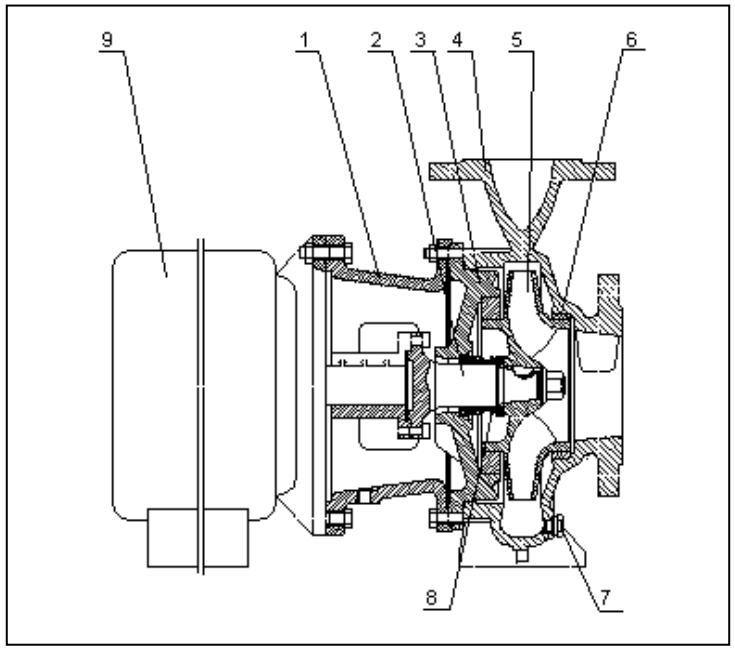
GOULDS PUMPS



Ref. No.	Description	Standard Materials
1	Motor Adapter	Cast Iron
2	Shaft	SS420
3	Backplate	Cas Iron
4	Pump Casing	Cast Iron
5	Impeller	Cast Bronze
6	Wear Ring	Bronze
7	Drain Plug	Malleable Steel
8	Mechanical Seal	John Crane Type 21 - Carbon/Ceramic/Nitrile
9	Motor	-

