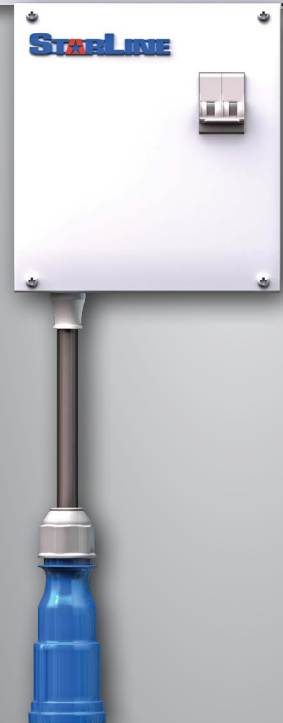




STARLINE[®]
TRACK BUSWAY

Metering



CRITICAL POWER MONITORING

M41/M43/M45/M47 DETAILS

The Starline Critical Power Monitor (CPM) is a revenue grade metering system that enables current and power monitoring in busway systems. Each phase and neutral can be monitored independently. The CPM may be incorporated at a power feed point or directly into a plug-in unit.

CURRENT TRANSFORMERS:

Current transformers (CT's) are supplied with the unit for installation onto the customer-supplied feeder cables. Sense leads from the CT's connect to the Meter.

METER MODULES:

Each unit is calibrated for accuracy and is within 0.5% to meet ANSI Revenue Grade Standards.

CPM- ENHANCED PACKAGE (M41/M43/M45/M47):

Provides current and voltage inputs, monitoring current, voltage, power, power factor, frequency, apparent power, energy kWh, reactive power, neutral current, power min. and max.

DISPLAY:

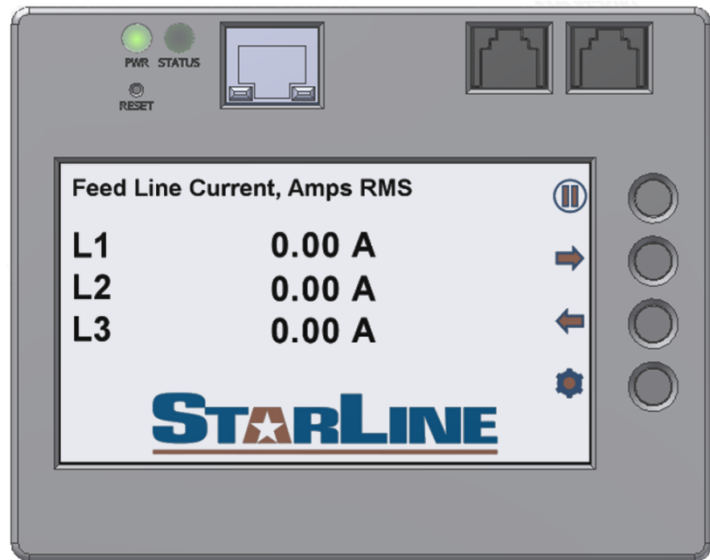
The bright, 4.9" LCD reports basic power measurements and alarms. Display buttons provide configuration and direct control to the active display screen. Large format display is easily readable at a distance and wide viewing angle.

COMMUNICATION:

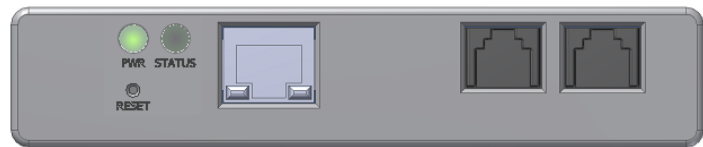
Ethernet and Modbus RTU ports are standard. Ethernet port provides an embedded web (HTTP) Interface & supports SNMP. Wi-Fi interface is optional, providing true versatility in the busway environment.

ALARMS:

When the defined alarm threshold is exceeded, a warning corresponding to that channel will turn ON and send an SNMP trap or an email to the user.



Critical Power Monitor with the (optional) 4.9" Display



Critical Power Monitor (No Display)

The Critical Power Monitor can be used to manage and maximize power distribution within a three phase power system. It can be employed as a component to help balance three phase power distribution between each phase. This increases efficiency by reducing the power factor and enables a user to fully analyze the power supplied to them.

POWER FEED MONITORING

The CPM, incorporated in or near the power feed unit, provides load monitoring of the entire run of busway. These are used in conjunction with BMS systems to ensure busway is not overloaded as well as for general power management. Typically uses the CPM unit with display.

BRANCH CIRCUIT MONITORING

The CPM, incorporated into a plug-in unit, monitors individual branch circuits. These units are used in conjunction with BMS system for power management and revenue purposes at the rack or circuit level. The CPM is capable of monitoring the entire unit or monitoring up to 4 individual devices, limited to 6 solid core Current Transformers (CTs).

BUILDING MANAGEMENT INTERFACE

The Starline CPM is easily interfaced with BMS/BCIM systems. Many BMS/BCIM systems offer drivers for use with the Starline CPM. Contact your BMS/BCIM supplier or Starline Engineering for more information.

POWER FEED UNIT WITH CPM

B100/B225 Power Feed Units

End Feed with Installed Critical Power Monitor
B100/B225

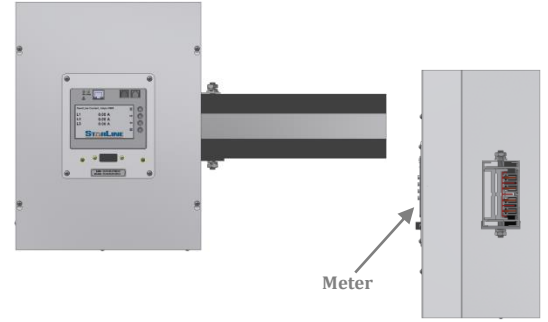
Standard End Power Feed units connect to the male end of the busway. Factory assembled unit consists of a 12" x 16" x 7.62" steel junction box, with removable sides, connected to a 1 foot section of busway. The assembly includes connection lugs, a ground lug, and shrink tubing for wires up to 300 MCM.

Integral CPM installed in the End Feed provides power monitoring and alarm capabilities. Nuisance tripping may be avoided using the current information to protect against overloading phases. The monitors also assist in the continuous challenge to balance the three phase loads. An automated email will be sent at 80% of full load as a warning to the user. This level may be changed in the field using the embedded webpage.

