg/h at 8,600 kcal/kg

DIMENSION BASIS FOR AIR AND OIL PIPE CONNECTION

Total air consumption incinerator : 6,600 m³/h

EXH. gas temperature : 350 °C

EXH. gas volume : 16,700 m³/h at 350 °C

Max. counter pressure in funnel,
incl. outlet loss : 490 Pa (50 mm W.G.)

Compressed air consumption-
sluice : max. 0.2 m³/h

Compressed air consumption

W.O burner : max. 32 m³/h

Compressed air pressure : 7 ~ 10 Kg/cm²

Fuel oil : Marine diesel oil Max. 14 cSt at 40 °C

Inside diameter of diesel oil pipe : 8 mm.

The consumption of diesel oil depends on the heat value of the solid waste.

Stack diameter to be calculated according to maximum counter pressure

Type : MAXI T150SL WS

CAPACITY

Capacity based on IMO specification

Calorific capacity : 988 kW (850,000 kcal/h)

Solid waste : 150 kg/h at 2,400 kcal/kg

Waste oil : 99 kg/h at 8,600 kcal/kg

DIMENSION BASIS FOR AIR AND OIL PIPE CONNECTION

Total air consumption incinerator : 6,600 m³/h

EXH. gas temperature : 350 °C

EXH. gas volume : 16,700 m³/h at 350 °C

Max. counter pressure in funnel,
incl. outlet loss : 490 Pa (50 mm W.G.)

Compressed air consumption-
sluice : max. 0.2 m³/h

Compressed air consumption

W.O burner : max. 32 m³/h

Compressed air pressure : 7 ~ 10 Kg/cm²

Fuel oil : Marine diesel oil Max. 14 cSt at 40 °C

Inside diameter of diesel oil pipe : 8 mm.

The consumption of diesel oil depends on the heat value of the solid waste.

Stack diameter to be calculated according to maximum counter pressure

3. INSTRUCTION FOR OPERATION

3.1 OPERATING INSTRUCTIONS

PREPERATION

Preparation for start of the incinerator

Before start of the incinerator, the following is to be carried out :

1. Open all inlet and outlet valves for diesel oil
2. Open inlet valve for compressed air
3. Make sure that there is no hindrance for air admission to primary blower, as well as free flow of EXH. gas to the outlet.
4. Make sure that the ash and sluice door are closed.
5. Make sure that W.O is available in the W.O tank and W.O reached temperature 60℃.
6. Make sure that diesel oil is available in the diesel oil tank
7. Remove ashes and dregs of possible combustion before incinerator starting, and confirm cleaning state of air main entrance for combustion (air nozzle).

OPERATIONS

The incinerator is operated via a control panel and the START/STOP switch.

A green light indicates that the incinerator's primary blower is in operation.

A red light indicates that there are alarms active on the incinerator.

MODE [MD1] = WASTE OIL BURNING

1. When the main switch is turned on, WASTE OIL MODE (MD1) is settled automatically.
For only solid waste burning, the mode should be changed to SOLID WASTE MODE(MD2).
When the WASTE OIL MODE (MD1) is settled waste oil and solid waste can be burnt together.
2. Make sure that the mode is settled on MD1.
3. Check the alarm messages on display screen by touch panel.
4. Activate the START-STOP switch to START position on control panel.
5. Incinerator is operated automatically by PLC.
If the abnormal alarm is occurred during operation, remove the cause of the abnormal alarm and reset alarm by touching the alarm display on touch panel and start again.
For the details, refer "Trouble shooting table".

MODE [MD2] = SOLID WASTE BURNING

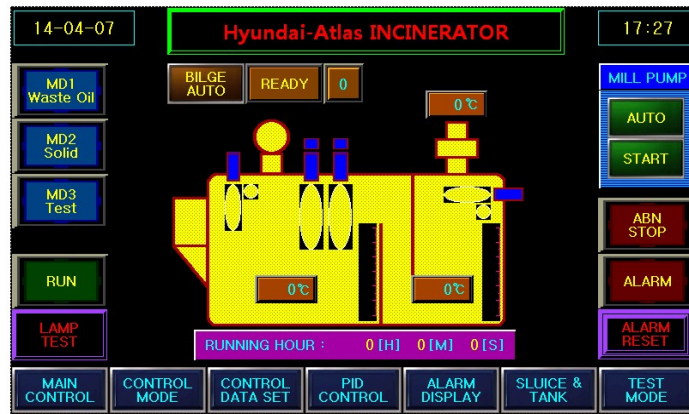
1. Make sure that the mode is settled on MD2.
2. Check the alarm messages on display screen by touch panel.
3. Activate the START-STOP switch to START position on control panel.
4. Incinerator is operated automatically by PLC.
If the abnormal alarm is occurred during operation, remove the cause of the abnormal alarm and reset alarm by touching the alarm display on touch panel and start again.
For the details, refer "Trouble shooting table" .

3.2 CONTROL PANEL

This control panel consists of **START-STOP** main switch, abnormal alarm lamp and touch panel. Touch panel of PLC displays the current temperatures in combustion chamber and operating condition of incinerator, can be made adjustment.

There are three kinds of system mode-**MD1, MD2, MD3**.

Main display screen **makes up** as below figure (FIG.M-01)



<< FIG M-01 >>

INDICATING LAMP

MD1 : WASTE OIL BURNING	MD2 : SOLID WASTE BURNING	MD3 : TEST&MAINTENANCE
RUN : INCINERATOR RUN	ABN : EMERGENCY ALARM	

The figure center of MMIC diagram indicates operation conditions and running hours for main parts which is in the process of operating, **NNN°C** are currently gas temperature indicates with the 3-combustion position.

BUTTON

LAMP TEST	: Lamp test touch button
ALARM RESET	: Alarm reset touch button
MILL PP/START	: It is a case Start button which operates the MILL PUMP by manual operation.---

OPTION

When touch **AUTO** BUTTON and will be changed to **MANUAL**.

After that, operator will start/stop Mill pump manually.

For incinerator start, this button will be changed to the **AUTO** and associated work with incinerator automatically.

SCREEN CHANGE BUTTON

CONTROL MODE	: Setting of burning system
CONTROL TEMP SET	: Temperature of combustion chambers and EXH. gas, display of upper and low limit value
PID CONTROL	: PID setting of W.O dosing pump
ALARM CONTROL	: Display and setting of alarms
SLUICE & WO TANK	: Automatic committed system for solid waste and pump operational screen
TEST MODE	: Confirmed operation and trouble shooting for MOTOR, SOL. V/V

SYSTEM SETTING

HMMCO incinerator carried out shop test and all setting values were settled in advance so that no need resetting.

In case of program reinstalling refer to below instructions.

When click the button on touch panel, all key (BUTTON) are work and touch the figure for input change to the figure of input so after input data and touch ENTER then input complete.

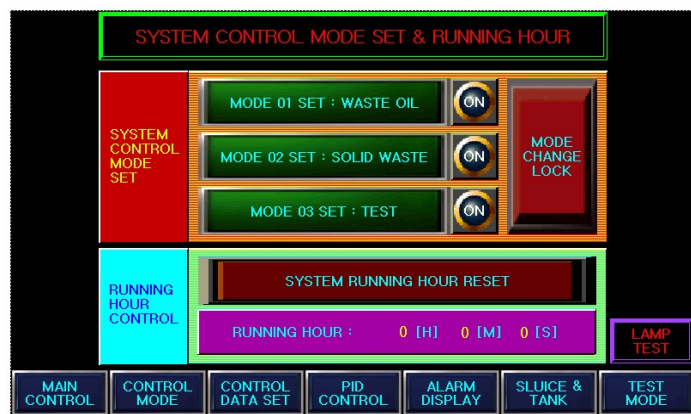
SETTING FOR BURNING MODE

When touch the **CONTROL MODE** BUTTON in FIG M-01 then display FIG M-02 in screen.

Change MODE CHANGE LOCK/UNLOCK SLIDE SWITCH to **MODE CHANGE UNLOCK** release Locking mode and select any mode among MD1/MD2/MD3 convert **MODE CHANGE LOCK** condition. Not change mode on **MODE CHANGE LOCK**.

When incinerator start in the first time, WASTE OIL MODE(MD1) is settled automatically.

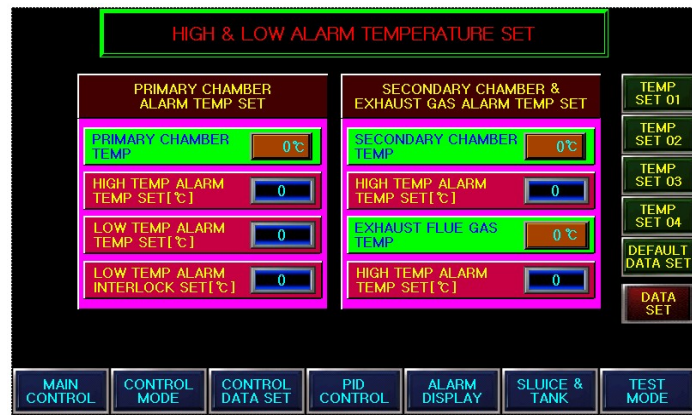
For Solid waste burning, must be change to SOLID WASTE MODE(MD2), WASTE OIL MODE(MD1) is for burning solid waste and waste oil simultaneously.



<< FIG. M-02 >>

DATA SETTING**1) HIGH & LOW TEMP,. ALARM LIMIT SETTING**

When touch **CONTROL TEMP SET** BUTTON and display **SET01** of FIG S-01 of

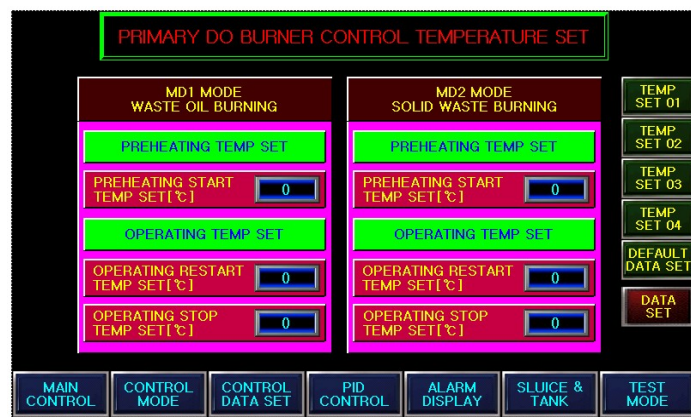


<< FIG. S-01 >>

1ST & 2ND CHAMBER TEMP : °C (Indicate the present temperature value)
 CHAMBER HIGH TEMP ALARM : °C
 EXH GAS TEMP : °C (Indicate the present temperature value for discharge gas.)
 EXH. GAS TEMP HIGH ALARM : °C

2) PRIMARY D.O BURNER CONTROL TEMP. SETTING

When touch **SET02** BUTTON on S-01 Screen and appear FIG S-02.