ITT Fluid Technology International (Australia) Pty Ltd

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Australia

Goulds Pumps

ITT Industries

GOULDS PUMPS

GIS Series

Installation and Operation Instructions

Owner's Information

Pump Model Number : _____

Pump Serial Number : _____

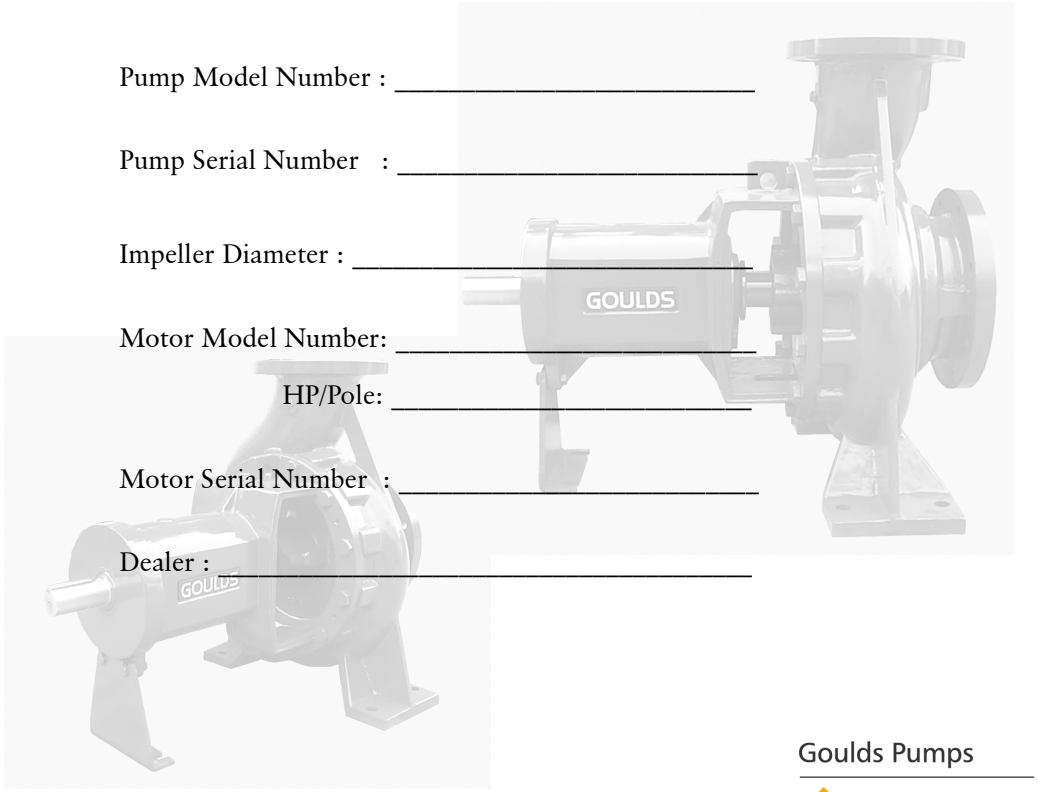
Impeller Diameter : _____

Motor Model Number: _____

HP/Pole: _____

Motor Serial Number : _____

Dealer : _____



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Goulds Pumps

ITT Industries

Engineered for life

1. Introduction

This Manual is intended to provide the user with the essential information required for installing, operating and maintaining the GIS Series Pump.
A trouble shooting guide indicating possible causes and effect along with a disassembly and assembly procedure are also provided to assist the user.
These are general guidelines and all relevant local regulations should be adhered to when working on this equipment.

2. General Data

Application

The GIS series centrifugal pump is suitable for application in the civil, agricultural and industrial fields, to pump chemically or mechanically non-aggressive liquids. Following are a few typical applications:

- Water supply
- Irrigation schemes
- Pressure boosting
- Air conditioning systems

For other applications, please contact your local ITT Representative.

Descriptions

GIS Series pump is an end-suction, single stage, back pullout centrifugal pump encompassing 29 standard sizes. The pump is designed in accordance to international standards ISO 2858, ISO 5199 & ISO 2548. The pump is dimensionally interchangeable with other ISO pumps of the same size conforming to the same standard.

- Suction: 50~250mm
  Discharge: 32~200mm
- Capacity: up to 900m^3/h
- Head: up to 160m
- Working pressure: up to 16 Bar
- Liquid temperature: -15^{0}C~140^{0}C

⚠ **Caution** **The specifications listed above are based on 50Hz operation, for more details, please contact an ITT representative. The performance specification can be found on the nameplate.**

⚠ **Caution** **For pumping corrosive liquids or liquid with temperatures higher than 80^{0}C, please contact an ITT representative.**

Construction Features

● Pump Casing — highly efficient volute type casing adopted. Back-pullout design provides easy maintenance without disturbing the pipe work.

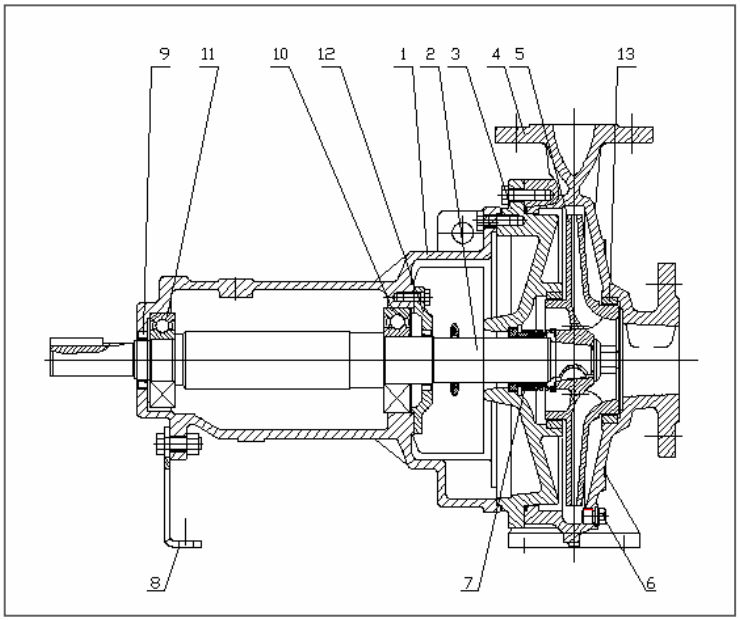
● Standard flange dimension:
Asia – ISO 7005.21988 PN16bar, compatible with BS4504-1989, ISO 7005.1-1992 & DIN2533-1976.
Australia/NZ – AS2129 Table "E"
**Other options available on request.*

