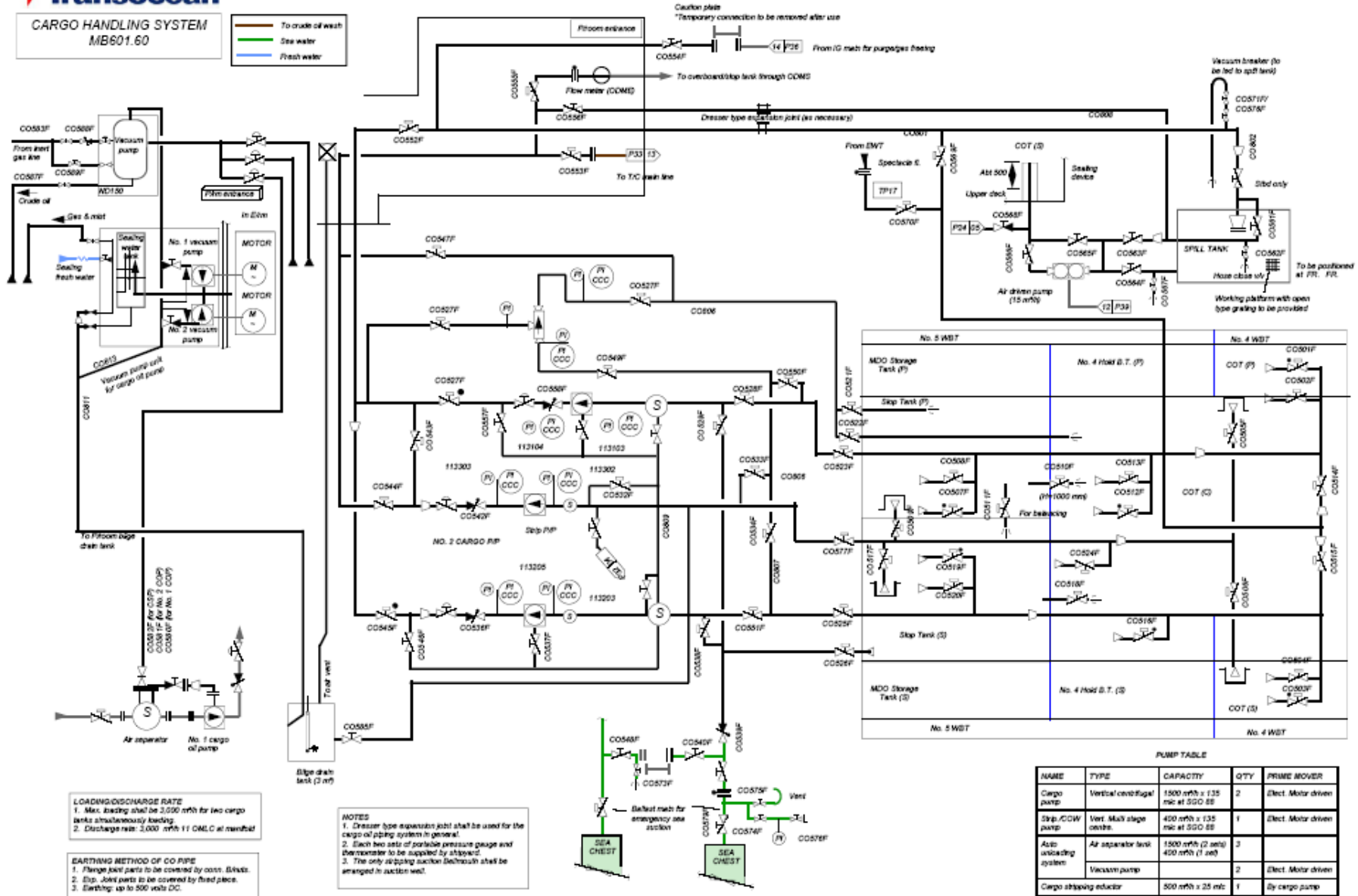


CARGO HANDLING SYSTEM
MB601.60

— To crude oil wash
— Sea water
— Fresh water

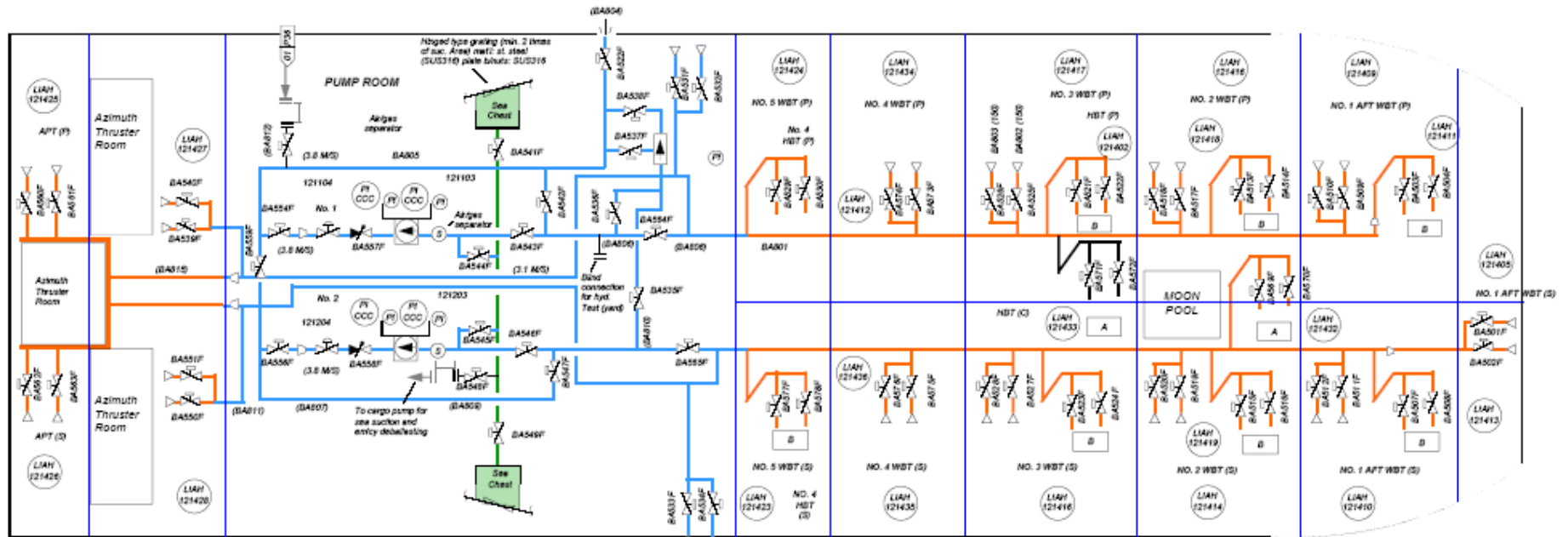


LOADING/DISCHARGE RATE
 1. Max. loading shall be 3,000 m³/hr for two cargo tanks simultaneously loading.
 2. Discharge rate: 3,000 m³/hr OMLC at normal

EARTHING METHOD OF CO PIPE
 1. Flange joint parts to be covered by caps. Ends.
 2. Slip joint parts to be covered by fixed piece.
 3. Earthing: up to 500 volts DC.

NOTES
 1. Dresser type expansion joint shall be used for the cargo oil piping system in general.
 2. Each two sets of portable pressure gauge and thermometer to be supplied by shipyard.
 3. The only stripping suction bellmouth shall be arranged in suction well.

NAME	TYPE	CAPACITY	QTY	PRIME MOVER
Cargo pump	Vertical centrifugal	1500 m ³ /hr x 135 msc at SGO SS	2	Elect. Motor driven
Slip, COW pump	Vert. Multi stage centrif.	450 m ³ /hr x 135 msc at SGO SS	1	Elect. Motor driven
Auto unloading system	Air separator tank	1500 m ³ (2 sets)	2	
	Vacuum pump	450 m ³ /hr (1 set)	1	Elect. Motor driven
Cargo strapping extender		500 m ³ x 25 msc	1	By cargo pump

