

ERROR SIGNAL UNIT UN1/99

See also UN14/7

Introduction

The error signal unit UN1/99 is essentially an integrator unit similar to the IN2/501 to which a restoration delay unit UN14/7 has been added. The complete unit UN1/99 is mounted in a CH1/12A chassis and has index pegs in positions 16 and 26. The UN1/99 is used in various automatic monitors in the MN2M series.

An alarm indicator lamp and a changeover relay, with contacts available for external use, are provided. These function when a voltage representing a fault condition is applied to the unit continuously, or intermittently but frequently, over a brief period. The purpose of the incorporated UN14/7 is to introduce a delay of about 15 minutes in the automatic resetting of the alarm circuit after the cessation of the fault condition. Some early models of the UN1/99 with serial numbers below 101 are fitted with non-standard versions of the UN14/7.

The UN1/99 can be used in situations where the operation of the alarm circuit initiates an executive action (such as a changeover to spare equipment), or where a succession of alarms may be undesirable. If the 15-minute delay is not required, it can be eliminated by linking pins 10 and 14 of the socket into which PLA on the unit is plugged. The UN1/99 then operates in the same way as the IN2/501.

Circuit Description (Fig. 1)

The external connections and the power supplies to the unit depend on the particular installation. In this description it is assumed that 0 volts is applied to PLA 11 and -24 volts to PLA 14.

In the normal condition the same voltage is applied to PLA12 as to PLA14, and in the trigger circuit containing TR4 and TR5 the second transistor is fully conducting, so that relay RLA is operated. Contacts RLA/1 provide a connection between the supply at PLA11 and board connector 10 on the UN14/7.

The unit is designed to accept, at PLA12, a voltage that is six volts positive relative to PLA14 if a fault condition is detected by preceding apparatus. When this voltage is applied, it causes C2 to receive an initial charge via C1, resulting in a step of voltage across C2, which then continues to charge through R4 if the fault condition persists or charges in steps through C1 if the fault condition recurs rapidly. The rise in voltage across C2 is conveyed by the compound emitter follower TR1 - TR3 to the base of TR4, causing this to conduct and cut off TR5, releasing RLA. Contacts RLA/1 open the circuit between PLA11 and connector 10 on the UN14/7 which then changes to the alarm state; this includes lighting the lamp LP1 in the press-button key on the UN1/99 panel and the operation of changeover relay contacts which are available for external use via PLA pins 7, 8 and 9 on the UN1/99.

When the fault condition ceases and PLA12 returns to the same voltage as PLA14, the UN14/7 introduces a delay of about 15 minutes before extinguishing LP1 and returning its relay facilities to normal. The delay can be (i) curtailed by operation of KA, the press-button key on the front panel, or (ii) eliminated or curtailed by a link or switch which may be connected externally between PLA pins 10 and 14.

The UN14/7 can be modified so that it does not automatically return to normal from the alarm state after a delay but only if there is manual operation of KA or a corresponding external switch. See the Instruction for the UN14/7.

If supplies are applied to a UN1/99 after having been withdrawn, the UN14/7 remains in the alarm state for about two minutes before automatically changing to normal. This delay can be eliminated or curtailed in the same way as the fifteen-minute delay after a fault voltage has been removed from PLA12. Whenever the UN1/99 is powered, except during the initial two-minute delay, a voltage is available between PLA pins 6 and 11 for external auxiliary applications; for details see the Instruction for the UN14/7.

An external switch can be connected between PLA pins 13 and 14 to short-circuit the output of TR1 - TR3 and so make the UN1/99 unresponsive to a fault voltage applied to PLA12.

