

SYMBOL KEY	
	CENTRIFUGAL PUMP WITH ELECTRICAL MOTOR (P)
	CYCLONE SEPARATOR (CY)
	FLOWMETER (FT)
	GLOBE VALVE (GV)
	AIR ACTUATED SOLENOID VALVE (SV)
	NORMALLY CLOSED BALL VALVE (BV)
	NORMALLY OPEN BALL VALVE (BV)
	PRESSURE TRANSMITTER (PT)
	PRESSURE SNUBBER (INTEGRAL TO PRESSURE TRANS.)
	COMBINED FLOW METER + TEMPERATURE TRANSMITTER

NOTES

- GENERAL**
 - ONE SYSTEM REQUIRED PER SHAFT
 - SUITABLE FOR 440-480V/3PH/60HZ FROM 2 SUPPLIES.
 - ALL PIPEWORK, VALVES AND TANKS OUTSIDE DOTTED LINE ARE CUSTOMER SUPPLY.
 - ALL CUSTOMER CONNECTING PIPEWORK SHALL BE SUPPORTED AND NOT IMPOSE LOADS ON THE SYSTEM PIPING.
 - ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED.
 - CUSTOMER INTERCONNECTION PIPEWORK TO BE 90/10 Cu-Ni (FROM PRE-STRAINER TO STERN TUBE).
 - CUSTOMER SUPPLY OUTLET & SEA SUCTION PIPES TO BE THE SAME SIZE OR LARGER DIAMETER THAN SYSTEM.
 - PURGE LINE PIPEWORK SHALL BE HORIZONTAL OR DOWNWARDS. ANY NORMALLY OPEN ISOLATION VALVES SHALL BE FULL BORE TYPES.
 - CUSTOMER INTERFACING PIPEWORK TO FEATURE FLEXIBLE HOSES / BELLOWS.
 - PRIOR TO WQS COMMISSIONING THOROUGHLY FLUSH UP AND DOWNSTREAM PIPEWORK. NO SOLIDS > 200µm ARE PERMISSIBLE.
 - WQS POSITIONING - NO HIGHER THAN 2m ABOVE THE TAILSHAFT CENTRELINE.
 - THE DUPLICATED POWER SUPPLY SHALL BE SOURCED FROM DISTRIBUTION SYSTEMS LOCATED ON EITHER SIDE OF THE MAIN SWITCHBOARD AS IS THE STANDARD PHILOSOPHY FOR OTHER REDUNDANT COMPONENTS AND SYSTEMS SUPPORTING MAIN PROPULSION FUNCTIONS.
 - PROPULSION START TO BE INTERLOCKED WITH SYSTEM START BY CUSTOMER
 - FOR TAIL SHAFT WITHDRAWAL EXTENSION (TWSE) NOTATION THE RELEVANT CLASS RULES SHALL BE COMPLIED WITH. CONSULT SYSTEM PROVIDER.
 - CUSTOMER TO SUPPLY COMPRESSED AIR TO ACTUATORS, DRY AND FILTERED TO 50 MICRONS.
 - INTERLOCKS:
 - NO START IF CRITICAL ALARM PRESENT
 - ENGINE SPEED RESTRICTION IF CRITICAL ALARM IS TRIGGERED DURING OPERATION
- BASE SKID**
 - PUMP 1 ACTIVE, PUMP 2 STANDBY FOR SYSTEM REDUNDANCY.
 - EACH PUMP IS COMPLETE WITH AN IP54 RATED, 2 POLE ELECTRIC MOTOR ARRANGED FOR ONBOARD VESSEL ELECTRICALS AND IS RATED TO 50°C AMBIENT TEMPERATURE.
 - SUPPLIED PIPEWORK CONNECTIONS ARE WELD NECK (90/10 CuNi) TO ALLOW FOR BUTT WELD CONNECTION BY CUSTOMER.
 - CYCLONE SEPARATOR WILL INTERMITTENTLY PURGE
 - THE SYSTEM HAS A DEDICATED CONTROL PANEL
 - AUTOMATIC SWITCH OVER OF THE PUMP IS CONTROLLED BY THE CONTROL PANEL.
 - CONTROL PANEL IS SUPPLIED MOUNTED ON BASE SKID
 - CONTROL PANEL WILL PROVIDE:
 - OPTION OF AUTO / MANUAL RUN PUMP 1 / PUMP 2
 - AUTO CHANGE OF PUMP IN EVENT OF LEAD PUMP FAULT / FAILURE.
 - ALTERNATE RUNNING ON EACH START / STOP CYCLE (FLIP / FLOP).
 - SKID TO BE LIFTED USING SUPPLIED LIFTING EYE.
 - SKID COLOUR: RAL 5019. ALL INSTRUMENTATION IS SELF COLOUR.
 - DEVICES TO BE IDENTIFIED WITH SELF-ADHESIVE LABELS.
 - ALL CABLING LOW SMOKE ZERO HALOGEN (LSZH).
 - INDICATION LAMPS FOR CONTROL PANEL TO BE FOLLOWING COLOURS:
 - POWER - WHITE
 - RUNNING - GREEN
 - CRITICAL ALARM - RED
 - WARNING ALARM - ORANGE

