

Safety – The Standard We Set

Universal Robots | Safety Fact Sheet | March 2026



Universal Robots pioneered human–robot collaboration in 2008 and remains the industry’s gold standard – with all safety functions evaluated and certified by TÜV Rheinland. With over 100,000 cobots sold worldwide, we have more real-world human–robot collaboration experience than anyone.

2008

First cobot

100k+

Sold worldwide

PLd Cat 3

Dual-channel safety

TÜV Rheinland

All functions certified

2027

ISO 10218-1:2025 target

Current Standard: ISO 10218-1:2011

All UR robots – both **e-Series** and **UR Series** – are **TÜV Rheinland certified** to EN ISO 10218-1:2011 and EN ISO 13849-1:2015 at PLd Category 3. This covers both **PolyScope 5** and **PolyScope X**.

KEY REQUIREMENTS (ISO 10218-1:2011)

- **PLd Category 3** dual-channel architecture – a single fault cannot cause loss of safety function
- **Power and Force Limiting (PFL)** – UR provides PFL as standard; enabling device (3PE) context-dependent under current edition
- **Monitored standstill** – enables standstill with quick resume of operation
- **Emergency stop** per ISO 13850 and **safeguard stop** for external protective devices
- **Configurable safety functions** with Normal and Reduced parameter sets – joint limits, TCP/elbow speed and force, safety planes, momentum, power, stopping time/distance
- **Safety-rated interfaces** (incl. PROFIsafe) for integration with external protective devices, safety PLCs, and field devices
- **Operator mode selection** – teach, automatic, and manual modes

Core safety functions cannot be disabled. Certain functions can be configured, deactivated, or muted within the parameters permitted by the standards.

KEY CHANGES – ISO 10218-1:2025

Published February 2025 – first major revision since 2011. Developed over 9 years by experts from 20+ countries; UR is a very active member of the committee.

- **3PE teach pendant mandatory** – standard TP will not function with new ISO 10218-1:2025 certified products
- **Single point of control** (Direct/External) – operator at the teach pendant can always override and deny any external control
- **Strict Automatic/Manual** mode separation explicitly required
- **Hand-guided control (HGC)** with own configurable speed limit
- **Mandatory security assessment**; if cyber threats pose safety risks, cybersecurity measures required (clause 5.1.16)
- **Start/restart interlock** mandatory – prevents unintentional and unexpected motion
- **15 named safety functions** explicitly defined with testable criteria (up from 4 in ISO 10218-1:2011)
- **Payload mass & center-of-gravity monitoring** – new safety parameters acting as boundaries to detect configuration errors

THE 3PE TEACH PENDANT

Three positions, one safety principle: **Released** = stop, **Center/Hold** = motion enabled, **Fully pressed** = stop. Any reflexive reaction – releasing in surprise or clenching in panic – triggers a safeguard stop. Double-click enables Freedrive. Features two 3PE switches for ergonomic left-/right-handed use (only one needs to be pressed), IP54. Available today for PolyScope 5.9.5+ and PolyScope X – plug-and-play.

Safety Architecture

PLd Category 3 dual-channel architecture. All safety functions have been evaluated and certified by TÜV Rheinland.

Emergency stop and safeguard stop are mandatory safety functions. Configurable safety functions include joint position and speed limits, TCP and elbow speed/force limits, safety planes, momentum and power limits, stopping time/distance, tool orientation, safe home position, and safety-rated I/Os.

TECHNIQUES ENABLING COLLABORATIVE APPLICATIONS

Certified for **Power and Force Limiting (PFL)**. Combined with external safeguards, supports **Speed and Separation Monitoring (SSM)**. **Hand-Guided Control (HGC)** being added for ISO 10218-1:2025 with its own configurable speed limit and hold-to-run control. **High-speed manual mode** via speed slider with time limitation. The risk assessment determines which technique(s) are appropriate. Robot applications using high-speed manual mode have additional risk reduction requirements.

