

RIA TR R15.806-2018

RIA TR R15.806-2018

technical report

*for Industrial Robots and Robot Systems —
Safety Requirements*

Testing Methods for Power & Force Limited Collaborative Applications

Registered with ANSI
December 17, 2018



Robotic Industries Association

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Technical Report
for Industrial Robots and Robot Systems — Safety Requirements —

Testing Methods for Power & Force Limited Collaborative Applications

Secretariat
Robotic Industries Association

Registered December 17, 2018
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Foreword

The Robotic Industries Association (RIA) has prepared this Technical Report with the objective of enhancing the safety of personnel associated with collaborative robot systems used in an industrial setting, including robots, robot end-effectors, and ancillary equipment. This Technical Report expands upon the information on collaborative robots and collaborative robot systems as previously presented in ANSI/RIA R15.06-2012 and in RIA TR R15.606-2016.

This technical report is supplemental to ANSI/RIA R15.06-2012 and is not itself a standard. The referenced industry standards and technical reports are voluntary. RIA makes no determination with respect to whether any robot, robot system or robot cell, associated safety devices, manufacturer, or user is in compliance with published standards and technical reports. Users of this document should consult applicable federal, state, and local laws and regulations.

Publication of this Technical Report that has been registered with the American National Standards Institute (ANSI) has been approved by the Accredited Standards Developer, Robotic Industries Association. This document is registered as a Technical Report according to the Procedures for the Registration of Technical Reports with ANSI. Comments on the content of this document should be sent to:

Robotic Industries Association
Attn: Subcommittee on Safety
900 Victors Way, Suite 140
Ann Arbor, MI 48108

Members of the R15 Standards Approval Committee, the R15.06 Drafting Subcommittee, and the Committee Secretary participated in the development of this technical report.

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Testing Methods for Power & Force Limited Collaborative Applications

Introduction

This information supplements ISO Technical Specification 15066:2016 on Collaborative Robotic Safety (adopted in the United States as RIA TR R15.606-2016). ISO/TS 15066 (RIA TR R15.606-2016), released in 2016, provides guidance to users and developers of collaborative applications. Within this document, RIA TR R15.606 is the reference and not ISO/TS 15066, as RIA TR R15.806 ("TR 806") is a U.S. national document. TR R15.606 contains an informative annex, Annex A, with pressure biomechanical values shown in controlled psychophysical studies to be consistently within human pain tolerance limits. Force values in Annex A are derived from literature studies concerning minor injury. It is possible that greater values for pressure or force will also avoid pain or injury. RIA TR R15.606 does not describe how to measure pressures and forces due to collaborative application contact situations. This document, RIA TR R15.806, provides guidance about how to perform this verification.

This document is informative as it is a technical report and is not a standard. The Annexes are also informative. The use of the word "shall" and "should" indicates the relative importance of specific criteria or guidance.

1. Scope

This Technical Report describes test methods and metrics for measuring the pressures and forces associated with quasi-static and transient contact events of collaborative applications where risk reduction is provided primarily by robots with power and force limiting (PFL) by inherently safe design or safety functions according to ANSI/RIA R15.06 and RIA TR R15.606. This Technical Report also provides guidance on determining the conditions of the test measurements.

A robot with PFL functionality is not to be considered safe "out of the box" as the PFL robot is a component within a collaborative application. If the PFL robot is used in an application with no human/robot collaboration, these test methods are not required. For further guidance on when to test, see Annex A: Determining When to Test PFL Applications.

Forces attributable to human motion are not taken into consideration for the application of this technical report.

2. References

RIA TR R15.606-2016 Technical Report for Industrial Robots and Robot Systems – Safety Requirements – Collaborative Robots

NOTE: This is a national adoption of ISO/TS 15066:2016

ANSI/RIA R15.06-2012 National Standard for Industrial Robot Systems – Safety Requirements – Part 1: Industrial robots

NOTE: This is a national adoption of ISO 10218-1:2011

ANSI/RIA R15.06-2012 National Standard for Industrial Robot Systems – Safety Requirements – Part 2: Industrial robot systems and integration

NOTE: This is a national adoption of ISO 10218-2:2011