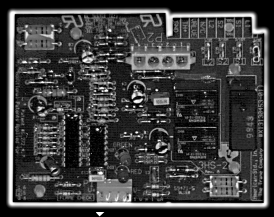
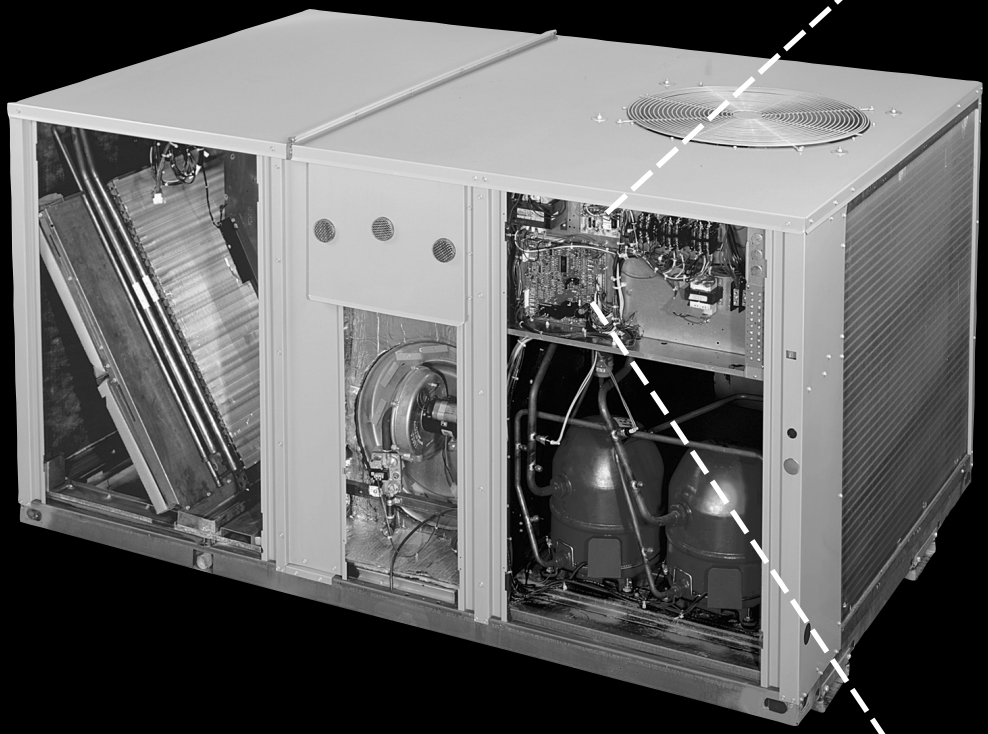
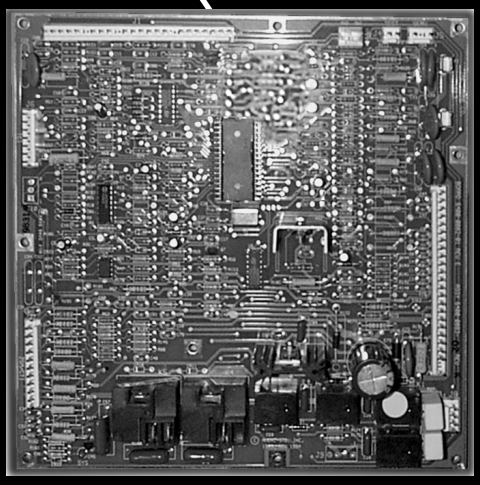
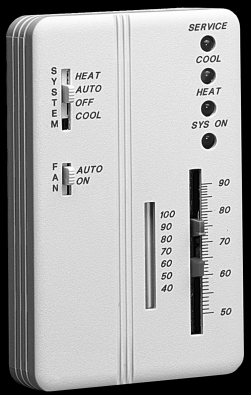
# Voyager™ Microcontrols








**PUB NO. 22-7706-06**

# 1. Introduction to Microcontrols

The Voyager Micro was developed with two specific thoughts in mind: comfort and reliability. It provides Proportional/Integral control for superior temperature control and eliminates the need to add time delay relays or anti-short cycle times in the field. The Micro also reduces the number of parts in the control system, which means fewer parts to fail and troubleshoot. In the unlikely event that a problem does occur, the Micro's on-board diagnostics are there to assist and get you back on line fast. Trane is a pioneer in the application of microprocessor controls in the HVAC industry and has extensive experience in the design of hardware and software.

## 1.1. New Information

This revised edition contains information on the following units:

### 1.1.1. Voyager I & II:

Voyager 3-25 ton cooling only, gas/electric, and 3-20 ton heat pumps. At the factory these are referred to as Voyager I (VI) and Voyager II (VII), which refers to cabinet size. They are grouped together in this manual because the control strategy is mostly the same regardless of tonnage. They differ only in type of heat, number of stages, etc.

### 1.1.2. Voyager III:

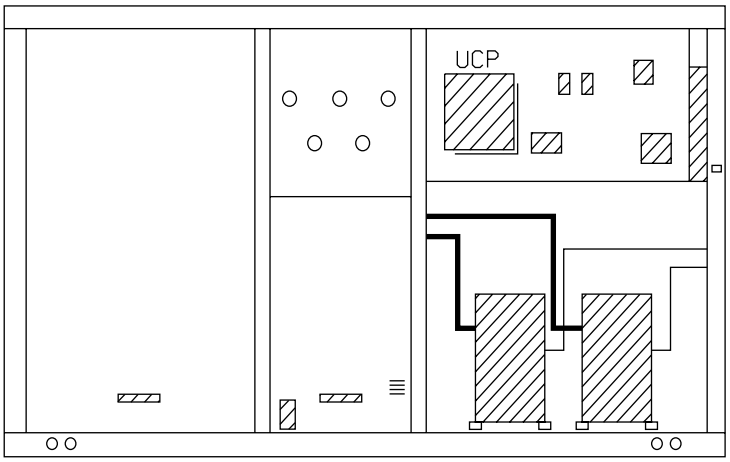
Voyager 27.5-50 ton cooling only, gas/electric and electric heat as either constant volume (CV) and variable air volume (VAV) units. At the factory these are referred to as Voyager III (VIII) or Voyager Commercial. Constant volume means that the unit is designed to provide a constant amount of air. Variable air volume means that the unit can provide a modulating quantity of air by means of inlet guide vanes (IGVs) or variable frequency drives (VFDs). Throughout this manual whenever Voyager III controls differ from Voyager I & II, look for "Voyager III Notes".

# 2. Unitary Control Processor

The Unitary Control Processor (UCP) includes the following functions:

- Controls decision making processes in place of a thermostat
- Functions as a proportional integral control for superior comfort
- Controls cooling & heating staging and timing
- Contains many other equipment protection and operational enhancement features

**Unitary Control Processor as a Decision Making Process**

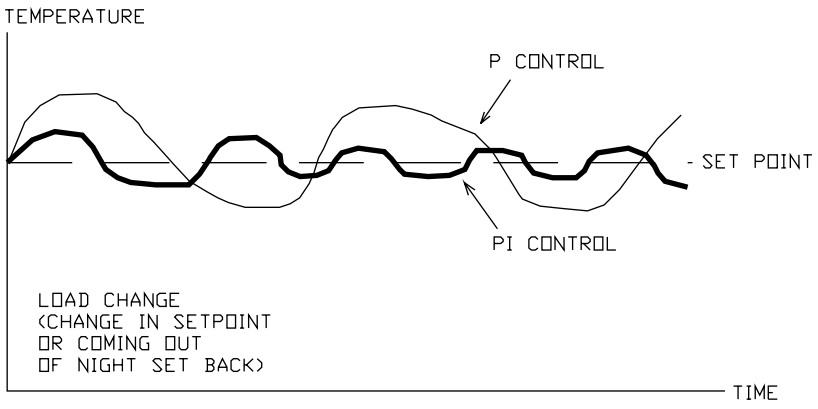



## 2.1. Proportional Integral Control

Proportional Integral Control (PI), located in the UCP enables space temperature control by the following:

- Sets the corrective action proportional to the error of deviation from the set point.
- Sets the rate of corrective action proportional to the error, resulting in the elimination of steady state error.

**Proportional Integral Control as a Corrective Action**

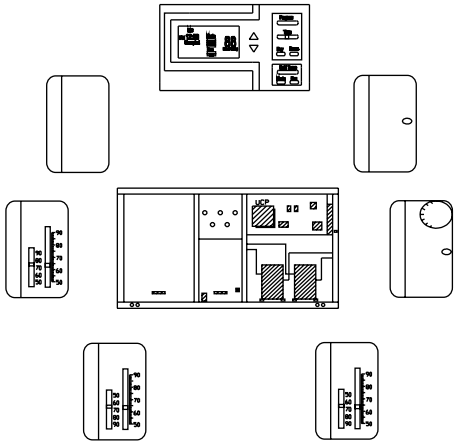


# 3. Zone Sensor Module

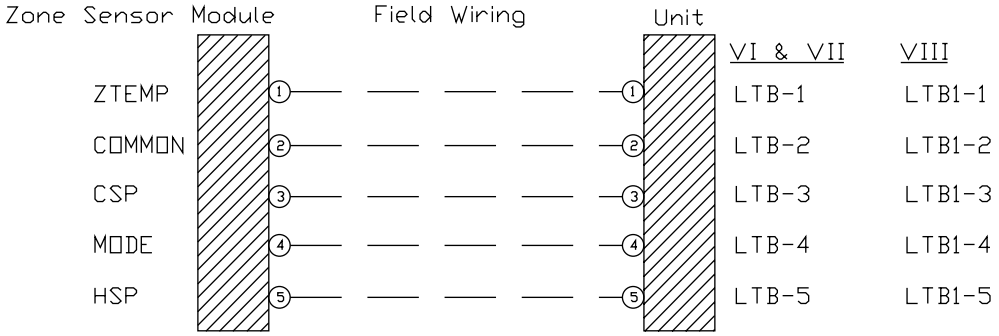
The Zone Sensor Modules (ZSMs) replace a thermostat by providing the operator interface and zone temperature sensor input for the UCP. A Zone Sensor Module (ZSM) is required for each constant volume system, unless a Conventional Thermostat Interface (CTI), or VariTrac II with CCP is being used.
**Voyager III Note**: Variable Air Volume (VAV) units, 27.5-50 ton can use similar controllers, or they can be operated from the VAV panel in the rooftop unit. For more information see section 8.8.

ZSMs are available with the following features:

- Remote sensing capabilities
- Space temperature averaging capabilities
- Single or Dual set point
- Programmable models
- Manual & Auto changeover
- Very simple to use



## 3.1. Installation Differences between Microcontrol & Electromechanical




### 3.1.1. Wiring

There are differences between microelectronic control units and electromechanical units. The most obvious difference is that typical industry terminal designations are not used. In other words, "R-G-Y-W-B" are not used. This is a very big change, but in reality it is a simplification. Terminal designations are now 1-2-3-4-5 etc.

The terminal designations on the Zone Sensor Modules (ZSMs) are identical to the terminal designations on the Low Voltage Terminal Board (LTB). No more wondering what thermostat terminal goes to what unit terminal.
Customer control wiring connections are as simple as: 1 to 1, 2 to 2, 3 to 3, 4 to 4, 5 to 5, and so on.
**Voyager III note:** VAV units use the VAV set point panel for supply air and morning warm-up set points.

