



Comprehensive Energy Audit For

Mountain Village Clinic



Prepared For
City of Mountain Village

August 11, 2017

Prepared By: Kevin Ulrich, CEM

ANTHC-DEHE
4500 Diplomacy Drive
Anchorage, AK 99508

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PREFACE

The purpose of this report is to provide guidance in reducing facility operating costs and enhance the sustainability of this community. The report assesses the current energy usage of the facility, provide options for reducing the amount of energy used, and evaluate the cost vs. benefit of each option.

Discussions of site specific concerns, financing options, general facility information, and an Energy Efficiency Action Plan are also included in this report.

ACKNOWLEDGMENTS

The Rural Energy Initiative gratefully acknowledges the assistance of Mountain Village City Manager Robert Joe and City Clerk Janelle Amos.

OVERVIEW

This report was prepared for the City of Mountain Village. The scope of the audit focused on the Mountain Village Clinic and includes an analysis of building occupancy schedules, building shell, heating systems, heating and ventilation systems, domestic hot water, lighting, and other electrical loads. The Mountain Village Clinic was constructed in the 2000's and is approximately 2,842 square feet. The building provides medical and healthcare services to the residents of the community.

ENERGY BASELINE

Based on unsubsidized electricity and fuel oil prices in effect at the time of the audit, the total predicted energy costs are \$22,118 per year. This includes \$9,989 for unsubsidized electricity and \$12,129 for #1 fuel oil.

The State of Alaska Power Cost Equalization (PCE) program provides a subsidy to rural communities across the state to lower electricity costs and make energy affordable in rural Alaska. In Mountain Village the cost of electricity without PCE is \$0.49/kWh and the cost of electricity with PCE is \$0.28/kWh. With the PCE subsidy, the electric utility cost to the City of Mountain Village is \$5,708 and the cost to the State of Alaska is \$4,281.

Table 1 lists the predicted annual energy usage before and after the proposed retrofits for the Mountain Village Clinic.

Table 1: Predicted Annual Energy Use for the Mountain Village Clinic

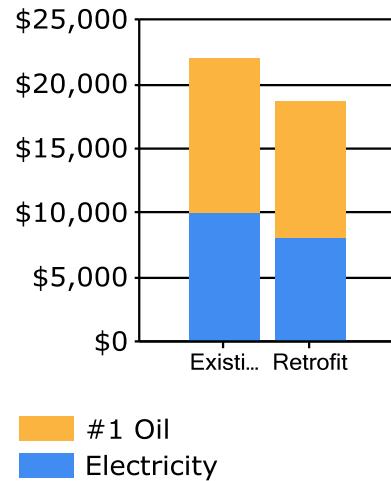
Predicted Annual Fuel Use				
Fuel Use	Existing Building	With Proposed Retrofits	Total Energy Savings	Total Cost Savings (Subsidized)
Electricity	27,798 kWh	22,937 kWh	4,861 kWh	\$1,361
#1 Oil	1,916 gallons	1,682 gallons	230 gallons	\$1,456

PROPOSED ENERGY EFFICIENCY MEASURES (EEM)

Table 2 below summarizes the energy efficiency measures analyzed for the Mountain Village Clinic. Listed are the estimates of the annual savings, installed costs, and two different financial measures of investment return. All costs assume that local labor will be used with no additional cost associated for travel or administrative tasks.

Table 2: Priority List – Energy Efficiency Measures

Annual Energy Costs by Fuel Type



Priority	Feature	Improvement Description	Annual Energy Savings	Installed Cost	Savings to Investment Ratio, SIR ¹	Simple Payback (Years) ²	CO ₂ Savings
High	Other Electrical: Small Coffee Pot	Unplug coffee maker at the end of the day when not in use.	\$93	\$100	9.52	1.1	527.4
High	Setback Thermostat: Exam Rooms/Hallway/Lab	Install new programmable thermostats and implement unoccupied setback temperatures of 60 deg. F for the facility.	\$1,769	\$7,500	3.20	4.2	5,914.2
Medium	Lighting: Front Office & Pharmacy	Replace with new direct-wire LED equivalent light bulbs and add an occupancy sensor.	\$193	\$560	2.73	2.9	1,032.5
Medium	Setback Thermostat: Lobby/Pharmacy/Restroom	Install new programmable thermostats and implement unoccupied setback temperatures of 60 deg. F for the facility.	\$290	\$2,000	1.97	6.9	970.9
Medium	Exterior Door: Back Entrance	Remove existing door and install standard pre-hung insulated door (This retrofit coincides with retrofit 9).	\$85	\$1,442	1.39	17.1	282.6
Medium	Lighting: Exam Rooms	Replace with new direct-wire LED equivalent light bulbs and add an occupancy sensor.	\$747	\$6,760	1.39	9.1	4,041.6
Low	Lighting: Lobby and Hallway	Replace with new direct-wire LED equivalent light bulbs.	\$98	\$800	0.96	8.2	537.1
Low	Lighting: Training Room	Replace with new direct-wire LED equivalent light bulbs.	\$26	\$320	0.84	12.5	140.8
Low	Air Tightening	Replace back entrance door with broken window (This retrofit coincides with retrofit 5).	\$55	\$1,000	0.51	18.2	184.1
Low	Lighting: Storage Rooms	Replace with new direct-wire LED equivalent light bulbs.	\$10	\$400	0.27	39.2	56.3
Low	Lighting: Restrooms	Replace with new direct-wire LED equivalent light bulbs.	\$1	\$160	0.07	158.8	5.6
TOTAL			\$3,366	\$21,042	2.06	6.3	13,693.2

FACILITY DESCRIPTION

Building Occupancy Schedules

The building is occupied from 8:30 AM – 6:00 PM for five days per week during standard operating hours. The clinic can be occupied in the evening in the event of a medical emergency where a health aide that is on call may need to respond.