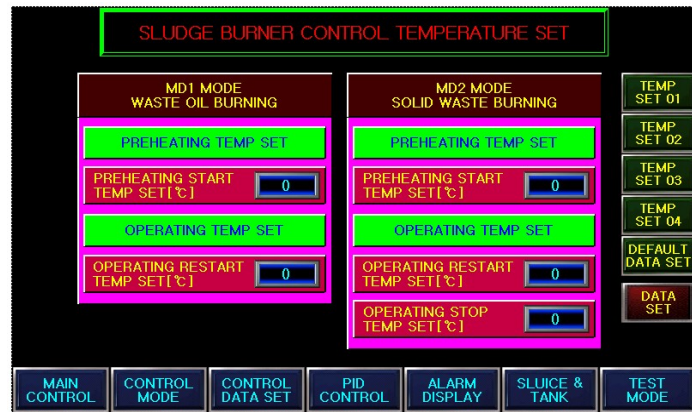


<< FIG. S-02 >>

MD1 PREHEATING : START °C
 MD1 OPERATING : RE-START °C STOP °C
 MD2 PREHEATING : START °C
 MD2 OPERATING : RESTART °C STOP °C

3) WASTE OIL BURNER CONTROL TEMP. SETTING

When touch **SET03** BUTTON on S-02 Screen and appear FIG S-03.



<< FIG. S-03 >>

MD1 PREHEATING START : **200**°C at. Diesel Oil Burning

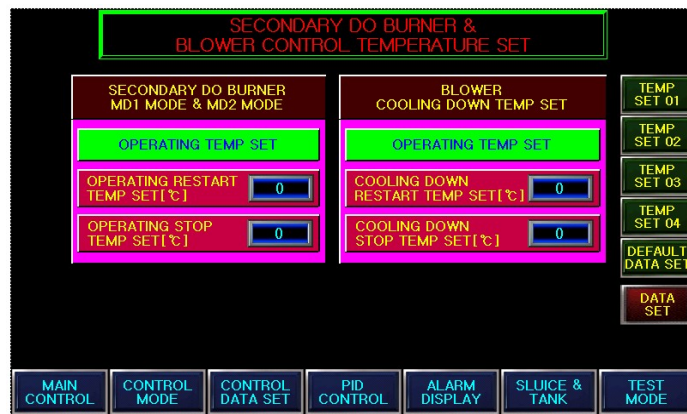
MD1 W.O. OPERATING : **600**°C at. Waste Oil Burning

MD2 PREHEATING START : **200**°C at. Diesel Oil Burning

MD2 AUTO OPERATING TEMP : START **200**°C STOP **600**°C at. Diesel Oil Burning

4) SECONDARY D.O BURNER CONTROL & COOLING DOWN TEMP. SET

When touch **SET04** BUTTON on S-03 .



<< FIG. S-04 >>

2ND BURNER OPERATING TEMP SET : START **670**°C STOP **750**°C

COOLING BLOWER : RESTART **150**°C STOP **100**°C

5) WASTE OIL BURNER DOSING PUMP PID CONTROL

When touch **PID CONTROL** BUTTON and appear FIG S-05.

This display is W.O PID Control screen and possible make up.

When incinerator installed in first time and reset all SYSTEM DATA then execute one AUTO TUNING and one AUTO TUNING possible incinerator operating continuously.



<< FIG. S-05 >>

SETPOINT : 950 °C PID START TEMP SET : 930 °C
 PROCESS VALUE : ??? °C

PID CONTROL PARAMETER SET

PROPORTIONAL GAIN(Kp) : 0.3
 INTEGRAL TIME (TI) : 900.0
 DERIVATIVE TIME (TD) : 1.0

6) SYSTEM CONTROL DEFAULT DATA TRANSMIT

When touch **PID02** BUTTON and appear FIG S-06..

This is necessary to operate for incinerator with the screen which it does at basic value. You must attention which uses the function, if you modified parameter value which necessary operate the incinerator. Because, it is in order to convert all PARAMETER by basic value of the system.

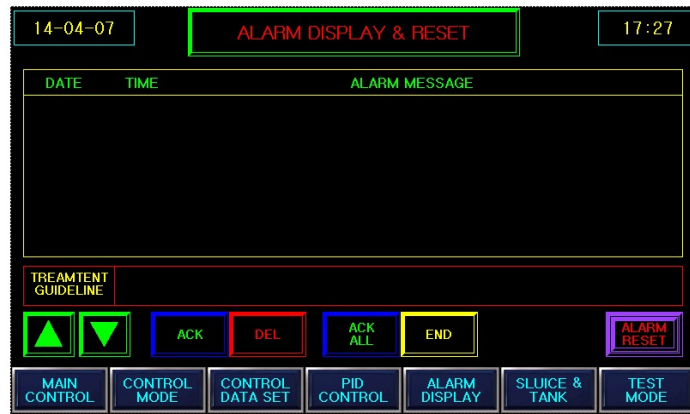


<< FIG. S-06 >>

After touch **DATA TRANSMIT LOCK** BUTTON in display, by basis value if pass about 30 seconds after touch **DEFAULT DATA TRANSMIT** BUTTON after do in UNLOCK state SETTING do .
And, because **TOUCH PANEL CONFIGULRE SET** is engineering mode by TOUCH PANEL control function, operator have special setting necessity.

7) ALARM DISPLAY & RESET

When touch **ALARM DONTROL** BUTTON and appear FIG D-01.



<< FIG. D-01 >>

This display show SYSTEM ALARM, when **ALARM SONTROL** lamp is on the confirm ARARM then estimate incinerator operating condition..

Removal the cause of ALARM and touch **MAIN CONTROL** button to operating incinerator continually.

8) SLUICE & WASTE OIL TANK CONTROL

When touch **SLUICE &W O TANK** button on main Screen and appear FIG OP-01.

Waste Oil Tank is **OPTIONAL ITEMS**, W.O. Tank panel use for working as one unit and no use separate unit for standard.



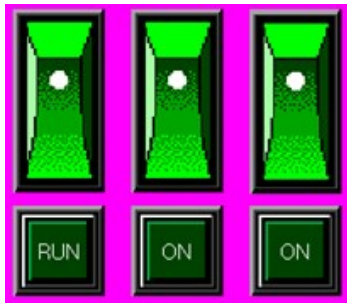
<< FIG. OP-01 >>

TEST & MAINTENANCE MODE

This screen is separated six screens and integrated each STAGE put together to group similarly for checking every SOLENOID VALVES, MOTORS, D.O BUNERS, OTHER INSTRUMENT operated normally and use to finding of cause in MAINTENANCE time.

Refer "Trouble-Shooting table" for solving problems.

Conditions of function, operating indicates FIG OP-2 and each functions for display are show as instruction manual FIG MT-01 ~ MT-06.



: SWITCH

(START : LED STOP : LED OFF)

(ON : LED OFF : LED OFF)

: INDICATING LAMP

(RUN : LED STOP : LED OFF)

(ON : LED OFF : LED OFF)

<< FIG. OP-2 >>

Warning !!

The MD3 mode is test mode for check-up of function of each components.

Must not try the normal operation for Waste oil and Solid waste burning on MD3 mode.

In order to test waste oil burner, first start primary blower and primary D.O burner before Waste Oil burner on.

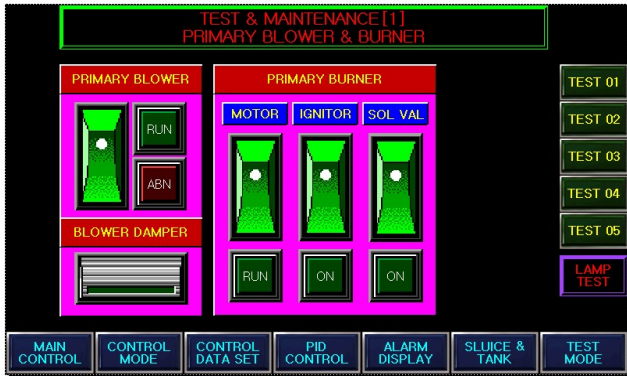
To finish the test, the reverse order to be taken.

(First stop Waste oil burner, then D.O burner and primary blower)

1) TEST & MAINTENANCE

After **TEST MODE** BUTTON TOUCH, it selects and confirm **TEST01** ~ **TEST03**.

PRIMARY BLOWER & 1ST D.O BURNER



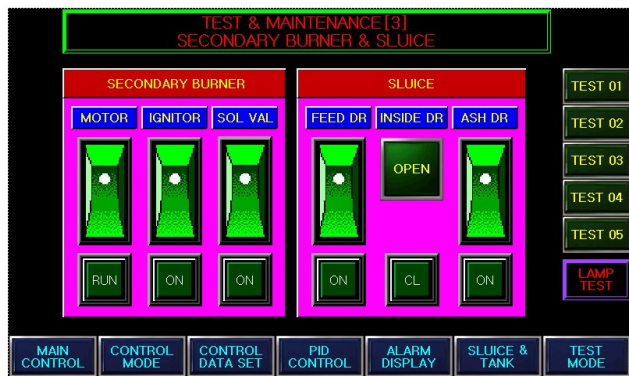
<<FIG MT-01>>

WASTE OIL BURNER CONTROL



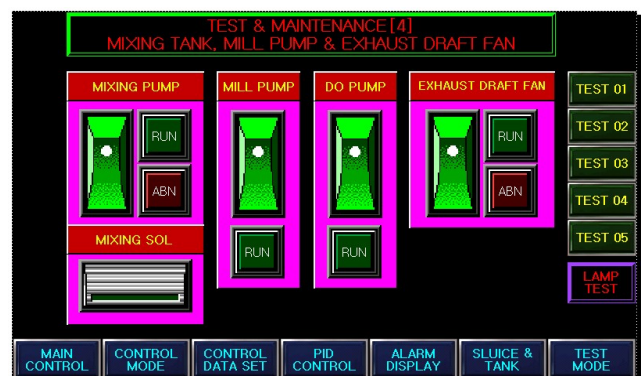
<<FIG MT-02>>

2ND D.O BURNER & SLUICE CONTROL



<<FIG MT-03>>

CP2 CONTROL & I.D FAN (OPTION)



<<FIG MT-04>>

3.3 STOP OF THE INCINERATOR

1. When the "START-STOP" switch is turned to STOP position all open oil solenoid valves are closed and the atomizing air valve is closed.
2. After finished W.O burning, the rest in the W.O burner is cleaned with diesel oil during 3sec. The incinerator cools down.
3. When the temperature in the combustion chamber is below 100℃, the primary blower is stopped, the each cooling fan of the Primary & Secondary D.O burner are stopped and the ash door is released.

