

M-7651A D-PAC

Protection, Automation and Control System for Power Distribution Applications

Protection

- Over 30 Protection Elements for optimal protection of Power Distribution Systems
- Ready to use advanced Protection Schemes for applications including Feeder Protection, Bay Control and DG Interconnection Protection
- 8 Setting Profiles
- Comprehensive I/O Matrix provides visual confirmation of enabled functions and selected outputs improving security

Automation/Communications

- Front panel USB and SD Card ports for local programming and data transfer
- One or two optional serial ports (TIA-232, TIA-485 or Serial Fiber)
- Optional single or dual Ethernet ports (copper or fiber) with simultaneous multi-user and multi-protocol support
- Protocols supported include:
 - MODBUS, DNP3.0
 - Optional: IEC61850
- Comprehensive Cyber Security tools for NERC CIP Compliance
- IEEE 1686 Compliant

Control

- Four user programmable Inputs and Outputs, expandable to twelve Inputs and twelve Outputs, plus three Virtual Inputs
- User programmable front-panel LEDs and pushbuttons

Monitoring

- Power Quality Monitoring up to the 63rd Harmonic including THD and TDD
- PQ Viewer (ITIC Curve)
- Sags, Swell and Sub-Synchronous Transient Detection
- Advanced Data Logging and Load Profile Recorder
- 3500 Event Sequence of Events (SOE) Recorder
- 100 DFR quality records of up to 480 cycles each with an adjustable sampling rate up to 128 s/c

IPScom® – Uncomplicated Software for Complex Power System Applications

- Integrated Metering, DFR and PQ Visualization Tools
- Search and filtering tools for analysis of SOE, DFR and PQ records
- IPSlogic Programmable Logic

Flexibility

- Fast and easy retrofitting for most popular relays in existing cutouts using Beckwith's Adapter Panel Technology™

