

INSTRUCTIONS

GEK- 45316
Insert Booklet GEK-45307



TRANSFORMER DIFFERENTIAL RELAY
WITH PERCENTAGE AND HARMONIC RESTRAINT
TYPE STD29C
6 RESTRAINT CIRCUITS

POWER SYSTEMS MANAGEMENT DEPARTMENT

GENERAL  ELECTRIC

PHILADELPHIA, PA.

TRANSFORMER DIFFERENTIAL RELAY
WITH PERCENTAGE AND HARMONIC RESTRAINT

TYPE STD29C

INTRODUCTION

These instructions are a supplement to instruction book GEK-45307, which is attached. The combination of the two form the instructions for the Type STD29C.

DESCRIPTION
AND APPLICATION

The STD29C relay is a single phase harmonic restrained transformer percentage differential relay for the protection of high voltage rectifier transformers. This relay is similar to the STD15C, except that the harmonic restraint is provided by the second harmonic only so that the normal odd harmonic flowing in a rectifier transformer will not reduce the relay sensitivity. This harmonic selection is accomplished by precisely tuned filters. However, the change in harmonic restraint does not change the application or setting calculation as outlined for the STD15, except the STD29 relay is so designed that the harmonic restraint may be set at 15% minimum.

Figure 1 illustrates the outline and panel drilling for the STD29C(-)D drawout case.

Figure 2 illustrates the internal connections diagram for the STD29C.

Figure 3 illustrates the external wiring diagram for the STD29C relay.

Figure 4 illustrates the test circuit for the STD relays. Note polarity when connecting DC sources.

TESTING INSTRUCTIONS

The STD29C relay may be tested per the instructions in the attached instruction book. In addition, since the harmonic restraint can be set at 15% by adjusting R₂ such may be checked by adjusting the Id-c at 4.0 amps and the I₁ (current into relay) at 8.1 amps per the test circuit illustrated in Figure 4 with S2 switch closed to position "A".

A tolerance of + 1% is acceptable, thus if the relay operated within 14 - 16% harmonic current restraint for the 15% calibration, no attempt should be made to obtain a more precise setting.

The following expression shows the relationship between the percent second harmonic, the d-c component, and the by-pass current.

$$\% \text{ SECOND HARMONIC} = \frac{.212I_{dc}}{.45I_1 + 0.51dc} \times 100$$

By setting the Idc at 4.0 amps, and solving for the "% second harmonic" for 14 - 16%, the following by-pass current levels are required:

% H.R.	I ₁
14%	9.1
15%	8.1
16%	7.3

This matter is discussed in more detail in the attached instruction book under the paragraph "Harmonic Current Restraint".

