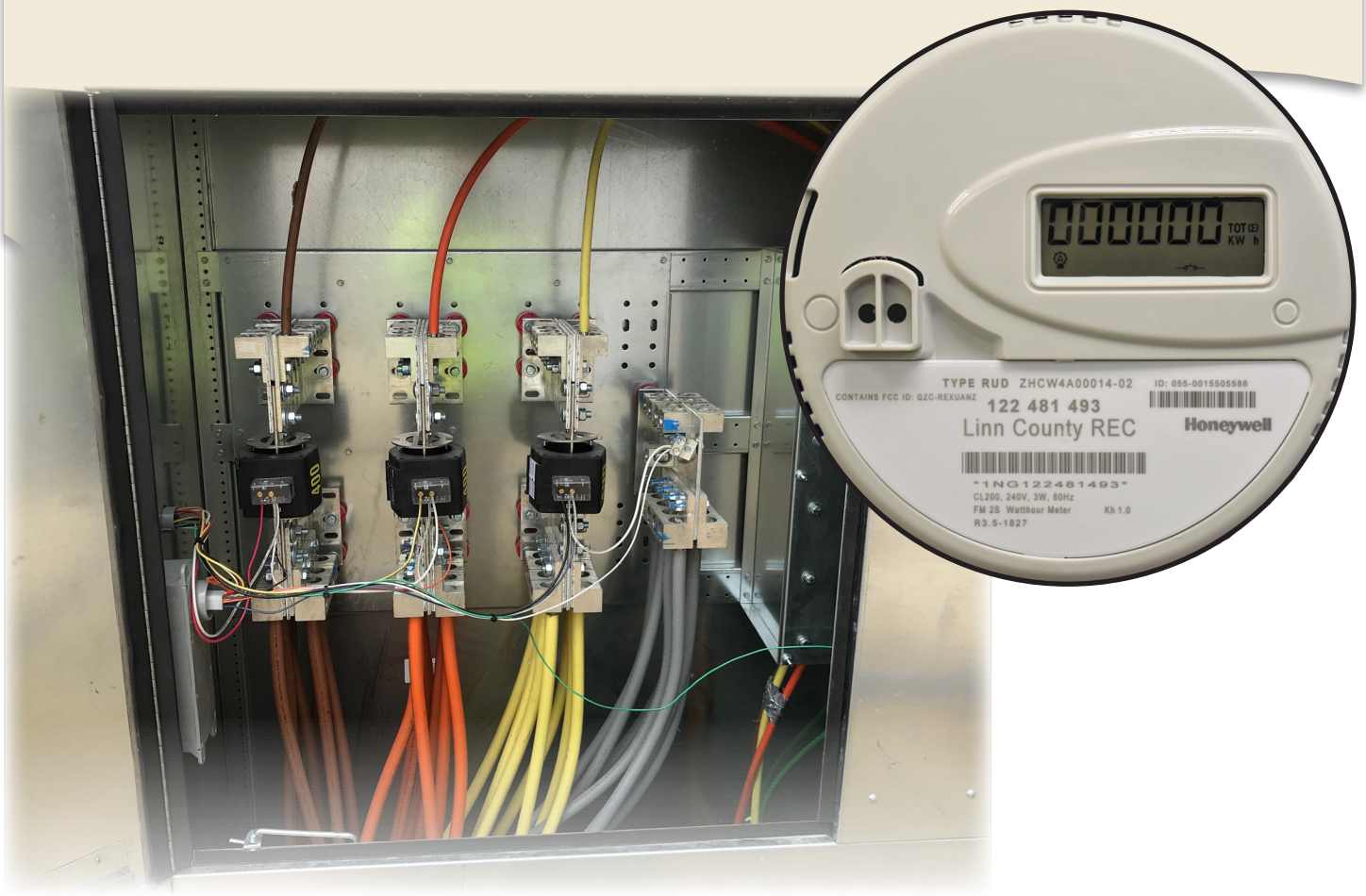
2022 Guide to Metering



This guide was prepared with information from manufacturers, distributors and Linn County REC's tariff. Its purpose is to provide information on requirements for installing metering for electric accounts served by Linn County REC.

****UPDATED ANNUALLY****

Updated 2021-12-02

Linn County Rural Electric Cooperative

Available at www.linncountyrec.com

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Classes of Service

120/240 volt, single phase, three wire (Limited to max 167 KVA transformer or 696 Amps)
120/208 volt, three phase, four wire wye
277/480 volt, three phase, four wire wye (Limited to min 300 KVA transformer or 361 Amps)

*****120 volt is not allowed*****

Service Types and Meter Forms

Service Type	Form	Label Color	Ø	Wire	Voltage	Class	Service Amps	Socket Terminals	Other
Single Phase	2S	white	1	3	120/240	200	200	4	Remote Disconnect
Single Phase >200	2S (320)	red	1	3	120/240	320	>200	4	NO Remote Disconnect, for services larger than 200 Amp
Single Phase (CT Cabinet)	4S	yellow	1	4	120/240	20	>400	6	CT Metered, Billing Multiplier, No Remote Disconnect
Three Phase (CT Cabinet)	9S	blue	3	3	120/208/480	20	>400	13	CT Metered, Billing Multiplier, No Remote Disconnect
Network Single Phase	12S	green	1	3	120/208	200	200	5	Remote Disconnect, Feed by 2 Phases of a 120/208
Three Phase	16S	yellow	3	4	120/208	200	200	7	NO Remote Disconnect
Three Phase >200	16S (320)	red	3	4	120/208	320	>200	7	NO Remote Disconnect, for services larger than 200 Amp

(no longer offered)	1S	white	1	2	120	100	100	4	Remote Disconnect
(no longer offered)	3S	blue	1	3	120/240	20	>400	5	CT Metered, Billing Multiplier, No Remote Disconnect

Any upgrades to existing 3S applications must be investigated to see if CT metering is allowed. If so, it must be converted to 4S or self-contained metering.

Meter Forms

The form number on an electric meter is the number that helps meter techs determine what type of meter should go in a particular service. There are a variety of form numbers that are used. The two types of services that metering installation are self-contained and transformer-rated. The difference between the two is the transformer-rated service use CT's, whereas the self-contained service does not. Blondel's Theorem is typically used to determine what type of meter to install in each different type of service. The theorem is the result of his attempt to simplify both the measurement of electrical energy and the validation of such measurements. The theorem states that the power provided to a system of N conductors is equal to the algebraic sum of the power measured by N watt-meters. The N watt-meters are separately connected such that each one measures the current level in one of the N conductors and the potential level between that conductor and a common point. In a further simplification, if that common point is located on one of the conductors, that conductor's meter can be removed and only N-1 meters are required.

Form 2S - The most common meter form out there. This meter is most commonly used in a 240v, single phase three wire service. This is the meter that most people will find on their homes. This form is also used for many small businesses as well.

Form 4S - Form 4S meters are used for single phase three wire services with two CT's. This is a transformer-rated meter that would be used when the service is too large to put in a form 2S meter.

Form 9S - The form 9S is most commonly used in a 4 wire wye service. This meter is also used in a 4 wire delta service, also known as a wild-leg service.

Form 12S - Form 12S meters are self-contained meters that can be used on a few different services. They can be used on 3 wire delta three phase services as well as single phase services that are pulled off of a three phase transformer. As an example, if you had a 120/208 4 wire wye transformer feeding a building and a member only wanted single phase, you could pull two legs and the neutral off the transformer to get the single phase. This is also known as a network service. **A common mistake is installing a 2S in this application which will only register 75% of the kWh.**

Form 16S - Form 16S meters are self-contained meters that are most commonly used to meter 4 wire wye services.

Class 320 Metering Applications

SINGLE PHASE
TRANSFORMER FULL LOAD CURRENT IN AMPS
RATED LINE VOLTAGE

KVA	240
1	4.2
10	41.6
15	62.5
25	104
37.5	156
50	208
75	312
100	416
167	696

THREE PHASE
TRANSFORMER FULL LOAD CURRENT IN AMPS
RATED LINE VOLTAGE

KVA	208	240	480
45	125	108	54
75	208	181	90.5
150	416	360	180
300	832	722	361
500	1388	1203	601
750	2082	1804	902
1000	2776	2406	1203
1500	4164	3608	1804
2500	6940	6014	3007

* USE 208V COLUMN TO DETERMINE CURRENT AVAILABLE AT 120V FROM NEUTRAL TO EACH LINE IN 120/208V 4 WIRE SYSTEM

* Class 320 meters will be installed to those highlighted Transformer size is the primary factor not the size of the service panel.
(example - a 25 KVA 1Ø transformer with a 400 Amp service panel should only have a Class 200 meter.

2S Socket to 12S Meter

Allows a form 12S network meter to be installed in a standard residential form 2S meter socket. The adapter provides a wire to attach to the neutral in the meter socket and adds a fifth jaw in the adapter for neutral connection to the meter.

The fifth terminal shall be installed horizontally in the nine o'clock position for proper fit.

Model: LP-5J4B-SP4437 Neutral Connection is 18" of #12 wire

Explanation:

If you have only 208 volt loads connected to a 120/208 Network circuit with a form 2S meter, it will meter the loads correctly.

If 120 volt loads are connected to a 120/208 Network service, a form 2S meter will not meter these correctly. The 120 volt loads are measured at 75%, which is a consistent error for these loads at unity power factor.

Thus, if you consider how the 120 volt loads are measured and want to measure combined 120 and 208 volt loads connected to a 120/208 Network service to a form 2S meter, it cannot and will not meter these correctly based upon the 75% error factor.

The overall accuracy of the combined load, with this metering error, is totally dependent on the load balance between the 120 V loads and 208 V loads.

Higher 208 V loads will increase the overall accuracy. Heavier 120 V loads will decrease the overall accuracy **(with the worst case being at a 75% accuracy)**.

Note: With all three load set-ups, a slight additional error will be added on an electromechanical meter where the meter voltage coil is energized at 208 V rather than at the rated 240 V.

Section 7 METER INSTALLATIONS (20.2(4) m)

7.1 Ownership

The Cooperative will furnish and maintain the meter which may include special provisions that enables certain functions to be performed from a remote location, including the disconnection or reconnection of service. The member-consumer will be required to provide and install the meter socket. The member-consumer will also be required to furnish and install the conductor, conduit, disconnect and all other required appurtenances.

On loads requiring current transformer metering (see Linn County REC's "Guide to Metering" for allowed applications), the Cooperative will provide the meter socket which must be installed by the member-consumer and the Cooperative will install the wiring, current transformers and primary bars, all of which will be charged to the member-consumer, in the member provided CT cabinet.

On loads serving mobile homes, the Mobile Home Park or the member-consumer will provide and own an approved meter pedestal with a disconnect, (see Linn County REC's "Guide to Metering"), and the Cooperative will install the meter at this pedestal. The Cooperative reserves the right to determine under what circumstances such equipment will be installed.

The Cooperative requires inspection and approval of member-consumer's wiring by the applicable state or local authorities, such inspection shall be completed and certificate of approval obtained before the Cooperative will render service.

7.1.1 Meter Location

The Cooperative will furnish a single meter at the point of connection to the member-consumer's premises at a location designated by the Cooperative. Any member-consumer requiring service at two or more separately metered points of connection to the Cooperative's distribution system shall be billed separately at each such metering point.

7.1.2 Meter Placement

The meter must be installed outside the building at a location designated by the Cooperative and must be accessible to Cooperative personnel without interference. The meter shall not be enclosed, be under or encircled by a deck or porch, or be over six feet off the ground. The unprotected, un-metered service entrance conductors shall not be enclosed (except where allowed by National Electrical Code) or be installed under or encircled by a porch or deck. If the member-consumer or agent alters the building or anything else that in any way

causes the meter to no longer be located outside the building, the member-consumer shall notify the Cooperative and pay all the costs of having the meter moved to a location outside the building.

7.1.3 Multi-occupancy Premises (20.3(1))

Each individual unit of multi-occupancy premises will be separately metered.

Exceptions:

- Electricity used in centralized heating, cooling, water heating, or ventilation.
- In a facility designated for elderly or handicapped persons where utility costs are not apportioned to individual tenants.
- Where sub-metering or resale of service was permitted prior to 1966.
- With the approval of the Iowa Utilities Board.
- Where impractical.

“Impractical” means: (1) where conditions or structural barriers exist in the multi-occupancy building that would make individual meters unsafe or physically impossible to install; (2) where the cost of providing individual metering exceeds the long-term benefits of individual metering; or (3) where the benefits of individual metering (reduced and controlled energy consumption) are more effectively accomplished through a master meter arrangement.

This provision shall not be construed to prohibit the Cooperative from requiring more extensive individual metering than otherwise required.

Master metering to multiple buildings is prohibited, except for multiple buildings owned by the same person or entity. Multi-occupancy premises within a multiple building complex may be master metered pursuant to this paragraph only if the requirements of Iowa Administrative Code 199--20.3(1) “b” have been met.

Specific Requirements
For specifics regarding Cooperative metering equipment and installation requirements contact the Cooperative.

