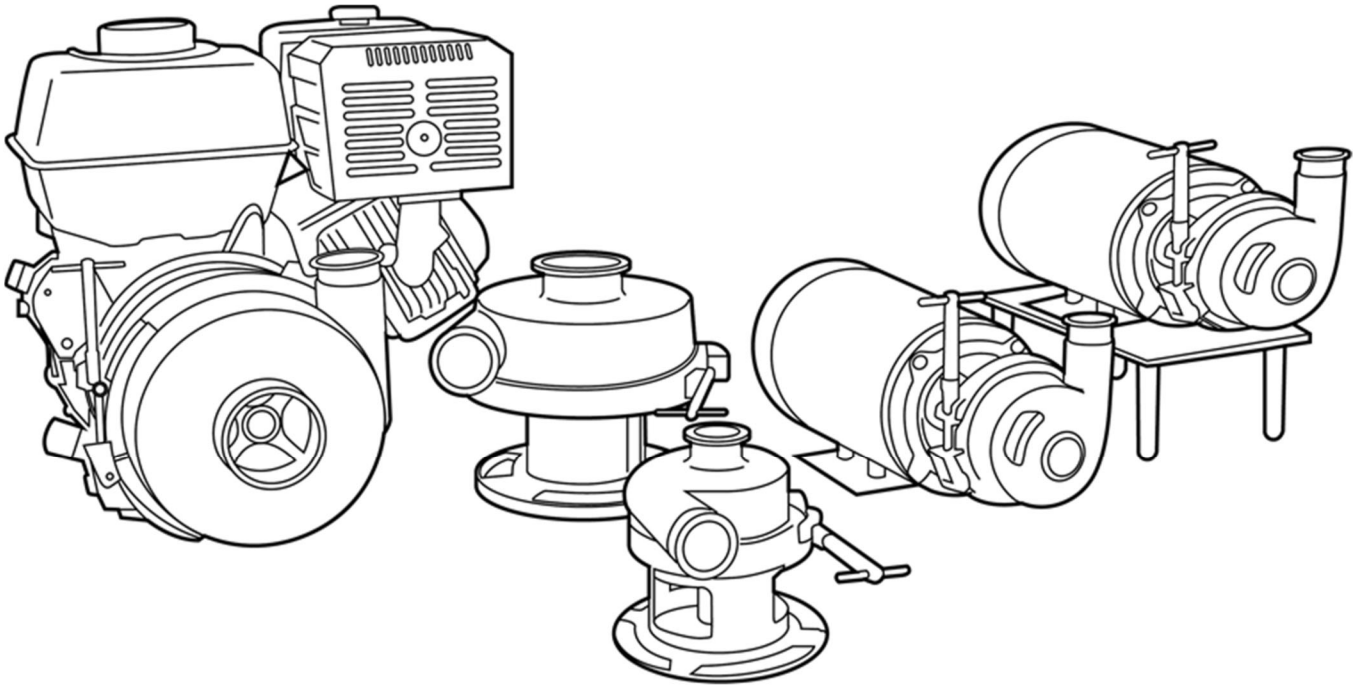

Thomsen 100 Series
Sanitary Centrifugal Pump
Installation & Operation Manual

Manufacturers of Quality Stainless Steel Flow Equipment Since 1933.

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Rev. 06172021

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INTRODUCTION

Congratulations, you are the owner of a quality-built centrifugal pump from Thomsen Group. This centrifugal pump was manufactured by the skilled personnel of a company which has served the needs of the dairy, food, and process industries for more than 85 years.

The purpose of this manual is to provide instructions for the safe installation, operation, and maintenance of your Thomsen 100 Series Centrifugal Pump. Please read and understand the entire manual prior to installing, operating, and servicing this equipment.

Thomsen Group, LLC is committed to providing quality equipment and customer satisfaction. We have a unique network of global sales and service. Please direct any questions concerning any information contained in this manual to:

Info@lcthomsen.com or 1 (800) 558-4018.

STANDARD WARRANTY

Obligations of Seller

During the warranty period, the Seller shall repair, or at Seller's option, replace parts determined by the seller to be defective in material or workmanship. The warranty period is one (1) year from the date of delivery to Buyer F.O.B. point of manufacture. The foregoing shall be the sole obligation of the seller under this warranty with respect to the equipment and the other property included in this agreement. With respect to the equipment, materials, parts, and accessories manufactured by others, seller's sole obligation shall be to use reasonable efforts to obtain for the Buyer the full benefit of the manufacturer's warranties.

Warranty Exclusions

Repair or replacement of parts required because of misuse, improper care or storage, negligence, alterations, accident, use of incompatible supplies or lack of specified maintenance are excluded from the Seller's warranty obligations.

Disclaimer of Warranties

The foregoing warranty expressions are in lieu of all other warranties, expressed or implied, including implied warranties of merchantability and fitness for a particular purpose, and existence of any such other warranty is hereby denied.

Limitation of Liability and Remedies

The liability of the Seller for breach of any warranty obligation hereunder is limited to:

1. The repair or replacement of the equipment on which the liability is based or,
2. At the Seller's option, the refund to the Buyer of the amount paid by the Buyer to the Seller for said equipment.

All other liability of the Seller with respect to this agreement, or from the manufacture, installation, maintenance, repair or use of any equipment covered by or furnished under this agreement, whether in contract or in tort, or otherwise, is limited to the amount paid by the Buyer to the Seller pursuant to the terms herein:

Seller shall not be liable for incidental or consequential damages of any of any kind whatsoever. The remedies set forth herein are exclusive.

Breach

Any breach by the Seller with respect to any items or unit of equipment shall be deemed a breach with respect to that item or unit only.

Infringement

The Seller will not be liable for the infringement of any patent by the Buyer's use of any equipment or materials delivered here under.

Aftermarket (Non-OEM) Parts

Aftermarket Non-OEM parts will void the original manufacturer's warranty and potentially not meet Thomsen performance, quality, and material specifications.

Thomsen parts are manufactured to meet regulatory agency authorization, approvals, and certifications including: 3A – Sanitary standards, USDA, ASME, BISSC, and OSHA. Where applicable, materials used in construction of Thomson parts conform to FDA regulations.

Aftermarket parts not manufactured to our specifications may cause damage to your Thomsen Group equipment and void all warranties. Use of parts that do not meet Thomsen Group specifications may cause property damages and serious bodily injury.

Availability of Service Parts Policy

Thomsen Group will attempt to remain in a position to supply replaceable parts during the normal life of any item of Thomsen Group equipment. This is contingent upon availability of tools, materials, facilities, and Thomsen Group suppliers.

After the expiration of this period, the supply of service parts will be limited to available stock of completed parts. If unable to supply the service part, drawings will be furnished when available to permit local manufacturing, if desired.

Thomsen Group reserves the right to improve, change or modify the construction of its equipment or any parts thereof without incurring any obligation to provide like changes to equipment previously sold.

RECEIVING AND INSPECTION

All Thomsen products are inspected and thoroughly packaged for shipment. All equipment should be visually inspected for damage immediately upon arrival with carrier present. Check the received equipment against the packing list to ensure no parts are missing. Report any damage or missing items to the carrier/dealer immediately.

