SM20
HYDRAULIC SUMP PUMP

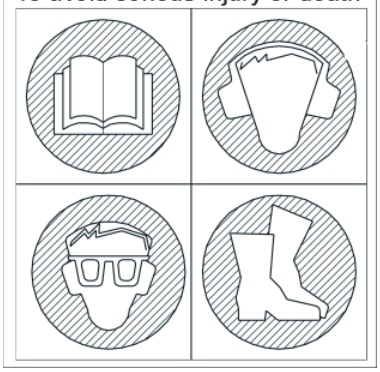
⚠ WARNING

SERIOUS INJURY OR DEATH COULD RESULT FROM IMPROPER REPAIR OR SERVICE OF THIS TOOL.

REPAIRS AND/OR SERVICE TO THIS TOOL MUST ONLY BE DONE BY AN AUTHORIZED AND CERTIFIED DEALER.

⚠ WARNING

To avoid serious injury or death



SAFETY, OPERATION AND MAINTENANCE
SERVICE MANUAL

CE

SVCE/MAINT USA
Printed in U.S.A.
10273 10/2005 ver 2

Stanley Hydraulic Tools
3810 SE Naef Road
Milwaukie OR 97267-5698
503-659-5660
FAX 503-652-1780
www.stanley-hydraulic-tools.com

TABLE OF CONTENTS

SERVICING THE STANLEY HYDRAULIC Sump Pump. This manual contains safety, operation, and routine maintenance instructions. Stanley Hydraulic Tools recommends that servicing of hydraulic tools, other than routine maintenance, be performed by an authorized and certified dealer. Please read the following warning.

⚠ WARNING

SERIOUS INJURY OR DEATH COULD RESULT FROM THE IMPROPER REPAIR OR SERVICE OF THIS TOOL.

REPAIRS AND / OR SERVICE TO THIS TOOL MUST ONLY BE DONE BY AN AUTHORIZED AND CERTIFIED DEALER.

For the nearest authorized and certified dealer, call Stanley Hydraulic Tools at the number listed on the back of this manual and ask for a Customer Service Representative.

CERTIFICATE OF CONFORMITY

CERTIFICATE OF CONFORMITY
ÜBEREINSTIMMUNGS-ZERTIFIKAT
CERTIFICAT DE CONFORMITE CEE
CERTIFICADO DE CONFORMIDAD
CERTIFICATO DI CONFORMITA

STANLEY

Hydraulic Tools

I, the undersigned:
Ich, der Unterzeichnende:
Je soussigné:
El abajo firmante:
lo sottoscritto:

Winterling, David

Surname and First names/Familiennname und Vornamen/Nom et prénom/Nombre y apellido/Cognome e nome

hereby certify that the construction plant or equipment specified hereunder:
bestätige hiermit, daß das im folgenden genannten Werk oder Gerät:
certifies par ceci que l' usine ou l' équipement de construction indiqué cidessous:
por el presente certifico que la fabrica o el equipo especificado a continuacion:
certifico che l'impianto o l'attrezzatura sotto specificata:

1. Category:
Kategorie:
Catégorie:
Categoria:
Categoria: Submersible Pump, Hydraulic

2. Make/Ausführung/Marque/Marca/Marca: Stanley

3. Type/Typ/Type/Tipo/Tipo: SM2043101, SM2043107, SM2052101, SM2053101

4. Serial number of equipment:
Seriennummer des Geräts:
Numéro de série de l'équipement:
Numero de serie del equipo:
Matricola dell´attrezzatura: **All**

5. Year of manufacture/Baujahr/année de fabrication/Año de fabricacion/Anno di fabbricazione: Beginning 2002

Has been manufactured in conformity with - EEC Type examination as shown.
Wurde hergestellt in Übereinstimmung mit - EEC Typ-Prüfung nach.
Est fabriqué conformément - au(x) type(s) examiné(s) comme indiqué dans le tableau ci-après.
Ha sido fabricado de acuerdo con - tipo examen EEC como dice.
E' stata costruita in conformitá con - le norme CEE come illustrato.

	Examen CEE de type			
Directive Richtlinie Directives particulières Directriz Direttiva	No. Nr Numéro No n.	Date Datum Date Fecha Data	Approved body Prüfung durch Organisme agréé Aprobado Collaudato	Date of expiry Ablaufdatum Date d´expiration Fecha de caducidad Data di scadenza
EN Machinery directive	809 98/37/EC	1995 1998	Self Self	NA NA

6. Special Provisions: None
Spezielle Bestimmungen:
Dispositions particulières:
Provisiones especiales:
Disposizioni speciali:

Done at/Ort/Fait à/Dado en/Fatto a Stanley Hydraulic Tools, Milwaukie, Oregon USA Date/Datum/le/Fecha/Data 7/30/2002

Signature/Unterschrift/Signature/Firma/Firma_____

Position/Position/Fonction/Puesto/Posizione Engineering Manager

8/1/05

SAFETY SYMBOLS

Safety symbols and signal words, as shown below, are used to emphasize all operator, maintenance and repair actions which, if not strictly followed, could result in a life-threatening situation, bodily injury or damage to equipment.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER — **This safety alert and signal word indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

⚠ WARNING — **This safety alert and signal word indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ CAUTION — **This safety alert and signal word indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

CAUTION — **This signal word indicates a potentially hazardous situation which, if not avoided, may result in property damage.**

NOTICE — **This signal word indicates a situation which, if not avoided, will result in damage to the equipment.**

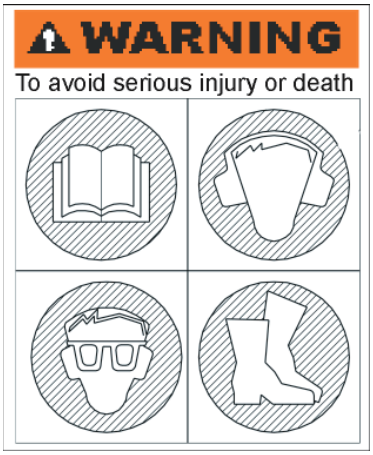
IMPORTANT — **This signal word indicates a situation which, if not avoided, may result in damage to the equipment.**

Always observe safety symbols. They are included for your safety and for the protection of the tool.

LOCAL SAFETY REGULATIONS

Enter any local safety regulations here. Keep these instructions in an area accessible to the operator and maintenance personnel.

SAFETY PRECAUTIONS



Tool operators and maintenance personnel must always comply with the safety precautions given in this manual and on the stickers and tags attached to the tool and hose.

These safety precautions are given for your safety. Review them carefully before operating the tool and before performing general maintenance or repairs.

Supervising personnel should develop additional precautions relating to the specific work area and local safety regulations. If so, place the added precautions in the space provided in this manual.

The models SM20 Hydraulic Pump will provide safe and dependable service if operated in accordance with the instructions given in this manual. Read and understand this manual and any stickers and tags attached to the pump and hoses before operation. Failure to do so could result in personal injury or equipment damage.

