



# GENERATOR SETUP

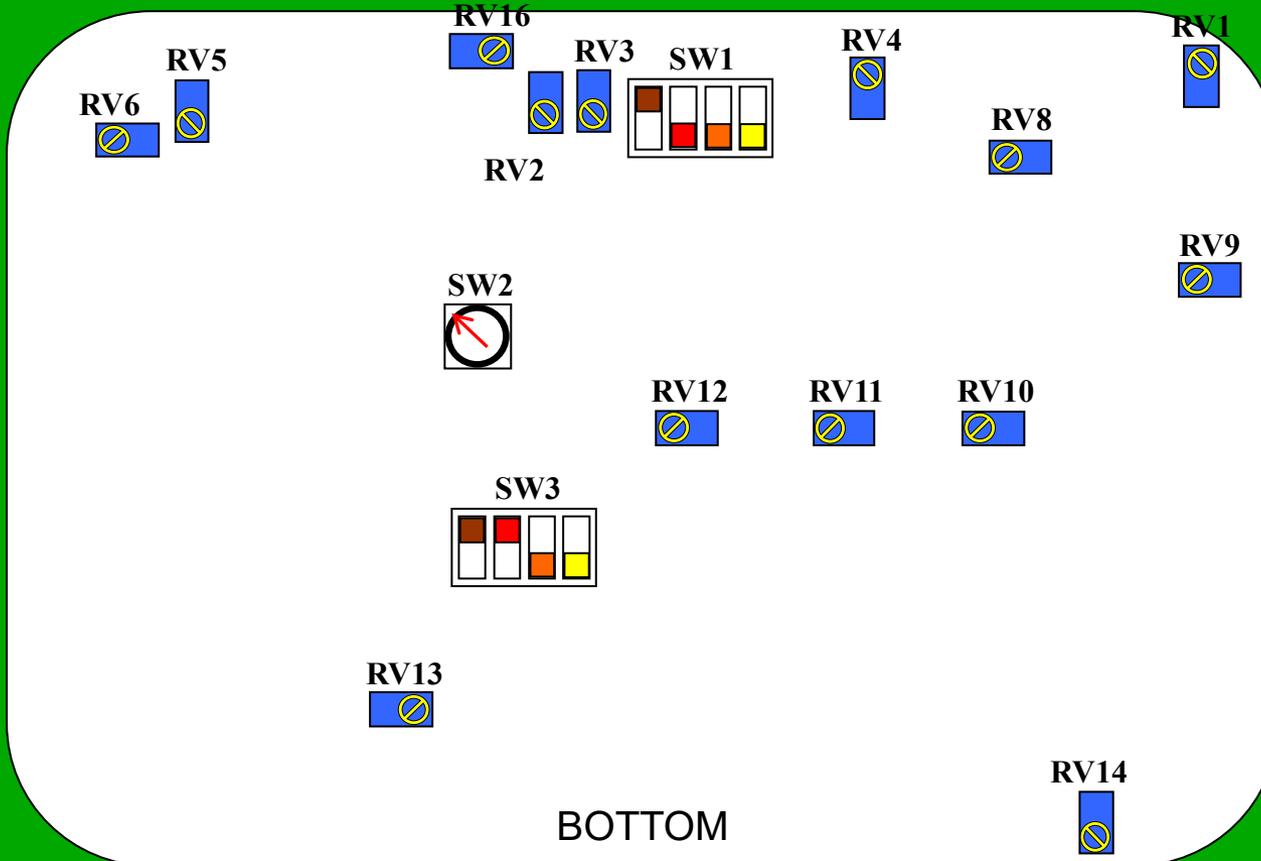
INVERTER CONTROL

PCB OVERVIEW



# GXR Inverter control board overview

## Potentiometer & switch locations





# GXR Inverter control board overview



## Switch descriptions

### SW1

**A** – Auto / Manual frequency control – UP = manual / Down = Auto

**B** – Not used

**C** – Not used

**D** – Not used

### SW2

Position 1 (left) – Manual power control (generator panel)

Position 2 (middle) – Proportional (line speed)

Position 3 (right) – Remote (PLC)

### SW3

**A** – UTS frequency – Up = high / down = low

**B** – UTS override – Up = override / Down = sensor

**C** – Not used

**D** – Power demand I/P – Up = 0-10V / Down = 4-20mA



# GXR Inverter control board overview



## Potentiometer descriptions

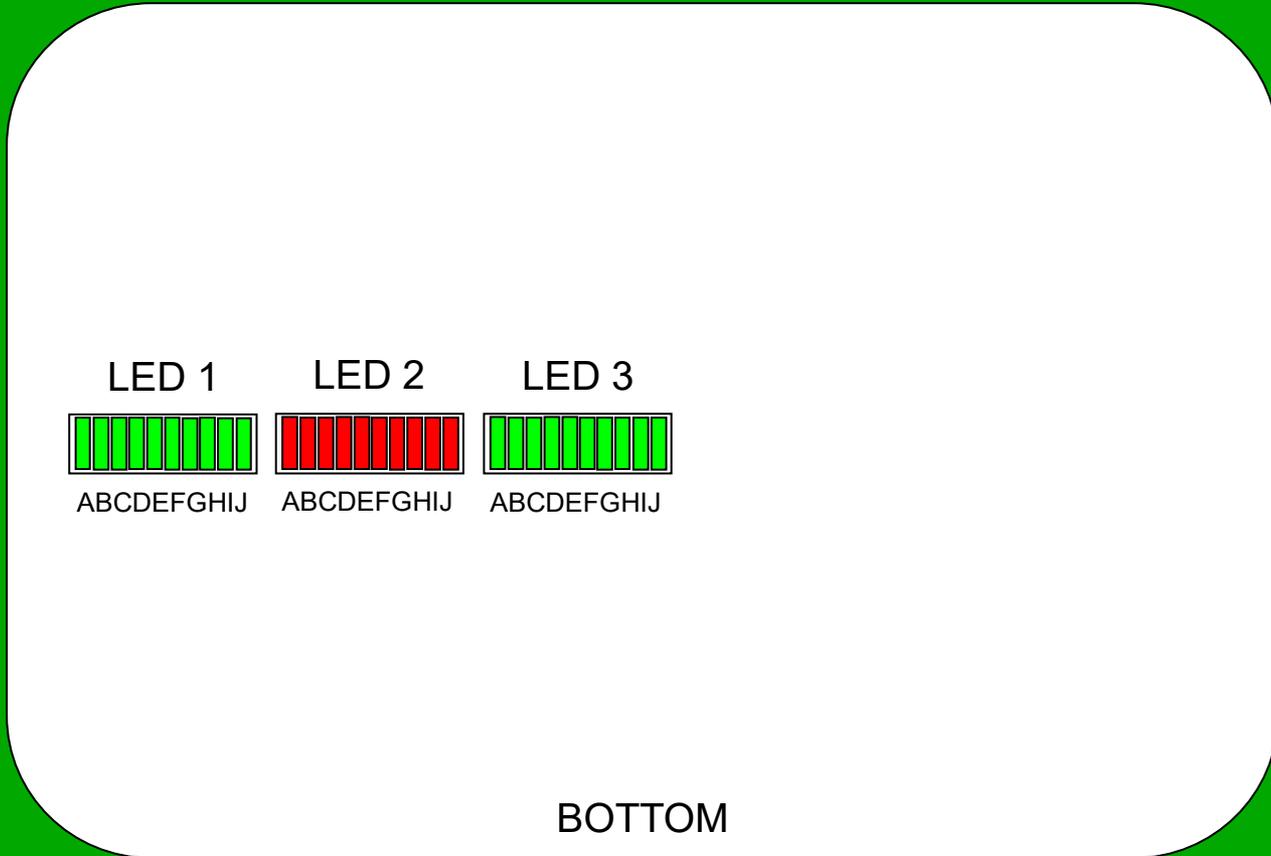
- RV1 – Meter calibration frequency
- RV2 – Maximum frequency (25kHz)
- RV3 – Reactive power zero calibration
- RV4 – Meter calibration true power
- RV5 – Main power calibration - DO NOT ADJUST
- RV6 – Proportional control speed / power setpoint
- RV7 – N/A
- RV8 – Minimum frequency (10 kHz)
- RV9 – Control voltage (10v) offset
- RV10 – Reactive power isolator - 5.00 v at 0.00 Kvar (O/P)
- RV11 – True power isolator - 10 v @ maximum power (O/P)
- RV12 – Power demand isolator - 10 v for maximum power (I/P)
- RV13 – Min Speed (up to speed)
- RV14 – Current trip level (over current)
- RV15 – N/A
- RV16 – Auto frequency control gain



