TECHNICAL SPECIFICATION

# ISO/TS 11686

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# Connectors for fluid power and general use — Assembly instructions for connectors with adjustable stud ends and O-ring sealing

*Raccordements pour applications générales et transmissions hydrauliques — Instructions d'assemblage pour des connecteurs avec des éléments mâles ajustables et joint torique*



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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

 

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# Foreword

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This document was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 4, *Connectors and similar products and components*.



# Introduction

In fluid power systems, power is transmitted and controlled through a fluid (liquid or gas) under pressure within an enclosed circuit. In general applications, a fluid may be conveyed under pressure.

Components may be connected through their ports by connections (connectors) and conductors (tubes and hoses). Tubes are rigid conductors while hoses are flexible conductors.

# Connectors for fluid power and general use — Assembly instructions for connectors with adjustable stud ends and O-ring sealing

## 1 Scope

This document provides common installation instructions for all connectors that have adjustable stud ends and O-ring sealing. Conformance with the requirements of this document will result in a considerable reduction of leaks in hydraulic systems.

## 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 1179-1, *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 1: Threaded ports*

ISO 1179-2, *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 2: Heavy-duty (S series) and light-duty (L series) stud ends with elastomeric sealing (type E)*

ISO 1179-3, *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 3: Light-duty (L series) stud ends with sealing by O-ring with retaining ring (types G and H)*

ISO 1179-4, *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 4: Stud ends for general use only with metal-to-metal sealing (type B)*

ISO 5598, *Fluid power systems and components — Vocabulary*

ISO 6149-1, *Connections for hydraulic fluid power and general use — Ports and stud ends with ISO 261 metric threads and O-ring sealing — Part 1: Ports with truncated housing for O-ring seal*

ISO 6149-2, *Connections for hydraulic fluid power and general use — Ports and stud ends with ISO 261 metric threads and O-ring sealing — Part 2: Dimensions, design, test methods and requirements for heavy-duty (S series) stud ends*

ISO 6149-3, *Connections for hydraulic fluid power and general use — Ports and stud ends with ISO 261 metric threads and O-ring sealing — Part 3: Dimensions, design, test methods and requirements for light-duty (L series) stud ends*

ISO 6149-4, *Connections for hydraulic fluid power and general use – Ports and stud ends with ISO 261 metric threads and O-ring sealing – Part 4: Dimensions, design, test methods and requirements for external hex and internal hex port plugs*

ISO 9974-1, *Connections for general use and fluid power — Ports and stud ends with ISO 261 threads with elastomeric or metal-to-metal sealing — Part 1: Threaded ports*

ISO 9974-2, *Connections for general use and fluid power — Ports and stud ends with ISO 261 threads with elastomeric or metal-to-metal sealing — Part 2: Stud ends with elastomeric sealing (type E)*

ISO 9974-3, *Connections for general use and fluid power — Ports and stud ends with ISO 261 threads with elastomeric or metal-to-metal sealing — Part 3: Stud ends with metal-to-metal sealing (type B)*

ISO 9974-4, *Connections for general use and fluid power — Ports and stud ends with ISO 261 threads with elastomeric or metal-to-metal sealing — Part 4: Dimensions, design, test methods and requirements for external hex and internal hex port plugs*

ISO 11926-1, *Connections for general use and fluid power — Ports and stud ends with ISO 725 threads and O-ring sealing — Part 1: Ports with O-ring seal in truncated housing*

ISO 11926-2, *Connections for general use and fluid power — Ports and stud ends with ISO 725 threads and O-ring sealing — Part 2: Heavy-duty (S series) stud ends*

ISO 11926-3, *Connections for general use and fluid power — Ports and stud ends with ISO 725 threads and O-ring sealing — Part 3: Light-duty (L series) stud ends*

ISO 11926-4, *Connections for general use and fluid power – Ports and stud ends with ISO 725 threads and O-ring sealing – Part 4: Dimensions, design, test methods and requirements for hexagon head screw port plugs and hexagon socket screw port plugs*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5598 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 http://www.iso.org/obp

## 4 Instructions for the assembly of connectors with adjustable stud ends and O-ring sealing

### 4.1 Preparation prior to assembly

**4.1.1** To protect the sealing surfaces and prevent dirt and other contaminants from entering the system, protective caps and/or plugs shall not be removed until it is time to assemble the components.

**4.1.2** Just prior to assembly, protective caps and/or plugs shall be removed, and the connector and the port shall be inspected to ensure that both mating parts are free of burrs, nicks, scratches or any foreign material.

**4.1.3** If an O-ring is not present, one shall be installed on the port end of the connector using a proper O-ring installation tool, taking care not to cut or nick the O-ring.

