



**Summary of Substantive Changes  
between the  
2010 edition including Updates No. 1 and No. 2 dated September 2010 and August 2011  
and the 2013 edition of  
CSA C22.2 No. 14 “Industrial control equipment”**

**Presented to the IAPMO Standards Review Committee on December 9, 2013**

**General:** The changes to this standard might have an impact on currently listed products. The substantive changes are:

- Added requirements for Type F combination motor controllers (see Section 4.11 and Table 42).
- Added an allowable alternative method (Method B) for control of overvoltage (see Section 4.15).
- Added marking requirements for combination motor controllers and for equipment that achieve electrical spacing by Method B (see Sections 5.56 and 5.57).
- Changed the required performance criteria for short-circuit tests performed with fuses, inverse-time circuit breakers or instantaneous-trip circuit breakers (see Sections 6.11.5 and 6.11.6).
- Added requirements for overload relays as follows (see Sections 6.12.1).
- Added minimum clearances for reduced spacing (see Table 55).
- Added normative Annex D for pressure-sensitive floor mats.

Section 4 Construction:

Section 4.2, Frame and enclosure: Added requirements for thermal insulation as follows:

[4.2.6 Enclosure thermal insulation](#)

[4.2.6.1](#)

[Thermal insulation inside the enclosure shall be retained by a mechanical means that secures it to the enclosure walls.](#)

[4.2.6.2](#)

[Adhesives may be used, but shall not be the sole means of securement.](#)

[4.2.6.3](#)

[The spacings shall not be less than the clearance and creepage distances specified in Group A of Table 6 with the thermal insulation in place.](#)

Section 4.11, Protective devices: Added requirements for Type E and Type F motor controllers, as follows:

[4.11.1.2](#)

*Combination motor controllers of ~~Types A to D~~ Types A to F (see Table 42) using fuses, inverse-time or instantaneous-trip circuit interrupters, self-protected combination motor controllers, or motor short-circuit protectors..... as the motor branch-circuit overcurrent protection shall be evaluated in accordance with the applicable requirements for the specific protective device employed and shall be marked in accordance with Clauses 5.27 to 5.30, ~~and~~ 5.46, and 5.56. In addition, a combination motor controller, using motor short-circuit protectors, shall be evaluated to determine whether it is suitable for the intended purpose (see also Table 41).*



Section 4.15, Electrical spacings: Added title and revised subsection numbering for Method A and added an alternative method (Method B) for control of overvoltage as follows:

[4.15.2 Clearances with controlled overvoltages \(Method A\)](#)

~~4.15.2~~ [4.15.2.1](#)

*The electrical spacings...*

~~Note~~ [4.15.2.2](#)

*Surge suppressors...*

~~4.15.3~~ [4.15.2.3](#)

*The transient suppression...*

[4.15.3 Clearances with controlled overvoltages \(Method B\)](#)

[4.15.3.1](#)

[As an alternative to Method A of Clause 4.15.2, control of overvoltages may be achieved by providing transient suppression devices or systems as an integral part of a product. For permanently installed equipment, the means of overvoltage control need not be provided if the requirement for overvoltage control is marked on the equipment as indicated in Clause 5.57. Testing to demonstrate transient overvoltage withstand shall be conducted per Clause 4.15.2.3.](#)

[4.15.3.2](#)

[Surge suppressors of the metal oxide varistor type are not considered acceptable overvoltage protection for equipment and circuits that operate in the primary circuit.](#)

[4.15.3.3](#)

[A clearance used to control overvoltages shall be capable of handling the available energy without functional damage \(to clearances\) leading to a higher breakdown level and consequent loss of protection.](#)

[Overvoltage breakdown levels of other clearances, and effects of arc-over on and in an electric field, shall be considered.](#)

[4.15.3.4](#)

[Line-connected transient suppression circuits and suppression devices shall be assigned both a phase-to-ground rated system voltage and an overvoltage category, as well as a rated operation voltage phase-to-phase as specified in Table 55. Circuits, line connected or secondary, employing the clearances specified in Table 55, shall be protected for the rated impulse withstand voltage peak identified in Table 55.](#)

[4.15.3.5](#)

[Line-connected transient suppression circuits and suppression devices shall be tested in accordance with the test procedure specified in Clause 6.19, except that the crest value shall be the applicable "Rated impulse voltage withstand voltage peak" identified in Table 55. Metal oxide varistors shall be removed prior to conducting the test. Suppression devices that have been evaluated to the requirements of "Electrical Certification Notice 516" and CSA C22.2 No. 8 may be acceptable without further testing.](#)