# GXR Inverter control board overview



## LED locations





# GXR Inverter control board overview



## LED Descriptions

### LED 1

- A – 24v (A)
- B – 15v (B)
- C – -15v (B)
- D – 15V (C)
- E – Interlocks closed
- F – Overtemperature (OK)
- G – 24v (B)
- H – Start
- I – Relays closed
- J – Line up to speed

### LED2

- A – Shutdown
- B – + Mismatch
- C – - Mismatch
- D – Overcurrent trip
- E – Skip
- F – Skip signal
- G – Remote skip / treat
- H – High alarm
- I – Low alarm
- J – UTS signal

### LED3

- A – UTS signal
- B – Rotation sensor (pulses)
- C – N/A
- D – Treat on
- E – N/A
- F – N/A
- G – No error IGBT driver 1
- H – No error IGBT driver 2
- I – Remote not stop
- J – Remote / Local



# GENERATOR SETUP

MATCHING GENERATOR TO  
TREATER STATION



# Matching generator to treater station



- The following steps show how to match a GXR generator to a treater station
- This ensures the generator, HT transformer and treater station are running at there most efficient
- Matching should be carried out when a system is first installed or when a substantial change has occurred i.e. changing air gap to suit a different material



## CAUTION

IN ORDER TO CARRY OUT THE FOLLOWING  
ADJUSTMENTS THE GENERATOR CABINET  
DOOR WILL NEED TO OPEN WHEN THE  
GENERATOR IS RUNNING

HIGH VOLTAGES ARE PRESENT INSIDE THE  
GENERATOR CABINET

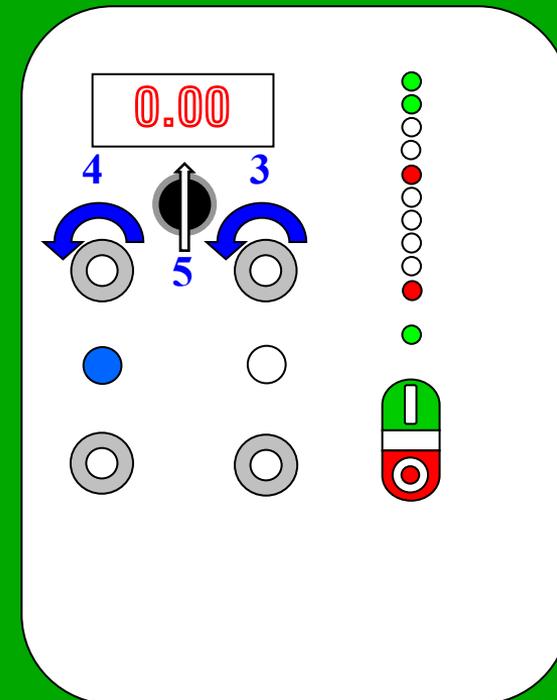
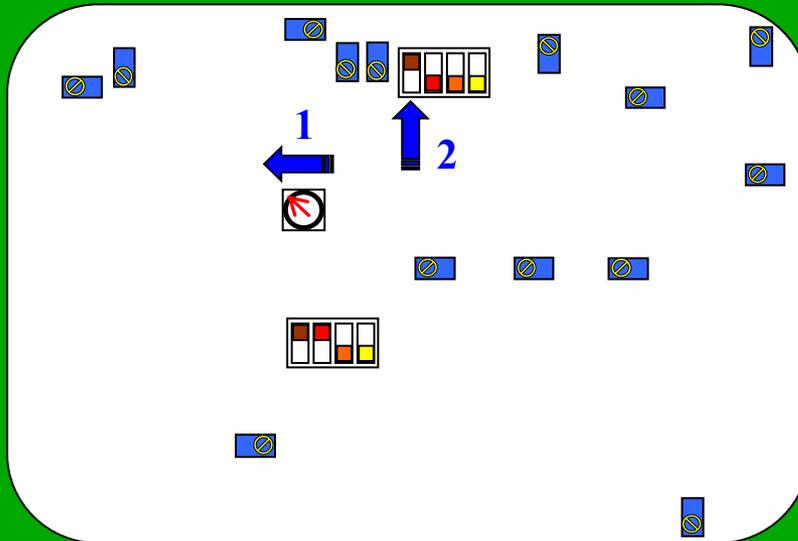
ADJUSTMENTS SHOULD ONLY BE MADE BY  
QUALIFIED PERSONNEL



# Matching generator to treater station



1/4 - Generator into manual frequency & local control mode



- 1 – Ensure SW2 is in position 1 (local control)
- 2 – Ensure SW1 is in the UP position (manual frequency control)
- 3 – Turn power dial to zero
- 4 – Turn frequency dial to zero
- 5 – Ensure selector switch is set to TRUE (↑) power



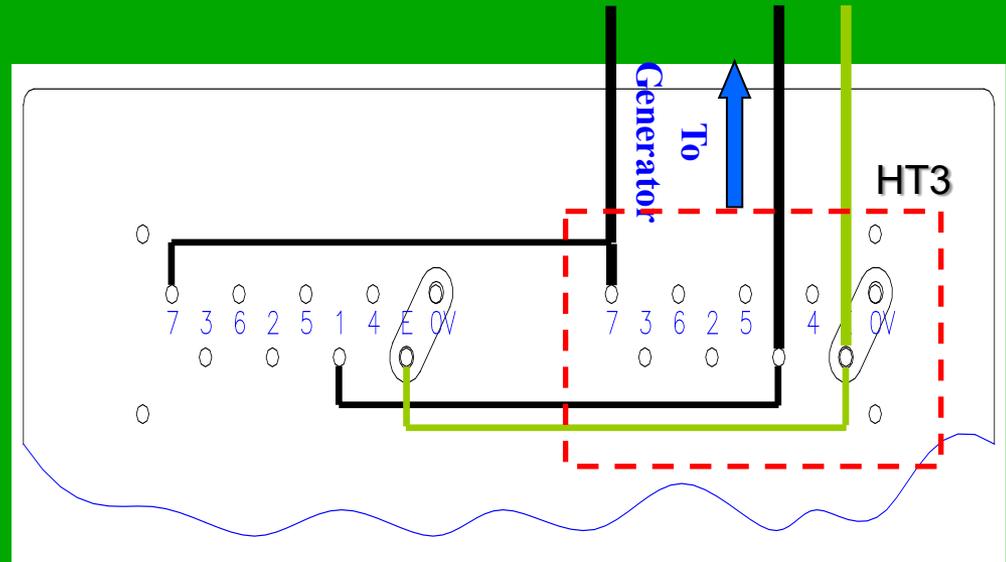
# Matching generator to treater station (cont)

