Square D® Integrated Power and Control Solutions (IPaCS™) Fueling Applications

Application Guide

Class 2735

Data Bulletin

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INTRODUCTION

Square D® Integrated Power and Control Solutions (IPaCS™) Business delivers reliable control solutions from the industry's most powerful combination of electrical control expertise, team service, and innovative products.

IPaCS products integrate electrical distribution, electrical controls, and power quality assurance into a single enclosure, saving construction managers space, time, and money. Application solutions can include any combination of lighting, fueling and HVAC controls, as well as electrical distribution and power quality products.

This application guide will assist you in applying IPaCS products to your control solution needs. The following products are covered in this guide:

- “Fueling Controls” on page 5
- “Lighting Controls” on page 12
- “Combination Controls (Fueling/Lighting)” on page 20
- “Peripheral Controls” on page 26
- “Power Quality” on page 30

FUELING CONTROLS

The fueling controls product line is designed to combine several conventionally-installed fueling controls into a single, integrated, space-saving system while meeting applicable National Electrical Code® (NEC)/National Fire Protection Association® (NFPA) requirements.

DISPENSER MANAGER–EX

The Dispenser Manager–EX (DM–EX) operates Multi-Product Dispensers (MPDs), Submersible Turbine Pumps (STPs), and the required interfacing to peripheral equipment such as tank monitoring systems, remote operating stations, and variable speed controllers.

Figure 1: Dispenser Manager–EX

DM-4D-4P-EX

DM-6D-4P-EX

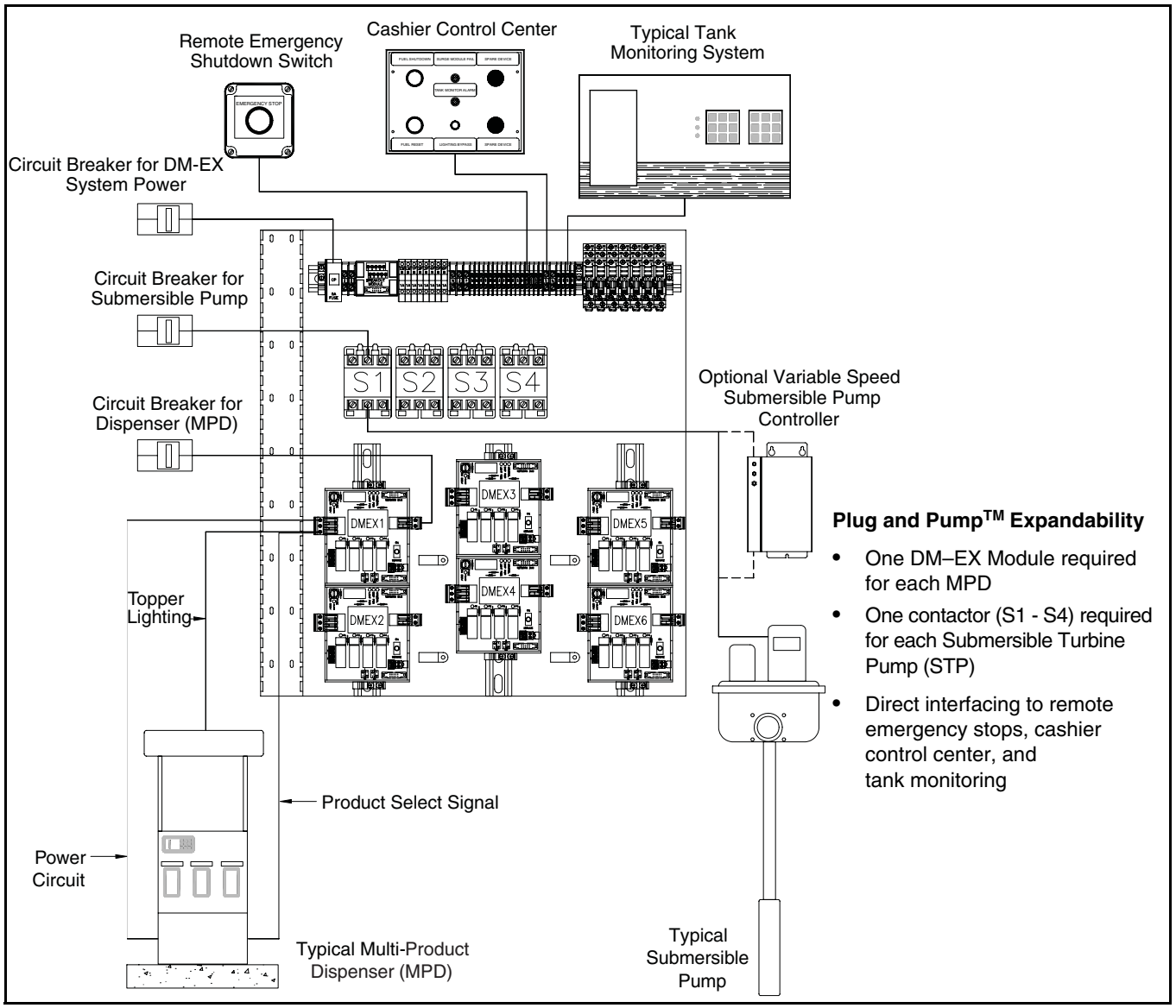
The Dispenser Manager–EX provides consistent, standardized, and modular expansion capabilities with terminal strip interfacing. Field-installed controls (such as emergency shutdown contactors, isolation relays, STP control boxes, and maintenance disconnect switches) are difficult to install and start up, as well as costly and time consuming to maintain.

The Dispenser Manager provides time-saving installation, consistent operation, factory-tested reliability, and the modular expansion of the latest DM–EX module technology. For more details about the DM–EX module, see page 10.

The Dispenser Manager eliminates the need for:

- Emergency shutdown contactors or shunt trip breakers
- Dedicated fueling panelboards
- Separately wired submersible pump control boxes
- Switched-neutral circuit breakers for dispenser power
- Separate circuit breakers for dispenser topper lighting circuits

Figure 2: Dispenser Manager–EX Overview



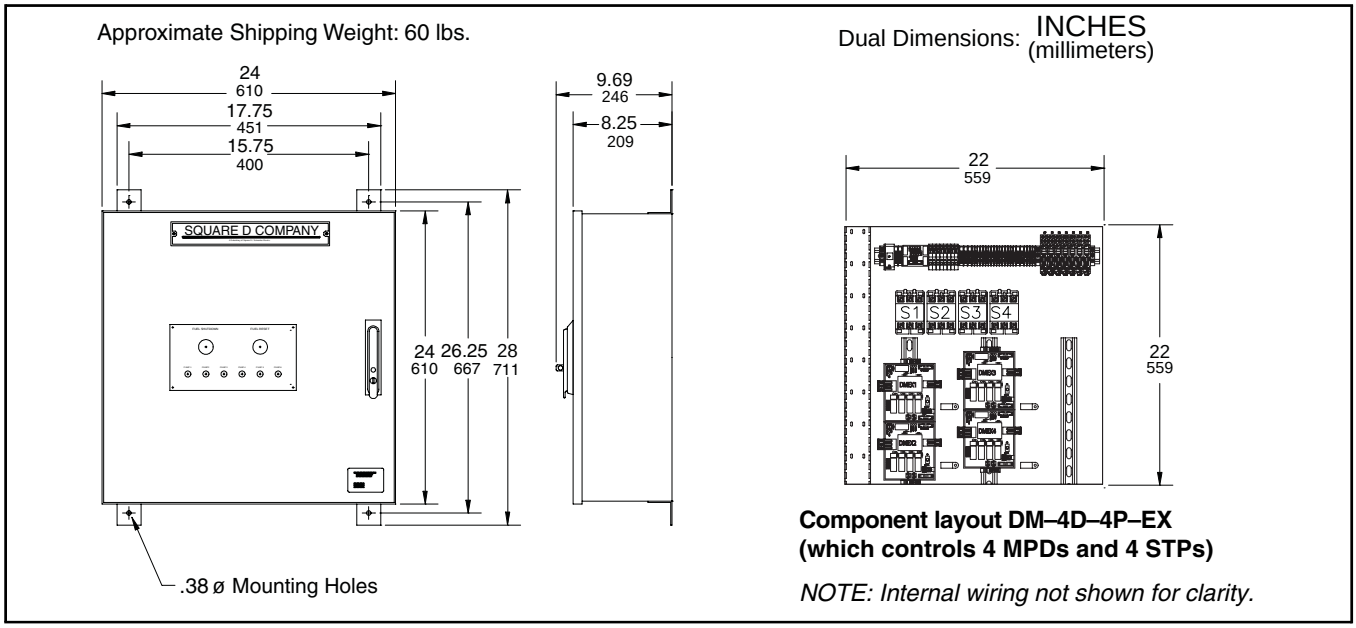
Product Features

The following components and requirements are pre-engineered on the DM–EX:

- Single, space saving cabinet prewired with controls and contactors
- Allows use of standard single-pole circuit breakers
- Eliminates the need for separate field wiring of fixed-speed STP control boxes
- Prewired interfacing to remotely located tank monitoring systems, emergency stop switches, and cashier control consoles
- Plug and Pump™ expandability for easy addition of MPD modules with track-mounted design and ribbon cable connection
- Front-mounted interface panel with emergency stop, reset switches, and STP status indicator lights
- Status indicator lights for MPD diagnostics
- Meets the following standards:
  - — UL® 508 Industrial Controls: File E–228717
  - — NEC® Article 514–5 (emergency shutdown on all line and neutral conductors) and Article 514–6 (providing switches for each dispenser to disconnect all line, neutral, and feedback conductors for maintenance and service)

Dimension Drawings

Figure 3: DM–4D–4P–EX Dimensions

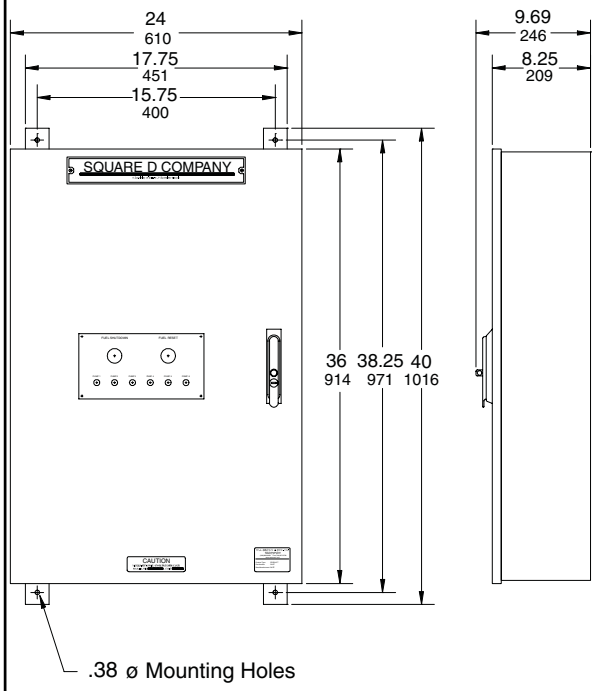


Component layout DM–4D–4P–EX (which controls 4 MPDs and 4 STPs)

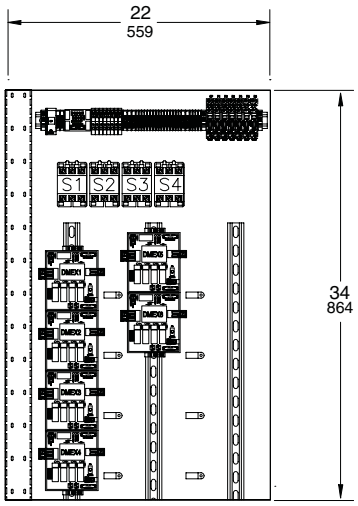
NOTE: Internal wiring not shown for clarity.

Figure 4: DM–6D–4P–EX Dimensions

Approximate Shipping Weight: 75 lbs.



