

भू-संचलन मशीनरी — संघात परिचालन
अभिमुख भारकों के युग्मक उपकरण

Earth-Moving Machinery — Coupling
of Attachments to Skid Steer
Loaders

ICS 53.100

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NATIONAL FOREWORD

This Indian Standard which is identical to ISO 24410 : 2020 'Earth-moving machinery — Coupling of attachments to skid steer loaders' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on recommendation of the Earth Moving Equipment and Material Handling Sectional Committee and approval of the Mechanical Engineering Division Council.

The text of ISO standard is proposed for publication as an Indian Standard without deviations. Certain terminologies and conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'; and
- b) Comma (,) has been used as a decimal marker, while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standard, which are to be substituted in their respective place, are listed below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 6165 Earth-moving machinery — Basic types — Identification and terms and definitions	IS/ISO 6165 : 2012 Earth-moving machinery — Basic types — Identification and terms and definitions	Identical
ISO 13031 : 2016 Earth-moving machinery — Quick couplers — Safety	IS/ISO 13031 : 2016 Earth-moving Machinery — Quick Couplers — Safety	Identical

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded-off value should be the same as that of the specified value in this standard.

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Introduction

Quick couplers typical to skid steer loaders are now used on other types of compact products, e.g. compact loaders, compact tractors, compact rough-terrain forklift trucks. The growth of the use of this style quick coupler with other products has resulted in the need to provide guidance regarding the design principles of this quick coupler system.

The previous edition of this document only provided the dimensional requirements for the mounting frame on the attachment. Dimensions for the quick coupler itself were not provided as these dimensions are dependent on the design of the quick coupler. This edition also does not provide dimensional requirements for the quick coupler itself; however, it does provide guidance for the quick coupler engagement system.

Indian Standard

EARTH-MOVING MACHINERY — COUPLING OF ATTACHMENTS TO SKID STEER LOADERS

1 Scope

This document provides for the interchangeability of attachments on skid steer loaders by establishing requirements for the quick coupler system including dimensional limits for the attachment mounting frame. These quick couplers are typically used on skid steer loaders as defined in ISO 6165.

NOTE 1 Skid steer loaders can use other styles of quick couplers but the coupler would not be interchangeable with attachments designed to comply with this document.

NOTE 2 The requirements of this document can be applied to quick couplers used on other compact machines.

NOTE 3 Quick couplers used on small skid steer loaders and some compact tool carriers can have a different width requirement than provided in this document. See [Annex B](#).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6165, *Earth-moving machinery — Basic types — Identification and terms and definitions*

ISO 13031:2016, *Earth-moving machinery — Quick couplers — Safety*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6165 and the following apply.

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

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

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1 attachment

assembly of components that can be mounted onto the skid steer loader lift arm for specific use

[SOURCE: ISO 6746-2:2003, 3.5, modified — The term “base machine or equipment” has been replaced with “skid steer loader lift arm”.]

3.2 quick coupler

device mounted on a skid steer loader to allow quick interchange of *attachments* ([3.1](#))

[SOURCE: ISO 13031:2016, 3.1, modified — The term “earth-moving machine” is replaced by “skid steer loader”, and Note 1 to entry is not included here.]

3.3 attachment mounting frame

attachment component that facilitates the quick mounting and removal of an *attachment* ([3.1](#)) to the *quick coupler* ([3.2](#))

3.4 engagement system

mechanical system of the *quick coupler* (3.2) which engages with the *attachment mounting frame* (3.3) and retains the *attachment* (3.1) in its working position

[SOURCE: ISO 13031:2016, 3.2, modified — The term “attachment” is replaced by “attachment mounting frame”.]

3.4.1 wedge-type engagement system

engagement system (3.4) of at least two interconnecting parts which engage with one another in a wedge action whereby the combination of the wedge angle and the friction coefficient counteract the tendency of the *working forces* (3.5) to cause disengagement

[SOURCE: ISO 13031:2016, 3.2.4, modified — The Note 1 to entry is not included here.]

