# red lion

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# Operator Interface Terminals

## MODEL CX-150
## 2 X 40 VFD OPERATOR TERMINAL

- *2 LINE X 40 CHARACTER VACUUM FLUORESCENT DISPLAY*
- *500 ALARM POINT LOGGER*
- *RECIPE HANDLING*
- *COMPREHENSIVE REPORT GENERATION*
- *UNLIMITED PASSWORD PROTECTION*
- *REAL TIME CLOCK, BATTERY BACKED*
- *EXPRESSION EVALUATION*
- *32 BIT / FLOATING POINT MATH*
- *DIRECT, NETWORK (Including Multiple protocols) OR MODEM LINK TO PLC*
- *NEMA 4/IP65 STEEL ENCLOSURE*
- *CE COMPLIANT*

## DESCRIPTION

The CX-150 from the Paradigm Range of operator interfaces meets the ever increasing demands of industry for powerful easy-to-use terminals. Both hardware and software are designed to allow the user to easily upgrade and take full advantage of our continuing development and improvements to our products.

## SPECIFICATIONS

1. **POWER REQUIREMENTS**: 11 min. to 30 max. VDC @ 4.7 W
   **Power Up Current**: 2.5 A for 25 msec. max.
   Must use a Class 2 or SELV rated power supply.
2. **DISPLAY**: 2 lines of 40 characters, 5 mm high Vacuum Fluorescent display
3. **KEYPAD**: 5 screen legendable soft keys, raise, lower, next, previous, exit, menu, alarms and mute keys, all with Tactile feedback.
4. **MEMORY**: 128 K (64 K user) battery backed RAM (Battery life expectancy 10 years). Optional factory fit expansion to 256 K (192 K user).
5. **SERIAL PORTS**: One RS-232 for PC or printer connection, one RS232 and one RS485 for PLC connection up to 19200 Baud. (Can be used as a three port device for multiple protocol applications)

6. **PHYSICAL DIMENSIONS**: L = 285 mm, H = 106 mm, D = 57 mm.
7. **CONSTRUCTION**: Metal enclosure with NEMA 4/IP65 front plate when correctly fitted with the gasket provided. This unit is rated for NEMA 4/IP65 indoor use. Installation Category I, Pollution Degree 2
8. **FIELD CONNECTIONS**: Removable screw terminal blocks.
9. **ENVIRONMENTAL CONDITIONS**:
   **Operating Temperature**: 0 to 40°C
   **Storage Temperature**: -20 to 80°C
   **Operating and Storage Humidity**: 80% max. relative humidity (non-condensing) from 0°C to 40°C.
   **Altitude**: Up to 2000 meters
10. **WEIGHT**: 2.1 lbs. (0.95 Kg)

### ORDERING INFORMATION

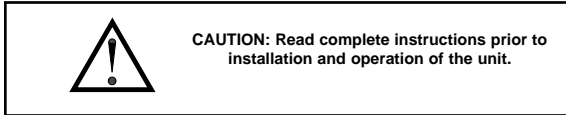| MODEL NO. | DESCRIPTION | PART NUMBER |
|-----------|-------------|-------------|
| CX-150 | VFD, 4 X 20, 8 Function keys, 128 K memory | CX150000 |
| | VFD, 4 X 20, 8 Function keys, 256 K memory | CX150010 |

## DIMENSIONS  "In inches (mm)"

PANEL CUT-OUT
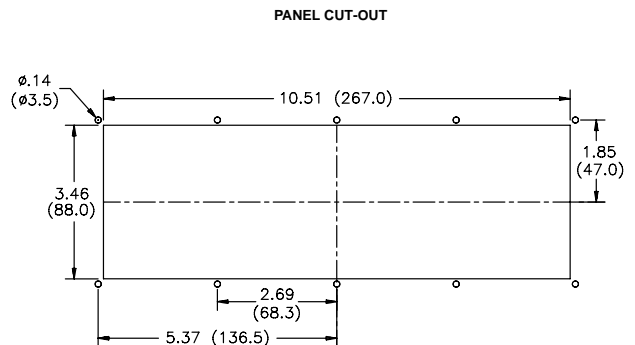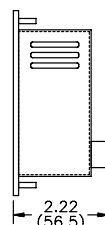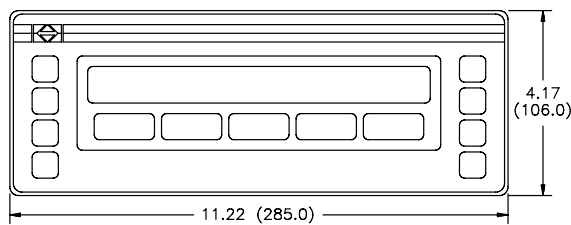
## SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