7.2 Types of Meter Loop Installations

The following are a number of approved installations:

7.2.1 Self-Contained Metering

The member-consumer shall provide the necessary equipment for secondary metering.

7.2.2 Meter Loop Construction

It is a requirement of the Cooperative that on meter poles the meter loop be constructed of rigid conduit and a disconnect device installed following the meter.

7.2.3 Current Transformer Installation

The Cooperative will install the current transformers and required hardware, which will be charged to the member at its determination of need for secondary service.

7.3 Temporary Meter Loops (Construction Sites)

The Cooperative will hook up a temporary meter loop provided by the members electrician to provide electric service for construction until a permanent meter loop is installed; provided the need for temporary service does not exceed one year. The Cooperative may charge the member-consumer to provide the temporary service.

7.4 Primary Metering

The Cooperative will order and install primary metering, charging the member actual costs, where possible and when it is mutually advantageous to both parties to use this type of metering and reduce the kilowatt hour and demand consumption by five (5%) percent and the load warrants such metering in accord with good engineering design and practice.

7.5 Meter Seals

Visible seals will be placed by the Cooperative on all meters and meter enclosures and such seals shall not be broken or disturbed by anyone other than authorized representatives of the Cooperative. Tampering with seals or any wiring between the meter and the Cooperative's service wires by anyone other than authorized Cooperative representatives may be sufficient cause for discontinuance of service.

Single-phase meters display 5 items and have the label to the right side of the reading.

	Label	Item Displayed
1.	TOT KW h	+kWh (TOTAL)
2.	TA KW h	+kWh (ON PEAK)
3.	TC KW h	+kWh (OFF PEAK)
4.	TOT KW h	-kWh has a Negative Sign (–) in front of the reading (TOTAL GENERATION OR REVERSE kWh)
5.	HOPS	# of Hops – AMI Communications

1. +kWh (TOTAL)

2. +kWh (ON PEAK)

3. +kWh (OFF PEAK)

4. -kWh has a Negative Sign (–) in front

5. # of Hops – AMI Communications

Three-phase meters display 7 items. The numbers 1-6 are displayed in the upper left corner and the 7th display is the segment test, which light up all areas of the display for verification all segments are working.

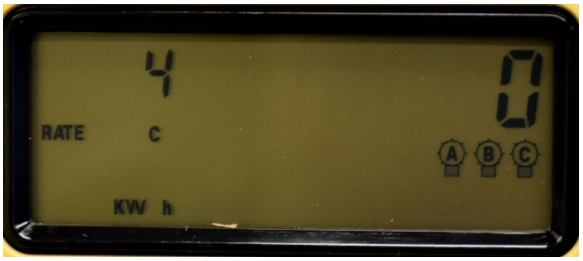
	Label	Item Displayed
1.	TOTAL KW h	+kWh (TOTAL)
2.	MAX KW	kW (15-minute Demand)
3.	Rate A KW h	+kWh (ON PEAK)
4.	Rate C KW h	+kWh (OFF PEAK)
5.	TOTAL KW h	-kWh (TOTAL GENERATION OR REVERSE kWh)
6.	HOPS	# of Hops – AMI Communications
7.	888 Segment Test	

1. +kWh (TOTAL)

2. kW (15-minute Demand)

3. +kWh (ON PEAK)

4. +kWh (OFF PEAK)



5. -kWh (TOTAL GENERATION OR REVERSE kWh)

6. # of Hops – AMI Communications

7. 888 Segment Test

Temporary Services

1. Single phase temporary meter loops will be provided by the members electrician for residential services.

2. Single phase commercial temporary meter loops will be provided by the members electrician and the installation of the temporary service, by Linn County REC, will be charged to the member.

3. Three phase temporary services must be feed from permanent three phase transformer.

4. Temporary meter loops must be in a location not to disrupt for the installation of the permanent service.

5. A temporary service will not be energized and a meter will not be installed if it is in the path of the permanent service, until it is relocated to an approved location by Linn County REC.

6. A temporary service will not be energized, and a meter will not be installed until an approved inspection has been received.

7. See Tariff - Section 7 Meter Installations included in this guide.

8. The 'Guide to Metering' and additional information can be found on the Linn County REC website https://www.linncountyrec.com/

Meter Sockets – Key Items

1. Only meter sockets listed in this guide are acceptable by Linn County REC.

2. Equipment installed, which has not been approved by Linn County REC will not be accepted, and the service will not be energized until corrected.

3. All sockets shall be inspected and approved by Linn County REC to ensure they meet our requirements.

4. Load side connections are on the bottom and line side connections are on the top in meter sockets. (this is opposite in CT cabinet connections)

5. All residential and commercial meter-sockets, including Heat Plus, shall be a ring-less type and have a **lever by-pass**.

6. For **Heat Plus** installations a 200 Amp socket w/by-pass must be used. Refer to Section 15 – heat Plus Metering.

7. On loads serving mobile homes, the Mobile Home Park or the member-consumer will provide and own an approved meter pedestal with a disconnect. See examples of Milbank on Approved List of Meter Sockets.

8. On 1Ø feed from a 120/208, 3Ø transformer the meter socket must be Form 12S.

9. A 400 Amp service, excluding those fed from a 480 Volt, will not be CT metered and require a 320 Amp socket.

10. On loads serving multi-plex units, such as apartment buildings, the gang sockets will be provided by the member-consumer. They must be ringless and if fed from a 120/208, 3Ø transformer it must be a Form 12S.

11. A meter will not be installed in a socket until an approved inspection has been received.

12. The meter socket is owned by the member and the maintenance of the meter socket is the members responsibility.

13. A Linn County REC meter seal will be installed on all sockets.

14. Primary Metering – See Tariff Section 7 Meter Installations

15. See Tariff Section 7 Meter Installations (included in this guide) for additional information.

16. The 'Guide to Metering' and additional information can be found on the Linn County REC website https://www.linncountyrec.com/

Linn County REC Required List of Meter Sockets

Service Type (Residential & Commercial)	Service Amps	Terminals	Form	VAC	Socket Amps	Voltage	Bypass	Cable Entry	UL Listed	Mfg.	Catalog Number
*Only Mobile Home Park Ped (1 Service)	100/200	4	2S	240	200	120/240	Lever	URD	yes	Milbank	U5701-O-200S
											U6221-O-200-10GR
*Only Mobile Home Park Ped (2 Services)	100/200	4	2S	240	200	120/240	Lever	URD	yes	Milbank	U5702-O-200S
Single Phase (including Heat Plus)	100/200	4	2S	600	200	120/240	Lever	OH or URD	yes	Milbank	U6513-XL-BL-ALT
								URD	***Alternative		U4721-O-BL-ALT
Single Phase w/ 200 Amp Main and 8 Circuits (Phone Amps, Farm & Trailer Peds, etc.)	200	4	2S	240	200	120/240	Lever	OH or URD	yes	Milbank	U5871-XL-200
									***Alternative 1		U6281-XL-200
									***Alternative 2		U3995-XL-200
									yes	Leviton	LP820-LMC
Single Phase 320	>200	4	2S (320)	600	320	120/240	Lever	OH or URD	yes	Milbank	U2448-X
								URD	***Alternative		U3000-O-K3L-K2L-ALT
Single Phase 320 w/ 2 - 200 Amp Mains	>200	4	2S (320)	600	320	120/240	Lever	OH or URD	yes	Milbank	U5059-X-2/200-K3L
									***Alternative		U6585
**Single Phase (CT Cabinet Required)	>400	6	4S	600	20	120/240	Test Sw.	OH or URD	yes	Milbank	UC7478-RL-361
Three Phase	200	7	16S	600	200	120/208/240	Lever	OH or URD	yes	Milbank	U9701-RXL
									***Alternative 1		U8606-RXL-CECHA
								URD	Alternative 2		U4910-O-BL-ALT
Three Phase 320	>200	7	16S (320)	600	320	120/208/240	Lever	OH or URD	yes	Milbank	U4911-X-QG-BL-AMS
									***Alternative		U2594-X-K7-ALT
**Three Phase (CT Cabinet Required)	>400	13	9S	600	20	120/208/240	Test Sw.	OH or URD	yes	Milbank	UC7445-XL-2031

* Recommended

** Provided by Linn County REC (included with the 1Ø and 3Ø CT Metering Packages on the Green Sheet section 14.

*** Alternative only if the other is not available

For **unique** applications not listed contact Linn County REC for socket approval.

MAP LOCATION		Work Order	
Billing Name			
Billing Address			
Billing City			
Billing State		SERVICE ADDRESS	
Billing Zip		Comments	

LCREC Item #	Materials (tax)		Credit 415.1			Amount	Labor Marion 2 NLOP 25
59102510	1Ø Standard URD/OH Socket (includes Heat+)	2S	U6513	Qty		$175.00	$0.00
94570201	1Ø w/200 Amp Main and 8 Circuits	2S	U5871	Qty.		$400.00	$0.00
59102848	1Ø Class 320 meter socket	2S	U2448	Qty.		$300.00	$0.00
94570320	1Ø Class 320 w/2 - 200 Amp Mains	2S	U5059	Qty.		$750.00	$0.00
59101932	1Ø CT 7-Term Socket (includes CT's & Bar Kit)	4S	UC7478	Qty.		$550.00	$0.00
59102640	3Ø Standard URD/OH Socket	16S	U9701	Qty.		$250.00	$0.00
59101270	3Ø CT 13-Term **208/240** (includes CT's & Bars)	9S	UC7445	Qty.		$775.00	$0.00
59101270	3Ø CT 13- Term **480** (includes CT's, VT & Bars)	9S	UC7445	Qty.		$1,300.00	$0.00
44401220	Secondary Pedestal		PRMC-150	Qty.		$140.00	$0.00
						$	$0.00

LCREC Item #	Materials/labor with work order (NO TAX)	Credit 107.2			Amount	
39071832	Pole, Metal Satin Aluminum		Qty.		$725.00	$ -
39073180	Pole, Galvanized 35' w/8'arm		Qty.		$1,450.00	$ -
39071831	Pole, Metal Black Aluminum		Qty.		$850.00	$ -
48063005	Pole, Wood, 30' class 5		Qty.		$260.00	$ -
48063505	Pole, Wood, 35' class 5		Qty.		$275.00	$ -
39002510	Arm, Light 2'		Qty.		$25.00	$ -
39080832	Arm, Light 8'		Qty.		$150.00	$ -
39081232	Arm, Light 12'		Qty.		$360.00	$ -
39062213	Light - LED Black Carriage		Qty.		$200.00	$ -
39062214	Light - LED Grey Round Top		Qty.		$250.00	$ -
	Pole install charge		Qty.		$350.00	$ -
	Additional Pole install charge		Qty.		$100.00	$ -
	Pole attachment fee		Qty.		$125.00	$ -
CIAC			Qty.			$ -
			Qty.			$ -
			Qty.			$ -
					$	$0.00

	OH materials/labor - no work order (no tax)	Credit 583			Amount
	Installation costs, service orders		Qty.	Cost	Total
					$0.00

	UG materials/labor - no work order (no tax)	Credit 584			Amount
	Installation costs, service orders		Qty.	Cost	Total
					$0.00

LCREC Item #	Special	Credit 415.1			
	Meter Treater Primary Surge Suppressor (tax)		Qty.	$120.00	$0.00
	Labor: Installation of Meter Treater (credit 583)		Qty.	$75.00	$0.00
					$0.00

	Subdivisions (no tax)		252.0		Amount
		Qty.		Price per foot	Total
	Footage			$10.13	$0.00

TAXES				
State	6%	credit 237.00		$0.00
Option	1%	credit 237.02		$0.00
		Total Tax Amount		**$0.00**
			TOTAL	$0.00

rev. 11/20 ***Current pricing is kept in the MR part of NISC.***

All new and existing services require the U5871-XL-200 for the Main Meter.
The existing socket must be replaced.

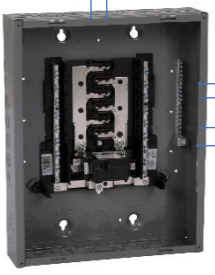
U5871-XL-200 (Single Phase w/ 200 Amp Main and 8 Circuits) or
U5059-X-2/200-K3L (Single Phase 320 w/ 2 - 200 Amp Mains)

U6513-XL-BL-ALT (200 Amp Heat+ Socket

ex. 1 - Electric Heat

ex. 2 - Heat Pump

Members Main Panel



Members Secondary Panel
for Qualified Heat+ Units

*Electric/Heat Pump Water Heater
MUST be in Main Panel

All wiring must meet current NES Code and Electrical Inspections

CT Cabinets – Key Items

1. Only CT cabinets listed in this guide are acceptable by Linn County REC and will be provided by the member.

2. 1Ø and 3Ø, 250V, 400 Amp or less will not be allowed.

3. 1Ø, 600 Volt CT metering will not be allowed.

4. Equipment installed, which has not been approved by Linn County REC will not be accepted, and the service will not be energized until corrected.

5. CT cabinets shall be inspected and approved by Linn County REC to ensure they meet our requirements. Those listed are already approved.

