



Better solutions through innovation

VFMQ Electric Thermal Storage (ETS) Heater Control Options and Wiring Manual

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IMPORTANT SAFETY INFORMATION: Always read the installation manuals first before attempting to install or use VFMQ storage heaters or DCP2010 charge control panels. For your safety, always comply with all warnings and safety instructions contained in these manuals to prevent personal injury or property damage.

To view the full line of Dimplex products, please visit www.dimplex.com

VFMQ Storage Heater Off-Peak Timing Control Options

VFMQ storage heaters are designed to store heat during the Off-Peak period when electricity is less expensive. The accuracy of the timing controls is critical to cost effective operation.

PLEASE NOTE. Different electric utilities use various control methodologies. Please contact your electric utility to understand their Off-Peak control procedure and if they offer an Off-Peak timing device.

The most common alternatives:

- A utility-supplied control relay. Popular with Rural Electric Cooperatives.
- A utility-supplied dry contact on a meter. Standard for Nova Scotia.
- A timer. Standard in Ontario.

Automatic vs Manual Charge Control

Managing the amount of energy to store to meet the next day's heating requirements can be done automatically or manually.

1. Automatic Charge Control requires the Dimplex DCP2010 Charge Control Panel to estimate how much heat to store to meet the next day's heating needs. It does this by using advanced algorithms based on temperature data and user preferences.

Automatic charge control is better:

- for sites with more than one heater.
- when low user involvement is desired.
- to individually control up to 4 additional circuit loads such as your water heater, baseboard heaters in non-living areas or any other loads on their own circuit up to 30 Amps.
- at reducing the sizing of the storage heater in areas that offer mid-peak periods, due to its intelligence for minimizing the use of more-expensive mid-peak power for the coldest days.

2. Manual Charge Control allows the user to decide how much heat to store for the next day by adjusting a knob on the side of the storage heater and:
 - is less expensive, eliminating the need for the DCP2010 Charge Control Panel.
 - is recommended for single heater installations.
 - can be upgraded to use the DCP2010 automatic charge control system at a later time.

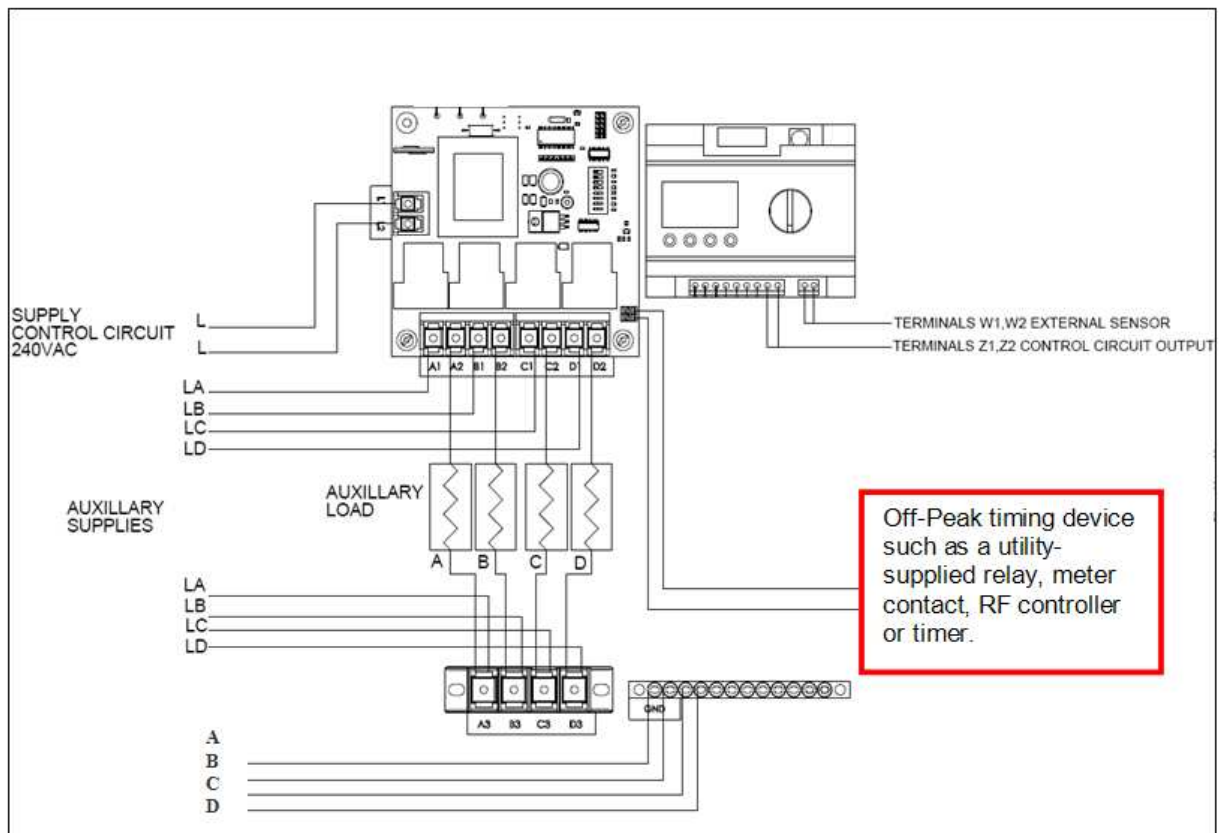
Automatic Charge Control Wiring DCP2010 Charge Control Panel

