

## Basic Hydraulics 1

### MEM30010A: Set up basic hydraulic circuits

HYDAC unit number: ST-T01-0

Duration: 16 hours (2 days)

This unit can be nationally recognised training through an association with **AiGROUP**



#### Outline

This course is designed to provide an introduction to industrial and mobile hydraulic systems. It provides vital information for a “quick start” in understanding what a hydraulic system is, and how it works. This provides a usable groundwork for maintenance technicians, trades people, sales people and junior engineers. This course promotes safety through the understanding of hydraulic principles, system components, and the dangers associated with hydraulic systems in general.

At the completion of this course, the participant will use their acquired knowledge to define the function of a simple hydraulic system. They should be able to identify the major hydraulic system components on a machine, and be able to describe the expected function of those components.

#### Program

##### Day 1

Welcome, introductions and overview

##### Principles and basics of hydraulics – CH99-T02-0

Understanding lubrication

Understanding viscosity

Definitions: Hydraulics, Hydrostatics, Hydrodynamics

Ancient hydraulic marvels to modern brilliance

Simple hydraulic jack – Pascal’s Law and energy conversion

Tipper – A simple hydraulic application. The necessity for various system components

##### Pumps – PU99-T01-0

What is displacement?

Positive displacement pumps vs. Non-positive displacement pumps

An overview of hydraulic pumps:

Fixed displacement pumps

- External gear pumps
- Internal gear pumps
- Screw pumps
- Piston pumps
- Vane pumps

Variable displacement pumps

- Vane pumps
- Radial piston pumps
- Axial piston pumps

## **Check valves and other poppet valves – CH30-T01-0**

Check valves  
Pilot check valves  
Anti-cavitation valves  
Shuttle valves  
Velocity fuses  
By-pass valves  
Pre-fill valves

## **Flow control valves – CH31-T01-0**

Orifices and pressure drops  
Throttle types  
Fixed flow control valves  
Variable flow control valves  
Priority flow control valves  
Bleed-off flow control  
Metering in  
Metering out

## **Pressure control valves – CH99-T05-0**

Direct operated relief valves  
Pilot operated relief valves  
Sequence valves  
Pressure reducing valves  
Unloading relief valves and accumulator charge valves

## **Day 2**

### **Directional control valves – CH34-T01-0**

Spool type DCV's  
Manually operated DCV's  
Solenoid operated DCV's  
Pilot operated DCV's  
Poppet type DCV's  
Proportional DCV's (Overview only)

### **Hydraulic schematics – CH99-T04-0**

Standard symbols  
Simplex vs. Complex symbols  
Standard practices  
Circuit interpretation – examples  
Reference material

### **Safety - GE99-T01-0**

Highlighting hazards in hydraulic systems, in particular:

- Accumulators
- Suspended loads
- Fluid injection

MDG41 in overview. What is that document and what does it imply?

Overview of risk assessments for safety with hydraulic systems.

## Assessment tasks

Observational assessment and written assessment.

## Outcomes

Upon successful completion of the course, HYDAC will issue a certificate of acknowledgement to the participant, stating the course name and other relevant details.

Through our proud partnership with AI Group, a statement of attainment can be issued for an extra fee. This nationally recognised certificate can only be issued to Australian & New Zealand residents.

## MEM30010A, “Set up basic hydraulic circuits”.

### Elements and performance criteria:

1. Determine system requirements
  - 1.1. Instructions regarding system requirements are obtained, understood and clarified as necessary.
  - 1.2. Circuit drawings using standard symbols are interpreted correctly.
2. Select components for simple hydraulic circuits
  - 2.1. Suitable fluids are selected for given hydraulic systems from specification charts and in accordance with safety procedures involving fluids.
  - 2.2. Linear actuators and motors are selected to suit system requirements.
  - 2.3. Control valves are selected to suit system requirements.
3. Verify component selection
  - 3.1. Circuits are set up and operated on laboratory benches.
  - 3.2. Operation is analysed and outcomes are verified against system requirements.

## Prerequisites

There are no prerequisites for this course, as it is designed for those with little or no experience in hydraulic technology.

