

MEC-E5003 Fluid Power Basics

Research Assignment: Hydraulics laboratory work

Study Year 2018–2019

LABORATORY EXERCISE ASSIGNMENT, CARRIED OUT IN GROUPS

Laboratory Exercise

Exercise involves building two hydraulic systems and getting acquainted with the operation of the circuits, the components used in them and also the flow/pressure phenomena related to circuits.

Exercise involves handling oily components, so leave your tail-coat/evening suit at home!

A.1 Preliminary task before arriving at the exercise

Get yourself acquainted with the hydraulic circuits presented in Figures 1 and 2, ponder how they operate and what effects do the valves have on the operation and characteristics of the systems. Answer the Figure 3 related questions personally before arriving at the exercise. Draw your answers to the same figure, fill up your name and student number, detach the page and hand it over to the person giving the exercise. If the preliminary task is either left unanswered or the page is not submitted, it will result into rejection of the attendance in the exercise.

A.2 Tasks in laboratory

The exercise involves building two hydraulic systems, and related to the latter one also some values of pressure and flow are written down (use table at page 4).

These values and the experiences in modification and use of the system may be used in solving future research problems.

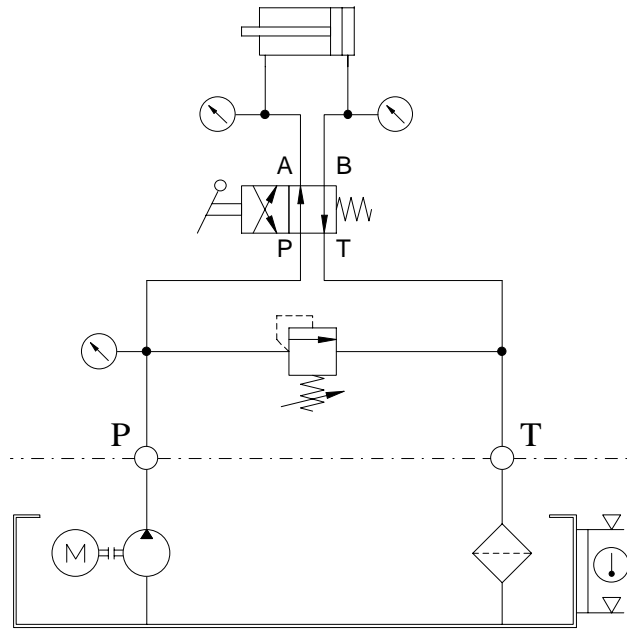


Figure 1. First system of Laboratory Exercise.

