BECKWITH ELECTRIC®

M-2979
Recloser Control Cabinet

The M-2979 cabinet houses the M-7679 R-PAC and components, for complete recloser control replacement applications

- **Provides easy direct replacement of recloser controls for Cooper, G&W, Elastimold, SEL, ABB, Whip & Bourne, Joslyn, and Tavrida reclosers**
- **Eliminates the need for expensive rewiring of I/O signals accepting existing connector plugs for Power, Control, Voltages and Currents with the same pin sequence**
- **Accepts the existing communications connections for Serial TIA-232, TIA-485, Fiber Optic and IRIG-B**
- **Simplifies upgrading communications to optional true embedded Ethernet ports in the M-7679 R-PAC allowing for multi-user, multi-protocol access to the advanced metering, PQ and DFR information collected by the control**
- **Includes an on board smart 24 V battery charger with 12 V and 24 V outputs**

HUBBELL®

Application

The M-2979 Recloser Control Cabinet, when combined with the M-7679 R-PAC, provides convenient direct replacement of the control and cabinet for the following reclosers:

- Cooper/Traditional Electronic
- Cooper NOVA with Control Power Interface
- G&W Viper ST/LT
- Cooper NOVA STS & TS
- ABB GridShield
- Tavrida OSM
- Cooper NOVA with Auxiliary Input Power
- G&W Viper S
- Elastimold MVR
- ABB OVR3 & VR-3S
- Joslyn TriMod 600R
- Whip & Bourne GVR

The M-2979 includes the capability to change out the Recloser Control and Cabinet as one component. The M-2979 Recloser Control Cabinet and M-7679 R-PAC combination includes all the required interface connections and external communications capabilities that are necessary to replace an existing recloser control. The M-2979 Recloser Control Cabinet meets or exceeds NEMA 250, IEC 60529 and IEEE C37.60. Each M-2979 Recloser Cabinet can be configured with the optional support equipment to match the existing recloser control application and environment, or the cabinet can be supplied completely empty.

Figure 1 M-2979 R-PAC Cabinet

Construction

Available Cabinet Materials

- Aluminum (5052-H32 .090" thickness)
- Stainless Steel (Optional) (Type 316, 14 gauge)

Finish

- Polyester powder coat, exterior and interior color ANSI 70 Gray

Standard Features

- Metallic enclosures are all welded seam construction, ground smooth
- NEMA 3RX or IP 55 rated
- Single exterior gasketed door with:
  - Quarter turn 3 point latch with pad-locking handle (includes hole for 3/8" max lock hasp)
  - Large open angle > 120°
  - Hold open device
  - Integral document holder
  - Nameplate on inside of door
- Stainless steel hardware and hinges
- External ground stud
- Vented at bottom and upper back (fine mesh screens)
- All cabinet penetrations are sealed to prevent moisture and insect ingress
- Each cabinet includes the applicable connector layout in the bottom that replicates the specific recloser control cabinet being replaced. Also provides penetrations for options and future customer added accessories. Connector mounting hardware is only accessible from inside of cabinet.
- Two lifting eyes, 1.5" diameter holes, attached to sides of cabinet
- Interior swing panel with:
  - Flush mounted recloser control
  - Aluminum construction with class 3 chromate finish
  - Thumb latches
  - Ground strap
- Pole mounting bracket that includes:
  - 5/8" maximum bolt diameter with keyway at top
  - 5/8" bolt diameter slot at bottom
  - 3 pole banding slots
- 35 mm DIN rail mounted Terminal Blocks

Cabinet to Recloser Interface

- Main Control and Measurement
  - 14 Pin Cannon receptacle (Cooper Traditional/G&W Viper S)
  - 14 Pin Cannon receptacle with 2 Pin LV closing receptacle (Cooper Traditional, NOVA/G&W Viper S)
  - 14 Pin Cannon receptacle with 2 Pin LV closing receptacle and 6 Pin Dead Line (G&W Viper S)
  - 19 Pin Cannon receptacle (Cooper NOVA, G&W Viper S)
  - 24 Pin rectangular receptacle (ABB OVR3/VR-3S, ABB GridShield)
  - 24 Pin rectangular receptacle (Whip & Bourne GVR)
  - 26 Pin Cannon receptacle (Cooper NOVA TS/STS)
  - 32 Pin Cannon receptacle (G&W Viper ST/LT, Elastimold MVR)
  - 42 Pin rectangular receptacle (G&W Viper ST/LT, Tavrida OSM)

Cabinet to Recloser Interface (Cont.)