## 2/4 Set HT transformer tap

### Caution

Ensure generator is switched off and isolated from the supply before commencing any work on the HT transformer

NOTE: The picture shows an HT8/10, an HT3 will only have one set of taps (**dotted area**)



Connect the wires as shown in the diagram. The same numbered taps should be linked with 6mm sq cable

When starting to match the generator to the treater station the HT transformer should be on taps 1 & 7

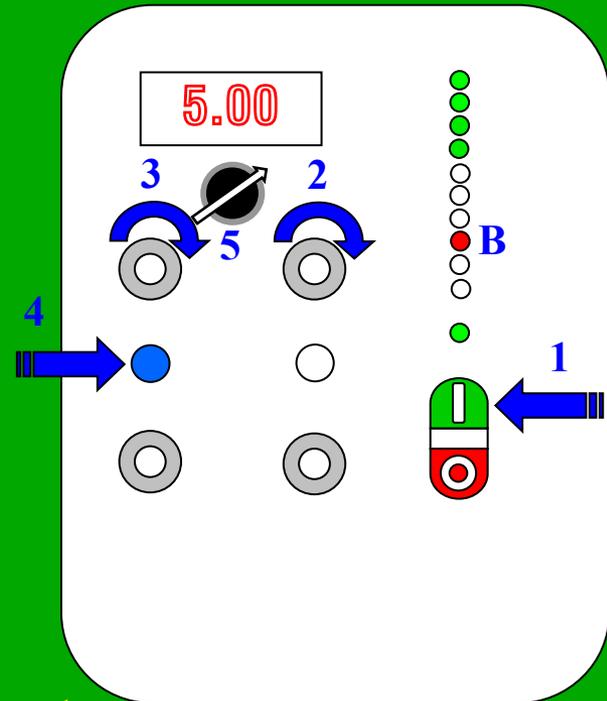
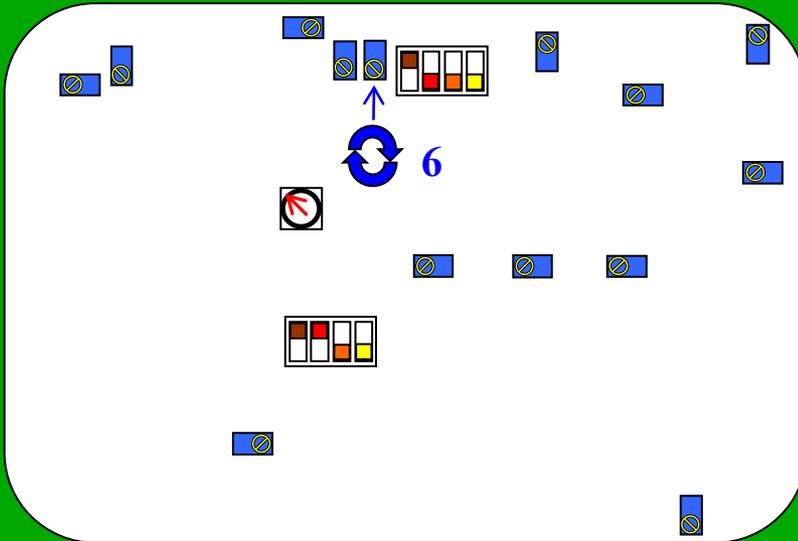
If two HT transformers are used for each generator (GX150-200R) they should be connected in exactly the same way



# Matching generator to treater station (cont)



## 3/4 – Obtain full power



1 – Press start button

2 – Increase power dial to MAX

3 – Adjust frequency dial until full power is displayed on digital meter.

If full power CANNOT be achieved the HT transformer tap must be changed (go to next step 4/4)

If full power is achieved (go to automatic frequency control set-up)

NOTE: If generator goes into mismatch (B) follow steps below

4 – Reset generator

5 – Move selector switch to REACTIVE power (↗)

6 – Adjust RV3 so reactive power meter reads 0.00 +/- 1.00 and continue from step 3.



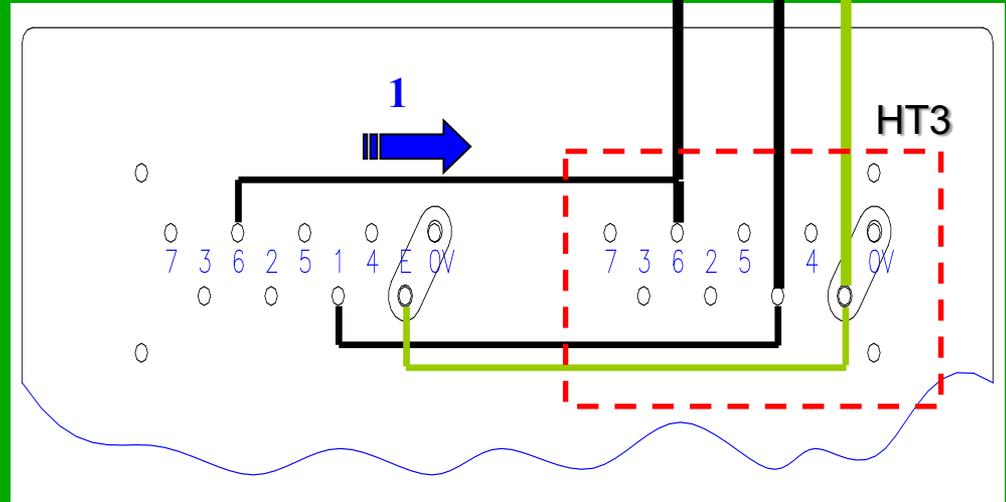
# Matching generator to treater station (cont)

## 4/4 Unable to achieve full power

### Caution

Ensure generator is switched off and isolated from the supply before commencing any work on the HT transformer

NOTE: The picture shows an HT8, an HT3 will only have one set of taps (dotted area)



If unable to achieve full power in the previous step (3/4)

1 – The HT transformer tap should be moved to the next lowest tap i.e. from tap 7 to tap 6.

The previous step (3/4) should then be repeated.

