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Cycling Device Training Manual

Southern California Edison
Summer Discount Plan



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1 Introduction

INTRODUCTION

HOW TO USE THIS MANUAL

This manual is designed to help technicians provide great customer service and learn the proper procedures for installation and service of cycling devices. Steps are illustrated with photographs.

ABOUT NRG POWER, INC.

NRG Power, Inc., has been responsible for installing thousands of cycling devices for Southern California Edison (SCE) since 1997. The procedures outlined in this manual were developed by veteran field technicians with proven productivity rates.

SCE SUMMER DISCOUNT PROGRAM



For overall system reliability in Southern California, SCE promotes the Summer Discount Plan (SDP), a load control program. In exchange for up to \$200 in credits on their bills, customers agree to let SCE control their air conditioners via a radio paging device. The cycling device turns off the system during power emergencies, usually when demand for electricity (and temperatures) are at their highest.

SCE hires subcontractors, such as NRG Power, to install the cycling devices on the central air conditioners. Therefore, technicians are the face of both SCE and NRG Power.

Cycling Device- the cycling device is a small unit that is attached to the outside of air conditioners. Activated by a remote radio signal it allows SCE to temporarily turn off, or "cycle," air conditioner(s) when needed.

How Summer Discount Plans Work

The Summer Discount Plan operates only during the summer season (beginning the first Sunday in June and ending the first Sunday in October). The air conditioner is "cycled" off at the discretion of SCE for energy conservation, during emergencies and for testing.

Air conditioner cycling may occur when:

- SCE is directed by the California Independent System Operator (Cal ISO), the statewide electrical transmission authority, when electricity reserves have dropped below 5% (referred to as a Stage 2 emergency).
- Emergency situations declare a Storm Alert exists and we need to avoid a more widespread power outage.
- SCE needs to control the device. Air conditioner testing interruptions will last up to a maximum of 15 minutes, will be conducted only during peak hours, and will occur only once per summer season.

GENERAL RULES OF INSTALLATION

SCE regulations, applicable code and Edison's State of Work (dated November 1991) govern all work performed in this manual. Compliance guidelines include all applicable federal, state and local codes, laws and requirements, including OSHA regulations, applicable local inspection authorities and SCE inspection personnel.

This guide is to be used for information regarding the installation and service of control devices for air conditioner cycling. However, final responsibility for determining that each installation meets all appropriate federal, state, and local electrical codes rests with the technician and NRG Power Inc.

General rules to follow throughout the installation and service process:

- Before leaving for your jobsites, make sure that portable signal strength receiver, signal transmitter, power tools and cell phone are properly charged with power overnight.
- You are responsible for the care, custody and protection of SCE- furnished equipment in your possession. Tag cycling devices that have been removed, or have been found defective with the customer's name/address and the reason for the failure.
- Your appearance and must be professional, including wearing an identification badge and NRG shirt with insignia.
- All work operations, barcodes, serial numbers, models, settings (timing, voltage and ratings of current A/C unit), exemptions such as non-standard installations, customer complaints, conditions, inability to install devices, must be documented and reported to the Program Supervisor by completion of work orders and submission via fax at the end of the work day.
- Do not remove the plastic padlock meter seal or the cover of any Edison-furnished equipment to inspect or service the equipment unless you are instructed to do so by an authorized representative.
- You are responsible for the clean up of the work area after the installation, including removal and disposal of all crating scrap and debris from the work premises.



OUTLINE - INSTALLATION AND SERVICING PROCESS

The installation and servicing process should be completed in the order that follows. There is a slight change in the steps if you are servicing, reinstalling or replacing the cycling device.

1	Contact customer at the door.
2	Ask customer to turn on A/C.
3	Disconnect power to A/C.
4	Types of work orders: a) Installation b) Removal c) Checking or verification of device d) Service call.
5	Test device.
6	Collect information.
7	Clean up.
8	Sign and leave.

2 Work Processes

Installation, Replacement and Reinstallation

THE INSTALLATION PROCESS

As a technician for NRG Power Inc., you will be going to the homes and business locations of SCE customers. After the customer signs up for the program through SCE, a customer service representative from NRG schedules an appointment. It is very important that the customer understands that you are working for NRG Power, Inc. a subcontractor for SCE's Summer Discount Plan.

FIRST CUSTOMER CONTACT

After you arrive at the customer location, knock on the door or ring the bell.



Identity yourself as an NRG Power, Inc. employee, a subcontractor for Southern California Edison's Summer Discount Plan. Show your I.D. badge.

Ask the customer to turn on the air conditioner, and check to see if the air is cold. Let the air conditioner run for one to two minutes.

DO NOT proceed until the A/C is working properly.

WHEN THE A/C DOESN'T WORK

If the unit is not working, inform the customer and explain that you can not continue working because it can only be installed on properly working equipment and/or SCE does not want to be liable for a possible claim that we have damaged their A/C unit.

- Note that A/C is not working in the remarks section of the work order.
- Ask the customer sign the work order.
- Proceed to the next appointment.

NO SHOWS

Please follow the following procedure when you think that the customer is a “no show.”.