## 3.2.1. Obsolete Zone Sensor Module Descriptions

| Accessory Model # | Zone Sensor Module Description | Required # Conductors | Terminal Description |
|---|---|---|---|
| **Heat/Cool** | | | |
| **BAYSENS006A**<br>**ASYSTAT661A** | Single Set Point<br>Manual Change Over | 4 | 1,2,3,4 |
| **BAYSENS008A**<br>**ASYSTAT663A** | Dual Set Point<br>Manual / Auto<br>Change Over | 5 | 1,2,3,4,5 |
| **BAYSENS010A** | Dual Set Point with<br>LEDs Manual / Auto<br>Change Over | 10 | 1,2,3,4,5,<br>6,7,8,9,10 |
| **BAYSENS019A/020A**<br>**ASYSTAT666A** | Programmable with<br>Night Setback and<br>LCD Indicators | 3-7 | <br>12,14<br>7-10 Optional |
| **Heat Pump** | | | |
| **BAYSENS007A**<br>**ASYSTAT662A** | Single Set Point<br>Manual Change Over | 6 | 1,2,3,4,<br>6,7 |
| **BAYSENS009A**<br>**ASYSTAT664A** | Dual Set Point<br>Manual / Auto<br>Change Over | 7 | 1,2,3,4,5**,**<br>6,7 |
| **BAYSENS011A** | Dual Set Point with<br>LEDs Manual / Auto<br>Change Over | 10 | 1,2,3,4,5,<br>6,7,8,9,10 |
| **BAYSENSO23A**<br>**ASYSTAT667A** | Programmable with<br>Night Setback and<br>LCD Indicators | 3-7 | 7,8,9,10,11,<br>12,14<br>7-10 Optional |
| **Heat / Cool Or Heat Pump** | | | |
| **BAYSENS012A**<br>**ASYSTAT665A** | Programmable with<br>Night Setback | 2 | 11,12 |
| **BAYSENS018A** | Programmable with<br>Night Setback and<br>LCDs | 6 | 7,8,9,10,<br>11,12 |
| **BAYSENS022A** | Digital with LCD<br>Temperature Display | 3 | 11,12,14 |
| **Tracer / Tracker / ComforTrac ICS** | | | |
| **BAYSENS013A**<br>**BAYSENS013B** | Override Sensor | 2 | 1,2 |
| **BAYSENS014A**<br>**BAYSENS014B** | Override Sensor<br>with Set Point | 3 | 1,2,3 |

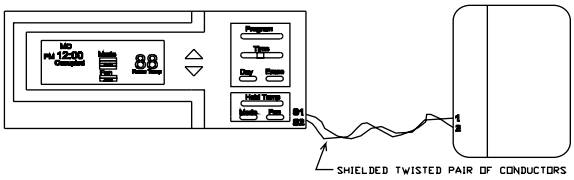
## 3.3.1. ZSM Current Zone Sensor Module Descriptions

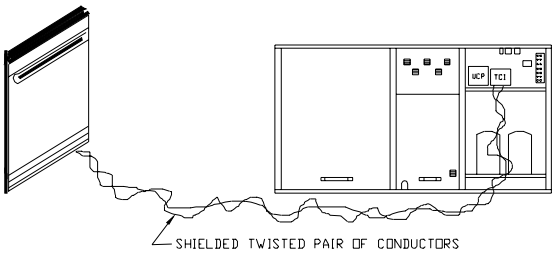
| Accessory Model # | Zone Sensor Module Description | Required # Conductors | Terminal Connections |
|---|---|---|---|
| **Heat/Cool** | | | |
| **BAYSENS006B**<br>**ASYSTAT661B** | Single Set Point<br>Manual Change Over | 4 | 1,2,3,4 |
| **BAYSENS008B**<br>**ASYSTAT663B** | Dual Set Point<br>Manual / Auto<br>Change Over | 5 | 1,2,3,4,5 |
| **BAYSENS010B** | Dual Set Point with<br>LEDs Manual / Auto<br>Change Over | 10 | 1,2,3,4,5,<br>6,7,8,9,10 |
| **BAYSENS017B** | Remote sensor | 2 | 1, 2 |
| **BAYSENS019B/020B**<br>**ASYSTAT666B** | Programmable with<br>Night Setback and<br>LCD Indicators | 3-7 | 7,8,9,10,<br>11,12,14,<br>7-10 optional |
| **BAYSENS021A** | VAV Remote Panel<br>w/out Night Setback | 4-9 | 1,2,3,4,6,7,<br>8,9,10<br>6-10 optional |
| **Heat Pump** | | | |
| **BAYSENS007B**<br>**ASYSTAT662B** | Single Set Point<br>Manual Change Over | 6 | 1,2,3,4,<br>6,7 |
| **BAYSENS009B**<br>**ASYSTAT664B** | Dual Set Point<br>Manual / Auto<br>Change Over | 7 | 1,2,3,4,5,<br>6,7 |
| **BAYSENS011B** | Dual Set Point with<br>LEDs Manual / Auto<br>Change Over | 10 | 1,2,3,4,5,<br>6,7,8,9,10 |
| **BAYSENS017B** | Remote sensor | 2 | 1, 2 |
| **BAYSENS019B**<br>**ASYSTAT666B** | Programmable with<br>Night Setback and<br>LCD Indicators | 3-7 | 7,8,9,10,<br>11,12,14,<br>7-10 optional |
| **Tracer / Tracker / ComforTrac ICS** | | | |
| **BAYSENS013C** | Override Sensor with<br>Override / Cancel | 2 | 1,2 |
| **BAYSENS014C** | Override Sensor with<br>Set Point and Override / Cancel | 3 | 1,2,3 |

## 3.4. ZSM Control Wiring Tables

**Control Wiring Tables**

| Standard Zone Sensor Module | | Conventional Thermostat | |
|---|---|---|---|
| **Wire Size** | **Maximum Wire Length** | **Wire Size** | **Maximum Wire Length** |
| 22-gauge | 150 feet | 22-gauge | 30 feet |
| 20-gauge | 250 feet | 20-gauge | 50 feet |
| 18-gauge | 375 feet | 18-gauge | 75 feet |
| 16-gauge | 600 feet | 16-gauge | 125 feet |
| 14-gauge | 975 feet | 14-gauge | 200 feet |
| Zone Sensor Module (ZSM) to Low Voltage Terminal Board (LTB), and Remote Sensor to Zone Sensor Module (ZSM). | | Conventional Thermostat Interface (CTI) Installation. **Voyager III Note:** CTI can be used on constant volume units only. Standard Thermostat to Low Voltage Terminal Board (LTB). | |
| Wire Type = Standard Thermostat Wire, solid conductor | | Wire Type = Standard Thermostat Wire, Solid Conductor. | |
| Note: Total resistance must not exceed 5 Ohms, or ZSM calibration / accuracy may be affected. | | Note: Total resistance must not exceed 1 Ohm; or CTI and low voltage transformer will be over powered. | |




**Remote Sensor to Programmable ZSM**

Type = Shielded Twisted Pair of Conductors.

Specification = 18-gauge / Belden 8760 or equivalent.

Length = 1,000 feet, or less.

**Integrated Comfort System (ICS) Device**

Type = Shielded Twisted Pair of Conductors.

Specification = 18-gauge / Belden 8760 or equivalent.

Length = 5,000 feet, or less.

# 4. Equipment Protection / Operation Timings And Features

**Increased Reliability** –
- Fewer components (moving electromechanical parts); less likelihood of equipment down time or failure. **Standard**

**Proportional Integral (PI) Control** –
- Proportional - sets corrective action proportional to deviation from set point. Integral - fine-tunes the rate of corrective action proportional to the error (results in superior temperature control). **Standard**

**Built In "TEST" Mode-**
- Aids in quick verification of system and control operation; exercises both hardware and software (no special tools required). **Standard**

**On Board Diagnostics** –
- Assists with equipment troubleshooting if a problem should occur. **Standard**

**Low Ambient Start Timer (LAST) Function** –
- Bypasses low pressure control when a compressor starts, eliminating nuisance compressor lockouts. **Standard**

**Anti Short Cycle Timer (ASCT) Function** –
- Provides a three (3) minute minimum "ON" time and a three (3) minute minimum "OFF" time for compressors; enhances compressor reliability by ensuring proper oil return. **Standard**

**Time Delay Relay (TDR) Function** –
- Provides an incremental staging delay between compressors; minimizes equipment current inrush and consumption by keeping compressors from starting simultaneously. **Standard**

**Built In Fan Delay Relay (FDR) Function** –
- Provides custom indoor fan timing sequences for the different types of equipment, enhancing efficiency and reliability. **Standard**

**Built In Evaporator Defrost Control Function** –
- Provides low ambient cooling down to 0° F. **Standard**
- Built in Froststat for Voyager 27.5-50 ton units - Provides low ambient cooling down to 0° F. **Standard**

**Integral Electric Heat Staging** –
- Stages electric heaters "OFF" and "ON", eliminating the use of sequencers. **Standard**

**Intelligent Fallback** –
- Built in Default Control provides adaptive operation, which allows the equipment to continue to operate, and provide comfort in the event of certain input failures. Also, allows temporary operation without a Zone Sensor Module (ZSM). **Standard**

**Emergency Stop Terminals on Low Voltage Terminal Board (LTB-16 & LTB-17)** –
- Provides a convenient point to disable the equipment completely and immediately. **Standard**

**Lower Installation Cost** –
- When using a standard Zone Sensor Module (ZSM), control voltage wiring may be run up to five (5) times further than any electromechanical system with no increase in wire gauge. Example: Electromechanical System - 75 feet using 18-gauge wire. Microcontrol System - 375 feet using 18 gauge wire. **Standard**

**Alternating Lead/Lag** –
- **Note:** Dual Compressor or Dual Circuit Models Only. During periods of part load operation, each compressor cycles alternately as circuit number one, equalizing compressor wear and run time. Enabled by cutting the wire at UCP junction number J1-7. **Standard**

**Demand Defrost on 3-7.5 Ton Heat Pumps** –

- Defrosts only if needed; not based on time like most other systems. Adapts to changing weather conditions and lowers operating costs. **Standard**

**Heat Pump on 3-20 Ton Soft Start** –

- Provides a smooth transition into heating after defrost, minimizing noise and compressor stress associated with switch over. **Standard**

**Heat Pump on 3-20 Ton Smart Recovery and Smart Staging** –

- Inhibits auxiliary heat operation if the space is recovering adequately (0.1° F./minute) with the heat pump alone, providing considerable savings in operating costs. **Standard**

**Remote Sensing** –

- All Zone Sensor Modules (ZSMs) have remote sensing capabilities. **Standard**

**Space Temperature Averaging** –

- All standard ZSMs have space temperature averaging capabilities. **Note:** Requires a minimum of four (4) remote sensors.

**Supply Air Tempering** –

- A built in feature enabled using a programmable ZSM or ICS device. When in the HEAT mode (and not actively heating), if supply air temperature drops 10° F. below the heating set point, heat is turned on until supply air temperature rises to a point 10° F. above the heating set point. Provides temperate air during the "OFF" cycle, and eliminates cold air dumping from supply ducts. Extremely effective when introducing large quantities of fresh air.

