



SUNNEN
INSTRUCTIONS
BOOKLET

for

SUNNEN PORTABLE
STONE ASSEMBLIES



"SUNNEN AND THE SUNNEN LOGO ARE REGISTERED TRADEMARKS OF SUNNEN PRODUCTS COMPANY."

SUNNEN® PRODUCTS COMPANY • 7910 MANCHESTER AVE. • ST. LOUIS, MO 63143, U.S.A.

TABLE OF CONTENTS

Tooling

Sunnen Portable Hones	1
---------------------------------	---

Stone Sets

G25 (2.50-2.70 in. / 63-70 mm)	9
GG25 (2.50-2.70 in. / 63-70 mm)	9
GY25 (2.50-2.70 in. / 63-70 mm)	9
M27 (2.70-4.10 in. / 69-104 mm)	9
MM33 (2.70-4.10 in. / 69-104 mm)	9
MY33 (2.70-4.10 in. / 69-104 mm)	9
N37 (3.50-5.50 in. / 89-140 mm)	9
NN40 (3.50-5.50 in. / 89-140 mm)	9
NY40 (3.50-5.50 in. / 89-140 mm)	9
S18 (1.75-2.00 in. / 44-51 mm)	6
T20 (2.00-2.20 in. / 51-56 mm)	6
U22 (2.20-2.40 in. / 56-61 mm)	6
V24 (2.40-2.60 in. / 61-66 mm)	6
W47 (4.10-15/60* in. / 104-381/1524* mm)	9
WW51 (4.10-15/60* in. / 104-381/1524* mm)	9
WY51 (4.10-15/60* in. / 104-381/1524* mm)	9

Application

Plateau Honing	12
--------------------------	----

*Requires use of Master Holder Sets

References – For Automotive Applications

Sunnen Engine Rebuilding Equipment Catalog	A-7100
Sunnen Portable Hones and Accessories for Engine Rebuilding	X-AN-5005

References – For Industrial Applications

Sunnen Bore Sizing & Finishing Supplies Catalog	X-SP-5500
Sunnen Portable Hones and Accessories for Industrial Applications	X-AN-5020

INSTRUCTIONS

For Reconditioning Cylinders with Portable Hones

For best results, use an air or electric slow speed drill (250 to 450 RPM). Drill must have right hand rotation. For Midget Hone and Junior Hones, use a 1/2 in. (13 mm) capacity drill motor. For Standard Hones, use a 5/8 in. (16 mm) capacity drill motor for honing up to 4-3/4 in. (120 mm), and a 3/4 in. (19 mm) capacity drill motor for honing bores larger than 4-3/4 in. For AN-815 Large Hones, use a 3/4 in. (19 mm) or larger drill.

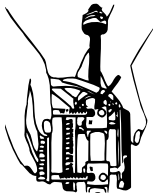
POWER SOURCE

In some cases, faster stock removal can be achieved by honing cast iron dry rather than wet. However, honing oil must be used with 500 series, which is a 280 grit stone, or any finer stones such as 400 and 600 grit. Honing oil must be used when honing steel or aluminum. Use a squirt can or brush to apply a continuous ample flow of Sunnen MAN-845 Honing Oil to stones and work.

COOLANT

NOTE: Honing stones which have been used for wet honing must never be used for dry honing . . . stones will load and stop cutting.

Thoroughly wash out cylinders with solvent and remove all carbon and oil. Dry with a clean rag before honing. Tape all openings to keep oil passages from becoming clogged.



Remove pinion from hone body by pulling straight out. Insert stones and guides as far as they will go into holes – marked “X” on hone body – with rack teeth toward pinion hole. Chatter and locking will result if stones and guides are installed in unmarked holes.

ASSEMBLY AN MODELS

Hold stones and guides tight against hone body and insert pinion.



Turn adjusting knob on top of hone to left (counterclockwise) until expanding mechanism reaches bottom of hone body. Insert two stones opposite each other and two guides opposite each other.

SN/JN MODEL

Each stone and guide holder has a retaining spring on side. Hold this spring down with thumb while installing.

NOTE: Stones and guides must be kept together and used as sets. Never interchange guides with different sets of stones. They would not be worn evenly, and poor results would be obtained.