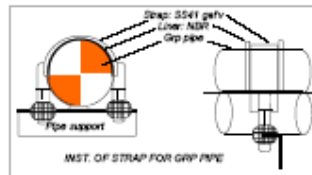


NOTE

- Design condition of pumps: Three (3) water ballast tanks are to be dewatered simultaneously by one (1) pump at stern tank.
- Grip steel shall be applied for the main and branch lines, T-pieces, bends and reducers in tank only. Bulkhead penetration piece: carbon steel with PE coating. Expansion joint & bellmouth: carbon steel with an epoxy coating.
- Pipe material:
 - Steel with an epoxy coating
 - Grip
- Four (4) sets of portable lifting lugs (LIG) shall be provided for maintenance of B/F valves in water ballast tanks.
- Only shutoff valves to be provided with direct position indication at the valve actuator.

Steel with an epoxy coating
Grip

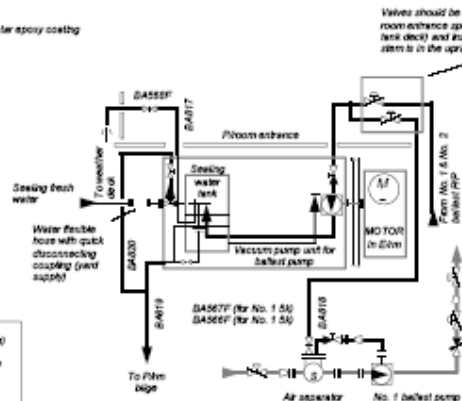
Valves should be located in the p/ room entrance space (above CO tank deck) and installed so that the stem is in the upright position



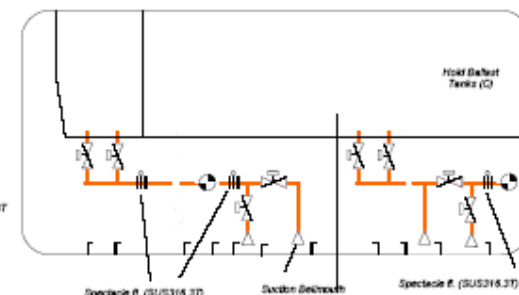
NAME	TYPE	CAPACITY	QTY	DRIVE MOTOR
Ballast pump	Vertical centrifugal	2300 m ³ /h @ 27 mwc @ 50 / 60 Hz	2	50. Motor drive
Ballast valve	-	150 m ³ /h @ 16 MPa	1	Ballast pump
Sea/Ballast valve	Air separator tank	2300 m ³ /h	2	-
	Receiver pump	-	1	50. Motor drive

BALLAST SYSTEM MB601.10

- Seawater suction (steel pipe)
- Ballast glass reinforced pipe
- Ballast steel pipe



Ballast overboard passing through No. 4 WBT deck above water level in the dewater section



11.1 BALLAST

OVERVIEW

- (a) The drillship is fitted with a segregated water ballast system, which in normal operation handles only clean sea water. During emergency conditions provision is made to join the ballast and cargo systems by manually inserting a suction spool piece between valve VA S48F on the ballast system and valve CO S40F on the cargo system. (Refer to drawings MB601.60, Cargo and MB601.10 Ballast System).

Note: For future operations some of the existing ballast tanks may be used for cargo oils storage during extended well test operations.

