

INSTALLATION GUIDE



PRODUCTS COVERED IN THIS GUIDE

Intuitious Home Energy Controller

For Security Systems

ECC-HS (Patent Pending)



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INSTALLATION GUIDE

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ABOUT THIS GUIDE

This guide provides detailed instructions on how to install and configure the Intuitous Home Energy Controller for Security Systems. Updated revisions to this guide are available on the Intuitous website at www.intuitous.com.

Each Intuitous Controller ships with an Owners Guide that is intended to be left with the Homeowner. The Owners Guide describes how the Intuitous system works in laymen's terms and provides the homeowner with the necessary information to modify setup options such as the setback temperature.

SAFETY INFORMATION & CAUTION

- ▶ To prevent the risk of electric shock, ensure that power to the HVAC equipment is disconnected prior to installing the Intuitous Controller. The Intuitous controller is a low voltage device and must not be connected to the 120-240Vac circuitry in any manner whatsoever.
- ▶ The Intuitous Controller must receive 12Vdc power from the security panel. The HVAC system's 24Vac power must not be connected to the controller's supply side.
- ▶ All electrical connections MUST conform to local electrical codes.
- ▶ DO NOT modify or attempt to repair the controller as this will void the warranty.
- ▶ The connection to the home security panel must be made by a qualified security system installer.
- ▶ All installations must conform to local fire codes, national building codes and life safety codes.

SECURITY SYSTEM COMPATIBILITY

The Intuitous controller is compatible with 12Vdc security panels that provides auxiliary power and one or two switched negative 12V programmable outputs (PGM's). Appendix B contains a listing of Security panels with compatibility information.

HVAC SYSTEM COMPATIBILITY

The controller is compatible with the following types of gas, oil or electric furnaces and air conditioners with 24Vac control systems.

- ▶ single stage heating
- ▶ Single stage cooling
- ▶ single stage heating and cooling

The controller is not compatible with the following systems.

- ▶ Heat Pumps
- ▶ Electric baseboard heaters and other (120-240VAC) control systems
- ▶ Multi-stage systems
- ▶ Hydronic/Radiant hot water heating systems

INTRODUCTION

The Intuitious Home Energy Controller is an advanced energy saving device that will substantially reduce heating and air conditioning fuel consumption, thus reducing energy costs and prolonging the life of the Heating and air conditioning equipment in the house.

The Intuitious controller is installed directly on the furnace duct and connected to the security system so that it knows when the residents are home, away or sleeping. The controller is also connected to the furnace and air conditioner so that it can override the thermostat and save energy during Vacancies and at night when the residents are sleeping. The controller has an on-board computer that uses advanced logic, timers and a temperature sensor to optimize energy saving opportunities without adversely affecting comfort.

WHAT'S INCLUDED IN THE BOX

- Intuitious Home Energy Controller for Security Systems
- Owners Guide
- Hardware pack containing 6 self tapping screws and 2 wire clamps

The controller has a sensitive temperature probe that protrudes from the back of the enclosure. Please take care when removing the controller from the protective envelope to ensure the probe doesn't get caught in the packaging.

THEORY OF OPERATION

DAYTIME SETBACK

When residents leave the house and activate the AWAY feature of the security system, the Intuitious controller places the heating and cooling system into a managed setback. The heating setback temperature can be 68, 66, 64 or 62 deg. F (20, 19,18,17 deg. C). The air conditioning setback (sometimes referred to as setup) can be 76, 78, 80 deg. F or OFF (24, 26, 27 deg. C). These temperature options are selectable on the front of the controller. When residents return home and deactivate the security system, the Intuitious controller transfers heating and cooling control back to the thermostat. There is also a 6-8 hour daytime timer option to have the controller exit the setback mode to ensure the house has been restored to comfort level before the residents return home from work.

