

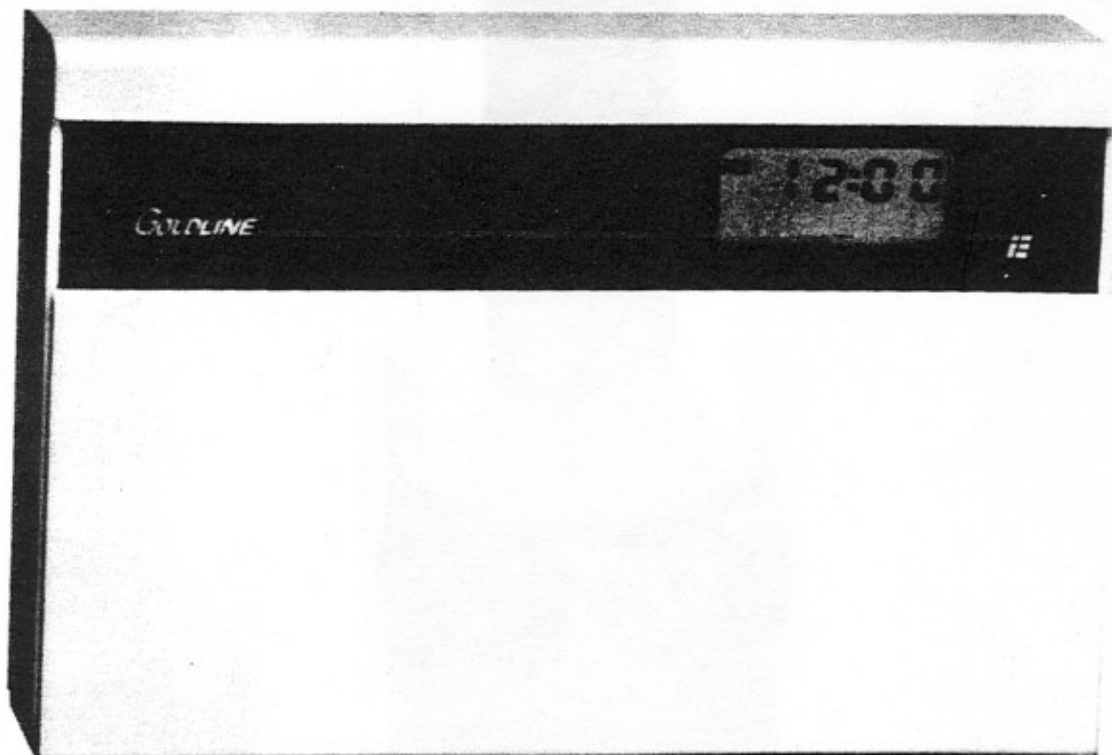
GOLDLINE

DM-30

Temperature Monitor



PROGRAMMING, INSTALLATION, AND APPLICATIONS MANUAL



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PROGRAMMING, INSTALLATION AND APPLICATION MANUAL

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GENERAL INFORMATION

The Independent Energy "Goldline" DM-30 is a **PROGRAMMABLE, DIGITAL TEMPERATURE MONITOR**. It can be used as a stand-alone monitor or it can be interfaced directly with a "Goldline" CM-30 or SP-30 control (via an Independent Energy Bus Cable *), or combined with virtually any output equipment.

When interfaced directly with a CM-30 or SP-30 control, the DM-30 digitally monitors the CM-30 or SP-30 sensors, their outputs and up to two additional sensors. EXAMPLE: A combination DM-30/CM-30 setup for control and monitor of a solar heating system.

The DM-30 is programmable by virtue of eight internally located micro-switches. These installer-accessible micro-switches provide the capability for "field" selection of the various options integral to every DM-30. These options include:

- CM-30 interfacing, SP-30 interfacing, other equipment interfacing or use as a stand-alone monitor
- Temperature display in °F or °C
- Capability to operate on 60 Hz or 50 Hz line frequency

Other DM-30 features:

- Digital clock
- Memory storage of one sensor (T6) maximum and minimum temperatures

* The Independent Energy Bus Cable (ABC) is available in 10, 50 and 100 ft. lengths and includes pre-wired adapter ends (one on each end) for quick plug-in interfacing of combination DM-30/CM-30 and DM-30/SP-30 systems.

