



Technical Specification 48-4

Issue 5 2016

DC relays associated with a tripping function in
protections systems

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First published in 1976; second issue in 1980; third issue in 1983; fourth issue in August 2010.

Amendments since publication

Issue	Date	Amendment
Issue 5	February 2016	<p>Minor revision of issue 4 to:</p> <ul style="list-style-type: none">(i) reflect changes to the relevant referenced standards(ii) clarify the scope(iii) reference digital and numerical relays(iv) reformat the document to the latest ENA engineering template <p>NOTE: To avoid confusion due to the changes in the document template, the clause numbering below refers to this revision, issue 5. The clause numbering of issue 4 is given in brackets, where relevant, for cross referencing.</p> <p>This issue includes the following principal technical changes.</p> <p>Introduction. New section added to assist in understanding the purpose of TS 48-4.</p> <p>Clause 1 (Clause 1), Scope: Revised to clarify the intended scope of TS 48-4.</p> <p>Clause 2 (Clause 2), References: Updated. Now includes references to digital and numerical relays.</p> <p>Clause 3, Terms and Definitions: New section added. No specific definitions were given in TS 48-4 issue 4. Some of the definitions given are taken from BS EN 61810-1.</p> <p>Clause 4.2, Digital or numerical modules fitted to trip relays: Reference made to digital and numerical modules, if fitted.</p> <p>Clause 4.8 (Clause 3.2), Continuous operation: Partially reworded.</p>

		<p>Clause 4.9.2 (Clause 4.1), Timer: Clause reworded to include nominal relay voltage supply.</p> <p>Clause 4.10.2 (Clause 3.2), Operate and reset coils: Partially reworded.</p> <p>Clause 4.10.3, Nominal voltage of the operate and reset coils: New clause inserted.</p> <p>Clause 5.1, Rated voltage: Voltage ranges added.</p> <p>Table 1, Time delay for reduced power consumption on high burden relays changed from 30 ms to 60 ms.</p> <p>Clause 5.5 (Clause 5.2), Output contacts. Reference to L/R ratio changed to time constant.</p> <p>Clause 7, Test Requirements. Amended to reflect re-structuring of document and include sub-clauses for Type and Routine test.</p> <p>Clause 8, Assessment. New section added.</p> <p>Annex A, Schedule of requirements. New section added.</p> <p>Annex B, Conformance declaration. New section added</p> <p>Details of all other technical, general and editorial amendments are included in the associated Document Amendment Summary for this Issue (available on request from the Operations Directorate of ENA).</p>
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Foreword

This Technical Specification (TS) is published by the Energy Networks Association (ENA) and comes into effect from the date of publication. It has been prepared under the authority of the ENA Engineering Policy and Standards Manager and has been approved for publication by the ENA Electricity Networks and Futures Group (ENFG). The approved abbreviated title of this engineering document is “ENA TS 48-4”.

This document replaces and supersedes Technical Specification 48-4 Issue 4 2010.

This document details the functional, performance, interface and test requirements for protection trip relays to be used on the UK transmission and distribution systems. This document applies to all new installations.

Manufacturers should refer to the ‘Schedule of Requirements’ submitted by the purchaser as outlined in Annex A of this document.

Annex B of the document includes ‘Self Certification Conformance Declaration’ sheets to enable manufacturers to declare conformance or otherwise, clause by clause, with the relevant parts of the document.

Where the term “shall” or “must” is used in this document it means the requirement is mandatory. The term “should” is used to express a recommendation. The term “may” is used to express permission. Where the term “shall” is used in this document it expresses a requirement. The term “may” is used to express permission.

NOTE: Commentary, explanation and general informative material is presented in smaller type, and does not constitute a normative element.

Introduction

A protection system is usually required to operate main plant items in order to protect the electrical system from further damage.

The initiating protection relay may have a limited number of output contacts and those output contacts may have insufficient rating to safely energise and de-energise the operating mechanisms of main plant items.

In more complex schemes, it is common to install a separate trip relay to ensure that there are sufficient contacts available, that the contacts are of sufficient rating and that the trip pulse remains applied for sufficient duration.

Such trip relays can be either self reset (where the relay resets after a defined time has elapsed after the removal of the trip pulse) or electrically reset (where the trip relay latches into the operated position and requires an electrical reset pulse to restore it to the non-operated position). Occasionally a hand reset (latching) relay is used. This requires human intervention to physically change the state of the relay from operated to non-operated.

1 Scope

This Technical Specification specifies the design, performance, testing requirements and application of direct current auxiliary relays intended to act as independent trip relays. The trip relays will usually be initiated by the associated protection equipment. They are intended to provide fast, simultaneous, signals to the circuit-breaker and all associated protection, control and indication systems that require initiation following operation of the associated protection equipment.

It is intended to apply to relays on the transmission and distribution systems. It does not take into account the requirements at power stations.

This Technical Specification applies only to relays energised from d.c. supplies having nominal voltages of 30 V, 48 V and 110 V and which also may be used for energising circuit-breaker tripping and closing coils, or for heavy current intermittent duty.

Additional requirements are applicable to intertrip relays.

2 Normative references

The following referenced documents, in whole or part, are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Standards publications

BS EN 60255-1:2010, *Measuring relays and protection equipment. Part 1: Common requirements*

BS EN 60255-24:2001, *Electrical relays. Part 24: Common format for transient data exchange (COMTRADE) for power systems*

BS EN 61810-1:2015, *Electromechanical elementary relays. Part 1: General and safety requirements*

BS EN 61810-2:2011, *Electromechanical elementary relays. Part 2: Reliability*

BS EN 61850-3:2014, *Communication networks and systems for power utility automation. General requirements*

BS EN 62271-3:2015, *High-voltage switchgear and controlgear. Digital interfaces based on IEC 61850*

Other publications

[N1] ENA TS 48-5 Issue 5: 2015, *Environmental test requirements for protection and control equipment and systems*

[N2] ENA ER G79 Part 1 Issue 2: 2012, *Procedure for the conformity assessment of plant and products for use by the Energy Networks Association Member Companies*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

trip relay

auxiliary relay used to provide simultaneous signals to circuit breakers and all associated protection and control systems that require initiation following a protection trip operation

3.2

self reset trip relay

relay which, having responded to an energising quantity and having changed its condition, returns to its previous condition when that quantity is removed

[BS EN 61810-1: 2015, Clause 3.2.5]

NOTE: BS EN 61810-1: 2015, Clause 3.2.5 uses the term 'monostable relay'. The same definition has been used here for the term 'self reset trip relay'.

3.3

time delay self reset trip relay

self reset trip relay which, having responded to an energising quantity and having changed its condition, returns to its previous condition after a predetermined time following the removal of the energising quantity

3.4

electrically reset trip relay

trip relay which, having responded to an energising quantity and having changed its condition, remains in that condition after the quantity has been removed; a further appropriate energisation is required to make it change its condition

[BS EN 61810-1:2015, Clause 3.2.6]