

CH Series

Installation, Operation & Maintenance Manual

Project: _____

Installation: _____

Pump Model: _____ **Serial Number:** _____

HOMA Pump Technology, Inc.
390 Birmingham Boulevard • Ansonia, CT 06401

GENERAL INSTRUCTIONS:

This manual is intended to provide basic installation and start-up guidance. It is to be read and thoroughly studied prior to attempting to install or operate any of the equipment supplied. *Equipment damage, which occurs by not following these instructions will void the warranty.*

SAFETY PRECAUTIONS:

Only trained qualified personnel shall be utilized for installation and start-up.

The following is a general list of safety precautions that should be followed when installing, starting-up or servicing the pump. **The pump station owner or operator is ultimately responsible for ensuring that all equipment is installed, started up and operated in a safe manner.**

- Do not work alone.
- Double check to make sure that all lifting equipment is in good working order and that it has adequate lifting capacity for the weight that it will handle.
- Wear safety helmet, goggles and protective shoes, or appropriate safety materials required.
- Before working on the pump make sure that the power is disconnected and cannot be energized by others. Lockout and tag the control panel circuit breaker.
- Do not stand under suspended loads!
- Never enter or work within a wet well without first checking to make sure sufficient oxygen is present and that there are no explosive or poisonous gases present.
- All personnel, who work with sewage pumping equipment and systems shall be vaccinated against diseases that can occur, If there are any questions or doubts in this area it is strongly suggested that the local health agency be contacted.
- For Hazardous Area Classifications, only use pumps with suitable Explosion Proof Rating.

EQUIPMENT INVENTORY AND INSPECTION:

Upon arrival of pump shipment carefully unpack all components and compare with shipping and purchase order documents to ensure that the order is complete. Also inspect equipment for any damage that might have occurred in shipment. *If any problems are detected contact an authorized Homa Pump Technology Representative immediately.*

TRANSPORTATION AND STORAGE PROCEDURE:

Always lift the pump by its lifting bail or eye.

Never lift the pump by its power cable!

Pumps should be stored in an upright position, taking extreme care to protect the power cable and control cables from crushing, nicks or tears which would permit water intrusion. Power cable ends must be protected from immersion in water as well as moisture intrusion. The cable will wick water into the pump if it is not protected properly. Power cable leads should be covered with shrink tubing or suitable sealing material.

Short Term Storage: Short term storage is defined as any time less than six months. We recommend that pump and accessories be stored in their original shipping container in a dry, temperature controlled area. If climate controlled storage is not possible, all exposed parts should be inspected before storage and all surfaces that have the paint scratched, damaged or worn should be re-coated with an air dry enamel paint.

Long Term Storage: Any storage time exceeding six months is considered long term. In addition to the safeguards specified above, the impeller should be rotated once a month to prevent the mechanical seals from being damaged, and the pump should be inspected. The oil in the mechanical seal chamber should be drained and replaced prior to commissioning.

ELECTRICAL INSTALLATION:

GENERAL GUIDELINES

All electrical work shall be carried out under the supervision of an authorized, licensed electrician. **The present state adopted edition of the National Electrical Code as well as all local codes and regulations shall be complied with.**

VERIFICATION OF POWER SUPPLY

Prior to making any electrical connections or applying power to the pump, compare the power supply available at the pump station to the data on the unit's nameplate. *Confirm that both voltage and phase match between pump and control panel.* The voltage supplied at the pump shall be plus or minus 10% of the nameplate value, frequency shall be plus or minus 5% of the nameplate value, the voltage phase balance shall be within 1% and the maximum corrected power factor shall be 1.0.