**4.1.4** The O-ring shall be lubricated with a light coat of system fluid or compatible oil.

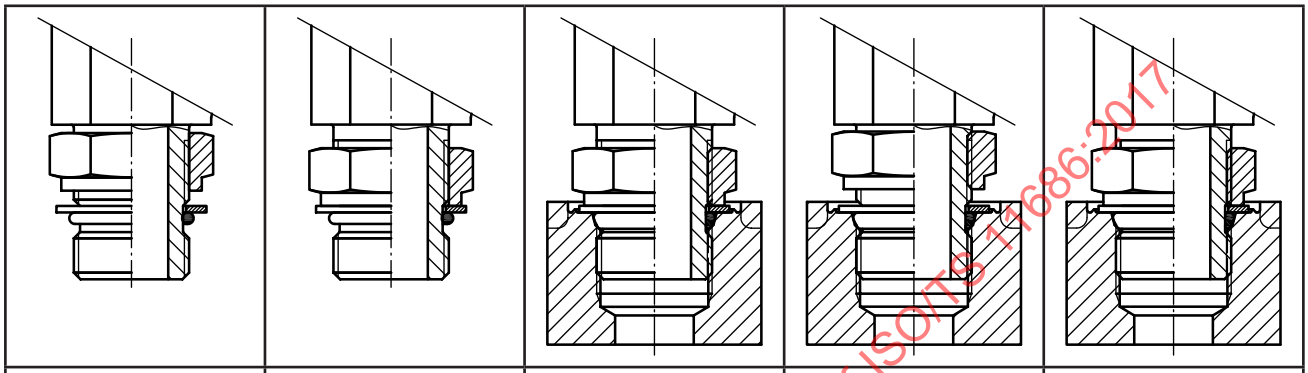


## 4.2 Assembly

### 4.2.1 Illustration

**4.2.1.1** Figure 1 illustrates the steps specified in 4.2.2 to 4.2.6 and the final assembly.



| Position 1 | Position 2 | Position 3 | Position 4 | Position 5 |
|---|---|---|---|---|
| Locknut and washer backed off with O-ring in position (see 4.2.2) | Locknut in position to protect the backup washer from damage during installation into the port (see 4.2.3) | Hand tightened into port until backup washer contacts port face (see 4.2.4) | Connector backed off for alignment to mating connector, tube assembly or hose assembly (see 4.2.5) | Connector tightened to final position (see 4.2.6) |

**Figure 1 — Instructions for assembling connectors with adjustable stud ends and O-ring sealing**

### 4.2.2 Location of O-ring (position 1 in Figure 1)

The O-ring should be located in the groove adjacent to the face of the backup washer. The washer and O-ring should be positioned at the extreme top end of the groove as shown in position 1 of Figure 1.

### 4.2.3 Positioning of locknut (position 2 in Figure 1)

Position the locknut to just touch the backup washer as shown in position 2 of Figure 1. Having the locknut in this position will eliminate potential damage to the backup washer during the next step (see 4.2.4).

### 4.2.4 Installation of connector into the port (position 3 in Figure 1)

Install the connector into the port until the backup washer contacts the face of the port as shown in position 3 of Figure 1.

**CAUTION — Over tightening beyond contact can cause damage to the backup washer, if the washer is not supported by the locknut.**

