

SIMBOLI - SYMBOLS

SCHEMA OLIO
DIATERMICO

	VALVOLA COMANDATA A SOFFIETTO STOP VALVE (BELOW SEAL TYPE)		SCARICATORE DI CONDENZA STEAM TRAP
	VALVOLA SEMIAUTOMATICA STOP-CHECK VALVE		SCARICATORE DI CONDENZA CON FILTRO STEAM TRAP WITH STRAINER
	VALVOLA DI NON RITORNO CHECK VALVE		SEPARATORE DI UMIDITA' MOISTURE SEPARATOR
	VALVOLA A FARFALLA BUTTERFLY VALVE		VETRO SPIA OBSERVATION GLASS
	SARACINESCA GATE VALVE		IMBUTO FUNNEL
	VALVOLA DI SICUREZZA SAFETY VALVE		GIUNTO DI DILATAZIONE FLEXIBLE JOINT
	VALVOLA A 3 VIE 3 WAY VALVE		ZINCO ZINC
	VALVOLA CON ATTACCO MANICA VALVE WITH HOSE CONNECTION		FLANGIA DOPPIA SPOSTABILE SPECTACLE FLANGIE
	VALVOLA DI REGOLAZIONE MANUALE HANDOPERATED REGULATING VALVE		ORIFICIO ORIFICE
	VALVOLA A SFERA BALL VALVE		FLANGIA CIECA BLANK FLANGE
	VALVOLA A SFERA A 3 VIE 3 WAY BALL VALVE		ATTACCO MANICA HOSE CONNECTION
	VALVOLA A SPILLO NEEDLE VALVE		ASPIRAZIONE A CAMPANA BELL-MOUTHED PIPE END
	VALVOLA DI RIDUZIONE AD AZIONE DIRETTA REDUCING VALVE DIRECT ACTING		PRESA A MARE E SCARICO F.B. SEA INLET & OVBOD DISCHARGE
	VALVOLA DI RIDUZIONE CON FILTRO REDUCING VALVE WITH STRAINER		SFOGO ARIA AIR VENT
	VALVOLA DI REGOLAZIONE PNEUMATICA A DIAFRAMMA MEMBRANE AIR OPERATED REGULATING VALVE		SFOGO D'ARIA CON PARAFIAMMA AIR VENT WITH FLAME-PROOF NET
	VALVOLA DI REGOLAZIONE AUTODAZIONATA SELF-OPERATED REGULATING VALVE		IMBARCO FILLING PIPE FITTING
	VALVOLA A SOLENOIDE ELECTRO-MAGNETIC VALVE		TUBO FLESSIBILE FLEXIBLE PIPE
	VALVOLA CON SERVOMOTORE PNEUMATICO A PISTONE PISTON AIR OPERATED VALVE		GHIOTTA CON SCARICO DRIP TRAY WITH DRAIN
	VALVOLA CON SERVOMOTORE ELETTRICO(A SOFFIETTO) ELECTRIC MOTOR OPERATED VALVE (BELOW SEAL TYPE)		MANEGGIO PER VALVOLE MECH. LINKAGE FOR VALVE REMOTE CONTROL
	VALVOLA MANUALE CON DISCO DI REGOLAZIONE (A SOFFIETTO) MANUAL VALVE WITH REGULATING DISC (BELOW SEAL TYPE)		COMANDO MANUALE HAND CONTROL
	VALVOLA CON SERVOMOTORE IDRAULICO HYDRAULICALLY OPERATED VALVE		MANOMETRO PRESSURE GAUGE
	VALVOLA RAPIDA CHIUSURA CON SERVOMOTORE IDRAULICO QUICK-CLOSING VALVE WITH HYDRAULIC ACTUATOR		VUOTOMETRO VACUUM GAUGE
	VALVOLA DI BILANCIAMENTO ADJUSTING VALVE		MANOVUOTOMETRO COMPOUND GAUGE
	VALVOLA DI RITEGNO A DOPPIO OTTURATORE 'DUAL CHECK' VALVE		TERMOMETRO THERMOMETER
	VALVOLA A FARFALLA CON SERVOMOTORE IDRAULICO HYDRAULICALLY OPERATED BUTTERFLY VALVE		INDICATORE DI LIVELLO LEVEL INDICATOR
	RUBINETTO COCK		TRASMETTITORE TRANSMITTER
	RUBINETTO CON MASCHIO A L COCK, 3 WAY, L - PORT IN PLUG		REGOLATORE CONTROLLER
	RUBINETTO CON MASCHIO A T COCK, 3 WAY, T - PORT IN PLUG		ALLARME A DISTANZA REMOTE ALLARM
	RUBINETTO A CONTRAPPESSO WEIGHT OPERATED COCK		INDICATORE A DISTANZA REMOTE INDICATOR
	RUBINETTO A CONTRAPPESSO CON MOLLA DI RITORNO WEIGHT OPERATED COCK WITH RETURN SPRING		LIVELLO LEVEL
	PIGNA SUCTION BOX		PRESSIONE PRESSURE
	FILTRO STRAINER		TEMPERATURA TEMPERATURE
	FILTRO A DOPPIO CORPO DOUBLE BODY STRAINER		FLUSSO FLOW

COSTR.
HULL

6 0 6 5

6 6

N. DISEGNO
DWG. NUMBER

A 5 1 5 1 2 2 5 8 B

FOGLIO N°.
SHEET NO.

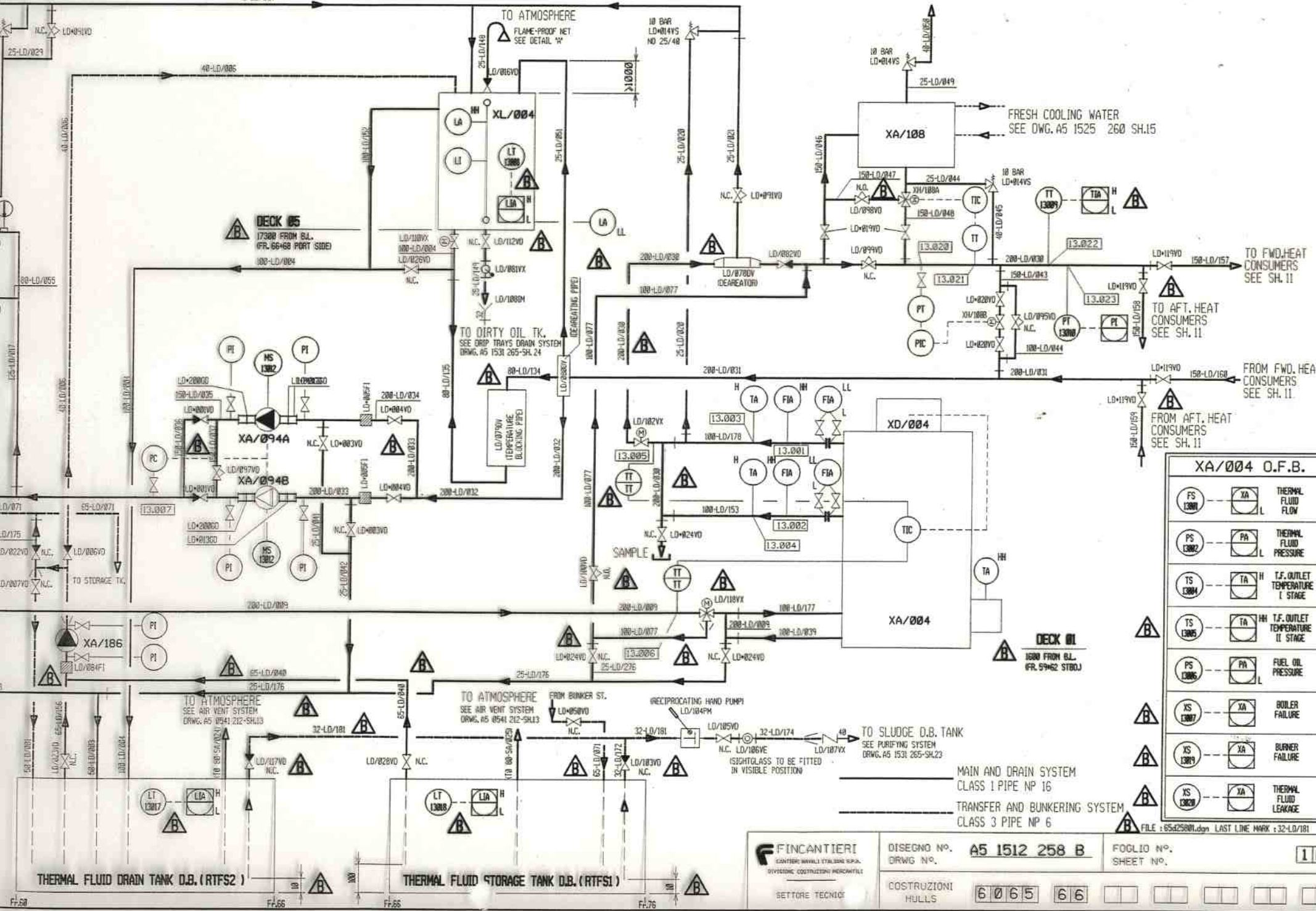
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DESCRIZIONE MACCHINARI-Machinery description

MARCA PEZZO piece number REPERTORIO cat. of cost	DESCRIZIONE description	CARATTERISTICHE PRINCIPALI main charact. PESO weight	TENS.FREQ. POT power GIRI min rpm Inst.mount.on
XA/004 14.12	CALDAIA OIL FIRED BOILER THERMAIL OIL TYPE	25-V1-35 189 m3/h 3 bar 9959 Kg	5000 kW
XD/004 14.12	BRUCIATORE CALDAIA A NAFTA OIL FIRED BOILER BURNER	RL60/2A 250 Kg	5000 kW
XL/004 14.12	CASSA ESPANSIONE OLIO DIATERMICO THERMAL OIL EXPANSION TANK	SVE19750 4.35 m3 960 Kg	
XA/006A 14.12	CALDAIA GAS DI SCARICO EXHAUST GAS BOILER	EXV10-30-25-76.1-600 69 m3/h Δ 9400 Kg	1300 kW
XA/006B 14.12	CALDAIA GAS DI SCARICO EXHAUST GAS BOILER	EXV10-30-25-76.1-600 69 m3/h Δ 9400 Kg	1300 kW
XA/007A 14.12	CALDAIA GAS DI SCARICO EXHAUST GAS BOILER	EXV535-33-57.0-600 27 m3/h Δ 3300 Kg	552 kW
XA/007B 14.12	CALDAIA GAS DI SCARICO EXHAUST GAS BOILER	EXV535-33-57.0-600 27 m3/h Δ 3300 Kg	552 kW
XA/009 14.12	GENERATORE DI VAPORE LOW PRESSURE STEAM GENERATOR	1300kg/h 3 bar 2250Kg	955 kW
XA/064 14.25	PRERISCALDATORE ACQUA CILINDRI MM/PP M/E JACKET WATER PREHEATER	500000 Kcal/h 350Kg	581 kW
XA/066 14.25	RISCALDATORE OLIO DIATERMICO THERMAL OIL CENTRAL HEATER	SXS V12"4.5 FL 650Kg	3000 kW
XA/094A 14.12	POMPA CIRCOLAZIONE OLIO DIATERMICO THERMAL OIL CIRCULATING PUMP	NTT 80-200/2 189 m3/h 82 m.l.c. 350Kg	3500 r.p.m.
XA/094B 14.12	POMPA CIRCOLAZIONE OLIO DIATERMICO THERMAL OIL CIRCULATING PUMP	NTT 80-200/2 189 m3/h 82 m.l.c. 350Kg	3500 r.p.m.
XA/108 14.12	CONDENSATORE REFRIG. ATMOSFERICO DUMP COOLER	HD40-16-SSS-L-LL 450Kg	3152 kW
XD/142C 14.31	RISCALDATORE DEPURATORE NAFTA N 1 H.F.O. PURIFIER HEATER N 1	CBM-26-100 6 m3/h CBM-26-60 4.4 m3/h	FOR HULL 6065 FOR HULL 6066

DESCRIZIONE MACCHINARI-Machinery description

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XD/142G 14.31	RISCALDATORE DEPURATORE NAFTA N 2	CBM-26-100 6 m3/h	FOR HULL 6065
	H.F.O. PURIFIER HEATER N 2	CBM-26-60 4.4 m3/h	FOR HULL 6066
XD/143D 14.31	RISCALDATORE DEPURATORE NAFTA	CBM-26-100 6 m3/h	FOR HULL 6065
	H.F.O./M.D.O. PURIFIER HEATER	CBM-26-60 4.4 m3/h	FOR HULL 6066
XD/145E 14.31	RISCALDATORE MODULO SPINTA NAFTA N 1 H.F.O. BOOSTER HEATER N 1	CBM-76-40 84.5 KW	△ △
XD/145F 14.31	RISCALDATORE MODULO SPINTA NAFTA N 2 H.F.O. BOOSTER HEATER N 2	CBM-76-40 84.5 KW	△ △
XD/146E 14.31	RISCALDATORE MODULO SPINTA NAFTA N 1 H.F.O. BOOSTER HEATER N 1	CB-200-100 474 KW	△
XD/146F 14.31	RISCALDATORE MODULO SPINTA NAFTA N 2 H.F.O. BOOSTER HEATER N 2	CB-200-100 474 KW	△
XA/186 14.12	POMPA DI RIEMPIMENTO FILLING PUMP	450 BRLS/SK14/M20 3 m3/h 4 BAR 41 KG	3X690V-60Hz 1750 R.P.M.
XD/192AC 14.32	RISCALDATORE OLIO DI LUBRIFICAZIONE LUBE OIL HEATER	CBM-26-60 3.8 m3/h	
XD/192BC 14.32	RISCALDATORE OLIO DI LUBRIFICAZIONE LUBE OIL HEATER	CBM-26-60 3.8 m3/h	
XD/192CC 14.32	RISCALDATORE OLIO DI LUBRIFICAZIONE LUBE OIL HEATER	CBM-26-60 3.8 m3/h	
XD/192DC 14.32	RISCALDATORE OLIO DI LUBRIFICAZIONE LUBE OIL HEATER	CBM-26-60 3.8 m3/h	
XD/193C 14.32	RISCALDATORE OLIO DI LUBRIFICAZIONE LUBE OIL HEATER	CBM-26-60 3.8 m3/h	
XD/427AA 04.21	BILGE WATER CENTR. SEPAR. SEPARATORE DI SENTINA	WSC 25-01-006 5 m3/h	690 V 13KW 60 HZ 3F
XA/680 06.43	RISCALDATORE HEATER EXCHANGER	114 m3/h	1600KW



XA/004 O.F.B.

FS 13001	XA	L	THERMAL FLUID FLOW
PS 13002	PA	L	THERMAL FLUID PRESSURE
TS 13004	TA	H	T.F. OUTLET TEMPERATURE I STAGE
TS 13005	TA	H	T.F. OUTLET TEMPERATURE II STAGE
PS 13006	PA	L	FUEL OIL PRESSURE
XS 13007	XA	L	BOILER FAILURE
XS 13019	XA	L	BURNER FAILURE
XS 13020	XA	L	THERMAL FLUID LEAKAGE

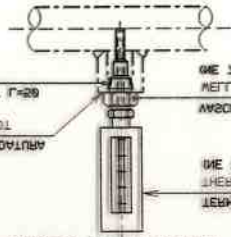
MAIN AND DRAIN SYSTEM
CLASS 1 PIPE NP 16

TRANSFER AND BUNKERING SYSTEM
CLASS 3 PIPE NP 6

FILE : 65425801.dgn LAST LINE MNRK : 32-LD/181

FINCANTIERI <small>CANTIERI MARITTIMI ITALIANI S.p.A.</small> <small>SISTEMATICI COSTRUZIONI MERCANTILI</small> SETTORE TECNICO	DISEGNO N° A5 1512 258 B DRWG N°	FOGLIO N° 10 SHEET N°
	COSTRUZIONI HULLS	6065 66
	FILE : 65425801.dgn LAST LINE MNRK : 32-LD/181	

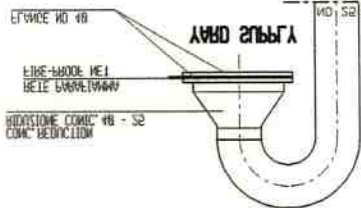
СТЕЕЛ БОУЭ ИИ250033 3/4 Ип1 Г=80
 МОЗЕЛЛО АСОЛМО ИИ250033 3/4 Ип1 Г=80
 TO BE WIDED WITH A WELDING BOT
 БОССАРЕ СОИ ПИ ВП1ТО ИИ 250033



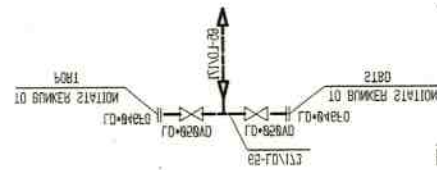
ИМЕ 205125-2744 Ип1-ЛАМЕ И35-214ИИ1 СТЕЛГ
 МЕТТ ГО+ИТЕА (ИД И2) - П-130mm
 АИ20СЕТТА ГО+ИТЕА (ИД 22) - П-130mm
 ИМЕ 205125-207С-207С Ип1-100 Г
 ТЕРМОМЕТЕР ГО+ИТЕА (ИД И2)
 ТЕРМОМЕТЕР ГО+ИТЕА (ИД 22)

(САРВОН СТЕЕЛ СИСТЕМ)
 ТЕРМОМЕТЕРС ДЛАТЛГ СТЕЕЛ СИСТЕМ

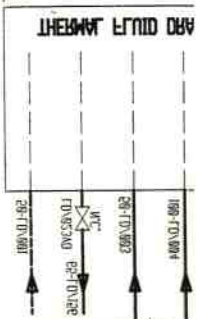
ПАРТИКУЛАРЕ СИСТЕМЕ ИИ250033



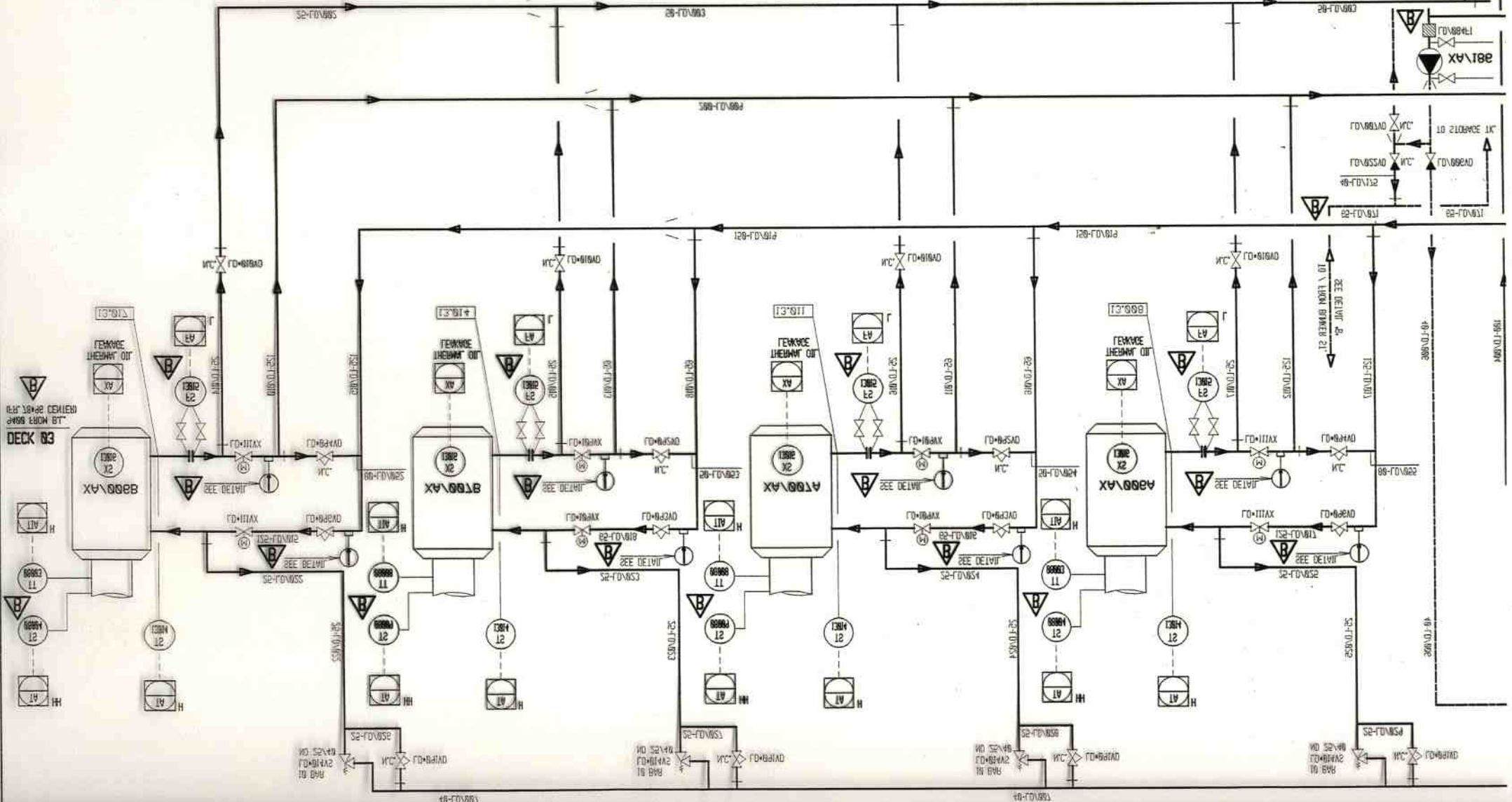
U-TYPE PIPE



DOUBLE BOTTOM



VERTICAL LINE



DECK 03

TO BE WIDED WITH A WELDING BOT

DIAGRAM DESCRIPTION

PRINCIPE ET PLAN/SEPARATEURS F.O. ET D.O. (Planche 12)

Le système F.O. est composé de 3 séparateurs / 2 en service / 1 en secours
 Les pompes des séparateurs peuvent aspirer dans chaque caisse décantation ou caisse journalière
 les résidus sont rejetés à la caisse résidus.
 Le F.O. épuré est refoulé à la caisse journalière et, en cas de trop plein à la caisse décantation.
 Le système D.O. est composé de 2 séparateurs, tous 2 en service.
 Les pompes séparateurs aspirent seulement à la caisse décantation et refoulement l'épuré à la caisse D.O. journalière.
 Pour les séparateurs F.O., des vannes motorisées sont en place pour garantir un cycle automatique de purification sans opération manuelle.

MPX ET DA MARCHE F.O. (Planche 13)

Les pompes alimentaires des modules pressurisation aspirent du F.O. ou du D.O. par des vannes motorisées
 Les pompes booster refoulement du F.O. ou du D.O. dans le circuit combustible où la pression est maintenue par des vannes auto-régulantes pour les MPX associés.
 Une rampe D.O. est fournie dans le cadre de maintenance des diesels. alt.

TRANSFERT -SOUTAGE/ ET SCHEMA D.O. (Planche 14)

Une rampe D.O. est fournie dans le cadre de maintenance des diesels. alt.
 Un système de tuyaux et de vannes motorisées compose le circuit de soutage F.O./D.O. du sas aux soutes
 Le circuit de transfert est composé de 2 pompes F.O. et 1 D.O. pour transférer les combustibles des soutes aux caisses décantation.
 Une pompe D.O. de secours est fournie pour alimenter la caisse du groupe de secours.

CIRCUIT COMBUSTIBLE CHAUDIERE MOUILLAGE (Planche 15)

Les pompes combustible des chaudières aspirent aux caisses journalière F.O. et D.O. via des vannes 3 voies motorisées.

FUEL OIL AND DIESEL OIL PURIFYING DIAGRAM (SH.12)

The f.o. system is composed of three purifiers, two in service one on stand-by.
 The purifiers pumps suct from each settling tank or in alternative from service tank.
 Sludge is ejected by pumps directly in the sludge tank .
 Clean fuel oil is delivered to service tank an than in case of overflow part of clean fuel oil is filling in the settling tanks.

The d.o. system is composed of two purifiers both in service.
 The purifiers pump suct only from d.o. settling tank and the clean d.o. is delivered to d.o. service tank
 for f.o. purifiers a number of motor-valves are installed to guarantee a automatic purified cicle without handle operation.

MM/EE AND DD/GG FUEL OIL AND DIESEL OIL SERVICE DIAGRAM (sh.13)

Feeding pumps of booster modules suct f.o. or d.o. from rispctive service tanks across motor-valves
 the boosters pumps delivery f.o. or d.o. in a circuit where the pressure is maintained by self-operated valves for mains engines couple.

A d.o. line is provided in case of diesel generators maintenance

TRANSFERING-BUNKERING AND DIESEL OIL DIAGRAM (sh.14)

A system of pipe and motor-valve provide to divide f.o.-d.o. flow from bunker station in the rispctive storage tanks
Two pumps for f.o. and one for d.o. are provide to transfer both fluids from storage tanks to settling tanks.
Emergency d.o. pump delivery d.o. to emergency diesel generator tank such as provided.

OIL FIRED BOILERS SERVICE DIAGRAM (sh.15)

Oil fired boilers pumps suct from f.o. service tanks or d.o. service tank across three-way motor valves.

CONSIDERAZIONI SULLA SCELTA DELLA CENTRALE

ELETTRICA CONVENZIONALE.

- 5 GRUPPI D/A W 6 R 32 LNE , IN LINEA
- POTENZA INSTALLATA $5 \times 2460 \text{ kW} = 12300 \text{ kW}$
- GRUPPI TUTTI UGUALI , TOTALE $5 \times 6 = 30$ CILINDRI
- POSSIBILI SOLUZIONI PIÙ ECONOMICHE ?
- PESO TOTALE INSTALLATO $5 \times 49 = 245 \text{ t}$
- 1^A POSSIBILITÀ : $3 \times 8 + 1 \times 6 = 30$ CIL , PESO TOTALE :
 $3 \times 67 + 1 \times 49 = 250 \text{ t}$
- 2^A POSSIBILITÀ : $2 \times 9 + 2 \times 6 = 30$ CIL , PESO TOTALE :
 $2 \times 75 + 2 \times 49 = 248 \text{ t}$
- 2 SOLUZIONI A PARI POTENZA , CON LO STESSO NUMERO DI CILINDRI IN LINEA , PRATICAMENTE CON LO STESSO PESO
- 1 MACCHINA IN MENO !
- > FLESSIBILITÀ NEL POWER MANAGEMENT (85÷60% MCR)
 CON PADRI / FIGLI BEN EQUILIBRATI
- RISPARMI NOTEVOLI SU IMPIANTISTICA (N° MACCHINE E TUBAZIONI / ACCESSORI), CON PARI CRITERI DI RIDONDANZA:
- POMPE AM/AD , CASSA COMPENSO , REFRIGERANTE , PRERISC.
- SEMPLIFICAZIONE CIRCUITI NAFTA , OLIO , ARIA C.
- SILENZIATORE , CONDOTTE

DESCRIZIONE MACCHINARI - Machinery description

MARCA PEZZO piece number REPERTORIO cat. of cost	Q.TA' Q.TY	DESCRIZIONE description	CARATTERISTICHE PRINCIPALI main charact. PESO - weight	TENS.FREQ. POT.power GIRI/min rpm Inst.mount.on
XA/001A-B-C-D	4	MOTEUR PRINCIPAL / MP A-B-C-D / MAIN ENGINE	WARTSILA 9L46 C 9450 kW	500 r.p.m.
XA/015A-B	2	REDUCTEUR LIGNE ARBRE BABORD/TRIBORD MAIN REDUCTION GEAR	MAAG MarineGear 2 MG-200/CW 500/154.13 rpm	500 r.p.m.
XD/015AC-AD	2	REFRIGERANT HUILE AV/AR REDUCTEUR BD MAIN REDUCTION GEAR OIL COOLER	MAAG MarineGear 200 kW	
XD/015BC-BD	2	REFRIGERANT HUILE AV/AR REDUCTEUR TD MAIN REDUCTION GEAR OIL COOLER	MAAG MarineGear 200 kW	
XA/055A-B-C-D-E	5	POMPE ED BT/ALT.&TRANSF./DA1-2-3-4-5 TRANSF. & D/G GEN. L.T.F.W. COOLING PUMP	GARBARINO MU 32/160M 15 mc/h-25 mwg	660V-50Hz 2900 r.p.m.
XA/039A-B-C-D	4	POMPE EM / MPA-B-C-D M.E. SEA WATER PUMP	GARBARINO MU 150-315 385 mc/h-30 mwg	660V-50Hz 55kW 1450 r.p.m.
XA/040A-B-C-D-E	5	POMPE EM / DA1-2-3-4-5 D/G. SEA WATER PUMP	GARBARINO MU 80-315 100 mc/h-30 mwg	660V-50Hz 19kW 1450 r.p.m.
XA/041A-B	2	POMPE EM BD/TD AUX.&ASSECHT SECOURS AUXILIARIES SEA WATER PUMP	GARBARINO MU 150-315 L 300 mc/h-30 mwg	660V-50Hz 55kW 1450 r.p.m.
XA/054A-B	2	POMPE ED AR/AV AUXILARIES AUXILIARIES FRESH WATER PUMP	GARBARINO MU 150-315 250 mc/h-30 mwg	660V-50Hz 45kW 1450 r.p.m.
XA/059A-B-C-D	4	REFRIGERANT ED BT/MP A-B-C-D MAIN ENGINE L.T. F.W. COOLER	Alfa Laval PHE MX25-BFM 303/385 mc/h	5386 Mcal/h
XA/060A-B-C-D-E	5	REFRIGERANT ED BT/DA1-2-3-4-5 D/G L.T. F.W. COOLER	Alfa Laval PHE M15-BFM8 80/100 mc/h	946 Mcal/h
XA/064A-B-C-D	4	PRERECHAUFFEUR VAP. ED HT/MP A-B-C-D MAIN ENGINE H.T. F.W. STEAM PREHEATER	Auramarine 108 Kw	
XA/065A-B-C-D-E	5	PRERECHAUFFEUR ELEC. ED HT/DA1-2-3-4-5 D/G H.T. F.W. ELECTRIC PREHEATER	Auramarine 18 kW - 3 mc/h	
XA/066A-B	2	REFRIGERANT AR/AV ED BT /AUXILIAIRES AUXILIARIES L.T. F.W. COOLER	Alfa Laval PHE M15-MFM8 226/280 mc/h	894 Mcal/h
XA/072A-B-C-D	4	CAISSE EXPENSION ED / MP A-B-C-D M.E. F.W. EXPANSION TANK	1000 l	
XA/073A-B-C-D-E	5	CAISSE EXPENSION ED / DA1-2-3-4-5 D/G. F.W. EXPANSION TANK	200 l	
XA/078	1	CAISSE EXPENSION ED AUXILIAIRES AUXILIARIES F.W. EXPANSION TANK	400 l	
XA/094A-B-C-D	4	POMPE CIRCULATION RECUP. A-C-B-D EXHAUST GAS BOILER WATER CIRC. PUMP	GARBARINO CN 65-40-200 40 mc/h-40 mwg	660V-50Hz 2900 r.p.m.

COSTR. HULL 6 0 8 1

N. DISEGNO DWG. NUMBER A 5 D 3 1 0 3 7 0

FOGLIO N° 0 2 SHEET N°

DESCRIZIONE MACCHINARI - Machinery description

MARCA PEZZO piece number REPERTORIO cat. of cost	Q.TA' Q.TY	DESCRIZIONE description	CARATTERISTICHE PRINCIPALI main charact. PESO - weight	TENS.FREQ. POT.power GIRI/min rpm Inst.mount.on
XA/107A-B	2	MODULE BOUILLEUR BABORD/TRIBORD	ALFA LAVAL D-TU-2-1200 150 mc/24h	660V-50Hz 50 kW
		FRESHWATER DISTILLER PLANT		
XD/107AA-BA	2	CORPS BOUILLEUR BABORD/TRIBORD	D-TU-2-1200 150 mc/24h	
		FRESHWATER DISTILLER		
XD/107AD-BD	2	POMPE EAU ALIMENTAIRE BABORD/TRIBORD	CNL 65-85/250 20 mc/h	660V-50Hz 4.5 kW 1450 rpm
		FEEDWATER PUMP		
XD/107AE-BE	2	POMPE EAUX SAUMATRES BABORD	PVVF 75.100.4X 20 mc/h	660V-50Hz 4.5 kW 1450 rpm
		BRINE PUMP		
XD/107AF-BF	2	POMPE EJECTEUR BABORD/TRIBORD	CNL 80-80/200 50 mc/h	660V-50Hz 14.5 kW 2950 rpm
		EJECTOR PUMP		
XD/107AG-BG	2	POMPE EAU DISTILLEE BABORD/TRIBORD	PVVF 75.100.4X 6.25 mc/h	660V-50Hz 7.5 kW 2950 rpm
		DISTILLATE WATER PUMP		
XD/107AF-BF	2	REFRIGERANT EAU DISTILLEE BD/TD	M6-MFM 6.25 mc/h	
		DISTILLATE COOLER		
XL/107AA-BA	2	EJECTEUR BOUILLEUR BABORD/TRIBORD		
		EJECTOR		
XL/107AB-BB	2	DOSEUR TRAITEMENT BOUILLEUR	200 l	
		CHEMICAL DOSING UNIT		
XM/107AA-BA	2	TABEAU DE CONTROLE BOUILLEUR BD/TD		
		CONTROL PANEL		
XD/107AL-AM	2	RECHAUFFEUR EXT./INT. BOUILLEUR BABORD	CNL 150-150/250 125/200 mc/h	
		JACKET WATER RECOVERY HEATER		
XD/107BL-BM	2	RECHAUFFEUR EXT./INT. BOUILLEUR TRIBORD	CNL 150-150/250 125/200 mc/h	
		JACKET WATER RECOVERY HEATER		
XD/107AN-BN	2	RECHAUFFEUR A VAPEUR BOUILLEUR BD/TD	steam 3860 kg/h	2205 kW
		STEAM HEATER		
XD/107AP-BP	2	POMPE CIRCULATION EAU CHAUDE BD/TD	CNL 150-150/250 250 mc/h	660V-50Hz 26 kW 1470 rpm
		HOT WATER PUMP		
XD/107AH-BH	2	POMPE EM REFRIGERATION BD/TD	CNL 200-200/250 234 mc/h	660V-50Hz 14.5 kW 1460 rpm
		SEA WATER COOLING PUMP		

DESCRIZIONE MACCHINARI - Machinery description

MARCA PEZZO piece number REPERTORIO cat. of cost	Q.TA' Q.TY	DESCRIZIONE description	CARATTERISTICHE PRINCIPALI main charact. PESO - weight	TENS.FREQ. POT.power GIRI/min rpm Inst.mount.on
XA/113	1	CONDENSEUR ATMOSPHERIQUE		
		ATMOSPHERIC CONDENSER		
XA/115	1	CONDENSEUR DES BUEES/BACHE		
		HOT WELL VAPOURS CONDENSER		
XK/004AA-BA	2	REFRIGERANT ECHANTILLON EAU CHAUDIERE		
		BOILER WATER SAMPLE COOLER		
XA/133	1	CUVE PRODUIT CHIMIQUE		
		CHEMICAL PRODUCT BARREL		
XA/155A-B-C-D	4	POMPE ED SUP./INF.REF.REDUCTEUR,LIPS BD	GARBARINO MU 50-160L 45 mc/h-30 mwg	660V-50Hz 7.5kW 2900 r.p.m.
		F.W. PUMP FOR C.P.P. OIL COOLER AND REDUCTION GEAR		
XA/195A-B-C-D	4	REFRIGERANT HUILLE / MP A-B-C-D	Alfa Laval PHE M20-MFM 130/200 mc/h	1092 Mcal/h
		MAIN ENGINE L.O. COOLER		
XD/248AG-AH	2	REFRIGERANT HUILLE HELICE BABORD	John Crane-Lips	27 kW
		C. P. P. OIL COOLER		
XD/248BG-BH	2	REFRIGERANT HUILLE HELICE TRIBORD	John Crane-Lips	27 kW
		C. P. P. OIL COOLER		
XA/274A-B-C-D-E	5	DIESEL ALTERNATOR 1-2-3-4-5		
		DIESEL GENERATOR		
XB/274A-B-C-D-E	5	MOTEUR DIESEL 1-2-3-4-5	WARTSILA 6R32LN E	2460 kW 750 r.p.m.
		DIESEL ENGINE		
YA/494A-B-C	3	POMPE EM COMPRESSEUR CARRIER		
		AIR CONDITIONING COMPRESSOR S.W. PUMP		
YA/673A-B	2	COMPRESSEUR FRIGO BABORD 1-2		
		PROVISION COMPRESSOR		
YA/673C-D	2	COMPRESSEUR FRIGO TRIBORD 3-4		
		PROVISION COMPRESSOR		
YA/685A-B-C	3	COMPRESSEUR AIR CONDITIONNE CARRIER		
		AIR CONDITIONING COMPRESSOR		
YA/685D-E	2	COMPRESSEUR AIR CONDIT.SDC & ATELIER		
		E.C.R., M.S.ROOM & ENGINE WORKSHOP AIR CONDITIONING COMPRESSOR		
YA/764A-B	2	PROPULSEUR D'ETRAVE 1-2		
		BOW THRUSTER		
YA/770A-B	2	STABILISATEUR BABORD/TRIBORD		
		STABILIZER		

SYSTEME : EAU DE MER

SYSTEM : SEA WATER INTAKES

LOCAL DA /PRISES EAU DE MER (PIAN 19)

Une traverse principale (couple double fond, en 2 moities) connectee de chaque bord a une prise d'eau haute et basse avec un filtre commun, se trouve au local DA.

