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Product Name :	**Product Code :**
Machinery Diagnostic System, Base Unit	TN698

Description :

Machinery Diagnostic System, Base Unit

Technical Specification :

Machinery Diagnostic System, Base Unit
The unit is perform the following experiments and investigations:

Learning Objectives / Experiments:
Introduction to vibration measuring methods on rotating machinery systems
Fundamentals of measurement of shaft and bearing vibrations
Basic variables and parameters
Sensors and measuring devices
Influences of speed and shaft layout
Influence of sensor positioning
Field balancing of rigid shafts
Influence of alignment between motor and coupling
Understanding and interpreting frequency spectra
Use of a computerised vibration analyser

Supplied with follow Accessories for experiments;
Computerised vibration analyser
Elastic shaft kit
Crack detection in rotating shaft kit
Roller bearing faults kit

Couplings kit
Belt drive kit
Damage to gears kit
Crank mechanism kit
Cavitation in pumps kit
Vibrations in fans kit
Electromechanical vibrations kit
Brake & load unit
Laboratory trolley
Two displacement sensors
PC1 Computer-System with 21" TFT-Monitor Win 10 engl.

Specification:
Base unit for machinery diagnostic training system
Rigid base plate with workpiece holder slots
Drive motor with variable speed via frequency converter
Digital speed and power display
2 shafts: 1x short, 1x long
2 unbalanced flywheels with interchangeable balance weights
Bearing blocks, roller bearings, interchangeable
Fixing holes for vibration measuring sensor
Flexible claw coupling and controlflex^r^ coupling
Motor can be aligned obliquely and transversally
Transparent protective hood
Stackable system for components

Technical Data:
Base plate Length x Width: 1100x800mm
M8-slots, spacing 50mm
Asynchronous motor with frequency converter
Drive power output: 0,37kw
Nominal speed: 2800rpm
Speed range via frequency converter 100...6000rpm
Display and control unit with digital power and speed display
2 shafts: Ã˜=20mm, length 300mm, 500mm
2 unbalanced flywheels: Ã˜=150mm, each 1675g, with interchangeable balance weights (bolts)
2 bearing blocks with roller bearings 6004 (can be exchanged)
Control flex ^R^ coupling: nominal torque: 15Nm
230V, 50Hz, 1 phase
230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase
230V, 60Hz, 3 phases
Dimensions and Weight
Length x Width x Height: 1100x800x500mm (base plate + hood)
Length x Width x Height: 475x420x200mm (control unit)
Length x Width x Height: 600x390x325mm (storage system)
Weight: 95kg (total)
1. Laboratory trolley
Trolley for the Machinery diagnostic system,
Blocan section, aluminium
4 castors, with brake

Technical Data:
Top area, Length x Width: 1100x770mm

Dimensions and Weight
Length x Width x Height: 1100x770x820mm
Weight: 39kg

2. Computerised vibration analyser
Within the context of the experiments in the complete Machinery diagnostic system, the following learning can be covered:
Familiarisation with vibration signals
Correct application of FFT analysis
Measurement of speed, vibration displacement, vibration velocity and acceleration
Assessment of the vibration state of a machine
Damage analysis of roller bearings and gears by means of envelope spectra
Detection of cracks in shafts by means of run-up curves and order analysis
Measurement of imbalance vibrations and field balancing of rigid rotors in 1 and 2 planes
Software for data acquisition via USB under Windows 7, 8.1, 10
Including PC1 Computer-System with 21" TFT-Monitor Win 10 engl.

Technical Data:
Acceleration sensors
Frequency range: 1...10000hz
Sensitivity: 100mv/g
Resonance frequency: 32khz
Optical speed sensor
Sampling width: 3...150mm
Laser class ii, 675nm
Measuring amplifier
Adjustable gain: x1, x10, x100
Powered by 12vdc power supply unit
Length x Width x Height: 230x220x80mm
USB box
16x analogue in, 2x analogue out
Each 4x digital in/out
230V, 50Hz, 1 phase
230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase
Dimensions and Weight
Length x Width x Height: 600x400x220mm (storage system)
Weight: 6kg

3. Brake & load unit
Technical Data
Continuous braking power: 450W/3000rpm
Transmission ratio between brake shafts: i=3
Direct brake operation
Speed range: 200...2000rpm
Braking torque: 1...10nm
Operation via belt drive
Speed range: 600...6000rpm
Braking torque: 0,3...3,3nm
230V, 50Hz, 1 phase
230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase
Dimensions and Weight
Length x Width x Height: 460x410x200mm (display and control unit)
Length x Width x Height: 600x400x320mm (storage system)

