Overview
The UDM08-EM (UDM) Universal Dimmer Module provides control of up to eight dimming loads. Each load can be independently set for forward or reverse phase load operation. Four linefeeds provide added reliability with AFCI circuit breakers by breaking each breaker feed's overall load. The modules have current sensing built-in allowing conditional programming in Design Center and increased support of Energy Management scenarios. UDM modules provide exceptional support of LED, CFL, and other low wattage lighting. High wattage lighting is also supported with 10amp capacity per individual load and 32 amp total module capacity. Vantage's easy plug-in and unplug installation, without removing any screws or wires, is now even easier with new locking handles on both sides of the module. The UDM module is compatible with standard and LCAP enclosures using TUDM-KIT AC terminal boards specific to this module. (See MODULE and ENCLOSURE EXAMPLES later in this document).

UDM Module and Related Parts

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDM08-EM</td>
<td>Universal Electronic Dimmer Module</td>
</tr>
<tr>
<td>TUDM-KIT</td>
<td>One TUDM-L (4 load, AC Terminal Board left in KIT) One TUDM-R (4 load, AC Terminal Board right in KIT)</td>
</tr>
<tr>
<td>TUDM-L</td>
<td>One 4 load, AC Terminal Board left</td>
</tr>
<tr>
<td>TUDM-R</td>
<td>One 4 load, AC Terminal Board right</td>
</tr>
</tbody>
</table>

Module Feature Summary:
- reverse/phase or forward-phase dimming, selectable each load,
- Dimming Configuration option in Design Center – Auto or Manual,
- advanced built-in circuitry protection and reporting via LEDs,
- automatic shutdown over current, over-voltage, and other incorrect load conditions are detected,
- locking mechanism - insert/release handles,
- Locks module in enclosure and allows the module to be securely held when inserting and removing,
- each of the 4 linefeeds has a replaceable fuse to help protect the module's main circuitry from critical damage; replacement fuses available, part # VCI-0038,
- supports up to 8 loads, o two loads per linefeed reduces false tripping when connected to AFCI circuit breakers,
- separate AC termination boards eliminate direct wiring to the module – “plug and go” installation,
- step-free ramping and dimming operation,
- support for LED lighting. (See LED Dimming pg 4)

Status LED indicators;
- Line Power (1 per feed), Fuse Status (1 per fuse), Load Power (1 per load).
- Over Temperature, Overcurrent, Manual Override, and Microprocessor Status.
- self-powered - remembers load levels if controller is temporarily not connected with controller,
- pre-program loads to any level when in override,
- load handling - IGBT dimming,
- power consumption is measured for each individual load, and
- firmware is field upgradeable.

Specifications
- Dimensions HWD: 7.63” x 9.44” x 3.75”
- Weight: 4.95 lbs or -2.25 kg
- Voltage: 120V/277V ~ 50/60Hz
- Max Amperes per module: 32A (3,840W@120V) + 32A (7,680W@240V) + 32A (8,864W@277V)
- Max Amperes per linefeed: 16A (1920W@120V) + 16A (3840W@240V) + 16A (4432W@277V)
- Max Amperes per individual load: 10A (1200W@120V) + 10A (2400W@240V) + 10A (2770W@277V)
- Max Amperes per individual LED load: 6A (720W@120V) + 6A (1440W@240V) + 6A (1662W@277V)

*Important Magnetic Load Information*
- Connecting unloaded magnetic transformers should be avoided.
- Magnetic transformers should be appropriately sized.
- Magnetic transformers should not be overloaded so as not to be used in such a way that they become over heated.
- Magnetic transformers should be operated on the low voltage side (fused or circuit breaker protection type).
- For transformers that have dual secondary coils, each secondary should be equally loaded (e.g., Model EREA E212SC300SK transformer or similar).

**Microprocessor Status LED:**
- No communication to Controller
  - Module not powered
  - Controller in service mode
  - Controller not powered
  - Controller in service mode
- Overcurrent LED: Amber
- Load Power LED: Red
- Over Temperature LED: Red
- Overcurrent LED: Amber
- Status LED: Red

**Dimming Configuration set to AUTO in Design Center**
- The module’s load indicator will be purple and the module will automatically select the correct load phase. NOTE: If the load is physically changed to a different phase the module may initiate a 1-blink pattern, wrong load type. Reset the module to correct load type, page 2, or re-programming the system will also correct the problem.