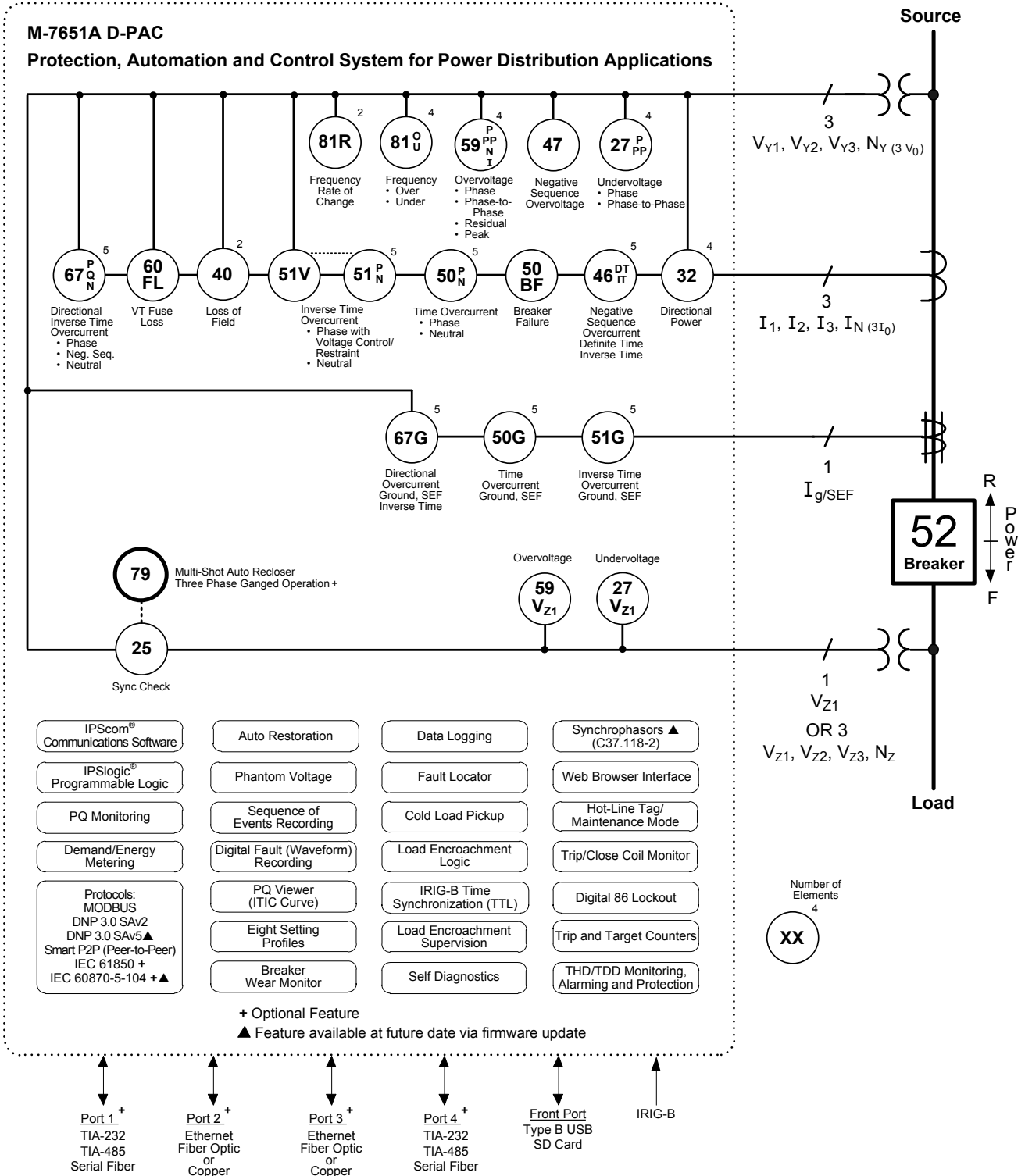


Figure 1 M-7651A D-PAC Typical Connections

Standard Control Features

- Over 30 protection functions
- Horizontal or Vertical Mounting
- 50 Hz or 60 Hz Frequency
- High (90 to 315 Vac/Vdc) or Low (18 to 60 Vdc) Power Supply
- IPScom Communications Software
- IPSlogic Programmable Logic
- Synchrophasors (IEEE C37.118-2)▲
- Load Encroachment Supervision
- Phantom Voltage
- Digital 86 Lockout▲
- I/O Map
- Smart Fuse Coordination▲
- Custom Curve Designer
- Hot-Line Tag/Maintenance Mode
- Fault Locator
- Eight Setting Profiles
- Compare Settings Tool
- Cold Load Pickup
- Auto Restoration
- Breaker Wear Monitor
- Power Quality Monitoring
- THD/TDD Monitoring, Alarming and Protection
- ITIC Curve Violation Counters and Recording
- Demand and Energy Metering
- Power Supply Monitor
- Trip/Close Coil Monitor
- Data Logging
- Sequence of Events Recording
- Trip and Target Counters
- Digital Fault (Waveform) Recording
- Fault Event Records
- Self-Diagnostics
- Three Phase Current Inputs plus one Ground or Sensitive Earth Current Input
- Three Phase Voltage Inputs plus one Sync Check Voltage Input
- IRIG-B Time Synchronization (TTL)
- Front Panel USB and SD Card ports
- Protocols Included:
 - MODBUS®
 - DNP3.0 SAv2
 - Smart P2P (Peer-To-Peer)▲

- Four User Programmable Digital Inputs
- Four User Programmable Digital Outputs
- Conformal coated circuit boards
- Configurable Front HMI LEDs and Pushbuttons
- 12 Vdc Backup Power Input
- SMTP E-mail server▲
- Web Browser Interface
- IEEE 1686 Standard Compliant Cyber Security
- IPsec (Internet Protocol Security)
- RADIUS Client Capability to manage local and remote access to the control
- Wide Variety of Communications Accessories