Dual Dimensions: INCHES (millimeters)

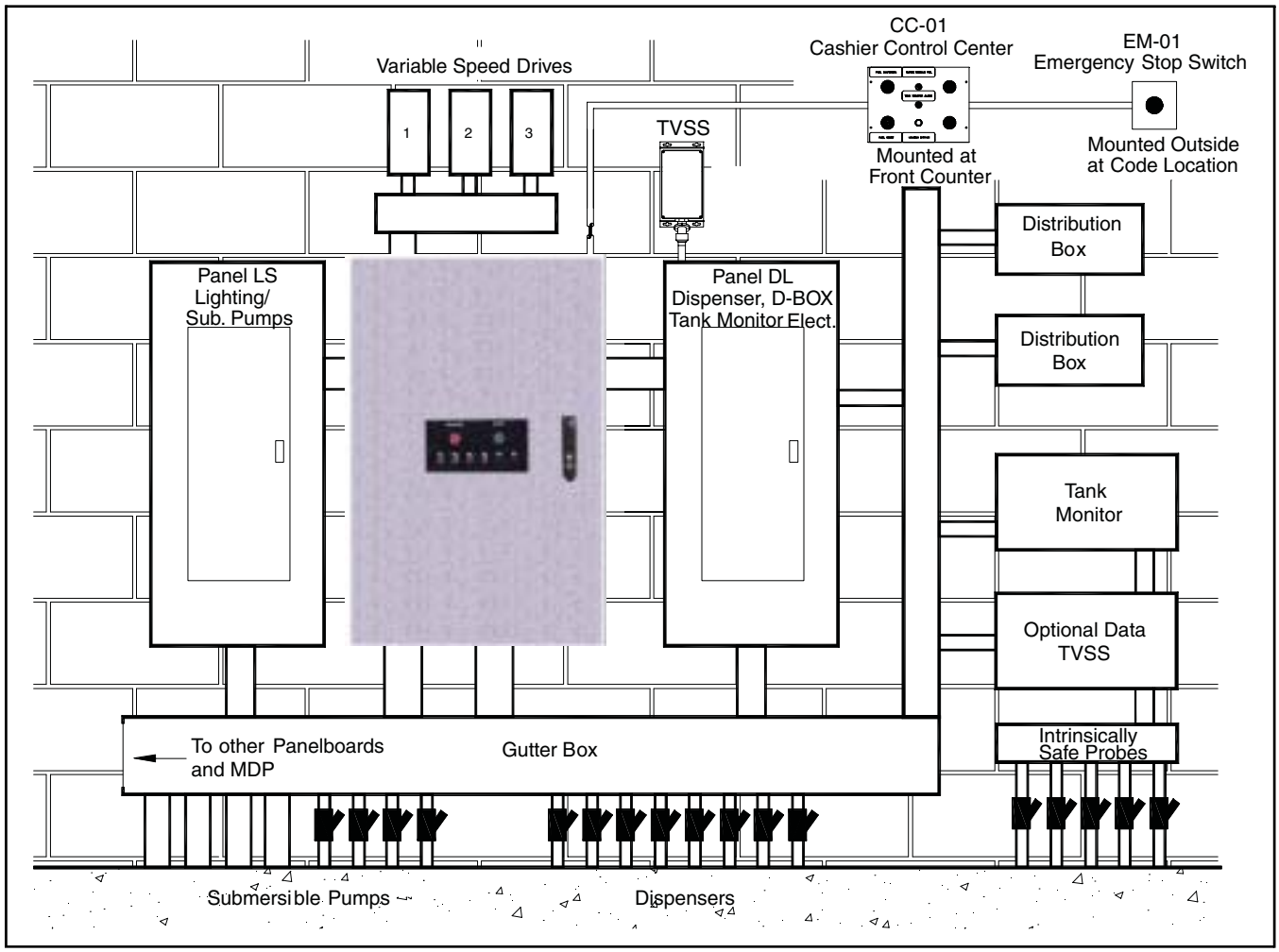


Component layout DM–6D–4P–EX (which controls 6 MPDs and 4 STPs)

NOTE: Internal wiring not shown for clarity.

Application Detail

Figure 5: Typical DM-4D-4P-EX and DM–6D–4P–EX Application



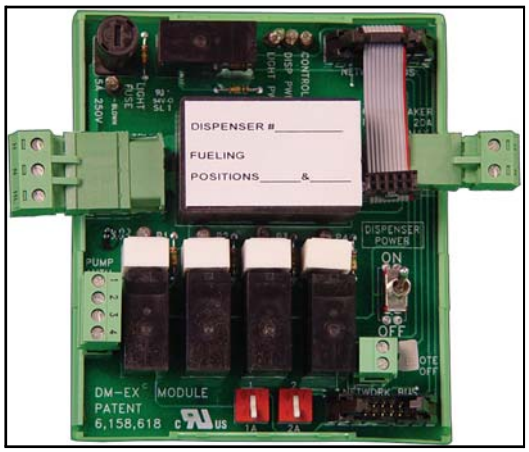
Technical Data

Table 1: DM–EX Products

	DM-4D-4P-EX/DM-4D-6P-EX	DM-6D-4P-EX/DM-6D-6P-EX
Supply voltage	120 Vac (+10%/-15%)	120 Vac (+10%/-15%)
Power consumption	250 watts max.	250 watts max.
MPD control capacity	4 (expandable to 6)	6 (expandable to 12)
STP control capacity	4 (expandable to 6)	4 (expandable to 6)
STP contactor switching capacity	30 A (5 hp max.)	30 A (5 hp max.)
Temperature	32° F to 122° F (0° C to 50° C)	32° F to 122° F (0° C to 50° C)
Humidity	8%—90% RH noncondensing	8%–90% RH noncondensing

DISPENSER MANAGER–EX MODULE

Figure 6: DM–EX Module



The DM–EX Dispenser Module is a component of the Dispenser Manager–EX and is a primary subsystem of the Square D® Integrated Power Center (IPC), a prefabricated electrical system. The module meets electrical and operational requirements for MPD fueling controls.

Product Features

The following components and requirements are pre-engineered on the DM–EX module:

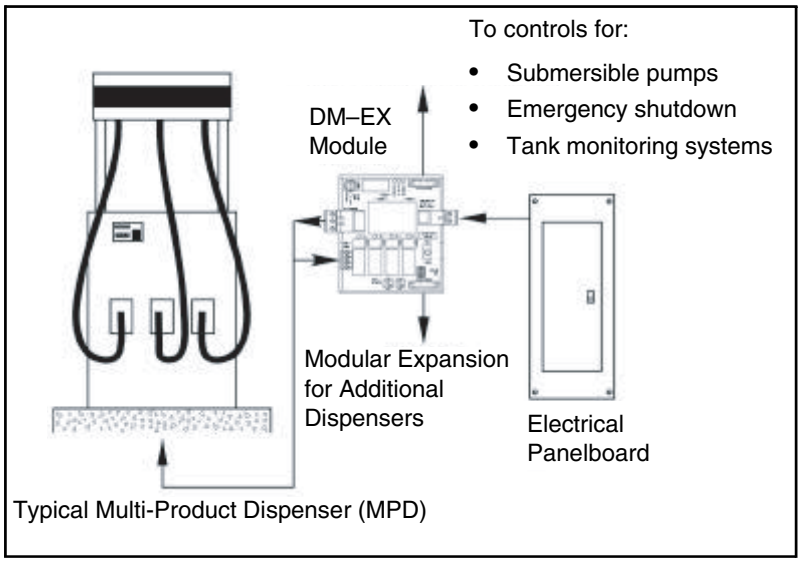
- Emergency shutdown of fueling system
- Electrical interface to submersible pump controls and tank monitoring systems
- Power relay mounted on each module provides NEC®–Article 514 required disconnect of both hot and neutral conductors
- Four product-isolation relays for multiphase and maintenance isolation, including status LED indication for diagnostics
- Separate relay control for dispenser topper lighting by Lighting Manager–5CB (also shuts down with the dispenser power)
- Dispenser power switch for manual shutdown of an individual MPD by a third party monitoring device
- Remote off terminals for automatic and/or manual shutdown of an individual MPD (for product leaks)
- DIN-rail mountable and network bus connections provide easy plug and pump expandability
- Status indicator pilot lights for dispenser diagnostics
- Two alternate pump selector switches control up to six submersible pumps, eliminating dispenser misphasing and the dangerous voltage backfeeds associated with conventionally-installed fueling systems
- Separate fuse and blown fuse indicator pilot lights for lighting relay
- Quick-connect wiring terminals for ease of installation and service
- Compact size saves wall space over conventional electrical wiring methods
- Meets the following standards:
  - — US Patent Number: 6,158,618
  - — UL® 508 Industrial Controls
  - — NEC Article 514

The following add-on options are available for the DM–EX module:

Description	Model Number
Add DM–EX module	ADD–DMEX
Add pump contactor	ADD–PUMP–CONT

Application Detail

Figure 7: Typical DM–EX Module Application



Technical Data

Table 2: DM–EX Module Data

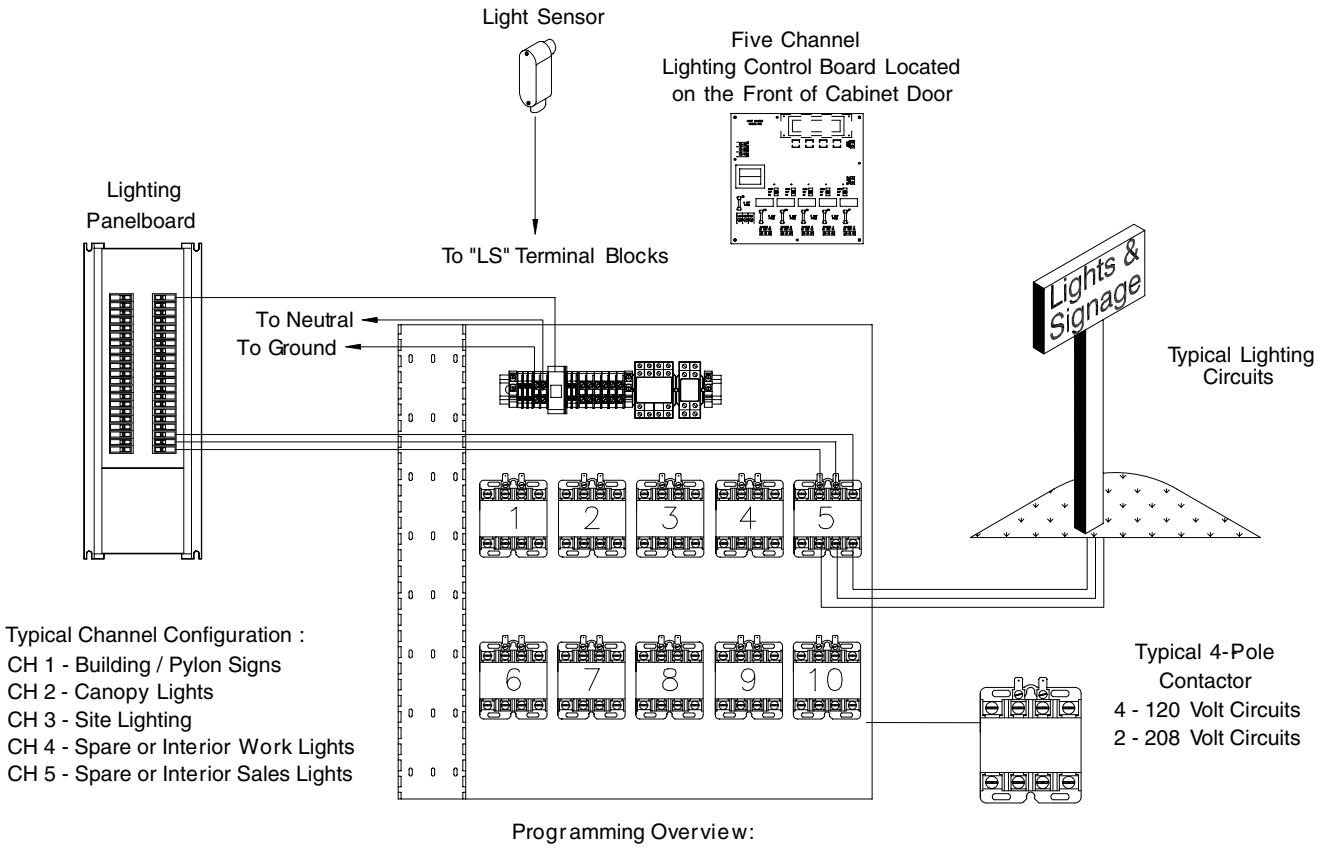
Supply voltage	120 Vac (+10%/-15%)
Operating current	20 A max.
Temperature	32° F to 131° F (0° C to 55° C)
Humidity	8%—90% RH noncondensing

LIGHTING CONTROLS

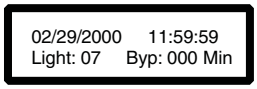
The lighting controls product line is designed to provide completely automatic lighting control systems in a single, integrated, space-saving system. This system helps conserve energy, reduce electrical costs, and maximize the efficient operation of lighting loads for outside lighting and other inside electrical loads.