Les prises de eau sont pourvu de degagement d'air et de connexions:vapeur, produit de traitement et systeme antifouling,

Les vannes d'entree et sortie edm sont commandeess du pc secu,(secours)et du pupitre de commande passerelle,

De la traverse aspire:

Les pompes EDM des MP (4)

Les pompes EDM des DA (5)

Les pompes EDM des auxiliaires (2)

Les pompes incendie (2)

Les pompes assechement et ballastage (2)

DD/GG ROOM SEA WATER INTAKES (See sh.19):

One main cross-over (double bottom frame in two halves), connected on each side to an high and to a low sea chest with a common filter, is located in the DD/GG room.

The sea chests are fitted with air vent and steam connections, connection for injection of treatment products and one set of antifouling system .

The inlet valves and sea water outlets are remote controlled from the safety room (emergency) and from the control desk in the wheelhouse.

From the cross-over sucks:

The main engines sea water pumps (4)

The diesel generators sea water pumps (5)

The auxiliaries sea water pumps (2)

The fire pumps (2)

The bilge and ballast pumps (2)

LOCAL A.C. COMPRESSEUR/PRISES EAU DE MER (PIAN 20)

Une traverse en 2 parties connecte de chaque bord a une prise d'eau haute et une basse avec un filtre commun se trouve au local 'Carrier'.

Les prises d'eau sont equipees de degagement d'air et de connexions : vapeur, produit traitement et antifouling,

Les vanne d'entree et sortie eau de mer sont commandeess du pc secu (secours) et dupupitre de commande passerelle.

Aspirent a la traverse :

Les pompes EDM 'Carrier' (4)

Les pompes incendie (2)

A.C. COMPRESSORS ROOM SEA WATER INTAKES (SEE SH. 20):

One cross-over in two halves , connected on each side to an high and to a low sea chest with a common filter, is located in the A.C. compressors room.

The sea chests are fitted with air vent and steam connections, connection for injection of treatment products and one set of antifouling system .

The inlet valves and sea water outlets are remote controlled from the safety room (emergency) and from the control desk in the wheelhouse.

From the cross-over suck:

The air cond.ing condensers pumps (4)

The fire pumps (2)

BOUILLEURS / PRISE EAU DE MER (PLAN 25)

Il existe , une prise d'eau , commune aux 2 bouilleurs .

Cette prise est equipee de degagement d'air et de connexions vapeur,

Les vannes d'entree et de sortie eau de mer sont commandeess du pc secu. (secours) et du pupitre de commande passerelle.

SYSTEME : REFRIGERATION MPX

SYSTEM : MAIN ENGINES COOLING

FRESHWATER GENERATORS SEA WATER INTAKE (See sh. 25) :

One dedicated sea chest, common to two freshwater generators, is provided.

The sea chest is fitted with air vent and steam connections.

The inlet valves and sea water outlets are remote controlled from the safety room (emergency) and from the control desk in the wheelhouse.

Les systemes de refrig. (4) sont totalement independant les uns des autres et chaque systeme consiste en :

UN CIRCUITE EAU DE MER (PLAN 19)

Le circuit comprend :

Une elec. pompe eau de mer venant de la traverse eau de mer local DA ; et refrigerant via un circuit ED BT , le MP , le refrigerant de huile reducteur , le refrigerant d'huile helice et le refrigerant huile MP.

Les tuyoutages et vannes entre chaque aspiration a la traverse (reparti en demi-traverse).

Un refrigerant ED/EM (plaque de titanium). Le refrigerant est concu pour dissiper la au maximum de sechage continu avec une temperature eau de mer a 32°C.

The cooling systems (4) are totally independent from each others and each system consists of:

ONE SEA WATER CIRCUIT (SEE SH. 19)

The sea water circuit includes :

One sea water el. pump drawing from the crossover located in the DD/GG room and cooling via a low temperature fresh-water circuit the main engine, the lube oil cooler of the reduction gear the lube oil cooler of the propeller control box and the main engine lube oil cooler.

A piping connection with valves between each suction of the cross-over (operation with half cross-over).

One SW/FW titanium plate type cooler. The cooler is designed to dissipate the heat from M.E. at the maximum continuous rating (MCR) with sea water temperature of 32 C.

UN CIRCUIT EAU DOUCE (PLAN 26 , 27 , 28 , 29)

Le MP est equipe d'un circuit eau douce basse temperture (ED BT) et d'un circuit haute temperature (ED HT).

Le circuit ED BT inclus : la pompe attelle ED BT , le refrigerant d'air BT et le refrigerant d'huile (installes separement).

Une electro. vanne thermoregulatrice est installee sur le circuit pour maintenir constantes les temperatures d'air suralimentes (MPX et DA).

Circuit BT MP / une electrovanne thermoregulatrice est installee sur le circuit pour maintenir l'air suralimentes a 50-55°C.

Le circuit HT inclus la pompe attelle ED HT , refrigerant les cylindres , la TS et l'air suralimentes.

Le cote HT du refrigerant d'air est connecte enserie aux cylindres et a la TS.

Une vanne thermostatique controle la temperature de sortie de l'ED HT du MP (point de consigne 91°C).

Une vanne thermostatique situee apres le rechauffeur du bouilleur assure une temperature d'entree ED HT au MP a 75-78°C.

La chaleur residuelle du circuit ED HT est utilisee a la production d'eau douce.

Un rechauffeur a vapeur est installe.

Une elec-pompe de circulation (ED) est installee pour la refrigeration de l'huile helice et de l'huile reducteur.

Une caisse expansion avec des degagements d'air HT , BT separees.

SYSTEME : REFRIGERATION DA

SYSTEM : DIESEL ENGINE SETS COOLING

ONE FRESH WATER CIRCUIT (SEE SH. 26, 27, 28, 29)

The engine is fitted with a fresh water low temperature (L.T.) circuit and a high temperature (H.T.) circuit.

The L.T. circuit includes the L.T. circulating water engine driven pump, the L.T. charge air cooler and the lube oil cooler (separately installed).

One electrical thermoregulating valve is installed on the circuit to maintain constant charge air temperature (MM.EE. and DD.GG.).

Main engines L.T. circuit : one electrical thermoregulating valve is installed in the circuit to maintain constant charge air temperature of about 50-55 °C

The H.T. circuit includes the H.T. circulating water engine driven pump, the cylinders cooling, turbocharger and H.T. charge air cooler.

The H.T. side of the charge air cooler is connected in series with the cylinders and turbocharger.

One thermostatic valve controls the outlet temperature of H.T. water from the engine. (set point 91°C)

One thermostatic valve located after the F/W generator heater ensures the inlet temperature of H.T. water to the engine of 75-78°C

The waste heat of the H.T. circuit is used for fresh water production.

One steam preheater unit is installed.

One circulating fresh water el. pump is installed for propeller control box l.o. and reduction gear l.o. cooling

One expansion tank with separate H.T. and L.T. venting pipes is provided.

Les systeme de refrigeration (5) sont totalement independants chaucon , et consiste en :

UN CIRCUIT EAU DE MER (PLANS 19 , 22)

Le circuit eau de mer comprend :

Une elec. pompe eau de mer alimentant de la traverse (situee local DA) le circuit ED BT de refrigeration DA.

Les tuyautages et vannes entre chaque aspiration a la traverse (sectionnee en 2 demi partie).

Un refrigerant a plaques (titanium) EDM/ED.

Une connexion au circuit incendie.

The cooling systems (5) are totally independent from each others and each system consists of:

ONE SEA WATER CIRCUIT (SEE SH. 19, 22)

The sea water circuit includes :

One sea water el. pump drawing from the crossover located in the DD/GG room and cooling via a low temperature fresh-water circuit the diesel engine.

A piping connection with valves between each suction of the cross-over (operation with half cross-over).

One SW/FW titanium plate type cooler.

One connection with fire circuit is provided.

UN CIRCUIT EAU DOUCE (PLANS 31 , 32)

La machine est equipee d'un circuit ED BT et d'un circuit ED HT.

Le circuit comprend une pompe attelée de circulation ED BT , le refrigerant d'air BT et le refrigerant d'huile.

SYSTEME : EAU DOUCE ET EAU DE MER DE REFRIGERATION AUXILIARIES

8

SYSTEM : SEA AND FRESH WATER FOR AUXILIARIES COOLING

Le refrigerant d'huile est integre au DA et est enserie avec le refrigerant d'air.
Une vanne thermostatique a action directe avec deux consignes est installee a la sortie du refrigerant d'huile. Le choix de la consigne est actionne pneumatiquement et depend de charge du DA. Le circuit ED HT comprend une pompe attelée de circ., la refriger., cylindres et TS.

Une vanne thermostatique commande la temperature de sortie de l'ED HT du DA (point de consigne 91°C).

Un rechauffeur electrique est integre au circuit.

Une caisse expansion avec des degagements d'air HT et BT separes.

ONE FRESH WATER CIRCUIT (SEE SH. 31, 32)

The engine is fitted with a fresh water low temperature (L.T.) circuit and a high temperature (H.T.) circuit.

The L.T. circuit includes the L.T. circulating water engine driven pump, the L.T. charge air cooler and the lube oil cooler.

The lube oil cooler is built-in on the engine and fitted in series with the charge air cooler. One direct acting thermostatic valve with two set points is installed on the outlet of lube oil cooler. The choice of set point is pneumatically actuated and depends of the engine load.

The H.T. circuit includes the H.T. circulating water engine driven pump, the cylinders cooling, turbocharger.

One thermostatic valve controls the outlet temperature of H.T. water from the engine. (set point 91°C)

One electric preheater unit is installed.

One expansion tank with separate H.T. and L.T. venting pipes is provided.

REFRIGERATION AUXILIAIRES (PLANS 23-33)

2 elec. pompes eau de mer (1 en marche , 1 en stand-by) aspirent dans chaque demi traverse

2 refrigerants a plaques ED/EDM (1 en service , 1 en stand-by)

2 elec. pompes ED (1 en marche , 1 en stand-by) alimentent les auxiliaires suivants :

Compresseurs air conditionnee SDC , atelier et magasin machine

Compresseurs air conditionnee

Refrigerant echantillons chaudiere

Compresseurs frigo

Propulseurs

Stabilisateurs

Condenseur vapeur

Centrale hydraulique

Le condenseur atmospherque est refrigeré par les pompes eau de mer auxiliaires.

Un dispositif de controle de temperature fait ajuster le debit eau de mer au condenseur par une vanne trois voies.

Le systeme comprend aussi :

1 connexion au circuit incendie

1 caisse expansion

COOLING OF AUXILIARIES (SEE SH. 23-33)

2 sea-water el.pumps (1 working, 1 on stand-by) sucking from each half cross-over supply

2 SW/FW plate coolers (1 in service, 1 on stand-by).

2 fresh-water el. pumps (1 working, 1 on stand-by) supply the following auxiliaries:

SYSTEME : BOUILLEURS

9

SYSTEM : FRESH WATER GENERATOR PLANT

ECR , workshop and engine stores air conditioning compressors
Air conditioning compressors
O.F.boilers water sample coolers
Provision room compressors
Bow thrusters
Stabilizers
Steam condenser
Stern ramp hydraulic power pack

The atmospheric condenser is cooled by the s.m. sea-water pumps.

A temperature control device for drains adjust the flow of sea water to the condenser by means of a three-way valve.

One connection with fire circuit is provided.

One expansion tank is provided.

Les équipements pour la production eau douce comprennent 2 bouilleurs , chacun ayant une production de 150 t/jour , et ponctionne a 80 % de la charge nominale MPX. Une unite fonctionne sur les MPX int., l'autre sur les MPX ext.

Une elec. pompe eau de mer de refrigeration , pour chaque bouilleur alimente le condenseur.

La pompe est equipee d'un filtre cote aspiration.

Une partie de l'eau de mer sortant du condenseur est pompee par la pompe alimentaire (EDM) vers le bouilleur.

Dans 2 echangeurs , l'eau de mer est rechauffee jusqu'a une temperature saumure de 80°C par l'ED HT des MPX concernes.

Aussi, si le rechauffage MP n'est pas suffisant, l'eau de mer est rechauffee a la vapeur.

Le vide au condenseur se fait par un ejecteur alimente' par la pompe ejecteur.

La saumure est evacuee du bouilleur , par la pompe eaux saumatre , a la mer avec l'eau de refrigeration et celle de l'ejecteur (1 vanne de coque par bouilleur).

L'eau distillee est evacuee par la pompe eau dist., et le debit est commande par une vanne a regulation. Dans le cas , d'une salinite trop haute , l'eau produite est automatiquement rejetyef a la mer , uja une vanne 3voilis.

The equipment for producing freshwater includes 2 fresh water generators, each with a production of 150 ton/day, and operating at 80% MCR of the main engines. Each installation is specific to each engine.

One sea cooling water el.pump for each evaporator supplies the condenser. The pump is fitted with a filter on the suction side.

One portion of the sea water outcoming from the condenser is pumped with the sea water feed pump to the distiller.

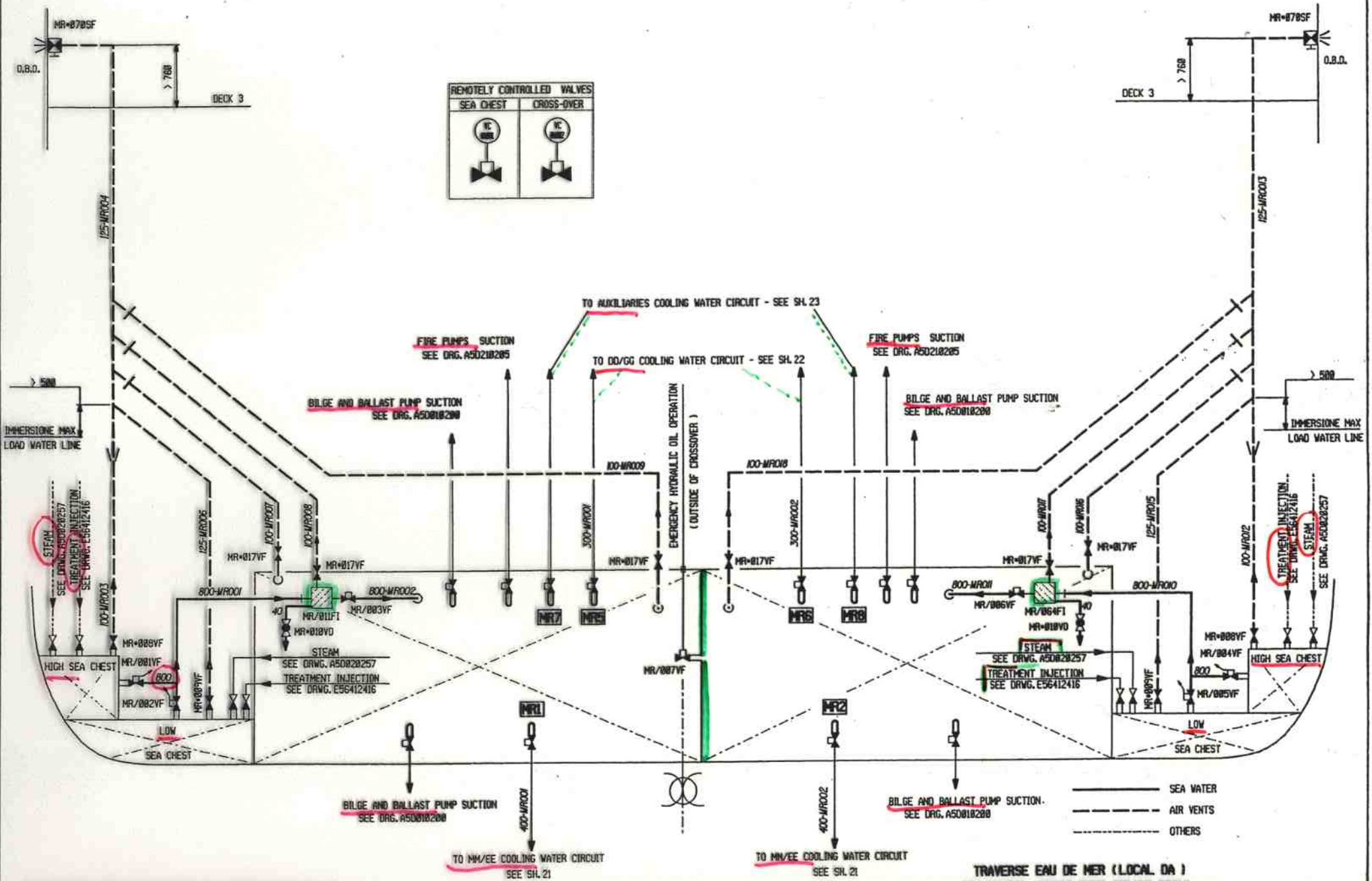
In two heat exchangers the sea water is heated up to top brine temperature of 80 °C by cooling the jacket water of the dedicated main engine. Then the sea water is passing the sea water booster.

Where, in case that no heat from engine is available, the sea water is heated by steam.

The vacuum of the condenser is carried out by one sea water pump through the vacuum ejector.

Brine is discharged from the evaporator with the brine pump to the overboard discharge together with the cooling water and the ejector motive water. (One overboard discharge for each freshwater generator, independent).

The distilled water is discharged with the freshwater pump, while flow is controlled with a pressure spring valve. In case of temporary high salinity the distillate is automatically dumped via an automatically controlled 3-way valve to sea.



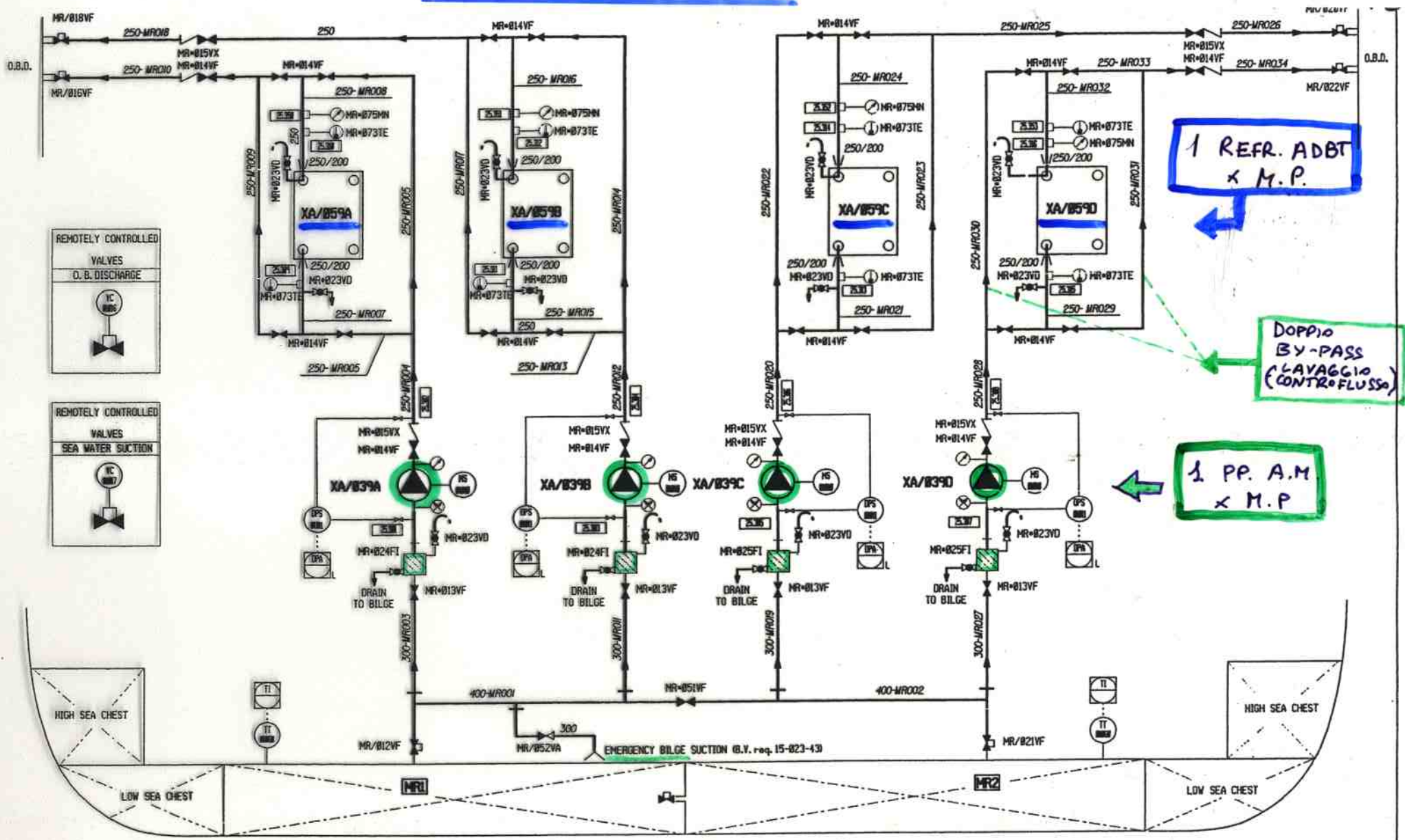
REMOTELY CONTROLLED VALVES	
SEA CHEST	CROSS-OVER

REMOTE CONTROL VALVES
 WILL BE SUPPLIED BY "LOCAL HANDLING OPERATOR"
 WITH OPERATOR ARRANGED OVER THE GREATIN (MINIMUM 450 mm.)

 FINCANTIERI CANTIERI S.p.A. DIVISIONE NAUTICA SETTORI TECNICI	DISEGNO NO. A50310370 DRWG NO.	FOGLIO NO. 119 SHEET NO.
	COSTRUZIONI MULLS	6 0 0 1

**TRAVERSE EAU DE MER (LOCAL DA)
 SEA WATER CROSS-OVER 100/GG ROOM**

4 SCARICHI F.B. SEPARATI



1 REFR. ADBT
x M.P.

DOPPIO
BY-PASS
(CONTRAFUSSO)

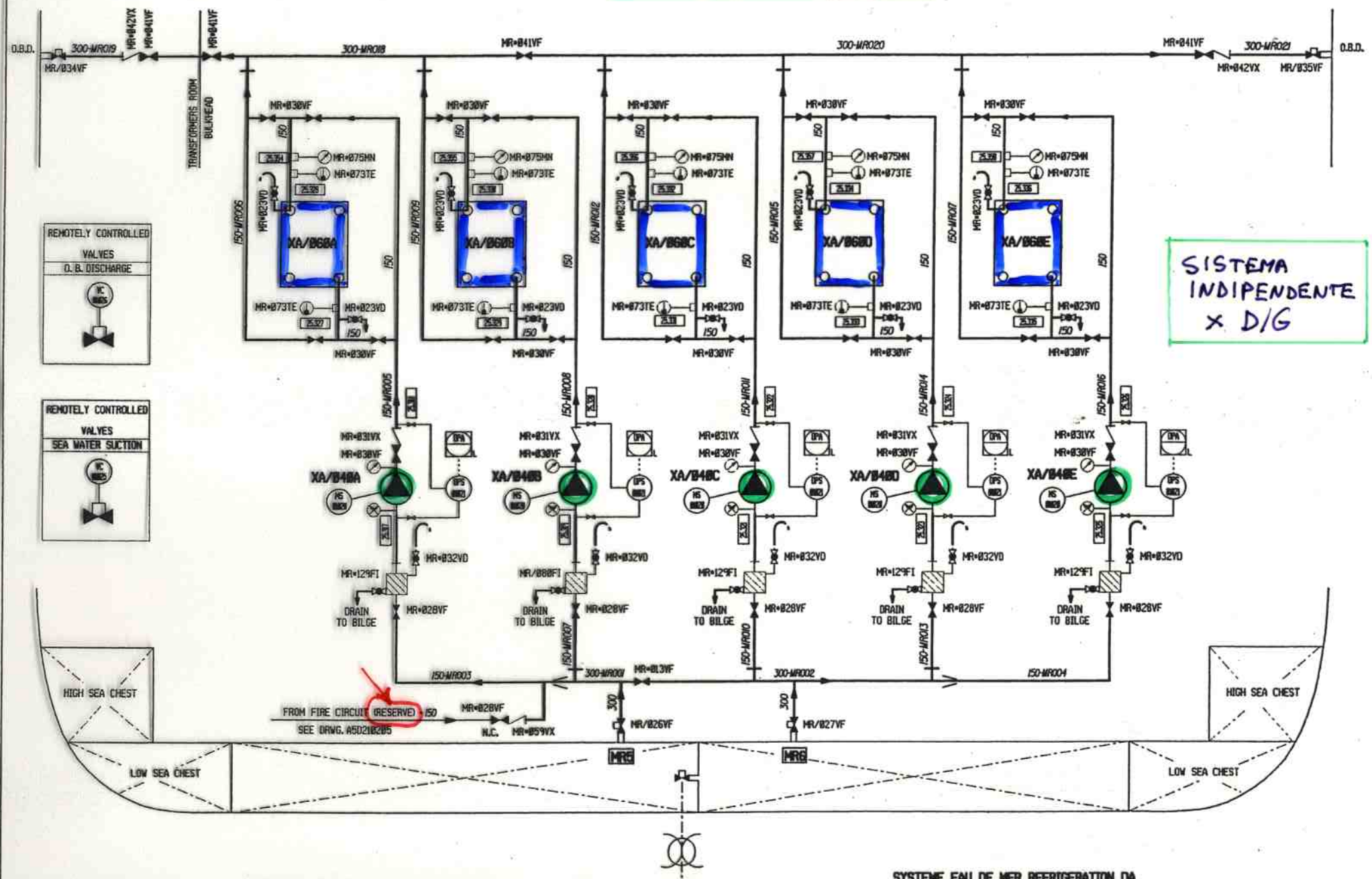
1 PP. A.M
x M.P.

POUR LE TRAVERSE EAU DE MER (PLAN 1)
FOR SEA WATER CROSS-OVER SH.19

SYSTEME EAU DE MER REFRIGERATION MPX
MVEE SEA WATER COOLING SYSTEM

FINCANTIERI <small>CONSTRUTTORE NAVALI ITALIANI S.P.A. SESTO SAN GIOVANNI VERONA</small>	DISEGNO N°. DRWG N°. A50310370	FOGLIO N°. SHEET N°. 21
	COSTRUZIONI HULLS 6 8 8 1	

2 SOLI S.F. B INCROCIATI



SISTEMA
INDIPENDENTE
X D/G

REMOTELY CONTROLLED
VALVES
D. B. DISCHARGE

REMOTELY CONTROLLED
VALVES
SEA WATER SUCTION

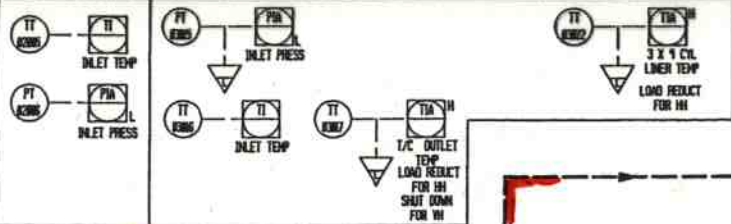
POUR LE TRAVERSE EAU DE MER (PLAN 19)
FOR SEA WATER CROSS-OVER SEE 54.19

SYSTEME EAU DE MER REFRIGERATION DA
OO/GG SEA WATER COOLING SYSTEM

FINCANTIERI INGEGNERIA MARITTIMA SISTEMI INTEGRATI VEICOLI	DESIGNO N°	ASD310370	FOGLIO N°	22
	DRWG N°		SHEET N°	
SETTORE TECNICO	COSTRUZIONI H.L.L.S. 6 8 8 1			

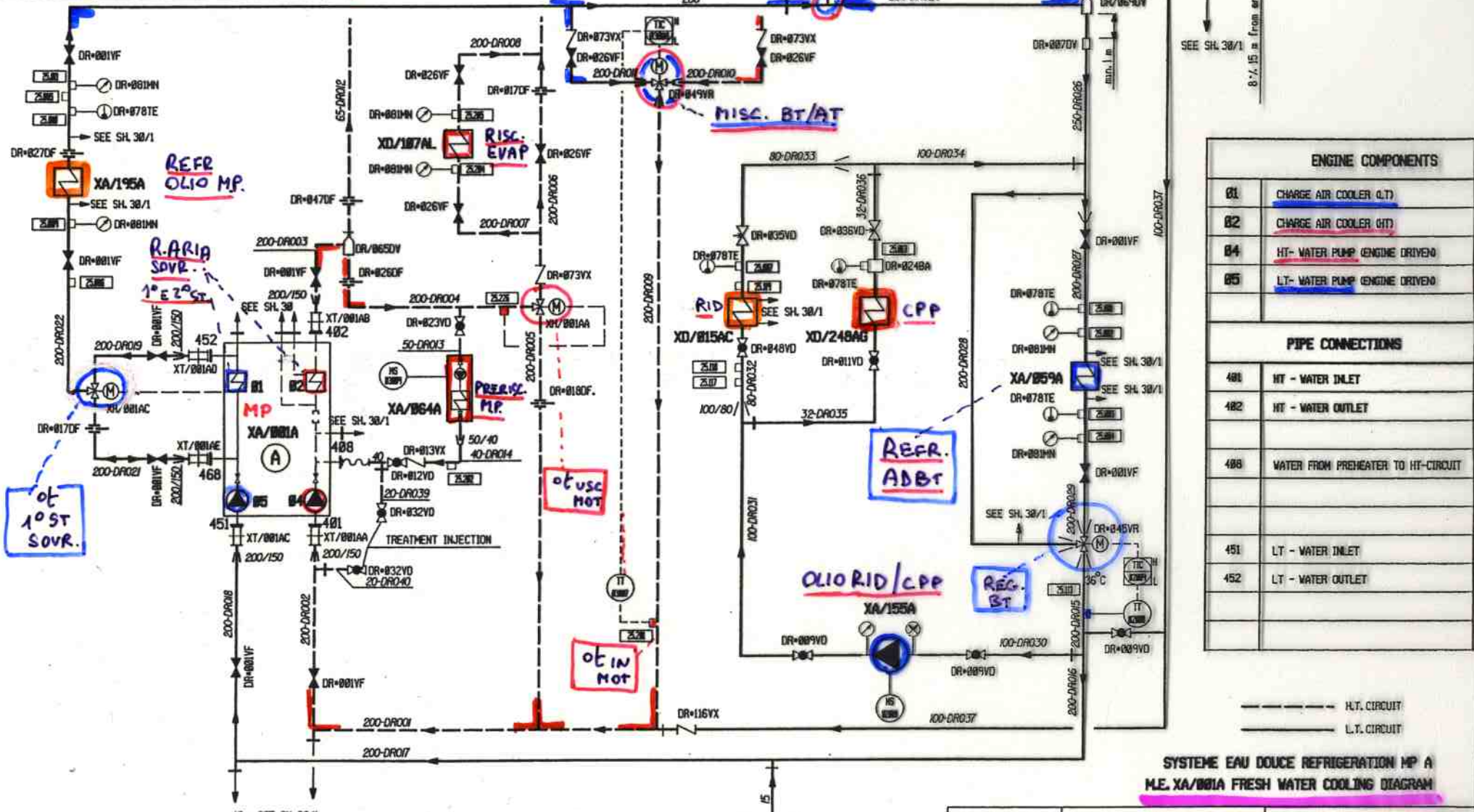
L.T. COOLING WATER

H.T. COOLING WATER



CIRCUITI ADBT/ADAT
SEPARATI * H.P. (TOT.4)

FILLING
SEE DRG. A50030262 SH. 15



ENGINE COMPONENTS	
01	CHARGE AIR COOLER (LT)
02	CHARGE AIR COOLER (HT)
04	HT- WATER PUMP ENGINE DRIVEN
05	LT- WATER PUMP ENGINE DRIVEN
PIPE CONNECTIONS	
481	HT - WATER INLET
482	HT - WATER OUTLET
488	WATER FROM PREHEATER TO HT-CIRCUIT
451	LT - WATER INLET
452	LT - WATER OUTLET

--- H.T. CIRCUIT
--- L.T. CIRCUIT

SYSTEME EAU DOUCE REFRIGERATION MP A
M.E. XA/801A FRESH WATER COOLING DIAGRAM

XA/195A
REFR. OLIO MP.

R. ARIO
SOVR.
1° e 2° ST

ot 109T
SOVR.

MP
XA/801A
A

PREV. M.P.
XA/864A

ot usc
NOT

ot in
NOT

MISC. BT/AT

REFR. ADBT

OLIORIO/ CPP
XA/155A

REG. BT

FROM XA/133
SEE SHEET 33/2

FINCANTIERI
SETTORE TECNICO

DISEGNO N°.
A50310370

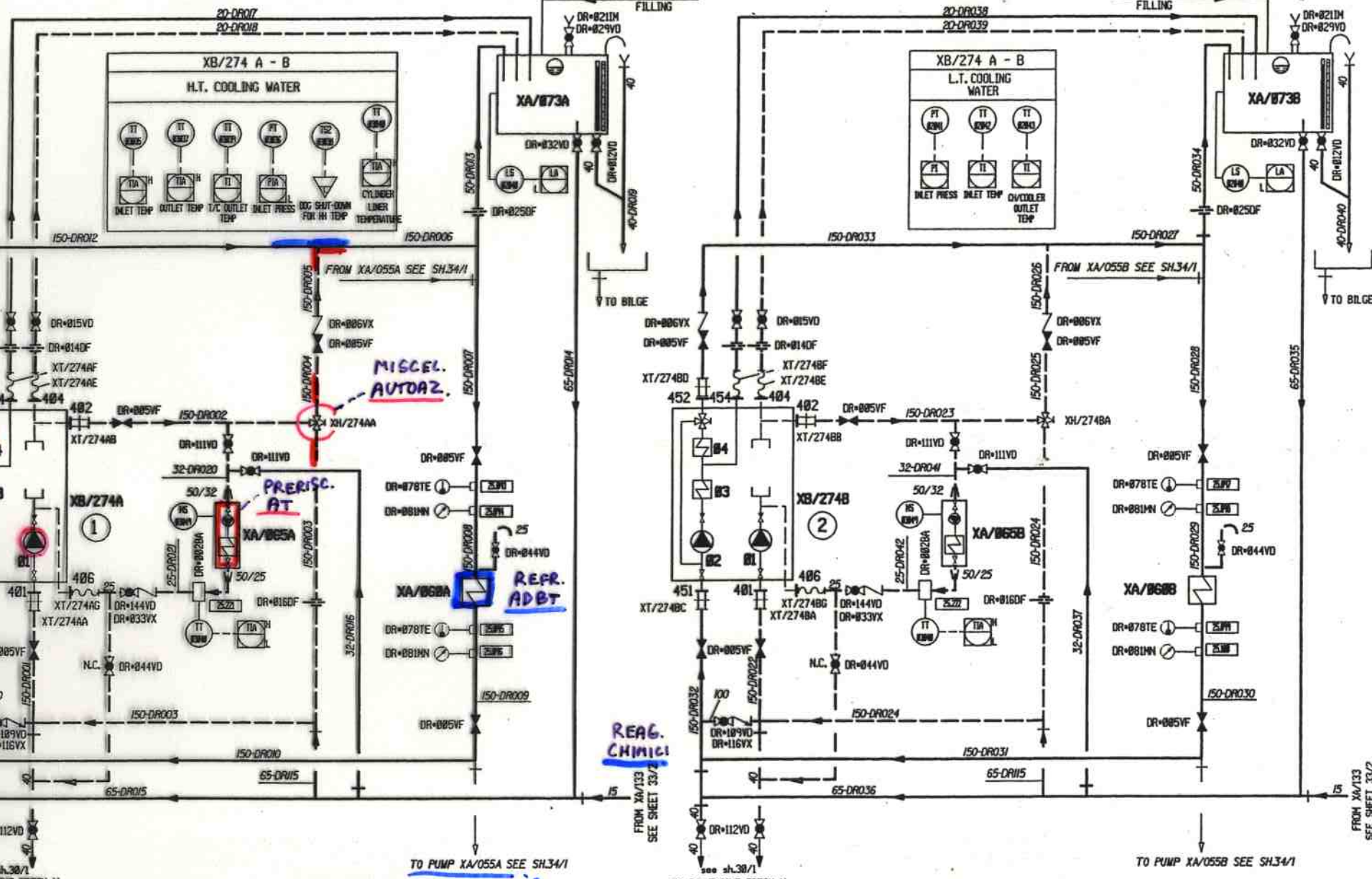
FOGLIO N°.
SHEET N°.
2/6

CONSTRUZIONI
HALLS
6 | 8 | 8 | 1

14

27

OLIO LUB.
ARIA SOVR.



