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## Agricultural and forestry tractors and implements — Hydraulic power beyond

*Tracteurs agricoles et forestiers et instruments — Puissance hydraulique externe disponible*

ICS: 65.060.10

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## 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 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](http://www.iso.org/directives)).

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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](http://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 4, *Tractors*.

This second edition cancels and replaces the first edition (ISO 17567:2005), which has been technically revised.

The main changes compared to the previous edition are as follows:

- Reassignment of flow classes and corresponding flow rates for each of the classes of hydraulic power beyond connections

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 at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

The number of implements and mounted equipment attached to agricultural and forestry tractors requiring the hydraulic power and control offered by the tractor's hydraulic system has greatly increased in complexity and need for efficient operation in recent years. As a result, many of these implements include specialized valves and require the capability to easily connect, interface, and control the tractor's implement hydraulic system. This standard sets forth the interfaces necessary to effectively and properly accomplish the connection of various tractor and implement combinations.

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# Agricultural and forestry tractors and implements — Hydraulic power beyond

## 1 Scope

This document defines hydraulic power beyond and specifies the number, type, capacity, and identification of the connections between agricultural and forestry tractors and implements.

## 2 Normative reference(s)

The following referenced documents are indispensable for the application 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/OECD 789-10, *Agricultural tractors — Test procedures — Part 10: Hydraulic power at tractor/implement interface*

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

ISO 5675, *Agricultural tractors and machinery — General purpose quick-action hydraulic couplers*

ISO 10448, *Agricultural tractors — Hydraulic pressure for implements*

ISO 16028, *Hydraulic fluid power — Flush-face type, quick-action couplings for use at pressures of 20 MPa (200 bar) to 31,5 MPa (315 bar) — Specifications*

## 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 <http://www.iso.org/obp>

### 3.1

#### **hydraulic power beyond**

the agricultural and forestry tractor's hydraulic power and/or control features available to implements independent of the tractor's remote valves (e.g. SCV's, etc)

### 3.2

#### **pressure port**

the connection used to provide access to the tractor's main source of hydraulic power

### 3.3

#### **return port**

the connection for the return flow from the implement or attached equipment

### 3.4

#### **load signal (pressure) port**

the connection used to provide access to the tractor's control signal network

### 3.5

#### **drain port**

the connection used to provide access to the tractor's lowest pressure return port for flows such as motor internal leakage

### 3.6

#### **hydraulic power beyond kit**

a kit provided by agricultural and forestry tractor manufacturers that includes all brackets, fittings, seals, lines, quick couplings, dust protection, instructions for installation (including flow class reference, load signal (pressure) drop values, and return pressure) on the tractor, and instructions for connection of implements to the hydraulic power beyond ports

## 4 Systems

### 4.1 Open centre hydraulic systems

On agricultural and forestry tractor systems with open center position hydraulic valves, as defined in ISO 5598, the pressure, return, and drain ports are needed. A schematic ([Figure 1](#)) shows two basic methods for hydraulic power beyond interfaces (power beyond priority or tractor valve priority) for a typical hydraulic motor connected to a tractor with an open center hydraulic system.

### 4.2 Constant pressure closed center hydraulic systems

On agricultural and forestry tractor systems with closed center position hydraulic valves, as defined in ISO 5598, the pressure, return, and drain ports are needed. A schematic ([Figure 2](#)) shows one basic method for a hydraulic power beyond interface for a typical hydraulic motor connected to a tractor with a constant pressure closed center hydraulic system.

### 4.3 Load sensing closed center hydraulic systems

On agricultural and forestry tractor systems with load sensing hydraulic valves, the pressure, return, load signal (pressure), and drain ports are needed. A schematic ([Figure 3](#)) shows one basic method for a hydraulic power beyond interface for a typical hydraulic motor connected to a tractor with a load sensing hydraulic system.

The signal from the implement connected to the load signal pressure port must be resolved with the load signal from the tractor's valves before being sent to the pump. This resolution valving or circuitry shall be provided by the agricultural and forestry tractor manufacturer. The implement manufacturer shall ensure that their load signal is vented when all external functions are in their hold or neutral position.

### 4.4 Load sensing closed center hydraulic systems with fixed displacement pump

A schematic ([Figure 4](#)) shows one basic method for a hydraulic power beyond interface for a typical hydraulic motor connected to a tractor with a load sensing closed center hydraulic system. The comments of [section 4.3](#), paragraph 2 apply.

## 5 Hydraulic power beyond flow class as specified for a single connection

Hydraulic power beyond flow classes as specified for a single connection are given in [table 1](#).



**Table 1 — Flow class**

Class	Flow L/min <sup>a, b</sup>	Rated Flow based on coupler performance L/min <sup>c</sup>
1	Up to 90	Up to 45
2	Up to 148	Up to 74
3	Up to 220	Up to 100
4	Up to 450	Up to 220

<sup>a</sup> Pressure port flow available can vary with system type and tractor system function.

<sup>b</sup> At rated engine speed.

<sup>c</sup> Flow values based on rated flow from ISO 16028.

## 6 Requirements

Agricultural and forestry tractor manufacturers should provide one or more set(s) of hydraulic power beyond ports.

Agricultural and forestry tractor manufacturers shall specify the maximum hydraulic power beyond flow class and system type for each set of hydraulic power beyond ports. Pressure and temperature characteristics from ISO 10448, are applicable. Drain port back pressure shall not exceed 100 kPa, gauge, at 20 L/min and 25 kPa, gauge, at zero flow conditions.

When quick-action couplings are used, female halves conforming to ISO 16028 shall be mounted on tractors to create a uniform system interface between manufacturers and system types as follows.

Sizes of hydraulic power beyond quick action couplings based upon ISO 16028 are given in [table 2](#).

**Table 2 — Quick action couplings**

Hydraulic power beyond Flow class	Quick-action coupling size		
	Pressure	Return	Load signal
1	1x Size 12,5	1x Size 16	Size 6,3
2	1x Size 16	1x Size 19	
3	1x Size 19	1x Size 25	
4	2x Size 19	2x Size 25	
			Drain
			Size 10

The quick-action pressure coupling shall have self-sealing capability and shall not have connect while engine is running capability.

The quick-action return, load signal (pressure), and drain couplings should have connect under pressure capability but shall have the flow path open after connection.

All quick-action couplers shall have breakaway functionality as defined in ISO 5598.

Port and quick-action coupling identification:

- The hose ends of the implement shall be identified with alphabetical symbols given in [Table 3](#).
- The ports and the quick-action couplings on the tractor, originally equipped or installed as part of the hydraulic power beyond kit, shall be identified with alphabetical symbols given in [Table 3](#).