See Power Monitoring pages for more details.

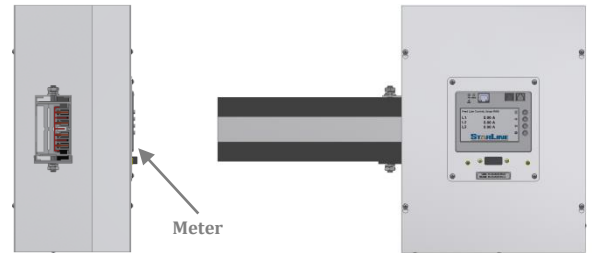
STANDARD END FEED

- EFxxx-4-RT-MyyRz
- EFxxxN-4-RT-MyyRz
- EFxxxG-4-RT-MyyRz
- EFxxxNG-4-RT-MyyRz



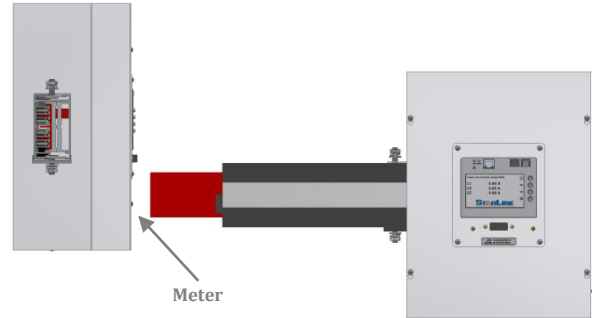
STANDARD 'LEFT LID' END FEED

- EFxxx-4-L-MyyRz
- EFxxxN-4-L-MyyRz
- EFxxxG-4-L-MyyRz
- EFxxxNG-4-L-MyyRz



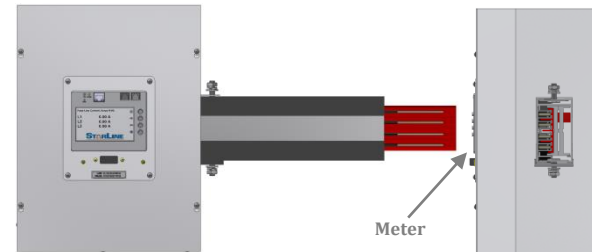
MALE END FEED

- EFxxx-4M-L-MyyRz
- EFxxxN-4M-L-MyyRz
- EFxxxG-4M-L-MyyRz
- EFxxxNG-4M-L-MyyRz

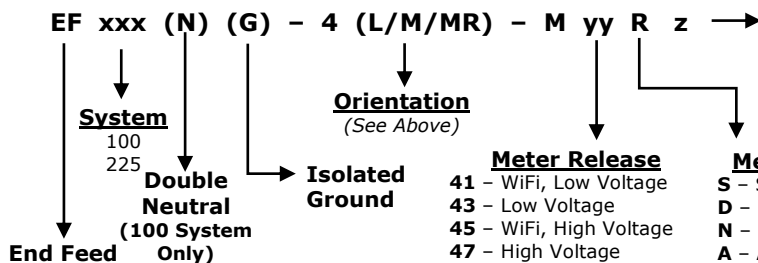


MALE 'RIGHT LID' END FEED

- EFxxx-4M-RT-MyyRz
- EFxxxN-4M-RT-MyyRz
- EFxxxG-4M-RT-MyyRz
- EFxxxNG-4M-RT-MyyRz



Catalog Number Sequence



System Configuration

*Please contact Engineering for assistance on selecting the appropriate Configuration

High Voltage Criteria:

Delta System: ≥400V
Wye System: ≥480V

- F - "Featured" (Display + Alarm)
- E - "Enhanced" (Neutral + Alarm)
- P - "Professional" (Display + Neutral)
- U - "Ultimate" (Display + Neutral + Alarm)

POWER FEED UNIT WITH CPM

B250/B400/B800 Power Feed Units

End Feed with Installed Critical Power Monitor B250/B400/B800

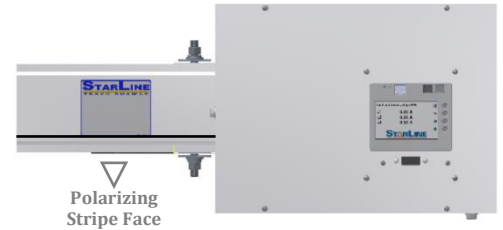
Standard End Power Feed units connect to the end of a Busway section. Factory assembled unit consists of a steel junction box with removable sides and is connected to a small section of busway. Reverse End Feed units for connection to opposite end of busway are also available. (For Frame specific information, see B250T5/ B400T5/B800T5 pages.)

Integral CPM installed in the End Feed provides power monitoring and alarm capabilities. Nuisance tripping may be avoided using the current information to protect against overloading phases. The monitors also assist in the continuous challenge to balance the three phase loads. An automated email will be sent at 80% of full load as a warning to the user. This level may be changed in the field using the embedded webpage.

See Power Monitoring pages for more details.

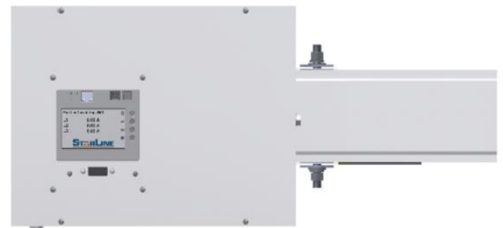
T5 STANDARD END FEED

- EFxxxT5-4-L-MyyRz
- EFxxxT5N-4-L-MyyRz
- EFxxxT5G-4-L-MyyRz
- EFxxxT5NG-4-L-MyyRz



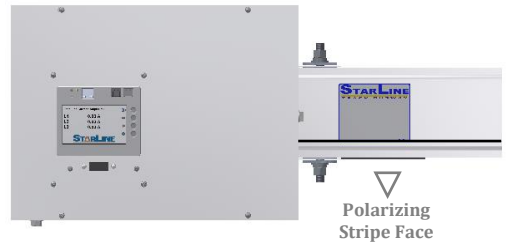
T5 STANDARD 'RIGHT LID' END FEED

- EFxxxT5-4-RT-MyyRz
- EFxxxT5N-4-RT-MyyRz
- EFxxxT5G-4-RT-MyyRz
- EFxxxT5NG-4-RT-MyyRz



