



WOODS ELECTRIC

BATTERY CHARGING SYSTEMS



FZ2UK

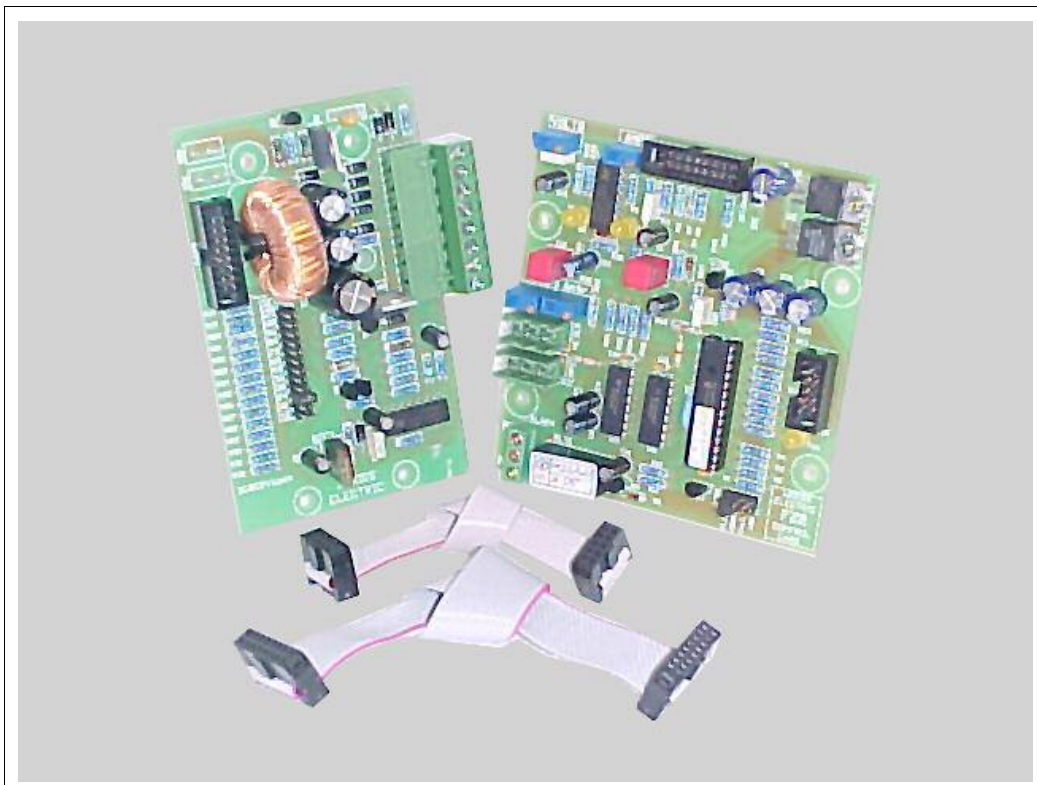
FZ2 UPGRADE KIT - CONVERTS ALL WOODS AUTO/FILTERED CHARGERS TO

*BETA*charge

INTELLIGENT MULTI-TAPER LEAD-ACID BATTERY CHARGER

12V, 24V, 30V, 36V, 48V
7A, 15A, 30A, 60A

REPLACES ALL PREVIOUS CONTROL CARDS : MX2, G99, FZ1



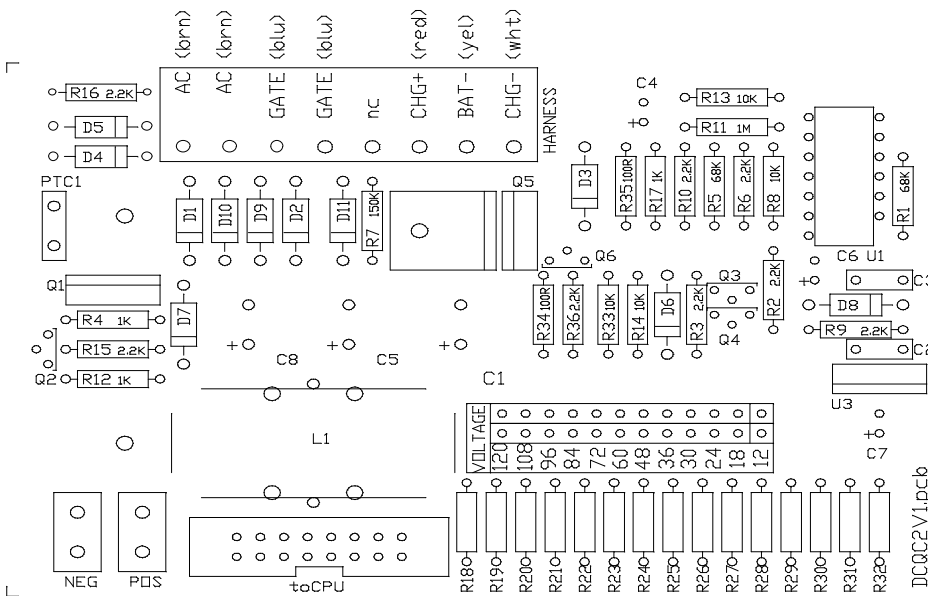
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DCQC CONNECTIONS:

DCQC CONNECTIONS:

On removing the original QCS pcb, snip off the push-on connectors and strip 5mm from the wire ends. Insert into the correct points on the Phoenix socket provided with the DCQC drive card. Screw firmly and plug into the socket on the DCQC card.

Connector pin	Wire Colour	Electrical Connection
1	White	Shunt negative (Rectifier negative)
2	Yellow	Shunt positive (Battery negative)
3	Red	Battery positive
4	n/c	not used
5	Blue	SCR gate #1
6	Blue	SCR gate #2
7	Brown	Transformer AC #2
8	Brown	Transformer AC #2



IMPORTANT:

The DCQC card is voltage dependant. Please ensure that the voltage jumper is set tot he correct position to suit the voltage of your battery charger. 12.18.24.30.36.48V etc

No other adjustments are necessary.

The auxilliary POS . NEG terminals in the lower left corner are for additional outputs only and are not used in upgrade conditions.

NOTES - If you are replacing a QCS card with a DCQC card:

The mounting holes in the DCQC card are positioned at the same location as a QCSV card, but you will need to space the DCQC card away from the aluminium mounting bracket, which will otherwise short-circuit component leads on the DCQC card.

Sufficient spacing may be achieved if the DCQC card is mounted to the bracket using M4x14 screws (3/16" x 5/8") with an additional nut and washer.

Ensure that the voltage selection link on the DCQC card is set to the correct voltage for your charger.

