

**CERTIFICATES OF COMPETENCY IN THE MERCHANT NAVY
MARINE ENGINEER OFFICER**

STCW 78 as amended MANAGEMENT ENGINEER REG. III/2 (UNLIMITED)

040-36 - ENGINEERING, SYSTEMS AND SHIP'S DRAWINGS

WEDNESDAY, 19 OCTOBER 2022

1315 - 1615 hrs

Materials to be supplied by examination centres

Candidate's examination workbook
Graph paper

Examination Paper Inserts

DRG - 130
DRG - 131
DRG - 132
DRG - 133
DRG - 134

Notes for the guidance of candidates:

1. Examinations administered by SQA on behalf of the Maritime & Coastguard Agency
2. Candidates are required to obtain 50% of the total marks allocated to this paper to gain a pass **AND** also obtain a minimum 40% in Sections A and B of the paper.
3. Non-programmable calculators may be used.
4. All formulae used must be stated and the method of working and ALL intermediate steps must be made clear in the answer.



ENGINEERING, SYSTEMS AND SHIP'S DRAWINGS

Attempt ALL questions

Marks for each part question are shown in brackets

All formulae used must be stated and the method of working and ALL intermediate steps must be made clear in the answer

Section A

1. DRG.130

State what EACH of the following items are and describe their function in the illustrated system:

(a)



(2)

(b)



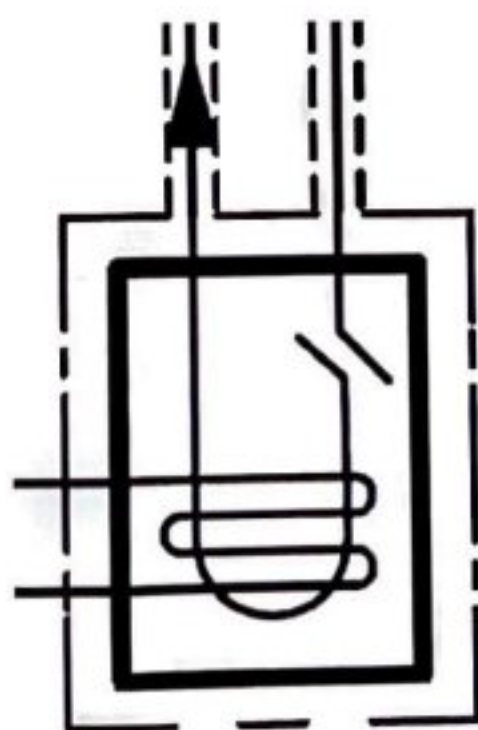
(2)

(c)



(2)

(d)



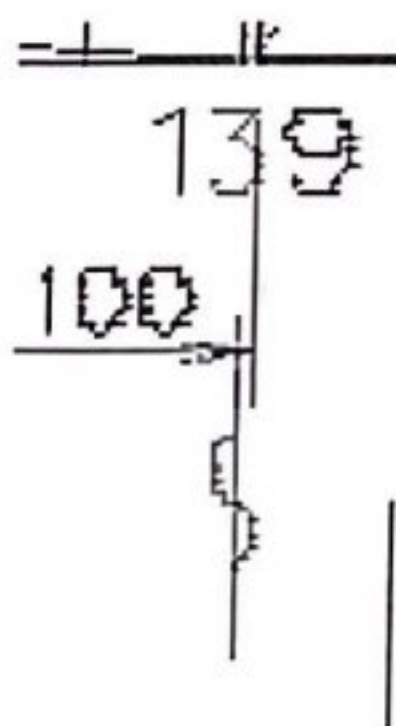
(4)

2. DRG.131

- (a) Describe how it can be determined if the valve is in the open or closed position by external observation. (2)
- (b) State the operating handles position in relation to the pipeline when the valve is open and describe how this was ascertained. (2)
- (c) State the function of detail 'A' and describe how it fulfils this function. (2)
- (d) State the function of detail 'B' and describe how it fulfils it's function. (2)
- (e) State how the valve is prevented from moving in service. (2)