6. Load side connections are on the top and line side connections are on the bottom in CT Cabinets. (this is opposite in Meter Socket connections)

7. All cabinets shall carry a NEMA 3R rating.

8. The location of the CT cabinet is recommended to be on the same pad as the transformer for 3Ø applications.

9. All CT cabinets will be within 100' of the transformer at a location agreed upon between Linn County REC and the members electrician.

10. CT's and Primary Bar Kits will be provided and installed by Linn County REC and charged to the member.

11. A Linn County REC padlock will be installed on all CT Cabinets.

12. See Tariff - Section 7 Meter Installations (included in this guide) for additional information.

13. The 'Guide to Metering' and additional information can be found on the Linn County REC website https://www.linncountyrec.com/

CT Metering Allowed Applications

SINGLE PHASE
TRANSFORMER FULL LOAD CURRENT IN AMPS
RATED LINE VOLTAGE

KVA	240
1	4.2
10	41.6
15	62.5
25	104
37.5	156
50	208
75	312
100	416
167	696

THREE PHASE
TRANSFORMER FULL LOAD CURRENT IN AMPS
RATED LINE VOLTAGE

KVA	208	240	480
45	125	108	not allowed
75	208	181	not allowed
150	416	360	not allowed
300	832	722	361
500	1388	1203	601
750	2082	1804	902
1000	2776	2406	1203
1500	4164	3608	1804
2500	6940	6014	3007

* USE 208V COLUMN TO DETERMINE CURRENT AVAILABLE AT 120V FROM NEUTRAL TO EACH LINE IN 120/208V 4 WIRE SYSTEM

* CT metering will be allowed for those highlighted or 600 Amp or greater services.

Linn County REC Approved List of CT Cabinets for 1Ø 250V

Service Type (Residential & Commercial)	Service Amps	Mount (wall or pad)	Cable Entry: Top In / Bottom Out	Cable Entry: Bottom In/Out	Cable Entry: Bottom In / Top Out	Amps	Voltage	Phase	Dimensions: H"	Dimensions: W"	Dimensions: D"	Manufacturer	Catalog Number	Local Distributors
Single Phase 250V	600	Wall			X	600	250	1	48	25	15	Milbank	ALIM-613	Crescent, Terry-Durin
		Wall		X		600	250	1	48	36	15	Milbank	ALIM-613UGBX	Crescent, Terry-Durin
		Wall	X	X	X	600	250	1	48	36	16	AMP	ALICT6-3B	3E
		Wall		X	X	600	250	1	48	36	15	Galva-Closure	ALI-613UGBX	Van Meter
	600	Pad		X		600	250	1	58	25	15	Milbank	ALIM-613PM	Crescent, Terry-Durin
		Pad	X	X	X	600	250	1	60	36	15	AMP	ALIPCT6-3	3E
		Pad		X	X	600	250	1	58	36	15	Galva-Closure	ALI-613PM	Van Meter

This is the only single phase application that CT Metering is allowed including no single phase 600V applications

Linn County REC Approved List of CT Cabinets for 3Ø 250V

Service Type (Residential & Commercial)	Service Amps	Mount (wall or pad)	Cable Entry: Top In / Bottom Out	Cable Entry: Bottom In/Out	Cable Entry: Bottom In / Top Out	Amps	Voltage	Phase	Dimensions: H"	Dimensions: W"	Dimensions: D"	Manufacturer	Catalog Number	Local Distributor
Three Phase 250V	600	Wall			X	600	250	3	48	25	15	Milbank	ALIM-634	Crescent, Terry-Durin
		Wall		X		600	250	3	48	36	15	Milbank	ALIM-634UGBX	Crescent, Terry-Durin
		Wall	X	X	X	600	250	3	48	36	15	AMP	ALICT6-4B	3E
		Wall		X	X	600	250	3	48	36	15	Galva-Closure	ALI-634UGBX	Van Meter
	600	Pad		X		600	250	3	58	36	15	Milbank	ALI-634PM	Crescent, Terry-Durin
		Pad	X	X	X	600	250	3	60	36	15	AMP	ALIPCT6-4	3E
		Pad		X	X	600	250	3	58	36	15	Galva-Closure	ALI-634PM	Van Meter
	800	Wall			X	800	250	3	48	25	15	Milbank	ALIM-834	Crescent, Terry-Durin
		Wall		X		800	250	3	48	36	15	Milbank	ALIM-834UGBX	Crescent, Terry-Durin
		Wall	X	X	X	800	250	3	48	36	15	AMP	ALICT8-4B	3E
		Wall		X	X	800	250	3	48	36	15	Galva-Closure	ALI-834UGBX	Van Meter
	800			X		800	250	3	58	36	15	Milbank	ALIM-834PM	Crescent, Terry-Durin
		Pad	X	X	X	800	250	3	60	36	15	AMP	ALIPCT8-4	3E
		Pad		X	X	800	250	3	58	36	15	Galva-Closure	ALI-834PM	Van Meter

1200 Amp and greater applications will NOT be Wall Mounted

For unique applications not listed contact Linn County REC for cabinet approval

Continued on next page

Linn County REC Approved List of CT Cabinets for 3Ø 250V

Service Type (Residential & Commercial)	Service Amps	Mount (wall or pad)	Cable Entry			Amps	Voltage	Phase	Dimensions			Manufacturer	Catalog Number	Local Distributor
			Top In / Bottom Out	Bottom In/Out	Bottom In / Top Out				H"	W"	D"			
Three Phase 250V	1200	Pad		X		1200	250	3	64	45	15	Milbank	ALIM-1234PM	Crescent, Terry-Durin
		Pad	X	X	X	1200	250	3	60	48	15	AMP	ALIPCT12-4	3E
		Pad		X	X	1200	250	3	64	46	15	Galva-Closure	ALI-1234PM	Van Meter
	1600	Pad		X		1600	250	3	66	54	15	Milbank	ALIM-1634PM	Crescent, Terry-Durin
		Pad	X	X	X	1600	250	3	72	54	21	AMP	ALIPCT16-4	3E
		Pad		X	X	1600	250	3	72	54	15	Galva-Closure	ALI-1634PM	Van Meter
	2000	Pad		X		2000	250	3	66	54	15	Milbank	ALIM-2034PM	Crescent, Terry-Durin
		Pad	X	X	X	2000	250	3	72	54	21	AMP	ALIPCT20-4	3E
		Pad		X	X	2000	250	3	72	54	15	Galva-Closure	ALI-2034PM	Van Meter
	2500	Pad		X		2500	250	3	72	50	21	Milbank	ALIM-2534PM	Crescent, Terry-Durin
		Pad	X	X	X	2500	250	3	72	54	21	AMP	ALIPCT25-4	3E
		Pad		X	X	2500	250	3	72	50	21	Galva-Closure	ALI-2534PM	Van Meter
	3000	Pad		X		3000	250	3	72	50	21	Milbank	ALIM-3034PM	Crescent, Terry-Durin
		Pad	X	X	X	3000	250	3	72	54	21	AMP	ALIPCT30-4	3E
		Pad		X	X	3000	250	3	72	15	21	Galva-Closure	ALI-3034PM	Van Meter

For unique applications not listed contact Linn County REC for cabinet approval

Continued on next page

Linn County REC Approved List of CT Cabinets for 3Ø 600V

Service Type (Residential & Commercial)	Service Amps	Mount (wall or pad)	Cable Entry			Amps	Voltage	Phase	Dimensions			Manufacturer	Catalog Number	Local Distributors
			Top In / Bottom Out	Bottom In/Out	Bottom In / Top Out				H"	W"	D"			
Three Phase 600V	400	Wall			X	400	600	3	48	36	15	Milbank	ALIM-464	Crescent, Terry-Durin
		Wall		X		400	600	3	48	36	15	Milbank	ALIM-464UGBX	Crescent, Terry-Durin
		Wall	X	X	X	400	600	3	60	36	15	AMP	ALICT4-4PT	3E
		Wall		X	X	400	600	3	48	36	15	Galva-Closure	ALI-464UGBX	Van Meter
	400	Pad		X		400	600	3	58	36	15	Milbank	ALIM-464PM	Crescent, Terry-Durin
		Pad		X		400	600	3	60	36	15	AMP	ALIPCT4-4PT	3E
		Pad		X	X	400	600	3	58	36	15	Galva-Closure	ALI-464PM	Van Meter
	600	Wall			X	600	600	3	48	36	15	Milbank	ALIM-664	Crescent, Terry-Durin
		Wall		X		600	600	3	48	36	15	Milbank	ALIM-664UGBX	Crescent, Terry-Durin
		Wall	X	X	X	600	600	3	48	36	15	AMP	ALICT6-4PT	3E
		Wall		X	X	600	600	3	48	36	15	Galva-Closure	ALI-664UGBX	Van Meter
	600	Pad		X		600	600	3	58	36	15	Milbank	ALIM-664PM	Crescent, Terry-Durin
		Pad		X		600	600	3	60	36	15	AMP	ALIPCT6-4PT	3E
		Pad		X	X	600	600	3	58	36	15	Galva-Closure	ALI-664PM	Van Meter
	800	Wall			X	800	600	3	48	36	15	Milbank	ALIM-864	Crescent, Terry-Durin
		Wall		X		800	600	3	48	36	15	Milbank	ALIM864UGBX	Crescent, Terry-Durin
		Wall	X	X	X	800	600	3	48	36	15	AMP	ALICT8-4PT	3E
		Wall		X	X	800	600	3	48	36	15	Galva-Closure	ALI-864UGBX	Van Meter
	800	Pad		X		800	600	3	58	36	15	Milbank	ALIM-864PM	Crescent, Terry-Durin
		Pad		X		800	600	3	60	36	15	AMP	ALIPCT8-4PT	3E
		Pad		X	X	800	600	3	58	36	15	Galva-Closure	ALI-864PM	Van Meter

*****1200 Amp and greater applications will NOT be Wall Mounted*****

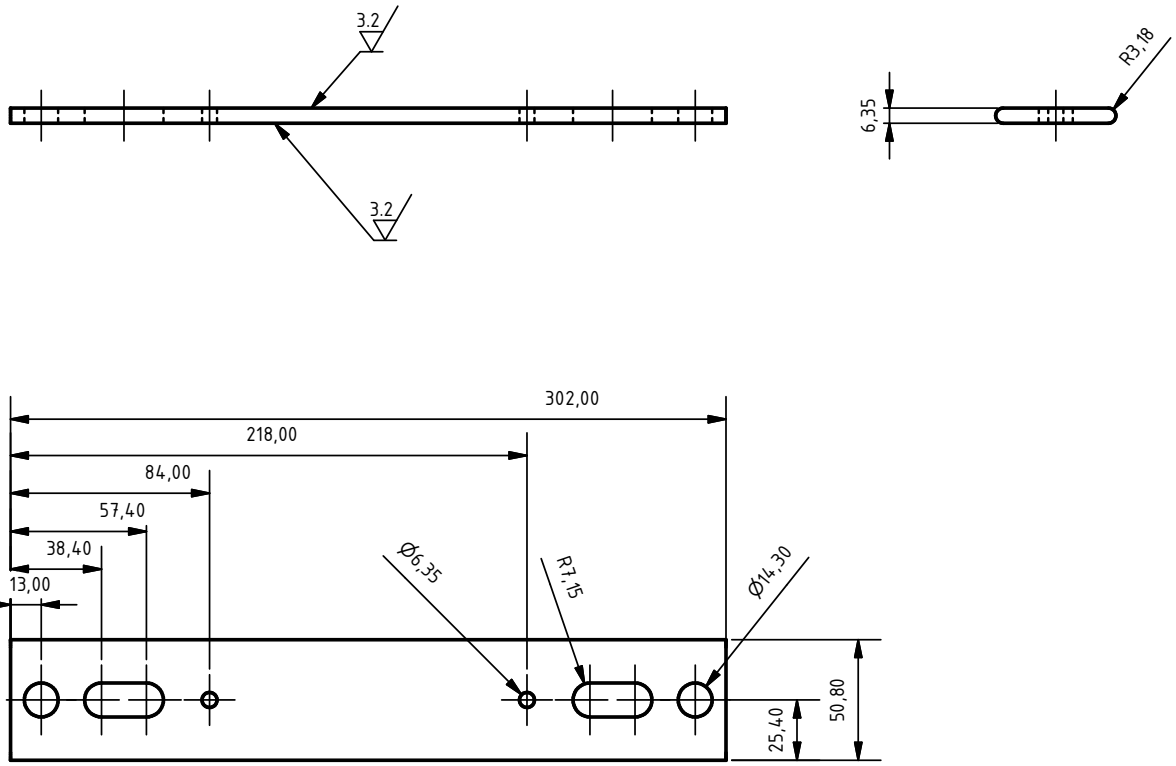
For unique applications not listed contact Linn County REC for cabinet approval