3.5 working forces

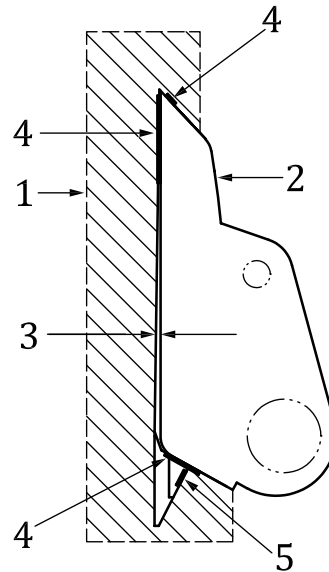
forces created by the working operations of the skid steer loader and *attachments* (3.1) that act upon the *quick coupler* (3.2) during intended use and reasonably foreseeable misuse

[SOURCE: ISO 13031:2016, 3.3.1, modified — The term “earth-moving machine” is replaced by “skid steer loader”.]

4 General requirements

The quick coupler system shall be designed in accordance with [Clause 5](#) and the following, using the attachment mounting frame dimensions given in [Clause 6](#) as guidance.

- a) The dimensions of the quick coupler should be such that the interface of the vertical face of the quick coupler and the attachment mounting frame does not result in surface-to-surface contact when engaged and locked together. This connection shall result in contact in each of the three zones of interface contact surface between the quick coupler and the attachment mounting frame during all operating modes of the loader and attachment. The design of the quick coupler may allow a gap between the quick coupler and the attachment mounting frame. See [Figure 1](#).



Key

- 1 attachment mounting frame
- 2 quick coupler
- 3 gap
- 4 zone of interface contact surface
- 5 wedge/pin contact surface

NOTE The gap is not shown to scale and is shown this way for illustrative purpose only.

Figure 1 — Quick coupler to attachment mounting frame

b) See [Figure 5](#). The quick coupler shall not protrude

- above surface A,
- forward of surface B, or
- below surface C.

NOTE Some attachments could require added support structure to the attachment mounting frame between surfaces A and B.

c) The linkage of the quick coupler to the loader lift arms should provide a minimum of 5° rollback beyond vertical of the quick coupler towards the loader with the lift arms in their lowest position. The amount of rollback may be less for quick couplers used on smaller skid steer loaders, compact tool carriers and other compact equipment.

5 Safety requirements

A skid steer loader quick coupler shall comply with the requirements of ISO 13031:2016, 4.1, for a wedge-type engagement system.

NOTE A skid steer quick coupler is a combination of two different wedge-type engagement systems. See [Annex A](#) for further information on how these different wedge-type engagement systems apply to the skid steer quick coupler system.

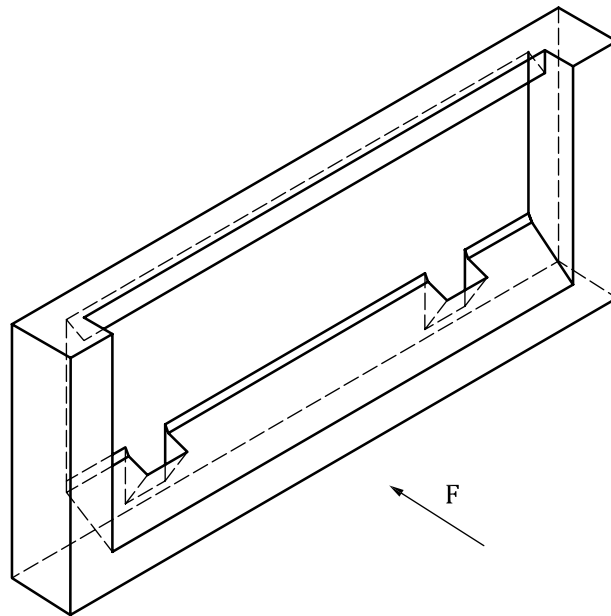
The wedges/pins of the quick coupler shall engage the attachment mounting frame at the wedge/pin contact surfaces (see [Figure 1](#)) when the attachment is properly connected.

The locking system shall prevent retraction of the wedges/pins from attachment mounting frame during operation of the loader with the attachment when the working forces are pulling the attachment mounting frame in a direction away from the quick coupler (e.g. forcing a bucket against the ground pushing upward on the bottom of the bucket, loader traveling rearward with a scarifier attachment). See [Figure A.2](#).

