

DESIGNED BY

**DIESEL DRIVEN
CRUDE/PRODUCT OIL CARRIER**

ACADEMIA ASP

Hull No.
IMO NO.

This drawing is prepared as fitted plan.

DIAGRAMMATIC ARRANGEMENT
OF PIPING
IN MACHINERY SPACE
(INCLUDING CONTROL AIR PIPING)

AS-FITTED PLAN

REVISION	1		3	
	2		4	

SCALE	~
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HEAVY INDUSTRIES
MARINE & ENGINEERING
CONSTRUCTION MANAGEMENT DIVISION

船主	1	技術	計画		生管		建造S		KEC	船殻
監督		見積		計画S	工作		塗装S			艙装
機装員		性能開発			生革		事務所			ニチアス
本船	2	構造設計			工程		海務			ニツパク
NK		船装設計			加工		機電S			京浜自動
JG		機装設計		部品供給S	物流		機50			横工
LR		電装設計			サブ		機90			
ABS		調	購買		管工場		電装			
DNV		達	見積		集配		品証部長			
BV		製造本部長			大組		品証			船体
		設計部長		組立S	船装		機電			注文先
企画G		工作部長			機装		A/S			控
営業G		ドックマスタ			電装		業務G			合計
										3

FINISHED PLAN
FILING NO MF - 1777

TOTAL SHEETS (WITH COVER) **65**
A3 - 43
A4 - 22

DRAWN BY		DATE	01/2015
CHARGED BY		WORK NO.	
ACT. MANAG. OF SECTION		JOB GROUP	
MANAGER OF SECTION		CLASSIF.	—
GEN. MANAG. OF SECTION		DRAWING No.	MF - 1777

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**MACHINERY PARTICULAR LIST
(MOTOR SHIP)**

ITEM	TYPE	No.	CAPACITY	MOTOR	AUTO	REMARKS	MAKER
HULL							
Lpp x B x D x d			234.34m x 42m x 21.45m x 12.19/14.688m				
G.T. x D.W. x Vs			57997 x 86621.3/109990.6M.T. x 14.9/13.9K.T.				
CLASS/FLAG			LR-UMS, SCM, IWS / MALTA				
MAIN ENGINE							
ENGINE	DIESEL	1	6S60ME-C8.2, T/C : 1-MET60MB (HPT low load tuning)			FO:380cSt	mitsui
MCR			11000kW x 89.5rpm x 167.6g/kW/h x (44.3t/d)			NOx Tire II	
NOR			9900kW x 86.4rpm x 165.4g/kW/h x (39.3t/d)				
			Fuel oil consumption rate at Shop test : 167.2g/kW/h				
AUX.BLOWER		2		3565rpm x 51.8kW	ASS, RSS		mitsui
TURN.GEAR		1		1140rpm x 3.7kw			mitsui
START-UP HYD.O.P.		2		1764rpm x 25.6kW	ASS, RSS		mitsui
ENGINE CONTROL SYSTEM		1		1.4kW			mitsui
STEAM GENE.							
AUX.BOILER	W.TUBE	2	25,000kg/h, 1.6MPa x sat.	60deg.C (Feed W.temp)	ASS	OL-25	ALFA LAVAL
EXH.GAS ECONOMIZER	MONO	1	1,075kg/h, 0.7MPa x sat.				ALFA LAVAL
SHAFT							
PROPELLER	FPP	1	7.25mDIA (4BLADES)			SPARE:NIL	NAKASHIMA SHIN
PROP.SHAFT		1				SPARE:NIL	KURUSHIMA SHIN
INT.SHAFT		1					KURUSHIMA
STERN TUBE BRG.		1	OIL BATH TYPE, WHITE METAL BRG				KEMEL
STERN TUBE SEAL		1	4-AFT-SEAL (AIR SEAL TYPE) WITH NET STOPPER WITH DISTANCE RING			Biodegradable oil	KEMEL
GENERATORS							
MAIN D/G	DIESEL	3	880kW AC450V	Engine output 900rpm x 940kW	AST,RSS	6DK-20e Start/Stop HFO NOx Tire II	DAIHATSU
EMG. D/G	DIESEL	1	160kW AC450V	1800rpm x 186kW	ASS	AD086TI Batt.+Spring start, Gas oil	GPC
AIR COMPRESSOR							
MAIN AIR COMP.	E 3STG	2	152m3/h x 2.45MPa	1780rpm x 43kW	ASS, RSS	WP151L	J.P. SAUER
G/S.AIR COMP.	SCREW	1	200m3/h x 0.88MPa	3545rpm x 31kW	ASS	SC42-10MA60	J.P. SAUER
AIR RESERVOIR							
MAIN AIR RESERV.		2	5.8m3 x 2.45MPa				OHAMA
AUX.AIR RESERV.		1	0.1m3 x 2.45MPa				OHAMA
G/S.AIR RESERV.		1	2m3 x 0.88MPa				OHAMA

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**MACHINERY PARTICULAR LIST
(MOTOR SHIP)**

ITEM	TYPE	No.	CAPACITY	MOTOR	AUTO	REMARKS	MAKER
PUMP							
MAIN COOL.S.W.P.	EVC(M) (1-SP)	3	840m ³ /h x 20m	1760rpm x 75kW	ACO, RSS	FEWV-300D (FEWD-300DVK)	NANIWA
CENTRAL COOL.F.W.P.	EVC(M)	2	740m ³ /h x 25m	1760rpm x 75kW	ACO, RSS	FEWV-300D	NANIWA
JACKET COOL.F.W.P.	EVC(M)	2	125m ³ /h x 40m	1745rpm x 30kW	ACO, RSS	FEV-125-2D	NANIWA
M/E L.O.P.	EVC	2	310m ³ /h x 0.45MPa	1770rpm x 80kW	ACO, RSS	TOM-200-2	NANIWA
F.O.SUPPLY P.	EHS(M)	2	4.2m ³ /h x 0.5MPa	1735rpm x 3.7kW	ACO, RSS	SNH-80ER46	NANIWA
M/E F.O.BOOST.P.	EHS(M)	2	6.3m ³ /h x 0.7MPa	1745rpm x 5.5kW	ACO, RSS	SNH-120ER46	NANIWA
STERN TUBE L.O.P.	EHG(M)	2	1m ³ /h x 0.3MPa	1140rpm x 0.75kW	ACO, RSS	TLG-2M	NANIWA
G/E D.O.SUPPLY P.	EHS(M)	2	1.7m ³ /h x 0.7MPa	1720rpm x 2.2kW	ACO, RSS	SNH-40ER46	NANIWA
G/E F.O.CIRC.P.	EHG(M)	2	2.7m ³ /h x 0.5MPa	1140rpm x 2.2kW	ACO, RSS	ALGT-40CQ	NANIWA
G/E L.O.PRIM.P.	EHG	3	2.5m ³ /h x 0.2MPa	3300rpm x 0.94kW	ASS	Maker supply	DAIHATSU
G/E COOL.F.W.P.	MHC	3	36m ³ /h x 25m	ENGINE DRIVEN			DAIHATSU
H.F.O.TRANS.P.	EVG(M)	1	34m ³ /h x 0.35MPa	1150rpm x 11kW	ASS	ALGV-80B	NANIWA
D.O.TRANS.P.	EHS(M)	1	6m ³ /h x 0.35MPa	1735rpm x 3.7kW		SNH-120ER46	NANIWA
L.O.TRANS.P.	EHG(M)	1	5m ³ /h x 0.35MPa	1140rpm x 2.2kW		ALG-40N	NANIWA
FIRE/BILGE & G.S.P.	EVC (M) (SP)	2	125/140m ³ /h x 85/40m	3525rpm x 65kW	RSS	FGV-150EVK	NANIWA
BILGE P.	EHP	1	5m ³ /h x 30m	1130rpm x 1.5kW	RSP, ASP	HP-5	NANIWA
SLUDGE P.	EHM	1	4m ³ /h x 0.4MPa	1130rpm x 1.5kW	ASP, RSP	AE1E-50-ID	NANIWA
FRESH WATER P.	EVC(M)	2	10m ³ /h x 60m (Hydrophor unit)	3460rpm x 7.5kW	ASS	UH-1.5-2R	NANIWA
HOT WATER CIRC.P.	EHC(M)	1	2m ³ /h x 5m	1670rpm x 0.4kW		BHR-32	NANIWA
AUX.CONDR.COND.P.	EVC(M)	2	45m ³ /h x 35m	1740rpm x 15kW	ACO, RSS	FEDV-100E	NANIWA
AIR CLR.CLEAN.P.	AVP	1	1m ³ /h x 20m				
EMERG.FIRE P. CLEAN DRAIN DISCHARGE P.	EVC(SP)	1	72m ³ /h x 85m	1760rpm x 45kW		2FDDV-100VK	NANIWA
	EHC	1	5m ³ /h x 20m	3450rpm x 1.5kW		BHR-32	NANIWA
L.O. PURIF. FEED P. BOILER WATER SUPPLY P.	EHG(M)	2	2.2m ³ /h x 0.35MPa	1130rpm x 1.5kW		ALG-32N	NANIWA
	EHC(M)	1	4m ³ /h x 10m	3300rpm x 0.4kW	ASS	BHR-32	NANIWA
M/E FUEL VALVE LEAK OIL PUMP	EHS(M)	2	2m ³ /h x 0.2MPa	1710rpm x 1.5kW	ASS	SNH-40ER46	NANIWA
PURIFIER							
F.O.PURIFIER	E	2	2700lit/h	1740rpm x 7.5kW	AUTO	SJ35HH	MITSUBISHI KAKOKI
L.O.PURIFIER	E	2	1950lit/h	1745rpm x 5.5kW	AUTO	SJ25H	MITSUBISHI KAKOKI

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**MACHINERY PARTICULAR LIST
(MOTOR SHIP)**

ITEM	TYPE	No.	CAPACITY	MOTOR	AUTO	REMARKS	MAKER
VENT.FAN							
E/R VENT.FAN	E.AXIAL	2	1700m3/m x 400Pa	1165rpm x 30kW	RSS	AKA-1400 1set reversible	HI AIR KOREA
PURI.ROOM EXH.FAN	E.AXIAL	1	150m3/m x 400Pa	1720rpm x 2.2kW		AWA-560	HI AIR KOREA
E/G ROOM EXH. FAN	E	1	4m3/m				
WELD.SP.EXH.FAN	E	1					
STM.GENE.AUX.							
BLR. FEED WATER P.	EHC(M)	2	65m3/h x 225m	3525rpm x 90kW	ACO, RSS	EB4H-100	NANIWA
ECO.FEED WATER P.	EHC(M)	2	2.5m3/h x 225m	3470rpm x 18.5kW	ACO, RSS	EB4H-40	NANIWA
BOILER W.CIRC.P.	EHC(M)	2	27m3/h x 35m	3440rpm x 5.5kW	ACO, RSS	BBH-65DMW	NANIWA
AUX. BLR F.O.BURN.P.	EHS(M)	2	8m3/h x 2.5MPa	1730rpm x 11kW	ACO, RSS	SNH-120ER51	NANIWA
AUX. BLR MGO.BURN.P.	EHS(M)	2	8m3/h x 2.5MPa	1740rpm x 15kW	ACO, RSS	SNH-210ER40	NANIWA
PILOT OIL P.	EHG	2	0.061m3/h x 1.4MPa	3500rpm x 0.22kW	ASS	Maker supply	ALFA LAVAL
COMBUSTION AIR FAN	EHC	2	460m3/m x 6.2kPa	3552rpm x 87.3kw	ASS	Maker supply	ALFA LAVAL
COOLER							
M/E AIR COOLER	H.TUBE	1		231m3/h(FW)		Attached M/E Titanium with inner filter	MITSUI
CENTRAL F.W.COOLER	PLATE	2	450m3/h x 49.9/38deg.C(FW)	435m3/h(SW)	ATC		HISAKA
M/E L.O.COOLER	PLATE	1	310m3/h x 51.7/45deg.C(LO)	140m3/h(FW)	ATC	SUS	HISAKA
BLR W.SAMPLING CLR		1				Maker supply	ALFA LAVAL
M/E M.G.O.COOLER	PLATE	1	6.3m3/h x 49/40deg.C(MGO)	12m3/h(FW)		SUS	HISAKA
G/E M.G.O.COOLER	PLATE	1	1.7m3/h x 60/40deg.C(MGO)	6m3/h(FW)		SUS	HISAKA
BLR M.G.O.COOLER	PLATE	1	8m3/h x 50/45deg.C(MGO)	8m3/h(FW)		SUS	HISAKA
CONDENSER							
ATMOS.CONDENSER	H.TUBE	1	2410/24070kg/h(STEAM/DRAIN)	110m3/h(FW)			SHOWA
AUX.CONDENSER	H.TUBE	1	41100kg/h(STEAM)	1100m3/h(SW)			SHOWA
AIR EJECTOR	Twin SGL	1	73kPa_Vacuum	20m3/h(SW)		NEOPRENE LINING	DONGHWA
HEATER							
M/E F.O.HEATER	H.TUBE	2	6300lit/h x 110/140deg.C	0.63MPaG_stm	AVC / ATC	MODEL 200-1000	DONGHWA
G/E F.O.HEATER	H.TUBE	1	2700lit/h x 119/140deg.C	0.63MPaG_stm	AVC / ATC	MODEL 150-800	DONGHWA
PURI.F.O.HEATER	H.TUBE	2	2700lit/h x 55/100deg.C	0.63MPaG_stm	ATC	MODEL 125-900	DONGHWA
PURI.L.O.HEATER	H.TUBE	2	1950lit/h x 40/90deg.C	0.63MPaG_stm	ATC	MODEL 125-800	DONGHWA
BOILER F.O.HEATER	H.TUBE	2	4128lit/h x 55/145deg.C	0.81MPaG_stm	ATC	Maker supply	ALFA LAVAL
M/E JACKET PRE-HEATER	H.TUBE	1	1m2	0.81MPaG_stm			SHOWA

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**MACHINERY PARTICULAR LIST
(MOTOR SHIP)**

ITEM	TYPE	No.	CAPACITY	MOTOR	AUTO	REMARKS	MAKER
F.W.GENERATOR							
F.W.GENE.		1	30ton/day without steam injector			KM30	SASAKURA
DISTILLED W.P.	EHC	1	2.5m3/h x 30m	3450rpm x 1.5kw		Maker supply	SASAKURA
EJECTOR P.	EHC	1	24m3/h x 39m	3450rpm x 5.5kw		Maker supply	SASAKURA
W/S MACHINE							
LATHE	E	1	C.D.=1000mm	1710rpm x 2.2kw		KL36B-100	KUSAKABE KIKAI
DRILLING MACHINE	E	1	DRILL=38mm	1720rpm x 1.5kw		KD-38	KUSAKABE KIKAI
TOOL GRINDER	E	1	205mm	3600rpm x 0.4kw		SY205S	YODOGAWA
WELDING MACHINE	E	1	300AMP				OTC DAIHEN WATARI
WELDING MACHINE	GAS	1	1-O2, 1-ACETYLENE				SHOKAI
MISCELLANEOUS							
OVERHEAD CRANE	E	1	4.0ton Hoist=3m/min Travel=5m/min Traverse=3m/min	3kW 0.2/0.2kW 0.75kW		CARGO GEAR CERTIFICATE	SEKIGAHARA
BILGE SEPARATOR		1	5m3/h (15ppm)		with alarm	USH-50	TAIKO
INCINERATOR		1	810kW	0.1/18.5kW		VIM-70	VOLCANO
CONTROL AIR DRYER	REF.	1	100m3/h	0.5kW		NH-F100NA- T440, R407C	NIHONSEIKI
C/R UNIT COOLER	E.PACK	1	10kW	3.0/0.4kW		USP3H, R407C	DAIKIN
STERILIZER	UVR	1	2000 Litter/h	0.09kW		L-N201F	NIPPON CONTROLS
CALORIFIER	H.TUBE & ELEC.	1	2m3/h x 10/60deg.C	0.63MPaG_stm 15kW	ATC	TTSEU-300	TOYO DENNETSU
F.O. VISCOSITY / TEMP. CONTROLLER		2	For M/E & G/E				NAKAKITA KANAGAWA KIKI
M/E F.O.2ND FILTER	Back w	1	15micron nom.		AUTO B/W		KANAGAWA KIKI
G/E F.O.2ND FILTER	Back w	1	10micron nom.		AUTO B/W		KANAGAWA KIKI
M/E L.O.2ND FILTER	Back w	1	40micron abs.		CONTINUOUS		KANAGAWA KIKI
SHAFT EARTH DEVICE		1	with milivolt meter			2-SLIP RINGS	NIPPON CORROSION
SILENCER		3	FOR G/E				DAIHATSU
SPARK ARREST.NET		6	FOR M/E, G/E, BOILER & INCINE.				
M.G.P.S.	Cu-Fe	1	2000m3/h, ELECT.CELL TYPE			DEFECURON	NIPPON CORROSION

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**MACHINERY PARTICULAR LIST
(MOTOR SHIP)**

ITEM	TYPE	No.	CAPACITY	MOTOR	AUTO	REMARKS	MAKER
P/R AUXILIARIES							
CARGO OIL PUMP	SVC(M)	3	2500m3/h x 150m 1650rpm x 1220kW (SG=1.025)	1.42MPaG steam 67kPa vacuum	RSC	KV400 / RX1	SHINKO
AUTO. UNLOAD. SYSTEM			3-VAC. PUMP, 3-SEPARATOR TANK	1150rpm x 11kW		for cargo oil p.	SHINKO
WATER BALLAST PUMP	EVC(M)	2	1000/1500m3/h x 35/30m	1175rpm x 185kW	RSS	CV350	SHINKO
CARGO STRIPPING PUMP	SVP	1	150m3/h x 130m	1.42MPaG steam	RSC	KPH150	SHINKO
TANK CLEAN.HEATER	H.TUBE	1	120m3/h x 20/70deg.C	0.81MPaG steam	ATC		SHOWA
CARGO OIL TURBINE L.O. P.		3	8.0m3/h	TURBINE DRIVEN		attach. turbine	SHINKO
CARGO OIL TURBINE L.O. PRIMING P.		3	7.2m3/h	3355rpm x 1kW	ASS	attach. turbine	SHINKO
I.G.S.							
INERT GAS SYSTEM		1	9400m3/h				ALFA LAVAL
I.G.FAN	EHC	2	4700m3/h x 18.6kPa	3565rpm x 55kW	RSS	Maker supply	ALFA LAVAL
I.G.SEAL. W. P.	EHC(M)	2	5m3/h x 30m	3460rpm x 2.2kW	ACO, RSS	BHR-40	NANIWA
I.G.SCRUBBER S.W.P.	EVC(M)	1	140m3/h x 40m	3520rpm x 30kW	RSS	FGV-150E	NANIWA

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ABBREVIATIONS FOR "TYPE" OF PUMPS

○□△(×) Example; EHS(M) : Electric motor driven, Horizontal, Screw and Mechanical seal type.

○	E : Electric motor driven S : Steam driven A : Air driven M : Engine driven
□	V : Vertical H : Horizontal
△	C : Centifugal S : Screw G : Gear M : Mono P : Piston
×	SP : Self-priming M : Mechanical seal

**MACHINERY PARTICULAR LIST
(MOTOR SHIP)**

ITEM	TYPE	No.	CAPACITY		AUTO	REMARKS	MAKER
			100% FULL (Nominal)				
F.O.TANK							
H.F.O.SETT.TK.	HULL	1	53.3m3 (36 m3)	with heating coil	ATC,ALC		
H.F.O.SERV.TK.	HULL	1	36.1m3 (25 m3)	with heating coil			
D.O.SERV.TK.	HULL	1	29.4m3 (20 m3)				
F.O.OVERFLOW TK.	HULL	1	21.5m3 (12 m3)	with heating coil			
EMG.G/E F.O.TK.	HULL	1	1.2m3 (1 m3)				
PILOT BURN. D.O. TK.		1	0.22m3 (0.2 m3)				
M/E FUEL VALVE LEAK OIL TK.		1	0.75m3 (0.5 m3)	with heating coil	ALC		
L.O.TANK							
M/E L.O.SUMP TK.	D.B.	1	25.1m3 (22 m3)	with back wash oil drain space			
M/E L.O.STORAGE TK.	HULL	1	36.2m3 (22 m3)				
M/E L.O.SETTLING TK.	HULL	1	36.2m3 (22 m3)	with heating coil			
NO.1 CYL.OIL STOR.TK.	HULL	1	34.0m3 (10m3)				
NO.2 CYL.OIL STOR.TK.	HULL	1	67.6m3 (43 m3)				
S/T L.O.SUMP TK.	D.B.	1	2.6m3 (1.6 m3)				
FWD SEAL OIL TK.		1	(0.02m3)				KEMEL
G/E L.O.SUMP TK.		3	(1.4m3)			attach. G/E	DAIHATSU
G/E L.O.STORAGE TK.		1	6.8m3 (6.5 m3)				
G/E L.O.SETTLING TK.		1	1.7m3 (1.6 m3)	with heating coil			
G/E L.O.OVERFLOW TK.	HULL	1	2.1m3 (2 m3)				
TURBINE OIL STORAGE TK.		1	1.1m3 (1 m3)				
COPT L.O.SUMP TK.		3	(0.27m3)			attach. turbine	SHINKO
S/T L.O. PRESS. TK.		1	(0.1m3)				KEMEL
S/T DRAIN COLLECTION TK.		1	(0.01m3)				KEMEL
WATER TANK							
COOL.F.W.EXP.TK.		1	1.2m3 (1 m3)				
FEED FILTER TK		1	8.7m3 (8.5 m3)	with steam injector	Auto.supply		
INSPECTION TK		1	0.65m3 (0.5 m3)				
FRESH W. HYD.TK.		1	(1.5m3)				NANIWA
BILGE / OTHER TANK							
BILGE TK.	D.B.	1	22.7m3 (19 m3)				
DIRTY BILGE TK.	D.B.	1	34.1m3 (24 m3)	with heating coil			
WASTE OIL TK.		2	1.4m3 (1 m3)	with heating coil	ATC,ALC(H)		VOLCANO
F.O.SLUDGE TK.		1	1.7m3 (1.5 m3)	with heating coil			
L.O.SLUDGE TK.		1	1.7m3 (1 m3)	with heating coil			
AIR CLR.CHEMICAL TK.		1	0.42m3 (0.3 m3)				
ECO. WASHING DRAIN TK.		1	4.4m3 (4 m3)				
CLEAN DRAIN TANK	D.B.	1	34.1m3 (27 m3)				

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







SYMBOLS FOR PIPING SYSTEM IN MACHINERY PART

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
	CROSSING PIPES NOT CONNECTED		STOP VALVE		DIAPHRAGM OPERATED VALVE WITH POSITIONER
	CROSSING PIPES CONNECTED		THREE-WAY VALVE		DIAPHRAGM OPERATED VALVE WITH POSITIONER & HANDLE
	TEE PIPE		LIFT CHECK VALVE		THREE-WAY DIAPHRAGM OPERATED VALVE
	STEAM TRACED LINE		SCREW DOWN STOP CHECK VALVE		THREE-WAY DIAPHRAGM OPERATED VALVE WITH POSITIONER
	FLEXIBLE TUBE		SWING CHECK VALVE		THREE-WAY DIAPHRAGM OPERATED VALVE WITH POSITIONER & HANDLE
	BELLOWS TYPE EXPANSION JOINT		PRESSURE REDUCING VALVE		STORM VALVE
	BLANK FLANGE		SAFETY VALVE		STORM VALVE WITH HANDLE
	SPECTACLE FLANGE (NORMALLY CLOSE)		SELF CLOSING VALVE		BALL VALVE FLANGED END
	SPECTACLE FLANGE (NORMALLY OPEN)		BUTTERFLY VALVE		THREE-WAY BALL VALVE FLANGED END
	SELF CLOSING VALVE WITH WEIGHT		HYD.OPERATING BUTTERFLY VALVE		STOP VALVE SCREWED END
	GATE VALVE		MOTOR OPERATING BUTTERFLY VALVE		COCK
	HOSE VALVE		GATE VALVE		THREE-WAY COCK (L-PORT)
	DISC TYPE CHECK VALVE		HOSE VALVE		THREE-WAY COCK (T-PORT)
	NEEDLE VALVE		DISC TYPE CHECK VALVE		LOCKED COCK
	RELIEF VALVE		NEEDLE VALVE		SELF CLOSING COCK
	EMERGENCY SHUT OFF VALVE		RELIEF VALVE		COCK SCREWED END
	MOTOR OPERATED VALVE		EMERGENCY SHUT OFF VALVE		THREE-WAY PISTON VALVE
	AIR PISTON VALVE		MOTOR OPERATED VALVE		THREE-WAY SOLENOID VALVE
	AIR PISTON CHECK VALVE		AIR PISTON VALVE		DIAPHRAGM VALVE
	AIR PISTON VALVE WITH HANDLE		AIR PISTON CHECK VALVE		EDUCTOR
	AIR PISTON BUTTERFLY VALVE		AIR PISTON VALVE WITH HANDLE		OIL HYDRAULIC REMOTE OPERATED BUTTERFLY VALVE (OPENING CONTROL)
	SOLENOID VALVE		AIR PISTON BUTTERFLY VALVE		OIL HYDRAULIC REMOTE OPERATED BUTTERFLY VALVE (OPEN-SHUT CONTROL)
	AIR MOTOR VALVE		SOLENOID VALVE		CHECK VALVE WITH SPRING
	DIAPHRAGM OPERATED VALVE		AIR MOTOR VALVE		VACUUM BREAKER
	WATER CHECK VALVE (BATA-CHECK VALVE)		DIAPHRAGM OPERATED VALVE		WATER CHECK VALVE (BATA-CHECK VALVE)

SYMBOLS FOR PIPING SYSTEM IN MACHINERY PART

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
	ROSE BOX		BOSS		THRMMOMETER		
	MUD BOX		BOSS AND PLUG		PRESSURE GAUGE		
	SIMPLEX OIL STRAINER				COMPOUND GAUGE		
	SIMPLEX WATER STRAINER		BONNET TYPE AIR VENT HEAD WITHOUT WIRE NET		VACCUUM GAUGE		
	DUPLEX OIL STRAINER		BONNET TYPE AIR VENT HEAD WITH WIRE NET		DIFFERENCIAL PRESSURE GAUGE		
	DRAIN TRAP						
	Y-TYPE STRAINER		BELLMOUTH				
	HOPPER WITHOUT CAP		STEAM JACKETED BELLMOUTH				
	HOPPER WITH CAP						
	SOUNDING HEAD WITH CAP		GLASS LEVEL GAUGE WITH VALVE AND SELF CLOSING VALVE				
	SOUNDING HEAD WITH SELF CLOSING VALVE		GLASS LEVEL GAUGE WITH SELF CLOSING VALVE				
	SCUPPER		GLASS LEVEL GAUGE WITH VALVE AT BOTH END				
	ORIFICE		GLASS LEVEL GAUGE WITH VALVE				
	HOSE COUPLING		FLAT TYPE GLASS LEVEL GAUGE WITH SELF CLOSING VALVE AT BOTH END				
	HAND PUMP		FLAT TYPE GLASS LEVEL GAUGE WITH SELF CLOSING VALVE AT LOWER END				
	BILGE HAT		DIAPHRAGM TYPE LEVEL GAUGE				
	SIGHT GLASS						
	FUSIBLE PLUG		FLOAT LEVEL GAUGE (OUTER FLOAT TYPE)				
	FLOW METER						
	SACRIFICIAL PIPE		FLOAT LEVEL GAUGE (INNER FLOAT TYPE)				
			FLOAT LEVEL GAUGE (DIRECT ACTING TYPE)				