ENGINE COMPONENTS	
B1	HT - WATER PUMP (ENGINE DRIVEN)
B2	LT - WATER PUMP (ENGINE DRIVEN)
B3	CHARGE AIR COOLER (L.T.)
B4	LUBRICATING OIL COOLER

PIPE CONNECTIONS	
481	HT - WATER INLET
482	HT - WATER OUTLET
484	HT - WATER AIR VENT
486	WATER FROM PREHEATER TO HT-CIRCUIT
451	LT - WATER INLET
452	LT - WATER OUTLET
454	LT - AIR VENT FROM AIR COOLER

ALT + TRF

--- H.T. CIRCUIT
 ——— L.T. CIRCUIT

CIRCUITI SEPARATI + DG

SYSTEME EAU DOUCE REFRIGERANT DA 1 - 2
DD.GG. XA/274A - XA/274B FRESH WATER COOLING DIAGRAM

FINCANTIERI <small>CONTR. ENCL. TRAC. S.M.A. SOCIETA' COOPERATIVA MEMBRI</small>	DISEGNO N°. DRMG N°. A50318370	POGGIO N°. SHEET N°. 31
SETTORE TECNICO	COSTRUZIONI HULLS 6881	

FROM XA/133
SEE SHEET 33/1

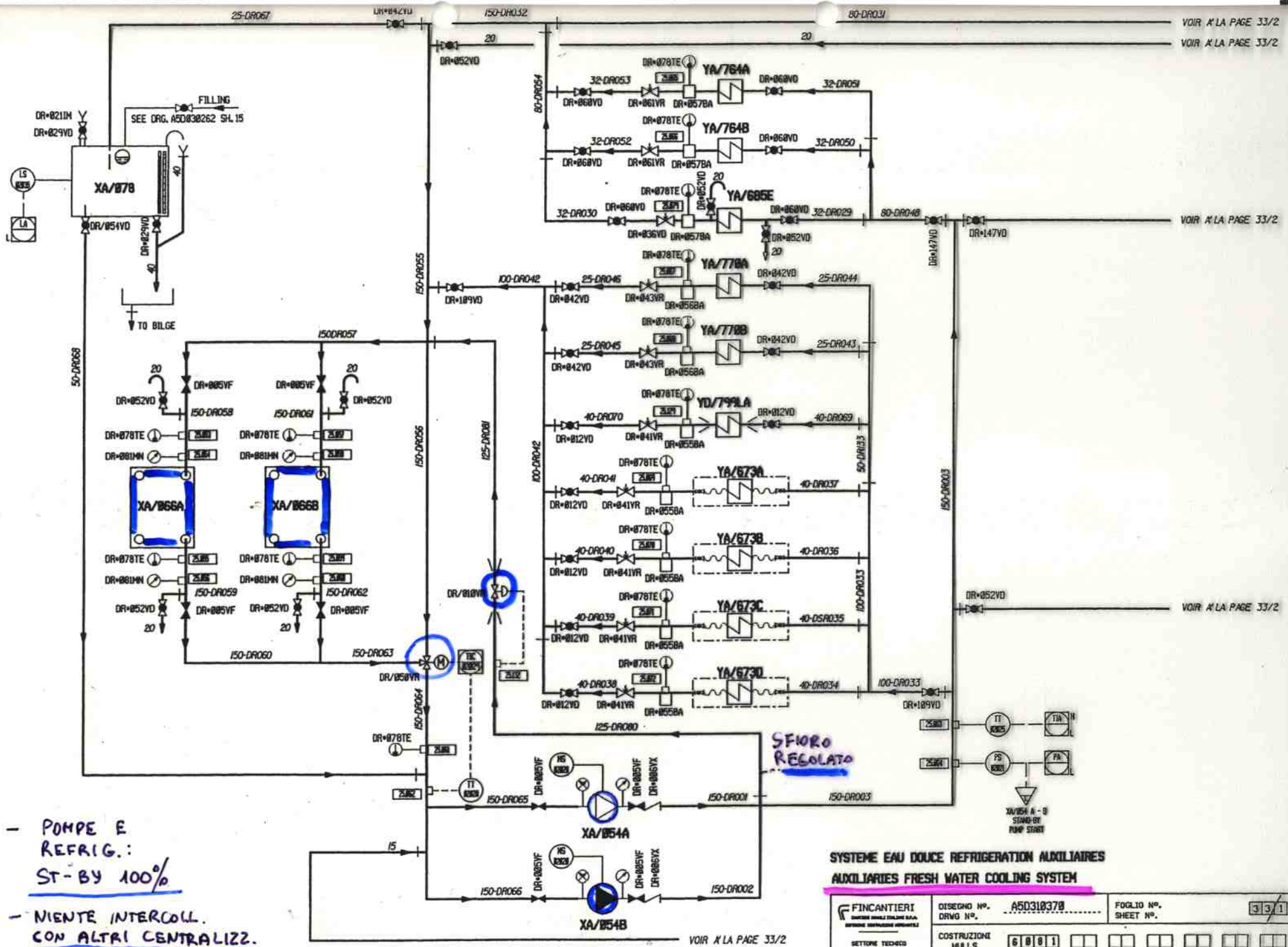
FROM XA/133
SEE SHEET 33/2

TO PUMP XA/055A SEE SH.34/1

TO PUMP XA/055B SEE SH.34/1

TO D.B. ENGINE FRESH W.
COLLECTING TK.

TO D.B. ENGINE FRESH W.
COLLECTING TK.



VOIR A LA PAGE 33/2

VOIR A LA PAGE 33/2

VOIR A LA PAGE 33/2

VOIR A LA PAGE 33/2

- POMPE E REFRIG.: ST-BY 100%
- NIENTE INTERCOLL. CON ALTRI CENTRALIZZ.

SYSTEME EAU DOUCE REFRIGERATION AUXILIAIRES
AUXILIAIRES FRESH WATER COOLING SYSTEM

FINCANTIERI DIREZIONE GENERALE TRILINE S.p.A. SEZIONE IMBARCHAZIONE	DISSEGNO NO. DRWG NO.	A50310370	FOGLIO NO. SHEET NO.	33/1
	COSTRUZIONI HULLS	6081		

VOIR A LA PAGE 33/2

15

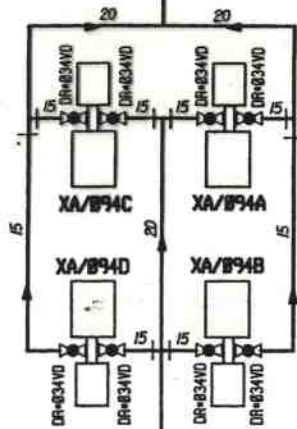
VOIR A LA PAGE 33/1

VOIR A LA PAGE 33/1

VOIR A LA PAGE 33/1

VOIR A LA PAGE 33/1

VOIR A LA PAGE 33/1

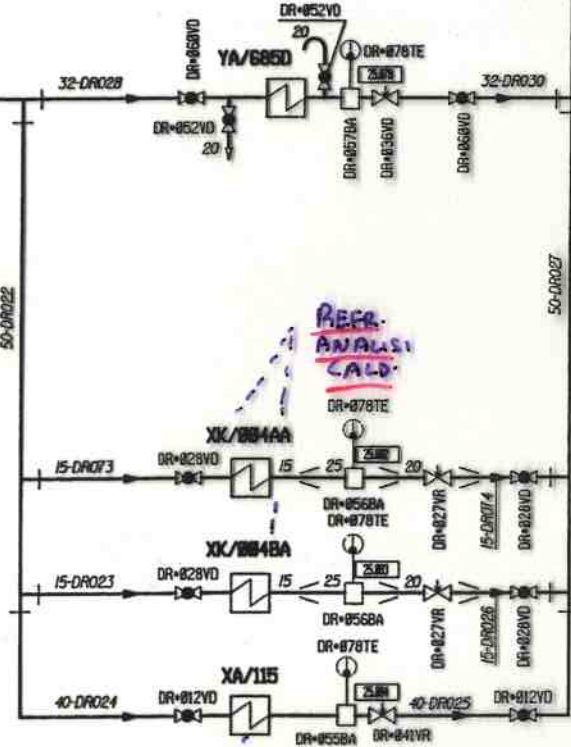
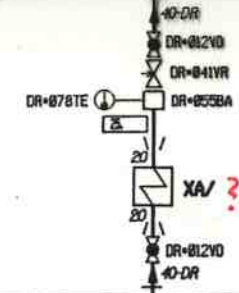


CHEMICAL TREATMENT TO MALLEE AND DOGS COOLING CIRCUITS
SEE SHEETS 26.27,28,29,31,32



REAGENT

RAFFR. TENUTE PPE CIR. CGS



REFR. ANALISI CALD.

CONDENS. P.C.

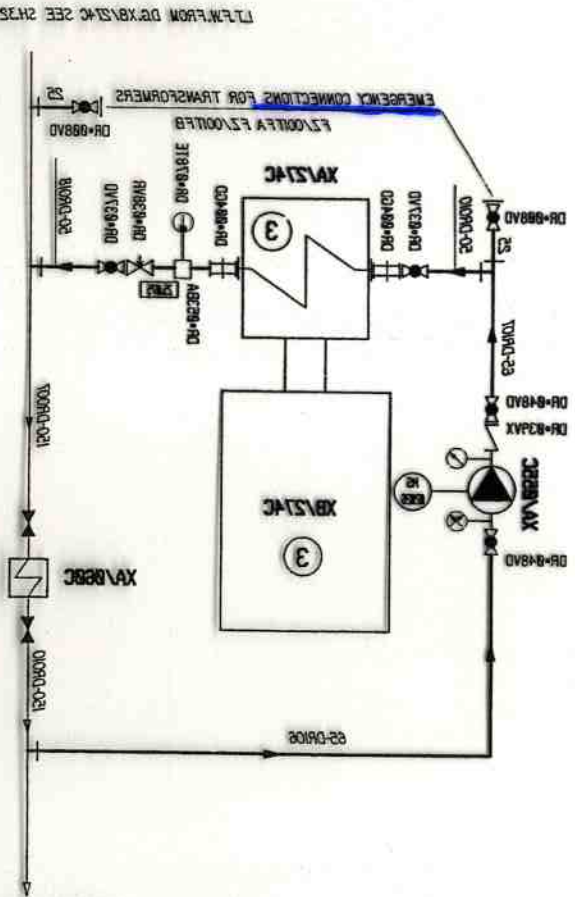
SYSTEME EAU DOUCE REFRIGERATION AUXILIAIRES
AUXILIARIES FRESH WATER COOLING SYSTEM

 FINCANTIERI <small>INDUSTRIE NAVALI ITALIANE S.p.A.</small> <small>ENGINEERING DIVISION</small>	DISEGNO NO. <u>A50310370</u> DRWG NO.	FOGLIO NO. SHEET NO.	33/2
	COSTRUZIONI HULLS	6881	[] [] [] [] [] [] [] []

347	DESIGNED BY: A.S. J. 1970	DATE: 10/10/70
DRG. NO. 1000000000	PROJECT NO. 1000000000	SHEET NO. 1000000000
CONSTRUCTION	INSTALLATION	OPERATION
HT'S	HT'S	HT'S

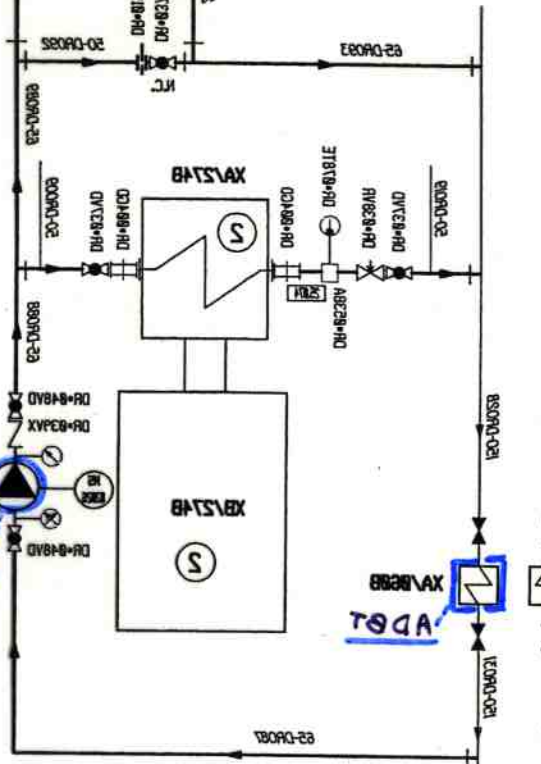
TRANSFORMERS AND D.G. GENERATORS L.T.F.W. COOLING DIAGRAM
 SYSTEME EN DOUCE B.T. REFRIGERATION GENERATEURS ET TRANSFORMATEURS

L.T.F.W. TO DR.XB.V.12.4C SEE 2H.2S

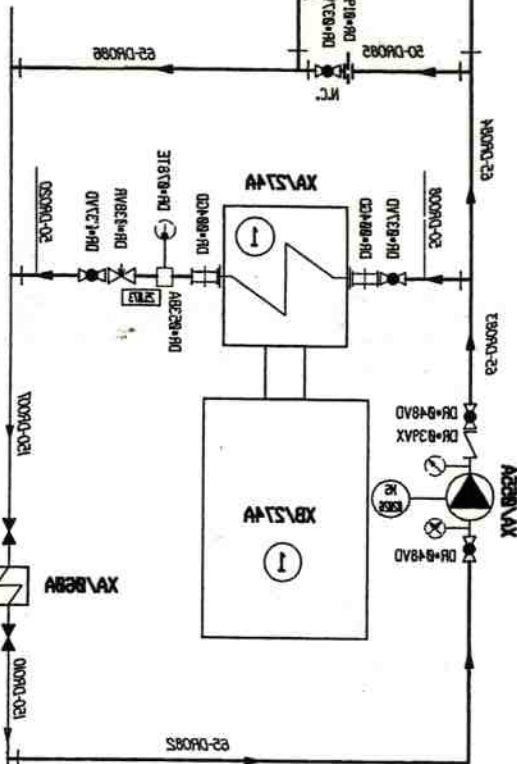


L.T.F.W. FROM DR.XB.V.12.4C SEE 2H.2S

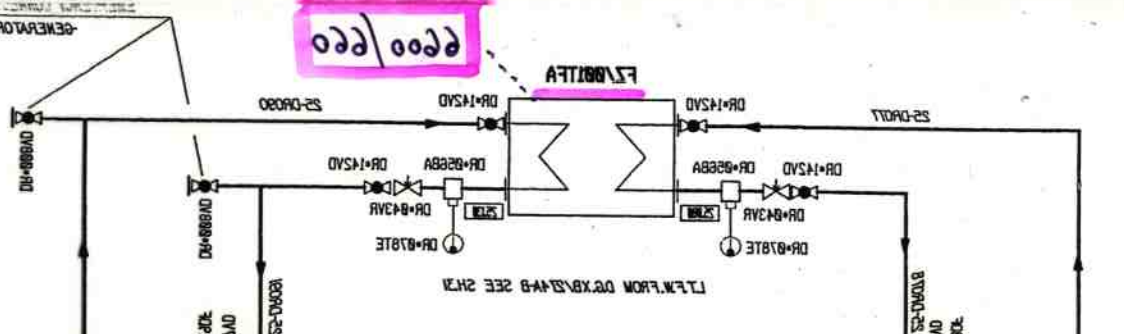
1
 1/1
 1/1
 x D/A



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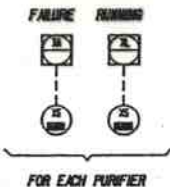


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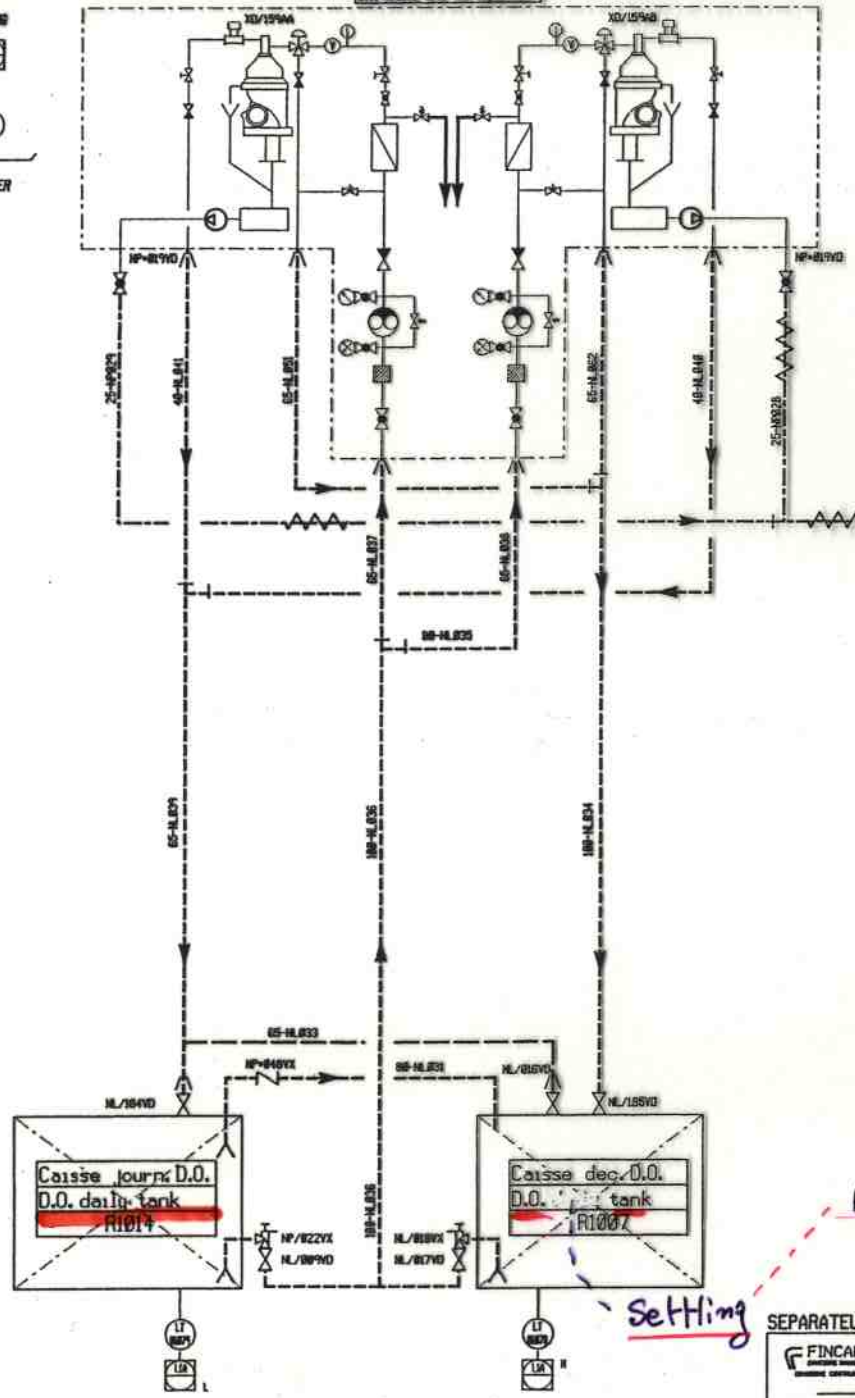


600/600

GENERATOR XB.V.12.4C



XA/159
Module double séparateur F.O.
F.O. module with two separator



DIESEL - OIL
2 DEP. IN SERVIZIO (?)

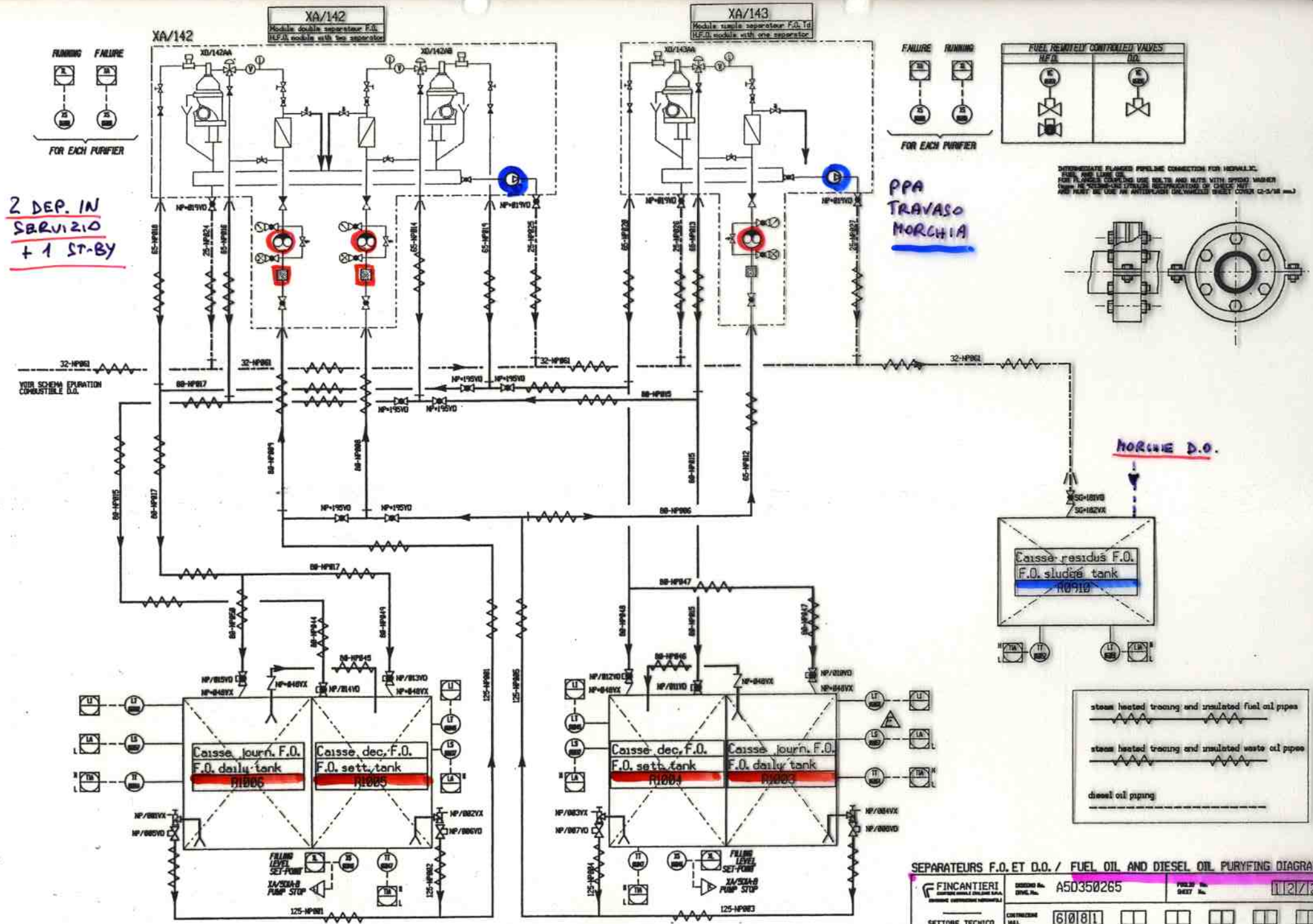
→ CASSA MORCHIA

RIPIUNANTE x DO

Setting

SEPARATEURS F.O. ET D.O. / FUEL OIL AND DIESEL OIL PURIFYING DIAGRAM

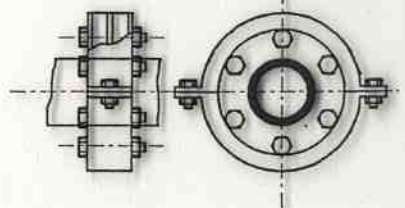
FINCANTIERI INGEGNERIA MARITTIMA S.P.A. SESTO CALENDE (MODENA)	DESIGN No.	A5D350265	FIELD No.	112/11
	DATE		SHEET No.	
SETTORE TECNICO	CONTRATTORE	61081		



2 DEP. IN SERVIZIO
+ 1 ST-BY

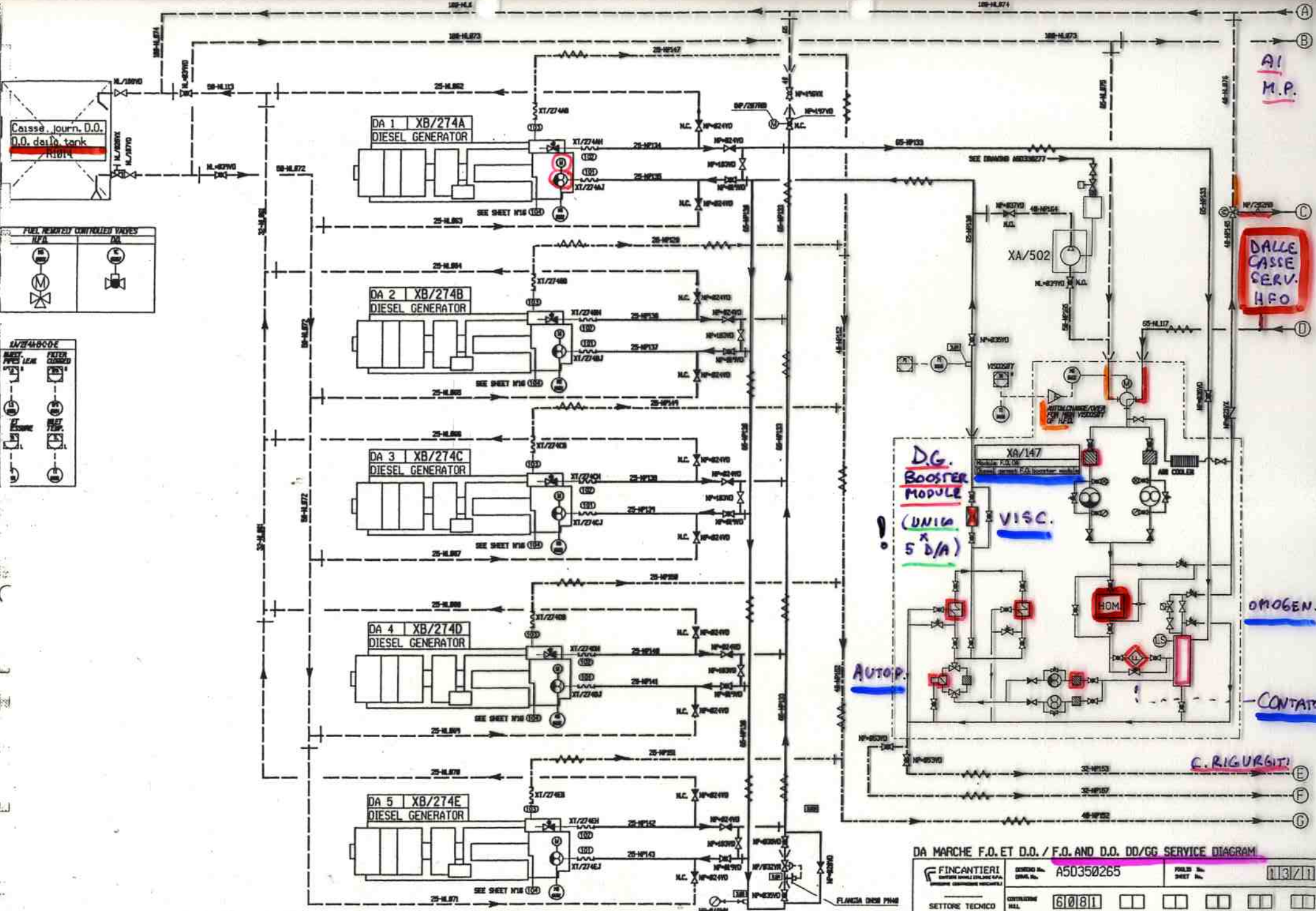
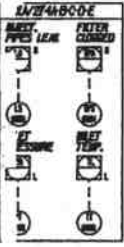
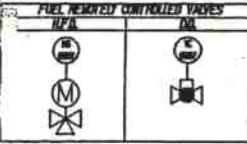
PPA TRAVASO MORCHIA

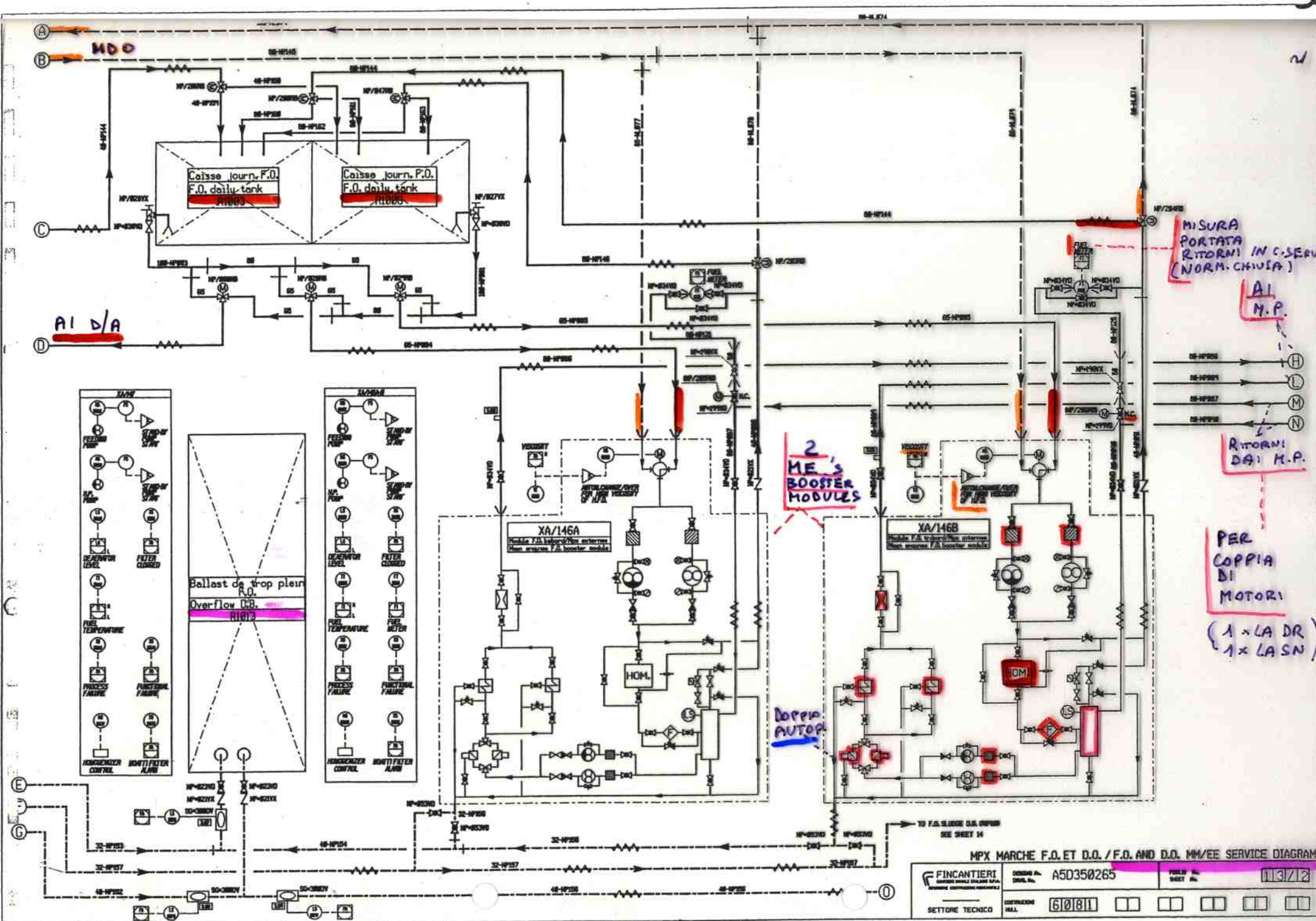
INTERMEDIATE FLANGED PIPELINE CONNECTION FOR HEPAFLIC TANKS AND LINES USE FOR FLANGES INCLUDING USE BOLTS AND NUTS WITH SPACED WASHER IN ORDER TO AVOID OVERSTRESSING OF GASKETS AND MUST BE USED AN ANTI-FLASH GALVANIZED SHEET COVER (2-3/16 IN.)



SEPARATEURS F.O. ET D.O. / FUEL OIL AND DIESEL OIL PURIFYING DIAGRAM

FINCANTIERI CORPORATE GROUP	DESIGN No. A50350265	FIELD No. 12/12
SETTORE TECNICO	CONTRATTORE N. 610181	





MISURA PORTATA RITORNI IN C. SERV (NORM. CHIUSA)

AI M.P.

RITORNI DA: M.P.

PER COPPIA DI MOTORI
(1 x LA DR, 1 x LASN)

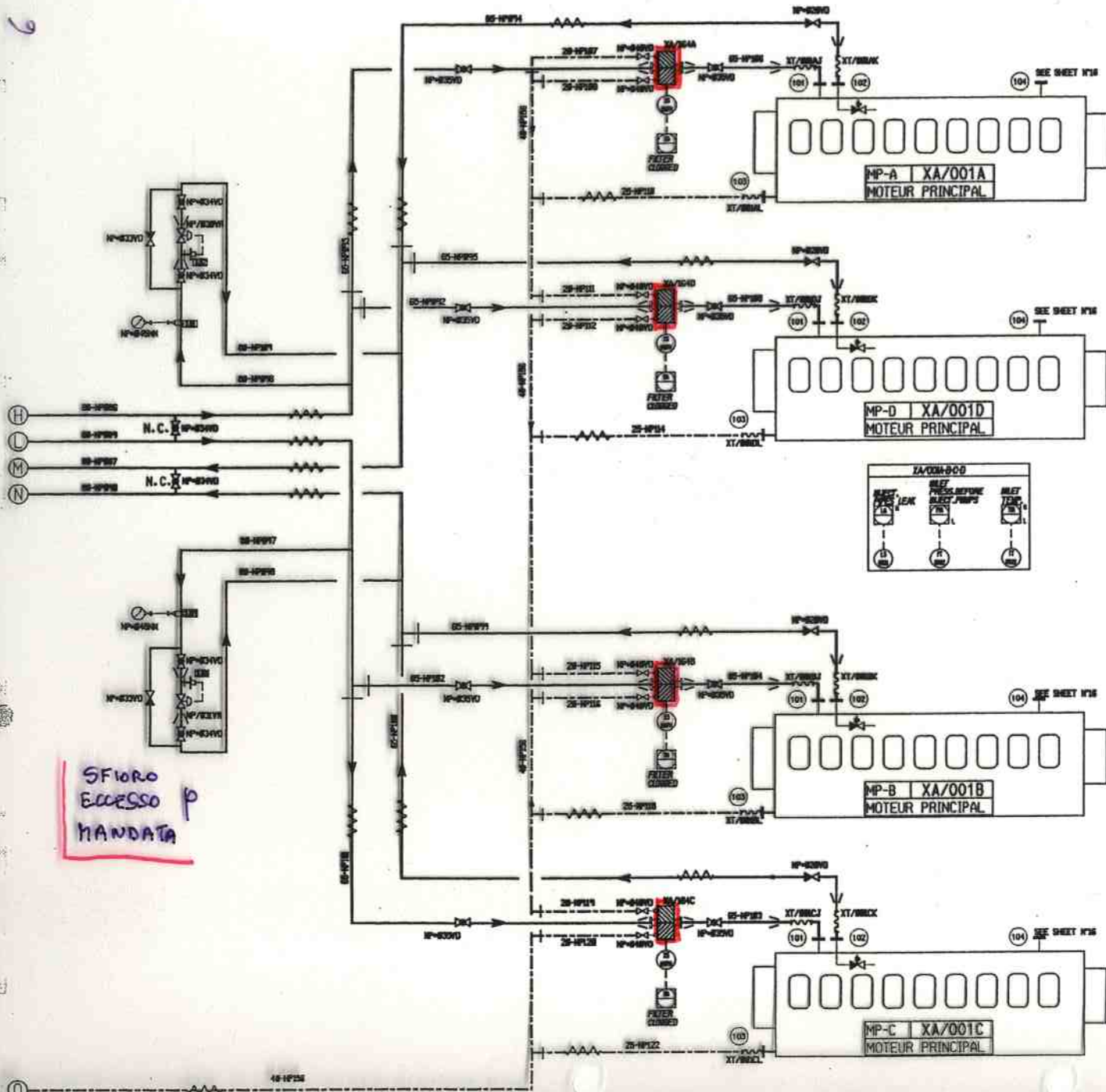
2 ME'S BOOSTER MODULES

Doppia AUTOP.

