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

September 1995
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Mailed to: E, D, C/41-200B

Device Number: 47

CIRCUIT SHIELD®

Types 47, 47D, 47H Undervoltage and Phase Sequence Relays

Features

- Time Delay, Pickup, and Dropout each independently adjustable
- 6 Time Delay Selections
- Inverse, Definite Time, or High Speed
- Negative Sequence sensitivity for unbalanced voltage protection
- Seismic capability to 6g ZPA
- Transient immunity
- 2 year warranty
- UL recognized

Application

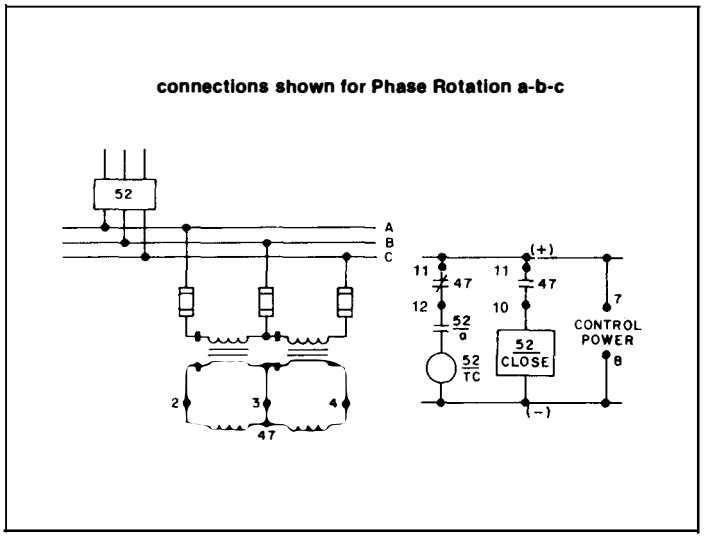
The Type 47 provides undervoltage and reverse phase detection. It is more sensitive to unbalanced line voltage than competitive types. For example, when used for motor protection, the relay can recognize a single phase condition even though the motor may be supplying considerable back emf after having one phase of the supply opened up.

When used for initiation of three phase automatic bus transfer schemes the Type 47 relay offers a distinct advantage over other relay types in that its dropout is the same for a phase-to-phase fault as it is for a three phase fault.

The unique design of the output circuit does not require seal-in contacts, allowing simplification of bus-transfer schemes. Operation indicators, however, are provided as standard features on all types.

Additionally, this is the only three phase voltage relay in the industry equipped with a time dial, allowing independent selection of the pickup, dropout, and time delay.

These relays are available with high speed, inverse delay, and definite time delay characteristics.



Typical Connections for Type 47 Series

Specifications

	Type 47, 47D, 47H	Type 47, 47D, 47H	Type 47D and 47H
PICKUP TAPS	90	155	90
(Volts)	100	175	100
	110	190	110
	120	208	120
DROPOUT TAPS			
(Percent of pickup voltage)	98		30
DROPOUT is the same for	90		40
line-to-line or three-phase	80		50
low conditions.	70		60

Input Circuit Rating: 160V, 50/60 Hz Continuous for 120V models
270V, 50/60 Hz Continuous for 208V models
Burden (per phase at 120V, 3 phase).
1VA, 1.0 pf, 120V model
1VA, 1.0 pf, 208V model

Control Power: 48/125 Vdc @ 0.05A max.
48/110 Vdc @ 0.05A max.
24/ 32 Vdc @ 0.08A max.
220 Vdc @ 0.05A max.
250 Vdc @ 0.05A max.
120 Vac 50/60 Hz @ 0.05A max.

Output Circuit Rating: 30 Amps Tripping Duty
@125 Vdc 5 Amps Continuous
1 Amp Opening Resistive
0.3 Amp Opening Inductive

Temperature: Minus 20° to Plus 70°C

Seismic Capability: More than 6g ZPA biaxial multifrequency vibration without damage or malfunction (ANSI/IEEE C37.98).

Transient Immunity: More than 2500V, 1 MHz bursts at 400 Hz repetition rate, continuous.

Operating Time:

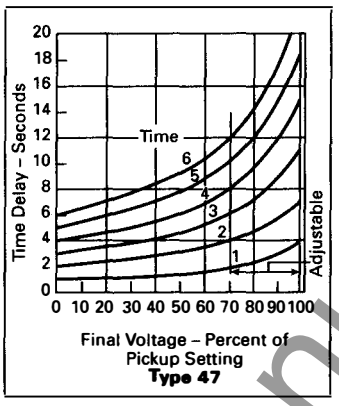
Type	Pickup	Dropout
47	Definite	Inverse
47D	Definite	Definite
47H	High Speed	High Speed

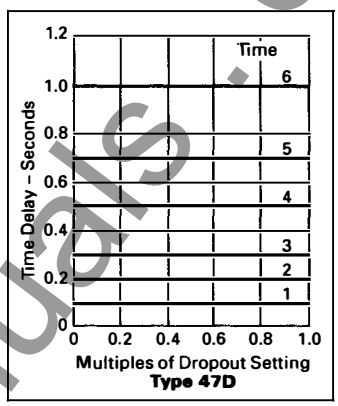
6 Time Tap Selections on type 47, 47D, 47H

