MVEC

Minnesota Valley Electric Cooperative

Your Touchstone Energy® Cooperative

ENERGY WISE WIRING DIAGRAMS

For technical questions, call 952.492.8330

To schedule Energy Wise/Off Peak meter installation,
call 952.492.8255

These diagrams are for reference only.
The manufacturer's connection requirements for the Demand Response Unit (DRU) shall be followed. MVEC is not responsible for these connections.

Ask our energy specialists for a preferred contractor, if you require further assistance.

MINNESOTA VALLEY ELECTRIC COOPERATIVE | www.mvec.net

ENERGY WISE® CONTROLLABLE LOADS

Electric Water Heaters – All electric water heaters are controlled as storage or interruptible. This is determined when there are three or less people who live at the residence, when the structure is less than three thousand square feet, or if the system is designed for storage. All others should be interruptible. The use of multiple electric water heaters will require two circuits controlled with a separate relay, or unless the manufacturer has provided wiring to interlock the two.

Heat Pumps and Air Conditioners are always controlled with the 24-volt system. Refer to the manufacturer or installing HVAC contractor on where you should control. When two-stage units are installed, it may be necessary to control both stages with a double pole relay. All low voltage connections are to be installed in junction boxes or inside equipment.

Plenum Heaters are inserts installed in the plenum of a furnace that will heat electrically and switch over to the back-up heat when being controlled. It is installed the same direction as the coil and is normally controlled in the 24-volt system.

Electric Heat – Baseboard, cove or wall heaters are normally controlled with line voltage using a relay related for the purpose. When there are more than two circuits to be controlled, a current transformer and a 12 x 12 x 4-inch CT can will be used.

Hot Tubs – Only indoor units qualify due to the possibility of freeze damage during the times it will be controlled. Please refer to manufacturer's instructions for control applications.

Boiler – In-floor heat and dual heat boilers are the most common and require special consideration when looking to control. Most will be controlled with the low voltage system. In-floor heat could be controlled by low voltage or line voltage with the circulating pump circuit depending on the situation.

ENERGY WISE EQUIPMENT LIST

Wiring Scenario:	Receiver	CT	240 VAC Relay/Black	Diagram Number:
Heat on 1 Circuit	X			#1
AC and WH	X	X		#3
Heat on 1 Circuit and WH	X	X		#2
Heat on 2 Circuits	X	X		#3
Heat on 5-6 Circuits and WH/AC Optional	X	X	X	#4

Additional notes:

Add single meter socket if member does not have a double meter socket.

Get technical advice if any circuit exceeds 30 amps.

Get technical advice if this chart does not cover the system being installed.

INSTALLATION SPECIFICATIONS

1. The meter and receiver must be mounted outside and always vertically.

2. Meters installed since 1992 are normally double meter sockets that are attached to the house or garage. All others will use Electro Industries EE5062A Single Meter socket in combination with a single main meter on house or when the main meter is on the pole. These meter sockets are available from MVEC.

3. When a current transformer is used for metering, the member or contractor shall supply 12x12x4 junction box to mount the CT and relays. When coupling to your service panel, size generously to allow for future loads. All controlled loads "A" phase wires from the panel breakers must run through the CT one direction "B" phase wires from panel breakers must run through the CT the opposite direction. Only controlled loads are to be wired through the CT. From CT terminals, two # 12 AWG stranded wires need to run to the meter socket and terminate at the upper left and lower left lugs.

4. When current transformer metering is used, Energy Wise meter potential must always be fused together with the Energy Wise controller. 240-volt power whenever possible will be supplied from the main socket load side lugs. Use crimp-on AL/CU barrels when appropriate. And when a single meter is used, an uninterruptible circuit such as a water heater circuit should be used. The meter potential terminals on a CT meter socket are middle left terminal and upper right lug.

5. Energy Wise controllers use a 30-amp relay with orange wires to control the water heater circuit and a 5-amp relay with blue wires to control low voltage heating loads. When controlling heating load's line voltage, 30-amp is required. When controlling various heating loads, external relay may be required - refer to the appropriate wiring diagrams. If further questions arise, please contact MVEC.

