



## *H060 Laboratory Cooling Plant With Ice Store*

Figure 1: H060 shown with H892 and R832



- *Compare Dry Cooling with Evaporative Cooling Using Hilton Bench Top Cooling Tower H892*
- *Investigate Flow and Batch Processes Using Hilton Air and Water Heat Pump R832*
- *Can be used in isolation or connected together*
- *Optional Computerised Data Acquisition Upgrade HC060A*
- *Two years warranty*



## ***Introduction***

In many industrial processes such as air conditioning or power generation a cooling tower is used to reject heat from the system. A reservoir may be used in these, or other processes to provide either a hot or cold store for an industrial process that has varying load.

To investigate these processes the Hilton Air and Water Heat Pump R832 may be linked to the Hilton Bench Top Cooling Tower H892 using the Hilton Reservoir System H060.

The Reservoir System H060 has a heat load and instrumentation, pumps, tanks, thermocouples and flow measurement to allow both batch and flow heating and cooling processes to be investigated

The units carrying out heating and cooling processes (R832 or H892) may all be used to their full specification either attached to the Reservoir System H060 or in their standard configuration in isolation. This gives complete flexibility and maximum equipment utilisation.

The unit will be of particular interest to those studying:

- **Refrigeration and Air Conditioning**
- **Building Services**
- **Chemical Engineering**
- **Energy Transfer and Conservation**
- **Mechanical Engineering**
- **Plant and Process Engineering**

## ***Experimental Capabilities***

### **Reservoir System H060 with Air and Water Heat Pump R832 Only.**

- Demonstration of a batch cooling and batch heating process using a vapour compression refrigeration system.
- Demonstration of continuous flow heating and cooling process using an air-water heat exchanger and a heat pump as the heat load.
- Thermodynamic investigation of a vapour compression air and water heat pump including full cycle pressure-enthalpy diagram, performance curves using an air and water heat source and individual component energy balances.
- Optional Computerised Data Acquisition available.

### **Reservoir System H060 with Air and Water Heat Pump R832 and Bench Top Cooling Tower H892. Allows all of the above experiments together with:**

- Comparison of dry cooling performance with evaporative cooling under the same load conditions.
- Investigation of the performance of a forced draught evaporative cooling tower under varying load conditions and with variable air and water flow rates. **Operation to the full specification of the Bench Top Cooling Tower H892.**
- Optional additional columns available refer to H892 literature.
- Optional Computerised Data Acquisition available.





## ***Description***

**The Laboratory Cooling Plant With Ice Store H060 has been designed to allow investigation of both batch and flow heating and cooling processes.**



The Reservoir System H060 comprises two insulated tanks mounted on a base with a central control panel and dry cooling heat exchanger. Three high capacity circulating pumps and the necessary hoses allow connection to three alternative Hilton units.

Utilising the Hilton Air and Water Heat Pump R832 the water evaporator is selected and this is connected through hoses supplied to a coiled heat exchanger inside the Cold Reservoir. One of the H060 circulating pumps provides a flow of water/glycol through the evaporator and heat exchanger thereby cooling the water inside the Cold Reservoir. With suitable flow rate the water inside the Cold Reservoir will form an ice bank around the heat exchanger. The Cold Reservoir is fitted with a heater that may be controlled and its heat input measured using the wattmeter on the control panel.

The Hot Reservoir provides a source of water circulated by a second pump through the condenser of the Air and Water Heat Pump R832 this raises the temperature of the water in the Hot Reservoir. A third pump circulates the water in the Hot Reservoir through the Dry cooling Heat Exchanger.

All of the pumps and heat load may be operated from the Control Panel and the flow rates varied using the original flow meters on the R832 unit. The flow through the Dry Cooling Heat Exchanger is controlled and measured by the flow meter on the H060 unit.

With the addition of the Bench Top Cooling Tower H892 self sealing couplings allow the H892 to replace the role of the Dry Cooling Heat Exchanger. As the H892 unit carries out evaporative cooling the water can be cooled closer to the ambient wet bulb temperature and the performance relative to the Dry Cooling Heat Exchanger may be investigated under identical load conditions.

The Control Panel includes a digital temperature indicator and selector switch to allow indication of all relevant system temperatures.

Each of the Hilton units coupled to the Reservoir System H060 may be disconnected and operated in isolation according to their full normal specification. This gives complete system flexibility and maximises equipment utilisation.

The addition of the Reservoir System H060 to the Air and Water Heat Pump R832 and Bench Top Cooling Tower H892 means that the requirement for a water supply and drain is removed and only a power supply is necessary for operation of all three units.



## Specification

### General

A two reservoir pump and tank system with heat load and control console that allows investigation of batch and flow heating and cooling processes (with the addition of a suitable vapour compression heat pump and bench top cooling tower).

Both the heat pump and cooling tower may be disconnected as required and operated in isolation or coupled to the pump and tank system. The pump and tank system incorporates a dry cooling heat exchanger and instrumentation to record the flow rate and relevant system temperatures.

### Detailed

A bench mounted system with hot reservoir, cold reservoir, dry cooling heat exchanger and three circulating pumps suitable for connection to the Hilton Air and Water Heat Pump R832 and Bench Top Cooling Tower H892.

An integral control console allows control and measurement of the heat load in the cold reservoir and measurement of all relevant system temperatures.

### Instrumentation:

A digital Temperature indicator with channel selector switch for all relevant system temperatures. Duplex thermocouples for optional computerised data acquisition. Variable area water flow meter with flow transducer for dry cooling flow measurement.

### Safety

All electrical circuits have combined miniature circuit breakers and overload cut outs.

Residual current circuit breaker for operator protection.

Heat load in the cold reservoir protected by high temperature cut out switch.

## Dimensions

Height: 450mm  
Depth: 650mm  
Width: 1300mm  
Weight 70kg

## Accessories and Spares

Unit supplied with:

One experimental operating and maintenance manual

Accessories and spares for 2 years normal operation. List available on request.

## Services Required

**Electrical: A:** 1.3 kW. 220-240 Volts, Single Phase 50Hz (With earth/ground).

Or: 1.3kW.110-120 Volts, Single Phase 60Hz (With earth/ground).

## Ordering Information

**Order as:** H060 Laboratory Cooling Plant

**Optional:** HC060A Data Acquisition Upgrade

### Electrical Specification

Either: A: 220-240 Volts, Single Phase 50Hz (With earth/ground).

B: 110-120 Volts, Single Phase 60Hz (With earth/ground).

## Shipping Specifications

**Net Weight:** 70 kg.

**Approximate Gross Weight:** 117 kg.

**Approximate Packing Case Dimensions:** 1.46 x 0.75 x 0.65m

**Approximate Packing Case Volume:** 0.712m<sup>3</sup>

## Also Available On Request

Further detailed specification.

Additional copies of instruction manual.

Recommended list of spares for 5 years operation.

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