Chapter 2

OVER-VOLTAGE UNIT (GRAVINER EXPLOSION PROTECTION SYSTEM)

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LEADING PARTICULARS

Over-voltage unit	*Ref. No.* 27*N*/163
Cold cathode valve	*S.T.C. CV*3524
◀ *Tripping voltage*	159 ± 3*V* ▶
Overall length	5 *in.*
Overall width	2·5 *in.*

Introduction

1. The over-voltage unit (*fig.* 1) is a component in the Graviner explosion protection system. It is in effect an electronic relay which trips in the event of the power pack output voltage exceeding the desired limit.

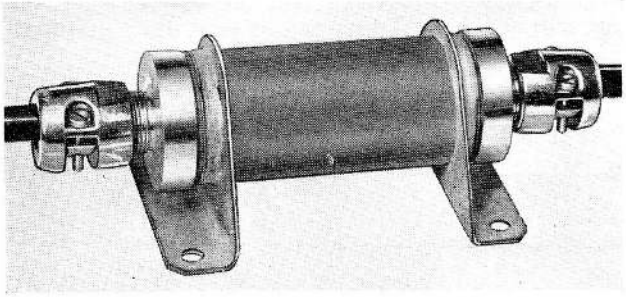

Fig. 1. Over-voltage unit

2. This chapter gives details of the over-voltage unit only and for further information on the explosion protection system as a whole, reference should be made to A.P.4343, Vol. 1, Sect. 22.

DESCRIPTION

3. The active components of this unit consist of six resistors, a 300 pF capacitor and a cold cathode triode valve. These components are contained within a tubular body, completely filled with resin which fully insulates the components and protects them against mechanical shock.

4. The connecting leads are brought in at either end of the tubular body via circular screwed end caps. Cable clamps, which screw on to the end caps, prevent unwanted rotation of the cables thereby obviating the risk of broken connections inside the unit.

OPERATION

General

5. It is extremely important that the power pack employed in the explosion protection system should not deliver a voltage in excess of 14 per cent above the normal level of 142 volts. The over-voltage unit ensures that this upper limit is never exceeded.

Over-voltage tripping

6. The over-voltage unit is inserted in the output lines of the power pack, between the power pack and the detector(s). The two 22K resistors (*fig.* 2), connected across the +142 volt power pack output, form a potential divider, the mid-point of which supplies the grid voltage of the cold cathode valve. These resistors, together with the trimming resistor provide sufficient potential at the mid-point to trigger the valve when the power pack output voltage is 159±3 volts.

7. After the valve fires, the d.c. resistance of the valve is reduced to such a value as to cause the trip circuit to be energized sufficiently for the relay in the power pack to drop off. This causes the power pack to trip out.

Power pack matching

8. In addition to ensuring that the power pack output voltage does not exceed the desired limit, the over-voltage unit enables the power pack to be matched to the number of detectors installed in the system. This is achieved by suitably connecting the three output resistors contained in the unit.

9. The necessary connections are carried out on the output side of the over-voltage unit and Table 1 gives the cable cores to be connected.

Table 1

Cable interconnections

No. of detectors	*Interconnections*
1 and 2	Black to Green Black to White Blue to Yellow
3 and 4	Black to Green Blue to Yellow
5 and 6	Black to White Black to Yellow
7 to 9	Black to Yellow
10 to 12	Black to Green
13 to 14	Black to White
15	None

INSTALLATION

10. Two mounting brackets, situated one at each end, enable the unit to be bolted in any convenient position. Care should be taken to ensure that the cables from the over-voltage unit go to their correct units. The destination of the relevant cable is clearly etched on the top of the cylindrical body.

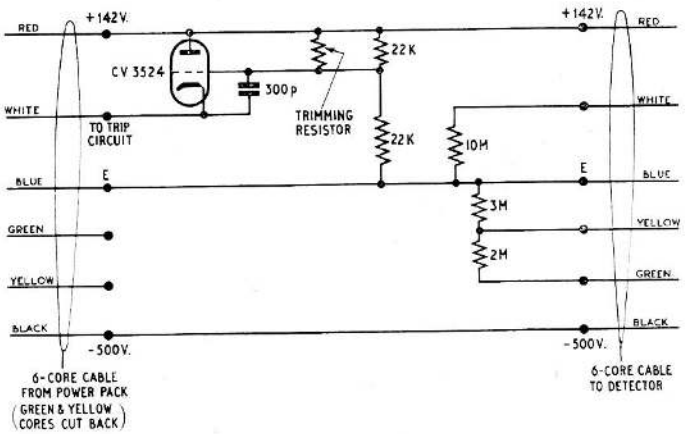

Fig. 2. Circuit diagram

SERVICING

11. Servicing of this unit should be restricted to a visual examination to ensure that the unit is secure and undamaged.

TESTING

12. A comprehensive test kit is available for testing each component of the Graviner explosion protection system including the over-voltage unit. Information on the test kit and the method of testing the various components will appear in A.P.4343S, Vol. 1, Sect. 17.