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

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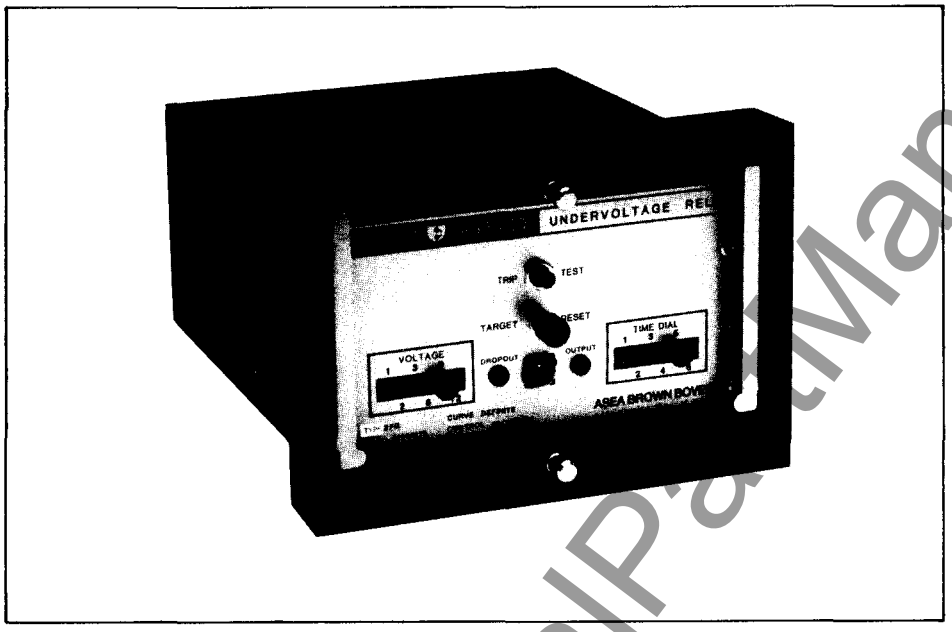
Mailed to; E, D, C/41-700B

Device Number: 27

CIRCUIT SHIELD ®

Type 27G, 180 Hz Third Harmonic Undervoltage Relay



Features

- Adjustable pickup and definite time delay
- Protects against faults at or near generator neutrals
- High continuous rating (208V)
- Seismic capability to 6g ZPA
- Transient immunity
- Drawout construction
- 2 year warranty

Application

Type 27G, 180 Hz undervoltage relay is specifically designed to protect generators against internal ground faults at or near the neutral end of generator windings. This relay is designed to be sensitive to third harmonic voltages only. It is usually used in conjunction with the Type 59G, ground voltage relay, to provide 100% generator stator ground fault protection.

The Type 27G relay operates such that its output contacts are held open during normal conditions, characterized by third harmonic voltage that is normally present across the generator neutral grounding resistor. The relay will stay picked up for any voltage in excess of the setting only if the frequency is approximately 180 Hz. During internal ground fault conditions, the resistor voltage will be 60 Hz and the relay output contact will close. If the fault is exactly at the generator neutral, the relay sees zero volts and will drop out for this condition as well.

The 27G includes a 180 Hz bandpass filter with approximately 30:1 rejection of 60 Hz signals. To prevent a high magnitude 60 Hz input signal from picking up the relay, the filter is followed by a 60 Hz detection circuit that blocks relay operation. This insures complete overlap of the protection provided by the 27G and 59G relays.

When applying the 27G, it is recommended that the relay be supervised by a voltage relay at the generator terminals such as the Type 59D to block incorrect operation during startup or shutdown of the generator.

The Type 27G has a high continuous rating of 208 volts, which permits omission of external relays usually required in sensitive protection schemes to disconnect the relay from the source.

A 150 Hz Model is available for 50 Hz Systems.