Field-installed controls such as multiple time clocks, photocells, and contactor enclosures are difficult to install, challenging to start up, as well as costly and time consuming to adjust and maintain.

Figure 8: Lighting Manager Operating Overview



Programming Overview:

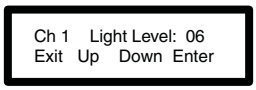


Key 1 Key 2 Key 3 Key 4

Keys 1–4 are the white buttons located under the display. To go into the programming mode, press “Key 1” and “Key 4” at the same time. The display will then change to the next screen.

Key 1 Key 2 Key 3 Key 4

To program “Light Level Setpoints” press “Key 1.” To program “Schedules,” press “Key 2.” To program “Clock,” press “Key 3.” To program “Miscellaneous,” press “Key 4.”



Key 1 Key 2 Key 3 Key 4

Light Level Setpoints:

1. Press the “UP” key to bring the lights on earlier (lighter).
2. Press the “DOWN” key to bring the lights on later (darker).
3. Press the enter key to go to the next channel.

Notes

- For 24-hour operations, it is not necessary to program any schedules. The light-level setpoints will automatically control the outside lighting according to the amount of sunlight available.
- The current light reading from the light sensor must be below the light-level setpoint for at least two minutes before the channel will turn on.
- Timed Bypass Switch (located on the front of cabinet): Press in to activate timed bypass. Press and hold two seconds to deactivate timed bypass.
- Emergency Override Switch Operation (located on the front of cabinet): Normal (up) = Runs programmed sequence, Emergency (down) = Bypasses program by turning channels on.
- Maintenance Override Switch Operation (one for each channel on the back of controller): “Auto” (up) = Normal operation, “Off” (middle) = Turns channel off, “On” (down) = Overrides program by turning channel on.
- Installation note for electrical contractor: To move a contactor to a different control channel (schedule / light level), locate the coil wire of the contactor (labeled 1–10) and rewire to the terminal strip labeled with the desired channel number (1–5).

The Lighting Manager replaces or eliminates the need for the following:

- Mechanical time clocks or electronic timers
- Photocells
- Panelboard or multi-pole contactors
- Operator-controlled switches for lighting
- Field wiring or multiple enclosures and control systems

The Lighting Manager line provides standardized automatic lighting control capabilities with terminal strip interfacing for the remote outdoor light sensor and optional remote timed bypass.

The Lighting Manager is a UL® listed, automatic lighting control system that replaces manual controls with a single-enclosure solution that integrates ambient light sensing, digital controls, and power switching of lighting circuits.

LIGHTING MANAGER: AUTOMATIC LIGHTING CONTROLLER

The Automatic Lighting Controller (LM–5CB) is a standalone controller designed for use with your existing contactor cabinet(s) or new contactor cabinet(s) available from IPaCS™.

Product Features

The following components and requirements are pre-engineered on the LM–5CB:

- Compact size saves wall space and maximizes installation flexibility
- Single, low-voltage light sensor controls three stages of outside lighting, two additional stages for automatic scheduling of interior lighting or signs
- Menu-driven programming allows easy setpoint adjustments
- Unique schedule programming for Monday—Thursday, Friday, Saturday, and Sunday; five programmable holidays and selectable daylight savings time functions
- Timed override switch for selected override of lighting stages
- Maintenance override switches allow service personnel to force lighting loads “on” or “off” without changing program schedules or light-levels setpoints
- Optional: Contactor enclosure, part # CE-24 (24 lighting circuits in 12 x 18 x 6 enclosure), Remote bypass switch, part # RB-01
- Included with LM-5CB: Light sensor and 50 ft. of #18-2 shielded cable
- Meets the following standards:
  - — UL 508A Industrial Controls: Files E–227793 and E–154976
  - — File Section 119 of the California 2005 Building Energy Efficiency Standards for Residential and Nonresidential Buildings—Automatic Time Switch Control Device

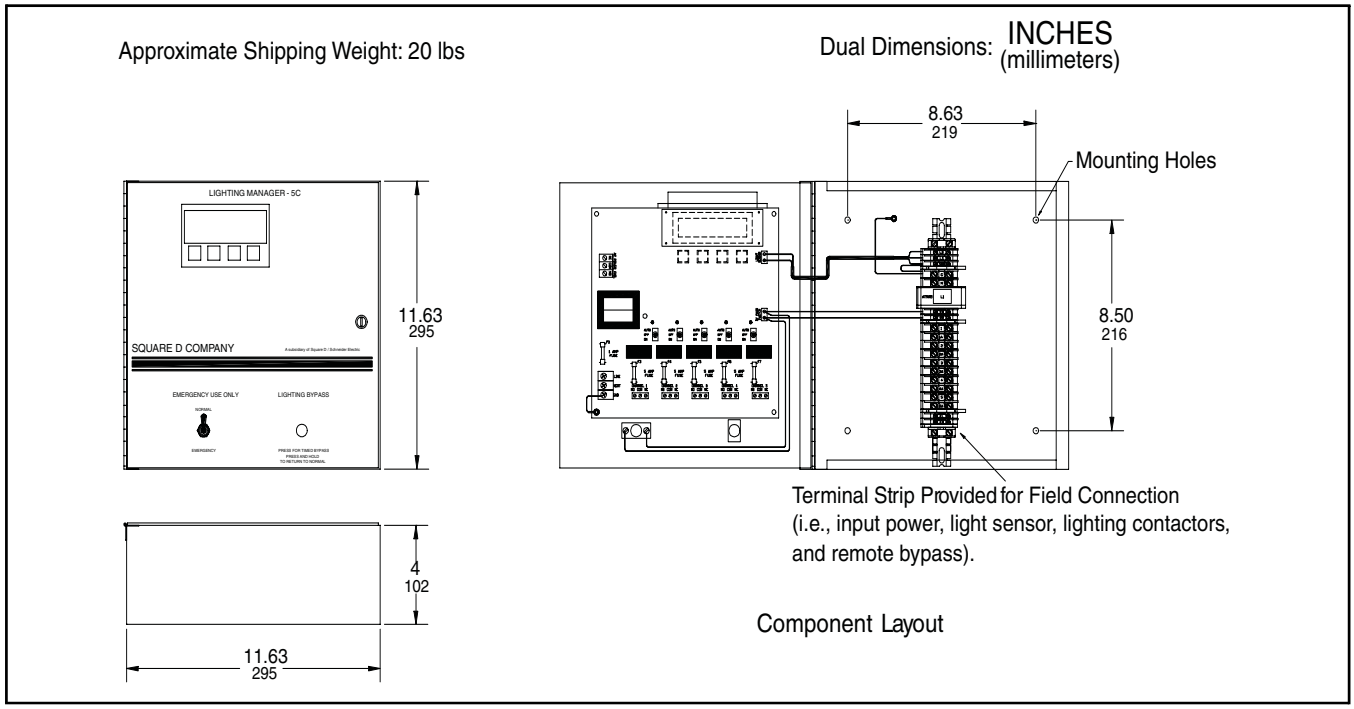
Figure 9: LM–5CB

The following add-on option is available for the LM–5CB module:

Description	Model Number
Add remote bypass button	RB–01

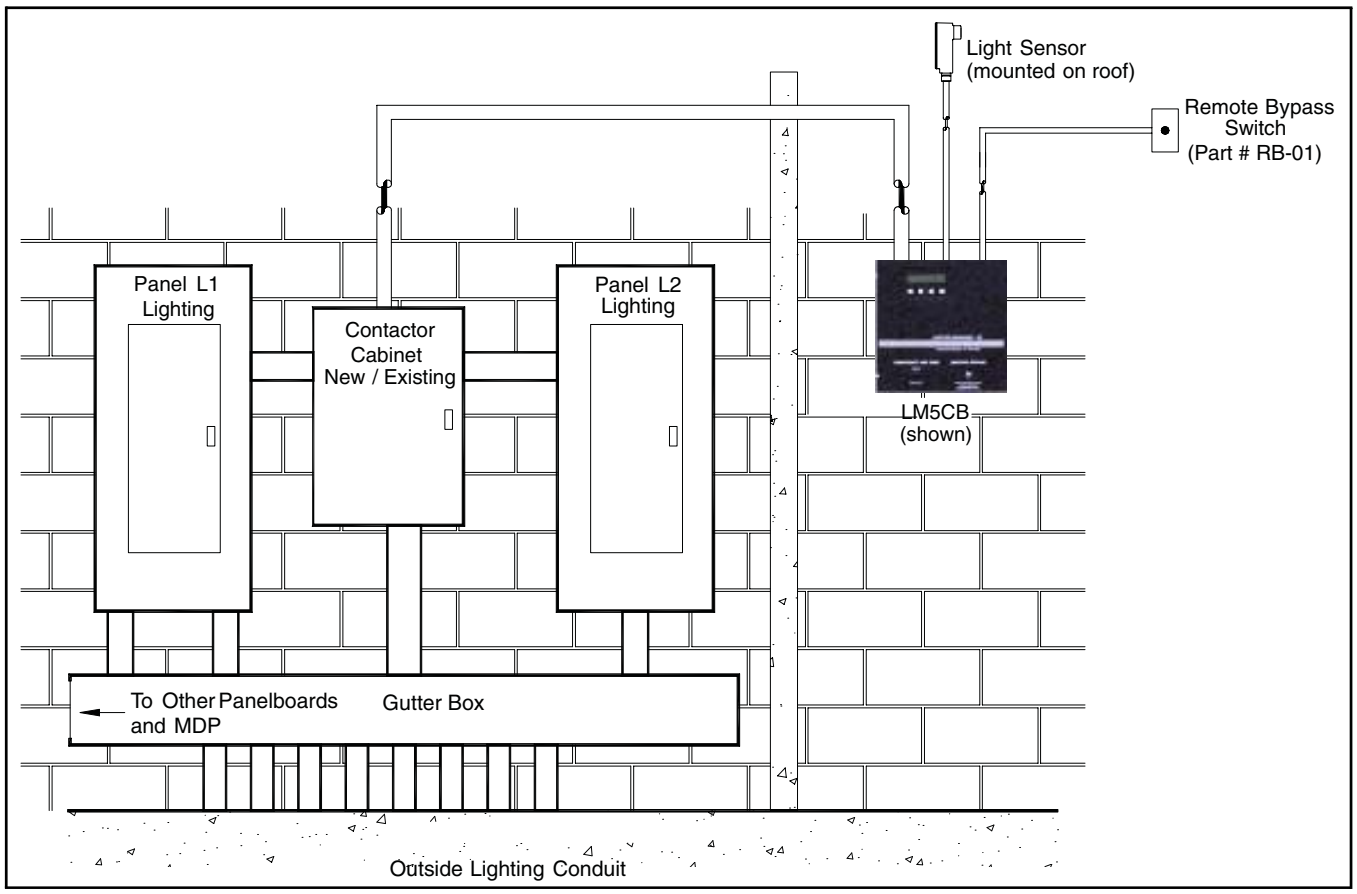
Dimension Drawing

Figure 10: LM–5CB Dimensions



Application Detail

Figure 11: Typical LM–5CB Application



Technical Data

Table 3: LM–5CB Data

Supply voltage	120 Vac (+10%/-15%)
Power consumption	125 watts max.
Switching capacity	10 contactors per channel
Display	Liquid crystal
Clock accuracy	+ / - 1 minute/month
Clock battery backup	120 day min.
Temperature	32° F to 122° F (0° C to 50° C)
Humidity	8%–90% RH noncondensing

LIGHTING MANAGER: AUTOMATIC LIGHTING CONTROL SYSTEM

The LM–40–5CB and LM–60–5CB models are single, space-saving cabinets prewired with controls and contactors from IPaCS™.