SYMBOLS FOR PIPING SYSTEM IN MACHINERY PART

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
	CONTROL AIR LINE		REMOTE INSTALLATION	RA	RUNNING FAILURE ALARM
	CAPILLARY TUBE		REMOTE INSTALLATION ON LCD MONITOR	A	ABNORMAL ALARM
	ELECTRIC WIRING			RI	REVOLUTION INDICATOR
		TI	TEMPERATURE INDICATOR	SI	STROKE COUNTER
	PRESSURE SWITCH	TAH	TEMPERATURE ALARM HIGH		
	TEMPERATURE SWITCH	TAL	TEMPERATURE ALARM LOW	VsAH	VISCOSITY ALARM HIGH
	MAGNET FLOAT SWITCH	TTAH	TRIP ALARM BY HIGH TEMPERATURE	VsAL	VISCOSITY ALARM LOW
	LIMIT SWITCH	PI	PRESSURE INDICATOR	Sml	SMOKE INDICATOR
	FLOAT SWITCH	PAH	PRESSURE ALARM HIGH	SmAH	SMOKE HIGH DENSITY ALARM
	DIFFERENTIAL PRESSURE SWITCH	PAL	PRESSURE ALARM LOW		
	FLOW SWITCH	PTAL	TRIP ALARM BY LOW PRESSURE	CLI	SALINITY INDICATOR
	TRANSMITTER	Pdl	DIFFERENTIAL PRESSURE INDICATOR	RHI	RUNNING HOUR INDICATOR
	MAKER SUPPLY	PdAH	DIFFERENTIAL PRESSURE ALARM HIGH	FREQ	FREQUENCY OPERATION ALARM
	TANK SIPHON	LI	LEVEL INDICATOR	MTI	MEAN TEMPERATURE INDICATOR
	SALINITY CELL	LAH	LEVEL ALARM HIGH	DTAH	DEVIATION TEMPERATURE ALARM HIGH
	DAMPER	LAL	LEVEL ALARM LOW	MAH	MIST ALARM HIGH
RSC	REMOTE SPEED CONTROL	LAHH	LEVEL ALARM VERY HIGH (OVER FILL ALARM)	OzI	O2 INDICATOR
RSS	REMOTE START & STOP	LALL	LEVEL ALARM VERY LOW	OzAH	O2 ALARM HIGH
RST	REMOTE START	FI	FLOW COUNTER	OzAHH	O2 ALARM VERY HIGH
RSP	REMOTE STOP	FAL	FLOW ALARM LOW	OR	O2 RECORDER
ASS	AUTOMATIC START & STOP	FAN	NON FLOW ALARM		
AST	AUTOMATIC START	GLAH	SALINITY ALARM HIGH	AVC	AUTOMATIC VISCOSITY CONTROL
ASP	AUTOMATIC STOP	OO	OPEN INDICATING LAMP	ATC	AUTOMATIC TEMPERATURE CONTROL
ARS	AUTOMATIC RESTART	OS	SHUT INDICATING LAMP		
ACO	AUTOMATIC CHANGE OVER	R	RUNNING INDICATING LAMP		

MARKS AND DEFINITION OF PIPE TO BE AS FOLLOWS:

SGP	"ELECTRIC WELDING (SGP-E) OR BUTT WELDED (SGP-B) CARBON STEEL PIPE" HAVING MINIMUM TENSILE STRENGTH OF 290 N/mm ² AND MINIMUM ELONGATION OF 30% (JIS G3452,SGP)
STPG 370	SGP-E TO BE USED IN GENERAL, HOWEVER, FOR PIPES OF 100 mm AND BELOW IN NOMINAL DIA., SGP-B MAY BE ADOPTED AT THE BUILDER'S DISCRETION. "ELECTRIC WELDING (STPG 370-E) OR HOT DRAWN SEAMLESS (STPG 370-S) CARBON STEEL PIPE" HAVING MINIMUM TENSILE STRENGTH OF 370 N/mm ² AND MINIMUM ELONGATION OF 30% (JIS G3454,STPG 370)
STPY 400	"ELECTRIC WELDING CARBON STEEL PIPE" HAVING MINIMUM TENSILE STRENGTH OF 400 N/mm ² FOR LARGE BORE (JIS G3457, STPY 400 OR EQUIVALENT)
STPT 410	"HOT DRAWN SEAMLESS CARBON STEEL PIPE"(FOR HIGH TEMPERATURE SERVICE) HAVING MINIMUM TENSILE STRENGTH OF 410 N/mm ² AND MINIMUM ELONGATION OF 25% (JIS G3456,STPT 410)
SS400P	"ELECTRIC WELDING CARBON STEEL PIPE" HAVING MINIMUM TENSILE STRENGTH OF 400 N/mm ² FOR LARGE BORE (JIS G3101, SS400P)
C1220T	"PHOSPHORUS-DEOXIDIZED COPPER SEAMLESS PIPE" (C1220T) HAVING MINIMUM TENSILE STRENGTH OF 205 N/mm ² AND MINIMUM ELONGATION OF 40% (JIS H3300, C1220T)
C6871T	"BRASS FOR CONDENSER TUBE" (ALUMINUM BRASS) HAVING MINIMUM TENSILE STRENGTH OF 375 N/mm ² AND MINIMUM ELONGATION OF 40% (JIS H3300, C6871T OR EQUIVALENT)
SUS304TP	"AUTOMATIC ARC WELDING (SUS304TP-A) OR SEAMLESS (SUS304TP-S) STAINLESS STEEL PIPE " HAVING MINIMUM TENSILE STRENGTH OF 520N/m ² .
SUS316TP	"AUTOMATIC ARC WELDING (SUS316TP-A) OR SEAMLESS (SUS316TP-S) STAINLESS STEEL PIPE " HAVING MINIMUM TENSILE STRENGTH OF 520N/m ² .

MARKS AND DEFINITION OF MATERIAL, TREATMENT, ETC. TO BE AS FOLLOWS:

MARKS	DEFINITION	MARKS	DEFINITION
SS400P	MILD STEEL	G	GALVANIZED
S25C	CARBON STEEL	SAN	CLEANED BY PICKLING
C3604B	FREE CUTTING BRASS ROD	PA	PARKERIZING
FC	CAST IRON	P.COAT	PURE EPOXY COATING
SC	CAST STEEL	P.LIN	POLYETHYLENE LINING
SF	FORGED STEEL	M.COAT	MODIFIED EPOXY COATING
SUS	STAINLESS STEEL	AL.DIP	DIPPED WITH ALUMINUM
BC	BRONZE	W.P.	WORKING PRESSURE
MI	MALLEABLE IRON	W.C.	WORKING CONDITION
C.STEEL	CARBON STEEL	FCD	SPHERICAL GRAPHITE IRON CASTING (ELONGATION ≥ 12%)
PVC	POLYVINYL CHLORIDE		

SPECIAL REQUIREMENT:

LENGTH OF STEEL PIPE (EXCLUDING SLEEVE JOINT) IS TO BE LESS THAN 5m.
HEATING COIL IS ARRANGED ALL OVER THE BOTTOM AREA FOR HFO SERV. TANK.
PLAIN TUBE IS APPLIED FOR HEATING OIL OF HFO SETT. TANK.
HEATING COIL RATIO IS 0.1m ² /m ³ FOR FO OVERFLOW TANK.

THICKNESS OF STEEL PIPE

NOMINAL DIAMETER (mm)	(INCH)	EXTERNAL DIAMETER (mm)	THICKNESS(mm)	
			SGP	STPG370
6	1/8	10.5	2.0	1.7
8	1/4	13.8	2.3	2.2
10	3/8	17.3	2.3	2.3
15	1/2	21.7	2.8	2.8
20	3/4	27.2	2.8	2.9
25	1	34	3.2	3.4
32	1-1/4	42.7	3.5	3.6
40	1-1/2	48.6	3.5	3.7
50	2	60.5	3.8	3.9
65	2-1/2	76.3	4.2	5.2
80	3	89.1	4.2	5.5
100	4	114.3	4.5	6.0
125	5	139.8	4.5	6.6
150	6	165.2	5.0	7.1
200	8	216.3	5.8	8.2
250	10	267.4	6.6	9.3
300	12	318.5	6.9	10.3
350	14	355.6	7.9	9.5*
400	16	406.4	6.4*7.9	9.5*
450	18	457.2	6.4*7.9*	9.5*
500	20	508	6.4*7.9*	9.5*
550	22	558.8	6.4*7.9*	9.5*
600	24	609.6	6.4*7.9*	9.5*
650	26	660.4	6.4*7.9*	9.5*
700	28	711.2	6.4*7.9*	9.5*
750	30	762.2	7.9*	9.5*

NOTE : PIPES MARKED * TO BE STPY400.

(6.4mm THICK FOR EXHAUST GAS, 7.9mm FOR SEA WATER PIPING)

THICKNESS OF STEEL PIPE (SS400P) FOR EXH.GAS PIPING

NOMINAL DIA. (mm)	EXTERNAL DIA. (mm)	THICKNESS (mm)
1350	1371.6	6.0
1300	1312.0	6.0
950	962.0	6.0

THICKNESS OF COPPER PIPE

NOMINAL DIA. (mm)	EXTERNAL DIA. (mm)	THICKNESS (mm)
4	6	1.0
6	10	1.0
10	15	1.2
15	20	1.2
20	25	1.5
25	30	1.5
32	35	1.5
40	42	2.0
50	55	2.0

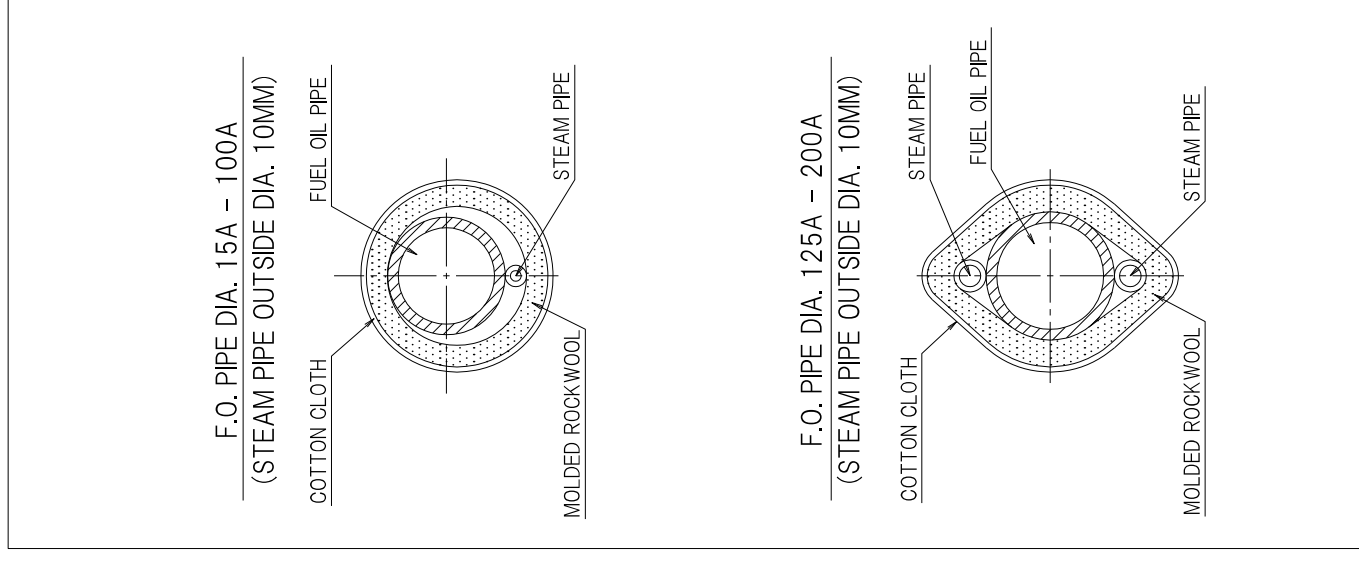
THICKNESS OF PVC PIPE

NOMINAL DIA. (mm)	EXTERNAL DIA. (mm)	THICKNESS (mm)
16(15)	22	3.0
20	26	3.0
25	32	3.5
30(32)	38	3.5
40	48	3.6
50	60	4.1

SCHEME OF STEAM TRACING FOR FUEL OIL PIPE

ATTACHMENT OF FLANGE

TYPE	SLIP-ON	SLIP-ON	SLIP-ON	BUILT-UP	SLIP-ON
MATERIAL	SS400	5.10k : S20C 16k : S25C OR SF440A	S25C OR SF440A	YBSC1 & SS400	SS400
APPLIED RATING&SIZE	5k (400 & BELOW) 10k (200 & BELOW)	5k (450 - 1000) 10k (250 - 800) 16k	20k (600 & BELOW) 30k (400 & BELOW)	5k & 10k	EXH. GAS FLANGE (550 & ABOVE)
SKETCH	"A" 	"B" 	"C" 	"D" 	"E"
TYPE	UNION-JOINT	SLEEVE		SLIP-ON	SOKET
MATERIAL	C3604B	CARBON STEEL		SS400	PVC
APPLIED RATING&SIZE				5k 10k (25 & BELOW)	5k (50 & BELOW)
SKETCH	"F" 	"G" 		"I" 	"J"
TYPE	SOKET	UNION-JOINT			
MATERIAL	PVC	S45C			
APPLIED RATING&SIZE	JIS K 6739 JIS K 6743 5k (50 & BELOW)				
SKETCH	"K" 	"L" 			



SERVICE	PIPES				FLANGE		DESIGN PRESS. (MPa)	PIPE HYD. TEST PRESS. (MPa)		VALVES			GASKET		INSULATION OF PIPING			
	SYSTEM NO.	MATERIAL JIS MARK	THICKNESS	PIPE CLASS	TREATMENT	APPL. JIS		MATERIAL	TYPE	NOMINAL DIA.(M/M)	MATERIAL OF BODY	MATERIAL OF SEAT	RATING (JIS)	MATERIAL	MATERIAL	MATERIAL	REMARKS	
H.P. STEAM	SX0	STPG370-S	#40	1		20K	S25C or SF440A	SLIP-ON "C"	1.8	1.5 D.P.	W.C.	20K	SUS	SPRAL-WOUND ASBESTOS FREE GASKET	ROCKWOOL	ONLY FOR HOT PART DANGEROUS TO TOUCH		
	SX4	SGP				5K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"			W.C.			METAL INSERTED GRAPHITE GASKET	GLASS CLOTH			
	SX5	STPG370-S	#40	1		20K	S25C or SF440A	SLIP-ON "C"	1.8	1.5 D.P.	W.C.			SPRAL-WOUND ASBESTOS FREE GASKET	ROCKWOOL			
	SX8	C1220T					C3604B	UNION "F"			W.C.	COCK D ≤ 10	BC					
	SX9	STPG370-S	#40	1		20K	S45C	UNION "F"			W.C.	SUS	SUS					
						10K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"										
						10K	SS400P C3STEEL	SLIP-ON "A" SLEEVE "G"										
						10K	SS400P C3STEEL	SLIP-ON "A" SLEEVE "G"										
						10K	SS400P C3STEEL	SLIP-ON "A" SLEEVE "G"										
						10K	SS400P C3STEEL	SLIP-ON "A" SLEEVE "G"										
STEAM	SY0	STPG370-S	#40	2		10K	SS400P C3STEEL	SLIP-ON "A" SLEEVE "G"	0.99	1.5 D.P.	W.C.			METAL INSERTED GRAPHITE GASKET	ROCKWOOL			
	SY2	SGP				5K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"			W.C.	FC BC OR MI	BC	METAL INSERTED GRAPHITE GASKET	GLASS CLOTH	ONLY FOR HOT PART DANGEROUS TO TOUCH		
	SY5	STPG370-S	#80	2		10K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"	0.99	1.5 D.P.	W.C.			METAL INSERTED GRAPHITE GASKET				
	SY6	STPG370-S	#40	2		10K	SS400P C3STEEL	SLIP-ON "A" SLEEVE "G"	0.99	1.5 D.P.	W.C.			METAL INSERTED GRAPHITE GASKET	ROCKWOOL			
	SY9	C1220T					C3604B	UNION "F"			W.C.	COCK D ≤ 10	BC					
							C3STEEL	SLEEVE "G"				1.5 D.P.						
TANK HEATING STEAM	DY0	STPG370-S	#40	2		10K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"	0.99	1.5 D.P.	W.C.			METAL INSERTED GRAPHITE GASKET	ROCKWOOL			
	DZ1	SGP				5K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"			W.C.	FC BC OR MI	SUS	METAL INSERTED GRAPHITE GASKET	GLASS CLOTH	ONLY FOR HOT PART DANGEROUS TO TOUCH		
	DZ2	SGP				5K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"			W.C.	FC BC OR MI	SUS	METAL INSERTED GRAPHITE GASKET	GLASS CLOTH	ONLY FOR HOT PART DANGEROUS TO TOUCH		
	DZ5	STPG370-E	#80			5K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"			W.C.	FC BC OR MI	SUS	METAL INSERTED GRAPHITE GASKET	GLASS CLOTH	ONLY FOR HOT PART DANGEROUS TO TOUCH		
	DZ6	SGP				5K	SS400P C3STEEL	SLIP-ON "A" SLEEVE "G"			W.C.			METAL INSERTED GRAPHITE GASKET	GLASS CLOTH	ONLY FOR HOT PART DANGEROUS TO TOUCH		
	DZ9	C1220T					C3604B	UNION "F"			W.C.	COCK D ≤ 10	BC					
EXHAUST STEAM	SE0	SGP				5K	SS400P C3STEEL	SLIP-ON "A" SLEEVE "G"	0.15 BELOW		W.C.	FC BC OR MI	BC	METAL INSERTED GRAPHITE GASKET	ROCKWOOL			
	SE2	STP400	7.9			5K	SS400P C3STEEL	SLIP-ON "B" SLEEVE "G"	0.15 BELOW		W.C.	FC	BC	METAL INSERTED GRAPHITE GASKET	ROCKWOOL			
	SE1	SGP				5K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"			W.C.	FC BC OR MI	BC	METAL INSERTED GRAPHITE GASKET	GLASS CLOTH	ONLY FOR HOT PART DANGEROUS TO TOUCH		
	SE9	C1220T					C3604B	UNION "F"			W.C.	COCK D ≤ 10	BC					
	SE3	SGP				5K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"			W.C.			METAL INSERTED GRAPHITE GASKET				

CLASS LR (INSPECTION)

LIST OF PIPES, VALVES, ETC. (2/8)

SERVICE	PIPES			FLANGE		DESIGN PRESS. (MPa)	PIPE HYD. TEST PRESS. (MPa)		VALVES			GASKET		INSULATION OF PIPING				
	SYSTEM NO.	MATERIAL JIS MARK	THICKNESS	PIPING CLASS	TREATMENT		APPL. JIS	MATERIAL	TYPE	MPa	SHOP	ON BOARD	NOMINAL DIA.(M/M)	MATERIAL OF BODY	MATERIAL OF SEAT	RATING (JIS)	MATERIAL	REMARKS
COOLING SEA WATER	WC0	STPG370-S	#40		P.LIN	5K	SS400P	SLIP-ON "A"	0.46		W.C.	D ≥ 50 D ≤ 40	FC * BC OR MI	BC BC	5K	ASBESTOS FREE JOINT SHEET	* INTERNALLY COATED WITH MODIFIED EPOXY	
		SGP																
	WC1	STPY400	7.9		P.LIN	5K	SS400P	SLIP-ON "B"	0.46		W.C.	D ≥ 450	FC *	BC	5K	ASBESTOS FREE JOINT SHEET	* INTERNALLY COATED WITH MODIFIED EPOXY	
	WC3	SGP		G		5K	SS400P	SLIP-ON "A"				D ≤ 40	BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	WC7	STPG370-S	#80			5K	SS400P	SLIP-ON "A"	0.46		W.C.							
	WC8	STPY400	12.7			5K	SS400P	SLIP-ON "A"	0.46		W.C.							
	WC9	C1220T					C3604B	UNION "F"			W.C.	COOK D ≤ 10	COOK BC	COOK BC	COOK 16K			
	WB7	STPG370-S	#40		G	5K	SS400P	SLIP-ON "I" SLIP-ON "A"	0.54		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	WB9	C1220T					C3604B	UNION "F"			W.C.	COOK D ≤ 10	COOK BC	COOK BC	COOK 16K			
FIRE & SEA W. SERVICE	WB8	STPG370-S	#80		G	5K												
	WD6	STPG370-E	#40		G	10K	SS400P	SLIP-ON "B"	1.15		W.C.	D ≥ 250	FC	BC	10K	ASBESTOS FREE JOINT SHEET		
	WD7	STPG370-E	#40		G	10K	SS400P	SLIP-ON "A"	1.15		W.C.	D ≥ 50 D ≤ 40	FC BC	BC	10K 16K	ASBESTOS FREE JOINT SHEET		
	WD7	STPG370-S	#40															
	FC0	SGP			PA	5K	SS400P	SLIP-ON "I"	0.65		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ONLY FOR M/E JACKET COOL LINE ABOVE 85DEG.C	
	FC1	SGP			PA	5K	SS400P	SLIP-ON "I" SLIP-ON "A"	0.55		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	FC2	SGP				5K	SS400P	SLIP-ON "I" SLEEVE "G"			W.C.	COOK D ≤ 10	COOK BC	COOK BC	COOK 16K			
	FC9	C1220T					C3604B	UNION "F"			W.C.	COOK D ≤ 10	COOK BC	COOK BC	COOK 16K			
	BD0	SGP				5K	SS400P	SLIP-ON "I" SLIP-ON "A"	0.42		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
CONDENSATE & FEED WATER	BD9	C1220T					C3604B	UNION "F"			W.C.	COOK D ≤ 10	COOK BC	COOK BC	COOK 16K			
	BJ0	SGP				5K	SS400P	SLIP-ON "I"			W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	BJ1	STPG370-S	#40	2		20K	S250 or SF440A	SLIP-ON "C"	2.8	1.5 D.P.	W.C.	D ≥ 32 D ≤ 25	SC SF	SUS	20K	METAL INSERTED GRAPHITE GASKET		
	BJ9	C1220T					C3604B	UNION "F"			W.C.	D ≤ 10	SF	SUS	20K			
	BC0	STPG370-S	#40	2		20K	S250 or SF440A	SLIP-ON "C"	2.5	1.5 D.P.	W.C.	D ≥ 32 D ≤ 25	SC SF	SUS	20K	METAL INSERTED GRAPHITE GASKET	ROCKWOOL	
	BC1	STPG370-S	#40	2		16K	S250 or SF440A	SLIP-ON "B"	2	1.5 D.P.	W.C.	D ≥ 32 D ≤ 25	SC SF	SUS	20K	METAL INSERTED GRAPHITE GASKET	ROCKWOOL	
	BC6	SGP				5K	SS400P	SLIP-ON "I" SLEEVE "G"			W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ONLY FOR HOT PART DANGEROUS TO TOUCH	
	BC7	SGP				5K	SS400P	SLIP-ON "I" SLEEVE "G"			W.C.					ASBESTOS FREE JOINT SHEET		
	BC9	C1220T					C3604B	UNION "F"			W.C.	D ≤ 10	SF	SUS	20K			
BE0	STPG370-S	#40	2		20K	S250 or SF440A	SLIP-ON "C"	2.25	1.5 D.P.	W.C.	D ≥ 32 D ≤ 25	SC SF	SUS	20K	METAL INSERTED GRAPHITE GASKET	GLASS CLOTH		

SERVICE	PIPES				FLANGE		DESIGN PRESS. (MPa)	PIPE HYD. TEST PRESS. (MPa)		VALVES			GASKET		INSULATION OF PIPING		
	SYSTEM NO.	MATERIAL JIS MARK	THICKNESS	PIPE CLASS	TREATMENT	APPL. JIS		MATERIAL	TYPE	ON BOARD	SHOP	NOMINAL DIA.(M/M)	MATERIAL OF BODY	MATERIAL OF SEAT	RATING (JIS)	MATERIAL	MATERIAL
FRESH WATER	DRINK W. SERVICE TO	F00	SUS304TP-A	#40		5K	SUS304	SLIP-ON "A"	0.85	W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	FRESH W. SERVICE TO E/R	FW0	SGP		G	5K	SS400P	SLIP-ON "A"	0.85	W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	DISTILLED W TO TK	FW1	C1220T			5K	YBSC1 & SS400P	BUILD-UP		W.C.		BC	BC	5K	ASBESTOS FREE JOINT SHEET		
	OPEN DRAIN	FW2	SGP			5K	SS400P	SLIP-ON "I"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC		ASBESTOS FREE JOINT SHEET		
	DISTILLED WATER SERVICE	FW3	SGP		G	5K	SS400P	SLIP-ON "A"	0.65	W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	STRIPPING FOR F.W.TK	FW4	SGP		G	5K	SS400P	SLIP-ON "A"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	PENET.PIECE FOR F.W. TO E/R (D ≤ 20)	FW5	STPG370-E	#80	G	5K	SS400P	SLIP-ON "A"	0.65	W.C.					ASBESTOS FREE JOINT SHEET		
	FRESH W. SERVICE TO ACCOMMODATION	FW6	SUS304TP-A	#40		5K	SUS304	SLIP-ON "A"	0.85	W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	AIR COOLER CLEANING	FW8	SGP			5K	SS400P	SLIP-ON "A"	0.85	W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
GAUGE & MISC.PIPES	FW9	C1220T				C3604B	UNION "F"		W.C.	D ≤ 10	COCK BC	COCK BC	COCK 16K				
HOT WATER	HOT WATER SERVICE	FH0	SUS304TP-A	#40		5K	SUS304	SLIP-ON "A"	0.59	W.C.					ASBESTOS FREE JOINT SHEET	GLASS CLOTH	
	PENETRATION PIECE FOR H.W. (D ≤ 20)	FH5	SUS304TP-A	#80		5K	SUS304	SLIP-ON "A"	0.59	W.C.					ASBESTOS FREE JOINT SHEET	GLASS CLOTH	
BILGE	BILGE SUC & DISCH. (D ≤ 25)	YB6	STPG370-E	#40	G	5K	SS400P	SLIP-ON "I"	0.45	W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	BILGE SUC & DISCH. (D ≥ 32)	YB7	STPG370-E	#40		5K	SS400P	SLIP-ON "A"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING
	SLUDGE T. SUCTION	YB8	STPG370-E	#40	G	5K	SS400P	SLIP-ON "A"	0.3	W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	CLEAN DRAIN SUC & DISCH. (D ≥ 32)	YB9	C1220T				C3604B	UNION "F"		W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K			
	GAUGE & MISC.PIPES	YD0	SGP							W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
SCUPPER	YC0	SGP							W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
CLEAN DRAIN	YC9	C1220T							W.C.	D ≥ 50 D ≤ 10	COCK BC	COCK BC	COCK 16K				

CLASS LR (INSPECTION)

LIST OF PIPES, VALVES, ETC. (4/8)

SERVICE	PIPES				FLANGE		DESIGN PRESS. (MPa)	PIPE HYD. TEST PRESS. (MPa)		VALVES			GASKET		INSULATION OF PIPING		
	SYSTEM NO.	MATERIAL JIS MARK	THICKNESS	PIPE CLASS	TREATMENT	APPL. JIS		MATERIAL	TYPE	SHOP	ON BOARD	NOMINAL DIA.(M/M)	MATERIAL OF BODY	MATERIAL OF SEAT	RATING (JIS)	MATERIAL	MATERIAL
F.O. TRANSFER	OT0	SGP				5K	SS400P	SLIP-ON "A"	0.5	1.5 D.P.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING
	OT1	SGP				5K	SS400P	SLIP-ON "A"		1.5 D.P.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING
	OT2	SGP				5K	SS400P	SLIP-ON "A"		0.4	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	OT3	SGP				5K	SS400P	SLIP-ON "A"	0.5	1.5 D.P.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	OT4	SGP				5K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	OT5	SGP				5K	SS400P	SLIP-ON "A"		0.4	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING
	OT9	C1220T					C3604B	UNION "F"		W.C.	COOK D ≤ 10	COOK BC	COOK BC	COOK 16K			
	OP0	SGP			SAN	5K	SS400P	SLIP-ON "A"		0.4	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING
	OP1	STPG370-S	#40	2	SAN	5K	SS400P	SLIP-ON "A"	0.45	1.5 D.P.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING
F.O. PURIFICATION	OP4	SGP				5K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	OP5	SGP			SAN	5K	SS400P	SLIP-ON "A"		0.4	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	OP6	SGP			SAN	5K	SS400P	SLIP-ON "A"	0.25	0.4	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	OP9	C1220T					C3604B	UNION "F"		W.C.	COOK D ≤ 10	COOK BC	COOK BC	COOK 16K			
	OM0	SGP			SAN	5K	SS400P	SLIP-ON "A"		0.4	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING
	OM1	SGP			SAN	5K	SS400P	SLIP-ON "A"		0.4	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	OM2	STPG370-S	#40	2	SAN	5K	SS400P	SLIP-ON "A"	0.4	1.5 D.P.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING
	OM3	STPG370-S	#40	2	SAN	16K	S25C or SF440A	SLIP-ON "B"	1.15	1.5 D.P.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	16K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING
	OM5	SGP				5K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
M/E F.O. SERVICE	OM6	STPG370-S	#40	2	SAN	5K	SS400P	SLIP-ON "A"	0.4	1.5 D.P.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	OM7	STPG370-S	#40	2	SAN	16K	SS400P	SLIP-ON "B"	1.15	1.5 D.P.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	16K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING
	OM8	SGP			SAN	5K	SS400P C3STEEL	SLIP-ON "I" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	OM9	C1220T					C3604B	UNION "F"		W.C.	COOK D ≤ 10	COOK BC	COOK BC	COOK 16K			