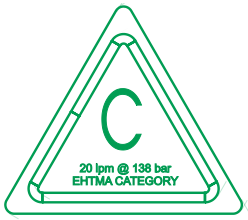
- Operator must start in a work area without bystanders. The operator must be familiar with all prohibited work areas such as excessive slopes and dangerous terrain conditions.
- Establish a training program for all operators to ensure safe operations.
- Do not operate the tool unless thoroughly trained or under the supervision of an instructor.
- Always wear safety equipment such as goggles, head protection, and safety shoes at all times when operating the tool.
- Do not inspect or clean the tool while the hydraulic power source is connected. Accidental engagement of the tool can cause serious injury.
- Do not operate this tool without first reading the Operating Instructions.
- Do not install or remove this tool while the hydraulic power source is connected. Accidental engagement of the tool can cause serious injury.
- Never operate the tool near energized transmission lines. know the location of buried or covered services before starting work.
- Do not wear loose fitting clothing when operating the tool. Loose fitting clothing can get entangled with the tool and cause serious injury.
- Supply hoses must have a minimum working pressure rating of 2500 psi/175 bar.
- Be sure all hose connections are tight.
- The hydraulic circuit control valve must be in the “OFF” position when coupling or uncoupling the tool. Wipe all couplers clean before connecting. Failure to do so may result in damage to the quick couplers and cause overheating. Use only lint-free cloths.
- Do not operate the tool at oil temperatures above 140° F/60° C. Operation at higher oil temperatures can cause operator discomfort and may cause damage to the tool.
- Do not operate a damaged, improperly adjusted, or incompletely assembled tool.

SAFETY PRECAUTIONS

- Do not put hand under volute while the pump is running.
- To avoid personal injury or equipment damage, all tool repair, maintenance and service must only be performed by authorized and properly trained personnel.
- Do not exceed the rated limits of the tool or use the tool for applications beyond its design capacity.
- Always keep critical tool markings, such as labels and warning stickers legible.
- Always replace parts with replacement parts recommended by Stanley Hydraulic Tools.
- Check fastener tightness often and before each use daily.
- Do not point water discharge at bystanders.

TOOL STICKERS & TAGS

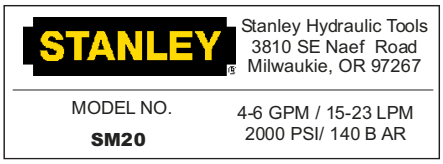
28323
CE Decal (CE Only)



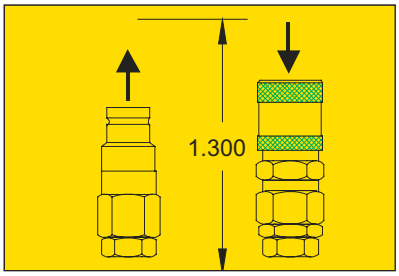
11207
Circuit Type C Decal (CE Only)

28788
fManual Decal

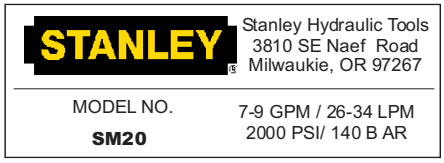
11206
Circuit Type D Decal (CE Only)
(SM2052101 Only)



28785
Model Decal (SM2052101 Only)

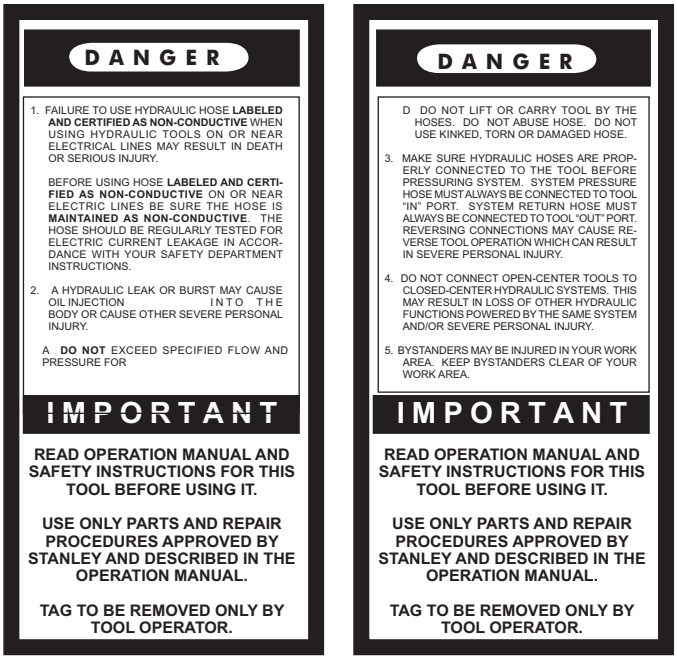


28786
Coupler Decal



28784
Model Decal

The safety tag (p/n 15875) at right is attached to the tool when shipped from the factory. Read and understand the safety instructions listed on this tag before removal. We suggest you retain this tag and attach it to the tool when not in use.



SAFETY TAG P/N 15875 (shown smaller then actual size)

HYDRAULIC HOSE REQUIREMENTS

HOSE TYPES

Hydraulic hose types authorized for use with Stanley Hydraulic Tools are as follows:

❶ Certified non-conductive

❷ Wire-braided (conductive)

❸ Fabric-braided (not certified or labeled non-conductive)

Hose ❶ listed above is the only hose authorized for use near electrical conductors.

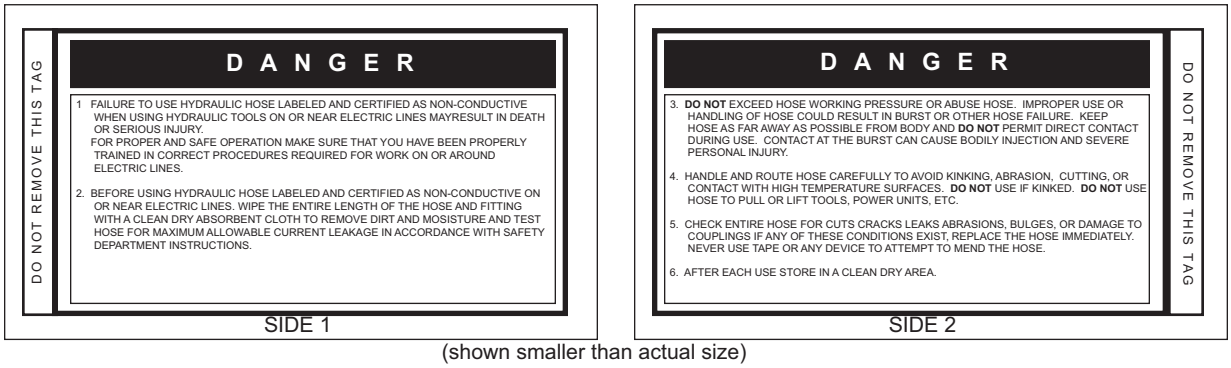
Hoses ❷ and ❸ listed above are **conductive** and **must never** be used near electrical conductors.