### 4.2.5 Connector adjustment (position 4 in Figure 1)

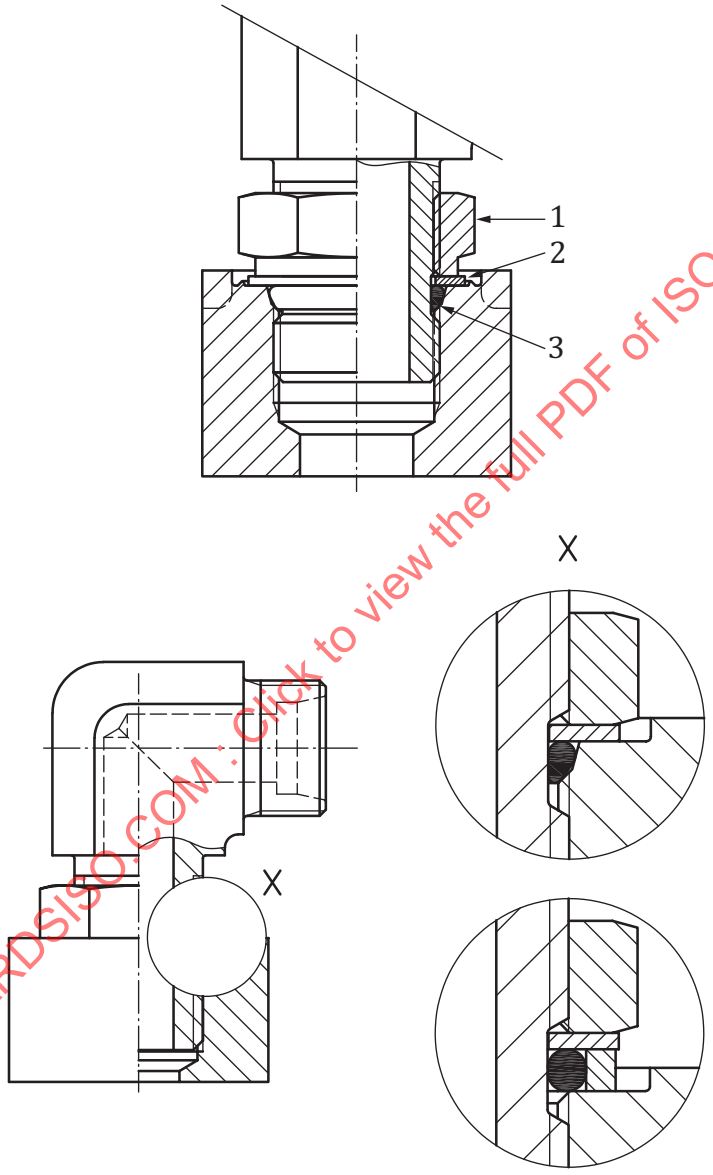
Adjust the connector to the proper position by turning it out, in a counter clockwise manner, up to a maximum of one turn as shown in position 4 of Figure 1, to provide proper alignment with the mating connector, tube assembly or hose assembly.

### 4.2.6 Final tightening (position 5 in Figure 1)

Using two wrenches, use the backup wrench to hold the connector in the desired position and then use the torque wrench to tighten the locknut to the appropriate torque level given by the manufacturer.

### 4.2.7 Final inspection

Visually inspect, where possible, the joint to ensure that the O-ring is not pinched or bulging out from under the washer and that the backup washer is properly seated flat against the face of the port. Figure 2 provides an illustration of the final assembly.






**Key**

1 locknut
2 backup washer
3 O-ring

**Figure 2 — Final assembly of adjustable stud ends with O-ring sealing**

# Annex A
(informative)

# Identification of ports, stud ends and plugs and potential for incompatible intermixing

## A.1 General

Table A.1 provides a summary of

a) how to identify the most common ports, stud ends and plugs used in hydraulic fluid power systems, and

b) how ports and stud ends of different types can potentially be intermixed in an incompatible way, which should be avoided.

For threaded ports and stud ends specified in new designs in hydraulic fluid power applications, ISO 6149 (all parts) should be used because these International Standards specify ports and stud ends with metric threads and O-ring sealing and because the sub-committee would like to help users by recommending one preferred system. Threaded ports and stud ends in accordance with ISO 1179 (all parts), ISO 9974 (all parts) and ISO 11926 (all parts) should not be used for new designs in hydraulic fluid power applications; these International Standards will be maintained because they specify ports and stud ends that are currently used in hydraulic systems worldwide.

**Table A.1 — Identification of ports, stud ends and plugs and potential for incompatible intermixing**

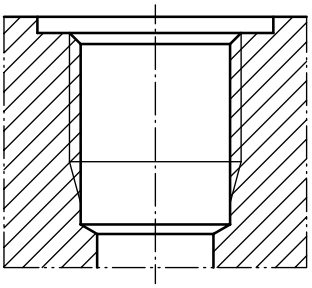
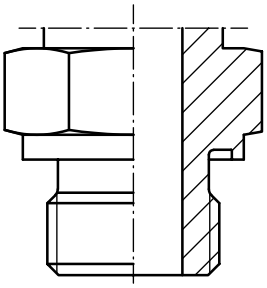
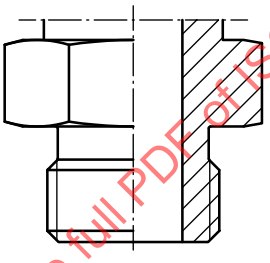
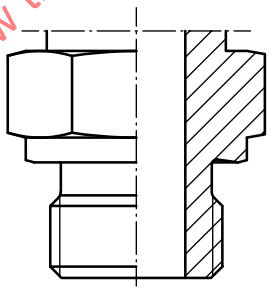
| Standard | Illustration of ports | Illustration of stud ends | Potential for incompatible intermixing |
|---|---|---|---|
| ISO 1179-1<br>ISO 1179-2<br>ISO 1179-3<br>ISO 1179-4 | ISO 1179-1<br>  | ISO 1179-2<br>  <br>ISO 1179-3<br>  <br>ISO 1179-4<br>  | Size G 1/8 stud end fits into M10 × 1 port (ISO 6149-1 and ISO 9974-1)<br>Size G 1/4 stud end fits into M14 × 1,5 port (ISO 6149-1 and ISO 9974-1)<br>Size G 1/2 stud end fits into M22 × 1,5 port (ISO 6149-1 and ISO 9974-1<br>Size G 3/4 stud end fits into M27 × 2 port (ISO 6149-1 and ISO 9974-1) |