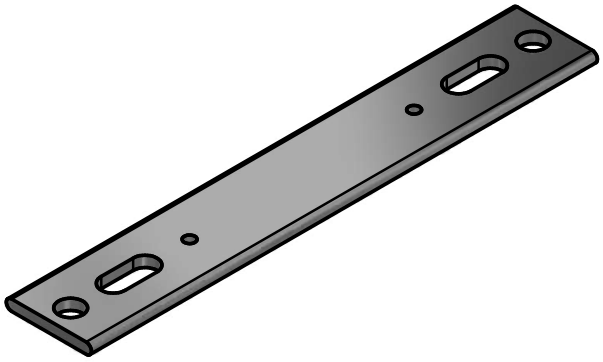
Continued on next page

Linn County REC Approved List of CT Cabinets for 3Ø 600V

Service Type (Residential & Commercial)	Service Amps	Mount (wall or pad)	Cable Entry			Amps	Voltage	Phase	Dimensions			Manufacturer	Catalog Number	Local Distributor
			Top In / Bottom Out	Bottom In/Out	Bottom In / Top Out				H"	W"	D"			
Three Phase 600V	1200	Pad		X		1200	600	3	58	54	15	Milbank	ALIM-1264PM	Crescent, Terry-Durin
		Pad		X		1200	600	3	60	48	15	AMP	ALIPCT12-4PT	3E
		Pad		X	X	1200	600	3	58	54	15	Galva-Closure	ALI-1264PM	Van Meter
	1600	Pad		X		1600	600	3	66	60	15	Milbank	ALIM-1664PM	Crescent, Terry-Durin
		Pad		X		1600	600	3	72	54	21	AMP	ALIPCT16-4PT	3E
		Pad		X	X	1600	600	3	72	60	15	Galva-Closure	ALI-1664PM	Van Meter
	2000	Pad		X		2000	600	3	66	60	15	Milbank	ALIM-2064PM	Crescent, Terry-Durin
		Pad		X		2000	600	3	72	54	21	AMP	ALIPCT20-4PT	3E
		Pad		X	X	2000	600	3	72	60	15	Galva-Closure	ALI-2064PM	Van Meter
	2500	Pad		X		2500	600	3	72	60	21	Milbank	ALIM-2564PM	Crescent, Terry-Durin
		Pad		X		2500	600	3	72	54	21	AMP	ALIPCT25-4PT	3E
		Pad		X	X	2500	600	3	72	60	21	Galva-Closure	ALI-2564PM	Van Meter
	3000	Pad		X		3000	600	3	72	60	21	Milbank	ALIM-3064PM	Crescent, Terry-Durin
		Pad		X		3000	600	3	72	54	21	AMP	ALIPCT30-4PT	3E
		Pad		X	X	3000	600	3	72	60	21	Galva-Closure	ALI-3064PM	Van Meter

For unique applications not listed contact Linn County REC for cabinet approval





Zul. Abweichung für untol. Maße General tolerances (mm) for dimensions w/o individual tolerances acc.							DIN ISO 2768-1 m DIN ISO 2768-1 m
> 0.5 ...3	> 3 ...6	> 6 ...30	> 30 ...120	> 120 ...400	> 400 ...1000	> 1000 ...2000	> 2000
± 0.1	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2

Geringe Maß- und Konstruktionsabweichungen vorbehalten!
Small deviations in dimension and design possible!

Werkstoff/Abmessung material/dimension	Oberfläche/surface	Urheberschutz nach DIN ISO 16016 copyright acc. to DIN ISO 16016	Maßstab/scale bei / ref. to DIN A4	1:3	Gewicht/weight	N/A
Copper Bright Tin Plating			Bemerkungen/comment			

				Maße in mm / All dimensions in mm		
					Datum/date	Name/name
	900A MAX			Bear. drawn	5/7/2014	CK
				Gepr. checked		

Index	Änderung revision	Datum date	Name name
04	dia/tol. change	01.14.19	CB
03	Added Tin plating	11.02.15	CB

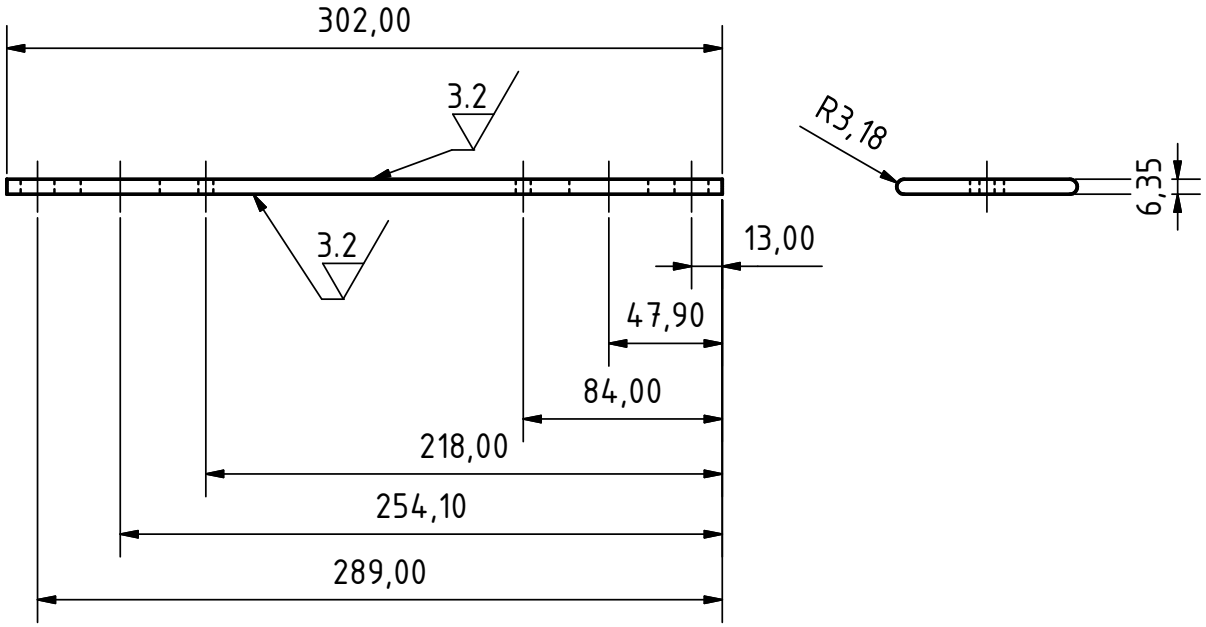
RITZ
Instrument Transformers

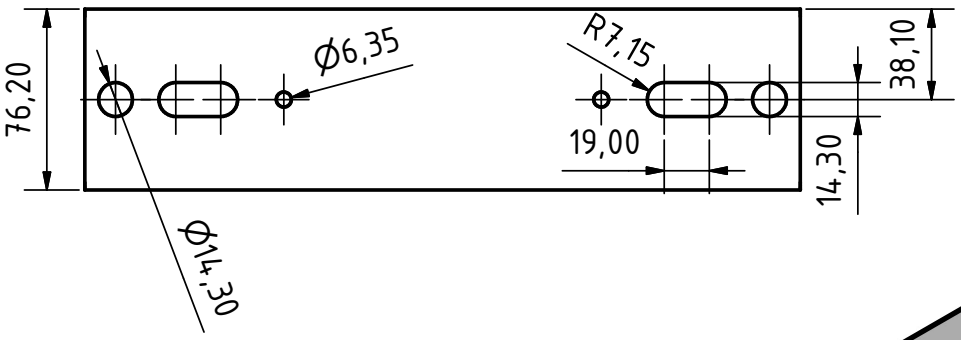
Benennung/designation

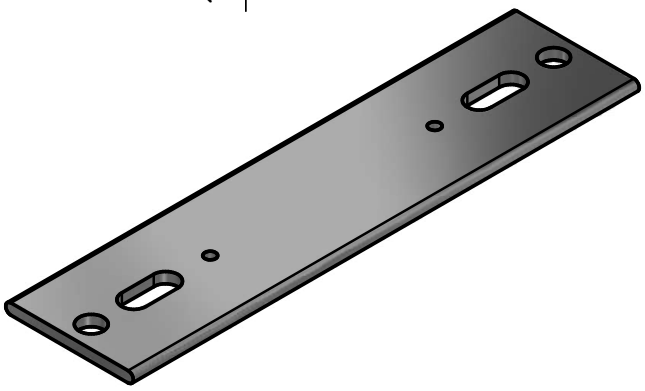
DCCB Bus Bar

Zeichnungsnummer/drawing number	Index
9.08.13.860.611	04

Dateiname data file name	9.08.13.860.611.03.idw	(Ers.f.)/(sub.for)	Blatt / page 1	von / of 1







Zul. Abweichung für untol. Maße General tolerances (mm) for dimensions w/o individual tolerances acc.							DIN ISO 2768-1 m DIN ISO 2768-1 m
> 0.5 ...3	> 3 ...6	> 6 ...30	> 30 ...120	> 120 ...400	> 400 ...1000	> 1000 ...2000	> 2000
± 0.1	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2

Geringe Maß- und Konstruktionsabweichungen vorbehalten!
Small deviations in dimension and design possible!

Werkstoff/Abmessung material/dimension: Tin platted Copper (Bright Tin)

Oberfläche/surface:

Urheberschutz nach DIN ISO 16016 copyright acc. to DIN ISO 16016

Maßstab/scale bei / ref. to DIN A4: 1:3

Gewicht/weight: N/A

Bemerkungen/comment:

Maße in mm / All dimensions in mm

Index	Änderung revision	Datum date	Name name
	1200A Max		
05	Hole Dia Revised	01/28/19	CB
04	Tolerance Mod.	11/4/14	CB
03			
02			
01	Added Dimensions	10/30/14	

	Datum/date	Name/name
Bear. drawn	5/7/2014	CK
Gepr. checked		

RITZ Instrument Transformers

Dateiname data file name: 9.08.13.860.612.04.idw

Benennung/designation:

DCCB Bus Bar

Zeichnungsnummer/drawing number: 9.08.13.860.612

Index: 05

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Current Transformers

Purpose

Current transformers are always connected in series with the circuit being measured. A current transformer (CT) has two purposes. First, to reduce the current in the circuit being measured to a lower value. Second, to isolate the meter from high voltages. You might ask, "How could a CT isolate the meter from high voltages"? Suppose you need to meter a 7,200-volt circuit. The current being measured may be less than 200 amps, which could normally be handled with a self-contained meter. However, there is no way to bring the current flow through the meter's current coil without bringing 7,200 volts with it. Therefore, a CT is used to keep the high voltage out of the meter socket even though the current does not actually need to be reduced. If voltage transformers are used to reduce metering voltage, CT's will be required to prevent the high voltage from entering the meter socket no matter what the current levels will be. Voltage for potential coils in the meter should always be picked up on the H1 side of the CT. This prevents the CT from registering the energy used by potential coils in the meter as energy used by the customer.

Stated once again, current transformers have two purposes, to reduce the current in the circuit being measured to a lower value and frequently to keep high voltage out of the meter socket.

Caution: The secondary circuit of a current transformer should never be opened when a load is passing through it's primary!

(See shorting bars, self-shorting devices, and test switches).

Ratio

The ratio of a current transformer refers to the turns ratio of the windings. For example, a

200/5 transformation is equivalent to a 40 to 1 ratio. (200 divided by 5 is 40). The secondary of a CT is always stated to be 5 amps at the rated primary winding current.

Transformer Factor

A current transformer with a 200/5 ratio is said to have a transformer factor (TF) of 40. Knowledge of the TF is required when calculating the dial multiplier.

Rating Factor

Current transformers may be overloaded without a loss of accuracy. This overload rating is known as the rating factor (RF). **When sizing CT's, you should normally use the lowest ratio available while utilizing the RF rating of the CT.** Appropriately sized CT's should always produce from .25 amps (light load) up to the class rating of the instrument meter they are working with which is usually 10 or 20 amps. For example, assume you are going to meter a load that may occasionally reach 1200 amps. However, the load may also be as little as 40 amps. By utilizing a 400/5 CT with an RF of 3.0, the CT can easily handle 1200 amps with no loss of accuracy while sending 15 amps to the meter. When the load drops to 40 amps, the CT will still be sending ½ (.5) amps to the meter. It should be noted that since the CT will produce up to 15 amps, a class 20 meter will be required for this application. If a 1200/5 CT had been used for this application, the CT would only produce .17 amps when the 40 amp

load was present. This is below the light load test amp rating for instrument meters and may cause a loss of accuracy.

Many CT's have a RF rating at 30 degrees Celsius (86° F) and a lesser rating at 55 degrees Celsius (131° F). For example, a 400/5 CT may have a RF rating of 4.0 at 30° C and 3.0 at 55° C. If the CT will be heavily loaded on a hot day or if the CT is in a metal enclosure with little air circulation, the lower rating should be used.

Type

Several variations of current transformers exist. However, there are actually three basic types, window, bar, and wound. Window and bar type CT's are normally used to meter circuits of 600 volts and less. The wound type is used for high voltage circuits in excess of 600 volts.