- Voltage Sensing
  - Direct Wiring
  - 4 Pin Cannon receptacle
  - 8 Pin Cannon receptacle (Threaded for 120 V)
  - 8 Pin Cannon receptacle (Quick Lock for LEAs)
- Power Supply
  - Direct Wired 1 Source
  - Direct Wired 2 Sources with AC Transfer Switch
  - 2 Pin Socket 1 Source
  - 3 Pin Socket 1 Source
  - Two, 2 Pin Sockets (2 Sources) with AC Transfer Switch
  - Two, 3 Pin Sockets (2 Sources) with AC Transfer Switch

M-2032B Battery Charger

■ **NOTE:** Refer to the M-2032B Specification sheet for more detailed information.

The M-2032B in conjunction with the M-7679 R-PAC includes smart battery charging features that are a result of the Beckwith Electric proprietary communication protocols employed between the M-2032B and the M-7679 utilizing a SATA cable connected via the Aux I/O port on the M-7679. The following features are provided when a M-2032B is connected to the M-7679:

- Receives commands to:
  - Turn-on/off battery test load
  - Turn-on/off 12 Vdc accessory supply
  - Turn battery supply off
- Communicates the following to the M-7679:
  - Charger state
  - Main power supply status
  - Battery Voltage
  - Battery Current
  - Recloser Gas Pressure (if recloser is equipped with sensor)
- Includes a Wakeup system that is initiated by the local panel pushbutton.

Inputs (AC or DC)

120 to 285 Vdc, 105 to 285 Vac 50/60 Hz

Burden of less than 90 VA

Transient protected

Output

12 Vdc (± 5%) @ 1 A for auxiliary equipment

24 Vdc (± 5%) @ 1.5 A for Beckwith controls or auxiliary equipment

BATT Out – Battery Charge for 24 V Lead Acid Batteries, 0.5 A charge rate max

Transient protected

■ **NOTE:** Maximum total output power on all outputs is 50 Watts.

M-2034 BECO DRIVE

The M-2034 BECO DRIVE is a multi-recloser Universal Capacitor/Battery Charger solution.

■ **NOTE:** Refer to the M-7679/M-2979 Cabinet Application Guide for more detailed information.

Battery Charger: The integrated Battery Charger charges two 12 Vdc batteries and has communication with the M-7679 control to allow the control to perform a battery test and monitor the battery status.

The Battery Charger is a Dual-Level Float/Boost Charger with Pre-Charge. When battery voltage is below 21 Vdc, the charge current is limited to 40 mA dc (Pre-Charge). Once the battery voltage is above 21 Vdc, the charger begins to charge at the higher rates (Boost/Float). This will prevent high current in a damaged battery. Boost mode charges the battery at a rate that minimizes charge time and maximizes battery capacity. Float mode maintains the battery charge after the Boost mode charge has finished, preventing overcharging of the battery. The battery charge voltage is temperature compensated to optimize battery charge and life.

Functions

- Capacitor Charger with options for 53 V, 90 V, 155 V, 250 V output
- Aux 12 Vdc ±2% at 5 A (60 W max) to power accessories
- Sealed Lead Acid Battery Charger with output 24 Vdc–32 Vdc at ~2 A
- Battery voltage and current monitoring through communication with M-7679 Control
- Battery Load Test (with 25 ohm load) enabled through communication with M-7679 Control
- Battery Turn Off due to low voltage, controlled through communication with M-7679 Control
- Battery Wake-up pushbutton
- Automatic Switching between AC and Battery for Control Power, Cap Charger, and Auxiliary 12 Vdc supply
- SF6 Gas-Pressure Sensor Interface through communication with M-7679 Control
- 24 V Control Power output
- AC Status Monitoring through communication with M-7679 Control

Onboard Status LEDs

Six function status LEDs on the lower panel of the M-2034 indicate Capacitor Charging Status, Battery Charge Status, 12V Aux Output Status, and Main Power Status.

Power Protection & Distribution Module (B-1757)

The Power Protection & Distribution Module B-1757 distributes AC and DC power to the internal components of the control cabinet while providing fuse protection for internal components and power circuits.