**Dimming Configuration set to MANUAL (default) in Design Center**
- Each load on the module has a dip-switch for load phase control.
- Load by load selectable – see reset module, page 2, or re-programming the system will automatically select the correct load phase.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Types</td>
<td>Incandescent; LED; dimmable CFL; dimmable ballasts; magnetic low voltage; neon/cold cathode (if); fluorescent (relay mode only); constant-speed motors (relay mode only)</td>
</tr>
<tr>
<td>SCR Rating</td>
<td>50A</td>
</tr>
</tbody>
</table>
| Built-in Protection | - Module, Overcurrent auto shutdown
|                    | - Load, Overcurrent auto shutdown of individual loads
|                    | - Load, Short Circuit auto shutdown of loads
|                    | - Load, Correct Load Type Protection
|                    | - Load, Irregular load Conduction Protection
|                    | - MOV surge
|                    | - Fuse protection linefeed
|                    | - Module, Thermal shutdown
|                    | - Lighting Surge Protection High Voltage
|                    | - Lighting Surge Protection Low Voltage |
| LED Load Error Status | - Line Power: .................. 1 green per feed
|                    | - Fuse Status: .................. 1 green per fuse
|                    | - Load Power: .................. 1 red/blue/purple per load
|                    | - 2 blink pattern: ............ red for forward phase + blue for reverse phase + purple for auto mode
|                    | - Over Temperature: ............ 1 amber
|                    | - Microprocessor Status: ...... 1 red
| LED Load Blink Pattern | (Blinks patterns are only in red or blue, it depends on the last load type the module tried.)
|                    | 1 – blink pattern: .................. load is wrong load type
|                    | 2 – blink pattern: ............ load has a short circuit
|                    | 3 – blink pattern: ............ load is overcurrent
|                    | 4 – blink pattern: ............ irregular load conduction, (e.g., saturated transformer)

**Module and Load LED Status Indicators**
- LED Load Error Status
- LED Load Blink Pattern

<table>
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</tr>
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<tbody>
<tr>
<td>Manual Override</td>
<td>Load by Load selectable – dip switches</td>
</tr>
<tr>
<td>Cooling</td>
<td>Connection must maintain 36° front clearance</td>
</tr>
</tbody>
</table>
| Ambient Operating Temperature/ Humidity | 32 - 104°F or -00 - 40°C
| Minimum RFI, non-condensing |
| FreeRTOS          | Real-time scheduling provided by FreeRTOS (www.freertos.org) |
| Compliance        | UL / CUL and CE |

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Electronic Universal Dimmer Module — MODEL: UDM08-EM  page 1 of 4
Module Operation

The UDM (Universal Dimmer Module) is designed for installation into standard, LCAP, and LT2VA(S) enclosures. Please note the following operational features:

- The module has a built-in 5W power supply; module remains powered and retains the last level for each load if the InFusion Controller is off line.
- **Primary Linefeed (Line A) must be connected**
- The large heat sink on the front is for heat dissipation; National Electrical Code requires that a minimum of 36 inches of clearance be maintained in front of the module enclosure.
- Over Temperature LED: An overtemperature condition may exist at the individual load level or at the entire module level. If the module overheats, it will shut down due to an over-temperature condition, it may be due to one or more of the following reasons:
  a. The enclosure is blocking air to move through it (36” front clearance required).
  b. The total wattage on one or more of the linefeeds exceeds the maximum allowed, which would potentially overheat the module, and/or
  c. Overcurrent LED: An overcurrent condition can exist at the individual load level or at the entire module level. If the module overcurrent status LED is on or the individual load status LED is a 3-blink pattern, locate and fix the problem immediately.

RESET MODULE: When problems are fixed, cycle power to “Line A” or in Design Center right click on the module and select Reset Module – loads will cycle on reset. Turning individual loads OFF and ON will also reset loads or turning all loads on module OFF and ON will reset module.

- See module / load LED information in Specifications table pg. 1.

Front Module Label / Status LED Description

<table>
<thead>
<tr>
<th>LED Descriptions Above:</th>
<th>Linefeeds A/B</th>
<th>Linefeeds C/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
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<tr>
<td>4.</td>
<td></td>
<td></td>
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<tr>
<td>5.</td>
<td></td>
<td></td>
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<tr>
<td>6.</td>
<td></td>
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<tr>
<td>7.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green........................</td>
<td>Normal Operation for linefeed power</td>
<td>On/Off status for loads</td>
</tr>
<tr>
<td>Red/Blue/Purple.........</td>
<td>Red = forward phase - switch up</td>
<td>Blue = reverse phase - switch down</td>
</tr>
<tr>
<td></td>
<td>If load LED is blinking the load needs attention. The blink pattern is 1 second off followed by 1 to 4 quick blinks. For example, a wrong load type error would have one short blink every second. See the Specifications table pg. 1. Auto-detect LED Load Error Status for all patterns.</td>
<td></td>
</tr>
</tbody>
</table>

Amber........................ | Problem, needs attention when ON for numbers 3-overtemp and 4-overcurrent, (see Module Operation above). If LED number 7 is ON and Manual Override was not intentionally enabled, please check the InFusion Controller/wiring to correct problem. |

Installation

Installation of Vantage products should be performed or supervised by a Certified Vantage Installer. Installation and maintenance of high voltage devices should only be performed by licensed, qualified, and competent personnel having appropriate training and experience.

