INTERNATIONAL STANDARD

ISO 13929

First edition
2001-01-15

Small craft — Steering gear — Geared link systems

Petits navires — Appareils à gouverner — Transmissions à engrenages

Reference number
ISO 13929:2001(E)

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Printed in Switzerland

Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 13929 was prepared by Technical Committee ISO/TC 188, *Small craft*.

Small craft — Steering gear — Geared link systems

1 Scope

This International Standard specifies the minimum level of requirements for construction, operation and installation of geared link steering systems on all types of small craft of hull length up to 24 m.

It excludes steering systems covered by ISO 8848 and ISO 9775.

2 Terms and definitions

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

2.1
geared link system
system in which rotation of the steering wheel positions the rudder blade by means of gearboxes, which converts the rotary motion to a push/pull force on the rudder operating lever, via a draglink assembly

2.2
draglink
component linking the rack operating lever to the rudder operating lever, which transmits the push and pull forces and allows rotational and angular misalignment

2.3
rudder operating lever
component fixed to the rudder, transmitting the torque to the rudder shaft from the steering system

2.4
rack operating lever
component fixed to the shaft of a steering system which rotates in relationship to movement of the steering wheel and achieves a corresponding movement of the rudder operating lever via the draglink

2.5
maximum output force
force that the system can supply upon application of a 450 N force tangentially to the wheel

3 Illustration of a geared link steering system

Figure 1 shows a geared link system and remotely mounted direct link system.

