

# TEMPERATURE SETBACK CONTROLLER

## INSTALLATION GUIDE



The package includes the controller and this installation guide.

### Description / Product Overview

This guide covers model number:

- ERM-FPU-24, single channel output Temperature Setback Controller

The ERM-FP controllers are intended for indoor use only.

The Temperature Setback Controller often referred to as a Packaged Terminal Air Conditioner (PTAC) Relay or controller, uses wireless technology to monitor a hotel room's environment and can additionally be used to interface with Building Energy Management Systems or HVAC equipment. This allows facilities to upgrade their hotel suites with occupancy based energy controls without having to replace existing equipment.

The controller has Simple Tap technology which allows installers and facility operators to manage configuration settings without any special tools.

## PTAC Controller Operation

The PTAC controller will activate the dry contact relay with received input from a linked sensor or switch.

As a controller, it operates the relay based on:

- occupancy state monitored by a wireless occupancy sensor
- switch state from a wireless key card switch
- switch state from a wireless door/window switch
- gateway control implementing schedules or other events

The controller has several sequence of operations depending on the remote devices linked.

**PTAC setback control** - When the controller has a temperature sensor and keycard switch (optionally an occupancy sensor) linked, it will behave as a PTAC setback controller. The relay should be connected to a low voltage auxiliary input on the PTAC unit designated for setback control.

The keycard switch or occupancy sensor defines the suite occupancy state, either occupied or vacant. When in the occupied state, the controllers relay will remain closed and the PTAC will operate and behave as normal providing conditioned air to the suite. When the keycard switch or occupancy sensor indicates vacancy, the controller will open the relay after an egress timer expires. The controller will monitor the suite temperature when the room is vacant. If the temperature exceeds a setback threshold (see table below), the relay will close taking the PTAC unit out of setback operation. Once in operating mode, the PTAC will provide conditioned air to the suite again. When the temperature has returned to within setback range, plus or minus (depending on the operating mode) the hysteresis value and the suite remains vacant, the relay will open returning to setback mode.

**NOTE: Some PTAC units have high and low thresholds built-in. In these cases, insure the controllers thresholds exceed the PTAC unit settings.**

If a wireless door switch is linked to the controller as a patio door and the switch is open, the relay will open after a timer expires setting the PTAC into setback mode. If the switch is closed or if the suite temperature exceeds the thresholds, the relay will close exiting setback mode.

**NOTE: Base Temperature Set Point is configurable (see page 7)**

Base Set Point	20°C or 68°F
Setback Range	Base Set Point $\pm$ 3°C (5.5°F)
Hysteresis Value	0.5°C or 1.0°F

**PTAC setback with AC lockout control** - The PTAC control with AC lockout includes a energy saving feature to the above sequence of operation that prevents guests in the suite from driving the temperature to extreme low temperatures. If AC lockout is enabled and the temperature drops below the AC lock-out set point then the relay will open. This is true if the suite is occupied or vacant.

AC Lockout Set Point	17°C or 62.5°F
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**Suite Energy Control**- If a keycard switch (or occupancy sensor) and door switch are linked to the controller (no temperature sensor), the controller will provide energy control for the PTAC unit. Depending on the model of PTAC unit, there

may be 1 or 2 auxiliary inputs for suite occupancy state and patio door / window state. An ERM-FPU-24 will open/close the relay based on a linked door/window switch (MC-21). When the door or window is open, the relay will open after a short time out.

The same ERM-FPU-24 can track the keycard switch (or occupancy state). When the room card is in the switch indicating occupied status, the relay will close. When the room becomes vacant, the relay opens after a short time out. If the PTAC has two auxiliary inputs, the relay output can be wired in series to both inputs.