Dimplex's DCP2010 Automatic Charge Control Panel provides the intelligence for the system and:

- can control up to 30 VFMQ storage heaters.
- can control up to 4 additional 30 Amp loads including the existing water heater, baseboard heaters in non-living areas and any other loads on their own circuit.
- the panel is supplied with an external temperature sensor with a 2m (6.5 ft) connection cable that can be extended to 30m (98 ft) by #16/2 wire.
- the external sensor allows the DCP2010 controller to automatically correct for the large temperature fluctuations in spring and fall by external temperature averaging.

The following wiring diagram shows how the DCP2010 Charge Control Panel connects:

- to various Off-Peak control timing devices.
- up to 30 VFMQ storage heaters through the Z1, Z2 terminals, wired in parallel.
- Up to 4 auxiliary loads such as a water heater.

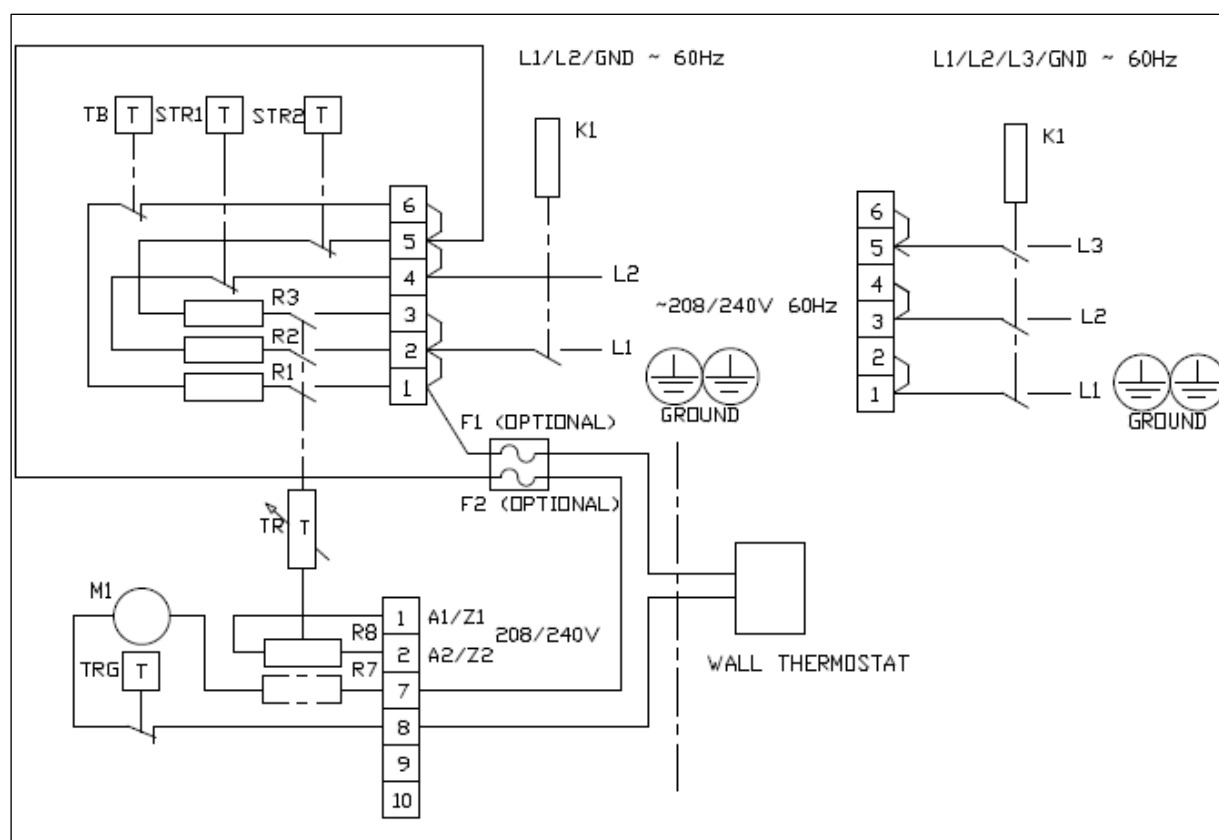


Wiring the TS521W Wall Thermostat

