

Actual Size

## FEATURES

- Compact 1/4 DIN size
- Rugged construction
- Ideal for retrofit applications
- Easy to program
- Dynamic thermal model
- Multifunction protection
- Microprocessor based
- On-line programming
- Nonvolatile memory
- Individual phase ammeters
- LSIG protection
- Isolated RS-485 communication
- Data logging
- Wide temperature range
- Isolated analog output

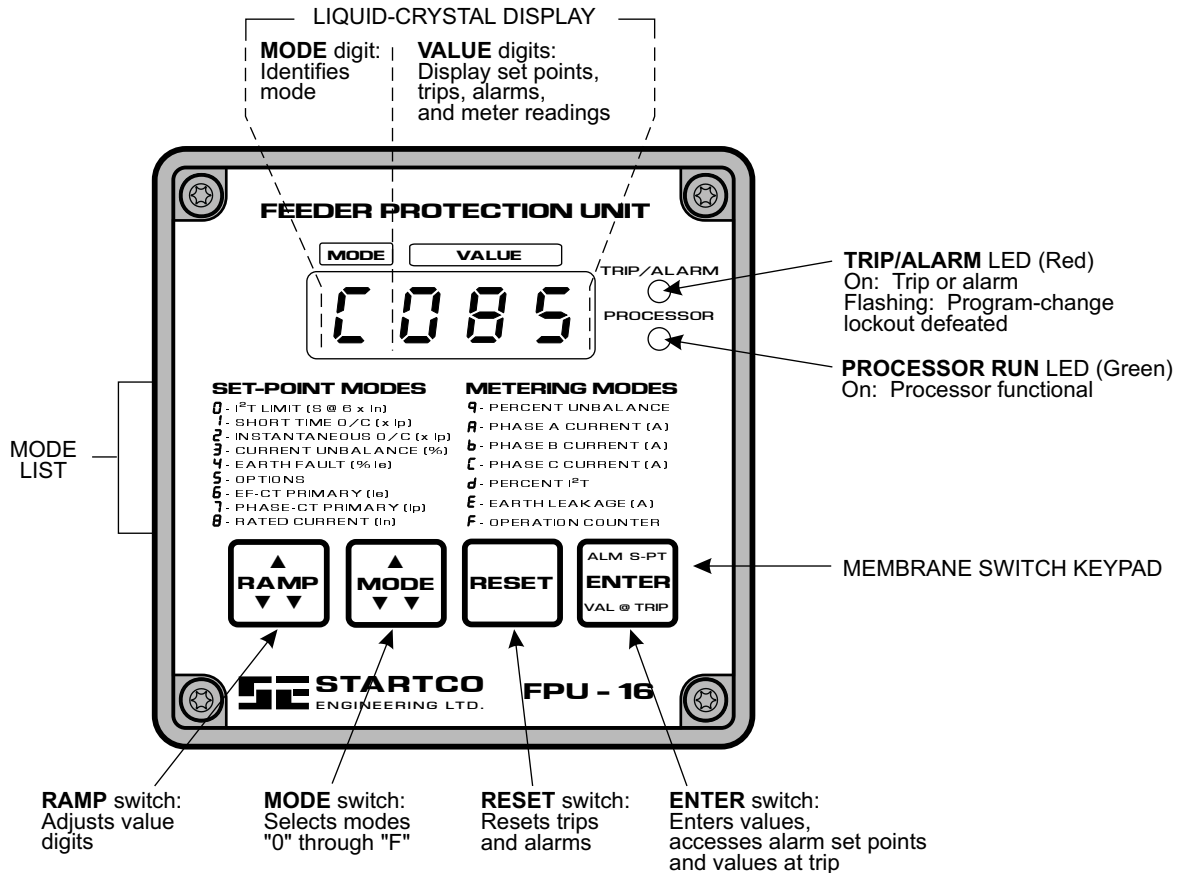
Manuals and additional information available at [www.startco.ca](http://www.startco.ca)

# FPU-16

## FEEDER PROTECTION UNIT

The FPU-16 is a microprocessor-based feeder protection unit with programmable trip and alarm set points for phase, earth-fault, and current-unbalance protection. Phase-protection set points include long-time, short-time, and instantaneous (LSI) elements. The FPU-16 uses inputs from 5-A- or 1-A-secondary current transformers connected to an interface CT to simplify installation and eliminate the need for CT shorting contacts. Features of the FPU-16 include an operation counter, front-panel programming, independent trip and alarm relays, and an isolated analog output. The FPU-16's compact size and its separate ICT-2 interface current transformer increase mounting options—the unit is ideal for new and retrofit applications. RS-485 communication provides remote access to metered values, set points, and 250 event records.