The DCQC card will work correctly with FZ1 control cards (all software versions) and FZ2 cards (all software versions).

The DCQC card will NOT operate correctly with MX2 or G99 cards.

Replacement DCQC cards will maintain the trimmed voltage of the control card to within 2%. This is generally acceptable in the short term, but the control card should be re-trimmed to 0.5% accuracy when the opportunity arises.

FZ2 INSTALLATION:

FZ2 INSTALLATION:

PHYSICAL MOUNTING:

Replacing an FZ1 card with an FZ2 card: The left-hand mounting holes in the FZ2 card are positioned at the same location as for the MX2/G99/FZ1 card. The FZ2 card features an additional pair of mounting holes which add extra stability when used. The flatcable connectors (10-way and 16-way) are in the same card position for MX2/G99/FZ1 and FZ2 cards, and all connections are compatible.

COMPATIBILITY:

The FZ2 card will work correctly with DCQC interface cards and QCS1V20 interface cards.
The FZ2 card will NOT operate correctly with QCS3_S1 cards, or with any other pre-1998 interface card.

TRIMMING PROCEDURES:

The FZ2 card is supplied with the voltage pre-adjusted at the factory. Further adjustment is rarely required, particularly if the FZ2 card is used in conjunction with a trimless DCQC card.

The current is also pre-adjusted, but should be trimmed accurately due to differences between the current-sensing shunts for different chargers.

"Power Supply" Mode: Turn power off, remove the "Mode" selection link on the FZ2 card, and reapply power. The green "Float" LED will flash on/off. In Power Supply mode the chargers' alarms are disabled, and it delivers a constant 2.3 volts per cell (13.8V for a 12V system). This mode is ideal for accurate trimming, since the charger will not attempt to compensate for temperature variations or algorithm instructions.

