Instructions

Micro VersaTrip™ Programmer

For Circuit Breakers 150-4000 Amperes; 240, 480 & 600V ac

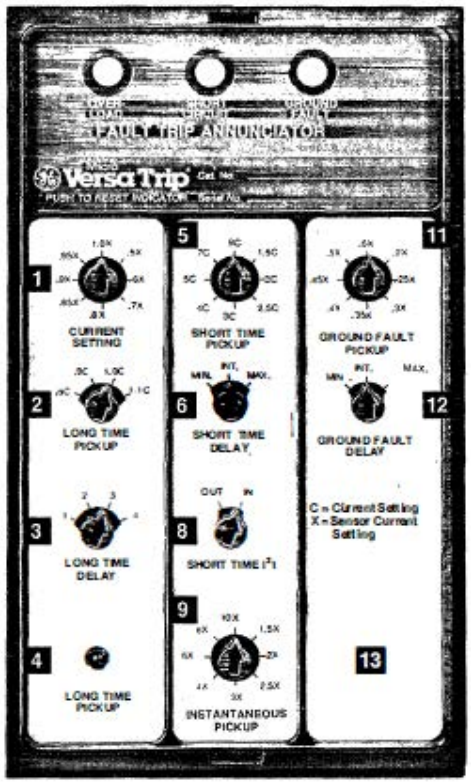
INTRODUCTION

Micro-VersaTrip® is the second generation of solid state programmers. A compact unti, it offers increased flexibility, more functions than Versa Trip® or Selectrip®. The Micro Versa Trip® programmers, current transformers and flux shifters are not compatible with the VersaTrip or Selectrip programmers, current transformers and flux shifters. Interchangeable trip Micro-VersaTrip® programmers are available in both a four-function and a nine-function version. These programmers can be installed, with few limitations, in circuit breakers with the following frame designations.

"J" Molded Case Circuit Breaker	THJ9V, THJ9VV "K"
Molded Case Circuit Breakers	THK9V, THK9VV
PowerBreak Circuit Breakers	TPVV, THPVV
AK Circuit Breakers	AKR30, AKR50
	AKRT50, AKR75
	AKR100

Programmer Rejection System

The programmer and breaker frames have a rejection system which prevents programmers with the HI instantaneous function from being used on standard breaker frames. Programmers with the suffix "M" (no instantaneous function) are compatible with AK breakers only and not on the Molded Case or Power Break lines of breakers. In addition, programmers for breakers rated at 2000 amperes and lower are not interchangeable with breakers rated at 2500 amperes and above.



TRIPPING FUNCTIONS

General Description

1. Current Setting - Standard
2. Long-Time Pickup - Optional (Cat. No. Suffix "L")
3. Long-Time Delay - Standard (Optional on 4-Function Version)
4. Long-Time Pickup Light - Standard
5. Short - Time Pickup - Optional (Cat. No. Suffixes "N" or"S")
6. Adjustable Short - Time Delay - Optional (Cat No. Suffix "S")
7. Fixed Short-Time I2t Delay - Optional (Cat. No. Suffix "N")
8. Short - Time 12t Switch - Optional (Cat. No. Suffix "L")
9. Instantaneous Pickup - Standard
10. Fixed Instantaneous Override - Optional (Cat. No. Suffixes "N" or "0")
11. Ground Fault Pickup - Optional (Cat. No. Suffixes "G" or "GR")
12. Ground Fault Delay - Optional (Cat. No. Suffixes "G" or "GR")
13. Adjustable High Range Instantaneous - Optional (Cat No. Suffix "H")
14. Fault Trip Annunciators - Optional (Cat. No. Suffixes "A" "A1" "A2" and "A3")
15. Zone Selective' Interlock - Optional (Cat. No. Suffixes "Z", "21", and "22". The quantity of the above functions in any given breaker is determined by complete catalog number.

DETAILED DESCRIPTION

1. Current Setting

Current Setting, C, is the value of current the breaker will carry indefinitely without tripping. This value of current is related to the nominal nameplate sensor ampere rating, X, or the sensor tap rating of the breaker in terms of percent.

The range of values is:

50-60-70-80-85-90-95-100%.

2. Long-Time Pickup

The primary function of the long-time pickup is to allow more precise matching of the current setting and the breaker load requirements. The long-time pick up setting may be changed from 80% to 110% of the current setting in four equal steps of 10% each.

As the long-time pickup is decreased from 110% to 80% of the current setting, the long-time delay band selected is extended to lower currents and longer times. The other functions are not affected.

3. Long-Time Delay Trip Bands

Long-Time delay trip bands provide the function of withstanding temporary overloads such as motor starting, welding or other over current conditions without interrupting service.

The purpose of the time delay bands is to provide further degrees of coordination and selectivity within a system. The delay bands provide increasing times to trip at any fixed overload current in ratios of 2:1 for adjacent bands.

