



UL 698A

STANDARD FOR SAFETY

Industrial Control Panels Relating to Hazardous
(Classified) Locations

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UL Standard for Safety for Industrial Control Panels Relating to Hazardous (Classified) Locations, UL 698A

Fourth Edition, Dated August 21, 2018

Summary of Topics

This new edition of ANSI/UL 698A is being issued to include the following changes in requirements:

Revisions to 1.2 and 1.3 to clarify what is and what is not covered by these requirements.

Revisions to Section 4 to clarify existing definitions and to add new definitions.

Revisions to Section 5 to clarify that it contains General industrial panel requirements for panels relating to hazardous locations.

Revisions to Section 6 to clarify applicable standards (UL 60079-0, UL 60079-11 and UL 120202).

Revisions to 6.3 to clarify that the power to the barriers can be suitably limited by means of either an isolating transformer within the panel, or by means of the rated input to the panel.

Revisions to 6.4 to correct the reference.

Revisions to Section 7 to clarify the requirements for the selection of apparatus for connection to the intrinsically safe outputs of the panel, either in the field or at the panel manufacturer's facility.

Revisions to Section 8 to clarify the applicable wiring and wiring terminal requirements in addition to UL 508A.

Revisions to Section 9 to clarify the general requirements for separation of circuits.

Revisions to 9.2 to harmonize the separation by distance requirements with the comparable requirements of UL 913 and UL 60079-11.

Revisions to 9.3 to harmonize the separation by partitions requirements with the comparable requirements of UL 913 and UL 60079-11.

Revisions to Section 11 to harmonize the mechanical test with the comparable requirements of UL 913 and UL 60079-11.

Revisions to Section 12 to clarify the application of internal markings and that an internal transformer relied upon to provide the required U_m to the barrier is a component whose substitutions may impair intrinsic safety.

Revisions to Section 13 to clarify the application of external markings.

Revisions to Section 14 and 15 to clarify the documentation required for each panel with specific clarification regarding the required content of the panel control drawing.

Clarification of other miscellaneous requirements and editorial corrections.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated May 25, 2018.

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AUGUST 21, 2018

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ANSI/UL 698A-2018

UL 698A

Standard for Industrial Control Panels Relating to Hazardous (Classified)

Locations

First Edition – April, 1999
Second Edition – May, 2008
Third Edition – September, 2012

Fourth Edition

August 21, 2018

This ANSI/UL Standard for Safety consists of the Fourth Edition.

The most recent designation of ANSI/UL 698A as an American National Standard (ANSI) occurred on August 21, 2018. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <https://csds.ul.com>.

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INTRODUCTION

1 Scope

1.1 These requirements cover industrial control panels intended for general industrial installation and use in unclassified locations with intrinsically safe circuit extensions into the following hazardous (classified) locations in accordance with the National Electrical Code (NEC), NFPA 70:

- a) Class I, Division 1;
- b) Class I, Zone 0 and Zone 1 AEx;
- c) Class II, Division 1;
- d) Class III, Division 1; and
- e) Zone 20 and Zone 21 AEx.

1.2 The industrial control panels covered by these requirements may include:

- a) electrical (entity) parameters, only if referenced on the control drawing for barriers that are part of the panel;
- b) external interconnection to non-specific simple apparatus, identified only by generic type and not by manufacturer or model number, but only if referenced in this manner on the control drawing for barriers that are part of the panel;
- c) external interconnection to specific simple apparatus and specific intrinsically safe apparatus, identified by manufacturer and model number, but only if referenced in this manner on either the control drawing for barriers that are part of the panel or on the panel control drawing;
- d) fieldbus intrinsically safe concept (FISCO) applications, if referenced on the control drawing for barriers that are part of the panel; and
- e) internal interconnection of multiple barriers, only if referenced on the control drawing for the barriers that are part of the panel.

1.3 The industrial control panels covered by these requirements do not include electrostatic devices, circuits or systems, gas or vapor analysis equipment, or equipment having a process line brought into the panel.