**Built In Night Set Back And Unoccupied Functions** –

- When using a standard dual set point/auto change over ZSM, enable this function by applying a short across terminals LTB-11 and LTB-12. Sets cooling set point up a minimum of 7° F., sets heating set point back a minimum of 7° F., forces outside air damper (if present) minimum position to zero, and forces fan operation to automatic. **Accessory (requires time clock accessory or field supplied/installed switch or contacts)**
- When using a standard single set point/manual change-over ZSM setback/setup will not occur but other unoccupied functions will. **Accessory (requires time clock accessory or field supplied/installed switch or contacts).** See defaults, Section 8.8 for more information.
- Voyager III Note: For VAV- mechanical cooling is disabled, outside air damper will close, and the fan stays off except for unoccupied heating mode (if present). IGVs and VAV boxes are forced open during transition from occupied to unoccupied.

**Selectable Economizer Dry Bulb Change Over** –

- Allows the capability of selecting the following dry bulb change over points: 55, 60 or 65° F. **Standard with economizer**

**Economizer Preferred Cooling** –

- Provides fully integrated operation. Will not turn on a compressor with the economizer, if the space is recovering adequately with the economizer alone (0.2° F./minute). Allows the equipment to be utilized in more varied applications. **Standard with economizer**

**Morning warm-up Control – (VAV units)**

- With a programmable sensor, ICS device or standard VAV set point panel .

**Daytime warm-up Control – (VAV units)**

- When using morning warm-up, the daytime control is available or can be disabled. **Standard**

# 5. Equipment Operation with a Conventional Thermostat Interface (CTI)

When a CTI and a conventional mechanical thermostat are applied to the unit, operation differs. Thermostat logic is different; therefore some features discussed previously are not available. They are as follows:

- The Supply Air Tempering feature is not available. If outdoor air is being introduced through the equipment, discharge air temperature may be cold when not actively heating.
- Proportional Integral (PI) control is not available.
- On Board Diagnostics are only available on the Unitary Control Processor (UCP) at the J7 pins, instead of the Low Voltage Terminal Board (LTB).
- Intelligent Fall Back is not available. If a failure occurs in the device controlling the equipment, operation will cease.
- Heat Pump Smart Recovery and Smart Staging is not available. Heat Pump operation becomes more costly unless the generic control being applied can accomplish this.
- Remote Sensing Capabilities are not available on mechanical thermostats.
- Space Temperature Averaging capabilities are not available on mechanical thermostats.
- Built in Night Set Back and Unoccupied Functions are not available on mechanical thermostats.
- Built in Unoccupied mode is not available on mechanical thermostats.

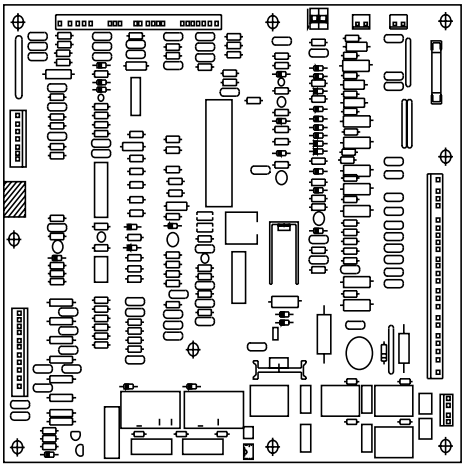
**Notes:** Installation can be more costly. In addition to the price of Conventional Thermostat Interface and the thermostat or generic control, the control wiring size must be increased.
Troubleshooting becomes more complex, because of the additional hardware (i.e. CTI Module).

**Voyager III Notes:** 1) Not an option on VAV units.
2) On CV units the unit is limited to 2 stages of cooling.

# 6. Microcontrol Component Descriptions and Part Numbers

## 6.1. Unitary Control Processor (UCP)

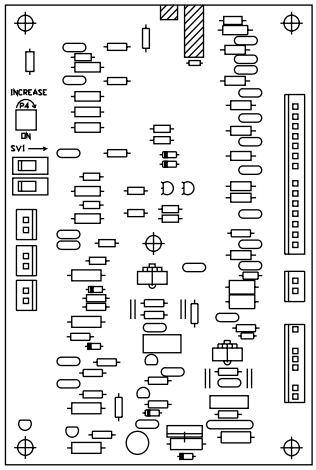
Main board in the unit control box, which is standard in all microcontrol units. The computer and program reside in this board. This is the brain of the control system.



| Component Description | Part Number |
|---|---|
| Unitary Control Processor (UCP) 3-25 tons | MOD-01164 |
| Unitary Control Processor (UCP) 27.5-50 tons | MOD-0405 |

## 6.2. Unitary Economizer Module (UEM)

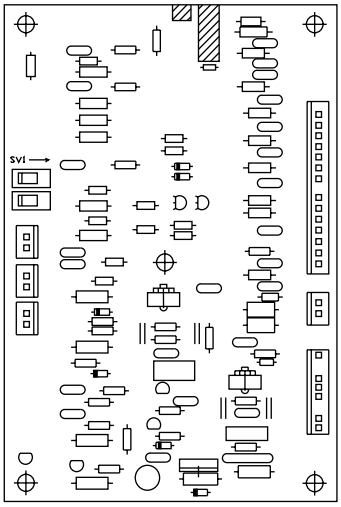
Board located in economizer section on 3-25 ton units, and unit control box on 27.5-50 ton units. Standard in all microcontrol economizers, motorized outside air dampers, and BAYDIAG001A. Allows UCP to directly control the economizer actuator (ECA). This is the hardware interface between the UCP and the economizer actuator (ECA) motor.




| Component Description | Part Number |
|---|---|
| Unitary Economizer Module (UEM) | MOD-0145 |

### 6.3. Unitary VAV Module (UVM)

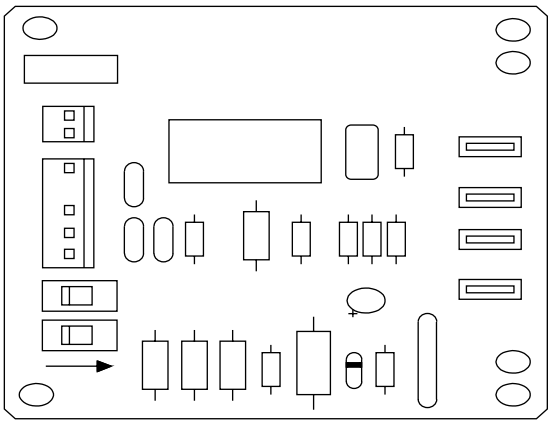
Standard board located in unit control box on 27.5-50 Ton VAV units. Provides a 2 to 10 VDC output to control Inlet Guide Vanes or Variable Frequency Drive.




| Component Description | Part Number |
|---|---|
| Unitary VAV Module (UVM) | MOD-0146 |

### 6.4. Defrost Module (DFM)

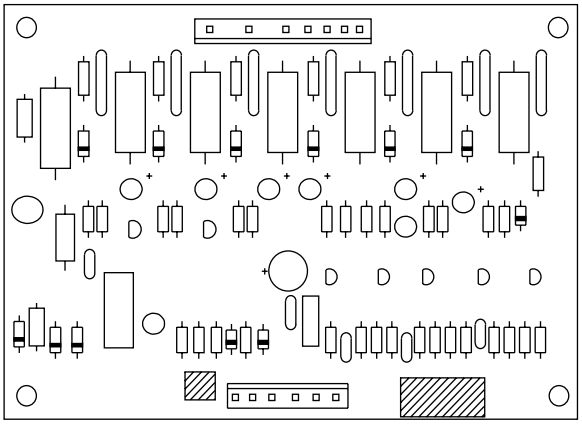
Small board located in the unit control box. Standard in 10-20 ton microcontrol heat pumps only. Provides time / temperature input to the UCP for time / temperature defrost.



| Component Description | Part Number |
|---|---|
| Defrost Module (DFM) | BRD-0742 |

## 6.5. Conventional Thermostat Interface (CTI)

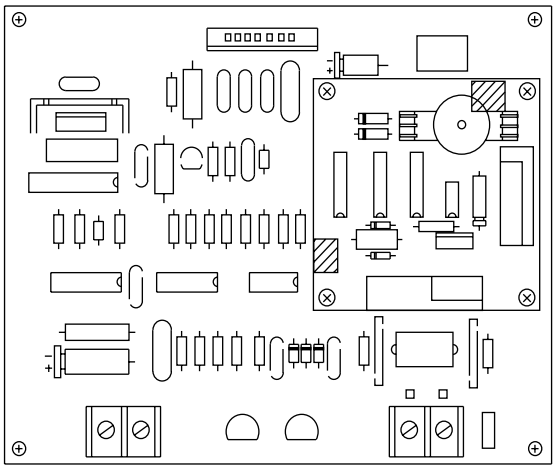
Accessory (BAYCTHI001C) field or factory installed board, mounted in unit control box to the right of the UCP board. Allows system to be operated by a conventional thermostat or through dry contact closure type controls. The only difference in hardware between VI/VII/VIII is the cable length from the UCP to the CTI. Can only be used on constant volume units.



| Component Description | Part Number |
|---|---|
| Conventional Thermostat Interface (CTI) | BRD-0968 |

## 6.6. Trane Communications Interface (TCI-3)

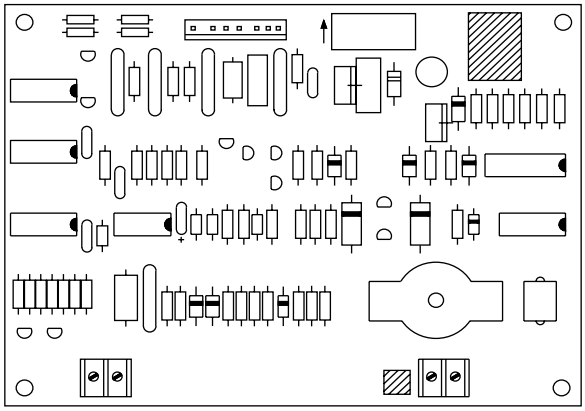
Accessory (BAYICSI001B) field or factory installed board, mounted in unit control box to the right of the UCP board. Allows system to communicate with, and be controlled by Tracer , the Tracker "STAT" 4/7/16 series, and VariTrac bypass VAV system.
**Voyager III (VAV) Note:** VariTrac can not be used with Voyager III VAV. Used with constant volume units only.
**Note:** Obsolete ComforTrac and VariTrac Comfort Manager also require this interface.



| Component Description | Part Number |
|---|---|
| Trane Communications Interface (TCI-3) | BRD-0917 |

## 6.7. Obsolete Trane Communications Interface (TCI-1)

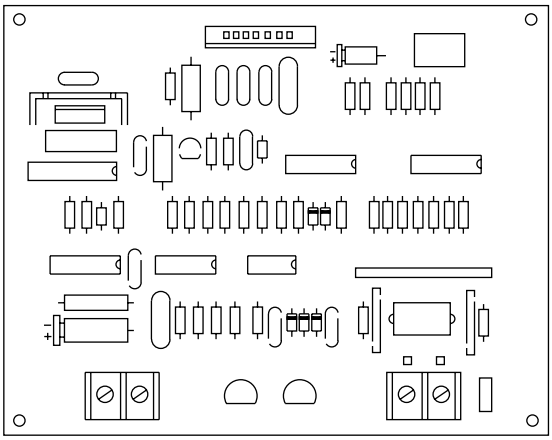
Accessory field installed board, mounted in unit control box to the right of the UCP board. Allows system to communicate with, and be controlled by, Tracer / Tracker / ComforTrac Integrated Comfort System (ICS) Building Management Devices.



