ORIGINAL INSTRUCTIONS

Installation, Setup and Operation

INSTRUCTIONS

for

SUNNEN® HTE-SERIES TUBE HONE

Model: HTE-1600WE/WCE & HTE-1600WG/WCG

READ THE FOLLOWING INSTRUCTIONS THOROUGHLY AND CAREFULLY BEFORE UNPACKING, INSPECTING, OR INSTALLING THE SUNNEN® TUBE HONE.

SUNNEN® PRODUCTS COMPANY • 7910 MANCHESTER ROAD • ST. LOUIS, MO 63143, U.S.A. • PHONE: 314-781-2100

GENERAL INFORMATION

The Sunnen® equipment has been designed and engineered for a wide variety of parts within the capacity and limitation of the equipment. With proper care and maintenance this equipment will give years of service.

READ THE FOLLOWING INSTRUCTIONS CAREFULLY AND THOROUGHLY BEFORE UNPACKING, INSPECTING, OR INSTALLING THIS EQUIPMENT.

IMPORTANT: Read any supplemental instructions BEFORE installing this equipment. These supplemental instructions give you important information to assist you with the planning and installation of your Sunnen equipment.

Sunnen Technical Service Department is available to provide telephone assistance for installation, programming, & troubleshooting of your Sunnen equipment. All support is available during normal business hours, 8:00 AM to 4:30 PM Central Time.

Review all literature provided with your Sunnen equipment. This literature provides valuable information for proper installation, operation, and maintenance of your equipment. Troubleshooting information can also be found within the Instructions. If you cannot find what you need, call for technical support.

Where applicable, programming information for your Sunnen equipment is also included. Most answers can be found in the literature packaged with your equipment.

Help us help you. When ordering parts, requesting information, or technical assistance about your equipment, please have the following information available:

- Have ALL MANUALS on hand. The Customer Services Representative or Technician will refer to it.
- Have Model Number and Serial Number printed on your equipment Specification Nameplate.
- Where Applicable: Have Drive model and all nameplate data. Motor type, brand, and all nameplate data.

For Troubleshooting, additional information may be required:

- Power distribution information (type - delta, wye, power factor correction; other major switching devices used, voltage fluctuations)
- Installation Wiring (separation of power & control wire; wire type/class used, distance between drive and motor, grounding).
- Use of any optional devices/equipment between the Drive & motor (output chokes, etc.).

For fast service on your orders call:

Sunnen Automotive Customer Service toll free at: 1-800-772-2878
Sunnen Industrial Customer Service toll free at: 1-800-325-3670
Customers outside the USA, contact your local authorized Sunnen Distributor.
Additional information available at: http://www.sunnen.com or e-mail: sunnen@sunnen.com

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ESD PREVENTION REVIEW

Let's review the basics of a sound static control system and its effective implementation. First, in the three step plan:

1. Always ground yourself when handling sensitive components or assemblies.
2. Always use a conductive or shielded container during storage or transportation. These materials create a Faraday cage which will isolate the contents from static charges.
3. Open ESD safe containers only at a static safe work station.

At the static safe work station, follow these procedures before beginning any work:

A. Put on your wrist strap or foot grounding devices.

B. Check all grounding cords to make sure they are properly connected to ground, ensuring the effective dissipation of static charges.

C. Make sure that your work surface is clean and clear of unnecessary materials, particularly common plastics.

D. Anti-static bubble wrap has been included for use at the machine when an ESD safe workstation is not available.

You are now properly grounded and ready to begin work. Following these few simple rules and using a little common sense will go a long way toward helping you and your company in the battle against the hazards of static electricity. When you are working with ESD sensitive devices, make sure you:

GROUND

ISOLATE

NEUTRALIZE

SUNNEN® LIMITED PRODUCT WARRANTY

Sunnen® Products Company and its subsidiaries (SPC) warrant that all new SPC honing machines, gaging equipment, tooling, and related equipment will be free of defects in material and/or workmanship for a period of one year from the date of original shipment from SPC.

Upon prompt notification of a defect during the one-year period, SPC will repair, replace, or refund the purchase price, with respect to parts that prove to be defective (as defined above). Any equipment or tooling which is found to be defective from improper use will be returned at the customer's cost or repaired (if possible) at customer's request. Customer shall be charged current rates for all such repair.

Prior to returning any SPC product, an authorization (RMA) and shipping instructions must be obtained from the Customer Service Department or items sent to SPC will be returned to the customer.

Warranty Limitations and Exclusions This Warranty does not apply to the following:

- Normal maintenance items subject to wear and tear: (belts, fuses, filters, etc).
- Damages resulting from but not limited to:
  - › Shipment to the customer (for items delivered to customer or customer's agent F.O.B., Shipping Point)
  - › Incorrect installation including improper lifting, dropping and/or placement
  - › Incorrect electric power (beyond +/- 10% of rated voltage) including intermittent or random voltage spikes or drops
  - › Incorrect air supply volume and/or pressure and/or contaminated air supply
  - › Electromagnetic or radio frequency interference from surrounding equipment (EMI, RFI)
  - › Storm, lightning, flood or fire damage
  - › Failure to perform regular maintenance as outlined in SPC manuals
  - › Improper machine setup or operation causing a crash to occur
  - › Misapplication of the equipment
  - › Use of non-SPC machines, tooling, abrasive, fixturing, coolant, repair parts, or filtration
  - › Incorrect software installation and/or misuse
  - › Non-authorized customer installed electronics and/or software
  - › Customer modifications to SPC software

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Shipping Damages

Except in the case of F.O.B., Buyer's destination shipments, SPC will not be liable for any settlement claims for obvious and/or concealed shipping damages. The customer bears the responsibility to unpack all shipments immediately and inspect for damage. When obvious and/or concealed damage is found, the customer must immediately notify the carrier's agent to make an inspection and file a claim. The customer should retain the shipping container and packing material.

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Any alteration or reverse engineering of the software is expressly forbidden and is in violation of this agreement.

SPC reserves the right to update the software covered by this agreement at any time without prior notice and any such updates are covered by this agreement.

SAFETY INSTRUCTIONS

READ FIRST

This machine, like any equipment, may be dangerous if used improperly. Please read all warnings and instructions before attempting to use this machine.

Always disconnect power at main enclosure before servicing machine.[1]

Always wear eye protection when operating this machine.

NEVER open or remove any machine cover or protective guard with power "ON." Always disconnect power at main enclosure before servicing this equipment.[1]

DO NOT attempt any repair or maintenance procedure beyond those described in this book. Contact your Sunnen® Field Service Engineer or Technical Services Representative for repairs not covered in these instructions.

Due to the wide variety of machine configurations, all possibilities cannot be described in these instructions. Instructions for safe use and maintenance of optional equipment ordered through Sunnen, will be provided through separate documentation and/or training provided by your Sunnen Field Service Engineer or Technical Services Representative.

DO NOT attempt to defeat any safety device on this machine or on any of the optional equipment.

If specially built automation components are added to this system, be sure that safety is not compromised. If necessary, obtain special enlarged work area safety system from Sunnen Products Co.

[1] DO NOT touch electrical components until main input power has been turned off and *CHARGE* lamps are extinguished. WARNING: The capacitors are still charged and can be quite dangerous.

TABLE OF CONTENTS

APPENDIXES

INTRODUCTION

This Instruction Manual is provided to give the information required to install, operate, and maintain the Sunnen® HTE-Series Tube Hones, models HTE-1600.

As there are numerous Workpieces that can be honed on this machine, all possible combinations cannot be discussed here. The determining factor as to whether a particular part or material can be honed in the machine will come with experience from working with the machine in your shop.

When ordering parts for, or requesting information about your machine, include the serial number of your machine.

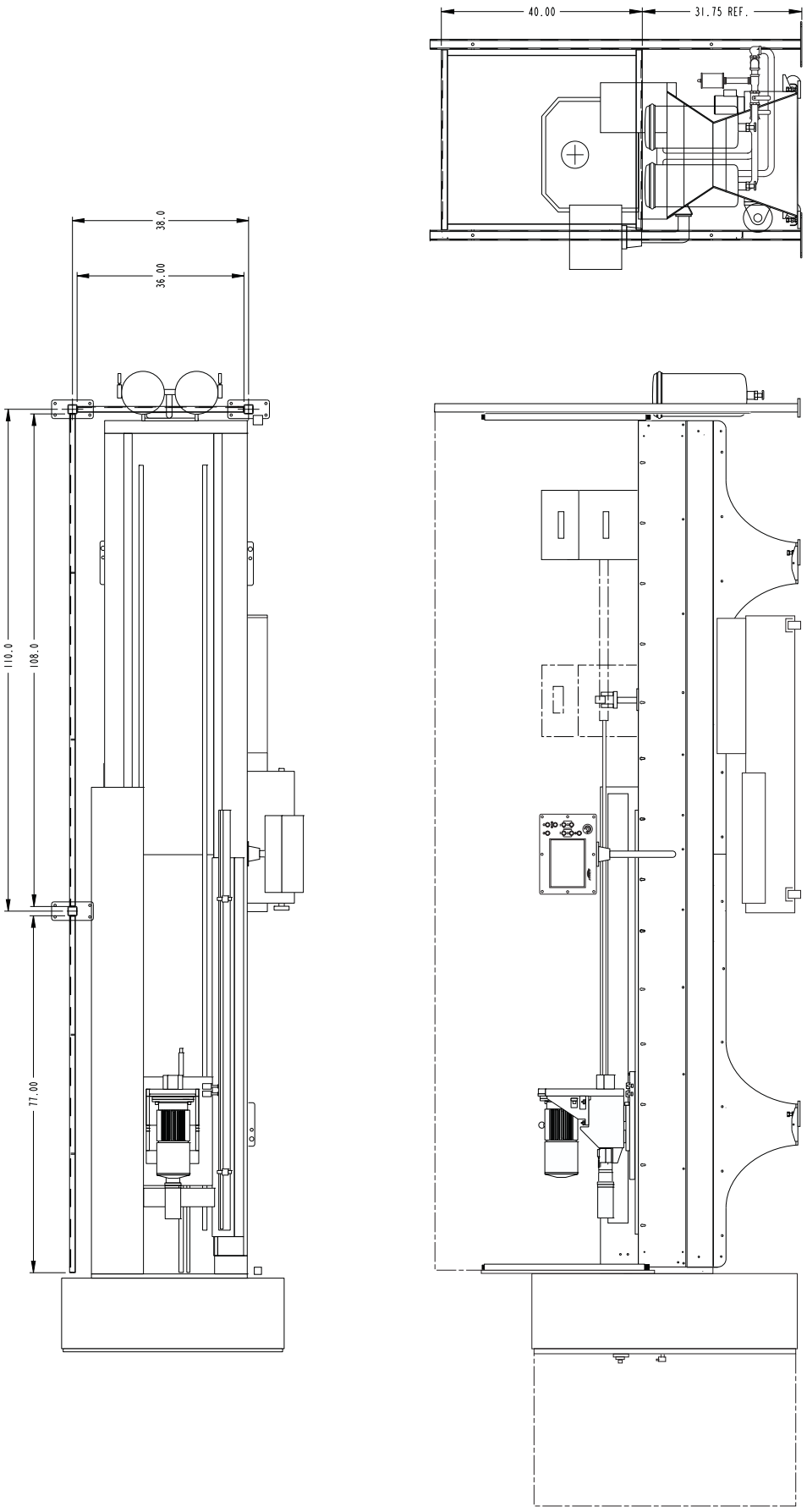
READ THE FOLLOWING INSTRUCTION THOROUGHLY BEFORE UNPACKING, INSPECTING, OR INSTALLING THE SUNNEN® TUBE HONE.

