TWC

ADVANCED ELECTRONIC VOLTAGE REGULATOR

# INSTALLATION INSTRUCTIONS

DATA SHEET

4:e

09-89

The following is a general guide to installing the TWC regulator in most alternator charging systems whilst specific data sheets for individual alternator makes and types are also supplied, where possible.

**IMPORTANT: Whilst the TWC regulator is not difficult to fit, it is essential that you understand these basic installation instructions, before commencing. If in doubt, please consult your TWC specialist.**

A. Disconnect the battery.

B. Make sure you have the correct TWC regulator, indicated on the case.
NEGATIVE REGULATOR: One end of the field winding is connected to (+) (61, Ind, L, D+) inside the alternator (Fig. 1a).
POSITIVE REGULATOR: One end of the field winding is firmly connected to earth (–) inside the alternator (Fig. 1b).

C. Mount the regulator in a dry, protected place.

D. Protect the contacts with water repellant grease, e.g. Valvoline, Castrol anti-corrosion grease. Also fill the space around contacts on the regulator to prevent ingress of water.

E. Disconnect the old regulator. If the regulator is integral with the brush-holder, the simplest solution is to change the brush-holder, e.g. Bosch K1/N1.

F. Connect according to the wiring instructions.

## CONNECTIONS TO THE ALTERNATOR

YELLOW – (Wire 6) Locate the lead from the ignition warning light, which is normally connected to the low current output terminal on the alternator (referred to as IND,D+,61 or L).

Disconnect this and attach it to the YELLOW TWC lead.

If there is a resistor installed in the instrument panel instead of an ignition warning light, connect a bulb of 2-4 W in parallel with the resistor.

In the absence of both lamp and resistor, a lead from the ignition key must be connected to the YELLOW TWC lead, **via a 2-4 W bulb**.

*Note 1:* The ignition warning light rating must not exceed 5W or damage to the TWC regulator will result.

*Note 2:* Any other functions, other than the ignition light circuit, must be re-routed to the alternator low current output.
This is especially important with BUKH engines, which employ an accoustic alarm function. (A separate TWC Data Sheet is available in this case).

BROWN – (Wire 1) Connect this to the low current output terminal, vacated by the ignition warning light lead. (Marked IND,D+,61 or L).

If there is no low current output, refer to Fig. 2.

With a twin-battery system using blocking diodes, a connection may be made to B+, the main high current output, or the primary (alternator) side of the blocking diode. (Fig. 2 posn 12).

Alternatively, the BROWN TWC lead can be extended to reach the ignition switch as shown in Fig. 2 posn 13. In this case, however, the ignition warning light will not give a steady emission when the ignition is turned on but, instead, will 'blink' slowly after approximately 15 seconds.

BLACK – (Wire 4) This should be connected to the NEGATIVE (–) output on the alternator.

GREEN – (Wire 5) The removal of the original regulator will have left one brush terminal empty (Marked DF,67,EXC or F). Connect the GREEN TWC lead to this terminal.

BLUE – (Wire 2) Connect to the B+ terminal (High current output) on the alternator.

*Note:* For twin-battery systems, with blocking diodes, connect, instead, to the 'Service' battery side of the diode plate. This wire must at all times be POSITIVE (+) (Fig. 2 posn 14).

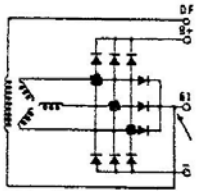
## CONNECTIONS TO THE BATTERY:

RED – (Wire 3) This is the battery sensing lead and must be connected to the POSITIVE (+) terminal on the battery.

Where blocking diodes are employed, connect the RED TWC lead to the 'Service' battery.

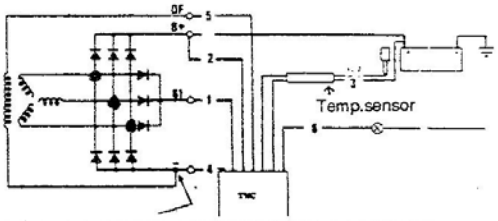
If a manual isolating switch is fitted, instead, connect the RED lead to the COMMON pole on the switch. This will ensure that the appropriate battery is sensed.

Fig. 1a.