> ⚠ **CAUTION: Read complete instructions prior to installation and operation of the unit.**

## ORDERING INFORMATION

| MODEL NO. | DESCRIPTION | PART NUMBER |
|---|---|---|
| CL-05 | LCD, 2 X 20, 3 Soft keys, 128 K memory | CL050000 |
| CL-10 | LCD, 2 X 20, 8 Function, 3 Soft keys, 128 K memory | CL100000 |
| | LCD, 2 X 20, 8 Function, 3 Soft keys, 256 K memory | CL100010 |
| CL-15 | LCD, 2 X 40, 5 Soft keys, 128 K memory | CL150000 |
| | LCD, 2 X 40, 5 Soft keys, 256 K memory | CL150010 |
| CL-20 | LCD, 4 X 20, 8 Function, 3 Soft keys, 128 K memory | CL200000 |
| | LCD, 4 X 20, 8 Function, 3 Soft keys, 256 K memory | CL200010 |
| CX-100 | VFD, 2 X 20, 8 Function keys, 128 K memory | CX100000 |
| | VFD, 2 X 20, 8 Function keys, 256 K memory | CX100010 |
| CX-150 | VFD, 2 X 40, 5 Soft keys, 128 K memory | CX150000 |
| | VFD, 2 X 40, 5 Soft keys, 256 K memory | CX150010 |
| CX-200 | VFD, 4 X 20, 8 Function keys, 128 K memory | CX200000 |
| | VFD, 4 X 20, 8 Function keys, 256 K memory | CX200010 |
| | EDICT-97 Development Kit Includes Software, Manual and 9-pin RS232 Programming cables | SFEDT |
| | Communication Cables | P895xxxZ |

## TROUBLESHOOTING

For further technical assistance, contact technical support at the appropriate company numbers listed.

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# COMMON FEATURES FOR CHARACTER BASED OPERATOR TERMINALS

## PROGRAMMABILITY

### Event Driven Configuration Tool

Edict 97, an extremely powerful Windows 95/3.11 based software program, provides for the intuitive configuration of every aspect of the operator interface's behavior. The requirement for time consuming PLC ladder logic is drastically reduced by the unique event driven approach of EDICT 97. The capability of this program, in conjunction with the PLC and the Paradigm operator interface unit, ensures a great deal of advanced functionality for your system. This powerful PLC/Paradigm system provides many of the capabilities and features normally associated with the more complicated and costly PC/SCADA systems. Display pages are easily generated, including PLC and internal variables, text strings, or bar charts. All dynamic elements are also available as alarms, recipes, triggers, and reports, for the run time software. After completion of the programming, the program is directly downloaded to the operator interface from your PC, without any compiling or saving requirement. When you require a change in your program, EDICT 97 loads only the change, not the entire program, saving valuable on-line time.

## DYNAMIC DISPLAY PAGE ELEMENTS

Each display page has provisions to show static and dynamic information, including data variables, text messages, time, and date.

*Data Variables* can be either PLC derived or internally generated, either in data entry or display only mode. The Paradigm unit has an extremely powerful math capability, allowing the operator to manipulate the variables to meet the specific application's demands. If required, the display can be formatted to BCD, binary, hex, floating point, and string. Upper and lower limits of data entry variables are fully supported and able to be password protected.

*Text Message Animation* enables several different types of animated text from a local or global message table to be displayed. The message displayed is dependent on the condition of the particular controlling expression. The controlling expression may be a PLC bit level, a timer value, preset counter condition, or any one of a wide variety of message triggers.

*Time and Date* in the Paradigm unit has the capability to display in any combination of year, month, day, hours, minutes, and seconds.