T5 REVERSED END FEED

- EFxxxT5-4R-RT-MyyRz
- EFxxxT5N-4R-RT-MyyRz
- EFxxxT5G-4R-RT-MyyRz
- EFxxxT5NG-4R-RT-MyyRz

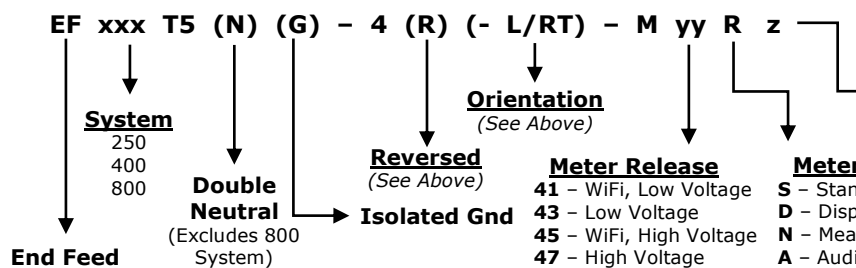


T5 REVERSED 'LEFT LID' END FEED

- EFxxxT5-4R-L-MyyRz
- EFxxxT5N-4R-L-MyyRz
- EFxxxT5G-4R-L-MyyRz
- EFxxxT5NG-4R-L-MyyRz



Catalog Number Sequence



System Configuration

*Please contact Engineering for assistance on selecting the appropriate Configuration

High Voltage Criteria:

Delta System: ≥400V
Wye System: ≥480V

- F** - "Featured" (Display + Alarm)
- E** - "Enhanced" (Neutral + Alarm)
- P** - "Professional" (Display + Neutral)
- U** - "Ultimate" (Display + Neutral + Alarm)

HINGED METER LID

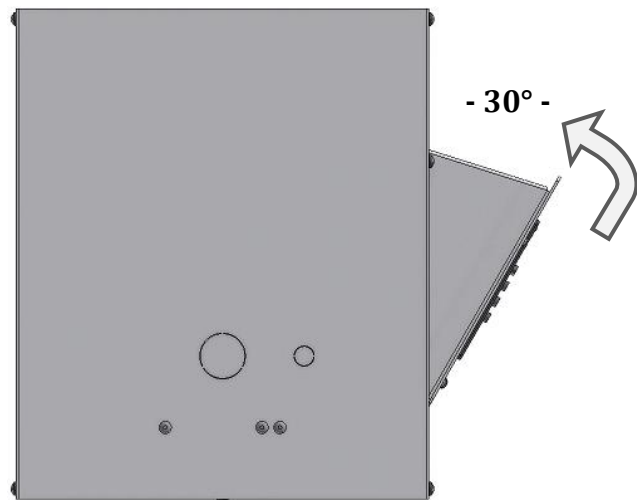
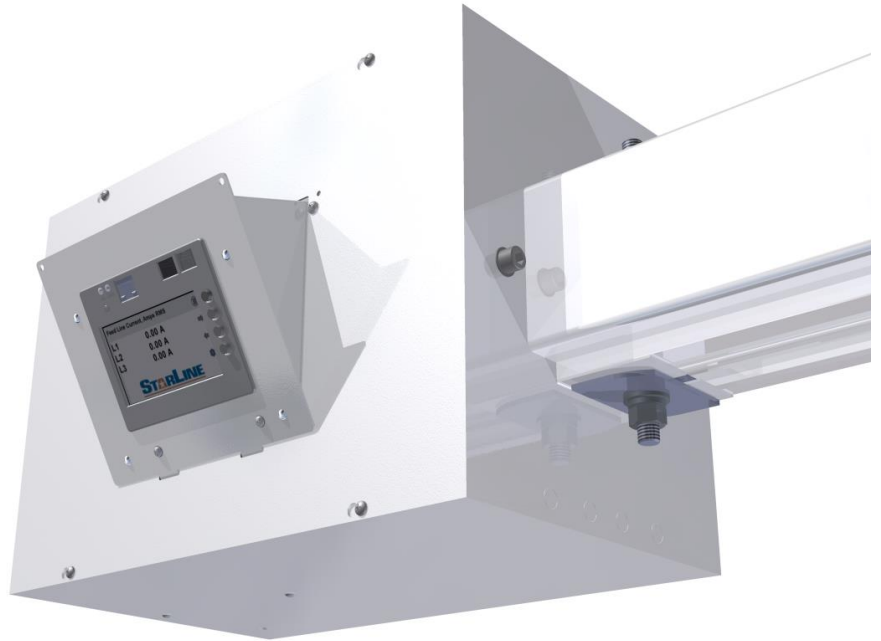
M40 Series CPM End Feeds

The hinged meter End Feed lid is an accessory that delivers the flexibility to change the viewing angle for Display Meters in an End Feed.

This enclosure allows for the Meter to be mounted flush to the End Feed lid or presented in an extended position at 30° from vertical. This presents a more comfortable and easier viewing angle when looking up at an End Feed unit to read the LCD screen.

The hinged enclosure can be quickly and easily repositioned by simply relocating two screws on the assembly and the enclosure is secured to prevent damage during installation.

This feature is available for most End Feed product lines with any M40 series CPM that contains a display. In addition, the angled enclosure is painted to match the desired End Feed color.



Catalog Number Selection

Catalog No.		
EF xxx ** - ** - M yy ** - HML		
↓	↓	↓
System	Meter	30° Hinged Meter Lid
*Call for Availability	M41 M43 M45 M47	

Description

HINGED METER LID
(M40-Series CPM only)

OUTLET BOX UNIT WITH CPM

Power Feed Current Monitoring

Outlet Box with Installed Critical Power Monitor

The CPM plug-in unit is installed within close proximity to the busway Power Feed. Current Transformers (CT) are installed around the feed wires and then cabled to the Outlet Box using factory provided 20 foot leads.

The CPM provides power monitoring of the busway run. The optional, 4.9" LCD screen displays the current level, voltage, and alarm status for each phase and neutral. Nuisance tripping may be avoided using the current information to protect against overloading phases. The monitors also assist in the continuous challenge to balance the three phase loads. An automated email will be sent at 80% of full load as a warning to the user. This level may be changed in the field using the embedded webpage.

