

# JobMaster Mechanical Series



## Industrial Maintenance Training Platform



The JobMaster® Mechanical Training Program is a robust, modular and stand-alone CTE solution providing comprehensive training in mechanical power transmission for students to integrate into industry jobs. The skills-based training is built with real-world industry in mind and is structured to deliver learning via job tasks in formats that students will see when they work in actual plants.

The all-in-one trainer features industrial-strength components housed in a modular and mobile framework with a customized modular storage system. Designed for ease of use, the trainer can be installed on the optional mobile base or any suitable workbench for single sided, or dual sided use, and can be customized to include the training components needed for your course structure.

The solution features six levels of mechanical elements including the basic and advanced machines, shafts, bearings, belt drives, chain drives, gear drives, couplings, brakes & speed reducers, laser alignment, vibration analysis and bearing maintenance.

The JobMaster Mechanical Training series provides a superior blended learning solution for training to prepare students for jobs in manufacturing and industrial maintenance by combining industrial-grade components with engaging e-learning curriculum.

### Learning Systems Designed for:

- Technical Schools
- Vocational Schools
- Colleges and Universities
- Training Institutes (government, NGO and private)

### Supports Curriculum for:

- Industrial Maintenance Programs
- Career Development Programs
- Manufacturing Design Programs

# Detailed Description of the Mechanical Training Series

The JobMaster training series for Industrial Maintenance technicians is a skills driven, task based training program ideal for high school, technical school, college and university programs to deliver hands-on skills to prepare students for careers in industry.

Integrated with Intelitek curriculum, the system offers in-depth theory and workplace training. The courses from Intelitek prepare students to work with actual equipment they will find in the field.

Using standard mountings and flexible modules, the training can be configured, dismantled and reconfigured regularly. The equipment is designed for ease of mobility to allow flexible classrooms and easy storage. The modular and flexible design and optional mobile bench can facilitate one large classroom or multiple smaller classes simultaneously.

## Features:

- Modular design
- Single or Double sided configuration
  - Independent groups on single workbench
  - Supports identical or different setups
- Mobile with everything onboard for easy transportation between classrooms
- Rugged, industrial design
- Standard mounting hardware
- Mobile Bench available
  - Same mobile bench used for JobMaster Electrical Series

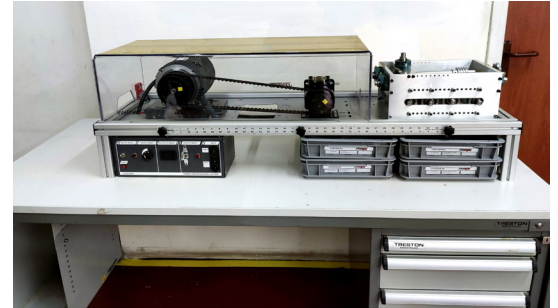
## System Components

### Mechanical Training Working Surface

Standalone working surface setup suitable for use with Intelitek Mobile Bench or other workbenches

Single or Double sided configuration

Dimensions: 52" x 32" x 8"  
(LxWxH) 1310mm x 800mm x 203mm



### Lab Hardware Kits

Hardware kits with industrial grade training components

- Coupling Kit
- Shaft, Bearing Kit
- Sheave, Pulley, Sprocket Kit
- Motor/Speed Reducer Kit
- Gears Kit
- C-Brake/Speed Reducer Kit
- Gear Box Kit
- Laser Alignment Kit
- Vibration Analysis Kit
- Bearing Kit (standalone)



### Mobile Bench for Mechanical Training

Optional mobile cart used for JobMaster Mechanical or Electrical series.

Dimensions: 52" x 32" x 32"  
(LxWxH) 1310mm x 800mm x 800mm



Single sided setup shown on the top of the optional Mobile Bench

Mobile mechanical bench showing Electrical trainer panel used on reverse side of cart



## Flexible, Modular, Mobile Platform for Career and Technology Education

# JobMaster Mechanical Training Learning Plans

The JobMaster Mechanical Training presents the operating principles of power transmission in the most effective way: with skills-based training using the same industrial-strength components used in factory environments. Below is an outline of the content, hardware and curriculum included with each training level.

## Level 1

Mechanical Training Level 1 Bundle includes the tabletop working surface for mechanical training and curriculum for Basic Machines, Machine Statics & Dynamics, Shafts & Keys, Bearings.

The single bench setup for two students or double bench setup for four students includes all the hardware and curriculum for the four (4) learning modules.

### Level 1 bundle includes

- Mechanical Training Working Surface
- Coupling Kit for Mech Training
- Shaft, Bearing Kit for Mech Training
- Accessory Kit 1

The mobile bench is not included.