GENERAL INFORMATION & SPECIFICATIONS

SUNNEN HTE-SERIES TUBE HONES

	HTE-1600WE	HTE-1600WG
WORKPIECE Ø RANGE (ID)[1]:	4 - 19 mm (0.15 - .75 in.)[2]	
WORKPIECE Ø RANGE (OD)[1]:	Workholding Fixture Dependent[2]	
MAXIMUM STROKE LENGTH:	1,600 mm (63 in)	
MAXIMUM BORE LENGTH:	1,500 mm (59 in)	
SPINDLE MOTOR:	0,75 kW (1 hP) AC gear motor (variable speed controlled)	
SPINDLE SPEED:	5 - 2100 rpm	
STROKE MOTOR:	2,17 kW (2.9 hP) belt drive	
STROKE RATE:	1 - 30 mpm (3.3 - 98.4 fpm)	
FEED MOTOR:	0,42 kW (0.56 hP) Servo Controlled (linear push/pull)	
COOLANT CAPACITY:	182 L (48 gal.)	
COOLANT REQUIREMENTS:	Sunnen Industrial Honing Fluids	
FILTER SYSTEM:	Manual paper bed filter with two PF filter	
CONTROLS:	Computechnic Touchpanel OF12270	
LANGUAGES:	English/German/Italian/French/Spanish	
FLOOR SPACE:	5190 L x 1482 W x 1406 H mm (204 x 58.3 x 55.4 in.) Spindle center height to floor 1,100 mm (43-3 in)	
FLOOR WEIGHT (Dry):	1240 kg (2733.7 lbs)	
ELECTRICAL REQUIREMENTS:	460V, 60Hz, 3Ph	400V, 50Hz, 3Ph
PNEUMATIC REQUIREMENTS:	20 lpm @ 0.65-0.85 MPa (5.3 pgm @ 94-123 psi)	

[1] Diameter range, length range, and workpiece weight are contingent on workpiece and application.
[2] Dependent on Workholding Fixture option, contact your local Sunnen Field Service Engineer.



FLOOR PLAN - Sunnen® Tube Hones

SECTION 1
INSTALLATION

PURPOSE

This Section is designed to aid user in unpacking, inspecting, and installing Sunnen® Tube Hone, models HTE-1600. Hereafter, referred to as the Machine.

TOOLS & MATERIALS

The following tools and materials are required for unpacking and installing machine:

Wire Cutters/Strippers	Knife
Screw Driver (Std. nose)	Hammer
Slip-Joint Pliers	Crowbar
Cleaning Solvent	Tin Snips
Hex Wrench Metric	Open End Wrenches
Machinist Level (accuracy .0005”/ft)	

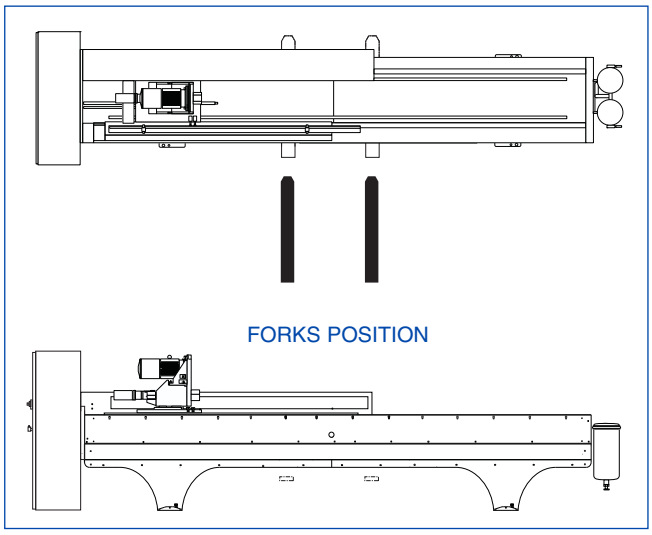


FIGURE 1-1, Lifting Machines

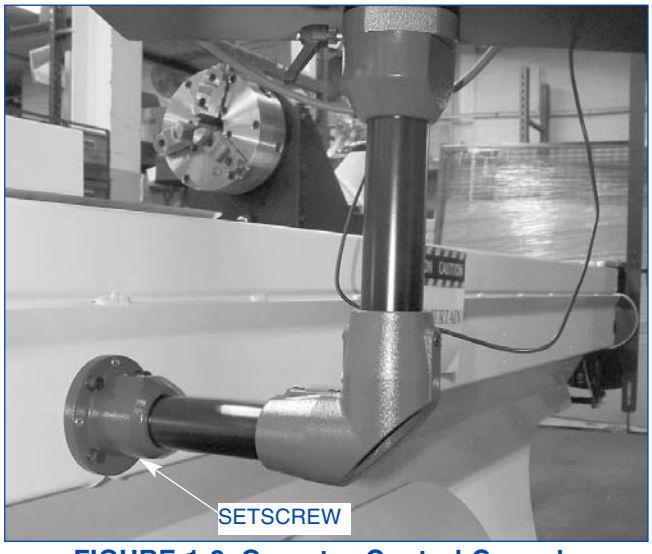


FIGURE 1-2, Operator Control Console

INSTALLATION

Read the following instructions carefully and thoroughly before unpacking, inspecting, and installing the Machine. All references to right and left in these instructions are, unless otherwise noted, as seen by operator as one looks at Machine or assembly being described.

1. Remove heavy duty plastic wrap from around shipping crate.

WARNING

Use safety glasses or goggles when cutting bands.

2. Cut, remove and discard shipping bands.
3. Remove Components from crate.
4. Remove items shipped inside Coolant Reservoir.
5. Remove nuts and bolts securing Hone to bottom of crate.
6. Lift Hone and Enclosure from crate using a fork lift.
7. Inspect Machine and Components for dents, scratches, or damage resulting from improper handling by carrier. If damage is evident, immediately file a claim with carrier.
8. Place Machine in desired location using a fork lift *(see Figure 1-1)*.
9. Remove all packing materials.
10. Position Operator Control Console *(see Figure 1-2)*: Slide Console into Mounting Bracket on side of machine. Align Console and tighten two (2) Setscrews in Mounting Bracket.
11. If not installed: Install and position optional Steady Rest on carriage ways *(see Figure 1-3)*.

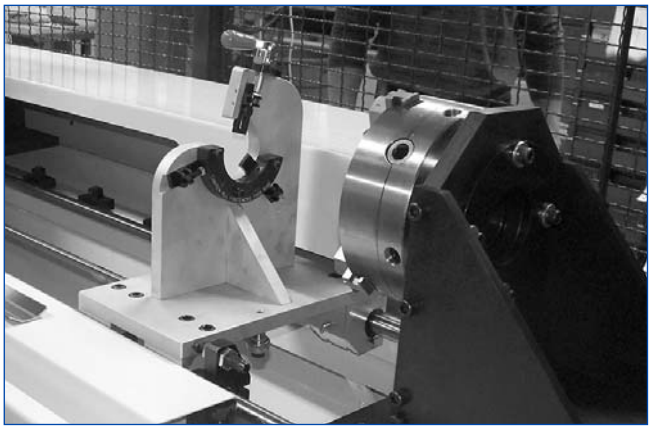


FIGURE 1-3, Steady Rest

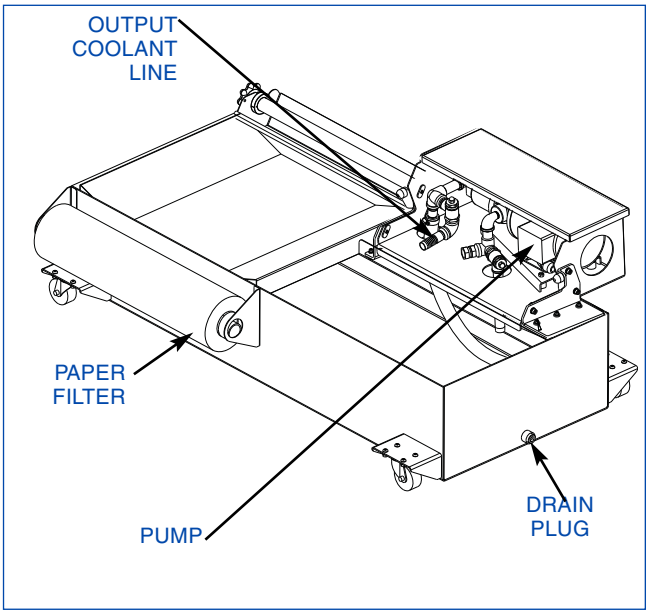


FIGURE 1-4, Coolant Reservoir

12. Install Coolant Reservoir under machine and connect coolant hoses.

- Connect coolant outlet supply lines to machine *(see Figure 1-4)*.
- Connect coolant intake supply lines to Filter Unit *(see Figure 1-5)*.
- Route and connect Pump Electrical Plug to Main Electrical Enclosure.

14. Loosen bolts securing Electrical Enclosure to Machine Base *(see Figure 1-6)*.

15. Using a machinist level, level machine by adjusting Leveling Setscrews in feet, using a 1-1/8 Open End Wrench as follows:

NOTE: Way-Bars should be level within .005"/ft. which is one mark on a Starrette No. 98 Level.

Install steel Pads under Support Feet.
Start by getting the base level across the Way-Bars at both ends (see Figure 1-7a).
Then raise the low end to level the base along its length (see Figure 1-7b).
For permanent installation, secure Machines Support Feet to Floor with appropriate fasteners (not supplied).

16. With Electrical Enclosure resting on its feet; tighten bolts securing Enclosure to Machine Base.

17. Clean Spindle Carriage Ways with solvent to remove antirust and any foreign materials. Lightly lubricate with Mobil Way Oil 300 or equivalent.

ELECTRICAL REQUIREMENTS

All wiring is to be performed by a competent, Licensed Electrician in accordance with all local, state, and federal codes and regulations; along with any special information provided on machine nameplate or electrical specification plate.