Product Features

The following components and requirements are pre-engineered on the LM–40–5CB and LM–60–5CB models:

- Single, low-voltage light sensor controls three stages of outside lighting, two additional stages for automatic scheduling of interior lighting or quick service restaurant signs
- Menu-driven programming allows easy setpoint adjustments

- Unique schedule programming for Monday—Thursday, Friday, Saturday, and Sunday; five programmable holidays and selectable daylight savings time functions
- Temporary override switch for selected timed override of lighting stages
- Maintenance override switches allow service personnel to force lighting loads “on” or “off” without changing program schedules or light-levels setpoints
- Meets the following UL® 508A Industrial Control standards:
  - — File E–227793
  - — File E–154976

Figure 12: Automatic Lighting Control Products

LM–40–5CB **LM–60–5CB**

Dimension Drawings

Figure 13: LM-40-5CB Dimensions

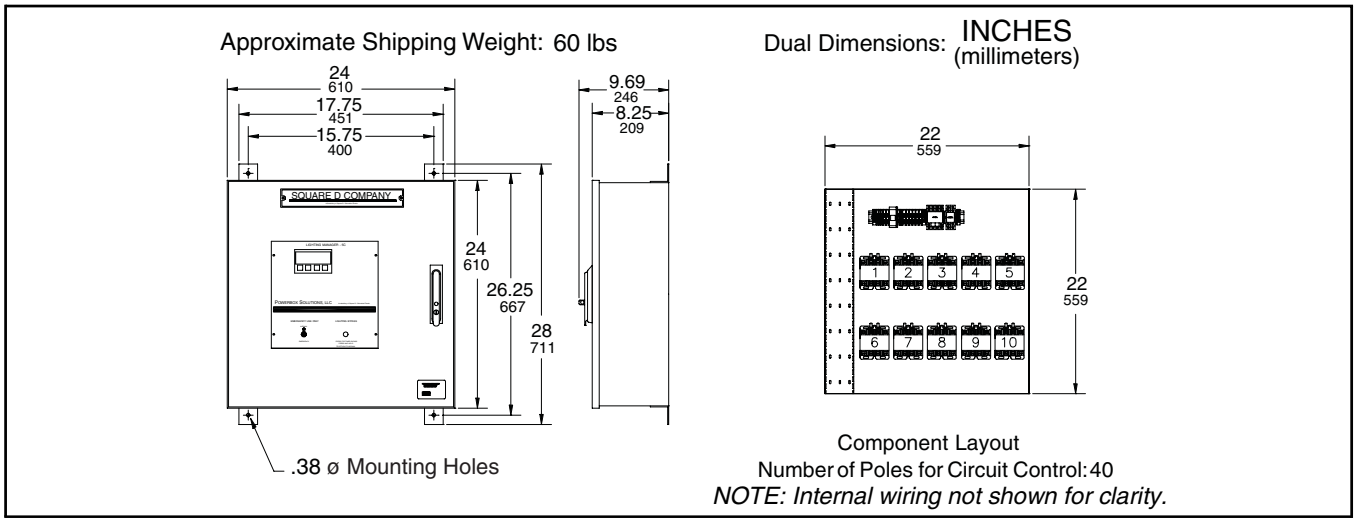
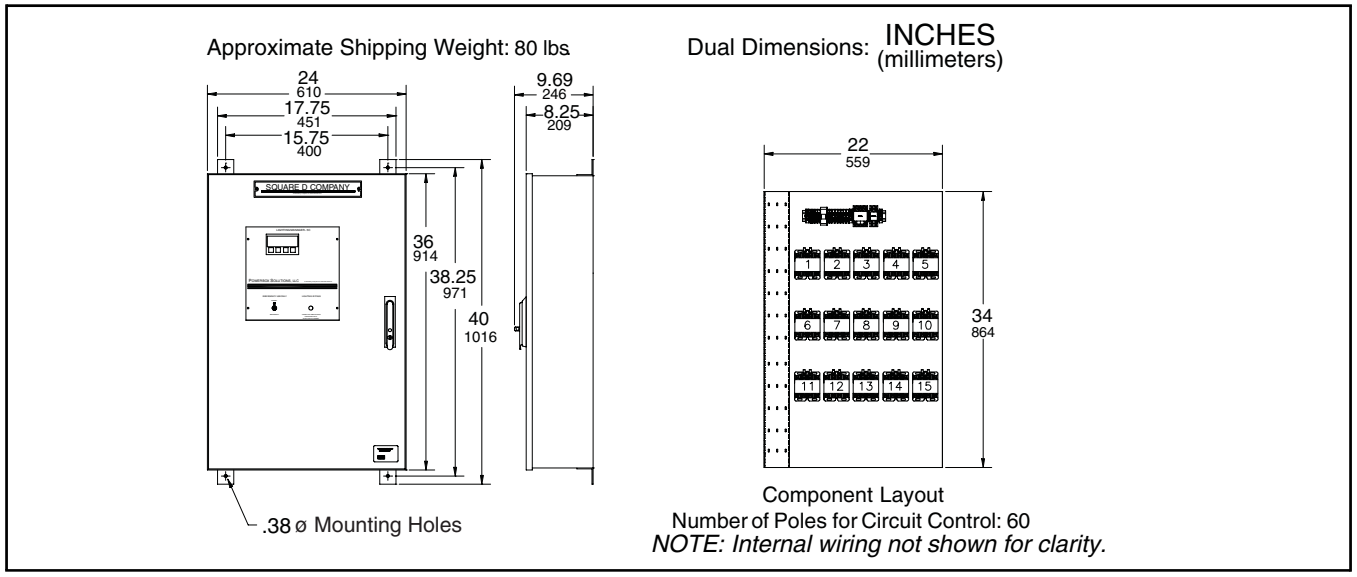
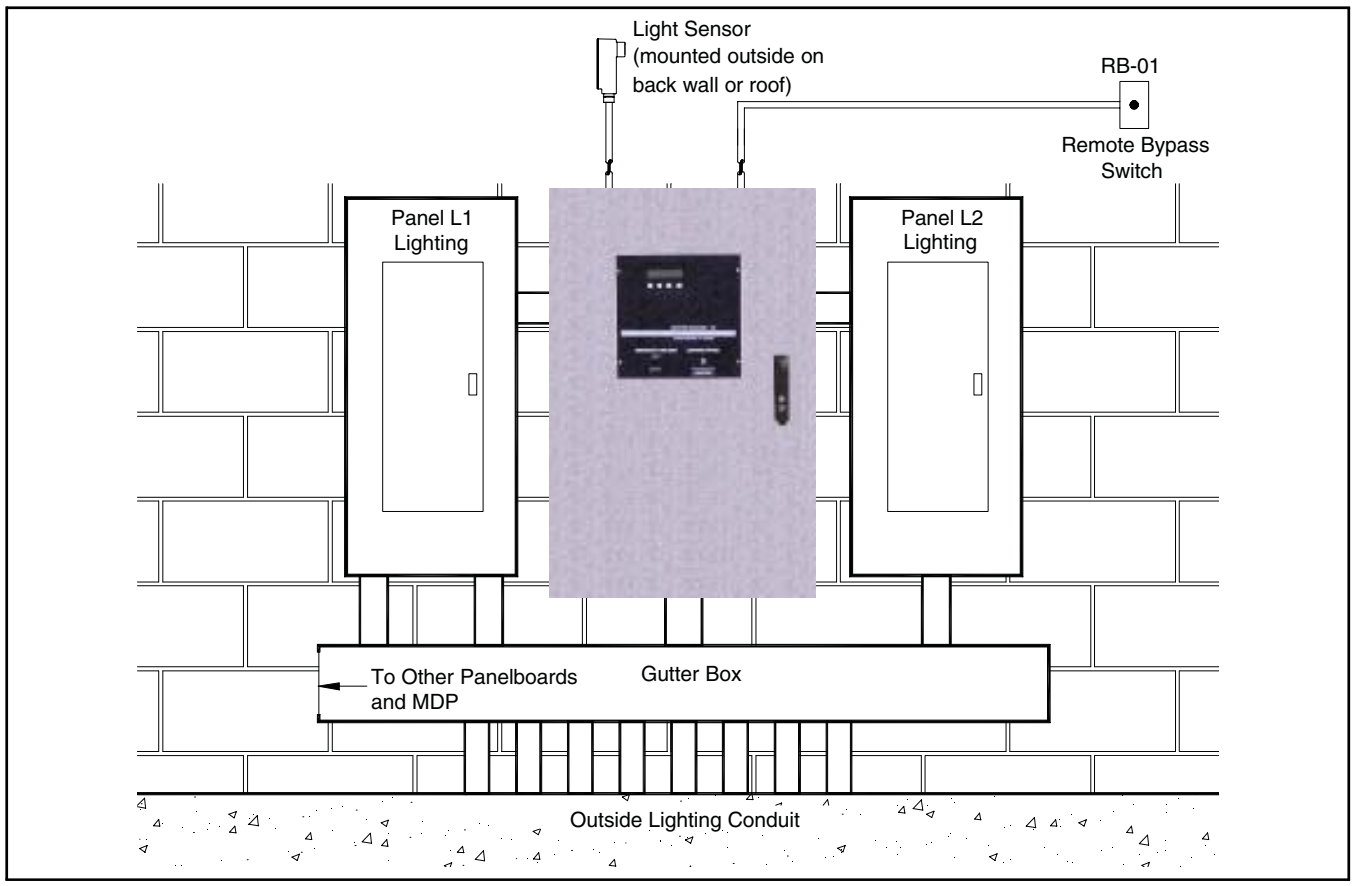


Figure 14: LM-60-5CB Dimensions



Application Detail

Figure 15: Typical Automatic Lighting Control System Application



Technical Data

Table 4: LM–40–5CB and LM–60–5CB Data

Supply voltage	120 Vac (+10%/-15%)
Power consumption	125 watts max.
Load switching capacity	**LM–40–5CB**: 40 circuits total–30 A (inductive) per pole, 40 A (resistive) per pole (10 4-pole contactors) **LM–60–5CB**: 60 circuits total–30 A (inductive) per pole, 40 A (resistive) per pole (15 4-pole contactors)
Display	Liquid crystal
Clock accuracy	+ / - 1 minute/month
Clock battery backup	120 day min.
Temperature	32° F to 122° F (0° C to 50° C)
Humidity	8%–90% RH noncondensing

COMBINATION CONTROLS (FUELING/LIGHTING)

LIGHTING/DISPENSER MANAGER

The Lighting/Dispenser Manager and Lighting/Dispenser Manager II solve field-installed control problems with a single, integrated solution that provides time-saving installation, consistent operation, factory-tested reliability, and advanced microprocessor and DM–EX module technology.