HOSE SAFETY TAGS

To help ensure your safety, the following DANGER tags are attached to all hose purchased from Stanley Hydraulic Tools. DO NOT REMOVE THESE TAGS.

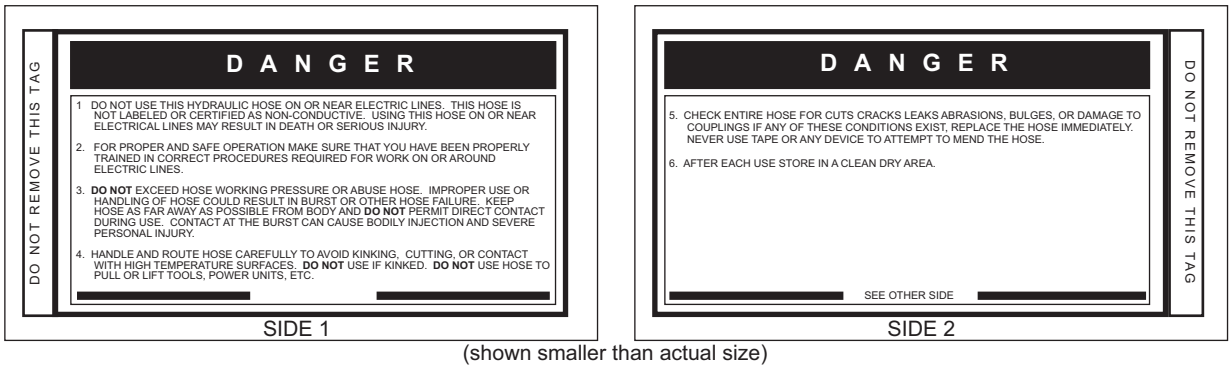
If the information on a tag is illegible because of wear or damage, replace the tag immediately. A new tag may be obtained from your Stanley Distributor.

THE TAG SHOWN BELOW IS ATTACHED TO "CERTIFIED NON-CONDUCTIVE" HOSE



(shown smaller than actual size)

THE TAG SHOWN BELOW IS ATTACHED TO "CONDUCTIVE" HOSE.



(shown smaller than actual size)

HOSE PRESSURE RATING

The rated working pressure of the hydraulic hose **must be equal to or higher than** the relief valve setting on the hydraulic system.

HTMA REQUIREMENTS

HYDRAULIC SYSTEM REQUIREMENTS	TOOL CATEGORY  TYPE 1	 TYPE II	TYPE III	TYPE RR
FLOW RATE	4-6 gpm (15-23 lpm)	7-9 gpm (26-34 lpm)	11-13 gpm (42-49 lpm)	9-10.5 gpm (34-40 lpm)
TOOL OPERATING PRESSURE (at the power supply outlet)	2000 psi (138 bar)	2000 psi (138 bar)	2000 psi (138 bar)	2000 psi (138 bar)
SYSTEM RELIEF VALVE SETTING (at the power supply outlet)	2100-2250 psi (145-155 bar)	2100-2250 psi (145-155 bar)	2100-2250 psi (145-155 bar)	2200-2300 psi (152-159 bar)
MAXIMUM BACK PRESSURE (at tool end of the return hose)	250 psi (17 bar)	250 psi (17 bar)	250 psi (17 bar)	250 psi (17 bar)
Measured at a max. fluid viscosity of: (at min. operating temperature)	400 ssu* (82 centistokes)	400 ssu* (82 centistokes)	400 ssu* (82 centistokes)	400 ssu* (82 centistokes)
TEMPERATURE Sufficient heat rejection capacity to limit max. fluid temperature to: (at max. expected ambient temperature)	140° F (60° C)	140° F (60° C)	140° F (60° C)	140° F (60° C)
Min. cooling capacity at a temperature difference of between ambient and fluid temps	3 hp (2.24 kW) 40° F (22° C)	5 hp (3.73 kW) 40° F (22° C)	7 hp (4.47 kW) 40° F (22° C)	6 hp (5.22 kW) 40° F (22° C)
NOTE: Do not operate the tool at oil temperatures above 140° F (60° C). Operation at higher temperatures can cause operator discomfort at the tool.				
FILTER Min. full-flow filtration Sized for flow of at least: (For cold temp. startup and max. dirt-holding capacity)	25 microns 30 gpm (114 lpm)	25 microns 30 gpm (114 lpm)	25 microns 30 gpm (114 lpm)	25 microns 30 gpm (114 lpm)
HYDRAULIC FLUID Petroleum based (premium grade, anti-wear, non-conductive) VISCOSITY (at min. and max. operating temps)	100-400 ssu*	100-400 ssu*	100-400 ssu* (20-82 centistokes)	100-400 ssu*
NOTE: When choosing hydraulic fluid, the expected oil temperature extremes that will be experienced in service determine the most suitable temperature viscosity characteristics. Hydraulic fluids with a viscosity index over 140 will meet the requirements over a wide range of operating temperatures.				

*SSU = Saybolt Seconds Universal

NOTE:
These are general hydraulic system requirements. See tool Specification page for tool specific requirements.

OPERATION

PREOPERATION PROCEDURES

CHECK POWER SOURCE

1. Using a calibrated flow meter and pressure gauge, make sure the hydraulic power source develops a flow of 4-6 gpm/15-23 lpm at 1000-2000 psi/70-140 bar or 7-9 gpm/26-34 lpm at 1000-2000 psi/70/140 bar.

2. Make certain that the power source is equipped with a relief valve set to open at 2100 psi/145 bar maximum.

3. Make certain that the power source return pressure does not exceed 250 psi/17 bar.

4. Make sure the pump inlet screen is clear of debris and the outlet hose is clean. Remove any obstruction before operating. Refer to PUMP CLEANING PROCEDURES.

CONNECT HOSES

1. Wipe all hose couplers with a clean lint free cloth before making connections.

2. Connect the hoses from the hydraulic power source to the couplers on the sump pump or sump pump hoses. It is a good practice to connect return hose first and disconnect it last to minimize or avoid trapped pressure within the trash pump motor.

Note:
If uncoupled hoses are left in the sun, pressure increase inside the hoses might make them difficult to connect. Whenever possible, connect the free ends of the hoses together.

3. Observe the arrow on the couplers to ensure that the flow is in the proper direction. The female coupler on the sump pump is the inlet (pressure) coupler.

PUMP OPERATION

1. Observe all safety precautions.

Note:
The SM20 is not designed for use with a suction pipe inlet. The diameter of the suction screen at the bottom of the pump provides maximum pump efficiency. Reducing the size of this inlet will greatly reduce pump performance.

2. Connect a hose fitted with a 2-1/2 inch/63.5 mm male pipe end to the pump outlet fitting. Make sure the fitting is securely tightened. For best performance, keep the hose as short as possible and lay it out to avoid sharp bends or kinks.

