Guidelines for Teachers on Working with the Astorino Educational Robot

1. Introduction

The Astorino educational robot is not equipped with a protective cage, requiring special attention when used in an educational environment. The teacher is responsible for ensuring safe working conditions and adhering to the appropriate procedures.

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2. Training and Safety Procedures

- Teachers should undergo training on robot operation and safety principles.
- Familiarity with ISO 10218-1:2011 safety standards for industrial robots is recommended.
- A technical inspection of the robot should be performed before working with students.
- Students must be trained in basic safety principles.

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3. Awareness of the Machinery Directive

- The lack of a protective cage is due to the need to ensure accessibility in a controlled learning environment.
- Risk-minimizing measures, such as collision detection and speed limitation, must be active and functional.
- The Astorino robot is an educational device and must not be used for industrial purposes.
- The minimum recommended age for users is 16 years old. Younger students may have difficulty using and programming the robot safely.

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4. Work Environment Assessment

- The robot workstation should be well-lit.
- No obstacles or objects should be near the robot that could interfere with its operation.
- Students must have adequate space around the robot.
- The robot should be placed on a stable and secure surface.
- The robot should not be used outdoors or in environments with dust, moisture, or strong electromagnetic fields.

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5. Safe Operation of the Robot

- Students must be informed about the specific nature of the robot as an educational machine.
- The robot's speed is limited to a maximum of 250 mm/s in accordance with educational safety principles.
- The collision detection function must be active.
- The robot must be used according to the manufacturer’s recommendations in a controlled educational environment.
- An emergency stop button must be available and functional.
- Students must know how to react in an emergency.
- Potential hazards (e.g., collisions, pinching, entanglement of loose clothing or hair) must be known to all participants.
- The teacher must constantly monitor the robot’s operation during sessions.
- In the event of a power failure, certain axes may unexpectedly lower, particularly if heavy grippers are mounted.

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6. Procedures in Case of a Hazard

- Teachers should know how to stop the robot in case of a malfunction or collision.
- Students must be informed about the necessity of reporting any unusual robot behaviour.
- The emergency stop button must be easily accessible.
- In case of power loss or control system failure, the robot may make unexpected movements—users should exercise caution.

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7. Compliance with Safety Standards

- Teachers should be aware of potential risks associated with working with the educational robot.
- There must be procedures in place for the quick stopping of the robot in emergency situations.

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8. Education and Supervision

- Teachers should undergo training on safety principles for educational machines.
- Students must be aware of the robot’s specific features and associated risks.
- Teachers must supervise the robot’s operation to minimize risks.

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9. Additional Safety Measures

- Teachers should regularly evaluate the effectiveness of current safety procedures.
- Any additional safety measures should be implemented as needed.
- The robot should only be used within its specified parameters, and any attempts to modify control settings are prohibited.

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10. Conclusion

Working with the Astorino educational robot requires special attention to safety. Awareness of potential hazards, implementation of appropriate procedures, and supervision of students are key to ensuring a safe and effective educational environment.