3.4 ABNORMAL START UP AND OPERATION OF INCINERATOR

1. By the first start-up of the incinerator, oscillating combustion can occur which must be stopped immediately. Activating the switch "STOP".
2. If there should be any problems during start-up and operation, the incinerator must be stopped immediately by activating the "STOP" switch.
3. Try to find the reason for this abnormal start-up/operation of the incinerator.
4. See the instruction manual under "Trouble Shooting".

3.5 ATTENDANCE OF THE COMBUSTION CHAMBER

1. Do not put glass, bottles, and other materials which may not be burner into the combustion chamber.
2. Do not fill wet solid waste into the combustion chamber more than one hour before starting the incinerator.
3. When burner oil-containing materials, such as filter cartridges, oily cotton waste, and scrapings from the centrifuges, do not put more than (see warning plate) liters per-charge into the combustion chamber.
4. When combusting material with high calorific value with explosion-like combustion, e.g. plastic, max. (see warning plate)Kg per charge is allowed to be fed into the incinerator.
5. Do NOT overload the incinerator with waste. Max.(See warning plate)kcal per charge of solid waste and max. 20% of the volume of the combustion chamber see warning plate liters).
6. When the incinerator is cold, remove ashes and slag from combustion chamber.
The ashes and the slag must be carefully removed. Do not knock or hammer on the sides of the combustion chamber.

WARNING!

DO NOT put explosive materials, closed containers or aerosols into the combustion chamber.

DO NOT overload the incinerator

MAXI T50 465Kw (400,000kcal/h)

MAXI T100 768Kw (660,000kcal/h)

MAXI T150 988Kw (850,000kcal/h)

DO NOT feed or remain solid waste in the combustion chamber before starting incinerator

3.6 WARNING

THIS INCINERATOR IS AUTOMATICALLY OPERATED

Do not activate the main power for the control panel before the cooling of the incinerator is finished and the incinerator has stopped automatically.

WARNING !

Failure to observe the below instructions can result in substantial damages to burners and thermocouples.

1) Generally, quantity per charge of solid waste (class II) :

MAXI T50	150ℓ
MAXI T100	250ℓ
MAXI T150	300ℓ

The quantity per charge of standard feeding sluice is about 45 L

2) Generally, quantity per charge of oil-containing materials, ie filter cartridges, oily cotton waste, scrapings from centrifuges, etc.,

MAXI T50	5ℓ
MAXI T100	5ℓ
MAXI T150	5ℓ

3) Generally, quantity per charge of high-calorific materials with explosion-like combustion, i.e, plastics, fishing net, etc

MAXI T50	5Kg
MAXI T100	5Kg
MAXI T150	5Kg

4) Do not burn explosive materials such as closed containers or aerosols.

5) Remove ashes when needed and make sure that the air holes for the combustion air are always unblocked.

6) Do not feed the incinerator without min (-)10 mm vacuum in the combustion chamber, check U-tube (UM).

7) Too much draught can disturb a constant flame and prolong the heating-up time.

In case that, must be adjust damper in exhaust gas uptake and readjust after reaching working conditions.

8) Power loss during operation might cause overheating and consequently damage the incinerator.

Shipboard incineration of the following substances shall be prohibited

A) Annex I, II and III cargo residues and related contaminated packing materials.

B) Polychlorinated biphenyls . (PCBs)

C) Garage, as defined in annex V of MARPOL 73/78, containing more than traces of heavy metals

D) Refined petroleum products containing halogen compounds.

Guarantee claims

All components mounted on the incinerator, including burner and flame tubes, are designed exclusively for the operating temperature and max. loaded quantities of energy stated in this instruction book.



3.7 CALORIFIC VALUE (calories)

Kitchen waste	945
Acetic acid	3,490
Glass fibre	3,615
Wall paper	3,690
Cardboard	3,786
Corrugated paper	3,916
Wrapping paper	4,034
Cellulose	4,200
Cotton	4,216
Chips from joiner's shop	4,281
Carbon paper	4,361
Shoe factory waste	4,380
Newspaper	4,437
Dry cortex from spruce	4,500
Wool	4,590
Dry cortex from fir	4,750
Telex paper	4,758
Uppers from shoes	4,882
PVC film	5,365
Dry cortex from birch	5,450
Polymeric film	5,542
Tar acid	5,600
Methylated alcohol	5,695
Car motor oil	5,722
Lignin	6,100
Cork waste	6,300
Laminated paper	6,311
Polyurethane	6,438
Acetone	6,667
Natural rubber	6,672
Disposable plastics	6,783
Bakelite	6,950
Neoprene	7,065
Ethanol	7,400
Nylon	7,573
Car rubber tyres	8,123
Waste oil	8,333
Butane	8,768
ABS plastics	9,200
Pork, lard	9,300
Olive oil	9,335
Turpentine	9,444
Polyethylene	9,700
Paraffin	9,800
Polystyrene	9,840
Benzene/Benzol	10,116
Wax paraffin	10,345
Kerosene	10,500
Glass fibre strengthened by synthetic resin	10,840
White spirit	10,960
Polythene	11,000
Polypropylene	11,040
Polyethylene bottles	11,111

IMO defines Solid Waste Class II as follows expressed in percentage:

50% Food waste

50% Rubbish, containing approx. 30% paper, 40% cardboard, 10% rags, 20% plastic.

This mixture will have up to 50% moisture and 7 % incombustible solids.

Refuse consisting of an approx. even mixture of rubbish and garbage by weight. This type of waste is common to passenger ships occupancy and has a calorific value of approx. 2,400 kcal/kg. (10,000 kJ/kg) as fired.

3.8 DIFFERENT TYPES OF FUEL

W.O oil consisting of:	75% W.O oil from heavy fuel oil 5% waste lubricating oil 20% emulsified water
------------------------	---

Low Caloric value:	8,600 kcal/kg (31,800 kJ/kg)
Density	0,98 (kg/L)

Diesel oil:

Low Caloric value:	10,130 kcal/kg (42,400 kJ/kg)
Density	0,84 (kg/L)

4. TROUBLE SHOOTING CHART

The following trouble shooting chart is by no means complete, but covers the more general type of problems, which would most likely occur if a breakdown is experienced.

4.1 ADJUSTMENT OF DAMPER & AIR NOZZLE

The damper of the exhaust gas funnel is to be completely open. This damper is only used, if there is too much 'draught' in the funnel, like for instance if the negative pressure in the combustion chamber drops below 50 mm WG. The ideal condition of W.O burning is when the negative pressure is 10 ~ 30 mmWG.

When the negative pressure is under 10mmWG.

Combustion air nozzle should be closed to protect back fire.

When the negative pressure is over 30mmWG combustion air nozzle should be open for optimum combustion performance.

The negative pressure has to be controlled by the U-tube with water (UM).

4.2 ADJUSTMENT OF BURNER

If the temperature in the secondary combustion chamber does not reach 700 °C within 30minutes, a thing which can occur when the vessel is placed in cold areas, the oil pressure to the burner must either be raised or alternatively a nozzle with a larger capacity must be installed.

4.3 FAULT LOCATION of INCINERATOR

ALARM OF PRIMARY & SECONDARY D.O BURNER FLAME FAILURE

The text "**Primary D.O burner flame fail / Secondary D.O burner flame fail**" will appear in the control panel display. The reason may be:

When heating up the incinerator:

No diesel oil to the incinerator:

Check liquid level in the diesel oil tanks.

Pressure gauge (M1/M2) of diesel oil pump oscillating

Clean filter on diesel oil pump. Check whether admission hoses of diesel oil pump are tight.

Flame detector (FD1/FD2) of incinerator soot up

Clean the glass.

Wrong adjustment of ignition electrodes

See instruction for auxiliary oil burner.

Oil nozzle filter on D.O burner (PU1 OR PU2) is obstructed

Take out the nozzle and clean the filter.

Solenoid valves do not open (SV1.1/SV1.2, SV2.1/SV2.2)

Check coil and electric connection.

Waste Oil burner soot up (B)

Take out the W.O burner and clean it, - see instruction for W.O burner.

Reset alarm.

During combustion of W.O

Reset alarm and the incinerator will run again. Watch the W.O dosing pump(PU3) before a possible new alarm sets in.

If the W.O dosing pump (PU3) is running and a flame can be seen through the sight glass:

Flame detector (FD1/FD2) of the incinerator soothed up

Clean the glass

If the W.O dosing pump (PU3) is running but you keep getting flame failure:

The W.O burner is soot up

Take out the W.O burner and clean it, - see instruction for W.O burner.

The stator in the W.O dosing pump is damaged

Replace stator.

W.O valve (POV1/POV2) is obstructed

Dismount, inspect or clean.

Solenoid valve (SV4.1/SV4.2) does not open

Examine coil and electric connection.

The self-cleaning strainer is blocked with fibers

Clean strainer.

No constant waste oil circulation in the circulation pipe

The rubber stator of the W.O dosing pump (PU3) is worn out.

See list of spare parts.

The W.O dosing pump is partly blocked, clean if possible.

The W.O dosing pump (PU3) is not running

Check connections.

The frequency control of the pump (PU3) has failed or there is no start signal from the PLC, reset alarm or switch off the main power and turn it on again after 3 min.



ALARM OF PRIMARY & SECONDARY COMB. CHAMBER TEMP. HIGH AND SENSOR FAILURE

The text **“Primary & Secondary chamber temp. high / Primary & Secondary chamber TC sensor fail”** will appear in the control panel display.

The reason can be:

Too much high-calorific waste in chamber

See capacities and instructions mounted on incinerator

The thermocouple (TC1/TC3) has been interrupted

Display text: “high temperature”

Check the thermocouple connection cable.

Reset alarm.

ALARM OF EXHAUST GAS TEMPERATURE HIGH AND SENSOR FAILURE

The text **“Exhaust gas temp high / Exhaust gas TC sensor fail”** will appear in the control panel display

The reason may be:

The thermocouple (TC2) has been interrupted

Check the thermocouple and the connection cable. Replace the thermocouple or try to fasten the connection cable.