Networking:

- Ethernet
- RS-485
- Wi-Fi (Optional)

Protocols:

- Web Interface
- Modbus RTU
- SNMP
- Telnet
- Modbus TCP/IP

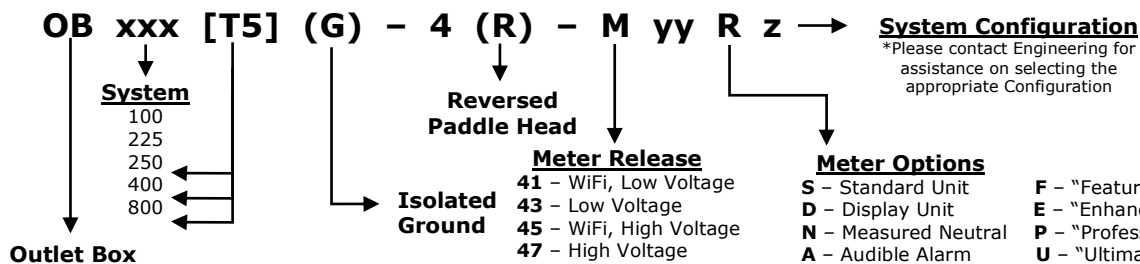
Model Shown:
OB225-4-M41D1



Knock-Out for easy CT Wiring access



Catalog Number Sequence



High Voltage Criteria:

Delta System: ≥400V
Wye System: ≥480V

M40 SERIES CIRCUIT BREAKER UNIT

Branch Circuit Monitoring

Circuit Breaker Unit with Installed Critical Power Monitor

MONITORING:

The Branch Circuit Monitoring unit has the capability of monitoring the energy of the entire unit (M-Meter) or monitoring up to 4 individual devices (V-Meter), limited to 6 solid core Current Transformers (CTs).

DISPLAY:

The optional, bright, 4.9" LCD reports basic power measurements and alarms. Display buttons provide configuration and direct control to the active display screen. Large format display is easily readable at a distance.

COMMUNICATIONS :

Ethernet and Modbus RTU ports are standard. Ethernet port provides an embedded web (HTTP) Interface & supports SNMP. Wi-Fi interface is optional, providing true versatility in the busway environment.

ALARMS:

When the defined alarm threshold is exceeded, a warning corresponding to that channel will turn ON and send an SNMP trap or an email to the user.

See Power Monitoring pages for more details.

Example:

CBT5GE60-520D-M41D



Example:

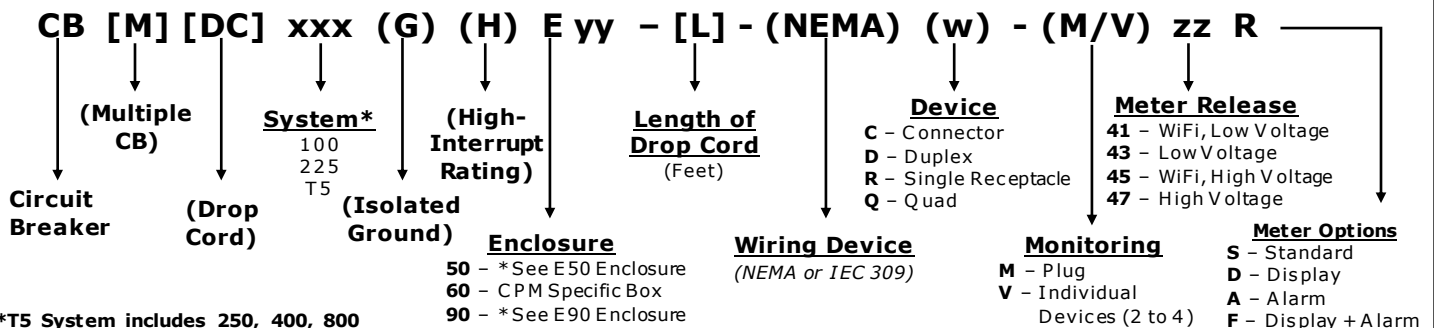
CBDCT5HGE94-1-L2230-M47S



High Voltage Criteria:

Delta System: ≥400V
Wye System: ≥480V

Catalog Number Sequence



The StarLine Critical Power Monitor (CPM) is a revenue grade metering system that enables current and power monitoring in busway systems. Each phase and neutral can be monitored independently. The CPM M50 series may be incorporated directly into a plug-in unit.

MONITORING:

The CPM is capable of monitoring the current of the entire unit (M-Meter) or monitoring up to 4 individual devices (V-Meter), limited to 6 solid core Current Transformers (CTs).

METER MODULES:

Each unit is calibrated for accuracy and is within 0.5% to meet ANSI Revenue Grade Standards.

CPM- ENHANCED PACKAGE (V51/V53/V58/V59):

Provides current and voltage inputs, monitoring current, voltage, power, power factor, frequency, apparent power, energy kWh, reactive power, neutral current, power min. and max.

COMMUNICATION:

- V51 – Single Ethernet + Wi-Fi
- V53 – Single Ethernet
- V58 – Dual Ethernet
- V59 – Dual Modbus + Dual Ethernet

ALARMS:

When the defined alarm threshold is exceeded, a warning corresponding to that channel will turn ON and send an SNMP trap or an email to the user.

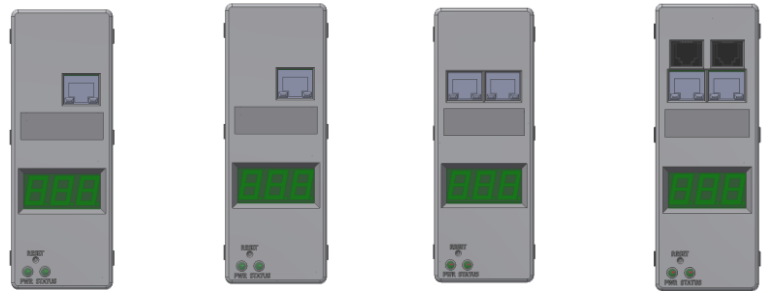
FIRMWARE:

Download the latest version of Firmware from the website. Visit www.starlinepower.com/CPM for link and details.

Meter Specs:

- Input Voltage – Up to 480V ac (Wye System)
- Current – Up to 125A

Critical Power Monitor with Optional Display



Critical Power Monitor (No Display)



Single Ethernet w/Wi-Fi V51

Single Ethernet V53

Dual Ethernet V58

Dual Modbus Dual Ethernet V59

The Critical Power Monitor can be used to manage and maximize power distribution within a three phase power system. It can be employed as a component to help balance three phase power distribution between each phase. This increases efficiency and enables a user to fully analyze the power supplied to them.