SETUP Raise pinion 1/4 in. (6 mm) and turn it counterclockwise
AN (left) to set stones approximately to diameter of cylinder.
MODELS Push pinion back down until its inside gear engages outside gear on the hone body.

Now expand stones and guides firmly against cylinder walls by turning wing wrench clockwise (right). During this adjustment, tops of stones and guides should not extend more than 1/2 in. (about 13 mm) out of cylinder.

SN/JN Turn knurled adjusting knob clockwise (right) to expand
MODELS stones and guides to approximate cylinder size. Then put hone in cylinder and continue expanding until firm contact with cylinder walls is made. Use wing wrench to apply final pressure against walls. Tops of stones and guides should not extend more than 1/2 in. (13 mm) from cylinder while final adjustment is being made.

CAUTION

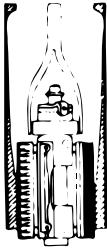
Watch clearances – cylinders honed by Sunnen method have a base metal finish and need no special “wearing in” allowance. Therefore, maximum piston-to-cylinder wall clearances are recommended for Sunnen honed cylinders.

TRUING Select correct truing sleeve for diameter range of stone set (see below). Mount truing sleeve in a vise and hone it with a constant, steady stroke. Allow stones to go through sleeve about 1 in. (25 mm) at both ends of stroke. Apply Sunnen Honing Oil liberally at first, then shut off oil flow so that a slurry is formed. Continue honing until entire cutting surface of stone contacts sleeve. You are now ready to hone cylinder.

RANGE	TRUING SLEEVE
1.7 to 2.0 in. (43 to 51 mm)	ST-1875
2.0 to 2.2 in. (51 to 56 mm)	ST-2125
2.2 to 2.4 in. (56 to 61 mm)	ST-2250
2.4 to 2.6 in. (61 to 66 mm)	ST-2500

SAFETY Drive shafts of Sunnen Hones are designed to shear when
FEATURE hone hits an obstruction. This safety feature is intended to protect other components of hone. Do not weld broken shafts or U-joints, because next time an obstruction is hit, a more expensive part of hone will be damaged. If repeated breakage occurs as result of normal honing, we recommend using AN-815 Heavy Duty Cylinder Hone.

OPERATION Fast-cutting roughing stones must always be used for sizing. Removing a large amount of stock with finishing stones will increase honing time appreciably, and polishing stones will practically stop cutting when base metal is reached.



Start stroking at bottom, or least worn section of cylinder, using short strokes in order to concentrate honing in smallest section of cylinder. Gradually lengthen stroke as metal is removed and stones contact higher on cylinder walls. Allow stones to go through lower end of bore 1/2 to 1 in. (13-25 mm). Stroke all way to top occasionally to remove ring ridge as the bore is

enlarged. Allow stones to extend about 1/2 in. (13 mm) from cylinder at top of stroke. Expand stones as needed to compensate for stock removal and keep stones firmly against cylinder wall.

An excellent indication of cylinder condition is speed of drill motor. A reduction in drill speed during honing indicates a smaller diameter. Localize stroking at such sections until drill speed is constant over at least 75% of cylinder length; then stroke full length of cylinder.

Do not let stones project more than 1 in. (25 mm) out of top or bottom of cylinder. Stroke at a rate of about 30 complete cycles per minute.

When using new stones it is necessary to seat stones to radius of cylinder. Start hone and stroke up and down in cylinder a few times. Expand stones again by means of wing wrench, and repeat process. New stones appear to wear rapidly until their curvature is the same as the cylinder's.

Most ring manufacturers recommend a honed finish of approximately 25-35 μin (0,7-0,9 μm) for ideal seating of rings. For recommended stone sets, refer to Sunnen Engine Rebuilding Equipment Catalog.

MATERIAL CAST IRON

1. Use roughing stones (100 Series) to remove stock to within 2-1/2 thousandths (.025 in. / 0,06 mm) of finished size. This stone cuts faster when used dry. (If a boring bar is used, bore to within 3 thousandths (.03 in. / 0,08 mm) of finished size.

2. To get a 25-35 μin (0,7-0,9 μm) finish: Use finishing stones (200 Series) to hone to finished size.

To get a 20-25 μin (0,5-0,7 μm) finish: Use finishing stones (300 Series) to hone to finished size.