NOTE: Upon initial power-up, the DM-30 will flash 12:00 AM. It will start to keep time but will continue to flash until the clock is set (see OPERATION 1). Each time the display is cycled back to TIME NOW, it will continue to flash until the clock is set.

1. TO SET THE CLOCK...

1. Press the TIME NOW key.
2. Repeatedly press the HRS key until the correct hour (including AM or PM) appears on the display.
3. Repeatedly press the MINS key until the correct minutes appear.

2. TEMPERATURE DISPLAY...

Description:

The DM-30 can monitor up to 6 temperature sensors (Independent Energy 10K ohm thermistors, see "WIRING", Fig. 6 & 7), displayed by pressing keys T1 through T6.

Temperature range: -27 to +227°F ($\pm 1^\circ$).

OPERATION, cont'd.

Temperatures below this range display as "LO". Temperatures above this range display as "HI".

NOTES:

1. See Programming Reference Chart for °C display option.
2. See APPLICATIONS I for details pertaining to the temperature display for combined DM-30/SP-30 or DM-30/CM-30 systems.
3. Any sensor terminals left open will display as "LO". Shorted sensor terminals display as "HI".
4. A pencil can be used to note the sensor locations in the appropriate log column to the right of the keyboard.

3. INPUT INDICATORS...

Description:

Two outputs from other sources can be monitored by the DM-30 via the input #1 (IN-1) and input #2 (IN-2) terminals.

These inputs to the DM-30 are displayed as indicators **1** and **2** (See P. 3, Fig. 1).

NOTES:

1. See APPLICATIONS I for details pertaining to indicators **1** and **2** for combined DM-30/SP-30 and DM-30/CM-30 Systems.
2. No additional wiring to IN-1 and IN-2 required for combined DM-30/SP-30 and DM-30/CM-30 Systems (See "WIRING", Fig. 6).
3. For IN-1 and IN-2 wiring when interfacing other equipment, see "WIRING", Fig. 7.
4. Indicators **3** and **4** are invalid on the DM-30 and should be disregarded.

4. T6 MAX AND T6 MIN...

Description:

T6 MAX and T6 MIN display the highest and lowest temperatures at the T6 sensor since the DM-30 was powered-up or since the last T6 MAX, CLR or T6 MIN, CLR, respectively.

Pressing T6 MAX, then CLR, or T6 MIN, then CLR should be used whenever previous T6 input data is to be erased and only new temperature inputs to T6 are to be considered.

5. THE CLR (CLEAR) KEY...

Use of the CLR key has been explained in the above section, OPERATION 4.

6. WHEN THE POWER FAILS...

WITH BATTERY BACK-UP:

BATTERIES ARE NOT NECESSARY for normal operation of the DLX-30.

However, four "AA" alkaline cells (not provided) may be installed in the subbase, observing the illustrated polarity. This will provide for a minimum four hour carry-over of the:

- Clock
- Memory of the T6 maximum and T6 minimum temperatures

A POWER FAILURE WITH BATTERY BACK-UP IS INDICATED BY THE DISPLAY "PF".

Normal operation resumes when power is restored to the control.

IMPORTANT: During a power failure the DM-30 keyboard is disabled and no temperature inputs are received by the DM-30.

WITH NO BATTERY BACK-UP:

On a power failure, no functions operate and the display blanks.

When the power is restored:

- DM-30 FLASHES 12:00 AM TO ALERT USER OF A PREVIOUS POWER INTERRUPTION.
- T6 MAX and T6 MIN keys display the current T6 sensor temperature.

7. 60HZ OR 50HZ OPERATION...

The DM-30 comes set up from the factory to run on 60Hz line frequency. For 50Hz line frequency operation, see Programming Reference Chart, #1.