Current Adjustments: Connect the charger to batteries through an average-reading DC current meter. Accuracy should be better than 2%, and resolution should be better than 0.1 amp. A current shunt and moving-coil meter are ideal; some DC clamp meters may also be useable.

Place a load on the batteries, at a higher current than the charger rating (eg: use a 40 amp load when setting a 30 amp charger). Apply power to the charger. Trim the charger current to within 5% of the chargers' rating (eg. 30 amps +/-1.5A). Excessive output current will overheat the chargers' transformer. Low currents will extend battery charging times.

Voltage Adjustments: Connect the charger to batteries which have previously been adequately charged, or to undersized batteries which will respond rapidly to charger variations. Monitor the battery terminal voltage with a very accurate meter (better than 0.5%). Monitor the charger current as well as the battery voltage.

Put the FZ2 card into Power Supply Mode. Trim the voltage SLOWLY, to 2.3 volts per cell (ie. 13.8V for a 12V system, 27.6V for a 24V system). If the charger current rises to greater than 50% of the chargers' maximum rating when trimming upward, you may need to wait until the batteries accept this charge before proceeding.

After Trimming: Place the selector link across the "MODE" pins which are suited to your battery. This will generally be the "NORML" pins. There is no need to remove charger power; the charger will re-initiate in the new mode when the link is placed. All alarms, LED displays and temperature compensation will become active.

TEMPERATURE COMPENSATION:

In the absence of a temperature compensation probe, the FZ2 card will assume a temperature of 22°C for establishing charging voltages.

A Woods Electric temperature probe (part number 36009) may be plugged into the FZ2 card. The temperature sensing head is normally mounted on the battery – either strapped to the battery case, or bolted to the negative terminal post.

The battery temperature modifies the charging voltage, at a rate of -3mV per degree C per cell. As the battery temperature increases, the charging voltage decreases.

Temperature compensation ensures that batteries in warm conditions are not overcharged, and do not lose excessive electrolyte. The compensation also ensures that batteries in frigid conditions are not undercharged.

EXTERNAL METERING:

The FZ2 card has voltage-metering and current-metering outputs suitable for driving moving-coil meters. The meters should have a full-scale deflection of 1mA, and a fascia scale to suit the charger current and battery voltage.

Woods Electric can supply moving coil meters with fascia scales to suit a wide range of voltages and currents, including dual-scale voltage and current meters. Refer to the Woods Electric catalogue for further details.

The metering outputs are trimmed for accuracy at the factory, but should be re-trimmed to take into account variations in meter-movement accuracy and fascia scaling.

The voltage metering should be trimmed under normal charging conditions. The current metering should be trimmed at the same time as the chargers' output current is set, to avoid metering non-linearities which occur at low output currents.

The meters may be physically located far from the charger. Meters may be connected to the FZ2 card with up to fifty metres of Telecom cable. Contacts are rated at 1A, 250V.

ALARM OUTPUT:

The conditions for alarm activation are listed in the ALERTS and ALARMS section of this manual.

The alarm relay contacts are rated at 1A, 250V

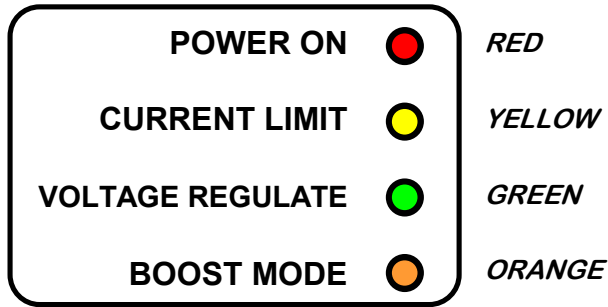
4 L.E.D STATUS DISPLAY:

4 L.E.D STATUS DISPLAY:

Earlier AUTOMATIC models may be upgraded to *BETA*charge recharging software. Therefore this supplement is provided for units with the **4LED STATUS DISPLAY**.

Recharging sunctions are identical.

The *BETA*charge will indicate via the LED display the charging status at all times. Below is listed a description of each LED and its function.