SERVICE	PIPES				FLANGE		DESIGN PRESS. (MPa)	PIPE HYD. TEST PRESS. (MPa)		VALVES			GASKET		INSULATION OF PIPING			
	SYSTE M NO.	MATERIAL JIS MARK	THICK- NESS	PIPING CLASS	TREAT -MENT	APPL. JIS		MATERIAL	TYPE	SHOP	ON BOARD	NOMINAL DIA.(M/M)	MATERIAL OF BODY	MATERIAL OF SEAT	RATIN G.(JIS)	MATERIAL	MATERIAL	REMARKS
D.O.SUPP.P. SUC. & OTHER DISCHARGE	OS0	SGP			SAN	5K	SS400P	SLIP-ON "A"		0.4	D ≤ 40	BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
	OS1	STPG370-S	#40	2	SAN	10K	SS400P	SLIP-ON "A"	1.5 D.P.	1.5 D.P.	D ≤ 40	BC OR MI	BC	16K	ASBESTOS FREE JOINT SHEET			
	OS2	SGP			SAN	5K	SS400P	SLIP-ON "A"		1.5 D.P.	D ≤ 40	BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
	OS3	STPG370-S	#40	2	SAN	5K	SS400P	SLIP-ON "A"	1.5 D.P.	1.5 D.P.	D ≤ 40	BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING	
	OS4	STPG370-S	#40	2	SAN	10K	SS400P	SLIP-ON "A"	1.05	1.5 D.P.	D ≤ 40	BC OR MI	BC	16K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING	
	OS5	SGP				5K	SS400P C-STEEL	SLIP-ON "I" SLEEVE "G"		W.C.					ASBESTOS FREE JOINT SHEET			
	OS6	STPG370-S	#40	2	SAN	5K	SS400P	SLIP-ON "A"	0.5	1.5 D.P.	D ≤ 40	BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING	
	OS9	C1220T					C3604B	UNION "F"		W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K				
F.O. SERVICE	OB0	SGP			SAN	5K	SS400P	SLIP-ON "A"		0.4	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING	
	OB1	STPG370-S	#40	1	SAN	20K	S250 or SF440A	SLIP-ON "C"	2.75	1.5 D.P.	D ≥ 32 D ≤ 25	SC SF	SUS	20K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING	
	OB2	SGP			SAN	5K	SS400P	SLIP-ON "A"		0.4	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
	OB3	STPG370-S	#40	1	SAN	20K	S250 or SF440A	SLIP-ON "C"	1.7	1.5 D.P.	D ≥ 32 D ≤ 25	SC SF	SUS	20K	ASBESTOS FREE JOINT SHEET			
	OB4	STPG370-S	#40	1	SAN	20K	S250 or SF440A	SLIP-ON "C"	2.75	1.5 D.P.	D ≥ 32 D ≤ 25	SC SF	SUS	20K	ASBESTOS FREE JOINT SHEET			
	OB5	STPG370-S	#40	2	SAN	5K	SS400P	SLIP-ON "A"	0.33	1.5 D.P.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING	
	OB6	SGP				5K	SS400P C-STEEL	SLIP-ON "I" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
	OB8	C1220T					C3604B	UNION "F"		W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K				
	OB9	C1220T					C3604B	UNION "F"		W.C.	COCK D ≤ 10	COCK SF	COCK SUS	COCK 20K				
BOILER F.O. SERVICE	OD5	SGP				5K	SS400P C-STEEL	SLIP-ON "I" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
	OD6	SGP				5K	SS400P C-STEEL	SLIP-ON "I" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING	
	OD7	SGP				5K	SS400P C-STEEL	SLIP-ON "I" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
	OD9	C1220T					C3604B	UNION "F"		W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K				
	LT0	SGP			SAN	5K	SS400P C-STEEL	SLIP-ON "A" SLEEVE "G"	0.5	W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
	LT3	SGP				5K	SS400P C-STEEL	SLIP-ON "I" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
	LT9	C1220T					C3604B	UNION "F"		W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K				

SERVICE	PIPES				FLANGE		DESIGN PRESS. (MPa)	PIPE HYD. TEST PRESS. (MPa)		VALVES			GASKET		INSULATION OF PIPING		
	SYSTE M NO.	MATERIAL JIS MARK	THICK- NESS	PIPING CLASS	TREAT -MENT	APPL. JIS		MATERIAL	TYPE	SHOP	ON BOARD	NOMINAL DIA.(M/M)	MATERIAL OF BODY	MATERIAL OF SEAT	RATIN G.(JIS)	MATERIAL	MATERIAL
L.O. PURIF- IIGATION	LP0	SGP			SAN	5K	SS400P	SLIP-ON "A" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LP1	STPG370-S	#40	2	SAN	5K	SS400P	SLIP-ON "A" SLEEVE "G"	0.5	1.5 D.P.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	GLASS CLOTH	ONLY FOR HOT PART DANGEROUS TO TOUCH
	LP2	SGP			SAN	5K	SS400P	SLIP-ON "A" SLEEVE "G"	0.5		D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LP3	SGP				5K	SS400P C.STEEL	SLIP-ON "T" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FCD BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LP9	C1220T					C3604B	UNION "F"		W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K			
M/E L.O. SERV.	LM0	SGP			SAN	10K	SS400P	SLIP-ON "B"	0.85	W.C.	D ≥ 250	FC	BC	10K	ASBESTOS FREE JOINT SHEET		
	LM1	SGP			SAN	10K	SS400P	SLIP-ON "A"	0.85	W.C.	D ≥ 50 D ≤ 40	FC	BC	10K 16K	ASBESTOS FREE JOINT SHEET		
	LM2	SGP			SAN	5K	SS400P	SLIP-ON "A"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LM3	SGP				5K	SS400P C.STEEL	SLIP-ON "T" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LM4	SGP				5K	SS400P C.STEEL	SLIP-ON "T" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	ROCKWOOL	STEAM TRACING
M/E L.O. SERVICE	LM9	C1220T					C3604B	UNION "F"		W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K			
	LG0	SGP			SAN	5K	SS400P	SLIP-ON "A"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LG2	SGP				5K	SS400P C.STEEL	SLIP-ON "T" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LG9	C1220T					C3604B	UNION "F"		W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K			
	LG9	C1220T															
G/E L.O. SERVICE	LS2	STPG370-S	#80		SAN		C.STEEL	SLEEVE "G"		W.C.							
	LS3	SUS304TP-A	#40		SAN	10K	SUS	SLIP-ON "A"	0.97	1.5 D.P.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	10K 16K	ASBESTOS FREE JOINT SHEET		
	LS4	SGP			SAN	5K	SS400P	SLIP-ON "A"	0.35		D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LS5	SUS304TP-A	#40		SAN	5K	SUS	SLIP-ON "A"	0.25		D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LS6	SUS304TP-S	#80		SAN	5K	SUS	SLEEVE "G"	0.25								
STERN TUBE L.O.SERVICE	LS7	SGP			SAN	5K	SS400P	SLIP-ON "A"	0.35	W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LT7	SGP			SAN	5K	SS400P	SLIP-ON "A"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LS9	C1220T					C3604B	UNION "F"		W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K			
	LT8	SGP			SAN	5K	SS400P	SLIP-ON "A"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET		
	LT8	SGP															

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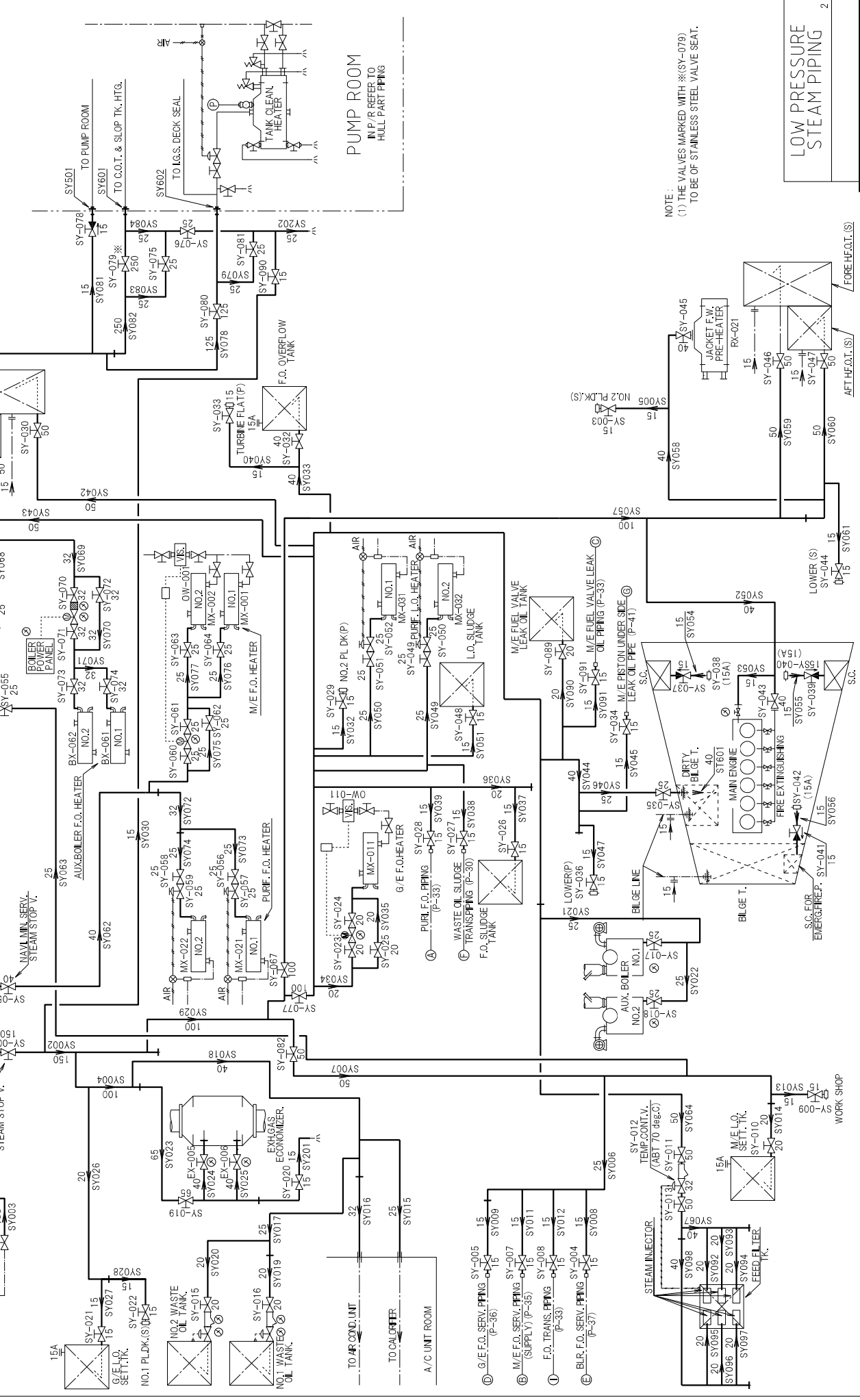
SERVICE	PIPES				FLANGE		DESIGN PRESS. (MPa)	PIPE HYD. TEST PRESS. (MPa)		VALVES			GASKET		INSULATION OF PIPING		
	SYSTEM NO.	MATERIAL JIS MARK	THICKNESS	PIPE CLASS	TREATMENT	APPL. JIS		MATERIAL	TYPE	SHOP	ON BOARD	NOMINAL DIA.(M/M)	MATERIAL OF BODY	MATERIAL OF SEAT	RATING (JIS)	MATERIAL	MATERIAL
L.O.DRAIN	LD0	SGP				5K	SS400P C.STEEL	SLIP-ON "T" SLEEVE "G"	W.C.	W.C.	D ≥ 50 D ≤ 40	FC	BC	5K	ASBESTOS FREE JOINT SHEET		
L.O.DRAIN	LD9	C1220T					C3604B	UNION "F"	W.C.	W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K			
2.45MPa. RESRV. TO ENG.	AK0	STPG370-S	#40	2	G	20K	S25C or SF440A	SLIP-ON "C"	1.5 D.P.	W.C.	D ≥ 32 D ≤ 25	SF OR C-STEEL	SUS	20K	ASBESTOS FREE JOINT SHEET		
2.45MPa. COMP. TO RESERV.	AK1	STPG370-S	#40	2	G	20K	S25C or SF440A	SLIP-ON "C" SLEEVE "G"	1.5 D.P.	W.C.	D ≥ 32 D ≤ 25	SF OR C-STEEL	SUS	20K	ASBESTOS FREE JOINT SHEET		
COMPRESSOR DRAIN	AK8	SGP			G	5K	SS400P	SLIP-ON "A" SLEEVE "G"	W.C.	W.C.					ASBESTOS FREE JOINT SHEET		FROM COMPRESSOR OUTLET UP TO 2M
2.45MPa. GAUGE & MISC.PIPES	AK9	C1220T					C3604B	UNION "F"	W.C.	W.C.	D ≤ 10	SF OR C-STEEL	SUS	20K			
0.88MPa. CONTROL AIR	AL0	SGP			G	10K	SS400P	SLIP-ON "A"	1.5 D.P.	W.C.	D ≥ 50 D ≤ 40	FC	BC	10K 16K	ASBESTOS FREE JOINT SHEET		
PENET.PIECE FOR CONT. AIR (D ≤ 20)	AL5	STPG370-E	#80		G	10K	SS400P	SLIP-ON "A"	1.5 D.P.	W.C.					ASBESTOS FREE JOINT SHEET		
CONTROL AIR	AL9	C1220T					C3604B	UNION "F"	W.C.	W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K			
0.88MPa. G.S. AIR	AC0	SGP			G	10K	SS400P	SLIP-ON "A"	1.5 D.P.	W.C.	D ≥ 50 D ≤ 40	FC	BC	10K 16K	ASBESTOS FREE JOINT SHEET		
PENET.PIECE FOR G.S. AIR (D ≤ 20)	AC5	STPG370-E	#80		G	10K	SS400P	SLIP-ON "A"	1.5 D.P.	W.C.					ASBESTOS FREE JOINT SHEET		
0.88MPa. GAUGE & MISC.PIPES	AC9	C1220T					C3604B	UNION "F"	W.C.	W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K			
DRAIN & OTHERS	GE0	SGP				5K	SS400P C.STEEL	SLIP-ON "T" SLEEVE "G"	W.C.	W.C.	D ≥ 50 D ≤ 40	FC	BC	5K	METAL INSERTED GRAPHITE GASKET	GLASS CLOTH	ONLY FOR HOT PART DANGEROUS TO TOUCH UP TO 2M ABOVE CASING TOP
GENERATOR ENGINE	GE2	STPY400	6.4			5K	SS400P C.STEEL	SLIP-ON "T" SLEEVE "G"	W.C.	W.C.					METAL INSERTED GRAPHITE GASKET	ROCKWOOL	UP TO 2M ABOVE CASING TOP
INCINERATOR (BELOW FUNNEL TOP)	GE3	STPY400	6.4			5K	SS400P C.STEEL	SLIP-ON "E" SLEEVE "G"	W.C.	W.C.					METAL INSERTED GRAPHITE GASKET	ROCKWOOL	UP TO 2M ABOVE CASING TOP
MAIN ENGINE	GE4	SS400P	6			EXH.GAS FLANGE	SS400P	SLIP-ON "E" SLEEVE "G"	W.C.	W.C.					WIPE REINFORCED GLASS CLOTH	ROCKWOOL	UP TO 2M ABOVE CASING TOP
AUX. BOILER	GE5	SS400P	6			EXH.GAS FLANGE	SS400P	SLIP-ON "E" SLEEVE "G"	W.C.	W.C.					WIPE REINFORCED GLASS CLOTH	ROCKWOOL	UP TO 2M ABOVE CASING TOP
EXHAUST GAS																	
DRAIN FROM SEAL POT	GE7	SGP			G	5K	SS400P C.STEEL	SLIP-ON "T" SLEEVE "G"	W.C.	W.C.					ASBESTOS FREE JOINT SHEET		
INCINERATOR (ABOVE FUNNEL TOP)	GE8	STPY400	6.4			5K	SS400P C.STEEL	SLIP-ON "E" SLEEVE "G"	W.C.	W.C.					METAL INSERTED GRAPHITE GASKET		
GAUGE & MISC.PIPES	GE9	C1220T					C3604B	UNION "F"	W.C.	W.C.	COCK D ≤ 10	COCK BC	COCK BC	COCK 16K			
GENERATOR ENGINE (ABOVE FUNNEL TOP)	GE1	STPY400	6.4			5K	SS400P C.STEEL	SLIP-ON "T" SLEEVE "G"	W.C.	W.C.					METAL INSERTED GRAPHITE GASKET		
OIL TANKS	A00	STPG370-E	#40			5K	SS400P C.STEEL	SLIP-ON "T" SLEEVE "G"	W.C.	W.C.					ASBESTOS FREE JOINT SHEET		
OTHERS	AW3	STPG370-E	#40		G	5K	SS400P C.STEEL	SLIP-ON "T" SLEEVE "G"	W.C.	W.C.					ASBESTOS FREE JOINT SHEET		
SHAFT COOL.W.TK. PENETRATION PIECE	AW4	STPG370-E	#80			5K											

CLASS LR (INSPECTION)

LIST OF PIPES, VALVES, ETC. (8/8)

SERVICE	PIPES				FLANGE		DESIGN PRESS. (MPa)	PIPE HYD. TEST PRESS. (MPa)		VALVES			GASKET		INSULATION OF PIPING			
	SYSTEM NO.	MATERIAL JIS MARK	THICKNESS	PIPE CLASS	TREATMENT	APPL. JIS		MATERIAL	TYPE	SHOP	ON BOARD	NOMINAL DIA.(M/M)	MATERIAL OF BODY	MATERIAL OF SEAT	RATIN G.(JIS)	MATERIAL	MATERIAL	REMARKS
SOUNDING	MS6	STPG370-E	#40			5K	SS400P C.STEEL	SLIP-ON "A" SLEEVE "G"	-	-				ASBESTOS FREE JOINT SHEET				
	MS7	STPG370-E	#80		G	5K	SS400P C.STEEL	SLIP-ON "A" SLEEVE "G"	-	-				ASBESTOS FREE JOINT SHEET				
	MS8	SGP			G	5K	SS400P	SLIP-ON "A"	-	-	D ≤ 40	BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
VALVES FITTED ON HULL						5K	SS400P	SLIP-ON "A"	0.2	W.C.	0.5	SC OR FOD	SC FACED WITH SUS	10K	ASBESTOS FREE JOINT SHEET			
						5K	SS400P	SLIP-ON "A"	0.2	W.C.	0.5	SC OR FOD	SUS	10K	ASBESTOS FREE JOINT SHEET			
						5K	SS400P	SLIP-ON "A"	0.2	W.C.	0.5	BC OR FOD	BC	16K	ASBESTOS FREE JOINT SHEET			
						5K	SS400P	SLIP-ON "A"	0.2	W.C.	0.5	SC	NBR	10K	ASBESTOS FREE JOINT SHEET			
						5K	SS400P	SLIP-ON "A"	0.2	W.C.	0.5	SC OR FOD	BC	5K	ASBESTOS FREE JOINT SHEET			
VALVES FITTED ON OIL TANKS						5K	SS400P	SLIP-ON "A"	0.2	W.C.	0.2	BC OR FOD	BC	5K	ASBESTOS FREE JOINT SHEET			
						5K	SS400P	SLIP-ON "A"	0.2	W.C.	0.2	BC OR FOD	BC	5K	ASBESTOS FREE JOINT SHEET			
INERT GAS SYSTEM						5K	SS400P	SLIP-ON "I"		W.C.		MAKER'S STANDARD			METAL INSERTED GRAPHITE GASKET	ROCKWOOL		
			12.7			5K	SS400P	SLIP-ON "I"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
			#80		M.COAT	5K	SS400P	SLIP-ON "A" SLEEVE "G"		W.C.		MAKER'S STANDARD			METAL INSERTED GRAPHITE GASKET	ROCKWOOL		
			#40			5K	SS400P C.STEEL	SLIP-ON "A" SLEEVE "G"		W.C.	D ≥ 50 D ≤ 40	FC BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET			
						5K	SUS	SLIP-ON "A" SLEEVE "G"		W.C.		SUS		10K	ASBESTOS FREE JOINT SHEET			
					M.COAT	5K	SS400P	SLIP-ON "I"		W.C.					ASBESTOS FREE JOINT SHEET			
						5K	C3604B	UNION "F"		W.C.		COCK D ≤ 10	COCK BC	COCK 16K				
			#40		P.LIN	5K	SS400P	SLIP-ON "A"		W.C.	0.66	D ≥ 50 25 ≤ D ≤ 40	FC * BC OR MI	BC	5K	ASBESTOS FREE JOINT SHEET	* INTERNALLY COATED WITH MODIFIED EPOXY	
							5K	SS400P	SLIP-ON "A"		W.C.							
OXYGEN & ACETYLENE						10K	C.STEEL	SLEEVE "G"	0.98	1.47		MAKER'S STANDARD			ASBESTOS FREE JOINT SHEET			
						10K	SUS	SLEEVE "G"	0.15	1.47		MAKER'S STANDARD			ASBESTOS FREE JOINT SHEET			

PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
SY001 - 088	10.31.41.48.85	SY001 - 091	06.14.54.66.
	80.848-88.89		83-87.88
SY201 - 203	03		
SY601 - 503			
SY601 - 602		SY901 - 903	03
SY9			
ST601			



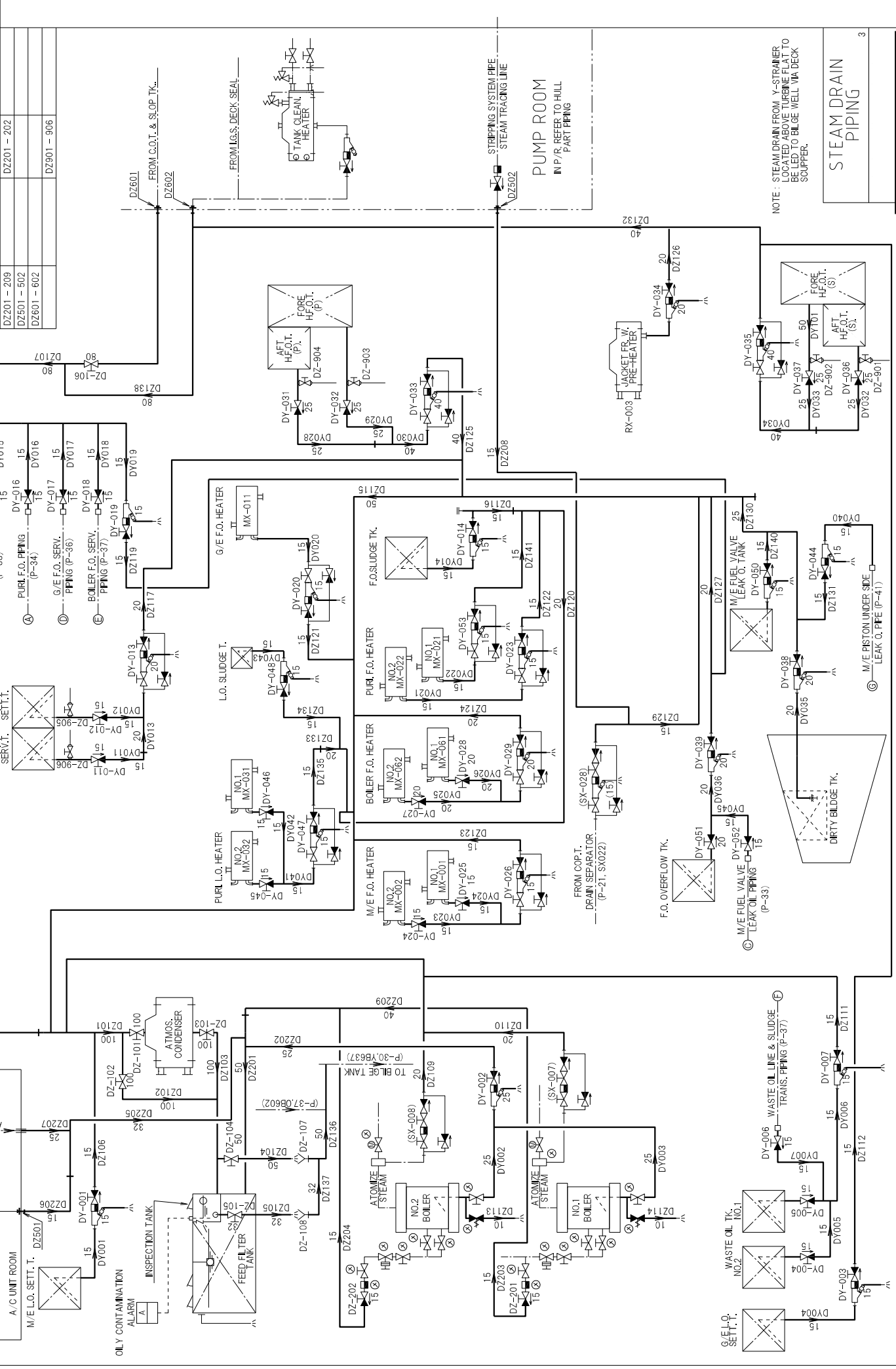
NOTE:
 (*) THE VALVES MARKED WITH * (SY-079)
 TO BE OF STAINLESS STEEL VALVE SEAT.

