

STANDARD INFORMATION

Standard Number: UL 1740

Standard ID: Industrial Robots and Robotic Equipment [UL 1740:2018 Ed.4]

Previous Standard ID: Industrial Robots and Robotic Equipment [UL 1740:2007 Ed.3+R:07Jan2015]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **January 26, 2023**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard. Reports not updated to this version by the effective date above will be withdrawn.

Overview of Changes:

- Revised requirements for motors
- Revised requirements for capacitors
- Revised requirements for supply-circuit disconnecting means
- Deleted entire Spacings Section, and replaced with references to UL 508, UL 840 and IEC 60947-1
- Added requirements for manual high-speed robots
- Added requirements for wireless and cables pendants

Specific details of new/updated requirements are found in table below.

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.



STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		<i>Additions to existing requirements are underlined and deletions are shown lined out below.</i>
22	Info	Motors The overload protection required by 22.2 shall consist of one of the following: a) Impedance protection complying with the requirements in the Standard for Overheating Protection for Motors, UL 2111 <u>Impedance Protected Motors, UL 1004-2</u> and the Standard for Rotating Electrical Machines – General Requirements, <u>UL 1004-1</u> ; or b) Thermal protection complying with the applicable requirements in the Standard for Overheating Protection for Motors, UL 2111 <u>Thermally Protected Motors, UL 1004-3</u> and Standard for Rotating Electrical Machines – General Requirements, <u>UL 1004-1</u> ; c) Other protection, such as electronic based components, overload relays and the like, that tests show is equivalent to the protection mentioned in (a) <u>or (b)</u> .
25	Info	Capacitors, Capristors and Varistors A component – such as a capacitor, a combination capacitor and resistor, or a suppressor used for line-by-pass, or metal-cabinet isolation; or between supply-circuit (line) connected parts and exposed metal parts (where the component is continually stressed) – shall comply with the requirements in the Standard for Capacitors and Suppressors for Radio- and Television-Type Appliances, UL 1414. <u>Fixed Capacitors for Use in Electronic Equipment – Part 14: Sectional Specification: Fixed Capacitors for Electromagnetic Interference Suppression and Connection to the Supply Mains, UL 60384-14.</u>
26	Info	Supply-Circuit Disconnecting Means <i>New section added;</i> 26.7 Capacitors and Suppressors for Radio- and Television-Type Appliances, UL 1414.
26.7.1		Any door(s) that permit(s) access to live parts operating at a risk of electric shock or more shall be interlocked in accordance with Electrical Standard for Industrial Machinery, NFPA 79.
28		Spacings <i>Deleted entire Spacings Section, and replaced with references to UL 508- Industrial Control Equipment, UL 840- Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment, IEC 60947-1- Low-Voltage</i>



CLAUSE	VERDICT	COMMENT
		<i>Switchgear and Controlgear – Part 1: General Rules, 5th Edition.</i>
		<i>New section added;</i>
28.1		General This section contains requirements for spacings (see standard for details).
		<i>New section added;</i>
28.2		Clearance and creepage distances This section contains requirements for clearances and creepages (see standard for details).
40	Info	Protection of Users and Service Personnel
40.2	Info	Robot control
40.2.2	Info	Emergency stop
40.2.2.1		An emergency stop function shall be provided and be readily visible and accessible. <u>For robots incorporating a control panel, the emergency stop function shall be provided on the control panel and</u> proper space shall be provided around the control panel so that the operator can easily activate the emergency stop function.
40.4	Info	Robot teach <u>manual</u> mode
		<i>New clause added;</i>
40.4.1	Info	Switching from automatic mode shall result in a stop.
		<i>New clause added;</i>
40.4.7		Manual High-Speed (High Speed APV or T2) shall meet the requirements of the Standard for Robots and Robotic Devices – Safety Requirements for Industrial Robots – Part 1: Robots, ISO 10218-1.
40.5	Info	Pendant
		<i>New clause added;</i>
40.5.6		Wireless/cableless pendants shall comply with the requirements found in the Standard for Robots and Robotic Devices – Safety Requirements for Industrial Robots – Part 1: Robots, ISO 10218-1.
41	Info	Batteries and Battery Circuits
41.3	Info	Lithium batteries
41.3.2		Lithium ion and other lithium cells that are configured into battery modules or battery packs shall comply with:



CLAUSE	VERDICT	COMMENT
		<p>a) The Standard for Household and Commercial Batteries, UL 2054; or lithium batteries may comply with 42-5;</p> <p>b) For robots that incorporate motive light EV or EV features, the requirements in The Standard for Batteries for Use in Electric Vehicles, UL 2580;</p> <p>c) The Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications, UL 1973; or</p> <p>d) <u>The Standard for Batteries for Use in Light Electric Vehicle (LEV) Applications, UL 2271.</u></p>
46	Info	Overvoltage and Undervoltage Tests
46.1		The robotic equipment shall operate as intended when tested as described in 46.2 at the overvoltage and undervoltage test voltages specified in Table 46.1 85% and 110% of its rated voltage.
64	Info	Manual Mode Reduced Speed Measurement
		<i>New clause added;</i>
		A singularity condition shall be checked to confirm at least one of the following:
64.2		<p>a) The maximum speed of any part of the robot does not exceed 250 mm/second (10 in/second);</p> <p>b) The robot control stops robot motion and provides a warning prior to the robot passing through or correcting for a singularity during motion initiated from the pendant;</p> <p>c) The robot control generates an audible or visible warning signal and continues to pass through the singularity with the speed of any part of the robot limited to a maximum speed of 250 mm/second (10 in/second).</p>
82	Info	Electromagnetic Compatibility (EMC)
82.1		If EMC Testing is required for compliance with the Standard for Robots and Robotic Devices – Safety Requirements for Industrial Robots – Part 1: Robots, ISO 10218-1, it shall be performed in accordance with the requirements of the appropriate EMC standards with respect to the Functional Safety requirements of those standards.
		<i>New section added;</i>
83		Functional Safety Analysis
		This section contains requirements for safety analysis (see standard for details).
		<i>New section added;</i>
92		Manufacturer’s Documentation
		Items in Table 92.1 are to be included in supplied documentation as needed (not every item applies to every robot) (see standard for details).