When wiring to the Dimplex TS521W wall thermostat, two additional fuses (F1 & F2) are required to protect the external wiring with a minimum rating of 240 volts and 15 Amps.

- The fuses must be wired in-line from terminals 1 & 5 with fully-rated wire (#8 or #10). The stat can then be wired with #12 or #14 from the fuse block.
- The 2 x fuse blocks can be installed within the VFMQ storage heater near the terminal blocks. Readily available components:
 - 2 x Littelfuse #LFR250301S fuse blocks that can connect #8 - #14 gauge wire.
 - 2 x Littelfuse #FLNR-015 fuses.

VFMQ Control and Power Wiring



Circuit diagram legend

A1/Z1, A2/Z2 - Control signal AC charge control
 K1 - Heating contactor
 L1, L2, L3 - External conductors
 M1 - Fan motor
 N - Neutral conductor
 R1-R3 - Heating elements

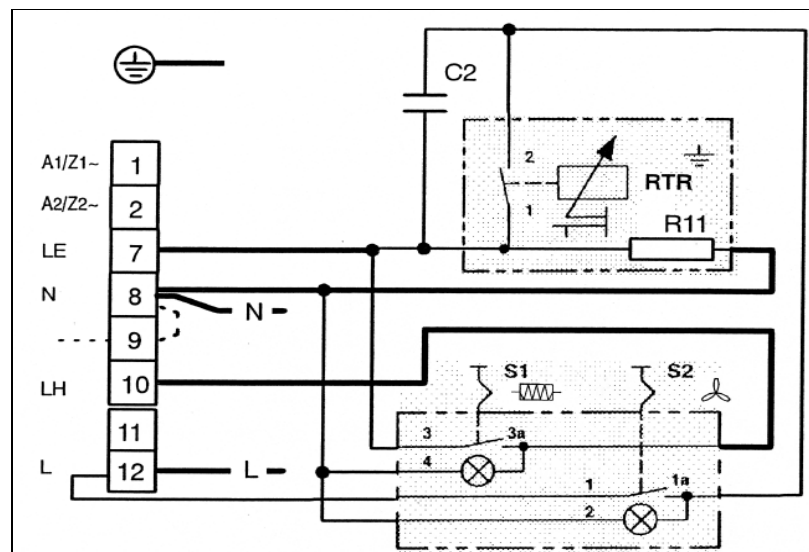
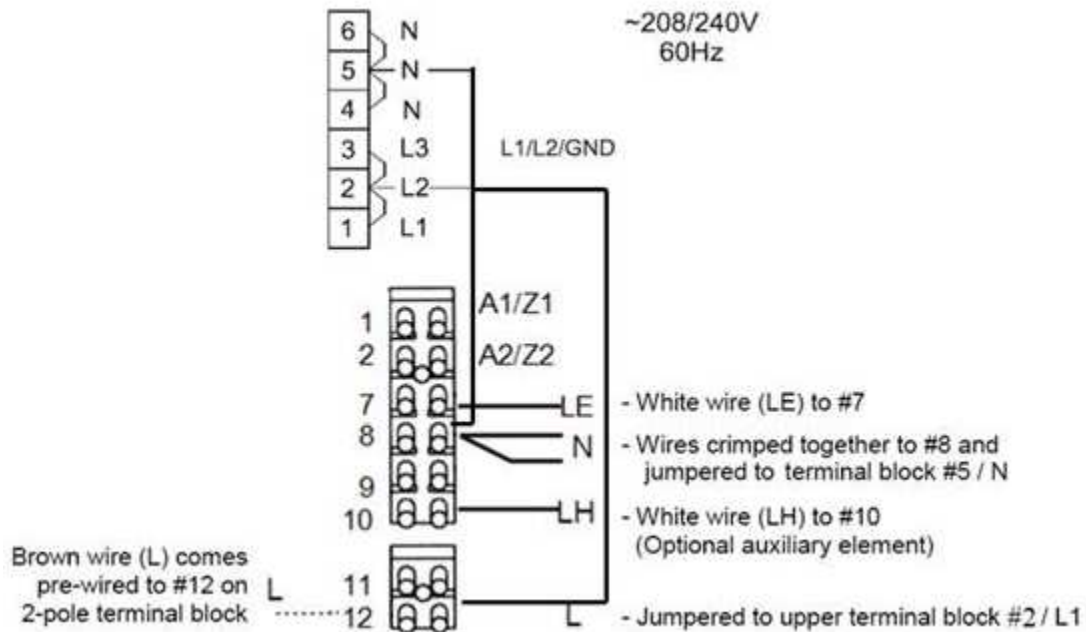
R7 - Series resistor for fan (not all types)
 R8 - Control resistors (charging)
 STR1, STR2 - Safety temperature controller
 TB - Temperature limiter
 TR - Charge controller
 TRG - Ventilation grid temperature controller