LOW PRESSURE
 STEAM PIPING

TO PUMP ROOM
 TO I.G.S. DECK SEAL
 TO CALORIFIER
 A/C UNIT ROOM
 WORK SHOP

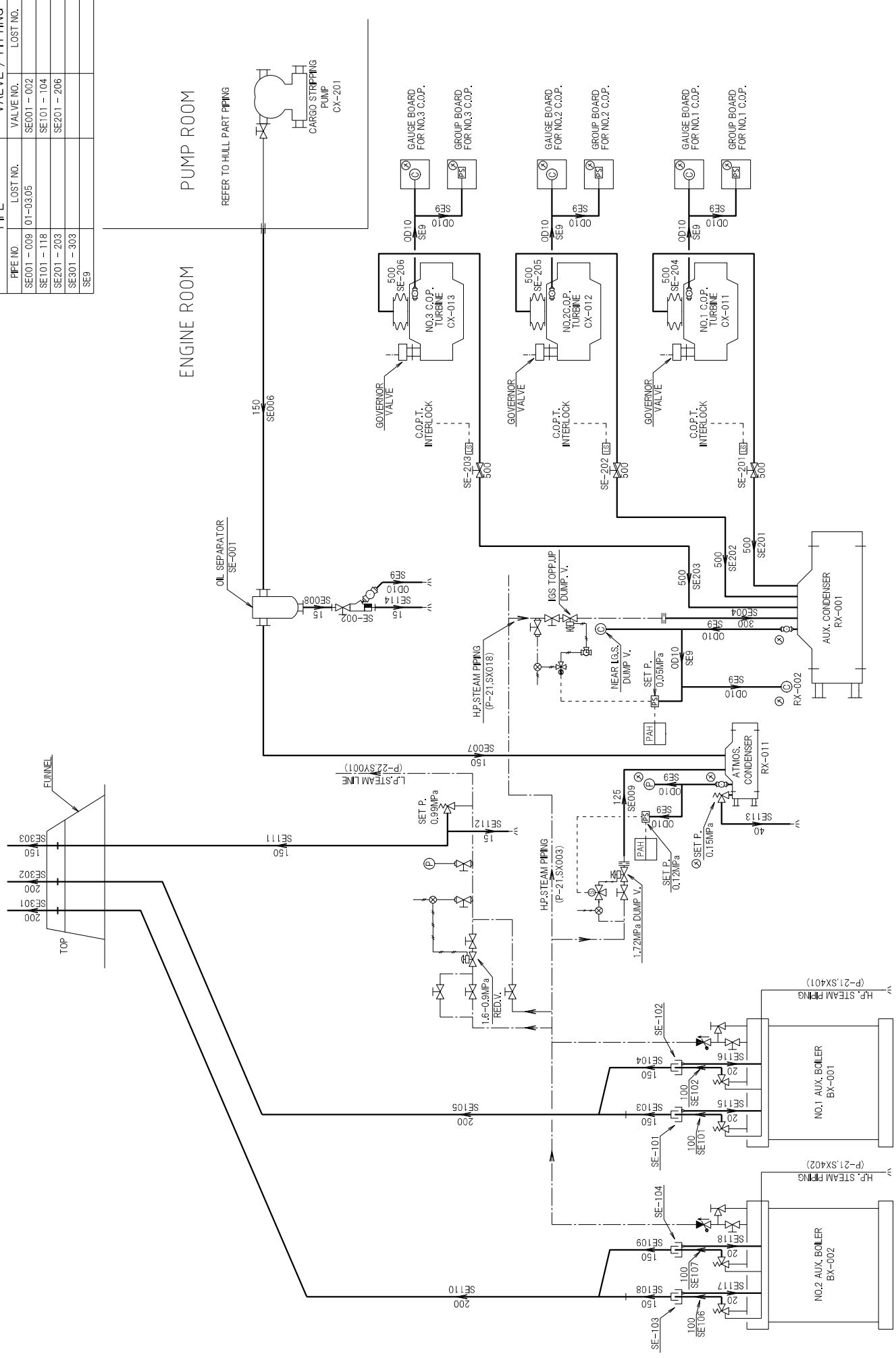
FORE HF.O.T. (P)
 AFT HF.O.T. (P)
 F.O. OVERFLOW TANK
 TURBINE FLAT (P)
 M/E F.O. HEATER
 PURIF. F.O. HEATER
 G/E F.O. HEATER
 WASTE OIL SLUDGE TRANSFER PIPING
 F.O. SLUDGE F.O. TANK
 M/E FUEL VALVE LEAK OIL TANK
 M/E FUEL VALVE LEAK OIL PIPING
 M/E PISTON UNDER SIDE LEAK OIL PIPE
 DIRTY BILGE T.
 BILGE T.
 S.C. FOR EMERGENCY PREP.
 MAIN ENGINE
 FIRE EXTINGUISHING
 JACKET F.W. PRE-HEATER
 NO.2 FLK. (S)
 LOWER (S)
 AFT HF.O.T. (S)
 FORE HF.O.T. (S)

PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
DY001 - 045	08-10,27,31,37,38	DY001 - 053	08-10,21,22,30,40
	44		42,43,49
DZ101 - 141	08,18,28	DZ101 - 108	
DZ201 - 209		DZ201 - 202	
DZ501 - 502			
DZ601 - 602			
		DZ901 - 906	



PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
SE001 - 009	01-03,05	SE001 - 002	
SE101 - 118		SE101 - 104	
SE201 - 203		SE201 - 206	
SE301 - 303			
SE9			

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EXHAUST STEAM
PIPING

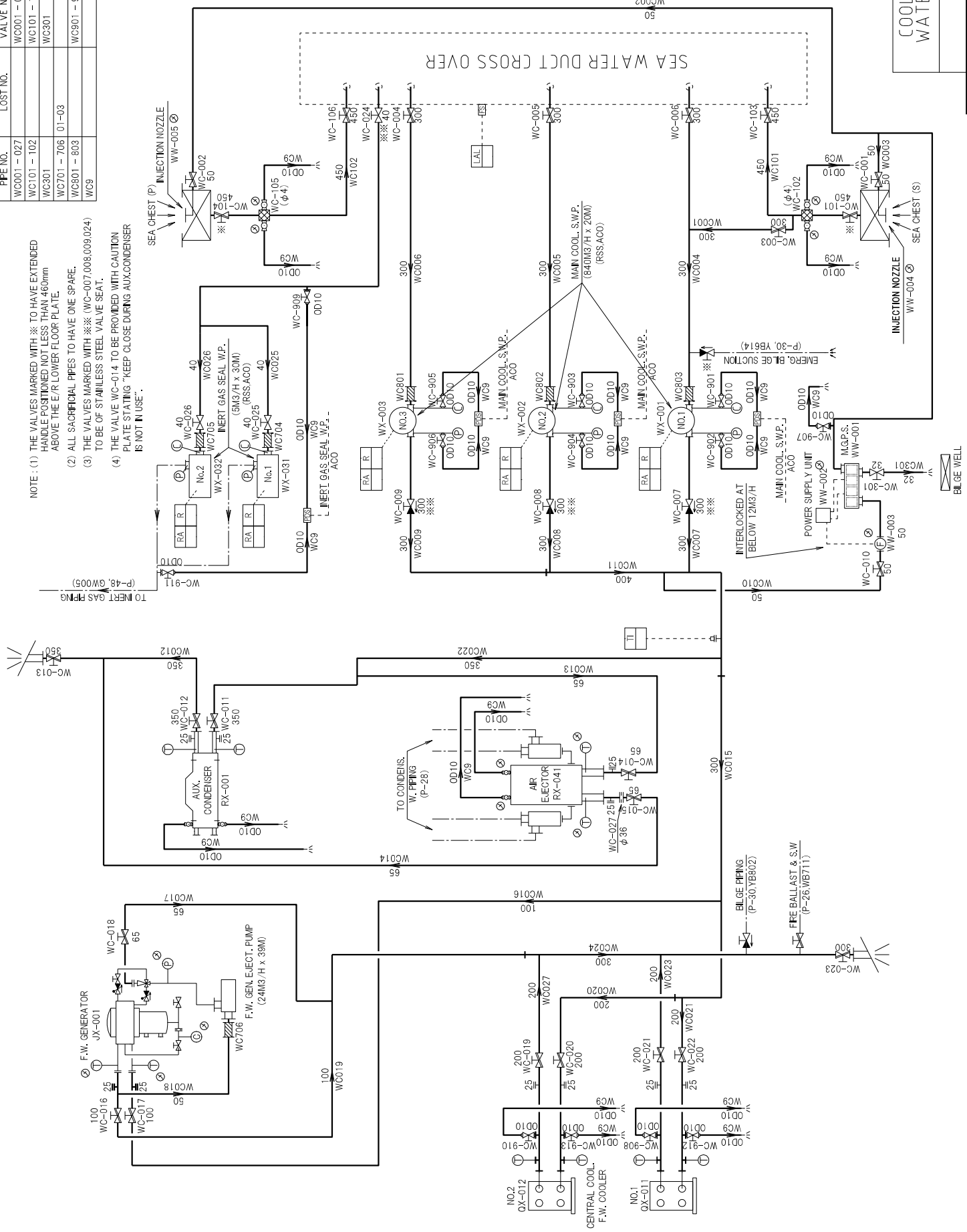
PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
WC001 - 027		WC001 - 027	
WC101 - 102		WC101 - 106	
WC301		WC301	
WC701 - 706 01-03		WC901 - 913	
WC801 - 803			
WC9			

NOTE: (1) THE VALVES MARKED WITH ※ TO HAVE EXTENDED HANDLE POSITIONED NOT LESS THAN 450mm ABOVE THE E/R LOWER FLOOR PLATE.

(2) ALL SACRIFICIAL PIPES TO HAVE ONE SPARE.

(3) THE VALVES MARKED WITH ※※ TO BE OF STAINLESS STEEL VALVE SEAT.

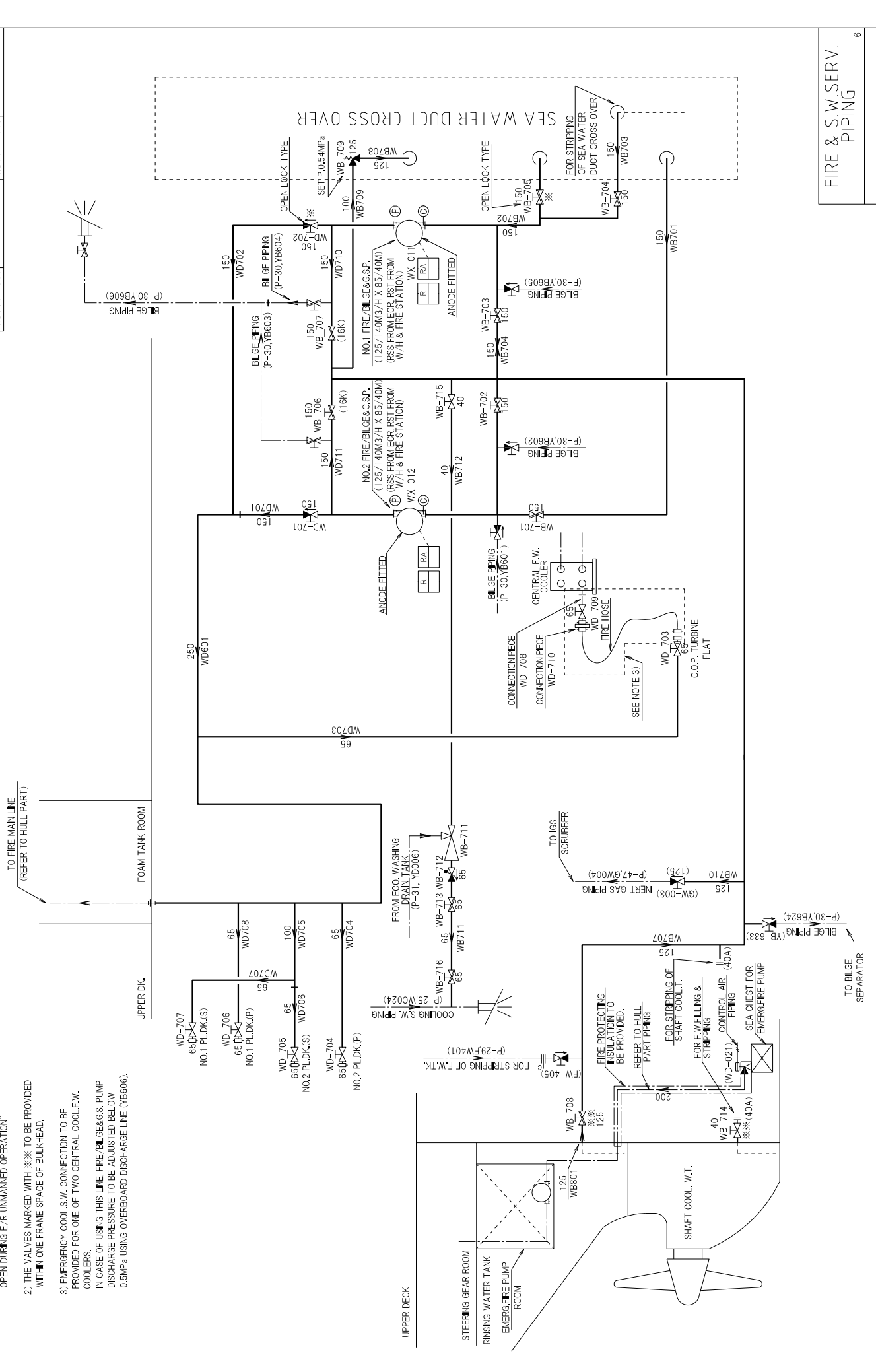
(4) THE VALVE WC-014 TO BE PROVIDED WITH CAUTION PLATE STATING "KEEP CLOSE DURING AUX CONDENSER IS NOT IN USE".



SEA WATER DUCT CROSS OVER

COOLING SEA WATER PIPING

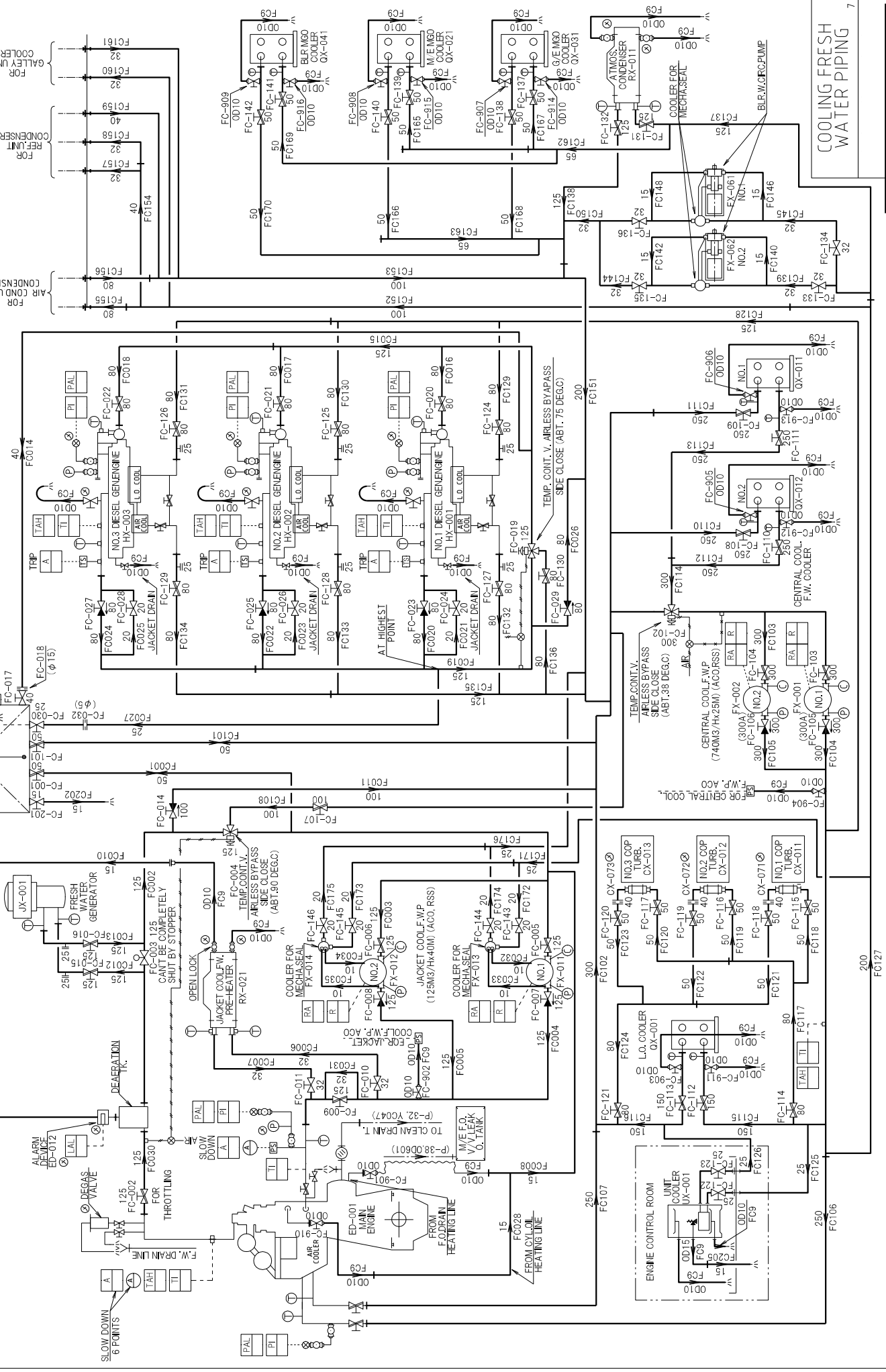
PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
WB701 - 712	05.06	WB701 - 716	10
WB801			
WD601			
WD701 - 711		WD701 - 710	



- NOTE: 1) THE VALVES MARKED WITH * TO BE PROVIDED WITH THE CAUTION PLATES WHICH STATING "KEPT OPEN DURING E/R UNMANNED OPERATION"
- 2) THE VALVES MARKED WITH ** TO BE PROVIDED WITHIN ONE FRAME SPACE OF BULKHEAD.
- 3) EMERGENCY COOL.S.W. CONNECTION TO BE PROVIDED FOR ONE OF TWO CENTRAL COOL.F.W. COOLERS.
IN CASE OF USING THIS LINE FIRE/BILGE&G.S. PUMP DISCHARGE PRESSURE TO BE ADJUSTED BELOW 0.5MPa USING OVERBOARD DISCHARGE LINE (YB606).

PIPE NO.	PIPE	VALVE / FITTING
FC001 - 035	09	FC001 - 032 12.31
FC101 - 176	41, 43, 47, 48, 64	FC101 - 146
FC201 - 205		FC201
FC9		FC901 - 916

REFER TO HULL PART PIPING (DWGNO:HF-212)



NOTE: THE WASTE HEAT FROM JACKET FRESH WATER OUTLET OF RUNNING MAIN DIESEL GENERATOR ENGINE IS UTILIZED AS A MEANS OF STARTUP ENGINE WARMUP. THEREFORE NO ADDITIONAL EQUIPMENT IS PROVIDED FOR PRE-HEATING PURPOSE.

OLY CONTAMINATION ALARM

SLOW DOWN 6 POINTS

DEAERATION TANK

FOR THROTTLING

FOR SHUT BY STOPPER

TEMP. CONT. V. AIRLESS BYPASS SIDE CLOSE (ABT. 90 DEG.C)

TEMP. CONT. V. AIRLESS BYPASS SIDE CLOSE (ABT. 75 DEG.C)

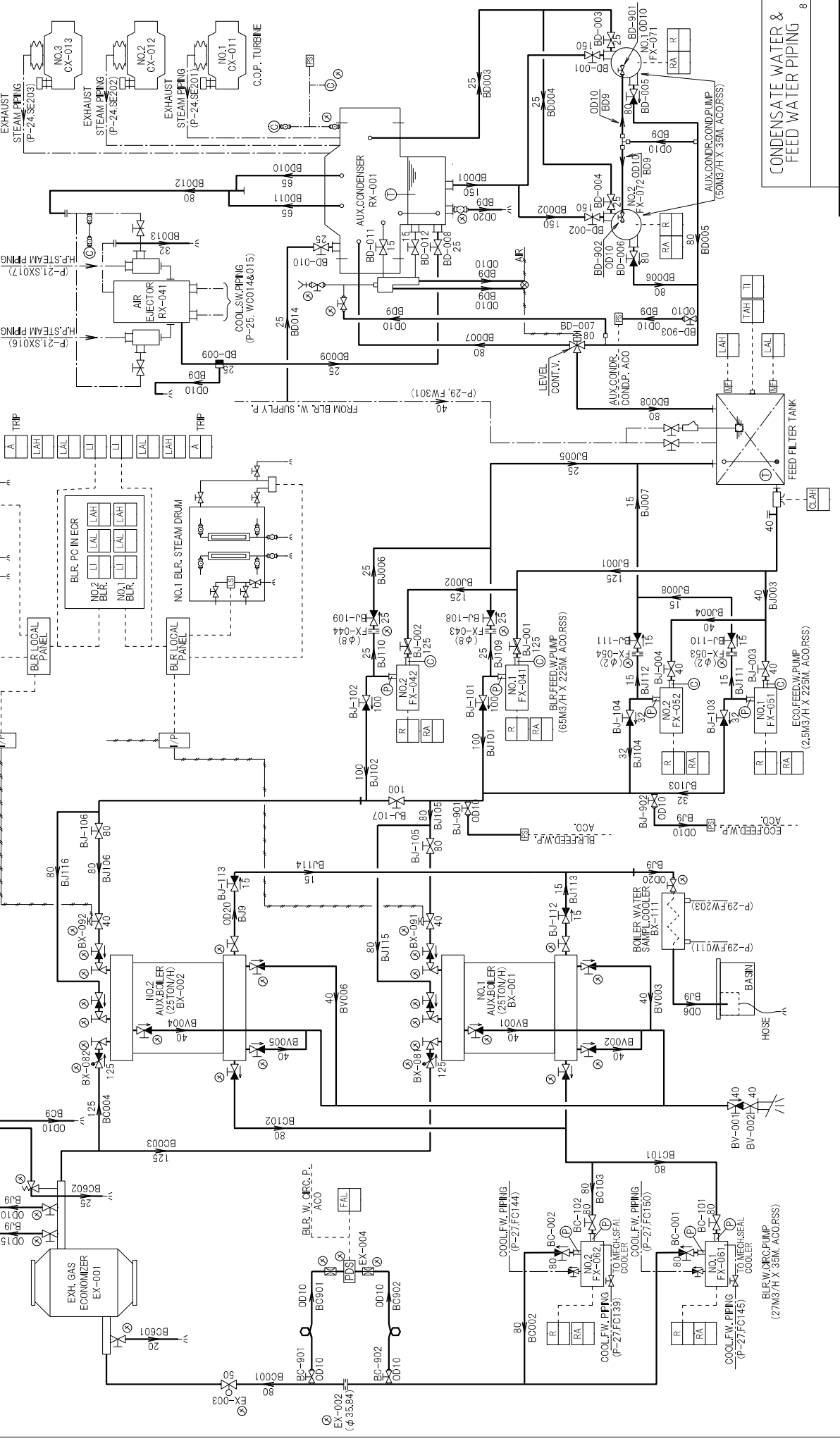
TEMP. CONT. V. AIRLESS BYPASS SIDE CLOSE (ABT. 38 DEG.C)

CENTRAL COOL. F.W. COOLER

CENTRAL COOL. F.W. COOLER

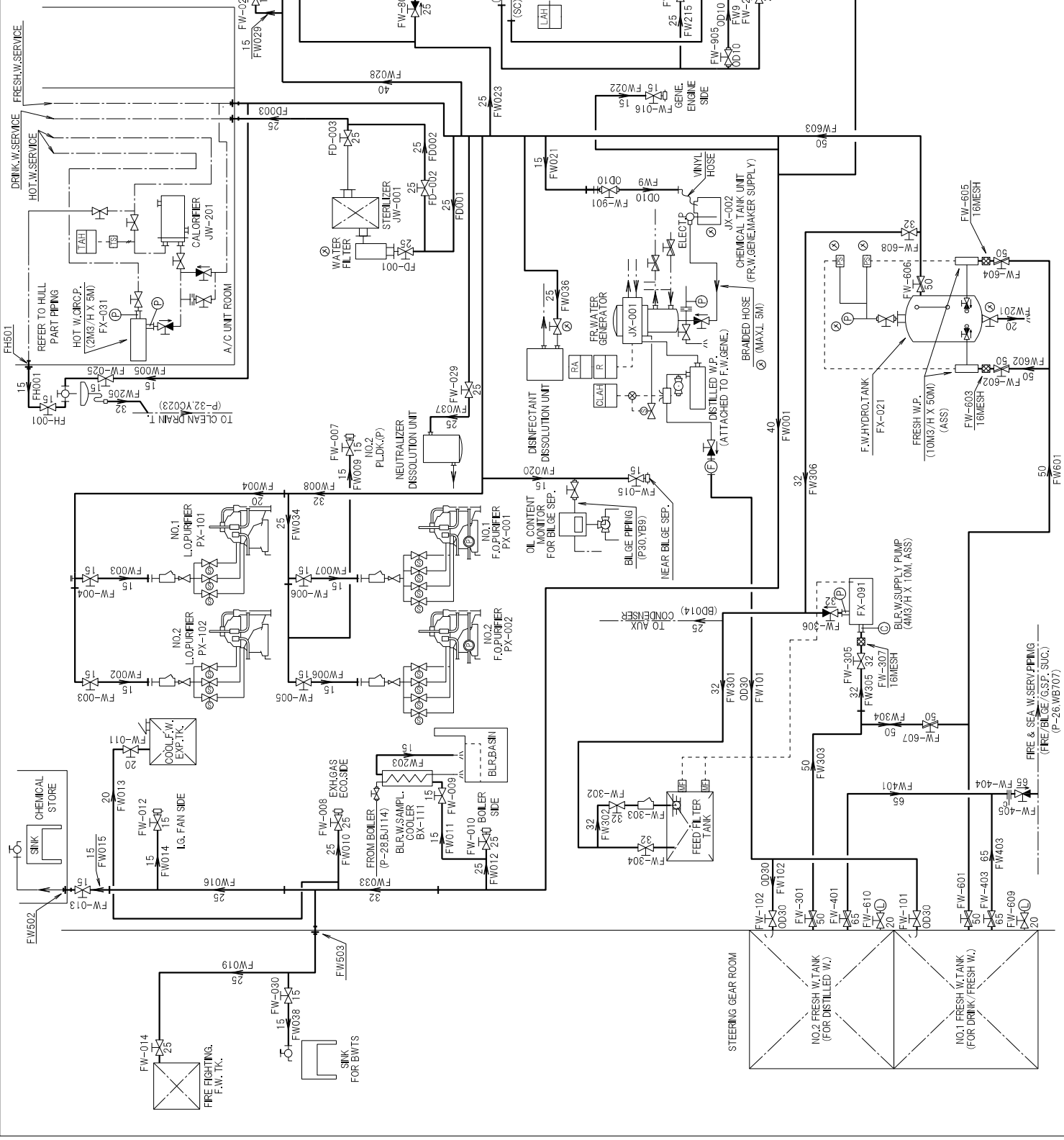
COOLING FRESH WATER PIPING

PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
BD001 - 014		BD001 - 012	
BD9		BD901 - 903	
BJ001 - 008		BJ001 - 004	
BJ101 - 116	07,08	BJ101 - 113	
BJ9		BJ901 - 902	
BC001 - 004		BC001 - 002	
BC101 - 103		BC101 - 102	
BC601 - 604			
BC701			
BC901 - 902		BC901 - 902	
BV001 - 006		BV001 - 002	



CONDENSATE WATER & FEED WATER PIPING

PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
FD001 - 009	04-07, 0809	FD001 - 003	
FW001 - 038	17,18,24,27,32,35	FW001 - 030	02,17,21,22,26,28
FW101 - 102		FW101 - 102	
FW201 - 213	04,08-10,11,13	FW201 - 208	
FW301 - 305		FW301 - 307	
FW401 - 403	02	FW401 - 405	02
FW501 - 503		FW601 - 610	
FW601 - 603		FW801 - 809	04,05
FW801 - 805		FW901 - 905	03,04
FW9		FH001	
FH001		FH501	

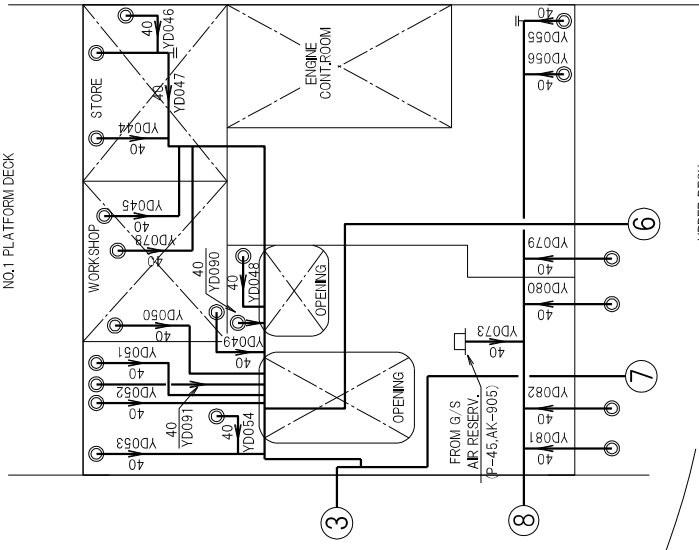


FRESH WATER & HOT WATER PIPING

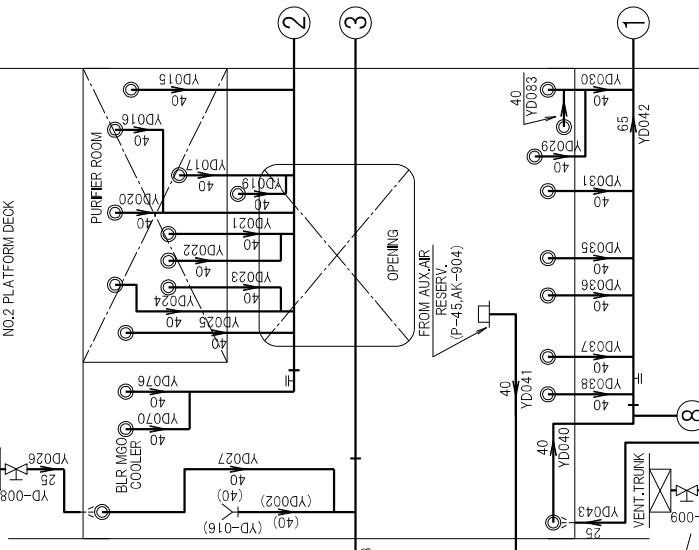
PIPE	VALVE / FITTING
PPE NO.	VALVE NO.
YD001 - 076	YD001 - 016
03.18.32-34.39.57.74	02.07.12.14.15
.72	

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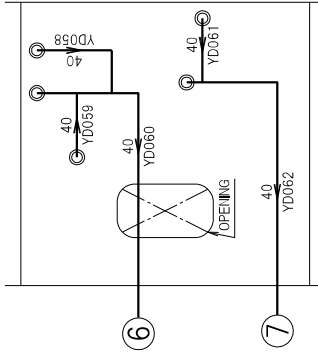
NO.1 PLATFORM DECK



NO.2 PLATFORM DECK

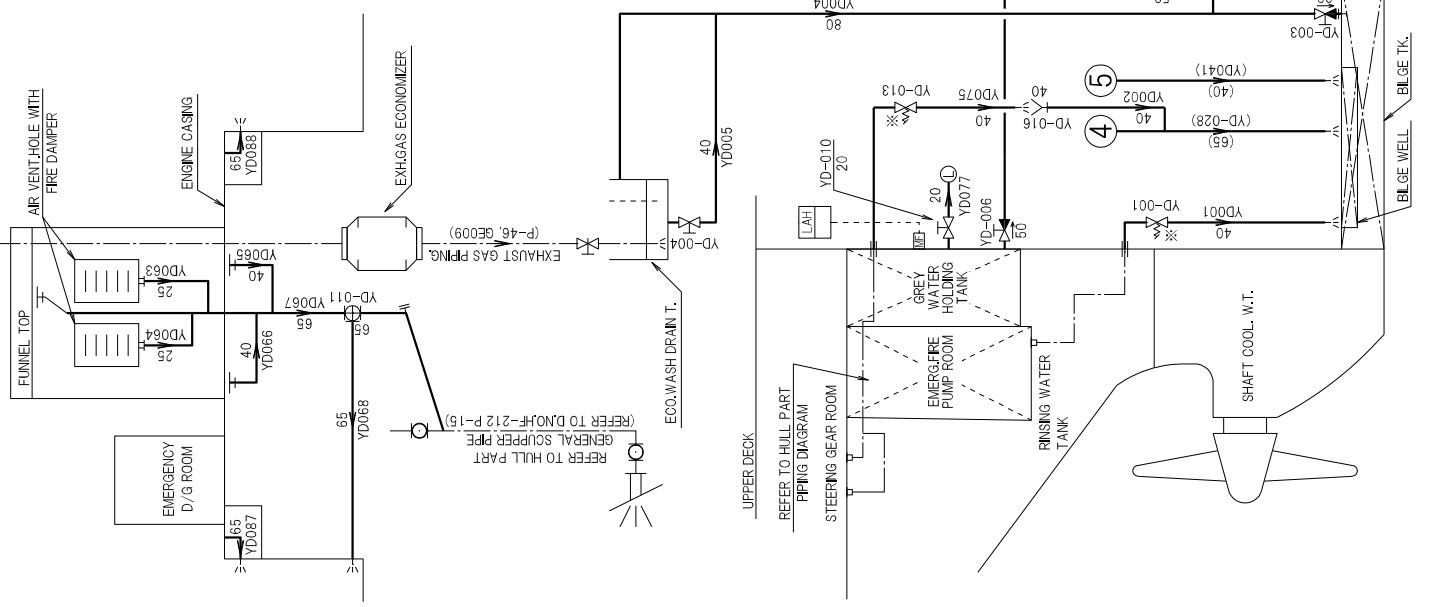


UPPER DECK



- NOTE: 1) NUMBER OF SCUPPER TO BE DECIDED AT DETAIL DESIGN STAGE.
 2) SOME SCUPPER PIPES MAY BE CONNECTED TO COMMON SCUPPER PIPES.
 3) THE VALVES MARKED WITH * TO BE PROVIDED WITHIN ONE FRAME SPACE OF BULKHEAD.