### Skills Curriculum Included

- ME01 - Basic Machines
  - Measurement
  - Torque
  - Work
  - Power
  - Horsepower
  - Friction
  - Velocity
  - Acceleration
  - Mass and Inertia
- ME02 Machine Statics & Dynamics
  - Identify Stress, Strain and Combined Stresses
  - Identify Material Fatigue and Fatigue Stress Points
  - Identify Fatigue Failure and Failure Modes
- ME03 - Machine Shafts & Keys
  - Measuring and Verifying Shafts
  - Demonstrating Shaft Expansion Principles
  - Measuring Eccentricity and Shaft Runout
  - Demonstrating Shaft Key Principles
  - Preparing a Key from Keystock
  - Shaft Troubleshooting and Failure Analysis
- ME04 - Bearings
  - Identifying Bearing Types
  - Reading Bearing Dimensions
  - Mounting Bearing Housings
  - Reading a Tolerance Chart
  - Bearing Troubleshooting and Failure Analysis

### Optional Accessories/Add-ons

- Mobile Bench
- Shelf Set
- Laser Alignment Bundle
- Vibration Analysis Bundle
- Bearing Maintenance Bundle

## Level 2

Mechanical Training Level 2 Bundle continues from the Level 1 training and includes training for Belt Drives, Chain Drives, and Machine Shaft Coupling.

The add on set for two students or four students includes all the hardware and curriculum for the three (3) learning modules.

**Prerequisites:** JobMaster Mechanical Training Level 1 is required

### Level 2 bundle includes

- Sheave, Pulley, Sprocket Kit
- Motor/Speed Reducer Kit
- Accessory Kit 2

The mobile bench is not included.

### Skills Curriculum Included

- ME05 - Belt Drives
  - Demonstrating Belt Drive Ratio Principles
  - Installing Belt Drives
  - Aligning a Belt Drive
  - Belt Tensioning
  - Installing Adjustable Speed Sheaves
  - Installing Positive Drive Systems
  - Belt Troubleshooting and Maintenance
- ME06 - Chain Drives
  - Demonstrating Roller Chain & Sprocket Principles
  - Sizing Chain
  - Installing and Aligning Sprockets
  - Installing Chain Drives
  - Adjusting Slack
  - Troubleshooting and Maintenance
- ME07 - Machine Shaft Couplings
  - Identifying Shaft Couplings
  - Correcting Soft Foot
  - Aligning Shafts
  - Aligning Rims and Faces
  - Connecting Chain Couplings
  - Connecting Universal Joints


**4.3: Skill Drill**

**4.3.3: Measuring Alignment**

3. Using the setup from the previous Skill Drill, turn on the display unit and enter the **ABC dimensions**.

4. The position circle in the upper left corner of the screen should start to flash with the dot at the **9 o'clock position**. Loosen the clamp journal and rotate the coupling with both units on it to the 9 o'clock position with the aid of the levels. Tighten the clamp journals to stop the shaft from rotating.

5. Press the right arrow key to record the measurement at this position. After a few seconds the position circle should start flashing with the dot at the 3 o'clock position.



Inteltek's LearnMate Learning Management System showing a parts of the Mechanical Series Curriculum

## Level 3

Mechanical Training Level 3 Bundle continues from the Level 2 training and includes training for Gear Drives, Machine Speed Reducers and Electric Brakes.

The add on set for two students or four students includes all the required hardware and curriculum for the three (3) learning modules. Single bench setup for two students

**Prerequisites:** JobMaster Mechanical Training Level 1 and Level 2 is required

### Level 3 bundle includes

- Gears Kit
- C-Brake/Speed Reducer Kit
- Gear Box Kit

The mobile bench is not included.

### Skills Curriculum Included

- ME08 - Gear Drives
  - Demonstrating Gear Measurement Principles
  - Installing a Worm Gear Drive
  - Installing a Spur Gear Drive
  - Measuring Backlash
  - Installing a Helical Gear Drive
  - Installing a Bevel Gear Drive
  - Maintaining and Troubleshooting Gear Drives
- ME09 - Machine Speed Reducers
  - Demonstrating Basic Speed Reducer Principles
  - Selecting a Speed Reducer
  - Maintaining & Troubleshooting Speed Reducers
- ME10 - Electric Brakes
  - Operating Electric Brakes
  - Installing Electric Brakes
  - Maintaining & Troubleshooting Electric Brakes

#### 1.4: Skill Drill

Perform the following:

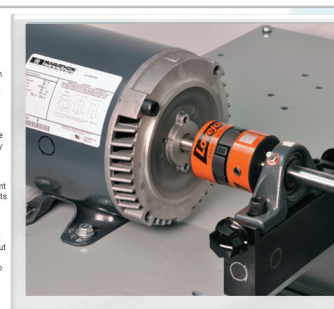
1. Place the electric brake on the bench top and remove its outer casing.
2. Inspect the inner workings of the fail-safe brake. Note how the input hub on the friction disk does not move when the brake is not energized.
3. Locate the manual release on the outside of the brake housing. With a flathead screwdriver, rotate the release until the stud is vertical. This moves the armature away from the friction disk and frees the input hub.



#### 5.3: Skill Drill

**5.3.4: Shaft Misalignment**

7. Assemble the jaw coupling, tighten down the pillow blocks, tighten the set screws onto the shaft, and attach the balanced rotor to the end of the shaft.
8. Fill out the appropriate fields on the maintenance log before beginning any tests.
9. Mark the journal mounts at the appropriate locations with a permanent marker so that vibration measurements can be repeated. See Skill Drill 2 for reference.
10. For each location denoted on the maintenance log, attach the probe, put on the safety shield and release lockout/tagout. Turn the system on to 1650 RPM and verify the speed with the photo-tachometer.