This course can only be provided for those fluent in English. Participants must be able to read and write, and to follow instructions.

## Clothing and equipment

Pens, paper, tools and training resources are provided.

Clothing should be neat casual, or cotton drill work clothing is fine, but they must be clean.

Dirty work boots are not to be worn, fully covered footwear such as runners are acceptable. Open toed footwear must not be worn.

## Lunches

Morning tea, lunch and afternoon tea are provided. If you have any special dietary needs, please contact SUMMIT HYDRAULICS beforehand to arrange alternatives.

## Dates and times

Times: 8:30AM to 5:00PM  
Dates: 23<sup>rd</sup> & 24<sup>th</sup> September

## Courses held in Auckland

**HYDAC Ltd.**  
108A Penrose Road  
Mount Wellington  
AUCKLAND 1060

## Course fee

Course fee is NZD \$1000 per participant, plus GST.

Maximum class size is 8 people.  
Flights, accommodation and taxi charges are not included in the course fee.

## Text book

We also have a 401 page text book available, entitled “Basic Hydraulics and Components”, it is the supporting text for this course. It can only be purchased by those who attend the course.

Part No: 3508592  
Nett price: \$180 plus GST

## Contact

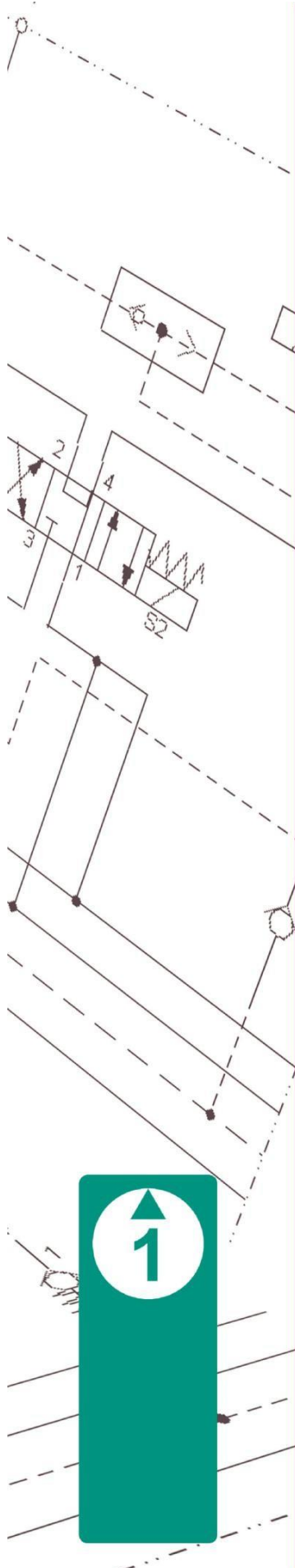
Summit Hydraulic Solutions

[John.Weller@summite.co.nz](mailto:John.Weller@summite.co.nz)  
[Craig.Morrison@summite.co.nz](mailto:Craig.Morrison@summite.co.nz)

Phone: +64 73480464

[www.summithydraulics.co.nz](http://www.summithydraulics.co.nz)





Enrolment form

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E-mail: [John.Weller@summite.co.nz](mailto:John.Weller@summite.co.nz)

Please enrol me in this course for the dates below.  
Course fee is NZD \$1000 per participant, plus GST.

Dates \_\_\_\_\_

Name \_\_\_\_\_

Title or position \_\_\_\_\_

Company \_\_\_\_\_

Company address \_\_\_\_\_

Contact phone number \_\_\_\_\_

E-mail address \_\_\_\_\_

Purchase order number. (Please attach). \_\_\_\_\_

Date of application \_\_\_\_\_

### Optional extras:

Yes, I would also like to purchase a text book at \$180 extra, plus GST.

Title: Basic Hydraulics and Components

Yes I would like a nationally recognised certificate \$200 extra plus GST

NOTE: We ask that payment is made in full before commencement of the course. Please contact [John.Weller@summite.co.nz](mailto:John.Weller@summite.co.nz) for payment details.