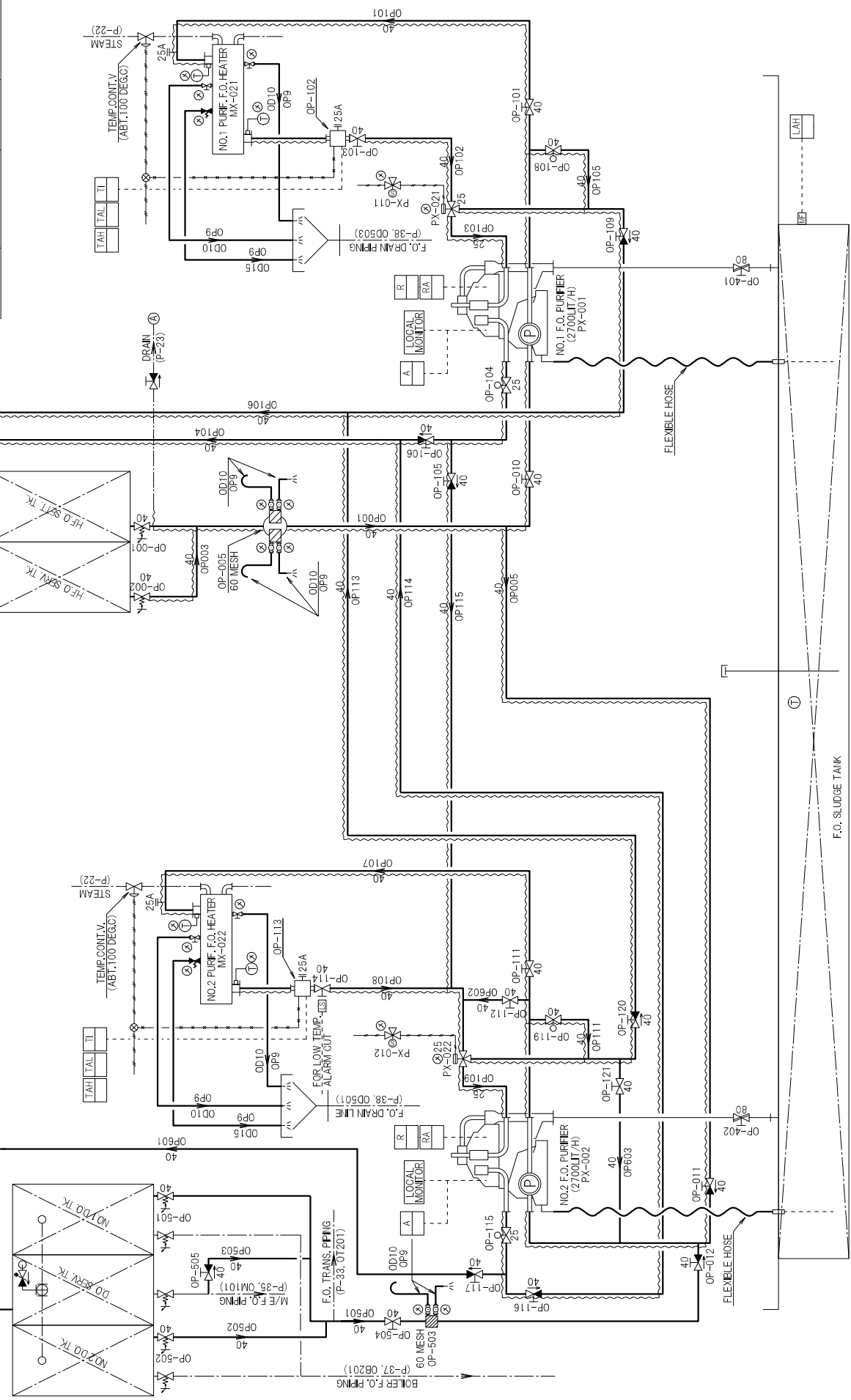
DECK SCUPPER PIPING
11



PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
OP001 - 005	02,04	OP001 - 012	03,04,06-09
OP101 - 115	10,12	OP101 - 121	07,10,18.
OP501 - 503		OP501 - 505	
OP601 - 604	04	OP601 - 605	
OP9		OP9	01

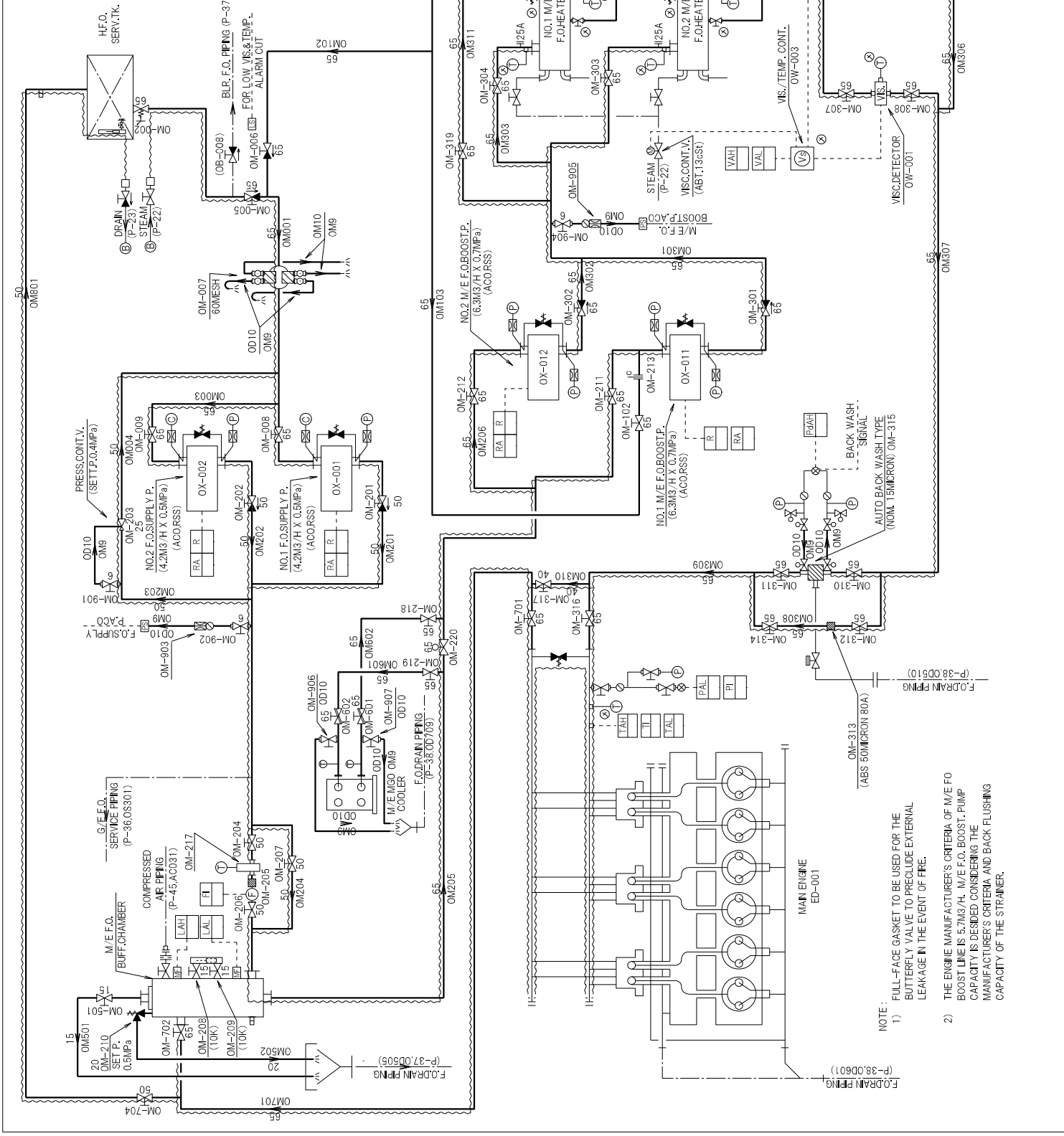
PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
OP001 - 005	02,04	OP001 - 012	03,04,06-09
OP101 - 115	10,12	OP101 - 121	07,10,18.
OP501 - 503		OP501 - 505	
OP601 - 604	04	OP601 - 605	
OP9		OP9	01

NOTE:
 THE RECOMMENDED PURIFIER'S CAPACITY BY MAN DIESEL AND
 DAHATSU ARE AS FOLLOWS.
 - MAN DIESEL : 0.23L/KW.HR. LE. 2.63L/H
 - DAHATSU : THERE IS NO RECOMMENDATION.
 THE MAX. CAPACITY OF SELECTED PURIFIERS : 3.900L/H



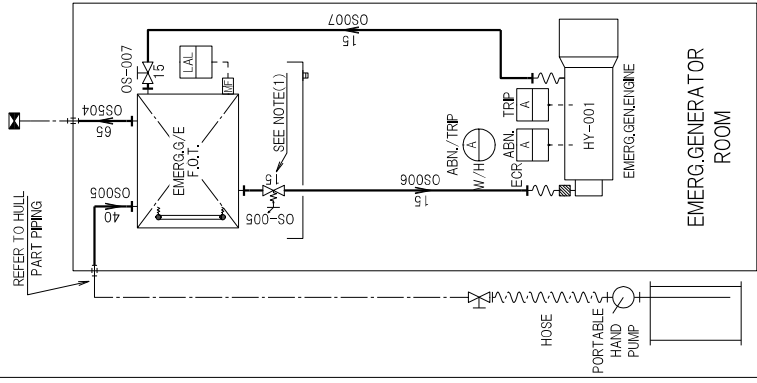
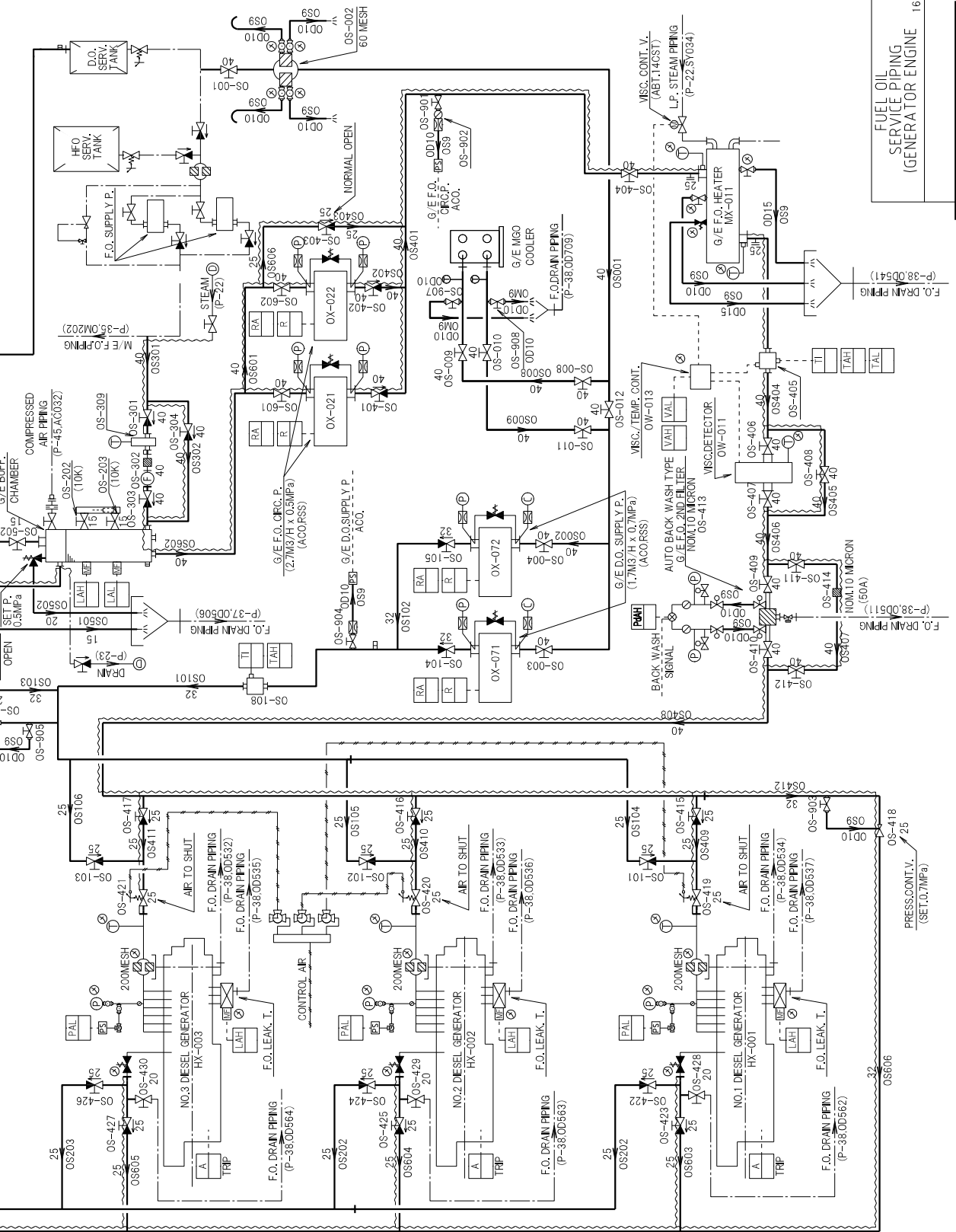
FUEL OIL
 PURIFICATION PIPING

PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
OM001 - 004 02		OM001 - 009	01.03.04
OM101 - 104 04		OM101 - 105	03-05
OM201 - 207 07		OM201 - 220	14-16.
OM301 - 311 11		OM301 - 319	
OM501 - 502		OM501	
OM601 - 602		OM601 - 602	
OM701		OM701 - 704 03	
OM801			
OM9		OM901 - 907	



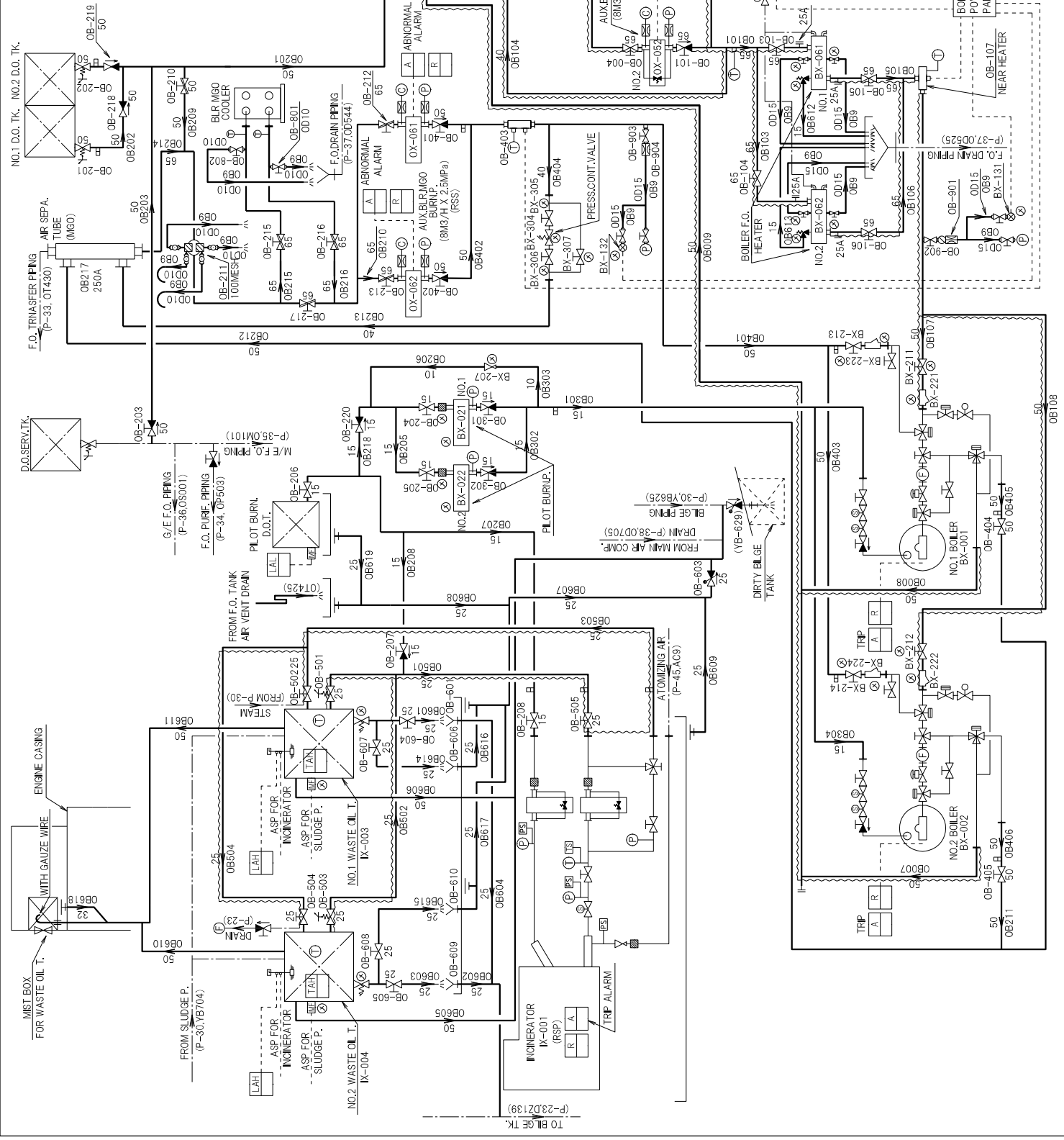
- NOTE:
- 1) FULL-FACE GASKET TO BE USED FOR THE BUTTERFLY VALVE TO PRECLUDE EXTERNAL LEAKAGE IN THE EVENT OF FIRE.
 - 2) THE ENGINE MANUFACTURER'S CRITERIA OF M/E FO BOOST LINE IS 5.7M3/H. M/E F.O. BOOST. PUMP CAPACITY IS DESIGNED CONSIDERING THE MANUFACTURER'S CRITERIA AND BACK FLUSHING CAPACITY OF THE STRAINER.

PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
OS001 - 010	08.09.10	OS001 - 013	06.13
OS101 - 107		OS201 - 206	01
OS201 - 206	01	OS301 - 303	05.06.08
OS301 - 303		OS401 - 412	01
OS401 - 412	03	OS501 - 502	01
OS501 - 502		OS601 - 602	
OS601 - 602		OS901 - 909	06
OS9			

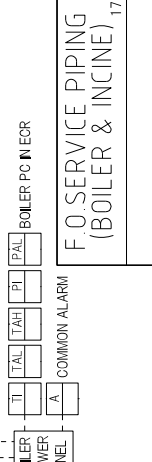


- NOTE:
- (1) THE EMERGENCY SHUT OFF VALVE (OS-005) TO BE OPERATED REMOTELY VIA WIRE FROM THE OUTSIDE OF EMERGENCY GENERATOR ROOM.
 - (2) THE SOLAS REQUIREMENT IS OPERATION OF 18 HOURS FOR THE EMERGENCY GENERATOR. THE CAPACITY OF EMERG. G/E F.O. TANK IS NOMINAL 1M3 AND COMPLES WITH THE REQUIREMENT OF SOLAS. MINIMUM REQUIRED LEVEL (FOR 18 HOURS OPERATION) FOR EMERGENCY G/E F.O. TANK TO BE MARKED ON THE LEVEL GAUGE.
 - (3) THE ENGINE MANUFACTURER'S CRITERIA OF G/E F.O. CIRCULATION LINE IS 1.64M3/H. G/E F.O. CIRC. PUMP CAPACITY IS DESIGNED CONSIDERING THE MANUFACTURER'S CRITERIA AND BACK FLUSHING CAPACITY OF THE STRAINER.

PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
OB001 - 010	03	OB001 - 008	02,06,07
OB101 - 109		OB201 - 218	04
OB201 - 218	04	OB301 - 302	
OB301 - 304		OB401 - 405	
OB401 - 406		OB501 - 505	
OB501 - 504		OB601 - 610	02
OB601 - 618		OB801 - 802	
OB9		OB901 - 904	

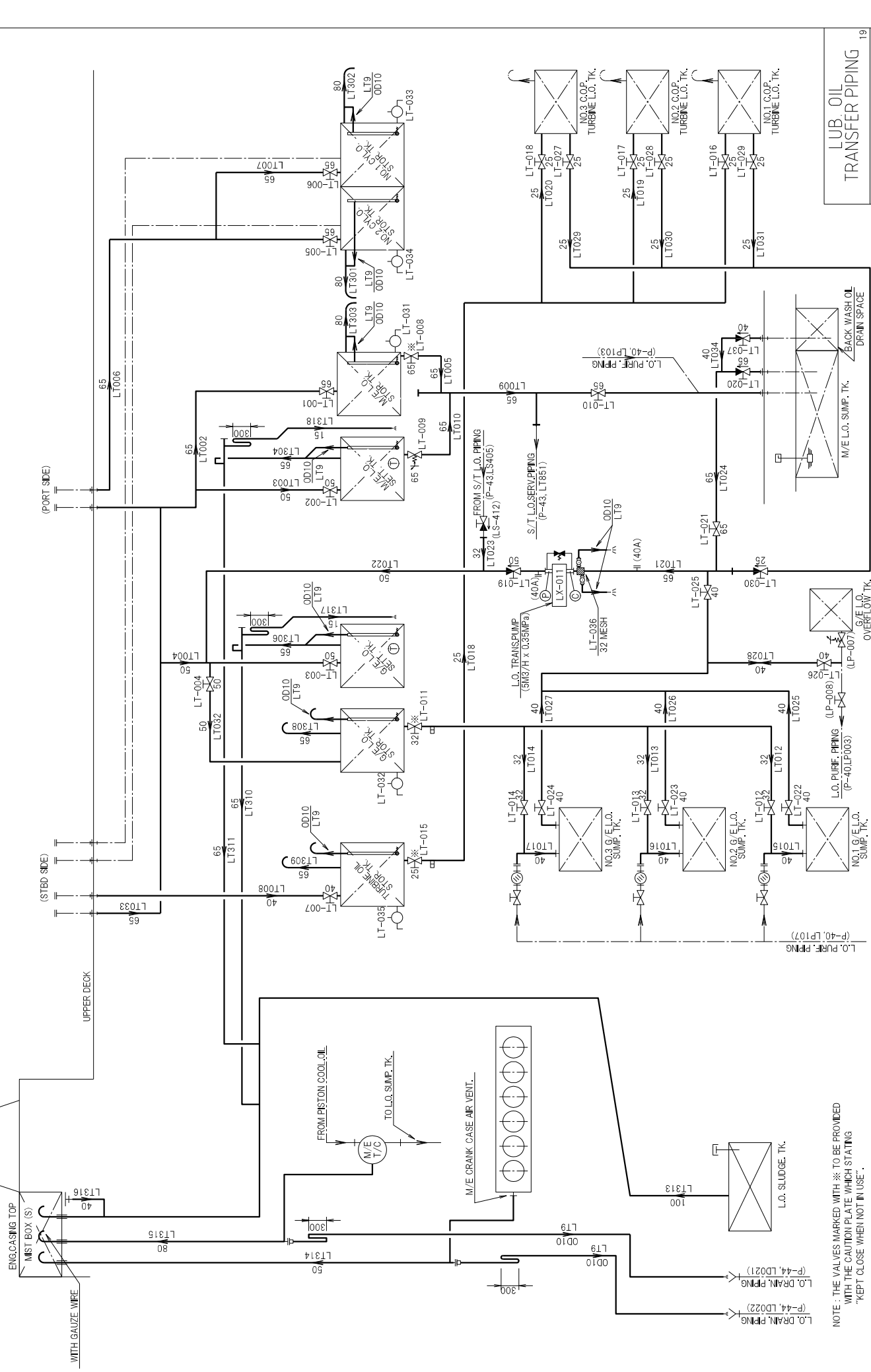


NOTE: 1) BOILER F.O. SUPPLY FROM H.F.O. SERVICE TANK TO BE USED ONLY WHEN THERE ARE ABNORMALLY MATCH FOREIGN PARTICLES IN FUEL OIL FROM H.F.O. SETTLING TANK.
 2) WHEN BOILER F.O. IS SUPPLIED FROM H.F.O. SERV. TANK RUN TWO (2) PURIFIERS.
 3) FULL-FACE GASKET TO BE USED FOR THE BUTTERFLY VALVE TO PRECLUDE EXTERNAL LEAKAGE IN THE EVENT OF FIRE.



F.O. SERVICE PIPING
(BOILER & INCINER.)

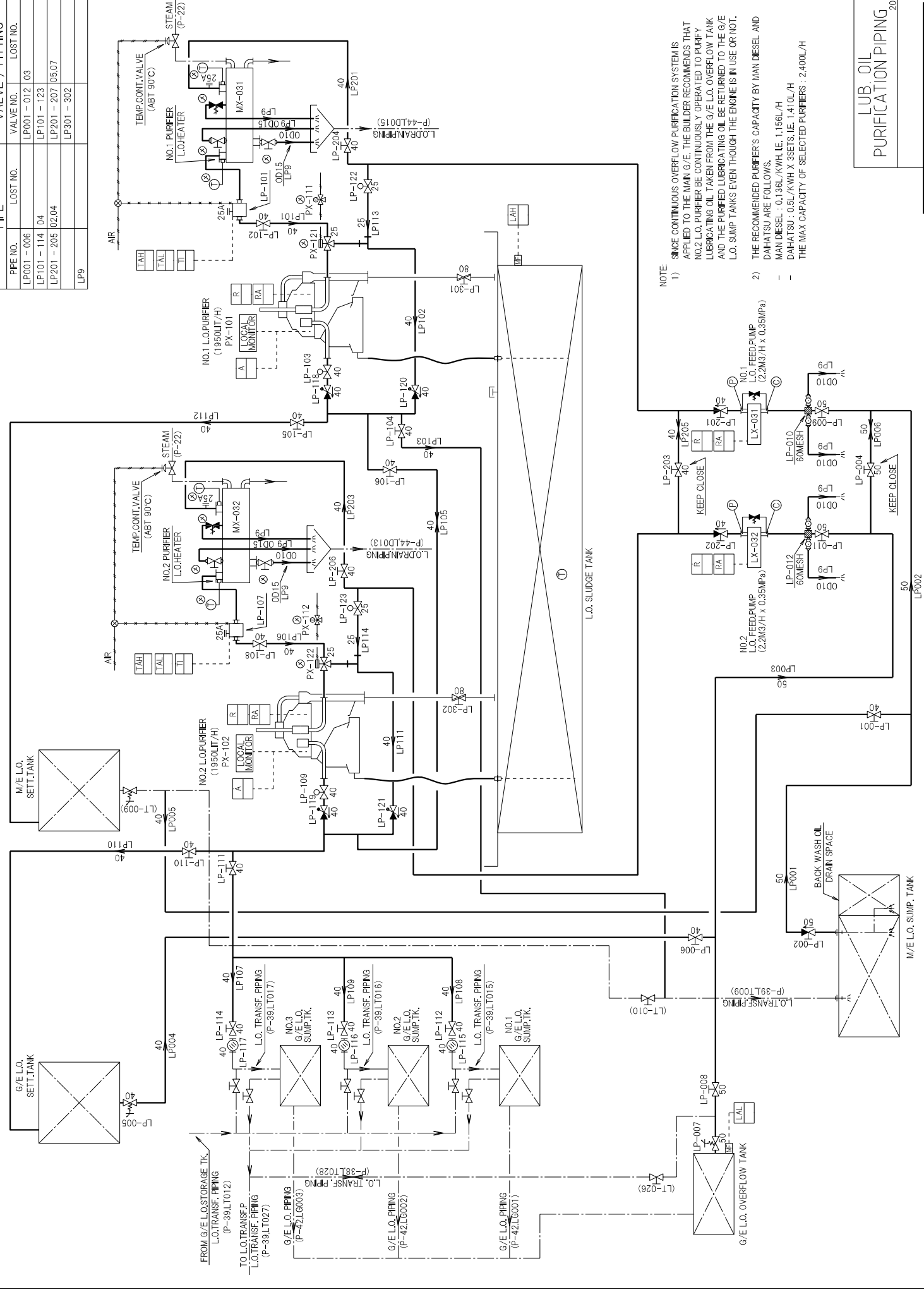
PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
LT001 - 034		LT001 - 037	
LT301 - 318 12			
LT19			



NOTE: THE VALVES MARKED WITH * TO BE PROVIDED WITH THE CAUTION PLATE WHICH STATING "KEPT CLOSE WHEN NOT IN USE".

PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
LP001 - 006		LP001 - 012	03
LP101 - 114	04	LP201 - 207	05,07
LP201 - 205	02,04	LP301 - 302	
LP9			

P-40

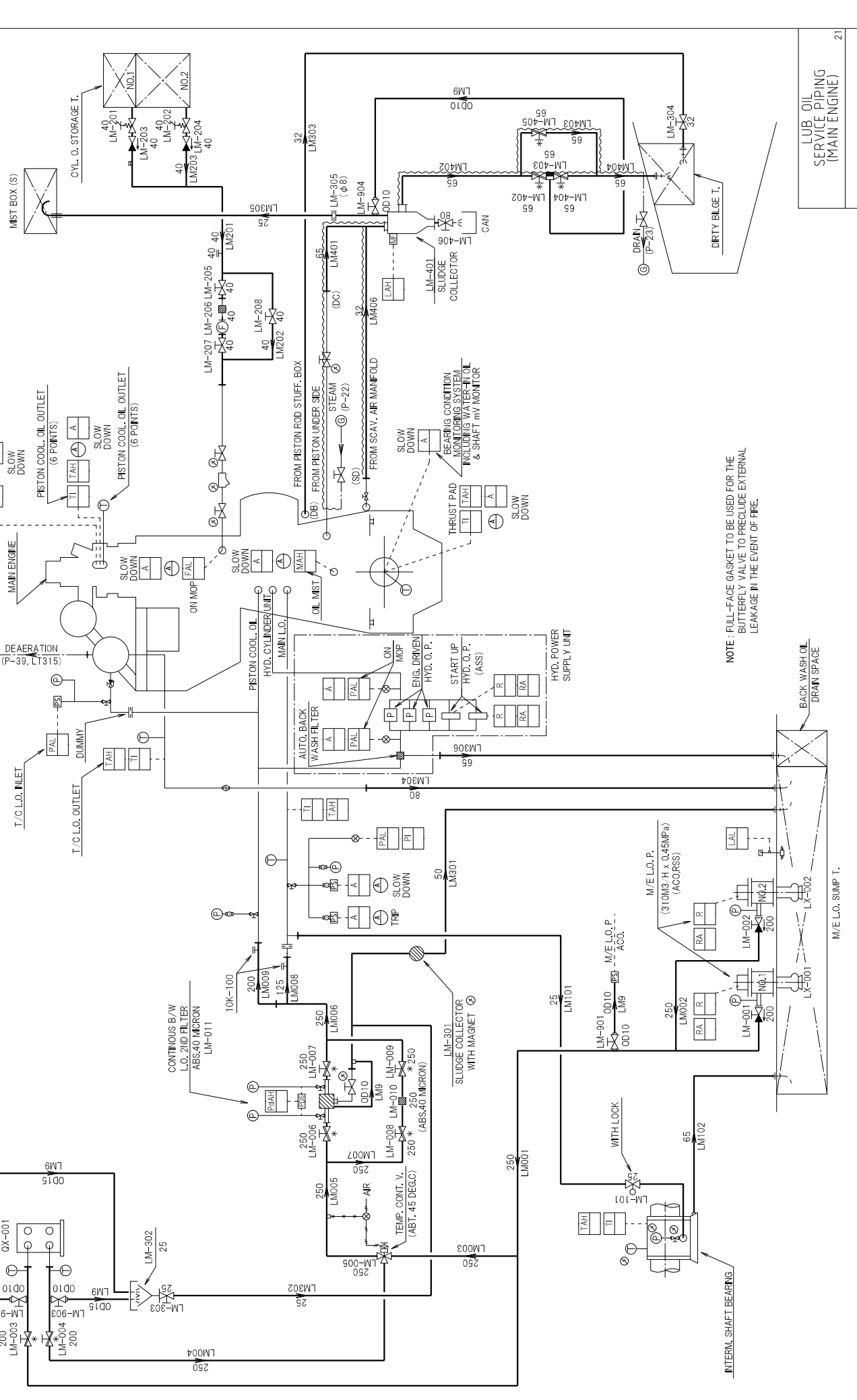


NOTE:

- 1) SINCE CONTINUOUS OVERFLOW PURIFICATION SYSTEM IS APPLIED TO THE MAIN G/E, THE BUILDER RECOMMENDS THAT NO.2 L.O. PURIFIER BE CONTINUOUSLY OPERATED TO PURIFY LUBRICATING OIL TAKEN FROM THE G/E L.O. OVERFLOW TANK AND THE PURIFIED LUBRICATING OIL BE RETURNED TO THE G/E L.O. SUMP TANKS EVEN THOUGH THE ENGINE IS IN USE OR NOT.
- 2) THE RECOMMENDED PURIFIER'S CAPACITY BY MAN DIESEL AND DAHATSU ARE AS FOLLOWS:
 MAN DIESEL : 0.136L/KWH IE. 1.156L/H
 DAHATSU : 0.5L/KWH X 3SETS IE. 1.410L/H
 THE MAX CAPACITY OF SELECTED PURIFIERS : 2.400L/H

LUB. OIL
PURIFICATION PIPING

PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
LM001 - 009		LM001 - 011	
LM101 - 102		LM101	
LM201 - 203		LM201 - 208	
LM301 - 306		LM301 - 305	
LM401 - 406 05		LM401 - 406	
LM9		LM901 - 904	

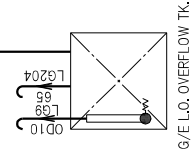
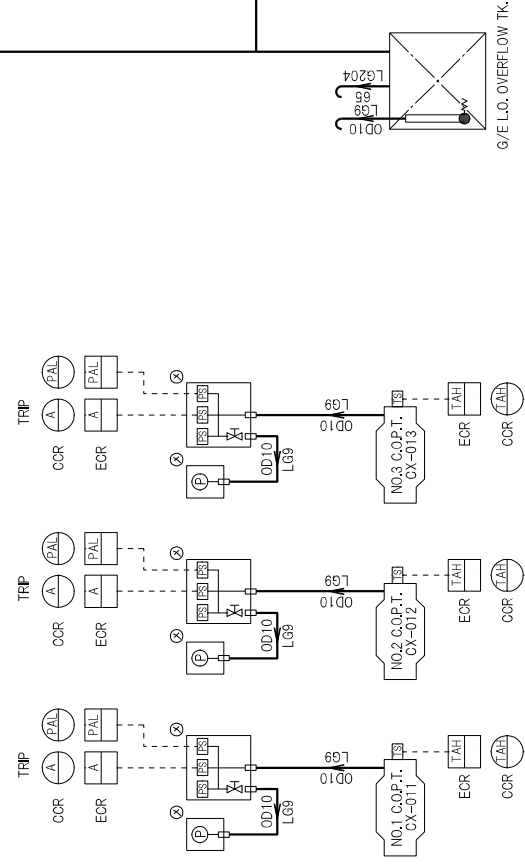
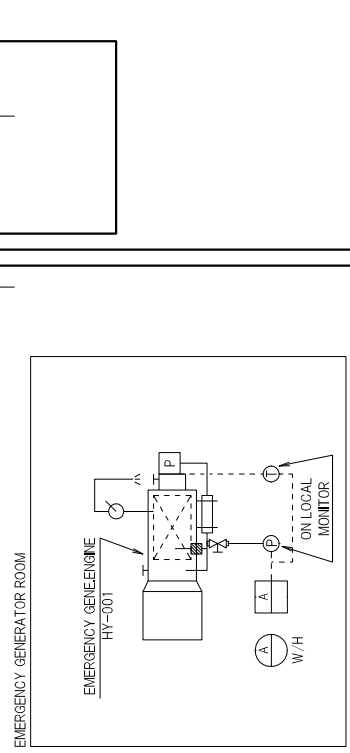
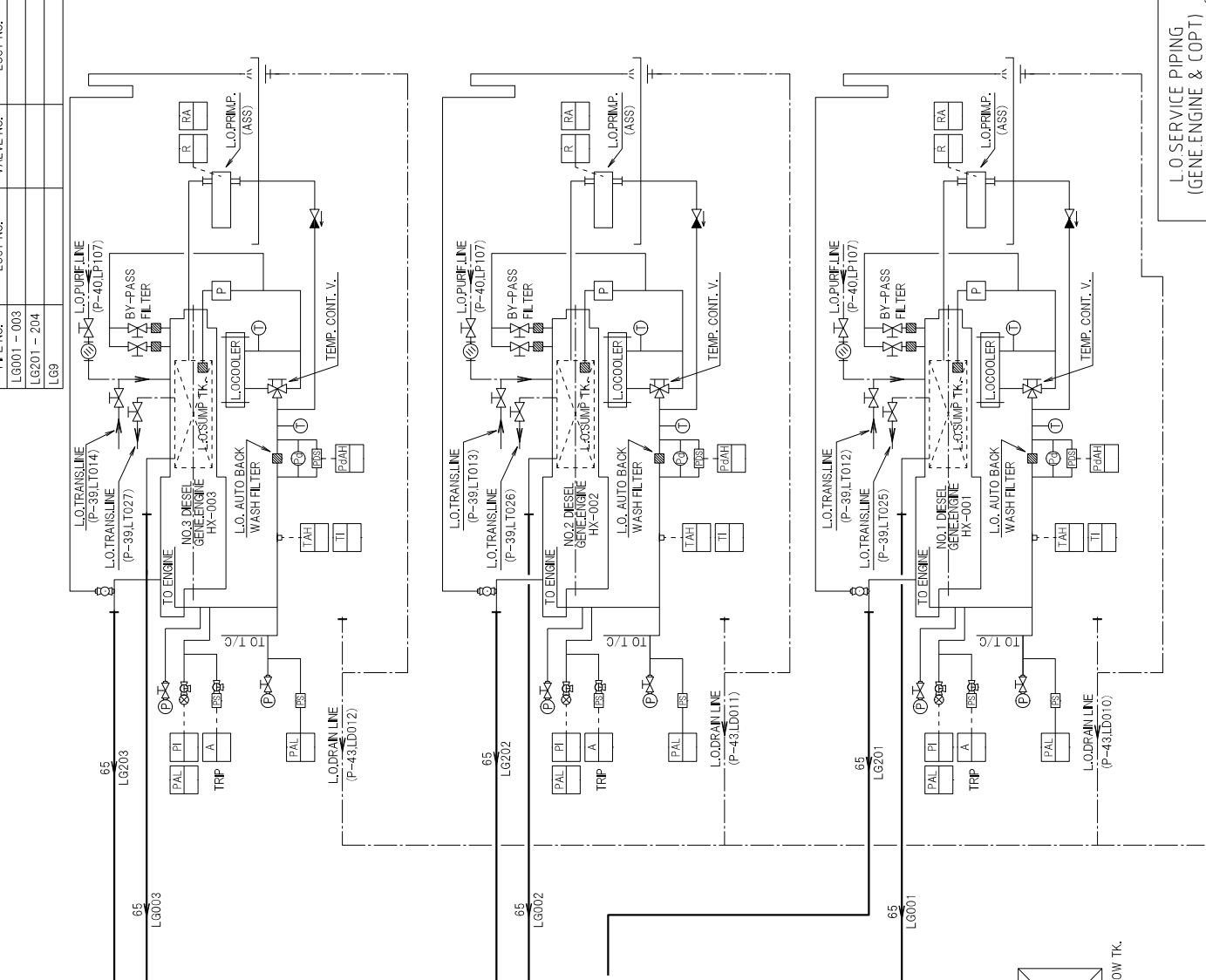


NOTE: FULL-FACE GASKET TO BE USED FOR THE BUTTERFLY VALVE TO PRECLUDE EXTERNAL LEAKAGE IN THE EVENT OF FIRE.

LUB. OIL SERVICE PIPING (MAIN ENGINE)

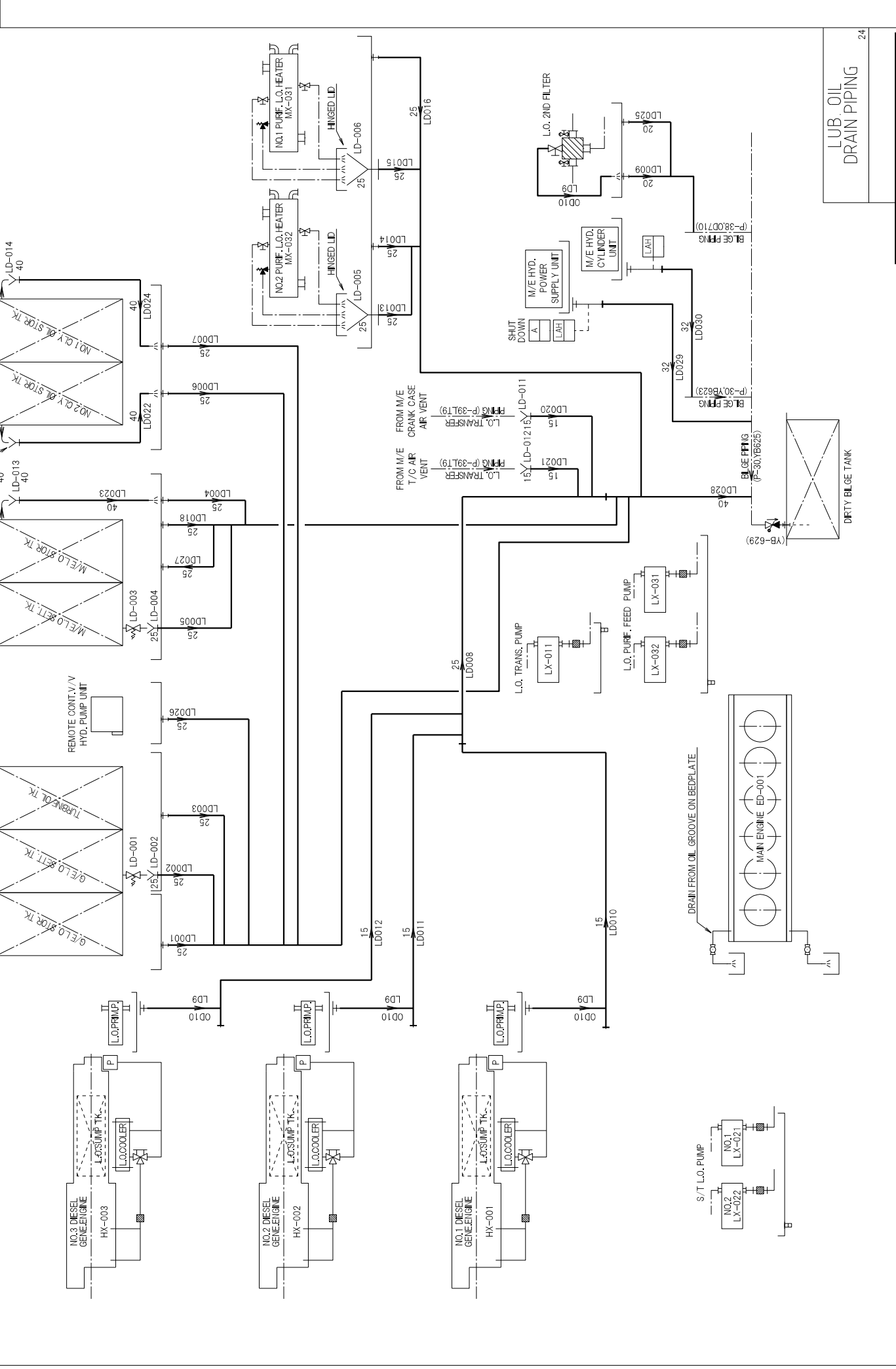
PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
LG001 - 003			
LG201 - 204			
LG8			

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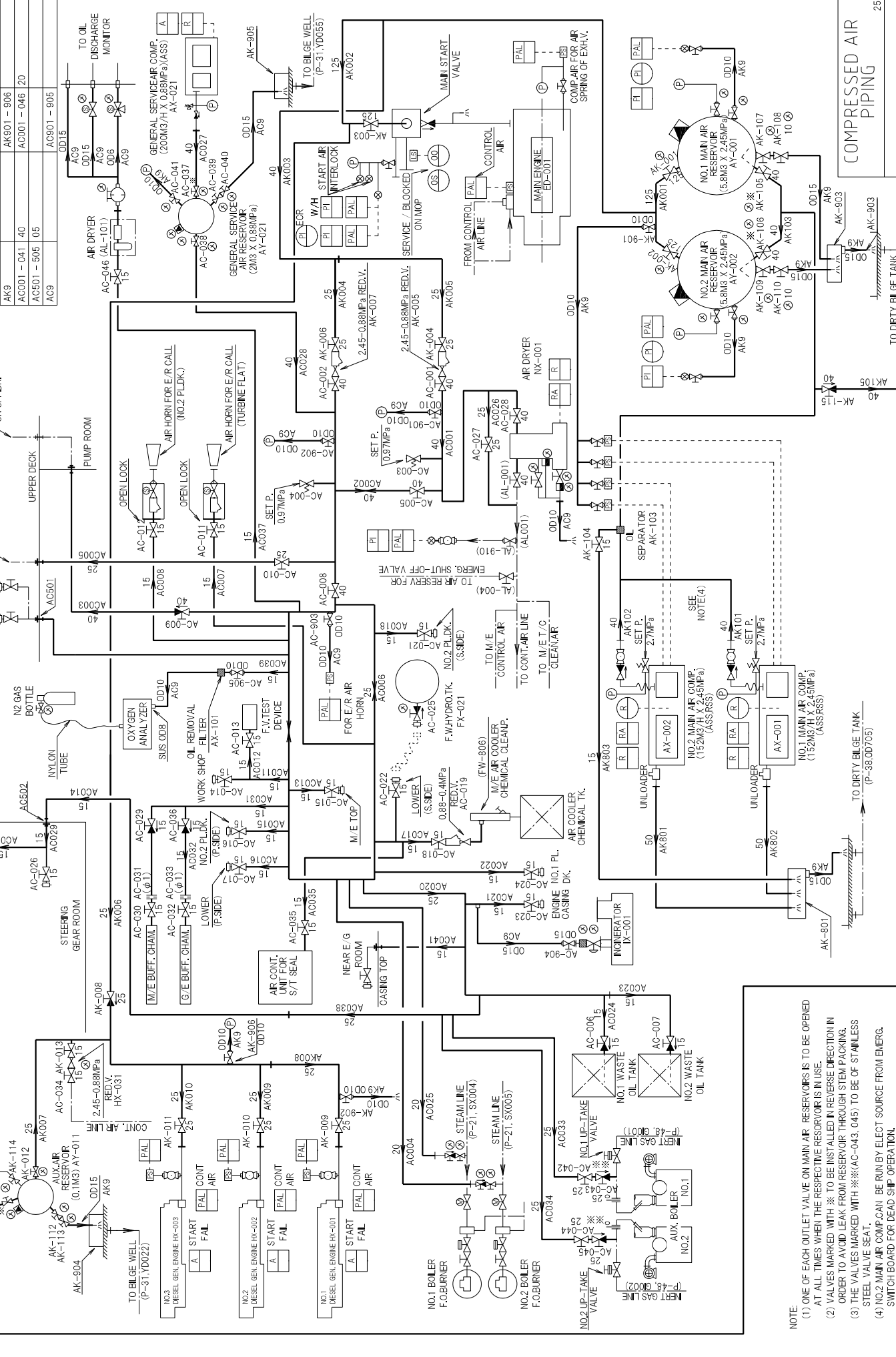
L.O SERVICE PIPING
(GENE ENGINE & COPT)

PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
LD001 - 030	28	LD001 - 014	07-09
LD8			



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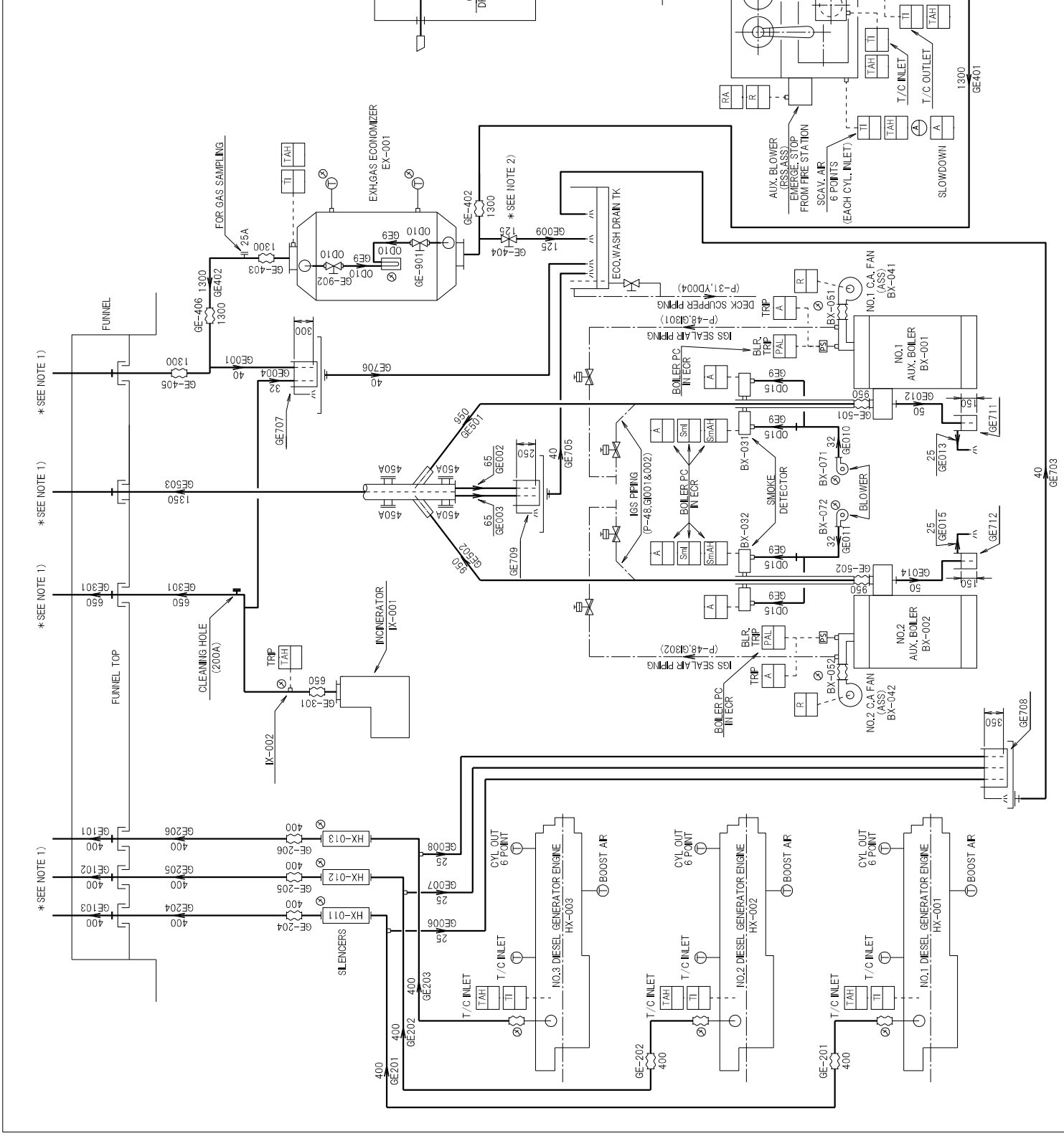
PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
AK001 - 009		AK001 - 014	
AK101 - 105		AK101 - 115	01.02.11
AK801 - 803	01	AK801	
AK9		AK901 - 906	
AC001 - 041	40	AC001 - 046	20
AC501 - 505	05		
AC9		AC901 - 905	



- NOTE:
- (1) ONE OF EACH OUTLET VALVE ON MAIN AIR RESERVOIRS IS TO BE OPENED AT ALL TIMES WHEN THE RESPECTIVE RESERVOIR IS IN USE.
 - (2) VALVES MARKED WITH * TO BE INSTALLED IN REVERSE DIRECTION IN ORDER TO AVOID LEAK FROM RESERVOIR THROUGH STEM PACKING.
 - (3) THE VALVES MARKED WITH ** (AC-043, 045) TO BE OF STAINLESS STEEL VALVE SEAT.
 - (4) NO.2 MAIN AIR COMP. CAN BE RUN BY ELECT SOURCE FROM EMERG. SWITCH BOARD FOR DEAD SHIP OPERATION.

PIPE		VALVE / FITTING	
PPE NO.	LOST NO.	VALVE NO.	LOST NO.
GE001 - 016			
GE101 - 103		GE201 - 207	03
GE201 - 208		GE301	
GE301		GE401 - 406	
GE401 - 402		GE501 - 502	
GE501 - 503			
GE701 - 712			
GE801			
GE9		GE901 - 902	

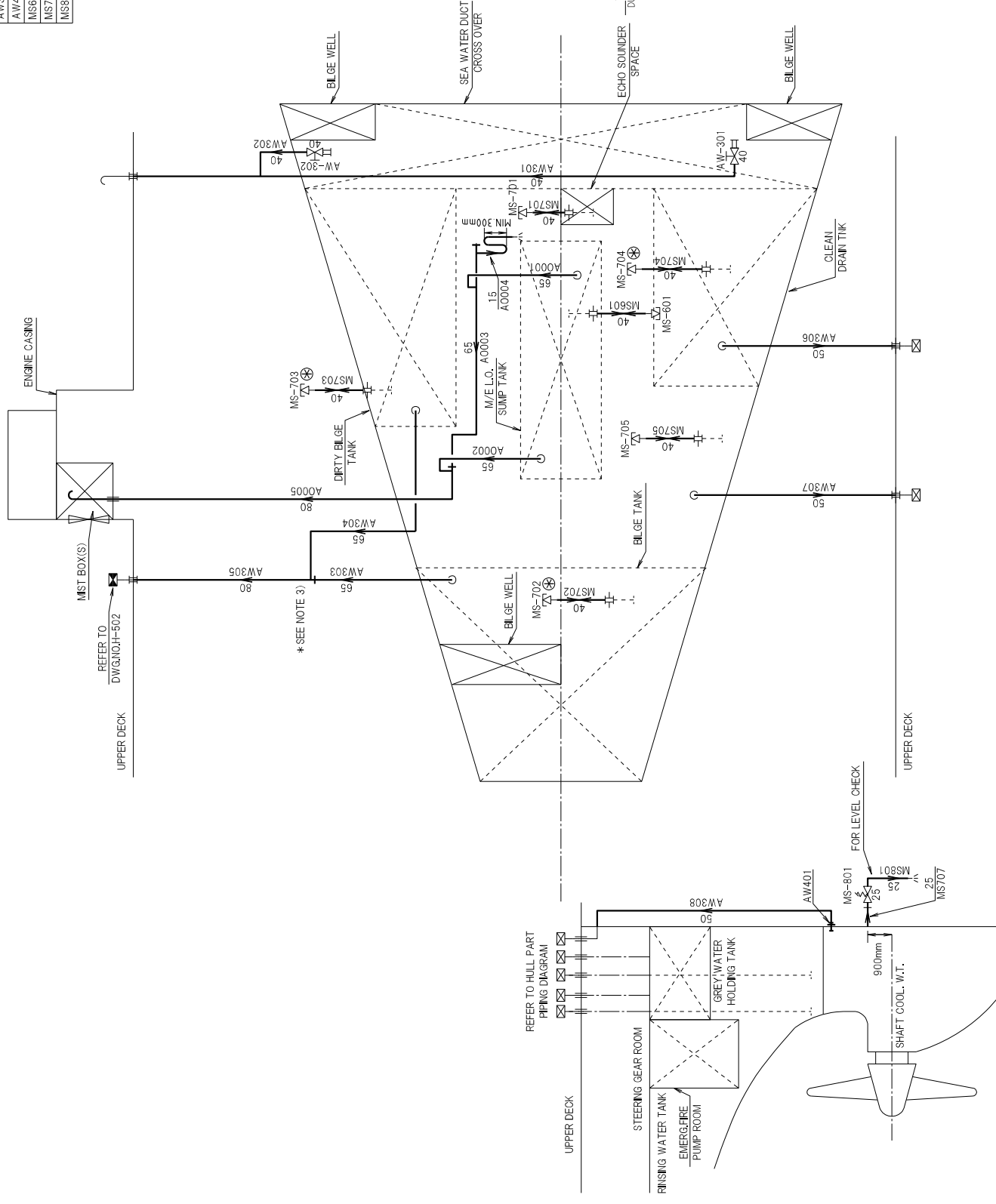
NOTE : (1) SPARK ARRESTING STAINLESS STEEL WIRE NET TO BE PROVIDED.
 (2) OPEN THE VALVE OF GE-404 WHEN THE EXH.GAS ECONOMIZER IS WASHED BY F.W.