| For Replacement use TCI-3 | Part Number |
|---|---|
| Trane Communications Interface (TCI-3) | BRD-0917 |

## 6.8. Obsolete Trane Communications Interface (TCI-2)

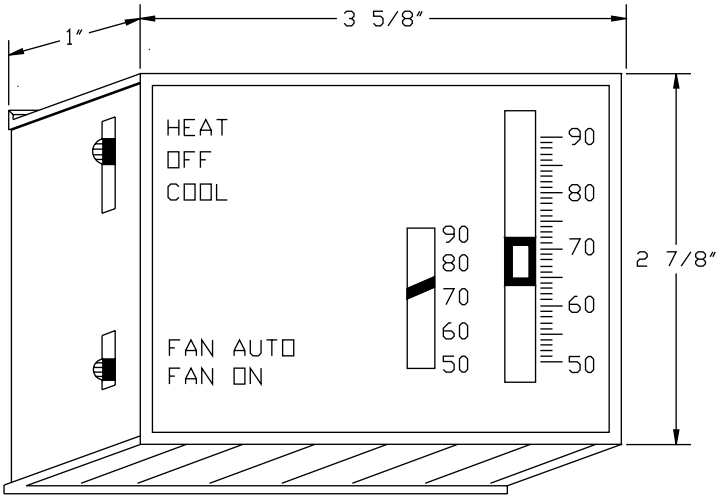
Accessory field installed board, mounted in unit control box to the right of the UCP board. Allows system to communicate with, and be controlled by, VariTrac Comfort Manager zoning system.



| For Replacement use TCI-3 | Part Number |
|---|---|
| Trane Communications Interface (TCI-3) | BRD-0917 |

## 6.9. Obsolete BAYSENS006A / ASYSTAT661A

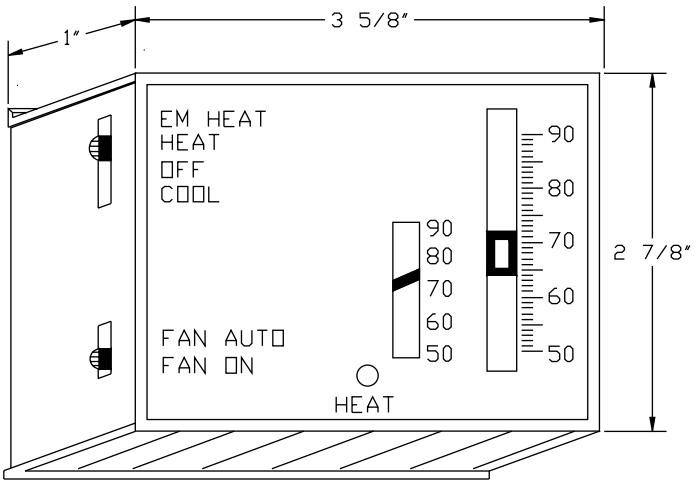
Accessory Heat / Cool Zone Sensor Module (ZSM), single set point, manual change over. Four conductors required. Manufactured by Sunne prior to 12/93.




| For Replacement use BAYSENS006B & Wall Plate BAYMTPL004A | Part Number |
|---|---|
| BAYSENS006B [Sunne part# 62822] | SEN-0410 |
| ASYSTAT661B [Sunne part# 62830] | SEN-0417 |

## 6.10. Obsolete BAYSENS007A / ASYSTAT662A

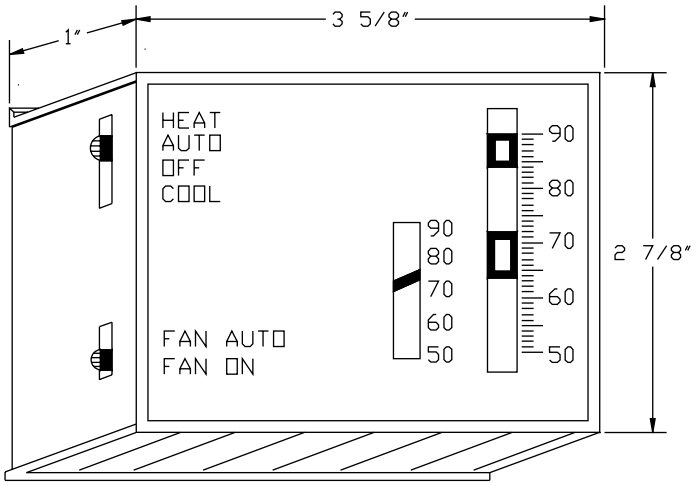
Accessory Heat Pump Zone Sensor Module (ZSM), single set point, manual change over. Six conductors required. Manufactured by Sunne prior to 12/93.




| For Replacement use BAYSENS007B & Wall Plate BAYMTPL004A | Part Number |
|---|---|
| BAYSENS007B [Sunne part# 62821] | SEN-0411 |
| ASYSTAT662B [Sunne part# 62831] | SEN-0418 |

## 6.11. Obsolete BAYSENS008A / ASYSTAT663A

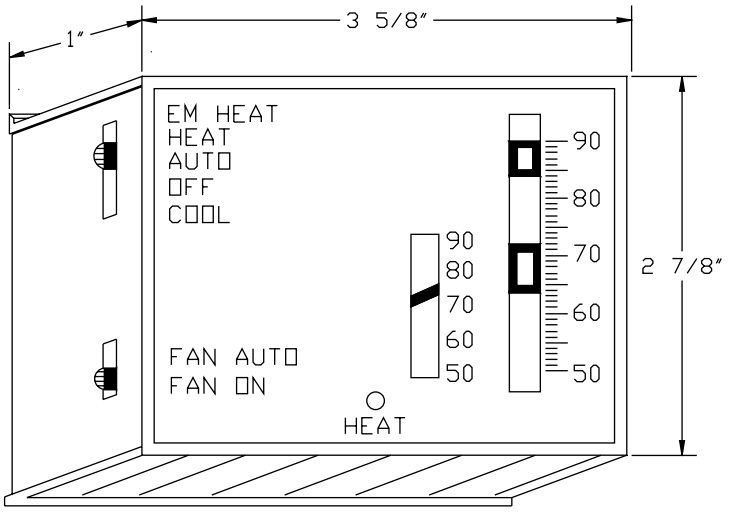
Accessory Heat / Cool Zone Sensor Module (ZSM), dual set point, manual / auto-change over. Five conductors required. Manufactured by Sunne prior to 12/93.




| For Replacement use BAYSENS008B & Wall Plate BAYMTPL004A | Part Number |
|---|---|
| BAYSENS008B [Sunne part# 62826] | SEN-0408 |
| ASYSTAT663B [Sunne part# 62833] | SEN-0419 |

## 6.12. Obsolete BAYSENS009A / ASYSTAT664A

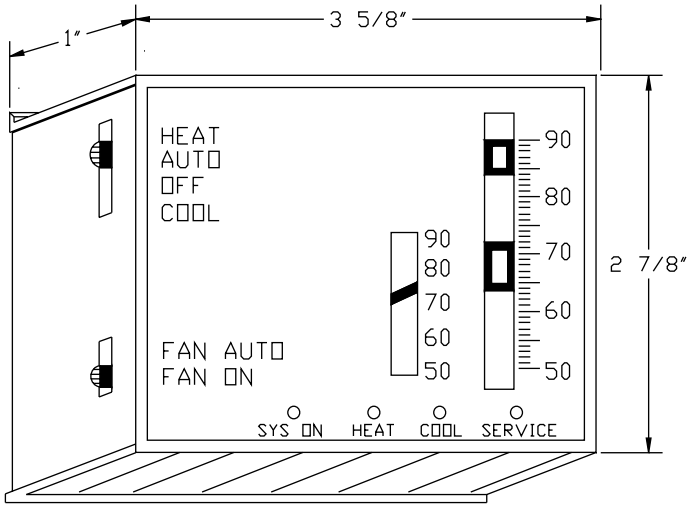
Accessory Heat Pump Zone Sensor Module (ZSM), dual set point, manual / auto-change over. Seven conductors required. Manufactured by Sunne prior to 12/93.




| For Replacement use BAYSENS009B & Wall Plate BAYMTPL004A | Part Number |
|---|---|
| BAYSENS009B [Sunne part# 62825] | SEN-0412 |
| ASYSTAT664B [Sunne part# 62832] | SEN-0420 |

## 6.13. Obsolete BAYSENS010A

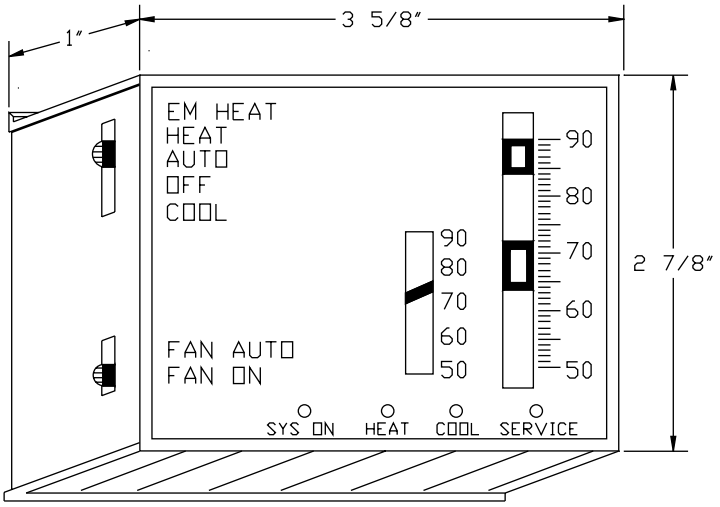
Accessory Heat / Cool Zone Sensor Module (ZSM), dual set point with LEDs, manual / auto-change over. Ten conductors required. Manufactured by Sunne prior to 12/93.




| For Replacement use BAYSENS010B & Wall Plate BAYMTPL004A | Part Number |
|---|---|
| BAYSENS010B [Sunne part# 62823] | SEN-0413 |

## 6.14. Obsolete BAYSENS011A

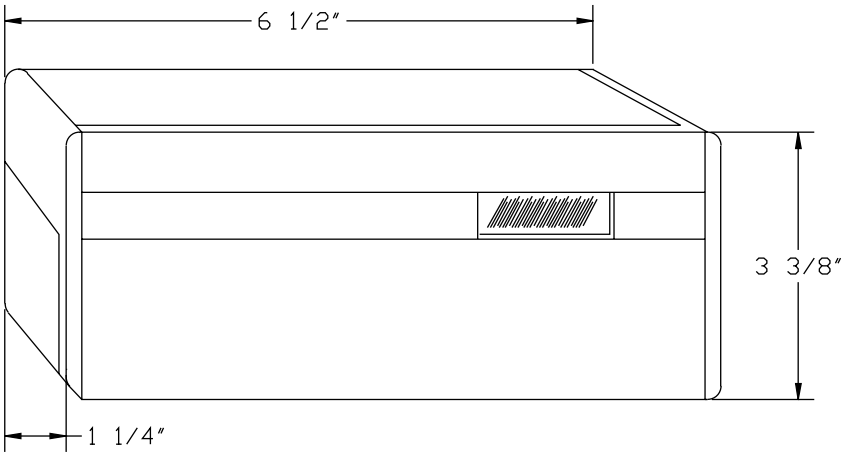
Accessory Heat Pump Zone Sensor Module (ZSM), dual set point with LEDs, manual / auto-change over. Ten conductors required. Manufactured by Sunne prior to 12/93.




| For Replacement use BAYSENS011B & Wall Plate BAYMTPL004A | Part Number |
|---|---|
| BAYSENS011B [Sunne part# 62824] | SEN-0414 |

## 6.15. Obsolete BAYSENS012A / ASYSTAT665A

Accessory Heat / Cool and Heat Pump, programmable night set back Zone Sensor Module (ZSM). Two conductors required. Manufactured by Enerstat/Valera prior to 02/94.