PRODUCT COMPLIANCE

PLATFORM	CURRENT	2025 TARGET	STATUS
PolyScope X	ISO 10218-1:2011	Jan 2027	✓ Future-Ready
PolyScope 5	ISO 10218-1:2011	Jan 2027	✓ Certified
PolyScope 3	ISO 10218-1:2011	No – EOL	✗ Legacy

CYBERSECURITY FOR SAFETY

ISO 10218-1:2025 clause 5.1.16 mandates a security assessment. Where cyber threats pose safety risks, measures must be provided to prevent unauthorized access to hardware, software, and configuration data. UR is **IEC 62443-4-1 ML2 certified** by TÜV Rheinland (Dec 2025). **IEC 62443-4-2 SL1** planned for PolyScope X by 2027. See our Cybersecurity Paper.

TECHNICAL SPECIFICATIONS

- **16 configurable safety-rated I/Os** – dual-channel (8 in / 8 out)
- **PROFIsafe SIL 2** over PROFINET (optional; all CB5 control boxes, PolyScope 5 & X)
- **IP54** (e-Series) / **IP65** (UR Series)
- **UL 1740** certified (all UR Series)
- **Cleanroom**: ISO 14644-1 Class 4 (model dependent)

REGULATORY DEADLINE

- **Jan 20, 2027** – EU Machinery Regulation (EU 2023/1230) takes effect. ISO 10218-1:2025 expected to be harmonized.
- ISO 10218-1:2025 **TÜV Rheinland certification** planned for January 2027 for all products with PolyScope 5 and PolyScope X.

Ready to Automate with Confidence?

Contact your Universal Robots representative to learn how you can automate safely with the industry’s most trusted collaborative robots.

Quality System: ISO 9001, ISO 14001, ISO 45001 – Bureau Veritas certified. | **Standards body:** UR is a very active member of ISO TC299 WG3.

Frequently Asked Questions

Q: Do I need to replace my robot when ISO 10218-1:2025 takes effect?

A: No. ISO 10218-1:2025 applies only to products newly placed on the market. Existing robots continue to operate under their original certification and do not need to be re-certified. Note: if an existing robot is used in a new application, that application must meet ISO 10218-2:2025.

Q: Will existing robots receive the new software?

A: Yes. The ISO 10218-1:2025 compliant software will be provided as a free upgrade for both PolyScope 5 and PolyScope X on e-Series and UR Series hardware. Existing installations can take advantage of new safety functions while continuing to use the standard TP – but **this does not make them ISO 10218-1:2025 certified**.

Q: Will both PolyScope platforms be certified?

A: Yes. UR targets TÜV Rheinland certification for all products with PolyScope 5 and PolyScope X by January 2027, aligned with the EU Machinery Regulation.

Q: What happens to the standard teach pendant?

A: Phased out by Q1 2027 for new products. Available as spare for ISO 10218-1:2011 installations. The standard TP will not function with new ISO 10218-1:2025 certified products. The 3PE TP is already available today as a plug-and-play accessory.

Q: Can I use the 3PE teach pendant today?

A: Yes. The 3PE Teach Pendant is available now for e-Series and UR Series robots running PolyScope 5.9.5+ or PolyScope X. No additional wiring or URCap required – it is a direct plug-and-play replacement.

Q: What does PLd Category 3 mean?

A: Performance Level d (PLd) is the second-highest reliability classification under ISO 13849-1. Category 3 means dual-channel architecture: two independent safety channels monitor each other, so a single fault cannot cause loss of the safety function. [SIL 2 / IEC 62061 sentence removed]

Q: Can safety functions be disabled?

A: Core safety functions cannot be disabled. Certain safety functions can be configured, deactivated, or muted within the parameters permitted by the standards. Most functions support two parameter sets – Normal and Reduced – for flexible deployment.

Q: What is the difference between ISO 10218-1 and ISO 10218-2?

A: Part 1 covers the robot (UR certifies to this). Part 2 covers the complete robot application including end-effectors, workpieces, and guarding.

Q: Who is responsible for the risk assessment?

A: The integrator (or end-user if they integrate themselves) is responsible for the application risk assessment per ISO 10218-2 and ISO 12100. UR provides the certified robot with a Declaration of Incorporation.