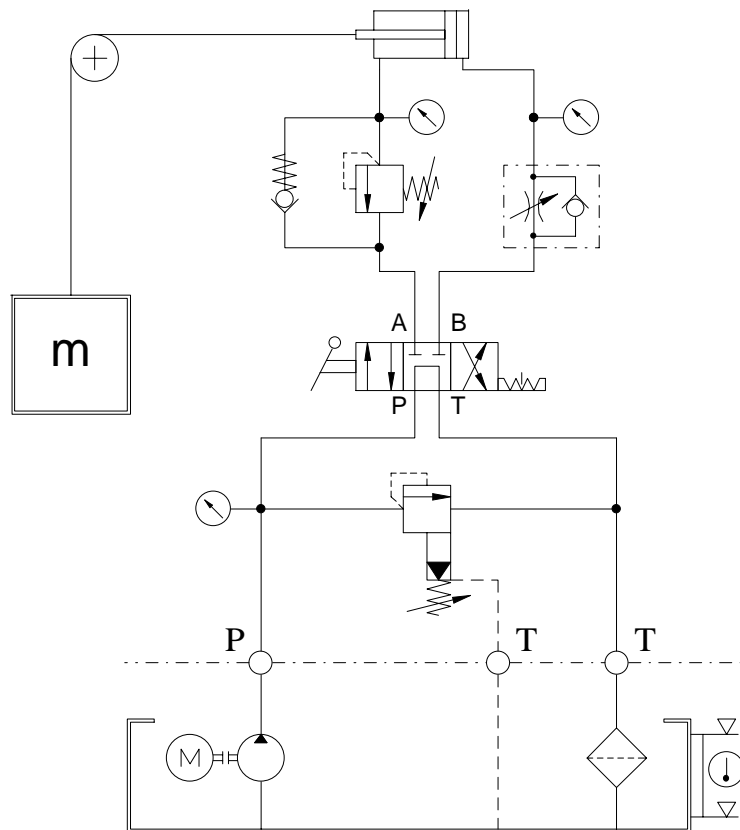


Figure 2. Second system of Laboratory Exercise.

Preliminary task for Hydraulics' Laboratory Exercise

Date	:	_____		
Group nr	:	_____		
1. Name	:	_____	Student nr	:
2. Name	:	_____	Student nr	:
3. Name	:	_____	Student nr	:
4. Name	:	_____	Student nr	:

- Place one (1) throttle check valve in the system in Figure 3 so that
- only the + speed (= extension speed) of the cylinder motion is affected
 - only the - speed (= retraction speed) of the cylinder motion is affected
 - both + and - speeds of the cylinder motion are affected

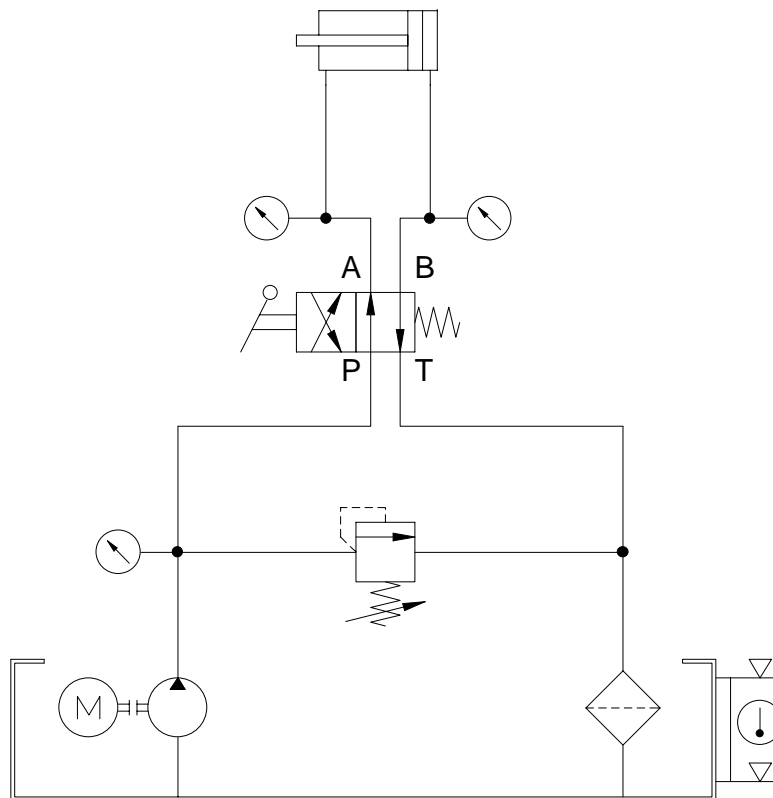


Figure 3. Preliminary task of Hydraulics' Laboratory Exercise.

NB: Preliminary task has to be submitted when arriving to the exercise!

Measurements at Hydraulics' Laboratory Exercise

Date : _____
 Group nr : _____

Measure point nr	p_P [bar]	$p_{S,m}$ [bar]	$p_{S,mv}$ [bar]	$q_{V,S}$ [l/min]	$q_{V,prv}$ [l/min]	Explanation

p_P = pressure at pump outlet [bar]
 $p_{S,m}$ = pressure in piston side of cylinder (+ chamber) [bar]
 $p_{S,mv}$ = pressure in piston rod side of cylinder (- chamber) [bar]
 $q_{V,S}$ = volume flow to cylinder [l/min]
 $q_{V,prv}$ = volume flow through pressure relief valve [l/min]