

MANUFACTURING ENGINEERING

The fundamentals of manufacturing engineering are an essential element within the broad training concept of 'mechatronics'. Our teaching and training systems support this field of activity by providing demonstration kits and a number of basic technological experiments.

You will find comprehensive, clearly structured instructional material accompanying all GUNT training systems, providing you with a major aid to lesson preparation.

DEMONSTRATION KITS

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FT 901 *Drilling Kit*



*** Comprehensive instructional kit of the key drilling tools used in engineering**

Technical Description

The kit is used primarily for viewing and information purposes. Exercises or experiments can only be carried out to a limited extent. It includes 19 different drills, including special types, e.g. a centre drill or a taper pin hole drill. In addition a taper shaft and the associated key, as well as a sliding gauge are included. The cutting geometry has been deliberately changed on some of the drills so that the influence of the cutting angle and clearance angle can be demonstrated. The kit is clearly laid out on a plastic tray. The well-structured instructional material enhances the informational value of the collection.

Learning Objectives / Experiments

- familiarisation with the key drilling tools used in engineering and their specific application
- investigation of cutting geometry
 - * cutting angle
 - * clearance angle
 - * incorrect cutter profile

Scope of Delivery

- 1 complete kit, laid out on a tray
- 1 set of instructional material

Specification

- [1] drilling tools demonstration collection
- [2] content: 19 different drills, 7 workpieces with specimen cuts, 1 taper shaft MK1 with key and a twist drills grinding gauge for checking point angle
- [3] all parts clearly laid out on a plastic tray
- [4] multiple trays stackable

Technical Data

- 14 twist drills: D=10mm
- 1 subland twist drill: D=5mm
- 4 centre drills: D=2,5mm

Dimensions and Weight

- LxWxH: 500x350x110mm (tray)
- Weight: approx. 6kg

Order Details

054.90100 FT 901 Drilling Kit

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web <http://www.gunt.de>
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FT 903 *Countersinking Kit*



*** Comprehensive instructional kit of the countersinking tools used in engineering**

Technical Description

The kit is used primarily for viewing and information purposes. No provision is made for conducting exercises or experiments. It includes 12 different countersinks including special types, e.g. a backward countersink tool. It also includes interchangeable guiding pins and a machining specimen with initial countersinking. The largest tool diameter is 16,75mm. The kit is clearly laid out on a plastic tray. The well-structured instructional material enhances the informational value of the collection.

Learning Objectives / Experiments

- familiarisation with the key countersinking tools used in engineering and their specific application
- applications of different countersink angles

Scope of Delivery

- 1 complete kit, laid out on a tray
- 1 set of instructional material

Specification

- [1] countersinking tools demonstration collection
- [2] content: 12 different countersink tools, 3 interchangeable guiding pins, 1 holder for a backward countersink tool and a specimen with initial countersinking
- [3] all parts clearly laid out on a plastic tray
- [4] multiple trays stackable

Technical Data

- 1 core drill: D=16,75mm
- 5 conical countersink tools (M8/90°, C20/60°, A20/60°, C15/90°, C16,5/90°)
- 4 flat countersink tools (3xM8, D=15mm)
- 1 counterbore: D=15mm
- 1 backward countersink tool: D=15mm

Dimensions and Weight

- LxWxH: 500x350x110mm (tray)
- Weight: approx. 6kg

Order Details

054.90300 FT 903 Countersinking Kit

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web <http://www.gunt.de>
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FT 905 Reaming Kit



* Comprehensive instructional kit of the key reaming tools used in engineering

Technical Description

The kit is used primarily for demonstration and information purposes. It allows only limited scope for conducting exercises or experiments. It includes 10 different reaming tools and a limit plug gauge. The kit includes a sample plate with reamed bores with which a fit can be checked. The kit is clearly laid out on a plastic tray. The well-structured instructional material enhances the informational value of the kit.

Learning Objectives / Experiments

- familiarisation with the key reaming tools used in engineering and their specific application
- checking a fit with the limit plug gauge

Scope of Delivery

- 1 complete kit, laid out on a tray
- 1 set of instructional material

Specification

- [1] reaming tools demonstration collection
- [2] content: 10 different reamers, 1 limit plug gauge and a sample plate with reamed bores
- [3] all parts clearly laid out on a plastic tray
- [4] multiple trays stackable

Technical Data

- 2 hand reamers, 1 of which is adjustable, D=10mm
- 1 stub reamer: D=10mm
- 7 chucking reamers: D=10mm
- 2 machine reamers with Morse taper: D=5mm (taper 1:50) and MK1
- Limit plug gauge: D=10mm, fit H7

Dimensions and Weight

- LxWxH: 500x350x110mm (tray)
- Weight: approx. 6kg

Order Details

054.90500 FT 905 Reaming Kit

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web <http://www.gunt.de>
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FT 907 Grinding Kit



* Comprehensive instructional kit of typical abrasives and grinding tools used in engineering

Technical Description

The kit is used primarily for viewing and information purposes. No provision is made for conducting exercises or experiments. It includes 13 different grinding tools and abrasives. The largest tool diameter is 115mm. The kit is clearly laid out on a plastic tray. The well-structured instructional material enhances the informational value of the kit.