APPLICATIONS

I. INTERFACING THE DM-30 WITH AN INDEPENDENT ENERGY "GOLDLINE" SP-30 OR CM-30(CM-32) CONTROLLER...

The DM-30 can be teamed up directly with an SP-30 or CM-30 by means of an Independent Energy Bus Cable. Shown below is a typical DM-30/CM-30 hook-up:

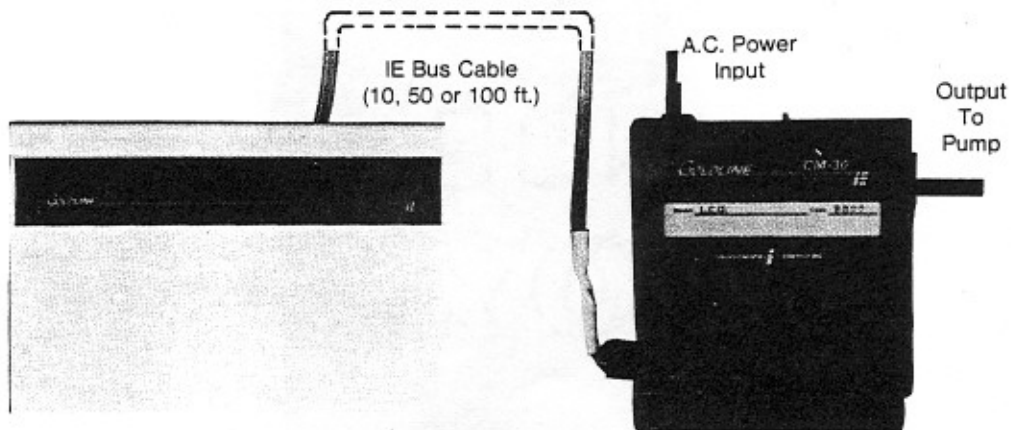


Fig. 2 Combination DM-30/CM-30 System

NOTE: For complete instructions on setting up combination DM-30/CM-30 or DM-30/SP-30 systems, see Programming Reference Chart, #2, "WIRING", Fig.6 and the respective Installation Instructions for the CM-30 or SP-30.

A. When interfaced with a CM-30, the DM-30 provides REMOTE MONITORING of...

- CM-30 storage sensor press T1 (range 10 to 254 $\pm 2^{\circ}\text{F}$)
- CM-30 collector sensor press T2 (range 10 to 254 $\pm 2^{\circ}\text{F}$)
- CM-30 "aux" sensor* press T3 (range -27 to 227 $\pm 2^{\circ}\text{F}$)
- CM-30 pump output displays **1** when on
- CM-30 freeze indicator displays **2** when in recirc mode

In addition, two DM-30 sensors, displaying at T5 and T6, are available for system monitoring.

NOTE: T4 is not available for monitoring and displays as " - - - ".

All of the above is also true when interfacing a CM-32 Draindown control, **EXCEPT**, the **2** indicator displays when the draindown freeze output is ON (i.e. draindown valve is energized, no freezing conditions occurring).

* Use of the CM-30 or CM-32 "aux" terminals is optional. They are available for sensor hook-up for system monitoring, with no control function.

B. When combined with an SP-30, the DM-30 provides REMOTE MONITORING of...

- SP-30 setpoint press T1 (range -27 to 227 $\pm 2^{\circ}\text{F}$)
- SP-30 sensor press T2 (range -27 to 227 $\pm 2^{\circ}\text{F}$)
- SP-30 output displays **1** when on
(**2** is not used in DLX-30/SP-30 systems)

In addition, two DM-30 sensors, displaying at T5 and T6, are available for system monitoring.

NOTE: T3 is not available for monitoring and displays as "LO".
T4 is not available for monitoring and displays as " - - - ".

II. MONITORING AND INTERFACING OTHER EQUIPMENT

The DM-30 can be used to monitor virtually any type of equipment. An example would be where control of temperature is critical, such as with refrigeration units, commercial greenhouses, etc.

Here the DM-30 would provide:

- Digital temperature readout of five remotely located sensors
- Capability to monitor the "on"- "off" status of the equipment via the IN-1 and IN-2 terminals (displays as indicators **1** and **2**).
- Memory of high and/or low temperatures via the T6 MAX and T6 MIN keys

See "WIRING", Fig. 7.