Water Ballast Tanks

COMPARTMENT	LOCATION (FR. NO.)	CAPACITIES		100% FULL		MAX. MT OF INERTIA (M**4)
		VOLUME 100% FULL (m**3)	WEIGHT 100% FULL (TONNES)	L.C.G. FROM A.P. (M)	V.C.G. ABOVE B.L. (M)	
NO.1 HOLD B. TANK (P)	94-102	2291.3	2348.6	164.005	8.536	3980
NO.1 HOLD B. TANK (S)	94-102	2291.3	2348.6	164.005	8.536	3980
NO.2 HOLD B. TANK (C)	89-94	3332.3	3415.6	139.200	11.209	2592
NO.2 HOLD B. TANK (P)	84-94	6451.1	6612.3	131.200	11.198	5183
NO.2 HOLD B. TANK (S)	84-94	6451.1	6612.3	131.200	11.198	5183
NO.3 HOLD B. TANK (C)	77-84	2699.4	2766.9	101.670	8.703	3628
NO.3 HOLD B. TANK (P)	77-84	4515.7	4628.6	104.000	11.198	3628
NO.3 HOLD B. TANK (S)	77-84	4515.7	4628.6	104.000	11.198	3628
NO.4 HOLD B. TANK (P)	67-71	2580.4	2644.9	67.200	11.198	2073
NO.4 HOLD B. TANK (S)	67-71	2580.4	2644.9	67.200	11.198	2073
NO.1 FWD W.B. TANK (C)	106-133	1512.7	1550.5	195.175	1.464	44645
NO.1 AFT W.B. TANK (P)	94-106	3400.2	3485.2	165.164	5.779	26306
NO.1 AFT W.B. TANK (S)	94-106	3400.2	3485.2	165.164	5.779	26306
NO.2 W.B. TANK (P)	84-94	2852.0	2923.3	131.976	5.433	17980
NO.2 W.B. TANK (S)	84-94	2852.0	2923.3	131.976	5.433	17980
NO.3 W.B. TANK (P)	77-84	2189.6	2244.4	103.998	5.076	17279
NO.3 W.B. TANK (S)	77-84	2189.6	2244.4	103.998	5.076	17279
NO.4 W.B. TANK (P)	71-77	1878.1	1925.1	83.200	5.079	14818
NO.4 W.B. TANK (S)	71-77	1878.1	1925.1	83.200	5.079	14818
NO.5 W.B. TANK (P)	62-71	2243.8	2299.9	62.055	5.115	16684
NO.5 W.B. TANK (S)	62-71	2243.8	2299.9	62.055	5.115	16684
NO.6 W.B. TANK (P)	13-62	3590.5	3680.3	29.446	5.327	23462
NO.6 W.B. TANK (S)	13-62	3588.0	3677.7	29.436	5.330	23462
A.P. TANK (P)	0-13	2137.5	2190.9	5.158	12.771	5006
A.P. TANK (S)	0-13	1718.6	1761.6	5.075	12.378	4965
TOTAL		75383.4	77268.1			

- (b) Major components of the system are as follows:

- 1: Suction and discharge ring main pipework, 500 mm diameter, connecting to both pumps and the stripping eductor.
- 2: Ballast pumps (2) electro-driven (11 kV) two speed vertical centrifugal, capacity 2500 m³/h @ 25 m head, with SG of 1.025.
- 3: Ballast stripping eductor, driven by the ballast pumps and discharging directly overside, capacity 700 m³/h @ 16 metre head.
- 4: Auto deballast system featuring an air separation unit on to the suction pipework of each pump. An electro driven vacuum pump takes suction from the top of the separation tank and removes any entrapped air.

Note: All pumps are fitted in the cargo pump room, with electric driven motors located in the engine room. Pumps and motors are connected by drive shafts which pass through gas tight seals fitted to the dividing bulkhead.

- 5: Remote operated hydraulic valves, identified by unique numbers and controlled by using a dedicated mimic panel in the Nautronics Integrated Alarms and Control System.

- (c) Ballast Tank branch Lines 150mm and 300mm diameter.

Hold tanks feature open ended pipes fitted with filters, but double bottom tanks feature suction bellmouths.

- (d) Ballast is discharged overboard on the port side only, using a pipe which passes through No. 4 water ballast tank and discharges approximately 0.5 m above the water line, at the normal working draft of 8.5 m.

- (e) Two sea chests are fitted at port and starboard sides of the pump room which can be used to take sea suction and load extra ballast as required. A third one is on the cargo oil system (stbd side) which is blanked off but could be used as emergency ballast.

Note: The overboard discharge from the ballast system is not fitted with an oil-in-water monitoring unit.

11.1.2 CONTROL OF BALLAST SYSTEM

OVERVIEW

- (a) The stop/start of the ballast pumps and the operation of suction and discharge valves is controlled by the dedicated mimic in the IACS and the following parameters are monitored and controlled;

- ♦ performance monitoring
- ♦ start interlock
- ♦ operation of the gas extraction valves fitted to the air separator units (No.1, BA 506F, No.2 BA 544F)
- ♦ automatic ballast pump control
- ♦ safety trip system