LED LABEL	LED COLOUR	DESCRIPTION
NO LEDs ILLUMINATED	none	This indicates that the <i>BETA</i> charge is non-operational, due to; <ul style="list-style-type: none"> No 240Vac mains supply Input Overload is off Over-Temperature shut down
ALL LEDs ILLUMINATED	ALL	This only occurs at <i>BETA</i> charge start-up. It indicates the <i>BETA</i> charge is checking its environment, program selection, batteries connected, etc
CHARGING - FLAT BATTERY	RED flash	The <i>BETA</i> charge has detected that the battery is severely depleted and will attempt to recover the battery.
CHARGING - SOFT START	RED	The <i>BETA</i> charge will gently ramp up charge current until the battery is ready to accept full charge.
CHARGING - BOOST	RED on, ORANGE on	The bulk of the battery recharging is done during BOOST.
FULLY CHARGED - FLOAT	GREEN	Indicates that the battery is 80% charged and may be disconnected for use. The battery may be left permanently connected to complete the recharging routine.
FULLY CHARGED - STANDBY	GREEN wink	The battery is charged to 100% capacity. The <i>BETA</i> charge ceases charging. All monitors are still active. The charger will recharge the battery automatically if necessary.
BATTERY FAULT	RED flash GREEN on	The <i>BETA</i> charge senses that the battery; <ul style="list-style-type: none"> is faulty, wont accept a charge. is faulty, has shorted cells, etc. is of the incorrect AmpHour rating, too small or too large. has a severe load connected to the battery while charging. This indicates a fault and should be attended to.
OVERVOLTAGE	ALL LEDs scroll up	Indicates that the <i>BETA</i> charge has sensed a voltage too high. <ul style="list-style-type: none"> the <i>BETA</i>charge is over-charging the battery. the wrong voltage battery has been connected. solar cells or alternator overcharge
NO BATTERY / UNDERVOLTAGE	ALL LEDs flash ALL LEDs scroll down	This occurs when the <i>BETA</i> charge senses; <ul style="list-style-type: none"> no battery connected at START UP. open circuit connection to the battery at START UP / the battery voltage is below a safe operating level.
CURRENT LIMIT	YELLOW flash	This indicates that the <i>BETA</i> charge is delivering its maximum current due to; <ul style="list-style-type: none"> charging phase current regulation applied load/battery too large for <i>BETA</i>charge

PROGRAM SELECTION:

PROGRAM SELECTION:

The WOODS ELECTRIC *BETA*charge boasts the ability to charge a wide range of different battery types by the use of four different recharging programs. Program selection is determined by an internal jumper shunt on the MODE header, located on the main control card. It is important to select the correct recharging program to suit the batteries you intend to charge. Shown below are the recharging programs and the batteries they are related to.

PROGRAM	BATTERY TYPE	DESCRIPTION
FLOAT	Sealed Lead-Acid Gel Cell	Float charge only
NORML (factory default)	Wet Lead-Acid Wet Deep Cycle Lead-Acid	Boost and Float charge modes
CALCM	Lead-Calcium	High Flat, Boost and Float charge modes
AGM	Absorbed Glass Matt Wet Nickel Cadmium	Boost, Peak and Float charge modes

By far the most popular battery types are the Wet Lead-Acid and the Wet Deep Cycle. These represent the common flooded wet cell battery families as used in most automotive, marine, commercial and solar applications. For this reason the NORML recharge program is set as the factory default. and is applicable in most situations.

If however, you are using your *BETA*charge with other battery types, you may change the program to suit your needs.

Use the table below to select the charging program depending on;

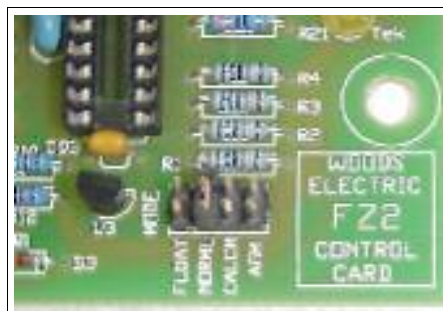
- Battery type
- Charger type

BATTERY CHARGER	SEALED LEAD ACID	GEL CELL	WET LEAD ACID	WET DEEP CYCLE	LEAD CALCIUM	AGM	WET NICKEL CADMIUM
STANDARD	FLOAT NORML *	FLOAT NORML *	NORML	NORML	CALCM	AGM	AGM
FILTERED	NORML	NORML	NORML	NORML	CALCM	AGM	AGM

*

IF, recharge time is to exceed 12 hours, a STANDARD unit is permissible for use on Sealed Lead-Acid and Gel Cell batteries.