To get a 15-20 μin (0,4-0,5 μm) finish: Use finishing stones (200 Series) to hone within 1/2 thousandth (.005 in. / 0,01 mm) of finished size.

3. Use polishing stones (500 Series) to hone to finished size. This stone must be used with honing oil (see "Coolant").

4. To get a plateau finish: Use 600 grit stones (C05 series) and hone for 45 seconds per cylinder. This stone must be used with honing oil (see "Coolant").

- ALUMINUM**
1. Use same stones as recommended in Stone Selection Table for Cast Iron, except use 200 Series stones for roughing (100 Series stones may gouge and score aluminum cylinders).
 2. All stone sets must be used with Sunnen Honing Oil when honing aluminum.
 3. True in stone set using truing sleeve. Due to the fast cutting action and stock removal of Sunnen stones when honing aluminum cylinders, the stones may not have time to become fully trued in before final size is reached. For this reason, stones must be trued in before honing cylinders.
 4. If cylinder is scored, remove all built-up metal before honing, or stones may chip.
 5. For high silicon aluminum (such as Chevrolet Vega), see related Instructions in this booklet.

**HARDENED
CAST IRON
SLEEVES** For recommended stone sets, when honing hardened (chilled) cast iron sleeves, refer to Sunnen Engine Rebuilding Equipment Catalog or Sunnen Portable Hones and Accessories Catalog.

STEEL For recommended stone sets, when honing steel cylinders, refer to Sunnen Engine Rebuilding Equipment Catalog.

**CLEANING
ENGINE** After honing, clean engine block thoroughly with hot water, steam, or solvents.

**TROUBLE-
SHOOTING**

Chatter

1. Guide blocks may be too tight. To check, expand stones and guides out against cylinder wall. You should be able to wiggle guides with your fingers. If you cannot, file or grind about 1/32 in. (1 mm) from wearing surface of each guide to relieve guide pressure and eliminate chatter.
2. Increase stroking speed to break up chatter pattern.

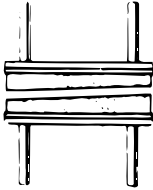
**Stones
Do Not Cut**

1. Be sure you are using proper stone set.
2. When honing dry, traces of grease, oil, or carbon in cylinders will cause stone to load and stop cutting. Clean stones with wire brush.

NOTE: Stones which have been used with honing oil must never be used dry.

3. Guide blocks may be too tight. To check, expand stones and guides out against cylinder wall. You should be able to wiggle guides with your fingers. If you cannot, file or grind off about 1/32 in. (1 mm) from wearing surface of each guide to relieve guide pressure and to speed up stock removal.

4. Stones may be glazed. Dress stones with an abrasive stick. Increase stone pressure with wing wrench. Increase stroking speed to improve self dressing.
5. If you are honing hardened cylinder sleeves, and steps 3 through 4 do not speed up cutting, narrow stone to half its normal width with a grinding wheel, or use saw blade to cut grooves into surface of stones.



1. Not enough pressure is applied to stones. Increase pressure with wrench. Adjust frequently to maintain stone pressure.
2. Stroking procedure is incorrect. Localize honing in tight portion of cylinder and gradually lengthen stroke as cylinder becomes straighter.

Taper

INSTRUCTIONS for Sunnen Portable Hones

Using S18, T20, U22, V24 Stone Sets

POWER SOURCE Use heavy duty electric drill motor or drill press with chuck capacity of no less than 5/8 in. (16 mm). To determine best rotation speed, divide 1200 by bore diameter stated in inches; metric users divide 30,000 by bore diameter stated in millimeters. Example for a 6 in. dia. hole: $1200 \div 6 = 200$ (rpm)
Example for a 150 mm dia. hole: $30,000 \div 150 = 200$ (rpm)

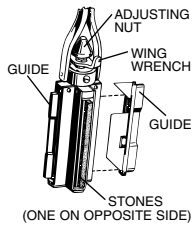
Approx. Bore Size	Recommended Drill
2.5 - 5.0 in. (63 - 125 mm)	5/8 in.
5.0 - 15 in. (125 - 375 mm)	3/4 in.
15 in. & up (375 mm & up)	1 in.