This should be repeated until full power can be achieved

If two HT transformers are used for each generator (GX150-200R) they should be connected in exactly the same way



# GENERATOR SETUP

AUTOMATIC FREQUENCY  
CONTROL



# Automatic frequency control



- The following steps show how to re-set the automatic frequency control
- This ensures the generator is running at its most efficient throughout the power range
- The automatic frequency control should be re-adjusted whenever a new control PCB or a new HT transformer is installed



## CAUTION

IN ORDER TO CARRY OUT THE FOLLOWING  
ADJUSTMENTS THE GENERATOR CABINET  
DOOR WILL NEED TO OPEN WHEN THE  
GENERATOR IS RUNNING

HIGH VOLTAGES ARE PRESENT INSIDE THE  
GENERATOR CABINET

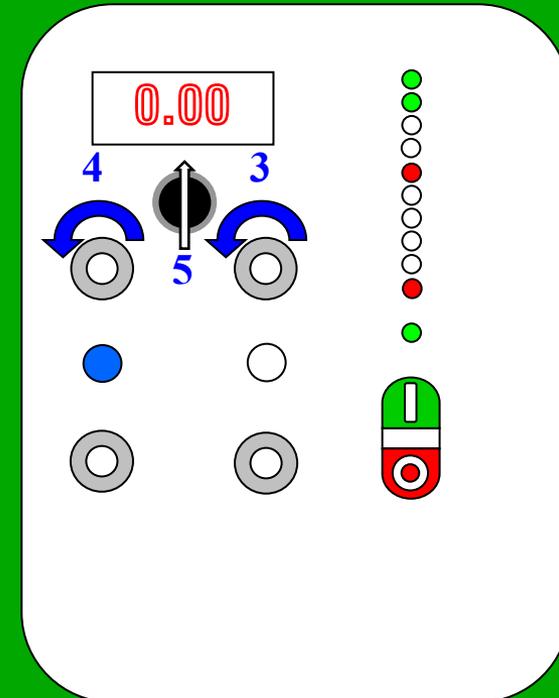
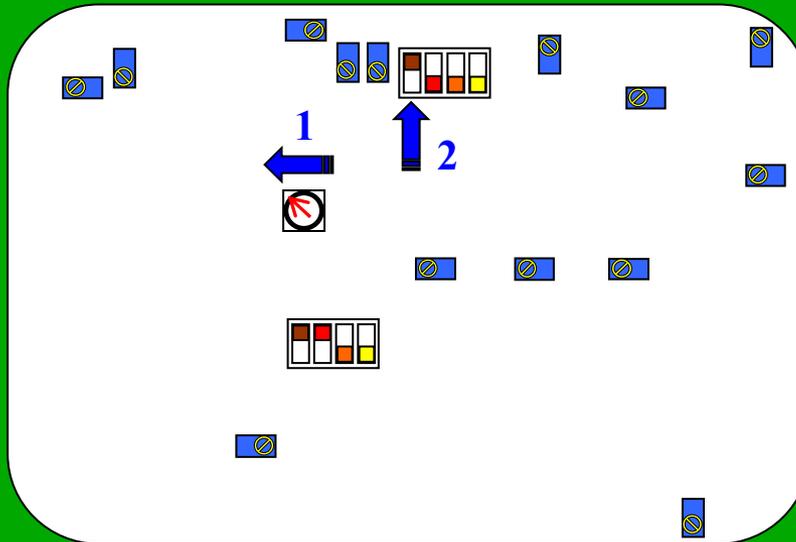
ADJUSTMENTS SHOULD ONLY BE MADE BY  
QUALIFIED PERSONNEL



# Automatic frequency control



1/4 - Generator into manual frequency & local control mode



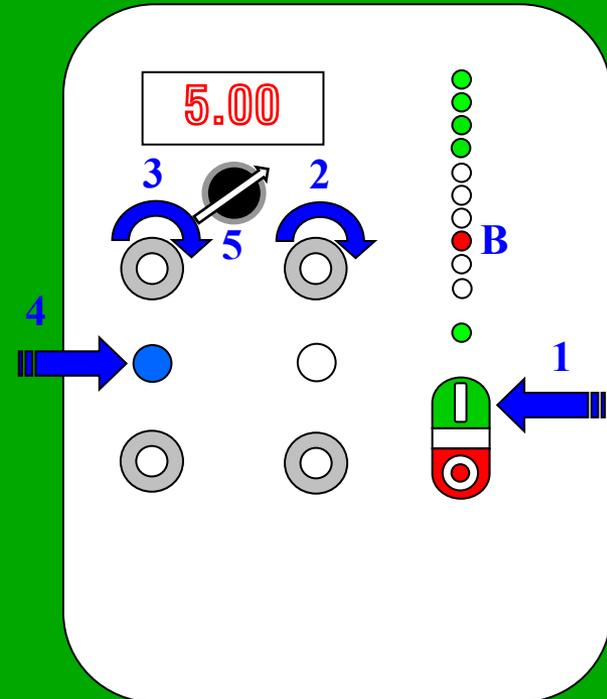
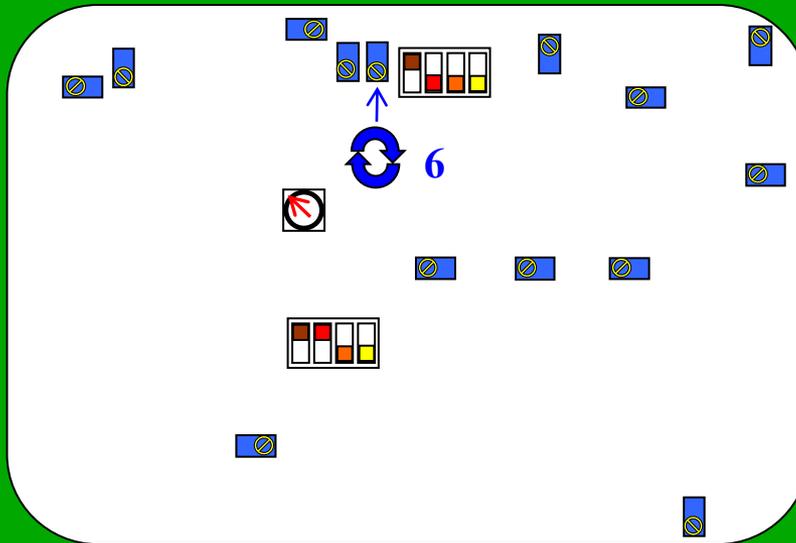
- 1 – Ensure SW2 is in position 1 (local control)
- 2 – Ensure SW1 A is in the UP position (manual frequency control)
- 3 – Turn power dial to zero
- 4 – Turn frequency dial to zero
- 5 – Ensure selector switch is set to TRUE power (↑)



# Automatic frequency control (cont)



2/4 - Obtain maximum power (manual frequency mode)



1 – Press start button

2 – Increase power dial to MAX

3 – Increase frequency dial until full power is displayed on digital meter

NOTE: If generator goes into mismatch (B) follow steps below

4 – Reset generator

5 – Move selector switch to REACTIVE power (↗)

