The ICHM
(Integrated Cooling & Heating Module)

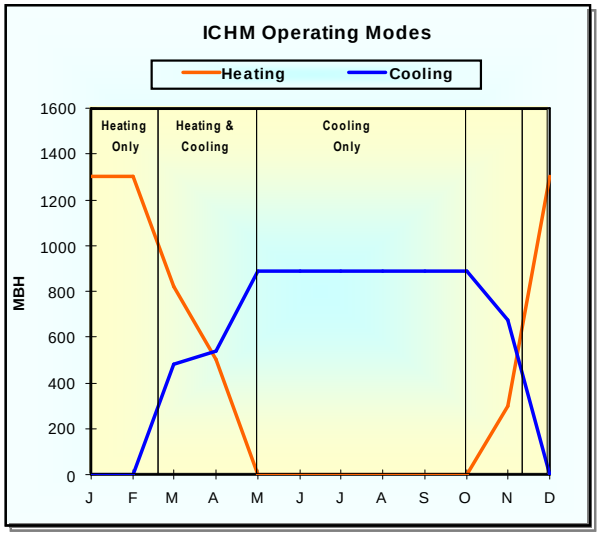
Suitable for IC Engines
between
250 kW and 2,000 kW

Integrated CHP Systems Corp.
15 Berkeley Pl., Fair Lawn, NJ 07410
(201) 791 0180 Fax (201) 791 9273

Integrated CHP Systems Corp.
15 Berkeley Pl., Fair Lawn, NJ 07410
(201) 791 0180 Fax (201) 791 9273

Introduction

The Integrated Cooling & Heating Module (ICHM) is a complete, ***pre-engineered thermal system*** that optimizes the heat recovered from the engine and provides simultaneous cooling and heating for a building's HVAC system. The ICHM consists of a YORK hot water fired absorber, cooling tower, condenser water pump, load controls, heat exchangers, pipe, valves, fittings, sensors, base frame, outdoor enclosure and system control panel. The ICHM controller integrates the thermal equipment with the generator and/or building and provides a single open protocol connection point.



The ICHM is connected to an IC engine generator coolant loop and to the building hydronic loops. The unit is driven with the heat rejected by the engine and provides both cooling and heating. The cooling and heating heat exchangers are in series and normally operate simultaneously for high load factor. The ICHM controller will maintain the correct coolant water leaving temperature through fluctuating loads.

The ICHM design optimizes the heat recovery in a ***skid mounted, prefabricated outdoor package***. The ICHM is designed specifically for application with continuous duty IC Engines that incorporate jacket and exhaust heat recovery. The control systems are designed to seamlessly integrate and the ICHM can accept control signals from either the building automation system or the generator.

General

The ICHM includes a rigid steel frame with lifting eyes and mounting holes. Flanged connections to the building cooling and heating loops as well as the generator coolant loop are provided. The system operates automatically through the generator controller. A detached cooling tower is provided to allow for close or remote coupling.

The ICHM is placed on a level concrete pad with the cooling tower sump located at least two feet above the top of the concrete pad. Treated make-up water is required for the tower along with drain connections at the ICHM and tower. A single power supply is required for the ICHM. The cooling tower is powered by the ICHM.

Major Equipment:

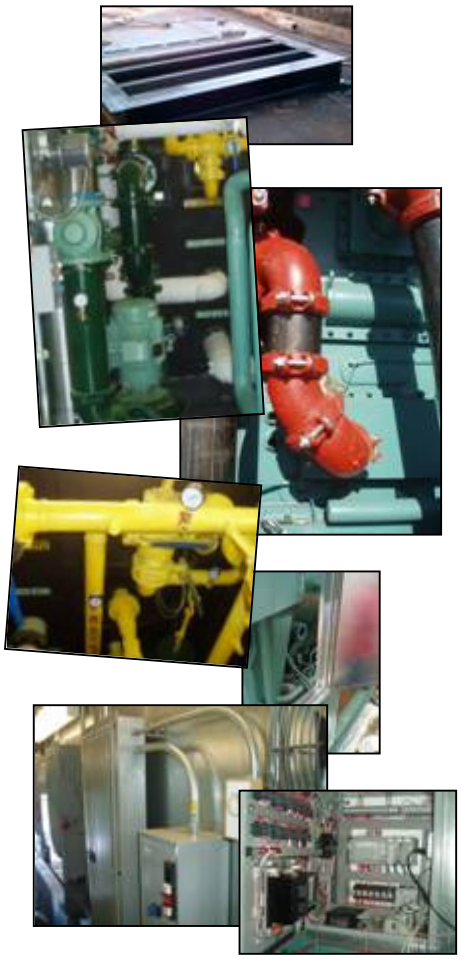
Item	Description
Absorber	York YIA Hot Water Fired Absorption Chiller
Absorber	ADVAGuard 750 LiBr Solution
Load Heat Exchanger	Flat Plate FP Series - 35% EG/H20
Cooling Tower	Baltimore Air Coil or equal
Controls	ICHM Control Panel with Local Readout and Indicator Lights
Controls	York Iso-Flow Absorber Control Panel
Controls	MODBUS RTU open Communications Protocol
Power	Main Disconnect
Power	Power Panel with Starters
Enclosure	Structural Steel Frame
Enclosure	Weatherproof Enclosure with Lights and Exhaust Fan
Condenser W Pump	In-Line TACO or equal
Vacuum Pump	Welsh or equal
Valves	Coolant, Hot Water and Condenser Water By-Pass Valves

Integrated CHP Systems Corp.
15 Berkeley Pl., Fair Lawn, NJ 07410
(201) 791 0180 Fax (201) 791 9273

Equipment Scope

Overview:

The ICHM is a steel frame based integrated mechanical room with weatherproof enclosure. It incorporates an absorber and load heat exchanger for building cooling and heating needs as well as a detached cooling tower. The ICHM controls integrate with the engine control system and cooling tower for data acquisition and control. The system has been designed to provide all the required equipment to convert the recovered waste heat from the generator into useful thermal energy. The ICHM will accept all the recovered heat at full electric load and provide simultaneous heating with cooling for increased thermal load factor.



The chilled and heating water pumps are part of the building scope as well as the tower make-up water treatment. The generator package shall be supplied with the engine generator, exhaust heat exchanger and dump radiator or heat exchanger.

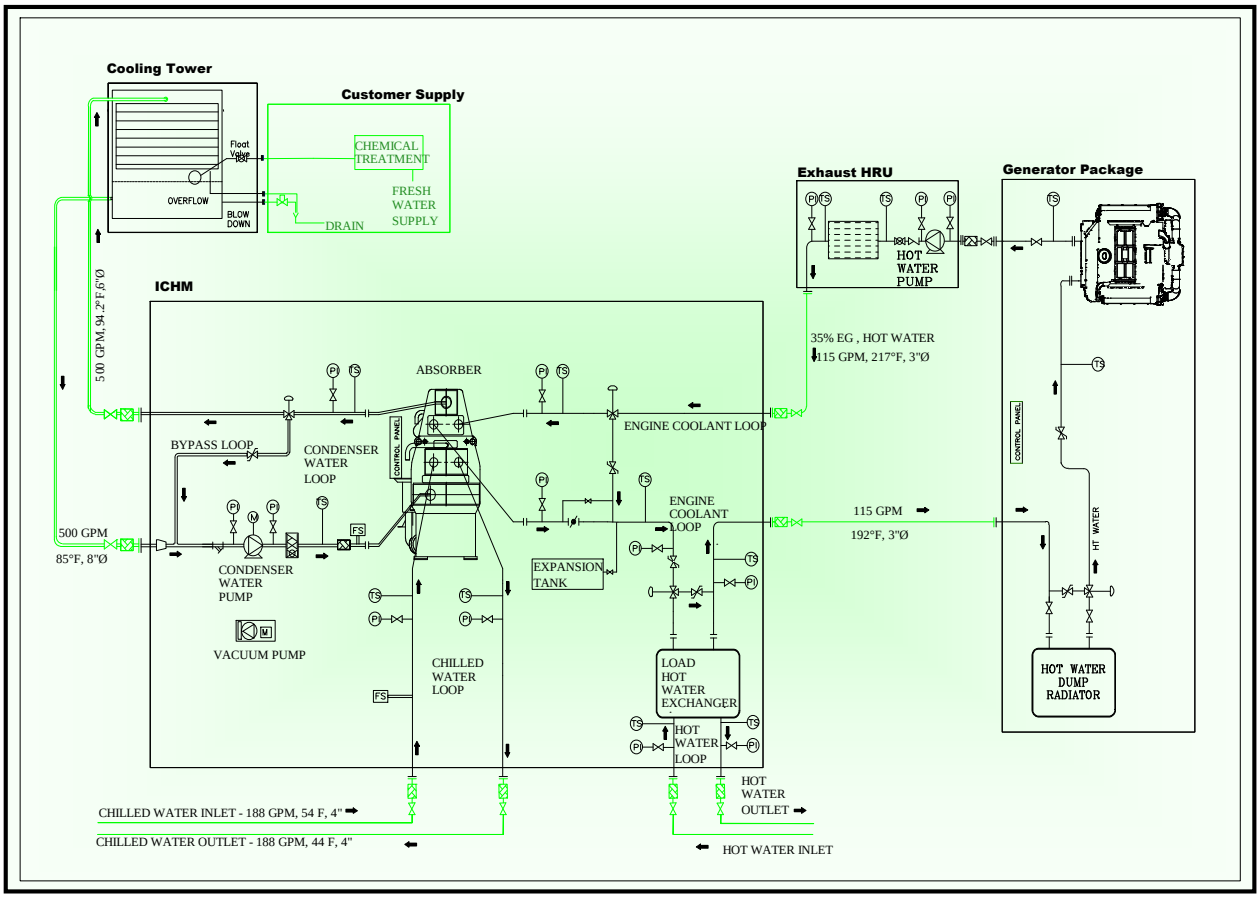
Provided by ICHPS:

The ICHM integrates the absorber and load heat exchanger with the generator's heat recovery system. It includes all pipe, valves and fittings required to operate the system and provide chilled and/or hot water. The ICHM is built on a steel frame and includes a weather proof enclosure. A cooling tower is provided to match the heat rejected from the absorber and is provided with an enclosure, axial fan, mechanical fill control and overflow and blow down connections.

Provided by Installer:

The installing contractor provides all interconnecting piping requirements between the ICHM and generator package, heat recovery unit and cooling tower. Make-up water and drain connections are required at the cooling tower as well as a power supply and drain for the ICHM. The power to the cooling tower fan is provided by the ICHM with a local disconnect by others. Control cable needs to be run from the ICHM to the generator and power cable from the ICHM to the cooling tower. Foundation pads and anchor bolts are required for the ICHM and cooling tower.

All items supplied by the installer should comply with local structural and code requirements. It is the responsibility of the installer to connect all lines and cables to the ICHM.

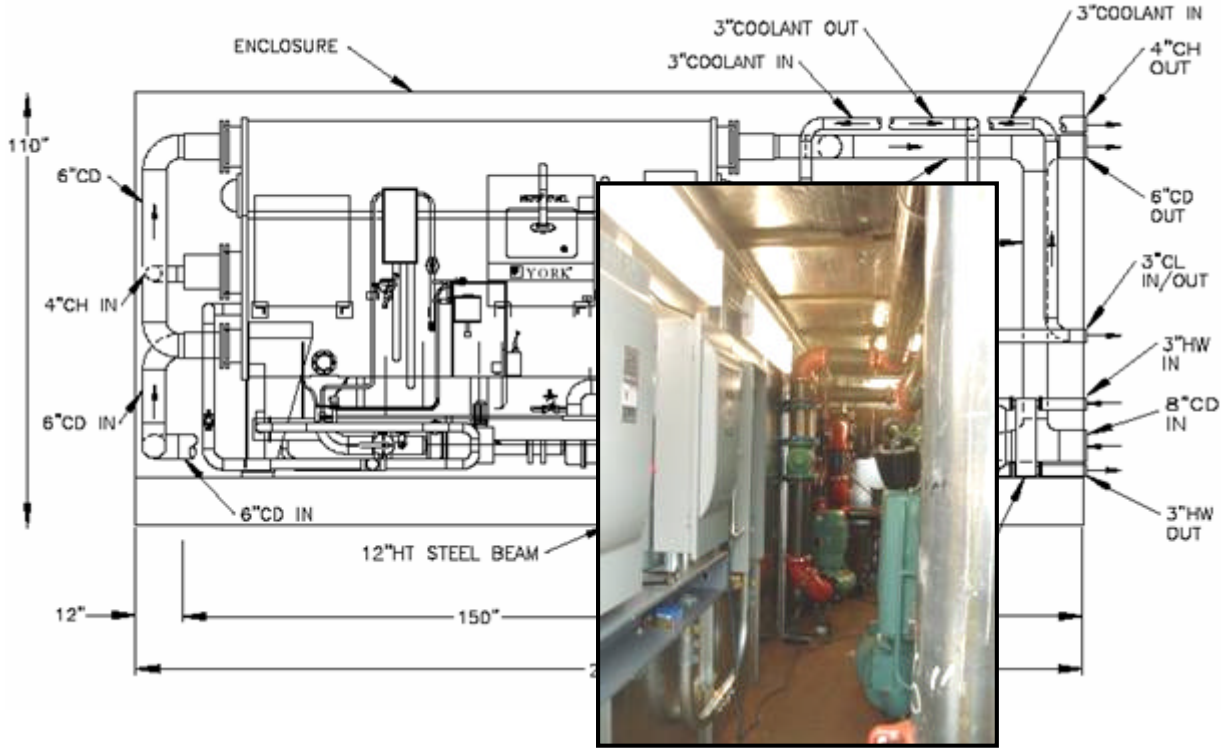


Customer mechanical supply is indicated in green.

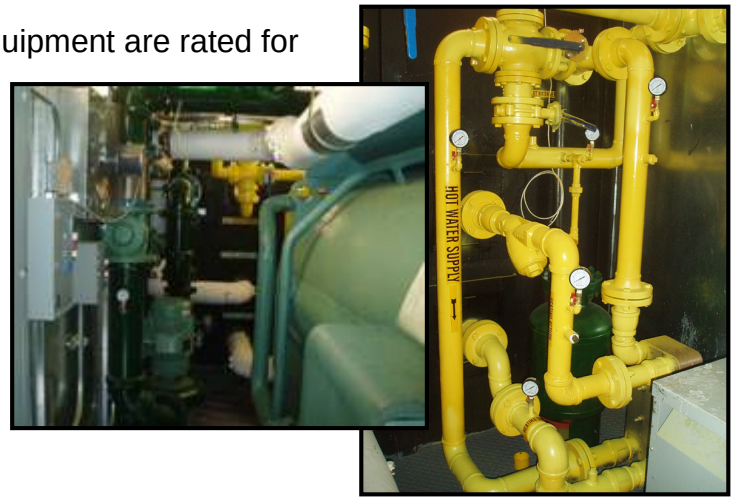
Integrated CHP Systems Corp.
15 Berkeley Pl., Fair Lawn, NJ 07410
(201) 791 0180 Fax (201) 791 9273

Mechanical

Internal piping has been laid out to allow for easy service access with minimum space requirements. Flanged connections are provided for HVAC system, cooling tower and coolant loop. Building water circuits and coolant loop are rated to 125 psig.

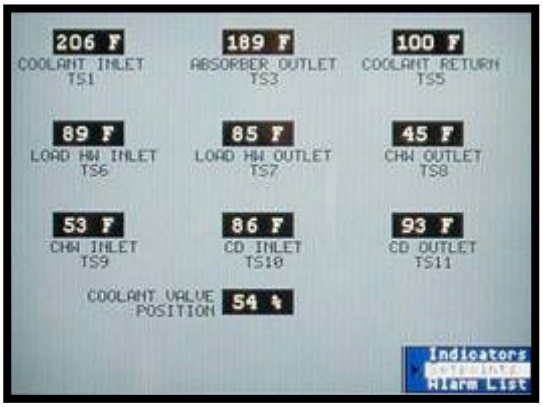


All internal pipe, valves, fittings and equipment are rated for the service provided in accordance with standard mechanical practice. Suitability for specific locations and local code compliance should be verified in advance.