3. Lower the pump into the liquid to be pumped. Locate the outlet end of the discharge hose to disperse the liquid as required. Remove any kinks from the hose to assure maximum water flow.

IMPORTANT

Never point the hose at bystanders.

4. Turn on the hydraulic power source. Watch for solids in the liquid being pumped. If solids are excessive, the discharge flow might decrease. If this happens, stop the pump and check for the cause of the problem.

Under some conditions, the liquid being pumped might be slowed enough so It can no longer push particles in the liquid. If this happens, particles can accumulate in the hose and backup the pumping chamber, causing further restriction. The impeller then acts as a “grinding wheel which causes accelerated pump wear. Reduced liquid flow can be caused by the following:

• The pump sinks into solids at the bottom of the hole.

• The end of the outlet hose is too high, causing an excessive lift height for the column of liquid being pushed by the sump pump. This slows the flow of liquid to a level where it can no longer carry solids out the end of the hose.

• The flow and pressure of hydraulic fluid to the pump is too low, which reduces impeller speed. A 20% decrease in hydraulic fluid flow can reduce pump performance by 50%. When operating at reduced hydraulic flow and pressure, the end of the outlet hose should not be more than 40 ft/12 m above the liquid.

5. When pumping is complete, set the hydraulic control valve to the “OFF” position. Lift the pump from the work area.

WHEN PUMPING WATER MIXED WITH SOLIDS

• Do not use a nozzle.

• Remove all hose kinks before starting the pump.

• Do not lift water mixed with solids over 40 ft/12 m if hydraulic flow from the power source is less than 7 gpm/26 lpm.

• If output flow from the water hose drops during operation, clean out the hose to remove all obstructions. Check for kinks in the hose.

Note:
Always keep water speed as fast as possible during operation. This helps to pump solids through the hose and keeps the pump clean for longer life.

COLD WEATHER OPERATION

If the sump pump is to be used during cold weather, preheat the hydraulic fluid at low power source speed. When using the normally recommended fluids, fluid should be at or above 50°F/10°C (400 ssu/82 centistokes) before use. Damage to the hydraulic system or pump motor seals can result from use with fluid that is too viscous or thick.

MAINTENANCE

CLEANING THE PUMPING CHAMBER

Debris such as weeds, sand and other solids may become trapped in the water hose and pumping chamber. This can reduce pump performance. It is important that the pumping chamber be kept clean at all times. The chamber can be cleaned as follows:

1. Remove motor and impeller by removing the seven 5/16 -18 capscrews (item 14).

2. Thoroughly clean the volute and impeller. Do not remove the impeller unless necessary for repair or replacement or to remove trapped debris.

3. Remove all debris from the pump screen by removing the four 5/16 -18 capscrews (item 18).

4. Assemble the motor and impeller to the volute. Clean the capscrews and lubricate the threads with underwater grease before installation.

5. Remove all debris from the hose. Otherwise, solids will backfill the pump.

EQUIPMENT PROTECTION & CARE

NOTICE

In addition to the Safety Precautions in this manual, observe the following for equipment protection and care.

- Make sure all couplers are wiped clean before connection.
- The hydraulic circuit control valve must be in the “OFF” position when coupling or uncoupling hydraulic tools. Failure to do so may result in damage to the quick couplers and cause overheating of the hydraulic system.
- Always store the tool in a clean dry space, safe from damage or pilferage.
- Make sure the circuit PRESSURE hose (with male quick disconnect) is connected to the “IN” port. The circuit RETURN hose (with female quick disconnect) is connected to the opposite port. Do not reverse circuit flow. This can cause damage to internal seals.
- Always replace hoses, couplings and other parts with replacement parts recommended by Stanley Hydraulic Tools. Supply hoses must have a minimum working pressure rating of 2500 psi/172 bar.
- Do not exceed the rated flow or pressure. Refer to the Specifications in this manual for correct flow rate and pressure. If specifications are exceeded, rapid failure of the internal seals may result.
- Always keep critical tool markings, such as warning stickers and tags legible.
- Do not use the tool for applications it was not designed for.
- Tool repair should be performed by experienced personnel only.
- Make certain that the recommended relief valves are installed in the pressure side of the system.
- Do not use the tool for applications for which it was not intended.

TROUBLESHOOTING

If symptoms of poor performance develop, the following chart can be used as a guide to correct the problem.

When diagnosing faults in operation, always make sure the hydraulic power source is supplying the correct hydraulic flow and pressure as listed in the table. Use a flowmeter know to be accurate. Check the flow with the hydraulic fluid temperature at least 80° F/27° C.

PROBLEM	CAUSE	SOLUTION
Pump will not start.	No hydraulic fluid flow or pressure.	Turn on power unit and check that 4-9 gpm/15-34 lpm at 1000-2000 psi/70-140 bar is available at the pump.
	Defective couplers.	Check the couplers. Replace if necessary.
	Impeller jammed with debris.	Clean the pumping chamber as described in the Maintenance section in this manual.
	Impeller rubbing against wear plates.	Check and adjust the impeller clearance as described in the Service Instructions section in this manual.
	Defective hydraulic motor.	Repair or replace motor.
Poor pump performance.	Hydraulic flow reversed.	Check that the hoses are correctly connected to the pump motor ports. The female coupler should be connected to the “IN” port. The return fluid must never flow through a reversing valve.
	Improper hydraulic fluid flow.	Check that 4-9 gpm/15-34 lpm at 1000-2000 psi/70-140 bar is available at the trash pump. A 20% decrease in flow can result in a 50% decrease in pump performance.
	Pump submersed in sediment.	Lift the pump from the bottom of the hole or chamber. Use a flat support under the pump if necessary.
	Trash pump inlet restricted.	Remove suction screen and thoroughly clean. Reassemble.
	Discharge hose kinked or restricted.	Straighten the hose. If the hose must bend at the top of the hole, use a piece of split rigid conduit with large diameter of the expanded hose. This keeps the hose from kinking.
	Discharge hose too small.	Use a 2-1/2 inch/63.5 mm diameter fire hose.
	Water lift too high.	Lower the outlet end of the discharge hose. Increase hydraulic flow (9 gpm/35 lpm max).
	Impeller worn or damaged.	Check impeller for damage and excessive wear. Replace if necessary.
	Pump not matched to application	Obtain higher capacity pump.
	Wear ring worn or damaged.	Check for wear ring damage or excessive wear. Replace if necessary.
	Hose used on suction side of pump.	Remove. Use no plumbing on suction side of pump.
Poor pump performance with excessive wear.	Too many solids in the water. Water speed out of the hose may be too slow, therefore hose and pump load up with solids.	Reduce solids content. Increase pump speed.