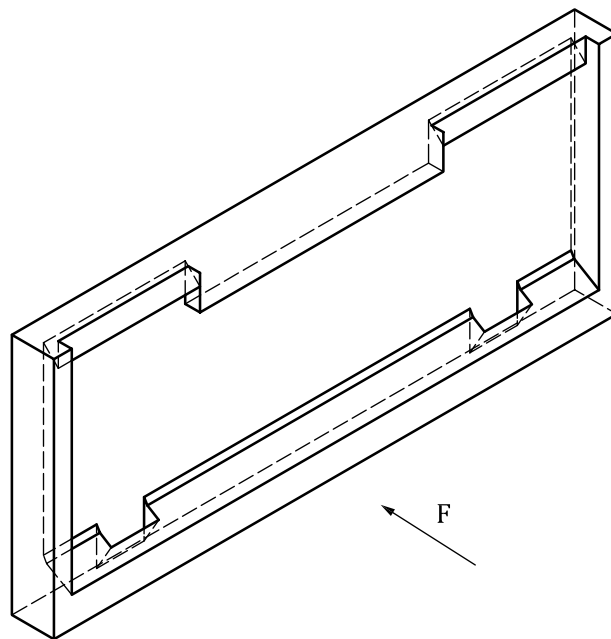
6 Attachment mounting frame dimensions

The dimensions for the attachment mounting frame shall be as shown in [Figures 2](#) to [5](#). The attachment shall only have components outside the described space.

Some attachments can require added support structure to the attachment mounting frame between surfaces A and B in [Figure 5](#). See [Figure 2](#) b) and [3](#) b) for dimensions of area that centre support structure may be allowed.



a) Attachment mounting frame with no centre support structure



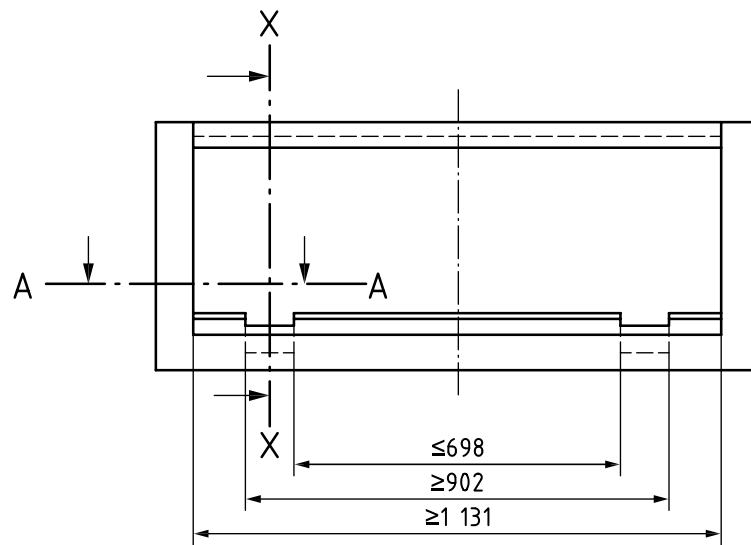
b) Attachment mounting frame with centre support structure