Optional Features

- Multi-Shot Auto Recloser, Three-Phase Ganged Reclose Operation
- PORT 1: TIA-232, TIA-485, or Fiber Optic
- PORT 2 – Rear Ethernet Fiber Optic or Copper
- PORT 3 – Rear Ethernet Fiber Optic or Copper
- PORT 4 – TIA-232, TIA-485, or Fiber Optic
- Optional Protocols in addition to standard MODBUS and DNP3.0 (requires at least one Ethernet Port):
 - Add IEC 61850
 - Add IEC 60870-5-104/101▲
 - Add Combination IEC 61850 and IEC 60870-05-104/101▲
- Expanded I/O – Additional eight digital Inputs and eight digital Outputs for a total of 12 each
- Low Energy Analog (LEA) Inputs per C37.92. Configurations available: 4 LEA, 3LEA + 1VT, or 6LEA.
- ArcFlash detection▲
- M-2032A Battery Charger/Power Supply – please refer to the M-2032A Specification for additional information and ordering options.

M-7651A Mounting Options

- 19" Rack Mount Adapter Panel
- Adapter Frames to mount the M-7651A into existing cutouts

▲ Feature available at future date via firmware update / IPScom update

M-7651A D-PAC – Specification

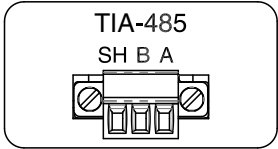
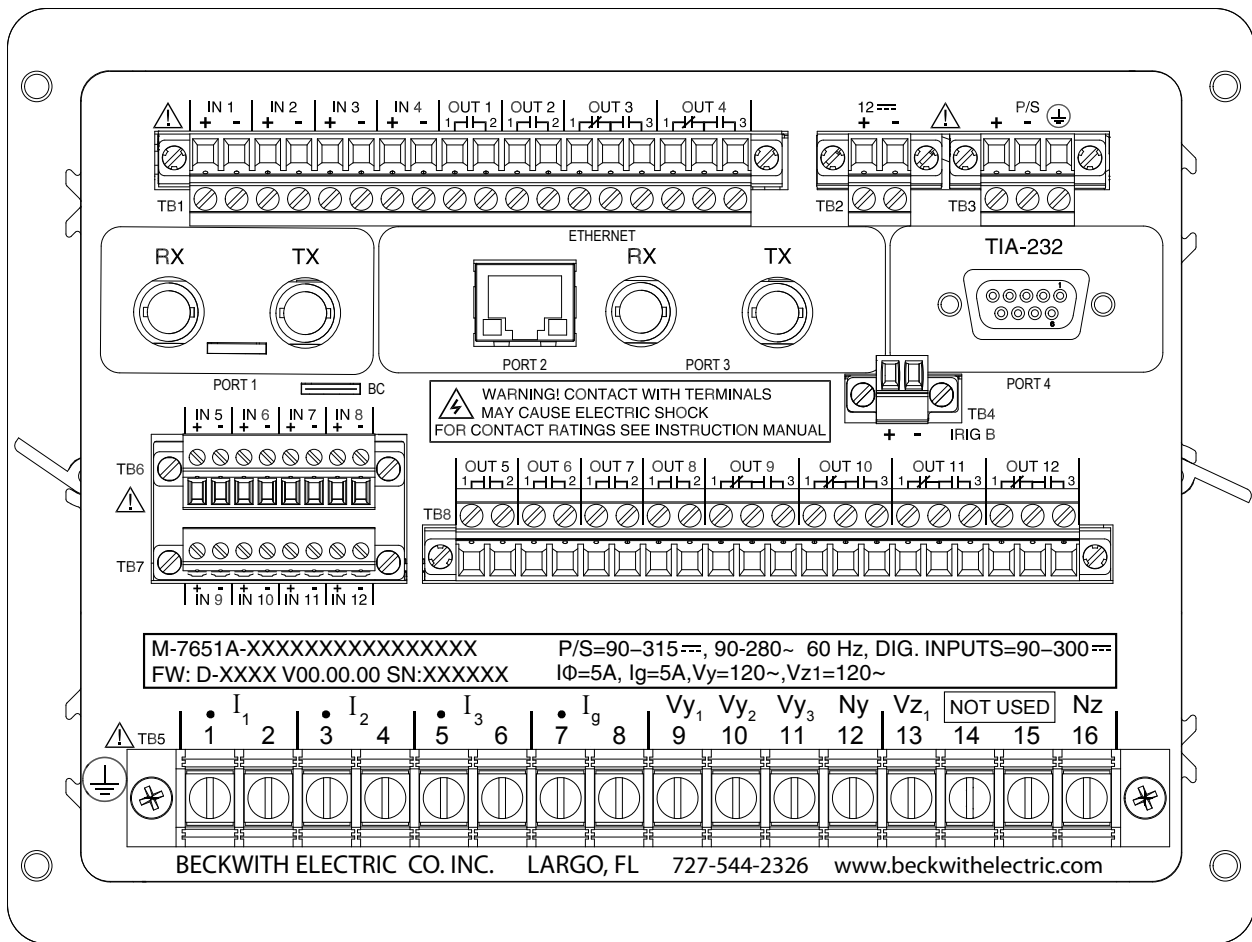