POWER LEAD WIRING

HOMA CH Series pumps may be provided with 1 or more cables, depending on motor horsepower and operating voltage. Power leads L1, L2, & L3 may be provided as single conductor, or as two conductor. Two conductor configuration may use leads from two separate cables, or may use two conductors within one cable. Please refer to wiring diagram in the appendix for specific connection details. *The pump must be connected electrically through a motor starter with proper circuit breaker protection in order to validate warranty. Do not splice cables.*

THERMAL SWITCH WIRING :

Pumps are equipped with thermal switches embedded in the stator windings which are normally closed, automatically resetting switches. Switches will open when the internal temperature rises above the design temperature, and will close when the temperature returns to normal. Smaller CH pumps have internally connected thermal switches. These units will not have cable leads marked T1 & T3. Larger CH pumps, and all Explosion Proof pumps will have the thermal

switches configured for external control. Pumps with external thermal switch connections must be wired by a current regulated control circuit in accordance with the NEC. Identify thermal switch leads marked T1 and T3 in the power or control cable. The resistance across these leads will be .5 Ohm. These leads must be connected to the thermal overload relay located in the control panel. *Thermal switch leads must be connected to validate warranty.*

SEAL PROBE WIRING (OPTIONAL)

The mechanical seal leak detector probe utilized in the pump is a conductive probe which is normally open. The intrusion of water into the seal chamber completes the electrical circuit. Control panel provisions will sense this circuit closure, and will provide indication or alarm functions depending on the panel design.

Either single or dual wire systems may be provided. Single wire systems utilize one energizing conductor, and the pump casing and neutral lead as the ground or return portion of the circuit. The dual wire systems utilize two separate conductors for each leg of the circuit. With either system, the seal probe leads must be wired into a control circuit provided in the control panel. This control circuit must energize the probe with a regulated power source, and sense the closed circuit in event of water intrusion. Indication and alarm functions must also be provided in the control circuit. Please see control panel wiring diagram for seal probe connection points. **IMPORTANT:** *For Hazardous Area Classification Pumps, leak detector circuit must be in conformance with applicable NEC codes and regulations.*

START / RUN CAPACITORS AND RELAYS:

All single phase motors require start and/or run capacitors to operate. Refer to the wiring schematics in the appendix. *Capacitors and relays must be sized for the specific motor.* Please refer to nameplate for verification of capacitor sizing.

MECHANICAL INSTALLATION: PUMPS WITH AUTOCOUPLING SYSTEMS

In the AutoCoupling installation mode the pump is installed on a stationary component and operates completely or partially submerged (min. 8" above volute) in the pumping media.

The HOMA AutoCoupling kit base, guide claw flange, upper guide rail bracket, profile seal. Refer to dimensional drawing for details.

For Threaded Discharge CH Series pumps, attach the guide claw flange to the pump discharge flange as follows:

1. Inspect threaded assemblies for damage.
2. Clean threaded portions of pump discharge flange and guide claw flange.
3. Apply hardening thread sealer (for example Loctite thread locker 242) to pump discharge threads.
4. Thread guide claw flange on to pump discharge fully. **DISCHARGE THREADS ARE NOT NPT. DO NOT OVER TIGHTEN.**
5. Loosen guide claw flange full turn to expose some threads.
6. Re-apply sealant on exposed threads .
7. Tighten guide claw flange until the claw is in upright (horizontal) position.

For Flanged Discharge CH Series pumps, attach the guide claw flange to the pump discharge flange with the fasteners and gaskets recommended in the accessory fastener selection table. Use tightening torque's indicated in the table.

Install suitable lifting chain of an adequate size and length to permit proper lowering and raising of the pump. Lower the pump into the area where it is required.

Install upper guide bar bracket as shown on outline drawing located in the appendix. Do not tighten mounting bolts completely at this point. Properly locate the base anchor bolts into the floor of the pump station. Make sure when

locating and securing the anchor bolts that the base will align properly with the access cover at the top elevation of the station. (Refer to outline drawing in appendix). Place the base in position, and level the base. *If base is not level, proper sealing of the pump to base will not occur!*

Fully tighten all anchor and mounting bolts, and verify that the profile seal is in position.