*Bar Graphs* in horizontal format are easily attached to data variables. The partial or full length bar graph displays can be scaled and offset to optimize the required display effect.

## SECURITY

The password protection scheme provides the ultimate in tamper-proof capability. Access can be limited on a unit, page, recipe, or even individual data entries.

## ALARMS

The Paradigm unit can monitor and log from 100 to 500 alarms, depending on model. Such triggers as a simple bit level transition, a PLC coil activation, or a complex application algorithm can activate an alarm. The alarms can be time and date stamped, with an automatic screen display and/or downloading to a printer for hard copy recording purposes.

## REAL TIME SCHEDULE

Real time schedule allows for repetitive or one time task to take place in the system. Typically a schedule action similar to...At 1:55 PM on Monday, Wednesday, and Friday, print the production report...is required in the application. In conjunction with the recipe capabilities, a downloading of a special recipe can be requested by the real time schedule feature.

## USER PROGRAMS

This feature offers the user the ability to incorporate custom application requirements via a powerful program language. For example, a program designated "Calculate Volume" which determines the amount of fluid in a round tank at specific temperatures could be created. This program would be triggered to run and display each time the page denoted as "Volume Now" is requested.

The ability to customize to your application's specialized needs is easily solved with the user program capability.

## KEYBOARD EDITING

All the interface keys can be programmed to perform virtually unlimited functions with each key, having multiple actions assigned to three types of key events: key pressed, key held down (auto repeat), and key released. Typical key actions would be Go to page, set value, load recipe, view alarms, print report, and many more.

## COMMUNICATIONS

With over 70 communication drivers available, the Paradigm operator interface offers a wide range of connectivity including: PLCs, Variable Speed Drives, Temperature Controllers, Bar Code Readers, etc. Utilizing real PLC data references, the automatic comms configuration optimizes the system's communication performance. In the event that your specific driver does not appear on the Paradigm drivers list, let us know, as this list is always being expanded to meet our customers' needs.

# HARDWARE INFORMATION

This bulletin contains a variety of information related to the installation and operation of the Operator Interface supplied. Ideally, you should read this document thoroughly before attempting to use the equipment. For information about the software aspects of the terminal, please consult other documentation.

## CONTENTS OF PACKAGE

The Operator Interface is supplied in a packaging box containing the following...

◆ The interface terminal itself.
◆ A NEMA 4/IP65 rated mounting gasket.
◆ A bag containing panel hardware.
◆ This hardware bulletin.
◆ If any of these items is missing, please contact your supplier immediately.

## POWER SUPPLY REQUIREMENTS

The Operator Interface requires a 24 V power supply rated at 0.5 A unless otherwise stated on the label.

◆ The Operator Interface requires a power supply capable of supplying a current of 500 mA at a regulated voltage of 24 V. Supplies providing between 18 V and 30 V are also suitable.
◆ The terminal may take as little as 100 mA in certain circumstances, so be sure that the chosen power supply can operate correctly with this load. Large switch-mode supplies tend to need a certain minimum load before they will operate correctly.

In any case, it is very important that the power supply is mounted correctly if the unit is to operate reliably. A very high proportion of reported problems are caused by incorrect power supply installation, so please take care to observe the following points...

◆ The power supply must be mounted close to the unit, with usually not more than 6 feet of cable between the supply and the Operator Interface. Ideally, as short a length as is possible should be used. In particular, the power supply should not be mounted on the back of the panel when the Operator Interface is installed in the panel door unless a short cable run can be achieved.
◆ The wire used to connect the Operator Interface's power supply should be of at least 22 gauge wire. If a longer cable run is used, you should use even thicker cable. The routing of the cable should be kept away from large contactors, inverters and other devices which may generate significant electrical noise.

## BATTERY BACKUP ISSUES

The Operator Interface is supplied with a Lithium Battery designed to maintain the internal memory and real-time clock during power outages. Assuming the operator interface terminal is powered up for 50% of the time, this battery should last over 4 years. A "Battery Low" system variable is available so that the programmer can choose specific action(s) to occur when the battery voltage drops below its nominal voltage.

It is possible to replace the battery without losing the contents of the Operator Interface's memory, but this does not reduce the importance of ensuring that a copy of the terminal's configuration is kept readily at hand to allow the terminal to be re-loaded in the case of mishaps. Please remember that it is not possible to extract the contents of a terminal for subsequent re-loading, so the importance of keeping a copy on disk cannot be over stressed.