NIGHT SETBACK

Similar to the Daytime Setback feature, there is a Night Setback option. When residents are at home for the evening and going to bed, the STAY feature can be activated from the security keypad. With most security systems, the STAY feature arms the perimeter door and window sensors and disregards the

interior motion sensors. If this feature is enabled, the Intuitous controller will enter the managed night setback mode until residents wake and disarm the security system. There is also a timer option to have the controller exit the setback mode after 6-8 hours to return to comfort level before residents wake.

LONG TERM SETBACK

If the security system has been in the AWAY mode for 18 hours or longer, (residents may have gone away for the weekend or on Vacation) the Intuitous controller will lower the setback temperature an additional 3 deg. F and remain in this aggressive energy saving setback mode until they return and disengage the security system.

NOTE: Upon return, the home may be uncomfortably cold (or hot in the summer), but the energy savings will have been very significant during the absence. This feature is optional and can be easily disabled by a switch on the front of the controller.

MISCELLANEOUS

There are several other features of the Intuitous Home Energy Controller that are important to understand.

Short Cycling: It can be detrimental for heating and air conditioning systems to turn on and off too frequently. This is referred to as short cycling. To prevent short cycling, the Intuitous controller implements a 3 minute delay timer between restarts. This timer is skipped when disarming the system to ensure an immediate response from the HVAC system when the thermostat is calling for heating or cooling. As a result, care should be taken when testing the system to wait several minutes before a forced restart.

Exit Delay: By default, the controller will enter the managed setback mode immediately whenever the security system is activated in AWAY mode. A 20 minute delay can be enabled. This delay is useful for residents who routinely engage the security system for short periods of Vacancy, such as a trip to the local store.

INSTALLATION

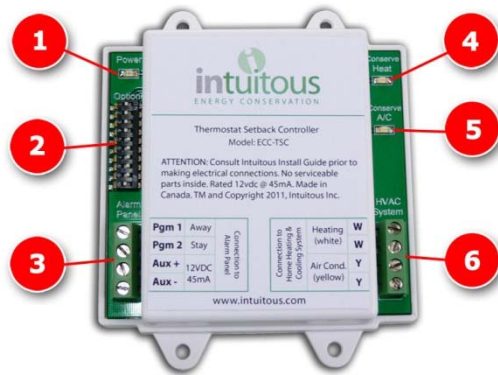
Installation of the Intuitious product should be performed by an experienced security system installer. This Installation guide has been written for qualified installers and assumes a strong knowledge of both home security and home HVAC systems.

FAMILIARIZING YOURSELF WITH THE INTUITIOUS HOME ENERGY CONTROLLER

The Intuitious Home Energy Controller is a low voltage (12Vdc) device that is mounted on the furnace's RETURN AIR DUCT and field wired into both the home security system and the home HVAC system.

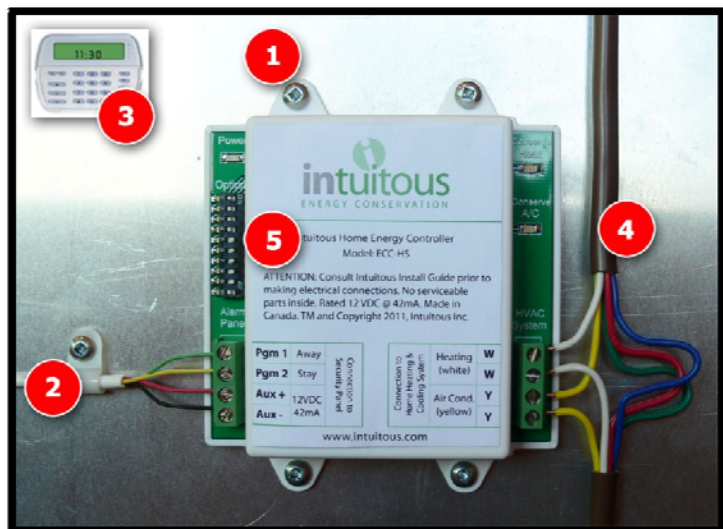
ORIENTATION OF COMPONENTS ON THE CONTROLLER

