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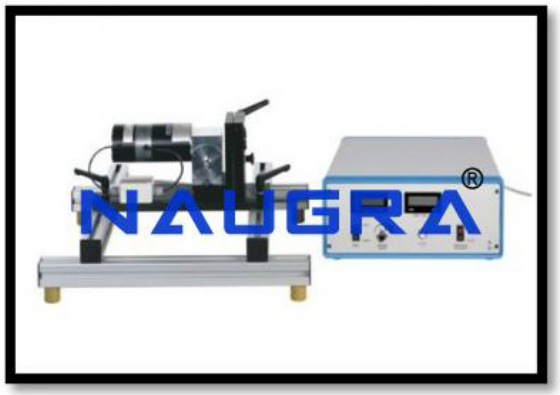
Product Name :	**Product Code :**
Drive Unit For Tribological Investigations	TN498



Description :

Drive Unit For Tribological Investigations

Technical Specification :

Drive Unit For Tribological Investigations
The unit is perform the following experiments and investigations:

Learning Objectives / Experiments:
Supplied with experimental units;
Rolling friction in friction wheels
Elasto-hydrodynamic behaviour
Dynamic friction in pin â€“ disk
Frictional vibrations
Dynamic friction in cylindrical pin â€“ roller
Pressure distribution in journal bearings

Specifications:
Base module with drive unit and display and control unit for studying tribological phenomena
Horizontal or vertical position of the drive shaft by means of pivotable motor block
Various experimental units available as accessories
Drive unit and experimental units secured by quick-action chucks
Drive unit comprising dc motor with worm gear
Speed of the dc motor is continuously adjustable
Speed measured by incremental encoder

frictional force measured by force sensor
force and speed displayed on display and control unit

Technical Data:
DC motor
Rated speed: 3000rpm
Torque: 18,5nm
Worm gear: ratio 15:1
Operating speed: 0...200rpm, electronically controlled
Measuring ranges
Force: 0...50n
Speed: 0...200rpm
230V, 50Hz, 1 phase
230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase
UL/CSA optional
Dimensions and Weight
Length x Width x Height: 500x450x280mm (base module)
Weight: 10kg
Length x Width x Height: 360x330x170mm (display and control unit)
Weight: 6kg
1. Rolling friction in Friction Wheels
Determine the frictional forces as a function of load, lubrication and operating speed
How slip affects the frictional force
Determine the coefficients of friction

Specifications:
Frictional forces in two rolling friction wheels
Quick and easy assembly of the experimental unit on the frame of the drive unit
Driving wheel is driven by a clampable coupling between drive unit and gear unit
Slip between friction wheels kept constant at 4% by means of gear unit
Load on the friction wheels via lever arm and stepped weights
Friction wheels materials pair: aluminium/rubber
Use of different lubricants
Frictional force measured by force sensor
Displays of force and speed and speed adjustment on the drive unit

Technical Data:
Load application device
Load: 80N
Lever arm ratio: 2:1
Friction wheels
Ã˜=49mm
Ã˜=45mm, incl. rubber ring
Gear ratio
i: 0,96, slip 23%
Force sensor for frictional force
0...50N
Weights
1x 5N (hanger)
1x 5N
1x 10N
1x 20N
Dimensions and Weight

Length x Width x Height: 480x250x150mm
Weight: 7kg

2. Elasto-hydrodynamic behaviour
Learning Objectives / Experiments:
Together with the drive unit
Determine the thickness of the lubricating film at the contact point of a sphere with a plane surface - compare with theoretical value
Study the effect of load and speed on the thickness of the lubricating film

Specifications:
Elasto-hydrodynamic behaviour of a lubricating film layer between sphere and rotating glass plate
Quick and easy assembly of the experimental unit on the frame of the drive unit
Determine the thickness of the lubricating film by optical interference
Glass plate is driven by a clampable coupling between drive unit and gear unit
Hardened steel sphere, polished
Rotating plane-parallel glass plate with dielectric coating
Continuous load on the sphere via lever arm
Load measured by force sensor
Displays of force and speed and speed adjustment on the drive unit

Technical Data:
Load application device
Load: 150N
Lever arm ratio: 3:1
Sphere
Diameter: 25,4mm
Hardened steel, polished
Glass plate
Diameter: 150mm, plane-parallel
Coating: bk 7, dielectric, r=30%
Microscope
Magnification: x50
Halogen lamp: 10w
Force sensor: 0...50N
Dimensions and Weight
Length x Width x Height: 350x250x550mm
Weight: 8kg
3. Dynamic friction in pin - disk
Frictional forces in different friction pairs and loads
Frictional forces with different lubrication
Frictional forces at different relative speeds of the friction partners
Wear under different friction parameters and lubrication conditions