Note. Installation must be in accordance of the wiring codes for load sizing of the circuits and wiring.

Wiring the RTEV99 Internal Thermostat

As per the RTEV99 Instructions, fasten the sensor probe assembly by the supplied screws on the base next to the fan. There are four wires:

- The white wire marked LE is wired into lower terminal block #7.
- The white wire marked LH is wired into lower terminal block #10.
- The two wires crimped together are wired to the lower terminal block #8 and jumpered to the upper terminal block #5 / N.
- The brown wire marked L is pre-wired to a 2-pole terminal block at #12. This terminal block is to be connected to the pre-drilled holes under the main terminal block and then wired to upper terminal block #2 – L1 to complete the circuit.

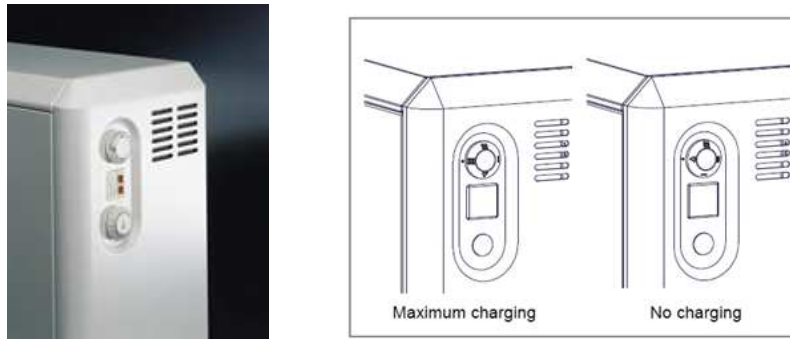


— Wiring by installer
 ---- Pre Wired

VFMQ Manual Charge Control Option

To reduce the installation cost in homes that require only a single storage heater, the heater's heat storage charging can be controlled manually eliminating the need for the DCP2010 automatic charge control panel. Every Dimplex storage heater has manual charge control functionality built in.

This manual charge control option allows the homeowner to manually decide how much heat energy to store during the next Off-Peak period. No charge is the zero setting (▼), while a full charge for those coldest days (January and February) would be a three (III). The typical winter setting is 2 (II), spring and fall is typically set at 1.