SPECIFICATIONS

Capacity	250 gpm/946 lpm
Weight	13.7 lbs/6.3 kg
Length	7.5 in./19 cm
Width	10 in./25.4 cm
Pressure	1000-2000 psi/70-140 bar
Flow Range	4-6 gpm/15-23 lpm (SM2052101)
Flow Range	7-9 gpm/26-34 lpm (SM2043101, SM2043107, SM2053101)
Porting	-8 SAE O-Ring
Connect Size and Type	3/8 in. Flush Face Quick Disconnect Couplers
Discharge Diameter	2-1/2 in./6.3 cm

ACCESSORIES

Description	Part No.
Fire Hose, 25 ft x 2-1/2 in. Diameter	02183
Fire Hose, 50 ft x 2-1/2 in. Diameter	05134
Fire Nozzle, 1 in.	02317
Thread Adapter for Pump to Fire Hose, 2-1/2 in.	05133
Spanner Wrench for Pin Lug Coupler	05135

SERVICE

⚠ WARNING

Disconnect the pump from the hydraulic circuit before performing any service on the pump.

CLEANING THE PUMPING CHAMBER

Debris such as weeds, sand and other solids may become trapped in the water hose and pumping chamber. This can reduce pump performance. It is important that the pumping chamber be kept clean at all times. The chamber can be cleaned as follows:

1. Remove the suction screen by removing the four 5/16-18 x 2-3/4 hex head capscrews and lockwashers.

2. Remove any debris from the pump screen.

3. Remove the seven 5/16-18 x 1-1/4 socket head capscrews securing the volute top to the volute bottom. Separate the two volute halves to expose the impeller.

4. Thoroughly clean the volutes and impeller. Do not remove the impeller unless necessary for repair or replacement or to remove trapped debris.

5. Assemble the volutes and suction screen. Clean the capscrews and lubricate the threads with underwater grease before installation.

6. Remove all debris from the hose. Otherwise, solids will backfill the pump.

CHECKING THE MAIN SHAFT SEAL

1. Separate the volute top and bottom.

2. Remove the impeller by removing the 1/4-20 x 1/2 stainless steel capscrew. Pull evenly around the diameter of the impeller to pull it loose from the motor shaft. Be careful not to lose the needle roller key.

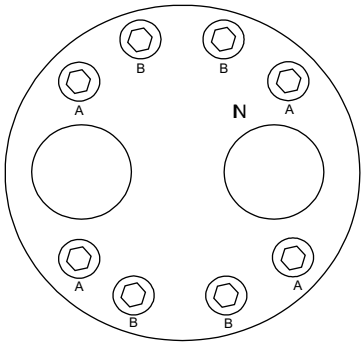
3. Thoroughly clean the area around the main shaft. Make sure the shaft is clean and dry before proceeding to step 4.

4. Connect the pump to a hydraulic power supply as described in the OPERATION section of this manual. Apply hydraulic power to the pump motor. Carefully check for oil leaks around the seal and main shaft.
5. If oil leaks are present around the shaft, remove the motor and replace the main shaft seal as described in the following paragraph.

6. If oil leakage is detected at the volute top casting, the casting may be cracked and must be replaced.

MOTOR REMOVAL AND INSTALLATION SEAL REPAIR

Note:
Pump serial numbers 1547 and up have a bronze gland seal to seal the pump shaft at the volute top. Serial numbers 1546 and lower use a cup seal. Be sure to order the correct repair and seal kits as specified in the following paragraphs.



A - Remove these screws to remove motor from top volute.

B - Remove these screws only to disassemble motor. DO NOT remove before motor is removed from top volute.

Figure 1. Motor Mounting Screws

REMOVAL
(PUMP SERIAL NUMBER 1546 & LOWER

1. Obtain seal kit Part Number 10318 or repair kit Part Number 10317 if damage is suspected.

2. Separate the volute top and volute bottom by removing the seven 5/16-18 x 1-1/4 socket head caps crews at the top volute.

3. Remove the impeller by removing the 1/4-20 x 1/2 stainless steel capscrew.

IMPORTANT

Do not attempt to remove the motor until the impeller has been removed.

Do not allow the main shaft to slide from the motor unless the drive gear and needle roller have been removed.

4. Remove ON L Y the four 10-24 x 3 hex socket head capscrews, marked “A” in Figure 1, then PUSH on the MAIN SHAFT end to remove the assembled motor from the volute top.

5. If oil leakage around the main shaft is evident, the cup seal must be replaced. The seal is shown in Figure 2 and is supplied in the seal kit.

6. Inspect the seal surfaces on the main shaft. If damage is evident, the main shaft must be replaced.

INSTALLATION

1. If there has been leakage around the main shaft or if shaft damage is evident, install a new main shaft seal in the volute top. Lubricate the seal with waterproof grease. The seal lips must face outward toward the motor.

2. Place the back-up washer on the seal, with small diameter toward the seal.

3. Place a bearing race on the back-up washer, then install the greased thrust bearing and the second bearing race. Add the a-ring around the motor pilot diameter to seal.

4. Carefully insert the motor shaft through the parts assembled in steps 2 and 3. Seat the motor in the bore of the volute top, then secure in place using the four 10-24 x 3 hex head capscrews. Tighten the capscrews to 35 pound inches in a circular pattern. Rotate the motor shaft while tightening the screws to check for binding.

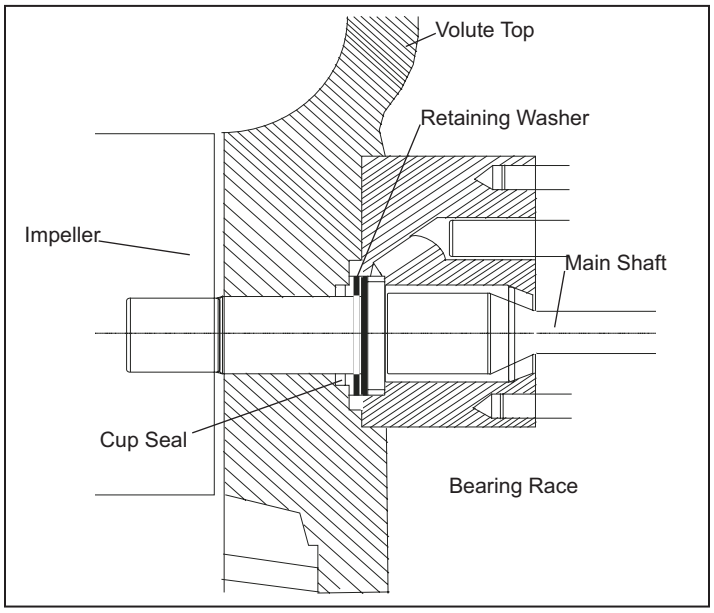


Figure 2. Cup Seal and associated parts

REMOVAL
(PUMP SERIAL NUMBER 1547 & UP)

1. Obtain seal kit Part Number 19937 or repair kit Part Number 20135 if oil leakage is evident or if damage is suspected.

2. Separate the volute top and volute bottom by removing the seven 5/16-18 x 1-1/4 socket head capscrews at the top volute.

