



# Product Data

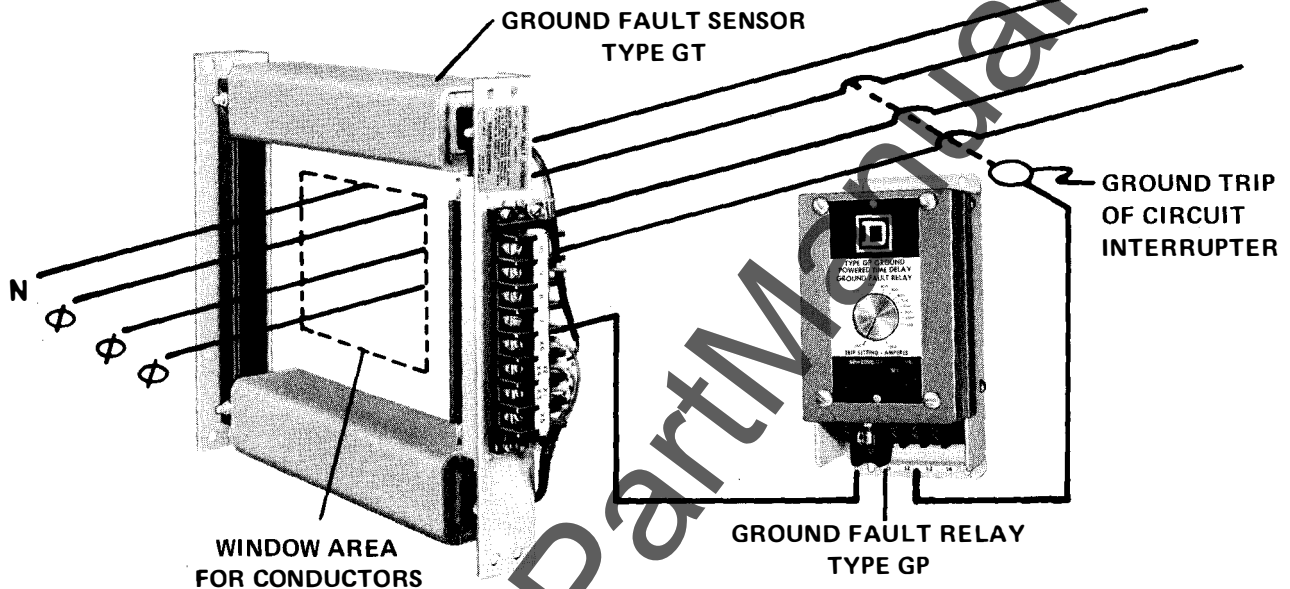
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Date 6-15-72

File 6640

Subject EQUIPMENT GROUND FAULT PROTECTION – GROUND-CENSOR, TYPE GP



Most apparatus designed to provide protection to service entrance equipment from the destructive effects of ground fault current operates on the same basic principles –

1. A sensor, which is essentially a CT, reacts to the unbalance in line current caused by the ground fault.
2. A relay reacts to predetermined values of ground fault currents and produces an output signal.
3. A protective device opens the circuit upon signal from the relay.

Operating within this basic framework, the Ground-Censor Type GP apparatus built by Square D Company adds a number of important refinements which provide distinct benefits. The following is a brief synopsis.

## Ground Powered

Most devices on the market use 120 volts derived from the system they are monitoring to power the relay and provide energy to signal the protective device. The Type GP Ground-Censor does not. It derives all the energy needed for operation from the ground current flow itself through transformer action.

Ground Powered operation means:

- **Independence from voltage drop on the protected system.** Low impedance ground faults can reduce the available voltage used to power the detection equipment to 58% of its normal value. Systems relying on this source of power introduce complications if they are to be built to operate reliably over this whole range of input voltages.

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- **Isolation from line voltage transient changes.** Incoming lines typically contain voltage "Hash" composed of transient voltage peaks superimposed on the nominal voltage wave. Systems relying on this source of power must be protected from these voltage transients to avoid damage to electronic components of the relay section. This introduces complications and additional circuitry.
- **Isolation from lightning strikes.** Lightning strikes on the primary service or primary switching can cause traveling waves that produce a false signal, tripping some kinds of ground fault protective equipment unnecessarily.