MPX MARCHE F.O. ET D.O. / F.O. AND D.O. MM/EE SERVICE DIAGRAM

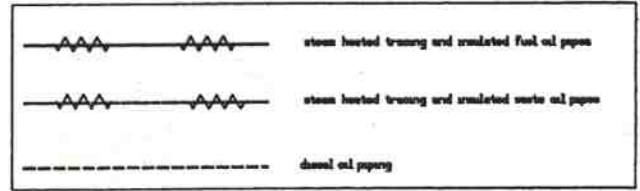
 F. FINCANTIERI <small>INGEGNERIA E COSTRUZIONI MARITIME</small>	DESIGN No. A5D350265	FIELD No. 113/12
	SETTORE TECNICO	CUSTOMER No. 610811

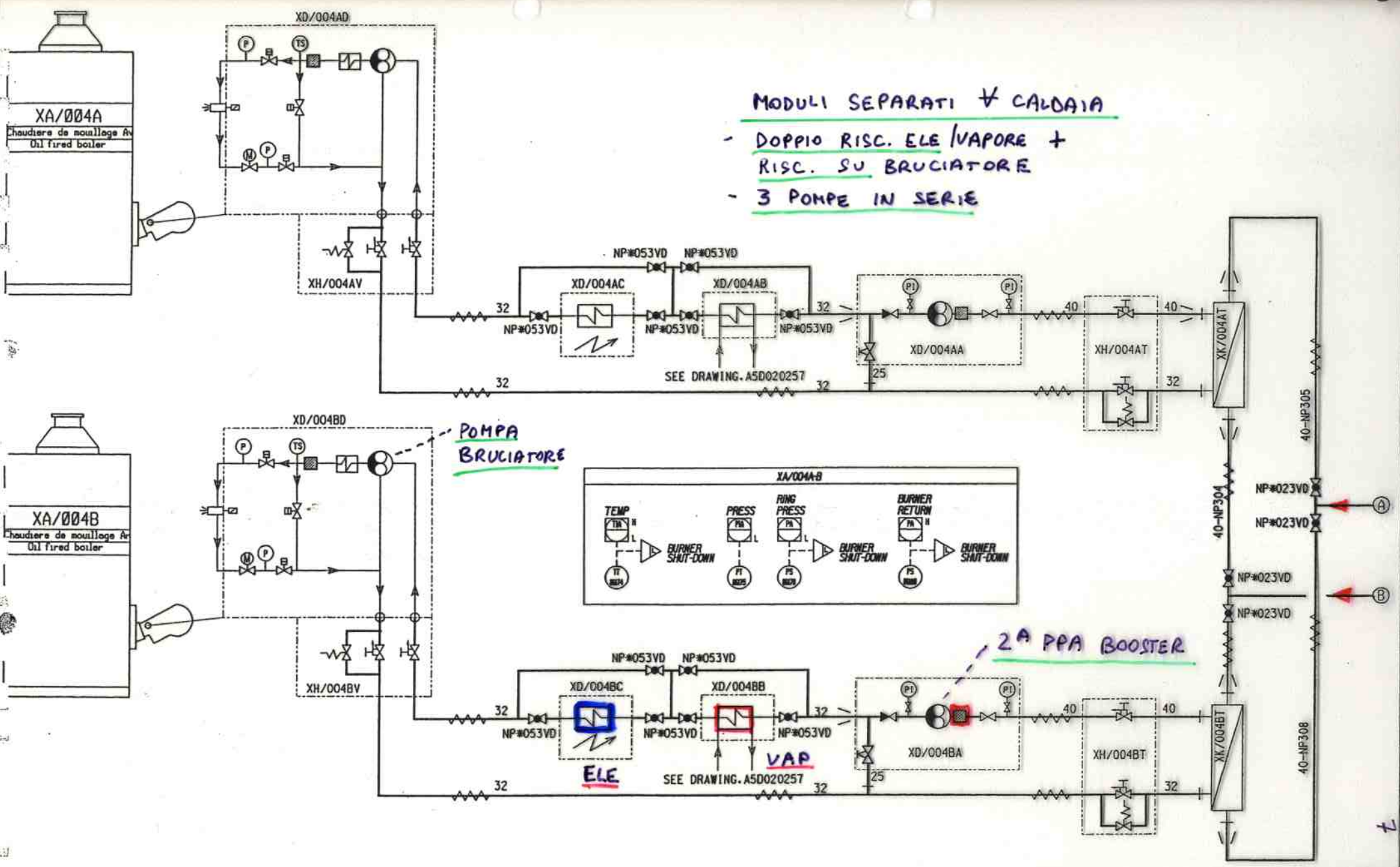
6



SFIDRO
ECESSO p
MANDATA

- (101) fuel inlet
- (102) fuel outlet
- (103) leak fuel drain/return fuel
- (104) leak fuel drain/return fuel

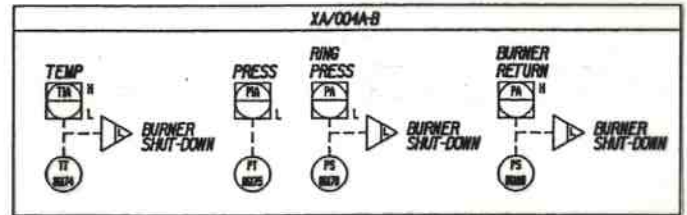




MODULI SEPARATI V CALDAIA

- DOPPIO RISC. ELE / VAPORE + RISC. SU BRUCIATORE
- 3 POMPE IN SERIE

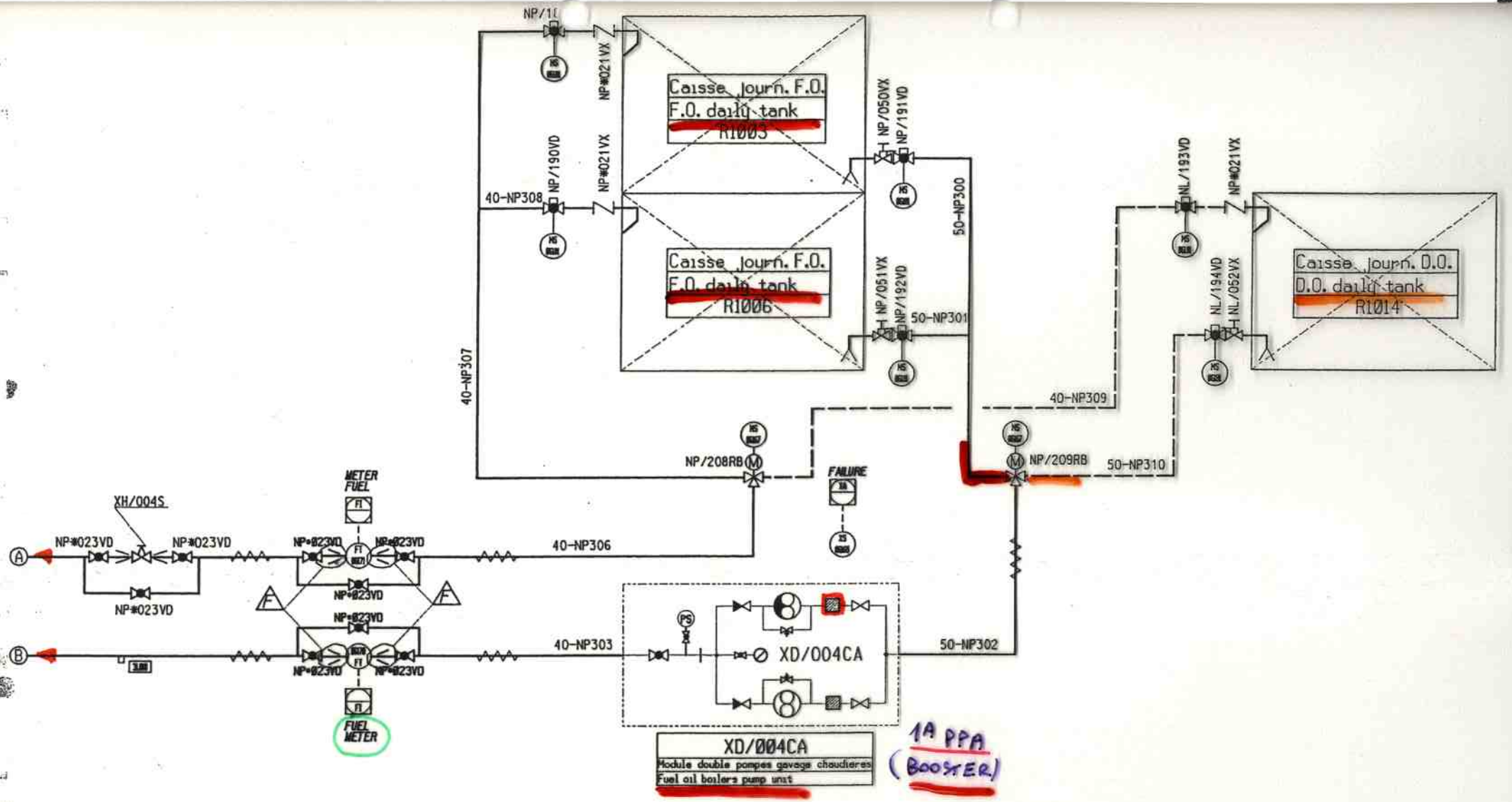
POMPA BRUCIATORE



2A PPA BOOSTER

CIRCUIT COMBUSTIBLE CHAUDIERE MOUILLAGE ET DA DE SECOURS
OIL FIRED BOILERS F.O. AND D.O. SERVICE DIAGRAM

FINCANTIERI SISTEMI ELETTRICI S.p.A. SISTEMI AUTOMAZIONE INDUSTRIALE	DESIGN No.	A50350265	FIELD No.	15/11
	SETTORE TECNICO	CONTRATTORE ALL.	6081	

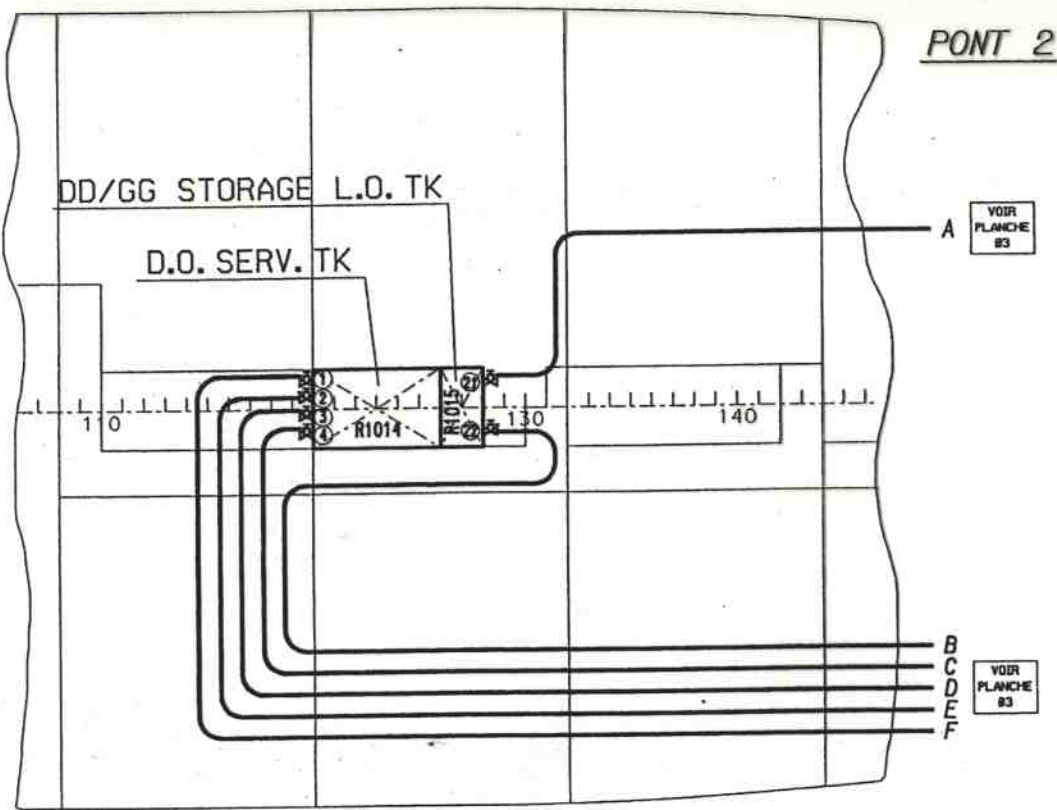


XD/004CA
 Module double pompes gavage chaudières
 Fuel oil boilers pump unit

1A PPA
(BOOSTER)

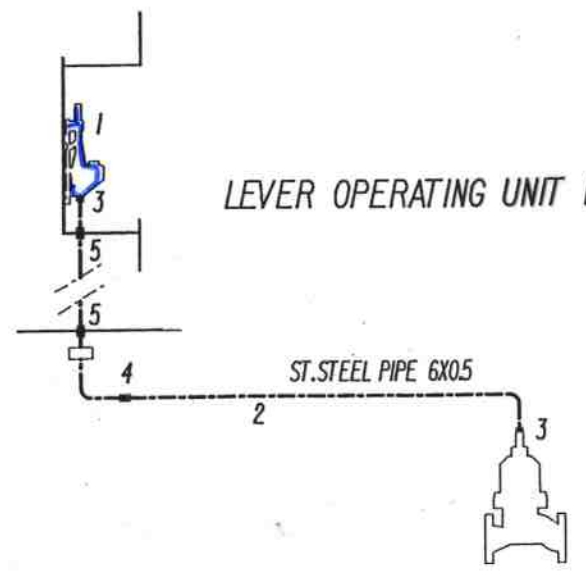
CIRCUIT COMBUSTIBLE CHAUDIERE MOUILLAGE ET DA DE SECOURS
 OIL FIRED BOILERS F.O. AND D.O. SERVICE DIAGRAM

FINCANTIERI <small>INDUSTRIE ITALIANA</small>	DESIGN No. A5D350265	FIELD No. 115712
	SETTORE TECNICO	CONTROLORE No. 6081



PONT 2

LEVER OPERATING UNIT DETAIL



	LEVER OPERATING UNIT	VALVE PIECE MARK
LEVER 1	D.O. SERVICE TANK (R1014) D.O. purifiers suction	① NP/022VX
	D.O. SERVICE TANK (R1014) D.O. for MM/EE and DD/GG service	② NL/025VX
	D.O. SERVICE TANK (R1014) D.O. transfer pump suction	③ IL/154VX
	D.O. SERVICE TANK (R1014) D.O. for OIL FIRED BOILERS service	④ NL/052VX
	DD/GG L.O. TANK (R1015) L.O. SUCTION	⑤ QL/022VX
LEVER 2	F.O. SERVICE TANK (R1006) F.O. purifiers suction	⑥ NP/001VX
	F.O. SERVICE TANK (R1006) F.O. for OIL FIRED BOILERS service	⑦ NP/051VX
	F.O. SERVICE TANK (R1006) F.O. transfer pump suction	⑧ IF/137VX
	F.O. SERVICE TANK (R1006) F.O. for MM/EE and DD/GG service	⑨ NP/027VX
LEVER 3	F.O. SETTLING TANK (R1005) F.O. purifiers suction	⑩ NP/002VX
	F.O. SETTLING TANK (R1005) F.O. transfer pump suction	⑪ IF/136VX
	F.O. SETTLING TANK (R1004) F.O. purifiers suction	⑫ NP/003VX
	F.O. SETTLING TANK (R1004) F.O. transfer pump suction	⑬ IF/135VX
LEVER 4	F.O. SERVICE TANK (R1003) F.O. purifiers suction	⑭ NP/004VX
	F.O. SERVICE TANK (R1003) F.O. for OIL FIRED BOILERS service	⑮ NP/050VX
	F.O. SERVICE TANK (R1003) F.O. transfer pump suction	⑯ IF/134VX
	F.O. SERVICE TANK (R1003) F.O. for MM/EE and DD/GG service	⑰ NP/026VX
LEVER 5	D.O. SETTLING TANK (R1007) D.O. transfer pump suction	⑱ IL/155VX
	D.O. SETTLING TANK (R1007) D.O. purifiers suction	⑲ NL/018VX
	F.O. STORAGE TANK (R1104) F.O. transfer pump suction	⑳ IF/149VX
	F.O. STORAGE TANK (R1105) F.O. transfer pump suction	㉑ IF/148VX
	DD/GG L.O. TANK (R1015) DD/GG L.O. filling	㉒ QL/063VX

ITEM POS.	DESCRIPTION DESCRIZIONE	NUMB. QTA	PIECE NUMBER MARCA	DRAWING. DISEGNO
1	LEVER OPERATING UNIT	2 PZ	MM#001DV	NE 481343 B
1	THREE LEVERS OPERATING UNIT	1 PZ	MM/002DV	NE 481343 B
2	RZD-BUNDLED MULTICORE TUBING "ZAPP"		NL	
3	WITH DOUBLE-ADGED RING COUPLING		PZ	
4	STRAIGHT TAPPER WITH DOUBLE-ADGED RING COUPLING		PZ	
5	DECK PENETRATION "KIEPE"		PZ	

VANNES A FERMETURE RAPIDE
HYDRAULIC SYSTEM FOR QUICK-CLOSING FUEL-LUBRICATING OIL VALVES DIAGRAM

<p>Centri Navali Italiani S.p.A. SEZIONE NAVI DA TRASPORTE</p>	DISEGNO No. A5D410252 DRWG. No.	FOGLIO No. 04 SHEET No.
	COSTRUZIONI HULLS 6081	ALT. C - 28 MAY 2002

SYSTEME HUILE MPX

Chaque moteur est équipé de son propre système indépendant d'huile pour la pression haute générale et la lubrification cylindre le carter d'huile est séparé des moteurs.

Chaque moteur est équipé d'une pompe attelée à huile

Une seule électro-pompe de prégraissage (XD/001 AH-BH-CH-DH) équipe chaque moteur. les pompes stand-by (XA/184A-B-C-D) démarrent avant la séquence de démarrage MP et s'arrêtent quand la vitesse moteur augmente.

La pompe de prégraissage démarre automatiquement par pression basse d'huile du défaut de la pompe stand-by.

Toutes les pompes aspirent du carter d'huile MP à travers des filtres à l'aspiration équipés d'inserts magnétiques puis refoulement vers le refroidisseur huile MP (XA/195A-B-C-D) du refroidisseur qui règle la température d'entrée MP à 63° par une vanne therm.

l'huile passe ensuite à travers le filtre à huile automatique du MPx, puis aux filtres duplex et en fin au moteur

Les moteurs ont un carter sec.

Le carter d'huile MP est connecté à un séparateur affecté à marcher en continu également quand le moteur est stoppé et le carter peut être vide ou rempli en utilisant le système d'appoint et de transfert.

MAIN ENGINE L.O. SYSTEMS-MAIN L.O. SYSTEM

Each main diesel engine is equipped with its own self-contained L.O. system for general high-pressure and cylinder lubrication. The L.O. sump tank dry is separate built in the engine

One direct-driven M.E. L.O. Pump is fitted to each engine.

A single built in electric motor-driven prelubricating pump (XD/001 AH-BH-CH-DH) is provided for each engine. The pumps are loose supply.

Stand-by pumps (XA/184A-B-C-D) starts before with the M.E. starting sequence and stops when the engine speed increases.

Prelubricating pump will automatically start on lube oil low pressure or stand-by pump failure.

All the pumps take suction from the M.E. L.O. Sump Tank through suction filters equipped with magnetic inserts, and delivery to the M.E. Lub Oil Cooler (XA/195 A-B-C-D).

From the cooler, which has a temperature control valve that regulates the inlet to the engine to 63 C max, the LO flows through a M.E. L.O. Autofilter, a duplex indicator filter and on to the engine.

The engine has a dry sump.

The M.E. L.O. sump tank has connections for its dedicated purifier to operate continuously even when the engine is not in use. In addition, the sump tank may be emptied or replenished by using the filling and transfer system.

COSTR.
HULL

6081

N.DISEGNO
DWG. NUMBER

A5D360267

FOGLIO N.
SHEET NR. 15SYSTEME L.O. SYSTEMS-MAIN L.O. SYSTEM

Tous les diesels alternateur sont equips avec leur propre systeme independants d'huile pour la pression haute.

Le carter d'huile da est carter humide

Une pompe atteleee huile da equipe chaque diesel

Une electro pompe de pregraissage equipe chaque diesel

La pompe de pregraissage demarre et continue a fonctionner quand le DA reste en position stand-by.

La pompe de pregraissage demarre autom au retablissement du courant, dans la phase suivant un black-out et stoppe par l'actionnement du systeme de secours dans le cas d'un feu.

Toutes les pompes aspirent au carter et refoulent au refrigerant d'huile DA

Du refrigerant temperature d'entree au diesel regulee a 63° par une vanne therm, l'huile passe a travers un filtre double vers le diesel.

Le carter du diesels alt est connecte a deux separateurs affectes a marcher en continu egalement quand le diesel est stoppe.

Le carter peut etre vide ou rempli en utilisant le systeme d'appoint et de transfert.

GENERATOR L.O. SYSTEMS-MAIN L.O. SYSTEM

All the diesel generators engine are equipped with their own self-contained L.O. system for general high-pressure . The L.O. sump tank wet is built in the engine skid.

One direct-driven D.G. L.O. Pump is fitted to each engine.

An electric motor driven prelubricating pump is provide for each engine.

The prelub. pump stop automatically with the D.G. starting sequence and the engine speed increase.

The prelubricating pump is started and remains running continuously when the D.G.-set remains in standby position.

The prelub. pump will automatically start on restoration of power supplies following a blackout and it is also arranged to stop by operation of the Emergency System in the event of a fire.

All the pumps take suction from the Crankase Sump, and delivery to the D.G. Lub Oil Cooler.

From the cooler, which has a temperature control valve that regulates the inlet to the engine to 63 C max , the LO flows through a D.G. L.O. Autofilter, a duplex indicator filter and on to the engine.

The DD. G.G. Crankase sumps have connections for two dedicated purifiers to operate continuously even when the engine is not in use. In addition, the Crankase sump may be emptied or replenished by using the filling and transfer system.

L.O. PURIFIER SYSTEM

Deux modules 'doubles' et deux modules 'simples' Alfa Laval equipent le systeme chaque module double a un debit de 2900 L/h et chaque module 'simple' a un debit de sortie de 2050 L/h Les 4 unites sont situees au local separateur chacun a une electro pompe separee. Les 2 'doubles' sont affectees aux MPx et les 2 'simples' au DA, chacun est dispose de sorte a dessevir son propre carter MP ceci en marche continue independamment de l'arret des moteurs.

La decharge de chaque separateur se fait au carter respectif de chaque moteur et en circuit ferme si l'aspiration est faite a un ballast a huile a epurer, l'huile epuree est dirigee vers le meme systeme celui en rapport.

Les separateur s'auto-nettoient automatiquement.

L'huile d'alimentation peut aussi etre detournee vers la traverse de decharge ceci est acceptable tant que le separateur est en circuit ferme sur un carter moteur mais au cas du l'aspiration est faite au ballast a huile a epuree et peut 'polluer' la charge en place donc il doit etre fait attention a la position des vannes lors du traitement des huiles sales.

La pression de vapeur est automatiquement controllee par une vanne de reculation a 2 Bar une vanne electro magnetique stoppe l'entree vapeur quand le separateur est stoppe' Chaque rechauffeur deseparateurs est fournie par le circuit eau technique les faux polluees et residus vont directement aux caisses residus

Les separateurs ont une unite de controle ces unites programmes les periodes de chasse pendant leur marche

Ils fonctionnent en moniteur d'alarmes quand la pression de decharge monte ou descend sous les limites definis

L.O. PURIFIER SYSTEM

Two 'double' and two 'single' ALFA LAVAL lube oil purifiers are provided, each 'double' purifiers with an output of 2900 l./h. and each 'single' purifiers with an output of 2050 l./h. All four units are located in the purifier Rooms. Each has a separate electric motor-driven pump.

Two 'double' are dedicated for main engines and two 'single' for the generators; each is arranged to operate on its designated diesel main engine L.O. sump tank. This is a continuous operation irrespective of whether the engine is running or stopped.

The discharge from each purifier is directed to its respective engine sump if the machine is operating in a closed circuit. Should the suction be taken from the L.O. renovating tank, the processed oil is then led to the same or to the relevant engine system.

The purifiers are automatically self-cleaning. Feed oil can also be diverted to the purifier discharge line; this is acceptable while a purifier is in a closed circuit with an engine sump, but in case the suction is taken from the LO renovating tank, the bypassed L.O. will be discharged to a purified (clean) L.O. tank and may contaminate the contents. Therefore, care is to be taken in the setting of valves when treating dirty or exhaust oil.

Steam pressure is automatically controlled by a regulating valve at 2 bars.

An electro magnetic valve stop the inlet steam when the purifier is stopped.

Each purifier heater is supplied with steam and is automatically temperature controlled.

Operating water for the purifiers is supplied by the Potable Water.

Waste water and sludge is directed to the respective in sludge tank.

The purifiers have a control unit. These control units programme the self-cleaning periods when the machines are operating. They also act as an alarm monitor should the discharge pressure rise or fall outside the defined limits.

SYSTEME TRANSFERT D'HUILE

Chacun des MPx et des DA a un circuit d'huile independant

Les systeme sont reapprovisionnes avec de l'huile propre, des ballast a huile reserve MPx et DA et des ballast a huile a epurer.

Les ballast a huile reserves MPx et DA sont connectes a une traverse commune allant des sas d'avitaillement BD a TD.

Les ballast a huile reserves Mpx et DA sont connectes a une traverse commune allant des sas d'avitaillement Bd a Td

Les huiles extraites des carters MPx et DA peuvent etre transferees au ballast a hile a epure ou auxsas d'avitaillement, par les pompes de transfert d'huile (XA/185)

La traverse d'alimentation est prevu pour l'alimentation des caisses suivantes par les sas Bd et Td

Bunker stations:

- Ballast huile etambot
- Ballasts a huile Mpx et DA
- Ballast huile reducteur

L.O. TRANSFER SYSTEM

Each main engine and DD.GG. has a separate L.O. circulating system. The nine systems are replenished with clean oil from the MM./EE. and DD.GG. L.O. Storage tank, from the L.O. Renovating tank.

The DD./GG. and MM./EE. L.O. Storage tanks are connected to a common filling line from the port/stbd bunker stations.

Exhaust oil from the main engines' L.O. sump tanks and DD.GG. sump tanks can be transferred to the L.O. renovating tank or to the bunker stations by means the L.O. transfer pump (XA/185).

The filling line is provided for filling the following tanks from the port/stbd bunker stations:

- L.O. stern tube tanks
- L.O. storage tank
- Red.gear L.O. tanks

LIGNES D'ARBRE, ET ETAMBOT SYSTEME LUBRIFICATION D'ETANCHEITE

Un systeme d'huile separe equipe chaque graissage de tube etambot des paliers d'etambot et des paliers de lignes d'arbre.

Chaque systeme comprend:

Une caisse a huile encharge

L'etancheite arriere est assuree par une circulation d'huile constante, avec une caisse d'huile desop. conque pour une refrigeration a l'air.

Une caisse a huile etambot destockage, est commune pour chaque systeme etambot equipe avec une elec.pompe de transfert d'huile.

Une caisse a huile vidange a tambot existe avec son tuyautage pour pompez l'huile dans chaque etambot et la ramener au systeme.

Les degagements d'air et tuyaux de recirculation sont situes en plafond de la caisse en charge.

SHAFT LINES AND TUBES - SEALING LUBRICATION SYSTEM

A separate lub. oil system to be provided for each stern tube lubrication of the stern tube bearings and shaft seals.

Each system to has :

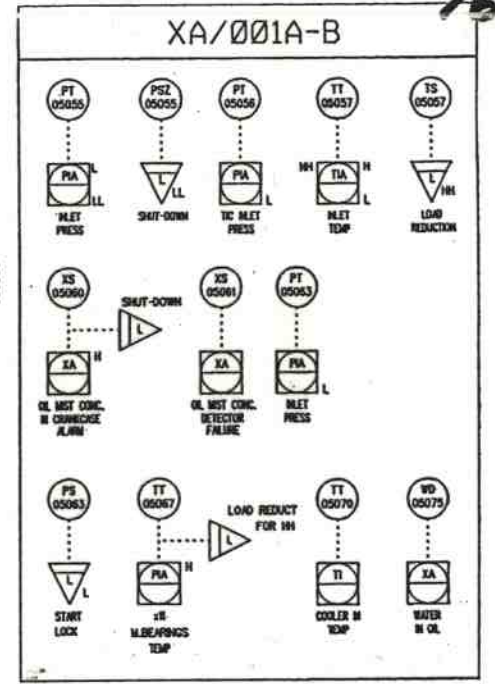
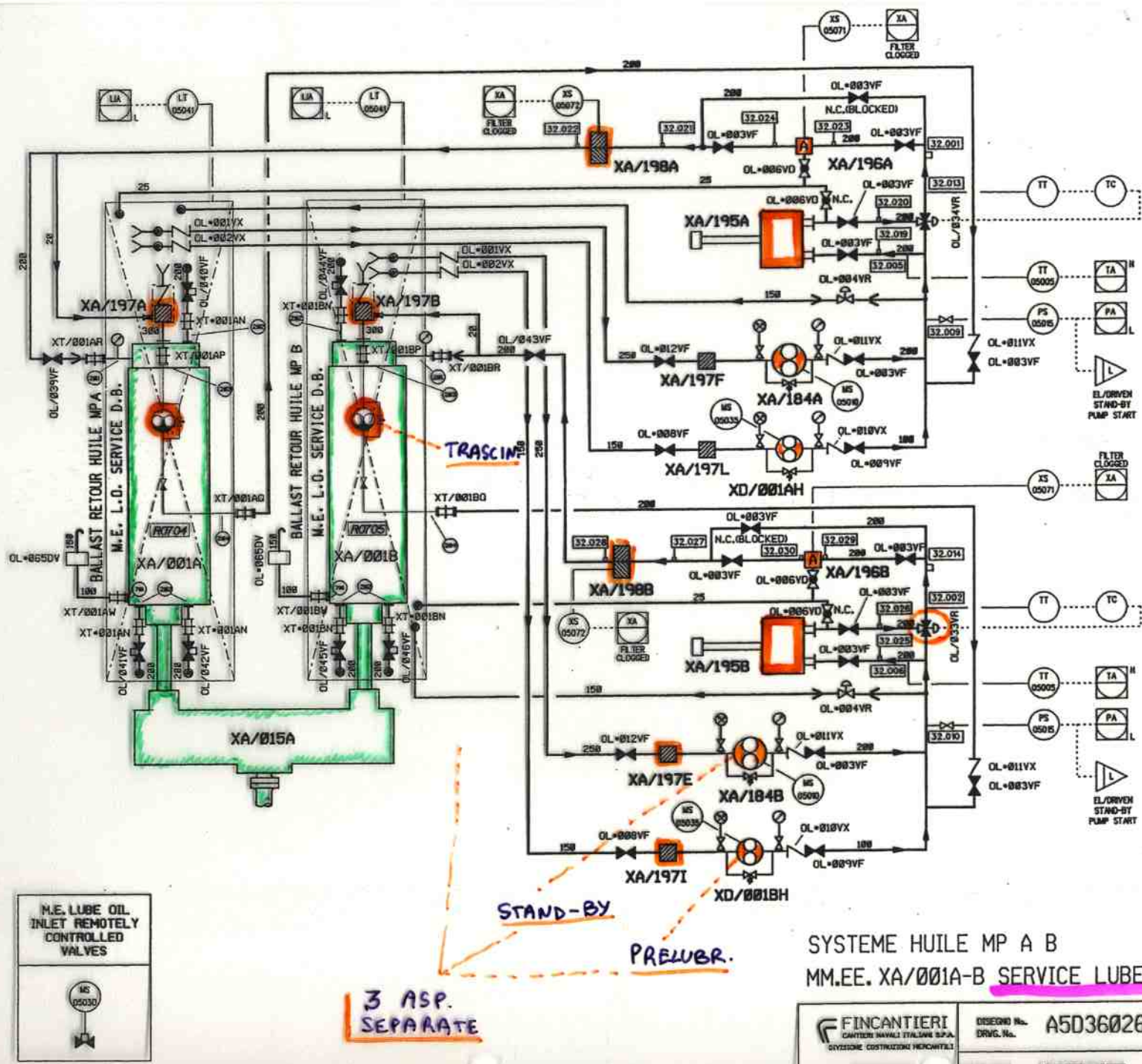
- Lub. oil header tank

The aft. seals to be arranged with a separate constant circulation oil system with separate 50 litre oil receiver arranged for air cooling.

One stern tube oil storage tank to be installed, common for each stern tube system, with an el-driven oil transfer pump.

A stern tube oil drain tank to be installed, complete with pipe arrangement for pumping lub. oil from each stern tube and back to system.

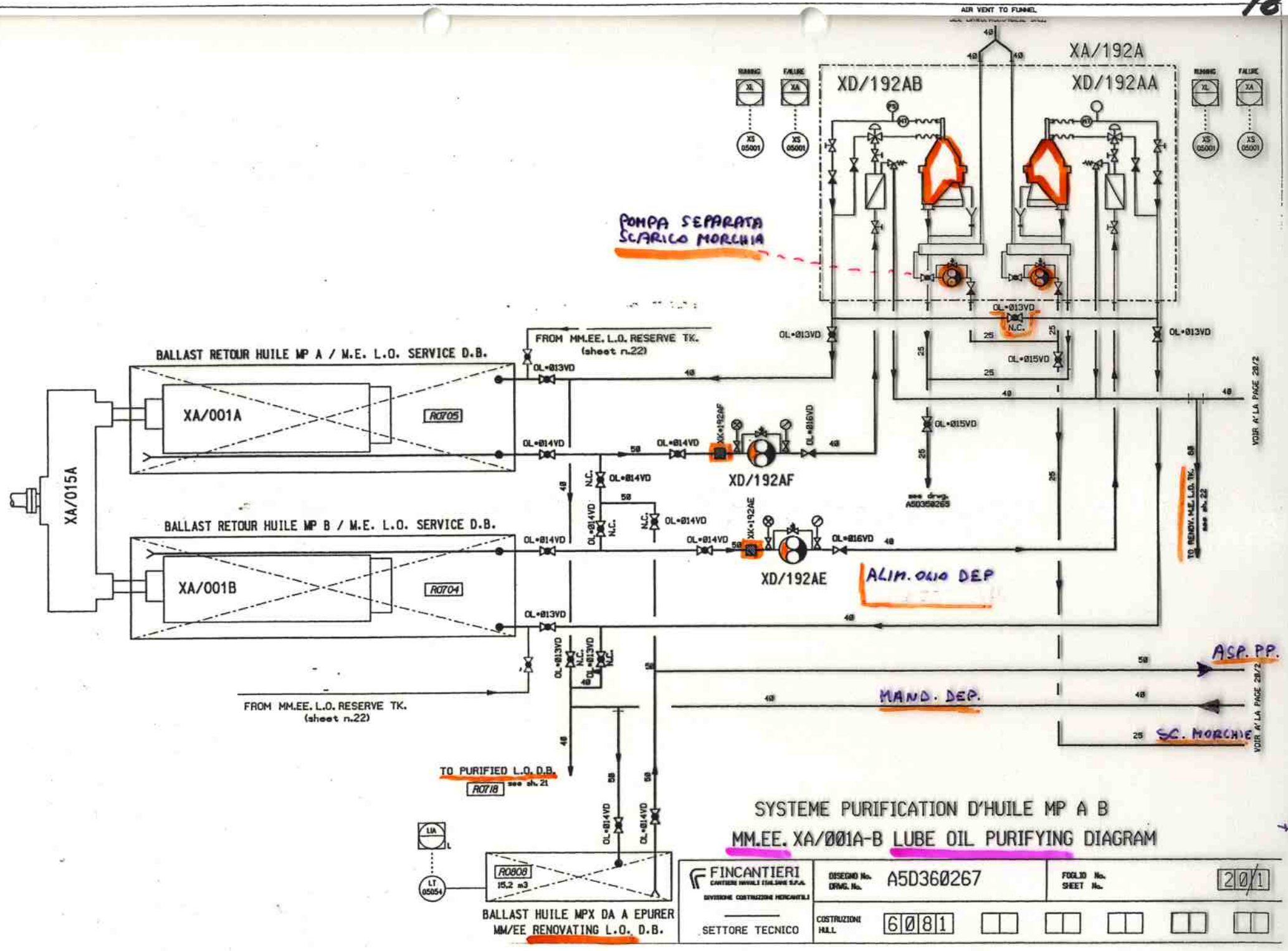
Air vent, and recirc. pipes to be provided and led to the top of the header tank



ITEM	M.M.E.E. CONNECTIONS
201	LUBE OIL INLET
202	LUBE OIL OUTLET
203	L.O. TO ENGINE DRIVEN PUMP
204	L.O. FROM ENGINE DRIVEN PUMP
701	CRANKCASE AIR VENT

SYSTEME HUILE MP A B
MM.EE. XA/001A-B SERVICE LUBE OIL DIAGRAM

AIR VENT TO FLAME



POMPA SEPARATA SCARICO MORCHIA

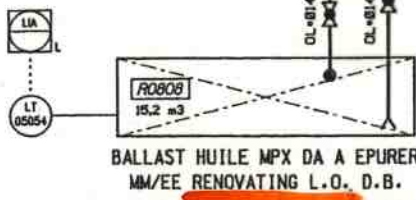
ALIM. OLIO DEP

MAND. DEP.