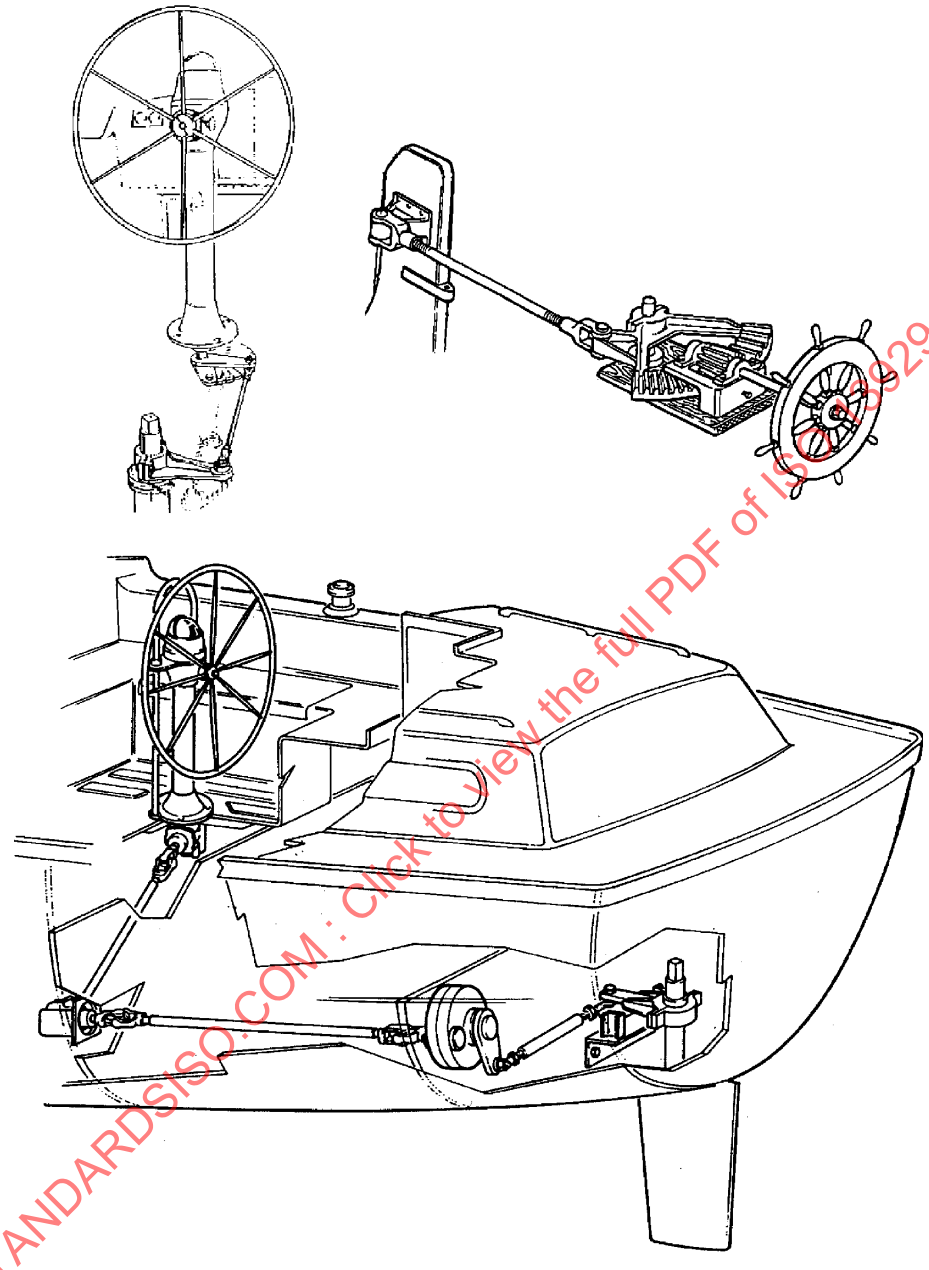


Figure 1 — Geared link system and remotely mounted direct link system

4 Constructional requirements

4.1 General

4.1.1 Steering rating

The steering system type shall be rated according to both its maximum permissible output torque and the corresponding rudder torques produced both at rudder midships and full lock. The manufacturer's specification for the maximum permissible output torque shall be used to determine the tangential torque tests as specified in 6.3.

4.1.2 Fasteners

All threaded fasteners whose integrity affects safe operation of the steering system shall be provided with a means for locking.

4.1.3 Materials

The choice and combination of materials shall be such as to minimize the risk of corrosion and galvanic action.

4.2 Specific

4.2.1 Rudder angle

The steering system manufacturer shall specify the maximum rudder angle.

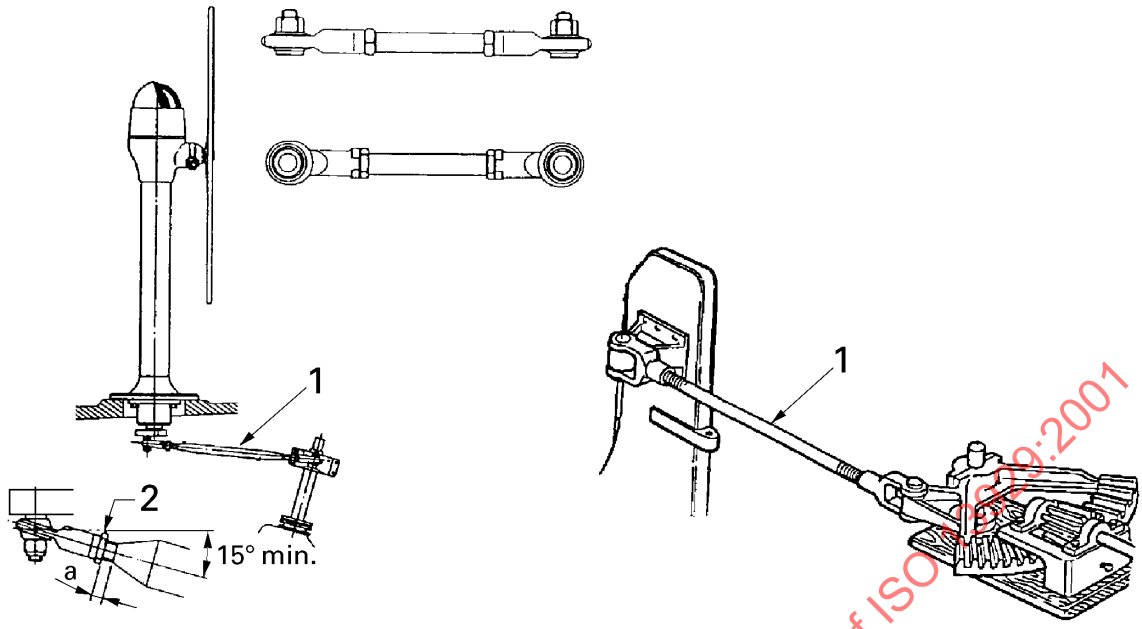
4.2.2 Compass interference

Materials used in the various components of the steering system as supplied shall not affect the accuracy and reliability of a compass mounted on the pedestal, if used, whatever the steering angle may be.

4.2.3 Draglink

The construction of the draglink shall be such that it will allow ± 20 mm of length adjustment and a minimum of 15° angular misalignment. Means shall be provided to secure the draglink after adjustments (see Figure 2).

Where the rudder lever and the operating lever are in the same plane and there is no angular misalignment, a clevis fitting is permissible.



