



Form #F1848
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Bard Wall-Mount™ Control Module Applications

LPC – Low Pressure Control: System protection device to disable the compressor as a result of loss of refrigerant charge from the system. Bard WAWL air conditioners with a LPC incorporate a Compressor Control Module (CCM) with a fixed 2-minute bypass. Bard WH/SH heat pumps with an LPC have a low-pressure bypass relay in the electrical circuit that holds the LPC out of the control circuit for approximately 90-seconds on startup. In either case the bypass time on start-up is to allow the refrigerant pressure time to stabilize. If refrigerant pressures are below the set point of the LPC at the end of the timed bypass, the LPC will disable compressor operation. Operating pressure range: Cut-in 30 PSIG +/-5, Cut-out 14 PSIG +/-4.

HPC – High Pressure Control: System protection device to disable the compressor as a result of the refrigerant pressure exceeding 450 PSIG. Most common causes for system high pressure would be restriction of airflow through the condenser coil or a failure of the condenser fan motor or capacitor. If the Compressor Control Module (CCM) on WAWL air conditioners, or the heat pump control on WH/SH heat pumps detects a high-pressure condition, the compressor operation is disabled. Operating pressure range: Cut-out 450 PSIG +/-10, Cut-in 350 PSIG +/-15.

CCM – Compressor Control Module: Has an adjustable 30-second to 5-minute delay-on-break timer. There is also a delay-on-make timing circuit that is active on initial power-up, or any time the power is interrupted. The delay-on-make time will be 2-minutes plus 10% of the delay-on-break time setting. There is no delay-on-make during routine operation of the unit. The CCM also provides the lockout feature (with 1 automatic retry before going to hard lockout requiring a manual reset) for HPC and/or LPC controls, and a 2-minute timed bypass for LPC. The CCM allows for “staggered start” on power interruption or transfer to a generator.

TDR – Time Delay Relay: Installed on an air conditioner or heat pump system to prevent the compressor from short cycling or starting under load because of an interruption of electrical power or short-cycling to thermostat. Not used on units WAWL air conditioners if HPC or LPC with CCM are installed. Time delay period is fixed 5-minutes.

LAC - Low Ambient Control: Maintains an acceptable head pressure during the compressor operating cycle so that mechanical cooling can be maintained, without the concern of evaporator icing, when the outside ambient temperature is below 65F. With the use of LAC mechanical cooling can be maintained down to 0F outdoor temperature by cycling the condenser fan motor to maintain acceptable head pressure. When the system starts the condenser fan motor will remain off until the head pressure builds to 280 PSIG, at which time the fan motor is energized. If the outdoor temperature conditions are warm enough to keep the head pressure above 180 PSIG the fan motor will continue to operate, and if the pressure drops below 180 PSIG the motor will cycle off until pressure builds again to 280 PSIG. Typically an LAC would be installed on any air conditioner or heat pump, which has a conditioned space with a high internal heat gain and requires mechanical cooling regardless of the outdoor temperature. Example: Office buildings, Telecommunication Shelters, Control or Power Distribution Enclosures, Computer Rooms, Retail Stores, Restaurants, Schools or similar Commercial installations. Operating range: Cut-in 280 PSIG +/-10, Cut-out 180 PSIG +/-10.

ALR – Alarm Relay: Available of WAWL air conditioners with “J” control module only. Provides a SPDT set of dry contacts to which a field connection can be made to detect a lockout of the air conditioning system because of refrigerant pressure condition detected by the CCM. Typical use would be telecommunication industry in which the conditioned space is unmanned and an inexpensive means of monitoring an A/C system malfunction.

SK - Start Kit: This kit is a “soft start” device consisting of a PTCR (positive temperature coefficient resistor) that increases the starting torque by momentarily increasing the current to the start winding of the compressor motor. The start kit can only be installed on single-phase equipment (three-phase models do not require as they have much higher starting torque by design). Typical installation would be where marginal line voltage is available to the A/C or Heat Pump unit and the compressor experiences problems on start-up. Installation of the start kit can help eliminate nuisance tripping of the equipment or main panel circuit breaker. Note: Start kits cannot overcome fundamental issues of low supply voltage and/or undersized supply wiring.

ODT – Outdoor Thermostat: Typical installation of the outdoor thermostat would be on a heat pump system in which once a set outdoor temperature is reached the heat m pump compressor would be disabled and electric heat strips only would be used to maintain the conditioned space heating requirements. The ODT can also be used to stage and/or inhibit electric heater operation, depending upon the system design and amount of electric heat installed.

DDC – Direct Digital Control Sensors: These are used with Bard Wall-Mount™ equipment traditionally used in telecommunication buildings and in conjunction with the Bard TCS22 Direct Digital Controller. The DDC sensors provide monitoring of the units operations for (1) indoor blower airflow (2) discharge air temperature (3) compressor operation and (4) dirty air filter sensor, all as input signals to the TCS22 controller system.