Building Shell

The building is a wood-framed lumber construction that is built on an elevated pile foundation. The roof has 2x6 lumber construction with attic space available.

There are 16 total windows in the building. Each window has double-pane glass with wood framing and approximate dimensions of 45" x 37". Five windows are south-facing and 11 windows are not south-facing.

There are three total entrances to the building. The main entrance is a single insulated metal door with an arctic entry and a half-lite window. The side entrance next to the main door is a single insulated metal with no windows. The back door has a single insulated metal door with a broken half-lite window that has been covered with plywood.

Heating Systems

The heating system information for the building are listed below:

Weil McLain Fuel Oil Boiler

Fuel Type:	#1 Oil
Input Rating:	172,000 BTU/hr
Steady State Efficiency:	82 %
Idle Loss:	0.5 %
Heat Distribution Type:	Glycol
Boiler Operation:	All Year

Space Heating Distribution Systems

Space heating is achieved through a baseboard distribution system. There are 21 individual thermostats for each room in the building in order to control the building temperature with precision. Five of the thermostats were programmed for 65 deg. F and 16 thermostats were programmed for 70 deg. F.

Building Ventilation Systems

The building uses a Fantech ECHO H2800Xi HRV system that provides necessary ventilation for the building while using exhaust air to heat supply air coming inside. This unit runs constantly and is always operating during clinic hours of operation in order to meet specifications for a healthcare facility.

Domestic Hot Water System

There is a 41-gallon hot water heater that is used for exam rooms, restrooms, and a small break room.

Lighting

Table 3: Lighting Information in the Mountain Village Clinic

Room	Bulb Type	Fixtures	Bulbs per Fixture	Annual Usage (kWh)
Exam Rooms	Fluorescent T8 4ft.	22	3	3,480
Lobby & Hallway	Fluorescent T8 4ft.	10	2	1,426
Front Office & Pharmacy	Fluorescent T8 4ft.	7	3	1,476
Restrooms	Fluorescent T8 4ft.	2	2	15
Storage Rooms	Fluorescent T8 4ft.	5	2	150
Training Room	Fluorescent T8 4ft.	4	3	211

Other Electrical Loads

There is a variety of office equipment and phones that are used during the day that use a small amount of energy throughout the year.

Major Equipment

Table 4: Major Electrical Equipment in the Mountain Village Clinic

Equipment	Rating (Watts)	Annual Usage (kWh)
Staff Refrigerator	~285	2,500
Medical Refrigerator	~185	1,600
Air Compresor - Dental	1,840	1,035
Cleanshield Washout	240	1,052
Dental Dry Vacuum System	3,600	2,577
Small Coffee Pot	~1,000	562
Desktop Computers (13)	~75 each	2,417
Office Phones (13)	~5 each	365
Microwave	1,200	78
Glycol Day Tank	28	4
Air Conditioner – Server Room	1,220	3,791

PROJECT FINANCING

The total estimated cost of the recommended EEM's \$21,042. The payback for the implemented EEM's is approximately 6.3 years. ANTHC is willing to assist the community with acquiring funds to complete the scope of work recommended in this energy audit.

There are several options for financing energy efficiency projects within the State of Alaska. These include the use of grants, loans, and other funding opportunities. Below is some information on potential funding opportunities.

Energy Efficiency Revolving Loan Program – This is a loan administered by the Alaska Housing Finance Corporation (AHFC) for use by any applicant who is also the owner of the building where the work will take place. It provides a loan for permanent energy-efficiency projects with a completion window of one year.

Sustainable Energy Transmission and Supply Program – This is a loan administered by the Alaska Energy Authority (AEA) for a government, business, or other organized body of people. It provides a loan for energy-efficiency or power transmission or distribution projects.

USDA-RD Communities Facilities Direct Loan & Grant Program - This is a loan or grant provided by the US Department of Agriculture – Rural Development (USDA-RD) for any essential community facility in a rural area. It provides a loan or grant to develop essential community facilities with upgrades or equipment for improvement.

MEASUREMENT AND VERIFICATION

The results of these recommended measures can be measured through the collection of energy use data through the monthly bills provided by the local electric utility and the local fuel oil supplier. Collecting data and performing a historical comparison is the simplest method of validating the energy and cost savings seen by the measures. Additionally, active remote monitoring systems are available that can collect and store data regarding energy and fuel usage. These systems allow the user to track the usage in real time and can be shared more easily with partners across the state.

APPENDICES

Appendix A –Energy Billing Data

The table below shows the fuel and electricity data used during the energy modeling process to confirm the accuracy of the energy distribution. The fuel use distribution was estimated based on the times of each fuel delivery, which were not in a precisely monthly basis.