● Impeller — Fully enclosed type, hydraulically designed for maximum efficiency and dynamically balanced for minimum vibration.
● Shaft — Heavy-duty stainless steel shaft for minimum deflection at high speed. The taper mount with keyed impeller provides positive locking and easy removal during servicing.

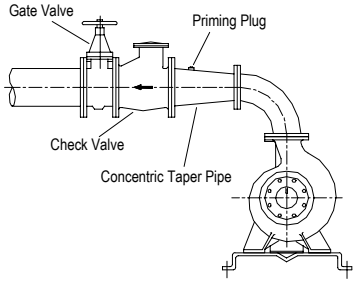
● Shaft seal — mechanical type with excellent sealing performance.

● Bearing — high quality oversize bearings.

● Two types of lubrication available:
Grease Lubrication – general purposes;
Oil Lubrication – for high ambient temperatures.



Ref No	Description	Standard Materials	Ref No	Description	Standard Materials
1	Bearing Housing	Cast Iron	8	Support Foot	Mild Steel
2	Shaft	SS420	9	Oil Seal	Nitrile Rubber
3	Backplate	Cast Iron	10	Bearing - Impeller End	NSK Ball Bearing
4	Pump Casing	Cast Iron	11	Bearing - Driver End	NSK Ball Bearing
5	Impeller	Cast Bronze	12	Bearing Cover	Cast Iron
6	Drain Plug	Malleable Steel	13	Wear Ring	Bronze
7	Mechanical Seal	John Crane Type 21 - Carbon/Ceramic/Nitrile			



Electric Motor:

⚠ **Caution** **If an electric motor is used as the prime mover, its installation, electrical connection and protection must comply with all local regulations.**

⚠ **Caution** **In the case of high flow pump operation. Check that either the motor has its overloads set for correct protection or the motor has been selected for non-overloading operation.**

Operation:

1. Open the suction valve and vent plug, ensure the discharge valve is closed. Prime the pump either by direct filling or evacuation of air (vacuum pump), until the pump casing and suction line is filled with liquid.

⚠ **Caution** **If Oil Lubricated bearings are employed, refer to "Lubrication 3." before proceeding.**

2. Rotate the pump shaft slowly by hand to ensure the mechanical seal has correct lubrication.

⚠ **Caution** **Do not run the pump dry as the mechanical seal will be severely damaged.**

3. Ensure the drive shaft rotation conforms to the direction arrow on the pump (rotation should be clockwise when view from motor end)
4. The unit may now be started. When the pump reaches full speed, open the discharge valve gradually until the required quantity of liquid is being delivered. If no liquid is delivered, stop the unit and check for cause.

⚠ **Caution** **Take care that the motor current does not exceed its rated value during operation.**

⚠ **Caution** **Do not operate the pump with discharge valve closed for more than 3 minutes.**

5. Check for exceptional noise or operating temperature and check pump mechanical seal for leaks.
6. It should not be necessary to re-prime the unit after initial priming
7. Sequence for stopping the unit: Close the discharge valve till approximately one quarter open --- stop the motor --- Fully close the discharge valve and suction valve when the pump has come to a complete stop.