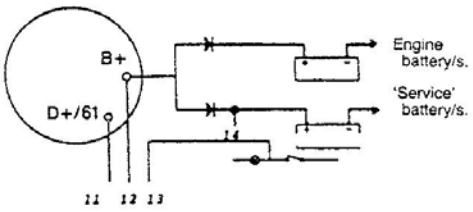

**NEGATIVE Regulator** – Indicated by connection of the field to the low current output (61,IND,L,D+)

Fig. 1b.




**POSITIVE Regulator** – Indicated by connection of the field to negative.

Fig 2.




*Note:* The RED TWC lead must always be connected. Should it ever become loose or disconnected, the ignition warning light will 'blink' slowly.

ATTENTION! Don´t cut the wiring harness, as there is a temperature sensor inside.

## TWIN-ALTERNATOR/TWIN-BATTERY SYSTEMS:

If, with twin-engines, start inhibitor relays are provided, these must be connected to the low oil-pressure warning light. Otherwise, only one engine will start.

A separate TWC Data Sheet is available for this situation.

## INSTALLATION CHECK

- Connect a digital voltmeter over the battery (2-battery systems over the service battery). It will show the prevailing battery voltage.
- Turn the ignition key to the position for starting and check that the ignition warning light gives a steady emission.
- Start the engine. The ignition warning light should go out. If it flashes – see ALARM/WARNING MODE.
- Increase the engine revs. to approx. 2000 rpm. The voltage should now rise to approx. 14 volts with 12 volt system (28 volts with 24 volt systems) – refer to TEMPERATURE/CHARGING VOLTAGE RELATIONSHIP. If the battery has been heavily discharged this could take a relatively long time.
- After approx. 5 minutes, charging will cease whilst the battery status is measured by TWC. Thereafter the voltage will be increased to approx. 14.6 volts with a 12 volt system (approx. 29.2 volts with a 24 volt system) – refer to TEMPERATURE/CHARGING VOLTAGE RELATIONSHIP.
- Load the alternator by switching on electrical equipment having a high consumption, such as beaters, lamps, blower-fans, etc. Should the charge control lamp give a rapid-flash alarm – see ALARM/WARNING MODE.
- Check and record the S.G. of the acid in **all** the battery cells of **all** the batteries.
- The TWC regulator will now adjust the charging voltage to the theoretically correct voltage. If the battery has deteriorated or is heavily sulphated, it cannot receive charge. Instead of storing energy it will become warm.

**After several hours running time:**

- Check that the acid S.G. has increased. (*Note:* This will take longer for older batteries). Feel the battery/batteries with your hand. They should not get noticeably warm by the charging if they are in good condition. If a battery gets warm, it is defective and should be replaced.

*Note:* New batteries have been known to be defective. Make it a habit to regularly check S.G. and fluid levels.

## ALARM/WARNING MODE:

'SLOW BLINK' (1 per second)

1. Too low alternator rpm.
   Solution – increase revs.
2. Excessive energy demand from electrical accessories.
   Solution – switch something off!

'FAST BLINK' (3 per second)

indicates an excessive voltage drop between generator and battery resulting from:

1. Faulty isolating switch (if fitted).
2. Bad connections in electrical system.
3. Too thin gauge electrical wiring.

**NOTE:**

Following HEAVY DISCHARGES a 'SLOW BLINK' may persist for several minutes after starting the engine, due to the initial high load on the generator.

If the 'SLOW BLINK' still persists under normal conditions – charging voltage is suspect.

**WARNING:**

**The 'FAST BLINK' mode should NOT be ignored.**

Please contact your Electrical Specialist IMMEDIATELY!

**TEMPERATURE/CHARGING VOLTAGE RELATIONSHIP (12 volt system):**

| | Hotter than | | | Colder than |
|---|---|---|---|---|
| **Temperature** | **+30°** | **+30° to 10°** | **+10° – 10°** | **–10°** |
| Normal Charge | 13,8 V | 14,0 V | 14,2 V | 14,4 V |
| High Charge | 14,4 V | 14,6 V | 14,8 V | 15,0 V |

*For 24 volt systems, multiply the Charging Voltage values by 2.*

Available from:

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