Too high calorific value of solid waste

Cool down, observe capacities and instructions mounted on incinerator
reset alarm, and try again.

ALARM FOR W.O PANEL INTERLOCK SIGNAL FROM W.O TANK OR MOTOR FAILURE

The text **“W.O panel interlock signal or motor failure”** will appear in the control display and the alarm ‘feed back or motor relay failure’ will be shown. The reason may be:

The heating control system has failed

Check the heating control system and reduce the heating.

The thermostat on the W.O tank wrongly adjusted

Adjust to correct temperature, 100°C.

Low level in W.O tank

Fill the W.O tank.

Motor relays failure

Reset the automatic fuses.

Reset alarm.

ALARM FOR ATOMIZING AIR PRESSURE FAILURE

The text "**W.O burner atomizing air pressure low**" will appear in the control panel display and the alarm '**W.O burner atomizing air pressure low**' will be shown. The reason may be:

Pressure regulator (TR) wrongly adjusted

Adjust to correct pressure which is between 0.8 and 2.0 Bar, depending on the W.O oil viscosity.

Failure in air supply

Check air supply

Pressure control (PS3) wrongly adjusted

Adjust to correct range of pressure (0.8 Bar).

Valves in air-pipe system closed

Clean them.

Filter for air (OL) obstructed

Clean it.

Reset alarm.

ALARM FOR COMBUSTION AIR PRESSURE FAILURE

The text "**Combustion air pressure low**" will appear in the control panel display and the alarm '**Combustion air pressure low**' will be shown. The reason may be:

Failure in air supply to the primary blower (VH)

Check air supply to the incinerator place

Pressure control (TR) wrongly adjusted

Adjust to correct range of pressure.

Reset alarm.



ALARM MOTOR OVERLOAD FAILURE

The text "**Primary blower overload trip, W.O dosing pump motor overload trip**" and **OPTIONAL ITME (Mill pump overload trip, D.O transfer pump overload trip, Exhaust fan motor overload trip)** will appear in the control panel display.

Alarm at abnormal stop of Primary blower(VH), W.O dosing pump (PU3),
OPTIONAL ITME - Mill pump (PU5), EXH. gas draft fan (6M8), D.O trans pump (PU6).

The alarm marked "**motor overload failure**" will be shown. The reason may be:

The motor thermal overload protectors for primary blower(VH) or W.O dosing pump(PU3) are switched off.

After cooling down, reset motor overload protector and restart.

Check the corresponding motor and thermal overload setting.
Restart after cooling down.

Fault in control equipment cabinet

Check electric cables and the function according to the key diagram.

Reset alarm.

ALL ALARMS AT THE SAME TIME

No lamps light and nothing is functioning

The reason may be:
Emergency stop activated.
Current interruption.
Find the reason.
The automatic fuses are switched off.

Reset the automatic fuses and find the reason why they are switched off.

Reset the alarm.

ALARM FOR CHAMBER NEGATIVE PRESSURE FAILURE

The text "**Chamber negative pressure low**" will appear in the control panel display and the alarm '**Chamber negative pressure low**' will be shown.

The reason may be:

Incorrect adjustment of pressure sensitive switch (PS2)
The primary fan is obstructed
No vacuum is obtained

Check the uptake, especially after standstills or repairs.

Reset alarm.

ALARM AT SLUICE INSIDE DOOR FAILURE

The text “**Sluice inside door open**” will appear in the control panel display and the alarm ‘**Sluice inside door open**’ will be shown the reason may be:

The inside gate is blocked by waste that has not fallen into the combustion chamber

Alarm will activate cooling process. When the incinerator temperature has fallen to 100°C it is possible to open the sluice door and remove the waste blockage.

Failure in air supply, low air pressure

Check air supply to incinerator by controlling the pressure on the pressure gauge on the pressure regulator (TR).

ALARM FOR SLUICE FEED DOOR FAILURE

The text “**SLUICE FEED DOOR OPEN**” will appear in the control panel display and the alarm ‘**Sluice feed door open**’ will be shown. The reason may be:

The front door is not closed

The micro switch on front door is broken, check the electrical -connections.



4.4 W.O DOSING PUMP(PU3)

Breakdown										Reasons / Remedies
pump has no suction	pump conveys irregularly	the conveying capacity is not achieved	pressure is not achieved	pump does not start	pump has seized or has stopped conveying	pump operates noisily	motor overheats	the stator wears out early	shaft sealing leaks	
1	2	3	4	5	6	7	8	9	10	
				●			●			a Adhesion between rotor and stator excessive (as delivered). Lubricate (soft soap, genuine soap) between stator and rotor. Then turn the pump by means of the tool W2.
●										b Check rotational direction of the pump per data sheet and nameplate. In case of wrong direction, change wiring of motor.
●	●	●			●	●				c Suction pipe or shaft sealing leak.
●	●	●				●				d Suction head too high (item 6.5.3.1). Check suction head with vacuum gauge. Increase the suction pipe diameter and fit larger filters. Open the suction valve.
●	●	●								e Viscosity of the liquid too high. Check and accommodate per data sheet.
		●		●			●			f Wrong pump speed. Correct pump speed as per data sheet.
	●	●								g Avoid inclusions of air in the conveying liquid.
		●		●	●		●	●		h Pressure head too high (point 6.5.3.2). Check pressure head with manometer. Reduce the pressure head by increasing the pressure pipe diameter or by shortening the pressure pipe.
●	●	●			●			●		i Pump runs partially or completely dry (point 6.5.2). Check flow in the suction chamber. Install dry running protection TSE.
						●	●			j Check coupling, possibly pump shaft is misaligned to drive. Check whether coupling gear is worn. Realign coupling. The coupling gear may have to be replaced.
●		●								k Speed too low. Increase the speed when high suction performances are required and when the liquid is very thin.
●	●					●				l Speed too high. Reduce the speed when pumping products with high viscosities - danger of cavitation.
						●				m Check the axial play in the coupling linkage. Check that the bush has been installed correctly. (see document OM.PJT. Item 2.2)
●		●		●	●			●		n Check for foreign substances in the pump. Dismantle the pump, remove foreign substances and replace worn parts.
●		●	●		●					o Stator or rotor worn. Dismantle the pump and replace defective parts.
●		●			●	●				p Joint parts worn. Replace worn parts and fill with special pin joint grease.
●		●			●			●		q Suction pipework partially or completely blocked. Clean suction pipework.
●				●	●		●	●		r Temperature of the pumping liquid too high. Excessive expansion of the stator. Check temperature and install rotor with diameter smaller than specified.
●		●		●			●		●	s Gland packing too strongly tightened or worn. Ease or tighten stuffing box. Replace defective packing rings.
●				●	●			●		t Solid contents and / or size of solids too large. Reduce pump speed and install perhaps a screen with suitable meshes. Increase fluid share.
●				●				●	●	u When the pump is non-operational, the solids settle out and become hard. Clear and flush pump immediately.
●				●	●			●	●	v The liquid becomes hard when the temperature falls below a certain limit. Heat the pump.
						●			●	w The bearing in the drive casing of the pump, or in the drive engine is defective. Replace bearing.
									●	x Mechanical seal defective. Check seal faces and O-rings. If necessary replace corresponding defective parts.

5. INSTRUCTION for OPERATION and MAINTENANCE of PARTS

5.1 SCHEME FOR MAINTENANCE

COMPONENT	CONTROL/INSPECTION/EXCHANGE	INTERVAL
Control Panel	Thermal relay (motor overload protector) to be checked (setting). Terminals to be tightened up.	5000 h
Waste oil burner (B)	To be cleaned and inspected for wear and tear.	1000 h
Primary and Secondary Burner (8M2)(8M4)	Oil nozzle to be changed. Oil filter on diesel oil pump to be cleaned, electrodes to be checked, see also special instruction.	2000 h
Flame detector (FD1 & FD2)	Photo cell to be cleaned.	500 h
Thermocouple (TC1/TC2/TC3)	To be cleaned and controlled. To be exchanged in case of fracture.	2000 h
Solenoid valves	To be checked for mobility tightness and possible obstruction. Electrical connections to be tightened up and cables to be checked.	5000 h
Pressure control (RV1 & RV2)	To be checked for function, adjustment and tightness.	5000 h
W.O dosing pump (PU3)	Check of stator, rotor and mechanical seal	1000 h
Mill pump (PU5)	Check of impeller and mechanical seal	1000 h
Gear motor for W.O dosing pump (PU3)	Oil level to be controlled.	Regularly
Mill pump (PU5)		
Doors (IL)	To be checked for possible leaks	5000 h
Refractory lining	Inspection concrete wash and repair, if necessary. See special instruction.	2000 h
Self cleaning strainer for waste oil	Deposit to be removed.	2000 h

The bearings for all electrical motors are of the fully closed type without lubrication nipples. Change of bearings after a working shift of 10,000 hours.

After start incinerator and operating stage in PID control 950 °C, please use the hook meter of onboard to be measured the rating current for primary & Secondary D.O burner motor.

If the current value is exceeded 10% compared normal current value, filter(of D.O burner) must be cleaned immediately.

- Reference table1 -

No.	Description	Current rating(A)	Measured*1 Current valve(A)	Filter cleaning(A)
1	Primary D.O burner motor	0.7A	0.6A	1.66A
2	Secondary D.O burner motor	0.5A	0.45A	0.50A

*Annotate 1 : Measurements can be changed by kind of oil & water.

5.2 INSTRUCTION FOR REPAIR OF REFRACTORY LINING

The refractory lining should be maintained according to operation and maintenance instructions. In case of damage to the lining, repairs can be carried out according to the following instructions:

- Repair type 1: Damages of less than 4 cm³ and cracks wider than approx. 5 mm.
- Repair type 2: Damages of between 4 cm³ and 100 cm³.
- Repair type 3: Damages exceeding 100 cm³ and wear exceeding approximately 20 mm.

LINE OF PROCEDURE

Repair type 1

The damaged area is to be cleaned for loose particles and then coated with an air setting mortar or a special, fine grain coating with approximately 42% Al₂O₃ and a low iron content temperature limit of approximately 1450 °C.

Repair type 2

The damaged area is to be cleaned for loose particles.

A chemically setting plastic module-able with approximately 45% Al₂O₃, a temperature limit of approximately 1500°C, and a grain size 0 - 5 mm can be used. The module-able is to be formed to balls of approximately 50 mm diameter and rammed into position in the holes. This should be continued until the damage is repaired.

