ABB Power T&D Company Inc.
Relay Division
Coral Springs, FL
Allentown, PA

Descriptive Bulletin
41-621M

July 1996

Device Number: 79

Mailed to: E, D, C/41-0001.

Type MRC2 Microprocessor Reclosing Relay

Features:

- 0 to 4 Reclosures
- Drive to Lockout
- Breaker Operations Limiter
- Reclose Counter/Limiter
- Instantaneous Trip Enable
- Status Contacts:
  Lockout, Failed Reclose, In Progress
- LED Status Indicators
  Power, Failed Reclose, Home, Lockout, Lockout LTC
- LCD Display with Data Scroll
- Non-volatile Memory Storage of all settings
- Self-diagnostics
- FT-21/FT-22 Flexitest™ Case

Application

The MRC2 microprocessor-based relay provides automatic reclosures of an ac or dc electrically operated circuit breaker opened by a protective relay or other external device. Relay models are available for supply voltages of 48/125vdc and 120vac, 250vdc and 230vac, or 24vdc. Settings are made by front panel push-buttons and a 32 character LCD display. LED indicators provide status indication.

The MRC2 may be programmed for 0 to 4 reclosures. The Open Interval times are individually adjustable from 0 to 250 seconds in increments as follows:

0.01 seconds for range 0-1 seconds
0.1 seconds for range 1-10 seconds
1 second for range 10-250 seconds

A Reclose Fail timer may be enabled. The setting range is 0 to 250 seconds. Should the breaker not respond to a close signal in the set time, the relay will go to Lockout.

The Reset Timer is adjustable 0 to 250 seconds. Reset timing begins from zero each time the breaker is closed. An optional input (Delay Reset/Pause) suspends reset timing as long as the input is energized. A Maximum Cycle Timer that starts timing at the first trip and ends timing when the relay has reached reset/home, may be used to drive the relay to lockout if the cycle time is excessive.

Output contacts for Close, Instantaneous Enable, and Self-Check Alarm are provided as standard. Optional contacts provide Lockout, In Progress, and Failed Reclose indication, and a contact to Block Tap Changer operation.

A Follow Breaker function may be activated in the settings process: if during the open interval time the relay sees the breaker close (52/b transfers), then the relay will step forward in its program and begin the reset timer. Should the breaker open before the reset time expires, the timing for the next open interval in the reclosing sequence will begin.

An optional 52/a input provides redundancy. Should a disagreement exist between the normally opposite states of the 52a and 52b inputs for more than 0.1 second, the relay will go to Lockout.

The MRC2 can be set by internal link to "power-up to last state" or "power-up to lockout". When set for "power-up to lockout" and operated from ac control voltage, the relay has the ability to ride through reduced control voltage conditions for sufficient time for the fault to be cleared.

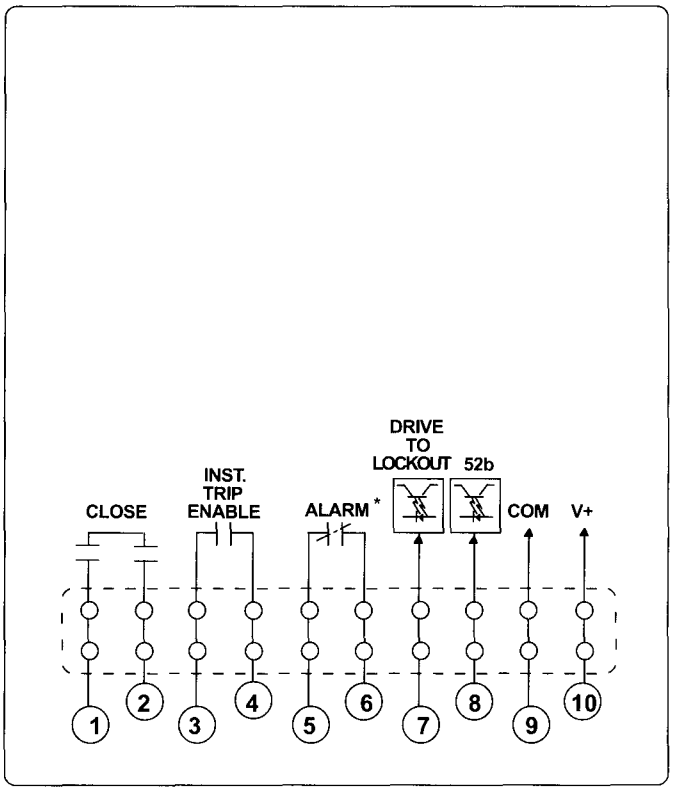
For maintenance purposes a Cumulative Reclosures to Lockout function may be enabled. This counter keeps track of the total number of breaker reclosures, and when the set point is reached the relay will be driven to Lockout.