PROGRAMMING

The DM-30 comes from the factory with the following programming micro-switches in the "on" position: A7, C1, C2, C3 and C4. All others are in the "off" position. This corresponds to the following program:

- Set up for stand-alone monitoring (for CM-30 or SP-30 set-up, see below).
- Temperature display in °F.
- 60 Hz operation.

TO CHANGE THE PROGRAM, locate the programming micro-switches, follow the Programming Reference Chart, and adjust the switch positions as required. A pen or pencil can be used to move the switches.

To Access the Micro-switches:

- 1) Separate subbase from front half of DM-30. Four plastic corner posts and side snaps hold the two halves together.

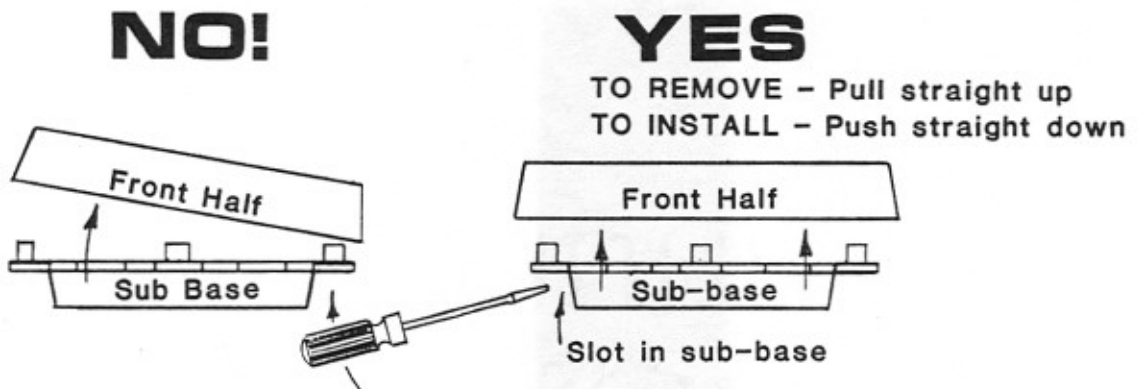
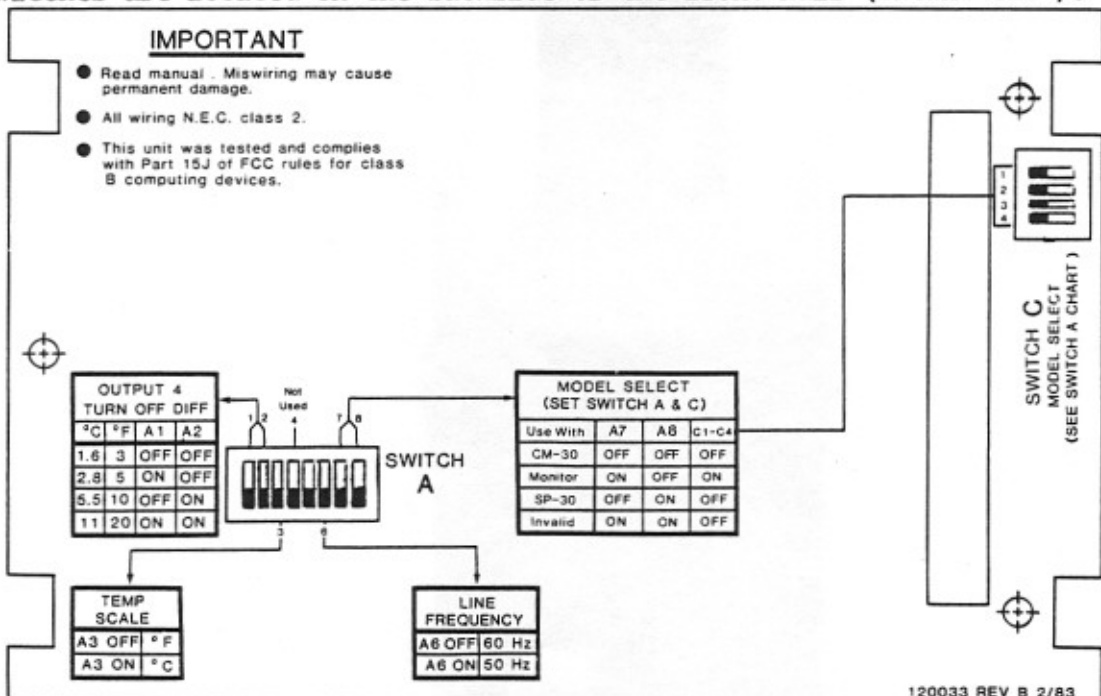


Fig. 3 Separating the subbase from the front half.