3. Remove the impeller by removing the 1/4.20 x 1/2 stainless steel capscrew.

IMPORTANT

Do not attempt to remove the motor until the impeller has been removed.
Do not allow the main shaft to slide from the motor unless the drive gear and needle roller have been removed.

4. Remove ONLY the four 1 0-24 hex socket head capscrews, marked “A” in Figure 1, then PUSH on the MAIN SHAFT end to remove the assembled motor from the volute top.

5. If oil leakage around the main shaft is evident, the bronze gland seal and associated parts must be replaced. These parts are shown in Figure 3 and are supplied in the seal kit.

6. Inspect the seal surfaces on the main shaft. If damage is evident, the mains haft must be replaced. Refer to MOTOR INSPECTION AND CLEANING.

INSTALLATION

1. If there has been leakage around the main shaft or if shaft damage is evident, install a new wiper seal, bronze gland seal, gland seal o-ring, quad ring and backup ring in the volute top as shown in Figure 3 before installing the motor. Lubricate the bronze gland seal, wiper seal and quad ring with waterproof grease before installation. Lubricate all other parts with clean hydraulic fluid.

Note:
The lip of the wiper seal must face down toward the impeller side of the volute top. The gland seal must be installed so the quad ring faces the motor. Make sure the quad ring fits evenly inside the bore of the bronze gland seal and that it is not twisted.

2. Place a bearing race against the back-up ring installed in step 1. Lubricate the thrust bearing with waterproof grease, then install it against the bearing race. Install the second bearing race.

3. Install the large o-ring in the volute top to seal the motor front.

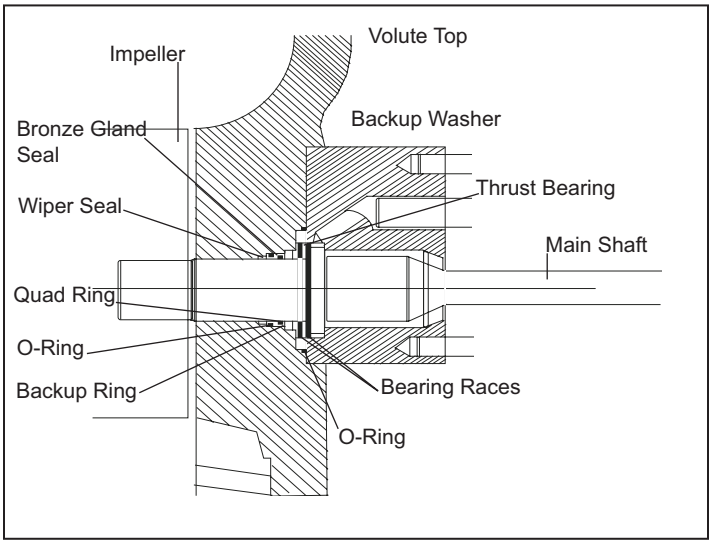


Figure 3. Bronze Gland Seal and associated parts. For serial number 1547 and up.

4. Carefully insert the motor shaft through the parts assembled in steps 1 through 3. Seat the motor in the bore of the volute top, then secure in place using the four 1 0-24 hex head capscrews. Tighten the capscrews to 35 pound inches in a circular pattern. Rotate the motor shaft while tightening the screws to check for binding.

MOTOR DISASSEMBLY & REASSEMBLY

DISASSEMBLY

IMPORTANT

Do not pull the main shaft from the front bearing retainer unless the needle roller and drive gear have been removed.

1. Remove the four 10-24 x 2 socket head capscrews, marked “B” in figure 1, securing the motor gear housing to the front bearing retainer.

2. Separate the housing and retainer. Do not twist the parts.

3. Remove the two gears, needle roller key, idler shaft, main shaft and o-ring. Be careful not to damage the o-ring groove when removing the o-ring.

4. Bushings should be gray in color. If the bushings show a bronze color, they must be replaced.

IMPORTANT

Worn bushings and/or rough gear chamber areas are a sign the hydraulic fluid is contaminated. Change fluid and fix power supply filtration before another use.

MOTOR CLEANING & INSPECTION

CLEANING

Clean all parts with a degreasing solvent. Blow dry with compressed air and wipe clean. Always use only lint free cloths.

BUSHINGS

The inside of the bushing should be gray. If a significant amount of yellow-bronze shows, bushing replacement is required. Inspect motor shaft for corresponding wear and replace as required.

GEAR HOUSING

The gear chamber bores and end faces around the bores should be polished but not rough or grooved. The flat surfaces around the chamber and bolt holes should be flat and free of nicks or burrs that could cause misalignment or leaks.

Both gears should have straight tips without nicks, square tooth ends and a smooth, even polish on the teeth and end faces. Check for cracks between the drive gear keyway and gear tooth root. Discard the gear if cracks are present.

MOTOR HOUSINGS AND RETAINER

The gear face running surface should show two interconnecting polished circles without a step and should not be rough or grooved.

The shaft seal bore should be smooth and free from nicks or scratches.

SHAFTS

The shaft diameter at the bearing and seal locations must be smooth. Grooves, roughness or a reduced diameter indicate fluid contamination and damaged bushings. Grit particles may have embedded in the bushings, grinding into the hardened shaft. If abnormal shaft wear as above occurs (in excess of normal polishing) both the shaft and associated bushings must be replaced. Main shaft Part Number 19175 (Part Number 21120 Main Shaft is used on SM2052101 only) can be used on both earlier and late motors.

REASSEMBLY

Note:
Lubricate the o-ring, bushings and gears with multipurpose grease or hydraulic fluid during reassembly.

1. Install new bushings in the front bearing retainer and gear chamber if required. The end of the bushings must be slightly below the face of the retainer bore.

2. Install the main shaft through the bushing in the front bearing retainer. Place the needle roller in the shaft groove, then install the drive gear on the shaft.

3. Install the idler shaft in the front bearing retainer. Install the gear on the shaft.

4. Install the large o-ring seal into the front bearing retainer. Use grease to hold the o-ring in place.

5. Carefully position the gear housing over the assembled gears and idler shaft. Seat the housing against the front bearing retainer. The capscrew holes will allow the front bearing retainer and gear housing to fit together in only one way.

6. With the gear housing correctly fitted against the front bearing retainer, install the four 10-24 x 2 socket head capscrews, marked “B” in figure 1. Tighten the capscrews to 35 pound inches (lubricated). Check that the shaft turns freely.

IMPELLER

REMOVAL

1. Separate the top volute from the bottom volute by removing the seven 5/16-18 x 1-1/4 capscrews and lockwashers.

2. Hold the impeller and remove the 1/4-20 x 1/2 stainless steel capscrew.

INSPECTION

Check the impeller blades for cracks, chips and signs of excessive wear which can affect pump performance. Replace the impeller if damaged or seriously worn. Check to be sure that the impeller to wear ring clearance is .030 inch/.07 mm. Add or remove shims as needed.