AC Circuit – The Power Protection & Distribution Module receives AC power (105 to 240 Vac 50/60 Hz) from the AC power supply input (TB1) and sends the power to the Main Power Supply. It also includes overvoltage protection MOVs and internal protection fuses for the AC power supply.

DC Circuit – The Power Protection & Distribution Module receives DC power (24 Vdc & 12 Vdc) from the Main Power Supply output and internally distributes the Vdc power to all of the available outputs. It also includes internal protection fuses for the 24 Vdc outputs.

Features:

Enclosure Dimensions: 6.375" x 3.625" x 2.75"

Mounting: DIN Rail

Storage/Operating Temperature: -40° C to 85° C

Inputs & Outputs (AC/DC):

AC Voltage Input: 105 to 240 Vac

AC Current Input: 15 A

AC Outputs: 105 to 240 Vac

- Convenience Outlet: 15A
- Heater: 3A
- AC Out: 5A
- Voltage Sensing & Power Supply: 5A

DC Voltage Input:

- 24 Vdc: 6A
- 12 Vdc: 7.5A

DC Outputs:

- Two 24 Vdc to Control: 3A
- Two 24 Vdc Accessories: 3A
- Three 12 Vdc Accessories: 7.5A

Optional AC Transfer Switch (B-1848)

The optional AC Transfer Switch is mounted to the cabinet DIN Rail. The AC Transfer Switch has two AC power inputs: SOURCE 1 (Primary) and SOURCE 2 (Secondary). Internal circuitry monitors the voltage magnitude of SOURCE 1 and will automatically switch the OUTPUT between SOURCE 1 and SOURCE 2.

When SOURCE 1 is greater than 104 Vac the OUTPUT is connected to SOURCE 1. If SOURCE 1 drops below 96 Vac the OUTPUT is switched to SOURCE 2. When SOURCE 1 returns and remains above 104 Vac for a time delay of 7 seconds, the OUTPUT will automatically be switched back to SOURCE 1. This eliminates "chattering" of the OUTPUT relays.

Status LEDs indicate the source availability and which source is connected to the OUTPUT. The "GREEN, SOURCE 1 PRESENT" LED is illuminated when SOURCE 1 is available. The "YELLOW, SOURCE 2 PRESENT" LED is illuminated when SOURCE 2 is available and SOURCE 1 is present. A bi-color "YELLOW, SOURCE 2 OUT/GREEN, SOURCE 1 OUT" LED will be used to determine which source is connected to the OUTPUT. The bi-color LED will be illuminated GREEN when connected to SOURCE 1 and YELLOW for SOURCE 2.

An External Voltage Control Input is provided to manually switch from SOURCE 1 to SOURCE 2. The OUTPUT will remain connected to SOURCE 2 until the voltage is removed from the External Voltage Control Input.

The OUTPUT relays are "break before make" ensuring that only one source is active at any given time.

Features:

Enclosure Dimensions: 4.25" x 3.5" x 2.5"

Storage/Operating Temperature: -40° C to 85° C

Inputs:

Input Voltage: 0 to 150 Vac

Input Frequency: 50/60 Hz

Maximum Continuous Current: 15 Amp

Pick Up Voltage: 104 ± 6 Vac

Drop Out Voltage: 96 ± 6 Vac

Minimum Hysteresis: 4 Vac

External Control Voltage Input: 15 Vdc to 30 Vdc

Time On Delay: 7 Seconds ± 3 Sec.

Optional M-2035 Analog to Digital Interface Module

■ **NOTE:** Refer to the M-2035 Specification sheet for more detailed information.

The M-2035 Interface Module monitors power supplies and battery chargers used in Reclosers that have been retrofitted to operate with the M-7679 R-PAC system. This analog to digital interface measures voltage, current, and current direction which can be monitored with the S-7600 IPScom communication software. The interface module can be DIN rail mounted and includes a SATA cable for easy hookup to the Aux I/O port in the recloser control. The module will accept 8 to 30 Vdc power from the existing power supply and batteries.

The module features essential indicator lights for battery and communication status plus on-board and remote manual wake-up pushbuttons to restore function after a power failure. Four extra analog to digital inputs are available for voltage measurements up to 30 Vdc. The module is able to periodically test the batteries by briefly disconnecting the charger with a high side switch and switching on a resistive load for five seconds.