ASP. PP.

SC. MORCHIA

SYSTEME PURIFICATION D'HUILE MP A B
 MM.EE. XA/001A-B LUBE OIL PURIFYING DIAGRAM



FINCANTIERI CANTIERI NAVALI TRIESTE S.P.A. DIVISIONE COSTRUZIONE MECCANICA	DISEGNO No. A5D360267 DRMG. No.	FOLIO No. SHEET No.	20/1
	COSTRUZIONE HALL	6081	[] [] [] [] [] []
SETTORE TECNICO			

VOIR A LA PAGE 28/2

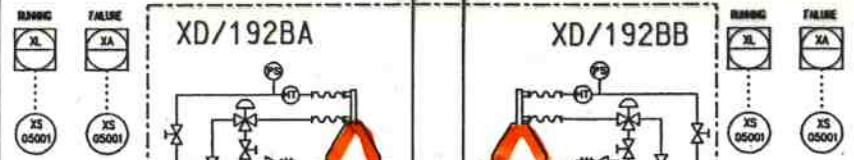
VOIR A LA PAGE 28/2

SEE DRWG. A50548212 SH.11

XA/192B

XD/192BA

XD/192BB



VOIR A LA PAGE 28/1

VOIR A LA PAGE 28/1

FROM M.M.E.E. L.O. RESERVE TK. (sheet n.22)

BALLAST RETOUR HUILE MP D / M.E. L.O. SERVICE D.B.

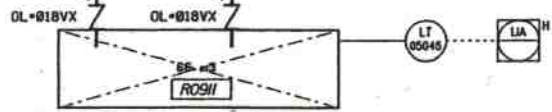
XD/192BF

XD/192BE

BALLAST RETOUR HUILE MP C / M.E. L.O. SERVICE D.B.

MANDATA DEP.

FROM M.M.E.E. L.O. RESERVE TK. (sheet n.22)



BALLAST RESIDUS BD (HUILE)
L.O. SLUDGE TANK

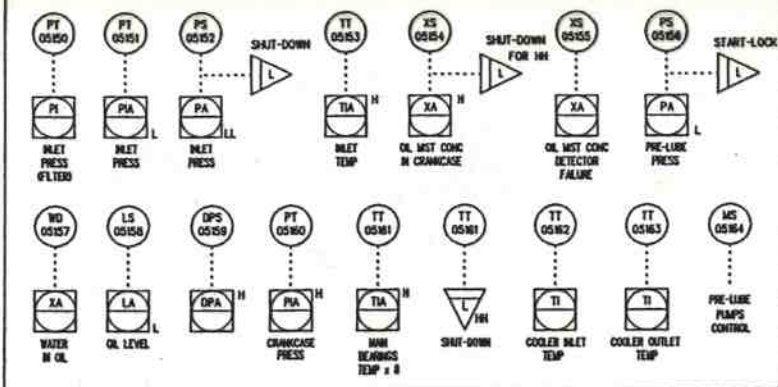
+ CASSA MORCHIA NAFTA

SYSTEME PURIFICATION D'HUILE MP C D M.M.E.E. XA/001C-D LUBE OIL PURIFYING DIAGRAM

FINCANTIERI <small>CANTIERI MARITIMI ITALIANI S.P.A.</small> <small>DIVISIONE COSTRUZIONI MERCHANTILI</small>	DISEGNO No. A50360267 DRWG. No.	FOGLIO No. 20/2 SHEET No.
	COSTRUZIONE HALL 6081	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

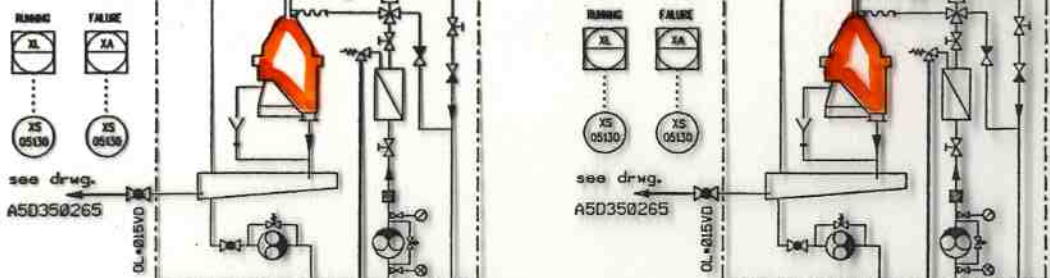
XB/274 A-B-C-D-E

IR VENT TO FUNNEL - SEE DRWG. A50540212 SH. 11

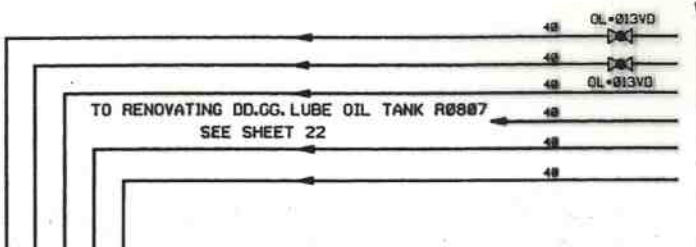
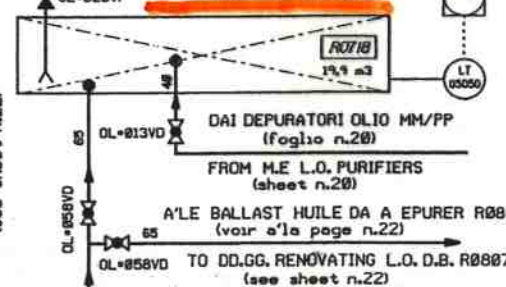


XA/193A

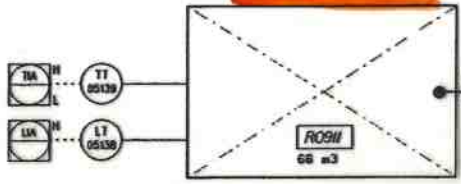
XA/193B



BALLAST HUILE EPUREE ET TROP PLEIN
PURIFIED LUBE OIL D.B.



BALLAST RESIDUS BD (HUILE)
L.O. SLUDGE TANK



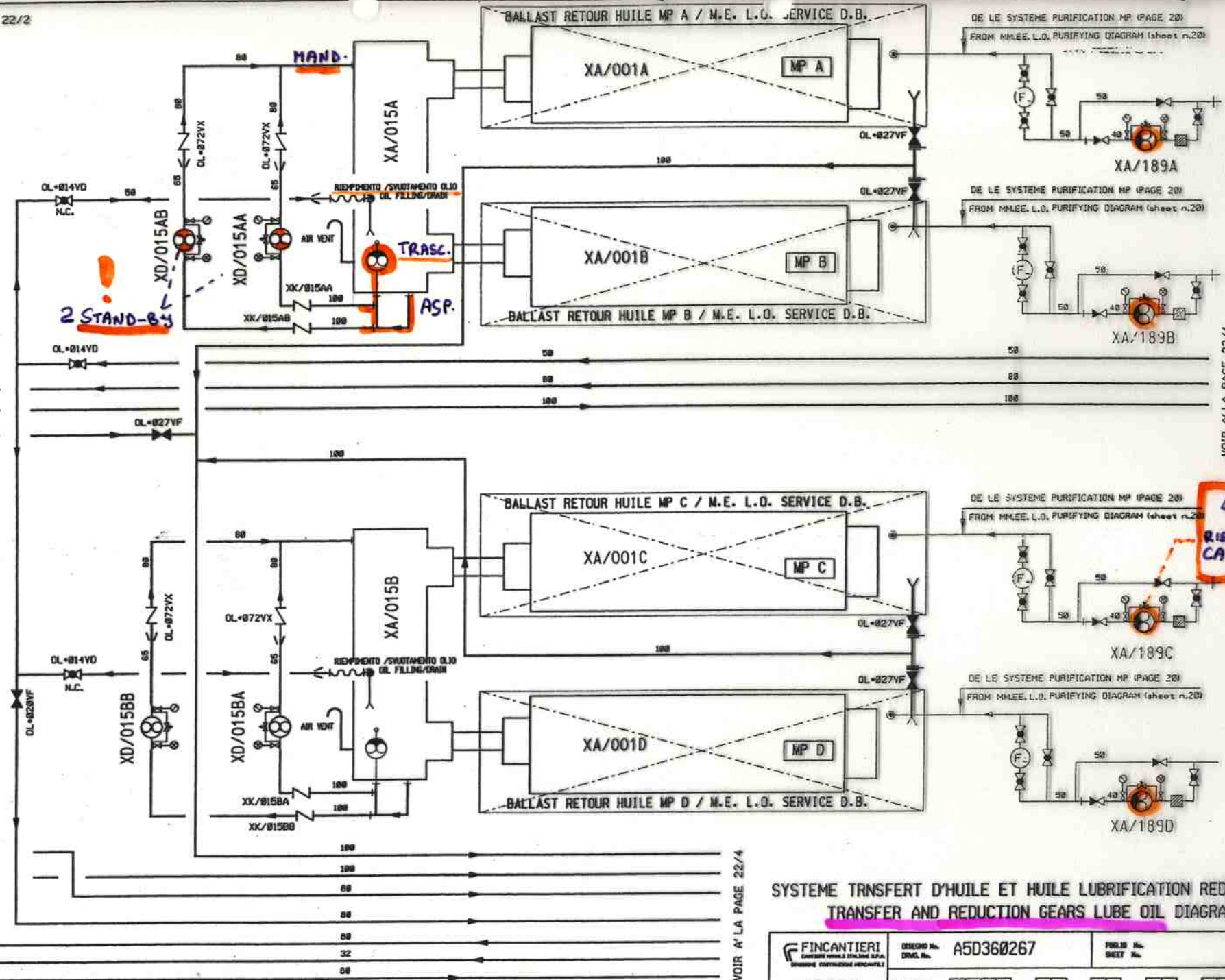
DE LA BALLAST HUILE
DA A EPURER R0807
(voir a'la page n.22)
FROM DD.GG. L.O.
RENOVATING D.B. R0807
(sheet n.22)

VOIR A' LA PAGE 21/1

5 D.A.

SYSTEME DEPURATION D'HUILE DA
SCHEMA DEPURAZIONE OLIO LUBRIFICAZIONE DD/GG

FINCANTIERI <small>CANTIERI MARITIMI ITALIANI S.P.A.</small> <small>DIVISIONE COSTRUZIONI FINCANTIERI</small>	DISEGNO No. A50360267 DRWG. No.	FOGLIO No. 21/2 SHEET No.
	COSTRUZIONI No. 6081	[] [] [] [] [] []
SETTORE TECNICO	HALL	[] [] [] [] [] []

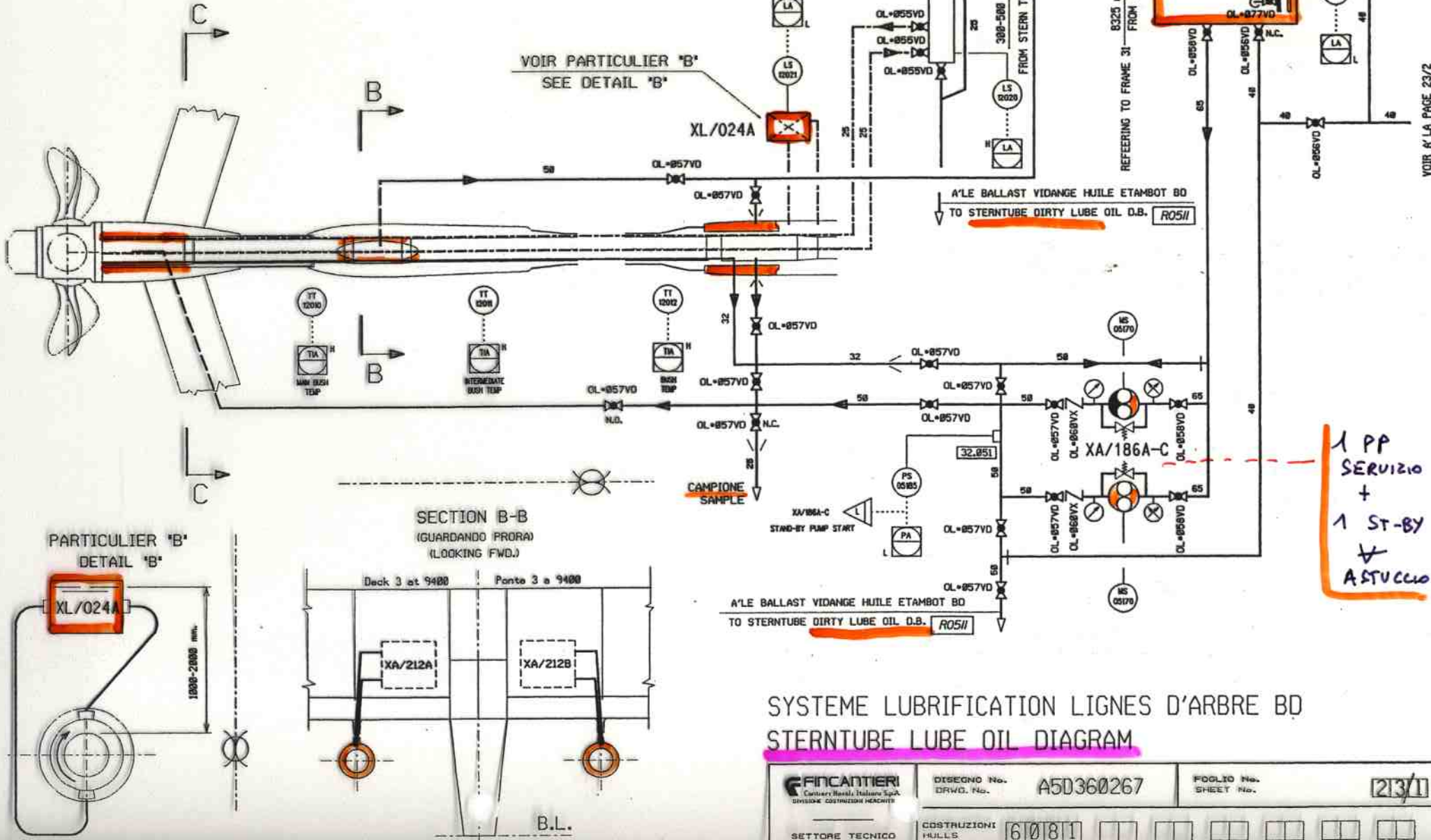


SYSTEME TRANSFERT D'HUILE ET HUILE LUBRIFICATION REDUCTEURS
 TRANSFER AND REDUCTION GEARS LUBE OIL DIAGRAM

FINCANTIERI <small>CAVOTEC S.p.A. - S.p.A. S.p.A.</small> <small>INDUSTRIE SIDERURGICHE</small>	DESIGN No. A5D360267	FILE No. 22/3
	SETTORE TECNICO	COSTRUZIONE N. 6081

4 PPE
RIEMPIM.
CARTER
MP

01



SYSTEME LUBRIFICATION LIGNES D'ARBRE BD
 STERN TUBE LUBE OIL DIAGRAM

 Fincantieri Cantieri Navali Italiani S.p.A. DIVISIONE COSTRUZIONI MECCANICHE	DISEGNO No. A5D360267 DRWD. No.	FOGLIO No. 213/1 SHEET No.
	SETTORE TECNICO	COSTRUZIONI HULLS

REMARK: RETURN PIPE FROM HEADERTANK (ITEM 1) TO HYDR. POWER PACK (ITEM 3) MUST BE SLOPED DOWNWARDS. MAX. LENGTH 20 m WITH MAX. 10 BENDS OF 90 DEGREES. TANK, PIPE AND POWER PACK MUST BE SITUATED IN FROST FREE COMPARTMENTS. IF ANY OF THESE CRITERIA ARE NOT FULLFILLED, PIPE DIAMETER MUST BE INCREASED ACC. LIPS DIRECTION.

HYDRAULIC UNITS WILL BE SUPPLIED WITH SAE 3000 PSI FLANGES AND WELD FITTINGS (ACC.DRWG.W000000032). ALL BLIND WELDING FLANGES HAVE TO BE DRILLED BY THE YARD. PIPES HAVE TO BE SEAMLESS STEEL PIPES. WE ADVISE PRECISION PIPES ACC. TO DIN 2391 MATERIAL SA 35 GRK OR NBRK PAGE 2 (LLOYDS). (THOSE PIPES ARE CLEANED INSIDE). ELBOWS AND MANIFOLDS MUST BE PROVIDED WITH BUTT WELD FLANGES TO ALLOW CLEANING AND INSPECTION OF PIPING ($\sigma = 350 \text{ N/mm}^2$). NOT SUPPLIED BY LPS BY.

HYDRAULIC LINES MUST BE MOUNTED IN SUCH A MANNER THAT NO STRESSES ARE TRANSMITTED TO THE SUB-ASSEMBLIES OR COMPONENTS WHICH THEY LINK. MOREOVER THEY MUST BE ADEQUATELY SUPPORTED TO PREVENT THE TRANSMISSION OF VIBRATIONS. PIPES WHICH HAVE BEEN HEATED FOR ANY REASON (WELDING OR MAKING OF BONDS) MUST SUBSEQUENTLY BE IMMERSED IN AN ACID SOLUTION AND AFTERWARDS THOROUGHLY FLUSHED THROUGH. FILTER ELEMENTS SHOULD BE CHANGED IN PRINCIPLE AFTER FLUSHING THROUGH THE SYSTEM AFTER TRIALS AND AFTER 500 RUNNING HOURS DEPENDING ON CONDITIONS OF ELEMENTS. 3 REPLACEMENT ELEMENTS WILL BE SUPPLIED.

A LIST OF SYMBOLS AND INFORMATION HAS BEEN ATTACHED TO THIS HYDRAULIC DIAGRAM. CODE WITHIN [] REFER TO ELC. DIAGRAM.

FINCANTIERI
Cantieri Navali Italiani S.p.A.
Divisione MOTO "PROPULSIONE"

DESIGNO No. A5L210250
C.P.A.G. No.

FOLIO No. 04
SHEE' No.

COSTRUZIONE
MELLE 610181

ALT. B - 29 MAY 2002

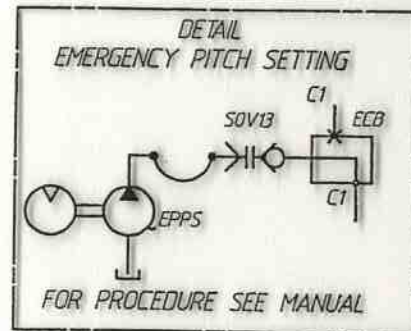
C.P. PROPELLER HYDRAULIC OIL SYSTEM
SYSTEME HYDRAULIQUE HELICESPAS VARIABLES

6.600 from B.L. LOADED WATERLINE

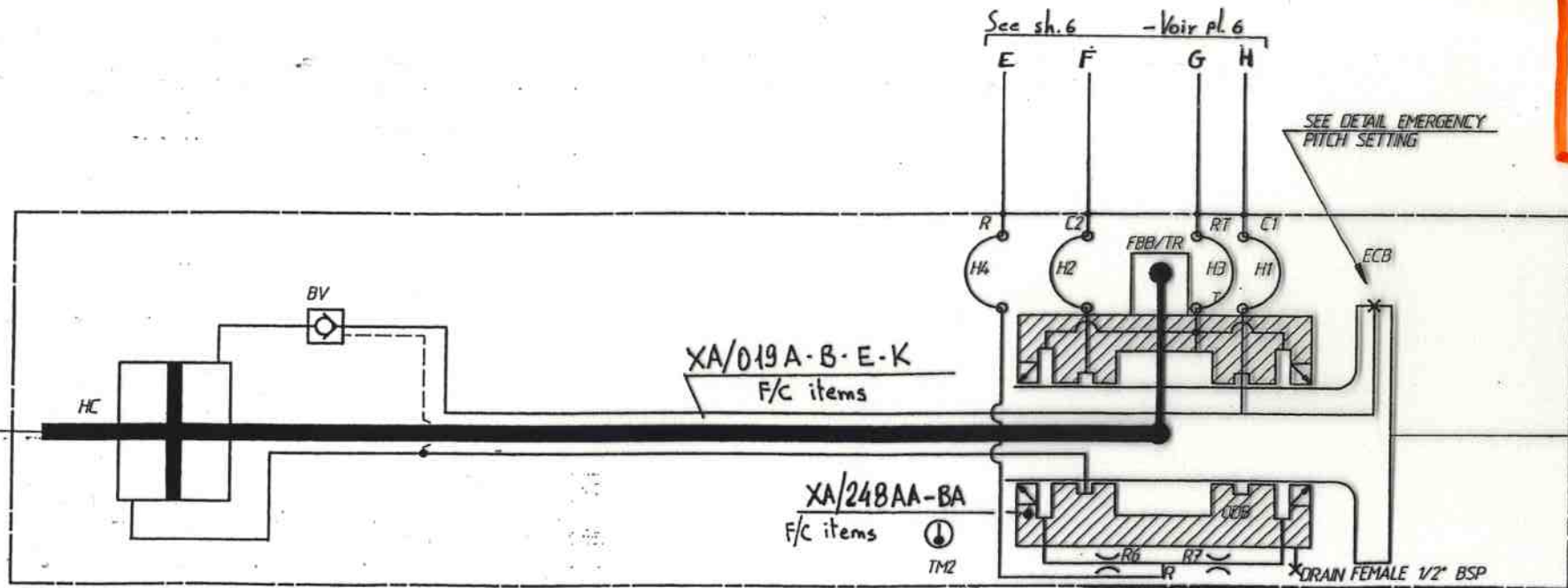
4000

2600

B.L.



OD. BOX
SU L.A.
NON SU
RIB.



BOITE DISTRIBUTION HUILE HELICE

MINAPP6081N 61025001.dwg

SERVIZIO: ACQUA ALIMENTO CALDAIE

SYSTEM : BOILERS FEED WATER

Pour alimenter les chaudières de mouillage, 2 élec.pompes XA/089A-XA/089B sont installées (1 en service, 1 en stand-by)

La pompe stand-by démarre autom. sur indication du pressostat différentiel.

Une 3ème él.pompe XA/089C (identique) est fournie comme rechange.

Les pompes aspirent à la bache XA/114.

Un salinomètre est installé à l'aspiration des pompes alimentaires.

L'eau de la bache est maintenue à 90 °C / par un réchauffage à vapeur.

Les vidanges de bache sont envoyées au D.B. ballast chaudières n°3C ou à la cale.

Pour alimenter la bache 2 él.pompes XA/102A-XA/102B (1 en service, 1 en stand-by).

La pompe XA/102A aspire aussi au ballast t vidange MPx

La pompe stand-by démarre automatiquement sur indication du pressostat différentiel.

Pour l'alimentation ed des chaudières récupératrice' XA/006A-B-C-D, 4 él.pompes XA/094A-B-C-D sont installées' (1 en service, 1 en stand-by par groupe de 2 récupératrices').

2 pompes (1 service, 1 stand-by) alimente 2 récupératrices (XA/006A-C et XA/006B-D).

Une cinquième él.pompe XA/094E (identique) est fournie en rechange.

La pompe stand-by démarre autom. sur indication du pressostat différentiel.

Une unité de traitement pour l'eau alimentaire est installée.

Un réfrigérant XK/004AA-BA pour échantillons est installé'.

Les prises d'échantillon sont disséminées au long du tuyautage pour les analyses'.

To supply the oil fired boilers two feed water el. pumps -XA/089A, XA/089B (one in service, one on stand-by) are installed.

The stand-by pump starts automatically based on the differential pressure indication.

A third el. pump XA/089C (identical) is supplied as spare.

The pumps suct from one hot-well XA/114.

One salinometer is installed on the feedwater pumps suction.

The water in the hot-well is kept at 90 °C temperature through steam heater.

Hot-well drains are discharged to a double bottom reserve water tank or to bilge.

To supply the hot-well two el. pumps-XA/102A, XA/102B- are installed (one in service, one on stand-by).

Pump XA/102A suct also from D.B. MM.EE. fresh water collecting tank for M.E. refilling.

The stand-by pump starts automatically based on the differential pressure indication.

For the fresh water feeding of the exhaust gas boilers-XA/006A-B-C-D, four el. pumps -XA/094A-B-C-D are provided (one in service, one on stand-by).

Two pumps (one in service, one on stand-by) supply the two boilers on the same side.

A fifth el. pump -XA/094E- (identical) is supplied as spare.

The stand-by pump starts automatically based on the differential pressure indication.

One dosing station for feed water treatment is installed.

One cooler -XK/004AA-BA- for samples cooling is provided.

Sample intakes are distributed along the piping to make analysis.

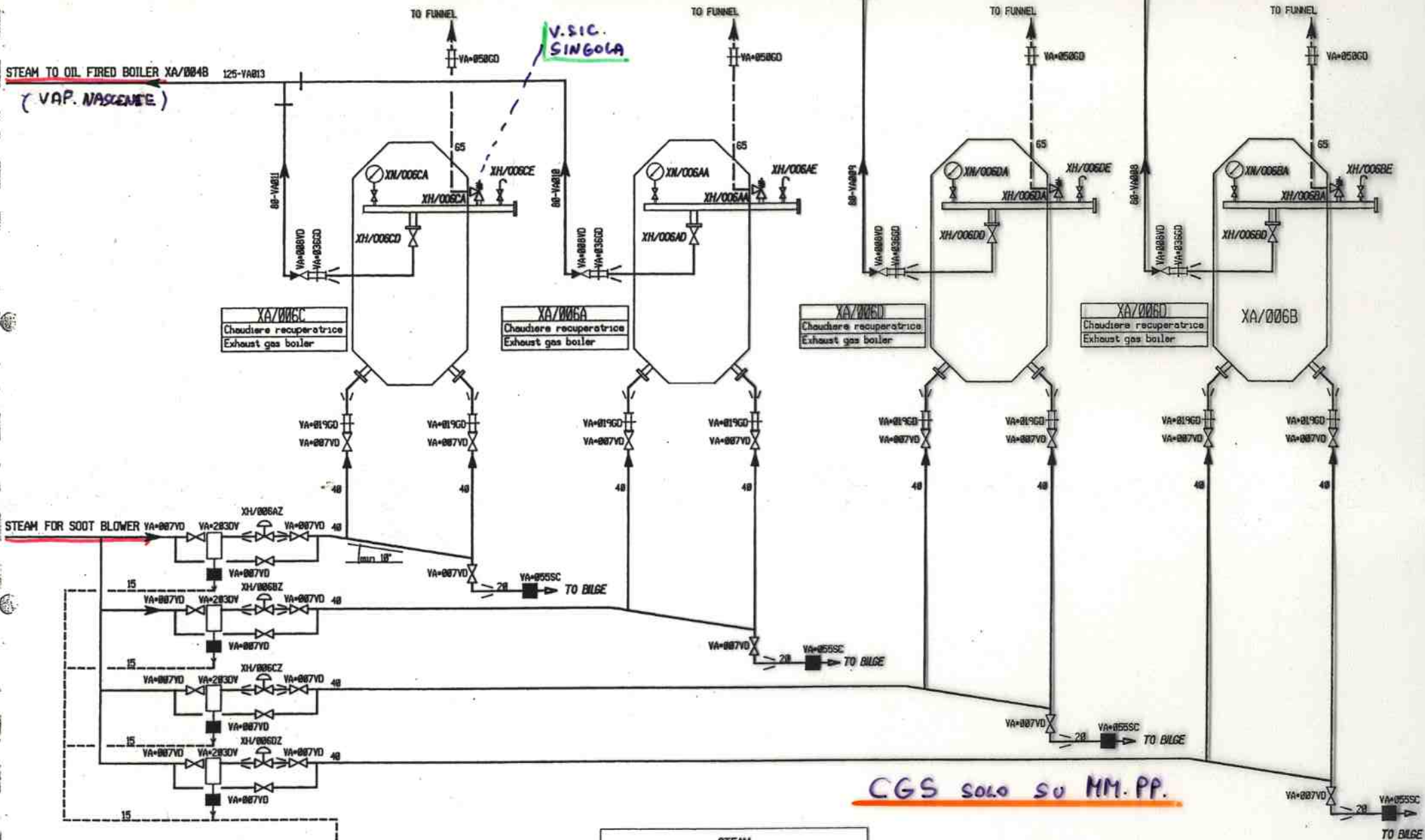
STEAM TO OIL FIRED BOILER XA/004A

25-VA012

88-VA088

STEAM TO OIL FIRED BOILER XA/004B 125-VA013

(VAP. NASCENSE)



V.SIC. SINGOLA

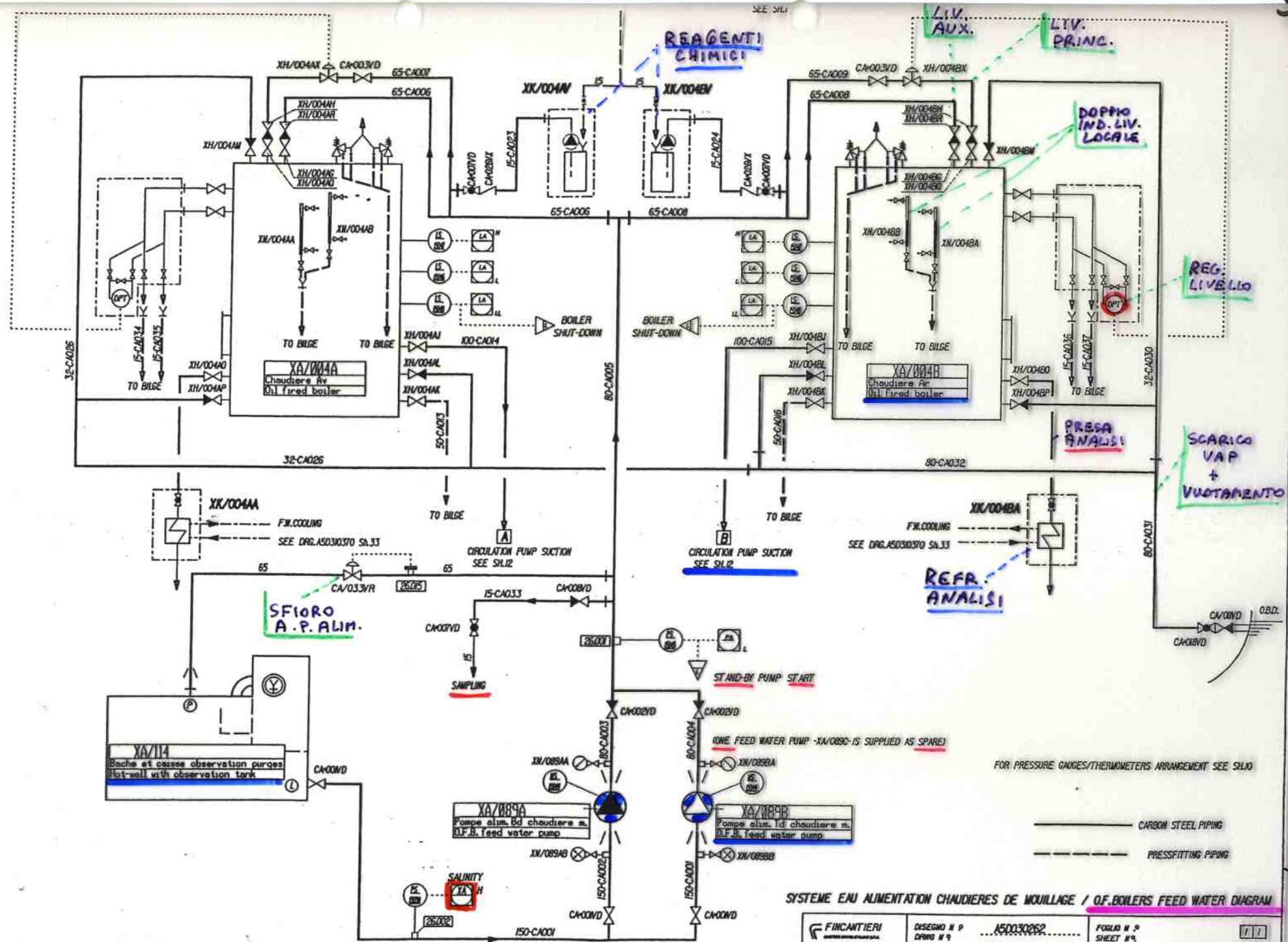
CGS solo su MM.PP.

TO THE NEAREST CONDENSATE MANIFOLD

	STEAM
	CLEAN CONDENSATE
	CONTAMINATED CONDENSATE

SYSTEME VAPEUR / STEAM AND CONDENSATE DIAGRAM

 <small>INGEGNERIA E PROGETTAZIONE</small>	DESIGN NO. A5D020257	SHEET NO. 09/11
	SETTORE TECNICO	COSTRUZIONE N. 6081



SEE SH.1

LIV. AUX.

LIV. PRINC.

REAGENTI CHIMICI

DOPPIO IND. LIV. LOCALI

REG. LIVELLO

PRESA ANALISI

SCARICO VAP + VUOTAMENTO

REFR. ANALISI

SFIORO A.P. ALIM.