Product Features

The following components and requirements are pre-engineered on the LDM2–4D–4P–EX–40L–5CB and LDM–4D–4P–EX–40L–5CB models:

- Cabinet prewired with controls and contactors required for lighting and fueling controls
- The LDM2–4D–4P–EX–40L–5CB model has the same capabilities as LDM–4D–4P–EX–40L–5CB with a 24 in. x 60 in. cabinet.
- Refer to the following sections for individual product features of the fueling/lighting controls:
  - — “Dispenser Manager–EX” on page 5
  - — “Lighting Manager: Automatic Lighting Controller” on page 14
- Meets the following standards:
  - — UL® 508A Industrial Controls: File E–228717 and File E–154976
  - — NEC® Article 514–5 and Article 514–6

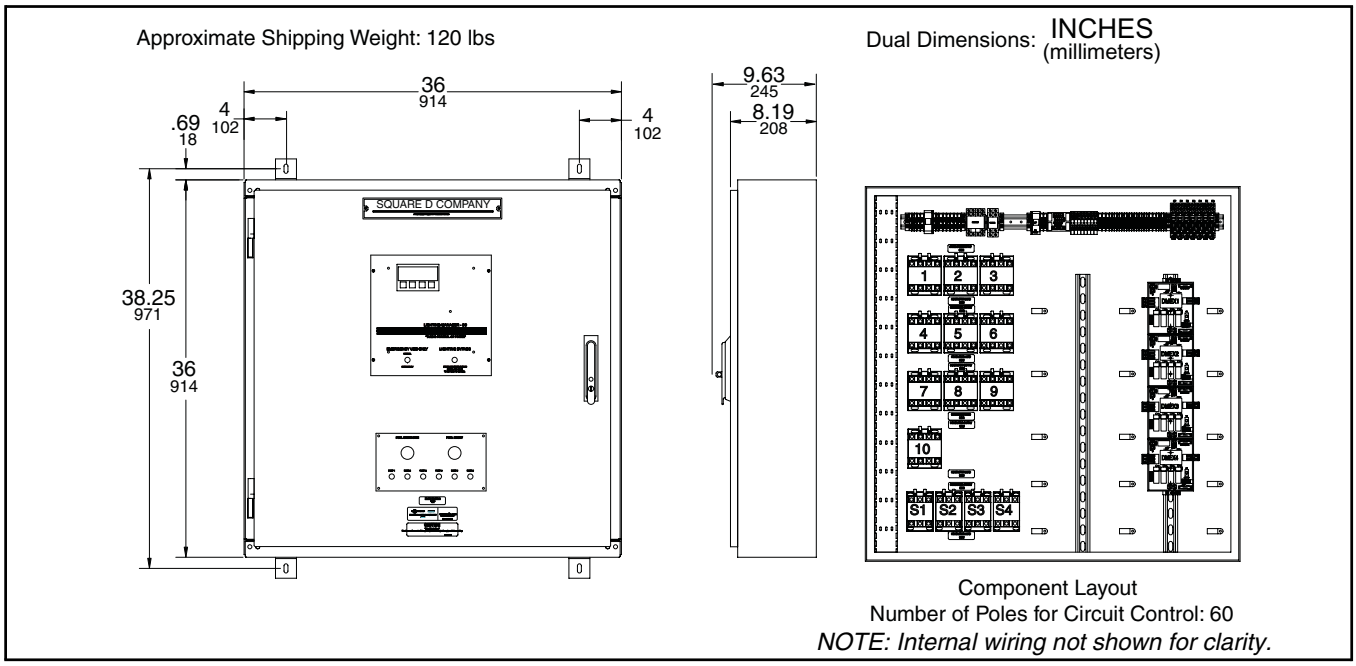
Figure 16: Lighting/Dispenser Manager, 36 in. x 36 in. (LDM–4D–4P–EX–40L–5CB)

The following add-on options are available for the LDM–4D–4P–EX–40L–5CB and LDM2–4D–4P–EX–40L–5C modules:

Description	Model Number
Add DM–EX module	ADD–DMEX
Add pump contactor	ADD–PUMP–CONT
Add lighting contactor	ADD–LTG–CONT
Add remote bypass button for LM–5CB	RB–01

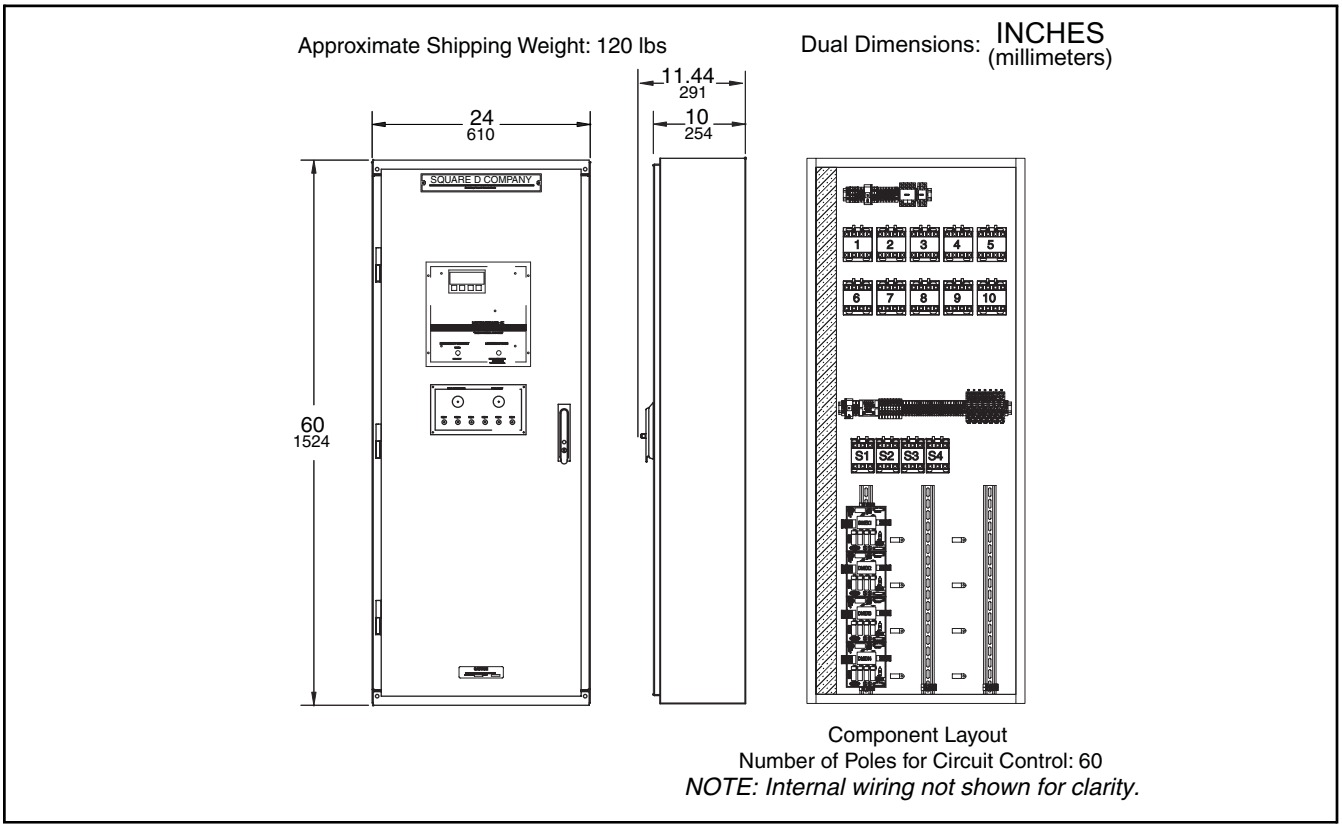
Dimension Drawings-

Figure 17: LDM–4D–4P–EX–40L–5CB Dimensions



Component Layout
Number of Poles for Circuit Control: 60
NOTE: Internal wiring not shown for clarity.

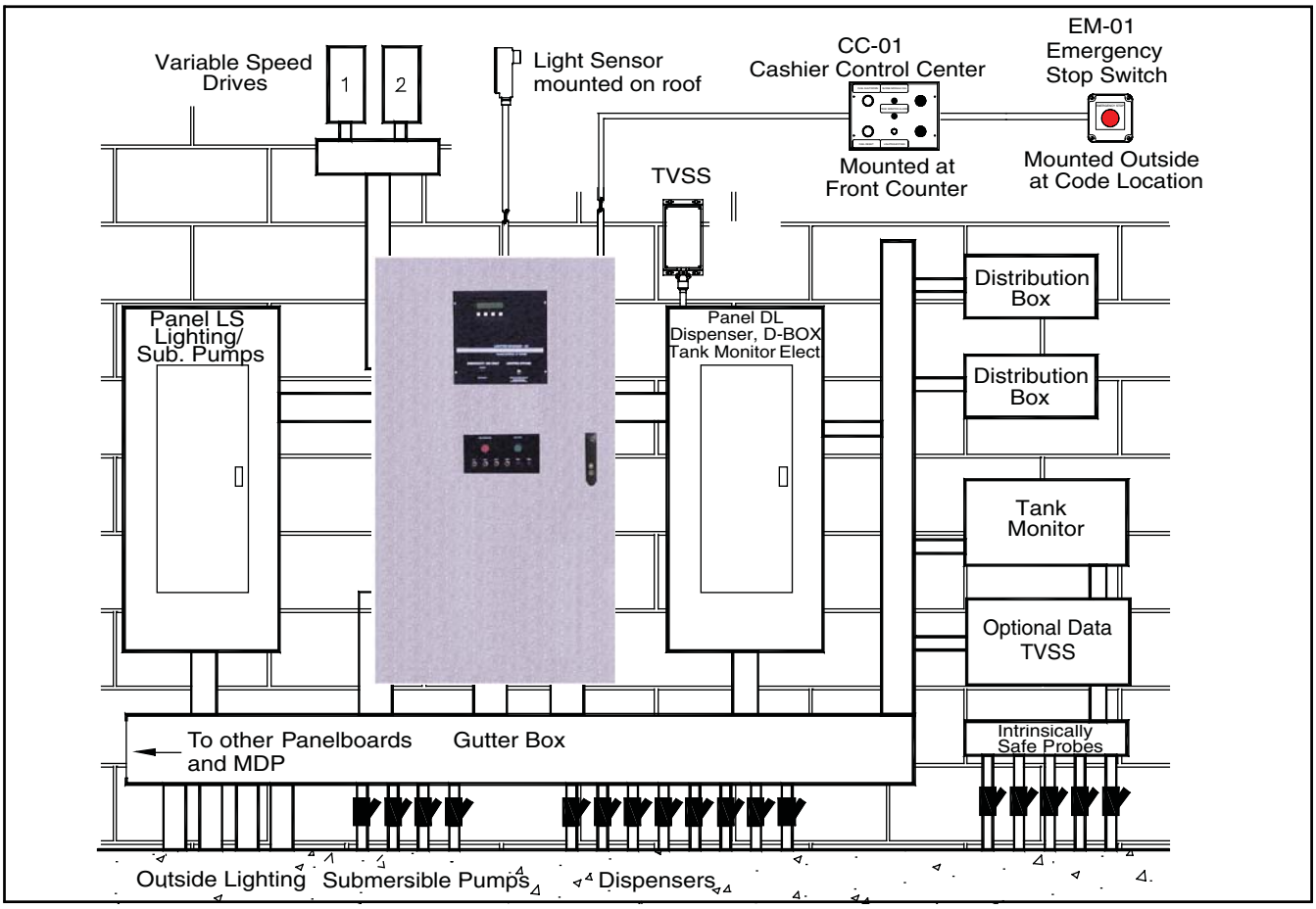
Figure 18: LDM2–4D–4P–EX–40L–5CB Dimensions



Component Layout
Number of Poles for Circuit Control: 60
NOTE: Internal wiring not shown for clarity.

Application Detail

Figure 19: Typical Lighting/Dispenser Manager Application



Technical Data

Table 5: LDM–4D–4P–EX–40L–5CB/LDM2–4D–4P–EX–40L–5CB Data

Supply voltage	120 Vac (+10%/-15%)
Power consumption	465 watts max.
Lighting	
Load switching capacity	**LDM–4D–4P–EX–40L–5CB**: 60 pole: 30 A (inductive) per pole, 40 A (resistive) per pole **LDM2–4D–4P–EX–40L–5CB**: 40 or 48 circuits: 30 A (inductive) per pole, 40 A (resistive) per pole
Display	Liquid crystal
Clock accuracy	+ / - 1 minute/month
Clock battery backup	120 day min.
Fueling	
MPD control capacity	4 expandable to 10
STP control capacity	4 expandable to 6
STP contactor switching capacity	30 A (5 hp max.)
Electrical and Environmental	
Temperature	32° F to 122° F (0° C to 50° C)
Humidity	8%–90% RH noncondensing

ON SITE MANAGER

The On Site Manager and On Site Manager II product lines are a combination of panelboard(s), Lighting Manager, and Dispenser Manager products in a single, space saving enclosure. Optional transient voltage surge protection is also available.