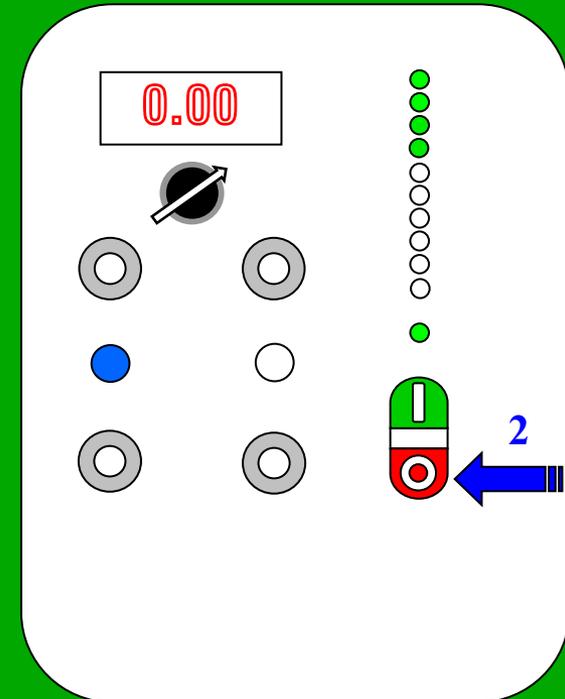
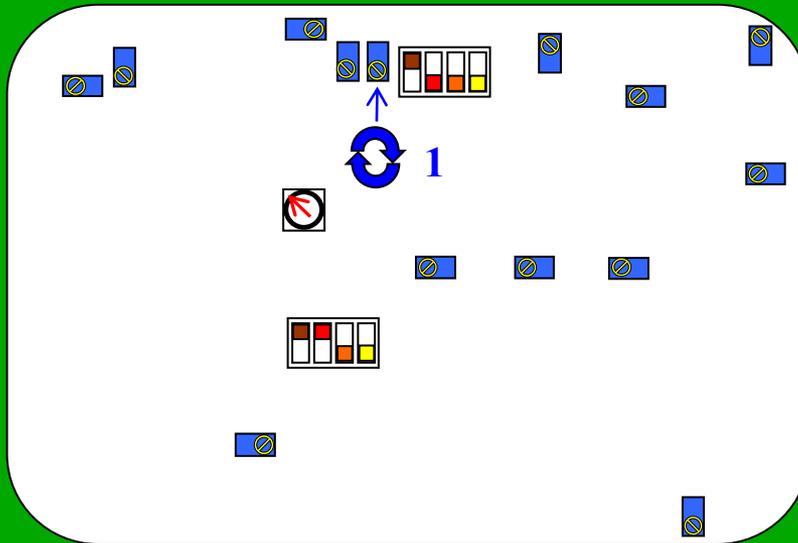
6 – Adjust RV3 so reactive power meter reads 0.00 +/- 1.00 and continue from step 3.



# Automatic frequency control (cont)



3/4 - Adjust reactive power to zero



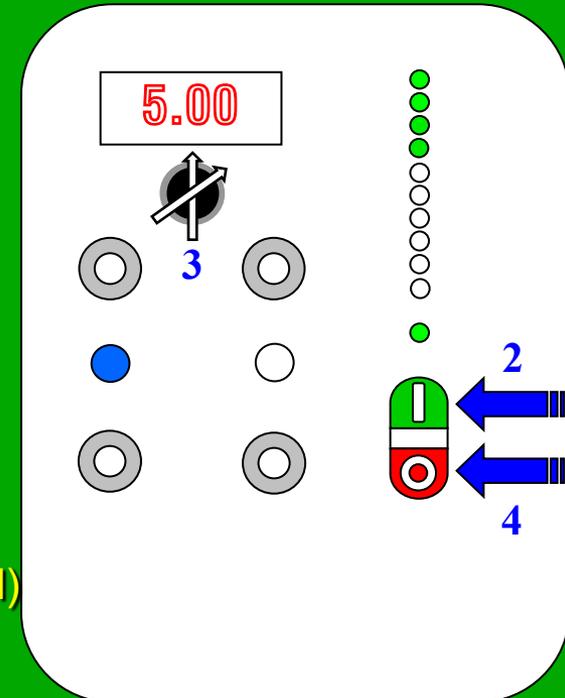
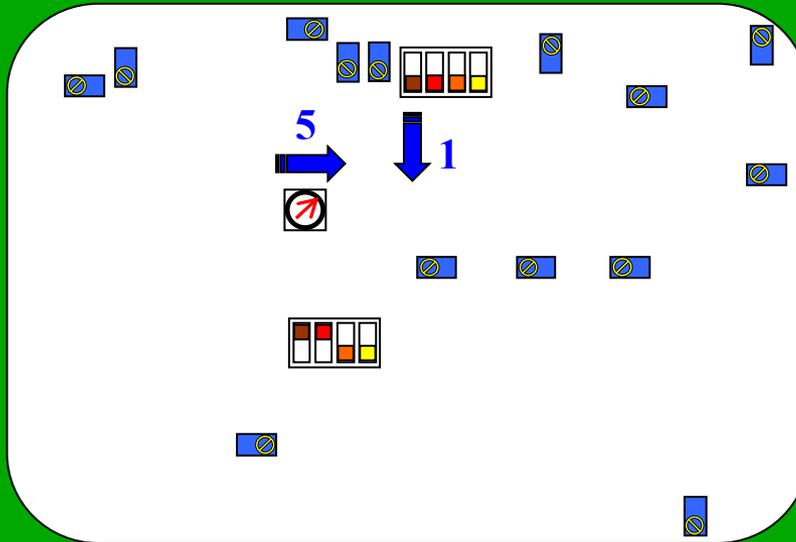
1 – Adjust RV3 until  $0.00 \pm 0.03$  is shown on Reactive power meter (A)

2 – Press stop button



# Automatic frequency control (cont)

4/4 - Generator into automatic frequency mode & achieve full power



1 – Put SW1 A in the down position (auto frequency control)

2 – Press start button,

3 – Using selector switch ensure digital meter reads full power & reactive power reads 0.00 +/- 0.05. If not return to step 2/4.

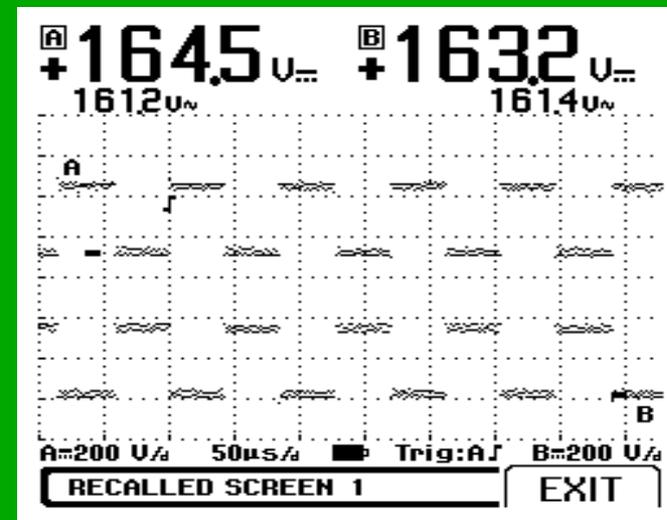
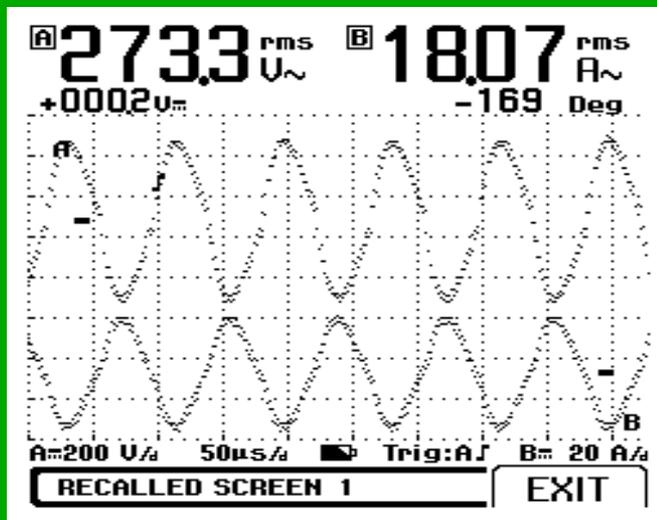
3 – Press stop button

4 – Put SW2 back into original position as required (1 local, 2 proportional, 3 remote)