- 1) Red LED power on indicator
- 2) DIP switch for configuration options
- 3) 4 position terminal for connection to security panel
- 4) Green LED – Lights up when the system is heating conservation mode
- 5) Green LED – Lights up when the system is cooling conservation mode
- 6) 4 position terminal for connection to the HVAC system



5 SIMPLE INSTALLATION STEPS:

- 1) Mount controller on duct
- 2) Connect controller to security panel
- 3) Program security system (from security keypad)
- 4) Connect to the home's HVAC system
- 5) Change setup options



WHAT YOU WILL NEED:

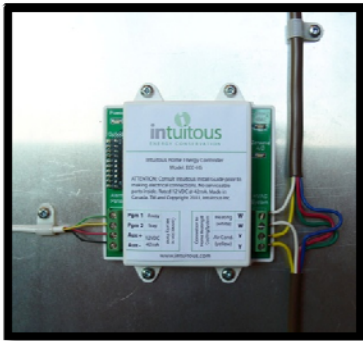
- ❑ Screwdriver - Green Robertson tip
- ❑ Screwdriver - Small slot
- ❑ Wire cutters and strippers
- ❑ Drill with a ¼" drill bit
- ❑ 4-conductor security wire
- ❑ The "Installers Code" (password) for the security panel

STEP 1: FASTEN THE INTUITOUS CONTROLLER TO THE RETURN AIR DUCT

The Intuitous controller must be mounted on the furnace's RETURN AIR DUCT so the temperature probe on the back of the controller protrudes into the duct and is exposed to the airflow in the duct. Proper installation and location on the duct is essential for the controller to sense the ambient temperature in the house.

The ideal location for the controller is 6 to 8 feet above the ground. If the controller is mounted too close to the furnace, the probe may be exposed to temperature fluctuations that will affect the accuracy of the setback temperatures.

The temperature probe is folded over for shipping. Prior to installation, the probe must be straightened perpendicular to the enclosure so that it can be inserted into a hole in the furnace duct when the controller is mounted. Care should be taken not to bend the probe excessively and to ensure that the probe protrudes through the hole in the sheet metal and does not touch the sides of the hole. The images below demonstrate how the probe should be positioned.



View from the furnace room with the controller mounted on the return air duct.



The temperature probe on the back of the enclosure must be bent perpendicular to the enclosure.



View from inside the return air duct demonstrating how the probe protrudes through the sheet metal into the air stream.

TO MOUNT THE INTUITOUS CONTROLLER:

- Drill a ¼" hole in the return air duct where the controller will be mounted.
- Place the controller on the duct with the temperature probe protruding into the duct through the center of the drilled hole.
- Fasten the controller to the duct using the 4 self tapping sheet metal screws provided.

NOTE: The return air duct is the ductwork connected to the furnace that returns air from the house back to the furnace. The ductwork that supplies heated air to the house is called the supply air duct. The Intuitous Controller will NOT function properly if it is installed on the supply air duct. If you are unsure where to install the controller, consult an HVAC technician.

STEP 2: CONNECT THE INTUITOUS CONTROLLER TO THE SECURITY PANEL

A 4-conductor security cable must be run between the security panel and the Intuitous controller to supply 12Vdc power from the security system to the controller and to connect 2 programmable outputs from the security panel to the Intuitous Controller's inputs. It is recommended that the Aux+ connection to the Intuitous controller is left unconnected at this step. It will be connected, thus powering up the controller during **Step 6: Power Up and Testing**.