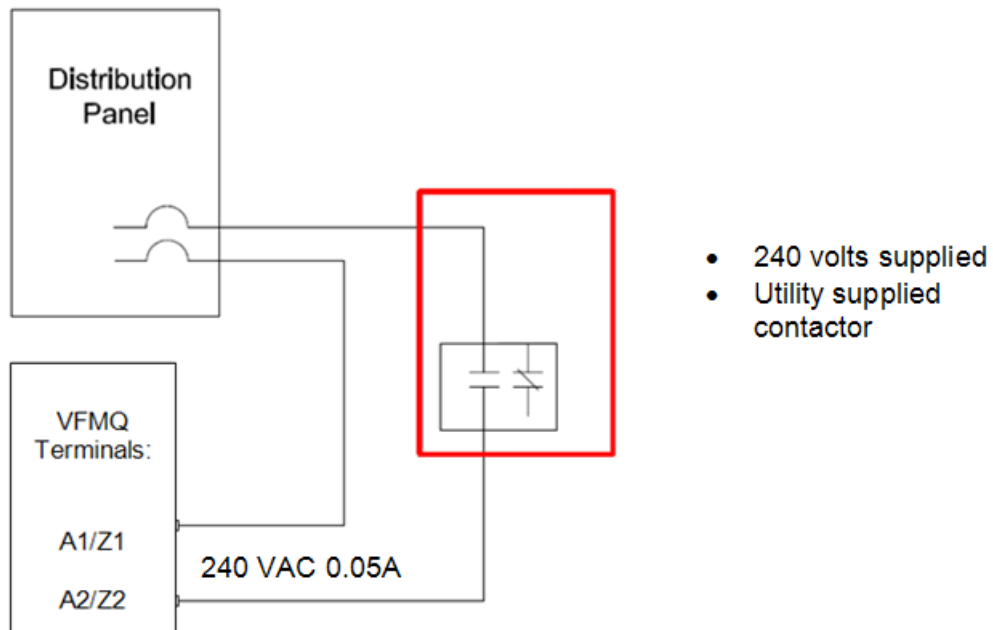
Note: The photo on the left shows the manual charge control knob on top. The middle switches and the second knob in the photo are part of the RTEV99 internal thermostat option.

Wiring Specifications to Connect various Timing Devices Using the Manual Charge Control Option

Connecting to Various Timing Devices:

- Option 1. The most common method is directly via a utility-supplied contactor.
- Option 2. A utility-supplied low voltage dry contact in which a voltage needs to be provided to open and close contacts. This method is common in Nova Scotia, Canada.
- Option 3. A timer.

Option 1. Typical Control Wiring Solution with a Contactor in a Utility-Supplied Device