Learning Objectives / Experiments

- familiarisation with typical abrasives and grinding tools used in engineering and their specific application
- investigation of
 - * grain / shape / material
 - * construction of grinding wheels
- discussion of areas of application

Scope of Delivery

- 1 complete kit, laid out on a tray
- 1 set of instructional material

Specification

- [1] abrasives and grinding tools demonstration kit
- [2] content: 6 different grinding wheels, 5 sheets of abrasive paper with different grain sizes, 1 cylindrical abrasive pencil, 1 hand finishing stick
- [3] all parts clearly laid out on a plastic tray
- [4] multiple trays stackable

Technical Data

- 3 flat grinding wheels: 1x for structural steel (rough grinding), 1x for tool steel (medium standard), 1x for hard metal (fine grinding)
- 1 depressed centre wheel
- 1 cup grinding wheel
- 1 right angle grinder for surface grinding
- 1 abrasive pencil with shaft
- 1 hand finishing stick (fine grain)
- Abrasive paper: P=40, 100, 180, 320, 400

Dimensions and Weight

- LxWxH: 500x350x110mm (tray)
- Weight: approx. 6kg

Order Details

054.90700 FT 907 Grinding Kit

G.U.N.T Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web <http://www.gunt.de>
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FT 909 *Turning Kit*



*** Comprehensive instructional kit of typical lathe tools used in engineering**

Technical Description

The kit is used primarily for viewing and information purposes. No provision is made for conducting exercises or experiments. It includes 13 different lathe tools, including a reversible carbide tip holder. Four reversible carbide tips and a turned part are also included. The turned part features examples of machining with the different tools. The kit is clearly laid out on a plastic tray. The well-structured instructional material enhances the informational value of the kit.

Learning Objectives / Experiments

- familiarisation with typical lathe tools used in engineering and their specific application
- familiarisation with
 - * different lathe tools: shape, application
 - * reversible carbide tips (cutting geometry)
- discussion of specific examples of application

Scope of Delivery

- 1 complete kit, laid out on a tray
- 1 set of instructional material

Specification

- [1] lathe tools demonstration kit
- [2] content: 13 different lathe tools, 4 reversible carbide tips, 1 turned part
- [3] turned part: aluminium shaft 262mm long, diameter 70mm
- [4] all parts clearly laid out on a plastic tray
- [5] multiple trays stackable

Technical Data

- 1 reversible carbide tip holder
- 4 reversible carbide tips of different materials
- 12 lathe tools with soldered-in carbide tips (including inside tool, parting-off tool, side tool, face tool)

Dimensions and Weight

- LxWxH: 500x350x110mm (tray)
- Weight: approx. 10kg

Order Details

054.90900 FT 909 Turning Kit

G.U.N.T. Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web <http://www.gunt.de>
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FT 913 *Milling Kit*



*** Comprehensive instructional kit of typical milling cutters used in engineering**

Technical Description

The kit is used primarily for viewing and information purposes. No provision is made for conducting exercises or experiments. It includes 12 different milling cutters. A shell end mill arbor and 2 cutter arbor rings are also included. A small steel plate with examples of machining is provided to help identify the possible applications for the different types of milling cutter. The kit is clearly laid out on a plastic tray. The well-structured instructional material enhances the informational value of the kit.

Learning Objectives / Experiments

- familiarisation with typical milling cutter types used in engineering and their specific application
- investigation of a milling cutter fixture
- discussion of specific applications for the various milling cutters

Scope of Delivery

- 1 complete kit, laid out on a tray
- 1 set of instructional material

Specification

- [1] milling cutter demonstration kit
- [2] content: 12 different milling cutters, 1 shell end mill arbor with 2 cutter arbor rings and 1 steel plate with examples of machining
- [3] all parts clearly laid out on a plastic tray
- [4] multiple trays stackable

Technical Data

- 2 keyway milling cutters: D=12mm, 2 and 3 blades
- 8 shell end mills: D=12mm (type N, NR, NF, W, HR)
- 1 shell end mill: D=40mm
- 1 side and face milling cutter: D=50mm
- Milling cutter arbor: SK 30, MK 1 and d=12mm

Dimensions and Weight

- LxWxH: 500x350x110mm (tray)
- Weight: approx. 10kg

Order Details

054.91300 FT 913 Milling Kit

G.U.N.T. Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web <http://www.gunt.de>
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FT 100 Cutting Forces during Drilling



* Measurement of feed force and torque

Technical Description

Investigation of cutting forces during drilling is fundamental to the teaching of cutting techniques. The setup comprises a transducer, which also holds the specimen being machined, and an amplifier unit with digital displays. The axial force (feed force) and torque occurring during cutting are measured using strain gauge transducers and digitally displayed on the amplifier unit.

The experiments must be conducted in a workshop environment, as a suitable drilling machine is required.