Figure 2 M-7651A External Connections (Typical configuration, other options are available)

PROTECTIVE FUNCTIONS

| Device Number | Function | Setpoint Ranges | Increment | Accuracy† |
|-------------------------------------|--|------------------------|------------------|-------------------|
| Sync Check | | | | |
| 25 | Reference Phase | A/B/C | – | – |
| | Undervoltage Permission | | – | – |
| | Dead Line/Dead Bus | Yes/No | – | – |
| | Dead Line/Live Bus | Yes/No | – | – |
| | Live Line/Dead Bus | Yes/No | – | – |
| | Live Line Minimum Voltage | 0.0 to 200.0 V | 0.1 V | ± 0.2 V or ± 0.5% |
| | Live Bus Minimum Voltage | 0.0 to 200.0 V | 0.1 V | ± 0.2 V or ± 0.5% |
| | Sync Check Permission | | | |
| | Max/Minimum Time Delay | 0.01 to 600.00 s | 0.01 s | ± 0.01 s or ± 1% |
| | Minimum Voltage | 10.0 to 300.0 V | 0.01 V | ± 0.2 V or ± 0.5% |
| | Maximum Voltage | 10.0 to 300.0 V | 0.01 V | ± 0.2 V or ± 0.5% |
| | Angle Difference | 0.00° to 90.00° | 0.01° | ± 0.3° |
| | Magnitude Difference | 0.00 to 300.00 V | 0.01 V | ± 0.2 V or ± 0.5% |
| | Frequency Difference | 0.00 to 5.00 Hz | 0.01 Hz | ± 0.02 Hz or ± 2% |
| Undervoltage | | | | |
| 27 | Phase Undervoltage (#1 to #4 Steps) | | | |
| | Pickup | 10.00 to 300.00 V | 0.01 V | ± 0.2 V or ± 0.5% |
| | Definite Time | 0.00 to 600.00 s | 0.01 s | ± 0.01 s or ± 1% |
| | Auto Restoration | Enable/Disable | | |
| 27 PP | Phase-to-Phase Undervoltage | | | |
| | Pickup | 10.00 to 300.00 V | 0.01 V | ± 0.2 V or ± 0.5% |
| | Definite Time | 0.00 to 600.00 s | 0.01 s | ± 0.01 s or ± 1% |
| 27 Vz1 | Vz1 Undervoltage | | | |
| | Pickup | 10.00 to 300.00 V | 0.01 V | ± 0.2 V or ± 0.5% |
| | Definite Time | 0.00 to 600.00 s | 0.01 s | ± 0.01 s or ± 1% |
| Bus Side Voltage Supervision | | | | |
| 27B | Bus Side Voltage Supervision | | | |
| | Minimum Closing Voltage | 0.00 to 300.00 V | 0.01 V | ± 0.2 V or ± 0.5% |
| | Supervision Time | 0.00 to 600.00 s | 0.01 s | ± 0.01 s or ± 1% |

†Select the greater of these accuracy values. For voltage accuracy specified, the range is (20 – 180 V).