Center Lapping Machine Maintenance Manual

Shree Tech SPM Industries (India)

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1) Introduction

Basic Introduction

The **Shree Tech SPM Industries (India)** Cone Centre Lapping Machine, Model **Adv. 1001**, is a high-precision lapping machine designed specifically for finishing 60-degree centers. It is used to improve the accuracy of center holes, correcting minor errors that may arise from hardening or rough turning operations. This process ensures greater accuracy in subsequent grinding and machining when performed between centers.

Technical Details:

- **Make**: Shree Tech SPM Industries (India)
- **Model**: Adv. 1001
- **Cone Angle of Centre Holes**: 60 degrees
- **Distance from Spindle Centre to Column**: 280 mm
- **Maximum Length of Job**: 900 mm
- **Max. Diameter of Centre Holes**: 60 mm
- **Max. Diameter of Abrasive Lap**: 60 mm
- **Spindle Speeds**: Up to 1440 RPM (adjustable via VFD)
- **Spindle Vertical Feed Travel**: 160 mm

This machine is in **excellent working condition** and is designed for precision tasks with reliable performance.

How to Use This Manual

This manual is structured to provide a step-by-step guide for machine setup, operation, maintenance, and troubleshooting. Each section is organized to help users safely and efficiently operate and maintain the center lapping machine.

General Safety Precautions

1. Always wear appropriate Personal Protective Equipment (PPE) while operating the machine.
2. Ensure all guards are in place before starting the machine.
3. Avoid wearing loose clothing or accessories that may get caught in moving parts.

Machine-Specific Safety Precautions

1. Confirm that the machine is correctly anchored and aligned before starting.
2. Only authorized personnel should adjust the spindle speeds or perform maintenance.
3. Regularly inspect and replace abrasive laps as needed for optimal performance.

Risk Assessment & Hazard Mitigation

To minimize risks, it is essential to assess potential hazards during machine operation and maintenance.

Risk Assessment Checklist

1. Check electrical connections for stability and insulation.
2. Inspect the lapping tool and ensure it is free of cracks or damage.
3. Ensure all control settings are set correctly.

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2) Overview

Features & Components

The **Shree Tech SPM Industries Cone Centre Lapping Machine** is equipped with high-quality components, designed to ensure accuracy and durability. Each part has been engineered for optimal performance and ease of maintenance.

a) Main Head

- **MT3 Taper Spindle**: Provides a stable and secure fit for the tool, enhancing accuracy during operation.
- **Head Locking Handle**: Allows the main head to be locked securely in position during lapping, ensuring stability.
- **Spindle Locking Handle**: Facilitates easy locking and unlocking of the spindle, allowing for quick adjustments as needed.

b) Dressing Unit

- **Angle Adjustment**: Capable of setting angles up to 60 degrees for precise dressing operations.
- **Fine Feed Adjustment**: The dresser is gradually fed upward using a fine-threaded feed, ensuring delicate adjustments during dressing.
- **Vertical Movement**: The dresser moves vertically with the aid of a rack-and-pinion mechanism, providing smooth and controlled movement.

c) V Steady Slide

- **Adjustable V-Support**: Allows adjustment to fit various work piece diameters. It's designed to provide stable support to work pieces based on their outer diameter (OD).
- **Vertical Adjustment and Locking**: The slide can be vertically positioned and securely locked according to job requirements, ensuring accurate alignment.

d) Job Resting Slide

- **Vertical Sliding Mechanism**: Moves only in the vertical direction, ensuring consistent positioning of the work piece.
- **60-Degree Center Cone**: Fitted with a center cone specifically designed at a 60-degree angle for optimal alignment during lapping.
- **Locking Handle**: Secures the job resting slide in place, maintaining stability during operations.

e) Column and Base

- **Vertically Positioned Column**: Heavy and precisely manufactured for stability and accuracy. Ensures proper alignment for consistent operation.
- **Balanced Base with Leveling Features**: The base is designed to maintain machine balance, with grouting holes provided for secure installation on shop floors.
- **High Precision**: Both the column and base are manufactured to maintain high accuracy in operations, even for heavy-duty tasks.

Specifications

1. **Maximum Diameter Held in V Steady**: 60 mm
2. **Maximum Work piece Diameter**: 100 mm
3. **Maximum Work piece Length**: 900 mm
4. **Maximum Diameter of Lapping Wheel (with Wheel Adapter)**: 60 mm
5. **Spindle Speeds**: Up to 1400 RPM (adjustable with VFD)
6. **Spindle Motor**: CG Make, 1 HP
7. **Diameter of Grinding Wheel Shank**: 15 mm
8. **Maximum Chucking Diameter of Collet**: 19 mm
9. **Spindle Traverse**: 160 mm
10. **Dressing Diamond Traverse**: 35 mm
11. **Net Weight**: Approximately 300 kg

This detailed overview section provides a comprehensive understanding of the machine's key features and components, ensuring that operators and maintenance personnel are well-acquainted with its capabilities and design attributes.

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3) Setup

Receipt & Inspection

Inspect the machine upon delivery. Check for visible damage and confirm all parts are included as per the packing list.

Assembly Parts

Assemble all parts according to the manufacturer's guidelines, ensuring each part is securely fastened.

Base Anchoring

Anchor the machine to a solid base to reduce vibration and maintain alignment.

Location & Alignment of Machine

Position the machine in a well-ventilated area. Verify alignment using leveling instruments for precision.

Installation

Follow the installation procedures for connecting electrical and hydraulic components as per guidelines.

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4) Operation

Pre-operation Checks

1. Inspect all moving parts for wear or misalignment.
2. Confirm that safety guards are in place.

Electric Motor & Panel Operation

Ensure the control panel is functional. Start the motor as per operating procedures.

Mechanical Operation

Set the machine to the desired parameters. Check for smooth and steady operation.

Dressing Unit Operation

Operate the dressing unit as per the instructions, ensuring it is correctly aligned with the lapping process.

Lapping Process for Center Lapping Machine

Step-by-step instructions for the lapping process:

1. Set the spindle speed based on job requirements.

2. Position the workpiece correctly.
3. Engage the lapping tool and monitor for any signs of irregularities.

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5) Maintenance

Maintenance Checklist

- **Daily**: Check for any wear on parts.
- **Weekly**: Inspect lubrication levels and clean surfaces.
- **Monthly**: Check alignment and safety mechanisms.

Lubrication Approved

Use only approved lubricants as specified for this machine.

Lubricating Machine Parts and Greasing

Apply lubricant to moving parts as needed. Follow greasing schedule for optimal performance.

Troubleshooting

- **Problem**: Vibration during operation
    - **Solution**: Check for worn or damaged parts; re-anchor machine if necessary.
- **Problem**: Poor finish on workpiece
    - **Solution**: Inspect lapping tool and replace if worn.

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6) Storage & Shipping

Storage

Store the machine in a clean, dry location. Cover to prevent dust accumulation.

Shipping

For transport, disassemble parts as needed and pack securely to prevent damage.