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

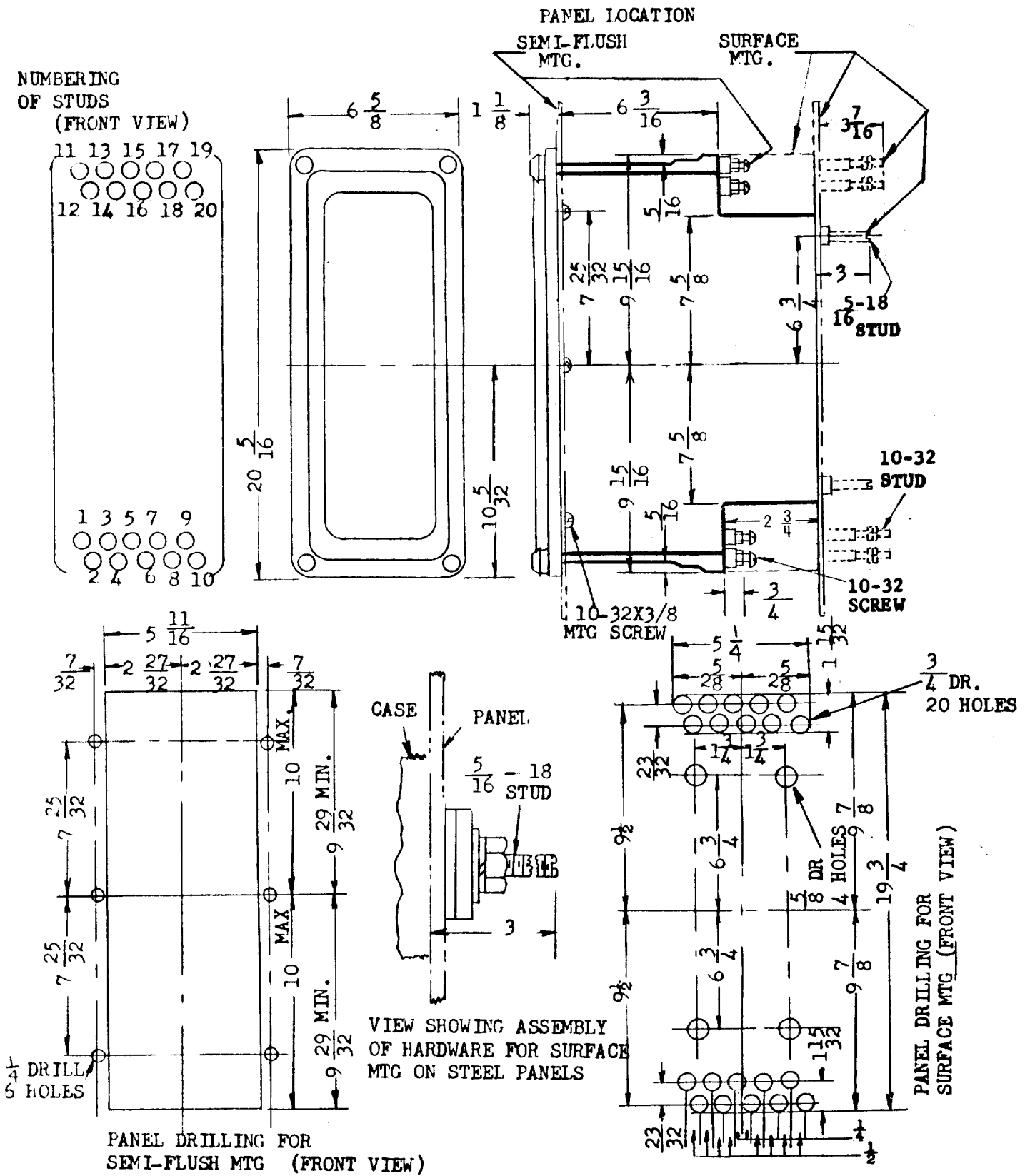


FIG. 1 (0178A7336-2) Outline And Panel Drilling Dimensions For The Large, Double Ended, Deep (L2D) Case Of The STD29C Relay

