

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

EXAMINATIONS ADMINISTERED BY THE
SCOTTISH QUALIFICATIONS AUTHORITY
ON BEHALF OF THE
MARITIME AND COASTGUARD AGENCY

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

040-36 - ENGINEERING, DRAWING AND SHIP SYSTEMS

WEDNESDAY, 18 JULY 2018

1315 - 1615 hrs

Examination paper inserts:

DRG - 028
DRG - 029
DRG - 031
DRG - 033
DRG - 036

Notes for the guidance of candidates:

1. 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.
2. Non-programmable calculators may be used.
3. All formulae used must be stated and the method of working and ALL intermediate steps must be made clear in the answer.

Materials to be supplied by colleges:

Candidate's examination workbook

ENGINEERING, DRAWING AND SHIP SYSTEMS

Attempt ALL questions

Marks for each part question are shown in brackets

Section A

1. Piping Systems - DRG. 028

- (a) Describe the device and the function for the following symbol: (2)



- (b) List the tanks that can be used to supply the main boiler burner. (2)
- (c) State the discharge options when using the sludge transfer pump. (2)
- (d) Describe why there are THREE different lines cross-connecting the supply and return for the boiler burner. (2)
- (e) State the purpose of valve 40V296005 located on branch from main fuel oil inlet line. (2)

2. Mechanical Assembly - DRG 029

- (a) State item '152', describing how it works. (2)
- (b) State what pump view is illustrated. (2)
- (c) State item '503', describing its purpose. (2)
- (d) Describe the least intrusive procedure for replacement of the rotor, assuming the pump is removed from situ. (4)

3. Ship's Construction Drawing - DRG 031

- (a) State the type of rudder that is fitted to the vessel. (2)
- (b) State at what frame number the engine room fore bulkhead is located. (2)
- (c) State the depth of the double bottom under the main engine, and what transverse frames it runs between. (2)
- (d) State the length of the plate section located between frames 45 and 50, and show how this was ascertained. (4)

4. Hydraulic and Pneumatic System Drawings - DRG. 033

Describe the device and the function for EACH of the following symbols:

(a)



(2)

(b)



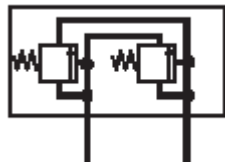
(2)

(c)



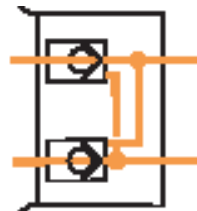
(2)

(d)



(2)

(e)



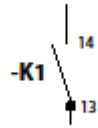
(2)

5. Electrical Power Systems and Control Drawings - DRG 036

(a) State the purpose of the circuit shown. (2)

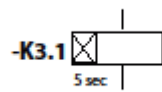
(b) State the device and the function, for EACH of the following symbols:

(i)



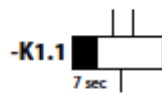
(2)

(ii)



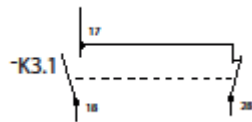
(2)

(iii)



(2)

(iv)



(2)