3. DRG.132

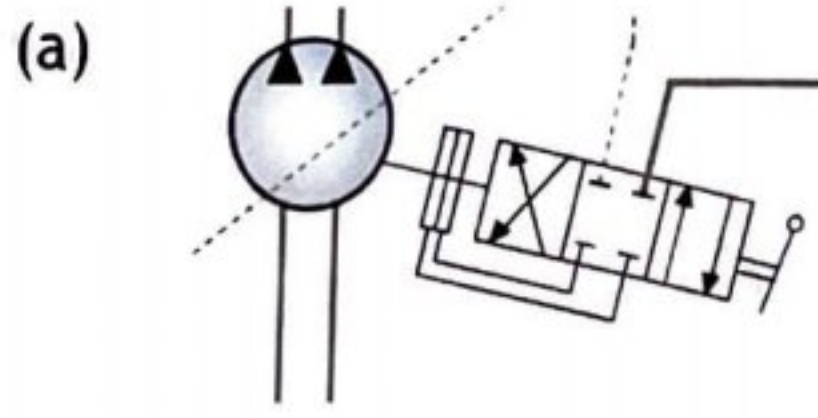
- (a) State the approximate loaded draft of the vessel. (2)
- (b) State the longitudinal location of the collision bulkhead. (2)
- (c) State the thickness of the heaviest plate section evident on the illustration. (2)
- (d) State the maximum sounding of No.3 S.W.B.Tk (P&S) (2)
- (e) State what the following item illustrates:



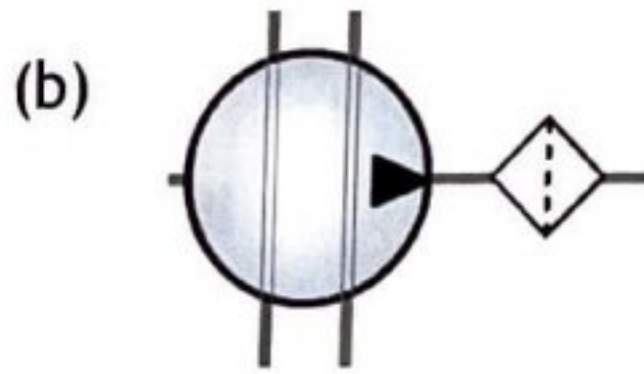
(2)

4. DRG.133

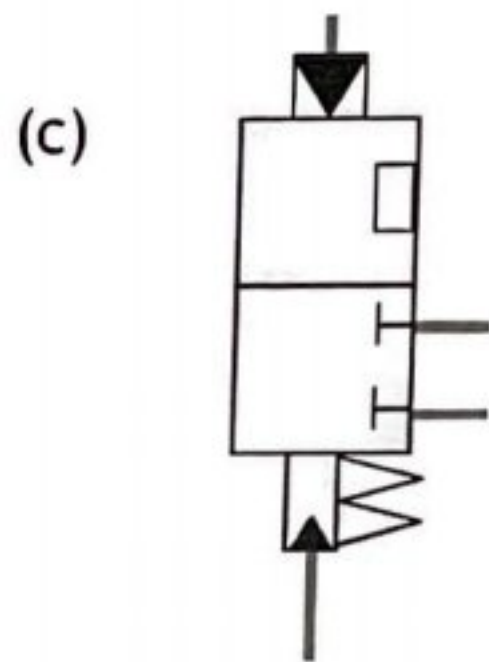
State what EACH of the following items are and describe their function in the illustrated system:



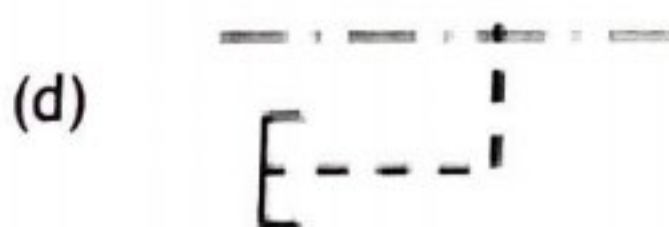
(2)



(2)



(2)



(2)



(2)

5. DRG.134

(a) State what EACH of the following items are and describe their function in the illustrated circuit.



(b) State what equipment the illustrated circuit is designed for. (2)

