



Compatible[®]
ZIVersys

FIT

Breaker Failure Protection
Protection, Metering and Communications



Description

The **ZIV FIT** is a state-of-the-art breaker failure protection Intelligent Electronic Device (IED). **FIT** terminals provide protection for breaker failure conditions initiated by single-phase trips, three-phase overcurrent trips or three-phase trips without overcurrent.

FIT terminals include overcurrent detection units with rapid reset characteristics for both single phase and three phase overcurrent pickup. This feature ensures against false breaker failure element pickup once the overcurrent condition disappears.

Application

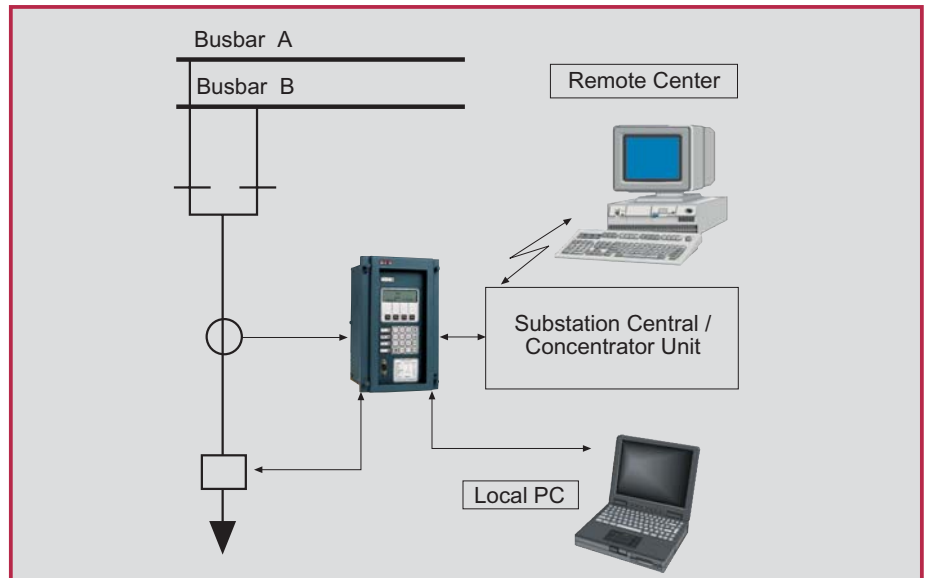
FIT terminals are suitable for breakers in transmission lines, feeders, transformers, etc. in MV, HV and EHV applications, for both single-phase trip and three phase trip schemes.

The breaker failure unit has two independent overcurrent elements per phase. A common timer is activated by either protection element. The breaker failure signal is generated if the overcurrent condition is still present after the timer has expired. The **FIT's** rapid

reset characteristic is the key feature to avoid false breaker failure indications. During three phase trips where overcurrent conditions do not exist, the breaker failure element monitors the breaker status signal connected to one of the digital inputs of the IED.

FIT terminals offer user-friendly data management and communication tools. The sequence of events record, fault reports and oscillographic recordings can be easily accessed locally or remotely.

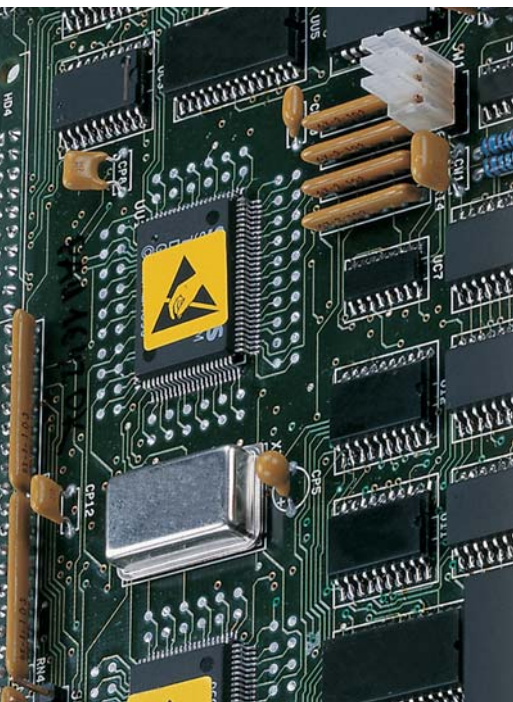
FIT terminals can be used individually or integrated into larger systems with other protective devices. Local and remote communication ports are available for either application. When an **FIT** is part of a Substation Integrated Protection and Control System (SIPACS), the linkage to the substation Central Unit is made through a communication subsystem. The Central Unit is responsible for the external communications and, if needed, will emulate specified RTU communication protocols.