**Table A.1** *(continued)*

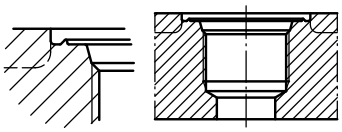
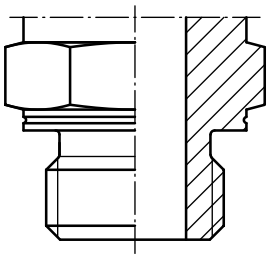
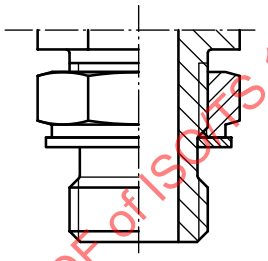
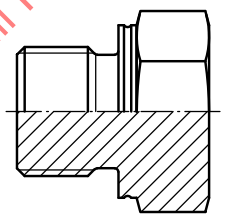
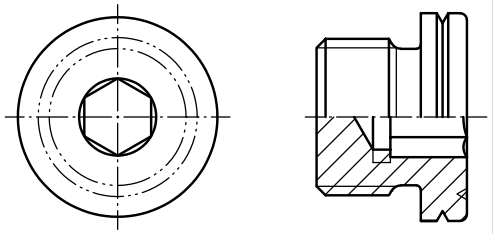
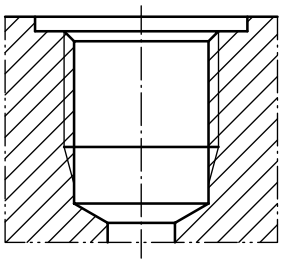
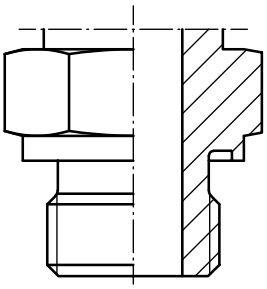
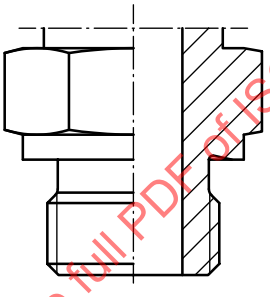
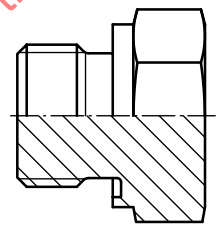
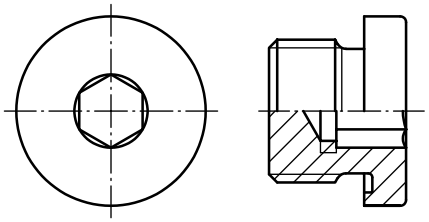
| Standard | Illustration of ports | Illustration of stud ends | Potential for incompatible intermixing |
|---|---|---|---|
| ISO 6149-1<br>ISO 6149-2<br>ISO 6149-3<br>ISO 6149-4 | ISO 6149-1<br>  | ISO 6149-2 and ISO 6149-3<br>  <br>  <br>ISO 6149-4<br>  <br>  | Several sizes of ISO 11926 (See Table A.2)<br>M12 × 1,5 stud end fits into G 1/4 port (ISO 1179-1)<br>M16 × 1,5 stud end fits into G 3/8 port (ISO 1179-1)<br>M20 × 1,5 stud end fits into G 1/2 port (ISO 1179-1) |

**Table A.1** *(continued)*

| Standard | Illustration of ports | Illustration of stud ends | Potential for incompatible intermixing |
|---|---|---|---|
| ISO 9974-1<br>ISO 9974-2<br>ISO 9974-3<br>ISO 9974-4 | ISO 9974-1<br>  | ISO 9974-2<br>  <br>ISO 9974-3<br>  <br>ISO 9974-4<br>  <br>  | Several sizes of ISO 11926 (See Table A.2)<br>M12 × 1,5 stud end fits into G 1/4 port (ISO 1179-1)<br>M16 × 1,5 stud end fits into G 3/8 port (ISO 1179-1)<br>M20 × 1,5 stud end fits into G 1/2 port (ISO 1179-1)<br>M26 × 1,5 stud end fits into G 3/4 port (ISO 1179-1) |