Pensar

Load Master™ IV

Load Management Systems

Owners Manual

ORIGINAL PURCHASER: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

DATE INSTALLED: _____

SERIAL NUMBER: _____

MODEL NUMBER: _____

SOLD BY

MANUFACTURED BY:

ElectroSem, LLC
2600 South Hardy Drive
Tempe, AZ 85282
602-955-6566

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INTRODUCTION

Congratulations on your purchase of a Pensar energy management system. The name Pensar represents quality and superior technical achievements. Please take the time to carefully read this manual before attempting to make any changes in operation. Keep it handy for future reference

The LOAD MASTER IV is an advanced microcomputer load control system that can help substantially save on your utility bills. It does so by monitoring your total electric consumption and controlling high energy usage appliances in order to limit your "peak demand"

DEMAND is the amount of power needed to operate all the appliances you have on at one time. PEAK DEMAND is the highest demand for electricity, averaged over a given period of time (15, 30 or 60 minutes), that you require during a billing month. Your LOAD MASTER IV has been programmed to coincide with the averaging period used by your utility.

When the LOAD MASTER IV senses that your kilowatt demand limit may be exceeded, it automatically "sheds" (turns off) selected electrical devices, one at a time, in an order (priority) that you have preselected. As the demand lessens, each device is restored at the earliest possible moment, usually within six to ten minutes.

High peak demand is a concern to utilities because they must always have enough energy available to service all of their customers at any given time. The higher the total peak demand, the more costly it is to the utility, and ultimately to you the consumer. In order to encourage customers to lower their peak demand, many utilities have created demand rates which reward you with lower energy bills.

With the help of a PENSAR energy management system, thousands of utility customers have been able to reduce their peak demand and take full advantage of the savings potential of these demand rates. Your wise investment in a LOAD MASTER IV makes it possible for you to enjoy these savings, starting today and for many years to come.

EQUIPMENT

The relay enclosure contains the switching devices used to control the loads (circuits and appliances). It also contains the MICRO-CONTROL MODULE (see inside of back cover) which allows selection of kilowatt demand limit, load priority, auto-adjust and other setup parameters. The module has informational displays to show your current demand limit, instantaneous demand, and load status.

The enclosure is usually mounted next to the circuit breaker panel. **CAUTION:** The LOAD MASTER IV is programmed with the power on. Extreme care must be exercised to avoid contact with live circuits in the Class 1 (relay) compartment. It is recommended that power be disconnected from all controlled loads before proceeding with load controller adjustments.

To Turn Off the LOAD MASTER IV simply turn off the circuit breaker labeled "Load Controller" located inside the breaker panel.

CONTROLS

The "**SWITCH FUNCTIONS**" are provided to allow access to all the controls necessary to effectively operate the LOAD MASTER IV.

SWITCHS 6 THROUGH 10 KILOWATT DEMAND LIMIT:

Kilowatt demand limit is the highest point the LOAD MASTER IV will allow your demand to rise. You may adjust this limit or set the computer to adjust automatically. See switch #2. The demand limit is adjustable in one kilowatt hour increments.

It may take some trail and error to determine the setting that best suits your needs, and maximizes your savings. Since there are

several variables affecting your choice of demand limit, such as location, climate, home size and life style, consult your local dealer or installer for advice on adjusting your peak limit.

How To Change Demand Limit Setting:

Switchs 6 through 10 are used to set the demand limit. Any desired setting from 1 to 31 kilowatts can be achieved by using these switchs in various combinations. The limit setting is determined by adding the kilowatt value of each switch in the "add" position (to the right).

Switch 10 in "add" position (right) adds 1 kilowatt
Switch 9 in "add" position (right) adds 2 kilowatts
Switch 8 in "add" position (right) adds 4 kilowatts
Switch 7 in "add" position (right) adds 8 kilowatts
Switch 6 in "add" position (right) adds 16 kilowatts
Maximum adjustment is 31 kilowatts.

Example A: If switch 7 is the only switch in the add position, the limit setting is 8 kilowatts.

Example B: If switchs 10, 9, and 8 are the only switchs in the add position, the limit setting is 1 + 2 + 4 = 7 kilowatts.