Month	Fuel Oil Use (gallons)	Electricity Use (kWh)
January	300	2,642
February	275	2,377
March	225	2,548
April	125	2,351
May	50	1,918
June	20	2,212
July	22	2,297
August	35	2,158
September	75	2,513
October	175	2,304
November	250	2,542
December	300	2,799

Appendix B – Energy Audit Report – Project Summary

ENERGY AUDIT REPORT – PROJECT SUMMARY	
General Project Information	
PROJECT INFORMATION	AUDITOR INFORMATION
Building: Mountain Village Clinic	Auditor Company: ANTHC-DEHE
Address: PO Box 32085	Auditor Name: Kevin Ulrich & Bailey Gamble
City: Mountain Village	Auditor Address: 4500 Diplomacy Drive
Client Name: Robert Joe	Anchorage, AK 99508
Client Address: PO Box 32085 Mountain Village, AK 99632	Auditor Phone: (907) 729-3237 Auditor FAX:
Client Phone: (907) 591-2929	Auditor Comment:
Client FAX:	
Design Data	
Building Area: 2,842 square feet	Design Space Heating Load: Design Loss at Space: 130,405 Btu/hour with Distribution Losses: 130,405 Btu/hour Plant Input Rating assuming 82.0% Plant Efficiency and 25% Safety Margin: 198,788 Btu/hour Note: Additional Capacity should be added for DHW and other plant loads, if served.
Typical Occupancy: 0 people	Design Indoor Temperature: 68.8 deg F (building average)
Actual City: Mountain Village	Design Outdoor Temperature: -24.3 deg F
Weather/Fuel City: Mountain Village	Heating Degree Days: 12,947 deg F-days
Utility Information	
Electric Utility: Alaska Village Electric Cooperative	Average Annual Cost/kWh: \$0.49/kWh

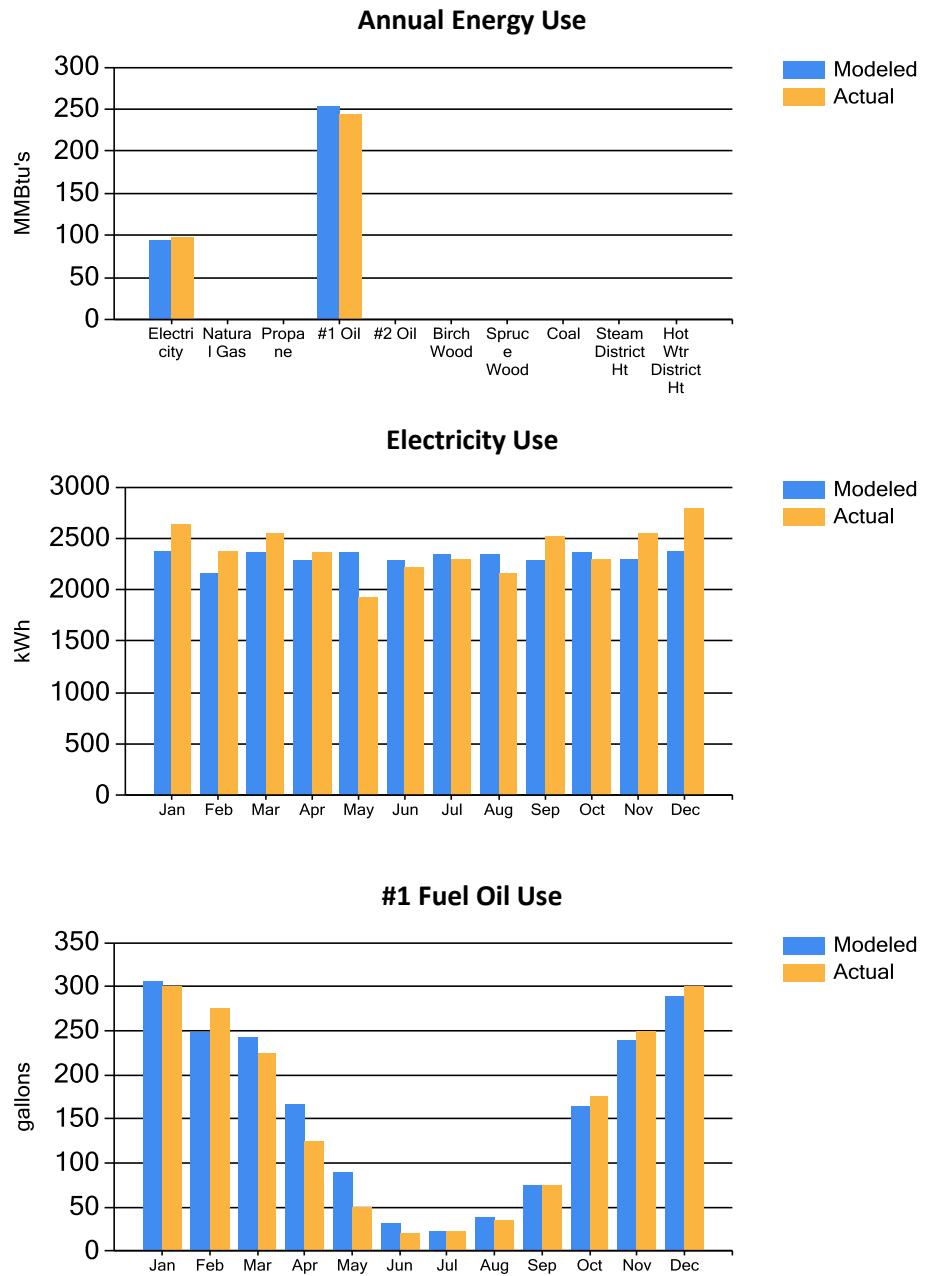
Annual Energy Cost Estimate							
Description	Space Heating	Water Heating	Ventilation Fans	Lighting	Refrigeration	Other Electrical	Total Cost
Existing Building	\$11,793	\$701	\$1,443	\$2,414	\$1,464	\$4,243	\$22,118
With Proposed Retrofits	\$10,285	\$714	\$1,417	\$823	\$1,438	\$4,015	\$18,752
Savings	\$1,507	-\$13	\$26	\$1,590	\$26	\$228	\$3,366

