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# **ELOTECH R-2x00 Temperature Controls**

## **Application Note**

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This document describes how to configure a Paradigm operator interface terminal to allow communications with an Elotech R-2x00 Temperature Controller. The communications protocol supports access to pertinent parameters. Please read this document carefully before attempting to configure communications with these devices.

## Introduction

The EDICT-97 configuration software has been designed to allow the user to enter a command mnemonic and number in a manner that should be familiar to the user of an Elotech R-2x00 Multi-Zone Controller. The driver allows the exchange of data with the Controller.

## Accessing Data

The programmer ordinarily selects the desired 2 character command code and the zone for the desired parameter. If the parameter is one that supports fractional values, the number of decimal positions in the display is also specified.

There is one special code assigned that can be applied for each zone number. That code is 00. When displayed, it will indicate the parameter and error code for the most recent error in that zone. See the Responses section for details.

On rare occasions, it will be necessary for a changed value to be saved into what is called Power Fail Storage, that is, the parameter value is written into memory that will restore the saved value when the system is re-powered. This storage is permitted only a limited number of write operations. Exceeding that limit will permanently damage the controller's ability to use that feature. If the programmer must save parameters to Power Fail Storage, those commands are selected by using the prefix PF.

**\*\* IT IS HIGHLY RECOMMENDED THAT THE PROGRAMMER USE A COMMUNICATION BLOCK FOR ALL POWERFAIL WRITES, AND TO SET THAT BLOCK TO MANUAL UPDATE.** Manual Update requires the specific instruction "WriteBlock(block designation) to perform the write. Assigning a Power Fail Write via Direct PLC References ( e.g. [PF1A(Zn)] ) runs the serious risk of continual changes in the Interface which will exceed the write limit very quickly.

The Parameter Group function ( Code 15 ) has not been implemented at this time.

## Reading and Write with Decimal Places

The driver treats all values as integers. Therefore, displayed decimal positions are cosmetic, but the selected number of positions is taken into account when computing the value to be sent to the controller, or returned from it. For example, if the integer field has a template with one decimal place, 00.0, and the operator enters what appears to be 12.3, the internal value is really 123. When the driver obtains that value to write, and if one decimal position was actually specified, the driver will transmit 123 with an exponent of -1. If the programmer actually specified 2 decimal places, but displayed 1, then the value sent to the controller would be 123 with an exponent of -2 ( 1.23 ). Similar considerations apply to Read operations.

The driver will round up any value when the leftmost digit to be discarded is 5 or greater. It is up to the programmer to match the number of decimal places with that of the parameter to be displayed or entered.

## Unit Addressing

The Elotech Controller requires a Unit Address of 1-255. This address is found in Comms Devices.

## Responses

When a read request is made the numeric value is returned. If a read error is detected on a read, the parameter and the error response code will be stored, and a value of 0 will be returned.

When a write operation is made, the controller will return a response code. If that value is 0, the write was successful. If the response code is not 0, the driver stores the parameter and the error response code.

Error values are stored, as hex, as a 16 bit number, with the most significant 8 bits containing the parameter, and the least significant 8 bits containing the error number. The programmer can select a "Last Error-Instruction code 0" for each zone, and use that for display and diagnostics just as any other value can be used.

It is recommended that the programmer, if displaying the code, use the template:

<16>00 00

for the integer display. Then the parameter number will be on the left, the error code on the right. The currently defined error codes are:

**01 H - Parity error**

**02 H - Check sum error**

**03 H - Procedure error**

**04 H - Non-compliance with specified range**

**05 H - Zone number not allowed / available.**

**06 H - The addressed parameter is a read-only parameter**

**FEH - Error during writing into the powerfail storage**

**FFH - General error**

Writing a 0 to the 00(Zn) location will clear the error. No other write value has any effect. The previous error will remain as long as the interface remains powered.

## Knowledge of Unit Operation Is Assumed

In all cases, the simple principle of 'pass-through' is maintained: there is no attempt to validate a value in terms of the end use of the unit: both familiarity with the Controller functions and knowledge of system operation are assumed.

## Communications

### RS232 Connection

<b>Paradigm RS232 Port</b>	<b>Elotech R-2x00</b>
Pin 1 (Tx)	TXD In
Pin 2 (Rx)	RXD Out
Pin 3 (RTS)	
Pin 4 (CTS)	
Pin 5 (Comm.)	GND

In addition a link must be fitted between Pin 3 (RTS) and Pin 4 (CTS) on the Paradigm.

### RS485 Connection

<b>Paradigm RS232 Port</b>	<b>Elotech R-2x00</b>
Pin 6 (TxA)	RS-485 A
Pin 7 (TxB)	RS-485 B
Pin 8 (RxA)	RS-485 A
Pin 9 (RxB)	RS-485 B
Pin 10 (Comm.)	GND

In addition fit a 1K resistor between Pin 9 (RxB) and Pin 10 (0V) on the Paradigm.