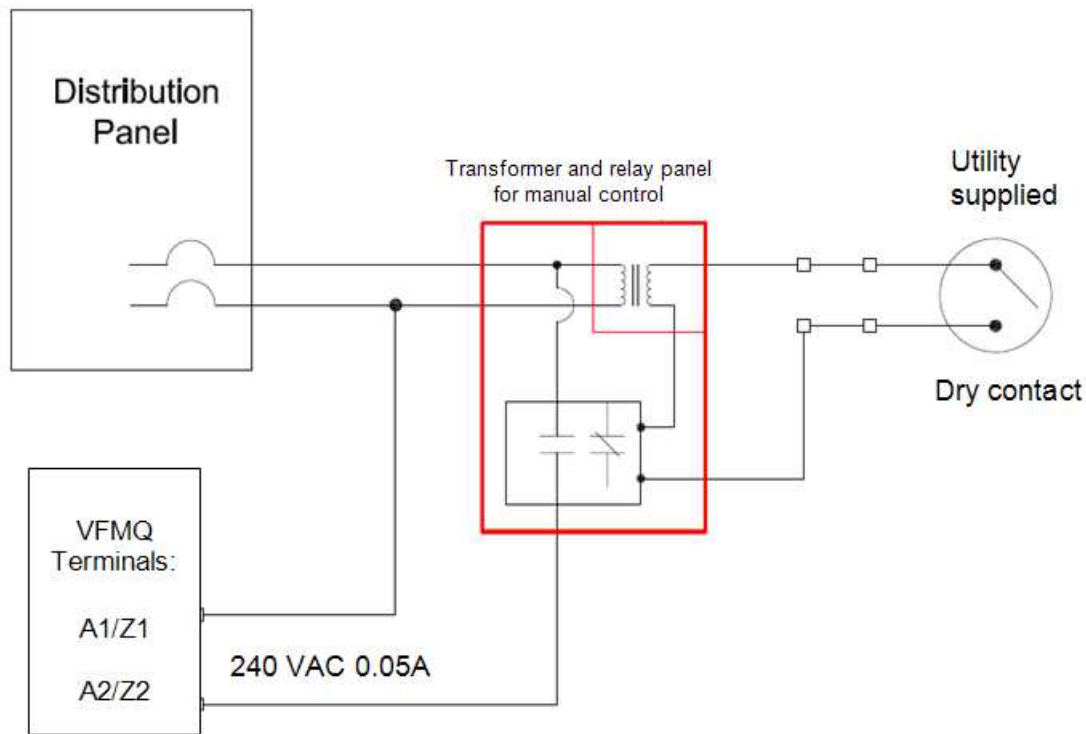


Note:

- Use a “normally open” contact if the Utility signal is an open contact for the Off-Peak periods. (Shown)
- Use a “normally closed” contact if the Utility signal is a closed contact for Off-Peak periods. (Not Shown)

Option 2. Control Wiring Solution using a Low Voltage Dry Contact from a Utility-Supplied Device

- This method requires low voltage to be passed across a Utility-supplied contact.
- Used by Nova Scotia Power, the dry contact is part of their Time-Of-Day meter.

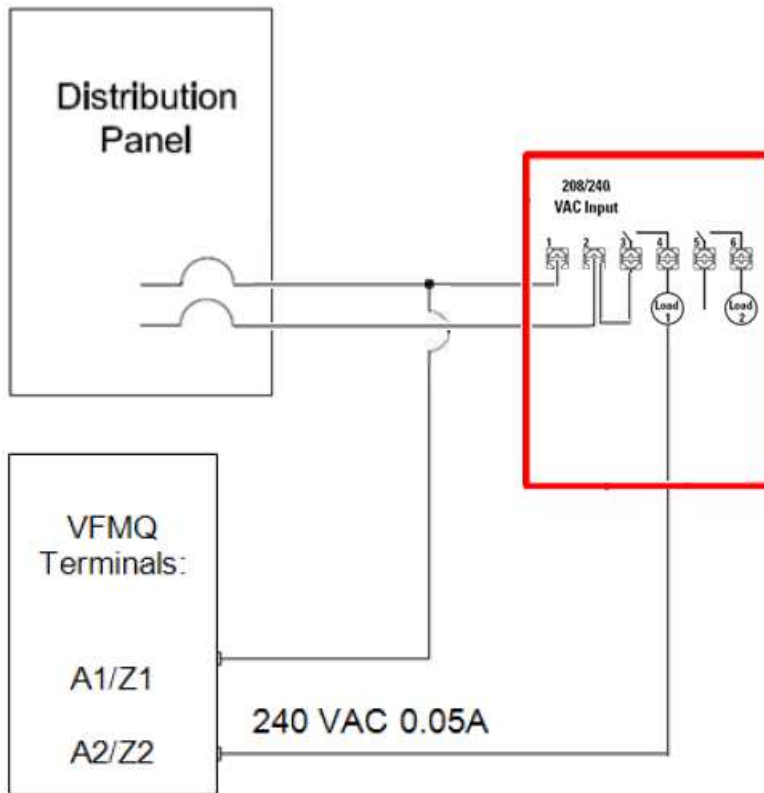


The transformer is only needed to provide low voltage to the dry contact. Examples of components:

- Marcus 12/240 to 12/24 AC transformer - MRCMO50A.
- Schneider relay - TLPRPM21B7 and Schneider relay base - TLPRPZF2.
- Use a “normally open” contact if the Utility signal is an open contact for Off-Peak periods. (Shown) This is the standard in Nova Scotia and requires the NSPi meter lead wire #113397 to connect to the NSPi meter dry contact.
- Use a “normally closed” contact if the Utility signal is a closed contact for Off-Peak periods. (Not Shown)
- The suggested transformer and relay panel dimensions are 8” w x 8” h x 4” d.