Building Benchmarks			
Description	EUI (kBtu/Sq.Ft.)	EUI/HDD (Btu/Sq.Ft./HDD)	ECI (\$/Sq.Ft.)
Existing Building	122.4	9.45	\$7.78
With Proposed Retrofits	105.7	8.16	\$6.60

EUI: Energy Use Intensity - The annual site energy consumption divided by the structure's conditioned area.
EUI/HDD: Energy Use Intensity per Heating Degree Day.
ECI: Energy Cost Index - The total annual cost of energy divided by the square footage of the conditioned space in the building.

Appendix C – Actual Fuel Use versus Modeled Fuel Use

The graphs below show the modeled energy usage results of the energy audit process compared to the actual energy usage report data. The model was completed using AkWarm modeling software. The orange bars show actual fuel use, and the blue bars are AkWarm's prediction of fuel use.



Appendix D - EUI Calculation Details

The Alaska Village Electric Cooperative owns and operates the utility that provides electricity to the residents of the community as well as to all the commercial and public facilities.

The average cost for each type of fuel used in this building is shown below in Table 5. This figure includes all surcharges, subsidies, and utility customer charges:

Table 5: Energy Cost Rates for each Fuel Type.

Average Energy Cost	
Description	Average Energy Cost
Electricity	\$ 0.49/kWh
#1 Oil	\$ 6.33/gallons

Table 6 shows the calculated results for the building Energy Use Index (EUI), which determines the total energy usage for a type of building for comparison with other buildings of the same type. This allows the user to determine the relative energy use of a building in relation to others of the same type or use.

Table 6: EUI Building Calculations for the Mountain Village Clinic

Energy Type	Building Fuel Use per Year	Site Energy Use per Year, kBtu	Source/Site Ratio	Source Energy Use per Year, kBtu
Electricity	27,798 kWh	94,875	3.340	316,881
#1 Oil	1,916 gallons	252,935	1.010	255,464
Total		347,810		572,345
BUILDING AREA		2,842	Square Feet	
BUILDING SITE EUI		122	kBTU/Ft ² /Yr	
BUILDING SOURCE EUI		201	kBTU/Ft²/Yr	

* Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued March 2011.

Table 7 shows information on common energy use benchmarks used to characterize the efficiency of a building.

Table 7: Building Benchmarks for the Mountain Village Clinic

Building Benchmarks

Description	EUI (kBtu/Sq.Ft.)	EUI/HDD (Btu/Sq.Ft./HDD)	ECI (\$/Sq.Ft.)
Existing Building	122.4	9.45	\$7.78
With Proposed Retrofits	105.7	8.16	\$6.60

EUI: Energy Use Intensity - The annual site energy consumption divided by the structure's conditioned area.
EUI/HDD: Energy Use Intensity per Heating Degree Day.
ECI: Energy Cost Index - The total annual cost of energy divided by the square footage of the conditioned space in the building.

Appendix E – Materials List and Labor Estimation

Table 8 & 9: Materials List and Cost Estimation for Mountain Village Clinic EEM's

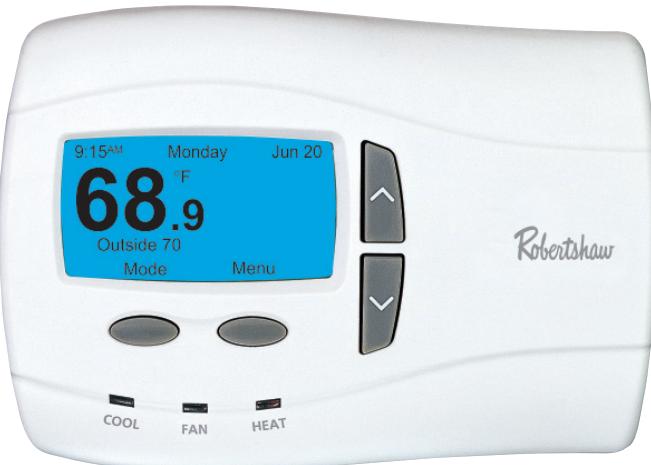
Energy Retrofit	Required Materials	Quantity	Cost per Item	Total Materials Cost
Setback Thermostats	Programmable Thermostat	19	300	5,700
LED Lighting	T8 LED Equivalent 4 ft.	100	15	1,500
Door Replacement	Door	1	500	500

Category	Cost (\$)
Labor	7,235
Travel	3,070
Materials	7,870
Freight	1,164
Indirect	1,923
Total	\$21,152

This energy audit cost information assumes that all work will be completed by an employee from outside of the community. If local labor is used for the retrofits, the travel and indirect costs may be removed from the total estimated cost. The setback thermostat retrofits will likely require outside labor.

Appendix F – Materials Specifications

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Programming Made Even Easier

Do you want to spend less time installing and setting up thermostats?

The new 9701i2 makes installation even easier with our new Setup Wizard. The Setup Wizard allows you to spend 50% less time setting up the thermostat over competitive models. Plus everything is in plain language so there are no complicated codes or button combinations to memorize.

