



Directional power reversal relay for preventing motoring in AC generators.

Features and Benefits

- Trip, auxiliary, power supply alarm
- Part of a modular system
- Independent 2" modules
- 1/8 standard 19" rack case available
- LED indicators and reset button

Applications

- Power directional protection
- Generator protection against motoring

Protection and Control

- Directional power
- Fixed time single phase
- Instantaneous or time delay
- Phase to ground or phase to phase polarizing voltage



Description

The TCW Series are fixed time directional single-phase power relays used to avoid motoring of alternating current generators. Two polarized models are available, phase to ground and phase to phase.

Only one relay is required in most three phase applications, since power flow is generally the same.

The TCW is a solid state, modular relay with a DC-DC power supply, and is available in 1/8 standard rack size cases.

Applications

TCW relays are designed specifically for the control of the power flow in alternating current generator applications. Operation depends on the phase angle and magnitude of the applied current and voltage. The relay operates when the magnitude of power, in a given direction, is greater than a pre-set value.

The relays are appropriate for balanced three phase loads, and the type of relay selected depends on the value of voltage phase to phase or between phase to ground.

The trip characteristic is shown in Fig. 1, for phase to ground models; for phase to phase models, the trip characteristic is shown in Fig. 2.

TCW relays protect excessive power flow from the small generating station to the larger system. The relay activates the interconnection breaker if the power supply exceeds a predetermined value for a fixed period of time.

Construction

- accurate and reliable with low power consumption
- 1/8 of a standard rack mounted case
- LED indicating lamps for pick-up, trip (with manual reset), and

- presence of auxiliary voltage (V_{aux}).
- shock and flame resistant, sealed plastic cover exterior indicator
- high seismic rating
- highly reliable components, manufactured specially treated to avoid premature failure

Response Time

There are two response modes

- instantaneous: 40 ms
- time delay with two scales:
0.1/1 sec (in 100 ms steps)
1/10 sec (in 1 sec. steps)

The same relay can be used in either mode, or in both modes.

Fig. 1. Tripping characteristic for phase to ground polarization

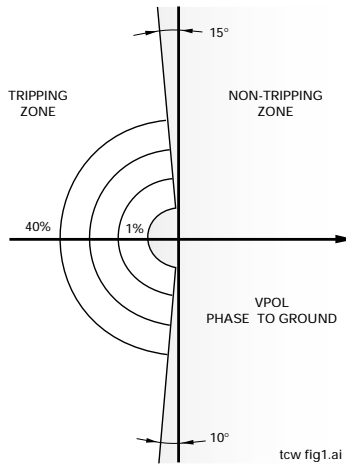
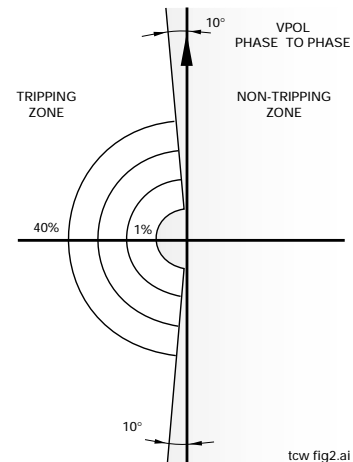
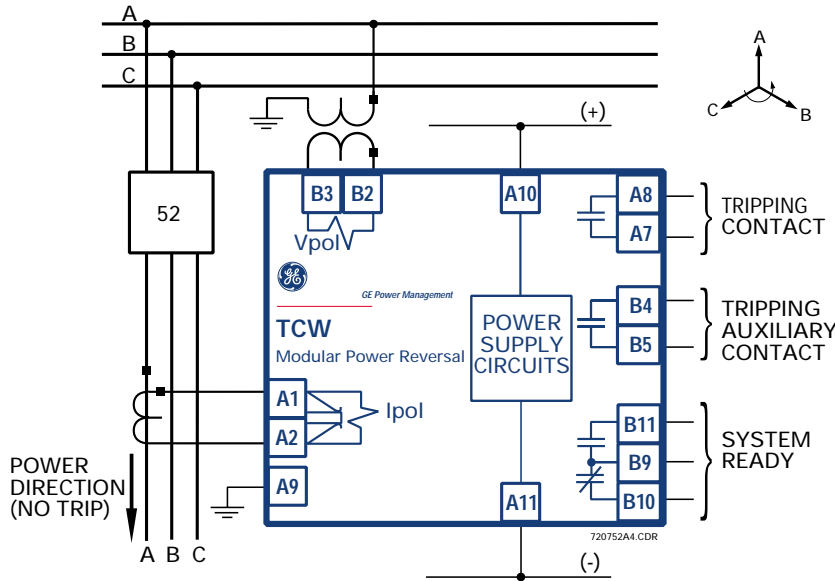