Inputs:

Module Power: 8 to 30 Vdc

Minimum Battery Operating Voltage: 8 Vdc

Signal Monitoring: 0 to 30 Vdc

Battery Reverse Polarity Protection: 15 A fuse

Charger Reverse Polarity Protection: 15 A fuse

Transient Protected

Output:

I^2C Communications

Maximum 10 A: Charge Rate Pass Through for Batteries

Dimensions: 6.06" long x 3.63" wide x 2.75" high (15.39 cm x 9.22 cm x 6.99 cm)

Optional External Trip/Close with Hot Line Tag Assembly (B-1893)

■ **NOTE:** Refer to the M-7679/M-2979 Cabinet Application Guide for more detailed information.

An optional external assembly with Trip/Close Buttons and Hot Line Tag Switch is available for the M-2979 cabinet. The assembly allows a user to manually TRIP a recloser even when the M-7679 is powered down. This assembly is factory installed into a custom M-2979 swing panel (Figure 2). It is not field upgradeable. The option is compatible with all Recloser configurations that use the M-2034 BECO DRIVE.

■ **NOTE:** The temperature range for the B-1893 Assembly is -25° C to +50° C.

Figure 2 External Trip/Close with Hot Line Tag Assembly in M-2979 Custom Swing Panel

M-2979 Optional Equipment/Accessories

- 120 Vac duplex, 3-wire, 15 A polarized GFI convenience outlet (on 120 Vac and 240 Vac supply only)
- Intrusion detection door contact
- Universal radio shelf
- Fold out out shelf for laptop rest
- Communications ready package
  - Fused DC power, 12 Vdc nominal
  - Radio equipment mounting
  - Polyphaser
  - Antenna and Type N external connector
  - Antenna cable lead with connectors
- Recloser control test switches mounted on the interior swing panel include:
  - Sensing currents
  - Sensing voltages
  - Trip and Close outputs
- Pole Mount Bracket Extension (B-1687) allows for mounting of the cabinet on any existing hole pattern from 20" to 40"
- Pole Mount Standoff Kit (B-1904) allows the cabinet to be mounted 4" away from the pole for climbing space
- 50 Watt, 120 Vac Heater with automatic thermostat (available on 120 Vac and 240 Vac supply only)
- Control cable locking devices, vandal resistant
- Lightning Protection (For installations with external antennas) options include:
  - DSXL PolyPhaser Lightning Arrestor 700MHz to 2.7GHz N Female protected side, N Female Bulkhead antenna side
  - AL-LSXM PolyPhaser Lightning Arrestor 2 GHz to 6 GHz N Female protected side, N Female Bulkhead antenna side
  - SMA male to N male antenna cable to connect lightning protection to a radio for cabinet mount
  - TNC male to N male antenna cable to connect lightning protection to a radio for cabinet mount
  - N male to N male antenna cable to connect lightning protection to a radio for cabinet mount (48")
- Antennas:
  - Laird FG9023, 902 MHz to 928 MHz, 3 dBi gain, fiberglass Omnidirectional antenna, N Female connector
  - FM2, antenna Pole Mount Bracket for Laird fiberglass antennas
  - Laird TRAB9023NP, 902 MHz to 928 MHz, 3 dBi gain, Omnidirectional Phantom antenna, N Female bulkhead connector
  - Laird TRAB806/17103P, Multi Band, 806 MHz to 2.5 GHz, 3 dBi gain, Omnidirectional Phantom antenna, N Female bulkhead connector
  - SMA male to N male antenna cable to connect antennas with an integrated bulkhead to a radio for cabinet mount (48")
  - TNC male to N male antenna cable to connect antennas with an integrated bulkhead to a radio for cabinet mount (48")
  - N male to N male antenna cable to connect lightning protection to a radio for cabinet mount (48")
- Radio Options Include:

  2 Way VHF (154 MHz) radio
  - Radius

Optional Equipment/Accessories (Cont.)

2 Way (130 MHz to 3.7 GHz) radio modems:

- SilverSpring Networks SSN ebridge and sbridge
- MDS INET 900 AP
- MDS INET II
- MDS SD9
- MDS X710
- MDS SD4
- MDS 9810
- MDS TransNET
- MDS Mercury 3650 and 900
- MDS entraNET 900 and 2400
- CellNet Series III

Digital Cellular Modems:

- CalAmp – Vanguard VG5530
- DIGI – Transport WR31
- Sixnet BT series Mobility Pro/Industrial Pro Gateways
- Multitech Multimodem series routers and modems
- AirLink Raven II, X, XE, XT
- Telemetrics DNP RTMII
- Zywan 3G/GPRS/GSM Cellular Modem

■ **NOTE:** Please contact the factory for additional radio options.

