INTERNATIONAL STANDARD

ISO 20112-1

First edition
2018-06

Tractors and machinery for agriculture and forestry — Camera interface between tractor and implement —

Part 1: Analogue camera interface

Tracteurs et matériels agricoles et forestiers — Interface de caméra entre tracteur et l'équipement —

Partie 1: Interface de caméra analogique

Reference number
ISO 20112-1:2018(E)

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Published in Switzerland

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Foreword

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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 documents 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).

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

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 19, *Agricultural electronics*.

A list of all parts in the ISO 20112 series can be found on the ISO website.

Tractors and machinery for agriculture and forestry — Camera interface between tractor and implement —

Part 1: Analogue camera interface

1 Scope

This document defines the physical link between analogue cameras mounted on implements and operator terminals or monitors installed in tractor cabins. The interface supports up to two analogue video streams and provides electrical power to the cameras. It is designed to be installed inside the cab of agricultural equipment.

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 15003, *Agricultural engineering — Electrical and electronic equipment — Testing resistance to environmental conditions*

Recommendation *ITU-R BT.470-7, Conventional analogue television systems*[1)]

3 Terms and definitions

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

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

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

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

3.1
camera control unit
CCU
device used to combine images from multiple cameras into a single video stream

3.2
CAN Bus
controller area network bus

3.3
discrete I/O's
electrical input and output lines

3.4
ISOBUS network
set of devices which are coupled together by and use the ISO 11783 network

1) Available from: http://www.itu.int/dms_pubrec/itu-r/rec/bt/R-REC-BT.470-7-200502-I!!PDF-E.pdf

4 Technical description of the camera interface

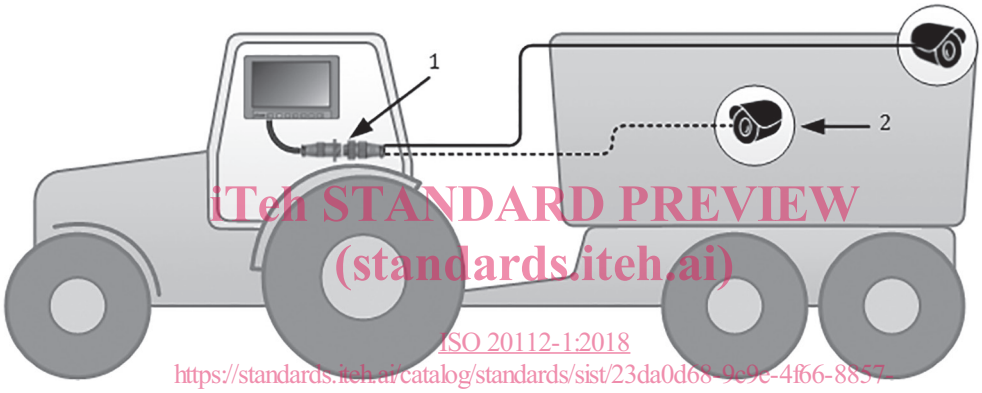
4.1 Physical link configuration

This document describes the physical link between analogue cameras mounted on implements and operator terminals or monitors installed in tractor cabins.

If an attachment (e.g. implement) contains more than two cameras, a CCU shall be installed on the attachment. The CCU composes the images of all connected cameras into one video stream, which is then transmitted via one video line to the operator terminal or monitor in the tractor cabin.

CCU control functions such as the selection of a camera image to be displayed in single mode, split or quad mode, the mirroring of images, the generation of overlays, etc. can be implemented by a separate interface. This interface is beyond the scope of this document and can be achieved by means of either discrete I/O's, CAN Bus, ISOBUS network, Ethernet or any other network.

Figures 1 to 3 show examples of single camera systems and of a multi-camera system addressed by this document.