CAUTION: Turn Breakers OFF and Check that no Power is ON at the AC Terminal Boards when working in the enclosure or working on lighting fixtures connected to the Module’s Loads, etc. Do not allow trimmed wire cuttings to fall into enclosure components as they may cause damage when power is restored. Damage from this type of short will void the warranty.

Before Module is Plugged In

All AC wiring must be terminated into AC screw terminal connectors - TUDM-R, TUDM-L. Vantage recommends installing MJTB jumper boards to pre-test* the wiring and to allow the module to be installed after construction is complete; this eliminates the chance of a module being damaged during the testing and construction phase.

*Pre-Test: Not testing with the MJTB jumper could void the module’s warranty (Please see the Testing and Pre-Installation of Module section, below, in this document).

Testing and Pre-Installation of Module

CAUTION: Turn linefeed breakers OFF before installing MJTB jumper boards! Using a reliable meter, verify that the power is OFF! Vantage’s MJTB jumper should be used to test all loads for shorts before modules are plugged in. The jumper may also be used during construction providing control of loads via circuit breakers.

Neutrals

Run a separate NEUTRAL for each load connected to dimming devices. Failure to do this may cause static loads to slightly flicker while other loads, sharing the same neutral, are ramping or fading.

Locking Mechanism – Module Insertion & Extraction Process

STOP! Always turn breakers OFF when inserting or extracting any module! Verify power is off with a reliable meter before proceeding!

Insertion Steps

1. Turn all breakers off to the module’s linefeeds – verify!
2. Be sure the handles are fully spread out/apart.
3. Grip the handles and carefully line up the module with AC terminal boards
4. Push module into enclosure by applying pressure to the heat sink with your palms and at the same time allowing the handles to swing in – toward module.
5. When the module is fully seated, make sure the handles are fully pressed in to the module sides, to properly lock.

Extraction Steps

1. Turn all breakers off to the module’s linefeeds – verify!
2. Grip the handles and spread apart. The locking handles are designed to lift the module free.
3. When the handles are fully spread apart the module has been extracted from the AC terminals and is free – securely hold both handles until the module is set aside.

Fuse Replacement

Fuse LED indicator is ON when the fuse is working. See: Front Module Label / Panel Description previous page.

CAUTION:

- Turn breakers off!
- Verify power is off with meter!
- Remove module from the AC panels by pulling the locking handles apart to raise module (see Locking Mechanism – Module Insertion & Extraction Process above).
Carefully follow the steps below to replace the bad fuse with a replacement fuse. Note the location of fuse holders on the back of module. Spare fuses may be ordered from Vantage, part # VCI-0038.
Module design allows for one working and one spare fuse at each fuse location of the module.
Steps to replace fuse

1. Use a wide, flat blade screw driver or pliers to carefully lift/pull the fuse holder component out of the module. Use caution to avoid damage to the fuse holder and/or module. Remove the old fuse and insert a new one.

2. With the new fuse installed into the fuse holder, carefully reinsert the fuse holder, using care that it is securely inserted making a solid connection.

3. After Fuse Replacement and Before Applying Power:
   - Make sure fuse is secure and centered top to bottom in the fuse clamps.
     - The metal fuse ends must fully line up with the fuse clamps for maximum surface contact between clamps and fuse end conductors.
   - Make sure fuse clamps in module are not bent allowing the fuse to be loose.
   - If fuse clamps are loose:
     - DO NOT PLUG MODULE IN.
     - Remove fuse holder again.
   - Carefully squeeze fuse clamps closer together (not too hard) so fuse holds tight. Do not over squeeze.
   - Reinsert fuse assuring maximum surface contact.

AC Terminal Boards Assembly • Standard/LCAP Enclosures

With new enclosures the AC terminal boards are installed in the field unless it is an LCAP series enclosure.

IMPORTANT: The LEFT AC terminal board, TUDM-L is the module’s only ground source. Make sure the center screw is properly connected and grounded.

Example 1:
UDM into enclosure
Enclosure AC panel board assembly for UDM module.