IF, recharge time is expected to be less than 6 hours, a FILTERED unit must be used.



The image to the left shows the position of the MODE header in the main control board, with the jumper in the default NORML position

Disconnect the mains power before removing the front panel.

Ensure that the INPUT and OUTPUT circuit breakers on the front panel are in the OFF position before altering the jumper shunt's position.

IMPORTANT NOTE:

If the jumper shunt is removed from the MODE header on the main control card, this will force the *BETA*charge into **Power Supply mode. This mode is for technical adjustments ONLY.** It delivers only a regulated voltage of 2.30Volts per cell and a current limit of charger maximum amps, and ALL Alerts and Alarms are disengaged. The green FULLY CHARGED - STANDBY LED will flash to indicate this mode. It is recommended that you **DO NOT REMOVE** the jumper shunt permanently.

It is even MORE important that you DO NOT ADJUST the VOLTS and AMPS trimpots.

This may result in irreversable battery or *BETA*charge damage and is not covered by any warranty.

PROGRAM OPERATION:

PROGRAM OPERATION:

FLOAT selection:

0 : START UP All indicator L.E.Ds are illuminated in sequence.
Environment and L.E.D check and system warm-up.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that no battery is connected, it will indicate alarm NO BATTERY.
- the the battery is reverse connected, it will indicate alarm BATTERY FAULT.
- the connected battery is within safe parameters, it will indicate CHARGING - SOFT START.

1 : CHARGING - SOFT START Yellow CHARGING - SOFT START L.E.D is illuminated.
The current is gently ramped up to begin charging the battery.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- the battery is severely depleted, it will indicate CHARGING - FLAT BATTERY.
- the battery is ready to receive a full charge, it will indicate FULLY CHARGED - FLOAT.

2: CHARGING - FLAT BATTERY Yellow CHARGING - FLAT BATTERY L.E.D is illuminated.
A reduced current rate is applied to the battery to avoid cell plate damage.

If the BETAcharge II senses;

- the battery voltage cannot be lifted to a safe level, it will indicate UNDERVOLTAGE.
- the battery voltage has risen to a safe level, it will indicate CHARGING - SOFT START.

4: FULLY CHARGED - FLOAT Green FULLY CHARGED - FLOAT L.E.D. is illuminated.
The bulk of the recharging is now being performed.

(It is important to note, that with FLOAT program selected, the label of FULLY CHARGED - FLOAT is misleading. This only pertains to NORML, CALCM and AGM selections. Therefore the battery will not be really fully charged until FULLY CHARGED - STANDBY is indicated.)

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the battery has an excessive external load connected, it will indicate alert BATTERY FAULT.
- that the battery is 100% recharged, it will indicate FULLY CHARGED - STANDBY.

5: FULLY CHARGED - STANDBY Green FULLY CHARGED - STANDBY L.E.D is illuminated.
Charging ceases with all monitors active.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the battery requires a replenishing charge, it will indicate CHARGING - SOFT START.
- that the Standby time has elapsed, it will indicate START UP.

PROGRAM OPERATION:

PROGRAM OPERATION:

NORML selection:

0 : START UP All indicator L.E.Ds are illuminated in sequence.
Environment and L.E.D check and system warm-up.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that no battery is connected, it will indicate alarm NO BATTERY.
- the the battery is reverse connected, it will indicate alarm BATTERY FAULT.
- the connected battery is within safe parameters, it will indicate CHARGING - SOFT START.

1 : CHARGING - SOFT START Yellow CHARGING - SOFT START L.E.D is illuminated.
The current is gently ramped up to begin charging the battery.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- the battery is severely depleted, it will indicate CHARGING - FLAT BATTERY.
- the battery is ready to receive a full charge, it will indicate CHARGING - BOOST CHARGE.

2: CHARGING - FLAT BATTERY Yellow CHARGING - FLAT BATTERY L.E.D is illuminated.
A reduced current rate is applied to the battery to avoid cell plate damage.