SWITCHS 3, 4, & 5 LOAD PRIORITY:

These switchs are used to select one of eight priority strategies. Priority 1 allows the greatest amount of operation time. Priority 6 allows the least operation time. When the average demand for the period is approaching the limit, loads with higher priority numbers are shed first. Loads with the same priority tend to operate the same amount of time (rotate).

The following two tables give the priority and minimum on/off times associated with each load for each switch setting.

How to Setup Load Priority & On/Off Times 60 Minute Period (P3130-1.A to P3130-3.H):

Switch Settings			LOADS											
#3	#4	#5	#1		#2		#3		#4		#5		#6	
left	left	left	1	6	1	6	1	6	1	6	1	6	1	6
left	left	right	1	6	2	6	3	6	4	6	5	6	6	6
left	right	left	1	6	2	6	2	6	3	6	4	6	5	6
left	right	right	1	6	3	6	3	6	2	6	4	6	4	6
right	left	left	1	6	3	6	4	6	2	6	5	6	5	6
right	left	right	2	6	1	6	1	6	1	6	1	6	3	6
right	right	left	2	6	1	6	1	6	2	6	1	6	1	6
right	right	right	1	6	2	6	2	6	2	6	2	6	3	6

KEY:	Load Priority 1=on most 8 = on least
	Load minimum on & off times in minutes

How to Setup Load Priority & On/Off Times 15 Minute Period (P3130-4.A to P3130-4.Z):

Switch Settings			LOADS											
#3	#4	#5	#1		#2		#3		#4		#5		#6	
left	left	left	1	2	2	6	3	2	4	2	5	2	6	2
left	left	right	1	2	2	6	2	2	3	2	2	2	2	2
left	right	left	1	2	2	2	2	2	2	2	2	2	2	2
left	right	right	1	2	2	6	3	6	4	2	5	2	6	2
right	left	left	1	2	2	6	3	2	4	2	4	2	4	2
right	left	right	1	2	2	6	6	2	3	2	4	2	5	2
right	right	left	1	2	2	2	3	2	3	2	3	2	3	2
right	right	right	1	2	2	6	2	6	3	2	4	2	5	2

KEY:	Load Priority 1=on most 8 = on least
	Load minimum on & off times in minutes

CAUTION: Damage may be caused to compressors if controlled with 2 minute minimum on/off times.

SWITCH 2 AUTO ON / OFF:

There are two options available for controlling the demand limit setting on the LOAD MASTER IV. When AUTO OFF (switch to right) is set, the demand limit will remain indefinitely at the kilowatt value indicated by switchs 6 through 10. When AUTO ON (switch to left) is set, the LOAD MASTER IV will continually adjust the demand limit to optimize it for seasonal usage patterns. This option provides maximum savings with minimum effort.

How To Setup Auto-Adjust Starting Limit:

1) Set switch #2 to AUTO OFF (right)

2) Set the desired starting demand limit using switchs 6 through 10. See "How To Change Demand Limit Setting". Note: The starting demand limit should be at least 50% of the maximum demand limit.

3) Wait 15 seconds and then set switch #2 to AUTO ON (left).

4) Set the desired maximum demand limit for the year using switchs 6 through 10. See "How To Change Demand Limit Setting". Note: Once switchs have not changed for several seconds the maximum limit is accepted and the current limit is set to a minimum of 50% of the maximum. Determine the switch positions prior to performing this last step.

SWITCH 1 PROGRAM / RUN (ON/OFF PEAK):

Switch 1 is normally in the RUN (left) postion. Programs 3130-4.A to 4.H required use of this switch to control the state of a input for "on peak" or "off peak" control. This switch has no effect for programs P3130-1.A to 3.Z but should be left in the RUN position.

When in the normal position (left), the controller is in the "on peak" state (input not reduced) when terminal HD1-11 is open and in the "off peak" state when HD1-11 is shorted to ground. When switch 1 is in the other position (right), HD1-11 has the opposite affect.

The current transformer input is divided by four during off peak periods.

INFORMATION DISPLAYS

LED #1 Instantaneous Demand:

The rate at which you are currently using power is displayed. When loads are turned on and off, the display will change within seconds to show the change in your power consumption rate.