Maintenance:

1. Check the unit regularly for smooth operation, abrasion and leakage of the mechanical seal. Replace the sealing components timely to prevent water leakage and subsequent damage.
2. Check the temperature of the bearing cover regularly. The maximum temperature should not exceed 80^0C.
3. Check the water supply regularly for foreign objects and observe the liquid level is adequate. Stop the pump when the level is below minimum level to avoid cavitation and subsequent damage to the impeller. If necessary, reduce the discharge capacity by adjusting the gate valve.
4. Regularly monitor the pressure gauge(s) and current readings, if any abnormal, take proper measures to correct.
5. If the pump is being left unused for an extended period of time, discharge the remaining water and remove rust from parts. Coat parts with rust inhibiting agent and store in an appropriate place.

Lubrication:

Note: Confirm bearing lubrication method before proceeding.

1. In case of pumps fitted with "sealed for life" bearings, these are pre-filled for life and cannot be replenished.
2. Where bearing housing is drilled with holes for adding grease, replenish the bearings with 3# calcium base grease through these holes for every 4000 working hour period.
3. For an oil-lubricated bearing housing, oil must be added to the bearing housing before starting the unit. The height of oil level should not be lower than the center of oil mirror and should not be higher than two-third of the oil mirror; Replace the oil every half a year.

4. Troubleshooting

- No water is delivered or the capacity is lower than the specified value.

1. Either suction pipe too long and discharge pipe too short or suction pipe diameter too small.
2. The pipeline or the filter is clogged; the valve closed; the diameter of foot valve too small.
3. Air leak in the suction pipeline or shaft seal.
4. Pump not properly primed
5. Speed too low
6. The discharge head exceeded the pump's rating
7. Excessive suction lift.
8. Incorrect rotation of direction.
9. Impeller partially or fully clogged.
10. Air or gases in the liquid.

- The Bearings Are Over-Heated.

1. The couplings are not aligned correctly.
2. The bearings lack lubrication or excessively worn.
3. The pump is strained by unsupported pipeline.

⚠ **Caution** **A temperature uncomfortably hot to the hand is not necessarily detrimental to the pump, however, any sudden rise in temperature should be investigated**

- Power Consumption Too High

1. Total head too low causing too much water to be pumped. Reduce the capacity by turning down the impeller diameter or by adjusting the discharge valve.
2. Pump speed too high.
3. The density of liquid greater than water.
4. The motor shaft is not in alignment with the pump, or the pump shaft is bent.
5. Foreign object jammed in the pump.

- Excessive Vibration

1. The foundation not sufficiently rigid or the unit was not mounted properly.
2. The motor shaft is not in alignment to that of the pump.
3. The impeller is partially clogged, causing imbalance.
4. The bearings are worn out.
5. The coupling is not properly mounted or balanced.

- Noisy Operation

1. Foreign object jammed in impeller or body.
2. Impeller binding in body.
3. Worn out or faulty bearings.
4. Cavitation noise.
5. Pump not properly primed.

- Excessive Internal Wear Of Pump.

1. Cavitation from air/gases entrained in the liquid.
2. Abrasion caused by solid particles in the liquid.
3. The liquid is corrosive.

5. Disassembly Sequence

⚠ **Caution Make sure all pressure has been released from within the pump, is safely isolated from pipe work and cannot rotate unintentionally.**

⚠ **Caution make sure the prime mover is correctly shutdown and cannot start or rotate unintentionally.**

NOTE: For frame mount versions first remove the coupling according to the manufacturer's instructions.