In order to obtain a good result the repair spot should have a finish coating. The incinerator has to air dry for 2 -4 hours before it is operated again.

Repair type 3

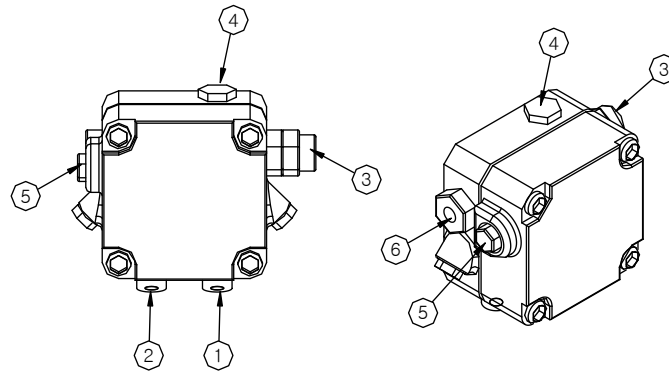
Please contact Incinerators A/S for information or contact a company specialized in refractory linings.

Broken ceramics are to be replaced by new ones using air setting mortar and castable refractory.

5.3 DIESEL OIL BURNER

5.3.1 ADJUSTMENT OF OIL PUMP (Type : AN77C, AS47C)

The illustration below shows the diesel oil pump (PU1, PU2), which is located on each diesel oil burner. Check the size of oil nozzle. The pump is factory adjusted at 10 bar.

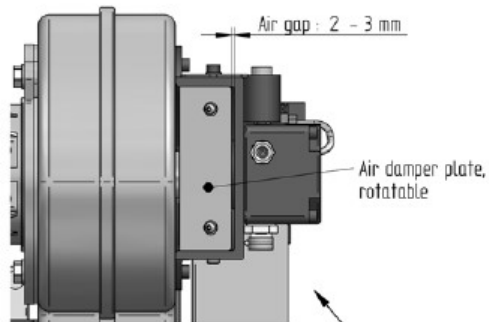


1	Suction connection G1/4 BSP
2	Return connection G1/4 BSP
3	Nozzle connections G1/8 BSP
4	Outlet connection G1/8 BSP
5	Vacuum gauge port G1/8 BSP
6	Pressure regulation

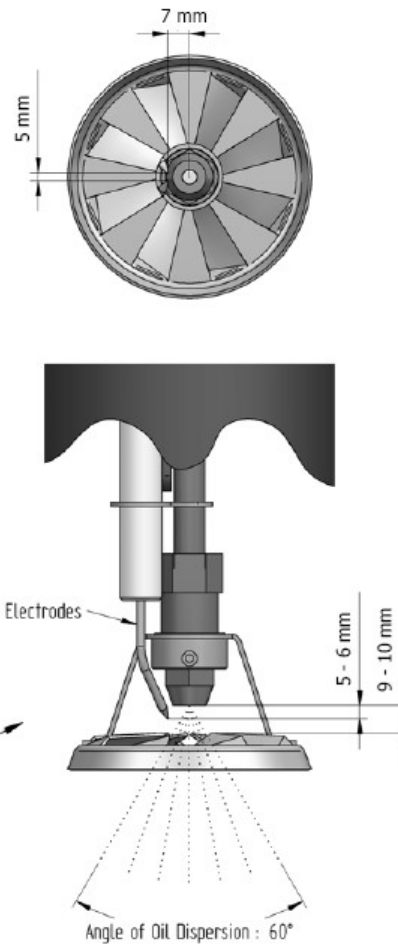
5.3.3 ADJUSTMENT OF BURNER

The illustration below shows the diesel oil burner (8M3, 8M5), which is located on top of the incinerator. Before dismantling the burner for adjustment or for service, make sure that the diesel oil supply and return lines are closed.

Adjustment of Air supply



Adjustment of Electrodes

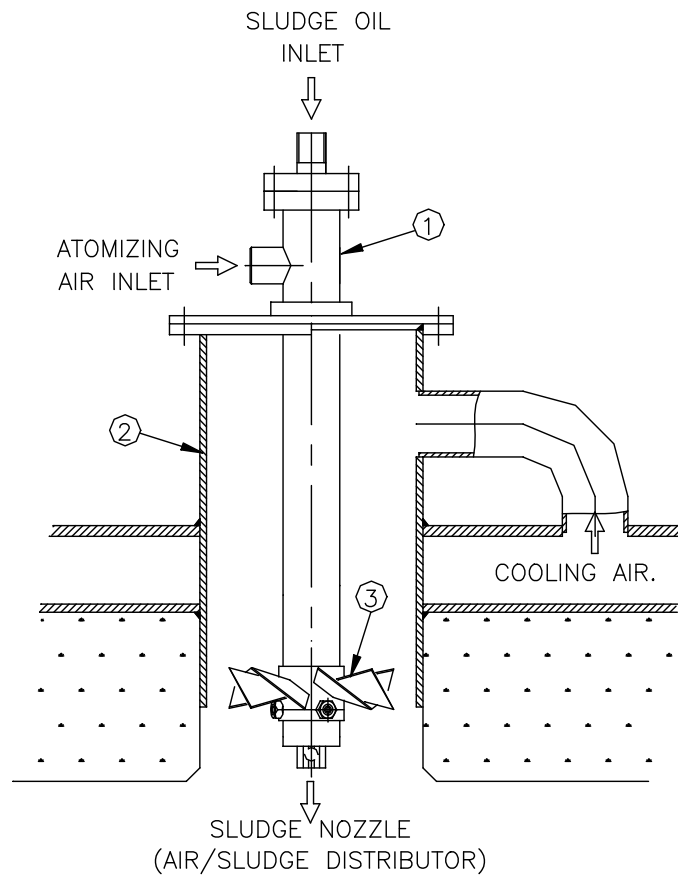


Diesel Oil Burner

5.4 WASTE OIL BURNER (B)

This type of W.O burner is specially designed to handle waste oil with soft particles up to max. 8mm diameter. In order to obtain proper combustion the below procedure should be observed strictly. Before start-up check the following:

1. The combustion air will be regulated by means of an air damper in order to obtain complete combustion. The combustion is controlled visually by means of a sight glass on the side of the incinerator. Note: During test of new incinerator's the damper is adjusted and should not be changed.
2. When starting-up the atomizing air regulates the pressure between 0,8 ~ 2 bar.



5.5 W.O. DOSING PUMP (PU3)

The W.O oil dosing pump (6M4) is a progressive cavity pump.

It is used for transporting W.O oil to the W.O oil burner.

The pump capacity is automatically adjusted by a speed controller in the control panel.

5.5.1 Lubrication

R1 GEAR UNITS				
GEAR UNIT SIZE	MOUNTING POSITION / LUBRICANT QUANTITY			TYPE
	B3-B5	V1-V5	V3-V6	
RF40/1 - RM40/1 - RT40/1 (SRF03/1)	0.200KG	0.260KG	0.230KG	ALTINA - GREASE O
RF50/1 - RM50/1 - RT50/1 (SRF05/1) (SPRF05/1)	0.350KG	0.450KG	0.400KG	
RF63/1 - RM63/1 - RT63/1 (SRF10/1)	0.600KG	0.800KG	0.700KG	
RF80/1 - RM80/1 - RT80/1 (SRF20/1)	1.000KG	1.300KG	1.150KG	
RF100/1 - RM100/1 - RT100/1 (SRF30/50/1)	1.600KG	2.100KG	1.900KG	
RF125/1 - RM125/1 - RT125/1 (SRF100/1)	2.500KG	3.300KG	2.900KG	IP

R2 GEAR UNITS				
GEAR UNIT SIZE	MOUNTING POSITION / LUBRICANT QUANTITY			TYPE
	B3-B5	V1-V5	V3-V6	
RF40/2 - RM40/2 - RT40/2	0.300KG	0.400KG	0.350KG	ALTINA - GREASE O
RF50/2 - RM50/2 - RT50/2	0.550KG	0.700KG	0.600KG	
RF63/2 - RM63/2 - RT63/2	1.000KG	1.300KG	1.150KG	
RF80/2 - RM80/2 - RT80/2	5.000KG	6.500KG	5.800KG	MELLANA OILS
RF100/2 - RM100/2 - RT100/2	8.300KG	10.800KG	9.500KG	
RF125/1 - RM125/1 - RT125/1	13.000KG	17.000KG	15.000KG	

RECOMMENDED TYPES OF GREASE: R1 / R2 GEAR UNITS		RECOMMENDED TYPES OF GREASE: R2 GEAR UNITS	
SIMMIA GREASE O	SHELL	OMALA OIL	SHELL
FGL	BP	MOBILGEAR 630	MOBIL
NEBULA EP O	ESSO	SPARTAN EP 220	ESSO
GR MU/EP O	AGIP	GR-XP 220	BP
		BLASIA 220	AGIP

Warning Notice

When the rotor or stator of dosing pump wears down, the temperature in the combustion chamber does not rise normally due to the decrease of flow rate.

In this case, please check the rotor and stator of dosing pump for wear.

5.5.2 Filling Up of Suction Side to Avoid Dry Running at Startup

CAUTION

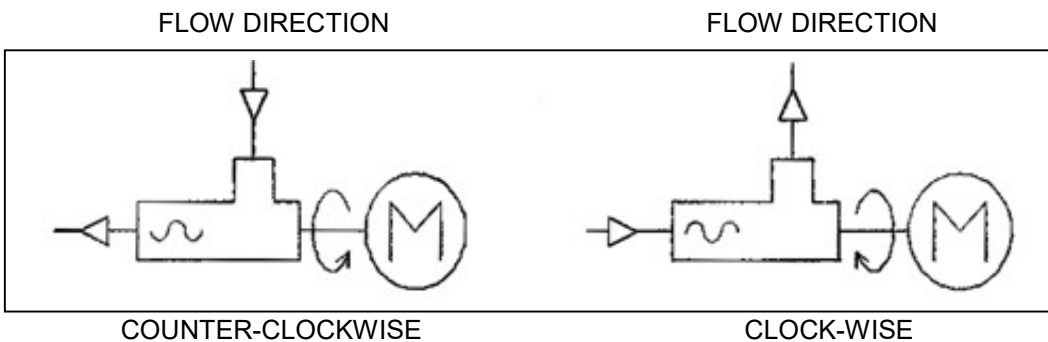
Before switching on the pump, fill the suction-sided pump casing with fluid so that the first rotations will lubricate the conveying elements immediately. A small quantity of fluid is sufficient for lubrication; the subsequent operation of the pump is self-priming, even if an air column up to the liquid level remains.