SAFETY INFORMATION

Electrical Hazard

A pump is normally powered by an electric motor. This creates a hazard of electrical shock which could cause severe injury or even loss of life.

To minimize the risk of this hazard:

1. All electric/electronic installation, maintenance, and service must be performed by trained and authorized electricians only.
2. All electric/electronic installation must comply with all applicable codes and standards including those established by OSHA (Occupational Safety and Health Administration).
3. DO NOT perform any maintenance or service on the motor or any other electrical devices unless the electric power source has been turned off and Locked Out using a locking device for which only the person involved in the maintenance procedure has possession of the key.

Make installation suitable for a wet environment, including:

1. A power disconnect shall be used which can be locked in a power OFF position and the key removed. This will allow maintenance or service to be performed without possibility of power being accidentally turned on.
2. Protection of all electric connections within a sealed junction box.
3. Proper grounding of the motor.
4. Protection from flooding. Do not install in an area which could fill with water to a level which contacts the motor.

Rotating Parts Hazard

Routine cleaning and maintenance procedures require pump disassembly. The pump contains close fitting parts which rotate during operation. If the pump starts unexpectedly while disassembled severe injury to personnel and damage to equipment could result.

To minimize the risk of this hazard:

1. DO NOT perform any maintenance or service on the motor or any other electrical devices unless the electric power source has been turned off and Locked Out using a locking device for which only the person involved in the maintenance procedure has possession of the key.
2. DO NOT assemble or disassembly the pump unless item 1 above is observed.
3. DO NOT remove the guard from the adapter while the pump is in operation and or item 1 is observed.

High Temperature Hazard

Some pump applications may require processing of high temperature liquids and/or the use of high temperature cleaning/sanitizing solutions. Pumping high temperature liquids is hazardous and extreme care should be taken when handling such liquids.

To minimize the risk of this hazard:

1. All installation, maintenance, and service of piping, valves, and other controls must be performed by trained and authorized plumbers only. This applies to process piping and cleaning/sanitizing piping.
2. All plumbing installations must comply with all applicable codes and standards, including those established by OSHA.
3. DO NOT perform any maintenance or service on the motor or any other electrical devices unless the electric power source has been turned off and Locked Out using a locking device for which only the person involved in the maintenance procedure has possession of the key.
4. NEVER disconnect any lines or fittings (whether process or cleaning/sanitizing) or disassemble the pump until the line is no longer under pressure and the fluid inside is not hot or harmful.
5. Operating personnel must be authorized and trained.

High Pressure Hazard

Fluids processed by a pump are under pressure. This creates a hazard to personnel working in the area should a leak occur. Leaking high pressure fluid may cause injury by startling personnel or from actual contact with the leaking fluid.

Explosion Hazard

Never operate the pump with both the inlet valve and the outlet valve in closed positions. If the pump runs with liquid in it, while the valves controlling the suction and discharge lines are both closed, the liquid in the pump will heat up and turn into vapor, causing a risk of explosion.

To eliminate the risk of explosion, it is strongly recommended that the following be Included in the system:

1. A pressure relief device which relieves pressure and contains any discharge, or
2. A thermal/pressure overload device to isolate the pump motor in the event of excessive temperature/pressure.

Fire Hazard

This centrifugal pump is not designed for use with hazardous liquids or flammable gasses. These fluids may be present in containment areas. Hazardous fluids can cause fire, burns, or death.

Leaking Fluid Hazard

Fluid leaks or spills may occur in any pumping system. This creates a hazard to personnel due to slippery floor conditions or contact with possibly hazardous fluids.

To minimize the risk of this hazard:

1. Always clean up leaks and spills immediately.
2. Find and correct the cause of the leak immediately.

PUMP CARE WARNINGS

The following important cautions describe ways to avoid incorrect operating procedures which will cause serious damage to the centrifugal pump.

Cavitation

Cavitation is a condition within the pump which results in extreme hydraulic forces which can create a risk of severe damage to pump components.

Cavitation makes a characteristic “rattling” noise. It is caused by operation with low fluid pressure at the pump inlet.

Install and operate the pump so that the NPSH (net positive suction head) available to the pump equals or exceeds the "NPSH required" as shown on the pump performance curve.

To increase NPSH available:

1. Decrease the temperature of the pumped liquid.
2. Increase the height of liquid supply level.
3. Decrease the suction line length and remove restrictions to flow such as elbows, valves, etc.
4. Increase the suction line size (diameter).
5. Reduce the pump flow rate (throttle discharge)

Corrosion Pitting

Stainless steel is subject to a risk of corrosion when improperly cleaned or sanitized.

To minimize this risk:

1. Never use steel wool or a wire brush to clean stainless-steel surfaces. Iron particles will embed and cause corrosion pits. Use a non-metallic brush or scrub pad for cleaning when required.
2. Never allow prolonged contact of sanitizing solutions or other corrosive cleaning chemicals with stainless steel. Only use sanitizing solutions immediately prior to processing.
3. Never use excessive cleaning solution concentrations or temperatures.
4. Keep surfaces clean, including those under gaskets or in grooves or tight corners. Clean immediately after use. Do not allow equipment to set uncleaned, exposed to air with accumulated foreign material on the surface.

IMPORTANT WARNINGS

Motor Overload

There is a risk the pump motor will overload depending on impeller diameter and motor horsepower, if operated with a fully open and unrestricted discharge.

To minimize risk:

1. Before operating the pump, review performance curve and application, considering motor horsepower and impeller diameter versus expected discharge flow rate and pressure. If the pump Is operated with less than expected discharge pressure, the flow rate will increase and the load on the motor will increase.
2. Install a throttling valve in the discharge piping to allow control of pump discharge flow rate during initial operation. The valve may be removed later when the system is proven to supply adequate discharge pressure to prevent overload.

Impeller Shaft Location

The location of the impeller shaft on the motor shaft is critical for correct pump operation and to obtain maximum operating efficiency.

Thomsen Centrifugal Pumps are designed to achieve excellent operating performance. This performance is possible, in part, because of precision manufacturing of the pump components. The impeller must be precisely located between the casing and back-plate to take full advantage of the pump's operating efficiency.

Incorrect location of the impeller shaft may cause the impeller to contact the casing or the backplate during operation and cause extensive damage to the pump.

The procedures for correctly locating the impeller shaft are described in Section 5 (Maintenance).

This should be referred to whenever:

1. A new pump is installed onto a motor or pedestal.
2. The impeller shaft is loosened or removed from the motor or pedestal shaft.
3. A replacement casing or backplate is installed.