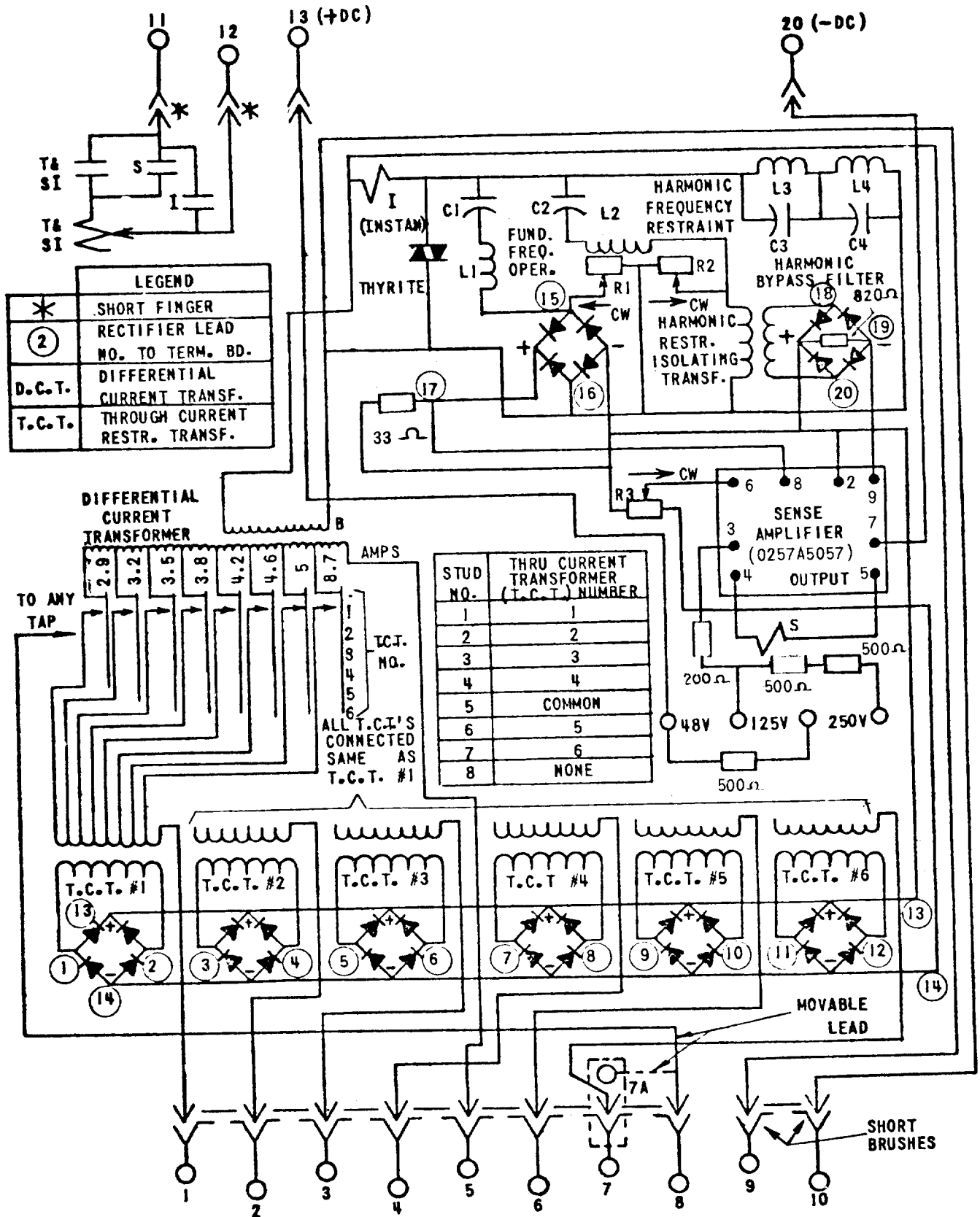


FIG. 2 (0257A5035-0) Internal Connections Diagram For The STD29C Relay

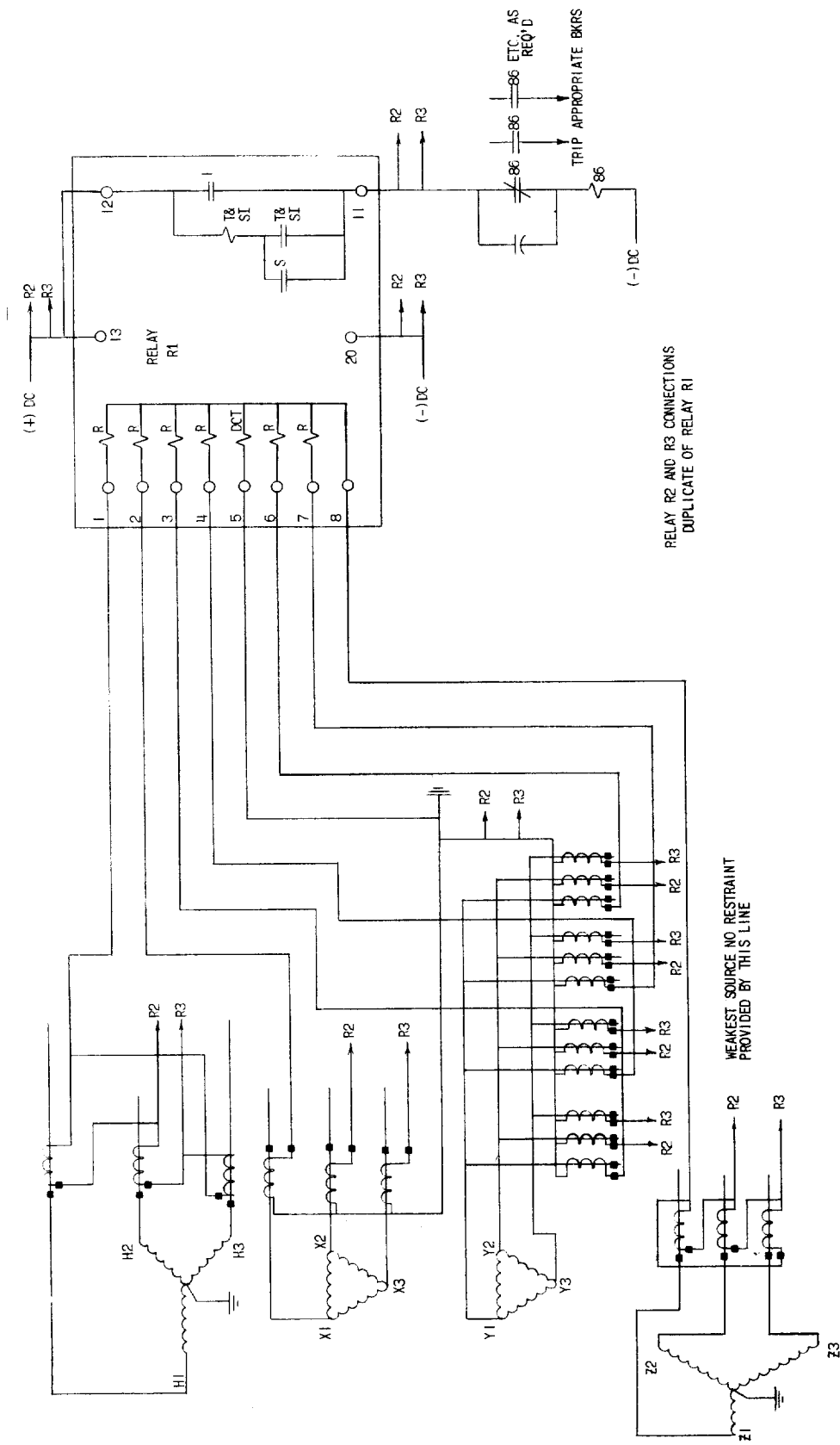


FIG. 3 (0165B2569-1) Typical External