

MT 110

Assembly station: Spur wheel / worm gear mechanism



Learning objectives/experiments

- design and function of a combination gear unit
- reading and understanding engineering drawings
- familiarisation with components and assemblies, their design features and functions
- dimensioning exercises, gauging parts
- work planning, in particular planning and presentation of the assembly process
- familiarisation with assembly aids and jigs
- assembly exercises: assembly of modules and complete units
- analysis of faults and damage, in conjunction with maintenance and repair steps
- material selection criteria

- in conjunction with MT 172
 - ▶ function testing of the assembled gear unit

Description

- fully equipped mobile teaching station for demonstration purposes, providing an introduction to assembly techniques using an industrial gear unit as an example
- comprehensive and well-structured instructional material
- learning in a practical environment
- highly suitable for developing interdisciplinary technical understanding

Gears transmit rotational movements. They adapt the torques and speeds of a consumer drive according to demand. MT 110 deals with a fixed gear unit. The gear unit comprises a worm gear with an upstream spur gear stage.

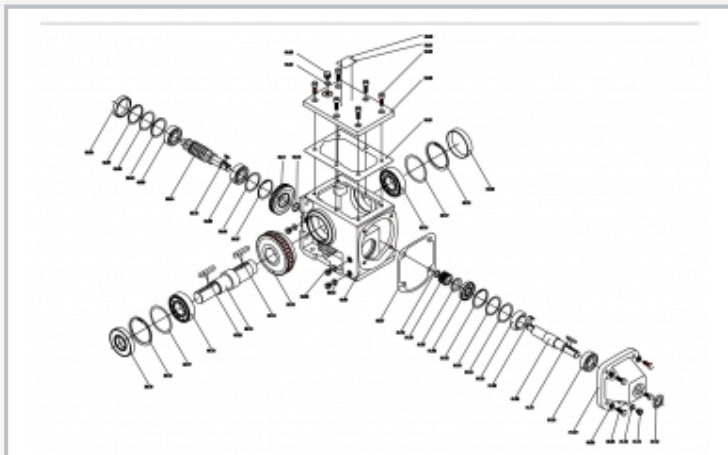
Combining the two types of gear in a single box enables high transmission ratios to be attained at high levels of efficiency in a compact space. Worm gears are normally deployed to gear down, and are mostly self-locking. Typical applications include motor vehicle wiper blades, escalators, and cable winches.

The mobile workstation MT 110 forms part of the GUNT assembly, maintenance and repair practice range designed for training at technical colleges and in company training centres. The station includes everything required to provide students with an introduction to a wide range of demanding assembly projects. The drawers in the trolley cabinet contain a disassembled combination gear unit and the tools, assembly aids, small parts and gaskets required for assembly.

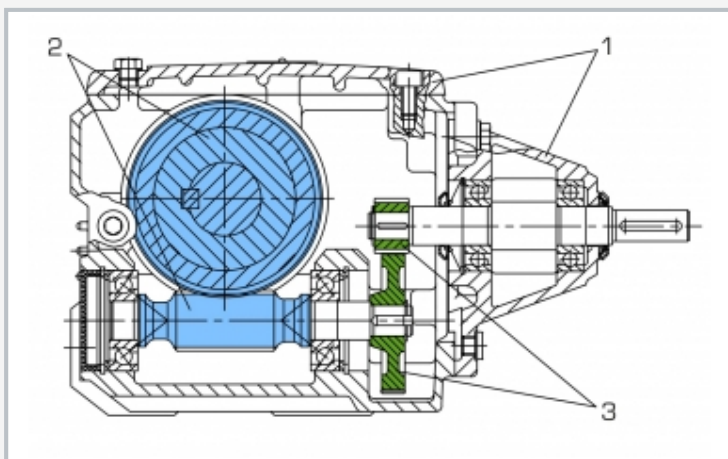
A second fully functional combination gear unit, permanently mounted to the workbench, can be used for demonstration purposes. This enables components to be compared directly with the complete system. Large-format drawings suitable for workshop practice can be attached to the display board at the rear of the trolley. All steps can be demonstrated to, and then performed by, the students themselves. The comprehensive and clearly structured instructional material, which includes a set of drawings, sets out the individual assembly steps in detail and provides additional information on the areas of application, mode of operation and design of the assemblies.