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The new 9701i2 is so user friendly, it sets a higher standard in efficiency and simplicity for programmable thermostats. It is truly programming made even easier.

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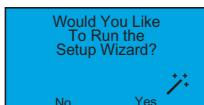
9701i2

**DELUXE
PROGRAMMABLE
THERMOSTAT**



Menu Driven Display 1 Heat / 1 Cool

Features and Benefits



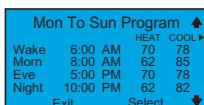
Set-up Wizard

Helps speed through the installation process with step-by-step setup and programming instructions.



Trilingual Display Option

Set to your customers' language of choice – English, Spanish or French



Convenient Displays

View a full day of programming at once for quick review or easy adjustment.



Contractor ID Feature

Set it yourself or custom order with your information pre loaded. Your name and phone number remind your customers when service is needed.

Daylight Saving Time Adjustment

Automatically adjusts to correct time regardless of seasonal changes.

Adjustable Backlighting

Choose to have backlighting on at all times or only when programming. You can also adjust the brightness and contrast for improved readability.

Time of Day Zoning

When coupled with a remote sensor (part #9020i), you can control the temperature in remote locations given different scheduled events.

Three Levels of Security

Secure protection against unwanted changes to the programming menus, temperature or set-up functions with your own 4-digit PIN.

Auto Changeover

Automatically adjusts between heating and cooling cycles to maintain optimal comfort.

Worry-Free Memory Storage

Even during power outages, the thermostat maintains set point and programmed parameters.

Adjustable Temperature Offset

Change the displayed temperature from the actual sensed temperature.

Adjustable Temperature Differential

Maintains optimal customer comfort.

Intermittent Fan

Maintains optimal air filtration and circulation with minimal energy use.

An ISO 9001 – 2008 Certified Company
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5 Year Limited Warranty

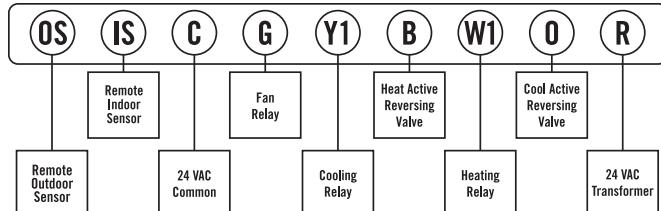
24V AC POWERED

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9701i2

**DELUXE
PROGRAMMABLE
THERMOSTAT**

Terminal Designations



Technical Specifications

Electrical Rating	24 Volt AC (18-30 VAC) 1 amp maximum load per terminal (relay outputs) 3 amp total maximum load (all terminals combined)
Temperature Control Range	45° - 90°F (7° - 32°C)
Accuracy	+/-1.0°F (+/-0.5°C)
Power Source	24 VAC
Auto Changeover Deadband	Selectable 2° to 8°F
Temporary Temperature Override	3 hour maximum or next setpoint
Remote Sensor Capable	1 indoor and 1 outdoor sensor
System Configurations	Single-stage gas, oil or electric heating/cooling systems and single stage heat pump
Terminations	R, W1, Y1, B, O, G, C, IS, OS

Shipping Specifications

Indiv. Ctn. Dim.: 6.625" x 4.25" x 1.625"	Item 9020i and 9025i Remote Sensors
Master Ctn. Qty.: 6	Indiv. Ctn. Dim.: 2.625" x 1.5625" x 4.4375"
Master Ctn. Dim.: 9.25" x 5.625 x 7.5"	Master Ctn. Qty.: 6
Master Ctn. Cu. Ft.: .23	Master Ctn. Dim.: 5.625" x 5.125" x 5.125"
Master Ctn. Wt.: 3.5 lbs.	Master Ctn. Cu. Ft.: .09
Max. Pallet Qty.: 1260	Master Ctn. Wt.: .78 lbs.
Max. Pallet Wt.: 785 lbs.	

Replacement Chart

9701i2	
Braeburn®	5000
Honeywell	TH8110U1003
White-Rodgers	1F95-1271, 1F90-51, 1F90-71, 1F90-371, 1F97-51, 1F97-71, 1F97-371
Carrier	TC-PAC, TC-PHP, P274-1100, P374-1100, P474-1100
Lux	PSPA711

Verify specific application requirements before substitution.

Patent Information

This product is covered by one or more of the following U.S. patents. Foreign patent rights may be pending. 4967382, 5803357, 6502758, 7000849, D301207, D462940

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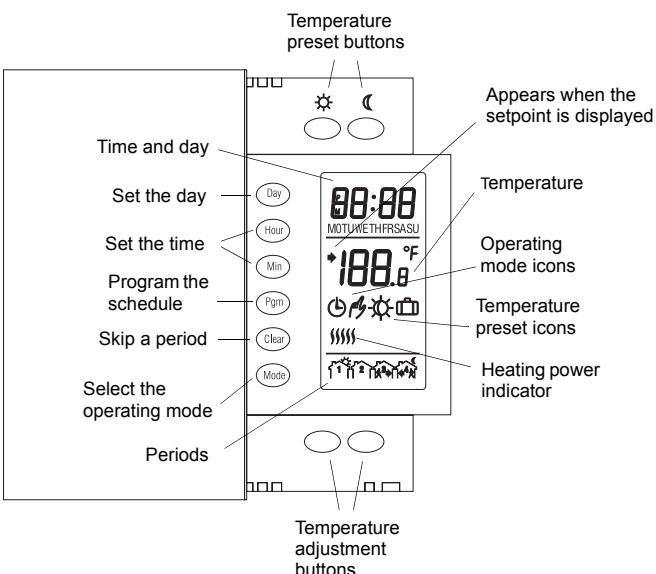