Electric/Hydraulic Connections

The risk of exposure to electrical hazards must be ruled out. Always observe the safety regulations valid at the site of installation.

Checking Direction of Rotation

The rotational direction of the pump determines the flow direction of the conveying medium. Prior to commissioning, the rotational direction of the pump must be checked for compliance with the data sheet specification and the rotational direction arrow on the type plate of the pump.



5.5.3 MAIN SPECIFICATION

Self-priming positive displacement pump with geared motor.

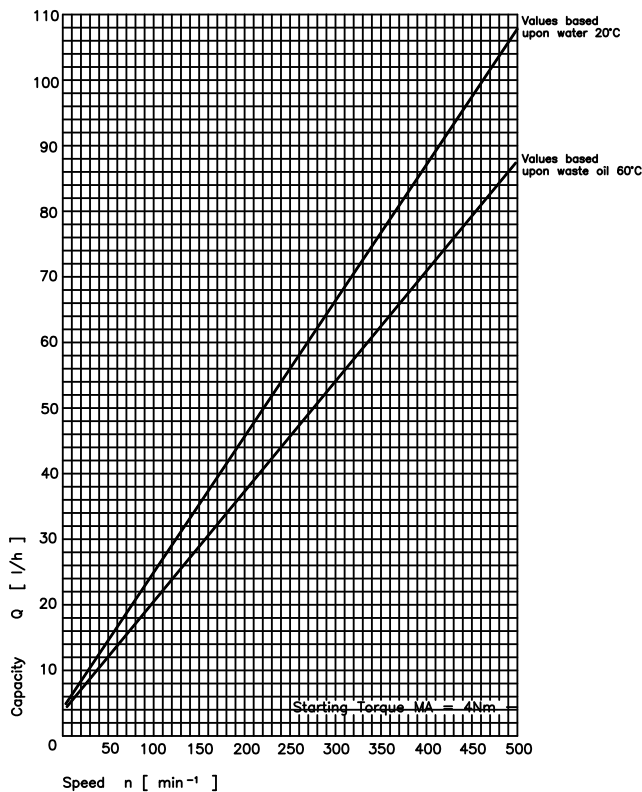
Type pump	HMD 008-12L	HMD 012-12L	HMD 025-6L
Capacity	Max. 115l/h	Max. 174l/h	Max. 233l/h
Head	2 Kg/cm ²	2 Kg/cm ²	2 Kg/cm ²
Output speed	Max.475rpm	Max.475rpm	Max.243rpm
Motor capacity	0.45Kw	0.45Kw	0.45Kw
Motor speed	1690 rpm	1690 rpm	1690 rpm

5.5.4 MATERIAL SPECIFICATION

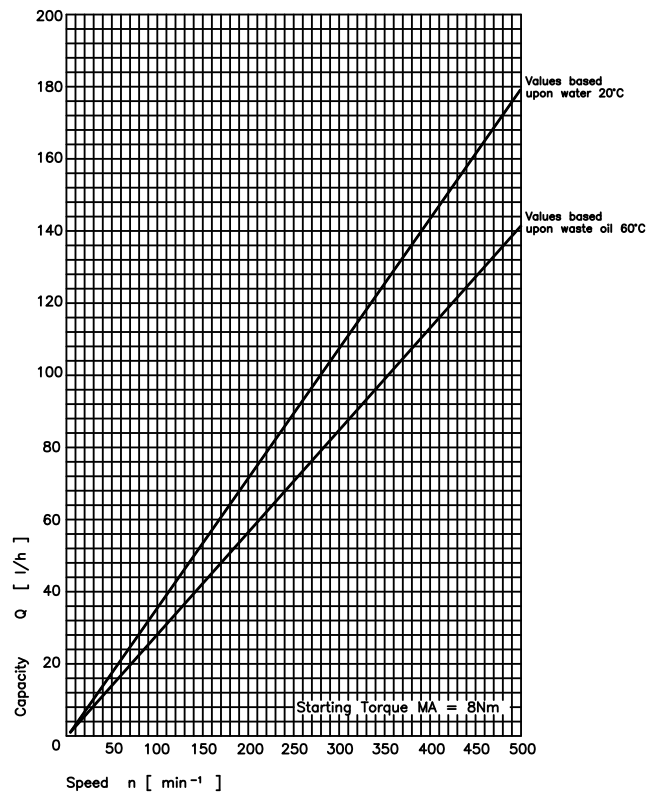
LANTERN	: Steel St 37-2
SUCTION CASING	: 1.4408
PRESSURE BRANCH	: 1.4571
COUPLING ROD	: 1.6582
ROTOR	: 1.4571
MECHANICAL SEAL CASING	: 1.4571
JOINT SEAL	: NBR Perbunan
PLUG-IN SHAFT	: 1.4571
STATOR	: VITON

5.5.5 CHARACTERISTIC CURVES

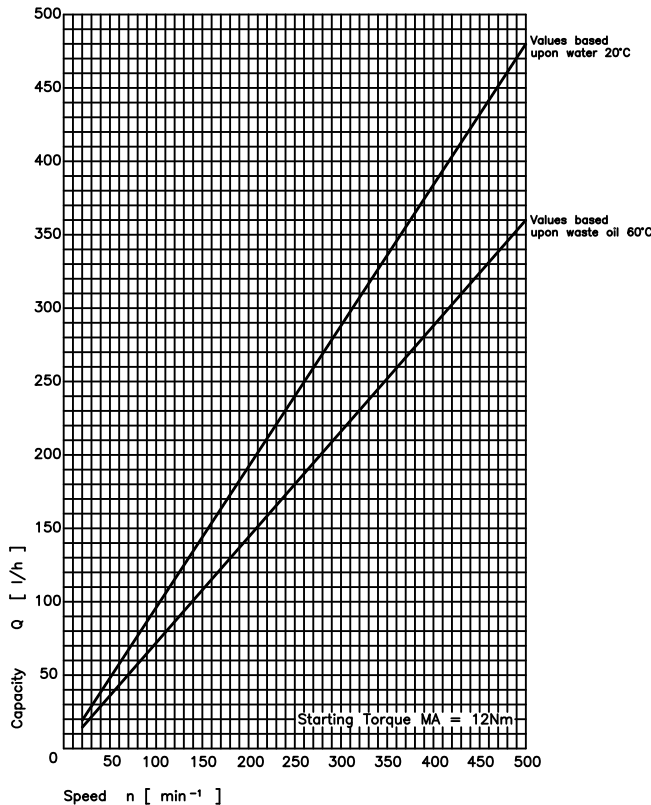
Type : HMD 008-012L



Type : HMD 012-012L



Type : HMD 025-6L



6.SPARE PARTS

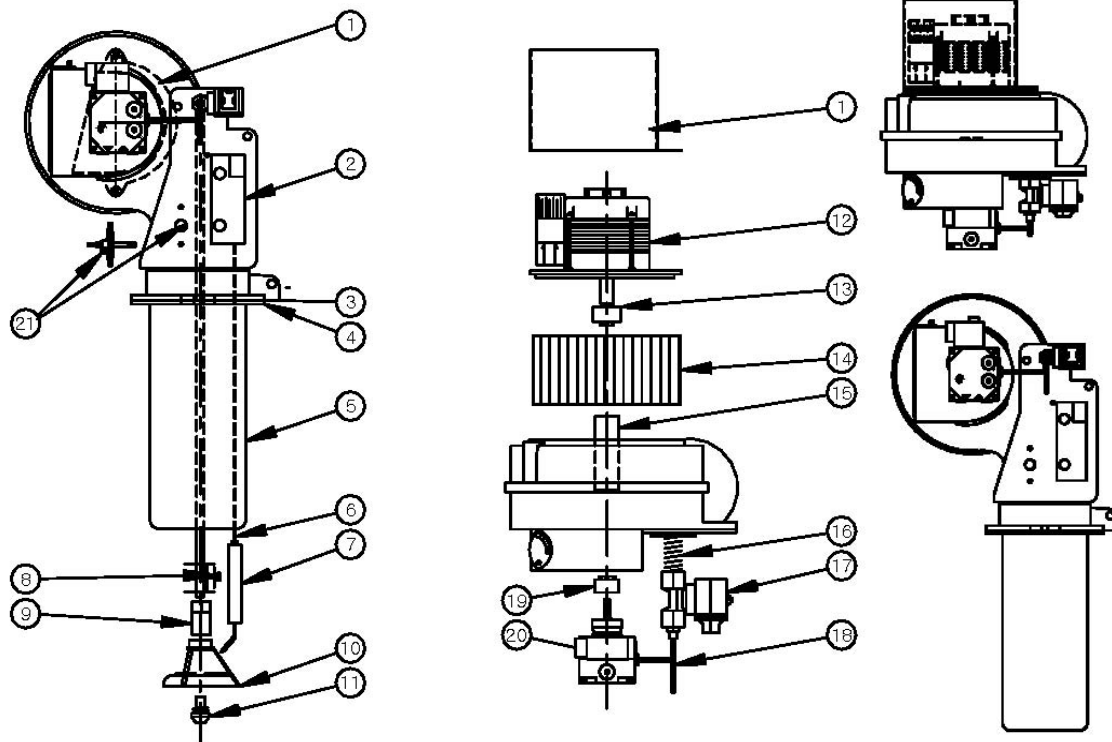
6.1 COMPONENTS INCINERATOR

- The description of "ID" refer to previous piping drawing on the final drawing.