IMPORTANT

Make sure hone rotates clockwise (as viewed from drive shank end of hone).

COOLANT Use a continuous and ample flow of Sunnen Industrial Honing Oil to ensure accurate, fast honing and desired finish. Do not dilute oil. Do not use lubricating oil, cutting oil, or water soluble oil; consistent results cannot be expected unless full-strength recommended oil is used.

ASSEMBLY



Stone sets consist of two stones and two guides. Stones and guides are inserted in alternate slots in hone body as shown.

For recommended stone sets, refer to your Sunnen Bore-Sizing & Finishing Supplies Catalog or Sunnen Portable Hones and Accessories Catalog.

CAUTION

Replace both stones and both guides at same time. Differences in stone and guide height can cause chatter or poor cutting action.

SAFETY FEATURE

Drive shafts of Sunnen Hones are designed to shear when hone hits an obstruction. This safety feature is intended to protect other components of hone. Do not weld broken shafts or U-joints, because next time an obstruction is hit, a more expensive part of hone will be damaged. If repeated breakage occurs as result of normal honing, call your Sunnen Field Engineer.

OPERATION HAND-FEED HONES

Hand-Feed Hones are supplied with only one universal joint, which is sufficient if hone is being used in a portable electric drill motor. If a hand-feed hone is used in a drill press, lathe, or other machine with a fixed spindle, a second universal joint (specify AN-70) must be substituted in place of AN-26A Drive Shaft supplied with hone.

1. Put the hone in bore far enough so that entire length of Stones contacts bore.
2. Turn Adjusting Nut clockwise until both Stones are fed out against bore.
3. Lift Wing Wrench until it engages Adjusting Nut.
4. Expand Stones firmly against the bore by turning Wing Wrench clockwise.
5. Direct stream of honing oil into bore.
6. Start hone rotating in bore and begin stroking back and forth over full length of bore. Overstroke both ends of bore about 1 in. (25 mm).
7. As bore becomes larger and Stones become loose, stop hone and expand Stones firmly against bore with Wing Wrench. Resume hone rotation and stroking.

The Remote-Feed Hones are designed for use in a rigid installation, where neither part to be honed nor power source are able to float. Two universal joints are supplied with each Remote-Feed Hone to provide full floating action at honing head.

REMOTE-FEED HONES

1. Put hone in the bore far enough so that entire length of Stones contacts bore.
2. Expand Stones against bore by turning handwheel counterclockwise, as viewed from drive shank end of hone. When Stones contact bore, stop and back handwheel off one-half turn.
3. Direct stream of Sunnen Honing Oil into bore.
4. Start hone rotating in bore in a clockwise direction as viewed from drive shank. At same time, start stroking hone back and forth over full length of bore. Overstroke both ends of bore about 1 in. (25 mm).
5. Apply pressure on stones by putting light braking pressure on handwheel while hone is rotating and stroking in bore.

NOTE: Remote-Feed Hones are designed for use in a drill press, lathe, or honing machine where neither spindle nor workpiece can float. All remote-feed hones are equipped with two universal joints so that honing head can align itself to workpiece.

Hone should be stroked fast enough to produce a crosshatch in the bore. If stroke is too slow, cutting action slows down and stones can even glaze and chatter. When starting out, it is best to “short stroke” in tight spots of bore and gradually lengthen stroke as tight spots are honed out.

STROKING

TROUBLE- SHOOTING

Chatters

1. Make sure hone is rotating in a clockwise direction as viewed from drive shank end of tool.
2. Increase stroking speed.
3. Make sure that stones are expanded out against bore before starting drive motor.
4. Guides may be too tight. To check, expand stones and guides out against bore. With stones bearing on bore, you should be able to wiggle guides with your fingers. If guides are tight, file or grind about 1/32 in. (1 mm) off wear surface of guide.

Stones Cuts Slowly

1. Make sure you are using right stone sets.
2. Make sure that a generous and continuous supply of Sunnen Industrial Honing Oil is being applied to bore.
3. Stones may be glazed. Dress glazed stones with Sunnen MAN-700 Diamond Dresser or another honing stone. To avoid glazing: Increase stone pressure, increase stroking speed, or use softer stone.
4. Guides may be too tight. To check, expand stones and guides out against bore. With the stones bearing on bore, you should be able to wiggle guides with your fingers. If guides are tight, file or grind about 1/32 in. (1 mm) off wear surface of guide.

