ECCIII LonWorks™ BAS Interface

Introduction

PoolPaks equipped with the ECCIII controller can be directly connected to a LonWorks based Building Automation System (BAS). Specifically, the interface is based on a Neuron™ 3150™ with an FTT-10A transceiver for use on a free topology network. 59 control points that include all basic information and set points for the PoolPak dehumidification system are available through the interface.

LonWorks Protocol Details

The LonWorks interface of the ECCIII is implemented with Echelon's Neuron 3150 and an FTT-10A transceiver for use on a TP/FT-10 channel at 78.125 kbps. The protocol implementation complies with ANSI / EIA Standard 709.1. For more information on the LonWorks protocol, refer to www.lonmark.org.

ECCIII LonWorks Configuration Parameters

The four LonWorks configuration parameters are accessed by pressing Key **I** on the ECCIII's Remote Terminal Unit (RTU). The password to access the service menu is 0005.

After successfully entering the password, use the down arrow key to scroll down the list of parameters. The four BAS interface parameters are:

> **062. Baudrate** – This parameter sets the baud rate for the onboard serial port. It should be set to **4800** for use with a LonWorks interface. The factory default setting is 19200.
>
> **BAS Addr** – This parameter must be set to **1** for proper operation of the LonWorks interface. The factory default setting is 1.
>
> **LonWorks Inst** – When set to **Yes**, this parameter enables the LonWorks communication mode of the ECCIII. The factory default setting is No.
>
> **Ser Port Proto** – This parameter sets the protocol that the ECCIII will use for the onboard serial port. For LonWorks operation, it must be set to **RS485**. The factory default is RS485.

The ECCIII must be rebooted after changing the value of any of these parameters.

Physical Network Connection

The terminal blocks for field connection to the LonWorks network are located in the PoolPak's main control panel. The block is labeled T16. Terminals 1, 2, and 3 are used for connection to the network with the following functions:

Terminal ID	Function
T16.1	Tx/Rx + (A)
T16.2	Tx/Rx – (B)
T16.3	Ground

PoolPak recommends the use of 24 AWG, Category 5, shielded, twisted pair cable. The maximum cable length is dependent on the network topology, but the distance from the ECCIII to any other node on the network segment cannot be more than 800 feet. The maximum total wire length of the network segment cannot exceed 1450 feet. For more information on wire length and approved types, refer to www.lonmark.org. Use two wires from the same pair for connection of T16.1 and T16.2. Use both wires from a second pair for connection of T16.3.

The LonWorks interface card of the ECCIII does not contain a termination resistor. A termination resistor must be installed in the field according to the LonWorks free topology network guidelines. Typically, a single 52.3 ohm resistor must be installed somewhere on the network.

Control Points Mapping

The ECCIII's LonWorks interface provides 59 control points that include all basic status information and set points for the PoolPak dehumidification system. PoolPak supplies an .XIF file containing the necessary information to integrate the PoolPak dehumidifier into a BAS network. The .XIF file can be obtained from the download area of PoolPak's website, www.poolpak.com. The following table lists the available points along with their Standard Network Variable Types (SNVT).

SNVT	Description	Variable Name	Direction
1	Supply Fan Current	nvoSplyFanCurr	Output
1	Return Fan Current	nvoRtnFanCurr	Output
1	System 1 Compressor Current	nvoCmpr1Curr	Output
105	Return Air Temperature	nvoRtnAirTemp	Output
105	Outside Air Temperature	nvoOutsAirTemp	Output
81	Exhaust Damper Actual Position	nvoExhDprFdBkSig	Output
81	Recirc Damper Actual Position	nvoRcrDprFdBkSig	Output
81	Outside Damper Actual Position	nvoOutDprFdBkSig	Output
105	Air Off Evap Temperature	nvoAirOffEvapTemp	Output
105	Cold Surface Temperature	nvoSurfaceTemp	Output
81	Return Air Relative Humidity	nvoRtnAirRH	Output

81	Outside Air Relative Humidity	nvoOutsAirRH	Output
81	Air Off Evap Relative Humidity	nvoAirOffEvpRH	Output
1	System 2 Compressor Current	nvoCmpr2Curr	Output
105	Pool 1 Water Temperature	nvoPoolTemp1	Output
105	Pool 2 Water Temperature	nvoPoolTemp2	Output
105	Supply Air Temperature	nvoSplyAirTemp	Output
29	Return Air CO2 Level (ppm)	nvoRtnAirCO2Lvl	Output
8	Fuzzy Logic Damper Variable	nvoFzyDprChg	Output
8	Fuzzy Logic Return Temp Var	nvoFzyRatCmprChg	Output
8	Fuzzy Logic Return Dewpoint Var	nvoFzyDptCmprChg	Output
81	Requested Outside Damper Pos	nvoOutsDprPos	Output
8	System 1 Active Fault Code	nvoCmpr1ActvFlt	Output
8	System 2 Active Fault Code	nvoCmpr2ActvFlt	Output
8	Compressor Stages Desired	nvoCmprStgsDes	Output
9	Compressor Stages of Heat/Cool	nvoCmprHtClStgs	Output
8	Compressor Stages of Dehumid	nvoCmprDehStgs	Output
8	Damper Position Limit Code	nvoDprLimitCode	Output
8	System 1 Fault Count	nvoCmpr1FltCount	Output
8	System 2 Fault Count	nvoCmpr2FltCount	Output
8	Return Air Temperature Set Point	nvoRtnTempSetp	Output
8	Pool 1 Water Temp Set Point	nvoPoolTempSetp	Output
8	Pool 2 Water Temp Set Point	nvoPoolTemp2Setp	Output
8	Return Air RH Set Point	nvoRtnRHSetp	Output
8	Damper Min Pos Limit Set Point	nvoDprMinLimSetp	Output
8	Damper Max Pos Limit Set Point	nvoDprMaxLimSetp	Output
8	Return Air Temperature Set Point	nviRtnTempSetp	Input
8	Pool 1 Water Temp Set Point	nviPoolTempSetp	Input
8	Pool 2 Water Temp Set Point	nviPoolTemp2Setp	Input
8	Return Air RH Set Point	nviRtnRHSetp	Input
8	Damper Min Pos Limit Set Point	nviDprMinLimSetp	Input
8	Damper Max Pos Limit Set Point	nviDprMaxLimSetp	Input
8	Aux Air Heat Stages Active	nvoAuxAirHtStgs	Output
8	System 1 Operation Mode	nvoCmpr1Mode	Output
8	System 2 Operation Mode	nvoCmpr2Mode	Output