# JobMaster Mechanical Training - Optional Add Ons

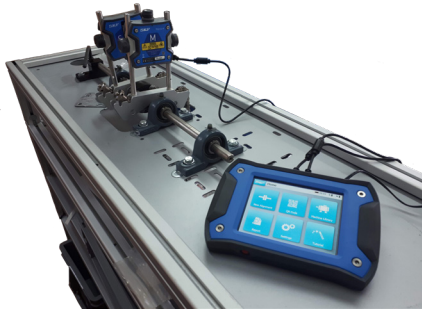
## Laser Alignment

The Laser Alignment Training package is an optional supplement to the JobMaster Mechanical Training Series. This option adds laser tools for both shaft and belt alignment along with all the hardware needed to deliver comprehensive instruction in all aspects of Laser Alignment.

**Prerequisites:** JobMaster Mechanical Training Level 1 and Level 2 is required

### Skills Curriculum Included

- ME11: Laser Alignment
  - Aligning a Belt Drive
  - Aligning a Coupling
  - Correcting for Soft Foot
  - Filling Out an Alignment Report



## Vibration Analysis

The Vibration Analysis Training package is an optional supplement to the JobMaster Mechanical Training Series. This option adds a digital vibration analyzer, shafts, rotors and other industrial-grade components to deliver comprehensive instruction in all aspects of vibration analysis

**Prerequisites:** JobMaster Mechanical Training Level 1 and Level 2 is required

### Skills Curriculum Included

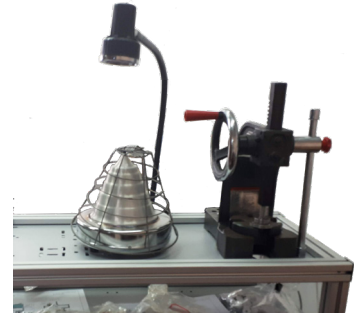
- ME12: Vibration Analysis
  - Reading a Vibration Severity Chart
  - Filling Out a Maintenance Log
  - Measuring the Vibration of a Motor
  - Measuring the Axis and Location of Vibration
  - Measuring Shaft Misalignment
  - Troubleshooting Misaligned Shaft Vibration
  - Measuring Coupling Vibration
  - Troubleshooting Bent Shaft Vibration
  - Troubleshooting Defective Shaft
  - Component Vibration
  - Troubleshooting Resonant Vibration
  - Demonstrating Vibration Source Principles

## Bearing Maintenance

The Bearing Maintenance Training kit covers installing, removing and servicing plain and roller bearings. Students learn the principles of proper bearing service and work with a bearing packer, bearing pullers, an arbor press, grease gun and various bearing types. The bearing kit is a standalone kit that mounts on the mechanical series cart or any workbench.

### Skills Curriculum Included

- ME13: Bearing Service
  - Identifying Anti-Friction Bearings & Plain Bearings
  - Using an Arbor Press & a Bearing Puller
  - Installing and Removing Bushings
  - Using a Cone Heater
  - Loading a Grease Gun & Greasing a Pillow Block
  - Hand Packing a Bearing
  - Using a Bearing Packer
  - Demonstrating Bearing Seal Principles
  - Performing Bearing Failure Analysis



## Reconfigurable Platform Supports Multiple Learning Configurations

Catalog Number	JM-MBL1-000x	JM-MBL2-000x	JM-MBL3-000x	JM-MBL4-0000	JM-MBL5-0000	JM-MBL6-000x	00-1800-0001/ 10-1800-0001
<b>Includes</b>	Tabletop working surface, hardware kit, curriculum (4), skill exercises	Hardware kit, curriculum (3), skill exercises	Hardware kit, curriculum (3), skill exercises	Laser alignment hardware kit, curriculum (1), skill exercises	Vibration analysis hardware kit, curriculum (1), skill exercises	Bearing maintenance hardware, curriculum (1), skill exercises	Mobile Workbench/ Shelf Set for Mobile Bench
<b>Training Level and Content</b>							
<b>Mechanical Series Level 1</b> Mechanical Training starter level with Couplings, Shafts, Bearings and Curriculum	√						Optional
<b>Mechanical Series Level 2</b> Level 2 includes Sheaves, Pulleys, Chains, Motor/Speed Reducers and Curriculum	Required	√					Optional
<b>Mechanical Series Level 3</b> Level 3 includes Gears, C-Brake/Speed Reducer, GearBoxes and Curriculum	Required	Required	√				Optional
<b>Mechanical Series - Laser Alignment</b> Add on Level 4 includes Laser Alignment and Curriculum	Required	Required		√			Optional
<b>Mechanical Series - Vibration Analysis</b> Add on Level 5 includes Vibration Analysis and Curriculum	Required	Required			√		Optional
<b>Mechanical Series - Bearing Maintenance</b> Add on Level 6 includes Bearing Maintenance and Curriculum						√	Optional

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