Electrical & Controls

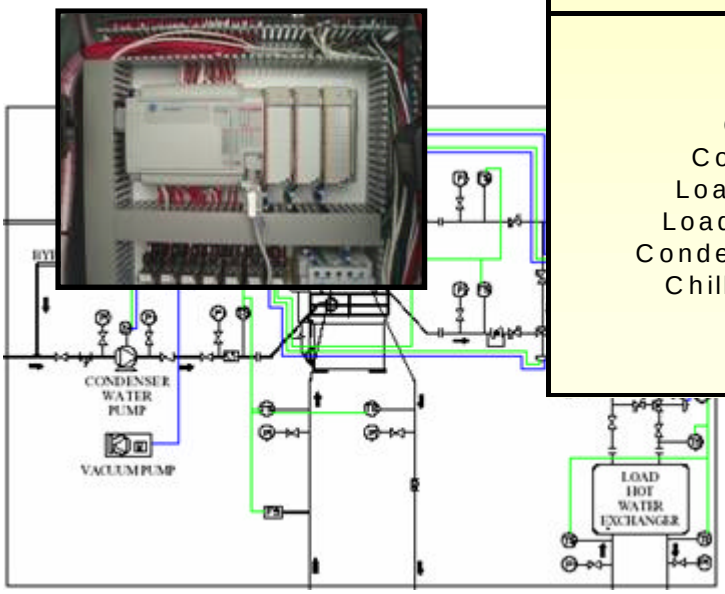
A 3 PH, 60 Hz power supply will be provided from the building to the ICHM power panel. 110 V and 24 V feeds will be provided by the ICHM panel to the absorber, motors and sensors. The cooling tower can have its power supply from the ICHM or from a separate source for remote location. All motorized valve operators are slow acting for thermal stability. A 110 V / 1 PH outlet is provided as well as enclosure fan and lights.



The ICHM controller communicates with the generator controller and operates all on-board equipment and the cooling tower. The ICHM provides a single connection to the engine controller which will provide data acquisition, operation control and status indication. Local status indication and alarm contacts are also provided. The ICHM power panel distributes power to the various electrical components and the cooling tower.

The controller provides operating data in the MODBUS RTU protocol. The following control and data points are available:

CONTROL POINTS
ICHM On/Off
Heating Start/Stop
Chilling Start/Stop
Stand-by
DATA POINTS
Chilled Water In
Chilled water Out
Coolant Temp In
Coolant Temp Out
Coolant Valve Position
Load Hot Water Temp In
Load Hot Water Temp Out
Condenser Water Flow Status
Chilled Water Flow Status
Operating Mode
Operation Status
Fault

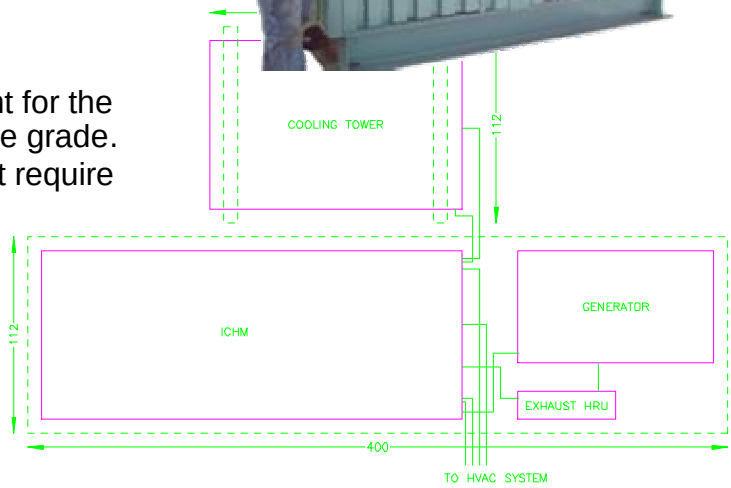


Integrated CHP Systems Corp.
15 Berkeley Pl., Fair Lawn, NJ 07410
(201) 791 0180 Fax (201) 791 9273

Installation

Site selection should consider structural support, service access with tube pull area and air flow to the generator and cooling tower. Follow standard engineering practices and local code requirements in laying out equipment, designing interconnecting piping, wiring and foundations. Adequate support must be provided to assure no weight is put on the pipe connections to the ICHM, cooling tower or generator package.

The recommended support arrangement for the ICHM is a concrete pad at least 2" above grade. The ICHM is vibration free and does not require spring type vibration isolators. The recommended support arrangement for the Cooling Tower is parallel I-beams. Vibration isolators are not required for the tower unless noise is a major concern.



Rigging

The ICHM and Cooling Tower are provided as two separate packages. Rigging points are provided in the ICHM frame. To lift the unit sling it vertically. Provide adequate spacers to prevent slings from rubbing against the enclosure. Do not use pipe nozzles or other points other than the rig points to lift or move the unit. Do not sling the unit against any projecting objects which may either damage the object or the unit.