Features

The following are standard features and functions incorporated into every FIT unit:

- 3 instantaneous phase current detection units, monitored by the trip command of each phase.
- 3 independent setting groups (1 active and 2 alternative).
- 5 LED targets (4 programmable).
- 2 n/o trip contacts which are activated by the breaker failure output.
- 2 n/o trip contacts which are activated by the breaker failure pickup.
- 8 programmable digital inputs.
- 8 auxiliary outputs (7 programmable).
- Local and remote communication interface.
- Sequence of events recording.
- Oscillographic recording (optional).
- Self diagnostics and monitoring.



User Interface (HMI)

FIT terminals can be accessed in two different modes:

LOCAL MODE

• Alphanumeric Keypad & Display (HMI)


The keypad (16 keys in a 4 x 4 matrix, plus 4 function keys) allows changes to be performed without the use of a computer, and provides the user the ability to access and edit IED functions and settings. Sensitive operations are password protected.

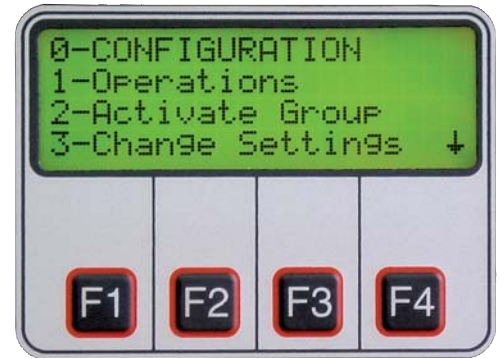
The HMI is menu driven and displayed on the LCD screen (4 line x 20 characters).

Essential information and functions are available through the **F2** key. This key allows access to information and operations by cycling through the following screens:

- Last Trip Information
- Current Metering (Primary Values)
- Last Trip Data Reset
- LED Targets Reset

• PC Via Serial Port

The terminals are equipped with an RS-232 front port. Through this port, a PC can communicate locally via a null modem cable with the user-friendly  software installed.



Display

REMOTE MODE

The terminals are equipped with a rear communications port(s). This connection permits remote access via modem, or it can be used to include the **FIT** in an existing system (via RTU, Substation Central Computer or SCADA).

Technical Assistance in
U.S.A. and Canada.





Communications

Vercom® is an intuitive, Windows™ based program that communicates directly with all types of terminals either locally (via front port), or remotely (via rear port). The software is structured with user-friendly menus and dialog boxes to access settings, local operations, data records and programming of inputs and outputs. Each screen prompts the user to enter data or make a selection in pull-down menus.

The software is password protected allowing various levels of clearance to individual users.

Vercom® allows the user to program IED settings off-line. These settings can be easily stored in the software's database to be uploaded to an IED in the future.



Screen from **Vercom** communications program.



Enclosure

FIT units are designed for either horizontal mounting (19" x 2U) or vertical mounting (1/4 of 19" x 6U).



Vercom protection and control IEDs can be furnished with a sealable clear protective cover to restrict access to the keypad. With the cover installed, the **F2** key is still accessible, which provides access to essential information and functions.