- 2) Switches are located on the backside of the front half (shown "off").



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Fig. 4 Backside of the front half of the DM-30.

DM-30 PROGRAMMING REFERENCE CHART

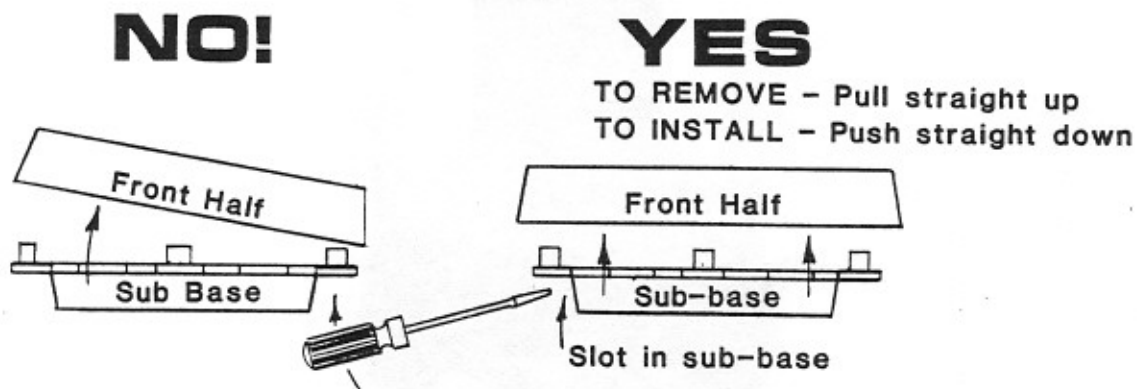
#	Options	Description	To Enable:	Notes
1	Operating Line Frequency	DM-30 runs on 60Hz line frequency	A6=off	See OPER. 7
		DM-30 runs on 50Hz line frequency	A6=on	
2	Equipment Interfacing	CM-30 (CM-32) Interfacing	A7, A8, C1-C4=off	See APPL. I
		SP-30 Interfacing	A7, C1-C4=off A8=on	See APPL. I
		DM-30 as stand-alone monitor or other equipment interfacing	A7, C1-C4=on	See APPL. II
3	Temperature Display Scale	Displays temperature in °F	A3=off	
		Displays temperature in °C	A3=on	

INSTALLATION

INSTALLER MUST BE A TRAINED, EXPERIENCED SERVICE TECHNICIAN.

REQUIRED TOOLS AND MATERIALS: flat head screw driver, drill, screws w/anchors (provided), 18 AWG cable and/or IE Bus Cable (for SP-30 or CM-30 interfacing).

SEPARATING THE SUBBASE FROM THE FRONT HALF



A. MOUNTING

NOTE: Do not mount the DM-30 directly above any heat sources.

1. Separate the subbase from the front half.
2. Use the subbase template provided to mark the screw holes and wiring access hole on the wall.

INSTALLATION, cont'd.

3. Install screws (w/anchors for hollow walls) and cut out wiring access hole.
4. Run the IE Bus Cable or other 18 AWG cable through the access hole.
5. Set the subbase on the screws through the keyhole slots, slide it into position and tighten down on the screws.
6. Wire the DM-30 as per the instructions on the next page. Install batteries if desired (See OPERATION 6).
7. Program the DM-30 (via the micro-switches - See PROGRAMMING) if not already done so.
8. Replace the front half of the DM-30 onto the subbase via the four corner posts.

The DM-30 will flash 12:00 AM upon initial power-up (See OPERATION).

NOTE ON CLEANING: Use only a mild detergent and warm water. DO NOT use abrasive cleansers or solvents.