## FACEPLATE



## PROTECTION

### Thermal Overload

- Long-time overcurrent
- Cyclic overloads

### Short-Time Overcurrent

- Cyclic overloads
- Intermittent fault

### Instantaneous Overcurrent

- Short circuit

### Current Unbalance

- Phase failure
- Supply unbalance
- Load unbalance
- Single phasing
- Pole failure

### Earth Fault

- Earth leakage
- Phase-to-ground fault

## INTERFACE CT

- 5-A and 1-A secondary CT inputs
- Shorting blocks not required
- Reduces CT lead lengths
- DIN rail mountable

## FEATURES

- Stores meter values at last trip
- Program-change lockout
- Fused, Form C trip relay
- Fused, Form C alarm relay
- Liquid-crystal display
- Conformally coated electronics
- Proven reliability
- Plug-in terminal blocks
- Emergency Thermal Reset
- Delayed or immediate thermal reset
- Backlit display option
- Remote-keypad input option
- ac and dc power supply options
- Operation counter
- Sensitive earth-fault protection

## USER SELECTABLE

- Trip and alarm set points
- Set point delete
- Earth-fault time delay
- Alarm latch
- Short-time-trip delay
- Autoreset (Thermal Overload)
- Immediate reset (Thermal Overload)
- Analog-output parameter
- Fail-safe or non-fail-safe output-relay operation

## METERING DISPLAYS

- Individual phase currents, A or %
- Percent current unbalance
- Earth-leakage current
- Percent I<sup>2</sup>t used
- Operation counter

## INFORMATION DISPLAYS

- Trip and alarm set points
- Time-to-reset (Thermal Overload)
- Meter values at trip
- Trip and alarm indication
- Processor-run indication
- Program-enable indication

## COMMUNICATION

- RS-485 interface for up to 63 protection units
- Allen-Bradley and Modbus protocols
- Free PC software
- Remote monitoring, programming, and reset
- Access to all meter readings
- Data logging option:
  - 250 time/date stamp records
  - User-configured event mask

# TECHNICAL SPECIFICATIONS

## Supply:

|                       |             |
|-----------------------|-------------|
| 120 or 240 Vac, 50/60 | 10 VA       |
| Maximum Continuous    | 135/265 Vac |
| Minimum Continuous    | 85/170 Vac  |
| Power-up Voltage      | 100/200 Vac |
| 100 to 240 Vdc        | 10 W        |
| Maximum Continuous    | 340 Vdc     |
| Minimum Continuous    | 90 Vdc      |
| 12, 24, or 48 Vdc     | 10 W        |
| Maximum Continuous    | + 50%       |
| Minimum Continuous    | - 25%       |

## Interface-CT Inputs:

|                   |                          |
|-------------------|--------------------------|
| Thermal Withstand |                          |
| Continuous        | 5 x CT-Secondary Rating  |
| 1-Second          | 80 x CT-Secondary Rating |
| Burden            | < 0.01 Ω                 |

## Output Relays:

|                       |  |
|-----------------------|--|
| Contact Rating        | 8 A Resistive, 250 Vac or 24 Vdc<br>B300 Pilot Duty<br>0.25 hp @ 120 Vac |
| Contact Configuration | Form C   |
| Fuse Rating (F1 & F2) | 8 A, 250 Vac   |

## Analog Output:

|           |   |
|-----------|---|
| Parameter | 0 to 125% Rated Current,<br>0 to 100% I <sup>2</sup> t, or<br>0 to 100% EF-CT Primary |
|-----------|---|

## Drive

|                     |                    |
|---------------------|--------------------|
| 4-20 mA             | 700 Ω max          |
| 0-5 Vdc             | 25 mA max          |
| 0-10 Vdc            | 25 mA max          |
| Isolation to Ground | 300 Vac Continuous |
| Dielectric Strength | 1500 Vac           |
| Resolution          | ± 1% Full Scale    |

## Accuracies:

|                        |  |
|------------------------|--|
| Ammeter Accuracy       | ± 0.3% Full Scale, or<br>± 3% Reading <sup>1,2</sup> |
| Earth-Leakage Accuracy | ± 3% EF-CT-Primary Rating <sup>2</sup>               |

<sup>1</sup> Ammeter Full Scale = 10 x Rated Current

<sup>2</sup> Interface-CT accuracy included

Shipping Weight . . . . . 3.2 kg (7 lb.)