XA/114
Banche et casse observation purges
Hot-well with observation tank

XA/089A
Pompe alim. B1 chaudiere m.
D.F.B. feed water pump

XA/089B
Pompe alim. D1 chaudiere m.
D.F.B. feed water pump

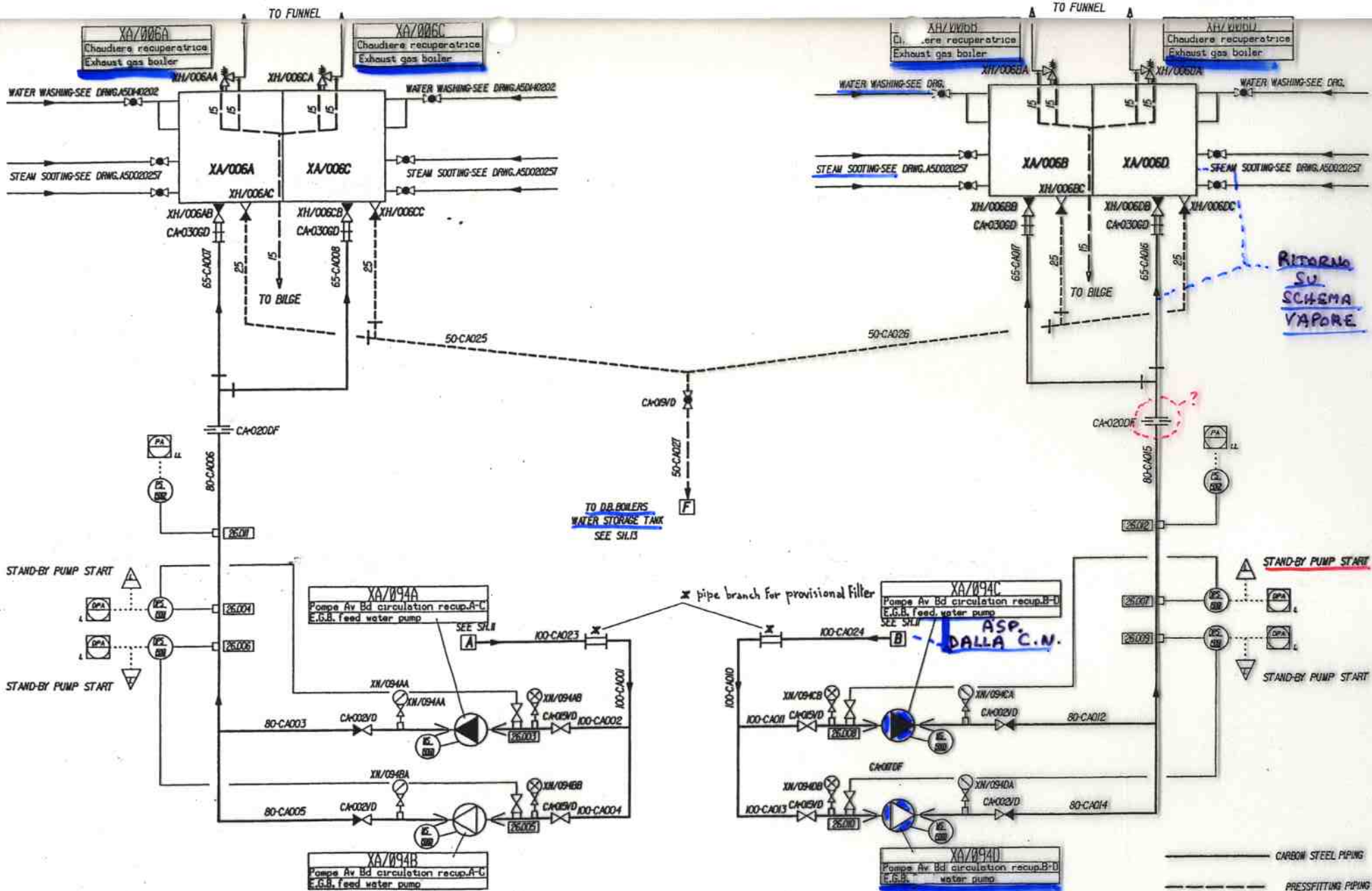
FOR PRESSURE GAUGES/THERMOMETERS ARRANGEMENT SEE SH.10

—— CARBON STEEL PIPING

- - - - PRESSFITTING PIPING

SYSTEME EAU ALIMENTATION CHAUDIERES DE MOILLAGE / O.F. BOILERS FEED WATER DIAGRAM

 FINCANTIERI GRUPPO IRI MITTONE TECNICO	DISEGNO N° P D'ORD N°	150030062	FOGLIO N° P SHEET N°	1/1
	COSTRUZIONI HULLS	6081	[] [] [] [] [] [] [] [] [] []	[] [] [] [] [] [] [] [] [] []

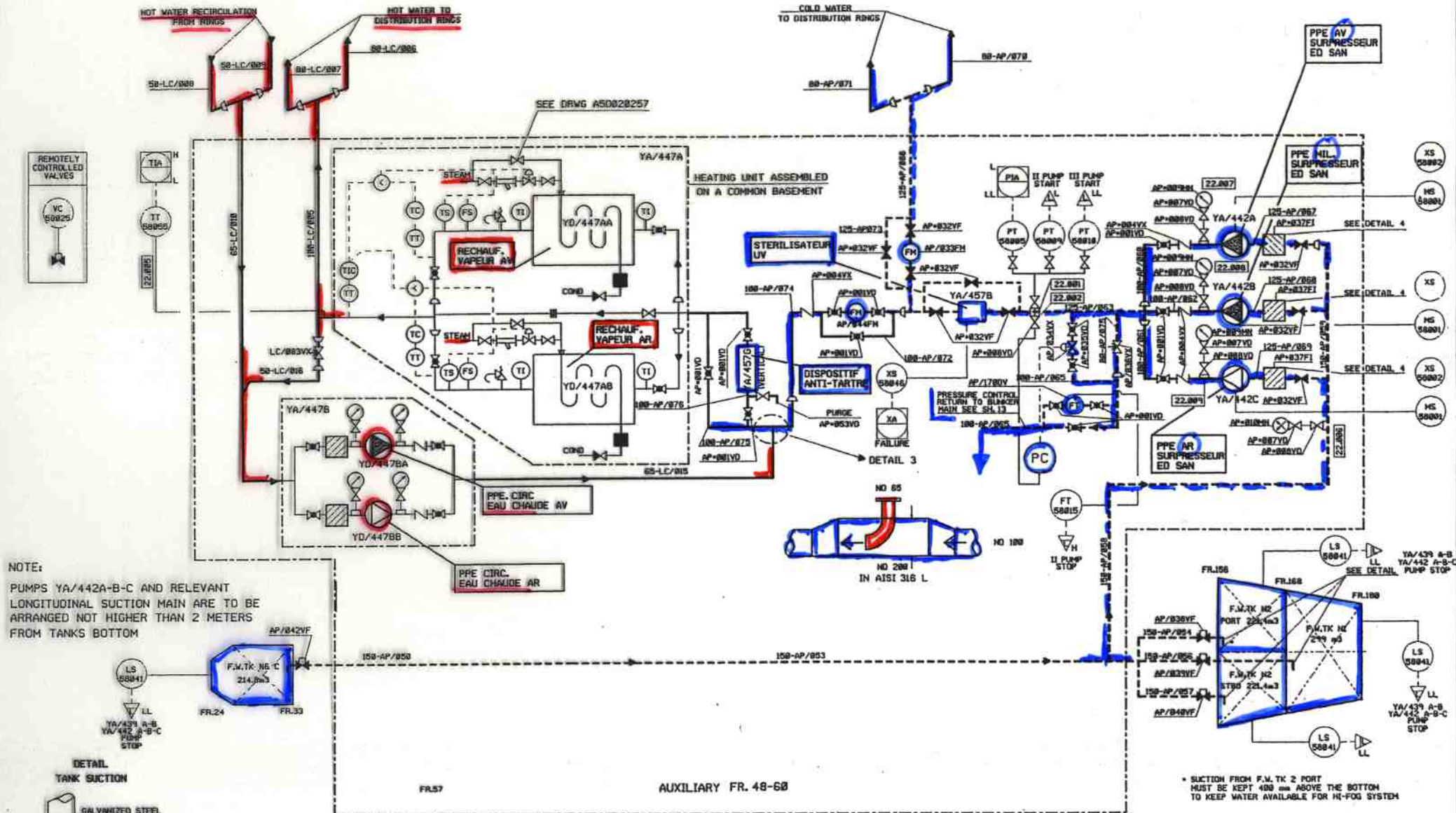


ONE CIRCULATING PUMP -XA/094E- IS SUPPLIED AS SPARE

CIRCOLAZ. SYSTEME EAU DE ALIMENTATION DES CHAUDIERES RECUPERATRICE EXHAUST GAS BOILERS FWK.CIRCULATING DIAGRAM

 FINCANTIERI SETTING TECHNICAL	DESEGNO N° 150030252 DRWG N°	FOGLIO N° 1 SHEET N°
	COSTRUZIONE HILLS	

POTABLE WATER PRESSUREZING AND HOT WATER PRODUCTION



NOTE:
 PUMPS YA/442A-B-C AND RELEVANT LONGITUDINAL SUCTION MAIN ARE TO BE ARRANGED NOT HIGHER THAN 2 METERS FROM TANKS BOTTOM



* SUCTION FROM F.W. TK 2 PORT MUST BE KEPT 300 mm ABOVE THE BOTTOM

----- HOT DEEP GALVANIZED STEEL
 _____ PRESSFITTING

 <small>Costruzioni Mecc. Idraul. SpA Direzione NAVI da IMPIANTO</small>	DESIGN No. A5D140202 DRWG. No.	FOGLIO No. 112 SHEET No.
	COSTRUZIONI 6081	ALT. G - 15/04/02

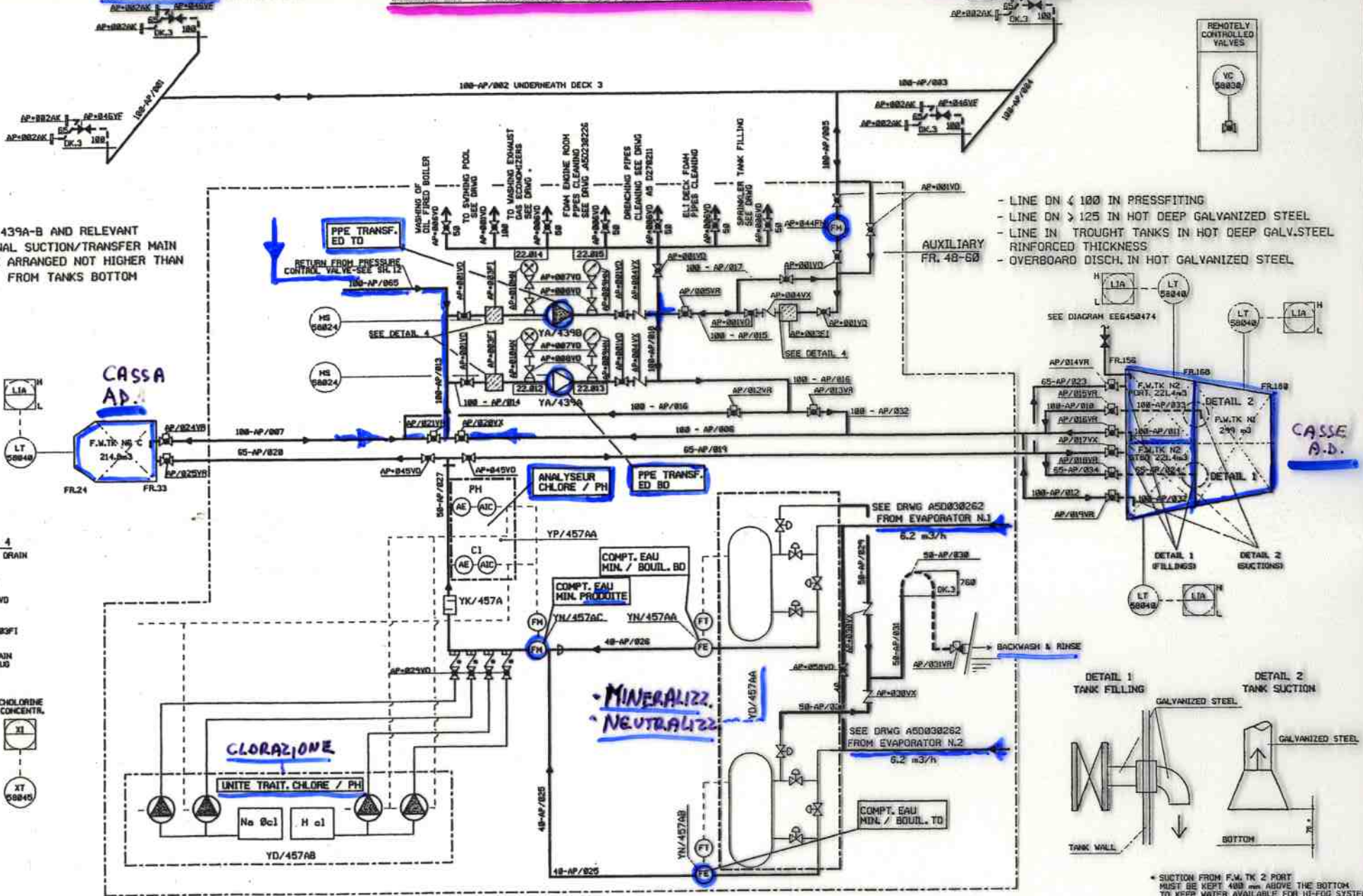
7

ULTIMA LC/816 ULTIMA AP/875

TRANSFER - BUNKERING - DISTILLED WATER TREATMENT

F.W.BUNKER STATIONS FR. 9-12 P & S

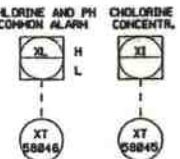
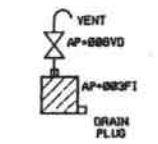
F.W.BUNKER STATIONS FR. 144-147 P & S



NOTE:
 PUMPS YA/439A-B AND RELEVANT
 LONGITUDINAL SUCTION/TRANSFER MAIN
 ARE TO BE ARRANGED NOT HIGHER THAN
 2 METERS FROM TANKS BOTTOM

- LINE DN < 100 IN PRESSFITTING
- LINE DN > 125 IN HOT DEEP GALVANIZED STEEL
- LINE IN TROUGH TANKS IN HOT DEEP GALV. STEEL REINFORCED THICKNESS
- OVERBOARD DISCH. IN HOT GALVANIZED STEEL

SEE DETAIL 4
 FILTER VENT AND DRAIN



• CULLIGAN SUPPLY

--- HOT DEEP GALVANIZED STEEL
 — PRESSFITTING

FINCANTIERI
 Cantieri Navali Italiani S.p.A.
 Direzione Generale

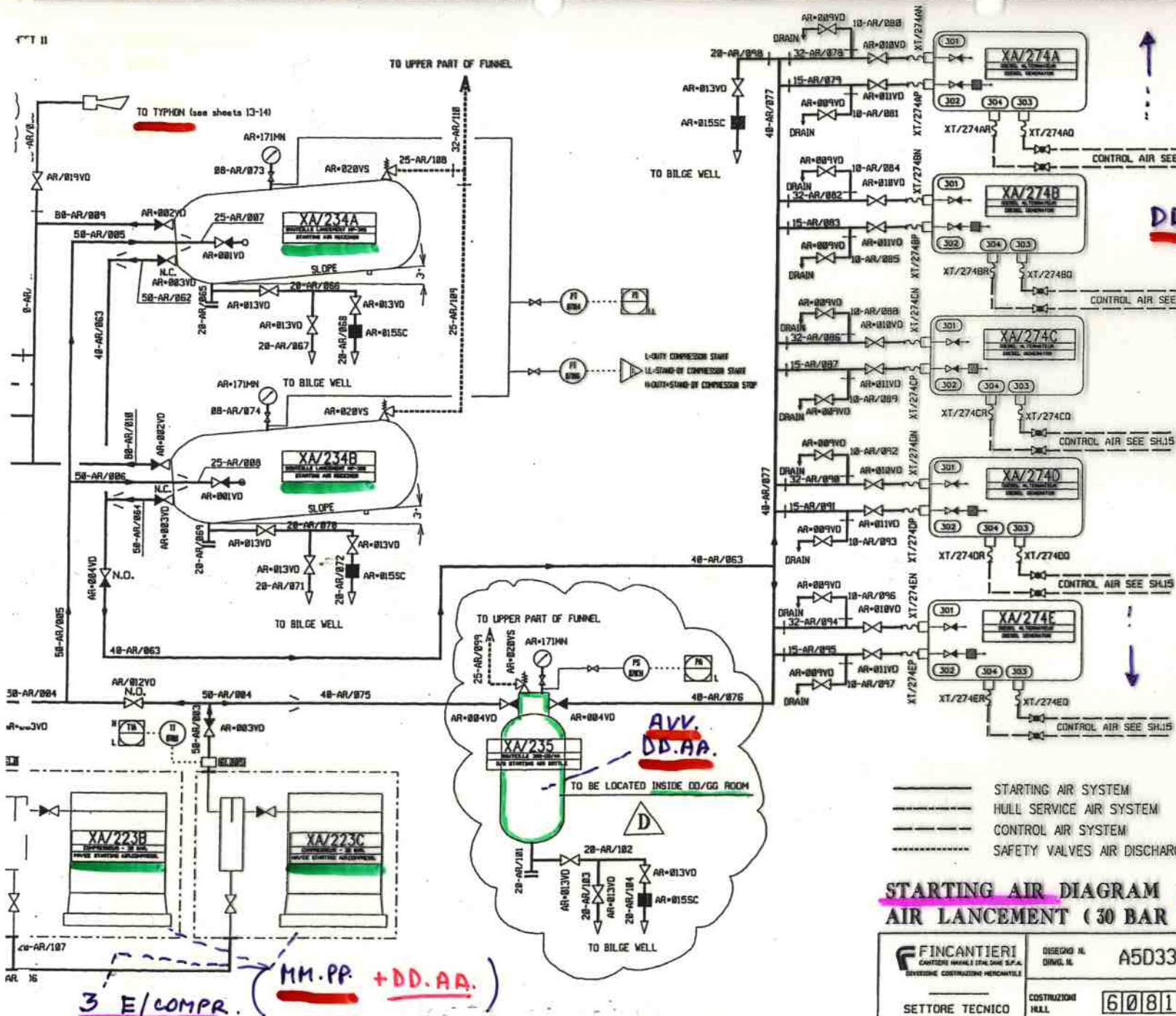
DISIGNO No. A5D140202
 DRWD. No.

FOGLIO No. SHEET No. 13

COSTRUZIONI HULLS 6081

ALT. G - 15/04/02

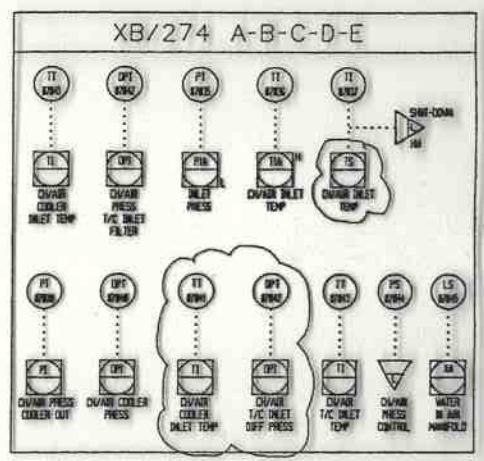
COSTR. HULL 6081		N. DISEGNO DWG. NUMBER A5D330277E		FOGLIO N° SHEET N° 01	
DESCRIZIONE MACCHINARI - Machinery description					
MARCA PEZZO piece number REPERTORIO cat. of cost	DESCRIZIONE description	CARATTERISTICHE PRINCIPALI main charact. PESO - weight	TENS.FREQ. POT.power GIRI/min rpm Inst.mounton		
XA/001A-B-C-D L120	MOTEUR PRINCIPAL MAIN ENGINES	WARTSILA 9L46C 147 t	9450 KW 500 r.p.m.		
XA/074 D370	CAISSE EAUX LAVAGE CHAUD. RECUP.COTE GAZ WATER COLLECTING TANK EXHAUST GAS BOILERS WASHING	10 M3			
XA/223A-B-C D330	COMPRESSEUR 30B MM/EE STARTING AIR COMPRESSORS	69 m3/h FAD 30 bar 666 Kg	660 V 50 Hz 15 Kw 725 r.p.m.		
XA/226A-B D330	COMPRESSEUR 9B HULL SERVICE AND CONTROL AIR COMPRESSORS	300 m3/h FAD 8.5 bar 850 Kg	660 V 50 Hz 42 Kw 5000 r.p.m.		
XA/234A-B D330	BOUTEILLE 30B LANCEMENT MP. MM/EE STARTING AIR RECEIVERS	3 m3 30 bar 1800 Kg	/		
XA/235 D330	BOUTEILLE 30B LANCEMENT DA. DD/GG STARTING AIR BOTTLE	1000 l 30 bar 800 Kg	/		
XA/237A D330	BOUTEILLE 9B-AIR SERVICE GENERAL HULL SERVICE AIR RECEIVER	2 m3 8.5 bar 725 Kg	/		
XA/237B D330	BOUTEILLE 9B-AIR DE CONTROLE CONTROL AIR RECEIVER	2 m3 8.5 bar 725 Kg	/		
XA/240A-B D330	SECHEUR AIR CONTROLE CONTROL AIR DRYER	126 m3/h 8.5 bar 120 Kg	220 V 50 Hz 0.7 KW		
XA/274A-B-C-D-E L010	DIESEL ALTERNATEUR DIESEL GENERATORS	WARTSILA 6R32 35.21 t	2460 KW 750 r.p.m.		
XA/277 L010	GROUPE DE SECOURS EMERGENCY DIESEL GENERATOR	DEMP-CUMMINS KTA 38DMG3 10 t	660 V - 50 Hz 600 KW 1500 r.p.m.		
YD/428AA-AB D210	SEPARATEUR EAUX MAZOUT BILGE SEPARATOR UNIT				
YA/439A-B D140	P.PE BD TRANSFERT EAU DOUCE SANITAIRE COLD POTABLE WATER TRANSFER PUMPS	50 m3/h 5 bar	660 V 50 Hz		



ITEM	MAIN ENGINES CONNECTIONS XA/BB1A-B-C-D
301	STARTING AIR INLET - 30 BAR - DN 50
302	CONTROL AIR INLET - 30 BAR - # 18 DN 150
303	DRIVING AIR TO OIL MIST DETECTOR 2-12 BAR - # 18
311	CONTROL AIR TO WG, BP AND TC-CLEANING 4-8 BAR - # 8

ITEM	DD.GG. CONNECTIONS XA/274A-B-C-D-E
301	STARTING AIR INLET - 30 BAR - DN 32
302	CONTROL AIR INLET - 30 BAR - DN 15
303	DRIVING AIR TO OIL MIST DETECTOR
304	CONTROL AIR TO SPEED GOVERNOR

DD.AA.



- STARTING AIR SYSTEM
- - - HULL SERVICE AIR SYSTEM
- CONTROL AIR SYSTEM
- SAFETY VALVES AIR DISCHARGE

**STARTING AIR DIAGRAM (30 BAR)
AIR LANCEMENT (30 BAR)**

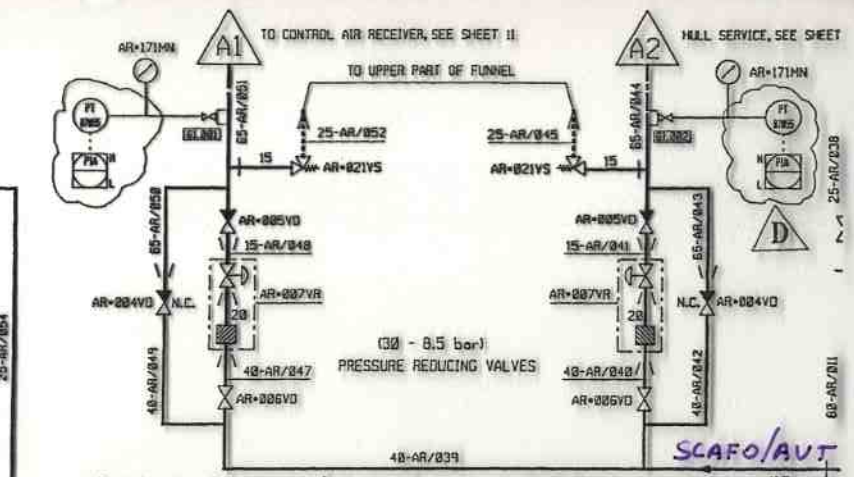
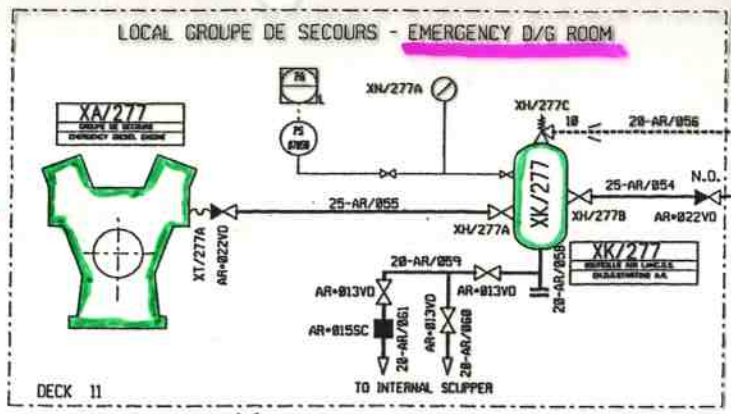
FINCANTIERI CANTIERI NAVALI ITALIANI S.P.A. SEZIONE COSTRUZIONI MERCANTILI	DISIGNO N. DIRIG. N.	A5D330277 E	FOGLIO N. SHEET N.	10
	COSTRUZIONI HALL	6081		

3 E/COMPR. (**MM.PP. + DD.AA.**)

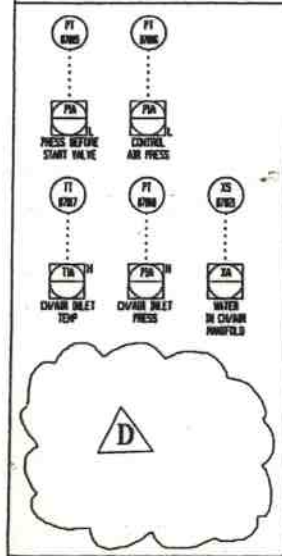
MOTO COMPRESSORE PER DAE

2° AVV. IDRAULICA?

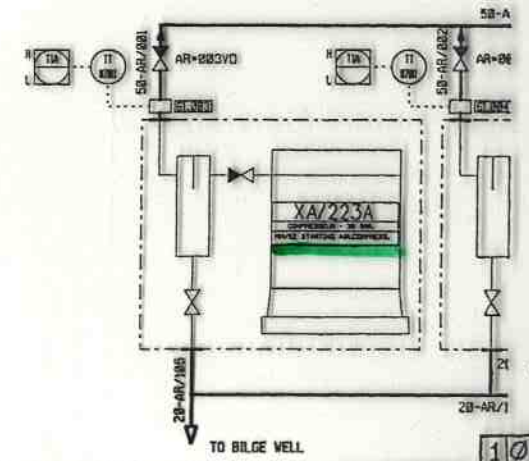
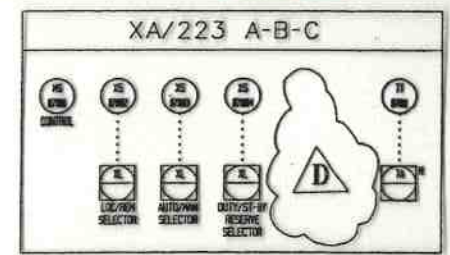
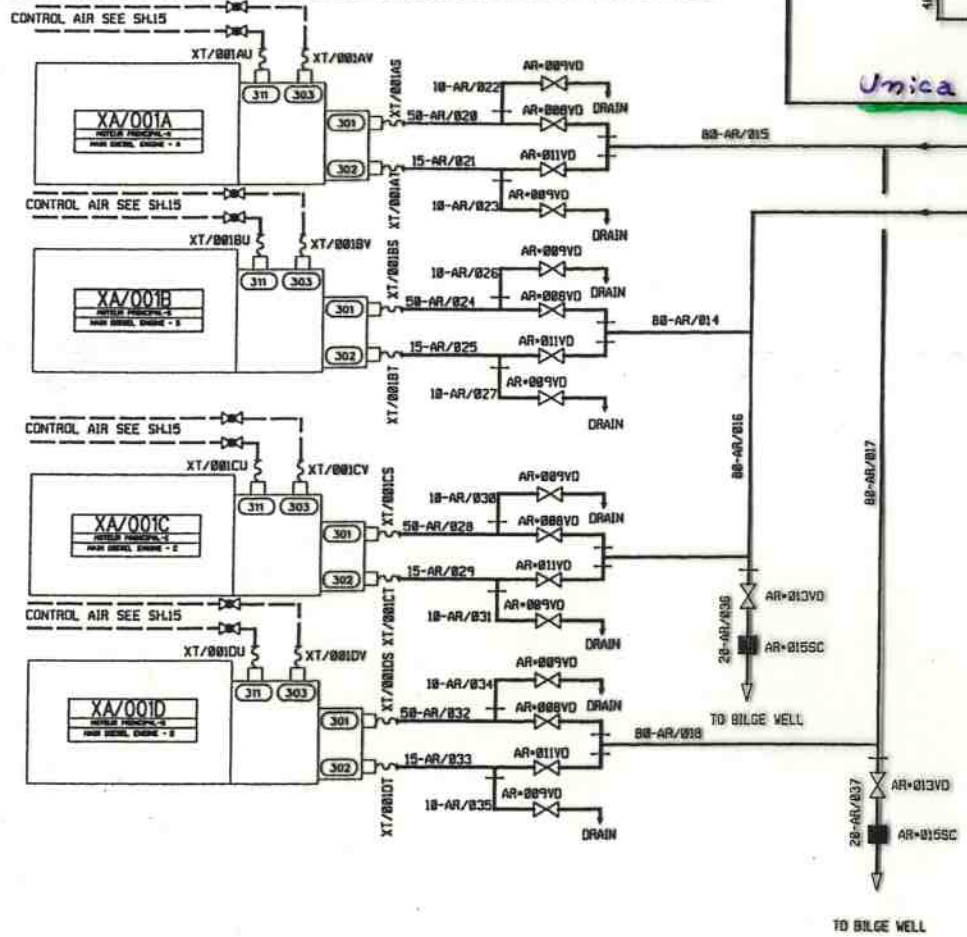
LOCAL GROUPE DE SECOURS - EMERGENCY D/G ROOM



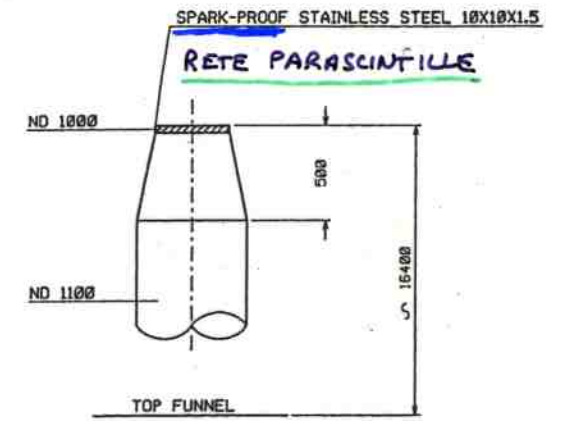
XA/001 A-B-C-D



M.P.



LAST LINES MARK: AR-023VD (ACCESSORIO) & AR/049 (LINEA) BID2770LDGN 12-12-01 SCALA 1:250

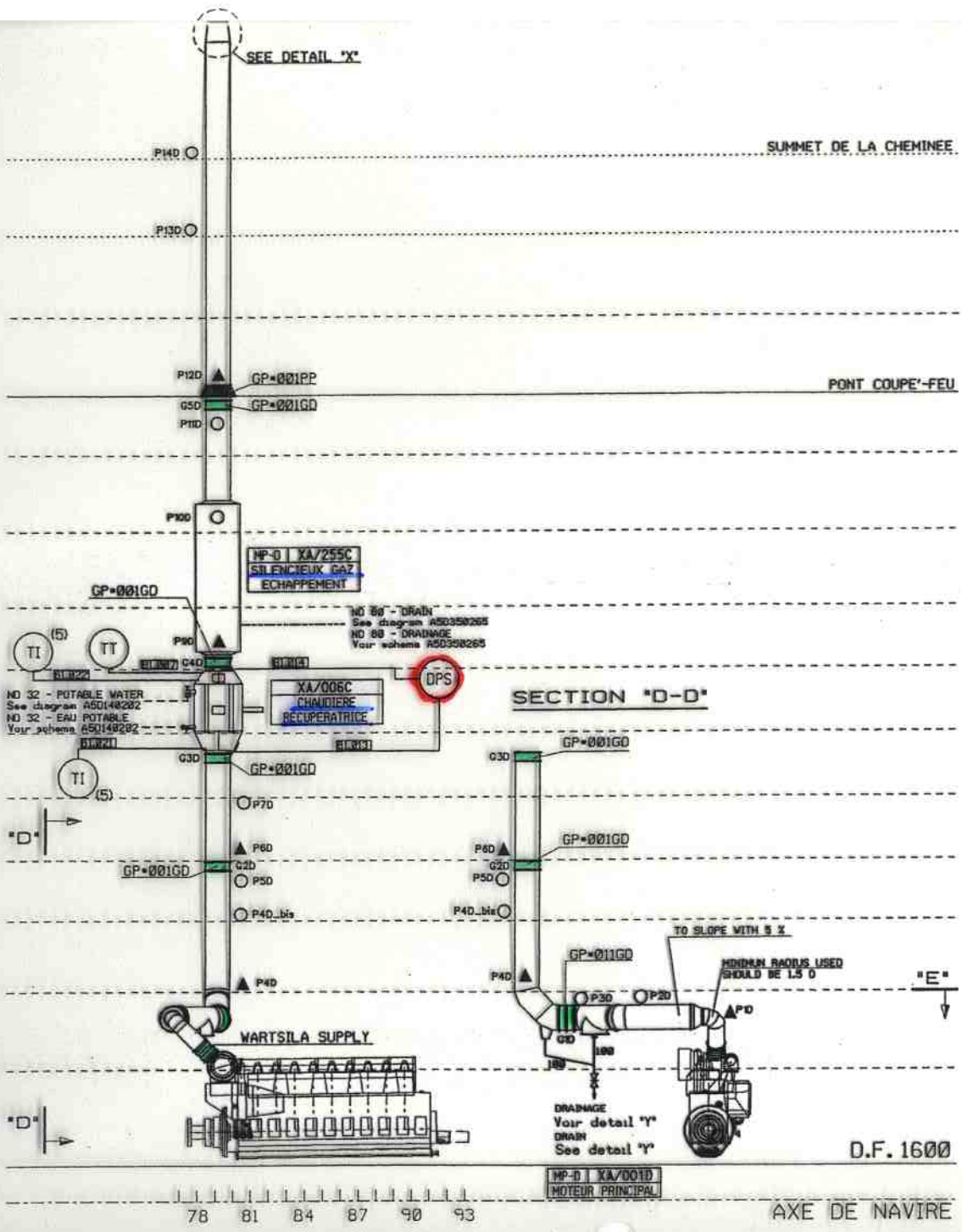


NOTES :

- 1) EXPANSION JOINTS :
 GP*001GD N. 17 (PIECES) - DN 1100 - (NE 867612) - LENGHT= 405 mm
 GP*011GD N. 4 (PIECES) - DN 1100 - (NE 867622)
- 2) FOR MM/EE :
 ○ SLIDING POINT ► FIXED POINT
 SUPPLIED BY DE MARTINI
- 3) FOR THE CORRECT POSITIONING AND RELATIVE ITEMS OF THE FIXED AND SLIDING SUPPORTS, INDICATED WITH ○ AND ►, SEE TECH. SPEC. E5 6414 439.
- 4) SEE OTHER DETAILS ON SHEETS 4.1 - 4.5
- 5) SEE DETAILS "Y" ON SHEETS 4.4
- 6) INSTRUMENTATION SUPPLIED BY AALBORG

EXHAUST GAS - MM/EE
 MOTEUR PRINCIPALS
 GAZ ECHAPPEMENT

SCALE 1:200



Pont a	46860
Pont a	43385
Pont 14	39785
Pont 12	36185
Pont 11	33485
Pont 10	30060
Pont 09	26685
Pont 08	23895
Pont 07	21055
Pont 06	18165
Pont 05	15300
Pont 04	12600
Pont 03	9400
Pont 02	5900

FINCANTIERI
 Cantieri Navali Italiani SpA
 BRESCIA - VIA S. TRONTO 15

DESIGN No. **A5D450232**
 DRWG. No.

FOLIO No. **05A**
 SHEET No.

COSTRUZIONI HULLS **6081**

ALT. D - 24 MAY 2002

MINAPP6081023206.dgn

Infrafone sonic cleaners keep the exhaust ga

WORKING PRINCIPLE

Each uptake is equipped with a sonic cleaner, which generates high intensity low frequency sound. The low frequency sound causes turbulence within the gas flow that prevents small particles from forming big soot flakes.