How To Read Your Instantaneous Demand:

1. Wait for a pause of several seconds with no pulses.

2. Count the number of pulses until the next pause occurs.

3. The result is the instantaneous demand in one kilowatt units.

NOTE: Because the LOAD MASTER IV is an averaging controller, you will, at times, see the instantaneous demand go above the demand limit. However, the average value displayed, over the entire averaging period, will be less than or equal to the demand limit.

LED #2 Present Demand Limit:

This LED indicates the present demand limit. This is the highest point the LOAD MASTER IV will allow your demand to rise during the current demand period.

IMPORTANT: If "auto adjust" is chosen using switch #2, the demand limit displayed with LED #2 will reflect the limit that your LOAD MASTER IV has currently adjusted to. The maximum demand limit set by the switchs cannot be exceeded in automatic.

How To Read Your Present Demand Limit:

1. Wait for a pause of several seconds with no pulses.

2. Count the number of pulses until the next pause occurs.

3. The result is the present demand limit in one kilowatt units.

LED #3 Load Status:

When the LED is in a constant "on" state, all loads have been shed. When the LED in a constant "off" state, all loads have been restored to normal operation. When the LED is pulsing it indicates that some loads have been shed, and some are restored.

HOW TO LIVE WITH YOUR LOAD CONTROLLER

The load controller is designed to HELP you save money but not to cause inconvenience. Raise your limit in small increments as you need more energy. If you want to reduce your limit, do so two to three days before your next billing cycle begins to reap the benefits in your next bill.

If you voluntarily spread out your usage, you may not even know the LOAD MASTER is keeping your demand in check. In summer, avoid using major appliances such as the range/oven during the hottest time of the day. In winter avoid major appliance use during times when your heater is required most. Use your microwave and barbecue to help shift your cooking loads. Dry cloths in the morning or later in the evening. Running pool equipment at night may cost a little chlorine but may drop your demand by 1.5 kilowatts per pump.