- If no one answers the door, try knocking on the door a few more times
- Call the customer on the telephone.
- After 10 minutes of waiting, leave a door tag with the time you arrived, the date, the length of time you waited, and any other pertinent information. Make sure to write the work order number on the customer door tag.
- If you someone is there and he/she is a minor, then you can not proceed. Note on the work order and door tag that “Adult not present.”
- Go to the next appointment.
- Call the ‘no show’ customer again before leaving the area to see if you can return to complete the work.

We are obligated to make a second attempt. If the customer is not there, the second time, leave a second door tag with the appropriate notations.

A/C UNIT PRE-INSTALLATION CHECK

After you locate the air conditioning unit, you will need to check the feasibility of a working installation of the cycling device. Look for obvious safety hazards, deteriorating equipment conditions, excessive age or installation difficulty.

EXAMPLE REASONS FOR INSTALLATION INFEASIBILITY		
1	ACCESS	Inability to gain access to A/C because of <ul style="list-style-type: none"> • locks • fences • dogs or other animals • beehives or insect infestation • overgrown vegetation, and other barriers.
2	SIGNAL STRENGTH	There is insufficient signal strength near the A/C unit.
3	INCOMPATIBILITY	A/C equipment is incompatible such as: complicated controls in heat pumps, multistage compressor, lack of space on the A/C unit for mounting anchoring and terminating the leads of cycling device.
4	POOR WORKING CONDITION	A/C equipment is not working properly or in such poor condition that it appears that it will fail soon.
5	ELECTRICAL HAZARDS	Presence of obvious electrical hazards such as: improper or unsafe wiring and/or connections, termination of aluminum wire on lugs designed for copper or lack of fused disconnecting means on new installations.
6	EXTRA WORK NEEDED	Any extra work (such as control circuit analysis, installation of step-down transformers or time delay relays or similar items) which requires further authorization by Program Supervisor.
7	NO SHUT-OFF SWITCH CLOSEBY	There must be a power shut-off switch within 6 feet of the A/C unit and it must be clearly visible.

CYCLING DEVICE INSTALLATION GENERAL RULES

Please keep in mind the following general rules during the installation process:

- Disconnect power to the air conditioner by opening the safety switch or circuit breaker.
- The cycling device will be mounted on the access panel of A/C unit.
- Do not mount the cycling device horizontally on top of air conditioner.
- Do not cut off excess wires from the cycling device.
- Provide proper weatherproofing at all areas affected by mounting and cable connections so that the completed installation is rain tight.



MOUNTING THE CYCLING DEVICE

Locate the access panel or cover for the A/C unit and remove it.



Do not locate access and mounting holes over existing electrical components.

The preferred method to mount the device is vertically (in upright position) to satisfy space and radio signal strength requirements; the alternate method is to mount sideways. Do NOT mount the device horizontally.

DRILLING

Before drilling, check for any obstruction or equipment that may be behind A/C enclosure. When drilling, take care to prevent metal cuttings from

dropping onto electrical components in the control compartment. (A doughnut type of magnet should be used to collect cuttings.)



Use a cordless electric drill to drill a 3/8-inch pilot hole through the A/C case. Next, use a Greenlee 1-1/8 inch chassis punch or equal and punch the required hole.

Attach the 90-degree plastic elbow to the panel at the punched hole and then place the lock nut on the threads of the elbow. Tighten the lock nut.

Drill self tapping screws through the mounting ears of the cycling device to hold it in place.



WIRING THE CYCLING DEVICE

The following wiring priorities will be used for device installation on 240 volt power wiring circuits:

Priority 1: Use the appropriate size insulated or non-insulated crimp-on female disconnect type connectors on existing spare tabs or on tab expanders.

Priority 2: Use the appropriate size, insulated or non-insulated crimp-on lugs on existing bolt-on terminals.

Priority 3: Use the appropriate size insulated crimp-on wire joint connectors (pigtail connection).

Priority 4: Use the appropriate size insulated, wing type wire nut.

Before you tap into the power to power the cycling device and connect cycling device wires into the thermostat and control wires, these are the steps you will follow.

Before you start the wiring process please remember:

- Do not cut off excess wires from control device.
- Do not install bare wires under screws on the contactor.



In order for the cycling device to work properly, you will need to tap into power to power the cycling device and connect cycling device wires into the thermostat and control wires. These are the steps you will follow:

Locate the contactors to pick up power source.

Crimp the female disconnect on the black wires from the cycling device.

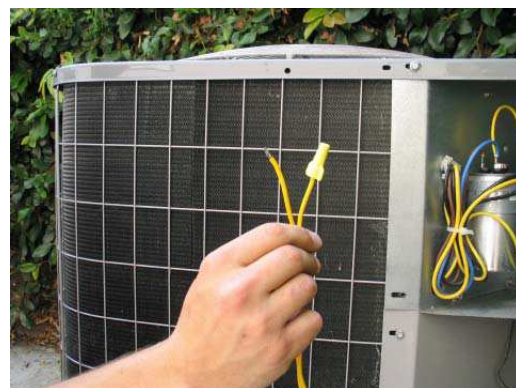


Connect the female disconnects on the black cycling device wires to the open copper tabs, on the load side.