Optional Sensors:
9020i REMOTE INDOOR
9025i REMOTE OUTDOOR

Feature Comparison

	Invensys i2-Series	Honeywell Vision Pro	Carrier Infinity	White-Rodgers 1F97-371
Menu Driven (Ease of Programming)	X			
Installation Wizard	X			
Displays Complete Program	X			
Adjustable Backlighting	X			
Cooling System Monitor	X			
Heating System Monitor	X			
Multi-Language	X			
1/2 Degree Resolution	X			
Time of Day Zoning	X			
5/2 Program	X			X
24 Hour Programming	X			X
7-Day Programming	X	X	X	
Large Display	X	X	X	
Adjustable Timed Override/Hold	X	X		
Automatic Daylight Saving Time Adjustment	X	X		
Adjustable Temperature Limits	X	X		
High/Low Balance Points	X	X		
LED Status Indicators	X	X		
Adjustable Differential	X	X		
Adjustable Compressor Short Cycle Protection	X	X		
Adjustable Residual Cooling	X	X		
Fossil Fuel Kit required on HP units	No	No	Yes	Yes
Battery Free Memory Retention	X		X	
Manual Override	X	X	X	X
Resume	X	X	X	X
Auto Changeover	X	X	X	X
Gas/Electric	X	X	X	X
Single Stage Heat Pump Compatible	X	X	X	X
Line Powered	X	X	X	X
Programmable Fan	X	X	X	X
Intermittent Fan	X		X	
°F and °C	X	X	X	X
12 or 24 Hour	X	X		X
Air Filter Monitor	X	X	X	X
Humidifier Pad Monitor	X	X	X	
UV Light Monitor	X	X	X	
Vacation Setting	X	X	X	X
O & B Terminals	X	X	Partial	X
Events per day	2, 4, 6	4	4	2, 4
Remote Outdoor Sensor	X	Combo	X	X
Remote Indoor Sensor	X		X	X
Energy Efficient Recovery	X	X	X	X
Pre-set Program	X	X	X	X
Hidden Service Level	X	X	X	
Security Key Pad	X			X
Temperature Recalibration	X	X	X	
Customizable Contractor ID	X			Factory Only

www.RobertshawTstats.com
www.InvensysControls.com
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1 Description

This programmable thermostat can be used to control an electric heating system such as an electric baseboard heater, a radiant ceiling, a radiant floor, a convector, etc.

The thermostat cannot be used under the following conditions:

- The resistive load is greater than 16.7 A
- The resistive load is less than 2 A
- The system is driven by a contactor or relay (inductive load)
- The system is a central heating system

SUPPLIED PARTS:

- One (1) thermostat
- Two (2) 6-32 screws
- Two (2) solderless connectors

2 Installation

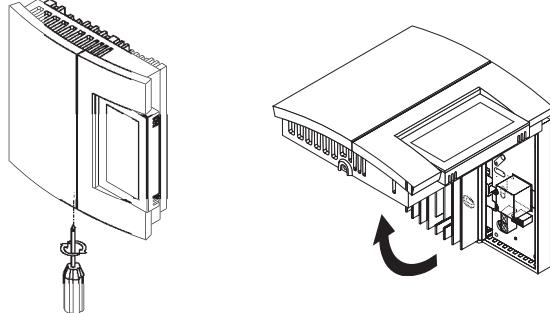
TURN OFF POWER TO THE HEATING SYSTEM AT THE MAIN POWER PANEL TO AVOID ELECTRICAL SHOCK.

THE INSTALLATION MUST BE PERFORMED BY AN ELECTRICIAN.

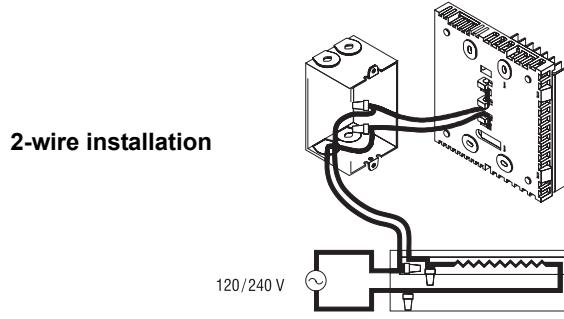
- ▶ All cables and connections must conform to the local electrical code.
- ▶ Special CO/ALR solderless connectors must be used when connecting with aluminum conductors.
- ▶ Install the thermostat onto an electrical box.
- ▶ Install the thermostat about 5 feet high, on an inside wall facing the heater.
- ▶ Avoid locations where there are air drafts (such as the top of a staircase or an air outlet), dead air spots (such as behind a door), or direct sunlight.
- ▶ Do not install the thermostat on a wall that conceals chimney or stove pipes.
- ▶ The thermostat wires are not polarized; either wire can be connected to the load or to the power supply.

NOTE: Always keep the thermostat's vents clean and unobstructed.