FIGURE 1-5, Filter Unit

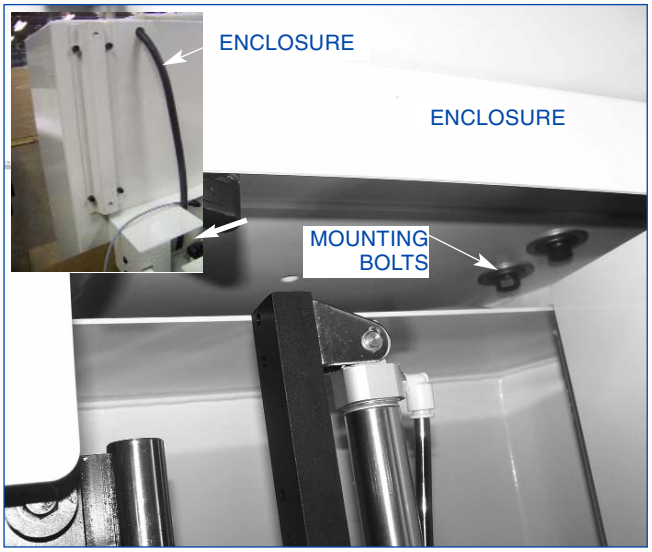


FIGURE 1-6, Electric Enclosure

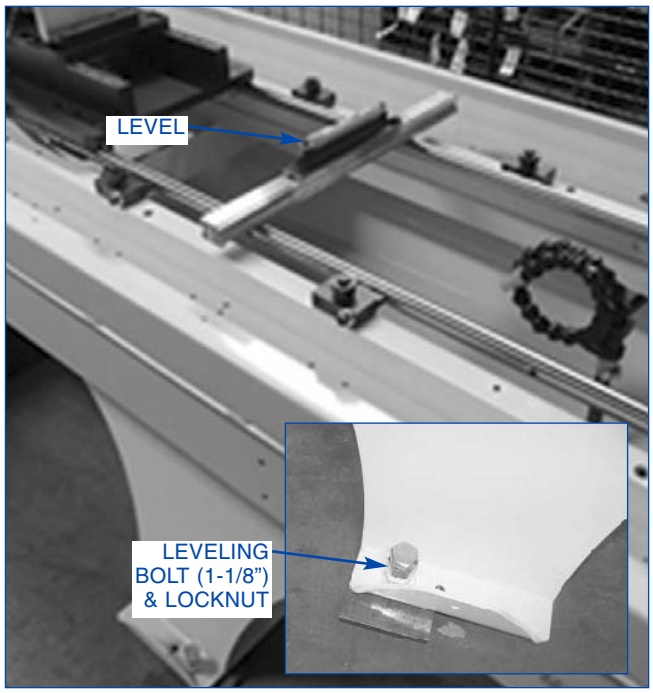


FIGURE 1-7a, Leveling Machine

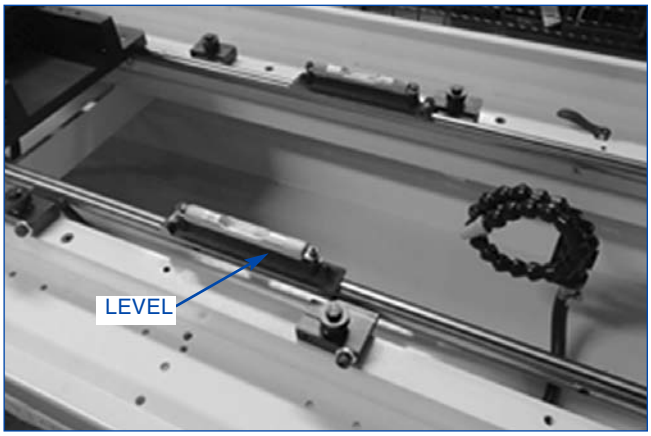


FIGURE 1-7b, Leveling Machine

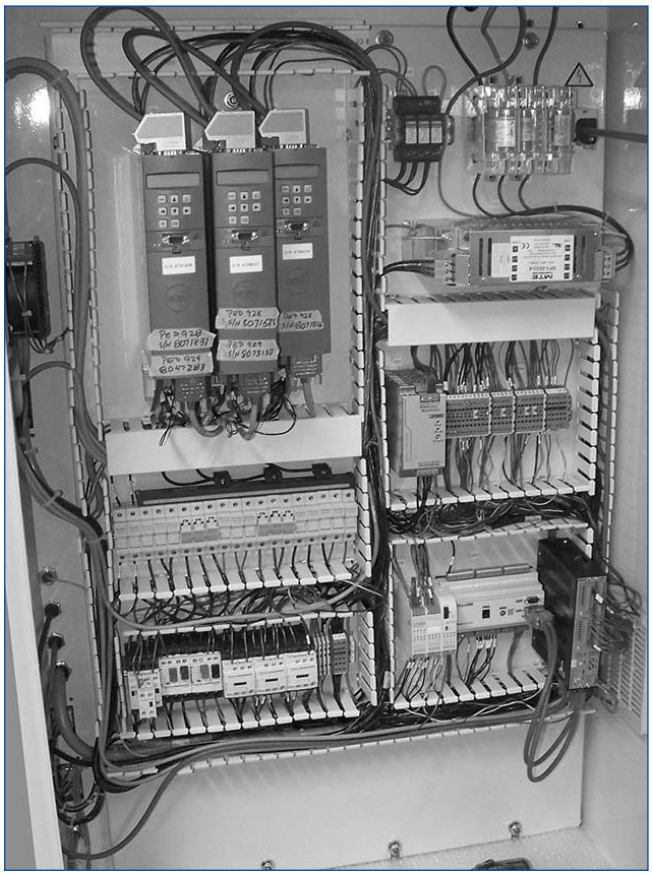


FIGURE 1-8, Electric Enclosure

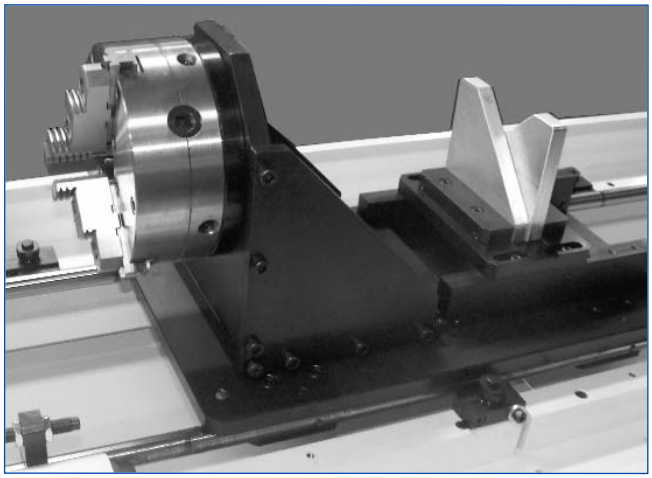


FIGURE 1-9, Manual Chuck

WARNING

All wiring and electrical equipment service should be performed by authorized personnel ONLY.

CAUTION

Note model electrical supply requirement printed on machine nameplate or electrical specification plate. Do not attempt to connect machine if supply voltage is not following acceptable limits as noted on nameplate or electrical specification plate. If supply voltage is not within these limits MACHINE WILL BE DAMAGED.

1. Verify supply voltage is same as voltage on Machine Nameplate or Electrical Specifications Plate.

2. Route and connect Electrical Supply Cord to power source (see Figure 1-8). (PLUG Machine's Electrical Supply Cord into a properly polarized grounding-type wall receptacle.)

OPTIONAL ACCESSORIES

Optional Manual Chuck

Sunnen offer an optional Manual Chuck. To install the Manual Chuck, proceed as follows *(see Figure 1-10)*:

- Mount Fixture to Plate on Threaded Column and Base Assembly, using four Mounting Bolts (supplied). Requires 8mm Hex Wrench.

Optional Pneumatic Chuck

Sunnen offers an optional Pneumatic Chuck. For installation, refer instructions packaged with the Pneumatic Chuck.

Optional V-Block Chain Fixture

Sunnen offer an optional V-Block Chain Fixtures for use on the HTE Tube Hone.

Optional Coolant Cup

Sunnen offers an optional Coolant Cup Kit for use on the HTE Tube Hone.

Optional Coolant System

Sunnen offers an optional OT/SVF Coolant System Adapter Kit for use on the HTE Tube Hone.

Optional Automatic Size Control

Sunnen offers an optional Automatic Size Control System for use on the HTE Tube Hone.

Optional Automation Interface

Sunnen offers an optional Part Handling Automation Interface for use on the HTE Tube Hone.

Optional Transformer

Sunnen offers an optional 230 VAC 60 Hz 3 phase to 460 VAC 60 Hz 3 phase Transformer for use on the HTE Tube Hone.

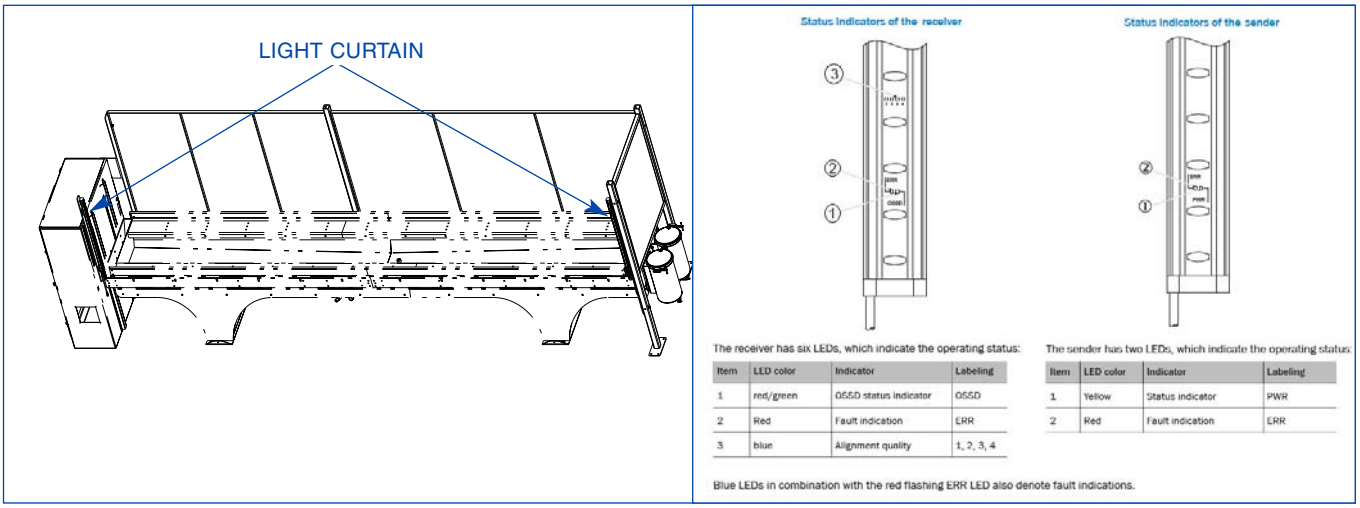


FIGURE 1-10, CE Guarding

Optional Splash Guards

Sunnen offers optional Splash Guards for use on the HTE Tube Hone.

OPTIONAL CE GUARDING

This CE guarding option would have been offered to you by your Sunnen sales representative at the time of sale. If this option was not offered to you, and you wish to have this installed or need more information, please contact Sunnen Products Company IMMEDIATELY, prior to powering up the machine.

(CE Machines Only) CE machines come with optional Light Curtain and CE Guarding installed. Light Curtain alignment must be tested for proper function after machine installation. To check, proceed as follows *(see Figure 1-10)*:

1. Install Guarding *(see Figure 1-11)*.

2. Mount Light Curtain Bars to Machine Base, using the hardware provided *(see Figure 1-11)*.

- Check for signs of external damage to the light curtain transmitter, receiver, or cables and wiring.

3. Connect Light Curtain Cables to Light Curtain Receiver and Transmitter.

- Inspect electrical connections between guarded machine's control system and light curtain. Verify they are properly connected.

4. Turn on power to machine.

5. Verify that curtain is in alignment. Individual beam indicators located on receiver will illuminate when alignment of a beam is not met *(refer to Figure 1-11)*.