The bands are marked as follows:

Continuous Current Ratings 150-4000 Ampere	Typical Time Delay at 600% of Device Setting
Band 1	3 Seconds
Band 2	6 Seconds
Band 3	12 Seconds
Band 4	25 Seconds

4. Long-Time Pickup Light

Whenever the current reaches or exceeds the long time pickup point set on the breaker a light emiting diode (LED) is illuminated and remains so for the duration of the overload period. This is available in local only or local and remote modes.

5. Short-Time Pickup

The primary function of the short-time pickup is to allow the breaker to carry high level overload currents for a short period of time. This feature again is to provide further degrees of selectivity within a system.

Short-time trip settings are the following multiples of the Current Setting: (Item 1), C;

150-4000A - 1.5C, 2C, 2.5C, 3C, 4C, 5C, 7C, 9C.

6. Adjustable Short-Time Delay

The adjustable short-time delay provides a further refinement of coordination between "upstream" and "downstream" circuit breakers which have the same short-time trip settings.

Three steps of selectivity are provided:

Minimum Delay .13 Seconds
Intermediate Delay .26 Seconds
Maximum Delay .42

7. Fixed Short-Time 1^2t Delay

The short-time delay is determined by the 1^2t characteristic and is non-adjustable. The time delays get shorter with increasing overload.

8. Short-Time 1^2t Switch

This switch allows the selection of the 12t slope short-time delay characteristic or the constant short-time delay bands.

9. Instantaneous Pickup

The instantaneous setting provides immediate (no intentional time delay) interruption of severe overloads, there by minimizing damage to the system equipment. The trip point is adjustable and expressed in multiples of Sensor Ampere Rating : X;

150-2500A- 1.5x, 2x, 2,5x, 3x, 4x, 6x, 8x, 1Ox,
3000 & 4000A- 1.5x, 2x, 2.5x, 3x, 4x, 5x, 7x, 9x

10. Fixed Instantaneous Override

A fixed instantaneous trip is provided on circuit breakers ordered with short-time delay and adjustable instantaneous trip.

These settings are the following multiples of Sensor Ampere Rating, X;

150-2000A - 15x
2500 & 3000A - 13x
4000A - 9x

11. Ground Fault Pickup

Settings are adjustable with. no setting exceeding 1200 amperes to comply with National Electrical Code,Section 230-95.

These settings are the following multiples of Sensor Ampere Rating, X;

150-2000A - .2x, .25x, .3x, .35x, .4x, .45x, .5x, .6x
2500 & 3000A - .2x, .22x, .24x, .26x, .28x, .3x, .34x, .37x
4000A - .2x, .22x, .24x, .26x, .28x, .3x

12. Ground Fault Delay

The time delay setting for ground fault interruption provides tripping selectivity for main and feeder breakers. The time delay follows l2t slope and then terminates in three fixed time delay bands as follows:

Minimum Delay .13 Seconds
Intermediate Delay .26 Seconds
Maximum Delay .42 Seconds

13. Adjustable High Range Instantaneous

The high range instantaneous provides protection and coordination at levels up to the full short-time rating of the circuit breaker. The high range instantaneous is adjustable from 40 to 100% of the short-time rating in four steps of 20% each.

14. Fault Trip Annunciators

The primary function of the mechanical pop-out type fault indicators is to identify the type of over current fault (overload, short circuit or ground fault) responsible for tripping the breaker. Remote fault indication is available in the form one N.O. contact per indicator.

15. Zone Selective Interlock

The Zone Selective Interlock system allows the breaker sensing the fault to trip immediately. It also sends out a signal which inhibits tripping to "upstream" breakers. If the fault is not cleared by the "downstream" breaker, then the "upstream" breakers respond to the fault by timed tripping according to the settings of the time delay bands.

Mounting Neutral Current Transformer

(Required on a 4-wire system if the programmer has the ground fault detection option).

If the load circuit does not include a neutral (for example: 3 phase, 3 wire) the neutral CT terminals on the circuit breaker should be left open and neutral CT not used. (Do NOT "short" terminals)

When a neutral is included in the load circuit, neutral CT markings of line and load must be respected when making bus or cable connections.

The polarity of connecting wires from secondary of neutral CT to circuit breaker must also be respected: white to white, black to black.

The neutral CT can only be used with static breaker of same ampere rating.