BRANCH CIRCUIT MONITORING

The CPM, incorporated into a plug-in unit, monitors individual branch circuits. These units are used in conjunction with a BMS for power management and revenue purposes at the rack or circuit level. The CPM is capable of monitoring the entire unit (M-Meter) or monitoring up to 4 individual devices (V-Meter), limited to 6 Current Transformers (CTs).

BUILDING MANAGEMENT INTERFACE

The Starline CPM is easily interfaced with BMS/DCIM systems. Many BMS/DCIM systems offer drivers for use with the Starline CPM. Contact your BMS/DCIM supplier or Starline Engineering for more information.

**OUTLET BOX UNIT FOR
POWER FEED CURRENT MONITORING**

**Outlet Box with Installed M26
Power Monitor**

An E63 plug-in unit is installed within close proximity of the Busway power feed. Current Transformers (CT) are installed around the feed wires and then cabled to the Outlet Box. Split Core CTs are also available.

M26 meter provides 3 voltage measurement and 4 current measurement inputs; active power, apparent power, reactive power, power factor, effective energy, reactive energy and total harmonic distortion (THD) are also the measured parameters. Harmonic analysis up to the 40th order is available.

MEMORY

256 MB of flash memory

DISPLAY

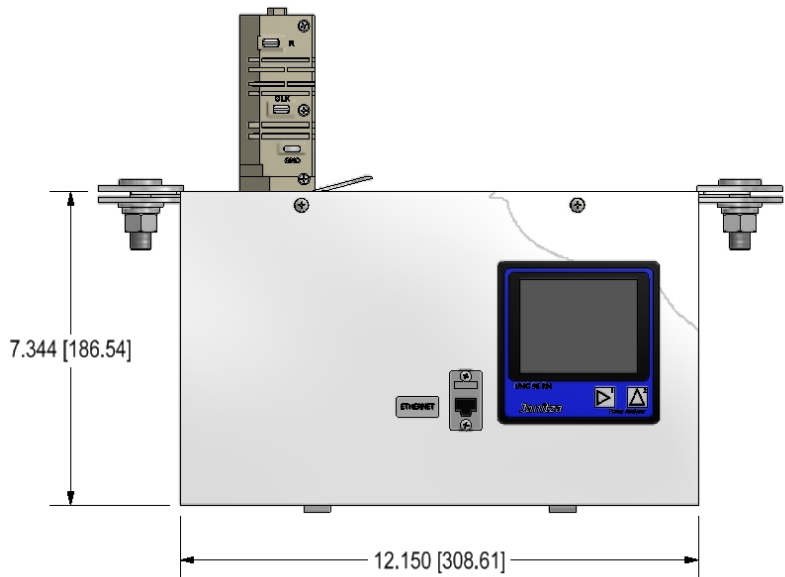
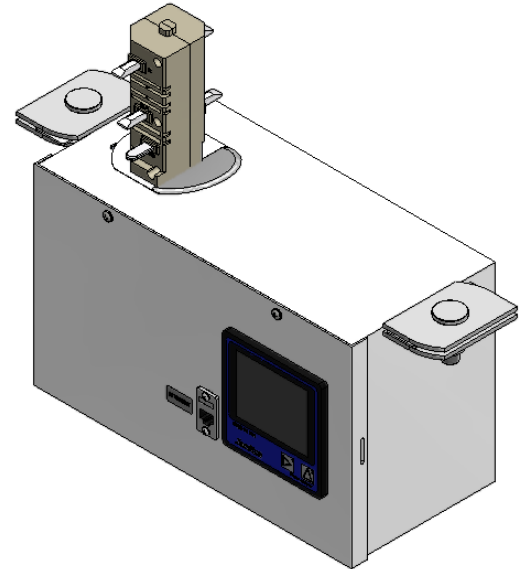
LCD display with backlight, displays all basic power measurements.

INTERFACES:

RS485, Ethernet (RJ 45)

PROTOCOLS:

Modbus RTU, Modbus Gateway, TCP/IP, SNMP, Webserver/e-mail



Catalog No.	Description
OB250T5E63-M26DR250/3	CURRENT MONITOR PLUG-IN, PWR QLTY w/ETHERNET, 250A
OB400T5E63-M26DR400/3	CURRENT MONITOR PLUG-IN, PWR QLTY w/ ETHERNET, 400A
OB800T5E63-M26DR800/3	CURRENT MONITOR PLUG-IN, PWR QLTY w/ ETHERNET, 800A

RETROFIT CRITICAL POWER MONITOR

Factory Rework: Branch Circuit Monitoring

MONITORING: The Retrofit CPM allows for non-metered legacy plug-in units to be upgraded (at Universal Electric Corporation) to include metering functionality. The unit is capable of monitoring the energy of the entire unit (M-Meter) or monitoring up to 4 individual devices (V-Meter), limited to 6 solid core Current Transformers (CTs).

The location of your meter will depend on the plug box style and your pluggable space.

DISPLAY: The optional, bright, 3 digit, 7-segment display reports current, voltage, and power factor. The three measurements can be turned on or off via the web page.

The display shows the aggregate measurements of the retrofit unit (will not display measurements of individual outlets).

COMMUNICATIONS: A single Ethernet port is standard; choose between optional dual Ethernet, Modbus and Wi-Fi configurations. Ethernet port provides an embedded web (HTTP(S)) interface & supports SNMP, Modbus TCP and BACnet TCP. Users can use Modbus RTU and Ethernet ports simultaneously.

The dual Ethernet configuration (V58 and V59) allows users to implement a daisy-chain topology. Alarm functionality is also included.

