

## CWS-PTAC-0011 Specification and Theory of Operations.

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Packaged Terminal Air Conditioners (PTAC) and Packaged Terminal Heat Pumps (PTHP) installed in California and across the country outnumber all other HVAC systems combined. They are self-contained HVAC systems commonly found in hotels, motels, apartments, condos, schools, medical facilities and offices nationwide. Installation of **CWS PTAC-0011** represents a cost effective measure to reduce energy consumption by these HVAC industry workhorses.

**CWS PTAC-0011** is a moisture proof PCBA with a combination of software, firmware and circuitry designed to optimize efficiency of operation of PTAC/PTHP units through intervening control of PTAC / PTHP system component activity. Subtle influences on system activity result in substantial savings in PTAC operating cost; usually about 10-12%.

**PTAC/PTHP Control Panels** usually have buttons or dials to set the machine to condition the air in a room to a desired temperature. When the room reaches the temperature set point, the PTAC heat exchanger unit / cooling compressor cycles off.

The fan, however, continues to run for thirty to sixty seconds. Studies show that PTAC / PTHP heat exchanger coils also retain energy after the compressor and fan have stop running. The heater remains hot or the coils remain cold and wet. The **CWS PTAC-0011** initiates the recovery of this otherwise wasted energy. The device works by extending the fan operation for a variable time period based on its assessment of previous and current session activity. It takes advantage of system component heating/cooling energy that is, otherwise, lost.

**In Most California Climate Zones**, there is no extreme temperature difference between the desired room temperature and the outside air temperature. As such, the compressor typically runs for three to twenty minutes per cycle. There are climate zones, where, at certain times of the year, the range between outside air and room temperature is sizable and an AC compressor can run continuously for an extended period of time in order to reach the set temperature. Sometimes, the set temperature is never reached, and the compressor runs non-stop throughout the day. In this situation, the CWS PTAC-0011 will force the compressor to rest temporarily for a few minutes, with the fan continuing to run, anytime the compressor runs for approximately twenty continuous minutes. The fan uses water condensed onto the evaporative coils to condition the air while the compressor is off. This results in a few minutes of almost energy free cooling. After the water condensed on the coil is evaporated and the compressor re-starts automatically with the fan running continuously throughout the process.

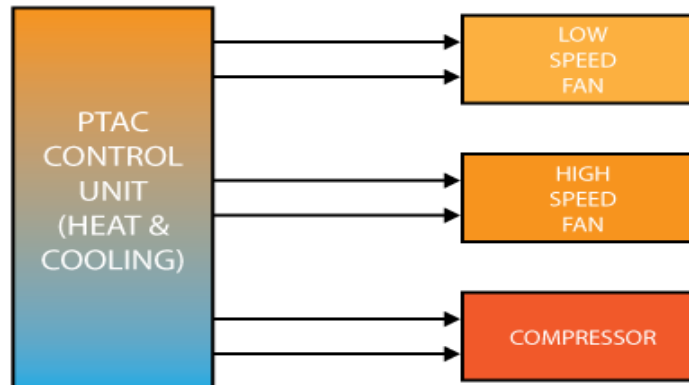
**In most situations**, the amount of time the fan continues to operate after the compressor shuts off varies with the amount of time the compressor has spent on and off during a service session as determined by the CWS-PTAC-0011 microprocessor and firmware.

All things considered, CWS PTAC-0011 recovers and delivers more heating and cooling energy to the conditioned room than is possible with original PTAC/PTHP. This device will improve the efficiency by delivering additional heating or cooling capacity for a reduced amount of additional electric energy (kWh). CWS PTAC-0011 also extends the service life of the equipment through greater efficiency and fewer cycles.

## How It Works

The microprocessor controlled CWS PTAC-0011 is installed at the output of the PTAC's high voltage control board. It has sensors that read the status of the compressor and the software controls the compressor and the fan.

PTAC Control Board Block Diagram (Before installing the CWS PTAC-0011)



The PTAC system usually has three relays; the low speed fan relay, the high speed fan relay and the compressor relay.

- a) The CWS PTAC-0011 is connected in parallel to the existing low speed fan relay which controls the Low Speed Fan of the PTAC unit (See "A" below).
- b) The CWS PTAC-0011 is also connected in parallel to the existing high speed relay which controls the High Speed Fan of the PTAC unit (See "B" below).
- c) The CWS PTAC-0011 is then connected in series with the existing compressor relay which controls the PTAC compressor (See "C" below).

The block diagram below shows the connection details.

- d) The CWS PTAC-0011 has a power supply that accepts universal input range (90vac to 260vac, 60 Hz). It provides all the necessary power to the electronics and relays inside the CWS PTAC-0011

PTAC Control Board Block Diagram After installing the CWS PTAC-0011