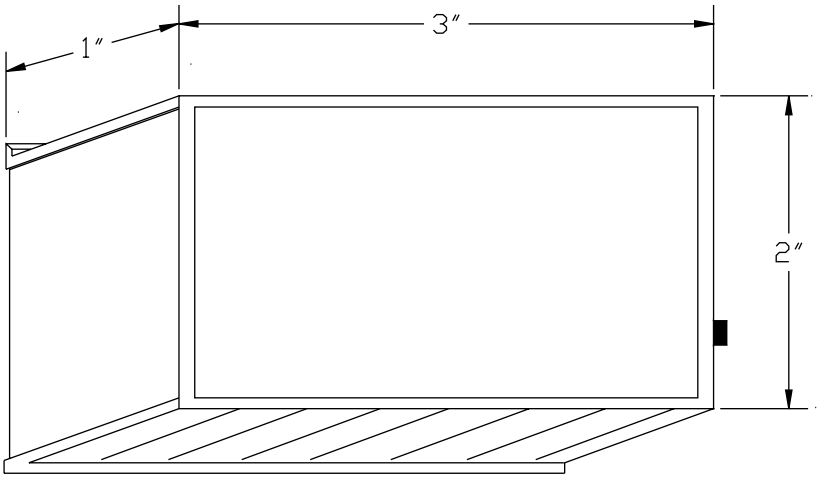



| For Replacement use BAYSENS019B | Part Number |
|---|---|
| BAYSENS019B [Caradon part# 91K91] | SEN-0874 |
| ASYSTAT666B [Caradon part# 91K92] | SEN-0907 |

**Note:** Minimum of 3 wires required with a BAYSENS019B.

## 6.16. Obsolete BAYSENS013A

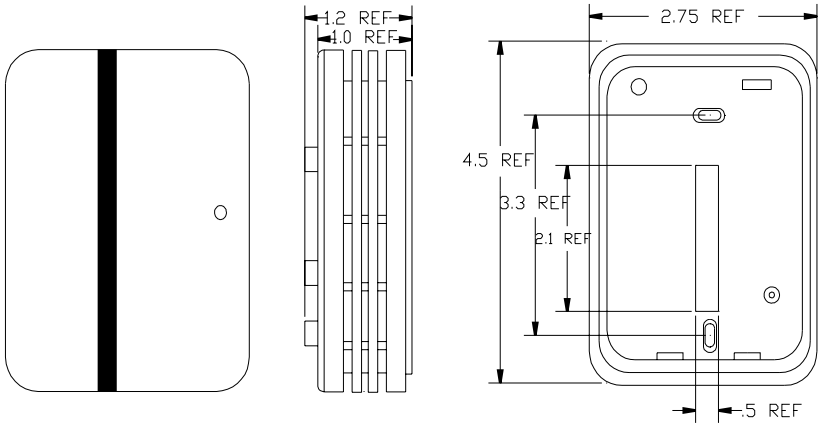
Accessory ICS (Tracer/Tracker/ComforTrac) Zone Sensor Module (ZSM), with override button. Two conductors required. Manufactured by Sunne prior to 12/93.




| For Replacement use BAYSENS013C & Wall Plate BAYMTPL004A | Part Number |
|---|---|
| BAYSENS013C [Sunne part# 65464] | SEN-0495 |

### 6.17. Obsolete BAYSENS013B

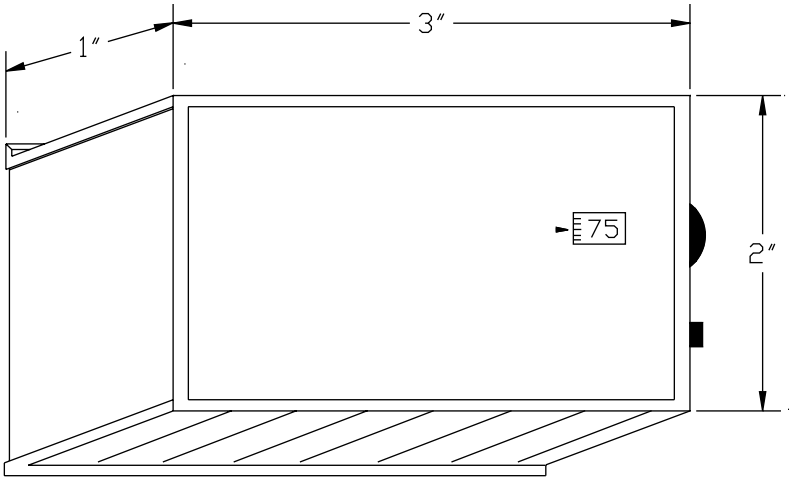
Accessory ICS (Tracer/Tracker/ComforTrac) Zone Sensor Module (ZSM), with override button. Two conductors required. Manufactured by Sunne, prior to 08/95.




| For Replacement use BAYSENS013C | Part Number |
|---|---|
| BAYSENS013C [Sunne part# 65464] | SEN-0495 |

### 6.18. Obsolete BAYSENS014A

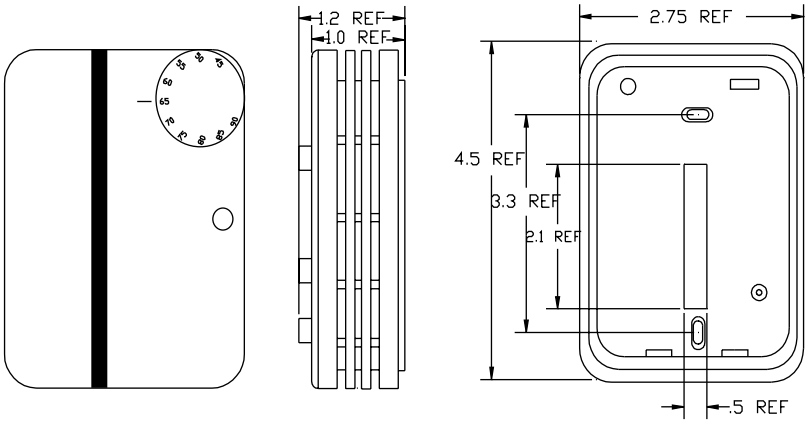
Accessory ICS (Tracer/Tracker/ComforTrac) Zone Sensor Module (ZSM), with override button and set point. Three conductors required. Manufactured by Sunne prior to 12/93.




| For Replacement use BAYSENS014C & Wall Plate BAYMTPL004A | Part Number |
|---|---|
| BAYSENS014C [Sunne part# 65465] | SEN-0496 |

## 6.19. Obsolete BAYSENS014B

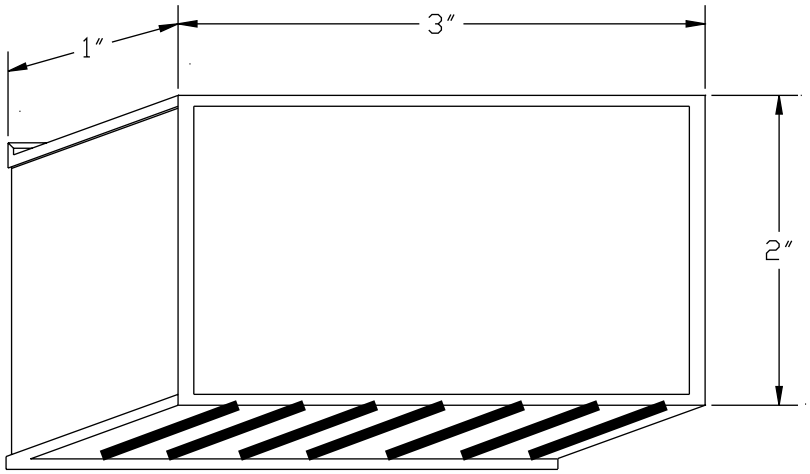
Accessory ICS (Tracer/Tracker/ComforTrac) Zone Sensor Module (ZSM), with override button and set point. Three conductors required. Manufactured by Sunne, prior to 08/95.




| For Replacement use BAYSENS014C | Part Number |
|---|---|
| BAYSENS014C [Sunne part# 65465] | SEN-0496 |

## 6.20. Obsolete BAYSENS017A

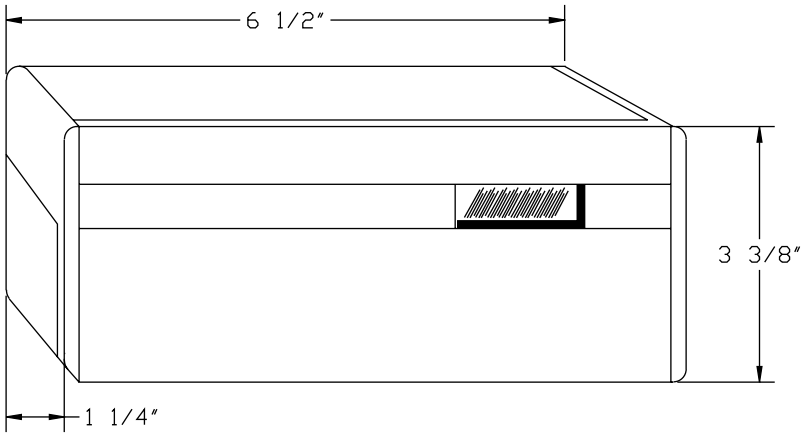
Accessory Zone Sensor Remote, used with BAYSENS006A, 007A, 008A, 009A, 010A or 011A. Two conductors required. Manufactured by Sunne prior to 12/93.




| For Replacement use BAYSENS017B & Wall Plate BAYMTPL004A | Part Number |
|---|---|
| BAYSENS017B [Sunne part# 62828] | SEN-0435 |
| ASYSTAT669A [Sunne part# 65541] | SEN-0493 |

## 6.21. Obsolete BAYSENS018A

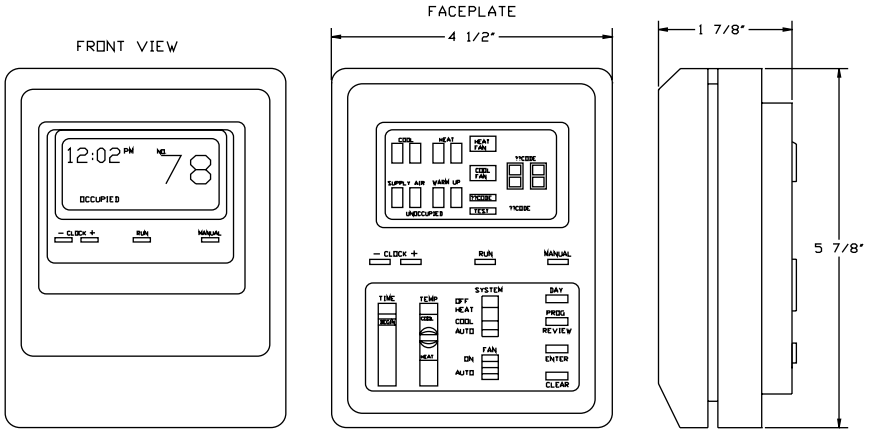
Accessory Heat / Cool and Heat Pump, programmable night set back Zone Sensor Module (ZSM), with LCD status / diagnostic indicators. Six conductors required. Manufactured by Enerstat/Valera prior to 02/94.