ID according to Pipe diagram:	Description:	Spare part No.: (if wear part)
	Air nozzle	HM20P3057
B	W.O burner	See section
BK	Mixing chamber	-
	Gasket for BK	HM86D3010
MS1/C5	Door blocking for (sluice)	HM58L4001 / HM58L4002
MS2/C6	Door blocking for (Ash door)	HM58L4003 / HM58L4004
EF	Secondary combustion chamber	-
	Refractory lining repair set	Contact HMMCO
F	Primary combustion chamber	-
	Refractory lining repair set	Contact HMMCO
FD1	Flame detector	HM60F4013
	Socket for FD1	HM26P40112
FD2	Flame detector	HM60F4013
	Socket for FD2	HM26P40112
IG	Sluice door	-
	Refractory lining repair set	Contact HMMCO
	Gasket for IG	HM86D4001
IL	Feeding door	-
	Gasket for IL	HM86D4001
M1	Pressure gauge (0~15 bar)	HM62M4001
M2	Pressure gauge (0~15 bar)	HM62M4001
M3	Pressure gauge (0~6 bar)	HM62M3001
M4	Pressure gauge (-1~ 1 bar)	HM62M4003
MS3	Micro switch	HM57S4001
SV1.1	Solenoid valve	See ST1
SV1.2	Solenoid valve	See ST1
SV2.1	Solenoid valve	See ST2
SV2.2	Solenoid valve	See ST2
SV3.1	Solenoid valve	HM87M4013
SV3.2	Solenoid valve	HM87M4013
SV4.1	Solenoid valve	HM87M4013
SV4.2	Solenoid valve	HM87M4011
SV8	Solenoid valve	HM87M4013
SV9	Solenoid valve	HM87M4013
	Silencer for 18Y9 (1/4")	HM96D4019
NV1	Non return valve	HM87D4013
NV2	Non return valve	HM87D4013
NRV2.1	Non return valve	HM87D4013
O	Waste oil strainer	HM65D4005

ID according to Pipe diagram:	Description:	Spare part No.: (if wear part)
OL	Air strainer	HM65A4001
POV1	W.O valve	HM87M4016
	Silencer for POV1 (1/4")	HM96D4019
POV2	W.O valve	HM87M4016
	Silencer for POV2 (1/4")	HM96D4019
RV3	Pressure check valve	HM87D4015
PS1	Pressure switch	HM60P4001
PS3	Pressure switch	HM60P4007
PS2	Pressure switch	HM60P4005
PU1	Diesel oil pump	See PU1
PU2	Diesel oil pump	See PU2
PU3	W.O dosing pump	See section
RD	Regulation damper	See final drawing
RV1	Pressure control	See PU1
RV2	Pressure control	See PU2
PU1	Primary auxiliary burner	See section
PU2	Secondary auxiliary burner	See section
TC-1	Temp. sensor	HM60T4001
TC-2	Temp. sensor in funnel	HM60M4001
TC-3	Temp. sensor	HM60T4001
TR	Pressure regulator	HM60P4002
	Bracket for TR	HM60P4010
VH	Primary blower	-
Additional	Sight glass	HM68A4002
Components	Gasket for SG	HM86G4012
	Bracket for SG	HM20P4077
	Cover for SG	HM26P40111
	U-gauge	HM62M4010
SCV	Speed control valve	HM87N4005

6.2 DIESEL OIL BURNER



Pos.1	Protection cover	77S4060
Pos.2	Ignition transformer	57T4000
Pos.3	Flange unit	77S4053
Pos.4	Gasket for flange	77S4016
Pos.5	Flame funnel	77S4051
Pos.6	Ignition cable	77S4050
Pos.7	Electrode unit	77S4062
Pos.8	Electrode holder	77S4072
Pos.9	Nozzle holder	64F4020
Pos.10	Mixing disc	77S4014
Pos.11	Oil nozzle	64F See Ttable1.
Pos.12	Motor	80E See Table 2.
Pos.13	Coupling sleeve for motor	77S4057
Pos.14	Impeller	77S4059
Pos.15	Coupling	77S4055
Pos.16	Spring for burner insert	77S4054
Pos.17	Solenoid valve	87M4001
Pos.18	Pressure pipe	77S4052
Pos.19	Coupling sleeve for pump	77S4056
Pos.20	Oil pump	80PSee Table 3.
Pos.21	Flame detector	60F4009

Table. 1 Oil nozzle

Type	8M4(ST1)	8M6(ST2)
MAXI T50	64F4045G	64F4080G
MAXI T100	64F4045G	64F4090G
MAXI T150	64F4060G	64F4110G

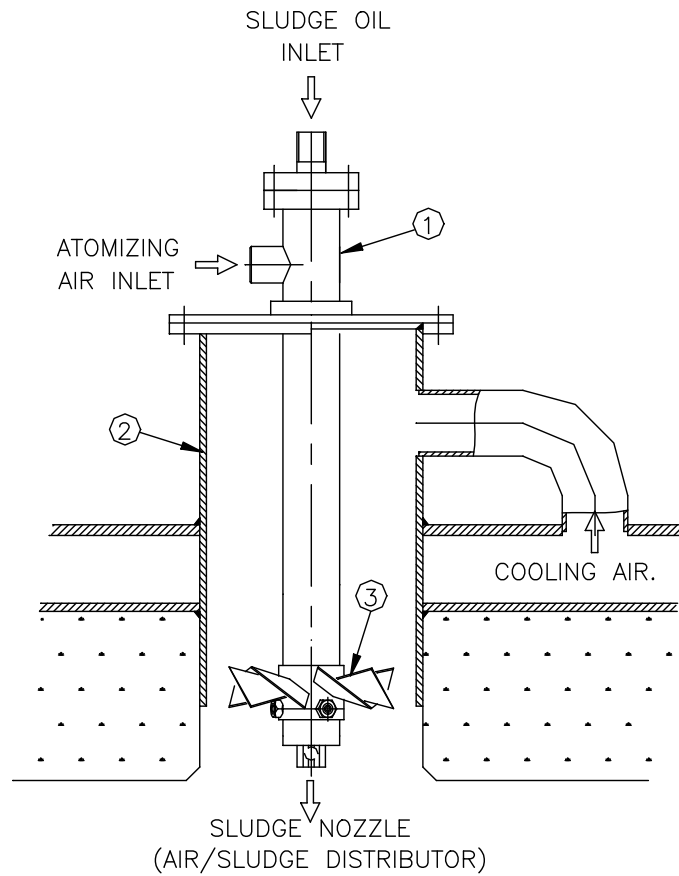
Table. 2 Motor

Type	8M4(ST1)	8M6(ST2)
NG25	80E4013-440	80E4013-440
MAXI T50	80E4020-440	80E4013-440
MAXI T100	80E4020-440	80E4013-440
MAXI T150	80E4020-440	80E4013-440

Table.3 Oil pump

Type	8M4(ST1)	8M6(ST2)
NG25	80P4004	80P4004
MAXI T50	80PAN77	80P4004
MAXI T100	80PAN77	80P4004
MAXI T150	80PAN77	80P4004

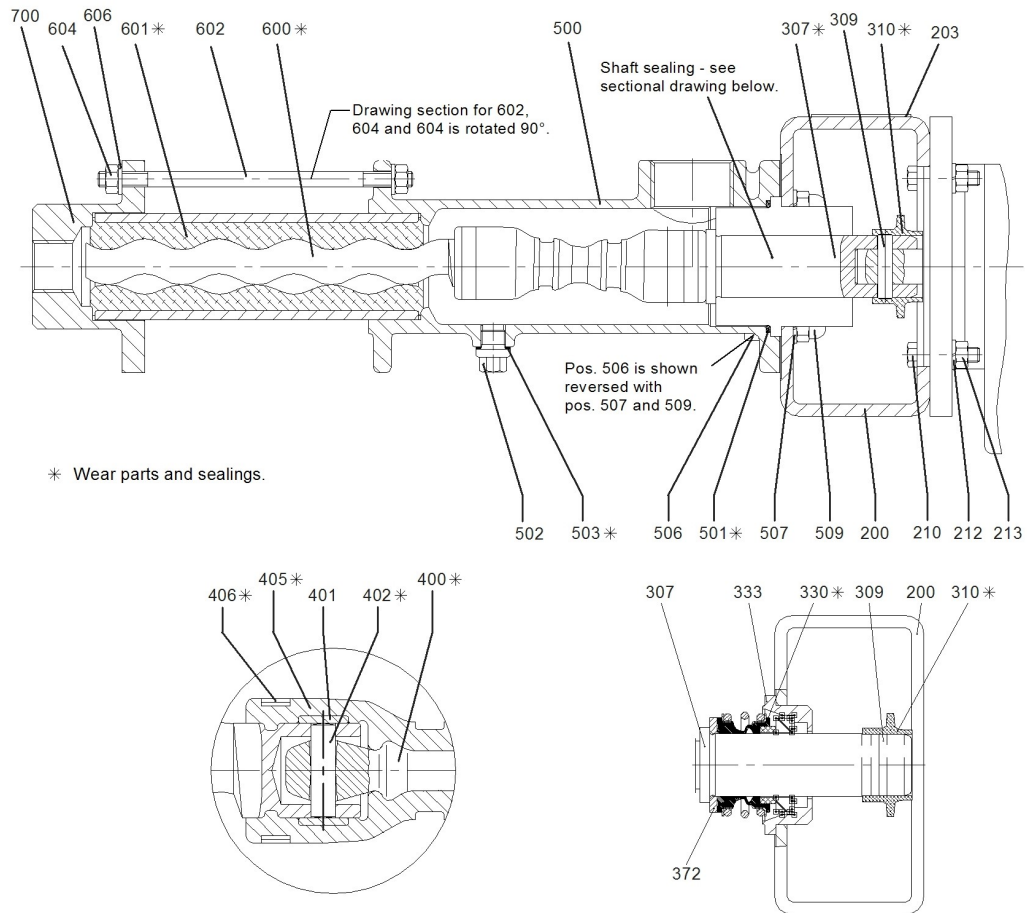
6.3 WASTE OIL BURNER (B)



ID according to drawing:	ID according to pipe diagram:	Description:	Spare part No.: (if wear part)
Pos. 1	B	W.O burner complete	HM20P2048
Pos. 2		Housing	HM20P2050
Pos. 3	-	Turbolator	HM20P2049

6.4 W.O DOSING PUMP

Sectional drawing of dosing pump



Spare Parts List

POS. NO.	PART NAME	Q'TY	SPARE PART NO.
-	DOSING PUMP + MOTOR	1	80P3997
-	SEPARATE PUMP	1	80P3929
-	SEPARATE MOTOR	1	80E4024
200	LANTERN	1	80P3994
203	RATING PLATE + RIVETS	1	80P3928
210	HEXAGON BOLT	4	80P3992
212	SPRING WASHER	4	80P3991
213	HEXAGON NUT	4	80P3990
307	PLUG-IN SHAFT	1	80P3984
309	PLUG-IN SHAFT PIN	1	80P3988
310	SPLASH RING	1	80P3987
330	MECHANICAL SEAL	1	80P4032
333	MECHANICAL SEAL CASING	1	80P3933
372	SUPPORT RING	1	80P3932
400	COUPLING ROD	1	80P3986
401	RETAINING SLEEVE	1	80P3985

POS. NO.	PART NAME	Q'TY	SPARE PART NO.
402	COUPLING ROD PIN	1	80P3984
405	UNIVERSAL JOINT SLEEVE	1	80P3983
406	HOLDING BAND	1	80P3982
500	SUCTION CASING	1	80P3981
501	CASING GASKET	1	80P3980
502	SCREW PLUG	1	80P3979
503	SEALING RING	1	80P3978
506	SOCKET SCREW	1	80P3977
507	SPRING WASHER	4	80P3976
509	CAP NUT	4	80P3975
600	ROTOR	1	80P3995
601	STATOR	1	80P3996
602	TIE BOLT	2	80P3974
604	HEXAGON NUT	2	80P3973
606	WASHER	2	80P3972
700	PRESSURE BRANCH	1	80P3968

7.ADDITIONAL COMPONENTS

7.1 MILL PUMP

The mill is a centrifugal pump with the impeller equipped with knives for comminuting the contents of the W.O tank, maximum particle size of comminution 6mm.