LIGHT CURTAIN FUNCTION TEST

(CE Machines Only) Check Light Curtain operation as follows *(see Figure 1-13)*:

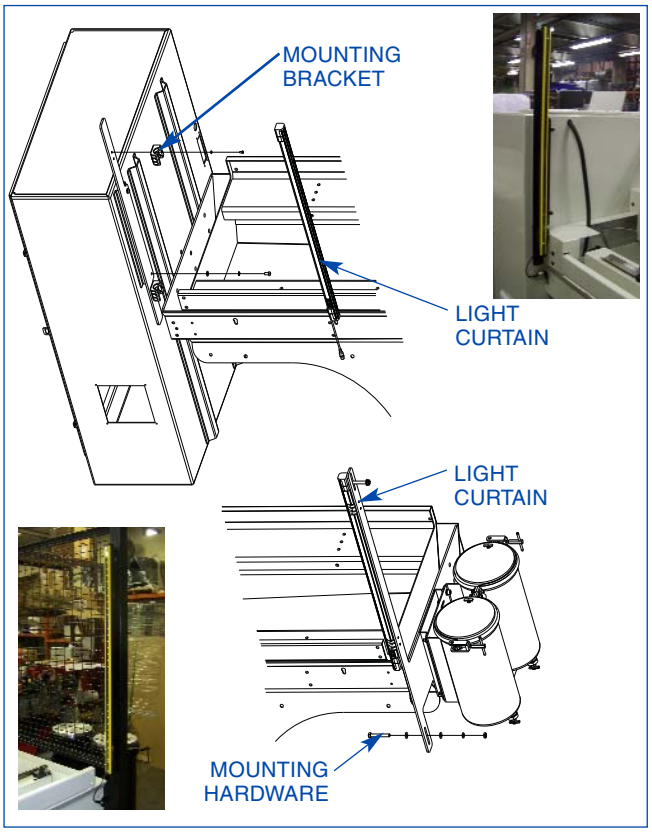


FIGURE 1-11, Light Curtain

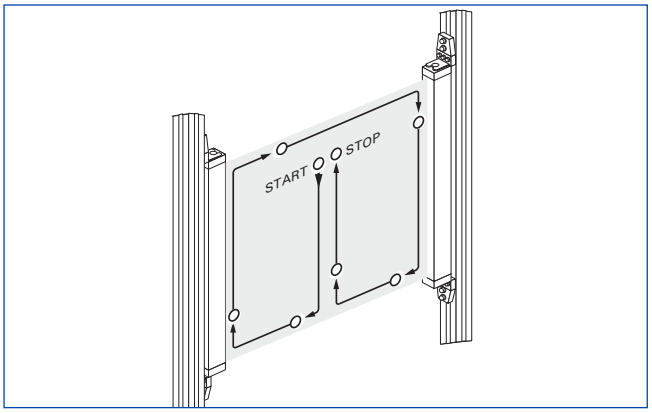


FIGURE 1-12, Light Curtain Alignment

CAUTION

As a safety precaution, it is recommended that the tooling be removed during this test. A honing cycle will be initiated during the test and even through the cycle should not start there is always potential that it could.

1. Interrupt light curtain system with proper size test object (Test object size: 30 mm diameter). When using the test object, guide it through the detection zone as shown below.

2. Start machine. While machine is in motion, interrupt detection zone with test object. Machine should stop immediately. Never insert test object into dangerous parts of machine.

3. Recover from Light Curtain Trip fault. Press the flashing Blue button to reset the machine.

4. Press the AUTO software key on Main Menu to prepare machine for a cycle.

5. With machine at rest, interrupt detection zone with test object.

6. With detection zone interrupted, press CYCLE START button. Machine should not start with the test object in detection zone.

7. Verify that system is working properly.

With machine running, interrupt detections zone with test object. Machine must come to a quick controlled stop when light curtain is interrupted. Drive faults, spindle coasting and stroker coasting are unacceptable.

OPERATIONAL CHECK

Read Sections 1 and 2 thoroughly and carefully before performing Operational Check.

1. Operate Machine and check proper function Spindle, Coolant Pump, and any optional equipment.

2. Set up and test all machine functions *(refer to Section 3, Setup & Operation)*.

3. After unpacking and installing Machine, clean and lubricate *(refer to Section: 4, Routine Maintenance)*.

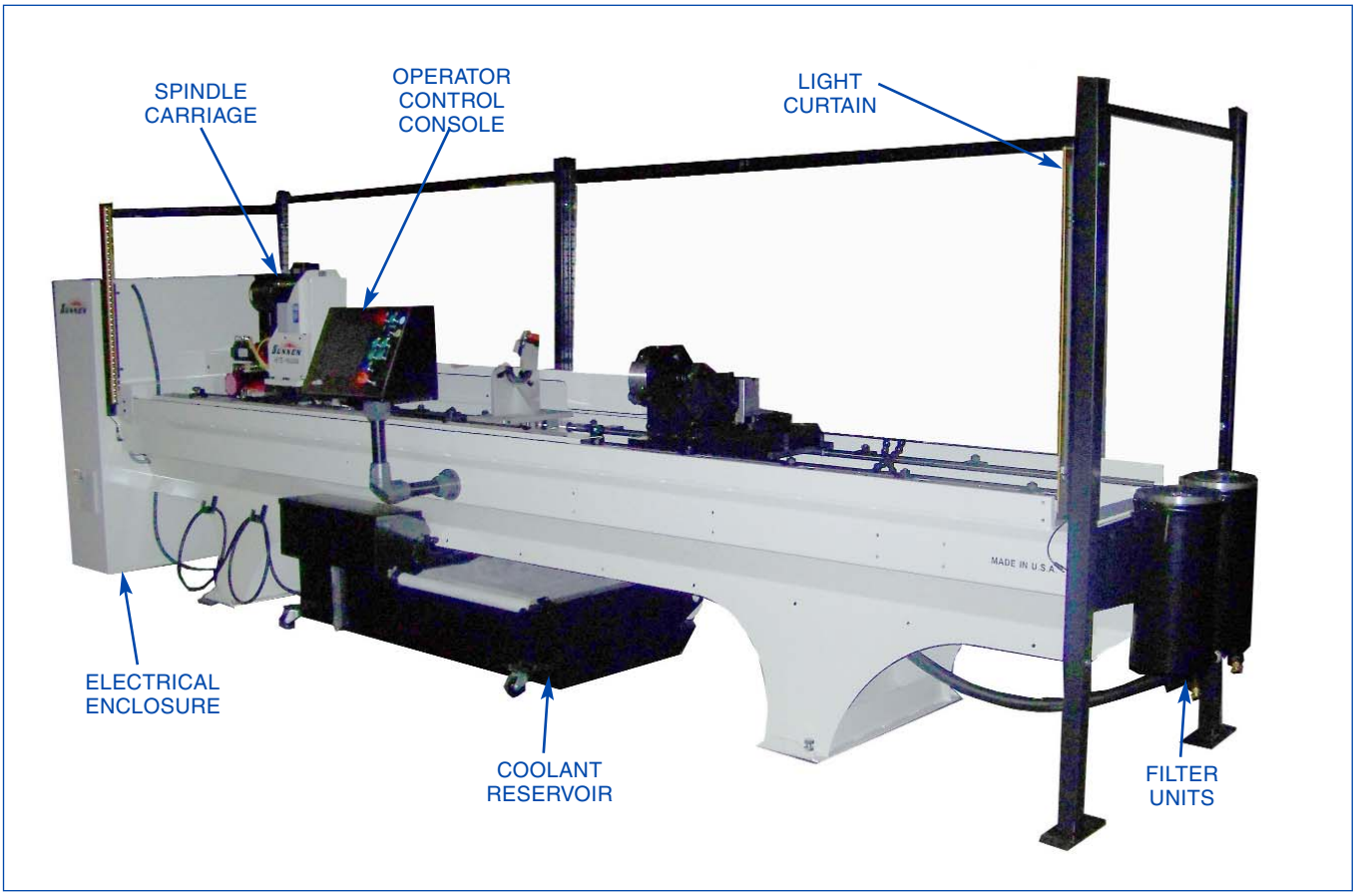


FIGURE 2-1, Major Components

TABLE 2-1, Safety Symbols

SYMBOL	DESCRIPTION	FUNCTION
	Warning Label	Warns that an electrical hazard exists.
	Warning Label	Warns that safety glasses should be worn at all times when operating this machine.
	Label	Designates this machine is *"CE"* compliant.
	Warning Label	Warns that a *hazard from objects falling off work table* exists and that proper precautions should be taken.
	Warning Label	Warns that an arc flash hazard exists.

SECTION 2
PREPARING FOR OPERATION

GENERAL
Consult this section when preparing Machine for operation.

MAJOR COMPONENTS
For location of major components on machine *(see Figure 2-1)*.

SAFETY SYMBOLS
For a description of safety symbols that may be used on this machine refer to Table 2-1.

OPERATOR CONTROLS
For location and function of Operator Controls *(see Figure 2-2 & Table 2-1)*.

HONING TOOL
Assembly and install Honing Tool per instructions packaged with Tooling.

1. Assemble Honing Tool.
2. Slide Honing Tool into Spindle and tighten.

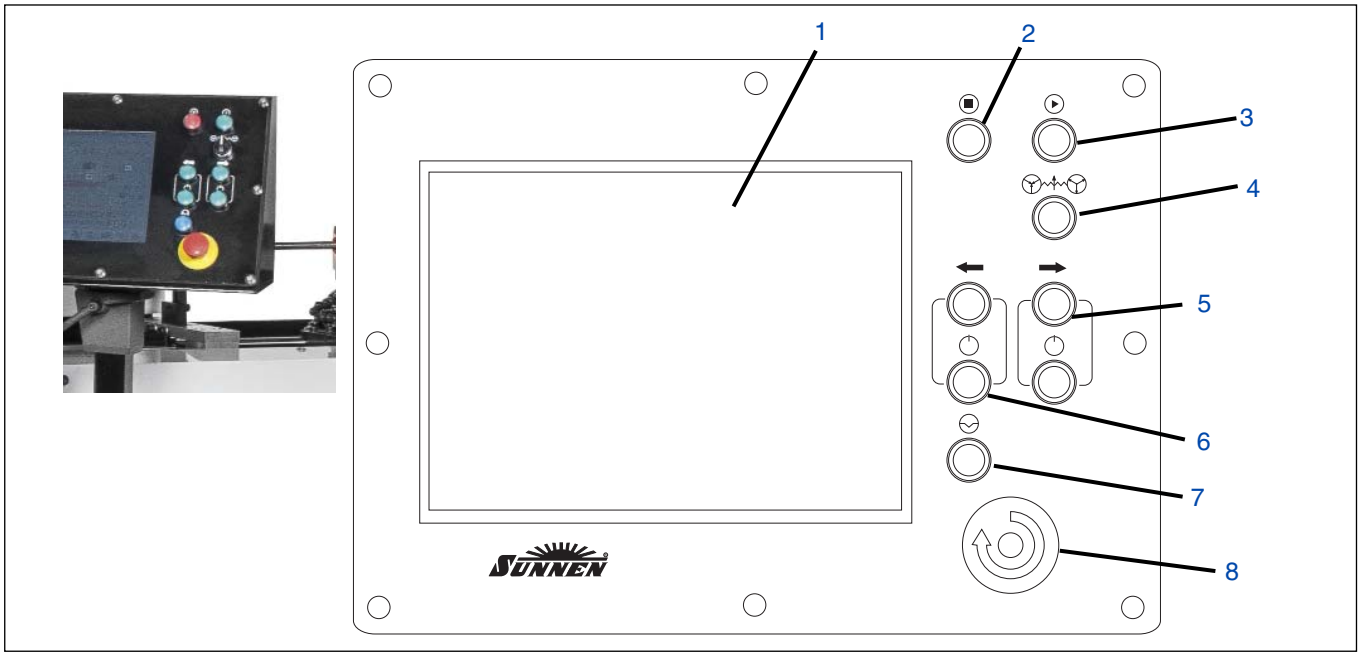


FIGURE 2-2, Operator Control Panel

TABLE 2-2, Operator Control Panel

1	LCD Display and Touch-Screen Operator Panel.	Operation of the machine can generally be done via the touch screen, which means that a function may be started by touching the corresponding key on the screen
2	Cycle STOP Button	Stop the honing cycle.
3	Cycle START Button	Start the honing cycle when the machine is in AUTO
4	Manual Feed Switch	Manual expand or retract tool.
5	Manual Stroke movement Left/Right Buttons	Manual movement of the carriage for setup (left / right)
6	Acknowledge Button	Used in conjunction with Manual Stroke Buttons.
7	RESET	Press to reset machine after recovering from a fault.
8	EMERGENCY STOP	Stop the machine in a emergency situation

NOTES

SECTION 3
SETUP & OPERATION

GENERAL

This section describes a step-by-step operating procedure for the Machine. Prior to starting the Machine, Operator shall ensure:

• All prerequisites described in sections 1 and 2 are complete.