If the BETAcharge II senses;

- the battery voltage cannot be lifted to a safe level, it will indicate UNDERVOLTAGE.
- the battery voltage has risen to a safe level, it will indicate CHARGING - SOFT START.

3: CHARGING - BOOST Yellow CHARGING - BOOST L.E.D is illuminated.
The bulk of the recharging is now being performed.

If the BETAcharge senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the battery has an excessive external load connected, it will indicate alert BATTERY FAULT.
- that the battery will not accept a charge, it will indicate alert BATTERY FAULT.
- that the battery is 80% recharged, it will indicate FULLY CHARGED - FLOAT.

4: FULLY CHARGED - FLOAT Green FULLY CHARGED - FLOAT L.E.D. is illuminated.
The battery may be disconnected for use, or left on charge to complete 100% recharge.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the battery has an excessive external load connected, it will indicate alert BATTERY FAULT.
- that the battery is 100% recharged, it will indicate FULLY CHARGED - STANDBY.

5: FULLY CHARGED - STANDBY Green FULLY CHARGED - STANDBY L.E.D is illuminated.
Charging ceases with all monitors active.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the battery requires a replenishing charge, it will indicate CHARGING - SOFT START.
- that the Standby time has elapsed, it will indicate START UP.

CALCM selection:

0 : START UP All indicator L.E.Ds are illuminated in sequence.
Environment and L.E.D check and system warm-up.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that no battery is connected, it will indicate alarm NO BATTERY.
- the the battery is reverse connected, it will indicate alarm BATTERY FAULT.
- the connected battery is within safe parameters, it will indicate CHARGING - SOFT START.

1 : CHARGING - SOFT START Yellow CHARGING - SOFT START L.E.D is illuminated.
The current is gently ramped up to begin charging the battery.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- the battery is severely depleted, it will indicate CHARGING - FLAT BATTERY.
- the battery is ready to receive a full charge, it will indicate CHARGING - BOOST CHARGE.

2: CHARGING - FLAT BATTERY Yellow CHARGING - FLAT BATTERY L.E.D is illuminated.
An increased current and voltage rate is applied to the battery to overcome high internal resistance.

If the BETAcharge II senses;

- the battery voltage cannot be lifted to a safe level, it will indicate UNDERVOLTAGE.
- the battery voltage has risen to a safe level, it will indicate CHARGING - SOFT START.

3: CHARGING - BOOST Yellow CHARGING - BOOST L.E.D is illuminated.
The bulk of the recharging is now being performed.

If the BETAcharge senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the battery has an excessive external load connected, it will indicate alert BATTERY FAULT.
- that the battery will not accept a charge, it will indicate alert BATTERY FAULT.
- that the battery is 80% recharged, it will indicate FULLY CHARGED - FLOAT.
- that the BOOST timer has elapsed, it will indicate FULLY CHARGED - FLOAT.

4: FULLY CHARGED - FLOAT Green FULLY CHARGED - FLOAT L.E.D. is illuminated.
The battery may be disconnected for use, or left on charge to complete 100% recharge.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the battery has an excessive external load connected, it will indicate alert BATTERY FAULT.
- that the battery is 100% recharged, it will indicate FULLY CHARGED - STANDBY.

5: FULLY CHARGED - STANDBY Green FULLY CHARGED - STANDBY L.E.D is illuminated.
Charging ceases with all monitors active.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the battery requires a replenishing charge, it will indicate CHARGING - SOFT START.
- that the Standby time has elapsed, it will indicate START UP.

AGM selection:

0 : START UP All indicator L.E.Ds are illuminated in sequence.
Environment and L.E.D check and system warm-up.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that no battery is connected, it will indicate alarm NO BATTERY.
- the the battery is reverse connected, it will indicate alarm BATTERY FAULT.
- the connected battery is within safe parameters, it will indicate CHARGING - SOFT START.

1 : CHARGING - SOFT START Yellow CHARGING - SOFT START L.E.D is illuminated.
The current is gently ramped up to begin charging the battery.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- the battery is severely depleted, it will indicate CHARGING - FLAT BATTERY.
- the battery is ready to receive a full charge, it will indicate CHARGING - BOOST CHARGE.