| For Replacement use BAYSENS019B & Wall Plate BAYMTPL003A | Part Number |
|---|---|
| BAYSENS019B [Caradon part# 91K91] | SEN-0874 |
| ASYSTAT666B [Caradon part# 91K92] | SEN-0907 |

## 6.22. Obsolete BAYSENS019A/020A/ASYSTAT666A

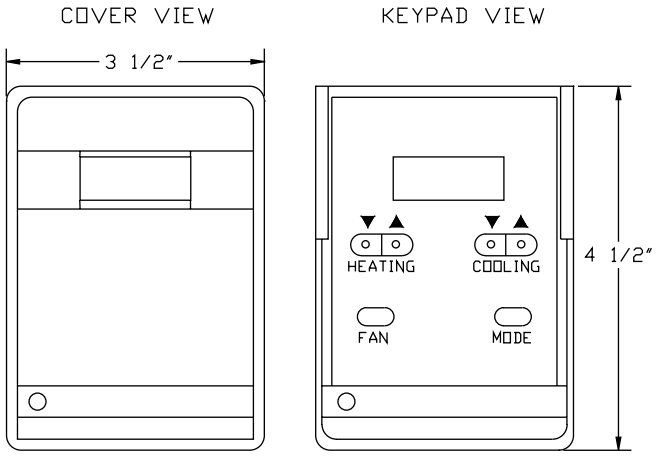
Accessory Heat/Cool, programmable night set back Zone Sensor Module (ZSM), with LCD status / diagnostic indicators. Seven conductors, terminals 11, 12 & 14 required, 7 through 10 optional. Manufactured by Caradon, introduced 03/94.




| For Replacement use BaYSENS019B/020B & Wall Plate BAYMTPL003A | Part Number |
|---|---|
| BAYSENS019B [Caradon part# 91K91] | SEN-0874 |
| ASYSTAT666B [Caradon part# 91K92] | SEN-0907 |
| BAYSENS020B [Caradon part# 91K93] (**VAV only**) | SEN-0874 |

## 6.23. Obsolete BAYSENS022A

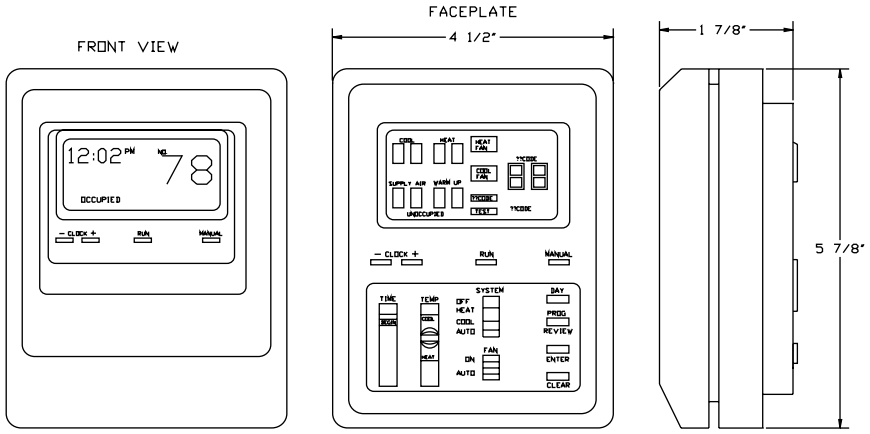
Accessory Heat / Cool and Heat Pump, (non-programmable) digital Zone Sensor Module (ZSM), with LCD display. Three conductors required. Manufactured by Enerstat/Valera, introduced 06/93.




**No Replacement**

## 6.24. Obsolete BAYSENS023A/ASYSTAT667A

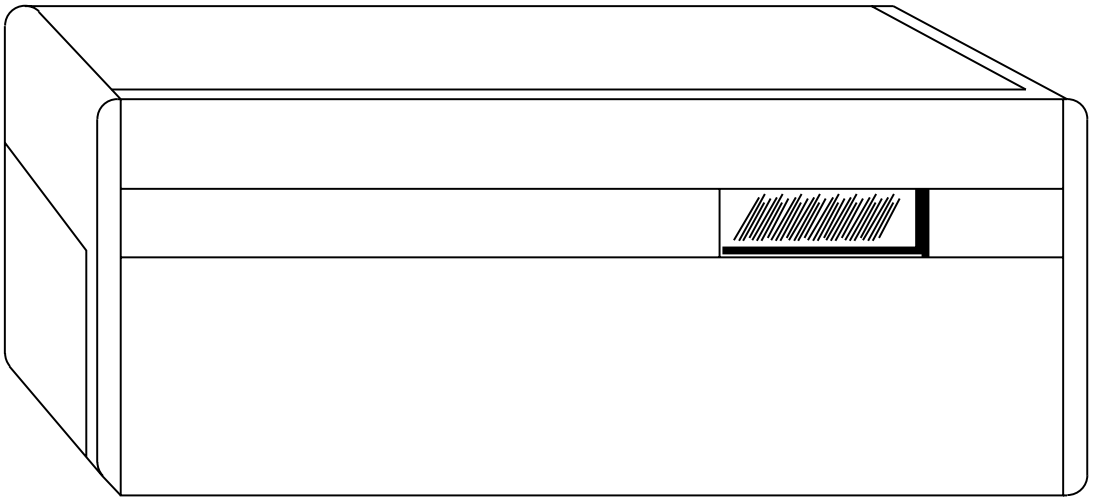
Accessory Heat Pump, programmable night set back Zone Sensor Module (ZSM), with LCD status / diagnostic indicators. Seven conductors, terminals 11, 12 & 14 required, 7 through 10 optional. Manufactured by Caradon, introduced 03/94.




| For Replacement use BAYSENS019B & Wall Plate BAYMTPL003A | Part Number |
|---|---|
| BAYSENS019B [Caradon part# 91K91] | SEN-0874 |
| ASYSTAT666B [Caradon part# 91K92] | SEN-0907 |

## 6.25. Obsolete Programmable Zone Sensor Modules

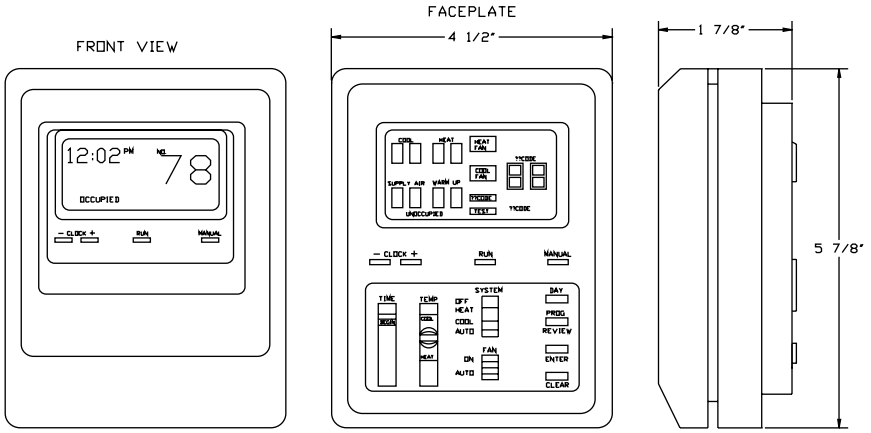
The programmable zone sensor module is a night set back device with 7 day programming capabilities, and one occupied / unoccupied period per day. Two wires are required for BAYSENS012A or ASYSTAT665A installation. BAYSENS018A required 6 wires. A microprocessor in the zone sensor communicates with the UCP once every 0.5 seconds.



**BAYSENS012A, 018A**

## 6.26. Obsolete Programmable Zone Sensor Modules

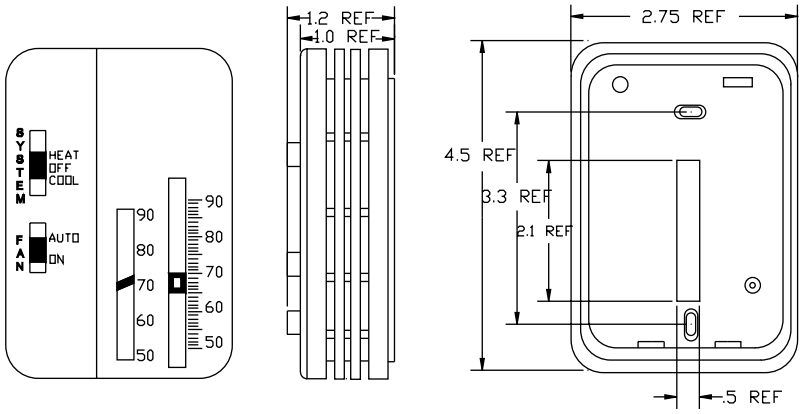
The programmable zone sensor module, is a night set back device with many features. It has 7 day programming capabilities, with two occupied, and two unoccupied periods per day. Three wires are required for BAYSENS019A/023A or ASYSTAT666B basic installation. When remote panel indication is needed, up to seven wires are used to complete installation. Its microprocessor communicates once every 0.5 seconds with the UCP, for rapid response to zone changes.



# 7. Microcontrol Accessories and What They Offer

## 7.1. BAYSENS006B/ASYSTAT661B

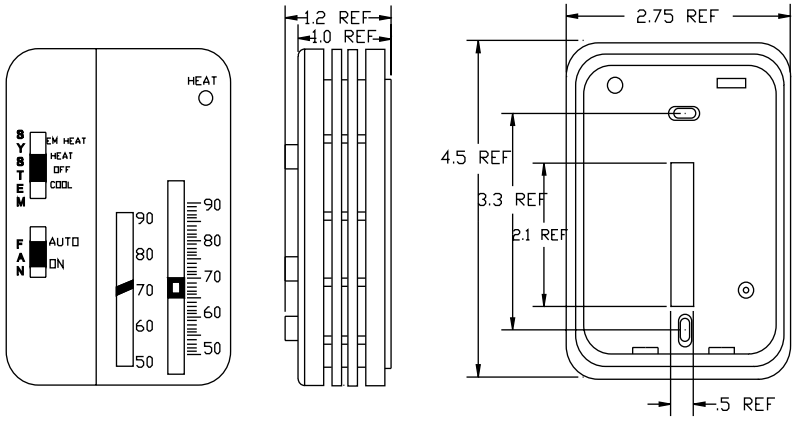
Accessory Heat / Cool Zone Sensor Module (ZSM), single set point, manual change over. Four conductors required. Manufactured by Sunne, introduced 12/93.




| Component Description | Part Number |
|---|---|
| BAYSENS006B [Sunne part# 62822] | SEN-0410 |
| ASYSTAT661B [Sunne part# 62830] | SEN-0417 |