APPLICATIONS

- Exhaust gas boilers after diesel engines
- Exhaust gas boilers after gas turbines
- Auxiliary oil fired boilers
- Thermal oil heaters
- Main boilers on turbine vessels
- Incinerators
- Catalysts
- Uptake piping

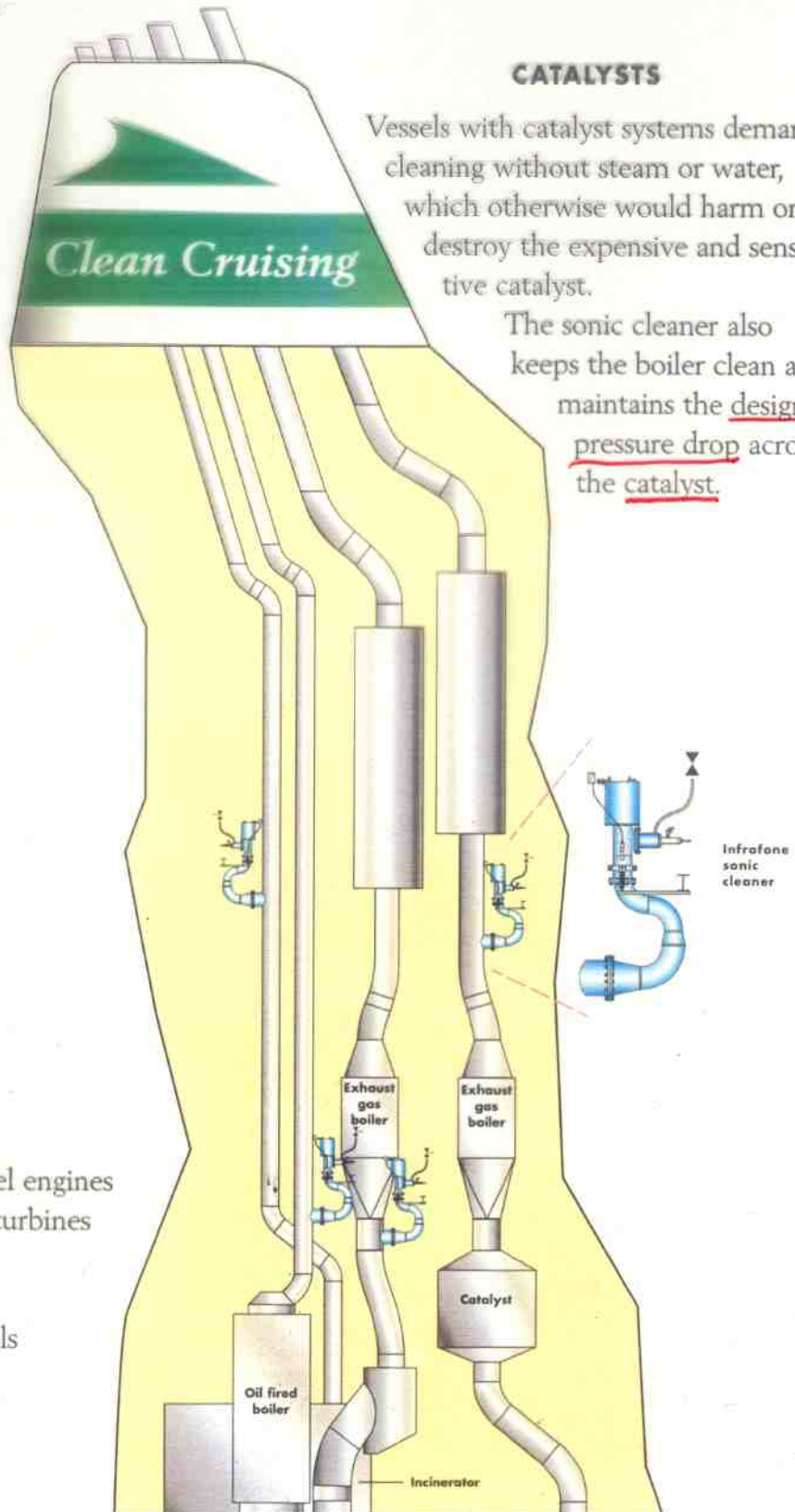
GAS TURBINES

Although gas turbines do not generate as much soot as diesel engines burning heavy fuel oil, a cleaning device is still necessary.

CATALYSTS

Vessels with catalyst systems demand cleaning without steam or water, which otherwise would harm or destroy the expensive and sensitive catalyst.

The sonic cleaner also keeps the boiler clean and maintains the design pressure drop across the catalyst.



Infrafone soni



INSONATING CONTROL BOX

The Insonating Control Box monitors up to eight sonic cleaners. The insonating time and the cycle time are set in this unit. It also has an indicator which displays the acoustic output of each sonic cleaner. An inhibit signal from each boiler is connected to the Insonating Control Box, which ensures that the sonic cleaner is only generating sound when the corresponding boiler is in operation.

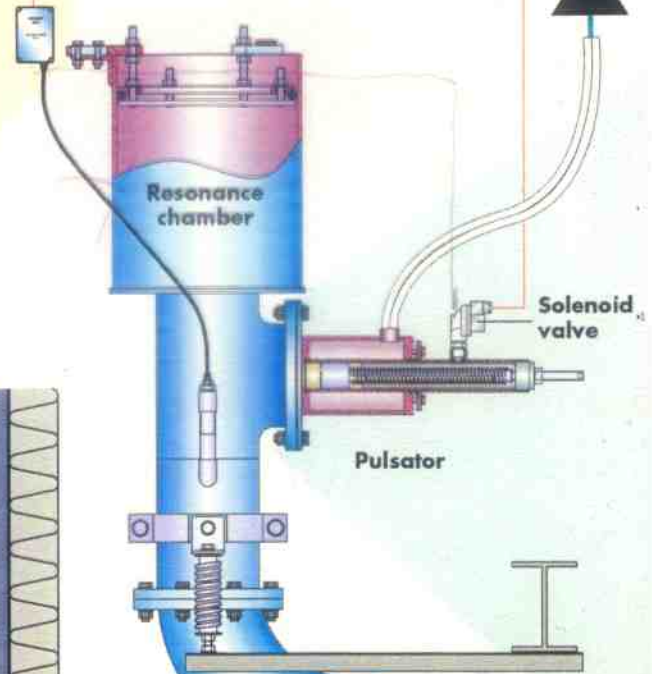
TRANSDUCER BOX

The Transducer Box measures the sound pressure inside the sonic cleaner. The signal from the Transducer Box is transmitted to the Insonating Control Box.

RESONANCE CHAMBER

The frequency of each sonic cleaner is tuned to the calculated frequency by means of the plate in the resonance chamber.

Transducer box



Sonic Cleaner 1

Nominal size of sonic cleaners for passenger vessels:

Type	Height mm	Depth mm	Weight kg
AP15	2700	500	130
AP70	2640	630	160
AP150	2610	890	230
AP350	2870	1190	380

cleaning system

The electrical supply has to be 220 VAC, 50/60 Hz single phase. The maximum consumption is about 1 A.

PULSATOR

The pulsator has a piston fitted to a spring. The standing sound wave inside the sonic cleaner moves the piston back and forth. By the movement of the piston, compressed air is fed into the resonance tube as pulses, which generate the low frequency sound.

When the solenoid valve on the pulsator is closed, the piston inhibits the airflow and the operation comes to an end. When the solenoid valve opens by a signal from the Insonating Control Box, the piston is free to move and the sonic cleaner generates sound again.

SUPPORT BEAM

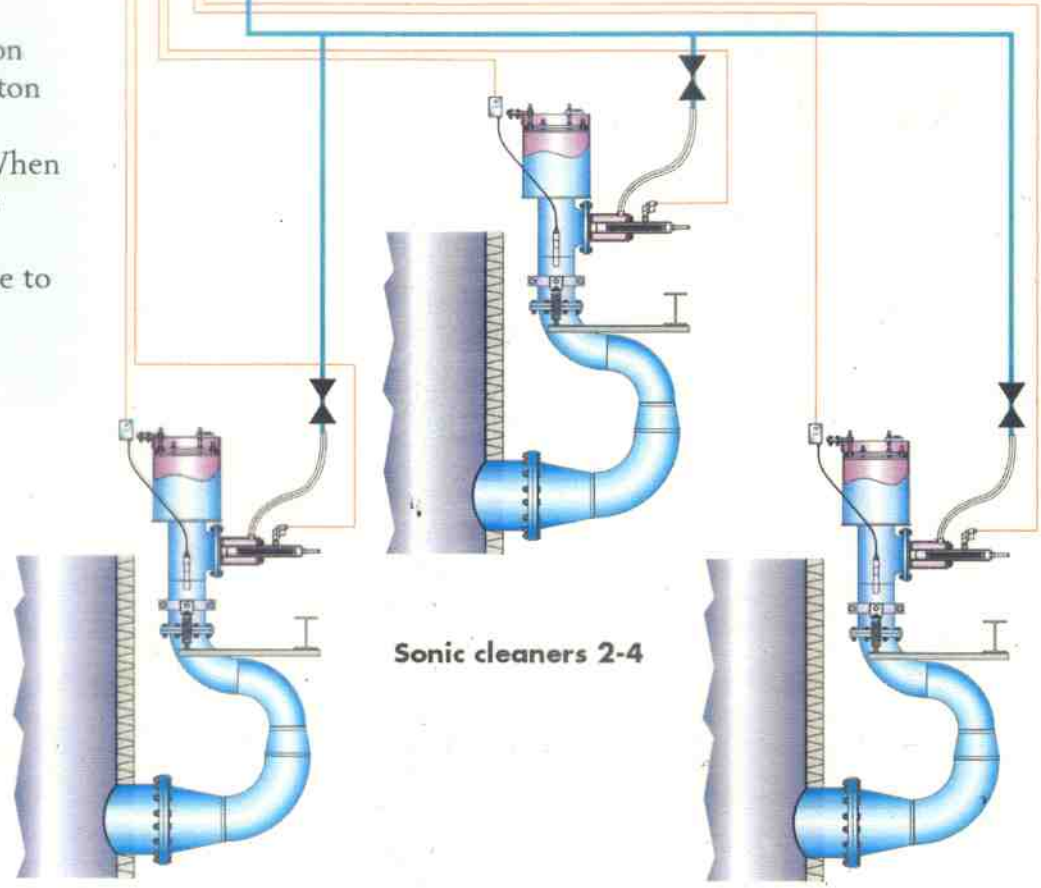
The sonic cleaner can be installed either with a support beam welded to the exhaust gas duct, or one welded against a construction beam, whichever is more convenient.



← Air from compressor

CONSUMPTION OF COMPRESSED AIR

The sonic cleaners are powered by compressed air at a pressure of 5-8 bar. The sonic cleaners are in operation about 3 times per hour and every sequence lasts about 7 seconds. Each sonic cleaner consumes between 0.060 nm³/s to 0.200 nm³/s of air during the operation which corresponds to 1.2-4.2 nm³/h (0.7-2.5 scfm) average consumption due to the short insonating periods.



GENERALITES GENERAL

1

LES DIAGRAMMES INCLUS LES SYSTEMES SUIVANTS:
DIAGRAMS INCLUDING FOLLOWING SYSTEMS:

- 1) GRAND ASSECHEMENT (SH 16) rules bilge
- LE SYSTEME EST COMPOSE DE 4 ELECTRO-POMPES CENTRIFUGES, A AUTO-AMORCAGE (YA/401A-B-C-D) A DECHARGE DIRECTE ET INDEPENDANTE A LA COQUE.
 - ELLES ASSECHENT LEUR PUISARD / ET LES AUTRES LOCAUX
 - LA POMPE YA/401A-B EST UTILISABLE POUR LE BALLASTAGE
 - LA POMPE YA/401D FONCTIONNE SUR LE TABLEAU DE SECOURS
 - CES POMPES SONT CONTROLEES PAR:
 - LA SALE DE CONTROLE
 - LA PASSERELLE
 - LE PC SECURITE
 - LOCALEMENT
 - LES VANNES D'ASSECHEMENT SONT COMMANDES LOCALEMENT ET A DISTANCE (INDICATEUR OUVER/FERME) PAR
 - LA SALE DE CONTROLE
 - LA PASSERELLE
 - LE PC SECURITE
 - CHAQUE PUISARD EST EQUIPE D'UN DETECTEUR DE NIVEAU HAUT, AVEC ALARME SONORE ET VISUELLE A LA SCD ET LA PASSERELLE, ET APPARAIT SUR LE SYNOPTIQUE DE L'AUTOMATE DU NAVIRE
 - LES VANNES CONNECTEES AU COLLECTEUR D'ASSECHEMENT SONT INSTALLEES HORS DU B5 ET SONT COMMANDEES EN CAS D'URGENCE AU DELA DU PONT 3.
 - 2 ALARMES D'ENVANHISSEMENT SONT INSTALLEES A LA MACHINE A 300 MM DU PARQUET
- 1) RULES BILGE SYSTEM (SH 16)
- THE SYSTEM IS CARRIED OUT THROUGH N.4 SELF-PRIMING CENTRIFUGAL E/PUMPS (YA/401A-B-C-D) WITH INDIVIDUALLY DIRECTLY OVER BOARD DISCHARGE
 - THEY DRAW FROM THE BILGE MAIN OR DIRECTLY THE VARIOUS ROOMS
 - E/PUMPS YA/401A-B TO BE USED ALSO FOR BALLAST DUTY
 - E/PUMPS YA/401D SHALL BE OPERATED ALSO BY THE EMERGENCY DIESEL-GENERATOR
 - ALL THE E/PUMPS TO BE CONTROLLED FROM:
 - WHEEL HOUSE
 - E.C.R.
 - SAFETY ROOM
 - LOCALLY
 - BILGE VALVES TO BE LOCALLY AND REMOTE CONTROLLED (WITH OPEN-CLOSED INDICATORS) FROM
 - E.C.R.
 - SAFETY ROOM
 - WHEEL HOUSE
 - EACH BILGE WELL TO BE EQUIPPED WITH A HIGH LEVEL SWITCH WITH SOUND AND VISUAL ALARM IN E.C.R. AND WHEELHOUSE AND DISPLAYED ON A MIMIC THROUGH THE SHIP AUTOMATION
 - VALVES CONNECTED TO THE BILGE MAIN WILL BE INSTALLED BEYOND THE B/5 AND REMOTE CONTROLLED IN CASE OF EMERGENCY FROM OVE DECK " 3 ".
 - TWO FLOODING ALARM SWITCHES TO BE INSTALLED IN THE MAIN E. R. AT 300 MM ABOVE THE FLOOR
- 2) PETIT ASSECHEMENT (SH 18) stripping
- LE SYSTEME COMPREND 25 E-POMPES INDIVIDUELLES (YA/401AA/AZ), COMMANDEES PAR DETECTEUR DE NIVEAU:
 - NIVEAU HAUT, DEMARRAGE DE LA POMPE
 - NIVEAU BAS, STOP POMPE
 - CHAQUE POMPE REFOULE VERS LE COLLECTEUR DU BALLAST EAUX MAZOUTEUSES (EMZ)
 - APPARTION D'UNE ALARME EN CAS DE MARCHE PROLONGEE OU DE DEMARRAGES FREQUENTS
 - QUAND LE DEBIT D'ASSECH. EST INSUFFISANT, UN DETECTEUR DE NIVEAU TRES HAUT (DANS CHAQUE PUISARD) DECLENCHE UN DEFAUT SUR LE SYNOPTIQUE PUIS LE DEMARRAGE DE LA POMPE PALE D'ASSECHEMENT, ET UNE ALARME D'ENVANHISSEMENT APPARAIT.
 - LES VANNES PEUVENT ENTRE MANOEUVREES MANUELLEMENT.
- 2) STRIPPING SYSTEM (SH 18)
- THE SYSTEM INCLUDE N. 26 INDIVIDUALLY E/PUMP (YA/401AA?AW) CONTROLLED EACH BY E LEVEL FLOATING SWITCH:
 - HIGH LEVEL, START OF THE PUMP
 - LOW LEVEL, STOP OF THE PUMP.
 - EACH PUMP WILL DISCHARGE INTO A DRAIN MAIN CONNECTED TO THE OILY BILGE TANK

- WITH THE E/PUMPS YA/401A-B DISTRIBUTION PIPING IS MADE TO ALLOW WATER TRANSFER FROM FORWARD TO AFT AND FROM STARBOARD TO PORT AND VICEVERSA.

PUMPS TO BE CONTROLLED FROM:

E.C.R.

WHEELHOUSE

DECK OFFICE

LOCALLY

- VALVES WITH " OPEN-CLOSE " INDICATION TO BE CONTROLLED FROM:

E.C.R.

WHEELHOUSE

DECK OFFICE

LOCALLY

- REVERSIBLE PUMP YA/409 ALLOWS HEELING CORECTION WITH AUTOMATIC WATER TRANSFERFROM A PORT TANK TO A STARBOARD TANK AND VICEVERSA.

PUMP TO BE CONTROLLED FROM:

E.C.R.

WHEELHOUSE

DECK OFFICE

LOCALLY

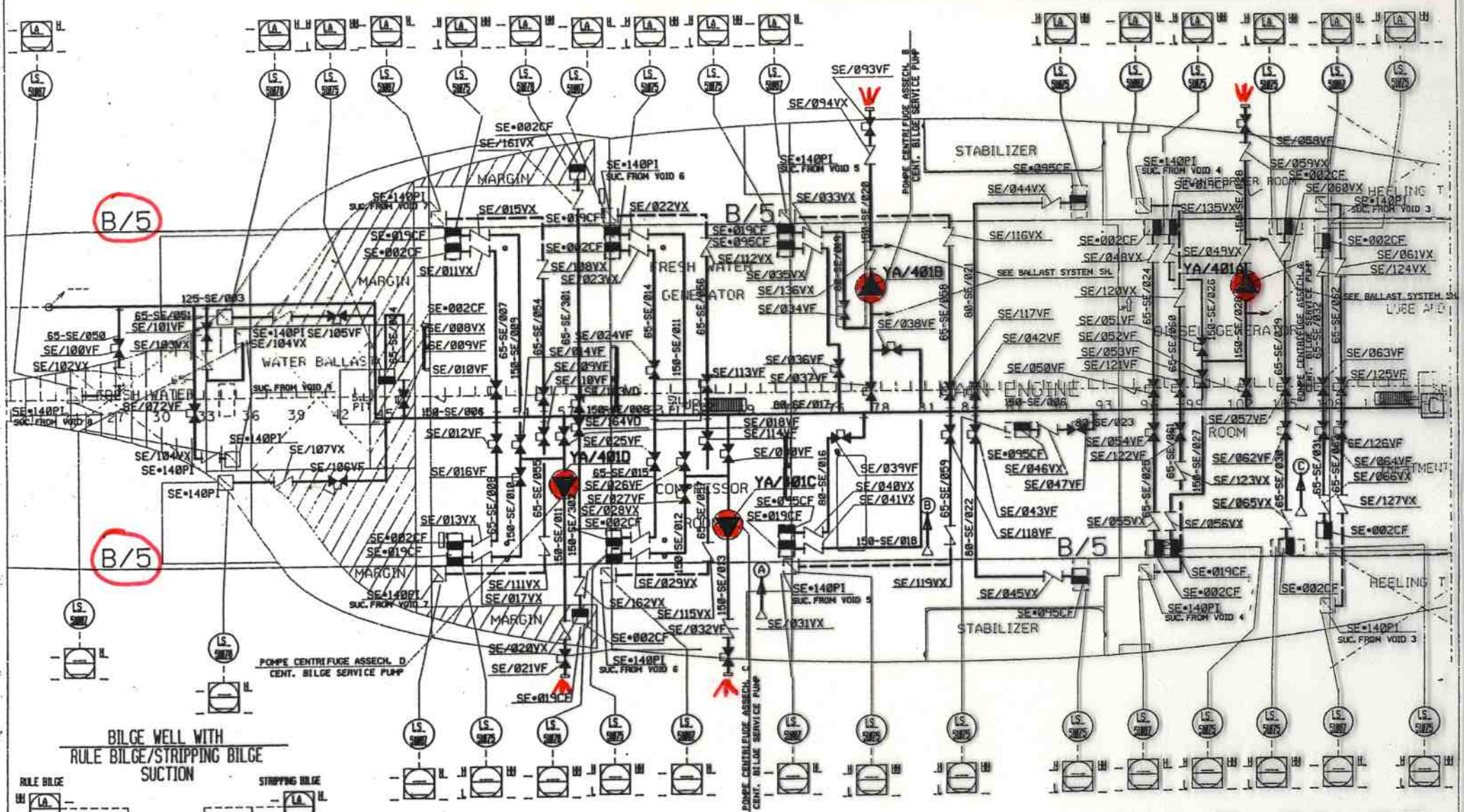
- A PUSH BOTTON CONTROL OF THIS PUMP AND A HEEL METER ARE INSTALLED FORWARD AND AFT DOORS OF DECK 3 A HEEL METER TO BE INSTALLED IN DECK OFFICE

NOTE FOR ALL SYSTEMS:

FOR PRESSURE AND VACUUM GAUGES ASSEMBLING SEE STANDARD PM 24501C

DECK 1 AT 1600

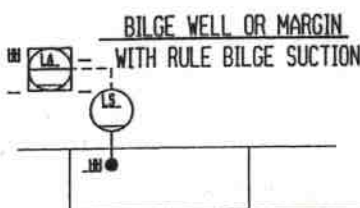
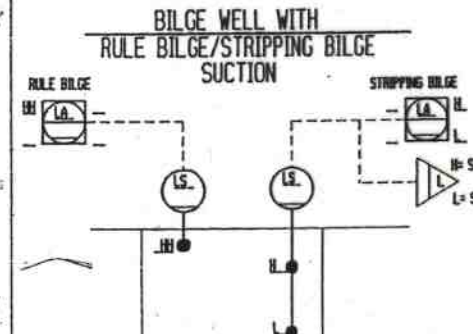
- (A) EMERGENCY SUCTION FROM PUMP XA/494B
- (B) EMERGENCY SUCTION FROM PUMPS XA/039A-B
- SEE FRESH AND SEA WATER COOLING SYSTEM DRWG. AS 0310 378
- (C) EMERGENCY SUCTION FROM PUMPS XA/041A-B



B/5

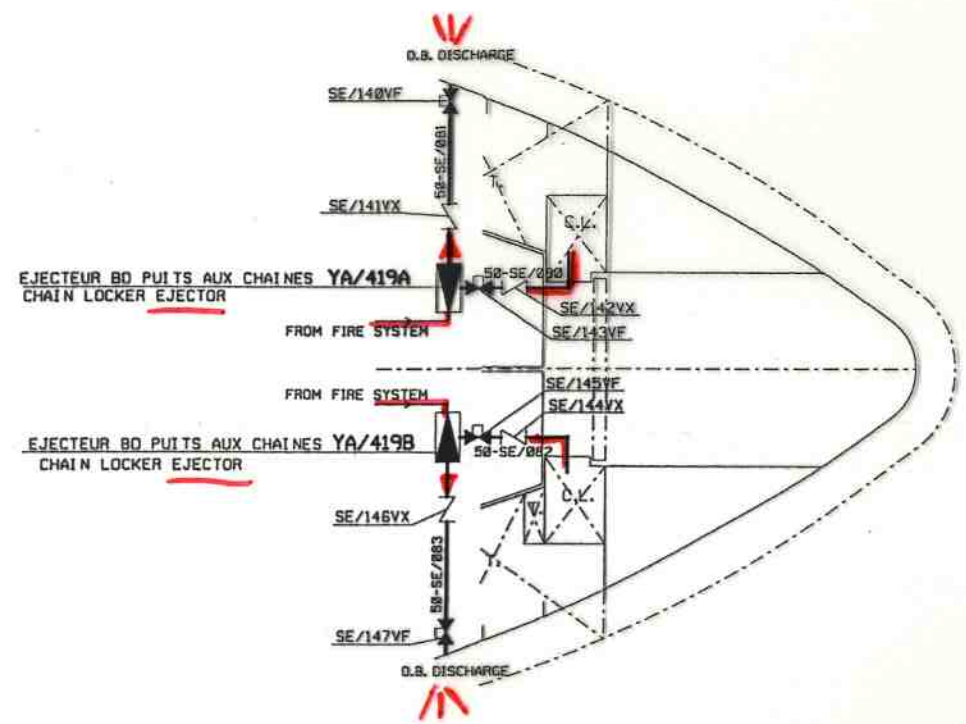
B/5

RULE BILGE



<p>FINCANTIERI Cantieri Riuniti Navali S.p.A. DIVISIONE COSTRUZIONI INCANTIERI</p>	<p>DISIGNO No. A50010200</p>	<p>FOGLIO No. 16</p>
	<p>SETTORE TECNICO</p>	<p>COSTRUZIONI HULLS 6081</p>

DETAIL CHAINS LOCKER SUCTION



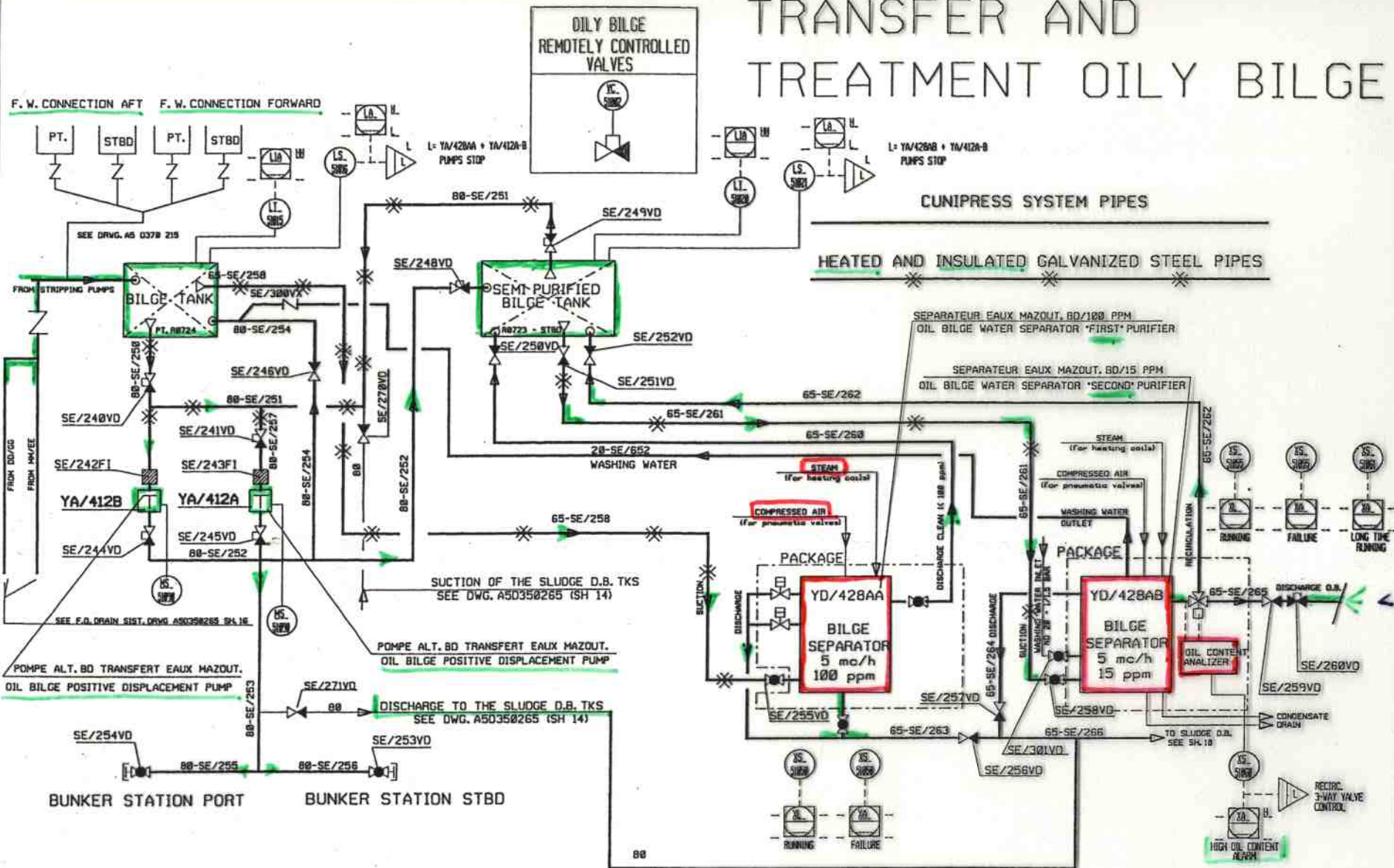
RULE BILGE

RULE BILGE
REMOTELY CONTROLLED
VALVES

FINCANTIERI <small>Consorzio Navale Italiano S.p.A. DIVISIONE COstruzioni NAVALI</small>	DISEGNO No. A50010200 DRWG. No.	FOGLIO No. 19 SHEET No.
	COSTRUZIONI HULLS 6081	

5

TRANSFER AND TREATMENT OILY BILGE



 FINCANTIERI Cantieri Navali Italiani S.p.A. DIVISIONE COSTRUZIONI NAVALI	DESIGN No. A50010200	FOGLIO No. 25
	COSTRUZIONI HULLS 6081	SHEET No.

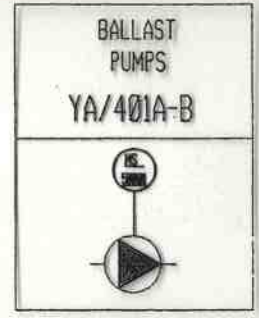
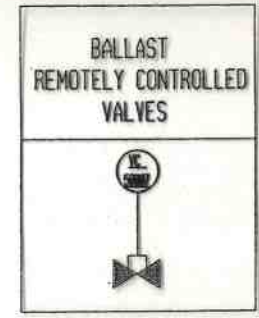
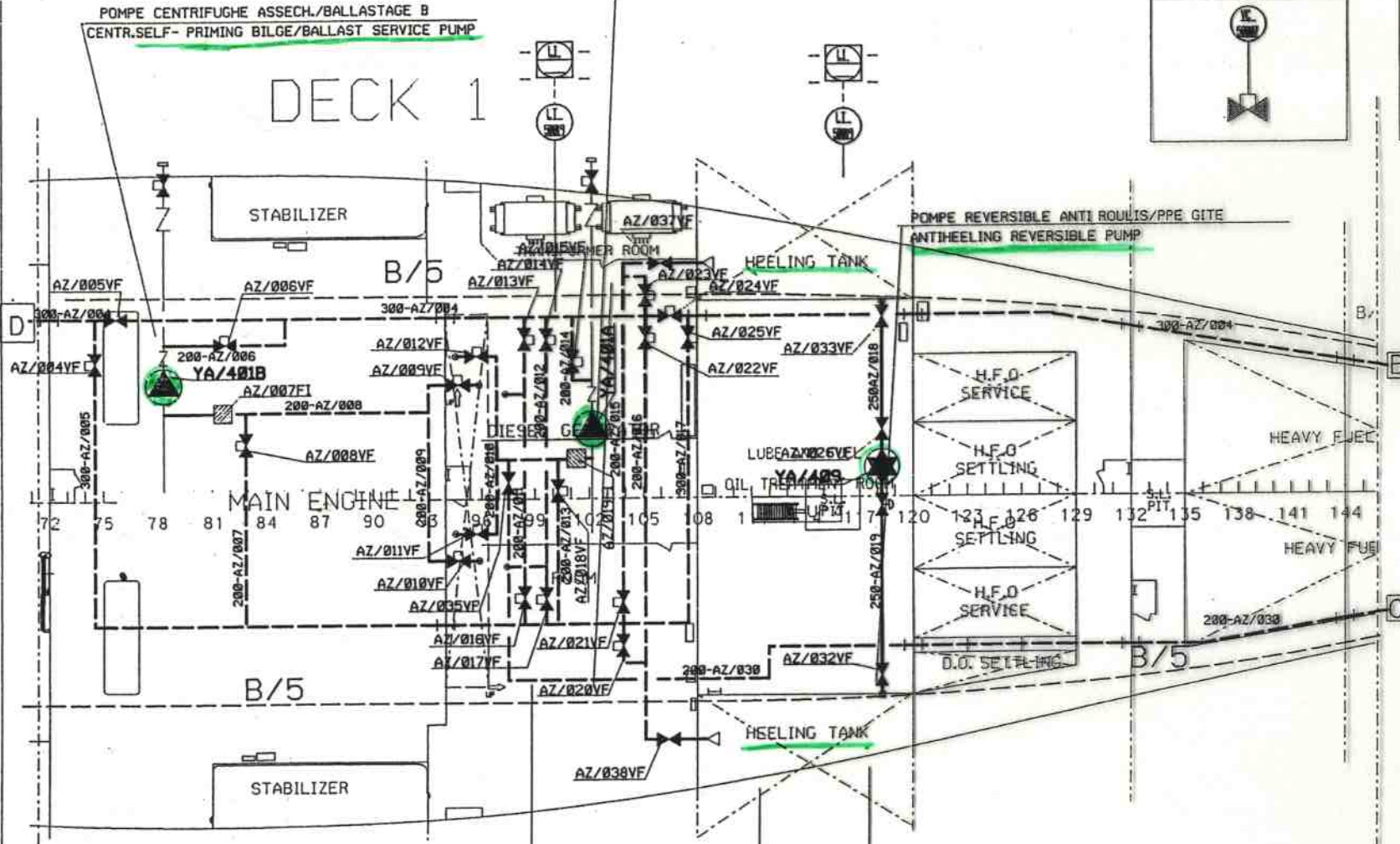
GALVANIZED STEEL PIPES

GRP PIPES

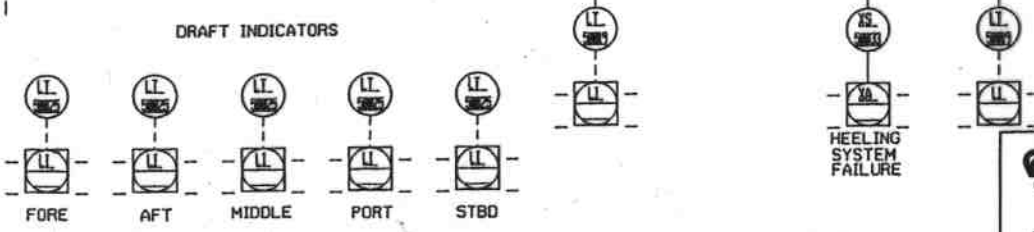
POMPE CENTRIFUGHE ASSECH./BALLASTAGE B
CENTR.SELF- PRIMING BILGE/BALLAST SERVICE PUMP

POMPE CENTRIFUGHE ASSECH./BALLASTAGE A
CENTR.SELF- PRIMING BILGE/BALLAST SERVICE PUMP

DECK 1



DRAFT INDICATORS



BALLAST

FINCANTIERI Cantieri Navali Italiani S.p.A. DIVISIONE COSTRUZIONI NAVECANTIERI	DESIGNO No. A50010200	FOGLIO No. 27
	DRWG. No.	SHEET No.
SETTORE TECNICO	COSTRUZIONI HULLS 6081	

CALCUL CALIBRATION POMPE INCENDIE

CONFORMEMENT A SOLAS CHAPTER II - 2 , PART A, RULE 4 , PARAGRAPH 2 , POINT 2.1 ET 2.2
LES POMPES INCENDIES SONT DIMENSIONNEES COMME SUIT.

$$\underline{\text{TDEBIT TOTAL ASSECHEMENT}} = 144.28 \text{ m}^3/\text{h} \times 4 = 577.12 \text{ m}^3/\text{h}$$

$$\underline{\text{DEBIT TOTAL POMPES INCENDIE}} = \frac{\underline{\text{DEBIT TOTAL ASSECHEMENT}} \times 2}{3}$$

$$= \frac{577.12 \times 2}{3} = 384.7 \text{ m}^3/\text{h}$$

$$\underline{\text{DEBIT TOTAL POUR CHAQUE POMPE INCENDIE}} = \frac{\underline{\text{DEBIT TOTAL POMPES INCENDIE}}}{\text{N.POMPES CONFORMEMENT A SOLAS}}$$

$$= \frac{384.7}{3} = 128.25 \text{ m}^3/\text{h}$$

$$\underline{\text{POMPE INCENDIE REQUISE}} = 130 \text{ m}^3/\text{h}$$

FIRE PUMP SIZE CALCULATIONS

ACCORDING TO SOLAS CHAPTER II - 2 , PART A, RULE 4 , PARAGRAPH 2 , POINT 2.1 AND 2.2
FIRE PUMPS ARE SIZED AS FOLLOW:

$$\underline{\text{TOTAL FLOW BILGE}} = 144.28 \text{ m}^3/\text{h} \times 4 = 577.12 \text{ m}^3/\text{h}$$

$$\underline{\text{TOTAL FLOW FIRE PUMPS}} = \frac{\underline{\text{TOTAL FLOW BILGE}} \times 2}{3}$$