• All personnel are clear of machine.

SAFETY PRECAUTIONS

The following precautions should be followed to ensure maximum safety of personnel while working on or around the Machine.

• Always follow proper lockout/tagout procedures.

• DO NOT initialize the system with a connected honing tool.

• Stay clear of all moving parts.

• Remove keys and wrenches from machine before honing.

• Ensure all guards are in place before operating.

• Ensure area is clear of other personnel before operating machine.

• Keep loose tools and other foreign objects clear of machine.

• Wear proper safety items such as, safety glasses, gloves, non-slip safety shoes and other personal safety equipment as necessary or required.

• DO NOT wear loose fitting clothes or jewelry while working on or around machine.

• When lifting Work piece or tooling use proper lifting procedures.

• Turn OFF Power Switch on Electrical Enclosure when ever performing service and no power is needed.

• Turn OFF electrical power at Main Power Source when performing maintenance on or cleaning of Electrical Enclosure.

• Clean up lubricant spills immediately.

SETUP & OPERATION

The following Setup and Operating procedure is provided as an example. The Setup and Operating procedure for machine and application may vary.

For a complete list of screen functions and more detail setup instructions refer Sunnen HTE Screen Manual shipped with your Machine.

Start-Up

1. Turn ON Main Power Switch.

2. Release all Emergency STOP Buttons.

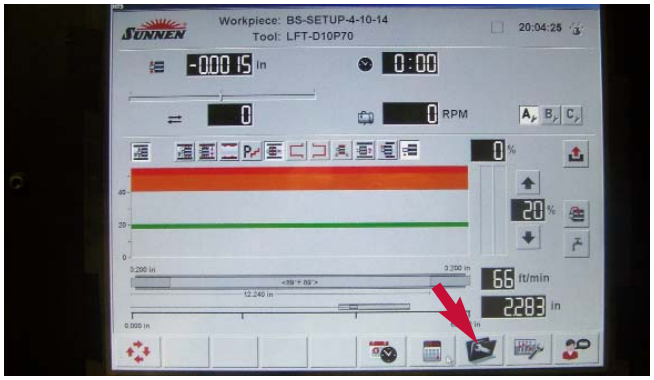
3. Press RESET (Blue) Button on Control Panel.

NOTE: Machine automatically comes up in Manual Mode when Machine is initialized.

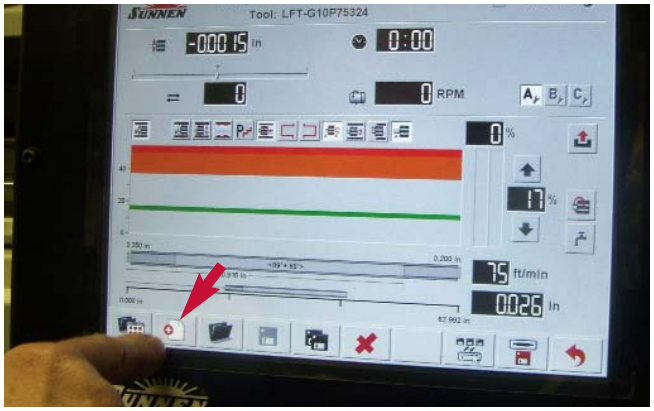
4. Once machine has initialized and the Main Screen comes up, precede to Setup-Workpiece.

Setup - Workpiece

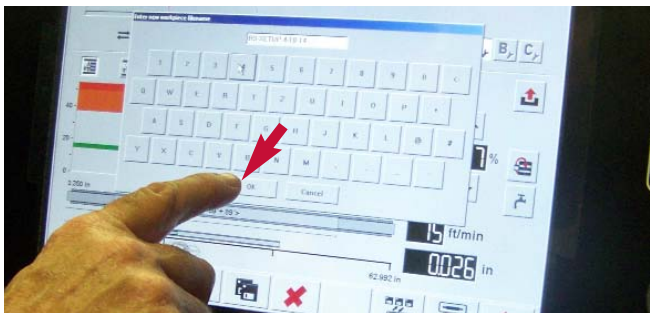
To install a new workpiece proceed as follows:



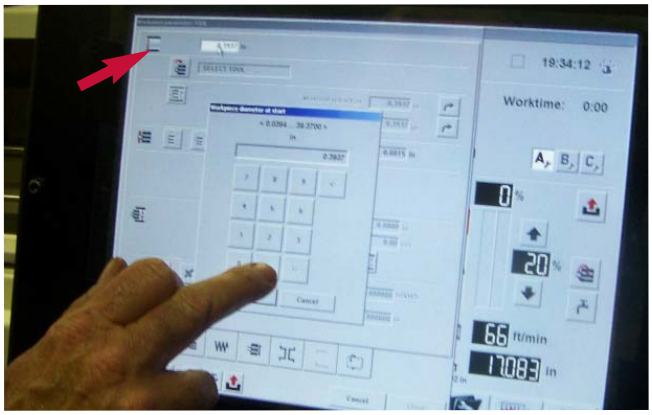
1. Press Workpiece Setup Icon, on bottom of Main Screen.



2. Press New Workpiece Icon, on bottom of Workpiece Setup Screen.

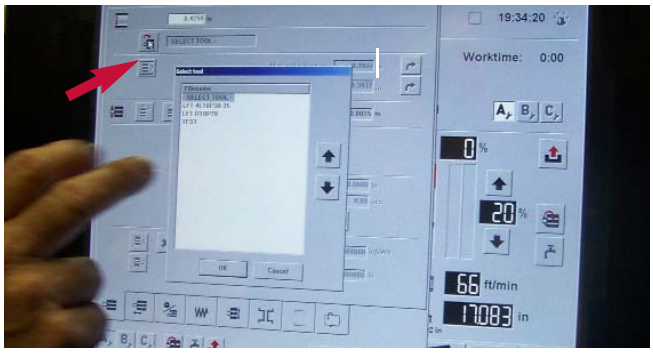


3. Enter Job Name and Press OK.



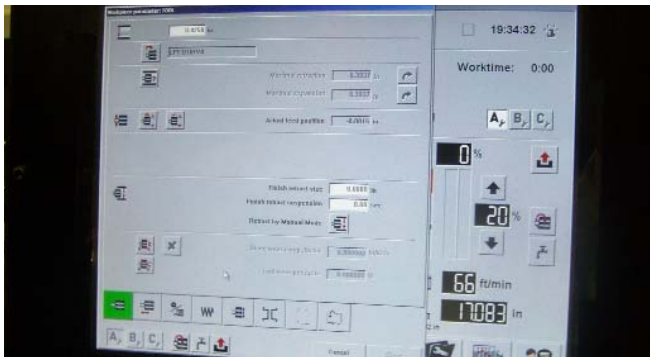
4.  Enter Bore End-Diameter.

Example: .742

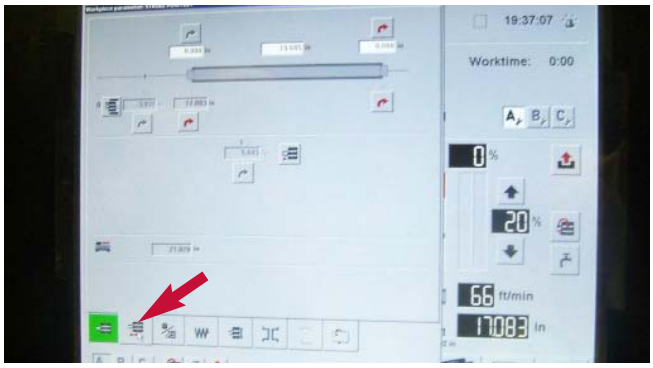


5.  Select tool from the tool library. Only tools according to the diameter range are listed.

Example: LFT-GL8P75412



Tool Setup Icon on bottom bar will turn green.

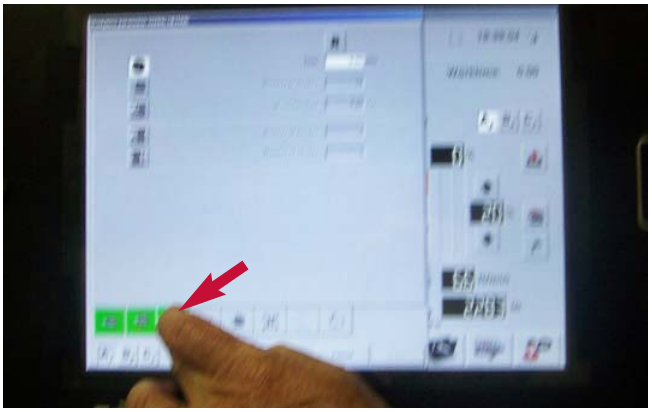


6. Press Stroke Position Icon, next icon on bottom bar.

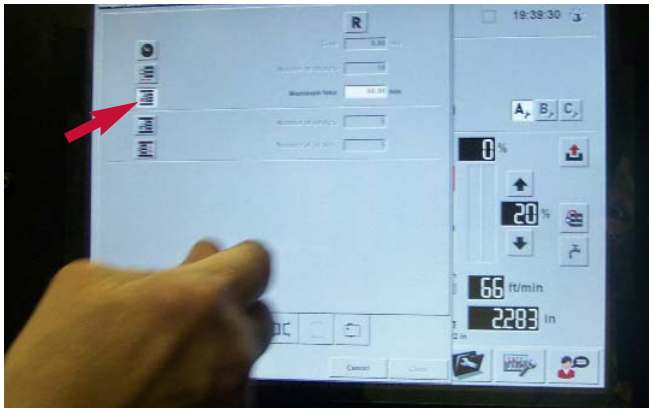
7.  Enter Start Position.

Example: .0010

Tool Setup Icon on bottom bar will turn green.