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

Learning Objectives / Experiments

- measuring feed force and torque at the cutting surface
 - * influence of rotational speed, rate of feed, lubrication and cooling conditions
- influence of the cutting geometry of the drill
- influence of the material being machined

Scope of Delivery

- 1 measurement kit for drilling experiments, comprising transducer and strain gauge amplifier
- 1 GUNT software CD + USB cable
- 1 set of instructional material

Specification

- [1] drilling measurement device
- [2] measurement of feed force and torque
- [3] strain gauge type measuring transducer
- [4] strain gauge amplifier with digital displays for axial force and torque
- [5] splash-proof stainless steel housing for transducer
- [6] GUNT software for data acquisition via USB under Windows Vista or Windows 7

Technical Data

- Drilling diameter: max. 16mm
- Specimens
 - square LxW: 25x10...25x20mm
 - possible materials: steel, brass, aluminium, copper, plastic
- Measuring ranges
 - axial force: 0...10kN
 - torque 0...50Nm
- Strain gauge in half-bridge configuration

Dimensions and Weight

- LxWxH: 220x150x230mm (transducer housing)
- LxWxH: 230x210x120mm (amplifier)
- Weight: approx. 20kg

Required for Operation

- 230V, 50/60Hz, 1 phase or 120V, 60Hz/CSA, 1 phase

Order Details

- 054.10000 FT 100 Cutting Forces during Drilling

G.U.N.T. Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web http://www.gunt.de
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FT 102 Cutting Forces during Turning



* Measurement of the forces acting on the lathe tool

Technical Description

Investigation of cutting forces during turning is fundamental to the teaching of cutting techniques. The setup comprises a transducer, which also holds the lathe tool, and an amplifier unit with digital displays. The forces that act on the lathe tool during machining are measured in three directions: cutting force, feed force and passive force. The 3-component force measurement device uses a strain gauge system. The amplifier unit supplies the strain gauge bridges and displays the measured values on three digital displays.

The experiments must be conducted in a workshop environment, as a suitable lathe is required.

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

Learning Objectives / Experiments

- measurement of forces in turning
 - * influence of rotational speed, rate of feed, feed motion, lubrication and cooling conditions
- influence of the cutting geometry of the lathe tool
- influence of the material being machined

Scope of Delivery

- 1 measuring device for turning experiments, comprising strain gauge amplifier and transducer
- 1 GUNT software CD + USB cable
- 1 set of instructional material

Specification

- [1] 3-component force measuring device for cutting experiments during turning
- [2] lathe tool holder implemented as transducer with strain gauge system
- [3] strain gauge amplifier unit with 3 digital displays for forces
- [4] transducer with splash-proof housing
- [5] GUNT software for data acquisition via USB under Windows Vista or Windows 7

Technical Data

- Force sensor
 - number of force axes: 3 (x, y, z)
 - measuring range: +/-5kN
 - overload capacity up to: +/- 6,5kN
 - breaking load: +/-8kN
 - non-linearity: <1%
 - supply: 10VDC
- Strain gauge in full-bridge configuration

Dimensions and Weight

- LxWxH: 365x315x150mm (measuring amplifier)
- Weight: approx. 7kg

Required for Operation

- 230V, 50/60Hz, 1 phase or 120V, 60Hz/CSA, 1 phase

Order Details

- 054.10200 FT 102 Cutting Forces during Turning

G.U.N.T. Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web http://www.gunt.de
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FT 200 *Forming by Bending*



- * Permanent deformation of flat bars
- * Measurement of deformation forces

Technical Description

The experimental setup enables fundamental experimentation in the mechanics of deformation. Flat rods can be permanently deformed by means of a simple bending device. The necessary deformation work, e.g. to produce a 90° angle, is recorded in the experiment using a force measurement system. A range of different materials and bend radii can be investigated using this experiment. The experiments should be conducted in a workshop environment, as the bending device has to be clamped into a vice. A suitable force measuring device and a wide range of specimens are supplied.

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

Learning Objectives / Experiments

- deformation experiments on flat sections
- measurement of the deformation force
- * influence of bend radius, bend angle, material

Scope of Delivery

- 1 bending device with lever and moulding
- 1 force measuring device
- 1 set of specimens
- 1 set of instructional material

Specification

- [1] experimental setup for deformation experiments on flat sections
- [2] bending device for insertion in a vice
- [3] device to measure the deformation forces
- [4] rotatable moulding to allow for 4 different bend radii
- [5] deformation forces on the lever up to 200N

Technical Data

- Bending device
 - lever length: 500mm
- Bend specimens
 - cross-section: 10x6mm
 - material: steel, copper, brass, aluminium
- Force measuring device: 200N
- Bend radii: R1, R2, R4, R8

Dimensions and Weight

- LxWxH: 640x120x100mm
- Weight: approx. 10kg

Order Details

054.20000 FT 200 Forming by Bending

G.U.N.T. Gerätebau GmbH, Hanskampring 15-17, D-22885 Barsbüttel, Phone +49 (40) 67 08 54-0, Fax +49 (40) 67 08 54-42, E-mail sales@gunt.de, Web <http://www.gunt.de>
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has been certified since 1998.