When using the window type current transformer the customer's secondary is passed through the window of the CT. This conductor is considered to be the primary turn of the CT. Often it is necessary to take more than one turn through the window. Generally speaking, each additional turn reduces the ratio. For example, two turns through a 400/5 CT makes it equivalent to a 200/5 ratio. To calculate the ratio when multiple turns are present, divide the ratio as usual and then divide your answer by the total number of turns. For example, if you have two turns through the window of a 400/5 CT, divide 400 by 5, which is 80. Then divide 80 by the 2 turns, and you get 40, which is the transformer factor.

Often, bar type CT's are just window CT's with a solid bar installed. Connectors on each end of the bars also allow easy access for picking up voltage for the potential coils in the meter. Some bar type CT's are designed with a removable bar, which allows the CT to be converted to a window type.

Wound type CT's are more commonly found in high voltage circuits. Although multiple turns are not possible because of the fixed primary winding, multi-ratio CT's are available. Although these wound type CT's are larger because of the additional insulation, the same principles apply as stated for window and bar type CT's.

Polarity

A meter stator contains a potential coil and one or more current coils. These coils provide both voltage and current signals to the meter. The stator must be able to compare these two signals at any moment in time. Therefore, to establish forward rotation of the meter disk, polarity marks on instrument transformers must be observed. Incorrect polarity connections will result in reverse rotation of the meter disk. All instrument transformers are wound subtractive. This simply means that H1 and X1 polarity marks are physically located directly across from one another. (Additive power transformers have H1 and X1 bushings located diagonally across from one another).

Accuracy

Simply stated, current transformers should be rated for plus or minus .3% (3 tenths of one percent) accuracy when used for metering.

Burden Rating

The burden on a current transformer is the ohm value in the secondary circuit, which passes through the current coil in the meter. The wiring from the CT to the meter is also part of the connected burden.

Wire size and clean tight connections are critical. As a general rule, if the meter is within 30 feet of the CT, number 12 copper wire may be used. Distances greater than 30 feet require number 10 copper wire or larger.

The thermal burden rating usually coincides with the primary rating factor (RF). Exceeding this rating will shorten the life of the CT and may cause a loss of accuracy.

Shorting Bars, Self-Shorting Devices, and Test Switches

Current transformers are designed to have their X1 secondary lug connected to the top of the meter's current coil. The X2 secondary lug is normally connected to the bottom of the same current coil. When load is passing through the primary of the CT and the secondary is connected properly, very little voltage is present in the secondary circuit. These connections to the current coil in the meter provide a short circuit, which is appropriate for normal operation.

If current is passing through the primary of a CT, and the secondary circuit is not connected to the current coil, a very high and dangerous voltage will be present. The CT becomes a voltage step-up transformer under this condition. Therefore, it is important to always short the X1 and X2 terminals to each other before breaking the circuit. **Shorting bars** are permanently installed on most CT's for this purpose. Simply stated, if you need to rewire a metering installation or change the meter while maintaining service to the customer, the shorting bar may be closed from X1 to X2 to prevent dangerous voltage buildup. (Shorting bars that are inadvertently left closed will cause a loss of revenue)!

An alternative (although a poor one) for using the shorting bar when changing a meter, is the meter socket with **self-shorting devices**. A self-shorting device in a meter socket is supposed to bypass the current coils in the meter as the meter is being removed from the socket. This action is designed to maintain continuity in the CT secondary circuit and therefore prevent dangerous high voltage buildup. Never trust these devices! They are spring loaded and may hang-up due to dirt, cob webs, etc… In addition, these self-shorting mechanisms may get damaged over time and cause partial shorting of the CT which will result in a loss of revenue.

Instrument-rated meter sockets with **test switches** provide an excellent method of shorting CT circuits as well as disconnecting voltage sources to the potential coils in the meter. By utilizing these test switches, meters may be changed safely and efficiently. Test switches also provide an opportunity to energize individual stators in the meter. This is important when verifying that an instrument-rated metering installation has been wired correctly. Color coded test switch handles may be ordered to match the utilities wiring color code. This enhancement simplifies wiring of the meter socket.

As a final note, CT's are not like capacitors. They do not hold a charge. However, they are very dangerous when a load is passing through their primary and the secondary circuit is open.

Never open the secondary of a CT while load is passing through the CT's primary!

COM-6 600V Metering CT

Applications

600V Metering current transformers are used in a wide variety of commercial and industrial applications where revenue class metering is necessary for billing purposes. The COM-6 is specifically engineered for pole-mounted applications and wall-mounted meter cabinets.

High Accuracy, Extended Range

The Alta Series high accuracy, extended range current transformers exceed the IEEE 0.15S accuracy standard. These CTs meet or exceed every 600V metering class CT in the industry with metering class 0.15 from 1% of nominal current through rating factor. The COM-6 is also available in standard accuracy.

Construction

The core is constructed from wound layers of high accuracy, low loss electrical grade steel. The core is evenly wound with enamel coated copper wire to ensure against potential short circuits. The core and coil assembly is encapsulated in polyurethane specifically engineered for premium dielectric, mechanical and thermal properties.

Test Reports

Each COM-6 has a unique serial number which allows the customer to track each test record. Certified test reports are stored electronically and provided with every shipment.

Specifications

Insulation: 600V, 10kV BIL
Frequency: 60 Hz
Environment: Indoor/outdoor
Standards: IEEE C57.13 (others upon request)
RUS: The COM-6 is RUS Listed

Cross Reference

ABB AccuRange CMF-S; GE ITI RevenueSense JAK-0S; Ritz DCCW/B

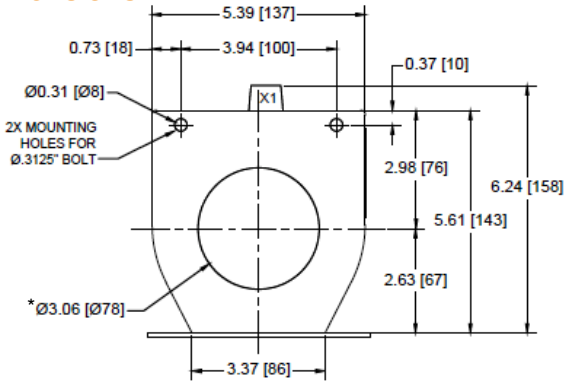
The Peak Demand™ Advantage

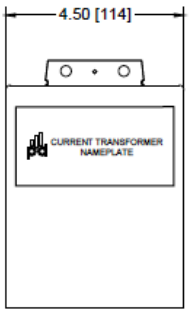
- Current transformer accuracy exceeds the IEEE C57.13-2016 0.15S class
- Accuracy class is 0.15 from 1% of nominal current through rating factor
- Stocking available for just in time delivery
- 90% of orders ship within 24 hours
- Designed and engineered to meet customer specifications
- Fast turn-around time for custom quotations
- Friendly team of industry veterans with decades of experience serving OEM customers

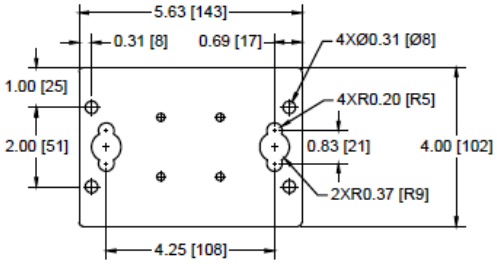
PEAK DEMAND INC.
www.peakdemand.com
1.844.PEAK.247 | 1.844.732.5247
605 Tarboro Street Annex SW Wilson, NC 27893 USA

peakdemand™ utility products

Dimensions

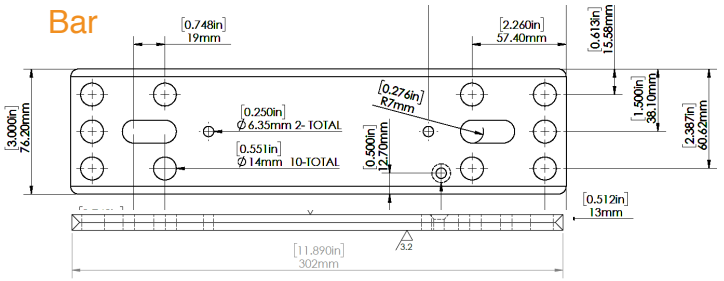






* Diameter = 2.6" [66mm] on COM0100SBN and COM0200SBN

Bar



Also available in a long bar with 13.5in between centers of outside holes

Metric dimensions displayed in [mm]

Product Number	Primary Rating	IEEE Metering Accuracy	Rating Factor	
Alta Series High Accuracy	Primary Rating	IEEE Metering Accuracy	30° C	55° C
COM0500ABN	500A	0.15SB-0.2	2.0	1.5
COM0500ABN-X	500A	0.15SB-0.1	3.0	2.2
COM0500ABN-H	500A	0.15SB-0.2	4.0	3.0
COM0600ABN	600A	0.15SB-0.5	2.0	1.5
COM0600ABN-X	600A	0.15SB-0.2	3.0	2.0
COM1000ABN	1000A	0.15SB-0.5	2.0	1.5
Standard Accuracy	Primary Rating	IEEE Metering Accuracy	30° C	55° C
COM0100SBN	100A	0.3B-0.1	4.0	3.0
COM0200SBN	200A	0.3B-0.5	4.0	3.0
COM0400SBN	400A	0.3B-0.5	4.0	3.0
COM0500SBN	500A	0.3B-0.5	3.0	2.2
COM0600SBN	600A	0.3B-0.5	2.0	1.5
COM0800SBN	800A	0.3B-0.5	2.0	1.5
COM1000SBN	1000A	0.3B-0.5	2.0	1.5
COM1200SBN	1200A	0.3B-1.8	1.5	1.2

Notes

Alta Series units exceed the 0.15S class.
Accurate to 1% of nominal current.
Approximate weight 8-12 lbs.
Other ratios available upon request.

Key to Selection Guide

COM 0600 X X X

- Primary Bar (B = Bar, N = No Bar)
- Base Plate (N = None, B = Low, H= High)
- Accuracy (A = High, S = Standard)
- Primary Current

Document: 1COM190219

Low-Voltage Extended-Range Current Transformers (ERCTs)

Overview

Ritz has long been regarded as the industry leader in providing cutting-edge metering accuracy performance for instrument transformers. In the 1990's, Ritz introduced the Medium-Voltage Extended-Range Current Transformer (MV ERCT). This technology is now available in the Ritz Low-Voltage CT offering for utility metering applications.

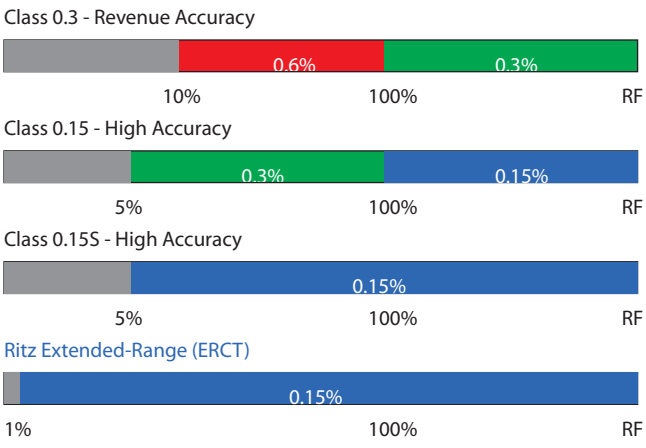
The Ritz ERCT design offers 0.15% accuracy performance from 1% nominal current up to the rating factor. This performance surpasses all of the metering accuracy classes defined under IEEE and CSA.

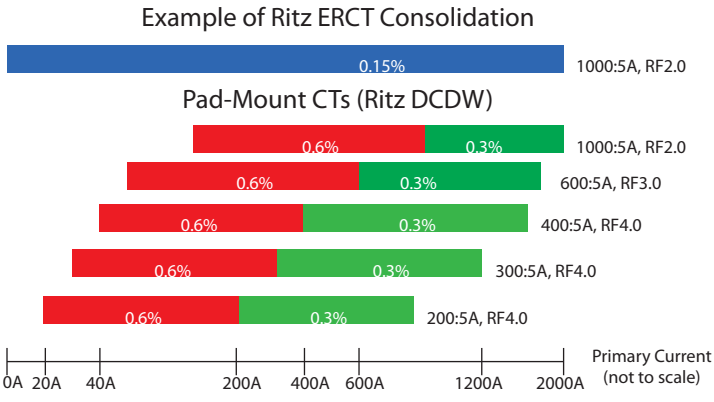
Applications

Since CT error gets more negative as the current level decreases, having better accuracy performance at lower current levels can result in less lost revenue at instrument-rated metering points. Also, the wider than normal current range of the Ritz ERCT offers the opportunity for users to drastically reduce the number of different ratios needed for a given style CT, thus reducing the amount of inventory needed to respond to customer demands.

Accuracy Class Definitions

The historical revenue metering class is 0.3 and in recent years, standards have defined high-accuracy revenue metering classes of 0.15 and 0.15S. The Ritz ERCT rating offers better accuracy down to lower currents than any standard defined accuracy class.