NOTES CONT..

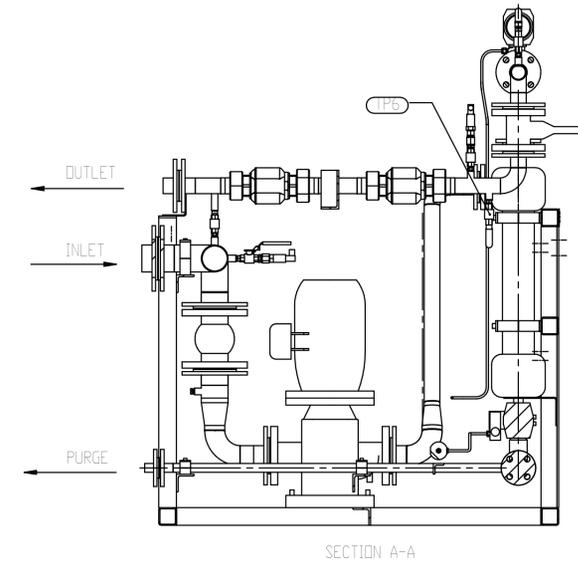
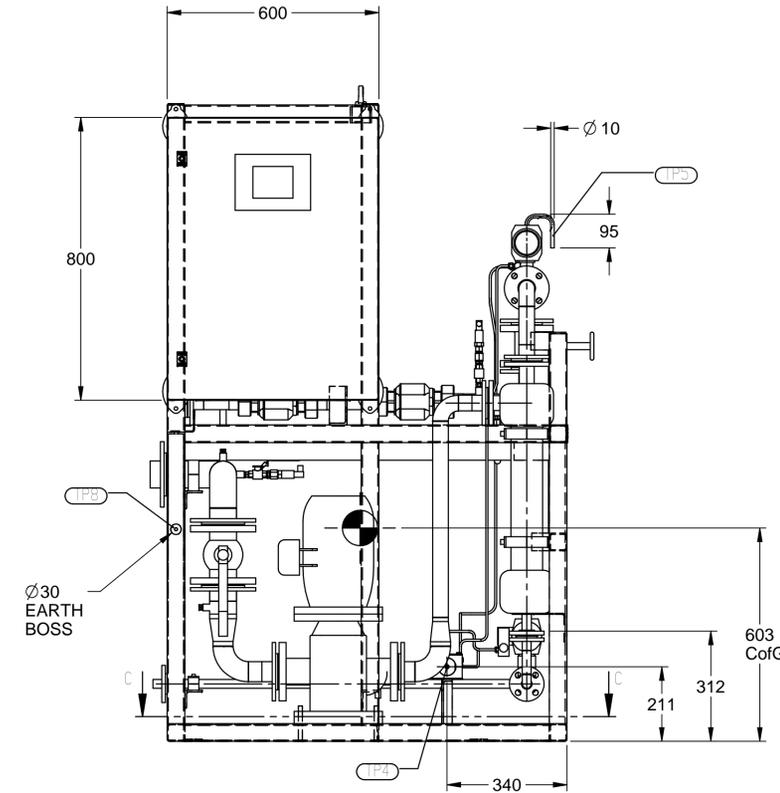
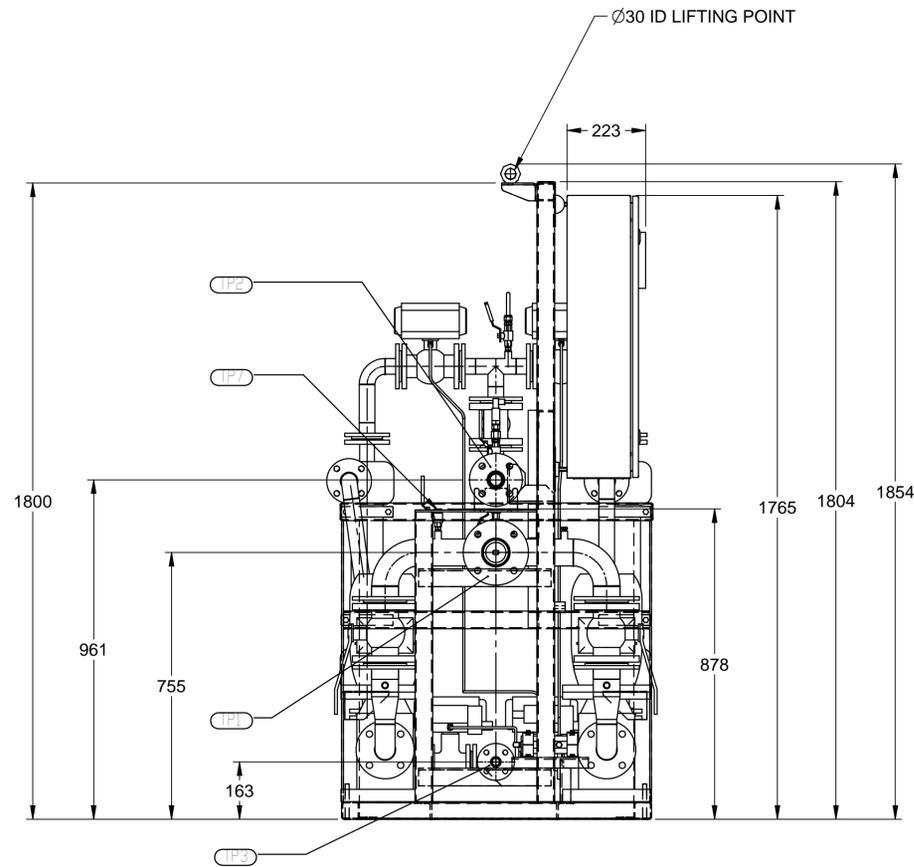
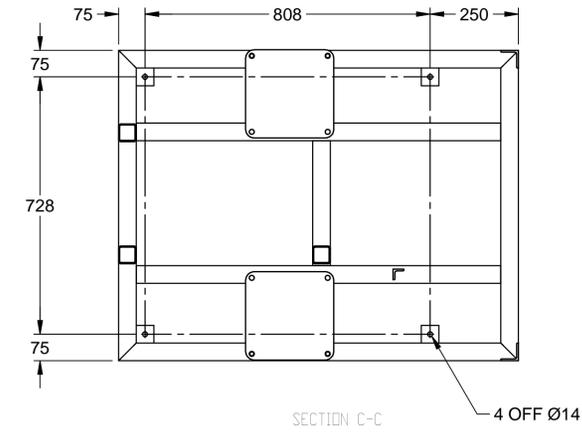
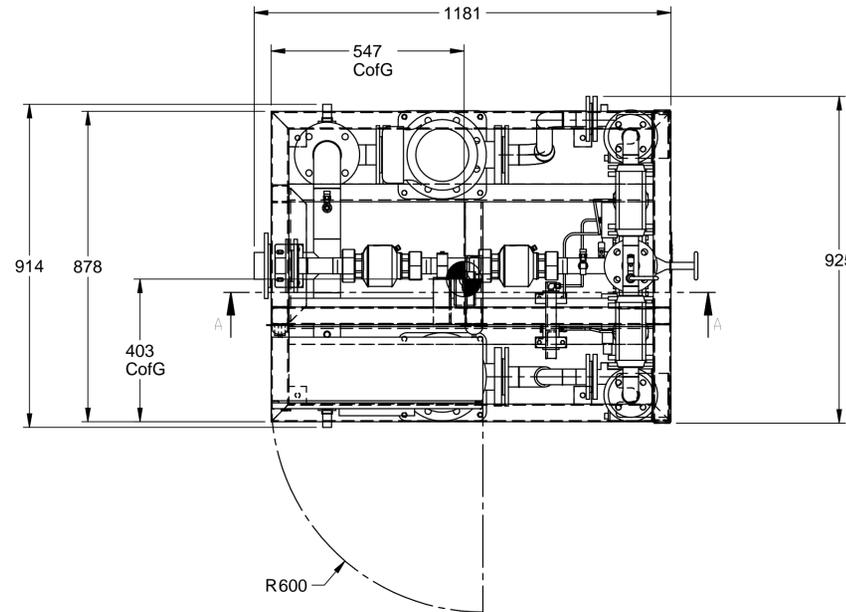
- FLOW METER**
 - FLOW METER ALARMS TO BE SET TO MIN FLOW REQUIRED AND TO ALARM ON FALLING FLOW.
 - FLOW METER WILL PROVIDE REMOTE SIGNALS TO CONTROL PANEL.
- ALARMS**
 - TWO VOLT FREE CONTACTS:
 - CONTACT 1 - INDICATES A WARNING ALARM STATE
 - CONTACT 2 - INDICATES A CRITICAL ALARM STATE
 - MODBUS TCP/IP COMS (SEE CONTROL PHILOSOPHY).
- WEIGHT**
 - DRY WEIGHT OF SKID - 400 KG.
 - THE MASS VALUE SHOWN IS NOT CONTRACTUALLY BINDING.
- SEPARATION PERFORMANCE**