Automatic Frequency control setup is now complete



# TROUBLE SHOOTING & FAULT FINDING

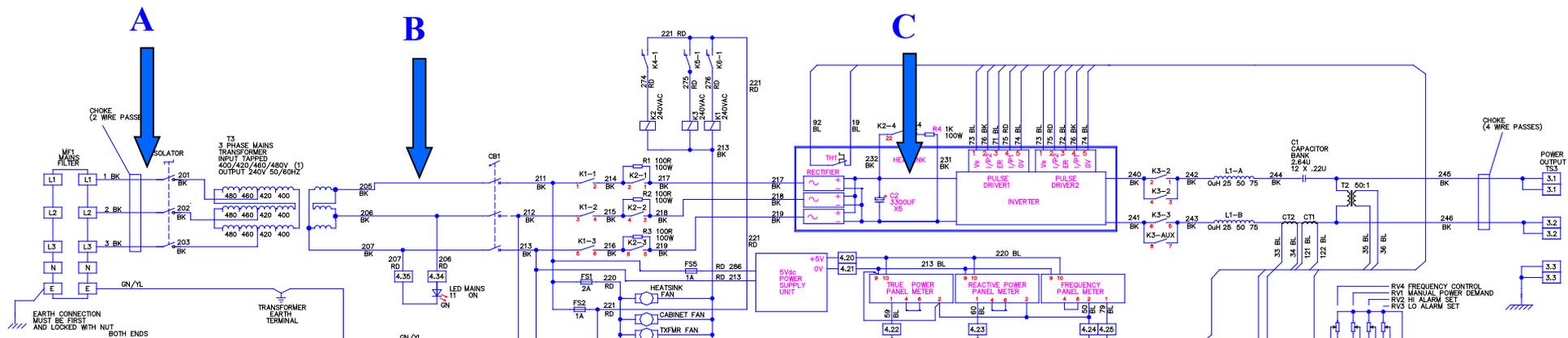




# Generator circuit overview



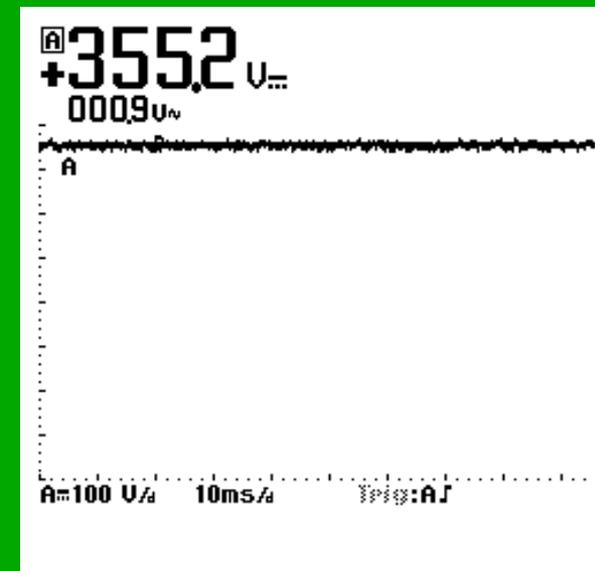
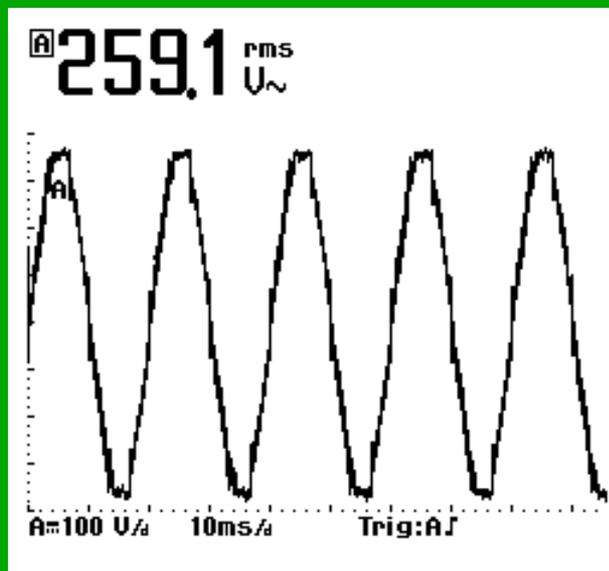
## Key Voltages & waveforms



A – Site supply 380-420v  
AC 50/60 Hz

B – 240v AC 50/60Hz

C – 330v +/- 10% DC

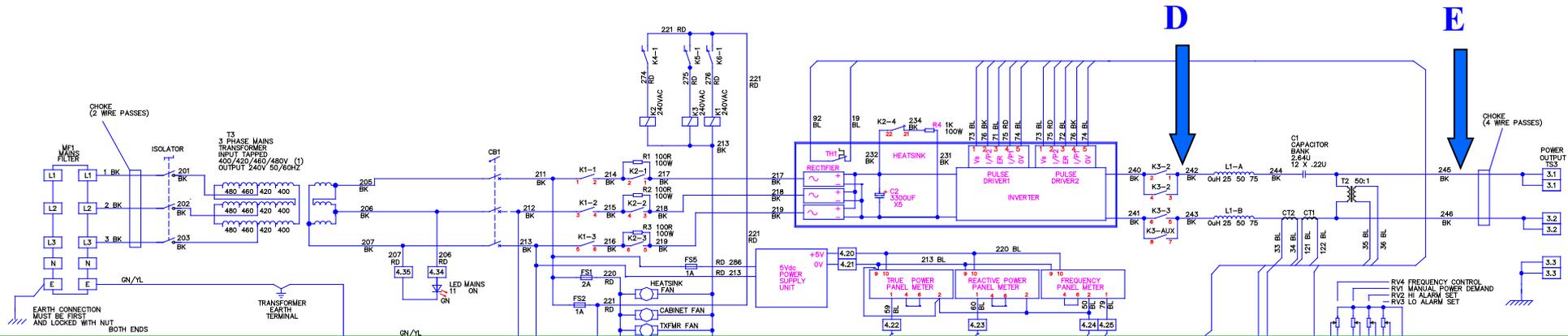




# Generator circuit overview

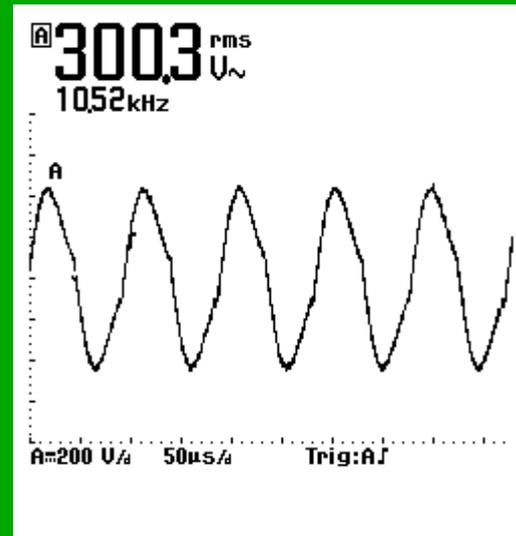
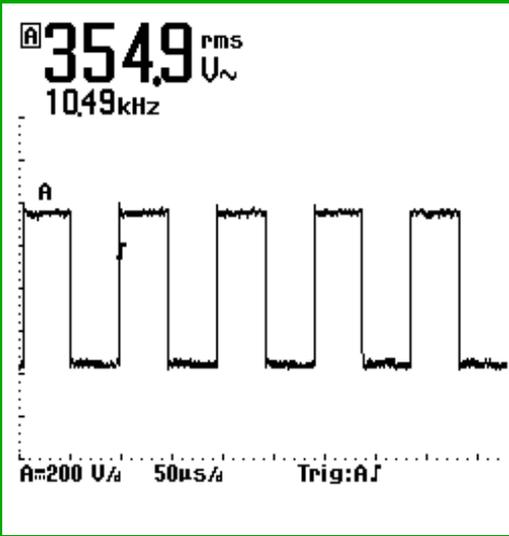