***The below catalog number will be appended to the end of your plug-in unit catalog number.**



CPM Standalone Rear (Standard)



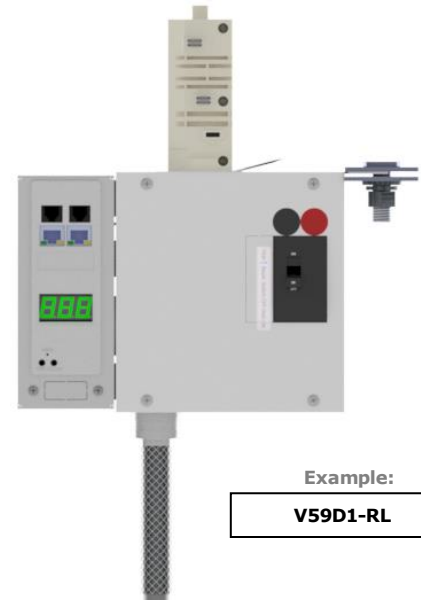
CPM Standalone Right



CPM Standalone Left

Example:

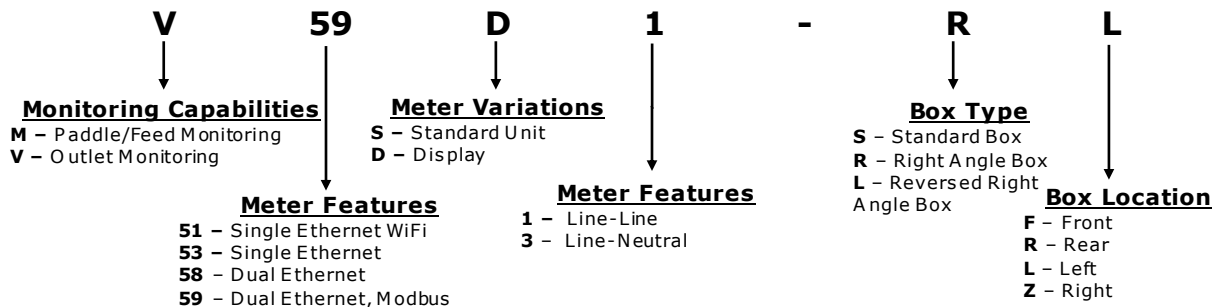
V59D1-SF



Example:

V59D1-RL

Catalog Number Sequence



RETROFIT CRITICAL POWER MONITOR

Customer Retrofit: Branch Circuit Monitoring

MONITORING: The Retrofit CPM allows for non-metered legacy plug-in units to be upgraded (in the field) to include metering functionality. The unit is capable of monitoring 3 phase energy. A measured neutral option is available.

The Retrofit CPM is not only capable of being installed in Starline plug-in units, but other manufacturers' devices as well.

If you would like to install this into a Starline plug-in unit, contact your applications engineer.

DISPLAY: The optional, bright, 3 digit, 7-segment display reports current, voltage, and power factor. The three measurements can be turned on or off via the web page.

The display shows the aggregate measurements of the retrofit unit (will not display measurements of individual outlets).

COMMUNICATIONS: A single Ethernet port is standard; choose between optional dual Ethernet, Modbus and Wi-Fi configurations. Ethernet port provides an embedded web (HTTP(S)) interface & supports SNMP, Modbus TCP and BACnet TCP. Users can use Modbus RTU and Ethernet ports simultaneously.

The dual Ethernet configuration (M58 and M59) allows users to implement a daisy-chain topology. Alarm functionality is also included.



CPM Standalone Rear (Standard)

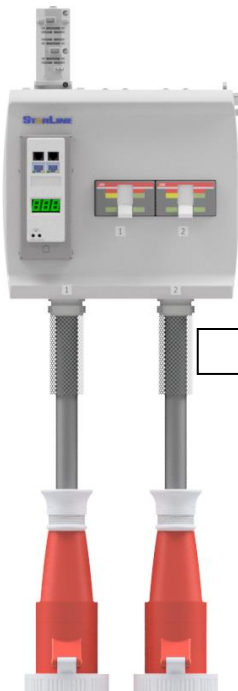


CPM Standalone Right



CPM Standalone Left

*Below examples are meant to depict sample Retrofit CPM installations (plug not included)



Example:

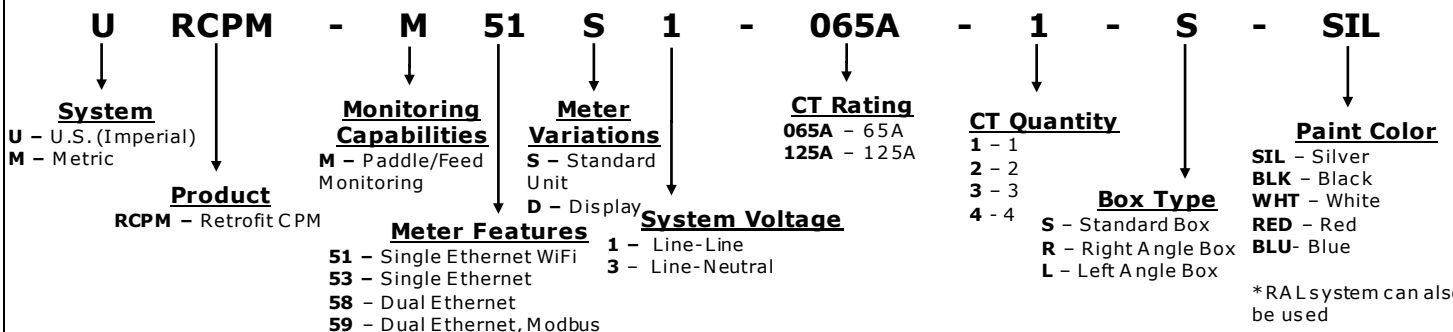
URCPM-M53D3-125A-3-S-SIL



Example:

URCPM-M51D3-065A-S-SIL

Catalog Number Sequence



CORDED CRITICAL POWER MONITOR

Branch Circuit Monitoring

MONITORING: The Corded CPM has a plug on one end and a connector body or receptacle on the other end; making it ideal for field power monitoring on-the-fly. It is capable of monitoring the energy of any device.