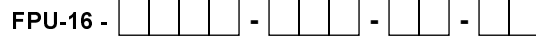
## Environment:

|                       |               |
|-----------------------|---------------|
| Operating Temperature | -40°C to 60°C |
| Storage Temperature   | -55°C to 80°C |

# ORDERING INFORMATION

FPU-16 supplied with ICT-2, 6 m (20 ft) ICT-2 interconnection cable, and mounting hardware. Provide complete model number with order.

## MODEL NUMBER:



### Mount

|   |         |
|---|---------|
| P | Panel   |
| S | Surface |

### Supply Voltage

|    |                        |
|----|------------------------|
| 12 | 120 Vac                |
| 24 | 240 Vac                |
| SW | Switchable 120/240 Vac |
| AD | 120-240 Vac/dc         |
| D1 | 12 Vdc                 |
| D2 | 24 Vdc                 |
| D4 | 48 Vdc                 |

Note 1

### Load Frequency

|   |                       |
|---|-----------------------|
| 5 | 50 Hz (IEC Fusing)    |
| 6 | 60 Hz (CSA/UL Fusing) |

### Signal-Output Configuration

|     |   |
|-----|---|
| 000 | Analog Output only  |
| 010 | RS-485 Communication Interface only,<br>Specify Analog-Output Type 00   |
| 011 | Dual Output: RS-485 and Analog,<br>Analog Parameter is CURRENT          |
| 012 | Dual Output: RS-485 and Analog,<br>Analog Parameter is I <sup>2</sup> t |
| 013 | Dual Output: RS-485 and Analog,<br>Analog Parameter is EARTH LEAKAGE    |

Note 3

Notes 1 & 2

### Options

|    |   |
|----|---|
| 00 | No options  |
| 01 | Electroluminescent Backlit Display                          |
| 02 | Remote-Keypad Input   |
| 03 | Options 01 and 02 Combined                                  |
| 10 | RS-485 Communication, A-B Protocol                          |
| 11 | RS-485 Communication, Modicon Protocol                      |
| 20 | RS-485 Communication with Data logging,<br>A-B Protocol     |
| 21 | RS-485 Communication with Data logging,<br>Modicon Protocol |

Note 1

### Analog-Output Type

|    |          |
|----|----------|
| 42 | 4-20 mA  |
| 05 | 0-5 Vdc  |
| 01 | 0-10 Vdc |
| 00 | None     |

## NOTES:

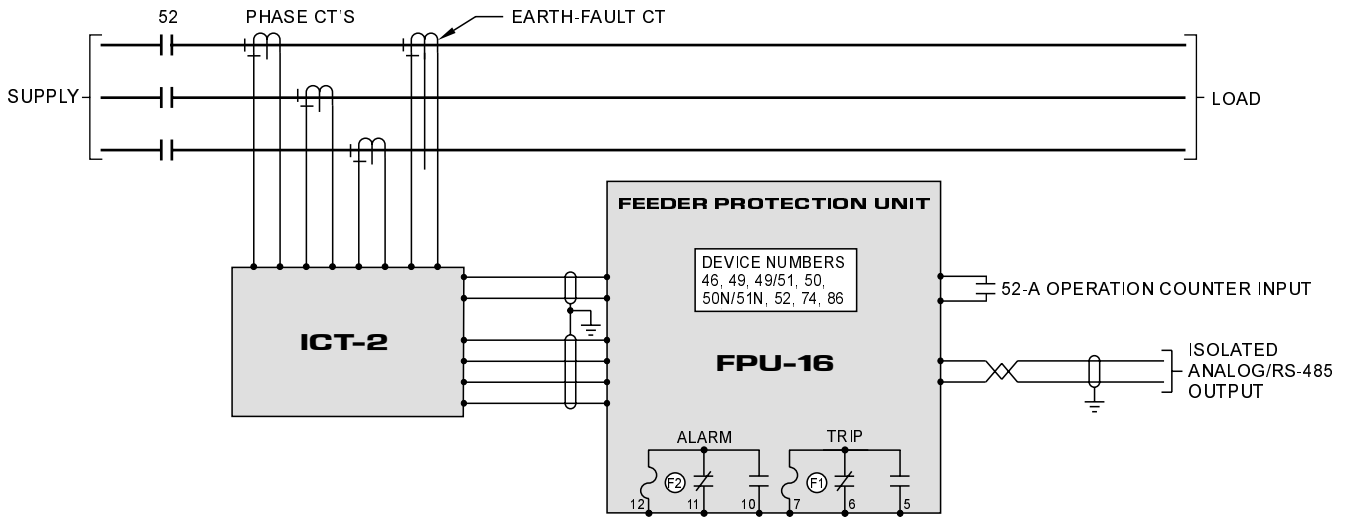
- Not included in base price.
- Communication protocol must be specified. See options.
- Panel mount only.