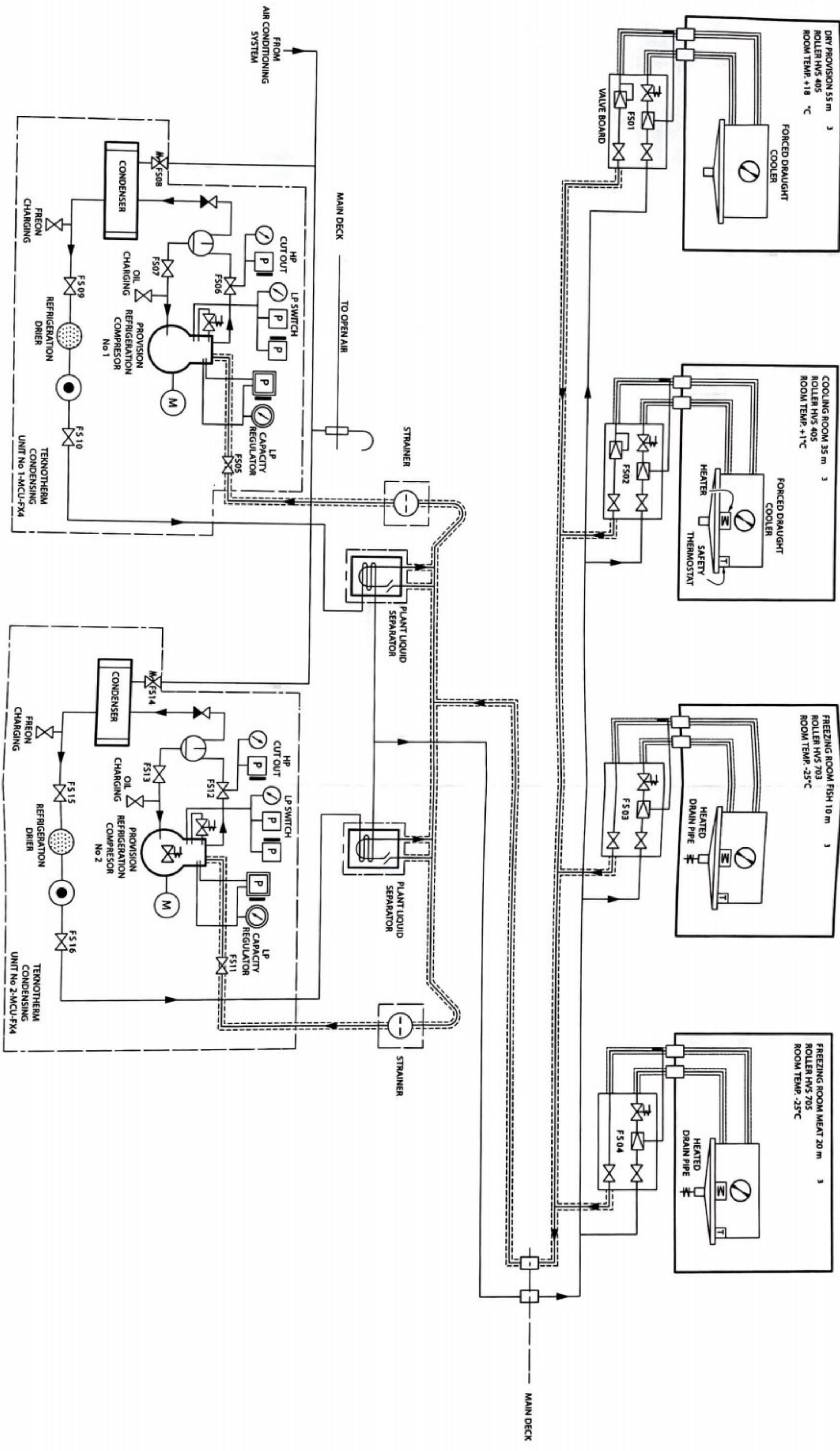
Section B

6. DRG.134

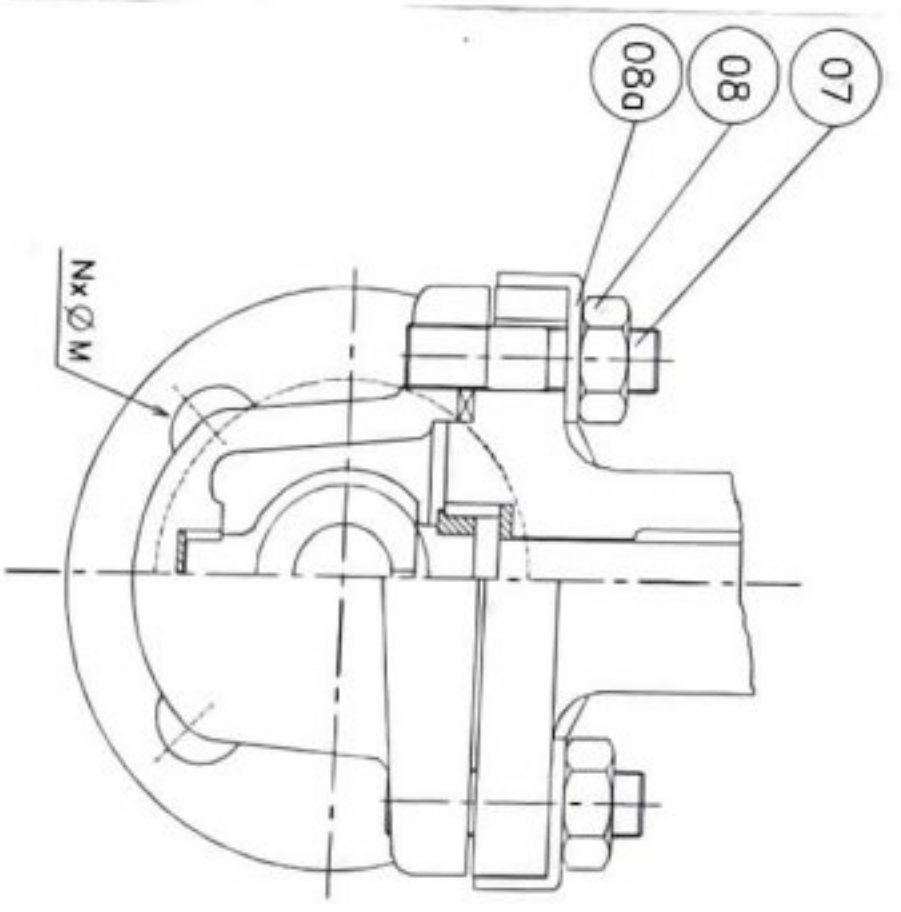
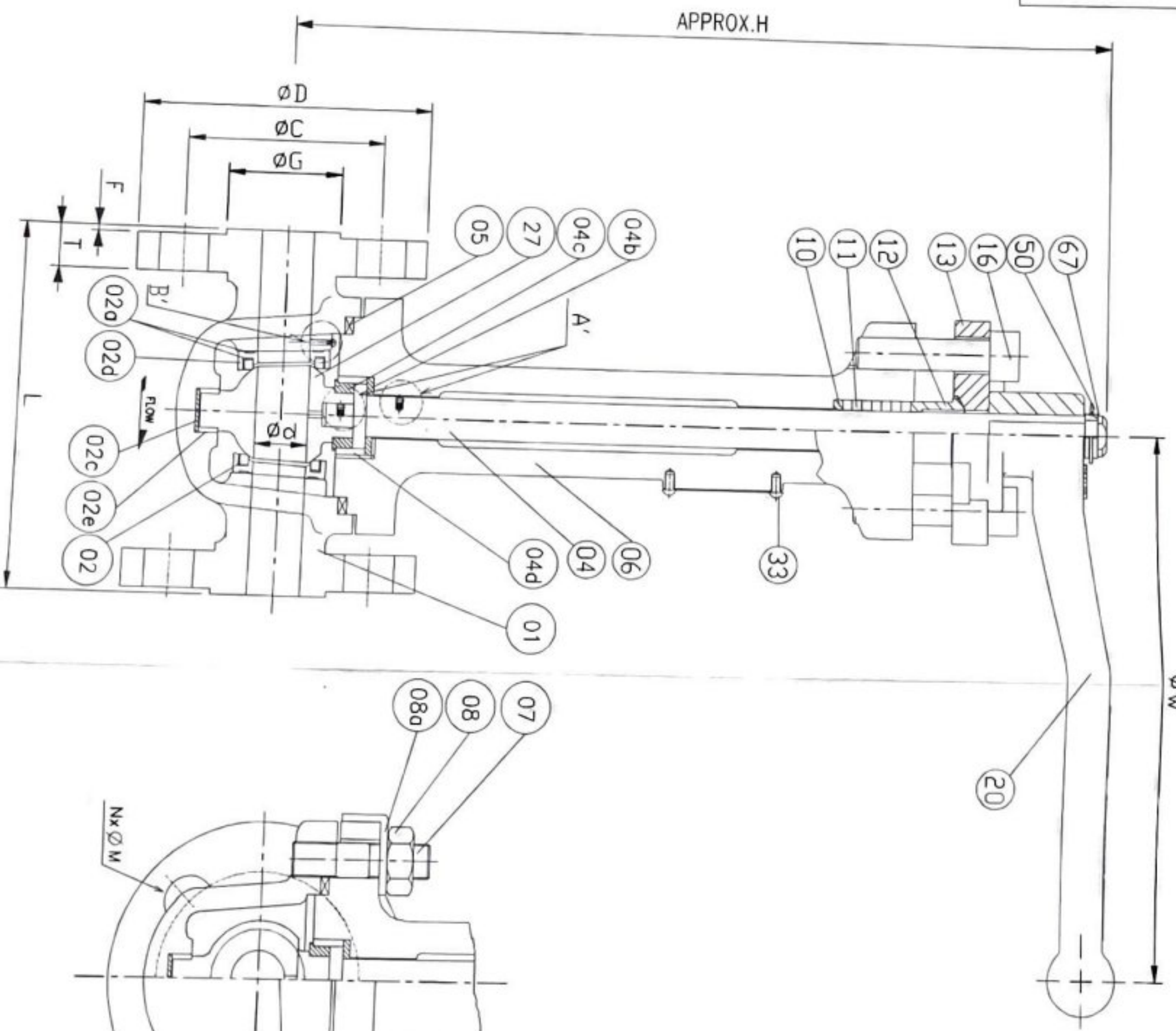
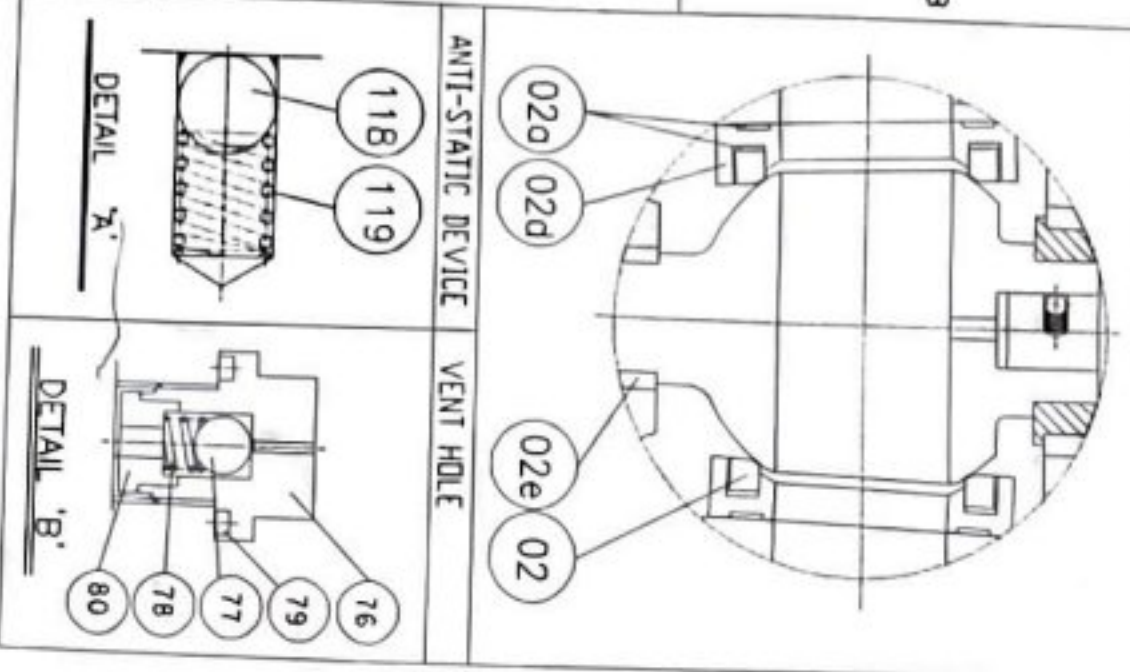