A Breaker Operation function may be enabled in the settings process to limit the breaker from excessive interruption duty. The MRC2 relay counts breaker operations (Limit Counter) in a set period of time (Limit Timer), and when reached will not allow reclosure until the Recovery Timer has elapsed.

In addition to the Cumulative Reclosures Counter, the relay maintains counters of the number of successful reclosures for each reclosing stage, and of the total number of operations to lockout.

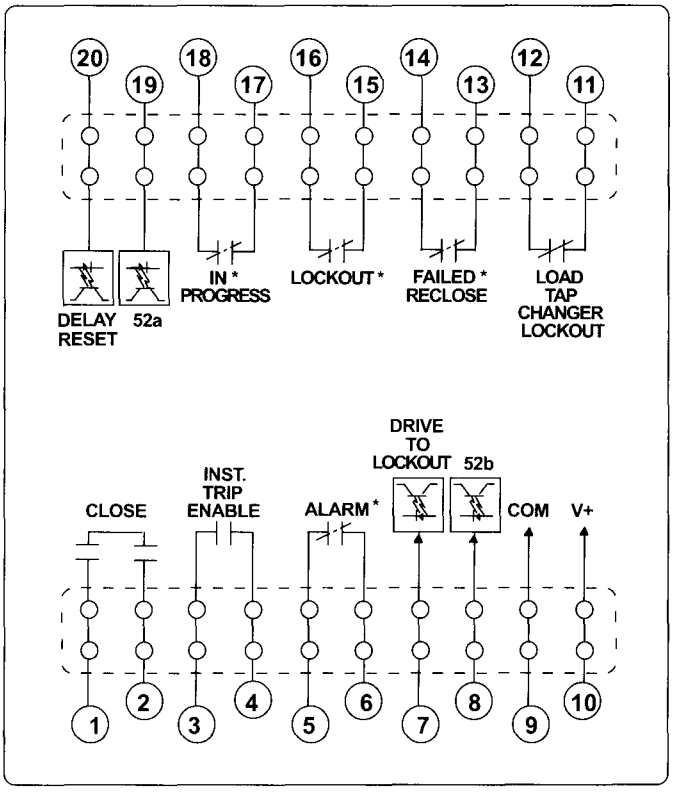
Optional communication capability is available using a Product Operated Network Interface (PONI) providing either an RS232C port or an INCOM™ port. Relay settings may be viewed or changed, status and counters viewed and counters reset, the Close contact actuated, and Lockout forced. Password protection prevents unauthorized access to settings and operations.

INCOM™ is a trademark of the Cutler-Hammer Corporation.