Option 3 – Control Wiring Solution using a Timer

- Used in lieu of a utility-supplied timing device.
- An example is Ontario where the Smart Meters do not include physical contacts to synchronize the system to.
- This solution requires an accurate timer programmed with the Utility's Off-Peak schedule. An example is the Intermatic ET1725C with 7 day programmability, battery backup and changes automatically for daylight savings time.



- The timing device must be rated for switching 240 volts.
- In this application, the storage heater will charge when the timer is in "off mode". The timer must open the control circuit during Off-Peak periods and close for Peak periods.



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DCP2010 Control Settings - Rural Electric Cooperatives

This is a simplified document for trained contractors. For complete instructions, please refer to the DCP2010 Installation and Operating Instructions

- a) **Setting the DIP Switches.** The DIP switches are located on the PCB board within the enclosure.

Position	Set Switch	Description
8	OFF	Rate Signaling, Closed contact for Off-Peak

NOTE: this DIP Switch must be changed to "ON" if the Utility uses an open contact for Off-Peak times

WARNING:

Ensure all circuits are de-energized before opening control enclosure as there may be up to five live circuits

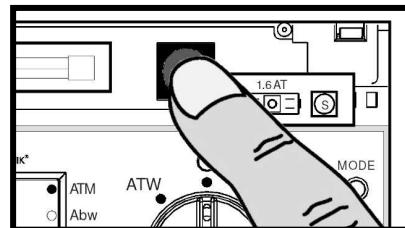
- b) **Setting the Charge Controller – Operator Mode.** Installer to set.

Selection	Enter Set Points	
Uhr:	Ja, set time	Timer (Ja =YES) Set time based on a 24h-Clock
TAE:	Day	Setting the day: T1=Monday, T2=Tuesday, T3=Wednesday, T4=Thursday, T5=Friday, T6=Saturday, T7=Sunday
ANZ	AU	Real-Time display

- c) **Setting the Charge Controller – Technician Mode**

To set in Technician mode, press the black button as shown on the right. The red LED will illuminate.

In Technician Mode, installers must set the following based on the length of the Utility's Off-Peak period.



Selection	8hr (Off-Peak) Enter Set Points	10hr (Off-Peak) Enter Set Points	12hr (Off-Peak) Enter Set Points	Description
E1	-24	-24	-24	Full charge setting
E3	7 h	9h	11h	Main charge duration
TU:	9 h	11h	13h	
SEH	0 h	0 h	0 h	

- All other settings to be left at factory defaults.
- After these selections, press button to de-select Technician Mode. Red LED will turn off.
- If Mid-Peak rates are available, please contract Dimplex @ 1-800-668-6663 x339.

NOTE. Installer to fill out the following commissioning table and leave with the homeowner for their records.

Customer Name: _____

Installation Company: _____

Address: _____

Installer Phone #: _____

Date _____

Position	Set switch to:	Description	Enter Setting
8	Off	Rate Signaling (Closed contact for Off-Peak, this DIP Switch must be changed to "ON" if the Utility uses an open contact for Off-Peak times	

Operator Menu	Operator menu abbreviation	Operator menu designation	Operator menu factory default	Enter Setting:
	LA	Runtime	0 h	0 h
	E5	Charge level	0 %	0 %
	E2	Charge start	15°C	15°C
	E15	Base charge start	15 %	15 %
	E10	Additional charging	85 %	85 %
	ATW	Effective external temperature	External temperature display	
	Timer	Real-time timer	No	
	TAE	Day setting	T 1	
	ANZ	Display		

Technician Menu	Technician menu abbreviation	Technician menu designation	Technician menu factory setting	Enter Setting:
	E1	Full charge	- 12°C	
	E3	Main charging duration	7 h	
	E4	Minimum charging base	25 %	25%
	TAS	Daytime skip	E1	E1
	TU	Daytime switching	10 h	
	SEH	Lock	6 h	
	UMD	Circulation period	22 h	22 h
	ATM	External temperature averaging	Yes	Yes
	FSU	Release synchronization with timer	No	No
	LFS	Earliest start of release	23:00	23:00
	LFD	Maximum duration of release	8 h	8 h
	LZS	Earliest start of additional release	14:00	14:00
	LZD	Maximum additional release duration	0 h	0 h
	SHT	Daytime heating contactor activation	No	No

DCP2010 Control Settings - Nova Scotia

This is a simplified document for trained contractors. For complete instructions, please refer to the DCP2010 Installation and Operating Instructions

WARNING:
Ensure all circuits are de-energized before opening control enclosure as there may be up to five live circuits

- a) Setting the DIP Switches.** The DIP switches are located on the PCB board within the enclosure.