- Radio, Factory Installation:
  - Radio mounted and installed in M-2979
  - Customer supplied radio mounted and installed in M-2979
- RS-232 Radio Comm Cable – 6' length
- RS-232 Radio Comm Cable – 6' length (Male to Female null modem)
- Ethernet Radio Comm Cable – 6' length
- DB9 to DB25 – RS-232 Cable Converter
- 1/2" HEYCO Liquid Tight Cordgrip to secure cable coming into cabinet
- 25 foot N male to N male LMR-400 antenna extension cable
- Surge Arrester for VT inputs
- Test Switches
- VT Fuses
- Cable Tray

Tests and Standards

The M-2979 Recloser Control Cabinet complies with the following tests and standards:

Electrical Environment

Surge Withstand Capability

IEEE C37.60	±100 KV, 7 KA HV Surge Arrester Operation
IEEE C37.90.1	±2,500 V_{pk} Oscillatory 1 MHz ±4,000 V_{pk} Fast Transient Burst 5 kHz
IEEE C37.90.1-1989	±2,500 V_{pk} Oscillatory 1 MHz ±5,000 V_{pk} Fast Transient 1 MHz
IEC 61000-4-18	±2,500 V_{pk} Oscillatory 1 MHz
IEC 61000-4-4	±4,000 V_{pk} Fast Transient Burst 5 kHz/2.5 kHz
IEC 61000-4-5	±4,000 V_{pk} 1.2 µs / 50 µs Surge (control cable)
IEEE C62.41.2	±6,000 V_{pk} 1.2 µs / 50 µs Surge (power cable)

Mechanical Environment

ASTM 4169-09 Truck Level III Shipping Vibration

Atmospheric Environment

Temperature/Humidity

IEC 60068-2-1	Cold, -40° C (-40° F) (See Table 1 for Operating Temp. with Batteries)
IEC 60068-2-2	Dry Heat, +85° C (+185° F) (See Table 1 for Operating Temp. with Batteries)
IEC 60068-2-30	Damp Heat condensing cycle, +25° C, +55° C (+131° F) @ 95%$_{RH}$ operating)
IEC 60664-3	Conformal coat grade UV40-250 board protection rating -50° C (-58° F) to +125° C (+257° F) CAT IV

IP Protection Degree

IEC 60529	IP55 Dust/Jetting Water Protection
ASTM B117-11	+50° C Salt Spray 5%

Paint System

IEEE C57.12 Coating System Tests:

ASTM D3359	Crosshatch adhesion
ASTM D2247	Humidity 100%, 45°C (113°F)
ASTM B117	Salt Spray
ASTM G154	Ultraviolet accelerated weathering
ASTM D4060	Abrasion resistance
ASTM D2794	Impact
IEEE C57.12	Oil Insulating fluid resistance

Batteries

Control System supply with a 24 Vdc control voltage powered by 2 x 12 Vdc sealed lead acid batteries. Additional battery models/capacities are available and can be quoted upon request.

Standard Battery Options	
BECO Part Number	**Operating Temperature Range**
B-1680: 2 x 12 Vdc, 12 Ahr	Charge: -20° C to +50° C (-4° F to +122° F) Discharge: -40° C to +60° C (-40° F to +140° F)
B-1746: 2 x 12 Vdc, 20 Ahr	
B-1936 Kit: 2 x 12 Vdc, 15 Ahr	Charge: -40° C to +80° C (-40° F to +176° F) Discharge: -40° C to +80° C (-40° F to +176° F)

Table 1 Battery Operating Temperature Ranges

Physical

Aluminum (5052-H32), .090" thickness

Size: 28.78" high x 17.75" wide x 14.11" deep (73.1 cm x 45.01 cm x 35.84 cm)

Approximate Weight with M-7679: 30.4 lbs (13.79 kg)

Approximate Shipping Weight with M-7679: 36.4 lbs (16.51 kg)

Stainless Steel (316), 14 gauge

Size: 28.78" high x 17.75" wide x 14.11" deep (73.1 cm x 45.01 cm x 35.84 cm)

Approximate Weight with M-7679: 45.4 lbs (20.59 kg)

Approximate Shipping Weight with M-7679: 51.4 lbs (23.32 kg)

■ **NOTE:** Add approximately 7.5 lbs (3.4 kg) when equipped with Battery Backup option.