Q: What about cybersecurity?

A: IEC 62443 (specifically Parts 4-1 and 4-2) is the cybersecurity reference standard for industrial automation. UR is IEC 62443-4-1 ML2 certified by TÜV Rheinland (Dec 2025) for secure development. IEC 62443-4-2 SL1 planned for PolyScope X by 2027. ISO 10218-1:2025 is the first robot safety standard to mandate a security assessment and, where cyber threats pose safety risks, require cybersecurity measures.

GLOSSARY

PLd – Performance Level d, high reliability for safety functions (ISO 13849-1). **Category 3** – Dual-channel architecture; single fault cannot cause loss of safety function. **3PE** – Three-Position Enabling Device; motion only in center position. **PFL** – Power and Force Limiting; safe contact forces for collaborative applications. **SSM** – Speed and Separation Monitoring; speed adjusts by human distance. **HGC** – Hand-Guided Control; dedicated configurable speed limit with hold-to-run (ISO 10218-1:2025). **PROFIsafe** – Safety over PROFINET (optional; all CB5 control boxes).

REFERENCES

ISO 10218-1:2011 & 2025, ISO 13849-1:2015, ISO/TS 15066:2016, ISO 12100:2010, IEC 60204-1:2018, IEC 62443-4-1/4-2, EU Machinery Regulation 2023/1230. For complete specifications, refer to the [UR product manuals](#).

What ISO 10218-1:2025 Means for You

ASPECT	2011 (CURRENT)	2025 (NEW)
Safety functions	4 named	15 explicitly defined
Enabling device	Context-dependent	Mandatory (Class II)
Cybersecurity	No requirements	Threat assessment mandatory
Control	Mode selection	Single point of control
Mode separation	Not explicitly required	Strict Auto / Manual
Hand-guided	Not specified	Dedicated HGC requirements
Start/restart	Understood, not explicit	Interlock mandatory
Payload monitoring	Not defined	Parameter requirement

What stays the same: Power and Force Limiting, software-based axis and space limiting, PLd Category 3 dual-channel architecture, and all existing communication interfaces remain available with current functionality.

Stop Categories (per IEC 60204-1)

CATEGORY	DESCRIPTION	DRIVE POWER	USED FOR
Cat 0	Immediate power removal	Removed	Safety limits exceeded
Cat 1	Controlled stop, then power off	Removed after stop	Emergency stop
Cat 2	Stop, position held	Retained	Safeguard / protective stop

Product & Hardware Overview

ROBOT PLATFORMS

SERIES	MODELS	IP	ISO 10218-1:2025
UR Series	UR8L, UR15, UR18, UR20, UR30	IP65	✓ Compliance path
e-Series	UR3e, UR5e, UR7e, UR12e, UR16e	IP54	✓ Compliance path
CB3	Legacy (EOL 2022)	–	✗ Not compliant

CONTROL BOXES

MODEL	SOFTWARE	KEY FEATURE
CB5.6	PolyScope X & 5	Required for PolyScope X
CB5.0–CB5.5	PolyScope 5	Same safety with latest SW
CB3	PolyScope 3	Legacy (EOL 2022)

COMMUNICATION INTERFACES

External Control (control actions) via Robot API, Dashboard Server, Primary/Secondary Client, RTDE. Industrial communication via Modbus TCP, EtherNet/IP, PROFINET with PROFIsafe, ROS/ROS2. Per ISO 10218-1:2025, in External Control mode, explicit permission must be granted; the teach pendant can always reclaim control.

Certification History

YEAR	MILESTONE	CERTIFIER
2014	CB3 series – first EN ISO 13849-1 certification	TÜV Nord
2018	e-Series introduced & certified	TÜV Nord
2023	UR Series launched (first: UR20) – ISO 10218-1:2011	TÜV Nord
2024	All robots re-certified – changed to TÜV Rheinland	TÜV Rheinland
2027	ISO 10218-1:2025 planned – PolyScope 5 & X	TÜV Rheinland