### **PTAC Controller and Key Card Switches**

The keycard switch is common in hospitality applications for indicating when the room is occupied by a guest. The keycard used to unlock the door is inserted into the switch, the controller will close the relay. The controller can be used to set the PTAC units into a occupied operating mode. When the guest leaves and the card is removed from the switch, an egress timer will expire and the relay will open setting the unit into set-back mode. The egress timer default is a 30 second timer. This value can be changed using Echoflex's Garibaldi configuration software.

When multiple key cards are used with one controller and any switch is active with a card inserted then the controller relay will remain closed. All linked switches must have no keycard inserted before the controller opens the relay.

When linking a key card to the controller, activate the switch three times in succession with the controller in LEARN mode.

### **PTAC Controller and Occupancy Sensors**

The controller will open the relay when there is no motion (vacancy) detected in the room indicated by a linked wireless motion sensor.

**Occupancy sensors only:** When only occupancy sensors are linked to the controller, the sensor will activate the relay closed on occupancy, open on vacancy.

**Room Occupancy State Latch:** The MC-21 proximity switch can be used on an entry door to trigger a door open-close event. Used together with a linked wireless motion sensor, the door event triggers a latch of the room occupancy. The controller will latch the room occupancy state with a received occupancy sensor telegram (within 3 minutes after the entry door open/close event). This is the preferred method to indicate occupancy when using the occupancy sensors.

After the room has been latched as occupied, only another door event can clear the latched state. If the room is latched vacant and an occupied telegram is received from the sensor, the room state will latch occupied.

This is an alternate solution to the key card application for defining room occupancy state.

**NOTE:** *To learn the MC-21 as an entry door occupancy trigger, link the switch to the controller with the magnet in place next to the switch.*

### **PTAC Controller and Window Switches**

The MC-21 switch is a proximity (reed) switch and when linked with the controller, can open or close the relay. The relay will close when the switch is closed, opening the relay when the switch is opened after a timer expires. This is used to disable the equipment when a window or patio door is left open.

**NOTE:** *To use the MC-21 as Window/Door switch, link the switch to the controller with the magnet separated from the switch body.*

## Radio Range Confirmation

The controller includes patent pending technology that interfaces with specific sensors to indicate the radio strength of the sensor signal received at the controller.

To evaluate the radio signal strength, the sensor must also support the test and be linked to the controller.

Sensors supporting the radio range confirmation test include:

- Temperature sensors, - RTS
- Occupancy sensors - all ROS , RCS, RVS, OWS and MOS models
- Window/Door switches - all MC models

The range confirmation test is invoked at the sensor and sends unique telegrams to the controller. The controller will evaluate the signal strength from the sensor and send back a unique telegram containing the strongest signal value received. This value is displayed at the sensor using color LEDs.

**Note: Do not have any repeaters in the controllers vicinity enabled during the test.**

Consult the sensor installation guide for more details.

## Installing the Controller

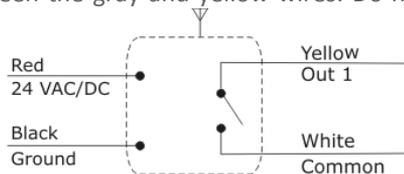
For best results, the controller may be installed in a non-metallic electrical junction box or affixed with double sided tape to a non-metallic surface close to the 24 VAC/DC power supply. A pin or pen is needed for pressing the controller buttons when assigning the wireless switches or sensors.

Consult local electrical code requirements.

NOTE: The controller should only be installed in an indoor location.

## Wiring Instructions

The signal relays have a red (24+) and black (ground) wires for power input. They have a 3A dry contact output between the gray and yellow wires. Do not cut or cap the orange (902MHz radio) antenna wire. Use only approved wire.



### Wire Specification Table

Connection	Color	Min. Size
Ground	Black	22AWG
24VAC/DC	Red	22AWG
Relay Output	Yellow	22AWG
Relay Common	White	22 AWG

Power Supply: 24VAC/DC  
Power Consumption: 1.0 W full load

### Outputs

N.O. Relay rating 3A@30 VDC  
LEDs - Clear and Learn

## Diagnostic LED's and buttons

### LEARN button

The LEARN button is used to link switches or sensors to the controller.