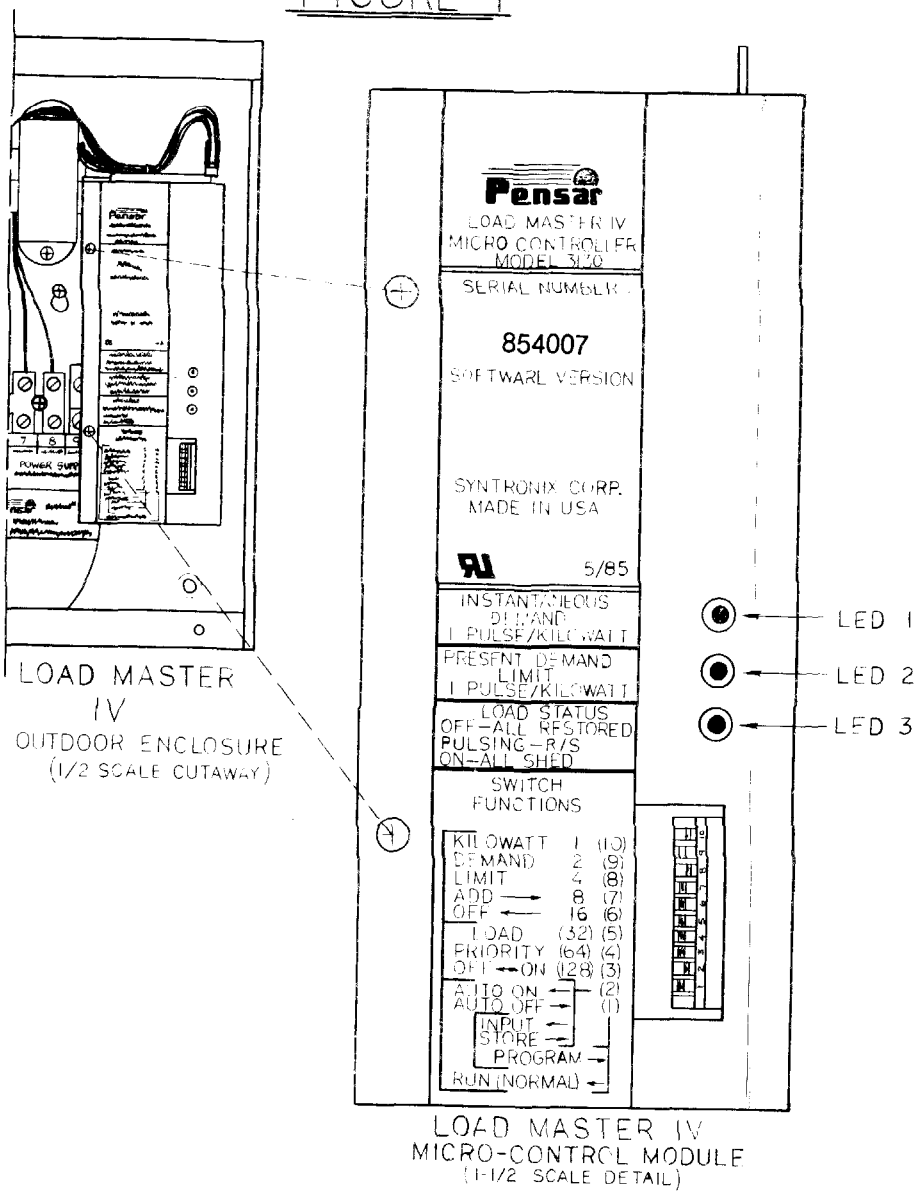
SERVICING

If one of the appliances controlled by the LOAD MASTER IV is not functioning properly you should first check your demand limit. See "How To Read Your Present Demand Limit" and "How to Set Your Demand Limit". Your major controlled loads require between 5 and 7 kilowatts each to run uninterrupted.

Otherwise, you may locate the source of a problem by turning off the LOAD MASTER IV at the circuit breaker panel. All circuits connected will be restored to normal operation. **CAUTION:** Watch your demand.

If the problem persists, the appliance involved is probably malfunctioning. The appropriate serviceman should be notified.

FIGURE 1


Pensar
LOAD MASTER IV
MICRO CONTROLLER
MODEL 3120
SERIAL NUMBER
854007
SOFTWARE VERSION
SYNTRONIX CORP.
MADE IN USA
5/85
INSTANTANEOUS DEMAND
1 PULSE/KILOWATT
PRESENT DEMAND LIMIT
1 PULSE/KILOWATT
LOAD STATUS
OFF=ALL RESTORED
PULSING=R/S
ON=ALL SHED
SWITCH FUNCTIONS
KILOWATT DEMAND LIMIT ADD → OFF ← 1 (10) 2 (9) 4 (8) 8 (7) 16 (6)
LOAD PRIORITY OFF ← → ON (32) (5) (64) (4) (128) (3)
AUTO ON → (2)
AUTO OFF → (1)
INPUT →
STORE →
PROGRAM →
RUN (NORMAL) ←
LED 1
LED 2
LED 3
LOAD MASTER IV
OUTDOOR ENCLOSURE
(1/2 SCALE CUTAWAY)
LOAD MASTER IV
MICRO-CONTROL MODULE
(1-1/2 SCALE DETAIL)

TECHNICAL SPECIFICATIONS

MICRO-CONTROLLER PLUG-IN MODULE 3130A

Demand Averaging Period: 15, 20, 30, 40 or 60 minutes
Minimum Load OFF Time: 6 minutes (compressor protect)
Demand Limit: 1 to 31 Kilowatts (switch selectable)
Auto- Adjust: Automatic, 50% to 100% of peak limit
Control Strategies: Eight variations (switch selectable)
Memory: Permanent (protects against power outages)

RELAY ENCLOSURE (3131-SIX LOAD, 3132-FOUR LOAD)

Dimensions: (3131-six load) 10''W x 12''H x 4''D
(3132-four load) 8''W x 10''H x 4''D
Enclosure Type: NEMA 3R Raintight with screw cover
Ambient Operating Temperature: -40'F to 122'F (-40 to 50'C)
Relays (3131): Four 30 amp 1 HP 240 VAC SPDT, Enclosed
Two 30 amp 28VAC/SPDT (module)
Relays (3132): Two 30 amp 1 HP 240 VAC SPDT, Enclosed
Two 3 amp 28 VAC/SPDT, enclosed (module)

CURRENT TRANSFORMER

Rating: Ratio = 200:1, Continuous current = 200 amps
Dimensions: Toroid construction, 2.4''OD x 1.1ID x .8''THK