Connections Diagram For The STD29C Relay

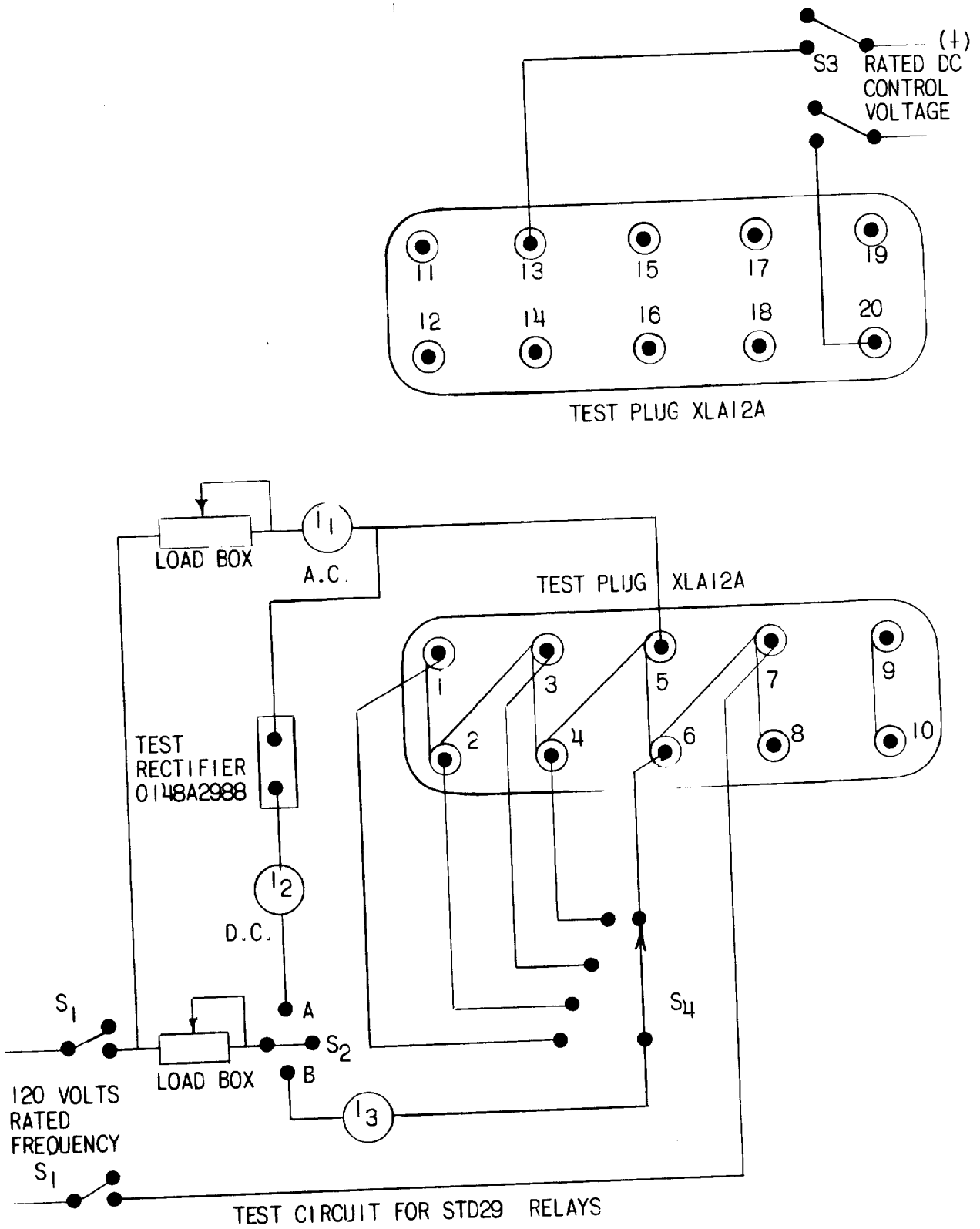


FIG. 4 (0246A2293-1) Test Connections Diagram For The STD29C Relay



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