[4.15.3.6 Devices that, during normal operation, create a temporary microenvironment with a higher](#)



*pollution degree than the general environment shall not be evaluated with the method specified in Clause 6.19. Examples of such devices include relays, contactors, and switches.*

Section 5, Marking: Added marking requirements for combination motor controllers and for equipment that achieve electrical spacing by Method B as follows:

5.56

*When the individual components of a combination motor controller are shipped separately, the manual self-protected combination motor controller shall be additionally marked, "COMBINATION MOTOR CONTROLLER WHEN USED WITH" or "SELF-PROTECTED COMBINATION MOTOR CONTROLLER WHEN USED WITH" followed by*

*a) the manufacturer's name and part number of the load side component; or*

*b) "MOTOR CONTROLLERS MARKED FOR USE WITH THIS COMPONENT" or the equivalent. Each load side component shall be marked "SUITABLE FOR USE ON THE LOAD SIDE OF MANUAL SELF PROTECTED COMBINATION MOTOR CONTROLLER", followed by the manufacturer's name and part number of the manual self-protected combination motor controller.*

5.57

*As required by Clause 4.15.3.1, equipment shall be marked in a visible manner with the following: "TRANSIENT SURGE SUPPRESSION SHALL BE INSTALLED ON THE LINE SIDE OF THIS EQUIPMENT AND SHALL BE RATED \_\_\_\_\_ V (PHASE TO GROUND), \_\_\_\_\_ V (PHASE TO PHASE), SUITABLE FOR OVERVOLTAGE CATEGORY \_\_\_\_\_, AND SHALL PROVIDE PROTECTION FOR A RATED IMPULSE WITHSTAND VOLTAGE PEAK OF \_\_\_\_\_ kV" or equivalent.*

Section 6, Tests:

Section 6.11, Short-circuit tests — Overload relays and equipment incorporating overload relays; Added additional requirements to include transient suppression devices as follows:

6.11.1 General

6.11.1.4

*An overload relay or industrial control equipment incorporating an overload relay and provided with an integral transient suppression device shall be tested with this device in the circuit.*

6.11.1.5

*An external line-connected transient suppression device intended for use with an overload relay or industrial control equipment incorporating an overload relay shall be tested in accordance with the test procedures of Clauses 6.11.3 and 6.11.4.*

Section 6.11.5, Criteria for short-circuit tests performed with fuses: Changed the required performance criteria to incorporate reduced spacing as follows:

*After the protective device has cleared the fault, an overload relay or industrial control equipment incorporating an overload relay shall comply with all of the following requirements (see also Table 26):*

~~*(a) Welding of the controller contacts shall be considered acceptable, but complete disintegration (evaporation) of the contacts or damage to other parts of the controller that would impair their function shall not be considered acceptable.*~~

~~*(b) Burnout of a pigtail, ignition of the cotton, or any other manifestation of a fire hazard shall not be considered acceptable.*~~



~~(c) Damage of the overload relay base, temperature-sensing element, or other parts shall not be considered acceptable, except that damage to the overload relay base, temperature-sensing element, or other parts may occur when current elements are permitted to burn out in accordance with Item (e).~~

~~(d) The wire connected between the live pole and the enclosure shall not open.~~

~~(e) The current element shall not burn out or be damaged to the extent that it would not perform in accordance with the requirements specified in Clause 6.4.2, except that an overload relay current element for use with a motor rated less than 0.25 A may burn out when subjected to the test specified in Clause 6.11.1.1 employing a 1 A fuse.~~

~~(f) The door or cover shall not be blown open, and it shall be possible to open the door or cover. Deformation of the enclosure shall be considered acceptable.~~

~~(g) The shorting or opening of PN junctions in semiconductor devices, or cracking or opening of the semiconductor case or package, shall be considered acceptable.~~

a) There shall be no discharge of parts. Except as required by Item b), the contactor or load-switching contacts may weld or completely disintegrate, and the current element of an overload relay may burn out. The load-switching function of the controller may be inoperative at the conclusion of the test.

b) Contacts that serve as disconnecting or branch circuit protection means shall not weld.

c) Transient suppression devices, if provided, shall be operable following the test using the test procedure of Clause 6.19, except that the crest value shall be the applicable "Rated impulse voltage withstand voltage peak" identified in Table 55. Metal oxide varistors shall be removed prior to conducting the test.