95	System 1 Pool Water Flow	nvoWaterFlow1	Output
95	System 2 Pool Water Flow	nvoWaterFlow2	Output
95	Occupied Mode Status	nvoOccMode	Output
95	Purge Mode Status	nvoPurgeMode	Output
95	System 1 ACC Status	nvoCmpr1ACCOK	Output
95	System 2 ACC Status	nvoCompr2ACCOK	Output
95	Aux Pool Water Heater 1	nvoAuxPoolHeat1	Output
95	Aux Pool Water Heater 2	nvoAuxPoolHeat2	Output
95	Force Occupied Mode	nviForceOcc	Input
95	Force Unoccupied Mode	nviForceUnocc	Input
95	Force Purge Mode	nviForcePurge	Input
95	Force No Purge Mode	nviForceNoPurge	Input
95	Active Alarm Present	nvoActvAlmPres	Output
95	Clear Active Alarm	nviClearActvAlm	Input

Changing a Set Point

Two variables are allocated for each set point, an input and an output. To change a set point, set the input variable to the new set point value. Verify that the ECCIII has accepted the new value by reading the value back from the corresponding output variable. There are value limits for each set point. If the BAS tries to set an inappropriate value, the ECCIII will apply the limits to the requested change. The BAS can detect this event by verifying the change in the output variable for the set point. The set point variables are integers representing the values in Fahrenheit or percent.

Controlling Occupied and Purge Modes

The BAS can control the PoolPak's Occupancy and Purge Modes directly. This control overrides all internal schedules and controls in the ECCIII. To force occupied mode, set the nviForceOcc variable to (100.0 1) and the nviForceUnocc variable to (0.0 0). To force unoccupied mode, set the nviForceOcc variable to (0.0 0) and the nviForceUnocc variable to (100.0 1). Use this same process to control purge mode with the nviForcePurge and nviForceNoPurge variables.

Active Alarm Flag Control

The nvoActvAlmPres variable indicates the status of the ECCIII's alarm flag. This status corresponds to the red light inside the RTU's alarm button. When the status is (xxx.x 1), there is an uncleared alarm present in the ECCIII. To clear the alarm, set the variable nviClearActvAlm to (0.0 0). If there are no active alarms in the system, the value of nvoActvAlmPres will change to (0.0 0). If there are still active alarms present, the value of nvoActvAlmPres will remain (xxx.x 1).

Service Pin Function

The LonWorks service pin function is activated by briefly shorting the two pins on the ECCIII's LonWorks interface card. This card is located in the serial port of control module CM1. The green LED next to the pins will illuminate when this function is activated.

Wink LED

The green LED next to the service pins is used to display a "wink." It will illuminate for approximately one second when the LonWorks card receives a wink message. A steady flash of the LED indicates that the LonWorks interface card is not commissioned.

Error LED

The red LED next to the service pins is used to indicate a communication problem between the LonWorks interface card and the ECCIII.

Interface Card Field Setup

The ECCIII's LonWorks interface card is shipped from the factory with the application software preinstalled. After the PoolPak unit has been connected to the LonWorks BAS, it will be necessary to commission the ECCIII's interface card. This can be done with a LonWorks service tool such as LonMaker from Echelon. For more information on this process, please refer to the documentation for the service tool.

Troubleshooting

Symptom	Possible Cause	Solution
The service tool cannot see the ECCIII on the LonWorks network.	The ECCIII or the service tool are not properly connected to the network.	Correct network wiring.
	Power to the ECCIII is off.	Turn on power to the ECCIII at the PoolPak control panel.
	The service tool cannot see the ECCIII unless it broadcasts a service pin message.	Briefly short the ECCIII's service pins to broadcast a service pin message.
The variable values sent by the ECCIII are different than those shown on the RTU.	Incorrect LonWorks parameter values in the ECCIII.	Review parameter values and adjust as necessary.
	The LonWorks Inst parameter is set to No.	Set the LonWorks Inst parameter to Yes.
Set point changes are different than requested by the BAS.	Requested set point change is outside of the acceptable range.	Select set points based on the acceptable range.

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