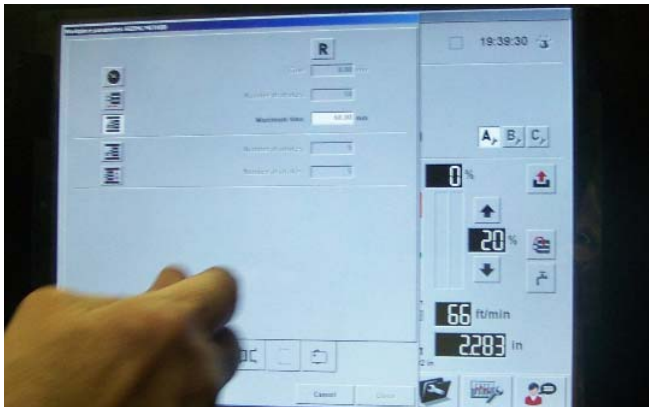


8. Press Sizing Method Icon, next icon on bottom bar.

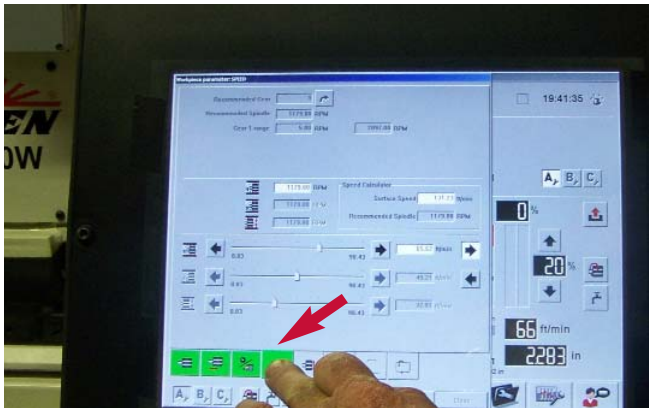


9.  Enter Maximum Time in minutes.

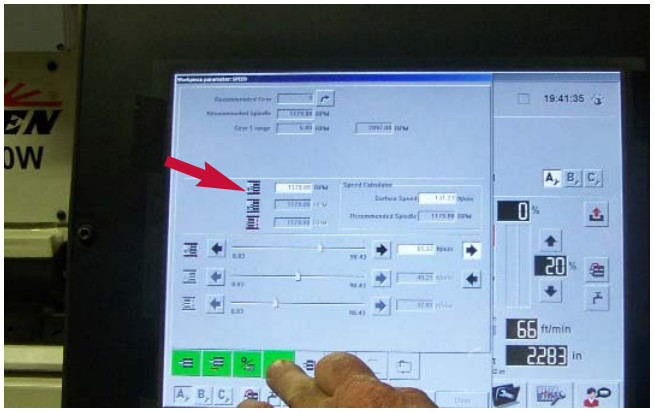
Example: 10.00



Tool Sizing Method Icon on bottom bar will turn green.



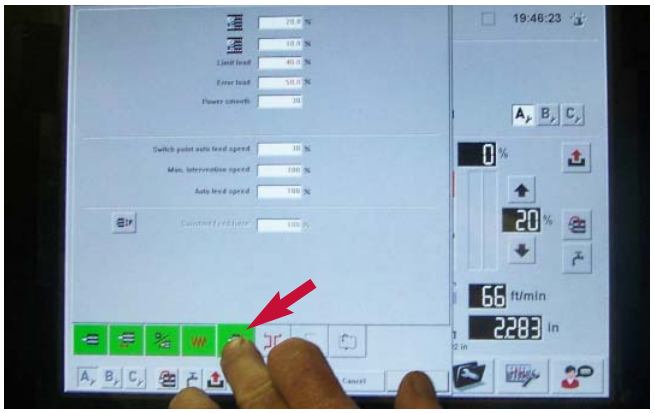
10. Press Speed Icon, next icon on bottom bar.



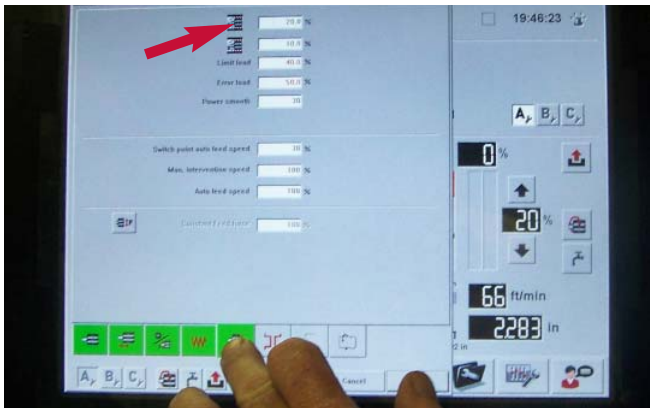
11.  Enter Spindle Speed Load in RPMs.

RPMs should be set 1/3 slower to start.

Tool Speed Icon, on bottom bar will turn green.



12. Press Power/Feed Icon, next icon on bottom bar.

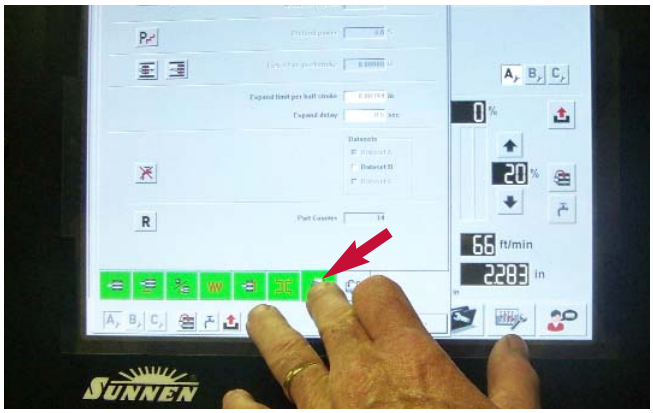


13.  Enter Spindle Load in %.

Set at 10.0% to start.

Tool Power/Feed Icon, on bottom bar will turn green.

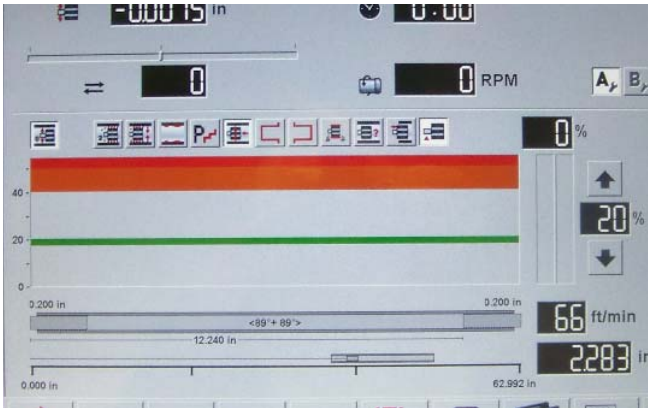
14. Press Dwell Icon, the next icon on bottom bar. Accept default Dwell setting. No action required. Dwell Icon, on bottom bar will turn green.



15. Press Options Icon, next icon on bottom bar. Accept Options setting. No action required. Option Icon, on bottom bar will be green.

16. Press Spindle Options Icon, next icon on bottom bar.
Accept Spindle Options setting. No action required. Spindle Option Icon, on bottom bar will be green.

17. Click Close on bottom right of screen.



Main Screen will appear.

BASIC SETUP IS COMPLETE

For a complete list of screen functions and more detail setup instructions refer Sunnen HTE Screen Manual shipped with your Machine.

SECTION 4
ROUTINE MAINTENANCE

GENERAL

The following procedures and suggested maintenance periods are given as guides only and are not to be construed as absolute or invariable. Local conditions must always be considered. Each machine must be maintained individually according to its particular requirements.

WARNING

Turn OFF electrical power when performing service on your machine, which does not require power. Disconnect Machine from main power supply before any work is performed inside of Electrical Enclosure.

An Arc Flash Hazard Exists. Follow safe work practices and wear appropriate Personal Protective Equipment. Follow proper lockout / tagout procedures. *Failure to comply can result in death or injury.*

CLEANING

Daily: Wipe exterior of Machine with a clean dry cloth to remove any coolant, dust and grime. Empty Filter Paper Tray as required.

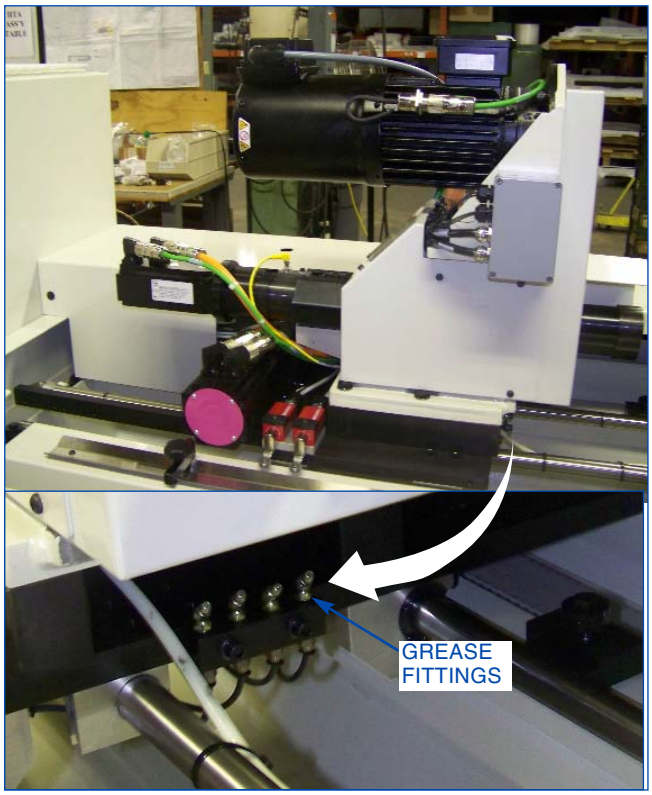


FIGURE 4-1, Spindle Carriage Ways

Monthly: Wipe exterior of Machine with a clean dry cloth. Then clean the exterior of Machine with warm water and a mild detergent or mild industrial solvent. Rinse thoroughly with clean hot water and wipe dry. Lightly lubricate following lubrication instructions.

LUBRICATION

NOTE: The intervals between lubrication will vary with amount of use your Machine receives. Lubricate all components at least once every three (3) months.

CAUTION

Be careful not to get oil/grease on drive belts.

1. SPINDLE CARRIAGE WAYS: A manifold is provided on the end of the Spindle Carriage for Lubricating Spindle Carriage Ways *(see Figure 4-1)*. Lubricate as required. (Every Three Months.)

2. STROKER GEARBOX: Gearbox is a sealed and maintenance free.

3. STEADY REST: Grease Fittings are provided on each of the Ways Bearing for the Steady Rest *(see Figure 4-2)*. Lubricate as required)

TIMING BELT

Check Tension of spindle Drive Timing Belt every 200 hours. *(see Figures 4-3)*.

NOTE: Timing belt should be replaced every 3000 hours.

1. Turn OFF power to the Machine.

.2. Take off with Cover on spindle carriage.

·3. Measuring belt deflection. Belt should deflect 8mm (1/3in.) when pressure is applied.