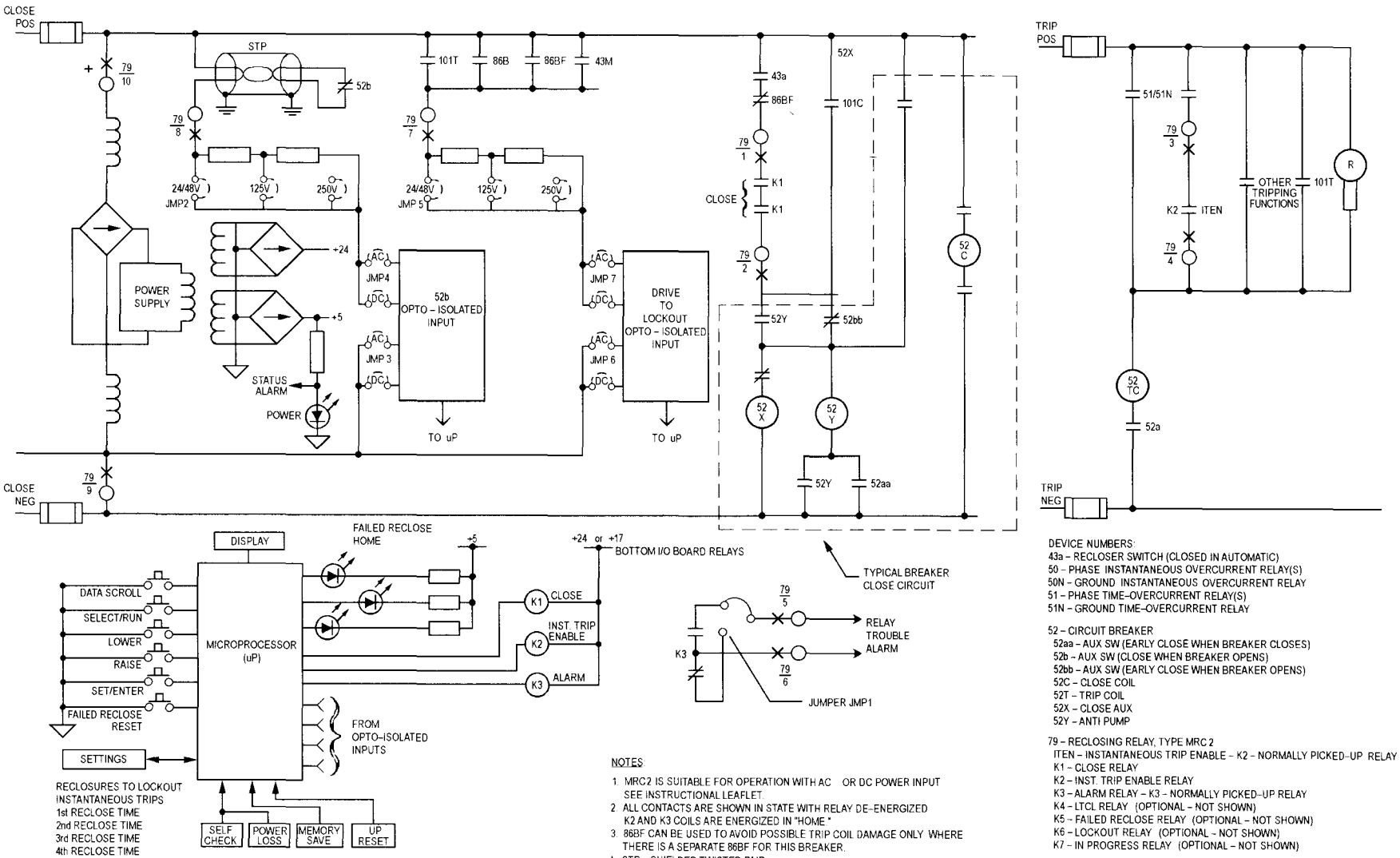
*** JUMPER CONFIGURABLE FOR N.O. OR N.C.**

Figure 1: Internal connections MRC2 in FT-21 Case.



*** JUMPER CONFIGURABLE FOR N.O. OR N.C.**

Figure 2: Internal connections MRC2 in FT-22 Case.



NOTES:

1. MRC2 IS SUITABLE FOR OPERATION WITH AC OR DC POWER INPUT SEE INSTRUCTIONAL LEAFLET.
2. ALL CONTACTS ARE SHOWN IN STATE WITH RELAY DE-ENERGIZED K2 AND K3 COILS ARE ENERGIZED IN "HOME."
3. 86BF CAN BE USED TO AVOID POSSIBLE TRIP COIL DAMAGE ONLY WHERE THERE IS A SEPARATE 86BF FOR THIS BREAKER.
4. STP – SHIELDED TWISTED PAIR.