Ground Return "GR" Suffix
MicroVersaTrip Circuit Breakers

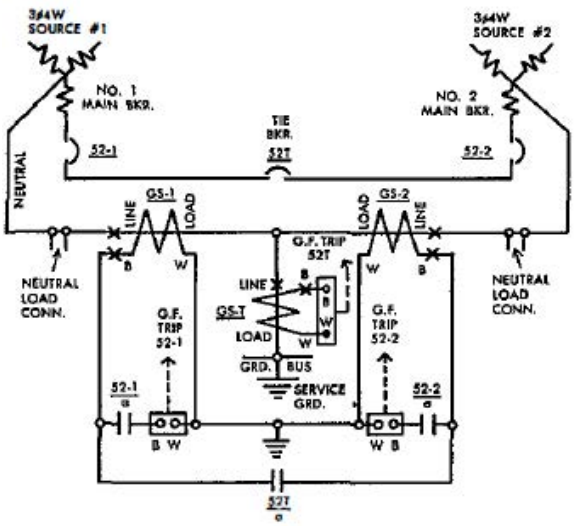


FIG. 1 - Double-Ended Switchboard with MlcroVesaTrip Ground Fault Protection - Mains and Tie Tripped for GFP

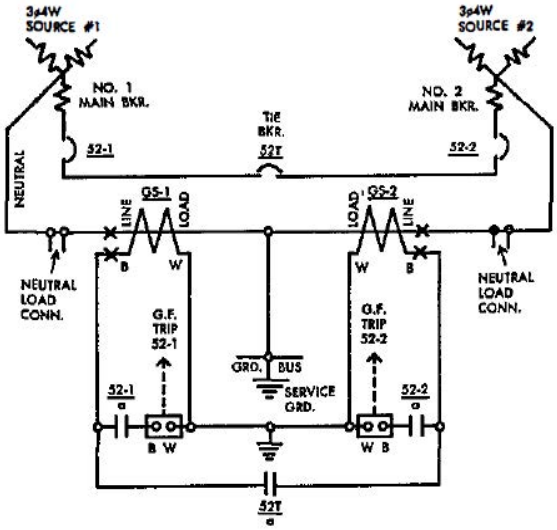


FIG. 2 - Double-Ended Switchboard with MlcroVesaTrip Ground Fault Protection - Mains only Tripped for GFP

WIRING

Connect wiring from sensor to breaker black to black and white to white using twisted pair #14 AWG minimum, Belden 8640, 61 or 8470, 71 or equal.

Ground Fault Protection GFP Schemes

There are two GFP schemes that can be used with 3-phase 4-wire double-ended equipment. In the first method, shown in Fig. 1, the two main breakers and the tie breaker are provided with MicroVersaTrip-GR ground fault protection. In the second method, shown in Fig. 2, the main breakers only are provided with MicroVersaTrip-GR ground fault protection, and the tie breaker is not tripped for GFP.

The most selective tripping is provided when all three breakers are equipped with GFP (Fig. 1). See comparison of the two schemes in the table below.

The two MicroVersaTrip GFP schemes described here are applicable to 3-phase 4-wire double-ended equipment where the system will not be operated with all three breakers closed.

MicroVersaTrip GFP utilizes internal tripping power derived from the flow of phase current through the phase sensors. To develop this tripping power, a minimum of 10% of rated sensor current must be carried by the breaker. Under balanced load conditions in a double-ended arrangement with mains and tie closed, a tie breaker might not carry enough current to develop tripping power for ground fault tripping of the tie.

When double-ended equipment is subject to operating with all three breakers closed, reliable GFP can be obtained by using a Ground-Break relay to trip the tie, in combination with MicroVersaTrip-GR mains. The tie can be either a standard breaker or a MicroVersaTrip with a shunt trip accessory.

Condition	Mains & Tie Tripped by MicroVersaTrip GFP	Mains only Tripped by MicroVersaTrip GFP
Mains closed, tie open	Main that supplies the faulted bus will open, other main stays closed.	Main that supplies the faulted bus will open, other main stays closed.
One main and tie closed, other main open	If ground fault is on load side of tie, the tie will open and main stays closed. If ground fault is on line side of tie, both main and tie will open.	Main that supplies both busses will open for a ground fault on either bus.

Neutral Load Current

In a double-ended switchboard, when one main is open a.nd the tie is closed, neutral load current can flow through the two neutral sensors. The sensor circuitry shown in Fig. 1 & Fig. 2 is arranged to prevent the neutral load current from actuating the ground fault trip units.

GFP Settings

When mains and tie have MicroVersaTrip-GR ground fault protection, set tie breaker delay time at MINIMUM (0.2 sec.). Set main breaker delay time at INTERMEDIATE (0.3 sec.), in order to obtain selectivity between the mains and tie.

When mains only have MicroVesaTrip-GR ground fault protection, set delay time at MINIMUM (0.2 sec.), unless longer time is needed in order to coordinate with other ground fault relays in downstream devices.

Current pickup settings (trip point) should be determined by a system study, but in the absence of other information, set trip point at 0.4X on each breaker (1100A for 3000A and 4000A frame sizes).

These instructions do not cover all details or variations in equipment nor do they provide for every possible contingency that may be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise that are not covered sufficiently for the purchaser's purposes, the matter should be referred to the ABB Inc.

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