1.4 The industrial control panels covered by these requirements are assemblies consisting of components such as motor controllers, overload relays, fused disconnect switches, and/or circuit breakers and related control devices such as pushbutton stations, selector switches, pilot lights, timers, switches, control relays and the like with associated wiring terminals. In all cases, the enclosure is provided as part of the assembly.

1.5 These requirements cover equipment for use under the following atmospheric conditions:

- a) An ambient temperature not exceeding 40°C (104°F);
- b) An oxygen concentration not greater than 21 percent by volume; and
- c) A nominal barometric pressure of one atmosphere.

2 Undated References

2.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

ANSI/NFPA 70, *National Electrical Code®*

UL 913, Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations

UL 60079-0, Explosive atmospheres – Part 0: Equipment – General requirements

UL 60079-11, Explosive Atmospheres - Part 11: Equipment Protection by Intrinsic Safety "i"

UL 60079-25, Explosive Atmospheres - Part 25: Intrinsically Safe Electrical Systems

UL 120202, Recommendations for the Preparation, Content, and Organization of Intrinsic Safety Control Drawings

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Glossary

4.1 For the purpose of this Standard, the following definitions apply.

4.2 BARRIER – The device that provides the intrinsically safe circuit.

4.3 BARRIER CONTROL DRAWING – A drawing or other document provided by the manufacturer of each intrinsically safe barrier used in the panel that details the allowed interconnections to each barrier.

4.4 INTRINSICALLY SAFE APPARATUS – Electrical equipment in which all the circuits are intrinsically safe circuits.

4.5 INTRINSICALLY SAFE CIRCUIT – A circuit in which any spark or thermal effect, produced either normally or under specified fault conditions, is incapable of causing ignition of a mixture of flammable or combustible material in air in the mixture's most easily ignitable concentration.

4.6 INTRINSICALLY SAFE FIELD WIRING – Conductors to be installed by others to connect the intrinsically safe field wiring terminals of the industrial control panel to external simple apparatus or intrinsically safe apparatus.

4.7 INTRINSICALLY SAFE INTERNAL WIRING – The wiring between the intrinsically safe field wiring terminal blocks and the terminals on the barrier.

4.8 NON-INTRINSICALLY SAFE FIELD WIRING – Conductors to be installed by others to connect the non-intrinsically safe field wiring terminals of the industrial control panel to external sources of supply, control devices, and loads.

4.9 NON-INTRINSICALLY SAFE INTERNAL WIRING – The wiring between the non-intrinsically safe field wiring terminal blocks and all non-intrinsically safe wiring, circuits and terminals, including the non-intrinsically safe terminals on the barriers.

4.10 PANEL CONTROL DRAWING – A drawing or other document provided by the manufacturer of the panel that details each barrier within the panel and the connections to simple apparatus or intrinsically safe apparatus in the field.

4.11 PARTITION – A metallic or non-metallic material used to maintain required separation between intrinsically safe and non-intrinsically safe equipment and wiring.

4.12 SIMPLE APPARATUS – An electrical component or combination of components of simple construction with well-defined electrical parameters that does not generate more than 1.5 volts, 0.1 amperes, and 25 milliwatts or a passive component that does not dissipate more than 1.3 watts and is compatible with the intrinsic safety of the circuit in which it is used.

NOTE 1 Examples of simple apparatus include passive components such as LED's pilot lights, resistors, RTD's, junction boxes, and electromechanical switches and sources of generated energy such as thermocouples and photocells which do not generate more than 1.5 volts, 0.1 amperes and 25 milliwatts.

NOTE 2 Simple apparatus in accordance with this definition intentionally excludes sources of stored energy, such as capacitors and inductors, unless identified on the barrier control drawing.

4.13 U_m – The maximum voltage (rms, ac, or dc) that can be applied to a non-intrinsically safe connection facilities of the barrier without invalidating the type of protection.