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Numbering System

4 **99** **21** **G** **BC**

PUMP SIZE	
(4)	#4 PUMP, 100 SERIES
(5)	#5 PUMP, 100 SERIES
(6)	#6 PUMP, 100 SERIES
(8)	#8 PUMP, 100 SERIES

3600 RPM MOTOR	
(5W)	1/2 HP, 115/230, 1Φ, 56C
(09)	3/4 HP, 115/230, 1Φ, 56C
(2U)	3/4 HP, 208-230/460, 3Φ, 56C
(10)	1 HP, 115/230, 1Φ, 56C
(OW)	1 HP, 115/230, 1Φ, 56C, WSHDWN
(15)	1 HP, 208-230/460, 3Φ, 56C
(73)	1 HP, 208-230/460, 3Φ, 56C, WSHDWN
(17)	1-1/2 HP, 115/230, 1Φ, 56C
(3H)	1-1/2 HP, 115/230, 1Φ, 56C, WSHDWN
(20)	1-1/2 HP, 208-230/460, 3Φ, 56C
(OH)	1-1/2 HP, 208-230/460, 3Φ, 56C, WSHDWN
(1S)	2 HP, 115/230, 1Φ, 145TC
(25)	2 HP, 208-230/460, 3Φ, 145TC
(64)	2 HP, 208-230/460, 3Φ, 145TC, WSHDWN
(29)	3 HP, 208-230/460, 3Φ, 182TC
(63)	3 HP, 208-230/460, 3Φ, 143TC, WSHDWN
(CM)	3 HP, 208-230/460, 3Φ, 182TC, WSHDWN
(33)	5 HP, 208-230/460, 3Φ, 184TC
(57)	5 HP, 208-230/460, 3Φ, 184TC, WSHDWN
(OF)	7-1/2 HP, 208-230/460, 3Φ, 213TC, WSHDWN
(40)	10 HP, 208-230/460, 3Φ, 215TC
(ON)	10 HP, 208-230/460, 3Φ, 215TC, WSHDWN
(43)	15 HP, 208-230/460, 3Φ, 215TC
(2C)	15 HP, 208-230/460, 3Φ, 215TC, WSHDWN
(3Y)	20 HP, 208-230/460, 3Φ, 256TC

1800 RPM MOTOR	
(03)	1/2 HP, 115/230V, 1Φ, 56C
(86)	1/2 HP, 115/230V, 1Φ, 56C, WSHDWN
(04)	1/2 HP, 208-230/460V, 3Φ, 56C
(59)	1/2 HP, 208-230/460V, 3Φ, 56C, WSHDWN
(05)	3/4 HP, 115/230V, 1Φ, 56C
(07)	3/4 HP, 208-230/460V, 3Φ, 56C
(OX)	3/4 HP, 208-230/460V, 3Φ, 56C, WSHDWN
(68)	1 HP, 208-230/460V, 3Φ, 143TC, WSHDWN
(16)	1-1/2 HP, 115/230V, 1Φ, 56C
(74)	1-1/2 HP, 208-230/460V, 3Φ, 145TC, WSHDWN
(OT)	2 HP, 208-230/460V, 3Φ, 145TC, WSHDWN
(28)	3 HP, 115/230V, 1Φ, 184TC
(9S)	3 HP, 115/230V, 1Φ, 184TC, WSHDWN
(26)	3 HP, 208-230/460V, 3Φ, 182TC
(92)	3 HP, 208-230/460V, 3Φ, 182TC, WSHDWN
(32)	5 HP, 208-230/460V, 3Φ, 184TC
(76)	5 HP, 208-230/460V, 3Φ, 184TC, WSHDWN
(3S)	7-1/2 HP, 115/230V, 1Φ, 215TC, WSHDWN
(39)	7-1/2 HP, 208-230/460V, 3Φ, 213TC
(OD)	7-1/2 HP, 208-230/460V, 3Φ, 213TC, WSHDWN
(41)	10 HP, 208-230/460V, 3Φ, 215TC
(4M)	10 HP, 208-230/460V, 3Φ, 215TC, WSHDWN

LESS MOTOR	
(99)	56C
(98)	143/145TC
(97)	182/184TC
(96)	213/215TC
(95)	256/284/286TC

IMPELLER DIAMETER (in)		
(A)	2-3/8	
(B)	2-5/8	
(C)	2-7/8	
(D)	3-1/8	#4 PUMP
(E)	3-3/8	
(F)	3-5/8	
(G)	3-7/8	
(H)	4-1/8	#5 PUMP
(I)	4-3/8	
(J)	4-5/8	
(K)	4-7/8	
(L)	5-1/8	#6 PUMP
(M)	5-3/8	
(N)	5-5/8	
(O)	5-7/8	
(P)	6-1/8	
(Q)	6-3/8	
(R)	6-5/8	
(S)	6-7/8	
(T)	7-1/8	
(U)	7-3/8	
(V)	7-5/8	#8 PUMP
(W)	7-7/8	

MECHANICAL SEAL & HEAD GASKET	
(A)	INTERNAL, TEFLON, BUNA
(C)	INTERNAL, TEFLON, VITON
(2)	INTERNAL, TEFLON, EPDM
(E)	INTERNAL, TEFLON, SILICONE
(6)	INTERNAL, TEFLON, BUNA, HIGH PRESSURE
(7)	INTERNAL, TEFLON, VITON, HIGH PRESSURE
(9)	INTERNAL, TEFLON, EPDM, HIGH PRESSURE
(8)	INTERNAL, TEFLON, SILICONE, HIGH PRESSURE
(G)	EXTERNAL, CARBON X SILICON CARBIDE, BUNA
(WCS)	EXTERNAL, CARBON X SILICON CARBIDE, BUNA, WTR CASD
(3)	EXTERNAL, CARBON X SILICON CARBIDE, EPDM
(WFS)	EXTERNAL, CARBON X SILICON CARBIDE, EPDM, WTR CASD
(K)	EXTERNAL, CARBON X SILICON CARBIDE, VITON
(WDS)	EXTERNAL, CARBON X SILICON CARBIDE, VITON, WTR CASD
(ES)	EXTERNAL, CARBON X SILICON CARBIDE, SILICONE
(WES)	EXTERNAL, CARBON X SILICON CARBIDE, SILICONE, WTR CASD
(GS)	EXTERNAL, SILICON CARBIDE X SILICON CARBIDE, BUNA
(WGS)	EXTERNAL, SILICON CARBIDE X SILICON CARBIDE, BUNA, WTR CASD
(KS)	EXTERNAL, SILICON CARBIDE X SILICON CARBIDE, VITON
(WKS)	EXTERNAL, SILICON CARBIDE X SILICON CARBIDE, VITON, WTR CASD
(3S)	EXTERNAL, SILICON CARBIDE X SILICON CARBIDE, EPDM
(W3S)	EXTERNAL, SILICON CARBIDE X SILICON CARBIDE, EPDM, WTR CASD
(N)	EXTERNAL, CARBON X STAINLESS STEEL, BUNA
(WN)	EXTERNAL, CARBON X STAINLESS STEEL, BUNA, WTR CASD
(EP)	EXTERNAL, CARBON X STAINLESS STEEL, EPDM
(WEP)	EXTERNAL, CARBON X STAINLESS STEEL, EPDM, WTR CASD
(J)	EXTERNAL, CARBON X STAINLESS STEEL, VITON
(WJ)	EXTERNAL, CARBON X STAINLESS STEEL, VITON, WTR CASD