2: CHARGING - FLAT BATTERY Yellow CHARGING - FLAT BATTERY L.E.D is illuminated.
A reduced current rate is applied to the battery to avoid cell plate damage.

If the BETAcharge II senses;

- the battery voltage cannot be lifted to a safe level, it will indicate UNDERVOLTAGE.
- the battery voltage has risen to a safe level, it will indicate CHARGING - BOOST.

3: CHARGING - BOOST Yellow CHARGING - BOOST L.E.D is illuminated.
The bulk of the recharging is now being performed.

If the BETAcharge senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the battery has an excessive external load connected, it will indicate alert BATTERY FAULT.
- that the battery is still depleted, it will indicate CHARGING - BOOST (PEAK phase)
- That the battery is 80% recharged, it will indicate FULLY CHARGED - FLOAT.

4: CHARGING - BOOST (PEAK phase) Yellow CHARGING - BOOST L.E.D will flash.
This is a battery cell equalising recharge.

If the BETAcharge senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- the PEAK charge timer has elapsed, it will indicate FULLY CHARGED - FLOAT (REST phase).

5: FULLY CHARGED - FLOAT (REST phase) Green FULLY CHARGED - FLOAT L.E.D will flash.
Charging ceases to allow the battery cells time to settle.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the REST timer has elapsed, it will indicate FULLY CHARGED - FLOAT.

4: FULLY CHARGED - FLOAT Green FULLY CHARGED - FLOAT L.E.D. is illuminated.
The battery may be disconnected for use, or left on charge to complete 100% recharge.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the battery has an excessive external load connected, it will indicate alert BATTERY FAULT.
- that the battery is 100% recharged, it will indicate FULLY CHARGED - STANDBY.

5: FULLY CHARGED - STANDBY Green FULLY CHARGED - STANDBY L.E.D is illuminated.
Charging ceases with all monitors active.

If the BETAcharge II senses;

- a dangerously high battery voltage, it will indicate alarm OVERVOLTAGE.
- that the battery requires a replenishing charge, it will indicate CHARGING - SOFT START.
- that the Standby time has elapsed, it will indicate START UP.

ALERT:

BATTERY FAULT:

The charger will indicate a battery fault if the batteries are severely loaded or unable to accept or maintain a charge. **The fault needs to be attended to immediately.**

In order to maintain any loads that may be present during recharge, the *β*ETCharge will act as a power supply and provide voltage and current at a reduced rate.

- The charging current is regulated to 50% maximum output.
- Voltage regulation is set to 2.17 volts per cell @ 25°C (ie: 13V per 6 cells).
- After 1 hour the the program will jump to START UP.

Possible reasons for the *β*ETCharge invoking BATTERY FAULT are;

- is faulty, wont accept a charge.
- is faulty, has shorted cells, etc.
- is of the incorrect AmpHour rating, too small or too large.
- has a severe load connected to the battery while charging.

ALARM:

In all ALARM situations the *β*ETCharge ceases charging. **The fault needs to be attended to immediately.**

UNDERVOLTAGE:

The battery voltage is below the lower safe level for the determined period.

- Charging ceases.
- If the battery voltage is above 0.83 volts per cell @ 25°C (ie: 5V per 6 cells), then the program will jump to START UP.

OVERVOLTAGE:

The battery voltage is above the upper safe level of;

- FLOAT = 2.60 volts per cell @ 25°C (ie: 15.5V per 6 cells)
- NORML = 2.60 volts per cell @ 25°C (ie: 15.5V per 6 cells)
- CALCM = 2.83 vplts per cell @ 25°C (ie: 17V per 6 cells)
- AGM = 2.83 volts per cell @ 25°C (ie: 17V per 6 cells)

This means that either;

- the battery connected is the wrong type (eg: 24V battery connected to 12 volt charger)
- the battery connected is faulty

Once the battery voltage reduces to or less than 2.5volts per cell @ 25 °C (ie: 15V per 6 cells) the charging program will return to resume charging.