Advantages

- Increases revenue due to more accurate and wider range
- Reduction of inventory levels
- Consolidation to 1 or 2 ratios per CT type
- Standardization of meter multipliers
- Reduces chance of incorrect CT sizing
- Eliminates the need for dual-ratio designs

DCAW/B

The DCAW/B is for use in 600V metering circuits, normally in an enclosure or transocket. This unit can be purchased as a window-type (W) or a bar-type (B). The DCAW/B ERCT design is offered with a 600:5A ratio offering 0.15% performance from 6A up to 1200A.

Ratings: 600:5A, 0.15S B0.2, 6A to 1200A, RF2.0 @ 30C (RF1.5 @ 55C)

Type	*Catalog Number*	*Feature*
DCAW	110601001.0810	No Base
DCAW	110601002.0811	Low Base
DCAW	110601003.0812	High Base
DCAB	110601001.0813	No Base
DCAB	110601002.0814	Low Base
DCAB	110601002.0815	High Base

DCCW/B

The DCCW/B is for use in 600V metering circuits, normally in an enclosure or for overhead services. This unit can be purchased as a window-type (W) or a bar-type (B). The DCCW/B ERCT design is offered with a 600:5A ratio offering 0.15% performance from 6A up to 1800A.

Ratings: 600:5A, 0.15S B0.5, 6A to 1800A, RF3.0 @ 30C (RF2.2 @ 55C)

Type	*Catalog Number*	*Feature*
DCCW	110601007.0800	No Base
DCCW	110601008.0801	Low Base
DCCW	110601009.0802	High Base
DCCW	110601010.0803	Wide Base
DCCB	110601007.0804	No Base
DCCB	110601008.0805	Low Base
DCCB	110601009.0806	High Base
DCCB	110601010.0807	Wide Base

DCDW

The DCDW is for use in 600V metering circuits, normally in pad-mount distribution transformers. This unit is available in a 500:5A, 1000:5A, or 2000:5A ratio with 0.15% performance from 1% Inom to RF.

Ratings: 500:5A, 0.15S B0.2, 5A to 2000A

Type	*Catalog Number*
DCDW	110601011.0832 - RF4.0 @ 30C (RF3.0 @ 55C)
DCDW	110601011.0833 - RF3.0 @ 85C

Ratings: 1000:5A, 0.15S B0.5, 10A to 2000A

Type	*Catalog Number*
DCDW	110601011.0808 - RF2.0 @ 30C (RF1.5 @ 55C)
DCDW	110601011.0809 - RF2.0 @ 85C

Ratings: 2000:5A, 0.15S B0.5, 20A to 4000A

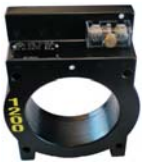
Type	*Catalog Number*
DCDW	110601011.0822 - RF2.0 @ 30C (RF1.5 @ 55C)
DCDW	110601011.0823 - RF1.5 @ 85C

DCEW/B

The DCEW/B is for use in 600V metering circuits, normally in an enclosure or in switchgear. This unit can be purchased as a window-type (W) or a bar-type (B). The DCEW/B ERCT design is offered with a 2000:5A ratio offering 0.15% performance from 20A up to 4000A.

Ratings: 2000:5A, 0.15S B0.9, 20A to 4000A, RF2.0 @ 30C (RF1.5 @ 55C)

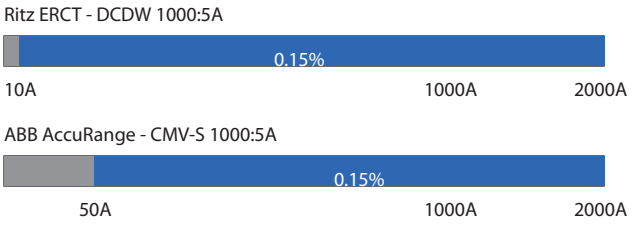
Type	*Catalog Number*	*Feature*
DCEW	110601012.0816	Without Mounting Bracket
DCEW	110601012.0817	With Mounting Bracket
DCEB	110601012.0818	Without Mounting Bracket
DCEB	110601012.0819	With Mounting Bracket



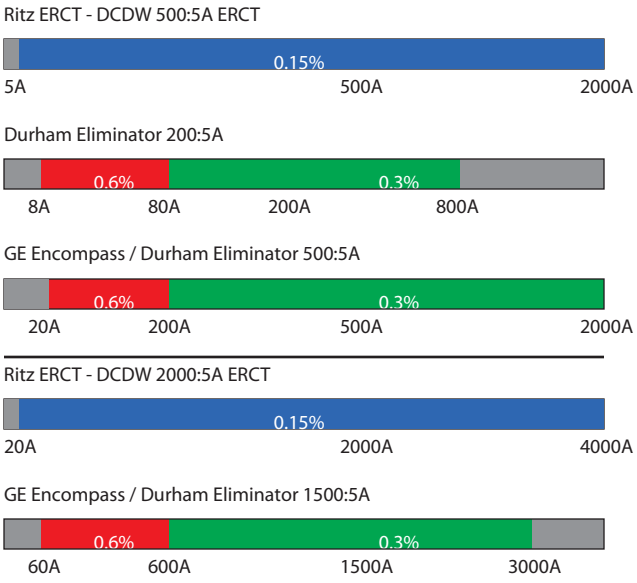
Comparison to Competitor Designs

The following is a comparison to offerings from other manufacturers based on the printed literature.

The Ritz ERCT design offers 0.15% accuracy performance down to 5 times lower current levels then the ABB AccuRange design.



The Ritz ERCT design is more accurate across a wider range than the GE Encompass design and the GEC Durham Eliminator design. The ERCT accuracy performance is rated 4 times better at low current levels where customers tend to lose the most revenue.



RITZ INSTRUMENT TRANSFORMERS, INC.
25 Hamburg Avenue • Lavonia, GA 30553 USA
706-356-7180 • www.ritzusa.com
e-mail: sales@ritzusa.com

SALES REPRESENTATIVE

Improving safety and revenues through more accurate and reliable electrical metering.

A6003012 2.5:1 12.5VA

VT Packs - VT Pucks

This VT Pack™ is for 480/277 4-wire wye applications where traditional 2.5:1 VTs are used. For all other 480V applications, we recommend other versions, see catalog for various options.

This VT Pack consists of three revenue-accuracy toroidal voltage transformers for use with modern wide voltage range electronic watthour meters or older induction (disk-type) meters. The transformers are encased in epoxy inside a UV-resistant polycarbonate enclosure.

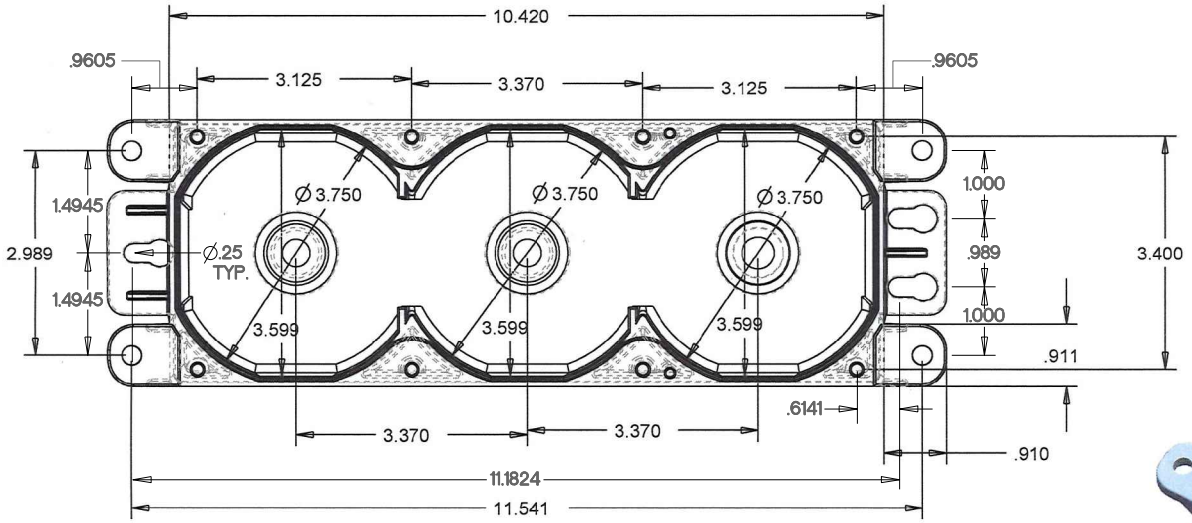
This VT Pack can be used with either standard transformer-rated meters or the Form 9S, Class 200 solid state polyphase meter. The connector on the VT Pack mates with the wiring harness of our sockets or block assemblies. For existing transformer-rated applications, a color-coded wiring harness is available either with our standard color code or can be supplied in custom color-coding
and lengths to meet your Company's requirements.

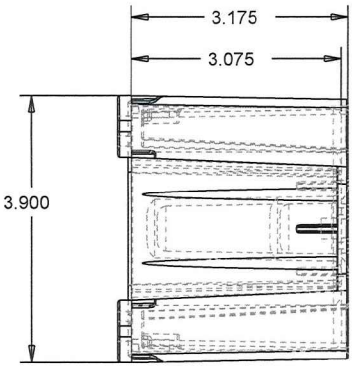
The VT Pack can be mounted in a pad mount transformer, transformer cabinet, on the outside of an existing meter socket, or other convenient location. The keyhole slot on the VT Pack makes mounting on any 1/4" mounting screw or shoulder rivet quick and easy. The VT Pack can also be mounted on a cross arm, pole or other suitable outdoor location when used with the optional Connector Cover.

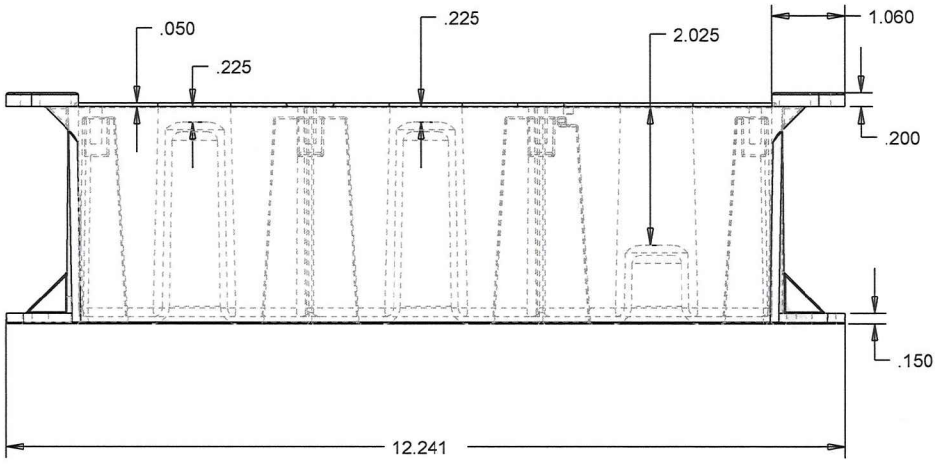
Weight:	**14 lbs**
Collar Diameter:	**2.2"**
Connector:	**9 pin, 600 volt, UL**
Enclosure:	**Light gray, UV resistant polycarbonate**
Insulation level:	**10 kV BIL**
Over voltage withstand:	**600V for 1 minute.**
Transformer type:	**Toroidal autotransformer**
Size:	**12 3/16" long by 4" wide by 3 1/16" deep, including 1" deep collar**
Accuracy:	**+/-0.3 @ 12.5 VA @ .1 PF lag**
Thermal Rating:	**150 VA @ 30 degrees C**

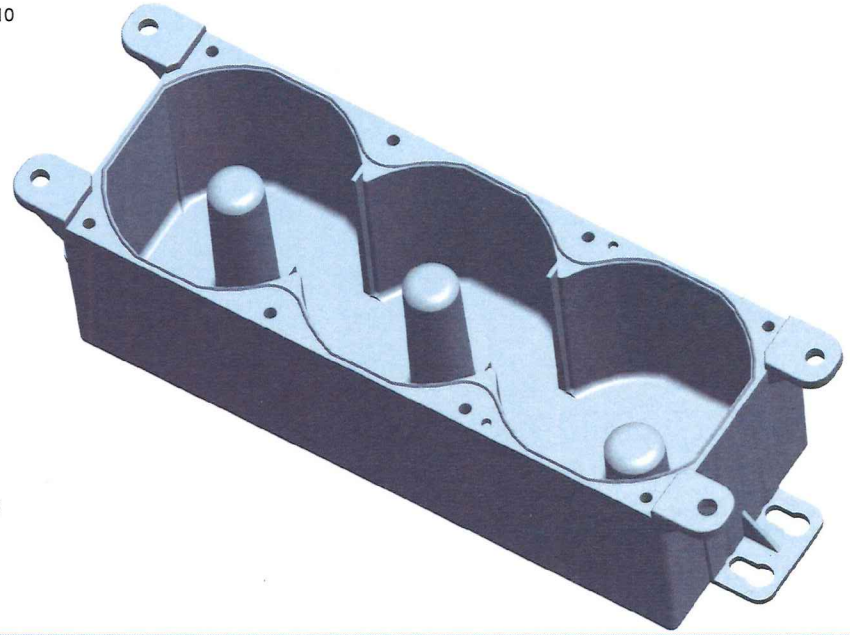
NOTES: (Unless otherwise specified)

revisions					
rev	eco	description	location	date	approved









Tolerances
(unless otherwise indicated)
2 place decimals: ± .020
3 place decimals: ± .005
angles: ± 1.0°