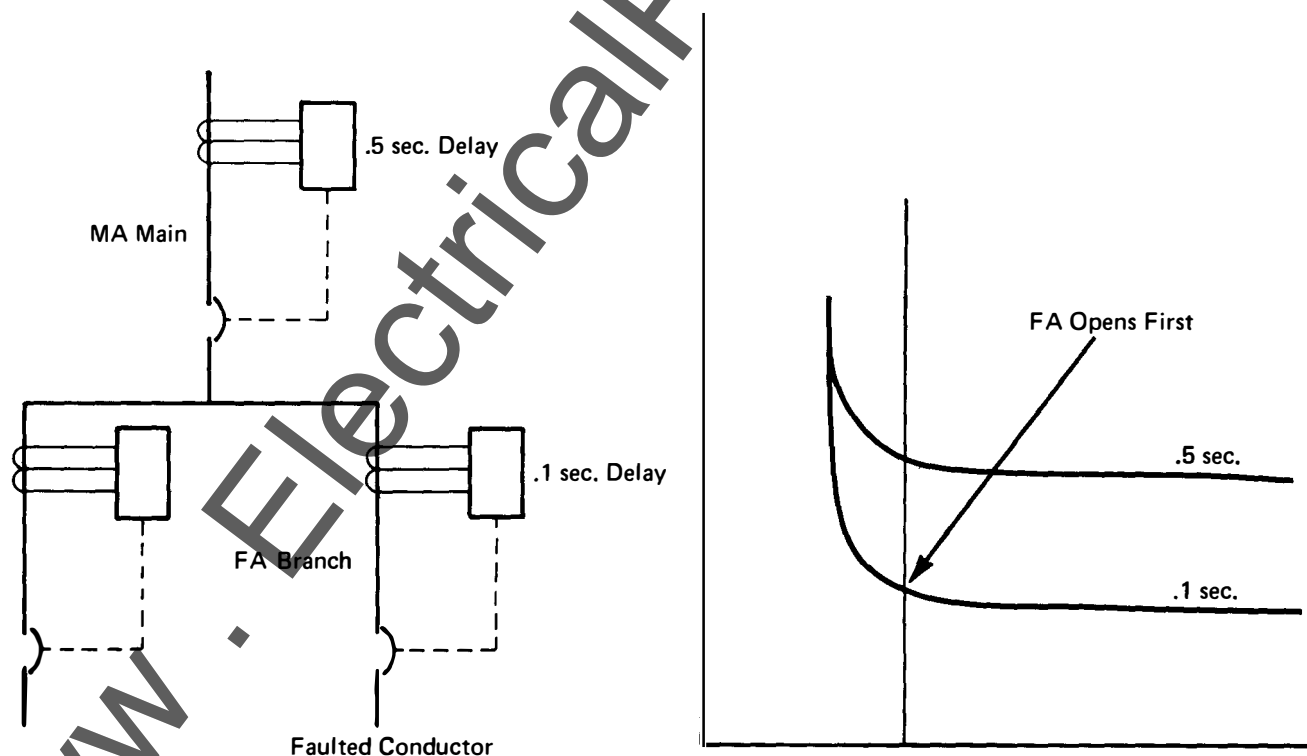
These effects don't trouble the Type GP Ground-Censor because it makes no electrical connection to any outside source of power.

### Time Delay Pre-Set

Nearly all available units have provisions for the introduction of some amount of time delay between the relay's receipt of the signal from the sensor element and its transmission of the signal to the protective device. These delay times may be fixed at manufacture or left for adjustment either continuously or in steps in the field.

The Ground-Censor system uses factory pre-set time delay calibrated at a nominal .1, .2, .3 and .5 seconds.

