

Frequently Asked Questions about the Remote Disconnect Switch in the I-210+* and I-210+c* Meters

1. In which Forms of the two meters can a Remote Disconnect switch be integrated?

A RD Switch can be installed in all I-210+ and I-210+c self-contained meter Forms including 1S, 2S, 12S and 25S meters. It is NOT available on the transformer rated forms 3S or 4S.

2. What actions are taken in the Factory when a RD Switch is to be integrated?

The RD switch is a factory installed option on the I210+ or I210+c meter. The switch is under the cover, mounted on the base of the meter. When the switch is installed, a “daughter” controller board is installed as well.

I-210+ Configuration

- In all meters, the “RCDC” flag is set, which allows the RD Switch to work in the meter
- If the Utility customer has specified that a “Consumer Acknowledgement Button” be included, then the “Push Button Present” flag must be set

Soft Switches

- To enable the Demand Limiting Period capability, the “DLP” Soft Switch must be loaded
- To enable the Emergency Conservation Period capability, the “ECP” Soft Switch must be loaded
- To enable operation of a Form 1S or 2S I-210+ as a “Prepay Meter,” the “Prepayment” Soft Switch must be loaded

I-210+c Configuration

- In all meters, the “RCDC” flag is set, which allows the RD Switch to work in the meter
- If the Utility customer has specified that a “Consumer Acknowledgement Button” be included, then the “Push Button Present” flag must be set

Soft Switches

- To enable the Demand Limiting Period capability, the “DLP” Soft Switch must be loaded
- To enable the Emergency Conservation Period capability, the “ECP” Soft Switch must be loaded
- To enable operation of a Form 1S, 2S or 12S I-210+c as a “Prepay Meter,” the “Prepayment” Soft Switch must be loaded



3. How does an AMI Module “close” the RD Switch in the meter?

The I210+ or I210+c responds to standard commands issued by the AMI module (or MeterMate through the optical port). There are two different commands that an AMI Module can issue to close the RD Switch:

- Automatic Close** – This directs the meter to close the “open” RD Switch if a) no Voltage is detected on the Load side of the meter, b) the capacitor is sufficiently charged to enable RD Switch operation and c) the open RD Switch has not been placed in “Lockout” (which will prevent the closing of the RD Switch until “Lockout” has been removed).
- Manual Arm and Close** – If the meter has a Consumer Acknowledgement Button, the AMI Module can send a command which “arms” the switch for closure as soon as a consumer pushes the button, provided that when the button is pushed a) no Voltage is detected on the Load side of the meter, b) the capacitor is sufficiently charged to enable RD Switch operation and c) the open RD Switch has not been placed in “Lockout” (which will prevent the closing of the RD Switch until “Lockout” has been removed).

It is possible for a utility to program the meter ahead of time to wait indefinitely for a consumer to push the button once an “arm” command has been received, or to “time out” after a specific number of minutes (up to 255) and revert back to normal operation with the switch remaining in the “open” position.



4. How does an AMI Module “open” the RD Switch in the meter?

An AMI Module can issue a direct command to the meter to “open” a closed RD Switch. The meter executes this command immediately, unless the closed RD Switch has been placed in “Lockout” (which will prevent the opening of the RD Switch until “Lockout” has been removed). If the meter was in DLP or ECP mode at the time the direct “open” command is received, those operating modes are cancelled and the meter reverts to normal operation with the RD Switch in the open position.

5. Is the status of the RD Switch displayed on the meter’s LCD ?

I-210+

- Status of the RD Switch is displayed on the lower three digits of the meter’s LCD
- “On” is displayed when the RD Switch is closed
- “OFF” is displayed when the RD Switch is open
- “Arn” is displayed when the meter is “armed” for closure and waiting for a consumer to push the acknowledgement button
- “Lou” is displayed when the RD Switch is open and the meter detects Voltage on the Load side (which will prevent the switch from being closed by any method)

I-210+c

- Status of the RD Switch is displayed in the upper 6 digits of the meter’s LCD in the regular scroll
- “CLOSEd” is displayed when the RD Switch is closed
- “OPEn” is displayed when the RD Switch is open
- “ArnEd” is displayed when the meter is “armed” for closure and waiting for a consumer to push the acknowledgement button
- “LOADU” is displayed when the RD Switch is open and the meter detects Voltage on the Load side (which will prevent the switch from being closed by any method)

6. What is the current rating of the RD Switch?

The switch is manufactured by Gruner and is factory rated for operation at 200 A. However, you should be aware that in some instances it may be necessary to de-rate the switch and operate it at a lower current setting. The reason pertains to heat. The meter’s metrology board and the RD Switch both produce heat inside the cover when the meter is operating. Ambient air and sunlight also add heat. If the heat contributed by the AMI module pushes the internal temperature above the allowable limit, then heat from one of these contributors must be reduced to protect the metrology electronic components. Either the current flow through the RD Switch must be reduced (which lowers the heat produced) or the operation of the AMI module must be curtailed temporarily to reduce the heat it produces.