TERMINAL CONNECTIONS – SECURITY PANEL

#	Label	Wire Color	Function
1	PGM1	Green	The PGM output from the security panel that is programmed for AWAY must be connected to PGM1 and the PGM output from the security panel that is programmed for STAY must be connected to PGM2
2	PGM2	Yellow	
3	Aux +	Red	The intuitous controller must be powered by the 12Vdc Auxiliary power from the security panel.
4	Aux -	Black	

NOTE: Some security panels do not provide standard PGM outputs but may provide relay outputs and/or accessory relay boards. A relay output may be used to interface with the Intuitous controller by connecting the common relay terminal to negative 12V and connecting the NO (Normally Open) relay terminal to the corresponding PGM input on the Intuitous Controller.

STEP 3: PROGRAM THE SECURITY PANEL

The Intuitous Controller needs to know when the security system has been armed in the AWAY and STAY modes. There are a wide range of security panel manufacturers and models that the Intuitous Controller can interface with, each with their own programming requirements. The instructions below describe the required operation of the programmable outputs. The security system installation and programming guide must be consulted for instructions on how to program the security panel.

NOTE: The Intuitous daytime setback mode is invoked when the security system enters the AWAY mode. The Intuitous night setback mode is invoked when the security system enters the STAY mode. These features operate independently; For example, the Intuitous controller could be installed using only one PGM output and only utilizing the daytime setback feature.

AWAY PROGRAMMING

The Intuitous controller must be notified when the security system has been armed in the AWAY mode. AWAY indicates that the space is Vacant and triggers the Intuitous Energy Conservation Controller to put the heating and cooling system into daytime setback mode.

STAY PROGRAMMING

The Intuitous controller also has a night setback feature. Most security systems use the STAY mode to arm the perimeter door and window sensors and disregard the interior motion sensors. If the security system is setup this way, then the STAY mode can be used to notify the Intuitous controller thus putting the heating and cooling system into night setback mode.

EXAMPLE: PROGRAMMING A DSC SECURITY PANEL

The following example demonstrates how to program the PGM1 and PGM2 outputs of a DSC security panel to provide a low output (switched negative 12V) on PGM1 when the security panel is in AWAY mode and a low output on PGM2 when the security panel is in STAY mode. These outputs are high, (+12V) in all other modes.

In the programming example below,

- ▶ PGM1 will be set to code [17], "AWAY ARMED STATUS"
- ▶ PGM2 will be set to code [18], "STAY ARMED STATUS"



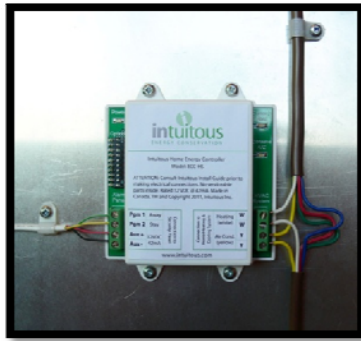
From any keypad, press the following sequence of buttons:

***8 5555 009 17 18 # #**

- ▶ **"*8"** puts the system into "Installers Programming" mode
- ▶ **"5555"** denotes the Installers code (password), often 5555 by default
- ▶ **"009"** selects PGM outputs as the section to be programmed
- ▶ **"17"** sets the first PGM output to code 17 – AWAY Armed Status
- ▶ **"18"** sets the second PGM output to code 18 – STAY Armed Status
- ▶ **"# #"** exits programming

STEP 4: CONNECT TO THE HEATING AND AIR CONDITIONING SYSTEM

The Intuitous Controller must be connected to the HVAC system so that it can interrupt calls from the thermostat for heating and cooling. This is achieved by simply opening the "W" (heating call) and "Y" (cooling call) on the cable that runs from the thermostat to the furnace. The cable is usually a 4 or 5 conductor cable encased in dark brown insulation. The heating call, typically denoted by "W" is usually a white wire. The cooling call, typically denoted by "Y" is usually a yellow wire.