## Key Voltages & waveforms



D – 330v +/- 10% DC (switched)

E – 250-550v 10-25 kHz AC (Load dependent)





# TROUBLE SHOOTING & FAULT FINDING

Front Panel Status Indicators



# Trouble shooting

## Status indicators – Up To Speed



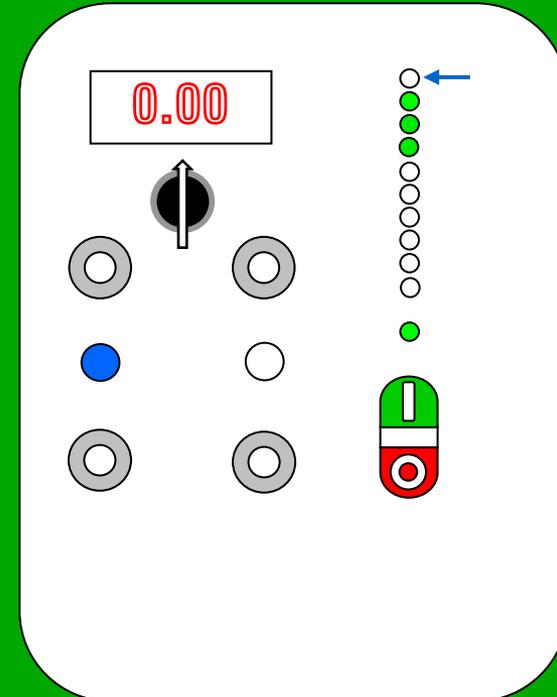
① Generator NOT up to speed



Generator will not treat

### Causes

- I. Ensure line is up to speed – Adjust RV13 ↻ to make generator treat at a lower line speed
- II. If line speed is monitored externally i.e. PLC – Ensure SW3 B is in the up position “UTS override”
- III. Sensor not sensing – Ensure magnetic sensor is 5-10mm away from magnets or inductive sensor is 1-2mm away from sensing disc – Check LED3 B for pulses
- IV. Faulty sensor – Replace sensor
- V. Fault on control PCB – See circuit A2/500001/05 (1,8 / 16)





# Trouble shooting

## Status indicators - Interlocks



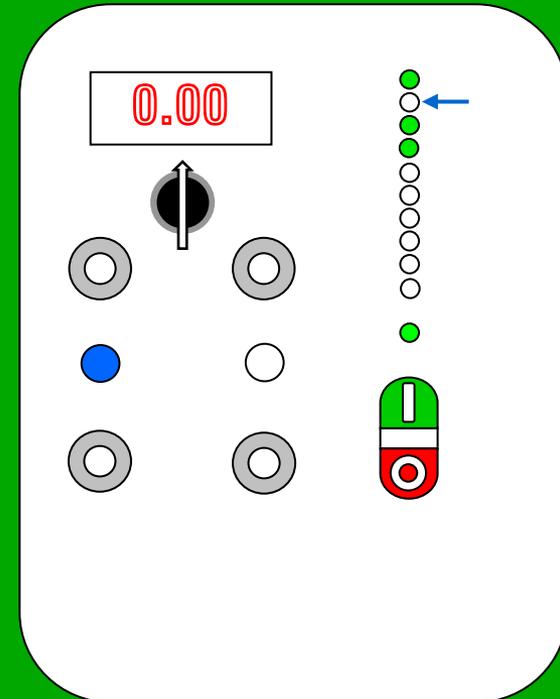
- ❗ Interlock circuit open
- 🎬 Generator will not start

### Causes

- I. Interlock circuit open – Check all doors, hoods, electrodes, airflow switches, E-stops etc – Ensure all switches are closed

Check circuit diagram “treater installation” supplied with the treater station

- II. Remote stop signal open (if applicable) – Ensure the remote stop contact is closed





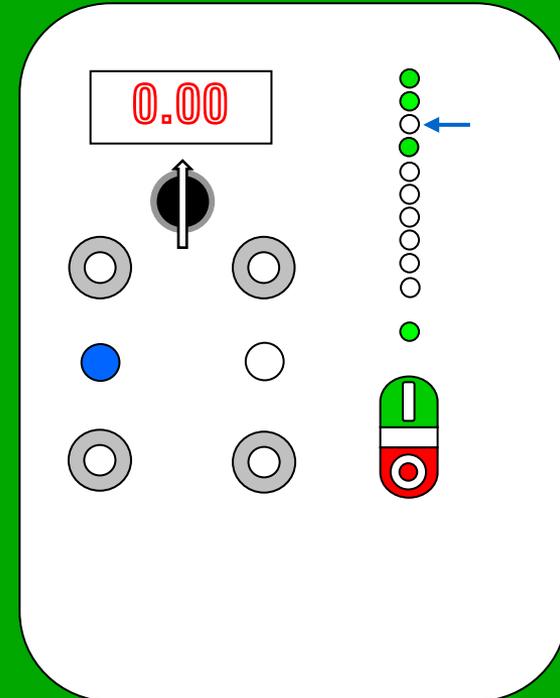
# Trouble shooting

Status indicators – Treat on

- ① Generator is on but no corona present
- 🎬 Indicator only

## Causes

- I. Power is set to minimum – Increase power
- II. Generator in standby – Ensure UTS is OK
- III. Generator in skip mode – Ensure no skip signal is present
- IV. HT transformer has failed – Check fault finding HT transformer
- V. Fault on control PCB – See circuit A2/500001/05 (1,8 / 16)





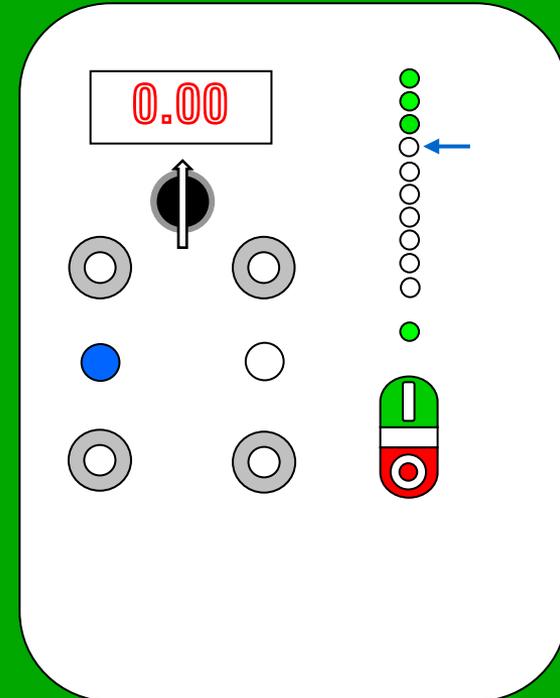
# Trouble shooting

## Status indicators – Inverter supply

-  Generator off
-  Indicator only

### Causes

- I. Generator has not been started – Press start button
- II. Fault on control PCB – See circuit A2/500001/05 (1,8 / 16)