## 7.2. BAYSENS007B / ASYSTAT662B

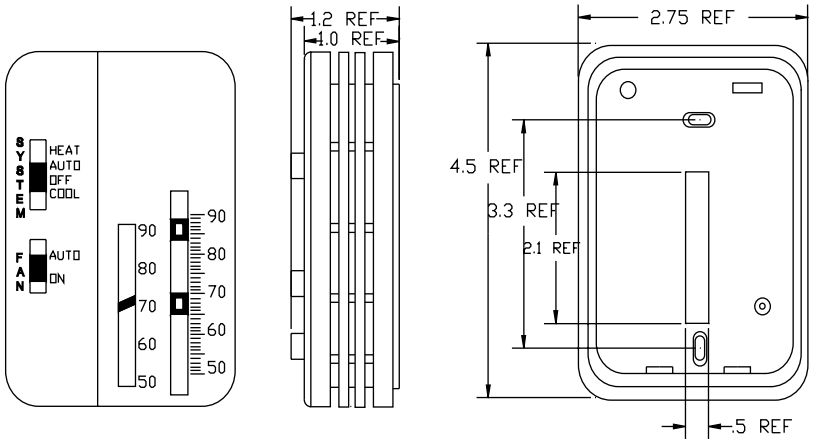
Accessory Heat Pump Zone Sensor Module (ZSM), single set point, manual change over. Six conductors required. Manufactured by Sunne, introduced 12/93.




| Component Description | Part Number |
|---|---|
| BAYSENS007B [Sunne part# 62821] | SEN-0411 |
| ASYSTAT662B [Sunne part# 62831] | SEN-0418 |

### 7.3. BAYSENS008B / ASYSTAT663B

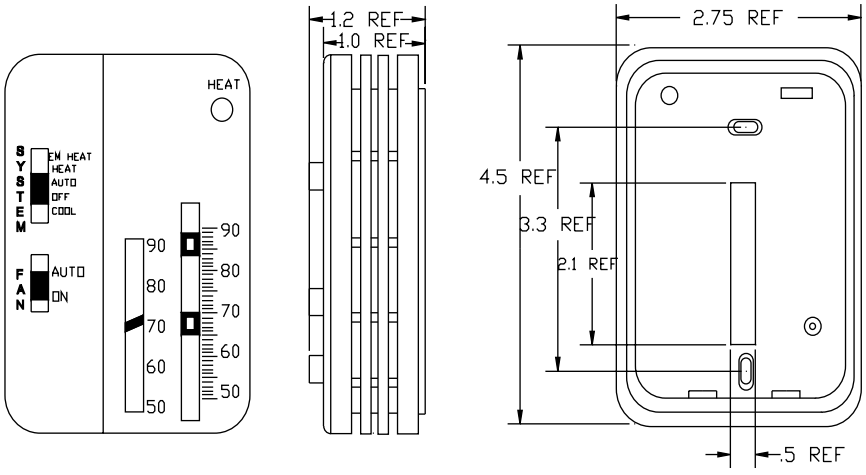
Accessory Heat / Cool Zone Sensor Module (ZSM), dual set point, manual / auto change over. Five conductors required. Manufactured by Sunne, introduced 12/93.




| Component Description | Part Number |
|---|---|
| BAYSENS008B [Sunne part# 62826] | SEN-0408 |
| ASYSTAT663B [Sunne part# 62833] | SEN-0419 |

### 7.4. BAYSENS009B / ASYSTAT664B

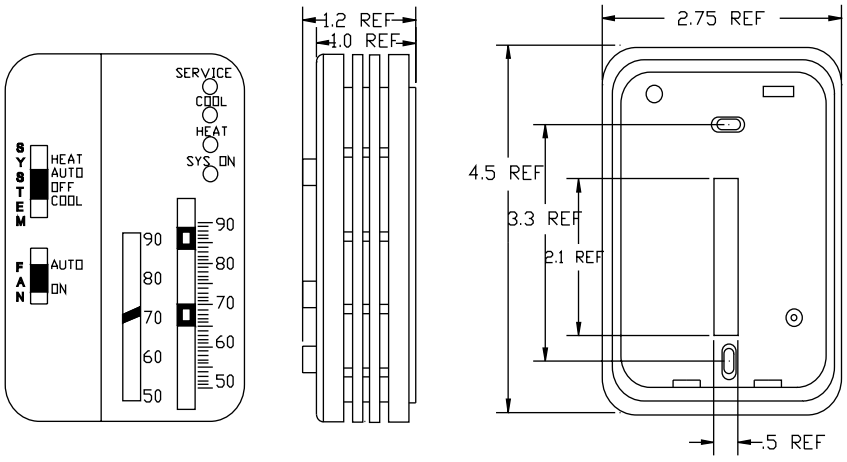
Accessory Heat Pump Zone Sensor Module (ZSM), dual set point, manual / auto change over. Seven conductors required. Manufactured by Sunne, introduced 12/93.




| Component Description | Part Number |
|---|---|
| BAYSENS009B [Sunne part# 62825] | SEN-0412 |
| ASYSTAT664B [Sunne part# 62832] | SEN-0420 |

## 7.5. BAYSENS010B

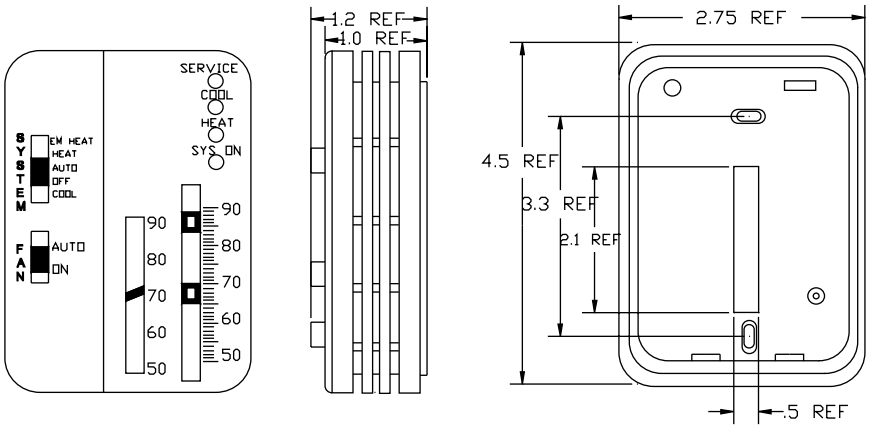
Accessory Heat / Cool Zone Sensor Module (ZSM), dual set point with LEDs, manual / auto change over. Ten conductors required. Manufactured by Sunne, introduced 12/93.




| Component Description | Part Number |
|---|---|
| BAYSENS010B [Sunne part# 62823] | SEN-0413 |

## 7.6. BAYSENS011B

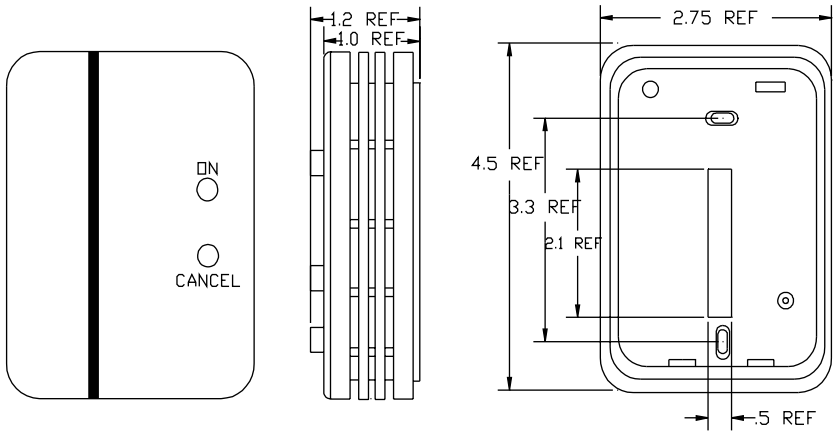
Accessory Heat Pump Zone Sensor Module (ZSM), dual set point with LEDs, manual / auto change over. Ten conductors required. Manufactured by Sunne, introduced 12/93.




| Component Description | Part Number |
|---|---|
| BAYSENS011B [Sunne part# 62824] | SEN-0414 |

## 7.7. BAYSENS013C

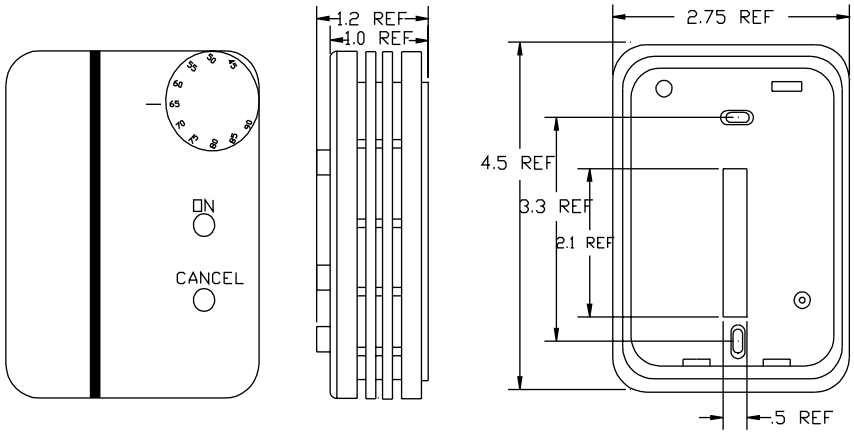
Accessory ICS (Tracer/Tracker/ComforTrac) Zone Sensor Module (ZSM), with override button, and override cancel button. Two conductors required. Manufactured by Sunne, introduced 08/95.




| **Component Description** | **Part Number** |
|---|---|
| BAYSENS013C [Sunne part# 65464] | SEN-0495 |

## 7.8. BAYSENS014C

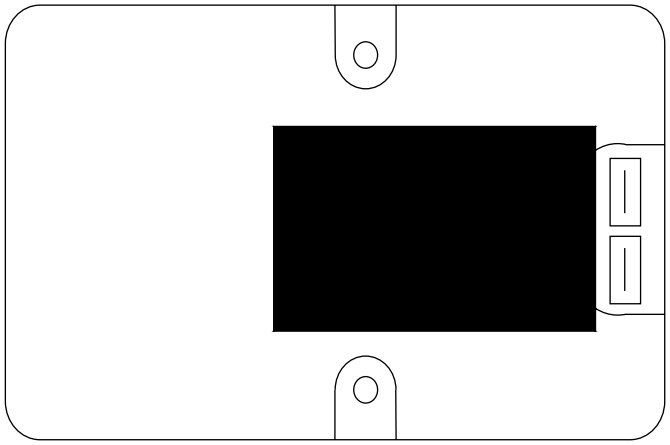
Accessory ICS (Tracer/Tracker/ComforTrac) Zone Sensor Module (ZSM), with override button, set point, and override cancel button. Three conductors required. Manufactured by Sunne, introduced 08/95.




| **Component Description** | **Part Number** |
|---|---|
| BAYSENS014C [Sunne part# 65465] | SEN-0496 |

## 7.9. BAYSENS015A Humidity Sensor (OHS, RHS)

**Outdoor Humidity Sensor**: Field installed accessory, located below and to the left of economizer actuator motor. Used in reference (BAYENTH003A) and comparative (BAYENTH004A) enthalpy control.
**Return Humidity Sensor**: Field installed accessory, located inside economizer barometric relief hood. Used in comparative (BAYENTH004A) enthalpy control only. (Honeywell #C7600A1028)



| Component Description | Part Number |
|---|---|
| BAYSENS015A Humidity Sensor (OHS, RHS) | SEN-0277 |