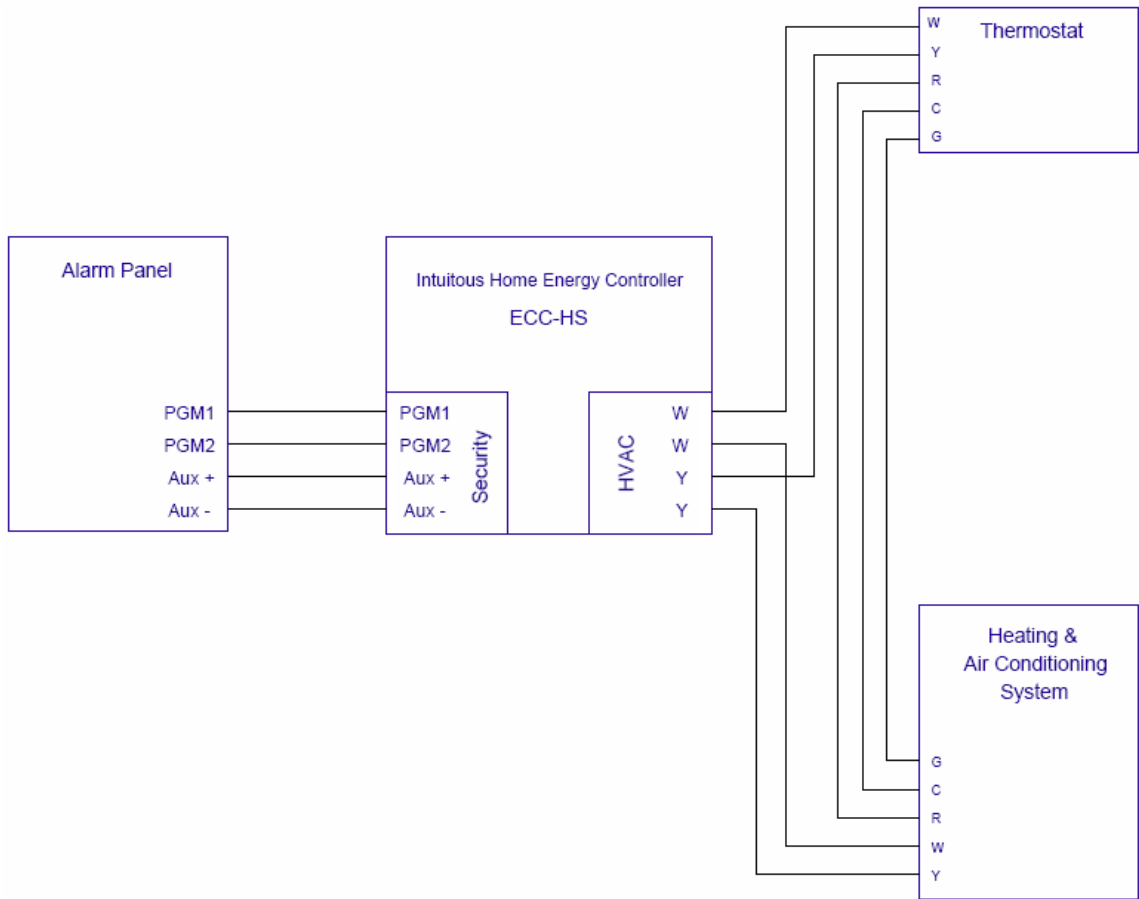


View from the furnace room with the controller mounted on the return air duct.

Note the 2 cable clamps used to secure the security wire (left) and the HVAC cable (upper right).

The Intuitous controller can be field wired to control any 24Vac thermostatically controlled HVAC system, however there are a vast number of manufacturers, equipment types and control schemes. The diagram below shows typical field wiring for a 24Vac controlled HVAC system.