B. WIRING

All wiring is N.E.C. Class 2. **Disconnect power supply before proceeding.**

CAUTION! 24 VAC WIRING CONNECTED TO SENSOR TERMINALS WILL CAUSE PERMANENT DAMAGE TO THIS UNIT!

CM-30 OR SP-30 INTERFACING

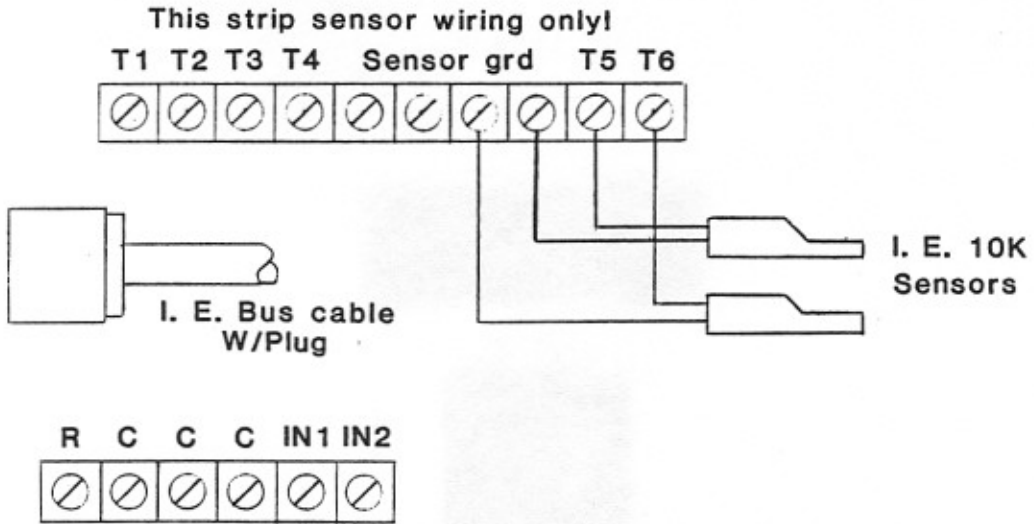
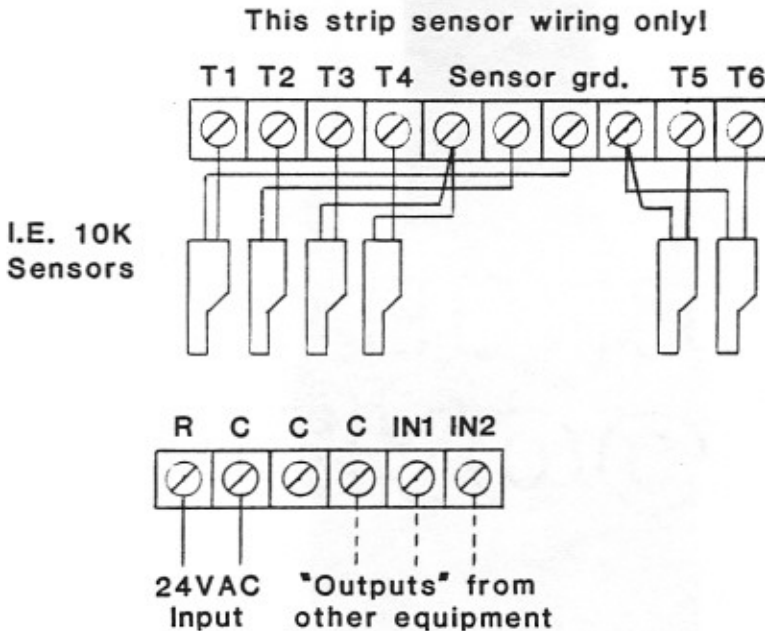


Fig. 6 DM-30 Subbase

NOTE: When interfacing the DM-30 with the SP-30 or CM-30 via the IE Bus Cable, under no circumstances should any connections be made to any of the following terminals: T1, T2, T3, T4, R, C, IN-1, or IN-2.

STAND ALONE OR OTHER EQUIPMENT INTERFACING



This strip power & control wiring 24Vac, CLASS 2 only.