EXHAUST GAS PIPING

PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
A0001 - 005		AW301 - 302	
AW301 - 309		MS801	
AW401		MS701 - 705	
MS601		MS801	
MS701 - 707			
MS801			

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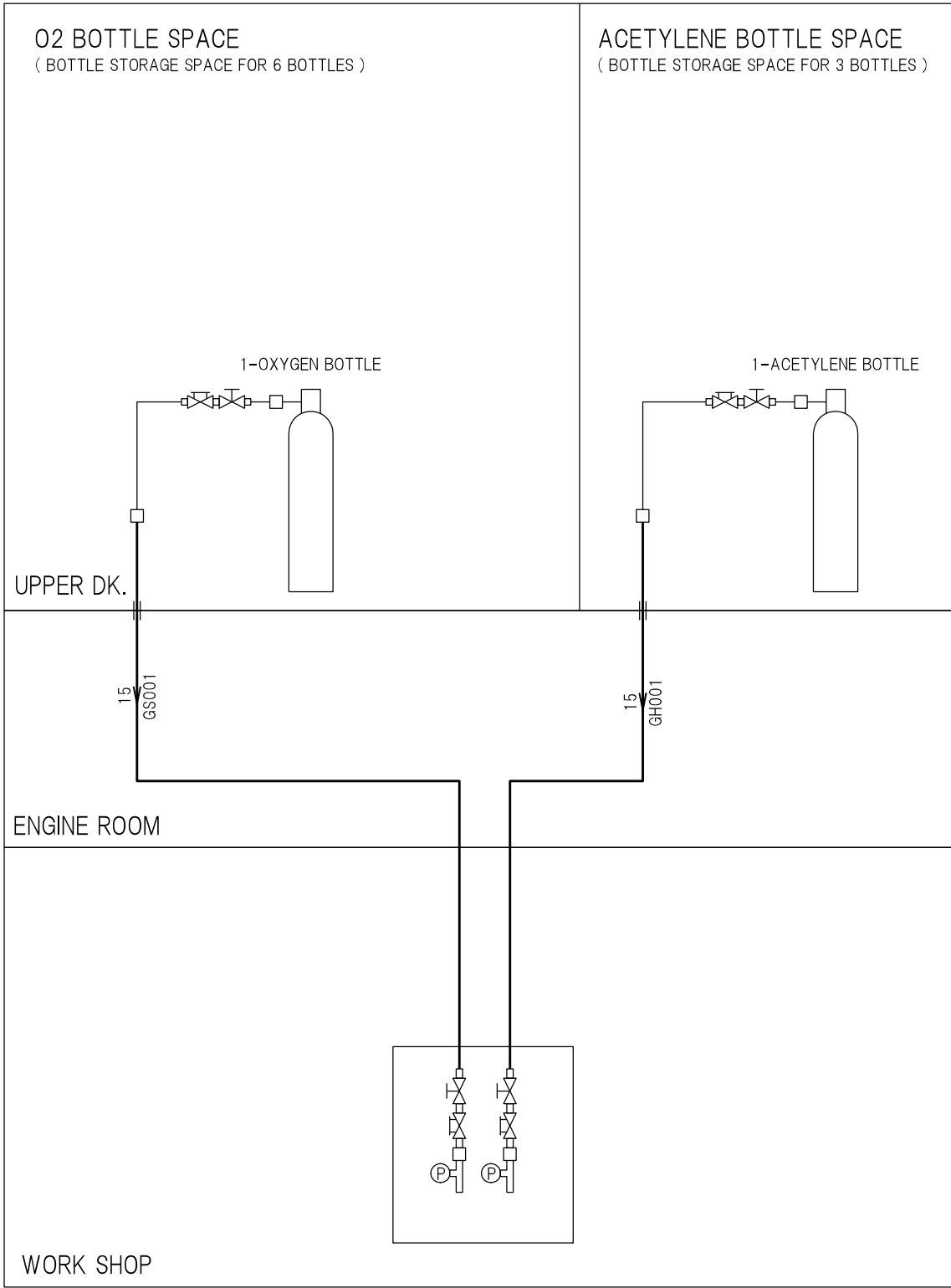
REFER TO DWG. NO. H-502
 * SEE NOTE 3)

- NOTE: 1) SOUNDING CAP MARKED WITH ⊗ TO HAVE SELF CLOSING DEVICE AND LEVEL CHECKER.
- 2) THE MANHOLES FOR COFFERDAM IN ENGINE ROOM TO BE PROVIDED WITH CAUTION PLATES WHICH STATING "MUST BE ADEQUATELY VENTILATED BEFORE ENTERING."
- 3) AW303 AND AW304 TO BE CONNECTED ABOVE THE FULL LOAD WATER LINE TO AW305.

REFER TO HULL PART PIPING DIAGRAM

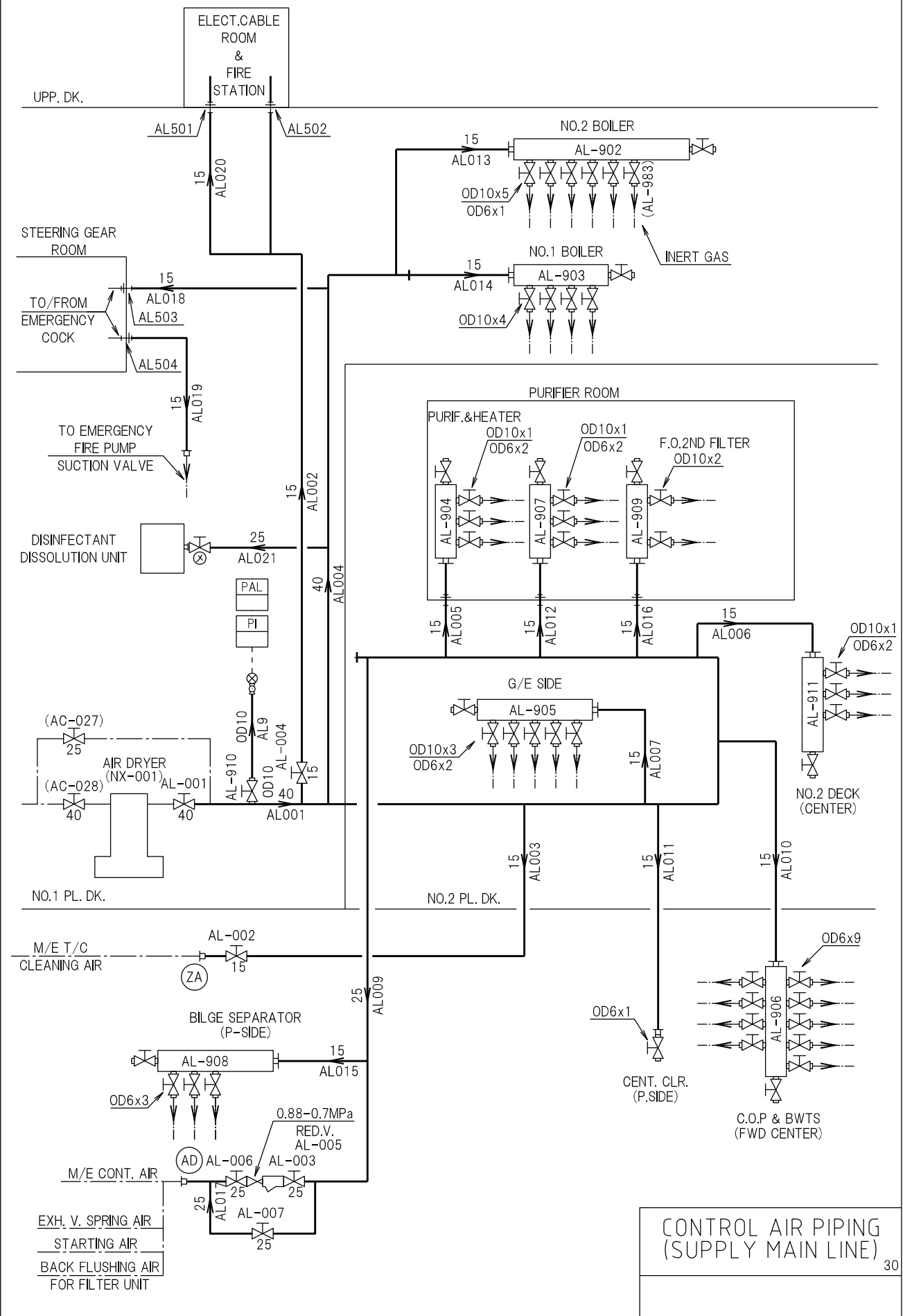
PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
GS001			
GH001			

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PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
AL001 - 021		AL001 - 008	08
AL501 - 504			
AL9		AL902 - 911	

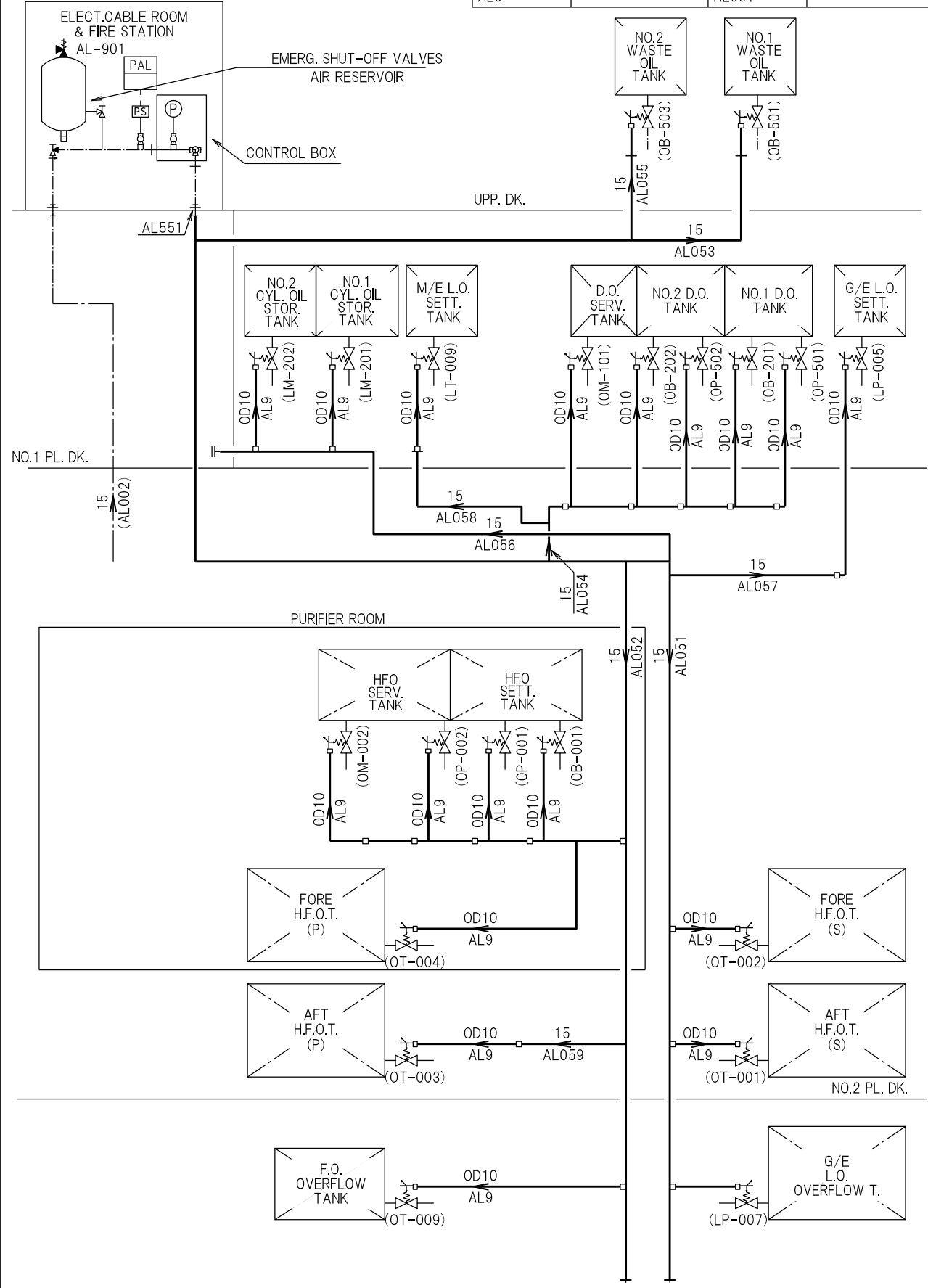
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CONTROL AIR PIPING
(SUPPLY MAIN LINE)
30

PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
AL051 - 059			
AL9		AL901	

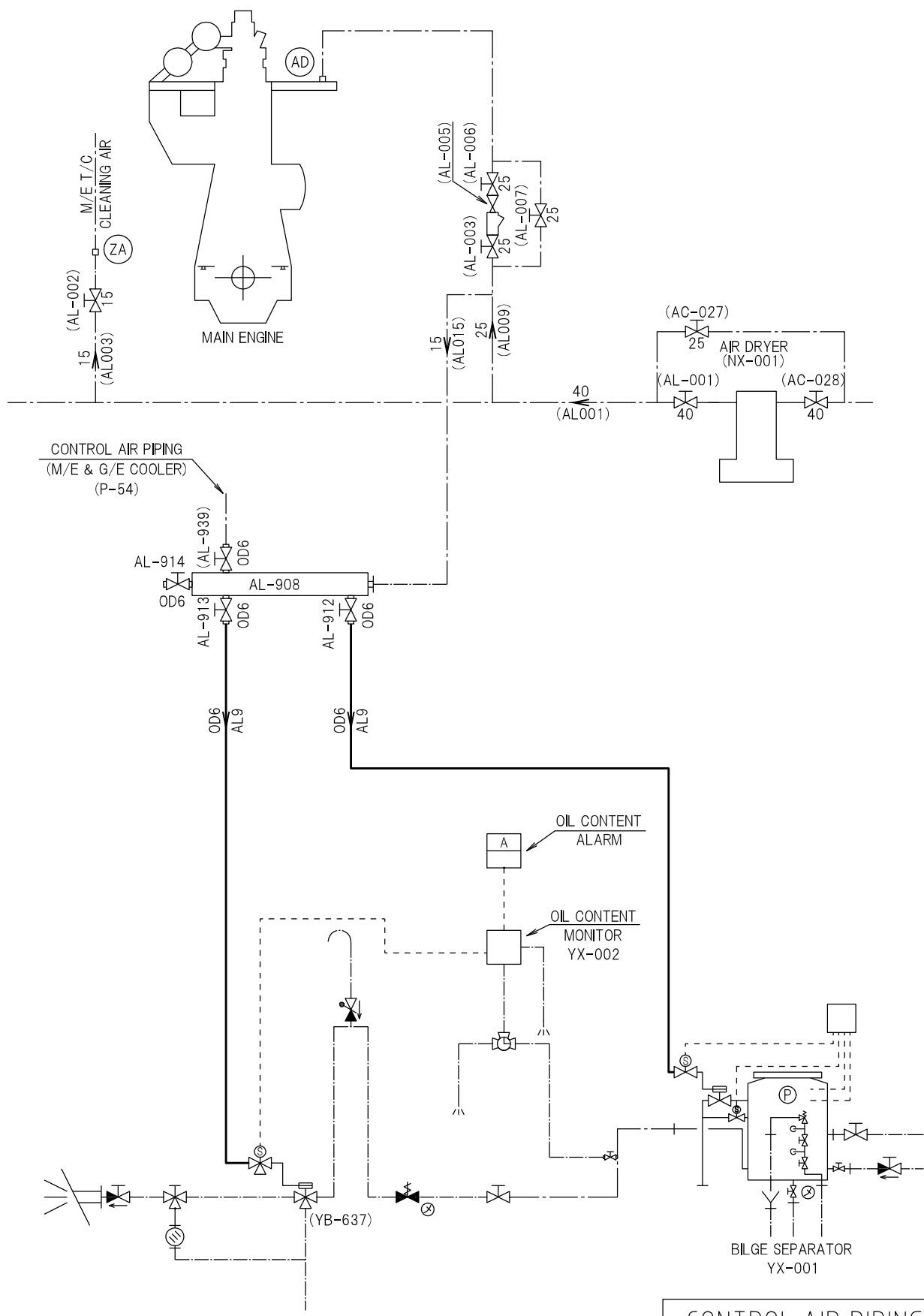
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CONTROL AIR PIPING
(EMERG. SHUT-OFF)

PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
AL9		AL912 - 914	

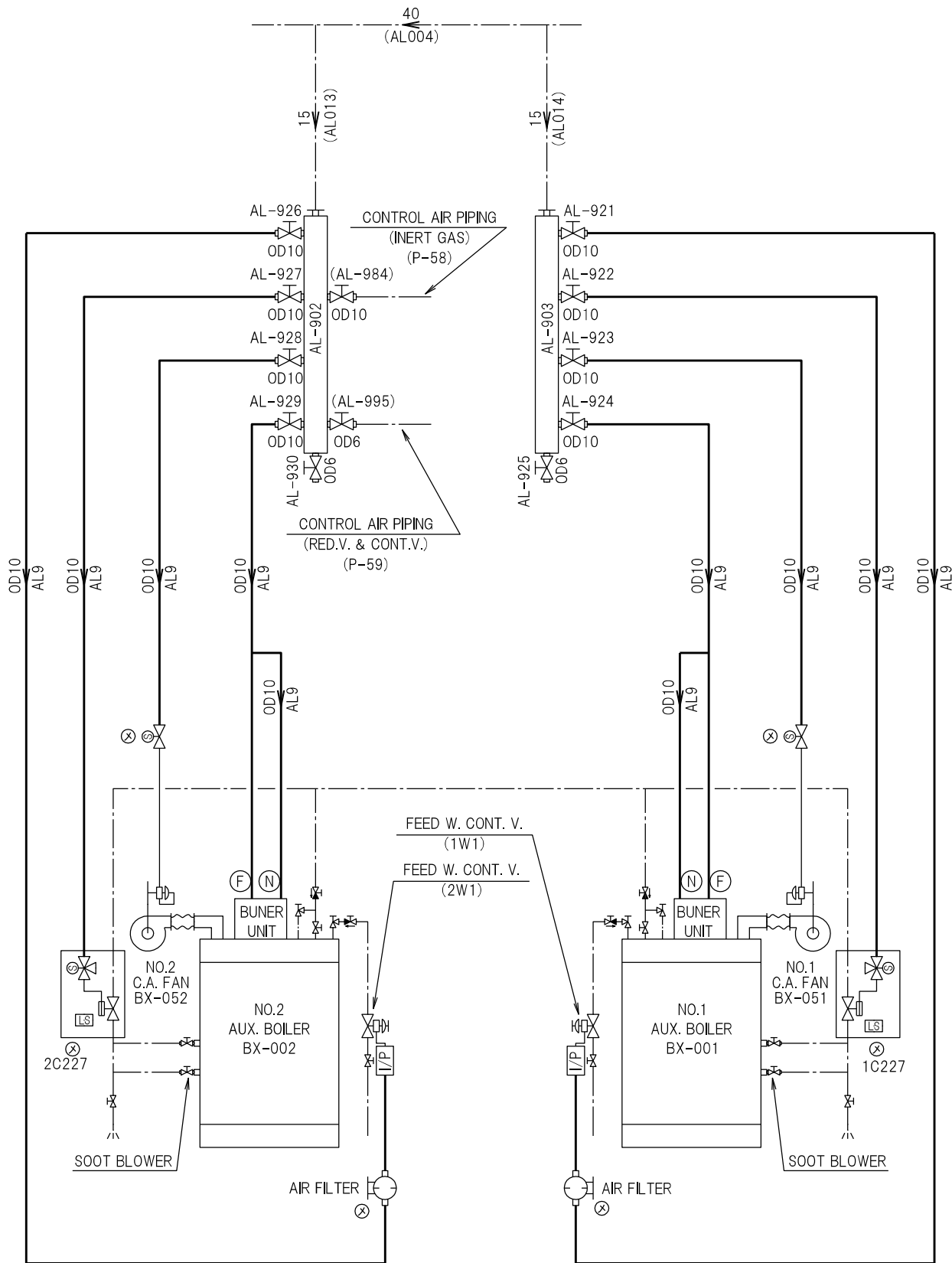
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CONTROL AIR PIPING (BILGE SEPARATOR)

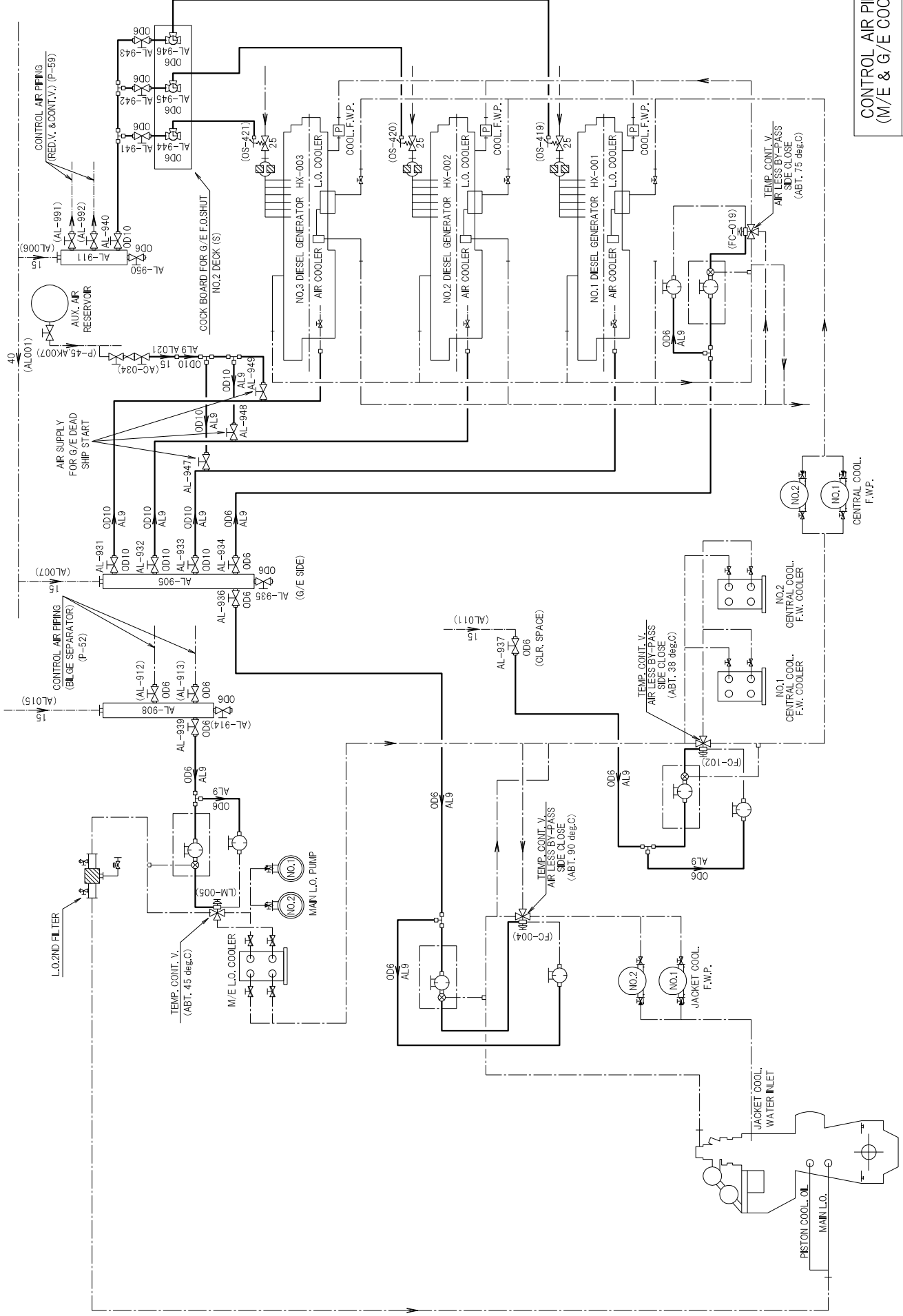
PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
AL9		AL921 - 930	

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CONTROL AIR PIPING
(AUX. BOILER CONTROL)

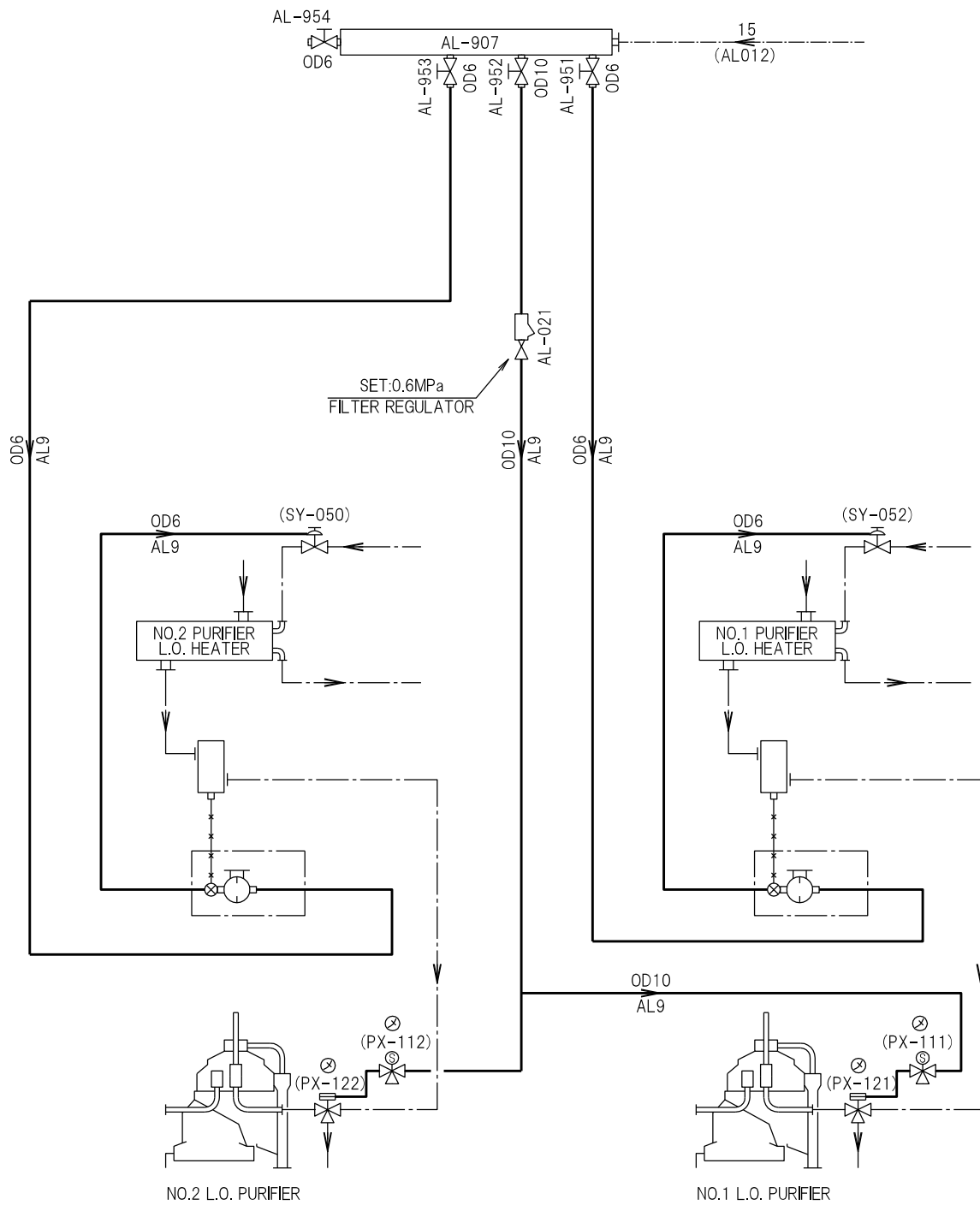
PIPE		VALVE / FITTING	
PIPE NO.	AL9	VALVE NO.	AL831 - 950 38
LOST NO.		LOST NO.	