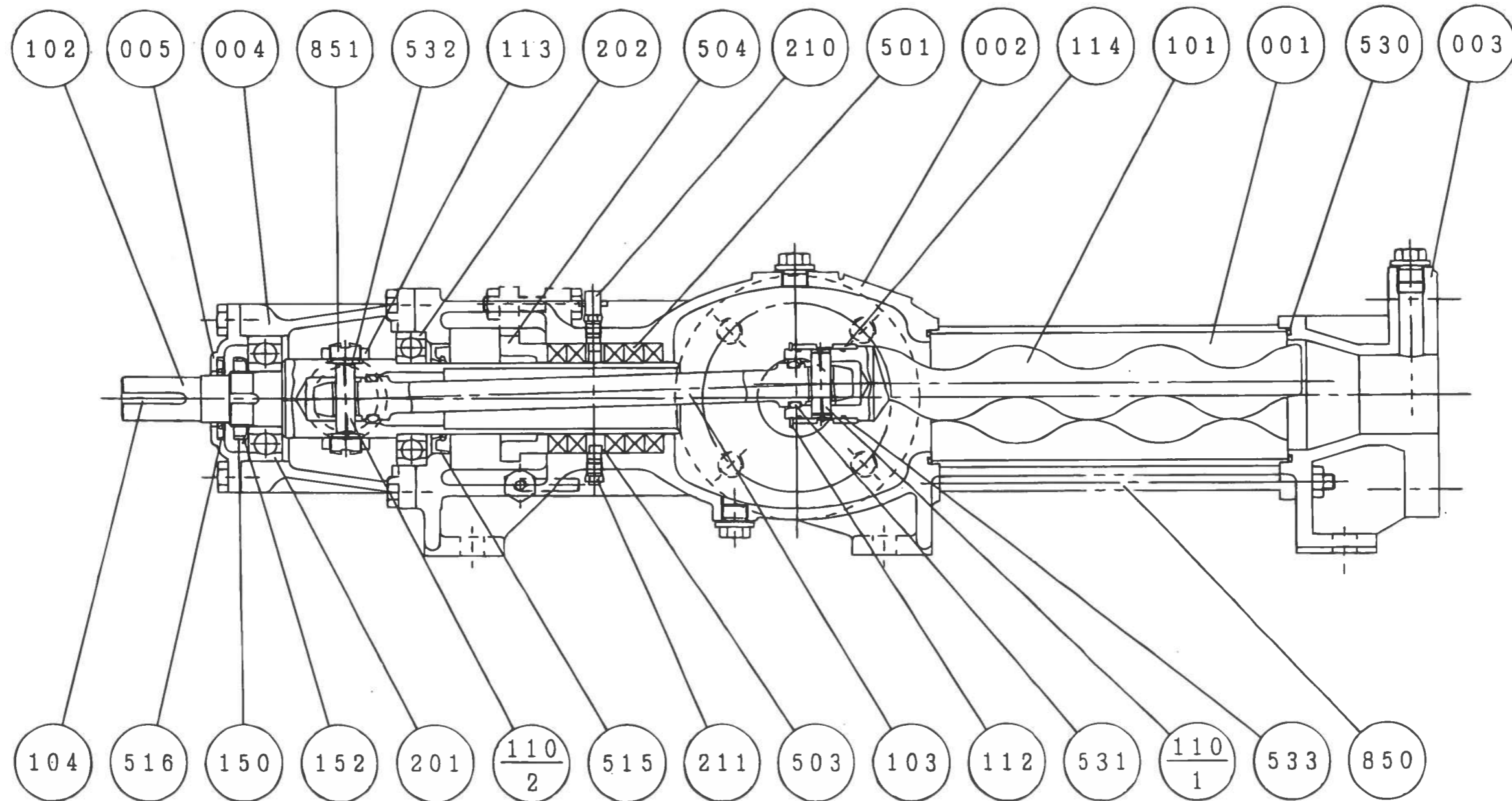
Section B

6. Drawing 033

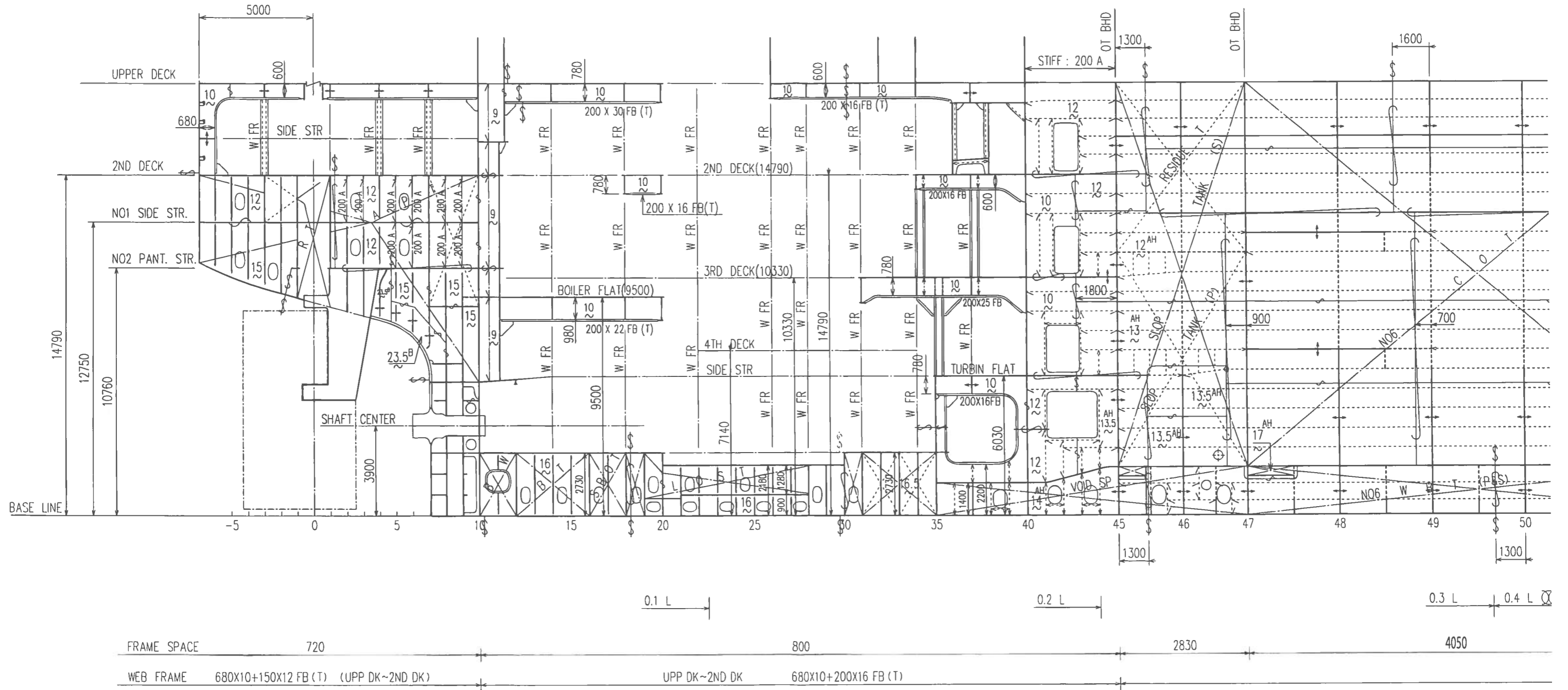
- (a) Describe the flow path of hydraulic oil when the rudder is stationary. (6)
- (b) Describe the sequence of events and oil flow paths, when a rudder movement is required (15)
- (c) Describe how the rudder is operated in emergency control. (4)