INSTRUCTIONS for Sunnen Portable Hones Using G25, M27, N37, W47, GG25, MM33, NN40, WW51, GY25, MY33, NY40, WY51 Stone Sets

Use heavy duty electric or air drill, or drill press. To establish best rpm for your operation, divide 1200 by hole diameter in inches, or 30,000 by hole diameter in millimeters.

**POWER
SOURCE**

Example for a 6 in. dia. hole: $1200 \div 6 = 200$ (rpm)

Example for a 150 mm dia. hole: $30,000 \div 150 = 200$ (rpm)

Approx. Bore Size	Recommended Drill
2.5 - 5.0 in. (63 - 125 mm)	5/8 in.
5.0 - 15 in. (125 - 375 mm)	3/4 in.
15 in. & up (375 mm & up)	1 in.

IMPORTANT

Make sure hone rotates clockwise (as viewed from drive shank end of hone).

Use a continuous and ample flow of Sunnen Industrial Honing Oil to ensure accurate, fast honing and desired finish. Do not dilute oil. Do not use lubricating oil, cutting oil, or water soluble oil; consistent results cannot be expected unless full-strength recommended oil is used.

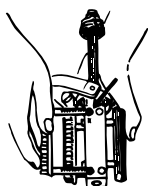
COOLANT

Stone sets consist of two stones and two guides. Stones and guides are inserted in alternate slots in hone body as shown. For recommended stone sets, refer to your Sunnen Bore-Sizing & Finishing Supplies Catalog or Sunnen Portable Hones and Accessories Catalog.

ASSEMBLY

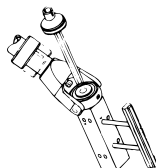
CAUTION

Replace both stones and both guides at same time. Differences in stone and guide height can cause chatter or poor cutting action.



Remove pinion from hone body by pulling it straight out. Insert stones and guides (stones only when using Guideless Stone Sets) as far as they will go in their proper holes – marked “X” on hone body – with rack teeth toward pinion hole. Insert pinion while compressing stones and guides against hone body.

**HAND-FEED
HONES**



Pull Release Ring back and tilt hone. Pull Pinion all way out. Insert Stone and Guide Assemblies as far as they will go into their proper holes with rack teeth toward pinion hole. Insert Pinion. Pull Release Ring back and engage Universal Ball with Pinion Socket.

**REMOTE-FEED
HONES**

**SAFETY
FEATURE**

Drive shanks of Sunnen Hones are designed to break if hone hits an obstruction in cylinder. This breakage is intended to protect other components of hone. Do not weld broken shanks, because next time an obstruction is hit, a more expensive part of hone will be damaged. If repeated breakage occurs as result of normal honing, call your Sunnen Field Engineer.

**OPERATION
HAND-FEED
HONES**

Hand-Feed Hones are supplied with only one universal joint, which is sufficient if hone is being used in a portable electric drill motor. If a hand-feed hone is used in a drill press, lathe, or other machine with a fixed spindle, a second universal joint must be ordered.

1. Place hone in workpiece.
2. Raise pinion about 1/4 in. (6 mm) and turn it counterclockwise to set stones roughly to bore diameter.
3. Push pinion back down, engaging its internal gear with gear on hone body.
4. Expand the stones firmly against the bore by turning the wing wrench clockwise. During this adjustment, stones should not protrude more than 1/2 in. (13 mm) from bore.
5. Start hone rotating in work in a clockwise direction. When stones become loose as hole gets larger, stop hone and repeat Step 4.

**REMOTE-FEED
HONES**

Remote-Feed Hones are designed for use in a rigid installation, where neither part to be honed nor power source is able to float. Two universal joints are supplied with each Remote-Feed Hone to provide full floating action at honing head.

1. Place hone in bore.
2. Expand stones by turning handwheel in a counterclockwise direction (opposite to direction of hone rotation). When stones contact bore, back handwheel off one-half turn.
3. Start hone rotating in work in a clockwise direction and apply very light stopping pressure to handwheel as hone is stroked through length of bore.

