Technical Specification

ISO/TS 25213

First edition
2026-09

Robotics — Test methods for measuring the energy consumption of robots — 6-Axis articulated industrial robots

Robotique — Méthodes d'essai pour mesurer la consommation d'énergie des robots — Robots industriels 6 axes

Sample Document
get full document from standards.iteh.ai

Reference number
ISO/TS 25213:2026(en)

© ISO 2026

Sample Document

get full document from standards.iteh.ai

COPYRIGHT PROTECTED DOCUMENT

© ISO 2026

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

ISO/TS 25213:2026 • https://standards.iteh.ai/catalog/standards/iso/b8957cf5-1f81-4b24-861b-839f18f1edff/iso-ts-25213-2026

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Setting up the measurements ... **1**
4.1 Robot mounting ... 1
4.2 Measurement equipment ... 2
4.3 Environmental conditions ... 2
4.4 Measurement preparations ... 2
4.5 Payload specifications ... 2
5 Measuring energy consumption ... **4**
5.1 Recording the measurement ... 4
5.2 Stationary manipulator ... 5
5.2.1 Stationary conditions ... 5
5.2.2 Stationary position and payload ... 5
5.3 Moving manipulator ... 5
5.3.1 Measurement path ... 5
5.3.2 Zoning ... 6
5.3.3 Acceleration and deceleration ... 6
5.3.4 Warm-up cycle ... 6
5.3.5 Repetition of S-plane ... 7
5.3.6 Measurement velocities ... 7
5.4 Energy efficiency coefficient (EEC) ... 7
6 Test report ... **8**
Annex A (normative) **Test report** ... **9**
Bibliography ... **13**

Sample Document
get full document from standards.iteh.ai

© ISO 2026 – All rights reserved

ISO/TS 25213:2026 • https://standards.iteh.ai/catalog/standards/iso/b8957cf5-1f81-4b24-861b-839f18f1edff/iso-ts-25213-2026

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents.ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

Sample Document

This document was prepared by Technical Committee ISO/TC 299, *Robotics*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found atwww.iso.org/members.html.

get full document from standards.iteh.ai

© ISO 2026 – All rights reserved

ISO/TS 25213:2026 • https://standards.iteh.ai/catalog/standards/iso/b8957cf5-1f81-4b24-861b-839f18f1edff/iso-ts-25213-2026

Introduction

There is significant global focus on energy savings, which also impact the field of robotics. To contribute to this worldwide effort, this document outlines how to measure the energy consumption of a 6-axis, articulated, industrial robot for typical applications. It supports ISO 9283 [1], which provides an overview of how to measure the performance criteria and related test methods.

While ISO 9283 [1] does not specify how to measure energy consumption, this document provides criteria for how to set up, run and report energy consumption results and calculate energy efficiency while the robot is moving, waiting and standing still.

Sample Document

get full document from standards.iteh.ai

© ISO 2026 – All rights reserved

ISO/TS 25213:2026 • https://standards.iteh.ai/catalog/standards/iso/b8957cf5-1f81-4b24-861b-839f18f1edff/iso-ts-25213-2026

Sample Document

get full document from standards.iteh.ai

Robotics — Test methods for measuring the energy consumption of robots — 6-Axis articulated industrial robots

1 Scope

This document specifies methods of measuring energy consumption for a 6-axis, articulated, industrial robot for typical applications. It further specifies the conditions for the measurements and how the results of the measurements are presented.

This document does not apply to service robots and medical, SCARA, AMRs and DELTA robots.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

Sample Document
get full document from standards.iteh.ai

3.1
S-plane
plane in a cube with defined measurement of the sides

3.2
brakes disengaged
state in which the motors are on, the motor brakes are open and the controller is on

Note 1 to entry: The brakes are disengaged when the robot is in an active state.

3.3
brakes engaged
state in which the motors are off, the motor brakes are engaged and the controller is on

Note 1 to entry: The brakes are engaged during, for example, lunch breaks or while waiting for the next cycle to start.

3.4
sleep
state in which the motors are off, the motor brakes are engaged and the controller and computer are asleep

Note 1 to entry: Sleep occurs during weekends or overnight.

4 Setting up the measurements

4.1 Robot mounting

The robot shall be mounted on the floor in accordance with the manufacturer's instructions.

© ISO 2026 – All rights reserved

ISO/TS 25213:2026 • https://standards.iteh.ai/catalog/standards/iso/b8957cf5-1f81-4b24-861b-839f18f1edff/iso-ts-25213-2026