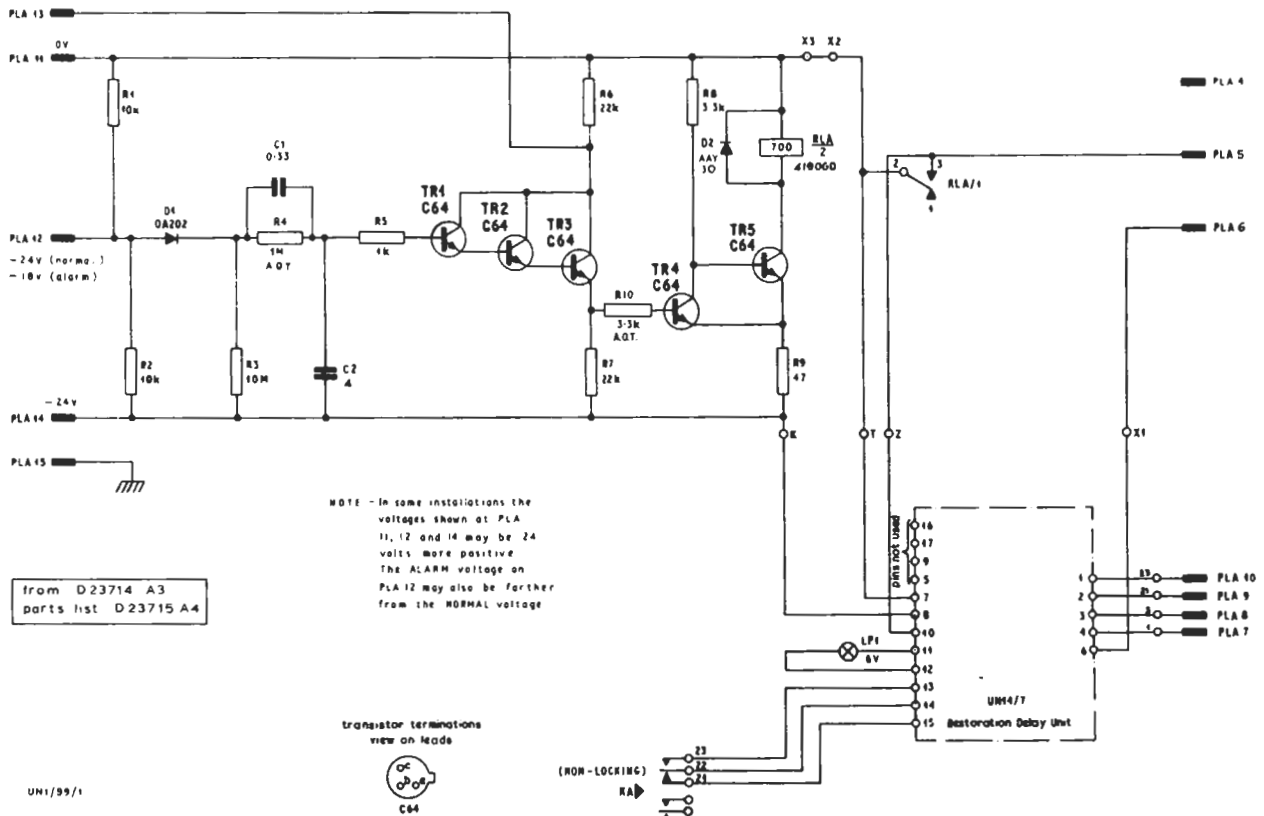


Fig. 1. Circuit of the UN1/99

Adjustment and Testing

The following applies to a UN1/99 that is fitted with a UN14/7, and serves to check the performance of that unit as well as the complete UN1/99.

Power Supply

Tested separately, the UN1/99 requires a floating 24-volt d.c. supply connected to PLA14 (negative) and PLA11 (positive). The unit may take up to 130 mA, including current taken by the UN14/7.

Adjustment

1. Commence without any external connection or link to PLA12, so that PLA12 takes up a positive potential relative to PLA14 through the internal circuit of the unit. The lamp in the front-panel press button should be alight. Connect an Avometer 8, on its 25-volt range, to PLA14 (negative) and PLA5 (positive).
2. Link both PLA12 and PLA13 to PLA14. Check that the Avometer reads the supply voltage, indicating that RLA has operated. Press the front-panel button and check that its internal lamp goes out.
3. Remove the link between PLA13 and PLA14. Then remove the link between PLA12 and PLA14, and check the time between removing this link and the release of RLA.
This should be between 1 and 1.5 seconds, measured on a stop-watch. If necessary, adjust the value of R4 on the main UN1/99 board.
4. With PLA12 open-circuited, as in step 1, connect PLA13 to PLA14 and then disconnect PLA13

again. Measure the time between disconnecting PLA13 and the release of RLA. This should be shorter by less than one second than the time measured in step 3.

5. Link PLA12 to PLA14 and measure the time until RLA operates. This should be between 5 and 8 seconds. If necessary, adjust the value of R10 on the main board of the UN1/99.
6. Continue with the following test procedure.

Test Procedure

As a check on the proper functioning of a unit which has previously been adjusted, the following tests may be made.

1. Commence with the power supply for the unit off. Ensure that PLA12 will receive a normal-condition voltage (i.e. the same as PLA14), if necessary by linking PLA12 and PLA14, and then apply power to the unit. The lamp in the front-panel press button should light initially, and then extinguish after a period of 100 ± 30 seconds.
2. Remove any external connection or link to PLA12 so that it can take up a positive potential relative to PLA14 (through the internal circuit of the unit). The front panel lamp should light in 1 to 1.5 seconds.
3. Return PLA12 to the same voltage as PLA14. The front panel lamp should now extinguish after a period of 15 ± 5 minutes. (Note that for this test to be valid the unit must be powered continuously from step 1.)

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