Fig. 7 DM-30 Subbase

C. SENSOR MOUNTING AND WIRING

1. Mechanically mount the sensors (e.g. bolt, hose clamp, etc.) - DO NOT tape or solder. The use of thermally conductive grease applied between sensor and mounting surface will enhance the accuracy of the sensor.
2. Always insulate the sensor to minimize the effects due to ambient temperature. Sensors located outdoors must be protected from rain and snow.
3. Sensor wire should be at least 18 AWG. Sensor wires that are exposed to weather should be suitable for the purpose (neoprene jacket).
4. Shielded wire (e.g. Belden #8760 for indoor use, Belden #8428 for outdoor use) is recommended for sensor wiring runs that travel near other electrical equipment, near A.C. wiring, ham/CB radio transmitters or other sources of electrical interference. Ground the shields to one of the "sensor ground" terminals. DO NOT ground the shields at the sensor end of the sensor wiring.

SPECIFICATIONS

POWER REQUIREMENTS: 20 TO 30 VAC 60/50 HZ, 4 VA MAXIMUM

INPUTS: 30 VAC MAXIMUM, POWER: .01 W. MAXIMUM.
"OFF" THRESHOLD: LESS THAN 1 VAC.
"ON" THRESHOLD: GREATER THAN 8 VAC.

BATTERIES (NOT PROVIDED): FOUR "AA" CELLS FOR RETENTION OF DATA DURING POWER OUTAGES. TWENTY HOURS TYPICAL WITH NEW ALKALINE BATTERIES.

CLOCK ACCURACY: BASED ON 60/50 HZ POWER LINE FREQUENCY.

TEMPERATURE SENSORS: 10 K THERMISTORS AT 77°F

OPERATING AMBIENT TEMPERATURE RANGE: 32 - 122 °F.

TEMPERATURE ACCURACY: ±1°F.

TEMPERATURE MONITOR RANGE: -27 °F. to +227 °F.

DIMENSIONS: LENGTH: 7-5/8" WIDTH: 5-3/8" DEPTH: 1-3/4"

WEIGHT: 1.25 LBS. (LESS BATTERIES)

MOUNTING: WALL (3 SCREWS, REMOVABLE SUB-BASE) OR HANDHELD.

ESD PROTECTED.

EMI/RFI PROTECTED.

FCC NOTICE:

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient the receiving antenna
- relocate the computer with respect to the receiver
- move the computer away from the receiver
- plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems"

This booklet is available from the US Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

TROUBLE SHOOTING

NOTE: If any of the items below fail to resolve your particular control problem, call the factory for further assistance and/or instructions for returning the control - 800-343-0826.

IMPORTANT! Please check the position of the programming micro-switches to verify that the control is programmed correctly before proceeding with the following steps.

PROBLEM	POSSIBLE CAUSE	TEST/CHECK
Display blanks	No A.C. power to DM-30 and no (or low) battery backup	Check for 24 VAC at R&C (if interfaced w/SP-30 or CM-30 then check for 20-38 VDC across gray capacitor on subbase - See P. 9, Fig. 5.
Display flashes 12:00 AM	Previous power outage (in this case, there is no, or low, battery backup)	Reset clock
Displays "PF"	Present power outage (in this case there is battery backup)	Restore power to control
T4 displays " _ _ _"	DM-30 is interfaced w/ SP-30 or CM-30 (See APPLICATIONS I)	No fix - normal operation
Clock runs fast	Control is programmed for 50 Hz operation (See OPERATION 7 & Programming Reference Chart)	Switch A6 to off
Input indicators 1 or 2 do not come on (or go off) [CM-30 or SP-30 Interfacing]	Output(s) from interfaced CM-30 or SP-30 are not on (or off) - (see APPLICATIONS I)	Check CM-30 or SP-30 output for proper functioning i.e., pumps, valves operating?
	Open in IE Bus Cable or defective DM-30	Call factory for assistance
Input indicators 1 or 2 do not come on (or go off) [Other Equipment Interfacing]	Outputs from interfaced equipment are not on (or off) - (See OPERATION 3)	Check output of interfaced equipment for proper functioning
	Open in IN-1 or IN-2 wiring from interfaced equipment	Check for continuity w/ohm meter