Protection Settings

General Settings

| | |
|---------------------------|-----------|
| Transformation ratio (CT) | 1 - 3,000 |
|---------------------------|-----------|

Breaker Failure Protection Settings

| | |
|---|--------------|
| Phase current (pick up 1) | 0.2 – 2.4 In |
| Phase current (pick up 2) | 0.2 – 2.4 In |
| Timer (Single phase pickup) | 0.005 - 1 s |
| Timer (3 ϕ pickup with overcurrent) | 0.005 - 1 s |
| Timer (3 ϕ pickup without overcurrent) | 0.005 - 1 s |

Metering History Settings

| | |
|----------------------|---------------------------------|
| Sampling Interval | 1 - 15 min |
| Data Record Interval | 0 – 24 h |
| Day Mask | Sunday - Saturday (YES / NO) |
| Recording Hours | 0 – 24 h |



Protection and control cabinet



Modular protection system



Technical Characteristics

Power Supply Voltage

| |
|-----------------------------|
| 24-48 V dc ($\pm 20\%$) |
| 110-125 V dc ($\pm 20\%$) |
| 220-250 V dc ($\pm 20\%$) |

Analog Current Inputs

| | |
|--------------------------------|---|
| Rated Current | $I_n = 1A / I_n = 5A$ |
| Thermal Withstand Capabilities | |
| Continuously | 4 I_n |
| 3 s | 50 I_n |
| 1 s | 100 I_n |
| Dynamic Limit | 240 I_n |
| Current Circuit Burden | $I_n = 5A < 0.2 VA$ $I_n = 1A < 0.05 VA$ |

Digital Inputs

| | |
|---------------------|----------------|
| Input Voltage Range | 24-125 Vdc |
| | 48-250 Vdc |
| | 125/110 Vdc/ac |
| Burden | < 5 mA |

Trip & Close Contacts

| | |
|----------------------------------|-----------------|
| Make and Carry (1 s) | 30 A |
| Continuous Current | 8 A |
| Switching Capability | 2500 W |
| Breaking Capability | 150 W (48Vdc) |
| | 55 W (110 Vdc) |
| | 1250 VA |
| Breaking Capability (L/R = 0.04) | 20 W at 125 Vdc |
| Switching Voltage | 250 Vdc |

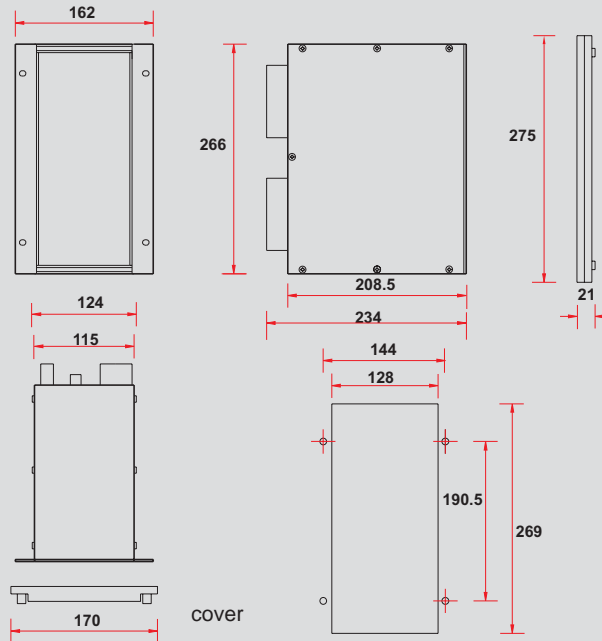
Auxiliary Outputs

| | |
|----------------------------------|-----------------|
| Make and Carry (30 s) | 5 A |
| Continuous Current | 3 A |
| Switching Capability | 2000 W |
| Breaking Capability | 75 W (48Vdc) |
| | 40 W (110 Vdc) |
| | 1000 VA |
| Breaking Capability (L/R = 0.04) | 20 W at 125 Vdc |
| Switching Voltage | 250 Vdc |

