PAB ELECTRONICS LTD.

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SUB CONTRACT ELECTRONIC ASSEMBLIES

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Converter Ringing 17A Installation and Operating Procedure

Installation Instructions

1. Remove front cover to expose terminal block.

2. Connection to supply should be as follows -

TB1 - Fused 50 V Battery

TB2 - Ring Return

TB5 - OV Earth

TB6 - OV Alarm - This should be seperate to the OV supply, so that a failed supply will indicate an alarm.

TB7 - Alarm output

TB8 - Ring start (Active when earthed)

TB10,TB11 - Port A Continous ring current

TB13,TB14 - Port B Cadenced ring current

TB16,TB17 - Port C Cadenced ring current

TB19,TB20 - Port D Cadenced ring current

TB9,TB12,TB15,TB18 - Ring Return

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The converter ringing 17A provides four output Ports.

A,B,C.D.
With ring start active i.e Earth on.

Port A supplies 100V RMS 25 HZ Continuous ring current.

Port B,C D, each supply 100V RMS 25 HZ Cadenced. Earth backed ring current.

The four output Ports will supply upto 12 Watts of total power.

At 90 - 100V RMS, overload detection will occur at 14 Watts, and the unit will Trip out.

Port B will be the first cadenced port to go active after the ring start has been acknowledged this is then followed by port C and then port D, at this point the cycle repeats.

If ring start goes inactive then all ports will be shut down, when ring start goes active again the first cadence port to be put on line will be port B irrespective of the point at which the cycle ended.

Whilst the ringer is running it will be monitoring the ports for fault conditions, the ringer will monitor the AC and DC status of the ports in the event that a port is deemed to be faulty it will be switched off for sixty seconds,however the other ports will remain in operation. For example if port B were found to be in distress this port would be shut down,but ports A,C and D will remain working.

Atthe end of the sixty second period the faulty port is reactivated and if no futher problem exists the port will remain in service, if however the fault remains the port willagain be closed down for a sixty second period and this cycle of close down and re-test will continue until the engineers intervention.

The ringer unit also has a boot phase this takes the form of a warm boot, and a cold boot, cold boots occur when the unit is first powered and the warm boot occurs when the unit generates a reset signal whilst it is running.

COLD BOOT

At power up the unit will carry out a check sum test on its EPROM. In the event that the check sum fails then the leds will flash long green flash short red flash this will continue as long as power remains on the unit.

The processor also runs a RAM check which carries out a RAM test if the RAM fails then there is a long flash on the RED led and a short flash on the green led and again this will continue for as long as there is power on the unit.

Note that during the phase where either RAM or EPROM fail routines are being run the alarm is flagged active.

The output transistors will be disabled during the boot period so that the surge currents are as small as possible.

The front panel LED's will be flashed together so as to indicate to engineers that the power is on the unit, in the event of RAM or EPROM failure the messages change as described above.

Cont'd

COLD BOOT Cont'd.

During this phase the processor will initialise as required.

Cold boot will also set a delay flag which will prevent the ringer becoming active for four seconds after the initialisation this will prevent the ringer providing distorted ringing to the customers as it will take some cycles beyond initialisation to establish the output stage in stable configuration.

WARM BOOT

If a warm boot occurs a reset is generated by the logic the start is as for cold boot but with the exception that the period where both LED's flash together is eliminated this shortens the return to active service.

STANDBY MODE

Once boot is complete if the ring start line is not active and the alarm memory bit is not set then the green led will flash to indicate the the unit is ready and in standby mode, the red LED will be extinguished.

If the alarm memory bit is set then the green led will be extinguished and the red LED will be flashing indicating that the unit is in the standby and that the alarm condition has occured.

ACTIVE MODE

If the ring start line is active, and the output stage is generating 25Hz and the alarm memory is not set then the green led will be solid and the red LED will be extinguished.

If the alarm memory bit is set then the green led will be on and solid and the red LED will be flashing.

ALARM

If a fault is detected then the alarm is flagged and the red LED will illuminate (solid) the green LED will follow the status of the ring start line. The green LED will flash if the fault is being caused by the loss of the output stage. The solid red LED will persist for sixty seconds along with the alarm signal if the fault relates to an output port. At the end of the sixty seconds the red Led will flash indicating that a failure has occured and four seconds after that providing that the fault is not reconfirmed the alarm will be released. The sixty second fault cycle will not be influenced by the status of the ring start line.

If port B was causing the alarm cycle to be run then forty seconds into the alarm port C flagged a fault then the red LED would remain solid for sixty seconds from the start of port C fault detection and this would appear to be 100 seconds after the start of the port B fault. However port B will still be returned to serivce after the shut down period of sixty seconds.

In the unlikely event that the ports failed in rotation the alarm signal and the red LED would appear to be continous.

Note that four seconds after the last shut down period was complete the alarm signal will be released.

Cont'd

After the sixty second period the red LED will flash indicating that a fault has occured. This memory will persist unless the power is removed or a warm boot occurs.

The alarm memory bit can also be reset by the operator as described below.

Having signalled an alarm the engineers arrive to determine which piece of equipment has caused the problem and find that the ringer has a flashing red LED indicating that some sort of failure has occured. The problem now is what caused the fault.

RESET SWITCH

If the reset button is pushed then the ringer will go into diagnostic display routine. All functions of the ringer are preserved, however the LED's will indicate the status of the ringer unit as far as faults are concerned.

There are five messages, each message is punctuated by a short pause with both LED's off, at the end of the message cycle there is a long pause of both LED's off and if the reset button is pushed during this period it will be acknowledged by both LED's coming on at once and when released the unit will return to normal operation and the alarm memory bit will be reset (flashing red LED will cease).

The messages take the form as follows:-

One flash port A
Two flashes port B
Three flashes port C
Four flashes port D
Five flashes output stage fail

If port C experiences some distress then the message cycle would be as follows:-

One flash on the green LED (Port A Ok)
Short break (both LED's off)
Two flashes on the green LED (Port B Ok)
Short break (both LED's off)
Three flashes on the red LED (Port C fault)
Short break (both LED's off)
Four flashes on the green LED (Port D Ok)
Short break (both LED's off)
Five flashes green LED (Output stage Ok)
Long break end of cycle

At the end of the cycle if the reset button is pushed then both LED's come on to acknowledge the reset button and the LED's are returned to normal function.

There are eight possible output faults these are:-

AC overload port A
AC overload port B
AC overload port C
AC overload port D
DC overload port B
DC overload port C
DC overload port D
AC fail output stage

Cont'd

In all but output stage failure the sixty second shut down programme applies.

If the output stage fails this is sensed via the zero crossing detector. If it fails to detect zero crossing, after a number of cycles, then it is said to have failed. When the output stage returns this will be detected and the unit will restore itself to normal operation, the output delay will be set allowing a four second window before the normal service is resumed allowing the output stage to stabalize. The alarm is set if output stage failure is detected and released if it is restored.