



Control system for AC Compressors with Electronic Expansion Valve Control

P & S Automation have designed and successfully commissioned several AC Control systems, the latest being an upgrade for Carrier 30HT, HQ Water Cooled twin circuit, reciprocating liquid chillers.

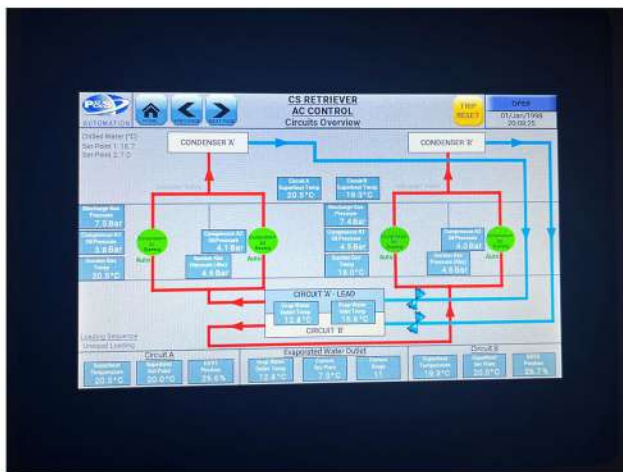
Using modern Programmable Logic Controller (PLC) and Touchscreen Operator Interface (HMI) we have designed a control system which can be retrofitted to chillers which can still be mechanically maintained.

The original Electronic Expansion Valves (EXV) can be retained as this has the potential to provide fine control of the Superheat temperature.

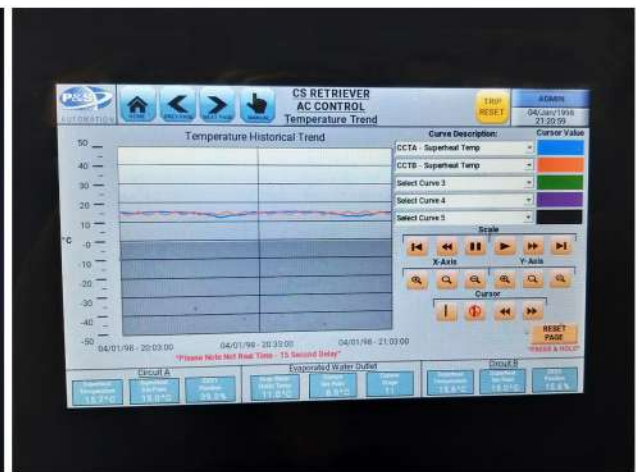
When commissioned the new controls proved to enable the chiller to run with far greater efficiency cutting down the number of compressors normally in operation from 8 to 5.



View of Carrier AC Skid

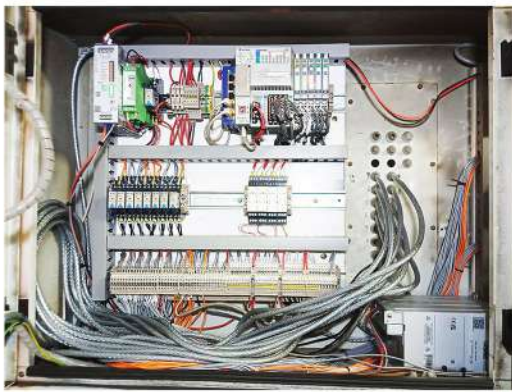


HMI Overview



HMI Trend Graph

The use of a Modern HMI (seen above) provides instant clarity of the system status, provides trend graphs to assist with tuning and allows simple and intuitive adjustment of parameters.



View of PLC

The PLC holds the operating program and maintains safe constant control, the stepper motor within the EXV is driven directly by solid state PLC outputs thus keeping hardware to a minimum. A Battery Backed supply which is built into the panel ensures that in the event of power loss which causes the compressors to stop the EXVs will close so stopping the possibility of liquid collecting at the inlet to the compressors.

Additional Chillers can be networked together to provide further control options.

Although the PLC controls the system, the interlocks are hardwired into the compressor starters thus ensuring safe operation of the compressors even in the unlikely event of the PLC failing.



View of Starter Panel

SPECIFICATIONS

Power Requirements	3 Phase 400 / 415/ 440V 50/60Hz
Interlocks	External via switch input, earth leakage, low current, high pressure, high temperature, low suction superheat, low suction temperature, low oil pressure, low refrigerant pressure, evaporator freeze, pump down not achieved
Modes	Dual set point, Running hour controlled circuit lead or equal loading
Compressors	To suit plant
Expansion Valves	To utilise those fitted, though new ones can be supplied
Battery Back up	To power the controls for > 30 minutes
Setup	All setup adjustments can be made on the HMI once logged in via password
Manual Control	Limited manual control of the EXVs, Compressors and Unloader Valves, to enable proving of plant and a manual pump down

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