Specifications:
[1] frictional forces in pin and disk, which slide against each other, disk subjected to axial load
[2] quick and easy assembly of the experimental unit on the frame of the drive unit
[3] disk is driven by a clampable coupling between drive unit and gear unit
[4] fixed pin made of different materials: aluminium, brass or steel
[5] rotating disk made of hardened and ground stainless steel
[6] load on the pin via lever arm and stepped weights
[7] use of different lubricants, e.g. water or oil
[8] frictional force measured by force sensor

[9] displays of force and speed and speed adjustment on the drive unit

Technical Data:
Load application device
- max. load: 80N
- lever arm ratio: 2:1
Disk
- Ã˜=50mm
- hardened stainless steel, ground
Pin, Ã˜xH: 4x25mm
- 3x aluminium
- 6x brass
6x steel
Force sensor for frictional force
- 0...50N
Weights
- 1x 5N (hanger)
- 1x 20N
- 1x 10N
- 1x 5N
Dimensions and Weight
Length x Width x Height: 350x430x230mm
Weight: 8kg

4. Frictional vibrations
Observation of the transition from static to dynamic friction
Influence of lubrication on slipâ€“stick phenomenon
Influence of the force between the friction partners on the slipâ€“stick phenomenon
Influence of the relative velocity of the friction partners on the slipâ€“stick phenomenon

Specification:
[1] friction oscillations at static and dynamic friction
[2] quick and easy assembly of the experimental unit on the frame of the drive unit
[3] rotating stainless steel disk
[4] disk is driven by a clampable coupling between drive unit and gear unit
[5] friction ring of different materials: stainless steel, brass or plastic (PA)
[6] friction pair subject to load by stepped weights
[7] frictional force measured by force sensor
[8] displays of force and speed and speed adjustment on the drive unit

Technical Data:
Disk
- Ã˜: 60mm
- stainless steel
Friction ring
- outer diameter: 80mm
- inner diameter: 50mm
- 1x stainless steel
- 1x brass
- 1x plastic (PA)
Force sensor for frictional force
- 0...50N
Weights

- 1x 5N
- 3x 10N
Dimensions and Weight
Weight: 7kg
5. Dynamic friction in cylindrical pin - roller
Together with the drive unit
Frictional forces in different friction pairs and loads
Frictional forces with different lubrication
Frictional forces at different relative speeds of the friction partners
Wear under different friction parameters
Specification
[1] frictional forces in cylindrical pin and roller that slide on each other (point contact)
[2] quick and easy assembly of the experimental unit on the frame of the drive unit
[3] rotating roller made of hardened and ground stainless steel
[4] roller is driven by a clampable coupling between drive unit and gear unit
[5] fixed cylindrical pin made of different materials: aluminium, brass or steel
[6] load on the cylindrical pin via lever arm and stepped weights
[7] use of different lubricants, e.g. oil or water
[8] frictional force measured by force sensor
[9] displays of force and speed and speed adjustment on the drive unit

Technical Data:
Load application device
- max. load: 80N
- lever arm ratio: 2:1
Roller
- Ã˜=40mm
- hardened stainless steel, ground
Cylindrical pin, Ã˜xH: 10x20mm
- 3x aluminium
- 6x brass
- 6x steel
Force sensor for frictional force
- 0...50N
Weights
- 1x 5N (hanger)
- 1x 20N
- 1x 10N
- 1x 5N
Dimensions and Weight
Length x Width x Height: 570x100x120mm
Weight: 8kg

6. Pressure distribution in journal bearings
Learning Objectives / Experiments:
Together with the drive unit
Pressure distribution in the journal bearing depending on speed
Pressure distribution in the journal bearing depending on load or bearing gap width
Stability limit as a function of the gap width

Specification
[1] demonstration and visualisation of the pressure distribution in a journal bearing with hydrodynamic lubrication
[2] quick and easy assembly of the experimental unit on the frame of the drive unit

[3] roller is driven by a clampable coupling between drive unit and gear unit
[4] bearing housing is completely transparent
[5] moveable bearing housing, adjustable bearing gap
[6] 13 radial pressure measuring points on the bearing shell
[7] radial pressure distribution indicated with 13 tube manometers
[8]base module required for operation

Technical Data
Shaft
- diameter: 50mm
- length: 50mm
- material: stainless steel
Bearing shell
- diameter: 52,5mm
- bearing gap adjustable from: 0...2,5mm
Adjustment mechanism for bearing shell
- graduation: 0,01mm
Oil
- ISO viscosity grade: VG 32
Measuring ranges
- pressure: 360mm oil column
- speed: 0...200rpm
Dimensions and Weight
Length x Width x Height: 350x150x450mm
Weight: 4kg.

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