TYPICAL WIRING DIAGRAM – INTUITOUS HOME ENERGY CONTROLLER



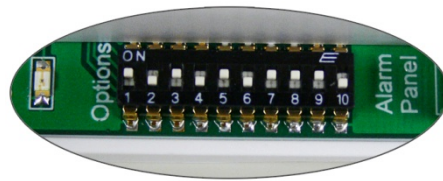
TERMINAL CONNECTIONS – HVAC SYSTEM

#	Label	Function
1	W	The two W terminals provide a normally closed connection through an electronic relay. When the controller enters heating setback, it opens the connection and prevents the heating system from running. These terminals are designed for low voltage 24 VAC control ONLY. Contacts are rated for 2.0A @ 24Vac.
2	W	
3	y	The two Y terminals provide a normally closed connection through an electronic relay. When the controller enters cooling setback, it opens the connection and prevents the air conditioner from running. These terminals are designed for low voltage 24 VAC control ONLY. Contacts are rated for 2.0A @ 24Vac.
4	Y	

Note: Once the HVAC system has been wired to the Intuitous Controller, the Controller must be powered up for the HVAC system to function. In emergency situations or to troubleshoot the HVAC system, the Intuitous Controller's control can be eliminated from the heating circuit by connecting a jumper wire between the two W terminals. Similarly, a jumper can be connected between the two Y terminals to override cooling control.

STEP 5: CHANGING CONTROLLER OPTIONS

The Intuitous controller is factory set with typical options that will be acceptable to most homeowners; however the options can be easily changed to fit site specific needs. These changes are made by altering a series of 10 small configuration switches on the front of the Intuitous controller.



The default configuration can be seen in the image above; **on, off, on, off, on, off, on, on, on, off.**

Switches can be flipped between the on/off position using a pointed object such as a small screwdriver or a pen. See the configuration worksheet in the next section for a functional description for each option switch.

The option switches can be changed “on-the-fly” without any need to power down or restart the controller. Changes will take effect immediately.

CHOOSING THE SETBACK TEMPERATURE

The setback temperature you choose is the temperature that will be maintained in your house while you are away (or sleeping). A lower heating setback temperature will save the most energy because the furnace will run less and consume less fuel.

There are a number of factors that need to be considered when determining the best setback temperatures for your home. The construction and insulation characteristics of your home, the size and type of furnace and your climate will all affect how quickly the house loses heat and how long it takes to restore the house to comfort level.

NOTE: All of the above explanations also relate to air conditioning; however it should be noted that the reverse is true with respect to setback temperature. I.e. a higher cooling setback temperature will save more energy.

INTUITOUS CONTROLLER CONFIGURATION WORKSHEET: ECC-HS

Switch #	Switch Position	Function	Description
<i>Select Temperature Setback for Heating</i>			
1	<input type="checkbox"/> On <input type="checkbox"/> Off	Heating Setback	These 2 switches are used to select the heating temperature setback using the following 4 combinations: Off-Off=62F (17C), Off-On=64F (18C), On-Off=66F (19C), On-On=68F (20C)
2	<input type="checkbox"/> On <input checked="" type="checkbox"/> Off		
<i>Select Temperature Setup for Cooling</i>			
3	<input type="checkbox"/> On <input type="checkbox"/> Off	Cooling Setback	These 2 switches are used to select the cooling temperature setback (also referred to as setup) using the following 4 combinations: Off-Off=Off, Off-On=80F (27C), On-Off=78F (26C), On-On=76F (24C)
4	<input type="checkbox"/> On <input checked="" type="checkbox"/> Off		
<i>Enable other Features and Timers</i>			
5	<input type="checkbox"/> On <input type="checkbox"/> Off	Daytime Restore	If enabled, the heat/cool system will exit setback once the daytime restore timer has expired. This feature allows the heat/cool system to exit conservation mode in time to heat/cool the house back to comfort level before the homeowner returns from work. If disabled, setback will continue until occupancy is re-established (I.e. AWAY is turned off). On = Enabled, Off = Disabled
6	<input type="checkbox"/> On <input checked="" type="checkbox"/> Off	Daytime Restore Time	This switch is used to set the daytime restore timer to 6 hours or 8 hours. Note that switch #5 must be on for this setting to take effect. On = 6 hours, Off = 8 hours
7	<input type="checkbox"/> On <input type="checkbox"/> Off	Night Restore	If enabled, the heat/cool system will exit setback once the night restore timer has expired. This feature allows the heat/cool system to exit conservation mode in time to heat/cool the house back to comfort level before the homeowner wakes. If disabled, setback will continue until the alarm is disabled (I.e. STAY is turned off). On = Enabled, Off = Disabled
8	<input type="checkbox"/> On <input type="checkbox"/> Off	Night Restore Time	This switch is used to set the night restore timer to 6 hours or 8 hours. Note that switch #7 must be on for this setting to take effect. On = 6 hours, Off = 8 hours
9	<input type="checkbox"/> On <input type="checkbox"/> Off	Long Term Setback	When enabled, the system will enter the long term conservation mode when the space has been Vacant (alarm in AWAY mode) for 18 hours and longer. The setback temperature is the Vacant setback setting minus 3F for heating and plus 3F for cooling. On = Enabled, Off = Disabled
10	<input type="checkbox"/> On <input checked="" type="checkbox"/> Off	Exit Delay	This switch is used to set the exit delay to 0 minutes (immediate) or 20 minutes. The delay will prevent the heating and cooling system from entering setback mode until the delay timer has expired. On = 20 minutes, Off = 0 minutes