BEFORE SETTING TO WORK

Control direction of rotating (indicate on the pump casing) should be clockwise when looking at the el-motor.

Clean tank, suction and discharge pipe for metals. If the pump is made with bayonet locking, control that the pump is properly locked in the bayonet locking.

MAINTENANCE

Check the mechanical seal for leakages, and change it if necessary.
The pump will normally work without maintenance.

As regards check-up of the universal cutter please note that the cutter blades are to be armour-plated. When they are worn out, the armour-plating must either be renewed repaired.

TECHNICAL DATA

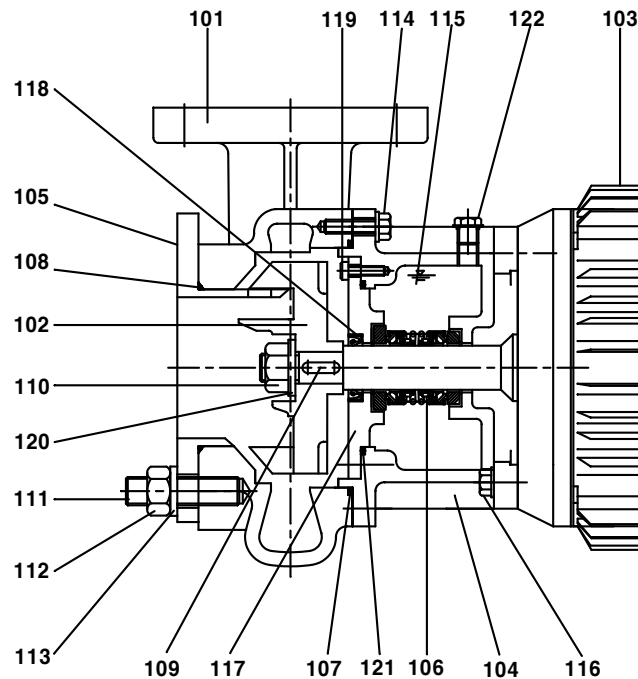
Is a centrifugal pump with the impeller equipped with knives for comminution content of the W.O tank. Max. particle size after comminution 6mm.

FOR 3 X 440 V - 60 CYCL.

Capacity	: 26 m ³ /hr and 15 m ³ /hr
Head	: 0.4 bar
Motor	: 3.7 Kw and 2.2 Kw / 3580 rpm / RT = 6.7 / 4.2 amp

MATERIAL SPECIFICATION

Pump cover	: Cast iron (GC 200)
Impeller	: Bronze castings (BC 6)
Spiral casting	: Cast iron (GC 200)
Cutter	: Bronze castings (BC 6)
Weight pump and motor	: Approx. 60 Kg

PART LIST**Complete part no. : 75K4018, 75K4019**

ITEM or POS.	COMPONENT	MATERIAL
101	PUMP CASING	GC 20
102	IMPELLER	BC 6
103	MOTOR	-
104	MOTOR BRACKET	GC 200
105	UNIVERSAL CUTTER	SS 400
106	DOUBLE MECHANICAL SEAL	SIC/SIC
107	CASING O-RING	VITON
108	SUCTION COVER O-RING	VITON
109	IMPELLER KEY	SM 45C
110	IMPELLER BOLT	SS 400
111	STUD BOLT	SS 400
112	HEX. NUT	SS 400
113	SPRING WASHER	SS 400
114	HEX. BOLT	SS 400
115	LUBRICATION	TURBINE OIL
116	HEX. BOLT	SS 400
117	SEAL COVER	GS 200
118	OIL SEAL	VITON
119	HEX. BOLT	SS400
120	SPRING WASHER	SS400
121	SEAL COVER O-RING	VITON
122	OIL GAUGE	AL

8. D.O SUPPLY SYSTEM

There are D.O trans pump or D.O tank for D.O SUPPLY SYSTEM and please see the P&ID on final drawing.

8.1 D.O TRANS PUMP

BEFORE SETTING TO WORK

Control direction of rotating (Indicate on the pump casing) should be counter-clockwise when looking at the el-motor.

FOR PROTECTION OF D.O. BURNER PUMP DRY RUNNING

For avoiding dry running, please full open all D.O. IN/OUTLET VALVE

During incinerator cooling time, as D.O burner pump continuously runs until 100℃ in furnace, please open D.O. IN/OUT V/V until primary blower stop. The burner motor and pump are as one body and dry running in oil pump is the cause of damage for the burner motor.

OPERATION NOTICE

For incinerator operation, the selector switch (RPB box or W.O tank control panel) for D.O trans pump to be set at auto position.

THE OPERATION OF D.O FLUSHING

D.O flushing is the function that W.O line cleans up by D.O and uses this function for approx. 3 min. in low temperature area or long dormant such as maintenance or dry dock.

MAINTENANCE

Check the oil seal for leakages, and change it if necessary.
The pump will normally work without maintenance.

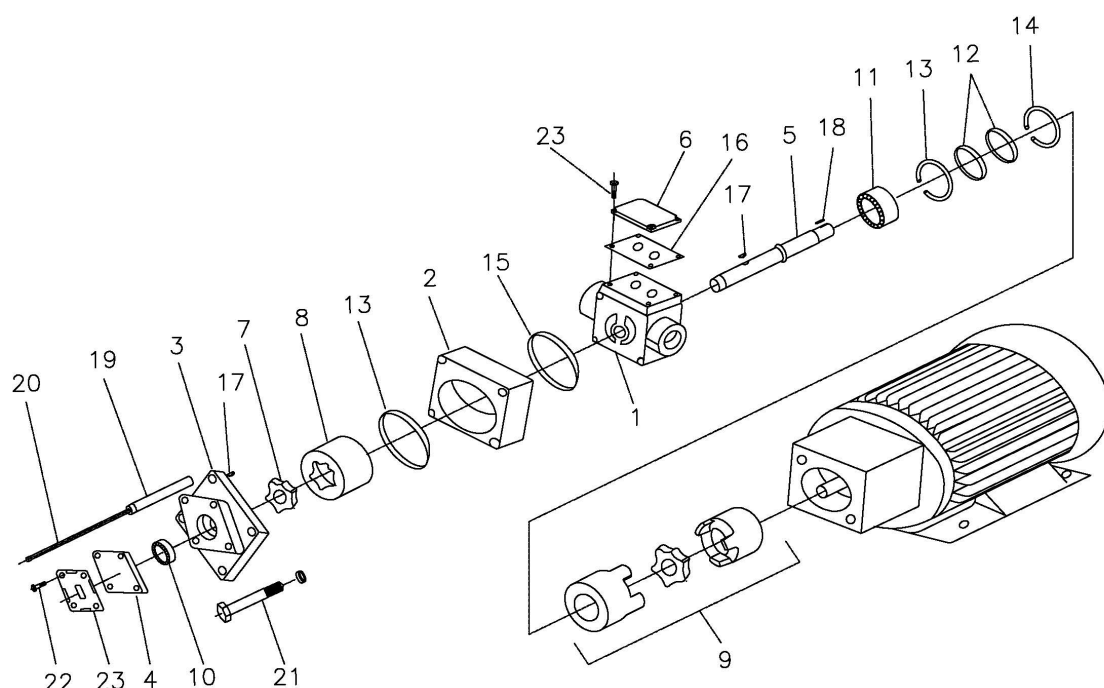
TECHNICAL DATA

FOR 3 X 440 V - 60 CYCL.

Capacity	: 450 L/hr
Head	: 3.0 bar
Motor	: 0.45 Kw / 1720 rpm / RT = 1.4 amp

MATERIAL SPECIFICATION

Pump cover	: Cast iron (FC 20)
Rotor	: SINTERED
Spiral casting	: Cast iron (FC 20)
Weight pump and motor	: Approx. 10 Kg

PART LIST**Complete part no. : 75K4020**

ITEM or POS.	COMPONENT	MATERIAL
1	PUMP BODY	FC20
2	CASING	FC20
3	BEARING COVER	FC20
4	FRONT COVER	FC20
5	SHAFT	S45C
6	BLIND COVER	FC20
7	INNER ROTER	SINTERED
8	OUTER ROTER	SINTERED
9	COUPLING	-
10	BEARING 6301	-
11	BEARING 6202	
12	OIL SEAL S15357	VITON
13	COLLAR	SPCCC
14	RETAINING RING	SUF3
15	O-RING N-56	NBR
16	GASKET	ASBESTOS
17	ROTER KEY	S45C
18	DRIVING KEY	S45C
19	PIPE COLLAR	STKM12C
20	HEX. BOLT WITH SW	SS41
21	HEX. BOLT WITH SW	SS41
22	HEX. BOLT	SS41
23	NAME PLATE	C2801.P

8.2 D.O TANK

D.O TANK WATER CLEANING

D.O burner pump which installed already, is trochoid pump type and sufficient lubrication action does not process enough when the water inflows. Therefore, D.O pump has been damaged and this matter is major cause of damage for burner motor

BEFORE SETTING TO WORK

The low level switch will be installed on D.O tank for prevention of dry running in D.O burner pump.

FOR PROTECTION OF D.O. BURNER PUMP DRY RUNNING

For avoiding dry running, please full open all D.O. IN/OUTLET VALVE

During incinerator cooling time, as D.O burner pump continuously runs until 100℃ in furnace, please open D.O. IN/OUT V/V until primary blower stop. The burner motor and pump are as one body and dry running in oil pump is the cause of damage for the burner motor.

MAINTENANCE

Check the oil seal for leakages, and change it if necessary.

The pump will normally work without maintenance.

THE OPERATION OF D.O FLUSHING

D.O flushing is the function that W.O line cleans up by D.O and uses this function for approx. 3 min. in low temperature area or long dormant such as maintenance or dry dock.



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