# ACCESSORIES

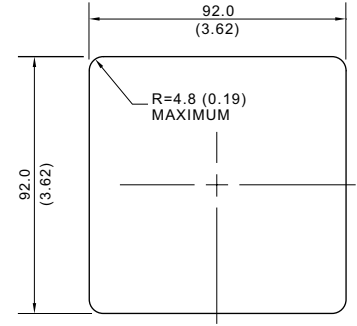
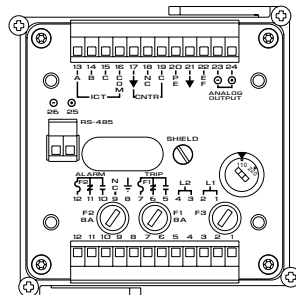
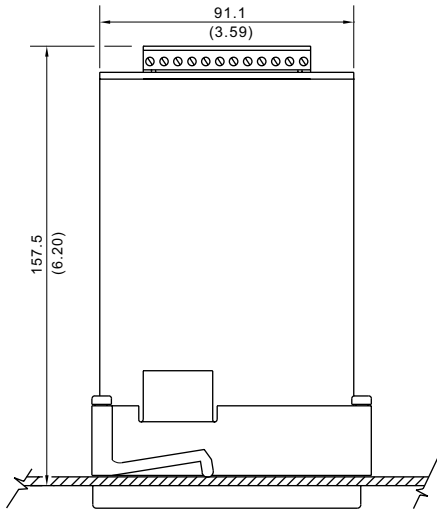
|                   |   |
|-------------------|---|
| EFCT-1            | Sensitive Earth-Fault CT with<br>82-mm (3.2") Window  |
| EFCT-1FC          | Flux Conditioner, 70 mm (2.7")                        |
| EFCT-2            | Sensitive Earth-Fault CT with<br>155-mm (6.1") Window |
| EFCT-2FC          | Flux Conditioner, 139 mm (5.5")                       |
| SE-EFVC           | Voltage Clamp   |
| SE-485            | RS-232/RS-485 Converter                               |
| SE-TA485          | Termination Assembly                                  |
| SE-COMM16         | PC Communication Software*                            |
| Retrofit Adapters | Consult Factory                                       |

\* Available at [www.startco.ca](http://www.startco.ca)

# TYPICAL CONNECTION

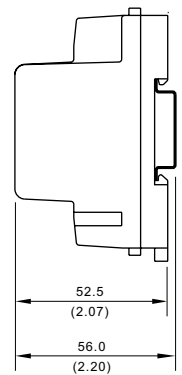
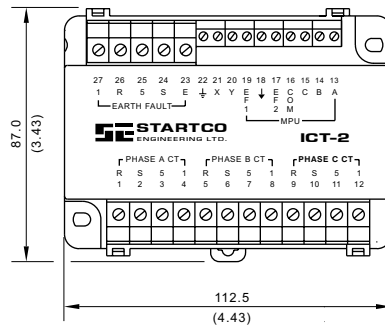
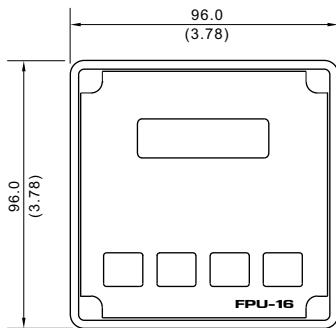


# DIMENSIONS



### NOTES:

1. Dimensions in millimeters (inches).
2. Switchable supply and dual output shown.
3. Panel-mount FPU-16 shown.



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