Note: Complete disintegration of the contact is considered to have occurred when the contacts are not capable of carrying rated current or if temperatures cannot be stabilized at rated current.

Section 6.11.6, Criteria for short-circuit tests performed with inverse-time circuit breakers or instantaneous-trip circuit breakers: Changed the required performance criteria to incorporate reduced spacing as follows:

#### 6.11.6.1

After the protective device has cleared the fault, an overload relay or industrial control equipment incorporating an overload relay shall comply with all of the following (see also Table 26):

~~(a) Welding of the controller contacts shall be considered acceptable, but complete disintegration (evaporation) of the contacts or damage to other parts of the controller that would impair their function shall not be considered acceptable.~~

~~(b) Burnout of the current element shall be acceptable.~~

~~(c) The wire connected between the live pole and the enclosure shall not open.~~

~~(d) Damage to the overload relay base or other parts may occur only if current element burnout occurs.~~

~~(e) The door or cover shall not be blown open, and it shall be possible to open the door or cover. Deformation of the enclosure shall be considered acceptable.~~

~~(f) The shorting or opening of PN junctions in semiconductor devices, or cracking or opening of the semiconductor case or package, shall be considered acceptable.~~

(a) There shall be no discharge of parts. Except as required by Item b), the contactor or load-switching contacts may weld or completely disintegrate, and the current element of an overload relay may burn out. The load-switching function of the controller may be inoperative at the conclusion of the test.

b) Contacts that serve as disconnecting or branch circuit protection means shall not weld.

c) Transient suppression devices, if provided, shall be operable following the test using the test procedure of Clause 6.19, except that the crest value shall be the applicable "Rated impulse voltage withstand voltage peak" identified in Table 55. Metal oxide varistors shall be removed prior to conducting the test.

Note: Complete disintegration of the contact is considered to have occurred when the contacts are not capable of carrying rated current or if temperatures cannot be stabilized at rated current.



Section 6.12, Controllers intended for use on circuits capable of delivering high-fault currents: Added general requirements for overload relays as follows:

*6.12.1 General*

*6.12.1.2*

*An overload relay or industrial control equipment incorporating an overload relay and provided with an integral transient suppression device shall be tested with this device in the circuit.*

*6.12.1.3*

*An external line connected transient suppression device intended for use with an overload relay or industrial control equipment incorporating an overload relay shall be tested in accordance with the test procedures of 6.12.1.5 and 6.12.4.3.*

Section 6.12.1.4: Added performance requirements for transient suppression devices as follows:  
*When tested in accordance with Clauses 6.12.2 and 6.12.3, and after the branch-circuit protective device has cleared the fault, a controller and its associated equipment shall meet the following requirements:*  
*i) Transient suppression devices, if provided, shall be operable following the test using the test procedure of Clause 6.19, except that the crest value shall be the applicable “Rated impulse voltage withstand voltage peak” identified in Table 55. Metal oxide varistors shall be removed prior to conducting the test.*

Section 6.15, Polymeric enclosure materials:

Section 6.15.3, Resistance to impact — Enclosures: Clarified the performance criteria as follows:

*6.15.3.1*

*Samples of equipment shall be subjected to the impact tests described in Clauses 6.15.3.2 and 5.45.2.*

*The impact shall not*

*d) produce any other condition that might increase the risk of shock, fire, or damage to the equipment.*

*With respect to item (d), the equipment shall comply with the dielectric voltage withstand requirements applicable to the equipment after being subjected to the impact test.*

Section 6.15.4, Resistance to impact — Observation openings: Specified the impact energy for polymeric enclosures for extra-low voltage components as follows:

*6.15.4.2*

*The test shall be made with an impact as follows:*

*c) 0.5 J for a polymeric enclosure containing only extra-low voltage components defined as a maximum of 30 Vac or 42.2 V peak, and 15 W.*

Section 6.19, Transient-voltage-surge suppression: Added an additional requirement to the test procedure as follows:

*6.19.3*

*Metal oxide varistors shall be removed prior to conducting the test.*

Table 42, Various constructions of combination motor controllers: Added two additional footnotes and a new column for type F motor controllers.



Added a new table to incorporate requirements for reduced spacing, and a normative annex to include requirements for pressure sensitive floor mats as follows:

[Table 55, Minimum clearances for equipment](#)

Added new Annex D

[Annex D, Requirements for electro-mechanical, pressure sensitive floor mats for personnel protection](#)