Caprock MANUFACTURING
2303 120th Street
Lubbock, Texas 79423
Phone:(806) 745-6454
Fax:(806) 745-9441

client: TSTM

title: VT-001-1

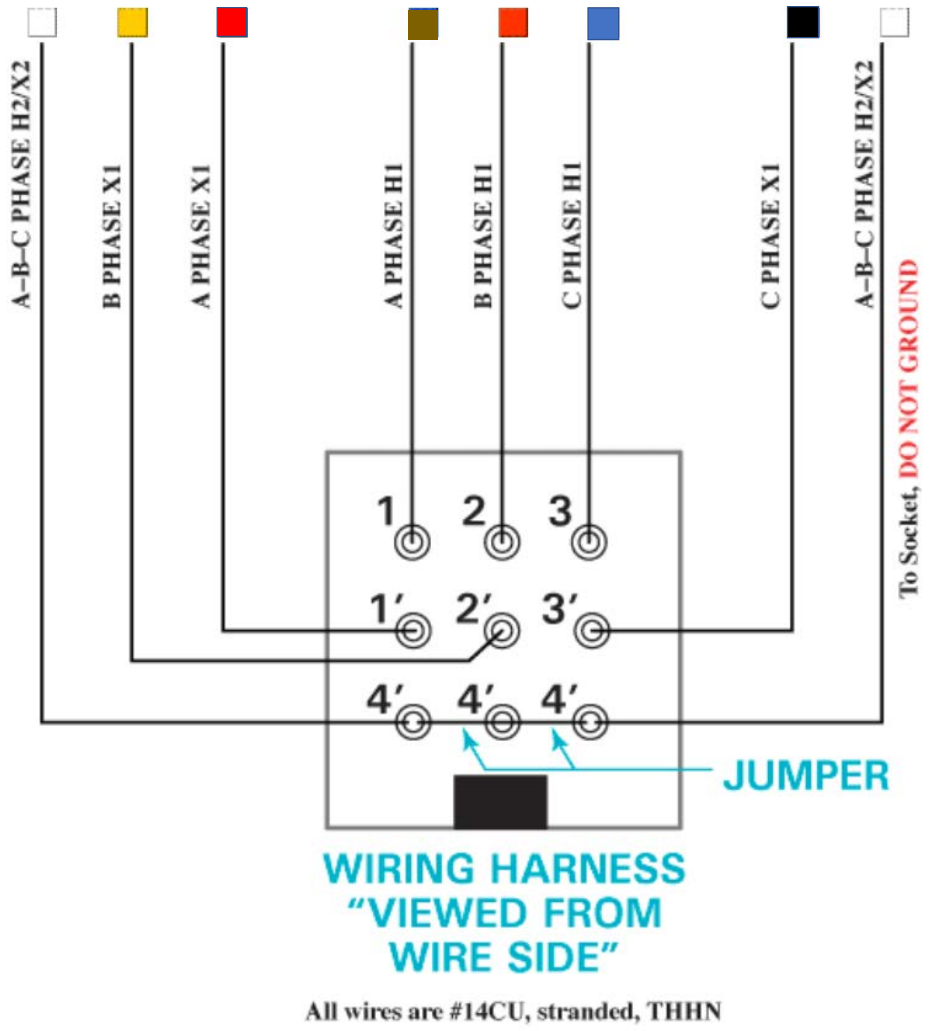
drawn		dwg no.	rev.
engineer		scale:	size C
checked	date		sheet 1of 1

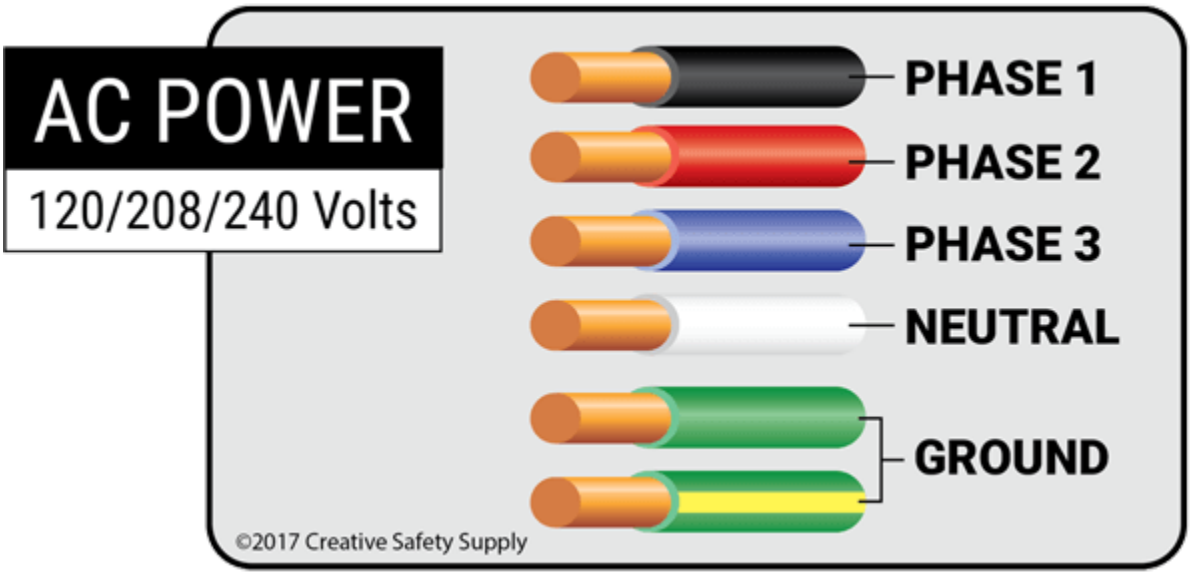
VT Pack color code (we use TSTM's standard wiring harnesses/color code)

High-side connections (H1)
A Phase - Brown
B Phase - Orange
C Phase - Blue

Low-side connections (X1)
A Phase - Red
B Phase - Yellow
C Phase - Black

Neutral/Ground (H2 / X2)
White



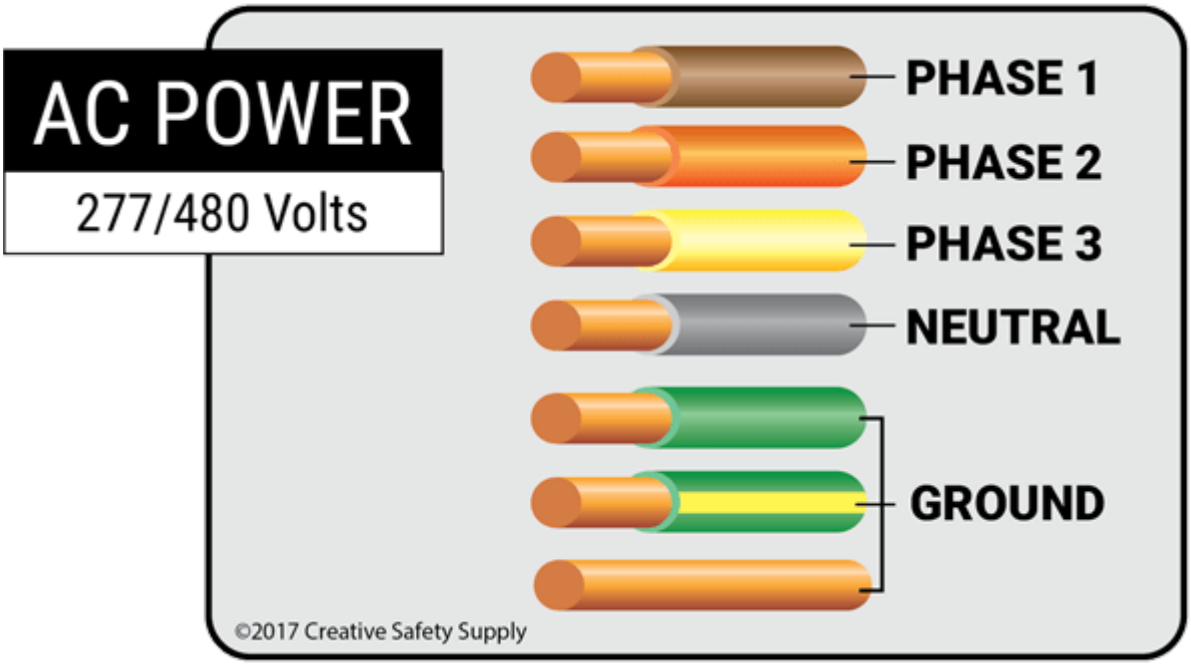


AC Power (120/208/240 Volts)

AC power comes in many different types based on how many volts the wires will be carrying. For wires that will be 120, 208 or 240 volts, the following wiring color standards are used. It is important to note that with this type of wiring, there are multiple phases in place, each of which will get its own color wire to make it clear what it is for those working on it.

- **Phase 1** - Phase 1 wiring should be black.
- **Phase 2** - Phase 2 wiring should be red.
- **Phase 3** - Phase 3 wiring should be blue.
- **Neutral** - Neutral wiring should be white.
- **Ground** - Ground wiring can be green or green with a yellow stripe.

In some uncommon situations, one phase will have a higher voltage than the others. These are known as high-leg connections. While rare, they can be identified by looking for a wire that is marked with orange, which will be the higher voltage wire.



277/480 Volt Wire Color Standards

These high-voltage connections are quite common in many manufacturing and other industrial areas. Due to the serious potential for deadly electrocution or other issues, getting these color codes right is essential.

- **Phase 1** - Phase 1 wiring should be brown.
- **Phase 2** - Phase 2 wiring should be orange.
- **Phase 3** - Phase 3 wiring should be yellow.
- **Neutral** - Neutral wires should be grey.
- **Ground** - - Ground wiring should be green, or green with a yellow stripe.

1Ø amps to kVA calculation formula

The apparent power S in kilovolt-amps is equal to current I in amps, times the voltage V in volts, divided by 1000:

$S_{(kVA)} = I_{(A)} \times V_{(V)} / 1000$
or
$S_{(kVA)}$ = Amps x (208,240 or 480) / 1,000

3Ø amps to kVA calculation formula
(Calculation with line-to-line voltage)

The apparent power S in kilovolt-amps is equal to phase current I in amps, times the line-to-line RMS voltage V_{L-L} in volts, divided by 1000:

$S_{(kVA)} = \sqrt{3} \times I_{(A)} \times V_{L-L(V)} / 1000$
or
$S_{(kVA)}$ = 1.73 x Amps x (208,240 or 480) / 1,000

Demand Calculations

kWh (15-min) x 4 = kW

kW (hourly) / 4 = kWh (15-min)

kW (hourly) x 1 = kWh

kW (15-min) x 4 = kWh (15-min)

Volts x Amps = Watts

Watts / 1000 = kW

Power Factor Calculation

This is how MV-90 calculates Power Factor:

PF = kW / (√ (kW^2 + $kvar^2$)
or
(if you have kVA already calculated):

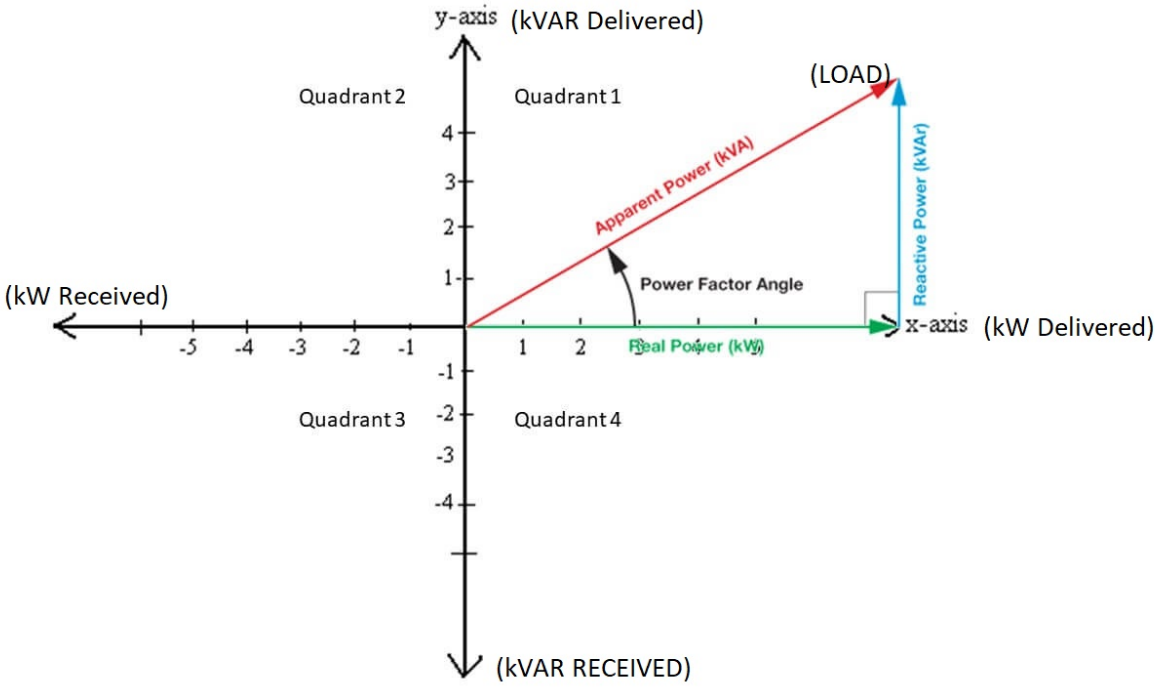
PF = kW / kVA

Calculate Peak kW to Amps

Example: If you have 65 Peak kW on a 1Ø service

65 x 1,000 = 65,000 / 240 (voltage) = 270.83 Amps (for 3Ø divide by 1.73)

Power Factor Graph



Meter Accuracy Tolerance Formula

Weighted Average Calculation

5/6 – FL (full load) + 1/6 LL (light load) = _____ %

Per Policy MP-6 Periodic Meter Testing:

All watt-hour meters must be accurate to within plus or minus 2% at full and light load, demand meters shall be accurate to within 1.5%. If the average error on a watt-hour meter is found to be more than 2% or a demand meter error is found in excess of 1.5% in addition to the errors allowed, an adjustment of bills for service for the period of inaccuracy shall be made in the case of over-registration and may be made in the case of under-registration. See Section 12 of the Cooperative's tariff to address adjustments of bills and member request tests or referee tests for meter accuracy.