NO BATTERY:

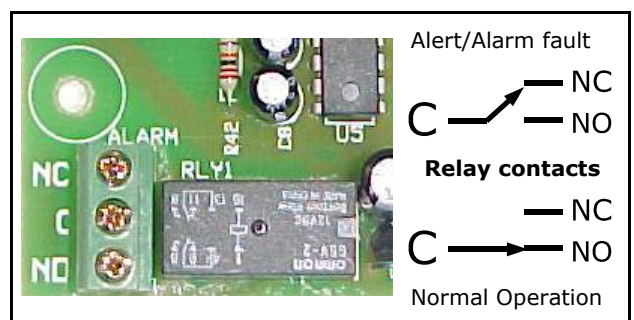
This Alarm is only active on START UP if no battery is connected to the *β*ETCharge on START UP.

- its output is switched off until a battery is connected.
- *The dead output eliminates sparking when a battery is connected to the charger.*
- when a battery is connected, it will start the charging program from START UP.

REMOTE ALARM RELAY:

The *β*ETCharge offers the ability to output a notification of an ALERT/ALARM event to a remote station.

- The relay is energised during normal operation.
- The relay is de-energised during ALERT/ALARM situations.
- One set of Common/Normally Open/Normally Closed contacts are available.
- Contacts are voltage-free, non-live.
- Contacts are rated at 1Amp.
- Remote ALERT/ALARM cables exit through a 5/8" (16mm) nylon bushing located on the left side panel below the output binding post terminals.
- Connection is at a 3-pole screw terminal block on the FZ2 control card.



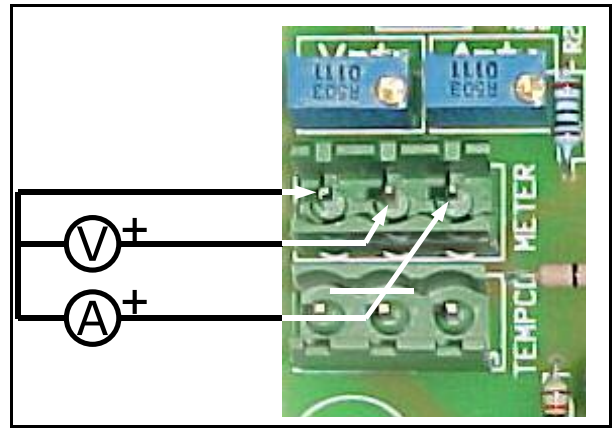
EXTERNAL ADD-ON METERING:

The diagram at right shows the connection of other external Volt and Ammeters.

It is imperative that the meters;

- meet the specifications, as per the specification tables
- cable lengths are no more than 3metres
- are connected correctly to the socket as per the diagram

EXTERNAL ADD-ON METERING:



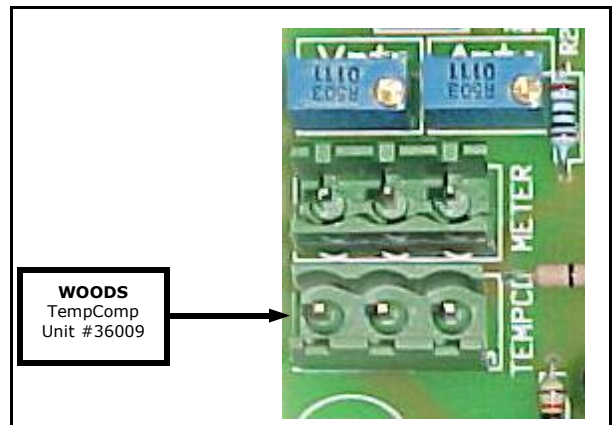
TEMPERATURE COMPENSATION PROBE:

The temperature compensation probe is a retrofit part to aid in the accurate recharging of the batteries in high ambient temperature environments.

The probe is not fitted as a standard part, and therefore the *βETA*charge assumes a temperature of 25°C.

USE ONLY WOODS ELECTRIC TEMPERATURE COMPENSATION PROBE (# 36009) WITH YOUR *βETA*charge.

TEMPERATURE COMPENSATION PROBE:



The regulated output voltage is compensated at a negative temperature co-efficient value of 3mV per cell per degrees Celcius.

- the regulated *voltage is increased* as the probe *temperature decreases*
- the regulated *voltage is decreased* as the probe *temperature increases*

The temperature probe is typically placed at;

- battery
- battery terminal