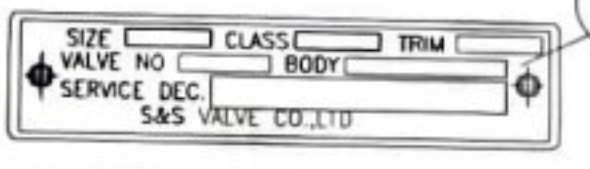
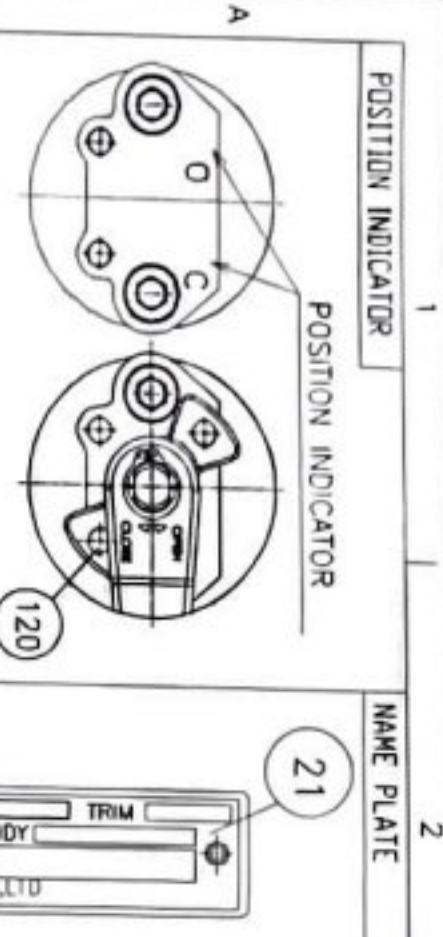
- (a) Describe the state of the contactors connected to the supply line for the motor, when 43SH is closed and the motor is not running. (5)
- (b) Using drawing references, describe the sequence of automated actions that occur when the start button is pressed. (15)
- (c) Describe the automated actions that occur when the motor is running. (5)