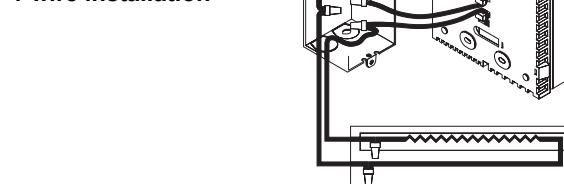
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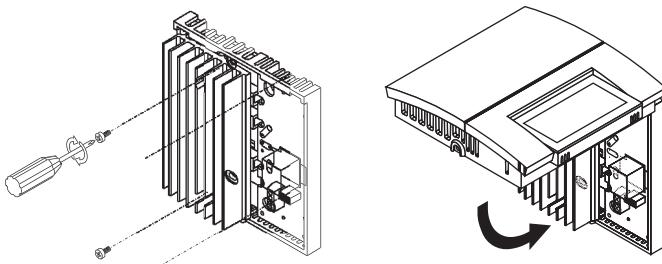
- ② Connect the thermostat wires to the line wires and to the load wires using solderless connectors for copper wires.



4-wire installation



- ③ Push any excess wire back into the electrical box.

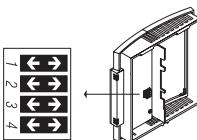


NOTE: If necessary, before re-installing the front component, configure the thermostat (see section 3).

- ④ Return power to heating system.

3 Configuration

The configuration switches are on the back of the thermostat. The factory settings are indicated by the gray cells in the following table.



SW1	Early Start ^a	Off	On
SW2	Temperature / time format ^b	°C / 24-hour	°F / 12-hour
SW3	Cycle length ^c	15 seconds	15 minutes
SW4	Not used	-	-

- a. Early Start can be used in Automatic mode only. When this function is enabled, the thermostat calculates the optimal time to start heating in order to obtain the desired temperature by the set time. The thermostat re-assesses the start time daily based on the previous day's performance.
- b. If you change the temperature display format, the preset temperatures (☀, ⚡ and 🛌) will return to their default settings.
- c. 15-second cycles should be selected in most cases as it provides better temperature control. 15-minute cycles must be selected if you have a fan-equipped heater or if 15-second cycles causes light flickering (especially in rural regions).

4 Power-up

Upon power-up, the thermostat is in manual mode (⚡) and displays the actual (ambient) temperature.

- 1 Press the **Hour** and **Min** buttons to set the thermostat's clock.
- 2 Press the **Day** button to set the day.

5 Temperature Setting

Setpoint

The thermostat normally displays the actual temperature. To view the setpoint, press the ▲ or ▼ button briefly. The setpoint will appear for the next 5 seconds.

To change the setpoint, press the ▲ or ▼ button until the desired temperature is displayed. To scroll faster, hold the button.

Using a preset temperature

The thermostat has 3 preset temperatures:

- Comfort temperature ☀
- Economy temperature ⚡
- Vacation temperature 🛌

Icon	Intended use	Factory setting
☀	Comfort (when at home)	21°C (70°F)
⚡	Economy (when asleep or away from home)	16.5°C (62°F)
🎄	Vacation (during prolonged absence)	10°C (50°F)

- To use the Comfort or Economy temperature, press the ☀ or ⚡ button respectively. The corresponding icon will be displayed.
- To use the Vacation temperature, press both ☀ and ⚡ buttons simultaneously. The 🛌 icon will be displayed.

Storing a preset temperature

To store the Comfort or Economy temperature:

Set the desired temperature using the ▲ or ▼ button. Press and hold the appropriate button (☀ or ⚡) for approximately 3 seconds until the corresponding icon is displayed. Press the **Mode** button.

To store the Vacation temperature:

Set the desired temperature using the ▲ or ▼ button. Press and hold both ☀ and ⚡ buttons simultaneously for approximately 3 seconds until the 🛌 icon is displayed. Press the **Mode** button.

6 Operating Modes

⌚ **Automatic** - The temperature is set according to the programmed schedule. To place the thermostat in this mode, press **Mode** until ⌚ is displayed. The icons of the current period and preset temperature are also displayed.

⚡ **Temporary Bypass**: If you modify the setpoint (by pressing the ▲, ▼, ☀ or ⚡ button) when the thermostat is in automatic mode, the new setpoint will be used until the end of the current period. When the next period starts, the temperature set for that period becomes the new setpoint.

🌙 **Manual** - The programmed schedule is not used. The temperature must be set manually. To place the thermostat in this mode:

- 1 Press **Mode** until ⚡ is displayed.
- 2 Set the temperature using the ▲, ▼, ☀ or ⚡ button.

7 Schedule

The schedule consists of 4 periods per day which represents a typical weekday. You can program the thermostat to skip the periods that do not apply to your situation. For example, you can skip periods 2 and 3 for the weekend.

Period	Description	Associated temperature preset
☀	Wake	☀
🌙	Leave	🌙
🌙	Return	☀
🌙	Sleep	🌙

The Comfort (☀) temperature is used in periods 1 and 3 and the Economy (🌙) temperature is used in periods 2 and 4. For example, when the period changes from 1 to 2, the setpoint automatically changes from Comfort setting (☀) to Economy setting (🌙).

You can have a different program for each day of the week; i.e., each period can start at different time for each day of the week. The thermostat has been programmed with the following schedule.

Period	Setting	MO	TU	WE	TH	FR	SA	SU
☀	☀	6:00 AM						
🌙	🌙	8:00 AM	--:--	--:--				
🌙	☀	6:00 PM	--:--	--:--				
🌙	🌙	10:00 PM						

To modify the schedule:

- 1 Press **Pgm** to access the programming mode. Period 1 is selected.
- 2 Press **Day** to select the day to program (hold for 3 seconds to select the entire week).
- 3 Press **Hour** and **Min** to set the start time of the selected period, or press **Clear** if you want to skip the period (--:-- is displayed).
- 4 Press **Pgm** to select another period, or press **Day** to select another day. Then repeat step 3.