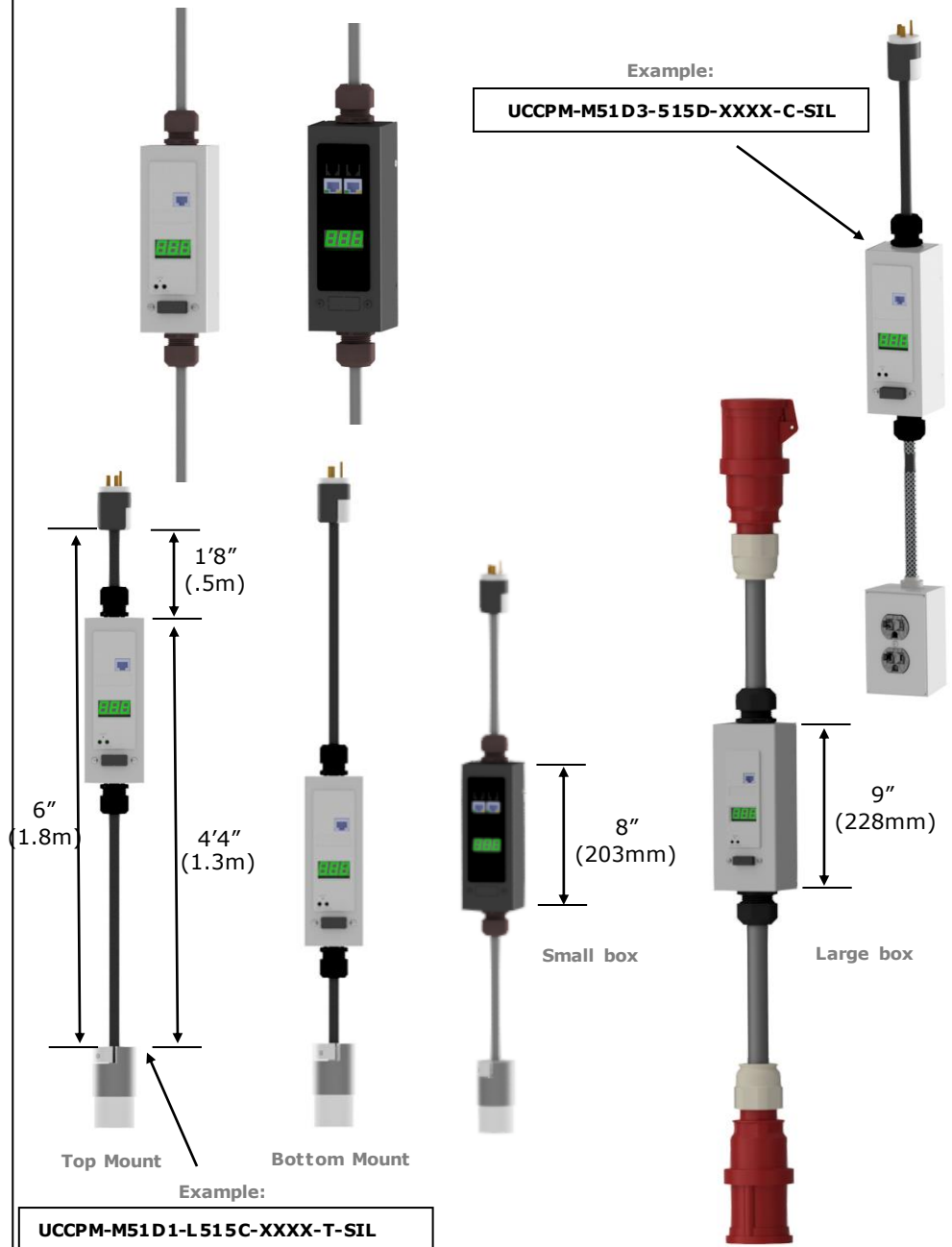
The Corded CPM is also available without connectors.

All M50 meter features, communication options and accessories are available except for measured neutral.

BOX SIZE: There are two different Corded CPM box sizes. The smaller is designed for single phase (2 pole/3 wire, 1 pole+N/3W) wiring devices rated from 0-32A & 0-480V. The color is black unless specified. The larger enclosure is designed for all other configurations. These include single phase (2 pole/3 wire) rated at 32A-63A & 0-480V, three phase delta (3 pole/4 wire) rated at 0-63A & 0-480V and three phase wye (4 pole/5 wire) rated at 0-63A & 0-480V.

METER LOCATION: The meter can be placed in the center or offset from the top or bottom of the cord. Top or Bottom meters will always be 1'8" (.5m) from the end of the connector.

LENGTH: Length of corded units range from 4 to 25 feet in increments of 1 foot for domestic units. International corded CPMs can be ordered in 1m, 3m or 9m. No other lengths are offered at this time.



Catalog Number Sequence

U	CCPM	-	M	51	S	1	-	L515	C	-	XXXX	-	C	-	BLK
System	Product		Monitoring Capabilities		Meter Variations			Wiring Device OR Cord Set			Length (end to end)				Paint Color
U - U.S. (Imperial) M - Metric	CCPM - Corded CPM		M - Paddle/Feed Monitoring		S - Standard Unit D - Display			(options listed on pg. 13.13)			Imperial: Length will be selected via Syteline. There will always be four X's for these characters.				BLK - Black** SIL - Silver WHT - White RED - Red BLU - Blue *RAL system can also be used
			Meter Features		System Voltage			Device Style			Meter Location on the cord				**Default color is black
			51 - Single Ethernet WiFi 53 - Single Ethernet 58 - Dual Ethernet 59 - Dual Ethernet, Modbus		1 - Line-Line 3 - Line-Neutral			C - Connector Body R - Receptacle D - Duplex Q - Quad Receptacle			C - Center T - Top B - Bottom				

CORDED CRITICAL POWER MONITOR

Wiring Device/Cord Set Options

AC NEMA/IEC Name	Voltage	Current
CS6360C	125V	50
CS6364C	125/250V	50
CS8264C	250V	50
CS8364C	250V	50
CS8164C	480V	50
CS8464C	480V	50
515D	125V	15
515	125V	15
520D	125V	20
520	125V	20
530	125V	30
615D	250V	15
615	250V	15
620D	250V	20
620	250V	20
630	250V	30
L1420	125/250V	20
L1430	125/250V	30
L1520	250V	20
L1530	250V	30
L1620	480V	20
L1630	480V	30
L2120	120/208V	20
L2130	120/208V	30
L2220	277/480V	20
L2230	277/480V	30
L2320	347/600V	20
L2330	347/600V	30
L515	125V	15
L520	125V	20
L530	125V	30
L615	250V	15
L620	250V	20
L630	250V	30
L715	277V	15
L720	277V	20
L730	277V	30
L820	480V	20
L830	480V	30
316C4S	110V	16
332C4S	110V	32
363C4S	110V	63
320C4S	125V	20
330C4S	125V	30
360C4S	125V	60
520C9W	120/208V	20
530C9W	120/208V	30
560C9W	120/208V	60
316C6S	230V	16
332C6S	230V	32
363C6S	230V	63