7. DRG.133

- (a) Describe the functions of the auxiliary pumps in the illustrated circuit. (5)
- (b) Using drawing references, describe the flow paths and operation of the illustrated circuit. (10)
- (c) Describe the effects of the low level switch being activated on No.2 oil tank when both systems were operational. (10)



DRG. 131



NO	PART NAME	MATERIAL	Q'TY	REMARK
119	MINI SPRING	SUS 316	2	
120	LOCK	SUS 316	1	

NO	PART NAME	MATERIAL	Q'TY	REMARK
01	BODY	A351-CF8M	1	
02	SEATING	PTFE	2	
02a	SHEET GASKET	GRAPHITE	4	
02c	BUSHING WASHER	PTFE	1	
02d	STOP RING	A276-316	2	
02e	BUSHING GUIDE	PTFE	1	
04	STEM	A276-316 COND B	1	
04b	SLEEVE WASHER	PTFE	1	
04c	BALL GUIDE	A276-316	1	
04d	GUIDE	PTFE	1	
05	GASKET	GRAPHITE+AISI 316	1	
06	BONNET	A351-CF8M	1	
07	BONNET BOLT	A320-B8M CL. 2	4	
08	BONNET BOLT NUT	A194-BM	4	
08a	WASHER	SUS 316	4	
10	PACKING WASHER	A276-316	1	
11	PACKING	V-GRAPHITE	1SET	
12	GLAND	A276-316	1	
13	GLAND FLANGE	A351-CF8M	1	
16	GLAND BOLT	A193CG-B8M	2	
20	HANDLE	A351-CF8M	1	
21	NAME PLATE	SUS 316	1	
27	BALL	A276-316	1	
33	SCREW BOLT	SUS 316	2	
50	SNAP RING	SUS 316	1	
67	GUIDE HOLDER	A276-316	1	
76	BALL GUIDE	A276-316	1	
77	BALL	SUS 316 + ENP	1	
78	SPRING	SUS 316	2	
79	BOLT SHEET GASKET	GRAPHITE	1	
80	SPRING COVER	A276-316	1	
118	MINI BALL	SUS 316	2	

NOTES
 1 RF FLANGE END: ASME B16.5
 2 ALL DIMENSIONS ARE IN MILLIMETERS
 3 FIRE SAFETY DESIGN
 4 TEST TEMP: -196°C

ITEM	TEST FLUID	TEST PRESSURE
SHEEL TEST	N2	15 bar
SEAT TEST	N2	11 bar
CRYOGENIC TEST	He	10 bar

NO.	DATE	DESCRIPTION	PRE	CHE	REV.	APP.
△	2014.06.20	FOR APPROVAL	Y.S.KIM			C.W.JUNG
△	2013.06.28	FOR APPROVAL	S.K.JUNG			C.W.JUNG
△	2012.09.19	FOR APPROVAL	S.K.JUNG	C.W.JUNG		Y.K.OH

VALVE NO	Q'TY	SIZE	H	W	L	d	C	G	D	T	F	NxØM	WEIGHT (KG)
32	2'(50A)	418	260	216	49	120.7	92	152.4	15.9	16	4x19.1		20

VALVE NO. : CR-105, CR-106, CR-205, CR-206, CR-305, CR-306, CR-405, CR-406, NC-105, NC-107, NC-111, NC-112, NC-117, NC-119, NC-205, NC-207, NC-211, NC-212, NC-217, NC-219, NC-305, NC-307, NC-311, NC-312, NC-317, NC-319, NC-405, NC-407, NC-411, NC-412, NC-417, NC-419

NO. 1 CARGO TANK

