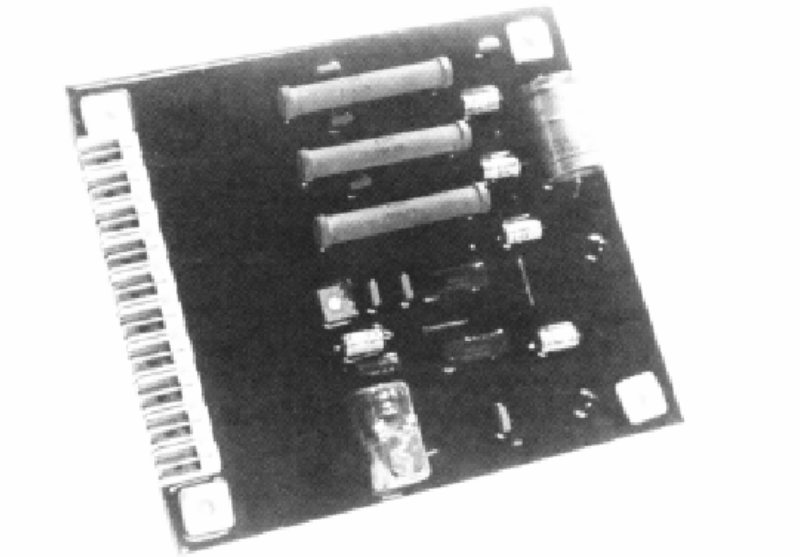
Alternator Protection Module



The Stamford Alternator Protection Module (APM) is a three phase overvoltage/ undervoltage detector. The relay output can trip a main circuit breaker, de-excite the generator, or stop the engine, if a fault occurs close enough to the terminals to produce a significant voltage discrepancy in any of the generator phases. Since every possible kind of short circuit will produce either an under voltage or an over voltage on at least one phase, this device represents an inexpensive alternative to the more conventional current-operated protection systems, all of which require three or more current transformers.

The APM is designed to trigger a disconnection(or some other protective action) whenever any of the line-to -neutral voltages exceeds an adjustable upper limit or drops below a fixed lower limit for more than a few cycles, the small time delay affording a safeguard against nuisance tripping. With a phase-to-neutral fault, the unit will operate on undervoltage on the affected phase. With a line-to-line fault, operation will occur wether on undervoltage on the affected phases or on overvoltage on the third, On a full three-phase short circuit the unit will of course operate on undervoltage, although in many instances some other form of no-voltage protection will also operate.

- Robust and reliable solid-state electronics
- Short circuit protection without current transformers.
- Integral changeover relay for direct circuit breaker tripping or indirect de-excitation/engine stop.

Typical modes of operation include the following

1. Opening a main circuit breaker by interrupting (via an integral relay) the feed to the no-volts hold-on coil.
2. Opening a main circuit breaker by closing (also via the integral relay) the battery-fed circuit to a shunt release coil.
3. De-exciting the generator by closing the battery-fed circuit to the shunt release coil of a small circuit-breaker carrying the exciter field current.
4. Stopping the engine by energising its engine-stop solenoid (and perhaps also opening the main circuit breaker) by means of battery-operated slave relay.

SPECIFICATION

INPUT	4 wire (3-phase & neutral) 50 - 60 Hz nominal, from machine terminals *(Single-phase operation also possible.) * Two separate versions, nominally 380V (175 - 625V) and 220V (100 - 360V), are available.
INPUT THRESHOLDS	Undervoltage 190V or 110V, +/- 10% Overvoltage 420 - 625V or 245V - 360V (both adjustable)

OUTPUT

Single-pole changeover relay
Rating 5A @ 30Vdc
5A @ 240Vdc
Pulsed output - see below

OUTPUT TIMINGS

Initial anti-transient delay - 100ms. Output pulse length - 200 ms minimum. Pulse frequency - typically 3.2 seconds(the pulse output prevents both the output circuit and any external shunt release coil from overloading.)

POWER DISSIPATION

6 watts maximum

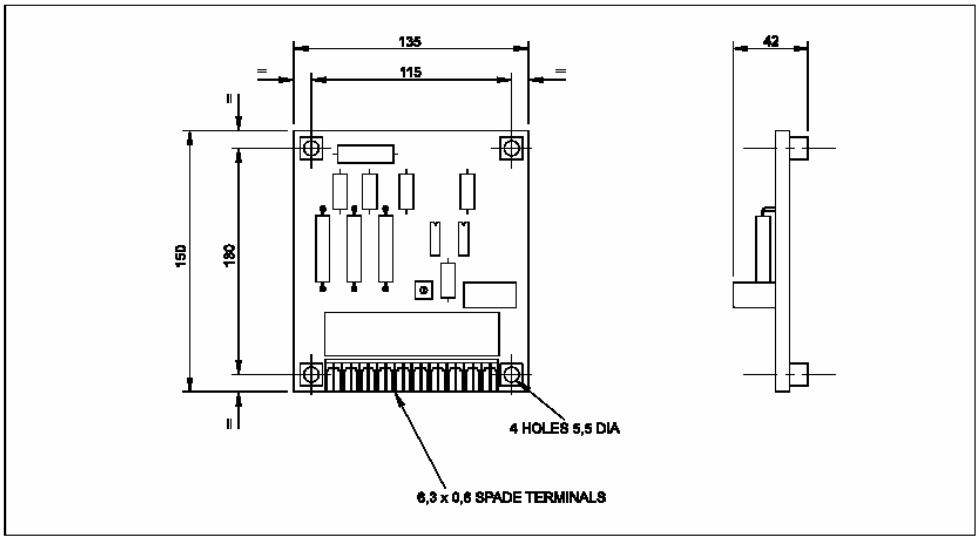
ENVIRONMENTAL

Vibration	20-100Hz 30mm/sec 100Hz-2kHz 2g
Relative humidity	95%
Operating temperature	-40 to 70c
Storage temperature	-55 to +80c

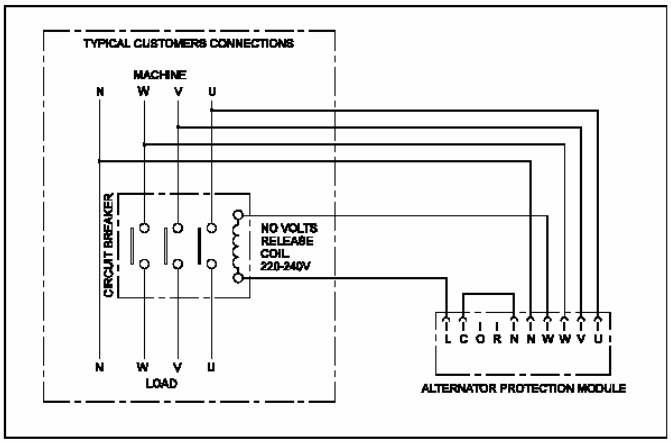
CONNECTIONS See below.

Not suitable for mounting in generator terminal box.
Switchboard or bedplate mounting recommended.

GENERAL ARRANGEMENT DIAGRAM



CONNECTION DIAGRAM



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