Locate the thermostat wires from the property on the A/C unit (usually red and white).

Prepare the yellow wires to connect to A/C unit thermostat wire by stripping both wires and capping one with a wire nut.

Please note: The reason the yellow wire is capped is to prevent shortages and damage to the customer's A/C.



Disconnect the thermostat wires from the property from their connections on the power source. When disconnecting the thermostat control wires, the wires will contain 24 Volts running through it, do not let the wires touch anything or it will cause damage to the thermostat, circuit board and/or transformer.



Splice into the white thermostat wire with the open yellow wire and cap it.

Splice into the contactor control wire (in this photo blue) with the capped yellow wire. Cap the wires with a wire nut.



Bundle the wires with ties and place them neatly in open areas.



Remount the access panel (case) with the cycling device attached to it.



Turn the power on.

Check to see if the green LED light is lit on the cycling device



Test cycling with the portable test transmitter (PTT.)

COLLECT INFORMATION



Fill out work order with test results. Be sure to note any conditions, problems or irregularities. Write as clearly as possible and check for errors.

Make sure that you sign and date all work orders including no shows and cancellations.



Remove barcode label from cycling device



Attach the barcode label from the cycling unit to the work order.

CLEAN UP



Survey your work area and check for any debris and garbage produced from the work. Collect the debris and clean the area. Dispose of garbage properly.

Contact customer. Show the customer that the cycling device is working.

Ask customer to sign the work order and give a copy to customer.

REMOVAL OF CYCLING DEVICES

Sometimes the customer requests the removal of the cycling device. This process is similar to the installation process.

Pull the fuse disconnect to shut off power to the A/C unit.



Remove electrical access panel.

Disconnect the two power wires (black) from the contactor.

Disconnect the two yellow wires from the thermostat control wires and rewire them to original condition.

When disconnecting the thermostat control wires, the wires will contain

24V; do not let the wires touch anything or it will cause damage to the thermostat, circuit board and or transformer.



Remove the cycling device from the A/C unit and seal $\frac{3}{4}$ " hole seal to plug opening.

Mount access panel back to unit.

Plug fuse back into disconnect box.

The A/C unit should turn back on at this point or shortly thereafter.

Missing Devices

If the device is missing, state on the work order that "device is missing" and ask the customer to sign the work order.

SERVICE CALLS

A service call occurs when customers contact SCE, because their A/C is not working. The call center contacts the customer to make an appointment and informs the customer that NRG will only check the cycling device. You will diagnose the problem and either replace the cycling device or disconnect the cycling device and tape the bare wires. Then inform the customer of what you have done.

Note: This is only time that you will ever work on a malfunctioning A/C unit, you must be careful what you say to the customer so that they do not blame SCE or NRG for their A/C malfunction.



After you arrive at the customer location, knock on the door or ring the bell.

Identify yourself as an NRG Power, Inc. employee, a subcontractor for Southern California Edison's Summer Discount Plan. Show your I.D. badge. Inform the customer that you are there to check the cycling device. If the device is not working you will install a new one and if there is nothing wrong with the cycling device, you will disconnect it.

Ask the customer to turn on the air conditioner,

Locate the air conditioning unit.

Check to see if the green LED light on the cycling device is on.



If the green LED is not on, remove the electrical access panel.

With a volt meter check to see if there is power going to the cycling device.



Disconnect the two power wires (black) from the contactor.



Disconnect the two yellow wires from the thermostat control wires and rewire them to original condition.

Remember that while disconnecting the thermostat control wires, the wires will contain 24V; do not let the wires touch anything or it will cause damage to the thermostat, circuit board and or transformer.

Remember that while disconnecting the thermostat control wires, the wires will contain 24V; do not let the wires touch anything or it will cause damage to the thermostat, circuit board and or transformer.

Diagnosis

- If the A/C powers on after the reconnection of the thermostat wires, install a new cycling device.
- If the A/C does not power on and there is no power, tape the ends of the bare cycling device yellow and black wires to avoid shorts. Mount the access panel, with the cycling device on it.

Clean up your work area, fill out the work order and then contact the customer.

If you installed a new cycling device, let the customer know that the cycling device is working.

If you disconnected the cycling device, inform the customer, "The cycling device has been checked and disconnected, your air conditioner *may* require service."

WORK ORDER COMPLETION

Complete the following sections of the work order for all actions completed involving a device.



- Action (e.g., Replace, Check, Remove)
- Device Number Mfr ID (e.g., RELM, SA, REG)

Complete the following sections of the work order for Replacements, Reinstalls, Check and Verify Devices:

- Volts Running Amps
- Phase 1 or 3
- New / Used
- Signal Test Passed
- Time Delay
- Multi Stage Compressor
- Make sure to write down "A/C working after install check, verify, replacement etc."

Ask an adult (18 years or older) to sign the work order to verify that the work has been completed and explained to the customer.

You are required to turn in or fax work orders daily. All original work orders must be in the office by Monday of the following week.

We hope that this manual answers all of your questions, if for any reason, you do not understand the work process, please contact your supervisor for further information.