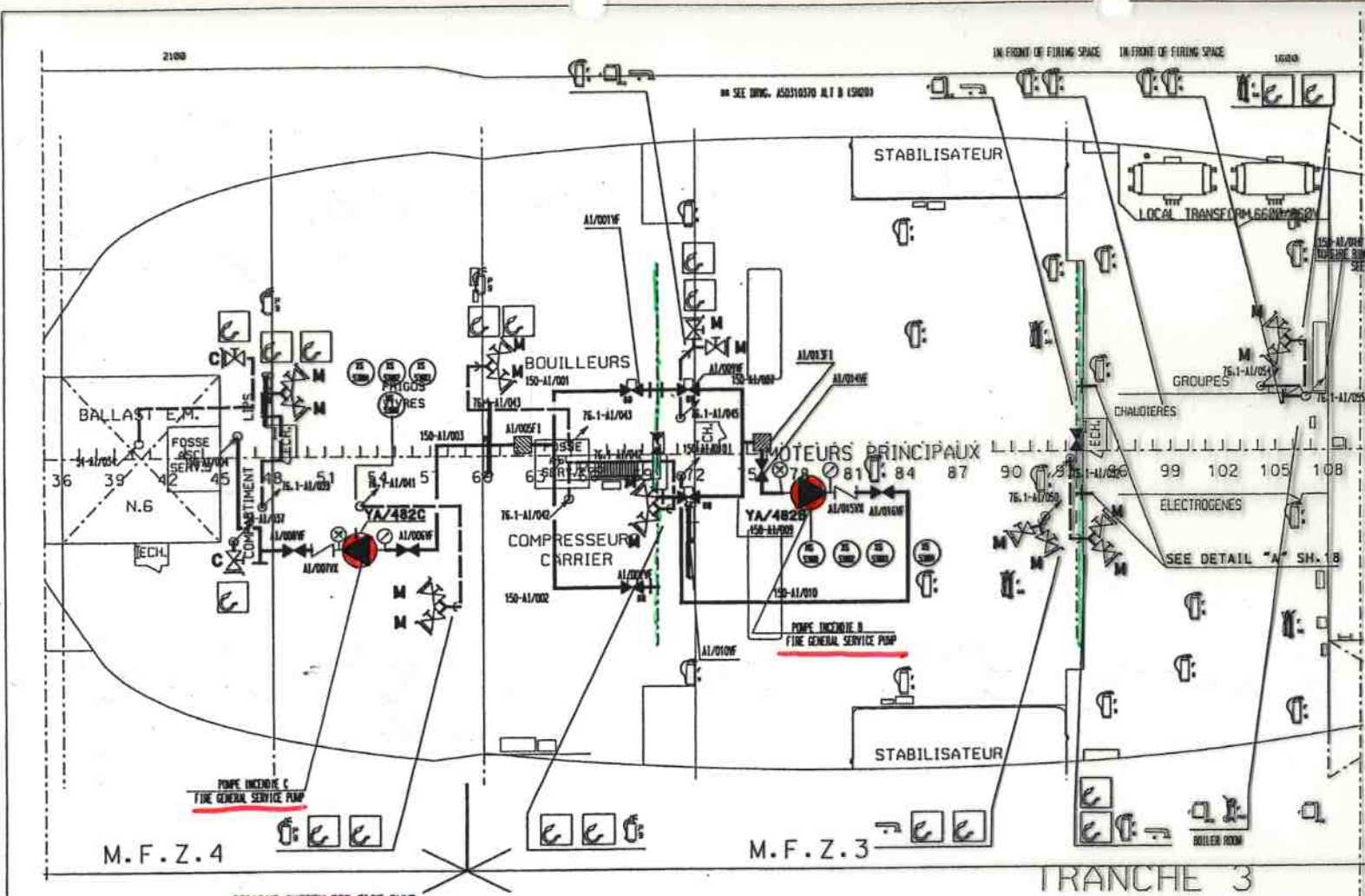
$$= \frac{577.12 \times 2}{3} = 384.7 \text{ m}^3/\text{h}$$

$$\underline{\text{TOTAL FLOW FOR EACH FIRE PUMP}} = \frac{\underline{\text{TOTAL FLOW FIRE PUMPS}}}{\text{N.PUMPS REQUIRED BY SOLAS}}$$

$$= \frac{384.7}{3} = 128.25 \text{ m}^3/\text{h}$$

$$\underline{\text{SELECTED FIRE PUMP}} = 130 \text{ m}^3/\text{h}$$

PONT 1

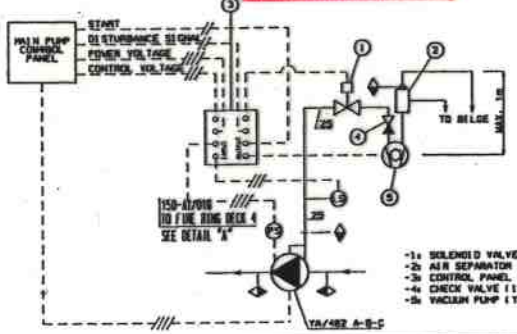


POMPE INCENDIE C
FIRE GENERAL SERVICE PUMP

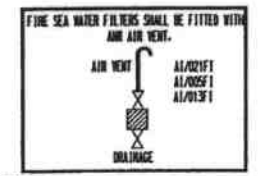
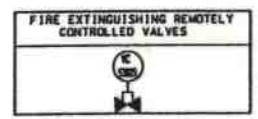
M.F.Z.3

TRANCHE 3

PRIMING SYSTEM FOR FIRE PUMP



- 1- SILENCED VALVE
- 2- AIR SEPARATOR
- 3- CONTROL PANEL (220V-50HZ)
- 4- CHECK VALVE (1")
- 5- VACUUM PUMP (YA/482 A-B-C)

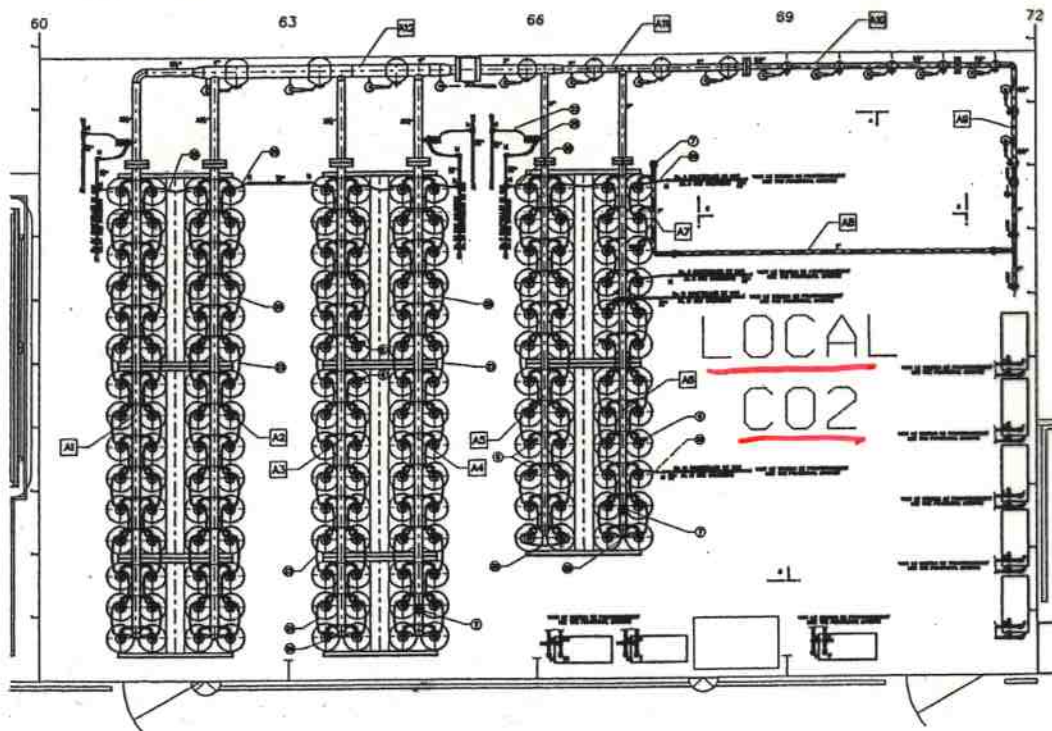


ASP. POMPE DA CROSS-OVER

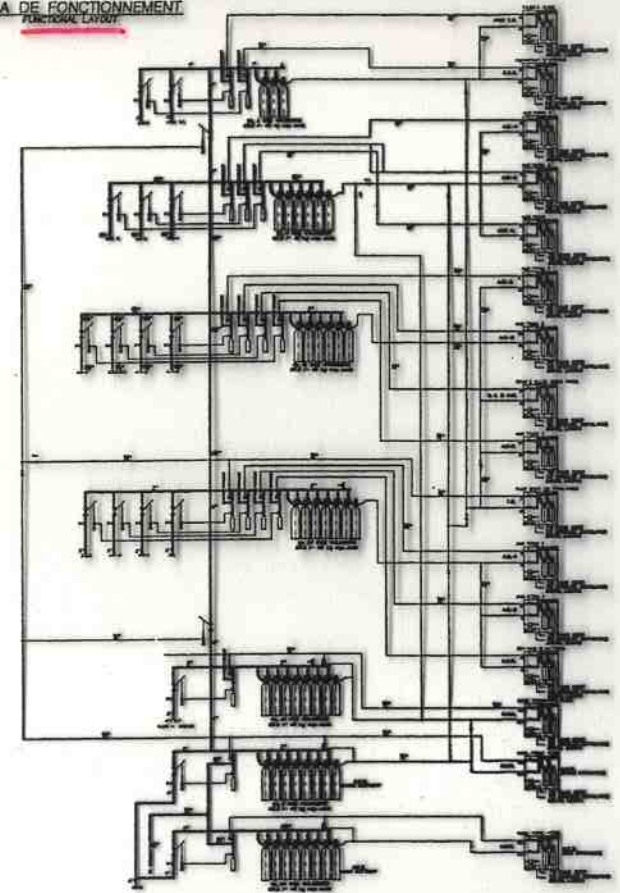
CIRCUIT INCENDIE - EXTINCTEURS ET EQUIPMENT LUTTE INCENDIE

FINCANTIERI <small>Financing and Technical Services</small> <small>INGEGNERIA, COSTRUZIONI, MANUTENZIONE</small>	DISEGNO No. DRWG. No.	A50210205 E	FOGLIO No. SHEET No.	17
	COSTRUZIONI HULLS	6081		

PLAN CENTRAL CO2
TOP VIEW CO2 ROOM



SCHEMA DE FONCTIONNEMENT
FUNCTIONAL LAYOUT



APPROVAL BY: BUREAU VERITAS

No. dt. 23/04/2002

THE NUMBER OF CO2 CYLINDERS

21 MODIFIED DIESEL GENERATORS CASINO VOLUME AND INCREASE 15/01/2002

22 ADDED BOX INTO CO2 ROOM 1/11/2002

23 MODIFIED AS S.V. LETTER (14/01/2002) ON CH. 22/1/2002

24 ADDED CO2 PROTECTION TO CONVERTER ROOM ON BESS II 15/1/2002

25 REVISION OF MAIN SYSTEM POTENTIALITY AND LESION 20/01/2002

MODIFICATIONS ALTERATIONS

MINIMAX
GENOVA ITALY

HULL 6081

CO2 FIRE FIGHTING SYSTEM TO PROTECT
M.E.R. - D.G.R. - LUBE and FUEL OIL T.R.
AUX.R. - B. & G.W.R. - MSB R. - S.G.R.
FWD T.R. - E.G.R.
- CO2 ROOM.

DONNE DATES
DIN 020
R.L. Ing. A.R.
DATA date
28 novembre 2000
ECHELLE SCALE
1 : 20
DESSIN N° DRAWING No.
SPD 6646 / 5

CAPACITE' DU SYSTEME PRINCIPALE
MAIN SYSTEM POTENTIALITY

SALLE MOTEUR PRINCIPALE (1423 m³) + VOLUME LUBE (270 m³) m³ 3692.5

SALE ENGINE ROOM + LUBE OIL m³ 2334.7

COPRIE CO2

FACTEUR DE SATURATION SATURATION 33 %

QUANTITE DE CO2 - QUANTITY OF CO2 - 527.2 ± 0.35 - kg 3760.75

CAPACITE' BOUTEILLES CYLINDER CAPACITY 1 57.5

CHARGE DE CO2 POUR CHAQUE BOUTEILLE CO2 CHARGE PER BOTTLE kg 45

REMPLISSAGE DES BOUTEILLES CYLINDER FILLING 0.67 kg/l

NOMBRE DES BOUTEILLES kg 3760.75 : 45 = N° 84
NECESSARY CYLINDERS

SYSTEME FIXE D'EXTINGUISHMENT A CO2
CO2 FIRE EXTINGUISHING SYSTEM

FINCATTIERI
Centros Navali Italiane Sp.A.
DIREZIONE NAU DI TRIESTE

DISEGNO No. A5D230225
DRWG. No.

FOLIO No. SHEET No. 03B

COSTRUZIONI HULLS 6081

ALT. C - 27 MAY 2002

COSTR.
HULL

6081

N.DISEGNO
DWG. NUMBER

A5D270211D

FOGLIO N.
SHEET NR.

01

DRENCHER SYSTEM (GARAGE)

15

MARCA PEZZO piece number REPERTORIO cat. of cost	DESCRIZIONE description	CARATTERISTICHE PRINCIPALI main characteristics	FORNITURA SUPPLY	SPEC. TEC. TECH. SPEC.
YA/490A-B D270	Pompe eau pulverisee <u>garage</u> CENTRIFUGAL PUMP	500 mc/h 45 m	F/C	E5.6310.303
YM/485AA-AB D210	Bouton poussoir cde eau pulverisee PUSH BUTTON	-	MINIMAX	E5.6450.475
YL*485 D210	Buses eau pulverisee SPRAY NOZZLES	mod. B 15 SSP B 15 SSP type	MINIMAX	E5.6450.475

SYSTEME EAU PULVERISEE

Le systeme est alimente par 2 electro-pompes centrifuges avec un debit suffisant pour 2 zones adjacentes.

Une des electro-pompes est alimentee par le tableau de secours l'aspiration des pompes se fait a la prise d'eau la plus proche les vannes d'aspiration et de refoulement doivent etre bloqueees en position ouvertes.

Le systeme est relie au circuit incendie par un clapet de non retour situe au local eau pulverisee.

L'installation peut etre rincee a l'eau douce par une connection a la pompe de transfert ed, et par une connection au reseau de terre.

Les vannes incendie d'air, ainsi que celles de vidange sont manoeuvrees manuellement dans le local eau pulverisee.

Les vannes des zones sont regroupees dans le local eau pulverisee et sont commandees du synoptique de controle a la passerelle, et localement dans le local eau pulverisee.

Les pompes (YA/490A-B) sont commandees du synoptique de controle a la passerelle et du local eau pulverisee.

DRENCHER SYSTEM

The system is supplied from two centrifugal electro-pumps with an output sufficient to supply two adjacent zones. One of the drencher electro-pump is supplied from the emergency switchboard. The suction of the pumps to be directly connected to the nearest sea chest.

Valves on suction and delivery lines at the drencher pumps shall be locked in open position.

The system to be supplied from the fire main with a screw down non return valve located in the drencher room.

The installation can be washed with fresh water through a connection to the fresh water transfer pump and also by connection with the fresh water shore network.

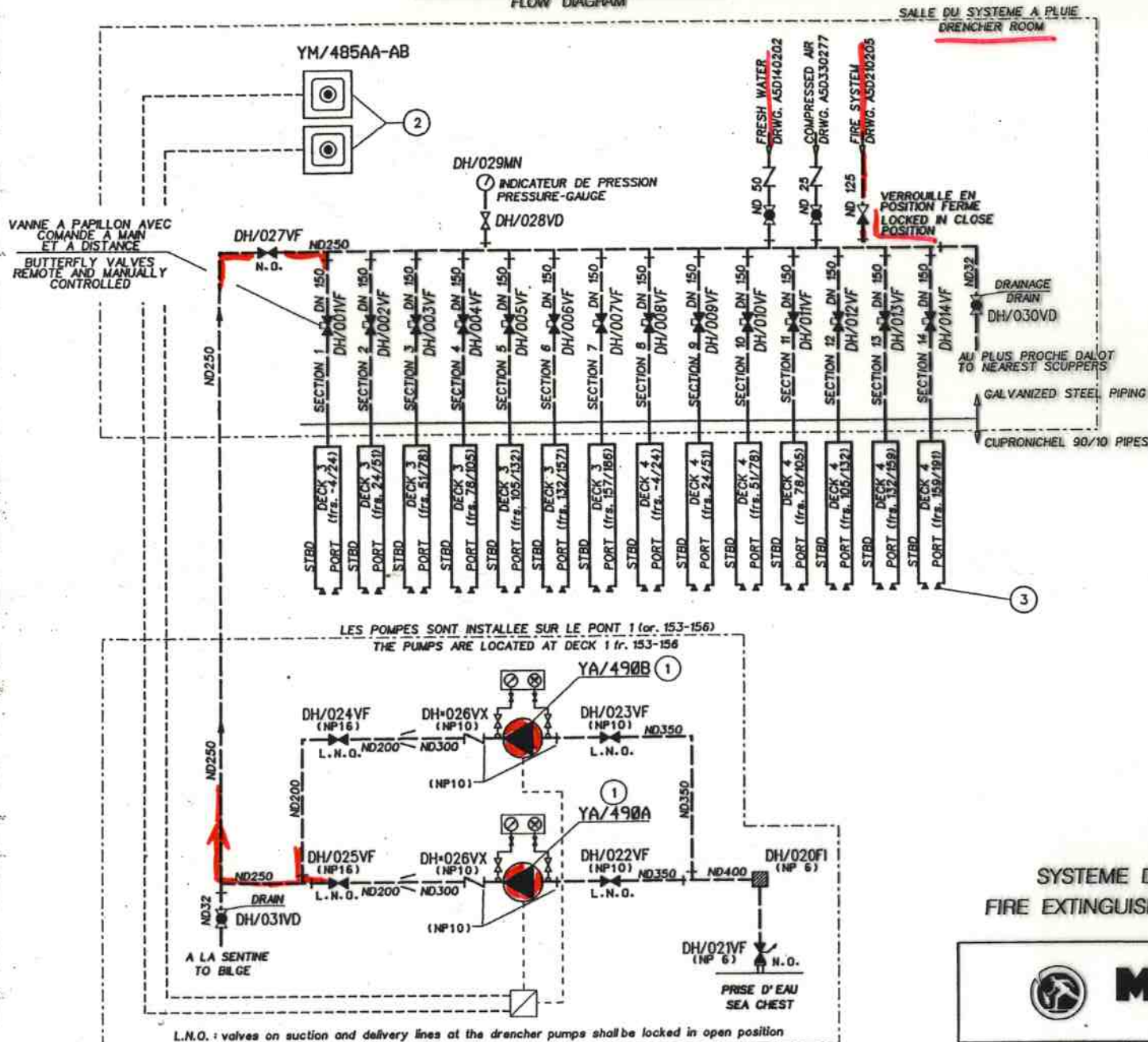
Fire and air valves and drain connections are manually operated in the drencher room.

Section valves per zone are grouped in the drencher room and they are remote controlled from the mimic control panel located in the wheelhouse and manually in the drencher room.

And the pumps (YA/490A-B) are remote controlled from the mimic control panel located in the wheelhouse and can be controlled locally and from the drencher room.

SCHEMA DE PROCEDE

FLOW DIAGRAM



POS. ITEM	DESCRIPTION DESCRIPTION	QUANTITE QUANTITY
1	ELECTROPOMPE 500 m ³ /h x 45 m (forniture FINCANTIERI) PUMP Q=500 m ³ /h x 45 m - F/C SUPPLY	2
2	POUSSOIR DE COMMANDE (forniture MINIMAX) PUSH BUTTON - MINIMAX SUPPLY	2
3	BUSES mod. B 15 SSP (forniture MINIMAX) SPRAY NOZZLE B 15 SSP type - MINIMAX SUPPLY	727

REMARQUES: NOTES:

- LES BUSES "B15SSP" SONT APPROUVE PAR M.M.M. AVEC No. 47/1996 dt. 8/3/1996
- "B15SSP" NOZZLE APPROVAL BY M.M.M. WITH No. 47/1996 dt. 8/3/1996
- DISTANCE MAXI ENTRE DEUX BUSES: 3,50 m (1,75 TETE DE BRANCHE)
- MAX NOZZLES SPACING: 3,50 m (1,75 m TO BULKHEAD)
- BUSES B15SSP mod. 1/2" NPT
- NOZZLES B15SSP type 1/2" NPT
- POUR BUSES B15SSP VOIR LA FICHE STD 1782
- FOR B15SSP NOZZLES DATA SHEET SEE STD 1782
- CARACTERISTIQUE DE LA POMPE EAU DE MER: 2 x 500 mc/h x 45 m
- SEA WATER PUMP CHARACTERISTIC: 2 x 500 mc/h x 45 m
- POUR LE CARACTERISTIQUE DES TUYAUX VOIR LE DESSIN FINCANTIERI
- FOR PIPES TECHNICAL CHARACTERISTIC SEE FINCANTIERI DRAWINGS

SYSTEME D'EXTINCTION A PLUIE FIRE EXTINGUISHING "DRENCHER SYSTEM"



MINIMAX
GENOVA ITALY

SPD 6626 / 4

FINCANTIERI
CANTIERI NAVALI ITALIANI S.p.A.
DIVISIONE COSTRUZIONI NAVALI

DISIGNO No. A50270211
DRWG. No.

FOGLIO No. SHEET No. 07A

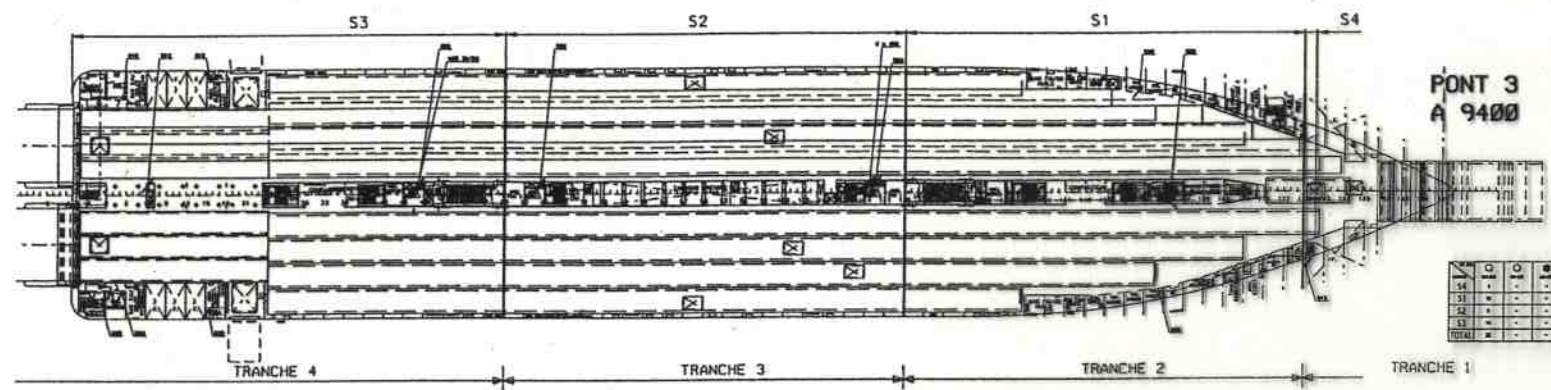
SETTORE TECNICO

COSTRUZIONI HULLS 6081

ALT. 'D' - 10/06/02

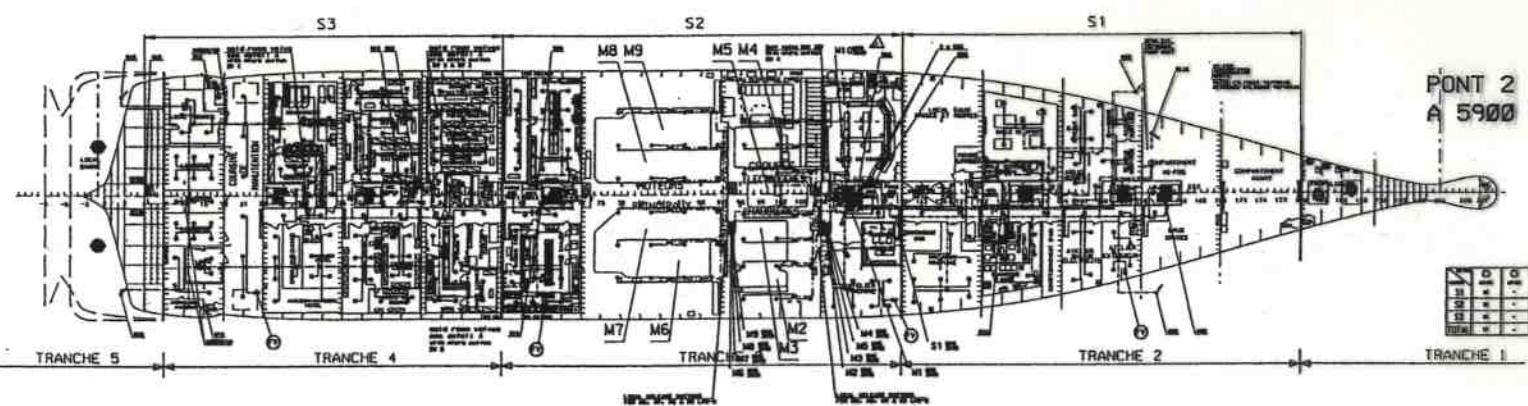
--- HOT DIP GALVANIZED STEEL PIPINGS (see F/C sheet N. 02, 03)
— CUPRONICHEL 90/10 PIPES (see sheet F/C N. 04)

SYSTEME D'EAU PULVERISEE HI-FOG
WATER MIST FIRE EXTINGUISHING PLANT



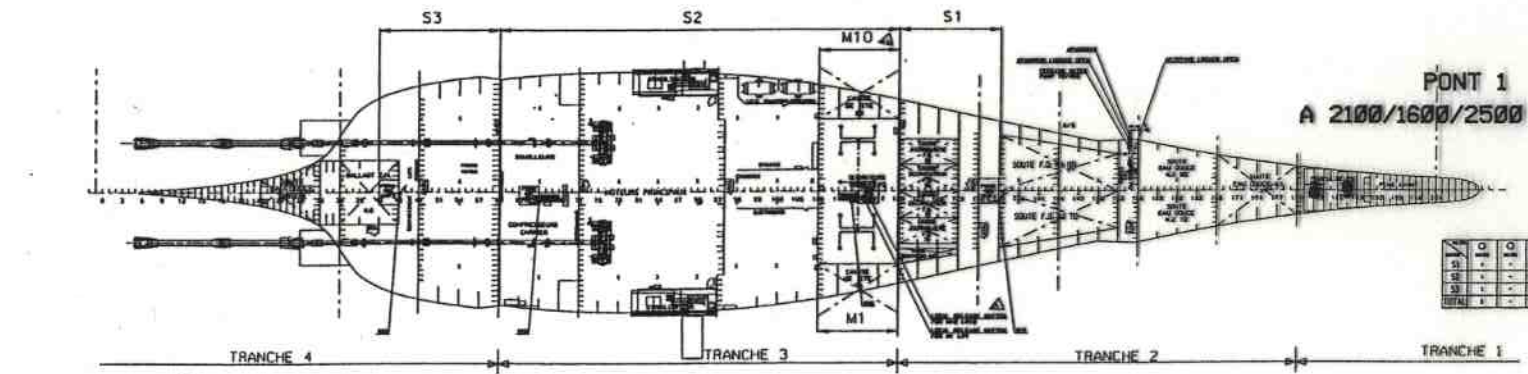
PONT 3
A 9400

	Q	O	B	Q	TOTAL
S1	-	-	-	-	-
S2	-	-	-	-	-
S3	-	-	-	-	-
TOTAL	-	-	-	-	-



PONT 2
A 5900

	Q	O	B	Q	TOTAL
S1	-	-	-	-	-
S2	-	-	-	-	-
S3	-	-	-	-	-
TOTAL	-	-	-	-	-



PONT 1
A 2100/1600/2500

	Q	O	B	Q	TOTAL
S1	-	-	-	-	-
S2	-	-	-	-	-
S3	-	-	-	-	-
TOTAL	-	-	-	-	-

- PIPE ASCENDING
- PIPE DESCENDING
- SPRINKLER PUMP UNIT
- HI-FOG SPRINKLER HEAD FOR ACCOMMODATION AREA CSD-57C
- HI-FOG SPRINKLER HEAD FOR ACCOMMODATION AREA CSD-57C
- HI-FOG SPRINKLER HEAD FOR STONE AREA 100 TAC 500 1000A
- HI-FOG SPRINKLER HEAD 100 TAC 500 1000
- HI-FOG SPRINKLER HEAD FOR 100 TAC 500 1000 CSD-57C
- HI-FOG SPRINKLER HEAD FOR 100 TAC 500 1000 CSD-57C
- HI-FOG SPRAY HEAD 45 TAC 500 1000
- BALL VALVE
- FLOWING VALVE
- SPRINKLER SECTION VALVE
- ACCOMMODATION SECTION NO.
- RESTRICTION BLOCK
- T-PIECE
- PIPE: AISI 316 STAINLESS STEEL
- SIZE: 80x3.0
- SIZE: 1.5
- SIZE: 1.5
- SECTION UNIT

NO.	DESCRIPTION	Q	O	B	Q	TOTAL
1	HI-FOG SPRINKLER HEAD FOR ACCOMMODATION AREA CSD-57C	1	0	0	0	1
2	HI-FOG SPRINKLER HEAD FOR ACCOMMODATION AREA CSD-57C	1	0	0	0	1
3	HI-FOG SPRINKLER HEAD FOR STONE AREA 100 TAC 500 1000A	1	0	0	0	1
4	HI-FOG SPRINKLER HEAD 100 TAC 500 1000	1	0	0	0	1
5	HI-FOG SPRINKLER HEAD FOR 100 TAC 500 1000 CSD-57C	1	0	0	0	1
6	HI-FOG SPRINKLER HEAD FOR 100 TAC 500 1000 CSD-57C	1	0	0	0	1
7	HI-FOG SPRAY HEAD 45 TAC 500 1000	1	0	0	0	1
8	BALL VALVE	1	0	0	0	1
9	FLOWING VALVE	1	0	0	0	1
10	SPRINKLER SECTION VALVE	1	0	0	0	1
11	RESTRICTION BLOCK	1	0	0	0	1
12	T-PIECE	1	0	0	0	1
13	PIPE: AISI 316 STAINLESS STEEL	1	0	0	0	1
14	SIZE: 80x3.0	1	0	0	0	1
15	SIZE: 1.5	1	0	0	0	1
16	SIZE: 1.5	1	0	0	0	1
17	SECTION UNIT	1	0	0	0	1

NOTES

- LE SYSTEME A MOUSSE COMPREND DES MOYENS DE COMMANDE ET DE SURVEILLANCE DANS LES LOCAUX SUIVANTS' :

PC SECURITE': COMMANDE ET TABLEAU DE CONTROLE
VANNE D'ALIMENTATION PAR CIRCUIT INCENDIE

SALLE DE CONTROLE: TABLEAU DE CONTROLE

PASSERELLE: COMMANDE ET TABLEAU DE CONTROLE

SUR PLACE (LOCAL MOUSSE, PONT 2): COMMANDE ELEC. PRINCIPAL ET TABLEAU DE CONTROLE

NOTES

- THE FOAM SYSTEM HAS THE FOLLOWING CONTROL AND MONITORING STATION:

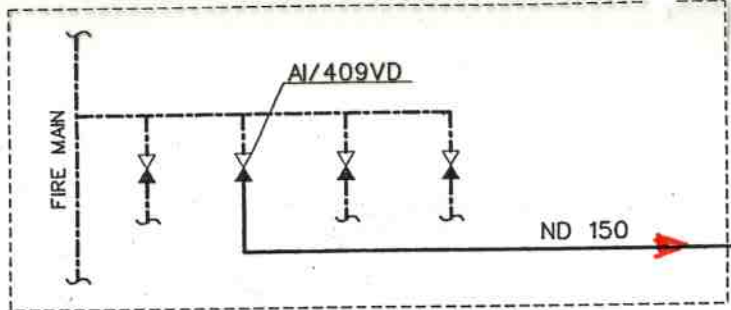
SAFETY ROOM: CONTROL AND MONITORING PANEL

FIRE SYSTEM WATER SUPPLY INTERCEPTION VALVE

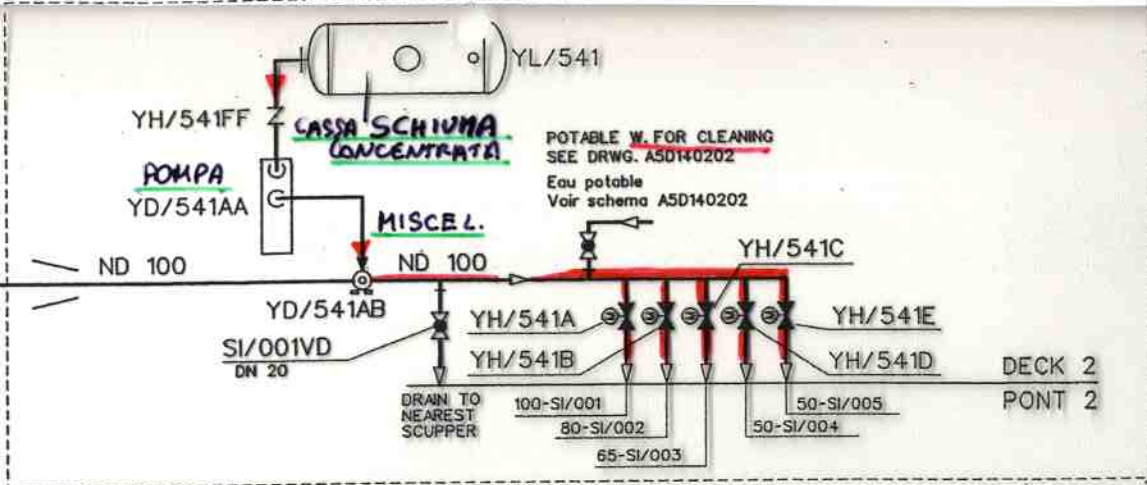
ENGINE CONTROL ROOM: MONITORING PANEL

WHEEL HOUSE: CONTROL AND MONITORING PANEL (PRIORITY CONTROL PANEL)

ON SITE (FOAM STATION DECK 2): MAIN ELECTRIC CONTROL AND MONITORING PANEL

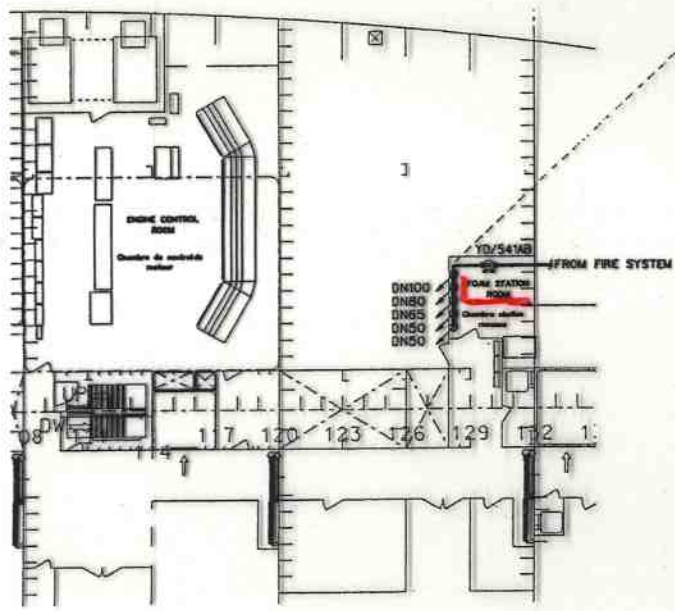


IN SAFETY ROOM (DECK 4 FR. 147-150)
SEE DRWG A5D210205 SHEET 20
La chambre sure (Pont 4 FR. 147-150)
Voir schema A5D210205 planche 20



IN FOAM ROOM
Chambre station mousse

PONT 2
A 5900



25.07.01	ADDED FOAM ROOM AS CONSTRUCTED	PT	CH	CB	
1	12.12.00	REVISED - ISSUE FOR APPROVAL	PT	CH	CB
	23.11.00	ISSUE	PT	CH	CB
		REVISIONS			
		DATE	REVISION	BY	APPV.
SILVANI ANTINCENDI S.p.A. Via REDIPUGLIA, 8 - 20010 BAREGGIO (MI) - ITALY FINECANTIERI S.p.A. HALL 6081		00-11-1700 L.O. D FINECANTIERI 00-1700DS1001 FILE 00-1700031001-00-02			
LOW EXPANSION FOAM SYSTEM FOR LOWER ENGINE FLOOR AREA - LAYOUT Systeme a mousse a basse expansion pour les aires de l'etage moteur inferieur - planimetrie					

Systeme a mousse a basse expansion pour les aires de l'etage moteur inferieur - planimetrie
 LOW EXPANSION FOAM SYSTEM FOR LOWER ENGINE FLOOR AREAS - LAYOUT

FINECANTIERI Cantieri Navali Italiani S.p.A. CONCESSIONE NAVI DA TRASPORTO	DISEGNO No. A5D230226 DRWD. No.	FOGLIO No. 06A SHEET No.
	COSTRUZIONI HULLS 6081	ALT. B - 06 JUNE 2002