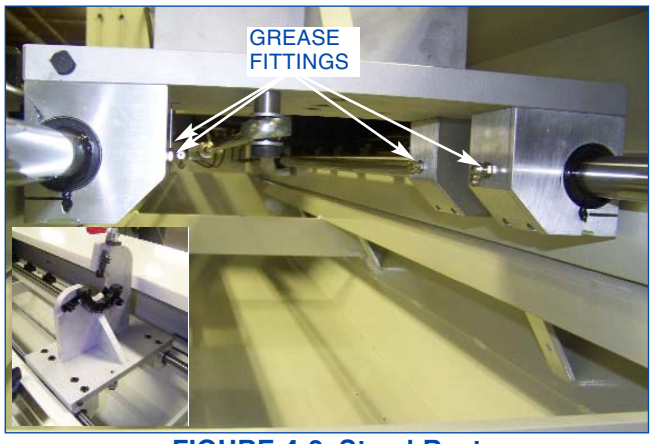


FIGURE 4-2, Stead Rest

Adjust belt tension, using all four (4) Threaded Pins (M12x70) equally, so Spindle and Drive Pulleys remain aligned.

PNEUMATIC LINES CHECK

(MONTHLY) Trace out Pneumatic Lines and inspect for leaks, severe dents, or kinks. Tighten any leaking Fittings and replace damaged parts.

COOLANT LINES CHECK

(MONTHLY) Trace out oil Lines and inspect for leaks, severe dents, or kinks. Tighten any leaking Fittings and replace damaged parts.

COOLANT RESERVOIR

Clean Coolant Reservoir and replace Coolant as follows using only Sunnen Industrial Honing Oil *(see Figure 4-4)*:

1. Direct one or more Coolant Nozzles into an approved waste container.
2. Open Coolant Control Valves.
3. Power up the Machine.
4. Go to Run Screen..
5. Press Coolant ON Button and pump waste coolant into waste container.
6. As coolant flow drops off, press Coolant ON Button.
7. Press E-Stop and turn OFF all power to the Machine.
8. Close Coolant Control Valves.
9. Return Coolant Nozzle(s) to Work Tray.
10. Slide Reservoir out from under the Machine.
11. Dip or siphon out any remaining coolant from the Reservoir.
12. Clean Sludge from Reservoir and wipe clean.
13. Fill Reservoir by pumping or pouring only approved Sunnen Industrial Honing Oil into the Coolant Reservoir.
14. Slide Reservoir under the Machine.

OPTIONAL LIGHT CURTAIN CLEANING

Accumulation of oil, dirt and grease on the front filter of the light curtain transmitter and receiver can affect the system operation. Clean filters with a mild detergent or glass cleaner. Use a clean, soft, lint-free cloth. Painted light curtain surfaces may be cleaned with a mild de-greasing cleaner or detergent.

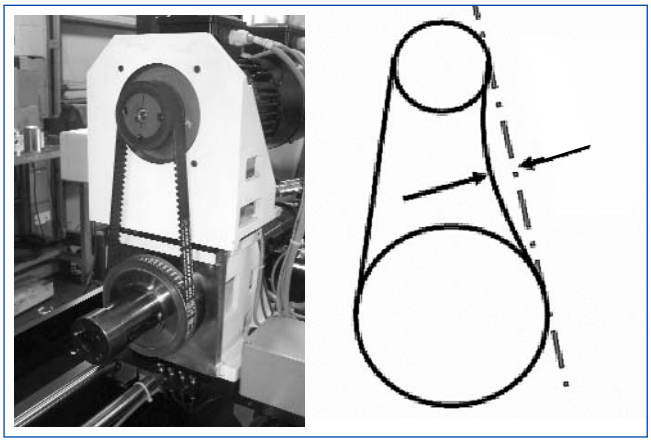


FIGURE 4-3, Timing Belt

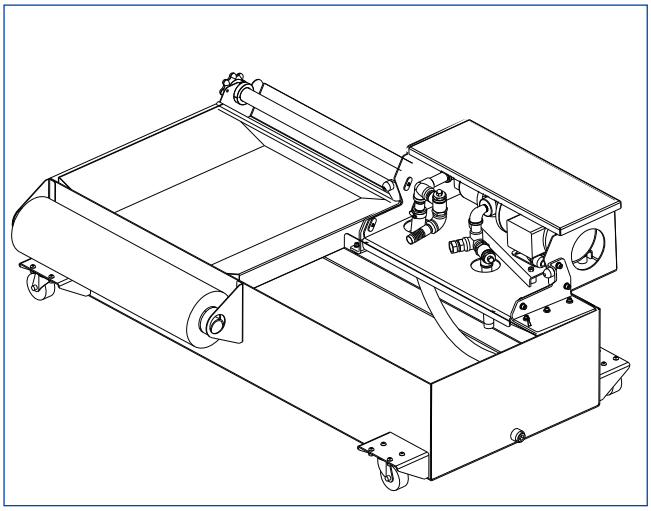


FIGURE 4-4, Coolant Reservoir

FIGURE 4-5, Filter Element

COOLANT FILTER UNIT

To replace Filter Element, on Optional Filter Unit, proceed as follows *(see Figure 4-5)*:

1. Turn OFF power to the Machine.
2. Place a suitable waste container under Draincock.
3. Open Air Vent in Canister Cover.
4. Open Draincock on bottom of Canister and drain about 4 Liters of Coolant from the Canister.
5. Close Draincock and Air Vent.
6. Loosen Cover Clamp Ring and remove Cover Clamp Ring.
7. Slowly pull dirty Filter Element out of Canister and place in the waste container to drain.
8. Insert new Filter Element into Canister; rotate element slightly so it will slide down the center post easily.
9. Replace Canister Cover and Cover Clamp Ring. Then tighten Ring.
10. Open Air Vent in Filter Canister Cover ½ turn counterclockwise.
11. Switch the Coolant ON/OFF Key ON.

As coolant fills the Filter Canister, air will escape through the air Vent. When coolant appears in the partially opened Vent, close the Vent. Then wipe any coolant from around Vent.

NOTES

SECTION 5
TROUBLESHOOTING

GENERAL

This section contains Troubleshooting information in table form, which should be used when problems occur with machine. The table lists problems encountered, possible causes, and solutions for problems along with reference to section of manual where detailed instructions may be found to correct problems.

OPERATIONAL TROUBLESHOOTING

For suggestions on correcting problems with bore conditions or with honing operation; consult Table 5-1.

TABLE 5-1, Operational Troubleshooting

PROBLEM	PROBABLE CAUSE	SOLUTIONS
Stone not cutting	1. Stone Glazing (Stone looks clean)	A. Dress stone B. Increase feed C. Increase stroking speed D. Use softer stone
	2. Stone Loading (Metal particles on stone surface)	A. Dress stone B. Increase stroking speed C. Use softer stone D. Use coarser stone E. Check coolant *
Slow stock removal	1. Improper spindle speed	A. Increase spindle speed
	2: Inadequate stone feed up	A. Increase feed
	3. Improper stone	A. Use softer stone B. Use coarser stone
Poor stone life	1. Excessive stone feed up	A. Decrease feed
	2. Inadequate spindle speed	A. Increase spindle speed
	3. Improper stone	A. Use harder stone B. Use coarser stone
Bellmouth	1. Improper overstroke	A. Shorten overstroke
	2. Improper stone	A. Use softer stone
Barrel	1. Improper overstroke	A. Increase overstroke
	2. Improper stone	A. Use finer stone
Taper in Blind End	1. Inadequate coolant flow	A. Adjust coolant nozzle
	2. Part	A. Short stroke tight end
	3. Material	A. Use hardtip stone
	4. Inadequate relief in blind end	A. Provide sufficient relief
Out-Off-Round	1. Workpiece flexing (thin wall)	A. Decrease feed B. Change method of fixturing

*Many honing problems, such as poor cutting action, poor stone life, and rough finish are caused by wrong honing oil, insufficient honing oil, dirty honing oil, or contaminated honing oil. Use only clean, full-strength Sunnen Industrial Honing Oil. Make sure that honing oil is neither diluted or "cut" with other oils. Keep solvents and cleaning fluids away from honing machine.

TABLE 5-1, Operational Troubleshooting

PROBLEM	PROBABLE CAUSE	SOLUTIONS
Rough Finish	1. Improper feed	A. Decrease feed
	2. Improper stone	A. Use finer stone B. Use softer stone
	3. Improper or Diluted coolant	A. Check coolant *
Scratches in Bore (Random)	1. Improper feed	A. Decrease feed
	2. Improper stone	A. Use finer stone B. Use softer stone
	3. Improper or diluted coolant	A. Check coolant *

*Many honing problems, such as poor cutting action, poor stone life, and rough finish are caused by wrong honing oil, insufficient honing oil, dirty honing oil, or contaminated honing oil. Use only clean, full-strength Sunnen Industrial Honing Oil. Make sure that honing oil is neither diluted or "cut" with other oils. Keep solvents and cleaning fluids away from honing machine.

APPENDIX A
COOLANT SYSTEM FLOW DIAGRAM

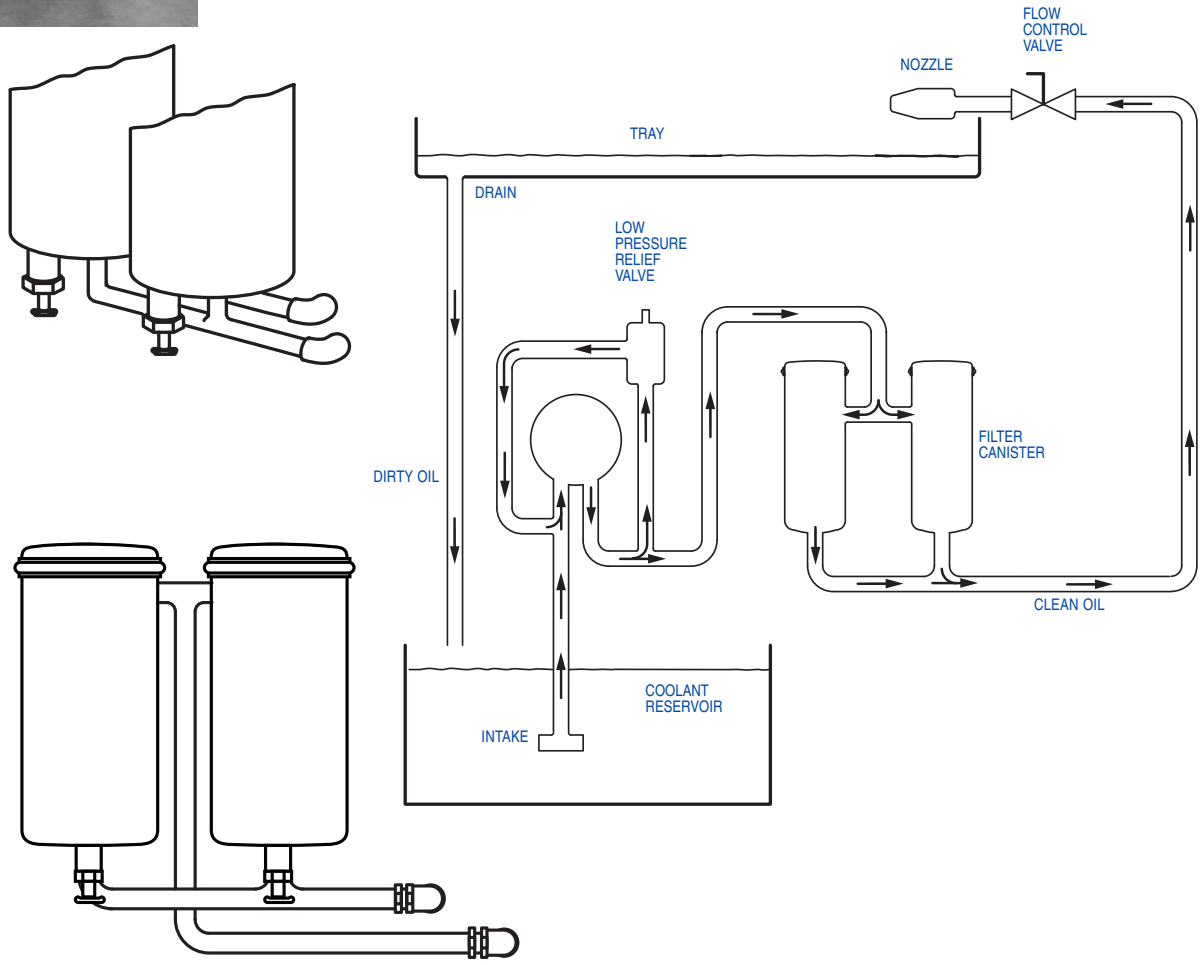


FIGURE C-1, PF-401 Filter Unit

NOTES

APPENDIX B
DECLARATION OF CONFORMITY (CE)