420C12W	125/250V	20
430C12W	125/250V	30
460C12W	125/250V	60
320C6W	250V	20
330C6W	250V	30
360C6W	250V	60
320C5W	277V	20
330C5W	277V	30
360C5W	277V	60
416C4S	110V	16
432C4S	110V	32
463C4S	110V	63
416C9S	230V	16
432C9S	230V	32
463C9S	230V	63
420C9S	250V	20
430C9S	250V	30
460C9S	250V	60
416C6S	415V	16
432C6S	415V	32
463C6S	415V	63
420C7S	480V	20
430C7S	480V	30
460C7S	480V	60
516C6S	230/400V	16
532C6S	230/400V	32
563C6S	230/400V	63
316C9S	415V	16
332C9S	415V	32
363C9S	415V	63
520C7S	277/480V	20
530C7S	277/480V	30
560C7S	277/480V	60
320C7W	480V	20
330C7W	480V	30
360C7W	480V	60
15A-300V	300V	15
16A-300V	300V	16
20A-300V	300V	20
30A-300V	300V	30
32A-300V	300V	32
50A-300V	300V	50
60A-300V	300V	60
63A-300V	300V	63
15A-480V	480V	15
16A-480V	480V	16
20A-480V	480V	20
30A-480V	480V	30
32A-480V	480V	32
50A-480V	480V	50
60A-480V	480V	60
63A-480V	480V	63

POWER FEED UNIT with IR WINDOW



End Feed with Infrared (IR) Window

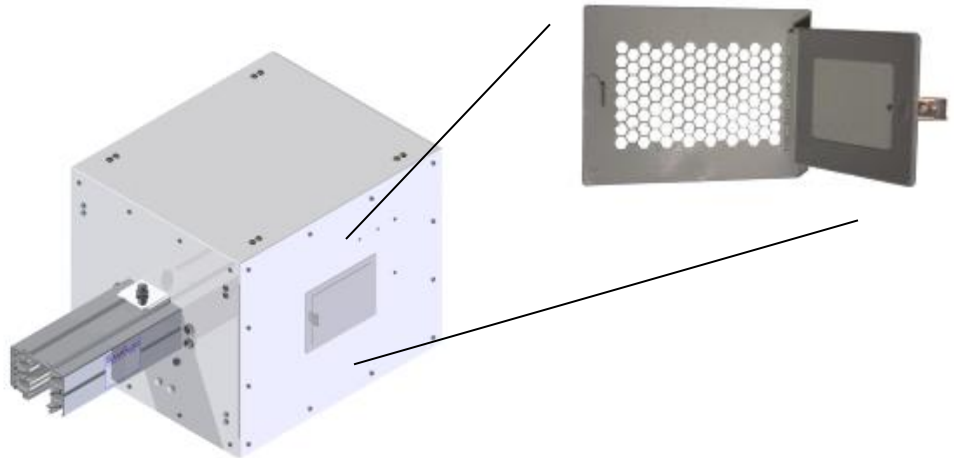
Standard End Power Feed units connect to the end of the Busway. Factory assembled unit consists of a steel junction box, with removable sides, connected to a section of Busway. The IR Window installed in the End Feed provides electrical connection information while the panel doors are safely closed.

IR windows offer:

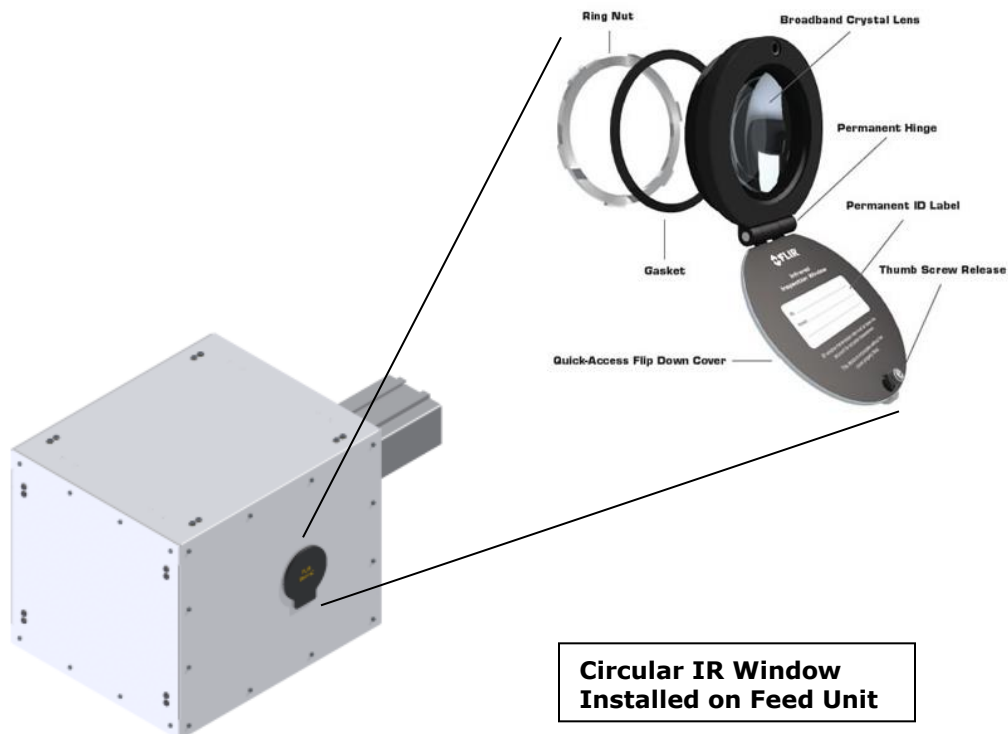
- Enhanced electrical safety
- Increased compliance to NFPA 70E / CSA Z462
- Reduced PPE
- Closed-door infrared inspections
- Stable and consistent transmission over product life
- Largest field of view of any IR window
- Supports visual and infrared imaging for any IR camera

Contact sales for End Feed enclosure dimensions and catalog numbers. This accessory will be denoted with a "IRW" for the rectangular IR window, and a "IRH" for the circular window in the catalog number.

Circular windows can be used when there are external spatial restrictions as it has a smaller footprint.



IR Window Installed on Feed Unit



Circular IR Window Installed on Feed Unit