Place the guide rails in to the rings of the base and cut them to a length that will allow the rails to be secured at the top of the pump station with the upper guide bar bracket and to extend down to the sump floor. Loosen bracket mounting bolts, install guide pipes into bracket and tighten mounting bolts. *For stations exceeding ten feet in depth intermediate guide bar brackets are recommended. One bracket is recommended for each additional 10 feet of station depth.*

Check that the guide system is properly installed in the vertical orientation by using levels and a plumb line. Connect the station riser piping to the outlet flange of the base.

Before lowering the pump, verify the direction of impeller rotation (refer to start-up section for procedure). *Also it is recommended that the stationary fitting be visible before lowering the unit. If this is not possible, ensure all debris is removed from wet well.*

Make sure to use lifting equipment that has adequate capacity for the pump that will be handled. Before installing pump, check to be certain the profile seal (rubber ring) is properly positioned in the guide claw flange. Lift, then position pump so the guides on the discharge flange engage the rails. Slowly lower the pump along the guide rail. Once the pump reaches its bottom location it will automatically connect to the base.

INSTALLATION OF PUMPS WITH RING STANDS:

The ring stand design allows for simple economical installation or to be transportable from one installation to another. It is intended to operate completely or partially submerged in the pumping liquid. Pump is designed to be installed as a free standing unit.

Install the ring stand to the underside of the volute with the supplied fasteners identified in the accessory fastener selection table. Use tightening torque's indicated in the table.

Install suitable lifting chain of an adequate length to ensure proper lowering and raising capabilities. Lower the pump into the area where it is required. Properly position power cable and chain so they stay above pump and cannot enter the pump suction.

START-UP

Prior To Applying Power

Prior to applying power to the pump; double check all wiring and verify that the power (Voltage, Phase) that will be supplied to the unit matches the nameplate specified values.

Measure resistance of cable and pump motor resistance of ground circuit between control panel and outside of pump. Perform MEG ohm check of motor insulation. Record all data on start-up checklist which is included with this manual.

Prior To Installation:

Before lowering the pump into position check the direction of rotation. The impeller will rotate clockwise as viewed from above, therefore the pump will try to move in the counter clockwise direction as the impeller rotates. "Bump the Motor" by closing the pump circuit breaker and push the pump start button and look for the direction of movement specified above.

For three phase motors, if the starting jerk is in the clockwise direction, open the circuit breaker to isolate power and interchange two of the three phase leads inside the control panel.

Wet Well Applications

If the above checks prove satisfactory the pump is ready for operation. Lower the pump into position. (Refer to Mechanical installation section of this manual.)

Open discharge valve, and verify that all check valves operate freely. It is very common for discharge check valves to be jammed shut (or open) after sitting for a period of time. Once all valves are open and free, start the pump and allow it to stabilize for several minutes prior to recording any test data.

Listen for any unusual noise and be on the lookout for unusual vibration. This is generally detectable on guide rails for AutoCoupling installations and on discharge piping for ring stand installations. Also for AutoCoupling installations, look for any blow by from the discharge connection.

Perform all remaining electrical, operational, and performance tests specified on start-up checklist. *Record and provide details on the checklist to validate warranty.*

Installation / Startup Troubleshooting:

Only authorized service personnel who are trained professionals shall troubleshoot and repair pumps that are experiencing operational or performance difficulties.

All HOMA pumps are factory tested, yet startup difficulties can occur with any mechanical equipment. Please note that our technical support staff stands ready to assist you with any problem or difficulty you might encounter with our equipment.

The following is a tabulation of common start-up problems and possible causes.