MATERIAL	TYPICAL RELATIVE DENSITY [g/cm³]	SEPARATION EFFICIENCY FOR 75µm PARTICLE [%]
EARTH / SILT / SOIL	1.7	90
SAND / SILICA / SHALE	2.6	95
METALLIC PARTICLES	>7	98

INSTALLATION

CLASSIFICATION	LR	1ST ANGLE:	ACCESS CODE:	OWNER:	YARD:	CUSTOMER:
NOTATION	-		6	-	-	CCG
VENDOR REFERENCE No.	HLS 30422	VESEL NAME:		Terry Fox	USED ON:	Icebreaker
ENQUIRY FORM	TD-18564	REF/FUNC. LOC.:		100015596		
CONTROL PHILOSOPHY	-	DRAWN BY:		R. STRICKLAND	CHECKED BY:	G. WELLER
ELECTRICAL DRG No.	-	MAX. MASS:		-		
SEAL GA DRG No.	H30850-01 & -02	DRAWN DATE:		12 FEB 2018	DATE REVISED:	4 JUL 2018
BEARING GA DRG Nos.	H31429-01 & 30-01	SHEET:		1 OF 3		
SHAFT SIZE, mm	Ø838 - Ø800	SEAL CODE/BASED ON:				
MAX COOLING FLOW RATE, L/Min	210 (189 & 21)	H31924-01				
NOM COOLING FLOW RATE, L/Min	155 (139 & 16)	<p>Wartsila UK Ltd., 4, Marples Way, Havant, Hampshire, PO9 1NX, UK</p> <p>The information contained in this document is the property of Wartsila UK Ltd and must not be disclosed without written consent. Title to information is neither sold or transferred and document is subject to return upon demand. Values in this document are not binding. Right of alteration reserved.</p> <p>© 2018 Registered Number: 1004816 Registered Office: Wartsila UK Ltd., Havant, Hampshire, UK</p>				
MIN COOLING FLOW RATE, L/Min	140 (126 & 14)					
MAX. COOLING FLOW TEMP., °C	40					
STERNTUBE TYPE	OPEN					
STERNTUBE FLUID	SEA WATER	TITLE:				
		GA OF WQS OPEN WATER (P&ID)				
		SIZE:		DRAWING NUMBER:		REV:
		A1		H32023-01		B