Today, only the former is possible but we are working on a way to “help” an AMI module reduce its heat production since all utilities want to be able to operate the RD Switch at 200 A regardless of the type of AMI system they have selected. AMI modules in PLC and BPL systems are the largest heat producers today, but many of the RF based systems are beginning to rival them so it isn’t possible to flatly state that one AMI system is “better” than another with respect to this issue.

7. What happens to the RD Switch in the event of a Power Outage?

Utilities can choose to program the meter ahead of time to “open” the RD Switch if power is lost. If they do not specify that they wish the meter to do this, then when power is lost the RD Switch will remain in the state (open or closed) that it was in prior to the power loss.

8. What happens to the RD Switch when power is Restored?

If a Utility has specified that the meter open the RD Switch in the event of a power outage, they can program the meter to react to power restoration in one of three ways:

- a. Close the RD Switch immediately once power is restored (and the capacitor is sufficiently charged).
- b. Wait a specific number of minutes (up to 255) before, then closing the RD Switch.
- c. Wait indefinitely until a direct command to “close” is received from the AMI Module (sent down through the AMI System) before closing the RD Switch.

9. What is DLP?

DLP is an acronym for “Demand Limiting Period”. A Utility can send a command down through an AMI system to a specific meter telling it to switch from normal operation mode to DLP mode. In that mode, the meter will continuously monitor demand over a fixed interval and will compare it with the programmed “Threshold.” If the measured interval demand exceeds the programmed demand threshold, the meter will open the RD Switch. This works in both meters, even though the I-210+ is not a “Demand” meter.

Prior to the issuance of that command, a utility would need to have programmed the following parameters in the meter:

- 1) “Threshold” – this specifies the level of Demand in kW that actual measurements will be compared to.
- 2) “Load Control Demand Interval Length” – this specifies the time Interval over which the meter should measure Demand with the default value being 5 minutes.
- 2) “Load Control Reconnect Time Duration Period” – this specifies how long (up to 60 minutes) the meter—each time it opens the RD Switch during DLP—will leave the RD Switch open before attempting to re-close it.

4) "Load Control Reconnect Attempts" – this field specifies how many times the meter will reconnect the RD Switch (after opening) before it permanently opens, leaving it open until a command to end DLP operation is sent down to the meter through the AMI system. The meter can be told to make no reconnections, a specific number of reconnections up to 254, or to continue reconnecting indefinitely until DLP operation ends.

5) "Load Control Demand Delay" – this specifies the time period that initiation of demand measurement should be delayed after power is restored to a meter that has experienced a loss of power (to prevent inadvertent opening based upon "inrush" current and associated demand measurement).

DLP mode of operation begins with the receipt of a command from the AMI module (unless meter is in "Lockout") and ends only when a direct command to terminate DLP operation or a direct "open" command is received.

While DLP operation is in effect, the meters will display the following:

I-210+

- "dLp" is displayed on the lower three digits while the meter is operating in DLP Mode
- "off" or "on" is displayed on the lower three digits to indicate whether the RD Switch is open or closed

I-210+c

- "DLP" is displayed in the normal display scroll on the upper six digits while the meter is operating in DLP Mode
- "DLPDSC" is displayed while the meter is operating in DLP Mode if the switch is open and the service is disconnected
- "DLPON" is displayed while the meter is operating in DLP Mode if the switch is closed and service to the customer is "on"

10. What is ECP?

ECP is an acronym for "Emergency Conservation Period". ECP is intended to allow a utility to enforce a mandatory emergency conservation policy for all (or a large group of) residential customers. It works in a very similar fashion as DLP, to limit demand (by comparing actual to a programmed Threshold) except that a utility can define the duration of time for it to be in effect and also can program individual meters to function in specific ways during ECP.

