



Phase and ground backup protection for the primary circuit breaker.

Applications

- Backup protection for primary circuit breaker

Protection and Control

- Two step instantaneous and/or time delayed breaker failure
- Independent timer per phase for the first step
- Phase instantaneous overcurrent
- Ground instantaneous overcurrent
- Three phase direct trip
- Fast tripping logic by using a second set of level detectors per phase and an independent timer
- Internal arcing protection
- Operation failure detection
- Three settings groups

- 14 configurable inputs
- 16 outputs (11 configurable)

Monitoring and Metering

- Current metering
- Breaker health monitoring
- Event recorder, last 165 events
- Oscillography, 4 records of 62 cycles
- Phase sequence selection

User Interfaces

- Keypad and display
- 17 LED indicators
- 3 communications ports
- RS232 ports
- Fiber optics available
- IRIG-B input



Description

The DBF is a digital breaker failure relay that provides phase and ground backup protection if the primary circuit breaker fails to clear a system fault.

Breaker failure protection is critical in any backup relaying scheme. This protection must have not only sensitivity and dependability, but also a high level of security because it is protecting the busbars. The reliability must also be the same as that of a busbar protection relay.

By using digital technology the operation time of the DBF has been improved.

An associated function protects against electrical arcing between the contacts of the breaker when it is opened. This will help to prevent damage to the breaker. This function uses three very sensitive overcurrent detectors set to the line capacitive current.

Three setting groups are available, with the active group selected by a setting or an input. There are 14 configurable inputs and 16 outputs (11 configurable).

The DBF meters the current continuously. It also monitors the breaker health I2t value. It has an event recorder that can store the last 165 events with a 1 ms resolution. It can store up to 4 oscillography records with 66 cycles each.

The local user interface includes a keypad and display. There are 17 LED indicators, one a two colored system alarm, and 16 red configurable to any of the 32 alarms available. There are three communications ports, one on the front panel and two on the rear. It has 2 tripping steps.

Protection and Control

Overcurrent Protection

The DBF's three phase overcurrent protection (50PBF) consists of single or three-phase breaker failure initiation units with independent pickups and time delays. It also has three phase direct trip protection (50XNF), which may be used for three phase breaker failure initiation without overcurrent. The DBF also includes ground overcurrent protection (50NBF).

Two step breaker failure operation is included where each step operation may be activated by single, two or three phase overcurrent functions. Both steps are time delayed and offer a wide range of settings.

Using independent timers per phase for the first step permits a correct coordination with the second zone in case of evolving faults in single-pole tripping schemes.

The fast tripping logic permits accelerated tripping during three-phase faults. This is particularly useful in maintaining power system stability where selective fast tripping is appropriate.

Internal Arcing Protection

If an electrical arc exists between the contacts of an open breaker it can eventually destroy the breaker. The DBF uses three very sensitive overcurrent detectors set to the line capacitive current to protect against internal arcing.

Settings Groups

Three groups of settings are available for the DBF. The active group may be selected by a setting or by an input.

Inputs and Outputs

The enhanced model DBF has 14 configurable inputs, in groups of 2 and 3 inputs.

There are 16 outputs with the following assignments:

- 1 breaker failure pickup
- 2 breaker failure fix tripping contacts
- 1 internal arc contact
- 1 alarm contact
- 5 spare configurable contacts
- 6 latching relay contacts (optional)

The logic for configurable outputs consists of a combination of NOT, AND, and OR gates applicable to trips, alarms and pickups of all the protection and control functions, internal protection status, control, digital inputs, etc.

A basic DBF model is also available which includes 6 configurable inputs and 10 outputs (5 of which are configurable).

Monitoring and Metering

Breaker Monitoring

The breaker status is monitored continuously. The cumulative I2t value is stored and used for breaker health monitoring.

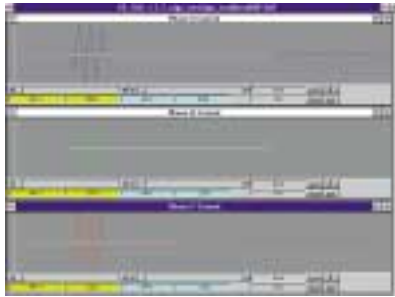
Event Recorder

The DBF records up to 165 events in non-volatile memory. Records include date and time with 1 ms resolution, type of event, current measurements and relay status.

Oscillography

The DBF system includes an oscillography recorder. It can be activated by any of the protective functions pickup or trip or by an external input. Records have a resolution of 16 samples per cycle. Up to 4 records may be stored with up to 66 cycles each, with pre-fault cycles adjustable between 2 and 10 cycles.

The DBF can store up to 4 oscillography records



Protection Status Self-checking

The DBF performs self tests both at start up and continuously in the background during operation.

User Interfaces

Keypad and Display

The DBF has a 20 button keypad and a 2 line by 16 character alphanumeric LCD. This allows local user interface without a computer.

LED Indicators

The DBF has 17 LED indicators. One is a two color system alarm. The other 16 are red, and are configurable to any of the 32 alarms available. Each LED can be configured with or without memory.

Communications

The DBF has three communications ports, one on the front panel which is connected to one on the rear panel, and a third independent rear panel port.