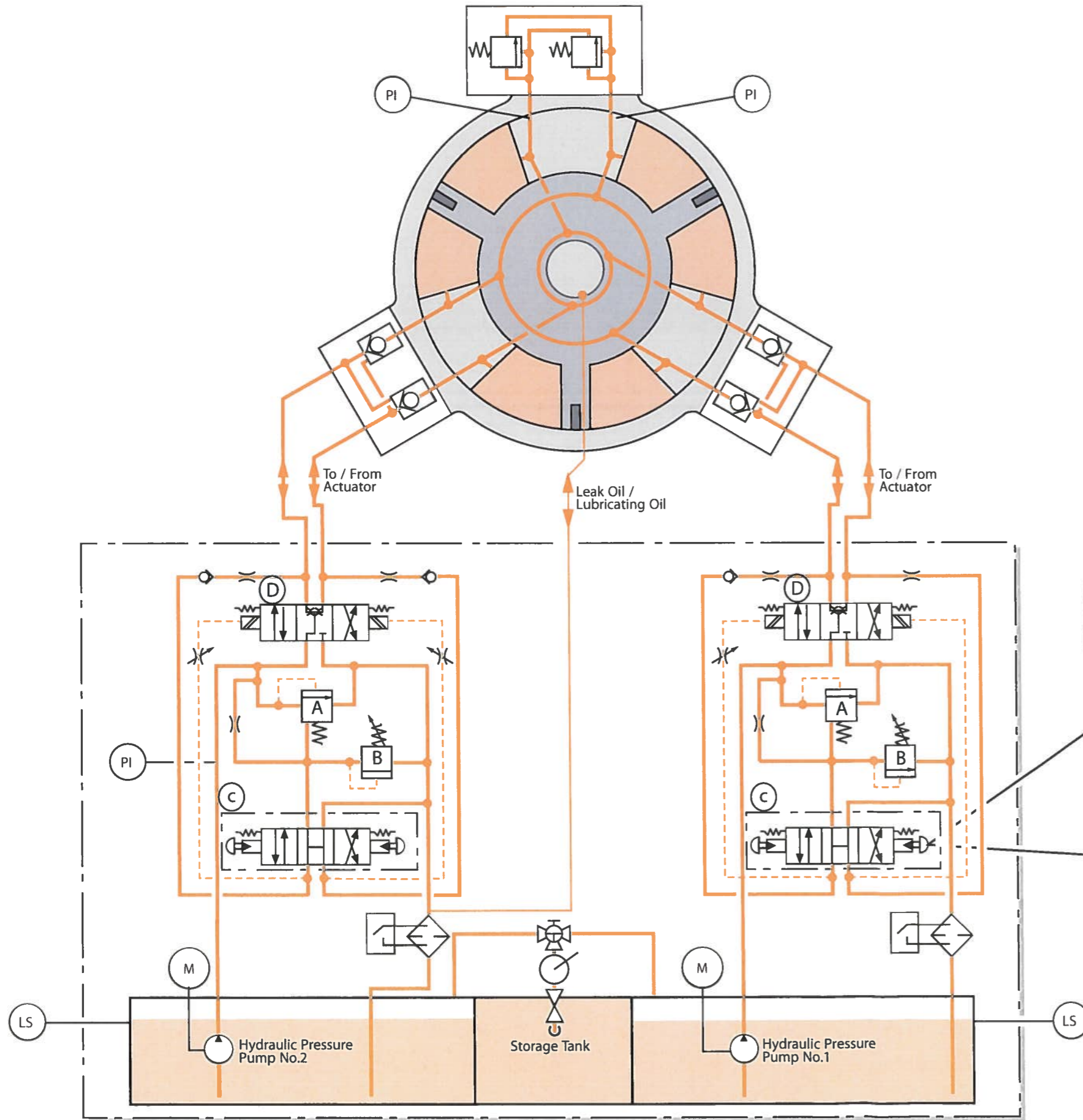
7. Drawing 036

- (a) With the motor running through contactor K1, describe the required action and subsequent automated actions that stop the motor, until the point it is ready to be restarted. (10)
- (b) Describe the required action and subsequent automated actions that occur during starting of the motor, assuming the motor was stopped to make use of the starter's available function. (15)



CENTRELINE SECTION





- Key
- Pressure Lines
 - - - Control Lines
 - Emergency Operation Pushbutton