Prior to the issuance of the ECP command, a Utility can program a meter to:

1) Operate in ECP mode after the direct ECP command is received for a specific period of time (up to a maximum of 24 hours) and then revert to normal operation or, continue in ECP mode until a subsequent direct command is received terminating the ECP mode of operation.

2) When a direct ECP command is received:

- a. Ignore the command and continue in Normal operation mode.
- b. Enter ECP mode of operation and (like DLP) begin to continuously monitor demand over a fixed interval and compare it with the programmed "Threshold." If the measured interval demand exceeds the programmed demand threshold, the meter will open the RD Switch.
- c. Enter ECP mode of operation, but instead of opening the RD Switch when it determines that measured Demand exceeds the Threshold,, record the kWh Consumption above that limit (calculated from the Threshold - the "Delta") in a separate "ECP register" so the utility can charge the customer a different rate for that "above Threshold" consumption.
- d. Enter ECP mode of operation but instead of opening the switch when it determines that measured Demand exceeds the Threshold, to record all the kWh Consumption in the "ECP register" so the utility can charge the customer a different rate for all consumption during the ECP.

The various other programmed parameters, including "Threshold," "Load Control Demand Interval Length," "Load Control Reconnect Time Duration Period," "Load Control Reconnect Attempts," "Load Control Demand Delay" discussed above are used both in DLP and ECP.

ECP mode of operation begins with the receipt of a command from the AMI module (unless meter is in "Lockout") and ends when the pre-programmed time limit is reached, a direct command to terminate DLP operation is received, or a direct command to open the switch is received.

While ECP operation is in effect, the meters will display the following:

I-210+

- "ECP" is displayed on the lower three digits while the meter is operating in ECP Mode
- "OFF" or "On" is displayed on the lower three digits to indicate whether the RD Switch is open or closed.

I-210+c

- "ECP" is displayed in the normal display scroll on the upper six digits while the meter is operating in DLP Mode
- "ECPDSC" is displayed while the meter is operating in DLP Mode if the switch is open and the service is disconnected
- "ECPON" is displayed while the meter is operating in DLP Mode if the switch is closed and service to the customer is "on"

In the I210+c, In addition, the numeric values for "Actual LC Demand," "Programmed Threshold," "Number of Reconnect Attempts Remaining," and "Time Remaining Before Reconnection" can be displayed in the normal rotation on the upper six digits with an associated Display ID Code displayed on the lower three.

11. How does the RD Switch “Lockout” feature work?

A utility can send a message through the AMI system to the meter to “lock” the RD Switch in one of two states so that a subsequent command to enter DLP or ECP modes would be ignored. The RD Switch can be locked “Open” (in the case where a Utility knew that an apartment was empty so there should be no consumption) or “Closed” (in the case of a consumer with life-critical medical equipment in their home).

12. How can the meter with RD Switch be used for Prepay billing?

If the “Prepayment” soft switch has been loaded and a RD Switch is installed, then the 1S or 2S I-210+ or the 1S, 2S or 12S I-210+c meter can be used as a prepay meter in a 2-way AMI system. A register in the meter, known as the “Prepayment Energy Bucket” can be credited through an AMI system with an amount of energy purchased by a consumer.

Once the Utility sends a command to a meter to enter “Prepay” operation, energy consumption is measured and the prepayment bucket is decremented in real time by the actual kWh energy consumed.

A Utility can specify that as soon as the Prepayment bucket equals zero, the RD Switch will automatically open or that energy consumption after zero balance is reached be recorded as a negative value. In the latter case, a consumer would need to pay for the “negative” amount used before they could then prepay for a new (positive) amount of energy. Just as it is possible for an AMI system to remotely add kWh to the “Prepayment Energy Bucket,” is also possible for kWh to be subtracted.

While Prepayment mode is in effect, the meters will display the following:

I-210+

- “PPT” is displayed on the lower three digits while the meter is operating in Prepay Mode
- “OFF” or “On” is displayed on the lower three digits to indicate whether the RD Switch is open or closed

I-210+c

- “Prepay” is displayed in the normal display scroll on the upper six digits while the meter is operating in Prepay Mode
- “PPtDSC” is displayed while the meter is operating in Prepay Mode if the switch is open and the service is disconnected
- “normal” is displayed while the meter is operating in DLP Mode if the switch is closed and service to the customer is “on”



For more information about this product, contact your GE Energy sales representative or email us at energy.tdsolutions@ge.com