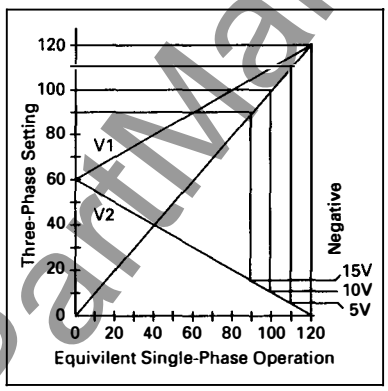
How To Specify

Three-phase undervoltage and phase sequence relay shall be Asea Brown Boveri Type 47 or approved equal, Drawout Case, capable of withstanding up to 6g ZPA seismic stress without malfunction at minimum voltage and time settings. Relay shall have independently adjustable pickup, dropout, and time settings. A magnetic operation indicator shall be provided which retains position on loss of power. Built-in means shall be provided to allow operational tests without additional equipment.

Time-Voltage Characteristics







How To Order

For a complete listing of available versions of Circuit Shield voltage relays see TD 41-025.

Models are available for 24, 32, 48, 125 Vdc control power. For 120 Vac potential applications, other control voltages and further information or to place an order, contact the nearest ABB Representative.

Further Information

List Prices: PL 41-020
Technical Data: TD 41-025
Instruction Book: IB 7.4.1.7-2
Application Note: AN-5
Other Protective Relays:
Application Selector Guide, TD 41-016

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Three-Phase

CIRCUIT SHIELD®

Types 47, 47D, 47H Undervoltage and Phase Sequence Relays

Type	Maximum Voltage Rating	Tap Range		Dropout		Internal Connections	① Control Voltage	Catalog Number	
		Pickup	Dropout	Curve	Time			60 Hz	50 Hz
47	160V	90-120 Vac	70-98%	Inverse	1-6 sec.	see chart	see chart	412N11X5	412N17X5
						16D412A	120 Vac	412F1165	412F1765
		155-208 Vac				see chart	see chart	412N14X5	412N19X5
47D		90-120 Vac		Definite	1-10 sec.	see chart	see chart	412N41X5	412N47X5
						16D412A	120 Vac	412F4165	412F4765
		155-208 Vac				see chart	see chart	412N44X5	412N49X5
		90-120 Vac			0.1-1 sec.	see chart	see chart	412N61X5	412N67X5
						16D412A	120 Vac	412F6165	412F6765
			30-60%		1-10 sec.	see chart	see chart	412N42X5	412N48X5
						16D412A	120 Vac	412F4265	412F4865
					0.1-1 sec.	see chart	see chart	412N62X5	412N68X5
						16D412A	120 Vac	412F6265	412F6865
47H		90-120 Vac	70-98%	Instantaneous	. . . .	see chart	see chart	412N01X5	412N07X5
						16D412A	120 Vac	412F0165	412F0765
		155-208 Vac				see chart	see chart	412N04X5	412N09X5
		90-120 Vac	30-60%			see chart	see chart	412N02X5	412N08X5
						16D412A	120 Vac	412F0265	412F0865

① For other control voltages contact the nearest ABB Representative.

Each of the listed catalog numbers contains an X for the control voltage designation. To complete the catalog number replace the X with the proper control voltage code digit.

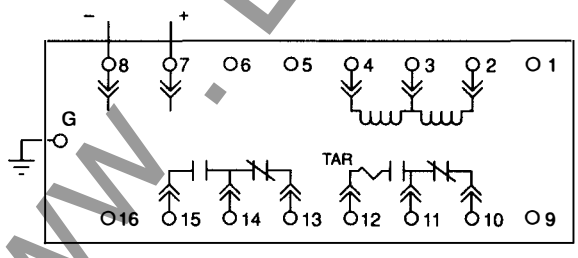
Control Voltage	Code Digit for X	Internal Connections
24/32	9	16D412A
48/125	7	16D412A
48/110	0	16D412A
220	2	16D412B
250	5	16D412B

To place an order, or for further information, contact the nearest ABB Representative.

Internal Connection Diagrams

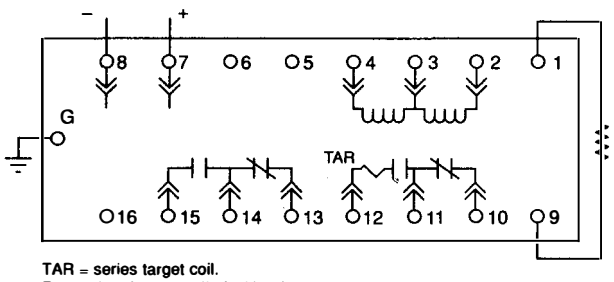
Note: Refer to Instruction Book IB 7.4.1.7-2 for contact logic data.

16D412A
Three-Phase Voltage Relays
Drawout Test Case



TAR = series target coil.

16D412B
Three-Phase Voltage Relays
Drawout Test Case



TAR = series target coil.
External resistor supplied with relay.