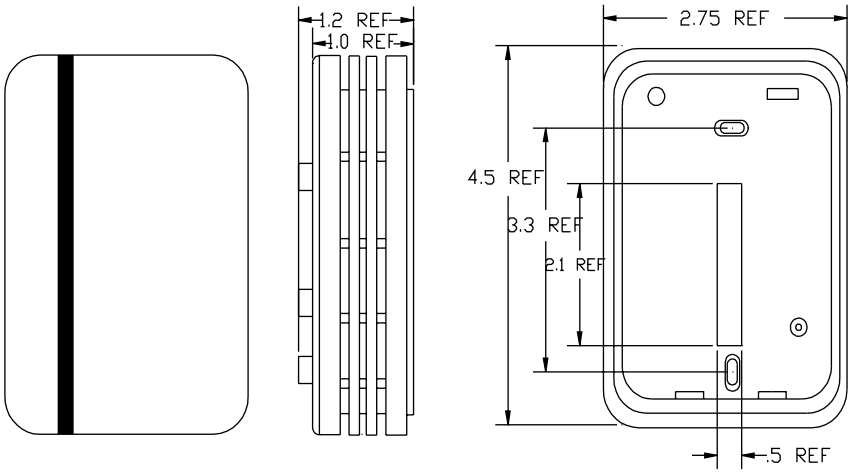
## 7.10. BAYSENS016A Thermistor Sensor (OAS, SAS, RAS, CTS)

**Outdoor Air Sensor**: Located in corner post by unit control box on Voyager I and II units. Located in the economizer section on Voyager Commercial units. Comes standard on all microcontrol units.
**Supply Air Sensor**: Field installed in supply fan housing for Voyager I and II units. Factory installed in supply fan housing for Voyager III units. Comes standard with all microcontrol economizers, or BAYDIAG001A (Generic Input/Output Module) used to gain additional points on ICS jobs when economizers are not used.
**Return Air Sensor**: Field installed accessory. Located in barometric relief hood of economizer accessory, used in comparative enthalpy control only (BAYENTH004A accessory).
**Coil Temperature Sensor**: Located in a 3/8" copper tube well, which is brazed to the lowest circuit entering the outdoor coil (3-7.5 ton heat pumps only).


| Component Description | Part Number |
|---|---|
| Thermistor Sensor (OAS, SAS, RAS) | SEN-0339 |

### 7.11. BAYSENS017B / ASYSTAT669A

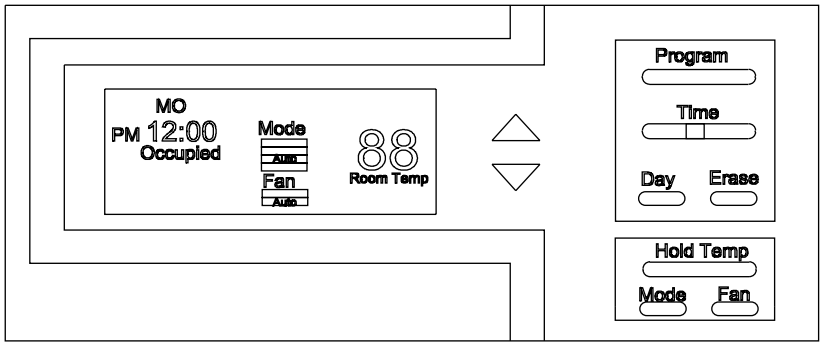
Accessory Zone Sensor Remote, used with all **current** zone sensors. Two conductors required. Manufactured by Sunne, introduced 12/93.




| Component Description | Part Number |
|---|---|
| BAYSENS017B [Sunne part# 62828] | SEN-0435 |
| ASYSTAT669A [Sunne part# 65541] | SEN-0493 |

### 7.12. BAYSENS019B / ASYSTAT666B (CV 3-50 Ton)

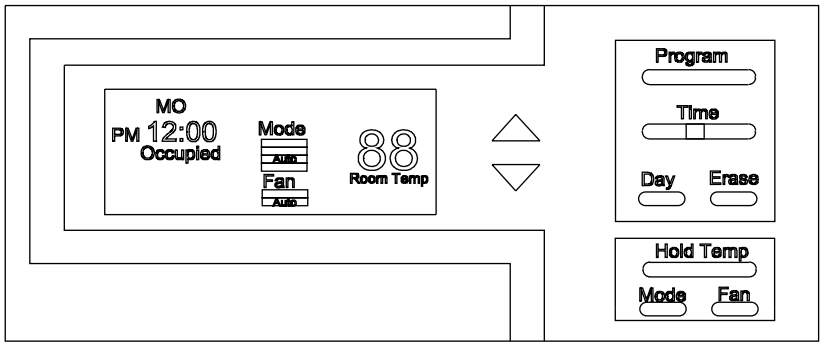
Accessory Heat/Cool, programmable night set back Zone Sensor Module (ZSM), with LCD status / diagnostic indicators. Seven conductors: terminals 11, 12 & 14 required, 7 through 10 optional. Manufactured by Caradon, introduced 06/98.




| Component Description | Part Number |
|---|---|
| BAYSENS019B [Caradon part# 91K91] | SEN-0874 |
| ASYSTAT666B [Caradon part# 91K92] | SEN-0907 |

## 7.13. BAYSENS020B (Voyager III VAV only)

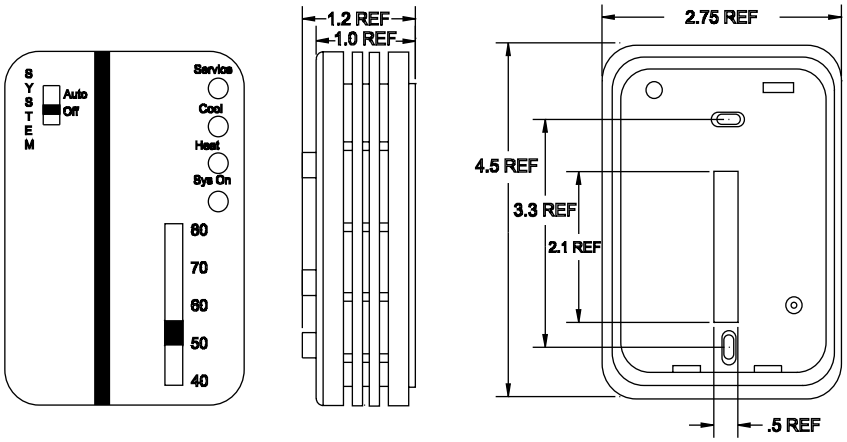
Accessory Heat/Cool, programmable night set back Zone Sensor Module (ZSM) for VAV applications, with LCD status / diagnostic indicators. Seven conductors: terminals 11, 12 & 14 required, 7 through 10 optional. Manufactured by Caradon, introduced 06/98.




| Component Description | Part Number |
|---|---|
| BAYSENS020B [Caradon part# 91K93] | SEN-0874 |

## 7.14. BAYSENS021B (Voyager III VAV only)

Accessory Zone Sensor Module (ZSM) for VAV applications, single set point with LEDs, system auto or off. Nine conductors, terminals 1, 2, 4, & 5 required, 6 through 10 optional.

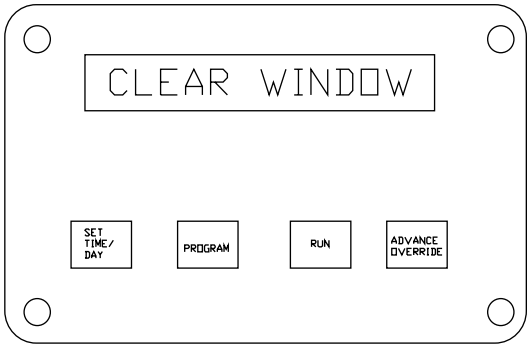



| Component Description | Part Number |
|---|---|
| BAYSENS021A | SEN-0440 |

## 7.15. Electronic Time Clock

The BAYCLCK001A / ASYSTAT668A has a 16 digit LCD display and provides set up / set back for multiple units (up to four), when used in conjunction with a standard dual setpoint zone sensor module (see YC-EB-1 for sequence of operation details). The electronic time clock is a true 7 day programmable device which offers one occupied and one unoccupied mode per day, and a smart copy feature allows Monday's program to be copied to every other day (upon initial power up).

The time clock contains four separate relays with normally open contacts. Each set of contacts should be wired to terminals LTB-11 and LTB-12. The normally open contacts may be used to power an auxiliary relay and control any generic building device or load. The time clock requires 24 VAC, provided by unit terminals LTB-16 and LTB-20 (or LTB-15 and LTB-16 on equipment produced prior 07/93).




| **Component Description** | **Part Number** |
|---|---|
| BAYCLCK001A | TWR-0115 |
| ASYSTAT668A | TWR-0116 |

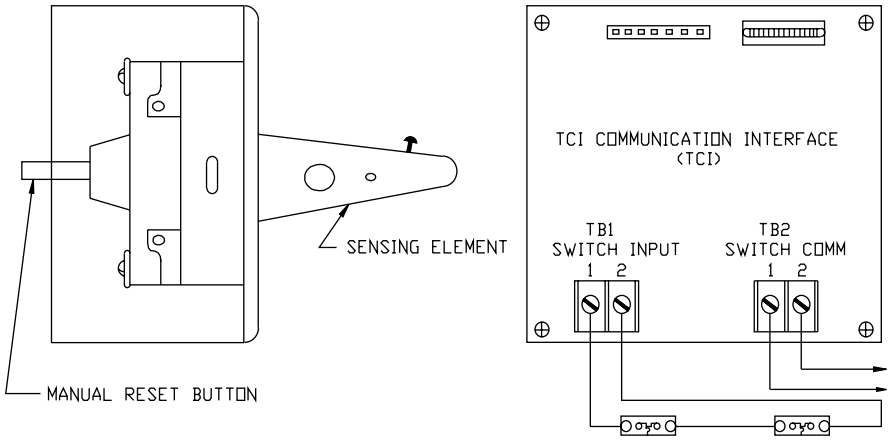
## 7.16. High Temperature Sensor

The high temperature sensor accessory (BAYFRST001A) provides high limit cutout with manual reset in ICS device Tracer / Tracker / ComforTrac / VariTrac systems. The sensors are wired to the TB-1 on the Trane Communications Interface (TCI).

The sensors may be used to detect heat from a fire in air conditioning or ventilation ducts and provide system shut down to contain the fire. Approximately 30 seconds after sensor opens, the associated unit will completely shut down. The sensors come with case and cover, and mount directly to the ductwork. There are two sensors that are included in the accessory. Both sensors are factory set; one opens at 135° F. and should be installed in the return air duct, the other opens at 240° F. and should be installed in the supply duct.

**Note:** This accessory can also be applied in Non-ICS applications and wired between terminals LTB-16 and LTB-17 at the low voltage terminal strip. The unit will shut down immediately when the sensor opens.

To reset a sensor which has opened, push and release the button protruding through the cover. See reset button. The sensor temperature must drop 25° F. below the cut out point before it will reset.
There are no field adjustments that can be made to the sensor; if a problem exists, the sensor must be replaced.
Part Number "CNT-0637" = 135° F. sensor. Part Number "CNT-0638" = 240° F. sensor.




| **Component Description** | **Part Number** |
|---|---|
| BAYFRST001A | CNT-0637 & CNT-0638 |