DEVICE NUMBERS:

43a – RECLOSER SWITCH (CLOSED IN AUTOMATIC)
50 – PHASE INSTANTANEOUS OVERCURRENT RELAY(S)
50N – GROUND INSTANTANEOUS OVERCURRENT RELAY
51 – PHASE TIME–OVERCURRENT RELAY(S)
51N – GROUND TIME–OVERCURRENT RELAY

52 – CIRCUIT BREAKER
52aa – AUX SW (EARLY CLOSE WHEN BREAKER CLOSES)
52b – AUX SW (CLOSE WHEN BREAKER OPENS)
52bb – AUX SW (EARLY CLOSE WHEN BREAKER OPENS)
52C – CLOSE COIL
52T – TRIP COIL
52X – CLOSE AUX
52Y – ANTI PUMP

79 – RECLOSING RELAY, TYPE MRC 2
ITEN – INSTANTANEOUS TRIP ENABLE – K2 – NORMALLY PICKED–UP RELAY
K1 – CLOSE RELAY
K2 – INST. TRIP ENABLE RELAY
K3 – ALARM RELAY – K3 – NORMALLY PICKED–UP RELAY
K4 – LTCL RELAY (OPTIONAL – NOT SHOWN)
K5 – FAILED RECLOSE RELAY (OPTIONAL – NOT SHOWN)
K6 – LOCKOUT RELAY (OPTIONAL – NOT SHOWN)
K7 – IN PROGRESS RELAY (OPTIONAL – NOT SHOWN)

86B – BUS DIFFERENTIAL LOCKOUT RELAY CONTACT
86BF – BREAKER FAILURE LOCKOUT RELAY CONTACT
101 – BREAKER CONTROL SWITCH
101C – CLOSE CONTACT
101T – TRIP CONTACT

BASIC INTERNAL AND EXTERNAL CONNECTIONS TYPE MRC2

Catalog Number
MRC2 2 R 1

Standard Features . . . . . .

- 1 to 4 Reclosures
- Lockout LED
- Reset LED
- Reclose Fail alarm LED
- Maximum Cycle Time
- Power Up to Last State or Power Up to Lockout
- Follow Breaker
- Cumulative Reclose Counter & Limiter
- Breaker Limiting Feature (Includes Breaker Limit Counter & Timer and a Breaker Recovery Timer)
- LCD Display with Data Scroll
- Optically Isolated Inputs:
  - 52B
  - Drive to Lockout
- Output Contacts:
  - Instantaneous Trip Enable (N.O.)
  - Alarm Relay (N.O. or N.C)
  - Close Relay (N.O.)

Additional Features

- Optically Isolated Inputs:
  - 52A
  - Delay Reset
- Output contacts:
  - Lockout Relay (N.O. or N.C.)
  - Failed Reclose Relay (N.O. or N.C.)
  - Load Tap Changer Lockout Relay (N.C.)
  - In Progress Relay (N.O. or N.C.) . . . . . (FT-22 Case) 2
- No Additional Features, ... (FT-21 Case) 1

Communications Options

RS232	R
INCOM	I
No communications	N

Power Supply

48/125 VDC & 120VAC	1
250 VDC & 230 VAC	2
24 VDC	3

Specifications

Dimensions
Refer to DB41-076 for FT-21 and FT-22 case dimensions

Shipping Weight:
FT-21: 11.5 lbs/5.3 Kg
FT-22: 13 lbs/5.9 Kg

Operating Temperature Range:
-40°C to + 65°C

Standards:
ANSI C37.90; IEC – 255

Contact Ratings:

	@125VDC	@250VDC
Closing	30A	30A
Continuous	5A	5A
Break	0.5A	0.25A

Additional Information: Instruction Book IL 41–665.

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