Note: Factory defaults denoted in **Bold Red** font.

STEP 6: POWER UP AND TESTING

Once the installation steps 1 through 5 have been completed, the system is ready to be powered up and tested:

CONNECT POWER AND CONFIRM NORMAL HVAC OPERATION

- Perform a quick visual inspection to ensure that all steps have been completed. There should be no loose wires, the Security wires should only be connected to the left terminals on the controller and the HVAC wires should only be connected to the terminals on the right side of the controller.
- Ensure the security system is un-armed, i.e. neither the STAY or AWAY mode has been activated.
- Connect the red (+12Vdc) Aux. wire to the security panel. This will now power up the Intuitous controller. The red LED on the top left corner of the controller should be on and the two green LED's on the right side of the controller should be off.
- Restore power to the HVAC system. The system should function normally without any intervention from the Intuitous controller since the security system is in neither the AWAY nor STAY modes. Test the HVAC system by cycling the heating and cooling system on and off with the thermostat. CAUTION: The air conditioning system should not be cycled if the outdoor temperature is below 60F (15C) without first consulting with an HVAC technician or the equipment specifications.

PUT THE SECURITY SYSTEM INTO STAY AND AWAY MODES TO CONFIRM HVAC SETBACK

Note: This stage of the testing process can be difficult because the alarm system must be activated while you are still in the house. It may be necessary to have a second person standing by the security keypad to disarm the system prior to triggering the alarm. It will also be necessary to turn off the Intuitous controller's exit delay using DIP switch #10 during testing.

- With the security panel, the Intuitous controller and the HVAC system powered on and the red LED on the Intuitous controller on, you are now ready to proceed with functional tests.
- Set the thermostat so that the HVAC system is running (depending on the time of year, you may need to bring on heating or cooling. Either will be fine for testing, but do not bring on the air conditioner when the outside temperature is below 60F (15C)).
- From a security keypad, put the system into STAY mode. This should immediately invoke the night setback mode and the HVAC system should be cycled off. The green LED lights on the right side of the controller will indicate that the heating and cooling system are in setback.
- NOTE: When in setback mode, the Intuitous controller will act as a thermostat thus cycling the heating and cooling systems on and off to maintain the temperature in the home at the setback level. This is important to understand during troubleshooting because the two green lights (and the HVAC system) will toggle on and off routinely during the managed setback mode.
- Although the Intuitous controller acts as a thermostat at the setback level, it can only allow or disallow requests from the thermostat in performing that function. Thus the controller can never bring on cooling if the thermostat is set to heating.