1. Press the button marked LEARN for a half second. In link mode the LEARN LED will stay ON and the POWER LED will toggle every 2 seconds.
2. Using the sensor that will be linked to the controller, press the sensors TEACH or LINK button, refer to the sensor documentation. To link a Keycard switch, insert and release the card three times consecutively. The POWER LED will remain lit for 4 seconds while it links the new device. It will resume toggling allowing you to link another device up to a total of 20 devices.

**NOTE: Linking a sensor or switch that is already linked to a controller, will remove or un-link it from the controller.**

3. To exit link mode, press the LEARN button on the controller again for a half second. Link mode will also time out after no activity in 30 seconds.

### CLEAR button

The CLEAR button erases all devices linked to the controller and resets the controller to factory default settings. Press the CLEAR button ( approximately 5 seconds) until the green LEARN LED blinks on.

### LED Blink Codes and operation

The table below describes the LED activity & associated mode of the controller.

Description	Learn LED	Power LED	Relay
LINK mode	ON	Toggle 2 sec.	Toggle
Storing ID	ON	ON 4 sec.	ON 4 seconds
Clearing ID	ON	OFF 4 sec.	OFF 4 seconds
CLEAR mode	ON 1 Sec.	N/A	ON 1 sec.

**Normal Operating Mode** - number of long blinks indicates the linked device type followed by short blinks counting the number of devices linked.

Description	Learn LED	Power LED
Factory default	OFF	ON Solid
Temperature	OFF	1 long blink
Linked occupancy sensor(s)	OFF	2 long blinks followed by short blinks counting sensors repeatedly
Temperature set point	OFF	3 long blinks
Linked keycard switch	OFF	4 long blinks followed by short blinks counting switches repeatedly
Linked window/door switch	OFF	5 long blinks followed by short blinks counting switches repeatedly
Linked entry door trigger	OFF	6 long blinks followed by short blinks counting switches repeatedly
With central command	OFF	7 long blinks followed by short blinks counting sensors repeatedly

## Configuring the Controller

There are several methods of configuring parameters in the controller. Simple Tap is a quick method of changing a parameters setting, one at a time. For accessing the complete set of configuration parameters, use Echoflex's Garibaldi Commissioning Software. There are three methods of configuring parameters in the controller.

1. Simple Tap, see below.
2. Garibaldi Commissioning Software (not covered in this guide)
3. Commissioning Service offered by Echoflex. The commissioning service is offered by the factory to make the installation go smoother and remove the burden of commissioning. Contact Echoflex Solutions for further details on this service.

## Simple Tap Instructions

Simple Tap is a quick method of changing a parameters setting, one at a time. For accessing additional configuration parameters, use the Garibaldi software or have Echoflex complete the commissioning before shipping.

Simple Tap uses the switches and sensors that are linked to the controller to set the associated configuration parameters. You must be able to access the sensors teach button or the switches to perform the Simple Tap process. If the sensor is linked to multiple controllers and you do not want to make changes to all, turn the controllers relay off (relay open) to ignore the Simple Tap changes. You must be able to monitor if the relay is open or close (feedback is required) for Simple Tap (ie: connect to a LED or use an ohmmeter to monitor relay's state).

Simple Tap allows you to:

- Adjust the motion sensor Auto-OFF timer
- Adjust the window switch timer
- Adjust the base temperature set point

## Adjust the Motion Sensor Auto-OFF Timer

1. Close the relay using the keycard switch or occupancy sensor.
2. Tap the occupancy sensors TEACH button to reset the timer period. There are 6 possible settings and the number of taps on the button counts the number according to the time period, see the table below. Level 1 (time out 0 seconds - demo mode) is set by tapping 3 times, consecutive taps up to a maximum of 8 taps is Level 6 (time out 25 minutes). The LED will blink once on the third tap and then begin counting the level set after 3 seconds.