Symptom

Possible Causes

Pump will not start

1, 2, 3, 4, 27

Little or zero discharge

5, 6, 7, 8, 16

Insufficient discharge flow/pressure

5, 6, 9, 10, 11, 12, 26

Excessive power consumption

6, 9, 13

Excessive current draw

6, 13, 14, 15, 19

Excessive pump vibration/noise

12, 15, 16, 25, 26

Pumps runs & motor protection trips

17, 18, 19, 20, 21

Pumps runs manually, but not automatically

22, 23, 24

Pump runs hot

7, 19,

Listing of Possible Causes:

1. Incorrect or no power supplied to motor.
2. Power cable cut.
3. Short to ground in cable or motor winding.
4. Control panel circuit breaker open.
5. Actual system head is higher than calculated or specified.
6. Incorrect impeller rotation direction.
7. Sump liquid level is below pump's minimum submergence requirement.
8. Closed discharge valve or jammed check valve.
9. Wear ring (s) worn. (If Applicable).
10. Vortex at pump's suction.
11. Discharge valve partially closed.
12. Insufficient NPSHA (Dry Pit Application).
13. Actual system head is lower than specified resulting in over pumping condition.
14. Voltage supply to motor is lower than required by motor.
15. Damaged bearings
16. High system head causing pump to operate at extremely reduced capacity.
17. Object stuck inside impeller.
18. Motor not receiving proper voltage on all three phases.
19. Phase/currents unbalanced or too high.
20. Insulation between phases and earth ground, <1M-ohm.
21. Density of the pumping media too high.
22. Defective level sensor.
23. Hand/Off/Auto switch not in Auto Position.
24. Defective H/O/A switch, relay or contactor coil.
25. Air Captured in Cooling Jacket
26. Pump not properly seated on AutoCoupling
27. Water intrusion through junction box

**If you need additional help,
please call us at:
1 (800) 452 - HOMA**

PREVENTIVE MAINTENANCE

Regular preventive maintenance will help ensure longer pump life and more reliable operation. It is recommended that pumps in intermittent operation be inspected twice a year and pumps in continuous operation be inspected every 1,000 hours. The following is a listing of required inspection and maintenance items. (Refer to shop manual for disassembly and reassembly procedures).

If any of the problems described in the following list exists stop operating the pump to avoid damage or personal injury.

1. CABLE ENTRY

Make sure that the cable entry flange and strain relief clamp are tight. If the cable entry is showing signs of leakage remove cable from entry, remove grommet, cut a piece of cable off so that the grommet seats on a new portion of the cable, replace grommet, and reinstall cable assembly, into the top of the motor.

Note: Explosion Proof cables are sealed with a Factory Mutual Approved potting compound. Please consult factory for instruction.

2. CABLES

Inspect the cable for cuts, scrapes or sharp bends. If the outer jacket is damaged, replace the cable. Do not attempt splices within wetwells

3. MOTOR INSULATION RESISTANCE

Megger the insulation between the phases and between any phase and ground. Resistance values should be greater than 1 M ohm. If abnormal readings are obtained contact authorized service center immediately.

4. EXTERNAL PARTS ON PUMP

Make sure that all screws, bolts and nuts are tight. Check the condition of pump lifting eyes and replace if damaged or worn, Replace any external part that appears worn or damaged.

5. SEAL CHAMBER OIL

Check the condition of the oil to see if any water leakage has occurred. Remove the oil fill plug. Drain the oil from the seal chamber into a transparent container. Check for impurities and emulsification (Oil is cream-like.) If water intrusion has occurred check lower mechanical seal and replace if necessary. Refill seal chamber with fresh oil. Refer to shop manual for type and quantity of oil.

6. IMPELLER

Periodically inspect impeller by turning pump on its side, remove suction strainer nuts and strainer to expose impeller and inspect. Replace the impeller if it is damaged or severely worn.

SPARE PARTS

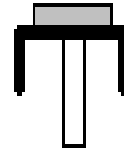
In order to obtain spare parts identify the required parts by looking at the enclosed cross sectional drawing and listing, and contact authorized HOMA PUMP TECHNOLOGY representative with the parts required and the pump serial number. Authentic Homa Pump Technology parts shall be used to maintain warranty.