CONTROL AIR PIPING
(M/E & G/E COOLER) 34

PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
AL9		AL951 - 954	
		AL021	

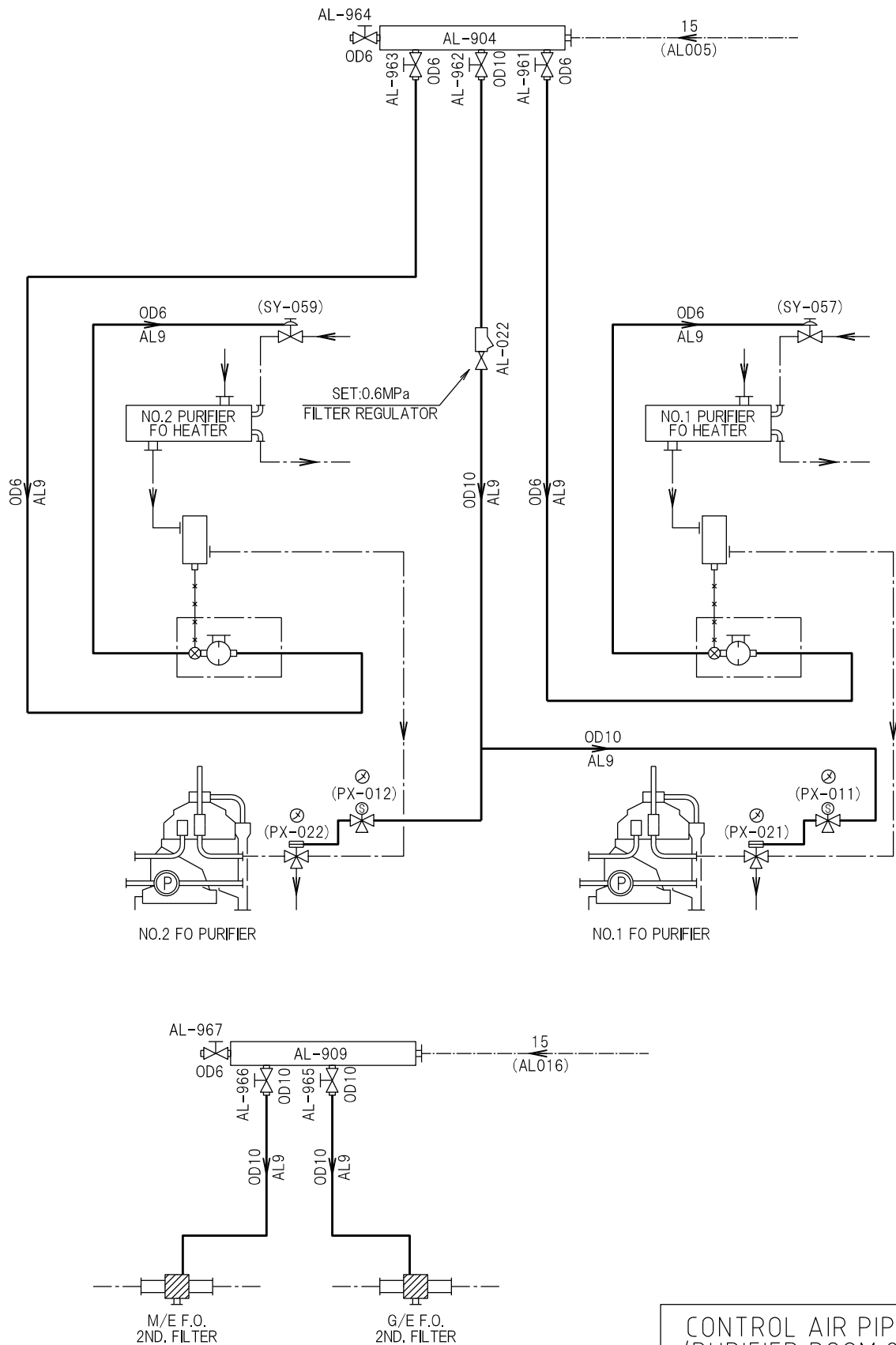
P-55



CONTROL AIR PIPING
(PURIFIER ROOM 1/2)

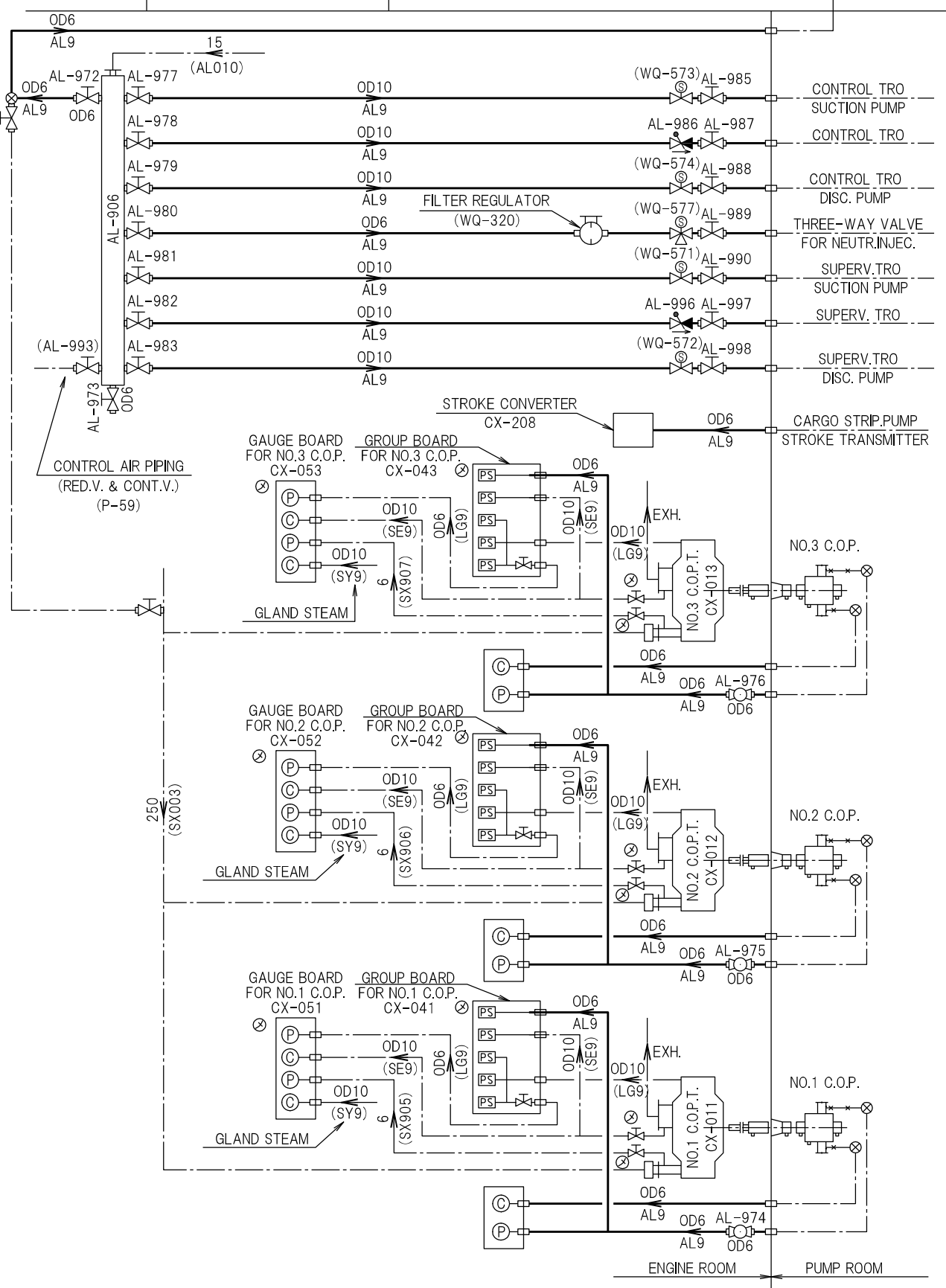
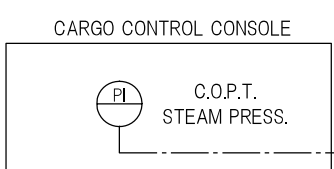
PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
AL9		AL961 - 968	68
		AL022	

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CONTROL AIR PIPING
(PURIFIER ROOM 2/2)

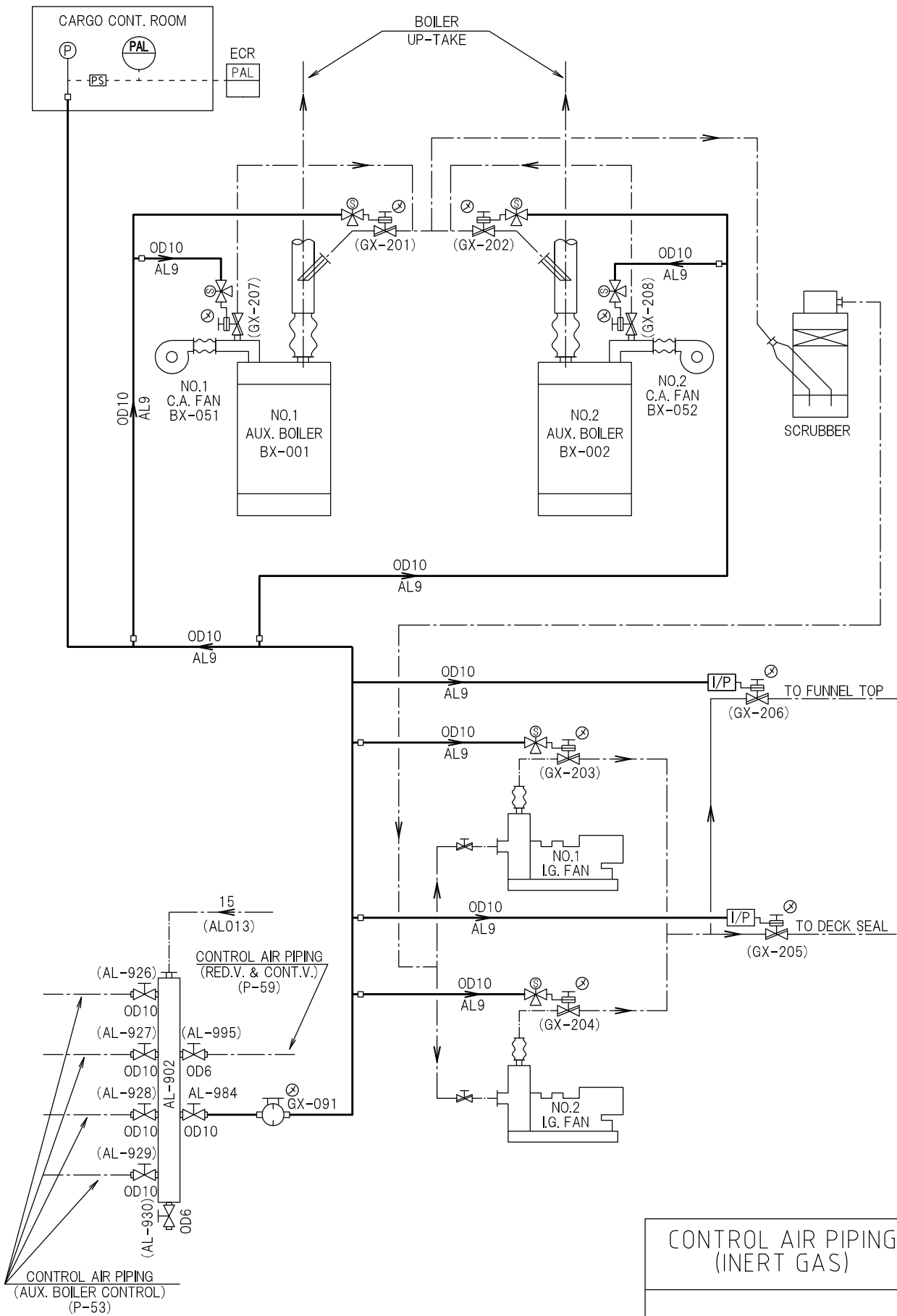
PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
AL9		AL972 - 990	84
		AL996 - 998	



CONTROL AIR PIPING
(C.O.P. & STRIP.P. & BWTS)
37

PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
AL9		AL984 - 984	

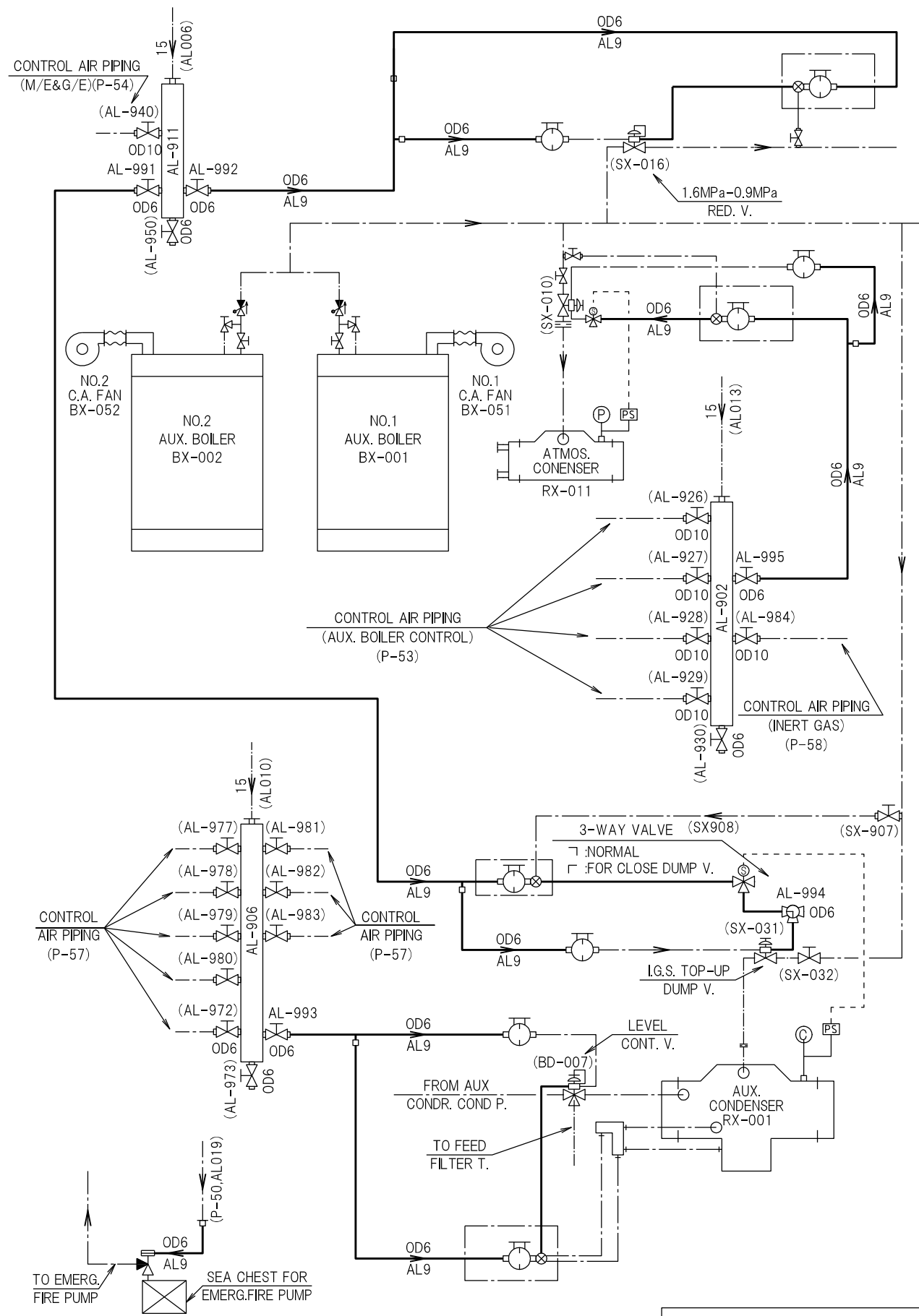
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CONTROL AIR PIPING (INERT GAS)

PIPE		VALVE / FITTING	
PIPE NO.	LOST NO.	VALVE NO.	LOST NO.
AL9		AL991 - 995	

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CONTROL AIR PIPING
(RED.V. & CONT. V.)

**CALCULATION OF REQUIRED TIME TO RESTORE PROPULSION
FROM A DEADSHIP CONDITION**

1. MINIMUM STARTING AIR PRESSURE

- 1) Generator engine : 1.2 MPa ^(*1)
2) Main engine : 1.0 MPa ^(*2)

2. AIR COMPRESSOR CAPACITY

- 1) Main air compressor : 152 m3/hr ^(*3) x 2.45 MPa

3. AIR RESERVOIR CAPACITY

- 1) Main air reservoir : 5.8 m3 ^(*5)
2) Aux. air reservoir : 0.1 m3 ^(*6)

4. REQUIRED TIME OF EACH STEPS

STEP No.	WORK CONTENT	REQUIRED TIME (min.)	REMARKS
1	Emerg. G/E start	-	
2	Main. air comp. Start	3	
3	Air charge to aux. air reservoir	1	NOTE 1
4	Main G/E start and ACB on	1	
5	Main air comp. Start		Auto start
6	Air charge to main air reservoir	12	NOTE 2
7	Main engine start	2	Including air blow
Total required time		19	

NOTE 1 : Required time is calculated as follows;

$$\frac{\text{Aux. air reservoir capacity (m3)} \times \text{Starting air pressure (MPa)} \times 60(\text{hr/min.})}{\text{Main air compressor capability (m3/hr)} \times \text{Atmospheric pressure (MPa)}} \\ = 0.1^{(*6)} \times 1.2^{(*1)} \times 60 / 152^{(*3)} / 0.1 = 1 \text{ min.}$$

NOTE 2 : Required time is calculated as follows;

$$\frac{\text{Main. air reservoir capacity (m3)} \times \text{Starting air pressure (MPa)} \times 60(\text{hr/min.})}{\text{Main air compressor capability (m3/hr)} \times \text{Quantity} \times \text{Atmospheric pressure (MPa)}} \\ = 5.8^{(*5)} \times 1.0^{(*2)} \times 60 / (152^{(*3)} \times 2 \times 0.1) = 12 \text{ min.}$$

SPRAY SHIELDS

SERVICE		PIPES		FLANGE	DESIGN PRESS. (MPa)	DESIGN TEMP. (°C)	SPRAY SHIELDS	
		SYSTEM NO.	PIPING CLASS	TYPE			MATERIAL	REMARKS
F.O. TRANSFER	H.F.O.T.P. SUCTION	OT0		SLIP-ON "A"		50	-	NOTE 2
	H.F.O.T.P. DISCHARGE	OT1		SLIP-ON "A"	0.5	50	-	NOTE 2
	D.O.T.P.SUCTION	OT2		SLIP-ON "A"		AMB.	-	NOTE 3
	D.O.T.P. DIS. & FILLING	OT3		SLIP-ON "A"	0.5	AMB.	FN TAPE	NOTE 1
	DRAIN, VENT & OVERFLOW	OT4		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
	M/E FUEL VALVE LEAK O. P. SUC. & DIS.	OT5		SLIP-ON "A"		50	-	NOTE 3
F.O. PURIFICATION	H.F.O.PURIF INLET	OP0		SLIP-ON "A"		80	-	NOTE 3
	H.F.O.PURIF OUTLET	OP1	2	SLIP-ON "A"	0.45	100	-	NOTE 2
	D.O.PURIF. INLET	OP5		SLIP-ON "A"		AMB.	-	NOTE 3
	D.O.PURIF. OUTLET	OP6		SLIP-ON "A"	0.25	AMB.	FN TAPE	NOTE 1
	DRAIN & OTHERS	OP4		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
M/E F.O. SERVICE	F.O.SUPP.P. SUC.(H.F.O.)	OM0		SLIP-ON "A"		105	-	NOTE 2
	F.O.SUPP.P. SUC.(D.O.)	OM1		SLIP-ON "A"		AMB.	-	NOTE 3
	F.O.SUPP.P. DISCHARGE	OM2	2	SLIP-ON "A"	0.4	140	-	NOTE 2
	F.O.BOOST.P. DISCHARGE	OM3	2	SLIP-ON "B"	1.15	140	-	NOTE 2
	VENT & DRAIN	OM5		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
	M/E RETURN	OM7	2	SLIP-ON "A"	1.15	140	-	NOTE 2
	F.O.SUPP.P. DIS.(M.G.O.)	OM6	2	SLIP-ON "A"	0.4	80	FN TAPE	NOTE 1
G/E F.O. SERVICE	D.O.SUPP.P. SUC.	OS0		SLIP-ON "A"		AMB.	-	NOTE 3
	D.O.SUPP.P. DISCHARGE	OS1	2	SLIP-ON "A"	0.7	AMB.	FN TAPE	NOTE 1
	G/E D.O.RETURN	OS2		SLIP-ON "A"	0.4	AMB.	-	NOTE 1
	F.O.SUPPLY P. DISCHARGE	OS3	2	SLIP-ON "A"	0.4	140	-	NOTE 2
	F.O.CIRC.P. DISCHARGE	OS4	2	SLIP-ON "A"	1.1	140	-	NOTE 2
	VENT & DRAIN	OS5		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
	F.O.CIRC.P.SUC. & G/E HFO	OS6	2	SLIP-ON "A"	0.5	-	-	NOTE 3
BOILER F.O. SERVICE	F.O.BURN.P. SUCTION	OB0		SLIP-ON "A"		145	-	NOTE 2
	F.O.BURN.P. DISCHARGE	OB1	1	SLIP-ON "C"	2.75	145	-	NOTE 2
	PILOT BURN. P. SUC.	OB2		SLIP-ON "A"		AMB.	-	NOTE 3
	VENT & DRAIN	OB6		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
	PILOT BURN. P. DISC.	OB3	1	SLIP-ON "C"	1.7	AMB.	FN TAPE	NOTE 1
	WASTE OIL SERVICE	OB5	2	SLIP-ON "A"	0.33	95	-	NOTE 2
	M.G.O. BURN. P. DISC.	OB4	1	SLIP-ON "C"	2.75	45	FN TAPE	NOTE 1
F.O. DRAIN	F.O.DRAIN (TO OVERFLOW T.)	OD5		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
	F.O.DRAIN (W/STM.TRACE)	OD6		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
	F.O.DRAIN (TO DIRTY BILGE T.)	OD7		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3

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SERVICE		PIPES		FLANGE	DESIGN PRESS. (MPa)	DESIGN TEMP. (°C)	SPRAY SHIELDS	
		SYSTEM NO.	PIPING CLASS	TYPE			MATERIAL	REMARKS
L.O. TRANSFER	FILL.& TRANSFER	LT0		SLIP-ON "A"	0.5	AMB.	-	NOTE 3
	AIR VENT & DRAIN	LT3		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
L.O. PURIFICATION	PURIFICATION	LP0		SLIP-ON "A"		50	-	NOTE 3
	HEATER OUTLET	LP1	2	SLIP-ON "A"	0.5	90	FN TAPE	NOTE 1
	FEED PUMP DISCHARGE	LP2		SLIP-ON "A"	0.5	50	FN TAPE	NOTE 1
	AIR VENT & DRAIN	LP3		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
M/E L.O. SERVICE	M/E L.O.SERV. $250 \leq D$	LM0		SLIP-ON "B"	0.65	55	-	NOTE 3
	M/E L.O.SERV. $D \leq 200$	LM1		SLIP-ON "A"	0.65	55	-	NOTE 3
	M/E CYL.O.SERV.	LM2		SLIP-ON "A"		AMB.	-	NOTE 3
	AIR VENT & DRAIN	LM3		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
	DRAIN WITH STM TRACE.	LM4		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
G/E L.O. SERVICE	G/E SERVICE	LG0		SLIP-ON "A"		55	-	NOTE 3
	AIR VENT & DRAIN	LG2		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3
STERN TUBE L.O.SERVICE	IN STERN TUBE (OIL)	LS2		SLEEVE "G"		AMB.	-	NOTE 4
	STERN TUBE SERVICE (AIR)	LS3		SLIP-ON "A"	0.97	AMB.	-	NOTE 3
	STERN TUBE SERVICE (OIL)	LS4		SLIP-ON "A"	0.35	AMB.	-	NOTE 3
	STERN TUBE SERVICE (AIR)	LS5		SLIP-ON "A"	0.25	AMB.	-	NOTE 3
	DRAIN&AIR VENT &	LT7		SLIP-ON "A"		-	-	NOTE 3
	FILLING	LT8		SLIP-ON "A"		-	-	NOTE 3
L.O.DRAIN	L.O. DRAIN	LD0		SLIP-ON "I" SLEEVE "G"		-	-	NOTE 3

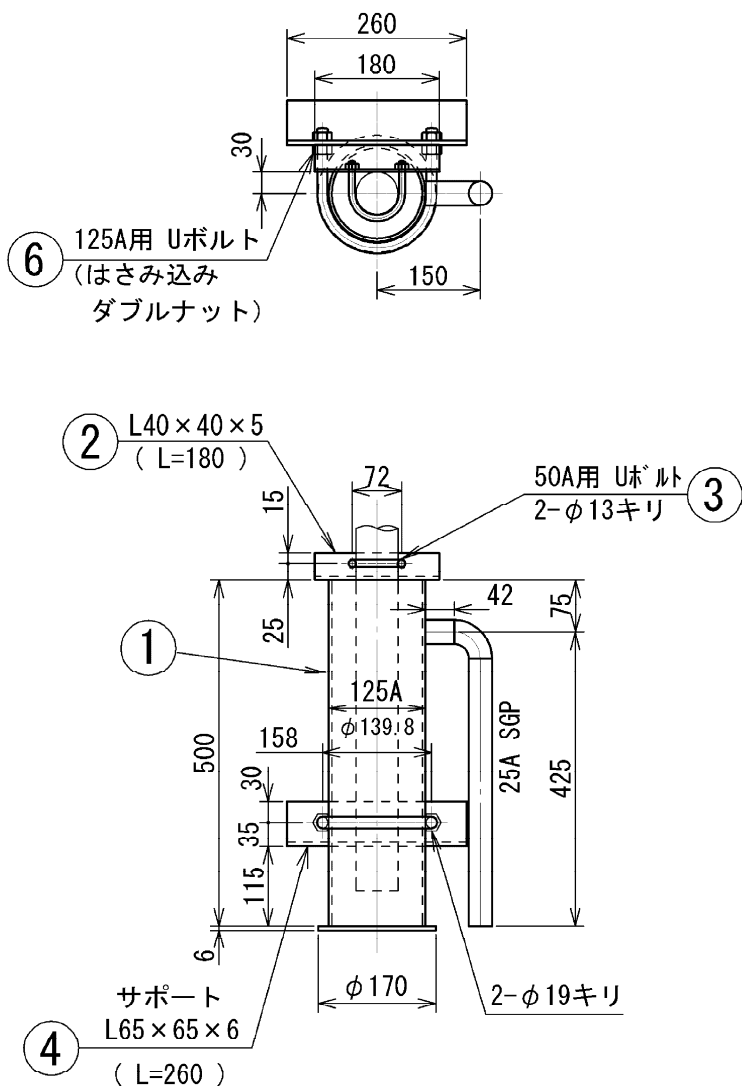
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NOTE1: THE SPRAY SHIELD IS PROVIDED UP TO 3m FROM HOT SURFACE.
(BOILER BURNER, EXHAUST GAS PIPING AND TURBO CHARGER.)

NOTE2: THE SPRAY SHIELD IS UNNECESSARY BECAUSE INSULATION (ACCORDING TO JIS F 7008) TO BE DONE.

NOTE3: THE SPRAY SHIELD IS UNNECESSARY BECAUSE THIS LINE IS NOT PRESSURIZED.

NOTE4: THE SPRAY SHIELD IS UNNECESSARY BECAUSE THIS LINE IS INSTALLED IN STERN TUBE.



塗装 ; GL

12.76x2
合計質量 ; 25.52 kg

5	U-BOLT (メッキ)	SS400	1		0.78	125A 用
4	SUPPORT	SS400	1		1.54	L65×65×6(L=260)
3	U-BOLT (メッキ)	SS400	1		0.15	50A 用
2	PIPE SUPORT	SS400	1		0.53	L40×40×5(L=180)
1	SEAL POT	SS400 SGP	1		9.76	125A,25A,PL6t
符号	名 称	材 料	常備	1個	合計	備 考
			個数	質量 (kg)		

DRAIN SEAL POT (GE-708,709,710)

尺度 1/10