Key

1 Draglink

2 Locknut

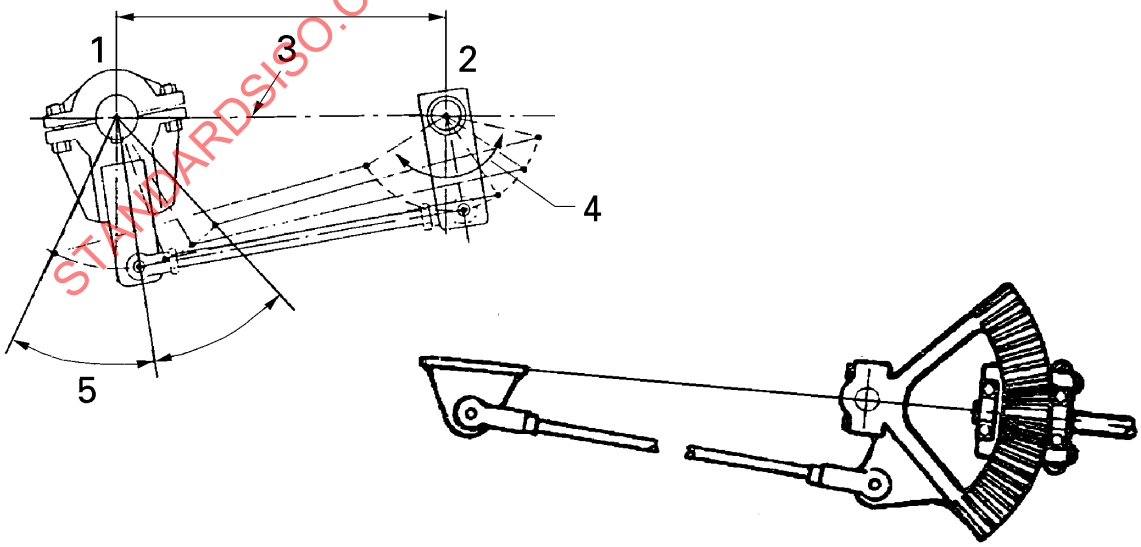
a ± 20 mm adjustment

Figure 2 — Draglink

4.2.4 Rudder/rack operating levers

The ratio of the operating lengths of the rudder and rack operating levers shall be arranged to ensure that the rack operating lever travels 65°, as a maximum, from neutral in either direction to achieve full rudder travel (see Figure 3).

The method of attaching the rudder operating lever shall withstand 150 % of the torque.



Key

1 Rudder operating lever

2 Rack operating lever

3 Centreline of yacht

4 Maximum permissible operating angle 130°

5 Full rudder travel

Figure 3 — Rudder/rack operating lever

4.2.5 Fastening

The system components shall be designed to allow for secure fastening to the boat structure.

5 Installation requirements

5.1 Fastening

To ensure the proper operation of a steering system, all components shall be securely fastened to the structure of the craft, which should be reinforced as necessary.

Threaded fasteners which may be expected to be disturbed by installation or adjustment procedures, whose integrity affects operation of the system such that separation or loss of the fasteners would cause sudden loss of steering without warning shall

a) be referenced by instructions for correct assembly, and

b) be locked by a device whose presence is determined by visual inspection or by feel following the assembly, or incorporate integral locking means, provided the fastener cannot be omitted, or substituted for, without making the system inoperable.

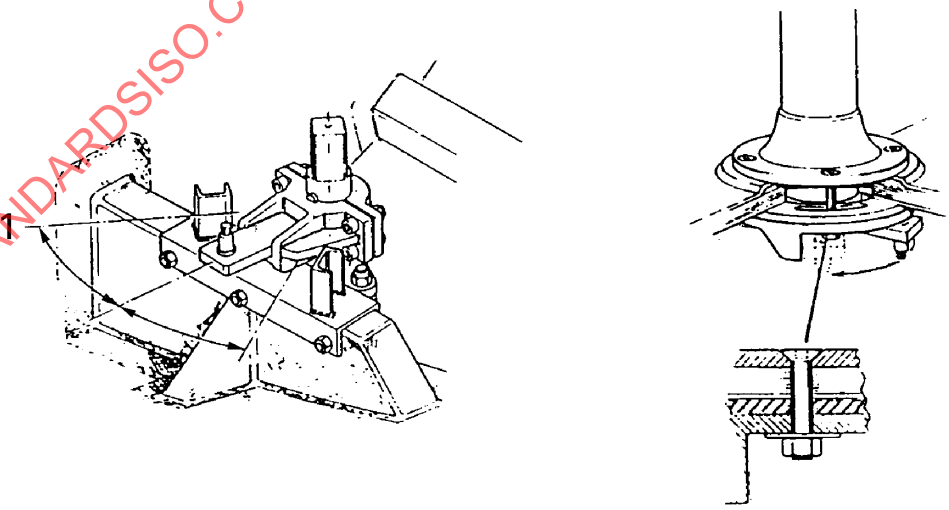
NOTE Self-locking nuts with plastic inserts which create mechanical plastic interference meet the requirements of this subclause.