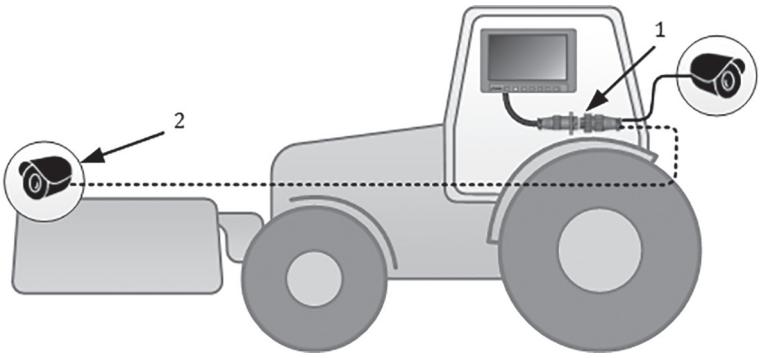


Key

1 camera connector interface

2 optional second camera on rear implement

Figure 1 — Connector interface with one or two cameras on rear implement

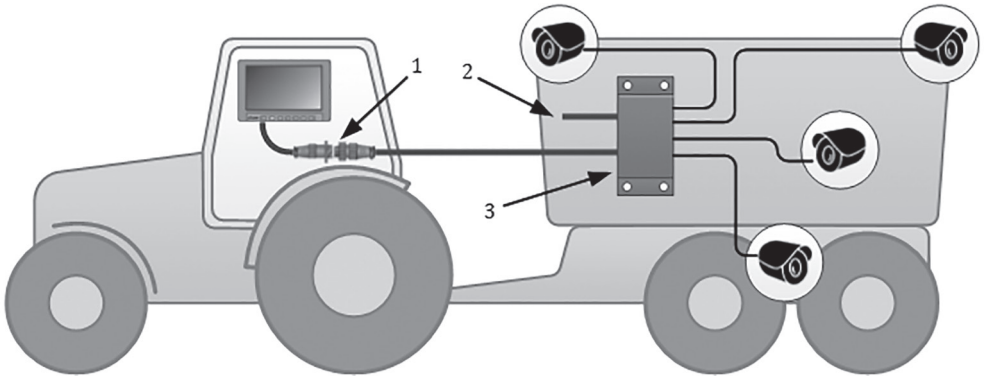


Key

1 camera connector interface

2 optional second camera on front implement

Figure 2 — Connector interface with rear camera and second camera on front implement



Key

1 camera connector interface
2 CCU control interface
3 CCU

Figure 3 — Connector interface with multiple cameras and CCU on rear implement

The interface connector shall be located inside the tractor cabin and be easily accessible by the driver. For tractors without cabin, the interface connector may be provided as an adapter cable from the terminal or monitor instead of a panel mounted connector. The camera cable from the implement should enter the cabin through a cable duct near the rear window.

The analogue camera interface shall be implemented in accordance with ISO 15003. The severity levels specified for a weather protected location shall be applied.

4.2 Connector plug (male) for installation inside tractor cabin

The connector plug shall have the dimensions given in Figure 4.

Dimensions in millimetres (inches)