Key

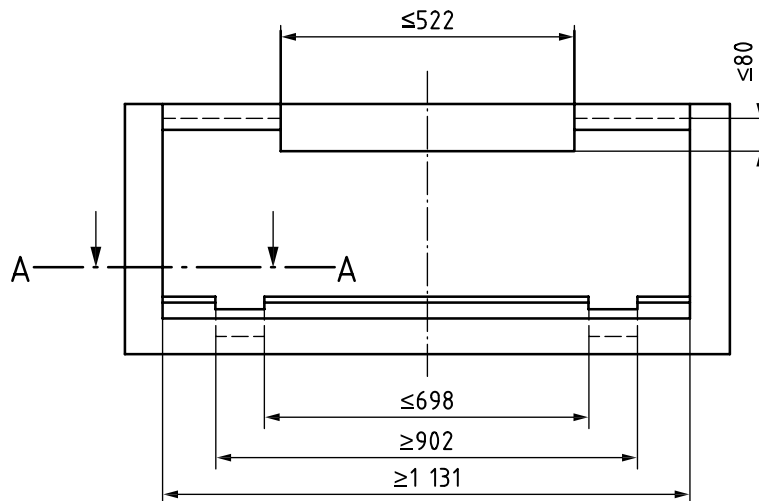
F forward direction

Figure 2 — Attachment mounting frame — Isometric view

Dimensions in millimetres



a) Attachment mounting frame with no centre support structure



b) Attachment mounting frame with centre support structure

Figure 3 — Attachment mounting frame — Rear view

Dimensions in millimetres

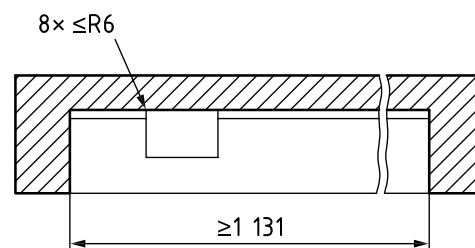
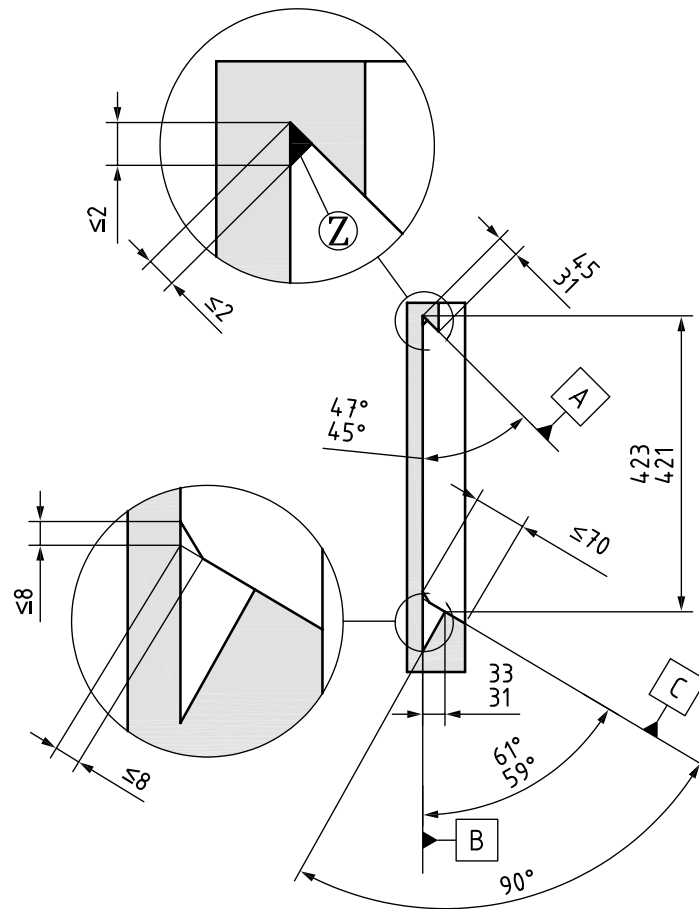


Figure 4 — Attachment mounting frame — Section A-A (See [Figure 3](#))

Dimensions in millimetres



Key

Z tolerance zone

There shall be no structure beyond Z.

Figure 5 — Attachment mounting frame — Section X-X (See [Figure 3](#))

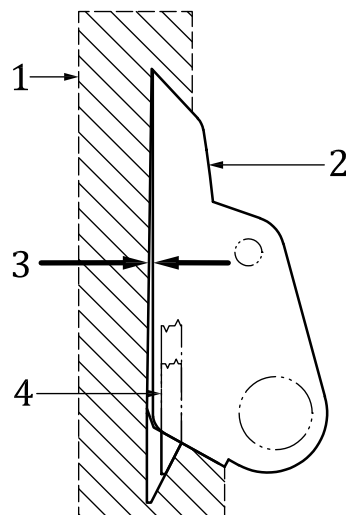
Annex A (informative)

Mechanics of a skid steer loader quick coupler

A.1 Application of working forces

Skid steer loaders can be equipped with many different attachments with some being operated while the loader is moving forward or moving rearward or both, or while stationary. The direction of the working forces changes depending on the direction the loader is traveling and the operation of the attachment. The direction of the working forces applied to the quick coupler during these different uses can either cause the attachment to wedge/tighten into the quick coupler or cause the attachment to try to pull away from the quick coupler.