5 Press **Mode** to exit the programming mode.

NOTE: If no button is pressed for 60 seconds, the thermostat will automatically exit the programming mode.

8 Power Outage

During a power outage, the settings are stored in memory. However, only the thermostat's clock must be re-adjusted if the power failure lasts more than 2 hours. When power comes back, the thermostat will return to the operating mode that was active prior to the power failure.

9 Troubleshooting

PROBLEM	SOLUTIONS
Thermostat is hot.	This condition is normal. Under normal operation, the thermostat housing can reach a temperature between 35°C (95°F) and 40°C (104°F).
Heater is always On.	The thermostat has not been correctly wired.
Thermostat indicates that heating is On, but the heater is not On.	The thermostat has not been correctly wired.
Wrong temperature is displayed.	The thermostat is exposed to air draft. Eliminate the draft. The sticker on the thermostat's screen has not been removed.
Wrong time is displayed.	The thermostat was without power for more than 2 hours.
Temperature does not change according to the programmed schedule.	Check that the thermostat is in Automatic mode. Check the schedule and clock settings.
Display disappears and reappears after a few minutes.	The thermal protection device on the heater is open. This can happen after a power failure or if the heater is obstructed by furniture or curtains.
Display looks faded when heating is activated	The heating system is less than the required minimum load. This thermostat cannot be used below that rating.

10 Technical Specifications

Power: 120/240 VAC, 50/60 Hz

Minimum load: 2 A (resistive only)

500 W @ 240 VAC

250 W @ 120 VAC

Maximum load: 16.7 A (resistive only)

2000 W @ 120 VAC

4000 W @ 240 VAC

Display range: 0°C to 60°C (32°F to 140°F)

Display resolution: 0.5°C (1°F)

Setpoint range: 5°C to 30°C (40°F to 86°F)

Setpoint interval: 0.5°C (1°F)

Storage: -20°C to 50°C (-4°F to 120°F)

Approval: c UL us



Warranty

Aube warrants this product, excluding battery, to be free from defects in the workmanship or materials, under normal use and service, for a period of three (3) years from the date of purchase by the consumer. If at any time during the warranty period the product is determined to be defective or malfunctions, Aube shall repair or replace it (at Aube's option).

If the product is defective,

(i) return it, with a bill of sale or other dated proof of purchase, to the place from which you purchased it, or

(ii) contact Aube. Aube will make the determination whether the product should be returned, or whether a replacement product can be sent to you.

This warranty does not cover removal or reinstallation costs. This warranty shall not apply if it is shown by Aube that the defect or malfunction was caused by damage which occurred while the product was in the possession of a consumer.

Aube's sole responsibility shall be to repair or replace the product within the terms stated above. AUBE SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE OF ANY KIND, INCLUDING ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING, DIRECTLY OR INDIRECTLY, FROM ANY BREACH OF ANY WARRANTY, EXPRESS OR IMPLIED, OR ANY OTHER FAILURE OF THIS PRODUCT. Some provinces and states do not allow the exclusion or limitation of incidental or consequential damages, so this limitation may not apply to you.

THIS WARRANTY IS THE ONLY EXPRESS WARRANTY AUBE MAKES ON THIS PRODUCT. THE DURATION OF ANY IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IS HEREBY LIMITED TO THE THREE-YEAR DURATION OF THIS WARRANTY. Some provinces and states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

This warranty gives you specific legal rights, and you may have other rights which vary from province or state to another.



Customer Assistance

If you have any questions about the product installation or operation, or concerning the warranty, contact us at:

705 Montrichard
Saint-Jean-sur-Richelieu, Quebec
J2X 5K8
Canada

Tel.: (450) 358-4600

Toll-free: 1-800-831-AUBE

Fax: (450) 358-4650

Email: aube.service@honeywell.com

For more information on our products, go to
www.aubetech.com



As an ENERGY STAR® partner, Aube Technologies has determined that this product meets the ENERGY STAR guidelines for energy efficiency.



LED T8 | T12

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[DESCRIPTION](#)

[SPECIFICATIONS](#)

[REVIEWS](#)

EarthLED Total Product Insight

PERFORMANCE SPECIFICATIONS

REPLACEMENT FOR:	T8 OR T12 4 FOOT FLUORESCENT TUBE
BRIGHTNESS (LUMENS):	2000
COLOR TEMPERATURE:	4000K 5000K
COLOR ACCURACY (CRI):	80
DIMENSIONS	1.02" X 47.2"
POWER CONSUMPTION:	18 WATTS
VOLTAGE:	120-277 VOLTS
DIMMABLE:	NO

DIMENSIONS / ADDITIONAL DATA

CERTIFICATIONS:	UL, DESIGNLIGHTS (DLC)
PRODUCT/ORDER CODE:	4000K - 18WT8P-4F-40K-BYP 5000K - 18WT8P-4F-50K-BYP

LIFESPAN / COST TO RUN

PROJECTED LIFE: @3 HRS/DAY	50,000 HRS
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YEARLY ENERGY COST: 3 HRS/DAY @ .11 KWH	\$2.17
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5 YEAR THINKLUX LIGHTING LIMITED WARRANTY
EARTHLED PRODUCT PROTECTION PLAN IS AVAILABLE