STROKING

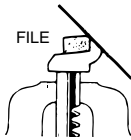
4. As hole diameter gets larger and stones become loose, a light braking on handwheel will keep stones cutting.

Hone should be stroked fast enough to produce a crosshatch in bore. If stroke is too slow, cutting action slows down and stones can even glaze and chatter. When starting out, it is best to "short stroke" in tight spots of bore and gradually lengthen stroke as tight spots are honed out.

1. For diameters of 6-1/2 in. (165 mm) and larger, use proper Stone Support.
2. Guide blocks may be too tight. To check, expand stones and guides out against cylinder wall. You should be able to wiggle guides with your fingers. If guides are tight, file or grind off about 1/32 in. (1 mm) from wearing surface of each guide to relieve guide pressure and stop chatter. Guideless (GG, MM, NN, WW) Stone Sets also eliminate this problem.
3. Increase stroking speed to break up chatter pattern.
4. Make sure hone rotates clockwise (as viewed from drive shank end of hone).

TROUBLE- SHOOTING Chatters

1. Guide blocks may be too tight. To check, expand stones and guides out against cylinder wall. You should be able to wiggle guides with your fingers. If guides are tight, file or grind off about 1/32 in. (1 mm) from wearing surface of each guide to relieve guide pressure and to speed up stock removal. Or, order Guideless Stone Sets.
2. Stones may be glazed. Stones should be dressed with Sunnen MAN-700 diamond dresser or another abrasive stick. Increase stone pressure with wing wrench (or handwheel on remote-feed hone). Increase stroking speed to improve self-dressing.
3. Make sure that a continuous and ample supply of Sunnen Industrial Honing Oil is being applied to bore.
4. Stone backing may be interfering with cutting. File backing as shown.



5. If you are honing hard steel, steps 2 & 3 may not speed up cutting. In that case, narrow stone with a grinding wheel.
6. Check stone chart to make sure you are using correct stone.
7. Remove one guide and move other guide out one notch of rack. (If this does not create good enough accuracy, finish hone with normal arrangement of stones.)

Stones Do Not Cut

1. Not enough pressure is applied to stones. Increase pressure with wing wrench (or handwheel on remote feed hone). Adjust frequently to maintain stone pressure.
2. Stroking is improper in a tapered cylinder. Localize honing in tight portion of bore and gradually lengthen stroke as bore becomes straighter.

Taper

INSTRUCTIONS

For Sunnen Plateau Honing Tools

POWER SOURCE Use heavy duty electric or air drill, or drill press. To establish best rpm for your operation, divide 1200 by hole diameter in inches, or 30000 by hole diameter in millimeters.

Example for a 6 in. dia. hole: $1200 \div 6 = 200$ (rpm)

Example for a 150 mm dia. hole: $30000 \div 150 = 200$ (rpm)

IMPORTANT

Make sure hone rotates clockwise (as viewed from drive shank end of hone). Use a continuous and ample flow of Sunnen Honing Fluid to ensure proper results.

NOTE: PHT tools are intended to be used for a second honing operation following a first honing operation using conventional abrasive. They are not intended or recommended for “glaze breaking” or stock removal operations.

ASSEMBLY AN HAND-FEED Remove pinion from hone body by pulling it straight out. Insert PHT tools as far as they will go in their proper holes – MARKED “X” on hone body – with rack teeth toward pinion hole. Insert pinion while compressing stones and guides against hone body.

SN, SNJ & JN HAND OR REMOTE-FEED SN and JN PHT sets consist of four abrasive segments. SNJ sets have three abrasive segments. Insert into slots of hone body.

AN REMOTE-FEED Pull Release Ring back and tilt hone body. Pull Pinion all way out. Release the Release Ring. Insert PHT tools as far as they will go into their proper holes with rack teeth toward pinion hole. Insert Pinion. Pull Release Ring back and engage Universal Ball with Pinion Socket.

OPERATION

NOTE: When hone is used in a lathe, drill press, or other rigid stroking device, two universal joints must be used to provide full floating action at honing head. Remote-Feed Hones are supplied with two universal joints as standard equipment; a second universal joint must be ordered separately when using Hand-Feed Hones in a rigid stroking device.