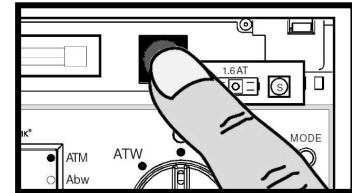
Position	Set Switch	Description
1	Off	Mid-Peak Off-Set (in hours): 5 hours (the time from the end of Off-Peak to the start of the Mid-Peak)
2	Off	
3	On	
4	On	Mid-Peak Duration (in hours): 4 hours
5	On	
6	Off	
7	Off	Stepped delay 5 minutes in sequence
8	On	Rate Signaling Open contact for Off-Peak

- b) Setting the Charge Controller – Operator Mode.** Installer to set.

Selection	Enter Set Points	
Uhr:	Ja, set time	Timer (Ja =YES) Set time based on a 24h-Clock
TAE:	Day	Setting the day: T1=Monday, T2=Tuesday, T3=Wednesday, T4=Thursday, T5=Friday, T6=Saturday, T7=Sunday
ANZ	AU	Real-Time display

- c) Setting the Charge Controller – Technician Mode.**

To set in Technician mode, press the black button as shown on the right. The red LED will illuminate.



In Technician Mode, contractors must set the following:

Selection	Enter Set Points	Description
E1	See Table B	
TU:	9 hr	
SEH	0 hr	
FSU	Ja	Real Clock Timer
LFS	23:00	Start of Off-Peak period
LZS	12:00	Start of Mid-Peak period
LZD	4hr	Length of Mid-Peak period

Table B - Area	E1 Setting
Amherst	-7
Halifax	-4
Kentville	-5
New Glasgow	-7
Sydney	-4
Truro	-7
Yarmouth	-2

- All other settings to be left at factory defaults.
- After these selections, press button to de-select Technician Mode. Red LED will turn off.
- Note. E1 is typically set to the outdoor design temperature (°C) for 8+0, but as we're using the Mid-Peak (8+4), E1 is reduced to minimize the use of more expensive Mid-Peak energy.

NOTE. Installer to fill out the following commissioning table and leave with the homeowner for their records.

Customer Name: _____

Installation Company: _____

Address: _____

Installer Phone # _____

Date: _____

Position	Set switch	Description	Enter Setting		
1	Off	Mid-Peak Off-Set (in hours) 5 hours (the time from the end of off-peak to the start of mid-peak)			
2	Off				
3	On				
4	On	Mid-Peak Duration (in hours) 4 hours			
5	On				
6	Off				
7	Off	Stepped delay 5 minutes in sequence			
8	On	Rate Signaling, Open contact for Off-Peak			

Operator Menu	Operator menu abbreviation	Operator menu designation	Operator menu factory default	Enter Setting:
	LA	Runtime	0 h	0 h
	E5	Charge level	0 %	0 %
	E2	Charge start	15°C	15°C
	E15	Base charge start	15 %	15 %
	E10	Additional charging	85 %	85 %
	ATW	Effective external temperature	External temperature display	
	Timer	Real-time timer	No	
	TAE	Day setting	T 1	
	ANZ	Display		

Technician Menu	Technician menu abbreviation	Technician menu designation	Technician menu factory setting	Enter Setting:
	E1	Full charge	- 12°C	
	E3	Main charging duration	7 h	7h
	E4	Minimum charging base	25 %	25%
	TAS	Daytime skip	E1	E1
	TU	Daytime switching	10 h	
	SEH	Lock	6 h	
	UMD	Circulation period	22 h	22h
	ATM	External temperature averaging	Yes	Yes
	FSU	Release synchronization with timer	No	
	LFS	Earliest start of release	21:00	
	LFD	Maximum duration of release	8 h	8 h
	LZS	Earliest start of additional release	14:00	
	LZD	Maximum additional release duration	0 h	
	SHT	Daytime heating contactor activation	No	No