INSTALLATION

1. Attach the impeller to the main shaft using the flat washer and 1/4-20 x 1/2 stainless steel capscrew. Lubricate the screw threads with waterproof grease.

2. Fit the volute top and volute bottom together. Clean the seven capscrews, then lubricate with waterproof grease. Install the capscrews and tighten in a circular pattern to 8 ft lb/11 Nm.

WEAR RING

REMOVAL

1. Remove the suction screen by removing the four 5/16-18 x 2-3/4 hex head capscrews and lockwashers.

2. Remove the wear ring from the bottom volute by removing the three 1/4-20 x 1 hex head capscrews and lockwashers.

Tap the ring with a plastic hammer to separate it from the volute. Never pry on the ring with metallic tools.

3. Carefully remove the shims. Do not discard.

INSPECTION

Carefully check the ring for cracks, deep scratches and signs of excessive wear. Scratches more than 1/16 inch/2 mm may affect pump performance. Replace the wear ring if damaged or seriously worn. Check impeller-to wear ring clearance.

INSTALLATION

1. Establish .030 inch/.07 mm clearance between the wear ring and impeller as described in IMPELLER INSPECTION.

2. Install the appropriate shims, then position the wear ring on the bottom volute. Secure in place using the three 1/4-20 x 1 hex head capscrews and lockwashers. Tighten the capscrews to 45 pound inches. Lubricate the capscrew threads with waterproof grease.

3. Install the suction screen. Secure in place using the four 5/16-18 x 2-3/4 hex head stainless steel capscrews. Tighten to 45 pound inches. Use only stainless steel capscrews with threads lubricated with waterproof grease.

IMPELLER-TO-WEAR RING CLEARANCE ADJUSTMENT

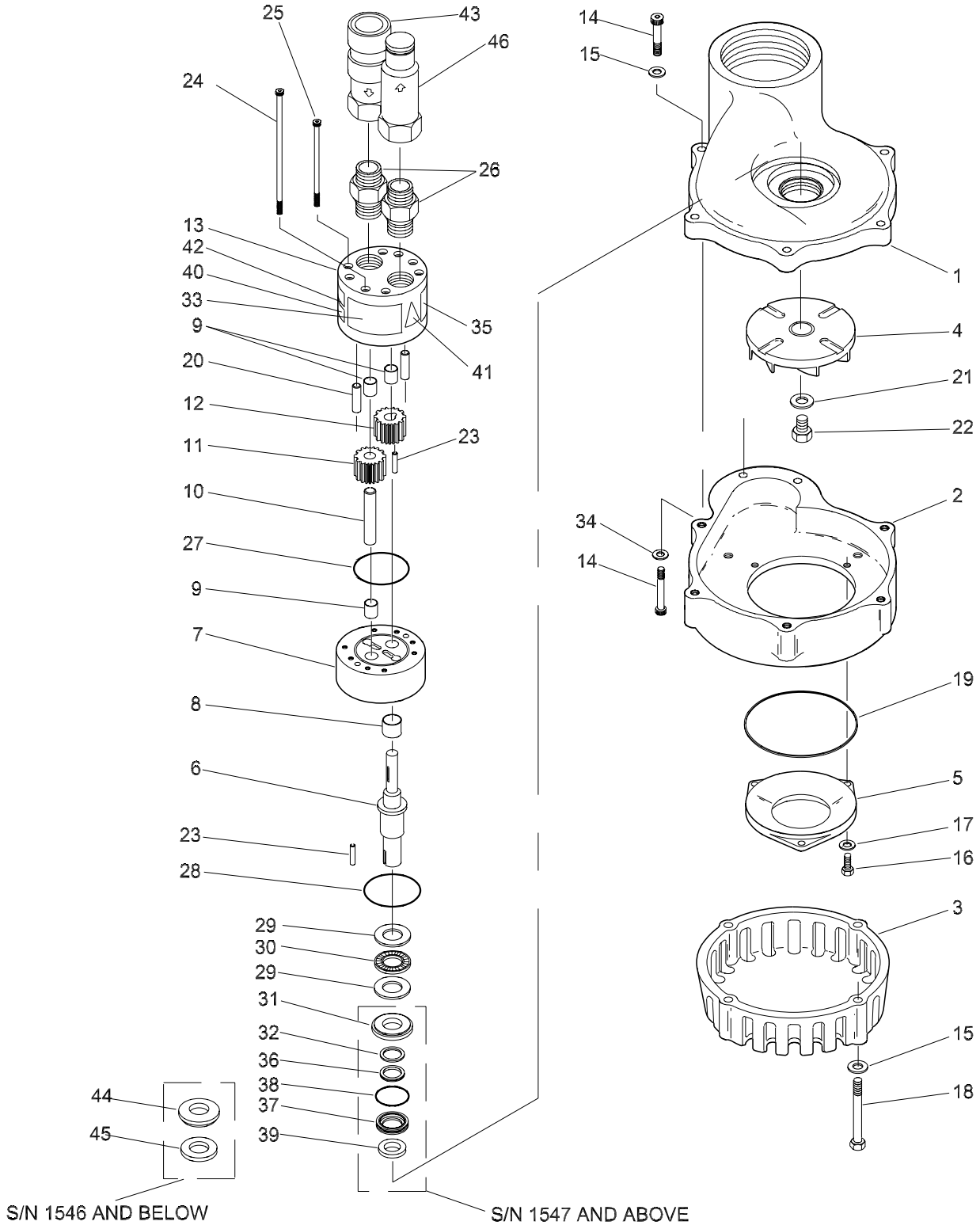
1. Remove the suction screen.

2. Remove the three 1/4-20 x 1 hex head capscrews securing the wear ring to the bottom volute.

3. Install .030 inch/.07 mm shim(s) in the groove of the bottom volute, then place the wear ring against the shim(s). Hold the wear ring in place while pulling on the impeller. Adjust the number of shims so that the clearance between the impeller blades and wear ring is .030 inch/.07 mm.