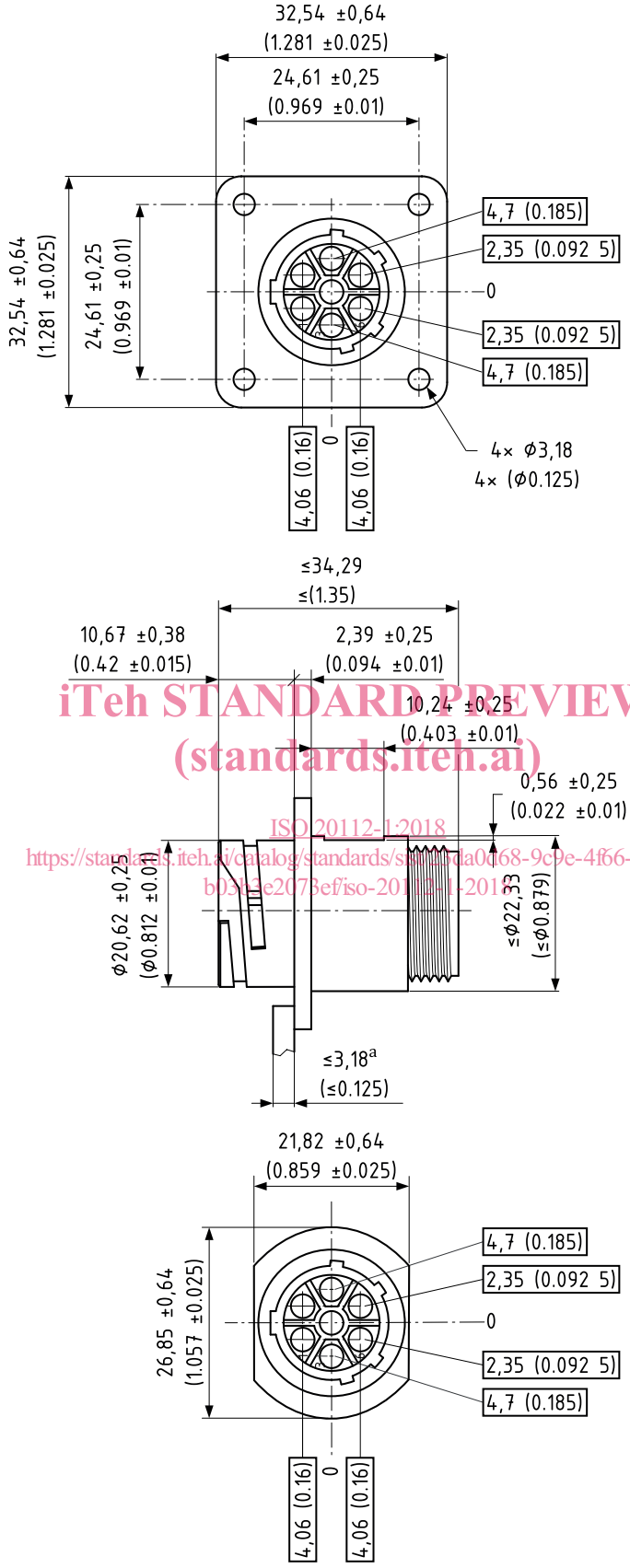


Figure 4 — Specification of connector plug inside tractor cabin

All contacts (pin terminals) shall be gold plated.

To protect the connector plug in unmated condition, a sealing cap shall be applied.

The inside cabin connector plug specifications are met by AMP/Tyco Electronics Circular Plastic Connector (CPC Connector) Series1 Part 211401-4 or 211401-1[2)].

4.3 Connector receptacle (female) to be fitted to the video cable of the camera

The connector receptacle shall have the dimensions given in Figure 5.

Dimensions in millimetres (inches)

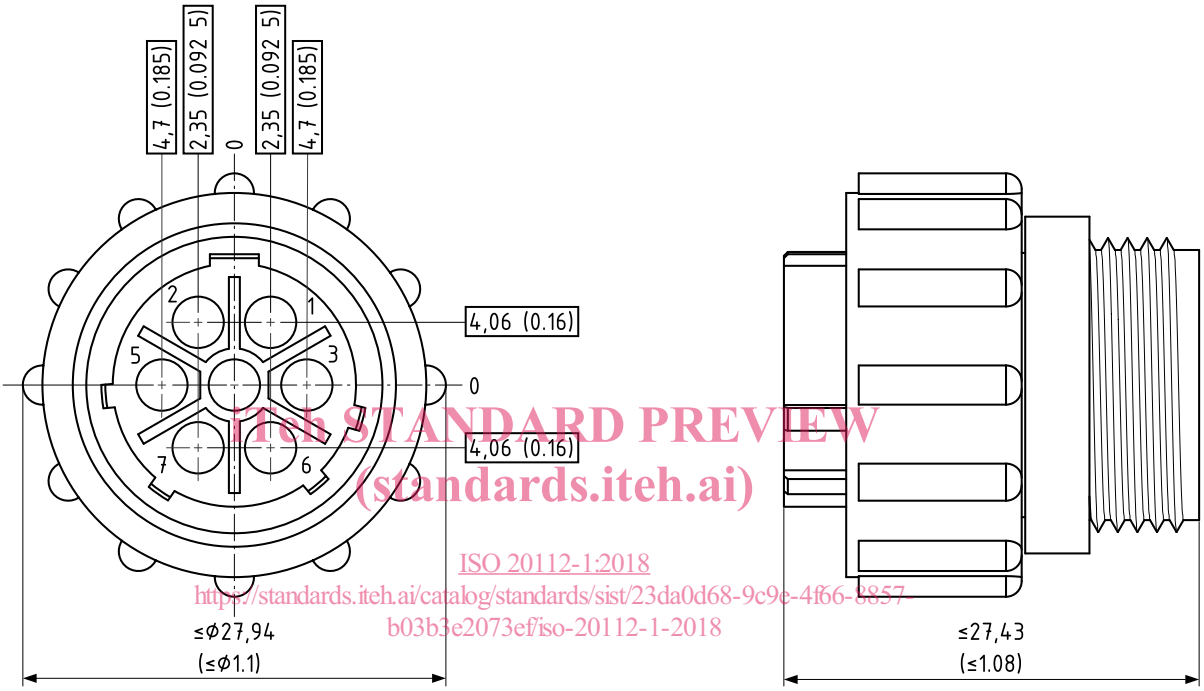


Figure 5 — Specification of receptacle on video cable of camera

All contacts (socket terminals) shall be gold plated.

To protect the connector receptacle in unmated condition, a sealing cap shall be applied.

The connector receptacle specifications are met by AMP/Tyco Electronics Circular Plastic Connector (CPC Connector) Series1 Part 211399-1[2)].

4.4 Pin assignment

The pin assignment for the analogue camera interface shall be in accordance with the specifications listed in Table 1.

2) AMP is the trademark of a product supplied by Tyco International. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the products named. Equivalent products may be used if they can be shown to lead to the same results.