6. All electric heat that is under control must be hard wired and all backup or standby heat must be permanently installed and is able to be operated automatically.

These diagrams are for reference only, the manufacturer's connection requirements for the Demand Response Unit (DRU) shall be followed.

MVEC is not responsible for these connections.

FAQs about
Energy Wise®
off-peak installations

1. Can I use a standard 100-amp socket from a wholesale electrical supplier for an off-peak installation?

The answer is NO: You must use the socket provided by MVEC because of the fusing requirements for the receiver. Standard sockets don't come equipped with the fuses that are placed in the socket for protection of the receiver.

2. Can I break line voltage to a central air unit?

The answer is NO: Newer units will not allow this type of installation as it extends the control time due to time outs and locking the unit out, making it inoperable. Make sure you contact the manufacturer to be sure on proper wiring methods for your air conditioner.

3. Can I control a 30-amp heating load with a DRU?

The answer is yes. The preferred DRU has two 30-amp relays. These relays are designed to control line voltage loads of less than 30-amp rating and can also be utilized for small resistive heat loads such as circulation pumps and small water heaters.

4. When do I need to use a black relay and how are they controlled?

The black relays are used on multiple line voltage-controlled loads where any one load does not exceed 30 amps. The control circuit comes from paralleling the line voltage from one of the loads passing one leg through the blue pair and onto the coil of the relay.

5. What should I do with the receiver on a peak shave central air unit if the member adds additional off-peak loads?

This answer is never easy! It is in MVEC's best interest to always try to limit each location to one receiver per metering point. If there is any possible way to remove the receiver at the central air and combine the control points at the new receiver location, we want everyone to try and accomplish that. If it's going to affect the integrity of the system by moving it, then leave the receiver in its location and meter the load through the CT at the new metering point. If this type of installation is needed, this should be authorized by MVEC before doing so.

6. When is it allowed to add a second off-peak meter?

If you have a facility (detached garage or outbuilding) that **has its own main panel fed from an existing panel that currently has off peak**, it's allowed to install a second meter at the new location of the service panel. If there is absolutely no possible way of getting back to the existing off-peak equipment, there may be an option for adding a second off peak meter to accommodate those loads. These types of installations need to be discussed with MVEC before installing.

7. I've seen at other cooperatives they meter the whole off-peak panel.

MVEC DOES allow this type of installation. Remember: if doing this type of installation, be sure all loads in this service panel need to be controlled for off peak. You will need to purchase a single socket and install that before the service panel. In

these types of installations, the panels still need to be fed from the load side of the general service meter. In NO case can the off-peak meter be the only meter at a service location.

8. Could I be billed from MVEC if the equipment was not installed correctly?

The answer is YES: We will bill the member if you schedule an appointment for install, we make a trip out there, and the equipment is not ready. Make sure all equipment is operational and ready to be controlled when we get there.

9. Does the CT need to be grounded?

The answer is YES: Make sure the CT is always grounded on one terminal upon installation.

10. Can I break a heat pump with high voltage? Can I line meter the heat pump if it's my only load?

The first answer is NO. The second answer is YES: All heat pumps need to be broke with some type of low voltage method. A heat pump – if it's the only load on the system – can be line metered.

11. I'm installing a wind turbine or solar panels to my existing service. Where do I locate the off-peak meter?

If you are installing some type of renewable energy, you MUST contact MVEC before getting started. It is required to visit the **NOVA Power Portal** at www.mvec.net/your-cooperative/cogeneration/ to start the process.

12. Is the receiver always the problem when out on a service call?

This is a myth: It's usually not the problem when we get there. Be sure you have a good idea of what's wrong before you cycle power to the equipment. The receivers have a built-in timeout that we utilize for system restore during outage situations. Remember, some of our equipment is being powered by the circuit breakers or disconnects of the equipment you're working on. This timeout is usually around 15 minutes before it will restore. Out of the thousands of receivers we have on our system, very few fail per year, so check the lights before powering down and be willing to wait when you power it back up.