4. Install the wear ring and suction screen as described in steps 2 and 3 of WEAR RING INSTALLATION.

SM20 PARTS ILLUSTRATION



SM20 PARTS LIST

Item No.	Part No.	Qty	Description
1	19177 08908	1	Volute Top (s/n 001547 and up) Volute Top (s/n 1546 and below)
2	08910	1	Volute Bottom
3	08912	1	Suction Screen
4	08914 25669	1	Impeller Impeller (SM2043101, SM2043107 Only)
5	08916	1	Wear Ring
6	19175 21120	1 1	Main Shaft Main Shaft (SM2052101 Only)
	08920	1	Front Bearing Retainer Assy. (Incl Items 7-9)
7	08919	1	Front Bearing Retainer
8	04040	1	DU Bushing, 9/16 ID
9	04041	3	DU Bushing, 3/8 ID
10	09382	1	Idler Shaft
11	09383 04105	1 1	Idler Gear Idler Gear (SM2052101 Only)
12	09384 04106	1 1	Drive Gear Drive Gear (SM2052101 Only)
	09385	1	Gear Housing Assy. (Incl Items 9, 13, 20)
13	21119	1	Gear Housing Assy. (Incl 9, 13, 20) (SM2052101 Only)
14	00230	7	Capscrew
15	00283	11	Lockwasher
16	08937	3	Capscrew
17	01324	3	Lockwasher
18	08925	4	Capscrew
19	08923	AR	Shims, .020
20	00289	2	Dowel Pin
21	02259	1	Flat Washer
22	01213	1	Capscrew
23	04044	2	Needle Roller
24	08927 21128	4 4	Capscrew Capscrew (SM2052101 Only)
25	09687 00786	4 4	Capscrew Capscrew (SM2052101 Only)
26	00936	2	Adapter
27	00020	1	O-Ring
28	00252	1	O-Ring
29	06636	2	Bearing Race
30	06637	1	Thrust Bearing
31	19178	1	Backup Washer
32	02445	1	Quad Ring

Item No.	Part No.	Qty	Description
33	28784 28785	1 1	SM20 Model Decal SM20 Model Decal (SM2052101 Only)
34	00283	2	Lockwasher
35	28788	1	Manual Decal
36	08928	1	Backup Ring
37	19174	1	Gland Seal
38	00074	1	O-Ring
39	19176	1	Wiper Seal
40	28323	1	CE Decal (CE Only)
41	11207 11206	1	Circuit Type D (CE Only) Circuit Type C (CE Only) (SM2052101 Only)
42	28786	1	Coupler Decal
43	03972	1	Female Coupler
44	08926	1	Retaining Washer (s/n 1546 and below)
45	03220	1	Cup Seal (s/n 1546 and below)
46	03973	1	Male Coupler
	03971	1	Coupler Set
	20135	1	REPAIR KIT
	19937	1	SEAL KIT

WARRANTY

Stanley Hydraulic Tools (hereinafter called “Stanley”), subject to the exceptions contained below, warrants new hydraulic tools for a period of one year from the date of sale to the first retail purchaser, or for a period of 2 years from the shipping date from Stanley, whichever period expires first, to be free of defects in material and/or workmanship at the time of delivery, and will, at its option, repair or replace any tool or part of a tool, or new part, which is found upon examination by a Stanley authorized service outlet or by Stanley’s factory in Milwaukie, Oregon to be DEFECTIVE IN MATERIAL AND/OR WORKMANSHIP.

EXCEPTIONS FROM WARRANTY

NEW PARTS: New parts which are obtained individually are warranted, subject to the exceptions herein, to be free of defects in material and/or workmanship at the time of delivery and for a period of 6 months after the date of first usage. Seals and diaphragms are warranted to be free of defects in material and/or workmanship at the time of delivery and for a period of 6 months after the date of first usage or 2 years after the date of delivery, whichever period expires first. Warranty for new parts is limited to replacement of defective parts only. Labor is not covered.

FREIGHT COSTS: Freight costs to return parts to Stanley, if requested by Stanley for the purpose of evaluating a warranty claim for warranty credit, are covered under this policy if the claimed part or parts are approved for warranty credit. Freight costs for any part or parts which are not approved for warranty credit will be the responsibility of the individual.

SEALS & DIAPHRAGMS: Seals and diaphragms installed in new tools are warranted to be free of defects in material and/or workmanship for a period of 6 months after the date of first usage, or for a period of 2 years from the shipping date from Stanley, whichever period expires first.

CUTTING ACCESSORIES: Cutting accessories such as breaker tool bits are warranted to be free of defects in material and or workmanship at the time of delivery only.

ITEMS PRODUCED BY OTHER MANUFACTURERS: Components which are not manufactured by Stanley and are warranted by their respective manufacturers.

a. Costs incurred to remove a Stanley manufactured component in order to service an item manufactured by other manufacturers.

ALTERATIONS & MODIFICATIONS: Alterations or modifications to any tool or part. All obligations under this warranty shall be terminated if the new tool or part is altered or modified in any way.

NORMAL WEAR: any failure or performance deficiency attributable to normal wear and tear such as tool bushings, retaining pins, wear plates, bumpers, retaining rings and plugs, rubber bushings, recoil springs, etc.

INCIDENTAL/CONSEQUENTIAL DAMAGES: To the fullest extent permitted by applicable law, in no event will STANLEY be liable for any incidental, consequential or special damages and/or expenses.

FREIGHT DAMAGE: Damage caused by improper storage or freight handling.

LOSS TIME: Loss of operating time to the user while the tool(s) is out of service.

IMPROPER OPERATION: Any failure or performance deficiency attributable to a failure to follow the guidelines and/or procedures as outlined in the tool’s operation and maintenance manual.

MAINTENANCE: Any failure or performance deficiency attributable to not maintaining the tool(s) in good operating condition as outlined in the Operation and Maintenance Manual.

HYDRAULIC PRESSURE & FLOW, HEAT, TYPE OF FLUID: Any failure or performance deficiency attributable to excess hydraulic pressure, excess hydraulic back-pressure, excess hydraulic flow, excessive heat, or incorrect hydraulic fluid.

REPAIRS OR ALTERATIONS: Any failure or performance deficiency attributable to repairs by anyone which in Stanley’s sole judgement caused or contributed to the failure or deficiency.

MIS-APPLICATION: Any failure or performance deficiency attributable to mis-application. “Mis-application” is defined as usage of products for which they were not originally intended or usage of products in such a matter which exposes them to abuse or accident, without first obtaining the written consent of Stanley. PERMISSION TO APPLY ANY PRODUCT FOR WHICH IT WAS NOT ORIGINALLY INTENDED CAN ONLY BE OBTAINED FROM STANLEY ENGINEERING.

WARRANTY REGISTRATION: STANLEY ASSUMES NO LIABILITY FOR WARRANTY CLAIMS SUBMITTED FOR WHICH NO TOOL REGISTRATION IS ON RECORD. In the event a warranty claim is submitted and no tool registration is on record, no warranty credit will be issued without first receiving documentation which proves the sale of the tool or the tools’ first date of usage. The term “DOCUMENTATION” as used in this paragraph is defined as a bill of sale, or letter of intent from the first retail customer. A WARRANTY REGISTRATION FORM THAT IS NOT ALSO ON RECORD WITH STANLEY WILL NOT BE ACCEPTED AS “DOCUMENTATION”.

NO ADDITIONAL WARRANTIES OR REPRESENTATIONS

This limited warranty and the obligation of Stanley thereunder is in lieu of all other warranties, expressed or implied including merchantability or fitness for a particular purpose except for that provided herein. There is no other warranty. This warranty gives the purchaser specific legal rights and other rights may be available which might vary depending upon applicable law.

Stanley Hydraulic Tools
3810 SE Naef Road
Milwaukie, Oregon
503-659-5660 / Fax 503-652-1780
www.stanley-hydraulic-tools.com