CONNECTIONS (INLET X OUTLET)					
(01)	1" ACME X 1" ACME	(44)	2" MNPT X 1-1/2" MNPT	(97)	2" 14WQ LINE X 1.5" 14WQ LINE
(02)	1-1/2" ACME X 1" ACME	(45)	2-1/2" MNPT X 1-1/2" MNPT	(98)	1-1/2" FNPT X 3/4" FNPT
(03)	1-1/2" ACME X 1-1/2" ACME	(46)	2" MNPT X 2" MNPT	(99)	3" FNPT X 2-1/2" MNPT
(04)	2" ACME X 1-1/2" ACME	(48)	1-1/2" FNPT X 1" FNPT	(0D)	2" CLAMP X 2" CLAMP LFT. DISCHARGE
(05)	2" ACME X 2" ACME	(49)	1-1/2" FNPT X 1-1/2" FNPT	(0C)	2" 15(WX)PV X 1-1/2" 15(WX)PV
(06)	2-1/2" ACME X 1-1/2" ACME	(50)	2" FNPT X 1-1/2" FNPT	(0A)	1-1/2" CLAMP X 2" CLAMP
(07)	2-1/2" ACME X 2" ACME	(52)	2" FNPT X 2" FNPT	(2H)	2" CLAMP X 1" DISCHARGE
(08)	2-1/2" ACME X 2-1/2" ACME	(53)	2-1/2" MNPT X 2" FNPT	(2G)	1-1/2" CLAMP X 1" DISCHARGE
(11)	3" ACME X 2" ACME	(54)	3" MNPT X 2" FNPT		
(12)	3" ACME X 2-1/2" ACME	(55)	1-1/2" MNPT X 1" MNPT		
(13)	3" ACME X 3" ACME	(57)	3" MNPT X 2" MNPT		
(17)	1-1/2" ACME X 1-1/2" CLAMP	(58)	2" MNPT X 1" FNPT		
(21)	1-1/2" CLAMP X 1-1/2" CLAMP	(59)	2-1/2" MNPT X 2" MNPT		
(22)	2" CLAMP X 1-1/2" CLAMP	(60)	1" WELD X 3/4" WELD		
(23)	2" CLAMP X 2" CLAMP	(62)	1-1/2" WELD X 1" WELD		
(24)	2-1/2" CLAMP X 1-1/2" CLAMP	(63)	1-1/2" WELD X 1-1/2" WELD		
(25)	2-1/2" CLAMP X 2" CLAMP	(64)	2" WELD X 1-1/2" WELD		
(26)	2-1/2" CLAMP X 2-1/2" CLAMP	(65)	2" WELD X 2" WELD		
(28)	3" CLAMP X 2" CLAMP	(70)	3" WELD X 2" WELD		
(29)	3" CLAMP X 2-1/2" CLAMP	(79)	3" FNPT X 1-1/2" MNPT		
(30)	3" CLAMP X 3" CLAMP	(80)	1-1/2" NO CONNECTION X 1.0" NO CONNECTION		
(31)	4" CLAMP X 2" CLAMP	(81)	1-1/2" NO CONNECTION X 1.0" NO CONNECTION		
(34)	1-1/2" CLAMP X 1-1/2" CLAMP LFT. DISCHARGE	(82)	2" NO CONNECTION X 1.0" NO CONNECTION		
(35)	3" CLAMP X 2" MNPT	(83)	2" NO CONNECTION X 1.5" NO CONNECTION		
(39)	3" CLAMP X 2" 14WI MALE I LINE	(84)	3" NO CONNECTION X 2.0" NO CONNECTION		
(40)	2" CLAMP X 2" 14WI MALE I LINE	(87)	1-1/2" FNPT X 1" MNPT		
(41)	1" MNPT X 1" MNPT	(92)	1-1/2" WELD X 1-1/2" SURGE FITTING		
(42)	1-1/2" MNPT X 1" MNPT	(95)	2" BS W/CAPTIVE NUT X 2.0" BS W/CAPTIVE NUT		
(43)	1-1/2" MNPT X 1-1/2" MNPT	(96)	2" 14WI MALE I LINE X 1.5" 14WI MALE I LINE		

DESCRIPTION AND SPECIFICATIONS

Thomsen 100 Series is a close coupled, end suction, centrifugal pump for sanitary and industrial applications. Each unit is designed and constructed for clean in place (CIP) and meet 3A Standards.

3-A Sanitary Standards maintains a large inventory of design criteria for equipment and processing systems developed using a modern consensus process based on ANSI requirements to promote acceptance by USDA, FDA, and state regulatory authorities. The 3-A Symbol Authorization program and other voluntary certificates help affirm the integrity of hygienic processing equipment and systems and provide extensive knowledge resources to support the training and education needs in the rapidly changing food, beverage, and pharmaceutical industries. The 3-A symbol provides protection against counterfeits.

Standard Construction

Pump Casing	316L Stainless Steel
Connections	TriClamp
Backplate	316L Stainless Steel
Impeller	316L Stainless Steel
Shaft Seal	Internal PTFE
Elastomers	BUNA (FDA Approved)
Finish	All product contact surfaces are provided with a sanitary polish.
Mounting	Close coupled for TS shafted motors.

1. IDENTIFICATION

Each centrifugal pump is fitted on the motor adaptor. See page 8 for model identification.

2. PUMP INSTALLATION

2.1. Location

2.1.1. Locate pump as near liquid source as possible (below level of liquid for automatic operation).

2.1.2. Protect from freezing or flooding. Freezing temperatures with liquid in the casing will result in damage to the pump. Properly drain pump prior to exposing it to freezing temperatures.

2.1.3. Allow adequate space for servicing and ventilation.

2.1.4. Ensure the pipe system is adequately supported by pipe supports so that the pump body is not subjected to strains and weight from the pipe system. Never draw piping into place by forcing the pump suction and discharge connections.

2.2. Suction & Discharge Piping

2.2.1. Avoid unnecessary valves, bends, and tee fittings. Select proper pipe sizes to keep friction losses to a minimum. Avoid up and down rises which can entrap air.

2.2.2. Ensure all joints are well seal to prevent air leaks.

2.2.3. The pump must be positioned so the suction pipe is as short as possible. The suction pipe should include a sloping gradient towards the suction port.

2.2.4. The suction pipe must be at least as large as the suction connection of the pump. Smaller suction pipe sizes will degrade pump performance.

2.3. Pump Casing Orientation

2.3.1. The pump casing may be rotated with the discharge connection pointing in any direction. Optimum performance will be with the discharge up or to the left when facing the suction connection. This ensures a flooded casing and prevents air entrapment issues.

2.4. Throttling Valve

2.4.1. This centrifugal pump is not self-priming. Install a foot valve or system check valve to keep the system flooded if installed above the supply liquid level.

2.4.2. A throttling valve may be required to control the pump flow rate to prevent motor overload conditions. Always install a throttling valve in the discharge piping at least 10 pipe diameters away from the pump outlet.

2.4.3. Do not install a throttling valve in the supply piping. Restrictions in the supply line will result in cavitation and pump damage.

2.5. Power Supply

2.5.1. Read the motor manufacturer's instructions prior to starting installation.

2.5.2. Check the motor nameplate to ensure it is compatible with the electrical supply, wiring, switches, and starters. Make sure all overload protections are correctly sized.

2.5.3. All electrical installation must comply with all applicable codes and standards including those established by the Occupational Safety and Health Administration (OSHA).

2.5.4. Install a main power disconnect on-off switch which can be locked in the power off position and have the key removed when service is performed.

2.5.5. Correct rotation is counterclockwise when viewed facing the suction inlet connection. Single phase motors are non-reversable. Rotation can be changed on three phase motors by interchanging any two power supply leads.