Weight: 30kg

4. Elastic shaft kit
Technical Data:
Elastic shaft
Min. Diameter: Ã¸=10mm
Diameter at bearings: Ã¸=20mm
Length: 530mm
Nominal length between bearings: 450mm
Dimensions and Weight
Length x Width x Height: 600x400x120mm (storage system)
Weight: 6kg

5. Crack detection in rotating shaft kit
Technical Data:
Flange diameter: Ã˜=90mm
6 hexagon flange bolts M8x20
Shafts
Diameter: Ã˜=20mm
Short shaft: L=85mm
Long shaft: L=200mm
Max. Permissible bending torques
Short shaft for belt pulley: 15,9Nm
Long shaft for mass disk: 3,9Nm
Dimensions and Weight
Length x Width x Height: 400x300x120mm (storage system)
Weight: 3kg

6. Roller Bearing Faults Kit
Technical Data:
Pendulum ball bearing
Inside diameter: Ã˜=20mm
Outside diameter: Ã˜=47mm
Width: 14mm
Number of rollers: 12
Dimensions and Weight
Length x Width x Height: 400x300x120mm (storage system)
Weight: 4kg

7. Couplings kit
Technical Data:
Pin coupling
1x centric pin
1x eccentric pin
Eccentricity of pin: 1mm
Max. Pitch fault: 180Â° Â±1,909Â°
Coupling stars for claw coupling
98 Shore A (red)
92 Shore A (yellow)
64 Shore D (green)
80 Shore A (blue, included in Machinery diagnostic system)
Flange coupling
Radial run-out (centre offset): 0,2mm

Axial run-out: 0,4 Â±0,1mm
Dimensions and Weight
Length x Width x Height: 400x300x170mm (storage system)
Weight: 6kg

8. Belt drive kit
Technical Data:
V-belt pulleys
Large: Ã˜=125mm
Small: Ã˜=63mm
Small, eccentric: Ã˜=63mm
Axle centres: 300mm
V-belt
SPZ, 10mm wide
Belt length: 912mm
Dimensions and Weight
Length x Width x Height: 600x400x170mm (storage system)
Weight: 6kg

9. Damage to gears kit
Technical Data:
Transmission ratio i: 1:3
Centre distance adjustable
Reference profile to DIN 867
Spur toothed gear sets
Gear wheel: 75 teeth on each, m=2mm
Pinion: 25 teeth on each, m=2mm
Helical gear sets
Gear wheel: 75 teeth on each, m=2mm
Pinion: 25 teeth on each, m=2mm
Helix angle: 10Â°
Dimensions and Weight
Length x Width x Height: 600x400x320mm (storage system)

10. Crank mechanism kit
Technical Data:
Stroke: 50 - 75 - 100mm
Balance mass total
490g, rated for operation with 50mm stroke
Bearing clearance: 0...1mm
Pressure spring
Relaxed length: 170mm
Spring stiffness: r=0,55N/mm
Dimensions and Weight
Length x Width x Height: 600x400x170mm (storage system)
Weight: 8kg

11. Cavitation in pumps kit
Technical Data:
Centrifugal pump
Max. Flow rate at 3300rpm: 17l/min
Max. Head at 3300rpm: 12m
Impeller with 3 blades

Min. Speed for cavitation: 2240rpm (with restriction on intake side)
Tank
Material: HDPE
Capacity: 20L
Manometer
Delivery side: 0...4bar
Intake side: -1...1,5bar
Dimensions and Weight
Length x Width x Height: 600x400x320mm (storage system)
Weight: 16kg

12. Vibrations in fans kit
Technical Data:
Sheet-steel fan rotor
3 blades
5 blades
7 blades
Ã˜ 204mm
Speed: 3000rpm
Protective disk, made of aluminium
Ã˜ 220mm
Dimensions and Weight
Length x Width x Height: 400x300x320mm (storage system)
Weight: 6kg

13. Electromechanical Vibrations Kit & Two Displacement Sensors
Influence of the gap on vibration behaviour
Influence of electromagnetic asymmetry on vibration behaviour
Influence of the load on the level of vibration
Influence of the gap on electromagnetic losses and efficiency
Influence of speed on vibration behaviour
Understanding and interpreting frequency spectra
Use of a computerised vibration analyser
In conjunction with a current measuring probe
Measurement of current consumption per phase

Technical Data:
Asynchronous motor with variable speed
Speed range: 100...6000rpm
Nominal power output: 370w
Eccentricity of armature: 0...0,2mm
Dimensions and Weight
Length x Width x Height: 400x300x320mm (storage system)
Weight: 11kg.