Multipliers

Meter Multiplier:

example of multiplier calculation for 200: 5 CT's

200 / 5 = 40 multiplier

example of multiplier calculation for a 2.5:1 PT

2.5 / 1 = 2.5 multiplier

An account with both the 200:5 CT and 2.5/1 PT would be

CT Multiplier of 40 * 2.5 PT = 100 multiplier

Pulse Multiplier (CTs * PTs = Meter Multiplier; (CTs * PTs)/1000 = Pulse Multiplier.

The pulses from the 15-minute Load Profile interval are taken times the Pulse Multiplier to equal demand/kwh

Rate 5 (CIPCO's Rate A)

6 – accounts

3 – 1 meter

2 – 2 meters

1 – 3 meters

Demands -

CIPCO Timestamp Seasonal (coincident)

CIPCO Timestamp Monthly (coincident)

Monthly Non-coincident **'HOURLY'** (NetSense describes this as MaxDemand)

Demand charges adjusted for all Pf's (power factor) below 90 = **1% for each 1%**

Rate 16 (CIPCO's Rate A-2)

7 – accounts

3 – 1 meter

4 – 2 meters

Demands -

Firm Demand (No Reading needed, Rate set by CIPCO, manually entered)

Interruptible Demand (No Reading needed, Rate set by CIPCO, manually entered)

Distribution Demand or Non-Coincident **'15-min'** (NetSense describes this as MaxDemand)

Excess Demand (No Reading needed, Rate set by CIPCO, manually entered, 6-month ratchet and manually entered)

Demand charges adjusted for all Pf's (power factor) below 90 = **1% for each 1%**

Additive Meters (this is no longer allowed and pertains to existing accounts only)

The Demand calculations for these meters needs to be done by adding the 15-min demands of each meter together on the spreadsheet and then the Non-coincident, Coincident Demands can be found based in this, basically new meter.

A virtual meter in the MDM should makes this calculation happen automatically.

Definitions

Demand - is measured in kilowatts (kW) and represents the rate at which electricity is consumed.

Coincident Demand - is measured in kilowatts (kW) and is the energy demand required by a given customer or class of customers during a particular time period.

Non-coincident Demand (NetSense describes this as MaxDemand) - is measured in kilowatts (kW) and is the highest level of electrical demand monitored in a period, usually for a month period.

Cumulative Demand - Monthly Non-coincident demands added up. (NetSense describes this as MaxDemand)

Power Factor - the percentage of kWh the load is actually using compared to actually provided.
Example: with a Pf of .90 the load is being provided 10% of the kWh at no cost to the member.
Pf is calculated at the time of MaxDemand in a 15-min period.

Ratchet Months – During pre-determined months (6 - seasonal) the Demand is calculated, and the other 6 months are carried forward from the previous month.

Time of Day:

Dependent on the time of day (i.e., on-peak {usually during the day} and off-peak {usually at nighttime periods) and/or the day of the week (e.g., Monday through Friday and separately for weekends): The metering system tracks the highest usage anytime during the month under the appropriate time windows. These pricing schedules are generally referred to as Time of Use (TOU) rates.

Demand:

Electric power use is metered in two ways: on maximum kilowatt use during a given time period (i.e., kW **demand** typically measured in 15-minute or 30-minute intervals) and on total cumulative **consumption** in kilowatt hours (kWh).

The general theory is that demand charges reflect the utilities' fixed costs of providing a given level of power availability to the customer, and energy charges reflect the variable portion of those costs as the customer actually uses that power availability.

Load Profile:

It is a variation in the electrical load versus time. A load profile will vary according to customer type (typical examples include residential, commercial, and industrial), temperature and holiday seasons. Power producers use this information to plan how much electricity they will need to make available at any given time.

EFFECTIVE: Dec. 2019 REVENUE MONTH

Rate Code 1RESI
Effective Date: November 21, 2019

Rate Designation: Residential Service; Rate Code 01

Class of Service: Single-phase, farm and non-farm residences.

< 75 kW Demand in Jun, Jul, Aug, Dec, Jan, Feb

Monthly Facility Charge	$ 22.00		
Energy Charge	All kWh	@ 10.743	Cents per kWh
Monthly Transformer Charge	$ 0.11	per kVa assigned/required ≥75 kVa	
Additional Minimum	$ 0.75	per kVa >10 kVa	
EAC Rider	1		

Rate Code 2ALLE
Effective Date: November 21, 2019

Rate Designation: Residential All Electric Service; Rate Code 02

Class of Service: Single-phase, farm and non-farm electric heated residences .

< 75 kW Demand in Jun, Jul, Aug, Dec, Jan, Feb

Monthly Facility Charge	$ 22.00		
Energy Charge First	1200 kWh	@ 10.743	Cents per kWh
Over	1200 kWh	@ 8.973	Cents per kWh
Monthly Transformer Charge	$ 0.11	per kVa assigned/required ≥75 kVa	
Additional Minimum	$ 0.75	per kVa >10 kVa	
EAC Rider	1		

Rate Code 3SCOM/3MCOM
Effective Date: November 21, 2019

Rate Designation: Small Commercial and Multi-Phase Service; Rate Code 03

Class of Service: Single and Multi-Phase Non- residence and Mutli- Phase residence

< 75 kW Demand in Jun, Jul, Aug, Dec, Jan, Feb

Facility Charge 3SCOM	$ 22.00	Single Phase	
Facility Charge 3MCOM	$ 50.00	Multi Phase	
Energy Charge	All kWh	@ 10.743	Cents per kWh
Monthly Transformer Charge	$ 0.11	per kVa assigned/required ≥75 kVa	
Additional Minimum	$ 0.75	per kVa >10 kVa	
EAC Rider	1		

Rate Code 4LCOM
Effective Date: November 21, 2019

Rate Designation: Commercial and Industrial; Rate Code 04

Class of Service: Single and Multi-Phase

> 75 kW Demand in Jun, Jul, Aug, Dec, Jan, Feb

Optional for > 25 kW

Monthly Facility Charge	$ 50.00		
Energy Charge First	100	kWh per kW Demand @ 6.695	Cents per kWh
Next	200	kWh per kW Demand @ 6.374	Cents per kWh
Over	300	kWh per kW Demand @ 4.500	Cents per kWh
Demand Charge	$ 12.20	per kW Demand	

Demand Charges adjusted for all Power Factors below 90%

Monthly Transformer Charge	$ 0.11	per kVa assigned/required ≥75 kVa	
Additional Minimum	$ 0.75	per kVa >10 kVa	
EAC Rider	1		

Rate Code 5LCOM
Effective Date: November 21, 2019

Rate Designation: Large Power Service; Rate Code 05

Class of Service: Three Phase

> 1000 kW Demand, Optional for >600 KW

Monthly Facility Charge	$ 150.00		
Energy Charge	All kWh	@ 3.553	Cents per kWh
Demand Charge			
Seasonal Demand	$ 8.17	per kW	
Coincident Demand Monthly	$ 8.16	per kW	
Monthly Non-coincident Demand	$ 9.50	per kW	

Demand Charges adjusted for all Power Factors below 90%

Additional Minimum	$ 0.75	per kVa >10 kVa	
EAC Rider	4		

Rate Code 8DFMT/38DFM (Optional)
Effective Date: November 21, 2019

Rate Designation: Heat Plus; Rate Code 08

Class of Service: Single and Multi-Phase Residential and small commercial

< 75 kW Demand in Jun, Jul, Aug, Dec, Jan, Feb

Monthly Facility Charge	$ 5.00		
Energy Charge	All kWh	@ 5.444	Cents per kWh

Applies October thru May

Must have approved separate metering

Verification required

EAC Rider	5		

Rate Code 11TOD - 12TOD (Optional)
Effective Date: November 21, 2019

Residential TOD Service (11) or Residential All-Electric TOD Service (12)

Class of Service: Single-phase, farm and non-farm residences.

< 75 kW Demand in Jun, Jul, Aug, Dec, Jan, Feb

Monthly Facility Charge	$ 22.00		
Energy Charge			
On-Peak 4:01pm to 9:00pm (TA)	All kWh	@ 26.435	Cents per kWh
Off-Peak 9:01pm to 4:00pm (TC)	All kWh	@ 6.599	Cents per kWh
Monthly Transformer Charge	$ 0.11	per kVa assigned/required ≥75 kVa	
Additional Minimum	$ 0.75	per kVa >10 kVa	
EAC Rider	1		

Rate Code 13TOD/13MTD (Optional)
Effective Date: November 21, 2019

Rate Designation: Small Commercial and Multi-Phase Time of Day Service; Rate Code 13

Class of Service: Single and Multi-Phase Non- residence and Mutli- Phase residence

<75 kW Demand in Jun, Jul, Aug, Dec, Jan, Feb

Facility Charge 13TOD	$ 22.00	Single Phase	
Facility Charge 13MTD	$ 50.00	Multi Phase	
Energy Charge			
On-Peak 4:01pm to 9:00pm (TA)	All kWh	@ 23.149	Cents per kWh
Off-Peak 9:01pm to 4:00pm (TC)	All kWh	@ 5.597	Cents per kWh
Monthly Transformer Charge	$ 0.11	per kVa assigned/required ≥75 kVa	
Additional Minimum	$ 0.75	per kVa >10 kVa	
EAC Rider	1		

Rate Code 14TOD (Optional)
Effective Date: November 21, 2019

Rate Designation: Commercial, Industrial; Time of Day Service; Rate Code 14

Class of Service: Single and Multi-Phase

Optional for > 25 kW

Monthly Facility Charge	$ 50.00		
Monthly Transformer Charge	$ 0.11	per kVa required/assigned	
Energy Charge	All kWh	@ 3.225	Cents per kWh
Demand Charge			
On-Peak 4:01pm to 9:00pm (A)	$ 16.30	per kW of On-Peak Monthly Billing Demand	
Off-Peak 9:01pm to 4:00pm (C)	$ 7.76	per kW of Off-Peak Monthly Billing Demand	

Demand Charges adjusted for all Power Factors below 90%

Monthly Transformer Charge	$ 0.11	per kVa assigned/required ≥75 kVa	
Additional Minimum	$ 0.75	per kVa >10 kVa	
EAC Rider	1		

Rate Code 16TOD (Optional)
Effective Date: November 21, 2019

Rate Designation: Large General Service Time of Day, Interruptible Service; Rate Code 16

Class of Service: Three Phase

> 150KW

Monthly Facility Charge	$ 150.00			
Energy Charges	Winter	Summer = June July August		
On Peak	$ 0.02836	$ 0.03491	Dollars per kWh	
Off Peak	$ 0.02618	$ 0.02836	Dollars per kWh	
Demand Charges	Winter	Summer = June July August		
Firm Demand	$ 14.79	$ 20.83	Dollars per kW Monthly	
Interruptible Demand	$ 10.33	$ 14.56	Dollars per kW Monthly	
Distribution Demand	$ 7.00	$ 7.00	Dollars per kW Monthly	
Excess Demand	$ 25.00	$ 25.00	Dollars per kW Monthly 6 month rachet	

Demand Charges adjusted for all Power Factors below 90%

Interruptible Demand shall be calculated as the larger of:
A. 75 % of the interruptible demand in the previous June, July or August or
B. The sum of the distribution demand minus contracted firm demand

Additional Minimum	$ 0.75	per kVa >10 kVa	
EAC Rider	6		