

~~SUPERSEDED BY~~

AS 1029.1 - 1985^{DUP}

Under Revision see DR 83219 of Oct 1987

AS 1029, Part 1—1982
UDC 621.316.53

Australian Standard 1029, Part 1—1982

LOW VOLTAGE CONTACTORS Part 1—ELECTROMECHANICAL (up to and including 1000 V a.c.)



STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter



Represented on the committee which was responsible for the preparation of this standard were the following:

Australian Electrical and Electronic Manufacturers Association
Australian-British Trade Association
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Department of Defence
Department of Productivity
Department of Public Works, N.S.W.
Electricity Supply Association of Australia
Institution of Engineers Australia
Metropolitan Water Sewerage and Drainage Board, N.S.W.
Railways of Australia Committee
State Rail Authority of New South Wales
Testing Authorities

This standard, prepared by Committee EL/6, Industrial Switchgear and Controlgear, was approved on behalf of the Council of the Standards Association of Australia on 9 December 1981, and was published on 19 April 1982.

To keep abreast of progress in industry, Australian standards are subject to continuous review and are kept up-to-date by the issue of amendments or new editions as necessary. It is important therefore that standards users ensure that their standards are up-to-date. Full details of all SAA publications will be found in the Annual List of Australian Standards; these details are supplemented by listings in the SAA monthly journal 'The Australian Standard'. Information on the Annual List and 'The Australian Standard' may be obtained from any sales office of the Association, where details are also available of the current status of individual standards. Suggestions for improvements to published standards, addressed to the head office of the Association, are welcomed.

AUSTRALIAN STANDARD

LOW VOLTAGE CONTACTORS
Part 1
ELECTROMECHANICAL
(up to and including 1000 V a.c.)

AS 1029, Part 1—1982

| | |
|--|------|
| First published (as AS C63) | 1965 |
| Revised and issued as AS 1029 | 1971 |
| Second edition (AS 1029, Part 1) | 1982 |

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.

ISBN 0 7262 2455 3



1 4 APR 1982

PREFACE

This standard was prepared by a subcommittee of the Association's Committee on Industrial Switchgear and Controlgear, to supersede AS 1029—1974.

The title has been changed as this standard has now become Part 1 of a two-part standard for low voltage contactors to cover electromechanical contactors, with Part 2 covering semiconductor (solid state) contactors.

The technical content of this Part of the two-part standard has not been changed from the 1974 edition of AS 1029 which it supersedes. However slight changes of an editorial nature have been made and the references to other standards updated. Its format is aligned with that of AS 1202, A.C. Motor Starters (up to and including 1000 V).

This standard applies only to a.c. contactors rated up to and including 1000 V as these are the voltages covered by the International Electrotechnical Commission recommendations. (For higher voltages, refer to AS 1864, High Voltage Alternating Current Contactors.)

The standard is based on IEC 158-1, Low Voltage Controlgear, Part 1—Contactors, but differs from the IEC publication in that it does not apply to d.c. contactors. Furthermore, some technical requirements have been modified to suit Australian conditions. To indicate these changes a rule is shown in the margin alongside the affected clause, table or part thereof.

In the application of this standard reference may be necessary to the following documents:

| | | | |
|---------|--|-----------|--|
| AS 1023 | Thermal Protection of Electric Motors Part 1—Built-in Thermal Detectors and Associated Control Units Part 2—Thermal Overload Protective Devices Part 3—Inherent Overheat Protectors | AS 1136 | Switchgear and Controlgear Assemblies for Voltages up to 1000 V a.c. |
| AS 1029 | Low Voltage Contactors Part 2—Semiconductor (Solid State) (up to and including 1000 V a.c. and 1500 V a.c.) | AS 1202 | A.C. Motor Starters (up to and including 1000 V) Part 1—Direct-on-line (Full Voltage) Starters |
| | | AS 1930 | Circuit-breakers for Distribution Circuits (up to and including 1000 V a.c. and 1200 V d.c.) |
| | | AS 1939 | Classification of Degrees of Protection Provided by Enclosures for Electrical Equipment |
| | | AS 2184 | Moulded-case Circuit-breakers (up to and including 600 V a.c. and 250 V d.c.) (interrupting rating 10 kA and more) |
| | | AS 3100 | Approval and Test Specification for Definitions and General Requirements for Electrical Materials and Equipment |
| | | AS 3111 | Approval and Test Specification for Miniature Overcurrent Circuit-breakers |
| | | AS 3135 | Approval and Test Specification for Semi-enclosed Fuses for A.C. Circuits |
| | | AS C320 | Classification of Insulating Materials for Electrical Machinery and Apparatus on the Basis of Thermal Stability in Service |
| | | SAA MP19 | Report on Preferred Numbers and Their Use |
| | | BS 3781 | Method for Determining the Comparative Tracking Index of Solid Insulating Material |
| | | IEC 158-1 | Low-voltage Controlgear Part 1—Contactors |

© Copyright — STANDARDS ASSOCIATION OF AUSTRALIA 1982

Users of standards are reminded that copyright subsists in all SAA publications. No part of this publication may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing of the Standards Association of Australia.