1. Disassemble the joint bolts between the bearing housing and the pump casing, and remove the bearing housing and rotating elements. For stub shaft version, remove the motor and the shaft elements.
2. Unscrew the impeller nut approximately 2 turns, and drive a pair of wedges, preferably of wood, between the impeller and back plate. Care should be taken to make sure the wedges align with the internal vanes of the impeller, this will ensure the rear coverplate is not damaged. Place a solid piece of wood block onto the impeller nut and give it a sharp blow with a hammer to loosen the impeller off the shaft. Undo the impeller nut fully and then remove the impeller, key, and all rotational parts of the mechanical seal.
3. Loosen then remove the joint bolts between the back plate and bearing housing *(or bell housing in the case of stub shaft version)* and remove the back plate. The stationary ring of mechanical seal can now be removed by tapping with a wooden stock.
4. Disassemble the retaining bolts between bearing cover and bearing housing, and then remove the bearing cover, shaft and bearings.

6. Assembly Sequence

The assembly sequences of the pump are carried out in the reverse orders of the disassembly sequence.

⚠ **Caution Care must be taken when handling the mechanical seal to avoid marking or damaging the sealing faces.**

⚠ **Caution All the pumps mating faces should be cleaned during assembly. Care must be used to make sure that small parts such as key and O ring are not missing or mounted in incorrectly..**

⚠ **Caution When mounting the O' ring to the pump cover, O ring grease should be applied to prevent it from failing off or folding while assembling.**

3. Installation, Operation & Maintenance

Installation:

1. Prior to the installation of the pump unit, check that the details of the packing list match against those on the order and against the data printed on the pump nameplate.
2. Mounting Location: The pump unit should be installed nearest to the source of the liquid, utilizing the least suction lift and the shortest length of suction pipe. Preferred installation practice is covered and protected from the environment.

⚠ **Caution Please ensure both the pump and motor are at least 150mm clear of obstructions and that adequate air supply reaches the motor cooling fan.**

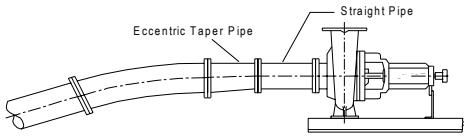
3. Mounting Foundation: Set the pump unit on a firm foundation. The foundation should be sufficiently substantial to support the pump and drive unit.
4. Coupling Arrangement: **(Not applicable to close coupled or belt driven pumps)* The following is intended as a guide only for the correct selection of the appropriate coupling.
   - The type of Pump: In this case Centrifugal.
   - The type of drive: Electric, Diesel, Petrol or other.
   - The maximum output power/shaft power of the drive.
   - The maximum speed of the drive.
   - Duty type: Continuous or intermittent
   - Shaft diameter & key size of pump & drive
   - **Shaft Alignment: Refer to coupling manufacturers specifications.*

⚠ **Caution Please ensure appropriate guards are fitted to all exposed rotating equipment prior to operation.**

5. Inlet and Outlet pipe work: All pipe work should be correctly aligned with the pump and firmly supported so that no external loads are imposed on the pump. The pump shaft must be free to turn after the pump has been bolted in position and pipe work connected.

Suction pipeline:

Suction piping must be free from air leaks. Suction piping should be the same size or larger than that of the pump suction flange. Tapered eccentric reducer should be used *when using larger diameter pipe work (refer to below drawing)*.
The pump should be fitted with a straight pipe of



length not less than 3 times the pipe diameter. Ensure that the end of the suction line is sufficiently below the lowest level of the liquid to prevent the formation of vortexing, and the consequent entry of air into the suction pipe. Where there is suction lift, it is essential that a reputable foot valve with a water opening of at least equal to that of the pipe, is used.

⚠ **Caution The suction pipeline should have a continual fall from pump to liquid source to prevent air pockets.**

Discharge pipeline:

It is recommended that a non-return valve is fitted to the pumps discharge. The installation of a gate valve after the non-return valve is beneficial to aid in priming of the pump, trimming of the discharge flow and maintenance on the non return valve *(refer to following drawing).* Discharge pipeline should be selected of a size suitable to carry the required capacity, such that the friction head created is not excessive. When the pipeline is laid over undulating ground with high points where air pockets can form, vent cocks must be placed to expel the accumulation of air, which may affect the discharge capacity of the pump.