# Trouble shooting

## Fault indicators - Shutdown

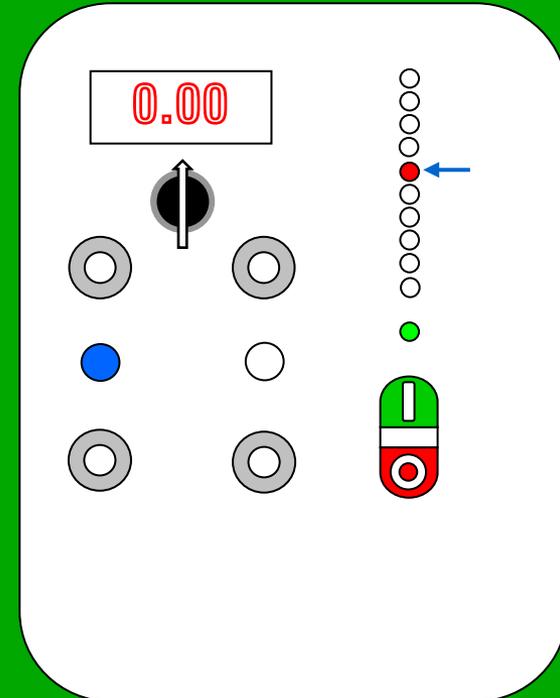


① Generator is stopped or in standby

🎬 Indicator only

### Causes

- I. Generator has not been started – Press start button
- II. Generator in standby – Ensure UTS is OK
- III. Generator is in skip mode – Ensure skip contact is closed
- IV. Fault on control PCB – See circuit A2/500001/05 (1,8 / 16)





# Trouble shooting

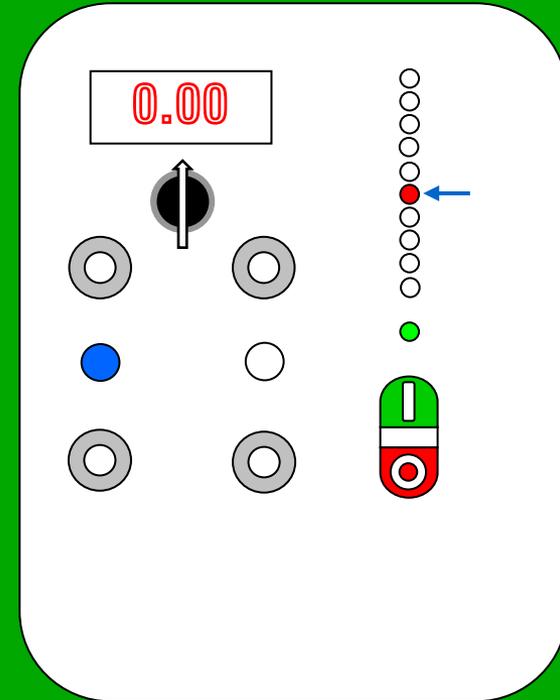
## Fault indicators - Overtemperature



- ① Inverter heatsink assy is to hot
- 🎬 Shuts down generator

### Causes

- I. Heatsink cooling fan failed – Check fan is free to rotate
- II. Heatsink cooling fan supply failed – Check FS1
- III. Filter panels blocked – Check & clean filter panels in generator door
- IV. Ambient air too high – Extra cooling may be required
- V. Generator not correctly matched to treater station – Carry out matching procedure
- VI. Frequency too high – Try re-tapping HT transformer to a lower tap and re-match





# Trouble shooting

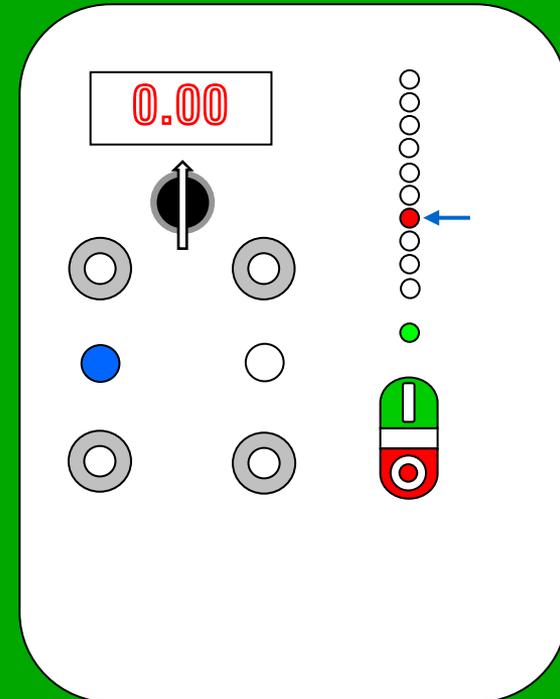
## Fault indicators - Overcurrent



- ① Generator output current is too high
- 🎬 Shuts down generator

### Causes

- I. Problem with treater station - Check for signs of arcing inside treater station, especially on insulators & HT connections
- II. Problem with treater roll - Check for pin holes in roll coating
- III. Generator not matched correctly - Carry out matching procedure
- IV. HT transformer incorrectly tapped - Try re-tapping HT transformer to a higher tap
- V. Fault with HT transformer - Carry out transformer test





# Trouble shooting

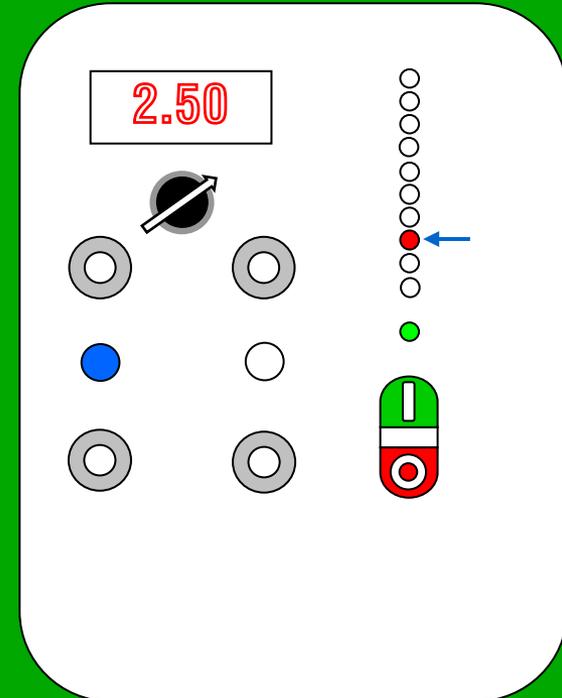
## Fault indicators - Mismatch



- ① Reactive power kVAR too high / low
- 🎬 Shuts down generator

### Causes

- I. Problem with treater station - Check for signs of arcing inside treater station, especially on insulators & HT connections
- II. Problem with treater roll - Check for pin holes in roll coating
- III. Generator not matched correctly - Carry out matching procedure
- IV. Fault with HT transformer - Carry out transformer test





# Trouble shooting

## Fault indicators – High / Low Alarm

- ① Generator output power is running below / above alarm threshold
- Indicator only

### Causes

- I. Alarm dials incorrectly set - Reset dials so output power is within alarm limits
- II. Generator output power low / high - Check output power levels are correct
- III. Fault on control PCB – See circuit A2/500001/05 (8 / 16)