Note: Explosion Proof pumps must be identified as such, and the pump serial number must be referenced for proper parts identification.

RECOMMENDED TOOLS AND SUPPLIES

In addition to ordinary, standard tools, ensure that complete set of metric socket wrenches, complete set of Allen wrenches, metric triangular wrench set, dead blow hammer, impeller puller, Loctite 242 (Blue), petroleum jelly and anti-seize compound are on hand.

CH Series CH Series (1.6 or 2.4 motors) 1 Phase Connection Diagram

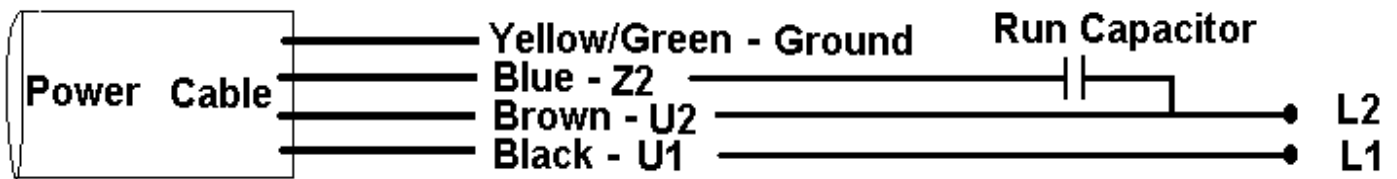


Note: CH Pumps (except XP) pumps have internally wired thermal switches. These pumps use 4 conductor cable.

Ground Lug - For auxiliary grounding to earth or grounding grid.

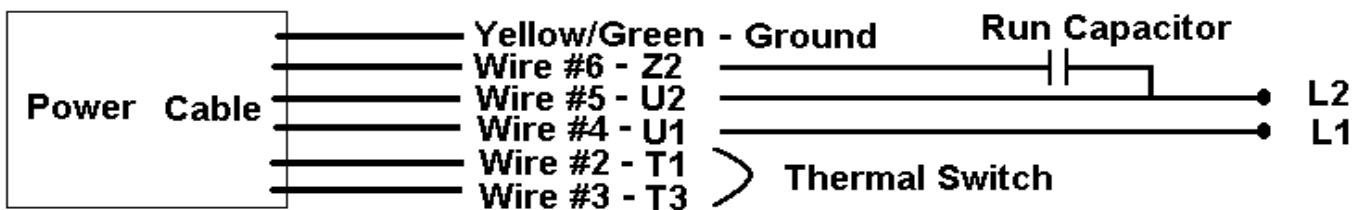
4 Conductor Cable

**See Chart for
Capacitor Sizing**



7 Conductor Cable

**See Chart for
Capacitor Sizing**

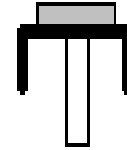


Capacitor Sizing Chart

Pump Model	Volts	Capacitor	Capacitor PN#	Pump Model	Volts	Capacitor	Capacitor PN#
CH 406	115V	80uf @ 370V	8856080	H 306	115V	80uf @ 370V	8856080
CH 406	230V	25uf @ 370V	8856025	H 306	230V	25uf @ 370V	8856025
CH 412	115V	80uf @ 370V	8856080	H 312	115V	80uf @ 370V	8856080
CH 412	230V	25uf @ 370V	8856020	H 312	230V	25uf @ 370V	8856020
CH 411	115V	60uf @ 370V	8856080				
CH 411	230V	20uf @ 370V	8856020				

Note: See Three Phase connection diagram for seal probe wiring.

CH Series 3 Phase Connection Diagram



Note: CH Series pumps(except XP) pumps that have internally wired thermal switches use 4 conductor cable.

Ground Lug - For auxiliary grounding to earth or grounding grid.