Fig. 2. Tripping characteristic for phase-phase polarization



Connection Diagram

Fig. 3. External connections for phase to ground polarization



Ordering

TCW	500DA	*	*	*	*	00	*	
TCW		1						Digital power reversal relay
		2						50 Hz
			1					V _n : phase to ground
			2					V _n : phase to phase
				1				I _n : 1 A
				2				I _n : 5 A
					F			24-48 VDC/VAC auxiliary power supply
					G			48-125 VDC/VAC auxiliary power supply
					H			110-240 VDC/110-220 VAC auxiliary power supply
						C		Individual drawout housing
						S		As part of a †MID drawout system

	50 Hz	60 Hz
V _n , Phase to Ground	63	69
V _n , Phase to Phase	110	120

Example: TCW500DA122G00C – TCW is directional power relay with nominal current I_n = 5 A, compound voltage polarized (phase to phase), and 50 Hz.

†Modular Industrial Protection System

Technical Specifications

METERING	
ACCURACY	
Operating Value:	±5%
Operating Time:	±5% or 30ms (whichever is greater)
INPUTS	
BURDENS	
Less than 3 W at all voltages	
Current Circuit:	
I _n = 1 A	
Current	Burden
1A	0.17 VA
2A	0.68 VA
I _n = 5 A	
Current	Burden
5A	2.30 VA
10A	9.30 VA
Voltage Circuit:	
V _{pol} :	110V
Burden:	0.25 VA
POWER SUPPLY	
RATINGS	
Frequency:	50/60 Hz
Effective Range:	48-51/57-63 Hz
Operating Range:	46-53/56-64 Hz
Current Range:	
I _n :	1 A/5 A
Setting:	1-40% I _n in 1% steps
Auxiliary Power Supply:	24-48 VDC/VAC (±20%) 48-125 VDC/VAC (±20%) 110-240 VDC/110-220 VAC (±20%)
OUTPUTS	
CONTACT CHARACTERISTICS	
The TCW offers two auxiliary relays with type "C" contacts	
First Contact:	Tripping:
Continuous:	3 A
Close:	30 A
Break:	180 VA resistive at 125/250 VDC 60 VA inductive at 125/250 VDC
Second Contact:	Trip Signalling:
Continuous:	3 A at 250 VDC max
Close:	5 A for 30 sec at 250 VDC max
Break:	25 W inductive at 250 VDC max
ENVIRONMENTAL	
ENVIRONMENTAL	
Ambient Temperature:	
Operation:	-10°C to +55°C
Storage:	-40°C to +70°C
Relative Humidity:	95% without condensing
TYPE TESTS	
STANDARDS AND TYPE TESTS:	
Impulse Test:	5kV peak, 1.2/50 µsec, 0.5 J, IEC 255-4
Interference Test:	2.5 kV longitudinal, 1 kV transverse, IEC 255-4, Class III
Electrostatic Discharge:	IEC 801-3, Class III
Radio Interference:	IEC 801-3, Class III
Fast Transient:	IEC 801-4, Class III
INSULATION	
Between terminals and ground:	2000 VDC for one min at rated frequency (50 Hz or 60 Hz)
Between independent groups:	2000 VAC for one min at rated frequency (50 Hz or 60 Hz)
Between terminals of each of the output contacts:	1000 VAC for one min at rated frequency (50 Hz or 60 Hz)
PACKAGING	
PHYSICAL	
Weight:	
Net:	6 lbs (2.7 kg)
Shipping:	7.7 lbs (3.5 kg)
APPROVALS	
CE Compliant	UL - UL listed for USA and Canada

*Specifications subject to change without notice.