For this reason, when the working forces are pushing the attachment mounting frame toward the quick coupler (e.g. lifting a bucket with load, loader traveling forward with a blade attachment), the working forces do not exert any upward force on the wedges/pins of the skid steer loader quick coupler. See [Figure A.1](#).

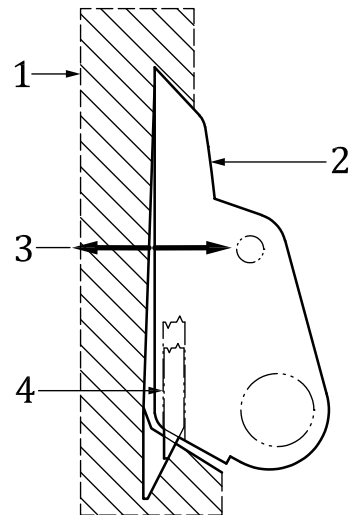


Key

- 1 attachment mounting frame
- 2 quick coupler
- 3 working forces
- 4 wedge/pin

Figure A.1 — Working forces pushing attachment and quick coupler together

However, when the working forces are pulling the attachment mounting frame in a direction away from the quick coupler (e.g. forcing a bucket against the ground pushing upward on the bottom of the bucket, loader traveling rearward with a scarifier attachment), the working forces exert an upward force on the wedges/pins of the skid steer loader quick coupler. See [Figure A.2](#).



Key

- 1 attachment mounting frame
- 2 quick coupler
- 3 working forces
- 4 wedge/pin

Figure A.2 — Working forces pulling attachment and quick coupler apart

Annex B (informative)

Width dimensions for narrow skid steer loader coupler

B.1 General

Quick couplers used on small skid steer loaders and some compact tool carriers can have a different width requirement than provided in [Figure 3](#). See [Figure B.1](#) for the width dimensions for a narrow skid steer loader coupler. All other requirements and dimensions in this document apply.

Dimensions in millimetres

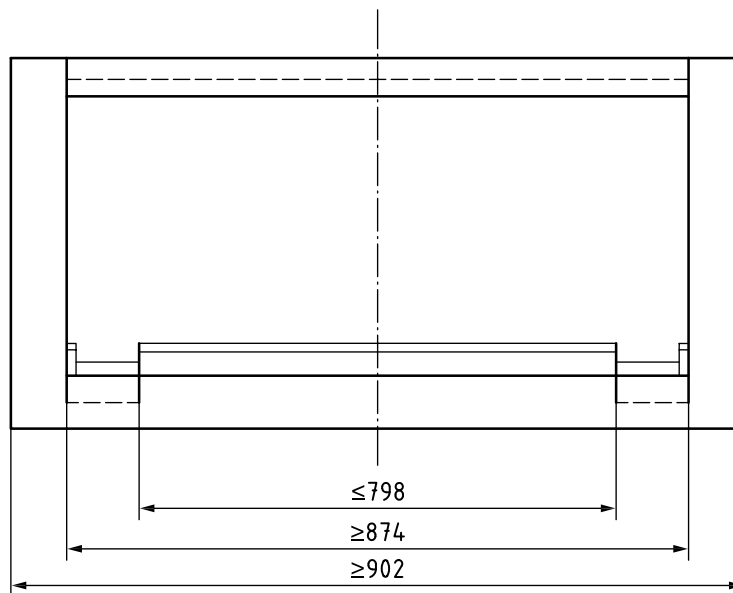


Figure B.1 — Narrow skid steer loader attachment frame - Rear view

Bibliography

- [1] ISO 6746-2:2003, *Earth-moving machinery — Definitions of dimensions and codes — Part 2: Equipment and attachments*
- [2] ISO 7131, *Earth-moving machinery — Loaders — Terminology and commercial specifications*

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