Dimensions

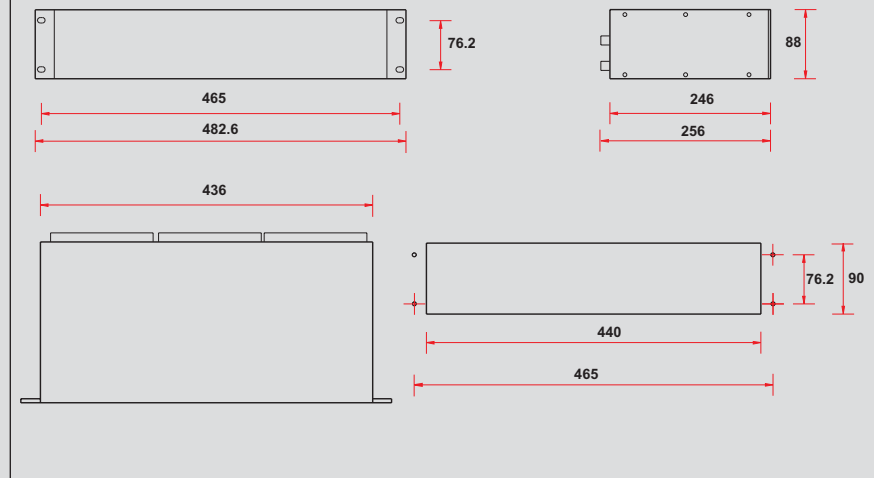
Enclosure type "C"

8 mm. drilling measurements in mm.



Enclosure type "F"

8 mm. drilling measurements in mm.



Model Selection

Model selection is determined using the following figure, according to the characteristics required:

| Enclosure | |
|-------------------------|---|
| Rack Modules (vertical) | 3 |
| Rack (horizontal) | 8 |

| Functions | |
|-----------|---|
| 50s + 62 | A |

| Options | |
|------------------------|---|
| Special Model | 0 |
| Basic Model | 1 |
| Oscillography Recorder | 2 |

| Rated Current | |
|---------------|---|
| 5 A | N |
| 1 A | E |

| Power Supply | Dig. Inputs | Superv. Inputs | |
|-----------------|-------------|----------------|---|
| 24-48 Vdc (*) | 24-48 Vdc | 24-48 Vdc | 1 |
| 110-125 Vdc (*) | 24-125 Vdc | 125 Vdc | 2 |
| 220-250 Vdc (*) | 48-250 Vdc | 250 Vdc | 3 |

(*) +/- 20%

| Frequency / Language | |
|----------------------|---|
| 50 Hz / Spanish | 0 |
| 60 Hz / English | 2 |
| 50 Hz / English | A |
| 60 Hz / Spanish | C |
| 60 Hz / Portuguese | E |

| Communications | |
|--|---|
| RS232 Front + RS232 Rear | 1 |
| RS232 Front + Plastic Fiber (1mm) Rear | 2 |
| RS232 Front / Glass Fiber (SMA) Rear | 3 |
| RS232 Front / Glass Fiber (ST) Rear | 4 |
| RS232 Front + RS485 Rear | 5 |

| I / O Module | |
|--------------|--|
|--------------|--|

| Enclosure Type | |
|-------------------|---|
| 2U x 1 19" rack | F |
| 6U x 1/4 19" rack | C |

Communications Protocol

Standards and Type Tests

| Insulation Test | IEC-255-5 |
|------------------------------|-----------------------------|
| Between Circuits and Ground | 2 kV, 50/60 Hz for 1 minute |
| Between Independent Circuits | 2 kV, 50/60 Hz for 1 minute |
| Impulse Test | IEC-255-5 |
| | 5 kV; 1.2/50 μ s; 0.5 J |

| 1 MHz Disturbance Test | |
|------------------------|--------|
| IEC-255-22-1 Class III | |
| Common Mode | 2.5 kV |
| Differential Mode | 1.0 kV |

| Fast Transient Disturbance Test | |
|---------------------------------|----------------|
| IEC-255-22-4 Class IV | |
| | 4 kV \pm 10% |

| Radiated Electromagnetic Field Disturbance Test | |
|---|--------|
| IEC-1000-4-3 | |
| Amplitude Modulated | 10 V/m |
| Pulse Modulated | 10 V/m |

| Electrostatic Discharge Test | |
|------------------------------|----------------|
| IEC-255-22-2 Class III | |
| | 8 kV \pm 10% |

| Radio Frequency Emissivity | |
|----------------------------|--|
| EN 55011 | |

| Temperature | IEC-255-6 |
|-----------------|----------------------|
| Operating Range | -10° C to +55° C |
| Storage Range | -25° C to +70° C |
| Humidity | 95% (non condensing) |