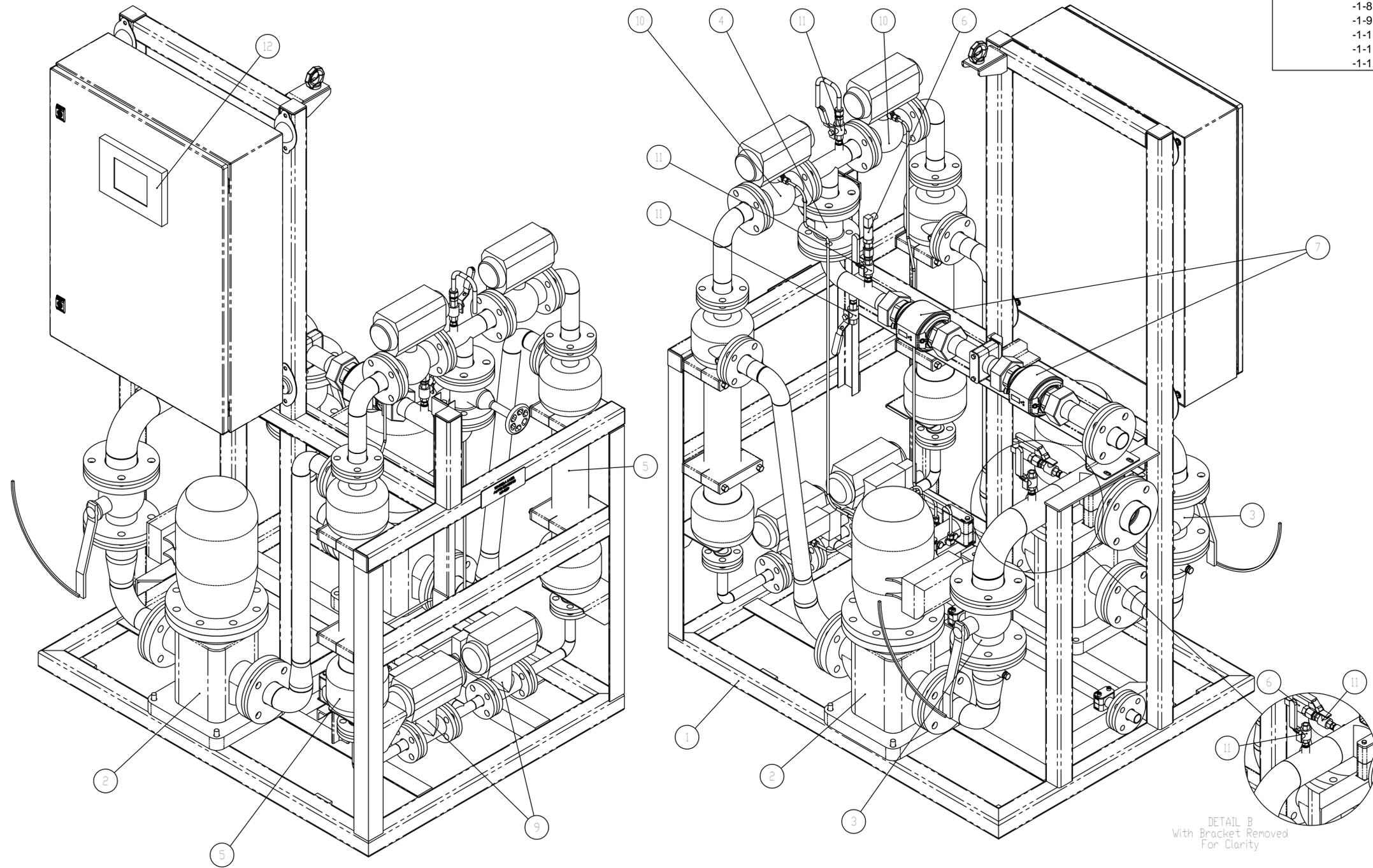
CONNECTION	DESCRIPTION	SIZE	PIPE OD	WALL THICKNESS
TP1	SEA WATER INLET	DN65	Ø76	2
TP2	SYSTEM OUTLET	DN40	Ø44.5	1.5
TP3	CYCLONE PURGE	DN20	Ø25	1.5
TP4	AIR INLET	RP1/4" - 6H	-	-
TP5	VENT	10mm OD TUBE	Ø10	1
TP6	SAMPLE POINT	RP1/4" - 6H	-	-
TP7	AIR PURGE POINT (COMMISSIONING) & RAW WATER TEST POINT	RP1/4" - 6H	-	-
TP8	EARTH	M12	-	-



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STERNTUBE TYPE	OPEN					
STERNTUBE FLUID	SEA WATER					

DRAWING POSn	DESCRIPTION	MATERIAL	QTY
H32023-01 -1	WQS ASSY	STEEL	1
-1-1	SKID	STEEL	1
-1-2	PUMP	STEEL	2
-1-3	BALL VALVE (DN65)	BRONZE	2
-1-4	BALL VALVE (1 1/4")	BRONZE	1
-1-5	CYCLONE SEPARATOR	ST. STEEL	2
-1-6	PRESSURE TRANSMITTER	ST. STEEL	2
-1-7	FLOW TRANSMITTER	ST. STEEL	2
-1-8	MANIFOLD BLOCK	ST. STEEL	1
-1-9	BALL VALVE (3/4")	BRONZE	2
-1-10	BALL VALVE (1 1/4")	BRONZE	2
-1-11	BALL VALVE (1/4")	ST. STEEL	5
-1-12	CONTROL PANEL (SUPPLIED LOOSE)	STEEL	1



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