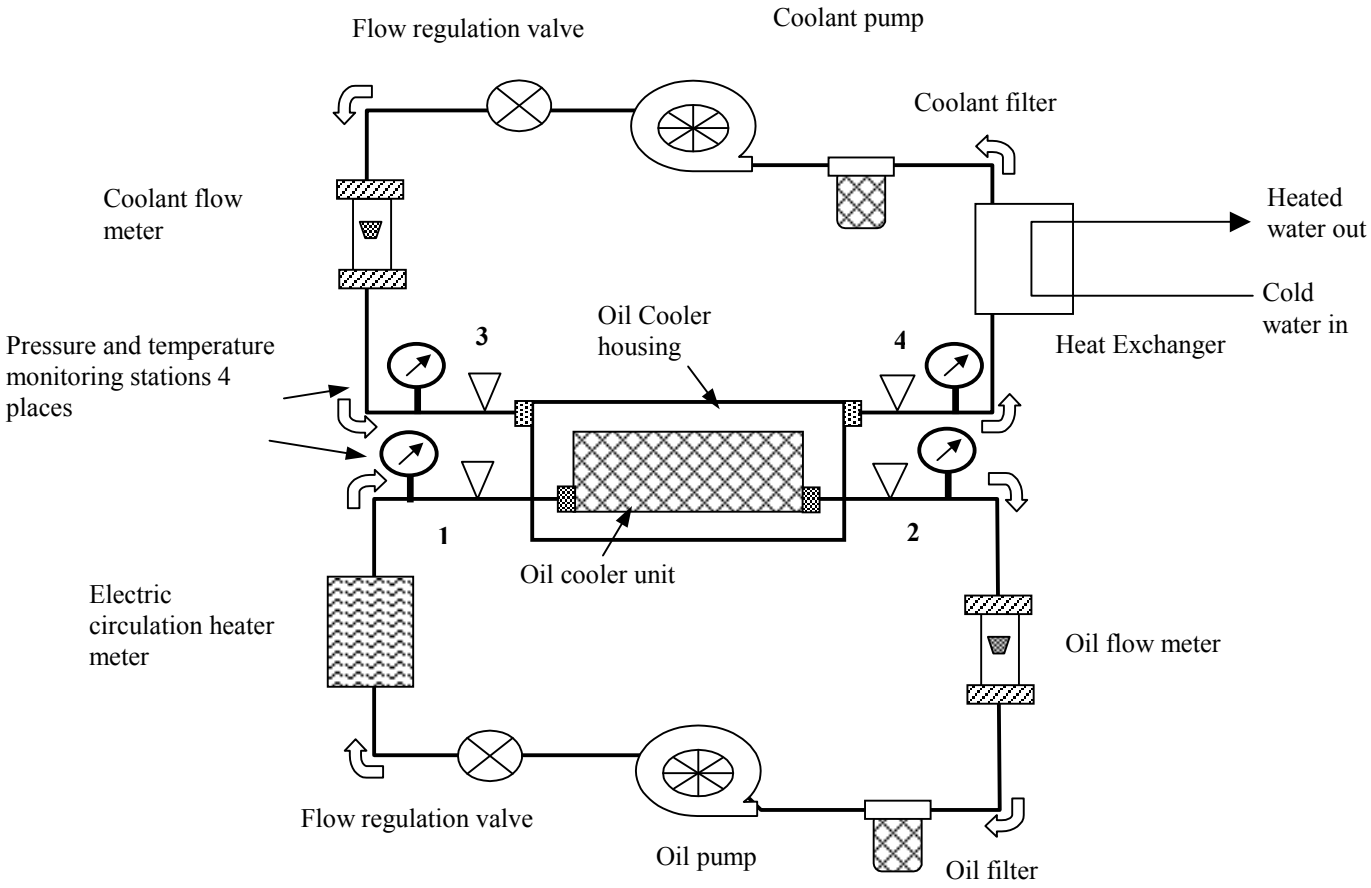
Operation Manual

For the Fluids Inc. International Test Bench

Purpose of this Manual

The Fluids Inc. X2G oil cooler testing facility was designed to emulate the oil heating capacity of the Cummins QSX15 diesel engine. This facility will allow you to measure the heat rejection of the several oil cooler designs. This is accomplished through monitoring and regulating the flow rates, inlet temperatures, and inlet pressures into the oil cooler housing. We have prepared this manual to provide a systematic approach for obtaining real-time data that will allow you to determine the heat rejection rate of your oil cooler prototype. Please read these instructions carefully before operating the testing facility and keep them handy for your future reference.



Oil Circuit
1 = inlet conditions
2 = outlet conditions

Coolant Circuit
3 = inlet conditions
4 = outlet conditions

READ CAREFULLY BEFORE PROCEEDING!!

Assumptions to consider before using this manual:

1) Both oil circuit and coolant circuit are purged of air.
2) Oil circuit filled to capacity with 20W-40 engine oil.
3) Coolant circuit filled to capacity with a Fluids Inc. approved coolant*
4) Prototype oil cooler is compatible with the Cummins QSX15 diesel engine.
5) Testing facility is located in an area that meets all requirements for operation.

* An approved Fluids Inc. coolant consist of tap water with 1.5% penticool3000 & 1000ppm chlorides & 500 ppm sulfates.

Operating Instructions

Getting Started

The first step in testing your oil cooler is to mount the prototype onto the oil cooler plate. In order for the oil cooler prototype to be mounted onto the oil cooler plate and installed in the oil cooler housing, it must be compatible with the Cummins QSX15 diesel engine. After the mounting process is complete, the test facility is ready for operation.

1. **Mounting the Oil Cooler Prototype**
   a. Unscrew the six bolts that attach the oil cooler plate to the oil cooler housing.
   b. Remove oil cooler plate from oil cooler housing.
   c. Attach the oil cooler prototype to the oil cooler plate using the eight Hex-bolts provided.
   d. Mount assembly onto oil cooler housing using the six bolts removed in step 1a.
   NOTE: Be sure the sealing gasket is properly seated on oil cooler plate.

2. **Turning on Digital Measure Devices**
   a. Connect digital measuring devices to any 120V outlet.
   b. Calibrate these measuring devices.

3. **Starting Pumps**
   a. Open regulation valves in both the coolant and oil circuits.
   b. Plug the oil and coolant pumps into any 110V outlet.
   c. Switch both pumps to the *ON* position.
4. **Achieving Desired Flow Rates**

   Oil Circuit
   a. Gradually close the flow regulation valve until the digital flow meter reads 35 gpm.
      NOTE: To insure flow rate stability, make sure digital flow meter indicates a constant 35 gpm for at least 5 minutes. In order to simulate engine conditions and achieve accurate measurements, digital flow meter must read 35 gpm throughout the duration of the testing cycle.

   Coolant Circuit
   a. Gradually close the flow regulation valve until the digital flow meter reads 98 gpm.
      NOTE: To insure flow rate stability, make sure digital flow meter indicates a constant 98 gpm for at least 5 minutes. In order to simulate engine conditions and achieve accurate measurements, the digital flow meter must read 98 gpm throughout the duration of the testing cycle.

5. **Achieving Desired Inlet Oil Temperature**
   a. Connect oil heater to a 220V outlet.
   b. Switch oil heater to *ON* position.
   c. Set the digital thermostat on the oil heater to 260°F (127°C).
      NOTE: