CHI and CHIE
Stainless Steel Horizontal Multistage End Suction Pumps

Installation and operating instructions

CONTENTS

Before beginning installation procedures, these installation and operating instructions should be studied carefully. The installation and operation should also be in accordance with local regulations and accepted codes of good practice.

PLEASE LEAVE THESE INSTRUCTIONS WITH THE PUMP FOR FUTURE REFERENCE.

1. Pre-installation Checklist

1.1 Confirm you have the right pump

Read the pump nameplate to make sure it is the one you ordered.

1.2 Check the condition of the pump

The shipping carton your pump came in is specially designed around your pump during production to prevent damage. As a precaution, it should remain in the carton until you are ready to install it. At that point look at the pump and examine it for any damage that may have occurred during shipping.

2. General data

2.1 CHI & CHIE...What is the difference?

CHI and CHIE pump end components are identical. The difference between the two models is the stator and terminal box. CHI pumps are standard 1 phase and 3 phase, 60 HZ, constant speed pumps. CHIE and CHIE-Plus pumps are powered by 1 phase, 230 volts, 60 HZ, variable speed motors with an integrated variable frequency drive (VFD) and system controller ("PI" type). Consult the Grundfos "CRE...CHIE Installation and Operating Instructions," included with the pump, for electrical installation and motor operation. Refer to these instructions for pump end installation and operation.

2.2 Applications

Grundfos pumps, type CHI, are horizontal multi-stage centrifugal pumps of the non-self-priming type designed for pumping thin non-explosive liquids.

CAUTION - This pump is intended for use with water only.

The pump with integral motor is fitted to a base plate.

The pump is made of corrosion-resistant materials, which makes it ideally suited for water supply and a wide range of applications in industry, agriculture and in the food industry.

The pump must not be used for the transfer of flammable liquids such as diesel oil, gasoline, or similar liquids.

The pump is designed for pumping clean water, domestic hot water, aqueous solutions, cleaning solutions, suspensions or light oils and other liquids with a density and viscosity corresponding to those of water. The liquids must not contain abrasive particles or fibers.

When pumping liquids with a density or viscosity higher than that of water, motors with correspondingly higher outputs must be used.

As standard, the mechanical shaft seal for the CHI pump is available in six versions with different material combinations; see the stamping code on the pump nameplate.

Example: Type CHI 4-50 A-B-G-**BQQE**.

Code	Shaft seal materials	
	Seal faces	Rubber parts
BUBE **BUBV**	Tungsten carbide/ carbon	EPDM FKM
BQQE **BQQV**	SiC/SiC*	EPDM FKM
BUUE **BUUV**	Tungsten carbide/ Tungsten carbide	EPDM FKM

*SiC: Silicon carbide.

3. Technical data

3.1 Ambient temperature

+5°F to +104° F (-15°C to +40° C) at a relative air humidity of maximum 95%.

3.2 Liquid temperature

+5°F to +230°F (-15°C to 110°C).

3.3 Maximum operating pressure

145 psi (10 bar).

3.4 Maximum Inlet Pressure

The actual inlet pressure plus the pressure when the pump is operating against a closed valve should always be lower than the "maximum operating pressure."

3.5 Sound pressure level

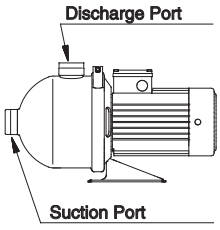
The sound pressure level of the pump is less than 70 dB(A) at a distance of 3 feet from the pump.

4. Installation

4.1 Pump location

The pump must be installed with the motor shaft horizontal, see fig. 1, and so that adequate air supply reaches the motor cooling fan.

Fig. 1



A solid foundation should be provided for the pump, which can be secured by bolts, if required.

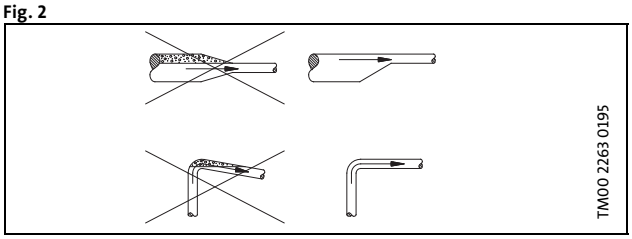
Pipe connections:

Suction and discharge ports:

CHI 2:	1" NPT
CHI 4:	1 1/4" NPT
CHI 8:	1 1/2" NPT
CHI 12:	1 1/2" NPT

Install the pipes so that air pockets are avoided, especially on the suction side of the pump, shown in fig. 2.

Fig. 2



Isolating valves should be fitted on either side of the pump to avoid draining the system if the pump needs to be cleaned or repaired.

If pumps are installed close to living accommodation, it is advisable to fit anti-vibration mountings on either side of the pump and between the foundation and pump to prevent vibration being transmitted through the pipework. This applies especially to pumps installed in concrete buildings.

Install the pump so that it is not stressed or strained by the pipework, especially tension caused by variations in temperature. If pumps are installed in long pipes, these should be adequately supported before and after the pump.

If there is any danger of the pump running against a closed valve in the discharge pipe, a bypass should be installed on the discharge side of the pump to ensure that adequate cooling and lubrication water is circulated through the pump (a minimum flow equal to 10% of the nominal flow is needed at all times).

This is less for CHIE pumps. CHIE pumps can automatically stop at no-flow conditions.

5. Electrical connections

The electrical connection and protection should be carried out in accordance with local regulations. The connections are shown in the wiring diagram inside the terminal box cover.

Never make any connections in the pump terminal box unless the electricity supply has been switched off.

The pump must be connected to an external main switch.

The operating voltage and frequency are marked on the nameplate. Please make sure that the motor is suitable for the electricity supply on which it will be used.

CHI single-phase motors DO NOT incorporate a thermal overload switch and require additional motor protection. (CHIE motors do not require this, only fuses or circuit breakers per instructions in the "CRE...CHIE Installation and Operating Instructions.")

Three-phase motors must be connected to an approved motor starter. The set nominal current of which must correspond to the electrical data on the pump nameplate.

- Do not start the pump until it has been filled with liquid.
- Connections should be made as shown on the inside of the terminal box cover.
- Choose one of the two CHI cable entries and knock out the pre-cut disk. CHIE instructions are in the "CRE...CHIE Installation and Operating Instructions."

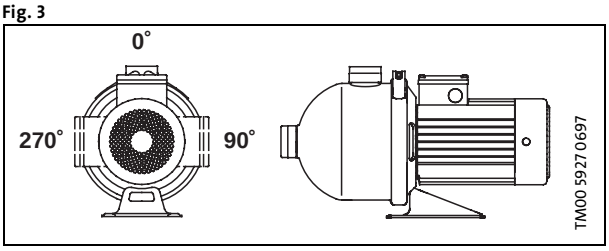
On pumps with the *base plate fitted to the pump,* the terminal box can be turned to three positions, in 90° steps, see fig. 3.

To change the position of the terminal box, proceed as follows:

1. Remove the four screws securing the motor to the motor stool.
2. Turn the motor to the required position.

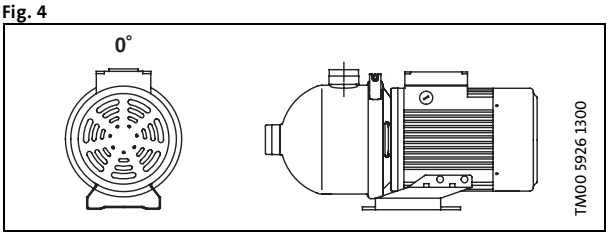
Replace and tighten the four screws.

Fig. 3



Pumps with the base plate fitted to the motor must be installed with the terminal box in position 0°, see fig. 4.

Fig. 4



6. CHIE-Plus – Additional instructions

- Attach the transducer/tank assembly to the pump. The mating half-union is already installed on the pump. Position the assembly such that the tank points in the same direction as the pump inlet.
- Install the check valve at or near the suction port and a pressure gauge down line from the pump discharge.
- Prime the pump through the priming plug on the cross fitting.
- At start-up, make sure fluid is supplied to the inlet of the pump. Adjust the pump by pressing the "+" or "-" buttons until the desired setpoint is achieved. Open the priming plug slightly to allow residual air to escape. If the fluid is something other than water, take care to make sure escaping air/fluid does not cause harm to the installer or adjacent equipment. Tighten the priming plug.
- To test the "stop function," close the pump discharge (isolation valve or demand fixtures). The pump should stop within two minutes. If it does not stop, check for plumbing leaks.
- To test the constant pressure function, open the discharge slightly and adjust the "+" or "-" buttons to the desired setpoint. As the flow is varied, the pump will change speed to maintain the desired pressure. If the pressure drops as you increase the flow, you may have exceeded the maximum capacity of the pump.
- The desired pressure is only maintained when the demand point is under the maximum pump curve.

7. Start-up

At high system temperatures, the pump may be extremely hot. Do not touch it.

7.1 Priming

Before startup, or if the pump has been drained, the pump must be filled with liquid and vented.

Proceed as follows:

In closed systems or open systems where the liquid level is above the pump inlet:

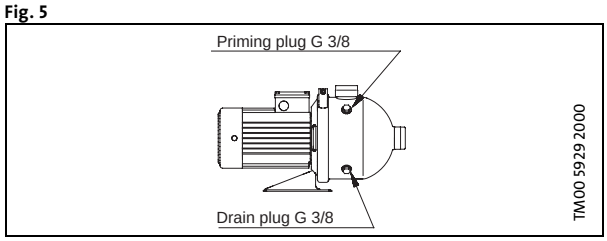
1. Close the discharge isolating valve.
2. Remove the priming plug in the pump sleeve, see fig. 5.

Slowly open the isolating valve in the suction pipe until a steady stream of liquid runs out of the priming port.

The escaping liquid may be scalding hot. Therefore, care must be taken to ensure that the liquid does not cause personal injury or damage to other components.

3. Start the pump and slowly open the discharge valve until it is fully open.
4. Completely open the isolating valve(s).

Fig. 5



In open systems where the liquid level is below the pump inlet, the suction pipe must also be filled with liquid and vented before the pump is started:

1. Close the discharge isolating valve.
2. Remove the priming plug in the pump sleeve.
3. Pour water through the priming hole until the suction pipe and the pump are completely filled with liquid.
   - If the suction pipe does not slope downwards away from the pump, air must be purged from the suction pipe while the pump is being filled.
   - Filling may take place at the highest point of the suction pipe if this is above the priming plug of the pump.
4. Replace the priming plug and tighten securely.

7.2 Checking direction of rotation (CHI three-phase)

Arrows on the fan cover indicate the correct direction of rotation. The pump should rotate counter-clock-wise when seen from the motor fan. To reverse rotation, switch off electricity supply and interchange any two of the incoming supply wires.

8. Operation and Maintenance

8.1 Frequency of starts and stops

Maximum 100 starts per hour.

8.2 Maintenance

Pump and motor are maintenance free.

8.3 Freeze protection

Pumps which are not being used during periods of freezing should be drained to avoid damage.

Remove the priming and drain plugs and allow the pump to drain. Do not replace the plugs until the pump is to be used again.

The escaping liquid may be scalding hot. Therefore, care must be taken to ensure that the liquid does not cause personal injury or damage to other components.

8.4 Cleaning

If the pump has been used for pumping aggressive or polluted liquids, it should be flushed through with clean water to avoid corrosion or sediment in case the pump is not being used for some time.

8.5 Service

If a pump has been used for a liquid which is injurious to health or toxic, the pump will be classified as contaminated.

If GRUNDFOS is requested to service the pump, GRUNDFOS must be contacted with details about the pumped liquid, etc., *before* the pump is returned for service. Otherwise GRUNDFOS can refuse to accept the pump for service.

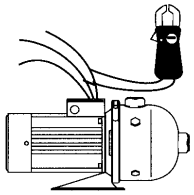
Possible costs of returning the pump are paid by the customer.

9. Preliminary Checks

9.1 Measuring Voltage

Use a volt meter, (set to the proper scale) measure the voltage at the pump terminal box or starter.

On single-phase units, measure between power leads L1 and L2 or L1 and N for 115 volt units). On three-phase units, measure between:



- Power leads L1 and L2
- Power leads L2 and L3
- Power leads L3 and L1

What it means

When the motor is under load, the voltage should be within +/- 10% of the nameplate voltage. Larger voltage variation may cause winding damage.

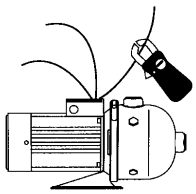
Large variations in the voltage indicate a poor electrical supply and the pump should be not operated until these variations have been corrected. If the voltage constantly remains high or low, the motor should be changed.

9.2 Measuring Current

Use an ammeter (set on the proper scale) to measure the current on each power lead at the terminal box or starter. See the motor nameplate for amp draw information.

Current should be measured when the pump is operating at constant discharge pressure.

What it means

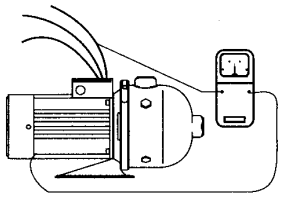


If the amp draw exceeds the listed service factor amps (SFA) or if the current imbalance is greater than 5% between each leg on three-phase units, check the following:

- Burned contacts on motor starter.
- Loose terminals in starter or terminal box or possible wire defect.
- Too high or too low supply voltage.
- Motor windings are shorted or grounded. Check winding and insulation resistances.
- Pump is damaged causing a motor overload.

9.3 Measuring Resistance

Turn off power and disconnect the supply power leads in the pump terminal box. Using an ohm or mega ohm meter, set the scale selector to Rx 100K and zero adjust the meter. Measure and record the resistance between each of the terminals and ground.



What it means

Motors of all HP, voltage, phase and cycle duties have the same value of insulation resistance. Resistance values for new motors must exceed 1,000,000 ohms. If they do not, motor should be repaired or replaced.

10. Fault-finding chart

Before removing the terminal box cover make sure that the electricity supply has been switched off. The pumped liquid may be scalding hot and under high pressure. Before any removal or dismantling of the pump, the system must therefore be drained or the isolating valves on either side of the pump must be closed.

Fault	Cause
1. Motor does not start when the motor starter is operated.	a. Supply failure. b. Fuses blown. c. Motor starter overload has tripped out. d. Main contacts in starter are not making contact or the coil is faulty. e. Control circuit fuses are defective.
2. Starter overload trips out immediately when supply is switched on.	a. One fuse is blown. b. Contacts in overload are faulty. c. Cable connection is loose or faulty. d. Motor winding is defective. e. Pump stiff and not free to run. f. Overload setting too low.
3. Motor starter overload trips out occasionally.	a. Overload setting too low. b. Periodic supply failure. c. Low voltage at peak times.
4. Pump does not run when starter is operated.	a. Check 1 a), b), d), and e).
5. Pump capacity not constant.	a. Pump inlet pressure is too low. b. Suction pipe partly blocked by impurities. c. Pump takes in air.
6. Pump runs but gives no water.	a. Suction pipe blocked by impurities. b. Foot or non-return valve blocked in closed position. c. Leakage in suction pipe. d. Air in suction pipe or pump.
7. Pump runs backwards when switched off.	a. Leakage in suction pipe. b. Foot or non-return valve defective. c. Foot valve blocked in open or partly open position.

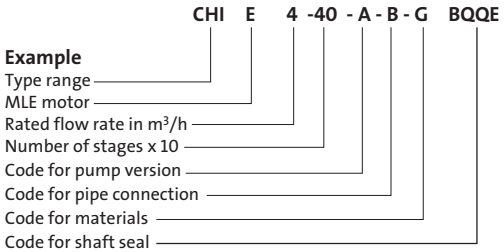
4. Disposal

Disposal of this product or parts of it must be carried out according to the following guidelines:

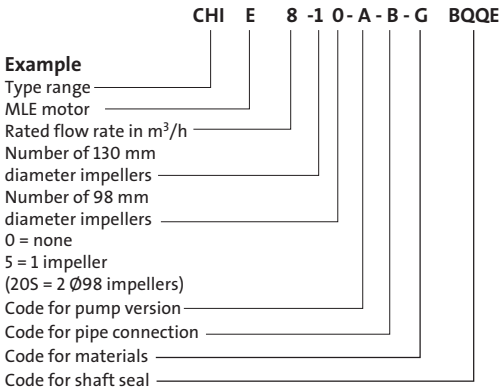
1. Use the local public or private waste collection service.
2. In case such waste collection service does not exist or cannot handle the materials used in the product, dispose of the product according to local regulations.

Type Keys Grundfos CHI(E)

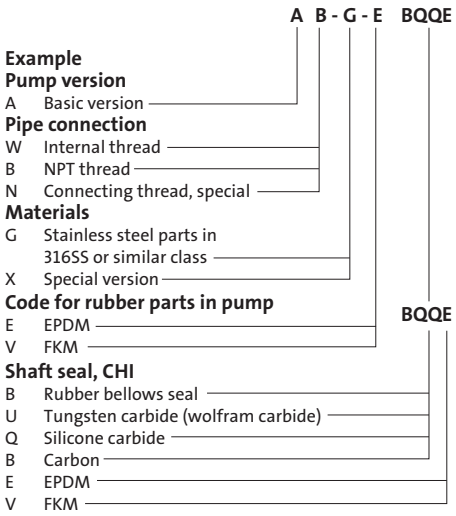
CHI(E) 2 and CHI(E) 4



CHI(E) 8 and CHI(E) 12



Codes



LIMITED WARRANTY

Products manufactured by GRUNDFOS PUMPS CORPORATION (GRUNDFOS) are warranted to the original user only to be free of defects in material and workmanship for a period of 24 months from date of installation, but not more than 30 months from date of manufacture. GRUNDFOS' liability under this warranty shall be limited to repairing or replacing at GRUNDFOS' option, without charge, F.O.B. GRUNDFOS' factory or authorized service station, any product of GRUNDFOS' manufacture. GRUNDFOS will not be liable for any costs of removal, installation, transportation, or any other charges which may arise in connection with a warranty claim. Products which are sold but not manufactured by GRUNDFOS are subject to the warranty provided by the manufacturer of said products and not by GRUNDFOS' warranty. GRUNDFOS will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair, or if the product was not installed in accordance with GRUNDFOS' printed installation and operating instructions.

To obtain service under this warranty, the defective product must be returned to the distributor or dealer of GRUNDFOS' products from which it was purchased together with proof of purchase and installation date, failure date, and supporting installation data. Unless otherwise provided, the distributor or dealer will contact GRUNDFOS or an authorized service station for instructions. Any defective product to be returned to GRUNDFOS or a service station must be sent freight prepaid; documentation supporting the warranty claim and/or a Return Material Authorization must be included if so instructed.

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BE > THINK > INNOVATE >

Being responsible is our foundation
Thinking ahead makes it possible
Innovation is the essence

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