2.6. Water Supply for Water Flushed Shaft Seals

2.6.1. Pumps with a water-flushed shaft seal include two hose connectors on the seal flange. The hose connectors are ⅛" NPT and fit ¼" plastic tubing. A flush flow of 4-8 gallons/hour is required. Maximum pressure is 50 PSIG.

2.6.2. The hose connection in the seal flange should always be positioned vertically with the fluid inlet below and the outlet above. See Fig. 2.

2.6.3. Water consumption can be limited by installing a solenoid valve on the supply side for the flushing water. The open/close function of the solenoid valve can be controlled by the pump's start/stop sequence.

2.6.4. Do not use the flushing water connectors for steam condensate. If you want to use steam as the barrier medium, special aseptic piping is required. Contact Thomsen Group for recommended parts & connection.

3. OPERATION

3.1. Before Start Up

3.1.1. Dismantle and clean the suction pipe of any foreign materials.

3.1.2. Check the pump body for foreign materials via the below procedure.

3.1.3. Disconnect the power supply.

3.1.4. Remove the pump casing (ITEM 1, PAGE 13) by undoing the casing clamp (ITEM 3, PAGE 13) and carefully pull off the pump casing.

3.1.5. Turn the impeller (ITEM 2, PAGE 13) to ensure that there is no foreign material behind it.

3.1.6. If there is any foreign material in the pump, remove it.

3.1.7. If the pump has not been operational for greater than 3 months, rotate the shaft by hand to ensure seals are rotating freely.

3.1.8. When the pump casing is clean and free of foreign material, reassemble the pump.

3.1.9. To make the pump body easier to reinstall, apply a thin layer of food-approved, acid-free grease or soapy water to the o-ring.

3.1.10. Remount pump casing. Be careful to avoid damaging the o-ring when installing the pump casing (ITEM 1, PAGE 13) over the o-ring. Press the casing over the o ring on the back plate and fasten with the clamp (ITEM 3, PAGE 13). Observe the correct tightening torque for 5⁄16 – 18 UNC bolts, 142 in-lbs. (16 Nm)

3.1.11. Install suction and discharge pipes. Check that all the pipe fittings have been tightened properly and that pipe supports have been fitted.

3.1.12. The pump must be primed (free of air and suction piping full of liquid) with the discharge valve partially open.

3.2. Starting the Pump

3.2.1. If the centrifugal pump has a flush seal option, start the flow of flush water prior to operating the pump.

3.2.2. Operating the centrifugal pump without liquid will damage the shaft seal.

3.2.3. Start the pump motor.

3.2.4. Check the pump to see that liquid is flowing. Ensure all piping connections and seals are leak-free.

3.2.5. Make sure that the pump is not operating against a closed discharge. Continued operation against a closed discharge will heat the liquid in the casing to boiling and lead to pump damage.

3.2.6. Slowly open the discharge valve until the desired flow is obtained. Observe the pressure gauges. If pressure does not build quickly, stop the pump, and prime it again.

4. MAINTENANCE

4.1. Routine Maintenance

4.1.1. Check for unusual noise, vibration, and bearing temperatures.

4.1.2. Inspect the pump and piping for leaks.

4.1.3. Inspect mechanical seal for leakage.

4.1.4. Check the backplate gasket for damage.

Replacement Part Numbers

			PUMP SIZE			
ITEM NO.	DESCRIPTION		#4	#5	#6	#8
1	PUMP CASING	1.0" ACME X 1.0" ACME	9055-67			
		1.5" ACME X 1.0" ACME	9059-67			
		1.5" ACME X 1.5" ACME	9056-67	9103-67		
		1.5" ACME X 1.5" CLAMP	9064-67			
		2.0" ACME X 1.5" ACME	9057-67	9104-67	9153-67	
		2.0" ACME X 2.0" ACME	9060-67	9105-67	9154-67	9202-67
		2.5" ACME X 2.5" ACME			9158-67	9207-67
		2.5" ACME X 2.0" ACME		9107-67	9155-67	9203-67
		3.0" ACME X 2.0" ACME			9157-67	9204-67
		3.0" ACME X 3.0" ACME			9152-67	9205-67
		3.0" ACME X 2.5" ACME				9206-67
		1.5" CLAMP X 1.5" CLAMP	9046-67	9093-67		
		1.5" CLAMP X 1.5" CLAMP LFT. DISCHARGE	S1476-67			
		2.0" CLAMP X 1.5" CLAMP	9047-67	9094-67	9143-67	
		2.0" CLAMP X 2.0" CLAMP	9048-67	9095-67	9144-67	9190-67
		2.0" CLAMP X 2.0" CLAMP LFT. DISCHARGE	S1481-67	O2078-67		
		2.0" CLAMP X 2.0" 14WI MALE I LINE			9140-67	
		2.5" CLAMP X 1.5" CLAMP	9049-67	9096-67	9146-67	
		2.5" CLAMP X 2.0" CLAMP		9097-67	9145-67	9193-67
		2.5" CLAMP X 2.5" CLAMP	9066-67			
		3.0" CLAMP X 2.0" CLAMP	9051-67		9147-67	9194-67
		3.0" CLAMP X 2.5" CLAMP			9150-67	9196-67
		3.0" CLAMP X 3.0" CLAMP			9149-67	9195-67
		3.0" CLAMP X 2.0" MNPT				9212-67
		4.0" CLAMP X 2.0" CLAMP				9192-67
		1.5" FNPT X 1.0" FNPT	9081-67	9123-67		
		1.5" FNPT X 1.5" FNPT	9079-67	9118-67		
		1.5" FNPT X 1.0" MNPT	9084-67			
		1.5" FNPT X .75" FNPT		9124-67		
		2.0" FNPT X 1.5" FNPT	9080-67		9169-67	
		2.0" FNPT X 2.0" FNPT			9170-67	
		3.0" FNPT X 1.5" MNPT	9083-67			
		3.0" FNPT X 2.5" MNPT			9138-67	
		1.0" MNPT X 1.0" MNPT	9071-67			
		1.25" MNPT X 1.0" MNPT	9087-67			
		1.5" MNPT X 1.0" MNPT	9072-67	9116-67		
		1.5" MNPT X 1.5" MNPT	9073-67	9113-67		
		2.0" MNPT X 1.5" MNPT	9074-67	9114-67	9164-67	
		2.0" MNPT X 1.0" FNPT	9078-67			
		2.0" MNPT X 2.0" MNPT		9115-67		
		2.5" MNPT X 1.5" MNPT			9165-67	
		2.0" 14WI MALE I LINE X 1.5" 14WI MALE I LINE			9142-67	
		2.0" 14WQ LINE X 1.5" 14WQ LINE			9139-67	