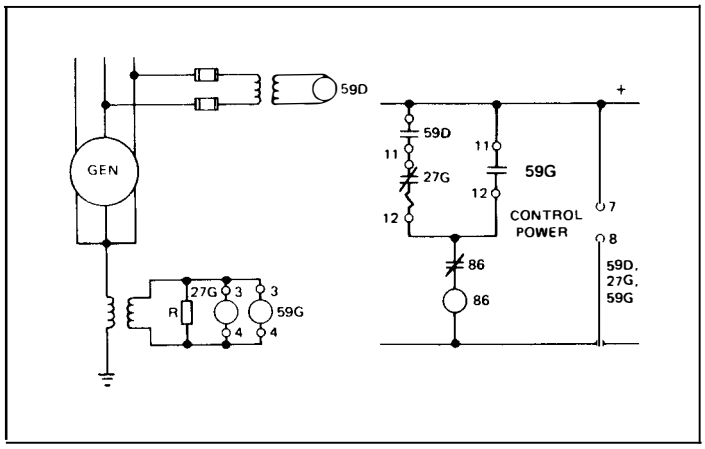


Figure 1. Typical Connection 100% Stator Ground Protection

Specifications

Dropout Taps:	1, 2, 3, 6, 9, 12 Volts or 0.5, 0.8 1, 1.5, 2, 3 Volts @ 180 Hz or 150 Hz.
Time Delay:	1-10s delay on dropout
Input Circuit Rating:	208V, continuous 480V, 10 seconds
Burden:	0.1VA 1.0 PF at 120V
Control Power:	48/125 Vdc, 48/110 Vdc, 250 Vdc @ .05A max.
Output Circuit:	2 Form C contacts
Output Rating:	Each contact at 125 Vdc 30 amps, tripping duty 5 amps, continuous 1 amp opening, resistive 0.3 amps opening, inductive
Target Coil:	1.0 amp min. to set target
Operating Temperature:	Minus 20° to plus 70°C
Seismic Capability:	More than 6g ZPA either axis biaxial broadband multifrequency vibration without damage or malfunction (ANSI/IEEE C37.98)
Transient Immunity:	More than 2500V, 1 MHz bursts at 400Hz repetition rate, continuous (ANSI C37.90a SWC); fast transient test; EMI test
Dielectric:	2000Vac rms, 60 seconds, all circuits to ground
Weight:	Unboxed – 3.6 lbs. (1.7 kg) Boxed – 4.2 lbs. (1.9 kg)
Volume:	Boxed – 0.26 cubic feet

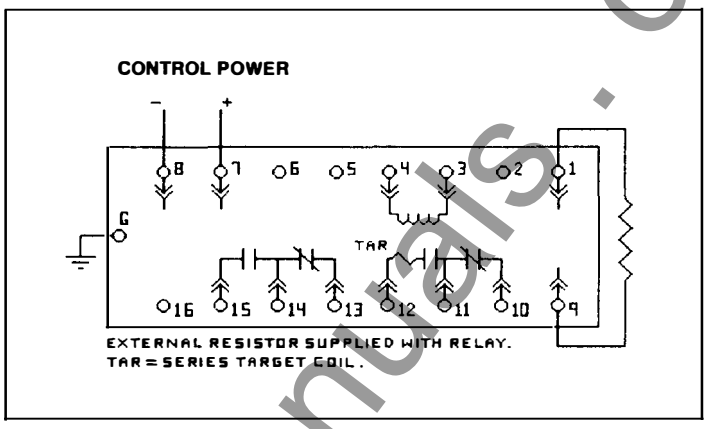


Figure 2. Internal Connections (Rear View)

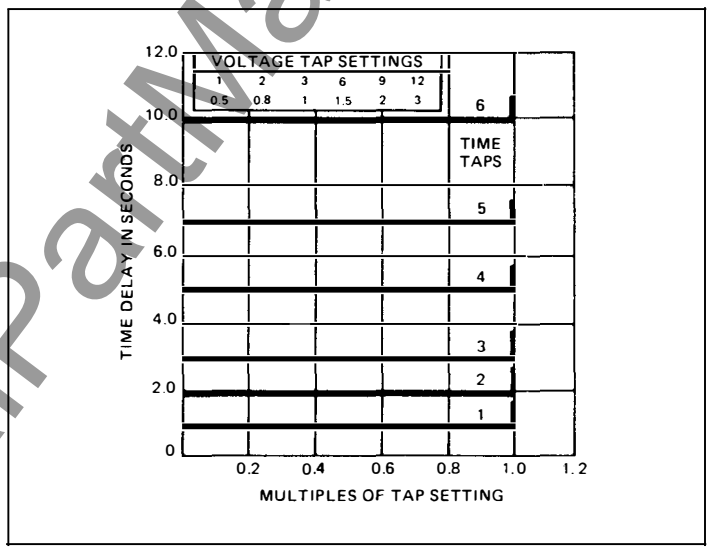


Figure 3. Time Delay Curves

How To Specify

180 Hz undervoltage relay for generator ground fauly protection. Relay shall be Asea Brown Boveri type 27G or approved equal, drawout case, capable of withstanding up to 6g ZPA seismic stress without damage or malfucntion, at minimum settings. Relay shall have minimum settings of 0.5 /1v and continuous rating of 208 volts or more. Built-in means shall be provided to allow operational tests without additional equipment.

How To Order

For a complete listing of available versions of single and three phase voltage relays see TD 41-025

Models are available for 48, 110, 125 or 250 Vdc control power and 120 Vac potential transformers. For other control voltages contact the nearest ABB Representative.

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

Further Information

List Prices: PL 41-020
Technical Data: TD 41-025
Instruction Book: IB 7.4.1.7-9
Technical Paper: TP 18.0.4
Synchronous Generator Protection Guide: AN-41-725S
Type 59G: DB 41-237S
Type 27, Type 59: DB 41-231S
Other Protective Relays:
Application Selector Guide, TD 41-016

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CIRCUIT SHIELD ®

Type 27G, 180 Hz, 150 Hz Third Harmonic Undervoltage Relay

Type	Max. Voltage Range	Frequency	Pickup Tap Range	Dropout Curve	Dropout Time	Output Contacts	Internal Connections	① Control Voltage	Catalog Number
27G	208V	180	1-12V	Definite	1-10 sec.	2-C	16D210H	48/125 Vdc	410Q4275
								48/110 Vdc	410Q4205
								250 Vdc	410Q4255
			0.5-3V					48/125 Vdc	410Q4575
								48/110 Vdc	410Q4505
								250 Vdc	410Q4555
		150	1-12V					48/125 Vdc	410Q4875
								220 Vdc	410Q4825
			0.5-3V					48/125 Vdc	410Q4775
								220 Vdc	410Q4725

① For other control voltages contact nearest ABB representative.

To place an order, or for further information, contact the nearest District Office.

Internal Connection Diagram

Note: Refer to Instruction Book IB 7.4.1.7-9 for contact logic data.

16D210H Type 27G
Single-Phase Voltage Relays
Drawout Test Case