## CHANGING THE BATTERY

To change the internal battery, follow these steps...

◆ Remove the power and PLC communications connector from the unit.
◆ Remove the four screws from the rear-cover.
◆ Remove the cover, ensuring that the right-hand edge is raised first to avoid fouling the earth stud. You may have to pivot the cover to an angle of about 30°to achieve this.
◆ If you wish to avoid losing the terminal's configuration, reconnect the power connector and re-apply power. Note that this will require the panel to be powered-up and, as such, only suitably qualified staff should carry out this procedure.
◆ The battery is located in a holder on the main circuit board. This should be clearly visible. Remove the battery from its holder.
◆ Place the new battery in the holder. The terminal's power supply can now be disconnected, if you re-applied power in the step above.
◆ Replace the lid, screws and connector by following the above procedure in reverse. You may like to make a note of the date the battery was replaced to allow planned maintenance to be carried out.
◆ If you did not keep the unit powered-up during battery replacement, hold down the EXIT and MUTE keys on the keyboard and remove and then re-apply power. This will clear the internal memory and thus the suitable configuration database should then be re-loaded.

Please note that the old battery must be disposed of in a manner which complies with your local waste regulations. Also, the battery must not be disposed of in fire or in a manner whereby it may be damaged and its contents come into contact with human skin.

# INSTALLATION & CONNECTIONS

The unit meets NEMA 4/IP65 requirements for indoor use, when properly installed. The units are intended to be mounted into an enclosed panel.

## Installation Environment

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

Continuous exposure to direct sunlight may accelerate the aging process of the bezel. The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

# CONNECTING TO A PLC

The Operator Interface is designed to operate with a PLC. A serial communication connection must be made between the operator interface terminal and PLC, and the details of this connection vary according to which PLC is used.

The following section lists the connection details for the PLC to be used .

## PLC TYPE

Details on how to connect to most PLCs are available on request from RLC.

## CONNECTING TO AN IBM PC/AT

The Operator Interface is programmed via software running on an IBM PC/AT or a compatible computer. The connection between the PC/AT and the operator interface terminal is made via a custom cable provided with the EDICT Developer's Kit. The cable is designed for a 9-way serial port. Please contact your supplier if you require a 25-way version.

## PROGRAMMING PORT PIN OUT

The Operator Interface's programming port is sometimes used to connect other RS-232 devices, such as printers. The following illustration and table gives the pin-out of this port to enable such connections to be made.

| RJ11 FEMALE | |
|------|------|
| PIN | NAME |
| 1 | RTS |
| 2 | Tx |
| 3 | GND |
| 4 | GND |
| 5 | Rx |
| 6 | CTS |
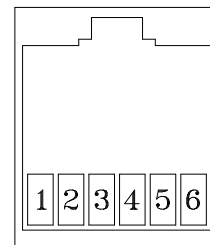


The above table denotes the pin names of the programming port. When connecting, the pin name at the programming port is connected to the opposite of that pin name at the destination device.

# MOUNTING INSTRUCTIONS

The Operator Interfaces are designed for through-panel mounting. A neoprene gasket is provided, to enable sealing to NEMA 4/IP65 specification. The panel cut-out diagram for the model supplied is provided. All mounting holes should be drilled for 0.14" clearance. Care should be taken to remove any loose material from the mounting hole to avoid such metal falling into the Operator Interface itself during installation.

# FUNCTION KEY STRIPS

The function keys on the Models CL-10, CL-20, CX-100, and CX-200, have clear windows that permit the user to insert labels appropriate to the process. A formatted page is supplied upon which the user can enter function names (e.g. RUN, PRINT, etc.). These strips are inserted from the rear of the panel through slots below the function keys located underneath the gasket.

Take care that the ink applied will not rub off of the paper, or else blemishes will be left on the inside of the window. Laminated paper or plastic film can prove easier to insert than normal photocopier paper. It also helps if the starting edge of the paper has about 0.25 inches of its corners cut off at a 45 degree angle.

*Note: Add an additional 1.5" to label length to allow for easier insertion and removal.*