Warranty

The M-2979 Recloser Control Cabinet is covered by a ten year warranty from date of shipment. Third party mounted options will carry their respective manufacturer's warranty, passed along through Beckwith Electric.

Trademarks

Specification subject to change without notice. Beckwith Electric has approved only the English version of this document.

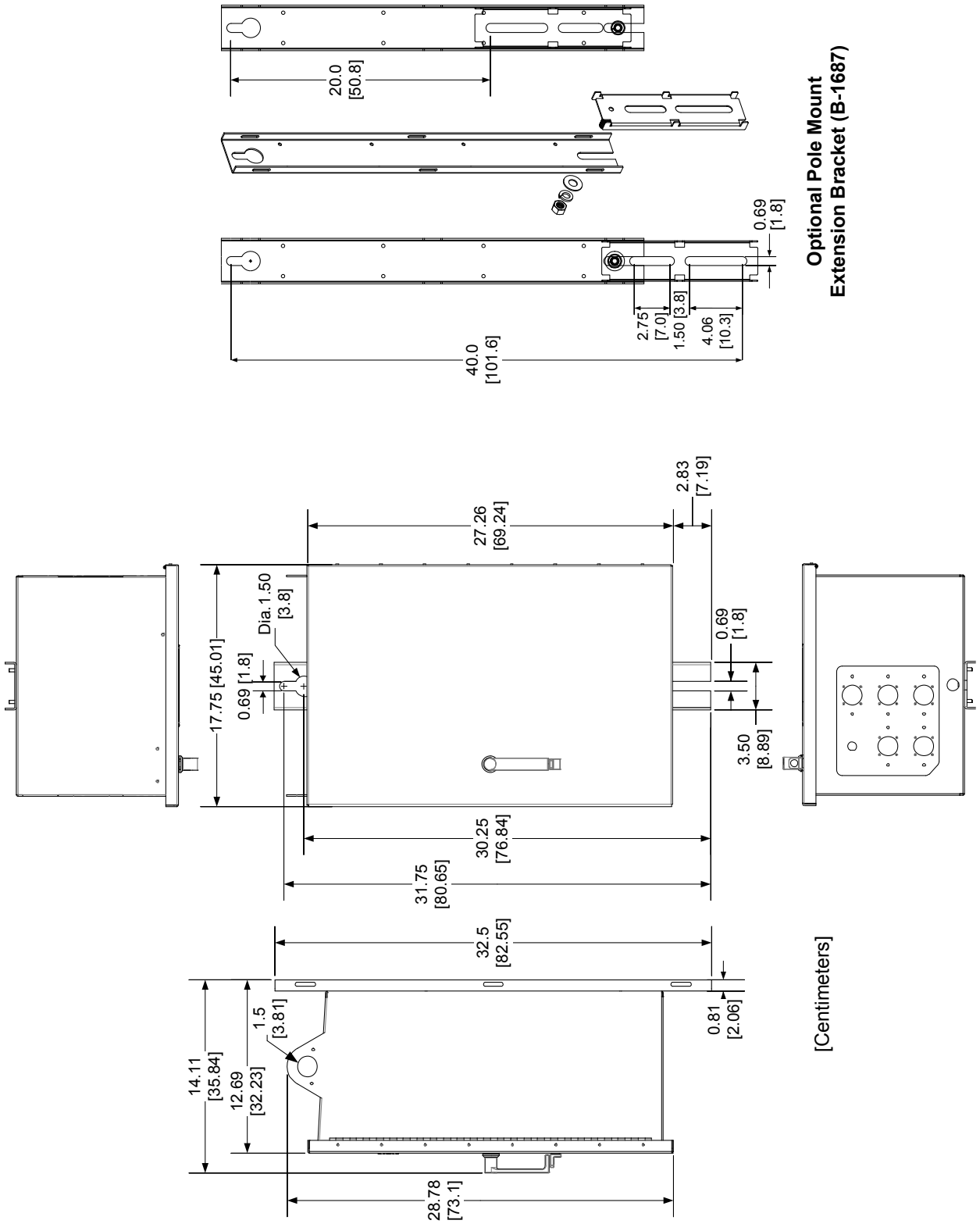

Figure 3 M-2979 Recloser Control Cabinet Dimensional Drawing

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