The first two ports allow communication through GE-LOCAL software, either locally with a

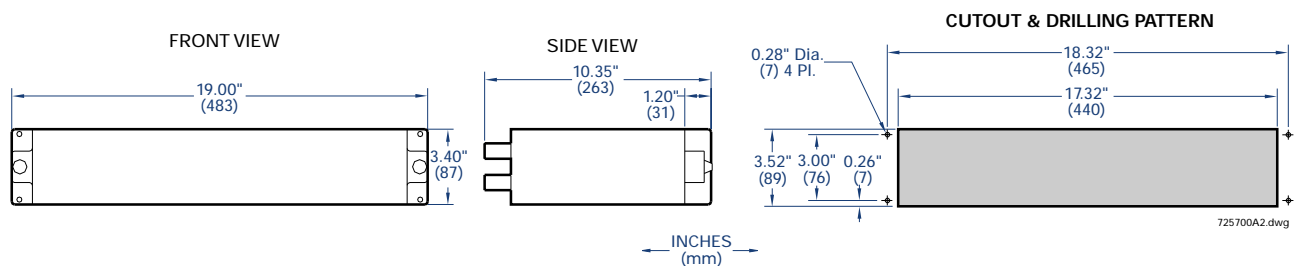
laptop computer, or remotely to a protection dispatch center. This software allows the user to visualize measurements and status as well as the relay's time synchronization.

The third port connects the user to a communications network, through GE-POWER software, to the part of a DDS integrated system. These applications are part of GE-NESIS (General Electric Network Substation Integration Software) used by the DDS system.

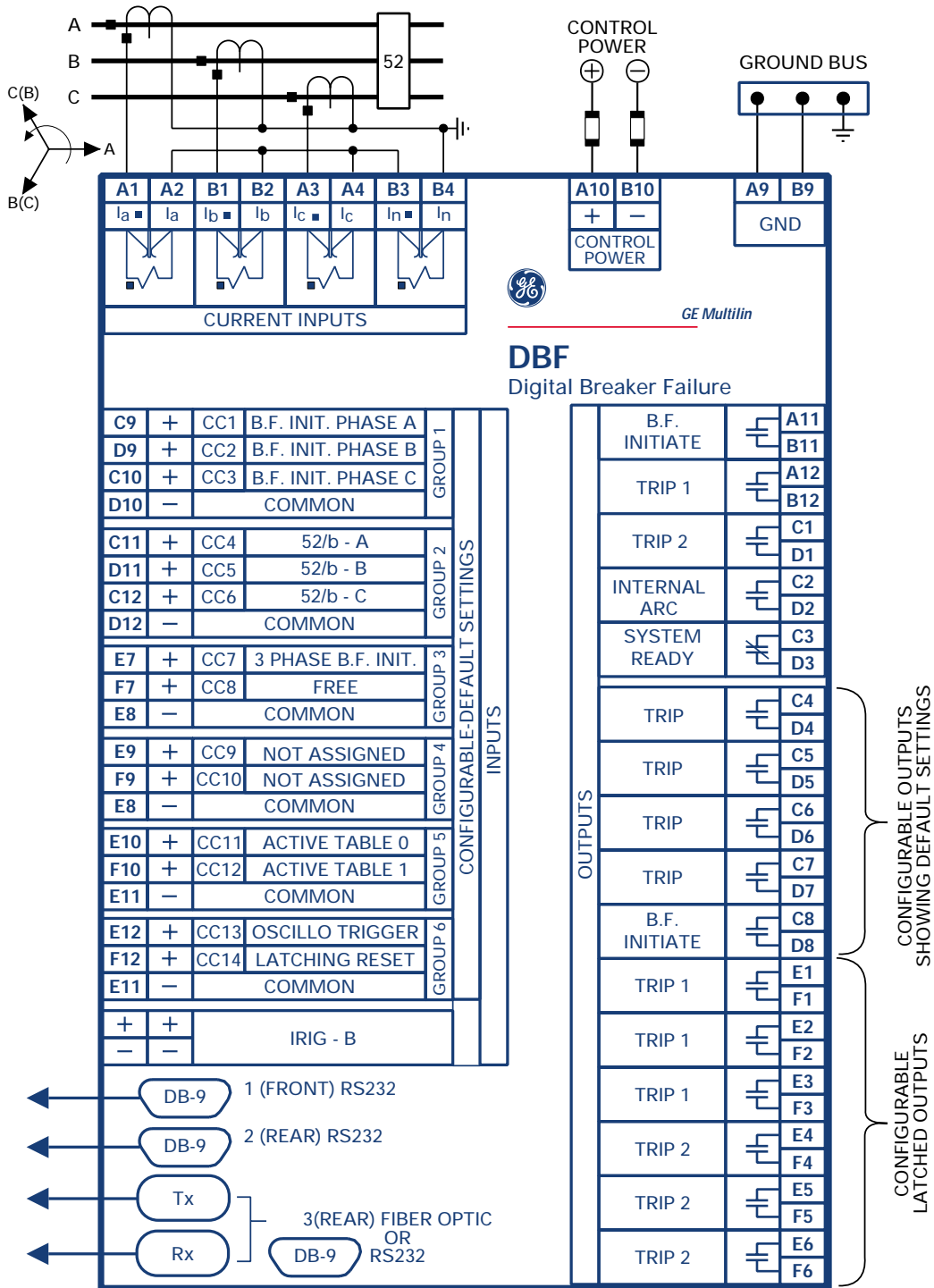
GE-LOCAL software is provided for DBF communication



Dimensions



Typical Wiring



Port 3 is independent from ports 1 and 2.
Port 1 has priority over port 2.

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