100 Series Standard Assembly

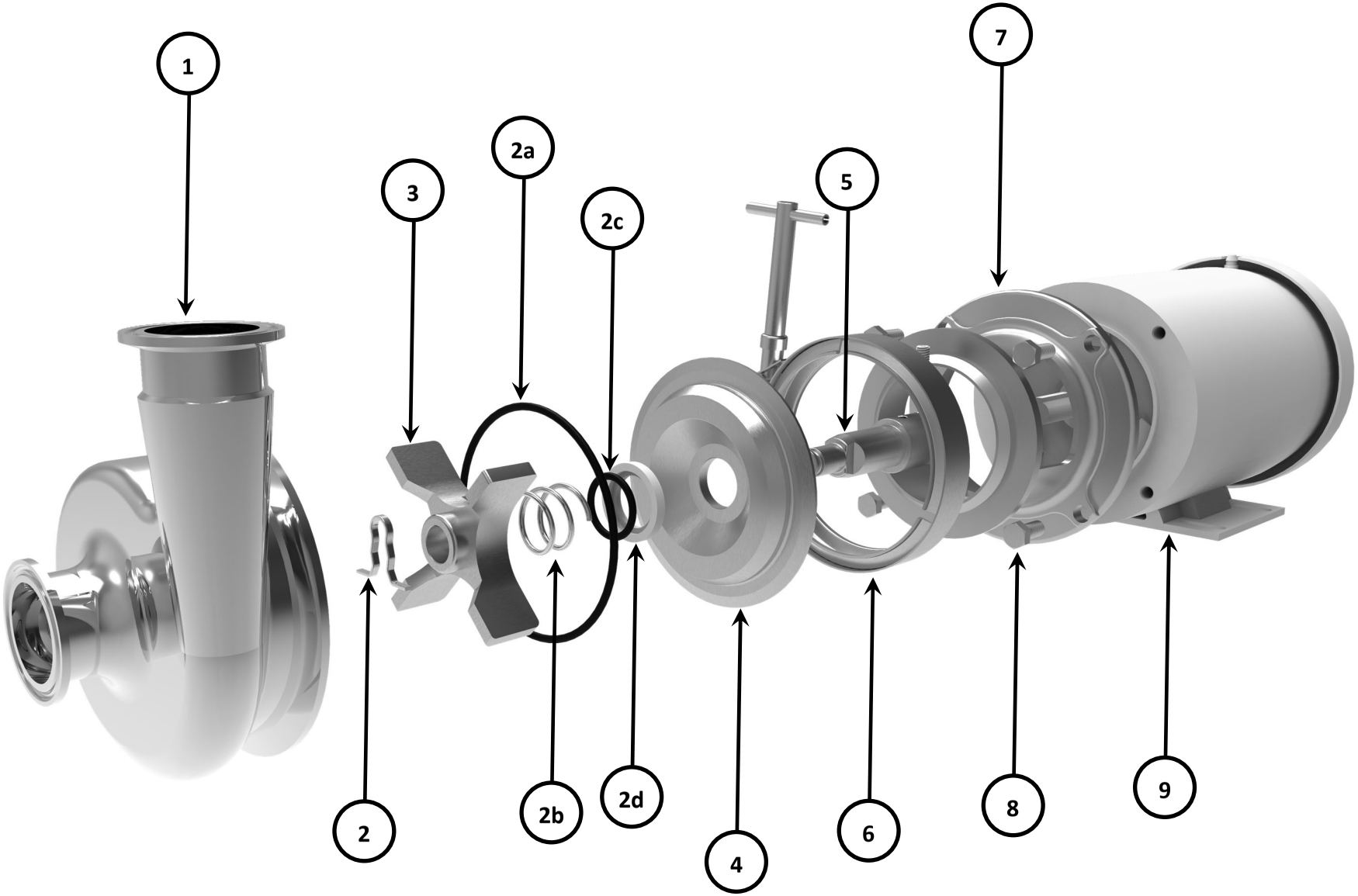
THOMSEN®

Replacement Part Numbers

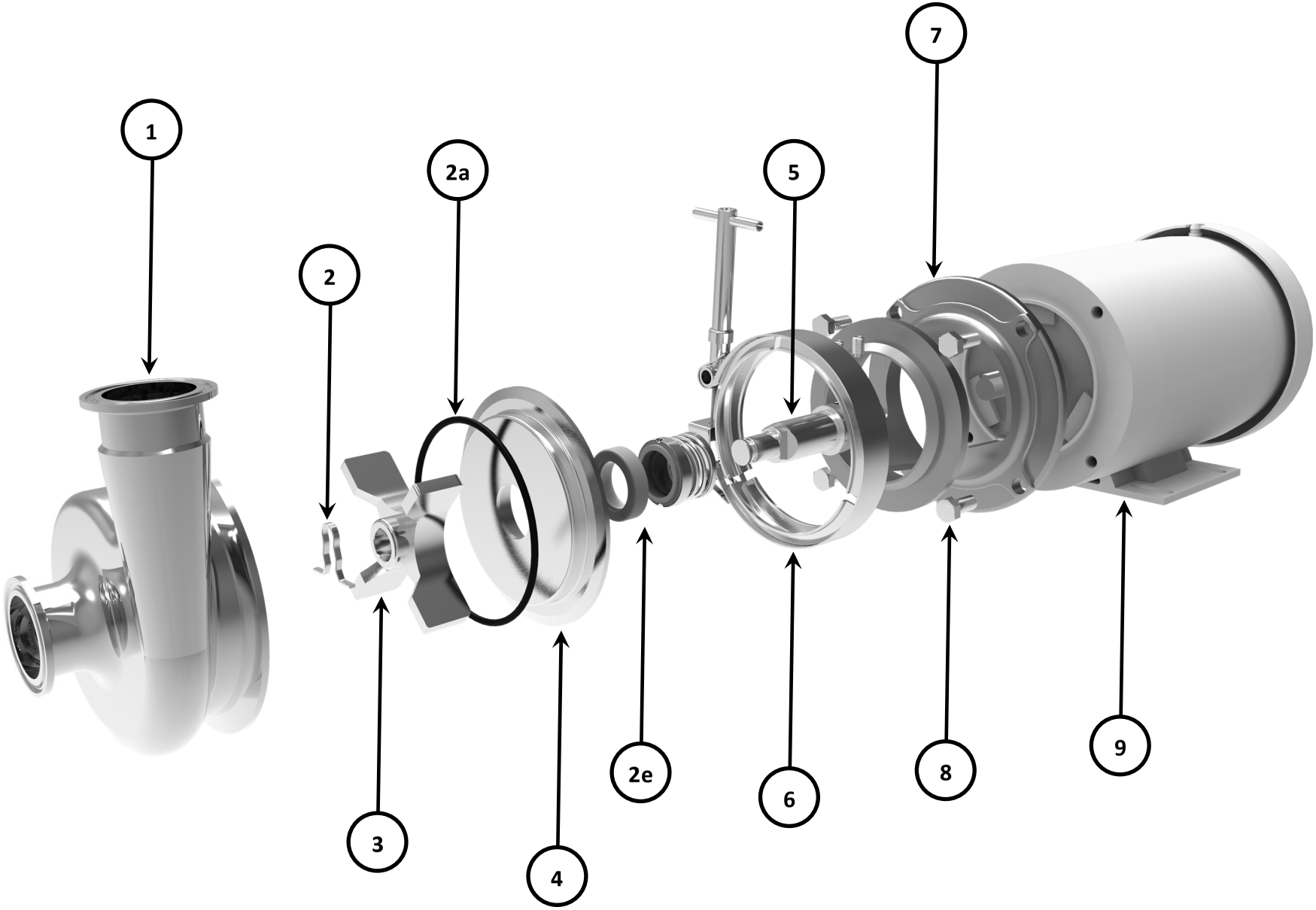
ITEM NO.	DESCRIPTION			PUMP SIZE			
				#4	#5	#6	#8
2	IMPELLER CLIP			REFER TO INTERNAL/EXTERNAL SEAL KITS (PAGE 7)			
2a	HEAD O-RING						
2b	SPRING (INTERNAL SEAL ONLY)						
2c	O-RING						
2d	TEFLON SEAL (INTERNAL SEAL ONLY)						
2e	CARBON SEAL ASSEMBLY (EXTERNAL SEAL ONLY)						
3	IMPELLER	(A)	2-3/8	9403-67			
		(B)	2-5/8	9410-67			
		(C)	2-7/8	9402-67			
		(D)	3-1/8	9400-67			
		(E)	3-3/8	9397-67			
		(F)	3-5/8	9396-67			
		(G)	3-7/8	9395-67		9427-67	
		(H)	4-1/8		9408-67	9426-67	
		(I)	4-3/8		9407-67	9425-67	
		(J)	4-5/8		9406-67	9421-67	
		(K)	4-7/8		9405-67	9420-67	9467-67
		(L)	5-1/8			9419-67	9466-67
		(M)	5-3/8			9417-67	9465-67
		(N)	5-5/8			9416-67	9464-67
		(O)	5-7/8			9415-67	9463-67
		(P)	6-1/8				9462-67
		(Q)	6-3/8				9461-67
		(R)	6-5/8				9460-67
		(S)	6-7/8				9459-67
		(T)	7-1/8				9458-67
		(U)	7-3/8				9457-67
		(V)	7-5/8				9456-67
		(W)	7-7/8				9455-67
4	BACKPLATE (INTERNAL SEAL)			9230-67	9235-67	9240-67	9246-67
	BACKPLATE (EXTERNAL SEAL)			9229-67	9234-67	9242-67	9249-67
5	DRIVE SHAFT - 5/8" BORE			9530-67			
	DRIVE SHAFT - 7/8" BORE			9531-67			
	DRIVE SHAFT - 1-1/8" BORE				9532-67		9536-67
	DRIVE SHAFT – 1 3/8" BORE					9533-67	9537-67
	DRIVE SHAFT – 1 5/8” BORE					9368-67	9377-67
	DRIVE SHAFT – 1 7/8” BORE						9378-67
6	HEAD CLAMP			9310-48	9311-48	9312-48	9313-48
7	ADAPTER – (56, 143, & 145 FRAME)			9250-04	9255-04	9266-04	
	ADAPTER – (182, 184, 213 & 215 FRAME)				9259-04	9265-67	
	ADAPTER – (284 & 286 FRAME)					9272-67	
	ADAPTER – (182 THRU 256 FRAME)						9276-67
	ADAPTER – (324TSC FRAME)						9277-67
	ADAPTER – (284 & 286 FRAME)						9275-67
8	ADAPTER MOUNTING BOLT 3/8” – 16 X 1” OAL			9350-40			
	ADAPTER MOUNTING BOLT 1/2” – 13 X 1” OAL				9351-40		
	ADAPTER MOUNTING BOLT 5/8" - 11 UNCBX 1” OAL						9352-40
9	MOTOR			SEE REPLACEMENT MOTORS (PAGES 8-9)			