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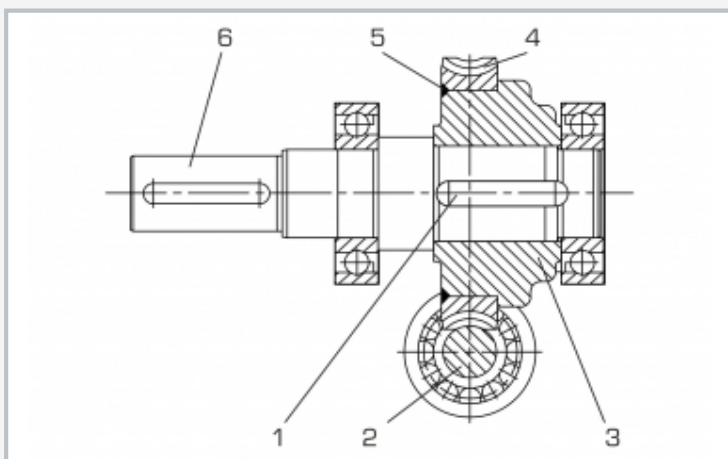
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The illustration shows a clear exploded drawing which the students can use as an aid to assembling the gear unit. It is designed to be put up on the display board at the rear of the workshop trolley.



Sectional drawing of the combination gear unit: 1 housing function group, 2 worm gear stage function group, 3 spur gear stage function group



Worm gear stage: 1 feather key, 2 worm, 3 hub, 4 worm gear rim, 5 weld seam, 6 power take-off shaft

Specification

- [1] assembly project for engineering training
- [2] 2 combination gear units: 1x set of components for assembly, 1x assembled, mounted on trolley as demonstrator
- [3] spur gear stage with helical gear wheels
- [4] worm gear stage with cylindrical worm and globoid wheel
- [5] workshop trolley with drawing display board at rear, built-under cabinet with 3 lockable drawers and vice with 115mm jaw width
- [6] assembly kit, tool kit, assembly aids, accessories and gaskets as well as instructional material contained in built-under cabinet
- [7] the assembly station forms part of the GUNT assembly, maintenance and repair practice line

Technical data

Gear unit dimensions without shaft couplings
 ■ LxWxH: 282x138x188mm, approx. 22kg

Transmission ratios

- spur gear stage: $i=2,83$
- worm gear stage: $i=12,33$
- total transmission ratio: $i=34,89$

Spur gear stage

- pinion: number of teeth: $z=24$, real pitch module: $m=1\text{mm}$
- gear wheel: $z=68$, $m=1\text{mm}$

Worm gear stage

- worm: $z=3$; worm gear wheel: $z=37$, $m=2,578\text{mm}$

Max. output torque: 212Nm at 1400min^{-1}

Materials

- housing: grey cast iron
- shafts: heat treated steel
- spur gear wheels, worm: case-hardened alloy steel

Shaft couplings

- drive: DxL: 16x40mm
- power take-off: DxL: 30x60mm

LxWxH: 1520x750x1850mm (workshop trolley)

Weight: approx. 150kg

Scope of delivery

- 1 workshop trolley with rear drawing display board and built-under cabinet
- 1 working combination gear unit
- 1 combination gear unit in parts
- 1 set of assembly tools and jigs
- 1 set of small parts and gaskets
- 1 set of instructional material, consisting of technical description of system, complete set of drawings with individual parts and parts list, description of assembly and disassembly sequences, set of transparencies for overhead projector

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Optional accessories

051.11010	MT 110.10	Cutaway model worm gear
051.11021	MT 110.21	Auto-CAD files worm gear
051.17200	MT 172	Alignment of drives, shafts and gears