The On Site Manager and On Site Manager II provide consistent operation, factory-tested reliability, and the latest in fueling control, lighting control, and transient surge protection technology.

Product Features

- Cabinet prewired with electrical distribution, controls, and surge protection for kiosk fueling applications
- The On Site Manager model (OSM–4D–3P–EX–12L–5CB) has the same capabilities as the On Site Manager II (OSMII–4D–3P–EX–20L–5CB) with a 24.5 in. x 60.5 in. cabinet.
- Refer to the following sections for individual product features of the fueling/lighting controls:
  - — “Dispenser Manager–EX” on page 5
  - — “Lighting Manager: Automatic Lighting Controller” on page 14
- Meets the following standards:
  - — UL® 891 and UL 508A: File E–82877 and File E–73120
  - — NEC® Article 514–5 and Article 514–6

Figure 20: On Site Manager II (36.5 in. x 60.5 in.)

The following add-on options are available for the OSM–4D–3P–EX–12L–5CB and OSMII–4D–3P–EX–20L–5CB modules:

Description	Model Number
Add DM–EX module	ADD–DMEX
Add pump contactor	ADD–PUMP–CONT
Add DM–EX module and circuit breaker	ADD–DMEX–BRKR
Add DM–EX module and circuit breaker, single phase	ADD–DMEX–BRKR–1P
Add lighting contactor (OSMII only)	ADD–LTG–CONT
Add remote bypass button for LM–5CB	RB–01

Dimension Drawings

Figure 21: OSM–4D–3P–EX–12L–5CB Dimensions

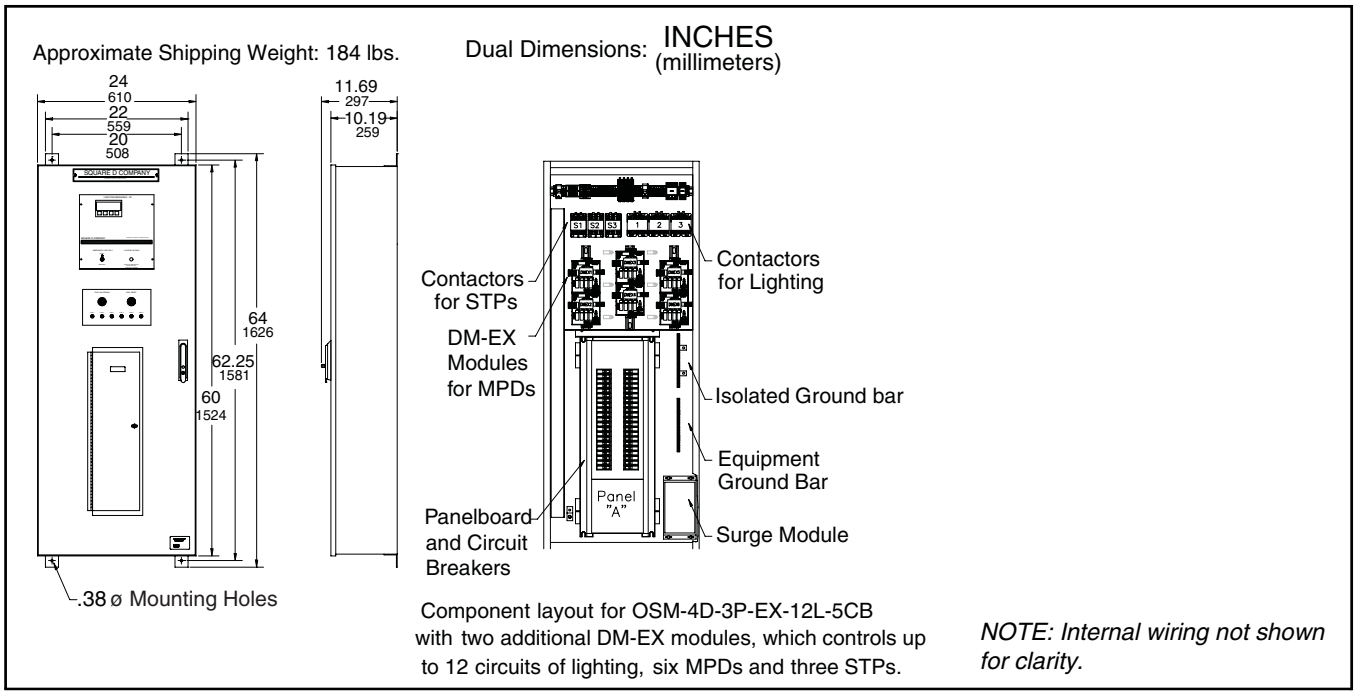
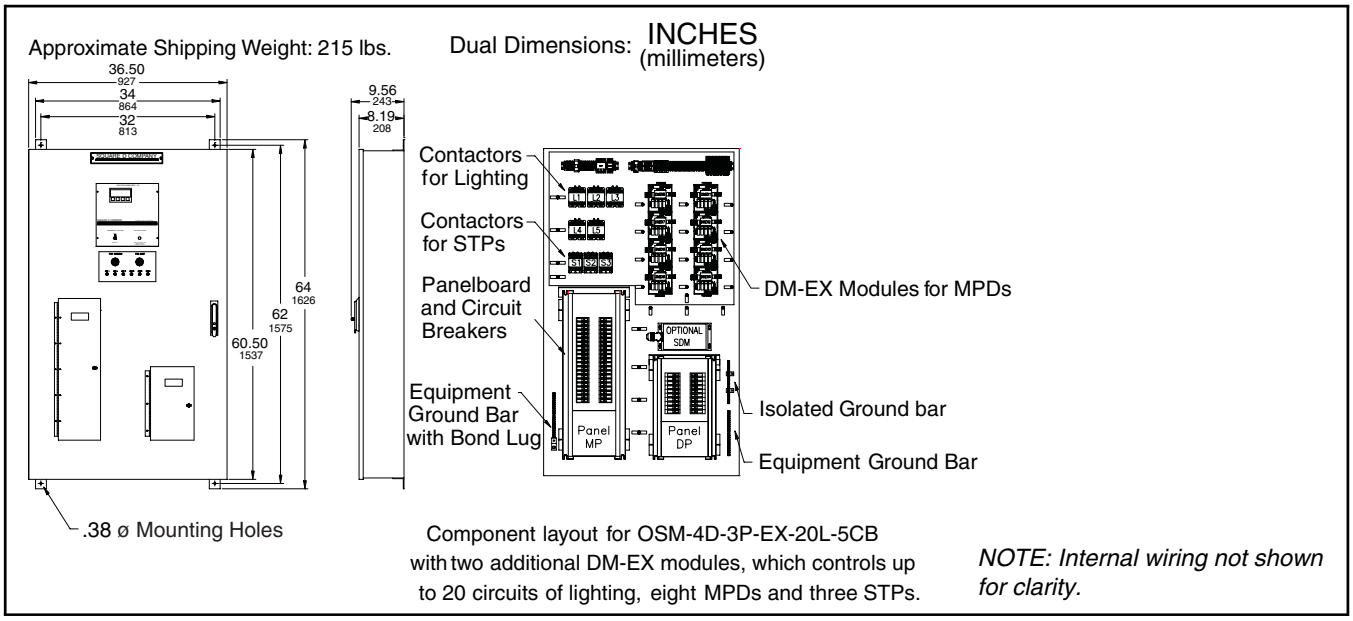
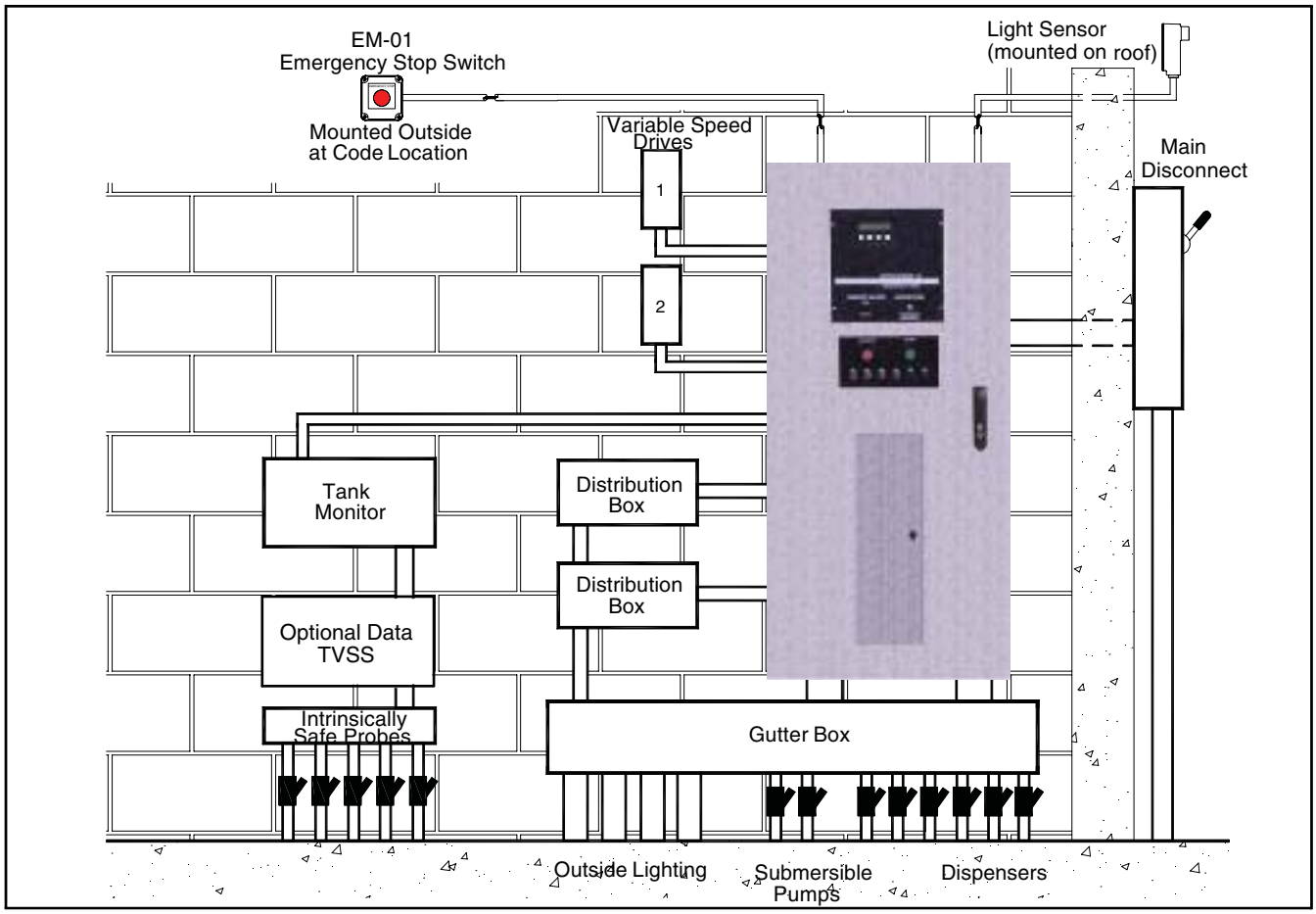