CONTENTS

| | <i>Page</i> | | <i>Page</i> |
|--|-------------|---|-------------|
| SECTION 1. SCOPE AND GENERAL | | SECTION 6. STANDARD CONDITIONS FOR OPERATION IN SERVICE | |
| 1.1 Scope | 4 | 6.1 Normal Service Conditions | 13 |
| 1.2 Objects | 4 | 6.2 Shape and Symmetry of Voltages | 13 |
| 1.3 Safety Requirements | 4 | 6.3 Non-standard Conditions | 13 |
| SECTION 2. DEFINITIONS | | SECTION 7. STANDARD CONDITIONS FOR CONSTRUCTION | |
| 2.0 Application of Section | 5 | 7.1 Mechanical Design | 14 |
| 2.1 Definitions Concerning Contactors | 5 | 7.2 Enclosures | 14 |
| 2.2 Definitions Concerning Positions, Control and Auxiliary Circuits of a Contactor | 6 | 7.3 Temperature Rise | 14 |
| SECTION 3. CLASSIFICATION | | Table 7.1 Temperature-rise Limits for Insulated Coils in Air and in Oil | 15 |
| 3.1 Designation of Contactors According to the Method of Control | 7 | Table 7.2 Temperature-rise Limits for the Various Materials and Parts | 16 |
| 3.2 Grouping of Contactors According to the Interrupting Medium | 7 | Table 7.3 Frequencies of Operation for Coil Windings of Contactors | 16 |
| 3.3 Distinction According to Degree of Protection Provided by the Enclosure | 7 | 7.4 Dielectric Properties | 15 |
| SECTION 4. CHARACTERISTICS OF CONTACTORS | | 7.5 Limits of Operation | 15 |
| 4.1 Summary of Characteristics | 8 | SECTION 8. TESTS | |
| 4.2 Type of Contactor | 8 | 8.1 Testing | 17 |
| 4.3 Rated Values | 8 | 8.2 Verification of the Characteristics of Contactors | 17 |
| Table 4.1 Utilization Categories | 10 | 8.3 Type Tests | 17 |
| Table 4.2 Verification of the Rated Making and Breaking Capacities | 11 | Table 8.1 Value of Test Voltage | 18 |
| Table 4.3 Verification of the Number of On-load Operating Cycles | 11 | Table 8.2 Standard Cross-sections of Copper Conductors Corresponding to the Rated Thermal Current | 19 |
| 4.4 Control Circuits and Air Supply Systems | 10 | 8.4 Routine Tests | 21 |
| Table 4.4 Standard Values of Rated Control Circuit Supply Voltages, if different from that of the Main Circuit | 11 | 8.5 Special Tests | 21 |
| 4.5 Auxiliary Circuits | 10 | APPENDICES | |
| 4.6 Coordination with Short-circuit Protective Devices | 10 | A Information to be Supplied by the Purchaser | 22 |
| SECTION 5. MARKINGS | | B Clearance and Creepage Distance | 23 |
| 5.1 General | 12 | C Coordination with Short-circuit Protective Devices | 26 |
| 5.2 Essential Markings | 12 | D Conventional Test Circuit for Verification of Making and Breaking Capacities | 28 |
| 5.3 Other Markings | 12 | E R10 Series of Preferred Numbers | 31 |
| 5.4 Terminals for External Conductors | 12 | | |

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

**LOW VOLTAGE CONTACTORS—ELECTROMECHANICAL
(up to and including 1000 V a.c.)**

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard applies to contactors for industrial use, intended for closing and opening electric circuits.

It applies only to contactors, the main contacts of which are intended to be connected in a.c. circuits and the nominal voltage of which does not exceed 1000 V. (For d.c. applications reference should be made to IEC 158-1.)

Contactors intended for application in merchant ships may also need to comply with supplementary requirements.

This standard does not apply to contactors intended for installation in rail or road vehicles, or in aircraft.

D.C. contactors are not covered by this standard and where required should be subject to agreement between purchaser and manufacturer.

Semiconductor (solid state) contactors are dealt with in AS 1029, Part 2 for voltages up to and including 1000 V a.c. and 1500 V d.c. However this standard would apply to the electromechanical part of hybrid semiconductor contactors to AS 1029, Part 2.

NOTES:

1. For electromechanical contactors with a rated voltage exceeding 1000 V see AS 1864.
2. Contactors which are intended to provide short-circuit protection must additionally satisfy the relevant conditions specified for circuit-breakers (see AS 1930, AS 2184, AS 3111).
3. Where contactors are used in motor starters, reference should also be made to AS 1202.
4. Information to be supplied by the purchaser is listed in Appendix A.

1.2 OBJECTS. The objects of this standard are to state:

- (a) the characteristics of contactors;
- (b) the conditions with which contactors must comply with reference to—
 - (i) their operation and behaviour in normal operation;
 - (ii) their dielectric properties;
 - (iii) the degrees of protection provided by their enclosures;
- (c) the tests intended for confirming that these conditions have been met and the methods to be adopted for these tests;
- (d) The data to be marked on the apparatus.

1.3 SAFETY REQUIREMENTS. This standard does not include all the electrical safety requirements with which compliance may be necessary to secure approval for connection or sale of contactors. These matters are covered in AS 3100 and relevant approval and test specifications.