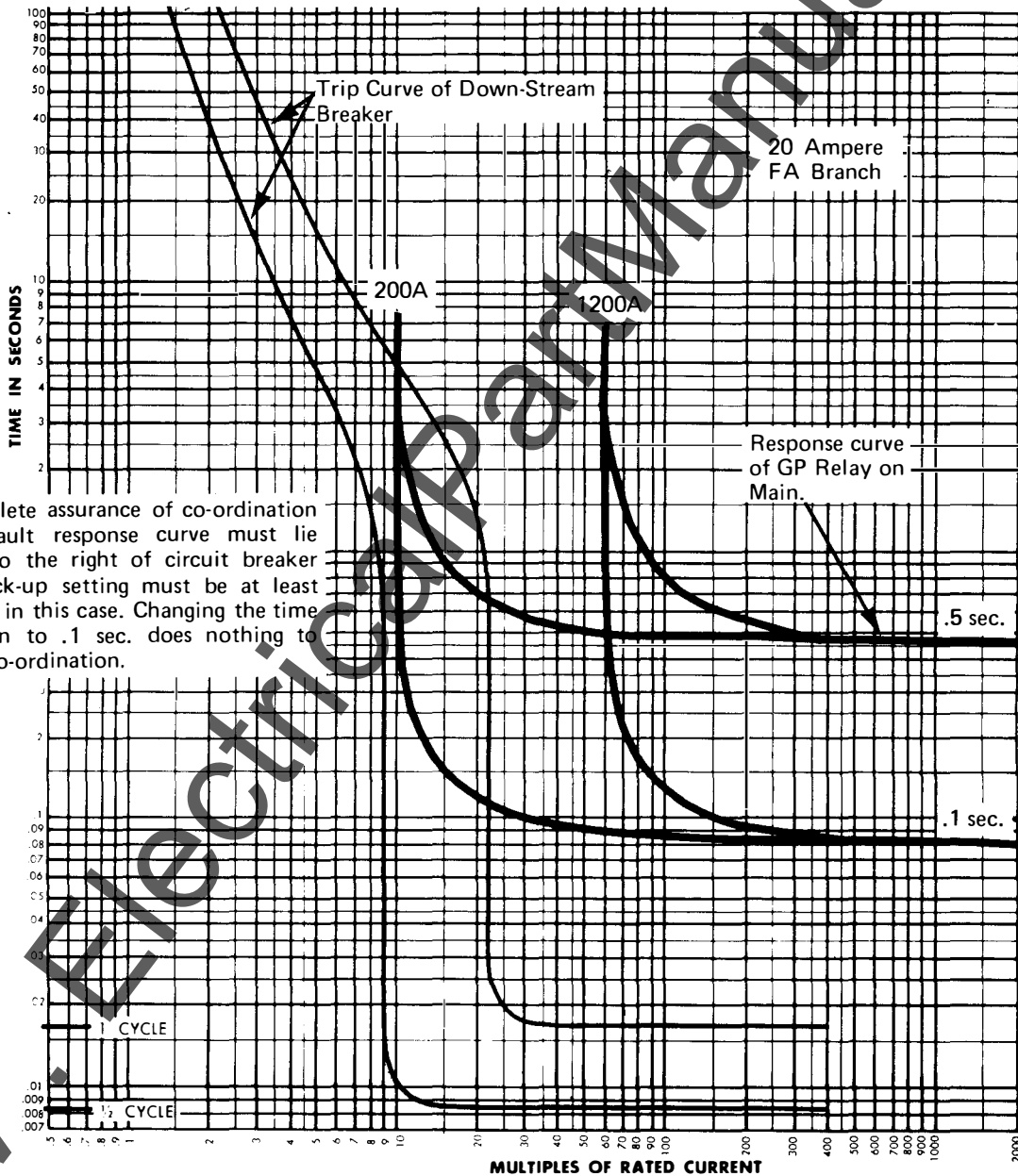
- **Time delay setting should be used to coordinate two or more relays on the main and branch of the same circuit.**



Discrete incremental settings provide enough separation for positive coordination.

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- Time delay setting alone is unreliable as a means of achieving coordination between ground fault interruptor and downstream molded case circuit breakers, or fuses.



For complete assurance of co-ordination ground fault response curve must lie entirely to the right of circuit breaker curve. Pick-up setting must be at least 430 amps in this case. Changing the time delay even to .1 sec. does nothing to improve co-ordination.

Current pick-up point must be adjusted for coordination with breakers.

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- **Fixed, preset time delay of the Ground-Censor:**

1. insures adequate separation for coordination
2. insures permanence of coordination and freedom from tampering after installation which would destroy coordination.

#### **Instantaneous Over-Ride**

The Type GP Ground-Censor is equipped with a fuse to act as final backup to all other circuit fail-safe features. If the fuse were to open due to massive components failure, instantaneous operation at any fault current level above 200 amperes.

- **Instantaneous reaction regardless of the nominal factory setting is achieved at any time simply by removing the fuse.**

Many engineers like to set all the GFI on "instantaneous" and ignore system coordination during construction when the system is most vulnerable to ground faults. Later the fuse can be reinstalled, reinstating whatever time delay was designed into the system.

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