THOMSEN®

100 Series Internal Seal Assembly



100 Series External Seal Assembly



100 Series Replacement Seal Kits

Internal Seal

PUMP SIZE	ELASTOMERS	TEFLON
		PART NO.
4	BUNA	9355-B0
	VITON	9355-V0
	EPDM	9355-E0
5	BUNA	9356-B0
	VITON	9356-V0
	EPDM	9356-E0
6	BUNA	9357-B0
	VITON	9357-V0
	EPDM	9357-E0
8	BUNA	9359-B0
	VITON	9359-V0
	EPDM	9359-E0

External Mechanical Seal

PUMP SIZE	ELASTOMERS	CARBON SILICON CARBIDE	CARBON STAINLESS STEEL	SILICON CARBIDE SILICON CARBIDE
4	BUNA	9222-B0	-	-
	VITON	9222-V0	9222-V6	9222-VSC
	EPDM	9222-EO	-	-
5	BUNA	9223-B0	-	-
	VITON	9223-V0	9223-V6	9223-VSC
	EPDM	9223-EO	-	-
6	BUNA	9224-B0	-	-
	VITON	9224-V0	9224-V6	9224-VSC
	EPDM	9224-EO	-	-
8	BUNA	9499-B0	-	-
	VITON	9499-V0	9499-V6	9499-VSC
	EPDM	9499-EO	-	-

1800 RPM, 60hz, Totally Enclosed Fan Cooled

HP	VOLTAGE	PHASE	FRAME	ALL STAINLESS	WASHDOWN	CODE	THOMSEN PART NO.
1/2	115/230	1	56C	NO	NO	03	**4800-03**
					YES	86	**4800-86**
	208-230/460	3	56C	NO	NO	04	**4800-04**
					YES	59	**4800-59**
3/4	115/230	1	56C	NO	NO	05	**4800-05**
	208-230/460	3	56C	NO	NO	07	**4800-07**
					YES	OX	**4800-OX**
1	208-230/460	3	143TC	NO	YES	68	**4800-68**
1-1/2	115/230	1	56C	NO	NO	16	**4800-16**
	208-230/460	3	145TC	NO	YES	74	**4800-74**
2	208-230/460	3	145TC	YES	YES	CB	**4800-CB**
				NO	YES	OT	**4800-OT**
3	115/230	1	184TC	NO	NO	28	**4800-28**
					YES	9S	**4800-9S**
	208-230/460	3	182TC	NO	NO	26	**4800-26**
					YES	92	**4800-92**
5	208-230/460	3	184TC	NO	NO	32	**4800-32**
					YES	76	**4800-76**
7-1/2	115/230	1	215TC	NO	YES	3S	**4800-3S**
	208-230/460	3	213TC	NO	NO	39	**4800-39**
					YES	OD	**4800-OD**
10	208-230/460	3	215TC	NO	NO	41	**4800-41**
					YES	4M	**4800-4M**

Replacement Motors

THOMSEN®

3600 RPM, 60hz, Totally Enclosed Fan Cooled

HP	VOLTAGE	PHASE	FRAME	ALL STAINLESS	WASHDOWN	CODE	THOMSEN PART NO.
1/2	115/230	1	56C	NO	NO	5W	**4800-5W**
3/4	115/230	1	56C	NO	NO	09	**4800-09**
	208-230/460	3	56C	NO	NO	2U	**4800-2U**
1	115/230	1	56C	NO	NO	10	**4800-10**
				NO	YES	OW	**4800-OW**
	208-230/460	3	56C	NO	NO	15	**4800-15**
				NO	YES	73	**4800-73**
1-1/2	115/230	1	56C	NO	NO	17	**4800-17**
					YES	3H	**4800-3H**
	208-230/460	3	56C	NO	NO	20	**4800-20**
					YES	OH	**4800-OH**
2	115/230	1	145TC	NO	NO	1S	**4800-1S**
	208-230/460	3	145TC	NO	NO	25	**4800-25**
					YES	64	**4800-64**
3	208-230/460	3	182TC	NO	NO	29	**4800-29**
					YES	CM	**4800-CM**
			143TC	NO	YES	63	**4800-63**
5	208-230/460	3	184TC	NO	NO	33	**4800-33**
					YES	57	**4800-57**
7-1/2	208-230/460	3	213TC	NO	YES	OF	**4800-OF**
10	208-230/460	3	215TC	NO	NO	40	**4800-40**
					YES	ON	**4800-ON**
15	208-230/460	3	215TC	NO	NO	43	**4800-43**
					YES	2C	**4800-2C**
20	208-230/460	3	256TC	NO	NO	3Y	**4800-3Y**

4.2. Mechanical Seal Removal

4.2.1. Review exploded diagram on page 14 for position and construction of standard internal mechanical seal. Review exploded diagram on page 15 for position and construction of an external mechanical seal.