4 Conductor Cable

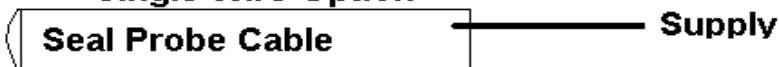


7 Conductor Cable



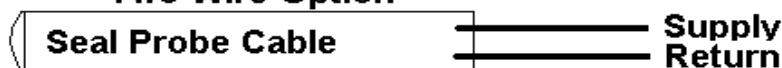
Seal Probe Connections

Single Wire Option



Circuit is completed though pump housing.
Use ground lead as return for 1 wire seal probe

Two Wire Option



START-UP REPORT

This report is designed to insure the customer that customer service and a quality product are the number one priority with Homa Pump Technology Inc. Please answer the following questions completely and as accurately as possible. Mail this form to:

**HOMA PUMP TECHNOLOGY INC.
390 BIRMINGHAM BOULEVARD
ANSONIA, CT 06401
ATTN: SERVICE MANAGER**

**Receipt of completed report will initiate operational warranty.
Reports that are not returned can delay or void warranty.**

- 1.) Pump User's Name: _____
Site Location: _____
Site Contract: _____
Unit Supplied By: _____

- 2.) Homa Pumps Model _____ Serial No. _____
Voltage _____ Phase _____ Hertz _____ Horsepower _____
Method Used to Check Rotation (viewed from bottom) _____
Does Impeller Turn Freely By Hand: YES _____ NO _____

- 3.) Condition of Equipment: EXCELLENT _____ GOOD _____ AVERAGE _____
Condition of Cable Jacket : EXCELLENT _____ GOOD _____ AVERAGE _____
Resistance of Cable and Pump Motor (measured at pump control)
U - V _____ Ohms V - W _____ Ohms U -W _____ Ohms
Resistance of Ground Circuit Between Control Panel and Outside of Pump _____ Ohms
MEG Ohm Check of Insulation:
U to Ground _____ V to Ground _____ W to Ground _____

- 4.) Condition of Equipment at Start-Up: Dry _____ Wet _____ Muddy _____
Was Equipment Stored: _____ Length of Storage _____
Describe Station Layout _____

- 5.) Liquid Level Controls: Model _____ Type _____
Is Control Installed Away From Turbulence? _____
Operation Check : (IF FLOAT SWITCHES SUPPLIED).
Tip lowest float (stop float), all pumps should remain off.
Tip second float (and stop float), one pump comes on
Tip third float (and stop float), both pumps on (alarm on simplex).
Tip fourth float (and stop float), high level alarm on (omit on simplex).

- 6.) Electrical Readings :
Single Phase:
Voltage Supply at Panel Line Connection, **Pump Off**, L1,L2 _____ L2-L3 _____ L3-L1 _____
Voltage Supply at Panel Line Connection, **Pump On**,L1,L2 _____ L2-L3 _____ L3-L1 _____
Amperage: Load Connection, **Pump On** ,L1 _____ L2 _____ L3 _____

Three Phase:
Voltage Supply at Panel Line Connection, **Pump Off**, L1-L2 _____ L2-L3 _____ L3- L1 _____
Voltage Supply at Panel Line Connection, **Pump On**, L1-L2 _____ L2-L3 _____ L-3-L1 _____
Amperage Load Connection, **Pump On**, L1 _____ L2 _____ L3 _____

7.) Final Check :
Is Pump Seated On Discharge Properly? _____ Check For Leaks? _____
Does Check Valves Operate Properly ? _____
Flow: Does Station Appear To Operate At Proper Rate _____
Vibration Level :Measured _____ Observed _____

COMMENTS: _____

8.) Equipment Difficulties During Start-Up: _____

9.) I Certify this Report to be accurate.
Authorized Homa Service Representative

(Signature)

DATE _____

Pump Station Owner/ Operator

(Signature)

DATE _____