- Once the setback operation has been confirmed, exit the STAY mode from a security keypad. This should cause both green LED's to turn off and the HVAC system should return to normal operation and be under full control of the home thermostat.
- The AWAY mode can be tested by following the STAY mode test procedure.

APPENDIX A – SPECIFICATIONS – INTUITOUS HOME ENERGY CONTROLLER

MODEL: ECC-HS

(PATENT PENDING)

Operating Voltage	10-15 Vdc
Supply Current	42mA @ 12Vdc, (16mA in heat/cool conservation mode)
Microprocessor speed	1Mhz
Onboard memory	8KB Flash (non-volatile) memory
Relays	(2) - Heating, Cooling
Relay Contacts	contacts rated 2A @ 30Vdc, SPST-NO (Form A)
Programmed Logic 1	Occupancy & Temperature based Heating setback
Programmed Logic 2	Occupancy & Temperature based Cooling setback
Programmed Logic 3	Daytime Setback with optional 6-8 timers
Programmed Logic 4	Night Setback with optional 6-8 timers
Programmed Logic 5	Long Term Setback (18 hours)
Programmed Logic 6	Restart Delays (3 min. heating, 3 min. cooling)
Temperature sensing	Thermistor sensor +/- 2F
Security inputs	(2) Standard PGM negative trigger
Mounting location	HVAC return air duct
Operating temperature	-20C ~ 50C (4F ~ 122F)
Dimensions	3.5"x4.1"x0.8" (89mm x 105mm x 21mm)

APPENDIX B – SECURITY SYSTEM COMPATIBILITY

The Intuitous controller is compatible with security panels that provide 12Vdc auxiliary power and switched negative 12V programmable outputs (PGM's). The following is a partial list of security system manufacturers, security panel model numbers and the number of PGM outputs available on-board. Note that some panels may not have PGM outputs available on-board, however the manufacturer may provide accessory boards that do provide PGM or relay outputs that can be used to interface with the Intuitous Controller. This information is provided as a guide only. Intuitous cannot guarantee the accuracy of 3rd party product specifications. Please consult the appropriate manufacturer for current and accurate specifications.

PARTIAL LIST OF COMPATIBLE SECURITY PANELS

Manufacturer	Model(s)	PGM Outputs	Notes
Ademco/Honeywell	Vista-10P, 15P, 20P, 20IP	0	Requires add-on relay board
Av-Gad	AV-20xxD, AV-2008 DEP, AV-2016 x	2 – 6	Standard on-board PGM outputs
DSC	PowerSeries PC1616, PC1832, PC1864, SCW9047, Alexor PC9155, Power 632, 832	1 – 4	Standard on-board PGM outputs
Elk	M1	10	Incompatible +12V outputs, must use relays
GE	Concord4	2	
Napco	P800	varies	Standard on-board PGM outputs
Paradox	E55, 728 ULT, SP 5500, SP 6000, SP 7000, MG 5000, MG 5050	1 - 4	Some PGM outputs have selective +ve or -ve triggering. Must be set to -ve.
Visonic	PowerMax+, PowerMax Pro	1	Limited to 1 PGM. Connection at keypad.

APPENDIX C – WARRANTY

INTUITOUS INC. – ONE YEAR LIMITED WARRANTY

Intuitous products are guaranteed against workmanship defects for a one year period following the date of installation. During this period, Intuitous Inc. will repair or replace, at our option and without charge to the customer, any defective product which has been properly installed and used under normal operating conditions.

This warranty does not cover on-site services or delivery costs and does not apply to products that have been poorly or improperly installed. This warranty supersedes any other manufacturers express or implied warranty.

Intuitous Inc. cannot be held liable for related or random damages following the installation of this product. The defective product along with a copy of the purchase invoice must be mailed, prepaid and insured, to the following address:

Intuitous Inc.
223 Hidden Lake Road
Blue Mountains, Ontario, Canada
L9Y 0T6

For more information, please visit our website: www.intuitous.com