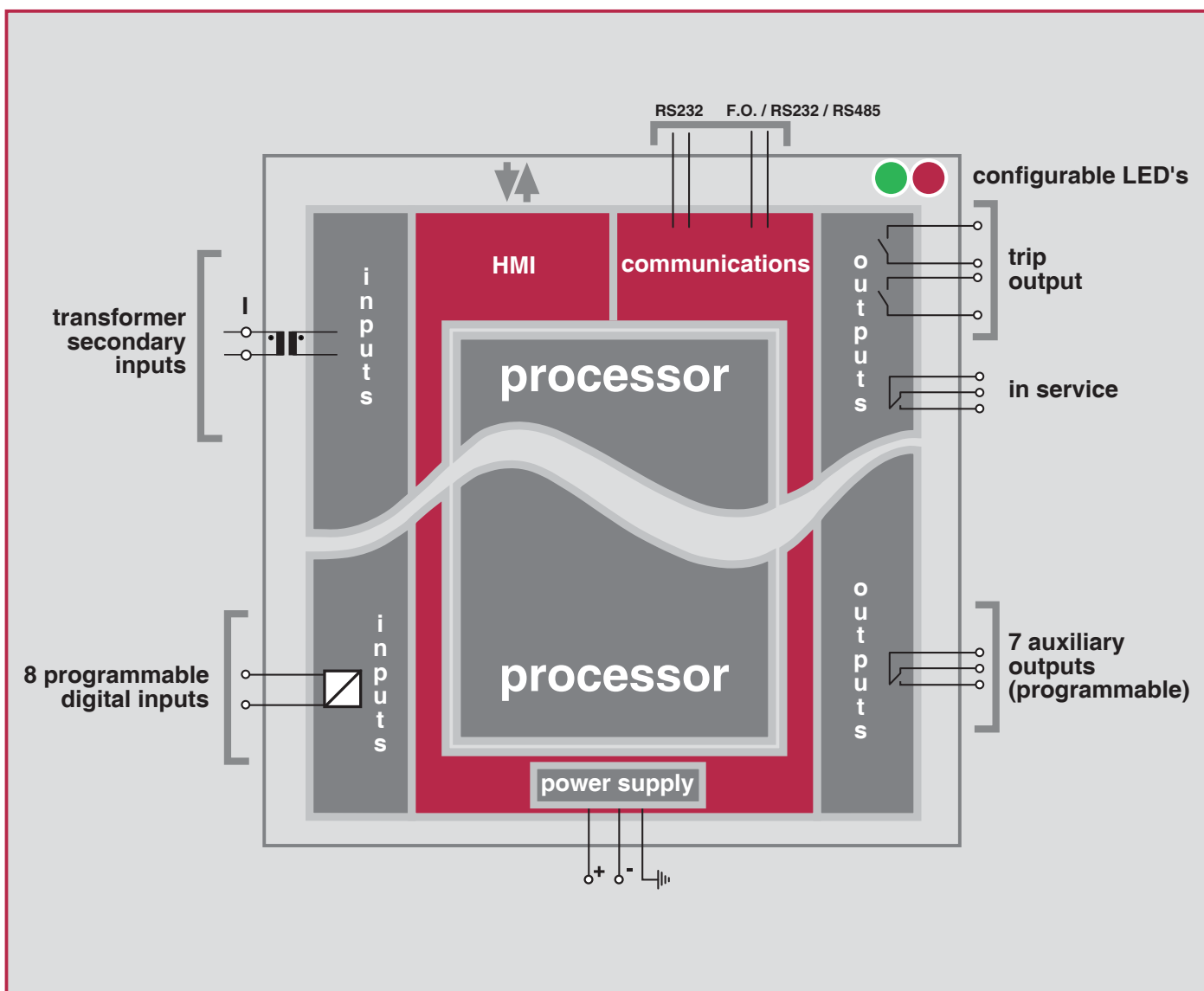
| Power Supply Ripple | |
|---------------------|-------|
| IEC-255-11 | |
| | < 20% |

| Vibration Test (sinusoidal) | IEC 255-21-1 Class I |
|-----------------------------|----------------------|
| Shock and Bump Test | |
| IEC 255-21-2 Class I | |

IDN terminals comply with the EEC 89/336 standard of electromagnetic compatibility



Generic Block Diagram



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