AN HAND-FEED

1. Place hone in workpiece.
2. Raise pinion about 1/4 in. (6 mm) and turn it counter-clockwise to set stones roughly to bore diameter.
3. Push pinion back down, engaging its internal gear with gear on hone body.

4. Expand PHT tool firmly against bore by turning wing wrench clockwise. (During this adjustment, PHT abrasive segments should not protrude more than 1/2 in. (12 mm) from bore.

5. Start hone rotating in work in a clockwise direction.

1. Put hone in bore far enough so that entire length of abrasive segments is in bore.

2. Turn Adjusting Nut clockwise until abrasive segments are against bore.

3. Lift Wing Wrench until it engages Adjusting Nut.

4. Expand abrasive segments firmly against bore by turning Wing Wrench clockwise.

5. Start hone rotating in work in a clockwise direction.

SN & JN HAND-FEED

Remote-Feed Hones are designed for use in a rigid installation, where neither part to be honed nor power source are able to float. Two universal joints are supplied with each Remote-Feed Hone to provide full floating action at honing head.

1. Place hone in bore.

2. Expand PHT tools by turning handwheel in a counter-clockwise direction (opposite to direction of hone rotation). When PHT tools contact bore, back handwheel off one-half turn.

3. Start hone rotating in work in a clockwise direction and apply very light stopping pressure to handwheel as hone is stroked through length of bore.

4. If PHT tools become loose, a light braking on handwheel will restore honing pressure.

AN, SN & JN REMOTE-FEED

Stroke hone fast enough to produce a crosshatch pattern in bore.

STROKING

Doing production honing? Write to Sunnen Products Company, 7910 Manchester Ave., St. Louis, Mo. 63143, U.S.A., for tips on honing rigs.

SAFETY INSTRUCTIONS READ FIRST

These tools and stone sets, like any equipment, may be dangerous if used improperly. Please read all warnings and instructions before attempting to use these tools and stone sets.

DO NOT remove or defeat any safety device.

Always wear eye protection when operating these tools.

DO NOT attempt any repair or maintenance procedure beyond those described in this booklet. Contact your Sunnen Field Service Engineer for repairs not covered.

 Indicates CE version ONLY.



SUNNEN PRODUCTS COMPANY

7910 Manchester Ave., St. Louis, MO 63143 U.S.A.

Phone: 314-781-2100 Fax: 314-781-2268

U.S.A. Toll-Free Sales and Service -

Automotive: 1-800-772-2878 • Industrial: 1-800-325-3670

International Division Telex: 4312052 SUNNEN PRODSTL

Cable Address: "SUNPROCO" All Codes

International Division Fax: 314-781-6128

<http://www.sunnen.com>

"SUNNEN AND THE SUNNEN LOGO ARE REGISTERED TRADEMARKS OF SUNNEN PRODUCTS COMPANY."

SUNNEN PRODUCTS LIMITED

No. 1 Centro, Maxted Road

Hemel Hempstead, Herts HP2 7EF ENGLAND

Phone: ++ 44 1442 39 39 39 Fax: ++ 44 1442 39 12 12

SUNNEN AG

Fabrikstrasse 1

8586 Ennetaach-Erlen, Switzerland

Phone: ++ 41 71 648 16 16 Fax: ++ 41 71 648 31 31

SHANGHAI SUNNEN MECHANICAL CO., LTD.

889 Kang Qiao East Road, PuDong

Shanghai 201319, P.R. China

Phone: 86 21 5 813 3322 Fax: 86 21 5 813 2299

SUNNEN ITALIA S.R.L.

Viale Stevio 12/15

20021 Ospiate di Bollate (MI) Italy

Phone: 39 02 383 417 44 Fax: 39 02 383 417 50

Sunnen® reserves the right to change or revise specifications and product design in connection with any feature of our products contained herein. Such changes do not entitle the buyer to corresponding changes, improvements, additions, or replacements for equipment, supplies or accessories previously sold. Information contained herein is considered to be accurate based on available information at the time of printing. Should any discrepancy of information arise, Sunnen recommends that user verify the discrepancy with Sunnen before proceeding.