Taps	Occ. Sensor Timer	LED Blinks
3 taps*	0 sec.	1 blink
4 taps	5 min.	2 blinks
5 taps	10 min.	3 blinks
6 taps	15 min. DEFAULT	4 blinks
7 taps	20 min.	5 blinks
8 taps	25 min.	6 blinks

\* for demonstration purposes only

## Adjust the Window Switch Timer

1. Close the relay using the keycard switch or occupancy sensor.
2. Tap the window switches TEACH button to reset the timer period. There are 6 possible settings and the number of taps on the button counts the number according to the time period, see the table below. Level 1 (time out = 0 seconds) is set by tapping 3 times, consecutive taps up to a maximum of 8 taps is Level 6 (time out 2.5 minutes).The LED will blink once on the third tap and then begin counting the level set after 3 seconds.

Taps	Timer	LED Blinks
3 taps	0 sec.	1 blink
4 taps	30 sec.	2 blinks
5 taps	1 min.	3 blinks
6 taps	1.5 mins.	4 blinks
7 taps	2 mins.	5 blinks
8 taps	2.5 mins.	6 blinks

## Adjust the Base Temperature Set Point

1. Close the relay using the keycard switch or occupancy sensor.
2. Tap the temperature sensors TEACH button to reset the base set point. There are 7 possible settings and the number of taps on the button selects the new setting and the LED blinks counts the level according to the selection, see the table below. Level 1 base set point of 19 C or 66 F is set by tapping 3 times, consecutive taps up to a maximum of 9 taps is Level 7 (base set point of 23 C or 73.5 F). The LED will blink on the third tap and then begin counting the level set after 3 seconds.

Taps	Base Set Point	LED Blinks
3 taps*	19°C / 66°F	1 blink
4 taps	20°C / 68°F	2 blinks
5 taps	20.5°C / 69°F	3 blinks
6 taps	21°C / 70°F	4 blinks
7 taps	21.5°C / 71°F	5 blinks
8 taps	22°C / 71.5°F	6 blinks
9 taps	23°C / 73.5°F	7 blinks

**This concludes the configuration directions for the controller.**

## Default Settings for Controller

Base temperature Set Point	20.0 °C (68.0°F)
Temperature hysteresis	± 0.5°C (1.0°F)
Set Point setback	- 3.0°C (5.5°F)
Set Point Range	± 3.0°C (5.5°F)
Repeater	disabled
Status	disabled

## Time-outs

Motion sensor	15 minutes
Key card switch	30 seconds
Window Switch	30 seconds

## Status Feedback Telegram

### EEP: A5-11-01

DB_3 Illumination	0 ... 510lx, linear n=0...255
DB_2 Illumination Set Point	Min. ... Max., linear n=0...255
DB_1: Dimming Output Level Min.	... Max., linear n=0...255
DB_0.BIT_7: Repeater	0b0 disabled, 0b1 enabled
DB_0.BIT_6: Power Relay Timer	0b0 disabled 0b1 enabled
DB_0.BIT_5: Daylight Harvesting	0b0 disabled 0b1 enabled
DB_0.BIT_4: Dimming	0b0 switching load 0b1 dimming load
DB_0.BIT_3: Learn button	0b0 Teach-in telegram 0b1 Data telegram
DB_0.BIT_2: Magnet Contact	0b0 open 0b1 closed
DB_0.BIT_1: Occupancy	0b0 unoccupied 0b1 occupied
DB_0.BIT_0: Power Relay	0b0 off 0b1 on

## Regulatory Statements

FCC Part 15.231

Contains FCC ID: SZV-TCM320U

The enclosed device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (i.) this device may not cause harmful interference and
- (ii.) this device must accept any interference received, including interference that may cause undesired operation.

IC RSS-210

Contains IC: 5713A-TCM320U

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