Figure 22: OSMII–4D–3P–EX–20L–5CB Dimensions



Application Detail

Figure 23: Typical On Site Manager/On Site Manager II Application



Technical Data

Table 6: On Site Manager/On Site Manager II Data

Lighting	
Load switching capacity	**OSM–4D–3P–EX–12L–5CB**: 12 circuits max.: 30 A (inductive)/ 40 A (resistive) per pole (3 4 -pole contactors) **OSMII–4D–3P–EX–20L–5CB**: 20 circuits max: 30 A (inductive)/40 A (resistive) per pole (5 4-pole contactors)
Fueling	
MPD capacity	**OSM–4D–3P–EX–12L–5CB**: 4 (expandable to 6) **OSMII–4D–3P–EX–20L–5CB**: 4 (expandable to 8)
Submersible pump capacity (STPs)	3
STP contactor switching capacity	30 A at 240 V (5 hp max.)
Surge Diversion	
Optional SDM—surge module protects the entire OSM/OSMII from transient voltage surges	
Electrical and Environmental	
Supply voltage	120/240 Vac, 1 phase, 3 wire or 120/208 Vac, 3 phase, 4 wire
Panelboard	Square D® NQOD type—42 circuits, 225 A, Main Lug Only (MLO)
Temperature	32° F to 122° F (0° C to 50° C)
Humidity	8%—90% RH noncondensing

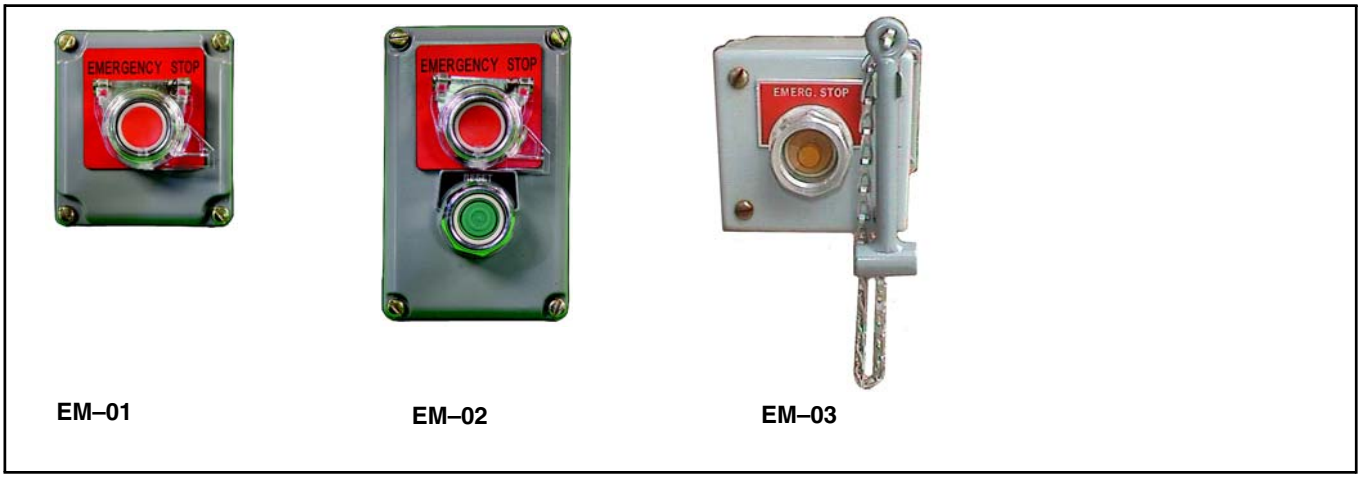
PERIPHERAL CONTROLS

EMERGENCY SHUTDOWN SWITCHES

Product Features

- Remote-mounted control option for the emergency shutdown system of the Dispenser Manager–EX. For more information on the Dispenser Manager–EX, see page 5.
- Options for emergency shutdown only or emergency shutdown with reset
- Surface mount, weatherproof enclosures
- Meets the UL® 508 Industrial Controls standard: File E–422590

Figure 24: Emergency Shutdown Switches



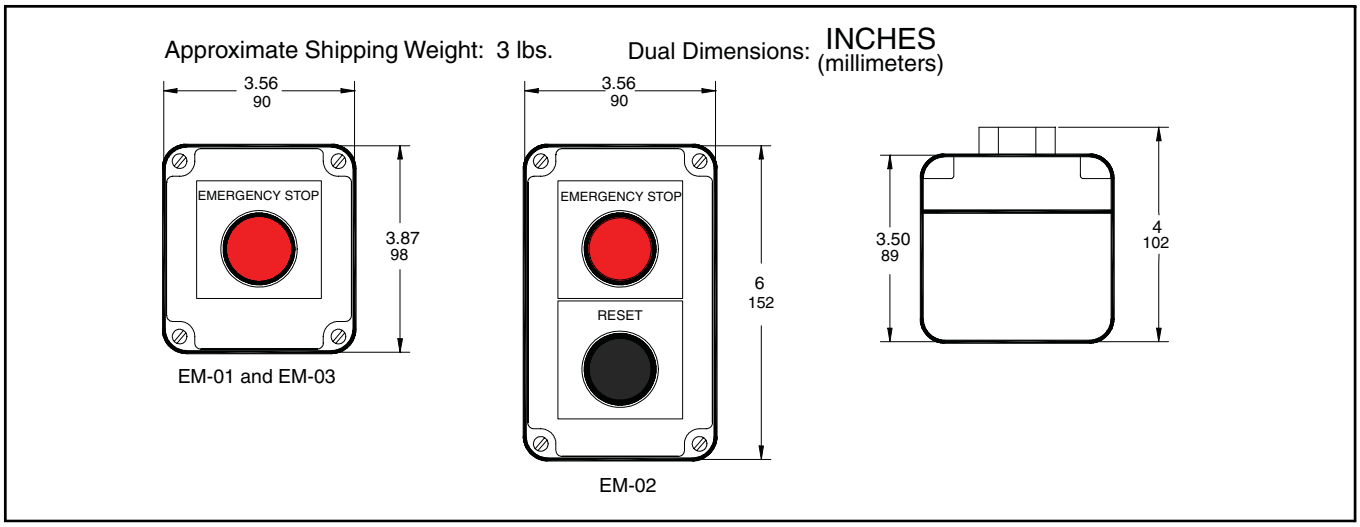
EM–01 Fueling system emergency shutdown switch mounted in a weather proof enclosure. Shutdown switch is a momentary pushbutton type with a clear, hinged, spring-loaded cover to minimize tampering.

EM–02 Fueling system emergency shutdown switch and reset switch mounted in a weatherproof enclosure. Both shutdown and reset switches are momentary pushbutton type.

EM–03 Fueling system emergency shutdown switch mounted in a weatherproof enclosure. The shutdown switch is a momentary pushbutton type with a clear, glass break cover to minimize tampering.

Dimension Drawings

Figure 25: EM–01, EM–02, and EM–03 Dimensions



Technical Data

Table 7: EM–01, EM–02, and EM–03 Data

Switching voltage	120 Vac (+10%/-15%)
Temperature	–20° F to 150° F (–29° C to 66° C)
Humidity	8%—90% RH noncondensing

CASHIER CONTROL CENTER

Product Features

- Single, space-saving remote mounted control cabinet for emergency shutdown, reset, lighting bypass, pump station lights, lighting status lights, and pilot light alarms
- Options for doorstrike switching, doorstrike transformer, and car wash shutdown
- Eliminates the need for separately wired control boxes
- Surface-mounted enclosure
- Includes labels to customize based upon specific application

Figure 26: CC–01 and CC–02

CC-01

CC-02

Table 8: CC–01 and CC–02 Series

CC–01	Base unit with the emergency shutdown and reset switches, lighting bypass switch, and two 120–volt pilot lights.
CC–01PB	Base unit with car wash shutdown pushbutton switch.
CC–01SS	Base unit with doorstrike switch.
CC–01SSPB	Base unit with both the car wash and doorstrike switches.
CC–02	Base unit with the emergency shutdown and reset switches and lighting bypass switch. Four–pump status, three–outdoor lighting status, and emergency shutdown status pilot lights. Flashing leak alarm light.
CC–02PB	Base unit with car wash shutdown pushbutton switch.
CC–02SS	Base unit with doorstrike switch.
CC–02SSPB	Base unit with both the car wash and doorstrike switches.
CC–02SSPBXF	Doorstrike transformer added.

Dimension Drawings

Figure 27: CC–01 Series Dimensions

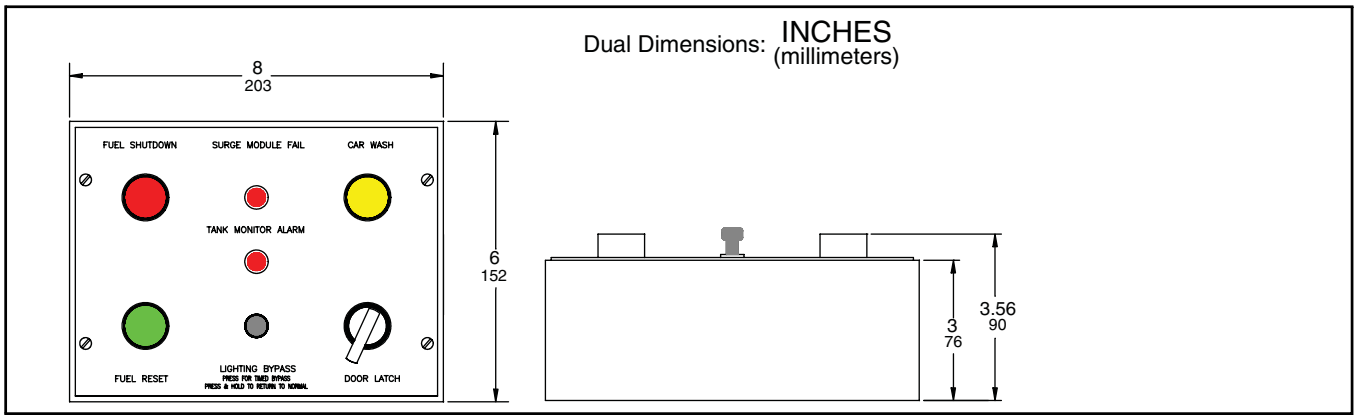
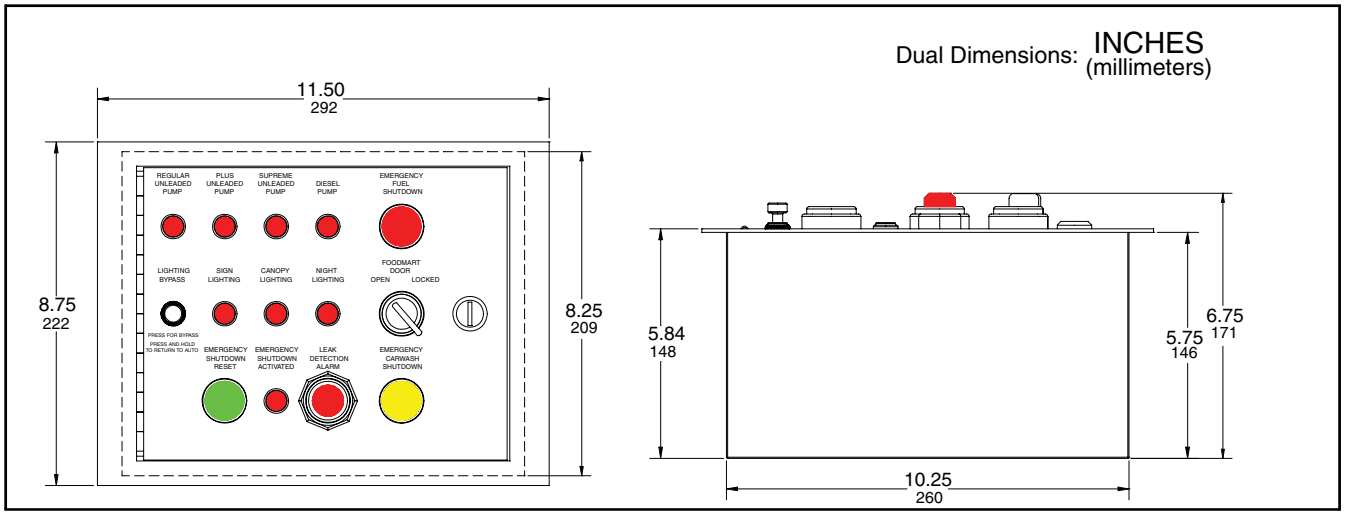


Figure 28: CC–02 Series Dimensions



Technical Data

Table 9: CC–01/CC–02 Data

Switching voltage	120 Vac (+10%/–15%)	
Power consumption	**CC–01**: 1 watt max.	**CC–02:** 5 watts max.
Temperature	32° F to 122° F (0° C to 50° C)	
Humidity	8%–90% RH noncondensing	

POWER QUALITY

POWER MANAGER (WITH OPTIONAL BATTERY BACK–UP)

Product Features

Figure 29: Power Manager with Optional Battery Back-up

The Square D® IPaCS™ Power Manager–25APC is an integrated solution that isolates and filters critical loads. All the components are installed in a single, pre-wired enclosure and tested in a controlled setting.