13. Is there a way to test the receiver to see if it's controlling correctly?

The answer is YES: Green means it is working. Amber means it is in a control period. Red means there is a problem and you should call MVEC.

Call 952.492.8330 for technical questions

Diagram #1

30/30A

IN DUAL SOCKETS, FUSES ARE LOCATED ON GENERAL SERVICE SIDE OF COMMON WALL ABOVE KNOCKOUT.

GENERAL SERVICE METER

ORANGE PAIR

RED/BLACK PAIR

BLUE PAIR

ORANGE PAIR

USE AL/CU CRIMP-ON CONNECTORS WHERE NECESSARY (INCLUDED IN DUAL SOCKETS)

LOW VOLTAGE/ CURRENT COMPARTMENT

SERVICE PANEL

TO LOAD

NOTES:

ALL WIRING CONNECTIONS AND GROUNDING MUST CONFORM TO THE NATIONAL ELECTRIC CODE.

ALL WIRING ADDITIONS AND MODIFICATIONS SHALL BE INSPECTED FOR YOUR SAFETY.

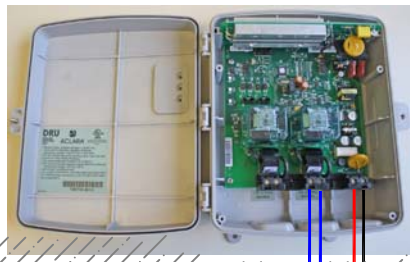
ATTENTION:
THE OFF PEAK METER IS A SUB-METER. INSTALLERS ARE ENCOURAGED TO SLUG THE OFF PEAK SOCKET SO THE LOAD CAN RUN, AVOIDING INCONVENIENCE TO THE HOME OWNER. THE OFF PEAK METER WILL BE INSTALLED AS SOON AS POSSIBLE AFTER MVEC IS NOTIFIED THAT EVERYTHING IS READY.

Touchstone Energy MVEC

SINGLE OFF PEAK LOAD
30 AMP MAX (NOT TO A.C.)
DRAWING #1

MDC	11/25/98
REV: KJ	5/8/12

Diagram #2



30/30A

ORANGE PAIR SHOWN DEPICTS INSTALLATION FOR A WATER HEATER. USE THE BLUE PAIR INSTEAD WHEN CONTROLLING SPACE HEAT OR A.C.

RECEIVER RELAY MUST BE 30 AMP AND #10 GAUGE WIRES.

RED/BLACK PAIR

WIRE NUT OR TAPE

BLUE PAIR

LOW VOLTAGE/ CURRENT COMPARTMENT

LOW VOLTAGE CONTROL

NOTES:

ALL WIRING CONNECTIONS AND GROUNDING MUST CONFORM TO THE NATIONAL ELECTRIC CODE.

ALL WIRING ADDITIONS AND MODIFICATIONS SHALL BE INSPECTED FOR YOUR SAFETY.

SERVICE PANEL

ATTENTION:
THE OFF PEAK METER IS A SUB-METER. INSTALLERS ARE ENCOURAGED TO SLUG THE OFF PEAK SOCKET SO THE LOAD CAN RUN, AVOIDING INCONVENIENCE TO THE HOME OWNER. THE OFF PEAK METER WILL BE INSTALLED AS SOON AS POSSIBLE AFTER MVEC IS NOTIFIED THAT EVERYTHING IS READY.

TO LOAD

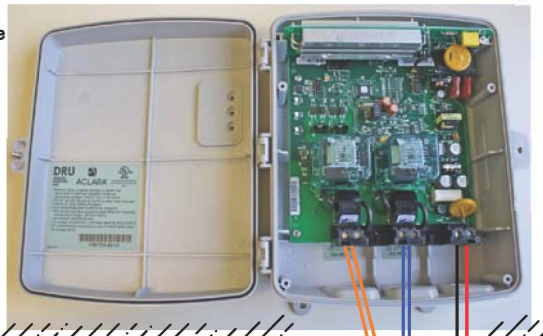
Touchstone Energy MVEC

SINGLE HEAT OFF PEAK LOAD (HEAT PUMP)

MDC	11/25/98
REV: KJ	05/08/12

This information is for general purposes only and is not intended to serve as a set of specifications for installation of the equipment. MVEC is not responsible for installations which it has not specifically approved. Please contact MVEC or your electrical contractor for further information.