4.2.2. Shut off and lock out power to the motor. Disconnect power supply to the pump motor.

4.2.3. Turn off the steam and/or flushing water supply, if equipped.

4.2.4. Close the inlet and discharge of the pump, and make sure that there is no liquid in the pump casing. If the pump is used for hot and/or aggressive liquids, special precautions must be taken. In such cases, observe the local regulations for personal protection when working with these products.

4.2.5. Remove the pump casing (ITEM 1) by releasing casing clamp (ITEM 6). Remove casing o-ring. Release one or two screws on the impeller shaft side of the collar (ITEM 5) and remove the impeller (ITEM 2, PAGE 13). Do not disturb the screw or screws on the motor shaft side of the collar. The collar is already pre-set on the motor shaft.

4.2.6. For a internal configuration, remove the spring, o-ring, and Teflon seal face. For an external seal configuration, gently remove the stationary seal face mounted in the back plate (ITEM 2e) with your fingers. The stationary seal face is breakable, due to its hardness and care should be taken not to shatter the seal during removal. Remove the rotary seal face mounted on the impeller.

4.3. Mechanical Seal Maintenance

4.3.1. Remove the o-ring from the rotary seal face on internal seal configurations.

4.3.2. Clean the static and rotary seal face locations, if necessary, with air or water.

4.3.3. In the case of water-flushed/aseptic shaft seals, the back plate must be removed to dismantle the rear shaft seal.

4.3.4. Inspect all o-rings for damage. Signs of damage may include cracks, lack of elasticity, brittleness, and/or chemical attack. Replace worn or defective parts.

4.3.6. For external seal configurations, inspect the stationary seal face and rotary seal face for signs of damage or wear. The wearing surfaces must be completely free of scratches/cracks. If not, the rotary seal face and stationary seal face must both be replaced.

4.4. Mechanical Seal Installation

4.4.1. For external mechanical seal configurations, fit new o-rings on the stationary seal face and rotary seal face. Clean rotary or stationary seal faces with a lint free rag and isopropyl alcohol. Take extra care not to leave fingerprints or contaminants on the seal faces during assembly which may cause the seal to leak.

4.4.2. Fit the rotary seal face on the impeller without using tools. The notch in the rotary seal face must be located so that it mates with the driving pin in the impeller hub.

4.4.3. Fit the impeller (ITEM 2) and secure it to the motor shaft with the shaft collar (ITEM 5). Make sure that the gap clearance between the impeller blade and the back plate is between .015 inch and .030 inch. Remember to use the proper tightening torque on the screws when fitting the collar to the shafts:

1/4 -28 UNF	94 in-lbs. (11 Nm)
5/16 – 24 UNF	142 in-lbs. (16 Nm)

4.4.4. Be careful to avoid damaging the casing o-ring seal. Press the pump casing (ITEM 1) in over the o-ring seal and fasten with the clamp ring (ITEM 3) observing the correct tightening torque on the clamp wing nut. Recommended torque for housing clamp/screws:

5/16 – 18 UNC	142 in-lbs. (16 Nm)

4.5. Motor Replacement

4.5.1. Lock out power supply then disconnect the pump and motor from the system making sure all fluids between the system and the pump have been isolated and drained from the pump.

4.5.2. Remove the pump casing. Refer to section 4.2, Mechanical Seal Removal.

4.5.3. Release all screws on the shaft collar (ITEM 5, PAGE 13) and remove the impeller and shaft collar. In this case the collar or required collar will have to be reset to fit the new motor shaft.

4.5.4. If possible, stand the pump on end. Undo the four motor flange bolts (ITEM 6, PAGE 13) between the motor and motor adapter (ITEM 7, PAGE 13) and remove them.

4.5.5. Lift the back plate, motor adapter and spacer ring (if so equipped), up and away from the motor.

4.5.6. Before reassembling the pump, clean all surfaces ensure there is no oil or dirt remain that could hinder assembly.

4.5.7. Fit the back plate and motor adapter and spacer ring (if so equipped) over the motor shaft.

4.5.8. Apply "Never-Seize" or equivalent to the bolt threads and secure the motor adapter to the motor with the four motor flange bolts (ITEM 6, PAGE 13). Tighten the bolts to the required torque as shown below.

3/8 – 16 UNC 15 ft.lb (20 Nm)

1/2 – 13 UNC 40 ft.lb (54 Nm)

5/8 – 11 UNC 80 ft.lb (108 Nm)

4.5.9. Turn the pump back so that it stands on its legs.

4.5.10. Fit the impeller (ITEM 2, PAGE 13) and secure it to the motor shaft with the shaft collar (ITEM 5, PAGE 13). Make sure that the gap clearance between the impeller blade and the back plate is between .015 inch and .030 inch. Remember to use the proper tightening torque on the screws when fitting the collar to the shafts:

1/4 -28 UNF 94 in-lbs. (11 Nm)

5/16 – 24 UNF 142 in-lbs. (16 Nm)

4.5.11. On standard assemblies only, it is helpful to use the static spring pusher as a guide to determine proper seal and impeller engagement. The tabs of the spring pusher should be about midway in the slot of the static spring retainer cup when correctly assembled. This feature is not available when using water/steam flush assemblies.

4.5.12. Install pump casing o-ring seal on the back plate flange (ITEM 4, PAGE 13)

4.5.13. Install the pump casing (ITEM 1, PAGE 13) over the casing o-ring seal and secure with the pump casing clamp (ITEM 3, PAGE 13). Tighten the clamp nut to the desired torque noting the recommended torque below.

5/16 – 18 UNC 142 in-lbs. (16 Nm)

4.6. Recommended Inventory of Spare Parts

4.6.1. A seal face kit and/or seal service kits for the Series 100 pumps should be locally stocked. See page 12 for kit part numbers.

4.6.2. The seal face kit for the Series 100 pump consists of the wearing parts of the pump. Standard seal assembly is shown on page 14. Water Flush assembly on page 14.

4.6.3. The seal service kit is made up of the seal face kit and several additional pump components which are not necessarily wearing parts but may require replacement. Standard seal assembly on page 15. Water flush assembly on page 16.

4.6.4. The table below shows the recommended inventory of spare parts for normal operation and special service. Special service may include, continuous duty, operation with abrasive media, or processes that are sensitive to even the shortest production stoppage.

PUMPS IN SERVICE	NORMAL OPERATION	SPECIAL SERVICE
0 - 5	2 KITS	3 KITS
6 - 20	3 KITS	6 KITS
>20	3 KITS PER 10 PUMPS	6 KITS PER 10 PUMPS