The Power Manager–25APC provides:

- Clean power to all electronic systems—uses a low-impedance isolation transformer (PIM), electrical noise filtering, and an optional surge diversion module
- Complete isolation from dirty power (for example, electrical noise, surges, and sags)
- Electrical panelboard and all circuit breakers (one main circuit breaker and 11 branch circuit breakers)
- Single-point isolated ground

The Power Manager with Optional Battery Back-Up™ product line is the most advanced solution to protect your electronic systems from electrical noise, surges, sags, short-term brownouts, and complete blackouts.

The Power Manager with Battery Back-Up includes provisions for connecting to a remote 3KVA UPS (Uninterruptible Power Supply) and a maintenance bypass switch, creating a robust and reliable centralized battery back-up system for hardwired and plug-in equipment.

The single-phase power conditioner is installed in an aluminum cabinet and is prewired to a Square D NQOD panelboard. An isolated ground bar and a chassis ground bar are included.

The benefits of the Power Manager product line are as follows:

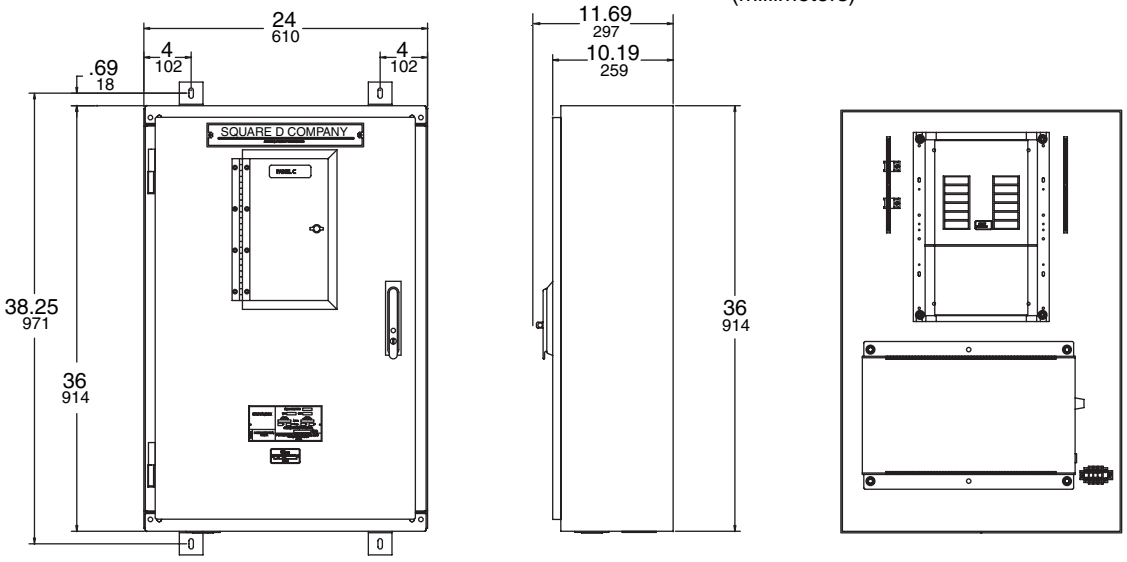
- Solves the problems of computer lock-ups, lost data, equipment damage, and downtime
- Reduces costly installation time and error, prevents unauthorized access, simplifies service and maintenance
- Provides the overcurrent protection required by NEC® for all connected electronic loads and dedicated isolated ground receptacles
- Meets the UL® 891 standards

Dimension Drawings

Figure 30: PM25APC Dimensions

Approximate Shipping Weight: 110 lbs

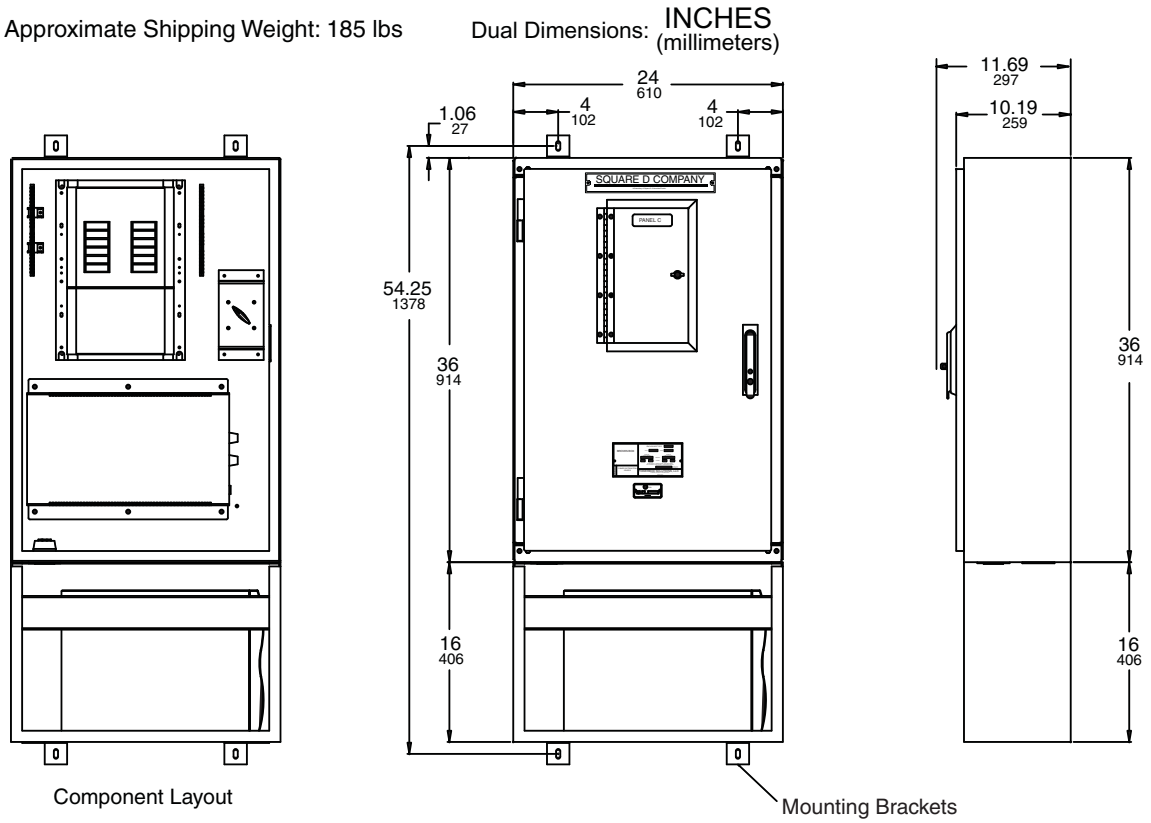
Dual Dimensions: INCHES (millimeters)



Component Layout

NOTE: Internal wiring not shown for clarity.

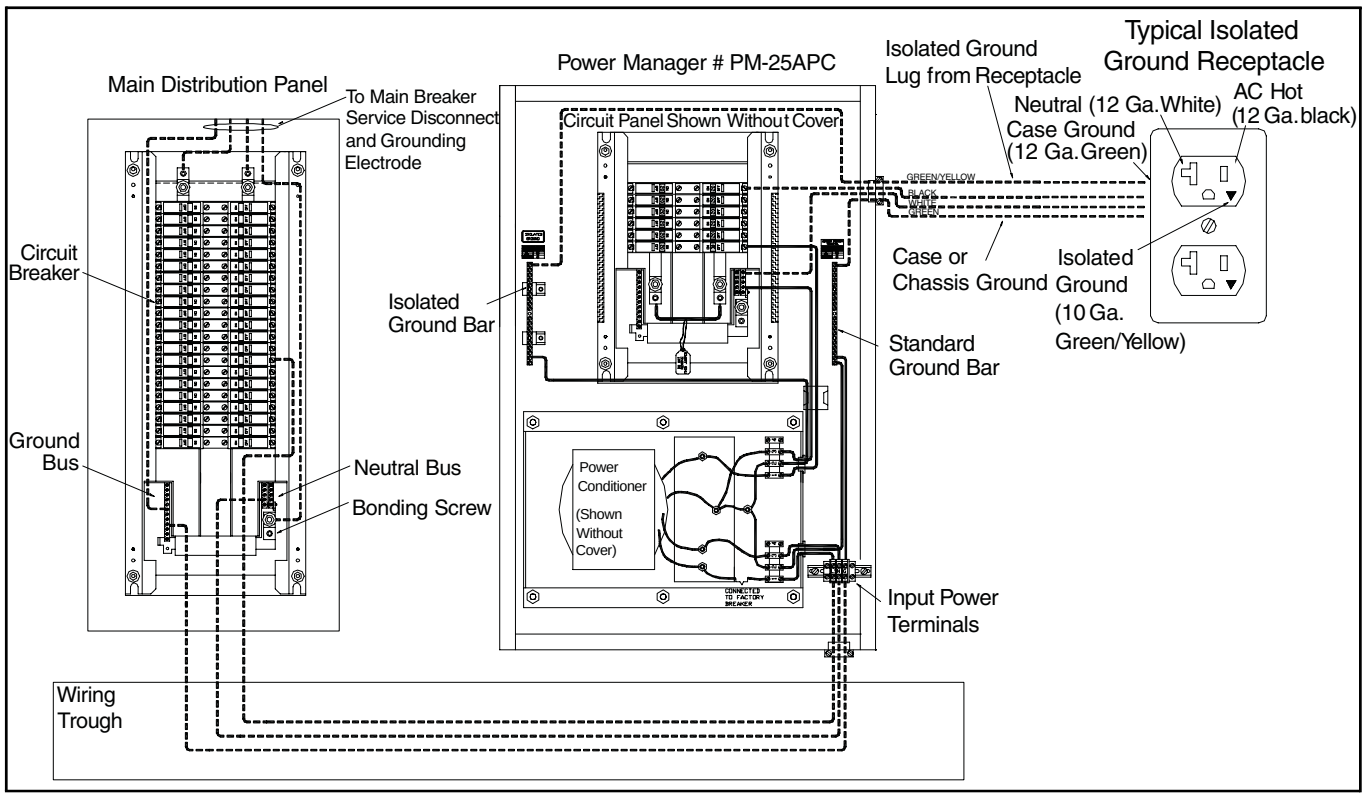
Figure 31: PM25APC–BB Dimensions



NOTE: Internal wiring not shown for clarity.

Application Detail

Figure 32: Typical Power Manager Application



Technical Data

Table 10: Power Manager and Power Manager with Battery Back-Up Data

Input voltage	120 Vac
Output voltage	120 Vac 3000 VA
Input range	96–132 Vac
Voltage drop no load/full load	+ / - 3% of input voltage
Noise rejection and isolation	
With unit under power and an ANSI/IEEE C62.41 Category A impulse applied either normal mode or common mode at the input, the noise output voltage will be less than 10 V normal mode and less than 0.5 V common mode in all four quadrants (CM–NM, NM–NM, CM–CM, NM–CM)	
Surge voltage withstand capability	
Tested under power to ANSI/IEEE C62.41	
Category A and B (formerly IEEE 587–1980)—Catalog A 6000 V/200 A, 0.5 usec. rise time, 100 kHz decay	
Category B—6000 V/500 A, 0.5 usec. rise time, 100 kHz decay	
Power Manager with Battery Back-Up	
Battery configuration	12 V, 7 Ah internal batteries; 96 Vdc
Backup time	Full load: 6 minutes Half load: 15 minutes
Input range	80–144 Vac without going to battery

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