HTA-0000-1001

EC Declaration of Conformity

According to the EU Machinery Directive 2006/42/EG, Annex II, 1.A

Manufacturer:
Sunnen Products Co., 7910
Manchester 63143 St. Louis,
Missouri USA

Person residing within the Community authorized to compile the relevant technical documentation:
Julian Hooper Sunnen Products Ltd,
Centro 1 Maxted Rd HP2BL Hemel
Hempstead, Hertfordshire

Description and identification of the machinery:

Make:	HTA-X000CE 0 meter Horizontal Hone
Serial No:	1001
Project Number:	XXXXX
Project Name:	HTA

It is expressly declared that the machinery the machinery fulfils all relevant provisions of the following EU Directives:

2006/42/EG:2006-05-17	EU Machinery Directive 2006/42/EG
2006/95/EC:2006-12-12	(Voltage limits) Directive of the European Parliament and of the council of 12 December 2006 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (codified version).
2004/108/EC:2004-12-15	Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC.

Reference to the harmonized standards used, as referred to in Article 7(2):

EN 349:1993-04	Safety of machinery; minimum gaps to avoid crushing of parts of the human body.
EN ISO 12100-1:2003-11	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology.
EN ISO 12100-2:2003-11	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles.
EN ISO 13850:2006-11	Safety of machinery - Emergency stop - Principles for design.
EN ISO13857e_2008-03	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs.
EN ISO 14121-1:2007	Safety of machinery - Risk assessment - Part 1: Principles.
IEC60204-1:2005+A1	Safety of machinery – Equipment, electrics of the machines – Part 1: General rules.
EN 60439-1:1999/A1	Low-voltage switchgear and control gear assemblies - Part 1: Type-tested and partially type-tested assemblies.
EN 953:1997-10	Safety of machinery – Guards - General requirements for the design and construction of fixed and movable guards.

Reference to the technical standards and specifications used:

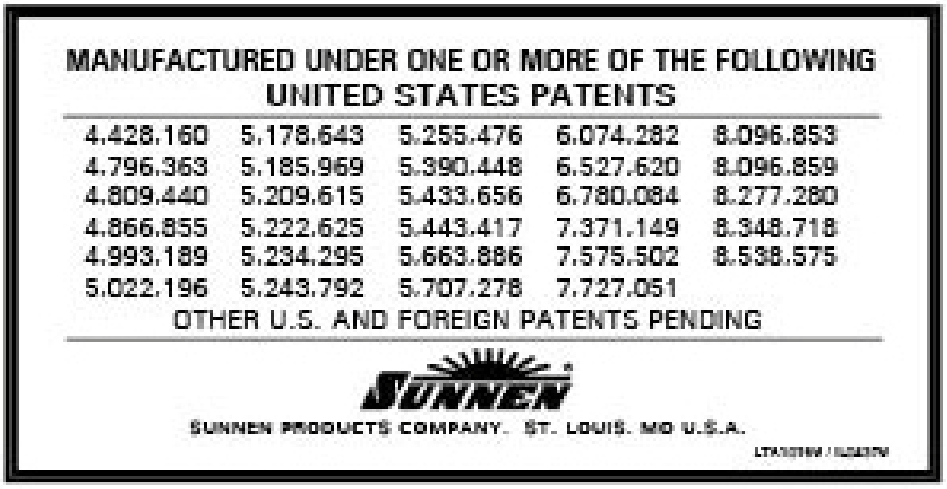
EN ISO 13849-1:2006-11	Safety of machinery – Safety, related parts of control systems. Part 1: General principles for design.

Place	Date	Signature
St. Louis, Missouri USA	2010-04-08	

Mike Haughey
Chief Operating Officer

NOTES

Like any machinery, this equipment may be dangerous if used improperly. Be sure to read and follow instructions for operation of equipment.



WARNING

An Arc Flash Hazard Exists. Follow safe work practices and wear appropriate Personal Protective Equipment. Follow proper lockout/tagout procedures. ***Failure to comply can result in death or injury.***

FRACTION / DECIMAL / MILLIMETER EQUIVALENTS CHART

INCH FRACTION	INCH DECIMAL	MILLIMETER	INCH FRACTION	INCH DECIMAL	MILLIMETER	INCH FRACTION	INCH DECIMAL	MILLIMETER
. . . .	.003937	0,1000	9/32	.281250	7,1438	21/32	.656250	16,6688
. . . .	.007874	0,2000	19/64	.296875	7,5406	. . . .	.669291	17,0000
. . . .	.011811	0,3000	5/16	.312500	7,9375	43/64	.671875	17,0656
1/64	.015625	0,3969	. . . .	.314961	8,0000	11/16	.687500	17,4625
. . . .	.015748	0,4000	21/64	.328125	8,3344	45/64	.703125	17,8594
. . . .	.019685	0,5000	11/32	.343750	8,7313	. . . .	.708661	18,0000
. . . .	.023622	0,6000	. . . .	.354331	9,0000	23/32	.718750	18,2563
. . . .	.027559	0,7000	23/64	.359375	9,1281	47/64	.734375	18,6531
1/32	.031250	0,7938	3/8	.375000	9,5250	. . . .	.748031	19,0000
. . . .	.031496	0,8000	25/64	.390625	9,9219	3/4	.750000	19,0500
. . . .	.035433	0,9000	. . . .	.393701	10,0000	49/64	.765625	19,4469
. . . .	.039370	1,0000	13/32	.406250	10,3188	25/32	.781250	19,8438
3/64	.046875	1,1906	27/64	.421875	10,7156	. . . .	.787402	20,0000
1/16	.062500	1,5875	. . . .	.433071	11,0000	51/64	.796875	20,2406
5/64	.078125	1,9844	7/16	.437500	11,1125	13/16	.812500	20,6375
. . . .	.078740	2,0000	29/64	.453125	11,5094	. . . .	.826772	21,0000
3/32	.093750	2,3813	15/32	.468750	11,9063	53/64	.828125	21,0344
7/64	.109375	2,7781	. . . .	.472441	12,0000	27/32	.843750	21,4313
. . . .	.118110	3,0000	31/64	.484375	12,3031	55/64	.859375	21,8281
1/8	.125000	3,1750	1/2	.500000	12,7000	. . . .	.866142	22,0000
9/64	.140625	3,5719	. . . .	.511811	13,0000	7/8	.875000	22,2250
5/32	.156250	3,9688	33/64	.515625	13,0969	57/64	.890625	22,6219
. . . .	.157480	4,0000	17/32	.531250	13,4938	. . . .	.905512	23,0000
11/64	.171875	4,3656	35/64	.546875	13,8906	29/32	.906250	23,0188
3/16	.187500	4,7625	. . . .	.551181	14,0000	59/64	.921875	23,4156
. . . .	.196850	5,0000	9/16	.562500	14,2875	15/16	.937500	23,8125
13/64	.203125	5,1594	37/64	.578125	14,6844	. . . .	.944882	24,0000
7/32	.218750	5,5563	. . . .	.590551	15,0000	61/64	.953125	24,2094
15/64	.234375	5,9531	19/32	.593750	15,0813	31/32	.968750	24,6063
. . . .	.236220	6,0000	39/64	.609375	15,4781	. . . .	.984252	25,0000
1/4	.250000	6,3500	5/8	.625000	15,8750	63/64	.984375	25,0031
17/64	.265625	6,7469	. . . .	.629921	16,0000	1	1.000000	25,4000
. . . .	.275591	7,0000	41/64	.640625	16,2719	1-1/16	1.062500	26,9880

FORMULAS:

MULTIPLY		BY		TO GET
INCHES (in)	x	25.4	=	MILLIMETERS (mm)
FEET (ft)	x	0.3048	=	METERS (m)

MULTIPLY		BY		TO GET
MILLIMETERS (mm)	x	0.03937	=	INCHES (in)
METERS (m)	x	3.281	=	FEET (ft)

SUNNEN PRODUCTS COMPANY
7910 Manchester Road, St. Louis, MO 63143 U.S.A.
Phone: 1 314 781 2100 Fax: 1 314 781 2268
U.S.A. Toll-Free Sales and Service:**1 800 325 3670**
International Division Fax: 314 781 6128

http://www.sunnen.com
e-mail: sunnen@sunnen.com

Brazil – Sunnen do Brasil LTDA
Phone: +55 11 4177 3824 Fax: +55 11 4362 3083
www.sunnen.com.br e-mail: Sbrasil@sunnen.be

Belgium – Sunnen Benelux BVBA
Phone: +32 3 880 28 00 Fax: +32 3 844 39 01
www.sunnen.be e-mail: info@sunnen.be

China – Shanghai Sunnen Mechanical Co., Ltd.
Phone: 86 21 5813 3990 Fax: 86 21 5813 2299
www.sunnensh.com e-mail: shsunnen@sunnensh.com

Czech Republic – Sunnen S.R.O.
Phone: +420 383 376 317 Fax: +420 383 376 316
www.sunnen.cz e-mail: sunnen@sunnen.cz

France – Sunnen SAS
Phone: +33 (0)1 69 30 00 00 Fax: +33 (0)1 69 30 11 11
www.sunnen.fr e-mail: info@sunnen.fr

Italy - Sunnen Italia S.R.L.
Phone: 39 02 383 417 1 Fax: 39 02 383 417 50
www.sunnenitalia.com e-mail: sunnen@sunnenitalia.com

Poland – Sunnen Polska Sp. Z o.o.
Phone: +48 22 814 34 29 Fax: +48 22 814 34 28
www.sunnen.pl e-mail: sunnen@sunnen.pl

Russia – Sunnen RUS
Phone: +7 495 258 43 43 Fax: +7 495 258 91 75
www.sunnen.ru e-mail: sunnen@sunnen-russia.ru

Switzerland – Sunnen AG
Phone: ++ 41 71 649 33 33 Fax: ++ 41 71 649 34 34
www.sunnen.ch e-mail: info@sunnen.ch

UK – Sunnen Products Ltd.
Phone: ++ 44 1442 39 39 39 Fax: ++ 44 1442 39 12 12
www.sunnen.co.uk e-mail: hemel@sunnen.co.uk

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