Diagram #3



30/30A

IN DUAL SOCKETS, FUSES ARE LOCATED ON GENERAL SERVICE SIDE OF COMMON WALL ABOVE KNOCKOUT.

LOW VOLTAGE CONTACTS IN RADIO RECEIVER ARE RATED AT 5 AMPS 24 V.

GENERAL SERVICE METER

USE AL/CU CRIMP-ON CONNECTORS WHERE NECESSARY (INCLUDED IN DUAL SOCKETS)

BLACK/RED

ORANGE PAIR

BLUE PAIR

NOTES:

ALL WIRING CONNECTIONS AND GROUNDING MUST CONFORM TO THE NATIONAL ELECTRIC CODE.

ALL WIRING ADDITIONS AND MODIFICATIONS SHALL BE INSPECTED FOR YOUR SAFETY.

SERVICE PANEL

CIRCUIT #1

CIRCUIT #2

CIRCUIT #3

CIRCUIT #4

A

B

Bø

Aø

NOTE: ALL HEAT PUMPS ARE CONTROLLED IN LOW VOLTAGE SYSTEM.

TO LOW VOLTAGE CONTROL DEVICE

WH

LOAD 1

LOAD 2

REQUIRED BOX 12" x12", 4" DEEP

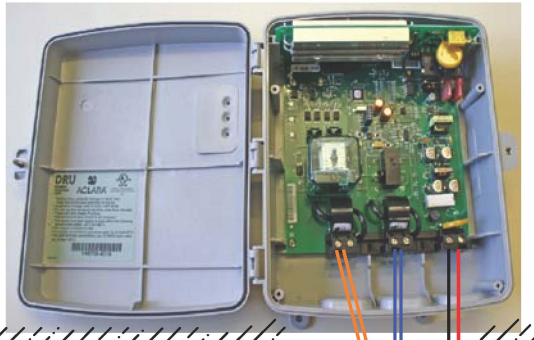
Touchstone Energy™ MVEC

Water Heater & Multiple OP Loads

MDC 12/21/09

This information is for general purposes only and is not intended to serve as a set of specifications for installation of the equipment. MVEC is not responsible for installations which it has not specifically approved. Please contact MVEC or your electrical contractor for further information.

Diagram #4



30/5A

IN DUAL SOCKETS, FUSES ARE LOCATED ON GENERAL SERVICE SIDE OF COMMON WALL ABOVE KNOCKOUT.

LOW VOLTAGE CONTACTS IN RADIO RECEIVER ARE RATED AT 5 AMPS 24 V.

GENERAL SERVICE METER

USE AL/CU CRIMP-ON CONNECTORS WHERE NECESSARY (INCLUDED IN DUAL SOCKETS)

BLACK/RED

ORANGE PAIR

BLUE PAIR

NOTES:

ALL WIRING CONNECTIONS AND GROUNDING MUST CONFORM TO THE NATIONAL ELECTRIC CODE.

ALL WIRING ADDITIONS AND MODIFICATIONS SHALL BE INSPECTED FOR YOUR SAFETY.

SERVICE PANEL

CIRCUIT #1

CIRCUIT #2

CIRCUIT #3

CIRCUIT #4

A

B

Bø

Aø

NOTE: ALL HEAT PUMPS ARE CONTROLLED IN LOW VOLTAGE SYSTEM.

TO LOW VOLTAGE CONTROL DEVICE

WH

LOAD 1

LOAD 2

REQUIRED BOX 12" x12", 4" DEEP

Touchstone Energy MVEC

Water Heater & Multiple OP Loads

MDC 12/21/09