5.2 Rudder stops

Stops shall be fitted to ensure that the maximum rudder angle specified by the steering system manufacturer is not exceeded.

NOTE The rudder stops may operate on the rudder operating lever, an independent lever attached to the rudder stock, or the rack operating lever or the rudder itself.

The strength of the rudder stops shall be adequate to withstand 150 % of the specified maximum output force at full lock of the steering type as specified in 4.1.1 (see Figure 4).



Key

1 Full rudder travel

Figure 4 — Rudder stops

5.3 Connection of gearboxes

Where the helm or pedestal is mounted remotely from the rudder operating lever, the gearboxes shall be connected via universal joints and solid linkages.

6 Tests of steering system

6.1 General

The whole steering system shall withstand the tests described in 6.2 and 6.3 without fracture or permanent distortion of any component.

6.2 Axial force test

Apply a push-pull force of 670 N over any 100 mm span for 10 cycles of at least 5 s duration, at any point on the outer wheel rim or the centre of the handgrip of an external spoke for the manufacturer's specified largest wheel diameter, in a direction parallel to the centreline of the wheel shaft (see Figure 5).

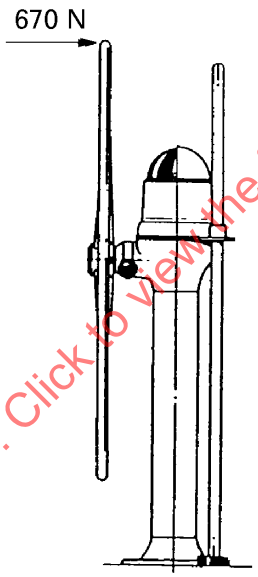


Figure 5 — Axial force test

6.3 Torque test

With the rudder shaft fixed to prevent rotation and at its maximum operating angle, but with the operating levers not against a stop, apply a force of 150 % of rated maximum output torque for 10 cycles of at least 5 s duration via the steering wheel shaft (see Figure 6).

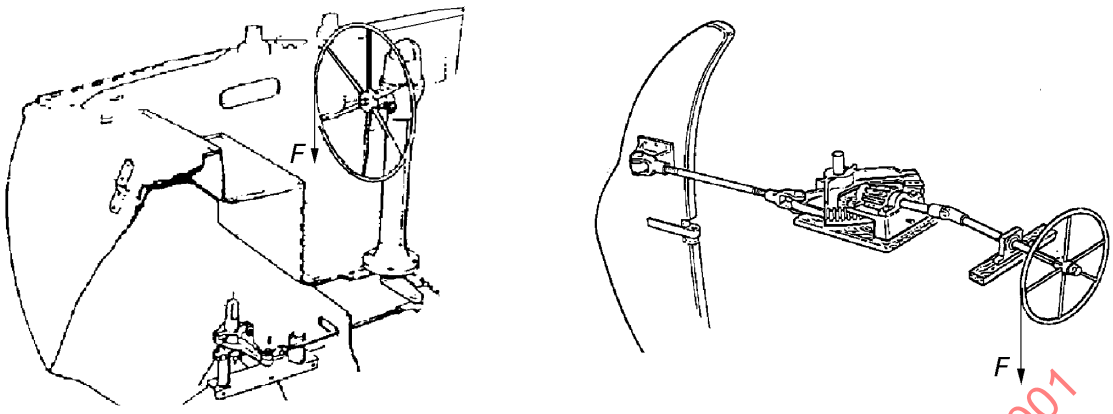


Figure 6 — Tangential torque test

7 Marking

Steering systems complying with this International Standard shall be marked with the following information:

— number of this International Standard;

— name of manufacturer;

— model type.

8 Manuals

8.1 Owner's manual

An owner's manual shall be provided with the system and include

— a general description of the principle of operation, and

— specific precautions critical for correct operation.

8.2 Installer's manual

An installation manual shall be provided with the system and shall include at least the following information:

— reference of the model type and identification of basic components;

— largest wheel diameter;

— general description of operation and reference to specification of rating;

— installation instructions;

— recommended installation test procedures;

— general description of rudder stop installations to meet the requirements of 4.2;

— exploded or sectioned diagram showing parts with identification numbers and description;