1. Insert AC terminal boards - TUDM-L, left and TUDM-R right to panel board and secure using 1, VHD-0082, #6-32 X 7/8" PHILLIPS PAN HEAD THREAD FORMING screws (TYPE-F) on each board.
   a. Left board is also the ground connection for the UDM module – it must connect to the enclosure – be careful not to strip self-tapping threads or damage AC terminal board.
   b. Place module load labels on left and right sides of the AC panel board using care to align with screw terminals.
   c. Enclosure section is now ready for wiring.

Example 2:
New UDM module into old enclosure-retrofit
When adding a UDM module to an old enclosure remember to order kit, part number: TUDM-KIT. The kit includes the Left: TUDM-L and Right: TUDM-R terminal boards. The new module must also have four linefeeds; two Linefeeds A & B on the left side terminal board and two Linefeeds C & D on the right side terminal board if the old enclosure has the clear plastic standoffs it will also be necessary to order a new panel board, part number 103160-1.

1. Remove old AC terminal boards and plastic standoffs*.
2. Install new screw panel board - inserted upside down. If placing next to an old module, it will be necessary to trim the clear plastic inter-lock sections of the old plastic panels in the enclosure to make room for the new 103160-1, panel board. This will need to be done at any location where the new panel board is next to an old module. See illustration (below).

*NOTE: If the enclosure pre-dates the plastic standoffs (enclosures shipped before February 2005) and uses pem-studs instead (metal standoffs), the new panel, part #103160-1, is not needed. Simply remove the old AC terminal boards and metal spring clips. Replace with the new AC terminal boards, using all three screws from old AC boards.

3. Insert AC terminal boards - Left: TUDM-L and Right: TUDM-R to panel board and secure using, VHD-0082, #6-32 X 7/8" PHILLIPS PAN HEAD THREAD FORMING screw (TYPE-F) on each board.
4. Place module load labels on left and right sides of the AC panel board using care to align with screw terminals (labels are not used with pem-stud type enclosures).
5. IMPORTANT: Make sure the left center screw is securely grounded to the metal enclosure. This is the module’s only ground point.
6. Enclosure section is now ready for wiring.

**Mixed installations with new and old modules next to each other in an older enclosure.

The interlock key on the old plastic standoffs will not allow the new plastic screw panel 103160-1 to fit properly and must be trimmed. Please note that this inter-lock key is typically on the top of the plastic standoffs for left-hand side and on the bottom for the right hand side.

Energy Management and Sensors
Each module has power/current sensing built into each of the eight loads. Design Center can monitor and report each load’s measurement in AMPS and/or WATTS. This information may be used in energy management scenarios to conserve the amount of energy used at any given time.

Power/Current Sensor Tracking
In Design Center, notice when the module is selected in Enclosure View the Object Editor displays each of the power and current sensors separately. This allows the programmer to place a checkmark in the Track checkbox which allows live, continuous tracking of the linefeed’s power consumption. It is recommended to only place a check mark in sensors that will be tracked “live” via a TPT Touchscreen.

It is still possible to program energy management scenarios without the sensors having the Track checkbox, checked.

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It is also possible (although not as accurate) to program energy management scenarios using load on percentages. Any combination of power/current sensor and load percentages may be used to shed loads for power shedding requirements.

Create load shedding tasks by using “IF” logic to compare AMPS and/or WATTS to specific levels.
**LED Dimming**

Vantage is leading the way in LED lighting control through innovations of new hardware and software products. However, industry standards are still undefined for dimming LED lamps and fixtures. Dimming performance of LED lighting cannot be guaranteed even when applying the correct dimming technology specified by the LED manufacturer. While Vantage may be consulted when performance issues are present, Vantage will not be liable for on-site performance issues. Vantage recommends the following to assist installers and lighting specifiers.

- Check Vantage's online library of LED product test reports prior to installing LED products to be dimmed by Vantage dimmers.
- We offer on-demand product testing of untested LED products.
  - Please contact Vantage for details regarding this service.
- Selecting a tested product greatly increases the likelihood of successful dimming. However, LED product tests are performed under laboratory conditions with a set number of samples and a quality power source.
- There are many factors that may contribute to unsatisfactory results within a specific installation, including, but not limited to,
  - line noise originating from electrical equipment within the premises,
  - line noise from the source (particularly with local generators or inverters),
  - interference between dimmed LED products,
  - wiring conditions (i.e., shared neutrals, loose neutrals, incorrectly bonded neutral, or grounding issues), and
  - LED product variances including,
    - unintended batch-related variances, and
    - product revisions.

**Product Drawings**

![Panel Board](image1)

![TUDM-KIT](image2)

![Product Drawings](image3)